

Bottom Ash Data

2021 Week 1

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on January 13, 2021. The data represents bottom ash composite results for week 1 of 2021 (December 27, 2020 to January 2, 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 : **VA21A0077**
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 : +1 604 253 4188
Date Samples Received : 05-Jan-2021 12:10
Date Analysis Commenced : 06-Jan-2021
Issue Date : 12-Jan-2021 09:43

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>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
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
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.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2101-A-1	BA2101-A-2	BA2101-A-3	BA2101-A-4	BA2101-A-5
(Matrix: Soil/Solid)					Client sampling date / time	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-001	VA21A0077-002	VA21A0077-003	VA21A0077-004	VA21A0077-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	20.1	28.1	27.6	23.7	18.2	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.6	10.5	10.4	10.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40200	39100	42300	40300	39200	
antimony	7440-36-0	E440	0.10	mg/kg	111	114	112	107	116	
arsenic	7440-38-2	E440	0.10	mg/kg	18.1	16.0	15.6	15.3	16.1	
barium	7440-39-3	E440	0.50	mg/kg	404	544	606	628	609	
beryllium	7440-41-7	E440	0.10	mg/kg	0.46	0.42	0.35	0.36	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	8.15	6.56	6.70	6.72	6.42	
boron	7440-42-8	E440	5.0	mg/kg	222	174	138	161	207	
cadmium	7440-43-9	E440	0.020	mg/kg	12.6	15.5	11.1	11.5	11.7	
calcium	7440-70-2	E440	50	mg/kg	128000	136000	130000	132000	133000	
chromium	7440-47-3	E440	0.50	mg/kg	130	133	162	137	116	
cobalt	7440-48-4	E440	0.10	mg/kg	73.6	34.2	68.0	84.8	32.1	
copper	7440-50-8	E440	0.50	mg/kg	2180	2750	1240	1740	2410	
iron	7439-89-6	E440	50	mg/kg	43600	49800	45100	35800	53200	
lead	7439-92-1	E440	0.50	mg/kg	420	333	449	796	354	
lithium	7439-93-2	E440	2.0	mg/kg	68.4	35.2	25.6	24.1	27.5	
magnesium	7439-95-4	E440	20	mg/kg	10200	12600	11900	11100	11200	
manganese	7439-96-5	E440	1.0	mg/kg	707	808	682	687	850	
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	12.6	20.6	20.6	19.9	15.3	
nickel	7440-02-0	E440	0.50	mg/kg	124	153	209	255	157	
phosphorus	7723-14-0	E440	50	mg/kg	11600	11300	11300	13300	10800	
potassium	7440-09-7	E440	100	mg/kg	4600	5910	5510	5570	5000	
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.33	0.40	0.36	0.34	
silver	7440-22-4	E440.Ag	0.10	mg/kg	5.35	----	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	4.03	2.94	7.25	6.54	
sodium	7440-23-5	E440	50	mg/kg	13800	17100	16600	16600	14900	
strontium	7440-24-6	E440	0.50	mg/kg	259	300	299	299	363	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2101-A-1	BA2101-A-2	BA2101-A-3	BA2101-A-4	BA2101-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-001	VA21A0077-002	VA21A0077-003	VA21A0077-004	VA21A0077-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	14200	12900	13100	12900	13300	
thallium	7440-28-0	E440	0.050	mg/kg	0.060	0.056	0.058	0.056	0.050	
tin	7440-31-5	E440	2.0	mg/kg	91.4	139	92.6	101	124	
titanium	7440-32-6	E440	1.0	mg/kg	350	523	416	304	342	
tungsten	7440-33-7	E440	0.50	mg/kg	11.3	6.61	3.74	4.32	8.37	
uranium	7440-61-1	E440	0.050	mg/kg	5.11	5.32	4.90	5.01	4.63	
vanadium	7440-62-2	E440	0.20	mg/kg	42.3	43.1	41.8	41.0	41.2	
zinc	7440-66-6	E440	2.0	mg/kg	5990	4020	5140	3070	4630	
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	2.0	2.6	3.0	2.5	
Speciated Metals										
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.10	mg/kg	0.17 ^{RRV}	----	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.3	11.3	11.4	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.17	8.46	8.66	8.40	8.38	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	6.29	6.53	6.41	6.48	6.48	
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	1.89	1.98	1.98	1.90	1.91	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.156	0.131	0.154	0.155	0.166	
calcium, TCLP	7440-70-2	E444	10	mg/L	2050	2120	2200	2230	2150	
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	0.614	1.36	0.590	0.566	0.716	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.768	0.721	0.883	0.772	1.26	
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	142	143	140	149	
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	0.45	0.33	0.35	0.33	0.36	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2101-A-1	BA2101-A-2	BA2101-A-3	BA2101-A-4	BA2101-A-5
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-001	VA21A0077-002	VA21A0077-003	VA21A0077-004	VA21A0077-005	
					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
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	32.1	17.3	35.6	31.6	24.1	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2101-A-6	BA2101-A-7	BA2101-A-8	BA2101-A-9	BA2101-A-10
(Matrix: Soil/Solid)					Client sampling date / time	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-006	VA21A0077-007	VA21A0077-008	VA21A0077-009	VA21A0077-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.8	22.7	25.7	22.2	27.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.4	10.6	10.6	10.5	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39700	39700	35600	42600	44400	
antimony	7440-36-0	E440	0.10	mg/kg	122	122	129	113	107	
arsenic	7440-38-2	E440	0.10	mg/kg	16.2	16.7	16.6	18.6	17.0	
barium	7440-39-3	E440	0.50	mg/kg	556	632	556	560	555	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.37	0.36	0.34	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	6.25	6.30	6.05	5.99	7.11	
boron	7440-42-8	E440	5.0	mg/kg	204	204	172	124	150	
cadmium	7440-43-9	E440	0.020	mg/kg	12.7	13.3	14.3	10.9	10.1	
calcium	7440-70-2	E440	50	mg/kg	128000	140000	133000	135000	126000	
chromium	7440-47-3	E440	0.50	mg/kg	134	128	120	131	173	
cobalt	7440-48-4	E440	0.10	mg/kg	25.2	30.3	60.6	42.3	34.7	
copper	7440-50-8	E440	0.50	mg/kg	1490	2060	5490	2810	1300	
iron	7439-89-6	E440	50	mg/kg	39100	37200	49400	48800	57400	
lead	7439-92-1	E440	0.50	mg/kg	362	381	323	555	331	
lithium	7439-93-2	E440	2.0	mg/kg	21.0	22.7	23.2	27.0	22.8	
magnesium	7439-95-4	E440	20	mg/kg	11100	12500	12500	12000	10900	
manganese	7439-96-5	E440	1.0	mg/kg	1110	691	645	819	694	
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	16.2	16.0	18.5	21.0	23.3	
nickel	7440-02-0	E440	0.50	mg/kg	97.6	116	134	146	122	
phosphorus	7723-14-0	E440	50	mg/kg	11700	11500	11700	10400	11900	
potassium	7440-09-7	E440	100	mg/kg	5150	5600	5520	5450	5290	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.48	0.41	0.51	0.33	
silver	7440-22-4	E440	0.10	mg/kg	3.77	5.44	4.32	7.64	2.93	
sodium	7440-23-5	E440	50	mg/kg	15000	16600	16000	16000	15800	
strontium	7440-24-6	E440	0.50	mg/kg	278	509	380	292	294	
sulfur	7704-34-9	E440	1000	mg/kg	13000	14200	13100	12600	11900	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.057	<0.050	0.062	0.056	



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2101-A-6	BA2101-A-7	BA2101-A-8	BA2101-A-9	BA2101-A-10
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-006	VA21A0077-007	VA21A0077-008	VA21A0077-009	VA21A0077-010
					Result	Result	Result	Result	Result
Metals									
tin	7440-31-5	E440	2.0	mg/kg	109	134	234	91.1	111
titanium	7440-32-6	E440	1.0	mg/kg	367	454	495	537	393
tungsten	7440-33-7	E440	0.50	mg/kg	7.27	18.4	9.00	6.97	4.12
uranium	7440-61-1	E440	0.050	mg/kg	5.33	5.04	5.04	4.58	4.84
vanadium	7440-62-2	E440	0.20	mg/kg	42.7	43.9	40.8	41.7	40.9
zinc	7440-66-6	E440	2.0	mg/kg	8650	4190	3470	6370	3700
zirconium	7440-67-7	E440	1.0	mg/kg	2.9	2.9	2.0	2.5	2.8
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.3	11.3	11.5
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.53	8.32	8.80	8.52	9.01
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444	0.010	pH units	6.47	6.40	6.34	6.45	6.59
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	1.91	1.83	1.81	1.94	2.06
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.187	0.278	0.187	0.155	0.127
calcium, TCLP	7440-70-2	E444	10	mg/L	2200	2080	2070	2150	2140
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	0.910	0.687	0.927	0.748	0.694
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.742	0.870	0.692	1.25	0.716
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	143	137	131	134	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	0.45	0.38	0.49	0.45	0.35
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
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2101-A-6	BA2101-A-7	BA2101-A-8	BA2101-A-9	BA2101-A-10
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00	30-Dec-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-006	VA21A0077-007	VA21A0077-008	VA21A0077-009	VA21A0077-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
zinc, TCLP	7440-66-6	E444	0.50	mg/L	42.9	29.7	45.6	29.5	24.5	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2101-A-11	BA2101-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	30-Dec-2020 09:00	30-Dec-2020 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-011	VA21A0077-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	19.8	21.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	32100	38200	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	133	225	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	18.1	16.2	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	461	574	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.36	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	14.1	6.63	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	170	182	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	14.9	11.5	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	131000	140000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	132	200	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	194	62.6	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2510	3430	----	----	----	
iron	7439-89-6	E440	50	mg/kg	43800	54400	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	847	1090	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	54.0	39.1	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12300	11600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	859	688	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	21.1	25.0	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	185	343	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11300	11500	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5170	5480	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.41	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	7.01	5.37	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	15500	16600	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	305	343	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	13700	13100	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.059	0.053	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2101-A-11	BA2101-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-011	VA21A0077-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	326	141	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	259	379	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	9.12	6.81	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.14	4.82	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	47.0	42.3	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	5670	3730	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.3	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.94	8.78	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.46	6.35	----	----	----	
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	1.83	1.77	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.176	0.187	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2130	2110	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.988	0.987	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.848	0.971	----	----	----	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	
lead, TCLP	7439-92-1	E444	0.25	mg/L	0.27	0.28	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	142	143	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.33	0.38	----	----	----	
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	----	----	----	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2101-A-11	BA2101-A-12	----	----	----
Client sampling date / time					30-Dec-2020 09:00	30-Dec-2020 09:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA21A0077-011	VA21A0077-012	-----	-----	-----	
TCLP Metals					Result	Result	---	---	---	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	36.2	28.9	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21A0077	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	: +1 604 253 4188
Project	: Weekly Bottom Ash-Suite	Date Samples Received	: 05-Jan-2021 12:10
PO	: VANCO 0000050390	Issue Date	: 12-Jan-2021 09:43
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.

RIGHT SOLUTIONS | RIGHT PARTNER



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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 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 BA2101-A-1	E440.Ag	30-Dec-2020	08-Jan-2021	180 days	9 days	✓	08-Jan-2021	170 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-1	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-10	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-11	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-12	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-2	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-3	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✓	07-Jan-2021	20 days	0 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 BA2101-A-4	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-5	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-6	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-7	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-8	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2101-A-9	E510	30-Dec-2020	07-Jan-2021	28 days	7 days	✔	07-Jan-2021	20 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2101-A-1	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2101-A-10	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2101-A-11	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 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 BA2101-A-12	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-2	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-3	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-4	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-5	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-6	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-7	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-8	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2101-A-9	E440	30-Dec-2020	07-Jan-2021	180 days	7 days	✔	07-Jan-2021	172 days	0 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 BA2101-A-1	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-10	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-11	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-12	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-2	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-3	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-4	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-5	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2101-A-6	E144	30-Dec-2020	----	----	----		06-Jan-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 BA2101-A-7	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2101-A-8	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2101-A-9	E144	30-Dec-2020	----	----	----		06-Jan-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-1	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-10	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-11	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-12	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-2	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-3	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 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 BA2101-A-4	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-5	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-6	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-7	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-8	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2101-A-9	E108	30-Dec-2020	07-Jan-2021	30 days	7 days	✔	07-Jan-2021	22 days	0 days	✔	
Speciated Metals : Hexavalent Chromium (Cr VI) by IC											
Glass soil jar/Teflon lined cap BA2101-A-1	E532	30-Dec-2020	10-Jan-2021	30 days	11 days	✔	11-Jan-2021	7 days	1 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-1	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-10	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 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) BA2101-A-11	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-12	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-2	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-3	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-4	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-5	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-6	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-7	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2101-A-8	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 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) BA2101-A-9	E512	06-Jan-2021	----	----	----		09-Jan-2021	35 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-1	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-10	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-11	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-12	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-2	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-3	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-4	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2101-A-5	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 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) BA2101-A-6	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2101-A-7	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2101-A-8	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2101-A-9	E444	06-Jan-2021	----	----	----		09-Jan-2021	187 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-1	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-10	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-11	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-12	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-2	EPP444	30-Dec-2020	06-Jan-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) BA2101-A-3	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-4	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-5	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-6	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-7	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-8	EPP444	30-Dec-2020	06-Jan-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2101-A-9	EPP444	30-Dec-2020	06-Jan-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)							
Hexavalent Chromium (Cr VI) by IC	E532	139398	1	6	16.6	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	138135	1	14	7.1	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	138136	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	138138	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	138137	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
Hexavalent Chromium (Cr VI) by IC	E532	139398	2	6	33.3	10.0	✔
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	138855	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	138135	2	14	14.2	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	138136	2	15	13.3	10.0	✔
Moisture Content by Gravimetry	E144	138138	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	138137	1	15	6.6	5.0	✔
Method Blanks (MB)							
Hexavalent Chromium (Cr VI) by IC	E532	139398	1	6	16.6	5.0	✔
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	138855	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	139015	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	138135	1	14	7.1	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	139016	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	138136	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	138138	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	139015	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	139016	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.
Hexavalent Chromium (Cr VI) by IC	E532 Edmonton - Environmental	Soil/Solid	APHA 3500-CR C	Instrumental analysis is performed by ion chromatography with UV detection.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions



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.
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.
Preparation of Hexavalent Chromium (Cr VI) for IC	EP532 Edmonton - Environmental	Soil/Solid	EPA 3060A	Field moist samples are digested with a sodium hydroxide/sodium carbonate solution as described in EPA 3060A.
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 : **VA21A0077**

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 : +1 604 253 4188
Date Samples Received : 05-Jan-2021 12:10
Date Analysis Commenced : 06-Jan-2021
Issue Date : 12-Jan-2021 09:43

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
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

Page : 2 of 11
Work Order : VA21A0077
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: 138137)											
VA20C2569-012	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	6.74	6.76	0.296%	5%	----
Physical Tests (QC Lot: 138138)											
VA21A0077-001	BA2101-A-1	moisture	----	E144	0.25	%	20.1	19.6	2.42%	20%	----
Metals (QC Lot: 138135)											
VA20C2569-012	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 138136)											
VA20C2569-012	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	24100	24800	2.80%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.35	0.36	0.01	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.67	5.66	0.153%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	108	127	16.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.35	0.01	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.107	0.098	0.009	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	4970	5640	12.6%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	32.7	32.0	1.99%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	10.3	11.5	11.0%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	50.4	45.8	9.46%	30%	----
		iron	7439-89-6	E440	50	mg/kg	27400	27200	0.674%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	6.24	5.72	8.74%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	10.8	10.5	0.3	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	7290	7160	1.74%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	522	590	12.3%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.53	0.57	6.78%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	28.6	28.8	0.540%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	632	601	5.06%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	980	1080	9.84%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.22	<0.20	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	282	315	11.1%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	37.7	41.5	9.62%	40%	----



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: 138136) - continued											
VA20C2569-012	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.074	0.082	0.008	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1220	1300	6.11%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	0.52	0.02	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.533	0.516	3.14%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	63.5	65.2	2.61%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	58.3	56.7	2.80%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	3.6	4.1	0.5	Diff <2x LOR	----
Speciated Metals (QC Lot: 139398)											
VA21A0077-001	BA2101-A-1	chromium, hexavalent [Cr VI]	18540-29-9	E532	0.10	mg/kg	0.17	0.13	0.04	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
Physical Tests (QCLot: 138138)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 138135)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 138136)						
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: 138136) - 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: 138855)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
Speciated Metals (QCLot: 139398)						
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 139015)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 139016)						
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	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----



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: 138137)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 138138)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Metals (QCLot: 138135)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 138136)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.4	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	99.7	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	97.4	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	98.7	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.1	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	99.2	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.4	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	102	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	104	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	99.3	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.8	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	106	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	96.9	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	95.3	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	104	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	96.3	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 138136) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	96.4	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	100.0	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Metals (QCLot: 138855)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	97.9	80.0	120	----
Speciated Metals (QCLot: 139398)									
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.1	mg/kg	16 mg/kg	91.8	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: 139015)										
VA21A0077-001	BA2101-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	99.5	50.0	140	----
TCLP Metals (QCLot: 139016)										
VA21A0077-001	BA2101-A-1	antimony, TCLP	7440-36-0	E444	5.0 mg/L	5 mg/L	100.0	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	94.4	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.2 mg/L	12.5 mg/L	106	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.232 mg/L	0.25 mg/L	92.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.98 mg/L	10 mg/L	99.8	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.241 mg/L	0.25 mg/L	96.5	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	1.17 mg/L	1.25 mg/L	93.6	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	2.27 mg/L	2.5 mg/L	90.7	50.0	140	----
		iron, TCLP	7439-89-6	E444	231 mg/L	250 mg/L	92.5	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.06 mg/L	10 mg/L	90.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	240 mg/L	250 mg/L	96.2	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.35 mg/L	2.5 mg/L	94.1	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.89 mg/L	5 mg/L	97.9	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	4.5 mg/L	5 mg/L	90.7	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	96.5	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	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: 138135)									
QC-138135-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	98.9	70.0	130	----
Metals (QCLot: 138136)									
QC-138136-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
QC-138136-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	95.7	70.0	130	----
QC-138136-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
QC-138136-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	108	70.0	130	----
QC-138136-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
QC-138136-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
QC-138136-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	101	70.0	130	----
QC-138136-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
QC-138136-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	109	70.0	130	----
QC-138136-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	102	70.0	130	----
QC-138136-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	100	70.0	130	----
QC-138136-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
QC-138136-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.2	70.0	130	----
QC-138136-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
QC-138136-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	108	70.0	130	----
QC-138136-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	104	70.0	130	----
QC-138136-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	109	70.0	130	----
QC-138136-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-138136-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	96.8	70.0	130	----
QC-138136-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	115	70.0	130	----
QC-138136-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	108	70.0	130	----
QC-138136-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----
QC-138136-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.0	40.0	160	----
QC-138136-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	96.1	70.0	130	----
QC-138136-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
QC-138136-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	107	70.0	130	----
QC-138136-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	105	70.0	130	----

Page : 11 of 11
 Work Order : VA21A0077
 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: 138136) - continued									
QC-138136-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-138136-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	105	70.0	130	----
Speciated Metals (QCLot: 139398)									
QC-139398-003	RM	chromium, hexavalent [Cr VI]	18540-29-9	E532	220 mg/kg	102	80.0	120	----



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		Email 1: smckinney@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Burnaby BC		Email 2: rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Phone: 604-521-1025		Email 3: dskrypnik@covanta.com		Analysis Request	
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No		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 #:			
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:			MET-TCLP-VA (al metals, Hg)		MOISTURE	Chrome 6	MET-CSR+FULL-VA (al metals)		Number of Containers
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type								
1	BA2101-A-1	30-Dec-20	9:00	Soil		X	X		X			1
2	BA2101-A-2	30-Dec-20	9:00	Soil		X	X		X			1
3	BA2101-A-3	30-Dec-20	9:00	Soil		X	X		X			1
4	BA2101-A-4	30-Dec-20	9:00	Soil		X	X		X			1
5	BA2101-A-5	30-Dec-20	9:00	Soil		X	X		X			1
6	BA2101-A-6	30-Dec-20	9:00	Soil		X	X		X			1
7	BA2101-A-7	30-Dec-20	9:00	Soil		X	X		X			1
8	BA2101-A-8	30-Dec-20	9:00	Soil		X	X		X			1
9	BA2101-A-9	30-Dec-20	9:00	Soil		X	X		X			1
10	BA2101-A-10	30-Dec-20	9:00	Soil		X	X		X			1
11	BA2101-A-11	30-Dec-20	9:00	Soil		X	X		X			1
12	BA2101-A-12	30-Dec-20	9:00	Soil		X	X		X			1

Environmental Division
 Vancouver
 Work Order Reference
VA21A0077

Telephone : +1 604 253 4188

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)			Observations: Yes / No ? <input type="checkbox"/> Yes add SIF
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	
<i>[Signature]</i>	5-Jan-21	0800				17.4 °C	<i>[Signature]</i>	Jan 5/21	12:10pm

15.9 °C note