

Bottom Ash Data

2021 Week 22

The following analytical report represents bottom ash composite results for week 22 of 2021 (May 23, 2021 to May 29, 2021).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.



CERTIFICATE OF ANALYSIS

Work Order : **VA21B0760**
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 : 01-Jun-2021 15:20
Date Analysis Commenced : 04-Jun-2021
Issue Date : 11-Jun-2021 11:35

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
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, 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
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

Sub-Matrix: Soil					Client sample ID	BA2122-A-1	BA2122-A-2	BA2122-A-3	BA2122-A-4	BA2122-A-5
(Matrix: Soil/Solid)					Client sampling date / time	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-001	VA21B0760-002	VA21B0760-003	VA21B0760-004	VA21B0760-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.6	20.0	17.1	17.5	19.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	11.0	11.1	11.1	11.1	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	29400	35400	37600	33900	33000	
antimony	7440-36-0	E440	0.10	mg/kg	123	109	108	111	107	
arsenic	7440-38-2	E440	0.10	mg/kg	31.5	28.3	31.5	31.4	28.7	
barium	7440-39-3	E440	0.50	mg/kg	371	503	536	385	628	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.35	0.38	0.40	0.39	
bismuth	7440-69-9	E440	0.20	mg/kg	13.6	7.03	8.84	8.24	8.33	
boron	7440-42-8	E440	5.0	mg/kg	163	150	171	203	237	
cadmium	7440-43-9	E440	0.020	mg/kg	14.4	11.0	12.1	18.8	12.0	
calcium	7440-70-2	E440	50	mg/kg	120000	118000	126000	125000	134000	
chromium	7440-47-3	E440	0.50	mg/kg	137	130	154	155	199	
cobalt	7440-48-4	E440	0.10	mg/kg	36.0	79.4	51.4	210	55.9	
copper	7440-50-8	E440	0.50	mg/kg	2310	2840	2860	3460	2700	
iron	7439-89-6	E440	50	mg/kg	62700	58100	62400	50600	64100	
lead	7439-92-1	E440	0.50	mg/kg	399	771	631	590	472	
lithium	7439-93-2	E440	2.0	mg/kg	25.0	31.0	28.3	27.1	31.2	
magnesium	7439-95-4	E440	20	mg/kg	10900	10700	11200	11100	11500	
manganese	7439-96-5	E440	1.0	mg/kg	831	801	921	720	1000	
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	25.0	20.4	25.4	608	35.4	
nickel	7440-02-0	E440	0.50	mg/kg	273	268	180	170	184	
phosphorus	7723-14-0	E440	50	mg/kg	9200	8060	9000	10300	11800	
potassium	7440-09-7	E440	100	mg/kg	4960	5270	5290	4930	5320	
selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.32	0.32	0.27	0.34	
silver	7440-22-4	E440	0.10	mg/kg	6.37	5.68	5.17	5.55	6.80	
sodium	7440-23-5	E440	50	mg/kg	15300	15900	16500	15300	16300	
strontium	7440-24-6	E440	0.50	mg/kg	287	268	279	294	293	
sulfur	7704-34-9	E440	1000	mg/kg	14800	13600	15200	12600	14700	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2122-A-1	BA2122-A-2	BA2122-A-3	BA2122-A-4	BA2122-A-5
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-001	VA21B0760-002	VA21B0760-003	VA21B0760-004	VA21B0760-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.072	0.059	0.055	0.063	0.057	
tin	7440-31-5	E440	2.0	mg/kg	1920	101	101	113	110	
titanium	7440-32-6	E440	1.0	mg/kg	244	700	763	190	459	
tungsten	7440-33-7	E440	0.50	mg/kg	15.3	11.2	13.2	11.2	10.8	
uranium	7440-61-1	E440	0.050	mg/kg	5.53	5.34	5.06	6.05	5.25	
vanadium	7440-62-2	E440	0.20	mg/kg	47.8	45.9	49.6	49.2	57.7	
zinc	7440-66-6	E440	2.0	mg/kg	9290	4010	4080	4520	3840	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.2	1.1	1.1	1.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.7	11.8	11.7	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.16	9.13	9.71	9.27	9.32	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	2.83	2.83	2.83	
pH, TCLP final	----	EPP444	0.010	pH units	6.11	6.17	6.12	6.03	6.28	
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	2.16	2.12	2.07	2.07	2.10	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.349	0.225	0.200	0.204	0.682	
calcium, TCLP	7440-70-2	E444	10	mg/L	2170	2080	1980	1930	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	0.871	1.39	2.05	0.595	1.36	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.592	0.641	0.416	0.630	0.917	
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	155	142	140	147	135	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.64	0.70	0.57	0.70	0.58	
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	BA2122-A-1	BA2122-A-2	BA2122-A-3	BA2122-A-4	BA2122-A-5
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-001	VA21B0760-002	VA21B0760-003	VA21B0760-004	VA21B0760-005	
					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	47.3	88.4	42.7	47.3	37.2	37.2
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	BA2122-A-6	BA2122-A-7	BA2122-A-8	BA2122-A-9	BA2122-A-10
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-006	VA21B0760-007	VA21B0760-008	VA21B0760-009	VA21B0760-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.9	19.2	19.7	20.7	17.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	10.8	10.9	11.2	11.0	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39200	30200	32400	30400	31300	
antimony	7440-36-0	E440	0.10	mg/kg	117	121	125	120	114	
arsenic	7440-38-2	E440	0.10	mg/kg	31.0	32.9	28.4	25.6	32.9	
barium	7440-39-3	E440	0.50	mg/kg	579	462	548	420	528	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.36	0.38	0.39	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	6.61	10.4	7.30	7.42	12.0	
boron	7440-42-8	E440	5.0	mg/kg	193	190	225	174	211	
cadmium	7440-43-9	E440	0.020	mg/kg	12.0	15.0	11.4	11.4	13.2	
calcium	7440-70-2	E440	50	mg/kg	134000	126000	124000	123000	134000	
chromium	7440-47-3	E440	0.50	mg/kg	207	167	142	141	190	
cobalt	7440-48-4	E440	0.10	mg/kg	33.8	111	37.0	65.2	34.4	
copper	7440-50-8	E440	0.50	mg/kg	6610	4520	6020	6560	1220	
iron	7439-89-6	E440	50	mg/kg	63600	59100	66300	70400	54700	
lead	7439-92-1	E440	0.50	mg/kg	430	379	4670	1620	522	
lithium	7439-93-2	E440	2.0	mg/kg	28.1	27.6	62.2	31.8	28.6	
magnesium	7439-95-4	E440	20	mg/kg	12400	12400	10900	10600	10600	
manganese	7439-96-5	E440	1.0	mg/kg	1130	816	775	816	777	
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	22.0	23.4	21.1	24.1	25.9	
nickel	7440-02-0	E440	0.50	mg/kg	124	168	186	160	150	
phosphorus	7723-14-0	E440	50	mg/kg	9190	10200	8920	7820	9750	
potassium	7440-09-7	E440	100	mg/kg	5280	5490	4900	5000	5320	
selenium	7782-49-2	E440	0.20	mg/kg	0.26	0.36	0.23	0.28	0.28	
silver	7440-22-4	E440	0.10	mg/kg	7.40	19.4	6.78	5.18	5.03	
sodium	7440-23-5	E440	50	mg/kg	17200	16600	14800	15700	16600	
strontium	7440-24-6	E440	0.50	mg/kg	286	280	284	287	302	
sulfur	7704-34-9	E440	1000	mg/kg	14000	15400	13500	13700	14000	
thallium	7440-28-0	E440	0.050	mg/kg	0.059	0.061	0.058	0.060	0.062	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2122-A-6	BA2122-A-7	BA2122-A-8	BA2122-A-9	BA2122-A-10
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-006	VA21B0760-007	VA21B0760-008	VA21B0760-009	VA21B0760-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	108	129	133	94.5	116	
titanium	7440-32-6	E440	1.0	mg/kg	696	409	621	308	490	
tungsten	7440-33-7	E440	0.50	mg/kg	19.0	15.6	13.5	13.0	13.6	
uranium	7440-61-1	E440	0.050	mg/kg	5.21	5.58	5.18	4.78	5.37	
vanadium	7440-62-2	E440	0.20	mg/kg	47.3	51.0	47.4	44.1	48.6	
zinc	7440-66-6	E440	2.0	mg/kg	4130	4490	5560	3340	4120	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.2	1.0	1.5	1.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.7	11.7	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.64	9.95	9.83	9.64	9.40	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	2.83	2.83	2.83	
pH, TCLP final	----	EPP444	0.010	pH units	6.10	6.06	6.21	6.24	6.08	
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	2.10	2.00	2.05	4.61	2.06	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.242	0.700	0.202	0.197	0.189	
calcium, TCLP	7440-70-2	E444	10	mg/L	2110	1900	2010	1960	1960	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.67	0.680	0.928	0.704	1.31	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.227	0.925	0.596	0.584	0.802	
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	0.26	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	148	138	137	138	135	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.66	1.12	0.71	0.61	0.63	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2122-A-6	BA2122-A-7	BA2122-A-8	BA2122-A-9	BA2122-A-10
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00	26-May-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-006	VA21B0760-007	VA21B0760-008	VA21B0760-009	VA21B0760-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	36.2	63.6	42.0	34.4	48.0	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2122-A-11	BA2122-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	26-May-2021 09:00	26-May-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-011	VA21B0760-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	19.0	17.5	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.0	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	30000	30500	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	110	119	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	28.2	30.5	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	522	575	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.39	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	8.63	8.32	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	188	256	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	13.2	12.8	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	118000	133000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	244	158	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	338	32.3	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1700	1850	----	----	----	
iron	7439-89-6	E440	50	mg/kg	53300	57100	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	422	369	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	60.3	33.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11400	11400	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	936	908	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	19.4	33.2	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	131	140	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	8100	9620	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5320	5290	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.31	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	19.6	9.00	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	16100	16200	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	283	311	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	14300	14500	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.065	0.063	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2122-A-11	BA2122-A-12	----	----	----
Client sampling date / time					26-May-2021 09:00	26-May-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-011	VA21B0760-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	95.8	179	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	402	389	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	10.8	15.4	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.42	5.74	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	47.3	47.5	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	4220	3710	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.6	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.88	9.73	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.09	6.23	----	----	----	
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	1.92	2.11	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.191	0.277	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	1910	2050	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.71	1.17	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.531	0.695	----	----	----	
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	145	148	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	1.23	0.71	----	----	----	
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	BA2122-A-11	BA2122-A-12	----	----	----
					Client sampling date / time	26-May-2021 09:00	26-May-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B0760-011	VA21B0760-012	-----	-----	-----	
					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	42.2	35.4	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21B0760	Page	: 1 of 15
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 01-Jun-2021 15:20
PO	: VANCO 0000050390	Issue Date	: 11-Jun-2021 11:35
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 Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	cobalt	7440-48-4	E440	48.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-2131530 02	----	boron	7440-42-8	E440	76.2 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG2-2131530 02	----	phosphorus	7723-14-0	E440	76.5 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG2-2131530 02	----	tungsten	7440-33-7	E440	72.8 % MES	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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 : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-1	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-10	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-11	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-12	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-2	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-3	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-4	E510	26-May-2021	07-Jun-2021	----	13 days	✓	08-Jun-2021	28 days	1 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-5	E510	26-May-2021	07-Jun-2021	----	13 days	✔	08-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-6	E510	26-May-2021	07-Jun-2021	----	13 days	✔	08-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-7	E510	26-May-2021	07-Jun-2021	----	13 days	✔	08-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-8	E510	26-May-2021	07-Jun-2021	----	13 days	✔	08-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2122-A-9	E510	26-May-2021	07-Jun-2021	----	13 days	✔	08-Jun-2021	28 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2122-A-1	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2122-A-10	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2122-A-11	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2122-A-12	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-2	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-3	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-4	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-5	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-6	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-7	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-8	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Metals : Metals in Soil/Solid by CRC ICPCS										
LDPE bag BA2122-A-9	E440	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	180 days	1 days	✔
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-1	E144	26-May-2021	----	----	----		04-Jun-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 BA2122-A-10	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-11	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-12	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-2	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-3	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-4	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-5	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-6	E144	26-May-2021	----	----	----		07-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2122-A-7	E144	26-May-2021	----	----	----		07-Jun-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 BA2122-A-8	E144	26-May-2021	----	----	----		07-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2122-A-9	E144	26-May-2021	----	----	----		07-Jun-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-1	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-10	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-11	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-12	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-2	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-3	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-4	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-5	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-6	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-7	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-8	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2122-A-9	E108	26-May-2021	07-Jun-2021	----	13 days	✔	07-Jun-2021	30 days	1 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2122-A-1	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2122-A-10	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2122-A-11	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2122-A-12	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 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) BA2122-A-2	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-3	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-4	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-5	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-6	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-7	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-8	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2122-A-9	E512	04-Jun-2021	----	----	----		06-Jun-2021	28 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2122-A-1	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 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) BA2122-A-10	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-11	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-12	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-2	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-3	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-4	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-5	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-6	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2122-A-7	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 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) BA2122-A-8	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2122-A-9	E444	04-Jun-2021	----	----	----		06-Jun-2021	180 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-1	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-10	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-11	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-12	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-2	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-3	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-4	EPP444	26-May-2021	04-Jun-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) BA2122-A-5	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-6	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-7	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-8	EPP444	26-May-2021	04-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2122-A-9	EPP444	26-May-2021	04-Jun-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	213154	1	17	5.8	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	213153	1	17	5.8	5.0	✔
Moisture Content by Gravimetry	E144	215395	2	32	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	213155	1	17	5.8	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	213154	2	17	11.7	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	213153	2	17	11.7	10.0	✔
Moisture Content by Gravimetry	E144	215395	2	32	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	213155	1	17	5.8	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	214186	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	213154	1	17	5.8	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	214185	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	213153	1	17	5.8	5.0	✔
Moisture Content by Gravimetry	E144	215395	2	32	6.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	214186	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	214185	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 $20 \pm 5^\circ\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^\circ\text{C}$) 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.
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 $<60^\circ\text{C}$) 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.

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Work Order : VA21B0760
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 : **VA21B0760**

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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 : 01-Jun-2021 15:20
 Date Analysis Commenced : 04-Jun-2021
 Issue Date : 11-Jun-2021 11:42

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
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

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Work Order : VA21B0760
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: 213155)											
VA21B0640-051	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.98	6.03	0.8%	5%	----
Physical Tests (QC Lot: 213156)											
VA21B0640-033	Anonymous	moisture	----	E144	0.25	%	9.35	9.31	0.455%	20%	----
Physical Tests (QC Lot: 215395)											
VA21B0760-002	BA2122-A-2	moisture	----	E144	0.25	%	20.0	19.5	2.39%	20%	----
Metals (QC Lot: 213153)											
VA21B0640-051	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	15400	15400	0.470%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.16	0.15	0.01	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	1.60	1.70	5.96%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	44.5	45.1	1.22%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.15	0.14	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	0.422	0.410	2.81%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	8040	7280	9.90%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	21.2	20.4	4.18%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	13.4	8.18	48.4%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	31.8	32.8	3.28%	30%	----
		iron	7439-89-6	E440	50	mg/kg	19400	18200	6.55%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	2.34	2.43	0.09	Diff <2x LOR	----
		lithium	7439-93-2	E440	2.0	mg/kg	7.1	6.3	0.8	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	8260	7790	5.80%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	309	300	2.89%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.56	0.50	10.6%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	12.5	11.9	5.33%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	405	467	14.2%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	640	590	7.60%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	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	440	444	0.866%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	53.1	47.4	11.4%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 213153) - continued											
VA21B0640-051	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	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	746	754	0.983%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.223	0.208	0.015	Diff <2x LOR	----
		vanadium	7440-62-2	E440	0.20	mg/kg	51.6	49.6	3.94%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	66.1	66.5	0.629%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.0	<1.0	0.01	Diff <2x LOR	----
Metals (QC Lot: 213154)											
VA21B0640-051	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 213156)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 215395)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 213153)						
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: 213153) - 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: 213154)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 214185)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 214186)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 213155)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 213156)									
moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Physical Tests (QCLot: 215395)									
moisture	---	E144	0.25	%	50 %	99.1	90.0	110	---
Metals (QCLot: 213153)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	84.4	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	82.8	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	97.3	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	93.3	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	92.7	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	# 76.2	80.0	120	MES
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.7	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	93.6	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	95.0	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	97.5	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	93.0	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.7	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	95.2	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	107	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	95.9	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	80.9	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	94.8	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	# 76.5	80.0	120	MES
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	95.4	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	85.0	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	95.2	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	94.4	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	88.8	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	93.0	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: 213153) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	83.0	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	84.0	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	# 72.8	80.0	120	MES
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	91.8	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	96.8	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	91.3	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	85.5	80.0	120	----
Metals (QCLot: 213154)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	82.8	80.0	120	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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 $\geq 1 \times$ 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: 214185)										
VA21B0760-001	BA2122-A-1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	95.6	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.9 mg/L	12.5 mg/L	95.0	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.258 mg/L	0.25 mg/L	103	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.28 mg/L	10 mg/L	92.8	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	1.20 mg/L	1.25 mg/L	95.8	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	2.22 mg/L	2.5 mg/L	88.6	50.0	140	----
		iron, TCLP	7439-89-6	E444	239 mg/L	250 mg/L	95.5	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.0 mg/L	10 mg/L	100	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	237 mg/L	250 mg/L	94.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.32 mg/L	2.5 mg/L	92.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.17 mg/L	5 mg/L	103	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.115 mg/L	0.1 mg/L	115	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	98.1	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.96 mg/L	5 mg/L	99.3	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.74 mg/L	0.75 mg/L	99.4	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	10 mg/L	10 mg/L	100	50.0	150	----
TCLP Metals (QCLot: 214186)										
VA21B0760-001	BA2122-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	88.3	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: 213153)									
QC-213153-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	105	70.0	130	----
QC-213153-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	103	70.0	130	----
QC-213153-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	120	70.0	130	----
QC-213153-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-213153-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	102	70.0	130	----
QC-213153-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	116	40.0	160	----
QC-213153-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	95.7	70.0	130	----
QC-213153-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
QC-213153-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	107	70.0	130	----
QC-213153-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
QC-213153-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.8	70.0	130	----
QC-213153-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-213153-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.5	70.0	130	----
QC-213153-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	120	70.0	130	----
QC-213153-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	110	70.0	130	----
QC-213153-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
QC-213153-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	99.7	70.0	130	----
QC-213153-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	99.9	70.0	130	----
QC-213153-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	85.6	70.0	130	----
QC-213153-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	105	70.0	130	----
QC-213153-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----
QC-213153-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	98.8	70.0	130	----
QC-213153-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	90.2	40.0	160	----
QC-213153-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	97.0	70.0	130	----
QC-213153-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	114	70.0	130	----
QC-213153-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	102	70.0	130	----
QC-213153-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	103	70.0	130	----
QC-213153-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	94.5	70.0	130	----
QC-213153-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	99.8	70.0	130	----

Page : 11 of 11
 Work Order : VA21B0760
 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: 213154)									
QC-213154-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	105	70.0	130	----



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COC # _____

Page ____ of ____

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="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 #:			<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:									Number of Containers
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type								
BA2122-A-1	<div style="text-align: center;"> <p>Environmental Division Vancouver Work Order Reference VA21B0760</p>  <p>Telephone : +1 604 263 4188</p> </div>	26-May-21	9:00	Soil	X	X			X			
BA2122-A-2		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-3		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-4		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-5		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-6		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-7		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-8		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-9		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-10		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-11		26-May-21	9:00	Soil	X	X			X			1
BA2122-A-12		26-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)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	1-May-21	0800	<i>[Signature]</i>	6/11	300	22°C				Yes / No ? If Yes add SIF