

Bottom Ash Data

2021 Week 43

The following analytical report represents bottom ash composite results for week 43 of 2021 (October 17, 2021 to October 23, 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 : **VA21C3740**
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 : 26-Oct-2021 11:55
Date Analysis Commenced : 31-Oct-2021
Issue Date : 05-Nov-2021 13:01

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 Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	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	BA2143A-1	BA2143-A-2	BA2143-A-3	BA2143-A-4	BA2143-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-001	VA21C3740-002	VA21C3740-003	VA21C3740-004	VA21C3740-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	25.2	22.5	24.9	26.1	26.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.1	10.3	10.1	10.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	36400	35500	36400	40000	48500	
antimony	7440-36-0	E440	0.10	mg/kg	118	123	169	122	138	
arsenic	7440-38-2	E440	0.10	mg/kg	24.1	18.9	20.6	21.6	28.3	
barium	7440-39-3	E440	0.50	mg/kg	553	598	646	566	507	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.41	0.38	0.40	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	46.7	24.1	23.4	25.5	40.3	
boron	7440-42-8	E440	5.0	mg/kg	150	176	228	214	155	
cadmium	7440-43-9	E440	0.020	mg/kg	11.3	10.3	10.6	11.2	10.9	
calcium	7440-70-2	E440	50	mg/kg	140000	136000	127000	143000	136000	
chromium	7440-47-3	E440	0.50	mg/kg	160	160	159	155	160	
cobalt	7440-48-4	E440	0.10	mg/kg	95.3	202	148	41.1	53.2	
copper	7440-50-8	E440	0.50	mg/kg	1390	2580	7560	1580	16100	
iron	7439-89-6	E440	50	mg/kg	61600	70000	70700	57300	72800	
lead	7439-92-1	E440	0.50	mg/kg	398	458	339	544	418	
lithium	7439-93-2	E440	2.0	mg/kg	24.8	29.0	22.6	22.8	21.9	
magnesium	7439-95-4	E440	20	mg/kg	11600	13000	12200	11700	11700	
manganese	7439-96-5	E440	1.0	mg/kg	706	718	987	905	913	
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	144	85.9	120	110	145	
nickel	7440-02-0	E440	0.50	mg/kg	171	431	168	173	276	
phosphorus	7723-14-0	E440	50	mg/kg	12900	11300	11500	12900	12300	
potassium	7440-09-7	E440	100	mg/kg	5180	5410	4850	5220	5060	
selenium	7782-49-2	E440	0.20	mg/kg	1.22	0.41	0.42	0.40	0.39	
silver	7440-22-4	E440	0.10	mg/kg	4.32	6.73	5.56	4.26	6.41	
sodium	7440-23-5	E440	50	mg/kg	15100	16300	14300	15300	15100	
strontium	7440-24-6	E440	0.50	mg/kg	371	315	302	357	311	
sulfur	7704-34-9	E440	1000	mg/kg	13800	13800	11600	13700	13000	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2143A-1	BA2143-A-2	BA2143-A-3	BA2143-A-4	BA2143-A-5
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-001	VA21C3740-002	VA21C3740-003	VA21C3740-004	VA21C3740-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.098	0.090	0.084	0.094	0.094	
tin	7440-31-5	E440	2.0	mg/kg	413	125	522	121	187	
titanium	7440-32-6	E440	1.0	mg/kg	399	413	607	625	612	
tungsten	7440-33-7	E440	0.50	mg/kg	9.86	8.59	14.5	15.8	10.0	
uranium	7440-61-1	E440	0.050	mg/kg	6.69	5.99	5.90	6.67	6.39	
vanadium	7440-62-2	E440	0.20	mg/kg	56.8	53.2	53.5	56.5	56.5	
zinc	7440-66-6	E440	2.0	mg/kg	3300	3990	4000	7070	3370	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.8	1.9	2.1	3.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.4	11.3	11.3	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.05	8.39	9.30	9.08	9.15	
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	6.40	6.44	6.23	6.27	6.33	
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	1.86	1.94	1.87	1.93	1.99	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.153	0.127	0.134	0.137	0.310	
calcium, TCLP	7440-70-2	E444	10	mg/L	1920	1970	1950	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	0.899	1.67	1.14	1.41	1.46	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.881	0.693	1.32	1.18	0.944	
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	0.47	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	128	134	132	136	133	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.51	0.51	0.57	0.52	0.60	
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	BA2143A-1	BA2143-A-2	BA2143-A-3	BA2143-A-4	BA2143-A-5
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-001	VA21C3740-002	VA21C3740-003	VA21C3740-004	VA21C3740-005	
					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	22.2	38.8	28.6	38.5	30.2	
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	BA2143-A-6	BA2143-A-7	BA2143-A-8	BA2143-A-9	BA2143-A-10
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-006	VA21C3740-007	VA21C3740-008	VA21C3740-009	VA21C3740-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	24.7	24.5	23.6	24.4	26.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.5	10.7	10.2	10.4	10.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	57600	40300	36100	37200	53000	
antimony	7440-36-0	E440	0.10	mg/kg	112	164	131	121	115	
arsenic	7440-38-2	E440	0.10	mg/kg	31.2	29.2	22.9	22.5	22.6	
barium	7440-39-3	E440	0.50	mg/kg	523	520	515	560	611	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.47	0.38	0.37	0.40	
bismuth	7440-69-9	E440	0.20	mg/kg	28.9	34.3	23.2	24.1	24.0	
boron	7440-42-8	E440	5.0	mg/kg	144	183	165	559	256	
cadmium	7440-43-9	E440	0.020	mg/kg	11.8	12.2	21.8	11.7	10.8	
calcium	7440-70-2	E440	50	mg/kg	126000	150000	138000	133000	150000	
chromium	7440-47-3	E440	0.50	mg/kg	142	216	205	148	163	
cobalt	7440-48-4	E440	0.10	mg/kg	41.0	41.5	63.8	41.5	36.0	
copper	7440-50-8	E440	0.50	mg/kg	2790	2890	9760	1380	1340	
iron	7439-89-6	E440	50	mg/kg	60100	65200	67800	52600	43500	
lead	7439-92-1	E440	0.50	mg/kg	400	606	514	398	536	
lithium	7439-93-2	E440	2.0	mg/kg	23.8	26.4	22.2	25.6	23.5	
magnesium	7439-95-4	E440	20	mg/kg	10400	11900	11300	11300	12900	
manganese	7439-96-5	E440	1.0	mg/kg	920	882	871	757	639	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.0530	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	122	154	98.3	133	117	
nickel	7440-02-0	E440	0.50	mg/kg	277	172	156	104	158	
phosphorus	7723-14-0	E440	50	mg/kg	10800	13100	11800	13100	13000	
potassium	7440-09-7	E440	100	mg/kg	4490	5550	5080	5540	5130	
selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.71	0.46	0.46	0.36	
silver	7440-22-4	E440	0.10	mg/kg	4.94	9.82	6.18	5.08	7.09	
sodium	7440-23-5	E440	50	mg/kg	13700	16600	14600	15400	16100	
strontium	7440-24-6	E440	0.50	mg/kg	305	337	368	310	333	
sulfur	7704-34-9	E440	1000	mg/kg	11600	14900	14500	12800	13500	
thallium	7440-28-0	E440	0.050	mg/kg	0.153	0.098	0.103	0.097	0.090	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2143-A-6	BA2143-A-7	BA2143-A-8	BA2143-A-9	BA2143-A-10
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-006	VA21C3740-007	VA21C3740-008	VA21C3740-009	VA21C3740-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	97.6	144	170	135	134	
titanium	7440-32-6	E440	1.0	mg/kg	859	502	483	467	747	
tungsten	7440-33-7	E440	0.50	mg/kg	11.9	14.5	14.8	11.0	11.0	
uranium	7440-61-1	E440	0.050	mg/kg	5.14	6.33	6.86	6.11	6.44	
vanadium	7440-62-2	E440	0.20	mg/kg	50.0	57.9	58.6	61.0	62.5	
zinc	7440-66-6	E440	2.0	mg/kg	6360	5080	4130	3640	3720	
zirconium	7440-67-7	E440	1.0	mg/kg	2.7	2.4	2.0	2.0	3.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.5	11.4	11.4	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.24	9.20	8.75	9.13	8.98	
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	6.34	6.20	6.58	6.24	6.60	
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	2.03	1.91	1.79	2.14	1.88	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.143	0.206	0.102	0.229	0.088	
calcium, TCLP	7440-70-2	E444	10	mg/L	2020	1980	1860	2000	1860	
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	0.584	0.856	1.94	1.26	0.888	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.857	1.00	0.612	1.06	0.404	
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	0.27	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	130	128	119	138	121	
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	0.48	0.58	0.44	0.51	0.42	
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	BA2143-A-6	BA2143-A-7	BA2143-A-8	BA2143-A-9	BA2143-A-10
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	20-Oct-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-006	VA21C3740-007	VA21C3740-008	VA21C3740-009	VA21C3740-010	
					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	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	36.3	31.8	14.9	42.4	13.6	
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	BA2143-A-11	BA2143-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	20-Oct-2021 09:00	20-Oct-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-011	VA21C3740-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	25.8	26.0	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.4	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	48100	43800	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	118	117	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	21.1	24.6	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	538	509	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.36	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	19.9	18.4	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	142	138	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.9	10.5	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	131000	130000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	302	142	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	40.1	100	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2050	2430	----	----	----	
iron	7439-89-6	E440	50	mg/kg	46900	46800	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1500	527	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	24.4	26.4	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11000	12100	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	901	907	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	131	131	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	280	203	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11700	11500	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5120	5690	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.40	0.38	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	12.1	5.04	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14500	15300	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	304	370	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12900	13400	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.088	0.090	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2143-A-11	BA2143-A-12	----	----	----
Client sampling date / time					20-Oct-2021 09:00	20-Oct-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-011	VA21C3740-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	106	117	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	752	774	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	13.9	9.46	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	5.78	6.09	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	55.4	56.5	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	4700	3390	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	3.6	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.5	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.89	8.99	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.61	6.21	---	---	---	
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	1.87	1.88	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.102	0.150	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	1860	2020	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.628	0.753	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.488	1.11	---	---	---	
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	120	144	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.38	0.66	---	---	---	
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	BA2143-A-11	BA2143-A-12	----	----	----
					Client sampling date / time	20-Oct-2021 09:00	20-Oct-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C3740-011	VA21C3740-012	-----	-----	-----	
					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	14.1	27.3	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21C3740	Page	: 1 of 14
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 26-Oct-2021 11:55
PO	: VANCO 0000050390	Issue Date	: 05-Nov-2021 13:01
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143A-1	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-10	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-11	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-12	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-2	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-3	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-4	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 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 BA2143-A-5	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-6	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-7	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-8	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2143-A-9	E510	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	15 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143A-1	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-10	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-11	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-12	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 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 ICPMS											
LDPE bag BA2143-A-2	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-3	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-4	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-5	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-6	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-7	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-8	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2143-A-9	E440	20-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	180 days	15 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2143A-1	E144	20-Oct-2021	----	----	----		31-Oct-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 BA2143-A-10	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-11	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-12	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-2	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-3	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-4	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-5	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-6	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-7	E144	20-Oct-2021	----	----	----		31-Oct-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 Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-8	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2143-A-9	E144	20-Oct-2021	----	----	----		31-Oct-2021	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143A-1	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-10	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-11	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-12	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-2	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-3	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2143-A-4	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2143-A-5	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2143-A-6	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2143-A-7	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2143-A-8	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2143-A-9	E108	20-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2143A-1	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2143-A-10	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2143-A-11	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2143-A-12	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 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)										
HDPE - total (lab preserved) BA2143-A-2	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-3	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-4	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-5	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-6	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-7	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-8	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2143-A-9	E512	02-Nov-2021	----	----	----		04-Nov-2021	----	15 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2143A-1	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 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) BA2143-A-10	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-11	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-12	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-2	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-3	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-4	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-5	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-6	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2143-A-7	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 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) BA2143-A-8	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2143-A-9	E444	02-Nov-2021	----	----	----		04-Nov-2021	180 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143A-1	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-10	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-11	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-12	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-2	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-3	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-4	EPP444	20-Oct-2021	02-Nov-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) BA2143-A-5	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-6	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-7	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-8	EPP444	20-Oct-2021	02-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2143-A-9	EPP444	20-Oct-2021	02-Nov-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	334375	1	19	5.2	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	334376	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	334378	1	14	7.1	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	334377	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	334375	2	19	10.5	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	334376	2	20	10.0	10.0	✔
Moisture Content by Gravimetry	E144	334378	1	14	7.1	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	334377	1	20	5.0	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	337747	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	334375	1	19	5.2	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	337748	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	334376	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	334378	1	14	7.1	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	337747	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	337748	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)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl . Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. 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 : VA21C3740
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 : VA21C3740

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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 : 26-Oct-2021 11:55
Date Analysis Commenced : 31-Oct-2021
Issue Date : 05-Nov-2021 13:01

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Dee Lee (Analyst), Janice Leung (Supervisor - Organics Instrumentation), and Kevin Duarte (Supervisor - Metals ICP Instrumentation).

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Work Order : VA21C3740
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: 334377)											
VA21C1430-024	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	6.86	6.84	0.3%	5%	----
Physical Tests (QC Lot: 334378)											
VA21C3370-001	Anonymous	moisture	----	E144	0.25	%	42.8	42.7	0.250%	20%	----
Metals (QC Lot: 334375)											
VA21C1430-024	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 334376)											
VA21C1430-024	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	17400	16200	7.24%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	1.43	1.24	14.0%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	7.46	6.74	10.2%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	142	130	9.30%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.74	0.74	0.567%	30%	----
		bismuth	7440-69-9	E440	0.20	mg/kg	0.36	0.33	0.03	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	4.42	3.91	12.3%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	5300	4940	7.03%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	30.2	28.5	5.82%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	10.4	9.91	4.64%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	47.1	42.0	11.3%	30%	----
		iron	7439-89-6	E440	50	mg/kg	23400	21600	7.80%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	119	96.2	21.1%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	23.8	22.2	6.62%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	7220	6720	7.13%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	674	606	10.6%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.43	1.36	5.03%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	33.2	31.4	5.49%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	1330	1240	7.32%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1580	1410	10.8%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.55	0.49	0.06	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.42	0.38	0.03	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	156	141	14	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	28.9	27.1	6.50%	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: 334376) - continued											
VA21C1430-024	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.235	0.221	0.014	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	758	673	11.9%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	0.69	0.86	0.17	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	3.14	2.81	10.9%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	76.3	71.8	6.03%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	530	470	12.1%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 334378)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 334375)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 334376)						
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: 334376) - 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	----
TCLP Metals (QCLot: 337747)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 337748)						
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	----



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: 334377)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 334378)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 334375)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	97.0	80.0	120	----
Metals (QCLot: 334376)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	111	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.7	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	93.6	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	100	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.8	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	97.4	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.8	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	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	99.3	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	100	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.2	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	103	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.2	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	99.4	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	100	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	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: 334376) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	102	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	105	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	96.4	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	102	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: 337747)										
VA21C3740-001	BA2143A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.4	50.0	140	----
TCLP Metals (QCLot: 337748)										
VA21C3740-001	BA2143A-1	antimony, TCLP	7440-36-0	E444	5.3 mg/L	5 mg/L	106	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	93.7	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.9 mg/L	12.5 mg/L	95.2	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.240 mg/L	0.25 mg/L	96.2	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.38 mg/L	10 mg/L	93.8	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.234 mg/L	0.25 mg/L	93.7	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	1.14 mg/L	1.25 mg/L	91.5	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	2.21 mg/L	2.5 mg/L	88.3	50.0	140	----
		iron, TCLP	7439-89-6	E444	234 mg/L	250 mg/L	93.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.1 mg/L	10 mg/L	101	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	238 mg/L	250 mg/L	95.2	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.27 mg/L	2.5 mg/L	91.0	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.06 mg/L	5 mg/L	101	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	4.9 mg/L	5 mg/L	98.7	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.88 mg/L	5 mg/L	97.6	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.71 mg/L	0.75 mg/L	95.0	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	95.8	50.0	150	----



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: 334375)									
QC-334375-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	90.3	70.0	130	----
Metals (QCLot: 334376)									
QC-334376-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	115	70.0	130	----
QC-334376-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	115	70.0	130	----
QC-334376-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	112	70.0	130	----
QC-334376-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	109	70.0	130	----
QC-334376-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	113	70.0	130	----
QC-334376-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	115	40.0	160	----
QC-334376-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	116	70.0	130	----
QC-334376-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	114	70.0	130	----
QC-334376-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	113	70.0	130	----
QC-334376-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	109	70.0	130	----
QC-334376-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
QC-334376-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	110	70.0	130	----
QC-334376-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	112	70.0	130	----
QC-334376-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	110	70.0	130	----
QC-334376-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	112	70.0	130	----
QC-334376-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	115	70.0	130	----
QC-334376-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	124	70.0	130	----
QC-334376-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	112	70.0	130	----
QC-334376-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	115	70.0	130	----
QC-334376-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	116	70.0	130	----
QC-334376-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	110	70.0	130	----
QC-334376-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	112	70.0	130	----
QC-334376-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	109	40.0	160	----
QC-334376-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	116	70.0	130	----
QC-334376-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
QC-334376-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	116	70.0	130	----
QC-334376-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	112	70.0	130	----



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: 334376) - continued									
QC-334376-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
QC-334376-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	109	70.0	130	----



Chain of Custody / Analytical Request Form

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COC # _____

Page ____ of ____

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

Invoice To Same as Report?	Client / Project Information	Please indicate below Filtered, Preserved or both (F, P, F/P)																		
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No	Job #:																			
Company:	PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																			
Contact:	LSD: (includes 2:1 pH)																			
Address:																				
Phone: _____ Fax: _____	Quote #:																			

Lab Work Order # (lab use only):	3740	ALS Contact:	Sampler:
--	------	---------------------	-----------------

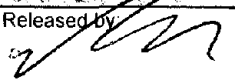
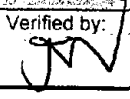
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Analysis Request										Number of Containers							
					MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)														
BA2143-A-1	Environmental Division Vancouver Work Order Reference VA21C3740  Telephone : +1 604 253 4188	20-Oct-21	9:00	Soil	X	X					X										1	
BA2143-A-2		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-3		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-4		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-5		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-6		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-7		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-8		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-9		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-10		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-11		20-Oct-21	9:00	Soil	X	X					X											1
BA2143-A-12	20-Oct-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): 26-Oct-21	Time (hh-mm): 0900	Received by:	Date:	Time:	Temperature: 20/°C	Verified by: 	Date: Oct-26/21	Time: 11:55	Observations: Yes / No? If Yes add SIF