

Bottom Ash Data

2022 Week 41

The following analytical report represents bottom ash composite results for week 41 of 2022 (October 9, 2022 to October 15, 2022).

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



CERTIFICATE OF ANALYSIS

<p>Work Order : VA22C5118</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO 0000051213</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 11</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Brent Mack</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : 778-370-3279</p> <p>Date Samples Received : 18-Oct-2022 13:35</p> <p>Date Analysis Commenced : 23-Oct-2022</p> <p>Issue Date : 27-Oct-2022 12:42</p>
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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
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	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	BA2241-A-1	BA2241-A-2	BA2241-A-3	BA2241-A-4	BA2241-A-5
(Matrix: Soil/Solid)					Client sampling date / time	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-001	VA22C5118-002	VA22C5118-003	VA22C5118-004	VA22C5118-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.7	19.8	20.7	20.4	20.8	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.6	11.5	11.6	11.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	32900	30100	39000	40100	35300	
antimony	7440-36-0	E440	0.10	mg/kg	105	104	162	110	93.1	
arsenic	7440-38-2	E440	0.10	mg/kg	27.8	27.2	30.4	27.0	31.0	
barium	7440-39-3	E440	0.50	mg/kg	595	592	494	450	694	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.39	0.37	0.32	0.42	
bismuth	7440-69-9	E440	0.20	mg/kg	10.2	8.66	9.64	7.05	8.00	
boron	7440-42-8	E440	5.0	mg/kg	228	169	160	181	130	
cadmium	7440-43-9	E440	0.020	mg/kg	8.75	37.9	12.0	11.9	8.16	
calcium	7440-70-2	E440	50	mg/kg	129000	124000	142000	116000	129000	
chromium	7440-47-3	E440	0.50	mg/kg	146	151	170	259	125	
cobalt	7440-48-4	E440	0.10	mg/kg	35.8	238	411	659	25.5	
copper	7440-50-8	E440	0.50	mg/kg	1370	8110	1950	1380	1200	
iron	7439-89-6	E440	50	mg/kg	68300	69100	58500	53300	44800	
lead	7439-92-1	E440	0.50	mg/kg	507	631	1200	355	2140	
lithium	7439-93-2	E440	2.0	mg/kg	23.9	28.6	55.9	32.7	20.3	
magnesium	7439-95-4	E440	20	mg/kg	10400	10600	12300	9870	10700	
manganese	7439-96-5	E440	1.0	mg/kg	720	688	793	671	717	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	16.9	25.5	20.1	15.2	18.3	
nickel	7440-02-0	E440	0.50	mg/kg	93.4	204	114	218	81.0	
phosphorus	7723-14-0	E440	50	mg/kg	9730	9110	9550	9210	9280	
potassium	7440-09-7	E440	100	mg/kg	4840	5180	5400	4820	4710	
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.38	0.50	0.39	0.33	
silver	7440-22-4	E440	0.10	mg/kg	3.76	6.12	5.33	3.80	4.07	
sodium	7440-23-5	E440	50	mg/kg	14300	14400	15000	13700	13700	
strontium	7440-24-6	E440	0.50	mg/kg	315	282	803	257	316	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2241-A-1	BA2241-A-2	BA2241-A-3	BA2241-A-4	BA2241-A-5
Client sampling date / time					12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-001	VA22C5118-002	VA22C5118-003	VA22C5118-004	VA22C5118-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	11000	10500	12800	11400	9800	
thallium	7440-28-0	E440	0.050	mg/kg	0.051	0.055	0.077	<0.050	0.052	
tin	7440-31-5	E440	2.0	mg/kg	121	107	126	98.9	99.5	
titanium	7440-32-6	E440	1.0	mg/kg	350	358	386	312	616	
tungsten	7440-33-7	E440	0.50	mg/kg	5.36	10.9	8.84	5.58	9.95	
uranium	7440-61-1	E440	0.050	mg/kg	4.47	4.33	5.17	4.20	4.22	
vanadium	7440-62-2	E440	0.20	mg/kg	49.2	50.4	57.3	53.0	45.6	
zinc	7440-66-6	E440	2.0	mg/kg	3670	3040	4310	3260	4920	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.5	2.0	3.8	2.5	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.8	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.26	8.76	8.40	8.84	9.23	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	6.62	6.80	6.82	6.71	6.64	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
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	2.31	2.26	2.34	2.30	2.29	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.139	0.123	0.112	0.292	0.198	
calcium, TCLP	7440-70-2	E444	10	mg/L	2040	2020	2100	2020	2020	
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	0.684	0.692	0.938	1.06	0.531	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.644	0.551	0.594	0.661	0.610	
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	128	128	133	132	130	
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	0.37	0.46	0.36	0.47	0.42	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2241-A-1	BA2241-A-2	BA2241-A-3	BA2241-A-4	BA2241-A-5
Client sampling date / time					12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-001	VA22C5118-002	VA22C5118-003	VA22C5118-004	VA22C5118-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	14.1	11.4	9.73	11.8	17.9	17.9
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2241-A-6	BA2241-A-7	BA2241-A-8	BA2241-A-9	BA2241-A-10
(Matrix: Soil/Solid)					Client sampling date / time	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-006	VA22C5118-007	VA22C5118-008	VA22C5118-009	VA22C5118-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.3	17.9	19.0	19.1	18.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.7	11.7	11.5	11.5	11.8	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	28800	31600	38000	41400	41200	
antimony	7440-36-0	E440	0.10	mg/kg	112	108	102	115	111	
arsenic	7440-38-2	E440	0.10	mg/kg	29.0	27.3	27.3	26.2	31.0	
barium	7440-39-3	E440	0.50	mg/kg	591	629	614	535	531	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.37	0.37	0.39	0.34	
bismuth	7440-69-9	E440	0.20	mg/kg	7.00	6.70	6.22	8.48	6.88	
boron	7440-42-8	E440	5.0	mg/kg	251	487	191	190	143	
cadmium	7440-43-9	E440	0.020	mg/kg	15.7	9.42	8.63	10.7	10.8	
calcium	7440-70-2	E440	50	mg/kg	135000	131000	126000	124000	127000	
chromium	7440-47-3	E440	0.50	mg/kg	211	182	276	125	213	
cobalt	7440-48-4	E440	0.10	mg/kg	29.4	293	27.4	46.1	19.3	
copper	7440-50-8	E440	0.50	mg/kg	1150	2080	1160	2060	3920	
iron	7439-89-6	E440	50	mg/kg	36000	53800	58100	50100	48700	
lead	7439-92-1	E440	0.50	mg/kg	433	808	346	477	627	
lithium	7439-93-2	E440	2.0	mg/kg	32.2	37.6	21.8	24.6	21.6	
magnesium	7439-95-4	E440	20	mg/kg	10500	10700	10700	10700	9830	
manganese	7439-96-5	E440	1.0	mg/kg	567	883	712	1150	705	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	16.3	18.5	20.4	17.6	16.6	
nickel	7440-02-0	E440	0.50	mg/kg	72.2	127	151	132	93.7	
phosphorus	7723-14-0	E440	50	mg/kg	9910	10000	8030	8900	9600	
potassium	7440-09-7	E440	100	mg/kg	4840	4970	4720	5320	5070	
selenium	7782-49-2	E440	0.20	mg/kg	0.37	0.34	0.39	0.47	0.48	
silver	7440-22-4	E440	0.10	mg/kg	4.02	3.79	3.53	3.70	4.40	
sodium	7440-23-5	E440	50	mg/kg	14700	14400	14600	14200	14000	
strontium	7440-24-6	E440	0.50	mg/kg	352	316	267	294	304	
sulfur	7704-34-9	E440	1000	mg/kg	10800	11000	10300	11600	11500	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2241-A-6	BA2241-A-7	BA2241-A-8	BA2241-A-9	BA2241-A-10
(Matrix: Soil/Solid)					Client sampling date / time	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-006	VA22C5118-007	VA22C5118-008	VA22C5118-009	VA22C5118-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.054	<0.050	0.063	0.057	
tin	7440-31-5	E440	2.0	mg/kg	99.8	99.6	95.7	101	134	
titanium	7440-32-6	E440	1.0	mg/kg	384	443	585	424	424	
tungsten	7440-33-7	E440	0.50	mg/kg	7.66	10.6	7.01	7.53	7.91	
uranium	7440-61-1	E440	0.050	mg/kg	4.92	4.50	4.41	4.75	4.56	
vanadium	7440-62-2	E440	0.20	mg/kg	52.7	55.1	54.0	49.7	52.6	
zinc	7440-66-6	E440	2.0	mg/kg	3340	3640	3700	5090	3660	
zirconium	7440-67-7	E440	1.0	mg/kg	1.5	1.6	1.5	2.0	2.3	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.8	11.7	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.80	9.03	8.88	9.14	9.40	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	6.77	6.77	6.49	6.61	6.77	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
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	2.25	2.29	2.31	2.42	2.37	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.118	0.105	0.210	0.113	0.098	
calcium, TCLP	7440-70-2	E444	10	mg/L	2020	2040	2010	2000	2040	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.05	0.742	3.93	1.80	1.04	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.668	0.728	0.660	0.444	0.539	
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	127	130	130	130	136	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.38	0.50	0.79	0.48	0.54	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2241-A-6	BA2241-A-7	BA2241-A-8	BA2241-A-9	BA2241-A-10
Client sampling date / time					12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	12-Oct-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-006	VA22C5118-007	VA22C5118-008	VA22C5118-009	VA22C5118-010	
TCLP Metals					Result	Result	Result	Result	Result	
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	
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	9.02	9.64	18.5	14.6	10.4	
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	BA2241-A-11	BA2241-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	12-Oct-2022 09:00	12-Oct-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-011	VA22C5118-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
moisture	----	E144	0.25	%	19.6	18.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.9	11.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	26800	29900	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	105	126	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	27.0	33.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	573	552	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.38	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.60	9.09	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	187	249	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	10.4	9.86	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	128000	142000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	124	159	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	48.0	27.8	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1140	1820	----	----	----	
iron	7439-89-6	E440	50	mg/kg	44600	58700	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	461	756	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	25.2	24.3	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	10800	10800	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	566	833	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	15.4	22.2	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	78.9	148	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10700	10800	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4860	5640	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.41	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.05	6.15	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14700	16100	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	283	319	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	11400	12700	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2241-A-11	BA2241-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	12-Oct-2022 09:00	12-Oct-2022 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-011	VA22C5118-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.054	---	---	---	
tin	7440-31-5	E440	2.0	mg/kg	96.0	115	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	436	434	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	8.61	9.01	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	4.31	4.95	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	48.9	54.4	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	3240	6690	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.3	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.8	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.48	9.43	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.58	6.51	---	---	---	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	---	---	---	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	---	---	---	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	---	---	---	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.31	2.28	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.564	0.116	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2010	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	0.959	1.12	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.749	0.832	---	---	---	
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	133	131	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	1.19	0.47	---	---	---	
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	---	---	---	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2241-A-11	BA2241-A-12	----	----	----
Client sampling date / time					12-Oct-2022 09:00	12-Oct-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22C5118-011	VA22C5118-012	-----	-----	-----	
TCLP Metals					Result	Result	---	---	---	
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	---	---	---	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	---	---	---	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	15.1	20.5	---	---	---	
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

<p>Work Order : VA22C5118</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO 0000051213</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 16</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Brent Mack</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : 778-370-3279</p> <p>Date Samples Received : 18-Oct-2022 13:35</p> <p>Issue Date : 27-Oct-2022 12:44</p>
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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 Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: Soil/Solid

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22C5118-001	BA2241-A-1	boron	7440-42-8	E440	35.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	cobalt	7440-48-4	E440	52.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	copper	7440-50-8	E440	58.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	iron	7439-89-6	E440	34.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	lead	7439-92-1	E440	81.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	nickel	7440-02-0	E440	46.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	tin	7440-31-5	E440	51.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	titanium	7440-32-6	E440	42.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	tungsten	7440-33-7	E440	89.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C5118-001	BA2241-A-1	zinc	7440-66-6	E440	53.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-1	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-10	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-11	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-12	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-2	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-3	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2241-A-4	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	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 BA2241-A-5	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2241-A-6	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2241-A-7	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2241-A-8	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2241-A-9	E510	12-Oct-2022	26-Oct-2022	----	----		27-Oct-2022	28 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2241-A-1	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2241-A-10	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2241-A-11	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2241-A-12	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	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 ICPCS											
LDPE bag BA2241-A-2	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-3	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-4	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-5	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-6	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-7	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-8	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2241-A-9	E440	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	180 days	15 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2241-A-1	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----		



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 BA2241-A-10	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-11	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-12	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-2	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-3	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-4	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-5	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-6	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2241-A-7	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----	



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 BA2241-A-8	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2241-A-9	E144	12-Oct-2022	----	----	----		25-Oct-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-1	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-10	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-11	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-12	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-2	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-3	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-4	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 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 BA2241-A-5	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-6	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-7	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-8	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2241-A-9	E108	12-Oct-2022	26-Oct-2022	----	----		26-Oct-2022	30 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-1	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-10	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-11	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-12	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	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) BA2241-A-2	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-3	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-4	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-5	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-6	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-7	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-8	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2241-A-9	E512	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	28 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-1	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	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) BA2241-A-10	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-11	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-12	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-2	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-3	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-4	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-5	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-6	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2241-A-7	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	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) BA2241-A-8	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2241-A-9	E444	23-Oct-2022	24-Oct-2022	----	----		24-Oct-2022	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) BA2241-A-1	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-10	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-11	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-12	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-2	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-3	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-4	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	



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) BA2241-A-5	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-6	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-7	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-8	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2241-A-9	EPP444	12-Oct-2022	23-Oct-2022	----	----		----	----	----	

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 (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	712449	1	13	7.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	712450	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	712454	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	712451	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	712449	2	13	15.3	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	712450	2	15	13.3	10.0	✔
Moisture Content by Gravimetry	E144	712454	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	712451	1	15	6.6	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	711403	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	712449	1	13	7.6	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	711404	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	712450	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	712454	1	16	6.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	711403	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	711404	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. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. 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.

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 Work Order : VA22C5118
 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>
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.
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	: VA22C5118	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Nicole Victor	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 18-Oct-2022 13:35
PO	: VANCO 0000051213	Date Analysis Commenced	: 23-Oct-2022
C-O-C number	: ----	Issue Date	: 27-Oct-2022 12:48
Sampler	: ---- ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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 Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

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Work Order : VA22C5118
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 Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



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: 712451)											
VA22C5118-001	BA2241-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.6	0.8%	5%	----
Physical Tests (QC Lot: 712454)											
VA22C5118-001	BA2241-A-1	moisture	----	E144	0.25	%	19.7	19.3	1.91%	20%	----
Metals (QC Lot: 712449)											
VA22C5118-001	BA2241-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 712450)											
VA22C5118-001	BA2241-A-1	aluminum	7429-90-5	E440	50	mg/kg	32900	26500	21.5%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	105	122	14.6%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	27.8	27.4	1.20%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	595	517	14.0%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.34	0.08	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	10.2	9.43	7.37%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	228	159	35.7%	30%	DUP-H
		cadmium	7440-43-9	E440	0.020	mg/kg	8.75	8.93	1.97%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	129000	134000	3.55%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	146	160	9.18%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	35.8	61.2	52.4%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	1370	2500	58.6%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	68300	48400	34.2%	30%	DUP-H
		lead	7439-92-1	E440	0.50	mg/kg	507	1200	81.2%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	23.9	28.3	17.1%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	10400	10900	4.19%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	720	657	9.09%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	16.9	20.9	21.4%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	93.4	150	46.4%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	9730	9670	0.555%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4840	4550	6.14%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.35	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	3.76	5.35	34.7%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	14300	13200	8.15%	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: 712450) - continued											
VA22C5118-001	BA2241-A-1	strontium	7440-24-6	E440	0.50	mg/kg	315	309	2.03%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	11000	11500	4.73%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.051	0.065	0.014	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	121	204	51.1%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	350	227	42.7%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	5.36	14.0	89.4%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	4.47	4.73	5.61%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	49.2	50.3	2.22%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3670	6330	53.2%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.9	0.02	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: 712454)						
moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 712449)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 712450)						
aluminum	7429-90-5	E440	50	mg/kg	<50	---
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	---
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	---
barium	7440-39-3	E440	0.5	mg/kg	<0.50	---
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	---
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	---
boron	7440-42-8	E440	5	mg/kg	<5.0	---
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	---
calcium	7440-70-2	E440	50	mg/kg	<50	---
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	---
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	---
copper	7440-50-8	E440	0.5	mg/kg	<0.50	---
iron	7439-89-6	E440	50	mg/kg	<50	---
lead	7439-92-1	E440	0.5	mg/kg	<0.50	---
lithium	7439-93-2	E440	2	mg/kg	<2.0	---
magnesium	7439-95-4	E440	20	mg/kg	<20	---
manganese	7439-96-5	E440	1	mg/kg	<1.0	---
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	---
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	---
phosphorus	7723-14-0	E440	50	mg/kg	<50	---
potassium	7440-09-7	E440	100	mg/kg	<100	---
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	---
silver	7440-22-4	E440	0.1	mg/kg	<0.10	---
sodium	7440-23-5	E440	50	mg/kg	<50	---
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	---
sulfur	7704-34-9	E440	1000	mg/kg	<1000	---
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	---
tin	7440-31-5	E440	2	mg/kg	<2.0	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 712450) - continued						
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 711403)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 711404)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
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: 712451)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 712454)									
moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 712449)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.9	80.0	120	----
Metals (QCLot: 712450)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	95.9	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	97.3	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.9	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	93.7	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	89.8	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	86.5	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	91.3	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	89.7	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	91.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	91.0	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	88.3	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	88.9	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	98.8	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	93.8	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.2	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	92.2	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	98.2	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	95.1	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	94.6	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	81.2	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	98.1	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	92.1	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	101	80.0	120	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 712450) - continued									
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	90.3	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.2	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	93.8	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	90.1	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	86.6	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	94.4	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	94.0	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	94.6	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: 711403)										
VA22C5118-001	BA2241-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.8	50.0	140	----
TCLP Metals (QCLot: 711404)										
VA22C5118-001	BA2241-A-1	antimony, TCLP	7440-36-0	E444	5.10 mg/L	5 mg/L	102	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	99.6	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.3 mg/L	12.5 mg/L	98.7	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.247 mg/L	0.25 mg/L	99.0	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.77 mg/L	10 mg/L	97.7	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.242 mg/L	0.25 mg/L	96.7	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	1.21 mg/L	1.25 mg/L	97.0	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	2.32 mg/L	2.5 mg/L	92.8	50.0	140	----
		iron, TCLP	7439-89-6	E444	243 mg/L	250 mg/L	97.2	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.99 mg/L	10 mg/L	99.9	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	251 mg/L	250 mg/L	100	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.37 mg/L	2.5 mg/L	94.7	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.04 mg/L	5 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.094 mg/L	0.1 mg/L	94.6	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	98.6	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.00 mg/L	5 mg/L	100	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.76 mg/L	0.75 mg/L	101	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	92.5	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:

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: 712449)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	96.6	70.0	130	----
Metals (QCLot: 712450)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	103	70.0	130	----
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	103	70.0	130	----
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	112	70.0	130	----
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	113	40.0	160	----
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	97.0	70.0	130	----
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	97.5	70.0	130	----
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	114	70.0	130	----
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	99.3	70.0	130	----
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	101	70.0	130	----
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	115	70.0	130	----
	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	105	70.0	130	----
	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	104	70.0	130	----
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	94.8	70.0	130	----
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	115	70.0	130	----
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	108	70.0	130	----
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	100	70.0	130	----
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	106	40.0	160	----
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	99.0	70.0	130	----
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----

Page : 11 of 11
 Work Order : VA22C5118
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:


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: 712450) - continued									
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	106	70.0	130	----
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	99.0	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	106	70.0	130	----



Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)					
Contact: Steve McKinney / Dan Skrypyk			<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: dskrypyk@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="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">MOISTURE</td> <td rowspan="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">Chrome 6</td> <td rowspan="5" style="writing-mode: vertical-rl; transform: rotate(180deg);">MET-CSR+FULL-VA (all metals)</td> <td colspan="6">Number of Containers</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </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 #:																																										

Lab Work Order # (lab use only)			ALS Contact:			Sampler:		
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Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)		MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)		Number of Containers
					X	X			X	X	
BA2241-A-1	Environmental Division Vancouver Work Order Reference VA22C5118  Telephone : +1 804 253 4188	12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-2		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-3		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-4		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-5		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-6		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-7		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-8		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-9		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-10		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-11		12-Oct-22	9:00	Soil	X	X			X		1
BA2241-A-12		12-Oct-22	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>	18-Oct-22	0800				21 °C	<i>[Signature]</i>	Oct 18/22	135	Yes / No ? If Yes add SIF	

(2 buckets)

[Signature] GENF 20.00 Front