

Bottom Ash Data

2022 Week 17

The following analytical report represents bottom ash composite results for week 17 of 2022 (April 24, 2022 to April 30, 2022).

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 : **VA22A9370**
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 0000051213
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 : 03-May-2022 14:30
Date Analysis Commenced : 12-May-2022
Issue Date : 19-May-2022 13:05

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>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		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	BA2217-A-1	BA2217-A-2	BA2217-A-3	BA2217-A-4	BA2217-A-5
(Matrix: Soil/Solid)					Client sampling date / time	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-001	VA22A9370-002	VA22A9370-003	VA22A9370-004	VA22A9370-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	22.6	21.8	20.5	21.5	21.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	10.1	10.3	10.3	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	44000	47900	35000	34100	44900	
antimony	7440-36-0	E440	0.10	mg/kg	141	114	125	130	173	
arsenic	7440-38-2	E440	0.10	mg/kg	24.0	19.8	21.3	21.9	28.4	
barium	7440-39-3	E440	0.50	mg/kg	364	500	467	302	316	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.38	0.34	0.38	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	10.1	12.0	10.5	9.43	12.2	
boron	7440-42-8	E440	5.0	mg/kg	188	213	153	166	188	
cadmium	7440-43-9	E440	0.020	mg/kg	15.2	10.8	12.2	22.6	19.3	
calcium	7440-70-2	E440	50	mg/kg	136000	116000	120000	132000	140000	
chromium	7440-47-3	E440	0.50	mg/kg	180	166	239	187	286	
cobalt	7440-48-4	E440	0.10	mg/kg	62.7	53.3	84.3	138	86.0	
copper	7440-50-8	E440	0.50	mg/kg	3140	1640	4160	2630	3400	
iron	7439-89-6	E440	50	mg/kg	80700	72500	107000	61100	76500	
lead	7439-92-1	E440	0.50	mg/kg	434	588	412	534	628	
lithium	7439-93-2	E440	2.0	mg/kg	45.7	22.8	26.0	30.0	27.7	
magnesium	7439-95-4	E440	20	mg/kg	13400	13100	11300	12900	13200	
manganese	7439-96-5	E440	1.0	mg/kg	3180	861	1990	820	1280	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0880	<0.0500	<0.0500	0.0884	0.0848	
molybdenum	7439-98-7	E440	0.10	mg/kg	34.7	29.8	35.0	33.9	44.8	
nickel	7440-02-0	E440	0.50	mg/kg	278	163	293	162	428	
phosphorus	7723-14-0	E440	50	mg/kg	14000	11500	10600	12500	14400	
potassium	7440-09-7	E440	100	mg/kg	6170	5850	5130	5860	6980	
selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.31	0.49	0.45	0.61	
silver	7440-22-4	E440	0.10	mg/kg	6.59	5.97	8.10	11.1	15.8	
sodium	7440-23-5	E440	50	mg/kg	16700	17700	15500	16500	17900	
strontium	7440-24-6	E440	0.50	mg/kg	381	273	289	315	344	
sulfur	7704-34-9	E440	1000	mg/kg	13800	11300	12000	13500	16400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2217-A-1	BA2217-A-2	BA2217-A-3	BA2217-A-4	BA2217-A-5
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-001	VA22A9370-002	VA22A9370-003	VA22A9370-004	VA22A9370-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.079	0.172	0.081	0.092	0.092	
tin	7440-31-5	E440	2.0	mg/kg	130	134	812	119	160	
titanium	7440-32-6	E440	1.0	mg/kg	284	410	339	213	358	
tungsten	7440-33-7	E440	0.50	mg/kg	39.1	31.2	48.6	40.2	49.2	
uranium	7440-61-1	E440	0.050	mg/kg	6.01	5.32	5.47	6.60	7.14	
vanadium	7440-62-2	E440	0.20	mg/kg	56.7	52.9	48.8	54.7	61.2	
zinc	7440-66-6	E440	2.0	mg/kg	4990	7570	10300	4600	5740	
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	2.6	1.9	3.3	2.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.4	11.5	11.4	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.17	9.10	8.73	8.77	9.01	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	6.84	6.25	6.30	6.39	6.33	
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	2.03	1.75	1.93	1.97	2.04	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.202	0.186	0.152	0.150	0.156	
calcium, TCLP	7440-70-2	E444	10	mg/L	2110	1860	2020	1990	1920	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.18	1.04	0.946	0.960	1.18	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.592	0.760	0.829	1.25	0.744	
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	124	118	124	121	126	
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	0.56	0.71	0.47	0.52	0.56	
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	BA2217-A-1	BA2217-A-2	BA2217-A-3	BA2217-A-4	BA2217-A-5
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-001	VA22A9370-002	VA22A9370-003	VA22A9370-004	VA22A9370-005	
					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	
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	31.5	45.0	39.2	29.0	36.3	
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 (Matrix: Soil/Solid)					Client sample ID	BA2217-A-6	BA2217-A-7	BA2217-A-8	BA2217-A-9	BA2217-A-10
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-006	VA22A9370-007	VA22A9370-008	VA22A9370-009	VA22A9370-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.6	20.3	20.5	22.4	23.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.4	10.3	10.2	10.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40300	40200	34400	36800	40800	
antimony	7440-36-0	E440	0.10	mg/kg	116	136	98.5	106	130	
arsenic	7440-38-2	E440	0.10	mg/kg	20.2	22.5	16.7	22.4	21.8	
barium	7440-39-3	E440	0.50	mg/kg	354	374	406	362	376	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.36	0.64	0.34	0.40	
bismuth	7440-69-9	E440	0.20	mg/kg	42.3	10.8	8.83	8.53	10.0	
boron	7440-42-8	E440	5.0	mg/kg	177	158	175	243	218	
cadmium	7440-43-9	E440	0.020	mg/kg	14.2	14.0	11.3	16.6	14.7	
calcium	7440-70-2	E440	50	mg/kg	124000	134000	113000	121000	125000	
chromium	7440-47-3	E440	0.50	mg/kg	171	170	425	187	491	
cobalt	7440-48-4	E440	0.10	mg/kg	65.5	58.9	44.8	52.2	55.0	
copper	7440-50-8	E440	0.50	mg/kg	2430	2170	1840	1540	3010	
iron	7439-89-6	E440	50	mg/kg	75200	62600	72000	68100	60400	
lead	7439-92-1	E440	0.50	mg/kg	915	522	875	3470	402	
lithium	7439-93-2	E440	2.0	mg/kg	27.8	23.8	29.0	24.5	41.5	
magnesium	7439-95-4	E440	20	mg/kg	11300	11700	12000	13000	12800	
manganese	7439-96-5	E440	1.0	mg/kg	1020	909	947	946	997	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0564	0.0763	<0.0500	0.144	0.0503	
molybdenum	7439-98-7	E440	0.10	mg/kg	36.3	28.5	54.4	29.4	33.1	
nickel	7440-02-0	E440	0.50	mg/kg	206	148	295	167	358	
phosphorus	7723-14-0	E440	50	mg/kg	11700	13900	10800	10800	11900	
potassium	7440-09-7	E440	100	mg/kg	5770	6110	5480	6240	6920	
selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.48	0.34	0.39	0.45	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	24.1	----	----	
silver	7440-22-4	E440	0.10	mg/kg	9.06	7.92	----	7.65	7.73	
sodium	7440-23-5	E440	50	mg/kg	17000	17800	17700	17900	17800	
strontium	7440-24-6	E440	0.50	mg/kg	290	301	265	283	290	
sulfur	7704-34-9	E440	1000	mg/kg	12100	14000	11200	12900	13900	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2217-A-6	BA2217-A-7	BA2217-A-8	BA2217-A-9	BA2217-A-10
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-006	VA22A9370-007	VA22A9370-008	VA22A9370-009	VA22A9370-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.109	0.081	0.104	0.085	0.087	
tin	7440-31-5	E440	2.0	mg/kg	146	154	98.5	109	121	
titanium	7440-32-6	E440	1.0	mg/kg	224	291	214	225	294	
tungsten	7440-33-7	E440	0.50	mg/kg	29.5	35.7	38.4	31.7	35.7	
uranium	7440-61-1	E440	0.050	mg/kg	5.50	6.38	5.14	6.01	6.46	
vanadium	7440-62-2	E440	0.20	mg/kg	49.7	50.8	50.2	55.2	54.3	
zinc	7440-66-6	E440	2.0	mg/kg	5190	4720	11500	4100	4700	
zirconium	7440-67-7	E440	1.0	mg/kg	2.7	2.0	2.5	2.6	2.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.4	11.4	11.4	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.74	9.03	8.88	8.73	9.08	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	6.27	6.21	6.24	6.05	6.09	
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	1.92	1.89	1.82	1.76	1.76	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.163	0.162	0.154	0.209	0.189	
calcium, TCLP	7440-70-2	E444	10	mg/L	1960	2000	1980	1820	1910	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.46	1.17	0.716	1.86	1.24	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.906	0.928	0.846	0.553	0.842	
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	126	122	124	115	116	
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	0.71	0.86	0.61	0.65	0.53	
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	BA2217-A-6	BA2217-A-7	BA2217-A-8	BA2217-A-9	BA2217-A-10
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00	27-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-006	VA22A9370-007	VA22A9370-008	VA22A9370-009	VA22A9370-010	
					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	44.2	58.4	32.7	43.4	51.6	
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 (Matrix: Soil/Solid)					Client sample ID	BA2217-A-11	BA2217-A-12	----	----	----
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-011	VA22A9370-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	19.3	21.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.4	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	33800	37800	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	122	128	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	22.9	22.8	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	306	314	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.33	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	8.71	10.2	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	136	164	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	14.5	14.8	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	122000	132000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	227	224	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	227	360	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2180	3050	----	----	----	
iron	7439-89-6	E440	50	mg/kg	79300	62000	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1490	618	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	24.6	29.8	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11700	12600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	945	878	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0687	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	31.7	27.2	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	205	166	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	12600	13900	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5960	6090	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.48	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	7.38	8.92	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	17300	17500	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	302	302	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	13100	13600	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.090	0.087	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2217-A-11	BA2217-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	27-Apr-2022 09:00	27-Apr-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-011	VA22A9370-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	144	120	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	216	205	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	39.3	31.3	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.98	6.52	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	52.6	79.6	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	5020	12900	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	3.2	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.5	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.77	9.20	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.04	6.26	----	----	----	
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	1.67	1.82	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.148	0.206	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	1830	2000	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	4.13	0.793	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.22	0.501	----	----	----	
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	112	123	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	2.71	0.55	----	----	----	
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	BA2217-A-11	BA2217-A-12	----	----	----
Client sampling date / time					27-Apr-2022 09:00	27-Apr-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A9370-011	VA22A9370-012	-----	-----	-----	
					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	44.8	51.7	----	----	----	
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	: VA22A9370	Page	: 1 of 16
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	: 03-May-2022 14:30
PO	: VANCO 0000051213	Issue Date	: 19-May-2022 13:05
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 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	VA22A9370-001	BA2217-A-1	cobalt	7440-48-4	E440	49.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9370-001	BA2217-A-1	lithium	7439-93-2	E440	57.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9370-001	BA2217-A-1	manganese	7439-96-5	E440	114 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9370-001	BA2217-A-1	nickel	7440-02-0	E440	33.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2217-A-8	E440.Ag	27-Apr-2022	18-May-2022	180 days	21 days	✓	18-May-2022	159 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-1	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-10	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-11	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-12	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-2	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-3	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 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 BA2217-A-4	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-5	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-6	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-7	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-8	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2217-A-9	E510	27-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2217-A-1	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2217-A-10	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2217-A-11	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 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 BA2217-A-12	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-2	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-3	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-4	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-5	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-6	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-7	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-8	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2217-A-9	E440	27-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	20 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-1	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-10	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-11	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-12	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-2	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-3	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-4	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-5	E144	27-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2217-A-6	E144	27-Apr-2022	----	----	----		16-May-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 BA2217-A-7	E144	27-Apr-2022	----	----	----		16-May-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2217-A-8	E144	27-Apr-2022	----	----	----		16-May-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2217-A-9	E144	27-Apr-2022	----	----	----		16-May-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-1	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-10	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-11	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-12	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-2	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-3	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 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 BA2217-A-4	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-5	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-6	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-7	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-8	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2217-A-9	E108	27-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-1	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-10	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-11	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 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) BA2217-A-12	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-2	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-3	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-4	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-5	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-6	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-7	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-8	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2217-A-9	E512	12-May-2022	----	----	----		13-May-2022	28 days	16 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) BA2217-A-1	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-10	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-11	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-12	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-2	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-3	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-4	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-5	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-6	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 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) BA2217-A-7	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-8	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2217-A-9	E444	12-May-2022	----	----	----		13-May-2022	180 days	16 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-1	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-10	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-11	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-12	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-2	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-3	EPP444	27-Apr-2022	12-May-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) BA2217-A-4	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-5	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-6	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-7	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-8	EPP444	27-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2217-A-9	EPP444	27-Apr-2022	12-May-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 (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	489894	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	489893	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	489896	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	489895	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	491718	1	2	50.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	489894	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	489893	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	489896	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	489895	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	491718	1	2	50.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	487332	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	489894	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	487334	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	489893	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	489896	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	487332	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	487334	1	12	8.3	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	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.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
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	: VA22A9370	Page	: 1 of 11
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	: 03-May-2022 14:30
PO	: VANCO 0000051213	Date Analysis Commenced	: 12-May-2022
C-O-C number	: ----	Issue Date	: 19-May-2022 13:05
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>
Caleb Deroche	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia

Page : 2 of 11
Work Order : VA22A9370
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: 489895)											
VA22A9370-001	BA2217-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	0.3%	5%	----
Physical Tests (QC Lot: 489896)											
VA22A9370-001	BA2217-A-1	moisture	----	E144	0.25	%	22.6	22.3	1.37%	20%	----
Metals (QC Lot: 489893)											
VA22A9370-001	BA2217-A-1	aluminum	7429-90-5	E440	50	mg/kg	44000	37100	16.9%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	141	126	11.3%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	24.0	19.5	20.7%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	364	437	18.3%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.47	0.11	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	10.1	10.5	4.35%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	188	203	7.64%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	15.2	12.1	22.6%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	136000	126000	7.55%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	180	167	7.09%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	62.7	37.7	49.7%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	3140	2940	6.48%	30%	----
		iron	7439-89-6	E440	50	mg/kg	80700	77500	4.05%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	434	335	26.0%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	45.7	25.3	57.4%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	13400	13300	1.17%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	3180	865	114%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	34.7	32.2	7.43%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	278	199	33.4%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	14000	11600	18.8%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6170	5720	7.68%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.39	0.05	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	6.59	8.84	29.1%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	16700	16800	0.0513%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	381	306	21.8%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13800	11700	15.8%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.079	0.081	0.002	Diff <2x LOR	----



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: 489893) - continued											
VA22A9370-001	BA2217-A-1	tin	7440-31-5	E440	2.0	mg/kg	130	114	13.0%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	284	277	2.33%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	39.1	34.4	12.6%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	6.01	5.45	9.71%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	56.7	63.0	10.5%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4990	4040	21.1%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.4	1.9	0.5	Diff <2x LOR	----
Metals (QC Lot: 489894)											
VA22A9370-001	BA2217-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.0880	<0.0500	0.0380	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: 489896)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 489893)						
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	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 489893) - continued						
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 489894)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 491718)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 487332)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 487334)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<1.00	----
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: 489895)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.7	95.0	105	---
Physical Tests (QCLot: 489896)									
moisture	---	E144	0.25	%	50 %	98.5	90.0	110	---
Metals (QCLot: 489893)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.7	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.8	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.5	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.4	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	95.9	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.4	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	99.6	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	94.7	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	100.0	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	93.7	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.5	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	88.3	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	111	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	100	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.4	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	80.0	120	---



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
Metals (QCLot: 489893) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.1	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.9	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.2	80.0	120	----
Metals (QCLot: 489894)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 491718)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	96.9	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1 \times$ spike level.

Sub-Matrix: Soil/Solid

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
TCLP Metals (QCLot: 487332)										
VA22A9370-001	BA2217-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	100	50.0	140	----
TCLP Metals (QCLot: 487334)										
VA22A9370-001	BA2217-A-1	antimony, TCLP	7440-36-0	E444	5.06 mg/L	5 mg/L	101	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.6 mg/L	5 mg/L	92.7	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.9 mg/L	12.5 mg/L	103	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.228 mg/L	0.25 mg/L	91.4	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.48 mg/L	10 mg/L	94.8	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.214 mg/L	0.25 mg/L	85.7	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	1.10 mg/L	1.25 mg/L	87.6	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.17 mg/L	2.5 mg/L	87.0	50.0	140	----
		iron, TCLP	7439-89-6	E444	221 mg/L	250 mg/L	88.4	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.48 mg/L	10 mg/L	94.8	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	240 mg/L	250 mg/L	96.1	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.22 mg/L	2.5 mg/L	89.0	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.65 mg/L	5 mg/L	92.9	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.099 mg/L	0.1 mg/L	99.4	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.9	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.78 mg/L	5 mg/L	95.6	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.70 mg/L	0.75 mg/L	92.9	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	86.1	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: 489893)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	123	70.0	130	----
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	114	70.0	130	----
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	118	70.0	130	----
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	110	70.0	130	----
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	115	70.0	130	----
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	119	40.0	160	----
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	100	70.0	130	----
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	122	70.0	130	----
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	112	70.0	130	----
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	103	70.0	130	----
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	109	70.0	130	----
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	109	70.0	130	----
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	103	70.0	130	----
	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	114	70.0	130	----
	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	116	70.0	130	----
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	107	70.0	130	----
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	110	70.0	130	----
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	103	70.0	130	----
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	129	70.0	130	----
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	120	70.0	130	----
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	110	70.0	130	----
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	115	40.0	160	----
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	97.6	70.0	130	----
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	130	70.0	130	----
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	118	70.0	130	----
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	118	70.0	130	----
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	108	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	99.2	70.0	130	----

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 Work Order : VA22A9370
 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: 489894)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	95.6	70.0	130	----



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

Invoice To Same as Report ?			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)						
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Job #:									
Company:			PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite								
Contact:			LSD:	(includes 2:1 pH)								
Address:			Quote #:									
Phone:		Fax:	ALS Contact:		Sampler:							
Lab Work Order # (lab use only)	9370											

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	
BA2217-A-1	Environmental Division Vancouver Work Order Reference VA22A9370  Telephone : +1 604 253 4188	27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-2		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-3		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-4		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-5		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-6		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-7		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-8		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-9		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-10		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-11		27-Apr-22	9:00	Soil	X	X			X		1
BA2217-A-12		27-Apr-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: Yes / No ? Yes add SIF
<i>[Signature]</i>	3-May-22	9:00				21.2°C	<i>[Signature]</i>	May 3/22	2:30pm	GEN F 20.00 Front

[Handwritten initials]