

Bottom Ash Data

2022 Week 47

The following analytical report represents bottom ash composite results for week 47 of 2022 (November 20, 2022 to November 26, 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 : **VA22C9051**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : ----
PO : VANCO 0000051213
C-O-C number : ----
Sampler : ----
Site : (includes 2:1 pH)
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 : 29-Nov-2022 11:50
Date Analysis Commenced : 30-Nov-2022
Issue Date : 07-Dec-2022 09:23

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>
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2247-A-1	BA2247-A-2	BA2247-A-3	BA2247-A-4	BA2247-A-5
Client sampling date / time					23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-001	VA22C9051-002	VA22C9051-003	VA22C9051-004	VA22C9051-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	21.4	22.8	19.9	22.1	22.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	10.7	10.6	10.6
Metals									
aluminum	7429-90-5	E440	50	mg/kg	32800	43300	43800	40300	44800
antimony	7440-36-0	E440	0.10	mg/kg	186	162	172	176	170
arsenic	7440-38-2	E440	0.10	mg/kg	30.8	33.9	66.0	36.7	29.2
barium	7440-39-3	E440	0.50	mg/kg	575	506	490	436	471
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.40	0.39	0.37	0.35
bismuth	7440-69-9	E440	0.20	mg/kg	11.8	11.8	12.4	30.6	13.2
boron	7440-42-8	E440	5.0	mg/kg	229	209	206	178	182
cadmium	7440-43-9	E440	0.020	mg/kg	10.5	13.1	11.4	13.1	11.8
calcium	7440-70-2	E440	50	mg/kg	146000	139000	143000	153000	143000
chromium	7440-47-3	E440	0.50	mg/kg	232	213	264	272	379
cobalt	7440-48-4	E440	0.10	mg/kg	54.9	37.8	50.0	90.5	44.6
copper	7440-50-8	E440	0.50	mg/kg	32300	20800	8940	2330	1850
iron	7439-89-6	E440	50	mg/kg	67900	89000	71100	99300	89600
lead	7439-92-1	E440	0.50	mg/kg	608	823	502	1810	1030
lithium	7439-93-2	E440	2.0	mg/kg	63.4	25.2	25.9	23.5	22.8
magnesium	7439-95-4	E440	20	mg/kg	11100	11800	11500	12800	11900
manganese	7439-96-5	E440	1.0	mg/kg	2250	1690	1180	1490	1280
mercury	7439-97-6	E510	0.0500	mg/kg	0.0518	0.0883	0.0572	0.101	0.0514
molybdenum	7439-98-7	E440	0.10	mg/kg	53.3	24.0	79.9	39.4	28.3
nickel	7440-02-0	E440	0.50	mg/kg	549	1070	509	218	205
phosphorus	7723-14-0	E440	50	mg/kg	13600	10800	10900	12100	11400
potassium	7440-09-7	E440	100	mg/kg	6930	6780	7060	7550	6980
selenium	7782-49-2	E440	0.20	mg/kg	0.55	0.52	0.37	0.62	0.44
silver	7440-22-4	E440	0.10	mg/kg	14.6	13.9	9.17	11.8	9.62
sodium	7440-23-5	E440	50	mg/kg	17800	16700	17000	18600	16800
strontium	7440-24-6	E440	0.50	mg/kg	398	320	314	386	316



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2247-A-1	BA2247-A-2	BA2247-A-3	BA2247-A-4	BA2247-A-5
Client sampling date / time					23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-001	VA22C9051-002	VA22C9051-003	VA22C9051-004	VA22C9051-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	16800	17500	16500	18900	16500
thallium	7440-28-0	E440	0.050	mg/kg	0.056	0.076	<0.050	<0.050	<0.050
tin	7440-31-5	E440	2.0	mg/kg	304	178	132	133	141
titanium	7440-32-6	E440	1.0	mg/kg	429	584	449	297	802
tungsten	7440-33-7	E440	0.50	mg/kg	137	73.2	97.5	82.6	93.2
uranium	7440-61-1	E440	0.050	mg/kg	2.21	2.20	2.36	2.64	2.22
vanadium	7440-62-2	E440	0.20	mg/kg	46.9	37.5	40.1	47.4	43.3
zinc	7440-66-6	E440	2.0	mg/kg	4070	14700	4260	5540	4520
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	2.0	2.9	2.8	2.6
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.3	11.4
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.23	8.48	9.16	9.01	9.09
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	6.49	6.36	6.49	6.69	6.65
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	2.39	2.36	2.37	2.18	2.26
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.133	0.140	0.129	0.092	0.151
calcium, TCLP	7440-70-2	E444	10	mg/L	1990	1810	2090	1790	1840
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	0.799	1.28	1.51	0.704	0.908
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.552	0.567	0.880	0.558	0.501
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	121	119	122	107	110
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	0.49	0.54	0.41	0.33	0.40
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/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2247-A-1	BA2247-A-2	BA2247-A-3	BA2247-A-4	BA2247-A-5
					Client sampling date / time	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-001	VA22C9051-002	VA22C9051-003	VA22C9051-004	VA22C9051-005	
					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	27.0	28.7	30.5	16.9	22.2	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2247-A-6	BA2247-A-7	BA2247-A-8	BA2247-A-9	BA2247-A-10
Client sampling date / time					23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-006	VA22C9051-007	VA22C9051-008	VA22C9051-009	VA22C9051-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	21.9	22.7	22.8	23.0	22.9
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	10.6	10.6	10.6
Metals									
aluminum	7429-90-5	E440	50	mg/kg	35200	57100	51700	37600	38200
antimony	7440-36-0	E440	0.10	mg/kg	152	167	155	197	155
arsenic	7440-38-2	E440	0.10	mg/kg	28.9	31.3	120	29.9	29.6
barium	7440-39-3	E440	0.50	mg/kg	498	516	573	558	548
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.39	0.34	0.34	0.36
bismuth	7440-69-9	E440	0.20	mg/kg	12.1	15.8	12.7	56.6	13.1
boron	7440-42-8	E440	5.0	mg/kg	158	204	158	195	179
cadmium	7440-43-9	E440	0.020	mg/kg	10.6	11.8	10.9	11.5	10.9
calcium	7440-70-2	E440	50	mg/kg	134000	157000	135000	136000	138000
chromium	7440-47-3	E440	0.50	mg/kg	361	251	355	278	356
cobalt	7440-48-4	E440	0.10	mg/kg	49.1	60.9	42.2	62.3	56.6
copper	7440-50-8	E440	0.50	mg/kg	6510	4280	10200	7230	7370
iron	7439-89-6	E440	50	mg/kg	82100	68600	89000	88700	83700
lead	7439-92-1	E440	0.50	mg/kg	424	830	1220	435	628
lithium	7439-93-2	E440	2.0	mg/kg	22.9	26.4	27.4	24.5	27.8
magnesium	7439-95-4	E440	20	mg/kg	12600	12300	12000	11600	11200
manganese	7439-96-5	E440	1.0	mg/kg	1230	1260	1360	1190	1200
mercury	7439-97-6	E510	0.0500	mg/kg	0.0602	0.0631	0.0532	<0.0500	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	42.1	34.4	32.8	35.0	32.7
nickel	7440-02-0	E440	0.50	mg/kg	197	217	1610	156	315
phosphorus	7723-14-0	E440	50	mg/kg	10600	11400	11200	11200	11700
potassium	7440-09-7	E440	100	mg/kg	7170	7970	7100	6620	7390
selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.55	0.60	0.47	0.49
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	10.7	----	11.1
silver	7440-22-4	E440	0.10	mg/kg	7.72	20.2	----	21.4	----
sodium	7440-23-5	E440	50	mg/kg	17000	19100	17800	17200	17400
strontium	7440-24-6	E440	0.50	mg/kg	302	364	475	307	330



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2247-A-6	BA2247-A-7	BA2247-A-8	BA2247-A-9	BA2247-A-10
Client sampling date / time					23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-006	VA22C9051-007	VA22C9051-008	VA22C9051-009	VA22C9051-010
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	16600	19000	17200	16600	16600
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.060	0.055	0.111	<0.050
tin	7440-31-5	E440	2.0	mg/kg	121	505	303	379	136
titanium	7440-32-6	E440	1.0	mg/kg	588	627	1110	568	478
tungsten	7440-33-7	E440	0.50	mg/kg	79.7	130	741	93.0	102
uranium	7440-61-1	E440	0.050	mg/kg	2.12	2.52	2.19	2.28	2.25
vanadium	7440-62-2	E440	0.20	mg/kg	40.6	43.2	37.3	40.8	43.1
zinc	7440-66-6	E440	2.0	mg/kg	4840	5260	8000	8990	5080
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	2.2	2.0	1.6	1.6
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.4	11.3	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.34	9.24	9.33	8.97	9.37
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	6.64	6.75	6.70	6.73	6.67
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	2.13	2.20	2.22	2.23	2.21
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.095	0.100	0.089	0.136	0.151
calcium, TCLP	7440-70-2	E444	10	mg/L	1730	1860	1770	1830	1860
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.00	0.701	0.867	0.724	1.21
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.440	0.671	0.512	0.614	0.628
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	110	108	109	107	114
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	0.41	0.33	0.36	0.33	0.36
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/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2247-A-6	BA2247-A-7	BA2247-A-8	BA2247-A-9	BA2247-A-10
					Client sampling date / time	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00	23-Nov-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-006	VA22C9051-007	VA22C9051-008	VA22C9051-009	VA22C9051-010	
					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	17.4	15.7	14.9	12.8	13.9	
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/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2247-A-11	BA2247-A-12	----	----	----
					23-Nov-2022 09:00	23-Nov-2022 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-011	VA22C9051-012	-----	-----	-----
					Result	Result	---	---	---
Physical Tests									
moisture	---	E144	0.25	%	23.7	22.6	---	---	---
pH (1:2 soil:water)	---	E108	0.10	pH units	10.6	10.6	---	---	---
Metals									
aluminum	7429-90-5	E440	50	mg/kg	32900	35900	---	---	---
antimony	7440-36-0	E440	0.10	mg/kg	254	179	---	---	---
arsenic	7440-38-2	E440	0.10	mg/kg	31.3	30.4	---	---	---
barium	7440-39-3	E440	0.50	mg/kg	516	410	---	---	---
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.38	---	---	---
bismuth	7440-69-9	E440	0.20	mg/kg	14.6	16.7	---	---	---
boron	7440-42-8	E440	5.0	mg/kg	180	181	---	---	---
cadmium	7440-43-9	E440	0.020	mg/kg	12.0	13.4	---	---	---
calcium	7440-70-2	E440	50	mg/kg	141000	140000	---	---	---
chromium	7440-47-3	E440	0.50	mg/kg	228	211	---	---	---
cobalt	7440-48-4	E440	0.10	mg/kg	58.1	44.3	---	---	---
copper	7440-50-8	E440	0.50	mg/kg	11000	45200	---	---	---
iron	7439-89-6	E440	50	mg/kg	76600	75000	---	---	---
lead	7439-92-1	E440	0.50	mg/kg	685	1910	---	---	---
lithium	7439-93-2	E440	2.0	mg/kg	22.5	23.6	---	---	---
magnesium	7439-95-4	E440	20	mg/kg	12300	12800	---	---	---
manganese	7439-96-5	E440	1.0	mg/kg	1230	1120	---	---	---
mercury	7439-97-6	E510	0.0500	mg/kg	0.100	0.100	---	---	---
molybdenum	7439-98-7	E440	0.10	mg/kg	33.6	25.8	---	---	---
nickel	7440-02-0	E440	0.50	mg/kg	254	184	---	---	---
phosphorus	7723-14-0	E440	50	mg/kg	11200	11200	---	---	---
potassium	7440-09-7	E440	100	mg/kg	6730	7220	---	---	---
selenium	7782-49-2	E440	0.20	mg/kg	0.53	0.56	---	---	---
silver	7440-22-4	E440.Ag	0.10	mg/kg	>819	---	---	---	---
silver	7440-22-4	E440	0.10	mg/kg	---	8.65	---	---	---
sodium	7440-23-5	E440	50	mg/kg	17700	17600	---	---	---
strontium	7440-24-6	E440	0.50	mg/kg	319	369	---	---	---



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2247-A-11	BA2247-A-12	----	----	----
Client sampling date / time					23-Nov-2022 09:00	23-Nov-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-011	VA22C9051-012	-----	-----	-----
					Result	Result	----	----	----
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	17200	17200	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.060	0.052	----	----	----
tin	7440-31-5	E440	2.0	mg/kg	179	207	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	483	279	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	177	68.4	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	2.29	2.32	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	37.7	36.7	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	16400	9200	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	1.5	2.4	----	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.41	9.04	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.74	6.72	----	----	----
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	2.17	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.088	0.110	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L	1900	1880	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.813	0.801	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.498	0.550	----	----	----
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	111	108	----	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.34	0.36	----	----	----
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2247-A-11	BA2247-A-12	----	----	----
					Client sampling date / time	23-Nov-2022 09:00	23-Nov-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C9051-011	VA22C9051-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
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	----	----	----	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	13.3	20.2	----	----	----	
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 : VA22C9051</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 : ----</p> <p>PO : VANCO 0000051213</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : (includes 2:1 pH)</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 : 29-Nov-2022 11:50</p> <p>Issue Date : 07-Dec-2022 09:23</p>
--	---

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	VA22C9051-001	BA2247-A-1	cobalt	7440-48-4	E440	53.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	copper	7440-50-8	E440	169 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	lithium	7439-93-2	E440	88.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	manganese	7439-96-5	E440	58.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	molybdenum	7439-98-7	E440	45.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	nickel	7440-02-0	E440	82.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	tin	7440-31-5	E440	65.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	tungsten	7440-33-7	E440	33.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C9051-001	BA2247-A-1	zinc	7440-66-6	E440	35.3 % 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 BA2247-A-10	E440.Ag	23-Nov-2022	06-Dec-2022	180 days	13 days	✓	06-Dec-2022	167 days	1 days	✓	
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2247-A-11	E440.Ag	23-Nov-2022	06-Dec-2022	180 days	13 days	✓	06-Dec-2022	167 days	1 days	✓	
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2247-A-8	E440.Ag	23-Nov-2022	06-Dec-2022	180 days	13 days	✓	06-Dec-2022	167 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-1	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-10	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-11	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-12	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-2	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-3	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-4	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-5	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-6	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-7	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-8	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2247-A-9	E510	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	28 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2247-A-1	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-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		
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-10	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-11	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-12	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-2	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-3	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-4	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-5	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-6	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2247-A-7	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-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		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2247-A-8	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2247-A-9	E440	23-Nov-2022	05-Dec-2022	----	----		06-Dec-2022	180 days	12 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-1	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-10	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-11	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-12	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-2	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-3	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-4	E144	23-Nov-2022	----	----	----		04-Dec-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 BA2247-A-5	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-6	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-7	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-8	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2247-A-9	E144	23-Nov-2022	----	----	----		04-Dec-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-1	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-10	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-11	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-12	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-2	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-3	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-4	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-5	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-6	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-7	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-8	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2247-A-9	E108	23-Nov-2022	05-Dec-2022	----	----		05-Dec-2022	30 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-1	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-10	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-11	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-12	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-2	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-3	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-4	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-5	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-6	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-7	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-8	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2247-A-9	E512	30-Nov-2022	02-Dec-2022	----	----		02-Dec-2022	28 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-1	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-10	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-11	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-12	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-2	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-3	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-4	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 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) BA2247-A-5	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-6	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-7	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-8	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2247-A-9	E444	30-Nov-2022	02-Dec-2022	----	----		04-Dec-2022	180 days	11 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-1	EPP444	23-Nov-2022	30-Nov-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-10	EPP444	23-Nov-2022	30-Nov-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-11	EPP444	23-Nov-2022	30-Nov-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-12	EPP444	23-Nov-2022	30-Nov-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: 180 Day HT (e.g. metals ex. Hg) BA2247-A-2	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-3	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-4	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-5	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-6	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-7	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-8	EPP444	23-Nov-2022	30-Nov-2022	---	---		---	---	---	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2247-A-9	EPP444	23-Nov-2022	30-Nov-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	767021	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	767022	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	767024	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	767023	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	768633	1	3	33.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	767021	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	767022	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	767024	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	767023	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	768633	1	3	33.3	5.0	✔
Mercury by CVAAS (TCLP)	E512	766146	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	767021	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	766145	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	767022	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	767024	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	766146	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	766145	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	: VA22C9051	Page	: 1 of 12
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	: ----	Date Samples Received	: 29-Nov-2022 11:50
PO	: VANCO 0000051213	Date Analysis Commenced	: 30-Nov-2022
C-O-C number	: ----	Issue Date	: 07-Dec-2022 09:23
Sampler	: ----		
Site	: (includes 2:1 pH)		
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>
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia

Page : 2 of 12
Work Order : VA22C9051
Client : Covanta Burnaby Renewable Energy, ULC
Project : ----



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: 767023)											
VA22C9051-001	BA2247-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	0.1%	5%	----
Physical Tests (QC Lot: 767024)											
VA22C9051-001	BA2247-A-1	moisture	----	E144	0.25	%	21.4	22.0	2.51%	20%	----
Metals (QC Lot: 767021)											
VA22C9051-001	BA2247-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.0518	0.0585	0.0066	Diff <2x LOR	----
Metals (QC Lot: 767022)											
VA22C9051-001	BA2247-A-1	aluminum	7429-90-5	E440	50	mg/kg	32800	32000	2.49%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	186	186	0.0860%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	30.8	30.8	0.205%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	575	508	12.3%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.35	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	11.8	12.9	8.76%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	229	208	9.62%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	10.5	11.1	5.28%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	146000	142000	2.64%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	232	273	16.4%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	54.9	95.0	53.5%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	32300	2680	169%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	67900	77000	12.6%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	608	567	7.09%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	63.4	24.6	88.1%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	11100	12200	10.0%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	2250	1230	58.4%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	53.3	33.6	45.2%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	549	228	82.5%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	13600	12500	8.51%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6930	7230	4.26%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.55	0.48	0.06	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	14.6	14.2	2.85%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	17800	17400	1.98%	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: 767022) - continued											
VA22C9051-001	BA2247-A-1	strontium	7440-24-6	E440	0.50	mg/kg	398	301	27.6%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	16800	17400	3.55%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.056	0.071	0.014	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	304	155	65.1%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	429	428	0.433%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	137	97.5	33.6%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	2.21	2.25	1.92%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	46.9	37.4	22.6%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4070	5820	35.3%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.3	0.3	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: 767024)						
moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 767021)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 767022)						
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: 767022) - 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	---
Metals (QCLot: 768633)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	---
TCLP Metals (QCLot: 766145)						
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	---
TCLP Metals (QCLot: 766146)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	---





Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 767023)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.8	95.0	105	---
Physical Tests (QCLot: 767024)									
moisture	---	E144	0.25	%	50 %	98.8	90.0	110	---
Metals (QCLot: 767021)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	---
Metals (QCLot: 767022)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	92.8	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.7	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	98.1	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	98.9	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.4	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	97.0	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.9	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.6	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	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	100	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.6	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	106	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: 767022) - continued									
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	106	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.0	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	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	102	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	107	80.0	120	----
Metals (QCLot: 768633)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	92.6	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: 766145)										
VA22C9051-001	BA2247-A-1	antimony, TCLP	7440-36-0	E444	4.30 mg/L	5 mg/L	86.0	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	94.0	50.0	140	----
		barium, TCLP	7440-39-3	E444	10.8 mg/L	12.5 mg/L	86.7	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.230 mg/L	0.25 mg/L	91.8	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.40 mg/L	10 mg/L	84.0	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.224 mg/L	0.25 mg/L	89.7	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.14 mg/L	1.25 mg/L	90.8	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.15 mg/L	2.5 mg/L	86.0	50.0	140	----
		iron, TCLP	7439-89-6	E444	218 mg/L	250 mg/L	87.2	50.0	140	----
		lead, TCLP	7439-92-1	E444	8.59 mg/L	10 mg/L	85.9	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	220 mg/L	250 mg/L	88.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.15 mg/L	2.5 mg/L	86.1	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.48 mg/L	5 mg/L	89.7	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.104 mg/L	0.1 mg/L	104	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.2 mg/L	5 mg/L	84.8	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.37 mg/L	5 mg/L	87.4	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.6	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	8 mg/L	10 mg/L	84.9	50.0	150	----
TCLP Metals (QCLot: 766146)										
VA22C9051-001	BA2247-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.2	50.0	140	----



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

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: 767021)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	---
Metals (QCLot: 767022)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	113	70.0	130	---
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	113	70.0	130	---
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	111	70.0	130	---
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	108	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	120	40.0	160	---
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	113	70.0	130	---
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	---
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	113	70.0	130	---
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	107	70.0	130	---
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	110	70.0	130	---
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	108	70.0	130	---
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	106	70.0	130	---
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	106	70.0	130	---
	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	113	70.0	130	---
	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	113	70.0	130	---
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	117	70.0	130	---
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	---
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	108	70.0	130	---
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	117	70.0	130	---
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	111	70.0	130	---
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	111	70.0	130	---
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	110	40.0	160	---
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	106	70.0	130	---
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	124	70.0	130	---

Page : 12 of 12
 Work Order : VA22C9051
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : ----




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: 767022) - continued									
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	116	70.0	130	----
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	111	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	117	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="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax				<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT									
Contact: Steve McKinney / Dan Skrypnik			Email 1: smckinney@covanta.com													
Address: 5150 Riverbend Drive Burnaby BC			Email 2: rjohnson4@covanta.com													
Phone: 604-521-1025 Fax: <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? <input type="checkbox"/> Yes <input type="checkbox"/> No			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:													

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	
BA2247-A-1	Environmental Division Vancouver Work Order Reference VA22C9051  Telephone : +1 604 253 4188	23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-2		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-3		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-4		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-5		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-6		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-7		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-8		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-9		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-10		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-11		23-Nov-22	9:00	Soil	X	X			X		1
BA2247-A-12	23-Nov-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:
	29-Nov-22	0800		11/29/22	1130	15°C				Yes/No? If Yes add SIF