

Bottom Ash Data

2023 Week 43

The following analytical report represents bottom ash composite results for week 43 of 2023 (October 22, 2023 to October 28, 2023).

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 : **VA23C6319**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : Weekly Bottom Ash - Suite
PO : VANCO0000051998
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 : ALS Environmental - Vancouver
Account Manager : Ian Chen
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 01-Nov-2023 12:10
Date Analysis Commenced : 06-Nov-2023
Issue Date : 10-Nov-2023 14:42

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

This 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>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Russell Zhang		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)					BA2343-A-1	BA2343-A-2	BA2343-A-3	BA2343-A-4	BA2343-A-5
Client sampling date / time					25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-001	VA23C6319-002	VA23C6319-003	VA23C6319-004	VA23C6319-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	30.5	31.0	30.6	30.9	29.8
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	10.7	10.7	10.7	10.7	10.7
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	29300	33800	29600	26400	26400
Antimony	7440-36-0	E440/VA	0.10	mg/kg	94.7	97.3	86.5	88.7	76.9
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	12.7	11.2	11.4	12.4	12.7
Barium	7440-39-3	E440/VA	0.50	mg/kg	477	451	366	406	458
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.27	0.23	0.24	0.31	0.27
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.32	6.59	16.1	11.4	14.1
Boron	7440-42-8	E440/VA	5.0	mg/kg	315	115	128	176	124
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	7.09	7.10	6.88	7.26	7.02
Calcium	7440-70-2	E440/VA	50	mg/kg	106000	102000	104000	114000	111000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	141	110	114	97.6	128
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	26.2	26.5	31.3	237	63.3
Copper	7440-50-8	E440/VA	0.50	mg/kg	3250	31200	2200	2450	3040
Iron	7439-89-6	E440/VA	50	mg/kg	52800	38000	42300	41500	61800
Lead	7439-92-1	E440/VA	0.50	mg/kg	319	252	1110	224	513
Lithium	7439-93-2	E440/VA	2.0	mg/kg	21.4	22.1	21.7	25.7	21.5
Magnesium	7439-95-4	E440/VA	20	mg/kg	8550	7940	7850	9110	8600
Manganese	7439-96-5	E440/VA	1.0	mg/kg	783	688	1010	597	674
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.178	0.449	0.208	0.181	0.362
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	11.3	14.0	12.1	12.6	14.5
Nickel	7440-02-0	E440/VA	0.50	mg/kg	134	109	154	86.8	251
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7880	6450	6980	7720	7430
Potassium	7440-09-7	E440/VA	100	mg/kg	4670	4620	4450	5000	5030
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.21	0.25	<0.20	0.31	0.24
Silver	7440-22-4	E440/VA	0.10	mg/kg	2.38	4.58	2.89	3.37	3.31
Sodium	7440-23-5	E440/VA	50	mg/kg	14600	13800	12800	14300	14200
Strontium	7440-24-6	E440/VA	0.50	mg/kg	254	227	229	249	285



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2343-A-1	BA2343-A-2	BA2343-A-3	BA2343-A-4	BA2343-A-5
(Matrix: Soil/Solid)					Client sampling date / time	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-001	VA23C6319-002	VA23C6319-003	VA23C6319-004	VA23C6319-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg	9600	9600	10000	11200	10400	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	99.4	90.2	77.3	87.3	82.7	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	218	242	153	198	194	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	3.21	3.98	2.38	4.94	3.02	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.71	2.53	2.64	2.78	2.79	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	32.7	30.4	29.4	31.5	29.0	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3730	3020	3580	2690	3450	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.2	3.0	3.9	2.4	3.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.2	11.2	11.1	11.2	11.2	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.57	7.66	6.19	6.10	6.20	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.37	6.64	6.69	6.69	6.76	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.20	2.13	2.13	2.02	2.20	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.460	0.103	0.088	0.096	0.093	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2060	2120	2020	1960	2070	
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	0.967	1.15	1.40	0.839	0.955	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.10	1.10	0.905	0.954	0.927	
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	114	120	110	109	115	
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.36	0.66	0.54	0.42	0.33	
Selenium, TCLP	7782-49-2	E444/VA	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	BA2343-A-1	BA2343-A-2	BA2343-A-3	BA2343-A-4	BA2343-A-5
					Client sampling date / time	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-001	VA23C6319-002	VA23C6319-003	VA23C6319-004	VA23C6319-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	14.0	17.0	10.7	17.0	12.7	12.7
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	<10

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2343-A-6	BA2343-A-7	BA2343-A-8	BA2343-A-9	BA2343-A-10
Client sampling date / time					25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-006	VA23C6319-007	VA23C6319-008	VA23C6319-009	VA23C6319-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	29.6	29.6	29.3	30.7	31.1
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	10.6	10.6	10.5	10.5	10.6
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	33200	33400	31100	26400	27400
Antimony	7440-36-0	E440/VA	0.10	mg/kg	87.8	114	98.8	89.8	99.6
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	12.9	13.0	16.2	14.2	13.7
Barium	7440-39-3	E440/VA	0.50	mg/kg	476	512	400	400	393
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.27	0.25	0.36	0.27	0.28
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	8.10	9.50	9.01	10.3	11.4
Boron	7440-42-8	E440/VA	5.0	mg/kg	162	133	148	126	151
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	6.97	8.15	9.49	8.20	7.73
Calcium	7440-70-2	E440/VA	50	mg/kg	120000	114000	118000	119000	118000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	140	392	125	128	131
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	21.8	91.4	65.0	101	112
Copper	7440-50-8	E440/VA	0.50	mg/kg	1370	9310	3170	24800	2350
Iron	7439-89-6	E440/VA	50	mg/kg	43600	45800	41800	45400	44000
Lead	7439-92-1	E440/VA	0.50	mg/kg	535	1210	745	886	272
Lithium	7439-93-2	E440/VA	2.0	mg/kg	25.5	50.8	30.9	25.7	27.2
Magnesium	7439-95-4	E440/VA	20	mg/kg	8880	8720	9490	8770	9340
Manganese	7439-96-5	E440/VA	1.0	mg/kg	780	697	692	618	750
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.158	0.132	0.138	0.125	0.119
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	12.5	15.1	13.6	11.1	15.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg	93.6	2660	114	95.1	132
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7420	6980	7850	8360	8450
Potassium	7440-09-7	E440/VA	100	mg/kg	4940	4920	5520	5200	5250
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.29	0.34	0.25	0.28	0.29
Silver	7440-22-4	E440/VA	0.10	mg/kg	3.01	3.60	3.80	5.77	5.81
Sodium	7440-23-5	E440/VA	50	mg/kg	15200	14200	15700	14300	14800
Strontium	7440-24-6	E440/VA	0.50	mg/kg	293	243	257	268	270
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11200	10200	11200	11000	11300



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2343-A-6	BA2343-A-7	BA2343-A-8	BA2343-A-9	BA2343-A-10
Client sampling date / time					25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-006	VA23C6319-007	VA23C6319-008	VA23C6319-009	VA23C6319-010
					Result	Result	Result	Result	Result
Metals									
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	318	170	89.7	111	95.1
Titanium	7440-32-6	E440/VA	1.0	mg/kg	224	228	199	153	168
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	3.64	4.06	3.43	3.54	3.30
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.94	2.97	2.98	2.99	3.13
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	33.6	32.5	34.9	32.3	32.5
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2600	3110	3790	5340	3500
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.6	3.2	3.5	3.8	3.4
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.2	11.2	11.2	11.2	11.2
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.87	6.13	6.41	6.21	6.38
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.70	6.58	6.77	6.79	6.66
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.57	2.14	2.16	2.18	2.01
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.100	0.121	0.096	0.140	0.179
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2020	1990	2030	2040	1960
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	0.834	0.917	0.898	0.805	1.56
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.04	0.744	0.928	0.836	0.913
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	114	116	111	117	109
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.35	0.38	0.38	0.32	0.36
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2343-A-6	BA2343-A-7	BA2343-A-8	BA2343-A-9	BA2343-A-10
					Client sampling date / time	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00	25-Oct-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-006	VA23C6319-007	VA23C6319-008	VA23C6319-009	VA23C6319-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	22.9	17.8	10.5	7.54	11.8	
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2343-A-11	BA2343-A-12	----	----	----
					25-Oct-2023 09:00	25-Oct-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-011	VA23C6319-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	30.9	31.5	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	10.6	10.6	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	29000	32000	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	105	99.6	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	19.4	12.2	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	383	431	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.26	0.28	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	8.28	9.97	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	153	171	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	6.54	9.24	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	111000	117000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	146	150	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	42.0	35.7	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	3430	10000	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	45400	43100	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	3810	323	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	22.0	22.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	8530	9210	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	793	709	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.102	0.135	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	12.7	13.3	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	389	301	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7750	8550	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	5060	4940	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.26	0.24	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	6.21	3.59	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	14600	14500	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	408	268	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	10700	10900	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID		BA2343-A-11	BA2343-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		25-Oct-2023 09:00	25-Oct-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-011	VA23C6319-012	-----	-----	-----	-----	-----
					Result	Result	----	----	----	----	----
Metals											
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.091	<0.050	----	----	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg	78.6	90.4	----	----	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	190	192	----	----	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	3.19	3.14	----	----	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.92	2.95	----	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	31.9	33.4	----	----	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2620	3550	----	----	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.8	5.0	----	----	----	----	----
TCLP Metals											
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.3	11.2	----	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.36	6.30	----	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	----	----	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.79	6.91	----	----	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	----	----	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	----	----
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	----	----	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	----	----	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.16	2.04	----	----	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.308	0.082	----	----	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1970	1950	----	----	----	----	----
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----	----
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.23	0.636	----	----	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.884	0.862	----	----	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	----	----	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	106	105	----	----	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.31	0.32	----	----	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	----	----	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	----	----	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2343-A-11	BA2343-A-12	----	----	----
					Client sampling date / time	25-Oct-2023 09:00	25-Oct-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C6319-011	VA23C6319-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	----	----	----	
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	----	----	----	
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	8.58	6.81	----	----	----	
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	----	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23C6319</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO0000051998</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 16</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 01-Nov-2023 12:10</p> <p>Issue Date : 10-Nov-2023 14:42</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA23C6319-001	BA2343-A-1	Boron	7440-42-8	E440	75.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23C6319-001	BA2343-A-1	Cobalt	7440-48-4	E440	59.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23C6319-001	BA2343-A-1	Copper	7440-50-8	E440	40.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23C6319-001	BA2343-A-1	Nickel	7440-02-0	E440	31.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23C6319-001	BA2343-A-1	Silver	7440-22-4	E440	49.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23C6319-001	BA2343-A-1	Zinc	7440-66-6	E440	38.9 % 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 : Analytical Method 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 BA2343-A-1	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-10	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-11	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-12	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-2	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-3	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-4	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2343-A-5	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-6	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-7	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-8	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2343-A-9	E510	25-Oct-2023	07-Nov-2023	28 days	13 days	✔	07-Nov-2023	28 days	14 days	✔
Metals : Metals in Soil/Solid by CRC ICMS										
LDPE bag BA2343-A-1	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔
Metals : Metals in Soil/Solid by CRC ICMS										
LDPE bag BA2343-A-10	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔
Metals : Metals in Soil/Solid by CRC ICMS										
LDPE bag BA2343-A-11	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔
Metals : Metals in Soil/Solid by CRC ICMS										
LDPE bag BA2343-A-12	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2343-A-2	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-3	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-4	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-5	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-6	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-7	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-8	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2343-A-9	E440	25-Oct-2023	07-Nov-2023	180 days	13 days	✔	09-Nov-2023	180 days	15 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2343-A-1	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days		



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2343-A-10	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-11	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-12	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-2	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-3	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-4	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-5	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-6	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-7	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2343-A-8	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2343-A-9	E144	25-Oct-2023	----	----	----		06-Nov-2023	----	12 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-1	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-10	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-11	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-12	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-2	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-3	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2343-A-4	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2343-A-5	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2343-A-6	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2343-A-7	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2343-A-8	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2343-A-9	E108	25-Oct-2023	07-Nov-2023	30 days	13 days	✔	07-Nov-2023	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-1	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✔	08-Nov-2023	40 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-10	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✔	08-Nov-2023	40 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-11	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✔	08-Nov-2023	40 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-12	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✔	08-Nov-2023	40 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2343-A-2	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-3	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-4	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-5	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-6	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-7	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-8	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2343-A-9	E512	06-Nov-2023	08-Nov-2023	40 days	14 days	✓	08-Nov-2023	40 days	14 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-1	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✓	08-Nov-2023	192 days	14 days	✓	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2343-A-10	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-11	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-12	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-2	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-3	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-4	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-5	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-6	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-7	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2343-A-8	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2343-A-9	E444	06-Nov-2023	08-Nov-2023	192 days	14 days	✔	08-Nov-2023	192 days	14 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-1	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-10	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-11	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-12	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-2	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-3	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-4	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔	



Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method 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, PFAS) BA2343-A-5	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-6	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-7	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-8	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2343-A-9	EPP444	25-Oct-2023	06-Nov-2023	----	----		----	28 days	12 days	✔

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	1225516	1	18	5.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1225517	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	1225519	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1225518	1	18	5.5	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1225516	2	18	11.1	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1225517	2	18	11.1	10.0	✔
Moisture Content by Gravimetry	E144	1225519	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1225518	1	18	5.5	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1227732	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1225516	1	18	5.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1227731	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1225517	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	1225519	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1227732	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1227731	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 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally $20 \pm 5^{\circ}\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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	: VA23C6319	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 01-Nov-2023 12:10
PO	: VANCO0000051998	Date Analysis Commenced	: 06-Nov-2023
C-O-C number	: ----	Issue Date	: 10-Nov-2023 14:42
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>
Alex Thornton	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
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Russell Zhang		Vancouver Metals, Burnaby, British Columbia



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: 1225518)											
VA23C6319-001	BA2343-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.6	0.1%	5%	----
Physical Tests (QC Lot: 1225519)											
VA23C6319-001	BA2343-A-1	Moisture	----	E144	0.25	%	30.5	30.2	0.824%	20%	----
Metals (QC Lot: 1225516)											
VA23C6319-001	BA2343-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.178	0.164	0.0135	Diff <2x LOR	----
Metals (QC Lot: 1225517)											
VA23C6319-001	BA2343-A-1	Aluminum	7429-90-5	E440	50	mg/kg	29300	42200	36.0%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	94.7	81.7	14.7%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	12.7	12.7	0.427%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	477	446	6.55%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.27	0.24	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	7.32	7.36	0.454%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	315	142	75.6%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.09	6.92	2.52%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	106000	109000	3.30%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	141	144	2.30%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	26.2	48.6	59.8%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	3250	2150	40.9%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	52800	52100	1.41%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	319	329	2.99%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	21.4	25.2	16.2%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	8550	8100	5.40%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	783	673	15.1%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	11.3	14.0	21.2%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	134	97.4	31.8%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	7880	7580	3.94%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4670	4760	2.05%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.21	<0.20	0.007	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	2.38	3.93	49.0%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	14600	14300	1.66%	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: 1225517) - continued											
VA23C6319-001	BA2343-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	254	274	7.57%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9600	10700	10.4%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	99.4	85.3	15.2%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	218	286	27.0%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	3.21	3.00	0.20	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	2.71	2.71	0.182%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	32.7	32.8	0.290%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3730	2510	38.9%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.2	3.2	1.0	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1225519)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1225516)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1225517)						
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: 1225517) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 1227731)						
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: 1227732)						
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: 1225518)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 1225519)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1225516)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	92.5	80.0	120	----
Metals (QCLot: 1225517)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	87.9	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	90.2	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	93.0	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	90.0	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	90.1	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	92.3	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	96.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	90.4	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	94.1	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	86.8	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	89.8	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	86.7	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	90.7	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	97.0	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	92.4	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	91.9	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	91.9	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	90.3	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	88.1	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	91.7	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	92.1	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	90.5	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	85.2	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	91.9	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	89.4	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	90.2	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: 1225517) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	95.4	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	90.5	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	86.8	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	94.3	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	94.7	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	89.7	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	90.2	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	92.8	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: 1227731)										
VA23C6319-001	BA2343-A-1	Antimony, TCLP	7440-36-0	E444	4.68 mg/L	5 mg/L	93.6	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.9 mg/L	5 mg/L	97.4	50.0	140	----
		Barium, TCLP	7440-39-3	E444	12.0 mg/L	12.5 mg/L	95.8	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.242 mg/L	0.25 mg/L	96.9	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.06 mg/L	10 mg/L	90.6	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.18 mg/L	1.25 mg/L	94.8	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	2.18 mg/L	2.5 mg/L	87.3	50.0	140	----
		Iron, TCLP	7439-89-6	E444	233 mg/L	250 mg/L	93.4	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.20 mg/L	10 mg/L	92.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	223 mg/L	250 mg/L	89.1	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.30 mg/L	2.5 mg/L	91.9	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.73 mg/L	5 mg/L	94.5	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.078 mg/L	0.1 mg/L	77.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	93.5	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.57 mg/L	5 mg/L	91.5	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	95.6	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	0.9 mg/L	1 mg/L	89.9	50.0	150	----
TCLP Metals (QCLot: 1227732)										
VA23C6319-001	BA2343-A-1	Mercury, TCLP	7439-97-6	E512	0.0011 mg/L	0.001 mg/L	108	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: 1225516)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	94.5	70.0	130	----
Metals (QCLot: 1225517)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	102	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	94.7	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	92.7	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	102	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	133	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	96.3	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	100	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	100	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	95.3	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	98.0	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	108	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	102	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	110	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	98.4	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	97.8	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	91.1	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	119	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	108	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	97.6	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	114	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	116	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	113	70.0	130	----

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 Work Order : VA23C6319
 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: 1225517) - 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	106	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	97.2	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	100	70.0	130	----



Chain of Custody / Analytical Request Form

COC #

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

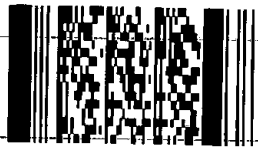
Page of

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

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

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
BA2343-A-1		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-2		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-3		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-4		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-5		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-6		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-7		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-8		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-9		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-10		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-11		25-Oct-23	9:00	Soil	X	X		X	1
BA2343-A-12		25-Oct-23	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA23C6319



Telephone: +1 604 253 4188

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 ? If Yes add SIF
	1-Nov-23	0900				°C				

GENF 20.00 From