

Bottom Ash Data

2023 Week 4

The following analytical report represents bottom ash composite results for week 4 of 2023 (January 22, 2023 to January 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

<p>Work Order : VA23A2258</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 11</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Brent Mack</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : 778-370-3279</p> <p>Date Samples Received : 31-Jan-2023 12:00</p> <p>Date Analysis Commenced : 06-Feb-2023</p> <p>Issue Date : 09-Feb-2023 10:53</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-1	BA2304-A-2	BA2304-A-3	BA2304-A-4	BA2304-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-001	VA23A2258-002	VA23A2258-003	VA23A2258-004	VA23A2258-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	29.3	28.3	27.6	28.6	28.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	10.2	10.1	10.2	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	48700	40500	43000	34700	40500	
Antimony	7440-36-0	E440	0.10	mg/kg	142	134	138	139	207	
Arsenic	7440-38-2	E440	0.10	mg/kg	24.3	22.0	20.6	21.0	23.2	
Barium	7440-39-3	E440	0.50	mg/kg	506	522	441	420	484	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.53	0.45	0.42	0.42	0.39	
Bismuth	7440-69-9	E440	0.20	mg/kg	24.0	22.7	18.1	13.4	14.9	
Boron	7440-42-8	E440	5.0	mg/kg	167	139	184	181	140	
Cadmium	7440-43-9	E440	0.020	mg/kg	13.6 ^{DLM}	18.0 ^{DLM}	12.8 ^{DLM}	18.4 ^{DLM}	14.6 ^{DLM}	
Calcium	7440-70-2	E440	50	mg/kg	151000	146000	144000	154000	148000	
Chromium	7440-47-3	E440	0.50	mg/kg	172	172	181	300	205	
Cobalt	7440-48-4	E440	0.10	mg/kg	42.1	40.6	93.2	93.4	42.1	
Copper	7440-50-8	E440	0.50	mg/kg	2640	3930	2230	4300	3870	
Iron	7439-89-6	E440	50	mg/kg	79700	68800	77000	71500	80700	
Lead	7439-92-1	E440	0.50	mg/kg	597	418	366	345	2740	
Lithium	7439-93-2	E440	2.0	mg/kg	24.8	28.3	28.9	31.1	32.5	
Magnesium	7439-95-4	E440	20	mg/kg	11800	13100	12200	13400	12400	
Manganese	7439-96-5	E440	1.0	mg/kg	954	1020	1200	919	1100	
Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440	0.10	mg/kg	24.9	71.5	26.8	39.6	30.5	
Nickel	7440-02-0	E440	0.50	mg/kg	304	136	161	220	215	
Phosphorus	7723-14-0	E440	50	mg/kg	13200	11600	12400	11800	11400	
Potassium	7440-09-7	E440	100	mg/kg	6090	5950	6100	6020	6180	
Selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.39	0.44	0.50	0.48	
Silver	7440-22-4	E440.Ag	0.10	mg/kg	13.2	----	----	15.6	----	
Silver	7440-22-4	E440	0.10	mg/kg	----	6.37	9.84	----	19.8	
Sodium	7440-23-5	E440	50	mg/kg	19200	17000	17300	18200	18900	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-1	BA2304-A-2	BA2304-A-3	BA2304-A-4	BA2304-A-5
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-001	VA23A2258-002	VA23A2258-003	VA23A2258-004	VA23A2258-005	
					Result	Result	Result	Result	Result	
Metals										
Strontium	7440-24-6	E440	0.50	mg/kg	336	320	308	310	307	
Sulfur	7704-34-9	E440	1000	mg/kg	13200	12400	13100	13400	12700	
Thallium	7440-28-0	E440	0.050	mg/kg	0.075	0.076	0.068	0.076	0.078	
Tin	7440-31-5	E440	2.0	mg/kg	336	249	132	296	161	
Titanium	7440-32-6	E440	1.0	mg/kg	416	520	316	213	286	
Tungsten	7440-33-7	E440	0.50	mg/kg	52.3	49.7	60.0	70.2	75.1	
Uranium	7440-61-1	E440	0.050	mg/kg	4.30	4.26	4.26	4.38	4.11	
Vanadium	7440-62-2	E440	0.20	mg/kg	47.2	45.0	46.6	46.0	47.4	
Zinc	7440-66-6	E440	2.0	mg/kg	5810	3690	4840	3840	3730	
Zirconium	7440-67-7	E440	1.0	mg/kg	4.2	2.3	3.6	2.9	3.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.2	11.2	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.99	6.84	6.41	6.00	5.49	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	6.35	6.51	7.13	6.52	6.47	
Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.77	1.81	1.84	1.72	1.84	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	1.24	0.652	0.167	0.140	0.147	
Calcium, TCLP	7440-70-2	E444	10	mg/L	1880	2060	2020	1830	2000	
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	1.71	3.96	1.19	1.88	1.25	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.497	0.636	0.580	0.847	0.540	
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	111	118	119	109	116	
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.65	0.56	0.44	0.44	0.46	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2304-A-1	BA2304-A-2	BA2304-A-3	BA2304-A-4	BA2304-A-5
Client sampling date / time					25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-001	VA23A2258-002	VA23A2258-003	VA23A2258-004	VA23A2258-005	
TCLP Metals					Result	Result	Result	Result	Result	
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
Zinc, TCLP	7440-66-6	E444	0.50	mg/L	16.6	17.3	19.7	17.2	21.8	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-6	BA2304-A-7	BA2304-A-8	BA2304-A-9	BA2304-A-10
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-006	VA23A2258-007	VA23A2258-008	VA23A2258-009	VA23A2258-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	29.0	26.5	27.9	28.3	27.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	10.2	10.2	10.2	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	39200	42700	42200	40300	37200	
Antimony	7440-36-0	E440	0.10	mg/kg	163	166	154	151	142	
Arsenic	7440-38-2	E440	0.10	mg/kg	22.7	20.4	20.0	19.8	21.7	
Barium	7440-39-3	E440	0.50	mg/kg	476	491	591	543	473	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.49	0.38	0.50	0.40	0.40	
Bismuth	7440-69-9	E440	0.20	mg/kg	18.1	15.5	22.2	15.6	17.5	
Boron	7440-42-8	E440	5.0	mg/kg	158	181	277	246	234	
Cadmium	7440-43-9	E440	0.020	mg/kg	12.4 ^{DLM}	15.3	12.1	12.4	12.7	
Calcium	7440-70-2	E440	50	mg/kg	154000	149000	164000	154000	160000	
Chromium	7440-47-3	E440	0.50	mg/kg	170	182	176	305	268	
Cobalt	7440-48-4	E440	0.10	mg/kg	44.5	130	148	194	54.1	
Copper	7440-50-8	E440	0.50	mg/kg	2280	4800	4880	7350	6910	
Iron	7439-89-6	E440	50	mg/kg	77200	67800	67600	60700	72600	
Lead	7439-92-1	E440	0.50	mg/kg	503	680	774	290	412	
Lithium	7439-93-2	E440	2.0	mg/kg	29.1	27.7	34.1	36.5	28.7	
Magnesium	7439-95-4	E440	20	mg/kg	12200	12100	14300	12900	12800	
Manganese	7439-96-5	E440	1.0	mg/kg	854	1110	950	829	1020	
Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440	0.10	mg/kg	25.4	31.4	37.3	50.3	65.8	
Nickel	7440-02-0	E440	0.50	mg/kg	199	250	232	195	208	
Phosphorus	7723-14-0	E440	50	mg/kg	14300	12100	11200	14400	13500	
Potassium	7440-09-7	E440	100	mg/kg	6280	7450	6930	7280	6840	
Selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.43	0.42	0.40	0.38	
Silver	7440-22-4	E440	0.10	mg/kg	15.8	7.19	7.89	6.86	13.7	
Sodium	7440-23-5	E440	50	mg/kg	18200	18400	18300	20300	19400	
Strontium	7440-24-6	E440	0.50	mg/kg	329	311	333	314	315	
Sulfur	7704-34-9	E440	1000	mg/kg	14600	15000	13900	13500	14400	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-6	BA2304-A-7	BA2304-A-8	BA2304-A-9	BA2304-A-10
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-006	VA23A2258-007	VA23A2258-008	VA23A2258-009	VA23A2258-010	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440	0.050	mg/kg	0.075	0.095	0.068	0.065	0.071	
Tin	7440-31-5	E440	2.0	mg/kg	1420	178	173	125	189	
Titanium	7440-32-6	E440	1.0	mg/kg	242	359	522	404	319	
Tungsten	7440-33-7	E440	0.50	mg/kg	37.2	48.5	62.6	114	61.7	
Uranium	7440-61-1	E440	0.050	mg/kg	4.62	4.18	4.20	4.42	4.19	
Vanadium	7440-62-2	E440	0.20	mg/kg	47.9	50.8	52.4	48.6	55.5	
Zinc	7440-66-6	E440	2.0	mg/kg	4360	5300	4060	3700	4080	
Zirconium	7440-67-7	E440	1.0	mg/kg	5.0	3.2	2.1	2.4	3.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.3	11.2	11.3	11.3	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.13	6.55	5.59	6.17	5.83	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	6.77	6.47	6.67	6.60	6.50	
Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.87	1.80	1.82	1.82	1.83	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.161	0.158	0.180	0.143	0.128	
Calcium, TCLP	7440-70-2	E444	10	mg/L	2020	1950	1940	1990	2060	
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	1.05	1.42	1.88	1.48	1.26	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.422	0.740	0.564	0.475	0.543	
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	118	117	112	116	119	
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	0.47	0.51	0.46	0.57	0.50	
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-6	BA2304-A-7	BA2304-A-8	BA2304-A-9	BA2304-A-10
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00	25-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-006	VA23A2258-007	VA23A2258-008	VA23A2258-009	VA23A2258-010	
TCLP Metals					Result	Result	Result	Result	Result	
Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
Zinc, TCLP	7440-66-6	E444	0.50	mg/L	14.5	16.6	16.6	25.2	16.8	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-11	BA2304-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-011	VA23A2258-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
Moisture	----	E144	0.25	%	27.8	28.1	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	----	----	----	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	41700	42000	----	----	----	
Antimony	7440-36-0	E440	0.10	mg/kg	134	148	----	----	----	
Arsenic	7440-38-2	E440	0.10	mg/kg	19.6	18.8	----	----	----	
Barium	7440-39-3	E440	0.50	mg/kg	557	509	----	----	----	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.45	0.41	----	----	----	
Bismuth	7440-69-9	E440	0.20	mg/kg	15.3	13.9	----	----	----	
Boron	7440-42-8	E440	5.0	mg/kg	210	175	----	----	----	
Cadmium	7440-43-9	E440	0.020	mg/kg	21.2	13.0	----	----	----	
Calcium	7440-70-2	E440	50	mg/kg	160000	154000	----	----	----	
Chromium	7440-47-3	E440	0.50	mg/kg	218	180	----	----	----	
Cobalt	7440-48-4	E440	0.10	mg/kg	81.4	80.1	----	----	----	
Copper	7440-50-8	E440	0.50	mg/kg	1700	6840	----	----	----	
Iron	7439-89-6	E440	50	mg/kg	55600	45400	----	----	----	
Lead	7439-92-1	E440	0.50	mg/kg	313	320	----	----	----	
Lithium	7439-93-2	E440	2.0	mg/kg	29.1	28.8	----	----	----	
Magnesium	7439-95-4	E440	20	mg/kg	12600	12400	----	----	----	
Manganese	7439-96-5	E440	1.0	mg/kg	840	780	----	----	----	
Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
Molybdenum	7439-98-7	E440	0.10	mg/kg	28.6	45.6	----	----	----	
Nickel	7440-02-0	E440	0.50	mg/kg	241	148	----	----	----	
Phosphorus	7723-14-0	E440	50	mg/kg	12500	13800	----	----	----	
Potassium	7440-09-7	E440	100	mg/kg	7460	7690	----	----	----	
Selenium	7782-49-2	E440	0.20	mg/kg	0.40	0.37	----	----	----	
Silver	7440-22-4	E440.Ag	0.10	mg/kg	39.0	----	----	----	----	
Silver	7440-22-4	E440	0.10	mg/kg	----	10.8	----	----	----	
Sodium	7440-23-5	E440	50	mg/kg	19500	19800	----	----	----	
Strontium	7440-24-6	E440	0.50	mg/kg	332	331	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2304-A-11	BA2304-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	25-Jan-2023 09:00	25-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-011	VA23A2258-012	-----	-----	-----	
					Result	Result	----	----	----	
Metals										
Sulfur	7704-34-9	E440	1000	mg/kg	13600	14200	----	----	----	
Thallium	7440-28-0	E440	0.050	mg/kg	0.070	0.065	----	----	----	
Tin	7440-31-5	E440	2.0	mg/kg	120	176	----	----	----	
Titanium	7440-32-6	E440	1.0	mg/kg	674	418	----	----	----	
Tungsten	7440-33-7	E440	0.50	mg/kg	107	59.9	----	----	----	
Uranium	7440-61-1	E440	0.050	mg/kg	4.52	4.06	----	----	----	
Vanadium	7440-62-2	E440	0.20	mg/kg	47.6	52.2	----	----	----	
Zinc	7440-66-6	E440	2.0	mg/kg	8990	5510	----	----	----	
Zirconium	7440-67-7	E440	1.0	mg/kg	2.3	2.9	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.2	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	5.79	5.92	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.61	6.44	----	----	----	
Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	----	----	----	
Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.84	1.82	----	----	----	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.142	0.172	----	----	----	
Calcium, TCLP	7440-70-2	E444	10	mg/L	2020	2080	----	----	----	
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.19	1.44	----	----	----	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.630	0.416	----	----	----	
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	119	122	----	----	----	
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.56	0.46	----	----	----	
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA2304-A-11	BA2304-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		25-Jan-2023 09:00	25-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A2258-011	VA23A2258-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	----	----	----	----	----
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	20.2	18.8	----	----	----	----	----
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 : VA23A2258</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 : 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 : 31-Jan-2023 12:00</p> <p>Issue Date : 09-Feb-2023 10:53</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	VA23A2258-001	BA2304-A-1	Bismuth	7440-69-9	E440	56.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-007	BA2304-A-7	Bismuth	7440-69-9	E440	56.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-001	BA2304-A-1	Cobalt	7440-48-4	E440	101 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-007	BA2304-A-7	Cobalt	7440-48-4	E440	35.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-007	BA2304-A-7	Copper	7440-50-8	E440	96.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-007	BA2304-A-7	Lead	7439-92-1	E440	44.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-001	BA2304-A-1	Lithium	7439-93-2	E440	41.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-001	BA2304-A-1	Manganese	7439-96-5	E440	79.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A2258-001	BA2304-A-1	Zinc	7440-66-6	E440	33.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-1	E440.Ag	25-Jan-2023	07-Feb-2023	180 days	13 days	✓	08-Feb-2023	167 days	1 days	✓	
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-4	E440.Ag	25-Jan-2023	07-Feb-2023	180 days	13 days	✓	08-Feb-2023	167 days	1 days	✓	
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-11	E440.Ag	25-Jan-2023	08-Feb-2023	180 days	14 days	✓	08-Feb-2023	166 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-1	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-2	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-3	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-4	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	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 BA2304-A-5	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-6	E510	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-10	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-11	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-12	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-7	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-8	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2304-A-9	E510	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-1	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-2	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-3	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-4	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-5	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-6	E440	25-Jan-2023	06-Feb-2023	----	----		07-Feb-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-10	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-11	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-12	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2304-A-7	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-8	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2304-A-9	E440	25-Jan-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-1	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-10	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-11	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-12	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-2	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-3	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-4	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		



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 BA2304-A-5	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-6	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-7	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-8	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2304-A-9	E144	25-Jan-2023	----	----	----		06-Feb-2023	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2304-A-1	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2304-A-2	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2304-A-3	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2304-A-4	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	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 BA2304-A-5	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	30 days	12 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-6	E108	25-Jan-2023	06-Feb-2023	----	----		06-Feb-2023	30 days	12 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-10	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-11	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-12	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-7	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-8	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2304-A-9	E108	25-Jan-2023	07-Feb-2023	----	----		07-Feb-2023	30 days	13 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2304-A-1	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-10	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-11	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-12	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-2	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-3	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-4	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-5	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-6	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-7	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-8	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2304-A-9	E512	06-Feb-2023	07-Feb-2023	----	----		07-Feb-2023	28 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-1	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-10	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-11	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-12	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-2	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-3	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2304-A-4	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2304-A-5	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2304-A-6	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2304-A-7	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2304-A-8	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2304-A-9	E444	06-Feb-2023	07-Feb-2023	----	----		08-Feb-2023	180 days	14 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-1	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-10	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-11	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-12	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	



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) BA2304-A-2	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-3	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-4	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-5	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-6	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-7	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-8	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2304-A-9	EPP444	25-Jan-2023	06-Feb-2023	----	----		----	----	----	

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	824919	2	19	10.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	825252	2	19	10.5	5.0	✔
Moisture Content by Gravimetry	E144	825255	2	18	11.1	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	825254	2	19	10.5	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	827937	2	3	66.6	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	824919	4	19	21.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	825252	4	19	21.0	10.0	✔
Moisture Content by Gravimetry	E144	825255	2	18	11.1	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	825254	2	19	10.5	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	827937	2	3	66.6	5.0	✔
Mercury by CVAAS (TCLP)	E512	826907	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	824919	2	19	10.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	826908	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	825252	2	19	10.5	5.0	✔
Moisture Content by Gravimetry	E144	825255	2	18	11.1	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	826907	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	826908	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)	<p>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 HNO₃ and HCl.</p> <p>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.</p> <p>Analysis is by Collision/Reaction Cell ICPMS.</p>
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	<p>Samples are sieved through a 2 mm sieve, and digested with HNO₃ 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.</p>
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	: VA23A2258	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Nicole Victor	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 31-Jan-2023 12:00
PO	: VANCO0000051998	Date Analysis Commenced	: 06-Feb-2023
C-O-C number	: ----	Issue Date	: 09-Feb-2023 10:53
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>
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
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	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: 824921)											
VA23A2258-001	BA2304-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.3	0.7%	5%	----
Physical Tests (QC Lot: 824923)											
VA23A2258-002	BA2304-A-2	Moisture	----	E144	0.25	%	28.3	28.0	0.939%	20%	----
Physical Tests (QC Lot: 825254)											
VA23A2258-007	BA2304-A-7	pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	0.1%	5%	----
Physical Tests (QC Lot: 825255)											
VA23A2258-007	BA2304-A-7	Moisture	----	E144	0.25	%	26.5	26.7	0.826%	20%	----
Metals (QC Lot: 824919)											
VA23A2258-001	BA2304-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0529	0.0029	Diff <2x LOR	----
Metals (QC Lot: 824920)											
VA23A2258-001	BA2304-A-1	Aluminum	7429-90-5	E440	50	mg/kg	48700	43600	11.1%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	142	144	1.48%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	24.3	20.3	17.8%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	506	488	3.54%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.53	0.39	0.15	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	24.0	13.4	56.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	167	164	2.29%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	13.6	13.1	3.58%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	151000	152000	0.543%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	172	215	22.4%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	42.1	128	101%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	2640	3110	16.3%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	79700	59400	29.2%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	597	464	25.1%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	24.8	37.7	41.2%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	11800	12200	3.10%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	954	2200	79.2%	30%	DUP-H
Molybdenum	7439-98-7	E440	0.10	mg/kg	24.9	29.4	16.8%	40%	----		
Nickel	7440-02-0	E440	0.50	mg/kg	304	343	12.3%	30%	----		
Phosphorus	7723-14-0	E440	50	mg/kg	13200	12700	4.30%	30%	----		



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: 824920) - continued											
VA23A2258-001	BA2304-A-1	Potassium	7440-09-7	E440	100	mg/kg	6090	6050	0.543%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.48	0.04	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	19200	17800	7.74%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	336	382	12.9%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13200	14100	6.37%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.075	0.081	0.006	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	336	499	39.0%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	416	284	37.8%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	52.3	42.9	19.6%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.30	4.26	1.00%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	47.2	50.2	6.03%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	5810	4150	33.4%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	4.2	2.6	1.6	Diff <2x LOR	----
Metals (QC Lot: 825252)											
VA23A2258-007	BA2304-A-7	Aluminum	7429-90-5	E440	50	mg/kg	42700	42000	1.68%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	166	149	10.5%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	20.4	21.1	3.19%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	491	429	13.3%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.42	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	15.5	27.7	56.4%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	181	233	25.3%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	15.3	14.2	7.19%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	149000	158000	5.91%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	182	152	17.9%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	130	91.4	35.0%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	4800	1680	96.3%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	67800	50200	29.8%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	680	434	44.2%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	27.7	33.9	20.2%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12100	12400	2.55%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	1110	885	22.4%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	31.4	29.0	8.04%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	250	233	7.06%	30%	----
Phosphorus	7723-14-0	E440	50	mg/kg	12100	12900	6.56%	30%	----		



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: 825252) - continued											
VA23A2258-007	BA2304-A-7	Potassium	7440-09-7	E440	100	mg/kg	7450	6970	6.62%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.42	0.003	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	7.19	6.34	12.6%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	18400	19300	4.60%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	311	310	0.310%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	15000	15200	2.00%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.095	0.076	0.019	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	178	138	25.2%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	359	322	10.9%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	48.5	43.9	10.0%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.18	4.50	7.31%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	50.8	51.1	0.504%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	5300	5330	0.663%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.2	3.0	0.2	Diff <2x LOR	----
Metals (QC Lot: 825253)											
VA23A2258-007	BA2304-A-7	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	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: 824923)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 825255)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 824919)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 824920)						
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	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 824920) - continued						
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
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: 825252)						
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	----



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 825252) - continued						
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
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: 825253)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 826933)						
Silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
Metals (QCLot: 827937)						
Silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 826907)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 826908)						
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	----

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Work Order : VA23A2258
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
TCLP Metals (QCLot: 826908) - continued						
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 824921)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 824923)									
Moisture	----	E144	0.25	%	50 %	99.4	90.0	110	----
Physical Tests (QCLot: 825254)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 825255)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 824919)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 824920)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	100	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	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	103	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	100	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	83.7	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	95.1	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.2	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.9	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.1	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----



Sub-Matrix: Soil/Solid

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 824920) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	88.6	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	105	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.8	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.5	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	99.0	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	97.2	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	92.1	80.0	120	----
Metals (QCLot: 825252)									
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	112	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	95.0	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	88.5	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.0	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.0	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	91.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.2	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	98.5	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.9	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	93.4	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	85.9	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	110	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.8	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.0	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.9	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	85.3	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: 825252) - continued									
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	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.6	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	104	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.0	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.0	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	95.5	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	90.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	93.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.5	80.0	120	----
Metals (QCLot: 825253)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	95.8	80.0	120	----
Metals (QCLot: 826933)									
Silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	90.6	80.0	120	----
Metals (QCLot: 827937)									
Silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	89.6	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: 826907)										
VA23A2258-001	BA2304-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	91.8	50.0	140	----
TCLP Metals (QCLot: 826908)										
VA23A2258-001	BA2304-A-1	Antimony, TCLP	7440-36-0	E444	4.67 mg/L	5 mg/L	93.4	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	93.7	50.0	140	----
		Barium, TCLP	7440-39-3	E444	12.2 mg/L	12.5 mg/L	98.0	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.222 mg/L	0.25 mg/L	89.0	50.0	140	----
		Boron, TCLP	7440-42-8	E444	7.70 mg/L	10 mg/L	77.0	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	1.13 mg/L	1.25 mg/L	90.1	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	2.19 mg/L	2.5 mg/L	87.7	50.0	140	----
		Iron, TCLP	7439-89-6	E444	219 mg/L	250 mg/L	87.6	50.0	140	----
		Lead, TCLP	7439-92-1	E444	8.78 mg/L	10 mg/L	87.8	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	240 mg/L	250 mg/L	96.1	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.20 mg/L	2.5 mg/L	88.0	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.82 mg/L	5 mg/L	96.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.096 mg/L	0.1 mg/L	96.0	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.5 mg/L	5 mg/L	89.4	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.43 mg/L	5 mg/L	88.6	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.5	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	83.4	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 824919)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	101	70.0	130	----
Metals (QCLot: 824920)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	104	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	107	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	105	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	101	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	103	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	96.4	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	104	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	112	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	102	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	101	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	107	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	107	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	105	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	121	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	105	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	91.3	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	108	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	105	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	105	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	98.8	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	88.9	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	108	70.0	130	----



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: 824920) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	106	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	103	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	97.8	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	94.5	70.0	130	----
Metals (QCLot: 825252)									
	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	114	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	106	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	106	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	105	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	112	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	116	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	108	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	107	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	105	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	100	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	119	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	114	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	128	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	98.1	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	118	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	111	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	100	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	122	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	98.5	70.0	130	----

Page : 16 of 16
 Work Order : VA23A2258
 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: 825252) - continued									
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	114	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	98.5	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	101	70.0	130	----
Metals (QCLot: 825253)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	101	70.0	130	----



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

Invoice To Same as Report ?			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)																																							
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Job #:			<table border="1"> <tr> <td rowspan="5">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="5">MOISTURE</td> <td rowspan="5">Chrome 6</td> <td rowspan="5">MET-CSR+FULL-VA (all metals)</td> <td colspan="6">Number of Containers</td> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers																													
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers																																									
Company:			PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite																																									
Contact:			LSD:	(includes 2:1 pH)																																									
Address:			Quote #:																																										

Lab Work Order # (lab use only)		A258		ALS-Contact:		Sampler:								
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					
	BA2304-A-1	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-2	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-3	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-4	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-5	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-6	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-7	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-8	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-9	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-10	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-11	25-Jan-23	9:00	Soil	X	X		X						1
	BA2304-A-12	25-Jan-23	9:00	Soil	X	X		X						1

Environmental Division
 Vancouver
 Work Order Reference
VA23A2258

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:
	31-Jan-23	0800	JC	JAN 31 2023	12pm	17.1°C				Yes / No ? If Yes add SIF