

Bottom Ash Data

2023 Week 20

The following analytical report represents bottom ash composite results for week 20 of 2023 (May 14, 2023 to May 20, 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 : VA23B1516</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 : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 24-May-2023 12:45</p> <p>Date Analysis Commenced : 25-May-2023</p> <p>Issue Date : 31-May-2023 13:06</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>
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



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				
(Matrix: Soil/Solid)					BA2320-A-1	BA2320-A-2	BA2320-A-3	BA2320-A-4	BA2320-A-5
Client sampling date / time					17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-001	VA23B1516-002	VA23B1516-003	VA23B1516-004	VA23B1516-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	18.5	19.4	18.6	19.1	18.2
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.6	11.7	11.7	11.7	11.6
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	39600	27400	36800	32700	39000
Antimony	7440-36-0	E440/VA	0.10	mg/kg	107	88.8	94.5	106	94.8
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	27.7	25.9	20.1	29.4	20.8
Barium	7440-39-3	E440/VA	0.50	mg/kg	671	586	609	600	661
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.38	0.34	0.35	0.56	0.38
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	12.0	6.91	8.43	19.6	10.4
Boron	7440-42-8	E440/VA	5.0	mg/kg	183	191	180	333	162
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	<9.32 ^{DLM}	<7.44 ^{DLM}	<8.76 ^{DLM}	<9.78 ^{DLM}	<8.60 ^{DLM}
Calcium	7440-70-2	E440/VA	50	mg/kg	145000	126000	133000	145000	139000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	147	140	246	164	174
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	88.8	47.1	32.2	52.3	255
Copper	7440-50-8	E440/VA	0.50	mg/kg	1760	1180	2720	2990	2270
Iron	7439-89-6	E440/VA	50	mg/kg	40700	60000	58100	58200	47700
Lead	7439-92-1	E440/VA	0.50	mg/kg	526	338	298	495	320
Lithium	7439-93-2	E440/VA	2.0	mg/kg	28.9	20.9	22.4	31.3	23.7
Magnesium	7439-95-4	E440/VA	20	mg/kg	11100	11300	10900	12400	11900
Manganese	7439-96-5	E440/VA	1.0	mg/kg	863	763	768	707	715
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.116	0.0913	0.171	0.138	0.187
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	63.8	55.4	107	73.2	57.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg	110	188	112	245	129
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10400	9400	10700	11100	9990
Potassium	7440-09-7	E440/VA	100	mg/kg	5360	4910	5390	5640	5420
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.47	0.37	0.47	0.48	0.49
Silver	7440-22-4	E440/VA	0.10	mg/kg	7.10	5.16	5.25	10.8	9.53
Sodium	7440-23-5	E440/VA	50	mg/kg	17300	15600	16900	17500	16300
Strontium	7440-24-6	E440/VA	0.50	mg/kg	264	250	274	278	250



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2320-A-1	BA2320-A-2	BA2320-A-3	BA2320-A-4	BA2320-A-5
(Matrix: Soil/Solid)					Client sampling date / time	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-001	VA23B1516-002	VA23B1516-003	VA23B1516-004	VA23B1516-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11400	9100	10000	11100	10400	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.093	0.066	0.072	0.095	0.092	
Tin	7440-31-5	E440/VA	2.0	mg/kg	84.9	94.2	95.8	123	125	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	467	188	236	196	295	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	22.9	15.9	17.1	20.2	19.0	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.60	3.89	4.31	4.56	4.40	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	51.7	43.2	43.2	48.1	49.1	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3230	3960	3290	3860	3560	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.7	2.0	2.4	2.6	1.8	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.5	11.4	11.4	11.4	11.4	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.65	5.43	5.67	5.32	5.43	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.88	2.88	2.88	2.88	2.88	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.78	6.80	6.83	6.83	6.96	
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	1.98	2.16	2.09	2.14	2.13	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.105	0.109	0.350	0.105	0.160	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2370	2510	2520	2460	2530	
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	0.888	0.795	0.926	1.08	0.842	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.624	0.702	0.645	0.657	0.610	
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	115	118	119	117	120	
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	0.32	0.30	0.36	0.31	0.30	
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 (Matrix: Soil/Solid)					Client sample ID	BA2320-A-1	BA2320-A-2	BA2320-A-3	BA2320-A-4	BA2320-A-5
Client sampling date / time					17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-001	VA23B1516-002	VA23B1516-003	VA23B1516-004	VA23B1516-005	
					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	8.16	8.09	7.52	7.11	6.23	6.23
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					Client sample ID	BA2320-A-6	BA2320-A-7	BA2320-A-8	BA2320-A-9	BA2320-A-10
(Matrix: Soil/Solid)					Client sampling date / time	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-006	VA23B1516-007	VA23B1516-008	VA23B1516-009	VA23B1516-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	---	E144/VA	0.25	%	18.8	18.9	17.8	18.2	17.9	
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.7	11.6	11.6	11.7	11.5	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	34000	44800	41200	31500	40900	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	93.9	103	106	96.6	114	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	22.0	25.2	24.6	19.7	23.3	
Barium	7440-39-3	E440/VA	0.50	mg/kg	558	563	571	548	608	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.84	0.35	0.38	0.35	0.35	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	8.31	9.07	8.50	8.07	8.76	
Boron	7440-42-8	E440/VA	5.0	mg/kg	187	331	232	164	176	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	<11.4 ^{DLM}	<8.48 ^{DLM}	<7.74 ^{DLM}	<9.02 ^{DLM}	9.18	
Calcium	7440-70-2	E440/VA	50	mg/kg	143000	139000	146000	135000	135000	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	157	156	383	327	181	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	44.4	46.3	866	297	72.6	
Copper	7440-50-8	E440/VA	0.50	mg/kg	5520	1660	4860	1460	4140	
Iron	7439-89-6	E440/VA	50	mg/kg	56700	60200	62700	56900	54100	
Lead	7439-92-1	E440/VA	0.50	mg/kg	647	1270	282	363	638	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	27.1	28.2	68.4	28.1	30.2	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12500	11700	12000	11200	10600	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	790	744	1630	841	761	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.123	0.121	0.105	0.162	0.158	
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	50.9	55.6	110	54.9	69.0	
Nickel	7440-02-0	E440/VA	0.50	mg/kg	149	231	298	228	417	
Phosphorus	7723-14-0	E440/VA	50	mg/kg	11400	10200	11600	9170	9460	
Potassium	7440-09-7	E440/VA	100	mg/kg	5360	5290	5080	5110	5120	
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.48	0.43	0.44	0.42	0.55	
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.72	8.18	7.55	6.14	6.20	
Sodium	7440-23-5	E440/VA	50	mg/kg	16400	16600	15500	15200	14700	
Strontium	7440-24-6	E440/VA	0.50	mg/kg	261	270	260	252	265	
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11000	10900	10200	10500	10700	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2320-A-6	BA2320-A-7	BA2320-A-8	BA2320-A-9	BA2320-A-10
(Matrix: Soil/Solid)					Client sampling date / time	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-006	VA23B1516-007	VA23B1516-008	VA23B1516-009	VA23B1516-010	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.115	0.105	0.070	0.075	0.096	
Tin	7440-31-5	E440/VA	2.0	mg/kg	127	97.9	105	113	154	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	177	503	302	303	501	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	27.8	20.1	65.4	19.6	24.9	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.53	4.55	4.28	4.50	4.52	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	45.4	47.0	48.7	48.3	47.6	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4690	3710	3280	2930	4610	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.8	2.3	3.3	1.5	1.7	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.4	11.5	11.5	11.5	11.5	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.48	6.66	5.79	5.50	5.43	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.88	2.88	2.88	2.88	2.88	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.87	6.66	6.90	6.77	6.80	
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	2.26	2.20	2.20	2.17	2.16	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.074	0.192	0.080	0.130	0.102	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2580	2610	2530	2510	2490	
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	0.756	0.739	0.792	1.12	0.922	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.653	0.793	0.639	0.687	0.676	
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	121	125	120	121	120	
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	0.28	0.40	0.29	0.31	0.30	
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 (Matrix: Soil/Solid)					Client sample ID	BA2320-A-6	BA2320-A-7	BA2320-A-8	BA2320-A-9	BA2320-A-10
Client sampling date / time					17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00	17-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-006	VA23B1516-007	VA23B1516-008	VA23B1516-009	VA23B1516-010	
TCLP Metals					Result	Result	Result	Result	Result	
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	6.61	12.1	5.98	9.10	7.94	
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					Client sample ID				
(Matrix: Soil/Solid)					BA2320-A-11	BA2320-A-12	----	----	----
Client sampling date / time					17-May-2023 09:00	17-May-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-011	VA23B1516-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	18.2	17.8	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.5	11.4	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	45900	33700	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	113	77.3	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	25.4	20.4	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	573	568	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	2.60	0.53	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	8.01	8.20	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	160	174	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	<9.58 ^{DLM}	<9.14 ^{DLM}	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	148000	150000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	138	182	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	56.7	228	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	2030	5530	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	48800	63300	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	314	602	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	21.2	28.8	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11700	12400	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	646	829	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.117	0.171	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	55.9	52.2	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	247	286	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	11300	10700	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	5410	5780	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.48	0.41	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	8.11	7.66	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	17000	17500	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	328	293	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11600	11600	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2320-A-11	BA2320-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	17-May-2023 09:00	17-May-2023 09:00	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-011	VA23B1516-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.118	0.088	---	---	---	
Tin	7440-31-5	E440/VA	2.0	mg/kg	106	203	---	---	---	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	218	198	---	---	---	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	20.0	17.2	---	---	---	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.72	4.67	---	---	---	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	48.0	47.7	---	---	---	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3670	4510	---	---	---	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.3	5.9	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.5	11.5	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.56	5.59	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.88	2.88	---	---	---	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.76	7.05	---	---	---	
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	2.28	2.16	---	---	---	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.082	0.087	---	---	---	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2520	2480	---	---	---	
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	0.807	0.755	---	---	---	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.700	0.667	---	---	---	
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	121	119	---	---	---	
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					Client sample ID		BA2320-A-11	BA2320-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		17-May-2023 09:00	17-May-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1516-011	VA23B1516-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	---	---	---	---	---
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	8.59	9.02	---	---	---	---	---
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 : VA23B1516</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 15</p> <p>Laboratory : Vancouver - Environmental</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 : 24-May-2023 12:45</p> <p>Issue Date : 31-May-2023 13:07</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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- 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.



Analysis Holding Time Compliance

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

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

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

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

Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-1	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-10	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-11	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-12	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-2	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-3	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2320-A-4	E510	17-May-2023	30-May-2023	----	----		31-May-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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2320-A-5	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2320-A-6	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2320-A-7	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2320-A-8	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2320-A-9	E510	17-May-2023	30-May-2023	----	----		31-May-2023	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2320-A-1	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2320-A-10	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2320-A-11	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2320-A-12	E440	17-May-2023	30-May-2023	----	----		31-May-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 ICPCS											
LDPE bag BA2320-A-2	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-3	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-4	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-5	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-6	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-7	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-8	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2320-A-9	E440	17-May-2023	30-May-2023	----	----		31-May-2023	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2320-A-1	E144	17-May-2023	----	----	----		30-May-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 BA2320-A-10	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-11	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-12	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-2	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-3	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-4	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-5	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-6	E144	17-May-2023	----	----	----		30-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2320-A-7	E144	17-May-2023	----	----	----		30-May-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 BA2320-A-8	E144	17-May-2023	----	----	----		30-May-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2320-A-9	E144	17-May-2023	----	----	----		30-May-2023	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-1	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-10	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-11	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-12	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-2	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-3	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-4	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-5	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-6	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-7	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-8	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2320-A-9	E108	17-May-2023	30-May-2023	----	----		31-May-2023	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-1	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-10	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-11	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-12	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 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) BA2320-A-2	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-3	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-4	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-5	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-6	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-7	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-8	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2320-A-9	E512	25-May-2023	26-May-2023	----	----		26-May-2023	28 days	9 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-1	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-10	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-11	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-12	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-2	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-3	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-4	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-5	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-6	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-7	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-8	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2320-A-9	E444	25-May-2023	26-May-2023	----	----		28-May-2023	180 days	11 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-1	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-10	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-11	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-12	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-2	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-3	EPP444	17-May-2023	25-May-2023	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-4	EPP444	17-May-2023	25-May-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: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-5	EPP444	17-May-2023	25-May-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-6	EPP444	17-May-2023	25-May-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-7	EPP444	17-May-2023	25-May-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-8	EPP444	17-May-2023	25-May-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2320-A-9	EPP444	17-May-2023	25-May-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	962423	1	15	6.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	962424	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	962431	1	15	6.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	962425	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	962423	2	15	13.3	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	962424	2	15	13.3	10.0	✔
Moisture Content by Gravimetry	E144	962431	1	15	6.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	962425	1	15	6.6	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	957094	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	962423	1	15	6.6	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	957095	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	962424	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	962431	1	15	6.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	957094	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	957095	1	12	8.3	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally $20 \pm 5^{\circ}\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C . Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl . Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl , followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.

QUALITY CONTROL REPORT

Work Order	: VA23B1516	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
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	: 24-May-2023 12:45
PO	: VANCO0000051998	Date Analysis Commenced	: 25-May-2023
C-O-C number	: ----	Issue Date	: 31-May-2023 13:06
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



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: 962425)											
VA23B1511-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.1	0.1%	5%	----
Physical Tests (QC Lot: 962431)											
VA23B1511-001	Anonymous	Moisture	----	E144	0.25	%	15.1	13.4	12.0%	20%	----
Metals (QC Lot: 962423)											
VA23B1511-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 962424)											
VA23B1511-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	13800	12600	9.64%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	1.04	1.04	0.764%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	5.34	5.91	10.2%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	81.5	69.2	16.3%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.48	0.44	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	6.7	6.1	0.5	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.181	0.179	1.08%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	61700	54900	11.7%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	24.4	24.6	0.984%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	6.70	6.32	5.80%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	46.0	45.1	1.78%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	19500	18000	7.90%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	6.07	6.47	6.43%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	9.8	9.7	0.1	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	7340	7200	1.95%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	307	303	1.10%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	4.24	4.82	12.7%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	13.8	13.3	3.21%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	382	383	0.160%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	980	780	22.4%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.21	<0.20	0.01	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	593	500	17.0%	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: 962424) - continued											
VA23B1511-001	Anonymous	Strontium	7440-24-6	E440	0.50	mg/kg	126	105	17.8%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	1900	1900	20	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.071	0.068	0.004	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	3.1	3.5	0.4	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	1130	944	17.9%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.837	0.739	12.4%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	53.6	48.6	9.88%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	71.6	70.6	1.41%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	7.4	7.4	0.622%	30%	----



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: 962431)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 962423)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 962424)						
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: 962424) - 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: 957094)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 957095)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 962425)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 962431)									
Moisture	----	E144	0.25	%	50 %	102	90.0	110	----
Metals (QCLot: 962423)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	115	80.0	120	----
Metals (QCLot: 962424)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	105	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	95.7	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	100	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	106	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	103	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	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	108	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.1	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	108	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	----



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: 962424) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.9	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	105	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	107	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	110	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	98.3	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: 957094)										
VA23B1516-001	BA2320-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	103	50.0	140	----
TCLP Metals (QCLot: 957095)										
VA23B1516-001	BA2320-A-1	Antimony, TCLP	7440-36-0	E444	5.37 mg/L	5 mg/L	107	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.6 mg/L	5 mg/L	92.1	50.0	140	----
		Barium, TCLP	7440-39-3	E444	12.8 mg/L	12.5 mg/L	102	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.233 mg/L	0.25 mg/L	93.3	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.91 mg/L	10 mg/L	99.1	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.226 mg/L	0.25 mg/L	90.6	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	1.12 mg/L	1.25 mg/L	89.8	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	2.11 mg/L	2.5 mg/L	84.4	50.0	140	----
		Iron, TCLP	7439-89-6	E444	222 mg/L	250 mg/L	88.9	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.2 mg/L	10 mg/L	102	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	266 mg/L	250 mg/L	106	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.14 mg/L	2.5 mg/L	85.6	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.62 mg/L	5 mg/L	92.3	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.103 mg/L	0.1 mg/L	103	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	100	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.18 mg/L	5 mg/L	104	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.4	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	8.45 mg/L	10 mg/L	84.5	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	89.5	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 962423)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	107	70.0	130	----
Metals (QCLot: 962424)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	98.5	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	121	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	99.6	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	109	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	112	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	98.4	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	107	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	99.5	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	96.4	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	113	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	100	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	100	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	97.5	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	107	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	94.9	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	95.3	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	98.2	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	99.6	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	112	70.0	130	----

Page : 11 of 11
 Work Order : VA23B1516
 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: 962424) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	99.5	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	102	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	92.9	70.0	130	----



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

Invoice To		Client / Project Information		Analysis Request	
Same as Report ?		Job #:		Please indicate below Filtered, Preserved or both (F, P, F/P)	
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:					

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
BA2320-A-1		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-2		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-3		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-4		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-5		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-6		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-7		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-8		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-9		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-10		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-11		17-May-23	9:00	Soil	X	X		X	1
BA2320-A-12		17-May-23	9:00	Soil	X	X		X	1

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous

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 co

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION	
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:
<i>[Signature]</i>	23-May-23	0800	<i>CW</i>	May 24	1245	20 °C	
							Date:

Environmental Division
 Vancouver
 Work Order Reference
VA23B1516



Telephone : +1 604 253 4168

If Yes add SIF