

Bottom Ash Data

2023 Week 1

The following analytical report represents bottom ash composite results for week 1 of 2023 (January 1, 2023 to January 7, 2023).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.

CERTIFICATE OF ANALYSIS

Work Order	: VA23A0791	Page	: 1 of 11
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 BC Canada V5A 1W9
Telephone	: ----	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 12-Jan-2023 13:00
PO	: VANCO0000051998	Date Analysis Commenced	: 16-Jan-2023
C-O-C number	: ----	Issue Date	: 20-Jan-2023 16:46
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 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.

Signatories	Position	Laboratory Department
Ophelia Chiu	Department Manager - Organics	Organics, 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).

Unit	Description
%	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

Qualifier	Description
RRR	Refer to report comments for issues regarding this analysis.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-1	BA2301-A-2	BA2301-A-3	BA2301-A-4	BA2301-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-001	VA23A0791-002	VA23A0791-003	VA23A0791-004	VA23A0791-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	24.1	26.1	25.1	27.5	28.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.3	11.4	11.3	11.4	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	30000	33600	43300	45900	48000	
Antimony	7440-36-0	E440	0.10	mg/kg	124	87.4	91.4	90.0	148	
Arsenic	7440-38-2	E440	0.10	mg/kg	14.8	11.6	14.0	12.9	16.1	
Barium	7440-39-3	E440	0.50	mg/kg	477	632	685	528	650	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.36	0.42	0.41	0.46	
Bismuth	7440-69-9	E440	0.20	mg/kg	8.52	6.98	4.58	4.68	7.28	
Boron	7440-42-8	E440	5.0	mg/kg	246	175	191	172	203	
Cadmium	7440-43-9	E440	0.020	mg/kg	8.87	6.73	6.54	7.66	9.62	
Calcium	7440-70-2	E440	50	mg/kg	140000	122000	124000	138000	164000	
Chromium	7440-47-3	E440	0.50	mg/kg	174	168	409	140	177	
Cobalt	7440-48-4	E440	0.10	mg/kg	72.7	206	460	159	191	
Copper	7440-50-8	E440	0.50	mg/kg	3770	2200	5880	1940	2090	
Iron	7439-89-6	E440	50	mg/kg	54200	56300	64700	65900	61500	
Lead	7439-92-1	E440	0.50	mg/kg	691	327	271	367	900	
Lithium	7439-93-2	E440	2.0	mg/kg	<40.0 ^{RRR}	<30.0 ^{RRR}	<120 ^{RRR}	<36.0 ^{RRR}	<36.0 ^{RRR}	
Magnesium	7439-95-4	E440	20	mg/kg	12000	11000	10300	12100	14500	
Manganese	7439-96-5	E440	1.0	mg/kg	906	780	1130	1220	1100	
Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.114	<0.0500	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440	0.10	mg/kg	25.6	18.8	24.6	22.7	31.5	
Nickel	7440-02-0	E440	0.50	mg/kg	278	168	187	286	197	
Phosphorus	7723-14-0	E440	50	mg/kg	16400	14200	12800	16000	21300	
Potassium	7440-09-7	E440	100	mg/kg	4270	4050	4500	4680	5800	
Selenium	7782-49-2	E440	0.20	mg/kg	0.51	0.36	0.32	0.28	0.50	
Silver	7440-22-4	E440	0.10	mg/kg	3.96	2.69	2.82	2.64	10.0	
Sodium	7440-23-5	E440	50	mg/kg	14300	14900	15700	18700	20400	
Strontium	7440-24-6	E440	0.50	mg/kg	305	248	502	277	345	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-1	BA2301-A-2	BA2301-A-3	BA2301-A-4	BA2301-A-5
(Matrix: Soil/Solid)										
Client sampling date / time										
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-001	VA23A0791-002	VA23A0791-003	VA23A0791-004	VA23A0791-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440	1000	mg/kg	11000	8800	8000	9200	12500	
Thallium	7440-28-0	E440	0.050	mg/kg	0.052	<0.050	0.053	<0.050	0.056	
Tin	7440-31-5	E440	2.0	mg/kg	110	109	114	86.1	236	
Titanium	7440-32-6	E440	1.0	mg/kg	294	338	480	316	416	
Tungsten	7440-33-7	E440	0.50	mg/kg	10.0	8.34	8.90	6.12	13.8	
Uranium	7440-61-1	E440	0.050	mg/kg	4.96	4.34	3.92	4.51	5.56	
Vanadium	7440-62-2	E440	0.20	mg/kg	42.9	38.4	37.4	42.5	54.7	
Zinc	7440-66-6	E440	2.0	mg/kg	4020	3840	6040	3320	3660	
Zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.7	3.3	4.3	3.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	12.0	11.8	11.9	11.9	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.81	6.29	7.11	5.92	6.15	
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	6.24	6.22	6.10	5.91	6.02	
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	1.75	1.77	1.72	1.71	1.90	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.110	0.150	0.082	0.097	0.112	
Calcium, TCLP	7440-70-2	E444	10	mg/L	1730	1840	1770	1710	1800	
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	1.40	1.65	2.04	2.03	1.36	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.737	0.798	0.629	0.904	0.741	
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	130	137	129	122	126	
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.50	0.53	0.60	0.56	0.54	
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-1	BA2301-A-2	BA2301-A-3	BA2301-A-4	BA2301-A-5
(Matrix: Soil/Solid)										
					Client sampling date / time	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-001	VA23A0791-002	VA23A0791-003	VA23A0791-004	VA23A0791-005	
					Result	Result	Result	Result	Result	Result
TCLP Metals										
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444	0.50	mg/L	21.1	17.4	24.4	29.4	25.9	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-6	BA2301-A-7	BA2301-A-8	BA2301-A-9	BA2301-A-10
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-006	VA23A0791-007	VA23A0791-008	VA23A0791-009	VA23A0791-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	25.1	23.5	30.0	26.6	27.8	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.8	12.0	11.3	11.4	11.2	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	44700	43600	39600	41900	34900	
Antimony	7440-36-0	E440	0.10	mg/kg	137	107	127	124	121	
Arsenic	7440-38-2	E440	0.10	mg/kg	17.1	15.6	16.4	16.0	15.3	
Barium	7440-39-3	E440	0.50	mg/kg	602	665	538	630	415	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.40	0.51	0.50	0.37	
Bismuth	7440-69-9	E440	0.20	mg/kg	28.6	7.60	7.20	8.36	6.45	
Boron	7440-42-8	E440	5.0	mg/kg	171	216	166	192	161	
Cadmium	7440-43-9	E440	0.020	mg/kg	9.15	7.92	10.4	9.72	9.92	
Calcium	7440-70-2	E440	50	mg/kg	165000	142000	157000	170000	141000	
Chromium	7440-47-3	E440	0.50	mg/kg	174	419	177	174	145	
Cobalt	7440-48-4	E440	0.10	mg/kg	253	81.6	86.4	156	138	
Copper	7440-50-8	E440	0.50	mg/kg	5610	5500	3110	1930	3590	
Iron	7439-89-6	E440	50	mg/kg	81400	56900	63000	53300	47000	
Lead	7439-92-1	E440	0.50	mg/kg	486	966	814	428	480	
Lithium	7439-93-2	E440	2.0	mg/kg	<40.0 ^{RRR}	<36.0 ^{RRR}	<46.0 ^{RRR}	<40.0 ^{RRR}	<60.0 ^{RRR}	
Magnesium	7439-95-4	E440	20	mg/kg	14200	12300	13100	13500	11800	
Manganese	7439-96-5	E440	1.0	mg/kg	1060	1060	1160	926	984	
Mercury	7439-97-6	E510	0.0500	mg/kg	0.0573	0.0649	<0.0500	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440	0.10	mg/kg	52.4	47.2	28.4	30.5	30.5	
Nickel	7440-02-0	E440	0.50	mg/kg	430	357	153	148	152	
Phosphorus	7723-14-0	E440	50	mg/kg	16500	12700	19500	18500	16700	
Potassium	7440-09-7	E440	100	mg/kg	5220	4220	5420	5210	4640	
Selenium	7782-49-2	E440	0.20	mg/kg	0.56	0.48	0.40	0.45	0.41	
Silver	7440-22-4	E440	0.10	mg/kg	3.96	3.35	3.71	3.48	11.5	
Sodium	7440-23-5	E440	50	mg/kg	17500	15700	18300	18100	15400	
Strontium	7440-24-6	E440	0.50	mg/kg	301	414	303	338	302	
Sulfur	7704-34-9	E440	1000	mg/kg	12400	9200	13300	11300	11800	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-6	BA2301-A-7	BA2301-A-8	BA2301-A-9	BA2301-A-10
(Matrix: Soil/Solid)										
Client sampling date / time										
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-006	VA23A0791-007	VA23A0791-008	VA23A0791-009	VA23A0791-010	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0.056	0.054	0.064	
Tin	7440-31-5	E440	2.0	mg/kg	127	157	150	114	192	
Titanium	7440-32-6	E440	1.0	mg/kg	362	355	260	257	221	
Tungsten	7440-33-7	E440	0.50	mg/kg	14.3	14.2	15.8	13.1	13.0	
Uranium	7440-61-1	E440	0.050	mg/kg	4.27	3.05	5.43	5.96	5.06	
Vanadium	7440-62-2	E440	0.20	mg/kg	70.6	56.3	44.9	47.3	43.6	
Zinc	7440-66-6	E440	2.0	mg/kg	4440	2780	5530	3590	5410	
Zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.2	2.8	4.8	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	12.0	11.9	11.9	12.0	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.54	6.76	6.55	7.07	6.15	
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	5.60	5.89	6.30	6.16	6.45	
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	1.38	1.54	2.22	1.78	1.86	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.083	0.115	0.090	1.13	0.147	
Calcium, TCLP	7440-70-2	E444	10	mg/L	1440	1650	1820	1710	1800	
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.979	1.75	1.50	1.77	4.57	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.880	1.11	0.550	1.07	0.610	
Iron, TCLP	7439-89-6	E444	5.0	mg/L	43.8	<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	101	116	127	126	130	
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.49	1.28	0.68	0.70	0.59	
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	BA2301-A-6	BA2301-A-7	BA2301-A-8	BA2301-A-9	BA2301-A-10
(Matrix: Soil/Solid)										
					Client sampling date / time	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00	06-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit		VA23A0791-006	VA23A0791-007	VA23A0791-008	VA23A0791-009	VA23A0791-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		155	32.6	19.0	19.9	12.7
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	BA2301-A-11	BA2301-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2023 09:00	06-Jan-2023 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-011	VA23A0791-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
Moisture	----	E144	0.25	%	22.2	24.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	12.1	12.0	----	----	----	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	43400	60200	----	----	----	
Antimony	7440-36-0	E440	0.10	mg/kg	119	101	----	----	----	
Arsenic	7440-38-2	E440	0.10	mg/kg	12.9	13.6	----	----	----	
Barium	7440-39-3	E440	0.50	mg/kg	704	580	----	----	----	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.40	----	----	----	
Bismuth	7440-69-9	E440	0.20	mg/kg	6.81	9.54	----	----	----	
Boron	7440-42-8	E440	5.0	mg/kg	218	147	----	----	----	
Cadmium	7440-43-9	E440	0.020	mg/kg	7.63	6.93	----	----	----	
Calcium	7440-70-2	E440	50	mg/kg	148000	136000	----	----	----	
Chromium	7440-47-3	E440	0.50	mg/kg	140	139	----	----	----	
Cobalt	7440-48-4	E440	0.10	mg/kg	117	206	----	----	----	
Copper	7440-50-8	E440	0.50	mg/kg	1570	1260	----	----	----	
Iron	7439-89-6	E440	50	mg/kg	62400	58300	----	----	----	
Lead	7439-92-1	E440	0.50	mg/kg	327	329	----	----	----	
Lithium	7439-93-2	E440	2.0	mg/kg	<32.0 ^{RRR}	<36.0 ^{RRR}	----	----	----	
Magnesium	7439-95-4	E440	20	mg/kg	12800	12500	----	----	----	
Manganese	7439-96-5	E440	1.0	mg/kg	2320	1350	----	----	----	
Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0548	----	----	----	
Molybdenum	7439-98-7	E440	0.10	mg/kg	39.6	45.4	----	----	----	
Nickel	7440-02-0	E440	0.50	mg/kg	164	247	----	----	----	
Phosphorus	7723-14-0	E440	50	mg/kg	15000	13000	----	----	----	
Potassium	7440-09-7	E440	100	mg/kg	5030	5180	----	----	----	
Selenium	7782-49-2	E440	0.20	mg/kg	0.56	0.72	----	----	----	
Silver	7440-22-4	E440	0.10	mg/kg	3.57	4.95	----	----	----	
Sodium	7440-23-5	E440	50	mg/kg	17400	15800	----	----	----	
Strontium	7440-24-6	E440	0.50	mg/kg	270	255	----	----	----	
Sulfur	7704-34-9	E440	1000	mg/kg	9200	9700	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-11	BA2301-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2023 09:00	06-Jan-2023 09:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-011	VA23A0791-012	-----	-----	-----	-----
					Result	Result	----	----	----	----
Metals										
Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	----
Tin	7440-31-5	E440	2.0	mg/kg	118	81.4	----	----	----	----
Titanium	7440-32-6	E440	1.0	mg/kg	372	412	----	----	----	----
Tungsten	7440-33-7	E440	0.50	mg/kg	9.05	8.62	----	----	----	----
Uranium	7440-61-1	E440	0.050	mg/kg	3.05	3.02	----	----	----	----
Vanadium	7440-62-2	E440	0.20	mg/kg	46.9	106	----	----	----	----
Zinc	7440-66-6	E440	2.0	mg/kg	3750	3860	----	----	----	----
Zirconium	7440-67-7	E440	1.0	mg/kg	2.5	4.6	----	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	12.0	11.9	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.49	5.40	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.00	5.87	----	----	----	----
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	1.76	2.04	----	----	----	----
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.110	0.812	----	----	----	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	1840	1810	----	----	----	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	----
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.81	1.14	----	----	----	----
Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.87	4.42	----	----	----	----
Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	6.5	----	----	----	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	0.42	----	----	----	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	118	120	----	----	----	----
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.71	0.82	----	----	----	----
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----	----
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	----	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2301-A-11	BA2301-A-12	----	----	----
(Matrix: Soil/Solid)										
					Client sampling date / time	06-Jan-2023 09:00	06-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A0791-011	VA23A0791-012	-----	-----	-----	
					Result	Result	----	----	----	
TCLP Metals										
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	37.1	44.1	----	----	----	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA23A0791	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	: 12-Jan-2023 13:00
PO	: VANCO0000051998	Issue Date	: 20-Jan-2023 16:46
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) 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	VA23A0791-001	BA2301-A-1	Aluminum	7429-90-5	E440	48.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0791-001	BA2301-A-1	Bismuth	7440-69-9	E440	43.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0791-001	BA2301-A-1	Cobalt	7440-48-4	E440	39.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0791-001	BA2301-A-1	Lead	7439-92-1	E440	47.7 % DUP-H	40%	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.

Laboratory Control Sample (LCS) Recoveries

Metals	QC-MRG2-8051280 02	----	Lithium	7439-93-2	E440	279 % LCS-H	80.0-120%	Recovery greater than upper control limit
--------	-----------------------	------	---------	-----------	------	-------------	-----------	---

Result Qualifiers

Qualifier Description

LCS-H Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.



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	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 BA2301-A-1	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-10	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-11	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-12	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-2	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-3	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-4	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✓



Matrix: Soil/Solid

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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-5	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-6	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-7	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-8	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-9	E510	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	28 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-1	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-10	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-11	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-12	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-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 ICPMS										
LDPE bag BA2301-A-2	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-3	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-4	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-5	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-6	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-7	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-8	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-9	E440	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	180 days	13 days	✔
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-1	E144	06-Jan-2023	----	----	----		17-Jan-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 BA2301-A-10	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-11	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-12	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-2	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-3	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-4	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-5	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-6	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-7	E144	06-Jan-2023	----	----	----		17-Jan-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 BA2301-A-8	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-9	E144	06-Jan-2023	----	----	----		17-Jan-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-1	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-10	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-11	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-12	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-2	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-3	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-4	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-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 BA2301-A-5	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-6	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-7	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-8	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-9	E108	06-Jan-2023	19-Jan-2023	----	----		19-Jan-2023	30 days	13 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-1	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-10	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-11	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-12	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-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	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-2	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-3	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-4	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-5	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-6	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-7	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-8	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-9	E512	16-Jan-2023	18-Jan-2023	----	----		18-Jan-2023	28 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-1	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✓



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-10	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-11	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-12	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-2	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-3	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-4	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-5	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-6	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-7	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-8	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-9	E444	16-Jan-2023	17-Jan-2023	----	----		18-Jan-2023	180 days	12 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-1	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-10	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-11	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-12	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-2	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-3	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-4	EPP444	06-Jan-2023	16-Jan-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) BA2301-A-5	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-6	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-7	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-8	EPP444	06-Jan-2023	16-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2301-A-9	EPP444	06-Jan-2023	16-Jan-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			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	805128	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	805129	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	805131	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	805130	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	805128	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	805129	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	805131	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	805130	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	805667	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	805128	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	805668	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	805129	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	805131	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	805667	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	805668	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
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.

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Work Order : VA23A0791
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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	: VA23A0791	Page	: 1 of 11
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	: 12-Jan-2023 13:00
PO	: VANCO0000051998	Date Analysis Commenced	: 16-Jan-2023
C-O-C number	: ----	Issue Date	: 20-Jan-2023 16:46
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.

Signatories	Position	Laboratory Department
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, 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: 805130)											
VA23A0791-001	BA2301-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.3	1.5%	5%	----
Physical Tests (QC Lot: 805131)											
VA23A0791-001	BA2301-A-1	Moisture	----	E144	0.25	%	24.1	22.8	5.80%	20%	----
Metals (QC Lot: 805128)											
VA23A0791-001	BA2301-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 805129)											
VA23A0791-001	BA2301-A-1	Aluminum	7429-90-5	E440	50	mg/kg	30000	49500	48.9%	40%	DUP-H
		Antimony	7440-36-0	E440	0.10	mg/kg	124	129	4.17%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	14.8	18.2	20.9%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	477	611	24.6%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.45	0.05	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	8.52	13.3	43.7%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	246	191	25.0%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	8.87	9.64	8.30%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	140000	169000	18.6%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	174	218	22.4%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	72.7	108	39.4%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	3770	3750	0.428%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	54200	56300	3.75%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	691	425	47.7%	40%	DUP-H
		Lithium	7439-93-2	E440	40.0	mg/kg	<40.0	<40.0	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	12000	13500	11.7%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	906	1050	14.6%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	25.6	27.9	8.48%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	278	287	3.34%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	16400	19100	15.2%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4270	4990	15.4%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.51	0.45	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	3.96	4.75	18.2%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	14300	17600	20.4%	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: 805129) - continued											
VA23A0791-001	BA2301-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	305	330	8.14%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	11000	12100	9.51%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.052	0.057	0.005	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	110	120	9.29%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	294	373	23.6%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	10.0	11.2	11.3%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.96	5.87	16.9%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	42.9	49.8	15.0%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4020	4200	4.41%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	1.4	3.1	1.6	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: 805131)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 805128)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 805129)						
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: 805129) - 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: 805667)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 805668)						
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: 805130)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 805131)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 805128)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	90.3	80.0	120	----
Metals (QCLot: 805129)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.3	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	90.9	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.7	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	95.5	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	85.9	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	98.3	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	95.2	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.7	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.2	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.0	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	98.2	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.3	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	# 279	80.0	120	LCS-H
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	96.1	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.6	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	96.4	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	116	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.3	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.7	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	83.8	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	99.0	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	95.7	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: 805129) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	95.9	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	94.6	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	96.6	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.2	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	99.8	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	95.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	95.6	80.0	120	----

Qualifiers

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.



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: 805667)										
VA23A0791-001	BA2301-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	103	50.0	140	----
TCLP Metals (QCLot: 805668)										
VA23A0791-001	BA2301-A-1	Antimony, TCLP	7440-36-0	E444	5.66 mg/L	5 mg/L	113	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.4 mg/L	5 mg/L	108	50.0	140	----
		Barium, TCLP	7440-39-3	E444	13.6 mg/L	12.5 mg/L	109	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.275 mg/L	0.25 mg/L	110	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.90 mg/L	10 mg/L	99.0	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.271 mg/L	0.25 mg/L	108	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	1.32 mg/L	1.25 mg/L	105	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	2.52 mg/L	2.5 mg/L	101	50.0	140	----
		Iron, TCLP	7439-89-6	E444	254 mg/L	250 mg/L	102	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	263 mg/L	250 mg/L	105	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.55 mg/L	2.5 mg/L	102	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.61 mg/L	5 mg/L	112	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.124 mg/L	0.1 mg/L	124	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.4 mg/L	5 mg/L	107	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.24 mg/L	5 mg/L	105	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.82 mg/L	0.75 mg/L	110	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	11 mg/L	10 mg/L	107	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:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 805128)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	94.9	70.0	130	----
Metals (QCLot: 805129)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	107	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	116	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	91.0	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	100	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	109	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	92.7	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	95.5	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	109	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	96.6	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	95.8	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	96.9	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	102	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	92.0	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	105	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	98.0	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	97.0	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	108	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	110	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	107	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	97.3	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	96.6	40.0	160	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	119	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	104	70.0	130	----



Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 805129) - continued									
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	104	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	95.4	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	94.4	70.0	130	----



ALS Environmental

Chain of Custody / Analytical Request Form

COC #

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Page ____ of ____

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)																																																																
Company: Covanta Energy				☐ Standard ☐ Other ☒ PDF ☐ Excel ☐ Digital ☐ Fax				☒ Regular (Standard Turnaround Times - Business Days) ☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT ☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT ☐ 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: rjohnson4@covanta.com																																																																				
Phone: 604-521-1025 Fax: _____				Email 3: dskrypnik@covanta.com																																																																				
				brent.kirkpatrick@metrovancover.org																																																																				
				Sarah.Wellman@metrovancover.org																																																																				
Invoice To Same as Report ?				Client / Project Information				Analysis Request																																																																
Hardcopy of Invoice with Report? ☐ Yes ☐ No				Job #:				Please indicate below Filtered, Preserved or both (F, P, F/P)																																																																
Company:				PO / AFE: PO# 46693 Weekly Bottom Ash - Suite				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">MOISTURE</td> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Chrome 6</td> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">MET-CSR-FULL-VA (all metals)</td> <td colspan="12"></td> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Number of Containers</td> </tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></td></tr> <tr><td colspan="12"></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																																																
Contact:				LSD: (includes 2:1 pH)																																																																				
Address:																																																																								
Phone: _____ Fax: _____				Quote #:																																																																				
Lab Work Order # (lab use only)				ALS Contact:				Sampler:																																																																
Sample #	Sample Identification (This description will appear on the report)			Date (dd-mm-yy)	Time (hh:mm)	Sample Type																																																																		
	BA2301-A-1			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-2			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-3			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-4			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-5			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-6			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-7			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-8			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-9			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-10			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-11			06-Jan-23	9:00	Soil	X	X					X						1																																																					
	BA2301-A-12			06-Jan-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 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-mm-yy)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:																																																														
	10-Jan-23	0800	JL	JAN 12 2023	1pm	21.21°C				Yes / No ?																																																														
										If Yes add SIF																																																														
GENF 20.00 Front																																																																								

Environmental Division
Vancouver
Work Order Reference
VA23A0791



Telephone : +1 604 253 4188

CERTIFICATE OF ANALYSIS

Work Order	: VA23A0499	Page	: 1 of 11
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 BC Canada V5A 1W9
Telephone	: ----	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 10-Jan-2023 12:20
PO	: VANCO0000051998	Date Analysis Commenced	: 11-Jan-2023
C-O-C number	: ----	Issue Date	: 17-Jan-2023 08:59
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 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.

Signatories	Position	Laboratory Department
Hamideh Moradi	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Parnian Sane	Analyst	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).

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BA2301-A-1-Un processed	BA2301-A-2-Un processed	BA2301-A-3-Un processed	BA2301-A-4-Un processed	BA2301-A-5-Un processed
Client sampling date / time					04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-001	VA23A0499-002	VA23A0499-003	VA23A0499-004	VA23A0499-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	25.4	23.1	20.0	22.8	21.8	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	11.0	11.0	11.0	11.1	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	47700	37300	49800	39600	42400	
Antimony	7440-36-0	E440	0.10	mg/kg	94.8	112	118	111	105	
Arsenic	7440-38-2	E440	0.10	mg/kg	13.1	16.7	16.3	11.9	13.8	
Barium	7440-39-3	E440	0.50	mg/kg	690	715	757	832	667	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.38	0.40	0.40	0.38	
Bismuth	7440-69-9	E440	0.20	mg/kg	4.92	5.57	5.13	7.50	7.12	
Boron	7440-42-8	E440	5.0	mg/kg	556	220	144	223	157	
Cadmium	7440-43-9	E440	0.020	mg/kg	8.13	8.97	7.54	6.60	8.07	
Calcium	7440-70-2	E440	50	mg/kg	151000	146000	136000	129000	147000	
Chromium	7440-47-3	E440	0.50	mg/kg	175	146	141	144	170	
Cobalt	7440-48-4	E440	0.10	mg/kg	36.6	120	43.6	82.3	41.2	
Copper	7440-50-8	E440	0.50	mg/kg	2700	6700	3320	2790	2310	
Iron	7439-89-6	E440	50	mg/kg	77200	61600	70600	58600	69900	
Lead	7439-92-1	E440	0.50	mg/kg	326	9600	772	288	332	
Lithium	7439-93-2	E440	2.0	mg/kg	25.0	23.9	21.1	29.4	26.1	
Magnesium	7439-95-4	E440	20	mg/kg	12000	11700	12700	10500	11100	
Manganese	7439-96-5	E440	1.0	mg/kg	949	1560	945	970	1010	
Mercury	7439-97-6	E510	0.0500	mg/kg	0.0757	0.108	0.0625	0.0804	0.0803	
Molybdenum	7439-98-7	E440	0.10	mg/kg	27.2	34.0	30.1	30.5	28.6	
Nickel	7440-02-0	E440	0.50	mg/kg	146	104	130	497	167	
Phosphorus	7723-14-0	E440	50	mg/kg	15400	15000	13900	12000	12600	
Potassium	7440-09-7	E440	100	mg/kg	4370	3950	4500	4730	4370	
Selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.36	0.35	0.34	0.63	
Silver	7440-22-4	E440	0.10	mg/kg	3.57	3.87	4.92	4.50	3.85	
Sodium	7440-23-5	E440	50	mg/kg	15000	14200	14900	15900	15000	
Strontium	7440-24-6	E440	0.50	mg/kg	330	317	289	370	304	



Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BA2301-A-1-Un processed	BA2301-A-2-Un processed	BA2301-A-3-Un processed	BA2301-A-4-Un processed	BA2301-A-5-Un processed
Client sampling date / time					04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-001	VA23A0499-002	VA23A0499-003	VA23A0499-004	VA23A0499-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440	1000	mg/kg	9000	9600	9600	8600	10100	
Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440	2.0	mg/kg	124	115	127	105	108	
Titanium	7440-32-6	E440	1.0	mg/kg	410	306	355	557	487	
Tungsten	7440-33-7	E440	0.50	mg/kg	10.9	18.4	12.5	12.6	16.4	
Uranium	7440-61-1	E440	0.050	mg/kg	3.74	4.08	4.03	3.80	3.91	
Vanadium	7440-62-2	E440	0.20	mg/kg	38.8	38.1	38.9	35.7	40.4	
Zinc	7440-66-6	E440	2.0	mg/kg	3120	4130	5110	4400	3390	
Zirconium	7440-67-7	E440	1.0	mg/kg	3.4	3.3	4.6	2.0	3.3	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.8	11.7	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.57	6.08	6.06	6.68	6.09	
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	6.37	6.36	6.37	6.31	6.29	
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	1.82	1.84	1.83	1.72	1.77	
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.075	0.124	0.148	0.177	0.090	
Calcium, TCLP	7440-70-2	E444	10	mg/L	1880	1920	1900	1880	1920	
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.72	1.67	1.86	2.29	1.32	
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.936	0.678	0.720	0.795	0.993	
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	127	130	129	129	129	
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	0.51	0.44	0.59	0.50	0.56	
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2301-A-1-Un processed	BA2301-A-2-Un processed	BA2301-A-3-Un processed	BA2301-A-4-Un processed	BA2301-A-5-Un processed
(Matrix: Soil/Solid)										
Client sampling date / time						04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-001	VA23A0499-002	VA23A0499-003	VA23A0499-004	VA23A0499-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444	0.50	mg/L	20.2	19.8	26.3	25.0	18.0	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2301-A-6-Un processed	BA2301-A-7-Un processed	BA2301-A-8-Un processed	BA2301-A-9-Un processed	BA2301-A-10-U nprocessed
(Matrix: Soil/Solid)										
Client sampling date / time					04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-006	VA23A0499-007	VA23A0499-008	VA23A0499-009	VA23A0499-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144	0.25	%	23.1	22.7	22.6	23.1	22.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	11.0	11.1	11.1	11.2	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	34400	36000	41400	40500	52200	
Antimony	7440-36-0	E440	0.10	mg/kg	117	96.0	90.6	92.6	101	
Arsenic	7440-38-2	E440	0.10	mg/kg	14.1	15.9	12.0	12.8	11.4	
Barium	7440-39-3	E440	0.50	mg/kg	796	829	590	730	615	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.40	0.40	0.37	0.34	
Bismuth	7440-69-9	E440	0.20	mg/kg	6.01	5.64	5.38	6.03	4.63	
Boron	7440-42-8	E440	5.0	mg/kg	159	228	158	168	132	
Cadmium	7440-43-9	E440	0.020	mg/kg	12.1	14.8	7.45	6.57	7.80	
Calcium	7440-70-2	E440	50	mg/kg	142000	131000	134000	128000	122000	
Chromium	7440-47-3	E440	0.50	mg/kg	265	166	113	134	253	
Cobalt	7440-48-4	E440	0.10	mg/kg	49.1	78.2	34.1	133	59.2	
Copper	7440-50-8	E440	0.50	mg/kg	7710	4440	2680	3060	4550	
Iron	7439-89-6	E440	50	mg/kg	99900	55700	27900	63100	47700	
Lead	7439-92-1	E440	0.50	mg/kg	331	2150	492	308	377	
Lithium	7439-93-2	E440	2.0	mg/kg	23.9	23.2	22.2	23.1	24.1	
Magnesium	7439-95-4	E440	20	mg/kg	10800	10800	10700	11900	11500	
Manganese	7439-96-5	E440	1.0	mg/kg	1390	836	794	1870	854	
Mercury	7439-97-6	E510	0.0500	mg/kg	0.0850	0.313	0.0823	0.0580	0.0845	
Molybdenum	7439-98-7	E440	0.10	mg/kg	46.7	30.5	221	52.9	43.9	
Nickel	7440-02-0	E440	0.50	mg/kg	240	183	93.8	206	342	
Phosphorus	7723-14-0	E440	50	mg/kg	14500	12300	13500	13400	13900	
Potassium	7440-09-7	E440	100	mg/kg	4240	4280	4970	4360	4010	
Selenium	7782-49-2	E440	0.20	mg/kg	0.41	1.52	0.39	0.39	0.39	
Silver	7440-22-4	E440	0.10	mg/kg	4.48	4.76	6.06	4.14	4.19	
Sodium	7440-23-5	E440	50	mg/kg	14700	15000	16400	15500	13700	
Strontium	7440-24-6	E440	0.50	mg/kg	314	300	305	313	288	
Sulfur	7704-34-9	E440	1000	mg/kg	10500	8500	9800	8300	8700	



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2301-A-6-Un processed	BA2301-A-7-Un processed	BA2301-A-8-Un processed	BA2301-A-9-Un processed	BA2301-A-10-U nprocessed
Client sampling date / time					04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00	04-Jan-2023 09:00
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-006	VA23A0499-007	VA23A0499-008	VA23A0499-009	VA23A0499-010
					Result	Result	Result	Result	Result
Metals									
Thallium	7440-28-0	E440	0.050	mg/kg	0.060	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440	2.0	mg/kg	129	163	218	150	105
Titanium	7440-32-6	E440	1.0	mg/kg	373	428	390	526	591
Tungsten	7440-33-7	E440	0.50	mg/kg	14.4	8.51	12.6	19.1	14.8
Uranium	7440-61-1	E440	0.050	mg/kg	4.26	3.68	4.40	3.94	4.02
Vanadium	7440-62-2	E440	0.20	mg/kg	39.2	37.6	36.0	38.9	39.6
Zinc	7440-66-6	E440	2.0	mg/kg	6740	2690	2540	5870	3050
Zirconium	7440-67-7	E440	1.0	mg/kg	2.4	2.0	4.1	3.0	4.3
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.8	11.7	11.7	11.7
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.35	5.64	5.74	5.66	5.48
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	6.29	6.28	6.36	6.36	6.36
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	1.79	2.02	1.79	1.87
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.183	0.081	0.160	0.108	0.096
Calcium, TCLP	7440-70-2	E444	10	mg/L	1910	1910	1930	1880	1910
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.37	1.19	1.30	1.33	1.10
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.909	0.863	0.684	0.539	0.766
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	127	131	130	140	134
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	0.60	0.45	0.50	0.54	0.47
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/Solid					Client sample ID	BA2301-A-6-Un processed	BA2301-A-7-Un processed	BA2301-A-8-Un processed	BA2301-A-9-Un processed	BA2301-A-10-U nprocessed
(Matrix: Soil/Solid)										
Client sampling date / time										
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-006	VA23A0499-007	VA23A0499-008	VA23A0499-009	VA23A0499-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
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	19.2	20.6	23.5	17.8	18.1	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2301-A-11-U nprocessed	BA2301-A-12-U nprocessed	----	----	----
(Matrix: Soil/Solid)										
					Client sampling date / time	04-Jan-2023 09:00	04-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-011	VA23A0499-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
Moisture	----	E144	0.25	%	24.3	21.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	10.9	----	----	----	
Metals										
Aluminum	7429-90-5	E440	50	mg/kg	50000	37000	----	----	----	
Antimony	7440-36-0	E440	0.10	mg/kg	101	97.9	----	----	----	
Arsenic	7440-38-2	E440	0.10	mg/kg	13.5	12.6	----	----	----	
Barium	7440-39-3	E440	0.50	mg/kg	611	625	----	----	----	
Beryllium	7440-41-7	E440	0.10	mg/kg	0.51	0.40	----	----	----	
Bismuth	7440-69-9	E440	0.20	mg/kg	4.75	5.92	----	----	----	
Boron	7440-42-8	E440	5.0	mg/kg	260	190	----	----	----	
Cadmium	7440-43-9	E440	0.020	mg/kg	6.37	7.74	----	----	----	
Calcium	7440-70-2	E440	50	mg/kg	124000	128000	----	----	----	
Chromium	7440-47-3	E440	0.50	mg/kg	168	148	----	----	----	
Cobalt	7440-48-4	E440	0.10	mg/kg	49.5	38.9	----	----	----	
Copper	7440-50-8	E440	0.50	mg/kg	4630	2630	----	----	----	
Iron	7439-89-6	E440	50	mg/kg	65400	56500	----	----	----	
Lead	7439-92-1	E440	0.50	mg/kg	2350	702	----	----	----	
Lithium	7439-93-2	E440	2.0	mg/kg	19.9	20.3	----	----	----	
Magnesium	7439-95-4	E440	20	mg/kg	11800	10900	----	----	----	
Manganese	7439-96-5	E440	1.0	mg/kg	1030	1020	----	----	----	
Mercury	7439-97-6	E510	0.0500	mg/kg	0.0568	0.0835	----	----	----	
Molybdenum	7439-98-7	E440	0.10	mg/kg	25.6	52.6	----	----	----	
Nickel	7440-02-0	E440	0.50	mg/kg	260	283	----	----	----	
Phosphorus	7723-14-0	E440	50	mg/kg	14100	13300	----	----	----	
Potassium	7440-09-7	E440	100	mg/kg	3970	4620	----	----	----	
Selenium	7782-49-2	E440	0.20	mg/kg	0.27	0.31	----	----	----	
Silver	7440-22-4	E440	0.10	mg/kg	4.25	4.47	----	----	----	
Sodium	7440-23-5	E440	50	mg/kg	13100	14500	----	----	----	
Strontium	7440-24-6	E440	0.50	mg/kg	288	312	----	----	----	
Sulfur	7704-34-9	E440	1000	mg/kg	7900	9500	----	----	----	



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2301-A-11-U nprocessed	BA2301-A-12-U nprocessed	----	----	----
Client sampling date / time					04-Jan-2023 09:00	04-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-011	VA23A0499-012	-----	-----	-----
					Result	Result	----	----	----
Metals									
Thallium	7440-28-0	E440	0.050	mg/kg	0.078	<0.050	----	----	----
Tin	7440-31-5	E440	2.0	mg/kg	137	101	----	----	----
Titanium	7440-32-6	E440	1.0	mg/kg	352	435	----	----	----
Tungsten	7440-33-7	E440	0.50	mg/kg	10.9	14.8	----	----	----
Uranium	7440-61-1	E440	0.050	mg/kg	3.56	4.20	----	----	----
Vanadium	7440-62-2	E440	0.20	mg/kg	35.5	55.7	----	----	----
Zinc	7440-66-6	E440	2.0	mg/kg	3380	2940	----	----	----
Zirconium	7440-67-7	E440	1.0	mg/kg	5.0	2.9	----	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.8	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	5.74	6.71	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.24	6.35	----	----	----
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	1.80	1.86	----	----	----
Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.093	0.096	----	----	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	1940	1910	----	----	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----
Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.12	1.30	----	----	----
Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.912	0.802	----	----	----
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	131	135	----	----	----
Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.51	0.53	----	----	----
Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2301-A-11-U nprocessed	BA2301-A-12-U nprocessed	----	----	----
(Matrix: Soil/Solid)										
					Client sampling date / time	04-Jan-2023 09:00	04-Jan-2023 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A0499-011	VA23A0499-012	-----	-----	-----	
					Result	Result	----	----	----	
TCLP Metals										
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	22.6	32.6	----	----	----	
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA23A0499	Page	: 1 of 17
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	: 10-Jan-2023 12:20
PO	: VANCO0000051998	Issue Date	: 17-Jan-2023 08:59
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: Soil/Solid

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Arsenic	7440-38-2	E440	41.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Boron	7440-42-8	E440	114 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Cadmium	7440-43-9	E440	45.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Cadmium	7440-43-9	E440	62.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Chromium	7440-47-3	E440	45.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Cobalt	7440-48-4	E440	32.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Cobalt	7440-48-4	E440	50.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Copper	7440-50-8	E440	48.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Iron	7439-89-6	E440	34.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Iron	7439-89-6	E440	83.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Lead	7439-92-1	E440	89.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Manganese	7439-96-5	E440	114 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Molybdenum	7439-98-7	E440	150 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Nickel	7440-02-0	E440	49.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Nickel	7440-02-0	E440	67.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Tin	7440-31-5	E440	48.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-001	BA2301-A-1-Unprocessed	Tungsten	7440-33-7	E440	37.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23A0499-008	BA2301-A-8-Unprocessed	Zinc	7440-66-6	E440	32.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
---------------	----------------------	----------------------	---------	------------	--------	--------	--------	---------

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	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 BA2301-A-10-Unprocessed	E510	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-11-Unprocessed	E510	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-12-Unprocessed	E510	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-1-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-2-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-3-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-4-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-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 BA2301-A-5-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-6-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-7-Unprocessed	E510	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-8-Unprocessed	E510	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2301-A-9-Unprocessed	E510	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	28 days	12 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-10-Unprocessed	E440	04-Jan-2023	16-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-11-Unprocessed	E440	04-Jan-2023	16-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-12-Unprocessed	E440	04-Jan-2023	16-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2301-A-1-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis				
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-2-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-3-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-4-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-5-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-6-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-7-Unprocessed	E440	04-Jan-2023	15-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-8-Unprocessed	E440	04-Jan-2023	16-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2301-A-9-Unprocessed	E440	04-Jan-2023	16-Jan-2023	----	----		17-Jan-2023	180 days	13 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2301-A-10-Unprocessed	E144	04-Jan-2023	----	----	----		13-Jan-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 BA2301-A-11-Unprocessed	E144	04-Jan-2023	----	----	----		13-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-12-Unprocessed	E144	04-Jan-2023	----	----	----		13-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-1-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-2-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-3-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-4-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-5-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-6-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-7-Unprocessed	E144	04-Jan-2023	----	----	----		12-Jan-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 BA2301-A-8-Unprocessed	E144	04-Jan-2023	----	----	----		13-Jan-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2301-A-9-Unprocessed	E144	04-Jan-2023	----	----	----		13-Jan-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-10-Unprocessed	E108	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-11-Unprocessed	E108	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-12-Unprocessed	E108	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-1-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-2-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-3-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-4-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-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 BA2301-A-5-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-6-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-7-Unprocessed	E108	04-Jan-2023	15-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-8-Unprocessed	E108	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2301-A-9-Unprocessed	E108	04-Jan-2023	16-Jan-2023	----	----		16-Jan-2023	30 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-10-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-11-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-12-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-1-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-2-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-3-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-4-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-5-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-6-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-7-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-8-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2301-A-9-Unprocessed	E512	11-Jan-2023	14-Jan-2023	----	----		14-Jan-2023	28 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-10-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-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) BA2301-A-11-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-12-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-1-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-2-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-3-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-4-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-5-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-6-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-7-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-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) BA2301-A-8-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2301-A-9-Unprocessed	E444	11-Jan-2023	14-Jan-2023	----	----		15-Jan-2023	180 days	11 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-10-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-11-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-12-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-1-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-2-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-3-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-4-Unprocessed	EPP444	04-Jan-2023	11-Jan-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) BA2301-A-5-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-6-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-7-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-8-Unprocessed	EPP444	04-Jan-2023	11-Jan-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2301-A-9-Unprocessed	EPP444	04-Jan-2023	11-Jan-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			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	802665	2	13	15.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	801552	2	20	10.0	5.0	✔
Moisture Content by Gravimetry	E144	802668	2	21	9.5	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	802667	2	20	10.0	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	802665	4	13	30.7	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	801552	4	20	20.0	10.0	✔
Moisture Content by Gravimetry	E144	802668	2	21	9.5	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	802667	2	20	10.0	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	802658	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	802665	2	13	15.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	802659	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	801552	2	20	10.0	5.0	✔
Moisture Content by Gravimetry	E144	802668	2	21	9.5	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	802658	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	802659	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
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.

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 Work Order : VA23A0499
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



<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	: VA23A0499	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	: 10-Jan-2023 12:20
PO	: VANCO0000051998	Date Analysis Commenced	: 11-Jan-2023
C-O-C number	: ----	Issue Date	: 17-Jan-2023 08:59
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.

Signatories	Position	Laboratory Department
Hamideh Moradi	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
Parnian Sane	Analyst	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: 801557)											
VA23A0499-001	BA2301-A-1-Unprocessed	pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	11.2	1.8%	5%	----
Physical Tests (QC Lot: 801558)											
VA23A0368-001	Anonymous	Moisture	----	E144	0.25	%	11.2	12.8	13.2%	20%	----
Physical Tests (QC Lot: 802667)											
VA23A0499-008	BA2301-A-8-Unprocessed	pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.2	0.9%	5%	----
Physical Tests (QC Lot: 802668)											
VA23A0499-008	BA2301-A-8-Unprocessed	Moisture	----	E144	0.25	%	22.6	24.0	6.12%	20%	----
Metals (QC Lot: 801552)											
VA23A0499-001	BA2301-A-1-Unprocessed	Aluminum	7429-90-5	E440	50	mg/kg	47700	44800	6.42%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	94.8	91.0	4.14%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	13.1	10.1	25.9%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	690	653	5.46%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.34	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	4.92	5.77	15.8%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	556	152	114%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	8.13	5.10	45.8%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	151000	117000	25.7%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	175	136	25.2%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	36.6	26.3	32.9%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	2700	1650	48.2%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	77200	54300	34.8%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	326	852	89.4%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	25.0	20.8	18.3%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12000	10400	14.2%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	949	3440	114%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	27.2	28.4	4.36%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	146	88.1	49.6%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	15400	12500	20.9%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4370	4530	3.51%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.24	0.09	Diff <2x LOR	----



Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 801552) - continued											
VA23A0499-001	BA2301-A-1-Unprocessed	Silver	7440-22-4	E440	0.10	mg/kg	3.57	3.99	11.1%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	15000	14300	4.57%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	330	234	34.0%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9000	7200	21.8%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	124	75.9	48.0%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	410	433	5.25%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	10.9	7.40	37.9%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	3.74	3.05	20.1%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	38.8	34.1	13.0%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3120	3580	13.5%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.4	2.4	1.0	Diff <2x LOR	----
Metals (QC Lot: 801553)											
VA23A0499-001	BA2301-A-1-Unprocessed	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0757	0.0557	0.0200	Diff <2x LOR	----
Metals (QC Lot: 802665)											
VA23A0499-008	BA2301-A-8-Unprocessed	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0823	0.0858	0.0035	Diff <2x LOR	----
Metals (QC Lot: 802666)											
VA23A0499-008	BA2301-A-8-Unprocessed	Aluminum	7429-90-5	E440	50	mg/kg	41400	37200	10.7%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	90.6	118	26.7%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	12.0	18.4	41.8%	30%	DUP-H
		Barium	7440-39-3	E440	0.50	mg/kg	590	612	3.76%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.38	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	5.38	6.67	21.3%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	158	182	14.1%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.45	14.3	62.9%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	134000	134000	0.112%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	113	179	45.0%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	34.1	57.4	50.9%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	2680	2240	17.8%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	27900	67900	83.5%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	492	696	34.3%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	22.2	26.3	16.8%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	10700	11200	5.21%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	794	1000	23.3%	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: 802666) - continued											
VA23A0499-008	BA2301-A-8-Unprocessed	Molybdenum	7439-98-7	E440	0.10	mg/kg	221	31.6	150%	40%	DUP-H
		Nickel	7440-02-0	E440	0.50	mg/kg	93.8	190	67.8%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	13500	14800	9.46%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4970	4260	15.3%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.41	0.02	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	6.06	4.80	23.3%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	16400	14400	13.1%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	305	315	2.94%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9800	10800	10.6%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.054	0.004	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	218	182	18.3%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	390	360	7.98%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	12.6	13.8	8.54%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.40	4.65	5.34%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	36.0	40.8	12.5%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	2540	3520	32.3%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	4.1	2.7	1.4	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: 801558)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 802668)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 801552)						
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: 801552) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 801553)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 802665)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 802666)						
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 802666) - continued						
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
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: 802658)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 802659)						
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: 801557)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 801558)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 802667)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 802668)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 801552)									
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	112	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.6	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	99.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.6	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	108	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	105	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	105	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	93.2	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	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	112	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	109	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----



Sub-Matrix: Soil/Solid					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 801552) - continued									
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	113	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	107	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.0	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	100.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	107	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	108	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	111	80.0	120	----
Metals (QCLot: 801553)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	117	80.0	120	----
Metals (QCLot: 802665)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	112	80.0	120	----
Metals (QCLot: 802666)									
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	102	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.8	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	95.2	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	92.6	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.9	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100.0	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.3	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	99.0	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.0	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	89.5	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	99.1	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	99.7	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	----



Sub-Matrix: Soil/Solid					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Analyte	CAS Number	Method	LOR	Unit					
Metals (QCLot: 802666) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.5	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.2	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	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	92.8	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	95.4	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	97.6	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	90.1	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.5	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	98.7	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: 802658)										
VA23A0499-001	BA2301-A-1-Unprocessed	Mercury, TCLP	7439-97-6	E512	0.0008 mg/L	0.001 mg/L	85.5	50.0	140	----
TCLP Metals (QCLot: 802659)										
VA23A0499-001	BA2301-A-1-Unprocessed	Antimony, TCLP	7440-36-0	E444	5.68 mg/L	5 mg/L	114	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.4 mg/L	5 mg/L	108	50.0	140	----
		Barium, TCLP	7440-39-3	E444	14.3 mg/L	12.5 mg/L	114	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.255 mg/L	0.25 mg/L	102	50.0	140	----
		Boron, TCLP	7440-42-8	E444	10.4 mg/L	10 mg/L	104	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.266 mg/L	0.25 mg/L	106	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	1.31 mg/L	1.25 mg/L	105	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	2.52 mg/L	2.5 mg/L	101	50.0	140	----
		Iron, TCLP	7439-89-6	E444	258 mg/L	250 mg/L	103	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	275 mg/L	250 mg/L	110	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.60 mg/L	2.5 mg/L	104	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.16 mg/L	5 mg/L	103	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.119 mg/L	0.1 mg/L	119	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.2 mg/L	5 mg/L	105	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.29 mg/L	5 mg/L	106	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.81 mg/L	0.75 mg/L	108	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	10 mg/L	10 mg/L	105	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:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 801552)									
	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	109	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	110	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	112	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	124	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	99.4	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	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	96.7	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	105	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	102	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	103	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	102	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	104	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	103	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	106	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	110	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	102	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	97.6	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	113	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	108	70.0	130	----



Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Metals (QCLot: 801552) - continued									
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	99.5	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	108	70.0	130	----
Metals (QCLot: 801553)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	123	70.0	130	----
Metals (QCLot: 802665)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	110	70.0	130	----
Metals (QCLot: 802666)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	105	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	119	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	112	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	107	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	105	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	98.2	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	98.6	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	104	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	97.6	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	98.1	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	99.5	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	94.8	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	99.0	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	112	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	112	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	107	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	100	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	112	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	107	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	108	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	105	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	110	70.0	130	----



Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Metals (QCLot: 802666) - continued									
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	114	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	108	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	110	70.0	130	----



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COC # _____

Page ____ of ____

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Burnaby BC			Email 2: rjohnson4@covanta.com			☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT																																																																																																																																																																																																											
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<table border="1"><thead><tr><th>Sample #</th><th>Sample Identification (This description will appear on the report)</th><th>Date (dd-mm-yy)</th><th>Time (hh:mm)</th><th>Sample Type</th><th>MET-TCLP-VA (all metals, Hg)</th><th>MOISTURE</th><th>Chrome 6</th><th>MET-CSR+FULL-VA (all metals)</th><th colspan="6">Number of Containers</th></tr></thead><tbody><tr><td></td><td>BA2301-A-1-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-2-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-3-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-4-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-5-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-6-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-7-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-8-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-9-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-10-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-11-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr><tr><td></td><td>BA2301-A-12-Unprocessed</td><td>04-Jan-23</td><td>9:00</td><td>Soil</td><td>X</td><td>X</td><td></td><td>X</td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr></tbody></table>															Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers							BA2301-A-1-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-2-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-3-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-4-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-5-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-6-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-7-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-8-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-9-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-10-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-11-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1		BA2301-A-12-Unprocessed	04-Jan-23	9:00	Soil	X	X		X						1
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers																																																																																																																																																																																																								
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