Bottom Ash Data

2023 Week 50

The following analytical report represents bottom ash composite results for week 50 of 2023 (December 10, 2023 to December 16 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	: **VA23D0382**	Page	: 1 of 11
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 19-Dec-2023 12:00
PO	: VANCO0000051998	Date Analysis Commenced	: 20-Dec-2023
C-O-C number	: ----	Issue Date	: 27-Dec-2023 09:15
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*
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	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.

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2350-A-1	BA2350-A-2	BA2350-A-3	BA2350-A-4	BA2350-A-5
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
						VA23D0382-001	VA23D0382-002	VA23D0382-003	VA23D0382-004	VA23D0382-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.4	26.1	27.6	26.1	28.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.2	12.3	12.3	12.2	12.1
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		31000	38200	34200	46000	33100
Antimony	7440-36-0	E440/VA	0.10	mg/kg		136	132	572	150	156
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		16.3	15.0	20.4	23.3	16.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		626	490	584	604	554
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.42	0.35	0.34	0.39	0.44
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		9.40	9.86	9.17	8.69	9.14
Boron	7440-42-8	E440/VA	5.0	mg/kg		212	142	162	235	182
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		9.55	7.99	8.76	11.2	9.31
Calcium	7440-70-2	E440/VA	50	mg/kg		151000	141000	149000	171000	160000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		247	174	172	136	149
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		248	82.4	46.2	182	138
Copper	7440-50-8	E440/VA	0.50	mg/kg		4500	2320	1960	1690	2700
Iron	7439-89-6	E440/VA	50	mg/kg		51700	56000	99300	49800	60700
Lead	7439-92-1	E440/VA	0.50	mg/kg		301	566	374	710	513
Lithium	7439-93-2	E440/VA	2.0	mg/kg		28.2	21.2	26.6	23.6	27.6
Magnesium	7439-95-4	E440/VA	20	mg/kg		11200	11100	11000	11600	12400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		2630	746	1080	977	1060
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	0.0581	0.112	0.0736	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.3	17.3	20.6	21.1	23.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg		186	122	145	110	132
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9390	7700	9540	8560	10200
Potassium	7440-09-7	E440/VA	100	mg/kg		4970	5130	5270	5840	5670
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.60	0.24	0.31	0.37	0.48
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.21	3.27	5.64	3.70	3.90
Sodium	7440-23-5	E440/VA	50	mg/kg		13600	14300	13900	17000	16200
Strontium	7440-24-6	E440/VA	0.50	mg/kg		301	285	310	307	314

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	BA2350-A-1	BA2350-A-2	BA2350-A-3	BA2350-A-4	BA2350-A-5
Client sample ID									
Client sampling date / time					13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
					VA23D0382-001	VA23D0382-002	VA23D0382-003	VA23D0382-004	VA23D0382-005
					Result	Result	Result	Result	Result
Metals									
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11600	11700	11300	12400	11600
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.051	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	236	113	110	113	101
Titanium	7440-32-6	E440/VA	1.0	mg/kg	237	252	274	521	245
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	3.67	4.24	384	9.71	9.47
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.66	3.28	3.61	3.98	4.04
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	41.3	39.3	32.5	43.4	40.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg	8440	3040	3400	4560	3260
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.3	3.2	2.8	2.8	2.8
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	8.57	9.22	8.64	8.94	8.79
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444/VA	0.010	pH units	7.05	7.55	7.27	7.67	7.51
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.01	1.95	2.00	1.94	2.03
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.090	<0.050	0.060	<0.050	0.052
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1980	1970	1980	2010	2050
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.04	0.506	0.467	0.486	0.355
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.922	0.855	0.916	0.841	0.906
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	118	113	119	114	119
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	0.26	0.27	<0.25	<0.25
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2350-A-1	BA2350-A-2	BA2350-A-3	BA2350-A-4	BA2350-A-5
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23D0382-001	VA23D0382-002	VA23D0382-003	VA23D0382-004	VA23D0382-005
						Result	Result	Result	Result	Result
TCLP Metals										
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		4.80	0.89	2.42	0.60	0.90
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2350-A-6	BA2350-A-7	BA2350-A-8	BA2350-A-9	BA2350-A-10
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
						VA23D0382-006	VA23D0382-007	VA23D0382-008	VA23D0382-009	VA23D0382-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.6	27.2	26.4	25.2	22.2
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.2	12.3	12.3	12.3	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		31800	45500	36900	29200	37300
Antimony	7440-36-0	E440/VA	0.10	mg/kg		195	158	148	159	136
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.0	19.0	16.5	18.7	16.1
Barium	7440-39-3	E440/VA	0.50	mg/kg		509	589	641	499	405
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.40	0.38	0.39	0.31	0.30
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		9.50	8.27	7.92	10.0	215
Boron	7440-42-8	E440/VA	5.0	mg/kg		232	154	194	165	177
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		9.34	8.53	8.18	9.26	9.98
Calcium	7440-70-2	E440/VA	50	mg/kg		160000	163000	157000	148000	135000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		186	126	125	149	129
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		110	621	87.8	111	48.1
Copper	7440-50-8	E440/VA	0.50	mg/kg		8600	2120	4230	3960	1840
Iron	7439-89-6	E440/VA	50	mg/kg		51700	45900	55200	54300	40800
Lead	7439-92-1	E440/VA	0.50	mg/kg		1640	432	409	417	420
Lithium	7439-93-2	E440/VA	2.0	mg/kg		23.7	27.7	22.3	17.5	21.9
Magnesium	7439-95-4	E440/VA	20	mg/kg		11500	11600	10700	11900	10200
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1100	905	834	1080	622
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0653	0.0787	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.1	20.6	19.3	17.5	17.3
Nickel	7440-02-0	E440/VA	0.50	mg/kg		149	443	104	548	104
Phosphorus	7723-14-0	E440/VA	50	mg/kg		7580	10500	8350	10100	8020
Potassium	7440-09-7	E440/VA	100	mg/kg		5300	5360	5460	4710	5000
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.35	0.34	0.39	0.43	0.32
Silver	7440-22-4	E440/VA	0.10	mg/kg		11.0	4.12	8.20	3.56	3.41
Sodium	7440-23-5	E440/VA	50	mg/kg		15200	15100	15300	12600	13300
Strontium	7440-24-6	E440/VA	0.50	mg/kg		300	296	302	279	275
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10900	12100	11500	11800	10900

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2350-A-6	BA2350-A-7	BA2350-A-8	BA2350-A-9	BA2350-A-10
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
						VA23D0382-006	VA23D0382-007	VA23D0382-008	VA23D0382-009	VA23D0382-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		583	136	131	130	121
Titanium	7440-32-6	E440/VA	1.0	mg/kg		295	310	381	253	337
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		9.79	6.49	8.07	5.78	3.57
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.78	3.65	3.68	3.29	3.01
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		48.1	41.3	40.6	40.8	35.7
Zinc	7440-66-6	E440/VA	2.0	mg/kg		5700	3430	3530	3720	6680
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.6	4.3	2.0	2.0	3.6
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	12.0	12.0	12.1
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.62	8.97	8.83	8.94	8.78
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.34	7.17	7.42	7.45	7.12
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	1.87
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.89	2.07	1.98	2.07	2.12
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.054	0.079	<0.050	0.121
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1950	2060	2010	2110	2040
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.678	0.650	0.715	1.27	0.796
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.899	1.04	0.943	0.810	0.753
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	0.29
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		118	123	120	120	118
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	0.25	<0.25	<0.25	0.25
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2350-A-6	BA2350-A-7	BA2350-A-8	BA2350-A-9	BA2350-A-10
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00	13-Dec-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23D0382-006	VA23D0382-007	VA23D0382-008	VA23D0382-009	VA23D0382-010
						Result	Result	Result	Result	Result
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		3.50	3.80	1.22	1.51	4.76
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2350-A-11	BA2350-A-12	----	----	----
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	----	----	----
						VA23D0382-011	VA23D0382-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.3	27.0	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.4	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		29400	31500	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		129	123	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.2	14.6	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		470	410	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.33	0.35	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.87	13.1	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		142	116	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		8.74	8.01	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		138000	137000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		146	175	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		81.2	48.2	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		2670	1620	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		54700	31500	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		276	550	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		22.8	20.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		10300	11400	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		696	782	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0553	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		15.7	14.9	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		122	90.2	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8180	9860	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		5110	5540	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.38	0.31	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.73	2.99	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		15000	14400	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		409	265	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10100	11100	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2350-A-11	BA2350-A-12	----	----	----
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23D0382-011	VA23D0382-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		106	143	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		229	168	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		3.15	2.95	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.92	2.90	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		58.6	37.4	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2900	2440	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.0	3.4	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.1	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.40	10.1	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.63	7.73	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	----	----	----
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.99	1.98	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2040	2130	----	----	----
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.278	0.168	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.809	0.809	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		117	116	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2350-A-11	BA2350-A-12	----	----	----
					Client sampling date / time	13-Dec-2023 09:00	13-Dec-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23D0382-011	VA23D0382-012	--------	--------	--------
						Result	Result	----	----	----
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	----	----	----
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	----	----	----
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	----	----	----
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		0.66	<0.50	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	----	----	----

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

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

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA23D0382**	Page	: 1 of 16
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 19-Dec-2023 12:00
PO	: VANCO0000051998	Issue Date	: 27-Dec-2023 09:16
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	VA23D0382-009	BA2350-A-9	Cobalt	7440-48-4	E440	76.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Copper	7440-50-8	E440	40.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Lead	7439-92-1	E440	43.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Lithium	7439-93-2	E440	49.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Manganese	7439-96-5	E440	30.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Nickel	7440-02-0	E440	32.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Titanium	7440-32-6	E440	44.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23D0382-009	BA2350-A-9	Zinc	7440-66-6	E440	30.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-1284853002	----	Boron	7440-42-8	E440	77.5 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG2-1284853002	----	Lithium	7439-93-2	E440	76.6 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG2-1284853002	----	Silver	7440-22-4	E440	76.9 % MES	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-1	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-2	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-3	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-4	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-5	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-6	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-7	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-8	E510	13-Dec-2023	21-Dec-2023	28 days	8 days	✓	21-Dec-2023	28 days	8 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-10	E510	13-Dec-2023	21-Dec-2023	28 days	9 days	✓	22-Dec-2023	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-11	E510	13-Dec-2023	21-Dec-2023	28 days	9 days	✓	22-Dec-2023	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-12	E510	13-Dec-2023	21-Dec-2023	28 days	9 days	✓	22-Dec-2023	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2350-A-9	E510	13-Dec-2023	21-Dec-2023	28 days	9 days	✓	22-Dec-2023	28 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-1	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-2	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-3	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-4	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-5	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-6	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-7	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-8	E440	13-Dec-2023	21-Dec-2023	180 days	8 days	✓	21-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-10	E440	13-Dec-2023	21-Dec-2023	180 days	9 days	✓	22-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-11	E440	13-Dec-2023	21-Dec-2023	180 days	9 days	✓	22-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-12	E440	13-Dec-2023	21-Dec-2023	180 days	9 days	✓	22-Dec-2023	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2350-A-9	E440	13-Dec-2023	21-Dec-2023	180 days	9 days	✓	22-Dec-2023	180 days	9 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-1	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-2	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-3	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-4	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-5	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-6	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-7	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-8	E144	13-Dec-2023	----	----	----		20-Dec-2023	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-10	E144	13-Dec-2023	----	----	----		21-Dec-2023	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-11	E144	13-Dec-2023	----	----	----		21-Dec-2023	----	8 days	

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-12	E144	13-Dec-2023	----	----	----		21-Dec-2023	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2350-A-9	E144	13-Dec-2023	----	----	----		21-Dec-2023	----	8 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-1	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-2	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-3	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-4	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-5	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-6	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2350-A-7	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2350-A-8	E108	13-Dec-2023	21-Dec-2023	30 days	8 days	✓	21-Dec-2023	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2350-A-10	E108	13-Dec-2023	21-Dec-2023	30 days	9 days	✓	22-Dec-2023	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2350-A-11	E108	13-Dec-2023	21-Dec-2023	30 days	9 days	✓	22-Dec-2023	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2350-A-12	E108	13-Dec-2023	21-Dec-2023	30 days	9 days	✓	22-Dec-2023	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2350-A-9	E108	13-Dec-2023	21-Dec-2023	30 days	9 days	✓	22-Dec-2023	30 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2350-A-1	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2350-A-10	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2350-A-11	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2350-A-12	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-2	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-3	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-4	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-5	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-6	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-7	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-8	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2350-A-9	E512	21-Dec-2023	22-Dec-2023	36 days	9 days	✓	22-Dec-2023	36 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2350-A-1	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-10	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-11	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-12	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-2	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-3	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-4	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-5	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-6	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-7	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-8	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2350-A-9	E444	21-Dec-2023	22-Dec-2023	188 days	9 days	✓	22-Dec-2023	188 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-1	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-10	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-11	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-12	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-2	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-3	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2350-A-4	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2350-A-5	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2350-A-6	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2350-A-7	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2350-A-8	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2350-A-9	EPP444	13-Dec-2023	21-Dec-2023	----	----		----	28 days	8 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1284854	2	29	6.9	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1284561	2	31	6.4	5.0	✓
Moisture Content by Gravimetry	E144	1284859	2	35	5.7	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1284858	2	26	7.6	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1284854	4	29	13.7	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1284561	4	31	12.9	10.0	✓
Moisture Content by Gravimetry	E144	1284859	2	35	5.7	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1284858	2	26	7.6	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1286440	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1284854	2	29	6.9	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1286441	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1284561	2	31	6.4	5.0	✓
Moisture Content by Gravimetry	E144	1284859	2	35	5.7	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1286440	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1286441	1	12	8.3	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 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 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 ALS Environmental - Vancouver	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury	EP440 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.

QUALITY CONTROL REPORT

Work Order	: **VA23D0382**	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 19-Dec-2023 12:00
PO	: VANCO0000051998	Date Analysis Commenced	: 20-Dec-2023
C-O-C number	: ----	Issue Date	: 27-Dec-2023 09:15
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*
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	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: 1284563)											
VA23D0302-009	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.86	8.90	0.5%	5%	----
Physical Tests (QC Lot: 1284569)											
VA23D0302-009	Anonymous	Moisture	----	E144	0.25	%	10.3	10.8	4.62%	20%	----
Physical Tests (QC Lot: 1284858)											
VA23D0382-009	BA2350-A-9	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.3	0.1%	5%	----
Physical Tests (QC Lot: 1284859)											
VA23D0382-009	BA2350-A-9	Moisture	----	E144	0.25	%	25.2	26.4	4.80%	20%	----
Metals (QC Lot: 1284561)											
VA23D0302-009	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	18000 µg/g	17900	0.271%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	1.75 µg/g	1.90	8.26%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	5.09 µg/g	5.59	9.42%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	66.1 µg/g	67.2	1.61%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.25 µg/g	0.23	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	<0.20 µg/g	<0.20	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	<5.0 µg/g	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.089 µg/g	0.092	0.003	Diff <2x LOR	----
		Calcium	7440-70-2	E440	50	mg/kg	20300 µg/g	20900	3.03%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	28.0 µg/g	26.0	7.54%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	9.65 µg/g	10.8	10.9%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	58.9 µg/g	56.6	3.91%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	22700 µg/g	24400	6.95%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	4.51 µg/g	4.17	8.01%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	10.0 µg/g	9.8	0.2	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	7070 µg/g	7400	4.50%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	352 µg/g	358	1.73%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.64 µg/g	0.62	2.64%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	19.1 µg/g	20.1	4.98%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	601 µg/g	539	11.0%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	600 µg/g	620	3.70%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	<0.20 µg/g	<0.20	0	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: 1284561) - continued											
VA23D0302-009	Anonymous	Silver	7440-22-4	E440	0.10	mg/kg	<0.10 µg/g	<0.10	0	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	712 µg/g	662	7.25%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	52.3 µg/g	55.8	6.54%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000 µg/g	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050 µg/g	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0 µg/g	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	1540 µg/g	1540	0.388%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50 µg/g	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.366 µg/g	0.409	10.9%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	71.3 µg/g	74.2	3.94%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	46.8 µg/g	50.2	7.15%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	4.5 µg/g	4.9	0.4	Diff <2x LOR	----
Metals (QC Lot: 1284562)											
VA23D0302-009	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500 µg/g	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1284853)											
VA23D0382-009	BA2350-A-9	Aluminum	7429-90-5	E440	50	mg/kg	29200	42000	36.2%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	159	144	9.63%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	18.7	17.1	8.71%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	499	482	3.57%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.30	0.006	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	10.0	10.2	1.76%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	165	212	25.2%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	9.26	8.96	3.27%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	148000	137000	7.31%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	149	139	6.82%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	111	248	76.7%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	3960	2620	40.7%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	54300	45500	17.7%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	417	648	43.5%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	17.5	28.9	49.5%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	11900	10800	10.2%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	1080	799	30.0%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	17.5	16.7	4.71%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	548	758	32.2%	30%	DUP-H

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: 1284853) - continued											
VA23D0382-009	BA2350-A-9	Phosphorus	7723-14-0	E440	50	mg/kg	10100	8900	12.4%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4710	5200	9.90%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.36	0.07	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	3.56	4.06	13.1%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	12600	14100	10.8%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	279	264	5.47%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	11800	11400	3.16%	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	130	107	19.2%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	253	396	44.2%	40%	DUP-H
		Tungsten	7440-33-7	E440	0.50	mg/kg	5.78	5.46	5.70%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.29	3.38	2.70%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	40.8	40.8	0.247%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3720	5080	30.9%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.0	3.0	0.9	Diff <2x LOR	----
Metals (QC Lot: 1284854)											
VA23D0382-009	BA2350-A-9	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----

Qualifiers

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

Method Blank (MB) Report

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

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1284569)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1284859)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1284561)						
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: 1284561) - 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: 1284562)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1284853)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1284853) - continued						
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 1284854)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1286440)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1286441)						
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: 1284563)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1284569)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1284858)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1284859)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1284561)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	98.5	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	114	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	100	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	110	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.2	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	100	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.3	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	105	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	95.8	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	95.0	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1284561) - continued									
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	95.1	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	105	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	96.3	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	107	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	112	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	101	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	99.2	80.0	120	----
Metals (QCLot: 1284562)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	----
Metals (QCLot: 1284853)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	93.4	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	90.4	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.2	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	91.2	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	84.3	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	91.2	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	# 77.5	80.0	120	MES
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	97.4	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	87.8	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.4	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	93.1	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	91.1	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.0	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	91.8	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	# 76.6	80.0	120	MES
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	93.9	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	94.9	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	84.4	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	92.6	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	92.2	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	95.0	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	92.1	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	# 76.9	80.0	120	MES

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: 1284853) - continued									
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	92.9	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	87.8	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	92.4	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	85.3	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	84.5	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	89.5	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	88.1	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	93.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	95.4	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	93.4	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	84.1	80.0	120	----
Metals (QCLot: 1284854)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.0	80.0	120	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

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: 1286440)										
VA23D0382-001	BA2350-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.8	50.0	140	----
TCLP Metals (QCLot: 1286441)										
VA23D0382-001	BA2350-A-1	Antimony, TCLP	7440-36-0	E444	4.62 mg/L	5 mg/L	92.4	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	101	50.0	140	----
		Barium, TCLP	7440-39-3	E444	10.9 mg/L	12.5 mg/L	87.3	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.239 mg/L	0.25 mg/L	95.7	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.09 mg/L	10 mg/L	90.9	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.238 mg/L	0.25 mg/L	95.3	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	1.20 mg/L	1.25 mg/L	95.6	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.19 mg/L	2.5 mg/L	87.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	232 mg/L	250 mg/L	92.8	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.00 mg/L	10 mg/L	90.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	234 mg/L	250 mg/L	93.8	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.32 mg/L	2.5 mg/L	92.8	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.77 mg/L	5 mg/L	95.5	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.078 mg/L	0.1 mg/L	77.5	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	91.9	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.73 mg/L	5 mg/L	94.5	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.71 mg/L	0.75 mg/L	95.0	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.32 mg/L	10 mg/L	93.2	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	76.9	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:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1284561)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	108	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	107	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	110	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	129	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	107	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	111	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	116	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	107	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	97.7	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	106	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	108	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	110	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	105	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	101	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	117	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	110	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	106	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	99.7	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	118	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	121	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	110	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1284561) - continued									
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	102	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	104	70.0	130	----
Metals (QCLot: 1284562)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	109	70.0	130	----
Metals (QCLot: 1284853)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	102	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	93.7	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	107	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	90.9	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	97.6	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	108	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	95.1	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	93.4	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	111	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	99.2	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	93.3	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	99.3	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	91.1	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	86.0	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	106	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	89.6	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	98.7	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	91.1	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	101	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	93.6	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	91.6	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	84.2	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	98.2	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1284853) - 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	97.5	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	92.6	70.0	130	----
Metals (QCLot: 1284854)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----

Chain of Custody / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ___ of ___

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Covanta Energy			☐ Standard ☐ Other				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Nicole Victor / Dan Skrypnyk			☑ PDF ☐ Excel ☐ Digital ☐ Fax				○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	5150 Riverbend Drive			Email 1:	nvictor@covanta.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Burnaby BC			Email 2:	ofetherstonhaugh@covanta.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-521-1025	Fax:		Email 3:	dskrypnyk@covanta.com			Analysis Request
		☐ Yes	☐ No		brent.kirkpatrick@metrovancouver.org			
					Sarah.Wellman@metrovancouver.org			
Invoice To	Same as Report ?			Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:				
Company:				PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite			
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-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers
	BA2350-A-1	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-2	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-3	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-4	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-5	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-6	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-7	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-8	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-9	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-10	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-11	13-Dec-23	9:00	Soil	X	X		X	1
	BA2350-A-12	13-Dec-23	9:00	Soil	X	X		X	1

Environmental Division Vancouver

Work Order Reference

VA23D0382

Telephone : +1 604 253 4188

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

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	19-Dec-23	330	JC	DEC 19 2023	12pm	16,16 °C				

GENF 20.00 Front