

Bottom Ash Data

2023 Week 28

The following analytical report represents bottom ash composite results for week 28 of 2023 (July 9, 2023 to July 15, 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 : **VA23B6502**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : Weekly Bottom Ash - Suite
PO : VANCO0000051998
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : ALS Environmental - Vancouver
Account Manager : Ian Chen
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 19-Jul-2023 12:55
Date Analysis Commenced : 20-Jul-2023
Issue Date : 26-Jul-2023 11:29

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Qualifiers

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2328-A-1	BA2328-A-2	BA2328-A-3	BA2328-A-4	BA2328-A-5
Client sampling date / time					12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-001	VA23B6502-002	VA23B6502-003	VA23B6502-004	VA23B6502-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	20.6	23.1	23.1	21.7	21.3
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.2	11.2	11.0	11.1	11.1
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	42500	31200	36700	39600	38900
Antimony	7440-36-0	E440/VA	0.10	mg/kg	180	135	154	145	142
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	25.6	20.4	22.1	20.4	19.9
Barium	7440-39-3	E440/VA	0.50	mg/kg	479	450	528	604	546
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.31	0.26	0.33	0.30	0.30
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.6	12.2	8.34	10.3	8.92
Boron	7440-42-8	E440/VA	5.0	mg/kg	121	146	164	143	180
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	13.5	12.7	11.7	12.9	11.2
Calcium	7440-70-2	E440/VA	50	mg/kg	138000	138000	153000	146000	132000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	247	131	137	161	132
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	48.0	164	44.2	76.6	123
Copper	7440-50-8	E440/VA	0.50	mg/kg	2700	4550	3810	1440	1910
Iron	7439-89-6	E440/VA	50	mg/kg	64100	40200	38600	46000	55000
Lead	7439-92-1	E440/VA	0.50	mg/kg	407	381	340	327	2760
Lithium	7439-93-2	E440/VA	2.0	mg/kg	23.6	24.8	19.7	20.8	34.1
Magnesium	7439-95-4	E440/VA	20	mg/kg	10300	9490	11500	10100	9780
Manganese	7439-96-5	E440/VA	1.0	mg/kg	902	671	653	692	748
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	4.00	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	21.3	16.7	20.6	17.0	17.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg	147	108	229	148	273
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9430	8180	11300	11800	7960
Potassium	7440-09-7	E440/VA	100	mg/kg	6290	5450	5910	5710	5580
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.42	0.38	0.49	0.44	0.57
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.21	>26.7	6.84	4.02	5.60
Sodium	7440-23-5	E440/VA	50	mg/kg	15600	14400	16100	14900	15500
Strontium	7440-24-6	E440/VA	0.50	mg/kg	263	236	272	248	238
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13000	11400	12300	12700	11800



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2328-A-1	BA2328-A-2	BA2328-A-3	BA2328-A-4	BA2328-A-5
Client sampling date / time					12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-001	VA23B6502-002	VA23B6502-003	VA23B6502-004	VA23B6502-005	
					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	246	179	110	114	110	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	362	165	178	247	306	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	9.44	6.04	9.57	6.49	7.55	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.43	3.07	3.24	3.22	3.03	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	41.6	37.2	41.0	41.4	44.9	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4110	3500	4200	4340	3410	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.7	2.9	3.2	2.2	1.9	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.6	11.7	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.90	6.19	5.80	6.47	6.49	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444/VA	0.010	pH units	7.09	6.43	6.38	6.96	6.42	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.92	2.21	2.22	2.06	2.47	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.076	0.175	0.248	0.092	0.624	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2160	2450	2410	2140	2530	
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	0.288	0.797	1.18	0.454	1.65	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.864	0.896	1.14	0.844	1.60	
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	114	139	132	112	132	
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.28	0.51	0.71	0.40	0.55	
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	
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2328-A-1	BA2328-A-2	BA2328-A-3	BA2328-A-4	BA2328-A-5
Client sampling date / time					12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-001	VA23B6502-002	VA23B6502-003	VA23B6502-004	VA23B6502-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	3.64	24.0	41.3	6.46	28.4	28.4
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	<10

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

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



Analytical Results

Sub-Matrix: Soil				Client sample ID	BA2328-A-6	BA2328-A-7	BA2328-A-8	BA2328-A-9	BA2328-A-10
(Matrix: Soil/Solid)				Client sampling date / time	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-006	VA23B6502-007	VA23B6502-008	VA23B6502-009	VA23B6502-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	22.0	22.1	22.5	22.5	22.3
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.0	10.9	11.1	11.1	11.0
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	33600	31300	39700	34600	47900
Antimony	7440-36-0	E440/VA	0.10	mg/kg	155	147	147	162	165
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	24.7	23.4	137	23.2	25.3
Barium	7440-39-3	E440/VA	0.50	mg/kg	537	489	590	622	636
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.30	0.27	<0.75 ^{DLM}	0.33	0.34
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.1	12.1	9.12	9.68	10.2
Boron	7440-42-8	E440/VA	5.0	mg/kg	134	139	354	211	167
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	15.2	14.2	13.0	14.9	14.5
Calcium	7440-70-2	E440/VA	50	mg/kg	156000	150000	134000	161000	172000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	150	326	260	178	155
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	55.3	51.6	94.5	38.5	52.4
Copper	7440-50-8	E440/VA	0.50	mg/kg	1940	2500	5200	1790	2220
Iron	7439-89-6	E440/VA	50	mg/kg	40600	50300	55300	56400	60100
Lead	7439-92-1	E440/VA	0.50	mg/kg	450	707	340	410	410
Lithium	7439-93-2	E440/VA	2.0	mg/kg	25.1	21.1	19.2	25.8	23.4
Magnesium	7439-95-4	E440/VA	20	mg/kg	10600	10600	9630	10100	10400
Manganese	7439-96-5	E440/VA	1.0	mg/kg	766	1260	625	682	722
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	0.0543	0.0560	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	28.8	26.6	25.2	21.0	20.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg	110	115	1500	116	113
Phosphorus	7723-14-0	E440/VA	50	mg/kg	13400	12600	12100	10500	8950
Potassium	7440-09-7	E440/VA	100	mg/kg	5300	6390	5690	6110	6460
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.43	0.46	<1.49 ^{DLM}	0.55	0.45
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.77	6.07	7.43	5.09	5.45
Sodium	7440-23-5	E440/VA	50	mg/kg	14500	16800	15200	17600	17800
Strontium	7440-24-6	E440/VA	0.50	mg/kg	254	392	287	263	267
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11700	12200	10800	12700	11600
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.373 ^{DLM}	<0.050	<0.050



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2328-A-6	BA2328-A-7	BA2328-A-8	BA2328-A-9	BA2328-A-10
(Matrix: Soil/Solid)					Client sampling date / time	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-006	VA23B6502-007	VA23B6502-008	VA23B6502-009	VA23B6502-010	
					Result	Result	Result	Result	Result	
Metals										
Tin	7440-31-5	E440/VA	2.0	mg/kg	131	114	112	123	139	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	162	166	342	267	496	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	6.44	7.44	11.7	6.94	14.4	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.35	3.52	3.26	3.43	3.36	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	39.6	42.9	40.8	47.0	43.0	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4230	3820	3470	4090	3530	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.5	2.8	<7.5 ^{DLM}	1.5	2.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.6	11.5	11.6	11.6	11.4	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.13	5.98	6.06	5.79	5.14	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.37	6.71	6.33	6.37	6.95	
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	2.22	1.99	2.13	2.30	2.09	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.182	0.129	0.185	0.183	0.086	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2540	2200	2430	2610	2220	
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	0.982	0.480	1.27	1.33	0.537	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.15	1.17	1.11	0.996	0.880	
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	135	113	132	139	111	
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	0.54	0.35	0.58	0.57	0.45	
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	
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	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2328-A-6	BA2328-A-7	BA2328-A-8	BA2328-A-9	BA2328-A-10
Client sampling date / time					12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00	12-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-006	VA23B6502-007	VA23B6502-008	VA23B6502-009	VA23B6502-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	38.7	21.0	30.6	30.8	5.23	
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA2328-A-11	BA2328-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		12-Jul-2023 09:00	12-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-011	VA23B6502-012	-----	-----	-----		
					Result	Result	----	----	----		
Physical Tests											
Moisture	----	E144/VA	0.25	%	21.8	23.8	----	----	----		
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.3	11.1	----	----	----		
Metals											
Aluminum	7429-90-5	E440/VA	50	mg/kg	31500	34200	----	----	----		
Antimony	7440-36-0	E440/VA	0.10	mg/kg	150	143	----	----	----		
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.2	19.1	----	----	----		
Barium	7440-39-3	E440/VA	0.50	mg/kg	529	499	----	----	----		
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.28	0.29	----	----	----		
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	8.55	11.0	----	----	----		
Boron	7440-42-8	E440/VA	5.0	mg/kg	156	139	----	----	----		
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	11.1	12.1	----	----	----		
Calcium	7440-70-2	E440/VA	50	mg/kg	151000	155000	----	----	----		
Chromium	7440-47-3	E440/VA	0.50	mg/kg	137	141	----	----	----		
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	27.7	26.5	----	----	----		
Copper	7440-50-8	E440/VA	0.50	mg/kg	2730	2360	----	----	----		
Iron	7439-89-6	E440/VA	50	mg/kg	56300	56200	----	----	----		
Lead	7439-92-1	E440/VA	0.50	mg/kg	482	1270	----	----	----		
Lithium	7439-93-2	E440/VA	2.0	mg/kg	19.4	18.7	----	----	----		
Magnesium	7439-95-4	E440/VA	20	mg/kg	9370	9040	----	----	----		
Manganese	7439-96-5	E440/VA	1.0	mg/kg	643	639	----	----	----		
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----		
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	26.4	18.4	----	----	----		
Nickel	7440-02-0	E440/VA	0.50	mg/kg	84.2	104	----	----	----		
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9680	7800	----	----	----		
Potassium	7440-09-7	E440/VA	100	mg/kg	5900	6000	----	----	----		
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.48	0.44	----	----	----		
Silver	7440-22-4	E440/VA	0.10	mg/kg	9.08	4.59	----	----	----		
Sodium	7440-23-5	E440/VA	50	mg/kg	16100	16100	----	----	----		
Strontium	7440-24-6	E440/VA	0.50	mg/kg	231	267	----	----	----		
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11100	11200	----	----	----		
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	----	----	----		



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2328-A-11	BA2328-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	12-Jul-2023 09:00	12-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-011	VA23B6502-012	-----	-----	-----	
					Result	Result	----	----	----	
Metals										
Tin	7440-31-5	E440/VA	2.0	mg/kg	130	137	----	----	----	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	211	317	----	----	----	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	6.41	7.07	----	----	----	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.08	3.18	----	----	----	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	35.4	53.4	----	----	----	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	12200	5640	----	----	----	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.8	2.2	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.6	11.5	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.00	5.49	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	----	----	----	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.39	6.28	----	----	----	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	----	----	----	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	----	----	----	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	----	----	----	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.24	2.32	----	----	----	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.189	0.190	----	----	----	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2430	2410	----	----	----	
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	0.554	1.16	----	----	----	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.785	1.15	----	----	----	
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	132	130	----	----	----	
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	0.66	0.61	----	----	----	
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	----	----	----	
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	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA2328-A-11	BA2328-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		12-Jul-2023 09:00	12-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B6502-011	VA23B6502-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	----	----	----	----	----
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	26.4	29.6	----	----	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	----	----	----	----	----

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

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



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23B6502</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO0000051998</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 16</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 19-Jul-2023 12:55</p> <p>Issue Date : 26-Jul-2023 11:29</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	Cadmium	7440-43-9	E440	44.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B6502-009	BA2328-A-9	Chromium	7440-47-3	E440	32.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Cobalt	7440-48-4	E440	39.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B6502-009	BA2328-A-9	Cobalt	7440-48-4	E440	143 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Magnesium	7439-95-4	E440	34.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B6502-009	BA2328-A-9	Manganese	7439-96-5	E440	102 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Nickel	7440-02-0	E440	32.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Phosphorus	7723-14-0	E440	30.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B6502-009	BA2328-A-9	Silver	7440-22-4	E440	109 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B6502-009	BA2328-A-9	Strontium	7440-24-6	E440	64.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Titanium	7440-32-6	E440	50.3 % 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.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-10	E510	12-Jul-2023	25-Jul-2023	28 days	13 days	✔	26-Jul-2023	15 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-11	E510	12-Jul-2023	25-Jul-2023	28 days	13 days	✔	26-Jul-2023	15 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-12	E510	12-Jul-2023	25-Jul-2023	28 days	13 days	✔	26-Jul-2023	15 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-9	E510	12-Jul-2023	25-Jul-2023	28 days	13 days	✔	26-Jul-2023	15 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-1	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-2	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-3	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 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 BA2328-A-4	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-5	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-6	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-7	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2328-A-8	E510	12-Jul-2023	21-Jul-2023	28 days	9 days	✔	23-Jul-2023	19 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-10	E440	12-Jul-2023	25-Jul-2023	180 days	13 days	✔	26-Jul-2023	167 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-11	E440	12-Jul-2023	25-Jul-2023	180 days	13 days	✔	26-Jul-2023	167 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-12	E440	12-Jul-2023	25-Jul-2023	180 days	13 days	✔	26-Jul-2023	167 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-9	E440	12-Jul-2023	25-Jul-2023	180 days	13 days	✔	26-Jul-2023	167 days	1 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 BA2328-A-1	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-2	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-3	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-4	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-5	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-6	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-7	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2328-A-8	E440	12-Jul-2023	21-Jul-2023	180 days	9 days	✔	24-Jul-2023	171 days	3 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-1	E144	12-Jul-2023	----	----	----		20-Jul-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 BA2328-A-10	E144	12-Jul-2023	----	----	----		25-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-11	E144	12-Jul-2023	----	----	----		25-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-12	E144	12-Jul-2023	----	----	----		25-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-2	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-3	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-4	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-5	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-6	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-7	E144	12-Jul-2023	----	----	----		20-Jul-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 BA2328-A-8	E144	12-Jul-2023	----	----	----		20-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2328-A-9	E144	12-Jul-2023	----	----	----		25-Jul-2023	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-10	E108	12-Jul-2023	25-Jul-2023	30 days	13 days	✔	25-Jul-2023	17 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-11	E108	12-Jul-2023	25-Jul-2023	30 days	13 days	✔	25-Jul-2023	17 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-12	E108	12-Jul-2023	25-Jul-2023	30 days	13 days	✔	25-Jul-2023	17 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-9	E108	12-Jul-2023	25-Jul-2023	30 days	13 days	✔	25-Jul-2023	17 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-1	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-2	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2328-A-3	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 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 BA2328-A-4	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2328-A-5	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2328-A-6	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2328-A-7	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2328-A-8	E108	12-Jul-2023	21-Jul-2023	30 days	9 days	✔	21-Jul-2023	21 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-1	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-10	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-11	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-12	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 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) BA2328-A-2	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-3	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-4	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-5	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-6	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-7	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-8	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2328-A-9	E512	20-Jul-2023	25-Jul-2023	36 days	13 days	✔	25-Jul-2023	23 days	0 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2328-A-1	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 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) BA2328-A-10	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-11	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-12	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-2	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-3	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-4	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-5	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-6	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-7	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 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) BA2328-A-8	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2328-A-9	E444	20-Jul-2023	24-Jul-2023	188 days	12 days	✔	24-Jul-2023	176 days	0 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2328-A-1	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-10	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-11	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-12	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-2	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-3	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-4	EPP444	12-Jul-2023	20-Jul-2023	----	----		----	28 days	8 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 : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2328-A-5	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-6	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-7	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-8	EPP444	12-Jul-2023	20-Jul-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) BA2328-A-9	EPP444	12-Jul-2023	20-Jul-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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1048928	2	24	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1055006	2	24	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1055009	2	12	16.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1055008	2	24	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1048928	4	24	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1055006	4	24	16.6	10.0	✔
Moisture Content by Gravimetry	E144	1055009	2	12	16.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1055008	2	24	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1053315	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1048928	2	24	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1053316	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1055006	2	24	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1055009	2	12	16.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1053315	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1053316	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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



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

QUALITY CONTROL REPORT

Work Order	: VA23B6502	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-Jul-2023 12:55
PO	: VANCO0000051998	Date Analysis Commenced	: 20-Jul-2023
C-O-C number	: ----	Issue Date	: 26-Jul-2023 11:29
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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: 1048930)											
VA23B4866-002	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.61	5.50	2.0%	5%	----
Physical Tests (QC Lot: 1048931)											
VA23B6502-001	BA2328-A-1	Moisture	----	E144	0.25	%	20.6	21.0	1.60%	20%	----
Physical Tests (QC Lot: 1055008)											
VA23B6502-009	BA2328-A-9	pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.2	0.3%	5%	----
Physical Tests (QC Lot: 1055009)											
VA23B6502-009	BA2328-A-9	Moisture	----	E144	0.25	%	22.5	22.2	1.08%	20%	----
Metals (QC Lot: 1048928)											
VA23B4866-002	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500 µg/g	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1048929)											
VA23B4866-002	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	22400 µg/g	17000	27.2%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.24 µg/g	0.15	0.09	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	4.91 µg/g	5.59	13.0%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	72.8 µg/g	68.0	6.73%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38 µg/g	0.41	0.03	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	0.156 µg/g	0.244	44.1%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	8650 µg/g	9450	8.80%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	41.6 µg/g	35.8	14.9%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	13.4 µg/g	8.99	39.4%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	44.9 µg/g	42.2	6.30%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	29000 µg/g	22100	27.0%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	4.85 µg/g	3.44	34.0%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	11.6 µg/g	8.8	2.8	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	12100 µg/g	8560	34.2%	30%	DUP-H
		Manganese	7439-96-5	E440	1.0	mg/kg	714 µg/g	572	22.2%	30%	----
Molybdenum	7439-98-7	E440	0.10	mg/kg	1.42 µg/g	2.11	38.9%	40%	----		
Nickel	7440-02-0	E440	0.50	mg/kg	25.9 µg/g	18.7	32.3%	30%	DUP-H		
Phosphorus	7723-14-0	E440	50	mg/kg	1070 µg/g	789	30.6%	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: 1048929) - continued											
VA23B4866-002	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	560 µg/g	450	23.1%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.78 µg/g	1.11	0.33	Diff <2x LOR	----
		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	583 µg/g	636	8.64%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	46.3 µg/g	44.3	4.45%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	1600 µg/g	3000	1400	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	1190 µg/g	713	50.3%	40%	DUP-H
		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	0.258 µg/g	0.246	0.012	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	110 µg/g	111	0.721%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	71.4 µg/g	60.1	17.1%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	4.3 µg/g	3.5	0.8	Diff <2x LOR	----
Metals (QC Lot: 1055006)											
VA23B6502-009	BA2328-A-9	Aluminum	7429-90-5	E440	50	mg/kg	34600	28400	19.8%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	162	157	3.33%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	23.2	22.5	3.19%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	622	579	7.24%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.42	0.09	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	9.68	9.88	2.09%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	211	178	17.3%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	14.9	15.2	1.81%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	161000	162000	0.664%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	178	247	32.5%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	38.5	233	143%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1790	2360	27.5%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	56400	72900	25.4%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	410	479	15.4%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	25.8	24.1	6.69%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	10100	10100	0.812%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	682	2100	102%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	21.0	20.3	3.26%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	116	141	18.9%	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: 1055006) - continued											
VA23B6502-009	BA2328-A-9	Phosphorus	7723-14-0	E440	50	mg/kg	10500	8950	15.7%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	6110	5810	5.09%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.55	0.43	0.12	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.09	17.4	109%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	17600	16100	8.83%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	263	514	64.5%	40%	DUP-H
		Sulfur	7704-34-9	E440	1000	mg/kg	12700	12100	4.48%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.067	0.017	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	123	150	20.0%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	267	239	11.0%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	6.94	8.30	17.8%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.43	3.36	2.19%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	47.0	41.6	12.3%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4090	3730	9.10%	30%	----
Zirconium	7440-67-7	E440	1.0	mg/kg	1.5	1.4	0.03	Diff <2x LOR	----		
Metals (QC Lot: 1055007)											
VA23B6502-009	BA2328-A-9	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0838	0.0338	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: 1048931)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 1055009)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1048928)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1048929)						
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: 1048929) - 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: 1055006)						
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: 1055006) - 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: 1055007)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1053315)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1053316)						
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: 1048930)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1048931)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1055008)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1055009)									
Moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Metals (QCLot: 1048928)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	95.9	80.0	120	----
Metals (QCLot: 1048929)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	98.7	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.1	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	88.2	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.4	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.8	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	99.5	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.0	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	99.9	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	92.5	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	110	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.1	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.7	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	98.5	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----



Sub-Matrix: Soil/Solid

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 1048929) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	90.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	96.5	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.0	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.6	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	100	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	93.5	80.0	120	----
Metals (QCLot: 1055006)									
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	107	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.9	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	108	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.7	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	99.5	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.8	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	94.5	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	107	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.4	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100.0	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	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	101	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	91.1	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: 1055006) - continued									
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	107	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	99.0	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	110	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	96.7	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.3	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	99.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.1	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.1	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	96.0	80.0	120	----
Metals (QCLot: 1055007)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	93.2	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: 1053315)										
VA23B6502-001	BA2328-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.8	50.0	140	----
TCLP Metals (QCLot: 1053316)										
VA23B6502-001	BA2328-A-1	Antimony, TCLP	7440-36-0	E444	5.18 mg/L	5 mg/L	104	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	102	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	0.265 mg/L	0.25 mg/L	106	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	0.256 mg/L	0.25 mg/L	102	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	1.25 mg/L	1.25 mg/L	99.7	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	2.33 mg/L	2.5 mg/L	93.2	50.0	140	----
		Iron, TCLP	7439-89-6	E444	248 mg/L	250 mg/L	99.2	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.2 mg/L	10 mg/L	102	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	280 mg/L	250 mg/L	112	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.47 mg/L	2.5 mg/L	98.9	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.21 mg/L	5 mg/L	104	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.112 mg/L	0.1 mg/L	112	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	100	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.27 mg/L	5 mg/L	105	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.78 mg/L	0.75 mg/L	104	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.88 mg/L	10 mg/L	98.8	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	94.2	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1048928)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	96.0	70.0	130	----
Metals (QCLot: 1048929)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	103	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	92.5	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	98.6	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	97.9	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	111	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	90.0	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	107	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	101	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	116	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	101	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	99.9	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	97.8	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	110	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	93.3	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	96.0	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	97.0	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	99.2	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	94.2	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	94.3	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	109	70.0	130	----



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1048929) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	99.8	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	105	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	97.6	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	83.7	70.0	130	----
Metals (QCLot: 1055006)									
	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	92.9	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	98.3	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	100.0	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	104	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	112	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	104	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	110	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	97.2	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	97.3	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	109	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	98.7	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	101	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	97.7	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	98.9	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	84.1	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	96.9	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	101	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	90.8	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	103	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	98.8	70.0	130	----

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 Work Order : VA23B6502
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1055006) - continued									
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	95.0	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	88.4	70.0	130	----
Metals (QCLot: 1055007)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----



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

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

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)		MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)		Number of Containers
					X	X			X	X	
BA2328-A-1		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-2		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-3		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-4		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-5		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-6		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-7		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-8		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-9		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-10		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-11		12-Jul-23	9:00	Soil	X	X			X		1
BA2328-A-12		12-Jul-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) / Ha

Environmental Division
 Vancouver
 Work Order Reference
VA23B6502



Telephone : +1 604 253 4188

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIF	
Released by:	Date (dd-mmm-yy): 19-Jul-23	Time (hh-mm): 0800	Received by:	Date: 19/7/23	Time: 12:55pm	Temperature: 24 °C	Verified by: _____
							Date: _____