Bottom Ash Data

2024 Week 23

The following analytical report represents bottom ash composite results for week 23 of 2024 (June 2, 2024 to June 8, 2024).

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	: **VA24B3695**	Page	: 1 of 11
Client	: **Reworld Renewable Burnaby, 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	: 12-Jun-2024 13:45
PO	: VANCO0000052919	Date Analysis Commenced	: 13-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 22:57
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

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

<: less than.

>: greater than.

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

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

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2423-A-1	BA2423-A-2	BA2423-A-3	BA2423-A-4	BA2423-A-5
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
						VA24B3695-001	VA24B3695-002	VA24B3695-003	VA24B3695-004	VA24B3695-005
						Result	Result	Result	Result	Result
TCLP Metals										
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		0.88	1.20	0.88	1.23	0.90
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		932	1180	954	1210	942
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		<0.050	<0.050	<0.050	<0.050	<0.050
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.04	0.915	1.00	0.922	0.976
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		7.2	52.9	7.8	55.3	7.7
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
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		<0.50	<0.50	<0.50	<0.50	<0.50
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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2423-A-6	BA2423-A-7	BA2423-A-8	BA2423-A-9	BA2423-A-10
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
						VA24B3695-006	VA24B3695-007	VA24B3695-008	VA24B3695-009	VA24B3695-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		1.27	0.88	0.89	0.90	0.85
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1180	948	941	956	954
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		<0.050	<0.050	<0.050	<0.050	<0.050
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.944	0.967	0.967	0.936	1.02
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		53.9	8.5	10.3	11.6	8.6
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
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		<0.50	<0.50	<0.50	<0.50	<0.50
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/Solid (Matrix: Soil/Solid)									
				Client sample ID	BA2423-A-11	BA2423-A-12	----	----	----
				Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B3695-011	VA24B3695-012	--------	--------	--------
					Result	Result	----	----	----
TCLP Metals									
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	1.19	0.88	----	----	----
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	1200	957	----	----	----
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	<0.050	<0.050	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.895	0.967	----	----	----
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	53.2	9.5	----	----	----
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	----	----	----
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	<0.50	<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.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2423-A-1	BA2423-A-2	BA2423-A-3	BA2423-A-4	BA2423-A-5
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
						VA24B3695-001	VA24B3695-002	VA24B3695-003	VA24B3695-004	VA24B3695-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		23.9	21.5	22.4	22.2	23.9
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.5	12.5	12.5	12.5	12.4
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		34100	52000	26900	50300	41300
Antimony	7440-36-0	E440/VA	0.10	mg/kg		98.2	104	108	83.6	92.7
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		16.1	12.4	21.6	28.9	20.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		812	726	482	705	731
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.37	0.52	0.32	0.33	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		5.65	4.47	8.01	5.90	7.92
Boron	7440-42-8	E440/VA	5.0	mg/kg		240	212	288	232	165
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		8.26	4.56	7.91	5.32	7.39
Calcium	7440-70-2	E440/VA	50	mg/kg		127000	126000	139000	122000	131000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		140	130	120	128	173
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		25.5	17.6	120	118	44.4
Copper	7440-50-8	E440/VA	0.50	mg/kg		1210	807	2060	6830	1460
Iron	7439-89-6	E440/VA	50	mg/kg		52400	41600	40400	58000	48400
Lead	7439-92-1	E440/VA	0.50	mg/kg		300	313	964	279	302
Lithium	7439-93-2	E440/VA	2.0	mg/kg		23.8	23.3	26.2	27.0	23.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		12300	11800	11200	11000	11800
Manganese	7439-96-5	E440/VA	1.0	mg/kg		667	690	658	1130	1010
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	0.0552	0.0624	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		17.6	19.8	16.3	14.8	15.3
Nickel	7440-02-0	E440/VA	0.50	mg/kg		81.6	60.3	138	222	232
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8600	8780	8980	10500	11500
Potassium	7440-09-7	E440/VA	100	mg/kg		5700	5280	5500	4940	5600
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.32	0.24	0.35	0.28	0.28
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.02	6.12	4.67	5.29	6.72
Sodium	7440-23-5	E440/VA	50	mg/kg		18000	16400	16300	15700	16600
Strontium	7440-24-6	E440/VA	0.50	mg/kg		335	296	299	282	319
Sulfur	7704-34-9	E440/VA	1000	mg/kg		8500	7600	11500	8600	9400

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2423-A-1	BA2423-A-2	BA2423-A-3	BA2423-A-4	BA2423-A-5
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
						VA24B3695-001	VA24B3695-002	VA24B3695-003	VA24B3695-004	VA24B3695-005
						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		172	1130	130	137	72.9
Titanium	7440-32-6	E440/VA	1.0	mg/kg		350	396	221	421	379
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		7.84	8.47	7.36	7.23	9.25
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.82	1.66	2.28	1.77	2.07
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		37.6	40.2	34.7	39.1	48.6
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2880	2320	3650	3770	3660
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.2	3.7	3.1	4.4	2.2
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	12.1	12.1	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.78	8.50	8.33	8.44	8.32
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		10.4	9.32	10.4	9.13	10.4

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	BA2423-A-6	BA2423-A-7	BA2423-A-8	BA2423-A-9	BA2423-A-10
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
						VA24B3695-006	VA24B3695-007	VA24B3695-008	VA24B3695-009	VA24B3695-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		22.3	24.1	23.0	23.6	23.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.4	12.4	12.4	12.4	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		46700	36200	35200	38300	41900
Antimony	7440-36-0	E440/VA	0.10	mg/kg		104	95.2	84.0	74.5	83.8
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.8	18.7	16.1	19.0	16.4
Barium	7440-39-3	E440/VA	0.50	mg/kg		696	532	578	608	682
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.39	0.34	0.37	0.42	0.34
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.50	11.6	5.46	6.47	8.54
Boron	7440-42-8	E440/VA	5.0	mg/kg		226	156	182	233	180
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.14	11.6	6.44	4.88	5.34
Calcium	7440-70-2	E440/VA	50	mg/kg		142000	130000	124000	119000	123000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		160	135	115	217	122
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		47.6	96.4	49.9	28.9	431
Copper	7440-50-8	E440/VA	0.50	mg/kg		1290	5210	1600	1360	2160
Iron	7439-89-6	E440/VA	50	mg/kg		39800	50700	42400	40400	45500
Lead	7439-92-1	E440/VA	0.50	mg/kg		814	392	338	437	335
Lithium	7439-93-2	E440/VA	2.0	mg/kg		39.1	24.1	37.0	23.3	28.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		12400	11100	10600	10700	10600
Manganese	7439-96-5	E440/VA	1.0	mg/kg		722	721	630	591	786
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	0.0689	0.0520	0.0867	0.0654
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		153	20.6	12.2	16.9	12.9
Nickel	7440-02-0	E440/VA	0.50	mg/kg		102	184	112	120	123
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10800	9230	9170	9350	9550
Potassium	7440-09-7	E440/VA	100	mg/kg		6110	4990	5380	5540	5160
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.38	0.30	0.27	0.25	0.26
Silver	7440-22-4	E440/VA	0.10	mg/kg		6.33	3.66	3.60	5.59	4.70
Sodium	7440-23-5	E440/VA	50	mg/kg		17700	14100	15500	16100	15500
Strontium	7440-24-6	E440/VA	0.50	mg/kg		300	305	279	271	292
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10800	10600	8800	8800	8400

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2423-A-6	BA2423-A-7	BA2423-A-8	BA2423-A-9	BA2423-A-10
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00	05-Jun-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24B3695-006	VA24B3695-007	VA24B3695-008	VA24B3695-009	VA24B3695-010
						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		85.9	99.2	86.4	98.8	128
Titanium	7440-32-6	E440/VA	1.0	mg/kg		509	320	392	312	551
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		8.26	7.20	10.3	7.37	6.59
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.13	2.13	2.11	1.98	1.99
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		54.3	36.5	40.6	34.9	36.6
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2840	3050	3230	3030	2600
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.2	2.7	2.7	2.9	2.1
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.1	12.1	12.0	12.1	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.72	7.99	8.29	8.20	8.40
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		9.23	10.4	10.4	10.3	10.5

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)				Client sample ID	BA2423-A-11	BA2423-A-12	----	----	----
				Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B3695-011	VA24B3695-012	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
Moisture	----	E144/VA	0.25	%	22.6	23.6	----	----	----
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	38600	39400	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	90.4	87.9	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.3	18.0	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	605	760	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.37	0.38	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.96	7.32	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	197	254	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	6.00	11.0	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	120000	133000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	259	176	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	23.8	31.9	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	1070	1800	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	42000	74500	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	1410	296	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	25.5	27.6	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11100	11700	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	829	946	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0662	0.0614	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	12.6	15.2	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	130	114	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	8950	10400	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	4860	5100	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.22	0.24	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	3.68	5.34	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	15300	16000	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	292	309	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	8700	9300	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2423-A-11	BA2423-A-12	----	----	----
					Client sampling date / time	05-Jun-2024 09:00	05-Jun-2024 09:00	----	----	----
						VA24B3695-011	VA24B3695-012	--------	--------	--------
						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		133	95.7	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		262	314	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		5.52	8.73	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.07	2.27	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		46.8	64.8	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2510	2780	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.1	3.0	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.1	12.0	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.31	7.82	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		9.23	10.4	----	----	----

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	: **VA24B3695**	Page	: 1 of 17
Client	: **Reworld Renewable Burnaby, 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	: 12-Jun-2024 13:45
PO	: VANCO0000052919	Issue Date	: 20-Jun-2024 22:57
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24B3695-005	BA2423-A-5	Antimony	7440-36-0	E440	33.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Arsenic	7440-38-2	E440	30.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Arsenic	7440-38-2	E440	32.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Chromium	7440-47-3	E440	43.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Cobalt	7440-48-4	E440	40.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Cobalt	7440-48-4	E440	66.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Iron	7439-89-6	E440	49.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Magnesium	7439-95-4	E440	30.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Manganese	7439-96-5	E440	46.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Manganese	7439-96-5	E440	58.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Nickel	7440-02-0	E440	85.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Silver	7440-22-4	E440	136 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Tin	7440-31-5	E440	156 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Titanium	7440-32-6	E440	43.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B3695-005	BA2423-A-5	Zirconium	7440-67-7	E440	2.3 % DUP-H	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

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 : 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 BA2423-A-1	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	19-Jun-2024	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-2	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	19-Jun-2024	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-3	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	19-Jun-2024	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-4	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	19-Jun-2024	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-10	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-11	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-12	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 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 BA2423-A-5	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-6	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-7	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-8	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2423-A-9	E510	05-Jun-2024	19-Jun-2024	28 days	14 days	✓	20-Jun-2024	28 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-1	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-10	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-11	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-12	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 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 BA2423-A-2	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-3	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-4	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-5	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-6	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-7	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-8	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2423-A-9	E440	05-Jun-2024	19-Jun-2024	180 days	14 days	✓	20-Jun-2024	180 days	15 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-1	E144	05-Jun-2024	----	----	----		18-Jun-2024	----	14 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 BA2423-A-10	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-11	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-12	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-2	E144	05-Jun-2024	----	----	----		18-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-3	E144	05-Jun-2024	----	----	----		18-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-4	E144	05-Jun-2024	----	----	----		18-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-5	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-6	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-7	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 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 BA2423-A-8	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2423-A-9	E144	05-Jun-2024	----	----	----		19-Jun-2024	----	14 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-1	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-2	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-3	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-4	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-10	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-11	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-12	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 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 BA2423-A-5	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-6	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-7	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-8	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2423-A-9	E108	05-Jun-2024	19-Jun-2024	30 days	14 days	✓	19-Jun-2024	30 days	15 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-1	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-10	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-11	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-12	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 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) BA2423-A-2	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-3	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-4	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-5	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-6	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-7	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-8	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2423-A-9	E512	13-Jun-2024	19-Jun-2024	37 days	14 days	✓	19-Jun-2024	37 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2423-A-1	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 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)										
BA2423-A-10	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-11	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-12	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-2	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-3	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-4	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-5	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-6	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2423-A-7	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 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) BA2423-A-8	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2423-A-9	E444	13-Jun-2024	19-Jun-2024	189 days	14 days	✓	19-Jun-2024	189 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2423-A-1	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-10	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-11	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-12	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-2	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-3	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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) BA2423-A-4	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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 : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2423-A-5	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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)										
BA2423-A-6	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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)										
BA2423-A-7	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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)										
BA2423-A-8	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 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)										
BA2423-A-9	EPP444	05-Jun-2024	13-Jun-2024	----	----		----	28 days	9 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 by CVAAS (TCLP)	E512	1502089	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1500975	2	20	10.0	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1502090	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1501117	2	28	7.1	5.0	✓
Moisture Content by Gravimetry	E144	1501121	2	31	6.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1501119	2	28	7.1	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1500975	4	20	20.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1501117	4	28	14.2	10.0	✓
Moisture Content by Gravimetry	E144	1501121	2	31	6.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1501119	2	28	7.1	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1502089	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1500975	2	20	10.0	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1502090	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1501117	2	28	7.1	5.0	✓
Moisture Content by Gravimetry	E144	1501121	2	31	6.4	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1502089	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1502090	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	: **VA24B3695**	Page	: 1 of 17
Client	: Reworld Renewable Burnaby, 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	: 12-Jun-2024 13:45
PO	: VANCO0000052919	Date Analysis Commenced	: 13-Jun-2024
C-O-C number	: ----	Issue Date	: 20-Jun-2024 22:57
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	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: 1500977)											
VA24B3456-002	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.53	5.43	1.8%	5%	----
Physical Tests (QC Lot: 1500980)											
VA24B3456-001	Anonymous	Moisture	----	E144	0.25	%	24.2	23.8	1.79%	20%	----
Physical Tests (QC Lot: 1501119)											
VA24B3695-005	BA2423-A-5	pH (1:2 soil:water)	----	E108	0.10	pH units	12.4	12.4	0.2%	5%	----
Physical Tests (QC Lot: 1501121)											
VA24B3695-005	BA2423-A-5	Moisture	----	E144	0.25	%	23.9	22.9	4.45%	20%	----
Metals (QC Lot: 1500975)											
VA24B3456-002	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0522	0.0022	Diff <2x LOR	----
Metals (QC Lot: 1500976)											
VA24B3456-002	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	21500	21000	2.38%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.30	0.26	0.05	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	2.93	2.16	30.1%	30%	DUP-H
		Barium	7440-39-3	E440	0.50	mg/kg	89.9	76.3	16.4%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.27	0.27	0.006	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.089	0.074	0.015	Diff <2x LOR	----
		Calcium	7440-70-2	E440	50	mg/kg	4250	3690	14.2%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	24.0	20.9	13.6%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	6.69	4.44	40.4%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	21.0	16.3	25.5%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	15800	12000	27.5%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	16.1	15.6	3.10%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	10.2	10.4	0.1	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	4550	3350	30.3%	30%	DUP-H
		Manganese	7439-96-5	E440	1.0	mg/kg	242	151	46.4%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.50	0.45	0.05	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.50	mg/kg	16.6	14.5	13.6%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	392	349	11.4%	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: 1500976) - continued											
VA24B3456-002	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	590	480	21.4%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.24	0.32	0.08	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	196	135	61	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	39.7	34.2	14.9%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.078	0.088	0.010	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	882	749	16.3%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.483	0.466	3.70%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	48.7	39.2	21.5%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	45.9	39.8	14.2%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
Metals (QC Lot: 1501117)											
VA24B3695-005	BA2423-A-5	Aluminum	7429-90-5	E440	50	mg/kg	41300	44200	6.56%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	92.7	66.4	33.0%	30%	DUP-H
		Arsenic	7440-38-2	E440	0.10	mg/kg	20.8	15.0	32.6%	30%	DUP-H
		Barium	7440-39-3	E440	0.50	mg/kg	731	569	24.9%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.37	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	7.92	9.74	20.6%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	165	179	8.38%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.39	6.62	11.0%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	131000	123000	6.49%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	173	111	43.9%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	44.4	22.2	66.6%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1460	1280	12.8%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	48400	29100	49.7%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	302	331	9.22%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	23.8	23.0	3.25%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11800	10300	13.8%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	1010	556	58.0%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	15.3	13.3	14.2%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	232	93.5	85.1%	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: 1501117) - continued											
VA24B3695-005	BA2423-A-5	Phosphorus	7723-14-0	E440	50	mg/kg	11500	9320	20.8%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5600	5640	0.838%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.28	0.22	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	6.72	35.2	136%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	16600	16200	2.92%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	319	279	13.3%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9400	9100	3.02%	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	72.9	595	156%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	379	244	43.4%	40%	DUP-H
		Tungsten	7440-33-7	E440	0.50	mg/kg	9.25	11.2	18.6%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	2.07	1.87	10.2%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	48.6	38.2	23.9%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3660	3490	4.63%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.2	# 4.5	2.3	Diff <2x LOR	DUP-H
Metals (QC Lot: 1501118)											
VA24B3695-005	BA2423-A-5	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.123	0.0728	Diff <2x LOR	----
TCLP Metals (QC Lot: 1502089)											
VA24B3695-001	BA2423-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1502090)											
VA24B3695-001	BA2423-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	0.88	0.89	0.004	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	932	909	2.53%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.04	1.03	0.966%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	7.2	7.3	0.04	Diff <2x LOR	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	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*
TCLP Metals (QC Lot: 1502090) - continued											
VA24B3695-001	BA2423-A-1	Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	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: 1500980)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1501121)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1500975)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1500976)						
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: 1500976) - 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: 1501117)						
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: 1501117) - 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: 1501118)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1502089)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1502090)						
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	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1500977)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 1500980)									
Moisture	----	E144	0.25	%	50 %	99.6	90.0	110	----
Physical Tests (QCLot: 1501119)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 1501121)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1500975)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	----
Metals (QCLot: 1500976)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	105	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	105	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	105	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	100	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	102	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	107	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	107	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	102	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	103	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1500976) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.8	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	111	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	103	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	101	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	105	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	103	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	106	80.0	120	----
Metals (QCLot: 1501117)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	102	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	106	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.2	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	98.1	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	102	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	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	104	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 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	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1501117) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.6	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	103	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	98.0	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	102	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	99.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	95.3	80.0	120	----
Metals (QCLot: 1501118)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	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: 1502089)										
VA24B3695-001	BA2423-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.5	50.0	140	----
TCLP Metals (QCLot: 1502090)										
VA24B3695-001	BA2423-A-1	Antimony, TCLP	7440-36-0	E444	5.10 mg/L	5 mg/L	102	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		Barium, TCLP	7440-39-3	E444	12.7 mg/L	12.5 mg/L	102	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.246 mg/L	0.25 mg/L	98.4	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.40 mg/L	10 mg/L	94.0	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.250 mg/L	0.25 mg/L	99.9	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.26 mg/L	1.25 mg/L	100	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	0.247 mg/L	0.25 mg/L	99.0	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.38 mg/L	2.5 mg/L	95.2	50.0	140	----
		Iron, TCLP	7439-89-6	E444	241 mg/L	250 mg/L	96.2	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.55 mg/L	10 mg/L	95.5	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	262 mg/L	250 mg/L	105	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.44 mg/L	2.5 mg/L	97.8	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.87 mg/L	5 mg/L	97.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.070 mg/L	0.1 mg/L	70.3	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	97.5	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.70 mg/L	5 mg/L	94.0	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	103	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	0.9 mg/L	1 mg/L	91.1	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: 1500975)									
QC-1500975-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	98.8	70.0	130	----
Metals (QCLot: 1500976)									
QC-1500976-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	109	70.0	130	----
QC-1500976-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	107	70.0	130	----
QC-1500976-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	101	70.0	130	----
QC-1500976-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	104	70.0	130	----
QC-1500976-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	109	70.0	130	----
QC-1500976-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	99.2	70.0	130	----
QC-1500976-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	102	70.0	130	----
QC-1500976-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	109	70.0	130	----
QC-1500976-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	101	70.0	130	----
QC-1500976-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	101	70.0	130	----
QC-1500976-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	98.9	70.0	130	----
QC-1500976-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	104	70.0	130	----
QC-1500976-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	97.7	70.0	130	----
QC-1500976-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	111	70.0	130	----
QC-1500976-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	107	70.0	130	----
QC-1500976-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	99.4	70.0	130	----
QC-1500976-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	103	70.0	130	----
QC-1500976-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	102	70.0	130	----
QC-1500976-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	94.4	70.0	130	----
QC-1500976-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	104	70.0	130	----
QC-1500976-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	95.5	60.0	140	----
QC-1500976-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	103	70.0	130	----
QC-1500976-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	109	70.0	130	----
QC-1500976-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	106	70.0	130	----
QC-1500976-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	90.8	50.0	150	----
QC-1500976-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	102	70.0	130	----
QC-1500976-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	106	40.0	160	----
QC-1500976-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	103	70.0	130	----
QC-1500976-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	122	70.0	130	----
QC-1500976-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	117	70.0	130	----
QC-1500976-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	103	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 (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1500976) - continued									
QC-1500976-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	102	70.0	130	----
QC-1500976-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	112	70.0	130	----
Metals (QCLot: 1501117)									
QC-1501117-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	103	70.0	130	----
QC-1501117-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	101	70.0	130	----
QC-1501117-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	95.8	70.0	130	----
QC-1501117-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	97.9	70.0	130	----
QC-1501117-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	105	70.0	130	----
QC-1501117-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	96.9	70.0	130	----
QC-1501117-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	99.9	70.0	130	----
QC-1501117-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	103	70.0	130	----
QC-1501117-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	98.5	70.0	130	----
QC-1501117-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	96.9	70.0	130	----
QC-1501117-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	98.1	70.0	130	----
QC-1501117-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	98.5	70.0	130	----
QC-1501117-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	91.4	70.0	130	----
QC-1501117-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	106	70.0	130	----
QC-1501117-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	101	70.0	130	----
QC-1501117-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	94.2	70.0	130	----
QC-1501117-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	98.3	70.0	130	----
QC-1501117-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	98.1	70.0	130	----
QC-1501117-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	100.0	70.0	130	----
QC-1501117-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	99.0	70.0	130	----
QC-1501117-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	91.8	60.0	140	----
QC-1501117-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	96.4	70.0	130	----
QC-1501117-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	102	70.0	130	----
QC-1501117-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	102	70.0	130	----
QC-1501117-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	92.8	50.0	150	----
QC-1501117-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	96.1	70.0	130	----
QC-1501117-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	98.6	40.0	160	----
QC-1501117-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	98.5	70.0	130	----
QC-1501117-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	115	70.0	130	----
QC-1501117-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	97.5	70.0	130	----
QC-1501117-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	96.8	70.0	130	----
QC-1501117-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	95.4	70.0	130	----
QC-1501117-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	94.2	70.0	130	----
Metals (QCLot: 1501118)									

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: 1501118) - continued									
QC-1501118-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	98.3	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

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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)	B3695			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
	BA2423-A-1	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-2	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-3	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-4	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-5	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-6	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-7	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-8	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-9	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-10	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-11	05-Jun-24	9:00	Soil	X	X				X						1
	BA2423-A-12	05-Jun-24	9:00	Soil	X	X				X						1

Environmental Division
Vancouver
Work Order Reference
VA24B3695

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
DANS	June 12/24	900	JC	12-6-24	1345	22 °C				

GENF 20.00 Front