metrovancouver

Bottom Ash Data

2024 Week 40

The following analytical report represents bottom ash composite results for week 40 of 2024 (September 29, 2024 to October 5, 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	: **VA24C7512**		
Client	: **Reworld Renewable Burnaby, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
Address	: 5150 Riverbend Drive Burnaby British Columbia 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	: 15-Oct-2024 13:00
PO	: VANCO0000052919	Date Analysis Commenced	: 22-Oct-2024
C-O-C number	: ----	Issue Date	: 24-Oct-2024 23:14
Sampler	: ----		
Site	: (includes 2:1ph)		
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
Owen Cheng		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*
mg/kg	milligrams per kilogram
%	percent
pH units	pH units
mg/L	milligrams per litre

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

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-1	BA2440-A-2	BA2440-A-3	BA2440-A-4	BA2440-A-5
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
						VA24C7512-001	VA24C7512-002	VA24C7512-003	VA24C7512-004	VA24C7512-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		27.6	27.2	27.6	27.1	27.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.5	11.6	11.5	11.4	11.4
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		42000	41400	31400	47600	47600
Antimony	7440-36-0	E440/VA	0.10	mg/kg		91.9	112	89.2	94.2	90.2
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		58.2	65.3	84.8	48.6	49.0
Barium	7440-39-3	E440/VA	0.50	mg/kg		604	619	491	433	619
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.33	0.61	0.35	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.98	18.6	8.85	8.66	9.34
Boron	7440-42-8	E440/VA	5.0	mg/kg		144	199	177	183	274
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.80	8.20	7.88	6.82	7.50
Calcium	7440-70-2	E440/VA	50	mg/kg		127000	144000	132000	135000	134000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		148	197	199	388	200
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		86.5	110	216	44.6	116
Copper	7440-50-8	E440/VA	0.50	mg/kg		1670	1860	2800	5110	2610
Iron	7439-89-6	E440/VA	50	mg/kg		52700	49400	68200	50500	51600
Lead	7439-92-1	E440/VA	0.50	mg/kg		334	458	327	414	1380
Lithium	7439-93-2	E440/VA	2.0	mg/kg		36.2	50.4	27.2	30.9	40.9
Magnesium	7439-95-4	E440/VA	20	mg/kg		11400	11800	10200	11300	11800
Manganese	7439-96-5	E440/VA	1.0	mg/kg		840	983	670	737	1560
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-1	BA2440-A-2	BA2440-A-3	BA2440-A-4	BA2440-A-5
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
						VA24C7512-001	VA24C7512-002	VA24C7512-003	VA24C7512-004	VA24C7512-005
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.5	17.0	14.1	40.0	14.7
Nickel	7440-02-0	E440/VA	0.50	mg/kg		201	233	174	262	198
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8520	12100	9480	9850	9360
Potassium	7440-09-7	E440/VA	100	mg/kg		5220	5440	5070	5320	5290
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.39	0.51	0.42	0.40	0.38
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.54	9.48	22.1	4.29	6.48
Sodium	7440-23-5	E440/VA	50	mg/kg		16200	17000	15200	16100	16200
Strontium	7440-24-6	E440/VA	0.50	mg/kg		399	337	310	342	976
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10000	11400	11600	10200	9000
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		102	318	93.4	122	125
Titanium	7440-32-6	E440/VA	1.0	mg/kg		391	366	242	521	543
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		24.3	23.2	84.0	22.4	16.5
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.68	2.79	2.52	2.67	2.59
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		41.2	38.9	36.1	41.2	41.2
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2820	4990	3600	3270	3860
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.2	3.7	3.7	4.1	2.8
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.8	11.7	11.8	11.7
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.79	8.02	7.57	7.18	6.47
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.93	2.93	2.93	2.93	2.93

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-1	BA2440-A-2	BA2440-A-3	BA2440-A-4	BA2440-A-5
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
						VA24C7512-001	VA24C7512-002	VA24C7512-003	VA24C7512-004	VA24C7512-005
						Result	Result	Result	Result	Result
TCLP Metals										
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.47	6.81	6.37	6.48	6.43
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		2.20	2.05	2.18	2.26	2.30
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.086	0.064	0.092	0.107	0.148
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2180	2070	2220	2260	2250
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		1.12	0.615	1.20	1.05	1.26
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.50	1.53	1.83	1.86	2.03
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		122	115	127	128	126
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		0.37	0.30	0.42	0.54	0.39
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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)				Client sample ID	BA2440-A-1	BA2440-A-2	BA2440-A-3	BA2440-A-4	BA2440-A-5
				Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C7512-001	VA24C7512-002	VA24C7512-003	VA24C7512-004	VA24C7512-005
					Result	Result	Result	Result	Result
TCLP Metals									
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	28.6	10.5	30.3	30.8	22.1
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10

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

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)				Client sample ID	BA2440-A-6	BA2440-A-7	BA2440-A-8	BA2440-A-9	BA2440-A-10
				Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C7512-006	VA24C7512-007	VA24C7512-008	VA24C7512-009	VA24C7512-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	28.0	27.9	26.9	27.2	27.2
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.6	11.4	11.0	11.3	11.1
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	41600	34900	35300	47800	38200
Antimony	7440-36-0	E440/VA	0.10	mg/kg	108	97.5	86.4	95.4	108
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	46.3	43.0	43.4	63.5	58.6
Barium	7440-39-3	E440/VA	0.50	mg/kg	539	624	628	613	482
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.32	0.36	0.34	0.35
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	21.9	6.15	6.67	7.14	9.62
Boron	7440-42-8	E440/VA	5.0	mg/kg	150	142	211	187	170
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	6.56	10.4	6.48	9.45	7.40
Calcium	7440-70-2	E440/VA	50	mg/kg	132000	124000	131000	130000	136000

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-6	BA2440-A-7	BA2440-A-8	BA2440-A-9	BA2440-A-10
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
						VA24C7512-006	VA24C7512-007	VA24C7512-008	VA24C7512-009	VA24C7512-010
						Result	Result	Result	Result	Result
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg		142	411	144	127	137
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		40.1	44.5	86.3	711	282
Copper	7440-50-8	E440/VA	0.50	mg/kg		1310	2840	1240	1720	7020
Iron	7439-89-6	E440/VA	50	mg/kg		51600	61800	50100	55400	62000
Lead	7439-92-1	E440/VA	0.50	mg/kg		500	428	335	321	707
Lithium	7439-93-2	E440/VA	2.0	mg/kg		26.6	44.0	23.8	74.9	55.0
Magnesium	7439-95-4	E440/VA	20	mg/kg		11200	9770	11400	11700	10700
Manganese	7439-96-5	E440/VA	1.0	mg/kg		739	849	799	886	4790
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		14.5	17.8	15.3	16.8	13.8
Nickel	7440-02-0	E440/VA	0.50	mg/kg		108	380	175	184	167
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8590	11200	10200	11200	10600
Potassium	7440-09-7	E440/VA	100	mg/kg		5130	4840	4990	5280	5480
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.38	0.37	0.32	0.34	0.43
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.69	10.2	5.02	4.07	11.7
Sodium	7440-23-5	E440/VA	50	mg/kg		15800	16200	15100	15700	16600
Strontium	7440-24-6	E440/VA	0.50	mg/kg		324	286	458	336	283
Sulfur	7704-34-9	E440/VA	1000	mg/kg		9400	8800	9000	9300	10300
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		106	438	204	86.6	116
Titanium	7440-32-6	E440/VA	1.0	mg/kg		271	277	252	319	270

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-6	BA2440-A-7	BA2440-A-8	BA2440-A-9	BA2440-A-10
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
						VA24C7512-006	VA24C7512-007	VA24C7512-008	VA24C7512-009	VA24C7512-010
						Result	Result	Result	Result	Result
Metals										
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		25.6	22.9	18.5	17.6	21.8
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.72	2.33	2.50	2.61	2.63
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		38.7	35.9	38.7	38.7	37.6
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3670	2810	4230	6720	3530
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		4.3	3.3	2.7	4.6	4.0
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.8	11.7	11.8	11.7
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.67	7.46	6.13	8.03	6.16
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.93	2.93	2.93	2.93	2.93
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.40	6.84	6.71	6.43	6.81
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		2.18	2.07	2.07	2.23	2.07
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.130	0.104	0.067	0.114	0.075
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2180	2050	2020	2260	2050
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.743	0.683	0.955	0.724	0.936
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		2.08	1.63	1.42	1.53	1.41
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2440-A-6	BA2440-A-7	BA2440-A-8	BA2440-A-9	BA2440-A-10
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00	02-Oct-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit		VA24C7512-006	VA24C7512-007	VA24C7512-008	VA24C7512-009	VA24C7512-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		124	114	114	125	113
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		0.42	0.27	0.29	0.35	0.32
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		23.4	10.4	23.0	29.0	18.4
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2440-A-11	BA2440-A-12	----	----	----
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit		VA24C7512-011	VA24C7512-012	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.9	29.3	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.3	11.2	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-11	BA2440-A-12	----	----	----
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	----	----	----
						VA24C7512-011	VA24C7512-012	----	----	----
						Result	Result	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		50000	49600	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		78.9	84.9	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		62.4	49.6	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		608	630	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.31	0.32	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.76	12.2	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		162	219	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.87	6.86	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		128000	126000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		170	158	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		218	46.0	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		5590	2640	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		66600	54400	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		304	422	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		43.9	26.0	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		10700	11600	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		884	1220	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.4	15.6	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		265	130	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9180	9150	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-11	BA2440-A-12	----	----	----
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	----	----	----
						VA24C7512-011	VA24C7512-012	----	----	----
						Result	Result	----	----	----
Metals										
Potassium	7440-09-7	E440/VA	100	mg/kg		5280	5460	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.29	0.31	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		16.4	4.97	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		16200	16900	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		320	345	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		8800	8900	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		112	149	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		285	270	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		26.6	14.5	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.37	2.48	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		40.6	38.9	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3080	2930	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		6.2	5.5	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.8	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.58	7.90	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.93	2.93	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.77	6.47	----	----	----
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	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	BA2440-A-11	BA2440-A-12	----	----	----
					Client sampling date / time	02-Oct-2024 09:00	02-Oct-2024 09:00	----	----	----
						VA24C7512-011	VA24C7512-012	----	----	----
						Result	Result	----	----	----
TCLP Metals										
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		2.30	2.30	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.074	0.105	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2110	2240	----	----	----
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		0.568	1.48	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.59	1.88	----	----	----
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		115	128	----	----	----
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		0.27	0.34	----	----	----
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		11.3	17.7	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	----	----	----

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

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

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C7512**	Page	: 1 of 16
Client	: **Reworld Renewable Burnaby, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: 15-Oct-2024 13:00
PO	: VANCO0000052919	Issue Date	: 24-Oct-2024 23:13
C-O-C number	: ----		
Sampler	: ----		
Site	: (includes 2:1ph)		
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	VA24C7512-001	BA2440-A-1	Bismuth	7440-69-9	E440	37.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Bismuth	7440-69-9	E440	145 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Boron	7440-42-8	E440	35.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Cadmium	7440-43-9	E440	126 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-001	BA2440-A-1	Cobalt	7440-48-4	E440	52.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-001	BA2440-A-1	Copper	7440-50-8	E440	51.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Copper	7440-50-8	E440	32.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-001	BA2440-A-1	Iron	7439-89-6	E440	40.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Manganese	7439-96-5	E440	38.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Silver	7440-22-4	E440	79.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Strontium	7440-24-6	E440	54.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Tin	7440-31-5	E440	64.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C7512-008	BA2440-A-8	Zinc	7440-66-6	E440	96.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

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 BA2440-A-1	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-2	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-3	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-4	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-5	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-6	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-7	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	23-Oct-2024	28 days	21 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 BA2440-A-10	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	24-Oct-2024	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-11	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	24-Oct-2024	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-12	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	24-Oct-2024	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-8	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	24-Oct-2024	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2440-A-9	E510	02-Oct-2024	23-Oct-2024	28 days	21 days	✓	24-Oct-2024	28 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-1	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-10	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-11	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-12	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 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 BA2440-A-2	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-3	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-4	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-5	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-6	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-7	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-8	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2440-A-9	E440	02-Oct-2024	23-Oct-2024	180 days	21 days	✓	24-Oct-2024	180 days	22 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-1	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 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 BA2440-A-10	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-11	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-12	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-2	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-3	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-4	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-5	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-6	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-7	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 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 BA2440-A-8	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2440-A-9	E144	02-Oct-2024	----	----	----		22-Oct-2024	----	20 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-1	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-10	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-11	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-12	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-2	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-3	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-4	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 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 BA2440-A-5	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-6	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-7	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-8	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2440-A-9	E108	02-Oct-2024	23-Oct-2024	30 days	21 days	✓	23-Oct-2024	30 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-1	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-10	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-11	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-12	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-2	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-3	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-4	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-5	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-6	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-7	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-8	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2440-A-9	E512	22-Oct-2024	24-Oct-2024	48 days	22 days	✓	24-Oct-2024	48 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-1	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 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) BA2440-A-10	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-11	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-12	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-2	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-3	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-4	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-5	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-6	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-7	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 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) BA2440-A-8	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2440-A-9	E444	22-Oct-2024	23-Oct-2024	200 days	22 days	✓	24-Oct-2024	200 days	22 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-1	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-10	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-11	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-12	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-2	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-3	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-4	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 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) BA2440-A-5	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-6	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-7	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-8	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2440-A-9	EPP444	02-Oct-2024	22-Oct-2024	----	----		----	28 days	20 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	1727397	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1724568	2	21	9.5	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1727396	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1724567	2	31	6.4	5.0	✓
Moisture Content by Gravimetry	E144	1724571	2	17	11.7	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1724547	2	34	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1724568	4	21	19.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1724567	4	31	12.9	10.0	✓
Moisture Content by Gravimetry	E144	1724571	2	17	11.7	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1724570	2	34	5.8	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1727397	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1724568	2	21	9.5	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1727396	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1724567	2	31	6.4	5.0	✓
Moisture Content by Gravimetry	E144	1724571	2	17	11.7	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1727397	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1727396	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	: **VA24C7512**	Page	: 1 of 17
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: 15-Oct-2024 13:00
PO	: VANCO0000052919	Date Analysis Commenced	: 22-Oct-2024
C-O-C number	: ----	Issue Date	: 24-Oct-2024 23:13
Sampler	: ----		
Site	: (includes 2:1ph)		
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
Owen Cheng		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: 1724547)											
VA24C7512-001	BA2440-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.6	0.2%	5%	----
Physical Tests (QC Lot: 1724550)											
VA24C7512-001	BA2440-A-1	Moisture	----	E144	0.25	%	27.6	28.4	2.99%	20%	----
Physical Tests (QC Lot: 1724570)											
VA24C7512-008	BA2440-A-8	pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	10.9	0.8%	5%	----
Physical Tests (QC Lot: 1724571)											
VA24C7512-008	BA2440-A-8	Moisture	----	E144	0.25	%	26.9	26.4	1.98%	20%	----
Metals (QC Lot: 1724548)											
VA24C7512-001	BA2440-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1724549)											
VA24C7512-001	BA2440-A-1	Aluminum	7429-90-5	E440	50	mg/kg	42000	53500	24.1%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	91.9	85.7	6.98%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	58.2	52.4	10.3%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	604	604	0.0167%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.37	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.98	10.2	37.0%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	144	179	21.6%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.80	6.28	21.5%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	127000	121000	4.70%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	148	191	25.2%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	86.5	147	52.0%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1670	2840	51.8%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	52700	79000	40.0%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	334	365	8.93%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	36.2	32.8	9.96%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11400	10600	6.77%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	840	926	9.74%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	22.5	17.2	26.9%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	201	190	5.28%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	8520	10000	16.0%	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: 1724549) - continued											
VA24C7512-001	BA2440-A-1	Potassium	7440-09-7	E440	100	mg/kg	5220	5220	0.0282%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.36	0.03	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	7.54	5.44	32.4%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	16200	16000	1.21%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	399	284	33.4%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	10000	9400	6.28%	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	102	102	0.897%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	391	480	20.5%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	24.3	22.7	6.97%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	2.68	2.43	9.69%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	41.2	38.7	6.15%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	2820	3180	12.0%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.2	4.2	1.0	Diff <2x LOR	----
Metals (QC Lot: 1724567)											
VA24C7512-008	BA2440-A-8	Aluminum	7429-90-5	E440	50	mg/kg	35300	43600	20.8%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	86.4	88.7	2.69%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	43.4	44.3	2.06%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	628	613	2.43%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.31	0.05	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.67	42.0	145%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	211	148	35.5%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	6.48	28.6	126%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	131000	123000	6.06%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	144	138	4.35%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	86.3	82.8	4.08%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	1240	1720	32.4%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	50100	66100	27.5%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	335	310	7.81%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	23.8	25.6	7.48%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11400	11100	2.51%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	799	1180	38.7%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	15.3	16.0	4.44%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	175	161	8.40%	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: 1724567) - continued											
VA24C7512-008	BA2440-A-8	Phosphorus	7723-14-0	E440	50	mg/kg	10200	9540	6.59%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4990	4740	5.16%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.33	0.005	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.02	11.6	79.3%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	15100	14600	3.75%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	458	263	54.1%	40%	DUP-H
		Sulfur	7704-34-9	E440	1000	mg/kg	9000	8600	3.71%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.054	0.004	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	204	105	64.0%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	252	270	7.08%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	18.5	15.2	19.7%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	2.50	2.42	3.38%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	38.7	35.6	8.23%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4230	12200	96.9%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.7	3.8	1.1	Diff <2x LOR	----
Metals (QC Lot: 1724568)											
VA24C7512-008	BA2440-A-8	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1727396)											
VA24C7512-001	BA2440-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	2.20	2.13	0.07	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.086	0.089	0.003	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	2180	2190	0.273%	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	1.12	1.13	0.849%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.50	1.49	0.114%	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	122	120	1.47%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.37	0.38	0.005	Diff <2x LOR	----
		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	----

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: 1727396) - continued											
VA24C7512-001	BA2440-A-1	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	28.6	29.0	1.34%	30%	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1727397)											
VA24C7512-001	BA2440-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	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: 1724550)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1724571)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1724548)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1724549)						
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: 1724549) - 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: 1724567)						
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: 1724567) - 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: 1724568)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1727396)						
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	----
TCLP Metals (QCLot: 1727397)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----

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: 1724547)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 1724550)									
Moisture	----	E144	0.25	%	50 %	98.2	90.0	110	----
Physical Tests (QCLot: 1724570)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 1724571)									
Moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Metals (QCLot: 1724548)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 1724549)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	100	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	97.7	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	99.3	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	109	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	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	108	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	102	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	105	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: 1724549) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	105	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	106	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.4	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	108	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100	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	106	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	111	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	109	80.0	120	----
Metals (QCLot: 1724567)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	114	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	118	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	100	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	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	110	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	109	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	110	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	114	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	111	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	117	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	109	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	110	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: 1724567) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	97.9	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	110	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	99.7	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.7	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	114	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	106	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	107	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	112	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	110	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
Metals (QCLot: 1724568)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	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: 1727396)										
VA24C7512-001	BA2440-A-1	Antimony, TCLP	7440-36-0	E444	5.08 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	13.5 mg/L	12.5 mg/L	108	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.258 mg/L	0.25 mg/L	103	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.85 mg/L	10 mg/L	98.5	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.242 mg/L	0.25 mg/L	96.8	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.24 mg/L	1.25 mg/L	99.0	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.45 mg/L	2.5 mg/L	98.1	50.0	140	----
		Iron, TCLP	7439-89-6	E444	247 mg/L	250 mg/L	98.7	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.60 mg/L	10 mg/L	96.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	294 mg/L	250 mg/L	118	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.42 mg/L	2.5 mg/L	97.0	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.86 mg/L	5 mg/L	97.2	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.090 mg/L	0.1 mg/L	90.1	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	97.1	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.89 mg/L	5 mg/L	97.9	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	ND mg/L	----	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	1.0 mg/L	1 mg/L	96.7	50.0	150	----
TCLP Metals (QCLot: 1727397)										
VA24C7512-001	BA2440-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	87.6	50.0	140	----

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: 1724548)									
QC-1724548-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	99.0	70.0	130	----
Metals (QCLot: 1724549)									
QC-1724549-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	108	70.0	130	----
QC-1724549-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	101	70.0	130	----
QC-1724549-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	100	70.0	130	----
QC-1724549-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	97.4	70.0	130	----
QC-1724549-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	93.6	70.0	130	----
QC-1724549-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	100	70.0	130	----
QC-1724549-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	102	70.0	130	----
QC-1724549-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	106	70.0	130	----
QC-1724549-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	101	70.0	130	----
QC-1724549-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	107	70.0	130	----
QC-1724549-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	100	70.0	130	----
QC-1724549-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	110	70.0	130	----
QC-1724549-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	108	70.0	130	----
QC-1724549-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	100	70.0	130	----
QC-1724549-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	98.0	70.0	130	----
QC-1724549-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	108	70.0	130	----
QC-1724549-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	101	70.0	130	----
QC-1724549-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	112	60.0	140	----
QC-1724549-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	99.9	70.0	130	----
QC-1724549-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	114	70.0	130	----
QC-1724549-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	68.0	50.0	150	----
QC-1724549-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	103	70.0	130	----
QC-1724549-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	99.0	40.0	160	----
QC-1724549-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	117	70.0	130	----
QC-1724549-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	99.4	70.0	130	----
QC-1724549-003	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: 1724549) - continued									
QC-1724549-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	104	70.0	130	----
QC-1724549-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	100	70.0	130	----
Metals (QCLot: 1724567)									
QC-1724567-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	107	70.0	130	----
QC-1724567-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	98.2	70.0	130	----
QC-1724567-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	103	70.0	130	----
QC-1724567-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	98.6	70.0	130	----
QC-1724567-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	102	70.0	130	----
QC-1724567-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	97.0	70.0	130	----
QC-1724567-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	103	70.0	130	----
QC-1724567-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	102	70.0	130	----
QC-1724567-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	102	70.0	130	----
QC-1724567-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	100	70.0	130	----
QC-1724567-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	102	70.0	130	----
QC-1724567-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	101	70.0	130	----
QC-1724567-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	94.7	70.0	130	----
QC-1724567-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	107	70.0	130	----
QC-1724567-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	108	70.0	130	----
QC-1724567-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	99.3	70.0	130	----
QC-1724567-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	93.5	70.0	130	----
QC-1724567-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	100	70.0	130	----
QC-1724567-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	107	70.0	130	----
QC-1724567-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	101	70.0	130	----
QC-1724567-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	94.7	60.0	140	----
QC-1724567-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	93.4	70.0	130	----
QC-1724567-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	112	70.0	130	----
QC-1724567-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	96.5	70.0	130	----
QC-1724567-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	75.1	50.0	150	----
QC-1724567-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	95.9	70.0	130	----
QC-1724567-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	94.4	40.0	160	----
QC-1724567-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	104	70.0	130	----
QC-1724567-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	104	70.0	130	----
QC-1724567-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	92.5	70.0	130	----
QC-1724567-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	102	70.0	130	----
QC-1724567-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	103	70.0	130	----
QC-1724567-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	93.4	70.0	130	----
Metals (QCLot: 1724568)									

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: 1724568) - continued									
QC-1724568-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	97.7	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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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:	rminchin@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)	C7512			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
[redacted]	BA2440-A-1	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-2	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-3	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-4	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-5	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-6	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-7	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-8	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-9	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-10	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-11	02-Oct-24	9:00	Soil	X	X		X	1
[redacted]	BA2440-A-12	02-Oct-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24C7512

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
	15-Oct-24	4PM		Oct 15th	1PM	17 °C				

GENF 20.00 Front