metrovancouver

Bottom Ash Data

2024 Week 49

The following analytical report represents bottom ash composite results for week 49 of 2024 (December 1, 2024 to December 7, 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	:	**VA24D3144**			
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	:	10-Dec-2024 13:30
PO	:	PO#46693 Weekly Bottom Ash -Suite	Date Analysis Commenced	:	12-Dec-2024
C-O-C number	:	----	Issue Date	:	18-Dec-2024 06:12
Sampler	:	----			
Site	:	(includes 2:1 PH)			
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
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Russell Zhang	Analyst	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.

Workorder Comments

Sample(13) BA2449-A-12 received extra sample at laboratory, but not listed on submitted Chain of Custody / analytical request form. Soil sample container will be placed on hold until analyses tests are confirmed.
Sample(11) BA2449-A-11 not received at laboratory, but requested on Chain of Custody / analytical request form; subsample cannot be obtained from other containers to meet request. The requested analysis cannot be performed.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-1	BA2449-A-2	BA2449-A-3	BA2449-A-4	BA2449-A-5
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-001	VA24D3144-002	VA24D3144-003	VA24D3144-004	VA24D3144-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.0	26.8	26.1	27.0	27.3
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.7	12.0	11.8	11.9	11.7
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		41600	35400	49600	42000	41800
Antimony	7440-36-0	E440/VA	0.10	mg/kg		107	92.3	78.7	62.2	75.1
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		16.7	12.9	15.7	11.7	12.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		455	512	488	418	525
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.37	0.34	0.31	0.29	0.33
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.92	4.32	6.48	6.75	4.53
Boron	7440-42-8	E440/VA	5.0	mg/kg		212	212	131	149	207
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		12.8	9.85	7.13	7.91	14.1
Calcium	7440-70-2	E440/VA	50	mg/kg		135000	118000	115000	104000	108000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		164	135	104	138	152
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		87.9	801	42.9	74.3	110
Copper	7440-50-8	E440/VA	0.50	mg/kg		3870	6150	1900	3680	7420
Iron	7439-89-6	E440/VA	50	mg/kg		61800	61900	46600	39300	53100
Lead	7439-92-1	E440/VA	0.50	mg/kg		454	368	303	348	765
Lithium	7439-93-2	E440/VA	2.0	mg/kg		35.5	32.3	23.2	27.8	23.7
Magnesium	7439-95-4	E440/VA	20	mg/kg		13400	11500	11200	10500	10000
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1000	1040	781	953	1160
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	LOR	Unit	Client sample ID	BA2449-A-1	BA2449-A-2	BA2449-A-3	BA2449-A-4	BA2449-A-5
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-001	VA24D3144-002	VA24D3144-003	VA24D3144-004	VA24D3144-005
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		36.7	15.0	12.6	10.9	12.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg		140	130	163	215	152
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9750	9990	7960	8520	6450
Potassium	7440-09-7	E440/VA	100	mg/kg		5640	4740	4460	4410	4280
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.36	0.66	0.22	0.30	0.25
Silver	7440-22-4	E440/VA	0.10	mg/kg		6.35	3.22	3.89	2.75	4.18
Sodium	7440-23-5	E440/VA	50	mg/kg		16400	14200	12800	12700	13000
Strontium	7440-24-6	E440/VA	0.50	mg/kg		325	259	231	210	224
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12500	9800	9500	8700	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		125	108	191	128	4180
Titanium	7440-32-6	E440/VA	1.0	mg/kg		352	223	340	187	228
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		4.33	5.42	4.11	3.49	3.08
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.90	1.87	1.58	1.57	1.62
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		41.1	35.5	31.8	33.2	32.5
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3370	4980	3040	3400	3050
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.2	1.7	3.6	4.4	4.9
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.7	11.7	11.8	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.86	6.40	6.12	6.85	7.15
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.83	2.83	2.83	2.83	2.83

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-1	BA2449-A-2	BA2449-A-3	BA2449-A-4	BA2449-A-5
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-001	VA24D3144-002	VA24D3144-003	VA24D3144-004	VA24D3144-005
						Result	Result	Result	Result	Result
TCLP Metals										
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.91	7.28	7.26	7.28	7.21
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		2.24	2.24	2.22	2.42	2.30
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.165	0.082	0.091	0.050	0.087
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1990	1950	1920	2010	1900
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		1.01	0.486	1.32	0.845	0.983
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.904	0.664	0.652	0.688	0.668
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		136	124	122	128	120
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		0.30	<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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-1	BA2449-A-2	BA2449-A-3	BA2449-A-4	BA2449-A-5
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-001	VA24D3144-002	VA24D3144-003	VA24D3144-004	VA24D3144-005
						Result	Result	Result	Result	Result
TCLP Metals										
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		8.72	2.20	3.48	2.57	2.85
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.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-6	BA2449-A-7	BA2449-A-8	BA2449-A-9	BA2449-A-10
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-006	VA24D3144-007	VA24D3144-008	VA24D3144-009	VA24D3144-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.8	27.7	25.4	25.7	26.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.7	12.0	11.9	11.8	11.7
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		35300	39200	46500	31500	35400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		87.7	73.8	99.6	79.7	112
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		13.0	13.8	12.7	19.1	12.9
Barium	7440-39-3	E440/VA	0.50	mg/kg		566	557	610	490	528
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.86	0.32	0.34	0.32	0.34
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		8.92	5.39	6.45	16.1	7.04
Boron	7440-42-8	E440/VA	5.0	mg/kg		189	199	209	187	293
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.26	10.5	9.55	7.62	13.0
Calcium	7440-70-2	E440/VA	50	mg/kg		120000	123000	123000	114000	123000

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-6	BA2449-A-7	BA2449-A-8	BA2449-A-9	BA2449-A-10
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-006	VA24D3144-007	VA24D3144-008	VA24D3144-009	VA24D3144-010
						Result	Result	Result	Result	Result
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg		120	123	117	120	210
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		91.7	64.6	97.3	237	186
Copper	7440-50-8	E440/VA	0.50	mg/kg		6950	1740	4040	5350	18800
Iron	7439-89-6	E440/VA	50	mg/kg		62400	37700	38200	46200	56100
Lead	7439-92-1	E440/VA	0.50	mg/kg		664	314	686	1210	1640
Lithium	7439-93-2	E440/VA	2.0	mg/kg		24.2	27.4	29.7	35.9	32.0
Magnesium	7439-95-4	E440/VA	20	mg/kg		13000	11500	12500	11600	12000
Manganese	7439-96-5	E440/VA	1.0	mg/kg		776	764	719	854	782
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0623	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		12.6	15.9	12.2	13.5	16.4
Nickel	7440-02-0	E440/VA	0.50	mg/kg		216	85.5	134	327	1500
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9130	8890	8540	9380	7930
Potassium	7440-09-7	E440/VA	100	mg/kg		4720	4800	5070	4710	4640
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.26	0.29	0.31	0.27	0.32
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.49	2.70	12.8	6.99	11.2
Sodium	7440-23-5	E440/VA	50	mg/kg		13700	14900	15100	13600	14100
Strontium	7440-24-6	E440/VA	0.50	mg/kg		548	289	239	235	237
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10300	10100	9900	8400	9400
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		479	245	113	576	568
Titanium	7440-32-6	E440/VA	1.0	mg/kg		192	185	234	152	281

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-6	BA2449-A-7	BA2449-A-8	BA2449-A-9	BA2449-A-10
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-006	VA24D3144-007	VA24D3144-008	VA24D3144-009	VA24D3144-010
						Result	Result	Result	Result	Result
Metals										
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		3.94	6.85	3.70	4.14	5.21
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.63	1.78	1.63	1.68	1.60
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		34.6	39.1	34.1	34.3	36.9
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4310	6030	3470	2870	4300
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.1	3.3	3.2	3.6	2.4
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		6.46	6.69	6.25	6.44	6.22
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.83	2.83	2.83	2.83	2.83
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.45	7.27	7.24	7.18	7.15
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		2.38	2.34	2.27	2.29	2.26
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	0.055	0.053	0.116
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1890	1940	1890	1910	1960
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		0.591	0.517	0.742	0.623	0.838
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.624	0.607	0.639	0.497	0.691
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)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-6	BA2449-A-7	BA2449-A-8	BA2449-A-9	BA2449-A-10
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00	04-Dec-2024 09:00
						VA24D3144-006	VA24D3144-007	VA24D3144-008	VA24D3144-009	VA24D3144-010
						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	124	117	126	121
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	0.27	<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		0.96	1.59	2.88	3.15	3.66
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.

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-12	BA2449-A-12	----	----	----
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	----	----	----
						VA24D3144-012	VA24D3144-013	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.9	26.0	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.0	11.8	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-12	BA2449-A-12	----	----	----
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	----	----	----
						VA24D3144-012	VA24D3144-013	----	----	----
						Result	Result	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		31500	37900	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		104	88.5	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		13.8	14.7	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		464	555	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.36	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.46	8.34	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		243	234	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		9.59	10.9	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		126000	127000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		117	120	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		83.2	146	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		14900	1530	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		38000	51000	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		675	1310	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		32.1	72.2	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		12800	12700	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		670	721	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	0.0547	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		11.6	12.1	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		152	88.5	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8290	10800	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2449-A-12	BA2449-A-12	----	----	----
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	----	----	----
						VA24D3144-012	VA24D3144-013	----	----	----
						Result	Result	----	----	----
Metals										
Potassium	7440-09-7	E440/VA	100	mg/kg		5110	5250	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.37	0.27	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		3.35	3.12	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		15000	15500	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		258	338	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11500	10400	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		203	158	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		235	190	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		5.12	5.05	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.74	1.59	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		33.9	35.7	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3920	7740	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.1	2.4	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.7	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.91	6.74	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.83	2.83	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.82	6.80	----	----	----
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	LOR	Unit	Client sample ID	BA2449-A-12	BA2449-A-12	----	----	----
					Client sampling date / time	04-Dec-2024 09:00	04-Dec-2024 09:00	----	----	----
						VA24D3144-012	VA24D3144-013	----	----	----
						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		2.33	2.36	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.109	0.152	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2020	1990	----	----	----
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		1.34	1.04	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.927	0.902	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		132	137	----	----	----
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		0.29	<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		12.8	11.9	----	----	----
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.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24D3144**	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	: 10-Dec-2024 13:30
PO	: PO#46693 Weekly Bottom Ash -Suite	Issue Date	: 18-Dec-2024 06:11
C-O-C number	: ----		
Sampler	: ----		
Site	: (includes 2:1 PH)		
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 Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24D3144-002	BA2449-A-2	Bismuth	7440-69-9	E440	35.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Boron	7440-42-8	E440	38.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Chromium	7440-47-3	E440	61.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Cobalt	7440-48-4	E440	170 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Copper	7440-50-8	E440	63.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Lead	7439-92-1	E440	96.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Lithium	7439-93-2	E440	35.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Manganese	7439-96-5	E440	71.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Manganese	7439-96-5	E440	30.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Molybdenum	7439-98-7	E440	47.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Molybdenum	7439-98-7	E440	95.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Nickel	7440-02-0	E440	94.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Silver	7440-22-4	E440	55.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-001	BA2449-A-1	Tungsten	7440-33-7	E440	102 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Tungsten	7440-33-7	E440	37.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D3144-002	BA2449-A-2	Zinc	7440-66-6	E440	40.3 % 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.*

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-1806644 002	----	Zirconium	7440-67-7	E440	121 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-10	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-12, BA2449-A-12	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-2	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-3	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-4	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-5	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-6	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 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 BA2449-A-7	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-8	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-9	E510	04-Dec-2024	14-Dec-2024	28 days	10 days	✓	16-Dec-2024	28 days	3 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2449-A-1	E510	04-Dec-2024	12-Dec-2024	28 days	8 days	✓	12-Dec-2024	28 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-10	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-12, BA2449-A-12	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-2	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-3	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-4	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 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 BA2449-A-5	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-6	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-7	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-8	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-9	E440	04-Dec-2024	14-Dec-2024	180 days	10 days	✓	17-Dec-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2449-A-1	E440	04-Dec-2024	12-Dec-2024	180 days	8 days	✓	12-Dec-2024	180 days	9 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-1	E144	04-Dec-2024	----	----	----		16-Dec-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-10	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-12, BA2449-A-12	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	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
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-2	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-3	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-4	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-5	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-6	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-7	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-8	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2449-A-9	E144	04-Dec-2024	----	----	----		13-Dec-2024	----	9 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-10	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 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 BA2449-A-12, BA2449-A-12	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-2	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-3	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-4	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-5	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-6	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-7	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-8	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2449-A-9	E108	04-Dec-2024	14-Dec-2024	30 days	10 days	✓	14-Dec-2024	30 days	10 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*	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2449-A-1	E108	04-Dec-2024	12-Dec-2024	30 days	8 days	✓	12-Dec-2024	30 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-1	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-10	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-12, BA2449-A-12	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-2	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-3	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-4	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-5	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2449-A-6	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 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) BA2449-A-7	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2449-A-8	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2449-A-9	E512	14-Dec-2024	17-Dec-2024	38 days	13 days	✓	17-Dec-2024	38 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-1	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-10	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-12, BA2449-A-12	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-2	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-3	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2449-A-4	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 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)										
BA2449-A-5	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2449-A-6	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2449-A-7	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2449-A-8	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved)										
BA2449-A-9	E444	14-Dec-2024	17-Dec-2024	190 days	13 days	✓	17-Dec-2024	190 days	13 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2449-A-1	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2449-A-10	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2449-A-12, BA2449-A-12	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2449-A-2	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 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) BA2449-A-3	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-4	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-5	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-6	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-7	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-8	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2449-A-9	EPP444	04-Dec-2024	14-Dec-2024	----	----		----	28 days	10 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	1813127	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1806644	2	13	15.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1813128	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1809365	2	14	14.2	5.0	✓
Moisture Content by Gravimetry	E144	1811602	2	29	6.9	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1809367	2	14	14.2	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1806644	4	13	30.7	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1809365	4	14	28.5	10.0	✓
Moisture Content by Gravimetry	E144	1811602	2	29	6.9	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1809367	2	14	14.2	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1813127	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1806644	2	13	15.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1813128	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1809365	2	14	14.2	5.0	✓
Moisture Content by Gravimetry	E144	1811602	2	29	6.9	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1813127	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1813128	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	: **VA24D3144**	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	: 10-Dec-2024 13:30
PO	: PO#46693 Weekly Bottom Ash -Suite	Date Analysis Commenced	: 12-Dec-2024
C-O-C number	: ----	Issue Date	: 18-Dec-2024 06:11
Sampler	: ----		
Site	: (includes 2:1 PH)		
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
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Paul Cushing	Team Leader - Organics	Vancouver Organics, Burnaby, British Columbia
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Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
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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: 1806646)											
VA24D3144-001	BA2449-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.7	11.6	1.3%	5%	----
Physical Tests (QC Lot: 1809367)											
VA24D3144-002	BA2449-A-2	pH (1:2 soil:water)	----	E108	0.10	pH units	12.0	11.7	1.9%	5%	----
Physical Tests (QC Lot: 1809368)											
VA24D3144-002	BA2449-A-2	Moisture	----	E144	0.25	%	26.8	26.2	2.33%	20%	----
Physical Tests (QC Lot: 1811602)											
CG2418400-001	Anonymous	Moisture	----	E144	0.25	%	13.8	12.8	7.96%	20%	----
Metals (QC Lot: 1806644)											
VA24D3144-001	BA2449-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1806645)											
VA24D3144-001	BA2449-A-1	Aluminum	7429-90-5	E440	50	mg/kg	41600	34400	19.2%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	107	119	10.6%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	16.7	18.7	11.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	455	512	11.7%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.40	0.03	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.92	6.25	10.2%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	212	184	14.2%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	12.8	10.5	20.0%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	135000	157000	14.8%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	164	309	61.2%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	87.9	83.5	5.22%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	3870	3160	20.2%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	61800	59400	3.98%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	454	1300	96.7%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	35.5	39.6	10.9%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	13400	14400	6.97%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	1000	2100	71.0%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	36.7	22.7	47.2%	40%	DUP-H
		Nickel	7440-02-0	E440	0.50	mg/kg	140	388	94.0%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	9750	11200	14.1%	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: 1806645) - continued											
VA24D3144-001	BA2449-A-1	Potassium	7440-09-7	E440	100	mg/kg	5640	5580	1.01%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.45	0.09	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	6.35	11.2	55.1%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	16400	16500	0.295%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	325	358	9.60%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	12500	13700	8.99%	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	125	125	0.165%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	352	373	5.74%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	4.33	13.4	102%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	1.90	2.08	8.78%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	41.1	41.0	0.306%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3370	3830	12.6%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.2	2.2	1.0	Diff <2x LOR	----
Metals (QC Lot: 1809365)											
VA24D3144-002	BA2449-A-2	Aluminum	7429-90-5	E440	50	mg/kg	35400	36700	3.61%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	92.3	85.7	7.42%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	12.9	12.4	4.15%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	512	495	3.44%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.34	0.0002	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	4.32	6.18	35.5%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	212	143	38.8%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	9.85	8.40	15.9%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	118000	120000	1.52%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	135	133	1.73%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	801	64.5	170%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	6150	3190	63.5%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	61900	49300	22.7%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	368	353	3.98%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	32.3	22.6	35.1%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	11500	12000	4.05%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	1040	764	30.8%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	15.0	42.4	95.7%	40%	DUP-H
		Nickel	7440-02-0	E440	0.50	mg/kg	130	111	15.5%	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: 1809365) - continued											
VA24D3144-002	BA2449-A-2	Phosphorus	7723-14-0	E440	50	mg/kg	9990	8560	15.4%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	4740	4620	2.71%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.66	0.30	0.35	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	3.22	4.00	21.4%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	14200	13200	7.18%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	259	247	5.01%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9800	10100	2.63%	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	108	103	4.89%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	223	185	18.6%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	5.42	3.72	37.3%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	1.87	1.66	11.8%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	35.5	44.5	22.6%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4980	3310	40.3%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	1.7	3.4	1.8	Diff <2x LOR	----
Metals (QC Lot: 1809366)											
VA24D3144-002	BA2449-A-2	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1813127)											
VA24D3144-001	BA2449-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1813128)											
VA24D3144-001	BA2449-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	2.24	2.24	0.0004	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.165	0.157	0.008	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1990	1940	2.19%	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	1.01	1.01	0.648%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.904	0.900	0.428%	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	136	137	0.746%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.30	0.30	0.003	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: 1813128) - continued											
VA24D3144-001	BA2449-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	8.72	8.62	1.14%	30%	----
		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: 1809368)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1811602)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1806644)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1806645)						
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: 1806645) - 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: 1809365)						
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: 1809365) - 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: 1809366)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1813127)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1813128)						
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: 1806646)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	101	95.0	105	----
Physical Tests (QCLot: 1809367)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1809368)									
Moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Physical Tests (QCLot: 1811602)									
Moisture	----	E144	0.25	%	50 %	97.3	90.0	110	----
Metals (QCLot: 1806644)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.2	80.0	120	----
Metals (QCLot: 1806645)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	112	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	107	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	99.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	108	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	105	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	110	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	111	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	112	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	109	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	110	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	112	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	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: 1806645) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	99.5	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	114	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	101	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	109	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	108	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	107	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	# 121	80.0	120	MES
Metals (QCLot: 1809365)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	106	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	93.6	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	101	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.7	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	98.3	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.2	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	99.2	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	112	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	106	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.8	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	111	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	103	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	96.0	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: 1809365) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.5	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	100	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.9	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	101	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	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	96.8	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	105	80.0	120	----
Metals (QCLot: 1809366)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	99.2	80.0	120	----

Qualifiers

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

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 1813127)										
VA24D3144-001	BA2449-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	99.7	50.0	140	----
TCLP Metals (QCLot: 1813128)										
VA24D3144-001	BA2449-A-1	Antimony, TCLP	7440-36-0	E444	5.62 mg/L	5 mg/L	112	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.5 mg/L	5 mg/L	111	50.0	140	----
		Barium, TCLP	7440-39-3	E444	14.2 mg/L	12.5 mg/L	114	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.268 mg/L	0.25 mg/L	107	50.0	140	----
		Boron, TCLP	7440-42-8	E444	10.00 mg/L	10 mg/L	100.0	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.272 mg/L	0.25 mg/L	109	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.30 mg/L	1.25 mg/L	104	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.52 mg/L	2.5 mg/L	101	50.0	140	----
		Iron, TCLP	7439-89-6	E444	256 mg/L	250 mg/L	102	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.1 mg/L	10 mg/L	101	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	261 mg/L	250 mg/L	104	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.56 mg/L	2.5 mg/L	102	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.34 mg/L	5 mg/L	107	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.084 mg/L	0.1 mg/L	83.5	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.09 mg/L	5 mg/L	102	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.80 mg/L	0.75 mg/L	106	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.69 mg/L	10 mg/L	96.9	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	85.3	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: 1806644)									
QC-1806644-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	96.4	70.0	130	----
Metals (QCLot: 1806645)									
QC-1806645-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	120	70.0	130	----
QC-1806645-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	111	70.0	130	----
QC-1806645-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	105	70.0	130	----
QC-1806645-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	103	70.0	130	----
QC-1806645-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	112	70.0	130	----
QC-1806645-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	96.8	70.0	130	----
QC-1806645-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	106	70.0	130	----
QC-1806645-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	108	70.0	130	----
QC-1806645-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	107	70.0	130	----
QC-1806645-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	104	70.0	130	----
QC-1806645-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	104	70.0	130	----
QC-1806645-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	111	70.0	130	----
QC-1806645-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	98.6	70.0	130	----
QC-1806645-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	120	70.0	130	----
QC-1806645-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	115	70.0	130	----
QC-1806645-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	106	70.0	130	----
QC-1806645-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	105	70.0	130	----
QC-1806645-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	105	70.0	130	----
QC-1806645-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	109	70.0	130	----
QC-1806645-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	110	70.0	130	----
QC-1806645-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	107	60.0	140	----
QC-1806645-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	99.3	70.0	130	----
QC-1806645-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	117	70.0	130	----
QC-1806645-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	114	70.0	130	----
QC-1806645-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	105	50.0	150	----
QC-1806645-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	101	70.0	130	----
QC-1806645-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	104	40.0	160	----
QC-1806645-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	108	70.0	130	----
QC-1806645-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	113	70.0	130	----
QC-1806645-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	112	70.0	130	----
QC-1806645-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	104	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: 1806645) - continued									
QC-1806645-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	103	70.0	130	----
QC-1806645-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	108	70.0	130	----
Metals (QCLot: 1809365)									
QC-1809365-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	107	70.0	130	----
QC-1809365-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	104	70.0	130	----
QC-1809365-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	99.5	70.0	130	----
QC-1809365-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	109	70.0	130	----
QC-1809365-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	106	70.0	130	----
QC-1809365-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	81.3	70.0	130	----
QC-1809365-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	98.2	70.0	130	----
QC-1809365-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	103	70.0	130	----
QC-1809365-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	97.7	70.0	130	----
QC-1809365-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	95.7	70.0	130	----
QC-1809365-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	100.0	70.0	130	----
QC-1809365-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	95.7	70.0	130	----
QC-1809365-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	94.6	70.0	130	----
QC-1809365-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	109	70.0	130	----
QC-1809365-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	104	70.0	130	----
QC-1809365-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	104	70.0	130	----
QC-1809365-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	100	70.0	130	----
QC-1809365-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	102	70.0	130	----
QC-1809365-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	102	70.0	130	----
QC-1809365-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	100	70.0	130	----
QC-1809365-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	82.2	60.0	140	----
QC-1809365-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	95.1	70.0	130	----
QC-1809365-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	108	70.0	130	----
QC-1809365-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	103	70.0	130	----
QC-1809365-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	87.7	50.0	150	----
QC-1809365-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	95.8	70.0	130	----
QC-1809365-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	104	40.0	160	----
QC-1809365-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	107	70.0	130	----
QC-1809365-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	115	70.0	130	----
QC-1809365-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	98.4	70.0	130	----
QC-1809365-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	97.4	70.0	130	----
QC-1809365-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	95.1	70.0	130	----
QC-1809365-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	129	70.0	130	----
Metals (QCLot: 1809366)									

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: 1809366) - continued									
QC-1809366-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	96.6	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:	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)	VA24D3144			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
	BA2449-A-1	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-2	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-3	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-4	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-5	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-6	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-7	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-8	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-9	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-10	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-11	04-Dec-24	9:00	Soil	X	X				X						1
	BA2449-A-12	04-Dec-24	9:00	Soil	X	X				X						1

Environmental Division
Vancouver
Work Order Reference
VA24D3144

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
	10-Dec-24	0900				17 °C	MG	12/10	1330	

GENF 20.00 Front