metrovancouver

Bottom Ash Data

2024 Week 47

The following analytical report represents bottom ash composite results for week 47 of 2024 (November 17, 2024 to November 23, 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	:	**VA24D1508**		
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	: 20-Nov-2024 14:10
PO	:	VANCO0000052919	Date Analysis Commenced	: 26-Nov-2024
C-O-C number	:	----	Issue Date	: 30-Nov-2024 15:00
Sampler	:	----		
Site	:	----		
Quote number	:	Covanta Burnaby Standing Offer 2024		
No. of samples received	:	12		
No. of samples analysed	:	12		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Chau Tran	Analyst	Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Organics, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-1	BA2446-A-2	BA2446-A-3	BA2446-A-4	BA2446-A-5
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-001	VA24D1508-002	VA24D1508-003	VA24D1508-004	VA24D1508-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.4	23.2	26.5	25.4	27.9
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.0	10.7	10.9	11.1	11.1
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		41100	47600	40200	39400	42600
Antimony	7440-36-0	E440/VA	0.10	mg/kg		111	123	87.0	108	105
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.7	14.8	13.4	13.9	22.6
Barium	7440-39-3	E440/VA	0.50	mg/kg		458	480	518	536	539
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.43	0.36	0.37	0.37	0.40
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.46	6.26	6.33	8.59	7.26
Boron	7440-42-8	E440/VA	5.0	mg/kg		155	156	195	196	208
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.74	6.16	6.48	10.1	6.54
Calcium	7440-70-2	E440/VA	50	mg/kg		134000	142000	140000	138000	135000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		161	170	220	126	156
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		230	63.6	46.1	52.7	76.6
Copper	7440-50-8	E440/VA	0.50	mg/kg		3010	5290	3730	2760	1290
Iron	7439-89-6	E440/VA	50	mg/kg		61900	51300	61800	51200	54300
Lead	7439-92-1	E440/VA	0.50	mg/kg		1640	365	561	975	805
Lithium	7439-93-2	E440/VA	2.0	mg/kg		28.8	29.3	31.1	30.2	41.1
Magnesium	7439-95-4	E440/VA	20	mg/kg		12100	12700	12500	13100	11700
Manganese	7439-96-5	E440/VA	1.0	mg/kg		905	1000	866	759	930
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.239	0.0855	0.0539	0.0566	0.0946

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-1	BA2446-A-2	BA2446-A-3	BA2446-A-4	BA2446-A-5
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-001	VA24D1508-002	VA24D1508-003	VA24D1508-004	VA24D1508-005
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.6	17.0	17.8	12.6	16.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg		129	203	196	166	128
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10300	11500	11000	11400	10800
Potassium	7440-09-7	E440/VA	100	mg/kg		5670	6090	6090	5900	6040
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.30	0.27	0.27	0.36	0.35
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.30	6.83	7.06	4.44	5.95
Sodium	7440-23-5	E440/VA	50	mg/kg		15300	15600	16300	16200	14800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		280	287	284	291	288
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10400	11000	10500	11600	10900
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		119	160	106	137	108
Titanium	7440-32-6	E440/VA	1.0	mg/kg		288	308	210	321	250
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		15.9	18.8	16.8	12.1	16.1
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.16	2.13	2.17	2.13	2.11
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		42.2	42.3	41.6	39.8	39.0
Zinc	7440-66-6	E440/VA	2.0	mg/kg		6750	4570	4110	4060	3290
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.6	3.1	3.4	2.1	2.4
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.8	11.7	11.8	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.92	6.73	5.71	6.01	6.43
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.86	2.86	2.86	2.86	2.86

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-1	BA2446-A-2	BA2446-A-3	BA2446-A-4	BA2446-A-5
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-001	VA24D1508-002	VA24D1508-003	VA24D1508-004	VA24D1508-005
						Result	Result	Result	Result	Result
TCLP Metals										
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.75	6.65	6.78	6.88	6.69
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.96	1.97	2.05	2.06	2.17
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.059	0.052	0.080	<0.050	0.082
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1940	1900	1940	1930	1990
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		0.640	1.03	0.559	1.06	0.821
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.916	1.01	0.756	0.761	0.845
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		130	125	128	122	130
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		0.26	0.26	<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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-1	BA2446-A-2	BA2446-A-3	BA2446-A-4	BA2446-A-5
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-001	VA24D1508-002	VA24D1508-003	VA24D1508-004	VA24D1508-005
						Result	Result	Result	Result	Result
TCLP Metals										
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		9.65	10.2	5.75	4.55	8.13
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-6	BA2446-A-7	BA2446-A-8	BA2446-A-9	BA2446-A-10
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-006	VA24D1508-007	VA24D1508-008	VA24D1508-009	VA24D1508-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		27.7	27.3	27.4	27.4	27.3
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.1	11.1	11.0	11.0	10.9
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		34000	39400	34700	35200	35400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		157	90.7	96.3	114	97.6
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		15.0	16.4	16.0	20.7	14.6
Barium	7440-39-3	E440/VA	0.50	mg/kg		548	469	443	542	702
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.41	0.35	0.40	0.38	0.34
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		11.9	6.41	6.89	6.36	5.46
Boron	7440-42-8	E440/VA	5.0	mg/kg		157	158	162	210	182
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		5.84	7.25	6.27	6.99	5.49
Calcium	7440-70-2	E440/VA	50	mg/kg		132000	128000	145000	142000	137000

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-6	BA2446-A-7	BA2446-A-8	BA2446-A-9	BA2446-A-10
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-006	VA24D1508-007	VA24D1508-008	VA24D1508-009	VA24D1508-010
						Result	Result	Result	Result	Result
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg		168	108	135	160	184
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		71.3	49.4	44.3	166	49.0
Copper	7440-50-8	E440/VA	0.50	mg/kg		6260	2820	1890	2950	7040
Iron	7439-89-6	E440/VA	50	mg/kg		58300	50400	59100	60500	74400
Lead	7439-92-1	E440/VA	0.50	mg/kg		1270	290	357	572	394
Lithium	7439-93-2	E440/VA	2.0	mg/kg		30.2	33.6	33.3	40.2	27.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		11600	10900	12700	12200	11800
Manganese	7439-96-5	E440/VA	1.0	mg/kg		888	709	944	932	973
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0505	0.136	0.0828	0.0788	0.0558
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.4	11.8	16.8	18.7	14.9
Nickel	7440-02-0	E440/VA	0.50	mg/kg		189	143	136	171	219
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10200	10300	12100	10300	9810
Potassium	7440-09-7	E440/VA	100	mg/kg		5580	5100	6390	5820	5250
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.32	0.30	0.34	0.32	0.30
Silver	7440-22-4	E440/VA	0.10	mg/kg		13.5	7.80	5.10	5.79	5.79
Sodium	7440-23-5	E440/VA	50	mg/kg		14900	14000	17400	16200	14800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		328	274	305	304	368
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10100	10200	11200	10800	8900
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		4830	110	97.6	120	102
Titanium	7440-32-6	E440/VA	1.0	mg/kg		256	227	255	302	312

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-6	BA2446-A-7	BA2446-A-8	BA2446-A-9	BA2446-A-10
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-006	VA24D1508-007	VA24D1508-008	VA24D1508-009	VA24D1508-010
						Result	Result	Result	Result	Result
Metals										
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		13.4	13.0	24.4	22.0	21.2
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.00	1.97	2.14	2.07	1.86
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		48.7	45.4	42.4	46.2	37.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3610	2800	3090	3960	3220
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		1.3	2.2	3.8	2.2	2.2
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.8	11.8	11.8	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.09	5.96	5.80	5.97	6.03
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.86	2.86	2.86	2.86	2.86
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.77	6.53	6.71	6.58	6.71
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		2.11	2.13	2.26	2.16	2.24
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.137	0.093	0.054	0.056
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1930	1950	2020	1930	2020
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		0.605	1.40	1.55	0.886	0.759
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.883	1.08	1.12	0.878	0.829
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-6	BA2446-A-7	BA2446-A-8	BA2446-A-9	BA2446-A-10
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00	13-Nov-2024 09:00
						VA24D1508-006	VA24D1508-007	VA24D1508-008	VA24D1508-009	VA24D1508-010
						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		127	130	138	131	132
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	0.43	0.62	0.30	0.26
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		4.93	25.0	12.4	13.0	6.42
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-11	BA2446-A-12	----	----	----
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	----	----	----
						VA24D1508-011	VA24D1508-012	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		28.0	28.5	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		10.9	10.9	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-11	BA2446-A-12	----	----	----
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	----	----	----
						VA24D1508-011	VA24D1508-012	----	----	----
						Result	Result	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		43100	33900	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		98.2	110	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		13.6	15.0	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		603	494	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.37	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.43	6.50	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		219	213	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		5.87	6.70	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		133000	135000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		139	393	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		180	154	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		4340	3650	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		54200	65900	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		425	621	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		44.9	29.9	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		11500	11500	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1170	1670	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0972	0.0876	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		17.5	17.2	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		199	344	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10100	9740	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-11	BA2446-A-12	----	----	----
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	----	----	----
						VA24D1508-011	VA24D1508-012	----	----	----
						Result	Result	----	----	----
Metals										
Potassium	7440-09-7	E440/VA	100	mg/kg		5580	5350	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.30	0.31	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		6.05	6.29	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		16400	15200	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		352	358	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		9900	9200	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		146	2540	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		278	262	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		17.8	17.9	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.05	1.94	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		37.2	42.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3460	7860	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.3	3.1	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.8	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.75	6.12	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.86	2.86	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.46	6.62	----	----	----
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2446-A-11	BA2446-A-12	----	----	----
					Client sampling date / time	13-Nov-2024 09:00	13-Nov-2024 09:00	----	----	----
						VA24D1508-011	VA24D1508-012	----	----	----
						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		2.13	2.22	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.076	0.074	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1910	2060	----	----	----
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		0.980	0.876	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.02	0.928	----	----	----
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		0.54	<0.25	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		130	138	----	----	----
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		0.33	0.57	----	----	----
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		28.7	10.2	----	----	----
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	: **VA24D1508**	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	: 20-Nov-2024 14:10
PO	: VANCO0000052919	Issue Date	: 30-Nov-2024 14:59
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	Bismuth	7440-69-9	E440	75.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Cobalt	7440-48-4	E440	130 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D1508-009	BA2446-A-9	Cobalt	7440-48-4	E440	90.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Copper	7440-50-8	E440	111 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D1508-009	BA2446-A-9	Copper	7440-50-8	E440	33.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Lead	7439-92-1	E440	58.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24D1508-009	BA2446-A-9	Lead	7439-92-1	E440	57.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Lithium	7439-93-2	E440	115 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Manganese	7439-96-5	E440	87.2 % 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 Spike (MS) Recoveries								
TCLP Metals	VA24D1508-001	BA2446-A-1	Silver, TCLP	7440-22-4	E444	47.3 % MES	50.0-140%	Recovery less than lower data quality objective

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 BA2446-A-10	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	27-Nov-2024	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-11	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	27-Nov-2024	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-12	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	27-Nov-2024	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-9	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	27-Nov-2024	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-1	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-2	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-3	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 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 BA2446-A-4	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-5	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-6	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-7	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2446-A-8	E510	13-Nov-2024	27-Nov-2024	28 days	14 days	✓	29-Nov-2024	28 days	2 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-10	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	27-Nov-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-11	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	27-Nov-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-12	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	27-Nov-2024	180 days	15 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-9	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	27-Nov-2024	180 days	15 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-1	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-2	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-3	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-4	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-5	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-6	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-7	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2446-A-8	E440	13-Nov-2024	27-Nov-2024	180 days	14 days	✓	29-Nov-2024	180 days	16 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-1	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	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
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-10	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-11	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-12	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-2	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-3	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-4	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-5	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-6	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-7	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	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
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-8	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2446-A-9	E144	13-Nov-2024	----	----	----		26-Nov-2024	----	13 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-1	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-10	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-11	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-12	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-2	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-3	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-4	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-5	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-6	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-7	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-8	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2446-A-9	E108	13-Nov-2024	27-Nov-2024	30 days	14 days	✓	27-Nov-2024	30 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-1	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-10	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-11	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-12	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 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) BA2446-A-2	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-3	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-4	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-5	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-6	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-7	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-8	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2446-A-9	E512	28-Nov-2024	29-Nov-2024	43 days	16 days	✓	29-Nov-2024	43 days	16 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-1	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 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) BA2446-A-10	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-11	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-12	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-2	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-3	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-4	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-5	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-6	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-7	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 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) BA2446-A-8	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2446-A-9	E444	28-Nov-2024	29-Nov-2024	195 days	16 days	✓	30-Nov-2024	195 days	17 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-1	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-10	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-11	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-12	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-2	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-3	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2446-A-4	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2446-A-5	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2446-A-6	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2446-A-7	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2446-A-8	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2446-A-9	EPP444	13-Nov-2024	28-Nov-2024	----	----		----	28 days	15 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	1789746	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1783357	2	38	5.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1789747	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1783850	2	38	5.2	5.0	✓
Moisture Content by Gravimetry	E144	1783858	2	34	5.8	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1783852	2	38	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1783357	4	38	10.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1783850	4	38	10.5	10.0	✓
Moisture Content by Gravimetry	E144	1783858	2	34	5.8	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1783852	2	38	5.2	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1789746	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1783357	2	38	5.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1789747	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1783850	2	38	5.2	5.0	✓
Moisture Content by Gravimetry	E144	1783858	2	34	5.8	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1789746	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1789747	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	: **VA24D1508**	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	: 20-Nov-2024 14:10
PO	: VANCO0000052919	Date Analysis Commenced	: 26-Nov-2024
C-O-C number	: ----	Issue Date	: 30-Nov-2024 14:59
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Chau Tran	Analyst	Vancouver Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Organics, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Owen Cheng		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: 1783359)											
VA24D1504-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.5	0.6%	5%	----
Physical Tests (QC Lot: 1783360)											
VA24D1504-001	Anonymous	Moisture	----	E144	0.25	%	28.4	28.8	1.51%	20%	----
Physical Tests (QC Lot: 1783852)											
VA24D1508-009	BA2446-A-9	pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	10.9	0.7%	5%	----
Physical Tests (QC Lot: 1783858)											
VA24D1508-009	BA2446-A-9	Moisture	----	E144	0.25	%	27.4	28.1	2.22%	20%	----
Metals (QC Lot: 1783357)											
VA24D1504-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1783358)											
VA24D1504-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	36200	41100	12.7%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	114	101	12.5%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	23.9	19.5	20.3%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	539	558	3.37%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.43	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	14.6	6.62	75.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	140	142	0.933%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.19	7.72	7.09%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	137000	136000	0.611%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	210	219	4.24%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	483	102	130%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1880	6600	111%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	69800	61000	13.4%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	833	457	58.4%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	120	32.2	115%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	12200	10800	11.6%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	2500	981	87.2%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	18.3	18.8	2.79%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	682	820	18.4%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	10500	10500	0.492%	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: 1783358) - continued											
VA24D1504-001	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	5480	5390	1.59%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.34	0.003	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	6.51	5.07	24.9%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	15100	14700	2.57%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	316	347	9.45%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	10000	10100	0.362%	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	106	102	4.17%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	304	238	24.5%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	17.4	20.4	16.0%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	1.91	2.02	5.64%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	41.4	50.2	19.1%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4070	3360	19.0%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	1.7	2.2	0.5	Diff <2x LOR	----
Metals (QC Lot: 1783850)											
VA24D1508-009	BA2446-A-9	Aluminum	7429-90-5	E440	50	mg/kg	35200	37500	6.46%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	114	84.4	29.7%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	20.7	16.2	24.2%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	542	553	2.01%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.38	0.004	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.36	7.83	20.8%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	210	180	15.2%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	6.99	5.95	16.0%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	142000	128000	10.6%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	160	180	11.7%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	166	62.7	90.3%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	2950	4150	33.9%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	60500	47900	23.4%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	572	316	57.7%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	40.2	35.2	13.2%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12200	11700	4.03%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	932	968	3.82%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	18.7	13.0	36.3%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	171	221	25.6%	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: 1783850) - continued											
VA24D1508-009	BA2446-A-9	Phosphorus	7723-14-0	E440	50	mg/kg	10300	8880	14.8%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5820	5210	11.0%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.29	0.03	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.79	6.87	16.9%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	16200	14700	10.2%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	304	272	11.1%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	10800	9100	17.4%	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	120	105	13.4%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	302	392	25.9%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	22.0	26.4	17.9%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	2.07	1.88	9.73%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	46.2	42.9	7.46%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3960	3250	19.6%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.2	4.0	1.8	Diff <2x LOR	----
Metals (QC Lot: 1783851)											
VA24D1508-009	BA2446-A-9	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0788	0.112	0.0336	Diff <2x LOR	----
TCLP Metals (QC Lot: 1789746)											
VA24D1508-001	BA2446-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1789747)											
VA24D1508-001	BA2446-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	1.96	1.91	0.05	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.059	0.056	0.003	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1940	1840	5.26%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.640	0.618	3.46%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.916	0.881	3.93%	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	130	127	2.35%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.26	0.25	0.009	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: 1789747) - continued											
VA24D1508-001	BA2446-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	9.65	9.32	3.56%	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: 1783360)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1783858)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1783357)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1783358)						
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: 1783358) - 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: 1783850)						
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: 1783850) - 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: 1783851)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1789746)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1789747)						
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: 1783359)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1783360)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1783852)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1783858)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1783357)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.2	80.0	120	----
Metals (QCLot: 1783358)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	96.8	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	99.3	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	95.7	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.5	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	95.2	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.3	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.5	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	98.5	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.5	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	92.9	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	91.1	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.3	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	96.0	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	96.3	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	94.4	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.1	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	92.2	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.8	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: 1783358) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	96.9	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.9	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	96.8	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.5	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	94.6	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	95.9	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.0	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.2	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	98.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	95.8	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	93.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	94.5	80.0	120	----
Metals (QCLot: 1783850)									
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	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	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	102	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	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100.0	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	105	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	108	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	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	102	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1783850) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	99.1	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.2	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	99.4	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	105	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	110	80.0	120	----
Metals (QCLot: 1783851)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	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: 1789746)										
VA24D1508-001	BA2446-A-1	Mercury, TCLP	7439-97-6	E512	0.0008 mg/L	0.001 mg/L	84.7	50.0	140	----
TCLP Metals (QCLot: 1789747)										
VA24D1508-001	BA2446-A-1	Antimony, TCLP	7440-36-0	E444	3.76 mg/L	5 mg/L	75.2	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	3.8 mg/L	5 mg/L	75.9	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.7 mg/L	12.5 mg/L	93.9	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.182 mg/L	0.25 mg/L	72.9	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.10 mg/L	10 mg/L	91.0	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.171 mg/L	0.25 mg/L	68.5	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	0.90 mg/L	1.25 mg/L	72.3	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	1.66 mg/L	2.5 mg/L	66.5	50.0	140	----
		Iron, TCLP	7439-89-6	E444	177 mg/L	250 mg/L	70.8	50.0	140	----
		Lead, TCLP	7439-92-1	E444	7.01 mg/L	10 mg/L	70.1	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	228 mg/L	250 mg/L	91.2	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	1.75 mg/L	2.5 mg/L	70.1	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	3.68 mg/L	5 mg/L	73.6	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.047 mg/L	0.1 mg/L	47.3	50.0	140	MES
		Thallium, TCLP	7440-28-0	E444	3.6 mg/L	5 mg/L	71.9	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	3.70 mg/L	5 mg/L	74.0	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.54 mg/L	0.75 mg/L	72.7	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	6.65 mg/L	10 mg/L	66.5	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.6 mg/L	1 mg/L	57.9	50.0	150	----

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).*

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: 1783357)									
QC-1783357-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	96.2	70.0	130	----
Metals (QCLot: 1783358)									
QC-1783358-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	108	70.0	130	----
QC-1783358-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	103	70.0	130	----
QC-1783358-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	101	70.0	130	----
QC-1783358-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	95.0	70.0	130	----
QC-1783358-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	110	70.0	130	----
QC-1783358-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	89.0	70.0	130	----
QC-1783358-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	101	70.0	130	----
QC-1783358-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	106	70.0	130	----
QC-1783358-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	99.0	70.0	130	----
QC-1783358-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	99.2	70.0	130	----
QC-1783358-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	98.7	70.0	130	----
QC-1783358-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	100	70.0	130	----
QC-1783358-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	97.7	70.0	130	----
QC-1783358-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	114	70.0	130	----
QC-1783358-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	103	70.0	130	----
QC-1783358-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.8	70.0	130	----
QC-1783358-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	99.8	70.0	130	----
QC-1783358-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	101	70.0	130	----
QC-1783358-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	109	70.0	130	----
QC-1783358-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	105	70.0	130	----
QC-1783358-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	112	60.0	140	----
QC-1783358-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	96.6	70.0	130	----
QC-1783358-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	114	70.0	130	----
QC-1783358-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	102	70.0	130	----
QC-1783358-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	105	50.0	150	----
QC-1783358-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	98.6	70.0	130	----
QC-1783358-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	100	40.0	160	----
QC-1783358-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	105	70.0	130	----
QC-1783358-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	114	70.0	130	----
QC-1783358-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	97.5	70.0	130	----
QC-1783358-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	99.5	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: 1783358) - continued									
QC-1783358-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	101	70.0	130	----
QC-1783358-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	99.6	70.0	130	----
Metals (QCLot: 1783850)									
QC-1783850-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	100.0	70.0	130	----
QC-1783850-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	102	70.0	130	----
QC-1783850-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	94.1	70.0	130	----
QC-1783850-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	100	70.0	130	----
QC-1783850-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	105	70.0	130	----
QC-1783850-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	90.9	70.0	130	----
QC-1783850-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	101	70.0	130	----
QC-1783850-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	103	70.0	130	----
QC-1783850-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	98.1	70.0	130	----
QC-1783850-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	95.5	70.0	130	----
QC-1783850-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	98.0	70.0	130	----
QC-1783850-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	102	70.0	130	----
QC-1783850-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	99.7	70.0	130	----
QC-1783850-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	112	70.0	130	----
QC-1783850-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	100	70.0	130	----
QC-1783850-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.1	70.0	130	----
QC-1783850-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	98.6	70.0	130	----
QC-1783850-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	98.2	70.0	130	----
QC-1783850-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	90.7	70.0	130	----
QC-1783850-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	95.4	70.0	130	----
QC-1783850-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	99.3	60.0	140	----
QC-1783850-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	98.8	70.0	130	----
QC-1783850-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	105	70.0	130	----
QC-1783850-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	104	70.0	130	----
QC-1783850-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	83.1	50.0	150	----
QC-1783850-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	102	70.0	130	----
QC-1783850-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	101	40.0	160	----
QC-1783850-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	102	70.0	130	----
QC-1783850-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	123	70.0	130	----
QC-1783850-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	106	70.0	130	----
QC-1783850-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	98.4	70.0	130	----
QC-1783850-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	100	70.0	130	----
QC-1783850-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	111	70.0	130	----
Metals (QCLot: 1783851)									

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: 1783851) - continued									
QC-1783851-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	99.2	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Covanta Energy			☐ Standard ☐ Other				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Nicole Victor / Dan Skrypnyk			☑ PDF ☐ Excel ☐ Digital ☐ Fax				○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	5150 Riverbend Drive			Email 1:	nvictor@covanta.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Burnaby BC			Email 2:	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)				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
	BA2446-A-1	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-2	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-3	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-4	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-5	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-6	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-7	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-8	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-9	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-10	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-11	13-Nov-24	9:00	Soil	X	X				X							1
	BA2446-A-12	13-Nov-24	9:00	Soil	X	X				X							1

Environmental Division
Vancouver
Work Order Reference
VA24D1508

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
	20-Nov-24	09:9		NOV 20	2:10	°C				

GENF 20.00 Front

17,18,17