Bottom Ash Data

2024 Week 14

The following analytical report represents bottom ash composite results for week 14 of 2024 (March 31, 2024 to April 6, 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	: **VA24A7603**	Page	: 1 of 11
Amendment	: **1**		
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 10-Apr-2024 11:45
PO	: VANCO0000052919	Date Analysis Commenced	: 10-Apr-2024
C-O-C number	: ----	Issue Date	: 02-May-2024 16:42
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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, 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

Amendment (02/05/2024): This report has been amended and re-released to allow the reporting of additional analytical data.

Qualifiers

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-1	BA2414-A-2	BA2414-A-3	BA2414-A-4	BA2414-A-5
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-001	VA24A7603-002	VA24A7603-003	VA24A7603-004	VA24A7603-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.8	24.5	23.0	24.5	23.5
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.6	11.4	11.5	11.5	11.6
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		35400	38400	29200	36800	39400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		115	124	105	124	129
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		65.6	39.5	30.0	33.4	32.7
Barium	7440-39-3	E440/VA	0.50	mg/kg		387	394	422	433	524
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.41	0.41	0.38	0.40	0.44
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		8.23	8.71	10.2	7.32	7.72
Boron	7440-42-8	E440/VA	5.0	mg/kg		182	238	223	206	220
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		11.1	10.1	8.01	8.68	9.24
Calcium	7440-70-2	E440/VA	50	mg/kg		146000	159000	134000	149000	147000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		142	154	199	138	157
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		66.8	83.6	162	30.5	247
Copper	7440-50-8	E440/VA	0.50	mg/kg		2460	1420	4590	4940	2320
Iron	7439-89-6	E440/VA	50	mg/kg		34400	43500	63600	47500	51400
Lead	7439-92-1	E440/VA	0.50	mg/kg		397	1750	365	399	348
Lithium	7439-93-2	E440/VA	2.0	mg/kg		26.3	34.7	39.2	26.8	25.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		11800	13600	11800	12800	12400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		609	910	2030	761	959
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0881	0.129	0.0832	0.0744	0.0896
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		25.7	26.2	23.2	25.8	26.3
Nickel	7440-02-0	E440/VA	0.50	mg/kg		125	141	171	102	632
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9090	9210	8610	9800	7860
Potassium	7440-09-7	E440/VA	100	mg/kg		6120	6130	5600	6030	6100
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.53	0.46	0.42	0.50	0.51
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.54	7.32	4.58	5.42	4.45
Sodium	7440-23-5	E440/VA	50	mg/kg		16600	16300	15100	16400	16000
Strontium	7440-24-6	E440/VA	0.50	mg/kg		272	314	585	314	280

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-1	BA2414-A-2	BA2414-A-3	BA2414-A-4	BA2414-A-5
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-001	VA24A7603-002	VA24A7603-003	VA24A7603-004	VA24A7603-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11800	13700	11100	12500	13400
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		86.3	122	96.6	114	126
Titanium	7440-32-6	E440/VA	1.0	mg/kg		293	262	170	228	496
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		14.8	20.3	10.5	29.7	15.5
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.83	3.30	2.66	2.88	2.86
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		35.7	38.9	35.9	40.8	36.7
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3400	5040	4580	3660	3320
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.1	3.3	2.9	2.8	1.7
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.9	11.8	11.9	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.28	6.49	6.26	6.55	7.75
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.85	2.85	2.85	2.85	2.85
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.66	6.79	6.69	8.01	7.92
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		1.83	1.99	2.08	1.77	1.73
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.139	0.108	0.100	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2060	2170	2150	1880	1800
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		2.64	1.22	0.720	0.088	0.182
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.939	0.764	0.857	0.629	0.572
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		120	120	127	93.7	93.8
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		0.40	0.37	0.29	<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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-1	BA2414-A-2	BA2414-A-3	BA2414-A-4	BA2414-A-5
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-001	VA24A7603-002	VA24A7603-003	VA24A7603-004	VA24A7603-005
						Result	Result	Result	Result	Result
TCLP Metals										
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		17.9	17.4	11.5	<0.50	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-6	BA2414-A-7	BA2414-A-8	BA2414-A-9	BA2414-A-10
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-006	VA24A7603-007	VA24A7603-008	VA24A7603-009	VA24A7603-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.5	25.1	25.5	26.2	25.7
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.9	11.7	11.5	11.6	11.8
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		38400	29400	31300	36800	34000
Antimony	7440-36-0	E440/VA	0.10	mg/kg		108	133	116	106	109
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		28.8	35.3	40.6	32.6	62.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		589	378	513	434	411
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.35	0.39	0.34	0.42
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.28	8.56	5.75	6.58	16.5
Boron	7440-42-8	E440/VA	5.0	mg/kg		250	228	173	232	241
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		9.68	10.5	6.99	8.54	8.78
Calcium	7440-70-2	E440/VA	50	mg/kg		125000	145000	127000	134000	139000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		202	143	124	216	133
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		83.6	115	38.2	784	39.2
Copper	7440-50-8	E440/VA	0.50	mg/kg		1150	1560	2490	1680	3680
Iron	7439-89-6	E440/VA	50	mg/kg		56500	39000	48100	64000	35500
Lead	7439-92-1	E440/VA	0.50	mg/kg		281	361	798	360	306
Lithium	7439-93-2	E440/VA	2.0	mg/kg		24.7	33.1	29.0	32.3	24.4
Magnesium	7439-95-4	E440/VA	20	mg/kg		10900	12300	11800	12300	12800
Manganese	7439-96-5	E440/VA	1.0	mg/kg		863	1980	814	978	793
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.111	0.119	0.0772	0.109	0.0951
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		24.3	27.9	19.2	212	22.5
Nickel	7440-02-0	E440/VA	0.50	mg/kg		281	177	154	501	89.1
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8220	8580	7050	7840	8800
Potassium	7440-09-7	E440/VA	100	mg/kg		5610	6020	5630	5740	5790
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.57	0.56	0.40	0.39	0.50
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.09	8.32	3.86	3.46	8.34
Sodium	7440-23-5	E440/VA	50	mg/kg		15100	16000	15400	15000	16100
Strontium	7440-24-6	E440/VA	0.50	mg/kg		265	282	283	303	297
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11400	13300	10300	10800	11900

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-6	BA2414-A-7	BA2414-A-8	BA2414-A-9	BA2414-A-10
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-006	VA24A7603-007	VA24A7603-008	VA24A7603-009	VA24A7603-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.051	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		174	135	139	91.7	105
Titanium	7440-32-6	E440/VA	1.0	mg/kg		506	299	450	356	260
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		25.2	13.4	12.4	22.4	9.73
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.80	2.96	2.49	2.58	2.73
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		36.1	33.8	36.0	52.7	39.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg		7540	3560	3360	3280	3750
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		<1.5 DLM	<1.5 DLM	<1.5 DLM	2.0	2.6
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.9	11.9	11.8	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.04	7.75	7.92	7.99	7.22
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.85	2.85	2.85	2.85	2.85
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.95	8.12	7.90	8.16	8.10
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		1.75	1.70	1.81	1.69	1.77
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1810	1800	1810	1800	1790
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		0.121	0.094	0.123	0.063	0.095
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.669	0.740	0.661	0.728	0.707
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		94.3	92.6	93.0	91.3	91.4
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-6	BA2414-A-7	BA2414-A-8	BA2414-A-9	BA2414-A-10
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00	03-Apr-2024 09:00
						VA24A7603-006	VA24A7603-007	VA24A7603-008	VA24A7603-009	VA24A7603-010
						Result	Result	Result	Result	Result
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-11	BA2414-A-12	----	----	----
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	----	----	----
						VA24A7603-011	VA24A7603-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.3	25.8	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.1	12.0	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		38000	30000	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		157	144	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		59.5	40.5	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		492	494	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.36	0.42	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		12.5	8.33	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		214	225	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		11.2	12.8	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		146000	150000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		207	174	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		70.8	128	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		3290	2120	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		50400	73700	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		1520	428	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		29.0	30.7	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		14000	13700	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		886	1550	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0998	0.121	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		34.6	48.1	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		168	850	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9670	9000	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		6900	6700	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.51	0.49	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.90	10.7	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		18000	16500	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		355	328	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		16700	16700	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2414-A-11	BA2414-A-12	----	----	----
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	----	----	----
						VA24A7603-011	VA24A7603-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		799	125	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		367	314	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		15.3	16.1	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.21	3.16	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		47.5	40.9	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		5120	5070	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.2	1.9	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.8	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.08	7.02	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.83	2.83	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.20	7.01	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	----	----	----
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.95	2.07	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.065	0.068	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1840	1870	----	----	----
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		0.599	0.338	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.828	0.961	----	----	----
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		112	119	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----

Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BA2414-A-11	BA2414-A-12	----	----	----
					Client sampling date / time	03-Apr-2024 09:00	03-Apr-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A7603-011	VA24A7603-012	--------	--------	--------
						Result	Result	----	----	----
TCLP Metals										
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		2.15	5.54	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	----	----	----

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

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

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24A7603**	Page	: 1 of 16
Amendment	: **1**		
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 10-Apr-2024 11:45
PO	: VANCO0000052919	Issue Date	: 02-May-2024 16:42
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

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	VA24A7603-011	BA2414-A-11	Bismuth	7440-69-9	E440	35.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A7603-011	BA2414-A-11	Copper	7440-50-8	E440	105 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A7603-011	BA2414-A-11	Nickel	7440-02-0	E440	83.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A7603-011	BA2414-A-11	Silver	7440-22-4	E440	105 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A7603-011	BA2414-A-11	Tin	7440-31-5	E440	70.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Zinc	7440-66-6	E440	56.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A7603-011	BA2414-A-11	Zinc	7440-66-6	E440	73.1 % 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.*

Reference Material (RM) Sample								
Metals	QC-MRG2-1422559 003	----	Zirconium	7440-67-7	E440	138 % MES	70.0-130%	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 BA2414-A-1	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-10	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-2	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-3	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-4	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-5	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-6	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 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 : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-7	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-8	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-9	E510	03-Apr-2024	15-Apr-2024	28 days	12 days	✓	16-Apr-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-11	E510	03-Apr-2024	01-May-2024	28 days	28 days	✓	01-May-2024	28 days	28 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2414-A-12	E510	03-Apr-2024	01-May-2024	28 days	28 days	✓	01-May-2024	28 days	28 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-1	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-10	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-2	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-3	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 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
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-4	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-5	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-6	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-7	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-8	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-9	E440	03-Apr-2024	15-Apr-2024	180 days	12 days	✓	16-Apr-2024	180 days	14 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-11	E440	03-Apr-2024	01-May-2024	180 days	28 days	✓	02-May-2024	180 days	29 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2414-A-12	E440	03-Apr-2024	01-May-2024	180 days	28 days	✓	02-May-2024	180 days	29 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-11	E144	03-Apr-2024	----	----	----		30-Apr-2024	----	27 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 BA2414-A-12	E144	03-Apr-2024	----	----	----		30-Apr-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-1	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-10	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-2	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-3	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-4	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-5	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-6	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-7	E144	03-Apr-2024	----	----	----		12-Apr-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 BA2414-A-8	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2414-A-9	E144	03-Apr-2024	----	----	----		12-Apr-2024	----	9 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-1	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-10	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-2	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-3	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-4	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-5	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-6	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 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 BA2414-A-7	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-8	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-9	E108	03-Apr-2024	15-Apr-2024	30 days	12 days	✓	15-Apr-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-11	E108	03-Apr-2024	01-May-2024	30 days	28 days	✓	01-May-2024	30 days	28 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2414-A-12	E108	03-Apr-2024	01-May-2024	30 days	28 days	✓	01-May-2024	30 days	28 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-1	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-10	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-2	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-3	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-4	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-5	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-6	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-7	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-8	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-9	E512	10-Apr-2024	12-Apr-2024	36 days	9 days	✓	12-Apr-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-11	E512	27-Apr-2024	28-Apr-2024	52 days	25 days	✓	28-Apr-2024	52 days	25 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2414-A-12	E512	27-Apr-2024	28-Apr-2024	52 days	25 days	✓	28-Apr-2024	52 days	25 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-1	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 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 : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-10	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-2	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-3	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-4	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-5	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-6	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-7	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-8	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-9	E444	10-Apr-2024	12-Apr-2024	188 days	9 days	✓	13-Apr-2024	188 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 : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-11	E444	27-Apr-2024	28-Apr-2024	204 days	25 days	✓	29-Apr-2024	204 days	26 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2414-A-12	E444	27-Apr-2024	28-Apr-2024	204 days	25 days	✓	29-Apr-2024	204 days	26 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-11	EPP444	03-Apr-2024	27-Apr-2024	----	----		----	28 days	24 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-12	EPP444	03-Apr-2024	27-Apr-2024	----	----		----	28 days	24 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-1	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-10	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-2	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-3	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-4	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 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) BA2414-A-5	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-6	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-7	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-8	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2414-A-9	EPP444	03-Apr-2024	10-Apr-2024	----	----		----	28 days	8 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury by CVAAS (TCLP)	E512	1420090	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1400274	2	15	13.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1420091	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1422560	2	15	13.3	5.0	✓
Moisture Content by Gravimetry	E144	1422562	2	22	9.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1422561	2	15	13.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1400274	4	15	26.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1422560	4	15	26.6	10.0	✓
Moisture Content by Gravimetry	E144	1422562	2	22	9.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1422561	2	15	13.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1420090	2	12	16.6	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1400274	2	15	13.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1420091	2	12	16.6	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1422560	2	15	13.3	5.0	✓
Moisture Content by Gravimetry	E144	1422562	2	22	9.0	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1420090	2	12	16.6	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1420091	2	12	16.6	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	: **VA24A7603**	Page	: 1 of 18
Amendment	: **1**		
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 10-Apr-2024 11:45
PO	: VANCO0000052919	Date Analysis Commenced	: 10-Apr-2024
C-O-C number	: ----	Issue Date	: 02-May-2024 16:42
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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Vancouver Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Organics, 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: 1400276)											
KS2401232-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.97	8.05	1.0%	5%	----
Physical Tests (QC Lot: 1400281)											
KS2401232-001	Anonymous	Moisture	----	E144	0.25	%	7.56	7.95	4.99%	20%	----
Physical Tests (QC Lot: 1422561)											
VA24A7603-011	BA2414-A-11	pH (1:2 soil:water)	----	E108	0.10	pH units	12.1	11.9	1.5%	5%	----
Physical Tests (QC Lot: 1422562)											
VA24A7603-011	BA2414-A-11	Moisture	----	E144	0.25	%	25.3	24.2	4.27%	20%	----
Metals (QC Lot: 1400274)											
KS2401232-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1400275)											
KS2401232-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	6120	5940	3.05%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.18	0.15	0.03	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	1.33	1.16	13.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	60.6	55.2	9.28%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.28	0.29	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.122	0.113	0.008	Diff <2x LOR	----
		Calcium	7440-70-2	E440	50	mg/kg	3550	3360	5.25%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	15.5	13.8	11.6%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	3.92	3.82	2.64%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	10.4	10.1	2.94%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	10000	9450	6.07%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	10.0	8.32	18.7%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	7.3	7.1	0.1	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	2820	2680	4.97%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	226	217	3.84%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.61	0.53	14.5%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	11.0	10.5	4.24%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	450	372	18.8%	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: 1400275) - continued											
KS2401232-001	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	1140	1110	1.95%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	133	133	0.2	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	31.1	30.0	3.54%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.068	0.060	0.008	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	470	437	7.22%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	0.59	0.57	0.02	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.560	0.527	6.05%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	19.6	17.9	8.96%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	63.6	35.5	56.6%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	4.1	4.0	0.1	Diff <2x LOR	----
Metals (QC Lot: 1422559)											
VA24A7603-011	BA2414-A-11	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0998	0.0950	0.0047	Diff <2x LOR	----
Metals (QC Lot: 1422560)											
VA24A7603-011	BA2414-A-11	Aluminum	7429-90-5	E440	50	mg/kg	38000	34100	10.8%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	157	182	14.7%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	59.5	44.8	28.3%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	492	444	10.1%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.47	0.11	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	12.5	8.73	35.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	214	223	4.06%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	11.2	10.6	5.11%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	146000	142000	3.02%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	207	227	9.29%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	70.8	68.4	3.37%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	3290	10600	105%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	50400	66500	27.5%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	1520	1070	35.0%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	29.0	34.2	16.4%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	14000	12800	8.78%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	886	1120	23.9%	30%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1422560) - continued											
VA24A7603-011	BA2414-A-11	Molybdenum	7439-98-7	E440	0.10	mg/kg	34.6	28.6	19.0%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	168	407	83.2%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	9670	8350	14.6%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	6900	6590	4.51%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.51	0.60	0.09	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	4.90	15.8	105%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	18000	17200	4.16%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	355	310	13.5%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	16700	16000	4.28%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.050	<0.050	0.0003	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	799	384	70.2%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	367	417	12.8%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	15.3	14.0	8.84%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.21	3.01	6.50%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	47.5	47.5	0.0690%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	5120	11000	73.1%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.2	1.7	0.5	Diff <2x LOR	----
TCLP Metals (QC Lot: 1420090)											
VA24A7603-011	BA2414-A-11	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1420091)											
VA24A7603-011	BA2414-A-11	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	1.95	2.00	0.05	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.065	0.065	0.0002	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1840	1790	2.73%	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	0.599	0.589	1.71%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.828	0.815	1.65%	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	112	110	2.39%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
TCLP Metals (QC Lot: 1420091) - continued											
VA24A7603-011	BA2414-A-11	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	2.15	2.12	0.02	Diff <2x LOR	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----

Qualifiers

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

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1400281)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1422562)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1400274)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1400275)						
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: 1400275) - 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: 1422559)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1422560)						
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	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1422560) - continued						
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
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	----
TCLP Metals (QCLot: 1400873)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1400874)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 1420090)						

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
TCLP Metals (QCLot: 1420090) - continued						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1420091)						
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: 1400276)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1400281)									
Moisture	----	E144	0.25	%	50 %	99.5	90.0	110	----
Physical Tests (QCLot: 1422561)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 1422562)									
Moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 1400274)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	92.4	80.0	120	----
Metals (QCLot: 1400275)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	97.0	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	95.8	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	99.5	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	95.6	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	91.8	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	91.8	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	96.0	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	92.6	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.9	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.2	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	93.5	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.5	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	93.9	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	88.1	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	95.7	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.4	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	94.2	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	99.3	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: 1400275) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	98.4	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	82.8	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	94.4	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	94.7	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	86.3	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	91.7	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.4	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	91.9	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	95.9	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	89.8	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	95.1	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	94.2	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	89.1	80.0	120	----
Metals (QCLot: 1422559)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Metals (QCLot: 1422560)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	113	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.0	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.6	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	96.8	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.9	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	103	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	105	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	96.1	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	106	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	109	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1422560) - continued									
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.2	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	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	111	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.4	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	106	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	100	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	106	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	118	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: 1400873)										
VA24A7603-001	BA2414-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.9	50.0	140	----
TCLP Metals (QCLot: 1400874)										
VA24A7603-001	BA2414-A-1	Antimony, TCLP	7440-36-0	E444	5.87 mg/L	5 mg/L	117	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		Barium, TCLP	7440-39-3	E444	13.8 mg/L	12.5 mg/L	111	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.252 mg/L	0.25 mg/L	101	50.0	140	----
		Boron, TCLP	7440-42-8	E444	10.8 mg/L	10 mg/L	108	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.250 mg/L	0.25 mg/L	100	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.24 mg/L	1.25 mg/L	99.4	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.40 mg/L	2.5 mg/L	95.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	250 mg/L	250 mg/L	99.9	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.4 mg/L	10 mg/L	104	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	276 mg/L	250 mg/L	111	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.46 mg/L	2.5 mg/L	98.3	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.22 mg/L	5 mg/L	104	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.087 mg/L	0.1 mg/L	87.2	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.3 mg/L	5 mg/L	105	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.20 mg/L	5 mg/L	104	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.76 mg/L	0.75 mg/L	101	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	ND mg/L	----	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	77.2	50.0	150	----
TCLP Metals (QCLot: 1420090)										
VA24A7603-011	BA2414-A-11	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.2	50.0	140	----
TCLP Metals (QCLot: 1420091)										
VA24A7603-011	BA2414-A-11	Antimony, TCLP	7440-36-0	E444	4.71 mg/L	5 mg/L	94.3	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.5 mg/L	12.5 mg/L	91.9	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.238 mg/L	0.25 mg/L	95.0	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.20 mg/L	10 mg/L	92.0	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.234 mg/L	0.25 mg/L	93.7	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.23 mg/L	1.25 mg/L	98.3	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.34 mg/L	2.5 mg/L	93.5	50.0	140	----
		Iron, TCLP	7439-89-6	E444	239 mg/L	250 mg/L	95.7	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.67 mg/L	10 mg/L	96.7	50.0	140	----

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: 1420091) - continued										
VA24A7603-011	BA2414-A-11	Magnesium, TCLP	7439-95-4	E444	261 mg/L	250 mg/L	104	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.47 mg/L	2.5 mg/L	99.0	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.97 mg/L	5 mg/L	99.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.084 mg/L	0.1 mg/L	84.1	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	96.5	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.79 mg/L	5 mg/L	95.8	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.74 mg/L	0.75 mg/L	99.1	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.77 mg/L	10 mg/L	97.7	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.9 mg/L	1 mg/L	86.7	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: 1400274)									
QC-1400274-003	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	104	70.0	130	----
Metals (QCLot: 1400275)									
QC-1400275-003	SCP SS-2	Aluminum	7429-90-5	E440	9820 mg/kg	105	70.0	130	----
QC-1400275-003	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	105	70.0	130	----
QC-1400275-003	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	99.8	70.0	130	----
QC-1400275-003	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	98.2	70.0	130	----
QC-1400275-003	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	100	70.0	130	----
QC-1400275-003	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	127	40.0	160	----
QC-1400275-003	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	101	70.0	130	----
QC-1400275-003	SCP SS-2	Calcium	7440-70-2	E440	31100 mg/kg	104	70.0	130	----
QC-1400275-003	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
QC-1400275-003	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	100	70.0	130	----
QC-1400275-003	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	105	70.0	130	----
QC-1400275-003	SCP SS-2	Iron	7439-89-6	E440	23600 mg/kg	97.4	70.0	130	----
QC-1400275-003	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	94.5	70.0	130	----
QC-1400275-003	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	96.9	70.0	130	----
QC-1400275-003	SCP SS-2	Magnesium	7439-95-4	E440	5510 mg/kg	110	70.0	130	----
QC-1400275-003	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-1400275-003	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	104	70.0	130	----
QC-1400275-003	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	97.8	70.0	130	----
QC-1400275-003	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	96.2	70.0	130	----
QC-1400275-003	SCP SS-2	Potassium	7440-09-7	E440	1590 mg/kg	110	70.0	130	----
QC-1400275-003	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	97.4	70.0	130	----
QC-1400275-003	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	96.2	70.0	130	----
QC-1400275-003	SCP SS-2	Thallium	7440-28-0	E440	0.079 mg/kg	85.2	40.0	160	----
QC-1400275-003	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	93.5	70.0	130	----
QC-1400275-003	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
QC-1400275-003	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	94.3	70.0	130	----
QC-1400275-003	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
QC-1400275-003	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	99.4	70.0	130	----
QC-1400275-003	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	89.1	70.0	130	----
Metals (QCLot: 1422559)									
QC-1422559-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	107	70.0	130	----

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: 1422560)									
QC-1422560-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	110	70.0	130	----
QC-1422560-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	104	70.0	130	----
QC-1422560-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	103	70.0	130	----
QC-1422560-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	109	70.0	130	----
QC-1422560-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	89.2	70.0	130	----
QC-1422560-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	108	70.0	130	----
QC-1422560-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	105	70.0	130	----
QC-1422560-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	98.8	70.0	130	----
QC-1422560-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	102	70.0	130	----
QC-1422560-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	90.9	70.0	130	----
QC-1422560-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	112	70.0	130	----
QC-1422560-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	104	70.0	130	----
QC-1422560-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	106	70.0	130	----
QC-1422560-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	99.2	70.0	130	----
QC-1422560-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	108	70.0	130	----
QC-1422560-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	105	70.0	130	----
QC-1422560-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	93.3	60.0	140	----
QC-1422560-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	102	70.0	130	----
QC-1422560-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	110	70.0	130	----
QC-1422560-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	115	70.0	130	----
QC-1422560-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	112	50.0	150	----
QC-1422560-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	97.2	70.0	130	----
QC-1422560-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	106	40.0	160	----
QC-1422560-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	108	70.0	130	----
QC-1422560-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	126	70.0	130	----
QC-1422560-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	101	70.0	130	----
QC-1422560-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	105	70.0	130	----
QC-1422560-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	# 138	70.0	130	MES

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).

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Page ____ of ____

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	Burnaby BC			Email 2:	ofetherstonhaugh@covanta.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-521-1025	Fax:		Email 3:	dskrypnyk@covanta.com			Analysis Request
		☐ Yes	☐ No		brent.kirkpatrick@metrovancouver.org			
					Sarah.Wellman@metrovancouver.org			
Invoice To	Same as Report ?			Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:				
Company:				PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite			
Contact:				LSD:	(includes 2:1 pH)			
Address:								
Phone:		Fax:		Quote #:				
Lab Work Order # (lab use only)	A7603			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
	BA2414-A-1	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-2	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-3	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-4	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-5	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-6	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-7	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-8	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-9	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-10	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-11	03-Apr-24	9:00	Soil	X	X		X	1
	BA2414-A-12	03-Apr-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A7603

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-APR-24	0800	JC	APR 10 2024	1145am	22.23 °C				

GENF 20.00 Front