

Bottom Ash Data

2023 Week 27

The following analytical report represents bottom ash composite results for week 27 of 2023 (July 2, 2023 to July 8, 2023).

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	: VA23B5796	Page	: 1 of 11
Contact	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
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Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 11-Jul-2023 12:45
PO	: VANCO0000051998	Date Analysis Commenced	: 12-Jul-2023
C-O-C number	: ----	Issue Date	: 17-Jul-2023 22:28
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	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).

<i>Unit</i>	<i>Description</i>
%	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.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
FR4	As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:4 due to high soil organic content.



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2327-A-1-Un processed	BA2327-A-2-Un processed	BA2327-A-3-Un processed	BA2327-A-4-Un processed	BA2327-A-5-Un processed
Client sampling date / time					05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-001	VA23B5796-002	VA23B5796-003	VA23B5796-004	VA23B5796-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	17.6	20.7	19.3	19.2	21.2
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.3	12.3	12.1 ^{FR4}	12.1 ^{FR4}	12.4
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	51800	43000	36800	34600	41600
Antimony	7440-36-0	E440/VA	0.10	mg/kg	142	139	126	142	122
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.9	22.1	20.4	21.5	18.6
Barium	7440-39-3	E440/VA	0.50	mg/kg	503	479	475	506	553
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.32	0.27	0.32	0.32	0.30
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	6.87	7.43	10.0	20.9	12.4
Boron	7440-42-8	E440/VA	5.0	mg/kg	262	189	148	141	394
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	9.38	11.4	9.68	9.40	8.32
Calcium	7440-70-2	E440/VA	50	mg/kg	158000	150000	135000	143000	133000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	116	112	159	162	136
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	35.7	39.6	64.7	35.2	303
Copper	7440-50-8	E440/VA	0.50	mg/kg	2860	1010	1690	4990	15800
Iron	7439-89-6	E440/VA	50	mg/kg	34600	39900	52600	51500	50800
Lead	7439-92-1	E440/VA	0.50	mg/kg	310	312	432	337	377
Lithium	7439-93-2	E440/VA	2.0	mg/kg	19.1	20.6	21.6	21.5	27.4
Magnesium	7439-95-4	E440/VA	20	mg/kg	10600	11400	10200	10600	9870
Manganese	7439-96-5	E440/VA	1.0	mg/kg	663	1100	621	827	713
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	24.9	19.2	21.2	21.2	19.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg	107	88.2	156	159	299
Phosphorus	7723-14-0	E440/VA	50	mg/kg	12500	10000	9250	9690	8640
Potassium	7440-09-7	E440/VA	100	mg/kg	5190	4980	5170	5100	4930
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.44	0.41	0.39	0.38	0.31
Silver	7440-22-4	E440/VA	0.10	mg/kg	21.2	3.70	5.25	3.56	4.42
Sodium	7440-23-5	E440/VA	50	mg/kg	15600	15100	14900	15700	15700
Strontium	7440-24-6	E440/VA	0.50	mg/kg	278	293	256	265	262
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12500	13800	11700	12400	10900



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2327-A-1-Un processed	BA2327-A-2-Un processed	BA2327-A-3-Un processed	BA2327-A-4-Un processed	BA2327-A-5-Un processed
Client sampling date / time					05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-001	VA23B5796-002	VA23B5796-003	VA23B5796-004	VA23B5796-005
					Result	Result	Result	Result	Result
Metals									
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	241	98.6	97.8	145	164
Titanium	7440-32-6	E440/VA	1.0	mg/kg	471	626	325	324	538
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	7.10	8.86	8.67	9.13	7.04
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.82	2.84	2.65	2.79	2.48
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	47.4	59.4	49.8	49.1	44.1
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3240	5510	4170	4080	9260
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.5	2.0	2.0	1.3	1.6
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.9	11.9	11.9	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.11	6.99	6.45	6.92	6.81
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	2.91	2.91	2.91
pH, TCLP final	----	EPP444/VA	0.010	pH units	5.92	5.89	5.91	6.13	5.96
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	2.08	2.14	2.15	2.31	2.35
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.146	0.129	0.132	0.127	0.107
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1910	1900	1940	1950	1970
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.20	0.736	1.07	0.679	0.969
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.17	0.519	1.24	1.30	0.243
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	0.48	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	119	113	112	117	119
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	0.59	0.49	0.48	0.76	0.59
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



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2327-A-1-Un processed	BA2327-A-2-Un processed	BA2327-A-3-Un processed	BA2327-A-4-Un processed	BA2327-A-5-Un processed
					Client sampling date / time	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-001	VA23B5796-002	VA23B5796-003	VA23B5796-004	VA23B5796-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<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	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	35.8	92.1	41.1	47.8	34.6	
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

Client sample ID

(Matrix: Soil/Solid)

					BA2327-A-6-Un processed	BA2327-A-7-Un processed	BA2327-A-8-Un processed	BA2327-A-9-Un processed	BA2327-A-10-Un processed
Client sampling date / time					05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-006	VA23B5796-007	VA23B5796-008	VA23B5796-009	VA23B5796-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	15.6	19.1	20.5	17.2	18.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.3 ^{FR4}	12.3 ^{FR4}	12.0	12.2 ^{FR4}	12.2
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	44900	35300	37500	29800	36000
Antimony	7440-36-0	E440/VA	0.10	mg/kg	110	100	119	104	0.78
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	17.2	15.3	20.8	30.0	15.0
Barium	7440-39-3	E440/VA	0.50	mg/kg	597	576	456	458	575
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.30	0.28	0.31	0.33	0.71
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	6.06	7.08	6.89	4.55	0.23
Boron	7440-42-8	E440/VA	5.0	mg/kg	204	152	213	160	8.3
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	21.0	8.37	9.64	15.4	0.108
Calcium	7440-70-2	E440/VA	50	mg/kg	144000	134000	139000	122000	4700
Chromium	7440-47-3	E440/VA	0.50	mg/kg	161	165	138	97.3	44.6
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	48.9	178	138	161	29.5
Copper	7440-50-8	E440/VA	0.50	mg/kg	3990	3160	2040	1410	56.3
Iron	7439-89-6	E440/VA	50	mg/kg	53700	66000	46400	38300	49100
Lead	7439-92-1	E440/VA	0.50	mg/kg	484	289	316	432	14.8
Lithium	7439-93-2	E440/VA	2.0	mg/kg	18.7	23.2	25.6	40.0	62.1
Magnesium	7439-95-4	E440/VA	20	mg/kg	11100	9880	10200	8780	12800
Manganese	7439-96-5	E440/VA	1.0	mg/kg	767	1290	642	610	1440
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0901	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	22.9	20.2	20.2	17.3	0.60
Nickel	7440-02-0	E440/VA	0.50	mg/kg	124	444	222	103	61.5
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9860	8220	9210	8880	393
Potassium	7440-09-7	E440/VA	100	mg/kg	4970	4600	5210	4350	2330
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.41	0.33	0.38	0.29	0.47
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.14	3.59	3.45	10.6	0.55
Sodium	7440-23-5	E440/VA	50	mg/kg	16500	14800	15200	14000	198
Strontium	7440-24-6	E440/VA	0.50	mg/kg	249	247	260	220	46.1
Sulfur	7704-34-9	E440/VA	1000	mg/kg	10900	9800	11900	8200	<1000
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	0.133



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2327-A-6-Un processed	BA2327-A-7-Un processed	BA2327-A-8-Un processed	BA2327-A-9-Un processed	BA2327-A-10-U nprocessed
Client sampling date / time					05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-006	VA23B5796-007	VA23B5796-008	VA23B5796-009	VA23B5796-010
					Result	Result	Result	Result	Result
Metals									
Tin	7440-31-5	E440/VA	2.0	mg/kg	104	98.8	96.0	81.0	<2.0
Titanium	7440-32-6	E440/VA	1.0	mg/kg	416	408	306	178	212
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	9.30	11.3	7.71	5.35	<0.50
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.55	2.50	2.92	2.12	0.290
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	205	41.7	45.1	42.1	88.9
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4840	7390	5140	2610	125
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.0	1.6	1.9	2.8	1.9
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	11.9	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.69	7.61	7.07	6.62	7.67
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	2.91	2.91	2.91
pH, TCLP final	----	EPP444/VA	0.010	pH units	5.73	6.10	5.94	5.52	5.89
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	2.17	2.56	2.35	2.31	2.46
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.132	0.174	0.126	0.134	0.264
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1860	1980	1930	1780	1900
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	0.928	0.694	1.16	0.543	0.682
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.941	2.16	1.17	1.10	1.19
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	6.5	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	0.38	0.25	<0.25	0.66	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	109	116	111	99.6	110
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	0.49	0.76	0.62	0.69	1.63
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



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2327-A-6-Un processed	BA2327-A-7-Un processed	BA2327-A-8-Un processed	BA2327-A-9-Un processed	BA2327-A-10-U nprocessed
					Client sampling date / time	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00	05-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-006	VA23B5796-007	VA23B5796-008	VA23B5796-009	VA23B5796-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	40.9	43.6	57.6	49.7	36.0	
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

Client sample ID

					BA2327-A-11-U nprocessed	BA2327-A-12-U nprocessed	----	----	----	
					Client sampling date / time	05-Jul-2023 09:00	05-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-011	VA23B5796-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
Moisture	----	E144/VA	0.25	%	18.5	17.6	----	----	----	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.4	12.3	----	----	----	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	37100	35400	----	----	----	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	98.8	92.0	----	----	----	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	18.8	15.8	----	----	----	
Barium	7440-39-3	E440/VA	0.50	mg/kg	511	526	----	----	----	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.28	0.24	----	----	----	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	5.07	4.02	----	----	----	
Boron	7440-42-8	E440/VA	5.0	mg/kg	176	195	----	----	----	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	6.67	5.86	----	----	----	
Calcium	7440-70-2	E440/VA	50	mg/kg	126000	136000	----	----	----	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	120	135	----	----	----	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	43.7	28.1	----	----	----	
Copper	7440-50-8	E440/VA	0.50	mg/kg	4960	2280	----	----	----	
Iron	7439-89-6	E440/VA	50	mg/kg	45000	66200	----	----	----	
Lead	7439-92-1	E440/VA	0.50	mg/kg	198	209	----	----	----	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	19.7	15.5	----	----	----	
Magnesium	7439-95-4	E440/VA	20	mg/kg	9020	9400	----	----	----	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	573	689	----	----	----	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	23.3	29.5	----	----	----	
Nickel	7440-02-0	E440/VA	0.50	mg/kg	126	518	----	----	----	
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10500	14400	----	----	----	
Potassium	7440-09-7	E440/VA	100	mg/kg	4320	3900	----	----	----	
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.39	0.31	----	----	----	
Silver	7440-22-4	E440/VA	0.10	mg/kg	3.02	3.29	----	----	----	
Sodium	7440-23-5	E440/VA	50	mg/kg	13500	14200	----	----	----	
Strontium	7440-24-6	E440/VA	0.50	mg/kg	232	229	----	----	----	
Sulfur	7704-34-9	E440/VA	1000	mg/kg	10400	8500	----	----	----	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2327-A-11-U nprocessed	BA2327-A-12-U nprocessed	----	----	----
					05-Jul-2023 09:00	05-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-011	VA23B5796-012	-----	-----	-----
					Result	Result	----	----	----
Metals									
Tin	7440-31-5	E440/VA	2.0	mg/kg	111	79.7	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	685	405	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	6.84	6.33	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.30	2.01	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	76.5	38.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2830	9470	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.4	2.0	----	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	11.9	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.09	6.55	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.10	5.46	----	----	----
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	3.54	2.13	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.130	0.134	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1940	1780	----	----	----
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	0.484	3.26	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.52	0.578	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	5.4	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	0.26	<0.25	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	115	101	----	----	----
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	0.49	1.04	----	----	----
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	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid

(Matrix: Soil/Solid)

					Client sample ID	BA2327-A-11-U nprocessed	BA2327-A-12-U nprocessed	----	----	----
					Client sampling date / time	05-Jul-2023 09:00	05-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B5796-011	VA23B5796-012	-----	-----	-----	
					Result	Result	----	----	----	
TCLP Metals										
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	47.0	40.3	----	----	----	
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.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA23B5796</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO0000051998</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 16</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 11-Jul-2023 12:45</p> <p>Issue Date : 17-Jul-2023 22:28</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	Cadmium	7440-43-9	E440	43.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Lead	7439-92-1	E440	49.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Magnesium	7439-95-4	E440	37.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-10-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-11-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-12-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-1-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-2-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-3-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-4-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-5-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-6-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-7-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-8-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2327-A-9-Unprocessed	E510	05-Jul-2023	12-Jul-2023	28 days	8 days	✔	13-Jul-2023	20 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-1-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-2-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-3-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-4-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-5-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-6-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-7-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-8-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-9-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	13-Jul-2023	172 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-10-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	14-Jul-2023	172 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-11-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	14-Jul-2023	172 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2327-A-12-Unprocessed	E440	05-Jul-2023	12-Jul-2023	180 days	8 days	✔	14-Jul-2023	172 days	2 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-10-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		



Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-11-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-12-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-1-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-2-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-3-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-4-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-5-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-6-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-7-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-8-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2327-A-9-Unprocessed	E144	05-Jul-2023	----	----	----		12-Jul-2023	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-10-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-11-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-12-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-1-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-2-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-3-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-4-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✔	13-Jul-2023	22 days	0 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-5-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✓	13-Jul-2023	22 days	0 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-6-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✓	13-Jul-2023	22 days	0 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-7-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✓	13-Jul-2023	22 days	0 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-8-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✓	13-Jul-2023	22 days	0 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2327-A-9-Unprocessed	E108	05-Jul-2023	12-Jul-2023	30 days	8 days	✓	13-Jul-2023	22 days	0 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2327-A-10-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✓	17-Jul-2023	25 days	1 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2327-A-11-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✓	17-Jul-2023	25 days	1 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2327-A-12-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✓	17-Jul-2023	25 days	1 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2327-A-1-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✓	17-Jul-2023	25 days	1 days	✓	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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) BA2327-A-2-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-3-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-4-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-5-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-6-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-7-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-8-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2327-A-9-Unprocessed	E512	13-Jul-2023	16-Jul-2023	36 days	11 days	✔	17-Jul-2023	25 days	1 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2327-A-10-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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 : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-11-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-12-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-1-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-2-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-3-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-4-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-5-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-6-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-7-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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 : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-8-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2327-A-9-Unprocessed	E444	13-Jul-2023	16-Jul-2023	188 days	11 days	✔	17-Jul-2023	177 days	1 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-10-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-11-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-12-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-1-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-2-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-3-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-4-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group 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 : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-5-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-6-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-7-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-8-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2327-A-9-Unprocessed	EPP444	05-Jul-2023	13-Jul-2023	----	----		----	180 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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1035054	2	24	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1035136	2	32	6.2	5.0	✔
Moisture Content by Gravimetry	E144	1035139	2	31	6.4	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1035138	2	25	8.0	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1035054	4	24	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1035136	4	32	12.5	10.0	✔
Moisture Content by Gravimetry	E144	1035139	2	31	6.4	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1035138	2	25	8.0	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1040826	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1035054	2	24	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1040827	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1035136	2	32	6.2	5.0	✔
Moisture Content by Gravimetry	E144	1035139	2	31	6.4	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1040826	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1040827	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 $20 \pm 5^{\circ}\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) 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 HNO_3 and HCl . Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, 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 HNO_3 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 $<60^{\circ}\text{C}$) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 HNO ₃ 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	: VA23B5796	Page	: 1 of 16
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	: 11-Jul-2023 12:45
PO	: VANCO0000051998	Date Analysis Commenced	: 12-Jul-2023
C-O-C number	: ----	Issue Date	: 17-Jul-2023 22:28
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	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: 1035059)											
KS2302444-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.88	6.01	2.2%	5%	----
Physical Tests (QC Lot: 1035061)											
VA23B5518-001	Anonymous	Moisture	----	E144	0.25	%	0.64	0.64	0.003	Diff <2x LOR	----
Physical Tests (QC Lot: 1035138)											
KS2302462-007	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.39	7.29	1.4%	5%	----
Physical Tests (QC Lot: 1035139)											
KS2302462-004	Anonymous	Moisture	----	E144	0.25	%	10.7	10.6	0.916%	20%	----
Metals (QC Lot: 1035054)											
KS2302444-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1035055)											
KS2302444-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	10600	9940	6.10%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.34	0.18	0.16	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	0.92	0.73	22.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	54.4	49.1	10.3%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.43	0.34	0.10	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	0.35	<0.20	0.15	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	0.173	0.111	43.3%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	1610	1680	3.74%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	17.9	21.1	16.8%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	5.54	5.85	5.50%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	17.3	14.2	19.4%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	13200	15100	13.3%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	13.2	8.00	49.3%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	13.5	14.9	10.00%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	3900	5670	37.0%	30%	DUP-H
		Manganese	7439-96-5	E440	1.0	mg/kg	176	182	3.52%	30%	----
Molybdenum	7439-98-7	E440	0.10	mg/kg	0.46	0.37	0.09	Diff <2x LOR	----		
Nickel	7440-02-0	E440	0.50	mg/kg	17.0	20.2	17.3%	30%	----		
Phosphorus	7723-14-0	E440	50	mg/kg	471	362	25.9%	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: 1035055) - continued											
KS2302444-001	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	1030	1080	4.58%	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	178	229	51	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	10.7	9.09	16.5%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.071	0.059	0.012	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0	3.8	1.8	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	622	640	2.96%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	1.29	1.12	14.0%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	18.4	20.7	11.8%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	52.6	45.2	15.2%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	1.8	1.2	0.6	Diff <2x LOR	----
Metals (QC Lot: 1035136)											
KS2302462-004	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	12000	12400	3.14%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	0.47	0.50	0.03	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.50	mg/kg	90.1	94.7	5.00%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.32	0.007	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	0.36	0.45	0.09	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	0.040	0.042	0.003	Diff <2x LOR	----
		Calcium	7440-70-2	E440	50	mg/kg	4250	4330	1.77%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	24.2	25.4	4.75%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	8.91	9.38	5.18%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	12.0	12.9	7.06%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	19000	19800	3.88%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	3.91	3.74	4.58%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	13.7	14.1	3.15%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	7460	7870	5.34%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	259	274	5.72%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.58	0.59	1.34%	40%	----
Nickel	7440-02-0	E440	0.50	mg/kg	16.2	16.4	1.07%	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: 1035136) - continued											
KS2302462-004	Anonymous	Phosphorus	7723-14-0	E440	50	mg/kg	331	345	4.22%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	2750	2960	7.51%	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	887	920	3.60%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	32.0	31.1	2.87%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.109	0.119	0.010	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	996	1040	4.59%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	9.74	11.0	11.9%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	1.20	1.56	25.5%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	42.3	44.1	4.10%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	34.0	35.2	3.55%	30%	----
Zirconium	7440-67-7	E440	1.0	mg/kg	2.1	2.2	0.2	Diff <2x LOR	----		
Metals (QC Lot: 1035137)											
KS2302462-007	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	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: 1035061)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 1035139)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1035054)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1035055)						
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: 1035055) - 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: 1035136)						
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: 1035136) - 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: 1035137)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1040826)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1040827)						
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	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1035059)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1035061)									
Moisture	----	E144	0.25	%	50 %	99.9	90.0	110	----
Physical Tests (QCLot: 1035138)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1035139)									
Moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 1035054)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.9	80.0	120	----
Metals (QCLot: 1035055)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.8	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	93.6	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	97.6	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	94.8	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	93.7	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	89.9	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	96.7	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.6	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.5	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	95.2	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	92.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	97.0	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	95.7	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.0	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	96.5	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	92.6	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	98.4	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	95.8	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	98.6	80.0	120	----



Sub-Matrix: Soil/Solid

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 1035055) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	89.9	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	97.6	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	95.6	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	91.9	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	94.8	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	90.8	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	90.7	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	89.5	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	96.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.4	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	85.5	80.0	120	----
Metals (QCLot: 1035136)									
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	98.2	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	97.8	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.0	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	94.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	92.1	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.2	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	98.3	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.3	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	95.8	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	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	101	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	96.5	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	99.7	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.2	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	92.0	80.0	120	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1035136) - continued									
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	97.5	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	96.9	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	94.7	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.1	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.1	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	98.4	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	94.8	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	92.1	80.0	120	----
Metals (QCLot: 1035137)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	99.2	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: 1040826)										
VA23B5796-001	BA2327-A-1-Unprocessed	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	106	50.0	140	----
TCLP Metals (QCLot: 1040827)										
VA23B5796-001	BA2327-A-1-Unprocessed	Antimony, TCLP	7440-36-0	E444	4.52 mg/L	5 mg/L	90.5	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	93.8	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.2 mg/L	12.5 mg/L	89.8	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.231 mg/L	0.25 mg/L	92.5	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.11 mg/L	10 mg/L	91.1	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.230 mg/L	0.25 mg/L	92.0	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.12 mg/L	1.25 mg/L	89.6	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.17 mg/L	2.5 mg/L	86.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	229 mg/L	250 mg/L	91.5	50.0	140	----
		Lead, TCLP	7439-92-1	E444	8.84 mg/L	10 mg/L	88.4	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	226 mg/L	250 mg/L	90.4	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.26 mg/L	2.5 mg/L	90.6	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.78 mg/L	5 mg/L	95.6	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.096 mg/L	0.1 mg/L	95.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.3 mg/L	5 mg/L	86.9	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.45 mg/L	5 mg/L	88.9	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.70 mg/L	0.75 mg/L	93.6	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	8 mg/L	10 mg/L	80.2	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:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
		Low	High						
Metals (QCLot: 1035054)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----
Metals (QCLot: 1035055)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	107	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	124	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	99.9	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	102	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	120	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	97.8	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	105	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	114	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	95.2	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	104	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	102	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	110	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	107	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	96.2	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	98.9	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	115	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	103	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	98.9	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	93.4	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	94.7	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	116	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 (%)		Qualifier
							Low	High	
Metals (QCLot: 1035055) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	96.6	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	95.7	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	85.9	70.0	130	----
Metals (QCLot: 1035136)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	96.1	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	110	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	101	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	112	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	118	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	100	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	99.1	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	108	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	113	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	99.9	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	105	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	104	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	101	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	100	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	90.5	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	91.6	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	108	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	99.7	70.0	130	----

Page : 16 of 16
 Work Order : VA23B5796
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1035136) - continued									
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	105	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	96.8	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	82.3	70.0	130	----
Metals (QCLot: 1035137)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----

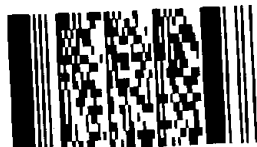


Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact:	Nicole Victor / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive	Email 1: invictor@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
	Burnaby BC	Email 2: ofetherstonhaugh@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Email 3: dskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
	<input type="checkbox"/> Yes <input type="checkbox"/> No	brent.kirkpatrick@metrovancover.org		Analysis Request	
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Sarah.Wellman@metrovancover.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?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Job #:									
Company:		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite								
Contact:		LSD:	(includes 2:1 pH)								
Address:		Quote #:									
Phone:		Fax:									

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
BA2327-A-1-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-2-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-3-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-4-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-5-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-6-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-7-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-8-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-9-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-10-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-11-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1
BA2327-A-12-Unprocessed		05-Jul-23	9:00	Soil	X	X		X	1

Environmental Division
 Vancouver
 Work Order Reference
VA23B5796



Telephone : +1 604 263 4188

Special Instructions / Remarks	freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details
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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
<i>[Signature]</i>	11-Jul-23	0900	JC	11 July 23	1245 pm	23, 23°C				