

Bottom Ash Data

2023 Week 22

The following analytical report represents bottom ash composite results for week 22 of 2023 (May 28, 2023 to June 3, 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 : **VA23B2606**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : Weekly Bottom Ash - Suite
PO : VANCO0000051998
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Ian Chen
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 06-Jun-2023 11:20
Date Analysis Commenced : 06-Jun-2023
Issue Date : 13-Jun-2023 16:05

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
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		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.



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2322-A-1	BA2322-A-2	BA2322-A-3	BA2322-A-4	BA2322-A-5
Client sampling date / time					31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-001	VA23B2606-002	VA23B2606-003	VA23B2606-004	VA23B2606-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	18.5	18.0	17.6	18.1	18.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.5	11.5	11.5	11.4	11.6
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	32700	32700	34300	52900	40200
Antimony	7440-36-0	E440/VA	0.10	mg/kg	93.9	96.6	223	98.8	76.9
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	26.3	22.4	27.3	20.1	17.0
Barium	7440-39-3	E440/VA	0.50	mg/kg	619	630	633	628	628
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.36	0.45	0.39	0.36	0.42
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.9	7.38	8.30	7.75	6.27
Boron	7440-42-8	E440/VA	5.0	mg/kg	203	214	289	216	258
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	13.0	8.02	7.53	9.72	7.76
Calcium	7440-70-2	E440/VA	50	mg/kg	114000	123000	134000	122000	121000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	110	106	206	136	132
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	58.0	25.7	31.3	31.5	35.9
Copper	7440-50-8	E440/VA	0.50	mg/kg	2160	1740	1320	1180	1630
Iron	7439-89-6	E440/VA	50	mg/kg	79500	42500	43200	33100	49400
Lead	7439-92-1	E440/VA	0.50	mg/kg	368	602	2040	578	631
Lithium	7439-93-2	E440/VA	2.0	mg/kg	21.1	29.6	22.7	31.2	21.0
Magnesium	7439-95-4	E440/VA	20	mg/kg	9490	10000	11600	10500	10400
Manganese	7439-96-5	E440/VA	1.0	mg/kg	714	616	657	752	678
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	28.8	37.8	51.2	30.8	44.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg	79.9	102	131	94.0	109
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7740	9750	9430	9880	8410
Potassium	7440-09-7	E440/VA	100	mg/kg	4940	5100	4850	5370	4880
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.29	0.27	0.61	0.27	0.29
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.78	4.24	4.69	4.46	3.17
Sodium	7440-23-5	E440/VA	50	mg/kg	15700	16400	15600	16600	15200
Strontium	7440-24-6	E440/VA	0.50	mg/kg	268	279	313	278	285



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2322-A-1	BA2322-A-2	BA2322-A-3	BA2322-A-4	BA2322-A-5
(Matrix: Soil/Solid)					Client sampling date / time	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-001	VA23B2606-002	VA23B2606-003	VA23B2606-004	VA23B2606-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg	9600	9600	10000	11100	9100	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.060	<0.050	<0.050	0.055	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	79.9	263	93.8	95.4	63.0	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	214	177	252	470	228	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	10.3	7.84	12.0	17.4	8.38	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.12	4.22	4.35	4.44	4.37	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	41.1	46.1	44.2	47.0	48.6	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3560	3830	3740	3080	2680	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.5	2.5	2.2	2.2	3.2	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.7	11.7	11.8	11.7	11.8	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.71	6.99	7.68	6.37	7.48	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.39	6.36	6.44	6.43	6.62	
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	2.34	2.61	2.44	2.47	2.25	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.164	0.287	0.247	0.155	0.124	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2270	2290	2310	2260	2190	
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	1.36	1.29	1.58	1.68	1.06	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.934	0.872	0.914	0.852	0.827	
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	139	140	139	133	128	
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	0.56	0.64	0.52	0.65	
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

Client sample ID

(Matrix: Soil/Solid)

					BA2322-A-1	BA2322-A-2	BA2322-A-3	BA2322-A-4	BA2322-A-5
Client sampling date / time					31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-001	VA23B2606-002	VA23B2606-003	VA23B2606-004	VA23B2606-005
					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	23.9	31.5	28.2	29.5	13.6
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)

					BA2322-A-6	BA2322-A-7	BA2322-A-8	BA2322-A-9	BA2322-A-10
Client sampling date / time					31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-006	VA23B2606-007	VA23B2606-008	VA23B2606-009	VA23B2606-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	17.2	17.9	17.5	17.7	18.2
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.0	10.8	10.6	11.0	11.2
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	29300	41400	30600	39800	28500
Antimony	7440-36-0	E440/VA	0.10	mg/kg	84.6	89.7	109	88.6	138
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.0	18.8	22.7	18.3	28.0
Barium	7440-39-3	E440/VA	0.50	mg/kg	613	631	628	536	531
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.39	0.39	0.46	52.7
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	6.91	16.2	11.1	7.01	10.5
Boron	7440-42-8	E440/VA	5.0	mg/kg	219	242	218	224	206
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	7.34	7.33	10.8	8.03	39.8
Calcium	7440-70-2	E440/VA	50	mg/kg	123000	131000	148000	131000	153000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	137	148	171	128	438
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	114	39.3	47.6	31.4	109
Copper	7440-50-8	E440/VA	0.50	mg/kg	1210	1590	3250	1150	4500
Iron	7439-89-6	E440/VA	50	mg/kg	41800	38500	54400	43600	62500
Lead	7439-92-1	E440/VA	0.50	mg/kg	312	404	645	286	1090
Lithium	7439-93-2	E440/VA	2.0	mg/kg	29.0	22.4	25.6	22.2	29.4
Magnesium	7439-95-4	E440/VA	20	mg/kg	11200	11500	11800	11000	11700
Manganese	7439-96-5	E440/VA	1.0	mg/kg	661	734	759	724	791
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	37.1	30.1	60.8	29.6	40.4
Nickel	7440-02-0	E440/VA	0.50	mg/kg	223	109	211	77.2	351
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9270	8440	9180	7970	9520
Potassium	7440-09-7	E440/VA	100	mg/kg	5020	5580	5340	4670	5450
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.34	0.34	0.33	0.31	0.40
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.64	4.22	5.66	3.47	5.89
Sodium	7440-23-5	E440/VA	50	mg/kg	16100	17000	16000	15700	15300
Strontium	7440-24-6	E440/VA	0.50	mg/kg	251	294	300	287	307
Sulfur	7704-34-9	E440/VA	1000	mg/kg	9700	10300	12300	9900	12500



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2322-A-6	BA2322-A-7	BA2322-A-8	BA2322-A-9	BA2322-A-10
Client sampling date / time					31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-006	VA23B2606-007	VA23B2606-008	VA23B2606-009	VA23B2606-010
					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	67.4	66.9	96.5	66.7	104
Titanium	7440-32-6	E440/VA	1.0	mg/kg	292	602	288	476	248
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	14.0	8.74	11.7	8.00	13.6
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.07	3.80	4.38	3.92	4.49
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	45.7	49.9	47.8	42.7	48.4
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2850	2560	3440	4410	3800
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.6	1.0	1.1	1.1	1.4
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.7	11.7	11.7	11.7	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.61	6.41	6.81	6.52	7.99
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.54	6.55	6.51	6.53	6.58
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	2.27	2.30	2.28	2.16	2.39
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.124	0.116	0.163	0.115	0.114
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2220	2170	2190	2110	2180
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	1.53	1.64	1.09	1.74	1.83
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.800	0.587	0.706	0.766	0.768
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	136	134	132	130	132
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.46	0.51	0.56	0.44	0.58
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)

					Client sample ID	BA2322-A-6	BA2322-A-7	BA2322-A-8	BA2322-A-9	BA2322-A-10
					Client sampling date / time	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00	31-May-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-006	VA23B2606-007	VA23B2606-008	VA23B2606-009	VA23B2606-010	
					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	<1.0
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	18.4	17.7	17.8	18.8	15.5	
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<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)

					BA2322-A-11	BA2322-A-12	----	----	----
					31-May-2023 09:00	31-May-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-011	VA23B2606-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	18.6	18.3	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.1	11.0	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	35500	43100	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	102	98.7	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	21.4	21.0	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	574	663	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.42	0.40	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	12.2	7.50	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	218	314	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	9.94	11.2	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	148000	151000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	160	146	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	45.5	37.7	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	4860	3700	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	64900	42000	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	492	370	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	33.6	23.8	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11600	11900	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	928	668	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	59.9	37.8	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	136	114	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9510	10400	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	5520	6030	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.34	0.33	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.46	4.62	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	16200	18200	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	333	303	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11200	11200	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2322-A-11	BA2322-A-12	----	----	----
Client sampling date / time					31-May-2023 09:00	31-May-2023 09:00	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-011	VA23B2606-012	-----	-----	-----
					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	324	75.5	---	---	---
Titanium	7440-32-6	E440/VA	1.0	mg/kg	187	265	---	---	---
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	12.3	10.6	---	---	---
Uranium	7440-61-1	E440/VA	0.050	mg/kg	4.24	4.34	---	---	---
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	49.0	46.6	---	---	---
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3830	3190	---	---	---
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.1	1.9	---	---	---
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.7	---	---	---
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.90	7.11	---	---	---
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.90	2.90	---	---	---
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.51	6.65	---	---	---
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	2.28	2.36	---	---	---
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.642	0.101	---	---	---
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2140	2230	---	---	---
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	---	---	---
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.64	1.28	---	---	---
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.872	0.828	---	---	---
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	131	135	---	---	---
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	0.42	---	---	---
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					Client sample ID		BA2322-A-11	BA2322-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		31-May-2023 09:00	31-May-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B2606-011	VA23B2606-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	---	---	---	---	---
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	22.0	14.4	---	---	---	---	---
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 : VA23B2606</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 17</p> <p>Laboratory : Vancouver - Environmental</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 : 06-Jun-2023 11:20</p> <p>Issue Date : 13-Jun-2023 16:05</p>
---	--

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	VA23B2606-001	BA2322-A-1	Bismuth	7440-69-9	E440	47.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Boron	7440-42-8	E440	48.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Cadmium	7440-43-9	E440	51.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Cobalt	7440-48-4	E440	91.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Cobalt	7440-48-4	E440	47.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Copper	7440-50-8	E440	44.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Iron	7439-89-6	E440	60.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Lithium	7439-93-2	E440	34.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Manganese	7439-96-5	E440	52.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Nickel	7440-02-0	E440	32.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Nickel	7440-02-0	E440	39.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Phosphorus	7723-14-0	E440	43.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Silver	7440-22-4	E440	49.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-001	BA2322-A-1	Silver	7440-22-4	E440	91.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B2606-006	BA2322-A-6	Tungsten	7440-33-7	E440	45.6 % 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.

Page : 4 of 17
Work Order : VA23B2606
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite





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 BA2322-A-10	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-11	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-12	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-6	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-7	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-8	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2322-A-9	E510	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	28 days	13 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 BA2322-A-1	E510	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	28 days	8 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2322-A-2	E510	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	28 days	8 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2322-A-3	E510	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	28 days	8 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2322-A-4	E510	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	28 days	8 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2322-A-5	E510	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	28 days	8 days	✔	
Metals : Metals in Soil/Solid by CRC ICNMS											
LDPE bag BA2322-A-10	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICNMS											
LDPE bag BA2322-A-11	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICNMS											
LDPE bag BA2322-A-12	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICNMS											
LDPE bag BA2322-A-6	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 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 ICMS											
LDPE bag BA2322-A-7	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-8	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-9	E440	31-May-2023	11-Jun-2023	----	----		13-Jun-2023	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-1	E440	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	180 days	8 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-2	E440	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	180 days	8 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-3	E440	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	180 days	8 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-4	E440	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	180 days	8 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2322-A-5	E440	31-May-2023	07-Jun-2023	----	----		08-Jun-2023	180 days	8 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2322-A-1	E144	31-May-2023	----	----	----		06-Jun-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 BA2322-A-10	E144	31-May-2023	----	----	----		07-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-11	E144	31-May-2023	----	----	----		07-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-12	E144	31-May-2023	----	----	----		07-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-2	E144	31-May-2023	----	----	----		06-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-3	E144	31-May-2023	----	----	----		06-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-4	E144	31-May-2023	----	----	----		06-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-5	E144	31-May-2023	----	----	----		06-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-6	E144	31-May-2023	----	----	----		07-Jun-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2322-A-7	E144	31-May-2023	----	----	----		07-Jun-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 BA2322-A-8	E144	31-May-2023	----	----	----		07-Jun-2023	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2322-A-9	E144	31-May-2023	----	----	----		07-Jun-2023	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-10	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-11	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-12	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-6	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-7	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-8	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 days		✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-9	E108	31-May-2023	11-Jun-2023	----	----		12-Jun-2023	30 days	12 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 BA2322-A-1	E108	31-May-2023	07-Jun-2023	----	----		07-Jun-2023	30 days	7 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-2	E108	31-May-2023	07-Jun-2023	----	----		07-Jun-2023	30 days	7 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-3	E108	31-May-2023	07-Jun-2023	----	----		07-Jun-2023	30 days	7 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-4	E108	31-May-2023	07-Jun-2023	----	----		07-Jun-2023	30 days	7 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2322-A-5	E108	31-May-2023	07-Jun-2023	----	----		07-Jun-2023	30 days	7 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-1	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-10	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-11	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-12	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 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) BA2322-A-2	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-3	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-4	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-5	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-6	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-7	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-8	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2322-A-9	E512	07-Jun-2023	09-Jun-2023	----	----		09-Jun-2023	28 days	9 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2322-A-1	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 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) BA2322-A-10	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-11	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-12	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-2	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-3	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-4	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-5	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-6	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-7	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 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) BA2322-A-8	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2322-A-9	E444	07-Jun-2023	09-Jun-2023	----	----		11-Jun-2023	180 days	11 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-1	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-10	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-11	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-12	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-2	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-3	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-4	EPP444	31-May-2023	07-Jun-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	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-5	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-6	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-7	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-8	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2322-A-9	EPP444	31-May-2023	07-Jun-2023	----	----		----	----	----	

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	975495	2	25	8.0	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	977185	2	25	8.0	5.0	✔
Moisture Content by Gravimetry	E144	977193	2	26	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	977187	2	26	7.6	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	975495	4	25	16.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	977185	4	25	16.0	10.0	✔
Moisture Content by Gravimetry	E144	977193	2	26	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	977187	2	26	7.6	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	981343	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	975495	2	25	8.0	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	981344	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	977185	2	25	8.0	5.0	✔
Moisture Content by Gravimetry	E144	977193	2	26	7.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	981343	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	981344	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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	: VA23B2606	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
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	: 06-Jun-2023 11:20
PO	: VANCO0000051998	Date Analysis Commenced	: 06-Jun-2023
C-O-C number	: ----	Issue Date	: 13-Jun-2023 16:05
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
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		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: 975497)											
VA23B2606-001	BA2322-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.5	0.0%	5%	----
Physical Tests (QC Lot: 975498)											
VA23B2606-001	BA2322-A-1	Moisture	----	E144	0.25	%	18.5	18.2	1.71%	20%	----
Physical Tests (QC Lot: 977187)											
VA23B2606-006	BA2322-A-6	pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	10.9	0.8%	5%	----
Physical Tests (QC Lot: 977193)											
VA23B2606-006	BA2322-A-6	Moisture	----	E144	0.25	%	17.2	18.4	6.45%	20%	----
Metals (QC Lot: 975495)											
VA23B2606-001	BA2322-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 975496)											
VA23B2606-001	BA2322-A-1	Aluminum	7429-90-5	E440	50	mg/kg	32700	36800	11.8%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	93.9	108	13.6%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	26.3	22.1	17.5%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	619	595	4.00%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.36	0.001	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	10.9	6.74	47.1%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	203	180	12.3%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	13.0	7.70	51.6%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	114000	131000	13.3%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	110	111	0.902%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	58.0	93.6	47.0%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	2160	1380	44.3%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	79500	42600	60.4%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	368	421	13.5%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	21.1	25.3	18.1%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	9490	10200	6.78%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	714	695	2.68%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	28.8	30.8	6.52%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	79.9	119	39.6%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	7740	12000	43.6%	30%	DUP-H



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: 975496) - continued											
VA23B2606-001	BA2322-A-1	Potassium	7440-09-7	E440	100	mg/kg	4940	4960	0.303%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.26	0.03	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	4.78	12.8	91.5%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	15700	15000	4.82%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	268	290	7.88%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9600	10200	5.93%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.060	<0.050	0.010	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	79.9	75.1	6.24%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	214	213	0.265%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	10.3	8.34	21.0%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.12	4.05	1.60%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	41.1	42.6	3.64%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3560	3030	15.9%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.5	3.0	0.5	Diff <2x LOR	----
Metals (QC Lot: 977185)											
VA23B2606-006	BA2322-A-6	Aluminum	7429-90-5	E440	50	mg/kg	29300	26200	11.1%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	84.6	97.5	14.2%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	20.0	26.6	28.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	613	767	22.3%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.36	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.91	8.59	21.7%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	219	134	48.3%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	7.34	7.42	0.976%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	123000	124000	0.733%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	137	126	8.34%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	114	42.7	91.2%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1210	939	25.5%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	41800	51100	19.9%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	312	364	15.4%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	29.0	20.6	34.1%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	11200	10800	3.76%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	661	1140	52.8%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	37.1	30.7	18.8%	40%	----
Nickel	7440-02-0	E440	0.50	mg/kg	223	161	32.2%	30%	DUP-H		



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: 977185) - continued											
VA23B2606-006	BA2322-A-6	Phosphorus	7723-14-0	E440	50	mg/kg	9270	8380	10.1%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5020	5200	3.54%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.28	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.64	3.40	49.7%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	16100	15700	2.58%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	251	235	6.61%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	9700	9000	8.34%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	67.4	64.7	4.05%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	292	227	25.0%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	14.0	8.82	45.6%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	4.07	4.16	2.23%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	45.7	40.0	13.1%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	2850	2890	1.54%	30%	----
Zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.6	0.0004	Diff <2x LOR	----		
Metals (QC Lot: 977186)											
VA23B2606-006	BA2322-A-6	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: 975498)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 977193)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 975495)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 975496)						
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: 975496) - 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: 977185)						
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: 977185) - 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: 977186)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 981343)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 981344)						
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: 975497)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 975498)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 977187)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 977193)									
Moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 975495)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.2	80.0	120	----
Metals (QCLot: 975496)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	101	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	100	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	93.9	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.2	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.5	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	93.5	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	95.0	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.8	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	91.6	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	98.8	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	89.5	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	94.3	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	96.2	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	93.3	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	94.1	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	98.5	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.9	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	96.4	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: 975496) - continued									
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	87.1	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	94.7	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	107	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	95.2	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	89.2	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.6	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	99.3	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.8	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	96.0	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	88.8	80.0	120	----
Metals (QCLot: 977185)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	101	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	116	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	107	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.9	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.4	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	97.1	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	108	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.4	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: 977185) - continued									
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	107	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	106	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	111	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	91.8	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.3	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	99.4	80.0	120	----
Metals (QCLot: 977186)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	111	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: 981343)										
VA23B2606-001	BA2322-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	99.3	50.0	140	----
TCLP Metals (QCLot: 981344)										
VA23B2606-001	BA2322-A-1	Antimony, TCLP	7440-36-0	E444	5.68 mg/L	5 mg/L	114	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.5 mg/L	5 mg/L	110	50.0	140	----
		Barium, TCLP	7440-39-3	E444	9.6 mg/L	12.5 mg/L	77.2	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.256 mg/L	0.25 mg/L	102	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.46 mg/L	10 mg/L	94.6	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.256 mg/L	0.25 mg/L	102	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	1.33 mg/L	1.25 mg/L	106	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	2.59 mg/L	2.5 mg/L	104	50.0	140	----
		Iron, TCLP	7439-89-6	E444	262 mg/L	250 mg/L	105	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.81 mg/L	10 mg/L	98.1	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	291 mg/L	250 mg/L	116	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.64 mg/L	2.5 mg/L	106	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.40 mg/L	5 mg/L	108	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.113 mg/L	0.1 mg/L	113	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.6 mg/L	5 mg/L	112	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.66 mg/L	5 mg/L	113	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.83 mg/L	0.75 mg/L	111	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	10 mg/L	10 mg/L	102	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: 975495)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	99.3	70.0	130	----
Metals (QCLot: 975496)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	113	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	93.4	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	101	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	103	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	127	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	101	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	99.4	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	100	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	95.6	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	103	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	100	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	103	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	98.8	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	99.3	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	89.4	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	120	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	108	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	98.9	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	95.1	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	109	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: 975496) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	110	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	97.6	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	95.7	70.0	130	----
Metals (QCLot: 977185)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	114	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	103	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	117	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	108	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	124	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	136	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	114	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	120	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	125	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	103	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	107	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	114	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	114	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	118	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	115	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	105	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	105	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	123	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	106	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	112	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	99.8	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	94.9	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	108	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: 977185) - continued									
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	116	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	99.6	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	107	70.0	130	----
Metals (QCLot: 977186)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	106	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<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:	nvictor@covanta.com		
	Burnaby BC	Email 2:	ofetherstonhaugh@covanta.com		
Phone:	604-521-1025	Fax:			
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		
			brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

Analysis Request	
<input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	

Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		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:							

Lab Work Order # (lab use only)	ALS Contact:	Sampler:	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
BA2322-A-1			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-2			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-3			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-4			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-5			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-6			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-7			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-8			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-9			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-10			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-11			31-May-23	9:00	Soil	X	X		X	1
BA2322-A-12			31-May-23	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA23B2606



Telephone: +1 604 253 4188

Special Instructions	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:
<i>[Signature]</i>	6-June-23	0800	JC	6/6/23	1120am	22 °C				Yes / No ? If Yes add SIF