

Bottom Ash Data

2022 Week 16

The following analytical reports represent bottom ash composite results for week 16 of 2022 (April 17, 2022 to April 23, 2022).

The 2020 Bottom Ash Management Plan has separate data analysis protocols for bottom ash processed by the non ferrous metal recovery system versus unprocessed bottom ash. On April 23, due to a mechanical issue with the non ferrous recovery system, two loads of unprocessed bottom ash was sent to the Vancouver Landfill. The remainder of the ash from week 16 was processed as per usual before sending to the Vancouver Landfill.

The Ministry of Environment and Climate Change Strategy accepted Metro Vancouver's 2020 Bottom Ash Management Plan on May 20, 2021. For the processed ash, the three-week rolling mean for the weekly composite results for cadmium, lead and pH meet the conditions of the 2020 Bottom Ash Management Plan. For the unprocessed ash, the upper 95th confidence limit of the mean for the composite results for cadmium, lead and pH meets the conditions of the 2020 Bottom Ash Management Plan.

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 : **VA22A8714**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000051213
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 : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 26-Apr-2022 13:00
Date Analysis Commenced : 03-May-2022
Issue Date : 11-May-2022 10:16

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>
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
Woochan Song	Lab Analyst	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					Client sample ID	BA2216-A-1	BA2216-A-2	BA2216-A-3	BA2216-A-4	BA2216-A-5
(Matrix: Soil/Solid)										
Client sampling date / time										
					20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-001	VA22A8714-002	VA22A8714-003	VA22A8714-004	VA22A8714-005	VA22A8714-005
					Result	Result	Result	Result	Result	Result
Physical Tests										
moisture	----	E144	0.25	%	17.5	17.7	17.8	17.5	16.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.8	10.8	10.8	10.8	10.8
Metals										
aluminum	7429-90-5	E440	50	mg/kg	50100	51200	32600	60800	42900	
antimony	7440-36-0	E440	0.10	mg/kg	95.9	115	114	423	120	
arsenic	7440-38-2	E440	0.10	mg/kg	19.9	25.3	31.7	20.6	24.8	
barium	7440-39-3	E440	0.50	mg/kg	618	591	476	489	526	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.42	0.48	0.37	0.34	
bismuth	7440-69-9	E440	0.20	mg/kg	10.8	6.50	6.77	6.44	7.28	
boron	7440-42-8	E440	5.0	mg/kg	172	170	170	158	146	
cadmium	7440-43-9	E440	0.020	mg/kg	8.84	11.9	13.0	33.3	12.2	
calcium	7440-70-2	E440	50	mg/kg	131000	144000	127000	133000	127000	
chromium	7440-47-3	E440	0.50	mg/kg	469	184	199	266	126	
cobalt	7440-48-4	E440	0.10	mg/kg	37.4	158	71.5	39.7	27.6	
copper	7440-50-8	E440	0.50	mg/kg	6720	4580	3410	2250	1200	
iron	7439-89-6	E440	50	mg/kg	93600	72700	95600	79900	55800	
lead	7439-92-1	E440	0.50	mg/kg	274	371	672	331	893	
lithium	7439-93-2	E440	2.0	mg/kg	22.8	22.3	21.5	20.4	19.8	
magnesium	7439-95-4	E440	20	mg/kg	14700	14500	13600	13600	12900	
manganese	7439-96-5	E440	1.0	mg/kg	1010	997	982	1770	900	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	51.5	72.4	59.7	54.8	72.2	
nickel	7440-02-0	E440	0.50	mg/kg	204	178	336	183	84.6	
phosphorus	7723-14-0	E440	50	mg/kg	11600	12400	11100	13800	12600	
potassium	7440-09-7	E440	100	mg/kg	6460	7270	6590	6230	6330	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.40	0.43	0.48	0.62	
silver	7440-22-4	E440	0.10	mg/kg	5.21	7.72	4.94	4.12	4.89	
sodium	7440-23-5	E440	50	mg/kg	18500	19000	18200	18400	19100	
strontium	7440-24-6	E440	0.50	mg/kg	316	340	326	324	313	
sulfur	7704-34-9	E440	1000	mg/kg	11300	14100	13400	13000	13100	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-1	BA2216-A-2	BA2216-A-3	BA2216-A-4	BA2216-A-5
Client sampling date / time						20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit		VA22A8714-001	VA22A8714-002	VA22A8714-003	VA22A8714-004	VA22A8714-005
						Result	Result	Result	Result	Result
Metals										
thallium	7440-28-0	E440	0.050	mg/kg		0.059	0.058	0.057	0.066	0.054
tin	7440-31-5	E440	2.0	mg/kg		99.4	111	117	116	116
titanium	7440-32-6	E440	1.0	mg/kg		407	474	273	586	524
tungsten	7440-33-7	E440	0.50	mg/kg		6.14	9.57	10.7	5.83	8.52
uranium	7440-61-1	E440	0.050	mg/kg		4.52	5.24	4.99	4.61	5.08
vanadium	7440-62-2	E440	0.20	mg/kg		53.0	53.0	51.2	45.8	45.5
zinc	7440-66-6	E440	2.0	mg/kg		3080	4040	5840	7490	3320
zirconium	7440-67-7	E440	1.0	mg/kg		2.3	2.0	1.5	3.2	1.9
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.7	11.7	11.8	11.7	11.8
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		8.80	8.74	8.44	7.98	8.62
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units		2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444	0.010	pH units		6.80	6.54	6.80	6.38	6.46
antimony, TCLP	7440-36-0	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L		1.80	1.97	1.92	1.93	1.90
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.144	0.300	0.287	0.267	0.277
calcium, TCLP	7440-70-2	E444	10	mg/L		1910	1920	1840	2100	1750
chromium, TCLP	7440-47-3	E444	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L		1.50	1.43	1.06	0.933	1.34
copper, TCLP	7440-50-8	E444	0.050	mg/L		0.675	0.796	0.532	0.598	0.450
iron, TCLP	7439-89-6	E444	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0
lead, TCLP	7439-92-1	E444	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L		137	119	121	145	116
mercury, TCLP	7439-97-6	E512	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nickel, TCLP	7440-02-0	E444	0.25	mg/L		0.50	0.42	0.41	0.61	0.48
selenium, TCLP	7782-49-2	E444	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
silver, TCLP	7440-22-4	E444	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-1	BA2216-A-2	BA2216-A-3	BA2216-A-4	BA2216-A-5
(Matrix: Soil/Solid)										
					Client sampling date / time	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-001	VA22A8714-002	VA22A8714-003	VA22A8714-004	VA22A8714-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	22.8	32.4	19.2	33.6	29.2	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-6	BA2216-A-7	BA2216-A-8	BA2216-A-9	BA2216-A-10
(Matrix: Soil/Solid)										
Client sampling date / time										
					20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-006	VA22A8714-007	VA22A8714-008	VA22A8714-009	VA22A8714-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.4	17.0	17.6	17.2	17.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.9	10.7	10.8	10.9	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40800	37600	35800	48400	34900	
antimony	7440-36-0	E440	0.10	mg/kg	123	93.0	99.4	133	111	
arsenic	7440-38-2	E440	0.10	mg/kg	21.4	23.0	20.2	22.9	25.4	
barium	7440-39-3	E440	0.50	mg/kg	478	594	637	577	566	
beryllium	7440-41-7	E440	0.10	mg/kg	0.43	0.36	0.75	0.36	0.41	
bismuth	7440-69-9	E440	0.20	mg/kg	7.91	7.13	5.71	6.59	6.74	
boron	7440-42-8	E440	5.0	mg/kg	277	204	192	208	167	
cadmium	7440-43-9	E440	0.020	mg/kg	13.6	10.8	58.4	16.0	12.0	
calcium	7440-70-2	E440	50	mg/kg	141000	116000	127000	134000	134000	
chromium	7440-47-3	E440	0.50	mg/kg	195	161	167	144	225	
cobalt	7440-48-4	E440	0.10	mg/kg	86.2	31.7	54.4	1410	378	
copper	7440-50-8	E440	0.50	mg/kg	2490	6300	16000	1600	1450	
iron	7439-89-6	E440	50	mg/kg	58900	73100	75000	44500	80400	
lead	7439-92-1	E440	0.50	mg/kg	325	1170	449	1930	655	
lithium	7439-93-2	E440	2.0	mg/kg	23.6	17.9	20.7	26.7	76.6	
magnesium	7439-95-4	E440	20	mg/kg	14100	11300	13200	13000	14600	
manganese	7439-96-5	E440	1.0	mg/kg	836	765	1720	880	1040	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.148	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	75.6	82.7	48.9	53.0	64.9	
nickel	7440-02-0	E440	0.50	mg/kg	154	147	218	106	216	
phosphorus	7723-14-0	E440	50	mg/kg	13200	10800	10300	13300	11700	
potassium	7440-09-7	E440	100	mg/kg	6810	6040	6460	6970	6550	
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.32	0.29	0.34	0.44	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	4.73	----	----	13.5	
silver	7440-22-4	E440	0.10	mg/kg	5.70	----	9.38	5.56	----	
sodium	7440-23-5	E440	50	mg/kg	19000	16900	18300	19000	18200	
strontium	7440-24-6	E440	0.50	mg/kg	380	301	303	375	518	
sulfur	7704-34-9	E440	1000	mg/kg	13500	11100	11800	13600	13400	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-6	BA2216-A-7	BA2216-A-8	BA2216-A-9	BA2216-A-10
(Matrix: Soil/Solid)										
Client sampling date / time										
					20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-006	VA22A8714-007	VA22A8714-008	VA22A8714-009	VA22A8714-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.054	0.070	0.054	0.062	0.056	
tin	7440-31-5	E440	2.0	mg/kg	112	194	186	99.2	113	
titanium	7440-32-6	E440	1.0	mg/kg	278	347	459	362	302	
tungsten	7440-33-7	E440	0.50	mg/kg	7.25	12.3	8.52	7.28	7.66	
uranium	7440-61-1	E440	0.050	mg/kg	5.69	4.48	4.90	5.21	5.58	
vanadium	7440-62-2	E440	0.20	mg/kg	49.4	45.0	50.5	51.7	53.2	
zinc	7440-66-6	E440	2.0	mg/kg	4670	13700	4250	4710	4030	
zirconium	7440-67-7	E440	1.0	mg/kg	2.2	1.7	1.1	2.0	1.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.8	11.7	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.10	8.56	8.41	9.15	9.42	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.54	6.31	6.18	6.46	6.11	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.93	1.92	1.86	2.08	1.76	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.196	0.199	0.593	0.173	0.169	
calcium, TCLP	7440-70-2	E444	10	mg/L	1720	1800	1700	1880	1700	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.08	0.886	0.700	0.706	1.26	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.484	0.939	1.22	0.757	1.04	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	123	127	111	128	116	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.48	0.44	0.42	0.42	0.87	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-6	BA2216-A-7	BA2216-A-8	BA2216-A-9	BA2216-A-10
(Matrix: Soil/Solid)										
					Client sampling date / time	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00	20-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-006	VA22A8714-007	VA22A8714-008	VA22A8714-009	VA22A8714-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	27.5	29.2	50.4	26.8	48.1	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-11	BA2216-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					20-Apr-2022 09:00	20-Apr-2022 09:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-011	VA22A8714-012	-----	-----	-----	-----
					Result	Result	----	----	----	----
Physical Tests										
moisture	----	E144	0.25	%	18.1	17.5	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.9	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg	45200	54600	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	127	90.9	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	21.7	20.6	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	529	597	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.35	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	6.93	5.11	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	155	154	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	14.4	71.7	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg	125000	123000	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	208	220	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	56.2	48.1	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	1800	2910	----	----	----	----
iron	7439-89-6	E440	50	mg/kg	60000	54100	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	553	340	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	21.6	28.0	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	11900	13300	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	750	935	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	215	46.5	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	181	476	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	11900	12300	----	----	----	----
potassium	7440-09-7	E440	100	mg/kg	7280	6400	----	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.30	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	5.46	4.54	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg	18900	18700	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	320	314	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	12800	11500	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.054	0.054	----	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-11	BA2216-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					20-Apr-2022 09:00	20-Apr-2022 09:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-011	VA22A8714-012	-----	-----	-----	-----
					Result	Result	----	----	----	----
Metals										
tin	7440-31-5	E440	2.0	mg/kg	148	160	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	336	603	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	8.44	4.75	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	4.99	4.59	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	47.5	48.9	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	8860	9920	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	2.0	3.9	----	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.7	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.05	8.88	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	----	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.25	6.30	----	----	----	----
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	----
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	----
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.90	1.84	----	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.163	0.168	----	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L	1810	1940	----	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.896	1.66	----	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.210	1.06	----	----	----	----
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	0.31	----	----	----	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	124	134	----	----	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.66	0.47	----	----	----	----
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----	----
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	----	----	----	----
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	----
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	----	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-11	BA2216-A-12	----	----	----
(Matrix: Soil/Solid)										
					Client sampling date / time	20-Apr-2022 09:00	20-Apr-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A8714-011	VA22A8714-012	-----	-----	-----	-----
					Result	Result	----	----	----	----
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	----
zinc, TCLP	7440-66-6	E444	0.50	mg/L	30.5	32.0	----	----	----	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A8714	Page	: 1 of 17
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 26-Apr-2022 13:00
PO	: VANCO 0000051213	Issue Date	: 11-May-2022 10:16
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

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

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: Soil/Solid

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22A8714-001	BA2216-A-1	antimony	7440-36-0	E440	36.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	cadmium	7440-43-9	E440	35.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	chromium	7440-47-3	E440	86.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	copper	7440-50-8	E440	48.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	lead	7439-92-1	E440	116 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	molybdenum	7439-98-7	E440	87.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	tungsten	7440-33-7	E440	57.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A8714-001	BA2216-A-1	zinc	7440-66-6	E440	39.0 % 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.

Laboratory Control Sample (LCS) Recoveries

Metals	QC-MRG2-4792840 02	----	antimony	7440-36-0	E440	122 % MES	80.0-120%	Recovery greater than upper control limit
--------	-----------------------	------	----------	-----------	------	-----------	-----------	---

Result Qualifiers

Qualifier Description

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

Reference Material (RM) Sample

Metals	QC-MRG2-4792840 03	----	aluminum	7429-90-5	E440	133 % MES	70.0-130%	Recovery greater than upper control limit
--------	-----------------------	------	----------	-----------	------	-----------	-----------	---

Result Qualifiers

Qualifier Description

Page : 4 of 17
Work Order : VA22A8714
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
---------------	----------------------	----------------------	---------	------------	--------	--------	--------	---------

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group 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 : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-10	E440.Ag	20-Apr-2022	10-May-2022	180 days	20 days	✓	10-May-2022	160 days	0 days	✓
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-7	E440.Ag	20-Apr-2022	10-May-2022	180 days	20 days	✓	10-May-2022	160 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-1	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-10	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-11	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-12	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-2	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 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 BA2216-A-3	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-4	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-5	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-6	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-7	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-8	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-9	E510	20-Apr-2022	07-May-2022	----	----		10-May-2022	28 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-1	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-10	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 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 BA2216-A-11	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-12	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-2	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-3	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-4	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-5	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-6	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-7	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-8	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 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 BA2216-A-9	E440	20-Apr-2022	07-May-2022	----	----		09-May-2022	180 days	20 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-1	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-10	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-11	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-12	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-2	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-3	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-4	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-5	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	



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 BA2216-A-6	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-7	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-8	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-9	E144	20-Apr-2022	----	----	----		06-May-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-1	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-10	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-11	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-12	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-2	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 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 BA2216-A-3	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-4	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-5	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-6	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-7	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-8	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-9	E108	20-Apr-2022	07-May-2022	----	----		09-May-2022	30 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-1	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-10	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 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) BA2216-A-11	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-12	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-2	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-3	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-4	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-5	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-6	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-7	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-8	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 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) BA2216-A-9	E512	03-May-2022	----	----	----		09-May-2022	28 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-1	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-11	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-12	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-2	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-3	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-4	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-5	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 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) BA2216-A-6	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-7	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-8	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-9	E444	03-May-2022	----	----	----		09-May-2022	180 days	19 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-1	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-10	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-11	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-12	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-2	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	



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: 28 day HT (e.g. Hg, CrVI) BA2216-A-3	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-4	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-5	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-6	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-7	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-8	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-9	EPP444	20-Apr-2022	03-May-2022	----	----		----	----	----	

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	479285	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	479284	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	479287	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	479286	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	482898	1	2	50.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	479285	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	479284	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	479287	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	479286	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	482898	1	2	50.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	480514	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	479285	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	480515	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	479284	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	479287	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	480514	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	480515	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are 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. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. 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



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°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
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.
Digestion for Silver	EP440.Ag 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 : **VA22A8714**

Page : 1 of 11

Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000051213
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 26-Apr-2022 13:00
Date Analysis Commenced : 03-May-2022
Issue Date : 11-May-2022 10:16

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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>
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
Woochan Song	Lab Analyst	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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage 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: 479286)											
VA22A8714-001	BA2216-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.8	0.1%	5%	----
Physical Tests (QC Lot: 479287)											
VA22A8714-001	BA2216-A-1	moisture	----	E144	0.25	%	17.5	18.0	2.74%	20%	----
Metals (QC Lot: 479284)											
VA22A8714-001	BA2216-A-1	aluminum	7429-90-5	E440	50	mg/kg	50100	56400	11.9%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	95.9	139	36.8%	30%	DUP-H
		arsenic	7440-38-2	E440	0.10	mg/kg	19.9	25.4	24.0%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	618	558	10.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.39	0.006	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	10.8	9.04	17.5%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	172	161	6.72%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	8.84	12.6	35.2%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	131000	137000	4.47%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	469	186	86.4%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	37.4	43.2	14.6%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	6720	11000	48.7%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	93600	78000	18.2%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	274	1040	116%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	22.8	21.0	8.48%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	14700	14400	1.64%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1010	1060	5.52%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	51.5	132	87.9%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	204	183	10.6%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11600	11800	1.93%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6460	7160	10.3%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.40	0.08	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.21	4.25	20.3%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	18500	20700	11.2%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	316	336	5.97%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	11300	14300	23.3%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.059	0.064	0.005	Diff <2x LOR	----



Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 479284) - continued											
VA22A8714-001	BA2216-A-1	tin	7440-31-5	E440	2.0	mg/kg	99.4	113	12.7%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	407	517	23.8%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	6.14	11.0	57.1%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	4.52	5.41	17.8%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	53.0	55.5	4.58%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3080	4570	39.0%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	2.3	2.5	0.2	Diff <2x LOR	----
Metals (QC Lot: 479285)											
VA22A8714-001	BA2216-A-1	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: 479287)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 479284)						
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	----
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 479284) - continued						
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: 479285)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 482898)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 480514)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 480515)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
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: 479286)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 479287)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 479284)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	112	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	# 122	80.0	120	MES
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	112	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	117	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.4	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	96.1	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	109	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	105	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	89.4	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	116	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	109	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	113	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	118	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	113	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	113	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.8	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	115	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	117	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	109	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	109	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	108	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	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: 479284) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	114	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	110	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	102	80.0	120	----
Metals (QCLot: 479285)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 482898)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	93.3	80.0	120	----

Qualifiers

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



Matrix Spike (MS) Report

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

Sub-Matrix: Soil/Solid					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 480514)										
VA22A8714-001	BA2216-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.6	50.0	140	----
TCLP Metals (QCLot: 480515)										
VA22A8714-001	BA2216-A-1	antimony, TCLP	7440-36-0	E444	5.5 mg/L	5 mg/L	110	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	101	50.0	140	----
		barium, TCLP	7440-39-3	E444	14.3 mg/L	12.5 mg/L	115	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.236 mg/L	0.25 mg/L	94.6	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.0 mg/L	10 mg/L	100	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.250 mg/L	0.25 mg/L	100	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.27 mg/L	1.25 mg/L	102	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	2.36 mg/L	2.5 mg/L	94.6	50.0	140	----
		iron, TCLP	7439-89-6	E444	236 mg/L	250 mg/L	94.3	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.87 mg/L	10 mg/L	98.7	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	278 mg/L	250 mg/L	111	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.40 mg/L	2.5 mg/L	96.2	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.20 mg/L	5 mg/L	104	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.106 mg/L	0.1 mg/L	106	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	100	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.05 mg/L	5 mg/L	101	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	103	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	9 mg/L	10 mg/L	90.0	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: Soil/Solid

Sub-Matrix: Soil/Solid					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 479284)									
QC-479284-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	# 133	70.0	130	MES
QC-479284-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	115	70.0	130	----
QC-479284-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	116	70.0	130	----
QC-479284-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	115	70.0	130	----
QC-479284-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
QC-479284-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	124	40.0	160	----
QC-479284-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	105	70.0	130	----
QC-479284-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	102	70.0	130	----
QC-479284-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	123	70.0	130	----
QC-479284-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	112	70.0	130	----
QC-479284-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	113	70.0	130	----
QC-479284-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	111	70.0	130	----
QC-479284-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	110	70.0	130	----
QC-479284-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	96.1	70.0	130	----
QC-479284-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	121	70.0	130	----
QC-479284-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	121	70.0	130	----
QC-479284-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	115	70.0	130	----
QC-479284-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	113	70.0	130	----
QC-479284-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	116	70.0	130	----
QC-479284-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	130	70.0	130	----
QC-479284-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	122	70.0	130	----
QC-479284-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	113	70.0	130	----
QC-479284-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	122	40.0	160	----
QC-479284-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	113	70.0	130	----
QC-479284-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	128	70.0	130	----
QC-479284-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	113	70.0	130	----
QC-479284-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	121	70.0	130	----
QC-479284-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	112	70.0	130	----
QC-479284-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	98.1	70.0	130	----



Sub-Matrix: Soil/Solid

Sub-Matrix: Soil/Solid					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method					
Metals (QCLot: 479285)									
QC-479285-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	97.6	70.0	130	----

Qualifiers

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



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COC #

Page of

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)																				
Company: Covanta Energy			☐ Standard ☐ Other			☒ Regular (Standard Turnaround Times - Business Days)																				
Contact: Steve McKinney / Dan Skrypnik			☒ PDF ☐ Excel ☐ Digital ☐ Fax			☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																				
Address: 5150 Riverbend Drive			Email 1: smckinney@covanta.com			☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																				
Burnaby BC			Email 2: rjohnson4@covanta.com			☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT																				
Phone: 604-521-1025			Email 3: dskrypnik@covanta.com			Analysis Request																				
Fax: ☐ Yes ☐ No			brent.kirkpatrick@metrovanvancouver.org																							
			Sarah.Wellman@metrovanvancouver.org																							
Invoice To Same as Report?			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)																				
Hardcopy of Invoice with Report? ☐ Yes ☐ No			Job #:																							
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																							
Contact:			LSD: (includes 2:1 pH)																							
Address:			Quote #:																							
Phone:			ALS Contact:																							
Fax:			Sampler:																							
Lab Work Order # (lab use only)			Date			Time			Sample Type			MET-TCLP-VA (all metals, Hg)			MOISTURE			Chromium 6			MET-CSR+FULL-VA (all metals)			Number of Containers		
8714			(dd-mm-yy)			(hh:mm)																				
Sample #			Sample Identification (This description will appear on the report)																							
BA2216-A-1			Environmental Division Vancouver Work Order Reference VA22A8714			20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-2						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-3						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-4						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-5						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-6						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-7						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-8						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-9						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-10						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-11						20-Apr-22			9:00			Soil			X			X			X			1		
BA2216-A-12						20-Apr-22			9:00			Soil			X			X			X			1		
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details																										
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																										
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.																										
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.																										
SHIPMENT RELEASE (client use)					SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)																
Released by:		Date (dd-mm-yy)		Time (hh-mm)	Received by:		Date:	Time:	Temperature:	Verified by:		Date:		Time:	Observations: Yes / No ? If Yes add SIF											
[Signature]		26-Apr-22		0800	[Signature]				20, 20°C	[Signature]		Apr. 26		1 pm	[Signature]											
GENF 20.00 Front																										

CERTIFICATE OF ANALYSIS

Work Order : **VA22A9371**
Amendment : **1**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000051213
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 16
No. of samples analysed : 16

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 03-May-2022 14:30
Date Analysis Commenced : 08-May-2022
Issue Date : 02-Jun-2022 09:36

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>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<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					Client sample ID				
(Matrix: Soil/Solid)					BA2216-A-1 Unprocessed	BA2216-A-2 Unprocessed	BA2216-A-3 Unprocessed	BA2216-A-4 Unprocessed	BA2216-A-5 Unprocessed
Client sampling date / time					23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-001	VA22A9371-002	VA22A9371-003	VA22A9371-004	VA22A9371-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	20.2	21.1	21.3	22.9	24.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.8	10.8	11.0	10.9
Metals									
aluminum	7429-90-5	E440	50	mg/kg	38600	34200	34700	34100	30400
antimony	7440-36-0	E440	0.10	mg/kg	100	152	93.3	107	114
arsenic	7440-38-2	E440	0.10	mg/kg	21.8	26.8	18.0	22.6	20.4
barium	7440-39-3	E440	0.50	mg/kg	366	318	330	341	307
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.39	0.47	0.44	0.39
bismuth	7440-69-9	E440	0.20	mg/kg	6.37	6.82	5.68	6.51	6.78
boron	7440-42-8	E440	5.0	mg/kg	215	170	188	237	151
cadmium	7440-43-9	E440	0.020	mg/kg	12.8	13.6	11.3	13.3	27.0
calcium	7440-70-2	E440	50	mg/kg	130000	124000	121000	129000	119000
chromium	7440-47-3	E440	0.50	mg/kg	142	174	194	166	162
cobalt	7440-48-4	E440	0.10	mg/kg	27.7	33.9	178	35.0	31.3
copper	7440-50-8	E440	0.50	mg/kg	1320	9020	3390	1790	13600
iron	7439-89-6	E440	50	mg/kg	53600	60000	36300	53400	65200
lead	7439-92-1	E440	0.50	mg/kg	415	2030	417	583	528
lithium	7439-93-2	E440	2.0	mg/kg	27.3	24.3	27.2	26.1	23.3
magnesium	7439-95-4	E440	20	mg/kg	11900	12700	12300	12800	11100
manganese	7439-96-5	E440	1.0	mg/kg	889	863	660	762	885
mercury	7439-97-6	E510	0.0500	mg/kg	0.0591	0.0627	<0.0500	0.0556	0.0571
molybdenum	7439-98-7	E440	0.10	mg/kg	20.2	22.9	20.7	23.6	20.5
nickel	7440-02-0	E440	0.50	mg/kg	134	177	131	475	1150
phosphorus	7723-14-0	E440	50	mg/kg	11000	9780	9190	9880	10200
potassium	7440-09-7	E440	100	mg/kg	6470	6150	6580	6580	5780
selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.42	0.37	0.42	0.46
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	----	8.70
silver	7440-22-4	E440	0.10	mg/kg	11.4	6.30	7.22	7.84	----
sodium	7440-23-5	E440	50	mg/kg	16600	16100	16800	16800	15400
strontium	7440-24-6	E440	0.50	mg/kg	338	361	314	325	328



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-1 Unprocessed	BA2216-A-2 Unprocessed	BA2216-A-3 Unprocessed	BA2216-A-4 Unprocessed	BA2216-A-5 Unprocessed
Client sampling date / time					23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-001	VA22A9371-002	VA22A9371-003	VA22A9371-004	VA22A9371-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	13700	13700	13700	14400	13200	
thallium	7440-28-0	E440	0.050	mg/kg	0.106	0.099	0.080	0.099	0.084	
tin	7440-31-5	E440	2.0	mg/kg	89.3	133	82.0	108	92.0	
titanium	7440-32-6	E440	1.0	mg/kg	244	198	190	199	223	
tungsten	7440-33-7	E440	0.50	mg/kg	66.4	40.0	47.4	66.5	73.3	
uranium	7440-61-1	E440	0.050	mg/kg	5.61	5.67	5.35	6.05	5.47	
vanadium	7440-62-2	E440	0.20	mg/kg	45.7	46.1	40.6	47.4	43.2	
zinc	7440-66-6	E440	2.0	mg/kg	3690	4060	3290	4520	4760	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	1.8	1.9	2.1	1.7	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.1	11.1	11.2	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.51	8.49	8.56	8.54	8.77	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	5.78	5.74	5.83	5.55	5.85	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	3.40	2.05	1.87	1.96	1.99	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.191	0.186	0.259	0.180	0.202	
calcium, TCLP	7440-70-2	E444	10	mg/L	1820	1850	1820	1710	1790	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.908	0.931	0.796	0.617	0.568	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.10	0.976	4.85	1.67	0.598	
iron, TCLP	7439-89-6	E444	5.0	mg/L	7.3	<5.0	15.8	18.2	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	0.97	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	114	113	114	107	119	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.70	0.42	0.68	0.63	0.96	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-1 Unprocessed	BA2216-A-2 Unprocessed	BA2216-A-3 Unprocessed	BA2216-A-4 Unprocessed	BA2216-A-5 Unprocessed
(Matrix: Soil/Solid)										
					Client sampling date / time	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-001	VA22A9371-002	VA22A9371-003	VA22A9371-004	VA22A9371-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	34.7	56.2	33.7	39.1	34.0	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-6 Unprocessed	BA2216-A-7 Unprocessed	BA2216-A-8 Unprocessed	BA2216-A-9 Unprocessed	BA2216-A-10 Unprocessed
(Matrix: Soil/Solid)										
Client sampling date / time										
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-006	VA22A9371-007	VA22A9371-008	VA22A9371-009	VA22A9371-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	23.8	20.8	23.0	21.2	24.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	10.9	10.9	10.8	10.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40900	37500	41000	37900	34000	
antimony	7440-36-0	E440	0.10	mg/kg	89.1	108	115	187	84.4	
arsenic	7440-38-2	E440	0.10	mg/kg	16.4	27.9	20.0	22.8	17.9	
barium	7440-39-3	E440	0.50	mg/kg	424	401	375	396	390	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.38	0.43	0.39	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	9.85	7.33	12.8	7.19	5.56	
boron	7440-42-8	E440	5.0	mg/kg	265	253	211	248	152	
cadmium	7440-43-9	E440	0.020	mg/kg	11.7	11.7	14.1	13.7	10.7	
calcium	7440-70-2	E440	50	mg/kg	117000	131000	126000	139000	114000	
chromium	7440-47-3	E440	0.50	mg/kg	174	134	135	172	150	
cobalt	7440-48-4	E440	0.10	mg/kg	26.2	21.1	26.5	25.7	147	
copper	7440-50-8	E440	0.50	mg/kg	3030	1210	1470	1540	945	
iron	7439-89-6	E440	50	mg/kg	62100	43700	52000	62300	50300	
lead	7439-92-1	E440	0.50	mg/kg	600	664	670	931	363	
lithium	7439-93-2	E440	2.0	mg/kg	24.8	28.1	25.3	24.9	26.4	
magnesium	7439-95-4	E440	20	mg/kg	13800	12600	11200	11100	12100	
manganese	7439-96-5	E440	1.0	mg/kg	695	753	772	890	800	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0580	0.0644	0.158	0.0542	
molybdenum	7439-98-7	E440	0.10	mg/kg	23.3	25.3	32.8	20.8	18.4	
nickel	7440-02-0	E440	0.50	mg/kg	132	144	110	138	95.3	
phosphorus	7723-14-0	E440	50	mg/kg	8200	9880	9660	9210	9410	
potassium	7440-09-7	E440	100	mg/kg	5600	6020	6460	6470	6690	
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.38	0.40	0.44	0.44	
silver	7440-22-4	E440	0.10	mg/kg	5.59	6.24	6.24	7.42	6.61	
sodium	7440-23-5	E440	50	mg/kg	15100	16500	17100	16700	17100	
strontium	7440-24-6	E440	0.50	mg/kg	300	323	328	1290	313	
sulfur	7704-34-9	E440	1000	mg/kg	11600	13900	14500	14200	12200	
thallium	7440-28-0	E440	0.050	mg/kg	0.135	0.087	0.084	0.098	0.074	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-6 Unprocessed	BA2216-A-7 Unprocessed	BA2216-A-8 Unprocessed	BA2216-A-9 Unprocessed	BA2216-A-10 Unprocessed
Client sampling date / time					23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-006	VA22A9371-007	VA22A9371-008	VA22A9371-009	VA22A9371-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	117	101	111	250	122	
titanium	7440-32-6	E440	1.0	mg/kg	346	231	255	257	168	
tungsten	7440-33-7	E440	0.50	mg/kg	42.4	68.6	53.6	73.1	54.4	
uranium	7440-61-1	E440	0.050	mg/kg	4.95	5.60	5.66	5.82	5.20	
vanadium	7440-62-2	E440	0.20	mg/kg	41.4	43.1	44.4	48.7	41.5	
zinc	7440-66-6	E440	2.0	mg/kg	4280	3560	3940	3900	3460	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.9	1.9	1.8	1.7	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.4	11.5	11.3	11.4	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.64	8.62	8.83	8.97	8.97	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	5.73	5.81	5.55	5.97	6.12	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.85	2.01	1.82	1.81	1.90	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.228	0.186	0.176	0.191	1.96	
calcium, TCLP	7440-70-2	E444	10	mg/L	1740	1810	1690	1780	1750	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.882	0.432	0.837	0.512	0.662	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.763	0.535	1.45	2.74	1.16	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	6.2	21.2	<5.0	5.5	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	0.37	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	111	116	107	110	112	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.65	0.54	0.43	0.52	0.80	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2216-A-6 Unprocessed	BA2216-A-7 Unprocessed	BA2216-A-8 Unprocessed	BA2216-A-9 Unprocessed	BA2216-A-10 Unprocessed
(Matrix: Soil/Solid)										
					Client sampling date / time	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit		VA22A9371-006	VA22A9371-007	VA22A9371-008	VA22A9371-009	VA22A9371-010
						Result	Result	Result	Result	Result
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L		38.0	32.9	33.4	86.2	71.8
zirconium, TCLP	7440-67-7	E444	10	mg/L		<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil

(Matrix: Soil/Solid)

Client sample ID

					BA2216-A-11 Unprocessed	BA2216-A-12 Unprocessed	BA2216-A-10 Unprocessed Rep 1	BA2216-A-10 Unprocessed Rep 2	BA2216-A-10 Unprocessed Rep 3
Client sampling date / time					23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-011	VA22A9371-012	VA22A9371-013	VA22A9371-014	VA22A9371-015
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	20.7	24.2	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.7	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	29400	35000	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	115	184	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	24.1	21.9	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	539	363	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.50	0.36	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	5.04	5.35	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	299	166	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	11.4	10.8	----	----	----
calcium	7440-70-2	E440	50	mg/kg	137000	126000	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	497	139	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	79.9	28.1	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	1500	3390	----	----	----
iron	7439-89-6	E440	50	mg/kg	65600	69300	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	463	468	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	34.9	26.4	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	12100	10700	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	831	754	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	0.0598	<0.0500	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	28.8	19.6	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	336	483	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	11600	8520	----	----	----
potassium	7440-09-7	E440	100	mg/kg	6470	5820	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.36	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	6.91	15.0	----	----	----
sodium	7440-23-5	E440	50	mg/kg	16600	16600	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	372	334	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	13100	13400	----	----	----



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-11 Unprocessed	BA2216-A-12 Unprocessed	BA2216-A-10 Unprocessed Rep 1	BA2216-A-10 Unprocessed Rep 2	BA2216-A-10 Unprocessed Rep 3
Client sampling date / time					23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-011	VA22A9371-012	VA22A9371-013	VA22A9371-014	VA22A9371-015	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.068	0.072	----	----	----	
tin	7440-31-5	E440	2.0	mg/kg	79.9	148	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	565	227	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	36.2	85.1	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.13	4.94	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	48.0	41.0	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	2630	2790	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.8	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.4	11.4	11.4	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.89	8.75	8.97	8.97	8.97	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.91	2.91	2.91	
pH, TCLP final	----	EPP444	0.010	pH units	6.05	6.04	6.62	6.62	6.46	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	----	----	----	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.97	2.00	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.171	0.190	0.144	0.159	0.135	
calcium, TCLP	7440-70-2	E444	10	mg/L	1810	1850	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.52	0.948	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.924	1.41	----	----	----	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	113	113	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.52	0.65	----	----	----	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-11 Unprocessed	BA2216-A-12 Unprocessed	BA2216-A-10 Unprocessed Rep 1	BA2216-A-10 Unprocessed Rep 2	BA2216-A-10 Unprocessed Rep 3
Client sampling date / time						23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00	23-Apr-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-011	VA22A9371-012	VA22A9371-013	VA22A9371-014	VA22A9371-015	VA22A9371-015
					Result	Result	Result	Result	Result	Result
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	----
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	----	----	----	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	----
zinc, TCLP	7440-66-6	E444	0.50	mg/L	79.5	37.9	----	----	----	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	----

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2216-A-10 Unprocessed Rep 4	----	----	----	----
Client sampling date / time						23-Apr-2022 09:00	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A9371-016	VA22A9371-016	VA22A9371-016	VA22A9371-016	VA22A9371-016	VA22A9371-016
					Result	Result	Result	Result	Result	Result
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	----	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.97	----	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	----	----	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.86	----	----	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.095	----	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A9371	Page	: 1 of 18
Amendment	: 1		
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 03-May-2022 14:30
PO	: VANCO 0000051213	Issue Date	: 02-Jun-2022 09:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 16		
No. of samples analysed	: 16		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

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

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	bismuth	7440-69-9	E440	107 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-001	BA2216-A-1 Unprocessed	bismuth	7440-69-9	E440	32.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	boron	7440-42-8	E440	35.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	cadmium	7440-43-9	E440	75.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	chromium	7440-47-3	E440	97.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	cobalt	7440-48-4	E440	74.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	copper	7440-50-8	E440	30.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-001	BA2216-A-1 Unprocessed	copper	7440-50-8	E440	65.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	iron	7439-89-6	E440	30.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	lithium	7439-93-2	E440	36.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	molybdenum	7439-98-7	E440	40.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	nickel	7440-02-0	E440	52.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	silver	7440-22-4	E440	60.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	tin	7440-31-5	E440	71.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	tungsten	7440-33-7	E440	56.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A9371-011	BA2216-A-11 Unprocessed	zinc	7440-66-6	E440	38.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier Description

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



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries - Continued								
Metals	QC-MRG2-4807770 02	----	antimony	7440-36-0	E440	124 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

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

Reference Material (RM) Sample								
Metals	QC-MRG2-4807770 03	----	titanium	7440-32-6	E440	134 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group 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 : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-5 Unprocessed	E440.Ag	23-Apr-2022	18-May-2022	180 days	25 days	✓	18-May-2022	155 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-11 Unprocessed	E510	23-Apr-2022	10-May-2022	----	----		10-May-2022	28 days	17 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-1 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-10 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-12 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-2 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-3 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 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 BA2216-A-4 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-5 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-6 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-7 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-8 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2216-A-9 Unprocessed	E510	23-Apr-2022	17-May-2022	----	----		18-May-2022	28 days	25 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-11 Unprocessed	E440	23-Apr-2022	10-May-2022	----	----		10-May-2022	180 days	17 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-1 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-10 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 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 BA2216-A-12 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-2 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-3 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-4 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-5 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-6 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-7 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-8 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2216-A-9 Unprocessed	E440	23-Apr-2022	17-May-2022	----	----		17-May-2022	180 days	24 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 : Moisture Content by Gravimetry										
LDPE bag BA2216-A-1 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-10 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-11 Unprocessed	E144	23-Apr-2022	----	----	----		08-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-12 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-2 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-3 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-4 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-5 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-6 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	



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 BA2216-A-7 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-8 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2216-A-9 Unprocessed	E144	23-Apr-2022	----	----	----		16-May-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-11 Unprocessed	E108	23-Apr-2022	10-May-2022	----	----		10-May-2022	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-1 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-10 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-12 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-2 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-3 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 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 BA2216-A-4 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-5 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-6 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-7 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-8 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2216-A-9 Unprocessed	E108	23-Apr-2022	17-May-2022	----	----		17-May-2022	30 days	24 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-1 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-10 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-11 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 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) BA2216-A-12 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-2 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-3 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-4 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-5 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-6 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-7 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-8 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2216-A-9 Unprocessed	E512	12-May-2022	----	----	----		14-May-2022	28 days	21 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) BA2216-A-1 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-11 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-12 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-2 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-3 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-4 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-5 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-6 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✓



Matrix: Soil/Solid

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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			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) BA2216-A-7 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-8 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-9 Unprocessed	E444	12-May-2022	----	----	----		15-May-2022	180 days	22 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10 Unprocessed Rep 1	E444	31-May-2022	----	----	----		01-Jun-2022	180 days	39 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10 Unprocessed Rep 2	E444	31-May-2022	----	----	----		01-Jun-2022	180 days	39 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10 Unprocessed Rep 3	E444	31-May-2022	----	----	----		01-Jun-2022	180 days	39 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2216-A-10 Unprocessed Rep 4	E444	31-May-2022	----	----	----		01-Jun-2022	180 days	39 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-1 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-10 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	



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) BA2216-A-10 Unprocessed Rep 1	EPP444	23-Apr-2022	31-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2216-A-10 Unprocessed Rep 2	EPP444	23-Apr-2022	31-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2216-A-10 Unprocessed Rep 3	EPP444	23-Apr-2022	31-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2216-A-10 Unprocessed Rep 4	EPP444	23-Apr-2022	31-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-11 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-12 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-2 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-3 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-4 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	



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: 28 day HT (e.g. Hg, CrVI) BA2216-A-5 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-6 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-7 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-8 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2216-A-9 Unprocessed	EPP444	23-Apr-2022	12-May-2022	----	----		----	----	----	

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	489898	2	21	9.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	480777	2	21	9.5	5.0	✔
Moisture Content by Gravimetry	E144	489900	2	23	8.7	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	489899	2	21	9.5	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	491718	1	2	50.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	489898	4	21	19.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	480777	4	21	19.0	10.0	✔
Moisture Content by Gravimetry	E144	489900	2	23	8.7	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	489899	2	21	9.5	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	491718	1	2	50.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	488129	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	489898	2	21	9.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	507375	2	16	12.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	480777	2	21	9.5	5.0	✔
Moisture Content by Gravimetry	E144	489900	2	23	8.7	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	488129	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	507375	2	16	12.5	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are 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. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. 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



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°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
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.
Digestion for Silver	EP440.Ag 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 : **VA22A9371**

Page : 1 of 17

Amendment : **1**

Client : Covanta Burnaby Renewable Energy, ULC

Contact : Steve McKinney

Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3

Telephone : 604 521 1025

Project : Weekly Bottom Ash - Suite

PO : VANCO 0000051213

C-O-C number : ----

Sampler : ----

Site : ----

Quote number : Standing Offer (BC work)

No. of samples received : 16

No. of samples analysed : 16

Laboratory : Vancouver - Environmental

Account Manager : Brent Mack

Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9

Telephone : 778-370-3279

Date Samples Received : 03-May-2022 14:30

Date Analysis Commenced : 08-May-2022

Issue Date : 02-Jun-2022 09:36

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Laboratory Department
Dee Lee	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
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 480779)											
VA22A9371-011	BA2216-A-11 Unprocessed	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	0.0%	5%	----
Physical Tests (QC Lot: 480785)											
VA22A9371-011	BA2216-A-11 Unprocessed	moisture	----	E144	0.25	%	20.7	17.5	16.4%	20%	----
Physical Tests (QC Lot: 489899)											
VA22A9371-001	BA2216-A-1 Unprocessed	pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.5	1.5%	5%	----
Physical Tests (QC Lot: 489900)											
VA22A9371-001	BA2216-A-1 Unprocessed	moisture	----	E144	0.25	%	20.2	23.0	12.6%	20%	----
Metals (QC Lot: 480777)											
VA22A9371-011	BA2216-A-11 Unprocessed	aluminum	7429-90-5	E440	50	mg/kg	29400	35200	17.9%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	115	126	8.65%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	24.1	28.1	15.3%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	539	463	15.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.50	0.67	0.17	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	5.04	16.6	107%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	299	209	35.5%	30%	DUP-H
		cadmium	7440-43-9	E440	0.020	mg/kg	11.4	25.2	75.1%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	137000	156000	13.0%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	497	171	97.4%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	79.9	36.4	74.7%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	1500	2040	30.4%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	65600	48300	30.2%	30%	DUP-H
		lead	7439-92-1	E440	0.50	mg/kg	463	490	5.53%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	34.9	24.1	36.6%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	12100	13900	13.5%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	831	914	9.49%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	28.8	43.3	40.5%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	336	197	52.2%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	11600	12000	3.85%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6470	8110	22.5%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.51	0.12	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	6.91	12.9	60.3%	40%	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: 480777) - continued											
VA22A9371-011	BA2216-A-11 Unprocessed	sodium	7440-23-5	E440	50	mg/kg	16600	20000	18.7%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	372	479	25.0%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13100	16200	21.2%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.068	0.121	0.053	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	79.9	169	71.7%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	565	463	19.7%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	36.2	65.0	56.8%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	5.13	6.89	29.3%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	48.0	53.9	11.6%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	2630	3880	38.4%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.8	0.5	Diff <2x LOR	----
Metals (QC Lot: 480778)											
VA22A9371-011	BA2216-A-11 Unprocessed	mercury	7439-97-6	E510	0.0500	mg/kg	0.0598	0.0792	0.0193	Diff <2x LOR	----
Metals (QC Lot: 489897)											
VA22A9371-001	BA2216-A-1 Unprocessed	aluminum	7429-90-5	E440	50	mg/kg	38600	49500	24.8%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	100	106	6.12%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	21.8	21.9	0.380%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	366	343	6.56%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.36	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	6.37	8.84	32.5%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	215	184	15.8%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	12.8	16.0	22.3%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	130000	118000	9.61%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	142	118	18.1%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	27.7	24.4	12.7%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	1320	2620	65.9%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	53600	47300	12.6%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	415	440	5.95%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	27.3	22.2	20.4%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11900	10600	11.7%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	889	774	13.8%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	20.2	24.2	18.0%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	134	106	23.6%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11000	9840	10.9%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6470	7050	8.63%	40%	----



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: 489897) - continued											
VA22A9371-001	BA2216-A-1 Unprocessed	selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.44	0.03	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	11.4	8.41	30.7%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	16600	16700	0.623%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	338	303	10.9%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13700	12600	8.66%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.106	0.077	0.029	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	89.3	119	28.4%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	244	284	15.3%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	66.4	56.1	16.9%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.61	4.93	12.9%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	45.7	40.6	11.8%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3690	3260	12.5%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.8	2.7	0.9	Diff <2x LOR	----
Metals (QC Lot: 489898)											
VA22A9371-001	BA2216-A-1 Unprocessed	mercury	7439-97-6	E510	0.0500	mg/kg	0.0591	<0.0500	0.0091	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: 480785)						
moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 489900)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 480777)						
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	----
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 480777) - continued						
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: 480778)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 489897)						
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	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 489897) - continued						
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: 489898)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 491718)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 488129)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 488130)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<1.00	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----
TCLP Metals (QCLot: 507375)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<1.00	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
TCLP Metals (QCLot: 507375) - continued						
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: 480779)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 480785)									
moisture	----	E144	0.25	%	50 %	94.8	90.0	110	----
Physical Tests (QCLot: 489899)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 489900)									
moisture	----	E144	0.25	%	50 %	99.1	90.0	110	----
Metals (QCLot: 480777)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	114	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	# 124	80.0	120	MES
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	118	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	117	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	110	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	108	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	116	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	110	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	110	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	118	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	98.7	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	116	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	118	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	116	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	114	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	114	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	115	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	116	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: 480777) - continued									
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	108	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	119	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	118	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	118	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	119	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	119	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	117	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	105	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	101	80.0	120	----
Metals (QCLOT: 480778)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	110	80.0	120	----
Metals (QCLOT: 489897)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	107	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	99.1	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.2	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	95.8	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	95.6	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.6	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	99.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.6	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	97.8	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	92.5	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	107	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.7	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	99.8	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	106	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	89.5	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	101	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	104	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: 489897) - continued									
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	99.6	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.6	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	99.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	111	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	102	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	112	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	98.9	80.0	120	----
Metals (QCLot: 489898)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	109	80.0	120	----
Metals (QCLot: 491718)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	96.9	80.0	120	----

Qualifiers

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



Matrix Spike (MS) Report

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

Sub-Matrix: Soil/Solid

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: 488129)										
VA22A9371-001	BA2216-A-1 Unprocessed	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	93.3	50.0	140	----
TCLP Metals (QCLot: 488130)										
VA22A9371-001	BA2216-A-1 Unprocessed	antimony, TCLP	7440-36-0	E444	4.64 mg/L	5 mg/L	92.8	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	95.4	50.0	140	----
		barium, TCLP	7440-39-3	E444	10.9 mg/L	12.5 mg/L	87.5	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.238 mg/L	0.25 mg/L	95.4	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.52 mg/L	10 mg/L	95.2	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.223 mg/L	0.25 mg/L	89.2	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	1.16 mg/L	1.25 mg/L	92.7	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	2.11 mg/L	2.5 mg/L	84.4	50.0	140	----
		iron, TCLP	7439-89-6	E444	229 mg/L	250 mg/L	91.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.15 mg/L	10 mg/L	91.5	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	250 mg/L	250 mg/L	99.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.26 mg/L	2.5 mg/L	90.4	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.66 mg/L	5 mg/L	93.2	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.105 mg/L	0.1 mg/L	105	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	94.7	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.55 mg/L	5 mg/L	91.1	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.71 mg/L	0.75 mg/L	94.9	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	9 mg/L	10 mg/L	89.8	50.0	150	----
TCLP Metals (QCLot: 507375)										
VA22A9371-013	BA2216-A-10 Unprocessed Rep 1	antimony, TCLP	7440-36-0	E444	5.44 mg/L	5 mg/L	109	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.4 mg/L	12.5 mg/L	98.9	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.247 mg/L	0.25 mg/L	98.8	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.94 mg/L	10 mg/L	99.4	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.242 mg/L	0.25 mg/L	96.8	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	1.29 mg/L	1.25 mg/L	103	50.0	140	----



Sub-Matrix: Soil/Solid

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: 507375) - continued										
VA22A9371-013	BA2216-A-10 Unprocessed Rep 1	cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.46 mg/L	2.5 mg/L	98.6	50.0	140	----
		iron, TCLP	7439-89-6	E444	248 mg/L	250 mg/L	99.1	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.73 mg/L	10 mg/L	97.3	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	256 mg/L	250 mg/L	102	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.46 mg/L	2.5 mg/L	98.4	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.22 mg/L	5 mg/L	104	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.109 mg/L	0.1 mg/L	109	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	98.5	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.86 mg/L	5 mg/L	97.2	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.78 mg/L	0.75 mg/L	104	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	9 mg/L	10 mg/L	91.7	50.0	150	----



Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 480777)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	122	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	115	70.0	130	----
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	122	70.0	130	----
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	110	70.0	130	----
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	119	40.0	160	----
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	111	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	120	70.0	130	----
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	112	70.0	130	----
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	108	70.0	130	----
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	108	70.0	130	----
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	110	70.0	130	----
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	92.8	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	123	70.0	130	----
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	115	70.0	130	----
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	109	70.0	130	----
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	111	70.0	130	----
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	129	70.0	130	----
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	117	70.0	130	----
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	117	70.0	130	----
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	111	40.0	160	----
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	116	70.0	130	----
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	# 134	70.0	130	MES
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	117	70.0	130	----
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	118	70.0	130	----
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	102	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	113	70.0	130	----



Sub-Matrix:

Sub-Matrix:					Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method			Low	High	
Metals (QCLot: 480778)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	106	70.0	130	----
Metals (QCLot: 489897)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	116	70.0	130	----
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	110	70.0	130	----
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	106	70.0	130	----
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	104	70.0	130	----
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	108	70.0	130	----
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	103	70.0	130	----
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	116	70.0	130	----
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	109	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	104	70.0	130	----
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	107	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	110	70.0	130	----
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	101	70.0	130	----
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	109	70.0	130	----
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	98.6	70.0	130	----
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	119	70.0	130	----
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	114	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	110	40.0	160	----
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	98.4	70.0	130	----
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	116	70.0	130	----
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	112	70.0	130	----
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	111	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	98.4	70.0	130	----
Metals (QCLot: 489898)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	95.6	70.0	130	----



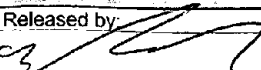
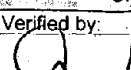


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Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)															
Company: Covanta Energy			☐ Standard ☐ Other			☒ Regular (Standard Turnaround Times - Business Days)															
Contact: Steve McKinney / Dan Skrypnik			☒ PDF ☐ Excel ☐ Digital ☐ Fax			☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT															
Address: 5150 Riverbend Drive			Email 1: smckinney@covanta.com			☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT															
Burnaby BC			Email 2: rjohnson4@covanta.com			☐ Same Day or Weekend Emergency - Contact ALS to Confirm TAT															
Phone: 604-521-1025			Email 3: dskrypnik@covanta.com			Analysis Request															
☐ Yes ☐ No			brent.kirkpatrick@metrovancover.org																		
			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? ☐ Yes ☐ No			Job #:																		
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																		
Contact:			LSD: (includes 2:1 pH)																		
Address:			Quote #:																		
Phone:			ALS Contact:																		
Fax:			Sampler:																		
Lab Work Order # (lab use only) 9371																					
Sample			Sample Identification			Date			Time			Sample Type									
#			(This description will appear on the report)			(dd-mm-yy)			(hh:mm)												
BA2216-A-1 Unprocessed			Environmental Division Vancouver Work Order Reference VA22A9371  Telephone : +1 604 253 4188			23-Apr-22			9:00			Soil			X X			X			
BA2216-A-2 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-3 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-4 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-5 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-6 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-7 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-8 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-9 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-10 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-11 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
BA2216-A-12 Unprocessed						23-Apr-22			9:00			Soil			X X			X			
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details																					
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.																					
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.																					
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.																					
SHIPMENT RELEASE (client use)						SHIPMENT RECEPTION (lab use only)						SHIPMENT VERIFICATION (lab use only)									
Released by: 		Date (dd-mm-yy): 3 May 22		Time (hh-mm): 0800		Received by:		Date:		Time:		Temperature: 21.21 °C		Verified by: 		Date: 3 May 22		Time: 2300		Observations: Yes / No ? If Yes add SIF	
SEMF 20.00 Front																					