

Bottom Ash Data

2024 Week 28

The following analytical report represents bottom ash composite results for week 28 of 2024 (July 7, 2024 to July 13, 2024).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.



CERTIFICATE OF ANALYSIS

Work Order : **VA24B7154**
Client : **Reworld Renewable Burnaby, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : Weekly Bottom Ash - Suite
PO : VANCO0000052919
C-O-C number : ----
Sampler : ----
Site : (includes 2:1 PH)
Quote number : Covanta Burnaby Standing Offer 2024
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : ALS Environmental - Vancouver
Account Manager : Ian Chen
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 16-Jul-2024 13:25
Date Analysis Commenced : 16-Jul-2024
Issue Date : 24-Jul-2024 08:10

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>
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Sam Silveira	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				
(Matrix: Soil/Solid)					BA242B-A-1	BA242B-A-2	BA242B-A-3	BA242B-A-4	BA242B-A-5
Client sampling date / time					10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-001	VA24B7154-002	VA24B7154-003	VA24B7154-004	VA24B7154-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	21.2	21.3	22.5	21.6	20.8
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.2	12.1	12.4	12.1	12.0
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	34800	35900	34700	35900	30500
Antimony	7440-36-0	E440/VA	0.10	mg/kg	174	170	180	192	185
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	29.9	30.7	28.6	37.5	36.1
Barium	7440-39-3	E440/VA	0.50	mg/kg	620	560	615	570	500
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.30	0.31	0.34	0.34
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	25.3	9.97	13.2	19.1	22.4
Boron	7440-42-8	E440/VA	5.0	mg/kg	203	218	226	217	227
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	14.8	11.8	13.1	15.4	14.2
Calcium	7440-70-2	E440/VA	50	mg/kg	165000	163000	171000	187000	173000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	192	183	180	233	211
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	42.3	68.4	215	255	151
Copper	7440-50-8	E440/VA	0.50	mg/kg	2570	5570	1990	2880	2480
Iron	7439-89-6	E440/VA	50	mg/kg	51300	54300	50800	82100	51400
Lead	7439-92-1	E440/VA	0.50	mg/kg	446	482	1700	560	788
Lithium	7439-93-2	E440/VA	2.0	mg/kg	21.9	32.4	31.2	28.3	27.2
Magnesium	7439-95-4	E440/VA	20	mg/kg	11600	11800	12200	13200	12400
Manganese	7439-96-5	E440/VA	1.0	mg/kg	649	1040	984	812	713
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0544	0.0585	0.0578	0.0784	0.0710
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	17.2	22.6	22.6	29.2	18.8
Nickel	7440-02-0	E440/VA	0.50	mg/kg	1110	150	131	305	237
Phosphorus	7723-14-0	E440/VA	50	mg/kg	11600	12600	11700	14500	13000
Potassium	7440-09-7	E440/VA	100	mg/kg	7200	6990	6750	7870	7550
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.58	0.59	0.65	0.69	0.64
Silver	7440-22-4	E440/VA	0.10	mg/kg	7.22	16.4	7.18	7.62	7.76
Sodium	7440-23-5	E440/VA	50	mg/kg	17000	16600	15600	18600	17500
Strontium	7440-24-6	E440/VA	0.50	mg/kg	326	320	414	374	348
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12500	12400	12800	14400	14100



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA242B-A-1	BA242B-A-2	BA242B-A-3	BA242B-A-4	BA242B-A-5
Client sampling date / time					10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-001	VA24B7154-002	VA24B7154-003	VA24B7154-004	VA24B7154-005	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	170	312	161	191	171	171
Titanium	7440-32-6	E440/VA	1.0	mg/kg	299	233	344	225	249	249
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	19.0	18.0	17.4	21.3	24.7	24.7
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.75	1.63	1.70	1.82	1.72	1.72
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	28.3	25.9	27.7	30.6	28.1	28.1
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4830	4700	4440	7950	5060	5060
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.7	3.3	1.9	4.1	2.4	2.4
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	12.0	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	8.34	8.15	8.69	8.19	8.03	8.03
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	2.86	2.86	2.86	2.86
pH, TCLP final	----	EPP444/VA	0.010	pH units	9.07	8.97	8.53	8.54	8.56	8.56
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.78	2.07	2.04	2.04	2.06	2.06
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1710	2020	1800	1780	1850	1850
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.12	1.20	1.05	1.19	1.15	1.15
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	67.8	73.3	77.8	76.3	80.8	80.8
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA242B-A-1	BA242B-A-2	BA242B-A-3	BA242B-A-4	BA242B-A-5
Client sampling date / time					10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-001	VA24B7154-002	VA24B7154-003	VA24B7154-004	VA24B7154-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	<10

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA242B-A-6	BA242B-A-7	BA242B-A-8	BA242B-A-9	BA242B-A-10
(Matrix: Soil/Solid)					Client sampling date / time	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-006	VA24B7154-007	VA24B7154-008	VA24B7154-009	VA24B7154-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144/VA	0.25	%	21.7	22.6	22.5	22.2	22.0	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.3	12.3	12.3	12.3	12.2	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	41100	29600	29800	30100	46100	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	165	153	177	169	170	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	28.8	29.7	30.5	29.7	28.6	
Barium	7440-39-3	E440/VA	0.50	mg/kg	556	591	531	629	644	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.35	0.31	0.30	0.30	0.42	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.4	9.34	10.9	13.3	13.2	
Boron	7440-42-8	E440/VA	5.0	mg/kg	282	219	224	208	233	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	12.4	10.7	13.8	14.7	11.6	
Calcium	7440-70-2	E440/VA	50	mg/kg	174000	150000	165000	174000	168000	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	229	187	180	191	207	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	226	41.0	253	89.6	82.9	
Copper	7440-50-8	E440/VA	0.50	mg/kg	1520	3280	3300	6280	1980	
Iron	7439-89-6	E440/VA	50	mg/kg	55500	65900	53300	45800	51100	
Lead	7439-92-1	E440/VA	0.50	mg/kg	447	796	462	487	506	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	40.5	20.0	25.9	32.4	24.8	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12500	10400	12800	12700	11800	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	4870	668	848	722	737	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0533	<0.0500	0.0713	0.0640	0.107	
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	19.2	72.4	20.8	18.5	20.9	
Nickel	7440-02-0	E440/VA	0.50	mg/kg	185	118	196	120	107	
Phosphorus	7723-14-0	E440/VA	50	mg/kg	13900	10900	12900	14200	11900	
Potassium	7440-09-7	E440/VA	100	mg/kg	7010	6610	6740	7120	7070	
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.54	0.58	0.63	0.62	0.56	
Silver	7440-22-4	E440/VA	0.10	mg/kg	7.14	8.51	18.1	8.64	8.27	
Sodium	7440-23-5	E440/VA	50	mg/kg	16600	15800	15700	16300	16600	
Strontium	7440-24-6	E440/VA	0.50	mg/kg	355	297	358	336	424	
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13000	10300	12500	12300	11600	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA242B-A-6	BA242B-A-7	BA242B-A-8	BA242B-A-9	BA242B-A-10
Client sampling date / time					10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-006	VA24B7154-007	VA24B7154-008	VA24B7154-009	VA24B7154-010	
					Result	Result	Result	Result	Result	
Metals										
Tin	7440-31-5	E440/VA	2.0	mg/kg	153	223	223	616	163	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	254	342	227	239	336	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	18.8	23.6	21.8	18.2	17.8	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.87	1.59	1.78	1.79	1.71	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	33.1	26.7	28.1	27.9	30.5	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4490	4400	5440	6950	9040	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.5	2.0	2.2	1.8	3.3	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.1	12.0	12.0	12.0	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	8.20	8.56	8.49	8.53	8.27	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444/VA	0.010	pH units	8.76	8.75	8.78	8.65	8.84	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.01	2.04	2.06	2.10	2.23	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1850	1800	1850	1830	1990	
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.06	1.10	1.10	1.15	1.12	
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	73.4	74.3	75.0	77.6	79.5	
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA242B-A-6	BA242B-A-7	BA242B-A-8	BA242B-A-9	BA242B-A-10
Client sampling date / time					10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00	10-Jul-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-006	VA24B7154-007	VA24B7154-008	VA24B7154-009	VA24B7154-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	<10

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA242B-A-11	BA242B-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		10-Jul-2024 09:00	10-Jul-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-011	VA24B7154-012	-----	-----	-----		
					Result	Result	----	----	----		
Physical Tests											
Moisture	----	E144/VA	0.25	%	21.7	23.0	----	----	----		
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.2	12.3	----	----	----		
Metals											
Aluminum	7429-90-5	E440/VA	50	mg/kg	35800	33600	----	----	----		
Antimony	7440-36-0	E440/VA	0.10	mg/kg	169	185	----	----	----		
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	27.9	27.4	----	----	----		
Barium	7440-39-3	E440/VA	0.50	mg/kg	590	587	----	----	----		
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.34	----	----	----		
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	14.9	11.2	----	----	----		
Boron	7440-42-8	E440/VA	5.0	mg/kg	229	224	----	----	----		
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	13.8	12.6	----	----	----		
Calcium	7440-70-2	E440/VA	50	mg/kg	173000	164000	----	----	----		
Chromium	7440-47-3	E440/VA	0.50	mg/kg	183	211	----	----	----		
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	161	178	----	----	----		
Copper	7440-50-8	E440/VA	0.50	mg/kg	1680	1510	----	----	----		
Iron	7439-89-6	E440/VA	50	mg/kg	62200	43300	----	----	----		
Lead	7439-92-1	E440/VA	0.50	mg/kg	450	472	----	----	----		
Lithium	7439-93-2	E440/VA	2.0	mg/kg	27.3	32.4	----	----	----		
Magnesium	7439-95-4	E440/VA	20	mg/kg	12000	11900	----	----	----		
Manganese	7439-96-5	E440/VA	1.0	mg/kg	880	748	----	----	----		
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0984	0.0655	----	----	----		
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	19.7	20.7	----	----	----		
Nickel	7440-02-0	E440/VA	0.50	mg/kg	214	136	----	----	----		
Phosphorus	7723-14-0	E440/VA	50	mg/kg	12000	12200	----	----	----		
Potassium	7440-09-7	E440/VA	100	mg/kg	6750	7180	----	----	----		
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.65	0.59	----	----	----		
Silver	7440-22-4	E440/VA	0.10	mg/kg	7.58	7.16	----	----	----		
Sodium	7440-23-5	E440/VA	50	mg/kg	16400	16200	----	----	----		
Strontium	7440-24-6	E440/VA	0.50	mg/kg	488	376	----	----	----		
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12700	12300	----	----	----		
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	----	----	----		



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA242B-A-11	BA242B-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		10-Jul-2024 09:00	10-Jul-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-011	VA24B7154-012	-----	-----	-----	-----	-----
					Result	Result	----	----	----	----	----
Metals											
Tin	7440-31-5	E440/VA	2.0	mg/kg	176	181	----	----	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	292	276	----	----	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	20.6	24.2	----	----	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.70	1.77	----	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	28.1	27.4	----	----	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4300	4310	----	----	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.1	1.9	----	----	----	----	----
TCLP Metals											
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.9	12.0	----	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.85	8.26	----	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.86	2.86	----	----	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	8.65	8.56	----	----	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	----	----	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	----	----
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	----	----	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	----	----	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.03	2.12	----	----	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	<0.050	<0.050	----	----	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1800	1830	----	----	----	----	----
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----	----
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	<0.050	<0.050	----	----	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.12	1.08	----	----	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	----	----	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	78.5	78.8	----	----	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	----	----	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	----	----	----	----	----
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	----	----
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	----	----	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA242B-A-11	BA242B-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		10-Jul-2024 09:00	10-Jul-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B7154-011	VA24B7154-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	----	----	----	----	----
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	----	----	----	----	----
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	<0.50	<0.50	----	----	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	----	----	----	----	----

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

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



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA24B7154</p> <p>Client : Reworld Renewable Burnaby, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO0000052919</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : (includes 2:1 PH)</p> <p>Quote number : Covanta Burnaby Standing Offer 2024</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 15</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 16-Jul-2024 13:25</p> <p>Issue Date : 24-Jul-2024 08:09</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-1	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-10	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-11	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-12	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-2	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-3	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA242B-A-4	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA242B-A-5	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA242B-A-6	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA242B-A-7	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA242B-A-8	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA242B-A-9	E510	10-Jul-2024	23-Jul-2024	28 days	13 days	✔	23-Jul-2024	28 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA242B-A-1	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA242B-A-10	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA242B-A-11	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA242B-A-12	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-2	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-3	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-4	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-5	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-6	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-7	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-8	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA242B-A-9	E440	10-Jul-2024	23-Jul-2024	180 days	13 days	✔	24-Jul-2024	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA242B-A-1	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days		



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-10	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-11	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-12	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-2	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-3	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-4	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-5	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-6	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA242B-A-7	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA242B-A-8	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA242B-A-9	E144	10-Jul-2024	----	----	----		22-Jul-2024	----	12 days		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-1	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-10	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-11	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-12	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-2	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-3	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-4	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-5	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-6	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-7	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-8	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA242B-A-9	E108	10-Jul-2024	23-Jul-2024	30 days	13 days	✔	23-Jul-2024	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA242B-A-1	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA242B-A-10	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA242B-A-11	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA242B-A-12	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-2	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-3	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-4	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-5	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-6	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-7	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-8	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA242B-A-9	E512	16-Jul-2024	20-Jul-2024	35 days	10 days	✔	20-Jul-2024	35 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA242B-A-1	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-10	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-11	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-12	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-2	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-3	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-4	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-5	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-6	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-7	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-8	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA242B-A-9	E444	16-Jul-2024	20-Jul-2024	187 days	10 days	✔	21-Jul-2024	187 days	11 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-1	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-10	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-11	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-12	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-2	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-3	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-4	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔	



Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-5	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-6	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-7	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-8	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA242B-A-9	EPP444	10-Jul-2024	16-Jul-2024	----	----		----	28 days	7 days	✔

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury by CVAAS (TCLP)	E512	1555614	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1558628	1	18	5.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1555615	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1558629	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	1558634	1	20	5.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1558631	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1558628	2	18	11.1	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1558629	2	18	11.1	10.0	✔
Moisture Content by Gravimetry	E144	1558634	1	20	5.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1558631	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1555614	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1558628	1	18	5.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1555615	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1558629	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	1558634	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1555614	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1555615	1	12	8.3	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally $20 \pm 5^{\circ}\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C . Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl . Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl , followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 ALS Environmental - Vancouver	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.

QUALITY CONTROL REPORT

Work Order	: VA24B7154	Page	: 1 of 10
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 16-Jul-2024 13:25
PO	: VANCO0000052919	Date Analysis Commenced	: 16-Jul-2024
C-O-C number	: ----	Issue Date	: 24-Jul-2024 08:11
Sampler	: ----		
Site	: (includes 2:1 PH)		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ghazaleh Khanmirzaei	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
Sam Silveira	Analyst	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 10
Work Order : VA24B7154
Client : Reworld Renewable Burnaby, ULC
Project : Weekly Bottom Ash - Suite



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: 1558631)											
VA24B7154-001	BA242B-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.2	12.1	1.1%	5%	----
Physical Tests (QC Lot: 1558634)											
VA24B7154-001	BA242B-A-1	Moisture	----	E144	0.25	%	21.2	21.9	3.19%	20%	----
Metals (QC Lot: 1558628)											
VA24B7312-001	Anonymous	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0422	0.0400	5.47%	40%	----
TCLP Metals (QC Lot: 1555614)											
VA24B7154-001	BA242B-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1555615)											
VA24B7154-001	BA242B-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.78	1.86	0.08	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1710	1740	1.28%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.12	1.12	0.0315%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	67.8	65.4	3.50%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----



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: 1558634)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1558628)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1558629)						
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	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1558629) - continued						
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 1555614)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1555615)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1558631)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 1558634)									
Moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Metals (QCLot: 1558628)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.0	80.0	120	---
Metals (QCLot: 1558629)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	95.9	80.0	120	---
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	---
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	---
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	96.6	80.0	120	---
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	91.9	80.0	120	---
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.1	80.0	120	---
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	99.0	80.0	120	---
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	94.4	80.0	120	---
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	91.0	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	95.4	80.0	120	---
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.9	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	93.1	80.0	120	---
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	91.8	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.0	80.0	120	---
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	91.3	80.0	120	---
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	---
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	95.2	80.0	120	---
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	92.9	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	---
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	---
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	84.2	80.0	120	---
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	95.1	80.0	120	---
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	99.0	80.0	120	---
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.1	80.0	120	---



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1558629) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	94.3	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
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	102	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	97.0	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	95.3	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 1555614)										
VA24B7154-001	BA242B-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	89.4	50.0	140	----
TCLP Metals (QCLot: 1555615)										
VA24B7154-001	BA242B-A-1	Antimony, TCLP	7440-36-0	E444	4.26 mg/L	5 mg/L	85.2	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.4 mg/L	5 mg/L	87.2	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.2 mg/L	12.5 mg/L	89.2	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.210 mg/L	0.25 mg/L	84.2	50.0	140	----
		Boron, TCLP	7440-42-8	E444	8.63 mg/L	10 mg/L	86.3	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.198 mg/L	0.25 mg/L	79.2	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.01 mg/L	1.25 mg/L	80.6	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	0.201 mg/L	0.25 mg/L	80.6	50.0	140	----
		Copper, TCLP	7440-50-8	E444	1.97 mg/L	2.5 mg/L	78.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	198 mg/L	250 mg/L	79.0	50.0	140	----
		Lead, TCLP	7439-92-1	E444	8.20 mg/L	10 mg/L	82.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	222 mg/L	250 mg/L	88.9	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.03 mg/L	2.5 mg/L	81.3	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.01 mg/L	5 mg/L	80.3	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.077 mg/L	0.1 mg/L	76.7	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.3 mg/L	5 mg/L	85.9	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	3.98 mg/L	5 mg/L	79.6	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.63 mg/L	0.75 mg/L	83.8	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	8.52 mg/L	10 mg/L	85.2	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	79.4	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1558628)									
QC-1558628-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	94.6	70.0	130	----
Metals (QCLot: 1558629)									
QC-1558629-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	116	70.0	130	----
QC-1558629-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	104	70.0	130	----
QC-1558629-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	104	70.0	130	----
QC-1558629-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	104	70.0	130	----
QC-1558629-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	101	70.0	130	----
QC-1558629-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	97.3	70.0	130	----
QC-1558629-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	102	70.0	130	----
QC-1558629-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	100.0	70.0	130	----
QC-1558629-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	103	70.0	130	----
QC-1558629-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	100	70.0	130	----
QC-1558629-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	104	70.0	130	----
QC-1558629-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	103	70.0	130	----
QC-1558629-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	97.8	70.0	130	----
QC-1558629-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	106	70.0	130	----
QC-1558629-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	111	70.0	130	----
QC-1558629-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	108	70.0	130	----
QC-1558629-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	101	70.0	130	----
QC-1558629-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	103	70.0	130	----
QC-1558629-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	102	70.0	130	----
QC-1558629-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	110	70.0	130	----
QC-1558629-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	94.9	60.0	140	----
QC-1558629-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	98.3	70.0	130	----
QC-1558629-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	111	70.0	130	----
QC-1558629-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	104	70.0	130	----
QC-1558629-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	75.5	50.0	150	----
QC-1558629-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	99.1	70.0	130	----
QC-1558629-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	101	40.0	160	----
QC-1558629-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	108	70.0	130	----
QC-1558629-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	128	70.0	130	----
QC-1558629-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	93.2	70.0	130	----
QC-1558629-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	103	70.0	130	----

Page : 10 of 10
 Work Order : VA24B7154
 Client : Reworld Renewable Burnaby, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1558629) - continued									
QC-1558629-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	101	70.0	130	----
QC-1558629-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	119	70.0	130	----



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

Invoice To Same as Report ?		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)						
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		Job #:				MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR-FULL-VA (all metals)	Number of Containers
Company:		PO / AFE:	PO# 4008 Weekly Bottom Ash - Suite							
Contact:		LSD:	(includes 2:1 pH)							
Address:		Quote #:								
Phone:		ALS Contact:		Sampler:						

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR-FULL-VA (all metals)	Number of Containers
	BA2428-A-1	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-2	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-3	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-4	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-5	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-6	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-7	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-8	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-9	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-10	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-11	10-Jul-24	9:00	Soil	X	X		X	1
	BA2428-A-12	10-Jul-24	9:00	Soil	X	X		X	1

Environmental Division
 Vancouver
 Work Order Reference
VA24B7154

Telephone: +1 604 253 4188

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
KINGLS	15/07/24	9:00	MPL	July 16	1:25 PM	23 °C				Yes / No ? If Yes add SIF