

Bottom Ash Data

2025 Week 01

The following analytical report represents bottom ash composite results for week 01 of 2025 (December 29, 2024 to January 4, 2025).

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	: VA25A0236		
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
Address	: 5150 Riverbend Drive	Address	: 8081 Lougheed Highway
	: Burnaby British Columbia Canada V3N 4V3		: Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Date Analysis Commenced	: 07-Jan-2025
C-O-C number	: ----	Issue Date	: 09-Jan-2025 22:44
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 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>
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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).

Unit	Description
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

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

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2501-A-1	BA2501-A-2	BA2501-A-3	BA2501-A-4	BA2501-A-5
Client sampling date / time					01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-001	VA25A0236-002	VA25A0236-003	VA25A0236-004	VA25A0236-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144/VA	0.25	%	25.8	26.4	27.2	26.1	27.2	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.1	11.9	12.0	12.0	12.0	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	36900	35200	36000	41400	40200	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	112	142	133	124	121	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	14.4	17.3	15.1	15.3	16.8	
Barium	7440-39-3	E440/VA	0.50	mg/kg	486	431	414	491	448	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.38	0.36	0.36	0.37	0.35	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	6.67	8.77	10.9	7.98	7.93	
Boron	7440-42-8	E440/VA	5.0	mg/kg	616	207	173	184	168	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.5	10.2	8.85	7.09	9.24	
Calcium	7440-70-2	E440/VA	50	mg/kg	143000	152000	134000	152000	138000	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	156	209	162	112	196	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	1590	142	58.7	164	101	
Copper	7440-50-8	E440/VA	0.50	mg/kg	3460	24700	2300	1700	1300	
Iron	7439-89-6	E440/VA	50	mg/kg	44800	66600	50000	42200	66700	
Lead	7439-92-1	E440/VA	0.50	mg/kg	300	426	377	421	315	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	68.1	53.8	30.5	42.7	47.6	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12100	12800	12200	14400	11900	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	801	1010	835	655	816	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	



Analytical Results

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

					Client sample ID	BA2501-A-1	BA2501-A-2	BA2501-A-3	BA2501-A-4	BA2501-A-5
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0236-001	VA25A0236-002	VA25A0236-003	VA25A0236-004	VA25A0236-005
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		17.9	16.7	14.9	16.5	18.6
Nickel	7440-02-0	E440/VA	0.50	mg/kg		200	367	610	106	240
Phosphorus	7723-14-0	E440/VA	50	mg/kg		13400	12000	9990	19300	12300
Potassium	7440-09-7	E440/VA	100	mg/kg		6330	5870	5800	6180	5730
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.45	0.41	0.41	0.36	0.35
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.05	7.48	3.87	3.82	3.67
Sodium	7440-23-5	E440/VA	50	mg/kg		19400	17000	17500	19400	17000
Strontium	7440-24-6	E440/VA	0.50	mg/kg		267	303	261	296	293
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11600	12700	11400	12000	11900
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		117	182	125	398	130
Titanium	7440-32-6	E440/VA	1.0	mg/kg		190	245	281	227	244
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		2.47	3.47	3.02	3.60	2.86
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.76	2.01	1.88	2.08	1.86
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		28.0	27.9	28.5	31.2	26.9
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4190	10500	3350	3930	3460
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.6	3.6	2.5	3.4	2.8
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.9	11.9	11.9	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.63	5.57	5.82	5.46	5.54
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.91	2.91	2.91	2.91	2.91



Analytical Results

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

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2501-A-1	BA2501-A-2	BA2501-A-3	BA2501-A-4	BA2501-A-5
Client sampling date / time					01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-001	VA25A0236-002	VA25A0236-003	VA25A0236-004	VA25A0236-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
pH, TCLP final	----	EPP444/VA	0.010	pH units	7.62	7.78	7.62	7.52	7.46	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.92	1.88	2.01	1.96	2.00	
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	1790	1790	1870	1820	1860	
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	0.315	0.217	0.257	0.272	0.391	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.483	0.552	0.495	0.559	0.588	
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	114	119	121	118	125	
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	
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2501-A-1	BA2501-A-2	BA2501-A-3	BA2501-A-4	BA2501-A-5
Client sampling date / time						01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0236-001	VA25A0236-002	VA25A0236-003	VA25A0236-004	VA25A0236-005
						Result	Result	Result	Result	Result
TCLP Metals										
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2501-A-6	BA2501-A-7	BA2501-A-8	BA2501-A-9	BA2501-A-10
Client sampling date / time						01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0236-006	VA25A0236-007	VA25A0236-008	VA25A0236-009	VA25A0236-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.4	26.0	27.8	25.9	25.9
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.0	11.8	11.8	12.0	11.8
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		43100	38600	45200	30500	33100
Antimony	7440-36-0	E440/VA	0.10	mg/kg		127	147	141	135	103
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.6	17.0	16.5	17.1	14.1
Barium	7440-39-3	E440/VA	0.50	mg/kg		421	402	426	383	458
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.42	3.69	0.35	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		16.9	13.1	9.02	9.47	5.44
Boron	7440-42-8	E440/VA	5.0	mg/kg		195	181	193	199	294
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		13.2	12.5	10.5	9.74	8.98
Calcium	7440-70-2	E440/VA	50	mg/kg		128000	147000	144000	142000	126000



Analytical Results

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

					Client sample ID	BA2501-A-6	BA2501-A-7	BA2501-A-8	BA2501-A-9	BA2501-A-10
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-006	VA25A0236-007	VA25A0236-008	VA25A0236-009	VA25A0236-010	VA25A0236-010
					Result	Result	Result	Result	Result	Result
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg	154	208	315	129	138	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	191	135	98.0	137	30.2	
Copper	7440-50-8	E440/VA	0.50	mg/kg	1980	1440	1890	4140	844	
Iron	7439-89-6	E440/VA	50	mg/kg	62000	62300	68400	50900	52300	
Lead	7439-92-1	E440/VA	0.50	mg/kg	810	367	2410	506	1440	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	44.8	36.1	37.1	31.9	29.8	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12700	13500	13100	12600	11900	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	927	990	919	810	718	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	14.8	20.3	19.9	14.6	15.2	
Nickel	7440-02-0	E440/VA	0.50	mg/kg	249	210	372	638	94.7	
Phosphorus	7723-14-0	E440/VA	50	mg/kg	11000	11000	12900	12000	10900	
Potassium	7440-09-7	E440/VA	100	mg/kg	5940	6510	5940	5620	6020	
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.38	0.46	0.43	0.44	0.31	
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.61	4.39	>85.2	4.23	5.40	
Sodium	7440-23-5	E440/VA	50	mg/kg	18000	18500	16600	16300	19000	
Strontium	7440-24-6	E440/VA	0.50	mg/kg	270	298	290	293	240	
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12100	13100	12800	11200	9000	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	186	133	140	146	116	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	251	253	293	155	223	



Analytical Results

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

					Client sample ID	BA2501-A-6	BA2501-A-7	BA2501-A-8	BA2501-A-9	BA2501-A-10
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-006	VA25A0236-007	VA25A0236-008	VA25A0236-009	VA25A0236-010	
					Result	Result	Result	Result	Result	
Metals										
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	2.36	5.67	3.20	3.03	2.08	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.78	2.11	2.00	1.92	1.73	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	28.2	32.8	30.7	26.6	24.2	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3200	3530	3830	3400	2910	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.3	2.5	3.0	2.2	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	11.9	12.0	12.0	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.55	5.60	5.59	6.10	6.58	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444/VA	0.010	pH units	7.93	7.60	6.94	6.99	6.78	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.95	1.93	2.01	2.12	2.00	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	<0.050	<0.050	0.069	0.055	0.097	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1850	1800	1870	1860	1830	
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	0.130	0.207	0.644	0.559	0.870	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.503	0.513	0.546	0.557	0.550	
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	



Analytical Results

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

					Client sample ID	BA2501-A-6	BA2501-A-7	BA2501-A-8	BA2501-A-9	BA2501-A-10
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0236-006	VA25A0236-007	VA25A0236-008	VA25A0236-009	VA25A0236-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		119	117	128	128	128
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	0.29
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
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	<0.50	5.27	4.79	9.88
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

					Client sample ID	BA2501-A-11	BA2501-A-12	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0236-011	VA25A0236-012	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.2	27.4	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.8	11.8	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11	BA2501-A-12	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-011	VA25A0236-012	----	----	----	----
					Result	Result	----	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	35200	54500	----	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	137	88.2	----	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	13.8	11.0	----	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	451	474	----	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.33	----	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	5.78	5.20	----	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	196	150	----	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.7	7.50	----	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	121000	114000	----	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	138	145	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	33.1	46.2	----	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	4440	992	----	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	53300	44700	----	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	254	218	----	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	93.3	27.4	----	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11200	11100	----	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	1100	1900	----	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	12.5	12.1	----	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	139	146	----	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10300	9900	----	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11	BA2501-A-12	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-011	VA25A0236-012	----	----	----	----
					Result	Result	----	----	----	----
Metals										
Potassium	7440-09-7	E440/VA	100	mg/kg	5400	6660	----	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.28	0.29	----	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	3.66	2.44	----	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	17000	18400	----	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	269	242	----	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	9600	10700	----	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	----	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg	111	103	----	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	268	358	----	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	2.05	1.47	----	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.65	1.59	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	26.9	26.3	----	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3440	4830	----	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.2	4.6	----	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.77	6.30	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	----	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.99	7.15	----	----	----	----
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	----	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11	BA2501-A-12	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0236-011	VA25A0236-012	----	----	----	----
					Result	Result	----	----	----	----
TCLP Metals										
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	2.11	1.98	----	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.061	0.051	----	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1960	1890	----	----	----	----
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	0.576	1.03	----	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.593	0.466	----	----	----	----
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	128	130	----	----	----	----
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	----	----	----	----
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	5.03	2.14	----	----	----	----
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.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA25A0236	Page	: 1 of 16
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Issue Date	: 09-Jan-2025 22:43
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		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA25A0236-001	BA2501-A-1	Boron	7440-42-8	E440	110 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Cobalt	7440-48-4	E440	71.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Copper	7440-50-8	E440	76.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Iron	7439-89-6	E440	45.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Lead	7439-92-1	E440	104 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Manganese	7439-96-5	E440	81.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Phosphorus	7723-14-0	E440	32.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Silver	7440-22-4	E440	52.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Titanium	7440-32-6	E440	80.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0236-001	BA2501-A-1	Zinc	7440-66-6	E440	67.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group : 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 BA2501-A-1	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-10	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-11	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-12	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-2	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-3	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-4	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓



Matrix: Soil/Solid

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

<i>Analyte Group : Analytical Method</i>	<i>Method</i>	<i>Sampling Date</i>	<i>Extraction / Preparation</i>				<i>Analysis</i>			
Container / Client Sample ID(s)			<i>Preparation Date</i>	<i>Holding Times</i>		<i>Eval</i>	<i>Analysis Date</i>	<i>Holding Times</i>		<i>Eval</i>
				<i>Rec</i>	<i>Actual</i>			<i>Rec</i>	<i>Actual</i>	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-5	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-6	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-7	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-8	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-9	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-1	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-10	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-11	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-12	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method	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		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-2	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-3	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-4	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-5	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-6	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-7	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-8	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2501-A-9	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2501-A-1	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-10	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-11	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-12	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-2	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-3	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-4	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-5	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-6	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-7	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-8	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-9	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-1	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-10	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-11	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-12	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-2	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-3	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-4	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-5	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-6	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-7	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-8	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-9	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-1	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-10	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-11	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-12	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-2	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-3	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-4	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-5	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-6	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-7	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-8	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-9	E512	07-Jan-2025	09-Jan-2025	34 days	8 days	✓	09-Jan-2025	34 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-1	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-10	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-11	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-12	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-2	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-3	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-4	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-5	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-6	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-7	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-8	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-9	E444	07-Jan-2025	09-Jan-2025	186 days	8 days	✓	09-Jan-2025	186 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-1	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-10	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-11	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-12	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-2	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-3	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-4	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 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) BA2501-A-5	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-6	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-7	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-8	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-9	EPP444	01-Jan-2025	07-Jan-2025	----	----		----	28 days	6 days	✔

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury by CVAAS (TCLP)	E512	1834224	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1832568	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1834225	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1832569	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1832572	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1832571	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1832568	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1832569	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	1832572	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1832571	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1834224	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1832568	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1834225	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1832569	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1832572	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1834224	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1834225	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl , followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/245.1 (mod)	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.

Page : 16 of 16
 Work Order : VA25A0236
 Client : Reworld Renewable Burnaby, ULC
 Project : ----



<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	: VA25A0236	Page	: 1 of 12
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Date Analysis Commenced	: 07-Jan-2025
C-O-C number	: ----	Issue Date	: 09-Jan-2025 22:43
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.

Signatories	Position	Laboratory Department
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Organics, Burnaby, British Columbia



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1832571)											
VA25A0236-001	BA2501-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.1	12.1	0.2%	5%	----
Physical Tests (QC Lot: 1832572)											
VA25A0236-001	BA2501-A-1	Moisture	----	E144	0.25	%	25.8	25.4	1.39%	20%	----
Metals (QC Lot: 1832568)											
VA25A0236-001	BA2501-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1832569)											
VA25A0236-001	BA2501-A-1	Aluminum	7429-90-5	E440	50	mg/kg	36900	44500	18.8%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	112	113	0.842%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	14.4	13.0	10.5%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	486	481	0.936%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.37	0.01	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.67	6.16	7.95%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	616	179	110%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	10.5	8.06	26.6%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	143000	130000	8.98%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	156	143	8.41%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	1590	756	71.0%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	3460	1540	76.7%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	44800	71200	45.6%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	300	946	104%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	68.1	83.8	20.7%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12100	11700	3.16%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	801	1910	81.9%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	17.9	15.1	16.8%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	200	237	17.3%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	13400	9610	32.7%	30%	DUP-H
		Potassium	7440-09-7	E440	100	mg/kg	6330	5990	5.46%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.45	0.38	0.07	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.05	2.94	52.8%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	19400	18000	7.41%	40%	----

Page : 4 of 12
 Work Order : VA25A0236
 Client : Reworld Renewable Burnaby, ULC
 Project : ----



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: 1832569) - continued											
VA25A0236-001	BA2501-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	267	274	2.56%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	11600	10800	7.31%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	117	137	15.5%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	190	446	80.6%	40%	DUP-H
		Tungsten	7440-33-7	E440	0.50	mg/kg	2.47	2.67	0.19	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	1.76	1.82	3.62%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	28.0	27.2	2.92%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4190	8490	67.8%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.6	3.1	0.6	Diff <2x LOR	----
TCLP Metals (QC Lot: 1834224)											
VA25A0236-001	BA2501-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1834225)											
VA25A0236-001	BA2501-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	1.92	1.85	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	1790	1760	1.62%	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	0.315	0.294	0.020	Diff <2x LOR	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.483	0.453	6.47%	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	114	104	8.62%	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	----



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: 1832572)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1832568)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1832569)						
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: 1832569) - 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	----
TCLP Metals (QCLot: 1834224)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1834225)						
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: 1832571)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1832572)									
Moisture	----	E144	0.25	%	50 %	99.9	90.0	110	----
Metals (QCLot: 1832568)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.4	80.0	120	----
Metals (QCLot: 1832569)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	103	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	95.6	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	100.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.9	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.6	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.2	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	106	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	105	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.7	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	97.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	98.6	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	98.4	80.0	120	----



Sub-Matrix: Soil/Solid					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1832569) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.4	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	100	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	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	100	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	108	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: 1834224)										
VA25A0236-001	BA2501-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.5	50.0	140	----
TCLP Metals (QCLot: 1834225)										
VA25A0236-001	BA2501-A-1	Antimony, TCLP	7440-36-0	E444	4.73 mg/L	5 mg/L	94.6	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	96.0	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.5 mg/L	12.5 mg/L	92.0	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.230 mg/L	0.25 mg/L	92.1	50.0	140	----
		Boron, TCLP	7440-42-8	E444	8.86 mg/L	10 mg/L	88.6	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.235 mg/L	0.25 mg/L	94.0	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND 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	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.16 mg/L	2.5 mg/L	86.3	50.0	140	----
		Iron, TCLP	7439-89-6	E444	232 mg/L	250 mg/L	92.9	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.10 mg/L	10 mg/L	91.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	236 mg/L	250 mg/L	94.2	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.24 mg/L	2.5 mg/L	89.5	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.73 mg/L	5 mg/L	94.5	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.081 mg/L	0.1 mg/L	80.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	91.6	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.59 mg/L	5 mg/L	91.8	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.6	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.13 mg/L	10 mg/L	91.3	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	84.0	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:

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: 1832568)									
QC-1832568-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	99.0	70.0	130	----
Metals (QCLot: 1832569)									
QC-1832569-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	107	70.0	130	----
QC-1832569-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	101	70.0	130	----
QC-1832569-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	96.8	70.0	130	----
QC-1832569-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	91.4	70.0	130	----
QC-1832569-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	104	70.0	130	----
QC-1832569-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	100.0	70.0	130	----
QC-1832569-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	96.3	70.0	130	----
QC-1832569-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	99.0	70.0	130	----
QC-1832569-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	99.5	70.0	130	----
QC-1832569-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	98.0	70.0	130	----
QC-1832569-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	96.1	70.0	130	----
QC-1832569-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	99.7	70.0	130	----
QC-1832569-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	89.9	70.0	130	----
QC-1832569-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	104	70.0	130	----
QC-1832569-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	102	70.0	130	----
QC-1832569-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.1	70.0	130	----
QC-1832569-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	98.1	70.0	130	----
QC-1832569-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	96.2	70.0	130	----
QC-1832569-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	108	70.0	130	----
QC-1832569-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	99.9	70.0	130	----
QC-1832569-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	102	60.0	140	----
QC-1832569-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	95.3	70.0	130	----
QC-1832569-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	108	70.0	130	----
QC-1832569-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	104	70.0	130	----
QC-1832569-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	97.1	50.0	150	----
QC-1832569-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	93.9	70.0	130	----
QC-1832569-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	98.9	40.0	160	----
QC-1832569-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	104	70.0	130	----
QC-1832569-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	106	70.0	130	----
QC-1832569-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	89.5	70.0	130	----
QC-1832569-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	97.6	70.0	130	----



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: 1832569) - continued									
QC-1832569-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	96.5	70.0	130	----
QC-1832569-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	111	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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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: Nicole Victor / Dan Skrypnik			☒ PDF ☐ Excel ☐ Digital ☐ Fax			☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																							
Address: 5150 Riverbend Drive			Email 1: nvictor@covanta.com			☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																							
Burnaby BC			Email 2: rminchin@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@metrovanancouver.org																										
			Sarah.Wellman@metrovanancouver.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)																													
Sample #			Sample Identification			Date (dd-mm-yy)			Time (hh:mm)			Sample Type			MET-TCLP-VA (all metals, Hg)			MOISTURE			Chrome 6			MET-CSR-FULL-VA (all metals)			Number of Containers		
			(This description will appear on the report)																										
BA2501-A-1						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-2						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-3						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-4						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-5						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-6						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-7						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-8						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-9						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-10						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-11						01-Jan-25			9:00			Soil			X X									X			1		
BA2501-A-12						01-Jan-25			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:									
[Signature]		7-Jan-25		0800										[Signature]		01/17/25		12:00		Yes / No ? If Yes add SIF									
GENF 20.00 Front																													

Environmental Division
Vancouver
Work Order Reference
VA25A0236

Telephone : +1 604 253 4188

notice

CERTIFICATE OF ANALYSIS

Work Order	: VA25A0244		
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
Address	: 5150 Riverbend Drive Burnaby British Columbia Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Date Analysis Commenced	: 08-Jan-2025
C-O-C number	: ----	Issue Date	: 13-Jan-2025 10:08
Sampler	: ----		
Site	: (include 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 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>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	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).

Unit	Description
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

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

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2501-A-1- Unprocessed	BA2501-A-2- Unprocessed	BA2501-A-3- Unprocessed	BA2501-A-4- Unprocessed	BA2501-A-5- Unprocessed
Client sampling date / time					01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0244-001	VA25A0244-002	VA25A0244-003	VA25A0244-004	VA25A0244-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144/VA	0.25	%	27.3	25.4	24.1	25.1	25.8	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.3	10.8	11.1	11.2	11.1	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	49300	57000	48200	50700	56400	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	104	82.2	87.6	161	78.8	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	10.1	20.9	16.9	9.65	9.91	
Barium	7440-39-3	E440/VA	0.50	mg/kg	764	830	737	629	680	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.35	0.39	0.41	0.37	0.38	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	3.92	3.38	4.04	3.60	2.95	
Boron	7440-42-8	E440/VA	5.0	mg/kg	156	216	164	227	208	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	5.42	8.86	7.97	5.08	4.56	
Calcium	7440-70-2	E440/VA	50	mg/kg	141000	139000	148000	140000	127000	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	121	108	115	204	87.7	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	99.6	82.2	93.4	507	143	
Copper	7440-50-8	E440/VA	0.50	mg/kg	16800	14100	2010	1150	1610	
Iron	7439-89-6	E440/VA	50	mg/kg	43800	57300	45100	45800	35200	
Lead	7439-92-1	E440/VA	0.50	mg/kg	486	1220	918	480	826	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	33.8	40.1	32.6	33.8	36.0	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12900	13000	12800	11100	12300	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	621	1110	1070	838	762	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	



Analytical Results

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

					Client sample ID	BA2501-A-1- Unprocessed	BA2501-A-2- Unprocessed	BA2501-A-3- Unprocessed	BA2501-A-4- Unprocessed	BA2501-A-5- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-001	VA25A0244-002	VA25A0244-003	VA25A0244-004	VA25A0244-005
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		11.7	30.4	15.6	33.0	10.9
Nickel	7440-02-0	E440/VA	0.50	mg/kg		92.7	211	76.8	227	167
Phosphorus	7723-14-0	E440/VA	50	mg/kg		14000	12200	14200	13500	13200
Potassium	7440-09-7	E440/VA	100	mg/kg		5520	5950	5750	5160	5440
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.22	0.44	0.23	0.22	0.49
Silver	7440-22-4	E440/VA	0.10	mg/kg		2.02	2.91	2.47	1.99	3.10
Sodium	7440-23-5	E440/VA	50	mg/kg		17000	17500	19600	16800	18500
Strontium	7440-24-6	E440/VA	0.50	mg/kg		421	307	291	254	277
Sulfur	7704-34-9	E440/VA	1000	mg/kg		7900	6600	7300	5800	6700
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		90.8	90.2	104	104	154
Titanium	7440-32-6	E440/VA	1.0	mg/kg		327	640	378	269	374
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		3.05	1.98	2.53	1.68	2.13
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.64	1.85	1.84	1.70	1.59
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		27.7	31.3	26.4	27.2	25.1
Zinc	7440-66-6	E440/VA	2.0	mg/kg		2020	4310	2350	2050	2970
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.4	4.2	5.2	5.9	4.5
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.8	11.8	12.0	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.78	5.42	6.68	7.89	7.64
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.87	2.87	2.87	2.87	2.87



Analytical Results

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

					Client sample ID	BA2501-A-1- Unprocessed	BA2501-A-2- Unprocessed	BA2501-A-3- Unprocessed	BA2501-A-4- Unprocessed	BA2501-A-5- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-001	VA25A0244-002	VA25A0244-003	VA25A0244-004	VA25A0244-005
						Result	Result	Result	Result	Result
TCLP Metals										
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.94	6.56	6.49	6.42	6.55
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.76	1.53	1.76	1.67	1.58
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.073	0.081	0.092	0.078	0.064
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1840	1700	1850	1720	1580
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		0.720	0.995	1.28	1.37	1.85
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.02	1.02	1.56	0.938	1.68
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	0.44
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		124	113	118	112	113
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	0.27	0.28	0.31	<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
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15



Analytical Results

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

					Client sample ID	BA2501-A-1- Unprocessed	BA2501-A-2- Unprocessed	BA2501-A-3- Unprocessed	BA2501-A-4- Unprocessed	BA2501-A-5- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-001	VA25A0244-002	VA25A0244-003	VA25A0244-004	VA25A0244-005
						Result	Result	Result	Result	Result
TCLP Metals										
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		4.55	24.3	16.0	14.9	13.9
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

					Client sample ID	BA2501-A-6- Unprocessed	BA2501-A-7- Unprocessed	BA2501-A-8- Unprocessed	BA2501-A-9- Unprocessed	BA2501-A-10- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-006	VA25A0244-007	VA25A0244-008	VA25A0244-009	VA25A0244-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.6	28.2	26.8	26.3	26.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.2	11.8	11.0	10.8	11.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		50800	46600	44100	60900	49500
Antimony	7440-36-0	E440/VA	0.10	mg/kg		78.0	78.6	88.8	91.5	80.0
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		11.0	13.0	10.3	16.1	12.2
Barium	7440-39-3	E440/VA	0.50	mg/kg		657	672	633	695	584
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.42	0.40	0.41	0.37	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		3.49	3.58	3.56	3.77	3.92
Boron	7440-42-8	E440/VA	5.0	mg/kg		153	200	172	324	157
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		7.67	6.84	7.86	5.12	7.98
Calcium	7440-70-2	E440/VA	50	mg/kg		137000	132000	135000	139000	136000



Analytical Results

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

					Client sample ID	BA2501-A-6- Unprocessed	BA2501-A-7- Unprocessed	BA2501-A-8- Unprocessed	BA2501-A-9- Unprocessed	BA2501-A-10- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-006	VA25A0244-007	VA25A0244-008	VA25A0244-009	VA25A0244-010
						Result	Result	Result	Result	Result
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg		125	109	105	111	147
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		118	207	92.0	35.3	70.9
Copper	7440-50-8	E440/VA	0.50	mg/kg		2090	1610	5500	1170	1750
Iron	7439-89-6	E440/VA	50	mg/kg		32200	39900	56400	42300	35300
Lead	7439-92-1	E440/VA	0.50	mg/kg		865	517	584	497	789
Lithium	7439-93-2	E440/VA	2.0	mg/kg		35.7	36.5	31.0	28.2	30.4
Magnesium	7439-95-4	E440/VA	20	mg/kg		12400	11900	11400	13600	11000
Manganese	7439-96-5	E440/VA	1.0	mg/kg		769	1320	1170	920	847
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		13.9	13.5	12.5	27.8	13.7
Nickel	7440-02-0	E440/VA	0.50	mg/kg		102	165	172	69.9	142
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9640	11600	10500	14700	12900
Potassium	7440-09-7	E440/VA	100	mg/kg		5630	5500	5720	5410	5380
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.25	0.29	0.24	0.20	0.23
Silver	7440-22-4	E440/VA	0.10	mg/kg		2.22	2.49	6.37	3.74	3.15
Sodium	7440-23-5	E440/VA	50	mg/kg		17800	17600	17300	16800	16800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		288	292	277	262	313
Sulfur	7704-34-9	E440/VA	1000	mg/kg		7200	6800	7400	6700	7600
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		96.5	100	92.9	201	104
Titanium	7440-32-6	E440/VA	1.0	mg/kg		368	300	310	389	294



Analytical Results

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

					Client sample ID	BA2501-A-6- Unprocessed	BA2501-A-7- Unprocessed	BA2501-A-8- Unprocessed	BA2501-A-9- Unprocessed	BA2501-A-10- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-006	VA25A0244-007	VA25A0244-008	VA25A0244-009	VA25A0244-010
						Result	Result	Result	Result	Result
Metals										
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		2.48	2.18	2.49	3.59	2.43
Uranium	7440-61-1	E440/VA	0.050	mg/kg		1.89	1.89	1.83	1.81	1.91
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		27.7	26.0	27.1	28.2	23.5
Zinc	7440-66-6	E440/VA	2.0	mg/kg		5960	2360	4840	2050	2680
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		4.0	3.8	3.9	5.5	4.2
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	12.0	11.8	11.9	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.85	8.43	7.36	8.06	8.13
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.87	2.87	2.87	2.87	2.87
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.94	6.88	6.62	6.76	6.43
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		1.54	1.57	1.58	1.56	1.59
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.072	0.074	0.107	0.078
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1660	1680	1680	1640	1600
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		0.694	1.15	1.21	1.78	1.42
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.688	0.795	1.07	0.821	1.13
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0



Analytical Results

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

					Client sample ID	BA2501-A-6- Unprocessed	BA2501-A-7- Unprocessed	BA2501-A-8- Unprocessed	BA2501-A-9- Unprocessed	BA2501-A-10- Unprocessed
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00	01-Jan-2025 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-006	VA25A0244-007	VA25A0244-008	VA25A0244-009	VA25A0244-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		101	108	106	97.4	99.8
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	0.78
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
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		4.23	8.61	13.8	9.56	34.4
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

					Client sample ID	BA2501-A-11- Unprocessed	BA2501-A-12- Unprocessed	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA25A0244-011	VA25A0244-012	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.9	26.7	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.0	11.1	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11- Unprocessed	BA2501-A-12- Unprocessed	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0244-011	VA25A0244-012	----	----	----	----
					Result	Result	----	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	58700	64700	----	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	69.9	73.2	----	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	36.8	10.5	----	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	658	776	----	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.42	0.38	----	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	3.30	3.70	----	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	265	168	----	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	4.68	4.72	----	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	133000	122000	----	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	181	201	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	204	903	----	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	1760	1520	----	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	53000	46900	----	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	630	12900	----	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	39.1	40.3	----	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	10700	11400	----	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	1020	684	----	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	12.1	13.2	----	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	151	84.1	----	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10600	9120	----	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11- Unprocessed	BA2501-A-12- Unprocessed	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0244-011	VA25A0244-012	----	----	----	----
					Result	Result	----	----	----	----
Metals										
Potassium	7440-09-7	E440/VA	100	mg/kg	5180	5410	----	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.33	0.24	----	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	2.17	3.79	----	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	17400	16600	----	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	290	276	----	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	7100	7000	----	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	0.110	----	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg	146	294	----	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	409	919	----	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	2.66	2.12	----	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	1.90	1.69	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	27.6	31.0	----	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2400	2370	----	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	9.4	3.4	----	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.9	11.8	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.28	7.62	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.87	2.87	----	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.44	6.67	----	----	----	----
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	----	----	----	----



Analytical Results

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

					Client sample ID	BA2501-A-11- Unprocessed	BA2501-A-12- Unprocessed	----	----	----
					Client sampling date / time	01-Jan-2025 09:00	01-Jan-2025 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA25A0244-011	VA25A0244-012	----	----	----	----
					Result	Result	----	----	----	----
TCLP Metals										
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	----	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	----	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.64	1.59	----	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.086	0.057	----	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1650	1690	----	----	----	----
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----	----
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.22	0.877	----	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.09	0.998	----	----	----	----
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	104	112	----	----	----	----
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	0.35	<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	----	----	----	----
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	13.3	9.42	----	----	----	----
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.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA25A0244	Page	: 1 of 16
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Issue Date	: 13-Jan-2025 10:06
C-O-C number	: ----		
Sampler	: ----		
Site	: (include 2:1 pH)		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Antimony	7440-36-0	E440	34.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Cobalt	7440-48-4	E440	134 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Copper	7440-50-8	E440	172 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Lithium	7439-93-2	E440	59.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Strontium	7440-24-6	E440	42.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Tungsten	7440-33-7	E440	1.31 % DUP-H	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA25A0244-001	BA2501-A-1- Unprocessed	Zinc	7440-66-6	E440	79.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



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	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 BA2501-A-1- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-10- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-11- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-12- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-2- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-3- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-4- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 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 BA2501-A-5- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-6- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-7- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-8- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2501-A-9- Unprocessed	E510	01-Jan-2025	09-Jan-2025	28 days	8 days	✓	09-Jan-2025	28 days	1 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-1- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-10- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-11- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-12- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-2- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-3- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-4- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-5- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-6- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-7- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-8- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2501-A-9- Unprocessed	E440	01-Jan-2025	09-Jan-2025	180 days	8 days	✓	09-Jan-2025	180 days	8 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-1- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-10- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-11- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-12- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-2- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-3- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-4- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-5- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-6- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-7- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-8- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2501-A-9- Unprocessed	E144	01-Jan-2025	----	----	----		08-Jan-2025	----	7 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-1- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-10- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-11- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-12- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-2- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-3- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-4- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-5- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-6- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-7- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-8- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2501-A-9- Unprocessed	E108	01-Jan-2025	09-Jan-2025	30 days	8 days	✓	09-Jan-2025	30 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-1- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-10- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-11- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-12- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 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 : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-2- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-3- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-4- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-5- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-6- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-7- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-8- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2501-A-9- Unprocessed	E512	10-Jan-2025	12-Jan-2025	37 days	11 days	✓	12-Jan-2025	37 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-1- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-10- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-11- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-12- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-2- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-3- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-4- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-5- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-6- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-7- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-8- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2501-A-9- Unprocessed	E444	10-Jan-2025	12-Jan-2025	189 days	11 days	✓	13-Jan-2025	189 days	12 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-1- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-10- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-11- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-12- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-2- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-3- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-4- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		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) BA2501-A-5- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-6- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-7- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-8- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2501-A-9- Unprocessed	EPP444	01-Jan-2025	10-Jan-2025	----	----		----	28 days	9 days	✓

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Mercury by CVAAS (TCLP)	E512	1836638	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1832661	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1836639	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1832662	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1832664	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1832663	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1832661	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1832662	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	1832664	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1832663	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1836638	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1832661	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1836639	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1832662	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1832664	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1836638	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1836639	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, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl , followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/245.1 (mod)	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.

Page : 16 of 16
 Work Order : VA25A0244
 Client : Reworld Renewable Burnaby, ULC
 Project : ----



<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	: VA25A0244	Page	: 1 of 12
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
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	: ----	Date Samples Received	: 07-Jan-2025 12:00
PO	: PO#46693 Weekly Bottom Ash-Suite	Date Analysis Commenced	: 08-Jan-2025
C-O-C number	: ----	Issue Date	: 13-Jan-2025 10:06
Sampler	: ----		
Site	: (include 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.

Signatories	Position	Laboratory Department
Angela Ren	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Vancouver Organics, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	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: 1832663)											
VA25A0244-001	BA2501-A-1- Unprocessed	pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	11.3	0.2%	5%	----
Physical Tests (QC Lot: 1832664)											
VA25A0244-001	BA2501-A-1- Unprocessed	Moisture	----	E144	0.25	%	27.3	27.3	0.0570%	20%	----
Metals (QC Lot: 1832661)											
VA25A0244-001	BA2501-A-1- Unprocessed	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1832662)											
VA25A0244-001	BA2501-A-1- Unprocessed	Aluminum	7429-90-5	E440	50	mg/kg	49300	50700	2.69%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	104	73.2	34.8%	30%	DUP-H
		Arsenic	7440-38-2	E440	0.10	mg/kg	10.1	11.3	11.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	764	654	15.5%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.41	0.06	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	3.92	3.57	9.19%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	156	141	9.65%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	5.42	5.17	4.85%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	141000	130000	8.43%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	121	95.9	23.0%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	99.6	504	134%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	16800	1240	172%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	43800	35500	20.8%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	486	568	15.7%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	33.8	62.7	59.7%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	12900	13600	5.10%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	621	806	25.9%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	11.7	11.1	5.58%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	92.7	92.2	0.584%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	14000	11400	20.8%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5520	5970	7.84%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.22	0.24	0.01	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	2.02	2.80	32.5%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	17000	19300	13.0%	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: 1832662) - continued											
VA25A0244-001	BA2501-A-1- Unprocessed	Strontium	7440-24-6	E440	0.50	mg/kg	421	273	42.5%	40%	DUP-H
		Sulfur	7704-34-9	E440	1000	mg/kg	7900	7000	12.5%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	90.8	112	21.3%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	327	323	1.20%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	3.05	# 1.74	1.31	Diff <2x LOR	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	1.64	1.86	12.4%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	27.7	26.5	4.35%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	2020	4700	79.6%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.4	4.5	1.1	Diff <2x LOR	----
TCLP Metals (QC Lot: 1836638)											
VA25A0244-001	BA2501-A-1- Unprocessed	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1836639)											
VA25A0244-001	BA2501-A-1- Unprocessed	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	1.76	1.69	0.07	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.073	0.068	0.005	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1840	1770	3.88%	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	0.720	0.654	9.61%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.02	0.907	11.4%	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	124	106	15.2%	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	4.55	4.17	8.81%	30%	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----



Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1832664)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1832661)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1832662)						
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: 1832662) - 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	----
TCLP Metals (QCLot: 1836638)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1836639)						
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: 1832663)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1832664)									
Moisture	----	E144	0.25	%	50 %	99.6	90.0	110	----
Metals (QCLot: 1832661)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	97.4	80.0	120	----
Metals (QCLot: 1832662)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	100	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.6	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	99.1	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	100.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	99.7	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	106	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	107	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.7	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.8	80.0	120	----



Sub-Matrix: Soil/Solid					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1832662) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.8	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	105	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	100	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	99.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	120	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: 1836638)										
VA25A0244-001	BA2501-A-1- Unprocessed	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	96.2	50.0	140	----
TCLP Metals (QCLot: 1836639)										
VA25A0244-001	BA2501-A-1- Unprocessed	Antimony, TCLP	7440-36-0	E444	5.03 mg/L	5 mg/L	101	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.4 mg/L	5 mg/L	107	50.0	140	----
		Barium, TCLP	7440-39-3	E444	13.1 mg/L	12.5 mg/L	105	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.238 mg/L	0.25 mg/L	95.3	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.01 mg/L	10 mg/L	90.1	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.241 mg/L	0.25 mg/L	96.4	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.26 mg/L	1.25 mg/L	100	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.40 mg/L	2.5 mg/L	95.9	50.0	140	----
		Iron, TCLP	7439-89-6	E444	240 mg/L	250 mg/L	95.9	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.43 mg/L	10 mg/L	94.3	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	240 mg/L	250 mg/L	96.2	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.48 mg/L	2.5 mg/L	99.4	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.02 mg/L	5 mg/L	100	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.085 mg/L	0.1 mg/L	84.7	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	92.8	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.78 mg/L	5 mg/L	95.5	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.76 mg/L	0.75 mg/L	101	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.25 mg/L	10 mg/L	92.5	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.9 mg/L	1 mg/L	91.1	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: 1832661)									
QC-1832661-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	100.0	70.0	130	----
Metals (QCLot: 1832662)									
QC-1832662-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	114	70.0	130	----
QC-1832662-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	103	70.0	130	----
QC-1832662-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	102	70.0	130	----
QC-1832662-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	98.2	70.0	130	----
QC-1832662-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	110	70.0	130	----
QC-1832662-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	92.8	70.0	130	----
QC-1832662-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	101	70.0	130	----
QC-1832662-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	108	70.0	130	----
QC-1832662-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	104	70.0	130	----
QC-1832662-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	104	70.0	130	----
QC-1832662-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	102	70.0	130	----
QC-1832662-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	106	70.0	130	----
QC-1832662-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	99.1	70.0	130	----
QC-1832662-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	115	70.0	130	----
QC-1832662-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	107	70.0	130	----
QC-1832662-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	104	70.0	130	----
QC-1832662-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	109	70.0	130	----
QC-1832662-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	106	70.0	130	----
QC-1832662-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	105	70.0	130	----
QC-1832662-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	108	70.0	130	----
QC-1832662-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	113	60.0	140	----
QC-1832662-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	99.8	70.0	130	----
QC-1832662-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	117	70.0	130	----
QC-1832662-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	109	70.0	130	----
QC-1832662-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	101	50.0	150	----
QC-1832662-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	102	70.0	130	----
QC-1832662-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	104	40.0	160	----
QC-1832662-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	110	70.0	130	----
QC-1832662-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	123	70.0	130	----
QC-1832662-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	96.0	70.0	130	----
QC-1832662-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	102	70.0	130	----



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: 1832662) - continued									
QC-1832662-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	101	70.0	130	----
QC-1832662-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	114	70.0	130	----

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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COC # _____

Page ____ of ____



ALS Environmental

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: Nicole Victor / Dan Skrypnik			☒ PDF ☐ Excel ☐ Digital ☐ Fax			☐ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																							
Address: 5150 Riverbend Drive			Email 1: nvictor@covanta.com			☐ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT																							
Burnaby BC			Email 2: minchin@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@metrovancooer.org																										
			Sarah.Wellman@metrovancooer.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			Chrome 6			MET-CSR-FULL-VA (all metals)			Number of Containers					
Sample #			Sample Identification (This description will appear on the report)			Date (dd-mm-yy)			Time (hh:mm)			Sample Type			MET-TCLP-VA (all metals, Hg)			MOISTURE			Chrome 6			MET-CSR-FULL-VA (all metals)			Number of Containers		
BA2501-A-1- Unprocessed			Environmental Division Vancouver Work Order Reference VA25A0244 Telephone : +1 604 253 4108			01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-2- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-3- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-4- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-5- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-6- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-7- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-8- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-9- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-10- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-11- Unprocessed						01-Jan-25			9:00			Soil			X X						X			1					
BA2501-A-12- Unprocessed						01-Jan-25			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]		7-Jan-25		0800																09 01/17/2025 12pm GENF 20.00 Front									