



**A. Lanfranco
& Associates Inc.**

Environmental Consultants

Prepared for
METRO VANCOUVER

**Metrotower III 4730 Kingsway
Burnaby, BC V5H 0C6**

WASTE-TO-ENERGY FACILITY

**Appendices of Compliance Emissions Testing Report
May 2022 Survey**

Table of Contents

Appendix

- A Quality Assurance / Quality Control Results
- B Laboratory Results
- C Computer Generated Results
- D Field Data Sheets
- E Calibration Sheets and Technician Certificates

APPENDIX – A

QUALITY ASSURANCE / QUALITY CONTROL RESULTS

Quality assurance / quality control (QA/QC) is divided into four categories: administration, preparation, testing, and analysis. The following sections detail results found for the above four categories.

Administration:

- All field, process, and analytical data was reviewed to ensure data integrity and accuracy.
- Duplicate proof of draft and final report, including data entry, conducted.

Preparation:

- All glassware cleaned
- Blank samples of reagents collected.

Testing:

- Stack diameter and absence of cyclonic flow confirmed
- Calibrated magnehelic used for all velocity measurements
- All trains past pre- and post- leak checks.
- Isokinetics all within $100\% \pm 10\%$.

Analysis:

- Trace Metals and Mercury analysis conducted at Element Labs, Surrey, B.C.
- Fluoride (HF) analysis conducted at ALS Environmental in Burnaby, B.C.
- Nitrous Oxide (N₂O) analysis conducted with portable analyzer by A. Lanfranco and Associates.
- Particulate analysis conducted at A. Lanfranco and Associates Inc., Surrey, BC.
- Chain of Custody protocols followed for all samples.
- Excellent blank values for all sample types. All samples blank corrected.

Sample Type	Blank Value		
Second Quarter 2022	Unit 1	Unit 2	Unit 3
Filter	0.0 mg	0.0 mg	0 mg
Front Half Washings	-0.2 mg	-0.8 mg	-0.5 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.27 ug	<0.27 ug	<0.17 ug
Trace Metals Front *	<74.1 ug	<65.8 ug	<84.1 ug
Trace Metals Back*	<35.4 ug	<45.7 ug	<44.9 ug
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug

APPENDIX - B

LABORATORY RESULTS

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Field Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1571999 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749066
Attn: Missy Sampled By: Company:		

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

Notes To Clients:

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Field Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571999**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749066

	Reference Number	1571999-1	1571999-2	1571999-3	
	Sample Date	May 10, 2022	May 11, 2022	May 12, 2022	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	20	20	41	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	3.3	<1	1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	0.41	1.1	0.53	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	4.0	2.5	2	0.25
Lead	µg	2	<2	<2	1.5
Manganese	µg	0.3	<0.3	<0.3	0.25
Nickel	µg	0.9	<0.5	<0.5	0.5
Phosphorus	µg	37	30	31	2.5
Selenium	µg	<2	4.0	<2	1.5
Tellurium	µg	<2	4.4	4.6	2
Thallium	µg	3.1	<2	2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	3.1	3.8	2	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	8	20	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.9	<0.9	<0.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	<0.2	0.68	<0.2	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	0.4	<0.2	2	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	<0.2	<0.2	<0.2	0.25
Nickel	µg	1	1	1	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	<1	3.3	1.5
Tellurium	µg	5.0	2	6.6	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	2	2	2	0.5
Volume	Sample	mL	390	395	320
Volume	aliquot volume	mL	340	345	270
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Field Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571999**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749066

		Reference Number	1571999-1	1571999-2	1571999-3	Nominal Detection Limit
		Sample Date	May 10, 2022	May 11, 2022	May 12, 2022	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
Mercury by CVAA - Continued						
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	390	395	320	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.2	<0.2	<0.1	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	135	135	135	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	0.06	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	0.02	<0.02	

Approved by:



Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Field Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1571999 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749066
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 7, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



www.Element.com

Project Information

Project ID: Metro Vancouver WTE
Project Name: Field Blanks
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:
Quote #:

Invoice To

Company: A. Lanfranco & Associates Inc.
Address: 101-9488 189 Street
Surrey BC, V4N 4W7
Attention:
Phone: 604-881-2582
Cell:
Fax:
E-mail: mark.lanfranco@alanfranco.com
Agreement ID:
Copy of Report: YES / NO

Report To

Company:
Address:
Attention:
Phone:
Cell:
Fax:
E-mail 1:
E-mail 2:
Copy of Invoice: YES / NO

Additional Reports to

1) Name:
E-mail:
2) Name:
E-mail:
Sample Custody
Sampled by:
Company:
I authorize Element to proceed with the work indicated on this form:
Signature:
Date/Time:

Report Results

Requirements

- ☐ Same Day (200%)
☐ Next Day/Two Day (100%)
☐ Three or Four Days (50%)
☒ 5 to 7 Days (Regular TAT)

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples. If not all samples require RUSH, please indicate in the special instructions.

- ☒ Email ☐ QA/QC
☐ Online ☒ PDF
☒ Fax ☐ Excel

- ☐ HCDWORG ☐ SPIGEC
☐ AB Tier 1 ☐ BCCSR
Other (list below)

Date Required

Special Instructions/Comments (please include contact information including phone number if different from above).

*Front and Back ICAP as per EPA Method 29. *Hg analysis as per EPA Method 29. *Please report µg/sample.

Site I.D.	Sample Description	Depth start end in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers ↓	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg								
1	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)		10-May-22			5	✓	✓	✓	✓	✓	✓								
2																				
3	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)		11-May-22			5	✓	✓	✓	✓	✓	✓								
4																				
5	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)		12-May-22			5	✓	✓	✓	✓	✓	✓								
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				

Please indicate any potentially hazardous samples

Submission of this form acknowledges acceptance of Element's Standard of terms and conditions (<https://www.element.com/terms/terms-and-conditions>)

Page ____ of ____ Control #
ED 120-005

.ot: 1571999 COC



Temp. received: 20.9 °C
Date/Time stamp: MAY 17 13:00
Delivery Method: Drop
Waybill:
Received by: *lu*

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID: Metro Vancouver	Lot ID: 1572080
#101, 9488 - 189 Street	Project Name: Filter Reagent Blanks	Control Number:
Surrey, BC, Canada	Project Location:	Date Received: May 17, 2022
V4N 4W7	LSD:	Date Reported: Jun 8, 2022
Attn: Missy	P.O.:	Report Number: 2749171
Sampled By:	Proj. Acct. code:	
Company:		

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

Notes To Clients:

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver
Project Name: Filter Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1572080**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749171

Reference Number	1572080-1	1572080-2	1572080-3
Sample Date	May 09, 2022	May 09, 2022	May 09, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 Container 1 (filter) / 22.9 °C	Reagent Blank Unit 2 Container 1 (filter) / 22.9 °C	Reagent Blank Unit 3 Container 1 (filter) / 22.9 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	3	<2	3	2.5
Arsenic	µg	1	5.5	1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	1.1	<0.2	0.39	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	<0.3	4.2	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	0.6	<0.5	0.5
Phosphorus	µg	34	38	35	2.5
Selenium	µg	3.5	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	2	2	2	0.5
Mercury by CVAA					
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	250	250	250	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 1B µg/sample	<0.02	<0.02	<0.02	

Approved by:



Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver Project Name: Filter Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1572080 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749171
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 7, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver

** Reference Method Modified*

References

EMC	Emission Measurement Center of EPA
-----	------------------------------------

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



www.Element.com

Project Information

Project ID: Metro Vancouver WTE
Project Name: Filter Reagent Blanks
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:
Quote #:

Invoice To

Company: A. Lanfranco & Associates Inc.
Address: 101-9488 189 Street
Surrey BC, V4N 4W7
Attention:
Phone: 604-881-2582
Cell:
Fax:
E-mail: mark.lanfranco@alanfranco.com
Agreement ID:
Copy of Report: YES / NO

Report To

Company:
Address:
Attention:
Phone:
Cell:
Fax:
E-mail 1:
E-mail 2:
Copy of Invoice: YES / NO

Additional Reports to

1) Name:
E-mail:
2) Name:
E-mail:
Sample Custody
Sampled by:
Company:
I authorize Element to proceed with the work indicated on this form:
Signature:
Date/Time:

Report Results

Requirements

- ☐ Same Day (200%)
☐ Next Day/Two Day (100%)
☐ Three or Four Days (50%)
☒ 5 to 7 Days (Regular TAT)

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples. If not all samples require RUSH, please indicate in the special instructions.

- ☒ Email ☐ QA/QC
☐ Online ☒ PDF
☐ Fax ☐ Excel

- ☐ HCDWORG ☐ SPIGEC
☐ AB Tier 1 ☐ BCCSR
Other (list below)

Date Required

Special Instructions/Comments (please include contact information including phone number if different from above).

* Please report µg/sample

Site I.D.	Sample Description	Depth start end in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	ICAP	Hg	Enter tests above (✓ relevant samples below)
1	Reagent Blank Unit 1 Container 1 (filter)		9-May-22			1	✓	✓	
2									
3	Reagent Blank Unit 2 Container 1 (filter)		9-May-22			1	✓	✓	
4									
5	Reagent Blank Unit 3 Container 1 (filter)		9-May-22			1	✓	✓	
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Please indicate any potentially hazardous samples

Submission of this form acknowledges acceptance of Element's Standard of terms and conditions (<https://www.element.com/terms/terms-and-conditions>)

Page ____ of ____ Control #
ED 120-005

Indicate lot # or affix barcode

Lot: 1572080 COC



Temp. received: 22.9 °C Date/Time stamp: 17 May / 16:32
Delivery Method: Courier
Waybill:
Received by: RLV

CERTIFICATE OF ANALYSIS

Work Order : **VA22B0638**
Client : **A. Lanfranco & Associates Inc.**
Contact : Mark Lanfranco
Address : Unit # 101 9488 - 189 St
 Surrey BC Canada V4N 4W7
Telephone : 604 881 2582
Project : Metro Vancouver WTE
PO : HF
C-O-C number : ----
Sampler : A. Lanfranco
Site : ----
Quote number : Standing Offer
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 2
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 16-May-2022 15:30
Date Analysis Commenced : 22-May-2022
Issue Date : 31-May-2022 10:40

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>
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Marianne Jensen	Analyst	Inorganics, 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
µg/sample	micrograms per sample
mL	millilitre

<: 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: Impinger

(Matrix: Air)

					Client sample ID	Unit 1 HF Blank	Unit 2 HF Blank	Unit 3 HF Blank	----	----
					Client sampling date / time	10-May-2022	11-May-2022	12-May-2022	----	----
Analyte	CAS Number	Method	LOR	Unit		VA22B0638-001	VA22B0638-002	VA22B0638-003	-----	-----
						Result	Result	Result	----	----
Field Tests										
volume, impinger	----	EP248	0.1	mL		295	275	270	----	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<5.0	<5.0	<5.0	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B0638	Page	: 1 of 5
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 16-May-2022 15:30
PO	: HF	Issue Date	: 31-May-2022 10:41
C-O-C number	: ----		
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: Air

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Blank	E248.F	12-May-2022	22-May-2022	----	----		22-May-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Blank	E248.F	11-May-2022	22-May-2022	----	----		22-May-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Blank	E248.F	10-May-2022	22-May-2022	----	----		22-May-2022	28 days	12 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: **Air**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	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
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

QUALITY CONTROL REPORT

Work Order	: VA22B0638	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 16-May-2022 15:30
PO	: HF	Date Analysis Commenced	: 22-May-2022
C-O-C number	: ----	Issue Date	: 31-May-2022 10:40
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Marianne Jensen	Analyst	Vancouver Inorganics, 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: Air					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
Anions and Nutrients (QC Lot: 496497)											
VA22B0638-001	Unit 1 HF Blank	fluoride	16984-48-8	E248.F	0.0050	mg/sample	<5.0	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	µg/sample 295	295		Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: Air								
Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier		
Anions and Nutrients (QCLot: 496497)								
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	----		
volume, impinger	----	EP248	0.1	mL	500	----		



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: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 496497)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	103	90.0	110	----

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: Air

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
Anions and Nutrients (QCLot: 496497)									
VA22B0638-002	Unit 2 HF Blank	fluoride	16984-48-8	E248.F	0.268 mg/sample	0.275 mg/sample	97.3	75.0	125
		volume, impinger	----	EP248		mL		0	0

CERTIFICATE OF ANALYSIS

Work Order : **VA22B0639**
Client : **A. Lanfranco & Associates Inc.**
Contact : Mark Lanfranco
Address : Unit # 101 9488 - 189 St
 Surrey BC Canada V4N 4W7
Telephone : 604 881 2582
Project : Metro Vancouver WTE
PO : HF
C-O-C number : ----
Sampler : A. Lanfranco
Site : ----
Quote number : Standing Offer
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 3
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 16-May-2022 15:30
Date Analysis Commenced : 22-May-2022
Issue Date : 31-May-2022 10:40

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>
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Marianne Jensen	Analyst	Inorganics, Burnaby, British Columbia



General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
µg/sample	micrograms per sample
mL	millilitre

<: less than.

>: greater than.

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

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

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

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



Analytical Results

Sub-Matrix: Impinger

Client sample ID

(Matrix: Air)

					Unit 1 HF Run 1	Unit 1 HF Run 2	Unit 1 HF Run 3	Unit 2 HF Run 1	Unit 2 HF Run 2
Client sampling date / time					10-May-2022	10-May-2022	10-May-2022	11-May-2022	11-May-2022
Analyte	CAS Number	Method	LOR	Unit	VA22B0639-001	VA22B0639-002	VA22B0639-003	VA22B0639-004	VA22B0639-005
					Result	Result	Result	Result	Result
Field Tests									
volume, impinger	----	EP248	0.1	mL	325	395	380	390	335
Anions and Nutrients									
fluoride	16984-48-8	E248.F	5.0	µg/sample	<5.0	<19.8 ^{DLOS}	<5.0	<5.0	<5.0

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

Analytical Results

Sub-Matrix: Impinger

Client sample ID

(Matrix: Air)

					Unit 2 HF Run 3	Unit 3 HF Run 1	Unit 3 HF Run 2	Unit 3 HF Run 3	----
Client sampling date / time					11-May-2022	12-May-2022	12-May-2022	12-May-2022	----
Analyte	CAS Number	Method	LOR	Unit	VA22B0639-006	VA22B0639-007	VA22B0639-008	VA22B0639-009	-----
					Result	Result	Result	Result	----
Field Tests									
volume, impinger	----	EP248	0.1	mL	425	465	410	410	----
Anions and Nutrients									
fluoride	16984-48-8	E248.F	5.0	µg/sample	<5.0	<5.0	<5.0	<5.0	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B0639	Page	: 1 of 6
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 16-May-2022 15:30
PO	: HF	Issue Date	: 31-May-2022 10:41
C-O-C number	: ----		
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: Air

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Run 1	E248.F	12-May-2022	22-May-2022	----	----		22-May-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Run 2	E248.F	12-May-2022	22-May-2022	----	----		22-May-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Run 3	E248.F	12-May-2022	22-May-2022	----	----		22-May-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 1	E248.F	11-May-2022	22-May-2022	----	----		22-May-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 2	E248.F	11-May-2022	22-May-2022	----	----		22-May-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 3	E248.F	11-May-2022	22-May-2022	----	----		22-May-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Run 1	E248.F	10-May-2022	22-May-2022	----	----		22-May-2022	28 days	12 days	✓



Matrix: **Air** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Run 2	E248.F	10-May-2022	22-May-2022	----	----		22-May-2022	28 days	12 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Run 3	E248.F	10-May-2022	22-May-2022	----	----		22-May-2022	28 days	12 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: **Air**

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)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	496497	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").

<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.



QUALITY CONTROL REPORT

Work Order : **VA22B0639**

Client : A. Lanfranco & Associates Inc.

Contact : Mark Lanfranco

Address : Unit # 101 9488 - 189 St
Surrey BC Canada V4N 4W7

Telephone : 604 881 2582

Project : Metro Vancouver WTE

PO : HF

C-O-C number : ----

Sampler : A. Lanfranco

Site : ----

Quote number : Standing Offer

No. of samples received : 9

No. of samples analysed : 9

Page : 1 of 3

Laboratory : Vancouver - Environmental

Account Manager : Brent Mack

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

Telephone : 778-370-3279

Date Samples Received : 16-May-2022 15:30

Date Analysis Commenced : 22-May-2022

Issue Date : 31-May-2022 10:40

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
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Marianne Jensen	Analyst	Vancouver Inorganics, 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: Air					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
Anions and Nutrients (QC Lot: 496497)											
VA22B0638-001	Anonymous	fluoride	16984-48-8	E248.F	0.0050	mg/sample	<5.0	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	µg/sample 295	295		Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: Air								
Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier		
Anions and Nutrients (QCLot: 496497)								
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	----		
volume, impinger	----	EP248	0.1	mL	500	----		



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: Air

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 496497)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	103	90.0	110	----

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: Air

					Matrix Spike (MS) Report				
					Spike		Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High
Anions and Nutrients (QCLot: 496497)									
VA22B0638-002	Anonymous	fluoride	16984-48-8	E248.F	0.268 mg/sample	0.275 mg/sample	97.3	75.0	125
		volume, impinger	----	EP248		mL		0	0

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID: Metro Vancouver WTE	Lot ID: 1571997
#101, 9488 - 189 Street	Project Name: Metals and Hg Samples	Control Number:
Surrey, BC, Canada	Project Location:	Date Received: May 17, 2022
V4N 4W7	LSD:	Date Reported: Jun 8, 2022
Attn: Missy	P.O.:	Report Number: 2749062
Sampled By:	Proj. Acct. code:	
Company:		

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

Notes To Clients:

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571997**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749062

		Reference Number	1571997-1	1571997-2	1571997-3
		Sample Date	May 09, 2022	May 10, 2022	May 10, 2022
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 1 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 1 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 1 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	45	44	30	5
Antimony	µg	8	10	3	2.5
Arsenic	µg	<1	<1	3.5	1
Cadmium	µg	2	3.0	1	0.25
Chromium	µg	1.4	1.5	0.99	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	8.3	9.8	10	0.25
Lead	µg	13	23	14	1.5
Manganese	µg	3.6	1	0.9	0.25
Nickel	µg	2	0.9	<0.5	0.5
Phosphorus	µg	42	40	43	2.5
Selenium	µg	10	2.5	<2	1.5
Tellurium	µg	3.4	<2	<2	2
Thallium	µg	<2	<2	5.9	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	151	183	96.9	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	31	20	20	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	1	<0.9	3.1	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	1.7	0.73	<0.2	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	0.5	<0.2	2.3	0.25
Lead	µg	2.4	<1	<1	1.5
Manganese	µg	0.8	0.3	0.8	0.25
Nickel	µg	2.1	1	0.8	0.5
Phosphorus	µg	27	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	2.5	<2	3.6	2
Thallium	µg	<1	<1	2.7	1.5
Vanadium	µg	<0.9	<0.9	<0.8	1
Zinc	µg	7.2	4.5	5.0	0.5
Volume	Sample	mL	840	795	930
Volume	aliquot volume	mL	790	745	880
Mercury by CVAA					
Mercury	As Tested	µg/L	0.23	0.06	<0.05

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1571997 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749062
Attn: Missy		
Sampled By:		
Company:		

		Reference Number	1571997-1	1571997-2	1571997-3	Nominal Detection Limit
		Sample Date	May 09, 2022	May 10, 2022	May 10, 2022	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 1 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 1 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 1 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
Mercury by CVAA - Continued						
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	0.092	0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	840	795	930	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.4	
Mercury	As Tested	µg/L	<0.05	0.18	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	210	205	205	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.02	0.060	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	1000	500	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.04	<0.08	
Mercury	As Tested	µg/L	0.15	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.048	<0.02	<0.02	

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571997**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749062

		Reference Number	1571997-4	1571997-5	1571997-6
		Sample Date	May 10, 2022	May 11, 2022	May 11, 2022
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 2 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 2 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 2 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	20	20	26	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	4.1	4.8	2	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	1.5	0.82	1.4	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	2	1	0.25
Lead	µg	3.5	<2	2	1.5
Manganese	µg	0.9	0.5	0.3	0.25
Nickel	µg	14	1	1	0.5
Phosphorus	µg	34	35	28	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	7.0	<2	2	2
Thallium	µg	2	<2	6.5	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	7.3	5.2	12	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	20	9	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.8	2.8	<0.8	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	0.60	<0.2	0.77	0.2
Cobalt	µg	<0.2	<0.2	0.3	0.25
Copper	µg	<0.2	0.9	<0.2	0.25
Lead	µg	<1	<1	2.7	1.5
Manganese	µg	1	0.7	0.5	0.25
Nickel	µg	2	2.3	2	0.5
Phosphorus	µg	22	20	20	2.5
Selenium	µg	3.4	2	<1	1.5
Tellurium	µg	4.5	<2	<2	2
Thallium	µg	<1	<1	2.3	1.5
Vanadium	µg	<0.8	<0.9	<0.8	1
Zinc	µg	7.8	5.1	4.2	0.5
Volume	Sample	mL	900	850	880
Volume	aliquot volume	mL	850	800	830
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	0.05

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1571997 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749062
Attn: Missy Sampled By: Company:		

		Reference Number	1571997-4	1571997-5	1571997-6	
		Sample Date	May 10, 2022	May 11, 2022	May 11, 2022	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 2 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 2 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 2 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	900	850	880	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.4	<0.3	<0.4	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	205	205	210	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	1000	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.08	<0.04	
Mercury	As Tested	µg/L	0.08	<0.05	0.08	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.02	<0.02	0.03	

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571997**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749062

		Reference Number	1571997-7	1571997-8	1571997-9
		Sample Date	May 11, 2022	May 12, 2022	May 12, 2022
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 3 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 3 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 3 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	28	29	20	5
Antimony	µg	4	4	4	2.5
Arsenic	µg	3.5	2	5.0	1
Cadmium	µg	0.6	0.5	0.5	0.25
Chromium	µg	1.9	1.4	1.4	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	7.8	4.6	5.7	0.25
Lead	µg	8.9	4.2	5.9	1.5
Manganese	µg	1	0.6	2	0.25
Nickel	µg	5.8	0.9	2	0.5
Phosphorus	µg	37	37	36	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	46.1	52.1	68.7	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	37	10	9	5
Antimony	µg	5	<2	<2	2.5
Arsenic	µg	<0.8	<0.8	<0.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	1.9	<0.2	<0.2	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	0.7	0.9	<0.2	0.25
Lead	µg	2.2	<1	<1	1.5
Manganese	µg	0.7	0.5	0.3	0.25
Nickel	µg	1	1	2.2	0.5
Phosphorus	µg	21	20	20	2.5
Selenium	µg	3.7	<1	2.8	1.5
Tellurium	µg	5.7	<2	3.7	2
Thallium	µg	<1	<1	2.6	1.5
Vanadium	µg	<0.8	<0.8	<0.9	1
Zinc	µg	4.2	3.5	3.7	0.5
Volume	Sample	mL	920	930	850
Volume	aliquot volume	mL	870	880	800
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	0.05

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1571997**
Control Number:
Date Received: May 17, 2022
Date Reported: Jun 8, 2022
Report Number: 2749062

		Reference Number	1571997-7	1571997-8	1571997-9	
		Sample Date	May 11, 2022	May 12, 2022	May 12, 2022	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 3 Run 1 (MV Unit R-1 + 4 Bottles) / 19.6 °C	Unit 3 Run 2 (MV Unit R-2 + 4 Bottles) / 19.6 °C	Unit 3 Run 3 (MV Unit R-3 + 4 Bottles) / 19.6 °C	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	920	930	850	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.4	<0.4	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	205	205	210	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	<0.05	<0.05	0.09	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	0.03	

Approved by:



Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1571997 Control Number: Date Received: May 17, 2022 Date Reported: Jun 8, 2022 Report Number: 2749062
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 7, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Project Information

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
Legal Location:
PO/AFE#:
Proj. Acct. Code:
Quote #:

Invoice To

Company: A. Lanfranco & Associates Inc.
Address: 101-9488 189 Street
Surrey BC, V4N 4W7
Attention:
Phone: 604-881-2582
Cell:
Fax:
E-mail: mark.lanfranco@alanfranco.com
Agreement ID:
Copy of Report: YES / NO

Report To

Company:
Address:
Attention:
Phone:
Cell:
Fax:
E-mail 1:
E-mail 2:
Copy of Invoice: YES / NO

Additional Reports to

1) Name:
E-mail:
2) Name:
E-mail:
Sample Custody
Sampled by:
Company:
I authorize Element to proceed with the work indicated on this form:
Signature:
Date/Time:

Report Results

Requirements

- ☐ Same Day (200%)
☐ Next Day/Two Day (100%)
☐ Three or Four Days (50%)
☒ 5 to 7 Days (Regular TAT)

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples. If not all samples require RUSH, please indicate in the special instructions.

- ☒ Email ☐ QA/QC
☐ Online ☒ PDF
☐ Fax ☐ Excel

- ☐ HCDWORG ☐ SPIGEC
☐ AB Tier 1 ☐ BCCSR
Other (list below)

Date Required

Special Instructions/Comments (please include contact information including phone number if different from above).

*Front and Back ICAP as per EPA Method 29. *Hg analysis as per EPA Method 29. *Please report µg/sample.

	Site I.D.	Sample Description	Depth start end in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers ↓	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg						
1		Unit 1 Run 1 (MV Unit 1 R-1 + 4 Bottles)		9-May-22			5	✓	✓	✓	✓	✓	✓						
2		Unit 1 Run 2 (MV Unit 1 R-2 + 4 Bottles)		10-May-22			5	✓	✓	✓	✓	✓	✓						
3		Unit 1 Run 3 (MV Unit 1 R-3 + 4 Bottles)		10-May-22			5	✓	✓	✓	✓	✓	✓						
4																			
5		Unit 2 Run 1 (MV unit 2 R-1 + 4 Bottles)		10-May-22			5	✓	✓	✓	✓	✓	✓						
6		Unit 2 Run 2 (MV unit 1 R-2 + 4 Bottles)		11-May-22			5	✓	✓	✓	✓	✓	✓						
7		Unit 2 Run 3 (MV unit 2 R-3 + 4 Bottles)		11-May-22			5	✓	✓	✓	✓	✓	✓						
8																			
9		Unit 3 Run 1 (MV Unit 3 R-1 + 4 Bottles)		11-May-22			5	✓	✓	✓	✓	✓	✓						
10		Unit 3 Run 2 (MV Unit 3 R-2 + 4 Bottles)		12-May-22			5	✓	✓	✓	✓	✓	✓						
11		Unit 3 Run 3 (MV Unit 3 R-3 + 4 Bottles)		12-May-22			5	✓	✓	✓	✓	✓	✓						
12																			
13																			
14																			
15																			

Please indicate any potentially hazardous samples

Submission of this form acknowledges acceptance of Element's Standard of terms and conditions (<https://www.element.com/terms/terms-and-conditions>)

Lot: 1571997 COC



Temp. received: 19.6 °C Date/Time stamp: MAY 17 12:07

Delivery Method: *drop*

Waybill:

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID: Metro Vancouver WTE	Lot ID: 1572273
#101, 9488 - 189 Street	Project Name: Reagent Blanks	Control Number:
Surrey, BC, Canada	Project Location:	Date Received: May 18, 2022
V4N 4W7	LSD:	Date Reported: Jun 9, 2022
Attn: Missy	P.O.:	Report Number: 2749437
Sampled By:	Proj. Acct. code:	
Company:		

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

Notes To Clients:

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1572273**
Control Number:
Date Received: May 18, 2022
Date Reported: Jun 9, 2022
Report Number: 2749437

		Reference Number	1572273-1	1572273-2	1572273-3
		Sample Date	May 09, 2022	May 09, 2022	May 09, 2022
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	4.7	3.2	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	0.42	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	6.5	0.3	0.8	0.25
Lead	µg	<2	3.2	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	<2	<2	<2	2.5
Selenium	µg	3.5	7.9	<2	1.5
Tellurium	µg	<2	4.1	4.4	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	0.6	<0.5	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	5	7	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1.0	<1.0	<1.0	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	0.3	1	<0.2	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	<0.2	<0.2	<0.2	0.25
Nickel	µg	<0.5	2	1.0	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	2.5	3.6	1.5
Tellurium	µg	<2	3.0	7.8	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<1.0	<1.0	<1.0	1
Zinc	µg	1	2	2	0.5
Volume	Sample	mL	265	265	270
Volume	aliquot volume	mL	215	215	220
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	250	250	250

Analytical Report

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1572273**
Control Number:
Date Received: May 18, 2022
Date Reported: Jun 9, 2022
Report Number: 2749437

		Reference Number	1572273-1	1572273-2	1572273-3
		Sample Date	May 09, 2022	May 09, 2022	May 09, 2022
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	265	265	220
Volume	aliquot volume	mL	5.0	5.0	5.0
Volume	Final	mL	50	45	45
Mercury	Fraction 2B	µg/sample	<0.1	<0.1	<0.10
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	100	100	100
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	200	200	200
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	<0.02

Approved by:



Carol Nam, Dipl. T.
Quality Assurance Coordinator

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7

Attn: Missy

Sampled By:

Company:

Project ID: Metro Vancouver WTE
Project Name: Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1572273**
Control Number:
Date Received: May 18, 2022
Date Reported: Jun 9, 2022
Report Number: 2749437

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 7, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 6, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 18, 2022	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Project Information

Project ID: Metro Vancouver WTE
 Project Name: Reagent Blanks
 Project Location:
 Legal Location:
 PO/AFE#:
 Proj. Acct. Code:
 Quote #:

Invoice To

Company: A. Lanfranco & Associates Inc.
 Address: 101-9488 189 Street
 Surrey BC, V4N 4W7
 Attention:
 Phone: 604-881-2582
 Cell:
 Fax:
 E-mail: mark.lanfranco@alanfranco.com
 Agreement ID:
 Copy of Report: YES / NO

Report To

Company:
 Address:
 Attention:
 Phone:
 Cell:
 Fax:
 E-mail 1:
 E-mail 2:
 Copy of Invoice: YES / NO

Additional Reports to

1) Name:
 E-mail:
 2) Name:
 E-mail:
Sample Custody
 Sampled by:
 Company:
 I authorize Element to proceed with the work indicated on this form:
 Signature:
 Date/Time:

Report Results

Requirements

- ☐ Same Day (200%)
☐ Next Day/Two Day (100%)
☐ Three or Four Days (50%)
☒ 5 to 7 Days (Regular TAT)

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples. If not all samples require RUSH, please indicate in the special instructions.

- ☒ Email ☐ QA/QC
☐ Online ☒ PDF
☐ Fax ☐ Excel

- ☐ HCDWORG ☐ SPIGEC
☐ AB Tier 1 ☐ BCCSR
 Other (list below)

Date Required

Special Instructions/Comments (please include contact information including phone number if different from above).

*Front and Back ICAP as per EPA Method 29. *Hg analysis as per EPA Method 29. *Please report µg/sample.

	Site I.D.	Sample Description	Depth start end in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg						
1		Reagent Blank Unit 1		9-May-22			5	✓	✓	✓	✓	✓	✓						
2																			
3		Reagent Blank Unit 2		9-May-22			5	✓	✓	✓	✓	✓	✓						
4																			
5		Reagent Blank Unit 3		9-May-22			5	✓	✓	✓	✓	✓	✓						
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			

Please indicate any potentially hazardous samples

Submission of this form acknowledges acceptance of Element's Standard of terms and conditions (<https://www.element.com/terms/terms-and-conditions>)

Page ____ of ____ Control #
 ED 120-005

Indicate lot # or affix barcode here

Lot: 1572273 COC



Temp. received: 22.3 °C
 Date/Time stamp: 17 May 16:32
 Delivery Method: Courier
 Waybill:
 Received by: Rm

APPENDIX - C

COMPUTER GENERATED RESULTS

Client: Metro Vancouver
Jobsite: WTE (Burnaby, BC)
Source: Unit 1

Date: 9-May-22
Run: 1 - Particulate / Metals
Run Time: 13:45 - 15:46

Concentrations:

Particulate	4.31 mg/dscm	0.00188 gr/dscf
	2.35 mg/Acm	0.00103 gr/Acf
	3.72 mg/dscm (@ 11% O2)	0.00163 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.280 Kg/hr	0.617 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1082 dscm/min	38210 dscf/min
	18.03 dscm/sec	637 dscf/sec
	1979 Acf/min	69900 Acf/min

Velocity	12.952 m/sec	42.49 f/sec
-----------------	--------------	-------------

Temperature	150.7 oC	303.3 oF
--------------------	----------	----------

Moisture	16.8 %
-----------------	--------

Gas Analysis	9.4 % O2
	10.3 % CO2

30.017 Mol. Wt (g/gmole) Dry
27.996 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5535 dscm	90.178 dscf
Sample Time	120.0 minutes	
Isokineticity	104.2 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	9-May-22
Jobsite:	WTE (Burnaby, BC)	Run:	1 - Particulate / Metals
Source:	Unit 1	Run Time:	11:10 - 13:15

Control Unit (Y)	0.9864	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3080	Filter (grams) 0.00840	CO2 O2	Impinger 1 226.0
Pitot Factor	0.8328	Washings (grams) 0.00260	10.17 9.37	Impinger 2 102.0
Baro. Press. (in. Hg)	29.83	Traverse 1	10.33 9.50	Impinger 3 30.0
Static Press. (in. H2O)	-19.00	Traverse 2		Impinger 4 10.0
Stack Height (ft)	30			Impinger 5 5.0
Stack Diameter (in.)	70.90			Impinger 6 3.0
Stack Area (sq.ft.)	27.417			Gel 11.6
Minutes Per Reading	5.0			
Minutes Per Point	5.0			

Total (grams) 0.01100	10.25	9.44	Gain (grams) 387.6
------------------------------	--------------	-------------	---------------------------

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	819.727								
1	5.0	823.640	0.39	1.99	68	68	5	293	1.5	104.0
2	10.0	827.650	0.41	2.08	69	69	5	299	4.7	104.2
3	15.0	831.760	0.43	2.17	70	70	6	302	8.4	104.3
4	20.0	835.960	0.45	2.27	70	70	6	303	12.5	104.3
5	25.0	840.080	0.43	2.18	71	71	6	303	17.7	104.4
6	30.0	844.150	0.42	2.13	72	72	6	304	25.2	104.2
7	35.0	848.120	0.40	2.03	72	72	6	303	45.6	104.1
8	40.0	851.850	0.35	1.78	73	73	6	302	53.2	104.2
9	45.0	855.480	0.33	1.67	73	73	6	304	58.3	104.6
10	50.0	858.980	0.31	1.58	74	74	6	302	62.5	103.7
11	55.0	862.390	0.29	1.48	75	75	6	302	66.1	104.2
12	60.0	865.440	0.23	1.18	75	75	6	299	69.4	104.4
Traverse 2	0.0	865.440								
1	5.0	868.480	0.23	1.18	75	75	5	301	1.5	104.2
2	10.0	871.650	0.25	1.28	75	75	5	302	4.7	104.3
3	15.0	874.880	0.26	1.33	75	75	6	302	8.4	104.2
4	20.0	878.230	0.28	1.43	76	76	6	303	12.5	104.0
5	25.0	881.640	0.29	1.48	76	76	6	303	17.7	104.1
6	30.0	885.170	0.31	1.58	76	76	6	303	25.2	104.2
7	35.0	889.360	0.44	2.23	77	77	6	311	45.6	104.4
8	40.0	893.650	0.46	2.33	77	77	6	312	53.2	104.6
9	45.0	898.080	0.49	2.49	78	78	7	310	58.3	104.4
10	50.0	902.730	0.54	2.75	78	78	7	308	62.5	104.3
11	55.0	907.520	0.57	2.91	79	79	7	307	66.1	104.3
12	60.0	912.080	0.51	2.62	79	79	7	302	69.4	104.6
Average:			0.378	1.923	74.3	74.3	6.0	303.3		104.2

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C.)
Source: Unit 1

Date: 10-May-22
Run: 2 - Particulate / Metals
Run Time: 08:58 - 11:00

Concentrations:

Particulate	4.20 mg/dscm	0.00184 gr/dscf
	2.36 mg/Acm	0.00103 gr/Acf
	3.71 mg/dscm (@ 11% O2)	0.00162 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.276 Kg/hr	0.609 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1097 dscm/min	38744 dscf/min
	18.28 dscm/sec	646 dscf/sec
	1950 Acm/min	68850 Acf/min
Velocity	12.757 m/sec	41.85 f/sec
Temperature	151.3 oC	304.3 oF
Moisture	14.3 %	
Gas Analysis	9.7 % O2	
	10.0 % CO2	
	29.988 Mol. Wt (g/gmole) Dry	
	28.278 Mol. Wt (g/gmole) Wet	

Sample Parameters:

Sample Volume	2.5242 dscm	89.140 dscf
Sample Time	120.0 minutes	
Isokineticity	101.5 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	10-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	2 - Particulate / Metals
Source:	Unit 1	Run Time:	08:58 - 11:00

Control Unit (Y)	0.9854	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3080	Filter (grams) 0.00650	CO2 O2	Impinger 1 130.0
Pitot Factor	0.8328	Washings (grams) 0.00410	10.00 9.60	Impinger 2 132.0
Baro. Press. (in. Hg)	29.83		10.00 9.80	Impinger 3 26.0
Static Press. (in. H2O)	-19.00	Total (grams) 0.01060		Impinger 4 8.0
Stack Height (ft)	30			Impinger 5 4.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 13.1
Minutes Per Reading	5.0		10.00 9.70	Gain (grams) 315.1
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	912.857								
1	5.0	916.620	0.38	1.87	55	55	6	301	1.5	101.7
2	10.0	920.480	0.40	1.96	55	55	6	303	4.7	101.8
3	15.0	924.380	0.41	2.01	54	54	6	303	8.4	101.8
4	20.0	928.320	0.42	2.06	55	55	6	303	12.5	101.4
5	25.0	932.100	0.39	1.91	54	54	7	304	17.7	101.2
6	30.0	935.750	0.36	1.76	55	55	7	304	25.2	101.5
7	35.0	939.300	0.34	1.67	55	55	7	304	45.6	101.6
8	40.0	942.740	0.32	1.57	56	56	7	305	53.2	101.3
9	45.0	946.230	0.33	1.62	57	57	7	306	58.3	101.1
10	50.0	949.630	0.31	1.52	58	58	7	307	62.5	101.4
11	55.0	952.930	0.29	1.43	59	59	6	304	66.1	101.4
12	60.0	956.060	0.26	1.29	59	59	6	299	69.4	101.2
Traverse 2	0.0	956.060								
1	5.0	959.150	0.25	1.24	60	60	5	302	1.5	101.9
2	10.0	962.290	0.26	1.29	61	61	5	304	4.7	101.4
3	15.0	965.540	0.28	1.38	61	61	5	306	8.4	101.3
4	20.0	968.900	0.30	1.49	62	62	5	306	12.5	101.0
5	25.0	972.160	0.28	1.39	63	63	5	307	17.7	101.3
6	30.0	975.650	0.32	1.59	63	63	5	307	25.2	101.5
7	35.0	979.650	0.41	2.08	64	64	6	308	45.6	102.8
8	40.0	983.800	0.45	2.24	66	66	6	309	53.2	101.5
9	45.0	988.200	0.50	2.50	67	67	6	307	58.3	101.8
10	50.0	992.690	0.52	2.61	68	68	6	305	62.5	101.6
11	55.0	997.330	0.55	2.78	69	69	6	302	66.1	101.7
12	60.0	1001.850	0.52	2.64	69	69	6	298	69.4	101.6
Average:			0.369	1.829	60.2	60.2	6.0	304.3		101.5

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C.)
Source: Unit 1

Date: 10-May-22
Run: 3 - Particulate / Metals
Run Time: 11:50 - 13:51

Concentrations:

Particulate	2.6 mg/dscm	0.0011 gr/dscf
	1.4 mg/Acm	0.0006 gr/Acf
	2.3 mg/dscm (@ 11% O2)	0.0010 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.170 Kg/hr	0.374 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1092 dscm/min	38560 dscf/min
	18.20 dscm/sec	643 dscf/sec
	1969 Acm/min	69536 Acf/min

Velocity	12.884 m/sec	42.27 f/sec
-----------------	--------------	-------------

Temperature	156.5 oC	313.7 oF
--------------------	----------	----------

Moisture	14.5 %
-----------------	--------

Gas Analysis	9.7 % O2
	9.9 % CO2

29.974 Mol. Wt (g/gmole) Dry
28.241 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5096 dscm	88.626 dscf
Sample Time	120.0 minutes	
Isokineticity	101.5 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	10-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	3 - Particulate / Metals
Source:	Unit 1	Run Time:	11:50 - 13:51

Control Unit (Y)	0.9854	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3080	Filter (grams) 0.00630	CO2 O2	Impinger 1 154.0
Pitot Factor	0.8328	Washings (grams) 0.00020	9.83 9.67	Impinger 2 105.0
Baro. Press. (in. Hg)	29.83	Traverse 1	9.83 9.70	Impinger 3 24.0
Static Press. (in. H2O)	-19.00	Traverse 2		Impinger 4 8.0
Stack Height (ft)	30			Impinger 5 4.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 21.7
Minutes Per Reading	5.0			Gain (grams) 318.7
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	2.154								
1	5.0	5.320	0.26	1.30	67	67	5	304	1.5	101.3
2	10.0	8.610	0.28	1.40	68	68	5	306	4.7	101.4
3	15.0	11.980	0.30	1.49	68	68	5	314	8.4	100.9
4	20.0	15.470	0.32	1.59	68	68	5	315	12.5	101.3
5	25.0	18.810	0.29	1.44	69	69	5.5	312	17.7	101.4
6	30.0	22.220	0.30	1.49	69	69	5.5	313	25.2	101.8
7	35.0	26.200	0.41	2.03	69	69	5	315	45.6	101.9
8	40.0	30.400	0.46	2.29	69	69	5	317	53.2	101.8
9	45.0	34.420	0.42	2.08	69	69	5	317	58.3	101.9
10	50.0	38.850	0.51	2.53	70	70	5	317	62.5	101.8
11	55.0	43.380	0.53	2.65	70	70	5	312	66.1	101.8
12	60.0	47.960	0.54	2.71	70	70	5	307	69.4	101.7
Traverse 2	0.0	47.960								
1	5.0	51.880	0.40	2.00	71	71	5	312	1.5	101.1
2	10.0	55.920	0.42	2.09	71	71	5	316	4.7	101.9
3	15.0	60.050	0.44	2.19	72	72	5	318	8.4	101.8
4	20.0	64.130	0.43	2.14	72	72	5	319	12.5	101.7
5	25.0	67.950	0.38	1.88	72	72	5	320	17.7	101.3
6	30.0	71.630	0.35	1.75	73	73	6	317	25.2	101.3
7	35.0	75.230	0.33	1.65	74	74	6	315	45.6	101.7
8	40.0	78.940	0.35	1.76	75	75	6	314	53.2	101.6
9	45.0	82.480	0.32	1.61	76	76	6	314	58.3	101.1
10	50.0	85.940	0.30	1.52	76	76	6	310	62.5	101.8
11	55.0	89.320	0.29	1.47	77	77	5	312	66.1	101.1
12	60.0	92.530	0.26	1.32	78	78	5	313	69.4	101.2
Average:			0.370	1.849	71.4	71.4	5.3	313.7		101.5

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C)
Source: Unit 2

Date: 10-May-22
Run: 1 - Particulate / Metals
Run Time: 11:18 - 13:24

Concentrations:

Particulate	0.4 mg/dscm	0.0002 gr/dscf
	0.3 mg/Acm	0.0001 gr/Acf
	0.4 mg/dscm (@ 11% O2)	0.0002 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.030 Kg/hr	0.067 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1142 dscm/min	40332 dscf/min
	19.03 dscm/sec	672 dscf/sec
	2008 Acm/min	70915 Acf/min

Velocity	13.140 m/sec	43.11 f/sec
-----------------	--------------	-------------

Temperature	146.6 oC	295.8 oF
--------------------	----------	----------

Moisture	15.0 %
-----------------	--------

Gas Analysis	11.0 % O2
	9.0 % CO2

29.880 Mol. Wt (g/gmole) Dry
28.100 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6109 dscm	92.205 dscf
Sample Time	120.0 minutes	
Isokineticity	100.9 %	

*** Standard Conditions:**

Metric:	20 deg C, 101.325 kPa
Imperial:	68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	10-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	1 - Particulate / Metals
Source:	Unit 2	Run Time:	11:18 - 13:24

Control Unit (Y)	1.0037	Collection:		Gas Analysis (Vol. %):		Condensate Collection:	
Nozzle Diameter (in.)	0.3080	Filter (grams)	0.00005	CO2	O2	Impinger 1	234.0
Pitot Factor	0.8525	Washings (grams)	0.00110	9.00	11.00	Impinger 2	70.0
Baro. Press. (in. Hg)	30.13		Traverse 1	9.00	11.00	Impinger 3	14.0
Static Press. (in. H2O)	-20.00		Traverse 2			Impinger 4	6.0
Stack Height (ft)	30					Impinger 5	3.0
Stack Diameter (in.)	70.90					Impinger 6	2.0
Stack Area (sq.ft.)	27.417					Gel	16.4
Minutes Per Reading	5.0					Gain (grams)	345.4
Minutes Per Point	5.0						

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	602.809								
1	5.0	606.600	0.39	1.83	57	57	7	294	1.5	100.9
2	10.0	610.470	0.41	1.90	57	57	7	301	4.7	100.9
3	15.0	614.100	0.36	1.68	58	58	7	300	8.4	100.7
4	20.0	617.400	0.29	1.35	58	58	7	299	12.5	101.9
5	25.0	620.380	0.24	1.12	60	60	6	300	17.7	100.7
6	30.0	623.130	0.20	0.94	61	61	6	300	25.2	101.6
7	35.0	626.710	0.34	1.61	62	62	7	295	45.6	101.1
8	40.0	630.880	0.46	2.17	62	62	7	296	53.2	101.4
9	45.0	635.310	0.52	2.47	63	63	10	291	58.3	100.9
10	50.0	639.900	0.56	2.66	64	64	10	294	62.5	100.8
11	55.0	644.140	0.47	2.24	65	65	10	291	66.1	101.1
12	60.0	648.120	0.41	1.98	66	66	10	285	69.4	101.0
Traverse 2	0.0	648.120								
1	5.0	652.560	0.52	2.46	67	67	10	301	1.5	101.0
2	10.0	656.930	0.50	2.37	68	68	10	300	4.7	101.1
3	15.0	661.050	0.44	2.09	69	69	9	300	8.4	101.3
4	20.0	664.830	0.37	1.76	70	70	9	300	12.5	101.1
5	25.0	668.220	0.30	1.43	70	70	9	299	17.7	100.6
6	30.0	671.390	0.26	1.24	70	70	6	299	25.2	101.0
7	35.0	674.750	0.29	1.39	70	70	6	294	45.6	101.0
8	40.0	678.350	0.34	1.63	71	71	6	293	53.2	99.8
9	45.0	681.980	0.34	1.64	71	71	6	294	58.3	100.7
10	50.0	685.800	0.37	1.79	72	72	7	293	62.5	101.3
11	55.0	689.710	0.39	1.89	73	73	7	291	66.1	100.7
12	60.0	693.240	0.32	1.55	73	73	7	290	69.4	100.3
Average:			0.379	1.800	65.7	65.7	7.8	295.8		100.9

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C)
Source: Unit 2

Date: 11-May-22
Run: 2 - Particulate / Metals
Run Time: 08:54 - 10:56

Concentrations:

Particulate	0.50 mg/dscm	0.00022 gr/dscf
	0.29 mg/Acm	0.00013 gr/Acf
	0.49 mg/dscm (@ 11% O2)	0.00021 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.034 Kg/hr	0.076 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1159 dscm/min	40922 dscf/min
	19.31 dscm/sec	682 dscf/sec
	1962 Acm/min	69304 Acf/min

Velocity	12.841 m/sec	42.13 f/sec
-----------------	--------------	-------------

Temperature	139.5 oC	283.1 oF
--------------------	----------	----------

Moisture	13.4 %
-----------------	--------

Gas Analysis	10.9 % O2 9.3 % CO2
---------------------	------------------------

29.915 Mol. Wt (g/gmole) Dry
28.315 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5212 dscm	89.035 dscf
Sample Time	120.0 minutes	
Isokineticity	100.4 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	11-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	2 - Particulate / Metals
Source:	Unit 2	Run Time:	08:54 - 10:56

Control Unit (Y)	1.0037	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3080	Filter (grams) 0.00005	CO2 O2	Impinger 1 172.0
Pitot Factor	0.8328	Washings (grams) 0.00120	9.17 10.67	Impinger 2 58.0
Baro. Press. (in. Hg)	30.16	Traverse 1	9.33 11.07	Impinger 3 32.0
Static Press. (in. H2O)	-19.50	Traverse 2		Impinger 4 8.0
Stack Height (ft)	30.16			Impinger 5 4.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 17.4
Minutes Per Reading	5.0			Gain (grams) 293.4
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	694.048								
1	5.0	697.420	0.31	1.45	56	56	4	275	1.5	100.4
2	10.0	700.820	0.32	1.49	56	56	4	277	4.7	99.7
3	15.0	704.050	0.29	1.43	57	57	4	284	8.4	100.5
4	20.0	707.080	0.25	1.15	57	57	4	286	12.5	100.9
5	25.0	709.980	0.23	1.06	58	58	4	285	17.7	100.4
6	30.0	712.950	0.24	1.11	59	59	5	286	25.2	100.5
7	35.0	716.590	0.36	1.67	60	60	5	284	45.6	100.4
8	40.0	720.560	0.43	2.00	60	60	6	284	53.2	100.3
9	45.0	724.860	0.50	2.33	61	61	6	284	58.3	100.6
10	50.0	729.500	0.58	2.71	62	62	6	282	62.5	100.6
11	55.0	733.920	0.52	2.45	63	63	6	279	66.1	100.7
12	60.0	738.390	0.53	2.51	63	63	6	275	69.4	100.6
Traverse 2	0.0	738.390								
1	5.0	742.360	0.42	1.97	64	64	6	282	1.5	100.6
2	10.0	746.430	0.44	2.06	65	65	6	284	4.7	100.7
3	15.0	750.400	0.42	1.97	66	66	6	285	8.4	100.4
4	20.0	754.030	0.35	1.64	67	67	6	287	12.5	100.4
5	25.0	757.500	0.32	1.50	68	68	6	288	17.7	100.2
6	30.0	760.930	0.31	1.46	69	69	5	289	25.2	100.5
7	35.0	764.710	0.38	1.79	69	69	5	287	45.6	100.0
8	40.0	768.550	0.39	1.83	69	69	5	288	53.2	100.3
9	45.0	772.450	0.40	1.88	70	70	5	288	58.3	100.5
10	50.0	776.540	0.44	2.09	70	70	6	282	62.5	100.1
11	55.0	780.770	0.47	2.24	70	70	6	280	66.1	100.1
12	60.0	784.890	0.44	2.11	70	70	6	274	69.4	100.3
Average:			0.389	1.950	63.7	63.7	5.3	283.1		100.4

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C)
Source: Unit 2

Date: 11-May-22
Run: 3 - Particulate / Metals
Run Time: 11:37 - 13:39

Concentrations:

Particulate	2.3 mg/dscm	0.0010 gr/dscf
	1.3 mg/Acm	0.0006 gr/Acf
	2.2 mg/dscm (@ 11% O2)	0.0010 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.16 Kg/hr	0.354 lb/hr
--------------------	------------	-------------

Flue Gas Characteristics:

Flow	1153 dscm/min	40723 dscf/min
	19.22 dscm/sec	679 dscf/sec
	2026 Acm/min	71539 Acf/min

Velocity	13.255 m/sec	43.49 f/sec
-----------------	--------------	-------------

Temperature	142.3 oC	288.2 oF
--------------------	----------	----------

Moisture	16.0 %
-----------------	--------

Gas Analysis	10.4 % O2
	9.6 % CO2

29.949 Mol. Wt (g/gmole) Dry
28.040 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6927 dscm	95.094 dscf
Sample Time	120.0 minutes	
Isokineticity	103.1 %	

*** Standard Conditions:**

Metric:	20 deg C, 101.325 kPa
Imperial:	68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	11-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	3 - Particulate / Metals
Source:	Unit 2	Run Time:	11:37 - 13:39

Control Unit (Y)	1.0037	Collection:	Gas Analysis (Vol. %):		Condensate Collection:				
Nozzle Diameter (in.)	0.3080		Filter (grams)	0.00005	CO2	O2	Impinger 1	265.0	
Pitot Factor	0.8328		Washings (grams)	0.00620	Traverse 1	9.33	10.70	Impinger 2	82.0
Baro. Press. (in. Hg)	30.16				Traverse 2	9.83	10.10	Impinger 3	10.0
Static Press. (in. H2O)	-19.50	Total (grams) 0.0063					Impinger 4	6.0	
Stack Height (ft)	30						Impinger 5	3.0	
Stack Diameter (in.)	70.90						Impinger 6	1.0	
Stack Area (sq.ft.)	27.417						Gel	17.1	
Minutes Per Reading	5.0			9.58	10.40		Gain (grams)	384.1	
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	785.083								
1	5.0	789.320	0.48	2.24	66	66	6	291	1.5	103.2
2	10.0	793.450	0.46	2.13	65	65	6	293	4.7	103.1
3	15.0	797.630	0.47	2.18	66	66	6	294	8.4	103.1
4	20.0	801.350	0.37	1.72	67	67	6	295	12.5	103.2
5	25.0	804.980	0.35	1.63	67	67	6	293	17.7	103.4
6	30.0	808.330	0.30	1.39	67	67	6	294	25.2	103.0
7	35.0	812.120	0.38	1.78	68	68	7	291	45.6	103.3
8	40.0	815.990	0.40	1.87	68	68	7	292	53.2	102.9
9	45.0	820.120	0.45	2.11	69	69	7	290	58.3	103.2
10	50.0	824.150	0.42	2.01	69	69	7	275	62.5	103.2
11	55.0	828.230	0.43	2.06	69	69	7	273	66.1	103.1
12	60.0	832.220	0.41	1.98	69	69	7	270	69.4	103.0
Traverse 2	0.0	832.220								
1	5.0	836.380	0.45	2.13	70	70	6	285	1.5	103.4
2	10.0	840.300	0.40	1.89	71	71	6	287	4.7	103.3
3	15.0	844.060	0.37	1.74	72	72	6	294	8.4	103.2
4	20.0	847.600	0.33	1.55	72	72	6	295	12.5	102.9
5	25.0	850.800	0.27	1.27	73	73	6	296	17.7	102.7
6	30.0	853.760	0.23	1.08	75	75	6	295	25.2	102.4
7	35.0	857.250	0.32	1.51	73	73	6	292	45.6	102.7
8	40.0	861.410	0.45	2.13	74	74	6	289	53.2	102.9
9	45.0	865.810	0.50	2.38	73	73	7	286	58.3	103.3
10	50.0	870.300	0.52	2.48	73	73	7	284	62.5	103.3
11	55.0	874.700	0.50	2.39	74	74	8	282	66.1	102.9
12	60.0	879.020	0.48	2.30	74	74	8	280	69.4	102.9
Average:			0.406	1.915	70.2	70.2	3.0	288.2		103.1

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C.)
Source: Unit 3

Date: 11-May-22
Run: 1 - Particulate / Metals
Run Time: 10:50 - 12:55

Concentrations:

Particulate	1.43 mg/dscm	0.00062 gr/dscf
	0.80 mg/Acm	0.00035 gr/Acf
	1.30 mg/dscm (@ 11% O2)	0.00057 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.104 Kg/hr	0.229 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1211 dscm/min	42756 dscf/min
	20.18 dscm/sec	713 dscf/sec
	2156 Acm/min	76133 Acf/min

Velocity	14.107 m/sec	46.28 f/sec
-----------------	--------------	-------------

Temperature	156.3 oC	313.3 oF
--------------------	----------	----------

Moisture	14.7 %
-----------------	--------

Gas Analysis	10.0 % O2
	9.3 % CO2

29.880 Mol. Wt (g/gmole) Dry
28.133 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6602 dscm	93.944 dscf
Sample Time	120.0 minutes	
Isokineticity	98.8 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	11-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	1 - Particulate / Metals
Source:	Unit 3	Run Time:	10:50 - 12:55

Control Unit (Y)	1.0043	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3050	Filter (grams) 0.00180	CO2 O2	Impinger 1 202.0
Pitot Factor	0.8525	Washings (grams) 0.00200	9.00 10.00	Impinger 2 98.0
Baro. Press. (in. Hg)	30.18		9.50 10.00	Impinger 3 16.0
Static Press. (in. H2O)	-18.00	Total (grams) 0.00380		Impinger 4 6.0
Stack Height (ft)	30			Impinger 5 2.0
Stack Diameter (in.)	70.90			Impinger 6 1.0
Stack Area (sq.ft.)	27.417			Gel 19.2
Minutes Per Reading	5.0		9.25 10.00	Gain (grams) 344.2
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	277.154								
1	5.0	281.050	0.44	2.16	60	60	7	308	1.5	99.6
2	10.0	285.250	0.51	2.50	60	60	7	311	4.7	100.0
3	15.0	289.520	0.54	2.65	61	61	9	311	8.4	98.6
4	20.0	294.070	0.60	2.94	61	61	9	311	12.5	99.8
5	25.0	298.490	0.56	2.74	61	61	9	311	17.7	100.3
6	30.0	302.470	0.46	2.26	62	62	9	312	25.2	99.4
7	35.0	305.990	0.36	1.76	62	62	7	313	45.6	99.3
8	40.0	309.380	0.33	1.62	63	63	7	313	53.2	99.7
9	45.0	312.600	0.30	1.47	64	64	6	314	58.3	99.1
10	50.0	315.550	0.25	1.24	64	64	6	309	62.5	99.1
11	55.0	317.980	0.23	1.13	64	64	5	312	66.1	85.2
12	60.0	320.630	0.20	0.99	65	65	5	310	69.4	99.3
Traverse 2	0.0	320.630								
1	5.0	324.190	0.36	1.78	66	66	8	311	1.5	99.5
2	10.0	327.900	0.39	1.92	66	66	8	316	4.7	100.0
3	15.0	331.590	0.39	1.92	67	67	8	317	8.4	99.4
4	20.0	335.260	0.39	1.92	67	67	8	317	12.5	98.8
5	25.0	338.920	0.38	1.87	68	68	8	317	17.7	99.6
6	30.0	342.550	0.38	1.87	68	68	8	317	25.2	98.8
7	35.0	347.020	0.57	2.81	68	68	5	318	45.6	99.6
8	40.0	351.940	0.69	3.40	68	68	5	317	53.2	99.8
9	45.0	356.700	0.66	3.26	69	69	5	317	58.3	98.5
10	50.0	361.080	0.55	2.72	69	69	5	316	62.5	99.1
11	55.0	365.200	0.48	2.38	69	69	4.5	315	66.1	99.6
12	60.0	368.900	0.38	1.91	70	70	4.5	305	69.4	99.6
Average:			0.433	2.134	65.1	65.1	6.8	313.3		98.8

Client: Metro Vancouver
Jobsite: WTE (Burnaby, B.C.)
Source: Unit 3

Date: 12-May-22
Run: 2 - Particulate / Metals
Run Time: 08:50 - 11:55

Concentrations:

Particulate	2.85 mg/dscm	0.00124 gr/dscf
	1.60 mg/Acm	0.00070 gr/Acf
	2.59 mg/dscm (@ 11% O2)	0.00113 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.206 Kg/hr	0.453 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1203 dscm/min	42483 dscf/min
	20.05 dscm/sec	708 dscf/sec
	2148 Acfm/min	75840 Acf/min

Velocity	14.052 m/sec	46.10 f/sec
-----------------	--------------	-------------

Temperature	150.3 oC	302.5 oF
--------------------	----------	----------

Moisture	15.4 %
-----------------	--------

Gas Analysis	10.0 % O2
	9.5 % CO2

29.920 Mol. Wt (g/gmole) Dry
28.080 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6685 dscm	94.240 dscf
Sample Time	120.0 minutes	
Isokineticity	100.0 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
 Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	12-May-22
Jobsite:	WTE (Burnaby, B.C)	Run:	2 - Particulate / Metals
Source:	Unit 3	Run Time:	08:50 - 11:55

Control Unit (Y)	1.0043	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3050	Filter (grams) 0.00190	CO2 O2	Impinger 1 192.0
Pitot Factor	0.8328	Washings (grams) 0.00570	9.50 10.00	Impinger 2 122.0
Baro. Press. (in. Hg)	29.95	Traverse 1	9.50 10.00	Impinger 3 24.0
Static Press. (in. H2O)	-18.00	Traverse 2		Impinger 4 6.0
Stack Height (ft)	30			Impinger 5 3.0
Stack Diameter (in.)	70.90			Impinger 6 1.0
Stack Area (sq.ft.)	27.417			Gel 17.5
Minutes Per Reading	5.0			Gain (grams) 365.5
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	369.685								
1	5.0	374.300	0.64	3.07	56	56	9	285	1.5	100.0
2	10.0	379.050	0.69	3.21	56	56	9	308	4.7	100.7
3	15.0	383.890	0.72	3.34	56	56	9.5	309	8.4	100.5
4	20.0	388.310	0.60	2.79	56	56	9.5	309	12.5	100.4
5	25.0	392.450	0.52	2.42	56	56	8	307	17.7	100.8
6	30.0	396.200	0.43	2.01	57	57	8	307	25.2	100.1
7	35.0	399.610	0.36	1.68	57	57	6	306	45.6	99.4
8	40.0	402.690	0.29	1.35	57	57	6	306	53.2	99.9
9	45.0	405.690	0.31	1.45	58	58	6	305	58.3	93.9
10	50.0	408.750	0.24	1.13	58	58	6	299	62.5	108.3
11	55.0	411.710	0.26	1.24	58	58	5.5	290	66.1	100.1
12	60.0	414.390	0.22	1.05	58	58	5.5	290	69.4	98.5
Traverse 2	0.0	414.390								
1	5.0	417.800	0.35	1.67	59	59	6.5	291	1.5	99.4
2	10.0	421.200	0.36	1.69	59	59	6.5	305	4.7	98.6
3	15.0	424.660	0.36	1.69	60	60	6.5	305	8.4	100.2
4	20.0	427.900	0.32	1.52	60	60	6.5	305	12.5	99.4
5	25.0	431.110	0.31	1.46	61	61	6	305	17.7	99.9
6	30.0	434.300	0.31	1.46	61	61	6	305	25.2	99.3
7	35.0	438.420	0.52	2.45	60	60	8	305	45.6	99.4
8	40.0	442.800	0.58	2.73	60	60	8	306	53.2	100.2
9	45.0	447.380	0.63	2.97	61	61	9	305	58.3	100.3
10	50.0	452.220	0.70	3.31	62	62	9	304	62.5	100.4
11	55.0	457.060	0.70	3.32	62	62	9.5	303	66.1	100.4
12	60.0	461.300	0.55	2.62	62	62	9.5	300	69.4	98.8
Average:			0.457	2.151	58.8	58.8	7.5	302.5		100.0

Client: Metro Vancouver
Jobsite: WTE(Burnaby,B.C)
Source: Unit 3

Date: 12-May-22
Run: 3 - Particulate / Metals
Run Time: 11:09 - 13:13

Concentrations:

Particulate	1.72 mg/dscm	0.00075 gr/dscf
	0.95 mg/Acm	0.00042 gr/Acf
	1.60 mg/dscm (@ 11% O2)	0.00070 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.121 Kg/hr	0.267 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1176 dscm/min	41538 dscf/min
	19.60 dscm/sec	692 dscf/sec
	2125 Acn/min	75051 Acf/min

Velocity	13.906 m/sec	45.62 f/sec
-----------------	--------------	-------------

Temperature	153.7 oC	308.7 oF
--------------------	----------	----------

Moisture	15.8 %
-----------------	--------

Gas Analysis	10.3 % O2 9.3 % CO2
---------------------	------------------------

29.890 Mol. Wt (g/gmole) Dry
28.016 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6174 dscm	92.435 dscf
Sample Time	120.0 minutes	
Isokineticity	100.2 %	

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	Metro Vancouver	Date:	12-May-22
Jobsite:	WTE(Burnaby,B.C)	Run:	3 - Particulate / Metals
Source:	Unit 3	Run Time:	11:09 - 13:13

Control Unit (Y)	1.0043	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3050	Filter (grams) 0.00380	CO2	Impinger 1
Pitot Factor	0.8525	Washings (grams) 0.00070	O2	Impinger 2
Baro. Press. (in. Hg)	29.95		Traverse 1	Impinger 3
Static Press. (in. H2O)	-18.00		Traverse 2	Impinger 4
Stack Height (ft)	30	Total (grams) 0.00450		Impinger 5
Stack Diameter (in.)	70.90			Impinger 6
Stack Area (sq.ft.)	27.417			Gel
Minutes Per Reading	5.0		9.25	Gain (grams)
Minutes Per Point	5.0		10.25	367.6

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	461.730								
1	5.0	464.800	0.28	1.38	60	60	5	308	1.5	98.8
2	10.0	468.100	0.32	1.57	60	60	5	311	4.7	99.6
3	15.0	471.420	0.32	1.57	60	60	6	311	8.4	100.2
4	20.0	474.530	0.28	1.37	61	61	6	311	12.5	100.1
5	25.0	477.640	0.28	1.37	60	60	6	309	17.7	100.2
6	30.0	480.800	0.29	1.42	60	60	6	309	25.2	100.0
7	35.0	484.710	0.44	2.16	60	60	7.5	307	45.6	100.5
8	40.0	488.830	0.49	2.41	60	60	7.5	308	53.2	100.5
9	45.0	493.140	0.54	2.66	60	60	8	307	58.3	100.2
10	50.0	497.600	0.57	2.82	61	61	8	305	62.5	100.6
11	55.0	501.900	0.55	2.71	61	61	8	306	66.1	98.8
12	60.0	505.910	0.45	2.23	61	61	8	301	69.4	101.4
Traverse 2	0.0	505.910								
1	5.0	510.290	0.55	2.71	61	61	5	306	1.5	100.6
2	10.0	514.820	0.61	2.99	61	61	5	310	4.7	99.1
3	15.0	519.400	0.60	2.95	62	62	5	309	8.4	100.8
4	20.0	523.900	0.59	2.90	62	62	5	310	12.5	99.9
5	25.0	528.280	0.55	2.70	63	63	5	312	17.7	100.6
6	30.0	532.450	0.50	2.46	63	63	5	312	25.2	100.4
7	35.0	536.080	0.38	1.87	63	63	4.5	310	45.6	100.0
8	40.0	539.520	0.34	1.67	63	63	4.5	311	53.2	100.2
9	45.0	542.750	0.30	1.47	63	63	4.5	312	58.3	100.2
10	50.0	546.050	0.31	1.53	63	63	4.5	310	62.5	100.6
11	55.0	549.180	0.28	1.38	63	63	4	309	66.1	100.3
12	60.0	552.080	0.23	1.14	64	64	4	305	69.4	102.0
Average:			0.419	2.060	61.5	61.5	5.7	308.7		100.2

Client: Metro Vancouver
Jobsite: WTE (Burnaby,B.C)
Source: Unit 1

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		10-May-22	10-May-22	10-May-22
Test Time		09:14 - 10:14	10:24 - 11:24	11:50 - 12:50
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.83	29.83	29.83
DGM Factor	(Y)	0.9886	0.9886	0.9886
Initial Reading	(m ³)	518.187	518.760	519.417
Final Reading	(m ³)	518.756	519.387	520.022
Temp. Outlet	(Avg. oF)	62.0	66.0	66.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.57	0.62	0.60
HF	(mg)	0.003	0.010	0.003
Oxygen	(Vol. %)	9.7	9.7	9.7
HF	(mg/Sm ³)	0.005	0.017	0.004
HF	(mg/Sm ³ @ 11% O2)	0.004	0.015	0.004
Moisture	(Vol. %)	14.3	14.3	14.5

Client: Metro Vancouver
Jobsite: WTE (Burnaby,B.C)
Source: Unit 2

Sample Type: HF		Test 1	Test 2	Test 3
Parameter				
Test Date		11-May-22	1-May-22	11-May-22
Test Time		09:04 - 10:04	10:17 - 11:17	11:26 - 12:26
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.16	30.16	30.16
DGM Factor	(Y)	0.9886	0.9886	0.9886
Initial Reading	(m ³)	520.025	520.632	521.197
Final Reading	(m ³)	520.628	521.192	522.069
Temp. Outlet	(Avg. oF)	57.0	59.0	62.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.61404	0.56823	0.87994
HF	(mg)	0.003	0.003	0.003
Oxygen	(Vol. %)	10.9	10.4	10.4
HF	(mg/Sm ³)	0.004	0.005	0.003
HF	(mg/Sm ³ @ 11% O ₂)	0.004	0.004	0.003
Moisture (isokinetic)	(Vol. %)	13.4	13.4	16.0

*Wet Basis Calculated on moisture from isokinetic tests

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

Client: Metro Vancouver
Jobsite: WTE (Burnaby,B.C)
Source: Unit 3

Sample Type: HF					
Parameter		Test 1	Test 2	Test 3	
Test Date		12-May-22	12-May-22	12-May-22	
Test Time		08:50 - 09:50	10:03 - 11:03	11:15 - 12:15	
Test Duration	(min.)	60	60	60	
Baro. Press.	(in. Hg)	29.93	29.93	29.93	
DGM Factor	(Y)	0.9886	0.9886	0.9886	
Initial Reading	(m ³)	522.078	522.685	523.281	
Final Reading	(m ³)	522.682	523.276	523.891	
Temp. Outlet	(Avg. oF)	67.0	70.0	68.0	
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50	
Gas Volume	(Sm ³)	0.59948	0.58277	0.60379	
HF	(mg)	0.003	0.003	0.003	
Oxygen	(Vol. %)	10.0	10.0	10.3	
HF	(mg/Sm³)	0.004	0.004	0.004	
HF	(mg/Sm³ @ 11% O₂)	0.004	0.004	0.004	
Moisture (isokinetic)	(Vol. %)	15.4	15.4	15.8	

*Wet Basis Calculated on moisture from isokinetic tests

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

Client: Metro Vancouver
Jobsite: WTE (Burnaby,B.C)

Parameter: N₂O

Molecular Weight: 44.00 grams/mol **Reportable Detection**
Lab Detection Limit: 0.1 ppm **Limit:** 0.18 mg/Sm³

Sample ID	Date	Time	N ₂ O ppm	N ₂ O mg/Sm ³	N ₂ O mg/Sm ³ @ 11% O ₂
Unit 1 - Run 1	10-May-22	9:14 - 10:14	3.0	5.5	5.8
Unit 1 - Run 2	10-May-22	10:24 - 11:24	4.0	7.3	7.5
Unit 1 - Run 3	10-May-22	11:50 - 12:50	3.0	5.5	5.6
Average					6.3
Unit 1 - Run 1	11-May-22	9:04 - 10:04	5.0	9.2	9.1
Unit 2 - Run 2	11-May-22	10:17 - 11:17	3.0	5.5	5.0
Unit 2 - Run 3	11-May-22	11:27 - 12:27	6.0	11.0	10.5
Average					8.2
Unit 3 - Run 1	12-May-22	8:50 - 09:50	3.0	5.5	5.4
Unit 3 - Run 2	12-May-22	10:03 - 11:03	5.0	9.2	9.1
Unit 3 - Run 3	12-May-22	11:15 - 12:15	3.0	5.5	5.3
Average					6.6

APPENDIX - D

FIELD DATA SHEETS

[illegible]

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE	DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN				
SOURCE <i>Unit #2</i>					PROBE	Cp		VOLUMES	(mL)	(mL)	(mL)				
PARAMETER / RUN No <i>metals / particulate / R-2</i>					PORT LENGTH			Imp. #1	0	172	172				
DATE <i>May. 14 2022</i>					STATIC PRESSURE, IN. H2O <i>-19.5"</i>			Imp. #2	100	158	58				
OPERATOR: <i>DS</i>					STACK DIAMETER <i>70.9"</i>			Imp. #3	100	132	32				
CONTROL UNIT <i>AV 15</i> Y <i>1.0037</i>					STACK HEIGHT <i>30.0</i>			Imp. #4	0	8	8				
								Imp. #5	100	109	9				
BAROMETRIC PRESSURE, IN. Hg <i>30.16</i>					INITIAL LEAK TEST <i>0.00 / 0.15%</i>			Imp. #6	100	102	2				
ASSUMED MOISTURE, Bw <i>16%</i>					FINAL LEAK TEST <i>0.00 / 0.15%</i>			Imp. #8							
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites				
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %			
	<i>0854</i>	<i>694.048</i>													
1		<i>697.42</i>	<i>0.31</i>	<i>1.45</i>	<i>56</i>	<i>275</i>	<i>264</i>	<i>231</i>	<i>59</i>	<i>4</i>					
2	10	<i>700.82</i>	<i>0.32</i>	<i>1.49</i>	<i>56</i>	<i>277</i>									
3		<i>704.05</i>	<i>0.29</i>	<i>1.34</i>	<i>57</i>	<i>284</i>	<i>273</i>	<i>235</i>	<i>57</i>	<i>4</i>	<i>9.5</i>	<i>10.6</i>			
4	20	<i>707.08</i>	<i>0.25</i>	<i>1.15</i>	<i>57</i>	<i>283</i>									
5		<i>709.98</i>	<i>0.23</i>	<i>1.06</i>	<i>58</i>	<i>285</i>	<i>251</i>	<i>261</i>	<i>56</i>	<i>4</i>					
6	30	<i>712.95</i>	<i>0.24</i>	<i>1.11</i>	<i>59</i>	<i>286</i>									
7		<i>716.59</i>	<i>0.36</i>	<i>1.67</i>	<i>60</i>	<i>284</i>	<i>250</i>	<i>254</i>	<i>59</i>	<i>5</i>	<i>9.5</i>	<i>10.5</i>			
8	40	<i>720.53</i>	<i>0.43</i>	<i>2.00</i>	<i>60</i>	<i>284</i>									
9		<i>724.86</i>	<i>0.50</i>	<i>2.33</i>	<i>61</i>	<i>284</i>	<i>250</i>	<i>248</i>	<i>52</i>	<i>6</i>					
10	50	<i>729.50</i>	<i>0.58</i>	<i>2.71</i>	<i>62</i>	<i>282</i>									
11		<i>733.92</i>	<i>0.52</i>	<i>2.45</i>	<i>63</i>	<i>279</i>	<i>251</i>	<i>252</i>	<i>51</i>	<i>6</i>					
12	60	<i>738.39</i>	<i>0.53</i>	<i>2.51</i>	<i>63</i>	<i>275</i>					<i>8.5</i>	<i>10.9</i>			
1		<i>742.36</i>	<i>0.42</i>	<i>1.97</i>	<i>64</i>	<i>282</i>	<i>250</i>	<i>251</i>	<i>52</i>	<i>6</i>					
2	10	<i>746.43</i>	<i>0.44</i>	<i>2.06</i>	<i>65</i>	<i>284</i>									
3		<i>750.40</i>	<i>0.42</i>	<i>1.97</i>	<i>66</i>	<i>285</i>	<i>249</i>	<i>251</i>	<i>53</i>	<i>6</i>	<i>9.0</i>	<i>11.1</i>			
4	20	<i>754.03</i>	<i>0.35</i>	<i>1.64</i>	<i>67</i>	<i>287</i>									
5		<i>757.50</i>	<i>0.32</i>	<i>1.50</i>	<i>68</i>	<i>288</i>	<i>250</i>	<i>251</i>	<i>49</i>	<i>5</i>					
6	30	<i>760.93</i>	<i>0.31</i>	<i>1.46</i>	<i>69</i>	<i>289</i>									
7		<i>764.71</i>	<i>0.38</i>	<i>1.79</i>	<i>69</i>	<i>286</i>	<i>251</i>	<i>252</i>	<i>48</i>	<i>5</i>	<i>9.5</i>	<i>11.0</i>			
8	40	<i>768.55</i>	<i>0.39</i>	<i>1.83</i>	<i>69</i>	<i>288</i>									
9		<i>772.45</i>	<i>0.40</i>	<i>1.88</i>	<i>70</i>	<i>288</i>	<i>251</i>	<i>252</i>	<i>48</i>	<i>6</i>					
10	50	<i>776.54</i>	<i>0.44</i>	<i>2.09</i>	<i>70</i>	<i>282</i>									
11		<i>780.71</i>	<i>0.44</i>	<i>2.24</i>	<i>70</i>	<i>280</i>	<i>249</i>	<i>252</i>			<i>9.5</i>	<i>11.1</i>			
12	<i>10:56</i>	<i>784.89</i>	<i>0.44</i>	<i>2.11</i>	<i>70</i>	<i>274</i>									

116

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE	DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN			
SOURCE <i>Unit #2</i>					PROBE	<i>G-308</i>	<i>0.3080</i>	VOLUMES	(mL)	(mL)	(mL)			
PARAMETER / RUN No <i>Metals/Particulate / R-3</i>					Cp		<i>0.8378</i>	Imp. #1	<i>0</i>	<i>265</i>	<i>265</i>			
DATE <i>May 11, 2022</i>					PORT LENGTH			Imp. #2	<i>100</i>	<i>182</i>	<i>82</i>			
OPERATOR: <i>OKS</i>					STATIC PRESSURE, IN. H2O		<i>-19.54</i>	Imp. #3	<i>100</i>	<i>110</i>	<i>10</i>			
CONTROL UNIT <i>AV 15</i>					STACK DIAMETER		<i>70.94</i>	Imp. #4	<i>0</i>	<i>6</i>	<i>6</i>			
Y <i>1.0037</i>					STACK HEIGHT		<i>30.01</i>	Imp. #5	<i>100</i>	<i>103</i>	<i>3</i>			
ΔH@ <i>7.669</i>					INITIAL LEAK TEST		<i>0.002 @ 15'</i>	Imp. #6	<i>100</i>	<i>101</i>	<i>1</i>			
BAROMETRIC PRESSURE, IN. Hg <i>30.16</i>					FINAL LEAK TEST		<i>0.002 @ 15'</i>	Imp. #7	<i>200g</i>					
ASSUMED MOISTURE, Bw <i>16%</i>								Imp. #8						
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %		
1	<i>11:37</i>	<i>785.083</i>												
2	10	<i>789.37</i>	<i>0.48</i>	<i>2.24</i>	<i>66</i>	<i>291</i>	<i>232</i>	<i>225</i>	<i>52</i>	<i>6</i>				
3		<i>793.45</i>	<i>0.48</i>	<i>2.13</i>	<i>65</i>	<i>293</i>					<i>9.0</i>	<i>10.9</i>		
4	20	<i>797.63</i>	<i>0.47</i>	<i>2.18</i>	<i>66</i>	<i>294</i>	<i>251</i>	<i>245</i>	<i>54</i>	<i>6</i>				
5		<i>801.35</i>	<i>0.37</i>	<i>1.72</i>	<i>67</i>	<i>295</i>								
6	30	<i>804.98</i>	<i>0.35</i>	<i>1.63</i>	<i>67</i>	<i>293</i>	<i>257</i>	<i>258</i>	<i>56</i>	<i>6</i>				
7		<i>808.33</i>	<i>0.30</i>	<i>1.39</i>	<i>67</i>	<i>294</i>								
8	40	<i>812.12</i>	<i>0.38</i>	<i>1.78</i>	<i>68</i>	<i>291</i>	<i>255</i>	<i>257</i>	<i>52</i>	<i>7</i>	<i>9.0</i>	<i>11.1</i>		
9		<i>815.99</i>	<i>0.40</i>	<i>1.87</i>	<i>68</i>	<i>292</i>								
10	50	<i>820.12</i>	<i>0.45</i>	<i>2.11</i>	<i>69</i>	<i>290</i>	<i>250</i>	<i>253</i>	<i>51</i>	<i>7</i>				
11		<i>824.15</i>	<i>0.42</i>	<i>2.01</i>	<i>69</i>	<i>278</i>								
12	60	<i>828.23</i>	<i>0.43</i>	<i>2.06</i>	<i>69</i>	<i>273</i>	<i>251</i>	<i>252</i>	<i>51</i>	<i>7</i>	<i>10.0</i>	<i>10.1</i>		
		<i>832.22</i>	<i>0.41</i>	<i>1.98</i>	<i>69</i>	<i>270</i>								
1		<i>836.38</i>	<i>.45</i>	<i>2.13</i>	<i>70</i>	<i>285</i>	<i>249</i>	<i>250</i>	<i>50</i>	<i>6</i>				
2	10	<i>840.30</i>	<i>.40</i>	<i>1.89</i>	<i>71</i>	<i>287</i>					<i>10.0</i>	<i>10.1</i>		
3		<i>844.06</i>	<i>0.37</i>	<i>1.74</i>	<i>72</i>	<i>294</i>	<i>250</i>	<i>251</i>	<i>52</i>	<i>6</i>				
4	20	<i>847.60</i>	<i>0.33</i>	<i>1.55</i>	<i>72</i>	<i>295</i>								
5		<i>850.80</i>	<i>0.27</i>	<i>1.27</i>	<i>73</i>	<i>296</i>	<i>250</i>	<i>251</i>	<i>50</i>	<i>6</i>				
6	30	<i>853.76</i>	<i>0.23</i>	<i>1.08</i>	<i>75</i>	<i>295</i>								
7		<i>857.25</i>	<i>0.32</i>	<i>1.51</i>	<i>73</i>	<i>292</i>	<i>249</i>	<i>249</i>	<i>51</i>	<i>6</i>				
8	40	<i>861.47</i>	<i>0.45</i>	<i>2.13</i>	<i>74</i>	<i>289</i>					<i>9.5</i>	<i>10.3</i>		
9		<i>865.81</i>	<i>0.50</i>	<i>2.38</i>	<i>73</i>	<i>286</i>	<i>251</i>	<i>250</i>	<i>53</i>	<i>7</i>				
10	50	<i>870.30</i>	<i>0.52</i>	<i>2.48</i>	<i>73</i>	<i>284</i>								
11		<i>874.70</i>	<i>0.50</i>	<i>2.39</i>	<i>74</i>	<i>282</i>	<i>251</i>	<i>251</i>	<i>50</i>	<i>8</i>	<i>10.0</i>	<i>9.9</i>		
12	<i>13:39</i>	<i>879.02</i>	<i>0.48</i>	<i>2.30</i>	<i>74</i>	<i>280</i>								

CLIENT <i>MV Covanta</i>	NOZZLE <i>MJ01</i>	DIAMETER, IN. <i>3050</i>	IMPINGER	INITIAL	FINAL	TOTAL GAIN
SOURCE <i>Unit H3</i>	PROBE <i>7ALGURP</i>	Cp. <i>8328</i>	VOLUMES	(mL)	(mL)	(mL)
PARAMETER / RUN No <i>Metals Part. 12-2</i>	PORT LENGTH		Imp. #1	<i>0</i>	<i>192</i>	<i>192</i>
DATE <i>5-12-22</i>	STATIC PRESSURE, IN. H ₂ O <i>-18"</i>		Imp. #2	<i>100</i>	<i>222</i>	<i>122</i>
OPERATOR: <i>ML</i>	STACK DIAMETER <i>70.9"</i>		Imp. #3	<i>100</i>	<i>124</i>	<i>24</i>
CONTROL UNIT <i>ST Gray CA6</i>	STACK HEIGHT <i>30"</i>		Imp. #4	<i>0</i>	<i>6</i>	<i>6</i>
<i>Y 1.0043</i>			Imp. #5	<i>100</i>	<i>103</i>	<i>3</i>
<i>ΔH@1.880</i>			Imp. #6	<i>100</i>	<i>101</i>	<i>1</i>
BAROMETRIC PRESSURE, IN. Hg <i>29.95</i>	INITIAL LEAK TEST <i>0.002 cal/s</i>		Upstream Diameters			
ASSUMED MOISTURE, Bw <i>18%</i>	FINAL LEAK TEST <i>0.000 cal/s</i>		Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %		
	<i>0850</i>	<i>369.685</i>												
1		<i>374.30</i>	<i>.64</i>	<i>3.07</i>	<i>56</i>	<i>285</i>	<i>250</i>	<i>251</i>	<i>47</i>	<i>9</i>	<i>9.5</i>	<i>10</i>		
2		<i>379.05</i>	<i>.69</i>	<i>3.21</i>	<i>56</i>	<i>308</i>								
3		<i>383.89</i>	<i>.72</i>	<i>3.34</i>	<i>56</i>	<i>309</i>	<i>250</i>	<i>252</i>	<i>46</i>	<i>9.5</i>				
4		<i>388.31</i>	<i>.60</i>	<i>2.79</i>	<i>56</i>	<i>309</i>								
5		<i>392.45</i>	<i>.52</i>	<i>2.42</i>	<i>56</i>	<i>307</i>	<i>251</i>	<i>252</i>	<i>47</i>	<i>8</i>				
6		<i>396.2</i>	<i>.43</i>	<i>2.01</i>	<i>57</i>	<i>307</i>								
7		<i>399.61</i>	<i>.36</i>	<i>1.68</i>	<i>57</i>	<i>306</i>	<i>250</i>	<i>251</i>	<i>48</i>	<i>6</i>				
8		<i>402.69</i>	<i>.29</i>	<i>1.35</i>	<i>57</i>	<i>306</i>								
9		<i>405.90</i>	<i>.31</i>	<i>1.45</i>	<i>58</i>	<i>305</i>	<i>250</i>	<i>252</i>	<i>49</i>	<i>6</i>				
10		<i>408.75</i>	<i>.24</i>	<i>1.13</i>	<i>58</i>	<i>299</i>								
11		<i>411.71</i>	<i>.26</i>	<i>1.24</i>	<i>58</i>	<i>290</i>	<i>250</i>	<i>252</i>	<i>50</i>	<i>5.5</i>	<i>9.5</i>	<i>10</i>		
12		<i>414.39</i>	<i>.22</i>	<i>1.05</i>	<i>58</i>	<i>290</i>								
1														
2		<i>417.80</i>	<i>.35</i>	<i>1.67</i>	<i>59</i>	<i>291</i>	<i>250</i>	<i>251</i>	<i>50</i>	<i>6.5</i>				
3		<i>421.2</i>	<i>.36</i>	<i>1.69</i>	<i>59</i>	<i>305</i>								
4		<i>424.66</i>	<i>.36</i>	<i>1.69</i>	<i>60</i>	<i>305</i>	<i>250</i>	<i>255</i>	<i>49</i>	<i>6.5</i>				
5		<i>427.90</i>	<i>.32</i>	<i>1.52</i>	<i>60</i>	<i>305</i>								
6		<i>431.11</i>	<i>.31</i>	<i>1.46</i>	<i>61</i>	<i>305</i>	<i>250</i>	<i>256</i>	<i>50</i>	<i>6</i>				
7		<i>434.30</i>	<i>.31</i>	<i>1.46</i>	<i>61</i>	<i>305</i>								
8		<i>438.42</i>	<i>.52</i>	<i>2.45</i>	<i>60</i>	<i>305</i>	<i>250</i>	<i>256</i>	<i>50</i>	<i>8</i>				
9		<i>442.8</i>	<i>.58</i>	<i>2.73</i>	<i>60</i>	<i>306</i>								
10		<i>447.38</i>	<i>.63</i>	<i>2.97</i>	<i>61</i>	<i>305</i>	<i>250</i>	<i>255</i>	<i>50</i>	<i>9</i>	<i>9.5</i>	<i>10</i>		
11		<i>452.22</i>	<i>.70</i>	<i>3.31</i>	<i>62</i>	<i>304</i>								
12		<i>457.06</i>	<i>.70</i>	<i>3.37</i>	<i>62</i>	<i>303</i>	<i>250</i>	<i>255</i>	<i>51</i>	<i>9.5</i>				
	<i>1155</i>	<i>461.33</i>	<i>.55</i>	<i>2.62</i>	<i>62</i>	<i>300</i>								

[illegible]

A. Lanfranco and Associates Inc.

Client COVANTA Y LMU-A (0.9886)
 Source Unit 1 Cp
 Parameter HF Pbar Static
 Date May 10, 2022 Operator Liam

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.0001	0.0001	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	09:14	518.1869	58					
			58					
			63					
	10:14	518.7558	66					
2	10:24	518.7604	64					
			66					
			67					
	11:24	519.3868	66					
3	11:50	519.4166	63					
			66					
			68					
	12:50	520.0215	68					

Client COVANTA Y LMU-A (0.9886)
 Source Unit 2 Cp
 Parameter HF Pbar Static
 Date May 11, 2022 Operator Liam / Daryl

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.0001	0.0001	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	09:04	520.0254	58					
			57					
			57					
	10:04	520.6280	56					
2	10:17	520.6322	58					
			59					
			60					
	11:17	521.1920						
3	11:26	521.1973	63					
	10		62					
	20		61					
	30							
	40							
	50							
	12:26	522.0692	60					

A. Lanfranco and Associates Inc.

MB

Client COVANTA Y LMU-A (0.9886)
 Source Unit 3 Cp _____
 Parameter HF Pbar 29.93 Static _____
 Date May 12, 2022 Operator Liam

Client _____ Y _____
 Source _____ Cp _____
 Parameter _____ Pbar _____ Static _____
 Date _____ Operator _____

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.0001	0.0001	0.0001

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	08:50	522.0778	62					
			62					
			68					
	09:50	522.6821	72					
2	10:03	522.6852	70					
			72					
			70					
	11:03	523.2760	69					
3	11:15	523.2808	66					
			68					
			70					
	12:15	523.8906	72					

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1								
2								
3								

MB

Client: Metro Vancouver Date: MAY 13, 2022
 Jobsite: WTE (Burnaby, B.C) Technician: SF+LF

Parameter: N2O

Sample ID	Date	Time	N2O ppm
Unit 1 - Run 1	May 10, 22	9:14	3
Unit 1 - Run 2	May 10, 22	10:24	4
Unit 1 - Run 3	May 10, 22	11:50	3
Unit 1 - Run 1	May 11, 22	9:04	5
Unit 2 - Run 2	May 11, 22	10:17	3
Unit 2 - Run 3	May 11, 22	11:27	6
Unit 3 - Run 1	May 12, 22	8:50	3
Unit 3 - Run 2	May 12, 22	10:03	5
Unit 3 - Run 3	May 12, 22	11:15	3

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	N2O (ppm)
Zero Gas (N2)	956	11/30/2021	11/29/2023	1600	0
1 Gas	284	10/31/2020	10/30/2023	1000	92.2
2 Gas	315	10/31/2020	10/30/2023	980	40.1

Calibrations

Cylinder	Initial	Final
Zero Gas (N2)	0	0
1 Gas	92	93
2 Gas	43	42

APPENDIX – E

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

A.Lanfranco & Associates inc.

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: AU 15
Serial #: 0028SPC-081915-1

Date: 11-Jan-22
Barometric Pressure: 30.01 (in. Hg)
Theoretical Critical Vacuum: 14.16 (in. Hg)

!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}/((in.Hg)^{0.5}(min)).
!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.60	30.00	797.900	830.200	32.300	73.0	73.0	75.0	75.0	73	0.8185	17.0	71.0	79.0	75.0
1.80	16.00	830.400	842.834	12.434	75.0	75.0	76.0	76.0	63	0.5956	20.0	77.0	79.0	78.0
1.10	38.00	843.200	866.213	23.013	76.0	76.0	78.0	78.0	55	0.4606	22.0	78.0	81.0	79.5
0.61	29.00	866.600	879.867	13.267	78.0	78.0	78.0	78.0	48	0.3560	23.0	81.0	84.0	82.5
0.27	19.00	880.100	885.968	5.868	78.0	78.0	79.0	79.0	40	0.2408	24.5	81.0	82.0	81.5

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y			CALIBRATION FACTOR dH@					
Vm(std) (cu ft)	Vm(std) (liters)		Vor(std) (cu ft)	Vor(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)			Ko (value)
32.303	914.8		31.859	902.2	32.197	0.986	-0.017		1.781	45.23	0.112			0.730
12.346	349.6		12.330	349.2	12.530	0.999	-0.005		1.686	42.83	0.017			0.742
22.747	644.2		22.614	640.4	23.046	0.994	-0.010		1.723	43.76	0.054			0.738
13.074	370.3		13.302	376.7	13.632	1.017	0.014		1.605	40.78	-0.063			0.748
5.772	163.5		5.900	167.1	6.035	1.022	0.018		1.549	39.34	-0.120			0.758
Average Y----->						1.0037		Average dH@----->	1.669	42.4		Average Ko----->	0.743	

TEMPERATURE CALIBRATION				
Calibration Standard ----->		Omega Model CL23A S/N:T-218768		
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results		
		Variation (degF)	Percent of Absolute	
32	32	0	0.00%	
100	100	0	0.00%	
300	300	0	0.00%	
500	500	0	0.00%	
1000	1000	0	0.00%	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Scott Ferguson

Signature: _____

Date: January 11, 2022

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada		Device (inches of Hg)		Difference (Env Can - Elv Corr)
		(kPa)	(inches of Hg)	Reading	Elevation Corrected	
LA	5-Jan-22	102.5	30.27	30.16	30.23	0.04
DS	5-Jan-22	102.5	30.27	30.16	30.23	0.04
CL	5-Jan-22	102.5	30.27	30.17	30.24	0.03
ML	5-Jan-22	102.5	30.27	30.14	30.21	0.06
SB	5-Jan-22	102.5	30.27	30.15	30.22	0.05
SH	5-Jan-22	102.5	30.27	30.15	30.22	0.05
MG	5-Jan-22	102.5	30.27	30.23	30.30	-0.03
SF	5-Jan-22	102.5	30.27	30.16	30.23	0.04
JG	5-Jan-22	102.5	30.27	30.12	30.19	0.08
JC	5-Jan-22	102.5	30.27	30.15	30.22	0.05
LF	5-Jan-22	102.5	30.27	30.15	30.22	0.05

Calibrated by: Jeremy Gibbs

Signature:



Date:

05-Jan-21

Performance Specification is

Device Corrected for Elevation must be +/- 0.1 " Hg of ENV CANADA SEA-LEVEL Pbar

Enter Environment Canada Pressure from their website for Vancouver (link below)
and the reading from your barometer on the ground floor of the office.

https://weather.gc.ca/city/pages/bc-74_metric_e.html

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Scott Ferguson
Date: January 18, 2022

Signature: *Scott Ferguson*

Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft ²)
A	0.1250	0.1240	0.1245	0.0010	0.1245	0.0000845
G-165	0.1640	0.1655	0.1660	0.0020	0.1652	0.0001488
G-170	0.1705	0.1695	0.1700	0.0010	0.1700	0.0001576
G-178	0.1780	0.1780	0.1790	0.0010	0.1783	0.0001735
J	0.1880	0.1880	0.1880	0.0000	0.1880	0.0001928
E	0.1880	0.1895	0.1882	0.0015	0.1886	0.0001939
Q	0.2070	0.2050	0.2060	0.0020	0.2060	0.0002315
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
G-215	0.2150	0.2135	0.2160	0.0025	0.2148	0.0002517
G-218	0.2180	0.2175	0.2190	0.0015	0.2182	0.0002596
G-221	0.2195	0.2195	0.2225	0.0030	0.2205	0.0002652
G-2231	0.2230	0.2230	0.2225	0.0005	0.2228	0.0002708
G-2232	0.2220	0.2240	0.2235	0.0020	0.2232	0.0002716
G-225	0.2245	0.2250	0.2240	0.0010	0.2245	0.0002749
G-2251	0.2230	0.2260	0.2245	0.0030	0.2245	0.0002749
G-228	0.2280	0.2270	0.2300	0.0030	0.2283	0.0002844
P-18	0.2375	0.2370	0.2380	0.0010	0.2375	0.0003076
G-245	0.2440	0.2450	0.2450	0.0010	0.2447	0.0003265
G-247	0.2450	0.2470	0.2470	0.0020	0.2463	0.0003310
G-2501	0.2505	0.2500	0.2505	0.0005	0.2503	0.0003418
G-250	0.2505	0.2505	0.2500	0.0005	0.2503	0.0003418
G-253	0.2530	0.2520	0.2520	0.0010	0.2523	0.0003473
G-257	0.2565	0.2585	0.2570	0.0020	0.2573	0.0003612
P	0.2580	0.2570	0.2575	0.0010	0.2575	0.0003616
P-2	0.2787	0.2790	0.2785	0.0005	0.2787	0.0004237
G-280	0.2780	0.2800	0.2810	0.0030	0.2797	0.0004266
G-282	0.2810	0.2820	0.2840	0.0030	0.2823	0.0004348
G-287	0.2870	0.2880	0.2860	0.0020	0.2870	0.0004493
G-2871	0.2870	0.2875	0.2865	0.0010	0.2870	0.0004493
G-292	0.2922	0.2920	0.2926	0.0006	0.2923	0.0004659
G-294	0.2940	0.2935	0.2940	0.0005	0.2938	0.0004709
G-304	0.3040	0.3045	0.3045	0.0005	0.3043	0.0005052
MV-01	0.3050	0.3045	0.3055	0.0010	0.3050	0.0005074
G-3072	0.3070	0.3070	0.3080	0.0010	0.3073	0.0005152
G-307	0.3080	0.3080	0.3080	0.0000	0.3080	0.0005174
G-308	0.3065	0.3080	0.3095	0.0030	0.3080	0.0005174
G-309	0.3085	0.3085	0.3090	0.0005	0.3087	0.0005196
G-3091	0.3090	0.3090	0.3085	0.0005	0.3088	0.0005202
G-310	0.3090	0.3105	0.3095	0.0015	0.3097	0.0005230
G-312	0.3115	0.3130	0.3115	0.0015	0.3120	0.0005309
G-3121	0.3115	0.3125	0.3130	0.0015	0.3123	0.0005321
G-316	0.3160	0.3160	0.3170	0.0010	0.3163	0.0005458
V-06	0.3200	0.3210	0.3210	0.0010	0.3207	0.0005608
P-27	0.3387	0.3385	0.3390	0.0005	0.3387	0.0006258
G-344	0.3440	0.3450	0.3440	0.0010	0.3443	0.0006467
G-345	0.3450	0.3450	0.3450	0.0000	0.3450	0.0006492
G-346	0.3450	0.3460	0.3460	0.0010	0.3457	0.0006517
G-367	0.3675	0.3650	0.3670	0.0025	0.3665	0.0007326
P-14	0.3910	0.3935	0.3920	0.0025	0.3922	0.0008388
G-433	0.4335	0.4330	0.4330	0.0005	0.4332	0.0010234
G-437	0.4350	0.4345	0.4355	0.0010	0.4350	0.0010321
G-468	0.4677	0.4670	0.4670	0.0007	0.4672	0.0011907
P-29	0.4680	0.4680	0.4690	0.0010	0.4683	0.0011963
P-7	0.4965	0.4940	0.4930	0.0035	0.4945	0.0013337
B	0.5015	0.5030	0.5025	0.0015	0.5023	0.0013763
G-540	0.5405	0.5400	0.5405	0.0005	0.5403	0.0015924

Where:

- (a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.
- (b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.
- (c) Average = average of D1, D2 and D3

A.Lanfranco & Associates inc.

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: CAE JO99
Serial #: 0028-022210-1

Date: 11-Jan-22
Barometric Pressure: 30.01 (in. Hg)
Theoretical Critical Vacuum: 14.16 (in. Hg)

!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}((in.Hg)²(min)).
!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.60	28.00	939.400	969.525	30.125	66.0	66.0	67.0	67.0	73	0.8185	16.0	65.0	76.0	70.5
1.85	15.00	897.500	909.074	11.574	62.0	62.0	63.0	63.0	63	0.5956	20.0	69.0	73.0	71.0
1.15	23.00	909.200	923.024	13.824	64.0	64.0	67.0	67.0	55	0.4606	22.0	74.0	80.0	77.0
0.66	18.00	923.500	931.772	8.272	67.0	67.0	69.0	69.0	48	0.3560	23.5	81.0	82.0	81.5
0.34	16.00	932.500	937.548	5.048	69.0	69.0	71.0	71.0	40	0.2408	24.5	80.0	83.0	81.5

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y			CALIBRATION FACTOR dH@					
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)			Ko (value)
30.557	865.4		29.861	845.7	29.924	0.9772	-0.008		1.791	45.49	-0.034			0.721
11.779	333.6		11.635	329.5	11.671	0.9877	0.002		1.753	44.53	-0.072			0.722
13.965	395.5		13.719	388.5	13.917	0.9824	-0.003		1.832	46.54	0.007			0.711
8.307	235.3		8.264	234.0	8.453	0.9948	0.009		1.767	44.87	-0.058			0.716
5.046	142.9		4.969	140.7	5.082	0.9846	-0.001		1.982	50.33	0.157			0.683
Average Y----->						0.9854	Average dH@----->		1.825	46.4	Average Ko----->		0.711	

TEMPERATURE CALIBRATION			
Calibration Standard ----->		Omega Model CL23A S/N:T-218768	
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results	
		Variation (degF)	Percent of Absolute
32	32	0	0.00%
100	100	0	0.00%
300	300	0	0.00%
500	500	0	0.00%
1000	1000	0	0.00%

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Scott Ferguson

Signature: 

Date: January 11, 2022

A. Lanfranco & Associates inc.

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: **LMU-A**
Serial #: **Kimmon 186**

Date: **5-Jan-22**
Barometric Pressure: **30.11** (in. Hg)
Theoretical Critical Vacuum: **14.20** (in. Hg)

!!!!!!!

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³*(deg R)^{0.5}/((in.Hg)*(min)).

!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (m ³)	Volume Final (m ³)	Volume Total (cu ft)	Initial Temps. Inlet (deg F) Outlet (deg F)		Final Temps. Inlet (deg F) Outlet (deg F)		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F) Final (deg F) Average (deg F)		
0.00	17.00	492.2545	492.4783	7.903	57.0	57.0	56.0	56.0	48	0.3560	20.0	58.0	58.0	58.0
0.00	16.00	492.4790	492.6902	7.458	58.0	58.0	61.0	61.0	48	0.3560	20.0	55.0	57.0	56.0
0.00	15.00	492.6910	492.8894	7.006	60.0	60.0	62.0	62.0	48	0.3560	20.0	56.0	57.0	56.5

***** RESULTS *****											
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----		
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y			CALIBRATION FACTOR dH@		
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)
8.127	230.2		8.007	226.7	7.808	0.985	-0.003		0.000	0.00	0.000
7.626	216.0		7.550	213.8	7.335	0.990	0.002		0.000	0.00	0.000
7.143	202.3		7.075	200.4	6.880	0.990	0.002		0.000	0.00	0.000
Average Y----->						0.9886		Average dH@----->	0.0000	0.00	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.

For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Liam Forrer

Signature: L Forrer

Date: January 5, 2022

Pitot Tube Calibration

Date: 05-Jan-22
Pbar (in.Hg): 30.16

Temp (R): 530
Dn (in.): 0.25

Pitot ID: **7A-1**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.050	0.070	14.9	0.8367	0.0024
0.100	0.140	21.0	0.8367	0.0024
0.150	0.210	25.7	0.8367	0.0024
0.350	0.490	39.3	0.8367	0.0024
0.590	0.850	51.0	0.8248	0.0095
Average :			0.8343	0.0038

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.040	0.055	13.3	0.8443	0.0027
0.080	0.110	18.8	0.8443	0.0027
0.180	0.250	28.2	0.8400	0.0016
0.300	0.420	36.4	0.8367	0.0049
0.500	0.690	47.0	0.8427	0.0011
Average :			0.8416	0.0026

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.4	0.8574	0.0056
0.120	0.160	22.8	0.8574	0.0056
0.200	0.247	29.5	0.8521	0.0003
0.380	0.520	40.6	0.8463	0.0055
0.730	1.000	56.3	0.8459	0.0059
Average :			0.8518	0.0046

Pitot ID: **ST 8B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.060	0.080	16.3	0.8574	0.0039
0.090	0.120	19.8	0.8574	0.0039
0.190	0.260	29.0	0.8463	0.0072
0.320	0.430	37.6	0.8540	0.0006
0.630	0.850	52.8	0.8523	0.0012
Average :			0.8535	0.0033

Pitot ID: **7 AL GVRD-1**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.060	0.085	16.3	0.8318	0.0011
0.090	0.125	19.9	0.8400	0.0072
0.145	0.200	25.3	0.8430	0.0101
0.290	0.420	35.8	0.8226	0.0102
0.530	0.760	48.4	0.8267	0.0061
Average :			0.8328	0.0069

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.050	0.070	14.9	0.8367	0.0031
0.085	0.120	19.4	0.8332	0.0004
0.195	0.270	29.0	0.8413	0.0078
0.420	0.600	43.1	0.8283	0.0053
0.630	0.900	52.8	0.8283	0.0053
Average :			0.8336	0.0044

Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.4	0.8574	0.0048
0.060	0.080	16.3	0.8574	0.0048
0.110	0.150	21.9	0.8478	0.0047
0.210	0.280	30.5	0.8574	0.0048
0.500	0.690	47.0	0.8427	0.0098
Average :			0.8525	0.0058

Pitot ID:

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
Average :				

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jeremy Gibbs

Signature: 

Date: January 5, 2022

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

QUARTZ NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Jeremy Gibbs
Date: March 21, 2022

Signature:



Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft ²)
Q-218	0.2180	0.2185	0.2180	0.0005	0.2182	0.0002596
Q-279	0.2790	0.2790	0.2800	0.0010	0.2793	0.0004256
Q-315	0.3150	0.3150	0.3150	0.0000	0.3150	0.0005412
Q-351	0.3520	0.3510	0.3510	0.0010	0.3513	0.0006732
Q-379	0.3800	0.3795	0.3795	0.0005	0.3797	0.0007862
Q-401	0.4020	0.4020	0.4000	0.0020	0.4013	0.0008785
Q-408	0.4070	0.4095	0.4090	0.0025	0.4085	0.0009101
Q-4091	0.4080	0.4090	0.4100	0.0020	0.4090	0.0009124
Q-409	0.4105	0.4090	0.4095	0.0015	0.4097	0.0009154
Q-433	0.4340	0.4320	0.4330	0.0020	0.4330	0.0010226
Q-440	0.4335	0.4350	0.4350	0.0015	0.4345	0.0010297
Q-442	0.4420	0.4430	0.4420	0.0010	0.4423	0.0010672
Q-500	0.5000	0.5005	0.5005	0.0005	0.5003	0.0013654

Where:

- (a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.
- (b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.
- (c) Average = average of D1, D2 and D3

A.Lanfranco & Associates inc.

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: **ST CAE2**
Serial #: **0028-072911-1**

Date: **11-Jan-22**
Barometric Pressure: **30.01** (in. Hg)
Theoretical Critical Vacuum: **14.16** (in. Hg)

!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}/((in.Hg)²(min)).
!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.70	28.00	624.800	654.678	29.878	69.0	69.0	72.0	72.0	73	0.8185	12.5	80.0	75.0	77.5
1.95	29.00	600.700	623.035	22.335	80.0	80.0	69.0	69.0	63	0.5956	21.0	79.0	79.0	79.0
1.15	19.00	655.800	667.384	11.584	72.0	72.0	73.0	73.0	55	0.4606	17.5	75.0	75.0	75.0
0.68	29.00	667.900	681.350	13.450	73.0	73.0	74.0	74.0	48	0.3560	19.0	75.0	74.0	74.5
0.33	17.00	681.600	687.002	5.402	74.0	74.0	74.0	74.0	40	0.2408	20.0	76.0	74.0	75.0

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y			CALIBRATION FACTOR dH@					
Vm(std) (cu ft)	Vm(std) (liters)		Vor(std) (cu ft)	Vor(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)			Ko (value)
30.085	852.0		29.666	840.1	30.121	0.986	-0.007		1.851	47.01	0.021			0.708
22.227	629.5		22.327	632.3	22.733	1.005	0.011		1.834	46.57	0.004			0.700
11.548	327.1		11.354	321.6	11.475	0.983	-0.010		1.801	45.76	-0.029			0.722
13.368	378.6		13.401	379.5	13.531	1.002	0.009		1.778	45.16	-0.052			0.714
5.360	151.8		5.311	150.4	5.368	0.991	-0.002		1.886	47.90	0.056			0.701
Average Y----->						0.9934		Average dH@----->	1.830	46.5		Average Ko----->	0.709	

TEMPERATURE CALIBRATION				
Calibration Standard ----->		Omega Model CL23A S/N:T-218768		
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results		
		Variation (degF)	Percent of Absolute	
32	32	0	0.00%	
100	100	0	0.00%	
300	300	0	0.00%	
500	500	0	0.00%	
1000	1000	0	0.00%	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Scott Ferguson

Signature: _____

Date: January 11, 2022

A.Lanfranco & Associates inc.

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: **ST Grey CAE**
Serial #: **0028-091801-1**

Date: **12-Jan-22**
Barometric Pressure: **29.92** (in. Hg)
Theoretical Critical Vacuum: **14.11** (in. Hg)

!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}/((in.Hg)^{0.5}(min)).
!!!!!!!

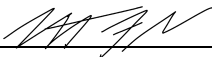
----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.70	15.00	174.900	190.673	15.773	62.0	62.0	68.0	68.0	73	0.8185	14.0	64.0	75.0	69.5
1.90	18.00	190.800	204.458	13.658	68.0	68.0	70.0	70.0	63	0.5956	16.0	77.0	75.0	76.0
1.20	15.00	204.700	213.509	8.809	70.0	70.0	72.0	72.0	55	0.4606	17.5	84.0	85.0	84.5
0.71	40.00	213.600	231.989	18.389	65.0	65.0	66.0	66.0	48	0.3560	19.0	67.0	82.0	74.5
0.33	31.00	232.300	241.830	9.530	67.0	67.0	69.0	69.0	40	0.2408	20.5	78.0	85.0	81.5

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR		CALIBRATION FACTOR						
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Y Variation (number)	dH@						
						Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)				Ko (value)
16.001	453.1		15.964	452.1	16.016	0.998	-0.007	1.848	46.94	-0.032				0.708
13.690	387.7		13.855	392.4	14.071	1.012	0.008	1.800	45.73	-0.079				0.709
8.782	248.7		8.859	250.9	9.139	1.009	0.005	1.924	48.88	0.044				0.689
18.501	524.0		18.429	521.9	18.663	0.996	-0.008	1.890	48.02	0.011				0.704
9.534	270.0		9.598	271.8	9.847	1.007	0.002	1.936	49.18	0.056				0.689
Average Y----->						1.0043	Average dH@----->	1.880	47.7	Average Ko----->	0.700			

TEMPERATURE CALIBRATION				
Calibration Standard ----->		Omega Model CL23A S/N:T-218768		
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results		
		Variation (degF)	Percent of Absolute	
32	32	0	0.00%	
100	100	0	0.00%	
300	300	0	0.00%	
500	500	0	0.00%	
1000	1000	0	0.00%	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2 .
For Temperature Devices, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Scott Ferguson

Signature: 

Date: January 12, 2022

TEMPERATURE CALIBRATION FORM

Signature:

Paula A. [Signature]

TEMPERATURE DEVICE CALIBRATIONS

Reference Device			Temperature Settings (degrees F)													
Model CL23A Calibrator			32		100		200		300		500		800		1700	
Device	ALA #	Serial #	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation
Omega HH11A	3	300132	32.5	0.10%	99.1	-0.16%	200.9	0.14%	302.5	0.33%	497.2	-0.29%	797.3	-0.21%	1697	-0.14%
Omega HH11A	4	200167		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
Omega HH11A	6	600059	33	0.20%	99.6	-0.07%	201.6	0.24%	301.3	0.17%	498.2	-0.19%	799.6	-0.03%	1697	-0.14%
TPI 341K	7	2.0315E+10	30.9	-0.22%	98.6	-0.25%	198.6	-0.21%	298.7	-0.17%	498.4	-0.17%	795.9	-0.33%	1695	-0.23%
TPI 341K	8	2.0313E+10	32.1	0.02%	99	-0.18%	200.7	0.11%	300.2	0.03%	488.2	-1.23%	797.6	-0.19%	1696	-0.19%
Cont Cmpny	10	102008464	30.5	-0.31%	97.6	-0.43%	198.2	-0.27%	297.8	-0.29%	498	-0.21%	796.4	-0.29%	1695	-0.23%
Omega HH11	14	409426		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	16	400120029	31	-0.20%	99	-0.18%	199.1	-0.14%	298.5	-0.20%	500	0.00%	799.9	-0.01%	1701	0.05%
TPI 341K	18	2.0329E+10	31.2	-0.16%	99.2	-0.14%	198.1	-0.29%	298.6	-0.18%	498.6	-0.15%	799.1	-0.07%	1697	-0.14%
TPI 341K	20	2.0329E+10	30.9	-0.22%	98	-0.36%	198.1	-0.29%	298.8	-0.16%	497.2	-0.29%	797.9	-0.17%	1697	-0.14%
TPI 341K	22	2.0329E+10	31.4	-0.12%	98.9	-0.20%	198	-0.30%	298.8	-0.16%	497.7	-0.24%	798	-0.16%	1697	-0.14%
Reference device is a NIST certified digital thermocouple calibrator																
Variation expressed as a percentage of the absolute temperature must be within 1.5 %																

Calibration Certificate

Date: 12-Apr-22
Calibrated by: Michael Goods
Authorizing Signature: _____

Insrtument Calibrated: Testo 1 (330-2LL)
Serial #: 03101345
Customer: ALA

Ambient Conditions: Temperature: 10 °C Barometric Pressure: 101.96 kPa Relative Humidity: 72%
A. Lanfranco and Associates Inc. certifies that the described instrument has been inspected and tested following calibration procedures in the Environment Canada Report EPS 1/PG/7 (Revised 2005). Below are the observed readings after calibrations are complete. Calibration checks should be completed at least every 6 months.

O ₂ Gas	Initial Evaluation				After Calibration				Certified Value (vol %)
	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O ₂	11.1	0.10	Pass		11.1	0.10	Pass		11.00
Ambient	20.99	0.04	Pass		21.0	0.05	Pass		20.95

Performance Specification: +/- 1% O₂ (absolute diff)

CO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	12	4.0%	Pass		12	4.0%	Pass		0
1 Gas	1150	39.6%	Fail	Re-cal with 2 gas	1918	0.7%	Pass	Will send back to Testo Canada in coming weeks for repair	1904
2 Gas	430	8.8%	Fail		496	5.2%	Fail		472
3 Gas	194	20.7%	Fail		306	25.1%	Fail		245
4 Gas	149	25.5%	Fail		190	5.0%	Pass		200

Performance Specification: +/- 5% of Certified Gas Value

NO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	1	0.3%	Pass		1	0.3%	Pass		0
1 Gas	257	0.4%	Pass	Re-cal with 2- gas	262	1.6%	Pass		258
2 Gas	474	0.1%	Pass		475	0.3%	Pass		473.4
3 Gas	105	5.8%	Fail		102	2.8%	Pass		99
4 Gas	53	5.8%	Fail		52	3.8%	Pass		50.1

Performance Specification: +/- 5% of Certified Gas Value

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	O ₂ (Vol. %)	CO (ppm)	NO (ppm)
Zero Gas (N ₂)	342103	29/Jan/2021	28/Jan/2026	300	0	0	0
1 Gas	CC320634	23/Mar/2018	23/Mar/2026	900	-	1904	258
2 Gas	SG9107852B	6/May/2021	5/May/2024	1450	-	471.5	473.4
3 Gas	CC146936	18/Nov/2021	19/Nov/2029	1520	-	244.6	99.23
4 Gas	DT0038176	19/Jun/2020	19/Jun/2024	600	-	199.9	50.1
O ₂ /CO ₂	CC38269	2/Jun/2021	3/May/2029	1680	11.00	-	-

Note: National Institute of Standards and Technology traceable certificates are available upon request.



MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Daryl Sampson

has successfully completed

The program of studies and is awarded the certificate in

STACK SAMPLING

May 2005

Date

Donna Spaulding

Dean

Faculty of Continuing Education and Extension

Conflict of Interest Disclosure Statement

A qualified professional ¹ providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Daryl Sampson, as a member of Air and Waste Management Association
declare

Select one of the following:

- ☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this project. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to

Mr. Sajid Barlas, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X Daryl Sampson

Print name: Daryl Sampson

Date: Dec.18, 2020

Witnessed by:

X 

Print name: Mark Lanfranco

¹Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals¹, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Michael Goods

Title Environmental Technician

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☐ No

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental Technician - specialising in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X *MGoods*

Print Name: Michael Goods

Witnessed by:

X *[Signature]*

Print Name: Scott Ferguson

Date signed: 11/23/2020

¹Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.



Declaration of Competency

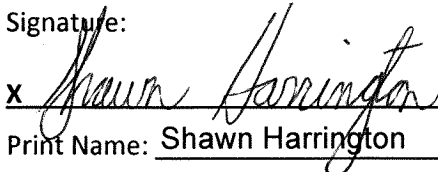
The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals¹, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

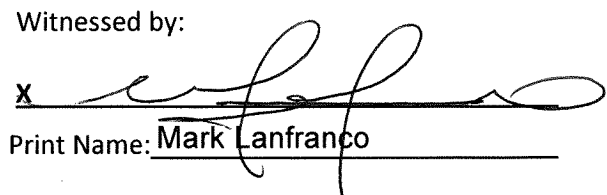
1. Name of Qualified Professional Shawn Harrington
Title Senior Environmental Technician /Project manager
2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No
Name of Association: _____ Registration # _____
3. Brief description of professional services:
Environmental consulting ,specializing in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: 
Print Name: Shawn Harrington

Witnessed by: 
Print Name: Mark Lanfranco

Date signed: November 26, 2020

¹Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals¹, under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Daryl Sampson

Title Senior Environmental Technician/Project Manager

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental consulting, specializing in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x *Daryl Sampson*

Print Name: Daryl Sampson

Witnessed by:

x *Louis Agassiz*

Print Name: Louis Agassiz

Date signed: November 23, 2020

¹Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Michael Eugene Goods

has successfully completed

Stack Sampling

35 Hours / 2019

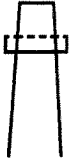
May 22, 2019

Date

BM
Dean

Faculty of Continuing Education and Extension





A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

Confidentiality and Impartiality Agreement

Confidentiality is legally enforceable in our client contracts for all projects and ensures that our firm, its personnel, and any outsourced bodies treat all information obtained or created during our scope of work as confidential. Our firm does not disclose information that is not public regarding a client or responsible party to a third party without express consent of that party. Our firm informs the client and responsible party before placing any information in the public domain and will use equipment and facilities to ensure the secure handling of confidential information.

Impartiality Our firm's policies and procedures regarding conflict of interest (COI) and safeguarding impartiality reflects the commitment to act impartially in all activities. Our firm understands that the principles of COI and impartiality are essential to providing independent services. Our team is required to personally declare any potential threat to impartiality or potential COI. Should a potential COI or threat to impartiality be identified, our team will work to determine mitigation measures, if applicable.

This agreement is made by and between

Michael Goats (1st Party)

AND

A. Lanfranco and Associates Inc. (2nd Party)

As of 24 Nov, 2020

Shawn Harrington

has met the requirements of

Stack Testing for Pollutants
(CHSC 7760)

School of Process, Energy and Natural Resources
Chemical Sciences Program

Endorsed by:

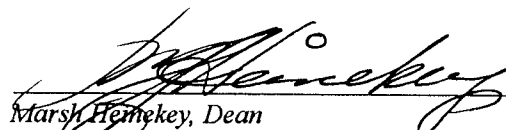


Environment
Canada

Environnement
Canada



Province of
British Columbia
Ministry of
Environment,
Lands and Parks


Marsh Hemekey, Dean
School of Process, Energy and Natural Resources

JUNE 21, 2001
Dated



Conflict of Interest Disclosure Statement

A qualified professional¹ providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Shawn Harrington as a member of Air and Waste Management Association
declare

Select one of the following:

- ☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this project. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to

Mr. Sajid Barlas

, erring on the side of caution.



☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

x Shawn Harrington

Print name: Shawn Harrington

Date: Dec. 16, 2020

Witnessed by:

x Mark Lanfranco

Print name: Mark Lanfranco

¹Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

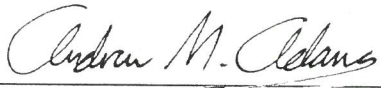
A. Lanfranco and Associates Inc.
101 - 9488 - 189th Street
Surrey, British Columbia



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Accreditation No.: A4232
Issued On: February 5, 2021
Accreditation Date: February 5, 2021
Expiry Date: August 6, 2023




President & CEO

