



**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**  
**February 2021 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 (N<sub>2</sub>O) 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.

<b>Sample Type</b>	<b>Blank Value</b>		
<b>First Q 2021</b>	<b>Unit 1</b>	<b>Unit 2</b>	<b>Unit 3</b>
Filter	-0.1 mg	-0.1 mg	-0.1 mg
Front Half Washings	-2.0 mg	-0.9 mg	0.8 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.28 ug	<0.27 ug	<0.27 ug
Trace Metals Front *	<60.6 ug	<60.2 ug	<53.7 ug
Trace Metals Back*	<13.6 ug	<26.0 ug	<32.8 ug
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug

Sum of all reported elements except Hg\*

**APPENDIX - B**

**LABORATORY RESULTS**

**Report Transmission Cover Page**

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: Filter Reagent Blanks  
Project Location:  
LSD:  
P.O.:  
Proj. Acct. code:

Lot ID: **1477163**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 26, 2021  
Report Number: 2599208

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

Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
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Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

**Notes To Clients:**

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If the reader is not the intended recipient, you are hereby notified that any use, dissemination, distribution or copy of this transmission is strictly prohibited.  
If you receive this transmission by error, or if this transmission is not satisfactory, please notify us by telephone.

## 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: Filter Reagent Blanks  
Project Location:  
LSD:  
P.O.:  
Proj. Acct. code:

Lot ID: **1477163**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 26, 2021  
Report Number: 2599208

		Reference Number	1477163-1	1477163-2	1477163-3
		Sample Date	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Reagent Blank Unit 1 Container 1 (filter)	Reagent Blank Unit 2 Container 1 (filter)	Reagent Blank Unit 3 Container 1 (filter)
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	0.53	0.2	1.6	0.2
Cobalt	µg	<0.3	<0.3	0.3	0.25
Copper	µg	0.5	<0.3	<0.3	0.25
Lead	µg	<2	<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	6	20	40	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	1	0.8	3.4	0.5
<b>Mercury by CVAA</b>					
Mercury	As Tested	µg/L	<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:



Carol Nam, Dipl. T.  
Quality Officer

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: Filter Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: <b>1477163</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 26, 2021 Report Number: 2599208
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	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	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](http://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](mailto: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)		22-Feb-21			1	✓	✓	
2										
3		Reagent Blank Unit 2 Container 1 (filter)		22-Feb-21			1	✓	✓	
4										
5		Reagent Blank Unit 3 Container 1 (filter)		22-Feb-21			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

Lot: 1477163 <sup>COC</sup>



Temp. received: 18 °C Date/Time stamp: MAR, 01, 21  
Delivery Method:  
Waybill:  
Received by:

## 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: Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: <b>1477144</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 Report Number: 2599196
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

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

Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
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Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

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## 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: **1477144**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599196

		Reference Number	1477144-1	1477144-2	1477144-3
		Sample Date	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
		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
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	3	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	0.3	0.25
Chromium	µg	0.75	0.58	0.76	0.2
Cobalt	µg	<0.3	<0.3	0.3	0.25
Copper	µg	0.6	<0.3	<0.3	0.25
Lead	µg	<2	2	<2	1.5
Manganese	µg	0.3	<0.3	0.6	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	<2	<2	<2	2.5
Selenium	µg	3.5	3.7	3.5	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	0.7	0.6	0.5
<b>Back Half Metals Fraction 2A</b>					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<3	<3	3	2.5
Arsenic	µg	5.2	5.7	4.4	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	0.37	<0.2	0.2
Cobalt	µg	<0.3	0.6	0.3	0.25
Copper	µg	0.4	0.4	<0.3	0.25
Lead	µg	2	3	<2	1.5
Manganese	µg	0.5	1	1	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<2	2.7	2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	0.5	0.7	<0.5	0.5
Volume	Sample	mL	220	220	220
Volume	aliquot volume	mL	170	170	170
<b>Mercury by CVAA</b>					
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: **1477144**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599196

		Reference Number	1477144-1	1477144-2	1477144-3
		Sample Date	Feb 22, 2021	Feb 22, 2021	Feb 22, 2021
		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
<b>Mercury by CVAA - Continued</b>					
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	0.11	0.12	0.10
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	220	220	220
Volume	aliquot volume	mL	5.0	5.0	5.0
Volume	Final	mL	40	40	40
Mercury	Fraction 2B	µg/sample	0.19	0.21	0.2
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	155	155	155
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
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 3B	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	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 Officer



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: Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: <b>1477144</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 Report Number: 2599196
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	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	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](http://www.Element.com)

### 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](mailto: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		22-Feb-21			5	✓	✓	✓	✓	✓	✓								
2																					
3		Reagent Blank Unit 2		22-Feb-21			5	✓	✓	✓	✓	✓	✓								
4																					
5		Reagent Blank Unit 3		22-Feb-21			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

Lot: 1477144<sup>COC</sup>



Temp. received: 15 °C  
Date/Time stamp: MAR 1 '21 17:00  
Delivery Method:  
Waybill:  
Received by:

---

**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: <b>1477152</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 Report Number: 2599197
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

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: Field Blanks  
Project Location:  
LSD:  
P.O.:  
Proj. Acct. code:

Lot ID: **1477152**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599197

		Reference Number	1477152-1	1477152-2	1477152-3
		Sample Date	Feb 23, 2021	Feb 24, 2021	Feb 25, 2021
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Field Blank Unit 1 (MV Unit 1 Blank + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 Blank + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 Blank + 4 Bottles)
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	<5	6	<5	5
Antimony	µg	<2	3	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	0.59	1.2	0.66	0.2
Cobalt	µg	<0.3	0.5	<0.3	0.25
Copper	µg	1	1	<0.3	0.25
Lead	µg	2	<2	<2	1.5
Manganese	µg	2	1	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	58	53	53	2.5
Selenium	µg	4.2	<2	3.1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	4.2	1	1	0.5
<b>Back Half Metals Fraction 2A</b>					
Aluminum	µg	<5	<5	7	5
Antimony	µg	3	<2	<2	2.5
Arsenic	µg	3.6	5.2	5.8	1
Cadmium	µg	<0.2	0.3	<0.2	0.25
Chromium	µg	<0.2	0.48	<0.2	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	2	2	0.3	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	4.1	1	1.0	0.25
Nickel	µg	0.7	1	<0.5	0.5
Phosphorus	µg	10	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	2	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	2	1	0.8	0.5
Volume	Sample	mL	360	360	360
Volume	aliquot volume	mL	310	310	310
<b>Mercury by CVAA</b>					
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: **1477152**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599197

		Reference Number	1477152-1	1477152-2	1477152-3	Nominal Detection Limit
		Sample Date	Feb 23, 2021	Feb 24, 2021	Feb 25, 2021	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Field Blank Unit 1 (MV Unit 1 Blank + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 Blank + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 Blank + 4 Bottles)	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
<b>Mercury by CVAA - Continued</b>						
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	0.06	0.07	0.07	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	360	360	360	
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	0.2	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	135	185	185	
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	600	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.05	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<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 Officer



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: <b>1477152</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 Report Number: 2599197
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	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	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 Blank' + 4 Bottles)		23-Feb-21			5	✓	✓	✓	✓	✓	✓								
2																				
3	Field Blank Unit 2 ('MV Unit 2 Blank' + 4 Bottles)		24-Feb-21			5	✓	✓	✓	✓	✓	✓								
4																				
5	Field Blank Unit 3 ('MV Unit 3 Blank' + 4 Bottles)		25-Feb-21			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

Lot: 1477152<sup>COC</sup>



Temp. received: 18.0 °C  
Date/Time stamp: MAR 1 21:00  
Delivery Method:  
Waybill:  
Received by:

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**Report Transmission Cover Page**

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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

---

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

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**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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

	Reference Number	1477162-1	1477162-2	1477162-3	
	Sample Date	Feb 22, 2021	Feb 23, 2021	Feb 23, 2021	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Unit 1 Run 1 (MV Unit 1 R-1 + 4 bottles)	Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)	Unit 1 Run 3 (MV Unit 1 R-3 + 4 bottles)	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	41	9	10	5
Antimony	µg	3	4	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	0.8	0.8	0.7	0.25
Chromium	µg	3.16	5.74	2.4	0.2
Cobalt	µg	0.3	<0.3	<0.3	0.25
Copper	µg	3.8	2	3.2	0.25
Lead	µg	6.7	2.8	2	1.5
Manganese	µg	2	2	1.0	0.25
Nickel	µg	2	5.1	2.8	0.5
Phosphorus	µg	64	41	57	2.5
Selenium	µg	4.2	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	59.0	40.8	52.2	0.5
<b>Back Half Metals Fraction 2A</b>					
Aluminum	µg	41	20	27	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	4.4	5.0	3.5	1
Cadmium	µg	<0.2	0.2	<0.2	0.25
Chromium	µg	0.98	0.29	0.56	0.2
Cobalt	µg	0.4	0.4	0.2	0.25
Copper	µg	3.1	4.4	<0.2	0.25
Lead	µg	<1	4.5	<1	1.5
Manganese	µg	4.4	1	1	0.25
Nickel	µg	0.6	2.3	<0.4	0.5
Phosphorus	µg	44	10	10	2.5
Selenium	µg	<1	3.1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	2.2	<1	<1	1.5
Vanadium	µg	<0.8	<0.8	<0.9	1
Zinc	µg	12	14	3.8	0.5
Volume	Sample	mL	870	720	
Volume	aliquot volume	mL	820	670	
<b>Mercury by CVAA</b>					
Mercury	As Tested	µg/L	0.10	0.29	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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

		Reference Number	1477162-1	1477162-2	1477162-3	
		Sample Date	Feb 22, 2021	Feb 23, 2021	Feb 23, 2021	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 1 Run 1 (MV Unit 1 R-1 + 4 bottles)	Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)	Unit 1 Run 3 (MV Unit 1 R-3 + 4 bottles)	
		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	0.042	0.04	0.11	
Mercury	As Tested	µg/L	0.34	2.20	1.03	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	870	870	720	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	2.4	15	5.9	
Mercury	As Tested	µg/L	0.08	0.13	0.13	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	155	155	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	0.02	0.032	0.033	
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	600	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.05	
Mercury	As Tested	µg/L	0.07	0.09	0.07	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	0.03	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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

		Reference Number	1477162-4	1477162-5	1477162-6
		Sample Date	Feb 23, 2021	Feb 24, 2021	Feb 24, 2021
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 bottles)	Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)	Unit 2 Run 3 (MV Unit 2 R-3 + 4 bottles)
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	10	<5	20	5
Antimony	µg	<2	<2	3	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	1.2	8.83	2.1	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	0.6	2	0.25
Lead	µg	2	<2	<2	1.5
Manganese	µg	0.7	1.0	1	0.25
Nickel	µg	4.0	6.4	1	0.5
Phosphorus	µg	52	53	49	2.5
Selenium	µg	5.0	2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	2.5	<2	2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	4.0	2.7	8.2	0.5
<b>Back Half Metals Fraction 2A</b>					
Aluminum	µg	10	10	6	5
Antimony	µg	<2	<2	3	2.5
Arsenic	µg	3.8	6.2	4.3	1
Cadmium	µg	0.3	0.4	<0.2	0.25
Chromium	µg	0.86	0.2	0.63	0.2
Cobalt	µg	<0.2	0.2	0.3	0.25
Copper	µg	2	1.0	0.3	0.25
Lead	µg	2	<1	<1	1.5
Manganese	µg	1	1	1.0	0.25
Nickel	µg	<0.4	<0.4	<0.4	0.5
Phosphorus	µg	22	10	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	2.9	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	3.6	2	2	0.5
Volume	Sample	mL	770	720	720
Volume	aliquot volume	mL	720	670	670
<b>Mercury by CVAA</b>					
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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

		Reference Number	1477162-4	1477162-5	1477162-6	
		Sample Date	Feb 23, 2021	Feb 24, 2021	Feb 24, 2021	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 bottles)	Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)	Unit 2 Run 3 (MV Unit 2 R-3 + 4 bottles)	
		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	0.44	0.43	0.43	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	770	720	720	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	2.7	2.5	2.5	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	155	185	
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	600	600	700	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.05	<0.05	<0.06	
Mercury	As Tested	µg/L	<0.05	<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	



## 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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

		Reference Number	1477162-7	1477162-8	1477162-9
		Sample Date	Feb 24, 2021	Feb 25, 2021	Feb 25, 2021
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 3 Run 1 (MV Unit 3 R-1 + 4 bottles)	Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)	Unit 3 Run 3 (MV Unit 3 R-3 + 4 bottles)
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
<b>Front Half Metals Fraction 1A</b>					
Aluminum	µg	9	8	<5	5
Antimony	µg	3	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	0.3	<0.3	<0.3	0.25
Chromium	µg	1.6	1.4	0.28	0.2
Cobalt	µg	<0.3	0.4	0.4	0.25
Copper	µg	0.5	2.8	0.6	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	1	0.6	0.3	0.25
Nickel	µg	2	2	<0.5	0.5
Phosphorus	µg	58	50	20	2.5
Selenium	µg	6.0	8.1	5.7	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	10	11	4.7	0.5
<b>Back Half Metals Fraction 2A</b>					
Aluminum	µg	10	4	7	5
Antimony	µg	<2	<2	3	2.5
Arsenic	µg	5.5	3.3	3.3	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	0.2	0.55	0.80	0.2
Cobalt	µg	<0.2	0.5	0.2	0.25
Copper	µg	<0.2	0.3	0.4	0.25
Lead	µg	2	<1	2.4	1.5
Manganese	µg	1	0.9	1	0.25
Nickel	µg	<0.4	<0.4	<0.4	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	3.1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	2	1	<1	1.5
Vanadium	µg	<0.8	<0.9	<0.8	1
Zinc	µg	2.2	1	2.5	0.5
Volume	Sample	mL	870	640	870
Volume	aliquot volume	mL	820	590	820
<b>Mercury by CVAA</b>					
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: **1477162**  
Control Number:  
Date Received: Mar 1, 2021  
Date Reported: Mar 30, 2021  
Report Number: 2599210

		Reference Number	1477162-7	1477162-8	1477162-9	
		Sample Date	Feb 24, 2021	Feb 25, 2021	Feb 25, 2021	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 3 Run 1 (MV Unit 3 R-1 + 4 bottles)	Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)	Unit 3 Run 3 (MV Unit 3 R-3 + 4 bottles)	
		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	0.62	0.48	0.40	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	870	640	870	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	4.3	2.4	2.8	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	155	185	
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	0.12	<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	0.039	<0.02	

Approved by:

Carol Nam, Dipl. T.  
Quality Officer



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: <b>1477162</b> Control Number: Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 Report Number: 2599210
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	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	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: 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)		22-Feb-21			5	✓	✓	✓	✓	✓	✓								
2		Unit 1 Run 2 ('MV Unit 1 R-2' + 4 Bottles)		23-Feb-21			5	✓	✓	✓	✓	✓	✓								
3		Unit 1 Run 3 ('MV Unit 1 R-3' + 4 Bottles)		23-Feb-21			5	✓	✓	✓	✓	✓	✓								
4																					
5		Unit 2 Run 1 ('MV Unit 2 R-1' + 4 Bottles)		23-Feb-21			5	✓	✓	✓	✓	✓	✓								
6		Unit 2 Run 2 ('MV Unit 2 R-2' + 4 Bottles)		24-Feb-21			5	✓	✓	✓	✓	✓	✓								
7		Unit 2 Run 3 ('MV Unit 2 R-3' + 4 Bottles)		24-Feb-21			5	✓	✓	✓	✓	✓	✓								
8																					
9		Unit 3 Run 1 ('MV Unit 3 R-1' + 4 Bottles)		24-Feb-21			5	✓	✓	✓	✓	✓	✓								
10		Unit 3 Run 2 ('MV Unit 3 R-2' + 4 Bottles)		25-Feb-21			5	✓	✓	✓	✓	✓	✓								
11		Unit 3 Run 3 ('MV Unit 3 R-3' + 4 Bottles)		25-Feb-21			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>)

Page \_\_\_\_ of \_\_\_\_ Control #  
ED 120-005

Lot: 1477162<sup>COC</sup>



Temp. received: 18.0 °C  
Date/Time stamp: MAR 1 '21 17:00  
Delivery Method:  
Waybill:  
Received by:



## CERTIFICATE OF ANALYSIS

**Work Order** : **VA21A3528**  
**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** : ----  
**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** : 26-Feb-2021 13:30  
**Date Analysis Commenced** : 02-Mar-2021  
**Issue Date** : 05-Mar-2021 13:51

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.

Signatories	Position	Laboratory Department
Miles Gropen	Department Manager - Inorganics	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 in reports identified as "Preliminary Report" are considered authorized for use.

## Analytical Results

Sub-Matrix: Air

Client sample ID

					Unit 1 HF Blank	Unit 2 HF Blank	Unit 3 HF Blank	----	----
(Matrix: Air)									
Client sampling date / time					24-Feb-2021	25-Feb-2021	26-Feb-2021	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A3528-001	VA21A3528-002	VA21A3528-003	-----	-----
					Result	Result	Result	----	----
<b>Field Tests</b>									
volume, impinger	----	EP248	0.1	mL	207	205	215	----	----
<b>Anions and Nutrients</b>									
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 : **VA21A3528**

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 : ----

Site : ----

Quote number : Standing Offer

No. of samples received : 3

No. of samples analysed : 3

Page : 1 of 5

Laboratory : Vancouver - Environmental

Account Manager : Brent Mack

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

Telephone : 778-370-3279

Date Samples Received : 26-Feb-2021 13:30

Issue Date : 05-Mar-2021 13:51

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

### Key

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

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

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## 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.

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## 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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 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	26-Feb-2021	02-Mar-2021	28 days	4 days	✓	02-Mar-2021	23 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Blank	E248.F	25-Feb-2021	02-Mar-2021	28 days	5 days	✓	02-Mar-2021	22 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Blank	E248.F	24-Feb-2021	02-Mar-2021	28 days	6 days	✓	02-Mar-2021	21 days	0 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	157062	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	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.



Environmental

## QUALITY CONTROL REPORT

Work Order : **VA21A3528**

Page : 1 of 3

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 : ----  
Site : ----  
Quote number : Standing Offer  
No. of samples received : 3  
No. of samples analysed : 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 : 26-Feb-2021 13:30  
Date Analysis Commenced : 02-Mar-2021  
Issue Date : 05-Mar-2021 13:51

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

This Quality Control Report contains the following information:

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

### Signatories

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

Signatories	Position	Laboratory Department
Miles Gropen	Department Manager - Inorganics	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 Services number is a unique identifier assigned to discrete substances.
  - DQO = Data Quality Objective.
  - LOR = Limit of Reporting (detection limit).
  - RPD = Relative Percentage Difference
  - # = Indicates a QC result that did not meet the ALS DQO.

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: 157062)											
VA21A3527-001	Anonymous	fluoride	16984-48-8	E248.F	16.8	mg/sample	<16.8	<0.0168	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	µg/sample 335	335		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 (QC Lot: 157062)						
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: 157062)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	101	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: 157062)									
VA21A3527-002	Anonymous	fluoride	16984-48-8	E248.F	1.54 mg/sample	1.625 mg/sample	94.8	75.0	125

- No Matrix Spike (MS) Results are required to be reported.

[illegible]

## CERTIFICATE OF ANALYSIS

**Work Order** : **VA21A3527**  
**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** : ----  
**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** : 26-Feb-2021 13:30  
**Date Analysis Commenced** : 02-Mar-2021  
**Issue Date** : 05-Mar-2021 14:37

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.

Signatories	Position	Laboratory Department
Miles Gropen	Department Manager - Inorganics	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 in reports identified as "**Preliminary Report**" are considered authorized for use.

## Qualifiers

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



## Analytical Results

Sub-Matrix: Air					Client sample ID	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
(Matrix: Air)										
Client sampling date / time						23-Feb-2021	23-Feb-2021	23-Feb-2021	24-Feb-2021	24-Feb-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A3527-001	VA21A3527-002	VA21A3527-003	VA21A3527-004	VA21A3527-005	
					Result	Result	Result	Result	Result	
<b>Field Tests</b>										
volume, impinger	----	EP248	0.1	mL	335	325	306	330	340	
<b>Anions and Nutrients</b>										
fluoride	16984-48-8	E248.F	5.0	µg/sample	<16.8 <sup>DLDS</sup>	<16.2 <sup>DLDS</sup>	<15.3 <sup>DLDS</sup>	<16.5 <sup>DLDS</sup>	<17.0 <sup>DLDS</sup>	

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

## Analytical Results

Sub-Matrix: Air					Client sample ID	Unit 2 HF Run 3	Unit 3 HF Run 1	Unit 3 HF Run 2	Unit 3 HF Run 3	----
(Matrix: Air)										
Client sampling date / time						24-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021	----
Analyte	CAS Number	Method	LOR	Unit	VA21A3527-006	VA21A3527-007	VA21A3527-008	VA21A3527-009	-----	
					Result	Result	Result	Result	----	
<b>Field Tests</b>										
volume, impinger	----	EP248	0.1	mL	322	315	337	335	----	
<b>Anions and Nutrients</b>										
fluoride	16984-48-8	E248.F	5.0	µg/sample	<16.1 <sup>DLDS</sup>	<15.8 <sup>DLDS</sup>	<16.8 <sup>DLDS</sup>	<16.8 <sup>DLDS</sup>	----	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order : **VA21A3527**

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 : ----

Site : ----

Quote number : Standing Offer

No. of samples received : 9

No. of samples analysed : 9

Page : 1 of 6

Laboratory : Vancouver - Environmental

Account Manager : Brent Mack

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

Telephone : 778-370-3279

Date Samples Received : 26-Feb-2021 13:30

Issue Date : 05-Mar-2021 14:37

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

### Key

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

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

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## 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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 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	25-Feb-2021	02-Mar-2021	28 days	5 days	✓	02-Mar-2021	22 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Run 2	E248.F	25-Feb-2021	02-Mar-2021	28 days	5 days	✓	02-Mar-2021	22 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Run 3	E248.F	25-Feb-2021	02-Mar-2021	28 days	5 days	✓	02-Mar-2021	22 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 1	E248.F	24-Feb-2021	02-Mar-2021	28 days	6 days	✓	02-Mar-2021	21 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 2	E248.F	24-Feb-2021	02-Mar-2021	28 days	6 days	✓	02-Mar-2021	21 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 3	E248.F	24-Feb-2021	02-Mar-2021	28 days	6 days	✓	02-Mar-2021	21 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Run 1	E248.F	23-Feb-2021	02-Mar-2021	28 days	7 days	✓	02-Mar-2021	20 days	0 days	✓



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

Analyte Group	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 1 HF Run 2	E248.F	23-Feb-2021	02-Mar-2021	28 days	7 days	✓	02-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Run 3	E248.F	23-Feb-2021	02-Mar-2021	28 days	7 days	✓	02-Mar-2021	20 days	0 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	157062	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	157062	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.





Environmental

## QUALITY CONTROL REPORT

Work Order : **VA21A3527**

Page : 1 of 3

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 : ----  
Site : ----  
Quote number : Standing Offer  
No. of samples received : 9  
No. of samples analysed : 9

Laboratory : Vancouver - Environmental  
Account Manager : Brent Mack  
Address : 8081 Lougheed Highway  
Burnaby, British Columbia Canada V5A 1W9  
Telephone : 778-370-3279  
Date Samples Received : 26-Feb-2021 13:30  
Date Analysis Commenced : 02-Mar-2021  
Issue Date : 05-Mar-2021 14:37

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

This Quality Control Report contains the following information:

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

### Signatories

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

Signatories	Position	Laboratory Department
Miles Gropen	Department Manager - Inorganics	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 Services number is a unique identifier assigned to discrete substances.
- DQO = Data Quality Objective.
- LOR = Limit of Reporting (detection limit).
- RPD = Relative Percentage Difference
- # = Indicates a QC result that did not meet the ALS DQO.

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: 157062)											
VA21A3527-001	Unit 1 HF Run 1	fluoride	16984-48-8	E248.F	16.8	mg/sample	<16.8	<0.0168	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	µg/sample 335	335		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 (QC Lot: 157062)						
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: 157062)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	101	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: 157062)									
VA21A3527-002	Unit 1 HF Run 2	fluoride	16984-48-8	E248.F	1.54 mg/sample	1.625 mg/sample	94.8	75.0	125

- No Matrix Spike (MS) Results are required to be reported.



**APPENDIX - C**

**COMPUTER GENERATED RESULTS**

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

**Date:** 22-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 12:18 - 14:22

---

**Concentrations:**

<b>Particulate</b>	3.12 mg/dscm	0.00136 gr/dscf
	1.72 mg/Acm	0.00075 gr/Acf
	2.47 mg/dscm (@ 11% O2)	0.00108 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.216 Kg/hr	0.476 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1153 dscm/min	40714 dscf/min
	19.21 dscm/sec	679 dscf/sec
	2087 Acn/min	73710 Acf/min

<b>Velocity</b>	13.658 m/sec	44.81 f/sec
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<b>Temperature</b>	155.0 oC	310.9 oF
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<b>Moisture</b>	15.7 %
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<b>Gas Analysis</b>	8.4 % O2
	10.6 % CO2

30.035 Mol. Wt (g/gmole) Dry  
28.144 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.8516 dscm	100.703 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	100.8 %	

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

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

**Date:** 22-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 12:18 - 14:22

Control Unit (Y) 0.9988  
Nozzle Diameter (in.) 0.3207  
Pitot Factor 0.8490  
Baro. Press. (in. Hg) 30.03  
Static Press. (in. H2O) -19.00  
Stack Height (ft) 30  
Stack Diameter (in.) 70.90  
Stack Area (sq.ft.) 27.417  
Minutes Per Reading 5.0  
Minutes Per Point 5.0

**Collection:**  
Filter (grams) 0.00270  
Washings (grams) 0.00620  
**Total (grams) 0.00890**

**Gas Analysis (Vol. %):**

CO2	O2
10.75	8.25
10.50	8.50
<b>10.63</b>	<b>8.38</b>

**Condensate Collection:**

Impinger 1	148.0
Impinger 2	154.0
Impinger 3	46.0
Impinger 4	22.0
Impinger 5	12.0
Impinger 6	4.0
Gel	12.9

**Gain (grams) 398.9**

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	558.600								
1	5.0	563.050	0.46	2.74	65	65	9.5	309	1.5	100.8
2	10.0	567.460	0.45	2.68	66	66	9.5	310	4.7	100.9
3	15.0	571.820	0.44	2.61	66	66	10	311	8.4	100.9
4	20.0	576.280	0.46	2.74	67	67	10	311	12.5	100.8
5	25.0	580.790	0.47	2.80	67	67	10.5	311	17.7	100.8
6	30.0	585.350	0.48	2.86	67	67	10.5	311	25.2	100.9
7	35.0	589.670	0.43	2.56	68	68	10	312	45.6	100.8
8	40.0	594.140	0.46	2.74	69	69	10	313	53.2	100.8
9	45.0	598.570	0.45	2.68	69	69	10	313	58.3	101.0
10	50.0	602.740	0.40	2.38	69	69	10	313	62.5	100.7
11	55.0	606.810	0.38	2.27	69	69	8.5	312	66.1	100.8
12	60.0	610.670	0.34	2.03	70	70	8.5	312	69.4	100.8
Traverse 2	0.0	610.670								
1	5.0	614.350	0.31	1.86	70	70	7.5	311	1.5	100.5
2	10.0	618.040	0.31	1.86	70	70	7.5	310	4.7	100.7
3	15.0	621.850	0.33	1.98	70	70	7.5	309	8.4	100.8
4	20.0	625.760	0.35	2.10	69	69	7.5	309	12.5	100.6
5	25.0	629.680	0.35	2.10	70	70	8	309	17.7	100.7
6	30.0	633.760	0.38	2.28	70	70	8	309	25.2	100.6
7	35.0	638.150	0.44	2.64	70	70	10	310	45.6	100.8
8	40.0	642.440	0.42	2.52	70	70	10	310	53.2	100.8
9	45.0	646.680	0.41	2.45	70	70	9.5	311	58.3	100.8
10	50.0	650.910	0.41	2.45	70	70	9.5	312	62.5	100.7
11	55.0	654.820	0.35	2.09	70	70	7.5	313	66.1	100.7
12	60.0	658.620	0.33	1.98	70	70	7.5	311	69.4	100.6
Average:			0.400	2.392	68.8	68.8	9.0	310.9		100.8



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

**Date:** 23-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 08:45 - 10:46

---

**Concentrations:**

<b>Particulate</b>	2.26 mg/dscm	0.00099 gr/dscf
	1.27 mg/Acm	0.00056 gr/Acf
	2.11 mg/dscm (@ 11% O2)	0.00092 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.167 Kg/hr	0.369 lb/hr
--------------------	-------------	-------------

**Flue Gas Characteristics:**

<b>Flow</b>	1235 dscm/min	43608 dscf/min
	20.58 dscm/sec	727 dscf/sec
	2192 Acm/min	77417 Acf/min

<b>Velocity</b>	14.344 m/sec	47.06 f/sec
-----------------	--------------	-------------

<b>Temperature</b>	155.2 oC	311.4 oF
--------------------	----------	----------

<b>Moisture</b>	14.4 %
-----------------	--------

<b>Gas Analysis</b>	10.3 % O2
	8.6 % CO2

29.792 Mol. Wt (g/gmole) Dry  
28.093 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	3.0098 dscm	106.292 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	99.3 %	

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

**Date:** 23-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 08:45 - 10:46

Traverse / Point	Time (min.)	Dry Gas Meter		Pitot ΔP	Orifice ΔH		Dry Gas Temperature		Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
		(ft3)	(in. H2O)		(in. H2O)	Inlet (oF)	Outlet (oF)					
Traverse 1	0.0	660.289										
1	5.0	664.500	0.44	2.55	47	47	4.5	302	1.5	99.1		
2	10.0	668.760	0.45	2.61	48	48	4.5	302	4.7	98.9		
3	15.0	673.240	0.49	2.87	47	47	5	308	8.4	100.4		
4	20.0	677.630	0.48	2.77	50	50	5	310	12.5	98.9		
5	25.0	682.140	0.50	2.88	49	49	5.5	311	17.7	99.8		
6	30.0	686.700	0.49	2.82	49	49	5.5	311	25.2	101.9		
7	35.0	691.120	0.48	2.75	49	49	5.5	313	45.6	100.0		
8	40.0	695.520	0.48	2.76	51	51	5.5	314	53.2	99.2		
9	45.0	699.680	0.42	2.42	51	51	5	314	58.3	100.2		
10	50.0	703.650	0.40	2.31	52	52	5	313	62.5	97.7		
11	55.0	707.680	0.41	2.37	53	53	5	313	66.1	97.8		
12	60.0	711.530	0.37	2.14	54	54	5	313	69.4	98.1		
Traverse 2	0.0	711.530										
1	5.0	716.140	0.52	3.01	55	55	5.5	315	1.5	99.2		
2	10.0	720.430	0.45	2.62	56	56	5.5	313	4.7	98.8		
3	15.0	724.580	0.42	2.44	56	56	5	313	8.4	98.9		
4	20.0	728.820	0.43	2.50	56	56	5	312	12.5	99.8		
5	25.0	733.150	0.45	2.63	57	57	5	312	17.7	99.5		
6	30.0	737.360	0.42	2.46	58	58	5	311	25.2	99.8		
7	35.0	741.690	0.45	2.64	59	59	5.5	311	45.6	99.0		
8	40.0	746.070	0.46	2.69	59	59	5.5	312	53.2	99.2		
9	45.0	750.350	0.43	2.52	60	60	5.5	313	58.3	100.0		
10	50.0	754.490	0.41	2.41	61	61	5.5	313	62.5	98.9		
11	55.0	758.540	0.39	2.29	62	62	5	313	66.1	99.0		
12	60.0	762.430	0.36	2.12	62	62	5	312	69.4	98.8		
Average:			0.442	2.566	54.2	54.2	5.2	311.4				99.3

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

**Date:** 23-Feb-21  
**Run:** 3 - Particulate / Metals  
**Run Time:** 11:15 - 13:18

---

**Concentrations:**

<b>Particulate</b>	2.1 mg/dscm	0.0009 gr/dscf
	1.2 mg/Acm	0.0005 gr/Acf
	1.8 mg/dscm (@ 11% O2)	0.0008 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.149 Kg/hr	0.329 lb/hr
--------------------	-------------	-------------

**Flue Gas Characteristics:**

<b>Flow</b>	1203 dscm/min	42476 dscf/min
	20.05 dscm/sec	708 dscf/sec
	2100 Acm/min	74154 Acf/min

<b>Velocity</b>	13.740 m/sec	45.08 f/sec
-----------------	--------------	-------------

<b>Temperature</b>	159.6 oC	319.3 oF
--------------------	----------	----------

<b>Moisture</b>	12.0 %
-----------------	--------

<b>Gas Analysis</b>	9.3 % O2
	10.6 % CO2

30.071 Mol. Wt (g/gmole) Dry  
28.617 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.8981 dscm	102.347 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	98.1 %	

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

<b>Client:</b>	Metro Vancouver	<b>Date:</b>	23-Feb-21
<b>Jobsite:</b>	WTE (Burnaby, B.C)	<b>Run:</b>	3 - Particulate / Metals
<b>Source:</b>	Unit 1	<b>Run Time:</b>	11:15 - 13:18

Control Unit (Y)	0.9988	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3207	Filter (grams) 0.00320	CO2 O2	Impinger 1 130.0
Pitot Factor	0.8490	Washings (grams) 0.00280	10.50 9.55	Impinger 2 100.0
Baro. Press. (in. Hg)	30.17	Traverse 1	10.75 9.00	Impinger 3 22.0
Static Press. (in. H2O)	-19.10	Traverse 2		Impinger 4 22.0
Stack Height (ft)	30	Total (grams) 0.00600		Impinger 5 5.0
Stack Diameter (in.)	70.90			Impinger 6 4.0
Stack Area (sq.ft.)	27.417			Gel 14.9
Minutes Per Reading	5.0			Gain (grams) 297.9
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)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	763.105								
1	5.0	767.180	0.39	2.33	61	61	7	311	1.5	97.9
2	10.0	771.540	0.45	2.67	61	61	7	314	4.7	97.8
3	15.0	775.960	0.46	2.74	61	61	8.5	319	8.4	98.4
4	20.0	780.180	0.42	2.50	61	61	8.5	320	12.5	98.3
5	25.0	784.550	0.45	2.68	62	62	9	322	17.7	98.3
6	30.0	788.820	0.43	2.55	62	62	9	322	25.2	98.2
7	35.0	793.190	0.45	2.67	62	62	8	323	45.6	98.4
8	40.0	797.510	0.44	2.61	62	62	8	323	53.2	98.3
9	45.0	801.780	0.43	2.55	63	63	8	323	58.3	98.1
10	50.0	805.750	0.37	2.20	63	63	8	323	62.5	98.3
11	55.0	809.510	0.33	1.97	63	63	6	323	66.1	98.5
12	60.0	813.120	0.30	1.79	63	63	6	323	69.4	99.1
Traverse 2	0.0	813.120								
1	5.0	817.400	0.43	2.56	63	63	7.5	323	1.5	98.4
2	10.0	821.590	0.41	2.45	63	63	7.5	321	4.7	98.5
3	15.0	825.720	0.40	2.38	62	62	8	319	8.4	98.3
4	20.0	829.690	0.37	2.20	62	62	8	318	12.5	98.1
5	25.0	833.820	0.40	2.38	62	62	8	318	17.7	98.2
6	30.0	838.130	0.44	2.61	61	61	8	317	25.2	97.9
7	35.0	842.380	0.43	2.54	60	60	8.5	314	45.6	97.7
8	40.0	846.780	0.46	2.72	61	61	8.5	318	53.2	97.9
9	45.0	850.990	0.42	2.49	60	60	8	318	58.3	98.1
10	50.0	855.140	0.41	2.42	60	60	8	318	62.5	97.9
11	55.0	859.130	0.38	2.24	60	60	8.5	317	66.1	97.6
12	60.0	862.900	0.34	2.00	60	60	8.5	316	69.4	97.4
Average:			0.409	2.427	61.6	61.6	7.9	319.3		98.1

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

**Date:** 23-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 10:59 - 13:03

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**Concentrations:**

<b>Particulate</b>	0.7 mg/dscm	0.0003 gr/dscf
	0.4 mg/Acm	0.0002 gr/Acf
	0.6 mg/dscm (@ 11% O2)	0.0003 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.051 Kg/hr	0.112 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1167 dscm/min	41210 dscf/min
	19.45 dscm/sec	687 dscf/sec
	2015 Acm/min	71156 Acf/min

<b>Velocity</b>	13.184 m/sec	43.26 f/sec
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<b>Temperature</b>	153.1 oC	307.5 oF
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<b>Moisture</b>	12.8 %
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<b>Gas Analysis</b>	9.0 % O2
	11.1 % CO2

30.140 Mol. Wt (g/gmole) Dry  
28.590 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.6843 dscm	94.797 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	99.6 %	

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

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

**Date:** 23-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 10:59 - 13:03

Control Unit (Y)	0.9925	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3110	Filter (grams) 0.00005	CO2 O2	Impinger 1 132.0
Pitot Factor	0.8494	Washings (grams) 0.00190	11.00 9.25	Impinger 2 94.0
Baro. Press. (in. Hg)	30.13		11.25 8.75	Impinger 3 36.0
Static Press. (in. H2O)	-17.00	<b>Total (grams) 0.00195</b>		Impinger 4 12.0
Stack Height (ft)	30			Impinger 5 5.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 13.8
Minutes Per Reading	5.0		<b>11.13 9.00</b>	<b>Gain (grams) 294.8</b>
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	517.575								
1	5.0	520.390	0.21	1.09	51	51	5.5	309	1.5	99.2
2	10.0	523.700	0.29	1.50	51	51	5.5	308	4.7	99.3
3	15.0	526.720	0.24	1.24	52	52	6.5	308	8.4	99.4
4	20.0	530.270	0.33	1.71	53	53	6.5	308	12.5	99.5
5	25.0	533.770	0.32	1.66	53	53	7.5	308	17.7	99.6
6	30.0	537.760	0.42	2.18	51	51	7.5	306	25.2	99.5
7	35.0	541.840	0.43	2.25	57	57	11	308	45.6	99.6
8	40.0	546.540	0.57	2.98	58	58	11	311	53.2	99.8
9	45.0	551.040	0.52	2.72	60	60	12	312	58.3	99.7
10	50.0	555.470	0.50	2.63	60	60	12	308	62.5	99.8
11	55.0	559.770	0.47	2.48	62	62	10	310	66.1	99.6
12	60.0	563.750	0.40	2.11	63	63	10	310	69.4	99.6
Traverse 2	0.0	563.750								
1	5.0	567.430	0.34	1.81	64	64	8.0	306	1.5	99.4
2	10.0	571.370	0.39	2.07	64	64	8.0	307	4.7	99.5
3	15.0	575.660	0.46	2.45	64	64	10	306	8.4	99.8
4	20.0	580.080	0.49	2.61	63	63	10	305	12.5	99.8
5	25.0	584.270	0.44	2.34	63	63	10	305	17.7	99.8
6	30.0	588.720	0.50	2.65	61	61	10	305	25.2	99.8
7	35.0	592.690	0.40	2.12	61	61	9.5	306	45.6	99.5
8	40.0	596.510	0.37	1.96	61	61	9.5	306	53.2	99.5
9	45.0	600.580	0.42	2.22	61	61	9.5	308	58.3	99.7
10	50.0	604.130	0.32	1.69	61	61	9.5	308	62.5	99.5
11	55.0	607.390	0.27	1.43	61	61	9.0	306	66.1	99.3
12	60.0	610.342	0.22	1.16	61	61	9.0	306	69.4	99.6
Average:			0.388	2.044	59.0	59.0	9.0	307.5		99.6

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

**Date:** 24-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 09:33 - 11:35

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**Concentrations:**

<b>Particulate</b>	0.04 mg/dscm	0.00002 gr/dscf
	0.02 mg/Acm	0.00001 gr/Acf
	0.03 mg/dscm (@ 11% O2)	0.00001 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.003 Kg/hr	0.006 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1265 dscm/min	44661 dscf/min
	21.08 dscm/sec	744 dscf/sec
	2187 Acm/min	77233 Acf/min

<b>Velocity</b>	14.310 m/sec	46.95 f/sec
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<b>Temperature</b>	152.2 oC	306.0 oF
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<b>Moisture</b>	14.2 %
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<b>Gas Analysis</b>	9.6 % O2
	10.1 % CO2

30.003 Mol. Wt (g/gmole) Dry  
28.302 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.6764 dscm	94.517 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	99.0 %	

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



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

**Date:** 24-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 09:33 - 11:35

Control Unit (Y) 0.9925  
 Nozzle Diameter (in.) 0.3050  
 Pitot Factor 0.8494  
 Baro. Press. (in. Hg) 30.50  
 Static Press. (in. H2O) -17.00  
 Stack Height (ft) 30.1  
 Stack Diameter (in.) 70.90  
 Stack Area (sq.ft.) 27.417  
 Minutes Per Reading 5.0  
 Minutes Per Point 5.0

**Collection:**  
 Filter (grams) 0.00005  
 Washings (grams) 0.00005  
**Total (grams) 0.00010**

**Gas Analysis (Vol. %):**  
 CO2 O2  
 Traverse 1 10.00 10.15  
 Traverse 2 10.25 9.00  
**10.13 9.58**

**Condensate Collection:**  
 Impinger 1 208.0  
 Impinger 2 72.0  
 Impinger 3 24.0  
 Impinger 4 8.0  
 Impinger 5 3.0  
 Impinger 6 2.0  
 Gel 14.7  
**Gain (grams) 331.7**

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	611.185								
1	5.0	614.920	0.42	1.94	47	47	5	300	1.5	98.9
2	10.0	618.750	0.44	2.03	47	47	5	300	4.7	99.1
3	15.0	622.650	0.45	2.08	48	48	5	302	8.4	99.7
4	20.0	626.680	0.49	2.26	48	48	5	302	12.5	98.8
5	25.0	630.840	0.52	2.40	50	50	5.5	304	17.7	98.8
6	30.0	635.080	0.54	2.49	50	50	5.5	305	25.2	98.9
7	35.0	639.180	0.50	2.32	52	52	5.5	330	45.6	100.5
8	40.0	643.240	0.49	2.27	53	53	5.5	305	53.2	98.7
9	45.0	647.190	0.46	2.14	54	54	5.5	304	58.3	98.9
10	50.0	650.960	0.42	1.95	55	55	5.5	307	62.5	98.7
11	55.0	654.560	0.38	1.77	57	57	5	308	66.1	98.7
12	60.0	658.010	0.35	1.63	57	57	5	308	69.4	98.5
Traverse 2	0.0	658.010								
1	5.0	661.520	0.35	1.65	58	58	4.5	300	1.5	99.5
2	10.0	665.250	0.41	1.91	58	58	4.5	308	4.7	98.3
3	15.0	669.170	0.44	2.05	59	59	5	309	8.4	99.6
4	20.0	672.920	0.41	1.91	60	60	5	311	12.5	98.7
5	25.0	676.590	0.38	1.77	60	60	5	312	17.7	100.3
6	30.0	680.110	0.36	1.68	61	61	5	312	25.2	98.6
7	35.0	684.380	0.53	2.47	61	61	5.5	312	45.6	98.8
8	40.0	688.720	0.55	2.58	62	62	5.5	311	53.2	98.4
9	45.0	693.300	0.61	2.86	62	62	6.5	311	58.3	98.6
10	50.0	697.700	0.56	2.63	63	63	6.5	311	62.5	98.6
11	55.0	701.720	0.45	2.17	64	64	5.5	290	66.1	98.9
12	60.0	705.570	0.40	1.96	64	64	5.5	281	69.4	99.8
<b>Average:</b>			0.455	2.122	56.3	56.3	5.3	306.0		99.0

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

**Date:** 24-Feb-21  
**Run:** 3 - Particulate / Metals  
**Run Time:** 12:07 - 14:08

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**Concentrations:**

<b>Particulate</b>	0.7 mg/dscm	0.0003 gr/dscf
	0.4 mg/Acm	0.0002 gr/Acf
	0.6 mg/dscm (@ 11% O2)	0.0003 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.05 Kg/hr	0.118 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1229 dscm/min	43418 dscf/min
	20.49 dscm/sec	724 dscf/sec
	2137 Acm/min	75451 Acf/min

<b>Velocity</b>	13.980 m/sec	45.87 f/sec
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<b>Temperature</b>	154.8 oC	310.7 oF
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<b>Moisture</b>	14.1 %
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<b>Gas Analysis</b>	9.8 % O2
	9.7 % CO2

29.938 Mol. Wt (g/gmole) Dry  
28.259 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.6889 dscm	94.957 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	98.5 %	

**\* Standard Conditions:**

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

<b>Client:</b>	Metro Vancouver	<b>Date:</b>	24-Feb-21
<b>Jobsite:</b>	WTE (Burnaby, B.C)	<b>Run:</b>	3 - Particulate / Metals
<b>Source:</b>	Unit 2	<b>Run Time:</b>	12:07 - 14:08

Control Unit (Y)	0.9925	Collection:	Gas Analysis (Vol. %):		Condensate Collection:			
Nozzle Diameter (in.)	0.3050		Filter (grams)	0.00005	CO2	O2	Impinger 1	222.0
Pitot Factor	0.8494		Washings (grams)	0.00190	10.25	9.00	Impinger 2	66.0
Baro. Press. (in. Hg)	30.50				9.10	10.50	Impinger 3	18.0
Static Press. (in. H2O)	-17.00						Impinger 4	6.0
Stack Height (ft)	30	Total (grams) 0.0020				Impinger 5	3.0	
Stack Diameter (in.)	70.90					Impinger 6	1.0	
Stack Area (sq.ft.)	27.417					Gel	14.2	
Minutes Per Reading	5.0			9.68	9.75	Gain (grams)	330.2	
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	706.278								
1	5.0	709.410	0.28	1.33	62	62	6	309	1.5	98.9
2	10.0	712.580	0.29	1.36	61	61	6	301	4.7	98.0
3	15.0	715.630	0.27	1.26	61	61	6	309	8.4	98.2
4	20.0	718.680	0.27	1.26	61	61	6	310	12.5	98.3
5	25.0	721.900	0.30	1.40	61	61	6	310	17.7	98.5
6	30.0	725.430	0.36	1.69	62	62	6	310	25.2	98.4
7	35.0	730.170	0.65	3.04	62	62	9	310	45.6	98.7
8	40.0	735.030	0.68	3.19	63	63	9	312	53.2	98.9
9	45.0	740.000	0.71	3.33	64	64	10	312	58.3	98.8
10	50.0	744.800	0.66	3.10	65	65	10	313	62.5	98.8
11	55.0	749.060	0.52	2.45	65	65	9	313	66.1	98.6
12	60.0	753.060	0.41	2.10	66	66	9	304	69.4	103.4
Traverse 2	0.0	753.060								
1	5.0	756.730	0.38	1.81	66	66	7.5	303	1.5	98.4
2	10.0	760.830	0.48	2.26	66	66	7.5	313	4.7	98.6
3	15.0	764.980	0.49	2.31	67	67	8	312	8.4	98.5
4	20.0	769.170	0.50	2.35	67	67	8	315	12.5	98.6
5	25.0	773.760	0.60	2.82	68	68	9.5	316	17.7	98.6
6	30.0	778.470	0.63	2.97	68	68	9.5	316	25.2	98.8
7	35.0	782.130	0.38	1.79	68	68	7	314	45.6	98.5
8	40.0	785.660	0.36	1.70	69	69	7	313	53.2	97.3
9	45.0	789.130	0.34	1.61	68	68	7	312	58.3	98.5
10	50.0	792.600	0.34	1.64	69	69	7	312	62.5	98.3
11	55.0	796.010	0.35	1.56	68	68	7	313	66.1	95.5
12	60.0	799.180	0.29	1.38	69	69	7	305	69.4	96.8
Average:			0.439	2.071	65.3	65.3	3.0	310.7		98.5

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

**Date:** 24-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 12:44 - 14:48

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**Concentrations:**

<b>Particulate</b>	0.04 mg/dscm	0.00002 gr/dscf
	0.02 mg/Acm	0.00001 gr/Acf
	0.04 mg/dscm (@ 11% O2)	0.00002 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.003 Kg/hr	0.006 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1181 dscm/min	41713 dscf/min
	19.69 dscm/sec	695 dscf/sec
	2072 Acm/min	73179 Acf/min

<b>Velocity</b>	13.559 m/sec	44.49 f/sec
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<b>Temperature</b>	156.7 oC	314.0 oF
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<b>Moisture</b>	14.1 %
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<b>Gas Analysis</b>	11.1 % O2
	9.2 % CO2

29.917 Mol. Wt (g/gmole) Dry  
28.240 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.6319 dscm	92.946 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	100.8 %	

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

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

**Date:** 24-Feb-21  
**Run:** 1 - Particulate / Metals  
**Run Time:** 12:44 - 14:48

Control Unit (Y)	0.9997	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3043	Filter (grams) 0.00005	CO2 O2	Impinger 1 200.0
Pitot Factor	0.8490	Washings (grams) 0.00005	9.00 11.00	Impinger 2 86.0
Baro. Press. (in. Hg)	30.50	Traverse 1	9.40 11.25	Impinger 3 16.0
Static Press. (in. H2O)	-19.00	Traverse 2		Impinger 4 6.0
Stack Height (ft)	30	Total (grams) 0.00010		Impinger 5 2.0
Stack Diameter (in.)	70.90			Impinger 6 1.0
Stack Area (sq.ft.)	27.417			Gel 12.5
Minutes Per Reading	5.0		9.20 11.13	Gain (grams) 323.5
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	148.598								
1	5.0	152.710	0.49	2.43	52	52	8	295	1.5	100.8
2	10.0	156.860	0.51	2.47	52	52	8	313	4.7	100.9
3	15.0	161.090	0.53	2.57	52	52	8	313	8.4	101.0
4	20.0	165.410	0.55	2.67	53	53	8	313	12.5	101.0
5	25.0	169.660	0.53	2.58	54	54	8	313	17.7	101.0
6	30.0	173.740	0.49	2.38	54	54	8	313	25.2	100.8
7	35.0	176.990	0.31	1.51	55	55	14	313	45.6	100.6
8	40.0	179.930	0.25	1.23	56	56	14	306	53.2	100.6
9	45.0	182.800	0.24	1.18	56	56	13	310	58.3	100.5
10	50.0	185.620	0.23	1.13	57	57	13	310	62.5	100.6
11	55.0	188.380	0.22	1.08	58	58	12.5	311	66.1	100.6
12	60.0	191.080	0.21	1.03	59	59	12.5	312	69.4	100.6
Traverse 2	0.0	191.080								
1	5.0	194.680	0.37	1.83	59	59	8	307	1.5	100.9
2	10.0	198.300	0.38	1.85	60	60	8	321	4.7	100.8
3	15.0	201.830	0.36	1.76	61	61	7.5	320	8.4	100.7
4	20.0	205.220	0.33	1.62	61	61	7.5	318	12.5	100.9
5	25.0	208.560	0.32	1.57	61	61	7.5	317	17.7	100.8
6	30.0	211.800	0.30	1.48	62	62	7.5	317	25.2	100.8
7	35.0	216.030	0.51	2.52	62	62	12.5	313	45.6	100.9
8	40.0	220.410	0.55	2.70	63	63	12.5	320	53.2	100.9
9	45.0	224.870	0.57	2.79	63	63	13	321	58.3	101.1
10	50.0	229.290	0.56	2.74	63	63	13	321	62.5	101.0
11	55.0	233.560	0.52	2.55	64	64	13	321	66.1	101.0
12	60.0	237.710	0.49	2.41	64	64	13	319	69.4	101.0
Average:			0.409	2.003	58.4	58.4	10.4	314.0		100.8

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

**Date:** 25-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 08:54 - 10:57

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**Concentrations:**

<b>Particulate</b>	0.35 mg/dscm	0.00015 gr/dscf
	0.20 mg/Acm	0.00009 gr/Acf
	0.30 mg/dscm (@ 11% O2)	0.00013 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.023 Kg/hr	0.051 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1092 dscm/min	38566 dscf/min
	18.20 dscm/sec	643 dscf/sec
	1936 Acm/min	68354 Acf/min
<b>Velocity</b>	12.665 m/sec	41.55 f/sec
<b>Temperature</b>	150.1 oC	302.2 oF
<b>Moisture</b>	14.8 %	
<b>Gas Analysis</b>	9.1 % O2	
	10.3 % CO2	
	30.005 Mol. Wt (g/gmole) Dry	
	28.225 Mol. Wt (g/gmole) Wet	

**Sample Parameters:**

<b>Sample Volume</b>	2.4057 dscm	84.959 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	99.2 %	

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

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

**Date:** 25-Feb-21  
**Run:** 2 - Particulate / Metals  
**Run Time:** 08:54 - 10:57

Control Unit (Y) 0.9970  
 Nozzle Diameter (in.) 0.3050  
 Pitot Factor 0.8490  
 Baro. Press. (in. Hg) 29.94  
 Static Press. (in. H2O) -18.00  
 Stack Height (ft) 30  
 Stack Diameter (in.) 70.90  
 Stack Area (sq.ft.) 27.417  
 Minutes Per Reading 5.0  
 Minutes Per Point 5.0

**Collection:**  
 Filter (grams) 0.00005  
 Washings (grams) 0.00080  
**Total (grams) 0.00085**

**Gas Analysis (Vol. %):**  

CO2	O2
10.25	9.50
10.25	8.75

**Condensate Collection:**  
 Impinger 1 194.0  
 Impinger 2 82.0  
 Impinger 3 18.0  
 Impinger 4 4.0  
 Impinger 5 1.0  
 Impinger 6 1.0  
 Gel 14.2  
**Gain (grams) 314.2**

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	238.143								
1	5.0	242.050	0.45	2.14	50	50	6.5	301	1.5	99.8
2	10.0	245.880	0.44	2.09	50	50	6.5	304	4.7	99.1
3	15.0	249.670	0.44	2.09	50	50	6.5	304	8.4	98.1
4	20.0	253.600	0.46	2.18	51	51	6.5	304	12.5	99.3
5	25.0	257.370	0.42	2.00	52	52	7	304	17.7	99.5
6	30.0	261.050	0.40	1.90	52	52	7	304	25.2	99.5
7	35.0	264.140	0.28	1.34	53	53	5.5	299	45.6	99.2
8	40.0	267.000	0.24	1.15	53	53	5.5	302	53.2	99.3
9	45.0	269.820	0.24	1.15	54	54	5	301	58.3	97.6
10	50.0	272.300	0.18	0.86	54	54	5	301	62.5	99.1
11	55.0	274.920	0.20	0.96	55	55	4.5	299	66.1	99.0
12	60.0	277.480	0.19	0.91	55	55	4.5	300	69.4	99.3
Traverse 2	0.0	277.480								
1	5.0	280.910	0.35	1.68	56	56	6.5	301	1.5	98.1
2	10.0	284.380	0.35	1.68	57	57	6.5	303	4.7	99.2
3	15.0	287.750	0.33	1.59	57	57	6	303	8.4	99.2
4	20.0	290.920	0.29	1.40	58	58	6	303	12.5	99.3
5	25.0	294.030	0.28	1.35	58	58	6	304	17.7	99.2
6	30.0	297.090	0.27	1.30	59	59	6	304	25.2	99.2
7	35.0	300.830	0.40	1.94	60	60	7.5	302	45.6	99.4
8	40.0	304.830	0.45	2.17	60	60	7.5	304	53.2	100.4
9	45.0	308.930	0.48	2.32	61	61	8	304	58.3	99.5
10	50.0	313.200	0.52	2.52	61	61	8	304	62.5	99.6
11	55.0	317.180	0.45	2.19	62	62	7.5	302	66.1	99.4
12	60.0	320.990	0.41	2.01	62	62	7.5	296	69.4	99.3
<b>Average:</b>			0.355	1.705	55.8	55.8	6.4	302.2		99.2



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

**Date:** 25-Feb-21  
**Run:** 3 - Particulate / Metals  
**Run Time:** 11:42 - 13:43

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**Concentrations:**

<b>Particulate</b>	0.13 mg/dscm	0.00006 gr/dscf
	0.07 mg/Acm	0.00003 gr/Acf
	0.10 mg/dscm (@ 11% O2)	0.00004 gr/dscf (@ 11% O2)

**Emission Rates:**

<b>Particulate</b>	0.009 Kg/hr	0.021 lb/hr
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**Flue Gas Characteristics:**

<b>Flow</b>	1205 dscm/min	42546 dscf/min
	20.08 dscm/sec	709 dscf/sec
	2178 Acn/min	76925 Acf/min

<b>Velocity</b>	14.253 m/sec	46.76 f/sec
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<b>Temperature</b>	152.7 oC	306.8 oF
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<b>Moisture</b>	16.0 %
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<b>Gas Analysis</b>	8.3 % O2
	9.9 % CO2

29.910 Mol. Wt (g/gmole) Dry  
28.004 Mol. Wt (g/gmole) Wet

**Sample Parameters:**

<b>Sample Volume</b>	2.6972 dscm	95.250 dscf
<b>Sample Time</b>	120.0 minutes	
<b>Isokineticity</b>	100.8 %	

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

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

**Date:** 25-Feb-21  
**Run:** 3 - Particulate / Metals  
**Run Time:** 11:42 - 13:43

Control Unit (Y)	0.9997	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3050	Filter (grams) 0.00030	CO2 O2	Impinger 1 230.0
Pitot Factor	0.8490	Washings (grams) 0.00005	Traverse 1 10.00 8.25	Impinger 2 106.0
Baro. Press. (in. Hg)	29.94		Traverse 2 9.75 8.25	Impinger 3 20.0
Static Press. (in. H2O)	-18.00	<b>Total (grams) 0.00035</b>		Impinger 4 10.0
Stack Height (ft)	30			Impinger 5 3.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 14.6
Minutes Per Reading	5.0		<b>9.88 8.25</b>	<b>Gain (grams) 385.6</b>
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	321.793								
1	5.0	325.240	0.34	1.65	59	59	8	301	1.5	100.7
2	10.0	328.730	0.35	1.70	59	59	8	300	4.7	100.4
3	15.0	332.210	0.35	1.69	59	59	8	305	8.4	100.5
4	20.0	335.780	0.36	1.73	60	60	8	307	12.5	101.6
5	25.0	339.280	0.33	1.59	60	60	8	307	17.7	104.0
6	30.0	342.690	0.33	1.59	61	61	8	308	25.2	101.2
7	35.0	347.380	0.63	3.03	61	61	14	309	45.6	101.1
8	40.0	351.990	0.61	2.94	62	62	14	310	53.2	100.9
9	45.0	356.560	0.60	2.88	62	62	13	311	58.3	100.9
10	50.0	361.040	0.57	2.77	63	63	13	305	62.5	100.9
11	55.0	365.370	0.53	2.58	63	63	12.5	303	66.1	100.9
12	60.0	369.490	0.48	2.34	63	63	12.5	303	69.4	100.8
Traverse 2	0.0	369.490								
1	5.0	372.900	0.33	1.60	64	64	8	307	1.5	100.5
2	10.0	376.250	0.32	1.55	64	64	8	309	4.7	100.4
3	15.0	379.550	0.31	1.50	64	64	7.5	309	8.4	100.5
4	20.0	382.800	0.30	1.45	64	64	7.5	308	12.5	100.5
5	25.0	386.060	0.30	1.46	65	65	7.5	308	17.7	100.6
6	30.0	389.500	0.34	1.65	66	66	7.5	308	25.2	99.6
7	35.0	393.830	0.53	2.57	65	65	12.5	308	45.6	100.8
8	40.0	398.110	0.52	2.53	66	66	12.5	309	53.2	100.5
9	45.0	402.550	0.55	2.67	66	66	13	308	58.3	101.3
10	50.0	407.000	0.57	2.78	67	67	13	308	62.5	99.6
11	55.0	411.430	0.55	2.69	67	67	13	306	66.1	100.8
12	60.0	415.650	0.50	2.44	67	67	13	306	69.4	100.6
Average:			0.442	2.141	63.2	63.2	10.4	306.8		100.8

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

**Sample Type:** HF

Parameter		Test 1	Test 2	Test 3
Test Date		23-Feb-21	23-Feb-21	23-Feb-21
Test Time		09:20 - 10:20	10:30 - 11:30	11:38 - 12:38
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.17	30.17	30.17
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	131.6150	132.1740	132.7090
Final Reading	(m <sup>3</sup> )	132.1580	132.7030	133.2610
Temp. Outlet	(Avg. oF)	57.5	66.0	64.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.58	0.55	0.58
HF	(mg)	0.009	0.009	0.008
Oxygen	(Vol. %)	10.3	10.3	9.3
HF	(mg/Sm <sup>3</sup> )	0.015	0.015	0.014
HF	(mg/Sm <sup>3</sup> @ 11% O2)	0.014	0.014	0.012
Moisture	(Vol. %)	14.4	14.4	12.0

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

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

Sample Type: HF		Test 1	Test 2	Test 3
Parameter				
Test Date		24-Feb-21	24-Feb-21	24-Feb-21
Test Time		09:39 - 10:39	10:49 - 11:49	12:00 - 13:00
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.50	30.50	30.50
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	133.2664	133.8020	134.3630
Final Reading	(m <sup>3</sup> )	133.7960	134.3546	134.9310
Temp. Outlet	(Avg. oF)	52.0	63.5	66.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.57676	0.58858	0.60211
HF	(mg)	0.009	0.009	0.008
Oxygen	(Vol. %)	9.6	9.8	9.8
HF	(mg/Sm <sup>3</sup> )	0.015	0.015	0.014
HF	(mg/Sm <sup>3</sup> @ 11% O2)	0.013	0.014	0.013
Moisture (isokinetic)	(Vol. %)	14.2	14.2	14.1
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		25-Feb-21	25-Feb-21	25-Feb-21
Test Time		08:50 - 09:50	10:02 - 11:02	11:42 - 12:42
Test Duration	(min.)	58.5	69.5	71.5
Baro. Press.	(in. Hg)	29.94	29.94	29.94
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	134.9390	135.4550	135.9190
Final Reading	(m <sup>3</sup> )	135.4460	135.9132	136.4386
Temp. Outlet	(Avg. oF)	28.5	69.5	71.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.568	0.474	0.535
HF	(mg)	0.008	0.009	0.009
Oxygen	(Vol. %)	9.1	9.1	8.3
HF	(mg/Sm <sup>3</sup> )	0.014	0.018	0.016
HF	(mg/Sm <sup>3</sup> @ 11% O2)	0.012	0.015	0.013
Moisture (isokinetic)	(Vol. %)	14.8	14.8	16.0
Tstd. (oF)		68	Pstd. (in. Hg)	29.92

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

**Parameter:** N<sub>2</sub>O

**Molecular Weight:** 44.00 grams/mol  
**Lab Detection Limit:** 0.1 ppm  
**Reportable Detection Limit:** 0.18 mg/Sm<sup>3</sup>

Sample ID	Date	Time (hh:mm - hh:mm)	N <sub>2</sub> O (ppm)	N <sub>2</sub> O (mg/Sm <sup>3</sup> )	N <sub>2</sub> O (mg/Sm <sup>3</sup> @ 11% O <sub>2</sub> )
<b>Unit #1</b>					
Run 1	23-Feb-21	09:20 - 10:20	7.00	12.81	15.14
Run 2	23-Feb-21	10:30 - 11:30	8.00	14.64	14.07
Run 3	23-Feb-21	11:38 - 12:38	8.50	15.56	16.61
<b>Average</b>					<b>15.27</b>
<b>Unit #2</b>					
Run 1	24-Feb-21	09:39 - 10:39	8.50	15.56	17.11
Run 2	24-Feb-21	10:49 - 11:49	7.00	12.81	13.25
Run 3	24-Feb-21	12:00 - 13:00	8.00	14.64	14.87
<b>Average</b>					<b>15.08</b>
<b>Unit #3</b>					
Run 1	25-Feb-21	08:50 - 09:50	8.00	14.64	13.03
Run 2	25-Feb-21	10:02 - 11:02	8.00	14.64	15.89
Run 3	25-Feb-21	11:42 - 12:42	7.00	12.81	15.37
<b>Average</b>					<b>14.76</b>

**APPENDIX - D**

**FIELD DATA SHEETS**

CLIENT <u>MUTE</u>					NOZZLE <u>V-06</u>		DIAMETER, IN. <u>0.3207</u>			IMPINGER	INITIAL	FINAL	TOTAL GAIN	
SOURCE <u>UN#1</u>					PROBE <u>AL GURD 701</u>		Cp <u>0.8490</u>			VOLUMES	(mL)	(mL)	(mL)	
PARAMETER / RUN No <u>MGT/MS/PARTIC/Hy Rwn#1</u>					PORT LENGTH					Imp. #1	<del>100</del>	<u>148</u>	<u>148</u>	
DATE <u>Feb 22, 2021</u>					STATIC PRESSURE, IN. H2O <u>19.0</u>					Imp. #2	<u>100</u>	<u>254</u>	<u>154</u>	
OPERATOR <u>ST</u>					STACK DIAMETER <u>70.9"</u>					Imp. #3	<u>100</u>	<u>146</u>	<u>46</u>	
CONTROL UNIT <u>STCAB 2</u>					STACK HEIGHT					Imp. #4	<del>100</del>	<u>27</u>	<u>27</u>	
										Imp. #5	<u>100</u>	<u>112</u>	<u>12</u>	
										Imp. #6	<u>100</u>	<u>104</u>	<u>4</u>	
BAROMETRIC PRESSURE, IN. Hg <u>30.03</u>					INITIAL LEAK TEST <u>0.003</u>					Upstream Diameters <u>(215" Hg)</u>				
ASSUMED MOISTURE, Bw <u>18% (16%)</u>					FINAL LEAK TEST <u>0.002</u>					Downstream Diameters <u>(215" Hg)</u>				
Point	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP IN. H <sub>2</sub> O	Orifice ΔH IN. H <sub>2</sub> O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO <sub>2</sub> Vol. %	O <sub>2</sub> Vol. %		
1		<u>563.05</u>	<u>.46</u>	<u>2.74</u>	<u>.65</u>	<u>309</u>	<u>252</u>	<u>251</u>	<u>58</u>	<u>9.5</u>	<u>11</u>	<u>8</u>		
2	10	<u>567.46</u>	<u>.45</u>	<u>2.68</u>	<u>.66</u>	<u>310</u>								
3		<u>571.82</u>	<u>.44</u>	<u>2.61</u>	<u>.66</u>	<u>311</u>				<u>10</u>				
4	20	<u>576.28</u>	<u>.46</u>	<u>2.74</u>	<u>.67</u>	<u>311</u>	<u>252</u>	<u>252</u>	<u>62</u>					
5		<u>580.79</u>	<u>.47</u>	<u>2.80</u>	<u>.67</u>	<u>311</u>				<u>10.5</u>	<u>10.5</u>	<u>8.5</u>		
6	30	<u>585.35</u>	<u>.48</u>	<u>2.86</u>	<u>.67</u>	<u>311</u>								
7		<u>589.67</u>	<u>.43</u>	<u>2.56</u>	<u>.68</u>	<u>312</u>	<u>250</u>	<u>250</u>	<u>58</u>	<u>10</u>				
8	40	<u>594.14</u>	<u>.46</u>	<u>2.74</u>	<u>.69</u>	<u>313</u>								
9		<u>598.57</u>	<u>.45</u>	<u>2.68</u>	<u>.69</u>	<u>313</u>				<u>10</u>	<u>10.5</u>	<u>8.5</u>		
10	50	<u>602.74</u>	<u>.40</u>	<u>2.38</u>	<u>.69</u>	<u>313</u>	<u>252</u>	<u>250</u>	<u>57</u>					
11		<u>606.81</u>	<u>.38</u>	<u>2.27</u>	<u>.69</u>	<u>312</u>				<u>8.5</u>				
12	60	<u>610.67</u>	<u>.34</u>	<u>2.03</u>	<u>.70</u>	<u>312</u>								
1		<u>614.35</u>	<u>.31</u>	<u>1.86</u>	<u>.70</u>	<u>311</u>	<u>250</u>	<u>251</u>	<u>56</u>	<u>7.5</u>	<u>10.5</u>	<u>8.5</u>		
2	10	<u>618.04</u>	<u>.31</u>	<u>1.86</u>	<u>.70</u>	<u>310</u>								
3		<u>621.85</u>	<u>.33</u>	<u>1.98</u>	<u>.70</u>	<u>309</u>				<u>7.5</u>				
4	20	<u>625.76</u>	<u>.35</u>	<u>2.10</u>	<u>.69</u>	<u>309</u>	<u>250</u>	<u>251</u>	<u>55</u>	<u>7</u>				
5		<u>629.68</u>	<u>.35</u>	<u>2.10</u>	<u>.70</u>	<u>309</u>				<u>8</u>				
6	30	<u>633.76</u>	<u>.38</u>	<u>2.28</u>	<u>.70</u>	<u>309</u>								
7		<u>638.15</u>	<u>.44</u>	<u>2.44</u>	<u>.70</u>	<u>310</u>	<u>249</u>	<u>251</u>	<u>54</u>	<u>10</u>				
8	40	<u>642.44</u>	<u>.42</u>	<u>2.52</u>	<u>.70</u>	<u>310</u>								
9		<u>646.68</u>	<u>.41</u>	<u>2.45</u>	<u>.70</u>	<u>311</u>				<u>9.5</u>				
10	50	<u>650.91</u>	<u>.41</u>	<u>2.45</u>	<u>.70</u>	<u>312</u>	<u>250</u>	<u>251</u>	<u>53</u>					
11		<u>654.82</u>	<u>.35</u>	<u>2.09</u>	<u>.70</u>	<u>313</u>				<u>7.5</u>				
12	60	<u>658.620</u>	<u>.33</u>	<u>1.98</u>	<u>.70</u>	<u>311</u>								
(end) <u>14:22</u>														



CLIENT <i>MV WTE</i>					NOZZLE <i>V-06</i> DIAMETER, IN. <i>3.207</i>					IMPINGER	INITIAL	FINAL	TOTAL GAIN	
SOURCE <i>UNIT #1</i>					PROBE <i>AL GVRD 7H</i> Cp <i>.8490</i>					VOLUMES	(mL)	(mL)	(mL)	
PARAMETER / RUN No <i>METALS PM 12-2</i>					PORT LENGTH					Imp. #1	<i>100</i>	<i>218</i>	<i>218</i>	
DATE <i>Feb 23, 2021</i>					STATIC PRESSURE, IN. H2O <i>-19</i>					Imp. #2	<i>100</i>	<i>202</i>	<i>102</i>	
OPERATOR: <i>MO</i>					STACK DIAMETER <i>70.9"</i>					Imp. #3	<i>100</i>	<i>132</i>	<i>32</i>	
CONTROL UNIT <i>ST CAS 2</i> Y <i>0.9988</i>					STACK HEIGHT <i>30'</i>					Imp. #4	<i>100</i>	<i>8</i>	<i>38</i>	
$\Delta H @$ <i>1.862</i>										Imp. #5	<i>100</i>	<i>104</i>	<i>4</i>	
BAROMETRIC PRESSURE, IN. Hg <i>30.17</i>					INITIAL LEAK TEST <i>0.003 @ 15"</i>					Imp. #6	<i>100</i>	<i>102</i>	<i>2</i>	
ASSUMED MOISTURE, Bw <i>18%</i>					FINAL LEAK TEST <i>0.002 @ 15"</i>					Upstream Diameters				
										Downstream Diameters				
Point	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot $\Delta P$ IN. H <sub>2</sub> O	Orifice $\Delta H$ IN. H <sub>2</sub> O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO <sub>2</sub> Vol. %	O <sub>2</sub> Vol. %		
1		<i>664.50</i>	<i>.44</i>	<i>2.55</i>	<i>47</i>	<i>302</i>	<i>249</i>	<i>249</i>	<i>48</i>	<i>4.5</i>	<i>7</i>	<i>11</i>		
2	<i>10</i>	<i>668.76</i>	<i>.45</i>	<i>2.61</i>	<i>48</i>	<i>302</i>								
3		<i>673.24</i>	<i>.49</i>	<i>2.87</i>	<i>47</i>	<i>308</i>	<i>249</i>	<i>251</i>	<i>49</i>	<i>5</i>				
4	<i>20</i>	<i>677.63</i>	<i>.48</i>	<i>2.77</i>	<i>50</i>	<i>310</i>								
5		<i>682.14</i>	<i>.50</i>	<i>2.88</i>	<i>49</i>	<i>310</i>	<i>251</i>	<i>251</i>	<i>49</i>	<i>5.5</i>				
6	<i>30</i>	<i>686.70</i>	<i>.49</i>	<i>2.82</i>	<i>49</i>	<i>311</i>								
7		<i>691.12</i>	<i>.48</i>	<i>2.75</i>	<i>49</i>	<i>313</i>	<i>251</i>	<i>251</i>	<i>49</i>	<i>5.5</i>	<i>8.5</i>	<i>10.5</i>		
8	<i>40</i>	<i>695.52</i>	<i>.48</i>	<i>2.76</i>	<i>51</i>	<i>314</i>								
9		<i>699.68</i>	<i>.42</i>	<i>2.42</i>	<i>51</i>	<i>314</i>	<i>250</i>	<i>251</i>	<i>49</i>	<i>5</i>				
10	<i>50</i>	<i>703.65</i>	<i>.40</i>	<i>2.31</i>	<i>52</i>	<i>313</i>								
11		<i>707.68</i>	<i>.41</i>	<i>2.37</i>	<i>53</i>	<i>313</i>	<i>249</i>	<i>250</i>	<i>48</i>	<i>5</i>				
12	<i>60</i>	<i>711.53</i>	<i>.37</i>	<i>2.14</i>	<i>54</i>	<i>313</i>								
1		<i>716.14</i>	<i>.52</i>	<i>3.01</i>	<i>55</i>	<i>315</i>	<i>249</i>	<i>252</i>	<i>48</i>	<i>5.5</i>	<i>9</i>	<i>10</i>		
2	<i>10</i>	<i>720.43</i>	<i>.45</i>	<i>2.62</i>	<i>56</i>	<i>313</i>								
3		<i>724.58</i>	<i>.42</i>	<i>2.44</i>	<i>56</i>	<i>313</i>	<i>250</i>	<i>251</i>	<i>48</i>	<i>5</i>				
4	<i>20</i>	<i>728.82</i>	<i>.43</i>	<i>2.5</i>	<i>56</i>	<i>312</i>								
5		<i>733.15</i>	<i>.45</i>	<i>2.63</i>	<i>57</i>	<i>312</i>	<i>250</i>	<i>250</i>	<i>49</i>	<i>5</i>				
6	<i>30</i>	<i>737.36</i>	<i>.42</i>	<i>2.46</i>	<i>58</i>	<i>311</i>								
7		<i>741.69</i>	<i>.45</i>	<i>2.64</i>	<i>59</i>	<i>311</i>	<i>251</i>	<i>252</i>	<i>49</i>	<i>5.5</i>				
8	<i>40</i>	<i>746.07</i>	<i>.46</i>	<i>2.69</i>	<i>59</i>	<i>312</i>					<i>10</i>	<i>9.7</i>		
9		<i>750.35</i>	<i>.43</i>	<i>2.52</i>	<i>60</i>	<i>313</i>	<i>251</i>	<i>251</i>	<i>49</i>	<i>5.5</i>				
10	<i>50</i>	<i>754.49</i>	<i>.41</i>	<i>2.41</i>	<i>61</i>	<i>313</i>								
11		<i>758.54</i>	<i>.39</i>	<i>2.29</i>	<i>62</i>	<i>313</i>	<i>248</i>	<i>251</i>	<i>51</i>	<i>5</i>				
12	<i>60</i>	<i>762.43</i>	<i>.36</i>	<i>2.12</i>	<i>62</i>	<i>312</i>								
	<i>1046</i>													

CLIENT <i>MV WTE</i>					NOZZLE <i>V-06</i> DIAMETER, IN. <i>3207</i>					IMPINGER	INITIAL	FINAL	TOTAL GAIN	
SOURCE <i>UNIT 1</i>					PROBE <i>AL GURD 7</i> Cp <i>8490</i>					VOLUMES	(mL)	(mL)	(mL)	
PARAMETER / RUN No <i>METALS/PM 12-3</i>					PORT LENGTH					Imp. #1	<i>100</i>	<i>130</i>	<i>130</i>	
DATE <i>Feb-23-21</i>					STATIC PRESSURE, IN. H2O <i>-19</i>					Imp. #2	<i>100</i>	<i>200</i>	<i>100</i>	
OPERATOR: <i>MG</i>					STACK DIAMETER <i>10.9"</i>					Imp. #3	<i>100</i>	<i>122</i>	<i>22</i>	
CONTROL UNIT <i>STC 2</i> Y <i>0.9988</i>					STACK HEIGHT <i>30'</i>					Imp. #4	<i>100</i>	<i>10</i>	<i>10</i>	
ΔH@ <i>1.862</i>										Imp. #5	<i>100</i>	<i>105</i>	<i>5</i>	
BAROMETRIC PRESSURE, IN. Hg <i>30.17</i>					INITIAL LEAK TEST <i>0.006 Cu 5"</i>					Upstream Diameters				
ASSUMED MOISTURE, Bw <i>18%</i>					FINAL LEAK TEST <i>0.0036, 15"</i>					Downstream Diameters				
Point	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP IN. H <sub>2</sub> O	Orifice ΔH IN. H <sub>2</sub> O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO <sub>2</sub> Vol. %	O <sub>2</sub> Vol. %		
1		<i>763.105</i>												
2	<i>10</i>	<i>767.18</i>	<i>.39</i>	<i>2.33</i>	<i>61</i>	<i>301</i>	<i>253</i>	<i>248</i>	<i>51</i>	<i>7</i>	<i>10.5</i>	<i>9.5</i>		
3		<i>771.54</i>	<i>.45</i>	<i>2.67</i>	<i>61</i>	<i>304</i>								
4	<i>20</i>	<i>775.96</i>	<i>.46</i>	<i>2.74</i>	<i>61</i>	<i>303</i>	<i>249</i>	<i>251</i>	<i>57</i>	<i>8.5</i>				
5		<i>780.18</i>	<i>.42</i>	<i>2.5</i>	<i>61</i>	<i>303</i>								
6	<i>30</i>	<i>784.55</i>	<i>.45</i>	<i>2.68</i>	<i>62</i>	<i>305</i>	<i>251</i>	<i>251</i>	<i>59</i>	<i>9</i>				
7		<i>788.82</i>	<i>.43</i>	<i>2.55</i>	<i>62</i>	<i>306</i>								
8	<i>40</i>	<i>793.19</i>	<i>.45</i>	<i>2.67</i>	<i>62</i>	<i>306</i>	<i>249</i>	<i>252</i>	<i>55</i>	<i>8</i>				
9		<i>797.51</i>	<i>.44</i>	<i>2.61</i>	<i>62</i>	<i>307</i>								
10	<i>50</i>	<i>801.78</i>	<i>.43</i>	<i>2.55</i>	<i>63</i>	<i>308</i>	<i>252</i>	<i>252</i>	<i>53</i>	<i>8</i>	<i>10.5</i>	<i>9.6</i>		
11		<i>805.75</i>	<i>.37</i>	<i>2.2</i>	<i>63</i>	<i>306</i>								
12	<i>60</i>	<i>809.51</i>	<i>.33</i>	<i>1.97</i>	<i>63</i>	<i>306</i>	<i>249</i>	<i>250</i>	<i>51</i>	<i>6</i>				
		<i>813.12</i>	<i>.30</i>	<i>1.79</i>	<i>63</i>	<i>303</i>								
1		<i>817.4</i>	<i>.43</i>	<i>2.56</i>	<i>63</i>	<i>305</i>	<i>248</i>	<i>252</i>	<i>50</i>	<i>7.5</i>				
2	<i>10</i>	<i>821.59</i>	<i>.41</i>	<i>2.45</i>	<i>63</i>	<i>303</i>								
3		<i>825.72</i>	<i>.40</i>	<i>2.38</i>	<i>62</i>	<i>303</i>	<i>250</i>	<i>252</i>	<i>49</i>	<i>8</i>	<i>11</i>	<i>9</i>		
4	<i>20</i>	<i>829.69</i>	<i>.37</i>	<i>2.2</i>	<i>62</i>	<i>304</i>								
5		<i>833.82</i>	<i>.40</i>	<i>2.38</i>	<i>62</i>	<i>304</i>	<i>249</i>	<i>251</i>	<i>50</i>	<i>8</i>				
6	<i>30</i>	<i>838.13</i>	<i>.44</i>	<i>2.61</i>	<i>61</i>	<i>306</i>								
7		<i>842.38</i>	<i>.43</i>	<i>2.54</i>	<i>60</i>	<i>307</i>	<i>251</i>	<i>250</i>	<i>49</i>	<i>8.5</i>				
8	<i>40</i>	<i>846.78</i>	<i>.46</i>	<i>2.72</i>	<i>61</i>	<i>308</i>					<i>10.5</i>	<i>9</i>		
9		<i>850.99</i>	<i>.42</i>	<i>2.49</i>	<i>60</i>	<i>305</i>	<i>251</i>	<i>250</i>	<i>49</i>	<i>8</i>				
10	<i>50</i>	<i>855.14</i>	<i>.41</i>	<i>2.42</i>	<i>60</i>	<i>303</i>								
11		<i>859.13</i>	<i>.38</i>	<i>2.24</i>	<i>60</i>	<i>309</i>	<i>249</i>	<i>250</i>	<i>50</i>	<i>8.5</i>				
12	<i>1318</i>	<i>862.90</i>	<i>.34</i>	<i>2.0</i>	<i>60</i>	<i>310</i>								



CLIENT <u>WV WTE</u>					NOZZLE <u>7E MV-01</u> DIAMETER, IN. <u>.8494</u>					IMPINGER	INITIAL	FINAL	TOTAL GAIN	
SOURCE <u>UNIT #2</u>					PROBE <u>7C</u> Cp <u>.8494</u>					VOLUMES	(mL)	(mL)	(mL)	
PARAMETER / RUN No <u>Metals 1PM RUN #2</u>					PORT LENGTH					Imp. #1	<u>100</u>	<u>200</u>	<u>200</u>	
DATE <u>Feb-24-21</u>					STATIC PRESSURE, IN. H2O <u>-17</u>					Imp. #2	<u>100</u>	<u>177</u>	<u>77</u>	
OPERATOR: <u>ALG</u>					STACK DIAMETER <u>70.9"</u>					Imp. #3	<u>100</u>	<u>124</u>	<u>24</u>	
CONTROL UNIT <u>CAE AL 1</u> Y <u>0.9925</u>					STACK HEIGHT <u>30'</u>					Imp. #4	<u>100</u>	<u>8</u>	<u>8</u>	
ΔH@ <u>1.805</u>										Imp. #5	<u>100</u>	<u>103</u>	<u>3</u>	
										Imp. #6	<u>100</u>	<u>102</u>	<u>2</u>	
BAROMETRIC PRESSURE, IN. Hg <u>30.50</u>					INITIAL LEAK TEST <u>0.003 @ 15"</u>					Upstream Diameters				
ASSUMED MOISTURE, Bw <u>18%</u>					FINAL LEAK TEST <u>0.003 @ 15"</u>					Downstream Diameters				
Point	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP IN. H <sub>2</sub> O	Orifice ΔH IN. H <sub>2</sub> O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO <sub>2</sub> Vol. %	O <sub>2</sub> Vol. %		
	<u>0933</u>	<u>611.185</u>												
<u>1</u>		<u>614.92</u>	<u>.42</u>	<u>1.94</u>	<u>47</u>	<u>300</u>	<u>252</u>	<u>251</u>	<u>52</u>	<u>5</u>	<u>10</u>	<u>9.8</u>		
<u>2</u>		<u>618.75</u>	<u>.44</u>	<u>2.03</u>	<u>47</u>	<u>300</u>								
<u>3</u>		<u>622.65</u>	<u>.45</u>	<u>2.08</u>	<u>48</u>	<u>302</u>	<u>252</u>	<u>250</u>	<u>53</u>	<u>5</u>				
<u>4</u>		<u>626.68</u>	<u>.49</u>	<u>2.26</u>	<u>48</u>	<u>302</u>								
<u>5</u>		<u>630.84</u>	<u>.52</u>	<u>2.4</u>	<u>50</u>	<u>304</u>	<u>251</u>	<u>252</u>	<u>46</u>	<u>5.5</u>				
<u>6</u>		<u>635.08</u>	<u>.54</u>	<u>2.49</u>	<u>50</u>	<u>305</u>								
<u>7</u>		<u>639.18</u>	<u>.50</u>	<u>2.32</u>	<u>52</u>	<u>304</u>	<u>252</u>	<u>255</u>	<u>46</u>	<u>5.5</u>				
<u>8</u>		<u>643.24</u>	<u>.49</u>	<u>2.27</u>	<u>53</u>	<u>305</u>								
<u>9</u>		<u>647.19</u>	<u>.46</u>	<u>2.14</u>	<u>54</u>	<u>304</u>	<u>252</u>	<u>254</u>	<u>46</u>	<u>5.5</u>	<u>10</u>	<u>10.5</u>		
<u>10</u>		<u>650.96</u>	<u>.42</u>	<u>1.95</u>	<u>55</u>	<u>307</u>								
<u>11</u>		<u>654.56</u>	<u>.38</u>	<u>1.77</u>	<u>57</u>	<u>308</u>	<u>251</u>	<u>252</u>	<u>47</u>	<u>5</u>				
<u>12</u>		<u>658.01</u>	<u>.35</u>	<u>1.63</u>	<u>57</u>	<u>308</u>								
<u>1</u>		<u>661.52</u>	<u>.35</u>	<u>1.65</u>	<u>58</u>	<u>300</u>	<u>252</u>	<u>250</u>	<u>46</u>	<u>4.5</u>	<u>10.5</u>	<u>9</u>		
<u>2</u>		<u>665.25</u>	<u>.41</u>	<u>1.91</u>	<u>58</u>	<u>308</u>								
<u>3</u>		<u>669.17</u>	<u>.44</u>	<u>2.05</u>	<u>59</u>	<u>309</u>	<u>250</u>	<u>251</u>	<u>47</u>	<u>5</u>				
<u>4</u>		<u>672.92</u>	<u>.41</u>	<u>1.91</u>	<u>60</u>	<u>311</u>								
<u>5</u>		<u>676.59</u>	<u>.38</u>	<u>1.77</u>	<u>60</u>	<u>312</u>	<u>251</u>	<u>253</u>	<u>48</u>	<u>5</u>				
<u>6</u>		<u>680.11</u>	<u>.36</u>	<u>1.68</u>	<u>61</u>	<u>312</u>								
<u>7</u>		<u>684.38</u>	<u>.33</u>	<u>2.47</u>	<u>61</u>	<u>312</u>	<u>252</u>	<u>252</u>	<u>48</u>	<u>5.5</u>				
<u>8</u>		<u>688.72</u>	<u>.55</u>	<u>2.58</u>	<u>62</u>	<u>311</u>								
<u>9</u>		<u>693.3</u>	<u>.61</u>	<u>2.86</u>	<u>62</u>	<u>311</u>	<u>252</u>	<u>251</u>	<u>50</u>	<u>6.5</u>	<u>10</u>	<u>9</u>		
<u>10</u>		<u>697.7</u>	<u>.56</u>	<u>2.63</u>	<u>63</u>	<u>311</u>								
<u>11</u>		<u>701.72</u>	<u>.45</u>	<u>2.17</u>	<u>64</u>	<u>290</u>	<u>251</u>	<u>252</u>	<u>50</u>	<u>5.5</u>				
<u>12</u>	<u>1135</u>	<u>705.57</u>	<u>.40</u>	<u>1.96</u>	<u>64</u>	<u>281</u>								



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CLIENT <i>MVWTE</i>					NOZZLE <i>MV-01</i>		DIAMETER, IN. <i>.3050</i>			IMPINGER	INITIAL	FINAL	TOTAL GAIN	
SOURCE <i>UNIT #3</i>					PROBE <i>TALCUBO</i>		Cp <i>.5490</i>			VOLUMES	(mL)	(mL)	(mL)	
PARAMETER / RUN No <i>Metals / PM Run #3</i>					PORT LENGTH					Imp. #1	<i>100</i>	<i>230</i>	<i>230</i>	
DATE <i>Feb-25-21</i>					STATIC PRESSURE, IN. H2O <i>-18</i>					Imp. #2	<i>100</i>	<i>206</i>	<i>106</i>	
OPERATOR: <i>UG</i>					STACK DIAMETER <i>70.9"</i>					Imp. #3	<i>100</i>	<i>120</i>	<i>20</i>	
CONTROL UNIT <i>FE18</i>					STACK HEIGHT <i>30</i>					Imp. #4	<i>100</i>	<i>10</i>	<i>10</i>	
Y <i>.9997</i>										Imp. #5	<i>100</i>	<i>103</i>	<i>3</i>	
ΔH@ <i>1.855</i>										Imp. #6	<i>100</i>	<i>102</i>	<i>2</i>	
BAROMETRIC PRESSURE, IN. Hg <i>29.94</i>					INITIAL LEAK TEST <i>0.0000 @ 15"</i>					Upstream Diameters				
ASSUMED MOISTURE, Bw <i>18%</i>					FINAL LEAK TEST <i>0.0040 @ 15"</i>					Downstream Diameters				
Point	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP IN. H <sub>2</sub> O	Orifice ΔH IN. H <sub>2</sub> O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO <sub>2</sub> Vol. %	O <sub>2</sub> Vol. %		
	<i>1142</i>	<i>321.793</i>												
<i>1</i>		<i>325.24</i>	<i>.34</i>	<i>1.65</i>	<i>59</i>	<i>301</i>	<i>245</i>	<i>251</i>	<i>54</i>	<i>8</i>	<i>10</i>	<i>8.5</i>		
<i>2</i>		<i>328.73</i>	<i>.35</i>	<i>1.7</i>	<i>59</i>	<i>300</i>								
<i>3</i>		<i>332.21</i>	<i>.35</i>	<i>1.69</i>	<i>59</i>	<i>305</i>	<i>250</i>	<i>252</i>	<i>60</i>	<i>8</i>				
<i>4</i>		<i>335.78</i>	<i>.36</i>	<i>1.73</i>	<i>60</i>	<i>307</i>								
<i>5</i>		<i>339.28</i>	<i>.33</i>	<i>1.59</i>	<i>60</i>	<i>307</i>	<i>255</i>	<i>252</i>	<i>60</i>	<i>8</i>				
<i>6</i>		<i>342.69</i>	<i>.33</i>	<i>1.59</i>	<i>60</i>	<i>308</i>								
<i>7</i>		<i>347.08</i>	<i>.33</i>	<i>1.69</i>	<i>61</i>	<i>309</i>	<i>255</i>	<i>254</i>	<i>52</i>	<i>14</i>				
<i>8</i>		<i>351.99</i>	<i>.61</i>	<i>2.94</i>	<i>62</i>	<i>310</i>								
<i>9</i>		<i>356.56</i>	<i>.66</i>	<i>2.88</i>	<i>62</i>	<i>311</i>	<i>251</i>	<i>252</i>	<i>52</i>	<i>13</i>	<i>10</i>	<i>8</i>		
<i>10</i>		<i>361.04</i>	<i>.57</i>	<i>2.77</i>	<i>63</i>	<i>305</i>								
<i>11</i>		<i>365.37</i>	<i>.53</i>	<i>2.58</i>	<i>63</i>	<i>303</i>	<i>255</i>	<i>251</i>	<i>52</i>	<i>12.5</i>				
<i>12</i>		<i>369.49</i>	<i>.48</i>	<i>2.34</i>	<i>63</i>	<i>303</i>								
<i>1</i>		<i>372.9</i>	<i>.33</i>	<i>1.6</i>	<i>64</i>	<i>307</i>	<i>252</i>	<i>251</i>	<i>53</i>	<i>8</i>				
<i>2</i>		<i>376.25</i>	<i>.32</i>	<i>1.55</i>	<i>64</i>	<i>309</i>								
<i>3</i>		<i>379.55</i>	<i>.31</i>	<i>1.5</i>	<i>64</i>	<i>309</i>	<i>252</i>	<i>255</i>	<i>51</i>	<i>7.5</i>	<i>9.5</i>	<i>8</i>		
<i>4</i>		<i>382.8</i>	<i>.30</i>	<i>1.45</i>	<i>64</i>	<i>308</i>								
<i>5</i>		<i>386.06</i>	<i>.30</i>	<i>1.46</i>	<i>65</i>	<i>308</i>	<i>252</i>	<i>251</i>	<i>52</i>	<i>7.5</i>				
<i>6</i>		<i>389.50</i>	<i>.34</i>	<i>1.65</i>	<i>66</i>	<i>308</i>								
<i>7</i>		<i>393.83</i>	<i>.53</i>	<i>2.57</i>	<i>65</i>	<i>308</i>	<i>252</i>	<i>257</i>	<i>51</i>	<i>12.5</i>				
<i>8</i>		<i>398.11</i>	<i>.52</i>	<i>2.53</i>	<i>66</i>	<i>309</i>								
<i>9</i>		<i>402.53</i>	<i>.55</i>	<i>2.67</i>	<i>66</i>	<i>308</i>	<i>252</i>	<i>251</i>	<i>51</i>	<i>13</i>	<i>10</i>	<i>8.5</i>		
<i>10</i>		<i>407.0</i>	<i>.52</i>	<i>2.78</i>	<i>67</i>	<i>308</i>								
<i>11</i>		<i>411.43</i>	<i>.55</i>	<i>2.69</i>	<i>67</i>	<i>306</i>	<i>250</i>	<i>254</i>	<i>52</i>	<i>13</i>				
<i>12</i>	<i>1343</i>	<i>415.65</i>	<i>.50</i>	<i>2.44</i>	<i>67</i>	<i>306</i>								



PH

A. Lanfranco and Associates Inc.

Client Metro Van Y LMU-B/1.0347  
 Source Unit 1 Cp 3A-1  
 Parameter HCL HF Pbar 30.17 Static -19  
 Date Feb. 23/21 Operator Simon B.

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 <sub>2</sub> O		
			DGM Outlet	Stack		R1	R2	R3
1	9:20	131.6150	51		200			
	10:20	132.1580	64		261			
2	10:30	132.1740	63		200			
	11:30	132.7030	69		250			
3	11:38	132.7090	68					
	12:38	133.2610	60		250			

Client Metro Van Y LMU-B 1.0347  
 Source Unit 2 Cp 3A-1  
 Parameter HCL HF Pbar 30.50 Static -17  
 Date Feb. 24/21 Operator Simon B.

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 <sub>2</sub> O		
			DGM Outlet	Stack		R1	R2	R3
1	9:39	133.2664	42					
	10:39	133.7960	62	260				
2	10:49	133.8020	61					
	11:49	134.3546	66	266				
3	12:00	134.3630	64					
	1:00	134.9310	69					

SH

A. Lanfranco and Associates Inc.

Client Metro Van Y LMU-B 1.0347  
 Source Unit #3 Cp 3A-1  
 Parameter HF Pbar 29.94 Static -18  
 Date Feb. 25/21 Operator Simon B

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. H₂O		
			DGM Outlet	Stack		R1	R2	R3
1	8:50	134.9390	48		200			
	9:50	135.4460	69		260			
2	10:02	135.4550	67		200			
	11:02	135.9132	72		265			
3	11:42	135.9190	70					
	12:42	136.4386	73					

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H₂O		
			DGM Outlet	Stack		R1	R2	R3
1								
2								
3								

A. Lanfranco & Associates Inc.

Client: Metro Vancouver  
 Jobsite: WTE (Burnaby, B.C.)  
 Parameter: N<sub>2</sub>O

Operator: C. LAAN

Unit #1

Barometric Pressure: 30.17

Sample ID	Date	Time (hh:mm - hh:mm)	N <sub>2</sub> O (ppm)					
Run 1	Feb. 23/21	09:20-10:20	0	0	0	0	0	0
Run 2	↓	10:30-11:30	0	1.5	0	1.0	0	0
Run 3	↓	11:38-12:38	0	1.5	2	0	1	0

Unit #2

Barometric Pressure: 30.50

Sample ID	Date	Time (hh:mm - hh:mm)	N <sub>2</sub> O (ppm)					
Run 1	Feb. 24/21	09:39-10:39	0		0	1.5	0	1.5
Run 2	↓	10:49-11:49	0	0	0	0	0	0
Run 3	↓	12:00-13:00	0	0	2.5	0	1.5	0

Unit #3

Barometric Pressure: 29.94

Sample ID	Date	Time (hh:mm - hh:mm)	N <sub>2</sub> O (ppm)					
Run 1	Feb. 25/21	08:50-09:50	0	2	0	0	2	0
Run 2	↓	10:02-11:02	0	0	2	0	0	1.5
Run 3	↓	11:42-12:42	0	0	0	0	0	0

**APPENDIX – E**

**CALIBRATION SHEETS and**

**TECHNICIAN CERTIFICATES**

# BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada		Device (inches of Hg)		Difference
		(kPa)	(inches of Hg)	Reading	Elevation Corrected	(Env Can - Elv Corr)
LA	6-Jan-21	101.8	30.07	29.94	30.01	0.05
DS	6-Jan-21	101.8	30.07	29.94	30.01	0.05
CL	6-Jan-21	101.8	30.07	29.94	30.01	0.05
ML	6-Jan-21	101.8	30.07	29.91	29.98	0.08
SB	6-Jan-21	101.8	30.07	29.93	30.00	0.06
SH	6-Jan-21	101.8	30.07	29.95	30.02	0.04
MG	6-Jan-21	101.8	30.07	29.94	30.01	0.05
SF	6-Jan-21	101.8	30.07	29.91	29.98	0.08
JG	6-Jan-21	101.8	30.07	29.89	29.96	0.10
JC	6-Jan-21	101.8	30.07	29.93	30.00	0.06
CNL	6-Jan-21	101.8	30.07	30.08	30.15	-0.09

Calibrated by: Jeremy Gibbs

Signature: 

Date: 06-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](https://weather.gc.ca/city/pages/bc-74_metric_e.html)

# A.Lanfranco & Associates inc.

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

Model #: CAE AL1  
Serial #: 0028-070611-1

Date: 04-Jan-21  
Barometric Pressure: 29.38 (in. Hg)  
Theoretical Critical Vacuum: 13.86 (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)<sup>3</sup>/(deg R)<sup>0.5</sup>((in.Hg)<sup>2</sup>(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	16.00	161.300	178.620	17.320	73.0	73.0	77.0	77.0	73	0.8185	17.0	83.0	80.0	81.5
1.85	19.00	145.000	159.782	14.782	71.0	71.0	73.0	73.0	63	0.5956	20.0	74.0	74.0	74.0
1.10	19.00	132.300	143.732	11.432	67.0	67.0	70.0	70.0	55	0.4606	22.0	73.0	78.0	75.5
0.64	24.00	119.200	130.140	10.940	64.0	64.0	67.0	67.0	48	0.3560	23.5	67.0	72.0	69.5
0.33	31.00	179.300	189.153	9.853	77.0	77.0	76.0	76.0	40	0.2408	25.0	80.0	74.0	77.0

***** 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)		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)
16.929	479.4		16.535	468.3	17.276	0.977	-0.016		1.838	46.67	0.033			0.717
14.467	409.7		14.388	407.5	14.825	0.995	0.002		1.769	44.92	-0.036			0.719
11.241	318.4		11.111	314.7	11.480	0.988	-0.004		1.775	45.08	-0.030			0.723
10.807	306.0		10.909	308.9	11.145	1.009	0.017		1.719	43.67	-0.086			0.720
9.526	269.8		9.464	268.0	9.806	0.994	0.001		1.925	48.88	0.120			0.692
Average Y----->						0.9925	Average dH@----->		1.805	45.8	Average Ko---->		0.714	

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 dm 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 4, 2021

# A.Lanfranco & Associates inc.

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

Model #: FE 18  
Serial #: 0028-020118-1

Date: 04-Jan-21  
Barometric Pressure: 29.53 (in. Hg)  
Theoretical Critical Vacuum: 13.93 (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)<sup>3</sup>\*(deg R)/(in.Hg)\*(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)
3.65	18.00	660.300	679.194	18.894	59.0	59.0	62.0	62.0	73	0.8185	15.5	61.0	68.0	64.5
1.90	15.00	679.500	690.951	11.451	62.0	62.0	64.0	64.0	63	0.5956	17.5	70.0	73.0	71.5
1.15	15.00	691.100	700.040	8.940	64.0	64.0	65.0	65.0	55	0.4606	19.0	74.0	74.0	74.0
0.67	28.00	701.800	714.470	12.670	63.0	63.0	66.0	66.0	48	0.3560	20.0	66.0	76.0	71.0
0.33	32.00	714.700	724.649	9.949	67.0	67.0	69.0	69.0	40	0.2408	21.5	76.0	79.0	77.5

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)		VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	CALIBRATION FACTOR Y			CALIBRATION FACTOR dH@					
						Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)			Ko (value)
19.081	540.4		18.997	538.0	19.128	0.996	-0.004		1.845	46.87	-0.010			0.707
11.459	324.5		11.443	324.1	11.676	0.999	-0.001		1.830	46.47	-0.026			0.710
8.904	252.2		8.829	250.0	9.051	0.992	-0.008		1.855	47.12	0.000			0.710
12.604	357.0		12.774	361.8	13.021	1.013	0.014		1.799	45.70	-0.056			0.706
9.823	278.2		9.815	278.0	10.127	0.999	-0.001		1.947	49.47	0.092			0.689
Average Y----->						0.9997		Average dH@----->	1.855	47.1		Average Ko----->		0.704

TEMPERATURE CALIBRATION				
Calibration Standard ----->		Omega Model CL23A S/N:T-218768		
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results		
		Variation (deg F)	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 dm 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 4, 2021

# 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: **05-Jan-21**  
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)<sup>3</sup>/(deg R)<sup>0.5</sup>((in.Hg)<sup>2</sup>(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)
3.80	32.00	587.900	621.792	33.892	67.0	67.0	70.0	70.0	73	0.8185	14.5	68.0	78.0	73.0
1.95	24.00	621.900	640.443	18.543	70.0	70.0	73.0	73.0	63	0.5956	16.0	77.0	82.0	79.5
1.15	30.00	640.600	658.697	18.097	73.0	73.0	77.0	77.0	55	0.4606	17.5	80.0	80.0	80.0
0.68	25.00	658.900	670.396	11.496	77.0	77.0	79.0	79.0	48	0.3560	19.0	79.0	81.0	80.0
0.34	20.00	670.600	676.930	6.330	78.0	78.0	79.0	79.0	40	0.2408	20.5	81.0	83.0	82.0

***** 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)
34.162	967.5		33.944	961.3	34.279	0.994	-0.005		1.898	48.20	0.036			0.698
18.502	524.0		18.413	521.5	18.822	0.995	-0.004		1.851	47.02	-0.011			0.707
17.904	507.0		17.791	503.9	18.203	0.994	-0.005		1.815	46.11	-0.047			0.716
11.297	319.9		11.459	324.5	11.724	1.014	0.016		1.787	45.38	-0.075			0.707
6.209	175.8		6.189	175.3	6.356	0.997	-0.002		1.958	49.73	0.096			0.688
Average Y----->						0.9988	Average dH@---->		1.862	47.3	Average Ko---->		0.703	

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 dm 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: Justin Ching

Signature: \_\_\_\_\_

Date: January 5, 2021





### 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 professionals<sup>1</sup>, 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:

x Shawn Harrington  
Print Name: Shawn Harrington

Witnessed by:

x Mark Lanfranco  
Print Name: Mark Lanfranco

Date signed: November 26, 2020

<sup>1</sup>Qualified 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 professionals<sup>1</sup>, 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

Title

Jeremy Gibbs  
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 Consultant Specialize in air and  
atmospheric sciences

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### 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

Print Name:

Jeremy Gibbs  
Nov 1, 2020

Witnessed by:

X

Print Name:

Connor Laan

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

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- 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 professionals<sup>1</sup>, 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 Scott Ferguson  
Title Environmental Technician
2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No  
Name of Association: ASTTBC Registration # 29114
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 

Print Name: Scott Ferguson

Witnessed by:

x 

Print Name: Michael Goods

Date signed: 11/23/2020

<sup>1</sup> *Qualified 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.*

# A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

## GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Connor Laan  
Date: January 4th, 2021

Signature: \_\_\_\_\_

Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft <sup>2</sup> )
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-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
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
Q	0.2190	0.2170	0.2185	0.0020	0.2182	0.0002596
G-218	0.2180	0.2175	0.2190	0.0015	0.2182	0.0002596
G-223	0.2220	0.2230	0.2225	0.0010	0.2225	0.0002700
G-2231	0.2230	0.2230	0.2225	0.0005	0.2228	0.0002708
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
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-253	0.2525	0.2520	0.2525	0.0005	0.2523	0.0003473
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-292	0.2922	0.2920	0.2926	0.0006	0.2923	0.0004659
G-304	0.3040	0.3050	0.3040	0.0010	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-309	0.3110	0.3080	0.3080	0.0030	0.3090	0.0005208
G-310	0.3090	0.3105	0.3095	0.0015	0.3097	0.0005230
G-311	0.3120	0.3100	0.3110	0.0020	0.3110	0.0005275
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-366	0.3650	0.3670	0.3650	0.0020	0.3657	0.0007293
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-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

## Conflict of Interest Disclosure Statement

A qualified professional <sup>1</sup> 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 Jeremy Gibbs, 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):

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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:

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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

Print name:

Jeremy G. B.S.S.

Witnessed by:

X

Print name:

Mark Lanfranco

Date: Dec. 16, 2020

<sup>1</sup>Qualified 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
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## Conflict of Interest Disclosure Statement

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

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- 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:

---

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---

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.

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Signature:

x Shawn Harrington

Print name: Shawn Harrington

Date: Dec. 16, 2020

Witnessed by:

x Mark Lanfranco

Print name: Mark Lanfranco

<sup>1</sup>Qualified 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.





## 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

  
\_\_\_\_\_  
Scott Ferguson  
AND  
(1<sup>st</sup> Party)

A. Lanfranco and Associates Inc.  
\_\_\_\_\_  
(2<sup>nd</sup> Party)

As of NOV. 24, 2020

# A. Lanfranco & Associates inc.

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

Model #: **LMU-B**  
Serial #: **Wizit 6276**

Date: **07-Jan-21**  
Barometric Pressure: **30.17** (in. Hg)  
Theoretical Critical Vacuum: **14.23** (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)<sup>3</sup>\*(deg R)<sup>0.5</sup>/((in.Hg)\*(min)).

!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (m³)	Volume Final (m³)	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)
0.00	20.00	125.0520	125.3036	8.885	59.0	59.0	64.0	64.0	48	0.3560	20.0	57.0	63.0	60.0
0.00	23.00	125.3050	125.5968	10.305	64.0	64.0	69.0	69.0	48	0.3560	20.0	63.0	67.0	65.0
0.00	23.00	125.6000	125.8940	10.383	69.0	69.0	70.0	70.0	48	0.3560	20.0	67.0	69.0	68.0

***** 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)		Value (in H2O)	dH@ Value (mm H2O)	Variation (in H2O)
9.067	256.8		9.420	266.8	9.204	1.039	0.004		0.000	0.00	0.000
10.416	295.0		10.781	305.3	10.636	1.035	0.000		0.000	0.00	0.000
10.435	295.5		10.751	304.5	10.666	1.030	-0.005		0.000	0.00	0.000
Average Y----->						1.0347		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.

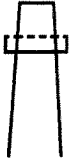
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Justin Ching

Signature: \_\_\_\_\_



Date: January 7, 2021



## 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 (1<sup>st</sup> Party)

AND

A. Lanfranco and Associates Inc. (2<sup>nd</sup> Party)

As of 24 Nov, 2020

## Pitot Tube Calibration

Date: 01-Jan-21  
Pbar (in.Hg): 29.69

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	0.0148
0.150	0.200	25.7	0.8574	0.0058
0.250	0.340	33.2	0.8489	0.0026
0.450	0.600	44.6	0.8574	0.0058
0.600	0.800	51.5	0.8574	0.0058
Average :			0.8515	0.0070

Pitot ID: **ST 8A**

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	0.0069
0.115	0.160	22.5	0.8393	0.0006
0.360	0.490	39.9	0.8486	0.0099
0.590	0.820	51.0	0.8398	0.0011
0.660	0.930	54.0	0.8340	0.0047
Average :			0.8387	0.0046

Pitot ID: **7A**

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	0.0056
0.190	0.260	29.0	0.8463	0.0040
0.240	0.330	32.6	0.8443	0.0020
0.500	0.690	47.0	0.8427	0.0005
0.650	0.900	53.6	0.8413	0.0009
Average :			0.8423	0.0026

Pitot ID: **ST 8B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.5	0.8574	0.0067
0.150	0.200	25.7	0.8574	0.0067
0.240	0.340	32.6	0.8318	0.0189
0.460	0.610	45.1	0.8597	0.0090
0.630	0.860	52.8	0.8473	0.0034
Average :			0.8507	0.0089

Pitot ID: **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	0.0172
0.140	0.190	24.9	0.8498	0.0008
0.230	0.310	31.9	0.8527	0.0038
0.410	0.550	42.6	0.8548	0.0058
0.680	0.910	54.8	0.8558	0.0068
Average :			0.8490	0.0069

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.070	0.100	17.6	0.8283	0.0051
0.250	0.350	33.2	0.8367	0.0033
0.300	0.420	36.4	0.8367	0.0033
0.450	0.650	44.6	0.8237	0.0096
0.650	0.900	53.6	0.8413	0.0080
Average :			0.8334	0.0059

Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.045	0.060	14.1	0.8574	0.0079
0.120	0.160	23.0	0.8574	0.0079
0.250	0.340	33.2	0.8489	0.0005
0.490	0.680	46.5	0.8404	0.0090
0.660	0.910	54.0	0.8431	0.0063
Average :			0.8494	0.0063

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: Michael Goods

Signature: 

Date: January 1, 2021

## TEMPERATURE CALIBRATION FORM

Signature:

Peri Anderson

## 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	32.3	0.06%	99.3	-0.13%	200	0.00%	301	0.13%	498	-0.21%	798	-0.16%	1698	-0.09%
Omega HH11A	4	200167		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
Omega HH11A	6	600059	33.1	0.22%	100	0.00%	202	0.30%	302	0.26%	499	-0.10%	798	-0.16%	1697	-0.14%
TPI 341K	7	2.0315E+10	30.5	-0.31%	98.3	-0.30%	198.1	-0.29%	298	-0.26%	497	-0.31%	796.4	-0.29%	1693	-0.32%
TPI 341K	8	2.0313E+10	32.1	0.02%	99.3	-0.13%	200.5	0.08%	299.9	-0.01%	499.3	-0.07%	798.7	-0.10%	1696	-0.19%
Cont Cmpny	10	102008464	30.2	-0.37%	97.5	-0.45%	197.8	-0.33%	297.7	-0.30%	497.7	-0.24%	795.9	-0.33%	1693.8	-0.29%
Omega HH11	14	409426		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	16	400120029	30.7	-0.26%	99	-0.18%	199.4	-0.09%	299.2	-0.11%	499.6	-0.04%	800.2	0.02%	1703	0.14%
TPI 341K	18	2.0329E+10	31	-0.20%	98.9	-0.20%	198.9	-0.17%	298.7	-0.17%	498.5	-0.16%	798.4	-0.13%	1698	-0.09%
TPI 341K	20	2.0329E+10	30	-0.41%	98.2	-0.32%	198.1	-0.29%	297.7	-0.30%	497.2	-0.29%	797.1	-0.23%	1696	-0.19%
TPI 341K	22	2.0329E+10	30.5	-0.31%	98.6	-0.25%	198.5	-0.23%	298.3	-0.22%	497.7	-0.24%	797.4	-0.21%	1696	-0.19%
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:** 19-Jan-21  
**Calibrated by:** Scott Ferguson  
**Authorizing Signature:** 

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

**Ambient Conditions:** Temperature: 9 °C Barometric Pressure: 102.3 kPa Relative Humidity: 90%

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.

<b>O<sub>2</sub></b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value (vol %)</b>
	<b>Instrument Reading (vol %)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (vol %)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	
Zero	0.3	0.30	Pass		0	0.00	Pass		0
O <sub>2</sub>	10.9	0.07	Pass	Recal on Amb	11.0	0.03	Pass		10.97
Ambient	21.1	0.15	Pass		21.0	0.00	Pass		20.95

Performance Specification: +/- 1% O<sub>2</sub> (absolute diff)

<b>CO</b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value (ppm)</b>
	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	279	11.2%	Fail	Recal w 2 Gas	251	0.0%	Pass		251
2 Gas	1990	3.6%	Pass		1918	0.1%	Pass		1920

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

<b>NO</b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value (ppm)</b>
	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	45	1.3%	Pass		46	0.9%	Pass		46
2 Gas	102	0.9%	Pass	Recal w 2 Gas	103	0.1%	Pass		102.9

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

## NIST Traceable Calibration Gases:

<b>Cylinder</b>	<b>Cylinder ID Number</b>	<b>Certification Date</b>	<b>Expiration Date</b>	<b>Cylinder Pressure (PSI)</b>	<b>O<sub>2</sub> (Vol. %)</b>	<b>CO (ppm)</b>	<b>NO (ppm)</b>
Zero Gas (N <sub>2</sub> )	340943	21/Jan/2020	24/Aug/2021	500	0	0	0
1 Gas	CC14093	5/Aug/2019	6/Aug/2027	900	-	251	45.6
2 Gas	CC711737	24/Feb/2020	25/Feb/2028	800	-	1920	102.9
O <sub>2</sub> /CO <sub>2</sub>	CC168470	27/Jul/2020	28/Jul/2028	1500	10.97	-	-

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

# Calibration Certificate

**Date:** 18-Jan-21  
**Calibrated by:** Scott Ferguson  
**Authorizing Signature:** 

**Instrument Calibrated:** Testo 2 (330-2LX)  
**Serial #:** 03282252  
**Customer:** ALA

**Ambient Conditions:** Temperature: 8 °C Barometric Pressure: 101.8 kPa Relative Humidity: 92%

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.

<b>O<sub>2</sub></b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value</b>
<b>Gas</b>	<b>Instrument Reading (vol %)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (vol %)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>(vol %)</b>
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O <sub>2</sub>	11.0	0.16	Pass		10.9	0.01	Pass		10.84
Ambient	21.1	0.14	Pass	Recal	21.0	0.04	Pass		20.96

Performance Specification: +/- 1% O<sub>2</sub> (absolute diff)

<b>CO</b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value</b>
<b>Gas</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>(ppm)</b>
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	1932	0.6%	Pass		1921	0.1%	Pass		1920
2 Gas	259	3.1%	Pass	Recal	251	0.1%	Pass		251

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

<b>NO</b>	<b>Initial Evaluation</b>				<b>After Calibration</b>				<b>Certified Value</b>
<b>Gas</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>Instrument Reading (ppm)</b>	<b>% Calibration Error</b>	<b>Pass/Fail</b>	<b>Notes</b>	<b>(ppm)</b>
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	102	0.9%	Pass	Recal	103	0.1%	Pass		103
2 Gas	46	0.9%	Pass		46	0.9%	Pass		45.61

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

## NIST Traceable Calibration Gases:

<b>Cylinder</b>	<b>Cylinder ID Number</b>	<b>Certification Date</b>	<b>Expiration Date</b>	<b>Cylinder Pressure (PSI)</b>	<b>O<sub>2</sub> (Vol. %)</b>	<b>CO (ppm)</b>	<b>NO (ppm)</b>
Zero Gas (N <sub>2</sub> )	340943	21/Jan/2020	21/Aug/2024	500	0	0	0
1 Gas	CC711737	24/Feb/2020	25/Feb/2028	800	-	1920	102.9
2 Gas	CC140943	5/Aug/2019	6/Aug/2027	900	-	251.3	45.61
O <sub>2</sub> /CO <sub>2</sub>	CC168470	27/Jul/2020	28/Jul/2028	1500	10.84	-	-

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

***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:*

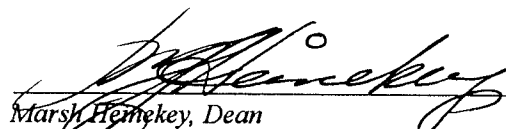


Environment  
Canada

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



# MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

**Jeremy Shawn Gibbs**

has successfully completed

**Stack Sampling**

35 Hours / 2019

May 22, 2019

*Date*

*BUM*  
Dean

*Faculty of Continuing Education and Extension*



# MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

**Scott Ferguson**

has successfully completed

**Stack Sampling**

2016

May 16, 2016

*Date*



*Dean*

*Faculty of Continuing Education and Extension*

