A.Lanfranco & Associates Inc.
Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III 4730 Kingsway
Burnaby, BC V5H 0C6

WASTE TO ENERGY FACILITY

Appendices of Compliance Emissions Testing Report

May 2021 Survey

Table of Contents

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_2O) analysis conducted with portable analyzer by A. Lanfranco and Associates.
- Particulate analysis conducted at A. Lanfranco and Associates Inc., Surrey, BC.
- Chain of Custody protocols followed for all samples.
- Excellent blank values for all sample types. All samples blank corrected.

Sample Type	**Blank Value**		
Second Q 2021	**Unit 1**	**Unit 2**	**Unit 3**
Filter	-0.2 mg	-0.2 mg	-0.3 mg
Front Half Washings	0.9 mg	0.5 mg	0.6 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.09 ug	<0.10 ug	<0.10 ug
Trace Metals Front *	<32.5 ug	<34.0 ug	<35.3 ug
Trace Metals Back*	<25.3 ug	<7.6 ug	<28.7 ug
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug

Sum of all reported elements except Hg*

APPENDIX - B

LABORATORY RESULTS

Element
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W: www.element.com

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: Reagent Blank
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491345**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621757

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:

Element
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W: www.element.com

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 Blank
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491345**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621757

Reference Number	1491345-1	1491345-2	1491345-3
Sample Date	May 04, 2021	May 04, 2021	May 04, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 / 22.6°C	Reagent Blank Unit 2 / 22.6°C	Reagent Blank Unit 3 / 22.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	0.43	0.2	0.2
Cobalt		µg	0.4	<0.3	0.6	0.25
Copper		µg	<0.3	1	<0.3	0.25
Lead		µg	3.1	2	3.0	1.5
Manganese		µg	<0.3	<0.3	0.3	0.25
Nickel		µg	<0.5	<0.5	1	0.5
Phosphorus		µg	<2	<2	<2	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	2	0.9	3.3	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	5	<3	<3	2.5
Arsenic		µg	<1	2	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.41	0.84	0.73	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	<0.3	1	1	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	20	20	20	2.5
Selenium		µg	4.1	<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	<0.5	<0.5	<0.5	0.5
Volume	Sample	mL	210	210	210	
Volume	aliquot volume	mL	160	160	160	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	

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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 Blank
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491345**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621757

Reference Number	1491345-1	1491345-2	1491345-3
Sample Date	May 04, 2021	May 04, 2021	May 04, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 / 22.6°C	Reagent Blank Unit 2 / 22.6°C	Reagent Blank Unit 3 / 22.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	210	210	210	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	45	45	
Mercury	Fraction 2B	µg/sample	<0.08	<0.09	<0.09	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	100	100	100	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	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	0.07	0.11	0.06	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	0.035	0.02	

Approved by:

Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Element
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Methodology and Notes

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

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

Lot ID: **1491345**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621757

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

element
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
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:

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

Date Required

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.

Report Results

- [x] Email
- [ ] QA/QC
- [ ] Online
- [x] PDF
- [ ] Fax
- [ ] Excel

Requirements

- [ ] HCDWORG
- [ ] SPIGEC
- [ ] AB Tier 1
- [ ] BCCSR

Other (list below)

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 in cm	Depth end m	Date/Time sampled	Matrix	Sampling method	Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg
								↓	Enter tests above (✓ relevant samples below)					
1		Reagent Blank Unit 1			4-May-21			5	✓	✓	✓	✓	✓	✓
2														
3		Reagent Blank Unit 2			4-May-21			5	✓	✓	✓	✓	✓	✓
4														
5		Reagent Blank Unit 3			4-May-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: 1491345 COC

Temp. received: 22.6 °C

Date/Time stamp: RECEIVED MAY 10 2021 @ 15:55pm

Delivery Method:

Waybill:

Received by:

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V3S 8P8, Canada

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W: www.element.com

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

Lot ID: **1491346**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621758

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:

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

Lot ID: **1491346**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621758

Reference Number	1491346-1	1491346-2	1491346-3
Sample Date	May 04, 2021	May 07, 2021	May 05, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (Unit 1 Blank' + 4 Bottles) / 22.6°C	Field Blank Unit 2 ('MV Unit 1 Blank' + 4 Bottles) / 22.6°C	Field Blank Unit 3 (Unit 1 Blank' + 4 Bottles) / 22.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	9	7	10	5
Antimony		µg	3	6	<2	2.5
Arsenic		µg	<1	1	<1	1
Cadmium		µg	0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	0.40	0.33	0.2
Cobalt		µg	<0.3	<0.3	0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	3.2	5.6	<2	1.5
Manganese		µg	<0.3	<0.3	0.4	0.25
Nickel		µg	0.7	<0.5	0.9	0.5
Phosphorus		µg	20	20	25	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	2	2	3.3	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	<5	6	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<0.9	<0.9	2.4	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	0.28	0.59	0.32	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	<0.2	2	<0.2	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	0.6	<0.2	0.5	0.25
Nickel		µg	<0.5	<0.5	<0.5	0.5
Phosphorus		µg	25	7	20	2.5
Selenium		µg	<1	2	<1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	3.9	1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	<0.5	<0.5	<0.5	0.5
Volume	Sample	mL	355	355	355	
Volume	aliquot volume	mL	305	305	305	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Analytical Report

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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1491346**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621758

	Reference Number	1491346-1	1491346-2	1491346-3	
	Sample Date	May 04, 2021	May 07, 2021	May 05, 2021	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Field Blank Unit 1 (Unit 1 Blank' + 4 Bottles) / 22.6°C	Field Blank Unit 2 ('MV Unit 1 Blank' + 4 Bottles) / 22.6°C	Field Blank Unit 3 (Unit 1 Blank' + 4 Bottles) / 22.6°C	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	355	355	355	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	50	50	50	
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	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	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	<0.05	0.08	<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	0.03	<0.02	

Approved by:

Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Element
#104, 19575-55 A Ave.
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Methodology and Notes

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

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

Lot ID: **1491346**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621758

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver

** Reference Method Modified*

References

EMC	Emission Measurement Center of EPA

element
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:

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

Date Required

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.

Report Results

- [x] Email
- [ ] QA/QC
- [ ] Online
- [x] PDF
- [ ] Fax
- [ ] Excel

Requirements

- [ ] HCDWORG
- [ ] SPIGEC
- [ ] AB Tier 1
- [ ] BCCSR

Other (list below)

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	Depth end	Date/Time sampled	Matrix	Sampling method	Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg
			in cm	m				↓	Enter tests above (✓ relevant samples below)					
1		Field Blank Unit 1 (Unit 1 Blank' + 4 Bottles)			4-May-21			5	✓	✓	✓	✓	✓	✓
2														
3		Field Blank Unit 2 ('MV Unit 2 Blank' + 4 Bottles)			7-May-21			5	✓	✓	✓	✓	✓	✓
4														
5		Field Blank Unit 3 (Unit 3 Blank' + 4 Bottles)			5-May-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: 1491346 COC

Temp. received: 22.6 °C

Date/Time stamp: RECEIVED MAY 10 2021 @ 15:55PM

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: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

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:

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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: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-1	1491431-2	1491431-3
Sample Date	May 04, 2021	May 04, 2021	May 04, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (Unit 1 R-1 + 4 bottles) / 22.6C	Unit 1 Run 2 (Unit 1 R-2 + 4 bottles) / 22.6C	Unit 1 Run 3 ('MV Unit 1 R-3' + 4 bottles) / 22.6C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	20	20	26	5
Antimony		µg	<2	4	<2	2.5
Arsenic		µg	1	<1	<1	1
Cadmium		µg	<0.3	<0.3	0.3	0.25
Chromium		µg	3.30	5.80	1.4	0.2
Cobalt		µg	0.3	0.9	0.4	0.25
Copper		µg	0.6	1	<0.3	0.25
Lead		µg	4.1	7.2	7.2	1.5
Manganese		µg	1	3.6	0.9	0.25
Nickel		µg	2	15	2	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	4.7	<2	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	8.8	20	23	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	27	34	20	5
Antimony		µg	<2	4	<2	2.5
Arsenic		µg	<0.9	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	22.5	2.75	1.7	0.2
Cobalt		µg	0.4	<0.2	<0.2	0.25
Copper		µg	3.0	7.7	1	0.25
Lead		µg	2.5	<1	<1	1.5
Manganese		µg	4.3	1	1	0.25
Nickel		µg	17	2	1.0	0.5
Phosphorus		µg	24	20	20	2.5
Selenium		µg	<1	2.6	<1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	21.4	6.0	0.9	0.5
Volume	Sample	mL	760	760	770	
Volume	aliquot volume	mL	710	710	720	
Mercury by CVAA						
Mercury	As Tested	µg/L	0.05	0.06	0.09	0.05

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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: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-1	1491431-2	1491431-3
Sample Date	May 04, 2021	May 04, 2021	May 04, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (Unit 1 R-1 + 4 bottles) / 22.6C	Unit 1 Run 2 (Unit 1 R-2 + 4 bottles) / 22.6C	Unit 1 Run 3 ('MV Unit 1 R-3' + 4 bottles) / 22.6C
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	0.03	0.04	
Mercury	As Tested	µg/L	0.51	0.49	0.35	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	760	760	770	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	3.1	3.0	2.1	
Mercury	As Tested	µg/L	0.43	0.75	0.12	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	150	155	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	0.11	0.18	0.029	
Mercury	As Tested	µg/L	<0.05	0.15	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	600	600	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.05	0.14	<0.04	
Mercury	As Tested	µg/L	0.20	0.53	0.09	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.063	0.17	0.03	

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Analytical Report

Bill To: A. Lanfranco & Associates
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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: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-4	1491431-5	1491431-6
Sample Date	May 07, 2021	May 07, 2021	May 07, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 ('MV Unit 2 R-1' + 4 bottles) / 22.6C	Unit 2 Run 2 ('MV Unit 2 R-2' + 4 bottles) / 22.6C	Unit 2 Run 3 ('MV Unit 2 R-3' + 4 bottles) / 22.6C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	26	10	10	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	1.3	5.14	1.3	0.2
Cobalt		µg	0.4	<0.3	<0.3	0.25
Copper		µg	<0.3	0.5	<0.3	0.25
Lead		µg	10	5.8	5.3	1.5
Manganese		µg	0.8	2	0.9	0.25
Nickel		µg	1	8.0	<0.5	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	2.9	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	7.8	5.1	4.0	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<4	34	<4	5
Antimony		µg	3	<2	<2	2.5
Arsenic		µg	<0.9	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.1	0.87	0.46	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	1	0.6	0.8	0.25
Lead		µg	2	<1	<1	1.5
Manganese		µg	0.9	1.0	0.6	0.25
Nickel		µg	1	0.8	2	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	2.8	<1	2.3	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	<0.4	0.5	<0.4	0.5
Volume	Sample	mL	710	760	850	
Volume	aliquot volume	mL	660	710	800	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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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: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-4	1491431-5	1491431-6
Sample Date	May 07, 2021	May 07, 2021	May 07, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 ('MV Unit 2 R-1' + 4 bottles) / 22.6C	Unit 2 Run 2 ('MV Unit 2 R-2' + 4 bottles) / 22.6C	Unit 2 Run 3 ('MV Unit 2 R-3' + 4 bottles) / 22.6C
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	0.50	0.38	0.35	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	710	760	850	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	2.8	2.3	2.4	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	160	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	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	600	600	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.05	<0.05	
Mercury	As Tested	µg/L	0.06	0.13	0.12	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	0.040	0.039	

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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: Metals and Hg Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-7	1491431-8	1491431-9
Sample Date	May 05, 2021	May 05, 2021	May 05, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (Unit 3 R-1' + 4 bottles) / 22.6C	Unit 3 Run 2 (Unit 3 R-2' + 4 bottles) / 22.6C	Unit 3 Run 3 ('MV Unit 3 R-3' + 4 bottles) / 22.6C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	9	10	10	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	2.7	<1	1
Cadmium		µg	<0.3	<0.3	0.3	0.25
Chromium		µg	2.57	0.78	1.1	0.2
Cobalt		µg	0.3	<0.3	0.4	0.25
Copper		µg	<0.3	<0.3	0.4	0.25
Lead		µg	3.2	<2	4.5	1.5
Manganese		µg	2	0.7	1	0.25
Nickel		µg	8.4	<0.5	3.5	0.5
Phosphorus		µg	20	20	33	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	9.5	8.7	11	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	10	6	8	5
Antimony		µg	<2	3	2	2.5
Arsenic		µg	<0.9	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	0.32	0.85	0.28	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	6.1	1	1	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	1.0	17	0.9	0.25
Nickel		µg	0.5	6.9	1	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<1	<1	2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	0.9	0.9	1.0	0.5
Volume	Sample	mL	850	850	760	
Volume	aliquot volume	mL	800	800	710	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	0.05	0.05

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Analytical Report

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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: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Reference Number	1491431-7	1491431-8	1491431-9
Sample Date	May 05, 2021	May 05, 2021	May 05, 2021
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (Unit 3 R-1' + 4 bottles) / 22.6C	Unit 3 Run 2 (Unit 3 R-2' + 4 bottles) / 22.6C	Unit 3 Run 3 ('MV Unit 3 R-3' + 4 bottles) / 22.6C
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	0.12	0.13	0.15	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	850	850	760	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	0.82	0.86	0.93	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	160	160	160	
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	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	0.10	0.11	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	0.032	0.034	

Approved by:

Max Hewitt
Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

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Methodology and Notes

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

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

Lot ID: **1491431**
Control Number:
Date Received: May 10, 2021
Date Reported: Jun 8, 2021
Report Number: 2621859

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	May 31, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 28, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 21, 2021	Element Vancouver

** Reference Method Modified*

References

EMC	Emission Measurement Center of EPA

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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

- [x] Email
- [ ] QA/QC
- [ ] Online
- [x] PDF
- [ ] Fax
- [ ] Excel

Requirements

- [ ] HCDWORG
- [ ] SPIGEC
- [ ] AB Tier 1
- [ ] BCCSR

Other (list below)

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

Date Required

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.

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 in cm	Depth end in cm	Date/Time sampled	Matrix	Sampling method	Number of Containers ↓	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg								
									Enter tests above (✓ relevant samples below)													
1		Unit 1 Run 1 (Unit 1 R-1' + 4 Bottles)			4-May-21			5	✓	✓	✓	✓	✓	✓								
2		Unit 1 Run 2 (Unit 1 R-2' + 4 Bottles)			4-May-21			5	✓	✓	✓	✓	✓	✓								
3		Unit 1 Run 3 ('MV Unit 1 R-3' + 4 Bottles)			4-May-21			5	✓	✓	✓	✓	✓	✓								
4																						
5		Unit 2 Run 1 ('MV Unit 2 R-1' + 4 Bottles)			7-May-21			5	✓	✓	✓	✓	✓	✓								
6		Unit 2 Run 2 ('MV Unit 2 R-2' + 4 Bottles)			7-May-21			5	✓	✓	✓	✓	✓	✓								
7		Unit 2 Run 3 ('MV Unit 2 R-3' + 4 Bottles)			7-May-21			5	✓	✓	✓	✓	✓	✓								
8																						
9		Unit 3 Run 1 (Unit 3 R-1' + 4 Bottles)			5-May-21			5	✓	✓	✓	✓	✓	✓								
10		Unit 3 Run 2 (Unit 3 R-2' + 4 Bottles)			5-May-21			5	✓	✓	✓	✓	✓	✓								
11		Unit 3 Run 3 ('MV Unit 3 R-3' + 4 Bottles)			5-May-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: 1491431 COC

Temp. received: 22.6 °C

Date/Time stamp: RECEIVED MAY 1[illegible]021 @15:55PM

Delivery Method:

Waybill:

Received by:

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A8849**	Page	: 1 of 2
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Date Analysis Commenced	: 11-May-2021
C-O-C number	: ----	Issue Date	: 17-May-2021 13:53
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This 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*
Cindy Tang	Team Leader - 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

Sub-Matrix: **Air** (Matrix: **Air**)				*Client sample ID*	**Unit 1 HF Blank**	**Unit 2 HF Blank**	**Unit 3 HF Blank**	**----**	**----**
				Client sampling date / time	04-May-2021	07-May-2021	05-May-2021	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA21A8849-001**	**VA21A8849-002**	**VA21A8849-003**	**--------**	**--------**
					Result	Result	Result	----	----
Field Tests									
volume, impinger	----	EP248	0.1	mL	360	355	355	----	----
Anions and Nutrients									
fluoride	16984-48-8	E248.F	5.0	µg/sample	<5.0	<5.0	<5.0	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A8849**	Page	: 1 of 4
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Issue Date	: 17-May-2021 13:55
C-O-C number	: ----		
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts 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 00:00 is used for calculation purposes.

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

Matrix: **Air**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Blank	E248.F	07-May-2021	11-May-2021	----	5 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Blank	E248.F	05-May-2021	11-May-2021	----	7 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Blank	E248.F	04-May-2021	11-May-2021	----	8 days	✓	11-May-2021	28 days	1 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Air**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓

Methodology References and Summaries

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

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

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

QUALITY CONTROL REPORT

Work Order	: **VA21A8849**	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Date Analysis Commenced	: 11-May-2021
C-O-C number	: ----	Issue Date	: 17-May-2021 13:53
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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*
Cindy Tang	Team Leader - 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: 195452)											
VA21A8849-001	Unit 1 HF Blank	fluoride	16984-48-8	E248.F	5.0	mg/sample	<5.0	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	360 µg/sample	360		Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 195452)						
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: 195452)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	104	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	Qualifier
Anions and Nutrients (QCLot: 195452)										
VA21A8849-002	Unit 2 HF Blank	fluoride	16984-48-8	E248.F	0.382 mg/sample	0.5 mg/sample	76.4	75.0	125	----

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

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	A. Lanfranco and Associates	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Mark Lanfranco	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Unit 101 9488 189 St	Email 1: mark.lanfranco@alanfranco.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Surrey BC V4N 4W7	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-881-2582 Fax: 604-881-2581	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: Metro Vancouver WTE	
Company:		PO / AFE: HF	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: A. Lanfranco and

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F	Number of Containers
	Unit 1 HF Blank	04-May-21		Water	X	1
	Unit 2 HF Blank	07-May-21		Water	X	1
	Unit 3 HF Blank	05-May-21		Water	X	1

Analysis Request

Please indicate below Filtered, Preserved or both (F, P, F/P)

Environmental Division Vancouver
Work Order Reference
VA21A8849

Telephone : +1 604 253 4188

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

Please report ug/sample

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			MB	May10	10:55AM	20 °C				

GENF 20.00 Front

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A8850**	Page	: 1 of 3
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Date Analysis Commenced	: 11-May-2021
C-O-C number	: ----	Issue Date	: 17-May-2021 13:55
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia

General Comments

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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.

Qualifiers

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

Analytical Results

Sub-Matrix: **Air**
(Matrix: **Air**)

Analyte	CAS Number	Method	LOR	Unit	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
					Client sampling date / time	04-May-2021	04-May-2021	04-May-2021	07-May-2021	07-May-2021
						VA21A8850-001	VA21A8850-002	VA21A8850-003	VA21A8850-004	VA21A8850-005
						Result	Result	Result	Result	Result
Field Tests										
volume, impinger	----	EP248	0.1	mL		455	475	430	400	400
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<5.0	<5.0	<21.5 DLDS	<20.0 DLDS	<20.0 DLDS

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

Analytical Results

Sub-Matrix: **Air**
(Matrix: **Air**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Unit 2 HF Run 3	Unit 3 HF Run 1	Unit 3 HF Run 2	Unit 3 HF Run 3	----
					Client sampling date / time	07-May-2021	05-May-2021	05-May-2021	05-May-2021	----
						VA21A8850-006	VA21A8850-007	VA21A8850-008	VA21A8850-009	--------
						Result	Result	Result	Result	----
Field Tests										
volume, impinger	----	EP248	0.1	mL		425	450	420	440	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<21.2 DLDS	<22.5 DLDS	<21.0 DLDS	<22.0 DLDS	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A8850**	Page	: 1 of 5
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Issue Date	: 17-May-2021 13:53
C-O-C number	: ----		
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts 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 00:00 is used for calculation purposes.

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

Matrix: **Air**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 1	E248.F	07-May-2021	11-May-2021	----	5 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 2	E248.F	07-May-2021	11-May-2021	----	5 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 3	E248.F	07-May-2021	11-May-2021	----	5 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 1	E248.F	05-May-2021	11-May-2021	----	7 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 2	E248.F	05-May-2021	11-May-2021	----	7 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 3	E248.F	05-May-2021	11-May-2021	----	7 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 1	E248.F	04-May-2021	11-May-2021	----	8 days	✓	11-May-2021	28 days	1 days	✓

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 2	E248.F	04-May-2021	11-May-2021	----	8 days	✓	11-May-2021	28 days	1 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 3	E248.F	04-May-2021	11-May-2021	----	8 days	✓	11-May-2021	28 days	1 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Air**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	195452	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.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21A8850**	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: Metro Vancouver WTE	Date Samples Received	: 10-May-2021 10:55
PO	: HF	Date Analysis Commenced	: 11-May-2021
C-O-C number	: ----	Issue Date	: 17-May-2021 13:53
Sampler	: AL		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Cindy Tang	Team Leader - 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: 195452)											
VA21A8849-001	Anonymous	fluoride	16984-48-8	E248.F	5.0	mg/sample	<5.0	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	µg/sample 360	360		Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 195452)						
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: 195452)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	104	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	Qualifier
Anions and Nutrients (QCLot: 195452)										
VA21A8849-002	Anonymous	fluoride	16984-48-8	E248.F	0.382 mg/sample	0.5 mg/sample	76.4	75.0	125	----

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

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	A. Lanfranco and Associates	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Mark Lanfranco	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Unit 101 9488 189 St	Email 1: mark.lanfranco@alanfranco.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Surrey BC V4N 4W7	Email 2:	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-881-2582 Fax: 604-881-2581	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: Metro Vancouver WTE	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE: HF	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:** Brent Mack	**Sampler:** A. Lanfranco and

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F											Number of Containers
	Unit 1 HF Run 1	04-May-21		Water	X											1
	Unit 1 HF Run 2			Water	X											1
	Unit 1 HF Run 3			Water	X											1
	Unit 2 HF Run 1	07-May-21		Water	X											1
	Unit 2 HF Run 2			Water	X											1
	Unit 2 HF Run 3			Water	X											1
	Unit 3 HF Run 1	05-May-21		Water	X											1
	Unit 3 HF Run 2			Water	X											1
	Unit 3 HF Run 3			Water	X											1

Environmental Division Vancouver
Work Order Reference
VA21A8850
Telephone : +1 604 253 4188

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

Please report ug/sample

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			MB	May 10	10:55AM	20 °C				

GENF 20.00 Front

APPENDIX - C

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	3-May-21
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	10:58 - 13:00

Concentrations:

Particulate	0.63	mg/dscm	0.00028	gr/dscf
	0.36	mg/Acm	0.00016	gr/Acf
	0.57	mg/dscm (@ 11% O2)	0.00025	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.048	Kg/hr	0.105	lb/hr

Flue Gas Characteristics:

Flow	1254	dscm/min	44279	dscf/min
	20.90	dscm/sec	738	dscf/sec
	2193	Acm/min	77444	Acf/min
Velocity	14.349	m/sec	47.08	f/sec
Temperature	155.3	oC	311.6	oF
Moisture	12.9	%		
Gas Analysis	10.0	% O2		
	10.0	% CO2		
	30.000	Mol. Wt (g/gmole) Dry		
	28.452	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.9240	dscm	103.261	dscf
Sample Time	120.0	minutes		
Isokineticity	102.3	%		

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

Client:	Metro Vancouver	**Date:**	3-May-21
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	10:58 - 13:00

Control Unit (Y)	1.0006
Nozzle Diameter (in.)	0.3090
Pitot Factor	0.8494
Baro. Press. (in. Hg)	30.14
Static Press. (in. H20)	-19.50
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)	0.00180
Total (grams)	**0.00185**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	10.00	10.00
Traverse 2	10.00	10.00
	10.00	**10.00**

Condensate Collection:

Impinger 1	140.0
Impinger 2	116.0
Impinger 3	42.0
Impinger 4	8.0
Impinger 5	4.0
Impinger 6	2.0
Gel	12.9
Gain (grams)	**324.9**

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	673.700								
1	5.0	677.320	0.32	1.96	68	68	6	309	1.5	102.7
2	10.0	681.360	0.40	2.45	69	69	6	310	4.7	102.5
3	15.0	685.400	0.40	2.45	69	69	7	313	8.4	102.7
4	20.0	689.550	0.42	2.57	69	69	7	314	12.5	103.0
5	25.0	693.590	0.40	2.45	70	70	8	315	17.7	102.6
6	30.0	697.640	0.40	2.45	70	70	8	316	25.2	102.9
7	35.0	702.720	0.63	3.86	71	71	12	314	45.6	102.9
8	40.0	707.700	0.61	3.73	71	71	12	313	53.2	102.4
9	45.0	712.220	0.50	3.06	71	71	10	310	58.3	102.3
10	50.0	716.370	0.42	2.57	72	72	10	307	62.5	102.0
11	55.0	720.310	0.38	2.33	73	73	8	305	66.1	101.4
12	60.0	724.140	0.36	2.20	73	73	8	300	69.4	100.9
Traverse 2	0.0	724.140								
1	5.0	728.180	0.40	2.45	74	74	8	309	1.5	101.4
2	10.0	732.470	0.45	2.75	75	75	8	310	4.7	101.5
3	15.0	737.080	0.52	3.18	75	75	8	314	8.4	101.8
4	20.0	741.460	0.47	2.88	76	76	8	315	12.5	101.6
5	25.0	746.070	0.42	3.18	76	76	8	315	17.7	113.2
6	30.0	750.500	0.48	2.94	77	77	8	315	25.2	101.5
7	35.0	755.110	0.52	3.18	77	77	9	313	45.6	101.4
8	40.0	759.630	0.50	3.06	78	78	9	313	53.2	101.2
9	45.0	764.240	0.52	3.18	78	78	10	312	58.3	101.1
10	50.0	768.430	0.43	2.63	77	77	10	312	62.5	101.1
11	55.0	772.470	0.40	2.45	77	77	10	312	66.1	101.1
12	60.0	776.520	0.40	2.45	78	78	10	312	69.4	101.1
Average:			0.448	2.767	73.5	73.5	8.7	311.6		102.3

Client:	Metro Vancouver	**Date:**	4-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	08:53 - 10:55

Concentrations:

Particulate	0.46	mg/dscm	0.00020	gr/dscf
	0.26	mg/Acm	0.00011	gr/Acf
	0.43	mg/dscm (@ 11% O2)	0.00019	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.035	Kg/hr	0.076	lb/hr

Flue Gas Characteristics:

Flow	1253	dscm/min	44248	dscf/min
	20.88	dscm/sec	737	dscf/sec
	2191	Acm/min	77358	Acf/min
Velocity	14.334	m/sec	47.03	f/sec
Temperature	150.4	oC	302.7	oF
Moisture	14.0	%		
Gas Analysis	10.3	% O2		
	9.8	% CO2		
	29.970	Mol. Wt (g/gmole) Dry		
	28.293	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.9371	dscm	103.722	dscf
Sample Time	120.0	minutes		
Isokineticity	102.9	%		

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

Client:	Metro Vancouver	**Date:**	4-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	08:53 - 10:55

Control Unit (Y)	1.0006	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3090	Filter (grams)	0.00005		CO2	O2		Impinger 1	192.0
Pitot Factor	0.8494	Washings (grams)	0.00130	Traverse 1	9.50	10.50		Impinger 2	102.0
Baro. Press. (in. Hg)	30.15			Traverse 2	10.00	10.00		Impinger 3	34.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00135**					Impinger 4	10.0
Stack Height (ft)	30							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	14.1
Minutes Per Reading	5.0				**9.75**	**10.25**		**Gain (grams)**	**359.1**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	776.950								
1	5.0	780.150	0.25	1.53	62	62	4	296	1.5	103.8
2	10.0	783.530	0.28	1.71	63	63	4	300	4.7	103.8
3	15.0	787.140	0.32	1.96	63	63	4	294	8.4	103.3
4	20.0	790.750	0.32	1.96	64	64	4	295	12.5	103.2
5	25.0	794.370	0.32	1.96	64	64	4	293	17.7	103.3
6	30.0	798.200	0.36	2.20	65	65	4	298	25.2	103.3
7	35.0	803.470	0.68	4.16	66	66	8	299	45.6	103.8
8	40.0	808.820	0.70	4.28	68	68	8	303	53.2	103.7
9	45.0	814.240	0.72	4.41	70	70	10	304	58.3	103.3
10	50.0	819.590	0.70	4.28	71	71	10	308	62.5	103.5
11	55.0	824.200	0.52	3.18	71	71	6	309	66.1	103.3
12	60.0	828.240	0.40	2.45	72	72	6	303	69.4	102.4
Traverse 2	0.0	828.240								
1	5.0	831.860	0.32	1.96	72	72	6	302	1.5	102.4
2	10.0	835.900	0.40	2.45	73	73	6	301	4.7	102.1
3	15.0	839.840	0.38	2.33	73	73	6	302	8.4	102.2
4	20.0	843.880	0.40	2.45	73	73	6	302	12.5	102.1
5	25.0	848.490	0.52	3.18	74	74	6	302	17.7	102.2
6	30.0	853.100	0.52	3.18	74	74	6	308	25.2	102.6
7	35.0	857.140	0.40	2.45	74	74	6	308	45.6	102.3
8	40.0	861.290	0.42	2.57	74	74	6	307	53.2	102.6
9	45.0	865.820	0.50	3.06	74	74	7	307	58.3	102.7
10	50.0	870.430	0.52	3.18	74	74	7	308	62.5	102.6
11	55.0	875.170	0.55	3.37	75	75	7	308	66.1	102.4
12	60.0	879.550	0.47	2.88	76	76	7	307	69.4	102.0
Average:			0.457	2.798	70.2	70.2	6.2	302.7		102.9

Client:	Metro Vancouver	**Date:**	4-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:18 - 13:10

Concentrations:

Particulate	1.2	mg/dscm	0.0005	gr/dscf
	0.7	mg/Acm	0.0003	gr/Acf
	1.1	mg/dscm (@ 11% O2)	0.0005	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.092	Kg/hr	0.202	lb/hr

Flue Gas Characteristics:

Flow	1261	dscm/min	44515	dscf/min
	21.01	dscm/sec	742	dscf/sec
	2225	Acm/min	78578	Acf/min
Velocity	14.560	m/sec	47.77	f/sec
Temperature	151.5	oC	304.7	oF
Moisture	14.6	%		
Gas Analysis	10.1	% O2		
	9.9	% CO2		
	29.990	Mol. Wt (g/gmole) Dry		
	28.239	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7268	dscm	96.296	dscf
Sample Time	110.0	minutes		
Isokineticity	103.6	%		

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

Client:	Metro Vancouver	**Date:**	4-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:18 - 13:10

Control Unit (Y)	1.0006	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3090	Filter (grams)	0.00020		CO2	O2		Impinger 1	186.0
Pitot Factor	0.8494	Washings (grams)	0.00310	Traverse 1	9.83	10.20		Impinger 2	98.0
Baro. Press. (in. Hg)	30.15			Traverse 2	10.00	10.00		Impinger 3	30.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00330**					Impinger 4	12.0
Stack Height (ft)	30							Impinger 5	6.0
Stack Diameter (in.)	70.90							Impinger 6	3.0
Stack Area (sq.ft.)	27.417							Gel	14.9
Minutes Per Reading	5.0				**9.92**	**10.10**		**Gain (grams)**	**349.9**
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	880.050								
1	5.0	883.940	0.37	2.26	72	72	5	293	1.5	102.4
2	10.0	887.980	0.40	2.45	73	73	5	298	4.7	102.5
3	15.0	892.020	0.40	2.45	72	72	5	303	8.4	103.0
4	20.0	896.070	0.40	2.45	73	73	5	302	12.5	103.0
5	25.0	900.840	0.42	2.57	73	73	6	302	17.7	118.4
6	30.0	904.880	0.40	2.45	74	74	6	302	25.2	102.6
7	35.0	909.020	0.42	2.57	73	73	6	303	45.6	102.8
8	40.0	913.450	0.48	2.94	72	72	6	303	53.2	103.2
9	45.0	917.970	0.50	3.06	73	73	6	304	58.3	103.1
10	50.0	922.580	0.52	3.18	73	73	6	305	62.5	103.2
11	55.0	927.100	0.50	3.06	73	73	6	305	66.1	103.2
12	60.0	931.490	0.47	2.88	74	74	6	306	69.4	103.2
Traverse 2	0.0	931.490								
1	5.0	935.530	0.40	2.45	74	74	6	303	1.5	102.6
2	10.0	939.670	0.42	2.57	75	75	6	304	4.7	102.5
3	15.0	943.720	0.40	2.45	75	75	6	306	8.4	102.9
4	20.0	947.860	0.42	2.57	76	76	6	308	12.5	102.6
5	25.0	952.000	0.42	2.57	75	75	6	308	17.7	102.8
6	30.0	956.040	0.40	2.45	76	76	6	309	25.2	102.6
7	35.0	961.070	0.62	3.79	76	76	8	310	45.6	103.0
8	40.0	966.190	0.64	3.92	77	77	8	311	53.2	103.1
9	45.0	971.140	0.60	3.67	76	76	7	310	58.3	103.1
10	50.0	976.010	0.58	3.55	77	77	7	309	62.5	102.8
Average:			0.463	2.832	74.2	74.2	6.1	304.7		103.6

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:30 - 11:32

Concentrations:

Particulate	0.1	mg/dscm	0.0000	gr/dscf
	0.0	mg/Acm	0.0000	gr/Acf
	0.0	mg/dscm (@ 11% O2)	0.0000	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.004	Kg/hr	0.009	lb/hr

Flue Gas Characteristics:

Flow	1225	dscm/min	43260	dscf/min
	20.42	dscm/sec	721	dscf/sec
	2107	Acm/min	74398	Acf/min
Velocity	13.785	m/sec	45.23	f/sec
Temperature	153.3	oC	307.9	oF
Moisture	12.0	%		
Gas Analysis	9.6	% O2		
	9.9	% CO2		
	29.965	Mol. Wt (g/gmole) Dry		
	28.533	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7036	dscm	95.477	dscf
Sample Time	120.0	minutes		
Isokineticity	97.9	%		

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

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:30 - 11:32

Control Unit (Y)	1.0101
Nozzle Diameter (in.)	0.3073
Pitot Factor	0.8490
Baro. Press. (in. Hg)	30.07
Static Press. (in. H20)	-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)	0.00010
Total (grams)	**0.00015**

Gas Analysis (Vol. %):	CO2	O2
Traverse 1	9.50	10.00
Traverse 2	10.25	9.25
	9.88	**9.63**

Condensate Collection:	
Impinger 1	162.0
Impinger 2	58.0
Impinger 3	28.0
Impinger 4	8.0
Impinger 5	4.0
Impinger 6	2.0
Gel	13.8
Gain (grams)	**275.8**

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	168.600								
1	5.0	172.890	0.50	2.52	67	67	8.5	301	1.5	98.0
2	10.0	177.270	0.52	2.62	68	68	8.5	305	4.7	98.2
3	15.0	181.470	0.48	2.41	68	68	8	306	8.4	98.0
4	20.0	185.890	0.53	2.66	69	69	8	308	12.5	98.2
5	25.0	190.270	0.52	2.61	70	70	8.5	309	17.7	98.1
6	30.0	194.610	0.51	2.56	70	70	8.5	310	25.2	98.2
7	35.0	198.160	0.34	1.71	71	71	6	308	45.6	97.8
8	40.0	201.550	0.31	1.56	72	72	6	309	53.2	97.7
9	45.0	205.010	0.32	1.62	73	73	6	309	58.3	97.8
10	50.0	207.950	0.23	1.17	73	73	6	302	62.5	97.6
11	55.0	211.080	0.26	1.32	74	74	5	306	66.1	97.9
12	60.0	214.080	0.24	1.22	74	74	5	307	69.4	97.7
Traverse 2	0.0	214.080								
1	5.0	217.450	0.30	1.53	74	74	7	303	1.5	98.0
2	10.0	220.860	0.31	1.57	74	74	7	310	4.7	98.0
3	15.0	224.150	0.29	1.47	74	74	6.5	310	8.4	97.7
4	20.0	227.270	0.26	1.32	74	74	6.5	309	12.5	97.7
5	25.0	230.670	0.31	1.56	73	73	6.5	310	17.7	97.9
6	30.0	234.280	0.35	1.77	73	73	6.5	310	25.2	97.3
7	35.0	238.800	0.55	2.77	73	73	9.5	311	45.6	98.0
8	40.0	243.710	0.65	3.27	72	72	9.5	311	53.2	98.2
9	45.0	248.270	0.56	2.82	72	72	11	310	58.3	98.1
10	50.0	253.120	0.63	3.18	73	73	11	310	62.5	98.3
11	55.0	257.970	0.63	3.19	73	73	11	308	66.1	98.2
12	60.0	262.860	0.64	3.24	73	73	11	307	69.4	98.2
Average:			0.427	2.153	72.0	72.0	7.8	307.9		97.9

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:51:13:53

Concentrations:

Particulate	0.43	mg/dscm	0.00019	gr/dscf
	0.24	mg/Acm	0.00011	gr/Acf
	0.37	mg/dscm (@ 11% O2)	0.00016	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.029	Kg/hr	0.065	lb/hr

Flue Gas Characteristics:

Flow	1132	dscm/min	39990	dscf/min
	18.87	dscm/sec	666	dscf/sec
	2008	Acm/min	70910	Acf/min
Velocity	13.139	m/sec	43.11	f/sec
Temperature	155.9	oC	312.6	oF
Moisture	14.1	%		
Gas Analysis	9.3	% O2		
	10.3	% CO2		
	30.010	Mol. Wt (g/gmole) Dry		
	28.318	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.4349	dscm	85.987	dscf
Sample Time	120.0	minutes		
Isokineticity	99.9	%		

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

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:51:13:53

Control Unit (Y)	1.0101
Nozzle Diameter (in.)	0.3073
Pitot Factor	0.8490
Baro. Press. (in. Hg)	30.07
Static Press. (in. H20)	-18.00
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)	0.00100
Total (grams)	**0.00105**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	10.25	9.50
Traverse 2	10.25	9.00
	10.25	**9.25**

Condensate Collection:

Impinger 1	196.0
Impinger 2	74.0
Impinger 3	8.0
Impinger 4	4.0
Impinger 5	2.0
Impinger 6	1.0
Gel	14.7
Gain (grams)	**299.7**

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	263.300								
1	5.0	266.610	0.30	1.50	67	67	6	310	1.5	100.0
2	10.0	269.850	0.29	1.44	67	67	6	314	4.7	99.8
3	15.0	272.980	0.27	1.34	67	67	5.5	313	8.4	99.8
4	20.0	275.990	0.25	1.24	67	67	5.5	313	12.5	99.7
5	25.0	279.240	0.29	1.44	68	68	6	313	17.7	99.8
6	30.0	282.650	0.32	1.59	68	68	6	313	25.2	99.7
7	35.0	287.210	0.57	2.84	68	68	10	313	45.6	100.2
8	40.0	291.930	0.61	3.04	69	69	10	314	53.2	100.2
9	45.0	296.820	0.65	3.25	71	71	11	314	58.3	100.3
10	50.0	301.560	0.61	3.05	71	71	11	313	62.5	100.2
11	55.0	306.300	0.61	3.06	71	71	10.5	312	66.1	100.1
12	60.0	310.930	0.58	2.92	71	71	10.5	310	69.4	100.2
Traverse 2	0.0	310.930								
1	5.0	314.970	0.44	2.21	72	72	7.5	311	1.5	100.0
2	10.0	318.960	0.43	2.15	72	72	7.5	314	4.7	100.1
3	15.0	323.090	0.46	2.31	73	73	8	313	8.4	100.0
4	20.0	327.090	0.43	2.17	74	74	8	313	12.5	99.9
5	25.0	331.000	0.41	2.07	74	74	7	312	17.7	100.0
6	30.0	334.810	0.39	1.96	74	74	7	314	25.2	100.0
7	35.0	338.040	0.28	1.41	74	74	6.5	314	45.6	99.9
8	40.0	341.090	0.25	1.24	74	74	6.5	313	53.2	99.7
9	45.0	343.890	0.21	1.06	74	74	6	314	58.3	99.9
10	50.0	346.750	0.22	1.11	74	74	6	312	62.5	99.6
11	55.0	349.490	0.20	1.01	74	74	6	310	66.1	99.9
12	60.0	352.150	0.19	0.96	74	74	6	311	69.4	99.6
Average:			0.386	1.932	71.2	71.2	7.5	312.6		99.9

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:12 - 16:14

Concentrations:

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

Emission Rates:

Particulate	0.02	Kg/hr	0.050	lb/hr

Flue Gas Characteristics:

Flow	1153	dscm/min	40726	dscf/min
	19.22	dscm/sec	679	dscf/sec
	2027	Acm/min	71591	Acf/min
Velocity	13.265	m/sec	43.52	f/sec
Temperature	153.4	oC	308.1	oF
Moisture	13.8	%		
Gas Analysis	8.6	% O2		
	10.8	% CO2		
	30.065	Mol. Wt (g/gmole) Dry		
	28.394	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5967	dscm	91.702	dscf
Sample Time	120.0	minutes		
Isokineticity	99.8	%		

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

Client:	Metro Vancouver	**Date:**	7-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:12 - 16:14

Control Unit (Y)	1.0101	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3073	Filter (grams)	0.00005		CO2	O2		Impinger 1	182.0
Pitot Factor	0.8490	Washings (grams)	0.00080	Traverse 1	11.00	8.50		Impinger 2	78.0
Baro. Press. (in. Hg)	30.07			Traverse 2	10.50	8.75		Impinger 3	26.0
Static Press. (in. H20)	-18.00	**Total (grams)**	**0.0008**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	14.2
Minutes Per Reading	5.0				**10.75**	**8.63**		**Gain (grams)**	**313.2**
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)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	355.100								
1	5.0	359.420	0.50	2.54	71	71	8.5	303	1.5	100.0
2	10.0	363.640	0.48	2.42	71	71	8.5	307	4.7	99.9
3	15.0	368.060	0.53	2.66	71	71	10	312	8.4	99.9
4	20.0	372.350	0.50	2.50	71	71	10	314	12.5	100.0
5	25.0	376.680	0.51	2.55	71	71	10	314	17.7	99.9
6	30.0	380.930	0.49	2.45	71	71	10	314	25.2	100.0
7	35.0	384.570	0.36	1.80	71	71	7.5	314	45.6	99.8
8	40.0	387.540	0.24	1.20	71	71	7.5	313	53.2	99.5
9	45.0	390.450	0.23	1.15	71	71	5.5	313	58.3	99.6
10	50.0	393.300	0.22	1.11	71	71	5.5	309	62.5	99.5
11	55.0	396.280	0.24	1.21	71	71	6	309	66.1	99.6
12	60.0	399.070	0.21	1.06	71	71	6	308	69.4	99.6
Traverse 2	0.0	399.070								
1	5.0	402.410	0.30	1.52	72	72	7	307	1.5	99.6
2	10.0	405.700	0.29	1.47	72	72	7	307	4.7	99.8
3	15.0	408.940	0.28	1.42	73	73	6.5	307	8.4	99.8
4	20.0	412.060	0.26	1.32	73	73	6.5	308	12.5	99.8
5	25.0	415.360	0.29	1.47	74	74	7	307	17.7	99.7
6	30.0	418.830	0.32	1.63	75	75	7	307	25.2	99.6
7	35.0	423.350	0.54	2.75	76	76	9.5	307	45.6	100.0
8	40.0	427.960	0.56	2.86	77	77	9.5	307	53.2	100.0
9	45.0	432.540	0.55	2.82	78	78	10	306	58.3	100.0
10	50.0	437.100	0.54	2.78	79	79	10	302	62.5	100.0
11	55.0	441.540	0.51	2.64	79	79	9.5	300	66.1	100.0
12	60.0	445.902	0.49	2.54	80	80	9.5	300	69.4	100.0
Average:			0.393	1.995	73.3	73.3	3.0	308.1		99.8

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	08:48 - 10:50

Concentrations:

Particulate	0.13	mg/dscm	0.00006	gr/dscf
	0.07	mg/Acm	0.00003	gr/Acf
	0.12	mg/dscm (@ 11% O2)	0.00005	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.009	Kg/hr	0.019	lb/hr

Flue Gas Characteristics:

Flow	1160	dscm/min	40949	dscf/min
	19.33	dscm/sec	682	dscf/sec
	2051	Acm/min	72445	Acf/min
Velocity	13.423	m/sec	44.04	f/sec
Temperature	151.7	oC	305.0	oF
Moisture	14.6	%		
Gas Analysis	10.4	% O2		
	9.7	% CO2		
	29.960	Mol. Wt (g/gmole) Dry		
	28.212	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7679	dscm	97.747	dscf
Sample Time	120.0	minutes		
Isokineticity	104.7	%		

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

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	08:48 - 10:50

Control Unit (Y)	0.9925	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3090	Filter (grams)	0.00005		CO2	O2		Impinger 1	168.0
Pitot Factor	0.8494	Washings (grams)	0.00030	Traverse 1	9.50	10.50		Impinger 2	116.0
Baro. Press. (in. Hg)	30.10			Traverse 2	9.83	10.20		Impinger 3	42.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00035**					Impinger 4	10.0
Stack Height (ft)	30							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	12.5
Minutes Per Reading	5.0				**9.67**	**10.35**		**Gain (grams)**	**355.5**
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	464.588								
1	5.0	469.140	0.50	2.70	55	55	8	309	1.5	106.7
2	10.0	473.790	0.52	2.80	56	56	8	310	4.7	106.8
3	15.0	478.430	0.52	2.80	56	56	8	310	8.4	106.6
4	20.0	482.880	0.48	2.59	56	56	8	308	12.5	106.2
5	25.0	487.210	0.45	2.43	57	57	8	307	17.7	106.4
6	30.0	491.390	0.42	2.26	58	58	8	307	25.2	106.1
7	35.0	495.040	0.32	1.72	59	59	8	304	45.6	105.6
8	40.0	498.570	0.30	1.62	60	60	8	303	53.2	105.1
9	45.0	501.980	0.28	1.51	61	61	8	303	58.3	104.9
10	50.0	505.390	0.28	1.51	62	62	8	304	62.5	104.8
11	55.0	508.670	0.26	1.40	62	62	8	303	66.1	104.5
12	60.0	511.950	0.26	1.40	63	63	8	302	69.4	104.2
Traverse 2	0.0	511.950								
1	5.0	515.660	0.33	1.78	63	63	8	303	1.5	104.8
2	10.0	519.470	0.35	1.89	64	64	8	304	4.7	104.4
3	15.0	523.440	0.38	2.05	64	64	8	304	8.4	104.4
4	20.0	527.080	0.32	1.72	65	65	8	304	12.5	104.1
5	25.0	530.720	0.32	1.72	66	66	8	305	17.7	103.9
6	30.0	534.530	0.35	1.89	67	67	8	305	25.2	103.9
7	35.0	539.080	0.50	2.70	68	68	8	305	45.6	103.8
8	40.0	543.540	0.48	2.59	68	68	8	304	53.2	103.7
9	45.0	548.000	0.48	2.59	69	69	8	304	58.3	103.5
10	50.0	552.550	0.50	2.70	70	70	8	305	62.5	103.4
11	55.0	556.870	0.45	2.43	70	70	8	304	66.1	103.3
12	60.0	561.040	0.42	2.26	71	71	8	303	69.4	102.9
Average:			0.395	2.128	62.9	62.9	8.0	305.0		104.7

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:05 - 13:07

Concentrations:

Particulate	0.32	mg/dscm	0.00014	gr/dscf
	0.18	mg/Acm	0.00008	gr/Acf
	0.29	mg/dscm (@ 11% O2)	0.00013	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.023	Kg/hr	0.051	lb/hr

Flue Gas Characteristics:

Flow	1207	dscm/min	42632	dscf/min
	20.12	dscm/sec	711	dscf/sec
	2143	Acm/min	75662	Acf/min
Velocity	14.019	m/sec	45.99	f/sec
Temperature	150.4	oC	302.7	oF
Moisture	15.1	%		
Gas Analysis	10.1	% O2		
	9.9	% CO2		
	29.990	Mol. Wt (g/gmole) Dry		
	28.174	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.8310	dscm	99.976	dscf
Sample Time	120.0	minutes		
Isokineticity	102.9	%		

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

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:05 - 13:07

Control Unit (Y)	0.9925
Nozzle Diameter (in.)	0.3090
Pitot Factor	0.8494
Baro. Press. (in. Hg)	30.10
Static Press. (in. H20)	-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)	0.00000
Washings (grams)	0.00090
Total (grams)	**0.00090**

Gas Analysis (Vol. %):		
	CO2	O2
Traverse 1	10.00	10.00
Traverse 2	9.83	10.17
	9.92	**10.09**

Condensate Collection:	
Impinger 1	252.0
Impinger 2	86.0
Impinger 3	18.0
Impinger 4	6.0
Impinger 5	2.0
Impinger 6	1.0
Gel	14.2
Gain (grams)	**379.2**

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	561.950								
1	5.0	565.760	0.35	1.89	68	68	4	294	1.5	103.5
2	10.0	569.670	0.37	1.99	69	69	4	296	4.7	103.3
3	15.0	573.480	0.35	1.89	69	69	4	303	8.4	103.9
4	20.0	577.290	0.35	1.89	70	70	4	302	12.5	103.6
5	25.0	580.920	0.32	1.72	70	70	4	303	17.7	103.3
6	30.0	584.560	0.32	1.72	71	71	4	304	25.2	103.5
7	35.0	589.020	0.48	2.59	71	71	4	304	45.6	103.7
8	40.0	593.570	0.50	2.70	72	72	4	306	53.2	103.6
9	45.0	598.210	0.52	2.80	72	72	6	307	58.3	103.7
10	50.0	602.990	0.55	2.96	73	73	6	304	62.5	103.6
11	55.0	607.890	0.58	3.13	74	74	6	302	66.1	103.1
12	60.0	612.780	0.58	3.13	75	75	6	301	69.4	102.6
Traverse 2	0.0	612.780								
1	5.0	617.560	0.55	2.96	75	75	6	302	1.5	103.0
2	10.0	622.200	0.52	2.80	76	76	6	302	4.7	102.6
3	15.0	626.980	0.55	2.96	76	76	6	303	8.4	102.9
4	20.0	631.620	0.52	2.80	77	77	6	304	12.5	102.6
5	25.0	636.170	0.50	2.70	77	77	6	303	17.7	102.5
6	30.0	640.630	0.48	2.59	78	78	6	302	25.2	102.2
7	35.0	644.710	0.40	2.16	78	78	6	302	45.6	102.3
8	40.0	648.630	0.37	1.99	79	79	6	302	53.2	102.0
9	45.0	652.270	0.32	1.72	79	79	6	304	58.3	101.9
10	50.0	655.800	0.30	1.62	80	80	5	305	62.5	101.9
11	55.0	659.330	0.30	1.62	79	79	5	304	66.1	102.1
12	60.0	662.740	0.28	1.51	80	80	5	305	69.4	101.9
Average:			0.432	2.327	74.5	74.5	5.2	302.7		102.9

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	13:32-15:35

Concentrations:

Particulate	0.28	mg/dscm	0.00012	gr/dscf
	0.16	mg/Acm	0.00007	gr/Acf
	0.23	mg/dscm (@ 11% O2)	0.00010	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.019	Kg/hr	0.043	lb/hr

Flue Gas Characteristics:

Flow	1137	dscm/min	40139	dscf/min
	18.94	dscm/sec	669	dscf/sec
	2041	Acm/min	72083	Acf/min
Velocity	13.356	m/sec	43.82	f/sec
Temperature	153.9	oC	309.1	oF
Moisture	15.0	%		
Gas Analysis	8.8	% O2		
	10.0	% CO2		
	29.950	Mol. Wt (g/gmole) Dry		
	28.159	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6495	dscm	93.566	dscf
Sample Time	120.0	minutes		
Isokineticity	100.9	%		

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

Client:	Metro Vancouver	**Date:**	5-May-21
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	13:32-15:35

Control Unit (Y)	0.9925	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3110	Filter (grams)	0.00005		CO2	O2		Impinger 1	230.0
Pitot Factor	0.8494	Washings (grams)	0.00070	Traverse 1	10.00	9.00		Impinger 2	84.0
Baro. Press. (in. Hg)	29.95			Traverse 2	10.00	8.50		Impinger 3	14.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00075**		10.00	8.50		Impinger 4	5.0
Stack Height (ft)	30				10.00	9.00		Impinger 5	2.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	14.6
Minutes Per Reading	5.0				**10.00**	**8.75**		**Gain (grams)**	**350.6**
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	664.300								
1	5.0	668.760	0.48	2.56	77	77	9	308	1.5	101.1
2	10.0	673.310	0.50	2.67	77	77	9	308	4.7	101.0
3	15.0	677.860	0.50	2.66	77	77	10	309	8.4	101.1
4	20.0	682.470	0.51	2.72	78	78	10	308	12.5	101.2
5	25.0	686.980	0.49	2.26	78	78	10	308	17.7	100.9
6	30.0	691.400	0.47	2.51	78	78	10	308	25.2	101.0
7	35.0	695.160	0.34	1.81	78	78	7	309	45.6	100.9
8	40.0	698.970	0.35	1.86	78	78	7	310	53.2	100.9
9	45.0	702.670	0.33	1.76	78	78	7	310	58.3	100.9
10	50.0	705.690	0.22	1.17	78	78	7	309	62.5	100.6
11	55.0	708.570	0.20	1.07	78	78	6	310	66.1	100.7
12	60.0	711.380	0.19	1.01	78	78	6	309	69.4	100.7
Traverse 2	0.0	711.380								
1	5.0	714.990	0.31	1.65	78	78	7.5	310	1.5	101.5
2	10.0	718.440	0.29	1.54	78	78	7.5	310	4.7	100.3
3	15.0	721.850	0.28	1.49	78	78	7	310	8.4	100.8
4	20.0	725.140	0.26	1.39	79	79	7	309	12.5	100.7
5	25.0	728.500	0.27	1.44	79	79	7	309	17.7	100.9
6	30.0	731.790	0.26	1.39	79	79	7	309	25.2	100.7
7	35.0	736.360	0.50	2.67	79	79	13	309	45.6	101.2
8	40.0	741.060	0.53	2.83	79	79	13	309	53.2	101.1
9	45.0	745.850	0.55	2.94	79	79	14	309	58.3	101.2
10	50.0	750.640	0.55	2.94	79	79	14	310	62.5	101.2
11	55.0	755.250	0.51	2.72	79	79	13	310	66.1	101.1
12	60.0	759.822	0.50	2.68	79	79	13	308	69.4	101.2
Average:			0.391	2.073	78.3	78.3	9.2	309.1		100.9

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		4-May-21	4-May-21	4-May-21
Test Time		09:35 - 10:35	10:44 - 11:44	11:55 - 12:55
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^3)	145.1820	145.7757	146.3620
Final Reading	(m^3)	145.7668	146.3557	146.9416
Temp. Outlet	(Avg. oF)	68.1	76.3	77.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.61	0.60	0.60
HF	(mg)	0.003	0.003	0.011
Oxygen	(Vol. %)	10.3	10.3	10.1
HF	**(mg/Sm^3)**	**0.004**	**0.004**	**0.019**
HF	**(mg/Sm^3 @ 11% O2)**	**0.004**	**0.004**	**0.017**
Moisture	**(Vol. %)**	14.0	14.0	14.6

Tstd. (oF) 68 Pstd. (in. Hg) 29.92

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		7-May-21	7-May-21	7-May-21
Test Time		09:45 - 10:45	10:58 - 11:58	12:10 - 13:10
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.07	30.07	30.07
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m^3)	148.6532	149.2540	149.8653
Final Reading	(m^3)	149.2472	149.8570	150.4634
Temp. Outlet	(Avg. oF)	64.0	72.5	70.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.62317	0.62251	0.61978
HF	(mg)	0.011	0.011	0.011
Oxygen	(Vol. %)	9.3	8.6	8.6
HF	**(mg/Sm^3)**	**0.017**	**0.017**	**0.018**
HF	**(mg/Sm^3 @ 11% O2)**	**0.014**	**0.014**	**0.015**
Moisture (isokinetic)	**(Vol. %)**	14.1	14.1	13.8

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		5-May-21	5-May-21	5-May-21
Test Time		09:08 - 10:08	10:22 - 11:22	11:42 - 12:42
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.10	30.10	30.10
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m^3)	146.9500	147.5322	148.0640
Final Reading	(m^3)	147.5253	148.0563	148.6458
Temp. Outlet	(Avg. oF)	67.3	77.5	77.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.600	0.537	0.596
HF	(mg)	0.012	0.011	0.011
Oxygen	(Vol. %)	10.1	10.1	8.8
HF	**(mg/Sm^3)**	**0.019**	**0.020**	**0.019**
HF	**(mg/Sm^3 @ 11% O2)**	**0.018**	**0.018**	**0.015**
Moisture (isokinetic)	**(Vol. %)**	15.1	15.1	15.0

Tstd. (oF) 68 Pstd. (in. Hg) 29.92

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

Parameter: N_2O

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

Sample ID	Date	Time (hh:mm - hh:mm)	N_2O (ppm)	N_2O (mg/Sm^3)	N_2O (mg/Sm^3 @ 11% O_2)
Unit #1					
Run 1	4-May-21	09:35 - 10:35	5.66	10.36	10.26
Run 2	4-May-21	10:44 - 11:44	5.00	9.15	8.84
Run 3	4-May-21	11:55 - 12:55	5.00	9.15	8.97
Average					**9.35**
Unit #2					
Run 1	7-May-21	09:45 - 10:45	5.00	9.15	9.41
Run 2	7-May-21	10:58 - 11:58	5.00	9.15	9.79
Run 3	7-May-21	12:10 - 13:10	5.83	10.67	12.25
Average					**10.48**
Unit #3					
Run 1	5-May-21	09:08 - 10:08	5.00	9.15	8.75
Run 2	5-May-21	10:22 - 11:22	5.00	9.15	8.98
Run 3	5-May-21	11:34 - 12:34	5.00	9.15	10.35
Average					**9.36**

APPENDIX - D

FIELD DATA SHEETS

$\sqrt{6.39}$ 6.12 ΔH

CLIENT	MVRD	NOZZLE	G309
		DIAMETER, IN.	.390
		PROBE	7C
		Cp	.8494
SOURCE	Unit #1		
PARAMETER / RUN No	1 Metals/Partic	PORT LENGTH	
DATE	May.3/21	STATIC PRESSURE, IN. H2O	-19.50
OPERATOR:	CL	STACK DIAMETER	131.0"
CONTROL UNIT	JD 14	STACK HEIGHT	300'
Y	1.0006		
ΔH@			
BAROMETRIC PRESSURE, IN. Hg	30.14	INITIAL LEAK TEST	0.002 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.002 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	140	140
Imp. #2	100	216	116
Imp. #3	100	142	42
Imp. #4	0	8	8
Imp. #5	100	104	4
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			14.8

5min Point	Clock Time	Dry Gas Meter ft^3	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %		
	10:58	673.700												
1		677.32	.32	1.96	68	309	250	250	65	6				
2		681.36	.40	2.45	69	310					10.0	10.0		
3		685.40	.40	2.45	69	313	250	250	66	7				
4		689.55	.42	2.57	69	314								
5		693.59	.40	2.45	70	315	250	250	64	8				
6		697.64	.40	2.45	70	316					10.0	10.0		
7		702.72	.63	3.86	71	314	250	250	66	12				
8		707.70	.61	3.73	71	313								
9		712.22	.50	3.06	71	310	250	250	68	10				
10		716.37	.42	2.57	72	307								
11		720.31	.38	2.33	73	305	250	250	66	8	10.0	10.0		
12		724.14	.36	2.20	73	300								
1		728.18	.40	2.45	74	309	250	250	62	8				
2		732.47	.45	2.75	75	310								
3		737.08	.52	3.18	75	314	250	250	60	8				
4		741.46	.47	2.88	76	315					10.0	10.0		
5		746.07	.52	3.18	76	315	250	250	58	8				
6		750.50	.48	2.94	77	315								
7		755.11	.52	3.18	77	313	250	250	56	9				
8		759.63	.50	3.06	78	313								
9		764.24	.52	3.18	78	312	250	250	55	10				
10		768.43	.43	2.63	77	312					10.0	10.0		
11		772.47	.40	2.45	77	312	250	250	54	10				
12	13:00	776.52	.40	2.45	78	312								

102.82

A. Lanfranco and Associates Inc.

$\sqrt{6.39}$ 6.12ΔH

CLIENT	MVRD	NOZZLE G 3.09 DIAMETER, IN. .3090	
SOURCE	Unit #1	PROBE FC Cp .8494	
PARAMETER / RUN No	2 Metals / Particle	PORT LENGTH	
DATE	May. 4 / 21	STATIC PRESSURE, IN. H2O −19.00	
OPERATOR:	C.L	STACK DIAMETER 13.9"	
CONTROL UNIT	JU 14 Y 1.0006 ΔH@	STACK HEIGHT 300	
BAROMETRIC PRESSURE, IN. Hg	30.15	INITIAL LEAK TEST 0.002 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.002 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	192	192
Imp. #2	100	202	102
Imp. #3	100	134	34
Imp. #4	0	10	10
Imp. #5	100	105	5
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	08:53	776.950												
1		780.15	.25	1.53	62	296	250	250	58	4				
2		783.53	.28	1.71	63	300					10.0	10.0		
3		787.14	.32	1.96	63	297	250	250	60	4				
4		790.75	.32	1.96	64	295								
5		794.37	.32	1.96	64	293	250	250	56	4				
6		798.20	.36	2.20	65	298								
7		803.47	.68	4.16	66	299	250	250	56	8				
8	Swing in process*	808.82	.70	4.28	68	303					9.0	11.0		
9	*	814.24	.72	4.41	70	304	250	250	58	10				
10		819.59	.70	4.28	71	308								
11		824.30	.52	3.18	71	309	250	250	60	6				
12		828.24	.40	2.45	72	303								
1		831.86	.32	1.96	72	302	250	250	56	6	10.0	10.0		
2		835.90	.40	2.45	73	301								
3		839.84	.38	2.32	73	302	250	250	54	6				
4		843.88	.40	2.45	73	302								
5		848.219	.52	3.18	74	302	250	250	52	6				
6		853.10	.52	3.18	74	306					10.0	10.0		
7		857.14	.40	2.45	74	308	250	250	50	6				
8		861.29	.42	2.57	74	307								
9		865.82	.50	3.06	74	307	250	250	55	7				
10		870.43	.52	3.18	74	308								
11		875.17	.55	3.37	75	308	250	250	55	7	10.0	10.0		
12	10:55	879.55	.47	2.88	76	307								

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$\sqrt{.639}$ 6.12ΔH

CLIENT MVRD	NOZZLE G309 DIAMETER, IN. .390	IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
SOURCE Unit #1	PROBE FC Cp .8494	Imp. #1	0	186	186
PARAMETER / RUN No 3 Metals/Plastic	PORT LENGTH	Imp. #2	100	198	98
DATE May. 4/21	STATIC PRESSURE, IN. H2O -19.00	Imp. #3	100	130	30
OPERATOR: CL	STACK DIAMETER 131.0"	Imp. #4	0	12	12
CONTROL UNIT JU14 Y 1.0006 ΔH@	STACK HEIGHT 300'	Imp. #5	100	106	6
BAROMETRIC PRESSURE, IN. Hg 30.15	INITIAL LEAK TEST 0.002 @ 15"	Imp. #6	100	103	3
ASSUMED MOISTURE, Bw 15%	FINAL LEAK TEST 0.002 @ 15"	Upstream Diameters			
		Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	11:18	880.050												
1		883.94	.37	2.26	72	293	250	250	62	5				
2		887.98	.40	2.45	73	298								
3		892.02	.40	2.45	73	303	250	250	62	5	10.0	10.0		
4		896.07	.40	2.45	73	302								
5		900.84	.42	2.57	73	302	250	250	64	6				
6		904.88	.40	2.45	74	302								
7		909.02	.42	2.57	73	303	250	250	64	6	9.5	10.5		
8		913.45	.48	2.94	72	303								
9		917.97	.50	3.06	73	304	250	250	65	6				
10		922.58	.52	3.18	73	305								
11		927.10	.50	3.06	73	305	250	250	66	6	10.0	10.0		
12		931.49	.47	2.88	74	306								
1		935.53	.40	2.45	74	303	250	250	64	6				
2		939.67	.42	2.57	75	304								
3		943.72	.40	2.45	75	306	250	250	62	6				
4		947.86	.42	2.57	76	308								
5		952.00	.42	2.57	75	308	250	250	60	6	10.0	10.0		
6		956.04	.40	2.45	76	309								
7		961.07	.62	3.79	76	310	250	250	58	8				
8		966.19	.64	3.92	77	311								
9		971.14	.60	3.67	76	310	250	250	56	7	10.0	10.0		
10	13:10	976.01	.58	3.56	77	309								
11							250	250	54	7				
12		End of Test												

* four trapped *

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S.H.

CLIENT MV WTE	NOZZLE G-3072 DIAMETER, IN. 0.3073	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT 2	PROBE TOT GURD Cp 0.8490	Imp. #1	0 / 162 / 162
PARAMETER / RUN NO. METALS/PM2.5 + Hg Run-1	PORT LENGTH	Imp. #2	100 / 158 / 58
DATE MAY 7, 2024	STATIC PRESSURE, IN. H2O −18.0	Imp. #3	100 / 128 / 28
OPERATOR: SF	STACK DIAMETER	Imp. #4	0 / 8 / 8
CONTROL UNIT 5099 Y 1.0101	STACK HEIGHT	Imp. #5	100 / 104 / 4
ΔH@ 1.812		Imp. #6	600 / 602 / 2
BAROMETRIC PRESSURE, IN. Hg 30.07	INITIAL LEAK TEST 0.002 @ 15" Hg	Upstream Diameters	
ASSUMED MOISTURE, Bw 17%	FINAL LEAK TEST 0.002 @ 18" Hg	Downstream Diameters	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	0930	166.600												
1		172.89	.50	2.52	67	301	252	248	56	8.5	9	11		
2	10	177.27	.52	2.68	68	305								
3		181.47	.48	2.41	68	306				8	9			
4	20	185.89	.53	2.66	69	308	251	251	59					
5		190.27	.52	2.61	70	309				8.5				
6	30	194.61	.51	2.56	70	310								
7		198.16	.34	1.71	71	308	251	255	55	6				
8	40	201.55	.31	1.56	72	309					10	9		
9		205.01	.32	1.62	73	309				6				
10	50	207.95	.23	1.17	73	302	251	252	54					
11		211.08	.26	1.32	74	306				5				
12	60	214.08	.24	1.22	74	307								
1		217.45	.30	1.53	74	303	251	249	52	7	10.5	8.5		
2	10	220.86	.31	1.57	74	310								
3		224.15	.29	1.47	74	310				6.5				
4	20	227.27	.26	1.32	74	309	251	252	49					
5		230.67	.31	1.56	73	310				6.5				
6	30	234.28	.35	1.77	73	310								
7		238.80	.55	2.77	73	311	252	254	49	9.5				
8	40	243.71	.65	3.27	72	311					10	10		
9		248.27	.56	2.82	72	310				11				
10	50	253.12	.63	3.18	73	310	251	252	51					
11		257.97	.63	3.19	73	308								
12	60	262.860	.64	3.24	73	307								
END	11:32													

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SH

CLIENT MV WTP	NOZZLE G-3072 DIAMETER, IN. 0.3073	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT #2	PROBE 7FT GUARD Cp 0.8498	Imp. #1	100 / 196 / 196
PARAMETER / RUN No PARTIC/METALS+Hg RUN #2		Imp. #2	100 / 174 / 74
DATE MAY 7, 2021	PORT LENGTH	Imp. #3	100 / 108 / 8
OPERATOR: SE	STATIC PRESSURE, IN. H2O -18.0	Imp. #4	100 / 104 / 4
CONTROL UNIT 5099 Y 1.0101	STACK DIAMETER	Imp. #5	100 / 102 / 2
ΔH@ 1.812	STACK HEIGHT	Imp. #6	100 / 101 / 1
BAROMETRIC PRESSURE, IN. Hg 30.07	INITIAL LEAK TEST 0.002 @ 15 in Hg	Upstream Diameters	
ASSUMED MOISTURE, Bw 17%	FINAL LEAK TEST 0 @ 15 in Hg	Downstream Diameters	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	11:51	263.300												
1		266.61	.30	1.50	67	310	250	246	54	6	10	10		
2	10	269.85	.29	1.44	67	314								
3		273.98	.27	1.34	67	313				5.5				
4	20	275.99	.25	1.24	67	313	252	253	54					
5		279.24	.29	1.44	68	313				6				
6	30	282.65	.32	1.59	68	313								
7		287.21	.57	2.84	68	313	251	251	52	10				
8	40	291.93	.61	3.04	69	314					10.5	9		
9		296.82	.65	3.25	71	314				11				
10	50	301.56	.61	3.05	71	313	252	251	53					
11		306.30	.61	3.06	71	312				10.5				
12	60	310.93	.58	2.92	71	310								
1		314.97	.44	2.21	72	311	250	250	52	7.5	10.5	9		
2	10	318.96	.43	2.15	72	314								
3		323.09	.46	2.31	73	313				8				
4	20	327.09	.43	2.17	74	313	250	251	51					
5		331.00	.41	2.07	74	312				7				
6	30	334.81	.39	1.96	74	314								
7		338.04	.28	1.41	74	314	252	253	52	6.5	10	9		
8	40	341.09	.25	1.26	74	313								
9		343.89	.21	1.06	74	314				6				
10	50	346.75	.22	1.11	74	312	251	250	52					
11		349.49	.20	1.01	74	310				6				
12	60	352.150	.19	0.96	74	311								
End	13:53													

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SA

CLIENT MVLME	NOZZLE G-3072 DIAMETER, IN. 0.3073	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT #2	PROBE TFE GUARD Cp 0.8490	Imp. #1	0 / 187 / 187
PARAMETER / RUN No METHANE/PROPANE+Hg RUN #3	PORT LENGTH	Imp. #2	100 / 178 / 78
DATE MAY 7 2021	STATIC PRESSURE, IN. H2O -18.0	Imp. #3	100 / 126 / 26
OPERATOR	STACK DIAMETER	Imp. #4	0 / F / F
CONTROL UNIT 5809 Y 1.0101	STACK HEIGHT	Imp. #5	100 / 103 / 3
ΔH@ 1.812		Imp. #6	100 / 102 / 2
BAROMETRIC PRESSURE, IN. Hg 30.07	INITIAL LEAK TEST 0.002 @ 15" Hg	Upstream Diameters	
ASSUMED MOISTURE, Bw 14%	FINAL LEAK TEST 0.002 @ 15" Hg	Downstream Diameters	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
1		359.412		2.54	71	303	254	253	58	8.5	11	8.5		
2	10	363.64	.48	2.42	71	307								
3		368.06	.53	2.66	71	312				10				
4	20	372.35	.50	2.50	71	314	260	245	58					
5		376.68	.51	2.55	71	314				10				
6	30	380.93	.49	2.45	71	314								
7		384.57	.36	1.80	71	314	261	250	57	7.5				
8	40	387.54	.24	1.20	71	313					11	8.5		
9		390.45	.23	1.15	71	313				5.5				
10	50	393.30	.22	1.11	71	309	260	245	56					
11		396.28	.24	1.21	71	309				6				
12	60	399.07	.21	1.06	71	308								
1		402.41	.30	1.52	72	307	250	252	58	7	10.5	8.5		
2	10	405.70	.29	1.47	72	307								
3		408.94	.28	1.42	73	307				6.5				
4	20	412.06	.26	1.32	73	308	251	252	56					
5		415.36	.29	1.47	74	307				7				
6	30	418.83	.32	1.63	75	307								
7		423.35	.54	2.76	76	307	251	246	56	9.5				
8	40	427.96	.56	2.86	77	307					10.5	9		
9		432.54	.55	2.89	78	306				10				
10	50	437.10	.54	2.76	79	302	252	248	58					
11		441.54	.51	2.64	79	300				9.5				
12	60	445.902	.49	2.54	80	300								
End	16:14													

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√6.44 5.39 ΔH

CLIENT	MVRD	NOZZLE	G309 DIAMETER, IN. .3090
SOURCE	Unit #3	PROBE	7C Cp .8494
PARAMETER / RUN No	1 Metals / Partic	PORT LENGTH	
DATE	May 5/21	STATIC PRESSURE, IN. H2O	-19.00
OPERATOR:	CL	STACK DIAMETER	131.0"
CONTROL UNIT	A21 Y .9925	STACK HEIGHT	300'
ΔH@			
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST	0.002 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.002 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	168	168
Imp. #2	100	216	116
Imp. #3	100	142	42
Imp. #4	0	10	10
Imp. #5	100	105	5
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O +.1	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %		
	08:48	464.588												
1		469.14	.50	2.70	55	309	250	250	55	8				
2		473.79	.52	2.80	56	310					9.5	10.5		
3		478.43	.52	2.80	56	310	250	250	56	8				
4		482.88	.48	2.59	56	308								
5		487.21	.45	2.43	57	307	250	250	58	8				
6		491.39	.42	2.26	58	307								
7		495.04	.32	1.72	59	304	250	250	58	8	9.5	10.5		
8		498.57	.30	1.62	60	303								
9		501.98	.28	1.51	61	303	250	250	60	8				
10		505.39	.28	1.51	62	304								
11		508.67	.26	1.40	62	303	250	250	58	8				
12		511.95	.26	1.40	63	302								
1		515.66	.33	1.78	63	303	250	250	54	8	9.5	10.5		
2		519.47	.35	1.89	64	304								
3		523.44	.38	2.05	64	304	250	250	55	8				
4		527.08	.32	1.72	65	304								
5		530.72	.32	1.72	66	305	250	250	55	8				
6		534.53	.35	1.89	67	305					10.0	10.0		
7		539.08	.50	2.70	68	305	250	250	56	8				
8		543.54	.48	2.59	68	304								
9		548.00	.48	2.59	69	304	250	250	57	8				
10		552.55	.50	2.70	70	305								
11		556.87	.45	2.43	70	304	250	250	58	8	10.0	10.0		
12	10:50	561.04	.42	2.26	71	303								

√6.44 5.39ΔH

CLIENT	MNRD	NOZZLE	G309
SOURCE	Unit #3	DIAMETER, IN.	.3090
PARAMETER / RUN No	2 Metals/Partic	PROBE	7C
DATE	May 5/21	Cp	.8494
OPERATOR:	C.L	PORT LENGTH	
CONTROL UNIT	A4	STATIC PRESSURE, IN. H2O	-19.00
Y	.9925	STACK DIAMETER	131.0"
ΔH@		STACK HEIGHT	300'
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST	0.002 @15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.002 @15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	252	252
Imp. #2	100	186	86
Imp. #3	100	118	18
Imp. #4	0	6	6
Imp. #5	100	102	2
Imp. #6	100	101	1

Upstream Diameters

Downstream Diameters

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	11:05	561.950										
1		565.76	.35	1.89	68	294	250	250	66	4		
2		569.67	.37	1.99	69	296	250	250				
3		573.48	.35	1.89	69	303			68	4	10.0	10.0
4		577.29	.35	1.89	70	302	250	250				
5		580.92	.32	1.72	70	303			66	4		
6		584.56	.32	1.72	71	304	250	250				
7		589.02	.48	2.59	71	304			60	4		
8		593.57	.50	2.70	72	306	250	250				
9		598.21	.52	2.80	72	307			54	6	10.0	10.0
10		602.99	.55	2.96	73	304	250	250				
11		607.89	.58	3.13	74	302			52	6		
12		612.78	.58	3.13	75	301	250	250				
									53	6		
1		617.56	.55	2.96	75	302	250	250				
2		622.28	.52	2.80	76	302			52	6		
3		626.98	.55	2.96	76	303	250	250			10.0	10.0
4		631.62	.52	2.80	77	304			52	6		
5		636.17	.50	2.70	77	303	250	250				
6		640.63	.48	2.59	78	302			50	6		
7		644.71	.40	2.16	78	302	250	250				
8		648.63	.37	1.99	79	302			52	6	10.0	10.0
9		652.27	.32	1.72	79	304	250	250				
10		655.80	.30	1.62	80	305			52	5		
11		659.33	.30	1.62	79	304	250	250				
12	13:07	662.74	.28	1.51	80	305			54	5	9.5	10.5

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CLIENT MWWE	NOZZLE G-311 DIAMETER, IN. 0.3110	IMPINGER	INITIAL / FINAL / TOTAL GAIN
SOURCE UNIT #3	PROBE 9C Cp 0.8494	VOLUMES	(mL) / (mL) / (mL)
PARAMETER / RUN No METALS/PARTIC RUN #3	PORT LENGTH	Imp. #1	100 / 230 / 230
DATE MAY 5, 2021	STATIC PRESSURE, IN. H2O -19.0	Imp. #2	100 / 184 / 84
OPERATOR: SF	STACK DIAMETER	Imp. #3	0 / 114 / 14
CONTROL UNIT CAE AL 1 Y 0.9925	STACK HEIGHT	Imp. #4	100 / 5 / 5
ΔH@ 1.905		Imp. #5	100 / 102 / 2
BAROMETRIC PRESSURE, IN. Hg 29.95	INITIAL LEAK TEST 0.003 @15"Hg	Imp. #6	601 / 101 / 1
ASSUMED MOISTURE, Bw 19%	FINAL LEAK TEST @15"Hg	Upstream Diameters	
		Downstream Diameters	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	13:32	664.300												
1		668.76	.48	2.56	77	308	262	262	53	9	10	9		
2	10	673.31	.50	2.67	77	308								
3		677.86	.50	2.66	77	309				10				
4	20	682.47	.51	2.72	78	308	249	259	54					
5		686.98	.44	2.62	78	308				10				
6	30	691.40	.47	2.51	78	308								
7		695.16	.34	1.81	78	309	249	252	54	7	10	8.5		
8	40	698.97	.25	1.86	78	310								
9		702.67	.33	1.76	78	310				7				
10	50	705.69	.22	1.17	78	309	251	262	55					
11		708.57	.20	1.07	78	310				6				
12	60	711.38	.19	1.01	78	309								
1		714.97	.31	1.65	78	310	252	257	55	7.5	10	8.5		
2	10	718.44	.29	1.54	78	310								
3		721.85	.28	1.49	78	310				7				
4	20	725.14	.26	1.39	79	309	250	263	56					
5		728.50	.27	1.44	79	309				7				
6	30	731.79	.26	1.39	79	309								
7		736.36	.50	2.67	79	309	251	256	55	13	10	9		
8	40	741.06	.53	2.83	79	309								
9		745.85	.55	2.94	79	309				14				
10	50	750.64	.55	2.94	79	309	250	260	55					
11		755.35	.51	2.72	79	310				13				
12	60	759.822	.50	2.68	79	308								
end	15:35													

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SH.

Client	MV WTE	Y	LMV-B 1.0347		
Source	Unit 1	Cp			
Parameter	HF	Pbar	30.17	Static	-19
Date	MAY 4, 2021	Operator	Connor Laan		

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) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	0935	145.1820	57.3					
	0945	145.2870						
	1005	145.4910	69.0					
	1035	145.7668	78.0					
2	1044	145.7757	73.5					
	11:44	146.3557	79					
3	11:55	146.3620	74					
	12:55	146.9416	80					

Client	MV WTE	Y	LMV B 1.0347		
Source	Unit 3	Cp			
Parameter	HF	Pbar	30.1	Static	-19
Date	May 5/2021	Operator	Connor Laan		

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) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	0908	146.9500	57					
	0928	147.1290						
	1006	147.5253	77.5					
2	1022	147.5322	73					
	1122	148.0563	82					
3	1134	148.0640	75					
	1234	148.6458	79					

S-A

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Client	MV WTE	Y	LMV-B 1.0347	Client		Y	
Source	Unit 2	Cp		Source		Cp	
Parameter	HF	Pbar	30.07 Static	Parameter		Pbar	Static
Date	May 7/21	Operator	Connor Laan	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) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	09:45	148.6532	58					
	10:45	149.2472	70					
2	10:58	149.2540	69					
	11:58	149.8570	76					
3	12:10	149.8653	69					
	1310	150.4634	77					

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1								
2								
3								

A. Lanfranco & Associates Inc.

Client: Metro Vancouver
Jobsite: WTE (Burnaby,B.C)
Parameter: N_2O

Operator: Conner Laan

Unit #1
Barometric Pressure: 30.17

Sample ID	Date	Time (hh:mm - hh:mm)	N_2O (ppm)					
Run 1	May 4/21	09:35-10:35	0.0	0	0	4	6	0
Run 2	May 4/21	10:44-11:44	0	0	0	0	0	0
Run 3	May 4/21	11:55-12:55	0	0	0	0	0	0

Unit #2
Barometric Pressure: 30.07

Sample ID	Date	Time (hh:mm - hh:mm)	N_2O (ppm)					
Run 1	May 7/21	9:45-10:45	0	0	0	0	0	0
Run 2	May 7/21	10:58-11:58	0	0	0	0	0	0
Run 3	May 7/21	12:10-13:10	0	0	0	0	0	5

Unit #3
Barometric Pressure: 30.10

Sample ID	Date	Time (hh:mm - hh:mm)	N_2O (ppm)					
Run 1	May 5/21	9:08-10:08	0	0	0	0	0	0
Run 2	May 5/21	10:22-11:22	0	0	0	0	0	0
Run 3	May 5/21	11:34-12:34	0	0	0	0	0	0

APPENDIX – E

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: 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)^3*(deg R)^0.5/((in.Hg)*(min)).
!!!!!!!!!

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
					Initial Temps.		Final Temps.					-- Ambient Temperature --		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	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 ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
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)	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)	Results 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 H20 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: 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 #: JU 14
Serial #: 0028-030615-1

Date: 05-Jan-21
Barometric Pressure: 29.88 (in. Hg)
Theoretical Critical Vacuum: 14.09 (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	-- Ambient Temperature --		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
4.15	32.00	987.300	1021.299	33.999	70.0	70.0	74.0	74.0	73	0.8185	16.0	69.0	78.0	73.5
2.15	21.00	21.600	37.757	16.157	75.0	75.0	76.0	76.0	63	0.5956	17.0	80.0	80.0	80.0
1.30	21.00	38.600	51.239	12.639	76.0	76.0	77.0	77.0	55	0.4606	18.5	82.0	82.0	82.0
0.76	21.00	51.600	61.225	9.625	76.0	76.0	76.0	76.0	48	0.3560	19.5	84.0	84.0	84.0
0.36	15.00	61.500	66.239	4.739	76.0	76.0	78.0	78.0	40	0.2408	21.0	84.0	82.0	83.0

********** RESULTS **********

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
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)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
34.029	963.7	33.883	959.6	34.296	0.996	-0.005	2.064	52.42	0.012	0.669
15.987	452.8	16.083	455.5	16.477	1.006	0.005	2.030	51.57	-0.021	0.669
12.457	352.8	12.414	351.6	12.766	0.997	-0.004	2.057	52.24	0.005	0.672
9.483	268.5	9.577	271.2	9.885	1.010	0.009	2.022	51.36	-0.030	0.669
4.656	131.8	4.632	131.2	4.771	0.995	-0.006	2.086	52.97	0.034	0.669
				Average Y---------->	**1.0006**	**Average dH@----->**	**2.052**	**52.1**	**Average Ko---->**	**0.670**

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)	Results 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 H20 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: Scott Ferguson Signature:  Date: January 5, 2021

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 06-Jan-21
Barometric Pressure: 30.18 (in. Hg)
Theoretical Critical Vacuum: 14.24 (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
					Initial Temps.		Final Temps.					-- Ambient Temperature --		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.60	45.00	402.300	448.616	46.316	58.0	58.0	67.0	67.0	73	0.8185	16.5	75.0	81.0	78.0
1.90	19.00	450.400	464.811	14.411	67.0	67.0	70.0	70.0	63	0.5956	19.5	81.0	80.0	80.5
1.15	15.00	392.400	401.338	8.938	71.0	71.0	72.0	72.0	55	0.4606	21.5	71.0	75.0	73.0
0.66	16.00	465.100	472.274	7.174	70.0	70.0	71.0	71.0	48	0.3560	23.5	80.0	81.0	80.5
0.33	22.00	472.500	479.319	6.819	71.0	71.0	72.0	72.0	40	0.2408	24.5	78.0	85.0	81.5

********** RESULTS **********

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
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)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
47.605	1348.2	47.925	1357.2	48.431	1.0067	-0.003	1.820	46.22	0.008	0.712
14.584	413.0	14.690	416.0	14.914	1.0073	-0.003	1.802	45.76	-0.011	0.716
8.978	254.3	9.032	255.8	9.042	1.0060	-0.004	1.788	45.41	-0.024	0.721
7.211	204.2	7.394	209.4	7.507	1.0254	0.015	1.745	44.33	-0.067	0.716
6.836	193.6	6.871	194.6	6.988	1.0051	-0.005	1.907	48.44	0.095	0.699
				Average Y---------->	**1.0101**		**Average dH@----->**	**1.812**	**46.0**	**Average Ko----->**	**0.713**

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)	Results 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 H20 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: Scott Ferguson Signature: _____ Date: January 6, 2021

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)^3*(deg R)^0.5/((in.Hg)*(min)).
!!!!!!!!!

---------- DRY GAS METER READINGS ----------

dH (in H2O)	Time (min)	Volume Initial (m^3)	Volume Final (m^3)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
0.00	20.00	125.0520	125.3036	8.885	59.0	59.0	64.0	64.0
0.00	23.00	125.3050	125.5968	10.305	64.0	64.0	69.0	69.0
0.00	23.00	125.6000	125.8940	10.383	69.0	69.0	70.0	70.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
48	0.3560	20.0	57.0	63.0	60.0
48	0.3560	20.0	63.0	67.0	65.0
48	0.3560	20.0	67.0	69.0	68.0

********** RESULTS **********

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
9.067	256.8
10.416	295.0
10.435	295.5

--------- ORIFICE ---------

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
9.420	266.8	9.204
10.781	305.3	10.636
10.751	304.5	10.666

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)
1.039	0.004
1.035	0.000
1.030	-0.005

--------- ORIFICE ---------

CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)
0.000	0.00	0.000
0.000	0.00	0.000
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 H20 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

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

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^2)
A	0.1250	0.1240	0.1245	0.0010	0.1245	0.0000845
G-165	0.1640	0.1655	0.1660	0.0020	0.1652	0.0001488
G-178	0.1780	0.1780	0.1790	0.0010	0.1783	0.0001735
J	0.1880	0.1880	0.1880	0.0000	0.1880	0.0001928
E	0.1880	0.1895	0.1882	0.0015	0.1886	0.0001939
Q	0.2070	0.2050	0.2060	0.0020	0.2060	0.0002315
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
G-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

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Justin Ching

Date: 07-Jan-21

Signature: 

TEMPERATURE DEVICE CALIBRATIONS

Reference Device			Temperature Settings (degrees F)													
Model CL23A Calibrator			32		100		200		300		500		800		1700	
Device	**ALA #**	**Serial #**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**
Omega HH11A	3	300132	32.3	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 %																

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada (kPa)	Pbar Env Canada (inches of Hg)	Device (inches of Hg) Reading	Device (inches of Hg) Elevation Corrected	Difference (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

Calibration Certificate

Date: 19-Jan-21
Calibrated by: Scott Ferguson
Authorizing Signature:

Insrtument 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.

O_2	Initial Evaluation				After Calibration				
Gas	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero	0.3	0.30	Pass		0	0.00	Pass		0
O_2	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_2 (absolute diff)

CO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
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

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
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:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	O_2 (Vol. %)	CO (ppm)	NO (ppm)
Zero Gas (N_2)	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_2/CO_2	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:

Insrtument 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.

O_2	Initial Evaluation				After Calibration				
Gas	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O_2	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_2 (absolute diff)

CO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
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

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
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:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	O_2 (Vol. %)	CO (ppm)	NO (ppm)
Zero Gas (N_2)	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_2/CO_2	CC168470	27/Jul/2020	28/Jul/2028	1500	10.84	-	-

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

Calibration Certificate

Date: 10-May-21
Calibrated by: Scott Ferguson
Authorizing Signature: Daryl Sampson

Insrtument Calibrated: Viasensor G200
Serial #: IN12898
Customer: **ALA**

Ambient Conditions: Temperature:17 °C Barometric Pressure: 100.9 kPa Relative Humidity: 62%

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.

N_2O Gas	Initial Calibration		Final Calibration		Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Instrument Reading (ppm)	% Calibration Error	
Zero	5.0	5.0	0	0.00	0
1 Gas	90.5	1.8	92.0	0.22	92.20
2 Gas	39.2	4.6	41.0	0.24	41.1

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

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	N_2O (ppm)
Zero Gas (N_2)	340943	21/Jan/2020	21/Aug/2024	500	0
1 Gas	FF58284	31/Oct/2020	30/Oct/2023	1900	92.2
2 Gas	FF62315	31/Oct/2020	30/Oct/2023	1900	41.1

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

MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Carter Lanfranco

has successfully completed

Stack Sampling

May 2009

Date

Norma D. MacDonald

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

MOUNT ROYAL
UNIVERSITY
1910

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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

Declaration

I Carter Lanfranco, as a member of Air and Waste Management Association declare

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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

Signature:

X _____

Print name: Carter Lanfranco

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec. 16, 2020

[1]*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.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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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.

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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.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X Shawn Harrington

Print name: Shawn Harrington

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.16, 2020

[1]*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 (1st Party)

AND

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

As of NOV. 24 ,2020

#101 9488 189 St. - Surrey, B.C. Canada - V4N 4W7 - 604 881 2582 - email: mark.lanfranco@alanfranco.com

BRITISH COLUMBIA

Ministry of
Environment and
Climate Change Strategy

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[1], 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 MGoods

Print Name: Michael Goods

Date signed: 11/23/2020

[1] *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.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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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

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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 Shawn Harrington

Print Name: Shawn Harrington

Witnessed by:

x

Print Name: Mark Lanfranco

Date signed: November 26, 2020

[1] *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.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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1. Name of Qualified Professional Carter LanFranco

   Title Chief operations officer / owner

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:

   _____

   _____

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: Carter LanFranco

Witnessed by:

x Shawn Harrington

Print Name: Shawn Harrington

Date signed: Dec. 7/2020

[1] *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.*