A.Lanfranco & Associates Inc.
Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III 4730 Kingsway
Burnaby, BC V5H 0C6

WASTE TO ENERGY FACILITY

Appendices of Compliance Emissions Testing Report

February 2020 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 at Maxxam Analytics, Mississauga, Ont.
- 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**		
First Q 2020 Survey	**Unit 1**	**Unit 2**	**Unit 3**
Filter	-0.2 mg	-0.1 mg	-0.3 mg
Front Half Washings	-0.1 mg	-0.8 mg	-1.5 mg
Mercury Front	0.00 ug	0.00 ug	0.00 ug
Mercury Back	0.03 ug	0.04 ug	0.04 ug
Trace Metals Front *	<37.0 ug	<42.4 ug	<40.3 ug
Trace Metals Back*	<28.6 ug	<20.0 ug	<20.0 ug
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug

Sum of all reported elements except Hg*

APPENDIX - B

LABORATORY RESULTS

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
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E: info.vancouver@element.com
W: 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: Filter Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411877**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497065

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

Notes To Clients:

Element
#104, 19575-55 A Ave.
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W: 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: Filter Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411877**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497065

Reference Number	1411877-1	1411877-2	1411877-3
Sample Date	Feb 24, 2020	Feb 24, 2020	Feb 24, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 Container 1 (filter)	Reagent Blank Unit 2 Container 1 (filter)	Reagent Blank Unit 3 Container 1 (filter)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	6	<5	<5	5
Antimony		µg	<2	<2	4	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	0.57	0.49	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	2	3.5	2	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	<0.5	<0.5	<0.5	0.5
Phosphorus		µg	40	41	43	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	3.4	4.0	2.8	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	0.7	2	2	0.5
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Matthew Norman, BSc, PChem
Operations Chemist

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

Lot ID: **1411877**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497065

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

element
www.Element.com

Project Information

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

Invoice To

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

Report To

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

Additional Reports to

1) Name:
E-mail:
2) Name:
E-mail:

Sample Custody

Sampled by:
Company:
I authorize Element to proceed with the work indicated on this form:
Signature:
Date/Time:

- [ ] 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).

* Please report µg/sample

	Site I.D.	Sample Description	Depth start	Depth end	Date/Time sampled	Matrix	Sampling method	Number of Containers ↓	ICAP	Hg
			in cm	m					Enter tests above (✓ relevant samples below)	
1		Reagent Blank Unit 1 Container 1(filter)			24-Feb-20			1	✓	✓
2										
3		Reagent Blank Unit 2 Container 1 (filter)			24-Feb-20			1	✓	✓
4										
5		Reagent Blank Unit 3 Container 1 (filter)			24-Feb-20			1	✓	✓
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

Please indicate any potentially hazardous samples

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

Page _____ of _____ Control #

ED 120-005

Lot: 1411877 COC

Temp. received: 17.2 °C

Date/Time stamp: MAR 3 '20 14:00

Delivery Method: HD

Waybill:

Received by: LC

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

Lot ID: **1411873**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497060

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

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

Lot ID: **1411873**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497060

Reference Number	1411873-1	1411873-2	1411873-3
Sample Date	Feb 24, 2020	Feb 24, 2020	Feb 24, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	3	<2	3	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	0.57	<0.2	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	2	1	2	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	<0.5	<0.5	<0.5	0.5
Phosphorus		µg	4	5	4	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	2.6	3.6	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	0.8	<0.5	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	<5	6	5
Antimony		µg	3	<3	<3	2.5
Arsenic		µg	3.5	1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.56	0.38	0.50	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	<0.3	3.4	1	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	1	<0.3	<0.3	0.25
Nickel		µg	0.8	0.8	0.6	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	3	<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	215	215	
Volume	aliquot volume	mL	160	165	165	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	

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Analytical Report

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

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

Lot ID: **1411873**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497060

Reference Number	1411873-1	1411873-2	1411873-3
Sample Date	Feb 24, 2020	Feb 24, 2020	Feb 24, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	210	215	215	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	43	43	43	
Mercury	Fraction 2B	µg/sample	<0.09	<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	110	110	110	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.009	<0.009	<0.009	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	0.09	0.13	0.08	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.03	0.041	0.03	

Approved by:

Matthew Norman, BSc, PChem
Operations Chemist

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W: element.com

Methodology and Notes

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

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

Lot ID: **1411873**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497060

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	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	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		Reagent Blank Unit 1			24-Feb-20			5	✓	✓	✓	✓	✓	✓									
2																							
3		Reagent Blank Unit 2			24-Feb-20			5	✓	✓	✓	✓	✓	✓									
4																							
5		Reagent Blank Unit 3			24-Feb-20			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: 1411873 COC

Temp. received: 17.2 °C

Date/Time stamp: MAR 3 '20 18:58

Delivery Method: HD

Waybill:

Received by: LC

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: 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 Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411865**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497049

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

Notes To Clients:

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

Lot ID: **1411865**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497049

Reference Number	1411865-1	1411865-2	1411865-3
Sample Date	Feb 25, 2020	Feb 26, 2020	Feb 27, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (Beaker (MV Unit 1 Blank + 4 Bottles)	Field Blank Unit 2 (Beaker (MV Unit 2 Blank + 4 Bottles)	Field Blank Unit 3 (Beaker (MV Unit 3 Blank + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	7	7	8	5
Antimony		µg	4	<2	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	0.35	0.29	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	1	2.8	2	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	0.3	0.3	0.25
Nickel		µg	<0.5	<0.5	<0.5	0.5
Phosphorus		µg	30	35	32	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	4.0	3.1	3.3	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2	1	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	6	5	<5	5
Antimony		µg	<2	4	<2	2.5
Arsenic		µg	2	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	0.57	0.40	<0.2	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	1	0.3	<0.2	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	<0.2	0.3	<0.2	0.25
Nickel		µg	0.8	1	0.9	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	3.7	<2	2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<1.0	<0.9	<0.9	1
Zinc		µg	<0.5	<0.5	<0.5	0.5
Volume	Sample	mL	300	350	340	
Volume	aliquot volume	mL	250	300	290	
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: Field Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411865**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497049

Reference Number	1411865-1	1411865-2	1411865-3
Sample Date	Feb 25, 2020	Feb 26, 2020	Feb 27, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (Beaker (MV Unit 1 Blank + 4 Bottles)	Field Blank Unit 2 (Beaker (MV Unit 2 Blank + 4 Bottles)	Field Blank Unit 3 (Beaker (MV Unit 3 Blank + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	300	350	340	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.1	<0.1	<0.1	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	140	115	175	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.009	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	0.10	0.12	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	0.033	0.037	0.038	

Approved by:

Matthew Norman, BSc, PChem
Operations Chemist

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
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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1411865**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497049

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	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 (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		Field Blank Unit 1 ('MV Unit 1 Blank' + 4 Bottles)			25-Feb-20			5	✓	✓	✓	✓	✓	✓
2														
3		Field Blank Unit 2 ('MV Unit 2 Blank' + 4 Bottles)			26-Feb-20			5	✓	✓	✓	✓	✓	✓
4														
5		Field Blank Unit 3 ('MV Unit 3 Blank' + 4 Bottles)			27-Feb-20			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: 1411865 COC

Temp. received: 17.2 °C

Date/Time stamp: [illegible] 20 18:58

Delivery Method: HD

Waybill:

Received by: LC

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

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

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

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

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Reference Number	1411857-1	1411857-2	1411857-3
Sample Date	Feb 24, 2020	Feb 25, 2020	Feb 25, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 R-1 + 4 bottles)	Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)	Unit 1 Run 3 (MV Unit 1 R-3 + 4 bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	7	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	0.86	2.2	1.1	0.2
Cobalt		µg	<0.3	0.3	<0.3	0.25
Copper		µg	2	2	2	0.25
Lead		µg	<2	2	<2	1.5
Manganese		µg	0.8	1	0.8	0.25
Nickel		µg	<0.5	2	2	0.5
Phosphorus		µg	37	45	44	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	2	2
Thallium		µg	2.6	6.4	4.3	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2.7	5.8	2	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	20	28	10	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	1	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.8	2.90	0.41	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	2	2.4	0.5	0.25
Lead		µg	<1	7.2	<1	1.5
Manganese		µg	0.3	186	<0.2	0.25
Nickel		µg	0.8	2	0.7	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<1	2	<1	1.5
Tellurium		µg	4.1	4.2	2.7	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	8.2	6.4	<0.4	0.5
Volume	Sample	mL	775	835	795	
Volume	aliquot volume	mL	725	785	745	
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
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

	Reference Number	1411857-1	1411857-2	1411857-3	
	Sample Date	Feb 24, 2020	Feb 25, 2020	Feb 25, 2020	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Unit 1 Run 1 (MV Unit 1 R-1 + 4 bottles)	Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)	Unit 1 Run 3 (MV Unit 1 R-3 + 4 bottles)	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	0.52	0.26	0.25	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	775	835	795	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	3.2	1.7	1.6	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	185	190	195	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	0.06	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	0.06	
Mercury	As Tested	µg/L	0.41	0.14	0.14	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	0.13	0.044	0.046	

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

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Reference Number	1411857-4	1411857-5	1411857-6
Sample Date	Feb 25, 2020	Feb 26, 2020	Feb 26, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 bottles)	Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)	Unit 2 Run 3 (MV Unit 2 R-3 + 4 bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	8	9	8	5
Antimony		µg	<2	3	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.93	0.97	0.81	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	2	2	2.7	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	0.8	0.4	1	0.25
Nickel		µg	2	1	<0.5	0.5
Phosphorus		µg	31	34	36	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	3.6	3.1	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2.8	2	2.7	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	22	6	10	5
Antimony		µg	2	<2	3	2.5
Arsenic		µg	1	0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	0.68	0.56	0.63	0.2
Cobalt		µg	2	0.3	<0.2	0.25
Copper		µg	1	1	0.8	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	3.8	<0.2	0.4	0.25
Nickel		µg	1	1	0.5	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	2	<1	2	1.5
Tellurium		µg	<2	<2	3.3	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.8	<0.9	1
Zinc		µg	2	<0.4	6.4	0.5
Volume	Sample	mL	820	860	820	
Volume	aliquot volume	mL	770	810	770	
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
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Reference Number	1411857-4	1411857-5	1411857-6
Sample Date	Feb 25, 2020	Feb 26, 2020	Feb 26, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 bottles)	Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)	Unit 2 Run 3 (MV Unit 2 R-3 + 4 bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	0.29	0.65	0.58	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	820	860	820	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	1.9	4.5	3.8	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	215	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	600	750	750	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.05	<0.06	<0.06	
Mercury	As Tested	µg/L	0.21	0.24	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	0.066	0.078	0.035	

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

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Reference Number	1411857-7	1411857-8	1411857-9
Sample Date	Feb 26, 2020	Feb 27, 2020	Feb 27, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 R-1 + 4 bottles)	Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)	Unit 3 Run 3 (MV Unit 3 R-3 + 4 bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	6	8	8	5
Antimony		µg	<2	3	<2	2.5
Arsenic		µg	2	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.97	0.44	0.36	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	3.3	2.7	1	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	1	0.5	0.6	0.25
Nickel		µg	2	1	0.5	0.5
Phosphorus		µg	30	39	35	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	2.6	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2.9	2	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	10	10	9	5
Antimony		µg	<2	4	<2	2.5
Arsenic		µg	<0.9	<0.8	2	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.1	0.96	0.58	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	1	0.3	<0.2	0.25
Lead		µg	2	<1	<1	1.5
Manganese		µg	57.1	24.2	0.4	0.25
Nickel		µg	1	0.7	0.7	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	3.0	2.4	2	2
Thallium		µg	<1	<1	2	1.5
Vanadium		µg	<0.9	<0.8	<0.9	1
Zinc		µg	1.0	<0.4	<0.4	0.5
Volume	Sample	mL	830	870	750	
Volume	aliquot volume	mL	780	820	700	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

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F: +1 (604) 514-3323
E: info.vancouver@element.com
W: 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: Metals and Hg
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Reference Number	1411857-7	1411857-8	1411857-9
Sample Date	Feb 26, 2020	Feb 27, 2020	Feb 27, 2020
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 R-1 + 4 bottles)	Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)	Unit 3 Run 3 (MV Unit 3 R-3 + 4 bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	0.33	0.37	0.35	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	830	870	750	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	2.2	2.6	2.1	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	185	190	210	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<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	600	600	750	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.05	<0.05	<0.06	
Mercury	As Tested	µg/L	0.16	0.14	0.30	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	0.052	0.044	0.095	

Approved by:

Matthew Norman, BSc, PChem
Operations Chemist

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.
Surrey, British Columbia
V3S 8P8, Canada

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E: info.vancouver@element.com
W: element.com

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

Lot ID: **1411857**
Control Number:
Date Received: Mar 3, 2020
Date Reported: Mar 25, 2020
Report Number: 2497041

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 12, 2020	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 23, 2020	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Mar 5, 2020	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:	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:

- [ ] 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		Unit 1 Run 1 ('MV Unit 1 R-1' + 4 Bottles)			24-Feb-20			5	✓	✓	✓	✓	✓	✓	
2		Unit 1 Run 2 ('MV Unit 1 R-2' + 4 Bottles)			25-Feb-20			5	✓	✓	✓	✓	✓	✓	
3		Unit 1 Run 3 ('MV Unit 1 R-3' + 4 Bottles)			25-Feb-20			5	✓	✓	✓	✓	✓	✓	
4															
5		Unit 2 Run 1 ('MV Unit 2 R-1' + 4 Bottles)			25-Feb-20			5	✓	✓	✓	✓	✓	✓	
6		Unit 2 Run 2 ('MV Unit 2 R-2' + 4 Bottles)			26-Feb-20			5	✓	✓	✓	✓	✓	✓	
7		Unit 2 Run 3 ('MV Unit 2 R-3' + 4 Bottles)			26-Feb-20			5	✓	✓	✓	✓	✓	✓	
8															
9		Unit 3 Run 1 ('MV Unit 3 R-1' + 4 Bottles)			26-Feb-20			5	✓	✓	✓	✓	✓	✓	
10		Unit 3 Run 2 ('MV Unit 3 R-2' + 4 Bottles)			27-Feb-20			5	✓	✓	✓	✓	✓	✓	
11		Unit 3 Run 3 ('MV Unit 3 R-3' + 4 Bottles)			27-Feb-20			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: 1411857 COC

Temp. received: 17.2 °C

Date/Time stamp: MAR 3 '20 13:58

Delivery Method: HD

Waybill:

Received by:

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20A2564**	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	: +1 604 253 4188
Project	: Metro Vancouver WTE	Date Samples Received	: 28-Feb-2020 15:50
PO	: HF	Date Analysis Commenced	: 04-Mar-2020
C-O-C number	: ----	Issue Date	: 06-Mar-2020 16:31
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This 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 - Water Quality, 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
L	litres

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Analytical Results

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

					Client sample ID	**Unit 1 HF Blank**	**Unit 2 HF Blank**	**Unit 3 HF Blank**	**----**	**----**
					Client sampling date / time	25-Feb-2020	26-Feb-2020	27-Feb-2020	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA20A2564-001**	**VA20A2564-002**	**VA20A2564-003**	**--------**	**--------**
						Result	Result	Result	----	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<5.0	<5.0	<5.0	----	----
volume, impinger	----	EP248	0.001	L		0.240	0.290	0.300	----	----

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA20A2565**	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	: +1 604 253 4188
Project	: Metro Vancouver WTE	Date Samples Received	: 28-Feb-2020 15:50
PO	: HF	Date Analysis Commenced	: 04-Mar-2020
C-O-C number	: ----	Issue Date	: 06-Mar-2020 16:38
Sampler	: A. Lanfranco		
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 - Water Quality, 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
L	litres

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

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

Analytical Results

Sub-Matrix: **Impinger Solution** (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	25-Feb-2020	25-Feb-2020	25-Feb-2020	26-Feb-2020	26-Feb-2020
						VA20A2565-001	VA20A2565-002	VA20A2565-003	VA20A2565-004	VA20A2565-005
						Result	Result	Result	Result	Result
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<50.0 DLDS	<5.0	<25.0 DLDS	<50.0 DLDS	<50.0 DLDS
volume, impinger	----	EP248	0.001	L		0.325	0.295	0.285	0.340	0.335

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

Analytical Results

Sub-Matrix: **Impinger Solution** (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	26-Feb-2020	27-Feb-2020	27-Feb-2020	27-Feb-2020	----
						VA20A2565-006	VA20A2565-007	VA20A2565-008	VA20A2565-009	--------
						Result	Result	Result	Result	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<25.0 DLDS	<100 DLDS	<25.0 DLDS	<25.0 DLDS	----
volume, impinger	----	EP248	0.001	L		0.310	0.335	0.240	0.350	----

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

Your Project #: METROVAN WTE[C013267]
Site Location: BURNABY, B.C.
Your C.O.C. #: C013267-ONTV-01-01

Attention: Customer Solutions

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2020/03/11
Report #: R6105475
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C052656
Received: 2020/02/27, 08:57

Sample Matrix: Tedlar Bag
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrous Oxide (1)	9	N/A	2020/02/28	CAM SOP-00203	GC/ECD

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Date Analyzed is the date the analytical batch was created. Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard, where applicable.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: METROVAN WTE[C013267]
Site Location: BURNABY, B.C.
Your C.O.C. #: C013267-ONTV-01-01

Attention: Customer Solutions

Bureau Veritas Laboratories
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2020/03/11
Report #: R6105475
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C052656
Received: 2020/02/27, 08:57

Encryption Key

Cristina (Maria) Bacchus
Project Manager
11 Mar 2020 11:45:04

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Jade Browne, Project Manager Assistant - Air
Email: Jade.Browne@bvlabs.com
Phone# (905)817-5831

==========

This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C052656
Report Date: 2020/03/11

Bureau Veritas Laboratories
Client Project #: METROVAN WTE[C013267]
Site Location: BURNABY, B.C.

COMPRESSED GAS PARAMETERS (TEDLAR BAG)

BV Labs ID		MCQ377	MCQ377	MCQ378	MCQ379		
Sampling Date		2020/02/24	2020/02/24	2020/02/24	2020/02/24		
COC Number		C013267-ONTV-01-01	C013267-ONTV-01-01	C013267-ONTV-01-01	C013267-ONTV-01-01		
	UNITS	XL1664-UNIT1 RUN1	XL1664-UNIT1 RUN1 Lab-Dup	XL1665-UNIT1 RUN2	XL1666-UNIT1 RUN3	RDL	QC Batch
Gas							
Nitrous Oxide	ppmv	15	15	18	13	0.1	6628074

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		MCQ380	MCQ381	MCQ382	MCQ383		
Sampling Date		2020/02/24	2020/02/24	2020/02/24	2020/02/24		
COC Number		C013267-ONTV-01-01	C013267-ONTV-01-01	C013267-ONTV-01-01	C013267-ONTV-01-01		
	UNITS	XL1667-UNIT2 RUN1	XL1668-UNIT2 RUN2	XL1669-UNIT2 RUN3	XL1670-UNIT3 RUN1	RDL	QC Batch
Gas							
Nitrous Oxide	ppmv	3.1	0.6	16	1.1	0.1	6628074

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs ID		MCQ384	MCQ385		
Sampling Date		2020/02/24	2020/02/24		
COC Number		C013267-ONTV-01-01	C013267-ONTV-01-01		
	UNITS	XL1671-UNIT3 RUN2	XL1672-UNIT3 RUN3	RDL	QC Batch
Gas					
Nitrous Oxide	ppmv	13	0.6	0.1	6628074

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

TEST SUMMARY

BV Labs ID: MCQ377
Sample ID: XL1664-UNIT1 RUN1
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ377 Dup
Sample ID: XL1664-UNIT1 RUN1
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ378
Sample ID: XL1665-UNIT1 RUN2
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ379
Sample ID: XL1666-UNIT1 RUN3
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ380
Sample ID: XL1667-UNIT2 RUN1
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ381
Sample ID: XL1668-UNIT2 RUN2
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ382
Sample ID: XL1669-UNIT2 RUN3
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

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BV Labs Job #: C052656
Report Date: 2020/03/11

Bureau Veritas Laboratories
Client Project #: METROVAN WTE[C013267]
Site Location: BURNABY, B.C.

TEST SUMMARY

BV Labs ID: MCQ383
Sample ID: XL1670-UNIT3 RUN1
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ384
Sample ID: XL1671-UNIT3 RUN2
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

BV Labs ID: MCQ385
Sample ID: XL1672-UNIT3 RUN3
Matrix: Tedlar Bag

Collected: 2020/02/24
Shipped:
Received: 2020/02/27

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	6628074	N/A	2020/02/28	Anojan Sureshkumar

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GENERAL COMMENTS

The sample was analysed 4 days after the date of sampling. The recommended holding time is 2 days.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Method Blank		RPD	
QC Batch	Parameter	Date	Value	UNITS	Value (%)	QC Limits
6628074	Nitrous Oxide	2020/02/28	<0.1	ppmv	NC	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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BV Labs Job #: C052656
Report Date: 2020/03/11

Bureau Veritas Laboratories
Client Project #: METROVAN WTE[C013267]
Site Location: BURNABY, B.C.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Vasan Thiagarajah, Analyst, Compressed Gases

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Sent to: BV Labs Campobello
6740 Campobello Road
Mississauga, ON, L5N 2L8
Tel: (905) 817-5700

BV LABS INTERLAB CHAIN OF CUSTODY RECORD

COC # C013267-ONTV-01-01

REPORT INFORMATION	
Company:	Bureau Veritas Laboratories
Address:	4606 Canada Way, Burnaby, British Columbia, V5G 1K5
Contact Name:	Customer Solutions
Email:	customersolutionswest@bvlabs.com, customerservice@bvlabs.com
Phone:	
BV Labs Project #:	C013267
Client Invoice To:	A. LANFRANCO & ASSOCIATES INC. (1301)
Client Report To:	A. LANFRANCO & ASSOCIATES INC. (1301) Incl. on Report? Yes / No

ANALYSIS REQUESTED

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	N2O Gas CSA Z2196.1 09 Subcontract	ADDITIONAL SAMPLE INFORMATION
1	XL1664-UNIT 1 RUN 1	AIR	2020/02/24			1	X	(P:01)
2	XL1665-UNIT 1 RUN 2	AIR	2020/02/24			1	X	(P:01)
3	XL1666-UNIT 1 RUN 3	AIR	2020/02/24			1	X	(P:01)
4	XL1667-UNIT 2 RUN 1	AIR	2020/02/24			1	X	(P:01)
5	XL1668-UNIT 2 RUN 2	AIR	2020/02/24			1	X	(P:01)
6	XL1669-UNIT 2 RUN 3	AIR	2020/02/24			1	X	(P:01)
7	XL1670-UNIT 3 RUN 1	AIR	2020/02/24			1	X	(P:01)
8	XL1671-UNIT 3 RUN 2	AIR	2020/02/24			1	X	(P:01)
9	XL1672-UNIT 3 RUN 3	AIR	2020/02/24			1	X	(P:01)
10								

Job Bureau Label

27-Feb-20 08:57
Nazeema Rahaman
C052656
J_L AIR-001

SITE LOCATION:	REGULATORY CRITERIA	SPECIAL INSTRUCTIONS	REQUIRED EDDs	TURNAROUND TIME
BURNABY, B.C		Please inform BV Labs immediately if you are not accredited for the requested test(s). **Please return a copy of this form with the report.** DO NOT DISCARD, RETURN TO CLIENT	National Excel (N001)	☐ Rush Required 2020/03/10 Date Required *Please inform us if rush charges will be incurred*
SITE #:				
PROJECT #:				
METROVAN WTE				
PO/AFE, TASK ORDER/SERVICE ORDER, LINE ITEM:				

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present		✓	N/A
Custody Seal Intact		✓	
Cooling Media Present		✓	

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

RECEIVING LAB USE ONLY
BV Labs Job #

RELINQUISHED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	Samples Labelled By:	Labels Verified By:
1 Simon Ng	2020/02/25	1500	1	2020/02/27	08:57		
2			2				

APPENDIX - C

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	24-Feb-20
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:53 - 14:56

Concentrations:

Particulate	0.28	mg/dscm	0.00012	gr/dscf
	0.16	mg/Acm	0.00007	gr/Acf
	0.24	mg/dscm (@ 11% O2)	0.00011	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.019	Kg/hr	0.042	lb/hr

Flue Gas Characteristics:

Flow	1125	dscm/min	39713	dscf/min
	18.74	dscm/sec	662	dscf/sec
	1994	Acm/min	70416	Acf/min
Velocity	13.047	m/sec	42.81	f/sec
Temperature	152.8	oC	307.0	oF
Moisture	15.8	%		
Gas Analysis	9.4	% O2		
	11.1	% CO2		
	30.150	Mol. Wt (g/gmole) Dry		
	28.235	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6816	dscm	94.701	dscf
Sample Time	120.0	minutes		
Isokineticity	104.1	%		

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

Client:	Metro Vancouver	**Date:**	24-Feb-20
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:53 - 14:56

Control Unit (Y)	1.0118
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.50
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)	0.00005
Washings (grams)	0.00070
Total (grams)	**0.00075**

Gas Analysis (Vol. %):		
	CO2	O2
Traverse 1	11.17	9.37
Traverse 2	11.00	9.47
	11.08	**9.42**

Condensate Collection:	
Impinger 1	176.0
Impinger 2	124.0
Impinger 3	42.0
Impinger 4	12.0
Impinger 5	5.0
Impinger 6	2.0
Gel	15.4
Gain (grams)	**376.4**

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	448.000								
1	5.0	451.360	0.32	1.64	52	52	6	311	1.5	103.7
2	10.0	455.060	0.39	1.99	52	52	6	312	4.7	103.6
3	15.0	458.880	0.41	2.12	52	52	7.5	311	8.4	104.3
4	20.0	462.740	0.42	2.17	52	52	7.5	310	12.5	104.1
5	25.0	466.750	0.45	2.34	53	53	8	309	17.7	104.2
6	30.0	470.670	0.43	2.23	53	53	8	309	25.2	104.2
7	35.0	474.690	0.45	2.34	54	54	8	309	45.6	104.3
8	40.0	478.350	0.37	1.93	55	55	8	307	53.2	104.3
9	45.0	481.800	0.33	1.73	55	55	7	306	58.3	104.0
10	50.0	485.150	0.31	1.62	55	55	7	306	62.5	104.1
11	55.0	488.560	0.32	1.68	56	56	6.5	305	66.1	104.1
12	60.0	492.070	0.34	1.78	56	56	6.5	306	69.4	104.0
Traverse 2	0.0	492.070								
1	5.0	495.320	0.29	1.52	57	57	6.5	307	1.5	104.1
2	10.0	498.690	0.31	1.63	58	58	6.5	307	4.7	104.2
3	15.0	502.110	0.32	1.68	58	58	6.5	306	8.4	104.0
4	20.0	505.310	0.28	1.47	58	58	6.5	306	12.5	104.0
5	25.0	508.790	0.33	1.74	59	59	7	305	17.7	104.0
6	30.0	512.490	0.37	1.96	60	60	7	304	25.2	104.2
7	35.0	516.790	0.50	2.64	60	60	9.5	305	45.6	104.4
8	40.0	521.180	0.52	2.75	61	61	9.5	306	53.2	104.4
9	45.0	525.650	0.54	2.86	61	61	10.5	305	58.3	104.3
10	50.0	529.960	0.50	2.65	62	62	10.5	306	62.5	104.3
11	55.0	533.770	0.39	2.07	62	62	8.5	305	66.1	104.2
12	60.0	537.431	0.36	1.91	62	62	8.5	305	69.4	104.2
Average:			0.385	2.019	56.8	56.8	7.6	307.0		104.1

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:43 - 11:48

Concentrations:

Particulate	0.20	mg/dscm	0.00009	gr/dscf
	0.12	mg/Acm	0.00005	gr/Acf
	0.17	mg/dscm (@ 11% O2)	0.00008	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.014	Kg/hr	0.030	lb/hr

Flue Gas Characteristics:

Flow	1124	dscm/min	39709	dscf/min
	18.74	dscm/sec	662	dscf/sec
	1987	Acm/min	70177	Acf/min
Velocity	13.003	m/sec	42.66	f/sec
Temperature	149.7	oC	301.5	oF
Moisture	16.1	%		
Gas Analysis	9.3	% O2		
	11.2	% CO2		
	30.159	Mol. Wt (g/gmole) Dry		
	28.199	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6921	dscm	95.071	dscf
Sample Time	120.0	minutes		
Isokineticity	104.6	%		

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

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:43 - 11:48

Control Unit (Y)	1.0118
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.51
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)	0.00005
Washings (grams)	0.00050
Total (grams)	**0.00055**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.17	9.33
Traverse 2	11.17	9.27
	11.17	**9.30**

Condensate Collection:

Impinger 1	196.0
Impinger 2	132.0
Impinger 3	26.0
Impinger 4	10.0
Impinger 5	4.0
Impinger 6	2.0
Gel	18.1
Gain (grams)	**388.1**

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	539.900								
1	5.0	543.320	0.33	1.72	47	47	7	298	1.5	104.5
2	10.0	546.890	0.36	1.87	48	48	7	300	4.7	104.4
3	15.0	550.510	0.37	1.92	48	48	7	300	8.4	104.5
4	20.0	554.280	0.40	2.08	48	48	7	300	12.5	104.7
5	25.0	558.240	0.44	2.29	49	49	8.5	300	17.7	104.7
6	30.0	562.110	0.42	2.19	50	50	8.5	300	25.2	104.5
7	35.0	566.090	0.44	2.31	52	52	9	300	45.6	104.6
8	40.0	570.210	0.47	2.47	53	53	9	301	53.2	104.7
9	45.0	574.020	0.40	2.10	54	54	9	302	58.3	104.7
10	50.0	577.640	0.36	1.90	56	56	9	302	62.5	104.4
11	55.0	581.160	0.34	1.79	56	56	7.5	302	66.1	104.4
12	60.0	584.640	0.33	1.74	57	57	7.5	302	69.4	104.6
Traverse 2	0.0	584.640								
1	5.0	587.800	0.27	1.43	58	58	6.5	299	1.5	104.5
2	10.0	591.180	0.31	1.64	59	59	6.5	303	4.7	104.4
3	15.0	594.450	0.29	1.53	59	59	6.5	304	8.4	104.5
4	20.0	597.670	0.28	1.49	60	60	6.5	303	12.5	104.4
5	25.0	601.000	0.30	1.59	60	60	6.5	304	17.7	104.4
6	30.0	604.650	0.36	1.91	60	60	6.5	302	25.2	104.5
7	35.0	608.960	0.50	2.66	60	60	9.5	301	45.6	104.8
8	40.0	613.480	0.55	2.93	61	61	9.5	302	53.2	104.7
9	45.0	617.890	0.52	2.77	62	62	10.5	302	58.3	104.8
10	50.0	622.080	0.47	2.50	62	62	10.5	303	62.5	104.8
11	55.0	625.940	0.40	2.13	62	62	9	303	66.1	104.5
12	60.0	629.511	0.34	1.81	63	63	9	303	69.4	104.6
Average:			0.385	2.032	56.0	56.0	8.0	301.5		104.6

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:20 - 14:23

Concentrations:

Particulate	0.0	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	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1157	dscm/min	40848	dscf/min
	19.28	dscm/sec	681	dscf/sec
	2021	Acm/min	71389	Acf/min
Velocity	13.228	m/sec	43.40	f/sec
Temperature	150.9	oC	303.6	oF
Moisture	14.9	%		
Gas Analysis	9.2	% O2		
	11.3	% CO2		
	30.181	Mol. Wt (g/gmole) Dry		
	28.361	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7397	dscm	96.753	dscf
Sample Time	120.0	minutes		
Isokineticity	103.4	%		

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

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:20 - 14:23

Control Unit (Y)	1.0118
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.51
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)	0.00005
Washings (grams)	0.00005
Total (grams)	**0.00010**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.83	8.83
Traverse 2	10.83	9.53
	11.33	**9.18**

Condensate Collection:

Impinger 1	142.0
Impinger 2	136.0
Impinger 3	46.0
Impinger 4	14.0
Impinger 5	5.0
Impinger 6	2.0
Gel	16.1
Gain (grams)	**361.1**

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	630.100								
1	5.0	633.220	0.26	1.39	63	63	7	303	1.5	103.2
2	10.0	636.570	0.30	1.60	62	62	7	303	4.7	103.5
3	15.0	639.910	0.30	1.60	62	62	7	304	8.4	103.2
4	20.0	643.140	0.28	1.49	62	62	7	304	12.5	103.3
5	25.0	646.540	0.31	1.65	62	62	7	305	17.7	103.4
6	30.0	649.990	0.32	1.70	62	62	7	304	25.2	103.3
7	35.0	654.050	0.44	2.35	63	63	9.5	303	45.6	103.5
8	40.0	658.390	0.50	2.68	63	63	9.5	300	53.2	103.7
9	45.0	663.170	0.61	3.25	63	63	12.5	303	58.3	103.7
10	50.0	667.820	0.58	3.09	63	63	12.5	305	62.5	103.6
11	55.0	672.010	0.47	2.50	64	64	10	306	66.1	103.4
12	60.0	675.940	0.41	2.19	65	65	10	306	69.4	103.6
Traverse 2	0.0	675.940								
1	5.0	679.420	0.32	1.72	66	66	8.5	302	1.5	103.2
2	10.0	683.450	0.43	2.30	66	66	8.5	304	4.7	103.4
3	15.0	687.530	0.44	2.36	66	66	9.5	304	8.4	103.5
4	20.0	691.760	0.47	2.53	67	67	9.5	303	12.5	103.6
5	25.0	695.800	0.43	2.31	67	67	10	303	17.7	103.4
6	30.0	700.030	0.47	2.53	67	67	10	303	25.2	103.6
7	35.0	704.210	0.46	2.47	67	67	10	304	45.6	103.5
8	40.0	708.210	0.42	2.26	68	68	10	303	53.2	103.4
9	45.0	712.120	0.40	2.15	68	68	9.5	303	58.3	103.5
10	50.0	715.770	0.35	1.88	68	68	9.5	303	62.5	103.2
11	55.0	719.370	0.34	1.83	68	68	9	304	66.1	103.4
12	60.0	722.862	0.32	1.72	68	68	9	304	69.4	103.3
Average:			0.401	2.148	65.0	65.0	9.1	303.6		103.4

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		25-Feb-20	25-Feb-20	25-Feb-20
Test Time		10:45 - 11:45	12:27 - 13:27	13:38 - 14:38
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.51	30.51	30.51
DGM Factor	(Y)	0.9757	0.9757	0.9757
Initial Reading	(m^3)	381.644	382.346	383.021
Final Reading	(m^3)	382.330	383.000	383.668
Temp. Outlet	(Avg. oF)	57.0	62.0	53.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.70	0.66	0.66
HF	(mg)	0.026	0.003	0.013
Oxygen	(Vol. %)	9.3	9.3	9.2
HF	**(mg/Sm^3)**	**0.038**	**0.004**	**0.020**
HF	**(mg/Sm^3 @ 1**	**0.032**	**0.003**	**0.017**
Moisture	**(Vol. %)**	16.1	16.1	14.9

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

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:50 - 13:52

Concentrations:

Particulate	0.0	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	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1069	dscm/min	37741	dscf/min
	17.81	dscm/sec	629	dscf/sec
	1902	Acm/min	67162	Acf/min
Velocity	12.444	m/sec	40.83	f/sec
Temperature	152.2	oC	306.0	oF
Moisture	16.1	%		
Gas Analysis	9.3	% O2		
	10.2	% CO2		
	30.000	Mol. Wt (g/gmole) Dry		
	28.065	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5121	dscm	88.714	dscf
Sample Time	120.0	minutes		
Isokineticity	104.2	%		

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

Client:	Metro Vancouver	**Date:**	25-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:50 - 13:52

Control Unit (Y)	0.9905	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3073	Filter (grams)	0.00005		CO2	O2		Impinger 1	202.0
Pitot Factor	0.8517	Washings (grams)	0.00005	Traverse 1	10.00	9.50		Impinger 2	104.0
Baro. Press. (in. Hg)	30.52			Traverse 2	10.33	9.17		Impinger 3	30.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00010**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	14.5
Minutes Per Reading	5.0				**10.17**	**9.33**		**Gain (grams)**	**362.5**
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	957.862								
1	5.0	961.950	0.45	2.25	51	51	8	302	1.5	104.2
2	10.0	966.120	0.47	2.34	51	51	8	306	4.7	104.3
3	15.0	970.450	0.51	2.53	51	51	9	310	8.4	104.3
4	20.0	974.880	0.53	2.64	53	53	9	311	12.5	104.4
5	25.0	978.960	0.45	2.24	53	53	10	311	17.7	104.2
6	30.0	982.620	0.36	1.79	54	54	10	314	25.2	104.4
7	35.0	985.680	0.25	1.25	56	56	8	312	45.6	104.1
8	40.0	988.430	0.20	1.00	57	57	8	310	53.2	104.2
9	45.0	991.140	0.19	0.97	57	57	6	300	58.3	104.6
10	50.0	993.750	0.18	0.91	58	58	6	306	62.5	103.7
11	55.0	996.360	0.18	0.91	58	58	6	307	66.1	103.8
12	60.0	998.820	0.16	0.81	58	58	6	307	69.4	103.7
Traverse 2	0.0	998.820								
1	5.0	1001.680	0.21	1.08	60	60	5	298	1.5	104.3
2	10.0	1004.660	0.23	1.17	60	60	5	303	4.7	104.2
3	15.0	1007.440	0.20	1.02	61	61	5	306	8.4	104.2
4	20.0	1010.150	0.19	0.96	61	61	5	308	12.5	104.4
5	25.0	1013.060	0.22	1.12	62	62	5	308	17.7	104.0
6	30.0	1016.100	0.24	1.22	62	62	5	307	25.2	104.0
7	35.0	1020.280	0.45	2.30	63	63	6	308	45.6	104.5
8	40.0	1024.900	0.55	2.80	63	63	6	307	53.2	104.6
9	45.0	1029.950	0.65	3.34	64	64	8	302	58.3	104.7
10	50.0	1034.680	0.57	2.92	65	65	8	307	62.5	104.8
11	55.0	1039.290	0.54	2.79	65	65	10	298	66.1	104.3
12	60.0	1043.750	0.50	2.60	66	66	10	295	69.4	104.4
Average:			0.353	1.790	58.7	58.7	7.2	306.0		104.2

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:29 - 11:33

Concentrations:

Particulate	0.27	mg/dscm	0.00012	gr/dscf
	0.14	mg/Acm	0.00006	gr/Acf
	0.23	mg/dscm (@ 11% O2)	0.00010	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.017	Kg/hr	0.037	lb/hr

Flue Gas Characteristics:

Flow	1038	dscm/min	36641	dscf/min
	17.29	dscm/sec	611	dscf/sec
	1929	Acm/min	68134	Acf/min
Velocity	12.624	m/sec	41.42	f/sec
Temperature	160.3	oC	320.5	oF
Moisture	18.1	%		
Gas Analysis	9.6	% O2		
	10.9	% CO2		
	30.131	Mol. Wt (g/gmole) Dry		
	27.930	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.4320	dscm	85.886	dscf
Sample Time	120.0	minutes		
Isokineticity	106.6	%		

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

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:29 - 11:33

Control Unit (Y)	0.9905
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.46
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)	0.00005
Washings (grams)	0.00060
Total (grams)	**0.00065**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.17	9.33
Traverse 2	10.67	9.90
	10.92	**9.62**

Condensate Collection:

Impinger 1	222.0
Impinger 2	106.0
Impinger 3	42.0
Impinger 4	12.0
Impinger 5	4.0
Impinger 6	2.0
Gel	16.6
Gain (grams)	**404.6**

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	44.200								
1	5.0	48.390	0.48	2.37	51	51	8.5	320	1.5	106.8
2	10.0	52.730	0.51	2.53	54	54	8.5	321	4.7	106.8
3	15.0	56.600	0.40	2.00	58	58	8	321	8.4	106.6
4	20.0	60.520	0.41	2.06	58	58	8	320	12.5	106.6
5	25.0	64.330	0.38	1.92	62	62	7	320	17.7	106.7
6	30.0	67.890	0.33	1.68	64	64	7	319	25.2	106.5
7	35.0	70.810	0.22	1.12	66	66	5.5	318	45.6	106.3
8	40.0	73.540	0.19	0.97	68	68	5.5	320	53.2	106.7
9	45.0	76.600	0.24	1.23	68	68	5.5	319	58.3	106.4
10	50.0	79.460	0.21	1.08	67	67	5.5	317	62.5	106.3
11	55.0	82.500	0.24	1.22	64	64	5.5	318	66.1	106.4
12	60.0	85.450	0.23	1.16	60	60	5.5	318	69.4	106.3
Traverse 2	0.0	85.450								
1	5.0	88.880	0.31	1.56	61	61	6.5	320	1.5	106.5
2	10.0	92.260	0.30	1.51	61	61	6.5	320	4.7	106.6
3	15.0	95.530	0.28	1.41	62	62	6	321	8.4	106.6
4	20.0	98.490	0.23	1.16	62	62	6	321	12.5	106.4
5	25.0	101.520	0.24	1.21	63	63	5.5	322	17.7	106.5
6	30.0	104.960	0.31	1.57	63	63	5.5	322	25.2	106.5
7	35.0	109.800	0.61	3.09	65	65	10.5	323	45.6	106.9
8	40.0	114.740	0.63	3.20	66	66	10.5	321	53.2	107.0
9	45.0	119.680	0.63	3.21	67	67	10.5	322	58.3	106.9
10	50.0	124.460	0.59	3.00	67	67	10.5	322	62.5	106.8
11	55.0	127.990	0.32	1.63	68	68	10.5	323	66.1	106.6
12	60.0	131.634	0.34	1.73	68	68	10.5	323	69.4	106.8
Average:			0.360	1.818	63.0	63.0	7.5	320.5		106.6

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:05 - 14:07

Concentrations:

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

Emission Rates:

Particulate	0.01	Kg/hr	0.031	lb/hr

Flue Gas Characteristics:

Flow	1102	dscm/min	38930	dscf/min
	18.37	dscm/sec	649	dscf/sec
	1983	Acm/min	70046	Acf/min
Velocity	12.979	m/sec	42.58	f/sec
Temperature	160.4	oC	320.7	oF
Moisture	15.4	%		
Gas Analysis	9.7	% O2		
	10.8	% CO2		
	30.121	Mol. Wt (g/gmole) Dry		
	28.257	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6179	dscm	92.451	dscf
Sample Time	120.0	minutes		
Isokineticity	103.7	%		

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

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:05 - 14:07

Control Unit (Y)	0.9905
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.46
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)	0.00005
Washings (grams)	0.00050
Total (grams)	**0.0006**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.00	9.63
Traverse 2	10.67	9.77
	10.83	**9.70**

Condensate Collection:

Impinger 1	160.0
Impinger 2	126.0
Impinger 3	44.0
Impinger 4	8.0
Impinger 5	4.0
Impinger 6	1.0
Gel	14.1
Gain (grams)	**357.1**

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	132.100								
1	5.0	135.460	0.29	1.48	67	67	6.5	319	1.5	103.6
2	10.0	138.750	0.28	1.43	66	66	6.5	319	4.7	103.5
3	15.0	141.920	0.26	1.32	66	66	6	320	8.4	103.5
4	20.0	144.970	0.24	1.23	66	66	6	318	12.5	103.5
5	25.0	147.960	0.23	1.18	67	67	5.5	319	17.7	103.5
6	30.0	151.320	0.29	1.48	67	67	5.5	320	25.2	103.7
7	35.0	156.110	0.59	3.01	67	67	10	320	45.6	104.0
8	40.0	160.990	0.61	3.12	68	68	10	319	53.2	104.0
9	45.0	165.910	0.62	3.17	68	68	10.5	319	58.3	104.0
10	50.0	170.700	0.59	3.01	67	67	10.5	319	62.5	104.0
11	55.0	174.450	0.36	1.84	68	68	9	319	66.1	103.7
12	60.0	178.090	0.34	1.74	68	68	9	319	69.4	103.6
Traverse 2	0.0	178.090								
1	5.0	182.640	0.53	2.72	67	67	10	316	1.5	103.9
2	10.0	187.120	0.52	2.64	67	67	10	324	4.7	103.8
3	15.0	191.430	0.48	2.44	67	67	9.5	323	8.4	103.8
4	20.0	195.930	0.52	2.65	68	68	9.5	323	12.5	104.0
5	25.0	200.290	0.49	2.49	68	68	9.5	324	17.7	103.8
6	30.0	204.520	0.46	2.34	68	68	9.5	324	25.2	103.9
7	35.0	207.880	0.29	1.48	68	68	7.5	322	45.6	103.6
8	40.0	211.060	0.26	1.33	68	68	7.5	321	53.2	103.5
9	45.0	214.370	0.28	1.43	69	69	7.5	322	58.3	103.7
10	50.0	217.300	0.22	1.12	69	69	7.5	322	62.5	103.5
11	55.0	220.420	0.25	1.28	69	69	6	323	66.1	103.5
12	60.0	223.280	0.21	1.07	69	69	6	323	69.4	103.4
Average:			0.384	1.958	67.6	67.6	3.0	320.7		103.7

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		26-Feb-20	26-Feb-20	26-Feb-20
Test Time		09:52 - 10:52	11:02 - 12:02	12:17 - 13:17
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.46	30.46	30.46
DGM Factor	(Y)	0.9757	0.9757	0.9757
Initial Reading	(m^3)	383.684	384.372	385.062
Final Reading	(m^3)	384.364	385.055	385.673
Temp. Outlet	(Avg. oF)	58.5	67.5	65.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.68826	0.68069	0.60974
HF	(mg)	0.026	0.026	0.013
Oxygen	(Vol. %)	9.6	9.7	9.7
HF	**(mg/Sm^3)**	**0.038**	**0.039**	**0.022**
HF	**(mg/Sm^3 @ 1**	**0.034**	**0.034**	**0.019**
Moisture (isokinetic)	**(Vol. %)**	18.1	18.1	15.4

*Wet Basis Calculated on moisture from isokinetic tests

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

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:16 - 12:23

Concentrations:

Particulate	0.25	mg/dscm	0.00011	gr/dscf
	0.14	mg/Acm	0.00006	gr/Acf
	0.22	mg/dscm (@ 11% O2)	0.00010	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.018	Kg/hr	0.040	lb/hr

Flue Gas Characteristics:

Flow	1196	dscm/min	42224	dscf/min
	19.93	dscm/sec	704	dscf/sec
	2112	Acm/min	74596	Acf/min
Velocity	13.822	m/sec	45.35	f/sec
Temperature	153.9	oC	309.0	oF
Moisture	15.2	%		
Gas Analysis	9.7	% O2		
	10.1	% CO2		
	30.000	Mol. Wt (g/gmole) Dry		
	28.180	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5939	dscm	91.604	dscf
Sample Time	115.0	minutes		
Isokineticity	100.7	%		

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

Client:	Metro Vancouver	**Date:**	26-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:16 - 12:23

Control Unit (Y)	0.9982
Nozzle Diameter (in.)	0.3073
Pitot Factor	0.8517
Baro. Press. (in. Hg)	30.48
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)	0.00005
Washings (grams)	0.00060
Total (grams)	**0.00065**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	10.17	9.67
Traverse 2	10.00	9.67
	10.08	**9.67**

Condensate Collection:

Impinger 1	182.0
Impinger 2	108.0
Impinger 3	26.0
Impinger 4	10.0
Impinger 5	4.0
Impinger 6	2.0
Gel	16.0
Gain (grams)	**348.0**

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	121.903								
1	5.0	126.500	0.58	3.05	50	50	8	303	1.5	103.4
2	10.0	131.200	0.61	3.18	50	50	8	310	4.7	103.6
3	15.0	135.820	0.59	3.06	50	50	8	312	8.4	103.6
4	20.0	140.400	0.58	3.01	51	51	8	313	12.5	103.5
5	25.0	144.900	0.56	2.91	51	51	6	314	17.7	103.5
6	30.0	149.330	0.54	2.81	52	52	6	314	25.2	103.5
7	35.0	152.700	0.31	1.62	53	53	6	312	45.6	103.3
8	40.0	155.900	0.28	1.47	53	53	6	310	53.2	103.1
9	45.0	159.060	0.27	1.42	55	55	5	311	58.3	103.3
10	50.0	162.280	0.28	1.47	56	56	5	311	62.5	103.2
11	55.0	165.650	0.30	1.60	57	57	5	300	66.1	103.4
12	60.0	169.120	0.32	1.71	58	58	5	301	69.4	103.0
Traverse 2	0.0	169.120								
1	5.0	172.800	0.36	1.92	59	59	6	306	1.5	103.2
2	10.0	176.580	0.38	2.01	59	59	6	311	4.7	103.5
3	15.0	180.360	0.38	2.01	61	61	6	313	8.4	103.2
4	20.0	184.080	0.37	1.95	61	61	6	317	12.5	103.2
5	25.0	187.380	0.29	1.53	61	61	7	315	17.7	103.2
6	30.0	190.620	0.28	1.48	61	61	7	315	25.2	103.1
7	35.0	194.400	0.38	2.01	61	61	8	314	45.6	103.3
8	40.0	198.780	0.51	2.71	61	61	8	312	53.2	103.4
9	45.0	203.250	0.52	2.81	62	62	8	299	58.3	103.4
10	50.0	207.800	0.54	2.92	62	62	8	298	62.5	103.2
11	55.0	209.600	0.48	2.60	62	62	8	297	66.1	43.3
Average:			0.422	2.229	56.8	56.8	6.7	309.0		100.7

Client:	Metro Vancouver	**Date:**	27-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:40 - 11:42

Concentrations:

Particulate	0.94	mg/dscm	0.00041	gr/dscf
	0.52	mg/Acm	0.00023	gr/Acf
	0.93	mg/dscm (@ 11% O2)	0.00041	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.064	Kg/hr	0.142	lb/hr

Flue Gas Characteristics:

Flow	1145	dscm/min	40422	dscf/min
	19.08	dscm/sec	674	dscf/sec
	2061	Acm/min	72778	Acf/min
Velocity	13.485	m/sec	44.24	f/sec
Temperature	158.3	oC	316.9	oF
Moisture	15.9	%		
Gas Analysis	10.9	% O2		
	9.6	% CO2		
	29.970	Mol. Wt (g/gmole) Dry		
	28.068	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7270	dscm	96.305	dscf
Sample Time	120.0	minutes		
Isokineticity	104.1	%		

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

Client:	Metro Vancouver	**Date:**	27-Feb-20
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:40 - 11:42

Control Unit (Y)	0.9982
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.40
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)	0.00250
Total (grams)	**0.00255**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	9.50	11.00
Traverse 2	9.67	10.83
	9.58	**10.92**

Condensate Collection:

Impinger 1	176.0
Impinger 2	124.0
Impinger 3	48.0
Impinger 4	14.0
Impinger 5	5.0
Impinger 6	2.0
Gel	17.5
Gain (grams)	**386.5**

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	209.800								
1	5.0	214.320	0.56	2.94	52	52	10	314	1.5	104.2
2	10.0	218.710	0.53	2.78	51	51	10	315	4.7	104.2
3	15.0	223.190	0.55	2.89	52	52	10	315	8.4	104.2
4	20.0	227.880	0.60	3.15	53	53	10	316	12.5	104.4
5	25.0	232.610	0.61	3.20	54	54	12	318	17.7	104.4
6	30.0	237.360	0.61	3.22	56	56	12	317	25.2	104.3
7	35.0	240.960	0.35	1.85	57	57	9	317	45.6	103.8
8	40.0	243.940	0.24	1.27	57	57	9	319	53.2	103.8
9	45.0	246.800	0.22	1.16	57	57	6	317	58.3	103.9
10	50.0	249.730	0.23	1.22	58	58	6	316	62.5	103.8
11	55.0	252.780	0.25	1.32	58	58	6	318	66.1	103.8
12	60.0	255.580	0.21	1.11	58	58	6	318	69.4	103.9
Traverse 2	0.0	255.580								
1	5.0	259.360	0.38	2.02	61	61	7	319	1.5	104.0
2	10.0	263.040	0.36	1.91	61	61	7	319	4.7	104.0
3	15.0	266.460	0.31	1.65	62	62	6.5	320	8.4	104.0
4	20.0	269.700	0.28	1.49	61	61	6.5	319	12.5	103.7
5	25.0	273.010	0.29	1.54	62	62	6.5	319	17.7	103.9
6	30.0	276.330	0.29	1.55	63	63	6.5	318	25.2	104.0
7	35.0	280.550	0.47	2.51	63	63	10	317	45.6	104.0
8	40.0	285.170	0.56	3.00	63	63	10	315	53.2	104.3
9	45.0	289.660	0.53	2.84	63	63	10.5	315	58.3	104.2
10	50.0	294.240	0.55	2.95	63	63	10.5	314	62.5	104.3
11	55.0	298.610	0.50	2.68	64	64	10	316	66.1	104.2
12	60.0	302.622	0.42	2.26	64	64	10	315	69.4	104.2
Average:			0.413	2.188	58.9	58.9	8.6	316.9		104.1

Client:	Metro Vancouver	**Date:**	27-Feb-20
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:10 - 14:11

Concentrations:

Particulate	0.24	mg/dscm	0.00010	gr/dscf
	0.13	mg/Acm	0.00006	gr/Acf
	0.20	mg/dscm (@ 11% O2)	0.00009	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.016	Kg/hr	0.036	lb/hr

Flue Gas Characteristics:

Flow	1139	dscm/min	40222	dscf/min
	18.98	dscm/sec	670	dscf/sec
	2049	Acm/min	72372	Acf/min
Velocity	13.410	m/sec	43.99	f/sec
Temperature	158.5	oC	317.3	oF
Moisture	15.8	%		
Gas Analysis	9.3	% O2		
	11.2	% CO2		
	30.160	Mol. Wt (g/gmole) Dry		
	28.240	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7179	dscm	95.982	dscf
Sample Time	120.0	minutes		
Isokineticity	104.3	%		

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

Client:	Metro Vancouver	**Date:**	27-Feb-20
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:10 - 14:11

Control Unit (Y)	0.9982
Nozzle Diameter (in.)	0.3097
Pitot Factor	0.8388
Baro. Press. (in. Hg)	30.40
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)	0.00060
Total (grams)	**0.00065**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.00	9.50
Traverse 2	11.33	9.17
	11.17	**9.33**

Condensate Collection:

Impinger 1	184.0
Impinger 2	128.0
Impinger 3	34.0
Impinger 4	10.0
Impinger 5	4.0
Impinger 6	3.0
Gel	19.5
Gain (grams)	**382.5**

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	303.100								
1	5.0	306.870	0.37	2.00	63	63	7	310	1.5	104.3
2	10.0	310.470	0.34	1.82	64	64	7	316	4.7	104.1
3	15.0	313.910	0.31	1.66	64	64	6	317	8.4	104.2
4	20.0	317.230	0.29	1.55	63	63	6	317	12.5	104.1
5	25.0	320.430	0.27	1.44	63	63	5.5	317	17.7	104.0
6	30.0	323.800	0.30	1.60	63	63	5.5	318	25.2	104.0
7	35.0	328.200	0.51	2.72	63	63	9	318	45.6	104.4
8	40.0	332.820	0.56	3.00	64	64	9	317	53.2	104.4
9	45.0	337.690	0.62	3.33	64	64	9.5	316	58.3	104.6
10	50.0	342.520	0.61	3.27	65	65	9.5	318	62.5	104.5
11	55.0	346.890	0.50	2.68	65	65	9	318	66.1	104.3
12	60.0	351.080	0.46	2.47	65	65	9	318	69.4	104.2
Traverse 2	0.0	351.080								
1	5.0	355.220	0.45	2.41	65	65	8.5	320	1.5	104.3
2	10.0	359.630	0.51	2.73	65	65	8.5	320	4.7	104.4
3	15.0	364.290	0.57	3.05	65	65	9	319	8.4	104.4
4	20.0	369.080	0.60	3.21	65	65	9	319	12.5	104.6
5	25.0	373.790	0.58	3.11	66	66	9.5	320	17.7	104.4
6	30.0	378.210	0.51	2.74	66	66	9.5	319	25.2	104.4
7	35.0	381.940	0.36	1.94	67	67	7	317	45.6	104.3
8	40.0	385.050	0.25	1.35	67	67	7	316	53.2	104.1
9	45.0	387.900	0.21	1.13	67	67	5.5	317	58.3	104.1
10	50.0	390.880	0.23	1.24	67	67	5.5	315	62.5	103.9
11	55.0	393.920	0.24	1.29	67	67	5.5	317	66.1	103.9
12	60.0	396.701	0.20	1.08	67	67	5.5	316	69.4	104.0
Average:			0.410	2.201	65.0	65.0	7.6	317.3		104.3

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		27-Feb-20	27-Feb-20	27-Feb-20
Test Time		10:05 - 11:05	11:17 - 12:17	12:31 - 13:31
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.40	30.40	30.40
DGM Factor	(Y)	0.9757	0.9757	0.9757
Initial Reading	(m^3)	385.685	386.402	387.145
Final Reading	(m^3)	386.394	387.142	387.854
Temp. Outlet	(Avg. oF)	61.0	68.5	69.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.71298	0.73320	0.70219
HF	(mg)	0.051	0.013	0.013
Oxygen	(Vol. %)	10.9	10.9	9.3
HF	**(mg/Sm^3)**	**0.072**	**0.018**	**0.018**
HF	**(mg/Sm^3 @ 1**	**0.072**	**0.017**	**0.016**
Moisture (isokinetic)	**(Vol. %)**	15.9	15.9	15.8

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Parameter: N_2O

Molecular Weight: 44.00 grams/mol
Lab Detection Limit: 0.1 ppm
Oxygen Correction: 11 %
Reportable Detection Limit: 0.18 mg/Sm^3

Sample ID	**Date**	**Time**	**N_2O** ppm	**N_2O** mg/Sm^3	**O_2** % Vol	**N_2O** mg/Sm^3 @ 11% O_2
Unit 1 Run 1	24-Feb-20	10:15 - 11:15	15.0	27.4	9.70	24.3
Unit 1 Run 2	24-Feb-20	11:20 - 12:20	18.0	32.9	9.70	29.1
Unit 1 Run 3	24-Feb-20	12:50 - 13:50	13.0	23.8	9.70	21.0
Average						24.8
Unit 2 Run 1	24-Feb-20	10:00 - 11:00	3.1	5.7	9.60	5.0
Unit 2 Run 2	24-Feb-20	11:01 - 12:01	0.6	1.1	9.60	1.0
Unit 2 Run 3	24-Feb-20	12:02 - 13:02	16.0	29.3	9.60	25.6
Average						10.5
Unit 3 Run 1	24-Feb-20	12:30 - 13:30	1.1	2.0	9.60	1.8
Unit 3 Run 2	24-Feb-20	13:31 - 14:31	13.0	23.8	9.60	20.8
Unit 3 Run 3	24-Feb-20	14:32 - 15:32	0.6	1.1	9.60	1.0
Average						7.9

APPENDIX - D

FIELD DATA SHEETS

A. Lanfranco and Associates Inc.

CLIENT MV WTE	NOZZLE G-310 DIAMETER, IN. 0.3097	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE VWLT #1	PROBE TC Cp 0.8388	Imp. #1	100 / 176 / 176
PARAMETER / RUN No ~~VWLT #1~~ METALS/PM/HCl/Hg RUN#1	PORT LENGTH	Imp. #2	100 / 224 / 124
DATE FEB 24, 2020	STATIC PRESSURE, IN. H2O -.79	Imp. #3	0 / 142 / 42
OPERATOR: SC	STACK DIAMETER 70.90	Imp. #4	600 / 12 / 12
CONTROL UNIT CAE AL 1 Y 1.0118 ΔH@ 1.8AA	STACK HEIGHT 30	Imp. #5	100 / 105 / 5
BAROMETRIC PRESSURE, IN. Hg 30.50	INITIAL LEAK TEST 0.003 @ 15"Hg	Imp. #6	GEL / 102 / 2
ASSUMED MOISTURE, Bw 15%	FINAL LEAK TEST 0.002 @ 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. %
	12:53	448.000										
1	5	451.36	0.32	1.64	52	311	256	242	46	6		9.6
2	10	455.06	0.39	1.99	52	312						
3	15	458.88	0.41	2.12	52	311				7.5		
4	20	462.74	0.42	2.17	52	310	257	249	46		11.5	9.0
5	25	466.75	0.45	2.34	53	309				8		
6	30	470.67	0.43	2.23	53	309						
7	35	474.69	0.45	2.34	54	309	256	256	49	8		
8	40	478.35	0.37	1.93	56	307						
9	45	481.80	0.33	1.73	55	306					11.0	9.5
10	50	485.15	0.31	1.62	55	306				7		
11	55	488.56	0.32	1.68	56	305	256	257	50			
12	60	492.01	0.34	1.78	56	306				6.5		
1	5	496.32	0.29	1.52	57	307	254	257	50	6.5	11.0	9.4
2	10	498.69	0.31	1.63	58	307						
3	15	502.11	0.32	1.68	58	306				6.5		
4	20	505.31	0.28	1.47	58	306	255	256	51		11.0	9.5
5	25	508.79	0.33	1.74	59	305				7		
6	30	512.49	0.37	1.96	60	304						
7	35	516.79	0.50	2.64	60	305	254	255	52	9.5		
8	40	521.18	0.52	2.75	61	306						
9	45	525.65	0.54	2.86	61	305					11	9.5
10	50	529.96	0.50	2.65	62	306	254	256	53	10.5		
11	55	533.77	0.39	2.07	62	305						
12	60	537.431	0.36	1.91	62	305				8.5		
END	14:56											

A. Lanfranco and Associates Inc.

CLIENT	MV WTE	NOZZLE	B-310
SOURCE	UNIT#1	DIAMETER, IN.	0.3097
PARAMETER / RUN No	AE/MS/Hg/Partic RUN#2	PROBE	7C
DATE	FEB. 25, 2020	Cp	0.83986
OPERATOR:	SE	PORT LENGTH	
CONTROL UNIT	CAE AL 1	STATIC PRESSURE, IN. H2O	-19.0
Y	1.0118	STACK DIAMETER	70.90
ΔH@	1.829	STACK HEIGHT	30'
BAROMETRIC PRESSURE, IN. Hg	30.51	INITIAL LEAK TEST	0.004 @15"Hg
ASSUMED MOISTURE, Bw	14.5%	FINAL LEAK TEST	0.002 @15"Hg

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	196	196
Imp. #2	100	232	132
Imp. #3	0	126	26
Imp. #4	100	110	10
Imp. #5	100	104	4
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. %	O_2 Vol. %
	09:43	539.900										
1	5	543.32	0.33	1.72	47	298	258	253	48	7	12	8.6
2	10	546.89	0.36	1.87	48	300						
3	15	550.51	0.37	1.92	48	300				7		
4	20	554.28	0.40	2.08	48	300	254	256	52			
5	25	558.24	0.44	2.29	49	300				8.5	11	9.6
6	30	562.11	0.42	2.19	50	300						
7	35	566.09	0.44	2.31	52	300	251	249	55	9		
8	40	570.21	0.47	2.47	53	301						
9	45	574.02	0.40	2.10	54	302				9	10.5	9.8
10	50	577.64	0.36	1.90	56	302	254	255	55			
11	55	581.16	0.34	1.79	56	302				7.5		
12	60	584.64	0.33	1.74	57	302						
1	5	587.80	0.27	1.43	58	299	254	255	51	6.5	10.5	9.7
2	10	591.18	0.31	1.64	59	303						
3	15	594.45	0.29	1.53	59	304				6.5		
4	20	597.67	0.28	1.49	60	303	249	256	51			
5	25	601.00	0.30	1.59	60	304				6.5	11.5	9.0
6	30	604.65	0.36	1.91	60	302						
7	35	608.96	0.50	2.66	60	301	254	254	55	9.5		
8	40	613.48	0.55	2.93	61	302						
9	45	617.89	0.52	2.77	62	302				10.5	11.5	9.1
10	50	622.08	0.47	2.50	62	303	252	252	57			
11	55	625.94	0.40	2.13	62	303				9		
12	60	629.511	0.34	1.81	63	303						
END	11:48											

A. Lanfranco and Associates Inc.

4A

CLIENT MV WTE	NOZZLE G-310	DIAMETER, IN. 0.3097	
SOURCE UNIT #1	PROBE-7C	Cp 0.8388	
PARAMETER / RUN No MCMS/Hg/Particle RUN#3	PORT LENGTH		
DATE FEB. 25, 2020	STATIC PRESSURE, IN. H2O -9.0		
OPERATOR: SF	STACK DIAMETER 70.90		
CONTROL UNIT CAE AL 1 Y 1.0118	STACK HEIGHT 30		
ΔH@ .829			
BAROMETRIC PRESSURE, IN. Hg 30.51	INITIAL LEAK TEST 0.002 @ 15 "Hg		
ASSUMED MOISTURE, Bw 14.5%	FINAL LEAK TEST 0.002 @ 15 "Hg		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	142	142
Imp. #2	100	236	136
Imp. #3	0	146	46
Imp. #4	100	14	14
Imp. #5	100	105	5
Imp. #6	Gel	102	2
Upstream Diameters			
Downstream Diameters			

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. %	Fyrites: O_2 Vol. %
1	12:20	630.100										
1	5	633.22	0.26	1.39	63	303	254	261	54	7	11.5	9.1
2	10	636.57	0.30	1.60	62	303						
3	15	639.91	0.30	1.60	62	304						
4	20	643.14	0.28	1.49	62	304	263	257	53	7		
5	25	646.54	0.31	1.65	62	305						
6	30	649.99	0.32	1.70	62	304				7	11.5	9.4
7	35	654.05	0.44	2.35	63	303	252	263	57			
8	40	658.39	0.50	2.66	63	300				9.5		
9	45	663.17	0.61	3.25	63	303						
10	50	667.82	0.58	3.09	63	305	255	256	61	12.5	12.5	9.0
11	55	672.01	0.47	2.50	64	306						
12	60	675.94	0.41	2.14	65	306				10.0		
1	5	679.42	0.32	1.72	66	302	259	258	56	8.5	11	9.4
2	10	683.45	0.43	2.30	66	304						
3	15	687.53	0.44	2.36	66	304				9.5		
4	20	691.76	0.47	2.53	67	303	259	256	53			
5	25	695.80	0.43	2.31	67	303						
6	30	700.03	0.47	2.53	67	303				10	11	9.5
7	35	704.21	0.46	2.47	67	304	258	257	63			
8	40	708.21	0.42	2.26	68	303				10		
9	45	712.12	0.40	2.15	68	303						
10	50	715.77	0.35	1.88	68	303				9.5	10.5	9.7
11	55	719.37	0.34	1.83	68	304	258	255	52			
12	60	722.862	0.32	1.72	68	304				9		
END	14:23											

PLANT	M.V. W.T.E.
RUN No	1 - Metals / Dioxin/Furan
LOCATION	Unit #2
DATE	Feb. 25, 2020
OPERATOR: Daryl Sampson + CNL	
CONTROL UNIT / Y	CAE GAS / 0.9905
	ΔH @ 1.775
BAROMETRIC PRESSURE, IN. Hg	30.52
ASSUMED MOISTURE, Bw	15%
PROBE TIP DIAMETER, IN.	G-3072 / 0.3073
PROBE LENGTH, FT / Cp	ALGURO / 0.8517
FILTER NUMBER	
STATIC PRESSURE, IN. H_2O	-19.5"
STACK DIAMETER	70.9"
STACK HEIGHT	30.0'
INITIAL LEAK TEST	0.006 @ 15"
FINAL LEAK TEST	0.005 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. # 1	0	202	202
Imp. # 2	100	204	104
Imp. # 3	100	130	30
Imp. # 4	0	8	8
#5	100	103	3
#6	100	101	1
Gel.	200g		
Upstream Diameters			
Downstream Diameters			

5 Point Min	Clock Time	Dry Gas Meter Ft^3	Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Outlet °F	Temperature °F Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg Gauge	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
	11:50	957.862										
1		961.95	0.45	2.25	51	302	256	239	54	8		
2		966.12	0.47	2.34	51	306						
3		970.45	0.51	2.53	51	310	256	244	55	9	10.0	9.5
4		974.88	0.53	2.64	53	311						
5		978.96	0.45	2.24	53	311	256	257	58	10		
6		982.62	0.36	1.79	54	314						
7		985.68	0.25	1.25	56	312	256	256	59	8	10.0	9.5
8		988.43	0.20	1.00	57	310						
9		991.14	0.19	0.97	57	300	256	257	60	6		
10		993.75	0.18	0.91	58	306						
11		996.36	0.18	0.91	58	307	256	257	57	6		
12		998.82	0.16	0.81	58	307						
1		1001.68	0.21	1.08	60	298	256	246	56	5	10.0	9.5
2		1004.66	0.23	1.17	60	303						
3		1007.44	0.20	1.02	61	306	256	256	56	5	10.0	9.5
4		1010.15	0.19	0.96	61	308						
5		1013.06	0.22	1.12	62	308	256	256	55	5		
6		1016.10	0.24	1.22	62	307						
7		1020.28	0.45	2.30	63	306	256	256	54	6	10.5	9.0
8		1024.70	0.55	2.80	63	307						
9		1029.95	0.65	3.34	64	302	256	256	55	8		
10		1034.68	0.57	2.92	65	307						
11		1039.29	0.54	2.79	65	298	256	255	57	10	10.5	9.0
12	13:52	1043.75	0.50	2.60	66	295						

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CLIENT MN WTC	NOZZLE G-310 DIAMETER, IN. 0.3097	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT #2	PROBE TC Cp 0.8388	Imp. #1	100 / 222 / 222
PARAMETER / RUN No METHOD 5/Hg/Particle RUN #2	PORT LENGTH	Imp. #2	100 / 206 / 106
DATE FEB 26 2020	STATIC PRESSURE, IN. H2O -19	Imp. #3	0 / 42 / 42
OPERATOR: SL	STACK DIAMETER 70.90"	Imp. #4	100 / 12 / 12
CONTROL UNIT CAE G105 Y 0.995 ΔH@ 1.775	STACK HEIGHT 30'	Imp. #5	100 / 104 / 4
BAROMETRIC PRESSURE, IN. Hg 30.46	INITIAL LEAK TEST 0.002 @ 15"Hg	Imp. #6	60CL / 102 / 2
ASSUMED MOISTURE, Bw 14.5%	FINAL LEAK TEST 0.003 @ 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. %
	09:29	44.200										
1	5	48.39	0.48	2.37	51	320	256	243	57	8.5	11.0	9.5
2	10	52.73	0.51	2.53	54	321						
3	15	56.60	0.40	2.00	58	321				8		
4	20	60.52	0.41	2.06	58	320	254	258	60			
5	25	64.33	0.38	1.92	62	320				7	11.5	9.0
6	30	67.89	0.33	1.68	64	319						
7	35	70.81	0.22	1.12	66	318	254	256	61	5.5		
8	40	73.54	0.19	0.97	68	318						
9	45	76.60	0.24	1.23	68	319				5.5	11	9.5
10	50	79.46	0.21	1.08	67	317	256	251	60			
11	55	82.50	0.24	1.22	64	318				5.5		
12	60	85.45	0.23	1.16	60	318						
1	5	86.86	0.31	1.56	60	320	256	257	57	6.5	9.5	11
2	10	92.26	0.30	1.51	61	320						
3	15	95.53	0.28	1.41	62	321				6		
4	20	98.49	0.23	1.16	62	321	256	256	58			
5	25	101.57	0.24	1.21	63	320				5.5	11	9.5
6	30	104.96	0.31	1.57	63	322						
7	35	109.80	0.61	3.09	65	323	256	248	59	10.5		
8	40	114.74	0.63	3.20	66	321						
9	45	119.68	0.63	3.21	67	322				10.5	11.5	9.2
10	50	124.46	0.59	3.00	67	322	256	256	59			
11	55	127.99	0.32	1.63	68	323						
12	60	131.634	0.34	1.73	68	323						
END	11:33											

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CLIENT MV WTE	NOZZLE 0.310 DIAMETER, IN. 0.309	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT #2	PROBE 7C Cp 0.8388	Imp. #1	100 / 160 / 160
PARAMETER / RUN No METHOD 5/Hg/Portic RUN #3	PORT LENGTH	Imp. #2	100 / 226 / 126
DATE FEB. 26, 2020	STATIC PRESSURE, IN. H2O -19	Imp. #3	0 / 144 / 44
OPERATOR: SF	STACK DIAMETER 70.90"	Imp. #4	100 / 8 / 8
CONTROL UNIT CAE 6105 Y 0.9905	STACK HEIGHT 30'	Imp. #5	100 / 104 / 4
ΔH@ 1.775		Imp. #6	100 / 101 / 1
BAROMETRIC PRESSURE, IN. Hg 30.46	INITIAL LEAK TEST 0.002 @ 15"Hg	Upstream Diameters	
ASSUMED MOISTURE, Bw 14.5%	FINAL LEAK TEST 0.003 @ 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. %		
	12:05	132.100												
1	5	135.96	0.29	1.48	67	319	246	249	61	6.5	11.5	9.2		
2	10	138.75	0.28	1.43	66	319								
3	15	141.92	0.36	1.32	66	320			63	6				
4	20	144.97	0.24	1.23	66	318	256	256						
5	25	147.96	0.23	1.18	67	319			63	5.5	10.5	10		
6	30	151.32	0.29	1.48	67	320								
7	35	156.11	0.59	3.01	67	320	257	256	64	10				
8	40	160.99	0.61	3.12	68	319								
9	45	165.91	0.62	3.17	68	319			62	10.5	11	9.7		
10	50	170.70	0.59	3.01	67	319	256	256						
11	55	174.45	0.36	1.84	68	319			63	9				
12	60	178.09	0.34	1.74	68	319								
1	5	182.64	0.53	2.72	67	316	256	256	64	10	10.5	10		
2	10	187.12	0.52	2.64	67	324								
3	15	191.43	0.48	2.44	67	323			63	9.5				
4	20	195.93	0.52	2.65	68	323	256	256						
5	25	200.29	0.49	2.49	68	324			58	9.5	10.5	9.8		
6	30	204.52	0.46	2.34	68	324								
7	35	207.98	0.29	1.48	68	322	256	256	55	7.5				
8	40	211.06	0.26	1.33	68	321								
9	45	214.37	0.28	1.43	69	322			56	7.5	11	9.5		
10	50	217.30	0.22	1.12	69	325	256	256						
11	55	220.42	0.25	1.28	69	323			56	6				
12	60	223.260	0.21	1.07	69	323								
(60)	14:07													

PLANT	M.V. W.T.E.
RUN No	1 - Metals/Particulate
LOCATION	Unit #3
DATE	Feb. 26, 2020
OPERATOR: Daryl Sampson	
CONTROL UNIT / Y	FE 18 / 0.9987
	ΔH@ 1.867
BAROMETRIC PRESSURE, IN. Hg	30.48
ASSUMED MOISTURE, Bw	15%

PROBE TIP DIAMETER, IN.	G-3072 / .3073
PROBE LENGTH, FT / Cp	ALGAO / .8517
FILTER NUMBER	
STATIC PRESSURE, IN. H_2O	-19.0"
STACK DIAMETER	70.94"
STACK HEIGHT	30.0'
INITIAL LEAK TEST	0.007 @ 15"
FINAL LEAK TEST	0.005 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. # 1	0	182	182
Imp. # 2	100	208	108
Imp. # 3	100	126	26
Imp. # 4	0	10	10
	100	104	4
	100	102	2
	Gel	200g	
Upstream Diameters			
Downstream Diameters			

5 Point Run	Clock Time	Dry Gas Meter Ft^3		Pitot IN. H_2O ΔP	Orifice ΔH IN. H_2O	Dry Gas Temp. Outlet °F	Temperature °F Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg Gauge	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
1	10:16	121.903											
1		126.50		0.58	3.05	50	303	265	241	52	8		
2		131.20		0.61	3.18	50	310					10.5	9.5
3		135.82		0.59	3.06	50	312	260	242	52	8		
4		140.40		0.58	3.01	51	313						
5		144.90		0.56	2.91	51	314	256	244	54	6	10.0	10.0
6		149.33		0.54	2.81	52	314						
7		152.70		0.31	1.62	53	312	253	243	53	6		
8		155.90		0.28	1.47	53	310						
9		159.06		0.27	1.42	55	311	253	251	52	5	10.0	9.5
10		162.28		0.28	1.47	56	311						
11		165.65		0.30	1.60	57	300	252	251	51	5		
12		169.12		0.32	1.71	58	301						
1		172.80		0.36	1.92	59	306	251	242	50	6		
2		176.58		0.38	2.01	59	311					10.0	9.5
3		180.36		0.38	2.01	61	313	237	231	45	6		
4		184.08		0.37	1.95	61	314						
5		187.38		0.29	1.53	61	315	253	249	46	7		
6		190.62		0.28	1.48	61	315					10.0	10.0
7		194.40		0.38	2.01	61	314	253	231	46	8		
8		198.78		0.51	2.71	61	312						
9		203.25		0.52	2.81	62	299	252	252	47	8		
10		207.80		0.54	2.92	62	298					10.0	9.5
11	12:23	209.60		0.48	2.60	62	297	252	251	48	8		
12	End of Test.			0.45									
		209.60											

CLIENT MV WTE	NOZZLE G-310 DIAMETER, IN. 0.3097	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE UNIT #3	PROBE SS Cp 0.8388	Imp. #1	100 / 176 / 176
PARAMETER / RUN No RUN #2 MM/MS/Hg/Particle.	PORT LENGTH	Imp. #2	100 / 224 / 124
DATE FEB. 27, 2020	STATIC PRESSURE, IN. H2O -18	Imp. #3	0 / 148 / 48
OPERATOR JS	STACK DIAMETER 70.90"	Imp. #4	100 / 114 / 14
CONTROL UNIT GGB Y 0.9982	STACK HEIGHT 30'	Imp. #5	100 / 105 / 5
ΔH@ 1.867		Imp. #6	100 / 102 / 2
BAROMETRIC PRESSURE, IN. Hg 30.40	INITIAL LEAK TEST 0.003 @ 15"Hg	Upstream Diameters	
ASSUMED MOISTURE, Bw 14.5%	FINAL LEAK TEST 0.003 @ 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. %		
	0940	209.800												
1	5	214.32	0.56	2.94	52	314	261	254	52	10	9	11.5		
2	10	218.71	0.58	2.78	51	315								
3	15	223.19	0.55	2.89	52	315			56	10				
4	20	227.88	0.60	3.15	53	316	262	254						
5	25	232.61	0.61	3.20	54	318			59	12	10	10.5		
6	30	237.36	0.61	3.22	56	317								
7	35	240.96	0.35	1.85	57	317	253	250	61	9				
8	40	243.94	0.24	1.27	57	319								
9	45	246.80	0.22	1.16	57	317			58	6	9.5	11		
10	50	249.73	0.23	1.22	58	316	250	250						
11	55	252.78	0.25	1.32	58	318			56	6				
12	60	255.58	0.21	1.11	58	318								
1	5	259.36	0.38	2.02	61	319	250	250	53	7	9.5	10		
2	10	263.04	0.36	1.91	61	319								
3	15	266.46	0.31	1.65	62	320			53	6.5				
4	20	269.70	0.28	1.49	61	319	252	250						
5	25	273.01	0.29	1.54	62	319			52	6.5	10	10.5		
6	30	276.33	0.29	1.55	63	318								
7	35	280.55	0.47	2.51	63	317	252	249	53	10				
8	40	285.17	0.56	3.00	63	315								
9	45	289.66	0.53	2.84	63	315			52	10.5	9.5	11		
10	50	294.24	0.55	2.95	63	314	254	250						
11	55	298.61	0.50	2.68	64	316			52	10				
12	60	302.622	0.42	2.26	64	315								
END	11:42													

CLIENT MV WTE	NOZZLE G-310	DIAMETER, IN. 0.3097	
SOURCE UNIT #3	PROBE -7C	Cp 0.8388	
PARAMETER / RUN No RUN #3 PM/NOx/PART.IC/Hg	PORT LENGTH		
DATE FEB 27, 2020	STATIC PRESSURE, IN. H2O -18.		
OPERATOR: CF	STACK DIAMETER 70.90"		
CONTROL UNIT FGIS Y 0.9892	STACK HEIGHT 30'		
ΔH@ 1.867			
BAROMETRIC PRESSURE, IN. Hg 30.40	INITIAL LEAK TEST 0.002 @ 15" Hg		
ASSUMED MOISTURE, Bw 14.5%	FINAL LEAK TEST 0.002 @ 15" Hg		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	184	184
Imp. #2	100	228	128
Imp. #3	0	134	34
Imp. #4	100	10	10
Imp. #5	100	104	4
Imp. #6	600	103	3
Upstream Diameters			
Downstream Diameters			

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. %	Fyrites O_2 Vol. %
	12:10	303.100										
1		306.87	0.37	2.00	63	310	248	253	56	7	11	9.5
2	10	310.47	0.34	1.82	64	316						
3		313.91	0.31	1.66	64	317			55	6		
4	20	317.23	0.29	1.55	63	317	262	254				
5		320.43	0.27	1.44	63	317			58	5.5	11	9.5
6	30	323.80	0.30	1.60	63	318						
7		326.20	0.51	2.72	63	318	249	252	59	9		
8	40	332.82	0.56	3.00	64	317						
9		337.69	0.62	3.33	64	316			62	9.5	11	9.5
10	50	342.52	0.61	3.27	65	318	252	249				
11		346.89	0.50	2.68	65	318			61	9		
12	60	351.08	0.46	2.47	65	318						
1		355.22	0.45	2.41	65	320	255	246	56	8.5	11	9.5
2	10	359.63	0.51	2.73	65	320						
3		364.29	0.57	3.05	65	319			54	9		
4	20	369.08	0.60	3.21	65	319	261	250				
5		373.79	0.58	3.11	66	320			53	9.5	11.5	9
6	30	378.21	0.51	2.71	66	319						
7		381.94	0.36	1.94	67	317	252	250	56	7		
8	40	385.05	0.25	1.35	67	316						
9		387.90	0.21	1.13	67	317			57	5.5	11.5	9
10	50	390.88	0.23	1.24	67	315	254	250				
11		393.92	0.24	1.29	67	317			55	5.5		
12	60	396.701	0.20	1.08	67	316						
END	14:11											

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Client	MV Covanta	Y	LMA (.9757)		
Source	Unit #1	Cp			
Parameter	MF	Pbar	30.51	Static	
Date	Feb-25-2020	Operator	MF		

Leak Check	Run 1	Run 2	Run 3
Initial	0.0002	0.0002	0.0002
Final	0.0002	0.0002	0.0002

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	1045	381.6438	50		200			
			52					
			55					
			58					
			60					
			62					
	1145	382.3300	62		265			
2	1227	382.3460	56		200			
	1327	383.0000	68		245			
3	1338	3830208	54		200			
	1438	383.6684	52		230			

Client	MV Covanta	Y	LMA (.9757)		
Source	Unit #2	Cp			
Parameter	MF	Pbar	30.46	Static	
Date	Feb-26-2020	Operator	MF		

Leak Check	Run 1	Run 2	Run 3
Initial	0.0002	0.0002	0.0002
Final	0.0002	0.0002	0.0002

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	0952	383.6840	49		200			
	1052	384.3636	68		285			
2	1102	384.3716	64		200			
	1202	385.0554	71		284			
3	1217	385.0624	64		200			
	1317	385.6726	67		260			

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Client	MV Concrete	Y	LMD-A (.9757)	Client	
Source	Unit #3	Cp		Source	
Parameter	H.F	Pbar	30.40 Static	Parameter	Pbar Static
Date	Feb-27-2020	Operator	MG	Date	Operator

Leak Check	Run 1	Run 2	Run 3
Initial	0.0002	0.0002	0.0002
Final	0.0002	0.0002	0.0002

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	1005	385.6852	51		200			
	1105	386.3940	71		290			
2	1117	386.4024	66		200			
	1217	387.1418	71		215			
3	1231	387.1452	66		200			
	1331	387.8540	72		288			

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								
2								
3								

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: 06-Jan-20
Barometric Pressure: 29.94 (in. Hg)
Theoretical Critical Vacuum: 14.12 (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)
3.65	21.00	927.900	950.011	22.111	71.0	71.0	74.0	74.0	73	0.8185	17.5	78.0	83.0	80.5
1.85	17.00	898.900	911.682	12.782	62.0	62.0	66.0	66.0	63	0.5956	20.5	70.0	75.0	72.5
1.10	19.00	960.300	971.646	11.346	74.0	74.0	76.0	76.0	55	0.4606	22.0	80.0	80.0	80.0
0.69	19.00	950.800	959.398	8.598	73.0	73.0	75.0	75.0	48	0.3560	23.5	80.0	80.0	80.0
0.35	17.00	972.100	977.388	5.288	75.0	75.0	76.0	76.0	40	0.2408	25.0	70.0	77.0	73.5

********** 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)
22.127	626.6	22.136	626.9	22.654	1.000	-0.011	1.833	46.57	0.005	0.715
12.942	366.5	13.137	372.0	13.245	1.015	0.003	1.757	44.63	-0.072	0.721
11.231	318.1	11.275	319.3	11.529	1.004	-0.008	1.735	44.07	-0.094	0.734
8.518	241.2	8.715	246.8	8.910	1.023	0.011	1.825	46.36	-0.004	0.703
5.220	147.8	5.306	150.3	5.360	1.017	0.005	1.994	50.64	0.165	0.677
				Average Y---------->	**1.0118**		**Average dH@----->**	**1.829**	**46.5**	**Average Ko----->**	**0.710**

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, 2020

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: CAE G10J

Serial #: 0028-1X1310-1

Date: 10-Jan-20

Barometric Pressure: 29.99 (in. Hg)

Theoretical Critical Vacuum: 14.15 (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	15.00	874.100	890.242	16.142	72.0	72.0	73.0	73.0	73	0.8185	16.0	74.0	78.0	76.0
1.85	15.00	860.800	872.526	11.726	73.0	73.0	73.0	73.0	63	0.5956	19.0	71.0	73.0	72.0
1.10	15.00	899.200	908.287	9.087	71.0	71.0	71.0	71.0	55	0.4606	20.0	76.0	78.0	77.0
0.65	15.00	890.700	897.640	6.940	71.0	71.0	71.0	71.0	48	0.3560	21.5	74.0	77.0	75.5
0.34	16.00	911.100	916.145	5.045	58.0	58.0	58.0	58.0	40	0.2408	23.0	50.0	51.0	50.5

********** 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)
16.178	458.2	15.904	450.4	16.114	0.983	-0.007	1.790	45.47	0.016	0.721
11.691	331.1	11.616	329.0	11.682	0.994	0.003	1.723	43.76	-0.052	0.728
9.078	257.1	8.941	253.2	9.076	0.985	-0.006	1.736	44.08	-0.039	0.733
6.925	196.1	6.921	196.0	7.005	0.999	0.009	1.712	43.48	-0.063	0.727
5.157	146.0	5.114	144.8	4.935	0.992	0.001	1.913	48.58	0.138	0.694
				Average Y---------->	**0.9905**	**Average dH@----->**	**1.775**	**45.1**	**Average Ko----->**	**0.721**

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 10, 2020

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 07-Jan-20
Barometric Pressure: 29.66 (in. Hg)
Theoretical Critical Vacuum: 13.99 (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 (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
3.65	22.00	586.500	609.839	23.339	63.0	63.0	66.0	66.0
1.90	22.00	610.800	627.778	16.978	66.0	66.0	68.0	68.0
1.20	23.00	461.100	474.910	13.810	73.0	73.0	73.0	73.0
0.68	18.00	641.000	649.247	8.247	69.0	69.0	70.0	70.0
0.34	27.00	649.900	658.342	8.442	70.0	70.0	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)
73	0.8185	15.0	65.0	72.0	68.5
63	0.5956	17.2	72.0	74.0	73.0
55	0.4606	19.5	70.0	73.0	71.5
48	0.3560	19.9	75.0	75.0	75.0
40	0.2408	21.2	75.0	76.0	75.5

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	CALIBRATION FACTOR dH@ Value (mm H2O)	CALIBRATION FACTOR dH@ Variation (in H2O)	Ko (value)
23.492	665.3	23.232	657.9	23.467	0.989	-0.009	1.837	46.67	-0.030	0.712
16.935	479.6	16.834	476.7	17.149	0.994	-0.004	1.813	46.05	-0.054	0.715
13.596	385.1	13.629	386.0	13.845	1.002	0.004	1.888	47.95	0.021	0.695
8.163	231.2	8.217	232.7	8.402	1.007	0.008	1.814	46.08	-0.053	0.707
8.341	236.2	8.333	236.0	8.529	0.999	0.001	1.983	50.36	0.116	0.682
				Average Y--------->	**0.9982**		**Average dH@----->**	**1.867**	**47.4**	**Average Ko----->** **0.702**

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 7, 2020

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: **LMU-A**

Serial #: **Kimmon 186**

Date: 10-Jan-20

Barometric Pressure: 29.55 (in. Hg)

Theoretical Critical Vacuum: 13.94 (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	22.00	377.0640	377.2633	7.038	66.0	66.0	62.0	62.0
0.00	15.00	377.2670	377.4029	4.799	62.0	62.0	63.0	63.0
0.00	15.00	377.4060	377.5421	4.806	63.0	63.0	64.0	64.0

-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)
40	0.2408	20.0	61.0	62.0	61.5
40	0.2408	20.0	62.0	64.0	63.0
48	0.2408	20.0	64.0	66.0	65.0

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
7.001	198.3
4.788	135.6
4.786	135.5

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
6.855	194.1	6.858
4.667	132.2	4.683
4.658	131.9	4.692

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)
0.979	0.003
0.975	-0.001
0.973	-0.002

--------- 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---------> 0.9757 **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: Scott Ferguson Signature:  Date: January 10, 2020

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Scott Ferguson
Date: February 10, 2020

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
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
G-215	0.2140	0.2150	0.2155	0.0015	0.2148	0.0002517
Q	0.2190	0.2170	0.2185	0.0020	0.2182	0.0002596
G-218	0.2180	0.2175	0.2190	0.0015	0.2182	0.0002596
G-223	0.2220	0.2230	0.2225	0.0010	0.2225	0.0002700
G-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-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
G-257	0.2570	0.2570	0.2570	0.0000	0.2570	0.0003602
P	0.2580	0.2570	0.2575	0.0010	0.2575	0.0003616
G-275	0.2750	0.2740	0.2750	0.0010	0.2747	0.0004115
G-278	0.2780	0.2770	0.2780	0.0010	0.2777	0.0004205
P-2	0.2787	0.2790	0.2785	0.0005	0.2787	0.0004237
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-02	0.3050	0.3040	0.3055	0.0015	0.3048	0.0005068
MV-01	0.3050	0.3045	0.3055	0.0010	0.3050	0.0005074
G-3071	0.3075	0.3070	0.3070	0.0005	0.3072	0.0005146
G-3072	0.3070	0.3070	0.3080	0.0010	0.3073	0.0005152
G-309	0.3090	0.3090	0.3085	0.0005	0.3088	0.0005202
G-310	0.3090	0.3105	0.3095	0.0015	0.3097	0.0005230
G-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
G-337	0.3380	0.3365	0.3380	0.0015	0.3375	0.0006213
P-27	0.3387	0.3385	0.3390	0.0005	0.3387	0.0006258
G-343	0.3435	0.3430	0.3435	0.0005	0.3433	0.0006429
I	0.3785	0.3785	0.3785	0.0000	0.3785	0.0007814
P-14	0.3910	0.3935	0.3920	0.0025	0.3922	0.0008388
P-17	0.4070	0.4075	0.4065	0.0010	0.4070	0.0009035
C	0.4255	0.4225	0.4235	0.0030	0.4238	0.0009798
#21	0.4335	0.4325	0.4330	0.0010	0.4330	0.0010226
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

Pitot Tube Calibration

Date: 10-Jan-20 Temp (R): 530
Pbar (in.Hg): 29.69 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)
0.045	0.060	14.1	0.8574	0.0024
0.115	0.155	22.5	0.8527	0.0022
0.300	0.400	36.4	0.8574	0.0024
0.520	0.700	47.9	0.8533	0.0017
0.610	0.820	51.9	0.8539	0.0011
		Average :	0.8549	0.0020

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.065	0.090	16.9	0.8413	0.0008
0.100	0.140	21.0	0.8367	0.0054
0.220	0.300	31.2	0.8478	0.0057
0.450	0.620	44.6	0.8434	0.0013
0.650	0.900	53.6	0.8413	0.0008
		Average :	0.8421	0.0028

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.080	0.110	18.8	0.8443	0.0000
0.100	0.140	21.0	0.8367	0.0075
0.220	0.300	31.2	0.8478	0.0035
0.400	0.550	42.0	0.8443	0.0000
0.690	0.940	55.2	0.8482	0.0039
		Average :	0.8442	0.0030

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	0.0034
0.105	0.140	21.5	0.8574	0.0034
0.220	0.300	31.2	0.8478	0.0061
0.520	0.700	47.9	0.8533	0.0007
0.610	0.820	51.9	0.8539	0.0001
		Average :	0.8539	0.0027

Pitot ID: **AL GVRD 1**

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	0.0057
0.090	0.120	19.9	0.8574	0.0057
0.280	0.380	35.2	0.8498	0.0019
0.550	0.750	49.3	0.8478	0.0039
0.650	0.890	53.6	0.8461	0.0056
		Average :	0.8517	0.0046

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.090	0.130	19.9	0.8237	0.0012
0.110	0.160	22.0	0.8209	0.0041
0.200	0.290	29.7	0.8222	0.0028
0.350	0.500	39.3	0.8283	0.0033
0.590	0.840	51.0	0.8297	0.0048
		Average :	0.8249	0.0032

Pitot ID: **7C**

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	0.0021
0.080	0.110	18.8	0.8443	0.0055
0.190	0.270	29.0	0.8305	0.0083
0.540	0.740	48.8	0.8457	0.0069
0.650	0.910	53.6	0.8367	0.0021
		Average :	0.8388	0.0050

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 10, 2020

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	January 16, 2020	100.3	29.62	29.55	29.62	0.00
DS	January 22, 2020	101.6	30.01	29.87	29.94	0.07
CL	January 16, 2020	100.3	29.62	29.56	29.63	-0.01
ML	January 6, 2020	101.8	30.07	29.96	30.03	0.03
SB	January 16, 2020	100.3	29.62	29.54	29.61	0.01
SH	January 16, 2020	100.3	29.62	29.46	29.53	0.09
JB	January 16, 2020	100.3	29.62	29.51	29.58	0.04
SF	January 6, 2020	101.8	30.07	29.96	30.03	0.03
JG	January 16, 2020	100.3	29.62	29.52	29.59	0.03

Calibrated by: Scott Ferguson Signature:  Date: January 16th, 2020

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.

http://www.weatheroffice.gc.ca/city/pages/bc-74_metric_e.html

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Scott Ferguson

Date: 20-Jan-20

Signature: 

TEMPERATURE DEVICE CALIBRATIONS

Reference Device Model CL23A Calibrator			Temperature Settings (degrees F)													
			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	33	0.20%	101	0.18%	200	0.00%	300	0.00%	499	-0.10%	800	0.00%	1700	0.00%
Omega HH11A	4	200167	33	0.20%	101	0.18%	200	0.00%	301	0.13%	500	0.00%	801	0.08%	1699	-0.05%
Omega HH11A	6	600059	32	0.00%	100	0.00%	199	-0.15%	299	-0.13%	501	0.10%	799	-0.08%	1699	-0.05%
TPI 341K	7	2.0315E+10	29.8	-0.45%	97.4	-0.46%	197.2	-0.42%	297	-0.39%	496.4	-0.38%	795.8	-0.33%	1693	-0.32%
TPI 341K	8	2.0313E+10	31	-0.20%	98	-0.36%	200	0.00%	300	0.00%	500	0.00%	800	0.00%	1697	-0.14%
Cont Cmpny	10	102008464	31.3	-0.14%	98.8	-0.21%	198.9	-0.17%	298.9	-0.14%	498.6	-0.15%	796.3	-0.29%	1693.8	-0.29%
Omega HH11	14	409426	33.2	0.24%	100.2	0.04%	202	0.30%	302	0.26%	500	0.00%	799	-0.08%	1699	-0.05%
TPI 341K	16	400120029	32	0.00%	99	-0.18%	200	0.00%	301	0.13%	500	0.00%	800	0.00%	1700	0.00%
TPI 341K	18	2.0329E+10	32	0.00%	101	0.18%	200	0.00%	300	0.00%	501	0.10%	799	-0.08%	1699	-0.05%
TPI 341K	20	2.0329E+10	30.4	-0.33%	98.2	-0.32%	198.2	-0.27%	298	-0.26%	497.1	-0.30%	796.8	-0.25%	1695	-0.23%

Reference device is a NIST certified digital thermocouple calibrator

Variation expressed as a percentage of the absolute temperature must be within 1.5 %

Calibration Certificate

Date: 27-Jan-20
Calibrated by: Louis Agassiz
Authorizing Signature:

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

Ambient Conditions: Temperature: 9 °C Barometric Pressure: 101.8 kPa Relative Humidity: 94%

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	11.3	0.33	Pass	Recal on Amb	11.0	0.03	Pass		10.97
Ambient	21.0	0.04	Pass		21.0	0.01	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	1878	0.2%	Pass	Recal w 2 Gas	1880	0.1%	Pass		1881
2 Gas	440	1.8%	Pass		448	0.0%	Pass		448
3 Gas	240	4.4%	Pass		249	0.8%	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	6	2.0%	Pass		0	0.0%	Pass		0
1 Gas	91	0.6%	Pass		91	0.6%	Pass		91
2 Gas	470	1.3%	Pass	Recal w 2 Gas	464	0.0%	Pass		464
3 Gas	47.5	4.6%	Pass		45.4	0.0%	Pass		45.4
4Gas	255	1.6%	Pass		252	0.4%	Pass		251

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)	894130	27-Jun-2019	26-May-2024	380	0	0	0
1 Gas	CC700648	5-Feb-2018	5-Feb-2026	200	-	1881	90.5
2 Gas	CC222743	13-Jan-2017	13-Jan-2025	500	-	448	464
3 Gas	CC119937	1-Feb-2018	1-Feb-2021	280	-	251	45.4
4 Gas	CC200180	13-Dec-2013	13-Dec-2021	710	-	-	251
O_2/CO_2	CC28009	5-Dec-2018	5-Dec-2026	1200	10.97	-	-

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

Calibration Certificate

Date: 27-Jan-20
Calibrated by: Louis Agassiz
Authorizing Signature:

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

Ambient Conditions: Temperature: 9 °C Barometric Pressure: 101.8 kPa Relative Humidity: 94%

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	10.9	0.07	Pass	Rezero	11.0	0.03	Pass		10.97
Ambient	20.7	0.26	Pass		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	1810	3.8%	Pass	Recal w 2 Gas	1880	0.1%	Pass		1881
2 Gas	435	2.9%	Pass		448	0.0%	Pass		448
3 Gas	246	2.0%	Pass		250	0.4%	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	1	0.3%	Pass		0	0.0%	Pass		0
1 Gas	88	2.8%	Pass		91	0.6%	Pass		91
2 Gas	450	3.0%	Pass	Recal w 2 Gas	464	0.0%	Pass		464
3 Gas	43.5	4.2%	Pass		45	0.9%	Pass		45.4
4Gas	247	1.6%	Pass		251	0.0%	Pass		251

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)	894130	27-Jun-2019	26-May-2024	380	0	0	0
1 Gas	CC700648	5-Feb-2018	5-Feb-2026	200	-	1881	90.5
2 Gas	CC222743	13-Jan-2017	13-Jan-2025	500	-	448	464
3 Gas	CC119937	1-Feb-2018	1-Feb-2021	280	-	251	45.4
4 Gas	CC200180	13-Dec-2013	13-Dec-2021	710	-	-	251
O_2/CO_2	CC28009	5-Dec-2018	5-Dec-2026	1200	10.97	-	-

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

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

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Shawn Harrington

has met the requirements of

Stack Testing for Pollutants

(CHSC 7760)

School of Process, Energy and Natural Resources
Chemical Sciences Program

Endorsed by:

Greater Vancouver Regional District

Environment Canada Environnement Canada

Province of British Columbia
Ministry of Environment, Lands and Parks

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

JUNE 21, 2001
Dated

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Daryl Sampson

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Date

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Dean
Faculty of Continuing Education and Extension

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Michael Eugene Goods

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May 22, 2019

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Scott Ferguson

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May 16, 2016

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