A.Lanfranco & Associates Inc.
Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III
4515 Central Boulevard
Burnaby, BC V5H 0C6

WASTE-TO-ENERGY FACILITY

Appendices of Emissions Testing Report
November 2023 Survey
Fourth Quarter 2023

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 Element Labs in Surrey, B.C.
- Nitrous Oxide (N_2O) analysis conducted with portable analyzer by A. Lanfranco and Associates.
- Volatile Organic Compounds (VOC) analysis conducted at ALS Environmental in Simi Valley, CA.
- Particulate analysis conducted at A. Lanfranco and Associates Inc., Surrey, BC.
- Chain of Custody protocols followed for all samples.
- Acceptable blank values for all sample types. All samples blank corrected.

Sample Type	**Blank Value**		
Fourth Quarter 2023	**Unit 1**	**Unit 2**	**Unit 3**
Filter	0.3 mg	0.1 mg	0.3 mg
Front Half Washings	0.8 mg	1.1 mg	0.7 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.2 ug	<0.18 ug	<0.17 ug
Trace Metals Front *	<11.8 ug	<25.9 ug	<12.4 ug
Trace Metals Back*	<37.3 ug	<60.9 ug	<32.2 ug
Ammonia	29.2 ug	13 ug	28.2 ug
Fluoride	<5 ug	<7 ug	<8 ug

Sum of all reported elements except Hg*

APPENDIX - B

CALCULATIONS

The following sections show the equations and define the variables that were used for this survey. The equations are organized in three sections. Equations 1-11 were used to calculate particulate concentration at standard conditions on a dry basis. Equations 12-26 were used to sample within the 100 ± 10% isokinetic variation and to confirm that sampling meets this isokinetic variation threshold. Equations 27-29 were used to calculate the volumetric flowrate of the stack flue gas.

App B.1 Contaminant Concentration Calculations

$$c = \frac{m}{V_{std}} \quad \textbf{Equation 1}$$

$$m_{part} = m_{filter} + m_{pw} \quad \textbf{Equation 2}$$

$$m_i = m_{ana,i} - m_{blank} \quad \textbf{Equation 3}$$

$$V_{std} = \frac{V_{std(imp)}}{35.315} \quad \textbf{Equation 4}$$

$$V_{std(imp)} = \frac{V_{samp} \times y \times P_m \times (T_{std} + 459.67)}{P_{std} \times (T_{m(ave)} + 459.67)} \quad \textbf{Equation 5}$$

$$V_{samp} = V_{final} - V_{init} \quad \textbf{Equation 6}$$

$$P_m = P_B + \frac{\Delta H_{ave}}{13.6} \quad \textbf{Equation 7}$$

$$\Delta H_{ave} = \frac{1}{n}\sum_{i=1}^{n} \Delta H_{i(act)}, where\ n = the\ number\ of\ points \quad \textbf{Equation 8}$$

$$OC = \frac{20.9 - \%O_{2c}}{20.9 - \%O_{2m}} \quad \textbf{Equation 9}$$

$$\%O_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%O_{2i}, where\ n = the\ number\ of\ O_2\ measurements \quad \textbf{Equation 10}$$

$$\%CO_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%CO_{2i}, where\ n = the\ number\ of\ CO_2\ measurements \quad \textbf{Equation 11}$$

Where,

c	= Contaminant concentration
m	= Contaminant mass
m_i	= Net analytical mass (mg, ng, or µg)
$m_{ana,i}$	= Analytical mass (mg, ng, or µg)
m_{blank}	= Blank analytical mass (mg, ng, or µg)
m_{part}	= Total particulate mass (mg)
m_{filter}	= Net particulate gain from filter (mg)
m_{pw}	= Net particulate gain from probe wash (mg)
$V_{std(imp)}$	= Sample volume at standard conditions (ft^3)
V_{std}	= Sample volume at standard conditions (m^3)
V_{samp}	= Sample volume at actual conditions (ft^3)
V_{final}	= Final gas meter reading (ft^3)
V_{init}	= Initial gas meter reading (ft^3)
T_{std}	= Standard temperature (68 °F)
T_m	= Gas meter temperature (°F)
$T_{m(ave)}$	= Average gas meter temperature (°F)
P_m	= Absolute meter pressure (inches of Hg)
P_B	= Barometric pressure (inches of Hg)
ΔH_{ave}	= Average of individual point orifice pressures (inches of H_2O)
$\Delta H_{i(act)}$	= Individual recorded point orifice pressures (inches of H_2O)
OC	= Oxygen correction factor (dimensionless)
$\%O_{2c}$	= Oxygen concentration to correct to (% dry basis)
$\%O_{2m}$	= Average measured stack gas oxygen concentration (% dry basis)
$\%CO_{2m}$	= Average measured stack gas oxygen concentration (% dry basis)

Equation 1 is the general concentration calculation used for all contaminants. The contaminant mass, *m*, is the net analytic mass for the given contaminant. For particulate, *m* is the sum of the mass contributed from probe washing and filter particulate.

App B.2 Isokinetic Variation Calculations

$$\Delta H_i = \frac{2.62 \times 10^7 \times c_p \times A_n \times (1 - B_{wo}) \times M_D \times (T_m + 459.67) \times \Delta p_i}{k_o \times M_w \times (T_{Stk} + 459.67)}$$ **Equation 12**

$$R_m = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{stk_i} + 459.67)}{M_w \times P_B}} \times 60 \times A_n \times \frac{(T_{m_i} + 459.67) \times (1 - B_{wo})}{(T_{stk_i} + 459.67) \times y}$$ **Equation 13**

$$A_n = \pi \left(\frac{d_n}{24}\right)^2$$ **Equation 14**

$$M_w = M_D \times (1 - B_{wo}) + 18 \times B_{wo}$$ **Equation 15**

$$M_D = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + 0.28 \times (100 - \%CO_2 - \%O_2)$$ **Equation 16**

$$T_{Stk} = \frac{1}{n}\sum_{i=1}^{n} T_{Stk_i}, where\ n = the\ number\ of\ points$$ **Equation 17**

$$B_{wo} = \frac{V_{cond}}{V_{cond} + V_{std(imp)}}$$ **Equation 18**

$$V_{cond} = 0.04707 \times V_{gain}$$ **Equation 19**

$$Iso = \frac{1}{n}\sum_{i=1}^{n} Iso_i, where\ n = the\ number\ of\ points$$ **Equation 20**

$$Iso_i = \frac{v_{nzi}}{v_i}$$ **Equation 21**

$$v_i = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{Stk_i} + 459.67)}{(P_{Stk} \times M_W)}}$$ **Equation 22**

$$v_{nzi} = \frac{(V_i - V_{i-1}) \times y \times (T_{Stk_i} + 459.67) \times (P_B + \frac{\Delta H_{i(act)}}{13.6})}{A_n \times t_i \times 60 \times (T_{m(i)} + 459.67) \times P_{stk} \times (1 - B_{wo})}$$ **Equation 23**

$$P_{stk} = P_B + \frac{P_g}{13.6}$$ **Equation 24**

$$v_{stk} = \frac{1}{n}\sum_{i=1}^{n} v_i \text{ , where } n = \text{the number of points}$$ **Equation 25**

$$v_{nz} = \frac{1}{n}\sum_{i=1}^{n} v_{nzi} \text{ , where } n = \text{the number of points}$$ **Equation 26**

Where,

A_n = *Nozzle area (ft^2)*
d_n = *Diameter of nozzle (inches)*
c_p = *Pitot coefficient (dimensionless)*
Δp_i = *Individual point differential pressures (inches of H_2O)*
T_{Stk} = *Average flue gas temperature (°F), second subscript i, indicates individual point measurements*
$\Delta H_{i(act)}$ = *Calculated individual point orifice pressures (inches of H_2O)*
P_g = *Stack Static pressure (inches of H_2O)*
P_{stk} = *Absolute stack pressure (inches of Hg)*
M_w = *Wet gas molecular weight (g/gmol)*
M_D = *Dry gas molecular weight (g/gmol)*
$\%CO_2$ = *Stack gas carbon dioxide concentration (% dry basis)*
$\%O_2$ = *Stack gas oxygen concentration (% dry basis)*
B_{wo} = *Stack gas water vapour, proportion by volume*
V_{cond} = *Total volume of water vapor collected, corrected to standard conditions (ft^3)*
V_{gain} = *Condensate gain of impinger contents (mL)*
P_{std} = *Standard pressure (29.92 inches of Hg)*
v_{stk} = *Average flue gas velocity (ft/sec)*
v_i = *Individual point flue gas velocity (ft/sec)*
v_{nz} = *Average velocity at nozzle(ft/sec)*
v_{nzi} = *Individual point velocity at nozzle(ft/sec)*
Iso_i = *Individual point isokinetic variation (%)*
Iso = *Average isokinetic variation (%)*
R_m = *Isokinetic sampling rate (ft^3/min)*

App B.3 Volumetric Flowrate Calculations

$$Q_S = Q_A \times \frac{(T_{Std} + 459.67)}{(T_{Stk} + 459.67)} \times \frac{P_{Stk}}{P_{Std}}$$ **Equation 27**

$$Q_A = \frac{v_{stk} \times 60 \times A_{stk}}{35.315}$$ **Equation 28**

$$A_{stk} = \pi \left(\frac{d}{24}\right)^2$$ **Equation 29**

Where,

Q_A = *Actual flowrate (Am³/min)*
Q_S = *Flowrate (m³/min) at standard conditions on a dry basis*
A_{stk} = *Area of stack (ft²)*
d = *Diameter of stack (inches)*

APPENDIX - C

LABORATORY RESULTS

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Report Transmission Cover Page

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1696346**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947248

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	COA / COC
Email	PDF	COC / Test Report

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Delivery	Format	Deliverables
Email	PDF	Invoice

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Analytical Report

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1696346**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947248

Reference Number	1696346-1	1696346-2	1696346-3
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles) / 21.3 °C	Field Blank Unit 2 (Unit 2 BLK + 4 Bottles) / 21.3 °C	Field Blank Unit 3 (Unit 3 BLK + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	10	<5	5
Antimony		µg	<2	4	4	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	0.3	<0.3	0.3	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	0.6	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	1	0.25
Nickel		µg	1	2	2	0.5
Phosphorus		µg	<2	<2	<2	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	4.6	5.1	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	5.3	4.8	5.1	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	20	10	5
Antimony		µg	<2	3	3	2.5
Arsenic		µg	3.7	1	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	0.5	0.6	<0.2	0.25
Copper		µg	<0.2	<0.2	0.8	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	0.8	<0.2	0.5	0.25
Nickel		µg	2.4	2.6	2	0.5
Phosphorus		µg	20	20	10	2.5
Selenium		µg	<1	<1	2.4	1.5
Tellurium		µg	5.5	8.6	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	4.4	5.1	3.5	0.5
Volume	Sample	mL	347	358	317	
Volume	aliquot volume	mL	297	308	267	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Attn: Missy
Sampled By:
Company:

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Project Name: Field Blanks
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Reference Number	1696346-1	1696346-2	1696346-3
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles) / 21.3 °C	Field Blank Unit 2 (Unit 2 BLK + 4 Bottles) / 21.3 °C	Field Blank Unit 3 (Unit 3 BLK + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	347	358	317	
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	160	135	106	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	50	50	50	
Mercury	Fraction 3A	µg/sample	<0.02	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	0.08	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	0.03	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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Methodology and Notes

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1696346**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947248

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 5, 2023	Element Vancouver

** Reference Method Modified*

References

EMC	Emission Measurement Center of EPA

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Report Transmission Cover Page

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Company:

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

Lot ID: **1696345**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947247

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	COA / COC
Email	PDF	COC / Test Report

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Delivery	Format	Deliverables
Email	PDF	Invoice

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Analytical Report

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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: **1696345**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947247

Reference Number	1696345-1	1696345-2	1696345-3
Sample Date	Nov 13, 2023	Nov 13, 2023	Nov 13, 2023
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	20	<5	<5	5
Antimony		µg	6	3	7	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	0.3	0.4	<0.3	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	3.6	2	2	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<2	<2	7.0	1.5
Tellurium		µg	5.3	9.0	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	5.8	4.9	5.2	0.5
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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Methodology and Notes

Bill To: A. Lanfranco & Associates
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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: **1696345**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947247

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 5, 2023	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.

Appendix C - Particulate Analysis

Client:	Metro Vancouver	**Sample Date:**	Nov-14-17-23
Source:	Units 1, 2, and 3	**Location:**	WTE (Burnaby, B.C)

A. Lanfranco & Associates Standard Operating Procedure:

SOP 1.2.1 Gravimetric determination of total particulate matter

Filter Collection:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	0.4610	0.4613	0.0003	
Unit 1 Run 1	0.4674	0.4683	0.0009	0.0006
Unit 1 Run 2	0.4637	0.4647	0.0010	0.0007
Unit 1 Run 3	0.4650	0.4652	0.0002	ND
Unit 2 Blank	0.4722	0.4723	0.0001	
Unit 2 Run 1	0.4636	0.4665	0.0029	0.0028
Unit 2 Run 2	0.4493	0.4497	0.0004	0.0003
Unit 2 Run 3	0.4693	0.4697	0.0004	0.0003
Unit 3 Blank	0.4543	0.4546	0.0003	
Unit 3 Run 1	0.4710	0.4710	0.0000	ND
Unit 3 Run 2	0.4652	0.4651	-0.0001	ND
Unit 3 Run 3	0.4670	0.4668	-0.0002	ND

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	113.3298	113.3306	0.0008	
Unit 1 Run 1	122.2529	122.2530	0.0001	ND
Unit 1 Run 2	122.2443	122.2446	0.0003	ND
Unit 1 Run 3	127.1422	127.1464	0.0042	0.0034
Unit 2 Blank	96.0552	96.0563	0.0011	
Unit 2 Run 1	118.5688	118.5729	0.0041	0.0030
Unit 2 Run 2	110.9555	110.9565	0.0010	ND
Unit 2 Run 3	119.2573	119.2611	0.0038	0.0027
Unit 3 Blank	119.3298	119.3305	0.0007	
Unit 3 Run 1	123.7575	123.7582	0.0007	ND
Unit 3 Run 2	84.8105	84.8113	0.0008	0.0001
Unit 3 Run 3	118.6535	118.6538	0.0003	ND

Task	Unit	Personnel	Date	Quality Control	Y/N
Fiter Recovery:	Unit 1	S.Harrington	14-15-Nov-23	Adequate PW volume:	Y
	Unit 2	S.Harrington	15-16-Nov-23	No sample leakage:	Y
	Unit 3	S.Harrington	16-17-Nov-23	Filter not compromised:	Y
PW Initial Analysis:	Unit 1	J. Ching	20-Nov-23		
	Unit 2	J. Ching	20-Nov-23		
	Unit 3	J. Ching	20-Nov-23		
PW, FilterFinal Analysis:	Unit 1	J. Ching	22-Nov-23		
	Unit 2	J. Ching	22-Nov-23		
	Unit 3	J. Ching	22-Nov-23		
Data entered to computer:	All	S. Harrington	7-Dec-23		

Comments:

No problems encountered in sample analysis.

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

Lot ID: **1695612**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945938

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	PDF	COA / COC
Email	PDF	COC / Test Report

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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Project Name: HF Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695612**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945938

Reference Number	1695612-1	1695612-2	1695612-3
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Blank / 17.8 °C	Unit #2 HF Blank / 17.8 °C	Unit #3 HF Blank / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	176	223	267	
Dilution Factor	fluoride		1.00000000	1.00000000	1.00000000	
Fluoride	As Tested	mg/L	<0.03	<0.03	<0.03	0.03
Fluoride	Water Soluble	µg/sample	<5	<7	<8	

Approved by:

Max Hewitt
Operations Manager

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

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Company:

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

Lot ID: **1695612**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945938

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Anions by IEC in air (VAN)	EMC	*	Determination of Hydrogen Halide & Halogen Emissions from Stationary Sources (Isokinetic), 26A	Nov 22, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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Results relate only to samples as submitted.

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

Lot ID: **1695615**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945943

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
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Email	PDF	COC / Test Report

Contact	Company	Address
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Project Name: HF Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695615**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945943

Reference Number	1695615-1	1695615-2	1695615-3
Sample Date	Nov 15, 2023	Nov 15, 2023	Nov 15, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Run 1 / 17.8 °C	Unit #1 HF Run 2 / 17.8 °C	Unit #1 HF Run 3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	413	426	419	
Dilution Factor	fluoride		1.00000000	1.00000000	1.00000000	
Fluoride	As Tested	mg/L	0.11	0.09	0.04	0.03
Fluoride	Water Soluble	µg/sample	44	40	20	

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

Lot ID: **1695615**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945943

Reference Number	1695615-4	1695615-5	1695615-6
Sample Date	Nov 16, 2023	Nov 16, 2023	Nov 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 HF Run 1 / 17.8 °C	Unit #2 HF Run 2 / 17.8 °C	Unit #2 HF Run 3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	343	384	358	
Dilution Factor	fluoride		1.00000000	1.00000000	1.00000000	
Fluoride	As Tested	mg/L	0.05	0.08	0.07	0.03
Fluoride	Water Soluble	µg/sample	20	30	30	

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Project Name: HF Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695615**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945943

Reference Number	1695615-7	1695615-8	1695615-9
Sample Date	Nov 17, 2023	Nov 17, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 HF Run 1 / 17.8 °C	Unit #3 HF Run 2 / 17.8 °C	Unit #3 HF Run 3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	426	407	485	
Dilution Factor	fluoride		1.00000000	1.00000000	1.00000000	
Fluoride	As Tested	mg/L	0.09	0.07	0.06	0.03
Fluoride	Water Soluble	µg/sample	40	30	30	

Approved by:

Max Hewitt
Operations Manager

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Methodology and Notes

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Lot ID: **1695615**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945943

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Anions by IEC in air (VAN)	EMC	*	Determination of Hydrogen Halide & Halogen Emissions from Stationary Sources (Isokinetic), 26A	Nov 22, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Contact	Company	Address
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Delivery	Format	Deliverables
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Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Reference Number	1696334-1	1696334-2	1696334-3
Sample Date	Nov 14, 2023	Nov 15, 2023	Nov 15, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (Unit 1 Run 1 + 4 Bottles) / 21.3 °C	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles) / 21.3 °C	Unit 1 Run 3 (Unit 1 Run 3 + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	10	8	5
Antimony		µg	<2	3	4	2.5
Arsenic		µg	1	<1	<1	1
Cadmium		µg	<0.3	0.3	<0.3	0.25
Chromium		µg	1.3	0.58	<0.2	0.2
Cobalt		µg	0.5	0.3	0.6	0.25
Copper		µg	<0.3	<0.3	2	0.25
Lead		µg	<2	<2	2	1.5
Manganese		µg	1	2	0.5	0.25
Nickel		µg	4.1	3.7	2	0.5
Phosphorus		µg	9	6	<2	2.5
Selenium		µg	<2	7.1	7.5	1.5
Tellurium		µg	4.6	4.5	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	22	25.0	20	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	30	38	24	5
Antimony		µg	3	6	<2	2.5
Arsenic		µg	<0.9	5.9	<0.9	1
Cadmium		µg	<0.2	0.2	<0.2	0.25
Chromium		µg	1.5	2.88	<0.2	0.2
Cobalt		µg	0.6	<0.2	<0.2	0.25
Copper		µg	<0.2	<0.2	<0.2	0.25
Lead		µg	2.7	4.3	<1	1.5
Manganese		µg	1	2	0.9	0.25
Nickel		µg	2	3.2	2.3	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	2.6	<1	3.5	1.5
Tellurium		µg	4.0	6.7	2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	8.3	6.2	3.8	0.5
Volume	Sample	mL	774	849	746	
Volume	aliquot volume	mL	724	799	696	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Date Received: Nov 22, 2023
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Report Number: 2947231

Reference Number	1696334-1	1696334-2	1696334-3
Sample Date	Nov 14, 2023	Nov 15, 2023	Nov 15, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (Unit 1 Run 1 + 4 Bottles) / 21.3 °C	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles) / 21.3 °C	Unit 1 Run 3 (Unit 1 Run 3 + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	774	849	746	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	178	161	172	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	50	50	50	
Mercury	Fraction 3A	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.08	<0.08	
Mercury	As Tested	µg/L	0.45	<0.05	0.06	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.14	<0.02	0.02	

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Analytical Report

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Reference Number	1696334-4	1696334-5	1696334-6
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (Unit 2 Run 1 + 4 Bottles) / 21.3 °C	Unit 2 Run 2 (MV Unit - 2 Run 2 + 4 Bottles) / 21.3 °C	Unit 2 Run 3 (Unit - 2 Run 3 + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	10	10	7	5
Antimony		µg	<2	3	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	0.3	0.5	<0.3	0.25
Chromium		µg	0.94	<0.2	6.11	0.2
Cobalt		µg	<0.3	0.7	<0.3	0.25
Copper		µg	0.4	<0.3	0.4	0.25
Lead		µg	<2	6.2	8.7	1.5
Manganese		µg	1	2	5.3	0.25
Nickel		µg	3.0	3.9	7.4	0.5
Phosphorus		µg	8	5	6	2.5
Selenium		µg	12	<2	<2	1.5
Tellurium		µg	3.9	7.7	5.9	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	17	21	24	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	34	20	28	5
Antimony		µg	5	3	<2	2.5
Arsenic		µg	4.9	4.2	3.2	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	2.61	2.21	<0.2	0.2
Cobalt		µg	<0.2	<0.2	0.4	0.25
Copper		µg	0.9	<0.2	<0.2	0.25
Lead		µg	5.8	3.2	<1	1.5
Manganese		µg	1	1	1	0.25
Nickel		µg	2.6	5.1	2.6	0.5
Phosphorus		µg	24	22	26	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	9.1	2	4.3	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	6.8	20	5.8	0.5
Volume	Sample	mL	816	770	749	
Volume	aliquot volume	mL	766	720	699	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Reference Number	1696334-4	1696334-5	1696334-6
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (Unit 2 Run 1 + 4 Bottles) / 21.3 °C	Unit 2 Run 2 (MV Unit - 2 Run 2 + 4 Bottles) / 21.3 °C	Unit 2 Run 3 (Unit - 2 Run 3 + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	816	770	749	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	143	186	158	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	50	50	50	
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	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	0.09	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.03	<0.02	<0.02	

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Analytical Report

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Company:

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Reference Number	1696334-7	1696334-8	1696334-9
Sample Date	Nov 16, 2023	Nov 17, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (Unit 3 Run 1 + 4 Bottles / 21.3 °C	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles) / 21.3 °C	Unit 3 Run 3 (Unit 3 Run 3 + 4 Bottles) / 21.3 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	10	20	477	5
Antimony		µg	10	20	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	0.4	0.4	0.4	0.25
Chromium		µg	2.1	0.95	1.5	0.2
Cobalt		µg	<0.3	0.9	<0.3	0.25
Copper		µg	<0.3	2	2	0.25
Lead		µg	<2	<2	3.3	1.5
Manganese		µg	1	1	1	0.25
Nickel		µg	5.7	3.3	3.1	0.5
Phosphorus		µg	6	3	9	2.5
Selenium		µg	<2	6.2	<2	1.5
Tellurium		µg	2	14	2.7	2
Thallium		µg	<2	<2	2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	17	15	28.0	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	10	9	10	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	3.8	0.9	<0.9	1
Cadmium		µg	<0.2	0.3	<0.2	0.25
Chromium		µg	<0.2	1.1	1.7	0.2
Cobalt		µg	0.6	0.7	<0.2	0.25
Copper		µg	<0.2	<0.2	1	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	0.3	0.5	1	0.25
Nickel		µg	2	2	4.0	0.5
Phosphorus		µg	20	20	25	2.5
Selenium		µg	<1	<1	8.3	1.5
Tellurium		µg	<2	2	2.8	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	4.5	10	5.5	0.5
Volume	Sample	mL	818	810	838	
Volume	aliquot volume	mL	768	760	788	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Company:

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

	Reference Number	1696334-7	1696334-8	1696334-9	
	Sample Date	Nov 16, 2023	Nov 17, 2023	Nov 17, 2023	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Unit 3 Run 1 (Unit 3 Run 1 + 4 Bottles / 21.3 °C	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles) / 21.3 °C	Unit 3 Run 3 (Unit 3 Run 3 + 4 Bottles) / 21.3 °C	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	818	810	838	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	156	173	156	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	50	50	50	
Mercury	Fraction 3A	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	0.09	0.06	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	0.03	0.02	0.038	

Approved by:

Max Hewitt
Operations Manager

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

Lot ID: **1696334**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947231

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 5, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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Project ID: Metro Vancouver WTE
Project Name: NH3 Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695601**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945927

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Delivery	Format	Deliverables
Email	PDF	COA / COC
Email	PDF	COC / Test Report

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Delivery	Format	Deliverables
Email	PDF	Invoice

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Project ID: Metro Vancouver WTE
Project Name: NH3 Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695601**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945927

Reference Number	1695601-1	1695601-2	1695601-3
Sample Date	Nov 15, 2023	Nov 16, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 NH3 Blk / 17.8 °C	Unit #2 NH3 Blk / 17.8 °C	Unit #3 NH3 Blk / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	195	50	103	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	150	254	274	
Ammonium - N		µg/sample	29.2	13	28.2	

Approved by:

Max Hewitt
Operations Manager

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Methodology and Notes

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Project ID: Metro Vancouver WTE
Project Name: NH3 Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695601**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945927

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	Nov 24, 2023	Element Edmonton - Roper Road

** Reference Method Modified*

References

APHA Standard Methods for the Examination of Water and Wastewater

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Project ID: Metro Vancouver WTE
Project Name: NH3 Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695608**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945934

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	COA / COC
Email	PDF	COC / Test Report

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	Invoice

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Project ID: Metro Vancouver WTE
Project Name: NH3 Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695608**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945934

Reference Number	1695608-1	1695608-2	1695608-3
Sample Date	Nov 15, 2023	Nov 15, 2023	Nov 15, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 NH3 / 17.8 °C	Unit 1 Run 2 NH3 / 17.8 °C	Unit 1 Run 3 NH3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	2840	13100	4700	25
Dilution Factor	As Tested		1.00	10.0	1.00	
Sample Volume	Sample volume	mL	395	434	445	
Ammonium - N		µg/sample	1120	5690	2090	

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Project ID: Metro Vancouver WTE
Project Name: NH3 Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695608**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945934

Reference Number	1695608-4	1695608-5	1695608-6
Sample Date	Nov 16, 2023	Nov 16, 2023	Nov 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 NH3 / 17.8 °C	Unit 2 Run 2 NH3 / 17.8 °C	Unit 2 Run 3 NH3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	5520	1850	1520	25
Dilution Factor	As Tested		1.00	10.0	10.0	
Sample Volume	Sample volume	mL	460	450	460	
Ammonium - N		µg/sample	2540	8310	7020	

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Project ID: Metro Vancouver WTE
Project Name: NH3 Samples
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1695608**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945934

Reference Number	1695608-7	1695608-8	1695608-9
Sample Date	Nov 17, 2023	Nov 17, 2023	Nov 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 NH3 / 17.8 °C	Unit 3 Run 2 NH3 / 17.8 °C	Unit 3 Run 3 NH3 / 17.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	2130	2150	2680	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	394	365	354	
Ammonium - N		µg/sample	838	784	948	

Approved by:

Max Hewitt
Operations Manager

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

Lot ID: **1695608**
Control Number:
Date Received: Nov 20, 2023
Date Reported: Nov 24, 2023
Report Number: 2945934

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	Nov 24, 2023	Element Edmonton - Roper Road

** Reference Method Modified*

References

APHA Standard Methods for the Examination of Water and Wastewater

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

Lot ID: **1696355**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947303

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Delivery	Format	Deliverables
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Email	PDF	COC / Test Report

Contact	Company	Address
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Delivery	Format	Deliverables
Email	PDF	Invoice

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

Lot ID: **1696355**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947303

Reference Number	1696355-1	1696355-2	1696355-3
Sample Date	Nov 13, 2023	Nov 13, 2023	Nov 13, 2023
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	20	5
Antimony		µg	4	<2	<2	2.5
Arsenic		µg	<1	<1	2	1
Cadmium		µg	<0.3	<0.3	0.4	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	0.6	<0.3	<0.3	0.25
Copper		µg	<0.3	0.4	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	<0.5	2	1	0.5
Phosphorus		µg	3	3	<2	2.5
Selenium		µg	<2	6.7	<2	1.5
Tellurium		µg	<2	<2	2.8	2
Thallium		µg	<2	<2	7.5	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	3.4	4.9	4.1	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	6	<5	5
Antimony		µg	<3	<3	<3	2.5
Arsenic		µg	<1	2	6.6	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.3	0.7	<0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	2	<2	<2	1.5
Manganese		µg	0.3	0.3	<0.3	0.25
Nickel		µg	2	2	2.6	0.5
Phosphorus		µg	32	32	33	2.5
Selenium		µg	4.0	<2	<2	1.5
Tellurium		µg	<2	7.2	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	3.4	4.8	3.6	0.5
Volume	Sample	mL	208	210	210	
Volume	aliquot volume	mL	158	160	160	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	

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W: www.element.com

Analytical Report

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

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

Lot ID: **1696355**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947303

Reference Number	1696355-1	1696355-2	1696355-3
Sample Date	Nov 13, 2023	Nov 13, 2023	Nov 13, 2023
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	208	210	210	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	50	50	50	
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	98	97	97	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	50	50	50	
Mercury	Fraction 3A	µg/sample	<0.010	<0.010	<0.010	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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Methodology and Notes

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

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

Lot ID: **1696355**
Control Number:
Date Received: Nov 22, 2023
Date Reported: Dec 14, 2023
Report Number: 2947303

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 11, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 5, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

ALS Environmental
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Simi Valley, CA 93065
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LABORATORY REPORT

December 7, 2023

Mark Lanfranco
A. Lanfranco and Associates Inc.
Unit 101 - 9488 189 St.
Surrey, BC V4N 4W7

RE: Metro Vancouver W.T.E

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on November 21, 2023. For your reference, these analyses have been assigned our service request number P2305587.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

ALS | Environmental

By Sue Anderson at 11:46 am, Dec 07, 2023

Sue Anderson
Project Manager

ALS Environmental
2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T +1 805 526 7161

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Client: A. Lanfranco and Associates Inc. Service Request No: P2305587
Project: Metro Vancouver W.T.E

CASE NARRATIVE

The samples were received intact under chain of custody on November 21, 2023 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

C3 through C6 Hydrocarbons, Methane, Ethene, and Ethane Analysis

The samples were analyzed per modified EPA Method TO-3 for C3 through >C6 hydrocarbons and methane, ethene and ethane using a gas chromatograph equipped with a flame ionization detector (FID). This procedure is described in laboratory SOP VOA-TO3C1C6. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP, LLC accreditation.

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CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	https://dec.alaska.gov/spar/csp/lab-approval/list-of-approved-labs	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	https://internet.deq.louisiana.gov/portal/divisions/lelap/accredited-laboratories	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtm	2022028
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	006-999-456
New Jersey DEP (NELAP)	https://dep.nj.gov/dsr/oqa/certified-laboratories/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oklahoma DEQ (NELAP)	labaccreditation.deq.ok.gov/labaccreditation/	2207
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068
Pennsylvania DEP	hhttp://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-23-14
Utah DOH (NELAP)	https://uphl.utah.gov/certifications/environmental-laboratory-certification/	CA016272023-15
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: A. Lanfranco and Associates Inc. Service Request: P2305587

Project ID: Metro Vancouver W.T.E

Date Received: 11/21/2023

Time Received: 09:44

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
Unit 1 Run 1	P2305587-001	Air	11/15/2023	11:38	SC01949	-2.44	4.24	X	X
Unit 1 Run 2	P2305587-002	Air	11/15/2023	12:49	SC00221	-3.36	4.47	X	X
Unit 1 Run 3	P2305587-003	Air	11/15/2023	14:01	SC01032	-4.00	4.45	X	X
Unit 2 Run 1	P2305587-004	Air	11/16/2023	10:56	SC00822	-2.94	4.55	X	X
Unit 2 Run 2	P2305587-005	Air	11/16/2023	12:08	SC00235	-2.55	4.27	X	X
Unit 2 Run 3	P2305587-006	Air	11/16/2023	13:23	SC02156	-2.19	4.90	X	X
Unit 3 Run 1	P2305587-007	Air	11/17/2023	10:39	SC01561	-3.70	4.34	X	X
Unit 3 Run 2	P2305587-008	Air	11/17/2023	11:54	SC00884	0.85	4.30	X	X
Unit 3 Run 3	P2305587-009	Air	11/17/2023	13:06	SC00071	-5.40	4.32	X	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. PO 5787

ALS Contact:

Company Name & Address (Reporting Information)	A.Lanfranco & Associates Inc.
Project Name	Metro Vancouver W.T.E.
Project Number	
Project Manager	Mark Lanfranco
P.O. # / Billing Information	Bill to Account
Phone	604-881-2582
Fax	
Email Address for Result Reporting	mark.lanfranco@alanfranco.com
Sampler (Print & Sign)	Daryl Sampson Daryl Sampson

Analysis Method: TO-3 (List on File)

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume
Unit 1 Run 1	1	11-15-23	0956-1138	SC01949	OA01213	-32"	7"	6L
Unit 1 Run 2	2	11-15-23	11:49-1249	SC00221	OA00217	-35"	9"	6L
Unit 1 Run 3	3	11-15-23	1307-1401	SC01030	OAO0250	-27"	8"	6L
Unit 2 Run 1	4	11-16-23	0956-1056	SC00822	OA02248	-29"	7"	6L
Unit 2 Run 2	5	11-16-23	1108-1208	SC00235	OA01364	-35"	8"	6L
Unit 2 Run 3	6	11-16-23	1223-1323	SCO2156	OA00613	-30"	7"	6L
Unit 3 Run 1	7	11-17-23	0939-1039	SC01561	OA00252	-28"	-9.5"	6L
Unit 3 Run 2	8	11-17-23	1054-1154	SC00884	OAO1220	-25"	-4"	6L
Unit 3 Run 3	9	11-17-23	1206-1306	SCO071	OA01808	-30"	-12"	6L

Report Tier Levels - please select

Tier I - Results (Default if not specified) ____ Tier III (Results + QC & Calibration Summaries) ____
Tier II (Results + QC Summaries) ____ Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) FD	Date:	Time:	Received by: (Signature)	Date: 11-21-23	Time: 0944

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: A. Lanfranco and Associates Inc. Work order: P2305587

Project: Metro Vancouver W.T.E

Sample(s) received on: 11/21/23 Date opened: 11/21/23 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☐	☒	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒
12	Lab Notification: Analyst and PM were alerted of Short HT or RUSH samples?	☐	☐	☒
13	Client Notification: Client has been notified regarding HT exceedances and/or other CoC discrepancies?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2305587-001.01	6.0 L Source Can					
P2305587-002.01	6.0 L Source Can					
P2305587-003.01	6.0 L Source Can					
P2305587-004.01	6.0 L Source Can					
P2305587-005.01	6.0 L Source Can					
P2305587-006.01	6.0 L Source Can					
P2305587-007.01	6.0 L Source Can					
P2305587-008.01	6.0 L Source Can					
P2305587-009.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers):

Can ID noted on COC for sample -003 is listed SC01030 but the correct can ID is SC01032.

Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-001

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01949

Initial Pressure (psig): -2.44 Final Pressure (psig): 4.24

Container Dilution Factor: 1.54

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.77	
C_4 as n-Butane	ND	0.77	
C_5 as n-Pentane	ND	0.77	
C_6 as n-Hexane	ND	0.77	
C_6+ as n-Hexane	ND	1.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-002

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00221

Initial Pressure (psig): -3.36 Final Pressure (psig): 4.47

Container Dilution Factor: 1.69

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.85	
C_4 as n-Butane	ND	0.85	
C_5 as n-Pentane	ND	0.85	
C_6 as n-Hexane	ND	0.85	
C_6+ as n-Hexane	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-003

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01032

Initial Pressure (psig): -4.00 Final Pressure (psig): 4.45

Container Dilution Factor: 1.79

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.90	
C_4 as n-Butane	ND	0.90	
C_5 as n-Pentane	ND	0.90	
C_6 as n-Hexane	ND	0.90	
C_6+ as n-Hexane	ND	1.8	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-004

Test Code: EPA TO-3 Modified Date Collected: 11/16/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00822

Initial Pressure (psig): -2.94 Final Pressure (psig): 4.55

Container Dilution Factor: 1.64

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.82	
C_4 as n-Butane	ND	0.82	
C_5 as n-Pentane	ND	0.82	
C_6 as n-Hexane	ND	0.82	
C_6+ as n-Hexane	ND	1.6	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-005

Test Code:	EPA TO-3 Modified	Date Collected:	11/16/23
Instrument ID:	HP5890 II/GC8/FID	Date Received:	11/21/23
Analyst:	Stephanie Reynoso	Date Analyzed:	11/29/23
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC00235		

Initial Pressure (psig): -2.55 Final Pressure (psig): 4.27

Container Dilution Factor: 1.56

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.78	
C_4 as n-Butane	ND	0.78	
C_5 as n-Pentane	ND	0.78	
C_6 as n-Hexane	ND	0.78	
C_6+ as n-Hexane	ND	1.6	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-006

Test Code: EPA TO-3 Modified Date Collected: 11/16/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02156

Initial Pressure (psig): -2.19 Final Pressure (psig): 4.90

Container Dilution Factor: 1.57

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.79	
C_4 as n-Butane	ND	0.79	
C_5 as n-Pentane	ND	0.79	
C_6 as n-Hexane	ND	0.79	
C_6+ as n-Hexane	ND	1.6	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-007

Test Code: EPA TO-3 Modified Date Collected: 11/17/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01561

Initial Pressure (psig): -3.70 Final Pressure (psig): 4.34

Container Dilution Factor: 1.73

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.87	
C_4 as n-Butane	ND	0.87	
C_5 as n-Pentane	ND	0.87	
C_6 as n-Hexane	ND	0.87	
C_6+ as n-Hexane	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-008

Test Code:	EPA TO-3 Modified	Date Collected:	11/17/23
Instrument ID:	HP5890 II/GC8/FID	Date Received:	11/21/23
Analyst:	Stephanie Reynoso	Date Analyzed:	11/29/23
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC00884		

Initial Pressure (psig): 0.85 Final Pressure (psig): 4.30

Container Dilution Factor: 1.22

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.61	
C_4 as n-Butane	ND	0.61	
C_5 as n-Pentane	ND	0.61	
C_6 as n-Hexane	ND	0.61	
C_6+ as n-Hexane	ND	1.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-009

Test Code: EPA TO-3 Modified Date Collected: 11/17/23
Instrument ID: HP5890 II/GC8/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00071

Initial Pressure (psig): -5.40 Final Pressure (psig): 4.32

Container Dilution Factor: 2.05

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	1.0	
C_4 as n-Butane	ND	1.0	
C_5 as n-Pentane	ND	1.0	
C_6 as n-Hexane	ND	1.0	
C_6+ as n-Hexane	ND	2.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P231129-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.50	
C_4 as n-Butane	ND	0.50	
C_5 as n-Pentane	ND	0.50	
C_6 as n-Hexane	ND	0.50	
C_6+ as n-Hexane	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P231129-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Stephanie Reynoso Date Analyzed: 11/29/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
Propane	984	1,070	1,070	**109**	**109**	92-120	0	6	
n-Butane	1,000	1,070	1,070	**107**	**107**	91-121	0	6	
n-Pentane	1,000	1,040	1,040	**104**	**104**	89-118	0	6	
n-Hexane	1,000	1,090	1,080	**109**	**108**	92-125	0.9	6	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-001

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01949

Initial Pressure (psig): -2.44 Final Pressure (psig): 4.24

Container Dilution Factor: 1.54

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**3.1**	2.0	**4.7**	3.1	
74-85-1	Ethene	ND	1.1	ND	0.92	
74-84-0	Ethane	ND	1.1	ND	0.92	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-002

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00221

Initial Pressure (psig): -3.36 Final Pressure (psig): 4.47

Container Dilution Factor: 1.69

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**6.2**	2.2	**9.4**	3.4	
74-85-1	Ethene	ND	1.2	ND	1.0	
74-84-0	Ethane	ND	1.2	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-003

Test Code: EPA TO-3 Modified Date Collected: 11/15/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01032

Initial Pressure (psig): -4.00 Final Pressure (psig): 4.45

Container Dilution Factor: 1.79

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**3.2**	2.3	**4.9**	3.6	
74-85-1	Ethene	ND	1.2	ND	1.1	
74-84-0	Ethane	ND	1.3	ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-004

Test Code: EPA TO-3 Modified Date Collected: 11/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00822

Initial Pressure (psig): -2.94 Final Pressure (psig): 4.55

Container Dilution Factor: 1.64

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.2**	2.2	**3.4**	3.3	
74-85-1	Ethene	ND	1.1	ND	0.98	
74-84-0	Ethane	ND	1.2	ND	0.98	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-005

Test Code: EPA TO-3 Modified Date Collected: 11/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00235

Initial Pressure (psig): -2.55 Final Pressure (psig): 4.27

Container Dilution Factor: 1.56

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.7**	2.0	**4.2**	3.1	
74-85-1	Ethene	ND	1.1	ND	0.94	
74-84-0	Ethane	ND	1.2	ND	0.94	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-006

Test Code: EPA TO-3 Modified Date Collected: 11/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02156

Initial Pressure (psig): -2.19 Final Pressure (psig): 4.90

Container Dilution Factor: 1.57

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.6**	2.1	**4.0**	3.1	
74-85-1	Ethene	ND	1.1	ND	0.94	
74-84-0	Ethane	ND	1.2	ND	0.94	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 1** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-007

Test Code: EPA TO-3 Modified Date Collected: 11/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01561

Initial Pressure (psig): -3.70 Final Pressure (psig): 4.34

Container Dilution Factor: 1.73

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.3	ND	3.5	
74-85-1	Ethene	ND	1.2	ND	1.0	
74-84-0	Ethane	ND	1.3	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 2** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-008

Test Code: EPA TO-3 Modified Date Collected: 11/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00884

Initial Pressure (psig): 0.85 Final Pressure (psig): 4.30

Container Dilution Factor: 1.22

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.6**	1.6	**3.9**	2.4	
74-85-1	Ethene	ND	0.84	ND	0.73	
74-84-0	Ethane	ND	0.90	ND	0.73	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 3** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2305587-009

Test Code: EPA TO-3 Modified Date Collected: 11/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 11/21/23
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00071

Initial Pressure (psig): -5.40 Final Pressure (psig): 4.32

Container Dilution Factor: 2.05

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.7	ND	4.1	
74-85-1	Ethene	ND	1.4	ND	1.2	
74-84-0	Ethane	ND	1.5	ND	1.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P231122-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.3	ND	2.0	
74-85-1	Ethene	ND	0.69	ND	0.60	
74-84-0	Ethane	ND	0.74	ND	0.60	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P2305587
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P231122-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Stephanie Reynoso Date Analyzed: 11/22/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
74-82-8	Methane	7.60	7.41	7.18	**98**	**94**	70-130	4	15	
74-85-1	Ethene	7.53	7.41	7.28	**98**	**97**	70-130	1	15	
74-84-0	Ethane	7.49	7.65	7.52	**102**	**100**	70-130	2	15	

Your Project #: METROVAN WTE
Site#: C394832
Site Location: BURNABY, BC
Your C.O.C. #: C394832-ONVT-01-01

Attention: Customer Solutions

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

Report Date: 2023/11/30
Report #: R7934726
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AL037
Received: 2023/11/25, 13:40

Sample Matrix: Tedlar Bag
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrous Oxide (1)	8	N/A	2023/11/27	CAM SOP-00203	GC/ECD

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas 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.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas 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 Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas 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 Bureau Veritas, 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 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: METROVAN WTE
Site#: C394832
Site Location: BURNABY, BC
Your C.O.C. #: C394832-ONVT-01-01

Attention: Customer Solutions

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

Report Date: 2023/11/30
Report #: R7934726
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3AL037
Received: 2023/11/25, 13:40

Encryption Key

Jade Browne
Project Manager Assistant - Air
30 Nov 2023 13:31:02

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

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

Bureau Veritas Job #: C3AL037
Report Date: 2023/11/30

Bureau Veritas
Client Project #: METROVAN WTE
Site Location: BURNABY, BC

COMPRESSED GAS PARAMETERS (TEDLAR BAG)

Bureau Veritas ID		XSC054	XSC054	XSC055	XSC056		
Sampling Date		2023/11/15 10:53	2023/11/15 10:53	2023/11/15 11:59	2023/11/15 13:01		
COC Number		C394832-ONVT-01-01	C394832-ONVT-01-01	C394832-ONVT-01-01	C394832-ONVT-01-01		
	UNITS	CFH102-UNIT#1 R1	CFH102-UNIT#1 R1 Lab-Dup	CFH103-UNIT#1 R2	CFH104-UNIT#1 R3	RDL	QC Batch
Gas							
Nitrous Oxide	ppmv	5.3	5.4	1.7	7.6	0.1	9080238

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

Bureau Veritas ID		XSC057	XSC058	XSC059	XSC061		
Sampling Date		2023/11/16 09:56	2023/11/16 11:08	2023/11/16 12:23	2023/11/17 10:57		
COC Number		C394832-ONVT-01-01	C394832-ONVT-01-01	C394832-ONVT-01-01	C394832-ONVT-01-01		
	UNITS	CFH105-UNIT#2 R1	CFH106-UNIT#2 R2	CFH107-UNIT#2 R3	CFH109-UNIT#3 R2	RDL	QC Batch
Gas							
Nitrous Oxide	ppmv	7.5	8.2	9.4	6.4	0.1	9080238

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		XSC062		
Sampling Date		2023/11/17 12:06		
COC Number		C394832-ONVT-01-01		
	UNITS	CFH110-UNIT#3 R3	RDL	QC Batch
Gas				
Nitrous Oxide	ppmv	0.5	0.1	9080238

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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

TEST SUMMARY

Bureau Veritas ID: XSC054
Sample ID: CFH102-UNIT#1 R1
Matrix: Tedlar Bag

Collected: 2023/11/15
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC054 Dup
Sample ID: CFH102-UNIT#1 R1
Matrix: Tedlar Bag

Collected: 2023/11/15
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/29	Satvinder Bhathal

Bureau Veritas ID: XSC055
Sample ID: CFH103-UNIT#1 R2
Matrix: Tedlar Bag

Collected: 2023/11/15
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC056
Sample ID: CFH104-UNIT#1 R3
Matrix: Tedlar Bag

Collected: 2023/11/15
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC057
Sample ID: CFH105-UNIT#2 R1
Matrix: Tedlar Bag

Collected: 2023/11/16
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC058
Sample ID: CFH106-UNIT#2 R2
Matrix: Tedlar Bag

Collected: 2023/11/16
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC059
Sample ID: CFH107-UNIT#2 R3
Matrix: Tedlar Bag

Collected: 2023/11/16
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

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TEST SUMMARY

Bureau Veritas ID: XSC061
Sample ID: CFH109-UNIT#3 R2
Matrix: Tedlar Bag

Collected: 2023/11/17
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

Bureau Veritas ID: XSC062
Sample ID: CFH110-UNIT#3 R3
Matrix: Tedlar Bag

Collected: 2023/11/17
Shipped:
Received: 2023/11/25

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9080238	N/A	2023/11/27	Satvinder Bhathal

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GENERAL COMMENTS

Nitrous Oxide Analysis: The samples were analysed 12 days after the date of sampling. The recommended holding time is 2 days.

Sample XSC055 [CFH103-UNIT#1 R2] : Sample bag appears to be somewhat deflated. Possible that the sample bag has some slow leaks.

Sample XSC062 [CFH110-UNIT#3 R3] : Sample bag appears to be somewhat deflated. Possible that the sample bag has some slow leaks.

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
9080238	Nitrous Oxide	2023/11/29	<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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Bureau Veritas Job #: C3AL037
Report Date: 2023/11/30

Bureau Veritas
Client Project #: METROVAN WTE
Site Location: BURNABY, BC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Tom Mitchell, B.Sc, Supervisor, Compressed Gases

Bureau Veritas 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 Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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

BV LABS INTERLAB CHAIN OF CUSTODY RECORD

COC # C394832-ONTV-01-01

REPORT INFORMATION	
Company:	Bureau Veritas Laboratories
Address:	4606 Canada Way, Burnaby, British Columbia, V5G 1K5
Contact Name:	Customer Solutions
Email:	customersolutionswest@bureauveritas.com, Customersolutionswest@bureauveritas.
Phone:	
BV Labs Project #:	C394832
Client Invoice To:	A. LANFRANCO & ASSOCIATES INC. (1301)
Client Report To:	A. LANFRANCO & ASSOCIATES INC. (1301)

Incl. on Report? Yes / No

ANALYSIS REQUESTED

Job Barcode Label

25-Nov-23 13:40
Colby Coutu
C3AL037
JDK AIR-RmTmp

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	N2O Gas CSA 22396.1 09 Subcontract	ADDITIONAL SAMPLE INFORMATION
1	CFH102-UNIT#1 R1	A	2023/11/15	10:53		1	X	(P: 01)
2	CFH103-UNIT#1 R2	A	2023/11/15	11:59		1	X	(P: 01)
3	CFH104-UNIT#1 R3	A	2023/11/15	13:01		1	X	(P: 01)
4	CFH105-UNIT#2 R1	A	2023/11/16	09:56		1	X	(P: 01)
5	CFH106-UNIT#2 R2	A	2023/11/16	11:08		1	X	(P: 01)
6	CFH107-UNIT#2 R3	A	2023/11/16	12:23		1	X	(P: 01)
7	CFH108-UNIT#3 R1	A	2023/11/17	09:30		1	X	(P: 01)
8	CFH109-UNIT#3 R2	A	2023/11/17	10:57		1	X	(P: 01)
9	CFH110-UNIT#3 R3	A	2023/11/17	12:06		1	X	(P: 01)
10								

SITE LOCATION:	REGULATORY CRITERIA	SPECIAL INSTRUCTIONS	REQUIRED EDDs	TURNAROUND TIME
BURNABY, BC		Please inform Bureau Veritas immediately if you are not accredited for the requested test(s) or the hold time is approaching. **Please return a copy of this form with the report.**	National Excel (N001)	☐ Rush Required
SITE #:				2023/12/08 Date Required
PROJECT #:				Please inform us if rush charges will be incurred
METROVAN WTE				
PO/AFE, TASK ORDER/SERVICE ORDER, LINE ITEM:				

COOLER ID:	YES	NO	Temp: (°C)	COOLER ID:	YES	NO	Temp: (°C)	COOLER ID:	YES	NO	Temp: (°C)	RECEIVING LAB USE ONLY
Custody Seal Present				Custody Seal Present				Custody Seal Present				BV Labs Job #
Custody Seal Intact				Custody Seal Intact				Custody Seal Intact				
Cooling Media Present				Cooling Media Present				Cooling Media Present				

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. Russell Sumarno	2023/11/24	1500	1.				
2			2.				

APPENDIX - D

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	14-Nov-23
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:17 - 14:19

Concentrations:

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

Emission Rates:

Particulate	0.017	Kg/hr	0.038	lb/hr

Flue Gas Characteristics:

Flow	1160	dscm/min	40962	dscf/min
	19.33	dscm/sec	683	dscf/sec
	2027	Acm/min	71566	Acf/min
Velocity	13.260	m/sec	43.50	f/sec
Temperature	147.7	oC	297.8	oF
Moisture	14.1	%		
Gas Analysis	11.0	% O2		
	8.7	% CO2		
	29.827	Mol. Wt (g/gmole) Dry		
	28.160	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6243	dscm	92.678	dscf
Sample Time	120.0	minutes		
Isokineticity	101.3	%		

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

Client:	Metro Vancouver	**Date:**	14-Nov-23
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:10 - 13:15

Control Unit (Y)	0.9844
Nozzle Diameter (in.)	0.3058
Pitot Factor	0.8351
Baro. Press. (in. Hg)	30.05
Static Press. (in. H20)	-19.50
Stack Height (ft)	30
Stack Diameter (in.)	70.90
Stack Area (sq.ft.)	27.417
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.00060
Washings (grams)	0.00005
Total (grams)	**0.00065**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	8.67	10.77
Traverse 2	8.67	11.20
	8.67	**10.99**

Condensate Collection:

Impinger 1	190.0
Impinger 2	80.0
Impinger 3	25.0
Impinger 4	8.0
Impinger 5	4.0
Impinger 6	2.0
Gel	14.0
Gain (grams)	**323.0**

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	309.539								
1	5.0	313.040	0.33	1.51	58	58	6	290	1.5	101.2
2	10.0	316.430	0.31	1.42	59	59	6	294	4.7	101.1
3	15.0	319.760	0.30	1.36	60	60	6	300	8.4	101.2
4	20.0	323.320	0.34	1.54	61	61	6	302	12.5	101.6
5	25.0	326.600	0.29	1.32	62	62	6	304	17.7	101.2
6	30.0	329.950	0.30	1.37	63	63	6	302	25.2	101.3
7	35.0	334.060	0.45	2.06	64	64	6	300	45.6	101.3
8	40.0	338.230	0.46	2.11	65	65	6	298	53.2	101.4
9	45.0	342.120	0.40	1.84	65	65	6	296	58.3	101.2
10	50.0	346.650	0.54	2.49	65	65	6	295	62.5	101.5
11	55.0	351.230	0.55	2.56	65	65	6	290	66.1	101.4
12	60.0	355.920	0.57	2.66	66	66	6	289	69.4	101.8
Traverse 2	0.0	355.920								
1	5.0	360.260	0.49	2.26	66	66	6	297	1.5	102.0
2	10.0	364.580	0.50	2.30	66	66	6	298	4.7	100.6
3	15.0	369.020	0.52	2.40	66	66	7	298	8.4	101.4
4	20.0	373.400	0.51	2.35	67	67	7	298	12.5	100.8
5	25.0	377.880	0.53	2.44	66	66	7	299	17.7	101.4
6	30.0	382.230	0.50	2.30	66	66	7	300	25.2	101.4
7	35.0	385.500	0.28	1.29	66	66	6	300	45.6	101.6
8	40.0	388.820	0.29	1.33	66	66	6	302	53.2	101.5
9	45.0	392.250	0.31	1.42	66	66	5	300	58.3	101.4
10	50.0	395.600	0.30	1.37	66	66	5	302	62.5	100.7
11	55.0	399.090	0.32	1.47	67	67	5	300	66.1	101.3
12	60.0	402.230	0.26	1.20	66	66	5	294	69.4	100.9
Average:			0.402	1.849	64.5	64.5	6.0	297.8		101.3

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:11 - 11:57

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	0.039	lb/hr

Flue Gas Characteristics:

Flow	1198	dscm/min	42297	dscf/min
	19.96	dscm/sec	705	dscf/sec
	2134	Acm/min	75351	Acf/min
Velocity	13.962	m/sec	45.81	f/sec
Temperature	142.2	oC	288.0	oF
Moisture	16.6	%		
Gas Analysis	9.9	% O2		
	10.0	% CO2		
	29.995	Mol. Wt (g/gmole) Dry		
	28.005	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	3.0145	dscm	106.456	dscf
Sample Time	120.0	minutes		
Isokineticity	106.5	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:11 - 11:57

Control Unit (Y)	0.9844	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3145	Filter (grams)	0.00070		CO2	O2		Impinger 1	225.0
Pitot Factor	0.8351	Washings (grams)	0.00005	Traverse 1	10.00	9.70		Impinger 2	142.0
Baro. Press. (in. Hg)	29.93			Traverse 2	10.00	10.05		Impinger 3	44.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00075**					Impinger 4	10.0
Stack Height (ft)	30							Impinger 5	6.0
Stack Diameter (in.)	70.90							Impinger 6	3.0
Stack Area (sq.ft.)	27.417							Gel	20.0
Minutes Per Reading	5.0				**10.00**	**9.88**		**Gain (grams)**	**450.0**
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	403.089								
1	5.0	406.390	0.25	1.36	57	57	6	289	1.5	106.2
2	10.0	410.120	0.32	1.74	57	57	6	289	4.7	106.2
3	15.0	413.620	0.28	1.53	59	59	6	290	8.4	106.2
4	20.0	417.190	0.29	1.58	60	60	6	291	12.5	106.3
5	25.0	421.020	0.33	1.81	62	62	7	289	17.7	106.4
6	30.0	425.970	0.55	3.02	63	63	7	289	25.2	106.6
7	35.0	431.280	0.63	3.47	64	64	12	289	45.6	106.8
8	40.0	436.440	0.59	3.27	66	66	12	287	53.2	106.6
9	45.0	441.200	0.50	2.78	67	67	9	287	58.3	106.5
10	50.0	445.920	0.49	2.72	68	68	9	288	62.5	106.5
11	55.0	450.450	0.45	2.50	68	68	8	287	66.1	106.6
12	60.0	454.680	0.39	2.18	69	69	8	286	69.4	106.5
Traverse 2	0.0	454.680								
1	5.0	458.730	0.36	2.00	68	68	7	288	1.5	106.5
2	10.0	463.820	0.57	3.17	68	68	7	288	4.7	106.6
3	15.0	469.180	0.63	3.51	69	69	13	288	8.4	106.7
4	20.0	473.300	0.37	2.07	68	68	13	285	12.5	106.6
5	25.0	478.230	0.53	2.96	68	68	10	286	17.7	106.9
6	30.0	483.240	0.55	3.07	68	68	10	287	25.2	106.8
7	35.0	488.070	0.51	2.84	69	69	10	288	45.6	106.7
8	40.0	492.800	0.49	2.73	69	69	10	287	53.2	106.5
9	45.0	497.530	0.49	2.72	69	69	10	289	58.3	106.6
10	50.0	501.910	0.42	2.33	69	69	10	289	62.5	106.6
11	55.0	506.080	0.38	2.12	70	70	8	288	66.1	106.3
12	60.0	510.134	0.36	2.00	69	69	8	289	69.4	106.4
Average:			0.447	2.478	66.0	66.0	8.8	288.0		106.5

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:14 - 14:17

Concentrations:

Particulate	1.3	mg/dscm	0.0006	gr/dscf
	0.7	mg/Acm	0.0003	gr/Acf
	1.2	mg/dscm (@ 11% O2)	0.0005	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.101	Kg/hr	0.222	lb/hr

Flue Gas Characteristics:

Flow	1260	dscm/min	44491	dscf/min
	21.00	dscm/sec	742	dscf/sec
	2252	Acm/min	79518	Acf/min
Velocity	14.734	m/sec	48.34	f/sec
Temperature	141.5	oC	286.7	oF
Moisture	17.0	%		
Gas Analysis	10.1	% O2		
	9.6	% CO2		
	29.943	Mol. Wt (g/gmole) Dry		
	27.911	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5873	dscm	91.371	dscf
Sample Time	120.0	minutes		
Isokineticity	106.9	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:14 - 14:17

Control Unit (Y)	0.9844	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Filter (grams)	0.00005		CO2	O2		Impinger 1	274.0
Pitot Factor	0.8469	Washings (grams)	0.00340	Traverse 1	9.75	9.80		Impinger 2	76.0
Baro. Press. (in. Hg)	29.93			Traverse 2	9.50	10.35		Impinger 3	16.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00345**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	17.0
Minutes Per Reading	5.0				**9.63**	**10.08**		**Gain (grams)**	**398.0**
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	510.794								
1	5.0	514.490	0.44	1.67	67	67	6	285	1.5	106.8
2	10.0	518.510	0.52	1.97	67	67	6	284	4.7	106.8
3	15.0	522.690	0.56	2.13	68	68	7	284	8.4	106.9
4	20.0	527.130	0.63	2.40	68	68	7	284	12.5	107.1
5	25.0	531.640	0.65	2.47	69	69	8	285	17.7	107.0
6	30.0	536.140	0.65	2.47	68	68	8	286	25.2	107.0
7	35.0	540.390	0.58	2.19	68	68	8	288	45.6	107.1
8	40.0	544.640	0.58	2.19	68	68	8	288	53.2	107.1
9	45.0	548.330	0.44	1.66	67	67	7	288	58.3	106.8
10	50.0	552.020	0.44	1.66	67	67	7	287	62.5	106.7
11	55.0	555.550	0.40	1.52	68	68	7	287	66.1	106.8
12	60.0	558.940	0.37	1.40	67	67	7	285	69.4	106.7
Traverse 2	0.0	558.940								
1	5.0	561.710	0.25	0.94	65	65	5	287	1.5	106.5
2	10.0	564.650	0.28	1.06	66	66	5	287	4.7	106.6
3	15.0	567.750	0.31	1.17	66	66	5	286	8.4	106.8
4	20.0	571.180	0.38	1.43	66	66	5	287	12.5	106.9
5	25.0	574.690	0.40	1.51	66	66	7	288	17.7	106.7
6	30.0	578.200	0.40	1.51	66	66	7	288	25.2	106.7
7	35.0	582.400	0.57	2.15	67	67	8	289	45.6	107.0
8	40.0	586.560	0.56	2.11	67	67	8	288	53.2	106.8
9	45.0	590.720	0.56	2.11	66	66	8	288	58.3	107.0
10	50.0	594.960	0.58	2.19	67	67	8	287	62.5	106.9
11	55.0	599.050	0.54	2.04	67	67	8	287	66.1	106.9
12	60.0	602.985	0.50	1.88	66	66	8	288	69.4	107.1
Average:			0.483	1.826	67.0	67.0	7.0	286.7		106.9

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		15-Nov-23	15-Nov-23	15-Nov-23
Test Time		09:51-11:38	11:49-12:49	13:01-14:01
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.92	29.92	29.92
DGM Factor	(Y)	1.0309	1.0309	1.0309
Initial Reading	(m^3)	116.810	117.331	117.871
Final Reading	(m^3)	117.329	117.867	118.508
Temp. Outlet	(Avg. oF)	59.5	59.5	56.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.54	0.56	0.67
HF	(mg)	0.046	0.042	0.021
Oxygen	(Vol. %)	11.0	9.9	10.1
HF	**(mg/Sm^3)**	**0.085**	**0.075**	**0.031**
HF	**(mg/Sm^3 @ 11% O2)**	**0.085**	**0.067**	**0.029**
Moisture	**(Vol. %)**	16.6	16.6	17.0

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

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

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		15-Nov-23	15-Nov-23	15-Nov-23
Test Time		09:53 - 11:38	11:49-12:49	13:01-14:01
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.92	29.92	29.92
DGM Factor	(Y)	1.0248	1.0248	1.0248
Initial Reading	(m^3)	594.341	594.774	595.429
Final Reading	(m^3)	594.768	595.425	596.088
Temp. Outlet	(Avg. oF)	55.0	53.0	52.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.45	0.69	0.70
NH_3	(mg)	1.3	6.9	2.5
Oxygen	(Vol. %)	11.0	9.9	10.1
NH_3	**(mg/Sm^3)**	**3.0**	**10.0**	**3.6**
NH_3	**(mg/Sm^3 @ 11% O2)**	**2.9**	**9.0**	**3.3**
Moisture	**(Vol. %)**	16.6	16.6	17.0

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

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	13:23 - 15:25

Concentrations:

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

Emission Rates:

Particulate	0.155	Kg/hr	0.342	lb/hr

Flue Gas Characteristics:

Flow	1156	dscm/min	40819	dscf/min
	19.26	dscm/sec	680	dscf/sec
	2042	Acm/min	72106	Acf/min
Velocity	13.360	m/sec	43.83	f/sec
Temperature	143.9	oC	291.0	oF
Moisture	15.4	%		
Gas Analysis	10.9	% O2		
	10.6	% CO2		
	30.126	Mol. Wt (g/gmole) Dry		
	28.258	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5916	dscm	91.522	dscf
Sample Time	120.0	minutes		
Isokineticity	100.4	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	13:23 - 15:25

Control Unit (Y)	1.0016	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3058	Filter (grams)	0.00280		CO2	O2		Impinger 1	176.0
Pitot Factor	0.8351	Washings (grams)	0.00300	Traverse 1	10.80	10.45		Impinger 2	102.0
Baro. Press. (in. Hg)	29.92			Traverse 2	10.35	11.25		Impinger 3	36.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00580**					Impinger 4	12.0
Stack Height (ft)	30							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	3.0
Stack Area (sq.ft.)	27.417							Gel	20.2
Minutes Per Reading	5.0				**10.58**	**10.85**		**Gain (grams)**	**354.2**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	349.553								
1	5.0	353.690	0.51	2.17	52	52	6	288	1.5	100.5
2	10.0	357.860	0.52	2.21	52	52	6	289	4.7	100.4
3	15.0	362.070	0.53	2.25	52	52	6	289	8.4	100.4
4	20.0	366.370	0.55	2.34	53	53	6	290	12.5	100.6
5	25.0	369.890	0.37	1.57	53	53	6	292	17.7	100.3
6	30.0	373.280	0.34	1.45	56	56	6	292	25.2	100.2
7	35.0	376.520	0.31	1.32	56	56	7	292	45.6	100.3
8	40.0	379.200	0.21	0.90	57	57	7	290	53.2	100.3
9	45.0	381.680	0.18	0.77	57	57	6	290	58.3	100.2
10	50.0	384.360	0.21	0.90	58	58	6	290	62.5	100.1
11	55.0	386.980	0.20	0.86	58	58	6	290	66.1	100.3
12	60.0	389.660	0.21	0.90	58	58	6	290	69.4	100.1
Traverse 2	0.0	389.660								
1	5.0	393.130	0.35	1.50	61	61	6	294	1.5	100.3
2	10.0	396.550	0.34	1.46	61	61	6	294	4.7	100.2
3	15.0	399.880	0.32	1.28	62	62	6	294	8.4	100.4
4	20.0	403.090	0.30	1.29	61	61	6	294	12.5	100.1
5	25.0	407.500	0.56	2.42	62	62	6	290	17.7	100.5
6	30.0	412.030	0.59	2.55	62	62	6	290	25.2	100.6
7	35.0	416.700	0.63	2.72	62	62	6	293	45.6	100.6
8	40.0	421.230	0.59	2.55	63	63	6	293	53.2	100.6
9	45.0	425.730	0.58	2.51	63	63	7	291	58.3	100.7
10	50.0	430.190	0.57	2.44	63	63	7	290	62.5	100.6
11	55.0	434.580	0.55	2.39	64	64	7	290	66.1	100.6
12	60.0	438.933	0.54	2.35	64	64	7	290	69.4	100.6
Average:			0.419	1.796	58.8	58.8	6.3	291.0		100.4

Client:	Metro Vancouver	**Date:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:47 - 11:50

Concentrations:

Particulate	0.16	mg/dscm	0.00007	gr/dscf
	0.09	mg/Acm	0.00004	gr/Acf
	0.15	mg/dscm (@ 11% O2)	0.00006	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.011	Kg/hr	0.024	lb/hr

Flue Gas Characteristics:

Flow	1128	dscm/min	39827	dscf/min
	18.80	dscm/sec	664	dscf/sec
	1995	Acm/min	70467	Acf/min
Velocity	13.057	m/sec	42.84	f/sec
Temperature	142.1	oC	287.8	oF
Moisture	16.4	%		
Gas Analysis	10.1	% O2		
	10.0	% CO2		
	30.003	Mol. Wt (g/gmole) Dry		
	28.030	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.1820	dscm	77.057	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:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:47 - 11:50

Control Unit (Y)	1.0016	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Filter (grams)	0.00030		CO2	O2		Impinger 1	220.0
Pitot Factor	0.8351	Washings (grams)	0.00005	Traverse 1	10.00	10.05		Impinger 2	62.0
Baro. Press. (in. Hg)	30.10			Traverse 2	10.00	10.10		Impinger 3	10.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00035**					Impinger 4	8.0
Stack Height (ft)	30.16							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	16.1
Minutes Per Reading	5.0				**10.00**	**10.08**		**Gain (grams)**	**322.1**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	441.388								
1	5.0	445.020	0.52	1.71	43	43	8	288	1.5	104.4
2	10.0	448.720	0.54	1.77	43	43	8	288	4.7	104.4
3	15.0	452.380	0.53	1.74	43	43	8	289	8.4	104.3
4	20.0	455.810	0.46	1.51	45	45	8	290	12.5	104.5
5	25.0	459.200	0.45	1.48	45	45	7	289	17.7	104.3
6	30.0	462.480	0.42	1.38	46	46	7	290	25.2	104.3
7	35.0	465.310	0.31	1.03	48	48	6	289	45.6	104.2
8	40.0	468.100	0.30	1.00	49	49	6	287	53.2	104.1
9	45.0	470.800	0.28	0.93	50	50	6	287	58.3	104.0
10	50.0	473.500	0.28	0.93	50	50	6	288	62.5	104.1
11	55.0	476.110	0.26	0.87	51	51	5	287	66.1	104.1
12	60.0	478.620	0.24	0.80	52	52	5	288	69.4	104.1
Traverse 2	0.0	478.620								
1	5.0	481.240	0.26	0.87	53	53	5	288	1.5	104.2
2	10.0	483.770	0.24	0.81	55	55	5	288	4.7	104.3
3	15.0	486.400	0.26	0.88	56	56	5	288	8.4	104.0
4	20.0	488.930	0.24	0.81	56	56	5	287	12.5	104.0
5	25.0	491.610	0.27	0.91	56	56	5	288	17.7	104.0
6	30.0	494.450	0.30	1.01	57	57	5	287	25.2	104.3
7	35.0	498.220	0.53	1.79	57	57	8	287	45.6	104.4
8	40.0	502.100	0.56	1.89	58	58	8	288	53.2	104.4
9	45.0	506.320	0.66	2.24	58	58	9	287	58.3	104.6
10	50.0	510.270	0.58	1.96	58	58	9	287	62.5	104.4
11	55.0	514.120	0.55	1.87	58	58	8	286	66.1	104.4
12	60.0	517.905	0.53	1.80	58	58	8	286	69.4	104.5
Average:			0.399	1.333	51.9	51.9	6.7	287.8		104.3

Client:	Metro Vancouver	**Date:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:02 - 14:05

Concentrations:

Particulate	1.3	mg/dscm	0.0006	gr/dscf
	0.8	mg/Acm	0.0003	gr/Acf
	1.3	mg/dscm (@ 11% O2)	0.0006	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.09	Kg/hr	0.205	lb/hr

Flue Gas Characteristics:

Flow	1173	dscm/min	41440	dscf/min
	19.56	dscm/sec	691	dscf/sec
	2047	Acm/min	72276	Acf/min
Velocity	13.392	m/sec	43.94	f/sec
Temperature	143.3	oC	289.9	oF
Moisture	15.0	%		
Gas Analysis	10.7	% O2		
	9.4	% CO2		
	29.928	Mol. Wt (g/gmole) Dry		
	28.140	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.2726	dscm	80.257	dscf
Sample Time	120.0	minutes		
Isokineticity	102.7	%		

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

Client:	Metro Vancouver	**Date:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:02 - 14:05

Control Unit (Y)	1.0016	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2810	Filter (grams)	0.00030		CO2	O2		Impinger 1	212.0
Pitot Factor	0.8469	Washings (grams)	0.00270	Traverse 1	9.50	10.50		Impinger 2	40.0
Baro. Press. (in. Hg)	30.10			Traverse 2	9.25	10.90		Impinger 3	22.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.0030**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	14.7
Minutes Per Reading	5.0				**9.38**	**10.70**		**Gain (grams)**	**300.7**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	518.542								
1	5.0	521.420	0.31	1.04	59	59	5	289	1.5	102.7
2	10.0	524.390	0.33	1.11	60	60	5	289	4.7	102.5
3	15.0	527.270	0.31	1.04	60	60	5	291	8.4	102.7
4	20.0	530.060	0.29	0.97	60	60	5	290	12.5	102.8
5	25.0	532.990	0.32	1.07	60	60	5	289	17.7	102.7
6	30.0	536.010	0.34	1.14	61	61	5	289	25.2	102.5
7	35.0	540.190	0.65	2.19	61	61	8	289	45.6	102.9
8	40.0	544.040	0.55	1.85	61	61	8	289	53.2	102.9
9	45.0	548.160	0.63	2.12	61	61	7	289	58.3	103.0
10	50.0	552.180	0.60	2.02	61	61	7	288	62.5	102.9
11	55.0	556.130	0.58	1.95	61	61	7	289	66.1	102.9
12	60.0	559.800	0.50	1.68	62	62	7	289	69.4	102.7
Traverse 2	0.0	559.800								
1	5.0	563.130	0.41	1.38	61	61	6	287	1.5	102.9
2	10.0	566.580	0.44	1.48	62	62	6	288	4.7	102.8
3	15.0	569.950	0.42	1.42	63	63	6	289	8.4	102.6
4	20.0	573.360	0.43	1.45	63	63	6	290	12.5	102.7
5	25.0	576.720	0.42	1.41	62	62	6	291	17.7	102.6
6	30.0	580.130	0.43	1.45	63	63	6	292	25.2	102.8
7	35.0	582.980	0.30	1.01	63	63	6	292	45.6	102.8
8	40.0	585.880	0.31	1.05	64	64	6	291	53.2	102.6
9	45.0	588.820	0.32	1.08	63	63	6	292	58.3	102.7
10	50.0	591.580	0.28	0.94	64	64	6	292	62.5	102.8
11	55.0	594.340	0.28	0.94	64	64	5	292	66.1	102.8
12	60.0	597.000	0.26	0.88	65	65	5	292	69.4	102.6
Average:			0.405	1.361	61.8	61.8	3.0	289.9		102.7

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		16-Nov-23	16-Nov-23	16-Nov-23
Test Time		09:56-10:56	11:08-12:08	12:21-13:21
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.10	30.10	30.10
DGM Factor	(Y)	1.0248	1.0248	1.0248
Initial Reading	(m^3)	596.101	596.524	596.925
Final Reading	(m^3)	596.519	596.923	597.335
Temp. Outlet	(Avg. oF)	49.6	56.0	60.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.44631	0.42123	0.42952
HF	(mg)	0.021	0.032	0.032
Oxygen	(Vol. %)	10.9	10.1	10.7
HF	**(mg/Sm^3)**	**0.047**	**0.075**	**0.074**
HF	**(mg/Sm^3 @ 11% O2)**	**0.046**	**0.069**	**0.071**
Moisture (isokinetic)	**(Vol. %)**	15.4	16.4	15.0

*Wet Basis Calculated on moisture from isokinetic tests
Tstd. (oF) 68 Pstd. (in. Hg) 29.92

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

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		16-Nov-23	16-Nov-23	16-Nov-23
Test Time		09:56-10:56	11:08-12:08	12:23-13:23
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.10	30.10	30.10
DGM Factor	(Y)	1.0309	1.0309	1.0309
Initial Reading	(m^3)	118.516	119.137	119.775
Final Reading	(m^3)	119.134	119.771	120.422
Temp. Outlet	(Avg. oF)	54.0	59.0	59.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.65931	0.66975	0.68230
NH_3	(mg)	3.1	10.1	8.5
Oxygen	(Vol. %)	10.9	10.1	10.7
NH_3	**(mg/Sm^3)**	**4.7**	**15.1**	**12.5**
NH_3	**(mg/Sm^3 @ 11% O2)**	**4.6**	**13.8**	**12.1**
Moisture (isokinetic)	**(Vol. %)**	15.4	16.4	15.0

*Wet Basis Calculated on moisture from isokinetic tests
Tstd. (oF) 68 Pstd. (in. Hg) 29.92

Client:	Metro Vancouver	**Date:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	13:11 - 15:13

Concentrations:

Particulate	0.05	mg/dscm	0.00002	gr/dscf
	0.03	mg/Acm	0.00001	gr/Acf
	0.04	mg/dscm (@ 11% O2)	0.00002	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.003	Kg/hr	0.007	lb/hr

Flue Gas Characteristics:

Flow	1065	dscm/min	37611	dscf/min
	17.75	dscm/sec	627	dscf/sec
	1953	Acm/min	68972	Acf/min
Velocity	12.780	m/sec	41.93	f/sec
Temperature	152.3	oC	306.1	oF
Moisture	17.3	%		
Gas Analysis	9.3	% O2		
	10.6	% CO2		
	30.071	Mol. Wt (g/gmole) Dry		
	27.989	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.0813	dscm	73.503	dscf
Sample Time	120.0	minutes		
Isokineticity	101.7	%		

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

Client:	Metro Vancouver	**Date:**	16-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	13:11 - 15:13

Control Unit (Y)	0.9844
Nozzle Diameter (in.)	0.2837
Pitot Factor	0.8351
Baro. Press. (in. Hg)	30.01
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	10.60	9.30
Traverse 2	10.65	9.25
	10.63	**9.28**

Condensate Collection:	
Impinger 1	232.0
Impinger 2	50.0
Impinger 3	16.0
Impinger 4	8.0
Impinger 5	4.0
Impinger 6	2.0
Gel	13.6
Gain (grams)	**325.6**

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	603.350								
1	5.0	606.680	0.44	1.40	57	57	6	311	1.5	101.6
2	10.0	610.050	0.45	1.43	57	57	6	311	4.7	101.7
3	15.0	613.470	0.46	1.46	59	59	6	311	8.4	101.7
4	20.0	616.860	0.45	1.43	59	59	6	311	12.5	101.9
5	25.0	620.150	0.42	1.35	61	61	6	308	17.7	101.8
6	30.0	623.410	0.41	1.32	63	63	6	308	25.2	101.7
7	35.0	626.290	0.32	1.03	63	63	6	309	45.6	101.7
8	40.0	629.080	0.30	0.97	63	63	6	309	53.2	101.7
9	45.0	631.830	0.29	0.94	64	64	6	308	58.3	101.7
10	50.0	634.490	0.27	0.87	66	66	6	308	62.5	101.5
11	55.0	637.060	0.25	0.81	67	67	6	305	66.1	101.6
12	60.0	639.590	0.24	0.78	69	69	6	306	69.4	101.7
Traverse 2	0.0	639.590								
1	5.0	642.340	0.28	0.92	70	70	4	301	1.5	101.9
2	10.0	645.030	0.27	0.89	70	70	4	302	4.7	101.5
3	15.0	647.770	0.28	0.92	70	70	4	302	8.4	101.6
4	20.0	650.370	0.25	0.83	72	72	4	302	12.5	101.6
5	25.0	652.920	0.24	0.79	72	72	4	304	17.7	101.8
6	30.0	655.730	0.29	0.96	74	74	4	306	25.2	101.8
7	35.0	659.070	0.41	1.36	74	74	4	304	45.6	101.8
8	40.0	662.600	0.46	1.52	73	73	4	304	53.2	101.8
9	45.0	666.260	0.49	1.62	75	75	4	304	58.3	101.9
10	50.0	669.990	0.51	1.69	75	75	4	304	62.5	101.8
11	55.0	673.900	0.56	1.86	75	75	4	304	66.1	101.9
12	60.0	677.523	0.48	1.59	75	75	4	304	69.4	101.9
Average:			0.368	1.198	67.6	67.6	5.0	306.1		101.7

Client:	Metro Vancouver	**Date:**	17-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:06 - 11:09

Concentrations:

Particulate	0.08	mg/dscm	0.00003	gr/dscf
	0.04	mg/Acm	0.00002	gr/Acf
	0.06	mg/dscm (@ 11% O2)	0.00003	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.004	Kg/hr	0.010	lb/hr

Flue Gas Characteristics:

Flow	985	dscm/min	34789	dscf/min
	16.42	dscm/sec	580	dscf/sec
	1769	Acm/min	62478	Acf/min
Velocity	11.576	m/sec	37.98	f/sec
Temperature	145.9	oC	294.5	oF
Moisture	16.9	%		
Gas Analysis	8.3	% O2		
	12.1	% CO2		
	30.272	Mol. Wt (g/gmole) Dry		
	28.203	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	1.9873	dscm	70.183	dscf
Sample Time	120.0	minutes		
Isokineticity	105.0	%		

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

Client:	Metro Vancouver	**Date:**	17-Nov-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:06 - 11:09

Control Unit (Y)	0.9844	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Filter (grams)	0.00005		CO2	O2		Impinger 1	222.0
Pitot Factor	0.8351	Washings (grams)	0.00010	Traverse 1	11.75	8.45		Impinger 2	40.0
Baro. Press. (in. Hg)	30.04			Traverse 2	12.50	8.15		Impinger 3	18.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00015**					Impinger 4	5.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	12.5
Minutes Per Reading	5.0				**12.13**	**8.30**		**Gain (grams)**	**302.5**
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	678.559								
1	5.0	681.790	0.39	1.32	50	50	7	298	1.5	105.2
2	10.0	685.170	0.43	1.45	50	50	7	300	4.7	105.0
3	15.0	688.600	0.44	1.48	51	51	7	300	8.4	105.1
4	20.0	692.350	0.52	1.76	54	54	7	302	12.5	105.3
5	25.0	695.690	0.41	1.39	56	56	7	303	17.7	105.2
6	30.0	698.990	0.40	1.36	57	57	7	303	25.2	105.0
7	35.0	701.550	0.24	0.82	57	57	5	299	45.6	104.8
8	40.0	703.840	0.19	0.65	58	58	5	298	53.2	105.0
9	45.0	706.190	0.20	0.69	58	58	4	297	58.3	105.0
10	50.0	708.540	0.20	0.69	59	59	4	296	62.5	104.7
11	55.0	710.840	0.19	0.66	60	60	4	296	66.1	105.0
12	60.0	713.020	0.17	0.59	61	61	4	294	69.4	104.8
Traverse 2	0.0	713.020								
1	5.0	715.150	0.16	0.56	63	63	4	293	1.5	105.1
2	10.0	717.410	0.18	0.63	64	64	4	291	4.7	104.8
3	15.0	719.910	0.22	0.77	64	64	4	292	8.4	105.0
4	20.0	722.470	0.23	0.81	65	65	4	291	12.5	104.8
5	25.0	724.920	0.21	0.74	66	66	4	291	17.7	104.8
6	30.0	727.430	0.22	0.77	65	65	4	290	25.2	105.0
7	35.0	730.820	0.40	1.41	66	66	7	290	45.6	105.2
8	40.0	734.380	0.44	1.55	66	66	7	289	53.2	105.3
9	45.0	738.090	0.48	1.69	66	66	7	289	58.3	105.1
10	50.0	741.730	0.46	1.62	66	66	7	289	62.5	105.3
11	55.0	745.200	0.42	1.48	66	66	6	289	66.1	105.0
12	60.0	748.385	0.35	1.24	66	66	6	289	69.4	105.5
Average:			0.315	1.089	60.6	60.6	5.5	294.5		105.0

Client:	Metro Vancouver	**Date:**	17-Nov-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:29 - 13:30

Concentrations:

Particulate	0.05	mg/dscm	0.00002	gr/dscf
	0.03	mg/Acm	0.00001	gr/Acf
	0.04	mg/dscm (@ 11% O2)	0.00002	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1008	dscm/min	35591	dscf/min
	16.80	dscm/sec	593	dscf/sec
	1833	Acm/min	64722	Acf/min
Velocity	11.992	m/sec	39.34	f/sec
Temperature	145.6	oC	294.2	oF
Moisture	17.9	%		
Gas Analysis	8.1	% O2		
	12.0	% CO2		
	30.242	Mol. Wt (g/gmole) Dry		
	28.046	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.0559	dscm	72.603	dscf
Sample Time	120.0	minutes		
Isokineticity	106.2	%		

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

Client:	Metro Vancouver	**Date:**	17-Nov-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:29 - 13:30

Control Unit (Y)	0.9844	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Filter (grams)	0.00005		CO2	O2		Impinger 1	250.0
Pitot Factor	0.8351	Washings (grams)	0.00005	Traverse 1	12.00	8.00		Impinger 2	52.0
Baro. Press. (in. Hg)	30.04			Traverse 2	12.00	8.10		Impinger 3	12.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00010**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	12.2
Minutes Per Reading	5.0				**12.00**	**8.05**		**Gain (grams)**	**337.2**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	748.697								
1	5.0	751.090	0.20	0.70	64	64	3	288	1.5	106.1
2	10.0	753.540	0.21	0.74	64	64	3	289	4.7	106.1
3	15.0	756.110	0.23	0.81	65	65	3	289	8.4	106.2
4	20.0	758.620	0.22	0.77	65	65	3	290	12.5	106.1
5	25.0	761.250	0.24	0.84	65	65	3	291	17.7	106.5
6	30.0	763.930	0.25	0.88	65	65	3	292	25.2	106.5
7	35.0	767.310	0.40	1.40	65	65	3	292	45.6	106.3
8	40.0	770.810	0.43	1.50	65	65	3	293	53.2	106.2
9	45.0	774.520	0.48	1.68	66	66	5	292	58.3	106.4
10	50.0	778.100	0.45	1.57	65	65	5	293	62.5	106.2
11	55.0	781.570	0.42	1.47	66	66	5	293	66.1	106.4
12	60.0	784.820	0.37	1.29	66	66	5	294	69.4	106.2
Traverse 2	0.0	784.820								
1	5.0	788.200	0.40	1.40	66	66	5	295	1.5	106.3
2	10.0	791.740	0.44	1.54	66	66	5	296	4.7	106.2
3	15.0	795.320	0.45	1.57	66	66	5	296	8.4	106.2
4	20.0	799.010	0.48	1.67	66	66	5	298	12.5	106.2
5	25.0	802.660	0.47	1.64	66	66	5	298	17.7	106.2
6	30.0	806.190	0.44	1.53	66	66	5	299	25.2	106.1
7	35.0	809.070	0.29	1.01	67	67	4	297	45.6	106.2
8	40.0	811.680	0.24	0.84	66	66	4	298	53.2	106.0
9	45.0	814.340	0.25	0.87	66	66	4	298	58.3	105.9
10	50.0	816.850	0.22	0.77	67	67	4	297	62.5	106.2
11	55.0	819.300	0.21	0.73	67	67	4	296	66.1	106.0
12	60.0	821.630	0.19	0.66	67	67	4	296	69.4	106.0
Average:			0.333	1.162	65.7	65.7	4.1	294.2		106.2

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		17-Nov-23	17-Nov-23	17-Nov-23
Test Time		09:39-10:39	10:54-11:54	12:06-13:06
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.04	30.04	30.04
DGM Factor	(Y)	1.0309	1.0309	1.0309
Initial Reading	(m^3)	120.578	121.283	121.962
Final Reading	(m^3)	121.280	121.956	122.668
Temp. Outlet	(Avg. oF)	58.8	64.5	68.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.74039	0.70271	0.73163
HF	(mg)	0.041	0.031	0.031
Oxygen	(Vol. %)	9.3	8.3	8.1
HF	**(mg/Sm^3)**	**0.056**	**0.044**	**0.042**
HF	**(mg/Sm^3 @ 11% O2)**	**0.047**	**0.034**	**0.032**
Moisture (isokinetic)	**(Vol. %)**	17.3	16.9	17.9

*Wet Basis Calculated on moisture from isokinetic tests
Tstd. (oF) 68 Pstd. (in. Hg) 29.92

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

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		17-Nov-23	17-Nov-23	17-Nov-23
Test Time		09:39-10:39	10:54-11:54	12:06-13:06
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.04	30.04	30.04
DGM Factor	(Y)	1.0248	1.0248	1.0248
Initial Reading	(m^3)	597.394	597.823	598.233
Final Reading	(m^3)	597.820	598.229	598.617
Temp. Outlet	(Avg. oF)	60.1	67.8	70.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.44615	0.41841	0.39409
NH_3	(mg)	1.0	0.9	1.1
Oxygen	(Vol. %)	9.3	8.3	8.1
NH_3	**(mg/Sm^3)**	**2.2**	**2.2**	**2.8**
NH_3	**(mg/Sm^3 @ 11% O2)**	**1.9**	**1.7**	**2.2**
Moisture (isokinetic)	**(Vol. %)**	17.3	16.9	17.9

*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
Reportable Detection Limit: 0.18 mg/Sm^3

Sample ID	Date	Time	N_2O ppm	N_2O mg/Sm^3	N_2O mg/Sm^3 @ 11% O_2
Unit 1 - Run 1	2023/11/15	10:53 - 11:53	5.35	9.79	9.79
Unit 1 - Run 2	2023/11/15	11:59 - 12:59	1.70	3.11	2.80
Unit 1 - Run 3	2023/11/15	13:59 - 14:59	7.60	13.91	12.73
Average					**8.44**
Unit 2 - Run 1	2023/11/16	09:56 - 10:56	7.50	13.73	13.54
Unit 2 - Run 2	2023/11/16	11:08 - 12:08	8.20	15.01	13.74
Unit 2 - Run 3	2023/11/16	12:23 - 13:23	9.40	17.20	16.72
Average					**14.66**
Unit 3 - Run 1	2023/11/17	09:30 - 10:30	3.45	6.31	5.38
Unit 3 - Run 2	2023/11/17	10:57 - 11:57	6.40	11.71	9.21
Unit 3 - Run 3	2023/11/17	12:06 - 13:06	0.50	0.92	0.71
Average					**5.10**

Date:	**15-Nov-23**			**16-Nov-23**			**17-Nov-23**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	09:50 - 10:50	11:10 - 12:10	12:23 - 13:23	09:58 - 10:58	11:10 - 12:10	12:22 - 13:22	09:09 - 10:09	10:26 - 11:26	11:40 - 12:40
Methane (ppmv)	4.70	9.40	4.90	3.4	4.2	4.0	ND	3.90	ND
Ethane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3 as Propane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4 as n-Butane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5 as n-Pentane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6 as n-Hexane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6+ as n-Hexane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Detection Limits:									
Methane	3.1	3.4	3.1	3.6	3.1	3.1	3.5	2.4	4.1
Ethane	0.92	1	0.92	1.1	0.9	0.94	1.00	0.73	1.20
Ethene	0.92	1	0.92	1.1	0.9	0.94	1.00	0.73	1.20
C3 as Propane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1
C4 as n-Butane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1
C5 as n-Pentane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1
C6 as n-Hexane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1
C6+	1.5	1.7	1.8	1.6	1.6	1.6	1.7	1.2	2.1

Using 1/2 DL Convention

Sample Date:	**15-Nov-23**			**16-Nov-23**			**17-Nov-23**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	09:50 - 10:50	11:10 - 12:10	12:23 - 13:23	09:58 - 10:58	11:10 - 12:10	12:22 - 13:22	09:09 - 10:09	10:26 - 11:26	11:40 - 12:40
Methane (ppm)	4.70	9.40	4.90	3.40	4.20	4.00	1.75	3.90	2.05
Ethane (ppm)	0.46	0.50	0.46	0.55	0.47	0.47	0.50	0.37	0.60
Ethene (ppm)	0.46	0.50	0.46	0.55	0.47	0.47	0.50	0.37	0.60
C3 as Propane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C4 as n-Butane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C5 as n-Pentane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C6 as n-Hexane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C6+ as n-Hexane (ppm)	0.75	0.85	0.90	0.80	0.80	0.80	0.85	0.60	1.05
Methane (mg/m^3 as CH_4)	3.14	6.27	3.27	2.27	2.80	2.67	1.17	2.60	1.37
Ethane (mg/m^3 as CH_4)	0.31	0.33	0.31	0.37	0.31	0.31	0.33	0.24	0.40
Ethene (mg/m^3 as CH_4)	0.31	0.33	0.31	0.37	0.31	0.31	0.33	0.24	0.40
C3 as Propane (mg/m^3 as CH_4)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C4 as n-Butane (mg/m^3 as CH_4)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C5 as n-Pentane (mg/m^3 as CH_4)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C6 as n-Hexane (mg/m^3 as CH_4)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C6+ as n-Hexane (mg/m^3 as CH_4)	0.50	0.57	0.60	0.53	0.53	0.53	0.57	0.40	0.70
Total mg/Sm^3 @11% O_2 as CH_4	3.53	6.30	4.15	3.14	3.65	3.36	2.51	3.65	3.64

All data is corrected to standard conditions (S) of 20 °C, 101.325 kPa (dry) unless otherwise noted.

APPENDIX - E

FIELD DATA SHEETS

A. Lanfranco and Associates Inc.

S.H.

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #1	NOZZLE G-309 DIAMETER, IN. 0.3058	
PARAMETER / RUN No	Metals - Particulate / R-1	PROBE 7B Cp 0.835T	
DATE	Nov 14, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O −19.5"	
CONTROL UNIT	G10J Y 0.9844	STACK DIAMETER 70.9"	
	ΔH@ 1.706	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.05		
ASSUMED MOISTURE, Bw	16%	INITIAL LEAK TEST 0.003 @ 15"	
		FINAL LEAK TEST 0.004 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	190	190
Imp. #2	100	180	80
Imp. #3	100	125	25
Imp. #4	0	D	
Imp. #5	100	104	4
Imp. #6	100	102	2
Imp. #7	200g		
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %
1	12:18	309.539										
1		313.04	0.33	1.51	58	290	239	250	50	5.5		
2	10	316.43	0.31	1.42	59	294					8.5	11.0
3		319.76	0.30	1.36	60	300	250	235	52	5.5		
4	20	323.52	0.34	1.59	61	302						
5		326.60	0.29	1.32	62	304	250	238	54	5		
6	30	329.95	0.30	1.37	63	302						
7		334.06	0.45	2.06	64	300	249	239	56	5.5	8.5	11.0
8	40	338.23	0.46	2.11	65	298						
9		342.12	0.40	1.84	65	296	251	243	55	5.5		
10	50	346.65	0.54	2.49	65	295						
11		351.23	0.55	2.56	65	290	249	235	52	6	9.0	10.3
12	60	355.72	0.57	2.66	66	289						
1		360.23	0.49	2.26	66	297	250	238	57	6		
2	10	364.58	0.50	2.30	66	298					9.0	10.4
3		369.02	0.52	2.40	66	298	249	239	56	7		
4	20	373.40	0.51	2.35	67	298						
5		377.88	0.53	2.44	66	299	250	240	55	7		
6	30	382.23	0.50	2.30	66	300					8.5	11.5
7		385.50	0.28	1.29	66	300	251	240	51	6		
8	40	388.82	0.29	1.33	66	302						
9		392.25	0.31	1.42	66	300	250	240	50	5		
10	50	395.60	0.30	1.37	66	302					8.5	11.2
11		399.09	0.32	1.47	67	300	250	239	49	5		
12	14:19	402.23	0.26	1.20	66	294						

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CLIENT MUWTE	NOZZLE P315 DIAMETER, IN. 0.3145	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE Unit 1	PROBE 7B Cp 0.8351	Imp. #1	0 / 225 / 225
PARAMETER / RUN No Metals/Part/Cl/Hg Run 2	PORT LENGTH	Imp. #2	100 / 242 / 142
DATE Nov. 15 2023	STATIC PRESSURE, IN. H2O −19.0	Imp. #3	100 / 144 / 44
OPERATOR: Justin Ching	STACK DIAMETER 70.9"	Imp. #4	0 / 10 / 10
CONTROL UNIT CAE G105 Y 0.9844	STACK HEIGHT 30'	Imp. #5	100 / 106 / 6
ΔH@ 1.706		Imp. #6	100 / 103 / 3
BAROMETRIC PRESSURE, IN. Hg 29.93	INITIAL LEAK TEST 0.003 @15"	Upstream Diameters	
ASSUMED MOISTURE, Bw 13%	FINAL LEAK TEST 0.002 @13"	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. %	O_2 Vol. %
	9:11	403.089										
1	5	406.39	0.25	1.36	57	289	250	250	48	6	10.0	9.6
2	10	410.12	0.32	1.74	57	289						
3	15	413.62	0.28	1.53	59	290	249	249	49	6		
4	20	417.79	0.29	1.58	60	291						
5	25	421.02	0.33	1.81	62	289	250	250	51	7		
6	30	425.97	0.55	3.02	63	289						
7	35	431.28	0.63	3.47	64	289	250	248	52	12		
8	40	436.44	0.59	3.27	66	287					10.0	9.8
9	45	441.20	0.50	2.78	67	287	250	247	54	9		
10	50	445.92	0.49	2.72	68	288						
11	55	450.45	0.45	2.50	68	287	251	248	54	8		
12	60	454.68	0.39	2.18	69	286						
1	65	458.73	0.36	2.00	68	288	250	251	51	7		
2	70	463.82	0.57	3.17	68	288						
3	75	469.18	0.63	3.51	69	288	250	250	49	13		
4	80	473.30	0.37	2.07	68	285						
5	85	478.23	0.53	2.96	68	286	250	250	47	10	10.0	10.0
6	90	483.24	0.55	3.07	68	287						
7	95	488.07	0.51	2.84	69	288	251	248	48	10		
8	100	492.80	0.49	2.73	69	287						
9	105	497.53	0.49	2.72	69	289	250	251	48	10		
10	110	501.91	0.42	2.33	69	289						
11	115	506.08	0.38	2.12	70	288	250	250	49	8		
12	120	510.134	0.36	2.00	69	289					10.0	10.1
END	11:57											

S.H.

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CLIENT MVWTE		NOZZLE G292	DIAMETER, IN. 0.2837	IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
SOURCE Unit 1		PROBE 7A1	Cp 0.8469	Imp. #1	0	274	274
PARAMETER / RUN No Metals/Part/HCl/Hg Run 3		PORT LENGTH		Imp. #2	100	176	76
DATE Nov. 15 2023		STATIC PRESSURE, IN. H2O -14.04		Imp. #3	100	116	16
OPERATOR: Justin Cline		STACK DIAMETER 70.9"		Imp. #4	0	8	8
CONTROL UNIT CAE G103	Y 0.9844	STACK HEIGHT 30'		Imp. #5	100	105	5
	ΔH@ 1.706			Imp. #6	100	102	2
BAROMETRIC PRESSURE, IN. Hg 29.93		INITIAL LEAK TEST 0.002 @ 15"		Upstream Diameters			
ASSUMED MOISTURE, Bw 13%		FINAL LEAK TEST 0.001 @ 9"		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. %	O_2 Vol. %
	12:14	510.794										
1	5	514.49	0.44	1.67	67	285	238	243	45	6	9.5	10.1
2	10	518.51	0.52	1.97	67	284						
3	15	522.69	0.56	2.13	68	284	247	251	46	7		
4	20	527.13	0.63	2.40	68	284						
5	25	531.64	0.65	2.47	69	285	250	249	48	8		
6	30	536.14	0.65	2.47	68	286						
7	35	540.39	0.58	2.19	68	288	250	250	47	8		
8	40	544.64	0.58	2.19	68	288					10.0	9.5
9	45	548.33	0.44	1.66	67	288	250	252	48	7		
10	50	552.02	0.44	1.66	67	287						
11	55	555.55	0.40	1.52	68	287	250	251	48	7		
12	60	558.94	0.37	1.40	67	285						
1	65	561.71	0.25	0.94	65	287	250	248	47	5		
2	70	564.65	0.28	1.06	66	287						
3	75	567.75	0.31	1.17	68	286	250	250	47	5	9.5	10.3
4	80	571.18	0.38	1.43	66	287						
5	85	574.69	0.40	1.51	66	285	250	247	48	7		
6	90	578.20	0.40	1.51	66	288						
7	95	582.40	0.57	2.15	67	289	250	251	49	8		
8	100	586.56	0.56	2.11	67	288						
9	105	590.72	0.56	2.11	66	288	250	252	49	8	9.5	10.4
10	110	594.96	0.58	2.19	67	287						
11	115	599.05	0.54	2.04	67	287	250	247	50	8		
12	120	602.985	0.50	1.88	66	288						
END	14:17											

S.H

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CLIENT	Metro Van WTE	NOZZLE G-369	DIAMETER, IN. .3058
SOURCE	Unit #2	PROBE 713	Cp .8551
PARAMETER / RUN No	Dioxin/metals #1	PORT LENGTH	
DATE	11/15/23	STATIC PRESSURE, IN. H2O	-19.5
OPERATOR	JG / CD	STACK DIAMETER	20.90
CONTROL UNIT	Aug 15 Y 1.0016 ΔH@ 1.661	STACK HEIGHT	30.16
BAROMETRIC PRESSURE, IN. Hg	29.92	INITIAL LEAK TEST	.001 @ 15"
ASSUMED MOISTURE, Bw	18%	FINAL LEAK TEST	.001 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	176	176
Imp. #2	100	202	102
Imp. #3	100	136	36
Imp. #4	0	17	17
Imp. #5	100	103	3
Imp. #6	100	103	3
Upstream Diameters			
Downstream Diameters			

Testo #2

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	Fyrites O_2 Vol. %
1		353.69	.51	2.17	52	288	250	251	58	6.0	10.8	10.4
2	10	357.86	.52	2.21	52	289						
3		362.07	.53	2.25	52	289	250	249	58	6.0		
4	20	366.37	.55	2.34	53	290						
5		369.89	.37	1.57	53	292	250	251	58	6.0		
6	30	373.28	.34	1.45	56	292						
7		376.92	.31	1.32	56	292	250	250	58	6.5		
8	40	379.70	.21	.90	57	290						
9		381.68	.18	.77	57	290	250	250	58	6.0		
10	50	384.36	.21	.90	58	290						
11		386.98	.20	.86	58	290	251	252	58	6.0	10.8	10.5
12	60	389.66	.21	.90	58	290						
1		393.13	.35	1.5	61	294	250	249	58	5.8		
2	10	396.55	.34	1.46	61	294						
3		399.88	.32	1.38	62	294	250	249	58	5.5	10.3	10.3
4	20	403.09	.30	1.29	61	294						
5		407.50	.56	2.42	62	290	248	250	58	6.0		
6	30	411.03	.54	2.33	62	290						
7		416.70	.63	2.71	62	293	248	252	58	6.0		
8	40	421.23	.53	2.55	63	293						
9		425.93	.58	2.51	63	291	250	253	58	6.5		
10	50	430.19	.57	2.44	63	290						
11		434.58	.55	2.30	64	290	251	250	58	6.5	10.4	11.2
12		438.93	.54	2.35	64	290						
	15:25	End test										

S.H.

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CLIENT MWTE	NOZZLE G292	DIAMETER, IN. 0.2837	IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
	PROBE 7B	Cp 0.8351				
SOURCE Unit 2			Imp. #1	0	220	220
PARAMETER / RUN No Metals/Partic/Hg Run 2	PORT LENGTH		Imp. #2	100	162	62
DATE Nov 16 2023	STATIC PRESSURE, IN. H2O -19.5"		Imp. #3	100	110	10
OPERATOR: Justin Ching	STACK DIAMETER 70.9"		Imp. #4	0	8	8
CONTROL UNIT AU15 Y 1.0016	STACK HEIGHT 30'		Imp. #5	100	104	4
ΔH@ 1.661			Imp. #6	100	102	2
BAROMETRIC PRESSURE, IN. Hg 30.10	INITIAL LEAK TEST 0.003 @15"		Upstream Diameters			
ASSUMED MOISTURE, Bw 15%	FINAL LEAK TEST 0.003 @10"		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. %	O_2 Vol. %		
	9:47	441.388												
1	5	445.02	0.52	1.71	43	288	255	248	41	8	10.0	9.8		
2	10	448.72	0.54	1.77	43	288								
3	15	452.38	0.53	1.74	43	289	248	246	42	8				
4	20	455.81	0.48	1.57	45	290								
5	25	459.20	0.45	1.48	45	289	251	251	44	7				
6	30	462.48	0.42	1.38	46	290								
7	35	465.31	0.31	1.03	48	289	248	251	46	6				
8	40	468.10	0.30	1.00	49	287					10.0	10.3		
9	45	470.80	0.28	0.93	50	287	250	254	47	6				
10	50	473.5	0.28	0.93	50	288								
11	55	476.11	0.26	0.87	51	287	249	251	49	5				
12	60	478.62	0.24	0.80	52	288								
1	65	481.24	0.26	0.87	53	288	252	251	50	5				
2	70	483.77	0.24	0.81	55	288								
3	75	486.40	0.26	0.88	56	288	250	252	50	5				
4	80	488.93	0.24	0.81	56	287					10.0	10.2		
5	85	491.61	0.27	0.91	56	288	248	251	52	5				
6	90	494.45	0.30	1.01	57	287								
7	95	498.22	0.53	1.79	57	287	248	257	53	8				
8	100	502.10	0.56	1.89	58	288								
9	105	506.32	0.66	2.24	58	287	249	247	51	9	10.0	10.0		
10	110	510.27	0.58	1.96	58	287								
11	115	514.12	0.55	1.87	58	286	250	249	51	8				
12	120	517.9045	0.53	1.80	58	286								
END	11:30													

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S.H.

P280 0.2810

CLIENT MWTE	NOZZLE ~~0.297~~ DIAMETER, IN. ~~0.2897~~	IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
SOURCE Met Unit 2	PROBE 7A1 Cp 0.8469	Imp. #1	0	212	212
PARAMETER / RUN No Particulate/Metals/Hg Run 3	PORT LENGTH	Imp. #2	100	140	40
DATE Nov. 16, 2023	STATIC PRESSURE, IN. H2O -1.95"	Imp. #3	100	122	22
OPERATOR: Justin Chung	STACK DIAMETER 70.9"	Imp. #4	0	6	6
CONTROL UNIT AU 15 Y 1.0016	STACK HEIGHT 30'	Imp. #5	100	104	4
ΔH@ 1.661		Imp. #6	100	102	2
BAROMETRIC PRESSURE, IN. Hg 30.10	INITIAL LEAK TEST 0.001 @ 15"	Upstream Diameters			
ASSUMED MOISTURE, Bw 15%	FINAL LEAK TEST 0.001 @ 9"	Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO_2 Vol. %	O_2 Vol. %		
	12:02	518.542												
1	5	521.42	0.31	1.04	59	289	232	231	48	5	9.5	10.5		
2	10	524.39	0.33	1.11	60	289								
3	15	527.27	0.31	1.04	60	~~291~~ 290	246	235	49	5				
4	20	530.06	0.29	0.97	60	290								
5	25	532.99	0.32	1.07	60	289	250	251	49	5				
6	30	536.01	0.34	1.14	61	289								
7	35	540.19	0.63	2.19	61	289	250	250	50	8				
8	40	544.04	~~0.55~~	1.85	61	289								
9	45	548.16	0.63	2.12	61	289	250	249	50	7	9.5	10.5		
10	50	552.13	0.60	2.02	61	288								
11	55	556.13	~~0.58~~ 0.58	1.95	61	289	249	250	48	7				
12	60	559.80	~~0.50~~ 0.50	1.68	62	289								
					61									
1	65	563.13	0.41	1.38	61	287	248	248	51	6				
2	70	566.58	0.44	1.48	62	288								
3	75	569.95	0.42	1.42	63	289	250	249	50	6	9.5	10.8		
4	80	573.36	0.43	1.45	63	290								
5	85	576.72	0.42	1.41	62	291	244	251	50	6				
6	90	580.13	0.43	1.45	63	292								
7	95	583.98	0.30	1.01	63	292	250	247	52	6				
8	100	585.88	0.31	1.05	64	291								
9	105	588.87	0.32	1.08	63	292	250	245	50	6	9.0	11.0		
10	110	591.58	0.28	0.94	64	292								
11	115	594.34	0.28	0.94	64	292	252	251	50	5				
12	120	597.000	0.26	0.88	65	292								
END	14:05													

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CLIENT MVWTE		NOZZLE G292	DIAMETER, IN. 0.2837
SOURCE Unit 3		PROBE 7B	Cp 0.8351
PARAMETER / RUN No Metals/Part/C/Hg Run 2		PORT LENGTH	
DATE Nov. 17, 2023		STATIC PRESSURE, IN. H2O -19.0"	
OPERATOR: Justin Ching		STACK DIAMETER 70.9"	
CONTROL UNIT CAE G103	Y 0.9844	STACK HEIGHT 30'	
	ΔH@ 1.706		
BAROMETRIC PRESSURE, IN. Hg 30.04		INITIAL LEAK TEST 0.002 @ 15"	
ASSUMED MOISTURE, Bw 15%		FINAL LEAK TEST 0.001 @ 8"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	222	222
Imp. #2	100	140	40
Imp. #3	100	118	18
Imp. #4	0	5	5
Imp. #5	100	103	3
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. %
	9:06	678.559										
1	5	681.79	0.39	1.32	50	298	251	243	44	7	11.5	8.4
2	10	685.17	0.43	1.45	50	300						
3	15	688.60	0.44	1.48	51	300	251	251	45	7		
4	20	692.35	0.52	1.76	54	302						
5	25	695.69	0.41	1.39	56	303	250	251	47	7		
6	30	698.99	0.40	1.36	57	303						
7	35	701.55	0.24	0.82	57	299	250	252	46	5		
8	40	703.84	0.19	0.65	58	298					12.0	8.5
9	45	706.19	0.20	0.69	58	297	250	250	47	4		
10	50	708.54	0.20	0.69	59	296						
11	55	710.84	0.19	0.66	60	296	250	249	48	4		
12	60	713.02	0.17	0.59	61	294						
1	65	715.15	0.16	0.56	63	293	251	232	44	4		
2	70	717.41	0.18	0.63	64	291					12.5	8.2
3	75	719.91	0.22	0.77	64	292	250	246	44	4		
4	80	722.47	0.23	0.81	65	291						
5	85	724.92	0.21	0.74	66	291	250	250	45	4		
6	90	727.43	0.22	0.77	65	290						
7	95	730.82	0.40	1.41	66	290	249	251	45	6		
8	100	734.38	0.44	1.55	66	289						
9	105	738.09	0.48	1.69	66	289	250	250	46	7		
10	110	741.73	0.46	1.62	66	289					12.5	8.1
11	115	745.2	0.42	1.48	66	289	250	251	47	6		
12	120	748.385	0.35	1.24	66	287						
END	11:09											

S.H.

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CLIENT Metro Van WTE	NOZZLE G292 DIAMETER, IN. .2837	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE Unit #3	PROBE 713 Cp .8351	Imp. #1	0 / 237 / 237
PARAMETER / RUN No particel metals R1	PORT LENGTH	Imp. #2	100 / 150 / 50
DATE 11.16.17	STATIC PRESSURE, IN. H2O -1.9	Imp. #3	100 / 116 / 16
OPERATOR: SG ACP	STACK DIAMETER 70.9"	Imp. #4	0 / 8 / 8
CONTROL UNIT GAE G105 Y .9844 ΔH@ 1.706	STACK HEIGHT 30'	Imp. #5	100 / 104 / 4
		Imp. #6	100 / 102 / 2
BAROMETRIC PRESSURE, IN. Hg 30.10	INITIAL LEAK TEST .004 @ 15"	Upstream Diameters	
ASSUMED MOISTURE, Bw 18%	FINAL LEAK TEST .010 @ 15"	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. %
	13:11	603.350										
1		606.68	.44	1.40	57	311	250	257	58	5.5	10.70	9.20
2	10	610.05	.45	1.43	57	311						
3		613.47	.46	1.46	59	311	250	249	58	5.5		
4	20	616.86	.45	1.43	59	311						
5		620.15	.42	1.35	61	308	250	249	58	5.5		
6	30	623.41	.41	1.32	63	308						
7		626.29	.32	1.03	63	309	251	252	58	5.5		
8	40	629.08	.30	.97	63	309						
9		631.83	.29	.94	64	308	250	257	58	5.5		
10	50	634.49	.27	.87	66	308					10.50	9.40
11		637.06	.25	.81	67	305	250	250	58	5.5		
12	60	639.59	.24	.78	69	306						
1		642.34	.28	.92	70	301	250	252	58	4.0		
2	10	645.03	.27	.89	70	302						
3		647.77	.28	.92	70	302	250	250	58	4.0		
4	20	650.37	.25	.83	72	302						
5		652.92	.24	.79	72	304	250	250	58	4.0	10.70	9.30
6	30	655.73	.29	.96	74	306						
7		659.07	.41	1.36	74	304	250	250	58	4.0		
8	40	662.60	.46	1.52	73	304						
9		666.26	.49	1.62	75	304	250	251	58	4.0		
10	50	669.99	.51	1.69	75	304						
11		673.90	.56	1.86	75	304	250	250	58	3.5	10.6	9.20
12		677.523	.48	1.59	75	304						
	15:13	END test										

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CLIENT MUWTE	NOZZLE G292 DIAMETER, IN. 0.2837	IMPINGER VOLUMES	INITIAL (mL) / FINAL (mL) / TOTAL GAIN (mL)
SOURCE Unit 3	PROBE 7B Cp 0.8351	Imp. #1	0 / 250 / 250
PARAMETER / RUN No Metals/Partic/Hg Run 3	PORT LENGTH	Imp. #2	100 / 152 / 52
DATE Nov. 17, 2023	STATIC PRESSURE, IN. H2O -19.0"	Imp. #3	100 / 112 / 12
OPERATOR: Justin Ching	STACK DIAMETER 70.9"	Imp. #4	0 / 6 / 6
CONTROL UNIT CAE G105 Y 0.9844	STACK HEIGHT 30'	Imp. #5	100 / 103 / 3
ΔH@ 1.706		Imp. #6	100 / 102 / 2
BAROMETRIC PRESSURE, IN. Hg 30.04	INITIAL LEAK TEST 0.002 @15"	Upstream Diameters	
ASSUMED MOISTURE, Bw 15%	FINAL LEAK TEST 0.001 @7"	Downstream Diameters	

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %		
	11:29	748.697												
1	5	751.09	0.20	0.70	64	288	231	244	43	3	12.5	7.9		
2	10	753.54	0.21	0.74	64	289								
3	15	756.11	0.23	0.81	65	289	249	251	44	3				
4	20	758.62	0.22	0.77	65	290								
5	25	761.25	0.24	0.84	65	291	249	250	50	3				
6	30	763.93	0.25	0.88	65	292								
7	35	767.31	0.40	1.40	65	292	249	249	48	5	11.5	8.1		
8	40	770.81	0.43	1.50	65	293								
9	45	774.52	0.48	1.68	66	292	249	251	48	5				
10	50	778.10	0.45	1.57	65	293								
11	55	781.57	0.42	1.47	66	293	250	250	50	5				
12	60	784.82	0.37	1.29	66	294								
1	65	788.20	0.40	1.40	66	295	250	251	50	5				
2	70	791.74	0.44	1.54	66	296					12.0	8.3		
3	75	795.32	0.45	1.57	66	296	250	250	50	5				
4	80	799.0	0.48	1.67	66	298								
5	85	802.66	0.47	1.64	66	298	250	249	52	5				
6	90	806.19	0.44	1.53	66	299								
7	95	809.07	0.29	1.01	67	297	251	253	53	4	12.0	7.9		
8	100	811.68	0.24	0.84	66	298								
9	105	814.34	0.25	0.87	66	298	250	251	53	4				
10	110	816.85	0.22	0.77	67	297								
11	115	819.30	0.21	0.73	67	296	250	251	50	4				
12	120	821.630	0.19	0.66	67	296								
END	13:30													

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SH

Client MVWTE
Source Unit #1
Parameter NH3
Date 15-Nov-23

Y LMU-4 1.0248
Cp
Pbar 29.92 Static
Operator

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.001	0.0001	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:58	594.3405	51		100			
					100			
	11:38	594.7676	59		251			
2	11:49	594.7739	52		200			
	12:49	595.4247	54		285			
3	13:09	595.4492	51		200			
	14:09	596.0884	54		295			

Client MV WTE
Source Unit #2
Parameter NH3
Date 16-NOV-23

Y LMU-4 1.0309
Cp
Pbar 30.10 Static
Operator

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
4	9:66	118.5157	51		200			
	10:56	119.1338	57		276			
5	11:08	119.1372	55		200			
	12:08	119.7712	63		287			
6	12:23	119.7751	58		200			
	13:23	120.4216	61		[illegible] 280			

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7 9 SH.

Client	MV	Y	LMU-C 1.0309		
Source	Unit 1	Cp			
Parameter	HF	Pbar	29.92	Static	
Date	11.15.2023	Operator	BL		

Leak Check	Run 1	Run 2	Run 3
Initial	.0001	.0001	.0001
Final	.0001	.0001	

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:51	116.8098	54.1		200			
			~~60~~					
			~~62~~					
	11:38	117.3292	~~62~~		270			
2	11:49	117.3308	~~55~~		200			
			57					
			60					
	12:49	117.8621	~~66~~		275			
3	1:01	117.8716	54		200			
	2:01	118.5082	58		285			

Client	MV WTE	Y	LMU-4 1.0248		
Source	Unit 2	Cp			
Parameter	HF	Pbar	30.10	Static	
Date	11/16/23	Operator	BL		

Leak Check	Run 1	Run 2	Run 3
Initial	0.0000	0.0001	0.0001
Final	0.0001	0.0001	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:56	596.1012	42.2		200			
	10:56	596.5185	57					
2	11:01	596.5244	54		200			
	12:08	596.9232	58		250			
3	12:21	596.9254	59		200			
	13:21	597.3352	61		245			

SA

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Client	MVWTE	Y	LMU-C 1039		
Source	Unit 3	Cp			
Parameter	HF	Pbar	30.04	Static	
Date	11/27/23	Operator	JL		

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:39	120.5776	55.8		200			
	10:39	121.2796	61.8		295			
2	10:54	121.2828	61.		200			
	11:54	121.9564	68		295			
3	12:06	121.9622	68		200			
	13:06	122.6682	68		300			

Client	MVWTE	Y	LMU-4 1024		
Source	Unit 3	Cp			
Parameter	NH3	Pbar	30.04	Static	
Date	11/1/23	Operator	JL		

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:39	597.3936	55.4		200			
	10:39	597.8202	67.2		255			
2	10:54	597.8226	64.6	~~200~~	200			
	11:54	598.2586	71		255			
3	12:06	598.2332	70		200			
	13:06	598.6172	68		250			

Canister sampling sheet

Plant MJ (WTE) Test Date 11.15.2023 - 11.17.2023
File No. Unit # Recovery Date

Source: Unit #1

Pbar in hg		29.93	29.93	29.93			
Canister number		SC01949	SC00220	SC01030			
Controller number		OA01213	OA00217	OA00250			
Initial:	Start time	09:52	11:49	13:07			
	Flask Vac. (in Hg)	-32	-35	-27			
Final:	Finish time	11:38	9	14:01			
	Flask Vac. (in Hg)	7	12:49	8			

Source: Unit #2 NOV. 16. 2023

Pbar in hg		30.10	30.10	30.10			
Canister number		SC00826	SC00235	SC02156			
Controller number		OA02248	OA01364	OA00613			
Initial:	Start time	0956	1108	1223			
	Flask Vac. (in Hg)	-29	-35	-30			
Final:	End time	10:56	1208	1323			
	Flask Vac. (in Hg)	7	8	7			

Source: Unit #3 NOV 17. 2023

Pbar in hg		30.04	30.04	30.04			
Canister number		SC01561	SC00884	SC00771			
Controller number		OA00252	OA01220	OA01808			
Initial:	Start time	9:39	1054	12:06			
	Flask Vac. (in Hg)	-28.0	-25.0	-30.0			
Final:	End time	10:39	1154	1306			
	Flask Vac. (in Hg)	-9.5	-4.0	-12.0			

Source:

Pbar in hg							
Canister number							
Controller number							
Initial:	Start time						
	Flask Vac. (in Hg)						
Final:	End time						
	Flask Vac. (in Hg)						

APPENDIX – F

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

Pitot Tube Calibration

Date: 27-Jun-23
Pbar (in.Hg): 29.84

Temp (R): 539
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)
0.075	0.100	18.3	0.8574	0.0105
0.155	0.210	26.3	0.8505	0.0036
0.295	0.400	36.3	0.8502	0.0033
0.460	0.630	45.3	0.8459	0.0010
0.570	0.810	50.5	0.8305	0.0164
		Average :	0.8469	0.0070

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.055	0.075	15.7	0.8478	0.0019
0.180	0.250	28.4	0.8400	0.0059
0.270	0.365	34.7	0.8515	0.0055
0.450	0.620	44.8	0.8434	0.0025
0.505	0.690	47.5	0.8469	0.0010
		Average :	0.8459	0.0034

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.050	0.072	14.9	0.8250	0.0101
0.130	0.180	24.1	0.8413	0.0062
0.295	0.400	36.3	0.8502	0.0151
0.460	0.630	45.3	0.8459	0.0108
0.560	0.830	50.0	0.8132	0.0219
		Average :	0.8351	0.0128

Pitot ID: **ST 8B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.040	0.055	13.4	0.8443	0.0076
0.110	0.155	22.2	0.8340	0.0179
0.300	0.420	36.6	0.8367	0.0152
0.460	0.630	45.3	0.8459	0.0059
0.560	0.680	50.0	0.8984	0.0465
		Average :	0.8519	0.0186

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

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.075	0.105	16.3	0.8367	0.0099
0.160	0.220	19.9	0.8443	0.0024
0.360	0.480	25.3	0.8574	0.0107
0.460	0.630	35.8	0.8459	0.0007
0.500	0.680	48.4	0.8489	0.0023
		Average :	0.8466	0.0052

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.075	0.105	14.9	0.8367	0.0020
0.160	0.220	19.4	0.8443	0.0055
0.280	0.380	29.0	0.8498	0.0111
0.570	0.810	43.1	0.8305	0.0082
0.615	0.870	52.8	0.8324	0.0064
		Average :	0.8387	0.0067

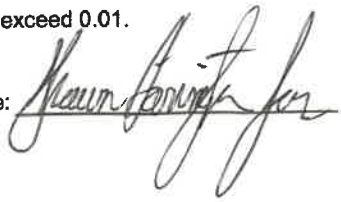
Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.038	0.051	13.0	0.8546	0.0057
0.110	0.150	16.3	0.8478	0.0011
0.295	0.400	36.3	0.8502	0.0013
0.450	0.620	30.5	0.8434	0.0055
0.540	0.735	47.0	0.8486	0.0003
		Average :	0.8489	0.0028

Pitot ID:

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

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jeremy Gibb Signature:  Date: June 27, 2023

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 27-Jun-23
Barometric Pressure: 29.82 (in. Hg)
Theoretical Critical Vacuum: 14.07 (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)
3.50	17.00	293.600	311.863	18.263	75.0	75.0	78.0	78.0	73	0.8185	17.0	77.0	76.0	76.5
1.80	26.00	312.100	332.364	20.264	78.0	78.0	80.0	80.0	63	0.5956	20.0	76.0	76.0	76.0
1.10	15.00	341.400	350.552	9.152	81.0	81.0	82.0	82.0	55	0.4606	22.0	76.0	76.0	76.0
0.61	18.00	332.700	341.064	8.364	80.0	80.0	81.0	81.0	48	0.3560	23.0	76.0	76.0	76.0
0.28	15.00	350.800	355.584	4.784	82.0	82.0	83.0	83.0	40	0.2408	24.0	76.0	78.0	77.0

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
18.061	511.5	17.914	507.3	18.271	0.992	-0.010	1.739	44.17	0.078	0.733
19.864	562.5	19.946	564.9	20.324	1.004	0.003	1.680	42.66	0.018	0.738
8.915	252.5	8.899	252.0	9.068	0.998	-0.003	1.708	43.39	0.047	0.737
8.152	230.9	8.254	233.7	8.410	1.012	0.011	1.589	40.36	-0.073	0.754
4.642	131.5	4.648	131.6	4.745	1.001	0.000	1.591	40.41	-0.070	0.762
				Average Y---------->	**1.0016**	**Average dH@----->**	**1.661**	**42.2**	**Average Ko----->**	**0.745**

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: Justin Ching Signature: Justin Ching Date: June 27, 2023

BAROMETER CALIBRATION FORM						
		Pbar Env Canada		Device (inches of Hg)		Difference
Device	Cal Date	(kPa)	(inches of Hg)	Reading	Elevation Corrected	(Env Can - Elv Corr)
LA	10-Jul-23	101.6	30.01	29.92	29.99	0.02
DS	10-Jul-23	101.6	30.01	29.91	29.98	0.03
CL	10-Jul-23	101.6	30.01	29.92	29.99	0.02
JC	10-Jul-23	101.6	30.01	29.89	29.96	0.05
LF	10-Jul-23	101.6	30.01	29.91	29.98	0.03
SH	10-Jul-23	101.6	30.01	29.90	29.97	0.04
CDO	10-Jul-23	101.6	30.01	29.89	29.96	0.05
JG	10-Jul-23	101.6	30.01	29.87	29.94	0.07
ML	10-Jul-23	101.6	30.01	29.89	29.96	0.05
BL	10-Jul-23	101.6	30.01	29.91	29.98	0.03

Calibrated by: Daryl Sampson Signature: Daryl Sampson Date: 10-Jul-23

Performance Specification is
Device Corrected for Elevation must be +/- 0.1 " Hg of ENV CANADA SEA-LEVEL Pbar
Enter Environment canada Pressure from their website for Vancouver (link below)
and the reading from your barometer on the ground floor of the office.

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

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

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

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

Accreditation No.: 1004232
Issued On: 4/11/2023
Accreditation Date: 2/5/2021
Expiry Date: 10/11/2025

President and CEO

MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Daryl Sampson

has successfully completed

The program of studies and is awarded the certificate in

STACK SAMPLING

May 2005
Date

Donna Spaulding
Dean
Faculty of Continuing Education and Extension

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

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

Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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

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

Signature:

X Daryl Sampson

Print name: Daryl Sampson

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.18, 2020

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

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Shawn Harrington

   Title Senior Environmental Technician /Project manager

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting ,specializing in air and atmospheric sciences

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

Declaration

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

Signature:

x Shawn Harrington

Print Name: Shawn Harrington

Witnessed by:

x

Print Name: Mark Lanfranco

Date signed: November 26, 2020

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

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Daryl Sampson

   Title Senior Environmental Technician/Project Manager

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting, specializing in air and atmospheric sciences

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

Declaration

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

Signature: Witnessed by:

X Daryl Sampson **X** _____

Print Name: Daryl Sampson Print Name: Louis Agassiz

Date signed: November 23, 2020

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1. Name of Qualified Professional Jeremy Gibbs

   Title Environmental technician

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:
   Environmental Consultant Specialize in air and atmospheric sciences

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Declaration

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

Signature:

X _____

Print Name: Jeremy Gibbs

Witnessed by:

X _____

Print Name: Connor Laan

Date signed: Nov 1, 2020

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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1. Name of Qualified Professional Justin Ching

Title Environmental Technician

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

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental Technician - specialising in air and atmospheric sciences

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Declaration

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

Signature: Witnessed by:

X Justin Ching **X** Daryl Sampson

Print Name: Justin Ching Print Name: Daryl Sampson

Date signed: June 28, 2023

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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1. Name of Qualified Professional Liam Forrer

Title Environmental Technician

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

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental consulting, specializing in air and atmospheric sciences

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Declaration

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

Signature:

x Liam Forrer

Print Name: Liam Forrer

Witnessed by:

x Daryl Sampson

Print Name: Daryl Sampson

Date signed: July 12, 2023

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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: 28-Jun-23
Barometric Pressure: 29.87 (in. Hg)
Theoretical Critical Vacuum: 14.09 (in. Hg)

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

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

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)
3.60	21.00	447.200	470.013	22.813	75.0	75.0	77.0	77.0
1.90	36.00	470.300	498.593	28.293	77.0	77.0	80.0	80.0
1.15	34.00	498.900	519.812	20.912	80.0	80.0	82.0	82.0
0.58	15.00	520.200	527.224	7.024	82.0	82.0	83.0	83.0
0.27	28.00	527.400	536.397	8.997	83.0	83.0	83.0	83.0

-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	17.0	75.0	84.0	79.5
63	0.5956	19.0	83.0	91.0	87.0
55	0.4606	20.0	90.0	88.0	89.0
48	0.3560	21.0	87.0	87.0	87.0
40	0.2408	23.0	87.0	89.0	88.0

********** **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)
22.625	640.7	22.104	626.0	22.633	0.977	-0.007	1.797	45.65	0.092	0.719
27.813	787.7	27.384	775.5	28.428	0.985	0.000	1.808	45.92	0.102	0.713
20.425	578.4	19.964	565.4	20.801	0.977	-0.007	1.828	46.43	0.122	0.715
6.832	193.5	6.820	193.1	7.080	0.998	0.014	1.533	38.95	-0.172	0.765
8.736	247.4	8.603	243.6	8.948	0.985	0.000	1.562	39.67	-0.144	0.768
				Average Y---------->	**0.9844**		**Average dH@----->**	**1.706**	**43.3**	**Average Ko----->** **0.736**

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: Justin Ching Signature: Justin Ching Date: June 28, 2023

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Christian De La O
Date: 26-Jun-23
Signature: Chris Del A O

Nozzle I.D.	d1	d2	d3	difference	average dia.	average area
	(inch)	(inch)	(inch)	(inch)	(inch)	(ft^2)
A	0.1270	0.1270	0.1255	0.0015	0.1265	0.0000873
G-165	0.1650	0.1660	0.1645	0.0015	0.1652	0.0001488
G-170	0.1700	0.1710	0.1695	0.0015	0.1702	0.0001579
G-178	0.1760	0.1770	0.1790	0.0030	0.1773	0.0001715
E	0.1950	0.1930	0.1960	0.0030	0.1947	0.0002067
L	0.2100	0.2070	0.2090	0.0030	0.2087	0.0002375
P-2240	0.2160	0.2155	0.2170	0.0015	0.2162	0.0002549
G-221	0.2160	0.2185	0.2190	0.0030	0.2178	0.0002588
G-225	0.2190	0.2175	0.2180	0.0015	0.2182	0.0002596
G-218	0.2180	0.2200	0.2210	0.0030	0.2197	0.0002632
G-2232	0.2210	0.2200	0.2215	0.0015	0.2208	0.0002660
P-250	0.2500	0.2495	0.2505	0.0010	0.2500	0.0003409
C-250	0.2500	0.2500	0.2500	0.0000	0.2500	0.0003409
P-251	0.2545	0.2530	0.2540	0.0015	0.2538	0.0003514
P-254	0.2550	0.2540	0.2535	0.0015	0.2542	0.0003523
P-256	0.2540	0.2550	0.2560	0.0020	0.2550	0.0003547
P-280	0.2810	0.2805	0.2815	0.0010	0.2810	0.0004307
C-280	0.2800	0.2800	0.2800	0.0000	0.2800	0.0004276
G-282	0.2820	0.2800	0.2825	0.0025	0.2815	0.0004322
P-281	0.2820	0.2820	0.2815	0.0005	0.2818	0.0004332
G-292	0.2820	0.2840	0.2850	0.0030	0.2837	0.0004389
G-309	0.3045	0.3065	0.3065	0.0020	0.3058	0.0005101
P-311	0.3115	0.3120	0.3120	0.0005	0.3118	0.0005304
P-312	0.3120	0.3110	0.3105	0.0015	0.3112	0.0005281
G-3121	0.3090	0.3085	0.3075	0.0015	0.3083	0.0005185
P-313	0.3140	0.3130	0.3130	0.0010	0.3133	0.0005355
P-314	0.3135	0.3135	0.3140	0.0005	0.3137	0.0005366
P-315	0.3145	0.3145	0.3145	0.0000	0.3145	0.0005395
V-06	0.3220	0.3215	0.3200	0.0020	0.3212	0.0005626
G-345	0.3470	0.3475	0.3475	0.0005	0.3473	0.0006580
P27	0.3490	0.3480	0.3500	0.0020	0.3490	0.0006643
G-367	0.3700	0.3685	0.3690	0.0015	0.3692	0.0007433
P-375	0.3730	0.3750	0.3745	0.0020	0.3742	0.0007636
P-401	0.3980	0.3990	0.4000	0.0020	0.3990	0.0008683
G-433	0.4360	0.4360	0.4355	0.0005	0.4358	0.0010360
G-437	0.4690	0.4690	0.4700	0.0010	0.4693	0.0012014
G-468	0.4700	0.4685	0.4720	0.0035	0.4702	0.0012057
P-7	0.4965	0.4945	0.4975	0.0030	0.4962	0.0013427
G-540	0.5400	0.5410	0.5400	0.0010	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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

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

Declaration

I Jeremy Gibbs, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X _____

Print name: Jeremy G. Sss

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec.16, 2020

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MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeremy Shawn Gibbs

has successfully completed

Stack Sampling

35 Hours / 2019

May 22, 2019

Date

Dean
Faculty of Continuing Education and Extension

MOUNT ROYAL
UNIVERSITY
1910

MOUNT ROYAL UNIVERSITY
Faculty of Continuing Education

MOUNT ROYAL
UNIVERSITY
1910
CALGARY, ALBERTA

Justin Ching

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023

Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Justin Ching, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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Signature:

X Justin Ching

Print name: Justin Ching

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: June 28, 2023

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MOUNT ROYAL UNIVERSITY
Faculty of Continuing Education

MOUNT ROYAL
UNIVERSITY
1910
CALGARY, ALBERTA

Liam Forrer

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023

Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Liam Forrer, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

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

Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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

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Signature:

X Liam Forrer

Print name: Liam Forrer

Witnessed by:

X

Print name: Mark Lanfranco

Date: July 12, 2023

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A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: LM 4
Serial #: 577

Date: 27-Jun-23
Barometric Pressure: 29.82 (in. Hg)
Theoretical Critical Vacuum: 14.07 (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	26.00	257.519	257.857	11.943	75.0	75.0	82.0	82.0
0.00	15.00	257.857	258.053	6.922	82.0	82.0	84.0	84.0
0.00	15.00	258.053	258.249	6.925	84.0	84.0	86.0	86.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
48	0.3560	20.0	77.0	76.0	76.5
48	0.3560	20.0	76.0	77.0	76.5
48	0.3560	20.0	77.0	78.0	77.5

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
11.667	330.4
6.705	189.9
6.684	189.3

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
11.916	337.5	12.154
6.875	194.7	7.012
6.868	194.5	7.018

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)
1.021	-0.003
1.025	0.001
1.028	0.003

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

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

Average Y---------> 1.0248 **Average dH@-----> 0.0000** **0.00**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Justin Ching Signature: Justin Ching Date: June 27, 2023

A. Lanfranco & Associates Inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: LMU-C
Serial #: Wizit 4615

Date: 29-Jun-23
Barometric Pressure: 29.87 (in. Hg)
Theoretical Critical Vacuum: 14.09 (in. Hg)

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

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

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	15.00	111.731	111.924	6.798	75.0	75.0	76.0	76.0
0.00	26.00	111.924	112.259	11.830	76.0	76.0	78.0	78.0
0.00	36.00	112.259	112.724	16.428	78.0	78.0	77.0	77.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
48	0.3560	20.0	73.0	73.0	73.0
48	0.3560	20.0	73.0	74.0	73.5
48	0.3560	20.0	74.0	74.0	74.0

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
6.689	189.4
11.608	328.7
16.105	456.1

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
6.909	195.7	6.989
11.970	339.0	12.120
16.566	469.1	16.789

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)
1.033	0.002
1.031	0.000
1.029	-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---------> 1.0309 **Average dH@-----> 0.0000 0.00**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Justin Ching Signature:  Date: June 29, 2023

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

BCIT

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

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

Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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

Signature:

X Shawn Harrington

Print name: Shawn Harrington

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.16, 2020

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

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Daryl Sampson

Date: 30-Jun-22

Signature: Daryl Sampson

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%	99.5	-0.09%	201	0.15%	301.5	0.20%	498	-0.21%	798.2	-0.14%	1696	-0.19%
Omega HH11A	4	200167	32	0.00%	98.5	-0.27%	200.5	0.08%	301	0.13%	499	-0.10%	799	-0.08%	1695	-0.23%
Omega HH11A	6	600059	32	0.00%	99.8	-0.04%	201.5	0.23%	301.5	0.20%	498.4	-0.17%	799.5	-0.04%	1696	-0.19%
TPI 341K	7	2.0315E+10	31	-0.20%	99.2	-0.14%	199.6	-0.06%	299.8	-0.03%	499.6	-0.04%	796.4	-0.29%	1695	-0.23%
TPI 341K	8	2.0313E+10	32	0.00%	99.2	-0.14%	200.3	0.05%	300.5	0.07%	490.2	-1.02%	797.6	-0.19%	1695	-0.23%
Cont Cmpny	10	102008464	30.5	-0.31%	98	-0.36%	199.3	-0.11%	298.5	-0.20%	498	-0.21%	796.8	-0.25%	1697	-0.14%
Omega HH11	14	409426	31.5	-0.10%	99.5	-0.09%	199	-0.15%	299	-0.13%	499	-0.10%	797	-0.24%	1698	-0.09%
TPI 341K	16	400120029	31	-0.20%	99	-0.18%	199.1	-0.14%	298.4	-0.21%	501	0.10%	799.8	-0.02%	1700	0.00%
TPI 341K	18	2.0329E+10	31.4	-0.12%	99.4	-0.11%	198.5	-0.23%	299.3	-0.09%	499.5	-0.05%	799.2	-0.06%	1698	-0.09%
TPI 341K	20	2.0329E+10	30.6	-0.28%	98.5	-0.27%	198.2	-0.27%	299.1	-0.12%	498.2	-0.19%	798	-0.16%	1697	-0.14%
TPI 341K	22	2.0329E+10	31.2	-0.16%	99.2	-0.14%	198.5	-0.23%	299	-0.13%	498.4	-0.17%	798	-0.16%	1698	-0.09%
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: 11-Aug-23
Calibrated by: Louis Agassiz
Authorizing Signature:

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

Ambient Conditions: Temperature: 23 °C Barometric Pressure: 101.8 kPa Relative Humidity: 64%

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		0.1	0.10	Pass		0
O_2	11.1	0.03	Pass		11.1	0.03	Pass		11.07
Ambient	20.9	0.05	Pass		20.9	0.05	Pass		20.95

Performance Specification: +/- 1% O_2 (absolute diff)

CO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	577	22.4%	Fail	Replaced Cell	472	0.1%	Pass		472
2 Gas	251	0.1%	Pass		250	0.3%	Pass		251
3 Gas	2285	19.7%	Fail		1908	0.1%	Pass		1909

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

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	492	3.9%	Pass	Re Cal on 1	474	0.1%	Pass		473
2 Gas	45.5	4.8%	Pass	Gas	43.8	0.9%	Pass		43
3 Gas	110	4.1%	Pass		106	0.2%	Pass		106

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

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	NO (ppm)	O_2 (Vol. %)	CO (ppm)
Zero Gas (N_2)	T97227026	10-Nov-2022	9-Nov-2027	2300	0	0	0
1 Gas	SG9107852B	6-May-2021	5-May-2024	1000	473.4	0	471.5
2 Gas	CC22286	18-Nov-2022	19-Nov-2026	1030	43.42	0	250.7
3 Gas	CC36070	13-Feb-2023	14-Feb-2031	1050	105.8	-	1909
O_2/CO_2	CC256047	11-Nov-2022	12-Nov-2030	1320	0	11.07	0

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

Calibration Certificate

Date: 08-Aug-23
Calibrated by: Louis Agassiz
Authorizing Signature:

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

Ambient Conditions: Temperature: 25 °C Barometric Pressure: 101.6 kPa Relative Humidity: 65%

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	11.1	0.03	Pass		11.1	0.03	Pass		11.07
Ambient	21	0.04	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	Replaced CO cell	0	0.0%	Pass		0
1 Gas	592	25.6%	Fail		472	0.1%	Pass		472
2 Gas	2154	13.1%	Fail		1900	0.2%	Pass		1904
3 Gas	245	2.3%	Pass		251	0.1%	Pass		251

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

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	428	9.6%	Fail	Re cal on 1	473	0.1%	Pass		473.4
2 Gas	235	8.9%	Fail	Gas	261	1.2%	Pass		258.0
3 Gas	45	3.6%	Pass		45	3.6%	Pass		43.4

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

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	NO (ppm)	O_2 (Vol. %)	CO (ppm)
Zero Gas (N_2)	T97227026	10-Nov-2022	9-Nov-2027	2270	0	0	0
1 Gas	SG9107852B	6-May-2021	5-May-2024	950	473.4	0	471.5
2 Gas	CC320634	23-Mar-2018	23-Mar-2026	520	258	0	1904
3 Gas	CC22286	18-Nov-2022	19-Nov-2026	1030	43.42	0	250.7
O_2/CO_2	CC256047	11-Nov-2022	12-Nov-2030	1320	0	11.07	0

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