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
May 2023 Survey
Second 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**		
Second Quarter 2023	**Unit 1**	**Unit 2**	**Unit 3**
Filter	0.2 mg	0.2 mg	0.3 mg
Front Half Washings	-0.5 mg	0.9 mg	0.3 mg
Mercury Front	<0.05 ug	<0.05 ug	<0.05 ug
Mercury Back	<0.203 ug	<0.20 ug	<0.209 ug
Trace Metals Front *	<14.9 ug	<17.0 ug	<22.2 ug
Trace Metals Back*	<44.6 ug	<44.6 ug	<25.2 ug
Ammonia	7.3 ug	<5.6 ug	23 ug
Fluoride	<8 ug	<7 ug	<7 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 1-12 were used to calculate particulate concentration at standard conditions on a dry basis. Equations 13-27 were used to sample within the 100 ± 10% isokinetic variation and to confirm that sampling meets this isokinetic variation threshold. Equations 28-30 were used to calculate the volumetric flowrate of the stack flue gas.

A2.1 Contaminant Concentration Calculations

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

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

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

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

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

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

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

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

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

$$CO2C = \frac{\%CO_{2c}}{\%CO_{2m}} \quad \textbf{Equation 10}$$

$$\%O_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%O_{2i}, where\ n = the\ number\ of\ O_2\ measurements \quad \textbf{Equation 11}$$

$$\%CO_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%CO_{2i}, where\ n = the\ number\ of\ CO_2\ measurements \quad \textbf{Equation 12}$$

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)
$CO2C$	= Carbon dioxide correction factor (dimensionless)
$\%O_{2c}$	= Oxygen concentration to correct to (% dry basis)
$\%O_{2m}$	= Average measured stack gas oxygen concentration (% dry basis)
$\%CO_{2c}$	= Carbon dioxide concentration to correct to (% 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.

A2.2 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 13**

$$R_m = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{stk_i} + 459.67)}{M_w \times P_B}} \times 60 \times A_n \times \frac{(T_{m_i} + 459.67) \times (1 - B_{wo})}{(T_{stk_i} + 459.67) \times y}$$ **Equation 14**

$$A_n = \pi \left(\frac{d_n}{24}\right)^2$$ **Equation 15**

$$M_w = M_D \times (1 - B_{wo}) + 18 \times B_{wo}$$ **Equation 16**

$$M_D = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + 0.28 \times (100 - \%CO_2 - \%O_2)$$ **Equation 17**

$$T_{Stk} = \frac{1}{n}\sum_{i=1}^{n} T_{Stk_i}, where\ n = the\ number\ of\ points$$ **Equation 18**

$$B_{wo} = \frac{V_{cond}}{V_{cond} + V_{std(imp)}}$$ **Equation 19**

$$V_{cond} = 0.04707 \times V_{gain}$$ **Equation 20**

$$Iso = \frac{1}{n}\sum_{i=1}^{n} Iso_i, where\ n = the\ number\ of\ points$$ **Equation 21**

$$Iso_i = \frac{v_{nzi}}{v_i}$$ **Equation 22**

$$v_i = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{Stk_i} + 459.67)}{(P_{Stk} \times M_W)}}$$ **Equation 23**

$$v_{nzi} = \frac{(V_i - V_{i-1}) \times y \times (T_{Stk_i} + 459.67) \times (P_B + \frac{\Delta H_{i(act)}}{13.6})}{A_n \times t_i \times 60 \times (T_{m(i)} + 459.67) \times P_{stk} \times (1 - B_{wo})}$$ **Equation 24**

$$P_{stk} = P_B + \frac{P_g}{13.6}$$ **Equation 25**

Equation 26

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

Equation 27

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

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)*

A2.3 Volumetric Flowrate Calculations

$$Q_S = Q_A \times \frac{(T_{Std} + 459.67)}{(T_{Stk} + 459.67)} \times \frac{P_{Stk}}{P_{Std}}$$ **Equation 28**

$$Q_A = \frac{v_{stk} \times 60 \times A_{stk}}{35.315}$$ **Equation 29**

$$A_{stk} = \pi \left(\frac{d}{24}\right)^2$$ **Equation 30**

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: **1653254**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876520

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: **1653254**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876520

Reference Number	1653254-1	1653254-2	1653254-3
Sample Date	May 16, 2023	May 17, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	7	<5	5
Antimony		µg	<2	<2	4	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	<0.2	1.1	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	0.9	1	1	0.5
Phosphorus		µg	10	7	9	2.5
Selenium		µg	2	<2	<2	1.5
Tellurium		µg	<2	<2	4.8	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2	2	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	7	6	<5	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1.0	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.4	0.86	0.86	0.2
Cobalt		µg	<0.2	0.7	<0.2	0.25
Copper		µg	1	<0.2	1	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	0.3	0.4	0.3	0.25
Nickel		µg	2	<0.5	1	0.5
Phosphorus		µg	25	20	20	2.5
Selenium		µg	<1	2.7	<1	1.5
Tellurium		µg	5.9	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<1.0	<0.9	<0.9	1
Zinc		µg	2	2.7	2	0.5
Volume	Sample	mL	302	324	319	
Volume	aliquot volume	mL	252	274	269	
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: Field Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1653254**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876520

Reference Number	1653254-1	1653254-2	1653254-3
Sample Date	May 16, 2023	May 17, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
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	302	324	319	
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	151	128	145	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	500	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.04	<0.08	
Mercury	As Tested	µg/L	0.09	<0.05	0.18	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	0.059	

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: **1653254**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876520

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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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: **1653268**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876512

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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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Sampled By:
Company:

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

Lot ID: **1653268**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876512

Reference Number	1653268-1	1653268-2	1653268-3
Sample Date	May 15, 2023	May 15, 2023	May 15, 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	6	180	<5	5
Antimony		µg	<2	7	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.84	<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	0.4	0.3	0.25
Nickel		µg	<0.5	<0.5	0.6	0.5
Phosphorus		µg	10	26	10	2.5
Selenium		µg	7.3	<2	<2	1.5
Tellurium		µg	9.2	<2	6.5	2
Thallium		µg	5.3	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	13	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: **1653268**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 14, 2023
Report Number: 2876512

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Appendix B - Particulate Analysis

Client:	Metro Vancouver	**Sample Date:**	May 15-18, 2023
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	0.4656	0.4658	0.0002	
Unit 1 Run 1	0.4670	0.4669	-0.0001	ND
Unit 1 Run 2	0.4669	0.4674	0.0005	0.0003
Unit 1 Run 3	0.4662	0.4662	0.0000	ND
Unit 2 Blank	0.4673	0.4675	0.0002	
Unit 2 Run 1	0.4675	0.4669	-0.0006	ND
Unit 2 Run 2	0.4656	0.4673	0.0017	0.0015
Unit 2 Run 3	0.4654	0.4657	0.0003	0.0001
Unit 3 Blank	0.4649	0.4652	0.0003	
Unit 3 Run 1	0.4674	0.4724	0.0050	0.0047
Unit 3 Run 2	0.4679	0.4766	0.0087	0.0084
Unit 3 Run 3	0.4635	0.4700	0.0065	0.0062

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	121.3313	121.3308	-0.0005	
Unit 1 Run 1	102.5383	102.5400	0.0017	0.0022
Unit 1 Run 2	119.7613	119.7622	0.0009	0.0014
Unit 1 Run 3	97.5817	97.5820	0.0003	0.0008
Unit 2 Blank	114.3618	114.3627	0.0009	
Unit 2 Run 1	119.9495	119.9503	0.0008	ND
Unit 2 Run 2	92.7512	92.7521	0.0009	ND
Unit 2 Run 3	117.7447	117.7450	0.0003	ND
Unit 3 Blank	121.7991	121.7994	0.0003	
Unit 3 Run 1	87.9210	87.9223	0.0013	0.0010
Unit 3 Run 2	95.9973	95.9991	0.0018	0.0015
Unit 3 Run 3	123.7625	123.7645	0.0020	0.0017

Task	**Unit**	**Personnel**	**Date**	**Quality Control**	**Y/N**
Fiter Recovery:	Unit 1	S.Harrington	15-16-May-23	Adequate PW volume:	Y
	Unit 2	S.Harrington	16-17-May-23	No sample leakage:	Y
	Unit 3	S.Harrington	17-18-May-23	Filter not compromised:	Y
PW Initial Analysis:	Unit 1	J. Ching	19-May-23		
	Unit 2	J. Ching	19-May-23		
	Unit 3	J. Ching	19-May-23		
PW, FilterFinal Analysis:	Unit 1	D. Sampson	24-May-23		
	Unit 2	D. Sampson	24-May-23		
	Unit 3	D. Sampson	24-May-23		
Data entered to computer:	All	S. Harrington	26-May-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: **1652737**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875824

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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Analytical Report

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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: **1652737**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875824

Reference Number	1652737-1	1652737-2	1652737-3
Sample Date	May 16, 2023	May 17, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Blank / 19.8 °C	Unit #2 HF Blank / 19.8 °C	Unit #3 HF Blank / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	255	247	247	
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	<8	<7	<7	

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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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: **1652737**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875824

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	May 24, 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.

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1652732**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875817

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:

- May 24, 2023 - Reduction of analytical volume was necessary for anion analysis due to matrix effects in lot 1652732. Detection limits are adjusted accordingly.

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Analytical Report

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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1652732**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875817

Reference Number	1652732-1	1652732-2	1652732-3
Sample Date	May 16, 2023	May 16, 2023	May 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Run 1 / 19.8 °C	Unit #1 HF Run 2 / 19.8 °C	Unit #1 HF Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	308	340	413	
Dilution Factor	fluoride		1.00000000	10.00	10.00	
Fluoride	As Tested	mg/L	<0.03	<0.3	<0.3	0.03
Fluoride	Water Soluble	µg/sample	<9	<10	<10	

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Company:

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

Lot ID: **1652732**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875817

Reference Number	1652732-4	1652732-5	1652732-6
Sample Date	May 17, 2023	May 17, 2023	May 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 HF Run 1 / 19.8 °C	Unit #2 HF Run 2 / 19.8 °C	Unit #2 HF Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	373	366	350	
Dilution Factor	fluoride		10.00	10.00	10.00	
Fluoride	As Tested	mg/L	<0.3	<0.3	<0.3	0.03
Fluoride	Water Soluble	µg/sample	<10	<10	<10	

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Analytical Report

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Attn: Missy
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Company:

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

Lot ID: **1652732**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875817

Reference Number	1652732-7	1652732-8	1652732-9
Sample Date	May 18, 2023	May 18, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 HF Run 1 / 19.8 °C	Unit #3 HF Run 2 / 19.8 °C	Unit #3 HF Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	360	306	358	
Dilution Factor	fluoride		10.00	10.00	10.00	
Fluoride	As Tested	mg/L	<0.3	<0.3	<0.3	0.03
Fluoride	Water Soluble	µg/sample	<10	<9	<10	

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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Attn: Missy
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Project ID: Metro Vancouver WTE
Project Name: HF Samples
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LSD:
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Proj. Acct. code:

Lot ID: **1652732**
Control Number:
Date Received: May 23, 2023
Date Reported: May 25, 2023
Report Number: 2875817

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	May 24, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Comments:

- May 24, 2023 - Reduction of analytical volume was necessary for anion analysis due to matrix effects in lot 1652732. Detection limits are adjusted accordingly.

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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: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

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

Lot ID: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

Reference Number	1653281-1	1653281-2	1653281-3
Sample Date	May 15, 2023	May 16, 2023	May 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles)	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles)	Unit 1 Run 3 (MV Unit 1 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	26	20	20	5
Antimony		µg	<2	<2	5	2.5
Arsenic		µg	2.9	<1	<1	1
Cadmium		µg	<0.3	0.3	<0.3	0.25
Chromium		µg	2.81	1.6	12.6	0.2
Cobalt		µg	0.7	<0.3	0.4	0.25
Copper		µg	2	2.6	<0.3	0.25
Lead		µg	5.1	<2	<2	1.5
Manganese		µg	2	2	2.7	0.25
Nickel		µg	2.9	15	13	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	10	13	23	1.5
Tellurium		µg	6.2	6.2	<2	2
Thallium		µg	<2	7.9	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	13	25	19	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	40	40	20	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	0.9	3.4	3.1	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	2.46	1.8	2.1	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	3.1	1	2	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	1	1	1	0.25
Nickel		µg	2	1.0	1	0.5
Phosphorus		µg	24	24	22	2.5
Selenium		µg	<1	<1	2	1.5
Tellurium		µg	2.4	2.2	<2	2
Thallium		µg	2	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	4.4	3.9	3.7	0.5
Volume	Sample	mL	830	750	750	
Volume	aliquot volume	mL	780	700	700	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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

Lot ID: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

	Reference Number	1653281-1	1653281-2	1653281-3	
	Sample Date	May 15, 2023	May 16, 2023	May 16, 2023	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles)	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles)	Unit 1 Run 3 (MV Unit 1 Run 3 + 4 Bottles)	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	830	750	750	
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	152	144	155	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	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	0.17	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	0.055	0.03	<0.02	

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Analytical Report

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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: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

Reference Number	1653281-4	1653281-5	1653281-6
Sample Date	May 16, 2023	May 17, 2023	May 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 Run 1 + 4 Bottles)	Unit 2 Run 2 (Unit-2 Run 2 + 4 Bottles)	Unit 2 Run 3 (Unit -2 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	10	10	5	5
Antimony		µg	<2	<2	7	2.5
Arsenic		µg	<1	1	1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	3.40	4.70	2.67	0.2
Cobalt		µg	<0.3	0.6	<0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	2	<2	<2	1.5
Manganese		µg	1	2.6	1.0	0.25
Nickel		µg	2.6	13	11	0.5
Phosphorus		µg	10	10	10	2.5
Selenium		µg	12	<2	5.4	1.5
Tellurium		µg	4.6	2.6	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	5.9	6.2	4.8	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	20	20	28	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<0.9	0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.3	1.4	3.10	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	2.7	2	2	0.25
Lead		µg	2	<1	<1	1.5
Manganese		µg	0.8	0.7	1	0.25
Nickel		µg	0.8	1	1	0.5
Phosphorus		µg	29	25	22	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	6.6	3.0	7.3	0.5
Volume	Sample	mL	850	776	825	
Volume	aliquot volume	mL	800	726	775	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Analytical Report

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

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

Lot ID: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

Reference Number	1653281-4	1653281-5	1653281-6
Sample Date	May 16, 2023	May 17, 2023	May 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 Run 1 + 4 Bottles)	Unit 2 Run 2 (Unit-2 Run 2 + 4 Bottles)	Unit 2 Run 3 (Unit -2 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	850	776	825	
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	148	143	162	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	<0.05	0.12	0.06	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	0.040	0.02	

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Analytical Report

Bill To: A. Lanfranco & Associates
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Surrey, BC, Canada
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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: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

Reference Number	1653281-7	1653281-8	1653281-9
Sample Date	May 17, 2023	May 18, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles)	Unit 3 Run 3 (MF-3 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	20	27	20	5
Antimony		µg	3	<2	10	2.5
Arsenic		µg	<1	4.1	1	1
Cadmium		µg	0.8	1	2.7	0.25
Chromium		µg	1.6	0.87	2.2	0.2
Cobalt		µg	<0.3	0.4	<0.3	0.25
Copper		µg	4.0	4.4	5.0	0.25
Lead		µg	6.1	12	11	1.5
Manganese		µg	2	3.1	2.7	0.25
Nickel		µg	3.0	6.2	4.7	0.5
Phosphorus		µg	10	20	20	2.5
Selenium		µg	2.9	<2	4.7	1.5
Tellurium		µg	3.8	4.9	3.0	2
Thallium		µg	3.4	<2	2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	65.1	96.8	136	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	10	10	20	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	1	2	2.5	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	2.15	1.1	1.9	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	2	1	0.3	0.25
Lead		µg	2.4	<1	3.6	1.5
Manganese		µg	0.7	0.4	1	0.25
Nickel		µg	1	2	0.9	0.5
Phosphorus		µg	23	20	21	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	5.1	2.4	3.5	0.5
Volume	Sample	mL	803	826	828	
Volume	aliquot volume	mL	753	776	778	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	0.28	0.20	0.05

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Analytical Report

Bill To: A. Lanfranco & Associates
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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: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

	Reference Number	1653281-7	1653281-8	1653281-9	
	Sample Date	May 17, 2023	May 18, 2023	May 18, 2023	
	Sample Time	NA	NA	NA	
	Sample Location				
	Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles)	Unit 3 Run 3 (MF-3 Run 3 + 4 Bottles)	
	Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	0.11	0.082	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	803	826	828	
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	153	166	150	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	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	0.07	0.07	0.21	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	0.068	

Approved by:

Reena Badwal
Operations Chemist

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Methodology and Notes

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Attn: Missy
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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: **1653281**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876531

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 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: **1652746**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875839

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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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Company:

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

Lot ID: **1652746**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875839

Reference Number	1652746-1	1652746-2	1652746-3
Sample Date	May 16, 2023	May 17, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 NH3 Blk / 19.8 °C	Unit #2 NH3 Blk / 19.8 °C	Unit #3 NH3 Blk / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	28	<25	78	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	262	223	300	
Ammonium - N		µg/sample	7.3	<5.6	23	

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: **1652746**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875839

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	May 25, 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: **1652742**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875835

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

Notes To Clients:

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

Lot ID: **1652742**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875835

Reference Number	1652742-1	1652742-2	1652742-3
Sample Date	May 16, 2023	May 16, 2023	May 16, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 NH3 Run 1 / 19.8 °C	Unit #1 NH3 Run 2 / 19.8 °C	Unit #1 NH3 Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	1080	1760	4500	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	345	400	354	
Ammonium - N		µg/sample	373	702	1590	

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

Lot ID: **1652742**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875835

Reference Number	1652742-4	1652742-5	1652742-6
Sample Date	May 17, 2023	May 17, 2023	May 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 NH3 Run 1 / 19.8 °C	Unit #2 NH3 Run 2 / 19.8 °C	Unit #2 NH3 Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	1020	3460	102	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	416	378	400	
Ammonium - N		µg/sample	426	1310	40.8	

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

Lot ID: **1652742**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875835

Reference Number	1652742-7	1652742-8	1652742-9
Sample Date	May 18, 2023	May 18, 2023	May 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 NH3 Run 1 / 19.8 °C	Unit #3 NH3 Run 2 / 19.8 °C	Unit #3 NH3 Run 3 / 19.8 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	1440	218	2920	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	354	322	346	
Ammonium - N		µg/sample	510	70.2	1010	

Approved by:

Max Hewitt
Operations Manager

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Methodology and Notes

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Lot ID: **1652742**
Control Number:
Date Received: May 23, 2023
Date Reported: May 26, 2023
Report Number: 2875835

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	May 25, 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: **1653274**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876525

Contact	Company	Address
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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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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1653274**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876525

Reference Number	1653274-1	1653274-2	1653274-3
Sample Date	May 15, 2023	May 15, 2023	May 15, 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	<5	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	0.3	<0.3	0.25
Chromium		µg	0.34	<0.2	0.2	0.2
Cobalt		µg	<0.3	<0.3	0.6	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	0.8	0.7	<0.5	0.5
Phosphorus		µg	<2	3	10	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	5.4	6.2	2
Thallium		µg	<2	<2	2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	0.9	1.0	1.0	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	7	6	5
Antimony		µg	<3	<3	<3	2.5
Arsenic		µg	5.3	2	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.46	0.70	0.66	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	2	2	1	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	0.3	<0.3	0.3	0.25
Nickel		µg	0.7	1	0.7	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	3.5	<2	<2	1.5
Tellurium		µg	6.8	5.3	<2	2
Thallium		µg	4.7	<2	3	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2.8	1	0.5
Volume	Sample	mL	201	207	213	
Volume	aliquot volume	mL	151	157	163	
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: **1653274**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876525

Reference Number	1653274-1	1653274-2	1653274-3
Sample Date	May 15, 2023	May 15, 2023	May 15, 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	201	207	213	
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	100	99	99	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	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	0.11	0.10	0.10	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	0.036	0.033	0.03	

Approved by:

Reena Badwal
Operations Chemist

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

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Methodology and Notes

Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
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: **1653274**
Control Number:
Date Received: May 24, 2023
Date Reported: Jun 15, 2023
Report Number: 2876525

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Jun 12, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	May 25, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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LABORATORY REPORT

June 1, 2023

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

RE: Metro Vacouver W.T.E.

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on May 22, 2023. For your reference, these analyses have been assigned our service request number P2302296.

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

Nicole Bryson
By Nicole.Bryson at 5:57 pm, Jun 01, 2023

for Sue Anderson
Project Manager

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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: P2302296
Project: Metro Vacouver W.T.E.

CASE NARRATIVE

The samples were received intact under chain of custody on May 22, 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.

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

The samples were analyzed per modified EPA Method TO-3 for methane, ethene, ethane, and C3 through >C6 hydrocarbons 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 accreditation.

Manual integration of the chromatographic ranges in each sample with reported concentrations was required to correct the integration performed by the automated data processing program. The raw data states the rationale and specific ranges impacted by the manual integration.

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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
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-011
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	T104704413-22-13
Utah DOH (NELAP)	https://uphl.utah.gov/certifications/environmental-laboratory-certification/	CA016272022-14
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: P2302296

Project ID: Metro Vacouver W.T.E.

Date Received: 5/22/2023

Time Received: 09:20

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	P2302296-001	Air	5/16/2023	10:50	SC02337	-3.60	3.70	X	X
Unit 1 Run 2	P2302296-002	Air	5/16/2023	12:10	SC01608	-2.30	3.83	X	X
Unit 1 Run 3	P2302296-003	Air	5/16/2023	13:23	SC02191	-2.10	4.55	X	X
Unit 2 Run 1	P2302296-004	Air	5/17/2023	10:58	SC00645	-0.85	3.95	X	X
Unit 2 Run 2	P2302296-005	Air	5/17/2023	12:10	SC02245	-3.43	4.00	X	X
Unit 2 Run 3	P2302296-006	Air	5/17/2023	13:22	SC01596	-3.75	4.15	X	X
Unit 3 Run 1	P2302296-007	Air	5/18/2023	10:09	SC00095	-6.59	3.83	X	X
Unit 3 Run 2	P2302296-008	Air	5/18/2023	11:26	SC01768	0.17	3.81	X	X
Unit 3 Run 3	P2302296-009	Air	5/18/2023	12:40	SC02250	-4.17	4.41	X	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

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Simi Valley, California 93065
Phone (805) 526-7161

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. [illegible]

Company Name & Address (Reporting Information)	A Lanfranco & Associates Inc. #101-9488 189 Street Surrey, BC, Canada V4N 4W7
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)	Christian De La O

ALS Contact:

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	05-16-23	0950-1050	SC02337	OA00804	-27"	-6.5"	6L
Unit 1 Run 2	2	05-16-23	1110-1210	SC01608	OA00538	-29.5"	-6"	6L
Unit 1 Run 3	3	05-16-23	1223-1323	SC02191	OA01426	-28"	-4"	6L
Unit 2 Run 1	4	05-17-23	0958-1058	SC00645	OA00080	-28.5"	-2.5"	6L
Unit 2 Run 2	5	05-17-23	1110-1210	SC02245	OA01178	-29.5"	-3"	6L
Unit 2 Run 3	6	05-17-23	1222-1322	SC01596	OA00936	-26"	-5.5"	6L
Unit 3 Run 1	7	05-18-23	0904-1004	SC00095	OA00984	-30"	-14.5"	6L
Unit 3 Run 2	8	05-18-23	1026-1126	SC01768	OA02930	-20"	-6.5"	6L
Unit 3 Run 3	9	05-18-23	1140-1240	SC02250	OA01669	-30"	-9"	6L

Report Tier Levels - please select

Tier I - Results (Default if not specified) _____
Tier II (Results + QC Summaries) _____
Tier III (Results + QC & Calibration 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)	Date:	Time:	Received by: (Signature)	5-22-23	8920	Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: A. Lanfranco and Associates Inc. Work order: P2302296

Project: Metro Vacouver W.T.E.

Sample(s) received on: 5/22/23 Date opened: 5/22/23 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?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2302296-001.01	6.0 L Source Can					
P2302296-002.01	6.0 L Source Can					
P2302296-003.01	6.0 L Source Can					
P2302296-004.01	6.0 L Source Can					
P2302296-005.01	6.0 L Source Can					
P2302296-006.01	6.0 L Source Can					
P2302296-007.01	6.0 L Source Can					
P2302296-008.01	6.0 L Source Can					
P2302296-009.01	6.0 L Source Can					

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

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-001

Test Code: EPA TO-3 Modified Date Collected: 5/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02337

Initial Pressure (psig): -3.60 Final Pressure (psig): 3.70

Container Dilution Factor: 1.66

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.2	ND	3.3	
74-85-1	Ethene	ND	1.1	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 2** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-002

Test Code: EPA TO-3 Modified Date Collected: 5/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01608

Initial Pressure (psig): -2.30 Final Pressure (psig): 3.83

Container Dilution Factor: 1.49

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.0	ND	3.0	
74-85-1	Ethene	ND	1.0	ND	0.89	
74-84-0	Ethane	ND	1.1	ND	0.89	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-003

Test Code: EPA TO-3 Modified Date Collected: 5/16/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02191

Initial Pressure (psig): -2.10 Final Pressure (psig): 4.55

Container Dilution Factor: 1.53

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.0	ND	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 2 Run 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-004

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00645

Initial Pressure (psig): -0.85 Final Pressure (psig): 3.95

Container Dilution Factor: 1.35

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.8	ND	2.7	
74-85-1	Ethene	ND	0.93	ND	0.81	
74-84-0	Ethane	ND	1.0	ND	0.81	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-005

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02245

Initial Pressure (psig): -3.43 Final Pressure (psig): 4.00

Container Dilution Factor: 1.66

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.2	ND	3.3	
74-85-1	Ethene	ND	1.1	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 2 Run 3** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-006

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01596

Initial Pressure (psig): -3.60 Final Pressure (psig): 3.70

Container Dilution Factor: 1.66

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.2	ND	3.3	
74-85-1	Ethene	ND	1.1	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 3 Run 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-007

Test Code: EPA TO-3 Modified Date Collected: 5/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00095

Initial Pressure (psig): -2.30 Final Pressure (psig): 3.83

Container Dilution Factor: 1.49

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.0	ND	3.0	
74-85-1	Ethene	ND	1.0	ND	0.89	
74-84-0	Ethane	ND	1.1	ND	0.89	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-008

Test Code: EPA TO-3 Modified Date Collected: 5/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01768

Initial Pressure (psig): -2.10 Final Pressure (psig): 4.55

Container Dilution Factor: 1.53

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.2**	2.0	**3.4**	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 3 Run 3** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-009

Test Code: EPA TO-3 Modified Date Collected: 5/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 5/22/23
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02250

Initial Pressure (psig): -0.85 Final Pressure (psig): 3.95

Container Dilution Factor: 1.35

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.8	ND	2.7	
74-85-1	Ethene	ND	0.93	ND	0.81	
74-84-0	Ethane	ND	1.0	ND	0.81	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P230523-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P230523-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 5/23/23
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	7.35	7.19	**97**	**95**	70-130	2	15	
74-85-1	Ethene	7.55	7.31	7.04	**97**	**93**	70-130	4	15	
74-84-0	Ethane	7.50	7.63	7.31	**102**	**97**	70-130	5	15	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-001

Test Code:	EPA TO-3 Modified	Date Collected:	5/16/23
Instrument ID:	HP5890 II/GC8/FID	Date Received:	5/22/23
Analyst:	Kylan Malloy/Gilbert Gutierrez	Date Analyzed:	5/25/23
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC02337		

Initial Pressure (psig): -3.60 Final Pressure (psig): 3.70

Container Dilution Factor: 1.66

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.83	
C_4 as n-Butane	ND	0.83	
C_5 as n-Pentane	ND	0.83	
C_6 as n-Hexane	ND	0.83	
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 2** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-002

Test Code:	EPA TO-3 Modified	Date Collected:	5/16/23
Instrument ID:	HP5890 II/GC8/FID	Date Received:	5/22/23
Analyst:	Kylan Malloy/Gilbert Gutierrez	Date Analyzed:	5/25/23
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC01608		

Initial Pressure (psig): -2.30 Final Pressure (psig): 3.83

Container Dilution Factor: 1.49

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.75	
C_4 as n-Butane	ND	0.75	
C_5 as n-Pentane	ND	0.75	
C_6 as n-Hexane	ND	0.75	
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 3** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-003

Test Code: EPA TO-3 Modified Date Collected: 5/16/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02191

Initial Pressure (psig): -2.10 Final Pressure (psig): 4.55

Container Dilution Factor: 1.53

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 2 Run 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-004

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00645

Initial Pressure (psig): -0.85 Final Pressure (psig): 3.95

Container Dilution Factor: 1.35

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.68	
C_4 as n-Butane	ND	0.68	
C_5 as n-Pentane	ND	0.68	
C_6 as n-Hexane	ND	0.68	
C_6+ as n-Hexane	ND	1.4	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-005

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02245

Initial Pressure (psig): -3.43 Final Pressure (psig): 4.00

Container Dilution Factor: 1.66

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.83	
C_4 as n-Butane	ND	0.83	
C_5 as n-Pentane	ND	0.83	
C_6 as n-Hexane	ND	0.83	
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 2 Run 3** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-006

Test Code: EPA TO-3 Modified Date Collected: 5/17/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01596

Initial Pressure (psig): -3.75 Final Pressure (psig): 4.15

Container Dilution Factor: 1.72

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.86	
C_4 as n-Butane	ND	0.86	
C_5 as n-Pentane	ND	0.86	
C_6 as n-Hexane	ND	0.86	
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 1** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-007

Test Code: EPA TO-3 Modified Date Collected: 5/18/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00095

Initial Pressure (psig): -6.59 Final Pressure (psig): 3.83

Container Dilution Factor: 2.28

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	1.1	
C_4 as n-Butane	ND	1.1	
C_5 as n-Pentane	ND	1.1	
C_6 as n-Hexane	ND	1.1	
C_6+ as n-Hexane	ND	2.3	

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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-008

Test Code: EPA TO-3 Modified Date Collected: 5/18/23
Instrument ID: HP5890 II/GC8/FID Date Received: 5/22/23
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01768

Initial Pressure (psig): 0.17 Final Pressure (psig): 3.81

Container Dilution Factor: 1.24

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.62	
C_4 as n-Butane	ND	0.62	
C_5 as n-Pentane	ND	0.62	
C_6 as n-Hexane	ND	0.62	
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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P2302296-009

Test Code:	EPA TO-3 Modified	Date Collected:	5/18/23
Instrument ID:	HP5890 II/GC8/FID	Date Received:	5/22/23
Analyst:	Kylan Malloy/Gilbert Gutierrez	Date Analyzed:	5/25/23
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC02250		

Initial Pressure (psig): -4.17 Final Pressure (psig): 4.41

Container Dilution Factor: 1.81

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.91	
C_4 as n-Butane	ND	0.91	
C_5 as n-Pentane	ND	0.91	
C_6 as n-Hexane	ND	0.91	
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: **Method Blank** ALS Project ID: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P230525-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
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: P2302296
Client Project ID: **Metro Vacouver W.T.E.** ALS Sample ID: P230525-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Kylan Malloy/Gilbert Gutierrez Date Analyzed: 5/25/23
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	1,000	972	952	**97**	**95**	92-120	2	6	
n-Butane	1,000	971	949	**97**	**95**	91-121	2	6	
n-Pentane	1,000	938	913	**94**	**91**	89-118	3	6	
n-Hexane	1,000	967	935	**97**	**94**	92-125	3	6	

APPENDIX - D

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	15-May-23
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:42 - 13:44

Concentrations:

Particulate	0.88	mg/dscm	0.00039	gr/dscf
	0.50	mg/Acm	0.00022	gr/Acf
	0.72	mg/dscm (@ 11% O2)	0.00031	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.058	Kg/hr	0.127	lb/hr

Flue Gas Characteristics:

Flow	1087	dscm/min	38372	dscf/min
	18.11	dscm/sec	640	dscf/sec
	1926	Acm/min	68022	Acf/min
Velocity	12.604	m/sec	41.35	f/sec
Temperature	143.8	oC	290.9	oF
Moisture	15.8	%		
Gas Analysis	8.7	% O2		
	11.1	% CO2		
	30.123	Mol. Wt (g/gmole) Dry		
	28.204	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5441	dscm	89.845	dscf
Sample Time	120.0	minutes		
Isokineticity	104.9	%		

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

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

Control Unit (Y)	0.9818
Nozzle Diameter (in.)	0.3058
Pitot Factor	0.8352
Baro. Press. (in. Hg)	29.92
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)	0.00220
Total (grams)	**0.00225**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	11.00	8.80
Traverse 2	11.17	8.67
	11.09	**8.74**

Condensate Collection:

Impinger 1	224.0
Impinger 2	92.0
Impinger 3	20.0
Impinger 4	6.0
Impinger 5	2.0
Impinger 6	1.0
Gel	14.0
Gain (grams)	**359.0**

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	562.401								
1	5.0	565.930	0.28	1.52	93	93	5	289	1.5	105.3
2	10.0	569.570	0.30	1.52	93	93	5	293	4.7	105.2
3	15.0	572.830	0.25	1.30	93	93	6	292	8.4	103.1
4	20.0	576.020	0.23	1.25	94	94	6	293	12.5	105.0
5	25.0	579.280	0.24	1.30	94	94	5	292	17.7	105.0
6	30.0	582.900	0.30	1.63	94	94	5	292	25.2	104.4
7	35.0	587.280	0.46	2.34	95	95	6	292	45.6	102.0
8	40.0	591.980	0.50	2.73	96	96	6	292	53.2	104.9
9	45.0	596.800	0.52	2.83	96	96	8	292	58.3	105.5
10	50.0	601.470	0.49	2.68	97	97	8	292	62.5	105.1
11	55.0	605.600	0.38	2.08	98	98	7	290	66.1	105.0
12	60.0	609.670	0.37	2.03	98	98	7	290	69.4	104.9
Traverse 2	0.0	609.670								
1	5.0	614.030	0.42	2.31	99	99	6	288	1.5	105.2
2	10.0	618.490	0.44	2.42	99	99	6	290	4.7	105.3
3	15.0	622.690	0.39	2.14	99	99	8	290	8.4	105.2
4	20.0	626.980	0.41	2.25	99	99	8	290	12.5	104.9
5	25.0	631.250	0.40	2.20	100	100	8	291	17.7	105.6
6	30.0	635.520	0.40	2.20	100	100	8	291	25.2	105.6
7	35.0	639.560	0.36	1.98	100	100	8	291	45.6	105.2
8	40.0	643.660	0.38	2.03	100	100	8	291	53.2	104.2
9	45.0	647.540	0.33	1.82	101	101	8	291	58.3	105.3
10	50.0	651.300	0.31	1.71	101	101	8	291	62.5	105.3
11	55.0	654.990	0.30	1.65	100	100	7	290	66.1	105.1
12	60.0	658.560	0.28	1.55	101	101	7	289	69.4	105.0
Average:			0.364	1.978	97.5	97.5	6.8	290.9		104.9

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:11 - 11:13

Concentrations:

Particulate	0.64	mg/dscm	0.00028	gr/dscf
	0.37	mg/Acm	0.00016	gr/Acf
	0.55	mg/dscm (@ 11% O2)	0.00024	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.044	Kg/hr	0.098	lb/hr

Flue Gas Characteristics:

Flow	1147	dscm/min	40490	dscf/min
	19.11	dscm/sec	675	dscf/sec
	1970	Acm/min	69568	Acf/min
Velocity	12.890	m/sec	42.29	f/sec
Temperature	142.7	oC	288.8	oF
Moisture	13.8	%		
Gas Analysis	9.3	% O2		
	10.9	% CO2		
	30.118	Mol. Wt (g/gmole) Dry		
	28.442	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6417	dscm	93.290	dscf
Sample Time	120.0	minutes		
Isokineticity	103.2	%		

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

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	09:11 - 11:13

Control Unit (Y)	0.9818	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3058	Filter (grams)	0.00030		CO2	O2		Impinger 1	185.0
Pitot Factor	0.8352	Washings (grams)	0.00140	Traverse 1	11.50	8.93		Impinger 2	87.0
Baro. Press. (in. Hg)	30.06			Traverse 2	10.33	9.63		Impinger 3	18.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00170**					Impinger 4	5.0
Stack Height (ft)	30							Impinger 5	2.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	20.0
Minutes Per Reading	5.0				**10.92**	**9.28**		**Gain (grams)**	**318.0**
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	659.041								
1	5.0	663.050	0.38	2.02	81	81	7	289	1.5	103.3
2	10.0	666.840	0.34	1.81	83	83	7	293	4.7	103.1
3	15.0	670.160	0.26	1.38	83	83	7	292	8.4	103.1
4	20.0	673.290	0.23	1.23	83	83	7	291	12.5	103.2
5	25.0	676.750	0.28	1.49	84	84	6	292	17.7	103.3
6	30.0	680.320	0.30	1.60	84	84	6	292	25.2	103.0
7	35.0	684.400	0.39	2.09	85	85	6	291	45.6	103.1
8	40.0	688.750	0.44	2.36	86	86	6	289	53.2	103.3
9	45.0	693.050	0.43	2.31	86	86	8	288	58.3	103.2
10	50.0	696.980	0.36	1.95	87	87	8	285	62.5	102.6
11	55.0	701.040	0.38	2.06	87	87	7	284	66.1	103.1
12	60.0	705.180	0.39	2.13	88	88	7	280	69.4	103.3
Traverse 2	0.0	705.180								
1	5.0	709.790	0.49	2.67	89	89	7	284	1.5	102.9
2	10.0	714.510	0.51	2.77	89	89	7	286	4.7	103.4
3	15.0	719.280	0.52	2.81	90	90	8	290	8.4	103.6
4	20.0	723.900	0.49	2.65	90	90	8	291	12.5	103.4
5	25.0	728.420	0.47	2.54	90	90	8	291	17.7	103.3
6	30.0	732.830	0.45	2.43	90	90	8	291	25.2	102.9
7	35.0	737.010	0.40	2.17	91	91	7	289	45.6	103.1
8	40.0	741.100	0.38	2.06	92	92	7	289	53.2	103.3
9	45.0	745.350	0.41	2.23	92	92	6	289	58.3	103.4
10	50.0	749.280	0.35	1.90	92	92	6	290	62.5	103.4
11	55.0	753.030	0.32	1.74	92	92	6	290	66.1	103.2
12	60.0	756.660	0.30	1.64	92	92	6	285	69.4	102.8
								.		
Average:			0.386	2.085	87.8	87.8	6.9	288.8		103.2

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:29 - 13:31

Concentrations:

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

Emission Rates:

Particulate	0.022	Kg/hr	0.049	lb/hr

Flue Gas Characteristics:

Flow	1184	dscm/min	41827	dscf/min
	19.74	dscm/sec	697	dscf/sec
	2047	Acm/min	72302	Acf/min
Velocity	13.397	m/sec	43.95	f/sec
Temperature	145.9	oC	294.5	oF
Moisture	13.7	%		
Gas Analysis	10.1	% O2		
	10.2	% CO2		
	30.030	Mol. Wt (g/gmole) Dry		
	28.383	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7226	dscm	96.149	dscf
Sample Time	120.0	minutes		
Isokineticity	103.0	%		

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

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:29 - 13:31

Control Unit (Y)	0.9818	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3058	Filter (grams)	0.00005		CO2	O2		Impinger 1	212.0
Pitot Factor	0.8352	Washings (grams)	0.00080	Traverse 1	9..5	10.43		Impinger 2	82.0
Baro. Press. (in. Hg)	30.06			Traverse 2	10.17	9.70		Impinger 3	6.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00085**					Impinger 4	4.0
Stack Height (ft)	30							Impinger 5	2.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	17.0
Minutes Per Reading	5.0				**10.17**	**10.07**		**Gain (grams)**	**324.0**
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	757.012								
1	5.0	761.720	0.51	2.75	90	90	4	292	1.5	103.1
2	10.0	766.750	0.58	3.13	90	90	4	292	4.7	103.4
3	15.0	771.850	0.60	3.23	90	90	6	294	8.4	103.2
4	20.0	776.850	0.58	3.11	89	89	6	295	12.5	103.2
5	25.0	781.890	0.59	3.15	89	89	6	297	17.7	103.2
6	30.0	786.680	0.53	2.84	90	90	6	296	25.2	103.2
7	35.0	791.380	0.51	2.74	91	91	7	297	45.6	103.1
8	40.0	795.800	0.45	2.41	91	91	7	297	53.2	103.1
9	45.0	800.080	0.42	2.26	91	91	7	296	58.3	103.2
10	50.0	804.080	0.37	1.99	92	92	7	297	62.5	102.6
11	55.0	807.980	0.35	1.88	92	92	8	298	66.1	102.9
12	60.0	811.660	0.31	1.67	92	92	8	295	69.4	102.9
Traverse 2	0.0	811.660								
1	5.0	815.830	0.40	2.15	92	92	6	297	1.5	102.9
2	10.0	819.790	0.36	1.94	92	92	6	297	4.7	103.0
3	15.0	823.230	0.27	1.45	93	93	6	297	8.4	103.0
4	20.0	826.580	0.26	1.40	93	93	6	297	12.5	102.2
5	25.0	829.950	0.26	1.40	93	93	6	296	17.7	102.7
6	30.0	833.260	0.25	1.35	93	93	6	295	25.2	102.8
7	35.0	837.450	0.40	2.16	93	93	6	294	45.6	103.0
8	40.0	841.750	0.42	2.27	93	93	6	294	53.2	103.2
9	45.0	846.200	0.45	2.44	93	93	7	292	58.3	103.1
10	50.0	850.450	0.41	2.23	93	93	7	290	62.5	103.0
11	55.0	854.500	0.37	2.02	95	95	6	288	66.1	102.7
12	60.0	858.350	0.33	1.81	96	96	6	286	69.4	103.0
Average:			0.416	2.241	91.9	91.9	6.3	294.5		103.0

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		16-May-23	16-May-23	16-May-23
Test Time		09:54 - 10:54	11:10 - 12:10	12:23 - 13:23
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.06	30.06	30.06
DGM Factor	(Y)	0.9983	0.9983	0.9983
Initial Reading	(m^3)	572.209	572.678	573.292
Final Reading	(m^3)	572.672	573.290	573.968
Temp. Outlet	(Avg. oF)	84.5	86.0	88.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.45	0.59	0.65
HF	(mg)	0.005	0.005	0.005
Oxygen	(Vol. %)	8.7	9.3	10.1
HF	**(mg/Sm^3)**	**0.011**	**0.009**	**0.008**
HF	**(mg/Sm^3 @ 11% O2)**	**0.009**	**0.008**	**0.007**
Moisture	**(Vol. %)**	13.8	13.8	13.7

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		16-May-23	16-May-23	16-May-23
Test Time		09:54 - 10:54	11:10 - 12:10	12:23 - 13:23
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.06	30.06	30.06
DGM Factor	(Y)	1.0609	1.0609	1.0609
Initial Reading	(m^3)	103.067	103.553	104.163
Final Reading	(m^3)	103.548	104.158	104.781
Temp. Outlet	(Avg. oF)	82.0	93.5	95.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.50	0.62	0.63
NH_3	(mg)	0.4	0.8	1.9
Oxygen	(Vol. %)	8.7	9.3	10.1
NH_3	**(mg/Sm^3)**	**0.9**	**1.4**	**3.1**
NH_3	**(mg/Sm^3 @ 11% O2)**	**0.7**	**1.2**	**2.8**
Moisture	**(Vol. %)**	13.8	13.8	13.7

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

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:15 - 14:17

Concentrations:

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

Emission Rates:

Particulate	0.002	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1072	dscm/min	37843	dscf/min
	17.86	dscm/sec	631	dscf/sec
	1926	Acm/min	68033	Acf/min
Velocity	12.606	m/sec	41.36	f/sec
Temperature	156.2	oC	313.2	oF
Moisture	14.9	%		
Gas Analysis	11.0	% O2		
	9.9	% CO2		
	30.020	Mol. Wt (g/gmole) Dry		
	28.233	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5726	dscm	90.852	dscf
Sample Time	120.0	minutes		
Isokineticity	105.9	%		

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

Client:	Metro Vancouver	**Date:**	16-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:15 - 14:17

Control Unit (Y)	0.9976	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00005		CO2	O2		Impinger 1	168.0
Pitot Factor	0.8461	Washings (grams)	0.00005	Traverse 1	9.75	10.75		Impinger 2	92.0
Baro. Press. (in. Hg)	30.03			Traverse 2	10.00	11.25		Impinger 3	39.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00010**					Impinger 4	12.0
Stack Height (ft)	30							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	20.2
Minutes Per Reading	5.0				**9.88**	**11.00**		**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	817.250								
1	5.0	821.060	0.34	1.83	76	76	5	313	1.5	105.8
2	10.0	825.040	0.37	1.99	76	76	5	313	4.7	106.0
3	15.0	829.070	0.38	2.04	76	76	5	313	8.4	105.9
4	20.0	832.950	0.35	1.88	78	78	5	314	12.5	105.9
5	25.0	836.480	0.29	1.56	78	78	5	315	17.7	105.8
6	30.0	840.370	0.35	1.89	79	79	5	314	25.2	106.0
7	35.0	844.310	0.36	1.94	79	79	5	314	45.6	105.8
8	40.0	848.780	0.46	2.49	81	81	5	314	53.2	106.0
9	45.0	852.950	0.40	2.16	81	81	5	315	58.3	106.0
10	50.0	857.570	0.49	2.65	82	82	5	315	62.5	106.0
11	55.0	861.750	0.40	2.17	83	83	5	315	66.1	105.9
12	60.0	865.930	0.40	2.17	83	83	5	315	69.4	105.9
Traverse 2	0.0	865.930								
1	5.0	870.030	0.38	2.08	85	85	5	311	1.5	105.8
2	10.0	874.070	0.37	2.02	85	85	5	314	4.7	105.9
3	15.0	878.280	0.40	2.19	87	87	5	315	8.4	105.8
4	20.0	882.280	0.36	1.97	87	87	5	315	12.5	105.9
5	25.0	886.400	0.38	2.09	88	88	5	313	17.7	105.9
6	30.0	889.940	0.28	1.54	88	88	5	313	25.2	105.9
7	35.0	893.220	0.24	1.32	88	88	5	312	45.6	105.8
8	40.0	896.430	0.23	1.27	88	88	5	311	53.2	105.7
9	45.0	899.840	0.26	1.43	88	88	5	311	58.3	105.7
10	50.0	903.380	0.28	1.54	88	88	5	311	62.5	105.7
11	55.0	907.050	0.30	1.65	88	88	5	310	66.1	105.9
12	60.0	910.203	0.22	1.21	89	89	5	310	69.4	105.9
Average:			0.345	1.878	83.4	83.4	5.0	313.2		105.9

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:11 - 11:12

Concentrations:

Particulate	0.63	mg/dscm	0.00027	gr/dscf
	0.35	mg/Acm	0.00015	gr/Acf
	0.57	mg/dscm (@ 11% O2)	0.00025	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.041	Kg/hr	0.090	lb/hr

Flue Gas Characteristics:

Flow	1087	dscm/min	38390	dscf/min
	18.12	dscm/sec	640	dscf/sec
	1940	Acm/min	68503	Acf/min
Velocity	12.693	m/sec	41.64	f/sec
Temperature	146.6	oC	295.9	oF
Moisture	15.8	%		
Gas Analysis	10.0	% O2		
	10.0	% CO2		
	29.998	Mol. Wt (g/gmole) Dry		
	28.098	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.4795	dscm	87.563	dscf
Sample Time	120.0	minutes		
Isokineticity	105.1	%		

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

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:11 - 11:12

Control Unit (Y)	0.9976	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3087	Filter (grams)	0.00150		CO2	O2		Impinger 1	234.0
Pitot Factor	0.8511	Washings (grams)	0.00005	Traverse 1	10.00	9.97		Impinger 2	86.0
Baro. Press. (in. Hg)	29.96			Traverse 2	10.00	9.93		Impinger 3	12.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00155**					Impinger 4	2.0
Stack Height (ft)	30.16							Impinger 5	0.0
Stack Diameter (in.)	70.90							Impinger 6	0.0
Stack Area (sq.ft.)	27.417							Gel	16.1
Minutes Per Reading	5.0				**10.00**	**9.95**		**Gain (grams)**	**350.1**
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	910.647								
1	5.0	913.960	0.26	1.38	72	72	8	300	1.5	105.0
2	10.0	917.340	0.27	1.44	73	73	8	301	4.7	105.0
3	15.0	920.680	0.26	1.39	74	74	8	299	8.4	105.4
4	20.0	924.080	0.27	1.44	74	74	8	298	12.5	105.2
5	25.0	927.540	0.28	1.50	74	74	7	298	17.7	105.2
6	30.0	932.020	0.47	2.52	75	75	7	298	25.2	105.2
7	35.0	936.280	0.42	2.26	76	76	7	296	45.6	105.4
8	40.0	941.070	0.53	2.87	77	77	7	293	53.2	105.2
9	45.0	945.820	0.52	2.82	78	78	6	294	58.3	105.2
10	50.0	950.500	0.50	2.73	79	79	6	290	62.5	105.2
11	55.0	955.150	0.49	2.68	80	80	6	289	66.1	105.3
12	60.0	959.610	0.45	2.48	81	81	6	285	69.4	104.9
Traverse 2	0.0	959.610								
1	5.0	963.920	0.42	2.28	82	82	8	297	1.5	105.5
2	10.0	968.330	0.44	2.40	84	84	8	298	4.7	105.2
3	15.0	972.650	0.42	2.29	85	85	8	297	8.4	105.2
4	20.0	976.820	0.39	2.14	86	86	8	296	12.5	105.0
5	25.0	980.870	0.37	2.03	87	87	8.5	298	17.7	104.7
6	30.0	984.830	0.35	1.93	88	88	8.5	296	25.2	104.9
7	35.0	988.260	0.26	1.43	89	89	8.5	297	45.6	105.1
8	40.0	991.620	0.25	1.38	89	89	8	297	53.2	105.0
9	45.0	994.920	0.24	1.32	89	89	8	297	58.3	105.3
10	50.0	998.150	0.23	1.27	90	90	8	297	62.5	105.0
11	55.0	1001.320	0.22	1.21	90	90	7.5	297	66.1	105.4
12	60.0	1004.480	0.22	1.22	91	91	7.5	293	69.4	104.6
Average:			0.355	1.934	81.8	81.8	7.5	295.9		105.1

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:35 - 13:39

Concentrations:

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

Emission Rates:

Particulate	0.00	Kg/hr	0.008	lb/hr

Flue Gas Characteristics:

Flow	1076	dscm/min	38000	dscf/min
	17.93	dscm/sec	633	dscf/sec
	1917	Acm/min	67689	Acf/min
Velocity	12.542	m/sec	41.15	f/sec
Temperature	147.5	oC	297.6	oF
Moisture	15.5	%		
Gas Analysis	10.0	% O2		
	9.8	% CO2		
	29.960	Mol. Wt (g/gmole) Dry		
	28.106	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5625	dscm	90.494	dscf
Sample Time	120.0	minutes		
Isokineticity	104.7	%		

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

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	11:35 - 13:39

Control Unit (Y)	0.9976	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3087	Filter (grams)	0.00010		CO2	O2		Impinger 1	222.0
Pitot Factor	0.8511	Washings (grams)	0.00005	Traverse 1	9.50	10.40		Impinger 2	78.0
Baro. Press. (in. Hg)	29.96			Traverse 2	10.00	9.60		Impinger 3	26.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.0001**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	14.7
Minutes Per Reading	5.0				**9.75**	**10.00**		**Gain (grams)**	**352.7**
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	4.940								
1	5.0	8.900	0.35	1.92	87	87	5.5	296	1.5	104.7
2	10.0	12.960	0.37	2.03	88	88	5.5	297	4.7	104.3
3	15.0	17.090	0.38	2.09	88	88	5.5	297	8.4	104.7
4	20.0	21.220	0.38	2.09	88	88	5.5	297	12.5	104.7
5	25.0	25.380	0.39	2.14	88	88	5.5	298	17.7	104.1
6	30.0	29.560	0.39	2.14	88	88	5.5	298	25.2	104.6
7	35.0	33.360	0.32	1.76	89	89	5.5	298	45.6	104.7
8	40.0	36.920	0.28	1.54	89	89	5.5	299	53.2	104.9
9	45.0	40.350	0.26	1.43	89	89	5.5	300	58.3	104.9
10	50.0	43.920	0.28	1.54	90	90	5.5	298	62.5	104.9
11	55.0	47.360	0.26	1.44	91	91	4.5	297	66.1	104.7
12	60.0	50.530	0.22	1.22	92	92	4.5	298	69.4	104.7
Traverse 2	0.0	50.530								
1	5.0	54.230	0.30	1.66	93	93	6	300	1.5	104.7
2	10.0	57.800	0.28	1.55	93	93	6	300	4.7	104.5
3	15.0	60.970	0.22	1.21	93	93	6	300	8.4	104.6
4	20.0	64.080	0.21	1.16	93	93	6	299	12.5	105.0
5	25.0	67.330	0.23	1.27	94	94	6.5	299	17.7	104.7
6	30.0	70.780	0.26	1.44	94	94	6.5	299	25.2	104.5
7	35.0	74.950	0.38	2.11	94	94	6.5	298	45.6	104.6
8	40.0	79.680	0.49	2.72	93	93	6.5	297	53.2	104.8
9	45.0	84.460	0.50	2.77	93	93	6.5	297	58.3	104.8
10	50.0	89.430	0.54	3.00	94	94	6	297	62.5	104.7
11	55.0	94.320	0.52	2.90	94	94	6	293	66.1	104.7
12	60.0	99.080	0.49	2.75	95	95	6	290	69.4	104.6
Average:			0.346	1.912	91.3	91.3	3.0	297.6		104.7

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		17-May-23	17-May-23	17-May-23
Test Time		09:58 - 10:58	11:10 - 12:10	12:22 - 13:22
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.96	29.96	29.96
DGM Factor	(Y)	0.9983	0.9983	0.9983
Initial Reading	(m^3)	573.976	574.570	575.186
Final Reading	(m^3)	574.566	575.180	575.782
Temp. Outlet	(Avg. oF)	72.0	85.5	88.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.58626	0.59093	0.57421
HF	(mg)	0.005	0.005	0.005
Oxygen	(Vol. %)	11.0	10.0	10.0
HF	**(mg/Sm^3)**	**0.009**	**0.009**	**0.009**
HF	**(mg/Sm^3 @ 11% O2)**	**0.009**	**0.008**	**0.008**
Moisture (isokinetic)	**(Vol. %)**	14.9	15.8	15.5

*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		17-May-23	17-May-23	17-May-23
Test Time		09:58 - 10:58	11:10 - 12:10	12:22 - 13:22
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.96	29.96	29.96
DGM Factor	(Y)	1.0320	1.0320	1.0320
Initial Reading	(m^3)	249.519	250.024	250.597
Final Reading	(m^3)	250.019	250.591	251.179
Temp. Outlet	(Avg. oF)	71.5	86.0	88.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.51330	0.56719	0.58008
NH_3	(mg)	0.5	1.6	0.0
Oxygen	(Vol. %)	11.0	10.0	10.0
NH_3	**(mg/Sm^3)**	**1.0**	**2.8**	**0.1**
NH_3	**(mg/Sm^3 @ 11% O2)**	**1.0**	**2.5**	**0.1**
Moisture (isokinetic)	**(Vol. %)**	14.9	15.8	15.5

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

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:40 - 13:42

Concentrations:

Particulate	2.27	mg/dscm	0.00099	gr/dscf
	1.26	mg/Acm	0.00055	gr/Acf
	2.08	mg/dscm (@ 11% O2)	0.00091	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.143	Kg/hr	0.314	lb/hr

Flue Gas Characteristics:

Flow	1048	dscm/min	36993	dscf/min
	17.46	dscm/sec	617	dscf/sec
	1891	Acm/min	66780	Acf/min
Velocity	12.374	m/sec	40.60	f/sec
Temperature	152.7	oC	306.8	oF
Moisture	15.9	%		
Gas Analysis	10.1	% O2		
	10.0	% CO2		
	29.997	Mol. Wt (g/gmole) Dry		
	28.094	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5138	dscm	88.773	dscf
Sample Time	120.0	minutes		
Isokineticity	105.8	%		

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

Client:	Metro Vancouver	**Date:**	17-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:40 - 13:42

Control Unit (Y)	0.9916
Nozzle Diameter (in.)	0.3083
Pitot Factor	0.8461
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)	0.00470
Washings (grams)	0.00100
Total (grams)	**0.00570**

Gas Analysis (Vol. %):		
	CO2	O2
Traverse 1	9.90	10.00
Traverse 2	10.00	10.25
	9.95	**10.13**

Condensate Collection:	
Impinger 1	232.0
Impinger 2	82.0
Impinger 3	16.0
Impinger 4	9.0
Impinger 5	2.0
Impinger 6	1.0
Gel	13.6
Gain (grams)	**355.6**

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	966.065								
1	5.0	969.490	0.27	1.56	81	81	5	307	1.5	105.6
2	10.0	972.720	0.24	1.39	81	81	5	307	4.7	105.5
3	15.0	975.890	0.23	1.33	81	81	5	306	8.4	105.7
4	20.0	979.190	0.25	1.45	82	82	5	307	12.5	105.5
5	25.0	982.560	0.26	1.51	82	82	5	306	17.7	105.6
6	30.0	986.700	0.39	2.26	83	83	5	306	25.2	105.9
7	35.0	991.150	0.45	2.61	83	83	5	306	45.6	106.0
8	40.0	995.700	0.47	2.73	84	84	5	307	53.2	106.0
9	45.0	1000.390	0.50	2.90	84	84	6	307	58.3	106.0
10	50.0	1004.800	0.44	2.56	85	85	6	307	62.5	105.9
11	55.0	1009.110	0.42	2.44	85	85	6	307	66.1	106.0
12	60.0	1013.210	0.38	2.22	86	86	6	307	69.4	105.7
Traverse 2	0.0	1013.210								
1	5.0	1017.440	0.40	2.34	88	88	6	307	1.5	105.9
2	10.0	1021.770	0.42	2.46	88	88	6	307	4.7	105.9
3	15.0	1026.200	0.44	2.57	88	88	7	307	8.4	105.8
4	20.0	1030.480	0.41	2.40	88	88	7	307	12.5	105.9
5	25.0	1034.870	0.43	2.52	89	89	7	307	17.7	105.9
6	30.0	1038.990	0.38	2.23	88	88	7	306	25.2	105.8
7	35.0	1042.340	0.25	2.47	89	89	5	307	45.6	106.0
8	40.0	1045.550	0.23	1.35	89	89	5	307	53.2	105.6
9	45.0	1048.540	0.20	1.17	89	89	5	307	58.3	105.4
10	50.0	1051.610	0.21	1.23	89	89	5	307	62.5	105.6
11	55.0	1054.830	0.23	1.35	90	90	4	307	66.1	105.7
12	60.0	1057.900	0.21	1.23	90	90	4	307	69.4	105.4
Average:			0.338	2.012	85.9	85.9	5.5	306.8		105.8

Client:	Metro Vancouver	**Date:**	18-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	08:29 - 10:31

Concentrations:

Particulate	3.92	mg/dscm	0.00171	gr/dscf
	2.25	mg/Acm	0.00098	gr/Acf
	3.15	mg/dscm (@ 11% O2)	0.00138	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.256	Kg/hr	0.564	lb/hr

Flue Gas Characteristics:

Flow	1087	dscm/min	38391	dscf/min
	18.12	dscm/sec	640	dscf/sec
	1897	Acm/min	66978	Acf/min
Velocity	12.410	m/sec	40.72	f/sec
Temperature	154.1	oC	309.4	oF
Moisture	12.6	%		
Gas Analysis	8.6	% O2		
	9.6	% CO2		
	29.884	Mol. Wt (g/gmole) Dry		
	28.381	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5258	dscm	89.198	dscf
Sample Time	120.0	minutes		
Isokineticity	102.4	%		

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

Client:	Metro Vancouver	**Date:**	18-May-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	08:29 - 10:31

Control Unit (Y)	0.9916	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00840		CO2	O2		Impinger 1	244.0
Pitot Factor	0.8461	Washings (grams)	0.00150	Traverse 1	9.75	8.60		Impinger 2	0.9
Baro. Press. (in. Hg)	30.01			Traverse 2	9.50	8.60		Impinger 3	8.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00990**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	2.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	12.5
Minutes Per Reading	5.0				**9.63**	**8.60**		**Gain (grams)**	**274.4**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	58.507								
1	5.0	62.650	0.40	2.30	76	76	6	303	1.5	102.4
2	10.0	66.890	0.42	2.34	76	76	6	307	4.7	102.6
3	15.0	71.280	0.45	2.54	77	77	6	309	8.4	102.6
4	20.0	75.600	0.44	2.51	76	76	6	311	12.5	102.4
5	25.0	80.120	0.48	2.73	76	76	6	311	17.7	102.7
6	30.0	84.270	0.40	2.29	78	78	6	308	25.2	102.5
7	35.0	87.920	0.31	1.78	78	78	6	308	45.6	102.3
8	40.0	91.330	0.27	1.55	79	79	6	309	53.2	102.3
9	45.0	94.550	0.24	1.38	79	79	5	309	58.3	102.4
10	50.0	97.700	0.23	1.32	81	81	5	312	62.5	102.1
11	55.0	100.780	0.22	1.26	81	81	5	312	66.1	102.1
12	60.0	103.720	0.20	1.15	81	81	5	312	69.4	102.2
Traverse 2	0.0	103.720								
1	5.0	107.020	0.25	1.44	83	83	6	311	1.5	102.2
2	10.0	110.460	0.27	1.57	83	83	6	307	4.7	102.3
3	15.0	114.030	0.29	1.68	83	83	6	306	8.4	102.4
4	20.0	117.670	0.30	1.74	84	84	6	306	12.5	102.4
5	25.0	120.920	0.24	1.39	84	84	5	309	17.7	102.4
6	30.0	124.550	0.30	1.79	85	85	5	310	25.2	102.3
7	35.0	128.960	0.44	2.56	86	86	7	310	45.6	102.6
8	40.0	133.980	0.57	3.31	86	86	7	310	53.2	102.8
9	45.0	138.290	0.42	2.44	87	87	6	311	58.3	102.5
10	50.0	142.550	0.41	2.38	87	87	6	312	62.5	102.6
11	55.0	146.490	0.35	2.03	87	87	5	311	66.1	102.5
12	60.0	150.073	0.29	1.69	87	87	5	311	69.4	102.3
Average:			0.341	1.966	81.7	81.7	5.8	309.4		102.4

Client:	Metro Vancouver	**Date:**	18-May-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:41 - 12:43

Concentrations:

Particulate	3.13	mg/dscm	0.00137	gr/dscf
	1.71	mg/Acm	0.00075	gr/Acf
	2.57	mg/dscm (@ 11% O2)	0.00112	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.197	Kg/hr	0.434	lb/hr

Flue Gas Characteristics:

Flow	1048	dscm/min	37001	dscf/min
	17.46	dscm/sec	617	dscf/sec
	1922	Acm/min	67859	Acf/min
Velocity	12.574	m/sec	41.25	f/sec
Temperature	154.6	oC	310.3	oF
Moisture	16.8	%		
Gas Analysis	8.8	% O2		
	10.6	% CO2		
	30.053	Mol. Wt (g/gmole) Dry		
	28.028	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5220	dscm	89.063	dscf
Sample Time	120.0	minutes		
Isokineticity	106.1	%		

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

Client:	Metro Vancouver	**Date:**	18-May-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:41 - 12:43

Control Unit (Y)	0.9916	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00620		CO2	O2		Impinger 1	254.0
Pitot Factor	0.8511	Washings (grams)	0.00170	Traverse 1	11.00	9.00		Impinger 2	84.0
Baro. Press. (in. Hg)	30.01			Traverse 2	10.25	8.65		Impinger 3	22.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00790**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	12.2
Minutes Per Reading	5.0				**10.63**	**8.83**		**Gain (grams)**	**382.2**
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	150.492								
1	5.0	154.080	0.29	1.68	89	89	7	311	1.5	105.9
2	10.0	157.790	0.31	1.79	89	89	7	311	4.7	105.9
3	15.0	161.260	0.27	1.56	89	89	8	311	8.4	106.1
4	20.0	164.660	0.26	1.50	89	89	8	312	12.5	106.0
5	25.0	168.240	0.29	1.67	88	88	8	312	17.7	105.9
6	30.0	171.770	0.28	1.62	89	89	8	311	25.2	106.0
7	35.0	176.590	0.52	3.01	90	90	8	312	45.6	106.5
8	40.0	181.080	0.45	2.61	91	91	8	312	53.2	106.3
9	45.0	185.420	0.42	2.44	91	91	8	311	58.3	106.2
10	50.0	189.650	0.40	2.32	91	91	8	311	62.5	106.1
11	55.0	193.780	0.38	2.21	91	91	7	311	66.1	106.2
12	60.0	197.450	0.30	1.74	91	91	7	311	69.4	106.1
Traverse 2	0.0	197.450								
1	5.0	201.750	0.41	2.39	92	92	8	309	1.5	106.2
2	10.0	206.100	0.42	2.45	92	92	8	308	4.7	106.1
3	15.0	210.610	0.45	2.63	92	92	8	308	8.4	106.3
4	20.0	214.960	0.42	2.45	92	92	8	308	12.5	106.1
5	25.0	219.470	0.45	2.62	93	93	8	311	17.7	106.3
6	30.0	223.610	0.38	2.22	93	93	8	311	25.2	106.1
7	35.0	227.290	0.30	1.75	93	93	8	311	45.6	106.0
8	40.0	230.850	0.28	1.63	93	93	8	311	53.2	106.1
9	45.0	234.150	0.24	1.41	94	94	6	309	58.3	105.9
10	50.0	237.380	0.23	1.35	94	94	6	309	62.5	105.9
11	55.0	240.540	0.22	1.29	94	94	7	308	66.1	105.8
12	60.0	243.563	0.20	1.17	94	94	7	308	69.4	106.1
Average:			0.340	1.980	91.4	91.4	7.6	310.3		106.1

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		18-May-23	18-May-23	18-May-23
Test Time		09:09 - 10:09	10:26 - 11:26	11:40 - 12:40
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.01	30.01	30.01
DGM Factor	(Y)	0.9983	0.9983	0.9983
Initial Reading	(m^3)	575.795	576.393	576.976
Final Reading	(m^3)	576.386	576.971	577.518
Temp. Outlet	(Avg. oF)	82.0	93.5	94.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.57738	0.55275	0.51662
HF	(mg)	0.005	0.005	0.005
Oxygen	(Vol. %)	10.1	8.6	8.8
HF	**(mg/Sm^3)**	**0.009**	**0.008**	**0.010**
HF	**(mg/Sm^3 @ 11% O2)**	**0.008**	**0.007**	**0.008**
Moisture (isokinetic)	**(Vol. %)**	15.9	12.6	16.8

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		18-May-23	18-May-23	18-May-23
Test Time		09:09 - 10:09	10:26 - 11:26	11:40 - 12:40
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.01	30.01	30.01
DGM Factor	(Y)	1.0320	1.0320	1.0320
Initial Reading	(m^3)	251.221	251.795	252.384
Final Reading	(m^3)	251.787	252.376	252.961
Temp. Outlet	(Avg. oF)	81.5	93.5	67.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.57256	0.57388	0.59933
NH_3	(mg)	0.6	0.1	1.2
Oxygen	(Vol. %)	10.1	8.6	8.8
NH_3	**(mg/Sm^3)**	**1.0**	**0.1**	**2.0**
NH_3	**(mg/Sm^3 @ 11% O2)**	**1.0**	**0.1**	**1.6**
Moisture (isokinetic)	**(Vol. %)**	15.9	12.6	16.8

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Parameter: N_2O

Molecular Weight: 44.00 grams/mol
Lab Detection Limit: 0.1 ppm
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	2023-05-16	10:00 - 11:00	0.00	0.18	0.15
Unit 1 - Run 2	2023-05-16	11:15 - 12:15	0.00	0.18	0.16
Unit 1 - Run 3	2023-05-16	12:23 - 13:23	0.00	0.18	0.17
Average					**0.16**
Unit 2 - Run 1	2023-05-17	09:58 - 10:58	0.00	0.18	0.18
Unit 2 - Run 2	2023-05-17	11:10 - 12:10	0.00	0.18	0.17
Unit 2 - Run 3	2023-05-17	12:22 - 13:22	0.00	0.18	0.17
Average					**0.17**
Unit 3 - Run 1	2023-05-18	09:09 - 10:09	0.00	0.18	0.17
Unit 3 - Run 2	2023-05-18	10:26 - 11:26	0.00	0.18	0.15
Unit 3 - Run 3	2023-05-18	11:40 - 12:40	0.00	0.18	0.15
Average					**0.16**

Date:	**16-May-23**			**17-May-23**			**18-May-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)	ND	ND	ND	ND	ND	ND	ND	3.40	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	3.3	3.0	3.1	2.7	3.3	3.3	3.0	3.1	2.7
Ethane	1.00	0.89	0.92	0.81	1.0	1.00	0.89	0.92	0.81
Ethene	1.00	0.89	0.92	0.81	1.0	1.00	0.89	0.92	0.81
C3 as Propane	0.83	0.75	0.77	0.68	0.83	0.86	1.10	0.62	0.91
C4 as n-Butane	0.83	0.75	0.77	0.68	0.83	0.86	1.10	0.62	0.91
C5 as n-Pentane	0.83	0.75	0.77	0.68	0.83	0.86	1.10	0.62	0.91
C6 as n-Hexane	0.83	0.75	0.77	0.68	0.83	0.86	1.10	0.62	0.91
C6+	1.7	1.5	1.5	1.4	1.7	1.7	2.3	1.2	1.8

Using 1/2 DL Convention

Sample Date:	**16-May-23**			**17-May-23**			**18-May-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)	1.65	1.50	1.55	1.35	1.65	1.65	1.50	3.40	1.35
Ethane (ppm)	0.50	0.45	0.46	0.41	0.50	0.50	0.45	0.46	0.41
Ethene (ppm)	0.50	0.45	0.46	0.41	0.50	0.50	0.45	0.46	0.41
C3 as Propane (ppm)	0.42	0.38	0.39	0.34	0.42	0.43	0.55	0.31	0.46
C4 as n-Butane (ppm)	0.42	0.38	0.39	0.34	0.42	0.43	0.55	0.31	0.46
C5 as n-Pentane (ppm)	0.42	0.38	0.39	0.34	0.42	0.43	0.55	0.31	0.46
C6 as n-Hexane (ppm)	0.42	0.38	0.39	0.34	0.42	0.43	0.55	0.31	0.46
C6+ as n-Hexane (ppm)	0.85	0.75	0.75	0.70	0.85	0.85	1.15	0.60	0.90
Methane (mg/m^3 as CH_4)	1.10	1.00	1.03	0.90	1.10	1.10	1.00	2.27	0.90
Ethane (mg/m^3 as CH_4)	0.33	0.30	0.31	0.27	0.33	0.33	0.30	0.31	0.27
Ethene (mg/m^3 as CH_4)	0.33	0.30	0.31	0.27	0.33	0.33	0.30	0.31	0.27
C3 as Propane (mg/m^3 as CH_4)	0.28	0.25	0.26	0.23	0.28	0.29	0.37	0.21	0.30
C4 as n-Butane (mg/m^3 as CH_4)	0.28	0.25	0.26	0.23	0.28	0.29	0.37	0.21	0.30
C5 as n-Pentane (mg/m^3 as CH_4)	0.28	0.25	0.26	0.23	0.28	0.29	0.37	0.21	0.30
C6 as n-Hexane (mg/m^3 as CH_4)	0.28	0.25	0.26	0.23	0.28	0.29	0.37	0.21	0.30
C6+ as n-Hexane (mg/m^3 as CH_4)	0.57	0.50	0.50	0.47	0.57	0.57	0.77	0.40	0.60
Total mg/Sm^3 @11% O_2 as CH_4	2.82	2.26	2.32	1.88	2.54	2.56	2.50	3.41	2.65

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.4

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #1
PARAMETER / RUN No	Metals / Particulate / R-1
DATE	May. 15, 2023
OPERATOR:	DS
CONTROL UNIT	CAE G105 Y 0.9818 ΔH@ 1.823
BAROMETRIC PRESSURE, IN. Hg	29.92
ASSUMED MOISTURE, Bw	14%

NOZZLE	G-309 DIAMETER, IN. 0.3058
PROBE	7' AL. GUIDE-1 Cp 0.8352
PORT LENGTH	
STATIC PRESSURE, IN. H2O	−19.0"
STACK DIAMETER	70.9"
STACK HEIGHT	30.0'
INITIAL LEAK TEST	0.002 @ 15"
FINAL LEAK TEST	0.003 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	224	224
Imp. #2	100	192	92
Imp. #3	100	120	20
Imp. #4	0	6	6
Imp. #5	100	102	2
Imp. #6	100	101	1
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	11:42	562.401										
2		565.93	0.28	1.82	93	289	252	247	91	5		
3	10	569.57	0.30	1.62	93	293					11.0	8.2
4		572.83	0.24	1.30	93	292	252	252	73	5.5		
5	20	576.07	0.23	1.75	94	293						
6		579.28	0.24	1.30	94	292	252	249	62	5		
7	30	582.90	0.30	1.63	94	292					10.5	9.3
8		587.28	0.43	2.34	95	292	252	250	59	6		
9	40	591.98	0.50	2.73	96	292						
10		596.80	0.52	2.83	96	292	252	249	56	8		
11	50	601.47	0.49	2.68	97	292					11.5	8.9
12		605.60	0.38	2.08	98	290	252	249	61	7		
	60	609.67	0.37	2.03	98	290						
1		614.03	0.42	2.31	99	288	252	250	68	6	11.5	8.4
2	10	618.44	0.44	2.43	99	290						
3		622.69	0.39	2.14	99	290	252	254	63	8		
4	20	626.98	0.41	2.25	99	290						
5		631.75	0.40	2.20	100	291	252	248	61	8	11.0	8.7
6	30	635.57	0.40	2.20	100	291						
7		639.56	0.36	1.98	100	291	252	249	63	8		
8	40	643.66	0.37	2.03	100	291						
9		647.54	0.33	1.82	101	291	252	251	64	8		
10	50	651.30	0.31	1.71	101	291					11.0	8.9
11		654.99	0.30	1.65	100	290	252	248	62	7		
12	13:49	658.56	0.28	1.55	101	289						

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S.H.

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #1	NOZZLE G-309 DIAMETER, IN. 0.3058	
PARAMETER / RUN No	Metals / particulate / R-2	PROBE 7' AL GVRD-1 Cp 0.8352	
DATE	May. 16, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O −19.0"	
CONTROL UNIT	CAE G10J Y 0.9818	STACK DIAMETER 70.9"	
	ΔH@ 1.822	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.06	INITIAL LEAK TEST 0.004 @ 15"	
ASSUMED MOISTURE, Bw	14%	FINAL LEAK TEST 0.003 @ 15"	
	9:11		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	185	185
Imp. #2	100	187	87
Imp. #3	100	118	18
Imp. #4	0	5	5
Imp. #5	100	102	2
Imp. #6	100	101	1
Imp. #7	200 g		
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	~~9:11~~	659.041												
2		663.05	0.38	2.07	81	289	252	250	54	7				
3	10	666.84	0.34	1.81	83	293					11.5	8.9		
4		670.16	0.26	1.38	83	292	252	251	55	7				
5	20	673.29	0.23	1.23	83	291								
6		676.75	0.28	1.49	84	291	252	249	57	6				
7	30	680.32	0.30	1.60	84	292					11.5	9.0		
8		684.40	0.39	2.09	85	291	252	250	61	6				
9	40	688.75	0.44	2.36	86	289								
10		693.05	0.43	2.31	86	288	252	250	65	8				
11	50	696.98	0.36	1.95	87	286					11.5	8.9		
12		701.04	0.38	2.06	87	284	252	254	62					
	60	705.18	0.39	2.13	88	280				7				
1		709.79	0.49	2.67	89	284	252	252	54	8				
2	10	714.51	0.51	2.77	89	286					10.5	9.5		
3		719.28	0.52	2.81	90	290	252	250	57	8				
4	20	723.90	0.49	2.65	90	291								
5		728.42	0.47	2.54	90	291	252	250	58	8				
6	30	732.83	0.45	2.43	90	291								
7		737.01	0.40	2.17	91	289	252	251	55	7	10.5	9.5		
8	40	741.10	0.38	2.06	92	289								
9		745.35	0.41	2.23	92	289	252	251	56	6				
10	50	749.28	0.35	1.90	92	290								
11		753.03	0.32	1.74	92	290	252	250	56	6	10.0	9.9		
12	11:13	756.66	0.30	1.64	92	285								

A. Lanfranco and Associates Inc.

S4-

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #1
PARAMETER / RUN No	metals/particulate / R-3
DATE	May. 16, 2023
OPERATOR:	DS
CONTROL UNIT	CAE G105 Y 0.9818
	ΔH@ 1.822
BAROMETRIC PRESSURE, IN. Hg	30.06
ASSUMED MOISTURE, Bw	14%

NOZZLE	G-309 DIAMETER, IN. 0.3058
PROBE	7' AL GUARD Cp 0.8352
PORT LENGTH	
STATIC PRESSURE, IN. H2O	−19.0"
STACK DIAMETER	70.9"
STACK HEIGHT	30.0'
INITIAL LEAK TEST	0.004 @ 15"
FINAL LEAK TEST	0.003 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	212	212
Imp. #2	100	182	82
Imp. #3	100	106	6
Imp. #4	0	4	4
Imp. #5	100	102	2
Imp. #6	100	101	1
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	11:29	757.012												
1		781.77	0.51	2.75	90	292	253	246	65	4				
2	10	786.75	0.58	3.13	90	292					9.5	10.2		
3		791.85	0.60	3.23	90	294	252	252	60	6				
4	20	796.85	0.58	3.11	89	295								
5		801.89	0.59	3.15	89	297	252	250	64	6				
6	30	806.68	0.53	2.84	90	296								
7		811.38	0.51	2.74	91	297	252	250	58	7	9.5	10.6		
8	40	815.80	0.45	2.41	91	297								
9		820.08	0.42	2.26	91	296	252	250	49	7				
10	50	824.08	0.37	1.99	92	297								
11		827.98	0.35	1.88	92	298	252	250	50	8	9.5	10.5		
12	60	831.66	0.31	1.67	92	295								
1		835.83	0.40	2.15	92	297	252	250	52	6				
2	10	839.79	0.36	1.94	92	297					9.5	10.3		
3		843.23	0.27	1.45	93	297	252	251	54	6				
4	20	846.58	0.26	1.40	93	297								
5		849.95	0.26	1.40	93	298	252	249	56	6				
6	30	853.26	0.25	1.35	93	295					10.5	9.5		
7		857.45	0.40	2.16	93	294	252	250	52	6				
8	40	861.75	0.42	2.27	93	294								
9		866.20	0.45	2.44	93	292	252	251	54	7				
10	50	870.45	0.41	2.23	93	290								
11		874.50	0.37	2.02	95	288	252	250	55	6	10.5	9.3		
12	13:31	878.35	0.33	1.81	96	286								

5H

A. Lanfranco and Associates Inc.

CLIENT	MU WTE	NOZZLE	G-3/21
SOURCE	Unit #2	DIAMETER, IN.	.3083
PARAMETER / RUN No	metals / partic R1	PROBE	7A-1
DATE	5.16.23	Cp	.8461
OPERATOR:	SG	PORT LENGTH	
CONTROL UNIT	Au 15	STATIC PRESSURE, IN. H2O	-19.0
Y	.9976	STACK DIAMETER	
ΔH@	1.739	STACK HEIGHT	
BAROMETRIC PRESSURE, IN. Hg	30.03	INITIAL LEAK TEST	.000 @ 15"
ASSUMED MOISTURE, Bw	12%	FINAL LEAK TEST	.000 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	168	168
Imp. #2	100	192	92
Imp. #3	100	139	39
Imp. #4	0	12	12
Imp. #5	100	104	4
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	12:15	817.250										
1		821.06	.34	1.83	76	313	250	251	58	4.5		
2	10	825.04	.37	1.99	76	313					9.5	11.0
3		829.07	.38	2.04	76	313	256	253	58	4.5		
4	20	832.95	.35	1.88	78	314						
5		836.48	.29	1.56	78	315	250	249	58	4.5		
6	30	840.37	.35	1.89	79	314						
7		844.31	.36	1.94	79	314	257	252	58	5.0	10.0	10.5
8	40	848.78	.46	2.49	81	314						
9		852.95	.40	2.16	81	315	250	252	58	5.0		
10	50	857.57	.49	2.65	82	315						
11		861.75	.40	2.17	83	315	249	248	58	5.0		
12	60	865.93	.40	2.17	83	315						
1		870.03	.38	2.08	85	311	250	249	58	4.5		
2		874.07	.37	2.02	85	314					10.0	11.0
3		878.28	.40	2.19	87	315	257	248	58	4.5		
4		882.28	.36	1.97	87	315						
5		886.40	.38	2.09	88	313	250	248	58	5.0		
6		889.94	.28	1.54	88	313						
7		893.22	.24	1.32	88	312	249	247	57	5.0		
8		896.43	.23	1.27	88	311						
9		899.84	.26	1.43	88	311	250	249	57	5.0	10.0	11.5
10		903.36	.28	1.54	88	311						
11		907.05	.30	1.65	88	310	251	251	57	5.0		
12		910.203	.22	1.21	89	310						
	14:17	END test										

A. Lanfranco and Associates Inc.

SH

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-3070 DIAMETER, IN. 0.3087	
PARAMETER / RUN No	Metals / Bactivitate / R-2	PROBE 7'C Cp 0.8511	
DATE	May. 17, 2023	PORT LENGTH	
OPERATOR:		STATIC PRESSURE, IN. H2O -19.5"	
CONTROL UNIT	AV15 Y 0.9976	STACK DIAMETER 29"	
	ΔH@ 1.739	STACK HEIGHT 30.6'	
BAROMETRIC PRESSURE, IN. Hg	29.96	INITIAL LEAK TEST 0.001 @ 15"	
ASSUMED MOISTURE, Bw	14%	FINAL LEAK TEST 0.002 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	234	234
Imp. #2	100	184	84
Imp. #3	100	114	14
Imp. #4	0	5	5
Imp. #5	100	102	2
Imp. #6	100	101	1
Imp. #7	200g		
Imp. #8			

Testo #1

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. %
	9:11	910.647										
1		913.96	0.26	1.38	72	300	260	238	45	5		
2	10	917.34	0.27	1.44	73	301					10.0	10.2
3		920.68	0.26	1.39	74	299	254	259	50	5		
4	20	924.08	0.27	1.44	74	298						
5		927.54	0.28	1.50	74	298	255	254	55	5		
6	30	932.02	0.47	2.52	74	298						
7		936.28	0.42	2.26	76	296	248	253	52	7	10.0	9.9
8	40	941.07	0.53	2.87	77	293						
9		945.87	0.52	2.82	78	294	251	255	56	8		
10	50	950.50	0.50	2.73	79	290						
11		955.18	0.49	2.68	80	289	252	253	54	7	10.0	9.8
12	60	959.61	0.45	2.48	81	285						
1		963.92	0.42	2.28	82	297	252	252	45	7	10.0	10.0
2	10	968.33	0.44	2.40	84	298						
3		972.65	0.42	2.29	85	297	252	250	48	7		
4	20	976.82	0.39	2.14	86	296						
5		980.87	0.37	2.03	87	298	248	248	49	7		
6	30	984.83	0.35	1.93	88	296					10.0	9.8
7		988.76	0.26	1.43	89	297	252	251	52	5		
8	40	991.67	0.25	1.38	89	297						
9		994.92	0.24	1.32	89	297	250	252	56	5		
10	50	998.15	0.23	1.27	90	297						
11		1001.32	0.22	1.21	90	297	248	254	60		10.0	10.0
12	11:12	1004.48	0.22	1.22	91	293						

A. Lanfranco and Associates Inc.

S-H

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-3072 DIAMETER, IN. 0.3087	
PARAMETER / RUN No	Metals / Particulate / R-3	PROBE 7ft Cp 0.8511	
DATE	May 17, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O – 0.5"	
CONTROL UNIT	AU 15 Y 0.9976	STACK DIAMETER 70.9"	
	ΔH@ 1.739	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	29.96	INITIAL LEAK TEST 0.001 @ 15"	
ASSUMED MOISTURE, Bw	14%	FINAL LEAK TEST 0.001 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	122	122
Imp. #2	100	178	78
Imp. #3	100	126	26
Imp. #4	0	8	8
Imp. #5	100	103	3
Imp. #6	100	101	1
Imp. #7	200		
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	11:35	4.940												
1		8.90	0.35	1.92	87	296	250	243	45	7				
2	10	12.96	0.37	2.03	88	297					9.5	10.4		
3		17.09	0.38	2.09	88	297	261	256	48	8				
4	20	21.27	0.38	2.09	88	297								
5		25.38	0.39	2.14	88	298	264	251	49	8				
6	30	29.56	0.39	2.14	88	298								
7		33.36	0.37	1.96	89	298	251	247	50	7	9.5	10.6		
8	40	36.97	0.28	1.54	89	299								
9		40.35	0.26	1.43	89	300	251	245	52	6				
10	50	43.97	0.28	1.54	90	298								
11		47.36	0.26	1.44	91	297	250	262	54	7	9.5	10.2		
12	60	50.53	0.22	1.22	92	298								
1		54.23	0.30	1.66	93	300	247	251	58	7				
2	10	57.80	0.28	1.55	93	300					10.5	9.4		
3		60.97	0.22	1.21	93	300	245	247	59	7				
4	20	64.08	0.21	1.16	93	299								
5		67.33	0.23	1.27	94	299	248	252	60	7	9.5	9.8		
6	30	70.78	0.26	1.44	94	299								
7		74.45	0.38	2.11	94	298	250	252	57	8				
8	40	79.68	0.49	2.77	93	297								
9		84.46	0.50	2.77	93	297	249	253	53	8	10.0	9.6		
10	50	89.43	0.54	3.00	94	297								
11		94.32	0.52	2.90	94	293	252	254	55	8				
12	13:39	99.08	0.49	2.75	95	290								

S.H.

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CLIENT	MW WTE	NOZZLE	G-3121	DIAMETER, IN.	.3083
SOURCE	Unit #3	PROBE	7A-1	Cp	.8461
PARAMETER / RUN No	metals / Partic R1	PORT LENGTH			
DATE	5.17.23	STATIC PRESSURE, IN. H2O	~.19		
OPERATOR:	JG + JC	STACK DIAMETER			
CONTROL UNIT	ST CAG 2 Y .9916 ΔH@ 1.873	STACK HEIGHT			
BAROMETRIC PRESSURE, IN. Hg	30.01	INITIAL LEAK TEST	.001@15"		
ASSUMED MOISTURE, Bw	13%	FINAL LEAK TEST	.002@15"		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	232	232
Imp. #2	100	182	82
Imp. #3	100	116	16
Imp. #4	0	9	9
Imp. #5	100	102	2
Imp. #6	100	101	1
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	11:40	966.065										
1		969.49	.27	1.56	81	307	251	252	58	4.5		
2	10	972.72	.24	1.39	81	307						
3		975.89	.23	1.33	81	306	250	250	58	4.5	10.0	10.0
4	20	979.19	.25	1.45	82	307						
5		982.56	.26	1.51	82	306	250	248	58	4.5		
6	30	986.70	.39	2.26	83	306						
7		991.15	.45	2.61	83	306	249	251	58	5.0		
8	40	995.70	.47	2.73	84	307						
9		1000.39	.50	2.90	84	307	250	251	58	6.0	9.8	10.0
10	50	1004.80	.44	2.56	85	307						
11		1009.11	.42	2.44	85	307	250	252	57	6.0		
12	60	1013.21	.38	2.22	86	307						
1		1017.44	.40	2.34	88	307	250	246	57	6.0		
2	10	1021.77	.42	2.46	86	307						
3		1026.20	.44	2.57	88	307	249	247	57	6.0	10.0	10.5
4	20	1030.48	.41	2.40	88	307						
5		1034.87	.43	2.52	89	307	250	248	57	7.0		
6	30	1038.99	.36	2.23	89	306						
7		1042.34	.25	1.47	89	307	251	254	57	5.0		
8	40	1045.55	.23	1.35	89	307						
9		1048.54	.20	1.17	89	307	250	253	57	4.5		
10	90	1051.61	.21	1.23	89	307					10.0	10.0
11		1054.63	.22	1.35	90	307	251	252	57	4.0		
12		1057.900	.21	1.23	90	307						
	13:42	END test										

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SH

CLIENT	MV WTE	NOZZLE	G-3121	DIAMETER, IN.	.3083
SOURCE	Unit #3	PROBE	7A-1	Cp	.8461
PARAMETER / RUN No	metals / partic R2	PORT LENGTH			
DATE	5.18.23	STATIC PRESSURE, IN. H2O	-.19		
OPERATOR:	SG + TC	STACK DIAMETER			
CONTROL UNIT	SFCAE2 Y .9916 ΔH@ 1.873	STACK HEIGHT			
BAROMETRIC PRESSURE, IN. Hg	30.07	INITIAL LEAK TEST	.000@15"		
ASSUMED MOISTURE, Bw	13%	FINAL LEAK TEST	.000@15"		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	244	244
Imp. #2	100	186	86
Imp. #3	100	108	8
Imp. #4	0	6	6
Imp. #5	100	102	2
Imp. #6	100	101	1
Upstream Diameters			
Downstream Diameters			

tests # 1

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. %
	8:29	58.507										
1		62.65	.40	2.30	76	303	280	251	58	6.0		
2	10	66.89	.42	2.40	76	307					10.0	8.7
3		71.28	.45	2.57	77	309	249	252	58	6.0		
4	20	75.60	.44	2.51	76	311						
5		80.12	.48	2.73	76	311	257	250	58	6.0		
6	30	84.27	.40	2.29	78	308						
7		87.97	.31	1.78	78	308	250	249	58	6.0		
8	40	91.33	.27	1.55	79	309						
9		94.55	.24	1.38	79	309	259	257	58	5.0		
10	50	97.70	.23	1.32	81	312					9.5	8.5
11		100.78	.22	1.26	84	312	250	249	58	4.5		
12	60	103.72	.20	1.15	91	312						
1		107.02	.25	1.44	83	311	250	249	58	3.8		
2	10	110.46	.27	1.57	83	307					10.0	8.7
3		114.03	.29	1.68	83	306	257	250	58	5.5		
4	20	117.67	.30	1.74	84	306						
5		120.92	.24	1.39	84	309	252	248	58	5.0		
6	30	124.55	.30	1.74	85	310						
7		128.96	.44	2.56	86	310	253	249	58	6.5		
8	40	133.98	.57	3.31	86	310						
9		139.29	.42	2.44	87	311	254	248	58	6.0	9.0	9.5
10	50	141.55	.41	2.35	87	312						
11		146.40	.35	2.03	87	311	250	251	58	4.5		
12		150.073	.29	1.69	87	311						
	10:31	END test										

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JH

CLIENT	MV WTE	NOZZLE	G-3121	DIAMETER, IN.	.3083
SOURCE	Unit #3	PROBE	7C	Cp	[illegible] .8511
PARAMETER / RUN No	Metals / Pm/HCl R3	PORT LENGTH			
DATE	5/18/23	STATIC PRESSURE, IN. H2O	-.19		
OPERATOR:	SG + JC	STACK DIAMETER			
CONTROL UNIT	ST CAE2	Y	.9916	STACK HEIGHT	300
		ΔH@	1.8773		
BAROMETRIC PRESSURE, IN. Hg	30.01	INITIAL LEAK TEST	.000 @ 15"		
ASSUMED MOISTURE, Bw	14%	FINAL LEAK TEST	.000 @ 15"		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	254	254
Imp. #2	100	184	84
Imp. #3	100	122	22
Imp. #4	0	6	6
Imp. #5	100	103	3
Imp. #6	100	107	7
Upstream Diameters			
Downstream Diameters			

Testo #1

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. %
	10:41	150.492										
1		154.08	.29	1.68	89	311						
2	10	157.79	.31	1.79	89	311	250	257	58	7.0	11	9
3		161.26	.27	1.56	89	311						
4	20	164.66	.26	1.50	89	312	250	250	58	7.5		
5		168.24	.29	1.67	88	312						
6	30	171.71	.28	1.67	89	311	250	251	58	7.5		
7		175.59	0.52 .57	3.01	90	312						
8	40	181.08	.45	2.61	91	312	250	250	59	9.0		
9		185.42	.42	2.44	91	311					11	9
10	50	189.65	.40	2.32	91	311	250	249	58	8.0		
11		193.78	.38	2.21	91	311						
12	60	197.45	.30	1.74	91	311	250	257	58	6.5		
1		201.95	.41	2.39	92	309						
2	10	206.10	.42	2.45	92	308	250	249	58	8.0		
3		210.61	.45	2.63	92	308					10.5	8.5
4	20	214.96	.42	2.45	92	308	257	248	57	8.0		
5		219.44	.45	2.62	93	311						
6	30	223.61	.38	2.22	93	311	250	247	57	8.0		
7		227.29	.30	1.75	93	311						
8	40	230.85	.28	1.63	93	311	227	254	57	7.5		
9		234.15	.24	1.41	94	309						
10	50	237.38	.23	1.35	94	308	249	253	57	6.0	10.0	8.8
11		240.54	.22	1.29	94	308						
12		243.563	.20	1.17	94	308	257	257	57	6.0		
	12:43	END test										

DB ✓

A. Lanfranco and Associates Inc.

DB ✓

Client	MV WTE	Y	LMV-A = 0.9983
Source	Unit 1	Cp	
Parameter	HF	Pbar	30.06 Static
Date	16-May-23	Operator	Christian

Leak Check	Run 1	Run 2	Run 3
Initial	0.0002	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	0954	572.2081	75					
	1054	572.6716	94					
2	1110	572.6775	82					
	1210	573.2898	90					
3	1223	573.2917	84					
	1323	573.9681	93					

Client	MV WTE	Y	LMV-D = 1.0609
Source	Unit 1	Cp	
Parameter	NH_3	Pbar	30.06 Static
Date	16-May-23	Operator	Christian

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	0954	103.0666	73					
	1054	103.5478	91					
5	1110	103.5527	91					
	1210	104.1584	96					
6	1223	104.1626	88					
	1323	104.7810	102					

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DS ✓

Client	MV WTE	Y	LMU-A = 0.9983
Source	Unit 2	Cp	
Parameter	HF	Pbar	29.96 Static
Date	17-May-23	Operator	Christian

Leak Check	Run 1	Run 2	Run 3
Initial	0.000	0.000	0.000
Final	0.000	0.000	0.000

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	0958	573.9755	60					
	1058	574.5657	84					
2	1110	574.5702	83					
	1210	575.1802	88					
3	1222	575.1860	88					
	1322	575.7820	89					

DS ✓

Client	MV WTE	Y	LMU-B = 1.0320
Source	Unit 2	Cp	
Parameter	NH_3	Pbar	29.96 Static
Date	17-May-23	Operator	Christian

Leak Check	Run 1	Run 2	Run 3
Initial	0.000	0.000	0.000
Final	0.000	0.000	0.000

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	0958	249.5194	60					
	1058	250.0188	83					
5	1110	250.0239	81					
	1210	250.5908	91					
6	1222	250.5972	83					
	1322	251.1791	93					

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Client	MV WTE	Y	LMU-A = 0.9983
Source	Unit 3	Cp	
Parameter	HF	Pbar	30.01
Date	18-May-23	Static	
		Operator	Christian

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	0909	575.7945	71					
	1009	576.3857	93					
2	1026	576.3929	91					
	1126	576.9709	96					
3	1140	576.9764	92					
	1240	577.5176	97					

Client	MV WTE	Y	LMU-B = 1.0320
Source	Unit 3	Cp	
Parameter	NH_3	Pbar	30.01
Date	18-May-23	Static	
		Operator	Christian

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	0909	251.2205	72					
	1009	251.7871	93					
5	1026	251.7954	91					
	1126	252.3759	96					
6	1140	252.3839	72					
	1240	252.9611	62					

CEM FIELD DATA SHEET

Client: M.V. WTE
Source: Units #1-3
Date: May. 2023 NOx Analysis

Technician: M.L
Ambient Temp (°C):
Barometric Pressure (in. Hg):

	N_2	H_2	1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	O_2	Comb Air	Low Meth	Mid Meth	High Meth
Cylinder #												
Pressure (psi)												
Expiry Date												
O_2 (%)												
CO_2 (%)												
CO (ppm)												
THC (ppm)												
SO_2 (ppm)												
NOx (ppm)			90.0									

NO2

Analyzer Range	O_2	CO_2	CO	THC	SO_2	NOx

CEM READINGS

Time	Source	O_2	CO_2	CO	THC	SO_2	NOx	Response Time (sec)
Cal	N_2	0.0						O_2 Up
	1 Gas	88						O_2 Dn
May 16/23								CO_2 Up
Unit 1-1	1000-1100							CO_2 Dn
1-2	1115-1215							CO Up
1-3	1229-1329							CO Dn
May 17/23								THC Up
Unit 2-1	0958-1058							THC Dn
2-2	1110-1210							SO_2 Up
2-3	1222-1322							SO_2 Dn
May 18/23								NOx Up
Unit 3-1	0909-1009							NOx Dn
3-2	1026-1126							
3-3	1140-1240							
Cal	N_2	0.0						
	1 Gas	89						

APPENDIX – F

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

Pitot Tube Calibration

Date: 11-Jan-23 Temp (R): 539
Pbar (in.Hg): 29.74 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)
0.055	0.075	15.7	0.8478	0.0016
0.095	0.130	20.6	0.8463	0.0002
0.420	0.560	43.4	0.8574	0.0112
0.600	0.830	51.9	0.8417	0.0044
0.730	1.020	57.2	0.8375	0.0086
		Average :	0.8461	0.0052

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.040	0.055	13.4	0.8443	0.0031
0.120	0.170	23.2	0.8318	0.0156
0.300	0.400	36.7	0.8574	0.0100
0.470	0.630	45.9	0.8551	0.0077
0.720	0.980	56.8	0.8486	0.0012
		Average :	0.8474	0.0075

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.6	0.8574	0.0151
0.150	0.210	25.9	0.8367	0.0056
0.230	0.320	32.1	0.8393	0.0030
0.430	0.610	43.9	0.8312	0.0111
0.710	0.970	56.4	0.8470	0.0047
		Average :	0.8423	0.0079

Pitot ID: **ST 8B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.045	0.060	14.2	0.8574	0.0046
0.230	0.320	32.1	0.8393	0.0135
0.430	0.580	43.9	0.8524	0.0003
0.630	0.840	53.2	0.8574	0.0046
0.690	0.920	55.6	0.8574	0.0046
		Average :	0.8528	0.0055

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

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.050	0.070	16.3	0.8367	0.0015
0.105	0.145	19.9	0.8425	0.0073
0.250	0.350	25.3	0.8367	0.0015
0.430	0.610	35.8	0.8312	0.0040
0.680	0.970	48.4	0.8289	0.0063
		Average :	0.8352	0.0041

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.055	0.075	14.9	0.8478	0.0021
0.105	0.145	19.4	0.8425	0.0033
0.210	0.290	29.0	0.8425	0.0033
0.500	0.680	43.1	0.8489	0.0032
0.710	0.970	52.8	0.8470	0.0013
		Average :	0.8457	0.0026

Pitot ID: **7C**

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	0.0069
0.150	0.200	16.3	0.8574	0.0062
0.430	0.580	43.9	0.8524	0.0013
0.480	0.660	30.5	0.8443	0.0069
0.690	0.920	47.0	0.8574	0.0062
		Average :	0.8511	0.0055

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: Justin Ching Signature: Carter Lanfranco Date: January 11, 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: 10-Jan-23
Barometric Pressure: 29.59 (in. Hg)
Theoretical Critical Vacuum: 13.96 (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)
3.40	16.00	250.496	267.425	16.929	75.0	75.0	74.0	74.0	73	0.8185	17.5	83.0	82.0	82.5
1.80	15.00	238.876	250.496	11.620	73.0	73.0	76.0	76.0	63	0.5956	20.0	80.0	84.0	82.0
1.20	15.00	229.882	238.876	8.994	70.0	70.0	73.0	73.0	55	0.4606	22.5	80.0	84.0	82.0
0.60	15.00	223.065	229.882	6.817	67.0	67.0	69.0	69.0	48	0.3560	23.0	71.0	77.0	74.0
0.29	15.00	218.360	223.065	4.705	66.0	66.0	62.0	62.0	40	0.2408	24.5	67.0	74.0	70.5

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
16.672	472.1	16.637	471.2	17.292	0.998	0.000	1.728	43.89	-0.011	0.728
11.398	322.8	11.355	321.6	11.791	0.996	-0.001	1.726	43.84	-0.013	0.731
8.859	250.9	8.781	248.7	9.118	0.991	-0.006	1.935	49.15	0.196	0.694
6.749	191.1	6.838	193.6	6.995	1.013	0.016	1.606	40.80	-0.133	0.746
4.690	132.8	4.640	131.4	4.716	0.989	-0.008	1.699	43.14	-0.040	0.743
				Average Y--------->	**0.9976**	**Average dH@----->**	**1.739**	**44.2**	**Average Ko---->**	**0.728**

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: Ben Lester

Signature: Carter Lanfranco

Date: January 10, 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-Jan-23	100.5	29.68	29.56	29.63	0.05
DS	10-Jan-23	100.5	29.68	29.55	29.62	0.06
CL	10-Jan-23	100.5	29.68	29.56	29.63	0.05
JC	10-Jan-23	100.5	29.68	29.53	29.60	0.08
SB (LF)	10-Jan-23	100.5	29.68	29.55	29.62	0.06
SH	10-Jan-23	100.5	29.68	29.58	29.65	0.03
CDO	10-Jan-23	100.5	29.68	29.53	29.60	0.08
JG	10-Jan-23	100.5	29.68	29.51	29.58	0.10

Calibrated by: Louis Agassiz Signature:  Date: 10-Jan-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

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: CAE G10J
Serial #: 0028-1X1310-1

Date: 10-Jan-23
Barometric Pressure: 29.55 (in. Hg)
Theoretical Critical Vacuum: 13.94 (in. Hg)

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

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

dH (in H2O)	Time (min)	Volume Initial (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	17.00	937.261	955.649	18.388	74.0	74.0	75.0	75.0
1.90	16.00	924.799	937.261	12.462	73.0	73.0	74.0	74.0
1.15	19.00	913.210	924.799	11.589	71.0	71.0	72.0	72.0
0.62	16.00	905.781	913.210	7.429	70.0	70.0	71.0	71.0
0.33	16.00	900.665	905.781	5.116	67.0	67.0	71.0	71.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
73	0.8185	15.5	85.5	82.5	84.0
63	0.5956	18.5	87.0	88.0	87.5
55	0.4606	20.0	80.5	81.0	80.8
48	0.3560	22.0	74.0	80.0	77.0
40	0.2408	23.5	64.0	73.0	68.5

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	CALIBRATION FACTOR dH@ Value (mm H2O)	CALIBRATION FACTOR dH@ Variation (in H2O)	Ko (value)
18.093	512.4	17.629	499.3	18.398	0.974	-0.007	1.837	46.66	0.015	0.711
12.234	346.5	12.035	340.8	12.641	0.984	0.002	1.846	46.90	0.024	0.704
11.398	322.8	11.121	314.9	11.537	0.976	-0.006	1.853	47.06	0.031	0.709
7.311	207.0	7.263	205.7	7.483	0.994	0.012	1.663	42.25	-0.158	0.736
5.045	142.9	4.952	140.3	5.021	0.982	0.000	1.910	48.51	0.088	0.695
				Average Y--------->	**0.9818**		**Average dH@----->**	**1.822**	**46.3**	**Average Ko----->**	**0.711**

TEMPERATURE CALIBRATION

Calibration Standard -------> Omega Model CL23A S/N:T-218768

Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results Variation (degF)	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: Ben Lester Signature: Carter Lanfranco Date: January 10, 2023

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Christian De La O
Date: January 10, 2023
Signature: Carter Lanfranco

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
Q	0.2110	0.2085	0.2100	0.0025	0.2098	0.0002401
P-2240	0.2160	0.2155	0.2170	0.0015	0.2162	0.0002549
P-224	0.2170	0.2160	0.2180	0.0020	0.2170	0.0002568
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-2232	0.2210	0.2200	0.2215	0.0015	0.2208	0.0002660
P-223	0.2220	0.2210	0.2200	0.0020	0.2210	0.0002664
G-245	0.2470	0.2455	0.2460	0.0015	0.2462	0.0003305
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
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
G-3121	0.3090	0.3085	0.3075	0.0015	0.3083	0.0005185
G-3091	0.3080	0.3080	0.3090	0.0010	0.3083	0.0005185
G-3072	0.3090	0.3070	0.3100	0.0030	0.3087	0.0005196
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
P-343	0.3430	0.3440	0.3435	0.0010	0.3435	0.0006435
P-346	0.3465	0.3470	0.3465	0.0005	0.3467	0.0006555
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
P-407	0.4085	0.4085	0.4090	0.0005	0.4087	0.0009109
G-433	0.4360	0.4360	0.4355	0.0005	0.4358	0.0010360
P-29	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
B	0.5020	0.5030	0.5035	0.0015	0.5028	0.0013790
G-540	0.5400	0.5410	0.5400	0.0010	0.5403	0.0015924
J				0.0000	#DIV/0!	#DIV/0!
G-215				0.0000	#DIV/0!	#DIV/0!
G-218				0.0000	#DIV/0!	#DIV/0!
G-2231				0.0000	#DIV/0!	#DIV/0!
G-2501				0.0000	#DIV/0!	#DIV/0!
P				0.0000	#DIV/0!	#DIV/0!
				0.0000	#DIV/0!	#DIV/0!
				0.0000	#DIV/0!	#DIV/0!
				0.0000	#DIV/0!	#DIV/0!
				0.0000	#DIV/0!	#DIV/0!
				0.0000	#DIV/0!	#DIV/0!

Where:

(a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.

(b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.

(c) Average = average of D1, D2 and D3

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: **LMU-A**

Serial #: **Kimmon 186**

Date: 10-Jan-23

Barometric Pressure: 29.52 (in. Hg)

Theoretical Critical Vacuum: 13.92 (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	557.8680	558.0660	6.992	68.0	68.0	70.0	70.0
0.00	16.00	558.0660	558.2770	7.451	69.0	69.0	65.0	65.0
0.00	21.00	558.2770	558.5550	9.817	67.0	67.0	65.0	65.0

-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	65.0	65.0	65.0
48	0.3560	20.0	64.0	61.0	62.5
48	0.3560	20.0	61.0	58.0	59.5

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
6.883	194.9
7.363	208.5
9.719	275.2

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
6.880	194.8	6.936
7.356	208.3	7.381
9.683	274.2	9.660

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	Variation (number)
1.000	0.001
0.999	0.001
0.996	-0.002

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

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

Average Y---------> 0.9983 **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: Liam Forrer Signature:  Date: January 10, 2023

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 10-Jan-23
Barometric Pressure: 29.58 (in. Hg)
Theoretical Critical Vacuum: 13.95 (in. Hg)

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

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

dH (in H2O)	Time (min)	Volume Initial (m^3)	Volume Final (m^3)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
0.00	22.00	232.3240	232.6050	9.923	68.0	68.0	71.0	71.0
0.00	18.00	232.6050	232.8370	8.193	70.0	70.0	73.0	73.0
0.00	16.00	232.8370	233.0430	7.275	72.0	72.0	76.0	76.0

-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	63.0	65.0	64.0
48	0.3560	20.0	64.0	66.0	65.0
48	0.3560	20.0	65.0	69.0	67.0

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
9.779	276.9
8.043	227.8
7.109	201.3

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
10.121	286.6	10.163
8.273	234.3	8.323
7.339	207.9	7.413

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	Variation (number)
1.035	0.003
1.028	-0.003
1.032	0.001

--------- 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---------> **1.0320** **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: Liam Forrer Signature: _____ Date: January 10, 2023

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: **LMU-D**

Serial #: **Wizit 4618**

Date: 10-Jan-23

Barometric Pressure: 29.58 (in. Hg)

Theoretical Critical Vacuum: 13.95 (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	18.00	96.613	96.838	7.942	72.0	72.0	75.0	75.0
0.00	15.00	96.838	97.026	6.653	73.0	73.0	76.0	76.0
0.00	20.00	97.026	97.278	8.899	75.0	75.0	76.0	76.0

-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	64.0	69.0	66.5
48	0.3560	20.0	63.0	68.0	65.5
48	0.3560	20.0	64.0	69.0	66.5

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

--- DRY GAS METER ---

VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)
7.768	220.0
6.495	183.9
8.671	245.6

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

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)
8.261	233.9	8.335
6.891	195.1	6.940
9.179	259.9	9.261

-- DRY GAS METER --

CALIBRATION FACTOR Y Value (number)	Variation (number)
1.063	0.003
1.061	0.000
1.058	-0.002

Average Y---------> **1.0609**

--------- 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 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: Liam Forrer Signature:  Date: January 10, 2023

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 09-Jan-23
Barometric Pressure: 29.33 (in. Hg)
Theoretical Critical Vacuum: 13.83 (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	-- Ambient Temperature --		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.70	19.00	86.397	106.864	20.467	76.0	76.0	79.0	79.0	73	0.8185	12.5	74.0	76.0	75.0
1.95	16.00	72.580	85.009	12.429	75.0	75.0	76.0	76.0	63	0.5956	15.5	75.0	72.0	73.5
1.18	17.00	62.184	72.515	10.331	73.0	73.0	75.0	75.0	55	0.4606	17.0	79.0	74.0	76.5
0.68	16.00	54.727	62.105	7.378	70.0	70.0	73.0	73.0	48	0.3560	19.5	74.0	79.0	76.5
0.33	15.00	49.950	54.794	4.844	72.0	72.0	70.0	70.0	40	0.2408	21.0	69.0	73.0	71.0

********** 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)
19.884	563.1	19.720	558.5	20.392	0.992	0.000	1.860	47.26	-0.012	0.701
12.067	341.7	12.101	342.7	12.478	1.003	0.011	1.853	47.08	-0.019	0.696
10.039	284.3	9.915	280.8	10.282	0.988	-0.004	1.891	48.04	0.018	0.701
7.194	203.7	7.213	204.3	7.479	1.003	0.011	1.833	46.56	-0.040	0.701
4.724	133.8	4.597	130.2	4.718	0.973	-0.018	1.926	48.92	0.053	0.705
				Average Y--------->	**0.9916**		**Average dH@----->**	**1.873**	**47.6**	**Average Ko----->**	**0.701**

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: Liam Forrer Signature: Date: January 9, 2023

Calibration Certificate

Date: 02-Feb-23
Calibrated by: Louis Agassiz
Authorizing Signature: 

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

Ambient Conditions: Temperature: 19 °C Barometric Pressure: 101.96 kPa Relative Humidity: 61%

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	0.15	0.15	Pass		0.05	0.05	Pass		0
O_2	11.0	0.00	Pass		11.0	0.00	Pass		11.00
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	-1	0.3%	Pass		0	0.0%	Pass		0
1 Gas	1899	0.4%	Pass	Re-cal on 2	1915	0.4%	Pass		1907
2 Gas	475	7.1%	Fail	Gas	444	0.1%	Pass		444
3 Gas	230	5.9%	Fail		245	0.2%	Pass		245

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

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	102	1.6%	Pass	Re-cal on 3	100	0.4%	Pass		100
2 Gas	460	1.1%	Pass	Gas	467	0.4%	Pass		465
3 Gas	55	20.3%	Fail		45	1.6%	Pass		46

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)	833435	30-Jan-2021	29-Nov-2026	1000	0	0	0
1 Gas	XC004912B	10-Jun-2021	11-Jun-2029	300	100.4	-	1907
2 Gas	XC015932B	15-Jun-2021	14-Jun-2024	600	465.2	-	443.5
3 Gas	CC101659	21-Jun-2021	22-Jun-2029	1000	45.71	-	244.5
O_2/CO_2	CC38269	2-Jun-2021	3-May-2029	500	-	11.00	-

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

Select one of the following:

☒ Absence from conflict of interest

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

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:

_____

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

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Signature:

X _____

Print name: Mark Lanfranco

Witnessed by:

X _____

Print name: Carter Lanfranco

Date: Dec. 16, 2020

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

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

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

BRITISH COLUMBIA 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

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Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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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 Shawn Harrington

Print name: Shawn Harrington

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.16, 2020

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

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MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Carter Lanfranco

has successfully completed

Stack Sampling

May 2009

Date

Norma D. MacDonald

Dean
Faculty of Continuing Education and Extension

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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Signature:

X _____

Print name: Carter Lanfranco

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec. 16, 2020

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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

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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.

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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*

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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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:

_____

_____

_____

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

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

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

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

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Declaration

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

Signature:

x Shawn Harrington

Print Name: Shawn Harrington

Witnessed by:

x

Print Name: Mark Lanfranco

Date signed: November 26, 2020

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

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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1. Name of Qualified Professional Carter LanFranco

   Title Chief operations officer / owner

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   _____

   _____

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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: Carter LanFranco

Witnessed by:

x Shawn Harrington

Print Name: Shawn Harrington

Date signed: Dec. 7/2020

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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

[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

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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

[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.*

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

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

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

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

Andrew M. Adams
President & CEO