



**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

February 2024 Survey

First Quarter 2024

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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 (N₂O) analysis conducted at Bureau Veritas in Mississauga, ON.
- 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		
	Unit 1	Unit 2	Unit 3
First Quarter 2024			
Filter	0.1 mg	0.0 mg	0.1 mg
Front Half Washings	-0.2 mg	-0.6 mg	0.1 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.32 ug	<0.32 ug	<0.32 ug
Trace Metals Front *	<80.2 ug	<91.9 ug	<77.6 ug
Trace Metals Back*	<34.4 ug	<37.9 ug	<42.5 ug
Ammonia	20.0 ug	17.0 ug	14.0 ug
Fluoride	<10 ug	<10 ug	<10 ug

Sum of all reported elements except Hg*

APPENDIX - B

CALCULATIONS

Appendix B Calculations

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

App B.1 Contaminant Concentration Calculations

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

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

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

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

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

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

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

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

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

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

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

Appendix B Calculations

Where,

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

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

App B.2 Isokinetic Variation Calculations

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

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

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

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

$$M_D = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + 0.28 \times (100 - \%CO_2 - \%O_2) \quad \text{Equation 16}$$

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

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

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

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

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

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

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

$$P_{Stk} = P_B + \frac{P_g}{13.6} \quad \text{Equation 24}$$

Appendix B Calculations

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

Equation 25

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

Equation 26

Where,

A_n	= Nozzle area (ft ²)
d_n	= Diameter of nozzle (inches)
c_p	= Pitot coefficient (dimensionless)
Δp_i	= Individual point differential pressures (inches of H ₂ O)
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 ₂ O)
P_g	= Stack Static pressure (inches of H ₂ O)
P_{stk}	= Absolute stack pressure (inches of Hg)
M_w	= Wet gas molecular weight (g/gmol)
M_D	= Dry gas molecular weight (g/gmol)
%CO ₂	= Stack gas carbon dioxide concentration (% dry basis)
%O ₂	= Stack gas oxygen concentration (% dry basis)
B_{wo}	= Stack gas water vapour, proportion by volume
V_{cond}	= Total volume of water vapor collected, corrected to standard conditions (ft ³)
V_{gain}	= Condensate gain of impinger contents (mL)
P_{std}	= Standard pressure (29.92 inches of Hg)
V_{stk}	= Average flue gas velocity (ft/sec)
v_i	= Individual point flue gas velocity (ft/sec)
v_{nz}	= Average velocity at nozzle(ft/sec)
v_{nzi}	= Individual point velocity at nozzle(ft/sec)
ISO_i	= Individual point isokinetic variation (%)
ISO	= Average isokinetic variation (%)
R_m	= Isokinetic sampling rate (ft ³ /min)

App B.3 Volumetric Flowrate Calculations

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

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

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

Where,

Q_A	= Actual flowrate (Am^3/min)
Q_S	= Flowrate (m^3/min) at standard conditions on a dry basis
A_{stk}	= Area of stack (ft^2)
d	= Diameter of stack (inches)

APPENDIX - C

LABORATORY RESULTS

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Field Blanks Project Location: LSD: P.O.:	Lot ID: 1714920 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976364 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Field Blanks Project Location: LSD: P.O.:	Lot ID: 1714920 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976364 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714920-1	1714920-2	1714920-3
Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (ME BLK + 4 Bottles) / 19.9 °C	Field Blank Unit 2 (MET Y BLK + 4 Bottles) / 19.9 °C	Field Blank Unit 3 (MH BLK + 4 Bottles) / 19.9 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	6	6	6	5
Antimony	µg	<2	4	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	<0.3	<0.3	<0.3	0.25
Lead	µg	<2	2	<2	1.5
Manganese	µg	0.8	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	68	72	67	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	3.3	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	5.4	4.0	4.6	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	<5	6	10	5
Antimony	µg	3	<2	<2	2.5
Arsenic	µg	2	<0.9	2.7	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	0.2	0.29	<0.2	0.2
Cobalt	µg	<0.2	<0.2	0.4	0.25
Copper	µg	<0.2	<0.2	<0.2	0.25
Lead	µg	<1	2	<1	1.5
Manganese	µg	<0.2	<0.2	<0.2	0.25
Nickel	µg	<0.5	0.5	<0.5	0.5
Phosphorus	µg	25	24	24	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	4.2	5.1	5.4	0.5
Volume	Sample	mL	448	445	386
Volume	aliquot volume	mL	398	395	336
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05

Analytical Report

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

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

Lot ID: **1714920**
 Control Number:
 Date Received: Feb 21, 2024
 Date Reported: Feb 29, 2024
 Report Number: 2976364
 Report Type: Final Report

Reference Number	1714920-1	1714920-2	1714920-3
Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (ME BLK + 4 Bottles) / 19.9 °C	Field Blank Unit 2 (MET Y BLK + 4 Bottles) / 19.9 °C	Field Blank Unit 3 (MH BLK + 4 Bottles) / 19.9 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	250	250	250
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	448	445	386
Volume	aliquot volume	mL	5.0	5.0	5.0
Volume	Final	mL	40	40	40
Mercury	Fraction 2B	µg/sample	<0.2	<0.2	<0.2
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	94	96	98
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
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	500	500	500
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	200	200	200
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	<0.02

Approved by: 
 Max Hewitt
 Operations Manager

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

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Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Field Blanks Project Location: LSD: P.O.:	Lot ID: 1714920 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976364 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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 Results relate only to samples as submitted.

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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Filter Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1714951 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976406 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Filter Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1714951 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976406 Report Type: Final Report
Attn: Missy Sampled By: Company:		

Reference Number	1714951-1	1714951-2	1714951-3
Sample Date	Feb 12, 2024	Feb 12, 2024	Feb 12, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 Container 1 (filter) / 18.4 °C	Reagent Blank Unit 2 Container 1 (filter) / 18.4 °C	Reagent Blank Unit 3 Container 1 (filter) / 18.4 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	7	6	10	2.5
Arsenic	µg	1	2	2	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	<0.3	<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	0.6	<0.5	<0.5	0.5
Phosphorus	µg	69	68	65	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	7.5	4.1	3.1	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	6.6	5.9	6.1	0.5
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	250	250	250
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02

Approved by: 
 Max Hewitt
 Operations Manager

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Filter Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1714951 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976406 Report Type: Final Report
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 26, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	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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Appendix B - Particulate Analysis

Client: Metro Vancouver **Sample Date:** February 12-15-24
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	0.4574	0.4575	0.0001	
Unit 1 Run 1	0.4583	0.4622	0.0039	0.0038
Unit 1 Run 2	0.4586	0.4622	0.0036	0.0035
Unit 1 Run 3	0.4569	0.4607	0.0038	0.0037
Unit 2 Blank	0.4610	0.4610	0.0000	
Unit 2 Run 1	0.4581	0.4578	-0.0003	ND
Unit 2 Run 2	0.4607	0.4603	-0.0004	ND
Unit 2 Run 3	0.4593	0.4589	-0.0004	ND
Unit 3 Blank	0.4580	0.4581	0.0001	
Unit 3 Run 1	0.4548	0.4574	0.0026	0.0025
Unit 3 Run 2	0.4581	0.4601	0.0020	0.0019
Unit 3 Run 3	0.4593	0.4616	0.0023	0.0022

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	120.3877	120.3875	-0.0002	
Unit 1 Run 1	121.8338	121.8337	-0.0001	0.0001
Unit 1 Run 2	125.0790	125.0795	0.0005	0.0007
Unit 1 Run 3	113.6650	113.6665	0.0015	0.0017
Unit 2 Blank	84.3544	84.3538	-0.0006	
Unit 2 Run 1	86.5520	86.5527	0.0007	0.0013
Unit 2 Run 2	86.7133	86.7138	0.0005	0.0011
Unit 2 Run 3	85.4904	85.4921	0.0017	0.0023
Unit 3 Blank	123.7734	123.7735	0.0001	
Unit 3 Run 1	122.0304	122.0327	0.0023	0.0022
Unit 3 Run 2	104.4659	104.4707	0.0048	0.0047
Unit 3 Run 3	115.7118	115.7137	0.0019	0.0018

Task	Unit	Personnel	Date	Quality Control	Y/N
Fiter Recovery:	Unit 1	J. Ching	12-13-Feb-24	Adequate PW volume:	Y
	Unit 2	J. Ching	13-14-Feb-24	No sample leakage:	Y
	Unit 3	J.Ching	14-15-Feb-24	Filter not compromised:	Y
PW Initial Analysis:	Unit 1	J. Ching	16-Feb-24		
	Unit 2	J. Ching	16-Feb-24		
	Unit 3	J. Ching	16-Feb-24		
PW, FilterFinal Analysis:	Unit 1	J. Ching	20-Feb-24		
	Unit 2	J. Ching	20-Feb-24		
	Unit 3	J. Ching	20-Feb-24		
Data entered to computer:	All	S. Harrington	4-Mar-24		

Comments:

No problems encountered in sample analysis.

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: HF Blanks Project Location: LSD: P.O.:	Lot ID: 1714949 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 27, 2024 Report Number: 2976401 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	Invoice

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Analytical Report


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

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

Lot ID: **1714949**
 Control Number:
 Date Received: Feb 21, 2024
 Date Reported: Feb 27, 2024
 Report Number: 2976401
 Report Type: Final Report

Reference Number	1714949-1	1714949-2	1714949-3
Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Blank / 18.4 °C	Unit #2 HF Blank / 18.4 °C	Unit #3 HF Blank / 18.4 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	374	382	398
Dilution Factor	fluoride		1.00	1.00	1.00
Fluoride	As Tested	mg/L	<0.03	<0.03	<0.03
Fluoride	Water Soluble	µg/sample	<10	<10	<10

Approved by: 
 Rachel Eden, B. Sc.
 Department Manager I

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: HF Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1714949 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 27, 2024 Report Number: 2976401 Report Type: Final Report
Attn: Missy Sampled By: Company:		

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 <i>* Reference Method Modified</i>	Feb 26, 2024	Element Vancouver

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.

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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: HF Samples Project Location: LSD: P.O.:	Lot ID: 1714947 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 27, 2024 Report Number: 2976400 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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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: HF Samples
 Project Location:
 LSD:
 P.O.:
 Proj. Acct. code:

Lot ID: **1714947**
 Control Number:
 Date Received: Feb 21, 2024
 Date Reported: Feb 27, 2024
 Report Number: 2976400
 Report Type: Final Report

Reference Number	1714947-1	1714947-2	1714947-3
Sample Date	Feb 13, 2024	Feb 13, 2024	Feb 13, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Run 1 / 17.7 °C	Unit #1 HF Run 2 / 17.7 °C	Unit #1 HF Run 3 / 17.7 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	335	373	417
Dilution Factor	fluoride		1.00	1.00	1.00
Fluoride	As Tested	mg/L	0.05	0.09	0.06
Fluoride	Water Soluble	µg/sample	20	30	20

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

Lot ID: **1714947**
 Control Number:
 Date Received: Feb 21, 2024
 Date Reported: Feb 27, 2024
 Report Number: 2976400
 Report Type: Final Report

Reference Number	1714947-4	1714947-5	1714947-6
Sample Date	Feb 14, 2024	Feb 14, 2024	Feb 14, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 HF Run 1 / 17.7 °C	Unit #2 HF Run 2 / 17.7 °C	Unit #2 HF Run 3 / 17.7 °C
Matrix	Stack Samples	Stack Samples	Stack Samples


Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	389	427	410
Dilution Factor	fluoride		1.00	1.00	1.00
Fluoride	As Tested	mg/L	0.08	0.07	<0.03
Fluoride	Water Soluble	µg/sample	30	30	<10

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: HF Samples Project Location: LSD: P.O.:	Lot ID: 1714947 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 27, 2024 Report Number: 2976400 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714947-7	1714947-8	1714947-9
Sample Date	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 HF Run 1 / 17.7 °C	Unit #3 HF Run 2 / 17.7 °C	Unit #3 HF Run 3 / 17.7 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample mL	400	387	433	
Dilution Factor	fluoride	1.00	1.00	1.00	
Fluoride	As Tested mg/L	<0.03	<0.03	0.06	0.03
Fluoride	Water Soluble µg/sample	<10	<10	30	

Approved by: 
 Rachel Eden, B. Sc.
 Department Manager I

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: HF Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1714947 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 27, 2024 Report Number: 2976400 Report Type: Final Report
Attn: Missy Sampled By: Company:		

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 <i>* Reference Method Modified</i>	Feb 22, 2024	Element Vancouver

References

EMC	Emission Measurement Center of EPA
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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714906-1	1714906-2	1714906-3
Sample Date	Feb 12, 2024	Feb 13, 2024	Feb 13, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (ME 1 Run 1 + 4 Bottles) / 19.0 °C	Unit 1 Run 2 (ME 2 Run 2 + 4 Bottles) / 19.0 °C	Unit 1 Run 3 (ME 3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	20	20	20	5
Antimony	µg	6	5	3	2.5
Arsenic	µg	3.3	1	<1	1
Cadmium	µg	0.7	0.7	1	0.25
Chromium	µg	0.68	10.0	6.55	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	5.0	3.0	3.5	0.25
Lead	µg	13	12	9.7	1.5
Manganese	µg	2.9	3.3	2	0.25
Nickel	µg	4.1	14	3.4	0.5
Phosphorus	µg	77	73	76	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	5.3	3.0	2
Thallium	µg	<2	3.2	4.6	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	80.2	91.9	106	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	34	130	83	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.9	1	<0.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	1.2	0.45	2.33	0.2
Cobalt	µg	<0.2	<0.2	0.4	0.25
Copper	µg	0.7	0.4	1	0.25
Lead	µg	2.2	4.2	7.4	1.5
Manganese	µg	0.9	0.2	2	0.25
Nickel	µg	0.6	<0.4	0.5	0.5
Phosphorus	µg	26	24	26	2.5
Selenium	µg	<1	4.9	<1	1.5
Tellurium	µg	<2	<2	3.1	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	7.1	10.0	13	0.5
Volume	Sample	mL	767	722	775
Volume	aliquot volume	mL	717	672	725
Mercury by CVAA					
Mercury	As Tested	µg/L	0.06	0.08	0.18

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714906-1	1714906-2	1714906-3
Sample Date	Feb 12, 2024	Feb 13, 2024	Feb 13, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (ME 1 Run 1 + 4 Bottles) / 19.0 °C	Unit 1 Run 2 (ME 2 Run 2 + 4 Bottles) / 19.0 °C	Unit 1 Run 3 (ME 3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	250	250	250	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 1B µg/sample	0.02	0.03	0.071	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	767	722	775	
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	123	123	133	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3A µg/sample	<0.010	<0.010	<0.01	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	500	500	500	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3B µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested µg/L	0.06	0.18	0.30	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	200	200	200	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3C µg/sample	0.02	0.057	0.096	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714906-4	1714906-5	1714906-6
Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 14, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MET X1 Run 1 + 4 Bottles) / 19.0 °C	Unit 2 Run 2 (MET X2 Run 2 + 4 Bottles) / 19.0 °C	Unit 2 Run 3 (MET X3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	20	26	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	3.24	27.2	4.39	0.2
Cobalt	µg	<0.3	0.5	<0.3	0.25
Copper	µg	0.4	2.5	0.5	0.25
Lead	µg	2.9	6.7	5.5	1.5
Manganese	µg	1	3.5	1	0.25
Nickel	µg	3.4	28.5	3.4	0.5
Phosphorus	µg	69	69	71	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	3.2	6.0	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	23	31.5	25.5	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	20	20	30	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.9	<0.9	2.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	2.52	2.0	2.25	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	<0.2	0.7	0.5	0.25
Lead	µg	1	2	<1	1.5
Manganese	µg	1	0.9	1	0.25
Nickel	µg	0.7	1	1	0.5
Phosphorus	µg	22	27	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	2.2	<2	<2	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	6.0	8.7	6.1	0.5
Volume	Sample	mL	712	693	714
Volume	aliquot volume	mL	662	643	664
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714906-4	1714906-5	1714906-6
Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 14, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MET X1 Run 1 + 4 Bottles) / 19.0 °C	Unit 2 Run 2 (MET X2 Run 2 + 4 Bottles) / 19.0 °C	Unit 2 Run 3 (MET X3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	250	250	250	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 1B µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	712	693	714	
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	135	134	113	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3A µg/sample	<0.01	<0.01	<0.009	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	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	0.29	<0.05	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	0.093	<0.02	0.067	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714906-7	1714906-8	1714906-9
Sample Date	Feb 14, 2024	Feb 15, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MR-1 Run 1 + 4 Bottles) / 19.0 °C	Unit 3 Run 2 (MH-2 Run 2 + 4 Bottles) / 19.0 °C	Unit 3 Run 3 (MH-3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Front Half Metals Fraction 1A						
Aluminum	µg	20	34	20	5	
Antimony	µg	<2	<2	4	2.5	
Arsenic	µg	1	<1	<1	1	
Cadmium	µg	0.5	<0.3	<0.3	0.25	
Chromium	µg	8.28	7.14	4.12	0.2	
Cobalt	µg	<0.3	<0.3	<0.3	0.25	
Copper	µg	2	1	1	0.25	
Lead	µg	7.4	8.2	3.3	1.5	
Manganese	µg	2	2	1	0.25	
Nickel	µg	15	12	3.4	0.5	
Phosphorus	µg	68	72	72	2.5	
Selenium	µg	<2	<2	<2	1.5	
Tellurium	µg	<2	<2	<2	2	
Thallium	µg	<2	<2	<2	1.5	
Vanadium	µg	<1	<1	<1	1	
Zinc	µg	53.4	48.4	46.3	0.5	
Back Half Metals Fraction 2A						
Aluminum	µg	60	5	10	5	
Antimony	µg	<2	<2	<2	2.5	
Arsenic	µg	<0.9	<0.9	<0.9	1	
Cadmium	µg	0.3	<0.2	<0.2	0.25	
Chromium	µg	0.72	0.67	<0.2	0.2	
Cobalt	µg	<0.2	<0.2	<0.2	0.25	
Copper	µg	<0.2	<0.2	<0.2	0.25	
Lead	µg	1	<1	<1	1.5	
Manganese	µg	0.5	<0.2	<0.2	0.25	
Nickel	µg	1	<0.4	<0.4	0.5	
Phosphorus	µg	24	25	24	2.5	
Selenium	µg	<1	<1	<1	1.5	
Tellurium	µg	2	3.0	<2	2	
Thallium	µg	<1	<1	<1	1.5	
Vanadium	µg	<0.9	<0.9	<0.9	1	
Zinc	µg	8.8	5.1	4.9	0.5	
Volume	Sample	mL	850	714	738	
Volume	aliquot volume	mL	800	664	688	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	0.06	<0.05	0.05

Analytical Report

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

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

Lot ID: **1714906**
Control Number:
Date Received: Feb 21, 2024
Date Reported: Feb 29, 2024
Report Number: 2976352
Report Type: Final Report

Reference Number	1714906-7	1714906-8	1714906-9
Sample Date	Feb 14, 2024	Feb 15, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MR-1 Run 1 + 4 Bottles) / 19.0 °C	Unit 3 Run 2 (MH-2 Run 2 + 4 Bottles) / 19.0 °C	Unit 3 Run 3 (MH-3 Run 3 + 4 Bottles) / 19.0 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	250	250	250	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 1B µg/sample	<0.02	0.02	<0.02	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	850	714	738	
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	124	130	165	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3A µg/sample	<0.010	<0.01	<0.01	
Mercury	As Tested µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	500	500	500	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3B µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested µg/L	<0.05	<0.05	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	<0.02	<0.02	0.03	

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.

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1714906 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976352 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services group.
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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Blanks Project Location: LSD: P.O.:	Lot ID: 1714936 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976389 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	Invoice


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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Blanks Project Location: LSD: P.O.:	Lot ID: 1714936 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976389 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

	Reference Number	1714936-1	1714936-2	1714936-3		
	Sample Date	Feb 13, 2024	Feb 14, 2024	Feb 15, 2024		
	Sample Time	NA	NA	NA		
	Sample Location					
	Sample Description	Unit #1 NH3 Blk / 18.6 °C	Unit #2 NH3 Blk / 18.6 °C	Unit #3 NH3 Blk / 18.6 °C		
	Matrix	Stack Samples	Stack Samples	Stack Samples		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Air Quality						
Ammonium - N	As Tested	µg/L	58	52	44	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	348	332	326	
Ammonium - N		µg/sample	20	17	14	

Approved by: 
 Rachel Eden, B. Sc.
 Department Manager I

Methodology and Notes

Bill To: A. Lanfranco & Associates	Project ID: Metro Vancouver WTE	Lot ID: 1714936
#101, 9488 - 189 Street	Project Name: NH3 Blanks	Control Number:
Surrey, BC, Canada	Project Location:	Date Received: Feb 21, 2024
V4N 4W7	LSD:	Date Reported: Feb 28, 2024
Attn: Missy	P.O.:	Report Number: 2976389
Sampled By:	Proj. Acct. code:	Report Type: Final Report
Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	* Automated Phenate Method, 4500-NH3 G	Feb 28, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Samples Project Location: LSD: P.O.:	Lot ID: 1714925 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976372 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email	PDF	COA / COC
Email	PDF	COC / Test Report
Missy	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: missy@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Samples Project Location: LSD: P.O.:	Lot ID: 1714925 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976372 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714925-1	1714925-2	1714925-3
Sample Date	Feb 13, 2024	Feb 13, 2024	Feb 13, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 NH3 / 18.6 °C	Unit 1 Run 2 NH3 / 18.6 °C	Unit 1 Run 3 NH3 / 18.6 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Air Quality						
Ammonium - N	As Tested	µg/L	2990	5110	6870	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	374	410	385	
Ammonium - N		µg/sample	1120	2100	2640	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Samples Project Location: LSD: P.O.:	Lot ID: 1714925 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976372 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714925-4	1714925-5	1714925-6
Sample Date	Feb 14, 2024	Feb 14, 2024	Feb 14, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 NH3 / 18.6 °C	Unit 2 Run 2 NH3 / 18.6 °C	Unit 2 Run 3 NH3 / 18.6 °C
Matrix	Stack Samples	Stack Samples	Stack Samples


Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Air Quality						
Ammonium - N	As Tested	µg/L	2000	3450	1980	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	374	396	412	
Ammonium - N		µg/sample	749	1370	817	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Samples Project Location: LSD: P.O.:	Lot ID: 1714925 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976372 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714925-7	1714925-8	1714925-9
Sample Date	Feb 15, 2024	Feb 15, 2024	Feb 15, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 NH3 / 18.6 °C	Unit 3 Run 2 NH3 / 18.6 °C	Unit 3 Run 3 NH3 / 18.6 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	4900	6130	2930	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	476	448	448	
Ammonium - N		µg/sample	2330	2750	1310	

Approved by: 
 Rachel Eden, B. Sc.
 Department Manager I

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: NH3 Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1714925 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 28, 2024 Report Number: 2976372 Report Type: Final Report
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	* Automated Phenate Method, 4500-NH3 G	Feb 28, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

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Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1714939 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976392 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
Mark Lanfranco	A. Lanfranco & Associates	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1714939 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976392 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1714939-1	1714939-2	1714939-3
Sample Date	Feb 12, 2024	Feb 12, 2024	Feb 12, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 / 18.5 °C	Reagent Blank Unit 2 / 18.5 °C	Reagent Blank Unit 3 / 18.5 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	20	<5	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	0.4	<0.3	<0.3	0.25
Copper	µg	<0.3	<0.3	<0.3	0.25
Lead	µg	3.2	3.3	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	6	3	3	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	5.2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	6.0	4.7	3.4	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	27	10	10	5
Antimony	µg	<3	3	<3	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	<0.3	<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	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<2	3.1	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	6.0	7.5	5.1	0.5
Volume	Sample	mL	212	205	209
Volume	aliquot volume	mL	162	155	159
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1714939 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976392 Report Type: Final Report
Attn: Missy	Proj. Acct. code:	
Sampled By:		
Company:		

Reference Number	1714939-1	1714939-2	1714939-3
Sample Date	Feb 12, 2024	Feb 12, 2024	Feb 12, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 / 18.5 °C	Reagent Blank Unit 2 / 18.5 °C	Reagent Blank Unit 3 / 18.5 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Volume	Sample	mL	250	250	250
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	212	205	209
Volume	aliquot volume	mL	5.0	5.0	5.0
Volume	Final	mL	50	50	55
Mercury	Fraction 2B	µg/sample	<0.1	<0.1	<0.1
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	94	95	95
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
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	500	500	500
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	200	200	200
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	<0.02

Approved by: 
 Max Hewitt
 Operations Manager

Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Metro Vancouver WTE Project Name: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1714939 Control Number: Date Received: Feb 21, 2024 Date Reported: Feb 29, 2024 Report Number: 2976392 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 23, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Feb 27, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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LABORATORY REPORT

February 29, 2024

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

RE: Metro Vancouver W.T.E

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on February 20, 2024. For your reference, these analyses have been assigned our service request number P2400701.

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

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

ALS | Environmental



By Sue Anderson at 6:04 pm, Feb 29, 2024

Sue Anderson
Project Manager



Client: A. Lanfranco and Associates Inc.
Project: Metro Vancouver W.T.E

Service Request No: P2400701

CASE NARRATIVE

The samples were received intact under chain of custody on February 20, 2024 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

C3 through C6 Hydrocarbons and Methane, Ethene and Ethane Analysis

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

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

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

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

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

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: A. Lanfranco and Associates Inc.
 Project ID: Metro Vancouver W.T.E

Service Request: P2400701

Date Received: 2/20/2024
 Time Received: 09:38

TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
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Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
Unit # 1 Run #1	P2400701-001	Air	2/13/2024	11:19	SC01555	-0.02	4.68	X	X
Unit #1 Run #2	P2400701-002	Air	2/13/2024	12:35	SC00527	0.45	4.65	X	X
Unit #1 Run #3	P2400701-003	Air	2/13/2024	13:50		-1.34	4.60	X	X
Unit #2 Run #1	P2400701-004	Air	2/14/2024	10:00		-9.22	4.72	X	X
Unit #2 Run #2	P2400701-005	Air	2/14/2024	11:05		-6.75	4.60	X	X
Unit #2 Run #3	P2400701-006	Air	2/14/2024	14:25		-9.34	5.30	X	X
Unit #3 Run #1	P2400701-007	Air	2/15/2024	10:07		-1.30	4.55	X	X
Unit #3 Run #2	P2400701-008	Air	2/15/2024	11:16	SC00282	0.53	4.89	X	X
Unit #3 Run #3	P2400701-009	Air	2/15/2024	12:20	SC00286	0.46	4.70	X	X



Air - Chain of Custody Record & Analytical Service Request

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

P2400701

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.
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Company Name & Address (Reporting Information) A. Lanfranco & Associates Inc.		Project Name Metro Vancouver W.T.E		ALS Contact:	Analysis Method	Comments e.g. Actual Preservative or specific instructions
Project Manager Mark Lanfranco		Project Number				
Phone 604-881-2582		P.O. # / Billing Information		Fax		
Email Address for Result Reporting mark.lanfranco@alfranco.com		Sampler (Print & Sign)				

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		02-13-24	10:19 - 11:19	X 00286	1153	-29	-15	
Unit #1 Run#2		02-13-24	11:35 - 12:35	01126	0694	-30	0	
Unit #1 Run#3		02-13-24	12:50 - 13:50	1447	1130	-30	0	
Unit #2 Run#1		02-14-24	9:00 - 10:00	43968	0763	-27	-17	
Unit #2 Run#2		02-14-24	10:05 - 11:05	43983	12934	-29	-15	
Unit #2 Run#3		02-14-24	13:25 - 14:25	33080	1087	-31	-22	
Unit #3 Run#1		02-15-24	9:07 - 10:07	43973	12946	-27	-4	
Unit #3 Run#2		02-15-24	10:16 - 11:16	SC00282	03689	-28	0	
Unit #3 Run#3		02-15-24	11:20 - 12:20	SC00286	12943	-30	0	

Report Tier Levels - please select				Project Requirements (MRLs, QAPP)	
Tier I - Results (Default if not specified) _____	Tier III (Results + QC & Calibration Summaries) _____	EDD required Yes / No	Chain of Custody Seal: (Circle)		
Tier II (Results + QC Summaries) _____	Tier IV (Data Validation Package) 10% Surcharge _____	Type: _____ Units: _____	INTACT	BROKEN	ABSENT
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature) <i>Fedex</i>	Date:	Time:
Relinquished by: (Signature) <i>[Signature]</i>	Date:	Time:	Received by: (Signature) <i>[Signature]</i>	Date: 2-20-24	Time: 09:30
					Cooler / Blank Temperature _____ °C

**ALS Environmental
Sample Acceptance Check Form**

Client: A. Lanfranco and Associates Inc.

Work order: P2400701

Project: Metro Vancouver W.T.E

Sample(s) received on: 2/20/24

Date opened: 2/20/24

by: ANTHONY.VASQUE

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? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 Did sample containers arrive in good condition? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 Were chain-of-custody papers used and filled out? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4 Did sample container labels and/or tags agree with custody papers? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 Was sample volume received adequate for analysis? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 Are samples within specified holding times? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 Was proper temperature (thermal preservation) of cooler at receipt adhered to? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8 Were custody seals on outside of cooler/Box/Container? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Location of seal(s)? _____ Sealing Lid? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Were signature and date included? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Were seals intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9 Do containers have appropriate preservation , according to method/SOP or Client specified information? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Is there a client indication that the submitted samples are pH preserved? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Were VOA vials checked for presence/absence of air bubbles? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10 Tubes: Are the tubes capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11 Badges: Are the badges properly capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Are dual bed badges separated and individually capped and intact? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12 Lab Notification: Analyst and PM were alerted of Short HT or RUSH samples? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 13 Client Notification: Client has been notified regarding HT exceedances and/or other CoC discrepancies? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2400701-001.01	6.0 L Source Can					Asset#00286 / SC01555
P2400701-002.01	6.0 L Source Can					Asset#01126 / SC00527
P2400701-003.01	6.0 L (ALS-SLC) Can					ALS-SLC 1447
P2400701-004.01	6.0 L (ALS-SLC) Can					ALS-SLC 8001143
P2400701-005.01	6.0 L (ALS-SLC) Can					ALS-SLC 1422
P2400701-006.01	6.0 L (ALS-SLC) Can					ALS-SLC 1115
P2400701-007.01	6.0 L (ALS-SLC) Can					ALS-SLC 8001532
P2400701-008.01	6.0 L Source Can					
P2400701-009.01	6.0 L Source Can					
P2400701-010.01	6.0 L Source Can					

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

Chain of Custody is missing analysis _____

Analysis per client discussion prior to receiving canisters. Analyses to be run as have for prior submissions for ongoing project. _____

Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit # 1 Run #1

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-001

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC01555

Date Collected: 2/13/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -0.02 Final Pressure (psig): 4.68

Container Dilution Factor: 1.32

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.66	
C ₄ as n-Butane	ND	0.66	
C ₅ as n-Pentane	ND	0.66	
C ₆ as n-Hexane	ND	0.66	
C ₆ + as n-Hexane	ND	1.3	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #1 Run #2

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-002

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC00527

Date Collected: 2/13/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): 0.45 Final Pressure (psig): 4.65

Container Dilution Factor: 1.28

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.64	
C ₄ as n-Butane	ND	0.64	
C ₅ as n-Pentane	ND	0.64	
C ₆ as n-Hexane	ND	0.64	
C ₆ + as n-Hexane	ND	1.3	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #1 Run #3
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-003

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890 II/GC8/FID
 Analyst: Stephanie Reynoso
 Sampling Media: Canister
 Test Notes:

Date Collected: 2/13/24
 Date Received: 2/20/24
 Date Analyzed: 2/23/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.34 Final Pressure (psig): 4.60

Container Dilution Factor: 1.44

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.72	
C ₄ as n-Butane	ND	0.72	
C ₅ as n-Pentane	ND	0.72	
C ₆ as n-Hexane	ND	0.72	
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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #2 Run #1

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-004

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: Canister

Test Notes:

Date Collected: 2/14/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -9.22

Final Pressure (psig): 4.72

Container Dilution Factor: 3.54

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	1.8	
C ₄ as n-Butane	ND	1.8	
C ₅ as n-Pentane	ND	1.8	
C ₆ as n-Hexane	ND	1.8	
C ₆ + as n-Hexane	ND	3.5	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #2 Run #2

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-005

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: Canister

Test Notes:

Date Collected: 2/14/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -6.75 Final Pressure (psig): 4.60

Container Dilution Factor: 2.43

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	1.2	
C ₄ as n-Butane	ND	1.2	
C ₅ as n-Pentane	ND	1.2	
C ₆ as n-Hexane	ND	1.2	
C ₆ + as n-Hexane	ND	2.4	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #2 Run #3

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-006

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: Canister

Test Notes:

Date Collected: 2/14/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -9.34

Final Pressure (psig): 5.30

Container Dilution Factor: 3.73

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	1.9	
C ₄ as n-Butane	ND	1.9	
C ₅ as n-Pentane	ND	1.9	
C ₆ as n-Hexane	ND	1.9	
C ₆ + as n-Hexane	ND	3.7	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #3 Run #1

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-007

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: Canister

Test Notes:

Date Collected: 2/15/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.30 Final Pressure (psig): 4.55

Container Dilution Factor: 1.44

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.72	
C ₄ as n-Butane	ND	0.72	
C ₅ as n-Pentane	ND	0.72	
C ₆ as n-Hexane	ND	0.72	
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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #3 Run #2

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-008

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC00282

Date Collected: 2/15/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): 0.53 Final Pressure (psig): 4.89

Container Dilution Factor: 1.29

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.65	
C ₄ as n-Butane	ND	0.65	
C ₅ as n-Pentane	ND	0.65	
C ₆ as n-Hexane	ND	0.65	
C ₆ + as n-Hexane	2.0	1.3	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #3 Run #3

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-009

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Stephanie Reynoso

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC00286

Date Collected: 2/15/24

Date Received: 2/20/24

Date Analyzed: 2/23/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): 0.46 Final Pressure (psig): 4.70

Container Dilution Factor: 1.28

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.64	
C ₄ as n-Butane	ND	0.64	
C ₅ as n-Pentane	ND	0.64	
C ₆ as n-Hexane	ND	0.64	
C ₆ + as n-Hexane	ND	1.3	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Method Blank
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
ALS Sample ID: P240223-MB

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Stephanie Reynoso
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/23/24
Volume(s) Analyzed: 1.0 ml(s)

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P240223-DLCS

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890 II/GC8/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 2/23/24
 Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount		Result		% Recovery		ALS	RPD	RPD	Data
	LCS / DLCS	LCS	DLCS	LCS	DLCS	Acceptance	RPD	RPD	Qualifier	
	ppmV	ppmV	ppmV	LCS	DLCS	Limits		Limit		
Propane	984	1,100	1,120	112	114	92-120	2	6		
n-Butane	1,000	1,100	1,120	110	112	91-121	2	6		
n-Pentane	1,000	1,080	1,090	108	109	89-118	0.9	6		
n-Hexane	1,000	1,140	1,140	114	114	92-125	0	6		

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit # 1 Run #1
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-001

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC01555

Date Collected: 2/13/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -0.02 Final Pressure (psig): 4.68

Container Dilution Factor: 1.32

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.1	1.7	3.1	2.6	
74-85-1	Ethene	ND	0.91	ND	0.79	
74-84-0	Ethane	ND	0.97	ND	0.79	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #1 Run #2
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-002

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00527

Date Collected: 2/13/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): 0.45 Final Pressure (psig): 4.65

Container Dilution Factor: 1.28

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.7	ND	2.6	
74-85-1	Ethene	ND	0.88	ND	0.77	
74-84-0	Ethane	ND	0.94	ND	0.77	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #1 Run #3
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-003

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: Canister
 Test Notes:

Date Collected: 2/13/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -1.34 Final Pressure (psig): 4.60

Container Dilution Factor: 1.44

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.5	1.9	3.8	2.9	
74-85-1	Ethene	ND	0.99	ND	0.86	
74-84-0	Ethane	ND	1.1	ND	0.86	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #2 Run #1
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-004

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: Canister
 Test Notes:

Date Collected: 2/14/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -9.22 Final Pressure (psig): 4.72

Container Dilution Factor: 3.54

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	4.6	ND	7.1	
74-85-1	Ethene	ND	2.4	ND	2.1	
74-84-0	Ethane	ND	2.6	ND	2.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit #2 Run #2

Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701

ALS Sample ID: P2400701-005

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Stephanie Reynoso

Sampling Media: Canister

Test Notes:

Date Collected: 2/14/24

Date Received: 2/20/24

Date Analyzed: 2/27/24

Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -6.75 Final Pressure (psig): 4.60

Container Dilution Factor: 2.43

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	3.2	ND	4.9	
74-85-1	Ethene	ND	1.7	ND	1.5	
74-84-0	Ethane	ND	1.8	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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #2 Run #3
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-006

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: Canister
 Test Notes:

Date Collected: 2/14/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -9.34 Final Pressure (psig): 5.30

Container Dilution Factor: 3.73

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	4.9	ND	7.5	
74-85-1	Ethene	ND	2.6	ND	2.2	
74-84-0	Ethane	ND	2.8	ND	2.2	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #3 Run #1
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-007

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: Canister
 Test Notes:

Date Collected: 2/15/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -1.30 Final Pressure (psig): 4.55

Container Dilution Factor: 1.44

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.3	1.9	3.4	2.9	
74-85-1	Ethene	ND	0.99	ND	0.86	
74-84-0	Ethane	ND	1.1	ND	0.86	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #3 Run #2
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-008

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00282

Date Collected: 2/15/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): 0.53 Final Pressure (psig): 4.89

Container Dilution Factor: 1.29

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.1	1.7	3.2	2.6	
74-85-1	Ethene	ND	0.89	ND	0.77	
74-84-0	Ethane	ND	0.95	ND	0.77	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit #3 Run #3
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P2400701-009

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00286

Date Collected: 2/15/24
 Date Received: 2/20/24
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): 0.46 Final Pressure (psig): 4.70

Container Dilution Factor: 1.28

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.6	1.7	4.0	2.6	
74-85-1	Ethene	ND	0.88	ND	0.77	
74-84-0	Ethane	ND	0.94	ND	0.77	

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Method Blank
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P240227-MB

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result mg/m ³	MRL mg/m ³	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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: Duplicate Lab Control Sample
Client Project ID: Metro Vancouver W.T.E

ALS Project ID: P2400701
 ALS Sample ID: P240227-DLCS

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID
 Analyst: Stephanie Reynoso
 Sampling Media: 6.0 L Summa Canister
 Test Notes:

Date Collected: NA
 Date Received: NA
 Date Analyzed: 2/27/24
 Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount		Result			ALS		RPD	RPD Limit	Data Qualifier
		LCS / DLCS ppmV	LCS ppmV	DLCS ppmV	% Recovery LCS DLCS		Acceptance Limits				
74-82-8	Methane	1.52	1.96	1.87	129	123	70-130	5	15		
74-85-1	Ethene	1.51	1.47	1.49	97	99	70-130	2	15		
74-84-0	Ethane	1.50	1.48	1.48	99	99	70-130	0	15		



Your Project #: MVWTE
 Site#: C411309
 Site Location: BURNABY BC
 Your C.O.C. #: C411309-ONTV-01-01

Attention: CXI West

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

Report Date: 2024/03/05
 Report #: R8053961
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C451275

Received: 2024/02/21, 09:00

Sample Matrix: Tedlar Bag
 # Samples Received: 8

Analyses	Date		Laboratory Method	Analytical Method
	Quantity Extracted	Analyzed		
Nitrous Oxide	8	N/A	2024/03/01 CAM SOP-00203	GC/ECD

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your Project #: MVWTE
Site#: C411309
Site Location: BURNABY BC
Your C.O.C. #: C411309-ONTV-01-01

Attention: CXI West

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

Report Date: 2024/03/05
Report #: R8053961
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C451275

Received: 2024/02/21, 09:00

Encryption Key

Jade Browne
Project Manager Assistant - Air
05 Mar 2024 16:34:12

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

=====

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Bureau Veritas Job #: C451275
 Report Date: 2024/03/05

Bureau Veritas
 Client Project #: MVWTE
 Site Location: BURNABY BC

COMPRESSED GAS PARAMETERS (TEDLAR BAG)

Bureau Veritas ID		YKS884	YKS885	YKS886	YKS886		
Sampling Date		2024/02/13	2024/02/13	2024/02/13	2024/02/13		
COC Number		C411309-ONTV-01-01	C411309-ONTV-01-01	C411309-ONTV-01-01	C411309-ONTV-01-01		
	UNITS	CJJ457-UNIT 1 RUN 1	CJJ458-UNIT 1 RUN 2	CJJ459-UNIT 1 RUN 3	CJJ459-UNIT 1 RUN 3 Lab-Dup	RDL	QC Batch

Gas							
Nitrous Oxide	ppmv	0.6	1.9	0.9	0.8	0.1	9250828
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							

Bureau Veritas ID		YKS887	YKS888	YKS889	YKS890		
Sampling Date		2024/02/14	2024/02/14	2024/02/14	2024/02/15		
COC Number		C411309-ONTV-01-01	C411309-ONTV-01-01	C411309-ONTV-01-01	C411309-ONTV-01-01		
	UNITS	CJJ460-UNIT 2 RUN 1	CJJ461-UNIT 2 RUN 2	CJJ462-UNIT 2 RUN 3	CJJ463-UNIT 3 RUN 1	RDL	QC Batch

Gas							
Nitrous Oxide	ppmv	0.6	3.1	1.5	0.4	0.1	9250828
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

Bureau Veritas ID		YKS892		
Sampling Date		2024/02/15		
COC Number		C411309-ONTV-01-01		
	UNITS	CJJ465-UNIT 3 RUN 3	RDL	QC Batch
Gas				
Nitrous Oxide	ppmv	0.5	0.1	9250828
RDL = Reportable Detection Limit QC Batch = Quality Control Batch				



Bureau Veritas Job #: C451275
 Report Date: 2024/03/05

Bureau Veritas
 Client Project #: MVWTE
 Site Location: BURNABY BC

TEST SUMMARY

Bureau Veritas ID: YKS884
Sample ID: CJJ457-UNIT 1 RUN 1
Matrix: Tedlar Bag

Collected: 2024/02/13
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS885
Sample ID: CJJ458-UNIT 1 RUN 2
Matrix: Tedlar Bag

Collected: 2024/02/13
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS886
Sample ID: CJJ459-UNIT 1 RUN 3
Matrix: Tedlar Bag

Collected: 2024/02/13
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS886 Dup
Sample ID: CJJ459-UNIT 1 RUN 3
Matrix: Tedlar Bag

Collected: 2024/02/13
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS887
Sample ID: CJJ460-UNIT 2 RUN 1
Matrix: Tedlar Bag

Collected: 2024/02/14
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS888
Sample ID: CJJ461-UNIT 2 RUN 2
Matrix: Tedlar Bag

Collected: 2024/02/14
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS889
Sample ID: CJJ462-UNIT 2 RUN 3
Matrix: Tedlar Bag

Collected: 2024/02/14
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy



BUREAU
VERITAS

Bureau Veritas Job #: C451275
Report Date: 2024/03/05

Bureau Veritas
Client Project #: MVWTE
Site Location: BURNABY BC

TEST SUMMARY

Bureau Veritas ID: YKS890
Sample ID: CJJ463-UNIT 3 RUN 1
Matrix: Tedlar Bag

Collected: 2024/02/15
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy

Bureau Veritas ID: YKS892
Sample ID: CJJ465-UNIT 3 RUN 3
Matrix: Tedlar Bag

Collected: 2024/02/15
Shipped:
Received: 2024/02/21

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	9250828	N/A	2024/03/01	Marina Tsoy



BUREAU
VERITAS

Bureau Veritas Job #: C451275

Report Date: 2024/03/05

Bureau Veritas

Client Project #: MVWTE

Site Location: BURNABY BC

GENERAL COMMENTS

Results relate only to the items tested.



Bureau Veritas Job #: C451275
 Report Date: 2024/03/05

QUALITY ASSURANCE REPORT

Bureau Veritas
 Client Project #: MVWTE
 Site Location: BURNABY BC

QC Batch	Parameter	Date	Method Blank		RPD	
			Value	UNITS	Value (%)	QC Limits
9250828	Nitrous Oxide	2024/03/01	<0.1	ppmv	NC	N/A

N/A = Not Applicable
 Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
 Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
 NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

Bureau Veritas Job #: C451275

Report Date: 2024/03/05

Bureau Veritas

Client Project #: MVWTE

Site Location: BURNABY BC

VALIDATION SIGNATURE PAGE

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

Tom Mitchell, B.Sc, Supervisor, Compressed Gases

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APPENDIX - D

COMPUTER GENERATED RESULTS

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

Date: 12-Feb-24
Run: 1 - Particulate / Metals
Run Time: 12:19 - 14:20

Concentrations:

Particulate	1.47 mg/dscm	0.00064 gr/dscf
	0.83 mg/Acm	0.00036 gr/Acf
	1.20 mg/dscm (@ 11% O2)	0.00053 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.097 Kg/hr	0.214 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1101 dscm/min	38892 dscf/min
	18.35 dscm/sec	648 dscf/sec
	1946 Acm/min	68729 Acf/min

Velocity	12.735 m/sec	41.78 f/sec
-----------------	--------------	-------------

Temperature	145.6 oC	294.1 oF
--------------------	----------	----------

Moisture	15.7 %	
-----------------	--------	--

Gas Analysis	8.8 % O2	
	10.9 % CO2	

30.098 Mol. Wt (g/gmole) Dry
28.200 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6492 dscm	93.556 dscf
Sample Time	120.0 minutes	
Isokineticity	104.1 %	

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

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

Date: 12-Feb-24
 Run: 1 - Particulate / Metals
 Run Time: 11:10 - 13:15

Control Unit (Y) 0.9905
 Nozzle Diameter (in.) 0.3112
 Pitot Factor 0.8373
 Baro. Press. (in. Hg) 30.12
 Static Press. (in. H2O) -19.50
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00380
 Washings (grams) 0.00010
 Traverse 1
 Traverse 2
 Total (grams) 0.00390

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 11.00 8.70
 Traverse 2 10.83 8.87
 10.92 8.79

Condensate Collection:
 Impinger 1 222.0
 Impinger 2 93.0
 Impinger 3 30.0
 Impinger 4 5.0
 Impinger 5 3.0
 Impinger 6 3.0
 Gel 14.0
 Gain (grams) 370.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1										
	0.0	93.343								
1	5.0	96.980	0.33	1.66	60	60	6	295	1.5	103.9
2	10.0	100.730	0.35	1.76	60	60	6	295	4.7	104.1
3	15.0	104.690	0.39	1.95	61	61	7	297	8.4	104.1
4	20.0	108.720	0.40	2.01	62	62	7	297	12.5	104.4
5	25.0	112.890	0.43	2.16	62	62	7	296	17.7	104.2
6	30.0	117.000	0.42	2.11	62	62	7	295	25.2	103.8
7	35.0	120.980	0.39	1.97	63	63	8	295	45.6	104.1
8	40.0	124.920	0.38	1.92	64	64	8	295	53.2	104.2
9	45.0	128.930	0.39	1.97	64	64	8	294	58.3	104.6
10	50.0	132.770	0.36	1.83	65	65	8	294	62.5	104.0
11	55.0	136.480	0.34	1.72	65	65	8	294	66.1	103.4
12	60.0	140.060	0.31	1.58	66	66	8	292	69.4	104.1
Traverse 2										
	0.0	140.060								
1	5.0	144.120	0.40	2.03	67	67	7	295	1.5	104.1
2	10.0	148.140	0.39	1.98	67	67	7	296	4.7	104.4
3	15.0	152.460	0.45	2.29	69	69	7	296	8.4	104.2
4	20.0	156.540	0.40	2.04	69	69	7	297	12.5	104.3
5	25.0	160.720	0.42	2.14	70	70	8	296	17.7	104.1
6	30.0	164.800	0.40	2.04	70	70	8	296	25.2	104.1
7	35.0	168.680	0.36	1.85	70	70	8	293	45.6	104.1
8	40.0	172.340	0.32	1.64	70	70	7	291	53.2	103.9
9	45.0	175.950	0.31	1.60	71	71	7	290	58.3	103.9
10	50.0	179.500	0.30	1.55	71	71	7	290	62.5	103.8
11	55.0	182.980	0.29	1.49	70	70	7	290	66.1	103.7
12	60.0	186.420	0.28	1.44	70	70	7	289	69.4	104.2
Average:			0.367	1.864	66.2	66.2	7.3	294.1		104.1

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

Date: 13-Feb-24
Run: 2 - Particulate / Metals
Run Time: 09:16 - 11:18

Concentrations:

Particulate	1.47 mg/dscm	0.00064 gr/dscf
	0.84 mg/Acm	0.00037 gr/Acf
	1.34 mg/dscm (@ 11% O2)	0.00059 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.101 Kg/hr	0.222 lb/hr
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Flue Gas Characteristics:

Flow	1142 dscm/min	40317 dscf/min
	19.03 dscm/sec	672 dscf/sec
	1987 Acm/min	70187 Acf/min

Velocity	13.005 m/sec	42.67 f/sec
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Temperature	150.3 oC	302.5 oF
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Moisture	13.4 %
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Gas Analysis	10.1 % O2 9.6 % CO2
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29.936 Mol. Wt (g/gmole) Dry
28.340 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.8579 dscm	100.925 dscf
Sample Time	120.0 minutes	
Isokineticity	101.7 %	

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

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

Date: 13-Feb-24
Run: 2 - Particulate / Metals
Run Time: 09:16 - 11:18

Control Unit (Y)	0.9905	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3212	Filter (grams) 0.00350	CO2 O2	Impinger 1 215.0
Pitot Factor	0.8477	Washings (grams) 0.00070	9.83 9.77	Impinger 2 78.0
Baro. Press. (in. Hg)	30.09		9.33 10.37	Impinger 3 6.0
Static Press. (in. H2O)	-19.50	Total (grams) 0.00420		Impinger 4 5.0
Stack Height (ft)	30			Impinger 5 2.0
Stack Diameter (in.)	70.90			Impinger 6 5.0
Stack Area (sq.ft.)	27.417			Gel 20.0
Minutes Per Reading	5.0		9.58 10.07	Gain (grams) 331.0
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	186.455								
1	5.0	190.330	0.33	1.89	55	55	5.5	302	1.5	101.6
2	10.0	194.280	0.34	1.95	57	57	6	304	4.7	101.8
3	15.0	197.920	0.29	1.66	57	57	6	303	8.4	101.5
4	20.0	201.690	0.31	1.78	57	57	6	303	12.5	101.7
5	25.0	205.860	0.38	2.18	58	58	6.5	306	17.7	101.7
6	30.0	210.070	0.39	2.23	58	58	6	307	25.2	101.4
7	35.0	214.760	0.48	2.76	59	59	6	306	45.6	101.7
8	40.0	219.650	0.52	2.99	60	60	6	306	53.2	101.7
9	45.0	224.430	0.49	2.84	63	63	6	304	58.3	101.7
10	50.0	229.180	0.48	2.80	63	63	6	303	62.5	102.0
11	55.0	233.610	0.42	2.44	63	63	6	302	66.1	101.5
12	60.0	237.720	0.36	2.10	63	63	6	301	69.4	101.6
Traverse 2	0.0	237.720								
1	5.0	241.620	0.32	1.87	64	64	6	300	1.5	101.9
2	10.0	245.650	0.34	1.99	66	66	6	301	4.7	101.9
3	15.0	249.320	0.28	1.64	67	67	6	300	8.4	101.9
4	20.0	253.480	0.36	2.12	67	67	6	299	12.5	101.9
5	25.0	257.680	0.37	2.18	67	67	6	299	17.7	101.5
6	30.0	261.990	0.39	2.29	67	67	6	300	25.2	101.6
7	35.0	266.360	0.40	2.35	68	68	6	301	45.6	101.6
8	40.0	270.790	0.41	2.41	68	68	6	300	53.2	101.7
9	45.0	274.820	0.34	2.00	69	69	6	301	58.3	101.3
10	50.0	278.790	0.33	1.94	69	69	6	303	62.5	101.4
11	55.0	282.650	0.31	1.82	69	69	6	304	66.1	101.8
12	60.0	286.380	0.29	1.70	70	70	6	305	69.4	101.6
Average:			0.372	2.164	63.5	63.5	6.0	302.5		101.7

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

Date: 13-Feb-24
Run: 3 - Particulate / Metals
Run Time: 11:45 - 13:47

Concentrations:

Particulate	1.7 mg/dscm	0.0007 gr/dscf
	1.0 mg/Acm	0.0004 gr/Acf
	1.6 mg/dscm (@ 11% O2)	0.0007 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.130 Kg/hr	0.287 lb/hr
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Flue Gas Characteristics:

Flow	1283 dscm/min	45298 dscf/min
	21.38 dscm/sec	755 dscf/sec
	2238 Acmm/min	79027 Acf/min

Velocity	14.643 m/sec	48.04 f/sec
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Temperature	152.3 oC	306.1 oF
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Moisture	12.9 %	
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Gas Analysis	10.2 % O2	
	9.3 % CO2	

29.902 Mol. Wt (g/gmole) Dry
28.370 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	3.1937 dscm	112.786 dscf
Sample Time	120.0 minutes	
Isokineticity	101.1 %	

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

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

Date: 13-Feb-24
Run: 3 - Particulate / Metals
Run Time: 11:45 - 13:47

Control Unit (Y) 0.9905
Nozzle Diameter (in.) 0.3212
Pitot Factor 0.8477
Baro. Press. (in. Hg) 30.00
Static Press. (in. H2O) -19.50
Stack Height (ft) 30
Stack Diameter (in.) 70.90
Stack Area (sq.ft.) 27.417
Minutes Per Reading 5.0
Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00370
 Washings (grams) 0.00170
Total (grams) 0.00540

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.67 10.00
 Traverse 2 9.00 10.43
9.34 10.22

Condensate Collection:
 Impinger 1 119.0
 Impinger 2 143.0
 Impinger 3 48.0
 Impinger 4 15.0
 Impinger 5 18.0
 Impinger 6 -6.0
 Gel 17.0
Gain (grams) 354.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	286.920								
1	5.0	291.480	0.44	2.57	64	64	6	299	1.5	101.1
2	10.0	296.080	0.45	2.61	65	65	6	308	4.7	101.2
3	15.0	299.840	0.30	1.74	65	65	6	306	1.5	101.0
4	20.0	303.480	0.28	1.63	65	65	6	305	4.7	101.1
5	25.0	307.720	0.38	2.22	65	65	6	302	17.7	101.1
6	30.0	312.080	0.40	2.33	65	65	8	302	25.2	101.3
7	35.0	317.120	0.54	3.14	64	64	8	303	45.6	101.3
8	40.0	322.240	0.56	3.24	65	65	8	308	53.2	101.2
9	45.0	327.250	0.54	3.13	65	65	7	308	58.3	100.8
10	50.0	332.340	0.55	3.19	66	66	7	308	62.5	101.3
11	55.0	336.790	0.42	2.44	67	67	7	309	66.1	101.0
12	60.0	340.900	0.36	2.10	66	66	7	305	69.4	100.6
Traverse 2	0.0	340.900								
1	5.0	345.720	0.49	2.85	67	67	8	308	1.5	101.3
2	10.0	350.580	0.50	2.91	68	68	8	309	4.7	101.0
3	15.0	355.580	0.53	3.08	67	67	9	308	8.4	101.1
4	20.0	360.350	0.48	2.79	67	67	9	307	12.5	101.2
5	25.0	365.220	0.50	2.91	67	67	9	307	17.7	101.3
6	30.0	370.080	0.50	2.91	67	67	9	306	25.2	101.0
7	35.0	375.360	0.59	3.44	68	68	9	308	45.6	101.1
8	40.0	380.480	0.55	3.21	69	69	9	307	53.2	101.2
9	45.0	385.430	0.52	3.04	68	68	9	306	58.3	100.7
10	50.0	390.320	0.50	2.93	69	69	9	305	62.5	101.2
11	55.0	395.040	0.47	2.74	68	68	9	306	66.1	101.0
12	60.0	399.400	0.40	2.33	68	68	9	307	69.4	101.1
Average:			0.469	2.728	66.5	66.5	7.8	306.1		101.1

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

Sample Type: HF				
Parameter		Test 1	Test 2	Test 3
Test Date		13-Feb-24	13-Feb-24	13-Feb-24
Test Time		09:43-10:43	10:52-11:52	12:00-13:00
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.09	30.09	30.09
DGM Factor	(Y)	1.0172	1.0172	1.0172
Initial Reading	(m ³)	160.104	160.878	161.554
Final Reading	(m ³)	160.869	161.549	162.171
Temp. Outlet	(Avg. oF)	72.5	73.0	76.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.78	0.68	0.62
HF	(mg)	0.021	0.032	0.021
Oxygen	(Vol. %)	8.8	10.1	10.2
HF	(mg/Sm³)	0.027	0.046	0.034
HF	(mg/Sm³ @ 11% O2)	0.022	0.042	0.031
Moisture	(Vol. %)	13.4	13.4	12.9

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		13-Feb-24	13-Feb-24	13-Feb-24
Test Time		09:43-10:43	10:52-11:52	12:00-13:00
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.09	30.09	30.09
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	279.900	280.426	280.955
Final Reading	(m ³)	280.421	280.949	281.484
Temp. Outlet	(Avg. oF)	52.0	52.5	53.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.56	0.56	0.57
NH ₃	(mg)	1.3	2.5	3.2
Oxygen	(Vol. %)	8.8	10.1	10.2
NH₃	(mg/Sm³)	2.4	4.5	5.6
NH₃	(mg/Sm³ @ 11% O2)	1.9	4.1	5.2
Moisture	(Vol. %)	13.4	13.4	12.9

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

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

Date: 13-Feb-24
Run: 1 - Particulate / Metals
Run Time: 11:29 - 13:31

Concentrations:

Particulate	0.5 mg/dscm	0.0002 gr/dscf
	0.3 mg/Acm	0.0001 gr/Acf
	0.5 mg/dscm (@ 11% O2)	0.0002 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.036 Kg/hr	0.079 lb/hr
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Flue Gas Characteristics:

Flow	1111 dscm/min	39228 dscf/min
	18.51 dscm/sec	654 dscf/sec
	1972 Acm/min	69648 Acf/min

Velocity	12.905 m/sec	42.34 f/sec
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Temperature	154.3 oC	309.7 oF
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Moisture	14.4 %
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Gas Analysis	10.3 % O2 10.1 % CO2
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30.021 Mol. Wt (g/gmole) Dry
28.294 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5122 dscm	88.717 dscf
Sample Time	120.0 minutes	
Isokineticity	101.4 %	

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

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

Date: 13-Feb-24
 Run: 1 - Particulate / Metals
 Run Time: 11:29 - 13:31

Control Unit (Y) 0.9886
 Nozzle Diameter (in.) 0.3058
 Pitot Factor 0.8373
 Baro. Press. (in. Hg) 30.09
 Static Press. (in. H2O) -19.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00130
 Total (grams) 0.00135

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.00 10.40
 Traverse 2 10.10 10.24
 10.05 10.32

Condensate Collection:
 Impinger 1 128.0
 Impinger 2 110.0
 Impinger 3 22.0
 Impinger 4 14.0
 Impinger 5 20.0
 Impinger 6 2.0
 Gel 20.2
 Gain (grams) 316.2

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	597.708								
1	5.0	602.190	0.57	2.72	54	54	2.5	310	1.5	101.6
2	10.0	606.590	0.55	2.62	54	54	2.5	309	4.7	101.5
3	15.0	610.780	0.50	2.38	54	54	3.5	310	8.4	101.4
4	20.0	614.850	0.47	2.24	54	54	3.5	310	12.5	101.5
5	25.0	618.970	0.48	2.29	55	55	3.5	310	17.7	101.5
6	30.0	622.690	0.39	1.87	56	56	3.5	309	25.2	101.3
7	35.0	626.160	0.34	1.63	56	56	5	310	45.6	101.2
8	40.0	629.540	0.32	1.54	58	58	5	310	53.2	101.2
9	45.0	632.870	0.31	1.49	58	58	4	310	58.3	101.3
10	50.0	635.480	0.19	0.91	59	59	4	310	62.5	101.1
11	55.0	638.020	0.18	0.87	59	59	4	310	66.1	101.1
12	60.0	640.640	0.19	0.92	60	60	4	310	69.4	101.3
Traverse 2	0.0	640.640								
1	5.0	644.140	0.34	1.64	59	59	4	308	1.5	101.4
2	10.0	647.540	0.32	1.54	60	60	4	309	4.7	101.4
3	15.0	650.940	0.32	1.54	60	60	4	309	8.4	101.4
4	20.0	654.230	0.30	1.45	60	60	4	309	12.5	101.3
5	25.0	657.730	0.34	1.64	60	60	4	309	17.7	101.3
6	30.0	662.600	0.66	3.18	60	60	4	310	25.2	101.6
7	35.0	667.320	0.62	2.99	60	60	4.5	310	45.6	101.5
8	40.0	672.120	0.64	3.08	60	60	4.5	310	53.2	101.6
9	45.0	676.850	0.62	2.99	61	61	5	310	58.3	101.5
10	50.0	679.600	0.21	1.01	61	61	5	310	62.5	101.0
11	55.0	682.220	0.19	0.92	61	61	3.5	310	66.1	101.1
12	60.0	684.912	0.20	0.96	61	61	3.5	311	69.4	101.3
Average:			0.385	1.851	58.3	58.3	4.0	309.7		101.4

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

Date: 14-Feb-24
Run: 2 - Particulate / Metals
Run Time: 08:38 - 10:46

Concentrations:

Particulate	0.47 mg/dscm	0.00020 gr/dscf
	0.26 mg/Acm	0.00012 gr/Acf
	0.45 mg/dscm (@ 11% O2)	0.00020 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.032 Kg/hr	0.070 lb/hr
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Flue Gas Characteristics:

Flow	1140 dscm/min	40263 dscf/min
	19.00 dscm/sec	671 dscf/sec
	2014 Acn/min	71128 Acf/min

Velocity	13.179 m/sec	43.24 f/sec
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Temperature	151.3 oC	304.4 oF
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Moisture	14.0 %
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Gas Analysis	10.6 % O2 9.8 % CO2
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29.998 Mol. Wt (g/gmole) Dry
28.312 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.4713 dscm	87.275 dscf
Sample Time	120.0 minutes	
Isokineticity	100.7 %	

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

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

Date: 14-Feb-24
 Run: 2 - Particulate / Metals
 Run Time: 08:38 - 10:46

Control Unit (Y) 0.9886
 Nozzle Diameter (in.) 0.3058
 Pitot Factor 0.8375
 Baro. Press. (in. Hg) 29.93
 Static Press. (in. H2O) -19.00
 Stack Height (ft) 29.93
 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) 0.00110
 Total (grams) 0.00115

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.75 10.68
 Traverse 2 9.90 10.60
 9.83 10.64

Condensate Collection:
 Impinger 1 207.0
 Impinger 2 74.0
 Impinger 3 0.0
 Impinger 4 5.0
 Impinger 5 3.0
 Impinger 6 -2.0
 Gel 16.1
 Gain (grams) 303.1

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	685.487								
1	5.0	689.780	0.54	2.54	45	45	6	306	1.5	100.9
2	10.0	693.990	0.52	2.45	45	45	6	306	4.7	100.8
3	15.0	698.240	0.53	2.49	45	45	6	306	8.4	100.8
4	20.0	702.300	0.48	2.26	46	46	6	306	12.5	100.9
5	25.0	706.450	0.50	2.36	47	47	6	306	17.7	100.9
6	30.0	710.440	0.46	2.18	49	49	6	303	25.2	100.5
7	35.0	713.720	0.31	1.47	50	50	5	306	45.6	100.5
8	40.0	716.900	0.29	1.38	50	50	5	303	53.2	100.5
9	45.0	719.980	0.27	1.29	51	51	5	303	58.3	100.7
10	50.0	723.060	0.27	1.29	51	51	5	303	62.5	100.7
11	55.0	725.710	0.20	0.96	52	52	4.5	304	66.1	100.4
12	60.0	728.300	0.19	0.91	52	52	4.5	304	69.4	100.7
Traverse 2	0.0	728.300								
1	5.0	731.460	0.28	1.35	54	54	5	301	1.5	100.7
2	10.0	734.990	0.35	1.69	55	55	5	303	4.7	100.6
3	15.0	738.620	0.37	1.78	55	55	5	303	8.4	100.7
4	20.0	742.160	0.35	1.61	56	56	5	303	12.5	100.7
5	25.0	745.430	0.30	1.45	56	56	5	304	17.7	100.5
6	30.0	748.760	0.31	1.49	56	56	5	305	25.2	100.8
7	35.0	753.040	0.51	2.46	57	57	6.5	304	45.6	100.9
8	40.0	757.910	0.66	3.19	57	57	6.5	304	53.2	101.1
9	45.0	762.740	0.65	3.14	58	58	8	305	58.3	100.9
10	50.0	767.470	0.62	3.00	59	59	8	306	62.5	101.1
11	55.0	770.750	0.30	1.45	58	58	8	306	66.1	100.6
12	60.0	773.930	0.28	1.35	59	59	8	306	69.4	100.7
Average:			0.398	1.898	52.6	52.6	5.8	304.4		100.7

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

Date: 14-Feb-24
Run: 3 - Particulate / Metals
Run Time: 10:56 - 14:18

Concentrations:

Particulate	0.9 mg/dscm	0.0004 gr/dscf
	0.5 mg/Acm	0.0002 gr/Acf
	0.8 mg/dscm (@ 11% O2)	0.0004 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.06 Kg/hr	0.141 lb/hr
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Flue Gas Characteristics:

Flow	1189 dscm/min	41988 dscf/min
	19.82 dscm/sec	700 dscf/sec
	2022 Acm/min	71416 Acf/min

Velocity	13.233 m/sec	43.41 f/sec
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Temperature	152.8 oC	307.1 oF
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Moisture	14.6 %
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Gas Analysis	10.1 % O2
	10.0 % CO2

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

Sample Parameters:

Sample Volume	2.6266 dscm	92.758 dscf
Sample Time	120.0 minutes	
Isokineticity	98.5 %	

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

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

Date: 14-Feb-24
 Run: 3 - Particulate / Metals
 Run Time: 10:56 - 14:18

Control Unit (Y) 0.9886
 Nozzle Diameter (in.) 0.3063
 Pitot Factor 0.8477
 Baro. Press. (in. Hg) 29.93
 Static Press. (in. H2O) -0.19
 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) 0.00230
 Total (grams) 0.0023

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.00 10.05
 Traverse 2 10.00 10.08
 10.00 10.07

Condensate Collection:
 Impinger 1 195.0
 Impinger 2 100.0
 Impinger 3 10.0
 Impinger 4 5.0
 Impinger 5 3.0
 Impinger 6 8.0
 Gel 14.7
 Gain (grams) 335.7

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	775.564								
1	5.0	779.190	0.35	1.75	60	60	5	305	1.5	99.1
2	10.0	782.600	0.31	1.55	60	60	5	305	4.7	99.0
3	15.0	785.960	0.30	1.50	60	60	5.5	306	8.4	99.2
4	20.0	789.430	0.32	1.60	61	61	5.5	306	12.5	99.0
5	25.0	793.060	0.35	1.75	61	61	6	306	17.7	99.1
6	30.0	797.620	0.55	2.76	62	62	6	306	25.2	99.3
7	35.0	802.620	0.66	3.31	62	62	8	304	45.6	99.4
8	40.0	807.810	0.71	3.57	62	62	8	305	53.2	99.6
9	45.0	812.970	0.70	3.52	63	63	9.5	306	58.3	99.6
10	50.0	816.970	0.42	2.12	64	64	9.5	306	62.5	99.2
11	55.0	820.410	0.31	1.56	64	64	7	306	66.1	99.1
12	60.0	823.680	0.28	1.41	64	64	7	306	69.4	99.1
Traverse 2	0.0	823.680								
1	5.0	828.020	0.50	2.51	60	60	9	304	1.5	99.3
2	10.0	832.390	0.51	2.55	60	60	9	307	4.7	99.2
3	15.0	836.630	0.48	2.39	60	60	8	308	8.4	99.3
4	20.0	840.820	0.47	2.34	60	60	8	308	12.5	99.1
5	25.0	845.150	0.50	2.50	61	61	8	308	17.7	99.2
6	30.0	849.350	0.47	2.34	61	61	8	309	25.2	99.2
7	35.0	852.710	0.30	1.50	61	61	7	310	45.6	99.2
8	40.0	855.960	0.28	1.40	62	62	7	310	53.2	99.1
9	45.0	859.150	0.27	1.35	62	62	6	310	58.3	99.1
10	50.0	862.034	0.26	1.30	62	62	6	310	62.5	91.3
11	55.0	864.930	0.27	1.35	62	62	5	310	66.1	90.0
12	60.0	867.750	0.21	1.05	63	63	5	310	69.4	99.1
Average:			0.408	2.041	61.5	61.5	3.0	307.1		98.5

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

Sample Type: HF				
Parameter		Test 1	Test 2	Test 3
Test Date		14-Feb-24	14-Feb-24	14-Feb-24
Test Time		09:09-10:09	10:27-11:27	13:20-14:20
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.93	29.93	29.93
DGM Factor	(Y)	1.0172	1.0172	1.0172
Initial Reading	(m ³)	162.182	162.785	163.326
Final Reading	(m ³)	162.781	163.318	163.794
Temp. Outlet	(Avg. oF)	70.0	76.5	72.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.60795	0.53501	0.47280
HF	(mg)	0.032	0.032	0.01
Oxygen	(Vol. %)	10.3	10.6	10.1
HF	(mg/Sm³)	0.052	0.059	0.01
HF	(mg/Sm³ @ 11% O2)	0.049	0.057	0.01
Moisture (isokinetic)	(Vol. %)	14.4	14.0	14.6

*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		14-Feb-24	14-Feb-24	14-Feb-24
Test Time		09:09-10:09	10:27-11:27	13:20-14:20
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.93	29.93	29.93
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	281.503	282.010	282.537
Final Reading	(m ³)	282.005	282.532	283.035
Temp. Outlet	(Avg. oF)	47.5	54.5	59.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.54226	0.55575	0.52498
NH ₃	(mg)	0.9	1.6	1.0
Oxygen	(Vol. %)	10.3	10.6	10.1
NH₃	(mg/Sm³)	1.6	3.0	1.9
NH₃	(mg/Sm³ @ 11% O2)	1.5	2.9	1.7
Moisture (isokinetic)	(Vol. %)	14.4	14.0	14.6

*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

Date: 14-Feb-24
Run: 1 - Particulate / Metals
Run Time: 13:39 - 15:44

Concentrations:

Particulate	1.43 mg/dscm	0.00063 gr/dscf
	0.79 mg/Acm	0.00034 gr/Acf
	1.20 mg/dscm (@ 11% O2)	0.00053 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.095 Kg/hr	0.210 lb/hr
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Flue Gas Characteristics:

Flow	1105 dscm/min	39019 dscf/min
	18.41 dscm/sec	650 dscf/sec
	2018 Acm/min	71256 Acf/min

Velocity	13.203 m/sec	43.32 f/sec
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Temperature	155.5 oC	311.9 oF
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Moisture	15.9 %	
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Gas Analysis	9.1 % O2	
	10.9 % CO2	

30.108 Mol. Wt (g/gmole) Dry
28.188 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	3.2777 dscm	115.752 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
 Jobsite: WTE (Burnaby, B.C)
 Source: Unit 3

Date: 14-Feb-24
 Run: 1 - Particulate / Metals
 Run Time: 13:39 - 15:44

Control Unit (Y) 1.0089
 Nozzle Diameter (in.) 0.3473
 Pitot Factor 0.8477
 Baro. Press. (in. Hg) 29.87
 Static Press. (in. H2O) -19.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00250
 Washings (grams) 0.00220
 Total (grams) 0.00470

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.80 8.83
 Traverse 2 11.00 9.37
 10.90 9.10

Condensate Collection:
 Impinger 1 245.0
 Impinger 2 138.0
 Impinger 3 58.0
 Impinger 4 5.0
 Impinger 5 5.0
 Impinger 6 -1.0
 Gel 13.6
 Gain (grams) 463.6

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	451.933								
1	5.0	455.850	0.26	2.45	58	58	4	303	1.5	102.7
2	10.0	459.910	0.28	2.63	58	58	4	306	4.7	102.8
3	15.0	463.890	0.27	2.54	58	58	4	307	8.4	102.7
4	20.0	467.720	0.25	2.35	58	58	4	307	12.5	102.7
5	25.0	471.780	0.28	2.63	59	59	4	308	17.7	102.8
6	30.0	476.380	0.36	3.37	59	59	4	310	25.2	103.0
7	35.0	481.970	0.53	4.98	60	60	5	310	45.6	103.4
8	40.0	487.400	0.50	4.69	60	60	5	311	53.2	103.4
9	45.0	492.730	0.48	4.51	62	62	5	313	58.3	103.3
10	50.0	497.720	0.42	3.94	62	62	5	313	62.5	103.2
11	55.0	502.650	0.41	3.85	63	63	6	314	66.1	103.1
12	60.0	507.410	0.38	3.58	64	64	6	314	69.4	103.1
Traverse 2	0.0	507.410								
1	5.0	512.550	0.44	4.16	65	65	6	312	1.5	103.3
2	10.0	517.920	0.48	4.54	66	66	6	313	4.7	103.3
3	15.0	523.400	0.50	4.73	66	66	6	313	8.4	103.3
4	20.0	528.890	0.50	4.73	67	67	6	314	12.5	103.4
5	25.0	534.210	0.47	4.45	67	67	6	314	17.7	103.2
6	30.0	539.310	0.43	4.07	68	68	6	315	25.2	103.2
7	35.0	544.220	0.40	3.79	68	68	6	315	45.6	103.0
8	40.0	548.820	0.35	3.32	68	68	6	315	53.2	103.0
9	45.0	553.290	0.33	3.13	69	69	6	315	58.3	102.9
10	50.0	557.400	0.28	2.66	68	68	6	314	62.5	102.7
11	55.0	561.290	0.25	2.37	68	68	6	315	66.1	102.8
12	60.0	564.930	0.22	2.08	68	68	5	315	69.4	102.5
Average:			0.378	3.565	63.7	63.7	5.3	311.9		103.0

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

Date: 15-Feb-24
Run: 2 - Particulate / Metals
Run Time: 08:41 - 10:42

Concentrations:

Particulate	2.61 mg/dscm	0.00114 gr/dscf
	1.47 mg/Acm	0.00064 gr/Acf
	2.42 mg/dscm (@ 11% O2)	0.00106 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.176 Kg/hr	0.389 lb/hr
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Flue Gas Characteristics:

Flow	1125 dscm/min	39718 dscf/min
	18.74 dscm/sec	662 dscf/sec
	2002 Acm/min	70708 Acf/min

Velocity	13.101 m/sec	42.98 f/sec
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Temperature	156.8 oC	314.3 oF
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Moisture	13.6 %	
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Gas Analysis	10.2 % O2	
	10.0 % CO2	

30.001 Mol. Wt (g/gmole) Dry
28.368 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5259 dscm	89.203 dscf
Sample Time	120.0 minutes	
Isokineticity	100.7 %	

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

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

Date: 15-Feb-24
 Run: 2 - Particulate / Metals
 Run Time: 08:41 - 10:42

Control Unit (Y) 1.0089
 Nozzle Diameter (in.) 0.3058
 Pitot Factor 0.8375
 Baro. Press. (in. Hg) 29.93
 Static Press. (in. H2O) -19.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00190
 Washings (grams) 0.00470
 Traverse 1
 Traverse 2
 Total (grams) 0.00660

Gas Analysis (Vol. %):
 CO2 O2
 9.90 10.05
 10.00 10.40
 9.95 10.23

Condensate Collection:
 Impinger 1 215.0
 Impinger 2 76.0
 Impinger 3 -6.0
 Impinger 4 0.0
 Impinger 5 2.0
 Impinger 6 -1.0
 Gel 12.5
 Gain (grams) 298.5

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	565.215								
1	5.0	568.520	0.32	1.74	57	57	5.5	317	1.5	100.7
2	10.0	571.920	0.34	1.84	57	57	5.5	317	4.7	100.5
3	15.0	575.220	0.32	1.74	57	57	8	316	8.4	100.5
4	20.0	578.520	0.32	1.73	56	56	8	316	12.5	100.7
5	25.0	581.930	0.34	1.85	58	58	8	315	17.7	100.5
6	30.0	586.440	0.59	3.22	59	59	8	315	25.2	101.0
7	35.0	591.390	0.71	3.89	59	59	10.5	312	45.6	101.0
8	40.0	596.190	0.67	3.66	59	59	10.5	314	53.2	100.9
9	45.0	601.180	0.72	3.95	60	60	12	313	58.3	101.0
10	50.0	604.760	0.37	2.03	60	60	12	314	62.5	100.7
11	55.0	607.330	0.19	1.04	62	62	8	314	66.1	100.3
12	60.0	609.970	0.20	1.10	62	62	8	314	69.4	100.4
Traverse 2	0.0	609.970								
1	5.0	614.280	0.53	2.92	63	63	10.5	314	1.5	100.9
2	10.0	618.500	0.51	2.81	63	63	10.5	314	4.7	100.7
3	15.0	622.770	0.52	2.86	63	63	11	314	8.4	100.9
4	20.0	627.120	0.54	2.97	63	63	11	314	12.5	100.9
5	25.0	631.180	0.47	2.59	64	64	11	315	17.7	100.8
6	30.0	634.790	0.37	2.05	65	65	11	314	25.2	100.6
7	35.0	638.350	0.36	1.99	65	65	8	314	45.6	100.6
8	40.0	641.320	0.25	1.38	65	65	8	314	53.2	100.5
9	45.0	644.110	0.22	1.22	66	66	6	314	58.3	100.4
10	50.0	646.830	0.21	1.16	66	66	6	315	62.5	100.3
11	55.0	649.490	0.20	1.11	66	66	5	314	66.1	100.4
12	60.0	652.093	0.19	1.06	67	67	5	310	69.4	100.3
Average:			0.394	2.163	61.8	61.8	8.6	314.3		100.7

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

Date: 15-Feb-24
Run: 3 - Particulate / Metals
Run Time: 10:46-12:47

Concentrations:

Particulate	1.64 mg/dscm	0.00072 gr/dscf
	0.90 mg/Acm	0.00039 gr/Acf
	1.53 mg/dscm (@ 11% O2)	0.00067 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.110 Kg/hr	0.243 lb/hr
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Flue Gas Characteristics:

Flow	1121 dscm/min	39572 dscf/min
	18.68 dscm/sec	660 dscf/sec
	2042 Acm/min	72107 Acf/min

Velocity	13.361 m/sec	43.83 f/sec
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Temperature	156.8 oC	314.3 oF
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Moisture	15.6 %	
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Gas Analysis	10.3 % O2	
	10.0 % CO2	

30.008 Mol. Wt (g/gmole) Dry
28.135 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.4390 dscm	86.133 dscf
Sample Time	120.0 minutes	
Isokineticity	101.1 %	

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

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

Date: 15-Feb-24
 Run: 3 - Particulate / Metals
 Run Time: 10:46-12:47

Control Unit (Y)	1.0089	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3063	Filter (grams) 0.00220	CO2	Impinger 1 250.0
Pitot Factor	0.8477	Washings (grams) 0.00180	O2	Impinger 2 69.0
Baro. Press. (in. Hg)	29.93		Traverse 1 10.00 10.30	Impinger 3 6.0
Static Press. (in. H2O)	-19.00		Traverse 2 9.95 10.30	Impinger 4 0.0
Stack Height (ft)	30	Total (grams) 0.00400		Impinger 5 3.0
Stack Diameter (in.)	70.90			Impinger 6 -2.0
Stack Area (sq.ft.)	27.417			Gel 12.2
Minutes Per Reading	5.0		9.98 10.30	Gain (grams) 338.2
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	652.608								
1	5.0	656.690	0.47	2.60	66	66	4.5	314	1.5	101.3
2	10.0	660.770	0.47	2.60	66	66	4.5	314	4.7	101.2
3	15.0	664.850	0.47	2.60	66	66	6	314	8.4	101.2
4	20.0	668.970	0.48	2.65	66	66	6	316	12.5	101.3
5	25.0	673.040	0.47	2.60	66	66	6	316	17.7	101.1
6	30.0	676.980	0.44	2.43	66	66	6	316	25.2	101.1
7	35.0	680.500	0.35	1.94	66	66	6	315	45.6	101.1
8	40.0	683.530	0.26	1.44	66	66	6	315	53.2	100.8
9	45.0	686.620	0.27	1.50	67	67	6	315	58.3	100.7
10	50.0	689.770	0.28	1.55	67	67	6	316	62.5	100.9
11	55.0	692.560	0.22	1.22	67	67	5	316	66.1	100.7
12	60.0	695.290	0.21	1.17	68	68	5	315	69.4	100.6

Traverse 2	0.0	695.29								
1	5.0	698.660	0.32	1.77	67	67	5.5	315	1.5	101.0
2	10.0	702.130	0.34	1.88	67	67	5.5	315	4.7	100.9
3	15.0	705.500	0.32	1.77	67	67	5.5	315	8.4	101.0
4	20.0	708.870	0.32	1.77	67	67	5.5	315	12.5	101.0
5	25.0	712.290	0.33	1.83	67	67	5.5	314	17.7	100.9
6	30.0	716.840	0.58	3.23	68	68	5.5	314	25.2	101.4
7	35.0	721.870	0.71	3.95	68	68	8	314	45.6	101.5
8	40.0	726.760	0.67	3.73	68	68	8	314	53.2	101.5
9	45.0	731.760	0.70	3.90	68	68	8	312	58.3	101.4
10	50.0	735.350	0.36	2.01	68	68	8	312	62.5	101.1
11	55.0	738.030	0.20	1.12	68	68	8	310	66.1	100.9
12	60.0	740.713	0.20	1.12	69	69	5	310	69.4	100.8
Average:			0.393	2.183	67.0	67.0	6.0	314.3		101.1

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		15-Feb-24	15-Feb-24	15-Feb-24
Test Time		09:03-10:03	10:16-11:16	11:29-12:29
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.93	29.93	29.93
DGM Factor	(Y)	1.0172	1.0172	1.0172
Initial Reading	(m ³)	163.805	164.448	165.085
Final Reading	(m ³)	164.444	165.0797	165.700
Temp. Outlet	(Avg. oF)	66.0	80.0	82.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.65328	0.62926	0.61026
HF	(mg)	0.0051	0.0051	0.031
Oxygen	(Vol. %)	9.1	10.2	10.3
HF	(mg/Sm³)	0.008	0.008	0.051
HF	(mg/Sm³ @ 11% O2)	0.007	0.008	0.047
Moisture (isokinetic)	(Vol. %)	15.9	13.6	15.6

*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: NH₃

Parameter		Test 1	Test 2	Test 3
Test Date		15-Feb-24	15-Feb-24	15-Feb-24
Test Time		09:03-10:03	10:16-11:16	11:29-12:29
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.93	29.93	29.93
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	283.042	283.560	284.078
Final Reading	(m ³)	283.554	284.073	284.597
Temp. Outlet	(Avg. oF)	50.0	51.5	52.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.55056	0.55002	0.55472
NH ₃	(mg)	2.8	3.3	1.6
Oxygen	(Vol. %)	9.1	10.2	10.3
NH₃	(mg/Sm³)	5.1	6.0	2.8
NH₃	(mg/Sm³ @ 11% O2)	4.3	5.6	2.7
Moisture (isokinetic)	(Vol. %)	15.9	13.6	15.6

*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: N₂O

Molecular Weight: 44.00 grams/mol **Reportable Detection**
Lab Detection Limit: 0.1 ppm **Limit:** 0.18 mg/Sm³

Sample ID	Date	Time	N ₂ O ppm	N ₂ O mg/Sm ³	N ₂ O mg/Sm ³ @ 11% O ₂
Unit 1 - Run 1	2024-02-13	09:43 - 10:43	0.60	1.10	0.90
Unit 1 - Run 2	2024-02-13	10:52 - 11:52	1.90	3.48	3.18
Unit 1 - Run 3	2024-02-13	12:00 - 13:00	0.90	1.65	1.53
Average					1.87
Unit 2 - Run 1	2024-02-14	09:00 - 10:00	0.60	1.10	1.03
Unit 2 - Run 2	2024-02-14	10:05 - 11:05	3.10	5.67	5.48
Unit 2 - Run 3	2024-02-14	13:22 - 14:22	1.50	2.75	2.51
Average					3.01
Unit 3 - Run 1	2024-02-15	09:07 - 10:07	0.40	0.73	0.61
Unit 3 - Run 2	2024-02-15	10:16 - 11:16	0.45	0.82	0.76
Unit 3 - Run 3	2024-02-15	11:20 - 12:20	0.50	0.92	0.86
Average					0.74

Date:	13-Feb-24			14-Feb-24			15-Feb-24		
	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:	10:19-11:19	11:35-12:35	12:50-13:50	09:00-10:00	10:05-11:05	13:25-14:25	09:07-10:07	10:16-11:16	11:20-12:20
Methane (ppmv)	3.10	ND	3.80	ND	ND	ND	3.40	3.20	4.0
Ethane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3 as Propane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4 as n-Butane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5 as n-Pentane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6 as n-Hexane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6+ as n-Hexane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND

Detection Limits:

Methane	3.1	3.4	3.1	3.6	3.1	3.1	3.5	2.4	4.1
Ethane	0.92	1.0	0.92	1.1	0.9	0.94	1.00	0.73	1.20
Ethene	0.92	1.0	0.92	1.1	0.9	0.94	1.00	0.73	1.20
C3 as Propane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1.0
C4 as n-Butane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1.0
C5 as n-Pentane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1.0
C6 as n-Hexane	0.77	0.85	0.9	0.82	0.78	0.79	0.87	0.61	1.0
C6+	1.5	1.7	1.8	1.6	1.6	1.6	1.7	1.2	2.1

Using 1/2 DL Convention

Sample Date:	13-Feb-24			14-Feb-24			15-Feb-24		
	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:	10:19-11:19	11:35-12:35	12:50-13:50	09:00-10:00	10:05-11:05	13:25-14:25	09:07-10:07	10:16-11:16	11:20-12:20
Methane (ppm)	3.10	1.70	3.80	1.80	1.55	1.55	3.40	3.20	4.00
Ethane (ppm)	0.46	0.50	0.46	0.55	0.47	0.47	0.50	0.37	0.60
Ethene (ppm)	0.46	0.50	0.46	0.55	0.47	0.47	0.50	0.37	0.60
C3 as Propane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C4 as n-Butane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C5 as n-Pentane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C6 as n-Hexane (ppm)	0.39	0.43	0.45	0.41	0.39	0.40	0.44	0.31	0.50
C6+ as n-Hexane (ppm)	0.75	0.85	0.90	0.80	0.80	0.80	0.85	0.60	1.05

Methane (mg/m³ as CH₄)	2.07	1.13	2.54	1.20	1.03	1.03	2.27	2.14	2.67
Ethane (mg/m³ as CH₄)	0.31	0.33	0.31	0.37	0.31	0.31	0.33	0.24	0.40
Ethene (mg/m³ as CH₄)	0.31	0.33	0.31	0.37	0.31	0.31	0.33	0.24	0.40
C3 as Propane (mg/m³ as CH₄)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C4 as n-Butane (mg/m³ as CH₄)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C5 as n-Pentane (mg/m³ as CH₄)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C6 as n-Hexane (mg/m³ as CH₄)	0.26	0.28	0.30	0.27	0.26	0.26	0.29	0.20	0.33
C6+ as n-Hexane (mg/m³ as CH₄)	0.50	0.57	0.60	0.53	0.53	0.53	0.57	0.40	0.70

Total mg/Sm³ @11% O₂ as CH₄	3.44	2.52	3.57	2.54	2.24	2.37	3.34	2.76	3.93
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All data is corrected to standard conditions (S) of 20 °C, 101.325 kPa (dry) unless otherwise noted.

APPENDIX - E

FIELD DATA SHEETS

AL

METRO VANCOUVER WTE - BURNABY B.C.				NOZZLE <i>P.312</i>	DIAMETER, IN. <i>0.3112</i>	IMPINGER	INITIAL	FINAL	TOTAL GAIN
SOURCE <i>Unit #1</i>				PROBE <i>F'AL GURO</i>	Cp <i>0.8373</i>	VOLUMES	(mL)	(mL)	(mL)
PARAMETER / RUN No <i>Metals/Particulate (R-1)</i>				PORT LENGTH		Imp. #1	<i>0</i>	<i>222</i>	<i>222</i>
DATE <i>Feb. 12, 2024</i>				STATIC PRESSURE, IN. H2O <i>-19.5"</i>		Imp. #2	<i>100</i>	<i>193</i>	<i>93</i>
OPERATOR: <i>DS</i>				STACK DIAMETER <i>70.90</i>		Imp. #3	<i>100</i>	<i>130</i>	<i>30</i>
CONTROL UNIT <i>AUIS</i>				STACK HEIGHT <i>30.0'</i>		Imp. #4	<i>0</i>	<i>5</i>	<i>5</i>
Y <i>0.9905</i>				INITIAL LEAK TEST <i>0.002 @ 15'</i>		Imp. #5	<i>100</i>	<i>103</i>	<i>3</i>
ΔH@ <i>1.702</i>				FINAL LEAK TEST <i>6.003 @ 15'</i>		Imp. #6	<i>100</i>	<i>103</i>	<i>3</i>
BAROMETRIC PRESSURE, IN. Hg <i>30.17</i>						Imp. #8	<i>600</i>	<i>700g</i>	
ASSUMED MOISTURE, Bw <i>15%</i>									

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %
	<i>12:19</i>	<i>93.343</i>										
1		<i>96.98</i>	<i>0.33</i>	<i>1.66</i>	<i>60</i>	<i>295</i>	<i>261</i>	<i>254</i>	<i>45</i>	<i>6</i>		
2	<i>10</i>	<i>100.73</i>	<i>0.35</i>	<i>1.76</i>	<i>60</i>	<i>295</i>	<i>261</i>	<i>254</i>	<i>45</i>	<i>6</i>		
3		<i>104.69</i>	<i>0.39</i>	<i>1.95</i>	<i>61</i>	<i>297</i>	<i>260</i>	<i>262</i>	<i>47</i>	<i>7</i>	<i>10.5</i>	<i>9.5</i>
4	<i>20</i>	<i>108.32</i>	<i>0.40</i>	<i>2.01</i>	<i>62</i>	<i>297</i>	<i>260</i>	<i>262</i>	<i>47</i>	<i>7</i>		
5		<i>112.89</i>	<i>0.43</i>	<i>2.16</i>	<i>62</i>	<i>296</i>	<i>237</i>	<i>265</i>	<i>45</i>	<i>7</i>		
6	<i>30</i>	<i>117.00</i>	<i>0.42</i>	<i>2.11</i>	<i>62</i>	<i>295</i>	<i>237</i>	<i>265</i>	<i>45</i>	<i>7</i>		
7		<i>120.98</i>	<i>0.39</i>	<i>1.97</i>	<i>63</i>	<i>295</i>	<i>258</i>	<i>260</i>	<i>46</i>	<i>8</i>	<i>12.5</i>	<i>7.2</i>
8	<i>40</i>	<i>124.92</i>	<i>0.38</i>	<i>1.92</i>	<i>64</i>	<i>295</i>	<i>257</i>	<i>255</i>	<i>48</i>	<i>8</i>		
9		<i>128.93</i>	<i>0.39</i>	<i>1.97</i>	<i>64</i>	<i>294</i>	<i>257</i>	<i>255</i>	<i>48</i>	<i>8</i>		
10	<i>50</i>	<i>132.77</i>	<i>0.36</i>	<i>1.83</i>	<i>65</i>	<i>294</i>	<i>257</i>	<i>254</i>	<i>49</i>	<i>8</i>	<i>10.0</i>	<i>9.4</i>
11		<i>136.48</i>	<i>0.34</i>	<i>1.72</i>	<i>65</i>	<i>294</i>	<i>257</i>	<i>254</i>	<i>49</i>	<i>8</i>		
12	<i>60</i>	<i>140.06</i>	<i>0.31</i>	<i>1.58</i>	<i>66</i>	<i>292</i>	<i>257</i>	<i>254</i>	<i>49</i>	<i>8</i>		
1		<i>144.12</i>	<i>0.40</i>	<i>2.03</i>	<i>67</i>	<i>295</i>	<i>255</i>	<i>256</i>	<i>50</i>	<i>7</i>	<i>10.5</i>	<i>9.2</i>
2	<i>10</i>	<i>148.14</i>	<i>0.37</i>	<i>1.98</i>	<i>67</i>	<i>296</i>	<i>255</i>	<i>256</i>	<i>50</i>	<i>7</i>		
3		<i>152.46</i>	<i>0.45</i>	<i>2.29</i>	<i>69</i>	<i>296</i>	<i>256</i>	<i>256</i>	<i>52</i>	<i>7</i>		
4	<i>20</i>	<i>156.54</i>	<i>0.40</i>	<i>2.04</i>	<i>69</i>	<i>297</i>	<i>256</i>	<i>256</i>	<i>52</i>	<i>7</i>		
5		<i>160.72</i>	<i>0.47</i>	<i>2.14</i>	<i>70</i>	<i>296</i>	<i>256</i>	<i>255</i>	<i>54</i>	<i>8</i>		
6	<i>30</i>	<i>164.80</i>	<i>0.40</i>	<i>2.04</i>	<i>70</i>	<i>296</i>	<i>256</i>	<i>255</i>	<i>54</i>	<i>8</i>		
7		<i>168.68</i>	<i>0.36</i>	<i>1.85</i>	<i>70</i>	<i>293</i>	<i>257</i>	<i>258</i>	<i>55</i>	<i>8</i>	<i>11.0</i>	<i>8.6</i>
8	<i>40</i>	<i>172.34</i>	<i>0.32</i>	<i>1.64</i>	<i>70</i>	<i>291</i>	<i>257</i>	<i>258</i>	<i>55</i>	<i>8</i>		
9		<i>175.95</i>	<i>0.31</i>	<i>1.60</i>	<i>71</i>	<i>290</i>	<i>257</i>	<i>257</i>	<i>52</i>	<i>7</i>		
10	<i>50</i>	<i>179.50</i>	<i>0.30</i>	<i>1.55</i>	<i>71</i>	<i>290</i>	<i>257</i>	<i>257</i>	<i>52</i>	<i>7</i>		
11		<i>182.98</i>	<i>0.29</i>	<i>1.49</i>	<i>70</i>	<i>290</i>	<i>256</i>	<i>256</i>	<i>54</i>	<i>7</i>	<i>11.0</i>	<i>8.8</i>
12	<i>14:20</i>	<i>186.42</i>	<i>0.28</i>	<i>1.44</i>	<i>70</i>	<i>289</i>	<i>256</i>	<i>256</i>	<i>54</i>	<i>7</i>		

AM

METRO VANCOUVER WTE - BURNABY B.C.				NOZZLE <i>V-06</i>	DIAMETER, IN. <i>0.3212</i>	IMPINGER	INITIAL	FINAL	TOTAL GAIN
				PROBE <i>7'0</i>	Cp <i>0.8477</i>	VOLUMES	(mL)	(mL)	(mL)
SOURCE <i>Unit #1</i>						Imp. #1	<i>0</i>	<i>215</i>	<i>215</i>
PARAMETER / RUN No <i>models/particulate / R-2</i>				PORT LENGTH <i>?</i>		Imp. #2	<i>100</i>	<i>178</i>	<i>78</i>
DATE <i>Feb. 13 2024</i>				STATIC PRESSURE, IN. H2O <i>-19.5'</i>		Imp. #3	<i>100</i>	<i>106</i>	<i>6</i>
OPERATOR: <i>GS'</i>				STACK DIAMETER <i>70.9"</i>		Imp. #4	<i>0</i>	<i>5</i>	<i>5</i>
CONTROL UNIT <i>AV15</i>	Y <i>0.9905</i>			STACK HEIGHT <i>30'</i>		Imp. #5	<i>100</i>	<i>102</i>	<i>2</i>
	ΔH@ <i>1.702</i>					Imp. #6	<i>100</i>	<i>105</i>	<i>5</i>
BAROMETRIC PRESSURE, IN. Hg <i>30.09</i>				INITIAL LEAK TEST <i>0.004 @ 15"</i>		Imp. #7 <i>100/200g</i>			
ASSUMED MOISTURE, Bw <i>15%</i>				FINAL LEAK TEST <i>0.003 @ 15"</i>		Imp. #8			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %		
1		<i>186.455</i>												
1		<i>190.33</i>	<i>0.33</i>	<i>1.89</i>	<i>55</i>	<i>302</i>	<i>235</i>	<i>251</i>	<i>42</i>	<i>5.5</i>				
2	<i>10</i>	<i>194.28</i>	<i>0.34</i>	<i>1.95</i>	<i>57</i>	<i>304</i>					<i>10.5</i>	<i>9.0</i>		
3		<i>197.91</i>	<i>0.29</i>	<i>1.66</i>	<i>57</i>	<i>303</i>	<i>246</i>	<i>264</i>	<i>44</i>	<i>6</i>				
4	<i>20</i>	<i>201.69</i>	<i>0.31</i>	<i>1.78</i>	<i>57</i>	<i>303</i>								
5		<i>205.83</i>	<i>0.38</i>	<i>2.18</i>	<i>58</i>	<i>306</i>	<i>251</i>	<i>260</i>	<i>45</i>	<i>6</i>				
6	<i>30</i>	<i>210.07</i>	<i>0.39</i>	<i>2.23</i>	<i>58</i>	<i>307</i>					<i>9.0</i>	<i>10.5</i>		
7		<i>214.71</i>	<i>0.48</i>	<i>2.76</i>	<i>59</i>	<i>306</i>	<i>249</i>	<i>257</i>	<i>44</i>	<i>6.5</i>				
8	<i>40</i>	<i>219.65</i>	<i>0.52</i>	<i>2.99</i>	<i>60</i>	<i>306</i>								
9		<i>224.43</i>	<i>0.49</i>	<i>2.84</i>	<i>63</i>	<i>304</i>	<i>250</i>	<i>252</i>	<i>45</i>	<i>6</i>	<i>10.0</i>	<i>9.8</i>		
10	<i>50</i>	<i>229.18</i>	<i>0.48</i>	<i>2.79</i>	<i>63</i>	<i>303</i>								
11		<i>233.61</i>	<i>0.42</i>	<i>2.44</i>	<i>63</i>	<i>302</i>	<i>254</i>	<i>250</i>	<i>46</i>	<i>6</i>				
12	<i>60</i>	<i>237.72</i>	<i>0.36</i>	<i>2.10</i>	<i>63</i>	<i>301</i>								
1		<i>241.62</i>	<i>0.32</i>	<i>1.87</i>	<i>64</i>	<i>300</i>	<i>252</i>	<i>257</i>	<i>48</i>	<i>6</i>				
2	<i>10</i>	<i>245.65</i>	<i>0.34</i>	<i>1.99</i>	<i>66</i>	<i>301</i>					<i>9.0</i>	<i>10.6</i>		
3		<i>249.32</i>	<i>0.28</i>	<i>1.64</i>	<i>67</i>	<i>300</i>	<i>254</i>	<i>261</i>	<i>47</i>	<i>6</i>				
4	<i>20</i>	<i>253.48</i>	<i>0.36</i>	<i>2.12</i>	<i>67</i>	<i>299</i>								
5		<i>257.68</i>	<i>0.37</i>	<i>2.18</i>	<i>67</i>	<i>299</i>	<i>257</i>	<i>260</i>	<i>48</i>	<i>6</i>				
6	<i>30</i>	<i>261.99</i>	<i>0.39</i>	<i>2.29</i>	<i>67</i>	<i>300</i>					<i>9.5</i>	<i>10.3</i>		
7		<i>266.36</i>	<i>0.40</i>	<i>2.35</i>	<i>68</i>	<i>301</i>	<i>250</i>	<i>261</i>	<i>48</i>	<i>6</i>				
8	<i>40</i>	<i>270.79</i>	<i>0.41</i>	<i>2.41</i>	<i>68</i>	<i>300</i>								
9		<i>274.82</i>	<i>0.34</i>	<i>2.00</i>	<i>69</i>	<i>301</i>	<i>256</i>	<i>259</i>	<i>46</i>	<i>6</i>				
10	<i>50</i>	<i>278.79</i>	<i>0.33</i>	<i>1.94</i>	<i>69</i>	<i>303</i>					<i>9.5</i>	<i>10.2</i>		
11		<i>282.65</i>	<i>0.31</i>	<i>1.82</i>	<i>69</i>	<i>304</i>	<i>258</i>	<i>262</i>	<i>43</i>	<i>6</i>				
12	<i>11:18</i>	<i>286.38</i>	<i>0.29</i>	<i>1.70</i>	<i>70</i>	<i>305</i>								

1652

AK

METRO VANCOUVER WTE - BURNABY B.C.				NOZZLE <i>V-06</i>	DIAMETER, IN. <i>0.3212</i>	IMPINGER	INITIAL	FINAL	TOTAL GAIN
				PROBE <i>71C</i>	Cp <i>0.8477</i>	VOLUMES	(mL)	(mL)	(mL)
SOURCE <i>Unit #1</i>				PORT LENGTH		Imp. #1	<i>0</i>	<i>119</i>	<i>119</i>
PARAMETER / RUN No <i>Metals / Particulate / R-3</i>				STATIC PRESSURE, IN. H2O <i>-19.5"</i>		Imp. #2	<i>100</i>	<i>243</i>	<i>143</i>
DATE <i>Feb. 13, 2024</i>				STACK DIAMETER <i>70.94</i>		Imp. #3	<i>100</i>	<i>148</i>	<i>48</i>
OPERATOR: <i>OS</i>				STACK HEIGHT <i>30.0'</i>		Imp. #4	<i>0</i>	<i>15</i>	<i>15</i>
CONTROL UNIT <i>AV15</i>	Y <i>0.9905</i>					Imp. #5	<i>100</i>	<i>118</i>	<i>18</i>
	ΔH@ <i>1.702</i>					Imp. #6	<i>100</i>	<i>94</i>	<i>-6</i>
BAROMETRIC PRESSURE, IN. Hg <i>30.09</i>				INITIAL LEAK TEST <i>0.005 @ 15'</i>		Imp. #7	<i>100</i>	<i>200g</i>	
ASSUMED MOISTURE, Bw <i>15%</i>				FINAL LEAK TEST <i>0.003 @ 15'</i>		Imp. #8			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %
	<i>11:45</i>	<i>286.920</i>										
1		<i>291.48</i>	<i>0.44</i>	<i>2.57</i>	<i>64</i>	<i>299</i>	<i>752</i>	<i>249</i>	<i>46</i>	<i>6</i>		
2	10	<i>296.08</i>	<i>0.45</i>	<i>2.61</i>	<i>65</i>	<i>308</i>					<i>10.5</i>	<i>9.3</i>
3		<i>299.84</i>	<i>0.30</i>	<i>1.74</i>	<i>65</i>	<i>308</i>	<i>262</i>	<i>263</i>	<i>48</i>	<i>6</i>		
4	20	<i>303.48</i>	<i>0.28</i>	<i>1.63</i>	<i>65</i>	<i>305</i>						
5		<i>307.72</i>	<i>0.38</i>	<i>2.22</i>	<i>65</i>	<i>302</i>	<i>752</i>	<i>258</i>	<i>47</i>	<i>6</i>		
6	30	<i>312.08</i>	<i>0.40</i>	<i>2.33</i>	<i>65</i>	<i>302</i>					<i>9.5</i>	<i>10.2</i>
7		<i>317.12</i>	<i>0.54</i>	<i>3.14</i>	<i>64</i>	<i>303</i>	<i>251</i>	<i>256</i>	<i>46</i>	<i>8</i>		
8	40	<i>322.74</i>	<i>0.56</i>	<i>3.24</i>	<i>65</i>	<i>308</i>						
9		<i>327.25</i>	<i>0.54</i>	<i>3.13</i>	<i>65</i>	<i>308</i>	<i>254</i>	<i>261</i>	<i>48</i>	<i>8</i>	<i>9.0</i>	<i>10.5</i>
10	50	<i>332.34</i>	<i>0.55</i>	<i>3.19</i>	<i>66</i>	<i>308</i>						
11		<i>336.79</i>	<i>0.42</i>	<i>2.44</i>	<i>67</i>	<i>309</i>	<i>744</i>	<i>263</i>	<i>49</i>	<i>7</i>		
12	60	<i>340.90</i>	<i>0.36</i>	<i>2.10</i>	<i>66</i>	<i>305</i>						
1		<i>345.72</i>	<i>0.49</i>	<i>2.85</i>	<i>67</i>	<i>308</i>	<i>249</i>	<i>264</i>	<i>45</i>	<i>8</i>		
2	10	<i>350.58</i>	<i>0.50</i>	<i>2.91</i>	<i>68</i>	<i>309</i>					<i>9.0</i>	<i>10.6</i>
3		<i>355.58</i>	<i>0.53</i>	<i>3.08</i>	<i>67</i>	<i>308</i>	<i>252</i>	<i>265</i>	<i>47</i>	<i>9</i>		
4	20	<i>360.35</i>	<i>0.48</i>	<i>2.79</i>	<i>67</i>	<i>307</i>						
5		<i>365.22</i>	<i>0.50</i>	<i>2.91</i>	<i>67</i>	<i>307</i>	<i>251</i>	<i>262</i>	<i>49</i>	<i>9</i>		
6	30	<i>370.08</i>	<i>0.50</i>	<i>2.91</i>	<i>67</i>	<i>306</i>						
7		<i>375.36</i>	<i>0.59</i>	<i>3.44</i>	<i>68</i>	<i>308</i>	<i>250</i>	<i>263</i>	<i>47</i>	<i>9</i>	<i>9.0</i>	<i>10.5</i>
8	40	<i>380.48</i>	<i>0.55</i>	<i>3.21</i>	<i>69</i>	<i>307</i>						
9		<i>385.43</i>	<i>0.52</i>	<i>3.04</i>	<i>68</i>	<i>306</i>	<i>252</i>	<i>265</i>	<i>48</i>	<i>9</i>		
10	50	<i>390.32</i>	<i>0.50</i>	<i>2.93</i>	<i>69</i>	<i>305</i>						
11		<i>395.04</i>	<i>0.47</i>	<i>2.74</i>	<i>68</i>	<i>306</i>	<i>254</i>	<i>263</i>	<i>49</i>	<i>9</i>	<i>9.0</i>	<i>10.2</i>
12	<i>13:47</i>	<i>399.40</i>	<i>0.40</i>	<i>2.33</i>	<i>68</i>	<i>307</i>						

A. Lanfranco and Associates Inc.

✓ CD

Client Covanta Y LMU-D 1.0372
 Source HCPD Unit #1 Cp _____
 Parameter NH3 Pbar 30.09 Static _____
 Date 13 Feb 24 Operator Liam/Chris

Client Covanta Y LMU-B 1.0362
 Source SRHS Unit #1 Cp _____
 Parameter NH3 Pbar 30.09 Static _____
 Date 13 Feb 24 Operator Chris/Liam

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

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	0943	160.1041	66		200			
	1043	160.8689	80		260			
2	1052	160.8780	70		200			
	1152	161.5497	75		297			
3	1200	161.5540	71		200			
	1300	162.1708	81		290			

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
4	0943	279.9000	71		280			
	1043	280.4214	83		255			
5	1052	280.4264	52		200			
	1152	280.9490	53		260			
6	1200	280.9545	52		200			
	1300	281.4835	55		265			

AA

CLIENT	MUTE	NOZZLE	6-309	DIAMETER, IN.	3058	IMPINGER	INITIAL	FINAL	TOTAL GAIN
SOURCE	Unit #2	PROBE	FALGVED	Cp	.8373	VOLUMES	(mL)	(mL)	(mL)
PARAMETER / RUN No	Metals / 21	PORT LENGTH				Imp. #1	0	128	
DATE	2.13.24	STATIC PRESSURE, IN. H2O			-99	Imp. #2	100	210	
OPERATOR	JG + BL	STACK DIAMETER			70.90	Imp. #3	100	122	
CONTROL UNIT	CAE 2	STACK HEIGHT			30	Imp. #4	0	14	
		ΔH@	Y	9886		Imp. #5	100	120	
				1.874		Imp. #6	100	102	
BAROMETRIC PRESSURE, IN. Hg	30.09	INITIAL LEAK TEST			100 @ 15"	Upstream Diameters			
ASSUMED MOISTURE, Bw	16%	FINAL LEAK TEST			100 @ 15"	Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %
1		597.708	.57	2.72	54	310	250	287	58	2.5		
2	10	606.59	.55	2.62	54	309					10.0	10.5
3		610.78	.50	2.38	54	310	255	250	58	3.5		
4	20	614.85	.47	2.24	54	310						
5		618.97	.48	2.29	55	310	250	282	58	3.5		
6	30	622.69	.39	1.87	56	309						
7		626.16	.34	1.63	56	310	250	252	58	5.0		
8	40	629.54	.32	1.54	58	310						
9		632.87	.31	1.49	58	310	250	257	58	4.0		
10	50	635.48	.19	.91	59	310					10.0	10.3
11		638.82	.18	.87	59	310	250	252	58	4.0		
12	600	640.64	.19	.92	60	310						
1		644.14	.34	1.64	59	308	250	282	58	4.0		
2	10	647.54	.32	1.54	60	309					10.2	10.25
3		650.94	.32	1.50	60	309	251	250	58	4.0		
4	20	654.23	.30	1.45	60	309						
5		657.73	.34	1.64	60	309	249	250	58	4.0		
6	30	662.60	.166	3.18	60	310						
7		667.32	.112	2.99	60	310	249	252	58	4.5		
8	40	672.17	.164	3.08	60	310						
9		676.85	.162	2.99	61	310	250	252	58	5.0		
10	50	679.60	.21	1.01	61	310						
11		682.72	.19	.92	61	310	250	257	58	3.5	10.0	10.22
12	13:31	END TEST	.20	.96	61	311						

A. Lanfranco and Associates Inc.

✓ CD

Client Covanta Y LMU-D 1.0362
 Source Unit 2 Cp _____
 Parameter HF Pbar 29.93 Static _____
 Date 14 Feb 24 Operator Chris / Verby

Client Covanta Y LMU-B 1.0362
 Source Unit 2 Cp _____
 Parameter NH3 Pbar 29.93 Static _____
 Date 14 Feb 24 Operator Chris / Verby

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

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	0909	162.1819	44	68	200			
	1009	162.7809	76	72	263			
2	1027	162.2845		71	200			
	1127	163.3181		82	250			
3	1320	163.3268		70	200			
	1420	163.7939		74				

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
4	0909	281.5026	43		200			
	1009	282.0078	52		254			
5	1027	282.0100	52		200			
	1127	282.5318	57		273			
6	1320	282.5370	58		200			
	1420	283.0376			260			

A. Lanfranco and Associates Inc.

Client Covanta Y LMU-D 1.0172
 Source Unit #3 Cp _____
 Parameter HF Pbar 29.93 Static _____
 Date 15 Feb 24 Operator Chris/Verby

Client Covanta Y LMU-B 1.0362
 Source Unit #3 Cp _____
 Parameter NH3 Pbar 29.93 Static _____
 Date 15 Feb 24 Operator Chris/Verby

✓CD

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

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	0903	163.8048	50		200			
	1005	164.4436	82					
2	1016	164.4480	77		200			
	1116	165.0777	83					
3	1129	165.0849	79		200			
	1229	165.0998	85		260			

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
4	0907	283.0417	50		200			
	1003	283.5541	51		255			
5	1016	283.5595	51		200			
	1116	284.0729	52		262			
6	1129	284.0784	52		200			
	1229	284.5972	53		265			

Canister sampling sheet

Client COVANTA Test Date Feb 13, 2024
 File No. _____ Recovery Date _____

Source: MV WTE Unit #1

Pbar in hg	30.11				
Canister number	00071				
Controller number	0747				
Initial: Start time					
Flask Vac. (in Hg)	0				
Final: Finish time					
Flask Vac. (in Hg)					

Source: MV WTE Unit #1

Pbar in hg	30.11				
Canister number	00373				
Controller number	1161				
Initial: Start time	10:10				
Flask Vac. (in Hg)	0				
Final: End time					
Flask Vac. (in Hg)					

Source: MV WTE unit #1 Run 1

Pbar in hg	30.11				
Canister number	00286				
Controller number	1153				
Initial: Start time	1019				
Flask Vac. (in Hg)	29				
Final: End time	1119				
Flask Vac. (in Hg)	15				

Source: MV WTE unit #1 Run 2

Pbar in hg	30.11				
Canister number	01126				
Controller number	0694				
Initial: Start time	1135				
Flask Vac. (in Hg)	30				
Final: End time	1235				
Flask Vac. (in Hg)	0				

Canister sampling sheet

Client COVANTA Test Date Feb 13, 2024
 File No. _____ Recovery Date _____

Source: MV WTE Unit 1 Run 3

Pbar in hg	30.11					
Canister number	1447					
Controller number	1130					
Initial: Start time	1250					
Flask Vac. (in Hg)	30					
Final: Finish time	1350					
Flask Vac. (in Hg)	0					

Source:

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

Source:

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

Source:

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

Client _____

Source MV WTE Unit #2

Date Feb-14-2024

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)	29.93	29.93	29.93		
Canister Number	43968	43983	33080		
Controller Number	0763	12934	1087		
Gauge Number					
Initial: Start Time	9:00	10:05	13:25		
Flask Vac. (in. Hg)	-27	-29	-30 -31		
Final: End Time	-17	11:05	14:25		
Flask Vac. (in. Hg)	10:00	-15	-22.5		

Source MV WTE Unit #3

Date Feb-15-2024

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)	29.93	29.93	29.93		
Canister Number	43973	500282	500206		
Controller Number	12946	0368A	12943		
Gauge Number					
Initial: Start Time	9:07	10:16	11:20		
Flask Vac. (in. Hg)	-27	-28	-30		
Final: End Time	10:07	11:16	12:20		
Flask Vac. (in. Hg)	-4	0	0		

Source _____

Date _____

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)					
Canister Number					
Controller Number					
Gauge Number					
Initial: Start Time					
Flask Vac. (in. Hg)					
Final: End Time					
Flask Vac. (in. Hg)					

Source _____

Date _____

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)					
Canister Number					
Controller Number					
Gauge Number					
Initial: Start Time					
Flask Vac. (in. Hg)					
Final: End Time					
Flask Vac. (in. Hg)					

APPENDIX – F

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

Pitot Tube Calibration

Date: 09-Jan-24
Pbar (in.Hg): 29.84

Temp (R): 539
Dn (in.): 0.25

Pitot ID: **7A-1**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.140	0.195	25.0	0.8388	0.0029
0.230	0.320	32.1	0.8393	0.0033
0.340	0.480	39.0	0.8332	0.0028
0.440	0.620	44.3	0.8340	0.0020
0.540	0.760	49.1	0.8345	0.0015
Average :			0.8360	0.0025

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.140	0.190	25.0	0.8498	0.0074
0.220	0.300	31.4	0.8478	0.0054
0.325	0.450	38.1	0.8413	0.0011
0.440	0.610	44.3	0.8408	0.0016
0.530	0.750	48.7	0.8322	0.0102
Average :			0.8424	0.0051

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.120	0.170	23.2	0.8318	0.0019
0.240	0.340	32.8	0.8318	0.0019
0.335	0.470	38.7	0.8358	0.0022
0.430	0.610	43.8	0.8312	0.0025
0.580	0.810	50.9	0.8377	0.0041
Average :			0.8337	0.0025

Pitot ID: **ST 8B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.120	0.170	23.2	0.8318	0.0024
0.225	0.320	31.7	0.8301	0.0040
0.331	0.470	38.5	0.8308	0.0033
0.450	0.630	44.8	0.8367	0.0026
0.520	0.720	48.2	0.8413	0.0072
Average :			0.8342	0.0039

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

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.145	0.200	16.3	0.8430	0.0057
0.245	0.340	19.9	0.8404	0.0031
0.360	0.500	25.3	0.8400	0.0028
0.430	0.610	35.8	0.8312	0.0061
0.540	0.765	48.4	0.8318	0.0055
Average :			0.8373	0.0046

Pitot ID: **ST 8C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.140	0.190	14.9	0.8498	0.0013
0.225	0.300	19.4	0.8574	0.0089
0.320	0.440	29.0	0.8443	0.0042
0.460	0.630	43.1	0.8459	0.0025
0.590	0.810	52.8	0.8449	0.0035
Average :			0.8485	0.0041

Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.140	0.190	25.0	0.8498	0.0021
0.230	0.315	16.3	0.8459	0.0018
0.320	0.440	37.8	0.8443	0.0034
0.410	0.560	30.5	0.8471	0.0006
0.540	0.730	47.0	0.8515	0.0038
Average :			0.8477	0.0023

Pitot ID:

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

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jeremy Gibbs

Signature: _____



Date:

June 27, 2023

A.Lanfranco & Associates inc.

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

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

Date: 18-Jan-24
Barometric Pressure: 30.08 (in. Hg)
Theoretical Critical Vacuum: 14.19 (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)³(min)).
!!!!!!!

----- DRY GAS METER READINGS -----										-CRITICAL ORIFICE READINGS-				
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. (deg F)		Final Temps. (deg F)		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial Final (deg F) (deg F)		Average (deg F)
3.55	17.00	700.003	718.136	18.133	64.0	64.0	67.0	67.0	73	0.8185	18.0	68.0	77.0	72.5
1.80	23.00	718.136	735.855	17.719	67.0	67.0	73.0	73.0	63	0.5956	20.5	77.0	80.0	78.5
1.10	15.00	735.855	744.908	9.053	72.0	72.0	72.0	72.0	55	0.4606	22.0	76.0	77.0	76.5
0.61	15.00	744.908	751.824	6.916	73.0	73.0	74.0	74.0	48	0.3560	23.0	78.0	74.0	76.0
0.30	17.00	751.824	757.256	5.432	64.0	64.0	66.0	66.0	40	0.2408	23.5	66.0	70.0	68.0

***** RESULTS *****												
-- DRY GAS METER --			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----			
VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			Ko (value)		
Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)			
18.468	523.0	18.138	513.7	18.202	0.982	-0.008	1.772	45.01	0.070	0.725		
17.817	504.6	17.757	502.9	18.021	0.997	0.006	1.701	43.21	-0.001	0.731		
9.054	256.4	8.972	254.1	9.072	0.991	0.001	1.725	43.83	0.023	0.730		
6.889	195.1	6.938	196.5	7.008	1.007	0.017	1.596	40.53	-0.107	0.748		
5.494	155.6	5.359	151.8	5.332	0.975	-0.015	1.717	43.61	0.015	0.744		
Average Y----->					0.9905	Average dH@----->		1.702	43.2	Average Ko----->		0.736

TEMPERATURE CALIBRATION										
Calibration Standard -----> Omega Model CL23A S/N:T-218768										
Reference Set-Point	Stack		Hot Box		Probe		Imp Out		Aux	
(deg F)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)
32	32	0.00%	32	0.00%	31	-0.20%	32	0.00%	33	0.20%
100	100	0.00%	100	0.00%	99	-0.18%	100	0.00%	100	0.00%
300	300	0.00%	300	0.00%	298	-0.26%	300	0.00%	300	0.00%
500	500	0.00%	500	0.00%	498	-0.21%	500	0.00%	500	0.00%
1000	999	-0.07%	999	-0.07%	999	-0.07%	1000	0.00%	999	-0.07%

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Sean Verby

Signature: 

Date: January 18, 2024

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada		Device (inches of Hg)		Difference
		(kPa)	(inches of Hg)	Reading	Elevation Corrected	(Env Can - Elv Corr)
LA	15-Jan-24	99.8	29.46	29.37	29.44	0.02
DS	15-Jan-24	99.8	29.46	29.36	29.43	0.03
CL	15-Jan-24	99.8	29.46	29.37	29.44	0.02
JC	15-Jan-24	99.8	29.46	29.34	29.41	0.05
LF	15-Jan-24	99.8	29.46	29.36	29.43	0.03
SH	15-Jan-24	99.8	29.46	29.35	29.42	0.04
CDO	15-Jan-24	99.8	29.46	29.34	29.41	0.05
JG	15-Jan-24	99.8	29.46	29.32	29.39	0.07
ML	15-Jan-24	99.8	29.46	29.34	29.41	0.05
BL	15-Jan-24	99.8	29.46	29.36	29.43	0.03

Calibrated by: Louis Agassiz Signature:  Date: 11-Jan-24

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 and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Sean Verby
Date: 08-Jan-24

Signature: 

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
J	0.1890	0.1889	0.1891	0.0002	0.1890	0.0001948
E	0.1950	0.1930	0.1960	0.0030	0.1947	0.0002067
Q	0.2030	0.2040	0.2050	0.0020	0.2040	0.0002270
L	0.2100	0.2070	0.2090	0.0030	0.2087	0.0002375
P-2240	0.2160	0.2155	0.2170	0.0015	0.2162	0.0002549
P-224	0.2160	0.2170	0.2150	0.0020	0.2160	0.0002545
G-221	0.2160	0.2185	0.2190	0.0030	0.2178	0.0002588
G-225	0.2190	0.2175	0.2180	0.0015	0.2182	0.0002596
G-218	0.2180	0.2200	0.2210	0.0030	0.2197	0.0002632
G-2232	0.2210	0.2200	0.2215	0.0015	0.2208	0.0002660
P-223	0.2297	0.2296	0.2298	0.0002	0.2297	0.0002878
P-250	0.2500	0.2495	0.2505	0.0010	0.2500	0.0003409
C-250	0.2500	0.2500	0.2500	0.0000	0.2500	0.0003409
P-251	0.2545	0.2530	0.2540	0.0015	0.2538	0.0003514
P-254	0.2484	0.2489	0.2482	0.0007	0.2485	0.0003368
P-256	0.2540	0.2550	0.2560	0.0020	0.2550	0.0003547
P-280	0.2810	0.2805	0.2815	0.0010	0.2810	0.0004307
C-280	0.2800	0.2800	0.2800	0.0000	0.2800	0.0004276
G-282	0.2820	0.2800	0.2825	0.0025	0.2815	0.0004322
P-281	0.2820	0.2820	0.2815	0.0005	0.2818	0.0004332
G-304	0.3030	0.3040	0.3050	0.0020	0.3040	0.0005041
G-3121	0.3055	0.3063	0.3070	0.0015	0.3063	0.0005116
G-309	0.3045	0.3065	0.3065	0.0020	0.3058	0.0005101
P-311	0.3115	0.3120	0.3120	0.0005	0.3118	0.0005304
P-312	0.3120	0.3110	0.3105	0.0015	0.3112	0.0005281
P-343	0.3420	0.3430	0.3440	0.0020	0.3430	0.0006417
P-313	0.3140	0.3130	0.3130	0.0010	0.3133	0.0005355
P-314	0.3135	0.3135	0.3140	0.0005	0.3137	0.0005366
P-315	0.3145	0.3145	0.3145	0.0000	0.3145	0.0005395
V-06	0.3220	0.3215	0.3200	0.0020	0.3212	0.0005626
G-345	0.3470	0.3475	0.3475	0.0005	0.3473	0.0006580
P-346	0.3457	0.3456	0.3458	0.0002	0.3457	0.0006518
G-349	0.3490	0.3490	0.3490	0.0000	0.3490	0.0006643
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-374	0.3740	0.3720	0.3730	0.0020	0.3730	0.0007588
C-375	0.3730	0.3750	0.3745	0.0020	0.3742	0.0007636
P-375	0.3705	0.3710	0.3709	0.0005	0.3708	0.0007499
P-401	0.3980	0.3990	0.4000	0.0020	0.3990	0.0008683
G-433	0.4360	0.4360	0.4355	0.0005	0.4358	0.0010360
P-29	0.4681	0.4683	0.4685	0.0004	0.4683	0.0011961
G-437	0.4690	0.4690	0.4700	0.0010	0.4693	0.0012014
G-468	0.4700	0.4685	0.4720	0.0035	0.4702	0.0012057
P-7	0.4965	0.4945	0.4975	0.0030	0.4962	0.0013427
B	0.5000	0.5020	0.5040	0.0040	0.5020	0.0013745
G-540	0.5400	0.5410	0.5400	0.0010	0.5403	0.0015924

- Where:
- (a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.
 - (b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.
 - (c) Average = average of D1, D2 and D3

A.Lanfranco & Associates inc.

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

Model #: JU 14
Serial #: 0028-030615-1

Date: 18-Jan-24
Barometric Pressure: 30.08 (in. Hg)
Theoretical Critical Vacuum: 14.19 (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)³(min)).
!!!!!!!

----- DRY GAS METER READINGS -----										-CRITICAL ORIFICE READINGS-				
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. (deg F)		Final Temps. (deg F)		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- (deg F)		
					Inlet	Outlet	Inlet	Outlet				Initial	Final	Average
4.15	19.00	840.050	859.960	19.910	65.0	65.0	67.0	67.0	73	0.8185	16.0	60.0	70.0	65.0
2.20	17.00	859.960	872.925	12.965	67.0	67.0	70.0	70.0	63	0.5956	17.0	68.0	71.0	69.5
1.35	21.00	872.925	885.445	12.520	70.0	70.0	73.0	73.0	55	0.4606	18.5	71.0	76.0	73.5
0.78	15.00	885.445	892.273	6.828	73.0	73.0	75.0	75.0	48	0.3560	20.0	74.0	78.0	76.0
0.38	18.00	892.273	897.930	5.657	75.0	75.0	76.0	76.0	40	0.2408	21.0	76.0	80.0	78.0

***** RESULTS *****																
-- DRY GAS METER --			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----							
VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	CALIBRATION FACTOR Y	CALIBRATION FACTOR dH@						
Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)		
20.288	574.6	20.416	578.2	20.200	1.006	-0.003	2.040	51.82	-0.042	0.671						
13.087	370.6	13.236	374.8	13.208	1.011	0.002	2.050	52.08	-0.032	0.668						
12.540	355.1	12.597	356.7	12.665	1.004	-0.004	2.108	53.54	0.026	0.664						
6.798	192.5	6.938	196.5	7.008	1.021	0.012	2.039	51.78	-0.043	0.665						
5.611	158.9	5.621	159.2	5.699	1.002	-0.007	2.173	55.19	0.091	0.656						
Average Y----->									1.0089	Average dH@----->		2.082	52.9	Average Ko----->		0.665

TEMPERATURE CALIBRATION										
Calibration Standard -----> Omega Model CL23A S/N:T-218768										
Reference Set-Point	Stack		Hot Box		Probe		Imp Out		Aux	
(deg F)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)
32	33	0.20%	31	-0.20%	31	-0.20%	33	0.20%	33	0.20%
100	102	0.36%	99	-0.18%	98	-0.36%	101	0.18%	101	0.18%
300	302	0.26%	299	-0.13%	298	-0.26%	301	0.13%	302	0.26%
500	501	0.10%	499	-0.10%	498	-0.21%	501	0.10%	501	0.10%
1000	1001	0.07%	998	-0.14%	998	-0.14%	1001	0.07%	1001	0.07%

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Liam Forrer

Signature: 

Date: January 18, 2024

A. Lanfranco & Associates inc.

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

Model #: LMU-B
Serial #: WIZIT 6276

Date: 12-Jan-24
Barometric Pressure: 30.25 (in. Hg)
Theoretical Critical Vacuum: 14.27 (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-					
dH (in H2O)	Time (min)	Volume Initial (m ³)	Volume Final (m ³)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
0.00	16.50	275.5750	275.7808	7.268	52.0	52.0	58.0	58.0	48	0.3560	20.0	51.0	62.0	56.5
0.00	15.00	275.7880	275.9764	6.653	59.0	59.0	64.0	64.0	48	0.3560	20.0	64.0	65.0	64.5
0.00	24.00	275.9890	276.2920	10.700	64.0	64.0	69.0	69.0	48	0.3560	20.0	67.0	75.0	71.0

***** RESULTS *****											
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----		
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	
7.530	213.3		7.819	221.4	7.568	1.038	0.002	0.000	0.00	0.000	
6.808	192.8		7.053	199.8	6.933	1.036	0.000	0.000	0.00	0.000	
10.845	307.1		11.216	317.6	11.161	1.034	-0.002	0.000	0.00	0.000	
Average Y----->						1.0362	Average dH@----->		0.0000	0.00	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Louis Agassiz

Signature: 

Date: January 12, 2024

A. Lanfranco & Associates inc.

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

Model #: LMU-D
Serial #: Wizit 4618

Date: 12-Jan-24
Barometric Pressure: 30.25 (in. Hg)
Theoretical Critical Vacuum: 14.27 (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-					
dH (in H2O)	Time (min)	Volume			Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --			
		Initial (m ³)	Final (m ³)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)	
0.00	17.00	165.769	165.988	7.723	66.0	66.0	67.0	67.0	48	0.3560	20.0	66.0	67.0	66.5	
0.00	18.00	166.281	166.514	8.228	72.0	72.0	73.0	73.0	48	0.3560	20.0	75.0	76.0	75.5	
0.00	16.00	166.514	166.721	7.321	73.0	73.0	74.0	74.0	48	0.3560	20.0	76.0	76.0	76.0	

***** RESULTS *****											
-- DRY GAS METER --			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----		
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	
7.828	221.7		7.979	226.0	7.872	1.019	0.002	0.000	0.00	0.000	
8.245	233.5		8.377	237.2	8.406	1.016	-0.001	0.000	0.00	0.000	
7.322	207.4		7.442	210.8	7.476	1.016	-0.001	0.000	0.00	0.000	
Average Y----->						1.0172	Average dH@----->		0.0000	0.00	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Louis Agassiz

Signature: 

Date: January 12, 2024

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: 08-Jan-24
Barometric Pressure: 29.85 (in. Hg)
Theoretical Critical Vacuum: 14.08 (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)²(min)).
!!!!!!!

----- DRY GAS METER READINGS -----										-CRITICAL ORIFICE READINGS-				
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. (deg F)		Final Temps. (deg F)		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- (deg F)		
					Inlet	Outlet	Inlet	Outlet				Initial	Final	Average
3.75	16.00	700.900	717.963	17.063	56.0	56.0	56.0	56.0	73	0.8185	15.5	58.0	60.0	59.0
1.95	15.00	717.963	729.559	11.596	56.0	56.0	58.0	58.0	63	0.5956	16.0	61.0	58.0	59.5
1.15	16.00	729.559	739.205	9.646	59.0	59.0	62.0	62.0	55	0.4606	16.5	63.0	63.0	63.0
0.67	17.00	739.205	747.020	7.815	62.0	62.0	65.0	65.0	48	0.3560	18.0	63.0	67.0	65.0
0.32	15.00	747.020	751.729	4.709	65.0	65.0	67.0	67.0	40	0.2408	22.0	65.0	68.0	66.5


***** RESULTS *****															
-- DRY GAS METER --				----- ORIFICE -----				-- DRY GAS METER --				----- ORIFICE -----			
VOLUME CORRECTED		VOLUME CORRECTED		VOLUME CORRECTED		VOLUME CORRECTED		VOLUME NOMINAL		CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)		
17.573	497.7	17.159	486.0	16.913	486.0	16.913	486.0	0.976	-0.012	1.872	47.55	0.048	0.708		
11.867	336.1	11.700	331.4	11.544	331.4	11.544	331.4	0.986	-0.003	1.837	46.65	0.013	0.709		
9.786	277.1	9.619	272.4	9.554	272.4	9.554	272.4	0.983	-0.006	1.811	46.01	-0.013	0.717		
7.874	223.0	7.884	223.3	7.861	223.3	7.861	223.3	1.001	0.013	1.763	44.78	-0.061	0.714		
4.718	133.6	4.699	133.1	4.698	133.1	4.698	133.1	0.996	0.007	1.837	46.66	0.013	0.703		
Average Y----->								0.9886	Average dH@----->		1.824	46.3	Average Ko----->		0.710

TEMPERATURE CALIBRATION											
Calibration Standard -----> Omega Model CL23A S/N:T-218768											
Reference Set-Point		Stack		Hot Box		Probe		Imp Out		Aux	
(deg F)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(% diff)
32	33	0.20%	33	0.20%	31	-0.20%	33	0.20%	33	0.20%	
100	101	0.18%	101	0.18%	100	0.00%	101	0.18%	101	0.18%	
300	301	0.13%	302	0.26%	300	0.00%	301	0.13%	301	0.13%	
500	500	0.00%	500	0.00%	500	0.00%	501	0.10%	501	0.10%	
1000	1000	0.00%	1000	0.00%	1000	0.00%	1000	0.00%	1000	0.00%	

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Liam Forrer Signature:  Date: January 8, 2024

Calibration Certificate

Date: 22-Jan-24
Calibrated by: Liam Forrer
Authorizing Signature: 

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

Ambient Conditions: Temperature: 7 °C Barometric Pressure: 101.8 kPa Relative Humidity: 64%

A. Lanfranco and Associates Inc. certifies that the described instrument has been inspected and tested following calibration procedures in the Environment Canada Report EPS 1/PG/7 (Revised 2005). Below are the observed readings after calibrations are complete. Calibration checks should be completed at least every 6 months.

O ₂ Gas	Initial Evaluation				After Calibration				Certified Value (vol %)
	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	
Zero	0.1	0.10	Pass		0.1	0.10	Pass		0
O ₂	11.2	0.13	Pass		11.2	0.13	Pass		11.07
Ambient	20.9	0.05	Pass		20.9	0.05	Pass		20.95

Performance Specification: +/- 1% O₂ (absolute diff)

CO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	435	1.9%	Pass		435	1.9%	Pass		444
2 Gas	1858	2.7%	Pass		1858	2.7%	Pass		1909
3 Gas	254	0.0%	Pass		254	0.0%	Pass		254

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

NO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	465	0.0%	Pass		465	0.0%	Pass		465
2 Gas	110	4.0%	Pass		110	4.0%	Pass		106
3 Gas	47	4.9%	Pass		47	4.9%	Pass		45

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

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	NO (ppm)	O ₂ (Vol. %)	CO (ppm)
Zero Gas (N ₂)	T97227026	10-Nov-2022	9-Nov-2027	1200	0	0	0
1 Gas	XC015932B	15-Jun-2021	14-Jun-2024	900	465.2	0	443.5
2 Gas	CC36070	13-Feb-2023	14-Feb-2031	1100	105.8	0	1909
3 Gas	AS759435	19-Dec-2023	20-Dec-2031	1700	44.81	-	254.1
O ₂ /CO ₂	CC256047	11-Nov-2022	12-Nov-2030	600	0	11.07	0

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

Calibration Certificate

Date: 22-Jan-24
Calibrated by: Liam Forrer
Authorizing Signature: 

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

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

A. Lanfranco and Associates Inc. certifies that the described instrument has been inspected and tested following calibration procedures in the Environment Canada Report EPS 1/PG/7 (Revised 2005). Below are the observed readings after calibrations are complete. Calibration checks should be completed at least every 6 months.

O ₂ Gas	Initial Evaluation				After Calibration				Certified Value (vol %)
	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O ₂	11.1	0.03	Pass		11.1	0.03	Pass		11.07
Ambient	21	0.04	Pass		20.9	0.06	Pass		20.96

Performance Specification: +/- 1% O₂ (absolute diff)

CO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	428	3.5%	Pass	Re cal on 1 Gas	443	0.1%	Pass		444
2 Gas	1818	4.8%	Pass		1891	0.9%	Pass		1909
3 Gas	250	1.6%	Pass		255	0.4%	Pass		254

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

NO Gas	Initial Evaluation				After Calibration				Certified Value (ppm)
	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	475	2.1%	Pass	Re cal on 1 Gas	465	0.0%	Pass		465.2
2 Gas	117	10.6%	Fail		110	4.0%	Pass		105.8
3 Gas	53	18.3%	Fail		47	4.9%	Pass		44.8

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

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	NO (ppm)	O ₂ (Vol. %)	CO (ppm)
Zero Gas (N ₂)	T97227026	10-Nov-2022	9-Nov-2027	1200	0	0	0
1 Gas	XC015932B	15-Jun-2021	14-Jun-2024	900	465.2	0	443.5
2 Gas	CC36070	13-Feb-2023	14-Feb-2031	1100	105.8	0	1909
3 Gas	AS759435	19-Dec-2023	20-Dec-2031	1700	44.81	-	254.1
O ₂ /CO ₂	CC256047	11-Nov-2022	12-Nov-2030	600	0	11.07	0

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



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

Dean
Faculty of Continuing Education and Extension

Conflict of Interest Disclosure Statement

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

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

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- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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

Declaration

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

Select one of the following:

- Absence from conflict of interest

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

Mr. Sajid Barlas, erring on the side of caution.

Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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

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

Signature:

X Daryl Sampson

Print name: Daryl Sampson

Date: Dec.18, 2020

Witnessed by:

X 

Print name: Mark Lanfranco

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

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

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals¹, 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

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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 *Daryl Sampson*

Print Name: Daryl Sampson

Witnessed by:

X *Louis Agassiz*

Print Name: Louis Agassiz

Date signed: November 23, 2020

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1. Name of Qualified Professional Jeremy Gibbs
Title Environmental technician

2. Are you a registered member of a professional association in B.C.? Yes No
Name of Association: _____ Registration # _____

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

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Declaration

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

Signature: [Handwritten Signature]

Witnessed by: [Handwritten Signature]

Print Name: Jeremy Gibbs

Print Name: Connor Lean

Date signed: Nov 1, 2020

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1. Name of Qualified Professional Justin Ching
Title Environmental Technician
2. Are you a registered member of a professional association in B.C.? Yes No
Name of Association: _____ Registration # _____
3. Brief description of professional services:
Environmental Technician - specialising in air and atmospheric sciences

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Declaration

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

Signature:

x Justin Ching

Print Name: Justin Ching

Witnessed by:

x Daryl Sampson

Print Name: Daryl Sampson

Date signed: June 28, 2023

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1. Name of Qualified Professional Liam Forrer
Title Environmental Technician
2. Are you a registered member of a professional association in B.C.? Yes No
Name of Association: _____ Registration # _____
3. Brief description of professional services:
Environmental consulting, specializing in air and atmospheric sciences

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Declaration

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

Signature:

x Liam Forrer

Print Name: Liam Forrer

Witnessed by:

x Daryl Sampson

Print Name: Daryl Sampson

Date signed: July 12, 2023

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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.

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Signature:

X

Print name:

Jeremy Gibbs

Witnessed by:

X

Print name:

Mark Lanfranco

Date: Dec. 16, 2020

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MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeremy Shawn Gibbs

has successfully completed

Stack Sampling

35 Hours / 2019

May 22, 2019

Date

BSU
Dean

Faculty of Continuing Education and Extension



Justin Ching

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023



Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

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Declaration

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

Select one of the following:

- Absence from conflict of interest

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Mr. Sajid Barlas, erring on the side of caution.

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Signature:

X Justin Ching

Print name: Justin Ching

Witnessed by:

X Mark Lanfranco

Print name: Mark Lanfranco

Date: June 28, 2023

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Liam Forrer

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023



Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

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

Select one of the following:

- Absence from conflict of interest

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

Mr. Sajid Barlas, erring on the side of caution.



Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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

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

Signature:

Liam Forrer

Print name: Liam Forrer

Date: July 12, 2023

Witnessed by:



Print name: Mark Lanfranco

¹Qualified 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.: 1004232
Issued On: 4/11/2023
Accreditation Date: 2/5/2021
Expiry Date: 10/11/2025

A handwritten signature in black ink, appearing to read "K. McKinley", written over a thin horizontal line.

President and CEO



This certificate is the property of the Canadian Association for Laboratory Accreditation Inc. and must be returned on request; reproduction must follow policy in place at date of issue.
For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.cala.ca.