



**A. Lanfranco
& Associates Inc.**

Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III

4515 Central Boulevard

Burnaby, BC V5H 0C6

WASTE-TO-ENERGY FACILITY

Appendices of Emissions Testing Report

May and June 2024 Survey

Second 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
Second Quarter 2024			
Filter	0.1 mg	0.1 mg	0.2 mg
Front Half Washings	0.2 mg	0.2 mg	-0.4 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.17 ug	<0.17 ug	<0.17 ug
Trace Metals Front *	<84.3 ug	<89.8 ug	<84.1 ug
Trace Metals Back*	<37.7 ug	<56.0 ug	<32.7 ug
Ammonia	29.0 ug	58.3 ug	51.5 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>i</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



LABORATORY REPORT

June 6, 2024

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

RE: Metro Vancouver WTE

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on May 22, 2024. For your reference, these analyses have been assigned our service request number P2402053.

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 2:27 pm, Jun 06, 2024

Sue Anderson
Project Manager



Client: A. Lanfranco and Associates Inc.
Project: Metro Vancouver WTE

Service Request No: P2402053

CASE NARRATIVE

The samples were received intact under chain of custody on May 22, 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	4068-012
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 WTE

Service Request: P2402053

Date Received: 5/22/2024
 Time Received: 09:40

TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
---------------------------	---------------------------

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	P2402053-001	Air	5/16/2024	10:40	SC01654	-4.47	4.15	X	X
Unit # 1 Run # 2	P2402053-002	Air	5/16/2024	12:02	SC01870	-4.08	4.20	X	X
Unit # 1 Run # 3	P2402053-003	Air	5/16/2024	13:22	SC00616	-3.73	4.35	X	X
Unit # 2 Run # 1	P2402053-004	Air	5/16/2024	11:10	SC01813	0.16	4.80	X	X
Unit # 2 Run # 2	P2402053-005	Air	5/16/2024	12:20	SC00515	-5.06	3.99	X	X
Unit # 2 Run # 3	P2402053-006	Air	5/16/2024	13:21	SC02338	-7.16	4.08	X	X
Unit # 3 Run # 1	P2402053-007	Air	5/16/2024	09:54	SC00235	-4.26	3.88	X	X
Unit # 3 Run # 2	P2402053-008	Air	5/16/2024	11:05	SC00363	-4.25	4.40	X	X
Unit # 3 Run # 3	P2402053-009	Air	5/16/2024	12:10	SC02192	0.06	4.50	X	X



Air - Chain of Custody Record & Analytical Service Request

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

P2402053

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. _____

Company Name & Address (Reporting Information) A. Lanfranco and Associates Inc.				Project Name Metro Vancouver WTE				ALS Contact:		EPA TO-3	Comments e.g. Actual Preservative or specific instructions
				Project Manager Mark Lanfranco				Project Number			
Phone 604-881-2582		Fax		P.O. # / Billing Information							
Email Address for Result Reporting Mark.lanfranco@alanfranco.com				Sampler (Print & Sign) Shawn Harrington							
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		05-16-24	09:40 - 10:40	SC01654	0A01418	-28	-9.5		✓		
Unit #1 Run #2		05-16-24	11:02 - 12:02	SC01870	0A01418	-28.5	-9		✓		
Unit #1 Run #3		05-16-24	12:22 - 13:22	SC00616	0A01418	-29	-8		✓		
Unit #2 Run #1		05-16-24	10:10 - 11:10	SC01813	0A02096	-27	0		✓		
Unit #2 Run #2		05-16-24	11:20 - 12:20	SC00515	0A02096	-27	-9		✓		
Unit #2 Run #3		05-16-24	12:21 - 13:21	SC02338	0A02096	-26	-14.5		✓		
Unit #3 Run #1		05-17-24	08:59 - 09:59	SC00235	0A01788	-30	-10		✓		
Unit #3 Run #2		05-17-24	10:05 - 11:05	SC00365	0A01788	-30	-9.5		✓		
Unit #3 Run #3		05-17-24	11:10 - 12:10	SC02192	0A01788	-20	0		✓		

Report Tier Levels - please select

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: 05-21-24	Time: 11:00	Received by: (Signature)	Date: 05-22-24	Time: 09:40
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date: 5-22-24	Time: 09:07

Project Requirements (MRLs, QAPP) _____
 Cooler / Blank Temperature _____ °C

**ALS Environmental
Sample Acceptance Check Form**

Client: A. Lanfranco and Associates Inc. Work order: P2402053
 Project: Metro Vancouver WTE
 Sample(s) received on: 5/22/24 Date opened: 5/22/24 by: ANTHONY.VASQUEZ

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 checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | Did sample container labels and/or tags agree with custody papers? | <input type="checkbox"/> | <input checked="" 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
P2402053-001.01	6.0 L Source Can					
P2402053-002.01	6.0 L Source Can					
P2402053-003.01	6.0 L Source Can					
P2402053-004.01	6.0 L Source Can					
P2402053-005.01	6.0 L Source Can					
P2402053-006.01	6.0 L Source Can					
P2402053-007.01	6.0 L Source Can					
P2402053-008.01	6.0 L Source Can					Correct ID = SC00363
P2402053-009.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____
 The canister ID for sample -008 listed on the COC is SC00365 but the correct ID is SC00363.

Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-001

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: SC01654

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/31/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.47 Final Pressure (psig): 4.15

Container Dilution Factor: 1.84

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.92	
C ₄ as n-Butane	ND	0.92	
C ₅ as n-Pentane	ND	0.92	
C ₆ as n-Hexane	ND	0.92	
C ₆ + as n-Hexane	ND	1.8	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-002

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: SC01870

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/31/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.08 Final Pressure (psig): 4.20

Container Dilution Factor: 1.78

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.89	
C ₄ as n-Butane	ND	0.89	
C ₅ as n-Pentane	ND	0.89	
C ₆ as n-Hexane	ND	0.89	
C ₆ + as n-Hexane	ND	1.8	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-003

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: SC00616

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/31/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -3.73 Final Pressure (psig): 4.35

Container Dilution Factor: 1.74

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.87	
C ₄ as n-Butane	ND	0.87	
C ₅ as n-Pentane	ND	0.87	
C ₆ as n-Hexane	ND	0.87	
C ₆ + as n-Hexane	ND	1.7	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit # 2 Run # 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053

ALS Sample ID: P2402053-004

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: SC01813

Date Collected: 5/16/24

Date Received: 5/22/24

Date Analyzed: 5/31/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): 0.16 Final Pressure (psig): 4.80

Container Dilution Factor: 1.31

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 # 2 Run # 2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053
 ALS Sample ID: P2402053-005

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: SC00515

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 6/5/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -5.06 Final Pressure (psig): 3.99

Container Dilution Factor: 1.94

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.97	
C ₄ as n-Butane	ND	0.97	
C ₅ as n-Pentane	ND	0.97	
C ₆ as n-Hexane	ND	0.97	
C ₆ + as n-Hexane	ND	1.9	

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 WTE

ALS Project ID: P2402053
 ALS Sample ID: P2402053-006

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: SC02338

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 6/5/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -7.16 Final Pressure (psig): 4.08

Container Dilution Factor: 2.49

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	2.5	

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 # 3 Run # 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053

ALS Sample ID: P2402053-007

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: SC00235

Date Collected: 5/16/24

Date Received: 5/22/24

Date Analyzed: 6/5/24

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.26 Final Pressure (psig): 3.88

Container Dilution Factor: 1.78

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.89	
C ₄ as n-Butane	ND	0.89	
C ₅ as n-Pentane	ND	0.89	
C ₆ as n-Hexane	ND	0.89	
C ₆ + as n-Hexane	ND	1.8	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-008

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: SC00363

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 6/5/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 4.40

Container Dilution Factor: 1.83

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.92	
C ₄ as n-Butane	ND	0.92	
C ₅ as n-Pentane	ND	0.92	
C ₆ as n-Hexane	ND	0.92	
C ₆ + as n-Hexane	ND	1.8	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-009

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: SC02192

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 6/5/24
 Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): 0.06 Final Pressure (psig): 4.50

Container Dilution Factor: 1.30

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	2.1	0.65	
C ₆ as n-Hexane	ND	0.65	
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

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Client: A. Lanfranco and Associates Inc.

Client Sample ID: Method Blank

Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053

ALS Sample ID: P240531-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: 5/31/24

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

RESULTS OF ANALYSIS

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Client: A. Lanfranco and Associates Inc.

Client Sample ID: Method Blank

Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053

ALS Sample ID: P240605-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: 6/05/24

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 WTE

ALS Project ID: P2402053
 ALS Sample ID: P240531-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: 5/31/24
 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	1,040	1,030	106	105	92-120	0.9	6		
n-Butane	1,000	1,040	1,030	104	103	91-121	1	6		
n-Pentane	1,000	999	993	100	99	89-118	1	6		
n-Hexane	1,000	1,020	1,020	102	102	92-125	0	6		

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 WTE

ALS Project ID: P2402053
 ALS Sample ID: P240605-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: 6/05/24
 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	1,030	1,030	105	105	92-120	0	6		
n-Butane	1,000	1,030	1,020	103	102	91-121	1	6		
n-Pentane	1,000	989	981	99	98	89-118	1	6		
n-Hexane	1,000	1,020	1,010	102	101	92-125	1	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 WTE

ALS Project ID: P2402053
 ALS Sample ID: P2402053-001

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC01654

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.47 Final Pressure (psig): 4.15

Container Dilution Factor: 1.84

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.7	2.4	4.1	3.7	
74-85-1	Ethene	ND	1.3	ND	1.1	
74-84-0	Ethane	ND	1.4	ND	1.1	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-002

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC01870

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.08 Final Pressure (psig): 4.20

Container Dilution Factor: 1.78

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.9	2.3	4.4	3.6	
74-85-1	Ethene	ND	1.2	ND	1.1	
74-84-0	Ethane	ND	1.3	ND	1.1	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-003

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00616

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.73 Final Pressure (psig): 4.35

Container Dilution Factor: 1.74

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.3	ND	3.5	
74-85-1	Ethene	ND	1.2	ND	1.0	
74-84-0	Ethane	ND	1.3	ND	1.0	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Unit # 2 Run # 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053

ALS Sample ID: P2402053-004

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID/TCD

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC01813

Date Collected: 5/16/24

Date Received: 5/22/24

Date Analyzed: 5/30/24

Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): 0.16 Final Pressure (psig): 4.80

Container Dilution Factor: 1.31

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.9	1.7	4.5	2.6	
74-85-1	Ethene	ND	0.90	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

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Client: A. Lanfranco and Associates Inc.
Client Sample ID: Unit # 2 Run # 2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053
 ALS Sample ID: P2402053-005

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00515

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -5.06 Final Pressure (psig): 3.99

Container Dilution Factor: 1.94

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.5	ND	3.9	
74-85-1	Ethene	ND	1.3	ND	1.2	
74-84-0	Ethane	ND	1.4	ND	1.2	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-006

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC02338

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -7.16 Final Pressure (psig): 4.08

Container Dilution Factor: 2.49

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	3.6	3.3	5.5	5.0	
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 # 3 Run # 1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053
 ALS Sample ID: P2402053-007

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00235

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.26 Final Pressure (psig): 3.88

Container Dilution Factor: 1.78

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.3	ND	3.6	
74-85-1	Ethene	ND	1.2	ND	1.1	
74-84-0	Ethane	ND	1.3	ND	1.1	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-008

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC00363

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.25 Final Pressure (psig): 4.40

Container Dilution Factor: 1.83

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.4	ND	3.7	
74-85-1	Ethene	ND	1.3	ND	1.1	
74-84-0	Ethane	ND	1.3	ND	1.1	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

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

ALS Project ID: P2402053
 ALS Sample ID: P2402053-009

Test Code: EPA TO-3 Modified
 Instrument ID: HP5890A/GC10/FID/TCD
 Analyst: Gilbert Gutierrez
 Sampling Media: 6.0 L Summa Canister
 Test Notes:
 Container ID: SC02192

Date Collected: 5/16/24
 Date Received: 5/22/24
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): 0.06 Final Pressure (psig): 4.50

Container Dilution Factor: 1.30

CAS #	Compound	Result mg/m ³	MRL mg/m ³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	2.0	1.7	3.1	2.6	
74-85-1	Ethene	ND	0.89	ND	0.78	
74-84-0	Ethane	ND	0.96	ND	0.78	

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

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Client: A. Lanfranco and Associates Inc.
Client Sample ID: Method Blank
Client Project ID: Metro Vancouver WTE

ALS Project ID: P2402053
 ALS Sample ID: P240530-MB

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

Date Collected: NA
Date Received: NA
Date Analyzed: 5/30/24
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 WTE

ALS Project ID: P2402053
 ALS Sample ID: P240530-DLCS

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

Date Collected: NA
 Date Received: NA
 Date Analyzed: 5/30/24
 Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount	Result		% Recovery		ALS	RPD	RPD	Data
		LCS / DLCS ppmV	LCS ppmV	DLCS ppmV	LCS	DLCS	Acceptance Limits			
74-82-8	Methane	7.60	7.13	7.24	94	95	70-130	1	15	
74-85-1	Ethene	7.53	7.13	7.14	95	95	70-130	0	15	
74-84-0	Ethane	7.49	7.58	7.54	101	101	70-130	0	15	

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: 1733903 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007218 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
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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
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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: 1733903 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007218 Report Type: Final Report
Attn: Missy	Proj. Acct. code:	
Sampled By:		
Company:		

Reference Number	1733903-1	1733903-2
Sample Date	May 16, 2024	May 17, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Field Blank Unit 1 (MV unit 1 BLANK + 4 Bottles) / 20.6°C	Field Blank Unit 2 (MV unit 2 BLANK + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	10		5
Antimony	µg	<2	<2		2.5
Arsenic	µg	2	<1		1
Cadmium	µg	<0.3	<0.3		0.25
Chromium	µg	<0.2	0.2		0.2
Cobalt	µg	<0.3	<0.3		0.25
Copper	µg	0.9	<0.3		0.25
Lead	µg	2.9	5.9		1.5
Manganese	µg	<0.3	0.6		0.25
Nickel	µg	1	<0.5		0.5
Phosphorus	µg	69	62		2.5
Selenium	µg	<2	<2		1.5
Tellurium	µg	5.0	5.7		2
Thallium	µg	<2	<2		1.5
Vanadium	µg	<1	<1		1
Zinc	µg	3.5	5.4		0.5
Back Half Metals Fraction 2A					
Aluminum	µg	5	6		5
Antimony	µg	<2	<2		2.5
Arsenic	µg	<0.9	1		1
Cadmium	µg	<0.2	0.3		0.25
Chromium	µg	0.32	1.1		0.2
Cobalt	µg	<0.2	<0.2		0.25
Copper	µg	0.5	0.9		0.25
Lead	µg	2.5	<1		1.5
Manganese	µg	<0.2	<0.2		0.25
Nickel	µg	<0.5	<0.5		0.5
Phosphorus	µg	26	28		2.5
Selenium	µg	<1	2		1.5
Tellurium	µg	<2	4.7		2
Thallium	µg	<1	<1		1.5
Vanadium	µg	<0.9	<0.9		1
Zinc	µg	3.4	12		0.5
Volume	Sample	mL	329	322	
Volume	aliquot volume	mL	279	272	
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: Field Blanks Project Location: LSD: P.O.:	Lot ID: 1733903 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007218 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733903-1	1733903-2
Sample Date	May 16, 2024	May 17, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Field Blank Unit 1 (MV unit 1 BLANK + 4 Bottles) / 20.6°C	Field Blank Unit 2 (MV unit 2 BLANK + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1		
Volume	Sample	mL	250	250	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1		
Volume	Sample	mL	329	322	
Volume	aliquot volume	mL	5.0	5.0	
Volume	Final	mL	40	40	
Mercury	Fraction 2B	µg/sample	<0.1	<0.1	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1		
Volume	Sample	mL	116	122	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3A	µg/sample	<0.009	<0.010	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1		
Volume	Sample	mL	500	500	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1		
Volume	Sample	mL	200	200	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3C	µg/sample	<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: Field Blanks Project Location: LSD: P.O.:	Lot ID: 1733903 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007218 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	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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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: 1733894 Control Number: Date Received: May 23, 2024 Date Reported: Jun 12, 2024 Report Number: 3007192 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
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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
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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: 1733894 Control Number: Date Received: May 23, 2024 Date Reported: Jun 12, 2024 Report Number: 3007192 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733894-1	1733894-2
Sample Date	May 13, 2024	May 13, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Reagent Blank Unit 1 Container 1 (filter) / 20.6 °C	Reagent Blank Unit 2 Container 1 (filter) / 20.6 °C
Matrix	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	6	9		5
Antimony	µg	<2	<2		2.5
Arsenic	µg	<1	<1		1
Cadmium	µg	<0.3	<0.3		0.25
Chromium	µg	0.47	<0.2		0.2
Cobalt	µg	<0.3	<0.3		0.25
Copper	µg	0.4	<0.3		0.25
Lead	µg	2	7.3		1.5
Manganese	µg	<0.3	<0.3		0.25
Nickel	µg	<0.5	0.7		0.5
Phosphorus	µg	57	64		2.5
Selenium	µg	<2	2		1.5
Tellurium	µg	7.5	11		2
Thallium	µg	<2	<2		1.5
Vanadium	µg	<1	<1		1
Zinc	µg	33.3	15		0.5
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	
Volume	Sample	mL	250	250	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	

Approved by: 

Carol Nam, Dipl. T.
 Quality Assurance Coordinator

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: Filter Reagent Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1733894 Control Number: Date Received: May 23, 2024 Date Reported: Jun 12, 2024 Report Number: 3007192 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	Jun 11, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29 <i>* Reference Method Modified</i>	May 28, 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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Appendix B - Particulate Analysis

Client: Metro Vancouver **Sample Date:** 16-17-May and 4-5-June-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	0.4565	0.4566	0.0001	
Unit 1 Run 1	0.4552	0.4571	0.0019	0.0018
Unit 1 Run 2	0.4493	0.4506	0.0013	0.0012
Unit 1 Run 3	0.4622	0.4644	0.0022	0.0021
Unit 2 Blank	0.4564	0.4565	0.0001	
Unit 2 Run 1	0.4572	0.4565	-0.0007	ND
Unit 2 Run 2	0.4568	0.4564	-0.0004	ND
Unit 2 Run 3	0.4598	0.4585	-0.0013	ND
Unit 3 Blank	0.4598	0.4600	0.0002	
Unit 3 Run 1	0.4585	0.4592	0.0007	0.0005
Unit 3 Run 2	0.4580	0.4585	0.0005	0.0003
Unit 3 Run 3	0.4582	0.4588	0.0006	0.0004

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	85.6026	85.6028	0.0002	
Unit 1 Run 1	84.3680	84.3684	0.0004	0.0002
Unit 1 Run 2	113.3305	113.3306	0.0001	ND
Unit 1 Run 3	108.7363	108.7394	0.0031	0.0029
Unit 2 Blank	84.3987	84.3989	0.0002	
Unit 2 Run 1	103.1158	103.1165	0.0007	0.0005
Unit 2 Run 2	83.9637	83.9638	0.0001	ND
Unit 2 Run 3	86.4742	86.4801	0.0059	0.0057
Unit 3 Blank	85.7026	85.7022	-0.0004	
Unit 3 Run 1	122.9355	122.9358	0.0003	0.0007
Unit 3 Run 2	125.0860	125.0869	0.0009	0.0013
Unit 3 Run 3	117.3470	117.3472	0.0002	0.0006

Task	Unit	Personnel	Date	Quality Control	Y/N
Fiter Recovery:	Unit 1	S. Harrington	16-May-24	Adequate PW volume:	Y
	Unit 2	S. Harrington	16-17-May-24	No sample leakage:	Y
	Unit 3	J.Ching	5-Jun-24	Filter not compromised:	Y
PW Initial Analysis:	Unit 1	J. Ching	21-May-24		
	Unit 2	J. Ching	21-May-24		
	Unit 3	J. Ching	6-Jun-24		
PW, FilterFinal Analysis:	Unit 1	L. Forrer	23-May-24		
	Unit 2	L. Forrer	23-May-24		
	Unit 3	J. Ching	11-Jun-24		
Data entered to computer:	All	S. Harrington	24-May-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: 1733130 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006100 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
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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
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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: **1733130**
 Control Number:
 Date Received: May 21, 2024
 Date Reported: May 27, 2024
 Report Number: 3006100
 Report Type: Final Report

Reference Number	1733130-1	1733130-2
Sample Date	May 16, 2024	May 17, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Unit #1 HF Blank / 18.2 °C	Unit #2 HF Blank / 18.2 °C
Matrix	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	195	259	
Dilution Factor	fluoride		1.00	1.00	
Fluoride	As Tested	mg/L	<0.03	<0.03	0.03
Fluoride	Water Soluble	µg/sample	<6	<8	

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: HF Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1733130 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006100 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>	May 23, 2024	Element Vancouver

References

EMC Emission Measurement Center of EPA

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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: 1733132 Control Number: Date Received: May 21, 2024 Date Reported: Jun 4, 2024 Report Number: 3006101 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Contact	Company	Address
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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: HF Samples Project Location: LSD: P.O.:	Lot ID: 1733132 Control Number: Date Received: May 21, 2024 Date Reported: Jun 4, 2024 Report Number: 3006101 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733132-1	1733132-2	1733132-3
Sample Date	May 16, 2024	May 16, 2024	May 16, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Run 1 / 18.2 °C	Unit #1 HF Run 2 / 18.2 °C	Unit #1 HF Run 3 / 18.2 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	461	404	444
Dilution Factor	fluoride		10.00	10.00	10.00
Fluoride	As Tested	mg/L	<0.3	<0.3	<0.3
Fluoride	Water Soluble	µg/sample	<10	<10	<10

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: **1733132**
 Control Number:
 Date Received: May 21, 2024
 Date Reported: Jun 4, 2024
 Report Number: 3006101
 Report Type: Final Report

Reference Number	1733132-4	1733132-5	1733132-6
Sample Date	May 17, 2024	May 17, 2024	May 17, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 HF Run 1 / 18.2 °C	Unit #2 HF Run 2 / 18.2 °C	Unit #2 HF Run 3 / 18.2 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample mL	408	393	400	
Dilution Factor	fluoride	10.00	10.00	10.00	
Fluoride	As Tested mg/L	<0.3	<0.3	<0.3	0.03
Fluoride	Water Soluble µg/sample	<10	<10	<10	

Approved by: 

Max Hewitt
 Operations Manager

Methodology and Notes

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

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

Lot ID: **1733132**
Control Number:
Date Received: May 21, 2024
Date Reported: Jun 4, 2024
Report Number: 3006101
Report Type: Final Report

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>	May 23, 2024	Element Vancouver

References

EMC Emission Measurement Center of EPA

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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: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 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
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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: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733899-1	1733899-2	1733899-3
Sample Date	May 16, 2024	May 16, 2024	May 16, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles) / 20.6°C	Unit 1 Run 2 (MV Unit 1 R-2 + 4 Bottles) / 20.6°C	Unit 1 Run 3 (MV Unit 1 R-3 + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	10	20	10	5
Antimony	µg	<2	<2	6	2.5
Arsenic	µg	<1	<1	3.9	1
Cadmium	µg	0.8	0.6	0.5	0.25
Chromium	µg	0.28	0.40	1.0	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	2.6	3.0	4.2	0.25
Lead	µg	13	9.2	5.3	1.5
Manganese	µg	4.2	1	2	0.25
Nickel	µg	0.9	2	12	0.5
Phosphorus	µg	32	20	77	2.5
Selenium	µg	<2	2.8	<2	1.5
Tellurium	µg	11	7.6	5.9	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	69.2	96.1	61.2	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	25	24	20	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.9	<0.9	<0.9	1
Cadmium	µg	0.4	0.5	<0.2	0.25
Chromium	µg	0.90	1.2	0.78	0.2
Cobalt	µg	0.2	<0.2	<0.2	0.25
Copper	µg	2	2	2	0.25
Lead	µg	2	<1	2.3	1.5
Manganese	µg	1	1	0.7	0.25
Nickel	µg	0.9	1	0.5	0.5
Phosphorus	µg	27	29	30	2.5
Selenium	µg	3.0	6.6	<1	1.5
Tellurium	µg	6.2	7.6	4.0	2
Thallium	µg	3.3	6.3	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	6.4	11	28.6	0.5
Volume	Sample	mL	711	732	748
Volume	aliquot volume	mL	661	682	698
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: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 Report Type: Final Report
Attn: Missy	Proj. Acct. code:	
Sampled By:		
Company:		

Reference Number	1733899-1	1733899-2	1733899-3
Sample Date	May 16, 2024	May 16, 2024	May 16, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles) / 20.6°C	Unit 1 Run 2 (MV Unit 1 R-2 + 4 Bottles) / 20.6°C	Unit 1 Run 3 (MV Unit 1 R-3 + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	250	250	250
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	711	732	748
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
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	167	152	152
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	1000	1000	1000
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08
Mercury	As Tested	µg/L	<0.05	0.22	0.06
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	0.072	0.02

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: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733899-4	1733899-5	1733899-6
Sample Date	May 16, 2024	May 17, 2024	May 17, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 Bottles) / 20.6°C	Unit 2 Run 2 (MV Unit 2 Run-2 + 4 Bottles) / 20.6°C	Unit 2 Run 3 (MV Unit 2 Run-3 + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Front Half Metals Fraction 1A						
Aluminum	µg	10	10	28	5	
Antimony	µg	<2	<2	<2	2.5	
Arsenic	µg	<1	<1	5.5	1	
Cadmium	µg	<0.3	<0.3	<0.3	0.25	
Chromium	µg	11.3	4.11	12.9	0.2	
Cobalt	µg	<0.3	<0.3	<0.3	0.25	
Copper	µg	1.0	1	1	0.25	
Lead	µg	4.5	5.2	2.5	1.5	
Manganese	µg	3.0	2.6	2.6	0.25	
Nickel	µg	11	11	10	0.5	
Phosphorus	µg	71	68	73	2.5	
Selenium	µg	<2	<2	<2	1.5	
Tellurium	µg	7.8	<2	7.9	2	
Thallium	µg	2.6	<2	<2	1.5	
Vanadium	µg	<1	<1	<1	1	
Zinc	µg	14	20	47.7	0.5	
Back Half Metals Fraction 2A						
Aluminum	µg	20	20	20	5	
Antimony	µg	<2	<2	<2	2.5	
Arsenic	µg	3.3	<0.9	<0.9	1	
Cadmium	µg	0.5	0.3	0.3	0.25	
Chromium	µg	1.8	0.27	1.3	0.2	
Cobalt	µg	<0.2	<0.2	0.4	0.25	
Copper	µg	2	0.4	1	0.25	
Lead	µg	<1	<1	2.7	1.5	
Manganese	µg	1	0.9	0.6	0.25	
Nickel	µg	1	<0.4	<0.4	0.5	
Phosphorus	µg	32	25	20	2.5	
Selenium	µg	4.9	1	3.9	1.5	
Tellurium	µg	8.8	5.5	2.5	2	
Thallium	µg	8.9	2.2	<1	1.5	
Vanadium	µg	<0.9	<0.9	<0.9	1	
Zinc	µg	89.7	7.5	4.8	0.5	
Volume	Sample	mL	755	772	720	
Volume	aliquot volume	mL	705	722	670	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<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: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733899-4	1733899-5	1733899-6
Sample Date	May 16, 2024	May 17, 2024	May 17, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 R-1 + 4 Bottles) / 20.6°C	Unit 2 Run 2 (MV Unit 2 Run-2 + 4 Bottles) / 20.6°C	Unit 2 Run 3 (MV Unit 2 Run-3 + 4 Bottles) / 20.6°C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	250	250	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	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	755	772	720
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
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	154	163	182
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL	1000	1000	1000
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08
Mercury	As Tested	µg/L	0.06	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: Metals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1733899 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007210 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	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 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: Megals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1738446 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014671 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: Megals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1738446 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014671 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1738446-1	1738446-2	1738446-3
Sample Date	Jun 04, 2024	Jun 05, 2024	Jun 05, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °C	Unit 3 Run 2 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °C	Unit 3 Run 3 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples


Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	6	10	7	5
Antimony	µg	<2	<2	4	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	0.8	0.4	0.4	0.25
Chromium	µg	3.11	1.1	1.5	0.2
Cobalt	µg	<0.3	0.5	0.6	0.25
Copper	µg	3.0	3.5	2	0.25
Lead	µg	<2	5.6	<2	1.5
Manganese	µg	5.4	1	1	0.25
Nickel	µg	8.8	3.0	2	0.5
Phosphorus	µg	69	66	62	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	25.5	39.1	28.9	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	25	10	25	5
Antimony	µg	<2	3	<2	2.5
Arsenic	µg	<0.9	<0.9	<0.9	1
Cadmium	µg	0.2	<0.2	<0.2	0.25
Chromium	µg	2.62	1.2	2.74	0.2
Cobalt	µg	0.2	0.5	0.4	0.25
Copper	µg	2.4	0.9	2.4	0.25
Lead	µg	5.9	<1	<1	1.5
Manganese	µg	2	0.5	2	0.25
Nickel	µg	2	0.6	2	0.5
Phosphorus	µg	20	22	20	2.5
Selenium	µg	8.0	<1	2.8	1.5
Tellurium	µg	2.8	<2	<2	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	9.0	4.6	6.1	0.5
Volume	Sample	mL	822	811	744
Volume	aliquot volume	mL	772	761	694
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: Megals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1738446 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014671 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1738446-1	1738446-2	1738446-3
Sample Date	Jun 04, 2024	Jun 05, 2024	Jun 05, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °C	Unit 3 Run 2 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °C	Unit 3 Run 3 (MV Unit 3 Run 1 + 4 Bottles) / 22.1 °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	822	811	744	
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	0.37	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample mL	111	152	111	
Volume	aliquot volume mL	25	25	25	
Volume	Final mL	40	40	40	
Mercury	Fraction 3A µg/sample	0.065	<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	1.11	0.19	0.39	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	0.36	0.060	0.13	

Approved by: 
 Rachel Eden, B. Sc.
 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: Megals and Hg Samples Project Location: LSD: P.O.:	Lot ID: 1738446 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014671 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	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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Your Project #: MVWTE
 Site#: C440961
 Site Location: BURNABY, BC
 Your C.O.C. #: C440961-ONTV-01-01

Attention: Rany El-Roz

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

Report Date: 2024/06/11
 Report #: R8186722
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4H1868

Received: 2024/06/07, 09:13

Sample Matrix: Tedlar Bag
 # Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Nitrous Oxide	9	N/A	2024/06/07	CAM SOP-00203	GC/ECD

Remarks:

Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard, where applicable.
 This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
 Date Analyzed is the date the analytical batch was created.
 Results relate only to the items tested.
 Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

Encryption Key

Patrick Huynh
 Project Manager, Compressed
 Breathing Gases
 11 Jun 2024 15:58:58

Please direct all questions regarding this Certificate of Analysis to:
 Patrick Huynh, Project Manager, Compressed Breathing Gases
 Email: hoa.huynh@bureauveritas.com
 Phone# (905)817-5801

=====
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DATE OF REPORT: June 11, 2024

REPORT #: C4H1868
LAB #: ZJQ458

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:


Date Submitted: June 7, 2024


Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		2.5

Approved by: 
Iqbal Hasan
Analyst, Compressed Gases

Certified by: 
Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ460

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		2.8

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ461

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		3.9

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ462

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		1.8

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ463

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		2.9

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ464

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		2.9

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ465

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		5.5

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ466

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		6.2
Nitrous Oxide	ppmv		6.0

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:

Tom Mitchell, B.Sc
Supervisor, Compressed Gases



DATE OF REPORT: June 11, 2024

REPORT #: C4H1868

LAB #: ZJQ467

MEDICAL GAS PURITY REPORT OF ANALYSIS: TEDLAR BAG

Hospital:

Location:

Cylinder ID:

Date Submitted: June 7, 2024

Submitted By: Bureau Veritas
4606 Canada Way
Burnaby, BC V5G 1K5
Attn: Rany El-Roz

SAMPLE DATE: June 5, 2024

ANALYSIS RESULTS

Components	Concentration UNITS	Maximum Allowable	Analysed Sample
Nitrous Oxide	ppmv		4.7

Approved by:

Iqbal Hasan
Analyst, Compressed Gases

Certified by:


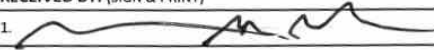
Tom Mitchell, B.Sc
Supervisor, Compressed Gases



ATR

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

BV LABS INTERLAB CHAIN OF CUSTODY RECORD

REPORT INFORMATION							ANALYSIS REQUESTED										Job Barcode Label																																																																																					
Company: Bureau Veritas Laboratories							<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small; margin-right: 10px;">N2O Gas CSA Z2396.1-09 Subcontract</div> <div style="text-align: center;"> <p>07-Jun-24 09:13</p> <p>Colby Coutu</p>  <p>C4H1868</p> <p>RPK AIR-RmTmp</p> </div> </div>										ADDITIONAL SAMPLE INFORMATION (P: 01) (P: 01) (P: 01) (P: 01) (P: 01) (P: 01) (P: 01) (P: 01) (P: 01)																																																																																					
Address: 4606 Canada Way, Burnaby, British Columbia, V5G 1K5																																																																																																						
Contact Name: Rany El-Roz																																																																																																						
Email: rany.el-roz@bureauveritas.com, Customersolutionswest@bureauveritas.com																																																																																																						
Phone:																																																																																																						
BV Labs Project #: C440961																																																																																																						
Client Invoice To: A. LANFRANCO & ASSOCIATES INC. (1301)																																																																																																						
Client Report To: A. LANFRANCO & ASSOCIATES INC. (1301)																																																																																																						
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2	COT799-UNIT 1 RUN 2	AIR	2024/06/05			1	X																																																																																															
3	COT800-UNIT 1 RUN 3	AIR	2024/06/05			1	X																																																																																															
4	COT801-UNIT 2 RUN 1	AIR	2024/06/05			1	X																																																																																															
5	COT802-UNIT 2 RUN 2	AIR	2024/06/05			1	X																																																																																															
6	COT803-UNIT 2 RUN 3	AIR	2024/06/05			1	X																																																																																															
7	COT804-UNIT 3 RUN 1	AIR	2024/06/05			1	X																																																																																															
8	COT805-UNIT 3 RUN 2	AIR	2024/06/05			1	X																																																																																															
9	COT806-UNIT 3 RUN 3	AIR	2024/06/05			1	X																																																																																															
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SITE #:											Please inform Bureau Veritas immediately if you are not accredited for the requested test(s) or the hold time is approaching. **Please return a copy of this form with the report.** !!!*DO NOT DISCARD, RETURN TO CLIENT AFTER ANALYSIS; SHIP USING Purolator account 2269965*!!!				National Excel (N001)		<input type="checkbox"/> Rush Required 2024/06/21 Date Required <i>Please inform us if rush charges will be incurred.</i>																																																																																					
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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: 1733115 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006081 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: 1733115 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006081 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733115-1	1733115-2
Sample Date	May 16, 2024	May 17, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Unit #1 NH3 Blk / 18.2 °C	Unit #2 NH3 Blk / 18.2 °C
Matrix	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Ammonium - N	As Tested	µg/L	67	133	25
Dilution Factor	As Tested		1.00	1.00	
Sample Volume	Sample volume	mL	426	438	
Ammonium - N		µg/sample	29	58.3	

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: NH3 Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1733115 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006081 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	May 24, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

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

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: NH3 Samples Project Location: LSD: P.O.:	Lot ID: 1733118 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006083 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 Samples Project Location: LSD: P.O.:	Lot ID: 1733118 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006083 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733118-1	1733118-2	1733118-3
Sample Date	May 16, 2024	May 16, 2024	May 16, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 NH3 / 18.2 °C	Unit 1 Run 2 NH3 / 18.2 °C	Unit 1 Run 3 NH3 / 18.2 °C
Matrix	Stack Samples	Stack Samples	Stack Samples


Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Air Quality						
Ammonium - N	As Tested	µg/L	3730	4900	3540	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	480	415	410	
Ammonium - N		µg/sample	1790	2040	1450	

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: 1733118 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006083 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733118-4	1733118-5	1733118-6
Sample Date	May 17, 2024	May 17, 2024	May 17, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 NH3 / 18.2 °C	Unit 2 Run 2 NH3 / 18.2 °C	Unit 2 Run 3 NH3 / 18.2 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	2090	867	755	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	435	200	325	
Ammonium - N		µg/sample	911	173	245	

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: NH3 Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1733118 Control Number: Date Received: May 21, 2024 Date Reported: May 27, 2024 Report Number: 3006083 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	May 24, 2024	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

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: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1733906 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007219 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: Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1733906 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007219 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1733906-1	1733906-2
Sample Date	May 13, 2024	May 13, 2024
Sample Time	NA	NA
Sample Location		
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2

Analyte	Matrix	Stack Samples		Nominal Detection Limit
		Stack Samples	Stack Samples	
Units	Results	Results	Results	
Front Half Metals Fraction 1A				
Aluminum	µg	5	20	5
Antimony	µg	<2	<2	2.5
Arsenic	µg	<1	1	1
Cadmium	µg	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	0.25
Copper	µg	1	<0.3	0.25
Lead	µg	<2	<2	1.5
Manganese	µg	<0.3	<0.3	0.25
Nickel	µg	2	<0.5	0.5
Phosphorus	µg	4	<2	2.5
Selenium	µg	<2	<2	1.5
Tellurium	µg	5.8	9.5	2
Thallium	µg	<2	<2	1.5
Vanadium	µg	<1	<1	1
Zinc	µg	3.7	8.1	0.5
Back Half Metals Fraction 2A				
Aluminum	µg	6	6	5
Antimony	µg	<3	<3	2.5
Arsenic	µg	<1	4.1	1
Cadmium	µg	0.3	0.5	0.25
Chromium	µg	<0.2	0.35	0.2
Cobalt	µg	<0.3	<0.3	0.25
Copper	µg	<0.3	1	0.25
Lead	µg	<2	<2	1.5
Manganese	µg	<0.3	0.3	0.25
Nickel	µg	<0.5	<0.5	0.5
Phosphorus	µg	27	20	2.5
Selenium	µg	<2	6.4	1.5
Tellurium	µg	<2	11	2
Thallium	µg	<2	5.1	1.5
Vanadium	µg	<1	<1	1
Zinc	µg	40.8	20	0.5
Volume	Sample	mL	210	211
Volume	aliquot volume	mL	160	161
Mercury by CVAA				
Mercury	As Tested	µg/L	<0.05	<0.05
Dilution Factor	As Tested		1	1
Volume	Sample	mL	250	250

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: 1733906 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007219 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Analyte	Matrix	Units	Reference Number		Nominal Detection Limit
			1733906-1	1733906-2	
Sample Description		Stack Samples	Stack Samples	Stack Samples	
Mercury by CVAA - Continued					
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	
Volume	Sample	mL	210	211	
Volume	aliquot volume	mL	5.0	5.0	
Volume	Final	mL	45	45	
Mercury	Fraction 2B	µg/sample	<0.09	<0.09	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	
Volume	Sample	mL	100	99	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	
Volume	Sample	mL	500	500	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	
Volume	Sample	mL	200	200	
Volume	aliquot volume	mL	25	25	
Volume	Final	mL	40	40	
Mercury	Fraction 3C	µg/sample	<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: 1733906 Control Number: Date Received: May 23, 2024 Date Reported: Jun 13, 2024 Report Number: 3007219 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	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 11, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	May 28, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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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: 1738322 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014498 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: 1738322 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014498 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1738322-1
Sample Date	Jun 05, 2024
Sample Time	NA
Sample Location	
Sample Description	Field Blank Unit 3 (MV unit 3 BLANK + 4 Bottles) / 22.1 °C
Matrix	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	8			5
Antimony	µg	<2			2.5
Arsenic	µg	2			1
Cadmium	µg	<0.3			0.25
Chromium	µg	0.72			0.2
Cobalt	µg	<0.3			0.25
Copper	µg	1			0.25
Lead	µg	<2			1.5
Manganese	µg	<0.3			0.25
Nickel	µg	0.6			0.5
Phosphorus	µg	63			2.5
Selenium	µg	<2			1.5
Tellurium	µg	4.3			2
Thallium	µg	<2			1.5
Vanadium	µg	<1			1
Zinc	µg	4.5			0.5
Back Half Metals Fraction 2A					
Aluminum	µg	5			5
Antimony	µg	<2			2.5
Arsenic	µg	<0.9			1
Cadmium	µg	<0.2			0.25
Chromium	µg	0.71			0.2
Cobalt	µg	0.3			0.25
Copper	µg	1			0.25
Lead	µg	<1			1.5
Manganese	µg	0.3			0.25
Nickel	µg	0.8			0.5
Phosphorus	µg	20			2.5
Selenium	µg	<1			1.5
Tellurium	µg	<2			2
Thallium	µg	<1			1.5
Vanadium	µg	<0.9			1
Zinc	µg	4.6			0.5
Volume	Sample	mL	352		
Volume	aliquot volume	mL	302		
Mercury by CVAA					
Mercury	As Tested	µg/L	<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: **1738322**
 Control Number:
 Date Received: Jun 11, 2024
 Date Reported: Jun 27, 2024
 Report Number: 3014498
 Report Type: Final Report

Reference Number 1738322-1
Sample Date Jun 05, 2024
Sample Time NA
Sample Location
Sample Description Field Blank Unit 3
 (MV unit 3 BLANK +
 4 Bottles) / 22.1 °C
Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Dilution Factor	As Tested		1		
Volume	Sample	mL	250		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 1B	µg/sample	<0.02		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	352		
Volume	aliquot volume	mL	5.0		
Volume	Final	mL	40		
Mercury	Fraction 2B	µg/sample	<0.1		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	107		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3A	µg/sample	<0.009		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	500		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3B	µg/sample	<0.04		
Mercury	As Tested	µg/L	0.07		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	200		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3C	µg/sample	0.02		

Approved by: 
 Rachel Eden, B. Sc.
 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: 1738322 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014498 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	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 12, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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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: 1738433 Control Number: Date Received: Jun 12, 2024 Date Reported: Jun 27, 2024 Report Number: 3014640 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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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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Bill To: A. Lanfranco & Associates
 #101, 9488 - 189 Street
 Surrey, BC, Canada
 V4N 4W7
 Attn: Missy
 Sampled By:
 Company:


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

Lot ID: **1738433**
 Control Number:
 Date Received: Jun 12, 2024
 Date Reported: Jun 27, 2024
 Report Number: 3014640
 Report Type: Final Report

Reference Number 1738433-1
 Sample Date May 13, 2024
 Sample Time NA
 Sample Location
 Sample Description Reagent Blank Unit 3
 Container 1 (filter) /
 22.1 °C

Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5			5
Antimony	µg	<2			2.5
Arsenic	µg	4.9			1
Cadmium	µg	<0.3			0.25
Chromium	µg	<0.2			0.2
Cobalt	µg	<0.3			0.25
Copper	µg	0.8			0.25
Lead	µg	<2			1.5
Manganese	µg	4.0			0.25
Nickel	µg	<0.5			0.5
Phosphorus	µg	68			2.5
Selenium	µg	<2			1.5
Tellurium	µg	<2			2
Thallium	µg	<2			1.5
Vanadium	µg	<1			1
Zinc	µg	3.5			0.5
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	250		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 1B	µg/sample	<0.02		

Approved by: 
 Rachel Eden, B. Sc.
 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: Filter Reagent Blanks Project Location: LSD: P.O.:	Lot ID: 1738433 Control Number: Date Received: Jun 12, 2024 Date Reported: Jun 27, 2024 Report Number: 3014640 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	Jun 26, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29 <i>* Reference Method Modified</i>	Jun 18, 2024	Element Vancouver

References

EMC Emission Measurement Center of EPA

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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: 1738313 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014489 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
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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
 Attn: Missy
 Sampled By:
 Company:

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

Lot ID: **1738313**
 Control Number:
 Date Received: Jun 11, 2024
 Date Reported: Jun 17, 2024
 Report Number: 3014489
 Report Type: Final Report

Reference Number 1738313-1
Sample Date Jun 05, 2024
Sample Time NA
Sample Location
Sample Description Unit #3 HF Blank /
 22.1 °C
Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	329		
Dilution Factor	fluoride		1.00		
Fluoride	As Tested	mg/L	<0.03		0.03
Fluoride	Water Soluble	µg/sample	<10		

Approved by: 
 Rachel Eden, B. Sc.
 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: HF Blanks Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1738313 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014489 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>	Jun 12, 2024	Element Vancouver

References

EMC	Emission Measurement Center of EPA
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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: 1738312 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014488 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
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Notes To Clients:

- Jun 13, 2024 - Reduction of analytical volume was necessary for fluoride analysis due to matrix effects in lot 1738312. Detection limits are adjusted accordingly.


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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: HF Samples Project Location: LSD: P.O.:	Lot ID: 1738312 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014488 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1738312-1	1738312-2	1738312-3
Sample Date	Jun 05, 2024	Jun 05, 2024	Jun 05, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 HF Run 1 / 22.1 °C	Unit #3 HF Run 2 / 22.1 °C	Unit #3 HF Run 3 / 22.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Volume	Sample	mL	325	357	323
Dilution Factor	fluoride		10.00	10.00	10.00
Fluoride	As Tested	mg/L	<0.3	<0.3	<0.3
Fluoride	Water Soluble	µg/sample	<100	<100	<100

Approved by: 
 Rachel Eden, B. Sc.
 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: HF Samples Project Location: LSD: P.O.:	Lot ID: 1738312 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014488 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

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>	Jun 12, 2024	Element Vancouver

References

EMC Emission Measurement Center of EPA

Comments:

- Jun 13, 2024 - Reduction of analytical volume was necessary for fluoride analysis due to matrix effects in lot 1738312. Detection limits are adjusted accordingly.

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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: 1738303 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014477 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
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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
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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: NH3 Blanks
 Project Location:
 LSD:
 P.O.:
 Proj. Acct. code:

Lot ID: **1738303**
 Control Number:
 Date Received: Jun 11, 2024
 Date Reported: Jun 17, 2024
 Report Number: 3014477
 Report Type: Final Report

Reference Number 1738303-1
Sample Date Jun 05, 2024
Sample Time NA
Sample Location
Sample Description Unit #3 NH3 Blk /
 22.1 °C
Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Ammonium - N	As Tested	µg/L	184		25
Dilution Factor	As Tested		1.00		
Sample Volume	Sample volume	mL	280		
Ammonium - N		µg/sample	51.5		

Approved by: 
 Benjamin Morris, B.Sc
 Operations Manager

Methodology and Notes

Bill To: A. Lanfranco & Associates	Project ID: Metro Vancouver WTE	Lot ID: 1738303
#101, 9488 - 189 Street	Project Name: NH3 Blanks	Control Number:
Surrey, BC, Canada	Project Location:	Date Received: Jun 11, 2024
V4N 4W7	LSD:	Date Reported: Jun 17, 2024
Attn: Missy	P.O.:	Report Number: 3014477
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	Jun 17, 2024	Element Edmonton - Roper Road

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
------	--

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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: 1738300 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014474 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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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: 1738300 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014474 Report Type: Final Report
Attn: Missy Sampled By: Company:	Proj. Acct. code:	

Reference Number	1738300-1	1738300-2	1738300-3
Sample Date	Jun 05, 2024	Jun 05, 2024	Jun 05, 2024
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 NH3 / 22.1 °C	Unit 3 Run 2 NH3 / 22.1 °C	Unit 3 Run 3 NH3 / 22.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Ammonium - N	As Tested	µg/L	9990	9510	11900
Dilution Factor	As Tested		10.0	1.00	10.0
Sample Volume	Sample volume	mL	470	424	410
Ammonium - N		µg/sample	4700	4030	4900

Approved by: 

Benjamin Morris, B.Sc
 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: NH3 Samples Project Location: LSD: P.O.: Proj. Acct. code:	Lot ID: 1738300 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 17, 2024 Report Number: 3014474 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	Jun 17, 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: 1738323 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014499 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: Reagent Blanks
 Project Location:
 LSD:
 P.O.:
 Proj. Acct. code:

Lot ID: **1738323**
 Control Number:
 Date Received: Jun 11, 2024
 Date Reported: Jun 27, 2024
 Report Number: 3014499
 Report Type: Final Report

Reference Number 1738323-1
 Sample Date May 13, 2024
 Sample Time NA
 Sample Location
 Sample Description Reagent Blank Unit 3
 / 22.1 °C

Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5			5
Antimony	µg	<2			2.5
Arsenic	µg	3.1			1
Cadmium	µg	<0.3			0.25
Chromium	µg	<0.2			0.2
Cobalt	µg	0.5			0.25
Copper	µg	0.9			0.25
Lead	µg	<2			1.5
Manganese	µg	<0.3			0.25
Nickel	µg	<0.5			0.5
Phosphorus	µg	<2			2.5
Selenium	µg	<2			1.5
Tellurium	µg	<2			2
Thallium	µg	<2			1.5
Vanadium	µg	<1			1
Zinc	µg	3.5			0.5
Back Half Metals Fraction 2A					
Aluminum	µg	<5			5
Antimony	µg	<3			2.5
Arsenic	µg	<1			1
Cadmium	µg	<0.3			0.25
Chromium	µg	0.78			0.2
Cobalt	µg	<0.3			0.25
Copper	µg	0.6			0.25
Lead	µg	<2			1.5
Manganese	µg	0.3			0.25
Nickel	µg	<0.5			0.5
Phosphorus	µg	30			2.5
Selenium	µg	<2			1.5
Tellurium	µg	7.3			2
Thallium	µg	<2			1.5
Vanadium	µg	<1			1
Zinc	µg	5.4			0.5
Volume	Sample	mL	204		
Volume	aliquot volume	mL	154		
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		

Analytical Report


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

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

Lot ID: **1738323**
 Control Number:
 Date Received: Jun 11, 2024
 Date Reported: Jun 27, 2024
 Report Number: 3014499
 Report Type: Final Report

Reference Number 1738323-1
Sample Date May 13, 2024
Sample Time NA
Sample Location
Sample Description Reagent Blank Unit 3
 / 22.1 °C
Matrix Stack Samples

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued					
Volume	Sample	mL	250		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 1B	µg/sample	<0.02		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	204		
Volume	aliquot volume	mL	5.0		
Volume	Final	mL	50		
Mercury	Fraction 2B	µg/sample	<0.1		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	98		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3A	µg/sample	<0.008		
Mercury	As Tested	µg/L	<0.05		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	500		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3B	µg/sample	<0.04		
Mercury	As Tested	µg/L	0.06		0.05
Dilution Factor	As Tested		1		
Volume	Sample	mL	200		
Volume	aliquot volume	mL	25		
Volume	Final	mL	40		
Mercury	Fraction 3C	µg/sample	0.02		

Approved by: 
 Rachel Eden, B. Sc.
 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: 1738323 Control Number: Date Received: Jun 11, 2024 Date Reported: Jun 27, 2024 Report Number: 3014499 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	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 12, 2024	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Jun 26, 2024	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Jun 18, 2024	Element Vancouver

* Reference Method Modified

References

EMC Emission Measurement Center of EPA

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APPENDIX - D

COMPUTER GENERATED RESULTS

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

Date: 16-May-24
Run: 1 - Particulate / Metals
Run Time: 07:57 - 10:00

Concentrations:

Particulate	0.97 mg/dscm	0.00042 gr/dscf
	0.55 mg/Acm	0.00024 gr/Acf
	0.90 mg/dscm (@ 11% O2)	0.00039 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.074 Kg/hr	0.164 lb/hr
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Flue Gas Characteristics:

Flow	1275 dscm/min	45024 dscf/min
	21.25 dscm/sec	750 dscf/sec
	2267 Acm/min	80046 Acf/min

Velocity	14.832 m/sec	48.66 f/sec
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Temperature	150.6 oC	303.0 oF
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Moisture	14.2 %
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Gas Analysis	10.2 % O2 9.6 % CO2
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29.947 Mol. Wt (g/gmole) Dry
28.248 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.0612 dscm	72.792 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: 16-May-24
 Run: 1 - Particulate / Metals
 Run Time: 07:57 - 10:00

Control Unit (Y) 0.9793
 Nozzle Diameter (in.) 0.2550
 Pitot Factor 0.8375
 Baro. Press. (in. Hg) 29.83
 Static Press. (in. H2O) -20.00
 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) 0.00180
 Washings (grams) 0.00020
 Traverse 1
 Traverse 2
 Total (grams) 0.00200

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.00 9.95
 Traverse 2 9.25 10.40
 9.63 10.18

Condensate Collection:
 Impinger 1 164.0
 Impinger 2 56.0
 Impinger 3 14.0
 Impinger 4 5.0
 Impinger 5 3.0
 Impinger 6 2.0
 Gel 12.5
 Gain (grams) 256.5

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										
1	5.0	365.180	0.35	0.91	70	70	4	302	1.5	103.9
2	10.0	367.740	0.33	0.85	70	70	4	303	4.7	103.9
3	15.0	370.100	0.28	0.73	71	71	4	303	8.4	103.7
4	20.0	372.670	0.33	0.86	72	72	4	303	12.5	103.9
5	25.0	375.120	0.30	0.78	72	72	4	302	17.7	103.8
6	30.0	377.730	0.34	0.88	72	72	4	301	25.2	103.8
7	35.0	380.810	0.47	1.23	73	73	5	301	45.6	104.1
8	40.0	384.410	0.64	1.67	74	74	5	300	53.2	104.1
9	45.0	388.030	0.64	1.67	75	75	6	300	58.3	104.6
10	50.0	391.820	0.71	1.86	75	75	6	302	62.5	104.1
11	55.0	395.620	0.71	1.86	76	76	6	302	66.1	104.1
12	60.0	399.340	0.68	1.78	76	76	6	303	69.4	104.2
Traverse 2										
1	5.0	402.920	0.63	1.65	77	77	6	303	1.5	104.0
2	10.0	406.610	0.66	1.73	78	78	6	304	4.7	104.6
3	15.0	410.200	0.64	1.68	78	78	6	304	8.4	103.3
4	20.0	413.940	0.68	1.79	79	79	6	304	12.5	104.3
5	25.0	417.780	0.71	1.87	80	80	6	305	17.7	104.7
6	30.0	421.640	0.72	1.90	81	81	6	304	25.2	104.2
7	35.0	424.540	0.40	1.05	80	80	4	305	45.6	105.1
8	40.0	427.200	0.35	0.92	80	80	4	304	53.2	103.0
9	45.0	429.950	0.36	0.95	81	81	4	305	58.3	104.8
10	50.0	432.630	0.35	0.92	79	79	4	304	62.5	103.9
11	55.0	435.390	0.37	0.97	79	79	4	304	66.1	104.1
12	60.0	438.008	0.33	0.87	80	80	4	303	69.4	104.3
Average:			0.499	1.308	76.2	76.2	4.9	303.0		104.1

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

Date: 16-May-24
Run: 2 - Particulate / Metals
Run Time: 10:18 - 12:20

Concentrations:

Particulate	0.59 mg/dscm	0.00026 gr/dscf
	0.32 mg/Acm	0.00014 gr/Acf
	0.57 mg/dscm (@ 11% O2)	0.00025 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.046 Kg/hr	0.102 lb/hr
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Flue Gas Characteristics:

Flow	1317 dscm/min	46513 dscf/min
	21.95 dscm/sec	775 dscf/sec
	2380 Acm/min	84067 Acf/min

Velocity	15.577 m/sec	51.10 f/sec
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Temperature	152.6 oC	306.7 oF
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Moisture	15.2 %
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Gas Analysis	10.8 % O2 9.3 % CO2
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29.910 Mol. Wt (g/gmole) Dry
28.097 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.1305 dscm	75.238 dscf
Sample Time	120.0 minutes	
Isokineticity	104.9 %	

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

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

Date: 16-May-24
Run: 2 - Particulate / Metals
Run Time: 10:18 - 12:20

Control Unit (Y) 0.9793
Nozzle Diameter (in.) 0.2542
Pitot Factor 0.8337
Baro. Press. (in. Hg) 29.83
Static Press. (in. H2O) -20.00
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) 0.00120
 Washings (grams) 0.00005
Total (grams) 0.00125

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	9.00	10.85
Traverse 2	9.50	10.65
Average	9.25	10.75

Condensate Collection:

Impinger 1	168.0
Impinger 2	72.0
Impinger 3	22.0
Impinger 4	6.0
Impinger 5	4.0
Impinger 6	2.0
Gel	13.0
Gain (grams)	287.0

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										
1	5.0	441.550	0.39	0.98	77	77	5	300	1.5	103.8
2	10.0	444.310	0.39	1.00	77	77	5	301	4.7	103.6
3	15.0	447.210	0.42	1.07	78	78	5	306	8.4	105.1
4	20.0	450.110	0.42	1.07	78	78	5	306	12.5	105.1
5	25.0	453.170	0.46	1.18	78	78	5	304	17.7	105.8
6	30.0	456.400	0.52	1.33	78	78	5	304	25.2	105.1
7	35.0	459.810	0.58	1.49	79	79	7	305	45.6	105.0
8	40.0	463.250	0.59	1.51	79	79	7	307	53.2	105.2
9	45.0	466.680	0.58	1.49	79	79	7	304	58.3	105.5
10	50.0	470.110	0.60	1.54	79	79	7	306	62.5	103.9
11	55.0	473.490	0.57	1.46	79	79	7	306	66.1	105.0
12	60.0	476.820	0.55	1.41	80	80	7	306	69.4	105.1
Traverse 2										
1	5.0	480.440	0.65	1.67	81	81	8	305	1.5	104.9
2	10.0	484.080	0.67	1.73	81	81	8	305	4.7	104.0
3	15.0	487.770	0.68	1.75	82	82	8	306	8.4	104.5
4	20.0	491.450	0.68	1.75	83	83	8	309	12.5	104.2
5	25.0	495.250	0.71	1.83	84	84	8	311	17.7	105.3
6	30.0	499.030	0.70	1.81	86	86	8	310	25.2	105.0
7	35.0	501.950	0.41	1.06	86	86	5	310	45.6	105.8
8	40.0	504.920	0.43	1.11	87	87	5	309	53.2	104.8
9	45.0	507.920	0.44	1.14	86	86	5	309	58.3	104.9
10	50.0	511.210	0.53	1.37	86	86	5	311	62.5	105.0
11	55.0	514.470	0.52	1.34	86	86	5	311	66.1	105.0
12	60.0	517.550	0.46	1.19	87	87	5	310	69.4	105.2
Average:			0.540	1.387	81.5	81.5	6.2	306.7		104.9

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

Date: 16-May-24
Run: 3 - Particulate / Metals
Run Time: 12:35 - 14:39

Concentrations:

Particulate	2.4 mg/dscm	0.0011 gr/dscf
	1.4 mg/Acm	0.0006 gr/Acf
	2.4 mg/dscm (@ 11% O2)	0.0010 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.188 Kg/hr	0.415 lb/hr
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Flue Gas Characteristics:

Flow	1284 dscm/min	45347 dscf/min
	21.40 dscm/sec	756 dscf/sec
	2286 Acmin/min	80717 Acf/min

Velocity	14.956 m/sec	49.07 f/sec
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Temperature	153.8 oC	308.9 oF
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Moisture	13.7 %	
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Gas Analysis	10.6 % O2	
	9.5 % CO2	

29.944 Mol. Wt (g/gmole) Dry
28.311 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.0447 dscm	72.208 dscf
Sample Time	120.0 minutes	
Isokineticity	102.6 %	

* **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: 16-May-24
 Run: 3 - Particulate / Metals
 Run Time: 12:35 - 14:39

Control Unit (Y) 0.9793
 Nozzle Diameter (in.) 0.2550
 Pitot Factor 0.8373
 Baro. Press. (in. Hg) 29.83
 Static Press. (in. H2O) -20.00
 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) 0.00210
 Washings (grams) 0.00290
 Traverse 1
 Traverse 2
 Total (grams) 0.00500

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.00 10.15
 Traverse 2 9.00 11.05
 9.50 10.60

Condensate Collection:
 Impinger 1 156.0
 Impinger 2 52.0
 Impinger 3 12.0
 Impinger 4 5.0
 Impinger 5 3.0
 Impinger 6 2.0
 Gel 13.0
 Gain (grams) 243.0

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	518.006								
1	5.0	520.730	0.36	0.94	85	85	4	304	1.5	102.5
2	10.0	523.460	0.37	0.96	86	86	4	306	4.7	101.3
3	15.0	526.230	0.37	0.96	86	86	4	306	1.5	102.8
4	20.0	528.890	0.34	0.88	85	85	4	307	4.7	103.2
5	25.0	531.660	0.37	0.96	85	85	4	308	17.7	103.1
6	30.0	534.400	0.38	0.92	86	86	4	308	25.2	100.4
7	35.0	538.010	0.63	1.63	86	86	6	309	45.6	103.0
8	40.0	541.750	0.69	1.79	87	87	6	309	53.2	101.8
9	45.0	545.390	0.63	1.63	86	86	6	309	58.3	103.9
10	50.0	548.900	0.60	1.55	86	86	6	310	62.5	102.7
11	55.0	552.470	0.61	1.58	87	87	6	309	66.1	103.3
12	60.0	555.900	0.58	1.51	87	87	6	308	69.4	101.7
Traverse 2	0.0	555.900								
1	5.0	559.330	0.56	1.46	87	87	5	308	1.5	103.5
2	10.0	562.910	0.62	1.61	87	87	5	309	4.7	102.8
3	15.0	566.610	0.67	1.74	87	87	6	309	8.4	102.2
4	20.0	570.420	0.72	1.87	87	87	6	310	12.5	101.6
5	25.0	574.240	0.71	1.84	87	87	6	310	17.7	102.6
6	30.0	578.040	0.70	1.82	87	87	6	310	25.2	102.8
7	35.0	580.910	0.39	1.01	88	88	5	310	45.6	103.6
8	40.0	583.750	0.38	0.99	88	88	5	311	53.2	103.9
9	45.0	586.470	0.36	0.93	88	88	5	311	58.3	102.2
10	50.0	589.150	0.34	0.88	87	87	5	311	62.5	103.8
11	55.0	591.720	0.33	0.85	87	87	5	311	66.1	101.1
12	60.0	594.329	0.33	0.86	87	87	5	310	69.4	102.5
Average:			0.502	1.299	86.6	86.6	5.2	308.9		102.6

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

Sample Type: HF				
Parameter		Test 1	Test 2	Test 3
Test Date		16-May-24	16-May-24	16-May-24
Test Time		09:27 - 10:27	10:57 - 11:57	12:15 - 13:15
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.83	29.83	29.83
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	298.709	299.241	299.803
Final Reading	(m ³)	299.238	299.797	300.413
Temp. Outlet	(Avg. oF)	65.5	68.5	71.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.55	0.57	0.63
HF	(mg)	0.005	0.005	0.005
Oxygen	(Vol. %)	10.2	10.8	10.6
HF	(mg/Sm³)	0.010	0.009	0.008
HF	(mg/Sm³ @ 11% O2)	0.009	0.009	0.008
Moisture	(Vol. %)	15.2	15.2	13.7

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

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

Sample Type: NH ₃				
Parameter		Test 1	Test 2	Test 3
Test Date		16-May-24	16-May-24	16-May-24
Test Time		09:27 - 10:27	10:57 - 11:57	12:15 - 13:15
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.83	29.83	29.83
DGM Factor	(Y)	0.9938	0.9938	0.9938
Initial Reading	(m ³)	605.945	606.445	606.951
Final Reading	(m ³)	606.442	606.948	607.482
Temp. Outlet	(Avg. oF)	59.5	71.0	71.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.50	0.50	0.52
NH ₃	(mg)	2.1	2.4	1.7
Oxygen	(Vol. %)	10.2	10.8	10.6
NH₃	(mg/Sm³)	4.3	4.9	3.3
NH₃	(mg/Sm³ @ 11% O2)	3.9	4.8	3.2
Moisture	(Vol. %)	15.2	15.2	13.7

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

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

Date: 16-May-24
Run: 1 - Particulate / Metals
Run Time: 10:32 - 12:34

Concentrations:

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

Emission Rates:

Particulate	0.015 Kg/hr	0.032 lb/hr
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Flue Gas Characteristics:

Flow	1082 dscm/min	38206 dscf/min
	18.03 dscm/sec	637 dscf/sec
	1891 Acm/min	66779 Acf/min

Velocity	12.373 m/sec	40.59 f/sec
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Temperature	151.1 oC	303.9 oF
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Moisture	12.5 %
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Gas Analysis	10.7 % O2 8.9 % CO2
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29.848 Mol. Wt (g/gmole) Dry
28.370 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.4447 dscm	86.334 dscf
Sample Time	120.0 minutes	
Isokineticity	100.8 %	

* **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: 16-May-24
 Run: 1 - Particulate / Metals
 Run Time: 10:32 - 12:34

Control Unit (Y) 1.0114
 Nozzle Diameter (in.) 0.3063
 Pitot Factor 0.8472
 Baro. Press. (in. Hg) 29.92
 Static Press. (in. H2O) -22.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00050
 Total (grams) 0.00055

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.00 11.00
 Traverse 2 8.75 10.40
 8.88 10.70

Condensate Collection:
 Impinger 1 116.0
 Impinger 2 79.0
 Impinger 3 36.0
 Impinger 4 8.0
 Impinger 5 5.0
 Impinger 6 2.0
 Gel 15.5
 Gain (grams) 261.5

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	464.533								
1	5.0	468.160	0.35	1.84	66	66	2.5	304	1.5	100.8
2	10.0	471.900	0.37	1.95	67	67	2.5	304	4.7	100.9
3	15.0	475.590	0.36	1.90	67	67	3.5	303	8.4	100.9
4	20.0	479.180	0.34	1.79	67	67	3.5	303	12.5	101.0
5	25.0	482.660	0.32	1.69	68	68	3.5	304	17.7	100.7
6	30.0	486.100	0.31	1.64	69	69	3.5	304	25.2	101.0
7	35.0	489.190	0.25	1.33	70	70	5	304	45.6	100.7
8	40.0	492.400	0.27	1.43	70	70	5	304	53.2	100.7
9	45.0	495.560	0.26	1.38	71	71	4	304	58.3	100.8
10	50.0	498.590	0.24	1.27	71	71	4	304	62.5	100.6
11	55.0	501.500	0.22	1.17	72	72	4	304	66.1	100.7
12	60.0	504.340	0.21	1.12	72	72	4	304	69.4	100.6
Traverse 2	0.0	504.340								
1	5.0	507.190	0.21	1.12	74	74	4	304	1.5	100.5
2	10.0	510.110	0.22	1.17	74	74	4	304	4.7	100.7
3	15.0	513.160	0.24	1.28	74	74	4	304	8.4	100.7
4	20.0	516.020	0.21	1.12	75	75	4	304	12.5	100.7
5	25.0	518.950	0.22	1.18	76	76	4	304	17.7	100.6
6	30.0	523.280	0.48	2.57	76	76	4	304	25.2	101.0
7	35.0	527.840	0.53	2.85	77	77	4.5	304	45.6	101.1
8	40.0	532.320	0.51	2.74	78	78	4.5	304	53.2	101.1
9	45.0	536.890	0.53	2.85	78	78	5	304	58.3	101.2
10	50.0	541.540	0.55	2.96	78	78	5	304	62.5	101.1
11	55.0	545.980	0.50	2.69	78	78	3.5	304	66.1	101.1
12	60.0	550.280	0.47	2.53	78	78	3.5	304	69.4	101.0
Average:			0.340	1.815	72.8	72.8	4.0	303.9		100.8

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

Date: 17-May-24
Run: 2 - Particulate / Metals
Run Time: 08:10 - 10:13

Concentrations:

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

Emission Rates:

Particulate	0.003 Kg/hr	0.006 lb/hr
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Flue Gas Characteristics:

Flow	1104 dscm/min	39003 dscf/min
	18.41 dscm/sec	650 dscf/sec
	1998 Acf/min	70566 Acf/min

Velocity	13.075 m/sec	42.90 f/sec
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Temperature	152.5 oC	306.6 oF
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Moisture	15.2 %
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Gas Analysis	10.5 % O2 8.8 % CO2
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29.825 Mol. Wt (g/gmole) Dry
28.033 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.4627 dscm	86.970 dscf
Sample Time	120.0 minutes	
Isokineticity	103.4 %	

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

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

Date: 17-May-24
Run: 2 - Particulate / Metals
Run Time: 08:10 - 10:13

Control Unit (Y) 1.0114
Nozzle Diameter (in.) 0.3063
Pitot Factor 0.8477
Baro. Press. (in. Hg) 29.92
Static Press. (in. H2O) -22.00
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) 0.00005
Total (grams) 0.00010

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	9.00	11.15
Traverse 2	8.55	9.90
Average	8.78	10.53

Condensate Collection:

Impinger 1	222.0
Impinger 2	66.0
Impinger 3	16.0
Impinger 4	6.0
Impinger 5	3.0
Impinger 6	2.0
Gel	15.0
Gain (grams)	330.0

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	551.637								
1	5.0	555.980	0.52	2.67	59	59	5	313	1.5	103.7
2	10.0	560.360	0.53	2.71	59	59	5	315	4.7	103.7
3	15.0	564.700	0.52	2.67	60	60	5	315	8.4	103.5
4	20.0	568.930	0.49	2.52	62	62	5	315	12.5	103.5
5	25.0	573.180	0.49	2.54	63	63	5	310	17.7	103.5
6	30.0	576.620	0.32	1.66	63	63	5	310	25.2	103.4
7	35.0	579.910	0.29	1.52	63	63	3	303	45.6	103.4
8	40.0	583.150	0.28	1.47	64	64	3	303	53.2	103.4
9	45.0	586.200	0.25	1.31	65	65	3	308	58.3	103.1
10	50.0	589.250	0.25	1.31	65	65	3	308	62.5	103.1
11	55.0	592.050	0.21	1.10	66	66	3	308	66.1	103.0
12	60.0	594.920	0.22	1.15	66	66	3	308	69.4	103.2
Traverse 2	0.0	594.920								
1	5.0	598.180	0.28	1.48	67	67	3	303	1.5	103.4
2	10.0	601.490	0.29	1.52	67	67	3	306	4.7	103.4
3	15.0	604.800	0.29	1.52	67	67	4	306	8.4	103.4
4	20.0	608.120	0.29	1.53	68	68	4	303	12.5	103.3
5	25.0	611.330	0.27	1.43	69	69	4	303	17.7	103.3
6	30.0	614.710	0.30	1.59	69	69	4	303	25.2	103.3
7	35.0	619.120	0.51	2.70	69	69	5	303	45.6	103.6
8	40.0	623.400	0.48	2.54	69	69	5	303	53.2	103.6
9	45.0	627.720	0.49	2.60	69	69	5	303	58.3	103.5
10	50.0	631.960	0.47	2.49	70	70	5	303	62.5	103.5
11	55.0	636.160	0.46	2.44	70	70	5	303	66.1	103.6
12	60.0	640.120	0.41	2.18	70	70	5	303	69.4	103.4
Average:			0.371	1.944	65.8	65.8	4.2	306.6		103.4

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

Date: 17-May-24
Run: 3 - Particulate / Metals
Run Time: 10:29 - 12:31

Concentrations:

Particulate	2.2 mg/dscm	0.0009 gr/dscf
	1.2 mg/Acm	0.0005 gr/Acf
	2.1 mg/dscm (@ 11% O2)	0.0009 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.15 Kg/hr	0.320 lb/hr
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Flue Gas Characteristics:

Flow	1116 dscm/min	39417 dscf/min
	18.60 dscm/sec	657 dscf/sec
	1944 Acm/min	68662 Acf/min

Velocity	12.722 m/sec	41.74 f/sec
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Temperature	150.4 oC	302.7 oF
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Moisture	12.3 %
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Gas Analysis	10.9 % O2
	8.9 % CO2

29.850 Mol. Wt (g/gmole) Dry
28.390 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6548 dscm	93.754 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: 17-May-24
Run: 3 - Particulate / Metals
Run Time: 10:29 - 12:31

Control Unit (Y) 1.0114
Nozzle Diameter (in.) 0.3145
Pitot Factor 0.8337
Baro. Press. (in. Hg) 29.92
Static Press. (in. H2O) -22.00
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) 0.00570

Total (grams) 0.0058

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	8.70	10.55
Traverse 2	9.00	11.15
Average	8.85	10.85

Condensate Collection:

Impinger 1	174.0
Impinger 2	68.0
Impinger 3	16.0
Impinger 4	4.0
Impinger 5	2.0
Impinger 6	1.0
Gel	15.0
Gain (grams)	280.0

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	640.557								
1	5.0	643.970	0.28	1.62	71	71	8	296	1.5	100.5
2	10.0	647.440	0.29	1.66	71	71	8	301	4.7	100.8
3	15.0	650.840	0.28	1.62	71	71	7	302	8.4	100.5
4	20.0	654.300	0.29	1.66	70	70	7	301	12.5	100.7
5	25.0	657.640	0.27	1.54	71	71	7	304	17.7	100.7
6	30.0	661.160	0.30	1.71	71	71	7	304	25.2	100.7
7	35.0	665.750	0.51	2.91	71	71	10	304	45.6	101.0
8	40.0	670.190	0.48	2.74	70	70	10	304	53.2	100.9
9	45.0	674.680	0.49	2.79	70	70	10	304	58.3	101.0
10	50.0	679.080	0.47	2.68	70	70	10	304	62.5	101.0
11	55.0	683.440	0.46	2.63	71	71	10	304	66.1	101.0
12	60.0	687.550	0.41	2.34	71	71	10	304	69.4	100.7
Traverse 2	0.0	687.550								
1	5.0	692.140	0.51	2.92	71	71	11	303	1.5	101.0
2	10.0	696.820	0.53	3.03	71	71	11	303	4.7	101.0
3	15.0	701.450	0.52	2.97	71	71	11	303	8.4	100.9
4	20.0	705.990	0.50	2.86	71	71	11	303	12.5	100.8
5	25.0	710.450	0.48	2.75	71	71	12	301	17.7	100.9
6	30.0	714.030	0.31	1.77	71	71	12	302	25.2	100.6
7	35.0	717.490	0.29	1.66	71	71	7	302	45.6	100.5
8	40.0	720.890	0.28	1.60	71	71	7	303	53.2	100.6
9	45.0	724.100	0.25	1.43	71	71	6	303	58.3	100.5
10	50.0	727.310	0.25	1.43	71	71	6	303	62.5	100.5
11	55.0	730.260	0.21	1.20	71	71	6	303	66.1	100.7
12	60.0	733.270	0.22	1.26	71	71	6	303	69.4	100.4
Average:			0.370	2.116	70.8	70.8	3.0	302.7		100.7

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

Sample Type: HF				
Parameter		Test 1	Test 2	Test 3
Test Date		17-May-24	17-May-24	17-May-24
Test Time		08:42 - 09:42	10:03 - 11:03	11:25 - 12:25
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.92	29.92	29.92
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	300.426	301.039	301.660
Final Reading	(m ³)	301.029	301.656	302.265
Temp. Outlet	(Avg. oF)	59.0	61.5	62.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.63624	0.64737	0.63563
HF	(mg)	0.005	0.005	0.01
Oxygen	(Vol. %)	10.7	10.5	10.9
HF	(mg/Sm³)	0.008	0.008	0.01
HF	(mg/Sm³ @ 11% O2)	0.008	0.008	0.01
Moisture (isokinetic)	(Vol. %)	12.5	15.2	12.3

*Wet Basis Calculated on moisture from isokinetic tests
Tstd. (oF) 68

Pstd. (in. Hg) 29.92

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

Sample Type: NH ₃				
Parameter		Test 1	Test 2	Test 3
Test Date		17-May-24	17-May-24	17-May-24
Test Time		08:42 - 09:42	10:03 - 11:03	11:15 - 12:15
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	29.92	29.92	29.92
DGM Factor	(Y)	0.9938	0.9938	0.9938
Initial Reading	(m ³)	607.486	608.013	608.519
Final Reading	(m ³)	608.010	608.516	609.037
Temp. Outlet	(Avg. oF)	60.5	61.5	61.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.52921	0.50603	0.52164
NH ₃	(mg)	1.0	0.1	0.2
Oxygen	(Vol. %)	10.7	10.5	10.9
NH₃	(mg/Sm³)	2.0	0.3	0.4
NH₃	(mg/Sm³ @ 11% O2)	1.9	0.3	0.4
Moisture (isokinetic)	(Vol. %)	12.5	15.2	12.3

*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: 4-Jun-24
Run: 1 - Particulate / Metals
Run Time: 11:27 - 13:29

Concentrations:

Particulate	0.47 mg/dscm	0.00021 gr/dscf
	0.26 mg/Acm	0.00011 gr/Acf
	0.38 mg/dscm (@ 11% O2)	0.00016 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.029 Kg/hr	0.064 lb/hr
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Flue Gas Characteristics:

Flow	1021 dscm/min	36065 dscf/min
	17.02 dscm/sec	601 dscf/sec
	1887 Acm/min	66650 Acf/min

Velocity	12.350 m/sec	40.52 f/sec
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Temperature	155.5 oC	311.8 oF
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Moisture	16.4 %
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Gas Analysis	8.5 % O2
	12.0 % CO2

30.252 Mol. Wt (g/gmole) Dry
28.243 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5383 dscm	89.642 dscf
Sample Time	120.0 minutes	
Isokineticity	105.8 %	

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

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

Date: 4-Jun-24
 Run: 1 - Particulate / Metals
 Run Time: 11:27 - 13:29

Control Unit (Y)	1.0114	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3137	Filter (grams) 0.00050	CO2	Impinger 1 172.0
Pitot Factor	0.8373	Washings (grams) 0.00070	O2	Impinger 2 119.0
Baro. Press. (in. Hg)	29.71		Traverse 1 11.90 8.90	Impinger 3 45.0
Static Press. (in. H2O)	-19.00		Traverse 2 12.00 8.10	Impinger 4 17.0
Stack Height (ft)	30	Total (grams) 0.00120		Impinger 5 4.0
Stack Diameter (in.)	70.90			Impinger 6 4.0
Stack Area (sq.ft.)	27.417			Gel 12.5
Minutes Per Reading	5.0		11.95 8.50	Gain (grams) 373.5
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	768.786								
1	5.0	772.000	0.25	1.42	71	71	5	320	1.5	105.7
2	10.0	775.360	0.27	1.56	71	71	5	311	4.7	105.8
3	15.0	778.590	0.25	1.44	71	71	5	313	8.4	105.8
4	20.0	782.060	0.29	1.66	71	71	5	314	12.5	105.6
5	25.0	785.650	0.31	1.78	72	72	5	315	17.7	105.6
6	30.0	789.730	0.40	2.30	72	72	4	315	25.2	105.8
7	35.0	794.830	0.62	3.57	74	74	5	315	45.6	106.1
8	40.0	799.820	0.59	3.41	75	75	5	314	53.2	106.1
9	45.0	804.720	0.57	2.29	75	75	5	315	58.3	105.8
10	50.0	808.830	0.40	2.31	75	75	5	315	62.5	106.0
11	55.0	812.840	0.38	2.20	76	76	6	315	66.1	105.8
12	60.0	817.010	0.41	2.37	76	76	6	315	69.4	106.0
Traverse 2	0.0	817.010								
1	5.0	821.570	0.47	2.83	77	77	6	285	1.5	106.1
2	10.0	826.100	0.48	2.80	77	77	6	310	4.7	106.0
3	15.0	830.490	0.45	2.62	77	77	6	310	8.4	106.0
4	20.0	834.360	0.35	2.04	77	77	6	310	12.5	105.8
5	25.0	837.890	0.29	1.69	78	78	6	310	17.7	105.8
6	30.0	841.100	0.24	1.40	78	78	6	310	25.2	105.7
7	35.0	844.100	0.21	1.23	78	78	6	310	45.6	105.5
8	40.0	847.100	0.21	1.22	78	78	6	313	53.2	105.7
9	45.0	850.240	0.23	1.34	78	78	6	313	58.3	105.8
10	50.0	853.090	0.19	1.11	78	78	6	313	62.5	105.6
11	55.0	855.940	0.19	1.11	78	78	6	313	66.1	105.6
12	60.0	858.870	0.20	1.17	78	78	5	310	69.4	105.6
Average:			0.344	1.953	75.5	75.5	5.5	311.8		105.8

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

Date: 5-Jun-24
Run: 2 - Particulate / Metals
Run Time: 09:27 - 11:29

Concentrations:

Particulate	0.57 mg/dscm	0.00025 gr/dscf
	0.31 mg/Acm	0.00013 gr/Acf
	0.49 mg/dscm (@ 11% O2)	0.00022 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.039 Kg/hr	0.085 lb/hr
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Flue Gas Characteristics:

Flow	1140 dscm/min	40275 dscf/min
	19.01 dscm/sec	671 dscf/sec
	2117 Acf/min	74779 Acf/min

Velocity	13.856 m/sec	45.46 f/sec
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Temperature	158.9 oC	318.0 oF
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Moisture	16.1 %
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Gas Analysis	9.5 % O2
	10.8 % CO2

30.105 Mol. Wt (g/gmole) Dry
28.154 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.8233 dscm	99.705 dscf
Sample Time	120.0 minutes	
Isokineticity	105.5 %	

*** 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 3

Date: 5-Jun-24
Run: 2 - Particulate / Metals
Run Time: 09:27 - 11:29

Control Unit (Y) 1.0114
Nozzle Diameter (in.) 0.3137
Pitot Factor 0.8373
Baro. Press. (in. Hg) 29.71
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) 0.00030
 Washings (grams) 0.00130
Total (grams) 0.00160

Gas Analysis (Vol. %):

CO2	O2
11.05	9.50
10.50	9.55
10.78	9.53

Condensate Collection:

Impinger 1	247.0
Impinger 2	114.0
Impinger 3	20.0
Impinger 4	5.0
Impinger 5	6.0
Impinger 6	3.0
Gel	12.0
Gain (grams)	407.0

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	859.632								
1	5.0	863.250	0.32	1.83	65	65	5.5	308	1.5	105.1
2	10.0	866.900	0.33	1.86	65	65	5.5	320	4.7	105.3
3	15.0	870.600	0.34	1.91	65	65	8	321	8.4	105.2
4	20.0	874.360	0.35	1.97	66	66	8	320	12.5	105.1
5	25.0	878.290	0.37	2.09	67	67	8	319	17.7	106.6
6	30.0	882.800	0.50	2.83	67	67	8	319	25.2	105.5
7	35.0	887.530	0.55	3.11	67	67	9	319	45.6	105.5
8	40.0	892.610	0.63	3.58	68	68	9	317	53.2	105.7
9	45.0	897.930	0.69	3.92	68	68	8	317	58.3	105.8
10	50.0	903.180	0.67	3.82	69	69	8	317	62.5	105.8
11	55.0	907.800	0.52	3.96	69	69	8	317	66.1	105.7
12	60.0	912.470	0.53	3.02	69	69	8	317	69.4	105.6
Traverse 2	0.0	912.470								
1	5.0	916.960	0.49	2.79	71	71	8	321	1.5	105.4
2	10.0	921.720	0.55	3.13	71	71	8	321	4.7	105.5
3	15.0	926.450	0.54	3.08	72	72	8	321	8.4	105.6
4	20.0	931.140	0.53	3.02	72	72	8	320	12.5	105.6
5	25.0	935.520	0.46	2.64	74	74	7.5	319	17.7	105.3
6	30.0	939.450	0.37	2.12	74	74	7.5	319	25.2	105.2
7	35.0	943.230	0.34	1.96	75	75	6	318	45.6	105.3
8	40.0	946.740	0.29	1.68	75	75	6	311	53.2	105.3
9	45.0	949.920	0.24	1.38	76	76	6	318	58.3	105.1
10	50.0	952.970	0.22	1.27	76	76	6	318	62.5	105.2
11	55.0	955.950	0.21	1.21	76	76	4	318	66.1	105.2
12	60.0	958.790	0.19	1.10	77	77	4	318	69.4	105.2
Average:			0.426	2.470	70.6	70.6	7.2	318.0		105.5

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

Date: 5-Jun-24
Run: 3 - Particulate / Metals
Run Time: 11:44 - 13:51

Concentrations:

Particulate	0.37 mg/dscm	0.00016 gr/dscf
	0.20 mg/Acm	0.00009 gr/Acf
	0.35 mg/dscm (@ 11% O2)	0.00015 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.025 Kg/hr	0.056 lb/hr
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Flue Gas Characteristics:

Flow	1132 dscm/min	39971 dscf/min
	18.86 dscm/sec	666 dscf/sec
	2084 Acm/min	73604 Acf/min

Velocity	13.638 m/sec	44.74 f/sec
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Temperature	160.3 oC	320.5 oF
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Moisture	15.1 %	
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Gas Analysis	10.2 % O2	
	10.2 % CO2	

30.038 Mol. Wt (g/gmole) Dry
28.215 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6690 dscm	94.256 dscf
Sample Time	120.0 minutes	
Isokineticity	104.3 %	

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

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

Date: 5-Jun-24
 Run: 3 - Particulate / Metals
 Run Time: 11:44 - 13:51

Control Unit (Y)	1.0114	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3133	Filter (grams) 0.00040	CO2	Impinger 1 240.0
Pitot Factor	0.8477	Washings (grams) 0.00060	O2	Impinger 2 89.0
Baro. Press. (in. Hg)	29.71		Traverse 1 10.20 10.10	Impinger 3 10.0
Static Press. (in. H2O)	-19.00		Traverse 2 10.20 10.20	Impinger 4 5.0
Stack Height (ft)	30	Total (grams) 0.00100		Impinger 5 1.0
Stack Diameter (in.)	70.90			Impinger 6 0.0
Stack Area (sq.ft.)	27.417			Gel 12.5
Minutes Per Reading	5.0		10.20 10.15	Gain (grams) 357.5
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	959.520								
1	5.0	964.350	0.54	3.18	78	78	11	319	1.5	104.4
2	10.0	969.330	0.58	3.38	77	77	11	325	4.7	104.5
3	15.0	974.390	0.60	3.50	77	77	11	326	8.4	104.5
4	20.0	979.280	0.56	3.27	77	77	11	325	12.5	104.4
5	25.0	984.090	0.54	3.15	77	77	11	325	17.7	104.6
6	30.0	988.810	0.52	3.03	77	77	8	325	25.2	104.5
7	35.0	992.330	0.29	1.69	77	77	8	324	45.6	104.0
8	40.0	995.600	0.25	1.46	76	76	8	323	53.2	104.1
9	45.0	998.800	0.24	1.40	76	76	8	323	58.3	104.0
10	50.0	1001.870	0.22	1.29	76	76	6	320	62.5	104.0
11	55.0	1004.880	0.21	1.24	77	77	6	318	66.1	104.0
12	60.0	1007.740	0.19	1.12	77	77	5	318	69.4	103.8

Traverse 2	0.0	1007.740								
1	5.0	1011.160	0.27	1.60	77	77	8	313	1.5	103.9
2	10.0	1014.700	0.29	1.71	77	77	8	317	4.7	104.1
3	15.0	1018.180	0.28	1.65	78	78	8	317	8.4	104.0
4	20.0	1021.540	0.26	1.54	78	78	8	317	12.5	104.1
5	25.0	1024.960	0.27	1.59	78	78	7.5	320	17.7	104.2
6	30.0	1028.560	0.30	1.76	78	78	7.5	320	25.2	104.1
7	35.0	1033.480	0.56	3.29	78	78	7	320	45.6	104.5
8	40.0	1038.450	0.57	3.36	79	79	7	320	53.2	104.5
9	45.0	1043.590	0.61	3.60	79	79	9	320	58.3	104.5
10	50.0	1048.650	0.59	3.48	79	79	11	320	62.5	104.6
11	55.0	1053.310	0.50	2.95	79	79	11	320	66.1	104.5
12	60.0	1057.930	0.49	2.90	79	79	8.5	318	69.4	104.5
Average:			0.405	2.381	77.5	77.5	8.5	320.5		104.3

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		5-Jun-24	5-Jun-24	5-Jun-24
Test Time		10:16 - 11:16	11:45 - 12:45	13:06 - 14:06
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.17	30.17	30.17
DGM Factor	(Y)	0.9938	0.9938	0.9938
Initial Reading	(m ³)	610.803	611.411	612.090
Final Reading	(m ³)	611.400	612.0852	612.707
Temp. Outlet	(Avg. oF)	70.0	73.0	75.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.59632	0.67029	0.61164
HF	(mg)	0.0514	0.0514	0.051
Oxygen	(Vol. %)	8.5	9.5	10.2
HF	(mg/Sm³)	0.086	0.077	0.084
HF	(mg/Sm³ @ 11% O₂)	0.069	0.067	0.077
Moisture (isokinetic)	(Vol. %)	16.4	16.1	15.1

*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		5-Jun-24	5-Jun-24	5-Jun-24
Test Time		10:16 - 11:16	11:45 - 12:45	13:06 - 14:06
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.17	30.17	30.17
DGM Factor	(Y)	1.0362	1.0362	1.0362
Initial Reading	(m ³)	306.945	307.576	308.255
Final Reading	(m ³)	307.573	308.251	308.847
Temp. Outlet	(Avg. oF)	66.0	71.0	74.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.65947	0.70152	0.61235
NH ₃	(mg)	5.7	4.8	5.9
Oxygen	(Vol. %)	8.5	9.5	10.2
NH₃	(mg/Sm³)	8.6	6.9	9.6
NH₃	(mg/Sm³ @ 11% O₂)	6.8	6.0	8.9
Moisture (isokinetic)	(Vol. %)	16.4	16.1	15.1

*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	2024/06/05	09:13 - 10:13	2.50	4.58	4.23
Unit 1 - Run 2	2024/06/05	10:22 - 11:32	2.80	5.12	5.00
Unit 1 - Run 3	2024/06/05	11:40 - 12:40	3.90	7.14	6.87
Average					5.37
Unit 2 - Run 1	2024/06/05	09:20 - 10:20	1.80	3.29	3.20
Unit 2 - Run 2	2024/06/05	10:25 - 11:25	2.90	5.31	5.07
Unit 2 - Run 3	2024/06/05	12:00 - 13:00	2.90	5.31	5.23
Average					4.50
Unit 3 - Run 1	2024/06/05	09:30 - 10:30	5.50	10.07	8.04
Unit 3 - Run 2	2024/06/05	10:36 - 11:36	6.10	11.16	9.73
Unit 3 - Run 3	2024/06/05	12:40 - 12:20	4.70	8.60	7.93
Average					8.57

Date:	16-May-24			16-May-24			17-May-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:	09:40-10:40	11:02-12:02	12:22-13:22	10:10-11:10	11:20-12:20	12:21-13:21	08:59-09:59	10:05-11:05	11:10-12:10
Methane (ppmv)	4.10	4.40	ND	4.5	ND	5.5	ND	ND	3.1
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	2.1
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:	16-May-24			16-May-24			17-May-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:	09:40-10:40	11:02-12:02	12:22-13:22	10:10-11:10	11:20-12:20	12:21-13:21	08:59-09:59	10:05-11:05	11:10-12:10
Methane (ppm)	4.10	4.40	1.55	4.50	1.55	5.50	1.75	1.20	3.10
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	2.10
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)	2.74	2.94	1.03	3.00	1.03	3.67	1.17	0.80	2.07
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	1.40
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	3.53	3.68	2.39	3.69	2.26	3.99	2.68	1.92	4.33
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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

A. Lanfranco and Associates Inc.

Client MV Y Low-4 0.993P
 Source Unit #1 Cp _____
 Parameter NH₃ Pbar 29.83 Static _____
 Date 5-16-24 Operator CD + JD

Client MV Y LMU-B 1.0362
 Source Unit #1 Cp _____
 Parameter H₂F Pbar 29.85 Static _____
 Date 5-16-24 Operator CPT SP

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) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	09:27	605.9452	49	6	200			
					140			
					93			
	10:27	606.4419	70		1			
2	10:57	606.4453	70		200			
					142			
					100			
	11:57	606.9478	72		1			
3	12:15	606.9514	71		200			
					155			
					102			
	10:15	607.4820	72		2			

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
4	09:27	298.7092	63		200			
					150			
					103			
	10:27	299.2378	68		3			
5	10:57	299.2410	67		200			
					160			
					130			
	11:57	299.7972	70		2			
6	12:15	299.8028	70		200			
					185			
					91			
	13:15	300.4131	73					

A. Lanfranco and Associates Inc.

Client MVWTE Y LMU-4 0.9938
 Source Unit #2 Cp _____
 Parameter NH₃ Pbar 29.92 Static _____
 Date 17 May 24 Operator CD + SV

Client MVWTE Y LMU-B 1.0362
 Source Unit #2 Cp _____
 Parameter HF Pbar 29.92 Static _____
 Date 17 May 24 Operator CD + SV

J.H.

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	0.0002	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	0842	607.4855	58		200			
	0942	608.0098	63	53 100 3				
2	10:03	608.0132	61		200			
	11:03	608.5155	62	150 100 3				
3	11:25	608.5192	60		200			
	12:15	609.0365	62					

151
95
1

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
4	0842	300.4262	57		200			
	0942	301.0290	61		172 100 1			
5	10:03	301.0393	60		200			
	11:03	301.6556	63		125 100 1			
6	11:25	301.6596	61		200			
	12:15	302.1653	63		150 100 1			

CLIENT MU WTE					NOZZLE 12-314	DIAMETER, IN. 1.3137	IMPINGER	INITIAL	FINAL	TOTAL GAIN		
SOURCE Unit #3					PROBE 7 HLGUR20	Cp .8375	VOLUMES	(mL)	(mL)	(mL)		
PARAMETER / RUN No METALS 721					PORT LENGTH			Imp. #1	0	172		
DATE 6.6.24					STATIC PRESSURE, IN. H2O -19.0			Imp. #2	100	219		
OPERATOR: SG					STACK DIAMETER 70.90			Imp. #3	100	145		
CONTROL UNIT FEIS Y 1.0114					STACK HEIGHT 30.0			Imp. #4	0	17		
BAROMETRIC PRESSURE, IN. Hg 29.71					INITIAL LEAK TEST 1.001015			Imp. #5	100	104		
ASSUMED MOISTURE, Bw 14%					FINAL LEAK TEST 1.001015			Imp. #6	100	101		
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. %
	11:27	768.786										
1		776.00	.25	1.42	71	320	256	250	59	5.0		
2		775.36	.27	1.56	71	311						
3		776.59	.25	1.44	71	313	250	250	59	5.0	11.8	8.8
4		782.06	.29	1.60	71	314						
5		785.65	.31	1.78	72	315	257	252	59	5.5		
6		789.73	.40	2.30	72	315						
7		794.83	.62	3.57	74	315	252	250	59	5.5		
8		799.82	.59	3.41	75	314						
9		804.72	.57	3.29	75	315	250	250	59	3.5		
10		805.83	.40	2.31	75	315						
11		812.94	.34	2.20	76	315	250	257	59	4.0	12.0	9.0
12		817.81	.41	2.37	76	315	7					
1		821.57	.47	2.83	77	285	250	257	59	7.0		
2		826.10	.48	2.80	77	310						
3		830.49	.45	2.62	77	310	250	255	59	7.0	12.0	9.2
4		834.36	.35	2.04	77	310						
5		837.89	.29	1.69	78	310	250	250	59	7.0		
6		841.60	.24	1.40	78	310						
7		844.60	.21	1.23	78	310	250	257	59	7.0	12.0	9.0
8		847.10	.21	1.22	78	313						
9		850.74	.23	1.34	78	313	250	257	59	5.0		
10		853.09	.19	1.11	78	313						
11		855.94	.19	1.11	78	313	250	250	59	4.5		
12		858.87	.20	1.17	78	310						
	13:29	DND TEST										

P-313

CLIENT		NOZZLE	DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN				
SOURCE		PROBE	Cp		VOLUMES	(mL)	(mL)	(mL)				
PARAMETER / RUN No		PORT LENGTH			Imp. #1							
DATE		STATIC PRESSURE, IN. H2O			Imp. #2							
OPERATOR		STACK DIAMETER			Imp. #3							
CONTROL UNIT		STACK HEIGHT			Imp. #4							
BAROMETRIC PRESSURE, IN. Hg		INITIAL LEAK TEST			Imp. #5							
ASSUMED MOISTURE, Bw		FINAL LEAK TEST			Imp. #6							
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. %
	11:30	959.520										
1		964.35	1.54	3.10	78	319	250	257	84	11.0	10.0	10.1
2		969.33	1.58	3.35	77	325						
3		974.29	1.60	3.50	77	326	250	250	88	11.0		
4		979.28	1.56	3.27	77	325						
5		984.09	1.54	3.15	77	325	250	250	88	11.0		
6		988.91	1.52	3.03	77	325						
7		992.33	1.29	1.69	77	324	250	257	88	9.0		
8		995.60	1.25	1.46	76	323					10.4	10.1
9		998.80	1.24	1.40	76	323	250	257	88	6.0		
10		1001.87	1.22	1.29	76	323						
11		1004.88	1.21	1.24	77	318	250	257	88	9.0		
12		1007.74	1.19	1.12	77	318						
1		1011.16	1.27	1.60	77	313	250	250	88	9.0		
2		1014.70	1.29	1.71	77	314					10.3	10.1
3		1018.18	1.28	1.65	78	317	257	252	88	7.5		
4		1021.59	1.26	1.54	78	317						
5		1024.96	1.27	1.59	78	320	250	250	98	7.0		
6		1028.56	1.30	1.76	78	320						
7		1033.48	1.36	3.29	78	320	250	250	88	9.0		
8		1038.45	1.37	3.36	79	320						
9		1043.59	1.61	3.60	79	320	250	250	88	11.0		
10		1048.65	1.59	3.48	79	320					10.1	10.3
11		1053.33	1.50	2.85	79	320	257	257	88	8.5		
12	13:51	END test	1.49	2.90	79	318						

A. Lanfranco and Associates Inc.

Client MV WTE Y LMU-B 1.0362
 Source Unit 3 Cp _____
 Parameter NH3 Pbar 30.17 Static _____
 Date June 5, 2024 Operator LF/BL

Client MV WTE Y LMU-4 0.9938
 Source Unit 3 Cp _____
 Parameter HF Pbar 30.17 Static _____
 Date June 5, 2024 Operator LF/BL



Leak Check	Run 1	Run 2	Run 3
Initial	0.000	0.0001	0.0001
Final	0.000	0.0001	0.0001

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.000	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	1016	306.9445	62	320	200			
			70	321				
	1116	307.5725	71	318	295			
2	1145	307.5764	69	319	200			
			71	318				
	1245	308.2508	72	317	295			
3	1306	308.2550	71	320	200			
			76	319				
	1406	308.8470	78	320	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
1	1016	610.8034	64	320	200			
			72	321				
	1116	611.4000	74	318	272			
2	1145	611.1108	71	319	200			
			74	318				
	1245	612.0852	75	317	280			
3	1306	612.0895	73	320	200			
			77	319				
	1406	612.7072	80	320	279			

SA

Client MVWTE

Source Unit #1

Date 16 May 2024

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)	29.83	29.83	29.83		
Canister Number	SC01654	SC01870	SC00616		
Controller Number	0A01418	0A01418	0A01418		
Gauge Number					
Initial: Start Time	09:40	11:02	12:22		
Flask Vac. (in. Hg)	-28	-28.5	-29		
Final: End Time	10:40	12:02	13:22		
Flask Vac. (in. Hg)	-9.5	-9	-8		

Source Unit #2

Date 16 May 2024

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)	29.83	29.83	29.83		
Canister Number	SC01818	SC00515	SC02338		
Controller Number	0A02096	0A02096	0A02096		
Gauge Number					
Initial: Start Time	10:10	11:20	12:21		
Flask Vac. (in. Hg)	-27	-27	-26		
Final: End Time	11:10	12:20	13:21		
Flask Vac. (in. Hg)	0	-9	-14.5		

Source Unit #3

Date 17 May 2024

	Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)	29.96	29.96	29.96		
Canister Number	SC00235	SC00363	SC02192		
Controller Number	0A01788	0A01788	0A01788		
Gauge Number					
Initial: Start Time	08:59	10:05	11:10		
Flask Vac. (in. Hg)	-30	-30	-20		
Final: End Time	09:59	11:03	12:10		
Flask Vac. (in. Hg)	-10	-9.5	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)					

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

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 & Associates inc.

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

Model #: CAE AL1
Serial #: 0028-070611-1

Date: 11-Jan-24
Barometric Pressure: 29.72 (in. Hg)
Theoretical Critical Vacuum: 14.02 (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.		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)
3.72	18.00	677.900	697.310	19.410	65.0	65.0	67.0	67.0	73	0.8185	14.5	69.0	74.0	71.5
1.90	20.50	698.000	714.085	16.085	67.0	67.0	70.0	68.0	63	0.5956	17.0	72.0	78.0	75.0
1.25	30.00	714.400	732.870	18.470	71.0	71.0	74.0	74.0	55	0.4606	18.8	73.0	69.0	71.0
0.67	16.00	733.100	740.615	7.515	74.0	74.0	74.0	74.0	48	0.3560	20.1	68.0	74.0	71.0
0.33	17.00	672.000	677.432	5.432	63.0	63.0	65.0	65.0	40	0.2408	21.5	65.0	68.0	66.5

***** RESULTS *****																	
--- DRY GAS METER ---				----- ORIFICE -----				-- DRY GAS METER --				----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED			
Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr	NOMINAL	Vcr	NOMINAL	Vcr	NOMINAL	Vcr	NOMINAL	Vcr	NOMINAL	Vcr			
19.524	552.9	18.993	537.9	19.255	0.973	-0.006	1.874	47.60	0.016	0.703							
16.046	454.4	15.688	444.3	16.010	0.978	-0.002	1.814	46.08	-0.043	0.714							
18.240	516.6	17.822	504.7	18.051	0.977	-0.002	1.962	49.84	0.105	0.687							
7.390	209.3	7.346	208.0	7.441	0.994	0.015	1.756	44.60	-0.102	0.714							
5.439	154.0	5.302	150.2	5.325	0.975	-0.004	1.881	47.78	0.023	0.704							
Average Y----->										0.9793	Average dH@----->		1.857	47.2	Average Ko---->		0.704

TEMPERATURE CALIBRATION										
Calibration Standard -----> Omega Model CL23A S/N:T-218768										
Reference Set-Point	Stack		Hot Box		Temperature Device Reading 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%	35	0.61%	35	0.61%	32	0.00%	32	0.00%
100	100	0.00%	102	0.36%	103	0.54%	100	0.00%	100	0.00%
300	300	0.00%	301	0.13%	304	0.53%	299	-0.13%	300	0.00%
500	499	-0.10%	501	0.10%	504	0.42%	499	-0.10%	499	-0.10%
1000	998	-0.14%	1001	0.07%	1004	0.27%	999	-0.07%	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 11, 2024

A.Lanfranco & Associates inc.

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

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

Date: 09-Jan-24
Barometric Pressure: 29.31 (in. Hg)
Theoretical Critical Vacuum: 13.83 (in. Hg)

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

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	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)
3.65	16.00	997.424	1014.205	16.781	61.0	61.0	64.0	64.0	73	0.8185	16.0	66.0	67.0	66.5
1.85	15.00	14.205	25.555	11.350	65.0	65.0	67.0	67.0	63	0.5956	17.0	70.0	72.0	71.0
1.20	15.00	25.555	34.435	8.880	67.0	67.0	70.0	70.0	55	0.4606	18.5	71.0	70.0	70.5
0.67	22.00	34.435	44.415	9.980	70.0	70.0	72.0	72.0	48	0.3560	20.0	72.0	71.0	71.5
0.33	16.00	44.415	49.386	4.971	72.0	72.0	73.0	73.0	40	0.2408	21.0	72.0	73.0	72.5

***** 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 (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)	
16.757	474.6	16.728	473.7	17.035	0.998	-0.013	1.859	47.23	0.002	0.711	
11.208	317.4	11.364	321.8	11.671	1.014	0.002	1.783	45.29	-0.074	0.716	
8.713	246.8	8.792	249.0	9.021	1.009	-0.002	1.923	48.84	0.066	0.694	
9.734	275.7	9.957	282.0	10.236	1.023	0.012	1.792	45.52	-0.065	0.709	
4.831	136.8	4.894	138.6	5.040	1.013	0.002	1.927	48.96	0.070	0.691	
Average Y----->					1.0114	Average dH@---->	1.857	47.2	Average Ko---->	0.704	

TEMPERATURE CALIBRATION										
Calibration Standard ----->		Omega Model CL23A S/N:T-218768								
Reference Set-Point (deg F)	Stack (deg F)	Temperature Device Reading								
		Hot Box		Probe		Imp Out		Aux		
		(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)	(deg F)	(% diff)
32	32	0.00%	31	-0.20%	32	0.00%	32	0.00%	32	0.00%
100	100	0.00%	99	-0.18%	99	-0.18%	100	0.00%	99	-0.18%
300	300	0.00%	299	-0.13%	298	-0.26%	299	-0.13%	299	-0.13%
500	499	-0.10%	498	-0.21%	498	-0.21%	499	-0.10%	499	-0.10%
1000	998	-0.14%	998	-0.14%	999	-0.07%	998	-0.14%	998	-0.14%

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 9, 2024

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 #: LMU 4
Serial #: 577

Date: 19-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)*(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	16.00	601.237	601.446	7.388	66.0	66.0	66.0	66.0	48	0.3560	20.0	69.0	73.0	71.0
0.00	16.00	601.446	601.657	7.430	67.0	67.0	68.0	68.0	48	0.3560	20.0	70.0	71.0	70.5
0.00	19.00	601.657	601.908	8.860	68.0	68.0	69.0	69.0	48	0.3560	20.0	71.0	80.0	75.5

***** 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 (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	
7.396	209.4		7.378	209.0	7.441	0.998	0.004	0.000	0.00	0.000	
7.417	210.0		7.382	209.1	7.437	0.995	0.002	0.000	0.00	0.000	
8.828	250.0		8.725	247.1	8.873	0.988	-0.005	0.000	0.00	0.000	
Average Y----->						0.9938	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: Liam Forrer

Signature: 

Date: January 19, 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

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.



Conflict of Interest Disclosure Statement

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

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

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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

Declaration

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

Select one of the following:

Absence from conflict of interest

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

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



Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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

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

Signature:

X

Print name:

Jeremy Gibbs

Witnessed by:

X

Print name:

Mark Lanfranco

Date: Dec. 16, 2020

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.



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 Shawn Harrington

Title Senior Environmental Technician /Project manager

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

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental consulting ,specializing in air and atmospheric sciences

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

Declaration

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

Signature:
Print Name: Shawn Harrington

Witnessed by:
Print Name: Mark Lanfranco

Date signed: November 26, 2020

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.

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 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

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

Declaration

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

Signature:

x 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 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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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

Conflict of Interest Disclosure Statement

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

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

- a) an ownership interest in the regulated person’s business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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

Declaration

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

Select one of the following:

- Absence from conflict of interest

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

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

Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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 Justin Ching

Print name: Justin Ching

Witnessed by:

X Mark Lanfranco

Print name: Mark Lanfranco

Date: June 28, 2023

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- 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.



Shawn Harrington

has met the requirements of

Stack Testing for Pollutants
(CHSC 7760)

School of Process, Energy and Natural Resources
Chemical Sciences Program

Endorsed by:

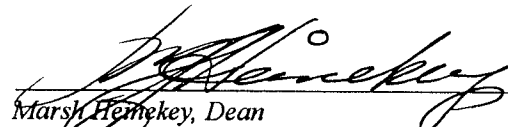


Environment
Canada

Environnement
Canada



Province of
British Columbia
Ministry of
Environment,
Lands and Parks


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

JUNE 21, 2001
Dated



Conflict of Interest Disclosure Statement

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

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

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

Select one of the following:

Absence from conflict of interest

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

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



Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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Signature:

x Shawn Harrington

Print name: Shawn Harrington

Date: Dec. 16, 2020

Witnessed by:

x Mark Lanfranco

Print name: Mark Lanfranco

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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 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.