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
July 2023 Survey
Third Quarter 2023

Table of Contents

APPENDIX – A

QUALITY ASSURANCE / QUALITY CONTROL RESULTS

Quality assurance / quality control (QA/QC) is divided into four categories: administration, preparation, testing, and analysis. The following sections detail results found for the above four categories.

Administration:

- All field, process, and analytical data was reviewed to ensure data integrity and accuracy.
- Duplicate proof of draft and final report, including data entry, conducted.

Preparation:

- All glassware cleaned
- Blank samples of reagents collected.

Testing:

- Stack diameter and absence of cyclonic flow confirmed
- Calibrated magnehelic used for all velocity measurements
- All trains past pre- and post- leak checks.
- Isokinetics all within 100% $\pm$ 10%.

Analysis:

- Trace Metals and Mercury analysis conducted at Element Labs, Surrey, B.C.
- Fluoride (HF) analysis conducted at ALS Environmental in Burnaby, B.C.
- Nitrous Oxide (N_2O) analysis conducted with portable analyzer by A. Lanfranco and Associates.
- 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**		
Third Quarter 2023	**Unit 1**	**Unit 2**	**Unit 3**
Filter	-0.2 mg	-0.3 mg	-0.3 mg
Front Half Washings	0.3 mg	0.4 mg	0.8 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.179 ug	<0.17 ug	<0.17 ug
Trace Metals Front *	<20.7 ug	<16.6 ug	<17.5 ug
Trace Metals Back*	<50.6 ug	<32.8 ug	<36.6 ug
Hexavalent Chromium	N/A	N/A	<0.42 ug
Ammonia	24.0 ug	30.8 ug	74.4 ug
Fluoride	<9 ug	<9 ug	<9 ug

Sum of all reported elements except Hg*

APPENDIX - B

LABORATORY RESULTS

Appendix B - Particulate Analysis

Client:	Metro Vancouver	**Sample Date:**	July 17-19, 2023
Source:	Units 1, 2, and 3	**Location:**	WTE (Burnaby, B.C)

A. Lanfranco & Associates Standard Operating Procedure:

SOP 1.2.1 Gravimetric determination of total particulate matter

Filter Collection:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	0.4721	0.4719	-0.0002	
Unit 1 Run 1	0.4644	0.4657	0.0013	0.0015
Unit 1 Run 2	0.4707	0.4709	0.0002	0.0004
Unit 1 Run 3	0.4696	0.4721	0.0025	0.0027
Unit 2 Blank	0.4701	0.4698	-0.0003	
Unit 2 Run 1	0.4720	0.4725	0.0005	0.0008
Unit 2 Run 2	0.4707	0.4705	-0.0002	0.0001
Unit 2 Run 3	0.4723	0.4720	-0.0003	ND
Unit 3 Blank	0.4682	0.4679	-0.0003	
Unit 3 Run 1	0.4690	0.4688	-0.0002	0.0001
Unit 3 Run 2	0.4649	0.4645	-0.0004	ND
Unit 3 Run 3	0.4675	0.4673	-0.0002	0.0001

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	121.3312	121.3315	0.0003	
Unit 1 Run 1	102.5385	102.5407	0.0022	0.0019
Unit 1 Run 2	119.7614	119.7624	0.0010	0.0007
Unit 1 Run 3	97.5815	97.5843	0.0028	0.0025
Unit 2 Blank	114.3624	114.3628	0.0004	
Unit 2 Run 1	119.9498	119.9512	0.0014	0.0010
Unit 2 Run 2	92.7510	92.7530	0.0020	0.0016
Unit 2 Run 3	117.7445	117.7457	0.0012	0.0008
Unit 3 Blank	121.7993	121.8001	0.0008	
Unit 3 Run 1	87.9211	87.9225	0.0014	0.0006
Unit 3 Run 2	95.9996	96.0003	0.0007	ND
Unit 3 Run 3	123.7626	123.7635	0.0009	0.0001

Task	Unit	Personnel	Date	Quality Control	Y/N
Fiter Recovery:	Unit 1	S.Harrington	17+19-July-23	Adequate PW volume:	Y
	Unit 2	S.Harrington	18-Jul-23	No sample leakage:	Y
	Unit 3	S.Harrington	19-20-July-23	Filter not compromised:	Y
PW Initial Analysis:	Unit 1	J. Ching	24-Jul-23		
	Unit 2	J. Ching	24-Jul-23		
	Unit 3	J. Ching	24-Jul-23		
PW, FilterFinal Analysis:	Unit 1	J. Ching	26-Jul-23		
	Unit 2	J. Ching	26-Jul-23		
	Unit 3	J. Ching	26-Jul-23		
Data entered to computer:	All	C. Lanfranco	21-Aug-23		

Comments:

No problems encountered in sample analysis.

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Report Transmission Cover Page

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

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

Lot ID: **1668174**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898281

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

T: +1 (604) 514-3322
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E: info.vancouver@element.com
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Analytical Report

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Project Location:
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Proj. Acct. code:

Lot ID: **1668174**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898281

Reference Number	1668174-1	1668174-2	1668174-3
Sample Date	Jul 17, 2023	Jul 17, 2023	Jul 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 Container 1 (filter)	Reagent Blank Unit 2 Container 1 (filter)	Reagent Blank Unit 3 Container 1 (filter)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	2	2	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.2	<0.2	0.63	0.2
Cobalt		µg	<0.3	0.8	<0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	0.5	0.6	<0.5	0.5
Phosphorus		µg	20	10	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<2	5.3	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	1	1.0	2	0.5
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1668174**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898281

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Jul 31, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

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Bill To: A. Lanfranco & Associates
#101, 9488 - 189 Street
Surrey, BC, Canada
V4N 4W7
Attn: Missy
Sampled By:
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Project ID: Metro Vancouver WTE
Project Name: Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1668178**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898285

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:

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

T: +1 (604) 514-3322
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E: info.vancouver@element.com
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Proj. Acct. code:

Lot ID: **1668178**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898285

Reference Number	1668178-1	1668178-2	1668178-3
Sample Date	Jul 17, 2023	Jul 17, 2023	Jul 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	4	<2	6	2.5
Arsenic		µg	<1	1	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.97	0.79	<0.2	0.2
Cobalt		µg	<0.3	0.6	<0.3	0.25
Copper		µg	0.9	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	<0.5	<0.5	<0.5	0.5
Phosphorus		µg	<2	5	<2	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	3.8	<2	2
Thallium		µg	3.3	3.0	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	1.0	1	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	6	<5	<5	5
Antimony		µg	<3	<3	3	2.5
Arsenic		µg	1	2	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	<0.2	0.50	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	0.3	0.4	0.3	0.25
Nickel		µg	<0.5	<0.5	1.0	0.5
Phosphorus		µg	26	32	41	2.5
Selenium		µg	3.2	12	7.1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	1	<1	1	1
Zinc		µg	5.7	4.8	4.6	0.5
Volume	Sample	mL	213	215	212	
Volume	aliquot volume	mL	163	165	162	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668178**
Control Number:
Date Received: Jul 26, 2023
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Report Number: 2898285

Reference Number	1668178-1	1668178-2	1668178-3
Sample Date	Jul 17, 2023	Jul 17, 2023	Jul 17, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	0.07	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	213	215	212	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	45	45	45	
Mercury	Fraction 2B	µg/sample	<0.10	<0.10	0.1	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	99	98	99	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<0.05	0.10	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	0.03	

Approved by:

Max Hewitt
Operations Manager

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1668178**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898285

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Jul 31, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

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

Lot ID: **1668182**
Control Number:
Date Received: Jul 27, 2023
Date Reported: Aug 17, 2023
Report Number: 2898292

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:

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668182**
Control Number:
Date Received: Jul 27, 2023
Date Reported: Aug 17, 2023
Report Number: 2898292

Reference Number	1668182-1	1668182-2	1668182-3
Sample Date	Jul 19, 2023	Jul 18, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	9	<5	5
Antimony		µg	5	<2	4	2.5
Arsenic		µg	<1	2	<1	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	0.72	<0.2	0.39	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	1	<0.3	<0.3	0.25
Lead		µg	3.3	<2	2	1.5
Manganese		µg	<0.3	<0.3	<0.3	0.25
Nickel		µg	0.7	0.6	<0.5	0.5
Phosphorus		µg	6	3	5	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	2	<2	4.1	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2	2	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	6	<2	2	2.5
Arsenic		µg	3.1	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	<0.2	<0.2	<0.2	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	<0.2	0.7	<0.2	0.25
Nickel		µg	<0.5	<0.5	0.6	0.5
Phosphorus		µg	31	25	20	2.5
Selenium		µg	6.7	<1	4.9	1.5
Tellurium		µg	<2	<2	3.3	2
Thallium		µg	<1	2	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	3.8	5.1	5.8	0.5
Volume	Sample	mL	345	372	362	
Volume	aliquot volume	mL	295	322	312	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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

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F: +1 (604) 514-3323
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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: Field Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1668182**
Control Number:
Date Received: Jul 27, 2023
Date Reported: Aug 17, 2023
Report Number: 2898292

Reference Number	1668182-1	1668182-2	1668182-3
Sample Date	Jul 19, 2023	Jul 18, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MV Unit 1 BLK + 4 Bottles)	Field Blank Unit 2 (MV Unit 2 BLK + 4 Bottles)	Field Blank Unit 3 (MV Unit 3 BLK + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	345	372	362	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	0.1	<0.1	<0.1	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	108	140	165	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.009	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.04	<0.04	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1668182**
Control Number:
Date Received: Jul 27, 2023
Date Reported: Aug 17, 2023
Report Number: 2898292

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Jul 31, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Report Transmission Cover Page

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-1	1668162-2	1668162-3
Sample Date	Jul 17, 2023	Jul 19, 2023	Jul 19, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles)	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles)	Unit 1 Run 3 (MV Unit 1 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	37	10	10	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	<1	2	1
Cadmium		µg	0.4	<0.3	<0.3	0.25
Chromium		µg	3.39	2.66	23.3	0.2
Cobalt		µg	<0.3	0.7	<0.3	0.25
Copper		µg	2	1	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	2	2	2	0.25
Nickel		µg	3.8	4.5	13	0.5
Phosphorus		µg	8	10	10	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<2	3.5	8.2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	17	4.2	7.5	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	20	10	10	5
Antimony		µg	4	3	<2	2.5
Arsenic		µg	<0.9	2.1	1	1
Cadmium		µg	0.3	0.4	<0.2	0.25
Chromium		µg	1.6	1.9	0.74	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	<0.2	0.5	<0.2	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	12	1	0.4	0.25
Nickel		µg	2	1	1	0.5
Phosphorus		µg	33	20	28	2.5
Selenium		µg	6.9	<1	18	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	1	<0.9	1
Zinc		µg	7.3	5.0	4.0	0.5
Volume	Sample	mL	800	885	850	
Volume	aliquot volume	mL	750	835	800	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-1	1668162-2	1668162-3
Sample Date	Jul 17, 2023	Jul 19, 2023	Jul 19, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MV Unit 1 Run 1 + 4 Bottles)	Unit 1 Run 2 (MV Unit 1 Run 2 + 4 Bottles)	Unit 1 Run 3 (MV Unit 1 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	800	885	850	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.4	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	150	154	144	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	1000	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.08	<0.04	
Mercury	As Tested	µg/L	0.52	0.07	<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	0.17	0.02	<0.02	

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-4	1668162-5	1668162-6
Sample Date	Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 Run 1 + 4 Bottles)	Unit 2 Run 2 (Unit - 2 Run 2 + 4 Bottles)	Unit 2 Run 3 (Unit - 2 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	8	8	9	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	1	3.7	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	17.7	2.4	1.7	0.2
Cobalt		µg	0.3	<0.3	0.3	0.25
Copper		µg	<0.3	<0.3	<0.3	0.25
Lead		µg	2.9	2	<2	1.5
Manganese		µg	1	1	0.3	0.25
Nickel		µg	2	4.0	2.7	0.5
Phosphorus		µg	10	5	10	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	5.4	<2	2
Thallium		µg	<2	4.0	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	5.6	4.4	3.4	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	26	10	20	5
Antimony		µg	<2	6	2	2.5
Arsenic		µg	<0.8	1	2	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.1	<0.2	3.52	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	1	<0.2	1	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	0.9	2	2	0.25
Nickel		µg	2	1	2.3	0.5
Phosphorus		µg	23	20	29	2.5
Selenium		µg	<1	6.9	6.3	1.5
Tellurium		µg	<2	<2	2.2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	1	1	<0.8	1
Zinc		µg	7.1	8.4	8.2	0.5
Volume	Sample	mL	855	830	885	
Volume	aliquot volume	mL	805	780	835	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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V3S 8P8, Canada

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F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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#101, 9488 - 189 Street
Surrey, BC, Canada
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Attn: Missy
Sampled By:
Company:

Project ID: Metro Vancouver WTE
Project Name: Metals and Hg Samples
Project Location:
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Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-4	1668162-5	1668162-6
Sample Date	Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MV Unit 2 Run 1 + 4 Bottles)	Unit 2 Run 2 (Unit - 2 Run 2 + 4 Bottles)	Unit 2 Run 3 (Unit - 2 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	855	830	885	
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	<0.4	
Mercury	As Tested	µg/L	0.20	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	160	144	169	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	0.052	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	500	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.04	<0.08	
Mercury	As Tested	µg/L	0.30	0.09	0.25	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	0.094	0.03	0.080	

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-7	1668162-8	1668162-9
Sample Date	Jul 19, 2023	Jul 20, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles)	Unit 3 Run 3 (MV Unit 3 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	10	5	7	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	0.4	0.25
Chromium		µg	1.9	1.2	2.83	0.2
Cobalt		µg	0.4	<0.3	<0.3	0.25
Copper		µg	2	<0.3	<0.3	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	1	0.7	0.9	0.25
Nickel		µg	8.0	3.4	3.8	0.5
Phosphorus		µg	10	10	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	5.4	<2	<2	2
Thallium		µg	2	13	5.8	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	15	11	14	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	10	7	9	5
Antimony		µg	<2	4	<2	2.5
Arsenic		µg	0.9	1	<0.8	1
Cadmium		µg	0.3	<0.2	<0.2	0.25
Chromium		µg	0.97	1.2	0.68	0.2
Cobalt		µg	<0.2	<0.2	<0.2	0.25
Copper		µg	<0.2	2.5	<0.2	0.25
Lead		µg	<1	<1	1	1.5
Manganese		µg	0.8	0.8	0.5	0.25
Nickel		µg	1	1	1.0	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	2	8.0	11	1.5
Tellurium		µg	<2	2.7	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.8	1
Zinc		µg	6.7	5.3	4.6	0.5
Volume	Sample	mL	835	800	855	
Volume	aliquot volume	mL	785	750	805	
Mercury by CVAA						
Mercury	As Tested	µg/L	0.05	<0.05	<0.05	0.05

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
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T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Reference Number	1668162-7	1668162-8	1668162-9
Sample Date	Jul 19, 2023	Jul 20, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MV Unit 3 Run 1 + 4 Bottles	Unit 3 Run 2 (MV Unit 3 Run 2 + 4 Bottles)	Unit 3 Run 3 (MV Unit 3 Run 3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	0.02	<0.02	<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	835	800	855	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	161	160	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	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.04	<0.08	<0.08	
Mercury	As Tested	µg/L	0.15	0.06	0.16	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	0.049	0.02	0.053	

Approved by:

Max Hewitt
Operations Manager

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

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1668162**
Control Number:
Date Received: Jul 26, 2023
Date Reported: Aug 17, 2023
Report Number: 2898261

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 15, 2023	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 16, 2023	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Aug 1, 2023	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Jul 31, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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CERTIFICATE OF ANALYSIS

Work Order	: **VA23B7585**	Page	: 1 of 2
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: MV WTW UNIT 3	Date Samples Received	: 31-Jul-2023 15:35
PO	: ----	Date Analysis Commenced	: 02-Aug-2023
C-O-C number	: ----	Issue Date	: 22-Aug-2023 16:54
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jon Fisher	Production Manager, Environmental	Metals, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg	micrograms
mL	millilitres

<: less than.

>: greater than.

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

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

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

Analytical Results

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

Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	*Client sample ID*	**MV WTE Unit 3 - Cr+6 Blank**	**MV WTE Unit 3 - Cr+6 Run 1**	**MV WTE Unit 3 - Cr+6 Run 2**	**MV WTE Unit 3 - Cr+6 Run 3**	**----**
					Client sampling date / time	25-Jul-2023 00:00	25-Jul-2023 00:00	26-Jul-2023 00:00	26-Jul-2023 00:00	----
						VA23B7585-001	**VA23B7585-002**	**VA23B7585-003**	**VA23B7585-004**	**--------**
						Result	Result	Result	Result	----
Sample Preparation										
Volume, impinger	----	EP532C/WT	0.1	mL		415	890	850	883	----
Speciated Metals										
Chromium, hexavalent [Cr VI]	18540-29-9	E532C/WT	0.20	µg		<0.42	<0.89	<0.85	<0.88	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA23B7585**	Page	: 1 of 5
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 881 2582	Telephone	: 778-370-3279
Project	: MV WTW UNIT 3	Date Samples Received	: 31-Jul-2023 15:35
PO	: ----	Issue Date	: 22-Aug-2023 16:59
C-O-C number	: ----		
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Air**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Speciated Metals : Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)										
HDPE										
MV WTE Unit 3 - Cr+6 Run 2	E532C	26-Jul-2023	02-Aug-2023	14 days	7 days	✓	02-Aug-2023	14 days	7 days	✓
Speciated Metals : Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)										
HDPE										
MV WTE Unit 3 - Cr+6 Run 3	E532C	26-Jul-2023	02-Aug-2023	14 days	7 days	✓	02-Aug-2023	14 days	7 days	✓
Speciated Metals : Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)										
HDPE										
MV WTE Unit 3 - Cr+6 Blank	E532C	25-Jul-2023	02-Aug-2023	14 days	8 days	✓	02-Aug-2023	14 days	8 days	✓
Speciated Metals : Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)										
HDPE										
MV WTE Unit 3 - Cr+6 Run 1	E532C	25-Jul-2023	02-Aug-2023	14 days	8 days	✓	02-Aug-2023	14 days	8 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Air**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)	E532C	1067553	1	4	25.0	5.0	✓
Laboratory Control Samples (LCS)							
Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)	E532C	1067553	1	4	25.0	5.0	✓
Method Blanks (MB)							
Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)	E532C	1067553	1	4	25.0	5.0	✓
Matrix Spikes (MS)							
Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)	E532C	1067553	1	4	25.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hexavalent Chromium (Cr VI) by IC (Impinger, ug/sample)	E532C ALS Environmental - Waterloo	Air	EPA 7199 / EPA 306	Impinger samples are analyzed by ion chromatography with UV/Vis detector using diphenylcarbazide in a sulphuric acid solution.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Hexavalent Chromium (Impinger)	EP532C ALS Environmental - Waterloo	Air	APHA 3500-Cr C (Ion Chromatography)	pH of a homogenized impinger sample is adjusted to pH 9 by NaOH for Ion Chromatography analysis.

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QUALITY CONTROL REPORT

Work Order	: **VA23B7585**	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Mark Lanfranco	Account Manager	: Brent Mack
Address	: Unit # 101 9488 - 189 St Surrey BC Canada V4N 4W7	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: 778-370-3279
Project	: MV WTW UNIT 3	Date Samples Received	: 31-Jul-2023 15:35
PO	: ----	Date Analysis Commenced	: 02-Aug-2023
C-O-C number	: ----	Issue Date	: 22-Aug-2023 16:57
Sampler	: A. Lanfranco 604 881 2582		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jon Fisher	Production Manager, Environmental	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Air**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Sample Preparation (QC Lot: 1067553)											
VA23B7585-002	MV WTE Unit 3 - Cr+6 Run 1	Volume, impinger	----	EP532C	0.1	mL	890	890		Diff <2x LOR	----
Speciated Metals (QC Lot: 1067553)											
VA23B7585-002	MV WTE Unit 3 - Cr+6 Run 1	Chromium, hexavalent [Cr VI]	18540-29-9	E532C	0.89	µg	<0.89	<0.89	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Air**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Sample Preparation (QCLot: 1067553)						
Volume, impinger	----	EP532C	0.1	mL	200	----
Speciated Metals (QCLot: 1067553)						
Chromium, hexavalent [Cr VI]	18540-29-9	E532C	0.2	µg	<0.20	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Air**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 1067553)									
Chromium, hexavalent [Cr VI]	18540-29-9	E532C	0.2	µg	10 µg	90.7	90.0	110	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Air**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Sample Preparation (QCLot: 1067553)										
VA23B7585-002	MV WTE Unit 3 - Cr+6 Run 1	Volume, impinger	----	EP532C		mL		0	0	----
Speciated Metals (QCLot: 1067553)										
VA23B7585-002	MV WTE Unit 3 - Cr+6 Run 1	Chromium, hexavalent [Cr VI]	18540-29-9	E532C	33.5 µg	35.6 µg	94.2	75.0	125	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Report To		Report Format / Distribution	Service Requested (Rush for routine analysis subject to availability)
Company:	A. Lanfranco and Associates	☑ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Mark Lanfranco	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	Unit 101 9488 189 St	Email 1: mark.lanfranco@alanfranco.com	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Surrey BC V4N 4W7	Email 2: louis.agassiz@alanfranco.com	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-881-2582 Fax: 604-881-2581	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information	Analysis Request
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #: MV WTE UNIT 3	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Erin Bolster	Sampler: A. Lanfranco and

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Cr+6	Number of Containers
	MV WTE Unit 3 - Cr+6 Blank	25-Jul-23			X	1
	MV WTE Unit 3 - Cr+6 Run 1	25-Jul-23			X	1
	MV WTE Unit 3 - Cr+6 Run 2	26-Jul-23			X	1
	MV WTE Unit 3 - Cr+6 Run 3	26-Jul-23			X	1

Environmental Division
Vancouver
Work Order Reference
VA23B7585

Telephone : +1 604 253 4188

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Account #: 18619 Please report ug/sample and volumes (ml) Cr+6 analysis according to EPA Stack Sampling Method 0061

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			CW	July 31	1535	6 °C				

ice pks

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Report Transmission Cover Page

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

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

Lot ID: **1667016**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896535

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1667016**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896535

Reference Number	1667016-1	1667016-2	1667016-3
Sample Date	Jul 19, 2023	Jul 18, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Blank / 23.6 °C	Unit #2 HF Blank / 23.6 °C	Unit #3 HF Blank / 23.6 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	293	295	298	
Dilution Factor	fluoride		1.00000000	1.00000000	1.00000000	
Fluoride	As Tested	mg/L	<0.03	<0.03	<0.03	0.03
Fluoride	Water Soluble	µg/sample	<9	<9	<9	

Approved by:

Max Hewitt
Operations Manager

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

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1667016**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896535

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	Jul 24, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Report Transmission Cover Page

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

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

Lot ID: **1667017**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896537

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1667017**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896537

Reference Number	1667017-1	1667017-2	1667017-3
Sample Date	Jul 19, 2023	Jul 19, 2023	Jul 19, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 HF Run 1 / 24.1 °C	Unit #1 HF Run 2 / 24.1 °C	Unit #1 HF Run 3 / 24.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	510	406	359	
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	<200	<100	<100	

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Analytical Report

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

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

Lot ID: **1667017**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896537

Reference Number	1667017-4	1667017-5	1667017-6
Sample Date	Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #2 HF Run 1 / 24.1 °C	Unit #2 HF Run 2 / 24.1 °C	Unit #2 HF Run 3 / 24.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	267	338	315	
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	<80	<100	<90	

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Analytical Report

Bill To: A. Lanfranco & Associates
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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: **1667017**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896537

Reference Number	1667017-7	1667017-8	1667017-9
Sample Date	Jul 20, 2023	Jul 20, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #3 HF Run 1 / 24.1 °C	Unit #3 HF Run 2 / 24.1 °C	Unit #3 HF Run 3 / 24.1 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Volume	Sample	mL	447	414	332	
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	<100	<100	<100	

Approved by:

Max Hewitt
Operations Manager

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

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Surrey, British Columbia
V3S 8P8, Canada

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F: +1 (604) 514-3323
E: info.vancouver@element.com
W: www.element.com

Methodology and Notes

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

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

Lot ID: **1667017**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 26, 2023
Report Number: 2896537

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	Jul 25, 2023	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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

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#104, 19575-55 A Ave.
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V3S 8P8, Canada

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F: +1 (604) 514-3323
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Report Transmission Cover Page

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

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

Lot ID: **1667009**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896529

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
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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: **1667009**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896529

Reference Number	1667009-1	1667009-2	1667009-3
Sample Date	Jul 19, 2023	Jul 18, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit #1 NH3 Blk / 23.7 °C	Unit #2 NH3 Blk / 23.7 °C	Unit #3 NH3 Blk / 23.7 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	81	105	253	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	293	293	294	
Ammonium - N		µg/sample	24	30.8	74.4	

Approved by:

Abhishek Suryawanshi
Operations Manager

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

Methodology and Notes

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

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

Lot ID: **1667009**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896529

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	Jul 27, 2023	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

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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1667012**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896533

Contact	Company	Address
Mark Lanfranco	**A. Lanfranco & Associates**	#101, 9488 - 189 Street Surrey, BC V4N 4W7 Phone: (604) 881-2582 Fax: (604) 881-2581 Email: mark.lanfranco@alanfranco.com

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

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

Delivery	Format	Deliverables
Email	PDF	Invoice

Notes To Clients:

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

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Analytical Report

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V4N 4W7
Attn: Missy
Sampled By:
Company:

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

Lot ID: **1667012**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896533

Reference Number	1667012-1	1667012-2	1667012-3
Sample Date	Jul 19, 2023	Jul 19, 2023	Jul 19, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 NH3 Run 1 / 23.4 °C	Unit 1 NH3 Run 2 / 23.4 °C	Unit 1 NH3 Run 3 / 23.4 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	1940	2840	3440	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	340	380	363	
Ammonium - N		µg/sample	658	1080	1250	

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

Lot ID: **1667012**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896533

Reference Number	1667012-4	1667012-5	1667012-6
Sample Date	Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 NH3 Run 1 / 23.4 °C	Unit 2 NH3 Run 2 / 23.4 °C	Unit 2 NH3 Run 3 / 23.4 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	4010	3990	3540	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	355	468	448	
Ammonium - N		µg/sample	1420	1870	1590	

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

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Analytical Report

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1667012**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896533

Reference Number	1667012-7	1667012-8	1667012-9
Sample Date	Jul 20, 2023	Jul 20, 2023	Jul 20, 2023
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 NH3 Run 1 / 23.4 °C	Unit 3 NH3 Run 2 / 23.4 °C	Unit 3 NH3 Run 3 / 23.4 °C
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	9160	3680	3410	25
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	385	375	384	
Ammonium - N		µg/sample	3530	1380	1310	

Approved by:

Abhishek Suryawanshi
Operations Manager

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

T: +1 (604) 514-3322
F: +1 (604) 514-3323
E: info.vancouver@element.com
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Methodology and Notes

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

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

Lot ID: **1667012**
Control Number:
Date Received: Jul 21, 2023
Date Reported: Jul 27, 2023
Report Number: 2896533

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Ammonium in Impingers (VAN)	APHA	*	Automated Phenate Method, 4500-NH3 G	Jul 27, 2023	Element Edmonton - Roper Road

** Reference Method Modified*

References

APHA Standard Methods for the Examination of Water and Wastewater

ALS Environmental
2655 Park Center Dr., Suite A
Simi Valley, CA 93065
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LABORATORY REPORT

August 9, 2023

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

RE: Metro Vancouver W.T.E.

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on July 26, 2023. For your reference, these analyses have been assigned our service request number P2303500.

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 3:21 pm, Aug 09, 2023

Sue Anderson
Project Manager

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

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Client: A. Lanfranco and Associates Inc. Service Request No: P2303500
Project: Metro Vancouver W.T.E.

CASE NARRATIVE

The samples were received intact under chain of custody on July 26, 2023 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

C3 through C6 Hydrocarbons, Methane, Ethene and Ethane Analysis

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

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CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	https://dec.alaska.gov/spar/csp/lab-approval/list-of-approved-labs	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	https://internet.deq.louisiana.gov/portal/divisions/lelap/accredited-laboratories	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtm	2022028
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	006-999-456
New Jersey DEP (NELAP)	https://dep.nj.gov/dsr/oqa/certified-laboratories/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oklahoma DEQ (NELAP)	labaccreditation.deq.ok.gov/labaccreditation/	2207
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-011
Pennsylvania DEP	hhttp://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-23-14
Utah DOH (NELAP)	https://uphl.utah.gov/certifications/environmental-laboratory-certification/	CA016272023-15
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

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

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

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: A. Lanfranco and Associates Inc. Service Request: P2303500

Project ID: Metro Vancouver W.T.E.

Date Received: 7/26/2023

Time Received: 09:32

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
Unit#1 Run1	P2303500-001	Air	7/19/2023	10:35	SC00787	-3.70	3.95	X	X
Unit#1 Run2	P2303500-002	Air	7/19/2023	11:51	SC02241	-3.24	4.00	X	X
Unit#1 Run3	P2303500-003	Air	7/19/2023	13:08	SC02186	-4.69	4.00	X	X
Unit#2 Run1	P2303500-004	Air	7/18/2023	11:42	SC01024	-5.90	3.61	X	X
Unit#2 Run2	P2303500-005	Air	7/18/2023	13:28	SC02242	-3.74	3.93	X	X
Unit#2 Run3	P2303500-006	Air	7/18/2023	14:44	SC01996	-3.53	3.69	X	X
Unit#3 Run1	P2303500-007	Air	7/20/2023	11:10	SC00640	-4.62	3.85	X	X
Unit#3 Run2	P2303500-008	Air	7/20/2023	12:35	SC00861	-4.87	4.10	X	X
Unit#3 Run3	P2303500-009	Air	7/20/2023	13:45	SC00265	-4.07	3.99	X	X

Air - Chain of Custody Record & Analytical Service Request

Page ______ of ______

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Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

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

ALS Project No. P2303500

ALS Contact:

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

Project Name: Metro Vancouver W.T.E.

Project Number:

Project Manager: Mark Lanfranco

P.O. # / Billing Information: Bill to Account

Phone: 604-881-2582

Fax:

Email Address for Result Reporting: mark.lanfranco@alanfranco.com

Sampler (Print & Sign): Sean Vesby [signature]

Analysis Method: TO-3 (List on File)

Comments e.g. Actual Preservative or specific instructions

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-3 (List on File)		Comments
Unit #1 Run 1	1	07-19-23	9:35-10:35	SC00787	OA00154	-30.0	-8.0	6L			
Unit #1 Run 2	2	07-19-23	10:51-11:51	SC02241	OA02255	-29.5	-6.5	6L			
Unit #1 Run 3	3	07-19-23	12:08-13:08	SC02186	OA01544	-34.0	-12.0	6L			
Unit #2 Run 1	4	07-18-23	10:42-11:42	SC01024	OA00091	-32.5	-12.5	6L			
Unit #2 Run 2	6	07-18-23	12:28-13:28	SC02242	OA00217	-32.0	-9.0	6L			
Unit #2 Run 3	5	07-18-23	13:44-14:44	SC01996	OA01178	-30.0	-6.5	6L			
Unit #3 Run 1	7	07-20-23	10:10-11:10	SC00640	OA00250	-30.0	-10.0	6L			
Unit #3 Run 2	8	07-20-23	11:35-12:35	SC00861	OA01809	-29.0	-9.0	6L			
Unit #3 Run 3	9	07-20-23	12:45-13:45	SC00265	OA01000	-29.0	-7.0	6L			

Report Tier Levels - please select

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

EDD required Yes / No
Type: ____________ Units: ____________

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT (circled)

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
			[signature]		
[signature]			[signature] 7/26/23 0932	7-27-23	829

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: A. Lanfranco and Associates Inc. Work order: P2303500

Project: Metro Vancouver W.T.E

Sample(s) received on: 7/26/2023 - 7/27/2023 Date opened: 7/26/23 by: ADAVID

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

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

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2303500-001.01	6.0 L Source Can					
P2303500-002.01	6.0 L Source Can					
P2303500-003.01	6.0 L Source Can					
P2303500-004.01	6.0 L Source Can					
P2303500-005.01	6.0 L Source Can					
P2303500-006.01	6.0 L Source Can					
P2303500-007.01	6.0 L Source Can					
P2303500-008.01	6.0 L Source Can					
P2303500-009.01	6.0 L Source Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-001

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00787

Initial Pressure (psig): -3.70 Final Pressure (psig): 3.95

Container Dilution Factor: 1.70

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-002

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02241

Initial Pressure (psig): -3.24 Final Pressure (psig): 4.00

Container Dilution Factor: 1.63

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.82	
C_4 as n-Butane	ND	0.82	
C_5 as n-Pentane	ND	0.82	
C_6 as n-Hexane	ND	0.82	
C_6+ as n-Hexane	**1.7**	1.6	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-003

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02186

Initial Pressure (psig): -4.69 Final Pressure (psig): 4.00

Container Dilution Factor: 1.87

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.94	
C_4 as n-Butane	ND	0.94	
C_5 as n-Pentane	ND	0.94	
C_6 as n-Hexane	ND	0.94	
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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-004

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01024

Initial Pressure (psig): -5.90 Final Pressure (psig): 3.61

Container Dilution Factor: 2.08

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	1.0	
C_4 as n-Butane	ND	1.0	
C_5 as n-Pentane	ND	1.0	
C_6 as n-Hexane	ND	1.0	
C_6+ as n-Hexane	**2.7**	2.1	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-005

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02242

Initial Pressure (psig): -3.74 Final Pressure (psig): 3.93

Container Dilution Factor: 1.70

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-006

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/27/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01996

Initial Pressure (psig): -3.53 Final Pressure (psig): 3.69

Container Dilution Factor: 1.65

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.83	
C_4 as n-Butane	ND	0.83	
C_5 as n-Pentane	ND	0.83	
C_6 as n-Hexane	ND	0.83	
C_6+ as n-Hexane	ND	1.7	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-007

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/27/23
Analyst: Kylan Malloy Date Analyzed: 8/4/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00640

Initial Pressure (psig): -4.62 Final Pressure (psig): 3.85

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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-008

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/27/23
Analyst: Kylan Malloy Date Analyzed: 8/4/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00861

Initial Pressure (psig): -4.87 Final Pressure (psig): 4.10

Container Dilution Factor: 1.91

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.96	
C_4 as n-Butane	ND	0.96	
C_5 as n-Pentane	ND	0.96	
C_6 as n-Hexane	ND	0.96	
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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-009

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890 II/GC8/FID Date Received: 7/27/23
Analyst: Kylan Malloy Date Analyzed: 8/4/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00265

Initial Pressure (psig): -4.07 Final Pressure (psig): 3.99

Container Dilution Factor: 1.76

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.88	
C_4 as n-Butane	ND	0.88	
C_5 as n-Pentane	ND	0.88	
C_6 as n-Hexane	ND	0.88	
C_6+ as n-Hexane	ND	1.8	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230802-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/02/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230804-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/04/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:

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

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230802-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/02/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
Propane	1,000	1,080	1,070	**108**	**107**	92-120	0.9	6	
n-Butane	1,000	1,090	1,080	**109**	**108**	91-121	0.9	6	
n-Pentane	1,000	1,070	1,060	**107**	**106**	89-118	0.9	6	
n-Hexane	1,000	1,130	1,120	**113**	**112**	92-125	0.9	6	

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230804-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/04/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
Propane	1,000	1,140	1,100	**114**	**110**	92-120	4	6	
n-Butane	1,000	1,140	1,110	**114**	**111**	91-121	3	6	
n-Pentane	1,000	1,120	1,090	**112**	**109**	89-118	3	6	
n-Hexane	1,000	1,190	1,150	**119**	**115**	92-125	3	6	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-001

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00787

Initial Pressure (psig): -3.70 Final Pressure (psig): 3.95

Container Dilution Factor: 1.70

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**3.0**	2.2	**4.5**	3.4	
74-85-1	Ethene	ND	1.2	ND	1.0	
74-84-0	Ethane	ND	1.3	ND	1.0	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-002

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02241

Initial Pressure (psig): -3.24 Final Pressure (psig): 4.00

Container Dilution Factor: 1.63

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.1	ND	3.3	
74-85-1	Ethene	ND	1.1	ND	0.98	
74-84-0	Ethane	ND	1.2	ND	0.98	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#1 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-003

Test Code: EPA TO-3 Modified Date Collected: 7/19/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02186

Initial Pressure (psig): -4.69 Final Pressure (psig): 4.00

Container Dilution Factor: 1.87

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.5	ND	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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-004

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01024

Initial Pressure (psig): -5.90 Final Pressure (psig): 3.61

Container Dilution Factor: 2.08

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**3.5**	2.7	**5.4**	4.2	
74-85-1	Ethene	ND	1.4	ND	1.2	
74-84-0	Ethane	ND	1.5	ND	1.2	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-005

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/26/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02242

Initial Pressure (psig): -3.74 Final Pressure (psig): 3.93

Container Dilution Factor: 1.70

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.2	ND	3.4	
74-85-1	Ethene	ND	1.2	ND	1.0	
74-84-0	Ethane	ND	1.3	ND	1.0	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#2 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-006

Test Code: EPA TO-3 Modified Date Collected: 7/18/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/27/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01996

Initial Pressure (psig): -3.53 Final Pressure (psig): 3.69

Container Dilution Factor: 1.65

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.2	ND	3.3	
74-85-1	Ethene	ND	1.1	ND	0.99	
74-84-0	Ethane	ND	1.2	ND	0.99	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run1** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-007

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/27/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00640

Initial Pressure (psig): -4.62 Final Pressure (psig): 3.85

Container Dilution Factor: 1.84

CAS #	Compound	Result mg/m³	MRL mg/m³	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	1.4	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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run2** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-008

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/27/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00861

Initial Pressure (psig): -4.87 Final Pressure (psig): 4.10

Container Dilution Factor: 1.91

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.5	ND	3.8	
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

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit#3 Run3** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P2303500-009

Test Code: EPA TO-3 Modified Date Collected: 7/20/23
Instrument ID: HP5890A/GC10/FID Date Received: 7/27/23
Analyst: Gilbert Gutierrez Date Analyzed: 8/2/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00265

Initial Pressure (psig): -4.07 Final Pressure (psig): 3.99

Container Dilution Factor: 1.76

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	2.3	ND	3.5	
74-85-1	Ethene	ND	1.2	ND	1.1	
74-84-0	Ethane	ND	1.3	ND	1.1	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230802-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/02/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:

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

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

ALS ENVIRONMENTAL

DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Duplicate Lab Control Sample** ALS Project ID: P2303500
Client Project ID: **Metro Vancouver W.T.E.** ALS Sample ID: P230802-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Gilbert Gutierrez Date Analyzed: 8/02/23
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
74-82-8	Methane	7.60	7.82	8.00	**103**	**105**	70-130	2	15	
74-85-1	Ethene	7.53	7.82	7.84	**104**	**104**	70-130	0	15	
74-84-0	Ethane	7.49	7.94	8.23	**106**	**110**	70-130	4	15	

APPENDIX - C

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	17-Jul-23
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:15 - 13:16

Concentrations:

Particulate	1.21	mg/dscm	0.00053	gr/dscf
	0.69	mg/Acm	0.00030	gr/Acf
	1.08	mg/dscm (@ 11% O2)	0.00047	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.087	Kg/hr	0.192	lb/hr

Flue Gas Characteristics:

Flow	1197	dscm/min	42272	dscf/min
	19.95	dscm/sec	705	dscf/sec
	2103	Acm/min	74277	Acf/min
Velocity	13.763	m/sec	45.15	f/sec
Temperature	145.0	oC	293.0	oF
Moisture	14.9	%		
Gas Analysis	9.8	% O2		
	10.0	% CO2		
	29.993	Mol. Wt (g/gmole) Dry		
	28.204	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.8051	dscm	99.061	dscf
Sample Time	120.0	minutes		
Isokineticity	103.3	%		

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

Client:	Metro Vancouver	**Date:**	17-Jul-23
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:10 - 13:15

Control Unit (Y)	0.9852
Nozzle Diameter (in.)	0.3083
Pitot Factor	0.8489
Baro. Press. (in. Hg)	29.98
Static Press. (in. H20)	-19.50
Stack Height (ft)	30
Stack Diameter (in.)	70.90
Stack Area (sq.ft.)	27.417
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.00150
Washings (grams)	0.00190
Total (grams)	**0.00340**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	10.00	9.90
Traverse 2	10.00	9.73
	10.00	**9.82**

Condensate Collection:

Impinger 1	216.0
Impinger 2	95.0
Impinger 3	26.0
Impinger 4	10.0
Impinger 5	5.0
Impinger 6	3.0
Gel	14.0
Gain (grams)	**369.0**

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	272.565								
1	5.0	276.460	0.34	1.91	85	85	4	289	1.5	103.1
2	10.0	280.420	0.35	1.97	85	85	4	287	4.7	103.2
3	15.0	284.700	0.40	2.28	90	90	4	285	8.4	103.3
4	20.0	289.050	0.41	2.34	91	91	4	284	12.5	103.4
5	25.0	293.940	0.52	2.96	93	93	4	289	17.7	103.4
6	30.0	298.880	0.53	3.02	94	94	4	290	25.2	103.3
7	35.0	304.050	0.58	3.30	94	94	6	291	45.6	103.5
8	40.0	308.860	0.50	2.84	97	97	6	295	53.2	103.3
9	45.0	313.580	0.48	2.73	97	97	6	296	58.3	103.5
10	50.0	318.490	0.52	2.96	98	98	6	296	62.5	103.4
11	55.0	323.050	0.45	2.56	97	97	6	296	66.1	103.3
12	60.0	327.460	0.42	2.39	98	98	6	297	69.4	103.2
Traverse 2	0.0	327.460								
1	5.0	332.020	0.45	2.55	98	98	6	300	1.5	103.4
2	10.0	336.690	0.47	2.97	99	99	6	300	4.7	103.5
3	15.0	341.160	0.43	2.45	100	100	6	299	8.4	103.2
4	20.0	345.490	0.40	2.28	101	101	6	298	12.5	103.3
5	25.0	349.760	0.39	2.22	100	100	6	297	17.7	103.3
6	30.0	354.040	0.39	2.23	101	101	6	296	25.2	103.3
7	35.0	358.280	0.38	2.18	101	101	7	294	45.6	103.5
8	40.0	362.440	0.37	2.12	99	99	7	292	53.2	103.1
9	45.0	366.430	0.34	1.95	99	99	5	292	58.3	103.2
10	50.0	370.250	0.31	1.78	99	99	5	291	62.5	103.3
11	55.0	373.950	0.29	1.67	99	99	4	290	66.1	103.4
12	60.0	377.700	0.30	1.73	99	99	4	288	69.4	102.9
Average:			0.418	2.391	96.4	96.4	4.0	293.0		103.3

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	08:57 - 11:01

Concentrations:

Particulate	0.39	mg/dscm	0.00017	gr/dscf
	0.22	mg/Acm	0.00009	gr/Acf
	0.34	mg/dscm (@ 11% O2)	0.00015	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.028	Kg/hr	0.061	lb/hr

Flue Gas Characteristics:

Flow	1173	dscm/min	41416	dscf/min
	19.55	dscm/sec	690	dscf/sec
	2121	Acm/min	74899	Acf/min
Velocity	13.878	m/sec	45.53	f/sec
Temperature	146.3	oC	295.4	oF
Moisture	17.2	%		
Gas Analysis	9.6	% O2		
	10.0	% CO2		
	29.989	Mol. Wt (g/gmole) Dry		
	27.925	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.8038	dscm	99.015	dscf
Sample Time	120.0	minutes		
Isokineticity	105.4	%		

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

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	08:57 - 11:01

Control Unit (Y)	0.9852	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00040		CO2	O2		Impinger 1	268.0
Pitot Factor	0.8489	Washings (grams)	0.00070	Traverse 1	10.10	9.50		Impinger 2	120.0
Baro. Press. (in. Hg)	30.03			Traverse 2	9.95	9.75		Impinger 3	18.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00110**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	19.5
Minutes Per Reading	5.0				**10.03**	**9.63**		**Gain (grams)**	**437.5**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	380.854								
1	5.0	384.570	0.31	1.74	85	85	5	288	1.5	105.3
2	10.0	388.170	0.29	1.63	87	87	5	289	4.7	105.1
3	15.0	391.980	0.32	1.82	90	90	5	287	8.4	105.2
4	20.0	395.910	0.34	1.93	90	90	5	287	12.5	105.3
5	25.0	399.670	0.31	1.77	92	92	5	287	17.7	105.1
6	30.0	403.310	0.29	1.65	93	93	5	288	25.2	105.1
7	35.0	407.850	0.45	2.57	93	93	5	288	45.6	105.4
8	40.0	412.500	0.47	2.68	94	94	5	288	53.2	105.5
9	45.0	417.110	0.46	2.63	96	96	6	290	58.3	105.5
10	50.0	421.910	0.50	2.86	96	96	6	290	62.5	105.4
11	55.0	426.530	0.46	2.63	97	97	8	290	66.1	105.5
12	60.0	430.940	0.42	2.47	97	97	8	289	69.4	105.3
Traverse 2	0.0	430.940								
1	5.0	435.410	0.44	2.48	95	95	4	300	1.5	105.4
2	10.0	440.010	0.47	2.64	93	93	4	300	4.7	105.4
3	15.0	444.730	0.49	2.76	95	95	6	300	8.4	105.5
4	20.0	449.250	0.45	2.53	95	95	6	300	12.5	105.4
5	25.0	453.880	0.47	2.65	97	97	7	302	17.7	105.4
6	30.0	458.470	0.46	2.60	98	98	7	302	25.2	105.5
7	35.0	463.370	0.52	2.94	101	101	7	304	45.6	105.5
8	40.0	468.030	0.47	2.67	102	102	7	304	53.2	105.3
9	45.0	472.530	0.44	2.49	100	100	7	304	58.3	105.5
10	50.0	476.820	0.40	2.26	100	100	7	304	62.5	105.4
11	55.0	481.160	0.41	2.32	100	100	8	304	66.1	105.3
12	60.0	485.550	0.42	2.37	100	100	8	304	69.4	105.3
								.		
Average:			0.419	2.379	95.3	95.3	6.1	295.4		105.4

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:30 - 13:32

Concentrations:

Particulate	1.9	mg/dscm	0.0008	gr/dscf
	1.0	mg/Acm	0.0004	gr/Acf
	1.7	mg/dscm (@ 11% O2)	0.0007	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.131	Kg/hr	0.288	lb/hr

Flue Gas Characteristics:

Flow	1159	dscm/min	40941	dscf/min
	19.32	dscm/sec	682	dscf/sec
	2130	Acm/min	75234	Acf/min
Velocity	13.940	m/sec	45.73	f/sec
Temperature	153.6	oC	308.5	oF
Moisture	17.1	%		
Gas Analysis	10.1	% O2		
	10.2	% CO2		
	30.030	Mol. Wt (g/gmole) Dry		
	27.971	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7694	dscm	97.801	dscf
Sample Time	120.0	minutes		
Isokineticity	105.3	%		

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

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:30 - 13:32

Control Unit (Y)	0.9852	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00270		CO2	O2		Impinger 1	270.0
Pitot Factor	0.8489	Washings (grams)	0.00250	Traverse 1	9..5	10.43		Impinger 2	100.0
Baro. Press. (in. Hg)	30.03			Traverse 2	10.17	9.70		Impinger 3	28.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00520**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	17.0
Minutes Per Reading	5.0				**10.17**	**10.07**		**Gain (grams)**	**429.0**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	487.457								
1	5.0	491.880	0.44	2.46	88	88	7	295	1.5	105.2
2	10.0	496.420	0.46	2.56	94	94	7	308	4.7	105.4
3	15.0	501.180	0.50	2.80	98	98	9	308	8.4	105.3
4	20.0	505.650	0.44	2.47	98	98	9	307	12.5	105.3
5	25.0	510.270	0.47	2.63	98	98	10	308	17.7	105.4
6	30.0	514.850	0.46	2.58	100	100	10	309	25.2	105.3
7	35.0	519.650	0.51	2.85	98	98	10	310	45.6	105.3
8	40.0	524.260	0.47	2.63	98	98	10	310	53.2	105.3
9	45.0	528.720	0.44	2.96	98	98	10	310	58.3	105.4
10	50.0	532.980	0.40	2.24	98	98	10	309	62.5	105.3
11	55.0	537.290	0.41	2.29	98	98	9	309	66.1	105.3
12	60.0	541.550	0.40	2.24	98	98	9	308	69.4	105.2
Traverse 2	0.0	541.550								
1	5.0	545.340	0.32	1.78	96	96	7	310	1.5	105.1
2	10.0	549.010	0.30	1.67	96	96	7	310	4.7	105.1
3	15.0	552.760	0.31	1.73	98	98	7	310	8.4	105.2
4	20.0	556.670	0.34	1.89	97	97	7	311	12.5	105.1
5	25.0	560.350	0.30	1.67	97	97	7	311	17.7	105.2
6	30.0	563.900	0.28	1.56	97	97	7	311	25.2	105.0
7	35.0	568.370	0.44	1.47	98	98	10	308	45.6	105.1
8	40.0	573.040	0.48	2.69	98	98	10	308	53.2	105.4
9	45.0	577.730	0.48	2.69	99	99	10	308	58.3	105.7
10	50.0	582.440	0.49	2.75	99	99	10	309	62.5	105.1
11	55.0	586.960	0.45	2.52	99	99	11	309	66.1	105.2
12	60.0	591.283	0.41	2.30	99	99	11	308	69.4	105.3
Average:			0.417	2.310	97.4	97.4	8.9	308.5		105.3

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		19-Jul-23	19-Jul-23	19-Jul-23
Test Time		09:35-10:35	10:51-11:51	12:08-13:08
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.07	30.07	30.07
DGM Factor	(Y)	1.0276	1.0276	1.0276
Initial Reading	(m^3)	112.797	113.653	114.269
Final Reading	(m^3)	113.652	114.265	114.883
Temp. Outlet	(Avg. oF)	90.7	107.1	101.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.85	0.59	0.60
HF	(mg)	0.105	0.053	0.053
Oxygen	(Vol. %)	9.8	9.6	10.1
HF	**(mg/Sm^3)**	**0.124**	**0.089**	**0.088**
HF	**(mg/Sm^3 @ 11% O2)**	**0.111**	**0.078**	**0.081**
Moisture	**(Vol. %)**	17.2	17.2	17.1

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		19-Jul-23	19-Jul-23	19-Jul-23
Test Time		09:35-10:35	10:51-11:51	12:08-13:08
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.07	30.07	30.07
DGM Factor	(Y)	1.0365	1.0365	1.0365
Initial Reading	(m^3)	260.516	261.002	261.487
Final Reading	(m^3)	260.999	261.482	261.974
Temp. Outlet	(Avg. oF)	91.0	102.8	100.8
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.48	0.47	0.48
NH_3	(mg)	0.8	1.3	1.5
Oxygen	(Vol. %)	9.8	9.6	10.1
NH_3	**(mg/Sm^3)**	**1.6**	**2.7**	**3.1**
NH_3	**(mg/Sm^3 @ 11% O2)**	**1.4**	**2.4**	**2.8**
Moisture	**(Vol. %)**	17.2	17.2	17.1

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

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:50 - 11:52

Concentrations:

Particulate	0.7	mg/dscm	0.0003	gr/dscf
	0.4	mg/Acm	0.0002	gr/Acf
	0.6	mg/dscm (@ 11% O2)	0.0003	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.045	Kg/hr	0.100	lb/hr

Flue Gas Characteristics:

Flow	1147	dscm/min	40491	dscf/min
	19.11	dscm/sec	675	dscf/sec
	2076	Acm/min	73308	Acf/min
Velocity	13.583	m/sec	44.56	f/sec
Temperature	149.9	oC	301.9	oF
Moisture	16.9	%		
Gas Analysis	10.1	% O2		
	9.9	% CO2		
	29.988	Mol. Wt (g/gmole) Dry		
	27.964	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7418	dscm	96.825	dscf
Sample Time	120.0	minutes		
Isokineticity	105.4	%		

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

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:50 - 11:52

Control Unit (Y)	1.0284	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00080		CO2	O2		Impinger 1	266.0
Pitot Factor	0.8489	Washings (grams)	0.00100	Traverse 1	9.83	10.03		Impinger 2	96.0
Baro. Press. (in. Hg)	30.13			Traverse 2	10.00	10.07		Impinger 3	22.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00180**					Impinger 4	8.0
Stack Height (ft)	30.16							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	20.0
Minutes Per Reading	5.0				**9.92**	**10.05**		**Gain (grams)**	**418.0**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	578.552								
1	5.0	582.660	0.44	2.38	72	72	5	300	1.5	105.3
2	10.0	586.820	0.45	2.43	73	73	5	302	4.7	105.4
3	15.0	591.020	0.46	2.49	73	73	5	302	8.4	105.3
4	20.0	595.320	0.48	2.60	74	74	5	302	12.5	105.3
5	25.0	599.520	0.46	2.49	74	74	6	303	17.7	105.1
6	30.0	603.350	0.38	2.06	75	75	6	302	25.2	105.1
7	35.0	607.040	0.35	1.90	77	77	6	303	45.6	105.1
8	40.0	610.580	0.32	1.74	77	77	6	303	53.2	105.4
9	45.0	614.010	0.30	1.64	77	77	7	299	58.3	105.2
10	50.0	617.280	0.27	1.48	80	80	7	302	62.5	105.3
11	55.0	620.450	0.25	1.38	84	84	6	302	66.1	105.3
12	60.0	623.580	0.24	1.39	88	88	6	299	69.4	105.1
Traverse 2	0.0	623.580								
1	5.0	627.080	0.31	1.70	81	81	5	301	1.5	105.0
2	10.0	630.750	0.34	1.86	81	81	5	303	4.7	105.3
3	15.0	634.200	0.30	1.64	82	82	5	305	8.4	105.3
4	20.0	637.600	0.29	1.60	84	84	5	304	12.5	105.0
5	25.0	640.890	0.27	1.49	85	85	6	303	17.7	105.1
6	30.0	644.340	0.28	1.63	85	85	6	304	25.2	108.3
7	35.0	648.990	0.54	2.98	85	85	7	302	45.6	105.3
8	40.0	653.980	0.62	3.43	86	86	7	302	53.2	105.4
9	45.0	658.890	0.60	3.32	86	86	8	302	58.3	105.4
10	50.0	663.860	0.61	3.39	87	87	8	301	62.5	105.5
11	55.0	668.940	0.64	3.55	87	87	8	302	66.1	105.4
12	60.0	673.800	0.58	3.24	87	87	8	297	69.4	105.5
Average:			0.408	2.242	80.8	80.8	6.2	301.9		105.4

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:28 - 14:29

Concentrations:

Particulate	0.66	mg/dscm	0.00029	gr/dscf
	0.36	mg/Acm	0.00016	gr/Acf
	0.53	mg/dscm (@ 11% O2)	0.00023	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.044	Kg/hr	0.097	lb/hr

Flue Gas Characteristics:

Flow	1110	dscm/min	39200	dscf/min
	18.50	dscm/sec	653	dscf/sec
	2039	Acm/min	72024	Acf/min
Velocity	13.345	m/sec	43.78	f/sec
Temperature	150.6	oC	303.1	oF
Moisture	18.0	%		
Gas Analysis	8.6	% O2		
	11.2	% CO2		
	30.131	Mol. Wt (g/gmole) Dry		
	27.951	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5676	dscm	90.674	dscf
Sample Time	120.0	minutes		
Isokineticity	106.6	%		

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

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:28 - 14:29

Control Unit (Y)	1.0284	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00010		CO2	O2		Impinger 1	278.0
Pitot Factor	0.8489	Washings (grams)	0.00160	Traverse 1	11.00	8.73		Impinger 2	104.0
Baro. Press. (in. Hg)	30.13			Traverse 2	11.33	8.50		Impinger 3	14.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00170**					Impinger 4	5.0
Stack Height (ft)	30.16							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	16.1
Minutes Per Reading	5.0				**11.17**	**8.62**		**Gain (grams)**	**422.1**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	675.890								
1	5.0	679.230	0.28	1.54	83	83	4	302	1.5	106.4
2	10.0	682.690	0.30	1.65	84	84	4	304	4.7	106.5
3	15.0	685.980	0.27	1.49	85	85	4	305	8.4	106.6
4	20.0	689.220	0.26	1.43	87	87	4	306	12.5	106.6
5	25.0	692.640	0.29	1.61	88	88	4	305	17.7	106.3
6	30.0	696.200	0.32	1.75	83	83	4	306	25.2	106.4
7	35.0	701.160	0.62	3.40	83	83	5	305	45.6	106.9
8	40.0	706.050	0.60	3.50	84	84	5	305	53.2	107.0
9	45.0	710.980	0.61	3.35	84	84	5	305	58.3	106.9
10	50.0	715.860	0.60	3.30	84	84	5	304	62.5	106.6
11	55.0	720.700	0.59	3.24	84	84	6	305	66.1	106.7
12	60.0	725.400	0.56	3.08	84	84	6	304	69.4	106.2
Traverse 2	0.0	725.400								
1	5.0	729.450	0.41	2.26	85	85	7	304	1.5	106.6
2	10.0	733.600	0.43	2.37	85	85	7	304	4.7	106.7
3	15.0	737.750	0.43	2.37	85	85	8	303	8.4	106.6
4	20.0	742.020	0.45	2.49	86	86	8	302	12.5	107.0
5	25.0	746.180	0.43	2.38	86	86	8	303	17.7	106.7
6	30.0	749.990	0.36	1.99	86	86	8	302	25.2	106.6
7	35.0	753.580	0.32	1.77	86	86	6	302	45.6	106.5
8	40.0	757.010	0.29	1.61	87	87	6	302	53.2	106.6
9	45.0	760.380	0.28	1.56	87	87	6	300	58.3	106.5
10	50.0	763.650	0.26	1.45	88	88	6	299	62.5	106.9
11	55.0	766.780	0.24	1.34	88	88	6	300	66.1	106.6
12	60.0	769.900	0.24	1.34	87	87	6	297	69.4	106.2
Average:			0.393	2.178	85.4	85.4	5.8	303.1		106.6

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:50 - 15:52

Concentrations:

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

Emission Rates:

Particulate	0.02	Kg/hr	0.047	lb/hr

Flue Gas Characteristics:

Flow	1156	dscm/min	40839	dscf/min
	19.27	dscm/sec	681	dscf/sec
	2095	Acm/min	73968	Acf/min
Velocity	13.706	m/sec	44.97	f/sec
Temperature	149.1	oC	300.3	oF
Moisture	17.1	%		
Gas Analysis	9.8	% O2		
	10.2	% CO2		
	30.016	Mol. Wt (g/gmole) Dry		
	27.963	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7711	dscm	97.863	dscf
Sample Time	120.0	minutes		
Isokineticity	105.6	%		

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

Client:	Metro Vancouver	**Date:**	18-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:50 - 15:52

Control Unit (Y)	1.0284	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00005		CO2	O2		Impinger 1	240.0
Pitot Factor	0.8489	Washings (grams)	0.00080	Traverse 1	10.33	9.80		Impinger 2	132.0
Baro. Press. (in. Hg)	30.13			Traverse 2	10.00	9.70		Impinger 3	28.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.0008**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	14.7
Minutes Per Reading	5.0				**10.17**	**9.75**		**Gain (grams)**	**428.7**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	770.233								
1	5.0	774.630	0.48	2.66	87	87	5.5	303	1.5	105.5
2	10.0	779.120	0.50	2.77	87	87	5.5	304	4.7	105.6
3	15.0	783.690	0.52	2.87	86	86	5.5	305	8.4	105.7
4	20.0	788.300	0.53	2.92	86	86	5.5	306	12.5	105.7
5	25.0	792.730	0.49	2.71	87	87	5.5	305	17.7	105.3
6	30.0	796.830	0.42	2.31	86	86	5.5	306	25.2	105.5
7	35.0	800.250	0.29	1.60	87	87	5.5	306	45.6	105.5
8	40.0	803.620	0.28	1.55	87	87	5.5	305	53.2	105.7
9	45.0	807.090	0.30	1.66	87	87	5.5	306	58.3	105.2
10	50.0	810.520	0.29	1.61	88	88	5.5	302	62.5	105.3
11	55.0	813.780	0.26	1.45	88	88	4.5	300	66.1	105.5
12	60.0	816.980	0.25	1.40	89	89	4.5	299	69.4	105.4
Traverse 2	0.0	816.980								
1	5.0	820.250	0.26	1.45	88	88	6	299	1.5	105.8
2	10.0	823.380	0.24	1.34	88	88	6	299	4.7	105.4
3	15.0	826.760	0.28	1.56	88	88	6	298	8.4	105.3
4	20.0	830.260	0.30	1.68	88	88	6	298	12.5	105.4
5	25.0	833.940	0.33	1.85	89	89	6.5	297	17.7	105.5
6	30.0	837.730	0.35	1.96	89	89	6.5	298	25.2	105.6
7	35.0	842.820	0.63	3.54	89	89	6.5	296	45.6	105.9
8	40.0	847.880	0.62	3.49	89	89	6.5	294	53.2	106.0
9	45.0	853.050	0.65	3.65	89	89	6.5	295	58.3	105.9
10	50.0	858.050	0.61	3.42	89	89	6	296	62.5	105.7
11	55.0	862.950	0.58	3.26	90	90	6	296	66.1	106.0
12	60.0	867.750	0.56	3.16	90	90	6	294	69.4	105.5
Average:			0.418	2.328	88.0	88.0	3.0	300.3		105.6

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		18-Jul-23	18-Jul-23	18-Jul-23
Test Time		10:42-11:42	12:28 - 13:28	13:44-14:44
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.13	30.13	30.13
DGM Factor	(Y)	1.0365	1.0365	1.0365
Initial Reading	(m^3)	259.124	259.619	260.056
Final Reading	(m^3)	259.613	260.052	260.512
Temp. Outlet	(Avg. oF)	85.2	89.1	93.8
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.49550	0.43481	0.45373
HF	(mg)	0.042	0.053	0.047
Oxygen	(Vol. %)	10.1	8.6	9.8
HF	**(mg/Sm^3)**	**0.085**	**0.121**	**0.104**
HF	**(mg/Sm^3 @ 11% O2)**	**0.078**	**0.098**	**0.093**
Moisture (isokinetic)	**(Vol. %)**	16.9	18.0	17.1

*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 2

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		18-Jul-23	18-Jul-23	18-Jul-23
Test Time		10:42-11:42	12:28 - 13:28	13:44-14:44
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.13	30.13	30.13
DGM Factor	(Y)	1.0276	1.0276	1.0276
Initial Reading	(m^3)	110.960	111.599	112.186
Final Reading	(m^3)	111.594	112.183	112.793
Temp. Outlet	(Avg. oF)	89.5	91.4	97.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.63135	0.57918	0.59521
NH_3	(mg)	1.7	2.2	1.9
Oxygen	(Vol. %)	10.1	8.6	9.8
NH_3	**(mg/Sm^3)**	**2.7**	**3.9**	**3.2**
NH_3	**(mg/Sm^3 @ 11% O2)**	**2.4**	**3.1**	**2.8**
Moisture (isokinetic)	**(Vol. %)**	16.9	18.0	17.1

*Wet Basis Calculated on moisture from isokinetic tests

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

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:20 - 12:23

Concentrations:

Particulate	0.26	mg/dscm	0.00011	gr/dscf
	0.15	mg/Acm	0.00006	gr/Acf
	0.23	mg/dscm (@ 11% O2)	0.00010	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.018	Kg/hr	0.040	lb/hr

Flue Gas Characteristics:

Flow	1153	dscm/min	40731	dscf/min
	19.22	dscm/sec	679	dscf/sec
	2068	Acm/min	73034	Acf/min
Velocity	13.532	m/sec	44.40	f/sec
Temperature	154.4	oC	310.0	oF
Moisture	15.1	%		
Gas Analysis	9.5	% O2		
	10.7	% CO2		
	30.086	Mol. Wt (g/gmole) Dry		
	28.263	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6656	dscm	94.137	dscf
Sample Time	120.0	minutes		
Isokineticity	103.5	%		

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

Client:	Metro Vancouver	**Date:**	19-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	10:20 - 12:23

Control Unit (Y)	0.9927
Nozzle Diameter (in.)	0.3058
Pitot Factor	0.8469
Baro. Press. (in. Hg)	30.06
Static Press. (in. H20)	-19.00
Stack Height (ft)	30
Stack Diameter (in.)	70.90
Stack Area (sq.ft.)	27.417
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:	
Filter (grams)	0.00010
Washings (grams)	0.00060
Total (grams)	**0.00070**

Gas Analysis (Vol. %):		
	CO2	O2
Traverse 1	11.33	9.33
Traverse 2	10.00	9.67
	10.67	**9.50**

Condensate Collection:	
Impinger 1	216.0
Impinger 2	94.0
Impinger 3	22.0
Impinger 4	6.0
Impinger 5	3.0
Impinger 6	1.0
Gel	13.5
Gain (grams)	**355.5**

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	724.241								
1	5.0	728.940	0.54	2.80	79	79	5	302	1.5	103.9
2	10.0	733.720	0.56	2.90	80	80	5	308	4.7	104.0
3	15.0	738.330	0.52	2.69	81	81	6	305	8.4	103.7
4	20.0	742.880	0.51	2.63	81	81	6	310	12.5	103.6
5	25.0	747.380	0.50	2.57	81	81	7	312	17.7	103.6
6	30.0	751.660	0.44	2.26	82	82	7	312	25.2	104.8
7	35.0	755.300	0.33	1.72	83	83	5	302	45.6	101.9
8	40.0	758.690	0.28	1.46	83	83	5	305	53.2	103.2
9	45.0	761.830	0.24	1.24	83	83	5	309	58.3	103.5
10	50.0	765.030	0.25	1.29	84	84	5	312	62.5	103.3
11	55.0	768.120	0.23	1.19	86	86	5	314	66.1	103.8
12	60.0	771.160	0.22	1.16	87	87	5	303	69.4	103.4
Traverse 2	0.0	771.160								
1	5.0	774.680	0.30	1.56	86	86	6	310	1.5	103.3
2	10.0	778.260	0.31	1.61	87	87	6	311	4.7	103.3
3	15.0	781.900	0.32	1.66	88	88	5	313	8.4	103.3
4	20.0	785.180	0.26	1.35	88	88	5	313	12.5	103.2
5	25.0	788.540	0.27	1.41	89	89	5	312	17.7	103.5
6	30.0	792.140	0.31	1.61	89	89	5	313	25.2	103.6
7	35.0	796.480	0.45	2.55	90	90	7	312	45.6	103.6
8	40.0	801.480	0.60	3.13	91	91	7	315	53.2	103.6
9	45.0	806.560	0.62	3.23	91	91	8	316	58.3	103.6
10	50.0	811.490	0.58	3.03	92	92	8	315	62.5	103.6
11	55.0	816.480	0.59	3.10	92	92	8	310	66.1	103.7
12	60.0	821.350	0.56	2.96	92	92	8	305	69.4	103.5
Average:			0.408	2.130	86.0	86.0	6.0	310.0		103.5

Client:	Metro Vancouver	**Date:**	20-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:17 - 11:18

Concentrations:

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

Emission Rates:

Particulate	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1162	dscm/min	41046	dscf/min
	19.37	dscm/sec	684	dscf/sec
	2050	Acm/min	72410	Acf/min
Velocity	13.417	m/sec	44.02	f/sec
Temperature	152.8	oC	307.1	oF
Moisture	14.1	%		
Gas Analysis	9.9	% O2		
	10.1	% CO2		
	30.010	Mol. Wt (g/gmole) Dry		
	28.312	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6584	dscm	93.882	dscf
Sample Time	120.0	minutes		
Isokineticity	102.4	%		

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

Client:	Metro Vancouver	**Date:**	20-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:17 - 11:18

Control Unit (Y)	0.9927	**Collection:**			**Gas Analysis (Vol. %):**		**Condensate Collection:**	
Nozzle Diameter (in.)	0.3058	Filter (grams)	0.00005		CO2	O2	Impinger 1	210.0
Pitot Factor	0.8469	Washings (grams)	0.00005	Traverse 1	11.00	9.27	Impinger 2	96.0
Baro. Press. (in. Hg)	30.10			Traverse 2	9.17	10.53	Impinger 3	4.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00010**				Impinger 4	3.0
Stack Height (ft)	30						Impinger 5	2.0
Stack Diameter (in.)	70.90						Impinger 6	1.0
Stack Area (sq.ft.)	27.417						Gel	12.5
Minutes Per Reading	5.0				**10.09**	**9.90**	**Gain (grams)**	**328.5**
Minutes Per Point	5.0							

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	821.706								
1	5.0	824.770	0.23	1.19	80	80	4	303	1.5	102.3
2	10.0	827.960	0.25	1.29	80	80	4	304	4.7	102.2
3	15.0	831.220	0.26	1.35	80	80	4	304	8.4	102.5
4	20.0	834.480	0.26	1.35	81	81	4	306	12.5	102.4
5	25.0	837.680	0.25	1.29	82	82	4	307	17.7	102.4
6	30.0	840.980	0.27	1.40	82	82	4	307	25.2	101.6
7	35.0	845.500	0.50	2.59	82	82	6	307	45.6	102.6
8	40.0	849.890	0.47	2.44	83	83	6	305	53.2	102.4
9	45.0	854.430	0.50	2.61	84	84	6	305	58.3	102.5
10	50.0	858.880	0.48	2.50	84	84	6	304	62.5	102.5
11	55.0	863.520	0.52	2.71	85	85	6	305	66.1	102.6
12	60.0	868.220	0.53	2.78	86	86	6	302	69.4	102.6
Traverse 2	0.0	868.220								
1	5.0	872.730	0.49	2.57	86	86	6	304	1.5	102.4
2	10.0	877.290	0.50	2.62	87	87	6	306	4.7	102.5
3	15.0	881.720	0.47	2.46	88	88	6	307	8.4	102.5
4	20.0	886.100	0.46	2.41	89	89	6	308	12.5	102.3
5	25.0	890.820	0.53	2.78	90	90	6	309	17.7	102.7
6	30.0	895.720	0.57	2.99	91	91	6	309	25.2	102.7
7	35.0	899.960	0.43	2.25	90	90	5	310	45.6	102.4
8	40.0	904.680	0.53	2.77	90	90	5	310	53.2	102.8
9	45.0	908.560	0.36	1.88	90	90	3	311	58.3	102.4
10	50.0	912.220	0.32	1.67	90	90	3	311	62.5	102.4
11	55.0	915.460	0.25	1.31	91	91	3	312	66.1	102.3
12	60.0	918.410	0.21	1.10	91	91	3	314	69.4	101.7
Average:			0.402	2.096	85.9	85.9	4.9	307.1		102.4

Client:	Metro Vancouver	**Date:**	20-Jul-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:45 - 13:46

Concentrations:

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

Emission Rates:

Particulate	0.005	Kg/hr	0.011	lb/hr

Flue Gas Characteristics:

Flow	1093	dscm/min	38586	dscf/min
	18.21	dscm/sec	643	dscf/sec
	2013	Acm/min	71095	Acf/min
Velocity	13.173	m/sec	43.22	f/sec
Temperature	157.6	oC	315.7	oF
Moisture	16.9	%		
Gas Analysis	9.3	% O2		
	10.6	% CO2		
	30.066	Mol. Wt (g/gmole) Dry		
	28.030	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.5685	dscm	90.705	dscf
Sample Time	120.0	minutes		
Isokineticity	105.3	%		

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

Client:	Metro Vancouver	**Date:**	20-Jul-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	11:45 - 13:46

Control Unit (Y)	0.9927	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3058	Filter (grams)	0.00010		CO2	O2		Impinger 1	264.0
Pitot Factor	0.8469	Washings (grams)	0.00010	Traverse 1	10.67	9.20		Impinger 2	90.0
Baro. Press. (in. Hg)	30.10			Traverse 2	10.50	9.40		Impinger 3	14.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00020**					Impinger 4	5.0
Stack Height (ft)	30							Impinger 5	4.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	12.2
Minutes Per Reading	5.0				**10.59**	**9.30**		**Gain (grams)**	**391.2**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	919.572								
1	5.0	923.900	0.45	2.34	90	90	7	314	1.5	105.3
2	10.0	928.280	0.46	2.39	90	90	7	316	4.7	105.5
3	15.0	932.750	0.48	2.50	91	91	8	316	8.4	105.3
4	20.0	937.280	0.49	2.55	92	92	8	316	12.5	105.4
5	25.0	941.660	0.46	2.39	91	91	8	316	17.7	105.3
6	30.0	945.990	0.45	2.34	91	91	8	316	25.2	105.3
7	35.0	949.760	0.34	1.77	91	91	8	316	45.6	105.3
8	40.0	953.360	0.31	1.61	91	91	8	316	53.2	105.3
9	45.0	956.780	0.28	1.46	91	91	8	316	58.3	105.2
10	50.0	960.150	0.27	1.41	92	92	8	317	62.5	105.4
11	55.0	963.450	0.26	1.35	92	92	7	317	66.1	105.2
12	60.0	966.620	0.24	1.25	92	92	7	314	69.4	104.9
Traverse 2	0.0	966.620								
1	5.0	969.860	0.25	1.31	93	93	8	316	1.5	105.0
2	10.0	973.230	0.27	1.41	94	94	8	317	4.7	105.0
3	15.0	976.530	0.26	1.36	93	93	8	317	8.4	105.0
4	20.0	979.770	0.25	1.30	93	93	8	318	12.5	105.2
5	25.0	983.080	0.26	1.36	93	93	8	316	17.7	105.2
6	30.0	986.450	0.27	1.41	93	93	8	317	25.2	105.2
7	35.0	991.130	0.52	2.72	94	94	8	316	45.6	105.4
8	40.0	995.630	0.48	2.51	94	94	8	315	53.2	105.3
9	45.0	1000.280	0.51	2.67	95	95	6	316	58.3	105.5
10	50.0	1004.980	0.52	2.73	95	95	6	315	62.5	105.6
11	55.0	1009.540	0.49	2.58	96	96	7	314	66.1	105.2
12	60.0	1014.180	0.50	2.65	96	96	7	309	69.4	105.7
Average:			0.378	1.974	92.6	92.6	7.6	315.7		105.3

Client:	Metro Vancouver	**Date:**	25-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Cr^{+6}
Source:	Unit 3	**Run Time:**	10:00 - 12:02

Concentrations:

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

Emission Rates:

Particulate	0.00	Kg/hr	0.000	lb/hr

Flue Gas Characteristics:

Flow	1201	dscm/min	42399	dscf/min
	20.01	dscm/sec	707	dscf/sec
	2046	Acm/min	72254	Acf/min
Velocity	13.388	m/sec	43.92	f/sec
Temperature	151.3	oC	304.3	oF
Moisture	11.4	%		
Gas Analysis	9.4	% O2		
	10.3	% CO2		
	30.017	Mol. Wt (g/gmole) Dry		
	28.642	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.2966	dscm	81.105	dscf
Sample Time	120.0	minutes		
Isokineticity	99.5	%		

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

Client:	Metro Vancouver	**Date:**	25-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Cr+6
Source:	Unit 3	**Run Time:**	10:00 - 12:02

Control Unit (Y)	0.9927	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Cr+6 (grams)	0.00000044		CO2	O2		Impinger 1	-20.0
Pitot Factor	0.8489			Traverse 1	10.00	9.50		Impinger 2	200.0
Baro. Press. (in. Hg)	30.10			Traverse 2	10.50	9.33		Impinger 3	21.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.0000004**					Impinger 4	0.0
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	21.6
Minutes Per Reading	5.0				**10.25**	**9.42**		**Gain (grams)**	**222.6**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	16.077								
1	5.0	18.760	0.26	0.96	60	60	69	306	1.5	99.0
2	10.0	21.550	0.28	1.04	60	60	6	306	4.7	99.3
3	15.0	24.500	0.31	1.15	60	60	6	305	8.4	99.7
4	20.0	27.500	0.32	1.20	60	60	6	305	12.5	99.8
5	25.0	30.500	0.32	1.20	60	60	6	306	17.7	99.9
6	30.0	33.350	0.29	1.07	60	60	6	306	25.2	99.6
7	35.0	37.160	0.52	1.93	60	60	6	305	45.6	99.6
8	40.0	40.910	0.50	1.86	62	62	6	305	53.2	99.6
9	45.0	44.880	0.56	2.08	62	62	7	305	58.3	99.7
10	50.0	48.860	0.56	2.09	64	64	7	305	62.5	99.5
11	55.0	52.760	0.54	2.02	64	64	7	305	66.1	99.3
12	60.0	56.460	0.48	1.80	65	65	7	305	69.4	99.7
Traverse 2	0.0	56.460								
1	5.0	60.390	0.54	2.03	67	67	8	305	1.5	99.5
2	10.0	64.320	0.54	2.04	68	68	8	304	4.7	99.3
3	15.0	68.080	0.49	1.85	68	68	8	304	8.4	99.7
4	20.0	71.760	0.47	1.77	66	66	8	303	12.5	99.9
5	25.0	75.390	0.46	1.73	66	66	8	303	17.7	99.6
6	30.0	78.960	0.45	1.69	64	64	8	303	25.2	99.4
7	35.0	82.070	0.34	1.27	62	62	7	303	45.6	99.9
8	40.0	85.080	0.32	1.19	62	62	7	303	53.2	99.6
9	45.0	87.980	0.30	1.12	62	62	7	303	58.3	99.1
10	50.0	90.790	0.28	1.05	62	62	7	303	62.5	99.4
11	55.0	93.540	0.27	1.01	62	62	7	303	66.1	99.0
12	60.0	96.200	0.25	0.95	62	62	7	302	69.4	99.5
Average:			0.402	1.504	62.8	62.8	9.5	304.3		99.5

Client:	Metro Vancouver	**Date:**	26-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Cr^{+6}
Source:	Unit 1	**Run Time:**	09:22 - 11:24

Concentrations:

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

Emission Rates:

Particulate	0.00	Kg/hr	0.000	lb/hr

Flue Gas Characteristics:

Flow	1217	dscm/min	42966	dscf/min
	20.28	dscm/sec	716	dscf/sec
	2063	Acm/min	72841	Acf/min
Velocity	13.497	m/sec	44.28	f/sec
Temperature	154.2	oC	309.6	oF
Moisture	10.4	%		
Gas Analysis	10.1	% O2		
	10.0	% CO2		
	30.002	Mol. Wt (g/gmole) Dry		
	28.758	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.3020	dscm	81.296	dscf
Sample Time	120.0	minutes		
Isokineticity	98.5	%		

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

Client:	Metro Vancouver	**Date:**	26-Jul-23
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Cr+6
Source:	Unit 1	**Run Time:**	09:22 - 11:24

Control Unit (Y)	0.9927	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Cr+6 (grams)	0.00000042		CO2	O2		Impinger 1	-65.0
Pitot Factor	0.8489			Traverse 1	10.00	10.30		Impinger 2	235.0
Baro. Press. (in. Hg)	30.10			Traverse 2	10.00	9.80		Impinger 3	10.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.0000004**					Impinger 4	0.0
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	19.7
Minutes Per Reading	5.0				**10.00**	**10.05**		**Gain (grams)**	**199.7**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	96.578								
1	5.0	99.360	0.27	1.01	68	68	3	309	1.5	98.5
2	10.0	102.200	0.28	1.05	70	70	3	310	4.7	98.4
3	15.0	105.140	0.30	1.15	70	70	3	310	8.4	98.4
4	20.0	108.180	0.32	1.20	70	70	3	310	12.5	98.6
5	25.0	111.310	0.34	1.28	70	70	3	310	17.7	98.5
6	30.0	114.300	0.31	1.17	71	71	3	310	25.2	98.3
7	35.0	118.420	0.59	2.22	71	71	7	309	45.6	98.4
8	40.0	122.440	0.56	2.11	72	72	4	309	53.2	98.3
9	45.0	126.440	0.55	2.07	72	72	4	310	58.3	98.8
10	50.0	130.470	0.56	2.11	72	72	4	311	62.5	98.7
11	55.0	134.350	0.52	1.96	72	72	4	311	66.1	98.6
12	60.0	137.990	0.46	1.73	72	72	4	310	69.4	98.2
Traverse 2	0.0	137.990								
1	5.0	142.060	0.57	2.15	73	73	4	310	1.5	98.5
2	10.0	146.070	0.55	2.08	75	75	4	310	4.7	98.4
3	15.0	149.940	0.51	1.93	75	75	4	310	8.4	98.6
4	20.0	153.710	0.48	1.82	76	76	4	310	12.5	98.8
5	25.0	157.350	0.45	1.71	76	76	4	310	17.7	98.5
6	30.0	160.920	0.43	1.65	76	76	4	310	25.2	98.8
7	35.0	164.200	0.36	1.37	78	78	5	309	45.6	98.7
8	40.0	167.320	0.33	1.26	78	78	5	309	53.2	98.1
9	45.0	170.360	0.31	1.20	78	78	5	309	58.3	98.6
10	50.0	173.200	0.27	1.03	78	78	5	308	62.5	98.6
11	55.0	175.940	0.25	0.96	78	78	5	308	66.1	98.8
12	60.0	178.560	0.23	0.88	79	79	5	308	69.4	98.3
Average:			0.408	1.546	73.8	73.8	4.1	309.6		98.5

Client:	Metro Vancouver	**Date:**	26-Jul-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Cr^{+6}
Source:	Unit 1	**Run Time:**	12:08 - 14:09

Concentrations:

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

Emission Rates:

Particulate	0.00	Kg/hr	0.000	lb/hr

Flue Gas Characteristics:

Flow	1187	dscm/min	41934	dscf/min
	19.79	dscm/sec	699	dscf/sec
	2107	Acm/min	74416	Acf/min
Velocity	13.788	m/sec	45.24	f/sec
Temperature	155.5	oC	311.8	oF
Moisture	14.1	%		
Gas Analysis	9.8	% O2		
	10.3	% CO2		
	30.031	Mol. Wt (g/gmole) Dry		
	28.332	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.3317	dscm	82.345	dscf
Sample Time	120.0	minutes		
Isokineticity	102.2	%		

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

Client:	Metro Vancouver	**Date:**	26-Jul-23
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Cr+6
Source:	Unit 1	**Run Time:**	12:08 - 14:09

Control Unit (Y)	0.9927	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.2837	Cr+6 (grams)	0.00000044		CO2	O2		Impinger 1	-68.0
Pitot Factor	0.8489			Traverse 1	10.17	9.90		Impinger 2	295.0
Baro. Press. (in. Hg)	30.10			Traverse 2	10.33	9.63		Impinger 3	39.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.0000004**					Impinger 4	0.0
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	21.6
Minutes Per Reading	5.0				**10.25**	**9.77**		**Gain (grams)**	**287.6**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	178.928								
1	5.0	183.000	0.56	2.14	78	78	4	308	1.5	101.9
2	10.0	187.020	0.54	2.06	78	78	4	308	4.7	102.5
3	15.0	190.870	0.50	1.91	78	78	4	308	8.4	101.9
4	20.0	194.650	0.48	1.83	77	77	4	310	12.5	102.5
5	25.0	198.310	0.45	1.71	77	77	4	310	17.7	102.4
6	30.0	201.920	0.44	1.67	77	77	5	310	25.2	102.2
7	35.0	205.360	0.40	1.52	78	78	5	312	45.6	102.0
8	40.0	208.620	0.36	1.37	78	78	5	312	53.2	101.9
9	45.0	211.600	0.30	1.14	78	78	5	312	58.3	101.9
10	50.0	214.480	0.28	1.06	78	78	5	312	62.5	102.0
11	55.0	217.260	0.26	1.00	79	79	6	311	66.1	101.9
12	60.0	219.940	0.24	0.92	79	79	6	311	69.4	102.2
Traverse 2	0.0	219.940								
1	5.0	222.830	0.28	1.07	78	78	5	310	1.5	102.2
2	10.0	225.820	0.30	1.14	80	80	5	313	4.7	102.0
3	15.0	228.920	0.32	1.22	80	80	5	313	8.4	102.4
4	20.0	232.110	0.34	1.30	80	80	5	313	12.5	102.2
5	25.0	235.210	0.32	1.22	80	80	5	313	17.7	102.4
6	30.0	238.200	0.30	1.14	81	81	5	314	25.2	101.9
7	35.0	242.500	0.62	2.36	81	81	5	314	45.6	102.2
8	40.0	246.700	0.59	2.25	81	81	6	315	53.2	102.4
9	45.0	250.800	0.56	2.13	81	81	6	315	58.3	102.5
10	50.0	254.940	0.57	2.18	82	82	6	314	62.5	102.4
11	55.0	258.970	0.54	2.06	82	82	6	314	66.1	102.4
12	60.0	262.820	0.49	1.88	82	82	6	312	69.4	102.5
Average:			0.418	1.595	79.3	79.3	5.1	311.8		102.2

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		20-Jul-23	20-Jul-23	20-Jul-23
Test Time		10:10-11:10	11:35-12:35	12:45-13:45
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.10	30.10	30.10
DGM Factor	(Y)	1.0276	1.0276	1.0276
Initial Reading	(m^3)	114.897	115.542	116.193
Final Reading	(m^3)	115.539	116.189	116.880
Temp. Outlet	(Avg. oF)	67.5	73.8	76.8
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.66554	0.66239	0.69937
HF	(mg)	0.051	0.051	0.051
Oxygen	(Vol. %)	9.5	9.9	9.3
HF	**(mg/Sm^3)**	**0.077**	**0.078**	**0.074**
HF	**(mg/Sm^3 @ 11% O2)**	**0.067**	**0.070**	**0.063**
Moisture (isokinetic)	**(Vol. %)**	15.1	14.1	16.9

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Sample Type: NH_3

Parameter		Test 1	Test 2	Test 3
Test Date		20-Jul-23	20-Jul-23	20-Jul-23
Test Time		10:10-11:10	11:35-12:35	12:45-13:45
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.10	30.10	30.10
DGM Factor	(Y)	1.0365	1.0365	1.0365
Initial Reading	(m^3)	261.978	262.497	262.863
Final Reading	(m^3)	262.482	262.860	263.254
Temp. Outlet	(Avg. oF)	69.5	73.8	79.8
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.52511	0.37434	0.39907
NH_3	(mg)	4.2	1.6	1.5
Oxygen	(Vol. %)	9.5	9.9	9.3
NH_3	**(mg/Sm^3)**	**8.0**	**4.2**	**3.8**
NH_3	**(mg/Sm^3 @ 11% O2)**	**6.9**	**3.8**	**3.2**
Moisture (isokinetic)	**(Vol. %)**	15.1	14.1	16.9

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Parameter: N_2O

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

Sample ID	Date	Time	N_2O ppm	N_2O mg/Sm^3	N_2O mg/Sm^3 @ 11% O_2
Unit 1 - Run 1	2023-07-19	09:35 - 10:35	0.00	0.18	0.16
Unit 1 - Run 2	2023-07-19	10:51 - 11:51	3.00	5.49	4.83
Unit 1 - Run 3	2023-07-19	12:08 - 13:08	0.00	0.18	0.17
Average					**1.72**
Unit 2 - Run 1	2023-07-18	10:42 - 11:42	0.00	0.18	0.17
Unit 2 - Run 2	2023-07-18	12:28 - 12:28	0.00	0.18	0.15
Unit 2 - Run 3	2023-07-18	13:44 - 14:44	0.00	0.18	0.16
Average					**0.16**
Unit 3 - Run 1	2023-07-20	10:10 - 11:10	0.00	0.18	0.16
Unit 3 - Run 2	2023-07-20	11:35 - 12:35	0.00	0.18	0.16
Unit 3 - Run 3	2023-07-20	12:45 - 13:45	0.00	0.18	0.16
Average					**0.16**

Date:	**19-Jul-23**			**18-Jul-23**			**20-Jul-23**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	09:35 - 10:35	10:51 - 11:51	12:08 - 13:08	10:42 - 11:42	12:28 - 13:28	13:44 - 14:44	10:10 - 11:10	11:35 - 12:35	12:45 - 13:45
Methane (ppmv)	4.50	ND	ND	5.4	ND	ND	ND	ND	ND
Ethane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3 as Propane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4 as n-Butane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5 as n-Pentane (ppmv)	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6 as n-Hexane (ppmv)	ND	1.7	ND	ND	ND	ND	ND	ND	ND
C6+ as n-Hexane (ppmv)	ND	ND	ND	2.7	ND	ND	ND	ND	ND
Detection Limits:									
Methane	3.4	3.3	3.7	4.2	3.4	3.3	3.7	3.8	3.5
Ethane	1.00	0.98	1.1	1.2	1.0	0.99	1.10	1.1	1.10
Ethene	1.00	0.98	1.1	1.2	1.0	0.99	1.10	1.1	1.10
C3 as Propane	0.85	0.82	0.94	1	0.85	0.83	0.92	0.96	0.88
C4 as n-Butane	0.85	0.82	0.94	1	0.85	0.83	0.92	0.96	0.88
C5 as n-Pentane	0.85	0.82	0.94	1	0.85	0.83	0.92	0.96	0.88
C6 as n-Hexane	0.85	0.82	0.94	1	0.85	0.83	0.92	0.96	0.88
C6+	1.7	1.6	1.9	2.1	1.7	1.7	1.8	1.9	1.8

Using 1/2 DL Convention

Sample Date:	**19-Jul-23**			**18-Jul-23**			**20-Jul-23**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	09:35 - 10:35	10:51 - 11:51	12:08 - 13:08	10:42 - 11:42	12:28 - 13:28	13:44 - 14:44	10:10 - 11:10	11:35 - 12:35	12:45 - 13:45
Methane (ppm)	4.50	1.65	1.85	5.40	1.70	1.65	1.85	1.90	1.75
Ethane (ppm)	0.50	0.49	0.55	0.60	0.50	0.50	0.55	0.55	0.55
Ethene (ppm)	0.50	0.49	0.55	0.60	0.50	0.50	0.55	0.55	0.55
C3 as Propane (ppm)	0.43	0.41	0.47	0.50	0.43	0.42	0.46	0.48	0.44
C4 as n-Butane (ppm)	0.43	0.41	0.47	0.50	0.43	0.42	0.46	0.48	0.44
C5 as n-Pentane (ppm)	0.43	0.41	0.47	0.50	0.43	0.42	0.46	0.48	0.44
C6 as n-Hexane (ppm)	0.43	1.70	0.47	0.50	0.43	0.42	0.46	0.48	0.44
C6+ as n-Hexane (ppm)	0.85	0.80	0.95	2.70	0.85	0.85	0.90	0.95	0.90
Methane (mg/m^3 as CH_4)	3.00	1.10	1.23	3.60	1.13	1.10	1.23	1.27	1.17
Ethane (mg/m^3 as CH_4)	0.33	0.33	0.37	0.40	0.33	0.33	0.37	0.37	0.37
Ethene (mg/m^3 as CH_4)	0.33	0.33	0.37	0.40	0.33	0.33	0.37	0.37	0.37
C3 as Propane (mg/m^3 as CH_4)	0.28	0.27	0.31	0.33	0.28	0.28	0.31	0.32	0.29
C4 as n-Butane (mg/m^3 as CH_4)	0.28	0.27	0.31	0.33	0.28	0.28	0.31	0.32	0.29
C5 as n-Pentane (mg/m^3 as CH_4)	0.28	0.27	0.31	0.33	0.28	0.28	0.31	0.32	0.29
C6 as n-Hexane (mg/m^3 as CH_4)	0.28	1.13	0.31	0.33	0.28	0.28	0.31	0.32	0.29
C6+ as n-Hexane (mg/m^3 as CH_4)	0.57	0.53	0.63	1.80	0.57	0.57	0.60	0.63	0.60
Total mg/Sm^3 @11% O_2 as CH_4	4.01	3.10	2.82	5.51	2.90	2.58	2.63	2.90	2.87

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

APPENDIX - D

FIELD DATA SHEETS

A. Lanfranco and Associates Inc.

S-4

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #1	NOZZLE G-3121 DIAMETER, IN. 0.3083	
PARAMETER / RUN No	Pitot's / Plastic / R-1	PROBE 7'C Cp 0.8489	
DATE	July 17, 2023	PORT LENGTH	
OPERATOR:	BS	STATIC PRESSURE, IN. H2O -19.5"	
CONTROL UNIT	CAL 1 Y 0.9852	STACK DIAMETER 70.9"	
	ΔH@ 1.820	STACK HEIGHT 30.6'	
BAROMETRIC PRESSURE, IN. Hg	29.98	INITIAL LEAK TEST 0.001 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.002 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	216	216
Imp. #2	100	195	95
Imp. #3	100	126	26
Imp. #4	0	10	10
Imp. #5	100	105	5
Imp. #6	100	103	3
Imp. #7	200	200	
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	11:15	272.565												
1		276.46	0.34	1.91	85	289	259	263	45	4				
2	10	280.42	0.35	1.97	85	287					10.0	9.6		
3		284.70	0.40	2.28	90	285	251	257	46	4				
4	20	289.05	0.41	2.34	91	284								
5		293.94	0.52	2.96	93	289	250	255	48	4				
6	30	298.88	0.53	3.02	94	290								
7		304.05	0.58	3.30	94	291	250	256	52	6				
8	40	308.86	0.50	2.84	93	295					10.0	10.1		
9		313.58	0.48	2.73	97	295	249	255	54	6				
10	50	318.49	0.52	2.96	98	296								
11		323.05	0.45	2.56	97	296	250	255	52	6				
12	60	327.46	0.42	2.39	98	297					10.0	10.0		
1		332.07	0.45	2.55	98	300	250	255	54	6				
2	10	336.69	0.47	2.67	99	300					10.0	10.0		
3		341.16	0.43	2.45	100	299	251	255	56	6				
4	20	345.49	0.40	2.28	101	298								
5		349.76	0.39	2.22	100	297	251	255	57	6				
6	30	354.04	0.39	2.23	101	296					10.5	9.0		
7		358.28	0.38	2.18	101	294	250	255	58	7				
8	40	362.44	0.37	2.12	99	292								
9		366.43	0.34	1.95	99	291	250	255	59	5				
10	50	370.25	0.31	1.78	99	291								
11		373.95	0.29	1.67	99	290	251	255	60	4	9.5	10.2		
12	13:16	377.70	0.30	1.73	99	288								

A. Lanfranco and Associates Inc.

J.H.

CLIENT	Metro Vancouver WTE	NOZZLE G-3121	DIAMETER, IN. .3083
SOURCE	Unit #1	PROBE 7C	Cp .8489
PARAMETER / RUN No	Particulate metals 122	PORT LENGTH	
DATE	7/5/23	STATIC PRESSURE, IN. H2O	-1.5
OPERATOR:	JG	STACK DIAMETER	70.9
CONTROL UNIT	CAE M1	Y .9857	STACK HEIGHT 30.0
		ΔH@ 1.870	
BAROMETRIC PRESSURE, IN. Hg	30.03	INITIAL LEAK TEST	.0002 @ 15
ASSUMED MOISTURE, Bw	15 %	FINAL LEAK TEST	.0000 @ 15

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	[illegible]	268	268
Imp. #2	100	220	120
Imp. #3	100	118	18
Imp. #4	0	6	6
Imp. #5	100	104	4
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			
Testo #1			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %
	8:57	380.852										
1		384.57	.31	1.74	85	288	250	251	59	4.5		
2	10	388.17	.29	1.63	87	289					10.0	9.6
3		391.98	.32	1.82	90	287	250	252	59	4.5		
4	20	395.91	.34	1.93	90	287						
5		399.67	.31	1.77	93	287	251	252	59	4.5		
6	30	403.31	.29	1.65	93	288						
7		407.85	.45	2.57	93	284	250	251	59	4.5		
8	40	411.50	.47	2.68	94	284					10.2	9.4
9		417.11	.46	2.63	96	290	250	251	59	6.0		
10	50	421.91	.50	2.86	96	290						
11		426.53	.46	2.63	97	290	250	251	59	6.0		
12	60	430.94	.42	2.41	97	289						
1		435.41	.44	2.48	95	300	251	249	59	4.0		
2	10	440.01	.47	2.64	93	300					10.0	9.7
3		444.73	.49	2.76	95	300	250	249	59	6.0		
4	20	449.25	.45	2.53	95	300						
5		453.84	.47	2.65	97	302	250	252	59	6.5		
6	30	458.47	.46	2.60	98	302						
7		463.33	.53	2.94	101	301	249	251	59	6.5		
8	40	468.03	.47	2.67	102	304						
9		472.33	.44	2.49	100	304	250	250	59	7.0		
10	50	476.82	.40	2.26	100	304					9.9	[illegible]
11		481.19	.41	2.32	100	304	249	251	58	5.5		
12	11:01	485.55	.42	2.37	100	304						9.8
		END Test										

S-H

A. Lanfranco and Associates Inc.

CLIENT	Metro Van WTE	NOZZLE G-5121	DIAMETER, IN. .5083
SOURCE	Unit #1	PROBE 7C	Cp .8489
PARAMETER / RUN No	PM/HCl/Hg metals 1	PORT LENGTH	
DATE	7/19/23	STATIC PRESSURE, IN. H2O	-1.5
OPERATOR:	SG	STACK DIAMETER	70.9
CONTROL UNIT	CAC AC1 Y .9857 ΔH@ 1.820	STACK HEIGHT	30.0
BAROMETRIC PRESSURE, IN. Hg	30.05	INITIAL LEAK TEST	.001@15
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	.001@15

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	270	270
Imp. #2	100	200	100
Imp. #3	100	118	18
Imp. #4	0	8	8
Imp. #5	100	104	4
Imp. #6	100	102	2
Upstream Diameters			
Downstream Diameters			

testo #1

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F					Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO_2 Vol. %	O_2 Vol. %
	11:30	487.451										
1		491.88	.44	1.46	88	295	250	250	54	7.0	10.0	10.1
2	10	496.42	.46	1.56	94	308						
3		501.18	.50	1.80	96	308	251	249	56	9.0		
4	20	505.65	.44	1.47	98	307						
5		510.27	.49	1.63	98	308	249	250	59	10.0		
6	30	514.85	.46	1.58	100	309						
7		519.65	.51	1.85	98	310	250	251	59	10.0		
8	40	524.26	.47	1.68	98	310					10.0	9.3
9		528.72	.44	1.46	98	310	251	252	58	10.0		
10	50	533.48	.40	1.24	98	309						
11		537.79	.41	1.29	98	309	248	249	58	9.0		
12	60	541.56	.40	1.24	98	308						
1		545.34	.32	1.78	96	310	250	251	58	6.5		
2	10	549.01	.30	1.67	96	310					10.0	10.1
3		552.79	.31	1.73	96	310	250	252	58	6.5		
4	20	556.67	.32	1.84	97	311						
5		560.35	.30	1.67	97	311	249	251	58	7.0		
6	30	563.90	.28	1.56	97	311						
7		567.37	.44	1.47	98	308	251	250	57	9.5		
8	40	573.04	.48	1.69	98	308						
9		577.74	.48	1.69	99	308	253	251	57	10.0	10.2	9.3
10	50	582.44	.49	1.75	99	309						
11		586.96	.45	1.57	99	309	248	249	56	11.0		
12		591.263	.41	1.50	99	308						
	1332	END test										

SA

A. Lanfranco and Associates Inc.

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-3121 DIAMETER, IN. 0.3083	
PARAMETER / RUN No	Metals / Particulate / R-1	PROBE 7'C Cp 0.8489	
DATE	July. 18, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O −19.5"	
CONTROL UNIT	FE 18 Y 1.0284	STACK DIAMETER 70.9"	
	ΔH@ 1.824	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.13	INITIAL LEAK TEST 0.002 @ 15"	
ASSUMED MOISTURE, Bw	15%.	FINAL LEAK TEST 0.003 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	266	266
Imp. #2	100	196	96
Imp. #3	100	122	22
Imp. #4	0	8	8
Imp. #5	100	104	4
Imp. #6	100	102	2
Imp. #7	200		
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	09:50	578.552												
1		582.66	0.44	2.38	72	300	251	258	63	5				
2	10	586.87	0.45	2.43	73	302					10.0	10.1		
3		591.02	0.46	2.49	73	302	249	249	61	5				
4	20	595.32	0.48	2.60	74	302								
5		599.57	0.46	2.49	74	303	250	250	60	6				
6	30	603.35	0.38	2.06	75	302								
7		607.04	0.35	1.90	77	303	251	251	58	6	9.5	10.3		
8	40	610.58	0.32	1.74	77	303								
9		614.01	0.30	1.64	77	299	250	250	56	7				
10	50	617.28	0.27	1.48	80	302								
11		620.45	0.25	1.38	84	302	250	250	52	6	10.0	9.7		
12	60	623.58	0.24	1.34	88	299								
1		627.08	0.31	1.70	81	301	247	245	55	5				
2	10	630.75	0.34	1.86	81	303					10.0	10.1		
3		634.20	0.30	1.64	82	305	251	250	57	5				
4	20	637.60	0.29	1.60	84	304								
5		640.89	0.27	1.49	85	303	251	251	59	6				
6	30	644.34	0.28	1.63	85	304					10.0	10.1		
7		648.99	0.54	2.98	85	302	250	248	55	7				
8	40	653.98	0.62	3.43	86	302								
9		658.89	0.60	3.32	86	302	247	247	54	8				
10	50	663.86	0.61	3.39	87	301								
11		668.94	0.64	3.55	87	302	248	245	57	8	10.0	10.0		
12	11:52	673.80	0.58	3.24	87	299								

A. Lanfranco and Associates Inc.

J-H.

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-3121 DIAMETER, IN. 0.3083	
PARAMETER / RUN No	Metals / Particulate / R-2	PROBE 7'C Cp 0.8489	
DATE	July 18, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O - 19.5'	
CONTROL UNIT	FE 18 Y 1.0284	STACK DIAMETER 70.9'	
	ΔH@ 1.824	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.13	INITIAL LEAK TEST 0.002 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.001 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	278	278
Imp. #2	100	204	104
Imp. #3	100	114	14
Imp. #4	0	5	5
Imp. #5	100	103	3
Imp. #6	100	102	2
Imp. #7	200 g		
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	12:28	675.890												
1		679.23	0.28	1.54	83	302	243	262	52	4				
2	10	682.69	0.30	1.65	84	304					11.0	8.9		
3		685.98	0.27	1.49	85	305	254	268	54	4				
4	20	689.22	0.26	1.43	87	306								
5		692.64	0.29	1.61	88	305	257	260	55	4				
6	30	696.70	0.32	1.75	83	306								
7		701.16	0.62	3.40	83	305	252	251	54	5	11.0	8.6		
8	40	706.05	0.60	3.30	84	305								
9		710.98	0.61	3.35	84	305	249	250	52	5				
10	50	715.86	0.60	3.30	84	304								
11		720.70	0.59	3.24	84	305	252	251	54	6	11.0	8.7		
12	60	725.40	0.56	3.08	84	304								
1		729.45	0.41	2.26	85	304	250	250	55	7				
2	10	733.60	0.43	2.37	85	304					11.0	8.8		
3		737.75	0.43	2.37	85	303	249	250	54	8				
4	20	742.07	0.45	2.49	86	302								
5		746.18	0.43	2.38	86	303	250	250	60	8				
6	30	749.99	0.36	1.99	86	302					12.0	7.6		
7		753.58	0.32	1.77	86	302	251	251	60	6				
8	40	757.01	0.29	1.61	87	302								
9		760.38	0.28	1.56	87	300	250	250	63	6				
10	50	763.65	0.26	1.45	88	299					11.0	9.1		
11		766.78	0.24	1.34	88	300	251	251	63	6				
12	14:29	769.90	0.24	1.34	87	297								

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S-H

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-3121 DIAMETER, IN. 0.3083	
PARAMETER / RUN No	Metals (Particulate) / R-3	PROBE 71C Cp 0.8489	
DATE	July 18 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O, -1.5"	
CONTROL UNIT	FE18 Y 1.0284	STACK DIAMETER 70.94	
	ΔH@ 1.824	STACK HEIGHT 30.01	
BAROMETRIC PRESSURE, IN. Hg	30.13	INITIAL LEAK TEST 0.002 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.003 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	240	240
Imp. #2	100	232	132
Imp. #3	100	128	28
Imp. #4	0	8	8
Imp. #5	100	105	5
Imp. #6	100	101	1
Imp. #7	200 g		
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
1	14:50	770.233	0.48	2.66	87	303	250	251	63	6				
2	10	774.63	0.50	2.77	87	304					11.0	9.3		
3		779.12	0.52	2.87	86	305	258	255	58	6				
4	20	783.69	0.53	2.97	86	306								
5		788.30	0.49	2.71	87	305	253	253	59	6				
6	30	792.73	0.42	2.31	86	306								
7		796.83	0.29	1.60	87	306	252	253	58	5	10.0	10.1		
8	40	800.78	0.28	1.55	87	305								
9		803.67	0.30	1.66	87	306	252	250	59	4				
10	50	807.09	0.29	1.61	88	302								
11		810.52	0.26	1.45	88	300	250	250	60	4	10.0	10.0		
12	60	813.78	0.25	1.40	89	299								
		816.98												
1		820.25	0.26	1.45	88	299	251	250	56	4				
2	10	823.38	0.24	1.34	88	299					10.0	9.7		
3		826.76	0.28	1.56	88	298	250	250	58	4				
4	20	830.21	0.30	1.68	88	298								
5		833.94	0.33	1.85	89	297	250	252	59	4				
6	30	837.73	0.35	1.96	89	298								
7		842.82	0.63	3.54	89	296	250	249	56	6	10.0	9.6		
8	40	847.88	0.62	3.49	89	294								
9		853.05	0.65	3.65	89	295	251	250	57	7				
10	50	858.05	0.61	3.47	89	296								
11		862.95	0.58	3.26	90	296	251	250	58	7	10.0	9.8		
12	16:57	867.75	0.56	3.16	90	294								

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DH

METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #3	NOZZLE G-309 DIAMETER, IN. 0.3058	
PARAMETER / RUN No	Metals (particulate) / R-1	PROBE 7A1 Cp 0.8469	
DATE	July. 19th, 2023	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O -19.0"	
CONTROL UNIT	STACK 2 Y 0.992	STACK DIAMETER 10.9"	
	ΔH@ 1.795	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.06	INITIAL LEAK TEST 0.001 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.002 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	216	216
Imp. #2	100	194	94
Imp. #3	100	122	22
Imp. #4	0	6	6
Imp. #5	100	103	3
Imp. #6	100	101	1
Imp. #7	300	300	
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	10:20	724.241												
1		728.94	0.54	2.80	79	302	251	254	61	5	11.0	9.5		
2	10	733.72	0.56	2.90	80	308								
3		738.33	0.52	2.69	81	305	249	246	63	6				
4	20	742.88	0.51	2.63	81	310								
5		747.38	0.50	2.57	81	312	251	251	61	7				
6	30	751.66	0.44	2.26	82	312					11.5	9.0		
7		755.30	0.33	1.72	83	302	251	254	58	5				
8	40	758.69	0.28	1.46	83	305								
9		761.83	0.24	1.24	83	309	250	258	57	5				
10	50	765.03	0.25	1.29	84	312								
11		768.12	0.23	1.19	86	314	249	253	58	5	11.5	9.5		
12	60	771.16	0.22	1.16	87	303								
1		774.68	0.30	1.56	86	310	250	248	56	6	10.0	10.0		
2	10	778.26	0.31	1.61	87	311								
3		781.90	0.32	1.66	88	313	251	262	58	5				
4	20	785.18	0.26	1.35	88	313								
5		788.54	0.27	1.41	89	317	250	261	60	5	10.0	9.5		
6	30	792.14	0.31	1.61	89	313								
7		796.48	0.45	2.35	90	317	249	274	62	4				
8	40	801.48	0.60	3.13	91	315								
9		806.56	0.62	3.23	91	316	250	271	55	8				
10	50	811.49	0.58	3.03	92	315								
11		816.48	0.59	3.10	92	310	251	273	56	8	10.0	9.5		
12	12:23	821.35	0.56	2.96	92	305								

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S.H.

CLIENT	M.V. W.T.E.	NOZZLE G-309	DIAMETER, IN. 0.3058
SOURCE	Unit #3	PROBE 7'A-1	Cp 0.8469
PARAMETER / RUN No	Metals/Particulate / R-2	PORT LENGTH	
DATE	July 20, 2023	STATIC PRESSURE, IN. H2O	-19.0"
OPERATOR:	DS	STACK DIAMETER	70.9"
CONTROL UNIT	STCAE 2 Y 0.9927	STACK HEIGHT	30.0'
	ΔH@ 1.795		
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST	0.002 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.006 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	210	210
Imp. #2	100	196	96
Imp. #3	100	104	4
Imp. #4	200g	3	3
Imp. #5	100	102	2
Imp. #6	100	101	1
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %		
	09:17	(7) 821.706												
1		824.77	0.23	1.19	80	303	247	259	65	4				
2	10	827.96	0.25	1.29	80	304					11.0	8.7		
3		831.22	0.26	1.35	80	304	250	256	59	4				
4	20	834.48	0.26	1.35	81	306								
5		837.68	0.25	1.29	82	307	249	248	60	4				
6	30	840.98	0.27	1.40	82	307								
7		845.50	0.50	2.59	82	307	251	253	57	6	11.0	9.6		
8	40	849.89	0.47	2.44	83	305								
9		854.43	0.50	2.61	84	305	250	254	56	6				
10	50	858.88	0.48	2.50	84	304								
11		863.52	0.52	2.71	85	305	250	253	57	6	11.0	9.5		
12	60	868.22	0.53	2.78	86	302								
1		872.73	0.49	2.57	86	304	249	257	55	6	9.5	10.2		
2	15	877.29	0.50	2.62	87	306								
3		881.72	0.47	2.46	88	307	249	253	56	6				
4	20	886.10	0.46	2.41	89	308								
5		890.87	0.53	2.78	90	309	251	258	58	6	9.0	10.6		
6	30	895.72	0.57	2.99	91	309								
7		899.96	0.43	2.25	90	310	249	259	55	5				
8	40	904.68	0.53	2.77	90	310								
9		908.56	0.36	1.88	90	311	251	256	53	3				
10	50	912.22	0.32	1.67	90	311								
11		915.46	0.25	1.31	91	312	250	252	54	3	9.0	10.8		
12	11:18	918.41	0.21	1.10	91	314								

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CLIENT	M.V. W.T.F.	NOZZLE	G-309
		DIAMETER, IN.	0.3058
		PROBE	7A
		Cp	0.8469
SOURCE	Unit #3		
PARAMETER / RUN No	Metals/Particulate / R-3	PORT LENGTH	
DATE	July 20, 2023	STATIC PRESSURE, IN. H2O	-19.0"
OPERATOR:	DS	STACK DIAMETER	70.9"
CONTROL UNIT	ST CAE 7	STACK HEIGHT	30.0'
Y	0.9927		
ΔH@	1.795		
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST	0.002 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.001 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	[illegible]	~~266~~ 264
Imp. #2	100	190	90
Imp. #3	100	114	14
Imp. #4	200	5	~~204~~ 5
Imp. #5	100	104	4
Imp. #6	100	102	2
Upstream Diameters	[illegible]		
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	O_2 Vol. %		
	11:45	919.577												
1		923.90	0.45	2.34	90	314	231	259	58	6				
2	5	928.28	0.46	2.39	90	316					11.0	9.0		
3		932.75	0.48	2.50	91	316	244	259	57	6				
4	10	937.28	0.49	2.55	92	316								
5		941.66	0.46	2.39	91	316	249	254	54	8				
6	15	945.99	0.45	2.34	91	316					10.5	9.2		
7		949.76	0.34	1.77	91	316	250	251	55	9				
8	20	953.36	0.31	1.61	91	316								
9		956.78	0.28	1.46	91	316	250	257	56	6				
10	25	960.15	0.27	1.41	92	317					10.5	9.4		
11		963.48	0.26	1.35	92	317	249	255	54	6				
12	30	966.67	0.24	1.25	92	314								
1		969.86	0.25	1.31	93	316	249	252	55	6	10.5	9.4		
2	5	973.23	0.27	1.41	94	317								
3		976.53	0.26	1.36	93	317	250	251	52	6				
4	10	979.77	0.25	1.30	93	318								
5		983.08	0.26	1.36	93	316	250	255	54	6				
6	15	986.45	0.27	1.41	93	317					10.5	9.3		
7		991.13	0.52	2.72	94	316	251	248	55	8				
8	20	995.63	0.48	2.51	94	315								
9		1000.28	0.51	2.67	95	316	249	256	56	8				
10	25	1004.98	0.52	2.73	95	315					10.5	9.5		
11		1009.54	0.49	2.58	96	314	249	250	58	9				
12	13:46	1014.18	0.50	2.65	96	309								

SH

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CLIENT	M.V. WTF	NOZZLE G-292 DIAMETER, IN. 0.7837	
SOURCE	Unit - 3	PROBE T-Cp 0.f489	
PARAMETER / RUN No	Cr 6+	PORT LENGTH	
DATE	July 25/23	STATIC PRESSURE, IN. H2O -19.0"	
OPERATOR:		STACK DIAMETER 70.90	
CONTROL UNIT	CAE-2 Y 0.9927	STACK HEIGHT	
	ΔH@ 1.793		
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST 0.002 @ 15 "	
ASSUMED MOISTURE, Bw	15 %	FINAL LEAK TEST 0.002 @ 15 "	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	150	130	-20
Imp. #2	75	175	100
Imp. #3	75	96	21
Imp. #4	0	0	0
Imp. #5	200	226	26
Imp. #6			
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites Tests -2: CO_2 Vol. %	O_2 Vol. %	A.H. = 9.3
	10:00	16.077											
1		18.76	0.26	0.96	60	306	N/A	N/A	56	6	10.0	9.3	
2		21.55	0.28	1.02	60	306							
3		24.30	0.31	1.13	60	303			57	6			
4		27.30	0.32	1.20	60	303							
5		30.30	0.32	1.20	60	306			57	6	10.0	9.3	
6		33.35	0.29	1.07	60	306							
7		37.16	0.33	1.23	60	305			57	6			
8		40.94	0.50	1.86	62	303							
9		44.85	0.56	2.08	62	303			57	7			
10		48.86	0.56	2.09	64	303							
11		52.76	0.54	2.02	64	303			57	7	10.0	10.0	
12		56.46	0.48	1.80	63	305							
1		60.39	0.54	2.03	64	305	N/A	N/A	57	8	10.5	9.3	
2		64.32	0.55	2.04	64	304							
3		68.08	0.49	1.83	64	304			58	8			
4		71.79	0.47	1.77	66	303					10.5	9.4	
5		75.39	0.46	1.73	66	303			58	9			
6		78.96	0.43	1.69	64	303							
7		82.07	0.34	1.27	62	303			58	7	10.5	9.3	
8		85.08	0.37	1.39	62	303							
9		87.98	0.30	1.12	62	303			58	7			
10		90.79	0.28	1.03	62	303							
11		93.54	0.27	1.01	62	303			58	7			
12	11:01	96.20	0.23	0.95	62	302							

S-4

A. Lanfranco and Associates Inc.

CLIENT	M. V. WTE	NOZZLE G-292 DIAMETER, IN. 0.2857	IMPINGER VOLUMES
SOURCE	Unit 3	PROBE 7-Cp 0.8489	
PARAMETER / RUN No	3 2 Cr 6 +	PORT LENGTH	Imp. #1
DATE	July 26/23	STATIC PRESSURE, IN. H2O -19.0"	Imp. #2
OPERATOR:		STACK DIAMETER 70.90	Imp. #3
CONTROL UNIT	CHEZY 0.9927 ΔH@	STACK HEIGHT	Imp. #4
BAROMETRIC PRESSURE, IN. Hg	30.10		Imp. #5
ASSUMED MOISTURE, Bw	15%	INITIAL LEAK TEST 0.001 @ 15"	Imp. #6
		FINAL LEAK TEST 0.001 @ 15	Upstream Diameters
			Downstream Diameters

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	150	83	- 67
Imp. #2	75	310	235
Imp. #3	75	85	10
Imp. #4	0	8	8
Imp. #5	200	219.7	19.7
Imp. #6			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites/Testo-2: CO_2 Vol. %	O_2 Vol. %	
1	09:22	96.578	0.27	1.01	68	309	N/A	N/A	58	6	10.0	9.7	P.H.=9.0
2		99.36	0.28	1.03	70	310							
3		102.20	0.30	1.15	70	310			58	6			
4		105.18	0.32	1.20	70	310							
5		108.31	0.34	1.28	70	310			59	6			
6		111.30	0.31	1.17	71	310							
7		114.42	0.39	1.27	71	309			59	6	10.0	10.8	
8		117.47	0.36	1.11	71	309							
9		120.44	0.33	1.07	72	310			58	7			
10		123.47	0.36	1.11	72	311							
11		126.35	0.32	1.96	71	311			58	7	10.0	10.4	
12		129.99	0.46	1.73	72	310							
1		132.06	0.57	2.15	73	310	N/A	N/A	58	8	10.0	9.8	
2		136.07	0.55	2.08	75	310							
3		139.94	0.51	1.93	75	310			58	8			
4		143.71	0.48	1.82	76	310							
5		147.35	0.45	1.71	76	310			58	8	10.0	9.8	
6		150.92	0.43	1.63	76	310							
7		154.20	0.36	1.37	78	309			58	7			
8		157.32	0.33	1.26	78	309							
9		160.36	0.31	1.20	78	309			58	7	10.0	9.8	
10		163.20	0.27	1.03	78	308							
11		166.94	0.25	0.96	78	308			58	7			
12	10:24	168.36	0.23	0.88	79	308							

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CLIENT	M.V. WTE	NOZZLE G-292 DIAMETER, IN. 0.2837	
SOURCE	Unit - 3	PROBE 7-Cp 0.8489	
PARAMETER / RUN No.	3 / Cr 6 +	PORT LENGTH	
DATE	July 26/23	STATIC PRESSURE, IN. H_2O -19.0 "	
OPERATOR:		STACK DIAMETER 70.98	
CONTROL UNIT	CAE-2 Y 0.9927 ΔH@	STACK HEIGHT	
BAROMETRIC PRESSURE, IN. Hg	30.10	INITIAL LEAK TEST 0.001 @ 15 "	
ASSUMED MOISTURE, Bw	15 %	FINAL LEAK TEST 0.001 @ 15	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	160	~~82~~	~~-68~~
Imp. #2	~~156~~	370	293
Imp. #3	75	114	39
Imp. #4	0	0	0
Imp. #5	200	211.6	11.6
Imp. #6			
Upstream Diameters			
Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
1	12:08	178.928												P.H. = 9.6
1		183.00	0.56	1.14	78	308	N/A	N/A	58	6				
2		187.02	0.54	1.06	78	308					10.0	10.2		
3		190.87	0.50	1.01	78	308			58	6				
4		194.65	0.48	1.03	77	310								
5		198.31	0.43	1.71	77	310			58	6				
6		201.91	0.44	1.67	77	310								
7		205.36	0.40	1.32	78	312			58	6	10.0	10.1		
8		208.62	0.36	1.37	78	312								
9		211.80	0.30	1.14	78	312			58	5				
10		214.78	0.28	1.06	78	312								
11		217.26	0.26	1.00	79	311			58	5	10.5	9.7		
12		219.94	0.24	0.92	79	311								
1		222.83	0.28	1.07	78	310	N/A	N/A	58	5	10.5	9.3		
2		225.82	0.30	1.14	80	313								
3		228.97	0.32	1.22	80	313			58	5				
4		232.17	0.32	1.30	80	313								
5		235.24	0.32	1.22	80	313			58	5				
6		238.20	0.30	1.14	81	314					10.0	9.8		
7		242.50	0.62	2.36	81	314			58	6				
8		246.70	0.59	2.23	81	315								
9		250.80	0.56	2.13	81	315			58	6				
10		254.94	0.57	2.18	82	314								
11		258.97	0.54	2.06	82	314			58	7	10.5	9.6		
12	14:09	262.82	0.49	1.88	82	312								

A. Lanfranco and Associates Inc.

S-4

Client MVWTE Y LHU-D 1.0276
Source Unit 2 Cp
Parameter HF Pbar 30.07 Static
Date 07/19/23 Operator B. LESTER

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.0004	0.0001	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:35	112.7972	73	290				
	9:50	113.0224	89.9					
	9:05	113.2680	99.1	290				
	9:25	113.5552	106.3					
	10:35	113.6518	108.3	290				
2	10:51	113.6532	99.6	290				
	11:13	113.8940	106.6					
	11:40	114.1550	111.2					
	11:51	114.2650	110.8					
3	12:08	114.2686	100.8	290				
	12:24	114.4460	104.2					
	13:08	114.5832	99.4					

Client MVWTE Y LHU-B 1.0365
Source Unit 1 Cp
Parameter Ammonia Pbar 30.07 Static
Date 07/19/23 Operator B. LESTER

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	9:35	260.5160	77					
	9:50	260.6412	82					
	9:05	260.7680	96.3					
	9:25	260.9240	98					
	10:35	260.9992	101.5					
2	10:51	261.0018	100.5					
	11:13	261.1840	101.4					
	11:40	261.3892	104					
	11:51	261.4524	105.2					
3	12:08	261.4865	100.4					
	12:24	261.6182	100.9					
	13:08	261.9740	101.2					

S.H.

A. Lanfranco and Associates Inc.

Client	MU WTE	Y	LMM-17 1.0776	Client	MU WTE
Source	Unit #3	Cp		Source	Unit #3
Parameter	HF	Pbar	30.10 Static	Parameter	NH3
Date	7-20-23	Operator	SG	Date	7-20-23

				Y	LMM-13 1.0365
				Cp	
				Pbar	30.10 Static
				Operator	JG

Leak Check	Run 1	Run 2	Run 3
Initial	.0000	.0000	.0000
Final	.0000	.0000	.0000

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:10	114.8965	63					
			66					
			70					
	11:10	115.5389	71					
2	11:36	115.5424	70					
			73					
			75					
	12:35	116.1894	77					
3	12:45	116.1934	72					
			75					
			78					
	13:45	116.6803	82					

Leak Check	Run 1	Run 2	Run 3
Initial	.0000	.0000	.0000
Final	.0000	.0000	.0000

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:10	261.9780	69					
			68					
			72					
	11:10	262.4824	74					
2	11:35	262.4970	70					
			73					
			75					
	12:35	262.8595	77					
3	12:45	262.8628	74					
			77					
			83					
	13:45	263.2536	85					

S-H

A. Lanfranco and Associates Inc.

Client	MVWTE	Y	LMU-B 1.0365
Source	Unit 2	Cp	
Parameter	HF	Pbar	30.13 Static
Date	07/18/23	Operator	BenLester

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:42	259.1236	72.5	300	200			
	10:52	259.2152	75.4					
	11:02	259.3045	80.7					
	11:12	259.4120	89.2					
	11:22	259.4756	89.6					
	11:32	259.5874	94.7					
HF	11:42	259.6132	94.2					
2	12:28	259.6188	80.4	306	200			
	12:38	259.6852	84.2					
	12:48	259.7618	86.7					
	12:58							
	13:08	259.9110	92					
	13:18	259.9752	95.8					
	13:28	260.0515	95.7					
3	13:44	260.0562	91.6	302	200			
	13:44	260.0932	90					
	13:54	260.1400	93					
	14:04	260.2130	94.5					
	14:14	260.2738	96.2					
	14:24							
	14:34	260.5116	99.6					

Client	MVWTE	Y	LMU-D 1.0276
Source	Unit 2	Cp	
Parameter	Ammonia	Pbar	30.13 Static
Date	07/18/23	Operator	BenLester

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:42	110.9600	74	300	200			
	10:52	111.0912	79.2					
	11:02	111.1978	84.4					
	11:12	111.3350	93.5					
	11:22	111.4172	99.7					
	11:32	111.5074	99.2					
Am	11:42	111.5942	96.3					
2	12:28	111.5990	82.5	306	200			
	12:38	111.6912	84.6					
	12:48	111.7960	87.5					
	12:58							
	13:08	111.9930	94					
	13:18	112.0782	88.4					
	13:28	112.1828	101.5					
3	13:34	112.1862	94.2	302	200			
	13:44	112.2392	95.2					
	13:54	112.3012						
	14:04	112.4020	97.8					
	14:14	112.5800	98.7					
	14:24							
	14:34	112.7928	101.6					

A. Lanfranco and Associates Inc.

Client Covanta MVWTE

Source Unit #2 Date 18-Jul-23

		Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)		30.13	30.13	30.13		
Canister Number		SC01024	SC02742	SC01996		
Controller Number		OA00091	OA00217	OA01178		
Gauge Number		AVG05342	N/A	N/A		
Initial:	Start Time	10:42	12:28	13:44		
	Flask Vac. (in. Hg)	-30.5	-30.0	-30		
Final:	End Time	11:42	13:28	14:44		
	Flask Vac. (in. Hg)	-12.5	-9.0	-6.5		

Source Unit #1 Date 19-Jul-23

		Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)		30.07	30.07	30.07		
Canister Number		SC00787	SC02241	SC02186		
Controller Number		OA00154	OA02235	OA01544		
Gauge Number		N/A	N/A	N/A		
Initial:	Start Time	9:35	10:51	12:08		
	Flask Vac. (in. Hg)	-30.0	-29.5	-30.0		
Final:	End Time	10:35	11:51	13:08		
	Flask Vac. (in. Hg)	-8.0	-6.5	-12.0		

Source Unit #3 Date 20-Jul-23

		Run 1	Run 2	Run 3	Run 4	Run 5
Pbar (in. Hg)		30.10	30.10	30.16		
Canister Number		SC00640	SC00861	SC00265		
Controller Number		OA00250	OA01909	OA01000		
Gauge Number		N/A	N/A	AVG05313		
Initial:	Start Time	10:10 ~~-30.0~~	11:35	12:45		
	Flask Vac. (in. Hg)	-30 ~~-30.0~~	-29.0	-29		
Final:	End Time	11:10	12:35	13:45		
	Flask Vac. (in. Hg)	~~-10.0~~ -10.0	-9.0	-7.0		

Source _____ Date _____

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

S-H.

CEM FIELD DATA SHEET

Client: M.V. W.T.E.
Source: Unit #1-3
Date: July 2023 (Q-3)
N2O Analysis.

Technician: DS
Ambient Temp (°C):
Barometric Pressure (in. Hg): 30.02

	N_2	H_2	1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	O_2	Comb Air	Low Meth	Mid Meth	High Meth
Cylinder #			619									
Pressure (psi)												
Expiry Date			4-20-26									
O_2 (%)												
CO_2 (%)												
CO (ppm)												
THC (ppm)												
SO_2 (ppm)			91.4									
~~NOx~~ N2O (ppm)			90.0									

Analyzer Range	O_2	CO_2	CO	THC	SO_2	NOx

CEM READINGS

~~NOx~~ N2O (Ppm)

Time	Source	O_2	CO_2	CO	THC	SO_2	~~NOx~~	Response Time (sec)
Cals:	N2 Gas	0						O_2 Up
		91						O_2 Dn
								CO_2 Up
July 19th								CO_2 Dn
Unit #1 R1	0935-1035						0.0	CO Up
R2	1051-1151						3.0	CO Dn
R3	1208-1308						0.0	THC Up
								THC Dn
July 18th								SO_2 Up
Unit #2 R1	1042-1142						0.0	SO_2 Dn
2	1228-1328						0.0	NOx Up
3	1344-1444						0.0	NOx Dn
July 20th								
Unit #3 R1	1010-1110						0.0	
2	1135-1235						0.0	
3	1245-1345						0.0	
Cals:	N2 Gas	0						
		91						

APPENDIX – E

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

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

Nozzle I.D.	d1	d2	d3	difference	average dia.	average area
	(inch)	(inch)	(inch)	(inch)	(inch)	(ft^2)
A	0.1270	0.1270	0.1255	0.0015	0.1265	0.0000873
G-165	0.1650	0.1660	0.1645	0.0015	0.1652	0.0001488
G-170	0.1700	0.1710	0.1695	0.0015	0.1702	0.0001579
G-178	0.1760	0.1770	0.1790	0.0030	0.1773	0.0001715
E	0.1950	0.1930	0.1960	0.0030	0.1947	0.0002067
L	0.2100	0.2070	0.2090	0.0030	0.2087	0.0002375
P-2240	0.2160	0.2155	0.2170	0.0015	0.2162	0.0002549
G-221	0.2160	0.2185	0.2190	0.0030	0.2178	0.0002588
G-225	0.2190	0.2175	0.2180	0.0015	0.2182	0.0002596
G-218	0.2180	0.2200	0.2210	0.0030	0.2197	0.0002632
G-2232	0.2210	0.2200	0.2215	0.0015	0.2208	0.0002660
P-250	0.2500	0.2495	0.2505	0.0010	0.2500	0.0003409
C-250	0.2500	0.2500	0.2500	0.0000	0.2500	0.0003409
P-251	0.2545	0.2530	0.2540	0.0015	0.2538	0.0003514
P-254	0.2550	0.2540	0.2535	0.0015	0.2542	0.0003523
P-256	0.2540	0.2550	0.2560	0.0020	0.2550	0.0003547
P-280	0.2810	0.2805	0.2815	0.0010	0.2810	0.0004307
C-280	0.2800	0.2800	0.2800	0.0000	0.2800	0.0004276
G-282	0.2820	0.2800	0.2825	0.0025	0.2815	0.0004322
P-281	0.2820	0.2820	0.2815	0.0005	0.2818	0.0004332
G-292	0.2820	0.2840	0.2850	0.0030	0.2837	0.0004389
G-309	0.3045	0.3065	0.3065	0.0020	0.3058	0.0005101
P-311	0.3115	0.3120	0.3120	0.0005	0.3118	0.0005304
P-312	0.3120	0.3110	0.3105	0.0015	0.3112	0.0005281
G-3121	0.3090	0.3085	0.3075	0.0015	0.3083	0.0005185
P-313	0.3140	0.3130	0.3130	0.0010	0.3133	0.0005355
P-314	0.3135	0.3135	0.3140	0.0005	0.3137	0.0005366
P-315	0.3145	0.3145	0.3145	0.0000	0.3145	0.0005395
V-06	0.3220	0.3215	0.3200	0.0020	0.3212	0.0005626
G-345	0.3470	0.3475	0.3475	0.0005	0.3473	0.0006580
P27	0.3490	0.3480	0.3500	0.0020	0.3490	0.0006643
G-367	0.3700	0.3685	0.3690	0.0015	0.3692	0.0007433
P-375	0.3730	0.3750	0.3745	0.0020	0.3742	0.0007636
P-401	0.3980	0.3990	0.4000	0.0020	0.3990	0.0008683
G-433	0.4360	0.4360	0.4355	0.0005	0.4358	0.0010360
G-437	0.4690	0.4690	0.4700	0.0010	0.4693	0.0012014
G-468	0.4700	0.4685	0.4720	0.0035	0.4702	0.0012057
P-7	0.4965	0.4945	0.4975	0.0030	0.4962	0.0013427
G-540	0.5400	0.5410	0.5400	0.0010	0.5403	0.0015924

Where:

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

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

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

Pitot Tube Calibration

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

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

Pitot ID: **7A-1**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.075	0.100	18.3	0.8574	0.0105
0.155	0.210	26.3	0.8505	0.0036
0.295	0.400	36.3	0.8502	0.0033
0.460	0.630	45.3	0.8459	0.0010
0.570	0.810	50.5	0.8305	0.0164
		Average :	0.8469	0.0070

Pitot ID: **ST 8A**

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

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.050	0.072	14.9	0.8250	0.0036
0.130	0.180	24.1	0.8413	0.0199
0.295	0.400	36.3	0.8502	0.0288
0.460	0.630	45.3	0.8459	0.0245
0.560	0.990	50.0	0.7446	0.0768
		Average :	0.8214	0.0307

Pitot ID: **ST 8B**

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

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

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

Pitot ID: **ST 8C**

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

Pitot ID: **7C**

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

Pitot ID:

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

* Average absolute deviation must not exceed 0.01.

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

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 27-Jun-23
Barometric Pressure: 29.82 (in. Hg)
Theoretical Critical Vacuum: 14.07 (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	-- Ambient Temperature --		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.80	15.00	175.000	191.562	16.562	79.0	79.0	84.0	84.0	73	0.8185	17.0	73.0	75.0	74.0
1.90	17.00	192.100	205.646	13.546	84.0	84.0	82.0	82.0	63	0.5956	20.0	75.0	76.0	75.5
1.10	17.00	205.900	216.455	10.555	82.0	82.0	81.0	81.0	55	0.4606	22.0	76.0	76.0	76.0
0.68	18.00	217.100	225.591	8.491	81.0	81.0	80.0	80.0	48	0.3560	24.0	76.0	77.0	76.5
0.35	17.00	225.800	231.294	5.494	80.0	80.0	80.0	80.0	40	0.2408	25.0	77.0	78.0	77.5

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
16.239	459.9	15.843	448.7	16.084	0.976	-0.010	1.862	47.29	0.042	0.708
13.184	373.4	13.048	369.5	13.283	0.990	0.004	1.758	44.66	-0.062	0.720
10.281	291.2	10.086	285.6	10.277	0.981	-0.004	1.708	43.39	-0.112	0.737
8.277	234.4	8.250	233.6	8.414	0.997	0.011	1.773	45.03	-0.047	0.713
5.356	151.7	5.265	149.1	5.380	0.983	-0.002	2.000	50.80	0.180	0.681
				Average Y---------->	**0.9852**		**Average dH@----->**	**1.820**	**46.2**	**Average Ko----->**	**0.712**

TEMPERATURE CALIBRATION

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

Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results Variation (degF)	Results Percent of Absolute
32	32	0	0.00%
100	100	0	0.00%
300	300	0	0.00%
500	500	0	0.00%
1000	1000	0	0.00%

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

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

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

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

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
					Initial Temps.		Final Temps.					-- Ambient Temperature --		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.80	15.00	471.400	487.620	16.220	81.0	81.0	82.0	82.0	73	0.8185	15.0	84.0	83.0	83.5
1.90	15.00	489.000	500.785	11.785	78.0	78.0	77.0	77.0	63	0.5956	16.0	75.0	77.0	76.0
1.10	15.00	501.100	510.288	9.188	77.0	77.0	77.0	77.0	55	0.4606	17.0	77.0	78.0	77.5
0.66	15.00	510.500	517.455	6.955	77.0	77.0	77.0	77.0	48	0.3560	19.0	78.0	80.0	79.0
0.32	18.00	517.600	523.315	5.715	77.0	77.0	78.0	78.0	40	0.2408	20.0	80.0	81.0	80.5

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
15.931	451.2	15.731	445.5	16.226	0.987	-0.005	1.892	48.05	0.097	0.699
11.607	328.7	11.527	326.4	11.725	0.993	0.000	1.775	45.08	-0.020	0.719
9.040	256.0	8.901	252.1	9.080	0.985	-0.008	1.725	43.81	-0.070	0.737
6.835	193.6	6.870	194.6	7.028	1.005	0.012	1.737	44.12	-0.058	0.720
5.607	158.8	5.569	157.7	5.713	0.993	0.001	1.844	46.84	0.050	0.707
				Average Y---------->	**0.9927**		**Average dH@----->**	**1.795**	**45.6**	**Average Ko----->**	**0.716**

TEMPERATURE CALIBRATION

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

Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results Variation (degF)	Results Percent of Absolute
32	32	0	0.00%
100	100	0	0.00%
300	300	0	0.00%
500	500	0	0.00%
1000	1000	0	0.00%

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

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

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: 26-Jun-23

Barometric Pressure: 29.87 (in. Hg)

Theoretical Critical Vacuum: (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
		Volume	Volume	Volume	Initial Temps.		Final Temps.		Orifice	K' Orifice	Actual	-- Ambient Temperature --		
dH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.65	16.00	452.400	468.970	16.570	73.0	73.0	76.0	76.0	73	0.8185	16.0	75.0	76.0	75.5
1.90	15.00	468.970	480.300	11.330	76.0	76.0	77.0	77.0	63	0.5956	17.5	76.0	80.0	78.0
1.15	19.00	480.300	491.513	11.213	79.0	79.0	78.0	78.0	55	0.4606	19.0	80.0	84.0	82.0
0.68	15.00	491.513	498.229	6.716	78.0	78.0	80.0	80.0	48	0.3560	20.0	80.0	85.0	82.5
0.33	19.00	498.229	504.067	5.838	79.0	79.0	80.0	80.0	40	0.2408	21.5	84.0	87.0	85.5

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
16.481	466.8	16.904	478.7	17.180	1.026	-0.003	1.814	46.07	-0.010	0.712
11.179	316.6	11.505	325.8	11.747	1.029	0.001	1.785	45.34	-0.039	0.717
11.003	311.6	11.228	318.0	11.550	1.021	-0.008	1.813	46.05	-0.011	0.718
6.576	186.2	6.848	193.9	7.051	1.041	0.013	1.795	45.58	-0.029	0.708
5.706	161.6	5.851	165.7	6.058	1.025	-0.003	1.912	48.57	0.089	0.697
				Average Y---------->	**1.0284**		**Average dH@----->**	**1.824**	**46.3**	**Average Ko----->**	**0.710**

TEMPERATURE CALIBRATION

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

Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results Variation (degF)	Results Percent of Absolute
32	32	0	0.00%
100	100	0	0.00%
300	300	0	0.00%
500	500	0	0.00%
1000	1000	0	0.00%

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

Calibrated by: Liam Forrer Signature: Justin Ching Date: June 26, 2023

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: LMU-B

Serial #: Wizit 6276

Date: 29-Jun-23

Barometric Pressure: 29.87 (in. Hg)

Theoretical Critical Vacuum: 14.09 (in. Hg)

!!!!!!!!!

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

!!!!!!!!!

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

dH (in H2O)	Time (min)	Volume Initial (m^3)	Volume Final (m^3)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
0.00	18.00	258.3240	258.5548	8.151	78.0	78.0	77.0	77.0
0.00	21.00	258.5548	258.8244	9.521	77.0	77.0	78.0	78.0
0.00	22.00	258.8244	259.1069	9.976	78.0	78.0	78.0	78.0

-CRITICAL ORIFICE READINGS-

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

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)
7.990	226.3	8.291	234.8	8.387	1.038	0.001	0.000	0.00	0.000
9.333	264.3	9.668	273.8	9.789	1.036	-0.001	0.000	0.00	0.000
9.771	276.7	10.124	286.7	10.260	1.036	0.000	0.000	0.00	0.000

Average Y---------> 1.0365 **Average dH@-----> 0.0000** **0.00**

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.

For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

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

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: **LMU-D**

Serial #: **Wizit 4618**

Date: 28-Jun-23

Barometric Pressure: 29.87 (in. Hg)

Theoretical Critical Vacuum: 14.09 (in. Hg)

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

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

dH (in H2O)	Time (min)	Volume Initial (m^3)	Volume Final (m^3)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
0.00	16.00	110.142	110.348	7.278	73.0	73.0	74.0	74.0
0.00	27.00	110.348	110.696	12.275	74.0	74.0	77.0	77.0
0.00	17.00	110.696	110.914	7.720	77.0	77.0	77.0	77.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
48	0.3560	20.0	73.0	74.0	73.5
48	0.3560	20.0	74.0	76.0	75.0
48	0.3560	20.0	76.0	77.0	76.5

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)
7.188	203.6	7.366	208.6	7.458	1.025	-0.003	0.000	0.00	0.000
12.078	342.1	12.413	351.5	12.604	1.028	0.000	0.000	0.00	0.000
7.575	214.5	7.805	221.0	7.947	1.030	0.003	0.000	0.00	0.000

Average Y---------> 1.0276 **Average dH@-----> 0.0000** **0.00**

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

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

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

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

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

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

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Daryl Sampson

Date: 8-Jul-23

Signature: Daryl Sampson

TEMPERATURE DEVICE CALIBRATIONS

Reference Device Model CL23A Calibrator			Temperature Settings (degrees F)													
			32		100		200		300		500		800		1700	
Device	**ALA #**	**Serial #**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**
Omega HH11A	3	300132	32	0.00%	99	-0.18%	201	0.15%	301	0.13%	500	0.00%	800	0.00%	1699	-0.05%
Omega HH11A	4	200167	32	0.00%	99	-0.18%	200	0.00%	303	0.39%	499	-0.10%	799	-0.08%	1697	-0.14%
Omega HH11A	6	600059	33	0.20%	100	0.00%	201	0.15%	300	0.00%	499.2	-0.08%	798	-0.16%	1696	-0.19%
TPI 341K	7	2.0315E+10	31	-0.20%	99.6	-0.07%	199	-0.15%	301	0.13%	499.1	-0.09%	799.1	-0.07%	1695	-0.23%
TPI 341K	8	2.0313E+10	32	0.00%	99.7	-0.05%	200.4	0.06%	301	0.13%	498.5	-0.16%	799.2	-0.06%	1696	-0.19%
Cont Cmpny	10	102008464	31	-0.20%	99.2	-0.14%	199.5	-0.08%	299	-0.13%	499	-0.10%	799.1	-0.07%	1699	-0.05%
Omega HH11	14	409426	32.5	0.10%	99.1	-0.16%	199	-0.15%	298	-0.26%	501	0.10%	799.1	-0.07%	1698	-0.09%
TPI 341K	16	400120029	31	-0.20%	100	0.00%	199.2	-0.12%	299.3	-0.09%	501	0.10%	799.1	-0.07%	1700	0.00%
TPI 341K	18	2.0329E+10	31	-0.20%	99.8	-0.04%	199.2	-0.12%	299.8	-0.03%	500	0.00%	799.5	-0.04%	1701	0.05%
TPI 341K	20	2.0329E+10	31	-0.20%	99.2	-0.14%	199.1	-0.14%	299	-0.13%	499.2	-0.08%	799.2	-0.06%	1699	-0.05%
TPI 341K	22	2.0329E+10	32	0.00%	99.6	-0.07%	199.2	-0.12%	298.4	-0.21%	499.1	-0.09%	798.5	-0.12%	1698	-0.09%
Reference device is a NIST certified digital thermocouple calibrator																
Variation expressed as a percentage of the absolute temperature must be within 1.5 %																

Calibration Certificate

Date: 11-Aug-23
Calibrated by: Louis Agassiz
Authorizing Signature:

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

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

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

O_2	Initial Evaluation				After Calibration				
Gas	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero	0.1	0.10	Pass		0.1	0.10	Pass		0
O_2	11.1	0.03	Pass		11.1	0.03	Pass		11.07
Ambient	20.9	0.05	Pass		20.9	0.05	Pass		20.95

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

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

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

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

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

NIST Traceable Calibration Gases:

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

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

Calibration Certificate

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

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

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

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

O_2	Initial Evaluation				After Calibration				
Gas	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O_2	11.1	0.03	Pass		11.1	0.03	Pass		11.07
Ambient	21	0.04	Pass		21.0	0.04	Pass		20.96

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

CO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass	Replaced CO cell	0	0.0%	Pass		0
1 Gas	592	25.6%	Fail		472	0.1%	Pass		472
2 Gas	2154	13.1%	Fail		1900	0.2%	Pass		1904
3 Gas	245	2.3%	Pass		251	0.1%	Pass		251

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

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

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

NIST Traceable Calibration Gases:

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

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

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

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

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

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

Andrew M. Adams
President & CEO

MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Daryl Sampson

has successfully completed

The program of studies and is awarded the certificate in

STACK SAMPLING

May 2005
Date

Donna Spaulding
Dean
Faculty of Continuing Education and Extension

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

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

Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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

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

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

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

Signature:

X Daryl Sampson

Print name: Daryl Sampson

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.18, 2020

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

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

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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

1. Name of Qualified Professional Daryl Sampson

   Title Senior Environmental Technician/Project Manager

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting, specializing in air and atmospheric sciences

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

Declaration

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

Signature: Witnessed by:

X Daryl Sampson **X** _____

Print Name: Daryl Sampson Print Name: Louis Agassiz

Date signed: November 23, 2020

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

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

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

BCIT

Shawn Harrington

has met the requirements of

Stack Testing for Pollutants

(CHSC 7760)

School of Process, Energy and Natural Resources
Chemical Sciences Program

Endorsed by:

Greater Vancouver Regional District

Environment Canada Environnement Canada

Province of British Columbia
Ministry of Environment, Lands and Parks

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

JUNE 21, 2001
Dated

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X Shawn Harrington

Print name: Shawn Harrington

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.16, 2020

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

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

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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

1. Name of Qualified Professional Shawn Harrington

   Title Senior Environmental Technician /Project manager

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting ,specializing in air and atmospheric sciences

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Declaration

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

Signature:

x Shawn Harrington

Print Name: Shawn Harrington

Witnessed by:

x

Print Name: Mark Lanfranco

Date signed: November 26, 2020

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

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

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeremy Shawn Gibbs

has successfully completed

Stack Sampling

35 Hours / 2019

May 22, 2019

Date

Dean
Faculty of Continuing Education and Extension

MOUNT ROYAL
UNIVERSITY
1910

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X _____

Print name: Jeremy G. Sss

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec.16, 2020

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

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

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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1. Name of Qualified Professional Jeremy Gibbs

   Title Environmental technician

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

   Name of Association: _____ Registration # _____

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

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Declaration

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

Signature:

X _____

Print Name: Jeremy Gibbs

Witnessed by:

X _____

Print Name: Connor Laan

Date signed: Nov 1, 2020

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

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MOUNT ROYAL UNIVERSITY
Faculty of Continuing Education

MOUNT ROYAL
UNIVERSITY
1910
CALGARY, ALBERTA

Justin Ching

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023

Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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1. Name of Qualified Professional Justin Ching

Title Environmental Technician

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

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental Technician - specialising in air and atmospheric sciences

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Declaration

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

Signature: Witnessed by:

X Justin Ching **X** Daryl Sampson

Print Name: Justin Ching Print Name: Daryl Sampson

Date signed: June 28, 2023

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

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

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Signature:

X Justin Ching

Print name: Justin Ching

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: June 28, 2023

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

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MOUNT ROYAL UNIVERSITY
Faculty of Continuing Education

MOUNT ROYAL
UNIVERSITY
1910
CALGARY, ALBERTA

Liam Forrer

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023

Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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Signature:

X _____

Print name: Mark Lanfranco

Witnessed by:

X _____

Print name: Carter Lanfranco

Date: Dec. 16, 2020

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