A.Lanfranco & Associates Inc.
Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III
4515 Central Boulevard
Burnaby, BC V5H 0C6

WASTE-TO-ENERGY FACILITY

Appendices of Emissions Testing Report
November 2022 Survey
Fourth Quarter 2022

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**		
Fourth Quarter 2022	**Unit 1**	**Unit 2**	**Unit 3**
Filter	0.0 mg	0.0 mg	-0.1 mg
Front Half Washings	0.1 mg	0.8 mg	0.6 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.21 ug	<0.17 ug	<0.17 ug
Trace Metals Front *	<42.0 ug	<53.5 ug	<63.1 ug
Trace Metals Back*	<30.4 ug	<20.8 ug	<37.1 ug
Hexavalent Chromium	<0.70 ug	<0.70 ug	<0.70 ug
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug

Sum of all reported elements except Hg*

APPENDIX - B

LABORATORY RESULTS

Appendix B - Particulate Analysis

Filter Collection:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	0.4455	0.4455	0.0000	
Unit 1 Run 1	0.4470	0.4465	-0.0005	ND
Unit 1 Run 2	0.4414	0.4402	-0.0012	ND
Unit 1 Run 3	0.4418	0.4415	-0.0003	ND
Unit 2 Blank	0.4405	0.4405	0.0000	
Unit 2 Run 1	0.4482	0.4476	-0.0006	ND
Unit 2 Run 2	0.4475	0.4466	-0.0009	ND
Unit 2 Run 3	0.4412	0.4406	-0.0006	ND
Unit 3 Blank	0.4493	0.4492	-0.0001	
Unit 3 Run 1	0.4475	0.4483	0.0008	0.0009
Unit 3 Run 2	0.4531	0.4604	0.0073	0.0074
Unit 3 Run 3	0.4423	0.4483	0.0060	0.0061

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	83.5145	83.5146	0.0001	
Unit 1 Run 1	86.6908	86.6911	0.0003	0.0002
Unit 1 Run 2	86.2500	86.2499	-0.0001	ND
Unit 1 Run 3	86.2617	86.2621	0.0004	0.0003
Unit 2 Blank	84.8732	84.8740	0.0008	
Unit 2 Run 1	85.7028	85.7029	0.0001	ND
Unit 2 Run 2	85.5523	85.5524	0.0001	ND
Unit 2 Run 3	85.4558	85.4556	-0.0002	ND
Unit 3 Blank	84.1462	84.1468	0.0006	
Unit 3 Run 1	85.7765	85.7782	0.0017	0.0011
Unit 3 Run 2	85.7239	85.7262	0.0023	0.0017
Unit 3 Run 3	81.7898	81.7936	0.0038	0.0032

Initial Analysis:	J. Ching	Date:	22-Nov-22
Final Analysis:	M. Goods	Date:	25-Nov-22

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Report Transmission Cover Page

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: Filter Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1617486**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821906

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 - Multiple Deliverables By Lot	PDF	COC / COA
Email - Multiple Deliverables By Lot	PDF	COC / Test Report

Notes To Clients:

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Analytical Report

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

Lot ID: **1617486**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821906

Reference Number	1617486-1	1617486-2	1617486-3
Sample Date	Nov 14, 2022	Nov 14, 2022	Nov 14, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1 Container 1 (filter)	Reagent Blank Unit 2 Container 1 (filter)	Reagent Blank Unit 3 Container 1 (filter)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	6	7	6	5
Antimony		µg	3	4	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	<0.3	<0.3	0.5	0.25
Chromium		µg	0.39	1.2	0.44	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	3.0	2	1	0.25
Lead		µg	3.5	<2	2	1.5
Manganese		µg	0.7	<0.3	0.3	0.25
Nickel		µg	2	2	1	0.5
Phosphorus		µg	38	37	32	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	4.3	<2	2
Thallium		µg	2.7	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	2.8	2	0.5
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Max Hewitt
Operations Manager

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

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Methodology and Notes

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

Lot ID: **1617486**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821906

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	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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Project ID: Metro Vancouver WTE
Project Name: Reagent Blanks
Project Location:
LSD:
P.O.:
Proj. Acct. code:

Lot ID: **1617475**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821896

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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Email - Multiple Deliverables By Lot	PDF	COC / Test Report

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

Lot ID: **1617475**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821896

Reference Number	1617475-1	1617475-2	1617475-3
Sample Date	Nov 14, 2022	Nov 14, 2022	Nov 14, 2022
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	5	<2	3	2.5
Arsenic		µg	<1	2	<1	1
Cadmium		µg	0.7	0.4	0.3	0.25
Chromium		µg	0.41	0.73	1.2	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	1	2	0.9	0.25
Lead		µg	<2	5.5	2	1.5
Manganese		µg	0.3	0.3	<0.3	0.25
Nickel		µg	2	2	1	0.5
Phosphorus		µg	<2	<2	3	2.5
Selenium		µg	2	<2	18	1.5
Tellurium		µg	<2	<2	3.3	2
Thallium		µg	7.2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	2	3.3	2	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	<5	<5	<5	5
Antimony		µg	<3	<3	<3	2.5
Arsenic		µg	<1	<1	2	1
Cadmium		µg	<0.3	<0.3	<0.3	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.3	0.5	<0.3	0.25
Copper		µg	<0.3	2	2	0.25
Lead		µg	<2	<2	<2	1.5
Manganese		µg	<0.3	<0.3	0.9	0.25
Nickel		µg	1	<0.5	1.0	0.5
Phosphorus		µg	20	20	20	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	5.7	<2	<2	2
Thallium		µg	<2	3.1	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	3.3	2.9	3	0.5
Volume	Sample	mL	215	210	210	
Volume	aliquot volume	mL	165	160	160	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	

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Reference Number	1617475-1	1617475-2	1617475-3
Sample Date	Nov 14, 2022	Nov 14, 2022	Nov 14, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	215	210	210	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	43	40	
Mercury	Fraction 2B	µg/sample	<0.09	<0.09	<0.08	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	99	99	97	
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	0.12	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	0.098	
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:

Abhishek Suryawanshi
Operations Manager

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Methodology and Notes

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617475**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821896

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	Element Vancouver

** Reference Method Modified*

References

EMC	Emission Measurement Center of EPA

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617510**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821938

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 - Multiple Deliverables By Lot	PDF	COC / COA
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Analytical Report

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Company:

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Project Name: Field Blanks
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Proj. Acct. code:

Lot ID: **1617510**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821938

Reference Number	1617510-1	1617510-2	1617510-3
Sample Date	Nov 15, 2022	Nov 18, 2022	Nov 16, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MET A Blk + 4 Bottles)	Field Blank Unit 2 (MET D Blk + 4 Bottles)	Field Blank Unit 3 (MET E Blk + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A						
Aluminum		µg	<5	7	<5	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<1	<1	<1	1
Cadmium		µg	0.3	0.4	0.4	0.25
Chromium		µg	0.49	0.33	0.42	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	<0.3	0.8	<0.3	0.25
Lead		µg	<2	<2	5.5	1.5
Manganese		µg	<0.3	<0.3	0.7	0.25
Nickel		µg	1	<0.5	1	0.5
Phosphorus		µg	37	41	38	2.5
Selenium		µg	<2	<2	6.4	1.5
Tellurium		µg	<2	<2	3.5	2
Thallium		µg	<2	2	3.2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	3.2	2	4.0	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	6	<5	8	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<0.9	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	<0.2	<0.2	<0.2	0.2
Cobalt		µg	<0.2	0.3	<0.2	0.25
Copper		µg	<0.2	3.3	0.7	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	<0.2	<0.2	<0.2	0.25
Nickel		µg	1	<0.5	2	0.5
Phosphorus		µg	20	6	20	2.5
Selenium		µg	<1	8.7	<1	1.5
Tellurium		µg	<2	<2	2.9	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	3.4	2.5	3.5	0.5
Volume	Sample	mL	350	320	335	
Volume	aliquot volume	mL	300	270	285	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05

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Sample Time	NA	NA	NA
Sample Location			
Sample Description	Field Blank Unit 1 (MET A Blk + 4 Bottles)	Field Blank Unit 2 (MET D Blk + 4 Bottles)	Field Blank Unit 3 (MET E 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	350	320	335	
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	100	127	123	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.01	<0.010	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	1000	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<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:

Abhishek Suryawanshi
Operations Manager

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

Bill To: A. Lanfranco & Associates
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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617510**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821938

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	Element Vancouver

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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Report Transmission Cover Page

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Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

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 - Multiple Deliverables By Lot	PDF	COC / COA
Email - Multiple Deliverables By Lot	PDF	COC / Test Report

Notes To Clients:

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Analytical Report

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-1	1617496-2	1617496-3
Sample Date	Nov 14, 2022	Nov 15, 2022	Nov 15, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MET A R-1 + 4 Bottles)	Unit 1 Run 2 (MET A R-2 + 4 Bottles)	Unit 1 Run 3 (MET A R-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	5	26	77	5
Antimony		µg	3	<2	<2	2.5
Arsenic		µg	<1	5.0	<1	1
Cadmium		µg	0.4	<0.3	0.3	0.25
Chromium		µg	2.53	1.1	1.5	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	2	3.5	3.1	0.25
Lead		µg	2	9.0	<2	1.5
Manganese		µg	1	2	2	0.25
Nickel		µg	4.5	3.3	3.0	0.5
Phosphorus		µg	34	35	29	2.5
Selenium		µg	5.0	<2	<2	1.5
Tellurium		µg	4.6	<2	<2	2
Thallium		µg	<2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	3.7	5.0	4.5	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	43	84	20	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<0.9	1	<0.8	1
Cadmium		µg	<0.2	0.5	<0.2	0.25
Chromium		µg	1.1	2.84	3.42	0.2
Cobalt		µg	<0.2	1	<0.2	0.25
Copper		µg	2	6.9	0.3	0.25
Lead		µg	<1	17	2	1.5
Manganese		µg	2	3.3	0.8	0.25
Nickel		µg	2	2	2.5	0.5
Phosphorus		µg	22	30	10	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	3.0	<2	<2	2
Thallium		µg	2	4.2	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.8	1
Zinc		µg	16	40.9	11	0.5
Volume	Sample	mL	810	785	870	
Volume	aliquot volume	mL	760	735	820	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	

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Analytical Report

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Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-1	1617496-2	1617496-3
Sample Date	Nov 14, 2022	Nov 15, 2022	Nov 15, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 1 Run 1 (MET A R-1 + 4 Bottles)	Unit 1 Run 2 (MET A R-2 + 4 Bottles)	Unit 1 Run 3 (MET A R-3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	810	785	870	
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	157	168	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	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	0.06	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.02	<0.02	0.02	

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Analytical Report

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-4	1617496-5	1617496-6
Sample Date	Nov 18, 2022	Nov 18, 2022	Nov 18, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MET D R-1 + 4 Bottles)	Unit 2 Run 2 (MET D R-2 + 4 Bottles)	Unit 2 Run 3 (MET D R-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	20	20	5
Antimony		µg	<2	<2	6	2.5
Arsenic		µg	1	<1	<1	1
Cadmium		µg	<0.3	0.4	<0.3	0.25
Chromium		µg	1.9	0.61	0.65	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	0.5	3.0	6.7	0.25
Lead		µg	<2	<2	4.2	1.5
Manganese		µg	1	1	1	0.25
Nickel		µg	4.4	4.1	2.6	0.5
Phosphorus		µg	37	33	42	2.5
Selenium		µg	<2	<2	<2	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	3.3	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	7.3	5.1	5.8	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	22	20	10	5
Antimony		µg	<2	<2	<2	2.5
Arsenic		µg	<0.9	<0.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	0.36	0.50	0.98	0.2
Cobalt		µg	0.3	<0.2	<0.2	0.25
Copper		µg	5.3	2.6	3.0	0.25
Lead		µg	<1	<1	<1	1.5
Manganese		µg	2	0.5	0.5	0.25
Nickel		µg	2	2	1.0	0.5
Phosphorus		µg	10	4	10	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	<2	<2	<2	2
Thallium		µg	<1	<1	<1	1.5
Vanadium		µg	<0.9	<0.9	<0.9	1
Zinc		µg	13	6.3	5.2	0.5
Volume	Sample	mL	770	700	740	
Volume	aliquot volume	mL	720	650	690	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	

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Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-4	1617496-5	1617496-6
Sample Date	Nov 18, 2022	Nov 18, 2022	Nov 18, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 2 Run 1 (MET D R-1 + 4 Bottles)	Unit 2 Run 2 (MET D R-2 + 4 Bottles)	Unit 2 Run 3 (MET D R-3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	770	700	740	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	148	155	164	
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	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	0.08	<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	

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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: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-7	1617496-8	1617496-9
Sample Date	Nov 15, 2022	Nov 16, 2022	Nov 16, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MET E R-1 + 4 Bottles)	Unit 3 Run 2 (MET E R-2 + 4 Bottles)	Unit 3 Run 3 (MET E R-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	27	46	43	5
Antimony		µg	4	3	10	2.5
Arsenic		µg	<1	2.9	<1	1
Cadmium		µg	2	2	2	0.25
Chromium		µg	2.1	4.26	2.1	0.2
Cobalt		µg	<0.3	<0.3	<0.3	0.25
Copper		µg	9.6	13	12	0.25
Lead		µg	16	22	21	1.5
Manganese		µg	2	3.6	3.7	0.25
Nickel		µg	3.8	3.9	2	0.5
Phosphorus		µg	43	44	47	2.5
Selenium		µg	3.5	<2	<2	1.5
Tellurium		µg	<2	<2	4.8	2
Thallium		µg	2	<2	<2	1.5
Vanadium		µg	<1	<1	<1	1
Zinc		µg	129	248	132	0.5
Back Half Metals Fraction 2A						
Aluminum		µg	24	34	25	5
Antimony		µg	<2	<2	3	2.5
Arsenic		µg	<0.9	2.9	<0.9	1
Cadmium		µg	<0.2	<0.2	<0.2	0.25
Chromium		µg	1.5	0.84	0.49	0.2
Cobalt		µg	0.2	<0.2	0.5	0.25
Copper		µg	4.2	3.7	2	0.25
Lead		µg	2.9	<1	1	1.5
Manganese		µg	2	2.5	2	0.25
Nickel		µg	2	1	2	0.5
Phosphorus		µg	23	20	24	2.5
Selenium		µg	<1	<1	<1	1.5
Tellurium		µg	<2	4.0	<2	2
Thallium		µg	<1	<1	5.3	1.5
Vanadium		µg	<0.9	<0.8	<0.9	1
Zinc		µg	6.2	6.3	17	0.5
Volume	Sample	mL	840	875	750	
Volume	aliquot volume	mL	790	825	700	
Mercury by CVAA						
Mercury	As Tested	µg/L	<0.05	0.06	<0.05	0.05
Dilution Factor	As Tested		1	1	1	

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Analytical Report

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Reference Number	1617496-7	1617496-8	1617496-9
Sample Date	Nov 15, 2022	Nov 16, 2022	Nov 16, 2022
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Unit 3 Run 1 (MET E R-1 + 4 Bottles)	Unit 3 Run 2 (MET E R-2 + 4 Bottles)	Unit 3 Run 3 (MET E R-3 + 4 Bottles)
Matrix	Stack Samples	Stack Samples	Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - Continued						
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	0.03	<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	840	875	750	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.4	<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	174	174	170	
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	0.16	<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	0.051	<0.02	<0.02	

Approved by:

Abhishek Suryawanshi
Operations Manager

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

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Attn: Missy
Sampled By:
Company:

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

Lot ID: **1617496**
Control Number:
Date Received: Nov 25, 2022
Date Reported: Dec 16, 2022
Report Number: 2821909

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	*	Metals Emissions from Stationary Sources, 29	Dec 14, 2022	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	*	Metals Emissions from Stationary Sources, 29	Nov 28, 2022	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.

A. Lanfranco & Associates Inc.
ATTN: Mark Lanfranco
Unit # 101 9488 - 189 St.
Surrey BC V4N 4W7

Date Received: 22-NOV-22
Report Date: 17-DEC-22 17:08 (MT)
Version: FINAL

Client Phone: 604-881-2582

Certificate of Analysis

Lab Work Order #: L2742267

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2742267-1	L2742267-2	L2742267-3	L2742267-4	
	Description					
	Sampled Date	17-NOV-22	17-NOV-22	18-NOV-22	18-NOV-22	
	Sampled Time					
	Client ID	MV WTE UNIT 1 - CR+6 BLANK	MV WTE UNIT 1 - CR+6 RUN 1	MV WTE UNIT 1 - CR+6 RUN 2	MV WTE UNIT 1 - CR+6 RUN 3	
Grouping	**Analyte**					
STACK						
Speciated Metals	Chromium, Hexavalent (ug)	<0.70	<0.84	<0.90	<0.85	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CR-CR6-IC-WT	Stack	Chromium, Hexavalent (Cr6+)	EPA 7199 / Method 306

This analysis is carried out using procedures adapted from "Determination of Chromium Emissions from Decorative and Hard Chromium Electroplating and Chromium Anodizing Operations - Isokinetic Method" Method 306, published by the United States Environmental Protection Agency (EPA). An emission sample is extracted isokinetically from the source using an unheated Method 5 sampling train. The emissions are collected in alkaline solution. Analysis is performed at the lab using ion chromatography with a UV/VIS detector.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

L2742267-COFC

ALS Environ

Chain of Custody / Analytical Request Form COC #

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Page 1 of 1

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:		Analysis Request
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☑ Yes ☐ No	Job #:	MV WTE UNIT 1	
Company:		PO / AFE:		
Contact:		LSD:		
Address:				
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)	8283	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 1 - Cr+6 Blank	17-Nov-22			X	1
	MV WTE Unit 1 - Cr+6 Run 1	17-Nov-22			X	1
	MV WTE Unit 1 - Cr+6 Run 2	18-Nov-22			X	1
	MV WTE Unit 1 - Cr+6 Run 3	18-Nov-22			X	1

Environmental Division
Vancouver
Work Order Reference
VA22C8283

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
			JC	22/11/22	9am	16 °C				

GENF 20.00 Front

CERTIFICATE OF ANALYSIS

Work Order	: **VA22C8279**	Page	: 1 of 2
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Date Analysis Commenced	: 26-Nov-2022
C-O-C number	: ----	Issue Date	: 28-Nov-2022 10:31
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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*
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia

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/sample	micrograms per sample
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*	*LOR*	*Unit*	*Client sample ID*	**Unit 1 HF Blank**	**Unit 2 HF Blank**	**Unit 3 HF Blank**	**----**	**----**
					Client sampling date / time	15-Nov-2022	18-Nov-2022	16-Nov-2022	----	----
						VA22C8279-001	**VA22C8279-002**	**VA22C8279-003**	**--------**	**--------**
						Result	Result	Result	----	----
Field Tests										
volume, impinger	----	EP248	0.1	mL		270	275	255	----	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<5.0	<5.0	<5.0	----	----

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

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA22C8279**	Page	: 1 of 5
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Issue Date	: 28-Nov-2022 10:31
C-O-C number	: ----		
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Blank	E248.F	16-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Blank	E248.F	15-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Blank	E248.F	18-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 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)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	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
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

QUALITY CONTROL REPORT

Work Order	: **VA22C8279**	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Date Analysis Commenced	: 26-Nov-2022
C-O-C number	: ----	Issue Date	: 28-Nov-2022 10:31
Sampler	: A. Lanfranco 604 881 2582		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 3		
No. of samples analysed	: 3		

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*
Courtney Cox	Analsyt	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

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*
Anions and Nutrients (QC Lot: 758824)											
VA22C8279-001	Unit 1 HF Blank	fluoride	16984-48-8	E248.F	0.0050	mg/sample	<5.0 µg/sample	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	270	270		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
Anions and Nutrients (QCLot: 758824)						
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	----
volume, impinger	----	EP248	0.1	mL	500	----

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
Anions and Nutrients (QCLot: 758824)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	98.6	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
Anions and Nutrients (QCLot: 758824)										
VA22C8279-002	Unit 2 HF Blank	fluoride	16984-48-8	E248.F	0.514 mg/sample	0.5 mg/sample	103	75.0	125	----
		volume, impinger	----	EP248		mL		0	0	----

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:	○ 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 #: Metro Vancouver WTE	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE: HF	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: A. Lanfranco and

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F	Number of Containers
	Unit 1 HF Blank	15-Nov-22		Water	X	1
	Unit 2 HF Blank	18-Nov-22		Water	X	1
	Unit 3 HF Blank	16-Nov-22		Water	X	1

Environmental Division
Vancouver
Work Order Reference
VA22C8279

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

Please report ug/sample

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: JC	Date: 22/11/22	Time: 9 am	Temperature: 16 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

CERTIFICATE OF ANALYSIS

Work Order	: **VA22C8306**	Page	: 1 of 3
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Date Analysis Commenced	: 26-Nov-2022
C-O-C number	: ----	Issue Date	: 28-Nov-2022 10:31
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia

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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/sample	micrograms per sample
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.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Unit 1 HF Run 1	Unit 1 HF Run 2	Unit 1 HF Run 3	Unit 2 HF Run 1	Unit 2 HF Run 2
					Client sampling date / time	15-Nov-2022	15-Nov-2022	15-Nov-2022	18-Nov-2022	18-Nov-2022
						VA22C8306-001	VA22C8306-002	VA22C8306-003	VA22C8306-004	VA22C8306-005
						Result	Result	Result	Result	Result
Field Tests										
volume, impinger	----	EP248	0.1	mL		300	400	360	245	310
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<15.0 DLDS	6.2	<5.0	<12.2 DLDS	<5.0

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Unit 2 HF Run 3	Unit 3 HF Run 1	Unit 3 HF Run 2	Unit 3 HF Run 3	----
					Client sampling date / time	18-Nov-2022	16-Nov-2022	16-Nov-2022	16-Nov-2022	----
						VA22C8306-006	VA22C8306-007	VA22C8306-008	VA22C8306-009	--------
						Result	Result	Result	Result	----
Field Tests										
volume, impinger	----	EP248	0.1	mL		230	380	345	415	----
Anions and Nutrients										
fluoride	16984-48-8	E248.F	5.0	µg/sample		<5.0	<5.0	<5.0	<20.8 DLDS	----

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

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA22C8306**	Page	: 1 of 6
Client	: **A. Lanfranco & Associates Inc.**	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Issue Date	: 28-Nov-2022 10:31
C-O-C number	: ----		
Sampler	: A. Lanfranco		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 1	E248.F	16-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 2	E248.F	16-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 3	E248.F	16-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	10 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 1	E248.F	15-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 2	E248.F	15-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 1 HF Run 3	E248.F	15-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	11 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 1	E248.F	18-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	8 days	✓

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
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 2	E248.F	18-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 days	8 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 2 HF Run 3	E248.F	18-Nov-2022	26-Nov-2022	----	----		26-Nov-2022	28 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)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Method Blanks (MB)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Fluoride by IC (Impinger, mg/sample)	E248.F	758824	1	12	8.3	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
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.

QUALITY CONTROL REPORT

Work Order	: **VA22C8306**	Page	: 1 of 3
Client	: A. Lanfranco & Associates Inc.	Laboratory	: Vancouver - Environmental
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	: Metro Vancouver WTE	Date Samples Received	: 22-Nov-2022 09:00
PO	: HF	Date Analysis Commenced	: 26-Nov-2022
C-O-C number	: ----	Issue Date	: 28-Nov-2022 10:31
Sampler	: A. Lanfranco 604 881 2582		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Courtney Cox	Analsyt	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

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*
Anions and Nutrients (QC Lot: 758824)											
VA22C8279-001	Anonymous	fluoride	16984-48-8	E248.F	0.0050	mg/sample	<5.0 µg/sample	<0.0050	0	Diff <2x LOR	----
		volume, impinger	----	EP248	0.1	mL	270	270		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
Anions and Nutrients (QCLot: 758824)						
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	----
volume, impinger	----	EP248	0.1	mL	500	----

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
Anions and Nutrients (QCLot: 758824)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	98.6	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
Anions and Nutrients (QCLot: 758824)										
VA22C8279-002	Anonymous	fluoride	16984-48-8	E248.F	0.514 mg/sample	0.5 mg/sample	103	75.0	125	----
		volume, impinger	----	EP248		mL		0	0	----

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:	○ 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 #: Metro Vancouver WTE	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE: HF	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Brent Mack	Sampler: A. Lanfranco and

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F								Number of Containers
	Unit 1 HF Run 1	15-Nov-22		Water	X								1
	Unit 1 HF Run 2			Water	X								1
	Unit 1 HF Run 3			Water	X								1
	Unit 2 HF Run 1	18-Nov-22		Water	X								1
	Unit 2 HF Run 2			Water	X								1
	Unit 2 HF Run 3			Water	X								1
	Unit 3 HF Run 1	16-Nov-22		Water	X								1
	Unit 3 HF Run 2			Water	X								1
	Unit 3 HF Run 3			Water	X								1

Environmental Division
Vancouver
Work Order Reference
VA22C8306

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

Please report ug/sample

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
			JC	22/11/22	9am	15 °C				

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

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LABORATORY REPORT

December 5, 2022

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

RE: Metro Vancouver W.T.E

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on November 22, 2022. For your reference, these analyses have been assigned our service request number P2205312.

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

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

ALS | Environmental

By Sue Anderson at 2:50 pm, Dec 05, 2022

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: P2205312
Project: Metro Vancouver W.T.E

CASE NARRATIVE

The samples were received intact under chain of custody on November 22, 2022 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, C6+ Hydrocarbons, Methane, Ethene and Ethane Analysis

The samples were analyzed per modified EPA Method TO-3 for C3 through >C6 hydrocarbons, 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	http://dec.alaska.gov/eh/lab.aspx	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)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1776326
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-008
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-19-10
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272019-10
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: P2205312
Project ID: Metro Vancouver W.T.E

Date Received: 11/22/2022
Time Received: 10:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-3 Modified - C1C6+ Can	TO-3 Modified - MEEPP Can
Unit 1 Run 1	P2205312-001	Air	11/15/2022	11:35	SC01053	-3.10	3.91	X	X
Unit 1 Run 2	P2205312-002	Air	11/15/2022	13:00	SC02256	-1.73	3.94	X	X
Unit 1 Run 3	P2205312-003	Air	11/15/2022	14:18	SC02013	-2.10	3.94	X	X
Unit 2 Run 1	P2205312-004	Air	11/18/2022	11:28	SC01013	-2.60	3.91	X	X
Unit 2 Run 2	P2205312-005	Air	11/18/2022	12:35	SC01610	-2.89	3.95	X	X
Unit 2 Run 3	P2205312-006	Air	11/18/2022	13:42	SC02255	-2.21	3.96	X	X
Unit 3 Run 1	P2205312-007	Air	11/16/2022	11:12	SC02191	-2.50	3.86	X	X
Unit 3 Run 2	P2205312-008	Air	11/16/2022	12:23	SC00098	-0.30	3.97	X	X
Unit 3 Run 3	P2205312-009	Air	11/16/2022	13:34	SC02248	-3.48	3.92	X	X

Air - Chain of Custody Record & Analytical Service Request

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

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

ALS Project No: P2205312

ALS Contact:

Company Name & Address (Reporting Information)	Project Name	Analysis Method
A.Lanfranco & Associates Inc.	Metro Vancouver W.T.E.	TO-3 (List on File)
	Project Number	
Project Manager: Mark Lanfranco	P.O. # / Billing Information	
Phone: 604-881-2582 / Fax:	Bill to Account	
Email Address for Result Reporting: mark.lanfranco@alanfranco.com	Sampler (Print & Sign): Daryl Sampson *Daryl Sampson*	

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	Analysis Method		Comments e.g. Actual Preservative or specific instructions
Unit 1 Run 1	1	11-15-22	1035-1135	SC01053	OA02193	-32"	-9"	6L			
Unit 1 Run 2	2	11-15-22	1200-1300	SC02256	OA01693	-30"	-6.5"	6L			
Unit 1 Run 3	3	11-15-22	1318-1418	SC02013	OAO1825	-33"	-8"	6L			
Unit 2 Run 1	4	11-18-22	1028-1128	SCO1013	OA01820	-29"	-7"	6L			
Unit 2 Run 2	5	11-18-22	1135-1235	SC01610	OA00084	-28"	-8"	6L			
Unit 2 Run 3	6	11-18-22	1242-1342	SCO2255	OA00491	-32"	-8"	6L			
Unit 3 Run 1	7	11-16-22	1012-1112	SC02191	OA01007	-32"	-8"	6L			
Unit 3 Run 2	8	11-16-22	1123-1223	SC00098	OAO1266	-28"	-8"	6L			
Unit 3 Run 3	9	11-16-22	1234-1334	SCO2248	OA00213	-28"	-9"	6L			

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

EDD required Yes / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	11-22-22	1015

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: A. Lanfranco and Associates Inc. Work order: P2205312

Project: Metro Vancouver W.T.E

Sample(s) received on: 11/22/22 Date opened: 11/22/22 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
P2205312-001.01	6.0 L Source Can					
P2205312-002.01	6.0 L Source Can					
P2205312-003.01	6.0 L Source Can					
P2205312-004.01	6.0 L Source Can					
P2205312-005.01	6.0 L Source Can					
P2205312-006.01	6.0 L Source Can					
P2205312-007.01	6.0 L Source Can					
P2205312-008.01	6.0 L Source Can					
P2205312-009.01	6.0 L Source Can					

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-001

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/23/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01053

Initial Pressure (psig): -3.10 Final Pressure (psig): 3.91

Container Dilution Factor: 1.60

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.80	
C_4 as n-Butane	ND	0.80	
C_5 as n-Pentane	**1.4**	0.80	
C_6 as n-Hexane	**1.7**	0.80	
C_6+ as n-Hexane	**3.4**	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 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-002

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/23/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02256

Initial Pressure (psig): -1.73 Final Pressure (psig): 3.94

Container Dilution Factor: 1.44

Compound	**Result ppmV**	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.72	
C_4 as n-Butane	ND	0.72	
C_5 as n-Pentane	ND	0.72	
C_6 as n-Hexane	ND	0.72	
C_6+ as n-Hexane	ND	1.4	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-003

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/23/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02013

Initial Pressure (psig): -2.10 Final Pressure (psig): 3.94

Container Dilution Factor: 1.48

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.74	
C_4 as n-Butane	ND	0.74	
C_5 as n-Pentane	**1.3**	0.74	
C_6 as n-Hexane	**0.92**	0.74	
C_6+ as n-Hexane	ND	1.5	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-004

Test Code: EPA TO-3 Modified Date Collected: 11/18/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/23/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC01013

Initial Pressure (psig): -2.60 Final Pressure (psig): 3.91

Container Dilution Factor: 1.54

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-005

Test Code:	EPA TO-3 Modified	Date Collected:	11/18/22
Instrument ID:	HP5890 II/GC8/FID	Date Received:	11/22/22
Analyst:	Drew Picard	Date Analyzed:	11/23/22
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC01610		

Initial Pressure (psig): -2.89 Final Pressure (psig): 3.95

Container Dilution Factor: 1.58

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-006

Test Code:	EPA TO-3 Modified	Date Collected:	11/18/22
Instrument ID:	HP5890 II/GC8/FID	Date Received:	11/22/22
Analyst:	Drew Picard	Date Analyzed:	11/28/22
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC02255		

Initial Pressure (psig): -2.21 Final Pressure (psig): 3.96

Container Dilution Factor: 1.49

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.75	
C_4 as n-Butane	ND	0.75	
C_5 as n-Pentane	ND	0.75	
C_6 as n-Hexane	ND	0.75	
C_6+ as n-Hexane	ND	1.5	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-007

Test Code:	EPA TO-3 Modified	Date Collected:	11/16/22
Instrument ID:	HP5890 II/GC8/FID	Date Received:	11/22/22
Analyst:	Drew Picard	Date Analyzed:	11/28/22
Sampling Media:	6.0 L Summa Canister	Volume(s) Analyzed:	1.0 ml(s)
Test Notes:			
Container ID:	SC02191		

Initial Pressure (psig): -2.50 Final Pressure (psig): 3.86

Container Dilution Factor: 1.52

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.76	
C_4 as n-Butane	ND	0.76	
C_5 as n-Pentane	ND	0.76	
C_6 as n-Hexane	ND	0.76	
C_6+ as n-Hexane	ND	1.5	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-008

Test Code: EPA TO-3 Modified Date Collected: 11/16/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/28/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC00098

Initial Pressure (psig): -0.30 Final Pressure (psig): 3.97

Container Dilution Factor: 1.30

Compound	Result ppmV	MRL ppmV	Data Qualifier
C_3 as Propane	ND	0.65	
C_4 as n-Butane	ND	0.65	
C_5 as n-Pentane	**1.8**	0.65	
C_6 as n-Hexane	ND	0.65	
C_6+ as n-Hexane	ND	1.3	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-009

Test Code: EPA TO-3 Modified Date Collected: 11/16/22
Instrument ID: HP5890 II/GC8/FID Date Received: 11/22/22
Analyst: Drew Picard Date Analyzed: 11/28/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.0 ml(s)
Test Notes:
Container ID: SC02248

Initial Pressure (psig): -3.48 Final Pressure (psig): 3.92

Container Dilution Factor: 1.66

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221123-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Drew Picard Date Analyzed: 11/23/22
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: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221128-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Drew Picard Date Analyzed: 11/28/22
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: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221123-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Drew Picard Date Analyzed: 11/23/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
Propane	1,000	972	996	**97**	**100**	92-120	3	6	
n-Butane	1,000	978	1,000	**98**	**100**	91-121	2	6	
n-Pentane	1,000	965	988	**97**	**99**	89-118	2	6	
n-Hexane	1,000	1,040	1,060	**104**	**106**	92-125	2	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: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221128-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890 II/GC8/FID Date Received: NA
Analyst: Drew Picard Date Analyzed: 11/28/22
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	1,010	1,000	**101**	**100**	92-120	1	6	
n-Butane	1,000	1,020	1,010	**102**	**101**	91-121	1	6	
n-Pentane	1,000	1,000	987	**100**	**99**	89-118	1	6	
n-Hexane	1,000	1,070	1,040	**107**	**104**	92-125	3	6	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-001

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01053

Initial Pressure (psig): -3.10 Final Pressure (psig): 3.91

Container Dilution Factor: 1.60

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**0.86**	1.0	**1.3**	1.6	**J**
74-85-1	Ethene	ND	0.55	ND	0.48	
74-84-0	Ethane	ND	0.59	ND	0.48	

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.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-002

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02256

Initial Pressure (psig): -1.73 Final Pressure (psig): 3.94

Container Dilution Factor: 1.44

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**0.85**	0.94	**1.3**	1.4	**J**
74-85-1	Ethene	ND	0.50	ND	0.43	
74-84-0	Ethane	ND	0.53	ND	0.43	

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.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 1 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-003

Test Code: EPA TO-3 Modified Date Collected: 11/15/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02013

Initial Pressure (psig): -2.10 Final Pressure (psig): 3.94

Container Dilution Factor: 1.48

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.97	ND	1.5	
74-85-1	Ethene	ND	0.51	ND	0.44	
74-84-0	Ethane	ND	0.55	ND	0.44	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-004

Test Code: EPA TO-3 Modified Date Collected: 11/18/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01013

Initial Pressure (psig): -2.60 Final Pressure (psig): 3.91

Container Dilution Factor: 1.54

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**1.2**	1.0	**1.8**	1.5	
74-85-1	Ethene	ND	0.53	ND	0.46	
74-84-0	Ethane	ND	0.57	ND	0.46	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-005

Test Code: EPA TO-3 Modified Date Collected: 11/18/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC01610

Initial Pressure (psig): -2.89 Final Pressure (psig): 3.95

Container Dilution Factor: 1.58

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.3**	1.0	**3.4**	1.6	
74-85-1	Ethene	ND	0.54	ND	0.47	
74-84-0	Ethane	ND	0.58	ND	0.47	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 2 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-006

Test Code: EPA TO-3 Modified Date Collected: 11/18/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02255

Initial Pressure (psig): -2.21 Final Pressure (psig): 3.96

Container Dilution Factor: 1.49

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.98	ND	1.5	
74-85-1	Ethene	ND	0.51	ND	0.45	
74-84-0	Ethane	ND	0.55	ND	0.45	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 1** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-007

Test Code: EPA TO-3 Modified Date Collected: 11/16/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02191

Initial Pressure (psig): -2.50 Final Pressure (psig): 3.86

Container Dilution Factor: 1.52

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.0	ND	1.5	
74-85-1	Ethene	ND	0.52	ND	0.46	
74-84-0	Ethane	ND	0.56	ND	0.46	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 2** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-008

Test Code: EPA TO-3 Modified Date Collected: 11/16/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC00098

Initial Pressure (psig): -0.30 Final Pressure (psig): 3.97

Container Dilution Factor: 1.30

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**2.3**	0.85	**3.5**	1.3	
74-85-1	Ethene	ND	0.45	ND	0.39	
74-84-0	Ethane	ND	0.48	ND	0.39	

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **A. Lanfranco and Associates Inc.**
Client Sample ID: **Unit 3 Run 3** ALS Project ID: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P2205312-009

Test Code: EPA TO-3 Modified Date Collected: 11/16/22
Instrument ID: HP5890A/GC10/FID Date Received: 11/22/22
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.50 ml(s)
Test Notes:
Container ID: SC02248

Initial Pressure (psig): -3.48 Final Pressure (psig): 3.92

Container Dilution Factor: 1.66

CAS #	Compound	Result mg/m³	MRL mg/m³	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	**1.2**	1.1	**1.9**	1.7	
74-85-1	Ethene	ND	0.57	ND	0.50	
74-84-0	Ethane	ND	0.61	ND	0.50	

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: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221130-MB

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
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	0.66	ND	1.0	
74-85-1	Ethene	ND	0.34	ND	0.30	
74-84-0	Ethane	ND	0.37	ND	0.30	

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: P2205312
Client Project ID: **Metro Vancouver W.T.E** ALS Sample ID: P221130-DLCS

Test Code: EPA TO-3 Modified Date Collected: NA
Instrument ID: HP5890A/GC10/FID Date Received: NA
Analyst: Alex Anderson-Heflin Date Analyzed: 11/30/22
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	1.52	1.48	1.47	**97**	**97**	70-130	0	15	
74-85-1	Ethene	1.51	1.47	1.49	**97**	**99**	70-130	2	15	
74-84-0	Ethane	1.50	1.47	1.48	**98**	**99**	70-130	1	15	

APPENDIX - C

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	**Date:**	14-Nov-22
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:07 - 14:11

Concentrations:

Particulate	0.08	mg/dscm	0.00004	gr/dscf
	0.05	mg/Acm	0.00002	gr/Acf
	0.08	mg/dscm (@ 11% O2)	0.00003	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.006	Kg/hr	0.014	lb/hr

Flue Gas Characteristics:

Flow	1321	dscm/min	46655	dscf/min
	22.02	dscm/sec	778	dscf/sec
	2256	Acm/min	79680	Acf/min
Velocity	14.764	m/sec	48.44	f/sec
Temperature	143.3	oC	290.0	oF
Moisture	14.1	%		
Gas Analysis	10.5	% O2		
	9.4	% CO2		
	29.916	Mol. Wt (g/gmole) Dry		
	28.240	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	3.0588	dscm	108.022	dscf
Sample Time	120.0	minutes		
Isokineticity	104.0	%		

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

Client:	Metro Vancouver	**Date:**	14-Nov-22
Jobsite:	WTE (Burnaby, BC)	**Run:**	1 - Particulate / Metals
Source:	Unit 1	**Run Time:**	11:10 - 13:15

Control Unit (Y)	0.9962
Nozzle Diameter (in.)	0.3053
Pitot Factor	0.8511
Baro. Press. (in. Hg)	30.36
Static Press. (in. H20)	-19.00
Stack Height (ft)	30
Stack Diameter (in.)	70.90
Stack Area (sq.ft.)	27.417
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:

Filter (grams)	0.00005
Washings (grams)	0.00020
Total (grams)	**0.00025**

Gas Analysis (Vol. %):

	CO2	O2
Traverse 1	9.25	10.35
Traverse 2	9.45	10.65
	9.35	**10.50**

Condensate Collection:

Impinger 1	166.0
Impinger 2	118.0
Impinger 3	56.0
Impinger 4	10.0
Impinger 5	4.0
Impinger 6	2.0
Gel	19.8
Gain (grams)	**375.8**

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	20.878								
1	5.0	24.920	0.42	2.12	61	61	5.5	300	1.5	103.9
2	10.0	29.100	0.45	2.27	61	61	5.5	302	4.7	104.0
3	15.0	33.240	0.44	2.22	61	61	5.5	300	8.4	104.0
4	20.0	37.350	0.43	2.19	62	62	5.5	295	12.5	103.9
5	25.0	41.320	0.40	2.04	62	62	6	293	17.7	103.9
6	30.0	45.140	0.37	1.90	62	62	6	291	25.2	103.8
7	35.0	49.980	0.59	3.03	63	63	7	290	45.6	104.1
8	40.0	54.910	0.61	3.15	64	64	7	289	53.2	104.1
9	45.0	59.730	0.58	3.00	65	65	8	289	58.3	104.1
10	50.0	64.480	0.56	2.91	66	66	8	287	62.5	104.1
11	55.0	69.270	0.57	2.96	66	66	8	287	66.1	104.0
12	60.0	74.080	0.57	2.97	67	67	8	286	69.4	104.2
Traverse 2	0.0	74.080								
1	5.0	78.460	0.47	2.46	67	67	6	282	1.5	104.1
2	10.0	82.690	0.44	2.30	67	67	6	282	4.7	103.8
3	15.0	87.020	0.46	2.41	67	67	7	283	8.4	104.1
4	20.0	91.290	0.45	2.34	67	67	7	286	12.5	103.9
5	25.0	95.620	0.46	2.40	68	68	8	286	17.7	104.1
6	30.0	99.850	0.44	2.29	68	68	8	288	25.2	104.1
7	35.0	104.360	0.50	2.60	69	69	8.5	290	45.6	104.1
8	40.0	109.040	0.54	2.80	69	69	8.5	292	53.2	104.1
9	45.0	113.640	0.52	2.70	69	69	8	290	58.3	104.1
10	50.0	118.280	0.53	2.76	69	69	8	290	62.5	104.1
11	55.0	122.510	0.44	2.29	69	69	8	290	66.1	104.0
12	60.0	126.640	0.42	2.28	69	69	8	291	69.4	104.0
Average:			0.486	2.516	65.8	65.8	7.1	290.0		104.0

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	10:02 - 12:06

Concentrations:

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

Emission Rates:

Particulate	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1188	dscm/min	41965	dscf/min
	19.80	dscm/sec	699	dscf/sec
	2026	Acm/min	71535	Acf/min
Velocity	13.255	m/sec	43.49	f/sec
Temperature	146.7	oC	296.1	oF
Moisture	13.8	%		
Gas Analysis	10.6	% O2		
	9.2	% CO2		
	29.900	Mol. Wt (g/gmole) Dry		
	28.260	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7889	dscm	98.490	dscf
Sample Time	120.0	minutes		
Isokineticity	103.4	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 1	**Run Time:**	10:02 - 12:06

Control Unit (Y)	0.9962	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00005		CO2	O2		Impinger 1	158.0
Pitot Factor	0.8506	Washings (grams)	0.00005	Traverse 1	9.25	10.65		Impinger 2	114.0
Baro. Press. (in. Hg)	30.48			Traverse 2	9.20	10.55		Impinger 3	34.0
Static Press. (in. H20)	-18.00	**Total (grams)**	**0.00010**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	16.5
Minutes Per Reading	5.0				**9.23**	**10.60**		**Gain (grams)**	**334.5**
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	127.845								
1	5.0	131.420	0.33	1.71	50	50	7	295	1.5	103.3
2	10.0	135.100	0.35	1.81	50	50	7	296	4.7	103.3
3	15.0	138.780	0.35	1.81	50	50	8	296	8.4	103.3
4	20.0	142.770	0.41	2.12	50	50	8	295	12.5	103.5
5	25.0	146.720	0.40	2.07	51	51	8	295	17.7	103.5
6	30.0	150.630	0.39	2.03	52	52	8	294	25.2	103.5
7	35.0	154.690	0.42	2.18	54	54	9.5	297	45.6	103.4
8	40.0	158.860	0.44	2.30	55	55	9.5	296	53.2	103.5
9	45.0	162.980	0.43	2.24	56	56	8.5	299	58.3	103.4
10	50.0	166.970	0.40	2.10	57	57	8.5	295	62.5	103.4
11	55.0	170.920	0.39	2.04	58	58	8.5	297	66.1	103.5
12	60.0	174.760	0.37	1.94	58	58	8.5	297	69.4	103.3
Traverse 2	0.0	174.760								
1	5.0	178.730	0.39	2.06	61	61	9	295	1.5	103.3
2	10.0	182.680	0.37	1.95	61	61	9	296	4.7	105.6
3	15.0	186.360	0.35	1.85	61	61	9.5	296	8.4	101.1
4	20.0	190.010	0.33	1.74	61	61	9.5	297	12.5	103.3
5	25.0	193.830	0.36	1.90	62	62	10	296	17.7	103.3
6	30.0	197.600	0.35	1.85	62	62	10	296	25.2	103.4
7	35.0	201.920	0.46	2.43	63	63	10	298	45.6	103.4
8	40.0	206.220	0.45	2.39	65	65	10	297	53.2	103.6
9	45.0	210.610	0.47	2.50	65	65	9.5	297	58.3	103.5
10	50.0	214.670	0.40	2.13	65	65	9.5	295	62.5	103.6
11	55.0	218.670	0.39	2.07	65	65	8	296	66.1	103.4
12	60.0	222.632	0.38	2.03	66	66	8	295	69.4	103.5
								.		
Average:			0.391	2.052	58.3	58.3	8.8	296.1		103.4

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:47 - 14:52

Concentrations:

Particulate	0.1	mg/dscm	0.0001	gr/dscf
	0.1	mg/Acm	0.0000	gr/Acf
	0.1	mg/dscm (@ 11% O2)	0.0000	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.009	Kg/hr	0.019	lb/hr

Flue Gas Characteristics:

Flow	1159	dscm/min	40920	dscf/min
	19.31	dscm/sec	682	dscf/sec
	1996	Acm/min	70483	Acf/min
Velocity	13.060	m/sec	42.85	f/sec
Temperature	143.1	oC	289.6	oF
Moisture	15.2	%		
Gas Analysis	9.9	% O2		
	9.0	% CO2		
	29.828	Mol. Wt (g/gmole) Dry		
	28.032	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7578	dscm	97.392	dscf
Sample Time	120.0	minutes		
Isokineticity	104.9	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 1	**Run Time:**	12:47 - 14:52

Control Unit (Y)	0.9962	**Collection:**			**Gas Analysis (Vol. %):**		**Condensate Collection:**	
Nozzle Diameter (in.)	0.3083	Filter (grams)	0.00005		CO2	O2	Impinger 1	250.0
Pitot Factor	0.8506	Washings (grams)	0.00030	Traverse 1	8.95	9.90	Impinger 2	82.0
Baro. Press. (in. Hg)	30.48			Traverse 2	8.95	9.90	Impinger 3	16.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00035**				Impinger 4	6.0
Stack Height (ft)	30						Impinger 5	2.0
Stack Diameter (in.)	70.90						Impinger 6	1.0
Stack Area (sq.ft.)	27.417						Gel	13.6
Minutes Per Reading	5.0				**8.95**	**9.90**	**Gain (grams)**	**370.6**
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	226.297								
1	5.0	230.250	0.38	2.03	63	63	7	290	1.5	104.9
2	10.0	234.150	0.37	1.98	63	63	7	290	4.7	104.9
3	15.0	237.940	0.35	1.86	63	63	7	290	8.4	104.8
4	20.0	241.610	0.33	1.75	63	63	7	292	12.5	104.6
5	25.0	245.450	0.36	1.91	64	64	7.5	295	17.7	104.8
6	30.0	249.410	0.38	2.03	64	64	7.5	295	25.2	105.2
7	35.0	253.670	0.44	2.36	64	64	7.5	290	45.6	105.0
8	40.0	257.600	0.37	2.00	65	65	7.5	289	53.2	105.2
9	45.0	261.370	0.34	1.84	65	65	7.5	284	58.3	104.9
10	50.0	265.250	0.36	1.95	65	65	7.5	284	62.5	105.0
11	55.0	269.180	0.37	2.00	65	65	8	284	66.1	104.9
12	60.0	273.000	0.35	1.88	66	66	8	285	69.4	104.6
Traverse 2	0.0	273.000								
1	5.0	276.770	0.34	1.84	66	66	8	285	1.5	104.8
2	10.0	280.600	0.35	1.84	67	67	8	287	4.7	104.9
3	15.0	284.430	0.35	1.89	67	67	8	288	8.4	104.9
4	20.0	288.530	0.40	2.16	68	68	8	288	12.5	104.9
5	25.0	292.570	0.39	2.10	68	68	8.5	290	17.7	104.9
6	30.0	296.660	0.40	2.15	68	68	8.5	292	25.2	105.0
7	35.0	300.860	0.42	2.27	69	69	9	290	45.6	104.9
8	40.0	305.160	0.44	2.38	69	69	9	290	53.2	104.9
9	45.0	309.410	0.43	2.32	70	70	8.5	292	58.3	104.8
10	50.0	313.510	0.40	2.12	70	70	8.5	292	62.5	104.8
11	55.0	317.560	0.39	2.10	71	71	9	295	66.1	104.9
12	60.0	321.510	0.37	2.00	71	71	9	294	69.4	104.9
Average:			0.378	2.032	66.4	66.4	8.0	289.6		104.9

Client:	Metro Vancouver	**Date:**	17-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Cr^{+6}
Source:	Unit 1	**Run Time:**	11:40 - 15:10

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	1287	dscm/min	45453	dscf/min
	21.45	dscm/sec	758	dscf/sec
	2172	Acm/min	76720	Acf/min
Velocity	14.215	m/sec	46.64	f/sec
Temperature	157.5	oC	315.6	oF
Moisture	10.5	%		
Gas Analysis	10.3	% O2		
	9.9	% CO2		
	29.990	Mol. Wt (g/gmole) Dry		
	28.737	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7970	dscm	98.777	dscf
Sample Time	120.0	minutes		
Isokineticity	97.7	%		

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

Client:	Metro Vancouver	**Date:**	17-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Cr+6
Source:	Unit 1	**Run Time:**	11:40 - 15:10

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Cr+6 (grams)	0.00000042		CO2	O2		Impinger 1	-40.0
Pitot Factor	0.8511			Traverse 1	9.75	10.25		Impinger 2	210.0
Baro. Press. (in. Hg)	30.48			Traverse 2	10.00	10.25		Impinger 3	35.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.0000004**					Impinger 4	12.5
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	27.5
Minutes Per Reading	5.0				**9.88**	**10.25**		**Gain (grams)**	**245.0**
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	455.050								
1	5.0	458.270	0.28	1.33	59	59	6	305	1.5	98.3
2	10.0	461.620	0.30	1.43	60	60	6	307	4.7	98.8
3	15.0	464.840	0.28	1.33	60	60	6	306	8.4	98.2
4	20.0	468.060	0.28	1.33	62	62	6	306	12.5	97.8
5	25.0	471.170	0.26	1.24	61	61	6	303	17.7	98.0
6	30.0	474.280	0.26	1.24	62	62	6	302	25.2	97.8
7	35.0	478.590	0.50	2.38	64	64	6	318	45.6	98.6
8	40.0	483.470	0.64	3.04	66	66	6	320	53.2	98.6
9	45.0	488.280	0.62	2.95	64	64	6	322	58.3	99.2
10	50.0	492.990	0.60	2.85	66	66	6	320	62.5	98.3
11	55.0	497.770	0.62	2.95	66	66	6	322	66.1	98.2
12	60.0	502.490	0.60	2.85	67	67	6	322	69.4	98.4
Traverse 2	0.0	502.490								
1	5.0	506.620	0.46	2.19	68	68	5	319	1.5	97.8
2	10.0	510.570	0.42	2.00	69	69	5	320	4.7	97.7
3	15.0	514.610	0.44	2.09	69	69	5	320	8.4	97.7
4	20.0	518.920	0.50	2.38	70	70	5	319	12.5	97.6
5	25.0	523.140	0.48	2.28	71	71	5	319	17.7	97.3
6	30.0	527.180	0.44	2.09	72	72	5	318	25.2	97.0
7	35.0	531.620	0.53	2.52	73	73	5	319	45.6	97.1
8	40.0	535.930	0.50	2.38	74	74	5	320	53.2	96.9
9	45.0	540.150	0.48	2.28	74	74	5	318	58.3	96.7
10	50.0	544.290	0.46	2.19	75	75	5	317	62.5	96.6
11	55.0	548.380	0.45	2.14	75	75	5	316	66.1	96.4
12	60.0	552.330	0.42	2.00	76	76	5	316	69.4	96.2
Average:			0.451	2.144	67.6	67.6	5.5	315.6		97.7

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Cr^{+6}
Source:	Unit 1	**Run Time:**	08:40 - 10:50

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	1330	dscm/min	46955	dscf/min
	22.16	dscm/sec	783	dscf/sec
	2208	Acm/min	77962	Acf/min
Velocity	14.445	m/sec	47.39	f/sec
Temperature	152.8	oC	307.1	oF
Moisture	9.9	%		
Gas Analysis	10.3	% O2		
	9.6	% CO2		
	29.950	Mol. Wt (g/gmole) Dry		
	28.772	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.9376	dscm	103.741	dscf
Sample Time	120.0	minutes		
Isokineticity	99.3	%		

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Cr+6
Source:	Unit 1	**Run Time:**	08:40 - 10:50

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Cr+6 (grams)	0.00000045		CO2	O2		Impinger 1	-42.0
Pitot Factor	0.8511			Traverse 1	9.75	10.25		Impinger 2	209.0
Baro. Press. (in. Hg)	30.50			Traverse 2	9.50	10.25		Impinger 3	39.0
Static Press. (in. H20)	-19.75	**Total (grams)**	**0.0000005**					Impinger 4	15.0
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	20.0
Minutes Per Reading	5.0				**9.63**	**10.25**		**Gain (grams)**	**241.0**
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	557.400								
1	5.0	560.910	0.33	1.57	45	45	3	302	1.5	100.9
2	10.0	564.130	0.28	1.33	46	46	3	304	4.7	100.3
3	15.0	567.350	0.28	1.33	48	48	3	304	8.4	99.9
4	20.0	570.690	0.30	1.43	46	46	3	304	12.5	100.6
5	25.0	574.140	0.32	1.52	47	47	3	304	17.7	100.4
6	30.0	577.660	0.33	1.57	49	49	3	303	25.2	100.4
7	35.0	582.140	0.54	2.57	50	50	7	304	45.6	100.0
8	40.0	586.530	0.52	2.47	50	50	4	305	53.2	99.9
9	45.0	591.170	0.58	2.76	51	51	4	304	58.3	99.8
10	50.0	595.960	0.62	2.95	52	52	4	305	62.5	99.6
11	55.0	600.480	0.55	2.61	54	54	4	304	66.1	99.2
12	60.0	604.870	0.52	2.47	55	55	4	303	69.4	98.8
Traverse 2	0.0	604.870								
1	5.0	609.000	0.46	2.19	56	56	4	304	1.5	98.6
2	10.0	613.040	0.44	2.09	57	57	4	305	4.7	98.5
3	15.0	617.430	0.52	2.47	56	56	4	310	8.4	99.1
4	20.0	621.920	0.54	2.57	57	57	4	311	12.5	99.3
5	25.0	626.560	0.58	2.76	58	58	4	312	17.7	99.0
6	30.0	631.280	0.60	2.85	59	59	4	313	25.2	98.9
7	35.0	635.770	0.54	2.57	58	58	5	313	45.6	99.3
8	40.0	640.160	0.52	2.47	59	59	5	314	53.2	98.8
9	45.0	644.200	0.44	2.09	60	60	5	312	58.3	98.4
10	50.0	648.590	0.52	2.47	61	61	5	310	62.5	98.1
11	55.0	652.820	0.48	2.28	62	62	5	311	66.1	98.2
12	60.0	656.860	0.44	2.09	62	62	5	309	69.4	97.8
Average:			0.469	2.228	54.1	54.1	4.1	307.1		99.3

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Cr^{+6}
Source:	Unit 1	**Run Time:**	11:32 - 13:40

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	1342	dscm/min	47406	dscf/min
	22.37	dscm/sec	790	dscf/sec
	2221	Acm/min	78436	Acf/min
Velocity	14.533	m/sec	47.68	f/sec
Temperature	154.7	oC	310.5	oF
Moisture	9.1	%		
Gas Analysis	10.5	% O2		
	9.5	% CO2		
	29.940	Mol. Wt (g/gmole) Dry		
	28.850	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.8910	dscm	102.096	dscf
Sample Time	120.0	minutes		
Isokineticity	96.8	%		

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Cr+6
Source:	Unit 1	**Run Time:**	11:32 - 13:40

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Cr+6 (grams)	0.00000043		CO2	O2		Impinger 1	-42.0
Pitot Factor	0.8511			Traverse 1	9.75	10.25		Impinger 2	205.0
Baro. Press. (in. Hg)	30.50			Traverse 2	9.25	10.75		Impinger 3	10.0
Static Press. (in. H20)	-19.75	**Total (grams)**	**0.0000004**					Impinger 4	22.0
Stack Height (ft)	30								
Stack Diameter (in.)	70.90								
Stack Area (sq.ft.)	27.417							Gel	23.0
Minutes Per Reading	5.0				**9.50**	**10.50**		**Gain (grams)**	**218.0**
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	659.600								
1	5.0	663.450	0.40	1.90	59	59	4	312	1.5	97.8
2	10.0	667.400	0.42	2.00	60	60	4	310	4.7	97.7
3	15.0	671.530	0.46	2.19	59	59	4	312	8.4	97.9
4	20.0	675.750	0.48	2.28	60	60	4	312	12.5	97.8
5	25.0	679.970	0.48	2.28	61	61	4	312	17.7	97.6
6	30.0	684.280	0.50	2.38	62	62	5	312	25.2	97.5
7	35.0	688.590	0.50	2.38	62	62	5	312	45.6	97.5
8	40.0	692.980	0.52	2.47	63	63	5	312	53.2	97.2
9	45.0	697.020	0.44	2.09	64	64	5	310	58.3	96.9
10	50.0	700.970	0.42	2.00	64	64	5	309	62.5	96.9
11	55.0	704.820	0.40	1.90	65	65	6	308	66.1	96.5
12	60.0	708.770	0.42	2.00	66	66	6	308	69.4	96.4
Traverse 2	0.0	708.770								
1	5.0	712.110	0.30	1.43	66	66	5	302	1.5	96.0
2	10.0	715.560	0.32	1.52	67	67	5	304	4.7	95.9
3	15.0	719.170	0.35	1.66	67	67	5	308	8.4	96.3
4	20.0	722.920	0.38	1.81	68	68	5	308	12.5	95.8
5	25.0	726.770	0.40	1.90	68	68	5	310	17.7	96.0
6	30.0	730.520	0.38	1.81	67	67	5	314	25.2	96.4
7	35.0	735.417	0.66	3.14	68	68	5	314	45.6	95.6
8	40.0	740.310	0.63	2.99	68	68	6	312	53.2	97.6
9	45.0	745.260	0.66	3.14	69	69	6	313	58.3	96.4
10	50.0	750.210	0.66	3.14	69	69	6	314	62.5	96.5
11	55.0	754.930	0.60	2.85	68	68	6	313	66.1	96.5
12	60.0	759.550	0.57	2.71	69	69	6	312	69.4	96.7
Average:			0.473	2.249	65.0	65.0	5.1	310.5		96.8

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

Sample Type: HF

Parameter		**Test 1**	**Test 2**	**Test 3**
Test Date		15-Nov-22	15-Nov-22	15-Nov-22
Test Time		10:35 - 11:35	12:00 - 13:00	13:18 - 14:18
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.48	30.48	30.48
DGM Factor	(Y)	1.0167	1.0167	1.0167
Initial Reading	(m^3)	86.204	86.811	87.126
Final Reading	(m^3)	86.801	87.116	87.617
Temp. Outlet	(Avg. oF)	57.5	67.3	66.3
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.63	0.32	0.51
HF	(mg)	0.008	0.007	0.003
Oxygen	(Vol. %)	10.6	10.6	9.9
HF	**(mg/Sm^3)**	**0.013**	**0.021**	**0.005**
HF	**(mg/Sm^3 @ 11% O2)**	**0.012**	**0.020**	**0.005**
Moisture	**(Vol. %)**	13.8	13.8	15.2

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:32 - 11:35

Concentrations:

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

Emission Rates:

Particulate	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1242	dscm/min	43875	dscf/min
	20.71	dscm/sec	731	dscf/sec
	2122	Acm/min	74938	Acf/min
Velocity	13.885	m/sec	45.55	f/sec
Temperature	145.3	oC	293.5	oF
Moisture	14.1	%		
Gas Analysis	10.6	% O2		
	9.3	% CO2		
	29.917	Mol. Wt (g/gmole) Dry		
	28.239	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.8449	dscm	100.468	dscf
Sample Time	120.0	minutes		
Isokineticity	101.9	%		

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 2	**Run Time:**	09:32 - 11:35

Control Unit (Y)	1.0014	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3067	Filter (grams)	0.00005		CO2	O2		Impinger 1	232.0
Pitot Factor	0.8506	Washings (grams)	0.00005	Traverse 1	9.33	10.57		Impinger 2	76.0
Baro. Press. (in. Hg)	30.50			Traverse 2	9.33	10.63		Impinger 3	14.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00010**					Impinger 4	8.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	15.0
Minutes Per Reading	5.0				**9.33**	**10.60**		**Gain (grams)**	**350.0**
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	984.328								
1	5.0	987.900	0.41	2.16	46	46	6	292	1.5	95.1
2	10.0	991.740	0.43	2.26	47	47	6	294	4.7	99.8
3	15.0	995.370	0.36	1.89	47	47	7	295	8.4	103.1
4	20.0	998.820	0.33	1.73	48	48	7	297	12.5	102.2
5	25.0	1002.420	0.36	1.89	48	48	7	297	17.7	102.2
6	30.0	1006.120	0.38	1.99	48	48	7	299	25.2	102.4
7	35.0	1010.150	0.45	2.36	49	49	8	298	45.6	102.3
8	40.0	1014.280	0.47	2.47	50	50	8	297	53.2	102.3
9	45.0	1018.540	0.50	2.63	51	51	9	299	58.3	102.3
10	50.0	1022.850	0.51	2.69	52	52	9	298	62.5	102.2
11	55.0	1027.080	0.49	2.59	52	52	9	297	66.1	102.3
12	60.0	1031.230	0.47	2.49	53	53	9	295	69.4	102.1
Traverse 2	0.0	1031.230								
1	5.0	1034.830	0.35	1.86	54	54	7	294	1.5	102.2
2	10.0	1038.380	0.34	1.81	55	55	7	296	4.7	102.2
3	15.0	1041.880	0.33	1.75	55	55	7	297	8.4	102.3
4	20.0	1045.090	0.28	1.48	54	54	7	298	12.5	102.1
5	25.0	1048.320	0.28	1.49	55	55	7	296	17.7	102.4
6	30.0	1051.480	0.27	1.45	56	56	7	292	25.2	101.5
7	35.0	1055.780	0.49	2.64	57	57	9	291	45.6	102.6
8	40.0	1060.250	0.53	2.87	57	57	9	287	53.2	102.3
9	45.0	1064.900	0.57	3.09	58	58	9	286	58.3	102.4
10	50.0	1069.700	0.61	3.31	58	58	9	285	62.5	102.2
11	55.0	1074.600	0.63	3.43	58	58	9	283	66.1	102.5
12	60.0	1079.380	0.60	3.28	59	59	9	281	69.4	102.1
Average:			0.435	2.317	52.8	52.8	7.8	293.5		101.9

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:01 - 14:03

Concentrations:

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

Emission Rates:

Particulate	0.003	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1264	dscm/min	44648	dscf/min
	21.07	dscm/sec	744	dscf/sec
	2134	Acm/min	75367	Acf/min
Velocity	13.965	m/sec	45.82	f/sec
Temperature	143.6	oC	290.5	oF
Moisture	13.4	%		
Gas Analysis	11.2	% O2		
	8.8	% CO2		
	29.861	Mol. Wt (g/gmole) Dry		
	28.270	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7566	dscm	97.350	dscf
Sample Time	120.0	minutes		
Isokineticity	101.4	%		

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 2	**Run Time:**	12:01 - 14:03

Control Unit (Y)	1.0014	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3067	Filter (grams)	0.00005		CO2	O2		Impinger 1	128.0
Pitot Factor	0.8506	Washings (grams)	0.00005	Traverse 1	9.00	11.10		Impinger 2	110.0
Baro. Press. (in. Hg)	30.50			Traverse 2	8.67	11.30		Impinger 3	46.0
Static Press. (in. H20)	-19.00	**Total (grams)**	**0.00010**					Impinger 4	14.0
Stack Height (ft)	30.16							Impinger 5	5.0
Stack Diameter (in.)	70.90							Impinger 6	2.0
Stack Area (sq.ft.)	27.417							Gel	15.5
Minutes Per Reading	5.0				**8.83**	**11.20**		**Gain (grams)**	**320.5**
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	79.709								
1	5.0	83.670	0.42	2.26	57	57	6	290	1.5	101.2
2	10.0	87.750	0.44	2.37	58	58	6	292	4.7	101.8
3	15.0	91.640	0.40	2.16	58	58	6	289	8.4	101.5
4	20.0	95.120	0.32	1.73	58	58	6	288	12.5	101.4
5	25.0	98.380	0.28	1.51	58	58	5	290	17.7	101.6
6	30.0	101.520	0.26	1.40	59	59	5	291	25.2	101.4
7	35.0	105.570	0.43	2.33	60	60	6	289	45.6	101.6
8	40.0	109.850	0.48	2.59	60	60	6	292	53.2	101.9
9	45.0	114.260	0.56	3.03	61	61	7	293	58.3	97.2
10	50.0	118.950	0.58	3.13	62	62	7	295	62.5	101.5
11	55.0	123.750	0.60	3.26	62	62	7	290	66.1	101.8
12	60.0	128.590	0.61	3.33	61	61	7	286	69.4	101.8
Traverse 2	0.0	128.590								
1	5.0	132.750	0.45	2.45	62	62	7	289	1.5	101.6
2	10.0	136.960	0.46	2.51	63	63	7	290	4.7	101.6
3	15.0	140.980	0.42	2.28	63	63	7	292	8.4	101.6
4	20.0	144.750	0.37	2.02	63	63	7	290	12.5	101.3
5	25.0	148.420	0.35	1.91	64	64	6	292	17.7	101.4
6	30.0	152.200	0.37	2.01	64	64	6	295	25.2	101.8
7	35.0	156.280	0.43	2.34	64	64	6	292	45.6	101.8
8	40.0	160.320	0.42	2.29	64	64	6	290	53.2	101.8
9	45.0	164.680	0.49	2.67	64	64	7	291	58.3	101.9
10	50.0	168.980	0.48	2.62	64	64	7	291	62.5	101.5
11	55.0	173.200	0.46	2.51	64	64	8	289	66.1	101.6
12	60.0	177.520	0.48	2.63	63	63	8	286	69.4	101.8
Average:			0.440	2.389	61.5	61.5	6.5	290.5		101.4

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:25 - 16:27

Concentrations:

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

Emission Rates:

Particulate	0.00	Kg/hr	0.006	lb/hr

Flue Gas Characteristics:

Flow	1219	dscm/min	43042	dscf/min
	20.31	dscm/sec	717	dscf/sec
	2061	Acm/min	72801	Acf/min
Velocity	13.489	m/sec	44.26	f/sec
Temperature	145.6	oC	294.0	oF
Moisture	13.2	%		
Gas Analysis	10.3	% O2		
	9.6	% CO2		
	29.946	Mol. Wt (g/gmole) Dry		
	28.371	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.7762	dscm	98.042	dscf
Sample Time	120.0	minutes		
Isokineticity	101.4	%		

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

Client:	Metro Vancouver	**Date:**	18-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 2	**Run Time:**	14:25 - 16:27

Control Unit (Y)	1.0014
Nozzle Diameter (in.)	0.3067
Pitot Factor	0.8506
Baro. Press. (in. Hg)	30.50
Static Press. (in. H20)	-19.00
Stack Height (ft)	30
Stack Diameter (in.)	70.90
Stack Area (sq.ft.)	27.417
Minutes Per Reading	5.0
Minutes Per Point	5.0

Collection:	
Filter (grams)	0.00005
Washings (grams)	0.00005
Total (grams)	**0.0001**

Gas Analysis (Vol. %):		
	CO2	O2
Traverse 1	9.83	10.00
Traverse 2	9.33	10.63
	9.58	**10.32**

Condensate Collection:	
Impinger 1	150.0
Impinger 2	108.0
Impinger 3	26.0
Impinger 4	10.0
Impinger 5	4.0
Impinger 6	2.0
Gel	16.4
Gain (grams)	**316.4**

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	178.100								
1	5.0	181.380	0.28	1.52	63	63	5	292	1.5	101.3
2	10.0	184.700	0.29	1.57	63	63	5	293	4.7	100.8
3	15.0	187.970	0.27	1.47	63	63	5	291	8.4	102.7
4	20.0	190.890	0.23	1.25	63	63	5	290	12.5	99.3
5	25.0	193.990	0.25	1.36	64	64	5	295	17.7	101.3
6	30.0	197.150	0.26	1.41	65	65	5	298	25.2	101.2
7	35.0	201.540	0.50	2.71	65	65	6	296	45.6	101.6
8	40.0	206.010	0.52	2.82	65	65	6	297	53.2	101.5
9	45.0	210.730	0.58	3.15	65	65	6	296	58.3	101.5
10	50.0	215.560	0.60	3.27	66	66	6	294	62.5	101.9
11	55.0	220.520	0.63	3.45	66	66	6	291	66.1	101.9
12	60.0	225.380	0.61	3.34	65	65	6	288	69.4	101.5
Traverse 2	0.0	225.380								
1	5.0	228.900	0.32	1.74	66	66	6	294	1.5	101.3
2	10.0	232.480	0.33	1.79	66	66	6	296	4.7	101.6
3	15.0	235.880	0.30	1.63	66	66	6	298	8.4	101.3
4	20.0	239.160	0.28	1.52	66	66	6	299	12.5	101.2
5	25.0	242.390	0.27	1.47	67	67	6	297	17.7	101.1
6	30.0	245.630	0.27	1.47	67	67	6	296	25.2	101.4
7	35.0	249.800	0.45	2.45	66	66	7	295	45.6	101.4
8	40.0	254.230	0.51	2.77	65	65	7	294	53.2	101.4
9	45.0	258.850	0.55	3.00	66	66	7	293	58.3	101.6
10	50.0	263.580	0.58	3.16	65	65	7	292	62.5	101.5
11	55.0	268.400	0.60	3.28	65	65	8	291	66.1	101.6
12	60.0	273.090	0.57	3.11	64	64	8	290	69.4	101.6
Average:			0.419	2.280	65.1	65.1	3.0	294.0		101.4

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

Sample Type: HF

Parameter		**Test 1**	**Test 2**	**Test 3**
Test Date		18-Nov-22	18-Nov-22	18-Nov-22
Test Time		10:28 - 11:28	11:35 - 12:35	14:42 - 13:42
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.50	30.50	30.50
DGM Factor	(Y)	1.0167	1.0167	1.0167
Initial Reading	(m^3)	89.710	90.317	90.844
Final Reading	(m^3)	90.315	90.840	91.394
Temp. Outlet	(Avg. oF)	48.3	58.3	61.3
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.65230	0.55272	0.57801
HF	(mg)	0.006	0.003	0.003
Oxygen	(Vol. %)	11.2	10.3	10.3
HF	**(mg/Sm^3)**	**0.010**	**0.005**	**0.005**
HF	**(mg/Sm^3 @ 11% O2)**	**0.010**	**0.004**	**0.004**
Moisture (isokinetic)	**(Vol. %)**	13.4	13.4	13.2

*Wet Basis Calculated on moisture from isokinetic tests

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

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:05 - 14:08

Concentrations:

Particulate	0.83	mg/dscm	0.00036	gr/dscf
	0.47	mg/Acm	0.00021	gr/Acf
	0.75	mg/dscm (@ 11% O2)	0.00033	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.052	Kg/hr	0.116	lb/hr

Flue Gas Characteristics:

Flow	1057	dscm/min	37337	dscf/min
	17.62	dscm/sec	622	dscf/sec
	1848	Acm/min	65255	Acf/min
Velocity	12.091	m/sec	39.67	f/sec
Temperature	149.1	oC	300.3	oF
Moisture	15.2	%		
Gas Analysis	10.0	% O2		
	10.0	% CO2		
	30.000	Mol. Wt (g/gmole) Dry		
	28.179	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.4171	dscm	85.361	dscf
Sample Time	120.0	minutes		
Isokineticity	102.7	%		

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

Client:	Metro Vancouver	**Date:**	15-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	1 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:05 - 14:08

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**		**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Filter (grams)	0.00090		CO2	O2	Impinger 1	232.0
Pitot Factor	0.8511	Washings (grams)	0.00110	Traverse 1	10.00	10.00	Impinger 2	56.0
Baro. Press. (in. Hg)	30.50			Traverse 2	10.00	10.00	Impinger 3	14.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00200**				Impinger 4	6.0
Stack Height (ft)	30						Impinger 5	3.0
Stack Diameter (in.)	70.90						Impinger 6	1.0
Stack Area (sq.ft.)	27.417						Gel	12.5
Minutes Per Reading	5.0				**10.00**	**10.00**	**Gain (grams)**	**324.5**
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	177.850								
1	5.0	181.870	0.42	2.03	52	52	4	302	1.5	106.3
2	10.0	186.030	0.45	2.18	54	54	4	304	4.7	106.0
3	15.0	190.340	0.48	2.32	54	54	5	304	8.4	106.4
4	20.0	194.370	0.42	2.03	54	54	5	304	12.5	106.3
5	25.0	198.590	0.48	2.32	54	54	6	303	17.7	104.1
6	30.0	202.380	0.39	1.85	54	54	6	304	25.2	103.7
7	35.0	205.430	0.25	1.19	56	56	6	304	45.6	103.6
8	40.0	208.290	0.22	1.05	56	56	6	303	53.2	103.5
9	45.0	211.010	0.20	0.95	58	58	6	302	58.3	102.7
10	50.0	213.740	0.20	0.95	59	59	6	302	62.5	102.9
11	55.0	216.330	0.18	0.90	60	60	6	302	66.1	102.7
12	60.0	218.840	0.17	0.81	62	62	6	301	69.4	101.9
Traverse 2	0.0	218.840								
1	5.0	221.950	0.26	1.24	62	62	6	300	1.5	102.2
2	10.0	225.170	0.28	1.33	62	62	6	300	4.7	102.0
3	15.0	228.390	0.28	1.33	64	64	6	299	8.4	101.5
4	20.0	231.250	0.22	1.05	64	64	6	299	12.5	101.6
5	25.0	234.110	0.22	1.05	65	65	6	298	17.7	101.4
6	30.0	237.090	0.24	1.14	66	66	6	298	25.2	101.0
7	35.0	240.940	0.40	1.90	66	66	6	297	45.6	101.2
8	40.0	244.920	0.43	2.04	66	66	6	297	53.2	100.9
9	45.0	248.870	0.42	2.00	68	68	7	297	58.3	100.9
10	50.0	252.820	0.42	2.00	68	68	7	296	62.5	100.9
11	55.0	256.860	0.44	2.09	68	68	8	296	66.1	100.8
12	60.0	260.900	0.44	2.09	69	69	8	295	69.4	100.6
Average:			0.330	1.577	60.9	60.9	6.0	300.3		102.7

Client:	Metro Vancouver	**Date:**	16-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:56 - 11:57

Concentrations:

Particulate	3.40	mg/dscm	0.00149	gr/dscf
	1.93	mg/Acm	0.00084	gr/Acf
	3.11	mg/dscm (@ 11% O2)	0.00136	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.237	Kg/hr	0.522	lb/hr

Flue Gas Characteristics:

Flow	1160	dscm/min	40967	dscf/min
	19.33	dscm/sec	683	dscf/sec
	2047	Acm/min	72292	Acf/min
Velocity	13.395	m/sec	43.95	f/sec
Temperature	152.5	oC	306.4	oF
Moisture	15.4	%		
Gas Analysis	10.1	% O2		
	9.8	% CO2		
	29.977	Mol. Wt (g/gmole) Dry		
	28.129	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6775	dscm	94.554	dscf
Sample Time	120.0	minutes		
Isokineticity	103.8	%		

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

Client:	Metro Vancouver	**Date:**	16-Nov-22
Jobsite:	WTE (Burnaby, B.C)	**Run:**	2 - Particulate / Metals
Source:	Unit 3	**Run Time:**	09:56 - 11:57

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**		**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Filter (grams)	0.00740		CO2	O2	Impinger 1	220.0
Pitot Factor	0.8506	Washings (grams)	0.00170	Traverse 1	9.67	10.10	Impinger 2	100.0
Baro. Press. (in. Hg)	30.54			Traverse 2	10.00	10.07	Impinger 3	18.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00910**				Impinger 4	8.0
Stack Height (ft)	30						Impinger 5	3.0
Stack Diameter (in.)	70.90						Impinger 6	2.0
Stack Area (sq.ft.)	27.417						Gel	15.5
Minutes Per Reading	5.0				**9.83**	**10.08**	**Gain (grams)**	**366.5**
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	261.878								
1	5.0	265.250	0.31	1.47	50	50	4	295	1.5	103.9
2	10.0	268.720	0.33	1.56	51	51	4	298	4.7	103.7
3	15.0	272.350	0.36	1.70	51	51	4.5	299	8.4	103.9
4	20.0	275.770	0.32	1.52	52	52	4.5	300	12.5	103.7
5	25.0	279.260	0.33	1.58	53	53	4	295	17.7	103.6
6	30.0	282.700	0.32	1.53	53	53	4	294	25.2	103.7
7	35.0	287.100	0.53	2.51	54	54	4.5	304	45.6	103.8
8	40.0	291.660	0.57	2.68	55	55	4.5	310	53.2	103.9
9	45.0	296.280	0.58	2.73	56	56	4.5	311	58.3	104.3
10	50.0	300.740	0.54	2.55	58	58	4.5	312	62.5	103.9
11	55.0	305.060	0.50	2.38	59	59	5	306	66.1	104.0
12	60.0	308.990	0.41	1.96	61	61	5	305	69.4	103.9
Traverse 2	0.0	308.990								
1	5.0	313.420	0.52	2.47	63	63	5	313	1.5	104.2
2	10.0	317.890	0.53	2.53	64	64	5	312	4.7	103.9
3	15.0	322.280	0.51	2.44	65	65	5	312	8.4	103.8
4	20.0	326.760	0.53	2.53	65	65	5	312	12.5	104.0
5	25.0	331.250	0.53	2.54	66	66	5	311	17.7	103.9
6	30.0	335.480	0.47	2.25	66	66	5	313	25.2	104.0
7	35.0	339.090	0.34	1.63	67	67	5	311	45.6	103.9
8	40.0	342.300	0.27	1.30	68	68	5	310	53.2	103.3
9	45.0	345.420	0.25	1.21	69	69	5	309	58.3	104.1
10	50.0	348.200	0.20	0.97	69	69	5	308	62.5	103.6
11	55.0	350.980	0.20	0.97	69	69	4	308	66.1	103.6
12	60.0	353.620	0.18	0.87	69	69	4	306	69.4	103.5
Average:			0.401	1.912	60.5	60.5	4.6	306.4		103.8

Client:	Metro Vancouver	**Date:**	16-Nov-22
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:22 - 14:23

Concentrations:

Particulate	3.57	mg/dscm	0.00156	gr/dscf
	2.05	mg/Acm	0.00089	gr/Acf
	3.39	mg/dscm (@ 11% O2)	0.00148	gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.246	Kg/hr	0.542	lb/hr

Flue Gas Characteristics:

Flow	1147	dscm/min	40493	dscf/min
	19.11	dscm/sec	675	dscf/sec
	2000	Acm/min	70641	Acf/min
Velocity	13.089	m/sec	42.94	f/sec
Temperature	155.7	oC	312.3	oF
Moisture	13.8	%		
Gas Analysis	10.5	% O2		
	9.3	% CO2		
	29.913	Mol. Wt (g/gmole) Dry		
	28.269	Mol. Wt (g/gmole) Wet		

Sample Parameters:

Sample Volume	2.6038	dscm	91.952	dscf
Sample Time	120.0	minutes		
Isokineticity	102.1	%		

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

Client:	Metro Vancouver	**Date:**	16-Nov-22
Jobsite:	WTE(Burnaby,B.C)	**Run:**	3 - Particulate / Metals
Source:	Unit 3	**Run Time:**	12:22 - 14:23

Control Unit (Y)	0.9909	**Collection:**			**Gas Analysis (Vol. %):**			**Condensate Collection:**	
Nozzle Diameter (in.)	0.3053	Filter (grams)	0.00610		CO2	O2		Impinger 1	216.0
Pitot Factor	0.8506	Washings (grams)	0.00320	Traverse 1	9.17	10.77		Impinger 2	62.0
Baro. Press. (in. Hg)	30.54			Traverse 2	9.50	10.20		Impinger 3	12.0
Static Press. (in. H20)	-19.50	**Total (grams)**	**0.00930**					Impinger 4	6.0
Stack Height (ft)	30							Impinger 5	3.0
Stack Diameter (in.)	70.90							Impinger 6	1.0
Stack Area (sq.ft.)	27.417							Gel	12.7
Minutes Per Reading	5.0				**9.33**	**10.48**		**Gain (grams)**	**312.7**
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	356.302								
1	5.0	360.620	0.49	2.34	66	66	3	313	1.5	102.3
2	10.0	364.980	0.50	2.39	66	66	3	314	4.7	102.4
3	15.0	369.460	0.53	2.53	66	66	4	315	8.4	102.3
4	20.0	373.730	0.48	2.29	67	67	4	315	12.5	102.2
5	25.0	378.040	0.49	2.34	66	66	5	314	17.7	102.2
6	30.0	382.040	0.42	2.01	67	67	5	313	25.2	102.1
7	35.0	385.440	0.30	1.44	68	68	4	312	45.6	102.3
8	40.0	388.600	0.26	1.25	69	69	4	313	53.2	102.0
9	45.0	391.700	0.25	1.20	69	69	5	313	58.3	102.0
10	50.0	394.420	0.19	0.92	70	70	5	307	62.5	102.0
11	55.0	397.080	0.18	0.88	70	70	5	302	66.1	102.1
12	60.0	399.590	0.16	0.79	70	70	5	297	69.4	101.9
Traverse 2	0.0	399.590								
1	5.0	403.160	0.33	1.59	69	69	4	310	1.5	102.1
2	10.0	406.830	0.35	1.69	70	70	4	312	4.7	101.9
3	15.0	410.340	0.32	1.54	70	70	4	316	8.4	102.2
4	20.0	413.750	0.30	1.44	71	71	4	316	12.5	102.3
5	25.0	417.050	0.28	1.35	71	71	4	316	17.7	102.4
6	30.0	420.620	0.33	1.59	71	71	4	315	25.2	102.1
7	35.0	425.230	0.55	2.65	72	72	4	316	45.6	102.2
8	40.0	429.880	0.56	2.70	72	72	4	316	53.2	102.2
9	45.0	434.370	0.52	2.52	73	73	5	314	58.3	102.0
10	50.0	438.750	0.49	2.38	74	74	5	313	62.5	102.3
11	55.0	443.170	0.50	2.43	74	74	5	312	66.1	102.1
12	60.0	447.120	0.40	1.95	74	74	5	311	69.4	101.8
Average:			0.383	1.842	69.8	69.8	4.3	312.3		102.1

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

Sample Type: HF

Parameter		**Test 1**	**Test 2**	**Test 3**
Test Date		16-Nov-22	16-Nov-22	16-Nov-22
Test Time		10:12 - 11:12	11:23 - 12:23	12:34 - 13:34
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.54	30.54	30.54
DGM Factor	(Y)	1.0167	1.0167	1.0167
Initial Reading	(m^3)	87.630	88.248	88.824
Final Reading	(m^3)	88.240	88.818	89.461
Temp. Outlet	(Avg. oF)	54.7	59.3	60.7
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm^3)	0.65023	0.60245	0.67076
HF	(mg)	0.003	0.003	0.011
Oxygen	(Vol. %)	10.1	10.1	10.5
HF	**(mg/Sm^3)**	**0.004**	**0.004**	**0.016**
HF	**(mg/Sm^3 @ 11% O2)**	**0.004**	**0.004**	**0.015**
Moisture (isokinetic)	**(Vol. %)**	15.4	15.4	13.8

*Wet Basis Calculated on moisture from isokinetic tests

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

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

Parameter: N_2O

Molecular Weight: 44.0 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	16-Nov-22	10:35-11:35	1.5	2.7	2.6
Unit 1 - Run 2	16-Nov-22	12:00-13:00	0.0	0.2	0.2
Unit 1 - Run 3	16-Nov-22	13:15-14:15	0.0	0.2	0.2
Average					**1.0**
Unit 2 - Run 1	18-Nov-22	10:40-11:40	2.0	3.7	3.4
Unit 2 - Run 2	18-Nov-22	11:41-12:41	0.0	0.2	0.2
Unit 2 - Run 3	18-Nov-22	12:42-13:42	1.0	1.8	1.8
Average					**1.8**
Unit 3 - Run 1	16-Nov-22	10:00-11:00	1.0	1.8	1.8
Unit 3 - Run 2	16-Nov-22	11:02-12:02	1.0	1.8	1.8
Unit 3 - Run 3	16-Nov-22	12:05-13:05	0.0	0.2	0.2
Average					**1.3**

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

Parameter: Multiple VOCs

Date:	**15-Nov-22**			**18-Nov-22**			**16-Nov-22**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	10:35 - 11:35	12:00 - 13:00	13:18 - 14:18	10:28 - 11:28	11:35 - 12:35	12:42 - 13:42	10:12 - 11:12	11:23 - 12:23	12:34 - 13:34
Methane	1.30	1.30	ND	1.8	3.4	ND	ND	3.50	1.9
Ethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3 as Propane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4 as n-Butane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5 as n-Pentane	1.4	ND	1.3	ND	ND	ND	ND	1.8	ND
C6 as n-Hexane	1.7	ND	0.92	ND	ND	ND	ND	ND	ND
C6+ as n-Hexane	3.4	ND	ND	ND	ND	ND	ND	ND	ND
Detection Limits:									
Methane	1.6	1.4	1.5	1.5	1.6	1.5	1.5	1.3	1.7
Ethane	0.48	0.43	0.44	0.46	0.47	0.45	0.46	0.39	0.50
Ethene	0.48	0.43	0.44	0.46	0.47	0.45	0.46	0.39	0.50
C3 as Propane	0.80	0.72	0.74	0.77	0.79	0.75	0.76	0.65	0.83
C4 as n-Butane	0.80	0.72	0.74	0.77	0.79	0.75	0.76	0.65	0.83
C5 as n-Pentane	0.80	0.72	0.74	0.77	0.79	0.75	0.76	0.65	0.83
C6 as n-Hexane	0.80	0.72	0.74	0.77	0.79	0.75	0.76	0.65	0.83
C6+	1.6	1.4	1.5	1.5	1.6	1.5	1.5	1.3	1.7

Using 1/2 DL Convention

Sample Date:	**15-Nov-22**			**18-Nov-22**			**16-Nov-22**		
	Unit 1			**Unit 2**			**Unit 3**		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Test Times:	10:35 - 11:35	12:00 - 13:00	13:18 - 14:18	10:28 - 11:28	11:35 - 12:35	12:42 - 13:42	10:12 - 11:12	11:23 - 12:23	12:34 - 13:34
Methane (ppm)	1.30	1.30	0.75	1.80	3.40	0.75	0.75	3.50	1.90
Ethane (ppm)	0.24	0.22	0.22	0.23	0.24	0.23	0.23	0.20	0.25
Ethene (ppm)	0.24	0.22	0.22	0.23	0.24	0.23	0.23	0.20	0.25
C3 as Propane (ppm)	0.40	0.36	0.37	0.39	0.40	0.38	0.38	0.33	0.42
C4 as n-Butane (ppm)	0.40	0.36	0.37	0.39	0.40	0.38	0.38	0.33	0.42
C5 as n-Pentane (ppm)	1.40	0.36	1.30	0.39	0.40	0.38	0.38	1.80	0.42
C6 as n-Hexane (ppm)	1.70	0.36	0.92	0.39	0.40	0.38	0.38	0.33	0.42
C6+ as n-Hexane (ppm)	3.40	0.70	0.75	0.75	0.80	0.75	0.75	0.65	0.85
Methane (mg/m^3 as CH_4)	0.87	0.87	0.50	1.20	2.27	0.50	0.50	2.34	1.27
Ethane (mg/m^3 as CH_4)	0.16	0.14	0.15	0.15	0.16	0.15	0.15	0.13	0.17
Ethene (mg/m^3 as CH_4)	0.16	0.14	0.15	0.15	0.16	0.15	0.15	0.13	0.17
C3 as Propane (mg/m^3 as CH_4)	0.27	0.24	0.25	0.26	0.26	0.25	0.25	0.22	0.28
C4 as n-Butane (mg/m^3 as CH_4)	0.27	0.24	0.25	0.26	0.26	0.25	0.25	0.22	0.28
C5 as n-Pentane (mg/m^3 as CH_4)	0.93	0.24	0.87	0.26	0.26	0.25	0.25	1.20	0.28
C6 as n-Hexane (mg/m^3 as CH_4)	1.13	0.24	0.61	0.26	0.26	0.25	0.25	0.22	0.28
C6+ as n-Hexane (mg/m^3 as CH_4)	2.27	0.47	0.50	0.50	0.53	0.50	0.50	0.43	0.57
Total mg/Sm^3 @11% O_2 as CH_4	4.25	1.91	2.42	2.11	2.73	1.64	1.54	3.56	2.30

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.

CLIENT	MU
SOURCE	Unit #1
PARAMETER / RUN No	Metals / R1
DATE	11.14.22
OPERATOR:	JG + CD
CONTROL UNIT	CAE G105 Y .9962 ΔH@ 1.733
BAROMETRIC PRESSURE, IN. Hg	30.36
ASSUMED MOISTURE, Bw	13%

NOZZLE	MU01 DIAMETER, IN. .3053
PROBE	7C Cp .8511
PORT LENGTH	
STATIC PRESSURE, IN. H2O	-1.9
STACK DIAMETER	
STACK HEIGHT	
INITIAL LEAK TEST	.001 @ 15"
FINAL LEAK TEST	.001 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	166	166
Imp. #2	100	218	118
Imp. #3	100	156	56
Imp. #4	0	10	10
Imp. #5	100	104	4
Imp. #6	100	102	2

Upstream Diameters

Downstream Diameters

test 0 #2

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	12:07	20.878										
1	5	24.92	.42	2.12	61	300	257	251	59	5.5		
2	10	29.10	.45	2.27	61	302						
3	15	33.24	.44	2.22	61	300	252	252	59	5.5	9.5	10.6
4	20	37.35	.43	2.19	62	295						
5	25	41.32	.40	2.04	62	293	250	252	59	6.0		
6	30	45.14	.37	1.90	62	291						
7	35	49.98	.59	3.03	63	290	251	250	59	7.0		
8	40	54.91	.61	3.15	64	289						
9	45	59.73	.58	3.00	65	289	249	251	59	8.0	9.0	10.1
10	50	64.48	.56	2.91	66	287						
11	55	69.27	.57	2.96	66	287						
12	60	74.08	.57	2.97	67	286	250	251	58	8.0		
1	5	78.46	.47	2.46	67	282	257	250	58	6.0		
2	10	82.69	.44	2.30	67	282					9.4	10.6
3	15	87.02	.46	2.41	67	283	249	250	57	7.0		
4	20	91.79	.45	2.34	67	286						
5	25	95.62	.46	2.40	68	286	257	251	57	8.0		
6	30	99.85	.44	2.29	68	288						
7	35	104.36	.50	2.60	69	290	252	253	57	8.5		
8	40	109.04	.54	2.80	69	292					9.5	10.7
9	45	113.64	.52	2.70	69	290	256	250	57	9.0		
10	50	118.28	.53	2.76	69	290						
11	55	122.51	.44	2.29	69	290	249	249	57	9.0		
12		126.640	.42	2.18	69	291						
	14:11	END test										

A. Lanfranco and Associates Inc.

CLIENT MV					NOZZLE G-3072 DIAMETER, IN. .3083					IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)				
SOURCE Unit #1					PROBE 7ft Guard-1 Cp .8506					Imp. #1	0	158	158				
PARAMETER / RUN No Metals 1&2					PORT LENGTH					Imp. #2	100	214	114				
DATE 11.15.22					STATIC PRESSURE, IN. H2O -.8					Imp. #3	100	134	34				
OPERATOR: TG + CD + JS					STACK DIAMETER					Imp. #4	0						
CONTROL UNIT CAE G10.5 Y .9962 ΔH@ 1.723					STACK HEIGHT					Imp. #5	100	103	3				
BAROMETRIC PRESSURE, IN. Hg 30.48					INITIAL LEAK TEST .002 @ 15"					Imp. #6	100	101	1				
ASSUMED MOISTURE, Bw 13%					FINAL LEAK TEST .002 @ 15"					Upstream Diameters							
										Downstream Diameters							
										testo 3[illegible].2							
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. %					
	10:02	127.845															
1	5	131.42	.33	1.71	50	295	250	251	54	7.0							
2	10	135.10	.35	1.81	50	296					9.0	10.5					
3	15	138.78	.35	1.81	50	296	251	252	54	8.0							
4	20	142.77	.41	2.12	50	295											
5	25	146.72	.40	2.07	51	295	250	249	54	8.0							
6	30	150.63	.39	2.03	52	294											
7	35	154.66	.42	2.18	54	297	250	250	54	9.0							
8	40	158.56	.44	2.30	55	296											
9	45	162.48	.43	2.24	56	299	251	252	54	8.5	9.5	10.8					
10	50	166.37	.40	2.10	57	295											
11	55	170.22	.39	2.04	54	297	252	253	55	8.5							
IV	60	174.16	.37	1.94	58	297											
1	5	178.73	.39	2.06	60	295	250	249	54	9.0							
2	10	182.66	.37	1.95	61	296											
3	15	186.36	.35	1.85	61	296	251	252	55	9.5	9.0	10.4					
4	20	190.21	.33	1.74	61	297											
5	25	193.83	.36	1.90	62	296	250	249	54	10.0							
6	30	197.60	.35	1.85	62	296											
7	35	201.92	.46	2.43	63	298	251	248	54	10.0							
8	40	206.72	.45	2.39	65	297											
9	45	210.61	.47	2.50	65	297	252	254	54	9.5	9.4	10.7					
10	50	214.67	.40	2.13	65	295											
11	55	218.67	.39	2.07	65	296	254	255	57	8.0							
IV		222.632	.38	2.03	66	295											
	12:06	END Test															

A. Lanfranco and Associates Inc.

CLIENT	MU	NOZZLE	G-
SOURCE	Unit #1	DIAMETER, IN.	.3083
PARAMETER / RUN No	Metals 1R3	PROBE	7AL GUPD1
DATE	11.15.22	Cp	.8506
OPERATOR:	JGT CD + DS	PORT LENGTH	
CONTROL UNIT	CAE 6105	STATIC PRESSURE, IN. H2O	-19
Y	.9962	STACK DIAMETER	
ΔH@	1.733	STACK HEIGHT	
BAROMETRIC PRESSURE, IN. Hg	30.48	INITIAL LEAK TEST	.000@15"
ASSUMED MOISTURE, Bw	13%	FINAL LEAK TEST	.000@15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	230	230
Imp. #2	100	182	82
Imp. #3	100	116	16
Imp. #4	0	6	6
Imp. #5	100	102	2
Imp. #6	100	101	1

Upstream Diameters

Downstream Diameters

te to ~~[illegible]~~ 2

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	12:47	226.297										
1	5	230.25	.38	2.03	63	290	250	252	58	7.0		
2	10	234.15	.37	1.98	63	290						
3	15	237.94	.35	1.86	63	292	252	257	58	7.0	8.9	9.8
4	20	241.61	.33	1.75	63	295						
5	25	245.45	.36	1.91	64	295	249	252	58	7.5		
6	30	249.41	.38	2.03	64	290						
7	35	253.67	.44	2.36	64	289	250	251	58	7.5		
8	40	257.60	.37	2.00	65	284						
9	45	261.37	.34	1.84	65	284	252	252	58	7.5		
10		265.25	.36	1.95	65	284					9.0	10.0
11		269.18	.37	2.00	65	285	250	250	58	8.0		
12		273.00	.35	1.88	66	285						
1		276.77	.34	1.84	66	285	257	253	58	8.0		
2		280.60	.35	1.89	67	287					8.9	9.9
3		284.43	.35	1.89	67	288	252	253	58	8.0		
4		288.53	.40	2.16	68	288						
5		292.57	.39	2.10	68	290	251	252	54	8.5		
6		296.66	.40	2.15	68	292					9.0	10.0
7		300.86	.42	2.27	69	290	252	257	54	9.0		
8		305.16	.44	2.38	69	290						
9		309.41	.43	2.32	70	292	250	249	55	8.5		
10		313.51	.40	2.16	70	292						
11		317.56	.37	2.16	71	295	252	249	54	9.0		
12		321.570	.37	2.00	71	294						
	14:52	END test										

√6.09 4.75ΔH

A. Lanfranco and Associates Inc.

CLIENT	MURD	NOZZLE MV01	DIAMETER, IN. .3803
SOURCE	Unit #1	PROBE PC	Cp .8521
PARAMETER / RUN No	C-+6 Run 1		
DATE	Nov. 17/22	PORT LENGTH	
OPERATOR:	AL	STATIC PRESSURE, IN. H2O	-19.00
CONTROL UNIT	AUS Y 99.09	STACK DIAMETER	70.90
	ΔH@	STACK HEIGHT	30'
BAROMETRIC PRESSURE, IN. Hg	30.28		
ASSUMED MOISTURE, Bw	15%	INITIAL LEAK TEST	0.008 @ 15"
		FINAL LEAK TEST	0.006 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	150	110	-40
Imp. #2	75	285	210
Imp. #3	75	110	35
Imp. #4			
Imp. #5			
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		458.27	.28	1.33	59	305	N/A	N/A	58	6				
2		461.62	.30	1.43	60	307					9.50	10.50		
3		464.84	.28	1.33	60	308			56	6				
4		468.06	.28	1.33	62	306								
5	Stop 12:30 Start 13:40	471.17	.26	1.24	61	303			60	6				
6		474.28	.26	1.24	62	302								
7		478.59	.30	1.39	64	316			62	6	10.0	10.0		
8		483.47	.41	1.91	66	320								
9		488.28	.42	1.95	64	322			62	6				
10		492.99	.42	1.95	66	320								
11		497.77	.42	1.95	66	322			62	6				
12		502.49	.40	1.85	67	322								
1		506.62	.46	2.19	68	319	N/A	N/A	60	5				
2		510.57	.42	2.00	69	320					10.0	10.0		
3		514.61	.44	2.09	69	320			58	5				
4		518.62	.50	2.38	70	319								
5		522.64	.48	2.28	71	319			57	5				
6		527.18	.44	2.09	72	318								
7		531.62	.53	2.52	73	317			58	5				
8		535.66	.50	2.38	74	318					10.0	10.5		
9		540.15	.48	2.28	74	318			57	5				
10		544.39	.46	2.19	75	317								
11		548.38	.45	2.14	75	316			57	5				
12	15:10	552.35	.42	2.00	76	316								

√6.09 4.75ΔH

A. Lanfranco and Associates Inc.

CLIENT MVRD	NOZZLE MN9	DIAMETER, IN. .355	
SOURCE Unit #1	PROBE PC	Cp .851	
PARAMETER / RUN No Cr+6 Run 2			
DATE Nov. 18 '22	PORT LENGTH		
OPERATOR: CAL FB.L	STATIC PRESSURE, IN. H2O -19.475		
CONTROL UNIT AV 15 Y .9909	STACK DIAMETER 70.90		
ΔH@	STACK HEIGHT 30		
BAROMETRIC PRESSURE, IN. Hg 30.50			
ASSUMED MOISTURE, Bw 15%	INITIAL LEAK TEST 0.0100 @ 15"		
	FINAL LEAK TEST 0.008 @ 15"		

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	150	108	-42
Imp. #2	75	284	209
Imp. #3	75	114	39
Imp. #4			
Imp. #5			
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	08:40	557.400	.33	1.57	45	302	N/A	N/A	42	3				
2		561.13	.28	1.33	46	304								
3		564.35	.28	1.33	48	304			42	3	9.5	10.5		
4		570.69	.30	1.43	46	304								
5		574.14	.32	1.52	47	304			42	3				
6		577.66	.35	1.67	49	303								
7		582.14	.54	2.57	50	304			44	4				
8		586.53	.52	2.47	50	305								
9		591.17	.58	2.76	51	304			46	4	10.0	10.0		
10		595.46	.62	2.95	52	307								
11		600.48	.55	2.61	54	304			46					
12		604.87	.52	2.47	55	303								
1		609.09	.46	2.19	56	304	N/A	N/A	45	4				
2		613.01	.44	2.09	57	305								
3		617.45	.52	2.47	56	310			46	4	9.5	10.0		
4		621.92	.54	2.57	57	311								
5		626.56	.58	2.76	58	312			48	4				
6		631.20	.60	2.85	59	313								
7		635.77	.54	2.57	58	313			50	5				
8		640.16	.52	2.47	59	314								
9		644.29	.44	2.09	60	312			52	5				
10		648.59	.52	2.47	61	310					9.5	10.5		
11		652.82	.46	2.28	62	311			50	5				
12	10:50	656.86	.44	2.09	62	309								

√6.09   4.75 ΔH

A. Lanfranco and Associates Inc.

CLIENT	mwep	NOZZLE	MW@1
SOURCE	Unit #1	DIAMETER, IN.	.353
PARAMETER / RUN No	C+6 Run 3	PROBE	7ft
DATE	Nov. 18/22	Cp	.854
OPERATOR:	CL & BL	PORT LENGTH	
CONTROL UNIT	AU 13	STATIC PRESSURE, IN. H2O	-19.75
Y	.9909	STACK DIAMETER	70.40"
ΔH@		STACK HEIGHT	30'
BAROMETRIC PRESSURE, IN. Hg	30.50	INITIAL LEAK TEST	0.010 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.010 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	150	108	-42
Imp. #2	75	280	205
Imp. #3	75	85	10
Imp. #4			
Imp. #5			
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. %	O_2 Vol. %
	11:32	659.600										
1		663.45	.40	1.90	59	312	N/A	N/A	44	4		
2		667.40	.42	2.00	60	310						
3		671.53	.46	2.19	59	312						
4		675.75	.48	2.28	60	312			46	4	9.5	10.5
5		679.97	.48	2.28	61	312						
6		684.25	.50	2.38	62	310			46	4		
7		688.51	.50	2.38	62	312						
8		692.98	.52	2.47	63	312			50	5		
9		697.03	.44	2.09	64	310						
10		700.97	.42	2.00	64	309			50	5	10.0	10.0
11		704.83	.40	1.90	65	308						
12		708.77	.42	2.00	66	308			52	6		
1		712.11	.30	1.43	66	302	N/A	N/A				
2		715.56	.32	1.52	67	304			49	5		
3		719.17	.35	1.66	67	308						
4		722.95	.38	1.81	68	308			48	5		
5		726.77	.40	1.90	68	310						
6		730.52	.38	1.81	67	314			48	5	9.5	10.5
7		735.27	.66	3.14	68	314						
8		740.31	.63	3.00	68	312			50	5		
9		745.26	.66	3.14	69	313						
10		750.21	.66	3.14	69	314			52	6		
11		754.93	.60	2.85	68	313						
12	13:40	759.55	.57	2.71	69	312			52	6	9.0	11.0

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Client	COVANTA	Y	LMU-D = 1.0167	Client		Y	
Source	Unit #1	Cp		Source		Cp	
Parameter	HF	Pbar	30.48	Static		Parameter		Pbar		Static	
Date	15-Nov-22	Operator	Christian	Date		Operator	

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

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

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	10:35	86.2041	51					
	10:45	86.4232	54					
	10:55	86.5718						
			61					
	11:05	86.7017						
	11:35	86.8010	64					
2	12:00	86.8806	65					
	10	~~87~~						
	20							
	30	86.9788	68					
	40							
	50							
	13:00	87.1163	69					
3	13:18	87.1261	63					
		87.1876						
		87.2432						
	13:49	87.3300	67					
		87.4218						
		87.5152						
	14:18	87.6169	69					

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								
2								
3								

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METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-309 DIAMETER, IN. 0.3067	
PARAMETER / RUN No	Metals/Particulate/R-1	PROBE 7' AL GUARD Cp 0.8506	
DATE	NOV. 18, 2022	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O 19.0"	
CONTROL UNIT	FE 18 Y 1.0014	STACK DIAMETER 70.9"	
	ΔH@ 1.875	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.50	INITIAL LEAK TEST 0.004 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.003 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	132	132
Imp. #2	100	176	76
Imp. #3	100	174	74
Imp. #4		8	8
Imp. #5	100	103	3
Imp. #6	100	102	2
Imp. #7	200		
Imp. #8			

5 Point (MIN)	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. %		
	09:32	984.328												
1		987.90	0.41	2.16	46	292	258	255	45	6				
2	10	991.74	0.43	2.26	47	294	-				9.5	10.6		
3		995.37	0.36	1.89	44	295	251	251	42	7				
4	20	998.82	0.33	1.73	48	297								
5		1002.42	0.36	1.89	48	297	256	254	43	7				
6	30	1006.12	0.38	1.99	48	298								
7		1010.15	0.45	2.36	49	298	257	258	45	8	9.5	10.3		
8	40	1014.28	0.47	2.41	50	297								
9		1018.54	0.50	2.63	51	299	257	250	47	9				
10	50	1022.85	0.51	2.69	52	298								
11		1027.08	0.49	2.59	52	297	257	256	48	9	9.0	10.8		
12	60	1031.23	0.47	2.49	53	295								
1		1034.83	0.35	1.86	54	294	255	256	45	7				
2	10	1038.38	0.34	1.81	55	296					9.0	10.8		
3		1041.88	0.33	1.75	55	297	257	254	48	7				
4	20	1045.09	0.28	1.48	54	298								
5		1048.32	0.28	1.49	55	296	255	256	49	7				
6	30	1051.48	0.27	1.45	56	292					9.5	10.6		
7		1055.78	0.49	2.64	57	291	256	253	46	9				
8	40	1060.25	0.53	2.87	57	287								
9		1064.90	0.57	3.09	58	286	257	255	46	9				
10	50	1069.70	0.61	3.31	58	285								
11		1074.60	0.63	3.43	58	283	256	254	48	9	9.5	10.5		
12	11:35	1079.38	0.60	3.28	59	281								

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METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #2	NOZZLE G-309 DIAMETER, IN. 0.3067	
PARAMETER / RUN No	Metals/Particulate / R-2	PROBE 7' ALGVRO Cp 0.8506	
DATE	Nov. 18, 2022	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O -19.0"	
CONTROL UNIT	EE 18 Y 1.0014	STACK DIAMETER 70.9"	
	ΔH@ 1.875	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.50	INITIAL LEAK TEST 0.005 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.001 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	128	128
Imp. #2	100	210	110
Imp. #3	100	146	46
Imp. #4	0	14	14
Imp. #5	100	105	5
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. %		
5														
Run	12:01	79.709												
1		83.67	0.42	2.26	57	290	235	247	44	6				
2	10	87.75	0.44	2.37	58	292					9.0	11.2		
3		91.64	0.40	2.16	58	289	257	261	45	6				
4	20	95.12	0.32	1.73	58	288								
5		98.38	0.28	1.51	58	290	258	261	47	5				
6	30	101.52	0.26	1.40	59	291					9.0	10.9		
7		105.57	0.43	2.33	60	289	257	261	48	6				
8	40	109.85	0.48	2.59	60	292								
9		114.26	0.56	3.03	61	293	258	262	49	7				
10	50	118.95	0.58	3.13	62	295								
11		123.75	0.60	3.26	62	290	257	260	50	7	9.0	11.2		
12	60	128.59	0.61	3.33	61	286								
1		132.75	0.45	2.45	62	289	257	260	52	7				
2	10	136.96	0.46	2.51	63	290					9.0	11.0		
3		140.98	0.42	2.28	63	292	256	260	54	7				
4	20	144.75	0.37	2.02	63	290								
5		148.42	0.35	1.91	64	292	257	259	51	6				
6	30	152.20	0.37	2.01	64	295					8.5	11.5		
7		156.28	0.43	2.34	64	292	258	259	52	6				
8	40	160.32	0.42	2.29	64	290								
9		164.68	0.49	2.67	64	291	257	261	54	7				
10	50	168.98	0.48	2.62	64	291					8.5	11.4		
11		173.20	0.46	2.51	64	289	257	260	55	8				
12	14:03	177.52	0.48	2.63	63	286								

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METRO VANCOUVER WTE - BURNABY B.C.		NOZZLE G-309 DIAMETER, IN. 0.3067	IMPINGER	INITIAL	FINAL	TOTAL GAIN
		PROBE Cp	VOLUMES	(mL)	(mL)	(mL)
SOURCE Unit #2			Imp. #1	0	150	150
PARAMETER / RUN No Metals / Particulate / R-3		PORT LENGTH	Imp. #2	100	208	108
DATE NOV. 18, 2022		STATIC PRESSURE, IN. H2O — 19.0"	Imp. #3	100	126	26
OPERATOR: DS		STACK DIAMETER 70.9"	Imp. #4	0	10	10
CONTROL UNIT FE 18	Y 1.0014	STACK HEIGHT 30.01	Imp. #5	100	104	4
	ΔH@ 1.875		Imp. #6	100	102	2
BAROMETRIC PRESSURE, IN. Hg 30.50		INITIAL LEAK TEST 0.002 @ 15"	Imp. #7	200g		
ASSUMED MOISTURE, Bw 15%		FINAL LEAK TEST 0.003 @ 15"	Imp. #8			

5 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. %		
Min	14:25	178.100												
1		181.38	0.28	1.52	63	292	242	240	51	5				
2	10	184.70	0.29	1.57	63	293					10.0	9.9		
3		187.97	0.27	1.47	63	291	239	252	53	5				
4	20	190.89	0.23	1.25	63	290								
5		193.99	0.25	1.36	64	293	257	250	55	5				
6	30	197.15	0.26	1.41	65	298					10.0	9.7		
7		201.54	0.50	2.71	65	296	257	249	56	6				
8	40	206.01	0.52	2.82	65	297								
9		210.73	0.58	3.15	65	296	256	250	54	6				
10	50	215.56	0.60	3.27	66	294								
11		220.52	0.63	3.45	66	291	257	252	55	6	9.5	10.4		
12	60	225.38	0.61	3.34	65	288								
1		228.90	0.32	1.74	66	294	256	251	54	6				
2	10	232.48	0.33	1.79	66	296					9.5	10.6		
3		235.88	0.30	1.63	66	298	256	250	55	6				
4	20	239.16	0.28	1.52	66	299								
5		242.39	0.27	1.47	67	297	256	251	54	6				
6	30	245.63	0.27	1.47	67	296								
7		249.80	0.45	2.45	66	295	258	252	52	7	9.5	10.5		
8	40	254.23	0.51	2.77	65	294								
9		258.85	0.55	3.00	66	293	258	251	53	7				
10	50	263.58	0.58	3.16	65	292								
11		268.40	0.60	3.28	65	291	257	248	55	8	9.0	10.8		
12	16:27	273.09	0.57	3.11	64	290								

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Client: Covanta | Y: LMUD = 1.0167
Source: Unit #2 | Cp:
Parameter: HF | Pbar: 30.50 | Static:
Date: 18-Nov-22 | Operator: Christian

Leak Check	Run 1	Run 2	Run 3
Initial	0.0001	0.0001	0.0001
Final	0.0001	0.0002	0.0001

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:28	89.7100	45					
		89.9242						
	10:58	90.1006	48					
		90.1796						
	11:28	90.3152	52					
2	11:35	90.3173	54					
		90.3986						
	12:05							
		90.6610	60					
	12:35	90.8402	61					
3	12:42	90.8440	58					
	13:12	91.1042	62					
	13:42	91.3940	64					

Client: | Y:
Source: | Cp:
Parameter: | Pbar: | Static:
Date: | Operator:

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

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								
2								
3								

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$\sqrt{6.20}$ 4.84 ΔH
-6.09- -4.75-

CLIENT	MVRD	NOZZLE	MV01
SOURCE	Unit #3	DIAMETER, IN.	.3053
PARAMETER / RUN No	1 Metals/Partic	PROBE	7C
DATE	Nov. 15/22	Cp	.8511
OPERATOR:	C.L. + B.L.	PORT LENGTH	
CONTROL UNIT	AU 15	STATIC PRESSURE, IN. H2O	-19.50
Y	.9909	STACK DIAMETER	70.9"
ΔH@		STACK HEIGHT	30'
BAROMETRIC PRESSURE, IN. Hg	30.50	INITIAL LEAK TEST	0.005 @ 15"
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.004 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	232	232
Imp. #2	100	156	56
Imp. #3	100	114	14
Imp. #4	0	6	6
Imp. #5	100	103	3
Imp. #6	100	101	1
Upstream Diameters			
Downstream Diameters			

5 min Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %
	12:05	177.850										
1		181.87	.42	2.03	52	302						
2		186.03	.45	2.18	54	304	250	250	43	4		
3		190.34	.48	2.32	54	304					10.0	10.0
4		194.37	.42	2.03	54	304	250	250	44	5		
5		198.59	.48	2.32	54	303						
6		202.38	.39	1.85	54	304	250	250	46	6		
7		205.43	.25	1.19	56	304					10.0	10.0
8		208.29	.22	1.05	56	303	250	250	44	6		
9		211.01	.20	.95	58	302						
10		213.74	.20	.95	59	302	250	250	46	6		
11		216.33	.18	.90	60	302					10.0	10.0
12		218.84	.17	.81	62	301	250	250	44	6		
1		221.95	.26	1.24	62	300						
2		225.17	.28	1.35	62	300	250	250	44	6		
3		228.39	.28	1.33	64	299						
4		231.25	.22	1.05	64	299	250	250	45	6	10.0	10.0
5		234.11	.22	1.05	65	298						
6		237.09	.24	1.14	66	298	250	250	48	6		
7		240.94	.40	1.90	66	297						
8		244.92	.43	2.04	66	297	250	250	50	6		
9		248.87	.42	2.00	68	297					10.0	10.0
10		252.82	.42	2.00	68	296	250	250	48	7		
11		256.86	.44	2.09	68	296						
12	14:08	260.90	.44	2.09	69	295	250	250	46	8		
											10.0	10.0

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METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #3	NOZZLE MV-01 DIAMETER, IN. 0.3053	
PARAMETER / RUN No	Metals / Fractionate / R-2	PROBE 7' ALGARD Cp 0.8506	
DATE	NOV. 16, 2022	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O −19.5"	
CONTROL UNIT	AD15 Y 0.9909	STACK DIAMETER 70.9"	
	ΔH@ 1.719	STACK HEIGHT 30.0'	
BAROMETRIC PRESSURE, IN. Hg	30.54	INITIAL LEAK TEST 0.010 @ 15"	
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST 0.002 @ 15"	

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	220	220
Imp. #2	100	200	100
Imp. #3	100	118	18
Imp. #4	0	8	8
Imp. #5	100	103	3
Imp. #6	100	102	2
Imp. #7	200g		
Imp. #8			

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %
	09:56	261.878										
1		265.25	0.31	1.47	50	295	259	235	51	4		
2	10	268.72	0.33	1.56	51	298					9.5	10.3
3		272.35	0.36	1.70	51	299	252	245	50	4.5		
4	20	275.77	0.32	1.52	52	300						
5		279.26	0.33	1.58	53	295	250	258	49	4	9.5	10.2
6	30	282.70	0.32	1.53	53	294						
7		287.10	0.53	2.51	54	304	249	254	49	4.5		
8	40	291.66	0.57	2.68	55	310						
9		296.28	0.58	2.73	56	311	250	249	49	4.5	10.0	9.8
10	50	300.74	0.54	2.55	58	312						
11		305.06	0.50	2.38	59	306	248	249	47	5		
12	60	308.99	0.41	1.96	61	305						
1		313.42	0.52	2.47	63	313	253	252	47	5	10.0	9.7
2	10	317.89	0.53	2.53	64	312						
3		322.28	0.51	2.44	65	312	250	249	47	5		
4	20	326.76	0.53	2.53	65	312						
5		331.25	0.53	2.54	66	311	250	250	47	5	10.0	9.9
6	30	335.48	0.47	2.25	66	313						
7		339.09	0.34	1.63	67	311	251	250	48	5		
8	40	342.30	0.27	1.30	68	310						
9		345.42	0.25	1.21	69	309	250	250	49	5		
10	50	348.20	0.20	0.97	69	308					10.0	10.6
11		350.98	0.20	0.97	69	308	248	249	50	4		
12	11:57	353.62	0.18	0.87	69	306						

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METRO VANCOUVER WTE - BURNABY B.C.

SOURCE	Unit #3	NOZZLE MV-01 DIAMETER, IN.	0.3053
PARAMETER / RUN No	Metals/Particulate / R-3	PROBE 7' AL GUARD Cp	0.8506
DATE	NOV. 16, 2022	PORT LENGTH	
OPERATOR:	DS	STATIC PRESSURE, IN. H2O	-19.5
CONTROL UNIT	AU15 Y 0.9909	STACK DIAMETER	70.9"
	ΔH@ 1.779	STACK HEIGHT	30.0
BAROMETRIC PRESSURE, IN. Hg	30.54	INITIAL LEAK TEST	0.012 @ 15.4
ASSUMED MOISTURE, Bw	15%	FINAL LEAK TEST	0.010 @ 15.4

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	0	216	216
Imp. #2	100	162	62
Imp. #3	100	112	12
Imp. #4	0	6	6
Imp. #5	100	103	3
Imp. #6	100	101	1
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. %		
	12:22	356.302												
1		360.62	0.49	2.34	66	313	256	247	59	3				
2	10	364.98	0.50	2.39	66	314					9.5	10.6		
3		369.46	0.53	2.53	65	315	254	237	46	4				
4	20	373.73	0.48	2.29	67	315								
5		378.04	0.49	2.34	66	314	255	258	48	5				
6	30	382.04	0.42	2.01	67	313								
7		385.44	0.30	1.44	68	317	253	256	50	5	9.0	10.9		
8	40	388.60	0.26	1.25	69	313								
9		391.70	0.25	1.20	69	313	250	257	47	5				
10	50	394.42	0.19	0.92	70	307								
11		397.08	0.18	0.88	70	302	252	255	47	5	9.0	10.8		
12	60	399.59	0.16	0.79	70	297								
1		403.16	0.33	1.59	69	310	252	250	44	4				
2	10	406.83	0.35	1.69	70	312					9.5	10.3		
3		410.34	0.32	1.54	70	316	252	250	45	4				
4	20	413.75	0.30	1.44	71	316								
5		417.05	0.28	1.35	71	316	250	251	45	4				
6	30	420.62	0.33	1.59	71	315								
7		425.23	0.55	2.65	72	316	250	251	44	5	9.5	10.2		
8	40	429.88	0.56	2.70	72	316								
9		434.37	0.52	2.52	73	314	251	250	45	5				
10	50	438.75	0.49	2.38	74	313					9.5	10.1		
11		443.17	0.50	2.43	74	317	249	250	46	5				
12	14:23	447.12	0.40	1.95	74	311								

A. Lanfranco and Associates Inc.

Client	Covanta	Y	LMV-D = 1.0167	Client		Y	
Source	Unit #3	Cp		Source		Cp	
Parameter	HF	Pbar	30.54	Static		Parameter		Pbar		Static	
Date	16-Nov-22	Operator	Christian			Date		Operator			

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

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m^3)	Temperature (°F) DGM Outlet	Temperature (°F) Stack	Imp. Vol. (mL)	ΔP IN. H_2O R1	ΔP IN. H_2O R2	ΔP IN. H_2O R3
1	10:12	87.6248	51					
		87.6724						
	10:42	87.8598	55					
		88.0672						
	11:12	88.2398	58					
2	11:23	88.2477	56					
		88.3372						
		88.4212						
	11:53	88.5533	60					
	12:23	88.8180	62					
3	12:34	88.8242	56					
		88.8930						
		88.9702						
	13:04	89.0488	62					
		89.1852						
	13:34	89.4608	64					

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

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								
2								
3								

Canister sampling sheet

Plant: M.V. W.T.E.

File No.:

Test Date: Nov. 15, 2022

Recovery Date:

Source: Unit #1

Nov. 15, 2022

		R1	R2	R3			
Pbar in hg		30.48"	30.48"	30.48"			
Canister number		SC01053	SC02256	SC02013			
Controller number		OA02193	OA01693	OA01825			
Initial:	Start time	1035	1200	1318			
	Flask Vac. (in Hg)	-32"	-30"	-33"			
Final:	Finish time	1135	1300	1418			
	Flask Vac. (in Hg)	-9"	-6.5"	-8"			

Source: Unit #3

Nov 16, 2022

		R1	R2	R3			
Pbar in hg		30.54	30.54	30.54			
Canister number		SC02191	[illegible]	[illegible]			
Controller number		OA01007	OA01266	OA00213			
Initial:	Start time	10:12	11:23	12:34			
	Flask Vac. (in Hg)	-32	-28	-25			
Final:	End time	11:12	12:23	13:34			
	Flask Vac. (in Hg)	-8	-8	-9			

Source: Unit #2

Nov 18, 2022

		R1	R2	R3			
Pbar in hg		30.50	30.50	30.50			
Canister number		SC01013	SC01610	SC02255			
Controller number		OA01820	OA00084	OA00491			
Initial:	Start time	10:28	11:35	12:42			
	Flask Vac. (in Hg)	-29	-28	-32			
Final:	End time	11:28	12:35	13:42			
	Flask Vac. (in Hg)	-7	-8	-8			

Source:

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

APPENDIX – E

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 15-Sep-22
Barometric Pressure: 29.89 (in. Hg)
Theoretical Critical Vacuum: 14.10 (in. Hg)

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

---------- DRY GAS METER READINGS ----------									-CRITICAL ORIFICE READINGS-					
					Initial Temps.		Final Temps.					-- Ambient Temperature --		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
3.50	15.00	84.751	100.880	16.129	74.0	74.0	82.0	75.0	73	0.8185	17.0	76.0	82.0	79.0
1.80	18.00	70.730	84.751	14.021	75.0	74.0	79.0	74.0	63	0.5956	20.0	83.0	83.0	83.0
1.10	18.00	59.787	70.730	10.943	74.0	73.0	76.0	74.0	55	0.4606	22.0	79.0	79.0	79.0
0.62	15.00	52.866	59.787	6.921	74.0	74.0	75.0	74.0	48	0.3560	23.0	80.0	80.0	80.0
0.30	15.00	48.110	52.866	4.756	74.0	73.0	74.0	73.0	40	0.2408	25.0	83.0	83.0	83.0

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

--- DRY GAS METER ---		--------- ORIFICE ---------			-- DRY GAS METER --		--------- ORIFICE ---------			
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@			
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
15.995	453.0	15.807	447.6	16.159	0.988	-0.003	1.750	44.44	0.030	0.728
13.866	392.7	13.752	389.4	14.162	0.992	0.001	1.713	43.52	-0.006	0.734
10.829	306.7	10.674	302.3	10.912	0.986	-0.005	1.740	44.19	0.020	0.733
6.841	193.7	6.869	194.5	7.035	1.004	0.013	1.643	41.73	-0.076	0.740
4.704	133.2	4.633	131.2	4.771	0.985	-0.006	1.750	44.46	0.031	0.731
				Average Y---------->	**0.9909**		**Average dH@----->**	**1.719**	**43.7**	**Average Ko----->**	**0.733**

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: Scott Ferguson Signature: _____ Date: September 15, 2022

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

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

Date: 05-Jul-22
Barometric Pressure: 29.88 (in. Hg)
Theoretical Critical Vacuum: 14.09 (in. Hg)

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

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

dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
3.50	15.00	356.655	372.859	16.204	79.0	79.0	82.0	82.0
1.80	18.00	342.552	356.565	14.013	75.0	75.0	78.0	78.0
1.10	18.00	331.600	342.499	10.899	73.0	73.0	75.0	75.0
0.64	22.00	321.430	331.548	10.118	71.0	71.0	72.0	72.0
0.32	17.00	316.000	321.395	5.395	71.0	71.0	71.0	71.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
73	0.8185	15.5	79.0	72.0	75.5
63	0.5956	18.5	75.0	80.0	77.5
55	0.4606	20.0	76.0	78.0	77.0
48	0.3560	21.5	75.0	77.0	76.0
40	0.2408	22.5	70.0	72.0	71.0

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	CALIBRATION FACTOR dH@ Value (mm H2O)	CALIBRATION FACTOR dH@ Variation (in H2O)	Ko (value)
15.938	451.4	15.853	449.0	16.106	0.995	-0.002	1.719	43.68	-0.014	0.731
13.828	391.6	13.817	391.3	14.090	0.999	0.003	1.689	42.90	-0.044	0.736
10.787	305.5	10.690	302.7	10.891	0.991	-0.005	1.732	44.00	-0.001	0.733
10.050	284.6	10.108	286.3	10.279	1.006	0.010	1.692	42.97	-0.041	0.731
5.359	151.8	5.308	150.3	5.348	0.990	-0.006	1.833	46.57	0.100	0.714
				Average Y--------->	**0.9962**		**Average dH@----->**	**1.733**	**44.0**	**Average Ko----->** **0.729**

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: Scott Ferguson Signature: _____ Date: July 5, 2022

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: 4-Jul-22

Barometric Pressure: 29.87 (in. Hg)

Theoretical Critical Vacuum: 14.09 (in. Hg)

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

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

dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
3.60	18.00	54.520	73.555	19.035	72.0	72.0	73.0	73.0
1.90	18.00	40.670	54.425	13.755	70.0	70.0	72.0	72.0
1.20	18.00	29.815	40.582	10.767	70.0	70.0	72.0	72.0
0.69	15.00	22.830	29.685	6.855	70.0	70.0	70.0	70.0
0.35	15.00	18.095	22.792	4.697	72.0	72.0	71.0	71.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
73	0.8185	15.0	78.0	80.0	79.0
63	0.5956	17.5	81.0	80.0	80.5
55	0.4606	19.5	79.0	80.0	79.5
48	0.3560	21.0	75.0	80.0	77.5
40	0.2408	22.5	73.0	74.0	73.5

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

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	CALIBRATION FACTOR Y Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	CALIBRATION FACTOR dH@ Value (mm H2O)	CALIBRATION FACTOR dH@ Variation (in H2O)	Ko (value)
19.002	538.1	18.955	536.8	19.390	0.998	-0.004	1.808	45.91	-0.068	0.714
13.713	388.3	13.774	390.1	14.129	1.004	0.003	1.812	46.02	-0.064	0.710
10.716	303.5	10.662	301.9	10.917	0.995	-0.006	1.910	48.51	0.034	0.699
6.827	193.3	6.880	194.8	7.018	1.008	0.006	1.835	46.61	-0.041	0.704
4.660	132.0	4.671	132.3	4.730	1.002	0.001	2.013	51.14	0.138	0.676
				Average Y--------->	**1.0014**	**Average dH@----->**	**1.875**	**47.6**	**Average Ko----->**	**0.701**

TEMPERATURE CALIBRATION

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

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

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

Calibrated by: Liam Forrer Signature: Shaun Harrington Date: July 4, 2022

A. Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: LMU-D

Serial #: Wizit 4618

Date: 5-Jul-22

Barometric Pressure: 29.88 (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	27.00	63.825	64.175	12.353	73.0	73.0	74.0	74.0
0.00	18.00	64.176	64.410	8.267	74.0	74.0	76.0	76.0
0.00	25.00	64.412	64.737	11.477	75.0	75.0	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	75.0	74.0	74.5
48	0.3560	20.0	74.0	78.0	76.0
48	0.3560	20.0	76.0	80.0	78.0

********** 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)
12.205	345.6	12.423	351.8	12.598	1.018	0.001	0.000	0.00	0.000
8.145	230.7	8.270	234.2	8.410	1.015	-0.001	0.000	0.00	0.000
11.276	319.3	11.465	324.7	11.703	1.017	0.000	0.000	0.00	0.000
				Average Y--------->	**1.0167**		**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: July 5, 2022

Pitot Tube Calibration

Date: 5-Jul-22
Pbar (in.Hg): 29.91

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)
0.035	0.050	12.5	0.8283	0.0098
0.130	0.180	24.1	0.8413	0.0032
0.250	0.350	33.4	0.8367	0.0014
0.480	0.660	46.3	0.8443	0.0061
0.720	1.000	56.7	0.8400	0.0019
		Average :	0.8381	0.0045

Pitot ID: **ST 8A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.035	0.050	12.5	0.8283	0.0044
0.140	0.200	25.0	0.8283	0.0044
0.250	0.350	33.4	0.8367	0.0040
0.600	0.850	51.7	0.8318	0.0009
0.710	0.990	56.3	0.8384	0.0057
		Average :	0.8327	0.0039

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.035	0.050	12.5	0.8283	0.0046
0.100	0.140	21.1	0.8367	0.0038
0.230	0.320	32.0	0.8393	0.0064
0.430	0.610	43.8	0.8312	0.0017
0.680	0.970	55.1	0.8289	0.0040
		Average :	0.8329	0.0041

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	0.0032
0.140	0.190	25.0	0.8498	0.0087
0.270	0.380	34.7	0.8345	0.0066
0.500	0.700	47.2	0.8367	0.0044
0.720	1.000	56.7	0.8400	0.0010
		Average :	0.8411	0.0048

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

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.040	0.055	16.3	0.8443	0.0063
0.120	0.160	19.9	0.8574	0.0067
0.200	0.270	25.3	0.8521	0.0014
0.430	0.580	35.8	0.8524	0.0018
0.710	0.970	48.4	0.8470	0.0036
		Average :	0.8506	0.0040

Pitot ID: **ST 8C**

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

Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.040	0.055	13.4	0.8443	0.0068
0.130	0.180	16.3	0.8413	0.0098
0.250	0.335	33.4	0.8552	0.0041
0.630	0.840	30.5	0.8574	0.0063
0.690	0.920	47.0	0.8574	0.0063
		Average :	0.8511	0.0066

Pitot ID:

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

* Average absolute deviation must not exceed 0.01.

Calibrated by: Justin Ching Signature: Justin Ching Date: July 5, 2022

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Scott Ferguson
Date: July 5, 2022

Signature:

Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft^2)
A	0.1260	0.1260	0.1270	0.0010	0.1263	0.0000870
G-165	0.1650	0.1640	0.1640	0.0010	0.1643	0.0001473
G-170	0.1700	0.1720	0.1690	0.0030	0.1703	0.0001582
G-178	0.1790	0.1800	0.1820	0.0030	0.1803	0.0001774
J	0.1890	0.1900	0.1890	0.0010	0.1893	0.0001955
E	0.1910	0.1910	0.1900	0.0010	0.1907	0.0001983
Q	0.2060	0.2050	0.2020	0.0040	0.2043	0.0002277
L	0.2090	0.2100	0.2120	0.0030	0.2103	0.0002413
G-215	0.2150	0.2140	0.2140	0.0010	0.2143	0.0002506
G-218	0.2170	0.2190	0.2200	0.0030	0.2187	0.0002608
G-221	0.2210	0.2190	0.2190	0.0020	0.2197	0.0002632
G-2231	0.2310	0.2280	0.2300	0.0030	0.2297	0.0002877
G-2232	0.2240	0.2220	0.2220	0.0020	0.2227	0.0002704
G-225	0.2220	0.2190	0.2200	0.0030	0.2203	0.0002648
G-2501	0.2490	0.2500	0.2510	0.0020	0.2500	0.0003409
P	0.2590	0.2570	0.2580	0.0020	0.2580	0.0003631
G-282	0.2910	0.2870	0.2880	0.0040	0.2887	0.0004545
G-2871	0.2860	0.2870	0.2870	0.0010	0.2867	0.0004482
G-292	0.2905	0.2890	0.2875	0.0030	0.2890	0.0004555
MV-01	0.3060	0.3040	0.3060	0.0020	0.3053	0.0005085
G-3072	0.3080	0.3080	0.3090	0.0010	0.3083	0.0005185
G-309	0.3060	0.3070	0.3070	0.0010	0.3067	0.0005129
G-3121	0.3080	0.3100	0.3110	0.0030	0.3097	0.0005230
G-345	0.3460	0.3440	0.3460	0.0020	0.3453	0.0006504
G-433	0.4320	0.4320	0.4340	0.0020	0.4327	0.0010210
P-29	0.4680	0.4680	0.4690	0.0010	0.4683	0.0011963
P-7	0.4920	0.4890	0.4920	0.0030	0.4910	0.0013149
B	0.5010	0.5020	0.5030	0.0020	0.5020	0.0013745
G-540	0.5390	0.5390	0.5390	0.0000	0.5390	0.0015845

Where:

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

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

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

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Daryl Sampson

Date: 30-Jun-22

Signature: Daryl Sampson

TEMPERATURE DEVICE CALIBRATIONS

Reference Device Model CL23A Calibrator			Temperature Settings (degrees F)													
			32		100		200		300		500		800		1700	
Device	**ALA #**	**Serial #**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**
Omega HH11A	3	300132	33	0.20%	99.5	-0.09%	201	0.15%	301.5	0.20%	498	-0.21%	798.2	-0.14%	1696	-0.19%
Omega HH11A	4	200167	32	0.00%	98.5	-0.27%	200.5	0.08%	301	0.13%	499	-0.10%	799	-0.08%	1695	-0.23%
Omega HH11A	6	600059	32	0.00%	99.8	-0.04%	201.5	0.23%	301.5	0.20%	498.4	-0.17%	799.5	-0.04%	1696	-0.19%
TPI 341K	7	2.0315E+10	31	-0.20%	99.2	-0.14%	199.6	-0.06%	299.8	-0.03%	499.6	-0.04%	796.4	-0.29%	1695	-0.23%
TPI 341K	8	2.0313E+10	32	0.00%	99.2	-0.14%	200.3	0.05%	300.5	0.07%	490.2	-1.02%	797.6	-0.19%	1695	-0.23%
Cont Cmpny	10	102008464	30.5	-0.31%	98	-0.36%	199.3	-0.11%	298.5	-0.20%	498	-0.21%	796.8	-0.25%	1697	-0.14%
Omega HH11	14	409426	31.5	-0.10%	99.5	-0.09%	199	-0.15%	299	-0.13%	499	-0.10%	797	-0.24%	1698	-0.09%
TPI 341K	16	400120029	31	-0.20%	99	-0.18%	199.1	-0.14%	298.4	-0.21%	501	0.10%	799.8	-0.02%	1700	0.00%
TPI 341K	18	2.0329E+10	31.4	-0.12%	99.4	-0.11%	198.5	-0.23%	299.3	-0.09%	499.5	-0.05%	799.2	-0.06%	1698	-0.09%
TPI 341K	20	2.0329E+10	30.6	-0.28%	98.5	-0.27%	198.2	-0.27%	299.1	-0.12%	498.2	-0.19%	798	-0.16%	1697	-0.14%
TPI 341K	22	2.0329E+10	31.2	-0.16%	99.2	-0.14%	198.5	-0.23%	299	-0.13%	498.4	-0.17%	798	-0.16%	1698	-0.09%
Reference device is a NIST certified digital thermocouple calibrator																
Variation expressed as a percentage of the absolute temperature must be within 1.5 %																

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada (kPa)	Pbar Env Canada (inches of Hg)	Device (inches of Hg) Reading	Device (inches of Hg) Elevation Corrected	Difference (Env Can - Elv Corr)
LA	1-Jul-22	102.1	30.16	30.06	30.13	0.02
DS	1-Jul-22	102.1	30.16	30.04	30.11	0.04
CL	1-Jul-22	102.1	30.16	30.03	30.10	0.05
ML	1-Jul-22	102.1	30.16	30.14	30.21	-0.06
SB	1-Jul-22	102.1	30.16	30.15	30.22	-0.07
SH	1-Jul-22	102.1	30.16	30.15	30.22	-0.07
MG	1-Jul-22	102.1	30.16	30.15	30.22	-0.07
SF	1-Jul-22	102.1	30.16	30.16	30.23	-0.08
JG	1-Jul-22	102.1	30.16	30.12	30.19	-0.04
JC	1-Jul-22	102.1	30.16	30.15	30.22	-0.07
LF	1-Jul-22	102.1	30.16	30.15	30.22	-0.07

Calibrated by: Jeremy Gibbs Signature: Jeremy Gibbs Date: 01-Jul-22

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

Edmonton Spec Gas Plant/Usine
12143 68th Street
Edmonton AB T5B 1P9
Canada

MESSER

MCRT NITROUS OXIDE 90PPM N2 BAL 32SZ/ MCRT OXYDE NITREUX 90PPM N2 BAL 32SZ CERTIFIED

Component Composant	Nominal Nominale	Certified Certifiée
Nitrous Oxide / OXYDE NITREUX	90 PPM	92.2 PPM
Nitrogen / AZOTE		BAL

Cylinder Details/ Détails - bouteille:
Cylinder Size/ Taille de la bouteille: 32 Contents/ Capacité: 0.742 M3 Valve Outlet/ Robinet de sortie: 590 Nominal Pressure/Pression nominale: 2,000 PSG

Analytical Details/ Détails d'analyse:
Certification Accuracy ± 2% for concentrations 10 ppm and above, ± 5% for concentrations < 10 ppm.
INMS and NIST traceability by one of the following: 1) Mass calibration certificate 2154736Z, 2154736B, 1845447, 2204452, W-017181-11799 or W-028737-17611; 2) Comparison to SRM or NTRM gas mixture.
Certification de précision ± 2% pour des concentrations de 10 ppm et plus, ± 5% pour des concentrations < 10 ppm.
Traçabilité IENM et NIST par l'une des façons suivantes : 1) Certificat d'étalonnage de la masse 2154736Z, 2154736B, 1845447, 2204452, W-017181-11799 ou W-028737-17611; 2) Comparaison avec le mélange gazeux SRM ou NTRM.

To reorder, please quote/ Pour renouveler une commande, veuillez indiquer le code: 24108500
Certificate Date (mm/dd/yy) / Date du certificat (mm/jj/aa) : 10/31/2020 Use by / Utilisé par: 10/30/2023

Approved Signature/ Approbation du Signataire: Randall Myhre
Analyst/Analyste: Randall Myhre

Lot No./ No. lot	Cylinder No./ No. bouteille	Code	Page
1494961	FF-58284	24108500	1/1

Edmonton Spec Gas Plant/Usine
12143 68th Street
Edmonton AB T5B 1P9
Canada

MESSER

MCRT NITROUS OXIDE 40PPM N2 BAL 32SZ/ MCRT OXYDE NITREUX 40PPM N2 BAL 32SZ CERTIFIED

Component Composant	Nominal Nominale	Certified Certifiée
Nitrous Oxide / OXYDE NITREUX	40 PPM	41.1 PPM
Nitrogen / AZOTE	BAL	

Cylinder Details/ Détails - bouteille:
Cylinder Size/ Taille de la bouteille: 32 Contents/ Capacité: 0.742 M3 Valve Outlet/ Robinet de sortie: 590 Nominal Pressure/Pression nominale: 2,000 PSG

Analytical Details/ Détails d'analyse:
Certification Accuracy ± 2% for concentrations 10 ppm and above, ± 5% for concentrations < 10 ppm.
INMS and NIST traceability by one of the following: 1) Mass calibration certificate 2154736Z, 2154736B, 1845447, 2204452, W-017181-11799 or W-028737-17611; 2) Comparison to SRM or NTRM gas mixture.
Certification de précision ± 2% pour des concentrations de 10 ppm et plus, ± 5% pour des concentrations < 10 ppm.
Traçabilité IÉNM et NIST par l'une des façons suivantes : 1) Certificat d'étalonnage de la masse 2154736Z, 2154736B, 1845447, 2204452, W-017181-11799 ou W-028737-17611; 2) Comparaison avec le mélange gazeux SRM ou NTRM.

To reorder, please quote/ Pour renouveler une commande, veuillez indiquer le code: 24108499
Certificate Date (mm/dd/yy) / Date du certificat (mm/jj/aa) :10/31/2020 Use by / Utilisé par: 10/30/2023

Approved Signature/ Approbation du Signataire Randall Myhre
Analyst/Analyste: Randall Myhre

Lot No./ No. lot	Cylinder No./ No. bouteille	Code	Page
1494960	FF-62315	24108499	1/1

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

CANADIAN ASSOCIATION FOR LABORATORY ACCREDITATION INC.
CALA

President & CEO

MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Carter Lanfranco

has successfully completed

Stack Sampling

May 2009

Date

Dean
Faculty of Continuing Education and Extension

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 Carter LanFranco

   Title Chief operations officer / owner

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   _____

   _____

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

Declaration

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

Signature:

X _____

Print Name: Carter LanFranco

Date signed: Dec. 7/2020

Witnessed by:

X Shawn Harrington

Print Name: Shawn Harrington

[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

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

Select one of the following:

☒ Absence from conflict of interest

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

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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

Signature:

X _____

Print name: Carter Lanfranco

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.

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

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

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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 Daryl Sampson **X** _____

Print Name: Daryl Sampson Print Name: Louis Agassiz

Date signed: November 23, 2020

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

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

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

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.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X Daryl Sampson

Print name: Daryl Sampson

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec.18, 2020

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

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.*

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeremy Shawn Gibbs

has successfully completed

Stack Sampling

35 Hours / 2019

May 22, 2019

Date

Dean
Faculty of Continuing Education and Extension

MOUNT ROYAL
UNIVERSITY
1910

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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

1. Name of Qualified Professional Jeremy Gibbs

   Title Environmental technician

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

   Name of Association: _____ Registration # _____

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

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Declaration

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

Signature:

X _____

Print Name: Jeremy Gibbs

Witnessed by:

X _____

Print Name: Connor Laan

Date signed: Nov 1, 2020

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

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

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

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.

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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 Gross

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 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

Declaration of Competency

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

1. Name of Qualified Professional Shawn Harrington

   Title Senior Environmental Technician /Project manager

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting ,specializing in air and atmospheric sciences

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

Declaration

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

Signature:

x Shawn Harrington

Print Name: Shawn Harrington

Witnessed by:

x

Print Name: Mark Lanfranco

Date signed: November 26, 2020

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

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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

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

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

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

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

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

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

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

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

Declaration

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

Select one of the following:

☒ Absence from conflict of interest

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

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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

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

_____

_____

_____

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

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Signature:

X Shawn Harrington

Print name: Shawn Harrington

Witnessed by:

X

Print name: Mark Lanfranco

Date: Dec.16, 2020

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1. Name of Qualified Professional Mark Lanfranco

   Title President | Owner

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

   Name of Association: _____ Registration # _____

3. Brief description of professional services:
   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 _____

Print Name: Mark Lanfranco

Witnessed by:

X _____

Print Name: Melissa Watkins

Date signed: Nov.16, 2020

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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.

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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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