



**A.Lanfranco
& Associates Inc.**

Environmental Consultants

Prepared for

METRO VANCOUVER

Metrotower III 4730 Kingsway
Burnaby, BC V5H 0C6

WASTE TO ENERGY FACILITY

Appendices of Compliance Emissions Testing Report

November 2018 Survey

Table of Contents

Appendix

- A Quality Assurance / Quality Control Results
- B Laboratory Results
- C Computer Generated Results
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- E Calibration Sheets and Technician Certificates

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 Exova Labs, Surrey, B.C.
- Fluoride (HF) analysis conducted at ALS Environmental in Burnaby, B.C.
- Nitrous Oxide (N₂O) analysis conducted at Maxxam Analytics, Mississauga, Ont.
- Particulate analysis conducted at A. Lanfranco and Associates Inc., Surrey, BC.
- THC/VOC analysis conducted at ALS Environmental in Simi Valley, California
- Ammonium (for ammonia NH₃) conducted at Exova Labs, Surrey, B.C.
- Chain of Custody protocols followed for all samples.
- Excellent blank values for all sample types. All samples blank corrected.

Sample Type	Blank Value		
Four Survey 2018	Unit 1	Unit 2	Unit 3
Filter	0.0 mg	0.1 mg	0.1 mg
Front Half Washings	-0.1 mg	0.4 mg	-0.2 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.18 ug	<0.17 ug	<0.17 ug
Trace Metals Front *	<176 ug	<174 ug	<170 ug
Trace Metals Back*	<12.0 ug	<14.8 ug	<10.4 ug
Fluoride	<2.5 ug	<2.6 ug	<2.6 ug
Ammonium	5.2 ug	16.1 ug	11.8 ug

Sum of all reported elements except Hg*

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: Filter Reagent Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312807 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347224
Attn: Missy Sampled By: Company:		

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 - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR
Email - Single Report	PDF	Test Report

Notes To Clients:

- Nov 13, 2018 - Sample Information Sheet was not received.

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Filter Reagent Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312807 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347224
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		Reference Number	1312807-1	1312807-2	1312807-3
		Sample Date	Nov 05, 2018	Nov 05, 2018	Nov 05, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Reagent Blank Unit 1 Container 1 (filter)	Reagent Blank Unit 2 Container 1 (filter)	Reagent Blank Unit 3 Container 1 (filter)
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	2	2	0.8	0.25
Lead	µg	<2	<2	2.9	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	140	130	140	2.5
Selenium	µg	<2	<2	2	1.5
Tellurium	µg	2	<2	<2	2
Thallium	µg	<2	3.2	2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	<0.5	<0.5	0.5
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	250	250	250
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02

Approved by: 
Mathieu Simoneau
Operations Manager

Methodology and Notes

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312807
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	Filter Reagent Blanks	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Dec 4, 2018
Attn:	Missy	P.O.:		Report Number:	2347224
Sampled By:		Proj. Acct. code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 30, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey
* Reference Method Modified				

References

EMC Emission Measurement Center of EPA

Comments:

- Nov 13, 2018 - Sample Information Sheet was not received.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

No Chain of Custody Available.

Report Transmission Cover Page

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312802
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	Reagent Blanks	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Dec 4, 2018
Attn:	Missy	P.O.:		Report Number:	2347216
Sampled By:		Proj. Acct. code:			
Company:					

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

<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

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If you receive this transmission by error, or if this transmission is not satisfactory, please notify us by telephone.

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1312802
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Reagent Blanks	Date Received: Nov 13, 2018
V4N 4W7	LSD:	Date Reported: Dec 4, 2018
Attn: Missy	P.O.:	Report Number: 2347216
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1312802-1	1312802-2	1312802-3
		Sample Date	Nov 05, 2018	Nov 05, 2018	Nov 05, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Reagent Blank Unit 1	Reagent Blank Unit 2	Reagent Blank Unit 3
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	<0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	2.9	3.8	3.5	0.25
Lead	µg	2.7	2	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	0.7	0.5
Phosphorus	µg	3	4	3	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	7.0	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	<0.5	<0.5	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	<3	<3	<3	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	0.63	0.2	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	<0.3	<0.3	1	0.25
Lead	µg	2	<2	<2	1.5
Manganese	µg	<0.3	1	5.1	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	7.2	8.6	5.2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	3	2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	<0.5	<0.5	0.5
Volume	Sample	mL	200	200	200
Volume	aliquot volume	mL	150	150	150
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	250	250	250

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Reagent Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312802 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347216
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		Reference Number	1312802-1	1312802-2	1312802-3	
		Sample Date	Nov 05, 2018	Nov 05, 2018	Nov 05, 2018	
		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	200	200	200	
Volume	aliquot volume	mL	5	5	5	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.08	<0.08	<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	100	101	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.02	<0.02	<0.02	
Mercury	As Tested	µg/L	<0.05	<0.05	0.09	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	<0.02	<0.02	0.03	

Approved by: 
Mathieu Simoneau
Operations Manager

Methodology and Notes

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

Attn: Missy

Sampled By:

Company:

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

Lot ID: **1312802**
Control Number:
Date Received: Nov 13, 2018
Date Reported: Dec 4, 2018
Report Number: 2347216

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Nov 20, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

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Exova



Testing
Advisir
Assurir

Lot: 1312802 COC



Control Number

Information Sheet

in order to proceed with analysis

Billing Address:

Company: A. Lanfranco and Associates
Address: Unit 101 9488 189 St
Surrey, BC V4N 4W7

QA/QC Report ☐

Attention: Mark Lanfranco
Phone: 604-881-2582
Fax: 604-881-2581
Cell:
e-mail: mark.lanfranco@alanfranco.com

Report Result:

Fax ☐
Mail ☐
Courier ☐
e-mail ☐
e-Service ☐

Copy of Report To:

Company:
Address:

Attention:
Phone:
Fax:
Cell:
e-mail:

Copy of invoice:

Mail invoice to this
address for approval ☐

Report Result:

Fax ☐
Mail ☐
Courier ☐
e-mail ☐
e-Service ☐

Information to be included on Report and Invoice

Project ID:
Project Name: Metro Vancouver WTE
Project Location: Reagent Blanks
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH Please contact the laboratory
to confirm rush dates and times
before submitting samples.

Upon filling out this section, client accepts that
surcharges will be attached to this analysis

RUSH All Analysis As indicated
required on: ☐ or ☐
Date Required:
Signature:
Exova Authorization:

Sample Custody (Please Print)

Sampled by:

Company Signature

I authorize Exova to proceed with the work
work indicated on this form:

Date: Initial:

Received by: Sample
Temp. 17.1°C

Waybill #: NOV 13 '18 16:29

Company Date
Time

Special Instructions / Comments

- *Front and Back ICAP as per EPA Method 29
- *Hg analysis as per EPA Method 29
- * Please report ug/sample

FOR LAB USE ONLY

Condition of containers/coolers
upon arrival at lab

Please indicate which regulations you are required to meet:

☐ Check here if Exova is required
to report results directly to a regulatory body
(Please include contact information)

☐ Check here if you are testing **POTABLE**
WATER for **HUMAN CONSUMPTION**

Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg								
5	✓	✓	✓	✓	✓	✓								
5	✓	✓	✓	✓	✓	✓								
5	✓	✓	✓	✓	✓	✓								

	Sample Identification	Location	Depth			Date/Time Sampled	Matrix	Sampling Method	↓	Enter tests above (✓ relevant samples below)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

Page ____ of ____

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: Field Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312799 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347214
Attn: Missy Sampled By: Company:		

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
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Email - Single Report	PDF	COR

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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Field Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312799 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347214
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		Reference Number	1312799-1	1312799-2	1312799-3
		Sample Date	Nov 08, 2018	Nov 07, 2018	Nov 06, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Field Blank Unit 1 (Beaker (MV Unit 1 Blank) + 4 Bottles)	Field Blank Unit 2 (Beaker (MV Unit 2 Blank) + 4 Bottles)	Field Blank Unit 3 (Beaker (MV Unit 3 Blank) + 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	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	2	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	0.29	0.25	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1.0	2.9	2	0.25
Lead	µg	4.4	4.1	<2	1.5
Manganese	µg	<0.3	0.8	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	170	170	170	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	3.7	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	<0.5	<0.5	<0.5	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	<5	<5	<5	5
Antimony	µg	2	<2	<2	2.5
Arsenic	µg	<1.0	2	<1.0	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	<0.2	<0.2	0.40	0.2
Cobalt	µg	<0.2	<0.2	<0.2	0.25
Copper	µg	<0.2	<0.2	<0.2	0.25
Lead	µg	2	2.8	<1	1.5
Manganese	µg	9.8	3.8	1	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	10	10	10	2.5
Selenium	µg	5.3	<1	2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	<1	3.2	1.5
Vanadium	µg	<1.0	<1.0	<1.0	1
Zinc	µg	3.0	6.6	2	0.5
Volume	Sample	mL	273	265	305
Volume	aliquot volume	mL	223	215	255
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05

Analytical Report

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

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

Lot ID: **1312799**
Control Number:
Date Received: Nov 13, 2018
Date Reported: Dec 4, 2018
Report Number: 2347214

		Reference Number	1312799-1	1312799-2	1312799-3	
		Sample Date	Nov 08, 2018	Nov 07, 2018	Nov 06, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Field Blank Unit 1 (Beaker (MV Unit 1 Blank) + 4 Bottles)	Field Blank Unit 2 (Beaker (MV Unit 2 Blank) + 4 Bottles)	Field Blank Unit 3 (Beaker (MV Unit 3 Blank) + 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	273	265	305	
Volume	aliquot volume	mL	5	5	5	
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	149	146	126	
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	0.09	0.07	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.03	0.02	<0.02	

Approved by: 
Mathieu Simoneau

Operations Manager

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

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312799
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	Field Blanks	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Dec 4, 2018
Attn:	Missy	P.O.:		Report Number:	2347214
Sampled By:		Proj. Acct. code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Nov 20, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

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Results relate only to samples as submitted.

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Exova

Lot: 1312799 ^{COC}Control Number

Information Sheet

Assuring ^{Proper completion of this form is required in order to proceed with analysis}

Billing Address: Company: A. Lanfranco and Associates Address: Unit 101 9488 189 St Surrey, BC V4N 4W7		Copy of Report To: Company: Address:		Copy of invoice: Mail invoice to this address for approval	
Attention: Mark Lanfranco Phone: 604-881-2582 Fax: 604-881-2581 Cell: e-mail: mark.lanfranco@alanfranco.com		QA/QC Report ☐ Report Result: Fax ☐ Mail ☐ Courier ☐ e-mail ☐ e-Service ☐		Report Result: Fax ☐ Mail ☐ Courier ☐ e-mail ☐ e-Service ☐	

Information to be included on Report and Invoice Project ID: Project Name: Metro Vancouver WTE Project Location: Field Blanks Legal Location: PO#: Proj. Acct. Code: Agreement ID:	RUSH Please contact the laboratory to confirm rush dates and times before submitting samples. Upon filling out this section, client accepts that surcharges will be attached to this analysis RUSH required on: ☐ All Analysis ☐ or ☐ As indicated Date Required: Signature: Exova Authorization:	Sample Custody (Please Print) Sampled by: Company: Signature: I authorize Exova to proceed with the work work indicated on this form: Date: Initial: Received by: Sample Temp. 17.1°C Waybill #: Date Company: Time
--	---	---

Special Instructions / Comments *Front and Back ICAP as per EPA Method 29 *Hg analysis as per EPA Method 29 * Please report ug/sample Please indicate which regulations you are required to meet:	FOR LAB USE ONLY Condition of containers/coolers upon arrival at lab	☐ Check here if Exova is required to report results directly to a regulatory body (Please include contact information) ☐ Check here if you are testing POTABLE WATER for HUMAN CONSUMPTION
--	--	---

	Sample Identification	Location	Depth			Date/Time Sampled	Matrix	Sampling Method	↓	Enter tests above (✓ relevant samples below)									
			IN	CM	M					Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg				
1	Field Blank Unit 1 (Beaker (MV Unit-1 Blank)+ 4 Bottles)					08-Nov-18			5	✓	✓	✓	✓	✓	✓				
2																			
3	Field Blank Unit 2 (Beaker (MV Unit 2 Blank) + 4 Bottles)					07-Nov-18			5	✓	✓	✓	✓	✓	✓				
4																			
5	Field Blank Unit 3 (Beaker (MV Unit 3 Blank) + 4 Bottles)					06-Nov-18			5	✓	✓	✓	✓	✓	✓				
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines. Page ____ of ____



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

Date Received: 09-NOV-18
Report Date: 19-NOV-18 13:07 (MT)
Version: FINAL

Client Phone: 604-881-2582

Certificate of Analysis

Lab Work Order #: L2195126
Project P.O. #: NOT SUBMITTED
Job Reference: METRO VANCOUVER WTE
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

		Sample ID Description Sampled Date Sampled Time Client ID	L2195126-1 Water 06-NOV-18 UNIT 1 HF BLANK	L2195126-2 Water 07-NOV-18 UNIT 2 HF BLANK	L2195126-3 Water 08-NOV-18 UNIT 3 HF BLANK	
Grouping	Analyte					
STACK						
Anions and Nutrients	Fluoride (F) (ug/sample)	<2.5	<2.6	<2.6		
	Volume (Anions) (mL)	250	255	255		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F-IMP-UG-VA	Stack	Fluoride in Water from Impinger	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

** 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
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, 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 ww - 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.



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

#COC#

Page 1 of 1

[illegible]

GENE 20.00 Front

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: NH3 Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1312780 Control Number: Date Received: Nov 13, 2018 Date Reported: Nov 19, 2018 Report Number: 2347213
Attn: Missy Sampled By: Company:		

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 - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

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Analytical Report

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

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

Lot ID: **1312780**
Control Number:
Date Received: Nov 13, 2018
Date Reported: Nov 19, 2018
Report Number: 2347213

		Reference Number	1312780-1	1312780-2	1312780-3	
		Sample Date	Nov 08, 2018	Nov 07, 2018	Nov 06, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 1 NH3 Blank	Unit 2 NH3 Blank	Unit 3 NH3 Blank	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	24.8	74.7	55.1	10
Dilution Factor	As Tested		1.00	1.00	1.00	
Sample Volume	Sample volume	mL	210	215	215	
Ammonium - N		µg/sample	5.2	16.1	11.8	

Approved by:



Randy Neumann, BSc
Division Director

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

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312780
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	NH3 Blanks	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Nov 19, 2018
Attn:	Missy	P.O.:		Report Number:	2347213
Sampled By:		Proj. Acct. code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Ammonium in Impingers (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	Nov 19, 2018	Exova Surrey
* Reference Method Modified				

References

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

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

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Exova



Testing
Advising
Assuring

EnviroLot: 1312780 COC
Note: P



on Sheet

in order to proceed with analysis

Billing Address:

Company: A. Lanfranco and Associates
Address: Unit 101 9488 189 St
Surrey, BC V4N 4W7

QA/QC Report ☐

Attention: Al Lanfranco
Phone: 604-881-2582
Fax: 604-881-2581
Cell:
e-mail: mark.lanfranco@alanfranco.com

Report Result:
Fax ☐
Mail ☐
Courier ☐
e-mail ☐
e-Service ☐

Copy of Report to:

Company:
Address:

Copy of invoice:

Mail invoice to this
address for approval ☐

Report Result:
Fax ☐
Mail ☐
Courier ☐
e-mail ☐
e-Service ☐

Information to be included on Report and Invoice

Project ID:
Project Name: Metro Vancouver WTE
Project Location: NH₃ Blanks
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH Please contact the laboratory
to confirm rush dates and times
before submitting samples.

Upon filling out this section, client accepts that
surcharges will be attached to this analysis

RUSH All Analysis As indicated
required on: ☐ or ☐
Date Required: _____
Signature: _____
Exova Authorization: _____

Sample Custody (Please Print)

Sampled by:

Company Signature

I authorize Exova to proceed with the work
work indicated on this form:

Date: Initial:

Received by: Sample
Temp. 17.1

Waybill #: NOV 13 '18 11:05

Company Time

Special Instructions / Comments

* Please report ug/sample and volumes +/- 1 mL

FOR LAB USE ONLY

Condition of containers/coolers
upon arrival at lab

Please indicate which regulations you are required to meet: _____

	Sample Identification	Location	Depth			Date/Time Sampled	Matrix	Sampling Method	↓	Enter tests above (✓ relevant samples below)									
			IN	CM	M														
1	Unit 1 NH ₃ Blank					08-Nov-18			1	✓									
2																			
3	Unit 2 NH ₃ Blank					07-Nov-18			1	✓									
4																			
5	Unit 3 NH ₃ Blank					06-Nov-18			1	✓									
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

Page ____ of ____

APPENDIX - B

LABORATORY RESULTS

Appendix B - Particulate Analysis

Filter Collection:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	0.4728	0.4728	0.0000	
Unit 1 Run 1	0.4745	0.4740	-0.0005	ND
Unit 1 Run 2	0.4752	0.4746	-0.0006	ND
Unit 1 Run 3	0.4793	0.4788	-0.0005	ND
Unit 2 Blank	0.4789	0.4790	0.0001	
Unit 2 Run 1	0.4814	0.4807	-0.0007	ND
Unit 2 Run 2	0.4739	0.4730	-0.0009	ND
Unit 2 Run 3	0.4751	0.4743	-0.0008	ND
Unit 3 Blank	0.4737	0.4738	0.0001	
Unit 3 Run 1	0.4789	0.4778	-0.0011	ND
Unit 3 Run 2	0.4785	0.4777	-0.0008	ND
Unit 3 Run 3	0.4781	0.4772	-0.0009	ND

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Diference (grams)	Blank Adjusted (grams)
Unit 1 Blank	121.3306	121.3305	-0.0001	
Unit 1 Run 1	122.2531	122.2547	0.0016	0.0017
Unit 1 Run 2	121.2323	121.2327	0.0004	0.0005
Unit 1 Run 3	121.7273	121.7278	0.0005	0.0006
Unit 2 Blank	122.9695	122.9699	0.0004	
Unit 2 Run 1	122.0330	122.0365	0.0035	0.0031
Unit 2 Run 2	121.9166	121.9185	0.0019	0.0015
Unit 2 Run 3	121.1058	121.1069	0.0011	0.0007
Unit 3 Blank	121.7994	121.7992	-0.0002	
Unit 3 Run 1	122.3192	122.3228	0.0036	0.0038
Unit 3 Run 2	121.0385	121.0416	0.0031	0.0033
Unit 3 Run 3	121.8354	121.8377	0.0023	0.0025

Report Transmission Cover Page

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312781
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	Metals and Hg	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Dec 4, 2018
Attn:	Missy	P.O.:		Report Number:	2347181
Sampled By:		Proj. Acct. code:			
Company:					

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 - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

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Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg LSD: P.O.: Proj. Acct. code:	Lot ID: 1312781 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347181
--	---	--

		Reference Number	1312781-1	1312781-2	1312781-3
		Sample Date	Nov 07, 2018	Nov 08, 2018	Nov 08, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 1 Run 1 (beaker (MV Unit 1 R-1) + 4 bottles)	Unit 1 Run 2 (beaker (MV Unit 1 R-2) + 4 bottles)	Unit 1 Run 3 (beaker (MV Unit 1 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	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	2	<1	1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	3.33	0.86	2.3	0.2
Cobalt	µg	0.4	<0.3	<0.3	0.25
Copper	µg	3.3	2	3.2	0.25
Lead	µg	4.0	3.0	5.6	1.5
Manganese	µg	2	0.7	2	0.25
Nickel	µg	3.1	0.9	3.2	0.5
Phosphorus	µg	160	170	170	2.5
Selenium	µg	3.1	2.8	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	7.7	2	2	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	6	<4	9	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.9	2.3	1	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	0.71	0.60	0.84	0.2
Cobalt	µg	<0.2	<0.2	0.5	0.25
Copper	µg	2	<0.2	0.8	0.25
Lead	µg	2.6	2	2.9	1.5
Manganese	µg	2	0.6	1	0.25
Nickel	µg	0.5	0.5	6.1	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	2	4.4	4.9	1.5
Tellurium	µg	2.4	<2	<2	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	9.5	3.5	17	0.5
Volume	Sample	mL	750	748	820
Volume	aliquot volume	mL	700	698	770
Mercury by CVAA					
Mercury	As Tested	µg/L	0.17	0.15	0.18
					0.05

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg LSD: P.O.: Proj. Acct. code:	Lot ID: 1312781 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347181
--	---	--

		Reference Number	1312781-1	1312781-2	1312781-3	Nominal Detection Limit
		Sample Date	Nov 07, 2018	Nov 08, 2018	Nov 08, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 1 Run 1 (beaker (MV Unit 1 R-1) + 4 bottles)	Unit 1 Run 2 (beaker (MV Unit 1 R-2) + 4 bottles)	Unit 1 Run 3 (beaker (MV Unit 1 R-3) + 4 bottles)	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
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	0.07	0.06	0.07	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	750	748	820	
Volume	aliquot volume	mL	5	5	5	
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	178	152	152	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	202	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	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg LSD: P.O.: Proj. Acct. code:	Lot ID: 1312781 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347181
--	---	--

		Reference Number	1312781-4	1312781-5	1312781-6
		Sample Date	Nov 06, 2018	Nov 07, 2018	Nov 07, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 2 Run 1 (beaker (MV Unit 2 R-1) + 4 bottles)	Unit 2 Run 2 (beaker (MV Unit 2 R-2) + 4 bottles)	Unit 2 Run 3 (beaker (MV Unit 2 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	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	28.4	1.1	1.1	0.2
Cobalt	µg	<0.3	<0.3	0.3	0.25
Copper	µg	5.4	3.0	0.8	0.25
Lead	µg	2.8	2.8	2	1.5
Manganese	µg	2	0.6	0.9	0.25
Nickel	µg	3.8	2	0.9	0.5
Phosphorus	µg	170	160	160	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	3.0	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	5.3	<0.5	0.8	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	46	9	8	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.8	<0.9	<0.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	1.6	1.3	1.4	0.2
Cobalt	µg	8.6	<0.2	<0.2	0.25
Copper	µg	2.8	2	1	0.25
Lead	µg	2.6	2.6	2.5	1.5
Manganese	µg	3.1	1	1	0.25
Nickel	µg	2	0.6	0.6	0.5
Phosphorus	µg	20	20	10	2.5
Selenium	µg	6.5	2	5.2	1.5
Tellurium	µg	<2	<2	2	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.8	<0.9	<0.9	1
Zinc	µg	30.0	7.4	9.5	0.5
Volume	Sample	mL	918	810	765
Volume	aliquot volume	mL	868	760	715
Mercury by CVAA					
Mercury	As Tested	µg/L	0.07	0.19	0.18
					0.05

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1312781
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Nov 13, 2018
V4N 4W7	LSD:	Date Reported: Dec 4, 2018
Attn: Missy	P.O.:	Report Number: 2347181
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1312781-4	1312781-5	1312781-6	Nominal Detection Limit
		Sample Date	Nov 06, 2018	Nov 07, 2018	Nov 07, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 2 Run 1 (beaker (MV Unit 2 R-1) + 4 bottles)	Unit 2 Run 2 (beaker (MV Unit 2 R-2) + 4 bottles)	Unit 2 Run 3 (beaker (MV Unit 2 R-3) + 4 bottles)	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
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	0.03	0.08	0.07	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	918	810	765	
Volume	aliquot volume	mL	5	5	5	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.4	<0.3	<0.3	
Mercury	As Tested	µg/L	<0.05	0.06	0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	168	146	154	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	<0.01	0.01	0.01	
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	<0.08	<0.08	<0.08	
Mercury	As Tested	µg/L	0.09	0.06	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	200	201	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	µg/sample	0.03	0.02	<0.02	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg LSD: P.O.: Proj. Acct. code:	Lot ID: 1312781 Control Number: Date Received: Nov 13, 2018 Date Reported: Dec 4, 2018 Report Number: 2347181
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		Reference Number	1312781-7	1312781-8	1312781-9
		Sample Date	Nov 05, 2018	Nov 06, 2018	Nov 06, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	Unit 3 Run 1 (beaker (MV Unit 3 R-1) + 4 bottles)	Unit 3 Run 2 (beaker (MV Unit 3 R-2) + 4 bottles)	Unit 3 Run 3 (beaker (MV Unit 3 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	20	<5	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	5.12	1.8	0.93	0.2
Cobalt	µg	0.4	<0.3	<0.3	0.25
Copper	µg	2	0.5	2	0.25
Lead	µg	2	4.7	5.0	1.5
Manganese	µg	4.6	2	1	0.25
Nickel	µg	12	3.1	2.9	0.5
Phosphorus	µg	180	160	160	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	4.0	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	7.1	2	0.9	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	26	20	<4	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	0.98	3.68	0.97	0.2
Cobalt	µg	<0.2	0.3	<0.2	0.25
Copper	µg	3.8	2.8	0.7	0.25
Lead	µg	1	4.0	2.5	1.5
Manganese	µg	2	2	1	0.25
Nickel	µg	0.7	3.1	1	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	4.7	7.8	3.4	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	1	<1	<1	1.5
Vanadium	µg	<0.9	<0.9	<0.9	1
Zinc	µg	6.5	9.3	13	0.5
Volume	Sample	mL	740	840	755
Volume	aliquot volume	mL	690	790	705
Mercury by CVAA					
Mercury	As Tested	µg/L	0.28	0.20	0.29
					0.05

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1312781
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Nov 13, 2018
V4N 4W7	LSD:	Date Reported: Dec 4, 2018
Attn: Missy	P.O.:	Report Number: 2347181
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1312781-7	1312781-8	1312781-9	Nominal Detection Limit
		Sample Date	Nov 05, 2018	Nov 06, 2018	Nov 06, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Unit 3 Run 1 (beaker (MV Unit 3 R-1) + 4 bottles)	Unit 3 Run 2 (beaker (MV Unit 3 R-2) + 4 bottles)	Unit 3 Run 3 (beaker (MV Unit 3 R-3) + 4 bottles)	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte	Units	Results	Results	Results		
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	0.1	0.08	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	740	840	755	
Volume	aliquot volume	mL	5	5	5	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	<0.3	<0.3	<0.3	
Mercury	As Tested	µg/L	0.80	0.18	0.13	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	140	128	144	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	0.2	0.04	0.03	
Mercury	As Tested	µg/L	0.11	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL	1000	1000	1000	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	µg/sample	0.2	<0.08	<0.08	
Mercury	As Tested	µg/L	0.33	0.12	0.14	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	0.1	0.04	0.04	

Approved by: 
Mathieu Simoneau
Operations Manager

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

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312781
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	Metals and Hg	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Dec 4, 2018
Attn:	Missy	P.O.:		Report Number:	2347181
Sampled By:		Proj. Acct. code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Nov 28, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Nov 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Nov 20, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Nov 14, 2018	Exova Surrey

** Reference Method Modified*

References

EMC Emission Measurement Center of EPA

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Exova



Test
Assuring

Lot: 1312781 COC



Control Number

Information Sheet

Required in order to proceed with analysis

Billing Address: Company: A. Lanfranco and Associates Address: Unit 101 9488 189 St Surrey, BC V4N 4W7		Copy of Report To: Company: Address:	Copy of invoice: Mail invoice to this address for approval
Attention: Mark Lanfranco Phone: 604-881-2582 Fax: 604-881-2581 Cell: e-mail: mark.lanfranco@alanfranco.com		Report Result: Fax ☐ Mail ☐ Courier ☐ e-mail ☐ e-Service ☐	

Information to be included on Report and Invoice Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg Legal Location: PO#: Proj. Acct. Code: Agreement ID:	RUSH Please contact the laboratory to confirm rush dates and times before submitting samples. Upon filling out this section, client accepts that surcharges will be attached to this analysis RUSH required on: ☐ All Analysis ☐ or ☐ As indicated Date Required: _____ Signature: _____ Exova Authorization: _____	Sample Custody (Please Print) Sampled by: _____ Company _____ Signature _____ I authorize Exova to proceed with the work work indicated on this form: Date: _____ Initial: _____ Received by: _____ Sample Temp. 17.1°C Waybill #: _____ Date _____ Company _____ Time _____
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Special Instructions / Comments *Front and Back ICAP as per EPA Method 29 *Hg analysis as per EPA Method 29 * Please report ug/sample Please indicate which regulations you are required to meet: _____	FOR LAB USE ONLY Condition of containers/coolers upon arrival at lab	☐ Check here if Exova is required to report results directly to a regulatory body (Please include contact information) ☐ Check here if you are testing POTABLE WATER for HUMAN CONSUMPTION
--	--	---

	Sample Identification	Location	Depth			Date/Time Sampled	Matrix	Sampling Method	Number of Containers	Enter tests above (✓ relevant samples below)									
			IN	CM	M					Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg				
1	Unit 1 Run 1 (Beaker (MV Unit 1 R-1) + 4 Bottles)					07-Nov-18			5	✓	✓	✓	✓	✓	✓				
2	Unit 1 Run 2 (Beaker (MV Unit 1 R-2) + 4 Bottles)					08-Nov-18			5	✓	✓	✓	✓	✓	✓				
3	Unit 1 Run 3 (Beaker (MV Unit 1 R-3) + 4 Bottles)					08-Nov-18			5	✓	✓	✓	✓	✓	✓				
4																			
5	Unit 2 Run 1 (Beaker (MV Unit 2 R-1) + 4 Bottles)					06-Nov-18			5	✓	✓	✓	✓	✓	✓				
6	Unit 2 Run 2 (Beaker (MV Unit 2 R-2) + 4 Bottles)					07-Nov-18			5	✓	✓	✓	✓	✓	✓				
7	Unit 2 Run 3 (Beaker (MV Unit 2 R-3) + 4 Bottles)					07-Nov-18			5	✓	✓	✓	✓	✓	✓				
8																			
9	Unit 3 Run 1 Beaker (MV Unit 3 R-1) + 4 Bottles)					05-Nov-18			5	✓	✓	✓	✓	✓	✓				
10	Unit 3 Run 2 Beaker (MV Unit 3 R-2) + 4 Bottles)					06-Nov-18			5	✓	✓	✓	✓	✓	✓				
11	Unit 3 Run 3 Beaker (MV Unit 3 R-3) + 4 Bottles)					06-Nov-18			5	✓	✓	✓	✓	✓	✓				
12																			
13																			
14																			
15																			



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

Date Received: 09-NOV-18
Report Date: 19-NOV-18 13:09 (MT)
Version: FINAL

Client Phone: 604-881-2582

Certificate of Analysis

Lab Work Order #: L2195127
Project P.O. #: NOT SUBMITTED
Job Reference: METRO VANCOUVER WTE
C of C Numbers:
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2195127-1	L2195127-2	L2195127-3	L2195127-4	L2195127-5
		Description	Water	Water	Water	Water	Water
		Sampled Date					
		Sampled Time					
		Client 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
Grouping	Analyte						
STACK							
Anions and Nutrients	Fluoride (F) (ug/sample)		283	13.4	<17 ^{DLDS}	<3.1	<2.7
	Volume (Anions) (mL)		405	360	340	310	270

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2195127-6	L2195127-7	L2195127-8	L2195127-9	
		Description	Water	Water	Water	Water	
		Sampled Date					
		Sampled Time					
		Client ID	UNIT 2 HF RUN 3	UNIT 3 HF RUN 1	UNIT 3 HF RUN 2	UNIT 3 HF RUN 3	
Grouping	Analyte						
STACK							
Anions and Nutrients	Fluoride (F) (ug/sample)		<3.4	6.0	<18 ^{DLDS}	4.9	
	Volume (Anions) (mL)		335	350	365	365	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Parameters Listed:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F-IMP-UG-VA	Stack	Fluoride in Water from Impinger	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

** 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
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, 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 ww - 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.



L2195127-COFC



Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #

Page 1 of 1

Company: A. Lanfranco and Associates		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Contact: Mark Lanfranco		☒ Standard ☐ Other		☒ Regular (Standard Turnaround)	
Address: Unit 101 9488 189 St		Email 1: mark.lanfranco@alanelanfranco.com		☐ Priority (2-4 Business Days)	
Surrey BC V4N 4W7		Email 2:		☐ Digital ☐ Fax	
Phone: 604-881-2582 Fax: 604-881-2581		Email 3:		☐ Emergency (1-2 BUS. DAYS) - 1	
Invoice To Same as Report ?		Client / Project Information		Please indicate below Filtered, P, C, or S, or D, or W, or E, or H, or G, or F, or A, or B, or C, or D, or E, or F, or G, or H, or I, or J, or K, or L, or M, or N, or O, or P, or Q, or R, or S, or T, or U, or V, or W, or X, or Y, or Z, or AA, or AB, or AC, or AD, or AE, or AF, or AG, or AH, or AI, or AJ, or AK, or AL, or AM, or AN, or AO, or AP, or AQ, or AR, or AS, or AT, or AU, or AV, or AW, or AX, or AY, or AZ, or BA, or BB, or BC, or BD, or BE, or BF, or BG, or BH, or BI, or BJ, or BK, or BL, or BM, or BN, or BO, or BP, or BQ, or BR, or BS, or BT, or BU, or BV, or BW, or BX, or BY, or BZ, or CA, or CB, or CC, or CD, or CE, or CF, or CG, or CH, or CI, or CJ, or CK, or CL, or CM, or CN, or CO, or CP, or CQ, or CR, or CS, or CT, or CU, or CV, or CW, or CX, or CY, or CZ, or DA, or DB, or DC, or DD, or DE, or DF, or DG, or DH, or DI, or DJ, or DK, or DL, or DM, or DN, or DO, or DP, or DQ, or DR, or DS, or DT, or DU, or DV, or DW, or DX, or DY, or DZ, or EA, or EB, or EC, or ED, or EE, or EF, or EG, or EH, or EI, or EJ, or EK, or EL, or EM, or EN, or EO, or EP, or EQ, or ER, or ES, or ET, or EU, or EV, or EW, or EX, or EY, or EZ, or FA, or FB, or FC, or FD, or FE, or FF, or FG, or FH, or FI, or FJ, or FK, or FL, or FM, or FN, or FO, or FP, or FQ, or FR, or FS, or FT, or FU, or FV, or FW, or FX, or FY, or FZ, or GA, or GB, or GC, or GD, or GE, or GF, or GG, or GH, or GI, or GJ, or GK, or GL, or GM, or GN, or GO, or GP, or GQ, or GR, or GS, or GT, or GU, or GV, or GW, or GX, or GY, or GZ, or HA, or HB, or HC, or HD, or HE, or HF, or HG, or HH, or HI, or HJ, or HK, or HL, or HM, or HN, or HO, or HP, or HQ, or HR, or HS, or HT, or HU, or HV, or HW, or HX, or HY, or HZ, or IA, or IB, or IC, or ID, or IE, or IF, or IG, or IH, or II, or IJ, or IK, or IL, or IM, or IN, or IO, or IP, or IQ, or IR, or IS, or IT, or IU, or IV, or IW, or IX, or IY, or IZ, or JA, or JB, or JC, or JD, or JE, or JF, or JG, or JH, or JI, or JJ, or JK, or JL, or JM, or JN, or JO, or JP, or JQ, or JR, or JS, or JT, or JU, or JV, or JW, or JX, or JY, or JZ, or KA, or KB, or KC, or KD, or KE, or KF, or KG, or KH, or KI, or KJ, or KK, or KL, or KM, or KN, or KO, or KP, or KQ, or KR, or KS, or KT, or KU, or KV, or KW, or KX, or KY, or KZ, or LA, or LB, or LC, or LD, or LE, or LF, or LG, or LH, or LI, or LJ, or LK, or LL, or LM, or LN, or LO, or LP, or LQ, or LR, or LS, or LT, or LU, or LV, or LW, or LX, or LY, or LZ, or MA, or MB, or MC, or MD, or ME, or MF, or MG, or MH, or MI, or MJ, or MK, or ML, or MM, or MN, or MO, or MP, or MQ, or MR, or MS, or MT, or MU, or MV, or MW, or MX, or MY, or MZ, or NA, or NB, or NC, or ND, or NE, or NF, or NG, or NH, or NI, or NJ, or NK, or NL, or NM, or NN, or NO, or NP, or NQ, or NR, or NS, or NT, or NU, or NV, or NW, or NX, or NY, or NZ, or OA, or OB, or OC, or OD, or OE, or OF, or OG, or OH, or OI, or OJ, or OK, or OL, or OM, or ON, or OO, or OP, or OQ, or OR, or OS, or OT, or OU, or OV, or OW, or OX, or OY, or OZ, or PA, or PB, or PC, or PD, or PE, or PF, or PG, or PH, or PI, or PJ, or PK, or PL, or PM, or PN, or PO, or PP, or PQ, or PR, or PS, or PT, or PU, or PV, or PW, or PX, or PY, or PZ, or QA, or QB, or QC, or QD, or QE, or QF, or QG, or QH, or QI, or QJ, or QK, or QL, or QM, or QN, or QO, or QP, or QQ, or QR, or QS, or QT, or QU, or QV, or QW, or QX, or QY, or QZ, or RA, or RB, or RC, or RD, or RE, or RF, or RG, or RH, or RI, or RJ, or RK, or RL, or RM, or RN, or RO, or RP, or RQ, or RR, or RS, or RT, or RU, or RV, or RW, or RX, or RY, or RZ, or SA, or SB, or SC, or SD, or SE, or SF, or SG, or SH, or SI, or SJ, or SK, or SL, or SM, or SN, or SO, or SP, or SQ, or SR, or SS, or ST, or SU, or SV, or SW, or SX, or SY, or SZ, or TA, or TB, or TC, or TD, or TE, or TF, or TG, or TH, or TI, or TJ, or TK, or TL, or TM, or TN, or TO, or TP, or TQ, or TR, or TS, or TT, or TU, or TV, or TW, or TX, or TY, or TZ, or UA, or UB, or UC, or UD, or UE, or UF, or UG, or UH, or UI, or UJ, or UK, or UL, or UM, or UN, or UO, or UP, or UQ, or UR, or US, or UT, or UY, or UZ, or VA, or VB, or VC, or VD, or VE, or VF, or VG, or VH, or VI, or VJ, or VK, or VL, or VM, or VN, or VO, or VP, or VQ, or VR, or VS, or VT, or VU, or VV, or VW, or VX, or VY, or VZ, or WA, or WB, or WC, or WD, or WE, or WF, or WG, or WH, or WI, or WJ, or WK, or WL, or WM, or WN, or WO, or WP, or WQ, or WR, or WS, or WT, or WU, or WV, or WW, or WX, or WY, or WZ, or XA, or XB, or XC, or XD, or XE, or XF, or XG, or XH, or XI, or XJ, or XK, or XL, or XM, or XN, or XO, or XP, or XQ, or XR, or XS, or XT, or XU, or XV, or XW, or XX, or XY, or XZ, or YA, or YB, or YC, or YD, or YE, or YF, or YG, or YH, or YI, or YJ, or YK, or YL, or YM, or YN, or YO, or YP, or YQ, or YR, or YS, or YT, or YU, or YV, or YW, or YX, or YY, or YZ, or ZA, or ZB, or ZC, or ZD, or ZE, or ZF, or ZG, or ZH, or ZI, or ZJ, or ZK, or ZL, or ZM, or ZN, or ZO, or ZP, or ZQ, or ZR, or ZS, or ZT, or ZU, or ZV, or ZW, or ZX, or ZY, or ZZ	
Company: A. Lanfranco and Associates		Contact: Mark Lanfranco		Address: Unit 101 9488 189 St	
Surrey BC V4N 4W7		Phone: 604-881-2582		Fax: 604-881-2581	
Invoice To Same as Report ?		Hardcopy of Invoice with Report?		Company: ☒ Yes ☐ No	
Contact: ☒ Yes ☐ No		Address: ☒ Yes ☐ No		Phone: ☒ Yes ☐ No	
Fax: ☒ Yes ☐ No		ALS Lab Work Order #		ALS Contact: Brent Mack	
Sample Identification (This description will appear on the report)		Date (dd-mm-yy)		Time (hh:mm)	
Unit 1 HF Run 1		08-Nov-18		Water	
Unit 1 HF Run 2		08-Nov-18		Water	
Unit 1 HF Run 3		08-Nov-18		Water	
Unit 2 HF Run 1		07-Nov-18		Water	
Unit 2 HF Run 2		07-Nov-18		Water	
Unit 2 HF Run 3		07-Nov-18		Water	
Unit 3 HF Run 1		06-Nov-18		Water	
Unit 3 HF Run 2		06-Nov-18		Water	
Unit 3 HF Run 3		06-Nov-18		Water	
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details		Number of Containers		1	
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)	
Released by:		Date (dd-mm-yy)		Time (hh:mm)	
Received by:		Date: Nov 9		Time: 21:45	
Temperature: 18 °C		Verified by:		Date:	
Observations: Yes / No ?		If Yes add SIF		GENF 20.00 Front	

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1312805
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: NH3	Date Received: Nov 13, 2018
V4N 4W7	LSD:	Date Reported: Nov 19, 2018
Attn: Missy	P.O.:	Report Number: 2347220
Sampled By:	Proj. Acct. code:	
Company:		

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 - Merge Reports	PDF	COC / Test Report
Email - Multiple Reports By Agreement	PDF	COA
Email - Single Report	PDF	COR

Notes To Clients:

- Nov 19, 2018 - Reduction of analytical volume was necessary for ammonia in air analysis to bring results within the analytical range for samples #1312805-1-9. Detection limits are adjusted accordingly.

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7 Attn: Missy Sampled By: Company:	Project ID: Project Name: Metro Vancouver WTE Project Location: NH3 LSD: P.O.: Proj. Acct. code:	Lot ID: 1312805 Control Number: Date Received: Nov 13, 2018 Date Reported: Nov 19, 2018 Report Number: 2347220
--	---	---

		Reference Number	1312805-1	1312805-2	1312805-3	
		Sample Date	Nov 08, 2018	Nov 08, 2018	Nov 08, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	NH3 Unit 1 Run 1	NH3 Unit 1 Run 2	NH3 Unit 1 Run 3	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	2280	3510	3410	10
Dilution Factor	As Tested		10.0	10.0	10.0	
Sample Volume	Sample volume	mL	390	420	435	
Ammonium - N		µg/sample	888	1470	1480	

Analytical Report

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: NH3 LSD: P.O.: Proj. Acct. code:	Lot ID: 1312805 Control Number: Date Received: Nov 13, 2018 Date Reported: Nov 19, 2018 Report Number: 2347220
Attn: Missy Sampled By: Company:		

		Reference Number	1312805-4	1312805-5	1312805-6
		Sample Date	Nov 07, 2018	Nov 07, 2018	Nov 07, 2018
		Sample Time	NA	NA	NA
		Sample Location			
		Sample Description	NH3 Unit 2 Run 1	NH3 Unit 2 Run 2	NH3 Unit 2 Run 3
		Matrix	Stack Samples	Stack Samples	Stack Samples
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Air Quality					
Ammonium - N	As Tested	µg/L	4790	6990	6590
Dilution Factor	As Tested		10.0	10.0	10.0
Sample Volume	Sample volume	mL	380	360	190
Ammonium - N		µg/sample	1820	2520	1250

Analytical Report

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312805
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	NH3	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Nov 19, 2018
Attn:	Missy	P.O.:		Report Number:	2347220
Sampled By:		Proj. Acct. code:			
Company:					

		Reference Number	1312805-7	1312805-8	1312805-9	
		Sample Date	Nov 06, 2018	Nov 06, 2018	Nov 06, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	NH3 Unit 3 Run 1	NH3 Unit 3 Run 2	NH3 Unit 3 Run 3	
		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Air Quality						
Ammonium - N	As Tested	µg/L	5420	8450	15200	10
Dilution Factor	As Tested		10.0	10.0	100	
Sample Volume	Sample volume	mL	305	365	410	
Ammonium - N		µg/sample	1650	3090	6240	

Approved by: 
Randy Neumann, BSc
Division Director

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

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To:	A. Lanfranco & Associates	Project ID:		Lot ID:	1312805
	#101, 9488 - 189 Street	Project Name:	Metro Vancouver WTE	Control Number:	
	Surrey, BC, Canada	Project Location:	NH3	Date Received:	Nov 13, 2018
	V4N 4W7	LSD:		Date Reported:	Nov 19, 2018
Attn:	Missy	P.O.:		Report Number:	2347220
Sampled By:		Proj. Acct. code:			
Company:					

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Ammonium in Impingers (Surrey)	APHA	* Flow Injection Analysis, 4500-NH3 H	Nov 19, 2018	Exova Surrey
* Reference Method Modified				

References

APHA	Standard Methods for the Examination of Water and Wastewater
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Comments:

- Nov 19, 2018 - Reduction of analytical volume was necessary for ammonia in air analysis to bring results within the analytical range for samples #1312805-1-9. Detection limits are adjusted accordingly.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



Lot: 1312805 ^{COC}

Number

to proceed with analysis

QA/QC Report ☐

Attention: Al Lanfranco
Phone: 604-881-2582
Fax: 604-881-2581
Cell:
e-mail: mark.lanfranco@alanfranco.com

Report Result:

Fax	
Mail	
Courier	
e-mail	
e-Service	

Company:
Address:

Mail invoice to this
address for approval

Report Result:

Fax	
Mail	
Courier	
e-mail	
e-Service	

Upon filling out this section, client accepts that surcharges will be attached to this analysis

Project ID:
Project Name: Metro Vancouver WTE
Project Location: NH3
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH All Analysis As indicated
required on: ☐ or ☐
Date Required: _____
Signature: _____
Exova Authorization: _____

Sample Custody (Please Print)

Sampled by:

Company	Signature
---------	-----------

I authorize Exova to proceed with the work
work indicated on this form:

Date: Initial:

Received by:	Sample
--------------	--------

Temp.

Waybill #:	Date:
------------	-------

Company	Time
---------	------

Special Instructions / Comments

FOR LAB USE ONLY

Condition of containers/coolers
upon arrival at lab

* Please report ug/sample and volumes +/- 1 mL

Please indicate which regulations you are required to meet:

	Check here if Exova is required to report results directly to a regulatory body (Please include contact information)
--	--

☐ Check here if you are testing POTABLE
WATER for HUMAN CONSUMPTION[illegible][illegible]

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

Page of



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

LABORATORY REPORT

November 28, 2018

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

RE: Metro Vancouver WTE

Dear Mark:

Enclosed are the results of the samples submitted to our laboratory on November 12, 2018. For your reference, these analyses have been assigned our service request number P1806200.

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.

Respectfully submitted,

ALS | Environmental



By Sue Anderson at 2:26 pm, Nov 28, 2018

For Kate Kaneko
Laboratory Director



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

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

Service Request No: P1806200

CASE NARRATIVE

The samples were received intact under chain of custody on November 12, 2018 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

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

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

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

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



2655 Park Center Dr., Suite A
 Simi Valley, CA 93065
 T: +1 805 526 7161
www.alsglobal.com

ALS Environmental – Simi Valley

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	1347317
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	4068-005
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	T104704413-18-9
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272018-9
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946
Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.		

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

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

Service Request: P1806200

Date Received: 11/12/2018
Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - C1C6+ Can	
								TO-3 Modified - C1C6+ Can	TO-3 Modified - MEPP Can
Metro Van WTE Unit 1 Run 1	P1806200-001	Air	11/8/2018	11:25	AC02042	-1.43	3.60	X	X
Metro Van WTE Unit 1 Run 2	P1806200-002	Air	11/8/2018	12:45	AC01911	-1.14	3.90	X	X
Metro Van WTE Unit 1 Run 3	P1806200-003	Air	11/8/2018	14:01	AC00677	-2.44	3.53	X	X
Metro Van WTE Unit 2 Run 1	P1806200-004	Air	11/7/2018	11:19	AS01350	-2.55	3.63	X	X
Metro Van WTE Unit 2 Run 2	P1806200-005	Air	11/7/2018	12:35	AC01780	-6.24	3.60	X	X
Metro Van WTE Unit 2 Run 3	P1806200-006	Air	11/7/2018	13:49	AC01610	-4.20	3.51	X	X
Metro Van WTE Unit 3 Run 1	P1806200-007	Air	11/6/2018	11:51	AC01034	-5.89	3.51	X	X
Metro Van WTE Unit 3 Run 2	P1806200-008	Air	11/6/2018	13:08	AS00535	-3.46	3.55	X	X
Metro Van WTE Unit 3 Run 3	P1806200-009	Air	11/6/2018	14:29	AS01282	-1.81	3.65	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

Company Name & Address (Reporting Information)				Project Name				ALS Project No. P1806200			
A. Lanfranco and Associates Inc.				Metro Vancouver WTE				ALS Contact:			
Project Manager				Project Number				Analysis Method			
Phone				P.O. # / Billing Information				Comments e.g. Actual Preservative or specific instructions			
604 881 2582				Turn around time 10 Day-Standard							
Email Address for Result Reporting				Sampler (Print & Sign)				EPA TO-3 (list on file)			
mark.lanfranco@alanfranco.com											
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			
Metro Van WTE Unit 1 Run 1	1	8-Nov-18	10:25-11:25	Ac02042	0A00506	-30	-6	x			
Metro Van WTE Unit 1 Run 2	2	8-Nov-18	11:45-12:45	Ac01911	0A01136	-33	-5	x			
Metro Van WTE Unit 1 Run 3	3	8-Nov-18	1:01-2:01	Ac00677	0A00610	-24	-8	x			
Metro Van WTE Unit 2 Run 1	4	7-Nov-18	10:19-11:19	As01350	0A01164	-30	-7	x			
Metro Van WTE Unit 2 Run 2	5	7-Nov-18	11:35-12:35	Ac01780	0A02170	-29	-14	x			
Metro Van WTE Unit 2 Run 3	6	7-Nov-18	12:49-1:49	Ac01610	0A01266	-31	-10	x			
Metro Van WTE Unit 3 Run 1	7	6-Nov-18	10:51-11:51	Ac01034	0A00647	-31	-14	x			
Metro Van WTE Unit 3 Run 2	8	6-Nov-18	12:08-1:08	As00535	0A02118	-30	-8	x			
Metro Van WTE Unit 3 Run 3	9	6-Nov-18	1:29-2:29	As01282	0A00009	-25	-6	x			
Report Tier Levels - please select				Chain of Custody Seal: (Circle)				Project Requirements (MRLs, QAPP)			
Tier I - Results (Default if not specified)				Tier III (Results + QC & Calibration Summaries)				INTACT BROKEN ABSENT			
Tier II (Results + QC Summaries)				Tier IV (Data Validation Package) 10% Surcharge				Type: Units:			
Relinquished by: (Signature)				Received by: (Signature)				Date: Time:			
Relinquished by: (Signature)				Received by: (Signature)				Date: Time:			
								Cooler / Blank Temperature °C			

ALS Environmental Sample Acceptance Check Form

Client: A. Lanfranco and Associates Inc. Work order: P1806200
 Project: Metro Vancouver WTE
 Sample(s) received on: 11/12/18 Date opened: 11/12/18 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 <u>if necessary</u> 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
P1806200-001.01	6.0 L Ambient Can					
P1806200-002.01	6.0 L Ambient Can					
P1806200-003.01	6.0 L Ambient Can					
P1806200-004.01	6.0 L Silonite Can					
P1806200-005.01	6.0 L Ambient Can					
P1806200-006.01	6.0 L Ambient Can					
P1806200-007.01	6.0 L Ambient Can					
P1806200-008.01	6.0 L Silonite Can					
P1806200-009.01	6.0 L Silonite Can					

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-001

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC02042

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.43 Final Pressure (psig): 3.60

Container Dilution Factor: 1.38

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.69	
74-85-1	Ethene	ND	0.17	
74-84-0	Ethane	ND	0.17	
74-86-2	Acetylene	ND	0.17	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-002

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01911

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.90

Container Dilution Factor: 1.37

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.69	
74-85-1	Ethene	ND	0.17	
74-84-0	Ethane	ND	0.17	
74-86-2	Acetylene	ND	0.17	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-003

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC00677

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.44 Final Pressure (psig): 3.53

Container Dilution Factor: 1.49

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.75	
74-85-1	Ethene	ND	0.19	
74-84-0	Ethane	ND	0.19	
74-86-2	Acetylene	ND	0.19	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-004

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS01350

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.55 Final Pressure (psig): 3.63

Container Dilution Factor: 1.51

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.76	
74-85-1	Ethene	ND	0.19	
74-84-0	Ethane	ND	0.19	
74-86-2	Acetylene	ND	0.19	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-005

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01780

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -6.24 **Final Pressure (psig):** 3.60

Container Dilution Factor: 2.16

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.1	
74-85-1	Ethene	ND	0.27	
74-84-0	Ethane	ND	0.27	
74-86-2	Acetylene	ND	0.27	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-006

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01610

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.20 **Final Pressure (psig):** 3.51

Container Dilution Factor: 1.73

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.87	
74-85-1	Ethene	ND	0.22	
74-84-0	Ethane	ND	0.22	
74-86-2	Acetylene	ND	0.22	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-007

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01034

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -5.89 Final Pressure (psig): 3.51

Container Dilution Factor: 2.07

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	7.4	1.0	
74-85-1	Ethene	ND	0.26	
74-84-0	Ethane	ND	0.26	
74-86-2	Acetylene	ND	0.26	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-008

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00535

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -3.46 Final Pressure (psig): 3.55

Container Dilution Factor: 1.62

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.81	
74-85-1	Ethene	ND	0.20	
74-84-0	Ethane	ND	0.20	
74-86-2	Acetylene	ND	0.20	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-009

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS01282

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.81 Final Pressure (psig): 3.65

Container Dilution Factor: 1.42

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	1.7	0.71	
74-85-1	Ethene	ND	0.18	
74-84-0	Ethane	ND	0.18	
74-86-2	Acetylene	ND	0.18	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Method Blank

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P181114-MB

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/14/18

Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	0.50	
74-85-1	Ethene	ND	0.13	
74-84-0	Ethane	ND	0.13	
74-86-2	Acetylene	ND	0.13	

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 SUMMARY

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Lab Control Sample

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P181114-LCS

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Magaly Rodriguez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/14/18

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
74-82-8	Methane	1.50	1.66	111	70-130	
74-85-1	Ethene	1.50	1.43	95	70-130	
74-84-0	Ethane	1.50	1.42	95	70-130	
74-86-2	Acetylene	1.50	1.57	105	70-130	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-001

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC02042

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.43 Final Pressure (psig): 3.60

Container Dilution Factor: 1.38

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.69	
C ₄ as n-Butane	ND	0.69	
C ₅ as n-Pentane	ND	0.69	
C ₆ as n-Hexane	ND	0.69	
C ₆ + as n-Hexane	ND	1.4	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-002

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01911

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.90

Container Dilution Factor: 1.37

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.69	
C ₄ as n-Butane	ND	0.69	
C ₅ as n-Pentane	ND	0.69	
C ₆ as n-Hexane	ND	0.69	
C ₆ + as n-Hexane	2.9	1.4	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 1 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-003

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC00677

Date Collected: 11/8/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.44

Final Pressure (psig): 3.53

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	3.7	1.5	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-004

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS01350

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.55 Final Pressure (psig): 3.63

Container Dilution Factor: 1.51

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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-005

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01780

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -6.24 Final Pressure (psig): 3.60

Container Dilution Factor: 2.16

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	1.1	
C ₄ as n-Butane	ND	1.1	
C ₅ as n-Pentane	ND	1.1	
C ₆ as n-Hexane	ND	1.1	
C ₆ + as n-Hexane	ND	2.2	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 2 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-006

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01610

Date Collected: 11/7/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.20

Final Pressure (psig): 3.51

Container Dilution Factor: 1.73

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

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 1

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-007

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: AC01034

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -5.89 Final Pressure (psig): 3.51

Container Dilution Factor: 2.07

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	1.0	
C ₄ as n-Butane	ND	1.0	
C ₅ as n-Pentane	ND	1.0	
C ₆ as n-Hexane	ND	1.0	
C ₆ + as n-Hexane	ND	2.1	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-008

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00535

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -3.46 Final Pressure (psig): 3.55

Container Dilution Factor: 1.62

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.81	
C ₄ as n-Butane	ND	0.81	
C ₅ as n-Pentane	ND	0.81	
C ₆ as n-Hexane	ND	0.81	
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

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Metro Van WTE Unit 3 Run 3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P1806200-009

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Silonite Canister

Test Notes:

Container ID: AS01282

Date Collected: 11/6/18

Date Received: 11/12/18

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -1.81 Final Pressure (psig): 3.65

Container Dilution Factor: 1.42

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.71	
C ₄ as n-Butane	ND	0.71	
C ₅ as n-Pentane	ND	0.71	
C ₆ as n-Hexane	ND	0.71	
C ₆ + as n-Hexane	ND	1.4	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Method Blank

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P181113-MB

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/13/18

Volume(s) Analyzed: 1.0 ml(s)

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.50	
C ₄ as n-Butane	ND	0.50	
C ₅ as n-Pentane	ND	0.50	
C ₆ as n-Hexane	ND	0.50	
C ₆ + as n-Hexane	ND	1.0	

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

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

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Lab Control Sample

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1806200

ALS Sample ID: P181113-LCS

Test Code: EPA TO-3 Modified

Instrument ID: HP5890 II/GC8/FID

Analyst: Gilbert Gutierrez

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/13/18

Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Propane	1,000	1,060	106	94-120	
n-Butane	1,000	1,060	106	91-121	
n-Pentane	1,000	1,030	103	86-118	
n-Hexane	1,000	1,080	108	87-126	

Your Project #: B897495
Your C.O.C. #: B897495-ONTV-01-01

Attention: Tanya Eugene

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/11/09
Report #: R5477597
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8T6435

Received: 2018/11/07, 08:57

Sample Matrix: Tedlar Bag
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Nitrous Oxide (1)	6	N/A	2018/11/07	CAM SOP-00203	GC/ECD

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

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

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

(1) Date Analyzed is the date the analytical batch was created. Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard, where applicable.

Your Project #: B897495
Your C.O.C. #: B897495-ONTV-01-01

Attention: Tanya Eugene

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/11/09
Report #: R5477597
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8T6435

Received: 2018/11/07, 08:57

Encryption Key



Jade Browne
Project Manager Assistant - Air
13 Nov 2018 15:22:49

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Jade Browne, Project Manager Assistant - Air

Email: jbrown@maxxam.ca

Phone# (905) 817-5700

=====

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COMPRESSED GAS PARAMETERS (TEDLAR BAG)

Maxxam ID		IFP419	IFP419	IFP420	IFP421		
Sampling Date							
COC Number		B897495-ONTV-01-01	B897495-ONTV-01-01	B897495-ONTV-01-01	B897495-ONTV-01-01		
	UNITS	US3920-MVWTE UNIT 1 RUN 1	US3920-MVWTE UNIT 1 RUN 1 Lab-Dup	US3921-MVWTE UNIT 1 RUN 2	US3922-MVWTE UNIT 1 RUN 3	RDL	QC Batch
Nitrous Oxide	ppmv	6.3	6.3	4.1	10	0.25	5827644

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		IFP422	IFP423	IFP424		
Sampling Date						
COC Number		B897495-ONTV-01-01	B897495-ONTV-01-01	B897495-ONTV-01-01		
	UNITS	US3923-MVWTE UNIT 3 RUN 1	US3924-MVWTE UNIT 3 RUN 2	US3925-MVWTE UNIT 3 RUN 3	RDL	QC Batch
Nitrous Oxide	ppmv	7.3	5.5	7.0	0.25	5827644

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

TEST SUMMARY

Maxxam ID: IFP419
Sample ID: US3920-MVWTE UNIT 1 RUN 1
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP419 Dup
Sample ID: US3920-MVWTE UNIT 1 RUN 1
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP420
Sample ID: US3921-MVWTE UNIT 1 RUN 2
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP421
Sample ID: US3922-MVWTE UNIT 1 RUN 3
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP422
Sample ID: US3923-MVWTE UNIT 3 RUN 1
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP423
Sample ID: US3924-MVWTE UNIT 3 RUN 2
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

Maxxam ID: IFP424
Sample ID: US3925-MVWTE UNIT 3 RUN 3
Matrix: Tedlar Bag

Collected:
Shipped:
Received: 2018/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5827644	N/A	2018/11/07	Vasan Thiagarajah

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Method Blank		RPD	
			Value	UNITS	Value (%)	QC Limits
5827644	Nitrous Oxide	2018/11/07	<0.1	ppmv	NC	N/A
N/A = Not Applicable						
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.						
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.						
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).						

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Tom Mitchell, B.Sc, Supervisor, Compressed Gases

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: B897730
Site Location: BURNABY B.C.
Your C.O.C. #: B897730-ONTV-01-01

Attention: Tanya Eugene

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/11/12
Report #: R5480902
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8T7861

Received: 2018/11/08, 08:50

Sample Matrix: AIR
Samples Received: 3

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Nitrous Oxide (1)	1	N/A	2018/11/08	CAM SOP-00203	GC/ECD
Nitrous Oxide (1)	2	N/A	2018/11/12	CAM SOP-00203	GC/ECD

Remarks:

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

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

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

(1) Date Analyzed is the date the analytical batch was created. Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard, where applicable.

Your Project #: B897730
Site Location: BURNABY B.C.
Your C.O.C. #: B897730-ONTV-01-01

Attention: Tanya Eugene

Maxxam Analytics
4606 Canada Way
Burnaby, BC
CANADA V5G 1K5

Report Date: 2018/11/12
Report #: R5480902
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8T7861

Received: 2018/11/08, 08:50

Encryption Key



Jade Browne
Project Manager Assistant - Air
13 Nov 2018 15:44:20

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Jade Browne, Project Manager Assistant - Air

Email: jbrown@maxxam.ca

Phone# (905) 817-5700

=====

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Maxxam Job #: B8T7861
Report Date: 2018/11/12

Maxxam Analytics
Client Project #: B897730
Site Location: BURNABY B.C.

COMPRESSED GAS PARAMETERS (AIR)

Maxxam ID		IFX275	IFX275	IFX276	IFX277		
Sampling Date		2018/11/06 11:20	2018/11/06 11:20	2018/11/06 12:27	2018/11/06 13:32		
COC Number		B897730-ONTV-01-01	B897730-ONTV-01-01	B897730-ONTV-01-01	B897730-ONTV-01-01		
	UNITS	US5091-UNIT-2 R-1	US5091-UNIT-2 R-1 Lab-Dup	US5092-UNIT-2 R-2	US5093-UNIT-2 R-3	RDL	QC Batch
Nitrous Oxide	ppmv	1.6	1.6	1.9	2.3	0.1	5832814
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate							

Maxxam Job #: B8T7861
Report Date: 2018/11/12

Maxxam Analytics
Client Project #: B897730
Site Location: BURNABY B.C.

TEST SUMMARY

Maxxam ID: IFX275
Sample ID: US5091-UNIT-2 R-1
Matrix: AIR

Collected: 2018/11/06
Shipped:
Received: 2018/11/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5832814	N/A	2018/11/08	Shilpa Kataria

Maxxam ID: IFX275 Dup
Sample ID: US5091-UNIT-2 R-1
Matrix: AIR

Collected: 2018/11/06
Shipped:
Received: 2018/11/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5832814	N/A	2018/11/12	Shilpa Kataria

Maxxam ID: IFX276
Sample ID: US5092-UNIT-2 R-2
Matrix: AIR

Collected: 2018/11/06
Shipped:
Received: 2018/11/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5832814	N/A	2018/11/12	Shilpa Kataria

Maxxam ID: IFX277
Sample ID: US5093-UNIT-2 R-3
Matrix: AIR

Collected: 2018/11/06
Shipped:
Received: 2018/11/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5832814	N/A	2018/11/12	Shilpa Kataria

GENERAL COMMENTS

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

Maxxam Analytics
Client Project #: B897730
Site Location: BURNABY B.C.

QC Batch	Parameter	Date	Method Blank		RPD	
			Value	UNITS	Value (%)	QC Limits
5832814	Nitrous Oxide	2018/11/12	<0.1	ppmv	NC	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times \text{RDL}$).

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APPENDIX - C

COMPUTER GENERATED RESULTS

Client:	Metro Vancouver	Date:	7-Nov-18
Jobsite:	WTE (Burnaby, BC)	Run:	1 - Particulate / Metals
Source:	Unit 1	Run Time:	14:17 - 16:20

Concentrations:

Particulate	0.65 mg/dscm	0.00028 gr/dscf
	0.37 mg/Acm	0.00016 gr/Acf
	0.54 mg/dscm (@ 11% O ₂)	0.00024 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.045 Kg/hr	0.100 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1160 dscm/min	40962 dscf/min
	19.33 dscm/sec	683 dscf/sec
	2045 Acm/min	72224 Acf/min

Velocity	13.382 m/sec	43.90 f/sec
-----------------	--------------	-------------

Temperature	145.5 °C	293.8 °F
--------------------	----------	----------

Moisture	16.4 %
-----------------	--------

Gas Analysis	9.0 % O ₂
	10.9 % CO ₂

	30.107 Mol. Wt (g/gmole) Dry
	28.119 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6960 dscm	95.210 dscf
Sample Time	120.0 minutes	
Isokineticity	104.7 %	

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

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

Date: 7-Nov-18
Run: 1 - Particulate / Metals
Run Time: 14:17 - 16:20

Control Unit (Y) 0.9717
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8388
 Baro. Press. (in. Hg) 30.39
 Static Press. (in. H₂O) -19.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00170
Total (grams) 0.00175

Gas Analysis (Vol. %):

	CO ₂	O ₂
Traverse 1	10.67	9.33
Traverse 2	11.17	8.67
Average	10.92	9.00

Condensate Collection:
 Impinger 1 164.0
 Impinger 2 142.0
 Impinger 3 44.0
 Impinger 4 14.0
 Impinger 5 6.0
 Impinger 6 3.0
 Gel 24.5
Gain (grams) 397.5

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	29.700								
1	5.0	33.420	0.36	1.85	61	61	5	290	1.5	104.4
2	10.0	37.140	0.36	1.98	60	60	5	289	4.7	104.6
3	15.0	41.120	0.41	2.12	61	61	6	289	8.4	104.7
4	20.0	44.990	0.39	2.51	61	61	6	291	12.5	104.6
5	25.0	49.150	0.45	2.64	62	62	7	292	17.7	104.6
6	30.0	53.270	0.44	2.64	62	62	7	293	25.2	104.8
7	35.0	57.250	0.41	3.17	63	63	7	294	45.6	104.9
8	40.0	61.340	0.43	3.17	64	64	7	292	53.2	104.9
9	45.0	65.280	0.40	2.97	64	64	7	293	58.3	104.8
10	50.0	69.180	0.39	2.91	65	65	7	292	62.5	104.8
11	55.0	72.980	0.37	2.38	65	65	6	290	66.1	104.5
12	60.0	76.740	0.36	1.85	66	66	6	291	69.4	104.6
Traverse 2	0.0	76.740								
1	5.0	80.060	0.28	1.98	67	67	6	289	1.5	104.4
2	10.0	83.430	0.29	1.98	67	67	6	295	4.7	104.6
3	15.0	86.740	0.28	1.92	67	67	6	294	8.4	104.4
4	20.0	90.120	0.29	2.31	68	68	6	294	12.5	104.7
5	25.0	93.610	0.31	2.18	68	68	6	294	17.7	104.5
6	30.0	97.420	0.37	2.31	68	68	6	295	25.2	104.5
7	35.0	102.030	0.54	3.64	69	69	8	297	45.6	105.0
8	40.0	106.880	0.60	3.97	69	69	8	299	53.2	105.0
9	45.0	111.520	0.55	3.97	69	69	8	299	58.3	104.9
10	50.0	116.130	0.54	3.70	70	70	8	300	62.5	105.0
11	55.0	120.650	0.52	2.84	70	70	8	300	66.1	104.7
12	60.0	125.130	0.51	2.51	70	70	8	300	69.4	104.7
Average:			0.410	2.646	65.7	65.7	6.7	293.8		104.7

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

Date: 8-Nov-18
Run: 2 - Particulate / Metals
Run Time: 09:23 - 11:25

Concentrations:

Particulate	0.23 mg/dscm	0.00010 gr/dscf
	0.13 mg/Acm	0.00006 gr/Acf
	0.20 mg/dscm (@ 11% O ₂)	0.00009 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.016 Kg/hr	0.036 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1172 dscm/min	41407 dscf/min
	19.54 dscm/sec	690 dscf/sec
	2048 Acfm/min	72325 Acf/min

Velocity	13.401 m/sec	43.97 f/sec
-----------------	--------------	-------------

Temperature	143.4 °C	290.0 °F
--------------------	----------	----------

Moisture	16.5 %
-----------------	--------

Gas Analysis	9.7 % O ₂
	10.3 % CO ₂

30.040 Mol. Wt (g/gmole) Dry
28.055 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.3689 dscm	83.657 dscf
Sample Time	120.0 minutes	
Isokineticity	104.4 %	

*** Standard Conditions:**

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

Client:	Metro Vancouver	Date:	8-Nov-18
Jobsite:	WTE (Burnaby, B.C)	Run:	2 - Particulate / Metals
Source:	Unit 1	Run Time:	09:23 - 11:25

Control Unit (Y)	0.9717	Collection:		Gas Analysis (Vol. %):		Condensate Collection:		
Nozzle Diameter (in.)	0.2847	Filter (grams)	0.00005	CO ₂		Impinger 1	150.0	
Pitot Factor	0.8489	Washings (grams)	0.00050	Traverse 1	10.33	9.67	Impinger 2	138.0
Baro. Press. (in. Hg)	30.54			Traverse 2	10.33	9.67	Impinger 3	27.0
Static Press. (in. H ₂ O)	-19.00	Total (grams) 0.00055					Impinger 4	10.0
Stack Height (ft)	30						Impinger 5	3.0
Stack Diameter (in.)	70.90						Impinger 6	1.0
Stack Area (sq.ft.)	27.417						Gel	22.0
Minutes Per Reading	5.0				10.33	9.67	Gain (grams)	351.0
Minutes Per Point	5.0							

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	125.602								
1	5.0	128.400	0.27	1.02	54	54	3	289	1.5	104.2
2	10.0	131.100	0.25	0.94	56	56	3	289	4.7	104.0
3	15.0	133.910	0.27	1.02	55	55	3	288	8.4	104.3
4	20.0	136.820	0.29	1.10	55	55	3	287	12.5	104.2
5	25.0	139.640	0.27	1.03	56	56	3	285	17.7	104.3
6	30.0	142.520	0.28	1.07	57	57	3	285	25.2	104.4
7	35.0	146.050	0.42	1.60	58	58	3	285	45.6	104.4
8	40.0	149.990	0.52	1.99	60	60	3	286	53.2	104.5
9	45.0	154.000	0.54	2.06	60	60	4	286	58.3	104.4
10	50.0	157.910	0.51	1.95	61	61	4	286	62.5	104.5
11	55.0	161.790	0.50	1.92	62	62	4	286	66.1	104.5
12	60.0	165.560	0.47	1.81	63	63	4	286	69.4	104.5
Traverse 2	0.0	165.560								
1	5.0	168.950	0.38	1.46	64	64	4	287	1.5	104.3
2	10.0	172.400	0.39	1.50	66	66	4	288	4.7	104.5
3	15.0	175.970	0.42	1.61	66	66	4	291	8.4	104.4
4	20.0	179.940	0.52	1.99	67	67	4	293	12.5	104.4
5	25.0	184.030	0.55	2.11	68	68	4	295	17.7	104.5
6	30.0	187.640	0.43	1.65	68	68	4	296	25.2	104.3
7	35.0	191.130	0.40	1.54	69	69	4	295	45.6	104.3
8	40.0	194.800	0.44	1.69	70	70	4	295	53.2	104.4
9	45.0	198.550	0.46	1.77	70	70	4	295	58.3	104.3
10	50.0	202.180	0.43	1.65	70	70	4	295	62.5	104.4
11	55.0	205.550	0.37	1.42	71	71	4	297	66.1	104.4
12	60.0	208.870	0.36	1.39	71	71	4	296	69.4	104.2
Average:			0.406	1.554	63.2	63.2	3.7	290.0		104.4

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

Date: 8-Nov-18
Run: 3 - Particulate / Metals
Run Time: 11:50 - 13:52

Concentrations:

Particulate	0.3 mg/dscm	0.0001 gr/dscf
	0.2 mg/Acm	0.0001 gr/Acf
	0.2 mg/dscm (@ 11% O ₂)	0.0001 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.019 Kg/hr	0.043 lb/hr
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Flue Gas Characteristics:

Flow	1177 dscm/min	41552 dscf/min
	19.61 dscm/sec	693 dscf/sec
	2079 Acm/min	73413 Acf/min

Velocity	13.603 m/sec	44.63 f/sec
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Temperature	145.4 °C	293.7 °F
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Moisture	17.0 %
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Gas Analysis	9.2 % O ₂
	10.8 % CO ₂

30.100 Mol. Wt (g/gmole) Dry
28.038 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.3779 dscm	83.976 dscf
Sample Time	120.0 minutes	
Isokineticity	104.4 %	

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

Client:	Metro Vancouver	Date:	8-Nov-18
Jobsite:	WTE (Burnaby, B.C)	Run:	3 - Particulate / Metals
Source:	Unit 1	Run Time:	11:50 - 13:52

Control Unit (Y)	0.9717	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.2847	Filter (grams) 0.00005	CO ₂ O ₂	Impinger 1 190.0
Pitot Factor	0.8489	Washings (grams) 0.00060	10.17 9.83	Impinger 2 106.0
Baro. Press. (in. Hg)	30.54	Traverse 1	11.50 8.50	Impinger 3 30.0
Static Press. (in. H ₂ O)	-19.00	Traverse 2		Impinger 4 11.0
Stack Height (ft)	30	Total (grams) 0.00065		Impinger 5 4.0
Stack Diameter (in.)	70.90			Impinger 6 2.0
Stack Area (sq.ft.)	27.417			Gel 23.5
Minutes Per Reading	5.0			Gain (grams) 366.5
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	209.669								
1	5.0	213.460	0.47	1.80	70	70	5	297	1.5	105.1
2	10.0	217.120	0.44	1.69	69	69	5	297	4.7	105.1
3	15.0	220.700	0.42	1.61	69	69	5	296	8.4	105.1
4	20.0	224.610	0.50	1.92	69	69	5	295	12.5	105.2
5	25.0	228.550	0.51	1.96	69	69	6	295	17.7	105.0
6	30.0	232.450	0.50	1.92	69	69	6	296	25.2	105.0
7	35.0	236.540	0.55	2.11	69	69	7	296	45.6	105.1
8	40.0	240.790	0.59	2.27	70	70	7	296	53.2	105.3
9	45.0	244.660	0.49	1.88	70	70	6	297	58.3	105.1
10	50.0	248.330	0.44	1.69	70	70	6	296	62.5	105.1
11	55.0	251.780	0.39	1.50	70	70	6	297	66.1	105.0
12	60.0	255.150	0.37	1.42	71	71	6	297	69.4	105.0
Traverse 2	0.0	255.150								
1	5.0	258.080	0.28	1.08	71	71	6	296	1.5	104.8
2	10.0	260.910	0.26	1.00	71	71	6	293	4.7	104.8
3	15.0	263.760	0.27	1.02	71	71	5	292	8.4	103.6
4	20.0	266.660	0.28	1.06	71	71	5	291	12.5	103.4
5	25.0	269.610	0.29	1.09	71	71	5	291	17.7	103.4
6	30.0	272.670	0.31	1.17	72	72	5	290	25.2	103.5
7	35.0	276.360	0.45	1.70	72	72	6	290	45.6	103.7
8	40.0	280.170	0.48	1.81	72	72	6	291	53.2	103.8
9	45.0	283.860	0.45	1.70	72	72	6	291	58.3	103.8
10	50.0	287.470	0.43	1.63	72	72	6	290	62.5	103.8
11	55.0	291.000	0.41	1.56	73	73	6	289	66.1	103.6
12	60.0	294.440	0.39	1.48	73	73	6	289	69.4	103.5
Average:			0.415	1.586	70.7	70.7	5.8	293.7		104.4

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

Date: 6-Nov-18
Run: 1 - Particulate / Metals
Run Time: 14:11 - 16:13

Concentrations:

Particulate	1.2 mg/dscm	0.0005 gr/dscf
	0.7 mg/Acm	0.0003 gr/Acf
	1.1 mg/dscm (@ 11% O ₂)	0.0005 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.080 Kg/hr	0.177 lb/hr
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Flue Gas Characteristics:

Flow	1072 dscm/min	37842 dscf/min
	17.86 dscm/sec	631 dscf/sec
	1987 Acm/min	70181 Acf/min

Velocity	13.004 m/sec	42.66 f/sec
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Temperature	155.9 °C	312.5 °F
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Moisture	18.0 %
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Gas Analysis	9.8 % O ₂
	10.2 % CO ₂

30.020 Mol. Wt (g/gmole) Dry
27.859 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5202 dscm	89.000 dscf
Sample Time	120.0 minutes	
Isokineticity	105.9 %	

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

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

Date: 6-Nov-18
Run: 1 - Particulate / Metals
Run Time: 14:11 - 16:13

Control Unit (Y)	0.9997	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3050	Filter (grams) 0.00005	CO ₂ O ₂	Impinger 1 242.0
Pitot Factor	0.8388	Washings (grams) 0.00310	10.17 9.83	Impinger 2 126.0
Baro. Press. (in. Hg)	30.13		10.17 9.83	Impinger 3 16.0
Static Press. (in. H ₂ O)	-18.30	Total (grams) 0.00315		Impinger 4 11.0
Stack Height (ft)	30			Impinger 5 2.0
Stack Diameter (in.)	70.90			Impinger 6 1.0
Stack Area (sq.ft.)	27.417			Cel 16.5
Minutes Per Reading	5.0		10.17 9.83	Gain (grams) 414.5
Minutes Per Point	5.0			

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	488.519								
1	5.0	492.560	0.46	2.10	59	59	6	311	1.5	106.1
2	10.0	496.730	0.49	2.24	59	59	6	311	4.7	106.1
3	15.0	500.690	0.44	2.01	60	60	8	311	8.4	106.1
4	20.0	504.690	0.45	2.06	60	60	8	311	12.5	106.0
5	25.0	508.510	0.41	1.88	61	61	8	312	17.7	105.8
6	30.0	512.090	0.36	1.64	61	61	8	314	25.2	105.9
7	35.0	515.410	0.31	1.42	61	61	7	314	45.6	105.8
8	40.0	518.570	0.28	1.28	62	62	7	315	53.2	105.8
9	45.0	521.560	0.25	1.14	62	62	6	314	58.3	105.8
10	50.0	524.490	0.24	1.10	62	62	6	313	62.5	105.8
11	55.0	527.480	0.25	1.15	62	62	6	312	66.1	105.7
12	60.0	530.480	0.25	1.15	63	63	6	311	69.4	105.8
Traverse 2	0.0	530.480								
1	5.0	533.770	0.30	1.39	64	64	6	310	1.5	105.7
2	10.0	537.120	0.31	1.43	65	65	6	311	4.7	105.7
3	15.0	540.580	0.33	1.53	66	66	6	311	8.4	105.7
4	20.0	544.000	0.32	1.48	67	67	6	312	12.5	105.9
5	25.0	547.630	0.36	1.67	69	69	7	314	17.7	105.8
6	30.0	551.210	0.35	1.63	69	69	7	313	25.2	105.7
7	35.0	555.580	0.52	2.42	69	69	8	313	45.6	106.1
8	40.0	559.910	0.51	2.37	69	69	8	313	53.2	106.1
9	45.0	564.200	0.50	2.32	70	70	8	314	58.3	106.1
10	50.0	568.270	0.45	2.09	70	70	8	314	62.5	106.0
11	55.0	572.210	0.42	1.96	71	71	8	313	66.1	105.9
12	60.0	576.000	0.39	1.82	71	71	8	314	69.4	105.8
Average:			0.373	1.720	64.7	64.7	7.0	312.5		105.9

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

Date: 7-Nov-18
Run: 2 - Particulate / Metals
Run Time: 09:27 - 11:29

Concentrations:

Particulate	0.61 mg/dscm	0.00027 gr/dscf
	0.33 mg/Acm	0.00015 gr/Acf
	0.48 mg/dscm (@ 11% O ₂)	0.00021 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.040 Kg/hr	0.088 lb/hr
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Flue Gas Characteristics:

Flow	1081 dscm/min	38162 dscf/min
	18.01 dscm/sec	636 dscf/sec
	1992 Acf/min	70343 Acf/min

Velocity	13.034 m/sec	42.76 f/sec
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Temperature	152.0 °C	305.6 °F
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Moisture	18.6 %
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Gas Analysis	8.4 % O ₂
	11.3 % CO ₂
	30.147 Mol. Wt (g/gmole) Dry
	27.885 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5313 dscm	89.393 dscf
Sample Time	120.0 minutes	
Isokineticity	107.2 %	

*** Standard Conditions:**

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

Client:	Metro Vancouver	Date:	7-Nov-18
Jobsite:	WTE (Burnaby, B.C)	Run:	2 - Particulate / Metals
Source:	Unit 2	Run Time:	09:27 - 11:29

Control Unit (Y)	0.9997	Collection:	Gas Analysis (Vol. %):		Condensate Collection:	
Nozzle Diameter (in.)	0.3098	Filter (grams) 0.00005	CO ₂	O ₂	Impinger 1	206.0
Pitot Factor	0.8489	Washings (grams) 0.00150	10.50	9.30	Impinger 2	142.0
Baro. Press. (in. Hg)	30.40	Total (grams) 0.00155	12.17	7.40	Impinger 3	46.0
Static Press. (in. H ₂ O)	-20.00				Impinger 4	16.0
Stack Height (ft)	30				Impinger 5	6.0
Stack Diameter (in.)	70.90				Impinger 6	3.0
Stack Area (sq.ft.)	27.417				Gel	15.7
Minutes Per Reading	5.0		11.33	8.35	Gain (grams)	434.7
Minutes Per Point	5.0					

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	576.310								
1	5.0	579.580	0.28	1.40	51	51	3	295	1.5	107.3
2	10.0	582.730	0.26	1.30	52	52	3	295	4.7	107.0
3	15.0	585.820	0.25	1.25	51	51	3	295	8.4	107.3
4	20.0	588.850	0.24	1.20	53	53	3	299	12.5	107.2
5	25.0	591.880	0.24	1.20	54	54	3.5	299	17.7	107.0
6	30.0	594.920	0.24	1.20	55	55	3.5	300	25.2	107.2
7	35.0	599.300	0.50	2.51	56	56	4	302	45.6	107.3
8	40.0	603.820	0.53	2.65	58	58	4	306	53.2	107.5
9	45.0	608.550	0.58	2.90	60	60	4	310	58.3	107.4
10	50.0	613.050	0.52	2.61	61	61	4	308	62.5	107.5
11	55.0	617.480	0.50	2.57	62	62	5	307	66.1	107.6
12	60.0	621.820	0.48	2.41	63	63	5	308	69.4	107.5
Traverse 2	0.0	621.820								
1	5.0	626.020	0.45	2.27	64	64	3	309	1.5	107.2
2	10.0	630.280	0.46	2.32	65	65	3	310	4.7	107.4
3	15.0	634.530	0.46	2.32	65	65	4	311	8.4	107.3
4	20.0	638.850	0.47	2.38	66	66	4	309	12.5	107.5
5	25.0	643.380	0.52	2.63	67	67	5	312	17.7	107.3
6	30.0	647.840	0.50	2.53	68	68	5	312	25.2	107.5
7	35.0	651.300	0.30	1.52	69	69	4.5	312	45.6	107.2
8	40.0	654.650	0.28	1.43	69	69	4.5	309	53.2	107.2
9	45.0	657.820	0.25	1.27	70	70	4	310	58.3	107.2
10	50.0	660.980	0.25	1.28	70	70	4	305	62.5	106.5
11	55.0	664.090	0.24	1.23	71	71	4	308	66.1	107.0
12	60.0	667.140	0.23	1.21	71	71	4	304	69.4	106.9
Average:			0.376	1.900	62.1	62.1	3.9	305.6		107.2

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

Date: 7-Nov-18
Run: 3 - Particulate / Metals
Run Time: 11:48 - 13:52

Concentrations:

Particulate	0.3 mg/dscm	0.0001 gr/dscf
	0.2 mg/Acm	0.0001 gr/Acf
	0.2 mg/dscm (@ 11% O ₂)	0.0001 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.02 Kg/hr	0.041 lb/hr
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Flue Gas Characteristics:

Flow	1059 dscm/min	37391 dscf/min
	17.65 dscm/sec	623 dscf/sec
	1929 Acm/min	68114 Acf/min
Velocity	12.621 m/sec	41.41 f/sec
Temperature	153.8 °C	308.9 °F
Moisture	17.3 %	
Gas Analysis	9.2 % O ₂ 10.7 % CO ₂	
	30.075 Mol. Wt (g/gmole) Dry	
	27.986 Mol. Wt (g/gmole) Wet	

Sample Parameters:

Sample Volume	2.5630 dscm	90.514 dscf
Sample Time	120.0 minutes	
Isokineticity	105.6 %	

*** Standard Conditions:**

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

Client:	Metro Vancouver	Date:	7-Nov-18
Jobsite:	WTE (Burnaby, B.C)	Run:	3 - Particulate / Metals
Source:	Unit 2	Run Time:	11:48 - 13:52

Control Unit (Y)	0.9997	Collection:		Gas Analysis (Vol. %):		Condensate Collection:			
Nozzle Diameter (in.)	0.3098		Filter (grams)	0.00005	CO ₂	O ₂	Impinger 1	138.0	
Pitot Factor	0.8489		Washings (grams)	0.00070	Traverse 1	11.33	8.60	Impinger 2	146.0
Baro. Press. (in. Hg)	30.40				Traverse 2	10.00	9.83	Impinger 3	60.0
Static Press. (in. H ₂ O)	-20.00							Impinger 4	24.0
Stack Height (ft)	30	Total (grams) 0.0007					Impinger 5	7.0	
Stack Diameter (in.)	70.90						Impinger 6	3.0	
Stack Area (sq.ft.)	27.417						Gel	24.5	
Minutes Per Reading	5.0				10.67	9.22	Gain (grams)	402.5	
Minutes Per Point	5.0								

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	667.905								
1	5.0	672.230	0.46	2.37	70	70	6.5	300	1.5	105.8
2	10.0	676.560	0.47	2.38	70	70	6.5	313	4.7	105.7
3	15.0	680.700	0.43	2.18	70	70	7	315	8.4	105.8
4	20.0	684.730	0.41	2.07	70	70	7	315	12.5	105.4
5	25.0	688.720	0.40	2.02	71	71	7.5	317	17.7	105.6
6	30.0	692.600	0.38	1.92	70	70	7.5	317	25.2	105.5
7	35.0	696.160	0.32	1.62	70	70	6	317	45.6	105.4
8	40.0	699.500	0.28	1.42	71	71	6	317	53.2	105.5
9	45.0	702.660	0.25	1.26	72	72	5	318	58.3	105.5
10	50.0	705.700	0.23	1.17	72	72	5	314	62.5	105.5
11	55.0	708.750	0.23	1.17	72	72	5	313	66.1	105.8
12	60.0	711.730	0.22	1.12	72	72	5	312	69.4	105.6
Traverse 2	0.0	711.730								
1	5.0	714.980	0.26	1.34	71	71	3.5	302	1.5	105.5
2	10.0	718.280	0.27	1.38	71	71	3.5	309	4.7	105.6
3	15.0	721.700	0.29	1.48	71	71	4	310	8.4	105.7
4	20.0	724.880	0.25	1.28	72	72	4	308	12.5	105.4
5	25.0	727.880	0.22	1.13	72	72	4	307	17.7	105.9
6	30.0	731.060	0.25	1.28	72	72	4	307	25.2	105.4
7	35.0	735.330	0.45	2.31	73	73	5.5	308	45.6	105.6
8	40.0	739.660	0.46	2.37	73	73	5.5	306	53.2	105.8
9	45.0	744.340	0.53	2.77	72	72	7	294	58.3	106.0
10	50.0	748.730	0.47	2.46	73	73	7	294	62.5	105.3
11	55.0	753.020	0.45	2.33	73	73	6.5	301	66.1	105.6
12	60.0	757.220	0.43	2.23	73	73	6.5	300	69.4	105.7
Average:			0.350	1.794	71.5	71.5	3.0	308.9		105.6

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

Date: 5-Nov-18
Run: 1 - Particulate / Metals
Run Time: 11:51 - 13:53

Concentrations:

Particulate	1.55 mg/dscm	0.00068 gr/dscf
	0.84 mg/Acm	0.00037 gr/Acf
	1.34 mg/dscm (@ 11% O ₂)	0.00058 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.096 Kg/hr	0.212 lb/hr
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Flue Gas Characteristics:

Flow	1035 dscm/min	36551 dscf/min
	17.25 dscm/sec	609 dscf/sec
	1897 Acm/min	66988 Acf/min

Velocity	12.412 m/sec	40.72 f/sec
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Temperature	153.3 °C	307.9 °F
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Moisture	16.7 %
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Gas Analysis	9.5 % O ₂
	10.5 % CO ₂

30.058 Mol. Wt (g/gmole) Dry
28.048 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.4908 dscm	87.962 dscf
Sample Time	120.0 minutes	
Isokineticity	105.1 %	

*** Standard Conditions:**

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

Client:	Metro Vancouver	Date:	5-Nov-18
Jobsite:	WTE (Burnaby, B.C)	Run:	1 - Particulate / Metals
Source:	Unit 3	Run Time:	11:51 - 13:53

Control Unit (Y)	1.0076	Collection:	Gas Analysis (Vol. %):		Condensate Collection:			
Nozzle Diameter (in.)	0.3098		Filter (grams)	0.00005	CO ₂	O ₂	Impinger 1	144.0
Pitot Factor	0.8489		Washings (grams)	0.00380	10.00	9.83	Impinger 2	145.0
Baro. Press. (in. Hg)	29.97				11.00	9.07	Impinger 3	34.0
Static Press. (in. H ₂ O)	-20.00		Total (grams) 0.00385				Impinger 4	16.0
Stack Height (ft)	30					Impinger 5	6.0	
Stack Diameter (in.)	70.90					Impinger 6	4.0	
Stack Area (sq.ft.)	27.417					Gel	25.0	
Minutes Per Reading	5.0			10.50	9.45	Gain (grams)	374.0	
Minutes Per Point	5.0							

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	656.548								
1	5.0	660.300	0.35	2.11	69	69	6	302	1.5	105.0
2	10.0	664.100	0.36	2.16	69	69	6	304	4.7	105.0
3	15.0	667.750	0.33	1.99	70	70	6	304	8.4	105.1
4	20.0	671.780	0.40	2.41	70	70	6	305	12.5	105.6
5	25.0	675.990	0.44	2.65	71	71	6	306	17.7	105.1
6	30.0	680.050	0.41	2.47	71	71	6	307	25.2	105.0
7	35.0	683.650	0.32	1.92	71	71	6	308	45.6	105.3
8	40.0	686.890	0.26	1.56	72	72	6	310	53.2	105.0
9	45.0	690.020	0.24	1.45	73	73	6	308	58.3	105.2
10	50.0	692.880	0.20	1.21	73	73	6	307	62.5	105.2
11	55.0	695.800	0.21	1.27	74	74	6	308	66.1	104.7
12	60.0	698.580	0.19	1.15	73	73	6	306	69.4	104.8
Traverse 2	0.0	698.580								
1	5.0	701.850	0.26	1.58	74	74	5	302	1.5	105.0
2	10.0	705.220	0.28	1.69	74	74	5	310	4.7	104.9
3	15.0	708.650	0.29	1.75	74	74	5	310	8.4	104.9
4	20.0	711.900	0.26	1.57	74	74	5	310	12.5	104.9
5	25.0	715.090	0.25	1.51	74	74	5	309	17.7	104.9
6	30.0	718.400	0.27	1.63	74	74	5	309	25.2	104.8
7	35.0	722.340	0.38	2.29	76	76	5	312	45.6	105.1
8	40.0	726.380	0.40	2.42	75	75	5	310	53.2	105.2
9	45.0	730.560	0.43	2.60	75	75	6	309	58.3	104.9
10	50.0	734.980	0.48	2.89	74	74	6	310	62.5	105.4
11	55.0	739.490	0.50	3.02	75	75	6.5	311	66.1	105.2
12	60.0	744.080	0.52	3.13	75	75	6.5	313	69.4	105.2
Average:			0.335	2.018	72.9	72.9	5.7	307.9		105.1

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

Date: 6-Nov-18
Run: 2 - Particulate / Metals
Run Time: 10:25 - 12:27

Concentrations:

Particulate	1.05 mg/dscm	0.00046 gr/dscf
	0.59 mg/Acm	0.00026 gr/Acf
	1.02 mg/dscm (@ 11% O ₂)	0.00045 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.084 Kg/hr	0.186 lb/hr
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Flue Gas Characteristics:

Flow	1338 dscm/min	47237 dscf/min
	22.29 dscm/sec	787 dscf/sec
	2399 Acm/min	84707 Acf/min

Velocity	15.695 m/sec	51.49 f/sec
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Temperature	153.0 °C	307.5 °F
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Moisture	15.4 %
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Gas Analysis	10.7 % O ₂
	9.3 % CO ₂

29.922 Mol. Wt (g/gmole) Dry
28.083 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	3.1909 dscm	112.686 dscf
Sample Time	120.0 minutes	
Isokineticity	104.1 %	

*** Standard Conditions:**

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

Date: 6-Nov-18
Run: 2 - Particulate / Metals
Run Time: 10:25 - 12:27

Condensate Collection:	
Impinger 1	245.0
Impinger 2	126.0
Impinger 3	22.0
Impinger 4	14.0
Impinger 5	2.0
Impinger 6	1.0
Gel	26.6
Gain (grams)	436.6

A. Lanfranco and Associates Inc. (604-881-2582)

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

Date: 6-Nov-18
Run: 3 - Particulate / Metals
Run Time: 13:22 - 14:26

Concentrations:

Particulate	0.80 mg/dscm	0.00035 gr/dscf
	0.43 mg/Acm	0.00019 gr/Acf
	0.70 mg/dscm (@ 11% O ₂)	0.00030 gr/dscf (@ 11% O ₂)

Emission Rates:

Particulate	0.063 Kg/hr	0.139 lb/hr
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Flue Gas Characteristics:

Flow	1312 dscm/min	46327 dscf/min
	21.86 dscm/sec	772 dscf/sec
	2418 Acn/min	85376 Acf/min

Velocity	15.819 m/sec	51.90 f/sec
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Temperature	155.9 °C	312.6 °F
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Moisture	17.1 %
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Gas Analysis	9.5 % O ₂
	10.3 % CO ₂
	30.033 Mol. Wt (g/gmole) Dry
	27.970 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	3.1860 dscm	112.514 dscf
Sample Time	120.0 minutes	
Isokineticity	106.0 %	

*** Standard Conditions:**

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

Client:	Metro Vancouver	Date:	6-Nov-18
Jobsite:	WTE(Burnaby,B.C)	Run:	3 - Particulate / Metals
Source:	Unit 3	Run Time:	13:22 - 14:26

Control Unit (Y)	1.0076	Collection:	Gas Analysis (Vol. %):	Condensate Collection:
Nozzle Diameter (in.)	0.3098	Filter (grams) 0.00005	CO ₂	Impinger 1
Pitot Factor	0.8489	Washings (grams) 0.00250	O ₂	Impinger 2
Baro. Press. (in. Hg)	30.15		Traverse 1	Impinger 3
Static Press. (in. H₂O)	-20.00		Traverse 2	Impinger 4
Stack Height (ft)	30	Total (grams) 0.00255		Impinger 5
Stack Diameter (in.)	70.90			Impinger 6
Stack Area (sq.ft.)	27.417			Gel
Minutes Per Reading	5.0		10.33	9.50
Minutes Per Point	5.0			Gain (grams) 494.8

Traverse / Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ΔP (in. H ₂ O)	Orifice ΔH (in. H ₂ O)	Dry Gas Temperature Inlet (°F)	Dry Gas Temperature Outlet (°F)	Vacuum (in. Hg.)	Stack Temp. (°F)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	858.712								
1	5.0	863.230	0.52	3.08	67	67	6	314	1.5	105.9
2	10.0	867.850	0.54	3.20	68	68	6	315	4.7	106.2
3	15.0	872.420	0.53	3.13	66	66	6.5	312	8.4	106.2
4	20.0	876.940	0.52	3.08	65	65	6.5	311	12.5	106.2
5	25.0	881.770	0.59	3.51	67	67	8	310	17.7	106.1
6	30.0	886.520	0.57	3.39	67	67	8	310	25.2	106.2
7	35.0	890.650	0.43	2.56	68	68	9	311	45.6	105.9
8	40.0	894.880	0.45	2.68	68	68	9	310	53.2	106.0
9	45.0	898.980	0.42	2.51	69	69	9	309	58.3	106.1
10	50.0	902.980	0.40	2.39	69	69	9	308	62.5	105.9
11	55.0	906.950	0.39	2.35	70	70	9	306	66.1	106.1
12	60.0	910.800	0.37	2.23	70	70	9	305	69.4	105.6
Traverse 2	0.0	910.800								
1	5.0	915.340	0.52	3.11	70	70	8	310	1.5	105.6
2	10.0	919.980	0.54	3.23	70	70	8	311	4.7	106.0
3	15.0	924.540	0.52	3.11	71	71	8	311	8.4	105.9
4	20.0	928.920	0.48	2.87	71	71	8	312	12.5	105.9
5	25.0	933.350	0.49	2.92	72	72	9	315	17.7	106.0
6	30.0	937.680	0.47	2.80	72	72	9	316	25.2	105.8
7	35.0	942.890	0.68	4.05	73	73	9	318	45.6	106.1
8	40.0	948.180	0.70	4.16	73	73	9	319	53.2	106.3
9	45.0	953.500	0.71	4.22	73	73	10	319	58.3	106.2
10	50.0	958.790	0.70	4.16	73	73	10	319	62.5	106.3
11	55.0	964.010	0.68	4.05	73	73	10.5	317	66.1	106.3
12	60.0	969.060	0.64	3.82	72	72	10.5	315	69.4	106.0
Average:			0.536	3.192	69.9	69.9	8.5	312.6		106.0

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		8-Nov-18	8-Nov-18	8-Nov-18
Test Time		10:25 - 11:25	11:45 - 12:45	13:01 - 14:01
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.54	30.54	30.54
DGM Factor	(Y)	0.9651	0.9651	0.9651
Initial Reading	(m ³)	267.237	267.852	268.455
Final Reading	(m ³)	267.846	268.449	269.055
Temp. Outlet	(Avg. °F)	61.8	65.0	69.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.61	0.59	0.59
HF	(mg)	0.298	0.014	0.009
Oxygen	(Vol. %)	9.7	9.2	9.2
HF	(mg/Sm ³)	0.490	0.024	0.015
HF	(mg/Sm ³ @ 11% O ₂)	0.432	0.021	0.013
Moisture	(Vol. %)	16.5	17.0	17.0

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

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

Sample Type: NH₃

Parameter		Test 1	Test 2	Test 3
Test Date		8-Nov-18	8-Nov-18	8-Nov-18
Test Time		10:25 - 11:25	11:45 - 12:45	13:01 - 14:01
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.54	30.54	30.54
DGM Factor	(Y)	1.0044	1.0072	1.0072
Initial Reading	(ft ³)	169.900	193.590	217.320
Final Reading	(ft ³)	193.410	217.100	242.050
Temp. Outlet	(Avg. °F)	59.6	63.0	66.5
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.69	0.69	0.72
NH ₃	(mg)	1.1	1.8	1.8
Oxygen	(Vol. %)	9.7	9.2	9.2
NH ₃	(mg/Sm ³)	1.6	2.6	2.5
NH ₃	(mg/Sm ³ @ 11% O ₂)	1.4	2.2	2.1
Moisture	(Vol. %)	16.5	17.0	17.0

Tstd. (oF) 68

Pstd. (in. Hg) 29.92

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		7-Nov-18	7-Nov-18	7-Nov-18
Test Time		10:19 - 11:19	11:35 - 12:35	12:49 - 13:49
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.40	30.40	30.40
DGM Factor	(Y)	0.9651	0.9651	0.9651
Initial Reading	(m ³)	265.398	266.029	266.635
Final Reading	(m ³)	266.023	266.629	267.233
Temp. Outlet	(Avg. °F)	59.7	65.0	65.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.62345	0.59282	0.59036
HF	(mg)	0.002	0.001	0.002
Oxygen	(Vol. %)	8.4	9.2	9.2
HF	(mg/Sm³)	0.003	0.002	0.003
HF	(mg/Sm³ @ 11% O₂)	0.002	0.002	0.003
Moisture (isokinetic)	(Vol. %)	18.6	17.3	17.3

Tstd. (oF)

68

Pstd. (in. Hg)

29.92

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

Sample Type: NH₃

Parameter		Test 1	Test 2	Test 3
Test Date		7-Nov-18	7-Nov-18	7-Nov-18
Test Time		10:19 - 11:19	11:35 - 12:35	12:49 - 13:49
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.4	30.40	30.40
DGM Factor	(Y)	1.0044	1.0044	1.0044
Initial Reading	(ft ³)	101.380	123.550	146.730
Final Reading	(ft ³)	123.400	146.500	168.700
Temp. Outlet	(Avg. °F)	63.0	68.8	69.5
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.64319	0.66306	22.38416
NH ₃	(mg)	2.2	3.1	1.5
Oxygen	(Vol. %)	8.4	9.2	9.2
NH₃	(mg/Sm³)	3.4	4.6	0.1
NH₃	(mg/Sm³ @ 11% O₂)	2.7	3.9	0.1
Moisture (isokinetic)	(Vol. %)	18.6	17.3	17.3

Tstd. (oF)

68

Pstd. (in. Hg)

29.92

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

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date		6-Nov-18	6-Nov-18	6-Nov-18
Test Time		10:51 - 11:51	12:08 - 13:08	13:29 - 14:29
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.19	30.19	30.19
DGM Factor	(Y)	0.9651	0.9651	0.9651
Initial Reading	(m ³)	263.481	264.106	264.785
Final Reading	(m ³)	264.097	264.778	265.392
Temp. Outlet	(Avg. °F)	61.3	66.0	67.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.60868	0.65789	0.59295
HF	(mg)	0.006	0.009	0.005
Oxygen	(Vol. %)	10.7	10.7	9.5
HF	(mg/Sm³)	0.010	0.014	0.008
HF	(mg/Sm³ @ 11% O₂)	0.010	0.014	0.007
Moisture (isokinetic)	(Vol. %)	15.4	15.4	17.1

Tstd. (oF)

68

Pstd. (in. Hg)

29.92

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

Sample Type: NH₃

Parameter		Test 1	Test 2	Test 3
Test Date		6-Nov-18	6-Nov-18	6-Nov-18
Test Time		10:51 - 11:51	12:08 - 13:08	13:29 - 14:29
Test Duration	(min.)	60	60	60
Baro. Press.	(in. Hg)	30.19	30.19	30.19
DGM Factor	(Y)	1.0440	1.0440	1.0440
Initial Reading	(ft ³)	31.620	54.690	76.950
Final Reading	(ft ³)	54.440	76.810	100.550
Temp. Outlet	(Avg. °F)	57.3	61.5	64.0
Orifice Press.	(ΔH in.H ₂ O)	0.50	0.50	0.50
Gas Volume	(Sm ³)	0.69559	0.66887	0.71021
NH ₃	(mg)	2.0	3.8	7.6
Oxygen	(Vol. %)	10.7	10.7	9.5
NH₃	(mg/Sm³)	2.9	5.6	10.7
NH₃	(mg/Sm³ @ 11% O₂)	2.8	5.5	9.3
Moisture (isokinetic)	(Vol. %)	15.4	15.4	17.1

Tstd. (oF)

68

Pstd. (in. Hg)

29.92

Date:	08-Nov-18			07-Nov-18			06-Nov-18		
	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:	10:25 - 11:25	11:45 - 12:45	13:01 - 14:01	10:19 - 11:19	11:35 - 12:35	12:49 - 13:49	10:51 - 11:51	12:08 - 13:08	13:29 - 14:29
Acetylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methane	ND	ND	ND	ND	ND	ND	7.40	ND	1.7
Ethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
C ₃ as Propane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C ₄ as n-Butane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C ₅ as n-Pentane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C ₆ as n-Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C ₆ + as n-Hexane	ND	2.9	3.7	ND	ND	ND	ND	ND	ND

Detection Limits:

Acetylene	0.17	0.17	0.19	0.19	0.27	0.22	0.26	0.20	0.18
Methane	0.69	0.69	0.75	0.76	1.1	0.87	1.0	0.81	0.7
Ethane	0.17	0.17	0.19	0.19	0.27	0.22	0.26	0.20	0.18
Ethene	0.17	0.17	0.19	0.19	0.27	0.22	0.26	0.20	0.18
C ₃ as Propane	0.69	0.69	0.75	0.76	1.1	0.87	1.0	0.81	0.71
C ₄ as n-Butane	0.69	0.69	0.75	0.76	1.1	0.87	1.0	0.81	0.71
C ₅ as n-Pentane	0.69	0.69	0.75	0.76	1.1	0.87	1.0	0.81	0.71
C ₆ as n-Hexane	0.69	0.69	0.75	0.76	1.1	0.87	1.0	0.81	0.71
C ₆ + n-Hexane	1.4	1.4	1.5	1.5	2.2	1.7	2.1	1.6	1.4

Using 1/2 DL Convention

Date:	08-Nov-18			07-Nov-18			06-Nov-18		
	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:	10:25 - 11:25	11:45 - 12:45	13:01 - 14:01	10:19 - 11:19	11:35 - 12:35	12:49 - 13:49	10:51 - 11:51	12:08 - 13:08	13:29 - 14:29
Acetylene (ppm)	0.09	0.09	0.10	0.10	0.14	0.11	0.13	0.10	0.09
Methane (ppm)	0.35	0.35	0.38	0.38	0.55	0.44	7.40	0.41	1.70
Ethane (ppm)	0.09	0.09	0.10	0.10	0.14	0.11	0.13	0.10	0.09
Ethene (ppm)	0.09	0.09	0.10	0.10	0.14	0.11	0.13	0.10	0.09
C ₃ as Propane (ppm)	0.35	0.35	0.38	0.38	0.55	0.44	0.50	0.41	0.36
C ₄ as n-Butane (ppm)	0.35	0.35	0.38	0.38	0.55	0.44	0.50	0.41	0.36
C ₅ as n-Pentane (ppm)	0.35	0.35	0.38	0.38	0.55	0.44	0.50	0.41	0.36
C ₆ as n-Hexane (ppm)	0.35	0.35	0.38	0.38	0.55	0.44	0.50	0.41	0.36
C ₆ + as n-Hexane (ppm)	0.70	2.90	3.70	0.75	1.10	0.85	1.05	0.80	0.70
Acetylene (mg/Sm ³ as CH ₄)	0.06	0.06	0.06	0.06	0.09	0.07	0.09	0.07	0.06
Methane (mg/Sm ³ as CH ₄)	0.23	0.23	0.25	0.25	0.37	0.29	4.94	0.27	1.13
Ethane (mg/Sm ³ as CH ₄)	0.06	0.06	0.06	0.06	0.09	0.07	0.09	0.07	0.06
Ethene (mg/Sm ³ as CH ₄)	0.06	0.06	0.06	0.06	0.09	0.07	0.09	0.07	0.06
C ₃ as Propane (mg/Sm ³ as CH ₄)	0.23	0.23	0.25	0.25	0.37	0.29	0.33	0.27	0.24
C ₄ as n-Butane (mg/Sm ³ as CH ₄)	0.23	0.23	0.25	0.25	0.37	0.29	0.33	0.27	0.24
C ₅ as n-Pentane (mg/Sm ³ as CH ₄)	0.23	0.23	0.25	0.25	0.37	0.29	0.33	0.27	0.24
C ₆ as n-Hexane (mg/Sm ³ as CH ₄)	0.23	0.23	0.25	0.25	0.37	0.29	0.33	0.27	0.24
C ₆ + as n-Hexane (mg/Sm ³ as CH ₄)	0.47	1.93	2.47	0.50	0.73	0.57	0.70	0.53	0.47
Total mg/Sm ³ @ 11% O ₂ as CH ₄	1.43	2.57	3.06	1.46	2.40	1.76	5.02	1.43	2.10

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

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

Parameter: N₂O

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

Sample ID	Date	Time	N ₂ O	N ₂ O	N ₂ O
			ppm	mg/Sm ³	mg/Sm ³ @ 11% O ₂
Unit 1 Run 1	05-Nov-18	10:00 - 11:00	6.30	11.53	10.2
Unit 1 Run 2	05-Nov-18	11:02 - 12:02	4.10	7.50	6.3
Unit 1 Run 3	05-Nov-18	12:04 - 13:04	10.00	18.30	15.4
Average					10.6
Unit 2 Run 1	06-Nov-18	10:20 - 11:20	1.60	2.93	2.3
Unit 2 Run 2	06-Nov-18	11:27 - 12:27	1.90	3.48	2.9
Unit 2 Run 3	06-Nov-18	12:32 - 13:32	2.30	4.21	3.6
Average					2.9
Unit 3 Run 1	05-Nov-18	10:00 - 11:00	7.30	13.36	13.0
Unit 3 Run 2	05-Nov-18	11:02 - 12:02	5.50	10.07	9.8
Unit 3 Run 3	05-Nov-18	12:04 - 13:04	7.00	12.81	11.1
Average					11.3

APPENDIX - D

FIELD DATA SHEETS

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE	DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN			
					PROBE	Cp		VOLUMES	(mL)	(mL)	(mL)			
SOURCE Unit #2					G-310		0.3098		Imp. #1	0	206	206		
PARAMETER / RUN No Metals/Particulate / Run 3					7C		0.8489		Imp. #2	100	242	142		
DATE Nov. 7, 2018					PORT LENGTH				Imp. #3	100	146	46		
OPERATOR: DS/LSB					STACK DIAMETER 70.9"				Imp. #4	0	16	16		
CONTROL UNIT EV18 Y 100% 0.999					STACK HEIGHT 30.0'				Imp. #5	100	106	6		
ΔH@ 2015 1.73									Imp. #6	100	103	3		
BAROMETRIC PRESSURE, IN. Hg 30.40					INITIAL LEAK TEST 0.004 @ 15"				Imp. #7	100	200			
ASSUMED MOISTURE, Bw 15%					FINAL LEAK TEST 0.005 @ 15"				Imp. #8					
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %		
1	9:27	579.58	0.28	1.40	51	295	253	231	55	3				
2		582.73	0.26	1.30	52	295					10.0	9.8		
3		585.82	0.25	1.25	51	295	259	243	53	3				
4		588.85	0.24	1.20	53	299								
5		591.88	0.24	1.20	54	299	251	264	51	3.5				
6		594.92	0.24	1.20	55	300								
7		599.30	0.50	2.51	56	307	249	257	53	4	11.0	8.9		
8		603.82	0.53	2.65	58	306								
9		608.55	0.58	2.90	60	310	238	235	54	4				
10		613.05	0.52	2.61	61	308								
11		617.48	0.50	2.57	62	307	250	253	55	5	10.5	9.2		
12		621.82	0.48	2.41	63	308								
1	11:29	626.02	0.45	2.27	64	309	247	252	54	3				
2		630.28	0.46	2.32	65	310					13.0	6.4		
3		634.53	0.46	2.32	65	311	249	255	52	4				
4		638.85	0.47	2.38	66	309								
5		643.38	0.52	2.63	67	312	252	254	54	5				
6		647.89	0.50	2.53	68	317					13.0	6.6		
7		651.30	0.30	1.52	69	312	249	240	54	4.5				
8		654.65	0.28	1.43	69	309								
9		657.82	0.25	1.27	70	310	249	255	55	4				
10		660.98	0.25	1.28	70	305					10.5	9.2		
11		664.09	0.24	1.23	71	308	246	239	56	4				
12		667.14	0.23	1.21	71	304								
					71	303								

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE		DIAMETER, IN.		IMPINGER		INITIAL		FINAL		TOTAL GAIN	
SOURCE					PROBE		Cp		VOLUMES		(mL)		(mL)		(mL)	
Unit #2					G-310		0.3098		Imp. #1		0		138		138	
PARAMETER / RUN No					7C		0.8489		Imp. #2		100		246		146	
DATE					PORT LENGTH				Imp. #3		100		160		60	
Nov. 7, 2018					STATIC PRESSURE, IN. H2O		- 20.0"		Imp. #4		0		24		24	
OPERATOR: DS+SB					STACK DIAMETER		70.94		Imp. #5		100		104		4	
CONTROL UNIT					STACK HEIGHT		30.0'		Imp. #6		100		103		3	
Y 0.9997									Imp. #7		100		200			
ΔH@ 1.713									Imp. #8							
BAROMETRIC PRESSURE, IN. Hg					INITIAL LEAK TEST		0.07 @ 15'									
30.40					FINAL LEAK TEST		0.009 @ 15"									
ASSUMED MOISTURE, Bw																
15%																
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites					
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %				
1	11:48	667.905														
2		672.23	0.46	2.37	70	300	237	237	56	6.5						
3		676.56	0.47	2.38	70	313					11.0	8.8				
4		680.70	0.43	2.78	70	315	255	257	56	7.0						
5		684.73	0.41	2.07	70	315										
6		688.72	0.40	2.02	71	317	259	261	55	7.5						
7		692.60	0.38	1.97	70	317										
8		696.16	0.32	1.62	70	317	252	256	56	6.0	10.5	9.5				
9		699.50	0.28	1.42	71	317										
10		702.66	0.25	1.26	72	318	248	255	57	5.0						
11		705.70	0.23	1.17	72	314										
12		708.75	0.23	1.17	72	313	250	256	61	5.0	12.5	7.5				
		711.73	0.22	1.12	72	312										
1		714.98	0.26	1.34	71	302	251	256	61	3.5						
2		718.28	0.24	1.38	71	309										
3		721.70	0.29	1.48	71	310	253	255	59	4.0	9.5	10.5				
4		724.88	0.25	1.28	72	308										
5		727.88	0.22	1.13	72	307	247	255	57	4.0						
6		731.06	0.25	1.28	72	307										
7		735.33	0.45	2.31	73	308	246	252	58	5.5	9.5	10.2				
8		739.66	0.46	2.37	73	306										
9		744.34	0.53	2.77	72	294	246	254	54	7.0						
10		748.73	0.47	2.46	73	294										
11		753.02	0.45	2.33	73	301	250	257	55	6.5	11.0	8.8				
12	13:50	757.22	0.43	2.23	73	300										

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE G-310	DIAMETER, IN. 0.3078		IMPINGER		INITIAL	FINAL	TOTAL GAIN	
					PROBE 7C	Cp 0.8489		VOLUMES		(mL)	(mL)	(mL)	
SOURCE	Unit #3				PORT LENGTH		Imp. #1		100	144	144		
PARAMETER / RUN No	Metals / Particulate / Run 1				STATIC PRESSURE, IN. H ₂ O - 20.0"		Imp. #2		100	245	145		
DATE	NOV. 5, 2018				STACK DIAMETER 70.9"		Imp. #3		100	134	34		
OPERATOR	DS+SE				STACK HEIGHT 30.0'		Imp. #4		0	16	16		
CONTROL UNIT	JV-14 Y 1.0076 ΔH@ 2.012						Imp. #5		100	106	6		
BAROMETRIC PRESSURE, IN. Hg	29.97				INITIAL LEAK TEST 0.002 @ 15"		Imp. #6		100	104	4		
ASSUMED MOISTURE, Bw	15%				FINAL LEAK TEST 0.003 @ 15"		Imp. #8		200				
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites		
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %	
1	11:51	656.548											
2		660.30	0.35	2.11	69	302	252	249	56	6			
3		664.10	0.36	2.16	69	304					10.0	9.9	
4		667.75	0.33	1.99	70	304	256	253	55	6			
5		671.78	0.40	2.41	70	305							
6		675.99	0.44	2.65	71	306	251	253	56	6			
7		680.05	0.41	2.47	71	307							
8		683.65	0.37	1.97	71	308	253	252	52	6	10.0	9.7	
9		686.89	0.26	1.56	72	310							
10		690.02	0.24	1.45	73	308	252	250	52	6			
11		692.88	0.20	1.21	73	307							
12		695.80	0.21	1.27	74	308	251	250	53	6	10.0	9.9	
		698.58	0.19	1.15	73	306							
1		701.85	0.26	1.58	74	307	249	249	53	5	10.0	9.8	
2		705.22	0.28	1.69	74	310							
3		708.65	0.29	1.75	74	310	248	250	54	5			
4		711.90	0.26	1.57	74	310							
5		715.09	0.25	1.51	74	309	251	251	50	5	11.5	8.6	
6		718.40	0.27	1.63	74	309							
7		722.34	0.38	2.29	76	312	246	250	52	5			
8		726.38	0.40	2.42	75	310							
9		730.53	0.43	2.60	75	309	252	251	54	8			
10		734.98	0.48	2.89	74	310					11.5	8.8	
11		739.49	0.50	3.02	75	311	251	250	55	8.5			
12	13:53	744.08	0.52	3.13	75	313							

METRO VANCOUVER WTE - BURNABY B.C.					NOZZLE	DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN			
					PROBE	Cp		VOLUMES	(mL)	(mL)	(mL)			
SOURCE Unit #3									Imp. #1	0	245	245		
PARAMETER / RUN No Metals / Particulate - Run 2					PORT LENGTH				Imp. #2	100	226	126		
DATE Nov 6 th , 2018					STATIC PRESSURE, IN. H2O -20.0"				Imp. #3	100	122	22		
OPERATOR: DS + SB					STACK DIAMETER 70.9"				Imp. #4	0	14	14		
CONTROL UNIT J114					STACK HEIGHT 30.0'				Imp. #5	100	102	2		
									Imp. #6	100	101	1		
BAROMETRIC PRESSURE, IN. Hg 30.15					INITIAL LEAK TEST 0.003 @ 15"				Imp. #7	200				
ASSUMED MOISTURE, Bw 15%					FINAL LEAK TEST 0.002 @ 15"				Imp. #8					
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites			
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %		
	10:25	746.363												
1		750.39	0.42	2.47	61	309	255	236	54	3				
2		754.46	0.43	2.52	60	310					9.5	11.1		
3		758.48	0.41	2.92	62	309	250	252	55	5				
4		762.39	0.40	2.36	62	309								
5		766.28	0.39	2.30	62	308	251	254	52	6	9.0	11.4		
6		770.18	0.39	2.31	63	307								
7		774.82	0.55	3.27	64	307	247	253	50	7				
8		779.52	0.56	3.33	64	307								
9		784.46	0.62	3.69	65	307	250	251	52	7	9.0	11.5		
10		789.64	0.68	4.05	66	308								
11		794.76	0.66	3.94	67	307	250	251	54	8				
12		799.88	0.65	3.89	68	306								
1		805.10	0.69	4.13	69	308	250	252	55	9	9.0	10.4		
2		810.39	0.70	4.20	69	307								
3		815.68	0.69	4.20	70	309	249	250	56	9				
4		820.92	0.68	4.08	71	309								
5		826.10	0.67	4.02	70	308	246	250	55	9	9.5	10.3		
6		831.30	0.68	4.07	70	309								
7		835.69	0.48	2.88	71	308	252	250	56	10				
8		840.18	0.49	2.85	71	307								
9		844.40	0.45	2.72	72	308	247	249	50	9	10.0	9.6		
10		848.52	0.42	2.54	72	305								
11		852.50	0.39	2.36	72	305	250	249	52	8				
12	12:27	856.32	0.36	2.18	72	304								

METRO VANCOUVER WTE - BURNABY B.C.				NOZZLE <i>G-310</i>		DIAMETER, IN. <i>0.3098</i>		IMPINGER		INITIAL		FINAL		TOTAL GAIN	
				PROBE <i>7C</i>		Cp <i>0.8489</i>		VOLUMES		(mL)		(mL)		(mL)	
SOURCE <i>Unit #3</i>										Imp. #1		<i>0</i>		<i>182</i>	
PARAMETER / RUN No <i>Metals/Practimate - Run 3</i>				PORT LENGTH						Imp. #2		<i>100</i>		<i>220</i>	
DATE <i>Nov. 6th 2018</i>				STATIC PRESSURE, IN. H2O <i>-20.0'</i>						Imp. #3		<i>100</i>		<i>178</i>	
OPERATOR: <i>DS+SB</i>				STACK DIAMETER <i>70.9"</i>						Imp. #4		<i>0</i>		<i>24</i>	
CONTROL UNIT <i>JU 14</i>				STACK HEIGHT <i>30.0'</i>						Imp. #5		<i>100</i>		<i>108</i>	
										Imp. #6		<i>100</i>		<i>104</i>	
BAROMETRIC PRESSURE, IN. Hg <i>30.15</i>				INITIAL LEAK TEST <i>0.002 @ 15"</i>						Imp. #7		<i>200</i>			
ASSUMED MOISTURE, Bw <i>15%</i>				FINAL LEAK TEST <i>0.003 @ 15'</i>						Imp. #8					
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F					Pump Vac. IN. Hg	Fyrites				
					Dry Gas Outlet	Stack	Probe	Box	Impinger Exit		CO ₂ Vol. %	O ₂ Vol. %			
1	<i>13:22</i>	<i>858.712</i>													
2		<i>863.23</i>	<i>0.52</i>	<i>3.08</i>	<i>67</i>	<i>314</i>	<i>250</i>	<i>242</i>	<i>57</i>	<i>6</i>					
3		<i>867.85</i>	<i>0.54</i>	<i>3.20</i>	<i>68</i>	<i>315</i>					<i>10.5</i>	<i>9.3</i>			
4		<i>872.42</i>	<i>0.53</i>	<i>3.13</i>	<i>66</i>	<i>312</i>	<i>258</i>	<i>257</i>	<i>58</i>	<i>6.5</i>					
5		<i>876.94</i>	<i>0.52</i>	<i>3.08</i>	<i>65</i>	<i>311</i>									
6		<i>881.74</i>	<i>0.59</i>	<i>3.51</i>	<i>67</i>	<i>310</i>	<i>250</i>	<i>253</i>	<i>57</i>	<i>8</i>					
7		<i>886.52</i>	<i>0.57</i>	<i>3.39</i>	<i>67</i>	<i>310</i>									
8		<i>890.65</i>	<i>0.43</i>	<i>2.56</i>	<i>68</i>	<i>311</i>	<i>250</i>	<i>251</i>	<i>58</i>	<i>9</i>	<i>10.5</i>	<i>9.5</i>			
9		<i>894.88</i>	<i>0.45</i>	<i>2.68</i>	<i>68</i>	<i>310</i>									
10		<i>898.98</i>	<i>0.42</i>	<i>2.51</i>	<i>69</i>	<i>309</i>	<i>250</i>	<i>251</i>	<i>60</i>	<i>9</i>					
11		<i>902.98</i>	<i>0.40</i>	<i>2.39</i>	<i>69</i>	<i>308</i>									
12		<i>906.95</i>	<i>0.39</i>	<i>2.35</i>	<i>70</i>	<i>306</i>	<i>251</i>	<i>250</i>	<i>62</i>	<i>9</i>	<i>10.5</i>	<i>9.4</i>			
		<i>910.80</i>	<i>0.39</i>	<i>2.23</i>	<i>70</i>	<i>305</i>									
1		<i>915.34</i>	<i>0.52</i>	<i>3.11</i>	<i>70</i>	<i>310</i>	<i>254</i>	<i>251</i>	<i>63</i>	<i>8</i>					
2		<i>919.98</i>	<i>0.54</i>	<i>3.23</i>	<i>70</i>	<i>311</i>					<i>9.5</i>	<i>10.2</i>			
3		<i>924.54</i>	<i>0.52</i>	<i>3.11</i>	<i>71</i>	<i>311</i>	<i>254</i>	<i>251</i>	<i>62</i>	<i>8</i>					
4		<i>928.92</i>	<i>0.48</i>	<i>2.87</i>	<i>71</i>	<i>312</i>									
5		<i>933.35</i>	<i>0.49</i>	<i>2.92</i>	<i>72</i>	<i>315</i>	<i>248</i>	<i>250</i>	<i>63</i>	<i>9</i>					
6		<i>937.68</i>	<i>0.47</i>	<i>2.80</i>	<i>72</i>	<i>316</i>					<i>9.5</i>	<i>10.4</i>			
7		<i>942.89</i>	<i>0.68</i>	<i>4.05</i>	<i>73</i>	<i>318</i>	<i>253</i>	<i>250</i>	<i>61</i>	<i>9</i>					
8		<i>948.18</i>	<i>0.70</i>	<i>4.16</i>	<i>73</i>	<i>319</i>									
9		<i>953.50</i>	<i>0.71</i>	<i>4.22</i>	<i>73</i>	<i>319</i>	<i>250</i>	<i>250</i>	<i>60</i>	<i>10</i>					
10		<i>958.79</i>	<i>0.70</i>	<i>4.16</i>	<i>73</i>	<i>319</i>									
11		<i>964.01</i>	<i>0.68</i>	<i>4.05</i>	<i>73</i>	<i>317</i>	<i>248</i>	<i>249</i>	<i>62</i>	<i>10.5</i>	<i>11.5</i>	<i>8.2</i>			
12	<i>14:26</i>	<i>969.06</i>	<i>0.64</i>	<i>3.82</i>	<i>72</i>	<i>315</i>									

A. Lanfranco and Associates Inc.

Client LMU Y FE-18 1.0044
 Source Unit #1 Cp _____
 Parameter NH3 Pbar 30.54 Static _____
 Date 11-8-2018 Operator Jeremy

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (cu ft)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:25	169.90	51					
	10:35							
	10:45							
	10:55	191.60	60					
	11:05	155.50	61					
	11:15	189.40	63					
	11:25	193.41	63					
2	11:45	193.59	59					
	12:45	217.10	67					
3	1:01	217.32	63					
	2:01	242.05	70					

Client LMU Y LMU-A .9651
 Source Unit #1 Cp _____
 Parameter HF Pbar 30.54 Static _____
 Date 11-8-2018 Operator Jeremy

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:25	267.2370	49					
	10:35							
	10:45							
	10:55	267.5730	62					
	11:05	267.6800	64					
	11:15	267.7820	66					
	11:25	267.8464	68					
2	11:45	267.8520	60					
	12:45	268.4490	70					
3	1:01	268.4548	66					
	2:01	269.0546	72					

A. Lanfranco and Associates Inc.

Client MU Y FE-18 1.0044
 Source Unit #2 Cp _____
 Parameter NH₃ Pbar 30.4 Static _____
 Date 11.7.2018 Operator Jeremy

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (cu ft)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:19	101.38	53					
	129							
	139	109.15	61					
	149	112.72	64					
	159	116.40	66					
	11:09	120.00	67					
	11:19	123.40	67					
2	11:35	123.55	64					
	145							
	155							
	12:05	134.90	70					
	115	135.80	71					
	125							
	12:35	140.50	70					
3	12:49	146.73	67					
	1:49	146.70	72					

Client MU Y LMU-A 9651
 Source Unit #2 Cp _____
 Parameter HF Pbar 30.4 Static _____
 Date _____ Operator Jeremy

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:19	265.3980	49					
	129							
	139	265.6120	57					
	149	265.7210	60					
	159	265.8310	63					
	11:09	265.9400	64					
	11:19	266.0230	65					
2	11:35	266.0290	63					
	145							
	155							
	12:05	266.3550	65					
	115	266.4690	65					
	125							
	12:35	266.6294	67					
3	12:49	266.6351	62					
		267.2330	68					

4

A. Lanfranco and Associates Inc.

Client MU Y FEIS 1.044
 Source Unit #3 Cp _____
 Parameter NH₃ Pbar 30.15 Static _____
 Date Nov 6, 2018 Operator _____

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (cu ft)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:51	31.62	56					
	11:01	36.01	56					
	11:11							
	11:21							
	11:31							
	11:41							
	11:51	54.41	60					
2	12:05	54.69	60					
	1:04pm	76.81	63					
3	12:29	76.95	62					
	2:29	100.55	66					

Client MU Y LMU-A 9651
 Source Unit #3 Cp _____
 Parameter HF Pbar 30.15 Static _____
 Date Nov 6, 2018 Operator _____

Leak Check	Run 1	Run 2	Run 3
Initial	0002	0002	0002
Final	0002	0002	0002

Test No.	Time (hhmm)	DGM Volume (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:51	263.4810	57					
	11:01	263.5847	59					
	11:11							
	11:21							
	11:31							
	11:41							
	11:51	264.0974	68					
2	12:08	264.1060	62					
	1:08pm	264.7782	70					
3	1:29	264.7850	64					
	2:29	265.3920	70					

Canister sampling sheet

Plant MV Test Date _____
 File No. _____ Recovery Date _____

Source: Unit #3 Nov, 8, 2018

		<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>			
Pbar in hg		30.15	30.15	30.15			
Canister number		AC01034	AS00535	AS01282			
Controller number		0A00647	0A02119	0A00009			
Initial: Start time		10:51 AM	12:08	1:29			
Flask Vac. (in Hg)		-31.0	-30.0	-25.0			
Final: Finish time		11:51 AM	1:08 PM	2:29			
Flask Vac. (in Hg)		-14.0	-8.0	-6.0			

Source:

Pbar in hg		30.15					
Canister number		AS01350					
Controller number		0A01164					
Initial: Start time		10:51					
Flask Vac. (in Hg)		-31.0					
Final: End time							
Flask Vac. (in Hg)							

Source: Unit #2 NOV 7, 2018

Pbar in hg		30.4	30.4	30.4			
Canister number		AS01350	AC01780	AC01610			
Controller number		0A01164	0A02170	0A01266			
Initial: Start time		10:19	11:35	12:49			
Flask Vac. (in Hg)		-20.0	-29.0	-31.0			
Final: End time		11:19	12:35	1:49			
Flask Vac. (in Hg)		-7.0	-14.0	-10.0			

Source: Unit #1 NOV 8, 2018

Pbar in hg		30.54	30.54	30.54			
Canister number		AC02042	AC01911	AC00677			
Controller number		0A00506	0A01136	0A00610			
Initial: Start time		10:25	11:45	1:01			
Flask Vac. (in Hg)		-30.0	-33.0	-24.0			
Final: End time		11:25	12:45	2:01			
Flask Vac. (in Hg)		-6.0	-5.0	-6.0			

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: 9-Jul-18
Barometric Pressure: 30.05 (in. Hg)
Theoretical Critical Vacuum: 14.17 (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)^{0.5}(min)).
!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.50	14.00	479.000	493.900	14.900	76.0	76.0	77.0	77.0	73	0.8185	18.2	77.0	77.0	77.0
1.85	15.00	494.200	505.917	11.717	77.0	77.0	78.0	78.0	63	0.5956	20.8	77.0	81.0	79.0
1.12	16.00	506.000	515.730	9.730	78.0	78.0	80.0	80.0	55	0.4606	22.2	79.0	81.0	80.0
0.63	18.00	516.000	524.338	8.338	79.0	79.0	79.0	79.0	48	0.3560	23.2	80.0	82.0	81.0
0.30	15.00	524.400	529.141	4.741	79.0	79.0	80.0	80.0	40	0.2408	25.0	82.0	82.0	82.0

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR			CALIBRATION FACTOR					
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Y	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	dH@		Ko (value)
14.848	420.5		14.859	420.8	15.053	1.001	0.001		1.727	43.87	0.014			0.727
11.608	328.7		11.564	327.5	11.758	0.996	-0.003		1.727	43.88	0.014			0.732
9.595	271.7		9.530	269.9	9.708	0.993	-0.006		1.747	44.38	0.034			0.731
8.213	232.6		8.279	234.5	8.449	1.008	0.008		1.648	41.86	-0.065			0.742
4.662	132.0		4.662	132.0	4.767	1.000	0.000		1.717	43.61	0.004			0.733
Average Y----->						0.9997	Average dH@----->		1.713	43.5	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)	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 H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Mat Harrington

Signature: _____

Mat Harrington

Date: July 9, 2018

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: **9-Jul-18**
Barometric Pressure: **30.05** (in. Hg)
Theoretical Critical Vacuum: **14.17** (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)^{0.5}(min)).
!!!!!!!

----- DRY GAS METER READINGS -----										-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.			Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		Average (deg F)
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)					Initial (deg F)	Final (deg F)	
3.65	15.00	136.600	153.142	16.542	78.0	78.0	81.0	81.0		73	0.8185	15.8	81.0	81.0	81.0
1.88	15.00	165.000	177.087	12.087	83.0	83.0	88.0	88.0		63	0.5956	19.1	82.0	82.0	82.0
1.12	17.00	153.400	164.189	10.789	83.0	83.0	85.0	85.0		55	0.4606	20.3	81.0	82.0	81.5
0.64	15.00	129.300	136.427	7.127	77.0	77.0	78.0	78.0		48	0.3560	21.7	77.0	82.0	79.5
0.34	15.00	124.300	129.166	4.866	76.0	76.0	77.0	77.0		40	0.2408	22.8	77.0	77.0	77.0

***** RESULTS *****															
--- DRY GAS METER ---				----- ORIFICE -----		-- DRY GAS METER --				----- ORIFICE -----					
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)		CALIBRATION FACTOR Y				CALIBRATION FACTOR dH@					
						Value (number)	Variation (number)			Value (in H2O)	Value (mm H2O)	Variation (in H2O)		Ko (value)	
16.398	464.4	15.862	449.2	16.189		0.967	-0.004			1.805	45.84	0.026		0.715	
11.799	334.2	11.532	326.6	11.791		0.977	0.006			1.739	44.18	-0.039		0.723	
10.542	298.5	10.112	286.4	10.329		0.959	-0.013			1.736	44.09	-0.043		0.738	
7.040	199.4	6.909	195.7	7.031		0.981	0.010			1.674	42.53	-0.104		0.735	
4.812	136.3	4.684	132.6	4.745		0.973	0.002			1.939	49.24	0.160		0.689	
Average Y----->						0.9717		Average dH@----->		1.779	45.2		Average Ko---->	0.720	

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)	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 H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Mat Harrington

Signature: 

Date: July 9, 2018

A.Lanfranco & Associates inc.

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

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

Date: **10-Jul-18**
Barometric Pressure: **30.15** (in. Hg)
Theoretical Critical Vacuum: **14.22** (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)^{0.5}(min)).
!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
4.15	17.00	300.000	317.934	17.934	68.0	68.0	69.0	69.0	73	0.8185	19.2	69.0	70.0	69.5
2.15	15.00	318.300	329.812	11.512	68.0	68.0	69.0	69.0	63	0.5956	21.5	70.0	70.0	70.0
1.32	19.00	823.600	834.907	11.307	68.0	68.0	69.0	69.0	55	0.4606	23.8	73.0	75.0	74.0
0.75	17.00	339.050	346.770	7.720	69.0	69.0	71.0	71.0	48	0.3560	24.5	71.0	73.0	72.0
0.35	15.00	346.900	351.551	4.651	72.0	72.0	72.0	72.0	40	0.2408	26.0	72.0	74.0	73.0

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
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)	CALIBRATION FACTOR Y Value (number)	Variation (number)	CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)				
18.230	516.3	18.231	516.3	18.151	1.000	-0.008	2.043	51.90	0.031	0.674				
11.646	329.8	11.700	331.4	11.660	1.005	-0.003	2.001	50.83	-0.011	0.680				
11.415	323.3	11.418	323.4	11.464	1.000	-0.007	2.070	52.57	0.058	0.672				
7.761	219.8	7.911	224.0	7.913	1.019	0.012	1.956	49.67	-0.056	0.679				
4.654	131.8	4.717	133.6	4.727	1.014	0.006	1.991	50.57	-0.021	0.677				
Average Y----->					1.0076	Average dH@----->	2.012	51.1	Average Ko---->	0.676				

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)	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 H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Mat Harrington

Signature: 

Date: July 10, 2018

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: 10-Jul-18
Barometric Pressure: 30.15 (in. Hg)
Theoretical Critical Vacuum: 14.22 (in. Hg)

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

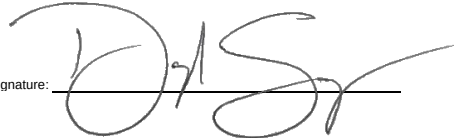
----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
3.62	15.00	152.600	168.628	16.028	75.0	75.0	73.0	73.0	73	0.8185	18.2	75.0	74.0	74.5
1.95	16.00	139.800	152.180	12.380	72.0	72.0	73.0	73.0	63	0.5956	20.0	70.0	72.0	71.0
1.20	19.00	128.300	139.685	11.385	70.0	70.0	72.0	72.0	55	0.4606	22.3	71.0	72.0	71.5
0.69	15.00	121.300	128.159	6.859	70.0	70.0	70.0	70.0	48	0.3560	24.5	69.0	68.0	68.5
0.34	15.00	116.500	121.187	4.687	70.0	70.0	70.0	70.0	40	0.2408	25.5	66.0	68.0	67.0

***** RESULTS *****														
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----					
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)	CALIBRATION FACTOR Y Value (number)	Variation (number)	CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)				
16.104	456.1	16.011	453.4	16.091	0.994	-0.010	1.781	45.23	-0.051	0.724				
12.424	351.8	12.469	353.1	12.449	1.004	-0.001	1.805	45.84	-0.027	0.714				
11.437	323.9	11.445	324.1	11.437	1.001	-0.004	1.864	47.35	0.033	0.705				
6.894	195.3	7.003	198.3	6.959	1.016	0.011	1.787	45.40	-0.044	0.710				
4.707	133.3	4.744	134.3	4.701	1.008	0.003	1.920	48.76	0.088	0.691				
Average Y----->					1.0044	Average dH@----->	1.831	46.5	Average Ko---->	0.709				

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)	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 H2O that equates to 0.75 cm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Mat Harrington

Signature: 

Date: July 10, 2018

A. Lanfranco & Associates inc.

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

Model #: **LMU-A**
Serial #: **Kimmon 186**

Date: **10-Jul-18**
Barometric Pressure: **30.15** (in. Hg)
Theoretical Critical Vacuum: **14.22** (in. Hg)

!!!!!!!

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

!!!!!!!

----- DRY GAS METER READINGS -----									-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (m³)	Volume Final (m³)	Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		
					Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				Initial (deg F)	Final (deg F)	Average (deg F)
0.00	15.00	207.6200	207.8250	7.240	69.0	69.0	69.0	69.0	48	0.3560	14.0	63.0	64.0	63.5
0.00	15.00	207.8300	208.0355	7.257	70.0	70.0	71.0	71.0	48	0.3560	14.0	65.0	65.0	65.0
0.00	20.00	208.0400	208.3145	9.694	70.0	70.0	72.0	72.0	48	0.3560	14.0	66.0	69.0	67.5

***** RESULTS *****											
--- DRY GAS METER ---			----- ORIFICE -----			-- DRY GAS METER --			----- ORIFICE -----		
VOLUME CORRECTED	VOLUME CORRECTED		VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATION FACTOR			CALIBRATION FACTOR		
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)
7.278	206.1		7.037	199.3	6.926	0.967	0.002		0.000	0.00	0.000
7.276	206.0		7.027	199.0	6.936	0.966	0.001		0.000	0.00	0.000
9.709	275.0		9.347	264.7	9.270	0.963	-0.002		0.000	0.00	0.000
Average Y----->						0.9651		Average dH@----->	0.0000	0.00	

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

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.

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

Calibrated by: Mat Harrington

Signature: _____

Mat Harrington

Date: July 10, 2018

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

GLASS NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Scott Ferguson
Date: October 25, 2018

Signature: 

Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft ²)
A	0.1250	0.1240	0.1245	0.0010	0.1245	0.0000845
G-165	0.1640	0.1655	0.1660	0.0020	0.1652	0.0001488
P-20	0.1855	0.1865	0.1835	0.0030	0.1852	0.0001870
J	0.1880	0.1880	0.1880	0.0000	0.1880	0.0001928
E	0.1880	0.1895	0.1882	0.0015	0.1886	0.0001939
P-13	0.2070	0.2080	0.2075	0.0010	0.2075	0.0002348
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
G-215	0.2160	0.2150	0.2130	0.0030	0.2147	0.0002513
Q	0.2190	0.2170	0.2185	0.0020	0.2182	0.0002596
G-222	0.2220	0.2195	0.2230	0.0035	0.2215	0.0002676
G-225	0.2240	0.2245	0.2250	0.0010	0.2245	0.0002749
V-07	0.2430	0.2460	0.2450	0.0030	0.2447	0.0003265
MV-248	0.2485	0.2490	0.2485	0.0005	0.2487	0.0003373
G-250	0.2480	0.2500	0.2520	0.0040	0.2500	0.0003409
P	0.2580	0.2570	0.2575	0.0010	0.2575	0.0003616
G-278	0.2775	0.2785	0.2790	0.0015	0.2783	0.0004225
P-2	0.2790	0.2780	0.2790	0.0010	0.2787	0.0004235
MV-280	0.2800	0.2795	0.2810	0.0015	0.2802	0.0004281
G-280	0.2850	0.2840	0.2850	0.0010	0.2847	0.0004420
G-292	0.2910	0.2925	0.2930	0.0020	0.2922	0.0004656
MV-02	0.3040	0.3070	0.3040	0.0030	0.3050	0.0005074
MV-01	0.3050	0.3060	0.3070	0.0020	0.3060	0.0005107
G-306	0.3060	0.3060	0.3065	0.0005	0.3062	0.0005113
G-309	0.3085	0.3110	0.3090	0.0025	0.3095	0.0005225
G-310	0.3105	0.3090	0.3100	0.0015	0.3098	0.0005236
V-06	0.3200	0.3210	0.3210	0.0010	0.3207	0.0005608
G-323	0.3210	0.3230	0.3245	0.0035	0.3228	0.0005684
G-330	0.3300	0.3305	0.3280	0.0025	0.3295	0.0005922
G-337	0.3380	0.3355	0.3365	0.0025	0.3367	0.0006182
P-27	0.3390	0.3380	0.3390	0.0010	0.3387	0.0006256
G-343	0.3430	0.3440	0.3435	0.0010	0.3435	0.0006435
P-9	0.3650	0.3640	0.3655	0.0015	0.3648	0.0007260
G-368	0.3685	0.3665	0.3690	0.0025	0.3680	0.0007386
G-372	0.3710	0.3730	0.3740	0.0030	0.3727	0.0007575
I	0.3785	0.3785	0.3785	0.0000	0.3785	0.0007814
O	0.3910	0.3915	0.3905	0.0010	0.3910	0.0008338
P-14	0.3910	0.3935	0.3920	0.0025	0.3922	0.0008388
P-17	0.4070	0.4075	0.4065	0.0010	0.4070	0.0009035
C	0.4255	0.4225	0.4235	0.0030	0.4238	0.0009798
#21	0.4305	0.4325	0.4315	0.0020	0.4315	0.0010155
G-434	0.4345	0.4335	0.4350	0.0015	0.4343	0.0010289
G-437	0.4340	0.4350	0.4360	0.0020	0.4350	0.0010321
P-29	0.4650	0.4680	0.4660	0.0030	0.4663	0.0011861
G-468	0.4680	0.4670	0.4680	0.0010	0.4677	0.0011929
P-7	0.4965	0.4940	0.4930	0.0035	0.4945	0.0013337
B	0.5015	0.5030	0.5025	0.0015	0.5023	0.0013763
G-540	0.5405	0.5400	0.5405	0.0005	0.5403	0.0015924

Where:

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

Pitot Tube Calibration

Date: 11-Jul-18
Pbar (in.Hg): 29.69

Temp (R): 530
Dn (in.): 0.25

Pitot ID: **7A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.290	0.400	35.8	0.8430	0.0006
0.360	0.500	39.9	0.8400	0.0035
0.460	0.640	45.1	0.8393	0.0042
0.570	0.790	50.2	0.8409	0.0026
0.700	0.940	55.6	0.8543	0.0108
Average :			0.8435	0.0043

Pitot ID:

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
Average :			#DIV/0!	#DIV/0!

Pitot ID: **7B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.120	0.160	23.0	0.8574	0.0111
0.260	0.370	33.9	0.8299	0.0164
0.410	0.550	42.6	0.8548	0.0085
0.530	0.740	48.4	0.8378	0.0085
0.640	0.865	53.2	0.8516	0.0053
Average :			0.8463	0.0099

Pitot ID:

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
		0.0	#DIV/0!	#DIV/0!
Average :			#DIV/0!	#DIV/0!

Pitot ID: **7 AL GVRD**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.290	0.400	35.8	0.8430	0.0041
0.350	0.480	39.3	0.8454	0.0065
0.470	0.670	45.6	0.8292	0.0097
0.600	0.840	51.5	0.8367	0.0021
0.720	1.000	56.4	0.8400	0.0012
Average :			0.8388	0.0047

Pitot ID:

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

Pitot ID: **7C**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.260	0.360	33.9	0.8413	0.0076
0.320	0.440	37.6	0.8443	0.0046
0.400	0.550	42.0	0.8443	0.0046
0.510	0.680	47.5	0.8574	0.0084
0.660	0.880	54.0	0.8574	0.0084
Average :			0.8489	0.0068

Pitot ID:

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

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jeremy Gibbs

Signature: 

Date: July 11, 2018

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada		Device (inches of Hg)		Difference
		(kPa)	(inches of Hg)	Reading	Elevation Corrected	(Env Can - Elv Corr)
LA	July 17, 2018	101.6	30.01	29.90	29.97	0.04
DS	July 17, 2018	101.6	30.01	29.91	29.98	0.03
CL	July 17, 2018	101.6	30.01	29.89	29.96	0.05
ML	July 17, 2018	101.6	30.01	29.90	29.97	0.04
MH	July 17, 2018	101.6	30.01	29.91	29.98	0.03
SH	July 17, 2018	101.6	30.01	29.91	29.98	0.03
JB	July 17, 2018	101.6	30.01	29.97	30.04	-0.03
SF	July 17, 2018	101.6	30.01	29.99	30.06	-0.05
JG	July 17, 2018	101.6	30.01	29.89	29.96	0.05
SB	July 17, 2018	101.6	30.01	29.89	29.96	0.05

Calibrated by: Daryl Sampson

Signature: 

Date: July 17, 2018

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.

http://www.weatheroffice.gc.ca/city/pages/bc-74_metric_e.html

A. LANFRANCO and ASSOCIATES INC.
ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Daryl Sampson

Date: 9-Jul-18

Signature:



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%	100	0.00%	202	0.30%	302	0.26%	499	-0.10%	799	-0.08%	1699	-0.05%
Omega HH11A	4	200167	33	0.20%	100	0.00%	201	0.15%	301	0.13%	498	-0.21%	797	-0.24%	1697	-0.14%
Omega HH11A	6	600059	33	0.20%	100	0.00%	201	0.15%	301	0.13%	498	-0.21%	797	-0.24%	1697	-0.14%
TPI 341K	7	2.0315E+10	32	0.00%	100	0.00%	199	-0.15%	299	-0.13%	498	-0.21%	797	-0.24%	1694	-0.28%
TPI 341K	8	2.0313E+10	31	-0.20%	99	-0.18%	199	-0.15%	298	-0.26%	498	-0.21%	798	-0.16%	1696	-0.19%
Cont Cmpny	10	102008464	32	0.00%	100	0.00%	200	0.00%	300	0.00%	500	0.00%	798	-0.16%	1697	-0.14%
Omega HH11	14	409426	33	0.20%	100	0.00%	202	0.30%	302	0.26%	499	-0.10%	798	-0.16%	1698	-0.09%
TPI 341K	16	400120029	29	-0.61%	97	-0.54%	198	-0.30%	298	-0.26%	498	-0.21%	800	0.00%	1703	0.14%
TPI 341K	17	2.0329E+10	30	-0.41%	98	-0.36%	198	-0.30%	298	-0.26%	497	-0.31%	797	-0.24%	1696	-0.19%
TPI 341K	18	2.0329E+10	31	-0.20%	99	-0.18%	199	-0.15%	299	-0.13%	498	-0.21%	798	-0.16%	1697	-0.14%
TPI 341K	19	2.0329E+10	30	-0.41%	98	-0.36%	198	-0.30%	298	-0.26%	497	-0.31%	797	-0.24%	1695	-0.23%
TPI 341K	20	2.0329E+10	31	-0.20%	99	-0.18%	199	-0.15%	298	-0.26%	498	-0.21%	797	-0.24%	1696	-0.19%

Reference device is a NIST certified digital thermocouple calibrator

Variation expressed as a percentage of the absolute temperature must be within 1.5 %

A. LANFRANCO and ASSOCIATES INC.
ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Daryl Sampson

Date: July 4, 2018

Signature:



K-TYPE THERMOCOUPLE CALIBRATIONS

Probe/TC ID	Hg Thermometer Temp (°F)	CL23A Readout (F)		Probe/TC ID	Hg Thermometer Temp (°F)	CL23A Readout (F)
3B	212	211		TC 3-3	212	211
3C	212	211		TC 4-3	210	211
4A	212	212		TC 4-4	212	212
4B	212	212		TC 5-4	210	212
5A	211	211		TC 5-5	n/a	n/a
5B	212	211		TC 5-6	212	211
5C	211	211		TC 6-4	211	211
5D	211	211		TC 10-3	211	211
6A	212	212		TC 10-4	n/a	n/a
6B	211	211		5' Fording	211	211
6C	212	211		TC Marshal	212	211
7C	210	210				
8A	211	212				
8B	210	210				
10A	210	211				
10B	212	212				
11A	210	211				
12A	213	212				
12B	209	209				

* n/a denotes not in service



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

Walter Smith & Associates, Inc.

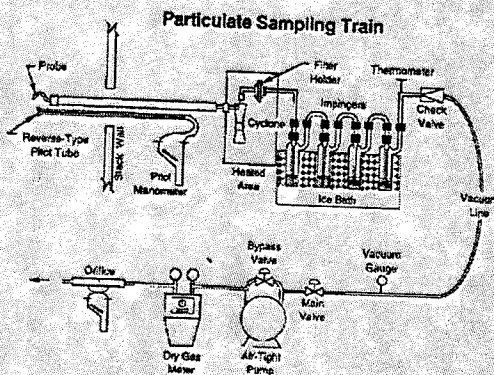
is hereby granted to:

Louis Agassiz

to certify that they have completed to satisfaction

Source Sampling & CEMS Workshop

Granted: March 11, 2011



Walter S. Smith

Walter S. Smith, PE, DEE 3.5 CEU

Shawn Harrington

has met the requirements of

Stack Testing for Pollutants
(CHSC 7760)

School of Process, Energy and Natural Resources
Chemical Sciences Program

Endorsed by:

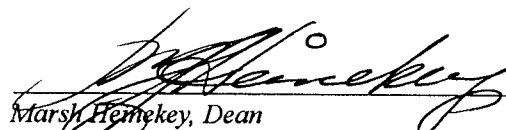


Environment
Canada

Environnement
Canada



Province of
British Columbia
Ministry of
Environment,
Lands and Parks


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

JUNE 21, 2001
Dated