

**MV WASTE-TO-ENERGY FACILITY
COMPLIANCE TESTING
REPORT APPENDICES
February 2018 Emission Survey**

Prepared For:

Metro Vancouver
Metrotower III
4730 Kingsway
Burnaby, BC
V5H 0C6

Prepared by:

A. Lanfranco and Associates Inc.
#101 – 9488 189th Street
Surrey, BC
V4N 4W7

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- A Quality Assurance / Quality Control Results
- B Laboratory Results
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APPENDIX – A

QUALITY ASSURANCE / QUALITY CONTROL RESULTS

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

Administration:

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

Preparation:

- All glassware cleaned
- Blank samples of reagents collected.

Testing:

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

Analysis:

- Trace Metals and Mercury analysis conducted at Exova Labs, Surrey, B.C.
- Fluoride (HF) analysis conducted at ALS Labs, 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
- Chain of Custody protocols followed for all samples.
- Excellent blank values for all sample types. All samples blank corrected.

Sample Type	Blank Value		
First Survey 2018	Unit 1	Unit 2	Unit 3
Filter	-0.2 mg	-0.2 mg	0 mg
Front Half Washings	1.7 mg	0.0 mg	0.4 mg
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug
Mercury Back	<0.10 ug	<0.14 ug	<0.11 ug
Trace Metals Front *	<145 ug	<150 ug	<155 ug
Trace Metals Back*	<34.2 ug	<24.0 ug	<39.5 ug
Fluoride	<2.0 ug	<2.0 ug	<2.0 ug

Sum of all reported elements except Hg*

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254365
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Filter Reagent Blanks	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 9, 2018
Attn: Missy	P.O.:	Report Number: 2264081
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

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

Lot ID: **1254365**
 Control Number:
 Date Received: Feb 13, 2018
 Date Reported: Mar 9, 2018
 Report Number: 2264081

		Reference Number	1254365-1	1254365-2	1254365-3
		Sample Date	Feb 05, 2018	Feb 05, 2018	Feb 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	2.8	2	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	<0.2	0.69	<0.2	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	<0.3	1	<0.3	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	0.3	0.6	0.3	0.25
Nickel	µg	0.5	0.6	1	0.5
Phosphorus	µg	120	120	110	2.5
Selenium	µg	<2	2.4	2.8	1.5
Tellurium	µg	<2	<2	2.6	2
Thallium	µg	<2	<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

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: 1254365
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Filter Reagent Blanks	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 9, 2018
Attn: Missy	P.O.:	Report Number: 2264081
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	Feb 22, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 14, 2018	Exova Surrey
* Reference Method Modified				

References

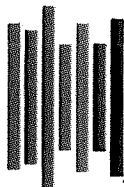
EMC Emission Measurement Center of EPA

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



Testing
Advising
Assuring

Enviro
Note: Prop

LOT: Lot: 1254365 COC



Sheet

ad with analysis

Billing Address: Company: A. Lanfranco and Associates Address: Unit 101 9488 189 St Surrey, BC V4N 4W7 Attention: Mark Lanfranco Phone: 604-881-2582 Fax: 604-881-2581 Cell: e-mail: mark.lanfranco@alanfranco.com		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
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Information to be included on Report and Invoice Project ID: Project Name: Metro Vancouver WTE Project Location: Filter 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. Waybill #: Date Company Time
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Special Instructions / Comments * 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 IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	Enter tests above (✓ relevant samples below)									
								ICAP	Hg								
1	Reagent Blank Unit 1 Container 1 (filter)			05-Feb-18			1	✓	✓								
2																	
3	Reagent Blank Unit 2 Container 1 (filter)			05-Feb-18			1	✓	✓								
4																	
5	Reagent Blank Unit 3 Container 1 (filter)			05-Feb-18			1	✓	✓								
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254398
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Reagent Blanks	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264134
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

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Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254398
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Reagent Blanks	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264134
Sampled By:	Proj. Acct. code:	
Company:		

Reference Number		1254398-1	1254398-2	1254398-3	
Sample Date		Feb 05, 2018	Feb 05, 2018	Feb 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	6	8	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	0.25	0.26	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	1	0.6	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	0.6	<0.5	<0.5	0.5
Phosphorus	µg	<2	<2	<2	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	0.6	<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	<0.2	0.34	0.42	0.2
Cobalt	µg	0.8	0.4	<0.3	0.25
Copper	µg	<0.3	<0.3	<0.3	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	<0.3	<0.3	<0.3	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	0.6	<0.5	<0.5	0.5
Volume	Sample	mL	205	200	
Volume	aliquot volume	mL	155	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: **1254398**
 Control Number:
 Date Received: Feb 13, 2018
 Date Reported: Mar 15, 2018
 Report Number: 2264134

		Reference Number	1254398-1	1254398-2	1254398-3
		Sample Date	Feb 05, 2018	Feb 05, 2018	Feb 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	0.10	0.09	0.10
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	205	200	200
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 2B	µg/sample	0.03	0.03	0.03
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	95	98	98
Volume	aliquot volume	mL	25	25	25
Volume	Final	mL	40	40	40
Mercury	Fraction 3A	µg/sample	<0.008	<0.008	<0.008
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05
Dilution Factor	As Tested		1	1	1
Volume	Sample	mL	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	0.27	0.29	0.26
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	0.09	0.09	0.08

Approved by: 
 Mathieu Simoneau
 Operations Manager

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

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: Reagent Blanks LSD: P.O.: Proj. Acct. code:	Lot ID: 1254398 Control Number: Date Received: Feb 13, 2018 Date Reported: Mar 15, 2018 Report Number: 2264134
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 8, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 14, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 14, 2018	Exova Surrey

* Reference Method Modified

References

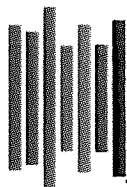
EMC Emission Measurement Center of EPA

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Results relate only to samples as submitted.

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Exova



Testing
Advising
Assuring

LOT Lot: 1254398 COC



1 Sheet

and with analysis

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

Information to be included on Report and Invoice	RUSH	Please contact the laboratory to confirm rush dates and times before submitting samples.	Sample Custody (Please Print)
	Upon filling out this section, client accepts that surcharges will be attached to this analysis		Sampled by:
	RUSH All Analysis As indicated		Company Signature
	required on: ☐ or ☐		I authorize Exova to proceed with the work work indicated on this form:
	Date Required: _____		Date: Initial:
	Signature: _____		Received by: Sample Temp.
Exova Authorization: _____		Waybill #: Date	Company Time

Special Instructions / Comments	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

Please indicate which regulations you are required to meet: _____

	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	Reagent Blank Unit 1					05-Feb-18			5	✓	✓	✓	✓	✓	✓				
2																			
3	Reagent Blank Unit 2					05-Feb-18			5	✓	✓	✓	✓	✓	✓				
4																			
5	Reagent Blank Unit 3					05-Feb-18			5	✓	✓	✓	✓	✓	✓				
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254355
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Field Blanks	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264066
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

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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: **1254355**
 Control Number:
 Date Received: Feb 13, 2018
 Date Reported: Mar 15, 2018
 Report Number: 2264066

Reference Number					
Sample Date					
Sample Time					
Sample Location					
Sample Description					
Matrix					
Stack Samples					
Stack Samples					
Stack Samples					
Stack Samples					
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fraction 1A					
Aluminum	µg	10	10	7	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	0.31	0.40	0.35	0.2
Cobalt	µg	<0.3	<0.3	0.3	0.25
Copper	µg	0.8	0.4	2	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	0.5	0.3	0.3	0.25
Nickel	µg	0.8	0.6	0.6	0.5
Phosphorus	µg	130	130	140	2.5
Selenium	µg	2.6	4.6	3.7	1.5
Tellurium	µg	<2	2.8	<2	2
Thallium	µg	<2	<2	<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	6	<5	7	5
Antimony	µg	<2	3	<2	2.5
Arsenic	µg	<0.9	<1	<0.9	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	<0.2	<0.2	0.2	0.2
Cobalt	µg	0.5	0.4	0.3	0.25
Copper	µg	<0.2	<0.2	<0.2	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	2	<0.2	<0.2	0.25
Nickel	µg	<0.5	<0.5	<0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	<1	2	1.5
Vanadium	µg	<0.9	<1	<0.9	1
Zinc	µg	5.7	0.6	10	0.5
Volume	Sample	mL	360	300	350
Volume	aliquot volume	mL	310	250	300
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: **1254355**
 Control Number:
 Date Received: Feb 13, 2018
 Date Reported: Mar 15, 2018
 Report Number: 2264066

		Reference Number	1254355-1	1254355-2	1254355-3	Nominal Detection Limit
		Sample Date	Feb 06, 2018	Feb 07, 2018	Feb 08, 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		
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	0.08	0.05	
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL 360	300	350		
Volume	aliquot volume	mL 25	25	25		
Volume	Final	mL 40	40	40		
Mercury	Fraction 2B	µg/sample 0.03	0.03	0.04		
Mercury	As Tested	µg/L <0.05	<0.05	<0.05	0.05	
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL 144	174	140		
Volume	aliquot volume	mL 25	25	25		
Volume	Final	mL 40	40	40		
Mercury	Fraction 3A	µg/sample <0.01	<0.01	<0.01		
Mercury	As Tested	µg/L <0.05	<0.05	<0.05	0.05	
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL 500	1000	500		
Volume	aliquot volume	mL 25	25	25		
Volume	Final	mL 40	40	40		
Mercury	Fraction 3B	µg/sample <0.04	<0.08	<0.04		
Mercury	As Tested	µg/L <0.05	0.08	<0.05	0.05	
Dilution Factor	As Tested	1	1	1		
Volume	Sample	mL 200	200	200		
Volume	aliquot volume	mL 25	25	25		
Volume	Final	mL 40	40	40		
Mercury	Fraction 3C	µg/sample <0.02	0.02	<0.02		

Approved by: 
 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 #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: 1254355 Control Number: Date Received: Feb 13, 2018 Date Reported: Mar 15, 2018 Report Number: 2264066
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 8, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 14, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 14, 2018	Exova Surrey

* Reference Method Modified

References

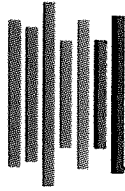
EMC Emission Measurement Center of EPA

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



Testing
Advising
Assuring

LOT: ☐

ironn

Lot: 1254355 COC



et

: 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: ☐	
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 ☐		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: 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: _____ Waybill #: _____ Date: _____ Company: _____ Time: _____												
		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												
		<table border="1"><tr><td>Number of Containers</td><td>Front ICAP</td><td>Back ICAP</td><td>Front Hg</td><td>Back Hg</td><td>5A Hg</td><td>5B Hg</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg				
Number of Containers	Front ICAP	Back ICAP	Front Hg	Back Hg	5A Hg	5B Hg								

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)					06-Feb-18				5	✓	✓	✓	✓	✓								
2																							
3	Field Blank Unit 2 (Beaker (MV Unit 2 Blank) + 4 Bottles)					07-Feb-18				5	✓	✓	✓	✓	✓								
4																							
5	Field Blank Unit 3 (Beaker (MV Unit 3 Blank) + 4 Bottles)					08-Feb-18				5	✓	✓	✓	✓	✓								
6																							
7																							
8																							
9																							
10																							
11																							
12																							
13																							
14																							
15																							



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

Date Received: 13-FEB-18
Report Date: 16-FEB-18 15:51 (MT)
Version: FINAL

Client Phone: 604-881-2582

Certificate of Analysis

Lab Work Order #: L2055675

Project P.O. #: HF

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

Environmental

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2055675-1	L2055675-2	L2055675-3		
		Description	WATER	WATER	WATER		
		Sampled Date	06-FEB-18	07-FEB-18	08-FEB-18		
		Sampled Time					
		Client ID	UNIT 1 HF BLANK	UNIT 2 HF BLANK	UNIT 3 HF BLANK		
Grouping	Analyte						
STACK							
Anions and Nutrients	Fluoride (F) (ug/sample)		<2.0	<2.0	<2.0		
	Volume (Anions) (mL)		195	200	200		

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.



Page 1 of 1

APPENDIX - B

LABORATORY RESULTS

Report Transmission Cover Page

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
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:

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Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1254383-1	1254383-2	1254383-3
		Sample Date	Feb 05, 2018	Feb 06, 2018	Feb 06, 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	8	20	<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	0.55	1.8	0.24	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	2	<0.3	0.25
Lead	µg	<2	2	<2	1.5
Manganese	µg	0.6	2	0.7	0.25
Nickel	µg	1	2	2	0.5
Phosphorus	µg	110	130	83	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	3.3	5.0	1	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	29	20	21	5
Antimony	µg	<2	4	2	2.5
Arsenic	µg	<0.8	<0.8	1	1
Cadmium	µg	<0.2	<0.2	<0.2	0.25
Chromium	µg	0.69	0.45	0.44	0.2
Cobalt	µg	<0.2	0.5	0.3	0.25
Copper	µg	1	0.8	0.5	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	12	0.5	1	0.25
Nickel	µg	0.5	<0.4	0.9	0.5
Phosphorus	µg	21	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	1	<1	1.5
Vanadium	µg	<0.8	<0.8	<0.8	1
Zinc	µg	6.0	9.2	11	0.5
Volume	Sample	mL	895	925	945
Volume	aliquot volume	mL	845	875	895
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	0.05

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1254383-1	1254383-2	1254383-3	
		Sample Date	Feb 05, 2018	Feb 06, 2018	Feb 06, 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
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	0.52	0.19	0.21	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	895	925	945	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	µg/sample	0.7	0.3	0.3	
Mercury	As Tested	µg/L	0.34	1.00	<0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	180	180	182	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	µg/sample	0.1	0.3	<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	0.36	0.34	0.07	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	0.1	0.02	

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1254383-4	1254383-5	1254383-6
		Sample Date	Feb 06, 2018	Feb 07, 2018	Feb 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	20	10	<5	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<1	<1	1	1
Cadmium	µg	1	0.5	0.3	0.25
Chromium	µg	1.9	2.3	0.29	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	4.9	2.9	0.7	0.25
Lead	µg	7.2	6.1	2	1.5
Manganese	µg	1	1	0.5	0.25
Nickel	µg	2	4.7	1	0.5
Phosphorus	µg	140	140	80	2.5
Selenium	µg	2	<2	2	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	72.9	70.2	22	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	10	20	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	<0.8	<0.8	<0.8	1
Cadmium	µg	0.2	<0.2	<0.2	0.25
Chromium	µg	0.80	0.49	0.33	0.2
Cobalt	µg	0.4	0.4	0.4	0.25
Copper	µg	0.6	<0.2	0.5	0.25
Lead	µg	<1	<1	<1	1.5
Manganese	µg	0.4	0.6	0.4	0.25
Nickel	µg	0.6	0.5	0.5	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	<1	<1	<1	1.5
Vanadium	µg	<0.8	<0.8	<0.8	1
Zinc	µg	9.3	3.4	6.1	0.5
Volume	Sample	mL	990	870	860
Volume	aliquot volume	mL	950	820	810
Mercury by CVAA					
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1254383-4	1254383-5	1254383-6
		Sample Date	Feb 06, 2018	Feb 07, 2018	Feb 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
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 0.21	0.26	0.18	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL 990	870	860	
Volume	aliquot volume	mL 25	25	25	
Volume	Final	mL 40	40	40	
Mercury	Fraction 2B	µg/sample 0.3	0.4	0.2	
Mercury	As Tested	µg/L 0.09	<0.05	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL 144	198	196	
Volume	aliquot volume	mL 25	25	25	
Volume	Final	mL 40	40	40	
Mercury	Fraction 3A	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 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	0.08	<0.05	0.05
Dilution Factor	As Tested	1	1	1	
Volume	Sample	mL 200	200	200	
Volume	aliquot volume	mL 25	25	25	
Volume	Final	mL 40	40	40	
Mercury	Fraction 3C	µg/sample 0.02	0.02	<0.02	

Analytical Report

Bill To: A. Lanfranco & Associates	Project ID:	Lot ID: 1254383
#101, 9488 - 189 Street	Project Name: Metro Vancouver WTE	Control Number:
Surrey, BC, Canada	Project Location: Metals and Hg	Date Received: Feb 13, 2018
V4N 4W7	LSD:	Date Reported: Mar 15, 2018
Attn: Missy	P.O.:	Report Number: 2264117
Sampled By:	Proj. Acct. code:	
Company:		

		Reference Number	1254383-7	1254383-8	1254383-9
		Sample Date	Feb 07, 2018	Feb 08, 2018	Feb 08, 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	9	10	5
Antimony	µg	<2	<2	<2	2.5
Arsenic	µg	1	1	<1	1
Cadmium	µg	<0.3	<0.3	<0.3	0.25
Chromium	µg	1.4	1.2	2.5	0.2
Cobalt	µg	<0.3	<0.3	<0.3	0.25
Copper	µg	1	2	0.9	0.25
Lead	µg	<2	<2	<2	1.5
Manganese	µg	0.6	0.9	0.7	0.25
Nickel	µg	1	1	2	0.5
Phosphorus	µg	140	120	120	2.5
Selenium	µg	<2	<2	<2	1.5
Tellurium	µg	<2	2	<2	2
Thallium	µg	<2	<2	<2	1.5
Vanadium	µg	<1	<1	<1	1
Zinc	µg	2	4.7	2.8	0.5
Back Half Metals Fraction 2A					
Aluminum	µg	20	10	10	5
Antimony	µg	2	3	3	2.5
Arsenic	µg	<0.8	<0.8	<0.8	1
Cadmium	µg	1	<0.2	<0.2	0.25
Chromium	µg	0.62	0.26	0.67	0.2
Cobalt	µg	0.4	<0.2	0.4	0.25
Copper	µg	0.3	0.3	<0.2	0.25
Lead	µg	1	<1	<1	1.5
Manganese	µg	1	0.5	0.5	0.25
Nickel	µg	0.5	<0.4	0.7	0.5
Phosphorus	µg	20	20	20	2.5
Selenium	µg	<1	<1	<1	1.5
Tellurium	µg	<2	<2	<2	2
Thallium	µg	2	<1	2.2	1.5
Vanadium	µg	<0.8	<0.8	<0.8	1
Zinc	µg	12	8.2	9.0	0.5
Volume	Sample	mL	895	880	870
Volume	aliquot volume	mL	845	830	820
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: Metals and Hg
 LSD:
 P.O.:
 Proj. Acct. code:

Lot ID: **1254383**
 Control Number:
 Date Received: Feb 13, 2018
 Date Reported: Mar 15, 2018
 Report Number: 2264117

		Reference Number	1254383-7	1254383-8	1254383-9			
		Sample Date	Feb 07, 2018	Feb 08, 2018	Feb 08, 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		
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	0.20	0.32	0.54	0.05		
Dilution Factor	As Tested		1	1	1			
Volume	Sample	mL	895	880	870			
Volume	aliquot volume	mL	25	25	25			
Volume	Final	mL	40	40	40			
Mercury	Fraction 2B	µg/sample	0.3	0.4	0.7			
Mercury	As Tested	µg/L	<0.05	<0.05	<0.05	0.05		
Dilution Factor	As Tested		1	1	1			
Volume	Sample	mL	176	156	212			
Volume	aliquot volume	mL	25	25	25			
Volume	Final	mL	40	40	40			
Mercury	Fraction 3A	µg/sample	<0.01	<0.01	<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	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	0.07	0.05	0.32	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	0.1			

Approved by: 
 Mathieu Simoneau
 Operations Manager



Methodology and Notes

Bill To: A. Lanfranco & Associates #101, 9488 - 189 Street Surrey, BC, Canada V4N 4W7	Project ID: Project Name: Metro Vancouver WTE Project Location: Metals and Hg LSD: P.O.: Proj. Acct. code:	Lot ID: 1254383 Control Number: Date Received: Feb 13, 2018 Date Reported: Mar 15, 2018 Report Number: 2264117
Attn: Missy Sampled By: Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (Surrey) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 22, 2018	Exova Surrey
Mercury in Air (Surrey) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Mercury in Air (Surrey) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Feb 21, 2018	Exova Surrey
Mercury in Air (Surrey) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 8, 2018	Exova Surrey
Mercury in Air (Surrey) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 14, 2018	Exova Surrey
Metals in Stack Samples - Back half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 16, 2018	Exova Surrey
Metals in Stack Samples - Front half (Surrey)	EMC	* Metals Emissions from Stationary Sources, 29	Feb 14, 2018	Exova Surrey

* Reference Method Modified

References

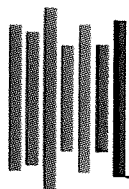
EMC Emission Measurement Center of EPA

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

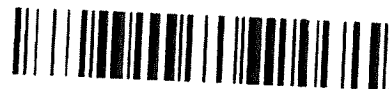


Testing
Advising
Assuring

LOT:

Lot: 1254383 COC

iviro
Note: Pro,



Sheet

id with analysis

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

Information to be included on Report and Invoice	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. _____ Waybill #: _____ Date: 19°C Company: _____ Time: _____	
Project ID:			
Project Name:	Metro Vancouver WTE		
Project Location:	Metals and Hg		
Legal Location:			
PO#:			
Proj. Acct. Code:			
Agreement ID:			

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	☐ 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	
Please indicate which regulations you are required to meet: _____		Number of Containers	
		Front ICAP Back ICAP Front Hg Back Hg 5A Hg 5B Hg	

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

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

Appendix B - Particulate Analysis

Filter Collection:

Test #	Initial (grams)	Final (grams)	Net Difference (grams)	Blank Adjusted (grams)
Unit 1 Blank	0.4817	0.4815	-0.0002	
Unit 1 Run 1	0.4819	0.4817	-0.0002	ND
Unit 1 Run 2	0.4818	0.4815	-0.0003	ND
Unit 1 Run 3	0.4849	0.4846	-0.0003	ND
Unit 2 Blank	0.4860	0.4858	-0.0002	
Unit 2 Run 1	0.4818	0.4850	0.0032	0.0034
Unit 2 Run 2	0.4871	0.4868	-0.0003	ND
Unit 2 Run 3	0.4810	0.4815	0.0005	0.0007
Unit 3 Blank	0.4827	0.4827	0.0000	
Unit 3 Run 1	0.4826	0.4820	-0.0006	ND
Unit 3 Run 2	0.4828	0.4823	-0.0005	ND
Unit 3 Run 3	0.4834	0.4831	-0.0003	ND

Front Half Washings:

Test #	Initial (grams)	Final (grams)	Net Difference (grams)	Blank Adjusted (grams)
Unit 1 Blank	120.6043	120.6060	0.0017	
Unit 1 Run 1	119.9521	119.9540	0.0019	0.0002
Unit 1 Run 2	116.0292	116.0324	0.0032	0.0015
Unit 1 Run 3	113.6698	113.6717	0.0019	0.0002
Unit 2 Blank	111.7509	111.7509	0.0000	
Unit 2 Run 1	114.8097	114.8095	-0.0002	ND
Unit 2 Run 2	123.3176	123.3168	-0.0008	ND
Unit 2 Run 3	113.0779	113.0785	0.0006	0.0006
Unit 3 Blank	123.2208	123.2212	0.0004	
Unit 3 Run 1	113.2622	113.2647	0.0025	0.0021
Unit 3 Run 2	119.4883	119.4895	0.0012	0.0008
Unit 3 Run 3	117.0934	117.0958	0.0024	0.0020



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

Date Received: 13-FEB-18
Report Date: 16-FEB-18 16:10 (MT)
Version: FINAL

Client Phone: 604-881-2582

Certificate of Analysis

Lab Work Order #: L2055676

Project P.O. #: HF

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
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Environmental

www.alsglobal.com

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ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2055676-1	L2055676-2	L2055676-3	L2055676-4	L2055676-5
		Description	WATER	WATER	WATER	WATER	WATER
		Sampled Date	06-FEB-18	06-FEB-18	06-FEB-18	06-FEB-18	06-FEB-18
		Sampled Time					
		Client ID	UNIT 1 HE RUN 1	UNIT 1 HE RUN 2	UNIT 1 HE RUN 3	UNIT 2 HE RUN 1	UNIT 2 HE RUN 2
Grouping	Analyte						
STACK							
Anions and Nutrients	Fluoride (F) (ug/sample)	<19 ^{DLM}	<20 ^{DLM}	<20 ^{DLM}	<3.4	<18 ^{DLM}	
	Volume (Anions) (mL)	385	395	405	340	355	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2055676-6	L2055676-7	L2055676-8	L2055676-9
		Description	WATER	WATER	WATER	WATER
		Sampled Date	06-FEB-18	06-FEB-18	06-FEB-18	06-FEB-18
		Sampled Time				
		Client ID	UNIT 2 HE RUN 3	UNIT 3 HE RUN 1	UNIT 3 HE RUN 2	UNIT 3 HE RUN 3
Grouping	Analyte					
STACK						
Anions and Nutrients	Fluoride (F) (ug/sample)	<18 ^{DLM}	<19 ^{DLM}	<19 ^{DLM}	<18 ^{DLM}	
	Volume (Anions) (mL)	355	375	385	360	

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

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

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.



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@alfranco.com		☐ Priority (2-4 Business Days) - \$	
Surrey BC V4N 4W7		Email 2:		☐ Digital ☐ Fax	
Phone: 604-881-2582 Fax: 604-881-2581		Email 3:		Analysis Frequency (1-7 Bus. Days) - 1	
Invoice To Same as Report?		Client / Project Information		Please indicate below Filtered, Pre-Filtered, or Rejected	
Hardcopy of Invoice with Report?		Job #: Metro Vancouver WTE		Weekend	
Company: ☒ Yes ☐ No		PO / AFE: HF		Energy	
Contact: ☒ Yes ☐ No		LSD:			
Address:		Quote #:			
Phone:		LS Contact: Brent Mack			
Lab Work Order (lab use only)		Sampler: A. Lanfranco and			
Sample #	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Number of Containers	
Unit 1 HF Run 1	06-Feb-18		Water	X	1
Unit 1 HF Run 2	06-Feb-18		Water	X	1
Unit 1 HF Run 3	06-Feb-18		Water	X	1
Unit 2 HF Run 1	07-Feb-18		Water	X	1
Unit 2 HF Run 2	07-Feb-18		Water	X	1
Unit 2 HF Run 3	07-Feb-18		Water	X	1
Unit 3 HF Run 1	08-Feb-18		Water	X	1
Unit 3 HF Run 2	08-Feb-18		Water	X	1
Unit 3 HF Run 3	08-Feb-18		Water	X	1
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details					

Please report ug/sample

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

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

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

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)		SHIPMENT VERIFICATION (lab use only)	
Released by:	Date (dd-mm-yy)	Received by:	Date: Feb 13th	Verified by:	Time:
			Temperature: 20.0 °C		
					Observations: Yes / No ?
					If Yes add SIF

GENF 20.00 Front



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

February 26, 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 February 12, 2018. For your reference, these analyses have been assigned our service request number P1800617.

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 Kelly Horiuchi at 3:48 pm, Feb 26, 2018

Kelly Horiuchi
Laboratory Director

RIGHT SOLUTIONS | RIGHT PARTNER



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

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

Service Request No: P1800617

CASE NARRATIVE

The samples were received intact under chain of custody on February 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.



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 Simi Valley, CA 93065
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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1347317
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-005
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/ga/env_lab_accreditation.html	T104704413-17-8
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272017-8
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: P1800617

Date Received: 2/12/2018
Time Received: 09:20

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-3 Modified - CIC6+ Can	TO-3 Modified - MEEPP Can
MV WTE Unit 1 R1	P1800617-001	Air	2/6/2018	10:18	AC00679	-2.18	4.03	X	X
MV WTE Unit 1 R2	P1800617-002	Air	2/6/2018	11:20	SC01535	-2.90	3.83	X	X
MV WTE Unit 1 R3	P1800617-003	Air	2/6/2018	12:22	SC00114	-2.60	4.01	X	X
MV WTE Unit 2 R1	P1800617-004	Air	2/7/2018	10:32	SC00234	-2.94	3.42	X	X
MV WTE Unit 2 R2	P1800617-005	Air	2/7/2018	11:38	AC02096	-3.16	3.84	X	X
MV WTE Unit 2 R3	P1800617-006	Air	2/7/2018	12:41	SC02081	-4.30	3.90	X	X
MV WTE Unit 3 R1	P1800617-007	Air	2/8/2018	10:24	AC01252	-2.75	3.64	X	X
MV WTE Unit 3 R2	P1800617-008	Air	2/8/2018	11:27	SC01652	-3.87	3.94	X	X
MV WTE Unit 3 R3	P1800617-009	Air	2/8/2018	12:29	SC00084	-2.63	4.08	X	X



2855 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 528-7161
Fax (805) 528-7270

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

91300617

Company Name & Address (Reporting Information)				Project Name				Requested Turnaround Time In Business Days (Surcharges) please circle				CAS Project No.			
A. Lanfranco and Associates Inc				Metro Vancouver WTE				1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day (Standard)				91300617			
Project Manager				P.O. # / Billing Information				CAS Contact:				Analysis Method/Analytes			
Mark Lanfranco								Kelly Horvath							
Phone				Sampler (Print & Sign)											
604-881-2582				Jeremy Gibbs											
Email Address for Result Reporting				Sample Type				Canister ID				Flow Controller			
Mark.Lanfranco@A.Lanfranco.com				(Air/Tube/Solid)				(Bar code # - AC, SC, etc.)				(Bar code - FC #)			
Client Sample ID				Laboratory ID Number				Date Collected				Time Collected			
MV WTE Unit 2 R1				1				2/6/18				9:18 AM			
MV WTE Unit 2 R2				2				2/6/18				10:18 AM			
MV WTE Unit 2 R3				3				2/6/18				11:20 AM			
MV WTE Unit 2 R4				4				2/6/18				11:22 AM			
MV WTE Unit 2 R5				5				2/6/18				11:24 AM			
MV WTE Unit 2 R6				6				2/6/18				11:26 AM			
MV WTE Unit 2 R7				7				2/6/18				11:28 AM			
MV WTE Unit 2 R8				8				2/6/18				11:30 AM			
MV WTE Unit 2 R9				9				2/6/18				11:32 AM			
MV WTE Unit 2 R10				10				2/6/18				11:34 AM			
MV WTE Unit 2 R11				11				2/6/18				11:36 AM			
MV WTE Unit 2 R12				12				2/6/18				11:38 AM			
MV WTE Unit 2 R13				13				2/6/18				11:40 AM			
MV WTE Unit 2 R14				14				2/6/18				11:42 AM			
MV WTE Unit 2 R15				15				2/6/18				11:44 AM			
MV WTE Unit 2 R16				16				2/6/18				11:46 AM			
MV WTE Unit 2 R17				17				2/6/18				11:48 AM			
MV WTE Unit 2 R18				18				2/6/18				11:50 AM			
MV WTE Unit 2 R19				19				2/6/18				11:52 AM			
MV WTE Unit 2 R20				20				2/6/18				11:54 AM			
MV WTE Unit 2 R21				21				2/6/18				11:56 AM			
MV WTE Unit 2 R22				22				2/6/18				11:58 AM			
MV WTE Unit 2 R23				23				2/6/18				12:00 PM			
MV WTE Unit 2 R24				24				2/6/18				12:02 PM			
MV WTE Unit 2 R25				25				2/6/18				12:04 PM			
MV WTE Unit 2 R26				26				2/6/18				12:06 PM			
MV WTE Unit 2 R27				27				2/6/18				12:08 PM			
MV WTE Unit 2 R28				28				2/6/18				12:10 PM			
MV WTE Unit 2 R29				29				2/6/18				12:12 PM			
MV WTE Unit 2 R30				30				2/6/18				12:14 PM			
MV WTE Unit 2 R31				31				2/6/18				12:16 PM			
MV WTE Unit 2 R32				32				2/6/18				12:18 PM			
MV WTE Unit 2 R33				33				2/6/18				12:20 PM			
MV WTE Unit 2 R34				34				2/6/18				12:22 PM			
MV WTE Unit 2 R35				35				2/6/18				12:24 PM			
MV WTE Unit 2 R36				36				2/6/18				12:26 PM			
MV WTE Unit 2 R37				37				2/6/18				12:28 PM			
MV WTE Unit 2 R38				38				2/6/18				12:30 PM			
MV WTE Unit 2 R39				39				2/6/18				12:32 PM			
MV WTE Unit 2 R40				40				2/6/18				12:34 PM			
MV WTE Unit 2 R41				41				2/6/18				12:36 PM			
MV WTE Unit 2 R42				42				2/6/18				12:38 PM			
MV WTE Unit 2 R43				43				2/6/18				12:40 PM			
MV WTE Unit 2 R44				44				2/6/18				12:42 PM			
MV WTE Unit 2 R45				45				2/6/18				12:44 PM			
MV WTE Unit 2 R46				46				2/6/18				12:46 PM			
MV WTE Unit 2 R47				47				2/6/18				12:48 PM			
MV WTE Unit 2 R48				48				2/6/18				12:50 PM			
MV WTE Unit 2 R49				49				2/6/18				12:52 PM			
MV WTE Unit 2 R50				50				2/6/18				12:54 PM			
MV WTE Unit 2 R51				51				2/6/18				12:56 PM			
MV WTE Unit 2 R52				52				2/6/18				12:58 PM			
MV WTE Unit 2 R53				53				2/6/18				1:00 PM			
MV WTE Unit 2 R54				54				2/6/18				1:02 PM			
MV WTE Unit 2 R55				55				2/6/18				1:04 PM			
MV WTE Unit 2 R56				56				2/6/18				1:06 PM			
MV WTE Unit 2 R57				57				2/6/18				1:08 PM			
MV WTE Unit 2 R58				58				2/6/18				1:10 PM			
MV WTE Unit 2 R59				59				2/6/18				1:12 PM			
MV WTE Unit 2 R60				60				2/6/18				1:14 PM			
MV WTE Unit 2 R61				61				2/6/18				1:16 PM			
MV WTE Unit 2 R62				62				2/6/18				1:18 PM			
MV WTE Unit 2 R63				63				2/6/18				1:20 PM			
MV WTE Unit 2 R64				64				2/6/18				1:22 PM			
MV WTE Unit 2 R65				65				2/6/18				1:24 PM			
MV WTE Unit 2 R66				66				2/6/18				1:26 PM			
MV WTE Unit 2 R67				67				2/6/18				1:28 PM			
MV WTE Unit 2 R68				68				2/6/18				1:30 PM			
MV WTE Unit 2 R69				69				2/6/18				1:32 PM			
MV WTE Unit 2 R70				70				2/6/18				1:34 PM			
MV WTE Unit 2 R71				71				2/6/18				1:36 PM			
MV WTE Unit 2 R72				72				2/6/18				1:38 PM			
MV WTE Unit 2 R73				73				2/6/18				1:40 PM			
MV WTE Unit 2 R74				74				2/6/18				1:42 PM			
MV WTE Unit 2 R75				75				2/6/18				1:44 PM			
MV WTE Unit 2 R76				76				2/6/18				1:46 PM			
MV WTE Unit 2 R77				77				2/6/18				1:48 PM			
MV WTE Unit 2 R78				78				2/6/18				1:50 PM			
MV WTE Unit 2 R79				79				2/6/18				1:52 PM			
MV WTE Unit 2 R80				80				2/6/18				1:54 PM			
MV WTE Unit 2 R81				81				2/6/18				1:56 PM			
MV WTE Unit 2 R82				82				2/6/18				1:58 PM			
MV WTE Unit 2 R83				83				2/6/18				2:00 PM			
MV WTE Unit 2 R84				84				2/6/18				2:02 PM			
MV WTE Unit 2 R85				85				2/6/18				2:04 PM			
MV WTE Unit 2 R86				86				2/6/18				2:06 PM			
MV WTE Unit 2 R87				87				2/6/18				2:08 PM			
MV WTE Unit 2 R88				88				2/6/18				2:10 PM			
MV WTE Unit 2 R89				89				2/6/18				2:12 PM			
MV WTE Unit 2 R90				90				2/6/18				2:14 PM			
MV WTE Unit 2 R91				91				2/6/18				2:16 PM			
MV WTE Unit 2 R92				92				2/6/18				2:18 PM			
MV WTE Unit 2 R93				93				2/6/18				2:20 PM			
MV WTE Unit 2 R94				94				2/6/18				2:22 PM			
MV WTE Unit 2 R95				95				2/6/18				2:24 PM			
MV WTE Unit 2 R96				96				2/6/18				2:26 PM			
MV WTE Unit 2 R97				97				2/6/18				2:28 PM			
MV WTE Unit 2 R98				98				2/6/18				2:30 PM			
MV WTE Unit 2 R99				99				2/6/18				2:32 PM			
MV WTE Unit 2 R100				100				2/6/18				2:34 PM			
MV WTE Unit 2 R101				101				2/6/18				2:36 PM			
MV WTE Unit 2 R102				102				2/6/18				2:38 PM			
MV WTE Unit 2 R103				103				2/6/18				2:40 PM			
MV WTE Unit 2 R104				104				2/6/18				2:42 PM			
MV WTE Unit 2 R105				105				2/6/18				2:44 PM			
MV WTE Unit 2 R106				106				2/6/18				2:46 PM			
MV WTE Unit 2 R107				107				2/6/18				2:48 PM			
MV WTE Unit 2 R108				108				2/6/18				2:50 PM			
MV WTE Unit 2 R109				109				2/6/18				2:52 PM			
MV WTE Unit 2 R110				110				2/6/18				2:54 PM			
MV WTE Unit 2 R111				111				2/6/18				2:56 PM			
MV WTE Unit 2 R112				112				2/6/18				2:58 PM			
MV WTE Unit 2 R113				113				2/6/18				3:00 PM			
MV WTE Unit 2 R114				114				2/6/18				3:02 PM			
MV WTE Unit 2 R115				115				2/6/18				3:04 PM			
MV WTE Unit 2 R116				116				2/6/18				3:06 PM			
MV WTE Unit 2 R117				117				2/6/18				3:08 PM			
MV WTE Unit 2 R118				118				2/6/18				3:10 PM			
MV WTE Unit 2 R119				119				2/6/18				3:12 PM			
MV WTE Unit 2 R120				120				2/6/18				3:14 PM			
MV WTE Unit 2 R121				121				2/6/18				3:16 PM			
MV WTE Unit 2 R122				122				2/6/18				3:18 PM			
MV WTE Unit 2 R123				123				2/6/18				3:20 PM			
MV WTE Unit 2 R124				124				2/6/18				3:22 PM			
MV WTE Unit 2 R125				125				2/6/18				3:24 PM			
MV WTE Unit 2 R126				126				2/6/18				3:26 PM			
MV WTE Unit 2 R127				127				2/6/18				3:28 PM			
MV WTE Unit 2 R128				128				2/6/18				3:30 PM			
MV WTE Unit 2 R129				129				2/6/18				3:32 PM			
MV WTE Unit 2 R130				130				2/6/18				3:34 PM			
MV WTE Unit 2 R131				131				2/6/18				3:36 PM			
MV WTE Unit 2 R132				132				2/6/18				3:38 PM			
MV WTE Unit 2 R133				133				2/6/18				3:40 PM			
MV WTE Unit 2 R134				134				2/6/18				3:42 PM			
MV WTE Unit 2 R135				135				2/6/18				3:44 PM			
MV WTE Unit 2 R136				136				2/6/18				3:46 PM			
MV WTE Unit 2 R137				137				2/6/18				3:48 PM			
MV WTE Unit 2 R138				138				2/6/18				3:50 PM			
MV WTE Unit 2 R139				139				2/6/18				3:52 PM			
MV WTE Unit 2 R140				140				2/6/18				3:54 PM			
MV WTE Unit 2 R141				141				2/6/18				3:56 PM			
MV WTE Unit 2 R142				142				2/6/18				3:58 PM			
MV WTE Unit 2 R143				143				2/6/18				4:00 PM			
MV WTE Unit 2 R144				144				2/6/18				4:02 PM			
MV WTE Unit 2 R145				145				2/6/18				4:04 PM			
MV WTE Unit 2 R146				146				2/6/18				4:06 PM			
MV WTE Unit 2 R147				147				2/6/18				4:08 PM			
MV WTE Unit 2 R148				148				2/6/18				4:10 PM			
MV WTE Unit 2 R149				149				2/6/18				4:12 PM			
MV WTE Unit 2 R150				150				2/6/18				4:14 PM			
MV WTE Unit 2 R151				151				2/6/18				4:16 PM			
MV WTE Unit 2 R152				152				2/6/18				4:18 PM			
MV WTE Unit 2 R153				153				2/6/18				4:20 PM			
MV WTE Unit 2 R154				154				2/6/18				4:22 PM			
MV WTE Unit 2 R155				155				2/6/18				4:24 PM			
MV WTE Unit 2 R156				156				2/6/18				4:26 PM			
MV WTE Unit 2 R157				157				2/6/18				4:28 PM			
MV WTE Unit 2 R158				158				2/6/18				4:30 PM			
MV WTE Unit 2 R159				159				2/6/18				4:32 PM			
MV WTE Unit 2 R160				160				2/6/18				4:34 PM			
MV WTE Unit 2 R161				161				2/6/18				4:36 PM			
MV WTE Unit 2 R162				162				2/6/18				4:38 PM			
MV WTE Unit 2 R163				163				2/6/18				4:40 PM			
MV WTE Unit 2 R164				164				2/6/18				4:42 PM			
MV WTE Unit 2 R165				165				2/6/18				4:44 PM			
MV WTE Unit 2 R166				166				2/6/18				4:46 PM			
MV WTE Unit 2 R167				167				2/6/18				4:48 PM			
MV WTE Unit 2 R168				168				2/6/18				4:50 PM			
MV WTE Unit 2 R169				169				2/6/18				4:52 PM			
MV WTE Unit 2 R170				170				2/6/18				4:54 PM			
MV WTE Unit 2 R171				171				2/6/18				4:56 PM			
MV WTE Unit 2 R172				172				2/6/18				4:58 PM			
MV WTE Unit 2 R173				173				2/6/18				5:00 PM			
MV WTE Unit 2 R174				174				2/6/18				5:02 PM			
MV WTE Unit 2 R175				175				2/6/18				5:04 PM			
MV WTE Unit 2 R176				176				2/6/18				5:06 PM			
MV WTE Unit 2 R177				177				2/6/18				5:08 PM			
MV WTE Unit 2 R178				178				2/6/18				5:10 PM			
MV WTE Unit 2 R179				179				2/6/18				5:12 PM			
MV WTE Unit 2 R180				180				2/6/18				5:14 PM			
MV WTE Unit 2 R181				181				2/6/18				5:16 PM			
MV WTE Unit 2 R182				182				2/6/18				5:18 PM			
MV WTE Unit 2 R183				183				2/6/18				5:20 PM			
MV WTE Unit 2 R184				184				2/6/18				5:22 PM			
MV WTE Unit 2 R185				185				2/6/18				5:24 PM			
MV WTE Unit 2 R186				186				2/6/18				5:26 PM			
MV WTE Unit 2 R187				187				2/6/18				5:28 PM			
MV WTE Unit 2 R188				188				2/6/18				5:30 PM			
MV WTE Unit 2 R189				189				2/6/18				5:32 PM			
MV WTE Unit 2 R190				190				2/6/18				5:34 PM			
MV WTE Unit 2 R191				191				2/6/18				5:36 PM			
MV WTE Unit 2 R192				192				2/6/18				5:38 PM			
MV WTE Unit 2 R193				193				2/6/18				5:40 PM			
MV WTE Unit 2 R194				194				2/6/18				5:42 PM			
MV WTE Unit 2 R195				195				2/6/18				5:44 PM			
MV WTE Unit 2 R196				196				2/6/18				5:46 PM			

**ALS Environmental
Sample Acceptance Check Form**

Client: A. Lanfranco and Associates Inc. Work order: P1800617
 Project: Metro Vancouver WTE
 Sample(s) received on: 2/12/18 Date opened: 2/12/18 by: E.PEREZ

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.

- | | <u>Yes</u> | <u>No</u> | <u>N/A</u> |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 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
P1800617-001.01	6.0 L Ambient Can					
P1800617-002.01	6.0 L Source Can					
P1800617-003.01	6.0 L Source Can					
P1800617-004.01	6.0 L Source Can					
P1800617-005.01	6.0 L Ambient Can					
P1800617-006.01	6.0 L Source Can					
P1800617-007.01	6.0 L Ambient Can					
P1800617-008.01	6.0 L Source Can					
P1800617-009.01	6.0 L Source Can					

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

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

ALS ENVIRONMENTAL**RESULTS OF ANALYSIS**

Page 1 of 1

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

ALS Project ID: P1800617

Acetylene

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 2/6 - 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/13/18

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Container Dilution Factor	Result ppmV	MRL ppmV	Data Qualifier
MV WTE Unit 1 R1	P1800617-001	0.50	1.50	ND	0.38	
MV WTE Unit 1 R2	P1800617-002	0.50	1.57	ND	0.39	
MV WTE Unit 1 R3	P1800617-003	0.50	1.55	ND	0.39	
MV WTE Unit 2 R1	P1800617-004	0.50	1.54	ND	0.39	
MV WTE Unit 2 R2	P1800617-005	0.50	1.61	ND	0.40	
MV WTE Unit 2 R3	P1800617-006	0.50	1.79	ND	0.45	
MV WTE Unit 3 R1	P1800617-007	0.50	1.53	ND	0.38	
MV WTE Unit 3 R2	P1800617-008	0.50	1.72	ND	0.43	
MV WTE Unit 3 R3	P1800617-009	0.50	1.56	ND	0.39	
Method Blank	P180213-MB	0.50	1.00	ND	0.25	

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: P1800617

ALS Sample ID: P180213-LCS

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Mike Conejo

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 2/13/18

Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
74-86-2	Acetylene	1.51	1.57	104	70-130	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 1 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-001

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC00679

Date Collected: 2/6/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.18 **Final Pressure (psig):** 4.03

Container Dilution Factor: 1.50

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	1.9	1.5	
74-85-1	Ethene	ND	0.38	
74-84-0	Ethane	ND	0.38	

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: MV WTE Unit 1 R2

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617

ALS Sample ID: P1800617-002

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Mike Conejo

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC01535

Date Collected: 2/6/18

Date Received: 2/12/18

Date Analyzed: 2/13/18

Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.90

Final Pressure (psig): 3.83

Container Dilution Factor: 1.57

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.6	
74-85-1	Ethene	ND	0.39	
74-84-0	Ethane	ND	0.39	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: MV WTE Unit 1 R3

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617

ALS Sample ID: P1800617-003

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Mike Conejo

Sampling Media: 6.0 L Summa Canister

Test Notes:

Container ID: SC00114

Date Collected: 2/6/18

Date Received: 2/12/18

Date Analyzed: 2/13/18

Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.60

Final Pressure (psig): 4.01

Container Dilution Factor: 1.55

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.6	
74-85-1	Ethene	ND	0.39	
74-84-0	Ethane	ND	0.39	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 2 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-004

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00234

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.94 **Final Pressure (psig):** 3.42

Container Dilution Factor: 1.54

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.5	
74-85-1	Ethene	ND	0.39	
74-84-0	Ethane	ND	0.39	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 2 R2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-005

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC02096

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.16 **Final Pressure (psig):** 3.84

Container Dilution Factor: 1.61

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.6	
74-85-1	Ethene	ND	0.40	
74-84-0	Ethane	ND	0.40	

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: MV WTE Unit 2 R3
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-006

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC02081

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -4.30 **Final Pressure (psig):** 3.90

Container Dilution Factor: 1.79

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.8	
74-85-1	Ethene	ND	0.45	
74-84-0	Ethane	ND	0.45	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 3 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-007

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC01252

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.75 **Final Pressure (psig):** 3.64

Container Dilution Factor: 1.53

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.5	
74-85-1	Ethene	ND	0.38	
74-84-0	Ethane	ND	0.38	

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: MV WTE Unit 3 R2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-008

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC01652

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -3.87 **Final Pressure (psig):** 3.94

Container Dilution Factor: 1.72

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.7	
74-85-1	Ethene	ND	0.43	
74-84-0	Ethane	ND	0.43	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 3 R3
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-009

Test Code: EPA TO-3 Modified
Instrument ID: HP5890A/GC10/FID
Analyst: Mike Conejo
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00084

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/13/18
Volume(s) Analyzed: 0.50 ml(s)

Initial Pressure (psig): -2.63 **Final Pressure (psig):** 4.08

Container Dilution Factor: 1.56

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	1.6	1.6	
74-85-1	Ethene	ND	0.39	
74-84-0	Ethane	ND	0.39	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.

Client Sample ID: Method Blank

Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617

ALS Sample ID: P180213-MB

Test Code: EPA TO-3 Modified

Instrument ID: HP5890A/GC10/FID

Analyst: Mike Conejo

Sampling Media: 6.0 L Summa Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 2/13/18

Volume(s) Analyzed: 0.50 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
74-82-8	Methane	ND	1.0	
74-85-1	Ethene	ND	0.25	
74-84-0	Ethane	ND	0.25	

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: P1800617
ALS Sample ID: P180213-LCS

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

Date Collected: NA
Date Received: NA
Date Analyzed: 2/13/18
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	1.49	99	70-130	
74-85-1	Ethene	1.50	1.43	95	70-130	
74-84-0	Ethane	1.50	1.42	95	70-130	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 1 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-001

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC00679

Date Collected: 2/6/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.18 **Final Pressure (psig):** 4.03

Container Dilution Factor: 1.50

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.75	
C ₄ as n-Butane	ND	0.75	
C ₅ as n-Pentane	ND	0.75	
C ₆ as n-Hexane	ND	0.75	
C ₆ + as n-Hexane	ND	1.5	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 1 R2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-002

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC01535

Date Collected: 2/6/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.90 **Final Pressure (psig):** 3.83

Container Dilution Factor: 1.57

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.79	
C ₄ as n-Butane	ND	0.79	
C ₅ as n-Pentane	ND	0.79	
C ₆ as n-Hexane	ND	0.79	
C ₆ + as n-Hexane	ND	1.6	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 1 R3
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-003

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00114

Date Collected: 2/6/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.60 **Final Pressure (psig):** 4.01

Container Dilution Factor: 1.55

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.78	
C ₄ as n-Butane	ND	0.78	
C ₅ as n-Pentane	ND	0.78	
C ₆ as n-Hexane	ND	0.78	
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: MV WTE Unit 2 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-004

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00234

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.94 **Final Pressure (psig):** 3.42

Container Dilution Factor: 1.54

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.77	
C ₄ as n-Butane	ND	0.77	
C ₅ as n-Pentane	ND	0.77	
C ₆ as n-Hexane	ND	0.77	
C ₆ + as n-Hexane	ND	1.5	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 2 R2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-005

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC02096

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -3.16 **Final Pressure (psig):** 3.84

Container Dilution Factor: 1.61

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: MV WTE Unit 2 R3
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-006

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC02081

Date Collected: 2/7/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -4.30 **Final Pressure (psig):** 3.90

Container Dilution Factor: 1.79

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.90	
C ₄ as n-Butane	ND	0.90	
C ₅ as n-Pentane	ND	0.90	
C ₆ as n-Hexane	ND	0.90	
C ₆ + as n-Hexane	ND	1.8	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 3 R1
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-007

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: AC01252

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.75 **Final Pressure (psig):** 3.64

Container Dilution Factor: 1.53

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.77	
C ₄ as n-Butane	ND	0.77	
C ₅ as n-Pentane	ND	0.77	
C ₆ as n-Hexane	ND	0.77	
C ₆ + as n-Hexane	ND	1.5	

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

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

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: A. Lanfranco and Associates Inc.
Client Sample ID: MV WTE Unit 3 R2
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P1800617-008

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC01652

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -3.87 **Final Pressure (psig):** 3.94

Container Dilution Factor: 1.72

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.86	
C ₄ as n-Butane	ND	0.86	
C ₅ as n-Pentane	ND	0.86	
C ₆ as n-Hexane	ND	0.86	
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: MV WTE Unit 3 R3
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
 ALS Sample ID: P1800617-009

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00084

Date Collected: 2/8/18
Date Received: 2/12/18
Date Analyzed: 2/15/18
Volume(s) Analyzed: 1.0 ml(s)

Initial Pressure (psig): -2.63 **Final Pressure (psig):** 4.08

Container Dilution Factor: 1.56

Compound	Result ppmV	MRL ppmV	Data Qualifier
C ₃ as Propane	ND	0.78	
C ₄ as n-Butane	ND	0.78	
C ₅ as n-Pentane	ND	0.78	
C ₆ as n-Hexane	ND	0.78	
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: Method Blank
Client Project ID: Metro Vancouver WTE

ALS Project ID: P1800617
ALS Sample ID: P180215-MB

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/15/18
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: P1800617
ALS Sample ID: P180215-LCS

Test Code: EPA TO-3 Modified
Instrument ID: HP5890 II/GC8/FID
Analyst: Wade Henton/Gilbert Gutierrez
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/15/18
Volume(s) Analyzed: NA ml(s)

Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS	Data Qualifier
				Acceptance Limits	
Propane	1,040	1,110	107	95-118	
n-Butane	1,010	1,100	109	93-119	
n-Pentane	1,000	1,050	105	90-115	
n-Hexane	1,010	1,140	113	95-125	

Your Project #: B808877
Your C.O.C. #: B808877-ONTV-01-01

Attention: Tanya Eugene

Maxxam Analytics
4606 Canada Way
Burnaby, BC
V5G 1K5

Report Date: 2018/02/22
Report #: R5006310
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B828504

Received: 2018/02/07, 10:54

Sample Matrix: Tedlar Bag
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Nitrous Oxide (1)	10	N/A	2018/02/07	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.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

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.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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

(1) Date Analyzed is the date the analytical batch was created.

Encryption Key



Jade Browne
Project Manager Assistant - Air
22 Feb 2018 15:02:06

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

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.

Maxxam Job #: B828504
Report Date: 2018/02/22

Maxxam Analytics
Client Project #: B808877

COMPRESSED GAS PARAMETERS (TEDLAR BAG)

Maxxam ID		GAY287		GAY288		GAY289		
Sampling Date		2018/02/05		2018/02/05		2018/02/05		
COC Number		B808877-ONTV-01-01		B808877-ONTV-01-01		B808877-ONTV-01-01		
	UNITS	SX5507-MV WTE-UNIT1-RUN1	RDL	SX5508-MV WTE-UNIT1-RUN2	RDL	SX5509-MV WTE-UNIT1-RUN3	RDL	QC Batch
Nitrous Oxide	ppmv	4.9	0.1	7.9	0.25	5.2	0.2	5389831
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam ID		GAY290	GAY291	GAY292	GAY293		
Sampling Date		2018/02/05	2018/02/05	2018/02/05	2018/02/05		
COC Number		B808877-ONTV-01-01	B808877-ONTV-01-01	B808877-ONTV-01-01	B808877-ONTV-01-01		
	UNITS	SX5510-MV WTE-UNIT2-RUN1	SX5511-MV WTE-UNIT2-RUN2	SX5512-MV WTE-UNIT2-RUN3	SX5513-MV WTE-UNIT3-RUN1	RDL	QC Batch
Nitrous Oxide	ppmv	9.9	11	12	6.5	0.25	5389831
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam ID		GAY293	GAY294	GAY295		GAY296		
Sampling Date		2018/02/05	2018/02/05	2018/02/05		2018/02/05		
COC Number		B808877-ONTV-01-01	B808877-ONTV-01-01	B808877-ONTV-01-01		B808877-ONTV-01-01		
	UNITS	SX5513-MV WTE-UNIT3-RUN1 Lab-Dup	SX5514-MV WTE-UNIT3-RUN2	SX5515-MV WTE-UNIT3-RUN3	RDL	SX5516-MV WTE-UNIT1-DUPLICATE	RDL	QC Batch
Nitrous Oxide	ppmv	6.8	8.6	6.4	0.25	0.9	0.1	5389831
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								
Lab-Dup = Laboratory Initiated Duplicate								

Maxxam Job #: B828504
Report Date: 2018/02/22

Maxxam Analytics
Client Project #: B808877

TEST SUMMARY

Maxxam ID: GAY287
Sample ID: SX5507-MV WTE-UNIT1-RUN1
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY288
Sample ID: SX5508-MV WTE-UNIT1-RUN2
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY289
Sample ID: SX5509-MV WTE-UNIT1-RUN3
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY290
Sample ID: SX5510-MV WTE-UNIT2-RUN1
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY291
Sample ID: SX5511-MV WTE-UNIT2-RUN2
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY292
Sample ID: SX5512-MV WTE-UNIT2-RUN3
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY293
Sample ID: SX5513-MV WTE-UNIT3-RUN1
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam Job #: B828504
Report Date: 2018/02/22

Maxxam Analytics
Client Project #: B808877

TEST SUMMARY

Maxxam ID: GAY293 Dup
Sample ID: SX5513-MV WTE-UNIT3-RUN1
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY294
Sample ID: SX5514-MV WTE-UNIT3-RUN2
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY295
Sample ID: SX5515-MV WTE-UNIT3-RUN3
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

Maxxam ID: GAY296
Sample ID: SX5516-MV WTE-UNIT1-DUPLICATE
Matrix: Tedlar Bag

Collected: 2018/02/05
Shipped:
Received: 2018/02/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrous Oxide	GC/ECD	5389831	N/A	2018/02/07	Satvinder Bhathal

GENERAL COMMENTS

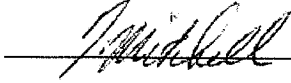
Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Method Blank		RPD	
			Value	UNITS	Value (%)	QC Limits
5389831	Nitrous Oxide	2018/02/07	<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.

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

MAXXAM INTERLAB CHAIN OF CUSTODY RECORD

Page 01 of 01

COC # B808877-ONTV-01-01



REPORT INFORMATION				ANALYSIS REQUESTED				Job Barcode Label			
Company: Maxxam				07-Feb-18 10:54				Nazeema Rahaman			
Address: 4606 Canada Way, Burnaby, British Columbia, V5G 1K5								B828504			
Contact Name: Tanya Eugene								J.L. AIR-001			
Email: TEugene@maxxam.ca, customerservice@maxxamanalytics.com											
Phone: (604) 639-2609											
Maxxam Project #: B808877											
Client Invoice To: A. LANFRANCO & ASSOCIATES INC. (1301)											
Client Report To: A. LANFRANCO & ASSOCIATES INC. (1301)											
#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	Incl. on Report? Yes / No				
1	SX5507-MV WTE-UNIT 1-RUN 1	AIR	2018/02/05			1	X				
2	SX5508-MV WTE-UNIT 1-RUN 2	AIR	2018/02/05			1	X				
3	SX5509-MV WTE-UNIT 1-RUN 3	AIR	2018/02/05			1	X				
4	SX5510-MV WTE-UNIT 2-RUN 1	AIR	2018/02/05			1	X				
5	SX5511-MV WTE-UNIT 2-RUN 2	AIR	2018/02/05			1	X				
6	SX5512-MV WTE-UNIT 2-RUN 3	AIR	2018/02/05			1	X				
7	SX5513-MV WTE-UNIT 3-RUN 1	AIR	2018/02/05			1	X				
8	SX5514-MV WTE-UNIT 3-RUN 2	AIR	2018/02/05			1	X				
9	SX5515-MV WTE-UNIT 3-RUN 3	AIR	2018/02/05			1	X				
10	SX5516-MV WTE-UNIT 1-DUPLICATE	AIR	2018/02/05			1	X				
SPECIAL INSTRUCTIONS								REQUIRED EDDS			
Please Inform Maxxam immediately if you are not accredited for the requested test(s). CLIENT RE-USES BAGS - DO NOT THROW OUT								National Excel (N001)			
Please return a copy of this form with the report.											
REGULATORY CRITERIA								TURNAROUND TIME			
SITELocation:								☐ Rush Required			
SITENumber:								2018/02/13			
PROJECT #:								Date Required			
PO/A/E, TASK ORDER/SERVICE ORDER, LINE ITEM:								Please inform us if rush charges will be incurred.			
COOLER ID: N/A								RECEIVING LAB USE ONLY			
Custody Seal Present								YES NO			
Custody Seal Intact								Temp: (°C)			
Cooling Media Present								Maxxam Job #			
RELINQUISHED BY: (SIGN & PRINT)								Samples			
DATE: 2018/02/06								Labelled By:			
1. BILLO PUNI								By:			
2.											

APPENDIX - C

COMPUTER GENERATED RESULTS

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

Date: 5-Feb-18
Run: 1 - Particulate / Metals
Run Time: 12:30 - 14:34

Concentrations:

Particulate	0.09 mg/dscm	0.00004 gr/dscf
	0.05 mg/Acm	0.00002 gr/Acf
	0.09 mg/dscm (@ 11% O2)	0.00004 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.006 Kg/hr	0.014 lb/hr
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Flue Gas Characteristics:

Flow	1208 dscm/min	42647 dscf/min
	20.13 dscm/sec	711 dscf/sec
	2210 Acm/min	78054 Acf/min

Velocity	14.462 m/sec	47.45 f/sec
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Temperature	157.7 oC	315.9 oF
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Moisture	16.0 %
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Gas Analysis	10.8 % O2 9.6 % CO2
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29.963 Mol. Wt (g/gmole) Dry
28.045 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.7985 dscm	98.831 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
Jobsite: WTE (Burnaby, BC)
Source: Unit 1

Date: 5-Feb-18
Run: 1 - Particulate / Metals
Run Time: 12:30 - 14:34

Control Unit (Y) 1.0019
Nozzle Diameter (in.) 0.3050
Pitot Factor 0.8520
Baro. Press. (in. Hg) 30.05
Static Press. (in. H2O) -19.50
Stack Height (ft) 30
Stack Diameter (in.) 70.90
Stack Area (sq.ft.) 27.417
Minutes Per Reading 5.0
Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00020
Total (grams) 0.00025

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.83 10.70
 Traverse 2 9.33 10.80
9.58 10.75

Condensate Collection:
 Impinger 1 136.0
 Impinger 2 148.0
 Impinger 3 60.0
 Impinger 4 24.0
 Impinger 5 12.0
 Impinger 6 6.0
 Gel 15.0

Gain (grams) 401.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	93.850								
1	5.0	97.420	0.34	1.74	62	62	4	316	1.5	105.1
2	10.0	100.980	0.34	1.74	62	62	4	318	4.7	104.9
3	15.0	105.120	0.46	2.36	62	62	4	316	8.4	104.9
4	20.0	109.170	0.44	2.26	63	63	4	317	12.5	104.8
5	25.0	113.490	0.50	2.57	62	62	4	317	17.7	105.2
6	30.0	117.810	0.50	2.57	63	63	4	319	25.2	105.1
7	35.0	122.290	0.54	2.77	63	63	6	319	45.6	104.9
8	40.0	126.820	0.55	2.82	64	64	6	320	53.2	105.0
9	45.0	131.090	0.49	2.51	64	64	6	320	58.3	104.8
10	50.0	135.370	0.49	2.51	65	65	6	318	62.5	104.7
11	55.0	139.450	0.45	2.31	65	65	7	319	66.1	104.2
12	60.0	143.220	0.38	1.95	66	66	7	320	69.4	104.5
Traverse 2	0.0	143.220								
1	5.0	146.670	0.32	1.64	65	65	6	318	1.5	104.2
2	10.0	150.230	0.34	1.74	66	66	6	317	4.7	104.1
3	15.0	153.790	0.34	1.74	66	66	6	317	8.4	104.1
4	20.0	157.250	0.32	1.64	67	67	6	315	12.5	103.9
5	25.0	160.710	0.32	1.64	66	66	6	314	17.7	104.0
6	30.0	164.220	0.33	1.69	67	67	6	314	25.2	103.7
7	35.0	168.780	0.56	2.87	67	67	6	312	45.6	103.6
8	40.0	173.270	0.54	2.77	68	68	6	311	53.2	103.6
9	45.0	178.090	0.62	3.18	67	67	6	311	58.3	104.1
10	50.0	182.740	0.58	2.98	68	68	6	311	62.5	103.6
11	55.0	186.930	0.47	2.41	67	67	6	311	66.1	103.8
12	60.0	190.990	0.44	2.26	68	68	6	312	69.4	103.7
Average:			0.444	2.278	65.1	65.1	5.6	315.9		104.4

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

Date: 6-Feb-18
Run: 2 - Particulate / Metals
Run Time: 09:00 - 11:02

Concentrations:

Particulate	0.60 mg/dscm	0.00026 gr/dscf
	0.33 mg/Acm	0.00014 gr/Acf
	0.56 mg/dscm (@ 11% O2)	0.00025 gr/dscf (@ 11% O2)

Emission Rates:

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

Flow	1118 dscm/min	39477 dscf/min
	18.63 dscm/sec	658 dscf/sec
	2018 Acn/min	71278 Acf/min

Velocity	13.207 m/sec	43.33 f/sec
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Temperature	148.8 oC	299.8 oF
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Moisture	16.8 %
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Gas Analysis	10.4 % O2 9.7 % CO2
---------------------	------------------------

29.966 Mol. Wt (g/gmole) Dry
27.956 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5937 dscm	91.596 dscf
Sample Time	120.0 minutes	
Isokineticity	104.5 %	

*** Standard Conditions:**

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

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

Date: 6-Feb-18
 Run: 2 - Particulate / Metals
 Run Time: 09:00 - 11:02

Control Unit (Y) 1.0019
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8520
 Baro. Press. (in. Hg) 30.10
 Static Press. (in. H2O) -19.50
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00150
 Total (grams) 0.00155

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.70 10.20
 Traverse 2 9.70 10.50
 9.70 10.35

Condensate Collection:
 Impinger 1 52.0
 Impinger 2 162.0
 Impinger 3 93.0
 Impinger 4 46.0
 Impinger 5 18.0
 Impinger 6 10.0
 Gel 12.0
 Gain (grams) 393.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	191.500								
1	5.0	194.960	0.32	1.64	58	58	4	298	1.5	105.4
2	10.0	198.520	0.34	1.74	60	60	4	300	4.7	105.0
3	15.0	202.440	0.41	2.10	58	58	4	298	8.4	105.6
4	20.0	206.480	0.43	2.21	59	59	4	298	12.5	106.1
5	25.0	210.350	0.40	2.05	60	60	6	298	17.7	105.2
6	30.0	214.210	0.40	2.05	60	60	6	298	25.2	104.9
7	35.0	218.170	0.42	2.15	60	60	6	299	45.6	105.1
8	40.0	222.220	0.44	2.26	61	61	6	297	53.2	104.7
9	45.0	226.370	0.46	2.36	62	62	6	298	58.3	104.8
10	50.0	230.180	0.39	2.00	63	63	6	297	62.5	104.2
11	55.0	233.630	0.32	1.64	64	64	6	296	66.1	103.8
12	60.0	236.920	0.29	1.49	64	64	6	294	69.4	103.8
Traverse 2	0.0	236.920								
1	5.0	239.970	0.25	1.28	64	64	6	301	1.5	104.0
2	10.0	243.200	0.28	1.44	65	65	6	302	4.7	104.0
3	15.0	246.440	0.28	1.44	65	65	6	302	8.4	104.4
4	20.0	249.680	0.28	1.44	66	66	6	303	12.5	104.2
5	25.0	252.790	0.26	1.33	65	65	6	302	17.7	103.9
6	30.0	256.020	0.28	1.44	65	65	6	302	25.2	104.0
7	35.0	260.200	0.47	2.41	65	65	6	302	45.6	104.2
8	40.0	264.390	0.47	2.41	66	66	6	302	53.2	104.2
9	45.0	268.770	0.52	2.67	65	65	6	302	58.3	103.8
10	50.0	272.990	0.48	2.46	65	65	6	302	62.5	104.1
11	55.0	277.140	0.46	2.36	66	66	6	302	66.1	104.3
12	60.0	281.090	0.42	2.15	66	66	6	302	69.4	103.9
Average:			0.378	1.938	63.0	63.0	5.7	299.8		104.5

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

Date: 6-Feb-18
Run: 3 - Particulate / Metals
Run Time: 11:33 - 13:36

Concentrations:

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

Emission Rates:

Particulate	0.007 Kg/hr	0.014 lb/hr
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Flue Gas Characteristics:

Flow	1148 dscm/min	40553 dscf/min
	19.14 dscm/sec	676 dscf/sec
	2128 Acn/min	75155 Acf/min

Velocity	13.925 m/sec	45.69 f/sec
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Temperature	151.1 oC	304.0 oF
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Moisture	18.6 %
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Gas Analysis	10.7 % O2 9.5 % CO2
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29.938 Mol. Wt (g/gmole) Dry
27.713 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6468 dscm	93.472 dscf
Sample Time	120.0 minutes	
Isokineticity	106.9 %	

*** Standard Conditions:**

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

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

Date: 6-Feb-18
Run: 3 - Particulate / Metals
Run Time: 11:33 - 13:36

Control Unit (Y) 1.0019
 Nozzle Diameter (in.) 0.3005
 Pitot Factor 0.8565
 Baro. Press. (in. Hg) 30.15
 Static Press. (in. H2O) -19.50
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00020
Total (grams) 0.00025

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 9.70 10.50
 Traverse 2 9.20 10.80
9.45 10.65

Condensate Collection:
 Impinger 1 304.0
 Impinger 2 112.0
 Impinger 3 16.0
 Impinger 4 7.0
 Impinger 5 3.0
 Impinger 6 1.0
 Gel 12.0
Gain (grams) 455.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	281.500								
1	5.0	284.640	0.28	1.37	60	60	4	300	1.5	106.5
2	10.0	287.890	0.30	1.46	62	62	4	300	4.7	106.1
3	15.0	291.030	0.28	1.37	62	62	4	301	8.4	106.1
4	20.0	294.170	0.28	1.37	62	62	4	301	12.5	106.1
5	25.0	297.260	0.27	1.32	61	61	5	301	17.7	106.5
6	30.0	300.620	0.32	1.56	62	62	5	302	25.2	106.3
7	35.0	304.840	0.50	2.44	61	61	5	303	45.6	107.3
8	40.0	309.170	0.53	2.59	60	60	5	304	53.2	107.3
9	45.0	313.590	0.55	2.68	61	61	6	303	58.3	107.3
10	50.0	317.440	0.42	2.05	61	61	6	302	62.5	106.7
11	55.0	321.510	0.47	2.29	60	60	6	302	66.1	106.9
12	60.0	325.360	0.42	2.05	60	60	6	302	69.4	106.9
Traverse 2	0.0	325.360								
1	5.0	328.920	0.36	1.76	59	59	6	304	1.5	107.0
2	10.0	332.590	0.38	1.85	60	60	6	304	4.7	107.2
3	15.0	336.160	0.36	1.76	59	59	6	304	8.4	107.3
4	20.0	340.000	0.42	2.05	60	60	6	304	12.5	106.8
5	25.0	343.850	0.42	2.05	60	60	6	304	17.7	107.0
6	30.0	347.790	0.44	2.15	60	60	6	305	25.2	107.1
7	35.0	351.910	0.48	2.34	60	60	5	305	45.6	107.3
8	40.0	355.940	0.46	2.24	61	61	5	305	53.2	107.0
9	45.0	360.300	0.54	2.64	60	60	6	308	58.3	107.3
10	50.0	364.580	0.52	2.54	61	61	6	310	62.5	107.3
11	55.0	368.570	0.45	2.20	60	60	6	310	66.1	107.6
12	60.0	372.330	0.40	1.99	61	61	6	311	69.4	107.4
Average:			0.410	2.005	60.5	60.5	5.4	304.0		106.9

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

Date: 6-Feb-18
Run: 1 - Particulate / Metals
Run Time: 11:51 - 13:53

Concentrations:

Particulate	1.3 mg/dscm	0.0006 gr/dscf
	0.7 mg/Acm	0.0003 gr/Acf
	1.2 mg/dscm (@ 11% O2)	0.0005 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.088 Kg/hr	0.195 lb/hr
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Flue Gas Characteristics:

Flow	1143 dscm/min	40353 dscf/min
	19.04 dscm/sec	673 dscf/sec
	2099 Acm/min	74120 Acf/min

Velocity	13.734 m/sec	45.06 f/sec
-----------------	--------------	-------------

Temperature	149.9 oC	301.9 oF
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Moisture	18.4 %
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Gas Analysis	10.3 % O2
	9.8 % CO2

29.978 Mol. Wt (g/gmole) Dry
27.771 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6783 dscm	94.584 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
Jobsite: WTE (Burnaby, B.C.)
Source: Unit 2

Date: 6-Feb-18
Run: 1 - Particulate / Metals
Run Time: 11:51 - 13:53

Control Unit (Y) 0.9759
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8520
 Baro. Press. (in. Hg) 30.29
 Static Press. (in. H2O) -20.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00340
 Washings (grams) 0.00005
Total (grams) 0.00345

Traverse 1
 Traverse 2

Gas Analysis (Vol. %):

CO2	O2
9.80	10.25
9.80	10.25

Condensate Collection:

Impinger 1	140.0
Impinger 2	206.0
Impinger 3	74.0
Impinger 4	16.0
Impinger 5	2.0
Impinger 6	1.0
Gel	15.0
Gain (grams)	454.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	400.457								
1	5.0	403.800	0.30	1.55	54	54	7	303	1.5	105.7
2	10.0	407.180	0.31	1.59	54	54	7	303	4.7	105.1
3	15.0	410.860	0.29	1.49	54	54	7	303	8.4	118.3
4	20.0	413.630	0.27	1.39	55	55	7	302	12.5	92.0
5	25.0	416.680	0.25	1.29	55	55	7	302	17.7	105.3
6	30.0	420.400	0.37	1.90	56	56	12	303	25.2	105.6
7	35.0	425.140	0.60	3.09	57	57	12	304	45.6	105.8
8	40.0	430.240	0.69	3.57	59	59	12	304	53.2	105.9
9	45.0	435.010	0.60	3.11	60	60	14	304	58.3	105.9
10	50.0	439.630	0.56	2.91	61	61	14	303	62.5	105.8
11	55.0	444.180	0.54	2.82	62	62	14	301	66.1	105.8
12	60.0	448.610	0.51	2.67	63	63	14	301	69.4	105.7
Traverse 2	0.0	448.610								
1	5.0	453.170	0.54	2.82	64	64	10	303	1.5	105.7
2	10.0	457.650	0.52	2.72	65	65	10	303	4.7	105.6
3	15.0	462.100	0.51	2.68	66	66	10	302	8.4	105.6
4	20.0	466.380	0.47	2.47	66	66	10	301	12.5	105.7
5	25.0	470.760	0.49	2.58	67	67	11	301	17.7	105.8
6	30.0	475.190	0.50	2.64	68	68	11	300	25.2	105.7
7	35.0	478.900	0.35	1.85	68	68	11	300	45.6	105.6
8	40.0	482.500	0.33	1.74	68	68	8	300	53.2	105.5
9	45.0	485.940	0.30	1.59	69	69	8	301	58.3	105.5
10	50.0	489.080	0.25	1.32	69	69	7	301	62.5	105.5
11	55.0	491.960	0.21	1.11	70	70	7	300	66.1	105.2
12	60.0	494.700	0.19	1.01	70	70	7	300	69.4	105.2
Average:			0.415	2.163	62.5	62.5	9.9	301.9		105.6

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

Date: 7-Feb-18
Run: 2 - Particulate / Metals
Run Time: 09:10 - 11:12

Concentrations:

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

Emission Rates:

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

Flow	1192 dscm/min	42078 dscf/min
	19.86 dscm/sec	701 dscf/sec
	2134 Acm/min	75353 Acf/min

Velocity	13.962 m/sec	45.81 f/sec
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Temperature	150.5 oC	302.9 oF
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Moisture	16.3 %
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Gas Analysis	10.3 % O2
	10.2 % CO2

30.042 Mol. Wt (g/gmole) Dry
28.085 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.5960 dscm	91.677 dscf
Sample Time	120.0 minutes	
Isokineticity	103.3 %	

*** Standard Conditions:**

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

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

Date: 7-Feb-18
 Run: 2 - Particulate / Metals
 Run Time: 09:10 - 11:12

Control Unit (Y) 0.9759
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8520
 Baro. Press. (in. Hg) 30.30
 Static Press. (in. H2O) -20.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00005
 Total (grams) 0.00010

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.20 10.20
 Traverse 2 10.20 10.30

Condensate Collection:
 Impinger 1 222.0
 Impinger 2 96.0
 Impinger 3 28.0
 Impinger 4 14.0
 Impinger 5 2.0
 Impinger 6 1.0
 Gel 15.0
 Gain (grams) 378.0

10.20 10.25

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	495.154								
1	5.0	498.530	0.30	1.55	57	57	4	300	1.5	103.7
2	10.0	502.020	0.32	1.65	58	58	4	300	4.7	103.7
3	15.0	505.340	0.29	1.50	58	58	4	299	8.4	103.5
4	20.0	508.550	0.27	1.40	58	58	4	300	12.5	103.7
5	25.0	511.760	0.27	1.40	58	58	4	300	17.7	103.7
6	30.0	515.020	0.28	1.45	58	58	5	300	25.2	103.5
7	35.0	519.730	0.58	3.00	59	59	5	301	45.6	104.1
8	40.0	524.640	0.63	3.26	59	59	5	301	53.2	104.2
9	45.0	529.690	0.67	3.46	60	60	7	302	58.3	103.9
10	50.0	534.970	0.73	3.77	62	62	7	302	62.5	103.7
11	55.0	539.750	0.60	3.10	62	62	8	300	66.1	103.3
12	60.0	544.290	0.54	2.79	62	62	8	298	69.4	103.2
Traverse 2	0.0	544.290								
1	5.0	549.070	0.60	3.10	62	62	8	302	1.5	103.4
2	10.0	553.940	0.62	3.21	63	63	8	307	4.7	103.8
3	15.0	558.800	0.62	3.21	64	64	8	307	8.4	103.4
4	20.0	563.750	0.64	3.31	64	64	8	308	12.5	103.7
5	25.0	568.380	0.56	2.90	66	66	8	308	17.7	103.2
6	30.0	572.890	0.53	2.74	66	66	8	308	25.2	103.3
7	35.0	576.600	0.36	1.86	66	66	8	307	45.6	102.8
8	40.0	579.980	0.30	1.55	67	67	6	308	53.2	102.4
9	45.0	583.010	0.24	1.24	67	67	6	305	58.3	102.4
10	50.0	585.840	0.21	1.09	68	68	6	303	62.5	101.9
11	55.0	588.600	0.20	1.03	67	67	4	302	66.1	101.9
12	60.0	591.220	0.18	0.93	68	68	4	301	69.4	101.7
Average:			0.439	2.271	62.5	62.5	6.1	302.9		103.3

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

Date: 7-Feb-18
Run: 3 - Particulate / Metals
Run Time: 11:32 - 13:34

Concentrations:

Particulate	0.6 mg/dscm	0.0003 gr/dscf
	0.3 mg/Acm	0.0001 gr/Acf
	0.5 mg/dscm (@ 11% O2)	0.0002 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.04 Kg/hr	0.078 lb/hr
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Flue Gas Characteristics:

Flow	1006 dscm/min	35524 dscf/min
	16.77 dscm/sec	592 dscf/sec
	1786 Acm/min	63084 Acf/min

Velocity	11.689 m/sec	38.35 f/sec
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Temperature	146.6 oC	295.9 oF
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Moisture	16.3 %
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Gas Analysis	10.1 % O2
	10.1 % CO2

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

Sample Parameters:

Sample Volume	2.2139 dscm	78.185 dscf
Sample Time	120.0 minutes	
Isokineticity	102.1 %	

*** Standard Conditions:**

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

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

Date: 7-Feb-18
 Run: 3 - Particulate / Metals
 Run Time: 11:32 - 13:34

Control Unit (Y) 0.9759
 Nozzle Diameter (in.) 0.3005
 Pitot Factor 0.8565
 Baro. Press. (in. Hg) 30.30
 Static Press. (in. H2O) -20.00
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00070
 Washings (grams) 0.00060
 Total (grams) 0.0013

Gas Analysis (Vol. %):

CO2	O2
10.20	10.00
10.00	10.20

Condensate Collection:

Impinger 1	86.0
Impinger 2	174.0
Impinger 3	30.0
Impinger 4	14.0
Impinger 5	2.0
Impinger 6	1.0
Gel	17.0
Gain (grams)	324.0

10.10	10.10
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Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Inlet (oF)	Dry Gas Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1										
1	0.0	592.750								
2	5.0	596.170	0.32	1.57	64	64	6	295	1.5	102.6
3	10.0	599.690	0.34	1.67	65	65	6	296	4.7	102.3
4	15.0	603.520	0.40	1.97	64	64	6	297	8.4	103.0
5	20.0	607.190	0.37	1.82	64	64	6	297	12.5	102.6
6	25.0	610.710	0.34	1.67	65	65	5	297	17.7	102.4
7	30.0	613.840	0.27	1.33	65	65	5	296	25.2	102.0
8	35.0	616.670	0.22	1.08	66	66	5	295	45.6	101.9
9	40.0	619.390	0.20	0.98	66	66	4	295	53.2	102.7
10	45.0	621.950	0.18	0.88	66	66	4	294	58.3	101.8
11	50.0	624.520	0.18	0.88	67	67	4	293	62.5	101.9
12	55.0	627.080	0.18	0.88	65	65	4	296	66.1	102.1
	60.0	629.640	0.18	0.88	66	66	4	296	69.4	101.9
Traverse 2										
1	0.0	629.640								
2	5.0	632.470	0.22	1.08	66	66	4	298	1.5	102.1
3	10.0	635.190	0.20	0.98	67	67	4	299	4.7	102.7
4	15.0	637.880	0.20	0.98	66	66	4	296	8.4	101.6
5	20.0	640.450	0.18	0.88	67	67	4	296	12.5	102.1
6	25.0	643.010	0.18	0.88	67	67	4	296	17.7	101.7
7	30.0	645.720	0.20	0.98	66	66	4	297	25.2	102.4
8	35.0	649.900	0.48	2.36	67	67	6	298	45.6	102.2
9	40.0	654.260	0.52	2.56	67	67	6	297	53.2	102.4
10	45.0	658.740	0.55	2.71	68	68	6	297	58.3	102.1
11	50.0	662.920	0.48	2.36	68	68	6	294	62.5	101.7
12	55.0	667.190	0.50	2.46	70	70	7	293	66.1	101.4
	60.0	671.330	0.47	2.31	71	71	7	293	69.4	101.2
Average:										
			0.307	1.506	66.4	66.4	3.0	295.9		102.1

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

Date: 7-Feb-18
Run: 1 - Particulate / Metals
Run Time: 12:30 - 14:32

Concentrations:

Particulate	0.95 mg/dscm	0.00041 gr/dscf
	0.53 mg/Acm	0.00023 gr/Acf
	0.84 mg/dscm (@ 11% O2)	0.00037 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.057 Kg/hr	0.126 lb/hr
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Flue Gas Characteristics:

Flow	1004 dscm/min	35472 dscf/min
	16.74 dscm/sec	591 dscf/sec
	1780 Acm/min	62867 Acf/min

Velocity	11.649 m/sec	38.22 f/sec
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Temperature	148.4 oC	299.1 oF
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Moisture	15.7 %
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Gas Analysis	9.7 % O2
	8.8 % CO2

29.788 Mol. Wt (g/gmole) Dry
27.932 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.2715 dscm	80.218 dscf
Sample Time	120.0 minutes	
Isokineticity	101.9 %	

*** Standard Conditions:**

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

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

Date: 7-Feb-18
 Run: 1 - Particulate / Metals
 Run Time: 12:30 - 14:32

Control Unit (Y) 1.0019
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8520
 Baro. Press. (in. Hg) 30.32
 Static Press. (in. H2O) -20.50
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00210
 Total (grams) 0.00215

Gas Analysis (Vol. %):

CO2	O2
8.50	10.00
9.00	9.40

Condensate Collection:

Impinger 1	180.0
Impinger 2	86.0
Impinger 3	16.0
Impinger 4	15.0
Impinger 5	3.0
Impinger 6	1.0
Gel	17.5

8.75	9.70
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Gain (grams) 318.5

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	372.720								
1	5.0	376.910	0.51	2.52	53	53	8	309	1.5	102.2
2	10.0	381.060	0.50	2.47	54	54	8	309	4.7	102.0
3	15.0	385.270	0.51	2.53	55	55	8	308	8.4	102.2
4	20.0	389.520	0.52	2.58	55	55	8	308	12.5	102.2
5	25.0	393.640	0.49	2.43	55	55	8	308	17.7	102.1
6	30.0	396.870	0.29	1.44	55	55	9	307	25.2	103.7
7	35.0	399.700	0.24	1.20	55	55	9	304	45.6	99.6
8	40.0	402.420	0.21	1.05	56	56	9	302	53.2	102.0
9	45.0	405.260	0.23	1.15	56	56	5	302	58.3	101.8
10	50.0	407.920	0.20	1.00	57	57	5	302	62.5	102.0
11	55.0	410.440	0.18	0.90	57	57	5	302	66.1	101.8
12	60.0	412.820	0.16	0.80	57	57	5	300	69.4	101.8
Traverse 2	0.0	412.820								
1	5.0	415.550	0.21	1.06	57	57	5	298	1.5	101.9
2	10.0	418.280	0.21	1.06	58	58	5	298	4.7	101.7
3	15.0	421.020	0.21	1.07	59	59	5	296	8.4	101.7
4	20.0	423.690	0.20	1.01	58	58	5	296	12.5	101.8
5	25.0	426.230	0.18	0.91	59	59	5	295	17.7	101.8
6	30.0	428.840	0.19	0.97	59	59	5	295	25.2	101.8
7	35.0	432.350	0.34	1.74	60	60	5	292	45.6	102.1
8	40.0	435.960	0.36	1.84	60	60	7	292	53.2	102.1
9	45.0	439.360	0.32	1.64	60	60	7	291	58.3	101.9
10	50.0	443.030	0.37	1.90	61	61	7	289	62.5	102.0
11	55.0	446.500	0.33	1.70	61	61	7	289	66.1	102.1
12	60.0	449.860	0.31	1.60	61	61	7	287	69.4	101.8
Average:			0.303	1.524	57.4	57.4	6.5	299.1		101.9

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

Date: 8-Feb-18
Run: 2 - Particulate / Metals
Run Time: 09:20 - 11:22

Concentrations:

Particulate	0.33 mg/dscm	0.00014 gr/dscf
	0.18 mg/Acm	0.00008 gr/Acf
	0.30 mg/dscm (@ 11% O2)	0.00013 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.022 Kg/hr	0.049 lb/hr
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Flue Gas Characteristics:

Flow	1146 dscm/min	40471 dscf/min
	19.10 dscm/sec	675 dscf/sec
	2062 Acn/min	72804 Acf/min

Velocity	13.490 m/sec	44.26 f/sec
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Temperature	149.4 oC	300.8 oF
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Moisture	16.0 %
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Gas Analysis	10.0 % O2
	10.0 % CO2

30.000 Mol. Wt (g/gmole) Dry
28.085 Mol. Wt (g/gmole) Wet

Sample Parameters:

Sample Volume	2.6109 dscm	92.203 dscf
Sample Time	120.0 minutes	
Isokineticity	102.6 %	

*** Standard Conditions:**

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

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

Date: 8-Feb-18
Run: 2 - Particulate / Metals
Run Time: 09:20 - 11:22

Control Unit (Y) 1.0019
 Nozzle Diameter (in.) 0.3050
 Pitot Factor 0.8520
 Baro. Press. (in. Hg) 30.03
 Static Press. (in. H2O) -20.50
 Stack Height (ft) 30
 Stack Diameter (in.) 70.90
 Stack Area (sq.ft.) 27.417
 Minutes Per Reading 5.0
 Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00080
 Traverse 1
 Traverse 2
Total (grams) 0.00085

Gas Analysis (Vol. %):
 CO2 O2
 10.00 10.00
 10.00 10.00
 10.00 10.00

Condensate Collection:
 Impinger 1 110.0
 Impinger 2 172.0
 Impinger 3 52.0
 Impinger 4 12.0
 Impinger 5 6.0
 Impinger 6 2.0
 Gel 18.0
Gain (grams) 372.0

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	450.400								
1	5.0	453.370	0.25	1.25	53	53	5	299	1.5	102.6
2	10.0	456.560	0.29	1.45	53	53	5	299	4.7	102.3
3	15.0	459.640	0.27	1.35	53	53	5	299	8.4	102.4
4	20.0	462.550	0.24	1.20	54	54	5	298	12.5	102.3
5	25.0	465.410	0.23	1.16	55	55	12	297	17.7	102.4
6	30.0	468.400	0.25	1.26	56	56	12	297	25.2	102.5
7	35.0	472.710	0.52	2.62	56	56	12	297	45.6	102.8
8	40.0	477.560	0.66	3.32	57	57	12	300	53.2	102.9
9	45.0	482.240	0.61	3.07	59	59	12	302	58.3	102.9
10	50.0	486.800	0.58	2.92	59	59	10	302	62.5	102.8
11	55.0	491.290	0.56	2.83	60	60	10	302	66.1	102.8
12	60.0	495.660	0.53	2.68	60	60	10	300	69.4	102.7
Traverse 2	0.0	495.660								
1	5.0	500.000	0.52	2.63	62	62	9	303	1.5	102.7
2	10.0	504.260	0.50	2.53	63	63	9	303	4.7	102.6
3	15.0	508.580	0.51	2.59	64	64	9	302	8.4	102.8
4	20.0	512.860	0.50	2.54	64	64	9	302	12.5	102.8
5	25.0	517.100	0.49	2.50	65	65	9	301	17.7	102.6
6	30.0	521.400	0.50	2.56	67	67	9	301	25.2	102.7
7	35.0	524.840	0.32	1.64	67	67	9	301	45.6	102.4
8	40.0	528.170	0.30	1.53	67	67	6	302	53.2	102.5
9	45.0	531.560	0.31	1.59	68	68	6	303	58.3	102.5
10	50.0	534.600	0.25	1.28	68	68	6	303	62.5	102.3
11	55.0	537.580	0.24	1.22	68	68	6	305	66.1	102.4
12	60.0	540.440	0.22	1.13	68	68	6	302	69.4	102.5
Average:			0.402	2.035	61.1	61.1	8.5	300.8		102.6

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

Date: 8-Feb-18
Run: 3 - Particulate / Metals
Run Time: 11:43 - 13:45

Concentrations:

Particulate	0.72 mg/dscm	0.00032 gr/dscf
	0.40 mg/Acm	0.00017 gr/Acf
	0.63 mg/dscm (@ 11% O2)	0.00028 gr/dscf (@ 11% O2)

Emission Rates:

Particulate	0.048 Kg/hr	0.106 lb/hr
--------------------	-------------	-------------

Flue Gas Characteristics:

Flow	1107 dscm/min	39102 dscf/min
	18.45 dscm/sec	652 dscf/sec
	2000 Acm/min	70639 Acf/min
Velocity	13.089 m/sec	42.94 f/sec
Temperature	150.6 oC	303.0 oF
Moisture	16.1 %	
Gas Analysis	9.6 % O2	
	10.1 % CO2	
	29.998 Mol. Wt (g/gmole) Dry	
	28.063 Mol. Wt (g/gmole) Wet	

Sample Parameters:

Sample Volume	2.8371 dscm	100.194 dscf
Sample Time	120.0 minutes	
Isokineticity	103.1 %	

*** Standard Conditions:**

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

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

Date: 8-Feb-18
Run: 3 - Particulate / Metals
Run Time: 11:43 - 13:45

Control Unit (Y) 1.0019
Nozzle Diameter (in.) 0.3227
Pitot Factor 0.8565
Baro. Press. (in. Hg) 30.05
Static Press. (in. H2O) -20.50
Stack Height (ft) 30
Stack Diameter (in.) 70.90
Stack Area (sq.ft.) 27.417
Minutes Per Reading 5.0
Minutes Per Point 5.0

Collection:
 Filter (grams) 0.00005
 Washings (grams) 0.00200
Total (grams) 0.00205

Gas Analysis (Vol. %):
 CO2 O2
 Traverse 1 10.10 9.60
 Traverse 2 10.10 9.50

Condensate Collection:
 Impinger 1 250.0
 Impinger 2 100.0
 Impinger 3 30.0
 Impinger 4 10.0
 Impinger 5 2.0
 Impinger 6 1.0
 Gel 16.5
Gain (grams) 409.5

10.10 9.55

Traverse / Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ΔP (in. H2O)	Orifice ΔH (in. H2O)	Dry Gas Temperature Inlet (oF)	Dry Gas Temperature Outlet (oF)	Vacuum (in. Hg.)	Stack Temp. (oF)	Wall Dist. (in.)	Isokin. (%)
Traverse 1	0.0	541.000								
1	5.0	545.630	0.46	2.97	66	66	9	304	1.5	103.1
2	10.0	550.450	0.50	3.22	66	66	9	304	4.7	103.0
3	15.0	555.310	0.51	3.25	65	65	9	304	8.4	103.1
4	20.0	560.370	0.55	3.55	66	66	9	304	12.5	103.2
5	25.0	565.420	0.55	3.54	66	66	12	305	17.7	103.1
6	30.0	570.380	0.53	3.41	66	66	12	305	25.2	103.1
7	35.0	574.040	0.29	1.86	65	65	12	305	45.6	102.7
8	40.0	577.570	0.27	1.73	64	64	12	305	53.2	102.8
9	45.0	580.830	0.23	1.48	64	64	9	305	58.3	102.8
10	50.0	583.790	0.19	1.22	64	64	9	303	62.5	102.5
11	55.0	586.660	0.18	1.16	62	62	9	302	66.1	102.4
12	60.0	589.540	0.16	1.16	62	62	9	301	69.4	108.9
Traverse 2	0.0	589.540								
1	5.0	592.880	0.24	1.54	62	62	9	302	1.5	103.3
2	10.0	596.380	0.27	1.73	62	62	9	302	4.7	102.1
3	15.0	600.090	0.30	1.92	62	62	9	303	8.4	102.8
4	20.0	603.740	0.29	1.86	63	63	9	303	12.5	102.6
5	25.0	607.330	0.28	1.80	63	63	9	303	17.7	102.7
6	30.0	611.040	0.30	1.92	62	62	9	303	25.2	102.8
7	35.0	615.640	0.46	2.96	63	63	9	302	45.6	102.9
8	40.0	620.680	0.55	3.53	63	63	13	302	53.2	103.3
9	45.0	625.670	0.54	3.47	63	63	13	302	58.3	103.2
10	50.0	630.470	0.50	3.22	63	63	13	301	62.5	103.0
11	55.0	634.870	0.42	3.20	63	63	13	301	66.1	103.0
12	60.0	639.170	0.40	2.57	63	63	13	301	69.4	103.0
Average:			0.374	2.428	63.7	63.7	10.3	303.0		103.1

Date:	6-Feb-18			7-Feb-18			8-Feb-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:	09:18-10:18	10:20-11:20	11:22-12:22	09:32-10:32	10:38-11:38	11:41-12:41	09:24-10:24	10:27-11:27	11:29-12:29
Acetylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methane	1.90	ND	ND	ND	ND	ND	ND	ND	1.6
Ethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
C3 as Propane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C4 as n-Butane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C5 as n-Pentane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6 as n-Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND
C6+ as n-Hexane	ND	ND	ND	ND	ND	ND	ND	ND	ND

Detection Limits:

Acetylene	0.38	0.39	0.39	0.39	0.4	0.45	0.38	0.43	0.39
Methane	1.5	1.6	1.6	1.5	1.6	1.8	1.5	1.7	1.6
Ethane	0.38	0.39	0.39	0.39	0.4	0.45	0.38	0.43	0.39
Ethene	0.38	0.39	0.39	0.39	0.4	0.45	0.38	0.43	0.39
C3 as Propane	0.75	0.79	0.78	0.77	0.81	0.9	0.77	0.86	0.78
C4 as n-Butane	0.75	0.79	0.78	0.77	0.81	0.9	0.77	0.86	0.78
C5 as n-Pentane	0.75	0.79	0.78	0.77	0.81	0.9	0.77	0.86	0.78
C6 as n-Hexane	0.75	0.79	0.78	0.77	0.81	0.9	0.77	0.86	0.78
C6+	1.5	1.6	1.6	1.5	1.6	1.8	1.5	1.7	1.6

Using 1/2 DL Convention

Date:	6-Feb-18			7-Feb-18			8-Feb-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:	09:18-10:18	10:20-11:20	11:22-12:22	09:32-10:32	10:38-11:38	11:41-12:41	09:24-10:24	10:27-11:27	11:29-12:29
Acetylene (ppm)	0.19	0.20	0.20	0.20	0.20	0.23	0.19	0.22	0.20
Methane (ppm)	1.90	0.80	0.80	0.75	0.80	0.90	0.75	0.85	1.60
Ethane (ppm)	0.19	0.20	0.20	0.20	0.20	0.23	0.19	0.22	0.20
Ethene (ppm)	0.19	0.20	0.20	0.20	0.20	0.23	0.19	0.22	0.20
C3 as Propane (ppm)	0.38	0.40	0.39	0.39	0.41	0.45	0.39	0.43	0.39
C4 as n-Butane (ppm)	0.38	0.40	0.39	0.39	0.41	0.45	0.39	0.43	0.39
C5 as n-Pentane (ppm)	0.38	0.40	0.39	0.39	0.41	0.45	0.39	0.43	0.39
C6 as n-Hexane (ppm)	0.38	0.40	0.39	0.39	0.41	0.45	0.39	0.43	0.39
C6+ as n-Hexane (ppm)	0.75	0.80	0.80	0.75	0.80	0.90	0.75	0.85	0.80

Acetylene (mg/m ³ as CH ₄)	0.13	0.13	0.13	0.13	0.13	0.15	0.13	0.14	0.13
Methane (mg/m ³ as CH ₄)	1.27	0.53	0.53	0.50	0.53	0.60	0.50	0.57	1.07
Ethane (mg/m ³ as CH ₄)	0.13	0.13	0.13	0.13	0.13	0.15	0.13	0.14	0.13
Ethene (mg/m ³ as CH ₄)	0.13	0.13	0.13	0.13	0.13	0.15	0.13	0.14	0.13
C3 as Propane (mg/m ³ as CH ₄)	0.25	0.26	0.26	0.26	0.27	0.30	0.26	0.29	0.26
C4 as n-Butane (mg/m ³ as CH ₄)	0.25	0.26	0.26	0.26	0.27	0.30	0.26	0.29	0.26
C5 as n-Pentane (mg/m ³ as CH ₄)	0.25	0.26	0.26	0.26	0.27	0.30	0.26	0.29	0.26
C6 as n-Hexane (mg/m ³ as CH ₄)	0.25	0.26	0.26	0.26	0.27	0.30	0.26	0.29	0.26
C6+ as n-Hexane (mg/m ³ as CH ₄)	0.50	0.53	0.53	0.50	0.53	0.60	0.50	0.57	0.53

Total mg/Sm ³ @11% O ₂ as CH ₄	2.15	1.74	1.74	1.74	1.83	2.08	1.64	1.99	2.32
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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	5-Feb-18	11:29-12:29	4.90	8.97	8.58
Unit 1 Run 2	5-Feb-18	12:30-13:30	7.90	14.46	13.8
Unit 1 Run 3	5-Feb-18	13:35-14:35	5.20	9.52	9.11
Average					10.5
Unit 2 Run 1	5-Feb-18	10:30-11:30	9.90	18.12	16.8
Unit 2 Run 2	5-Feb-18	11:32-12:32	11.00	20.13	18.7
Unit 2 Run 3	5-Feb-18	12:34-13:34	12.00	21.96	20.4
Average					18.6
Unit 3 Run 1	5-Feb-18	12:00-13:00	6.50	11.90	10.2
Unit 3 Run 2	5-Feb-18	13:02-14:02	8.60	15.74	13.5
Unit 3 Run 3	5-Feb-18	14:04-15:04	6.40	11.71	10.1
Average					11.3

APPENDIX - D

FIELD DATA SHEETS

12:30 Day #2

A. Lanfranco and Associates Inc.

16.10 5.132H

CLIENT	M.N.R.D.	NOZZLE	MV02	DIAMETER, IN.	30.50	IMPINGING	INITIAL	FINAL	TOTAL GAIN
SOURCE	Unit #	PROBE	TC	Cp	18580	VOLUMES	(mL)	(mL)	(mL)
PARAMETER / RUN No.	101	PORT LENGTH				Imp. #1	0	136	136
DATE	Feb. 12/18	STATIC PRESSURE, IN. H2O	-19.50			Imp. #2	100	248	148
OPERATOR	C.L. & S.B.	STACK DIAMETER	30.90			Imp. #3	100	169	69
CONTROL UNIT	ST CPE2	STACK HEIGHT	30'			Imp. #4	0	24	24
	ΔH@					Imp. #5	100	112	112
BAROMETRIC PRESSURE, IN. Hg	30.05	INITIAL LEAK TEST	0.002 e 15"			Imp. #6	100	106	6
ASSUMED MOISTURE, Bw	15.3	FINAL LEAK TEST	0.002 e 15"			Upstream Diameters			
						Downstream Diameters			18.3

Point	Clock Time	Dry Gas Meter ft ³	Pilot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F			Impinger Exit	Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe			Box	CO ₂ Vol. %
1	12:30	93.850	34	1.74	62	316	250	250	4	10.0	10.5
2		97.42	34	1.74	62	318	250	250	4		
3		100.98	34	1.74	62	319	250	250	4		
4		105.12	46	3.39	62	319	250	250	4		
5		109.17	44	3.26	62	317	250	250	4		
6		113.49	50	3.57	62	317	250	250	4		
7		117.81	59	3.77	62	319	250	250	6	9.5	11.0
8		122.34	55	3.77	62	319	250	250	6		
9		126.82	50	3.82	62	320	250	250	7		
10		131.07	49	3.81	62	320	250	250	7		
11		135.37	49	3.81	62	318	250	250	7	10.0	10.5
12		139.42	45	3.31	62	318	250	250	7		
13		143.32	38	1.95	62	320	250	250			
14		146.67	32	1.64	62	318	250	250	6		
15		150.22	34	1.74	62	317	250	250	6		
16		153.75	34	1.74	62	317	250	250	6	9.5	11.0
17		157.31	32	1.64	62	317	250	250	6		
18		160.77	33	1.64	62	317	250	250	6		
19		164.22	33	1.64	62	314	250	250	6		
20		168.36	36	1.87	62	312	250	250	6	9.0	11.0
21		172.27	34	1.64	62	311	250	250	6		
22		176.09	32	1.50	62	311	250	250	6		
23		180.27	32	1.50	62	311	250	250	6		
24		183.97	32	1.50	62	311	250	250	6		
25		188.43	34	1.77	62	311	250	250	6	9.5	10.5
26	14:34	190.99	44	2.26	62	312	250	250	6		

97.14

√6.10 5.13 ΔH

CLIENT		NOZZLE		DIAMETER, IN.		IMPINGING		INITIAL		FINAL		TOTAL GAIN	
SOURCE		PROBE		Cp		VOLUMES		(mL)		(mL)		(mL)	
MV WIE		MV 02		3500		3500		0		52		52	
PARAMETER / RUN No		2		2		2		2		2		2	
DATE		Feb 6/18		Feb 6/18		Feb 6/18		Feb 6/18		Feb 6/18		Feb 6/18	
OPERATOR:		C. L. + S. G. + S. B. + S. Z.		C. L. + S. G. + S. B. + S. Z.		C. L. + S. G. + S. B. + S. Z.		C. L. + S. G. + S. B. + S. Z.		C. L. + S. G. + S. B. + S. Z.		C. L. + S. G. + S. B. + S. Z.	
CONTROL UNIT		SICAT 2		SICAT 2		SICAT 2		SICAT 2		SICAT 2		SICAT 2	
BAROMETRIC PRESSURE, IN. Hg		30.10		30.10		30.10		30.10		30.10		30.10	
ASSUMED MOISTURE, BW		15.6		15.6		15.6		15.6		15.6		15.6	
INITIAL LEAK TEST		0.008 e 15"		0.008 e 15"		0.008 e 15"		0.008 e 15"		0.008 e 15"		0.008 e 15"	
FINAL LEAK TEST		0.002 e 15"		0.002 e 15"		0.002 e 15"		0.002 e 15"		0.002 e 15"		0.002 e 15"	
Upstream Diameters		Downstream Diameters		18.0		18.0		18.0		18.0		18.0	
Point	Clock Time	Dry Gas Meter ft ³	Pilot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature of				Impinger Exit	Pump Vac. IN. Hg	Fyrites		TOTAL GAIN
					Dry Gas Outlet	Stack	Probe	Box			CO ₂ Vol. %	O ₂ Vol. %	
1	09:00	191.500	3.37	1.64	58	208	250	250	50	4	9.5	10.0	
2		194.96	3.37	1.74	60	200	250	250	50	4	9.5	10.0	
3		198.52	3.37	1.74	58	208	250	250	50	4	9.5	10.0	
4		202.44	3.37	1.74	58	208	250	250	50	4	9.5	10.0	
5		206.48	3.37	1.74	58	208	250	250	50	4	9.5	10.0	
6		210.33	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
7		214.21	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
8		218.17	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
9		222.22	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
10		226.37	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
11		230.10	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
12		233.62	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
13		236.62	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
14		239.97	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
15		243.20	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
16		246.44	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
17		249.68	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
18		252.71	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
19		256.02	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
20		259.20	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
21		262.39	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
22		265.57	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
23		268.77	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
24		271.94	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
25		275.14	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
26		278.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
27		281.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
28		284.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
29		287.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
30		290.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
31		293.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
32		296.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
33		299.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
34		302.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
35		305.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
36		308.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
37		311.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
38		314.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
39		317.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
40		320.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
41		323.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
42		326.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
43		329.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
44		332.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
45		335.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
46		338.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
47		341.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
48		344.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
49		347.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	
50		350.09	3.37	1.74	60	208	250	250	50	4	9.5	10.0	

11.10
5.93

N-03 13005

CLIENT	MV WTF	NOZZLE	5253	DIAMETER, IN.	3.005	IMPINGER, INITIAL	0	FINAL	0	TOTAL GAIN	0
SOURCE	Unit #1	PROBE	7 AL GPR	Cp	8565	VOLUMES	Imp. #1	0	0	0	0
PARAMETER / RUN No	Feb. 6/13	PORT LENGTH				Imp. #2	100	212	112	112	112
DATE	Feb. 6/13	STATIC PRESSURE, IN. H ₂ O	19.50			Imp. #3	100	116	116	116	116
OPERATOR	S.L. + S.B. + J.G.	STACK DIAMETER	70.90			Imp. #4	0	7	7	7	7
CONTROL UNIT	ST CAFE 2	STACK HEIGHT	30'			Imp. #5	100	103	103	103	103
	ΔH@					Imp. #6	100	101	101	101	101
BAROMETRIC PRESSURE, IN. Hg	30.15	INITIAL LEAK TEST	0.003 @ 15"			Upstream Diameters					
ASSUMED MOISTURE, Bw	15.6	FINAL LEAK TEST	0.002 @ 15"			Downstream Diameters					20.9

Point	Clock Time	Dry Gas Meter ft ³	Pilot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F				Impinger Exit	Box	Fyrites	
					Dry Gas Outlet	Stack	Probe				CO ₂ Vol. %	O ₂ Vol. %
1	11:33	281.509	28	1.76	60	300	250		50	250		
2		284.64	28	1.76	60	300	250		50	250		
3		287.88	28	1.76	60	301	250		52	250		
4		291.03	28	1.76	60	301	250		54	250		
5		294.17	28	1.76	60	301	250		54	250		
6		297.26	28	1.76	60	301	250		54	250		
7		300.62	28	1.76	60	303	250		54	250		
8		304.04	28	1.76	60	304	250		54	250		
9		307.17	28	1.76	60	303	250		54	250		
10		313.54	28	1.76	60	303	250		56	250		
11		317.24	28	1.76	60	303	250		56	250		
12		321.51	28	1.76	60	303	250		56	250		
		325.36	28	1.76	60	304	250		56	250		
1		328.92	28	1.76	60	304	250		56	250		
2		332.59	28	1.76	60	304	250		58	250		
3		336.16	28	1.76	60	304	250		56	250		
4		340.00	28	1.76	60	304	250		55	250		
5		343.87	28	1.76	60	305	250		55	250		
6		347.79	28	1.76	60	305	250		56	250		
7		351.91	28	1.76	60	305	250		56	250		
8		355.94	28	1.76	60	305	250		56	250		
9		360.30	28	1.76	60	308	250		56	250		
10		364.58	28	1.76	60	310	250		58	250		
11		368.57	28	1.76	60	319	250		58	250		
12		372.33	28	1.76	60	319	250		58	250		

CLIENT	Melpo Van WTC	NOZZLE	MV-2	DIAMETER, IN.	0.3050	IMPINGER	INITIAL	FINAL	TOTAL GAIN
SOURCE	Unit 2	PROBE	7E	Cp	0.8520	VOLUMES	(mL)	(mL)	(mL)
PARAMETER/RUN No	Melody Partic 1	PORT LENGTH				Imp. #1	100	140	140
DATE	Feb 6 2018	STATIC PRESSURE, IN. H ₂ O				Imp. #2	100	306	206
OPERATOR:	JZ SB	STACK DIAMETER				Imp. #3	100	174	74
CONTROL UNIT	G-105	STACK HEIGHT				Imp. #4	100	16	16
	Y 0.9759					Imp. #5	100	102	2
	ΔH@ 1.897					Imp. #6	100	101	1
BAROMETRIC PRESSURE, IN. Hg	30.29	INITIAL LEAK TEST	0.002 @ 15"			Upstream Diameters			
ASSUMED MOISTURE, Bw	16%	FINAL LEAK TEST	0.003 @ 15"			Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F				Pump Vac. IN. Hg	Fyrites	
					Dry Gas Outlet	Stack	Probe	Box		CO ₂ Vol. %	O ₂ Vol. %
1	11:51	403.80	0.30	1.53	54	303	265	255	7		
2	10	407.18	0.31	1.54	54	303					
3		410.86	0.29	1.49	54	303					
4	20	413.63	0.27	1.39	55	302	266	254	7	9.5	10.5
5		416.68	0.25	1.29	55	302					
6	30	420.40	0.37	1.90	56	303					
7		425.14	0.60	3.09	57	304	264	253	12	10.0	10.0
8	40	430.24	0.69	3.57	59	304			14	10.0	10.0
9		435.01	0.60	3.11	60	304					
10	50	439.63	0.56	2.91	61	303	265	255			
11		444.18	0.54	2.82	62	301				9.5	10.5
12	60	448.61	0.51	2.67	63	301					
1		453.17	0.54	2.82	64	303	270	260	10		
2	10	457.65	0.52	2.72	65	303				9.5	10.5
3		462.10	0.51	2.68	66	30A					
4	20	466.38	0.47	2.47	66	301	268	255	19		
5		470.76	0.49	2.58	67	301				10.0	10.0
6	30	475.19	0.50	2.64	68	300					
7		478.90	0.35	1.85	68	300	265	250	8		
8	40	482.50	0.33	1.74	68	300				10.0	10.0
9		485.94	0.30	1.59	69	301					
10	50	489.08	0.25	1.32	69	301	265	255	7		
11		491.96	0.21	1.11	70	300				9.5	10.5
12	13:53	494.70	0.19	1.01	70	300					

16.01
6.17

5.17

CLIENT MV WTE		NOZZLE MV 02		DIAMETER, IN.		IMPINGING		INITIAL		FINAL		TOTAL GAIN	
SOURCE UNIT #2		PROBE 7C		Cp		VOLUMES		(mL)		(mL)		(mL)	
PARAMETER/RUN NO		PORT LENGTH				Imp. #1							
DATE Feb 7/18		STATIC PRESSURE, IN. H2O -20.00				Imp. #2		100		196		272	
OPERATOR: CLT SLO TJC		STACK DIAMETER 70.90"				Imp. #3		100		128		280	
CONTROL UNIT CAFE 6103		STACK HEIGHT 30'				Imp. #4		0		14		14	
		AH@				Imp. #5		100		102		2	
BAROMETRIC PRESSURE, IN. Hg 30.30						Imp. #6		100		101			
ASSUMED MOISTURE, BW 53						Upstream Diameters							
						Downstream Diameters						17.1	
Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	CO ₂ Vol. %	O ₂ Vol. %	
1	09:10	495.154	30	1.35	57	300	250	250	60	4	10.5	10.0	
2		498.533	30	1.35	58	300	250	250	60	4			
3		502.022	30	1.35	58	300	250	250	60	4			
4		503.37	30	1.40	59	300	250	250	60	4			
5		503.57	30	1.40	59	300	250	250	60	4			
6		511.46	30	1.40	59	300	250	250	60	4			
7		515.92	30	1.40	59	300	250	250	60	4			
8		519.73	30	1.40	59	300	250	250	60	4			
9		524.21	30	1.40	59	300	250	250	60	4			
10		529.69	30	1.40	59	300	250	250	60	4			
11		534.17	30	1.40	59	300	250	250	60	4			
12		539.67	30	1.40	59	300	250	250	60	4			
13		544.29	30	1.40	59	300	250	250	60	4			
14		549.07	30	1.40	59	300	250	250	60	4			
15		553.94	30	1.40	59	300	250	250	60	4			
16		558.69	30	1.40	59	300	250	250	60	4			
17		563.73	30	1.40	59	300	250	250	60	4			
18		568.39	30	1.40	59	300	250	250	60	4			
19		573.00	30	1.40	59	300	250	250	60	4			
20		577.68	30	1.40	59	300	250	250	60	4			
21		582.01	30	1.40	59	300	250	250	60	4			
22		586.84	30	1.40	59	300	250	250	60	4			
23		591.20	30	1.40	59	300	250	250	60	4			
24	11:12	595.22	30	1.40	59	300	250	250	60	4			

6.03 4.92 ΔH

CLIENT M.V.R.D		NOZZLE V-03		DIAMETER, IN. 3.225		IMPINGER, INITIAL (mL)		FINAL (mL)		TOTAL GAIN (mL)	
SOURCE UNIT #2		PROBE 7ALGUPD		CP 8365		Imp. #1		Imp. #2		Imp. #3	
DATE Feb. 7/18		PORT LENGTH				Imp. #4		Imp. #5		Imp. #6	
OPERATOR: C. B. J. G.		STATIC PRESSURE, IN. H2O -22.00				Upstream Diameters		Downstream Diameters			
CONTROL UNIT CAC 3105 Y 0.9759		STACK DIAMETER 70.40"									
		STACK HEIGHT 30									
BAROMETRIC PRESSURE, IN. Hg 30.30		INITIAL LEAK TEST 0.002 @ 15"									
ASSUMED MOISTURE, BW 152		FINAL LEAK TEST 0.001 @ 15"									

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature °F			Impinger Exit	Box	Probe	Stack	Dry Gas Outlet	Fyrites	CO ₂ Vol. %	O ₂ Vol. %
					Stack	Probe	Box								
1	11:32	592.750	32	1.57	295	250	250	59				64			
2		596.17	34	1.67	296	250	250	59				65			
3		599.69	40	1.77	297	250	250	60				66			
4		603.22	37	1.82	297	250	250	60				67			
5		607.71	37	1.87	297	250	250	60				68			
6		613.24	37	1.92	296	250	250	60				69			
7		616.39	32	1.97	295	250	250	62				70			
8		619.39	28	2.00	295	250	250	62				71			
9		621.95	28	2.00	295	250	250	60				72			
10		624.52	11	2.00	295	250	250	60				73			
11		627.09	11	2.00	296	250	250	60				74			
12		629.67	11	2.00	296	250	250	60				75			
1		632.47	32	1.90	298	250	250	59				76			
2		635.14	30	1.90	297	250	250	58				77			
3		637.90	30	1.90	296	250	250	58				78			
4		640.40	11	1.90	296	250	250	56				79			
5		643.01	30	1.90	297	250	250	55				80			
6		645.32	40	1.90	296	250	250	55				81			
7		647.90	40	1.90	297	250	250	55				82			
8		651.26	40	1.90	297	250	250	55				83			
9		654.24	40	1.90	297	250	250	55				84			
10		656.92	40	1.90	297	250	250	55				85			
11		659.16	40	1.90	297	250	250	55				86			
12	13:34	661.35	47	1.90	297	250	250	55				87			

METRO VANCOUVER WTE - BURNABY B.C.												
SOURCE		NOZZLE		DIAMETER, IN.		IMPINGER		TOTAL GAIN				
441 3		MV 2		0.3050		INITIAL		(mL)				
PARAMETER / RUN No		PROBE		Cp		VOLUMES		(mL)				
Feb 7 2018		7C		0.8520		Imp. #1		180				
OPERATOR:		PORT LENGTH				Imp. #2		186				
32 SF3		STATIC PRESSURE, IN. H2O				Imp. #3		116				
CONTROL UNIT		STACK DIAMETER				Imp. #4		15				
ST CAGE 2		STACK HEIGHT				Imp. #5		100				
Y 1.0019						Imp. #6		101				
ΔH@ 1.862						Imp. #7		209				
BAROMETRIC PRESSURE, IN. Hg		INITIAL LEAK TEST		0.0020 15"		Imp. #8						
ASSUMED MOISTURE, BW		FINAL LEAK TEST		0.0040 15"								
16.5%												
Point	Clock Time	Dry Gas Meter ft ³	Pilot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO ₂ Vol. %	O ₂ Vol. %
1	1230	372.72	0.51	2.52	53	309	250	250	45	8		
2	10	381.06	0.50	2.47	54	309						
3	20	385.27	0.51	2.53	55	308					8.5	10.0
4	20	389.52	0.52	2.68	55	308						
5	30	393.64	0.49	2.43	55	308	257	249	55	9		
6	30	396.81	0.29	1.44	55	307					8.5	10.0
7	40	399.70	0.24	1.20	55	304						
8	40	402.42	0.21	1.05	56	302						
9	50	405.26	0.23	1.15	56	302	250	251	55	5		
10	50	407.92	0.20	1.00	57	302					8.5	10.0
11	60	410.44	0.18	0.90	57	302						
12	60	412.83	0.16	0.80	57	300					1.5	10.0
1	10	415.55	0.21	1.06	57	298	257	249	55	5		
2	10	418.28	0.21	1.06	58	298						
3	20	421.02	0.21	1.07	59	296					9.0	9.5
4	20	423.69	0.20	1.01	58	296						
5	30	426.23	0.18	0.91	59	295	250	248	55	5		
6	30	428.84	0.19	0.97	59	295					9.0	9.5
7	40	432.35	0.34	1.74	60	293						
8	40	435.96	0.36	1.84	60	292						
9	50	439.36	0.32	1.64	60	291	257	252	55	7		
10	50	443.03	0.37	1.46	61	289						
11	60	446.50	0.33	1.70	61	289					9.0	9.5
12	1432	449.86	0.31	1.60	61	287						



CLIENT		NOZZLE		DIAMETER, IN.		IMPINGER	INITIAL	FINAL	TOTAL GAIN
SOURCE		PROBE	AL	GUP-4	Op	VOLUMES	(mL)	(mL)	(mL)
Meto Van Wt3		6-323	7	AL	GUP-4	0.3227	0	250	
PARAMETER / RUN NO		PORT LENGTH				Imp. #1	Imp. #2	Imp. #3	Imp. #4
DATE		STATIC PRESSURE, IN. H ₂ O		-20.50		Imp. #5	Imp. #6	Imp. #7	Imp. #8
OPERATOR:		STACK DIAMETER				Imp. #9	Imp. #10	Imp. #11	Imp. #12
CONTROL UNIT		STACK HEIGHT				Imp. #13	Imp. #14	Imp. #15	Imp. #16
BAROMETRIC PRESSURE, IN. Hg		INITIAL LEAK TEST		0.002 @ 15"		Upstream Diameters			
ASSUMED MOISTURE, Bw		FINAL LEAK TEST		0.005 @ 15"		Downstream Diameters			

Point	Clock Time	Dry Gas Meter ft ³	Pitot ΔP IN. H ₂ O	Orifice ΔH IN. H ₂ O	Temperature of				Impinger Exit	Pump Vac. IN. Hg	Fyrites		
					Dry Gas Outlet	Stack	Probe	Box			CO ₂ Vol. %	O ₂ Vol. %	
1	1143	545.63	0.46	2.97	66	304	251	249	55	9			
2	10	550.45	0.50	3.22	66	304	2						
3		555.31	0.51	3.28	65	304							
4	20	560.37	0.53	3.55	66	304							
5		565.42	0.55	3.54	66	305	251	250	55	12			
6	30	570.38	0.53	3.41	66	305							
7		574.04	0.29	1.86	65	305							
8	40	577.57	0.27	1.73	64	305							
9		580.83	0.23	1.48	64	305	250	252	55	9			
10	50	583.79	0.19	1.22	64	303							
11		586.66	0.18	1.16	62	302							
12	60	589.54	0.18	1.16	62	301							
1		592.86	0.24	1.54	62	302	251	251	55	9			
2	10	596.38	0.27	1.73	62	302							
3		600.09	0.30	1.92	62	303							
4	20	603.74	0.29	1.86	63	303							
5		607.33	0.28	1.80	63	303	249	251	55	9			
6	30	611.04	0.30	1.92	62	303							
7		615.64	0.40	2.96	63	302							
8	40	620.68	0.55	3.53	63	302							
9		625.67	0.54	3.47	63	302	250	250	55	13			
10	50	630.47	0.50	3.22	63	301							
11		634.87	0.48	2.70	63	301							
12	1345	639.17	0.40	2.57	63	301							

A. Lanfranco and Associates Inc.

Client Metro Van Y Blue 1/9755
 Source Unit #1 Cp
 Parameter HF Pbar 30.10 Static
 Date 2-6-18 Operator

Leak Check	Run 1	Run 2	Run 3
Initial	10002	10002	10002
Final	10003	10003	10003

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H₂O		
			DGM Outlet	Stack		R1	R2	R3
1	Am 9:26	622.0	60					
		628.4						
	Am 10:26	649.1						
2	10:38	649.4	60					
		654.0						
	11:38	673.2						
3	11:48	673.5	60					
		688.4						
	pm 12:44	697.3						

Client Metro Van Y Blue 1/9755
 Source Unit #2 Cp
 Parameter HF Pbar 30.3 Static
 Date 2-7-18 Operator

Leak Check	Run 1	Run 2	Run 3
Initial	10002	10002	10002
Final	10003	10003	10003

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H₂O		
			DGM Outlet	Stack		R1	R2	R3
1	Am 9:34	697.6	60					
		716.0						
	10:34	722.4						
2	10:48	722.6	60					
		731.0						
	11:48	746.4						
3	11:59	746.9	60					
		751.0						
	pm 12:59	770.1						

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A. Lanfranco and Associates Inc.

Client Metro VAN Y Blue 1, 9755
Source Unit #3 Cp _____
Parameter HF Pbar 30.04 Static _____
Date 2-8-18 Operator _____

Client _____ Y _____
Source _____ Cp _____
Parameter _____ Pbar _____ Static _____
Date _____ Operator _____

Leak Check	Run 1	Run 2	Run 3
Initial	1.0002	1.0002	1.0002
Final	1.0003	1.0003	1.0003

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1	10:24	770.8	60					
		783.1						
		787.5						
		791.8						
2	10:37	795.0	60					
		809.8						
		817.2						
3	11:44	817.5	60					
		832.0						
		840.0						

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m ³)	Temperature (°F)		Imp. Vol. (mL)	ΔP IN. H ₂ O		
			DGM Outlet	Stack		R1	R2	R3
1								
2								
3								

Canister sampling sheet

Client Metro VAW-Covanta Test Date Feb. 6-8, 2018
 File No. _____ Recovery Date _____

Source: Unit #1 Feb. 6/18 1 2 3

Pbar in hg	30.10	30.10	30.10			
Canister number	AC00679	SC01535	SC00114			
Controller number	0A00705	0A01141	0A01164			
Initial: Start time	9:18 Am	10:20 Am	11:22 Am			
Flask Vac. (in Hg)	-31.0	-29.0	-27.0			
Final: Finish time	10:18 Am	11:22 Am	12:22 pm			
Flask Vac. (in Hg)	-6.0	-7.0	-3.0			

Source: Unit #2 Feb. 7/18 1 2 3

Pbar in hg	30.3	30.3	30.3			
Canister number	SC00234	AC02096	SC02081			
Controller number	0A00672	0A01735	0A00506			
Initial: Start time	9:32 Am	10:38 Am	11:41 Am			
Flask Vac. (in Hg)	-30.0	-30.0	-35.0			
Final: End time	10:32 Am	11:38 Am	12:41 pm			
Flask Vac. (in Hg)	-8.0	-9.0	-23.0			

Source: Unit #3 Feb. 8/18 1 2 3

Pbar in hg	30.04	30.04	30.04			
Canister number	AC01252	SC01652	SC00084			
Controller number	0A01767	0A02145	0A00610			
Initial: Start time	9:24 Am	10:27 Am	11:29 Am			
Flask Vac. (in Hg)	-31.0	-35.0	-24.0			
Final: End time	10:24 Am	11:27 Am	12:29 pm			
Flask Vac. (in Hg)	-7.0	-11.0	-6.5			

Source:

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

APPENDIX – E

CALIBRATION SHEETS and

TECHNICIAN CERTIFICATES

A.Lanfranco & Associates inc.

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

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

Date: 10-Jan-18
Barometric Pressure: 29.88 (in. Hg)
Theoretical Critical Vacuum: 14.09 (in. Hg)

IMPORTANT
IMPORTANT

For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
The Critical Orifice Coefficient K', must be entered in English units. (ft³/31(deg R)^{0.5}((in.Hg)^{1/2}(min))

***** DRY GAS METER READINGS *****									
dH (in H ₂ O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temp. Inlet (deg F)	Initial Temp. Outlet (deg F)	Final Temp. Inlet (deg F)	Final Temp. Outlet (deg F)	Orifice Serial# (number)
0.34	15.00	41.200	45.850	4.650	68.0	68.0	68.0	68.0	40
0.69	15.00	34.100	40.846	6.746	68.0	68.0	67.0	67.0	48
1.16	17.00	23.700	33.859	10.159	67.0	67.0	69.0	69.0	55
1.98	15.00	10.500	22.084	11.584	65.0	65.0	66.0	66.0	63
3.75	15.00	983.100	1009.855	15.855	67.0	67.0	65.0	65.0	73
***** CRITICAL ORIFICE READINGS *****									
K Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial Temp. (deg F)	Final Temp. (deg F)	Average Temp. (deg F)					
0.2408	20.5	65.0	68.0	66.5					
0.3580	18.8	69.0	70.0	69.5					
0.4876	17.8	70.0	70.0	70.0					
0.5856	15.5	69.0	68.0	68.5					
0.8195	14.2	66.0	68.0	67.0					

***** DRY GAS METER ---									
VOLUME CORRECTED Un(sat) (cu ft)	VOLUME CORRECTED Un(sat) (ft ³ /hr)	VOLUME CORRECTED V(sat) (cu ft)	VOLUME CORRECTED V(sat) (ft ³ /hr)	VOLUME NOMINAL Vcr (cu ft)	VOLUME NOMINAL Vcr (ft ³ /hr)	Value (number)	Variation (number)	Average Y----->	Average dh@----->
4.646	131.6	4.701	133.1	4.701	6.966	1.012	0.010	1.0019	47.3
6.852	184.1	6.924	198.4	6.924	10.219	1.012	0.010	1.0019	47.3
10.210	289.2	10.183	297.8	10.183	11.643	0.965	-0.007	1.0019	47.3
11.686	330.9	11.612	328.8	11.612	15.978	0.994	-0.008	1.0019	47.3
18.034	454.1	15.980	452.6	15.978		0.997	-0.005	1.0019	47.3
						1.863	0.001	1.862	47.3
						1.862	0.001	1.862	47.3
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						1.862	0.001	1.862	47.3</

***** RESULTS *****									
--- DRY GAS METER ---					--- ORIFICE ---				
VOLUME CORRECTED V _{sc} (std) (cu ft)	VOLUME CORRECTED V _{sc} (std) (cu ft)	VOLUME CORRECTED V _{sc} (std) (cu ft)	VOLUME CORRECTED V _{sc} (std) (cu ft)	VOLUME CORRECTED V _{sc} (std) (cu ft)	Value (number)	Variation (in H ₂ O)	K _o (value)	Average K _o →	Average K _o →
4.646	4.701	133.1	4.701	4.701	1.012	0.010	0.682	0.682	0.682
6.852	6.834	196.4	6.834	6.834	1.012	0.010	0.706	0.706	0.706
10.210	10.183	287.8	10.183	10.183	0.995	-0.007	0.715	0.715	0.715
11.686	11.612	328.8	11.612	11.612	0.994	-0.008	0.708	0.708	0.708
16.034	15.980	452.6	15.980	15.978	0.997	-0.005	0.705	0.705	0.705
Average Y→					1.0019	Average dH→	47.3	Average K _o →	0.703

TEMPERATURE CALIBRATION				
Calibration Standard →	Omega Model CL23A S/N:T-218788			
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Variation (deg F)	Percent of Absolute	Results
32	32	0	0.00%	0
100	100	0	0.00%	0
300	300	0	0.00%	0
500	500	0	0.00%	0
1000	1000	0	0.00%	0

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

Calibrated by: Matt Harrington

Signature: 

Date: January 10, 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-Jan-18
Barometric Pressure: 29.93 (in. Hg)
Theoretical Critical Vacuum: 14.12 (in. Hg)

IMPORTANT
IMPORTANT

For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
The Critical Orifice Coefficient, K, must be entered in English units, (ft³/3'(deg R)(in.Hg)^{1/2}(min)).

--- DRY GAS METER READINGS ---									
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temp. Inlet (deg F)	Initial Temp. Outlet (deg F)	Final Temp. Inlet (deg F)	Final Temp. Outlet (deg F)	Pressure (in. Hg)
3.55	17.00	251.900	270.484	18.584	69.0	69.0	71.0	71.0	71.6
1.88	16.00	272.500	295.225	12.729	71.0	71.0	73.0	73.0	74.0
1.15	17.00	285.900	295.462	10.562	73.0	73.0	73.0	73.0	74.2
0.70	18.00	296.900	305.384	8.484	74.0	74.0	73.0	73.0	74.5
0.41	16.00	306.000	311.150	5.150	74.0	74.0	75.0	75.0	77.0

--- CRITICAL ORIFICE READINGS ---									
Orifice Serial# (number)	K Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)				
73	0.8185	17.8	74.2	69.0	71.6				
63	0.5856	20.5	72.9	76.0	74.0				
55	0.4800	22.7	74.4	74.0	74.2				
48	0.3560	23.8	74.0	75.0	74.5				
40	0.2408	25.0	50.0	77.0	68.5				

***** RESULTS *****									
--- DRY GAS METER ---					--- ORIFICE ---				
VOLUME CORRECTED Vmt(ad) (cu ft)	VOLUME CORRECTED Vmt(ad) (liters)	VOLUME CORRECTED Vmt(ad) (cu ft)	VOLUME CORRECTED Vmt(ad) (liters)	VOLUME NOMINAL Vmt (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Variation (in H2O)	Ko (value)
18.674	528.9	18.063	511.5	18.187	0.987	-0.009	1.763	-0.132	0.727
12.661	359.4	12.343	349.5	12.484	0.973	-0.003	1.764	-0.131	0.724
10.482	297.1	10.140	287.2	10.260	0.960	-0.009	1.802	-0.093	0.722
8.410	238.2	8.296	234.9	8.398	0.968	0.010	1.835	-0.080	0.701
5.062	144.2	5.026	142.3	5.012	0.987	0.011	2.310	0.415	0.625
Average Y----->					Average dH@----->				
					Average Ko----->				

TEMPERATURE CALIBRATION				
Calibration Standard ----->	Omega Model CL23A S/N T-218708			
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Variation (deg F)	Percent of Absolute	Results
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 20.32 inches of Hg, acceptable tolerance of individual values from the average is ± 0.2 .
For Temperature Devices, the reading must be within 1.5% of certified calibration standard (reference temperature) to be acceptable.

Calibrated by: Mat Harrington

Signature: _____

Date: January 9, 2018

A. Lanfranco & Associates inc.

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

Model #: DGM Blue 1
Serial #: N/A

Date: 11-Jan-18
Barometric Pressure: 29.69 (in. Hg)
Theoretical Critical Vacuum: 14.00 (in. Hg)

!!!!!!!
IMPORTANT
IMPORTANT
!!!!!!!

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

***** DRY GAS METER READINGS *****										***** CRITICAL ORIFICE READINGS *****				
dH (in H2O)	Time (min)	Volume Initial (m ³)	Volume Final (m ³)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.00	15.00	607.1000	611.8270	4.727	60.0	60.0	60.0	60.0	40	0.2408	14.0	62.0	64.0	63.0
0.00	16.00	611.9000	617.0170	5.117	60.0	60.0	60.0	60.0	40	0.2408	14.0	56.0	59.0	62.5
0.00	15.00	617.2000	621.9900	4.790	60.0	60.0	60.0	60.0	40	0.2408	14.0	60.0	69.0	64.5

***** RESULTS *****										
--- DRY GAS METER ---					--- DRY GAS METER ---					
***** ORIFICE *****					***** ORIFICE *****					
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vc(std) (cu ft)	VOLUME CORRECTED Vc(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	
4.761	4.689	132.8	4.683	0.985	0.985	0.009	0.000	0.00	0.000	
5.154	5.004	141.7	4.983	0.971	0.971	-0.005	0.000	0.00	0.000	
4.824	4.683	132.6	4.689	0.971	0.971	-0.005	0.000	0.00	0.000	
Average Y ----->					Average dH@----->					0.00
0.9755					0.0001					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.

Signature: 

Calibrated by: Scott Ferguson

Date: January 11, 2018

Pitot Tube Calibration

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

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

Pitot ID: 7A-1

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.110	0.150	22.0	0.8478	0.0052
0.160	0.220	26.6	0.8443	0.0017
0.260	0.370	33.9	0.8299	0.0127
0.510	0.700	47.5	0.8450	0.0025
0.635	0.870	53.0	0.8458	0.0032
Average :			0.8426	0.0051

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)
0.140	0.190	24.9	0.8498	0.0009
0.205	0.280	30.1	0.8471	0.0018
0.285	0.390	35.5	0.8463	0.0026
0.505	0.690	47.2	0.8469	0.0020
0.730	0.980	56.8	0.8544	0.0055
Average :			0.8489	0.0026

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: AL GVRD 1

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.135	0.180	24.4	0.8574	0.0009
0.260	0.350	33.9	0.8533	0.0032
0.370	0.495	40.4	0.8559	0.0006
0.560	0.750	49.7	0.8555	0.0010
0.710	0.940	56.0	0.8604	0.0039
Average :			0.8565	0.0019

Pitot ID:

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

Pitot ID: 7C

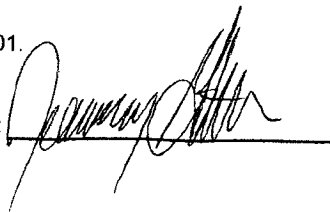
Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.110	0.150	22.0	0.8478	0.0042
0.170	0.230	27.4	0.8511	0.0009
0.265	0.360	34.2	0.8494	0.0026
0.480	0.640	46.0	0.8574	0.0054
0.700	0.940	55.6	0.8543	0.0023
Average :			0.8520	0.0031

Pitot ID:

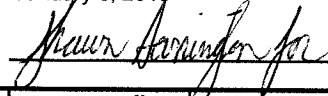
Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
Average :				

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jeremy Gibbs

Signature: 

Date: January 11, 2018

A. LANFRANCO and ASSOCIATES INC.**ENVIRONMENTAL CONSULTANTS****GLASS NOZZLE DIAMETER CALIBRATION FORM**Calibrated by: Jeff Zywicki
Date: January 8, 2018Signature: 

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-22	0.1910	0.1890	0.1900	0.0020	0.1900	0.0001969
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
P-24	0.2515	0.2525	0.2540	0.0025	0.2527	0.0003482
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
G-283	0.2820	0.2835	0.2830	0.0015	0.2828	0.0004363
G-306	0.3060	0.3060	0.3065	0.0005	0.3062	0.0005113
V-03	0.3000	0.3010	0.3005	0.0010	0.3005	0.0004925
V-06	0.3200	0.3210	0.3210	0.0010	0.3207	0.0005608
G-323	0.3225	0.3225	0.3230	0.0005	0.3227	0.0005679
G-337	0.3380	0.3355	0.3365	0.0025	0.3367	0.0006182
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
P-29	0.4680	0.4680	0.4690	0.0010	0.4683	0.0011963
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
MV-248	0.2485	0.2490	0.2485	0.0005	0.2487	0.0003373
MV-280	0.2800	0.2795	0.2810	0.0015	0.2802	0.0004281
MV-281	0.2805	0.2805	0.2805	0.0000	0.2805	0.0004291
MV-286	0.2865	0.2855	0.2865	0.0010	0.2862	0.0004466
MV 2	0.3040	0.3070	0.3040	0.0030	0.3050	0.0005074
MV-307	0.3055	0.3075	0.3070	0.0020	0.3067	0.0005129
MV-346	0.3445	0.3460	0.3465	0.0020	0.3457	0.0006517

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.

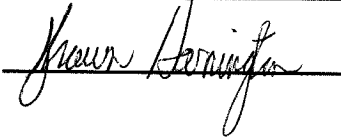
(c) Average = average of D1, D2 and D3

BAROMETER CALIBRATION FORM

Device	Cal Date	Pbar Env Canada		Device (inches of Hg)		Difference (Env Can - Elv Corr)
		(kPa)	(inches of Hg)	Reading	Elevation Corrected	
LA	January 17, 2018	100.6	29.71	29.60	29.67	0.04
DS	January 17, 2018	100.6	29.71	29.60	29.67	0.04
CL	January 17, 2018	100.6	29.71	29.66	29.66	0.05
ML	January 17, 2018	100.6	29.71	29.60	29.67	0.04
MH	January 17, 2018	100.3	29.71	29.60	29.67	0.04
SH	January 17, 2018	100.6	29.71	29.60	29.67	0.04
JZ	January 17, 2018	100.6	29.71	29.60	29.67	0.04
JB	January 17, 2018	100.6	29.71	29.66	29.73	-0.02
SF	February 19, 2018	102.5	30.27	30.20	30.27	0.00
JG	February 16, 2018	102.3	29.71	29.66	29.73	-0.02

Calibrated by: Daryl Sampson

Signature:



Date: January 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

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeff Zywicki

has successfully completed

Stack Sampling

2014

June 20, 2014

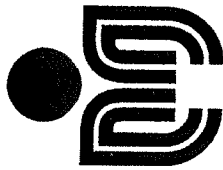
Date



Dean

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MOUNT ROYAL COLLEGE

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Carter Lanfranco

has successfully completed

Stack Sampling

May 2009

Date

Norma MacDonald

**Dean
Faculty of Continuing Education and Extension**