

# **WASTE TO ENERGY FACILITY**

Appendices of Compliance Emissions Testing Report February 2021 Survey

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- B Laboratory Results
- C Computer Generated Results
- D Field Data Sheets
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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% ± 10%.

## Analysis:

- Trace Metals and Mercury analysis conducted at Element Labs, Surrey, B.C.
- Fluoride (HF) analysis conducted at ALS Environmental in Burnaby, B.C.
- Nitrous Oxide (N<sub>2</sub>O) analysis conducted with portable analyzer by A. Lanfranco and Associates.
- Particulate analysis conducted at A. Lanfranco and Associates Inc., Surrey, BC.
- Chain of Custody protocols followed for all samples.
- Excellent blank values for all sample types. All samples blank corrected.

Sample Type	Blank Value							
First Q 2021	Unit 1	Unit 2	Unit 3					
Filter	-0.1 mg	-0.1 mg	-0.1 mg					
Front Half Washings	-2.0 mg	-0.9 mg	0.8 mg					
Mercury Front	<0.02 ug	<0.02 ug	<0.02 ug					
Mercury Back	<0.28 ug	<0.27 ug	<0.27 ug					
Trace Metals Front *	<60.6 ug	<60.2 ug	<53.7 ug					
Trace Metals Back*	<13.6 ug	<26.0 ug	<32.8 ug					
Fluoride	<5.0 ug	<5.0 ug	<5.0 ug					

Sum of all reported elements except Hg\*

# APPENDIX - B LABORATORY RESULTS



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**Report Transmission Cover Page** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE Filter Reagent Blanks

Project Name: **Project Location:** 

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477163

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 26, 2021

Report Number: 2599208

Contact	Company		Address						
Mark Lanfranco	A. Lanfrance	o & Associates	#101, 9488 - 189 Street						
			Surrey, BC V4N 4W7	Surrey, BC V4N 4W7					
			Phone: (604) 881-2582	Fax:	(604) 881-2581				
			Email: mark.lanfranco@alanfranco.com						
Delivery		Format	<u>Deliverables</u>	<u>Deliverables</u>					
Email - Merge Reports		PDF	COC / Test Re	COC / Test Report					
Email - Multiple Reports	s By Agreement	PDF	COA						
Email - Single Report		PDF	COR						
Missy	A. Lanfrance	o & Associates	#101, 9488 - 189 Street						
			Surrey, BC V4N 4W7						
			Phone: (604) 881-2582	Fax:	(604) 881-2581				
			Email: missy@alanfranco.	.com					
<u>Delivery</u>		<u>Format</u>	<u>Deliverables</u>						
Email - Single Report		PDF	Invoice						

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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE

Project Name: Filter Reagent Blanks **Project Location:** 

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477163

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 26, 2021

Report Number: 2599208

**Reference Number** Sample Date Sample Time

1477163-1 Feb 22, 2021 NA

1477163-2 Feb 22, 2021 NA

1477163-3 Feb 22, 2021 NA

Sample Location

Sample Description Reagent Blank Unit 1 Reagent Blank Unit 2 Reagent Blank Unit 3

Container 1 (filter)

Container 1 (filter)

Container 1 (filter)

		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fra	ction 1A					
Aluminum		μg	<5	<5	<5	5
Antimony		μg	<2	<2	<2	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	<0.3	<0.3	<0.3	0.25
Chromium		μg	0.53	0.2	1.6	0.2
Cobalt		μg	<0.3	<0.3	0.3	0.25
Copper		μg	0.5	<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	6	20	40	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	1	0.8	3.4	0.5
Mercury by CVAA						
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	250	250	250	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 1B	µg/sample	<0.02	<0.02	<0.02	

Approved by:

Carol Nam, Dipl. T. **Quality Officer** 





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**Methodology and Notes** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE
Project Name: Filter Reagent Blanks

Project Name: Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477163

Control Number:

Date Received: Mar 1, 2021
Date Reported: Mar 26, 2021
Report Number: 2599208

**Method of Analysis** 

Method Name Method Reference Date Analysis Location Started Mercury in Air (VAN) - 1B **EMC** \* Metals Emissions from Stationary Mar 17, 2021 Element Vancouver Sources, 29 Metals in Stack Samples - Front half **EMC** Metals Emissions from Stationary Mar 5, 2021 **Element Vancouver** (VAN) Sources, 29

\* Reference Method Modified

#### References

EMC Emission Measurement Center of EPA

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

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elemer	Company:	A. Lanfranco & Assoc	iates Inc.	Company:	-						1) Na	me:							
www.Element.co	om Address:	101-9488 189 St	treet	Address:						1	E-ma	il:							
Project Informa	tion	Surrey BC, V4N	4W7								2) Na	me:							
Project ID: Metro Va	ncouver WTE Attention:			Attention:							E-ma	il:							
Project Name: Filter Re	agent Blanks Phone:	604-881-2582	2	Phone:					Sample Custody										
Project Location:	Cell:			Cell:							Samp	oled b	y:						
Legal Location:	Fax:		100	Fax:							Comp	oany:	10						
PO/AFE#:	E-mail:	mark.lanfranco@alan	franco.com	E-mail 1:							I a	utho	rize I	Elem	ent	to p	roce	ed v	with
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Special Instruc	ctions/Comments (please inclu	de contact information includi	ng phone numb	er if different f	from abo	ove).		ē		ľ									
		* Please report μg/sample				)		Numb	ICAP	Hg									
Site I.D.	Sample De	escription	Depth start end in cm m	Date/Tin sample		Matrix	Sampling method							w)					
1	Reagent Blank Unit	1 Container 1( filter)		22-Feb-	-21			1	1	<b>√</b>									
2																			
3	Reagent Blank Unit	2 Container 1 (filter)		22-Feb	-21			1	<b>√</b>	✓									
4																			
5	Reagent Blank Unit	3 Container 1 (filter)		22-Feb	-21			1	<b>√</b>	<b>√</b>							_		
6										_					1				
7	-		30					$\vdash$		_							_		
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Please indicate any potentially hazardous samples				4 47740	<b>3</b> CO	C		<b>-</b>	emp			°C	Dat	te/Tir	ne s	tamp	):		
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Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE

Project Name: Reagent Blanks

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477144

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599196

Contact	Company		Address						
Mark Lanfranco	A. Lanfranc	o & Associates	#101, 9488 - 189 Street						
			Surrey, BC V4N 4W7						
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Email: mark.lanfranco@alanfranco.com									
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Email - Multiple Repo	rts By Agreement	PDF	COA						
Email - Single Report		PDF	COR						
Missy	A. Lanfrance	o & Associates	#101, 9488 - 189 Street						
			Surrey, BC V4N 4W7						
			Phone: (604) 881-2582	Fax:	(604) 881-2581				
			Email: missy@alanfranco.com	m					
Delivery		<u>Format</u>	<u>Deliverables</u>						
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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Sampled By: Company:

Attn: Missy

Project ID: Metro Vancouver WTE

Project Name: Reagent Blanks

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477144

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

2599196 Report Number:

**Reference Number** Sample Date Sample Time

1477144-1 Feb 22, 2021 NA

1477144-2 Feb 22, 2021 NA

1477144-3 Feb 22, 2021 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 Frac	tion 1A					
Aluminum		μg	<5	<5	<5	5
Antimony		μg	3	<2	<2	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	<0.3	<0.3	0.3	0.25
Chromium		μg	0.75	0.58	0.76	0.2
Cobalt		μg	<0.3	<0.3	0.3	0.25
Copper		μg	0.6	<0.3	<0.3	0.25
Lead		μg	<2	2	<2	1.5
Manganese		μg	0.3	<0.3	0.6	0.25
Nickel		μg	<0.5	<0.5	<0.5	0.5
Phosphorus		μg	<2	<2	<2	2.5
Selenium		μg	3.5	3.7	3.5	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<2	<2	<2	1.5
Vanadium		μg	<1	<1	<1	1
Zinc		μg	<0.5	0.7	0.6	0.5
Back Half Metals Frac	tion 2A					
Aluminum		μg	<5	<5	<5	5
Antimony		μg	<3	<3	3	2.5
Arsenic		μg	5.2	5.7	4.4	1
Cadmium		μg	<0.3	<0.3	<0.3	0.25
Chromium		μg	<0.2	0.37	<0.2	0.2
Cobalt		μg	<0.3	0.6	0.3	0.25
Copper		μg	0.4	0.4	<0.3	0.25
Lead		μg	2	3	<2	1.5
Manganese		μg	0.5	1	1	0.25
Nickel		μg	<0.5	<0.5	<0.5	0.5
Phosphorus		μg	20	20	20	2.5
Selenium		μg	<2	2.7	2	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<2	<2	<2	1.5
Vanadium		μg	<1	<1	<1	1
Zinc		μg	0.5	0.7	<0.5	0.5
Volume	Sample	mL	220	220	220	
Volume	aliquot volume	mL	170	170	170	
Mercury by CVAA	•					
Mercury	As Tested	μg/L	< 0.05	<0.05	< 0.05	0.05
Dilution Factor	As Tested	-	1	1	1	
Volume	Sample	mL	250	250	250	



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#### **Analytical Report**

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE

Project Name: Reagent Blanks

**Project Location:** 

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477144

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599196

Reference Number 1477144-1 1477144-2 1477144-3 Sample Date Feb 22, 2021 Feb 22, 2021 Feb 22, 2021 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 - C	ontinued					
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	0.11	0.12	0.10	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	220	220	220	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	μg/sample	0.19	0.21	0.2	
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	155	155	
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	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	μg/sample	< 0.02	< 0.02	< 0.02	
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	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:

Carol Nam, Dipl. T. **Quality Officer** 





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#### **Methodology and Notes**

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE Project Name: Reagent Blanks

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477144

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599196

## **Method of Analysis**

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	Element Vancouver

<sup>\*</sup> Reference Method Modified

#### References

**EMC Emission Measurement Center of EPA** 

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er er	emer	11	Company:	A. Lanfranco & Assoc	iates Inc	).	Company:						1	) Na	me:							
w	ww.Element.c	<u>com</u>	Address:	101-9488 189 St	reet		Address:						E	-ma	il:							
Pro	oject Informa	ation	•	Surrey BC, V4N	1W7								2	) Na	me:							
Project ID:	Metro Va	ancouver WTE	Attention:				Attention:						E	-ma	il:							L
Project Name:	Reag	gent Blanks	Phone:	604-881-2582	2		Phone:							Sample Custody								
Project Location:			Cell:				Cell:					S	Sampled by:									
Legal Location:			Fax:				Fax:							om	pany:							
PO/AFE#:			E-mail:	mark.lanfranco@alan	franco.	.com	E-mail 1:						_	Ιa	utho	rize	Elem	ent	to pi	roce	ed wit	th
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	Special Instru	ctions/Comments	(please include	le contact information includi	ng phon	e numb	er if different	from ab	ove).		er of	ICA	S .	<u> </u>	위 _							
											Number	Front ICAP	Back ICAP	Front ng	Back Hg 5A Hg	5B Hg						
<del></del>	*Front and	Back ICAP as pe	r EPA Method	29. *Hg analysis as per EPA		29. *Pl	ease report µ T	g/samp	le.		z	正	m l	L				Щ	11.30			Щ
s	ite I.D.		Sample De	scription	start in cr	end	Date/Time Matrix Sampling method			Sampling method	$\downarrow$		(	<b>√</b> ı					oove es below)			
1			Reagent Bla	ank Unit 1			22-Feb	-21			5	1	V V	/\	1 1	<b>V</b>						
2												8 4										
3		I	Reagent Bla	ank Unit 2			22-Feb	-21			5	<b>V</b>	√ v	1	1 1	<b>√</b>		Ш				
4											_							Ш				
5			Reagent Bla	ank Unit 3			22-Feb	-21			5	<b>V</b>	√ v	4	/ /	<b>√</b>		Ш		- 4		
6						80					_							Ш				
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11																						
12											$\vdash$					8		$\vdash$				
13											$\vdash$									-		
14 15																						
Please indicate any potentially hazardous samples Submission of this form acknowledges acceptance of Element's Standard of			L	.ot: 1	1477144	coc				Temp ceive		4	°(	Da	te/Ti	me s	tamp	: )()				
terms and c	terms and conditions (https://www.element.com/terms/terms-and-conditions)						y Method:															
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Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Attn: Miss Sampled By:

Company:

Project ID: Metro Vancouver WTE

Project Name: Field Blanks

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477152

Control Number:

Date Received: Mar 1, 2021
Date Reported: Mar 30, 2021
Report Number: 2599197

ContactCompanyAddressMark LanfrancoA. Lanfranco & Associates#101, 9488 - 189 Street

Surrey, BC V4N 4W7

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Email: mark.lanfranco@alanfranco.com

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 Email - Multiple Reports By Agreement
 PDF
 COA

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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE

Field Blanks Project Name:

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477152

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

2599197 Report Number:

**Reference Number** Sample Date Sample Time

**Sample Location** 

**Sample Description** 

1477152-1 Feb 23, 2021 NA

1477152-2 Feb 24, 2021 NA

1477152-3 Feb 25, 2021

NA

Field Blank Unit 1

Field Blank Unit 2 (MV Unit 1 Blank + 4 (MV Unit 2 Blank + 4 (MV Unit 3 Blank + 4

Field Blank Unit 3

Bottles)

Bottles)

Bottles) Stack Samples

		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Fra	action 1A					
Aluminum		μg	<5	6	<5	5
Antimony		μg	<2	3	<2	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	<0.3	<0.3	<0.3	0.25
Chromium		μg	0.59	1.2	0.66	0.2
Cobalt		μg	<0.3	0.5	<0.3	0.25
Copper		μg	1	1	<0.3	0.25
Lead		μg	2	<2	<2	1.5
Manganese		μg	2	1	<0.3	0.25
Nickel		μg	<0.5	<0.5	<0.5	0.5
Phosphorus		μg	58	53	53	2.5
Selenium		μg	4.2	<2	3.1	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<2	<2	<2	1.5
Vanadium		μg	<1	<1	<1	1
Zinc		μg	4.2	1	1	0.5
Back Half Metals Fra	ction 2A					
Aluminum		μg	<5	<5	7	5
Antimony		μg	3	<2	<2	2.5
Arsenic		μg	3.6	5.2	5.8	1
Cadmium		μg	<0.2	0.3	<0.2	0.25
Chromium		μg	<0.2	0.48	<0.2	0.2
Cobalt		μg	<0.2	<0.2	<0.2	0.25
Copper		μg	2	2	0.3	0.25
Lead		μg	<1	<1	<1	1.5
Manganese		μg	4.1	1	1.0	0.25
Nickel		μg	0.7	1	<0.5	0.5
Phosphorus		μg	10	20	20	2.5
Selenium		μg	<1	<1	<1	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<1	2	<1	1.5
Vanadium		μg	<0.9	<0.9	<0.9	1
Zinc		μg	2	1	0.8	0.5
Volume	Sample	mL	360	360	360	
Volume	aliquot volume	mL	310	310	310	
Mercury by CVAA						
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05



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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy Sampled By:

Company:

Project ID: Metro Vancouver WTE

Project Name: Field Blanks

**Project Location:** 

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477152

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599197

Reference Number 1477152-1 1477152-2 1477152-3 Sample Date Feb 23, 2021 Feb 24, 2021 Feb 25, 2021 Sample Time NA NA NA

**Sample Location** 

**Sample Description** Field Blank Unit 1 (MV Unit 1 Blank + 4

Bottles)

Field Blank Unit 2 Bottles)

Field Blank Unit 3 (MV Unit 2 Blank + 4 (MV Unit 3 Blank + 4 Bottles)

		Matrix	Stack Samples	Stack Samples	Stack Samples	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mercury by CVAA - C	ontinued					
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	0.06	0.07	0.07	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	360	360	360	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	μg/sample	0.2	0.2	0.2	
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	135	185	185	
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	600	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	μg/sample	< 0.05	< 0.04	<0.04	
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	200	200	200	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3C	μg/sample	< 0.02	<0.02	< 0.02	

Approved by:

Carol Nam, Dipl. T. **Quality Officer** 





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**Methodology and Notes** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE

Field Blanks

Project Name: Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477152

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599197

et	hoc	l ot	Ana	lysis

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	* Metals Emissions from Stationary Sources, 29	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	* Metals Emissions from Stationary Sources, 29	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	* Metals Emissions from Stationary Sources, 29	Mar 5, 2021	Element Vancouver

<sup>\*</sup> Reference Method Modified

#### References

**EMC Emission Measurement Center of EPA** 

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element element	Company: A.	Lanfranco & Assoc	iates Inc.	Company:						1	Na	ne:						
www.Element.com	Address:	101-9488 189 St	reet	Address:		-1111				E	-mai	l:						
Project Information		Surrey BC, V4N	4W7	199						2)	Naı	me:						
Project ID: Metro Vancouver WTE	Attention:			Attention:		. 42		- 10		E	-mai	l:						
Project Name: Field Blanks	Phone:	604-881-2582	2	Phone:									Sai	mple	e Cı	ısto	dy	
Project Location:	Cell:			Cell:						s	amp	led by	y:					
Legal Location:	Fax:			Fax:						C	omp	any:						
PO/AFE#:	E-mail: <u>mark.l</u>	lanfranco@alan	franco.com	E-mail 1:							I a	uthor	ize l	Elem	ent	to pr	ocee	d with
Proj. Acct. Code:	Agreement ID:			E-mail 2:	·						t	he w	ork i	ndic	ated	on t	his fo	rm:
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			Report F	Results	j j	Requirem	ents			D	ate/	Time:				_	_	
☐ Same Day (200%) ☐ Next Day/Two Day (100%) ☐ Three or Four Days (50%) ☑ 5 to 7 Days (Regular TAT)  Date Required	When "ASAP" is reques default to a 100% RUSH and turn around time to m the lab prior to submittin not all samples require R in the special in	H priority, with pricing natch. Please contact ng RUSH samples. If RUSH, please indicate nstructions.		✓ PDF ☐ Excel	□ AB O	ther (list b	BCCSR	of Containers	٩P	dt.								
Special Instructions/Comments	(please include contact	t information includi	ng phone numb	er if different f	rom abo	ove).		ber	/C	2 3	2 2	D D	l b					
*Front and Back ICAP as per	EPA Method 29. *Hg a	analysis as per EPA	Method 29. *PI	ease report µg	g/sampl	e.		Numb	Front ICAP	Back ICAP	BI JUIN	5A Hg	5B Hg					
	0 1 0		Depth start end	Date/Tin	ne		Sampling					Ent	er t	ests	ab	ove		
Site I.D.	Sample Description		in cm m	sample	d	Matrix	method	$\downarrow$		(	√ r	elev	ant	sam	ple	s be	low)	)
1 Field Blank Ur	nit 1 ('MV Unit 1 Bla	ank' + 4 Bottles)		23-Feb-	-21		e e	5	<b>/</b>	√ √	′ ✓	<b>/ /</b>	<b>√</b>					
2																		
3 Field Blank Ur	nit 2 ('MV Unit 2 Bla	ank' + 4 Bottles)		24-Feb-	-21			5	<b>V</b>	√ √	\ \	′ √	<b>√</b>		_			
4											9				_			
5 Field Blank Ur	nit 3 ('MV Unit 3 Bla	ank' + 4 Bottles)		25-Feb-	-21			5	<b>/</b>	V V	\ \	<b>✓</b>	<b>√</b>					
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**Report Transmission Cover Page** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE

Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477162

Control Number:

Date Received: Mar 1, 2021
Date Reported: Mar 30, 2021

Report Number: 2599210

Contact	Company	Address		
Mark Lanfranco	A. Lanfranco & Associa	s #101, 9488 - 189 Street		
		Surrey, BC V4N 4W7		
		Phone: (604) 881-2582	Pax: (60	04) 881-2581
		Email: mark.lanfranco@	@alanfranco.com	
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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE

Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: **1477162** 

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

2599210 Report Number:

**Reference Number** Sample Date Sample Time **Sample Location** 

**Sample Description** 

1477162-1 Feb 22, 2021 NA

1477162-2 Feb 23, 2021 NA

1477162-3 Feb 23, 2021

NA

Unit 1 Run 1 (MV Unit 1 R-1 + 4 bottles)

Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)

Unit 1 Run 3 (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 Fr	action 1A					
Aluminum		μg	41	9	10	5
Antimony		μg	3	4	<2	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	0.8	0.8	0.7	0.25
Chromium		μg	3.16	5.74	2.4	0.2
Cobalt		μg	0.3	<0.3	<0.3	0.25
Copper		μg	3.8	2	3.2	0.25
Lead		μg	6.7	2.8	2	1.5
Manganese		μg	2	2	1.0	0.25
Nickel		μg	2	5.1	2.8	0.5
Phosphorus		μg	64	41	57	2.5
Selenium		μg	4.2	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	59.0	40.8	52.2	0.5
Back Half Metals Fra	action 2A					
Aluminum		μg	41	20	27	5
Antimony		μg	<2	<2	<2	2.5
Arsenic		μg	4.4	5.0	3.5	1
Cadmium		μg	<0.2	0.2	<0.2	0.25
Chromium		μg	0.98	0.29	0.56	0.2
Cobalt		μg	0.4	0.4	0.2	0.25
Copper		μg	3.1	4.4	<0.2	0.25
Lead		μg	<1	4.5	<1	1.5
Manganese		μg	4.4	1	1	0.25
Nickel		μg	0.6	2.3	<0.4	0.5
Phosphorus		μg	44	10	10	2.5
Selenium		μg	<1	3.1	<1	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	2.2	<1	<1	1.5
Vanadium		μg	<0.8	<0.8	<0.9	1
Zinc		μg	12	14	3.8	0.5
Volume	Sample	mL	870	870	720	
Volume	aliquot volume	mL	820	820	670	
Mercury by CVAA						
Mercury	As Tested	μg/L	0.10	0.10	0.29	0.05





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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477162

Control Number:

Date Received: Mar 1, 2021 Mar 30, 2021 Date Reported:

Report Number: 2599210

Reference Number 1477162-1 1477162-2 1477162-3 Sample Date Feb 22, 2021 Feb 23, 2021 Feb 23, 2021 Sample Time NA NA NA

bottles)

Sample Location

**Sample Description** Unit 1 Run 1 (MV Unit 1 R-1 + 4

Unit 1 Run 2 (MV Unit 1 R-2 + 4 bottles)

Unit 1 Run 3 (MV Unit 1 R-3 + 4 bottles)

**Matrix** Stack Samples Stack Samples Stack Samples Nominal Detection Analyte Units Results Results Results Limit Mercury by CVAA - Continued **Dilution Factor** As Tested 1 1 1 Volume Sample mL 250 250 250 25 25 Volume aliquot volume mL 25 Volume Final 40 40 40 mL Mercury Fraction 1B µg/sample 0.042 0.04 0.11 Mercury As Tested μg/L 0.34 2.20 1.03 0.05 As Tested **Dilution Factor** 870 Volume Sample mL 870 720 Volume aliquot volume mL 5.0 5.0 5.0 Volume Final mL 40 40 40 Mercury Fraction 2B µg/sample 2.4 15 5.9 0.08 0.05 Mercury As Tested μg/L 0.13 0.13 **Dilution Factor** As Tested 1 1 1 Volume Sample 155 155 mL 155 Volume aliquot volume mL 25 25 25 40 Volume Final mL 40 40 Mercury Fraction 3A µg/sample 0.02 0.032 0.033 0.05 As Tested < 0.05 < 0.05 < 0.05 Mercury μg/L **Dilution Factor** As Tested 1 1 1 Volume Sample mL 500 500 600 Volume aliquot volume mL 25 25 25 Volume Final mL 40 40 40 Fraction 3B < 0.04 < 0.04 < 0.05 Mercury µg/sample Mercury As Tested μg/L 0.07 0.09 0.07 0.05 **Dilution Factor** As Tested 1 1 1 Volume Sample 200 200 200 mL aliquot volume mL 25 25 25 Volume Volume Final mL 40 40 40 Fraction 3C 0.02 0.03 0.02 Mercury µg/sample



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**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE

Project Name: Metals and Hg Samples Project Location:

LSD: P.O.:

Proj. Acct. code:

**Sample Description** 

Lot ID: **1477162** 

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021 2599210 Report Number:

Reference Number 1477162-4 Sample Date Feb 23, 2021 Sample Time NA **Sample Location** 

Unit 2 Run 1 (MV

Feb 24, 2021 NA

1477162-6 Feb 24, 2021

NA

Unit 2 R-1 + 4 bottles)

Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)

1477162-5

Unit 2 Run 3 (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 Fra	ction 1A					
Aluminum		μg	10	<5	20	5
Antimony		μg	<2	<2	3	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	<0.3	<0.3	<0.3	0.25
Chromium		μg	1.2	8.83	2.1	0.2
Cobalt		μg	<0.3	<0.3	<0.3	0.25
Copper		μg	1	0.6	2	0.25
Lead		μg	2	<2	<2	1.5
Manganese		μg	0.7	1.0	1	0.25
Nickel		μg	4.0	6.4	1	0.5
Phosphorus		μg	52	53	49	2.5
Selenium		μg	5.0	2	<2	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	2.5	<2	2	1.5
Vanadium		μg	<1	<1	<1	1
Zinc		μg	4.0	2.7	8.2	0.5
Back Half Metals Fra	ction 2A					
Aluminum		μg	10	10	6	5
Antimony		μg	<2	<2	3	2.5
Arsenic		μg	3.8	6.2	4.3	1
Cadmium		μg	0.3	0.4	<0.2	0.25
Chromium		μg	0.86	0.2	0.63	0.2
Cobalt		μg	<0.2	0.2	0.3	0.25
Copper		μg	2	1.0	0.3	0.25
Lead		μg	2	<1	<1	1.5
Manganese		μg	1	1	1.0	0.25
Nickel		μg	<0.4	<0.4	<0.4	0.5
Phosphorus		μg	22	10	20	2.5
Selenium		μg	<1	<1	<1	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<1	2.9	<1	1.5
Vanadium		μg	<0.9	<0.9	<0.9	1
Zinc		μg	3.6	2	2	0.5
Volume	Sample	mL	770	720	720	
Volume	aliquot volume	mL	720	670	670	
Mercury by CVAA	•					
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05





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Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE

Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477162

Control Number:

Date Received: Mar 1, 2021 Mar 30, 2021 Date Reported:

Report Number: 2599210

Reference Number 1477162-4 1477162-5 1477162-6 Sample Date Feb 23, 2021 Feb 24, 2021 Feb 24, 2021 Sample Time NA NA NA

bottles)

Sample Location

**Sample Description** Unit 2 Run 1 (MV Unit 2 R-1 + 4

Unit 2 Run 2 (MV Unit 2 R-2 + 4 bottles)

Unit 2 Run 3 (MV Unit 2 R-3 + 4 bottles)

**Matrix** Stack Samples Stack Samples Stack Samples Nominal Detection Analyte Units Results Results Results Limit Mercury by CVAA - Continued **Dilution Factor** As Tested 1 1 1 Volume Sample mL 250 250 250 25 25 Volume aliquot volume mL 25 Volume Final 40 40 40 mL Mercury Fraction 1B µg/sample < 0.02 < 0.02 < 0.02 Mercury As Tested μg/L 0.44 0.43 0.43 0.05 As Tested **Dilution Factor** 1 1 Volume Sample mL 770 720 720 Volume aliquot volume mL 5.0 5.0 5.0 Volume Final mL 40 40 40 Mercury Fraction 2B µg/sample 2.7 2.5 2.5 < 0.05 < 0.05 < 0.05 0.05 Mercury As Tested μg/L **Dilution Factor** As Tested 1 1 1 Volume Sample 155 155 mL 185 Volume aliquot volume mL 25 25 25 40 Volume Final mL 40 40 Mercury Fraction 3A µg/sample < 0.01 < 0.01 < 0.01 0.05 As Tested < 0.05 < 0.05 < 0.05 Mercury μg/L **Dilution Factor** As Tested 1 1 1 Volume Sample mL 600 600 700 Volume aliquot volume mL 25 25 25 Volume Final mL 40 40 40 Fraction 3B < 0.05 < 0.05 < 0.06 Mercury µg/sample Mercury As Tested μg/L < 0.05 < 0.05 < 0.05 0.05 **Dilution Factor** As Tested 1 1 1 Volume Sample 200 200 200 mL aliquot volume mL 25 25 25 Volume Volume Final mL 40 40 40 Fraction 3C < 0.02 < 0.02 < 0.02 Mercury µg/sample



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#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company:

Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: **1477162** 

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

2599210 Report Number:

Reference Number 1477162-7 1477162-8 1477162-9 Sample Date Feb 24, 2021 Feb 25, 2021 Feb 25, 2021 Sample Time NA NA NA **Sample Location** 

**Sample Description** Unit 3 Run 1 (MV Unit 3 R-1 + 4 bottles)

Stack Samples

Matrix

Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)

Stack Samples

Unit 3 Run 3 (MV Unit 3 R-3 + 4 bottles)

Stack Samples

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Front Half Metals Frac	ction 1A					-
Aluminum		μg	9	8	<5	5
Antimony		μg	3	<2	<2	2.5
Arsenic		μg	<1	<1	<1	1
Cadmium		μg	0.3	<0.3	<0.3	0.25
Chromium		μg	1.6	1.4	0.28	0.2
Cobalt		μg	<0.3	0.4	0.4	0.25
Copper		μg	0.5	2.8	0.6	0.25
Lead		μg	<2	<2	<2	1.5
Manganese		μg	1	0.6	0.3	0.25
Nickel		μg	2	2	<0.5	0.5
Phosphorus		μg	58	50	20	2.5
Selenium		μg	6.0	8.1	5.7	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	<2	<2	<2	1.5
Vanadium		μg	<1	<1	<1	1
Zinc		μg	10	11	4.7	0.5
Back Half Metals Frac	ction 2A					
Aluminum		μg	10	4	7	5
Antimony		μg	<2	<2	3	2.5
Arsenic		μg	5.5	3.3	3.3	1
Cadmium		μg	<0.2	<0.2	<0.2	0.25
Chromium		μg	0.2	0.55	0.80	0.2
Cobalt		μg	<0.2	0.5	0.2	0.25
Copper		μg	<0.2	0.3	0.4	0.25
Lead		μg	2	<1	2.4	1.5
Manganese		μg	1	0.9	1	0.25
Nickel		μg	<0.4	<0.4	<0.4	0.5
Phosphorus		μg	20	20	20	2.5
Selenium		μg	<1	3.1	<1	1.5
Tellurium		μg	<2	<2	<2	2
Thallium		μg	2	1	<1	1.5
Vanadium		μg	<0.8	<0.9	<0.8	1
Zinc		μg	2.2	1	2.5	0.5
Volume	Sample	mL	870	640	870	
Volume	aliquot volume	mL	820	590	820	
Mercury by CVAA	,					
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05



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

**Analytical Report** 

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By: Company: Project ID: Metro Vancouver WTE

Metals and Hg Samples Project Name:

**Project Location:** 

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477162

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599210

Reference Number 1477162-7 1477162-8 1477162-9 Sample Date Feb 24, 2021 Feb 25, 2021 Feb 25, 2021 Sample Time NA NA NA

bottles)

**Sample Location** 

**Sample Description** Unit 3 Run 1 (MV Unit 3 R-1 + 4

Unit 3 Run 2 (MV Unit 3 R-2 + 4 bottles)

Unit 3 Run 3 (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 - C	ontinued					
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	0.62	0.48	0.40	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	870	640	870	
Volume	aliquot volume	mL	5.0	5.0	5.0	
Volume	Final	mL	40	40	40	
Mercury	Fraction 2B	μg/sample	4.3	2.4	2.8	
Mercury	As Tested	μg/L	<0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	155	155	185	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3A	μg/sample	<0.01	<0.01	<0.01	
Mercury	As Tested	μg/L	< 0.05	< 0.05	< 0.05	0.05
Dilution Factor	As Tested		1	1	1	
Volume	Sample	mL	500	500	500	
Volume	aliquot volume	mL	25	25	25	
Volume	Final	mL	40	40	40	
Mercury	Fraction 3B	μg/sample	< 0.04	< 0.04	< 0.04	
Mercury	As Tested	μg/L	< 0.05	0.12	< 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	0.039	<0.02	

Approved by:

Carol Nam, Dipl. T. **Quality Officer** 



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#### **Methodology and Notes**

Bill To: A. Lanfranco & Associates

#101, 9488 - 189 Street Surrey, BC, Canada

V4N 4W7

Attn: Missy

Sampled By:

Company:

Project ID: Metro Vancouver WTE Project Name: Metals and Hg Samples

Project Location:

LSD: P.O.:

Proj. Acct. code:

Lot ID: 1477162

Control Number:

Date Received: Mar 1, 2021 Date Reported: Mar 30, 2021

Report Number: 2599210

## **Method of Analysis**

Method Name	Reference	Method	Date Analysis Started	Location
Mercury in Air (VAN) - 1B	EMC	* Metals Emissions from Stationary Sources, 29	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 2B	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 17, 2021	Element Vancouver
Mercury in Air (VAN) - 3A	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 23, 2021	Element Vancouver
Mercury in Air (VAN) - 3B	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 25, 2021	Element Vancouver
Mercury in Air (VAN) - 3C	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 25, 2021	Element Vancouver
Metals in Stack Samples - Back half (VAN)	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 17, 2021	Element Vancouver
Metals in Stack Samples - Front half (VAN)	EMC	<ul> <li>Metals Emissions from Stationary Sources, 29</li> </ul>	Mar 5, 2021	Element Vancouver

<sup>\*</sup> Reference Method Modified

#### References

**EMC Emission Measurement Center of EPA** 

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

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www	.Element.co	<u>om</u>	Address:	101-9488 189 St	reet	Address:					Ji .	E	E-ma	ail:							Jim
Proje	ct Informat	ion	_	Surrey BC, V4N	4W7							2	2) Na	ame:							
Project ID:	Metro Var	ncouver WTE	Attention:			Attention:						E	-ma	ail:				MAR			
Project Name:	Metals and	d Hg Samples	Phone:	604-881-2582	2	Phone:					200				Sa	amp	le C	Custo	ody		
Project Location:			Cell:			Cell:						5	Sam	pled	by:						
Legal Location:			Fax:			Fax:							Com	pany							
PO/AFE#:			E-mail:	mark.lanfranco@alan	franco.com	E-mail 1:														ed w	
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	*Front and E	Back ICAP as per	EPA Method	29. *Hg analysis as per EPA	Method 29. *PI Depth			le.		Z	Ш	Ш	Щ					<u></u>			
Site	I.D.		Sample Des	scription	start end in cm m	Date/Tir sample		Matrix	Sampling method	$\downarrow$			(~					bove les b		w)	
1		Unit 1 Run	1 ('MV Uni	t 1 R-1' + 4 Bottles)		22-Feb	-21			5	/	✓ .	/	√ \	/ /						
2		Unit 1 Run	2 ('MV Uni	t 1 R-2' + 4 Bottles)		23-Feb	-21			5	1	✓ .	/	√ v	/ /						
3		Unit 1 Run	3 ('MV Uni	t 1 R-3' + 4 Bottles)		23-Feb	-21			5	✓	√ .	/	√ \	/ /						
4																			Ш		
5				t 2 R-1' + 4 Bottles)		23-Feb				5		√ ·	/	√ \	/ /				$\square$		
6				t 2 R-2' + 4 Bottles)		24-Feb					<b>√</b>	√ ·	/	√ \	/ \				Н		
7		Unit 2 Run	3 ('MV Uni	t 2 R-3' + 4 Bottles)		24-Feb	-21			5	<b>√</b>	<b>√</b>	/	√ \	/ /				$\vdash$		
8						04.5.1	0.4		16	F	,		,	,	,	,	-		$\vdash$		
9				t 3 R-1' + 4 Bottles)		24-Feb					✓ ✓	V	/		/ /				$\vdash$		
10				t 3 R-2' + 4 Bottles)		25-Feb 25-Feb	7-31871				√ ./	/	<b>/</b>	/ \	/ \	/			$\vdash$		
11		Unit 3 Run	3 (WV Uni	t 3 R-3' + 4 Bottles)	100 Ex 1000	25-Feb	-21			3	<b>V</b>		<u> </u>	<u> </u>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				$\vdash$		
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## **CERTIFICATE OF ANALYSIS**

**Work Order** : VA21A3528

Client A. Lanfranco & Associates Inc.

Contact Mark Lanfranco

Address : Unit # 101 9488 - 189 St

Surrey BC Canada V4N 4W7

Telephone : 604 881 2582

: Metro Vancouver WTE **Project** 

: HF

C-O-C number Sampler Site

Quote number : Standing Offer

No. of samples received : 3 No. of samples analysed : 3

Page : 1 of 2

Laboratory : Vancouver - Environmental

Account Manager Brent Mack

Address : 8081 Lougheed Highway

: 02-Mar-2021

Burnaby BC Canada V5A 1W9

Telephone : 778-370-3279

**Date Samples Received** : 26-Feb-2021 13:30 **Date Analysis Commenced** 

Issue Date : 05-Mar-2021 13:51

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

#### Signatories

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

Signatories Position Laboratory Department

Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia Page : 2 of 2 Work Order : VA21A3528

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



#### General Comments

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

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

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

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

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

μg/sample micrograms per sample	Unit	Description
mL millilitre		

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

#### Analytical Results

Sub-Matrix: Air			CI	ient sample ID	Unit 1 HF Blank	Unit 2 HF Blank	Unit 3 HF Blank	 
(Matrix: Air)								
			Client sampli	ng date / time	24-Feb-2021	25-Feb-2021	26-Feb-2021	 
Analyte	CAS Number	Method	LOR	Unit	VA21A3528-001	VA21A3528-002	VA21A3528-003	 
					Result	Result	Result	 
Field Tests								
volume, impinger		EP248	0.1	mL	207	205	215	 
Anions and Nutrients								
fluoride	16984-48-8	E248.F	5.0	µg/sample	<5.0	<5.0	<5.0	 

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



#### QUALITY CONTROL INTERPRETIVE REPORT

Page

: VA21A3528 **Work Order** 

Client Laboratory : Vancouver - Environmental : A. Lanfranco & Associates Inc.

Contact Mark Lanfranco **Account Manager** Brent Mack

> Address : Unit # 101 9488 - 189 St : 8081 Lougheed Highway Surrey BC Canada V4N 4W7

Burnaby, British Columbia Canada V5A 1W9

: 1 of 5

Telephone 604 881 2582 Telephone : 778-370-3279

26-Feb-2021 13:30 **Project** Metro Vancouver WTE **Date Samples Received** Issue Date : 05-Mar-2021 13:51

PO : HF C-O-C number Sampler Site

Quote number : Standing Offer

No. of samples received : 3 No. of samples analysed : 3

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

#### Key

Address

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

### **Summary of Outliers**

#### **Outliers: Quality Control Samples**

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

#### Outliers: Reference Material (RM) Samples

No Reference Material (RM) Sample outliers occur.

#### Outliers: Analysis Holding Time Compliance (Breaches)

• No Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

• No Quality Control Sample Frequency Outliers occur.

## RIGHT SOLUTIONS | RIGHT PARTNER

Page : 3 of 5 Work Order : VA21A3528

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



## **Analysis Holding Time Compliance**

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Air Evaluation: ▼ = Holding time exceedance; ✓ = Within Holding Time

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Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 3 HF Blank	E248.F	26-Feb-2021	02-Mar-2021	28	4 days	<b>√</b>	02-Mar-2021	23 days	0 days	<b>√</b>
				days						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Blank	E248.F	25-Feb-2021	02-Mar-2021	28 days	5 days	✓	02-Mar-2021	22 days	0 days	✓
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 1 HF Blank	E248.F	24-Feb-2021	02-Mar-2021	28 days	6 days	✓	02-Mar-2021	21 days	0 days	✓

#### **Legend & Qualifier Definitions**

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

Page : 4 of 5 Work Order : VA21A3528

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



## **Quality Control Parameter Frequency Compliance**

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

Matrix: Air Evaluation: **×** = QC frequency outside specification; ✓ = QC frequency within specification. Quality Control Sample Type Count Frequency (%) Method QC Lot # QC Regular Actual Expected Evaluation Analytical Methods Laboratory Duplicates (DUP) Fluoride by IC (Impinger, mg/sample) 157062 12 8.3 5.0 E248.F Laboratory Control Samples (LCS) Fluoride by IC (Impinger, mg/sample) 12 157062 1 8.3 5.0 E248.F Method Blanks (MB) Fluoride by IC (Impinger, mg/sample) 157062 E248.F 1 12 8.3 5.0 Matrix Spikes (MS) Fluoride by IC (Impinger, mg/sample) 157062 1 12 8.3 5.0 E248.F

Page : 5 of 5 Work Order : VA21A3528

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



## **Methodology References and Summaries**

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.



## **QUALITY CONTROL REPORT**

**Work Order** :VA21A3528

: A. Lanfranco & Associates Inc.

Contact Mark Lanfranco

Address : Unit # 101 9488 - 189 St

Surrey BC Canada V4N 4W7

Telephone :604 881 2582

Project : Metro Vancouver WTE

:HF C-O-C number

Sampler Site

Quote number : Standing Offer

No. of samples received : 3 No. of samples analysed : 3 Page : 1 of 3

Laboratory : Vancouver - Environmental

**Account Manager** : Brent Mack

Address :8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

Telephone :778-370-3279

**Date Samples Received** :26-Feb-2021 13:30

**Date Analysis Commenced** :02-Mar-2021

:05-Mar-2021 13:51 Issue Date

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

#### Signatories

Client

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

Signatories Position Laboratory Department

Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia Page : 2 of 3
Work Order : VA21A3528

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



#### **General Comments**

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

#### Key:

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

#### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Air	o-Matrix: Air						Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier			
Anions and Nutrients (QC Lot: 157062)														
VA21A3527-001	Anonymous	fluoride	16984-48-8	E248.F	16.8	mg/sample	<16.8 µg/sample	<0.0168	0	Diff <2x LOR				
		volume, impinger		EP248	0.1	mL	335	335		Diff <2x LOR				

### Method Blank (MB) Report

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

#### Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1570)	62)					
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	
volume, impinger		EP248	0.1	mL	500	

Page : 3 of 3
Work Order : VA21A3528

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



# Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Air	p-Matrix: <b>Air</b>						Laboratory Control Sample (LCS) Report						
								Recovery Limits (%)					
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier				
Anions and Nutrients (QCLot: 157062)													
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	101	90.0	110					

#### Matrix Spike (MS) Report

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

Sub-Matrix: Air	b-Matrix: <b>Air</b>					Matrix Spike (MS) Report							
						ike	Recovery	Limits (%)					
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier			
Anions and Nutri	ents (QCLot: 157062)												
VA21A3527-002	Anonymous	fluoride	16984-48-8	E248.F	1.54 mg/sample	1.625 mg/sa mple	94.8	75.0	125				

<sup>•</sup> No Matrix Spike (MS) Results are required to be reported.

# ALS Environmental

# Chain of Custody / Analytical Request Form Canada Toll Free: 1 800 668 9878

www.alsglobal.com

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Page <u>1</u> of <u>1</u>

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Company:	A. Lanfranco and Associates			d Other			Regular (Si							
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Address:	Unit 101 9488 189 St		Email 1:	mark.lanfranco	@alanfranco.co	o <u>m</u>	○Emergency	(1-2 Bus. (	Days) - 100°	% Surcha	rge - Contac	t ALS to Cor	firm TAT	
	Surrey BC V4N 4W7		Email 2:				Same Day	or Weekend	d Emergency	y - Contac	t ALS to Co	nfirm TAT		
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# **CERTIFICATE OF ANALYSIS**

Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Contact : Mark Lanfranco

Address : Unit # 101 9488 - 189 St

Surrey BC Canada V4N 4W7

Telephone : 604 881 2582

Project : Metro Vancouver WTE

PO : HF

C-O-C number : --Sampler : --Site : ---

Quote number : Standing Offer

No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 3

Laboratory : Vancouver - Environmental

Account Manager : Brent Mack

Address : 8081 Lougheed Highway

Burnaby BC Canada V5A 1W9

Telephone : 778-370-3279

Date Samples Received : 26-Feb-2021 13:30

Date Analysis Commenced : 02-Mar-2021

Issue Date : 05-Mar-2021 14:37

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

#### Signatories

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

Signatories Position Laboratory Department

Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia

Page : 2 of 3 Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



#### **General Comments**

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

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

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

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

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	Description
μg/sample mL	micrograms per sample millilitre

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

#### **Qualifiers**

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

Page : 3 of 3 Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



# Analytical Results

Sub-Matrix: Air			Cl	ient sample ID	Unit 1 HF Run 1	Unit 1 HF Run 2	Unit 1 HF Run 3	Unit 2 HF Run 1	Unit 2 HF Run 2
(Matrix: Air)									
			Client sampli	ng date / time	23-Feb-2021	23-Feb-2021	23-Feb-2021	24-Feb-2021	24-Feb-2021
Analyte	CAS Number	Method	LOR	Unit	VA21A3527-001	VA21A3527-002	VA21A3527-003	VA21A3527-004	VA21A3527-005
					Result	Result	Result	Result	Result
Field Tests									
volume, impinger		EP248	0.1	mL	335	325	306	330	340
Anions and Nutrients									
fluoride	16984-48-8	E248.F	5.0	μg/sample	<16.8 DLDS	<16.2 DLDS	<15.3 DLDS	<16.5 DLDS	<17.0 DLDS

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

# Analytical Results

Sub-Matrix: Air			CI	ient sample ID	Unit 2 HF Run 3	Unit 3 HF Run 1	Unit 3 HF Run 2	Unit 3 HF Run 3	
(Matrix: Air)									
Client sampling date / time					24-Feb-2021	25-Feb-2021	25-Feb-2021	25-Feb-2021	
Analyte	CAS Number	Method	LOR	Unit	VA21A3527-006	VA21A3527-007	VA21A3527-008	VA21A3527-009	
					Result	Result	Result	Result	
Field Tests									
volume, impinger		EP248	0.1	mL	322	315	337	335	
Anions and Nutrients									
fluoride	16984-48-8	E248.F	5.0	µg/sample	<16.1 DLDS	<15.8 DLDS	<16.8 DLDS	<16.8 DLDS	

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



## QUALITY CONTROL INTERPRETIVE REPORT

Page

Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc. Laboratory : Vancouver - Environmental

Contact : Mark Lanfranco Account Manager : Brent Mack

: Unit # 101 9488 - 189 St Address : 8081 Lougheed Highway

Burnaby, British Columbia Canada V5A 1W9

: 1 of 6

Telephone : 604 881 2582 Telephone : 778-370-3279

 Project
 : Metro Vancouver WTE
 Date Samples Received
 : 26-Feb-2021 13:30

 PO
 : HF
 Issue Date
 : 05-Mar-2021 14:37

PO : **HF**C-O-C number : ---Sampler : ---Site : ----

Surrey BC Canada V4N 4W7

Quote number : Standing Offer

No. of samples received : 9
No. of samples analysed : 9

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

#### Key

Address

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

# **Summary of Outliers**

#### **Outliers: Quality Control Samples**

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

#### Outliers: Reference Material (RM) Samples

No Reference Material (RM) Sample outliers occur.

#### **Outliers : Analysis Holding Time Compliance (Breaches)**

• No Analysis Holding Time Outliers exist.

## **Outliers: Frequency of Quality Control Samples**

• No Quality Control Sample Frequency Outliers occur.

Page : 3 of 6
Work Order : VA21A3527

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



# **Analysis Holding Time Compliance**

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: Air Evaluation: ▼ = Holding time exceedance; ✓ = Within Holding Time

Matrix: Air					E	aluation: 🔻 =	Holding time exce	edance;	= vvitnin	Holding Tin
Analyte Group	Method	Sampling Date	Ex	traction / Pr	reparation			Analys	sis	
Container / Client Sample ID(s)			Preparation	Holding	g Times	Eval	Analysis Date	Holding	g Times	Eval
			Date	Rec	Actual			Rec	Actual	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 1	E248.F	25-Feb-2021	02-Mar-2021	28	5 days	✓	02-Mar-2021	22 days	0 days	✓
				days						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 2	E248.F	25-Feb-2021	02-Mar-2021	28	5 days	✓	02-Mar-2021	22 days	0 days	✓
				days						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE										
Unit 3 HF Run 3	E248.F	25-Feb-2021	02-Mar-2021	28	5 days	✓	02-Mar-2021	22 days	0 days	✓
				days						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE	5040.5	04 5 1 0004					00.14	0.4		,
Unit 2 HF Run 1	E248.F	24-Feb-2021	02-Mar-2021	28	6 days	✓	02-Mar-2021	21 days	0 days	✓
				days						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)										
HDPE Unit 2 HF Run 2	E248.F	24-Feb-2021	02-Mar-2021	00	6 days	✓	02-Mar-2021	21 days	0 daya	✓
Offit 2 HF Ruff 2	E240.F	24-F60-2021	02-IVIAI-202 I	28 days	0 uays	•	02-IVIAI-202 I	21 uays	0 days	•
				uays						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample) HDPE										
Unit 2 HF Run 3	E248.F	24-Feb-2021	02-Mar-2021	28	6 days	✓	02-Mar-2021	21 days	0 days	<b>√</b>
OHILZ HE KUH S	L240.I	24-1 CD-2021	02-IVIAI-202 I	days	0 days	•	02-IVIAI-202 I	Ziuays	0 days	•
Aniana and Nationa - Floorida ha IO (lauria and				uays						
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample) HDPE										
Unit 1 HF Run 1	E248.F	23-Feb-2021	02-Mar-2021	28	7 days	✓	02-Mar-2021	20 days	0 days	<b>√</b>
One i'm ran i	2240.1	20-1 05-2021	02-Wai-2021	days	, days	•	52-IVIGI-2021	_o days	Judys	•
				uays						

Page : 4 of 6
Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



Matrix: Air Evaluation: ▼ = Holding time exceedance; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Ext	raction / Pr	eparation		Analysis				
Container / Client Sample ID(s)			Preparation	Holding	Holding Times		Analysis Date	Holding	g Times	Eval	
			Date	Rec	Actual			Rec	Actual		
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)											
HDPE Unit 1 HF Run 2	E248.F	23-Feb-2021	02-Mar-2021	28 days	7 days	✓	02-Mar-2021	20 days	0 days	✓	
Anions and Nutrients : Fluoride by IC (Impinger, mg/sample)											
HDPE Unit 1 HF Run 3	E248.F	23-Feb-2021	02-Mar-2021	28 days	7 days	1	02-Mar-2021	20 days	0 days	✓	

#### **Legend & Qualifier Definitions**

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

Page : 5 of 6 Work Order : VA21A3527

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



# **Quality Control Parameter Frequency Compliance**

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

Matrix: Air Evaluation: **x** = QC frequency outside specification; ✓ = QC frequency within specification. Quality Control Sample Type Count Frequency (%) Method QC Lot # QC Regular Actual Expected Evaluation Analytical Methods Laboratory Duplicates (DUP) Fluoride by IC (Impinger, mg/sample) 157062 12 8.3 5.0 E248.F Laboratory Control Samples (LCS) Fluoride by IC (Impinger, mg/sample) 12 157062 1 8.3 5.0 E248.F Method Blanks (MB) Fluoride by IC (Impinger, mg/sample) 157062 E248.F 1 12 8.3 5.0 Matrix Spikes (MS) Fluoride by IC (Impinger, mg/sample) 157062 1 12 8.3 5.0 E248.F

Page : 6 of 6 Work Order : VA21A3527

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



# **Methodology References and Summaries**

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Fluoride by IC (Impinger, mg/sample)	E248.F Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Anions for IC (Impinger)	EP248 Vancouver - Environmental	Air	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection. Reported sample volumes are for the bottle/sub-sample submitted for the listed analyses.



# **QUALITY CONTROL REPORT**

:VA21A3527

Page : 1 of 3

Client : A. Lanfranco & Associates Inc.

Laboratory : Vancouver - Environmental Mark Lanfranco **Account Manager** : Brent Mack

Address : Unit # 101 9488 - 189 St

Address :8081 Lougheed Highway

Surrey BC Canada V4N 4W7 Burnaby, British Columbia Canada V5A 1W9

:604 881 2582 Telephone :778-370-3279

Project : Metro Vancouver WTE **Date Samples Received** :26-Feb-2021 13:30

**Date Analysis Commenced** :02-Mar-2021 :HF C-O-C number :05-Mar-2021 14:37 Issue Date

Quote number : Standing Offer

: 9 No. of samples analysed : 9

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

This Quality Control Report contains the following information:

Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits

- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

#### Signatories

**Work Order** 

Contact

Telephone

Sampler Site

No. of samples received

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

Signatories Position Laboratory Department

Miles Gropen Department Manager - Inorganics Inorganics, Burnaby, British Columbia Page : 2 of 3
Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



#### **General Comments**

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

#### Key:

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

# = Indicates a QC result that did not meet the ALS DQO.

#### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Air							Labora	tory Duplicate (D	UP) Report		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 157062)											
VA21A3527-001	Unit 1 HF Run 1	fluoride	16984-48-8	E248.F	16.8	mg/sample	<16.8 µg/sample	<0.0168	0	Diff <2x LOR	
		volume, impinger		EP248	0.1	mL	335	335		Diff <2x LOR	

### Method Blank (MB) Report

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

#### Sub-Matrix: Air

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1570)	62)					
fluoride	16984-48-8	E248.F	0.005	mg/sample	<0.0050	
volume, impinger		EP248	0.1	mL	500	

Page : 3 of 3
Work Order : VA21A3527

Client : A. Lanfranco & Associates Inc.

Project : Metro Vancouver WTE



# Laboratory Control Sample (LCS) Report

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

ub-Matrix: <b>Air</b>				Laboratory Control Sample (LCS) Report					
					Spike	Recovery (%)	Recovery	Limits (%)	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 157062)									
fluoride	16984-48-8	E248.F	0.005	mg/sample	0.5 mg/sample	101	90.0	110	

#### Matrix Spike (MS) Report

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

Sub-Matrix: Air							Matrix Spi	ke (MS) Report		
					Spi	ike	Recovery (%)	Recovery	Limits (%)	
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutri	ents (QCLot: 157062)									
VA21A3527-002	Unit 1 HF Run 2	fluoride	16984-48-8	E248.F	1.54 mg/sample	1.625 mg/sa mple	94.8	75.0	125	

<sup>•</sup> No Matrix Spike (MS) Results are required to be reported.

# ALS Enuironmental

# Chain of Custody / Analytical Request Form Canada Toll Free: 1 800 668 9878

www.alsglobal.com

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	Page	1 of	1

Report To		Report Fo	ormat / Distribu	tion		Service	Requeste	d (Rush for rou	itine analysis	subject to a	vailabilit	v)
Company:	A. Lanfranco and Associates	☑ Standard	Other					Furnaround Time				<del></del>
Contact:	Mark Lanfranco	✓ PDF	Excel	☐ Digital	Fax	Priority	(2-4 Busine	ss Days) - 50% S	urcharge - Con	tact ALS to C	onfirm TA	T
Address:	Unit 101 9488 189 St	Email 1:	mark.lanfranco	@alanfranco.co	m	Emerge	ncy (1-2 Bu	s. Days) - 100%	Surcharge - Co	ntact ALS to (	Confirm T/	AT.
	Surrey BC V4N 4W7	Email 2:				OSame D	ay or Week	end Emergency -	Contact ALS to	Confirm TAT		
Phone:	604-881-2582 Fax: 604-881-2581	Email 3:							s Request			
Invoice To	Same as Report ?	Client / Pr	roject Informati	on		Please	indicate b	elow Filtered,	Preserved of	or both (F,	P, F/P)	$I\Box$
	nvoice with Report?	Job #:	Metro Vancouv	er WTE								]
Company:		PO / AFE:	HF ·		···.							1 1
Contact:		LSD:	·							1 1		
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F 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	/ork Order# (use.oniv)	ALS Contact:	Brent Mack	Sampler:	A. Lanfranco and			Environme Vancouver				Number of Containers
Sample 	Sample Identification (This description will appear on the repo	rt)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ı.		VA2	er Reference 1A35	27	-	Vumbe
	Unit 1 HF Run 1		23-Feb-21		Water	х	T	-01 EU T	Wal SWA	<b>-</b> 1111		1
	Unit 1 HF Run 2		-		Water	х	T			<b>-</b> 1111 -	_	1
	Unit 1 HF Run 3	,			Water	х		11 135				1
										111		
1	Unit 2 HF Run 1	·	24-Feb-21		Water	Х		Telephone: +1	604 253 4188			1
	Unit 2 HF Run 2				Water	X	ļ <u>, , </u>		3 <b>1</b>	1 T		1
	Unit 2 HF Run 3				Water	Х						1
to the residence seems	Unit 3 HF Run 1		25-Feb-21		Water	Х						1
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GENF 20.00 Front

# APPENDIX - C COMPUTER GENERATED RESULTS

Client: Metro Vancouver Date: 22-Feb-21

Jobsite: WTE (Burnaby, BC) Run: 1 - Particulate / Metals

**Source:** Unit 1 **Run Time:** 12:18 - 14:22

**Concentrations:** 

Particulate 3.12 mg/dscm 0.00136 gr/dscf

1.72 mg/Acm 0.00075 gr/Acf

2.47 mg/dscm (@ 11% O2) 0.00108 gr/dscf (@ 11% O2)

**Emission Rates:** 

Particulate 0.216 Kg/hr 0.476 lb/hr

Flue Gas Characteristics:

Flow 1153 dscm/min 40714 dscf/min

 19.21 dscm/sec
 679 dscf/sec

 2087 Acm/min
 73710 Acf/min

**Velocity** 13.658 m/sec 44.81 f/sec

**Temperature** 155.0 oC 310.9 oF

**Moisture** 15.7 %

Gas Analysis 8.4 % O2

10.6 % CO2

30.035 Mol. Wt (g/gmole) Dry 28.144 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.8516 dscm 100.703 dscf

Sample Time 120.0 minutes Isokineticity 100.8 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 22-Feb-21 1 - Particulate / Metals Jobsite: WTE (Burnaby, BC) Run: Unit 1 Run Time: 12:18 - 14:22 Source: Control Unit (Y) 0.9988 Collection: Gas Analysis (Vol. %): Condensate Collection: 0.3207 Filter (grams) 0.00270 148.0 Nozzle Diameter (in.) CO2 Impinger 1 Pitot Factor 0.8490 Washings (grams) 0.00620 Impinger 2 154.0 Baro. Press. (in. Hg) 30.03 Traverse 2 10.50 8.50 Impinger 3 46.0 Total (grams) 0.00890 Static Press. (in. H20) -19.00 Impinger 4 22 0 Stack Height (ft) Impinger 5 12.0 Stack Diameter (in.) 70.90 Impinger 6 4.0 10.63 8 38 Stack Area (sq.ft.) 27 417 Gel 12.9 Minutes Per Reading 5.0 Minutes Per Point 5.0 Gain (grams) 398.9 Dry Gas Temperature Stack Wall Traverse / Time Dry Gas Meter Pitot ^P Orifice ^H Outlet Vacuum Temp. Dist. Isokin. Point (in. H2O) (oF) (oF) (in. Hg.) (oF) (min.) (in.) Traverse 2.74 65 1.5 100.8 5.0 563.050 0.46 65 9.5 309 567.460 9.5 310 10.0 2.68 66 4.7 0.45 66 100.9 571.820 0.44 2.61 10 311 100.9 20.0 25.0 2.74 2.80 10 10.5 311 311 311 12.5 17.7 4 576.280 0.46 67 67 100.8 5 0.47 67 580.790 67 100.8 585.350 0.48 2.86 30.0 67 10.5 25.2 100.9 35.0 589.670 0.43 2.56 68 68 10 312 45.6 100.8 0.46 0.45 2.74 2.68 313 313 53.2 58.3 8 40.0 594,140 69 69 69 10 100.8 598.570 2.38 2.27 2.03 313 312 312 50.0 55.0 10 602.740 0.40 69 69 10 62.5 100.7 8.5 8.5 606.810 0.38 69 69 66.1 100.8 12 60.0 610.670 0.34 70 70 69.4 100.8 Traverse 2 0.0 610.670 5.0 614.350 0.31 1.86 70 311 1.5 100.5

70

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70

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68.8

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68.8

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9.5

9.5 7.5

7.5

9.0

310

309 309

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309

310

310

311

312 313

311

310.9

4.7

8.4 12.5

17.7

25.2

45.6

53.2

58.3

62.5

66.1

69.4

100.7

100.8

100.6

100.7

100.6

100.8

100.8

100.8

100.7

100.7

100.6

100.8

10.0

15.0

20.0

25.0

30.0

35.0

40.0

45.0

50.0

60.0

5

6

9

10

12

Average:

618.040

621.850 625.760

629.680

633 760

638.150

642.440

646.680

650.910

658.620

0.31

0.33 0.35

0.35

0.38

0.44

0.42

0.41

0.41

0.33

0.400

1.86

1.98

2.10

2.10

2.28

2.64

2.52

2.45

2.45

1.98

2.392

Client: Metro Vancouver Date: 23-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 2 - Particulate / Metals

**Source:** Unit 1 **Run Time:** 08:45 - 10:46

**Concentrations:** 

Particulate 2.26 mg/dscm 0.00099 gr/dscf

1.27 mg/Acm 0.00056 gr/Acf

2.11 mg/dscm (@ 11% O2) 0.00092 gr/dscf (@ 11% O2)

**Emission Rates:** 

Particulate 0.167 Kg/hr 0.369 lb/hr

Flue Gas Characteristics:

Flow 1235 dscm/min 43608 dscf/min

 20.58 dscm/sec
 727 dscf/sec

 2192 Acm/min
 77417 Acf/min

**Velocity** 14.344 m/sec 47.06 f/sec

Temperature 155.2 oC 311.4 oF

Moisture 14.4 %

Gas Analysis 10.3 % O2

8.6 % CO2

29.792 Mol. Wt (g/gmole) Dry 28.093 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 3.0098 dscm 106.292 dscf

Sample Time 120.0 minutes Isokineticity 99.3 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 23-Feb-21 2 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: Source: Unit 1 Run Time: 08:45 - 10:46 Control Unit (Y) 0.9988 Collection: Gas Analysis (Vol. %): Condensate Collection: 0.3207 Filter (grams) 0.00250 CO2 7.75 218.0 Nozzle Diameter (in.) Impinger 1 Pitot Factor 0.8490 Washings (grams) 0.00430 Impinger 2 102.0 Baro. Press. (in. Hg) 30.17 Traverse 2 9.50 9.85 Impinger 3 32.0 -19.00 Total (grams) 0.00680 Static Press. (in. H20) Impinger 4 8.0 4.0 Stack Height (ft) 30 Impinger 5 Stack Diameter (in.) 70.90 2.0 Impinger 6 27.417 Stack Area (sq.ft.) Gel 14.1 8.63 10.30 Gain (grams) 380.1 Minutes Per Reading 5.0 Minutes Per Point 5.0 Wall Dry Gas Temperature Stack Traverse / Dry Gas Meter Pitot ^P Time Orifice ^H Vacuum Isokin. Inlet Outlet Temp. Dist. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 0.0 47 47 0.44 2.55 4.5 302 1.5 99.1 664.500 10.0 668.760 0.45 2.61 48 48 4.5 302 3 15.0 673.240 0.49 2.87 47 47 308 8.4 100.4 20.0 25.0 2.77 2.88 310 311 12.5 17.7 4 677.630 0.48 50 50 98.9 0.50 6 30.0 686.700 0.49 2.82 49 49 5.5 311 25.2 101.9 35.0 2.75 49 45.6 691.120 0.48 49 5.5 313 100.0 0.48 2.76 9 45.0 699.680 0.42 2.42 51 51 314 58.3 100.2 10 50.0 703.650 0.40 2.31 52 52 313 62.5 97.7 2.37 55.0 313 707.680 0.41 53 53 66.1 97.8 11 12 60.0 711.530 0.37 54 54 313 69.4 98.1 Traverse 2 0.0 711.530 5.0 716.140 0.52 3.01 55 55 5.5 315 1.5 99.2 720 430 56 47 0.45 2.62 313 98.8 2.44 56 3 15.0 724.580 0.42 56 313 8.4 98.9 20.0 728.820 0.43 2.50 12.5 733.150 0.45 2.63 57 312 17.7 99.5 30.0 35.0 58 59 0.42 6 737.360 2.46 58 311 25.2 99.8 741.690 0.45 2.64 5.5 99.0 40.0 45.0 8 746.070 0.46 2.69 59 59 5.5 312 53.2 99.2 750.350 0.43 2.52 5.5 5.5 313 313 100.0 60 58.3 10 50.0 754.490 0.41 2.41 55.0 758 540 0.39 2 29 62 62 313 66 1 99 N 69.4 12 60.0 762.430 0.36 2.12 62 62 312 98.8 5.2 Average: 0.442 2.566 54.2 54.2 311.4 99.3

Client: Metro Vancouver Date: 23-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 3 - Particulate / Metals

**Source:** Unit 1 **Run Time:** 11:15 - 13:18

**Concentrations:** 

Particulate2.1 mg/dscm0.0009 gr/dscf

1.2 mg/Acm 0.0005 gr/Acf

**Emission Rates:** 

Particulate 0.149 Kg/hr 0.329 lb/hr

Flue Gas Characteristics:

Flow 1203 dscm/min 42476 dscf/min

 20.05 dscm/sec
 708 dscf/sec

 2100 Acm/min
 74154 Acf/min

**Velocity** 13.740 m/sec 45.08 f/sec

**Temperature** 159.6 oC 319.3 oF

Moisture 12.0 %

Gas Analysis 9.3 % O2

10.6 % CO2

30.071 Mol. Wt (g/gmole) Dry 28.617 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.8981 dscm 102.347 dscf

Sample Time 120.0 minutes Isokineticity 98.1 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 23-Feb-21 3 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: Source: Unit 1 Run Time: 11:15 - 13:18 Control Unit (Y) 0.9988 Collection: Gas Analysis (Vol. %): Condensate Collection: Nozzle Diameter (in.) 0.3207 Filter (grams) 0.00320 130.0 CO2 02 Impinger 1 Pitot Factor 0.8490 Washings (grams) 0.00280 10.50 Impinger 2 100.0 Baro, Press. (in. Hg) 30.17 Traverse 2 10.75 9.00 Impinger 3 22.0 -19.10 Total (grams) 0.00600 22.0 Static Press. (in. H20) Impinger 4 30 Stack Height (ft) 5.0 Impinger 5 Stack Diameter (in.) 70.90 4.0 Impinger 6 27.417 Gel Stack Area (sq.ft.) 14.9 Minutes Per Reading 10.63 9.28 297.9 5.0 Gain (grams) **Minutes Per Point** 5.0 Wall Dry Gas Temperature Stack Traverse / Time Dry Gas Meter Pitot ^P Orifice ^H Dist. Isokin. Inlet Outlet Vacuum Temp. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 0.0 763 105 61 61 311 1.5 0.39 2.33 97.9 5.0 767.180 10.0 771.540 0.45 61 97.8 3 15.0 775.960 0.46 2.74 61 61 8.5 319 8.4 98.4 61 62 12.5 17.7 4 20.0 780.180 0.42 2.50 61 8.5 320 98.3 25.0 0.45 2.68 6 30.0 788 820 0.43 2 55 62 62 322 25.2 98.2 62 62 793.190 2.67 323 45.6 35.0 0.45 62 98.4 40.0 2.61 53.2 98.3 45.0 801.780 0.43 2.55 63 63 323 58.3 98.1 10 50.0 805.750 0.37 2.20 63 63 323 62.5 98.3 55.0 1.97 63 63 809.510 0.33 323 66.1 98.5 11 12 60.0 813.120 0.30 1.79 63 63 323 69.4 99.1 Traverse 2 0.0 813.120 5.0 63 63 62 323 321 817.400 0.43 2.56 63 98.4 821 590 7.5 4.7 0.41 2 45 63 98.5 62 319 8.4 98.3 15.0 825.720 0.40 2.38 829.690 0.37 2.20 62 62 61 60 12.5 25.0 833.820 0.40 2.38 62 61 318 17.7 98.2 317 97.9 30.0 0.44 25.2 45.6 6 838,130 2.61 35.0 842.380 0.43 2.54 8 40.0 846,780 0.46 2.72 61 61 8.5 318 53.2 97.9 45.0 850.990 0.42 318 2.49 60 60 60 58.3 98.1 10 855.140 0.41 2.42 62.5 97.9 55.0 60 8.5 317 859 130 0.38 2 24 60 66.1 97.6 69.4 12 60.0 862.900 0.34 2.00 60 60 8.5 316 97.4 Average: 0.409 2.427 61.6 61.6 7.9 319.3 98.1

Client: Metro Vancouver Date: 23-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 1 - Particulate / Metals

**Source:** Unit 2 **Run Time:** 10:59 - 13:03

**Concentrations:** 

Particulate 0.7 mg/dscm 0.0003 gr/dscf

0.4 mg/Acm 0.0002 gr/Acf

**Emission Rates:** 

Particulate 0.051 Kg/hr 0.112 lb/hr

Flue Gas Characteristics:

Flow 1167 dscm/min 41210 dscf/min

 19.45 dscm/sec
 687 dscf/sec

 2015 Acm/min
 71156 Acf/min

**Velocity** 13.184 m/sec 43.26 f/sec

**Temperature** 153.1 oC 307.5 oF

Moisture 12.8 %

Gas Analysis 9.0 % O2

11.1 % CO2

30.140 Mol. Wt (g/gmole) Dry 28.590 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.6843 dscm 94.797 dscf

Sample Time 120.0 minutes Isokineticity 99.6 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: 23-Feb-21 Metro Vancouver Date: 1 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: Source: Unit 2 Run Time: 10:59 - 13:03 Control Unit (Y) 0.9925 Collection: Gas Analysis (Vol. %): Condensate Collection: 0.3110 Nozzle Diameter (in.) Filter (grams) 0.00005 132.0 CO2 11.00 Impinger 1 Pitot Factor 0.8494 Washings (grams) 0.00190 Impinger 2 94.0 Baro. Press. (in. Hg) 30.13 Traverse 2 11.25 8.75 Impinger 3 36.0 Static Press. (in. H20) Stack Height (ft) -17.00 12.0 5.0 Total (grams) 0.00195 Impinger 4 30 Impinger 5 Stack Diameter (in.) 70.90 Impinger 6 2.0 27.417 Stack Area (sq.ft.) Gel 13.8 Minutes Per Reading Gain (grams) 11.13 9.00 294.8 5.0 Minutes Per Point 5.0 Dry Gas Temperature Wall Stack Orifice ^H Dry Gas Meter Pitot ^P Vacuum Traverse / Time Outlet Dist. Isokin. Inlet Temp. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 1 0.0 51 5.5 309 1.5 99.2 0.21 1.09 520.390 10.0 523.700 0.29 5.5 308 15.0 526.720 0.24 1.24 52 52 6.5 308 8.4 99.4 0.33 1.71 6.5 7.5 7.5 12.5 17.7 20.0 25.0 530.270 53 53 308 308 99.5 99.6 4 53 53 2.18 51 25.2 45.6 53.2 6 30.0 537.760 0.42 306 99.5 308 311 35.0 541.840 0.43 99.6 546.540 45.0 551.040 0.52 2.72 60 60 12 312 58.3 99.7 60 62 63 308 310 62.5 66.1 10 50.0 555.470 0.50 2.63 60 12 99.8 55.0 559.770 0.47 2.48 62 99.6 11 10 12 60.0 563.750 0.40 63 10 310

verage:			0.388	2.044	59.0	59.0	9.0	307.5		99.6
12	60.0	610.342	0.22	1.16	61	61	9.0	306	69.4	99.6
11	55.0	607.390	0.27	1.43	61	61	9.0	306	66.1	99.3
10	50.0	604.130	0.32	1.69	61	61	9.5	308	62.5	99.5
9	45.0	600.580	0.42	2.22	61	61	9.5	308	58.3	99.7
8	40.0	596.510	0.37	1.96	61	61	9.5	306	53.2	99.5
7	35.0	592.690	0.40	2.12	61	61	9.5	306	45.6	99.5
6	30.0	588.720	0.50	2.65	61	61	10	305	25.2	99.8
5	25.0	584.270	0.44	2.34	63	63	10	305	17.7	99.8
4	20.0	580.080	0.49	2.61	63	63	10	305	12.5	99.8
3	15.0	575.660	0.46	2.45	64	64	10	306	8.4	99.8
2	10.0	571.370	0.39	2.07	64	64	8.0	307	4.7	99.5
1	5.0	567.430	0.34	1.81	64	64	8.0	306	1.5	99.4
averse 2	0.0	563.750								

Client: Metro Vancouver Date: 24-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 2 - Particulate / Metals

**Source:** Unit 2 **Run Time:** 09:33 - 11:35

**Concentrations:** 

Particulate 0.04 mg/dscm 0.00002 gr/dscf

0.02 mg/Acm 0.00001 gr/Acf

**Emission Rates:** 

Particulate 0.003 Kg/hr 0.006 lb/hr

Flue Gas Characteristics:

Flow 1265 dscm/min 44661 dscf/min

 21.08 dscm/sec
 744 dscf/sec

 2187 Acm/min
 77233 Acf/min

**Velocity** 14.310 m/sec 46.95 f/sec

**Temperature** 152.2 oC 306.0 oF

Moisture 14.2 %

Gas Analysis 9.6 % O2

10.1 % CO2

30.003 Mol. Wt (g/gmole) Dry 28.302 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.6764 dscm 94.517 dscf

Sample Time 120.0 minutes Isokineticity 99.0 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 24-Feb-21 2 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: 09:33 - 11:35 Source: Unit 2 Run Time: Control Unit (Y) 0.9925 Collection: Gas Analysis (Vol. %): Condensate Collection: Nozzle Diameter (in.) 0.3050 Filter (grams) 0.00005 208.0 CO2 Impinger 1 Pitot Factor 0.8494 Washings (grams) 0.00005 Traverse 1 Impinger 2 72.0 Baro. Press. (in. Hg) 30.50 Traverse 2 10.25 9.00 Impinger 3 24.0 -17.00 Total (grams) 0.00010 Static Press. (in. H20) Impinger 4 8.0 Stack Height (ft) 30.1 3.0 Impinger 5 Stack Diameter (in.) 70.90 2.0 Impinger 6 27.417 Stack Area (sq.ft.) Gel 14.7 Minutes Per Reading 10.13 9.58 Gain (grams) 331.7 5.0 Minutes Per Point 5.0 Wall Dry Gas Temperature Stack Traverse / Vacuum Time Dry Gas Meter Pitot ^P Orifice ^H Isokin. Inlet Outlet Temp. Dist. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 0.0 1.94 300 1.5 98.9 0.42 5.0 614.920 618.750 0.44 2.03 47 47 300 99.1 3 15.0 622,650 0.45 2.08 48 48 302 8.4 99.7 20.0 25.0 2.26 12.5 17.7 626,680 0.49 48 50 48 302 98.8 50 50 6 30 O 635 080 0.54 2.49 5.5 305 25.2 ရန ရ 639,180 0.50 330 100.5 35.0 2.32 45.6 643.240 2.27 9 45.0 647.190 0.46 2.14 54 54 5.5 304 58.3 98.9 10 50.0 650.960 0.42 1.95 55 5.5 307 62.5 98.7 1.77 55.0 654.560 0.38 308 66.1 98.7 12 60.0 658.010 0.35 1.63 57 57 308 69.4 98.5 Traverse 2 0.0 658.010 5.0 661.520 0.35 1.65 58 58 300 1.5 99.5 10.0 665 250 58 59 58 59 4.5 308 0.41 1 91 47 98.3 15.0 669.170 0.44 2.05 309 8.4 99.6 672.920 0.41 1.91 98.7 25.0 676.590 0.38 1.77 60 60 312 17.7 100.3 680.110 7 30.0 0.36 1.68 61 61 312 25.2 98.6 684.380 0.53 2.47 98.8 8 40.0 688.720 0.55 2.58 62 62 5.5 311 53.2 98.4 311 311 45.0 693.300 0.61 2.86 58.3 98.6 10 697.700 2.63 55.0 701 720 0.45 2.17 64 64 5.5 290 66 1 98.9 60.0 12 705.570 0.40 1.96 64 64 5.5 281 69.4 99.8 5.3 Average: 0.455 2.122 56.3 56.3 306.0 99.0

Client: Metro Vancouver Date: 24-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 3 - Particulate / Metals

**Source:** Unit 2 **Run Time:** 12:07 - 14:08

**Concentrations:** 

Particulate 0.7 mg/dscm 0.0003 gr/dscf

0.4 mg/Acm 0.0002 gr/Acf

**Emission Rates:** 

Particulate 0.05 Kg/hr 0.118 lb/hr

Flue Gas Characteristics:

Flow 1229 dscm/min 43418 dscf/min

 20.49 dscm/sec
 724 dscf/sec

 2137 Acm/min
 75451 Acf/min

**Velocity** 13.980 m/sec 45.87 f/sec

Temperature 154.8 oC 310.7 oF

Moisture 14.1 %

Gas Analysis 9.8 % O2

9.7 % CO2

29.938 Mol. Wt (g/gmole) Dry 28.259 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.6889 dscm 94.957 dscf

Sample Time 120.0 minutes Isokineticity 98.5 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 24-Feb-21 3 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: Source: Unit 2 Run Time: 12:07 - 14:08 Control Unit (Y) 0.9925 Collection Gas Analysis (Vol. %): Condensate Collection: 0.3050 Filter (grams) 0.00005 222.0 Nozzle Diameter (in.) CO2 Impinger 1 02 Pitot Factor 0.8494 Washings (grams) 0.00190 9.00 Impinger 2 66.0 Baro. Press. (in. Hg) 30.50 Traverse 2 9.10 10.50 Impinger 3 18.0 -17.00 Total (grams) 0.0020 Static Press. (in. H20) Impinger 4 6.0 Stack Height (ft) 30 3.0 Impinger 5 Stack Diameter (in.) 70.90 Impinger 6 1.0 14.2 27.417 Gel Stack Area (sq.ft.) Minutes Per Reading 9.68 9.75 Gain (grams) 330.2 5.0 Minutes Per Point 5.0 Wall Dry Gas Temperature Stack Traverse / Dist. Time Dry Gas Meter Pitot ^P Orifice ^H Isokin. Inlet Outlet Vacuum Temp. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 1 0.0 5.0 706.278 1.5 62 62 309 98.9 0.28 1.33 709.410 712.580 0.29 61 98.0 3 15.0 715.630 0.27 1.26 61 61 309 8.4 98.2 0.27 12.5 17.7 20.0 718.680 1.26 61 61 61 310 98.3 6 30.0 725.430 0.36 1 60 62 62 310 25.2 98.4 730.170 62 63 45.6 35.0 0.65 3.04 62 98.7 735.030 45.0 740.000 0.71 3.33 64 64 10 312 58.3 98.8 10 50.0 744.800 0.66 3.10 65 65 10 313 62.5 98.8 749.060 65 65 313 55.0 0.52 2.45 66.1 98.6 12 60.0 753.060 0.41 2.10 66 66 304 69.4 103.4 Traverse 2 0.0 753.060 5.0 756.730 0.38 1.81 66 66 303 98.4 760 830 0.48 66 67 66 7.5 47 98.6 10.0 2 26 0.49 67 8.4 98.5 15.0 764.980 2.31 312 769.170 0.50 67 98.6 68 68 68 25.0 773.760 0.60 2.82 68 9.5 316 17.7 98.6 68 25.2 778,470 2.97 1.79 6 30.0 0.63 9.5 316 98.8 35.0 782.130 0.38 45.6 8 40.0 785.660 0.36 1.70 69 69 313 53.2 97.3 0.34 45.0 789.130 1.61 68 312 58.3 98.5 792.600 69 62.5 98.3 11 55.0 796 010 0.35 1.56 68 68 66 1 95.5 69.4 12 60.0 799.180 0.29 1.38 69 69 305 96.8 Average: 0.439 2.071 65.3 65.3 3.0 310.7 98.5

Client: Metro Vancouver Date: 24-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 1 - Particulate / Metals

**Source:** Unit 3 **Run Time:** 12:44 - 14:48

**Concentrations:** 

Particulate 0.04 mg/dscm 0.00002 gr/dscf

0.02 mg/Acm 0.00001 gr/Acf

**Emission Rates:** 

Particulate 0.003 Kg/hr 0.006 lb/hr

Flue Gas Characteristics:

Flow 1181 dscm/min 41713 dscf/min

 19.69 dscm/sec
 695 dscf/sec

 2072 Acm/min
 73179 Acf/min

**Velocity** 13.559 m/sec 44.49 f/sec

**Temperature** 156.7 oC 314.0 oF

Moisture 14.1 %

Gas Analysis 11.1 % O2

9.2 % CO2

29.917 Mol. Wt (g/gmole) Dry 28.240 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.6319 dscm 92.946 dscf

Sample Time 120.0 minutes Isokineticity 100.8 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 24-Feb-21 WTE (Burnaby, B.C) 1 - Particulate / Metals Jobsite: Run: Source: Unit 3 **Run Time:** 12:44 - 14:48 Control Unit (Y) 0.9997 Collection: Gas Analysis (Vol. %): Condensate Collection: Nozzle Diameter (in.) 0.3043 Filter (grams) 0.00005 200.0 CO2 Impinger 1 Pitot Factor 0.8490 Washings (grams) 0.00005 11.00 Impinger 2 86.0 Baro, Press. (in. Hg) 30.50 Traverse 2 9.40 11.25 Impinger 3 16.0 -19.00 Total (grams) 0.00010 Static Press. (in. H20) Impinger 4 6.0 Stack Height (ft) 30 2.0 Impinger 5 Stack Diameter (in.) 70.90 1.0 Impinger 6 27.417 Gel Stack Area (sq.ft.) 12.5 Minutes Per Reading 9.20 11.13 5.0 Gain (grams) 323.5 Minutes Per Point 5.0 Wall Dry Gas Temperature Stack Traverse / Dry Gas Meter Pitot ^P Time Orifice ^H Dist. Isokin. Inlet Outlet Vacuum Temp. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 1 0.0 148 598 52 295 100.8 152.710 0.49 2.43 52 5.0 10.0 0.51 2.47 52 52 100.9 3 15.0 161.090 0.53 2.57 52 52 8 313 8.4 101.0 2.67 2.58 53 54 53 54 12.5 17.7 4 20.0 165.410 0.55 8 313 101.0 25.0 169.660 0.53 54 54 6 30.0 173 740 0.49 2.38 313 25.2 100.8 14 176,990 55 313 45.6 35.0 0.31 1.51 100.6 40.0 179.930 0.25 1.23 100.6 9 45.0 182.800 0.24 1.18 56 56 13 310 58.3 100.5 10 50.0 185.620 0.23 1.13 57 57 13 310 62.5 100.6 55.0 58 12.5 188.380 0.22 1.08 311 66.1 100.6 11 12 60.0 191.080 0.21 1.03 59 59 12.5 312 69.4 100.6 Traverse 2 0.0 191.080 5.0 194.680 1.83 59 59 307 100.9 10.0 198 300 60 61 60 61 321 4.7 0.38 1 85 100.8 1.76 7.5 8.4 15.0 201.830 0.36 320 100.7 7.5 20.0 205.220 0.33 1.62 318 12.5 100.9 25.0 208.560 0.32 1.57 61 61 317 17.7 100.8 7.5 12.5 211.800 30.0 0.30 1.48 6 62 62 317 25.2 100.8 35.0 216.030 0.51 2.52 313 45.6 100.9 8 40.0 220.410 0.55 2.70 63 63 12.5 320 53.2 100.9 2.79 0.57 63 101.1 45.0 224.870 63 321 58.3 10 229.290 0.56 63 63 62.5 101.0 13 321 55.0 233 560 0.52 2 55 64 64 66.1 101.0 12 60.0 237.710 0.49 2.41 64 64 13 319 69.4 101.0

58.4

58.4

10.4

314.0

100.8

0.409

2.003

Average:

Client: Metro Vancouver Date: 25-Feb-21

Jobsite: WTE (Burnaby, B.C) Run: 2 - Particulate / Metals

**Source:** Unit 3 **Run Time:** 08:54 - 10:57

**Concentrations:** 

Particulate 0.35 mg/dscm 0.00015 gr/dscf

0.20 mg/Acm 0.00009 gr/Acf

**Emission Rates:** 

Particulate 0.023 Kg/hr 0.051 lb/hr

Flue Gas Characteristics:

Flow 1092 dscm/min 38566 dscf/min

 18.20 dscm/sec
 643 dscf/sec

 1936 Acm/min
 68354 Acf/min

**Velocity** 12.665 m/sec 41.55 f/sec

Temperature 150.1 oC 302.2 oF

Moisture 14.8 %

Gas Analysis 9.1 % O2

10.3 % CO2

30.005 Mol. Wt (g/gmole) Dry 28.225 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.4057 dscm 84.959 dscf

Sample Time 120.0 minutes Isokineticity 99.2 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

Client: Metro Vancouver Date: 25-Feb-21 2 - Particulate / Metals Jobsite: WTE (Burnaby, B.C) Run: Source: Unit 3 Run Time: 08:54 - 10:57 Control Unit (Y) 0.9970 Collection: Gas Analysis (Vol. %): Condensate Collection: 0.3050 Filter (grams) 0.00005 194.0 Nozzle Diameter (in.) CO2 Impinger 1 02 Pitot Factor 0.8490 Washings (grams) 0.00080 Impinger 2 82.0 Baro. Press. (in. Hg) 29.94 Traverse 2 10.25 8.75 Impinger 3 18.0 -18.00 Total (grams) 0.00085 Static Press. (in. H20) Impinger 4 4 0 Stack Height (ft) 30 1.0 Impinger 5 Stack Diameter (in.) 70.90 1.0 Impinger 6 27.417 Stack Area (sq.ft.) Gel 14.2 10.25 9.13 Gain (grams) 314.2 Minutes Per Reading 5.0 Minutes Per Point 5.0 Wall Dry Gas Temperature Stack Dry Gas Meter Pitot ^P Traverse / Time Orifice ^H Isokin. Inlet Outlet Vacuum Temp. Dist. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (in.) (%) Traverse 1 0.0 238.143 50 50 6.5 0.45 2.14 301 1.5 99.8 242.050 10.0 245.880 0.44 2.09 50 304 3 15.0 249.670 0.44 2.09 50 50 6.5 304 8.4 98.1 20.0 25.0 253.600 257.370 2.18 51 52 12.5 17.7 4 0.46 51 6.5 304 99.3 0.42 30.0 52 6 261.050 0.40 1.90 52 304 25.2 99.5 35.0 1.34 5.5 45.6 264.140 0.28 53 299 99.2 267.000 0.24 1.15 9 45.0 269.820 0.24 1.15 54 54 301 58.3 97.6 10 50.0 272,300 0.18 0.86 54 54 301 62.5 99.1 55.0 55 4.5 274.920 0.20 55 299 66.1 99.0 11 0.96 12 60.0 277.480 0.19 0.91 55 55 4.5 300 69.4 99.3 Traverse 2 0.0 277.480 5.0 56 57 280.910 0.35 1.68 56 6.5 301 1.5 98.1 284 380 47 0.35 1 68 6.5 303 99.2 57 57 3 15.0 287.750 0.33 1.59 303 8.4 99.2 20.0 290.920 0.29 1.40 99.3 294.030 0.28 1.35 58 58 304 17.7 99.2 30.0 35.0 297.090 1.30 59 60 304 6 0.27 59 6 7.5 25.2 99.2 300.830 0.40 1.94 302 45.6 99.4 40.0 45.0 8 304.830 0.45 2.17 60 60 7.5 304 53.2 100.4 2.32 308.930 0.48 61 61 304 61 58.3 99.5 10 50.0 0.52 304 55.0 7.5 317 180 0.45 2.19 62 62 302 66 1 99 4 12 60.0 320.990 0.41 2.01 62 62 7.5 296 69.4 99.3 Average: 0.355 1.705 55.8 55.8 6.4 302.2 99.2

Client: Metro Vancouver Date: 25-Feb-21

Jobsite: WTE(Burnaby,B.C) Run: 3 - Particulate / Metals

**Source:** Unit 3 **Run Time:** 11:42 - 13:43

**Concentrations:** 

Particulate 0.13 mg/dscm 0.00006 gr/dscf

0.07 mg/Acm 0.00003 gr/Acf

**Emission Rates:** 

Particulate 0.009 Kg/hr 0.021 lb/hr

Flue Gas Characteristics:

Flow 1205 dscm/min 42546 dscf/min

 20.08 dscm/sec
 709 dscf/sec

 2178 Acm/min
 76925 Acf/min

**Velocity** 14.253 m/sec 46.76 f/sec

Temperature 152.7 oC 306.8 oF

**Moisture** 16.0 %

Gas Analysis 8.3 % O2

9.9 % CO2

29.910 Mol. Wt (g/gmole) Dry 28.004 Mol. Wt (g/gmole) Wet

**Sample Parameters:** 

Sample Volume 2.6972 dscm 95.250 dscf

Sample Time 120.0 minutes Isokineticity 100.8 %

\* Standard Conditions: Metric: 20 deg C, 101.325 kPa

25-Feb-21 Client: Metro Vancouver Date: Jobsite: WTE(Burnaby, B.C) Run: 3 - Particulate / Metals Source: Unit 3 Run Time: 11:42 - 13:43 Control Unit (Y) 0.9997 Collection: Gas Analysis (Vol. %): Condensate Collection: CO2 10.00 Nozzle Diameter (in.) 0.3050 Filter (grams) 0.00030 230.0 Impinger 1 Pitot Factor 0.8490 Washings (grams) 0.00005 Impinger 2 106.0 Baro. Press. (in. Hg) 29.94 Traverse 2 9.75 8.25 Impinger 3 20.0 -18.00 Total (grams) 0.00035 Static Press. (in. H20) Impinger 4 10.0 Stack Height (ft) 30 3.0 Impinger 5 Stack Diameter (in.) 70.90 Impinger 6 2.0 27.417 Stack Area (sq.ft.) 14.6 9.88 8.25 Gain (grams) 385.6 Minutes Per Reading 5.0 Minutes Per Point 5.0 Dry Gas Temperature Stack Wall Traverse / Time Dry Gas Meter Pitot ^P Orifice ^H Vacuum Isokin. Inlet Outlet Temp. Dist. Point (min.) (ft3) (in. H2O) (in. H2O) (oF) (oF) (in. Hg.) (oF) (%) Traverse 0.0 321.793 59 301 100.7 325.240 0.34 1.65 59 1.5 5.0 328.730 1.70 300 100.4 3 15.0 332.210 0.35 1.69 50 50 8 305 8.4 100.5 0.36 0.33 1.73 1.59 12.5 17.7 20.0 335.780 60 60 8 307 101.6 6 30.0 342 690 1.59 61 61 8 308 25.2 101.2 347.380 309 45.6 0.63 3.03 14 101.1 35.0 351.990 0.61 310 100.9 9 45.0 356.560 0.60 2.88 62 62 13 311 58.3 100.9 10 50.0 361.040 0.57 2.77 63 63 13 305 62.5 100.9 2.58 303 11 55.0 365.370 0.53 63 63 12.5 66.1 100.9 12 60.0 369.490 0.48 2.34 63 63 12.5 303 69.4 100.8 Traverse 2 0.0 369.490 5.0 372.900 0.33 1.60 64 307 100.5 10.0 309 47 376 250 0.32 1 55 64 64 100.4 0.31 64 7.5 15.0 379.550 1.50 309 8.4 100.5 382.800 0.30 1.45 308 100.5 5 25.0 386.060 0.30 1.46 65 65 7.5 308 17.7 100.6 30.0 0.34 6 389.500 1.65 66 66 7.5 308 25.2 99.6 393.830 0.53 12.5 308 45.6 100.8 100.5 101.3 8 40.0 398.110 0.52 2.53 66 66 12.5 309 53.2 2.67 402.550 308 45.0 0.55 66 66 13 58.3 10 407.000 0.57 308 11 55.0 411 430 0.55 2 69 67 67 13 306 66 1 100.8 12 60.0 415.650 0.50 2.44 67 67 13 306 69.4 100.6 Average:

63.2

63.2

10.4

306.8

100.8

0.442

2.141

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

Source: Unit 1

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date Test Time Test Duration	(min.)	23-Feb-21 09:20 - 10:20 60	23-Feb-21 10:30 - 11:30 60	23-Feb-21 11:38 - 12:38 60
Baro. Press.	(in. Hg)	30.17	30.17	30.17
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	131.6150	132.1740	132.7090
Final Reading	$(m^3)$	132.1580	132.7030	133.2610
Temp. Outlet	(Avg. oF)	57.5	66.0	64.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.58	0.55	0.58
HF	(mg)	0.009	0.009	0.008
Oxygen	(Vol. %)	10.3	10.3	9.3
HF	(mg/Sm³)	0.015	0.015	0.014
HF	(mg/Sm <sup>3</sup> @ 11% O2)	0.014	0.014	0.012
Moisture	(Vol. %)	14.4	14.4	12.0

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

Client: Metro Vancouver

Jobsite: WTE (Burnaby,B.C)

Source: Unit 2

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date Test Time Test Duration	(min.)	24-Feb-21 09:39 - 10:39 60	24-Feb-21 10:49 - 11:49 60	24-Feb-21 12:00 - 13:00 60
Baro. Press.	(in. Hg)	30.50	30.50	30.50
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	133.2664	133.8020	134.3630
Final Reading	(m <sup>3</sup> )	133.7960	134.3546	134.9310
Temp. Outlet	(Avg. oF)	52.0	63.5	66.0
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.57676	0.58858	0.60211
HF	(mg)	0.009	0.009	0.008
Oxygen	(Vol. %)	9.6	9.8	9.8
HF	(mg/Sm³)	0.015	0.015	0.014
HF	(mg/Sm³ @ 11% O2)	0.013	0.014	0.013
Moisture (isokinetic)	(Vol. %)	14.2	14.2	14.1

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

Client: Metro Vancouver

Jobsite: WTE (Burnaby,B.C)

Source: Unit 3

Sample Type: HF

Parameter		Test 1	Test 2	Test 3
Test Date	(min.)	25-Feb-21	25-Feb-21	25-Feb-21
Test Time		08:50 - 09:50	10:02 - 11:02	11:42 - 12:42
Test Duration		58.5	69.5	71.5
Baro. Press.	(in. Hg)	29.94	29.94	29.94
DGM Factor	(Y)	1.0347	1.0347	1.0347
Initial Reading	(m <sup>3</sup> )	134.9390	135.4550	135.9190
Final Reading	(m <sup>3</sup> )	135.4460	135.9132	136.4386
Temp. Outlet	(Avg. oF)	28.5	69.5	71.5
Orifice Press.	(ΔH in.H2O)	0.50	0.50	0.50
Gas Volume	(Sm <sup>3</sup> )	0.568	0.474	0.535
HF	(mg)	0.008	0.009	0.009
Oxygen	(Vol. %)	9.1	9.1	8.3
HF	(mg/Sm³)	0.014	0.018	0.016
HF	(mg/Sm³ @ 11% O2)	0.012	0.015	0.013
Moisture (isokinetic)	(Vol. %)	14.8	14.8	16.0

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

Client: Metro Vancouver

Jobsite: WTE (Burnaby,B.C)

Parameter: N<sub>2</sub>O

Molecular Weight: 44.00 grams/mol

Lab Detection Limit: 0.1 ppm Reportable Detection Limit: 0.18 mg/Sm<sup>3</sup>

Sample ID	Date	Time	N <sub>2</sub> O	N <sub>2</sub> O	N <sub>2</sub> O
•		(hh:mm - hh:mm)	(ppm)	(mg/Sm <sup>3</sup> )	(mg/Sm <sup>3</sup> @ 11% O <sub>2</sub> )
Unit #1					
Run 1	23-Feb-21	09:20 - 10:20	7.00	12.81	15.14
Run 2	23-Feb-21	10:30 - 11:30	8.00	14.64	14.07
Run 3	23-Feb-21	11:38 - 12:38	8.50	15.56	16.61
Average					15.27
Jnit #2					
Run 1	24-Feb-21	09:39 - 10:39	8.50	15.56	17.11
Run 2	24-Feb-21	10:49 - 11:49	7.00	12.81	13.25
Run 3	24-Feb-21	12:00 - 13:00	8.00	14.64	14.87
verage					15.08
Jnit #3					
Run 1	25-Feb-21	08:50 - 09:50	8.00	14.64	13.03
Run 2	25-Feb-21	10:02 - 11:02	8.00	14.64	15.89
Run 3	25-Feb-21	11:42 - 12:42	7.00	12.81	15.37
Average					14.76

# APPENDIX - D FIELD DATA SHEETS

S.H

OPERATOR: CONTROL UNITA	JIN NO MUTHUS PACISC/ JOHN ST CAC Q  RESSURE, IN. Hg 30.00 TURE, Bw 18% (16%)  ne Dry Gas Meter ft'	Y 0.7%	38	PORT LENG	ESSURE, IN METER Z GHT	H2O-19.0	CPO.849		VOLUMES Imp. #1 Imp. #2 Imp. #3 Imp. #4 Imp. #5	(mL) 10-0 10-0 10-0	FINAL (mL)   (ML)   154   146   121   112	TOTAL GAIN (mL)
PARAMETER / RI DATE CONTROL UNIT CONTROL UNI	RESSURE, IN. Hg 30.05  TURE, Bw 18% (16%)  The Dry Gas Meter ft's	Υ <i>O</i> · <b>7</b> % ΔH@ ] . 8 C c 3	28	STATIC PR STACK DIA STACK HEI	ESSURE, IN METER Z GHT	H20 - 19.0			Imp. #2 Imp. #3 Imp. #4	100	154	148 154 46
DATE CB POPERATOR: SF CONTROL UNIT CONTROL U	RESSURE, IN. Hg 30.00.  TURE, Bw 18% (1670)  The Dry Gas Meter ft's  563.65	Υ <i>O</i> · <b>7</b> % ΔH@ ] . 8 C c 3	28	STATIC PR STACK DIA STACK HEI	ESSURE, IN METER Z GHT	0.94	)		Imp. #3 Imp. #4	100	154	154
DATE CO TO OPERATOR: SF CONTROL UNITO BAROMETRIC PRASSUMED MOIST Point 12:18	RESSURE, IN. Hg 30.00.  TURE, Bw 18% (1670)  The Dry Gas Meter ft's  563.65	Υ <i>O</i> · <b>7</b> % ΔH@ ] . 8 C c 3	)	STACK DIA STACK HEI INITIAL LEA	METER ZIGHT	0.94	>		Imp. #4	100	17461	46
BAROMETRIC PER ASSUMED MOIST  Clock Tir Point   2   10   3   4   20   5   6   30   7	RESSURE, IN. Hg 30.05  TURE, Bw 18% (16%)  Dry Gas Meter ft <sup>3</sup> 563.65	ΔH@ 1.866 3 Pitot ΔP	)	STACK HEI	GHT /					1000	121:	22
BAROMETRIC PRASSUMED MOIST  Clock Tir  Point    1	RESSURE, IN. Hg 30.05  TURE, Bw 18% (16%)  Dry Gas Meter ft <sup>3</sup> 563.65	ΔH@ 1.866 3 Pitot ΔP	)	INITIAL LEA	AK TEST (				Imp. #5		+ 7/2 +	
ASSUMED MOIST  Point   Clock Tir   2   10 3   4   20 5   6   30	Dry Gas Meter ft'  563-65	Pitot ΔP								,	. // // .	17
ASSUMED MOIST  Point   Clock Tir   2   10 3   4   20 5   6   30	Dry Gas Meter ft'  563-65	Pitot ΔP	Orifice ΔH						Imp. #6	100	1/041	l-f
Point	Dry Gas Meter ft <sup>3</sup>	4	Orifice ΔH	FINAL LEAF	/ TENO	2.003	(2/5)	'He	Upstream D		- / - /	
Point 12:18 2 10 3 4 20 5 30 7	\$\$.600 5.63.65	4	Orifice ΔH	1	K TEST 2	).002	TN 15"	48/	Downstream	n Diameters		
Point 12:18 2 10 3 4 20 5 30 7	\$\$.600 5.63.65	4	Orifice ΔH	I				8				
12:18 2 10 3 4 20 5 30 7	563.65	IN. H₂O				Temperature °	'F		Pump Vac.	Fv!	rites	
1 2 3 4 4 5 6 30 7	563.65	1	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	$O_2$	
3 4 5 6 30	562.05			Outlet				Exit		Vol. %	Vol. %	ļ
3 4 20 5 6 30		.46	2.74	.65	309	252	251	58	9.5	11	8	
3 4 5 6 30		.45	2.68	66	310	1000	1 04)	70	7.7	<del>                                     </del>	<del>  7  </del>	
5 30	571.82	. 44	2.61	60	311	1			10	<del> </del>	<del> </del>	
5 30	5-6.28	.46	2.54	60	311	252	252	62	10	<b> </b>	<del>  -</del>	
7	588:79	119	2.80	67	3/1	1000	0)0	600	H	1000	-	
7	585.35	,48	2.86	67	1311				10.5	10.5	8.5	
Q 1 77A	589.67	.43	256	68	13/2	250	0 - 20	58	<del>  /                                   </del>	<b> </b>	<del></del>	
$\rho$	1594.14	,46	15,74	69	313	<i>a</i> 5 0	250	128	10		<del> </del>	
9	598.5-7	.45	2.68	89	33		<u> </u>					
10 50	602.74	.40	238	69	313	1000			10	10.5	8.5	
17 30	606.81	-38	2.27	8		252	250	57	02		<b>├</b> ──┼	
12 60	610.67	<u> </u>	203	96	312				8.5		<b> </b>	
12 60	6.0.07	1 39	1205	70	32			<b></b>				
	614.35	21	107		1211							
2 10	618.04	.31	1.86	70	311	250	251	56	7.5	10.5	8.5	
\$ 10		133	1.86	70	310							
4 20	621.85		1.98	78	309				7.5			
5		135	3~10	69	309	250	251	55	7			
/		, 35	9.10	70	309				8			
9 30	633.76	,38	2:38	70	309	-/-						
7 110	638.15	, 44	2.64	70	310	249	257	54	10			
\$ 40	47.44	:42	2.52	70	310							
	646.68	.41	345	70	311				95			
10 50	650.91	.41	2.45	70	312	250	251	53				
	654.82	.35	2.09	70	313				7.5			
10 60 Sm 14:22	(058,630)	.33	1,96	70	311							
um 14:20	<u> </u>											
	1								, ,	1	1 <b>j</b>	1

CLIEN	T //./	, ME			NOZZLE V	-06	DIAME	TER, IN.	3207	IMPINGER	INITIAL	FINAL	TOTAL GAIN
l	T MV				PROBE A	LOVED	74+	Cp .849	0	VOLUMES	•	(mL)	(mL)_
SOUR	CE UNIT:	41						777		Imp. #1	100	11/2	7/8
		10 METALS PM	1 2-2		PORT LENG		-				100	102	702
	feb, 23,7				STATIC PR	essure, in	. H2O -19	-		Imp. #3	1100	1772	137
	ATOR: MO					METER 70	29^	-	-		<b>8</b> 0	1 9	The second second
CONT	ROLUNIT 5	TCAE2	Y 0,998	18	STACK HEI	GHT 30				Imp. #5	100	104	4
			ΔH@ /. 80	62						Imp. #6	100	17021	4
		SURE, IN. Hg 30	.17		INITIAL LEA	K TEST 🔿	0036	1154	-	Upstream D	iameters		
ASSU	MED MOISTUR	E, Bw <i>18%</i>			FINAL LEAF	(TEST ),	202Ce15	-h		Downstream	n Diameters		
										·	.,		
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ∆P	Orifice ΔH			Temperature 6	'F		Pump Vac.	Fy	rites	
Point	1	116000	IN. H <sub>2</sub> O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	$CO_2$	$O_2$	
	0845	660.289			Outlet				Exit		Vol. %	Vol. %	
		664.50	.44	2.55	47	362	249	249	48	4.5	7		
2	10	668-76	.45	2.61	48	30 <b>3</b>							
3		673.24	.49	2.87	47	308	249	251	49	5			
4	23	677.63	-48	2.77	50	310							
5		682.14	.50	2.88	49	310	251	251	49	5.5			
6	30	686.70	49	2.82	149	311							
7		681.12	48	2.75	49	313	251	251	49	5.5	8.5	10.5	
8	40	695.52	.48	2.76	51	314							
9		699.68	42	2.42	51	314	250	251	49	5			
10	50	703.65	40	2.31	52	3/3							
11		707.68	Lol	2.37	53	313	249	250	48	5			
12	60	711. <i>5</i> 3	.37	2.14	54	313							
1		716.14	.52	3.01	55	315	249	252	48	5.5	9	10	
2	10	720.43	.45	2.62	56	313							
3		724.58	.42	2.44	56	313	250	251	48	5			
4	90	728 · 82	43	2.5	56	312							
5		733.15	.45	2.63	57	312	250	250	49	3			
6	<i>30</i>	737. 36	42	2.46	58	311							
7	1.00	741.69	45	2.64	59	311	251	252	49	5.5			
	46	746.07	46	2.69	59	312					10	9.7	
9		75 <b>0</b> .35	.43	2.52	60	313	251	251	49	5.5			
	50	754.49	.41	2.41	61	313							
11	7.2	758.54	39	2.29	62	313	248	251	51	5			
	66	762.43	,36	2.12	62	312							
	1046												
			ļ										
[				<u> </u>	1								

CLIEN	MVh	/TC			NOZZLE \		DIAME	TER, IN.	3207	IMPINGER	INITIAL	FINAL	TOTAL GAIN
					PROBE A	LOVRE	7 7	Cp . RZL	<i>i</i> 0	VOLUMES	(mL)	(mL)	(mL)
	CE UNIT I									Imp. #1	+60	130	130
PARAM	METER / RUN N	10 METALS/PU	R-3		PORT LENG					lmp. #2	100	200	100
DATE	1eb-23-	-21					H20 -19			Imp. #3	100	1722	11
	ATOR: 146					METER 7	5.9		****	Imp. #4	1000	170%	10
CONTR	ROL UNIT 57	TCA62	Y 0.9988	~	STACK HEI	GHT 30	2				100	105	
			ΔH@ 7.867	2						Imp. #6	100	1/041	4
		SURE, IN. Hg 20./	7		INITIAL LEA	K TEST 🔿,	0060	us sh		Upstream D	iameters		
ASSUM	MED MOISTURI	E, Bw 1896			FINAL LEAF	(TEST 🔿 (	30361	5''		Downstream	n Diameters		
· · · · · ·													
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP	Orifice ΔH		7	Temperature c	'F		Pump Vac.	Fy	rites	
Point		7/0	IN. H <sub>2</sub> O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	$O_2$	l
	1115	763.105			Outlet				Exit		Vol. %	Vol. %	
1		767.18	.39	2.33	61	301	2 <i>5</i> 3	248	51	7	10.5	9.5	
23	10	771.54	. 45	2.67	61	304							
3		775.96	.46	2.74	61	303	249	251	57	8.5		j – – – – – – – – – – – – – – – – – – –	
4	26	780.18	.42	2.5	61	303							
5		784.55	.45	2.68	62	305	251	251	59	9			
6	<i>3</i> 0	788.82	.48	2.55	62	306							
7		793.19	.45	2.67	62	366	249	2.52	55	8			
8	40	797.51	.44	2.61	62	307							
9		801.78	.43	2.55	63	308	252	252	53	8	10.5	9-6	
10	50	<i>805.</i> 75	.37	2.2	63	306							
//		809.51	.33	1.97	63	306	249	250	51	6	****		
12	60	813.12	.30	1.79	63	303							
	-												
		817.4	.43	2.56	63	305	248	252	50	7.5			
2	16	821.59	-41	2.45	63	303							
3		825.72	.40	2.38	62	303	250	252	49	8	11	9	
4	20	829.69	.37	2.2	62	304					,		
5		833-82	.40	2.38	62	304	249	251	50	8			
4	36	838.13	.44	2.61	61	306							
/		842.38	.43	2.54	60	307	251	250	49	8.5			
8	40	846.78	-46	2.72	61	308					10.5	9	
7		850.99	.42	2.49	60	30 <b>5</b>	251	250	49	8			
10	50	855.14	-41	2.42	60	30 <b>3</b>							
11		859.13	.38	2.24	60	339	249	250	50	8.5			
12	1318	862.90	.34	2.0	60	310							
			<u> </u>										

					NOZZLE (	3-311	DIAME	TER, IN.	0110	IMPINGER.	INITIAL	FINAL	TOTAL GAIN
ME	ETRO VA	ANCOUVER WTE	- BURNAB	Y B.C.		FC		Cp 1849	4	VOLUMES	(mL)	(mL)	(mL)
OURCE	Unit 3	# 7.	·			.,'				lmp. #1	7	132	132
		No motals /RI			PORT LENG					Imp. #2	100	194	94
DATE /	76 23-	207.)			STATIC PRI	ESSURE, IN	. H2O 💳 🛵		-17	lmp. #3	11950-	136	36
PERATO	DR: TG	SF			STACK DIA	METER	70	90		Imp. #4	の	12	12
	UNIT C	4= Al I	Y ,992		STACK HEI	GHT	30			lmp. #5	100	105	5
		16 /15/	ΔH@ /, 8/							Imp. #6	1800	102	2
AROME	TRIC PRES	SURE, IN. Hg 30	13	<i>y</i>	INITIAL LEA		1002	(415"		Imp. #7	Jober		
	MOISTUR		10		FINAL LEAP	( TEST	. U026	18		Imp. #8	10.		<u> </u>
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP	Orifice ΔH			Temperature '	'F		Pump Vac.	Fy	rites	1
Point 🗀			IN. H <sub>2</sub> O	IN, H₂O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	$CO_2$	$O_2$	
	5.59	1517,575	1	,	Outlet			1	Exit	ļ	Vol. %	Vol. %	
$\frac{1}{1}$	/ <u> </u>	520,39	15,	1,09	.5	209	250	757	51	5.5			
- 5	10	573,70	1,29	1.50	51	308	12.00				11,0	9.0	
3		526.72	124	1,24	52	308	252	757	51	6.5			
4	20	330, 27	133	11:71	53	308	1000	1					
5		533,77	32	1,106	53	308	249	255	51	7.5			·
6	30	537,74	142	2.18	157	306	101.						
<del>- 7</del>  -		541.84	12	7.25	हैं ने	308	256	283	52	11.0		,	
8	40	546.34	1767	2.98	158	311							
9		551.04	.52	2:72	100	312	749	280	55	17.0	11.0	9.5	
10	50	555,47	150	7,63	190	308	1-/-			1,	****		
11		359.17	LIT	7.48	102	210	247	752	35	10.n		1	
12	60	363.75	140	2.11	63	310						1	
		1 -26-7: 13	1 70		1 4	1 1.5				<b>†</b>			
-1		567,43	.34	1.81	104	306	751	250	93	8,0			
<del>-</del> 2 -	10	57137	1.39	7.07	104	1307	<del> </del>		<del>                                     </del>	1			
3	10	575.66	1:46	2.45	64	300	254	257	53	10,5	11,0	9,0	
$\frac{3}{4}$	20	580,08		7,61	63	305	9	1001		1	1 -		
5		584.27	144	734	63	305	757	257	50	10.0			
6	30	588:72	150	1.65	161	305		***************************************		T			
$\frac{9}{7}$		597,69	140	272	61	306	750	253	50	9,6			
8	40	496.51	134	1:96	61	306							
9		600.58	142	7.22	61	308	250	752	879	9.5			
10	50	1000 30	132	7,69	6	308	100	100		+	1115	8.5	
11		604.13	177	1.42	101	306	750	251	44	81,0		1247	
12		60.342	122	1110	61	306	1,70	1 - 2 -	++*				
	5,95	(NDtest)	+ · · · ·		101	1							
-+6	7, √2	1 CIUVES!	<del>                                     </del>			1							
			<del>                                     </del>	<del>                                     </del>				<b>1</b>	1				
	·			<del> </del>					1				

.3050

						2050				
CLIENT NV WTE		NOZZLE	ZEMV-				IMPINGER		FINAL	TOTAL GAIN
		PROBE ~	72		Cp .84	-94	VOLUMES	<u> </u>	(mL)	(mL)
SOURCE UNITH2								100	208	705
PARAMETER / RUN No Metal) 1911 Rus	N#2	PORT LENG						100	172	72
DATE feb-24-21			ESSURE, IN.		7		Imp. #3	100	11241	24
OPERATOR: UL-			METER ウ				Imp. #4	+00	<u> </u>	J2
CONTROL UNIT CAE AL 1 Y	0.9925	STACK HEI	GHT 30	2`				100	103	3
ΔΗ	@ 1. <i>805</i>						Imp. #6	1600	1/021	
BAROMETRIC PRESSURE, IN. Hg 30.50			K TEST <i>)</i> .	0030	15		Upstream D	iameters		
ASSUMED MOISTURE, BW 18%		FINAL LEAF	CTEST	0030	15"		Downstream	n Diameters		
					•					
	Pitot $\Delta P$ Orifice $\Delta H$			Temperature 6	'F		Pump Vac.	Fy	rites	
Point	IN. H <sub>2</sub> O IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	O <sub>2</sub>	
0933 611.185		Outlet				Exit		Vol. %	Vol. %	
614.92	42 1.94	47	300	252	251	52	5	10	9.8	
2 618.75	44 2.03	47	300							
3 622.65 .2	45 2.08	48	302	252	250	53	5			
H 626.68 .4	19 2.26	48	302						1	
	2 2.4	50	304	251	252	46	5.5			
6 635.08	54 2.49	50	305							
	3 2.32	52	301	232	255	46	5.5		†         †	
8 643.24	19 2.27	53	305				1			
	46 2.14	54	304	252	254	46	5.5	10	10.5	
	42 195	54 55	307	,	1		13.3		10, 5	
11 654.56	38 1.77	57	308	251	252	47	5			
	35 1.63	57	308						<del> </del>	
		9 /	1000				<u> </u>		<del> </del>	
661.52	35 1.65	58	300	252	280	46	4.5	10.5	9	
	41 191	38	308		1	140	1 200	10.7	<del>                                     </del>	
	14 2.05	59	309	250	251	47	5		<del>                                     </del>	
4 672.92		60	311			1	1		<del> </del>	
	38 1.77	60	312	251	253	48	5		-	
6 680.11	36 1.68	61	312	100	121	140	3			
	53 2.47	61	312	252	252	48	3.5			
	55 2.58	62	311	122		140	3.3		<del> </del>	
	1 2.86	62	311	252	251	50	6.5	10	9	
	36 2.63	63	311	1232	16-7	1	0.7	10	1	
	45 2.17	64	290	251	252	50	5.3			
	40 1.96	14	281		600	1 30	+2.5			
	1.70	1 5th	1 481	<b>-</b>						
		-								
									<del>                                     </del>	<del></del>
				<u> </u>	<del> </del>		<del>                                     </del>		<del> </del>	
				<b></b>					ļ	
		L	<u></u>	L	1	l	L		L	

CLIEN	Γ		· · · · · · · · · · · · · · · · · · ·		NOZZLE.	11-01	DIAME	TER, IN.	3050	IMPINGER	INITIAL	FINAL	TOTAL GAIN
CLIEN	MUL	176			PROBE -	7 <i>C</i>			194	VOLUMES	(mL)	(mL)	(mL)
SOUR	CEUNIT	222								Imp. #1	<b>1890</b>	222	727
PARAM	METER / RUN N	10 Mater 11	m R-3		PORT LENG	GTH .				Imp. #2	100	166	66
DATE	Feb-24	-2-/			STATIC PR	ESSURE, IN	. H2O - 17			Imp. #3	100	1 1171	78
OPER/	ATOR: MG				STACK DIA	METER	10.99			Imp. #4	150	16	6
CONTR	ROLUNIT CA	EALL	Y.9925		STACK HEI	GHT 'S	0)"			Imp. #5	100	103	7
			DH@ 1.80	<i>/</i> S						Imp. #6	1.00	1011	<del></del>
BARON	METRIC PRESS	SURE, IN. Hg 30.	50		INITIAL LEA	AK TEST O.	004 Ca	150		Upstream D	70		
ASSUN	MED MOISTURE				FINAL LEAF	KTEST (3)	00 5 ON	24		Downstream	n Diameters		
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP	Orifice ΔH			Temperature 6	°F		Pump Vac.	Fv	rites	
Point			IN. H <sub>2</sub> O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	O <sub>2</sub>	
	1207	706.278	_	~	Outlet				Exit		Vol. %	Vol. %	l l
	/	709.41	- 28	1.33	62	201	248	751	47	6	10	8.3	
2	10	712.58	. 29	1.36	61	309	10	1	<b>-</b>		<del>                                     </del>	10-0	
3		715.63	.27	1.26	l di	310	254	252	47	6		<del> </del>	
14	<i>S</i> G	718.68	.27	1.26	हिं।	310	T	1 2 3 -		-		<del>                                     </del>	
3	- 0	721.9	-30	1.14	61	310	252	250	48	6		<del>                                     </del>	
Ĭ,	BB	725.43	·3 <b>6</b>	1.69	62	310	1	120	1 00	<del>                                     </del>			
ΗĂΠ		730.17	.65	3.04	62	312	252	255	145	9			
8	40	735.03	68	3.19	13	312	1632	+	I family and	<del>                                     </del>	ļ	<del>                                     </del>	
ď	· · · ·	140.0	-71	333	184	313	254	250	47	10			
10	50	744.8	.66	3.1	63	313				<del>  '\-</del>		<del>                                     </del>	
		749.06	.52	2.43	65	312	254	250	48	9	10.5	9.2	
12	60	753.06	- 141	21	66	304			130	i i	.0(5	1.3	
				A	1 00	1 301						l	
		756.73	,38	18.7	66	303							
2	10	760.83	. 24.8	2.26	66	343	249	255	49	7.5			
3	.= .,=.;	764.98	. 49	2.31	67	312		1	1			<del>                                     </del>	
14	20	769.17	-50	2.35	67	315	253	252	47	8	9.5	10.5	
3		773.76		2.82	68	316						<del>  ` ` '    </del>	
6	30	778.47	.60	2.97	68	316	249	251	48	9.5		<del>                                     </del>	
$\bar{z}$		182.13	-38	1.79	68	314	1					<del>1                                    </del>	
8	43	785.66	-36	1.7	69	313	252	254	49	7		†       †	
9		789.13	-34	1.61	78	312					8.7	10.5	
10	5O	792.6	.34	1.64	69	312	251	255	49	7			
1		796.01	.35	1.56	18								
12	60	799.18	.3S .29	1.38	69	313 305	252	251	50	7			
	1408	* * * * * * * * * * * * * * * * * * * *			T								
								1					
									<u> </u>				
								<u> </u>					
	I		·	•	I	1	<u> </u>	<del></del>	<u> </u>	<u> </u>	<u> </u>		

Note   Note		METDO VA	NCOLIVED WITE	DUDNAD	V D C	NOZZLE /	2-504	DIAME	TER, IN. 7	1043	IMPINGER	INITIAL	FINAL	TOTAL GAIN
PARAMETER FRUN No   Mortal	'	WEIRO VA	NCOUVER WIE	- BUKNAB	T B.C.	PROBE(2)	120 T-		Cp , 8490	)	VOLUMES	(mL)	(mL)	(mL)
PARAMETER PRUN No Mortal		CE IN H	#3						10-1-		Imp. #1	1/4/19 0	200	200
DATE	PARAM	METER TRUN N	10 motals - 1			PORT LENG	GTH				Imp. #2	100 100		76
COPERATOR: \( \frac{\alpha}{\alpha}			2027			STATIC PR	ESSURE, IN		· · · · · · · · · · · · · · · · · · ·		lmp. #3		. / 4 400.	
CONTROLUNIT   FIG.   Y   O   O   O   O   O   O   O   O   O	OPER/	ATOR: 36	3B			STACK DIA	METER	70.9	J		<del></del>	B D		
Clock Time   Dry Gas Meter It   Pitot AP   Orifice AH   Temperature F   Exit   N. Hg   CO. O. O	CONTR	ROL UNIT	<u>≥</u> (8	Y 19997		STACK HEI	GHT	30.0	)		Imp. #5	100		7
ASSUMED MOISTURE. Bw				$\sim l \cdot D$	3<						Imp. #6	100		7
Clock Time   Dry Gas Meter ft   Priot ΔP   Inp. #8	BARON	IETRIC PRESS	SURE, IN. Hg 30,	¥50				10019	1500		lmp. #7	200c	1 1	
Clock Time	ASSUM	MED MOISTURE	E, Bw [66/0			FINAL LEAF	K TEST	1000 (4)	15"		lmp. #8	; ,		
Point														
		Clock Time	Dry Gas Meter ft'	Pitot ΔP	Orifice ΔH			Temperature 6	°F	-	Pump Vac.	Fy	rites	
1	Point		in do and	IN. H <sub>2</sub> O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	$CO_2$	$O_2$	
2 10   5 0, 8 0   65   7,47   52   313   252   251   4/5   7,5   10   1/1,0    3		12:44	1418,594			Outlet				Exit		Vol. %	Vol. %	
2 10 15 0 4 1	1			,419	2.43	52	795	250	252	40	7.0			
4 20	2	10		1051						<b>,</b>	1 ' '	9.0	11.0	
4 20 115.41 \$\frac{5}{5}\$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3		161,00	153	7.57	52	313	252	251	4/5	7.5	1.0	1,,,,	
5	4	20		155			1313						† †	
6 30 175,74	5		1602 1060	153	2,58	54	1313	755	753	418	75			
8 40 149,43 125 1,13 56 306 9 187,80 1,24 1,18 56 310 750 252 4/5 5, 3 9, 0 11, 0 10 50 185,67 1,13 1,13 5,7 3,10 11 185,36 1,22 1,08 5,9 311 252 257 4/5 5, 0 12 60 191,04 1,21 1,03 5,7 3,12 1 10 101,04 1,37 1,53 5,9 30 7 255 254 4/5 6,5 2 10 101,04 1,37 1,55 60 32 9, 5 11,55 1,02 61 370 751 253 4/5 6,5 4 20 75,22 1,33 1,62 61 370 751 253 4/5 6,5 5 105,56 1,32 1,57 60 31,7 250 253 4/5 6,0 5 105,05 1,32 1,57 60 31,7 250 253 4/5 6,0 8 40 170,91 1,55 1,70 63 320 9 9 774,87 5,77 63 320 751 752 673 370 753 4/5 9,0 9,3 1/60 10 50 774,79 1,54 57 7,77 63 320 751 752 6/6 8,0	6	30	173.74	1219	2.38	54	1313							
8 40	11 1		176,99	131	1,51	35	3/3	755	251	48	10.5			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		40	174.93	125	7.73	5(0	306							
10 50 185.67, 1.23 1.13 57 310  11 186.36 .72 1.68 59 311 252 257 4/5 5.0  12 60 191.08 .21 1.63 59 312  1 1 1/41.66 .37 1.85 60 321  2 10 198.35 .38 1.85 60 321  3 700.83 .36 1.76 61 520 751 753 45 6.5  4 20 765.22 .33 1.62 61 318  5 208.56 .32 1.57 61 318  5 208.56 .32 1.57 61 317  7 216.03 .51 7.52 62 313 255 252 4/6 8.0  8 40 770.91 .55 7.70 63 320  9 775.84 .77 7.74 63 32 7.57 7.50 7.77 63 320  9 775.84 .77 7.74 63 32 7.57 7.50 7.77 63 320	9		182.80	124	1.18	56	1710	750	202	45	5.0	9.0	1/20	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11 8	50		.23	1.13		310							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11 5		188,38	,22	1,08	58	311	252	257	45	90			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	12	60	191.08	,21	1.03		312							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	IL		194.68			59	1307	1255	254	4/5	6.5			
3	11	10	198:35	L38	1.85	60	321					9,5	11.5	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	11		701.83			61	320	251	257	45	4,5			
5		20	705.22	133	1,62	61	1318							
6 30 211.80 30 7.48 62 317 317 317 318 30 318 318 318 318 318 318 318 318 318 318	1 1			132	1,57	61	317	250	253	45	6.0			
7 7 76.03 75 62 313 255 252 46 8.0 8 40 770.41 755 2.70 63 320 9 714.87 77 63 32 250 753 45 9.0 9.3 16.0 10 50 779.29 56 7.74 63 32 250 755 45 9.0 9.3 16.0	111	30	* * * * * * * * * * * * * * * * * * * *	130	7,48	62	317							
8 40 /10.41 155 7.70 63 320 9 774.87 177 63 32 750 753 45 9, 0 9.3 //.0 10 50 779.29 156 7.74 63 32 750 750 753 45 9, 0 9.3 //.0	11 1			151		102	313	735	252	46	8.0		1	
9 724,87 ,57 7.79 63 32) 250 753 45 9,0 9.3 1/.0 10 50 729,29 55 7.74 63 321 11 733,56 51 7.55 761 321 754 4/5 8,5	11 1	40		155	2.70	63	320			1				
10 50 779, 29 SV 7.44 63 321 11 733, 56 51 7.55 KG 321 754 455	9		724,87	57	7.79	103	1321	250	753	45	9,0	9.3	11.0	
1 11 1935,36 1.51 17.55 17.01 137.1 17.55 14.6 18.5 1 1 1	11 1	50	729,29	186	7.74	63				1		<u> </u>	1 "	
$  1\rangle  1\rangle  1\rangle  1\rangle  1\rangle  1\rangle  1\rangle  1\rangle  1\rangle  1$			733,56	1.56	2.55	CCI	321	251	25-1	45	8,5			
	12		237,710	.49	7.41	1041	319							
14:48 ENBTEST 1		14:48		'''										
												ĺ		
							T T				1			

CLIEN	т МУ	V. 175		***************************************	NOZZLE /	44-01	DIAME	TER, IN 3	3050	IMPINGER	INITIAL	FINAL	TOTAL GAIN
1	-					ALGUE	20	Cp . 8149		VOLUMES	<u> </u>	(mL)	(mL)
SOUR	CE UNIT	#3								Imp. #1	<b>100</b> 0	194	194
PARAI	METER / RUN I	10 Metals/PM	たらとせん		PORT LEN	GTH 7-A	E GVRS	)			100	194	82
DATE	Feb. 25.	-2١			STATIC PR	ESSURE, IN	H2O -18			Imp. #3	100	1 1/Pi	1 1
OPER.	ATOR: 106	p-			STACK DIA	METER 7	294			Imp. #4	(CO)(C)	4	- 2
CONT	ROLUNIT FE	< \8	Y .9997		STACK HEI	GHT 30				Imp. #5	100	! 7!	1
			∆Н@ \%5	5							100	1 7 1	
	METRIC PRES		94		INITIAL LEA	AK TEST O.	00461	SU		Upstream D	- W		
ASSU	MED MOISTUR	E, Bw \\%%			FINAL LEAF	K TEST O.C	2020a15	. 61		Downstream	n Diameters		
												*-	
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP	Orifice ΔH			Temperature '	°F		Pump Vac.	Fy	rites	
Point			IN. H <sub>2</sub> O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	O <sub>2</sub>	
L	0854	238.143		1	Outlet				Exit		Vol. %	Vol. %	
1		242.03	.45	2.14	50	301	255	249	54	6.5	10	10.5	
2		245-88	.44	2.09	50	304	-		Million	T	- *0000*	<del>  ``\``</del>	
3		249.67	-44	2.09	50	304	251	255	52	6.5			
Th		253.6	.46	2.18	51	304	-		3 4	10.3		<del>                                     </del>	
3		257.37	.42	2	52	304	252	251	48	1 7		<del> </del>	
6		261.05	.40	1.9	52	304							
17		264.14	.28	1.34	53	299	251	254	47	5.5		†	
8		267.0	-24	1.15	53	302	-		Long /			<del>                                     </del>	
9		269.82	.24	1.15	54	301	252	254	46	5	10.5	8.5	
10		272.3	.18	.86	54	301			rese, C)			3.7	
		274.92	.20	.96	55	299	250	250	46	4.5		<del> </del>	
12		277.48	.19	.91	55	300							
			1							1		<b>†</b>	
١		280.91	-35	1.68	56	301	250	251	45	6.5	10.5	8.5	
2		284.38	.35	1.68	57	303				1 9 2	10.5	3 2	
3		287-75	.33	1.59	57	303	252	251	46	6	<b> </b>		
4		290.92	29	1.4	58	303			7.0			t	
5		294.03	28	1.35	58	304	253	256	47	6	<b> </b>		
6		297.09	27	1.3	59	304							
7		300.83	40	1.94	60	302	252	251	50	7.5	10	9	
8		304.83	.45	2.17	60	364					1 1		
9		308.93	.48	2.32	61	304	252	256	5i	8			
10		3/3.2	.32	2.52	61	304							
- 11		317.18	.45	2.19	62	302	251	253	51	7.5			
12	1057	326.99	.41	2.01	62	296				1 1			
				· · · · · · · · · · · · · · · · · · ·								<del>                                     </del>	
			•				1			·	l	<u> </u>	

CLIEN	T & A				NOZZLE ,	111-01	DIAME	TER, IN 3	esses	IMPINGER	! INITIAL	! FINAL !	TOTAL GAIN
CLIEN	MVh	ITE			PROBE 7	AL GURT	2	Cp . She	ilo	VOLUMES	(mL)	(mL)	(mL)
SOUR	CE UNIT	<i>4</i> 3					·			Imp. #1	160	230	230
PARA	METER / RUN N	10 Metals IPX	1 RUN #3	3	PORT LENG	GTH .	***************************************		*****	Imp. #2	100	206	106
DATE	Feb-25	1-21			STATIC PR	ESSURE, IN.	H2O - \ 8			Imp. #3	100	12.0	20
	ATOR: M	Ju			STACK DIA	METER 7	7.9"			Imp. #4	<b>(20)</b> (2)	77	10
CONT	ROL UNIT	E18	Y .9997		STACK HEI	GHT 3	>5			Imp. #5	100	103	- 3
			ΔH@ \.85	55						Imp. #6	100	100	<u> </u>
BARO	METRIC PRESS		94		INITIAL LEA	AK TEST O	338G	15"		Upstream D			
ASSU	MED MOISTURE	Ξ, Bw \ <b>8</b> %			FINAL LEAF	CTEST O	303 40, 1	30		Downstream	Diameters		
	Clock Time	Dry Gas Meter ft <sup>3</sup>	Pitot ΔP	Orifice ΔH			Temperature °	F		Pump Vac.	Fy	rites	
Point			IN. H₂O	IN. H <sub>2</sub> O	Dry Gas	Stack	Probe	Box	Impinger	IN. Hg	CO <sub>2</sub>	O <sub>2</sub>	
	1142	321.793			Outlet				Exit		Vol. %	Vol. %	j
, Marie Control		325.24	.34	1.65	59	301	245	251	54	8	10	8.5	
2		328.73	.35	1.7	59	300		2000			1		
3		332.21	-35	1.69	59	305	250	252	60	3			
1		335.78	.36	1.73	60	307				- Constitution of the Cons		<del>                                     </del>	
5		339.28	.33	1.59	60	307	255	252	60	8		<del>                                     </del>	
6		342.69	.33	1.59	600	308				<u> </u>		<del>                                     </del>	
		347.38	83	3.09	61	309	255	254	52	14			
8		351.99	31	2.94	62	310	-			1			
9		356-56	-66	2.88	62	311	251	252	52	13	10	8	
10		361.04	.57	2.77	63	305							
ĪΙ		365.37	.53	2.58	63	303	255	251	52	12.5			
1/2		369.49	-48	2.34	63	303		1-2	and fee	V 2m., 3			
				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		132			<u> </u>				
		372.9	.33	1.6	64	307	252	251	53	8			
2		376.25	.32	1.55	64	309	from the form	, J.				<del> </del>	
3		379.55	.31	1.5	64	309	252	255	51	7.5	9.5	8	
4		382.8	.38	1.45	64	308				1.3			
3		386-06	.30	1.146	65	308	252	251	52	7.5			
6		389.50	-34	1.65	66	308			36	1.3			
7		393, 83	-53	2.57	63	308	252	257	51	12.5			
8		398.11	.52	2.33	66	309							
9		402.53	.35	2.67	46	308	252	251	51	13	10	8.5	
10		407.0	.52	2.78	67	308		<u> </u>					
1/4		411.43	.55	2.69	67	306	250	254	52	١3			
11	1343	415.65	.50	2.44	17	306							
				71	T *								
			•	·			L	L	L	<u> </u>		<u> </u>	

Client Source	Metro Van Unit	Y Cp	LMU-B/1.0347	Client Source	Metro Van Drif 2	Y Cp	LMU-B 1.0347
Parameter Date	#G+ HF Feb 23/21	Pbar	30:17 Static - 4 Simon B:	Parameter Date	HCL HF Feb. 24/21	Pbar	30.50 Static -17 Simon B

Leak Check	Run 1	Run 2	Run 3	Leak Check	Run 1	Run 2	Run 3
Initial	0.000/	0.000 l	1000.0	Initial	0.0001	0.0001	0.0001
Final	D.000/	0.0001	0.0001	Final	0.000	0,0001	0.000

					·			
Test	Time	DGM Volume	Tempera	ature (°F)	lmp.		ΔP IN. H <sub>2</sub> (	
No.	(hhmm)	(cu ft) / (m <sup>3</sup> )	DGM Outlet	Stack	Vol. (mL)	R1	R2	R3
	9:20	131.6150	51		200			1.0
	<b></b>							
a								
1								
	10:20	132.1 <b>5</b> 80	64		261			
	1000	100 100	רוו	T	A- 0			
	10.20	132.1740	63		200			
2								
	11235	132.7030	<u>L9</u>	,,,	250			
	1.1.30	1102 1030	6					
	11:38	132-7090	LS					
3								
3								
	.2 . 2%							
	115.20	133.2610	190		250			

			Tempera	ature (°F)	Imp.		<b>D.</b> IN	
Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	DGM Outlet	Stack	Vol. (mL)	R1	P IN. H <sub>2</sub> i	R3
	9:39	133.2664	42			101	1\2	N3
		· · · · · · · · · · · · · · · · · · ·						
1								
	10:.39	133.7960	67	260				
	10:49	133.8020	18					
							·····	
2								
	11:49	134.3546	66	266				
	15:00	134.3630	1.4					*****
	12.0	13 1. 3000	13/					
3								<b>V</b> -8
•								
	1:00	134.9310	10					
				I				
							1	

Client	Metro Van	Y	LMU-B 1.0347	Client	Y	
Source	Unit#3	Ср	34-1	Source	Ср	
Parameter	HF	Pbar	29.94 Static -18	Parameter	Pbar	Static
Date	Feb: 25/21	Operator	Simon B	Date	 Operator	Charles and the control of the contr

Leak Check	Run 1	Run 2	Run 3
Initial	6.0001	0.000/	1000.0
Final	0.0001	1000.0	8,000

Leak Check	Run 1	Run 2	Run 3
Initial			
Final			

Test	Time	DGM Volume		ture (°F)	lmp. Vol.	Δ	√P IN. H <sub>2</sub> (	0
No.	(hhmm)	(cu ft) / (m <sup>3</sup> )	DGM Outlet	Stack	(mL)	R1	R2	R3
	8:20	134,9390	48		200			
1								
	9:50	135.4460	69		260			
<u> </u>	10,03	135,4550	(1		200			
	10.02	13341320	0		700			
2								
	11:00	102 9195	70		265			
	11:02	135.9132	12					
	11:42	135.4190	70					
3						***		
<u></u>	12:42	136.4386	73					
		. •						

Test No.	Time (hhmm)	DGM Volume (cu ft) / (m³)	Tempera DGM	iture (°F)	lmp. Vol.	Δ	P IN. H <sub>2</sub> (	)
NO.	(1111111111)	(cu it) / (iii )	Outlet	Stack	(mL)	R1	R2	R3
				******				
1								
					<u></u>			
								*********
				,				
2		***************************************			İ			
							***************************************	
					I			
_								
3								

Client:

Metro Vancouver

Jobsite:

WTE (Burnaby, B.C)

Parameter: N<sub>2</sub>O

Operator: LAAN

Unit #1

Barometric Pressure: 30.17

Sample ID	Date	Time (hh:mm - hh:mm)	N₂O (ppm)					
Run 1	Feb. 23/21	09:20-10:20	0	0	0	0	0	0
Run 2		10:30 - 11:30	0	1.5	0	1.0	0	6
Run 3	<b>V</b>	11:38-12:38	0	1.5	2_	0	1	0

Unit #2

Barometric Pressure: 30.50

Sample ID	Date	Time (hh:mm - hh:mm)	<b>N₂O</b> (ppm)					
Run 1	Feb. 24/2	09:39-10:39	0		0	1.5	0	1.5
Run 2		10:49-11:49	0	0	0	0	0	0
Run 3	<b>A</b>	12:00-13:00	ಲ	0	2.5	0	1.5	0

Unit #3

Barometric Pressure: 29.94

Sample ID	Date	Time (hh:mm - hh:mm)	<b>N<sub>2</sub>O</b> (ppm)					
Run 1	Feb. 25/21	08:50-09:50	0	2	0	0	2	6
Run 2		10:02-11:02	0	0	2	0	0	1.5
Run 3	<b>Y</b>	11:42-12:42	0	0	0	0	U	0

# APPENDIX – E CALIBRATION SHEETS and TECHNICIAN CERTIFICATES

	BAROMETER CALIBRATION FORM										
		Pbar E	nv Canada	Device (inc	hes of Hg)	Difference					
					Elevation						
Device	Cal Date	(kPa)	(inches of Hg)	Reading	Corrected	(Env Can - Elv Corr)					
LA	6-Jan-21	101.8	30.07	29.94	30.01	0.05					
DS	6-Jan-21	101.8	30.07	29.94	30.01	0.05					
CL	6-Jan-21	101.8	30.07	29.94	30.01	0.05					
ML	6-Jan-21	101.8	30.07	29.91	29.98	0.08					
SB	6-Jan-21	101.8	30.07	29.93	30.00	0.06					
SH	6-Jan-21	101.8	30.07	29.95	30.02	0.04					
MG	6-Jan-21	101.8	30.07	29.94	30.01	0.05					
SF	6-Jan-21	101.8	30.07	29.91	29.98	0.08					
JG	6-Jan-21	101.8	30.07	29.89	29.96	0.10					
JC	6-Jan-21	101.8	30.07	29.93	30.00	0.06					
CNL	6-Jan-21	101.8	30.07	30.08	30.15	-0.09					

Calibrated by: Jeremy Gibbs Signature: \_\_\_\_\_\_ Date: 06-Jan-21

#### Performance Specification is

Device Corrected for Elevation must be +/- 0.1 " Hg of ENV CANADA SEA-LEVEL Pbar

Enter Environment canada Pressure from their website for Vancouver (link below) and the reading from your barometer on the ground floor of the office.

https://weather.gc.ca/city/pages/bc-74\_metric\_e.html

#### A.Lanfranco & Associates inc.

FPA Method 5

#### Meter Box Calibration

English Meter Box Units, English K' Factor

04-Jan-21

 Model #:
 CAE AL1
 Date:

 Serial #:
 0028-070611-1
 Barome

 0028-070611-1
 Barometric Pressure:
 29.38
 (in. Hg)

 Theoretical Critical Vacuum:
 13.86
 (in. Hg)

!!!!!!!!!!

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)\03\*(deg R)\0.5/((in.Hg)\*(min)).

111111111

----- DRY GAS METER READINGS ------CRITICAL ORIFICE READINGS-Volume Volume Volume Initial Temps. Final Temps. Orifice K' Orifice Actual -- Ambient Temperature -dН Time Initial Final Total Inlet Outlet Inlet Outlet Serial# Coefficient Vacuum Initial Final Average (in H2O) (min) (cu ft) (cu ft) (cu ft) (deg F) (deg F) (deg F) (deg F) (number) (see above) (in Hg) (deg F) (deg F) (deg F) 178.620 77.0 3.60 16.00 161.300 17.320 73.0 73.0 77.0 73 0.8185 17.0 83.0 80.0 81.5 1.85 19.00 145.000 159.782 14.782 71.0 71.0 73.0 73.0 63 0.5956 20.0 74.0 74.0 74.0 1.10 19.00 132.300 143.732 11.432 67.0 67.0 70.0 70.0 55 0.4606 22.0 73.0 78.0 75.5 0.64 24.00 119.200 130.140 10.940 64.0 64.0 67.0 67.0 48 0.3560 23.5 67.0 72.0 69.5 0.33 31.00 179.300 189.153 9.853 77.0 77.0 76.0 76.0 0.2408 25.0 80.0 74.0 77.0

	******	*******	******* RES	ULTS ******	*******	******	***				
DRY GAS METER		ORIFICE		DRY GAS	S METER			ORIFICE			
OLUME RRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATIO	ON FACTOR Y	CA	LIBRATION FA dH@	CTOR			
/m(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)		
479.4	16.535	468.3	17.276	0.977	-0.016	1.838	46.67	0.033	0.717		
409.7	14.388	407.5	14.825	0.995	0.002	1.769	44.92	-0.036	0.719		
318.4	11.111	314.7	11.480	0.988	-0.004	1.775	45.08	-0.030	0.723		
306.0	10.909	308.9	11.145	1.009	0.017	1.719	43.67	-0.086	0.720		
269.8	9.464	268.0	9.806	0.994	0.001	1.925	48.88	0.120	0.692		
			Average Y>	0.9925	Average dH@>	1.805	45.8	Average Ko>	0.714		
CR/IIII	DLUME RECTED m(std) liters) 179.4 109.7 118.4	DILUME VOLUME RECTED CORRECTED (fistd) Vor(std) (itiers) (cu ft) (79.4 16.535 109.7 14.388 118.4 11.111 1066.0 10.909	DLUME VOLUME VOLUME RECTED CORRECTED CORRECTED (std) Vcr(std) Vcr(std) (liters) (cu ft) (liters) (79.4 16.535 468.3 (199.7 14.388 407.5 (118.4 11.111 314.7 (106.0 10.909 308.9	Columb	CALIBRATIC   CAL	CALIBRATION FACTOR   CALIBRATIC   CALIBRATION FACTOR   CALIBRATION FACTOR   CALIBRATION FAC	CALIBRATION FACTOR   CALIBRATICA   CALIBRATION FACTOR   CALIBRATICA   CALIBRATION FACTOR	ER ORIFICE DRY GAS METER	ER —		

т	TEMPERATURE CALIBRATION							
Calibration Standard>	Omega Model CL23A S/N:T-2	18768						
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Re Variation (degF)	sults Percent of Absolute					
32	32	0	0.00%					
100	100	0	0.00%					
300	300	0	0.00%					
500	500	0	0.00%					
1000	1000	0	0.00%					

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orlifice Calibration Factor 0H8, the orlice differential pressure in inches of H20 that equates to 0.75 cm of a rist 6B F and 292 sinches 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 (absolute temperature) to be acceptable.

Calibrated by:	Scott Ferguson	Signature:	Date:	January 4, 2021

#### A.Lanfranco & Associates inc.

#### Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: FE 18 Date: 04-Jan-21

Serial #: 0028-020118-1 Barometric Pressure: 29.53 (in. Hg) Theoretical Critical Vacuum: 13.93 (in. Hg)

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

	DRY GAS METER READINGS								-CI	RITICAL ORIF	CE READING	iGS-			
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Te Inlet (deg F)	emps. Outlet (deg F)	Final Inlet (deg F)	Temps. Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Am Initial (deg F)	bient Temperati Final (deg F)	ure Average (deg F)	
3.65	18.00	660.300	679.194	18.894	59.0	59.0	62.0	62.0	73	0.8185	15.5	61.0	68.0	64.5	
1.90	15.00	679.500	690.951	11.451	62.0	62.0	64.0	64.0	63	0.5956	17.5	70.0	73.0	71.5	
1.15	15.00	691.100	700.040	8.940	64.0	64.0	65.0	65.0	55	0.4606	19.0	74.0	74.0	74.0	
0.67	28.00	701.800	714.470	12.670	63.0	63.0	66.0	66.0	48	0.3560	20.0	66.0	76.0	71.0	
0.33	32.00	714.700	724.649	9.949	67.0	67.0	69.0	69.0	40	0.2408	21.5	76.0	79.0	77.5	
DRY GAS	S METER VOLUME		VOLUME	VOLUME	VOLUME		DRY GAS METER CALIBRATION FACTOR			CAL	IBRATION FA	ORIFICE CTOR			
CORRECTED	CORRECTED		CORRECTED	CORRECTED	NOMINAL			Υ			dH@				
Vm(std) (cu ft)	Vm(std) (liters)		Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)		Value (number)	Variation (number)		Value (in H2O)	Value (mm H2O)	Variation (in H2O)		Ko (value)	
19.081	540.4		18.997	538.0	19.128		0.996	-0.004		1.845	46.87	-0.010		0.707	
11.459	324.5		11.443	324.1	11.676		0.999	-0.001		1.830	46.47	-0.026		0.710	
8.904	252.2		8.829	250.0	9.051		0.992	-0.008		1.855	47.12	0.000		0.710	
12.604	357.0		12.774	361.8	13.021		1.013	0.014		1.799	45.70	-0.056		0.706	
9.823	278.2		9.815	278.0	10.127		0.999	-0.001		1.947	49.47	0.092		0.689	
					Avera	age Y>	0.9997	Avera	ge dH@>	1.855	47.1	Av	erage Ko>	0.704	

TEMPERATURE CALIBRATION								
Calibration Standard> Omega Model CL23A S/N:T-218768								
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Res Variation (degF)	sults Percent of Absolute					
32	32	0	0.00%					
100	100	0	0.00%					
300	300	0	0.00%					
500	500	0	0.00%					
1000	1000	0	0.00%					

Calibrated by: Scott Ferguson

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 Orlifice Calibration Factor dHg, the orlifice differential pressure in inches of H20 that equates to 0.75 cfm of air 46 8 F and 29 st 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 emperature) to be acceptable.

Signature:

Date: January 4, 2021

#### A.Lanfranco & Associates inc.

#### EPA Method 5

#### Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: ST CAE2 Date: 05-Jan-21

 Serial #:
 0028-072911-1
 Barometric Pressure:
 29.92
 (in. Hg)

 Theoretical Critical Vacuum:
 14.11
 (in. Hg)

111111111

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

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

	DRY GAS METER READINGS								-CRITICAL ORIFICE READINGS-					
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial T Inlet (deg F)	emps. Outlet (deg F)	Final Inlet (deg F)	Temps. Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Aml Initial (deg F)	bient Tempera Final (deg F)	ture Average (deg F)
3.80	32.00	587.900	621.792	33.892	67.0	67.0	70.0	70.0	73	0.8185	14.5	68.0	78.0	73.0
1.95	24.00	621.900	640.443	18.543	70.0	70.0	73.0	73.0	63	0.5956	16.0	77.0	82.0	79.5
1.15	30.00	640.600	658.697	18.097	73.0	73.0	77.0	77.0	55	0.4606	17.5	80.0	80.0	80.0
0.68	25.00	658.900	670.396	11.496	77.0	77.0	79.0	79.0	48	0.3560	19.0	79.0	81.0	80.0
0.34	20.00	670.600	676.930	6.330	78.0	78.0	79.0	79.0	40	0.2408	20.5	81.0	83.0	82.0
			******	******	*****	****** RES	ULTS *****	******	******	*****	***			
DRY GAS METER ORIFICE							DRY GAS METER ORIFICE							

				0								
DRY GAS METER			ORIFICE		DRY GA	S METER			ORIFICE			
VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL	CALIBRATIO	ON FACTOR Y	CA	LIBRATION FA	CTOR			
Vm(std) (cu ft)	Vm(std) (liters)	Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)	Value (number)	Variation (number)	Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)		
34.162	967.5	33.944	961.3	34.279	0.994	-0.005	1.898	48.20	0.036	0.698		
18.502	524.0	18.413	521.5	18.822	0.995	-0.004	1.851	47.02	-0.011	0.707		
17.904	507.0	17.791	503.9	18.203	0.994	-0.005	1.815	46.11	-0.047	0.716		
11.297	319.9	11.459	324.5	11.724	1.014	0.016	1.787	45.38	-0.075	0.707		
6.209	175.8	6.189	175.3	6.356	0.997	-0.002	1.958	49.73	0.096	0.688		
				Average Y>	0.9988	Average dH@>	1.862	47.3	Average Ko>	0.703		

т	TEMPERATURE CALIBRATION							
Calibration Standard>	Omega Model CL23A S/N:T-2	18768						
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Re Variation (degF)	sults Percent of Absolute					
32	32	0	0.00%					
100	100	0	0.00%					
300	300	0	0.00%					
500	500	0	0.00%					
1000	1000	0	0.00%					

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orlifice Calibration Factor 0H8, the orlice differential pressure in inches of H20 that equates to 0.75 cm of a rist 6B F and 292 sinches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Justin Ching Signature: \_\_\_\_\_\_\_ Date: January 5, 2021



#### **Declaration of Competency**

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

1.	Name of Qualified Professional	Shawn Harrington
	Title	Senior Environmental Technician /Project manager
2.	Are you a registered member of a	professional association in B.C.? ☐ Yes ☑ No
	Name of Association:	Registration #
3.	Brief description of professional se Environmental consulting ,spe	ervices: ecializing in air and atmospheric sciences
Pro pro pu ca pe	otection of Privacy Act for the purportessional ethics and accountability blication and its disclosure outside nnot be revoked. If you have any q	sected under section 26(c) of the Freedom of Information and coses of increasing government transparency and ensuring r. By signing and submitting this statement you consent to its of Canada. This consent is valid from the date submitted and uestions about the collection, use or disclosure of your the Ministry of Environment and Climate Change Strategy 57.
		<u>Declaration</u>
	·	knowledge, skills and experience to provide expert ndations in relation to the specific work described above.
<u>X</u> Pri	int Name: Shawn Harrington te signed: November 26, 2020	Witnessed by:  X  Print Name: Mark Lanfranco

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

 $<sup>^{1}</sup>$ Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who



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knowledge, experience and objectivity necessary to fulfill this role.
1. Name of Qualified Professional Jeverny Obles
Title Environmental technician
2. Are you a registered member of a professional association in B.C.? ☐ Yes ☐ No
Name of Association:Registration #
3. Brief description of professional services:  Environmental Consultant Specialize in Gir and atmospheric Sciences
This declaration of competency is collected under section 26(c) of the <i>Freedom of Information and Protection of Privacy Act</i> for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.
<u>Declaration</u>
I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.  Signature:  Witnessed by:
* home All
Print Name: Deremy 6.45 Print Name: Connoc Jaan
Date signed: Nav 1 2020

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

 $<sup>^{</sup>f 1}$ Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who



#### **Declaration of Competency**

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

1.	Name of Qualified Professional	Scott Ferguson							
	Title	Environmental Technician							
2.	Are you a registered member of a	professional association in B.C.? ☑ Yes ☐ No							
	Name of Association: ASTTBC	Registration # 29114							
3.	Brief description of professional se Environmental consulting, spe	rvices: cializing in air and atmospheric sciences							
Pro pro pul car per	ntection of Privacy Act for the purportessional ethics and accountability olication and its disclosure outside and the revoked. If you have any quant	ected under section 26(c) of the <i>Freedom of Information and</i> oses of increasing government transparency and ensuring and submitting this statement you consent to its of Canada. This consent is valid from the date submitted and duestions about the collection, use or disclosure of your the Ministry of Environment and Climate Change Strategy 77.							
		<u>Declaration</u>							
	am a qualified professional with the knowledge, skills and experience to provide expert nformation, advice and/or recommendations in relation to the specific work described above.								
Sig	nature:	Witnessed by:							
X	MAN	*MG00ds							
Pri	nt Name: Scott Ferguson	Print Name: Michael Goods							
Dat	e signed: 11/23/2020								

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

#### A. LANFRANCO and ASSOCIATES INC.

#### **ENVIRONMENTAL CONSULTANTS**

#### **GLASS NOZZLE DIAMETER CALIBRATION FORM**

Calibrated by: Date: Connor Laan January 4th, 202

Signature:

			7			
Nozzle I.D.	d1	d2	d3	difference	average dia.	average area
	(inch)	(inch)	(inch)	(inch)	(inch)	(ft²)
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
G-178	0.1780	0.1780	0.1790	0.0010	0.1783	0.0001735
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
L	0.2112	0.2120	0.2105	0.0015	0.2112	0.0002434
Q	0.2190	0.2170	0.2185	0.0020	0.2182	0.0002434
G-218	0.2180	0.2175	0.2190	0.0015	0.2182	0.0002596
G-223	0.2220	0.2230	0.2225	0.0010	0.2225	0.0002390
G-2231	0.2230	0.2230	0.2225	0.0005	0.2228	0.0002700
G-225	0.2245	0.2250	0.2240	0.0003	0.2245	
G-2251	0.2243	0.2260	0.2240	0.0010		0.0002749
P-18					0.2245	0.0002749
G-245	0.2375	0.2370	0.2380	0.0010	0.2375	0.0003076
	0.2440	0.2450	0.2450	0.0010	0.2447	0.0003265
G-247	0.2450	0.2470	0.2470	0.0020	0.2463	0.0003310
G-253	0.2525	0.2520	0.2525	0.0005	0.2523	0.0003473
Р	0.2580	0.2570	0.2575	0.0010	0.2575	0.0003616
P-2	0.2787	0.2790	0.2785	0.0005	0.2787	0.0004237
G-280	0.2780	0.2800	0.2810	0.0030	0.2797	0.0004266
G-282	0.2810	0.2820	0.2840	0.0030	0.2823	0.0004348
G-287	0.2870	0.2880	0.2860	0.0020	0.2870	0.0004493
G-292	0.2922	0.2920	0.2926	0.0006	0.2923	0.0004659
G-304	0.3040	0.3050	0.3040	0.0010	0.3043	0.0005052
MV-01	0.3050	0.3045	0.3055	0.0010	0.3050	0.0005074
G-3072	0.3070	0.3070	0.3080	0.0010	0.3073	0.0005152
G-309	0.3110	0.3080	0.3080	0.0030	0.3090	0.0005208
G-310	0.3090	0.3105	0.3095	0.0015	0.3097	0.0005230
G-311	0.3120	0.3100	0.3110	0.0020	0.3110	0.0005275
G-316	0.3160	0.3160	0.3170	0.0010	0.3163	0.0005458
V-06	0.3200	0.3210	0.3210	0.0010	0.3207	0.0005608
P-27	0.3387	0.3385	0.3390	0.0005	0.3387	0.0006258
G-344	0.3440	0.3450	0.3440	0.0010	0.3443	0.0006250
G-345	0.3450	0.3450	0.3450	0.0000	0.3450	0.0006492
G-346	0.3450	0.3460	0.3460	0.0010	0.3457	0.0006517
G-366	0.3650	0.3670	0.3650	0.0020	0.3457	0.0000317
G-367	0.3675	0.3650	0.3670	0.0025		
P-14	0.3073	0.3030			0.3665	0.0007326
G-437			0.3920	0.0025	0.3922	0.0008388
	0.4350	0.4345	0.4355	0.0010	0.4350	0.0010321
G-468	0.4677	0.4670	0.4670	0.0007	0.4672	0.0011907
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
	1					

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



#### **Conflict of Interest Disclosure Statement**

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

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

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

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

their common sense, conscience and sense of personal in	tegrity.
<u>Declaration</u>	
Jeremy Globs as a me	mber of _Air and Waste Management Association
declare	
Select one of the following:	
Absence from conflict of interest	
Other than the standard fee I will receive for my p	rofessional services, I have no financial or
other interest in the outcome of this <b>project</b>	. I further declare that should a
conflict of interest arise in the future during the co	ourse of this work, I will fully disclose the
circumstances in writing and without delay to  Mr. Sajid Barlas	, erring on the side of caution.

☐ Real or perceived co	onflict of interest
Description and nat	ure of conflict(s):
I will maintain my o and standards of pr	bjectivity, conducting my work in accordance with my Code of Ethics actice.
	ke the following steps to mitigate the real or perceived conflict(s) I nsure the public interest remains paramount:
	dge that this disclosure may be interpreted as a threat to my will be considered by the statutory decision maker accordingly.

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

Signature:

Print name

Date: Dec.16, 2020

Witnessed by:

Mark Lanfranco
Print name:

<sup>&</sup>lt;sup>1</sup>Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who

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

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

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

1/

- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

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

**Declaration** 

I <u>Shawn Harrington</u> , as a m declare	ember of Air and Waste Management Association
Select one of the following:	
☑ Absence from conflict of interest	
Other than the standard fee I will receive for my	professional services, I have no financial or
other interest in the outcome of this project	. I further declare that should a
conflict of interest arise in the future during the o	course of this work, I will fully disclose the
circumstances in writing and without delay to  Mr. Sajid Barlas	, erring on the side of caution.



Date: Dec.16, 2020

Description	on and nature of conflic	t(s):	
		.(0).	
·			
and the second			
	ntain my objectivity, cood dards of practice.	nducting my work	in accordance with my Code of Ethics
	on, I will take the followi losed, to ensure the pul	• .	nte the real or perceived conflict(s) I ins paramount:
-		•	e interpreted as a threat to my tory decision maker accordingly.
			under section 26(c) of the Freedom c
•			untability. By signing and submitting t
•	·		re outside of Canada. This consent is
			f you have any questions about the new please contact the Ministry of
	•		s Office at 1-800-663-7867.
ignature:	// · A	Wi	itnessed by:
Manua	Home alon		$\mathcal{L}(\mathcal{A})$

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Print name:

Mark Lanfranco

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#### A. LANFRANCO and ASSOCIATES INC.

#### **ENVIRONMENTAL CONSULTANTS**

#### **Confidentiality and Impartiality Agreement**

Confidentiality is legally enforceable in our client contracts for all projects and ensures that our firm, its personnel, and any outsourced bodies treat all information obtained or created during our scope of work as confidential. Our firm does not disclose information that is not public regarding a client or responsible party to a third party without express consent of that party. Our firm informs the client and responsible party before placing any information in the public domain and will use equipment and facilities to ensure the secure handling of confidential information.

**Impartiality** Our firm's policies and procedures regarding conflict of interest (COI) and safeguarding impartiality reflects the commitment to act impartially in all activities. Our firm understands that the principles of COI and impartiality are essential to providing independent services. Our team is required to personally declare any potential threat to impartiality or potential COI. Should a potential COI or threat to impartiality be identified, our team will work to determine mitigation measures, if applicable.

This agreement is made by and between

Scott Ferguson (1st Party)

A. Lanfranco and Associates Inc. (2<sup>nd</sup> Party)

As of 1/0V. 24 ,20 20

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: LMU-B Date: 07-Jan-21

Serial #: Wizit 6276 Barometric Pressure: 30.17 (in. Hg)

Theoretical Critical Vacuum: 14.23 (in. Hg)

!!!!!!!!!!

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

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

!!!!!!!!!!

	DRY GAS METER READINGS							-CI	RITICAL ORIF	ICE READING	GS-			
Volume			Volume	Volume		al Temps. Final Temps.			K' Orifice			Ambient Temperature		
dH (in H2O)	Time (min)	Initial (m³)	Final (m³)	Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.00	20.00	125.0520	125.3036	8.885	59.0	59.0	64.0	64.0	48	0.3560	20.0	57.0	63.0	60.0
0.00	23.00	125.3050	125.5968	10.305	64.0	64.0	69.0	69.0	48	0.3560	20.0	63.0	67.0	65.0
0.00	23.00	125.6000	125.8940	10.383	69.0	69.0	70.0	70.0	48	0.3560	20.0	67.0	69.0	68.0
			*******	******	****	******	N.II. TO ******		***********		***			
DDV 04	0 METER					········· RES						ODIFICE		
DRY GA	S METER			ORIFICE		······································	DRY GAS					ORIFICE		
VOLUME	VOLUME		VOLUME	ORIFICE	VOLUME	······································		S METER ON FACTOR			LIBRATION FA			
VOLUME				ORIFICE		······································	DRY GAS	S METER						
VOLUME CORRECTED Vm(std)	VOLUME CORRECTED Vm(std)		VOLUME CORRECTED Vcr(std)	VOLUME CORRECTED Vcr(std)	VOLUME NOMINAL Vcr	······································	DRY GAS CALIBRATIO	S METER ON FACTOR Y Variation		CAI Value	 LIBRATION FA dH@ Value	CTOR  Variation		
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)		VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	RES	DRY GAS CALIBRATIO Value (number)	S METER ON FACTOR Y Variation (number)		CAl Value (in H2O)	 LIBRATION FA dH@ Value (mm H2O)	Variation (in H2O)		
VOLUME CORRECTED Vm(std) (cu ft) 9.067	VOLUME CORRECTED Vm(std) (liters) 256.8		VOLUME CORRECTED Vcr(std) (cu ft) 9.420	VOLUME CORRECTED Vcr(std) (liters) 266.8	VOLUME NOMINAL Vcr (cu ft) 9.204	RES	DRY GAS CALIBRATIO Value (number) 1.039	DN FACTOR Y Variation (number) 0.004		CAI Value (in H2O) 0.000	 JBRATION FA dH@ Value (mm H2O) 0.00	Variation (in H2O) 0.000		
VOLUME CORRECTED Vm(std) (cu ft) 9.067 10.416	VOLUME CORRECTED Vm(std) (liters) 256.8 295.0		VOLUME CORRECTED Vcr(std) (cu ft) 9.420 10.781	VOLUME CORRECTED Vcr(std) (liters) 266.8 305.3	VOLUME NOMINAL Vcr (cu ft) 9.204 10.636	RES	DRY GAS CALIBRATIO Value (number) 1.039 1.035	S METER ON FACTOR Y Variation (number) 0.004 0.000		CAI Value (in H2O) 0.000 0.000	LIBRATION FA dH@ Value (mm H2O) 0.00	Variation (in H2O) 0.000 0.000		

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

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

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

Calibrated by: Justin Ching Signature: \_\_\_\_\_\_ Date: January 7, 2021



#### A. LANFRANCO and ASSOCIATES INC.

#### **ENVIRONMENTAL CONSULTANTS**

#### **Confidentiality and Impartiality Agreement**

Confidentiality is legally enforceable in our client contracts for all projects and ensures that our firm, its personnel, and any outsourced bodies treat all information obtained or created during our scope of work as confidential. Our firm does not disclose information that is not public regarding a client or responsible party to a third party without express consent of that party. Our firm informs the client and responsible party before placing any information in the public domain and will use equipment and facilities to ensure the secure handling of confidential information.

**Impartiality** Our firm's policies and procedures regarding conflict of interest (COI) and safeguarding impartiality reflects the commitment to act impartially in all activities. Our firm understands that the principles of COI and impartiality are essential to providing independent services. Our team is required to personally declare any potential threat to impartiality or potential COI. Should a potential COI or threat to impartiality be identified, our team will work to determine mitigation measures, if applicable.

This agreement is made by and between	
Muhuel Goods Milliff	(1st Party)
AND	
A. Lanfranco and Associates Inc.	(2 <sup>nd</sup> Party)
As of <u>24 Nov</u> ,20 <u>20</u>	

#### **Pitot Tube Calibration**

 Date:
 01-Jan-21
 Temp (R): 530

 Pbar (in.Hg):
 29.69
 Dn (in.): 0.25

Pitot ID:	7A-1			
Reference	S-Type	Air	Pitot	Deviation
Pitot	Pitot	Velocity	Coeff.	(absolute)
(in H2O)	(in H2O)	(ft/s)	Ср	
0.050	0.070	14.9	0.8367	0.0148
0.150	0.200	25.7	0.8574	0.0058
0.250	0.340	33.2	0.8489	0.0026
0.450	0.600	44.6	0.8574	0.0058
0.600	0.800	51.5	0.8574	0.0058
-		Average:	0.8515	0.0070

Pitot ID:	ST 8A			
Reference	S-Type	Air	Pitot	Deviation
Pitot	Pitot	Velocity	Coeff.	(absolute)
(in H2O)	(in H2O)	(ft/s)	Ср	
0.060	0.085	16.3	0.8318	0.0069
0.115	0.160	22.5	0.8393	0.0006
0.360	0.490	39.9	0.8486	0.0099
0.590	0.820	51.0	0.8398	0.0011
0.660	0.930	54.0	0.8340	0.0047
-		Average:	0.8387	0.0046

Pitot ID:	7A			
Reference	S-Type	Air	Pitot	Deviation
Pitot	Pitot	Velocity	Coeff.	(absolute)
(in H2O)	(in H2O)	(ft/s)	Ср	
0.050	0.070	14.9	0.8367	0.0056
0.190	0.260	29.0	0.8463	0.0040
0.240	0.330	32.6	0.8443	0.0020
0.500	0.690	47.0	0.8427	0.0005
0.650	0.900	53.6	0.8413	0.0009
		Average:	0.8423	0.0026

Pitot ID:	ST 8B			
Reference	S-Type	Air	Pitot	Deviation
Pitot	Pitot	Velocity	Coeff.	(absolute)
(in H2O)	(in H2O)	(ft/s)	Ср	
0.030	0.040	11.5	0.8574	0.0067
0.150	0.200	25.7	0.8574	0.0067
0.240	0.340	32.6	0.8318	0.0189
0.460	0.610	45.1	0.8597	0.0090
0.630	0.860	52.8	0.8473	0.0034
		Average:	0.8507	0.0089

	Pitot ID:	AL GVRD 1			
	Reference	S-Type	Air	Pitot	Deviation
	Pitot	Pitot	Velocity	Coeff.	(absolute)
	(in H2O)	(in H2O)	(ft/s)	Ср	
	0.060	0.085	16.3	0.8318	0.0172
	0.140	0.190	24.9	0.8498	0.0008
	0.230	0.310	31.9	0.8527	0.0038
	0.410	0.550	42.6	0.8548	0.0058
	0.680	0.910	54.8	0.8558	0.0068
,			Average:	0.8490	0.0069

Pitot ID:	ST 8C			
Reference	S-Type	Air	Pitot	Deviation
Pitot	Pitot	Velocity	Coeff.	(absolute)
(in H2O)	(in H2O)	(ft/s)	Ср	
0.070	0.100	17.6	0.8283	0.0051
0.250	0.350	33.2	0.8367	0.0033
0.300	0.420	36.4	0.8367	0.0033
0.450	0.650	44.6	0.8237	0.0096
0.650	0.900	53.6	0.8413	0.0080
<u> </u>		Average:	0.8334	0.0059

	Pitot ID:	7C			
	Reference	S-Type	Air	Pitot	Deviation
	Pitot	Pitot	Velocity	Coeff.	(absolute)
	(in H2O)	(in H2O)	(ft/s)	Ср	
	0.045	0.060	14.1	0.8574	0.0079
	0.120	0.160	23.0	0.8574	0.0079
	0.250	0.340	33.2	0.8489	0.0005
	0.490	0.680	46.5	0.8404	0.0090
	0.660	0.910	54.0	0.8431	0.0063
,	<u> </u>	_	Average:	0.8494	0.0063

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

Calibrated by: Michael Goods Signature: \_\_\_\_\_\_ Date: January 1, 2021

<sup>\*</sup> Average absolute deviation must not exceed 0.01.

#### A. LANFRANCO and ASSOCIATES INC.

**ENVIRONMENTAL CONSULTANTS** 

#### **TEMPERATURE CALIBRATION FORM**

Calibrated by: Justin Ching
Date: 07-Jan-21

Signature:

#### **TEMPERATURE DEVICE CALIBRATIONS**

Reference Device								Temp	erature Set	tings (degre	es F)					
Model CL23A Calib	rator		3	32	100		200		30	00	5(	00	80	00	1700	
Device	ALA#	Serial #	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation	Reading	Variation
Omega HH11A	3	300132	32.3	0.06%	99.3	-0.13%	200	0.00%	301	0.13%	498	-0.21%	798	-0.16%	1698	-0.09%
Omega HH11A	4	200167		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
Omega HH11A	6	600059	33.1	0.22%	100	0.00%	202	0.30%	302	0.26%	499	-0.10%	798	-0.16%	1697	-0.14%
TPI 341K	7	2.0315E+10	30.5	-0.31%	98.3	-0.30%	198.1	-0.29%	298	-0.26%	497	-0.31%	796.4	-0.29%	1693	-0.32%
TPI 341K	8	2.0313E+10	32.1	0.02%	99.3	-0.13%	200.5	0.08%	299.9	-0.01%	499.3	-0.07%	798.7	-0.10%	1696	-0.19%
Cont Cmpny	10	102008464	30.2	-0.37%	97.5	-0.45%	197.8	-0.33%	297.7	-0.30%	497.7	-0.24%	795.9	-0.33%	1693.8	-0.29%
Omega HH11	14	409426		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	16	400120029	30.7	-0.26%	99	-0.18%	199.4	-0.09%	299.2	-0.11%	499.6	-0.04%	800.2	0.02%	1703	0.14%
TPI 341K	18	2.0329E+10	31	-0.20%	98.9	-0.20%	198.9	-0.17%	298.7	-0.17%	498.5	-0.16%	798.4	-0.13%	1698	-0.09%
TPI 341K	20	2.0329E+10	30	-0.41%	98.2	-0.32%	198.1	-0.29%	297.7	-0.30%	497.2	-0.29%	797.1	-0.23%	1696	-0.19%
TPI 341K	22	2.0329E+10	30.5	-0.31%	98.6	-0.25%	198.5	-0.23%	298.3	-0.22%	497.7	-0.24%	797.4	-0.21%	1696	-0.19%
Reference device is	a NIST ca	rtified digital th	ermocounle	calibrator												

Reference device is a NIST certified digital thermocouple calibrator

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

#### **Calibration Certificate**

Date:19-Jan-21Insrtument Calibrated:Testo 1 (330-2LL)Calibrated by:Scott FergusonSerial #:03101345Authorizing Signature:ALA

Ambient Conditions: Temperature: 9 °C Barometric Pressure: 102.3 kPa Relative Humidity: 90%

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

O <sub>2</sub>		Initial Evaluation	on						
Gas	Instrument Reading (vol %)	% Calibration Error	ibration Error Pass/Fail Notes		Instrument Reading (vol %)	% Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero O <sub>2</sub> Ambient	0.3 10.9 21.1	0.30 0.07 0.15	Pass Pass Pass	Recal on Amb	0 11.0 21.0	0.00 0.03 0.00	Pass Pass Pass		0 10.97 20.95

Performance Specification: +/- 1% O<sub>2</sub> (absolute diff)

CO		Initial Evaluation	on						
Gas	Instrument Reading (ppm)	% Calibration Error	alibration Error Pass/Fail		Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero 1 Gas 2 Gas	0 279 1990	0.0% 11.2% 3.6%	Pass Fail Pass	Recal w 2 Gas	0 251 1918	0.0% 0.0% 0.1%	Pass Pass Pass		0 251 1920

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

NO	Inchument	Initial Evaluation	on		Certified Value				
Gas	Instrument Reading (ppm)	% Calibration Error	on Error Pass/Fail Note		Instrument Reading (ppm)	% Calibration Error	Error Pass/Fail Not		(ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	45	1.3%	Pass		46	0.9%	Pass		46
2 Gas	102	0.9%	Pass	Recal w 2 Gas	103	0.1%	Pass		102.9

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

#### **NIST Traceable Calibration Gases:**

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	O <sub>2</sub> (Vol. %)	CO (ppm)	NO (ppm)
Zero Gas (N <sub>2</sub> )	340943	21/Jan/2020	24/Aug/2021	500	0	0	0
1 Gas 2 Gas	CC14093 CC711737	5/Aug/2019 24/Feb/2020	6/Aug/2027 25/Feb/2028	900 800	-	251 1920	45.6 102.9
O <sub>2</sub> /CO <sub>2</sub>	CC168470	27/Jul/2020	28/Jul/2028	1500	10.97	-	-

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

#### **Calibration Certificate**

 Date:
 18-Jan-21
 Insrtument Calibrated:
 Testo 2 (330-2LX)

 Calibrated by:
 Scott Ferguson
 Serial #:
 03282252

 Authorizing Signature:
 ALA
 Customer:
 ALA

Ambient Conditions: Temperature:8 °C Barometric Pressure: 101.8 kPa Relative Humidity: 92%

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

O <sub>2</sub>		Initial Evaluation	on						
Gas	Instrument Reading (vol %)	% Calibration Error	Error Pass/Fail Notes		Instrument Reading (vol %)	% Calibration Error	Pass/Fail Notes		Certified Value (vol %)
Zero	0.1	0.10	Pass		0	0.00	Pass		0
O <sub>2</sub> Ambient	11.0 21.1	0.16 0.14	Pass Pass	Recal	10.9 21.0	0.01 0.04	Pass Pass		10.84 20.96

Performance Specification: +/- 1% O<sub>2</sub> (absolute diff)

CO		Initial Evaluati	on						
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Instrument Notes Reading (ppm)		% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	0	0.0%	Pass		0	0.0%	Pass		0
1 Gas	1932	0.6%	Pass		1921	0.1%	Pass		1920
2 Gas	259	3.1%	Pass	Recal	251	0.1%	Pass		251

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

Instrument	Initial Evaluation	on		Instrument	Certified Value			
Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Reading (ppm)	% Calibration Error	Pass/Fail	Notes	(ppm)
0	0.0%	Pass		0	0.0%	Pass		0
102	0.9%	Pass	Recal	103	0.1%	Pass		103
46	0.9%	Pass		46	0.9%	Pass		45.61
	0 102	Instrument   % Calibration Error	Reading (ppm)         % Calibration Error         Pass/Fail           0         0.0%         Pass           102         0.9%         Pass	Instrument   Reading (ppm)   % Calibration Error   Pass/Fail   Notes	Instrument Reading (ppm)         % Calibration Error         Pass/Fail         Notes         Reading (ppm)           0         0.0%         Pass         0           102         0.9%         Pass         Recal         103	Instrument   Reading (ppm)   % Calibration Error   Pass/Fail   Notes   Reading (ppm)   % Calibration Error	Instrument Reading (ppm)  Calibration Error  Pass/Fail  Notes  Instrument Reading (ppm)  Calibration Error  Pass/Fail  O 0.0% Pass 102  Pass Recal  O 0.0% Pass 103  O.1%  Pass Pass	Instrument Reading (ppm)  Calibration Error  Pass/Fail  Notes  Instrument Reading (ppm)  Calibration Error  Pass/Fail  Notes  0 0.0%  Pass 102  0.9%  Pass  Recal  103  0.1%  Pass

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

#### **NIST Traceable Calibration Gases:**

Cylinder	Cylinder ID Number	<b>Certification Date</b>	Expiration Date	Cylinder Pressure (PSI)	O <sub>2</sub> (Vol. %)	CO (ppm)	NO (ppm)
Zero Gas (N <sub>2</sub> )	340943	21/Jan/2020	21/Aug/2024	500	0	0	0
1 Gas	CC711737		25/Feb/2028	800	-	1920	102.9
2 Gas O <sub>2</sub> /CO <sub>2</sub>	CC140943 CC168470	5/Aug/2019 27/Jul/2020	6/Aug/2027 28/Jul/2028	900 1500	- 10.84	251.3	45.61 -

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



# Shawn Harrington

has met the requirements of

# Stack Testing for Pollutants (CHSC 7760)

School of Process, Energy and Natural Resources Chemical Sciences Program

Endorsed by:





Environment Canada

Environnement



**British Columbia** Ministry of

JUNE 21, 2001

School of Process, Energy and Natural Resources

Marsh Hemekey, Dean

# MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

## Jeremy Shawn Gibbs

has successfully completed

**Stack Sampling** 

35 Hours / 2019

May 22, 2019

Date





# MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

### **Scott Ferguson**

has successfully completed

Stack Sampling

2016

May 16, 2016

Date

Clarke Seben Dean

Dean
Faculty of Continuing Education and Extension

