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## Wood Buffalo Environmental Association

# MARCH 2024 MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING
April 30, 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

## AMS01 BERTHA GANTER - FORT MCKAY MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 5, 2024

Start time (MST): 11:11 Routine Reason:

Station number: AMS01

February 5, 2024 Last Cal Date:

End time (MST):

14:41

#### **Calibration Standards**

Cal Gas Concentration: 49.21

Cal Gas Cylinder #: CC418809

Removed Cal Gas Conc: 49.21

Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: March 10, 2031

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3565

Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

ppm

Calibration slope: 1.001365 Calibration intercept: -0.173166

0.997052 -0.112969 Backgd or Offset: Coeff or Slope: Start 19.7 0.891 **Finish** 19.5 0.885

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.4	
as found span	4918	81.3	800.3	802.9	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4918	81.3	800.3	798.5	1.002
second point	4959	40.7	400.6	397.9	1.007
third point	4979	20.3	199.8	199.1	1.004
as left zero	5000	0.0	0.0	0.7	
as left span	4918	81.3	800.3	796.5	1.005
			Averag	ge Correction Factor	1.004
Baseline Corr As found:	802.50	Previous response	801.19	*% change	0.2%

Baseline Corr As found: 802.50 Previous response 801.19 \*% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By: Rene Chamberland



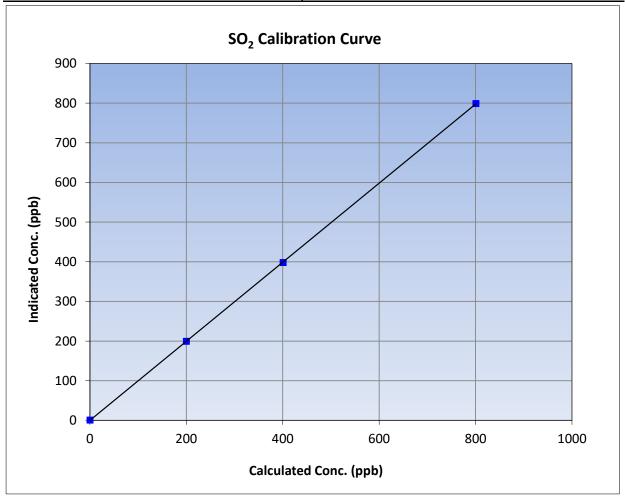
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 5, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:11 End Time (MST): 14:41 Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

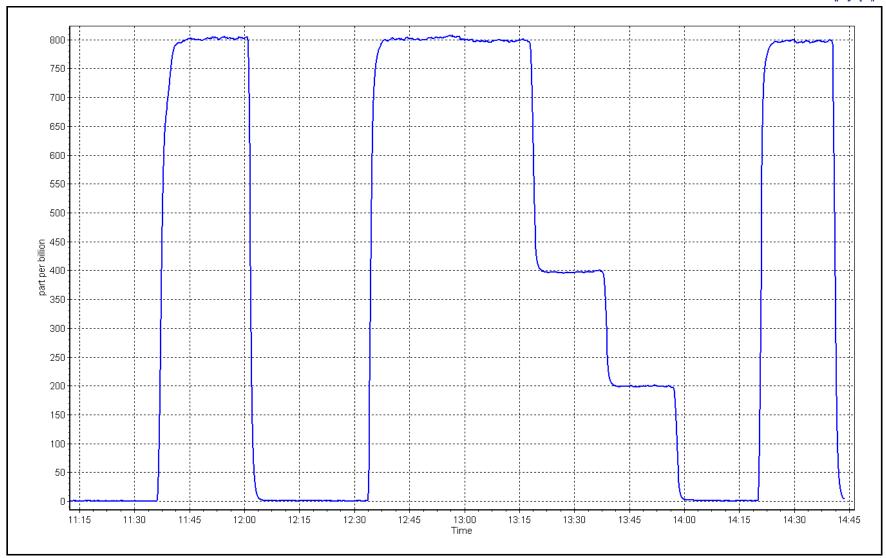
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999991	≥0.995
800.3	798.5	1.0022	Correlation Coefficient	0.555551	20.333
400.6	397.9	1.0068	Slope	0.997052	0.90 - 1.10
199.8	199.1	1.0036	Slope	0.997032	0.90 - 1.10
			Intercept	-0.112969	+/-30



SO2 Calibration Plot

Date: February 5, 2024







## **TRS Calibration Report**

Station number:

AMS01

13:18

Version-11-2021

**Station Information** 

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 18, 2024 Last Cal Date: February 7, 2024

Start time (MST): 9:09 End time (MST):

Routine Reason:

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: September 16, 2024 5.10 ppm

Cal Gas Cylinder #: CC511749

Removed Cal Gas Conc: Rem Gas Exp Date: N/A 5.10 ppm Removed Gas Cyl #: Diff between cyl: N/A

Calibrator Make/Model: Teledyne API T700 Serial Number: 3565

ZAG Make/Model: Teledyne API T701 Serial Number: 4890

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

Converter serial #: 470 Converter make: CD Nova

Analyzer Range 0 - 100 ppb

**Finish** <u>Finish</u> <u>Start</u> <u>Start</u> 2.43 1.002936 Backgd or Offset: Calibration slope: 0.997793 2.45

Calibration intercept: 0.179996 0.199998 Coeff or Slope: 0.937 0.931

#### **TRS As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4921	78.4	80.0	80.5	0.994
as found 2nd point	4960	39.2	40.0	40.5	0.988
as found 3rd point	4980	19.6	20.0	20.2	0.990
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	78.4	80.0	80.4	0.995
second point	4960	39.2	40.0	40.4	0.990
third point	4980	19.6	20.0	20.2	0.990
as left zero	5000	0.0	0.0	0.3	
as left span	4921	78.4	80.0	80.5	0.994
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chang	ge:	December 17, 2021		Ave Corr Factor	0.992

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	0.992
Date of last converter efficiency test:			efficiency

80.5 Baseline Corr As found: 80.00 Prev response: \*% change: 0.6% 1.006365 0.079997 Baseline Corr 2nd AF pt: 40.5 AF Slope: AF Intercept: Baseline Corr 3rd AF pt: 20.2 AF Correlation: 0.999988 \* = > +/-5% change initiates investigation

Inlet filter change and scrubber check completed after as founds. Adjusted span only. Notes:

Calibration Performed By: Rene Chamberland



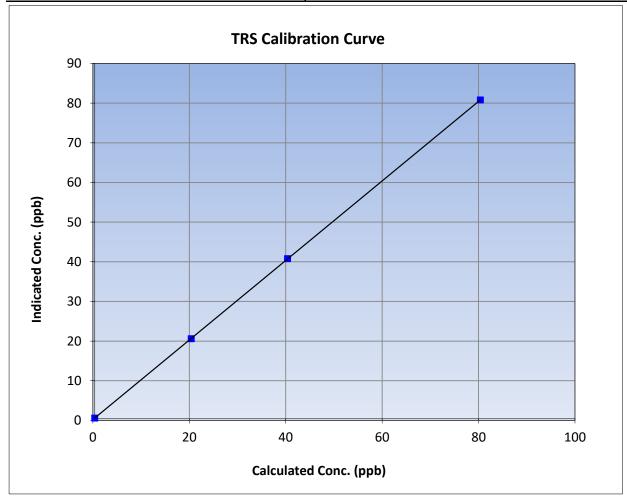
## **TRS Calibration Summary**

Version-11-2021

#### **Station Information**

Calibration Date: March 18, 2024 **Previous Calibration:** February 7, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:09 End Time (MST): 13:18 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

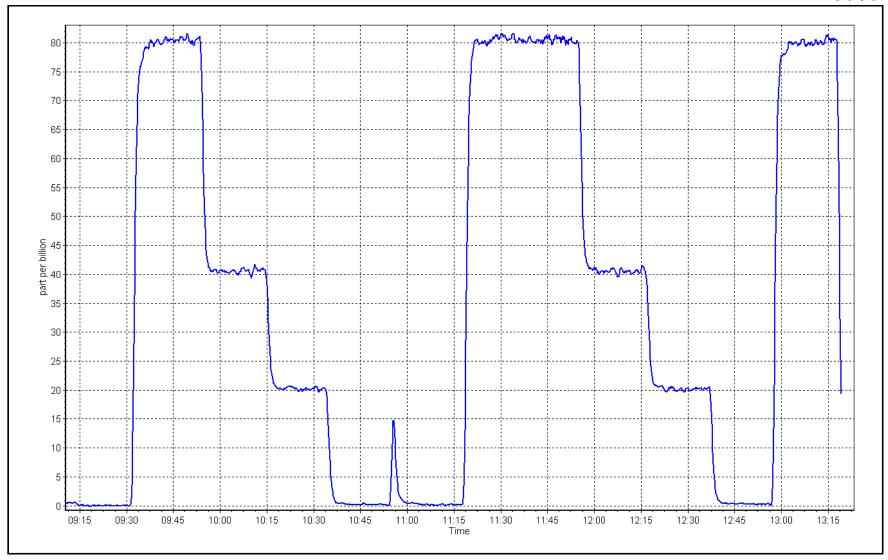
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999997	≥0.995
80.0	80.4	0.9949	Correlation Coefficient	0.555557	20.333
40.0	40.4	0.9901	Slope	1.002936	0.90 - 1.10
20.0	20.2	0.9900	Slope	1.002930	0.90 - 1.10
			- Intercept	0.199998	+/-3





Date: March 18, 2024







## H<sub>2</sub>S Calibration Report

Station number:

AMS01

Version-11-2021

**Station Information** 

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 18, 2024 Last Cal Date: February 7, 2024

Start time (MST): 9:09 End time (MST): 13:18

Routine Reason:

**Calibration Standards** 

Cal Gas Exp Date: September 16, 2024 Cal Gas Concentration: 5.10 ppm

Cal Gas Cylinder #: CC511749

Removed Cal Gas Conc: Rem Gas Exp Date: N/A 5.10 ppm Removed Gas Cyl #: Diff between cyl: N/A

Calibrator Make/Model: Teledyne API T700 3565 Serial Number:

ZAG Make/Model: Teledyne API T701 Serial Number: 4890

**Analyzer Information** 

Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

Converter make: Global Converter serial #: 2022-221

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> 1.005285 Backgd or Offset: 2.04 2.02 Calibration slope: 1.002571 -0.003216 Calibration intercept: 0.116774 Coeff or Slope: 0.992 0.985

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4922	78.4	80.0	80.9	0.988
as found 2nd point	4960	39.2	40.0	40.6	0.985
as found 3rd point	4980	19.6	20.0	20.2	0.990
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4922	78.4	80.0	80.4	0.995
second point	4960	39.2	40.0	40.2	0.995
third point	4980	19.6	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.4	80.0	80.6	0.992
SO2 Scrubber Check	4919	81.3	813.0	0.1	
Date of last scrubber chan	ge:	January 25, 2024		Ave Corr Factor	0.995
Date of last converter effic	ciency test:				efficiency

Date of last scrubber change:	January 25, 2024	Ave Corr Factor	0.995
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 80.9 80.28 Prev response: \*% change: 0.8% Baseline Corr 2nd AF pt: 40.6 AF Slope: 1.012057 AF Intercept: 0.016754 Baseline Corr 3rd AF pt: 20.2 0.999995 AF Correlation:

\* = > +/-5% change initiates investigation

Inlet filter change and scrubber check completed after as founds. Adjusted span only. Notes:

Calibration Performed By: Rene Chamberland



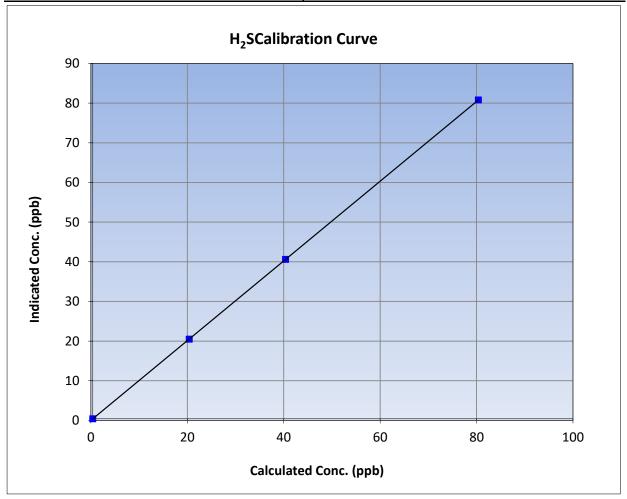
# H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

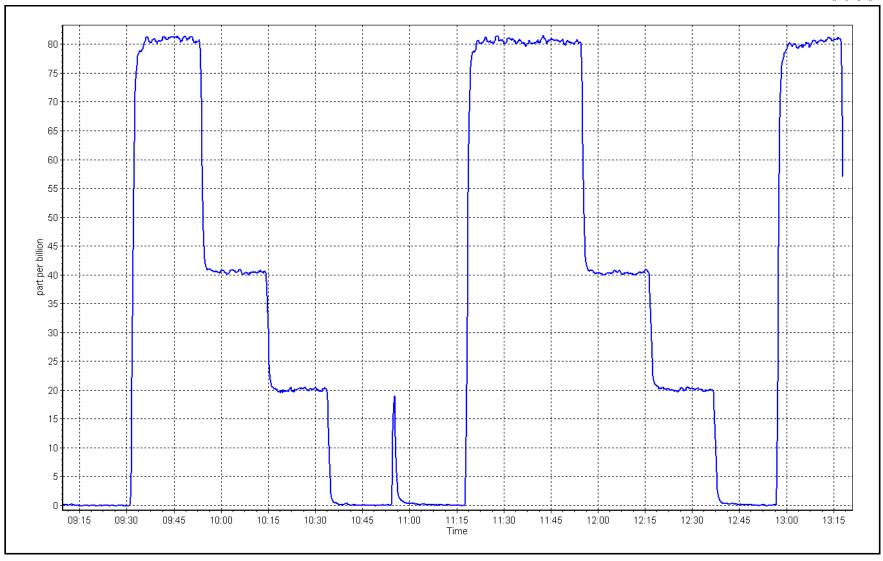
Calibration Date: March 18, 2024 **Previous Calibration:** February 7, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:09 End Time (MST): 13:18 Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	1.000000	≥0.995
80.0	80.4	0.9947	Correlation Coefficient	1.000000	20.333
40.0	40.2	0.9950	Slope	1.005285	0.90 - 1.10
20.0	20.1	0.9949	Slope	1.003283	0.90 - 1.10
			- Intercept	-0.003216	+/-3



Date: March 18, 2024







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 5, 2024

Start time (MST): 11:11 Routine Reason:

Station number: AMS01

Last Cal Date: February 5, 2024

End time (MST): 14:41

Removed Gas Expiry: NA

#### **Calibration Standards**

Gas Cert Reference: CC418809 Cal Gas Expiry Date: March 10, 2031

CH4 Cal Gas Conc. 497.2 CH4 Equiv Conc. 1061.8 ppm ppm

205.3 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NΑ

Removed CH4 Conc. 497.2 CH4 Equiv Conc. 1061.8 ppm ppm

Removed C3H8 Conc. 205.3 Diff between cyl (THC): ppm

Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1180320040

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 4.30E-04 4.30E-04 NMHC SP Ratio: 7.20E-05 7.18E-05 CH4 Retention time: 16.7 16.7 NMHC Peak Area: 127929 127593 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	17.27	17.22	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4918	81.3	17.27	17.29	0.999
second point	4959	40.7	8.64	8.53	1.014
third point	4980	20.3	4.31	4.25	1.016
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.27	17.30	0.998
			,	Average Correction Factor	1.009
Baseline Corr AF:	17.22	Prev response	17.23	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

Set Point	Dil air fl	NMHC Calibr		Ind cons ( \ /1-\	CE Limit 0.05 1.01
as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
	4918	0 81.3	0.00 9.18	0.00 9.10	1.009
as found span	4918	81.3	9.18	9.10	1.009
as found 2nd point					
as found 3rd point					
new cylinder response		0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00	4.005
high point	4918	81.3	9.18	9.14	1.005
second point	4959	40.7	4.60	4.55	1.011
third point	4980	20.3	2.29	2.26	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	9.18	9.19	1.000
				age Correction Factor	1.010
Baseline Corr AF:	9.10	Prev response	9.16	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	8.13	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4918	81.3	8.09	8.15	0.993
second point	4959	40.7	4.05	3.98	1.017
third point	4980	20.3	2.02	1.98	1.017
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	8.09	8.12	0.996
		<u> </u>	Avera	age Correction Factor	1.009
Baseline Corr AF:	8.13	Prev response	8.07	*% change	0.7%
	8.13 NA	Prev response AF Slope:	8.07	*% change AF Intercept:	0.7%
Baseline Corr 2nd AF:		•	8.07	•	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 2nd AF:	NA	AF Slope: AF Correlation:		AF Intercept:	
Baseline Corr 2nd AF:	NA	AF Slope: AF Correlation: Calibration		AF Intercept: * = > +/-5% change initiat	
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope: THC Cal Offset:	NA	AF Slope: AF Correlation: Calibration Start		AF Intercept:  * = > +/-5% change initiat  Finish	

Notes: Changed out the inlet filter after as founds. Adjusted span only.

1.002874

-0.035591

0.998167

-0.005978

Calibration Performed By: Rene Chamberland

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

1.008062

-0.039196

0.995931

-0.013994



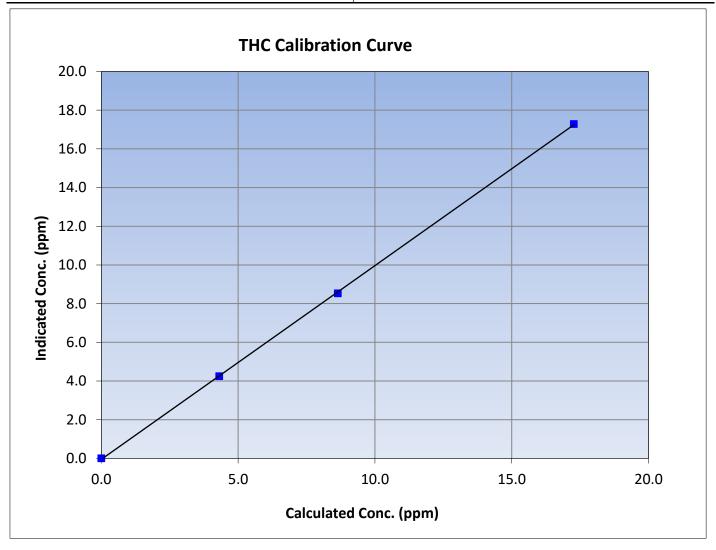
# **THC Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 5, 2024 Station Name: AMS01 Bertha Ganter-Fort McKay Station Number: Start Time (MST): 11:11 End Time (MST): 14:41 Analyzer make: Thermo 55i Analyzer serial #: 1180320040

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999933	≥0.995
17.27	17.29	0.9990	Correlation Coemicient	0.55555	20.333
8.64	8.53	1.0135	Slope	1.001618	0.90 - 1.10
4.31	4.25	1.0155	Siope	1.001018	0.90 - 1.10
			Intercept	-0.052990	+/-0.5





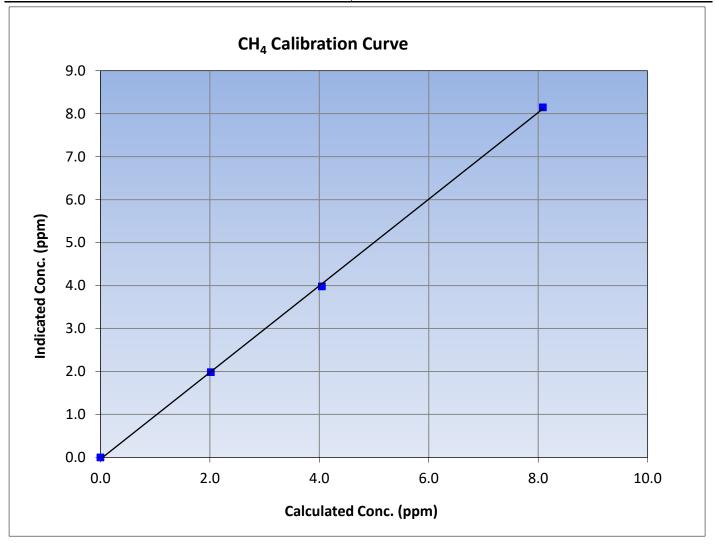
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 5, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:11 End Time (MST): 14:41 Analyzer make: Analyzer serial #: 1180320040 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.000034		
8.09	8.15	0.9927	Correlation Coemicient	0.999821	≥0.995	
4.05	3.98	1.0169	Slope	1.008062	0.90 - 1.10	
2.02	1.98	1.0175	Slope	1.008002	0.90 - 1.10	
			Intercept	-0.039196	+/-0.5	





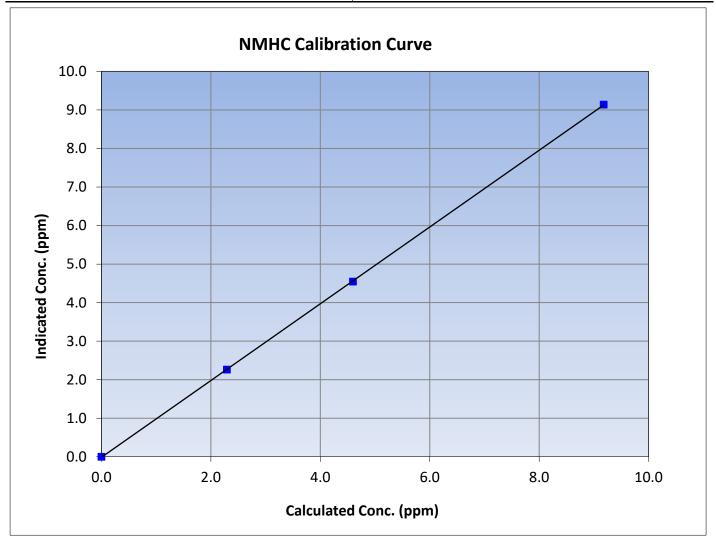
# **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 5, 2024 Station Name: AMS01 Bertha Ganter-Fort McKay Station Number: Start Time (MST): 11:11 End Time (MST): 14:41 Analyzer make: Thermo 55i Analyzer serial #: 1180320040

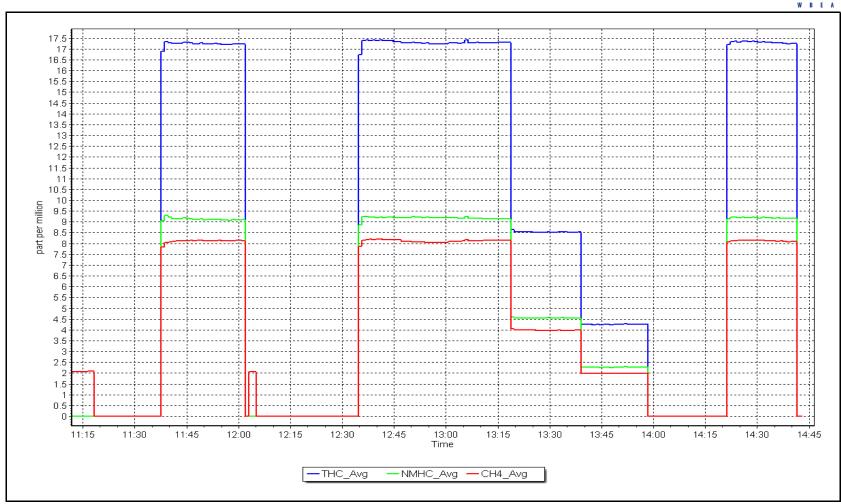
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999986	≥0.995	
9.18	9.14	1.0045	Correlation Coemicient	0.555560	20.333	
4.60	4.55	1.0108	Slope	0.995931	0.90 - 1.10	
2.29	2.26	1.0138	Slope	0.555551	0.90 - 1.10	
			Intercept	-0.013994	+/-0.5	



**NMHC Calibration Plot** 

Date: March 5, 2024







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Station number: AMS01

End time (MST): 15:51

Last Cal Date: February 26, 2024

Version-04-2020

#### **Station Information**

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 14, 2024

Start time (MST): 10:32

Reason: Routine

## **Calibration Standards**

NO Gas Cylinder #: CC335700 Cal Gas Expiry Date: September 1, 2032

NOX Cal Gas Conc: 59.40 ppm NO Cal Gas Conc: 59.20 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 59.40 ppm Removed Gas NO Conc: 59.20 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1218153357

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.556 1.496 NO bkgnd or offset: 7.6 7.4 NOX coeff or slope: 0.999 0.999 NOX bkgnd or offset: 7.6 7.5 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 196.0 200.1

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.000310	0.999371
NO <sub>x</sub> Cal Offset:	-0.160000	0.020000
NO Cal Slope:	1.001719	1.000862
NO Cal Offset:	-0.920000	-1.220000
NO <sub>2</sub> Cal Slope:	0.995800	0.995953
NO <sub>2</sub> Cal Offset:	-0.397873	0.117298



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.3	0.4		
as found span	4932	67.6	803.1	800.4	2.7	868.0	860.8	7.3	0.9252	0.9298
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.3	0.3		
high point	4932	67.6	803.1	800.4	2.7	802.8	800.6	2.1	1.0004	0.9997
second point	4966	33.8	401.5	400.2	1.4	401.3	398.6	2.7	1.0006	1.0040
third point	4983	16.9	200.8	200.1	0.7	199.9	197.5	2.4	1.0044	1.0131
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3		
as left span	4932	67.6	803.1	398.7	404.4	797.1	392.0	405.1	1.0075	1.0171
							Average C	Correction Factor	1.0018	1.0056
Corrected As fo	ound NO <sub>X</sub> =	867.3 ppb	NO :	= 860.5 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	7.4%
Previous Respo	nse NO <sub>x</sub> =	803.2 ppb	NO :	= 800.8 ppb				*Percent Chan	ge NO =	6.9%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO :	NA ppb	As foun	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO :	NA ppb	As foun	d NO r <sup>2</sup> :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	PT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	797.3		395.6	404.4		403.5	1.0022	2	99.8%
2nd GPT point	(200 ppb O3)	797.3		593.0	207.0		204.7	1.0113	3	98.9%
3rd GPT point	(100 ppb O3)	797.3		699.4	100.6	·	101.1	0.9952	L	100.5%

Notes:

Changed the inlet filter after as founds. Adjusted span only.

Average Correction Factor

1.0029

Calibration Performed By:

Rene Chamberland

99.7%



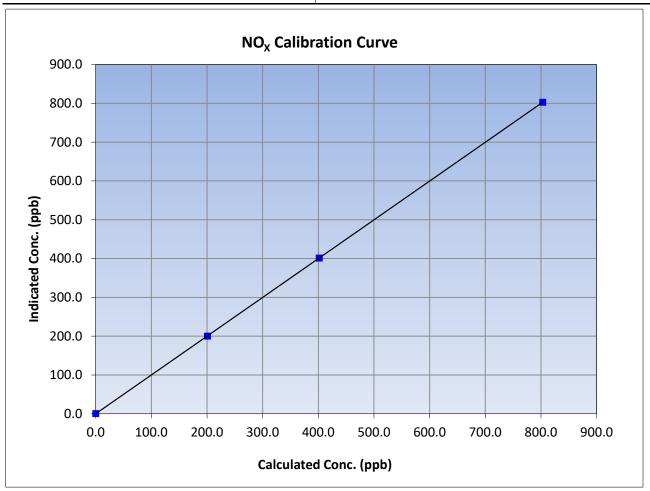
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 26, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:32 End Time (MST): 15:51 Analyzer serial #: Analyzer make: Thermo 42i 1218153357

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999997	≥0.995
803.1	802.8	1.0004	correlation coemicient	0.55557	20.333
401.5	401.3	1.0006	Slope	0.999371	0.90 - 1.10
200.8	199.9	1.0044	Slope	0.999571	0.90 - 1.10
			Intercept	0.020000	+/-20





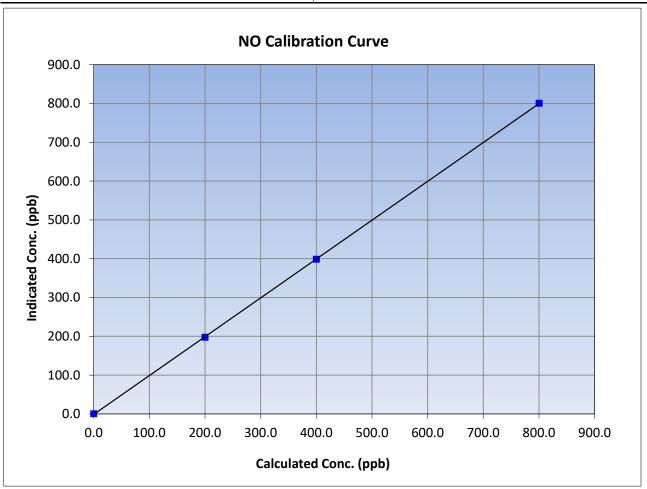
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 26, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:32 End Time (MST): 15:51 Analyzer make: Analyzer serial #: Thermo 42i 1218153357

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999984	≥0.995
800.4	800.6	0.9997	Correlation Coefficient	0.555504	20.993
400.2	398.6	1.0040	Slope	1.000862 <i>0.90</i> -	0.90 - 1.10
200.1	197.5	1.0131	Slope	1.000602	0.90 - 1.10
			Intercept	-1.220000	+/-20





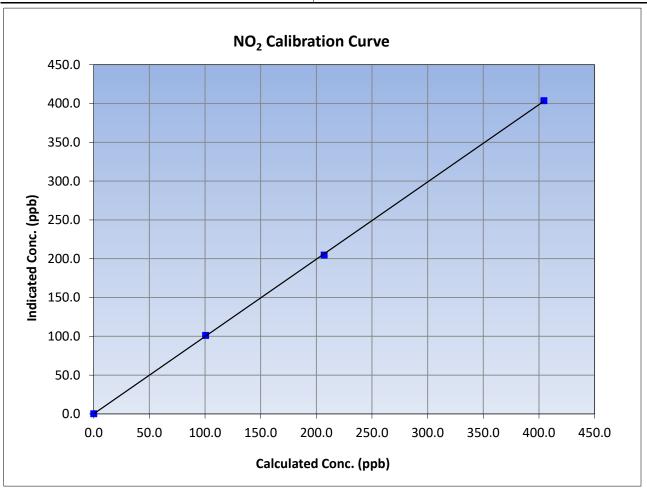
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 26, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:32 End Time (MST): 15:51 Analyzer serial #: Analyzer make: Thermo 42i 1218153357

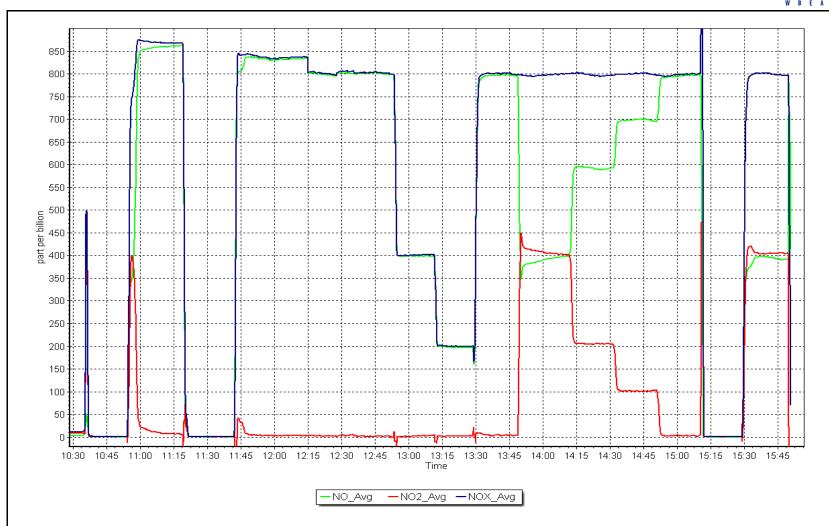
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999960	≥0.995
404.4	403.5	1.0022	correlation coefficient	0.999900	20.333
207.0	204.7	1.0113	Slope	0.995953	0.90 - 1.10
100.6	101.1	0.9951	Siope	0.555555	0.90 - 1.10
	<u> </u>		Intercept	0.117298	+/-20



NO<sub>x</sub> Calibration Plot

Date: March 14, 2024







# O<sub>3</sub> Calibration Report

Version-01-2020

#### Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 6, 2024 Last Cal Date: February 2, 2024

Start time (MST): 10:42 Reason: Routine End time (MST): 13:30

Station number: AMS01

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3565 Teledyne API T701 Serial Number: 4890 ZAG Make/Model:

**Analyzer Information** 

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 1107

**Finish** Start Calibration slope: 0.999143

1.001057

Start Backgd or Offset: 5.3 Coeff or Slope:

Finish 5.5

Calibration intercept: 1.000000

0.640000

1.015

1.044

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration (	Correction factor (Cc/Ic)
Set Pollit	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	5000	863.1	400.0	390.8	1.024
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.2	
high point	5000	863.1	400.0	400.6	0.999
second point	5000	742.5	200.0	201.4	0.993
third point	5000	651.7	100.0	101.5	0.985
as left zero	5000	0.0	0.0	0.0	
as left span	5000	863.1	400.0	400.7	0.998
			Averag	ge Correction Factor	0.992

Baseline Corr As found: 390.9 400.7 Previous response \*% change -2.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Adjusted span only.

Rene Chamberland Calibration Performed By:



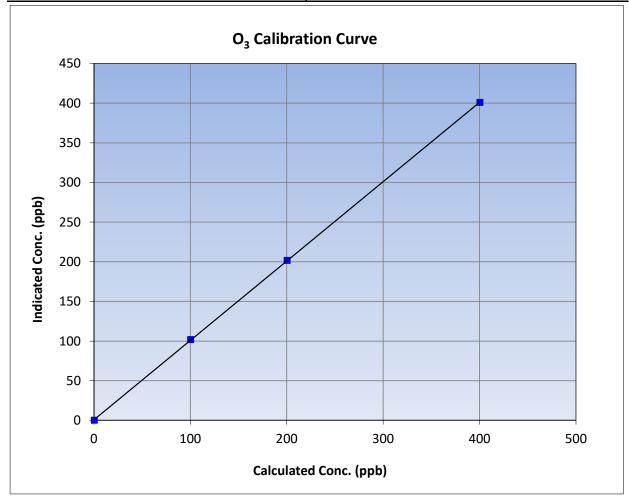
# O<sub>3</sub> Calibration Summary

Version-01-2020

#### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 2, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:42 End Time (MST): 13:30 Analyzer make: Teledyne API T400 Analyzer serial #: 1107

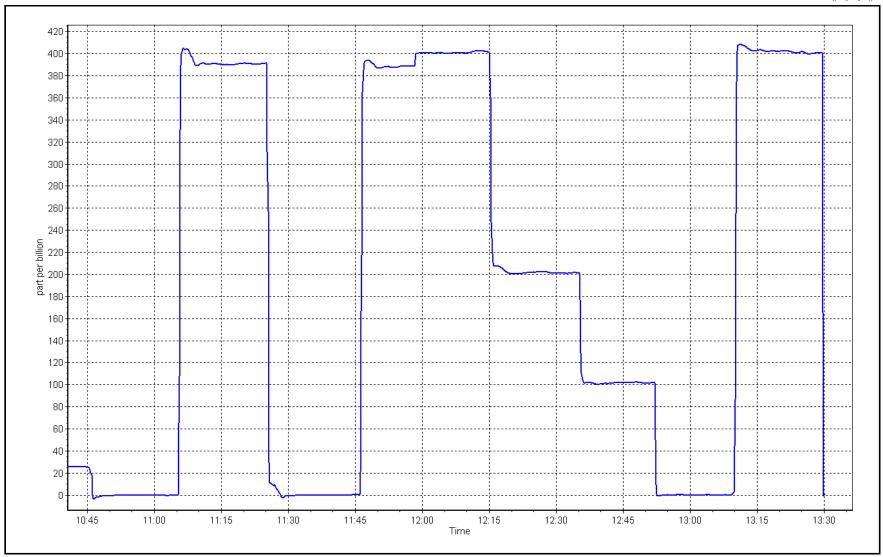
	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	-0.2		Correlation Coefficient	0.999980	≥0.995					
400.0	400.6	0.9985	Correlation coefficient	0.999980	20.993					
200.0	201.4	0.9930	Slope	1.001057	0.90 - 1.10					
100.0	101.5	0.9852	Slope	1.001037	0.90 - 1.10					
			- Intercept	0.640000	+/- 5					



O<sub>3</sub> Calibration Plot

Date: March 6, 2024







## **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informatio	n		
Station Name: Calibration Date: Start time (MST):	Fort McKay - Bertha March 18, 2024 12:10	Ganter	Station number: AM Last Cal Date: Fel End time (MST): 13:	oruary 27, 2024	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N: 324	4	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		S/N: 388 S/N: 388		
		Monthly Calibration	Гest		
<u>Parameter</u> T (°C) P (mmHg) Flow (LPM)	<u>As found</u> -1.7 740.4 5.03	<u>Measured</u> -2.41 739.69 5.16	<u>As left</u> -1.7 740.4 5.03	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
PW% (pump)	40		40		>80%
Zero Verification	PM w/o HEPA:	7.3	PM w/ HEPA:	0.0	<0.2 ug/m3
PM Inlet observation :  SPAN DUST  Parameter  PMT Peak Test	Refractive Index: Lot No.: As found	Quarterly Calibration 10.9 100128-050-042 Post maintenance	Test Expiry Date:  As left	June 10, 20.  Adjusted	( <i>Limits</i> )
Date Optical Cham Date Disposable Fil		January 26 January 26			
Post- maintenance Zero Ver	ification:	PM w/ HEPA: _		<0.2 ug/m3	
		Annual Maintenan	ce		
Date Sample Tub Date RH/T Senso		September : January 26	· -		
Notes:	\	erified flow, temperatu	re, and pressure. Leak	check passed.	
Calibration by:	Rene Chamberland				



## **CO Calibration Report**

Station number:

AMS01

Version-01-2020

#### **Station Information**

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 15, 2024 Last Cal Date: February 21, 2024

Start time (MST): 10:02 End time (MST): 13:04

Reason: Routine

#### **Calibration Standards**

Cal Gas Concentration: 3040 ppm Cal Gas Exp Date: December 1, 2028

Cal Gas Cylinder #: ALM042207

Removed Cal Gas Conc: 3040 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 3565 ZAG Make/Model: Teledyne API T701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Teledyne API T300 Analyzer serial #: 3520

Analyzer Range: 0 - 50 ppm

Start Finish Finish Start Calibration slope: 1.001370 1.000382 Backgd or Offset: -0.013 -0.013 Calibration intercept: 0.195846 Coeff or Slope: 0.989 0.989 0.145823

#### **CO Calibration Data** Calculated Correction factor Dilution air flow rate Source gas flow rate Indicated concentration Set Point concentration (ppm) (Cc/Ic) (sccm) (sccm) (ppm) (Ic) (Cc) Limit = 0.95-1.050.0 as found zero 5000 0.0 0.1 4933 66.7 40.6 40.7 0.998 as found span as found 2nd point as found 3rd point new cylinder response calibrator zero 0.0 5000 0.0 0.1 ---high point 4933 66.7 40.6 40.6 0.998 second point 4966 33.3 20.2 20.7 0.976 third point 4983 16.7 10.2 10.3 0.983 5000 0.0 0.0 0.1 as left zero ---as left span 2960 40.0 40.5 40.1 1.010 Average Correction Factor 0.986 Baseline Corr As found: 40.57 Prev response: 40.76 \*% change: -0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: NA

Notes: Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Rene Chamberland

\* = > +/-5% change initiates investigation



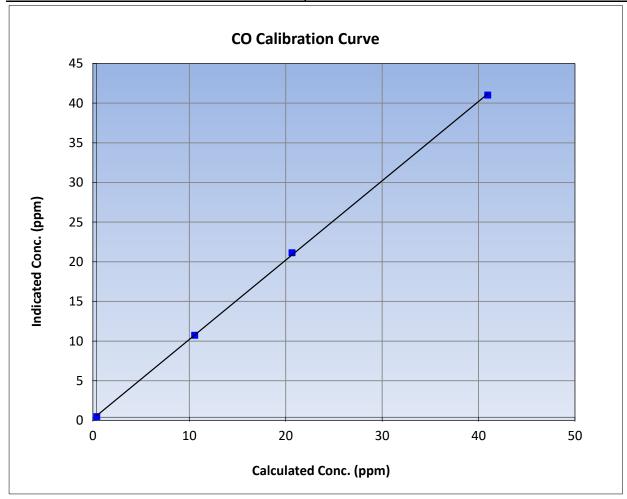
## **CO Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 15, 2024 **Previous Calibration:** February 21, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:02 End Time (MST): 13:04 Analyzer make: Teledyne API T300 Analyzer serial #: 3520

Calibration Data									
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999869	≥0.995				
40.6	40.6	0.9982	Correlation Coefficient	0.555605	20.993				
20.2	20.7	0.9763	Slope	1.000382	0.90 - 1.10				
10.2	10.3	0.9830	Slope	1.000362	0.90 - 1.10				
			- Intercept	0.195846	+/-1.5				

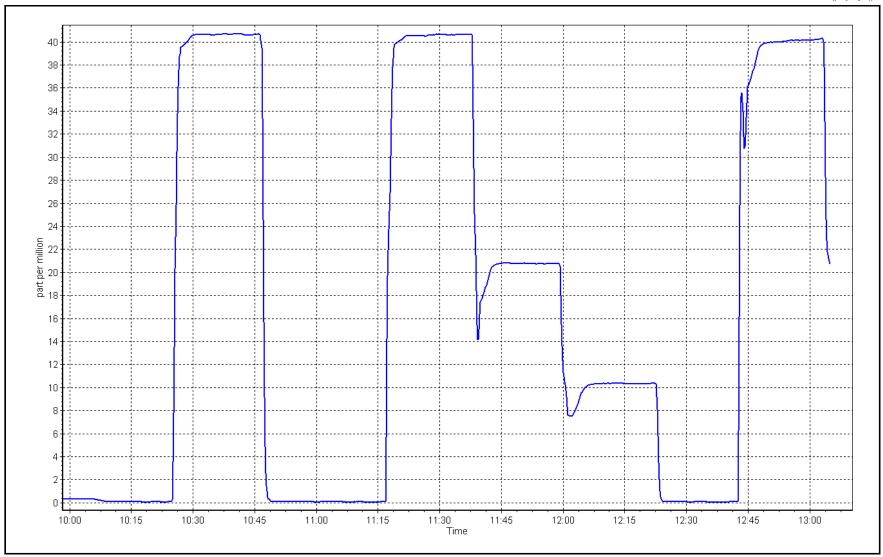


**CO Calibration Plot** 

Date:

March 15, 2024







# **CO<sub>2</sub> Calibration Report**

Station number:

End time (MST):

AMS01

13:46

Version-01-2020

#### **Station Information**

Station Name: Bertha Ganter-Fort McKay

March 12, 2024 February 6, 2024 Calibration Date: Last Cal Date:

Start time (MST): 10:13 Reason:

Routine

**Calibration Standards** 

Cal Gas Concentration: December 1, 2028 60,200 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: ALM042207

Removed Cal Gas Conc: 60,200 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: <u>NA</u>

Teledyne API T700 Calibrator Make/Model: Serial Number: 3565

N2 Gen Make/Model: Peak Sci NG5000 Serial Number: 7220900034

**Analyzer Information** 

Analyzer make: Teledyne API 360 Analyzer serial #: 442

Analyzer Range 0 - 2,000 ppm

Baseline Corr 3rd AF pt:

Start Finish Start Finish Backgd or Offset: Calibration slope: 0.998372 1.000907 0.045 0.045 Calibration intercept: -5.840000 -6.720000 Coeff or Slope: 0.876 0.876

CO<sub>2</sub> Calibration Data

		<del>-</del>			
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05
as found zero	3000	0.0	0.0	0.0	
as found span	2920	80.0	1605.3	1600.8	1.003
as found 2nd point	2960	40.0	802.7	793.9	1.011
as found 3rd point	2980	20.0	401.3	390.1	1.029
new cylinder response					_
calibrator zero	3000	0.0	0.0	0.0	
high point	2920	80.0	1605.3	1604.6	1.000
second point	2960	40.0	802.7	789.8	1.016
third point	2980	20.0	401.3	390.6	1.027
as left zero	3000	0.0	0.0	0.1	
as left span	2960	40.0	802.7	778.7	1.031
			Avera	ge Correction Factor	1.015
Baseline Corr As found: Baseline Corr 2nd AF pt:	1600.80 793.9	Prev response: AF Slope:	1596.88 0.998870	*% change: AF Intercept:	0.2% -5.340000
•		•		•	

Notes: Changed the inlet filter after as founds. No adjustments made.

AF Correlation:

0.999949

Calibration Performed By: Rene Chamberland

390.1

\* = > +/-5% change initiates investigation



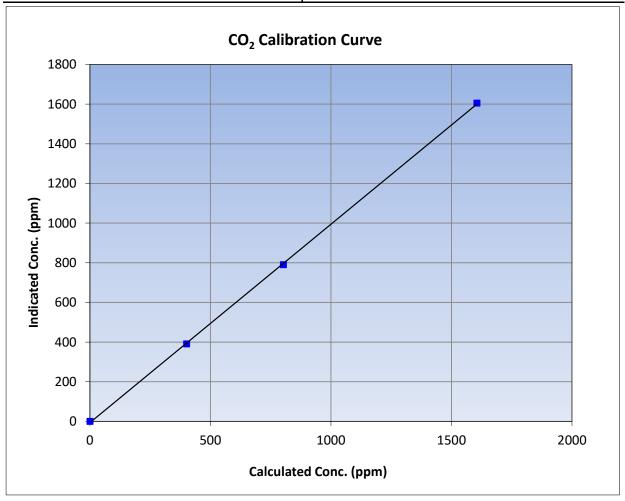
# CO<sub>2</sub> Calibration Summary

Version-01-2020

#### **Station Information**

Calibration Date	March 12, 2024	<b>Previous Calibration</b>	February 6, 2024
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS01
Start Time (MST)	10:13	End Time (MST)	13:46
Analyzer make	Teledyne API 360	Analyzer serial #	442

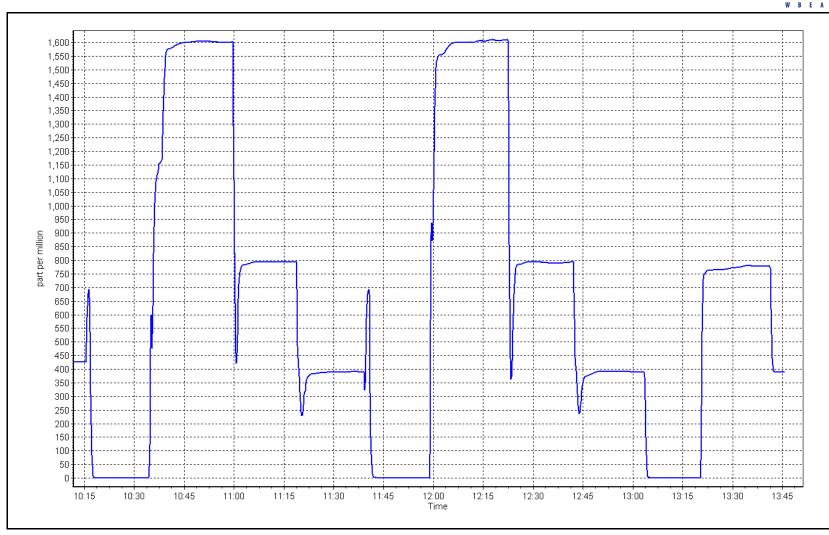
Calibration Data									
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999906	≥0.995				
1605.3	1604.6	1.0005	Correlation coefficient	0.999900	20.993				
802.7	789.8	1.0163	Slope	1.000907	0.90 - 1.10				
401.3	390.6	1.0275	- зюре	1.000907	0.30 - 1.10				
			- Intercept	-6.720000	+/-10				



CO<sub>2</sub> Calibration Plot

Date: March 12, 2024







## TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-05-2023

#### Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS01

NOX Cal Date: March 19, 2024 Last Cal Date: February 27, 2024

9:46 14:14 Start time (MST): End time (MST):

March 20, 2024 NH3 Cal Date: Last Cal Date: February 27, 2024

10:00 13:35 Start time (MST): End time (MST):

Routine Reason:

#### **Calibration Standards**

NOX Cal Gas Conc: CC335700 59.40 NO Gas Cylinder #: ppm

NO Cal Gas Conc: 59.20 NO Cal Gas Expiry: September 1, 2032 ppm

Removed NOX Conc: 59.40 Removed Cylinder #: ppm NA 59.20 NA Removed NO Conc: ppm Removed cyl Expiry:

NO gas Diff:

NH3 Cal Gas Conc: 76.58 NH3 Gas Cylinder #: CC743587 ppm

> NH3 Cal Gas Expiry: August 22, 2024

Removed NH3 Conc: 76.58 Removed Cylinder #: ppm

NH3 gas Diff:

NOX gas Diff:

Removed cyl Expiry: NA Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 4890

#### **Analyzer Information**

Analyzer model: Teledyne API T201 Analyzer serial #: 475 Converter model: Teledyne API T501 Converter serial #: 824 Reaction cell Press: 6.00 NH3 Range (ppb): 0 - 2000 ppb

NOX Range (ppb): 0 - 1000 ppb Sample Flow: 552

Start **Finish Start Finish** 0.960 0.969 NO coefficient: 0.956 TN coefficient: 0.968 NOX coefficient: 0.966 NO bkgrnd: -0.9 -0.9 0.962 NO2 coefficient: 1.000 1.000 NOX bkgrnd: -0.3 -0.3 NH3 coefficient: 0.946 0.946 TN bkgrnd: 1.2 1.2

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.999528	1.001292
NO <sub>X</sub> Cal Offset:	-1.960000	-2.380000
NO Cal Slope:	0.999963	1.000877
NO Cal Offset:	-2.580000	-2.600000
NO <sub>2</sub> Cal Slope:	0.992493	0.999426
NO <sub>2</sub> Cal Offset:	-0.912249	-0.898937
NH3 Cal Slope:	1.004564	1.002078
NH3 Cal Offset:	-0.612859	-0.363408
TN Cal Slope:	1.007097	1.004775
TN Cal Offset:	-0.451064	-0.436983



# **TN - NOX - NH<sub>3</sub> Calibration Report**

Version-05-2023

#### **Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.2		
as found NO	4932	67.6	803.1	803.1		804.7	806.3	-1.6	0.998	
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1		
high NO point	4932	67.6	803.1	803.1		801.5	803.0	-1.3	1.002	
NO/O3 point	4932	67.6	803.1	803.1		798.7	796.7	2.0	1.005	
as found NH3	3418	82.2	1798.5		1798.5	1806.1		1801.4	0.996	0.998
new NH3 cyl rp										
first NH3	3418	82.2	1798.5		1798.5	1806.1		1801.4	0.996	0.998
second NH3	3454	45.7	1000.0		1000.0	1006.1		1003.5	0.994	0.997
third NH3	3477	22.8	498.9		498.9	499.4		497.8	0.999	1.002
							Average Co	rrection Factor	1.0037	0.9990

Corrected As found TN = 804.9 ppb NO<sub>X</sub> = 806.2 ppb NH3 = 1801.6 ppb Previous Response TN = 808.3 ppb NO<sub>X</sub> = 800.7 ppb NH3 = 1806.1 ppb

\*Percent Change TN = -0.4%

\*Percent Change  $NO_X = 0.7\%$ \*Percent Change NH3 = -0.3%

NH3 Previous Converter Efficiency = 94.6%

NH3 Current Converter Efficiency = 94.6%

\* = > +/-5% change initiates investigation



# NO<sub>X</sub> - NO - NO<sub>2</sub> Calibration Report

Version-05-2023

#### **Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.7		
as found span	4932	67.6	803.1	800.4	803.1	806.7	797.2	803.7	0.9955	1.0040
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2		
high point	4932	67.6	803.1	800.4	803.1	803.0	799.8	801.5	1.0001	1.0007
second point	4966	33.8	401.5	400.2	401.5	398.0	396.5	398.1	1.0089	1.0093
third point	4983	16.9	200.8	200.1	200.8	197.0	195.3	198.2	1.0191	1.0246
							Average C	Correction Factor	1.0094	1.0115
Baseline Corr A	s fnd TN =	804.4 ppb	$NO_X = 806.9$	ppb NO =	797.4 ppb			*Percent Chang	e TN=	-0.5%
Previous Respo	onse TN =	808.3 ppb	$NO_X = 800.7$	ppb NO =	797.8 ppb			*Percent Chang	e NO <sub>x</sub> =	0.8%
								*Percent Chang	e NO =	0.0%
								* = > +/-5% change	initiates investigati	ion

<sup>\* = &</sup>gt; +/-5% change initiates investigation

#### **GPT Calibration Data**

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	-0.1		
calibration zero			0.0	-0.2		
1st GPT point (400 ppb O3)	795.8	385.0	413.5	412.9	1.0015	99.9%
2nd GPT point (200 ppb O3)	795.8	590.8	207.7	205.8	1.0093	99.1%
3rd GPT point (100 ppb O3)	795.8	694.1	104.4	103.1	1.0126	98.8%
			A	verage Correction Factor	1.0078	99.2%

Notes:

Changed the inlet filter after as founds. Adjusted the NOx/TN span.

Calibration Performed By:

Rene Chamberland



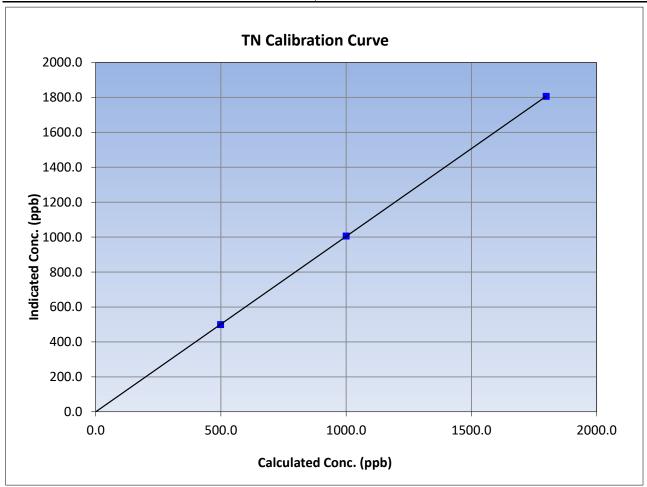
### **TN Calibration Summary**

Version-05-2023

#### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 27, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:00 End Time (MST): 13:35 Analyzer make: Teledyne API T201 Analyzer serial #: 475

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999997	≥0.995
1798.5	1806.1	0.9958	Correlation Coefficient	0.555557	20.333
1000.0	1006.1	0.9939	Slone	1.004775	0.90 - 1.10
498.9	499.4	0.9989	Slope	1.004775	0.90 - 1.10
			Intercept	-0.436983	+/-20





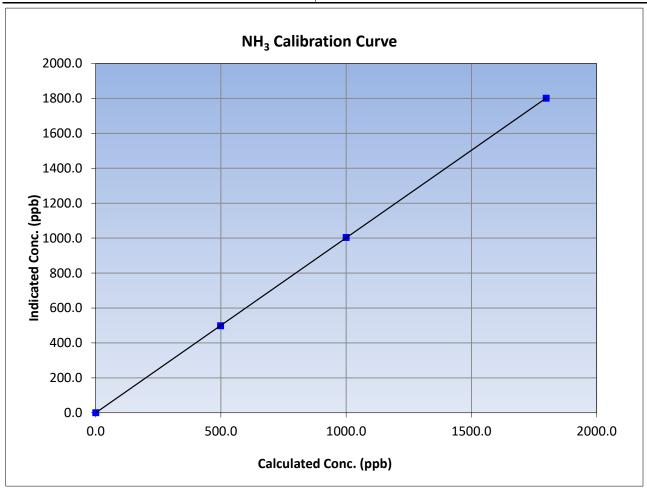
### NH<sub>3</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 27, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:00 End Time (MST): 13:35 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999996	≥0.995
1798.5	1801.4	0.9984	Correlation Coefficient	0.999990	20.333
1000.0	1003.5	0.9965	Slope	1.002078	0.90 - 1.10
498.9	497.8	1.0021	Slope	1.002078	0.90 - 1.10
			Intercept	-0.363408	+/-20





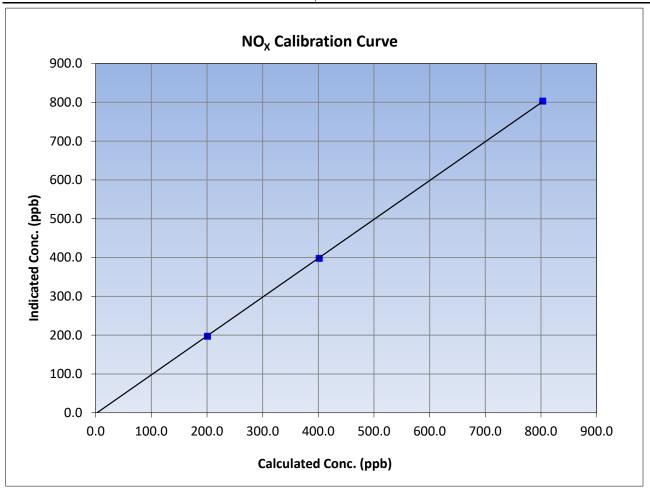
### NO<sub>x</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 27, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:46 End Time (MST): 14:14 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999968	≥0.995
803.1	803.0	1.0001	Correlation Coefficient	0.555500	20.333
401.5	398.0	1.0089	Slope	1.001292	0.90 - 1.10
200.8	197.0	1.0191	Slope	1.001292	0.90 - 1.10
			Intercept	-2.380000	+/-20





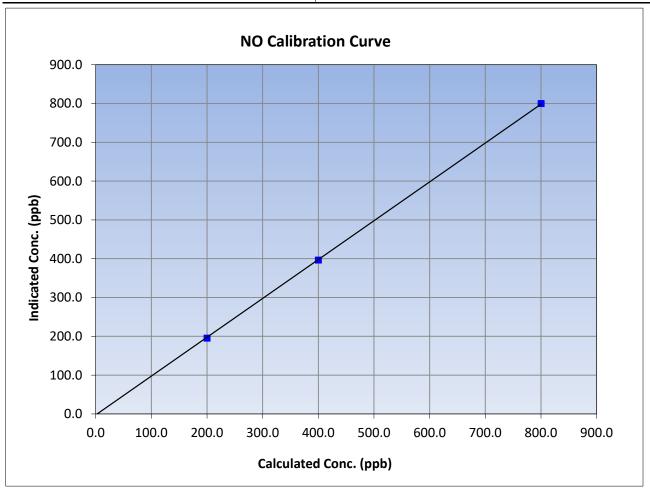
### **NO Calibration Summary**

Version-05-2023

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 27, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:46 End Time (MST): 14:14 Analyzer make: Teledyne API T201 Analyzer serial #: 475

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999955	≥0.995
800.4	799.8	1.0007	Correlation Coefficient	0.55555	20.333
400.2	396.5	1.0093	Slope	1.000877	0.90 - 1.10
200.1	195.3	1.0246	Slope	1.000877	0.90 - 1.10
			Intercept	-2.600000	+/-20





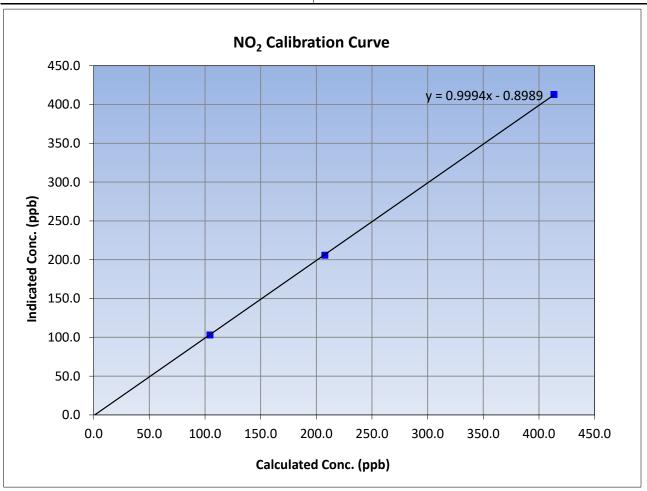
### NO<sub>2</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 27, 2024 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:46 End Time (MST): 14:14 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999982	≥0.995
413.5	412.9	1.0015	Correlation Coefficient	0.555502	20.555
207.7	205.8	1.0093	Slope	0.999426	0.90 - 1.10
104.4	103.1	1.0126	Slope	0.999420	0.90 - 1.10
			Intercept	-0.898937	+/-20

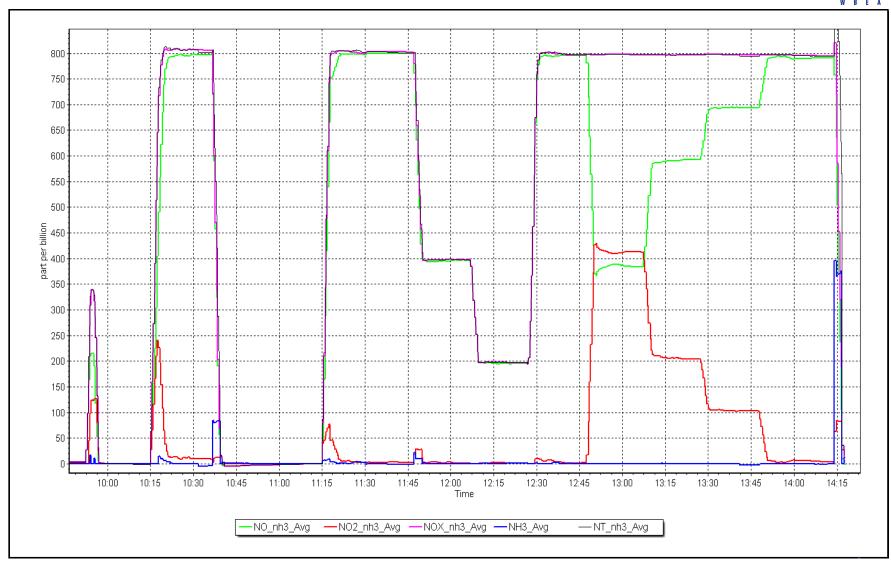


NO<sub>x</sub> Calibration Plot

Date: March 19, 2024

Location: Bertha Ganter-Fort McKay



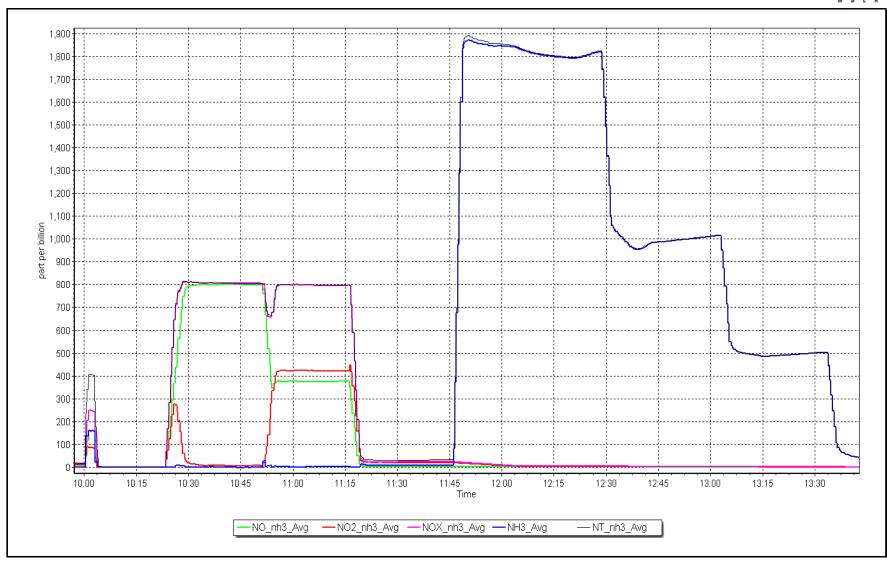


NH<sub>3</sub> Calibration Plot

Date: March 20, 2024

Location: Bertha Ganter-Fort McKay







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS02 MILDRED LAKE MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

**Finish** 

Start

#### **Station Information**

Mildred Lake Station Name:

Calibration Date: March 19, 2024

Start time (MST): 10:09

Routine Reason:

Station number: AMS02

> February 15, 2024 Last Cal Date:

End time (MST): 13:26

**Calibration Standards** 

Cal Gas Concentration: 49.98

Cal Gas Cylinder #: CC501209

Removed Cal Gas Conc: 49.98 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701**  ppm Cal Gas Exp Date: August 12, 2024

Rem Gas Exp Date: NA

Diff between cyl: Serial Number:

1185 Serial Number: 4891

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

Calibration slope: 0.998019 1.000614 Backgd or Offset: 18.4 18.5 0.787 Calibration intercept: -0.505025 -0.364904 Coeff or Slope: 0.795

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Follit	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.3	
as found span	4920	80.2	801.6	809.0	0.991
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.2	801.6	802.0	1.000
second point	4960	40.1	400.8	400.4	1.001
third point	4980	20.0	199.9	199.4	1.003
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.2	801.6	801.0	1.001
			Averag	ge Correction Factor	1.001
			<u> </u>	<u> </u>	

Baseline Corr As found: 808.70 Previous response 799.55 \*% change 1.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Adjusted zero and span.

Calibration Performed By: **Braiden Boutilier** 



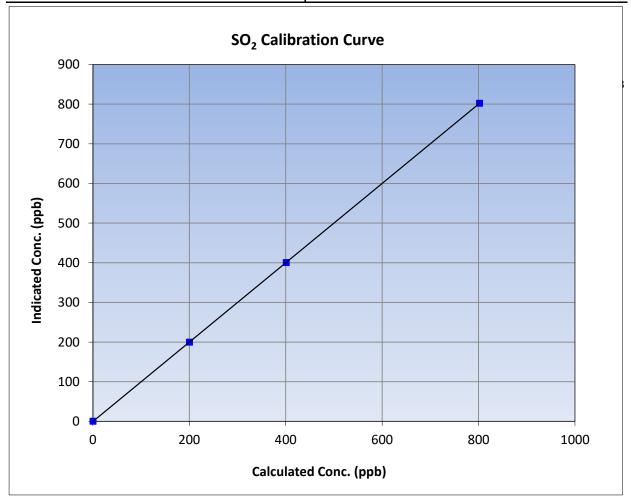
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

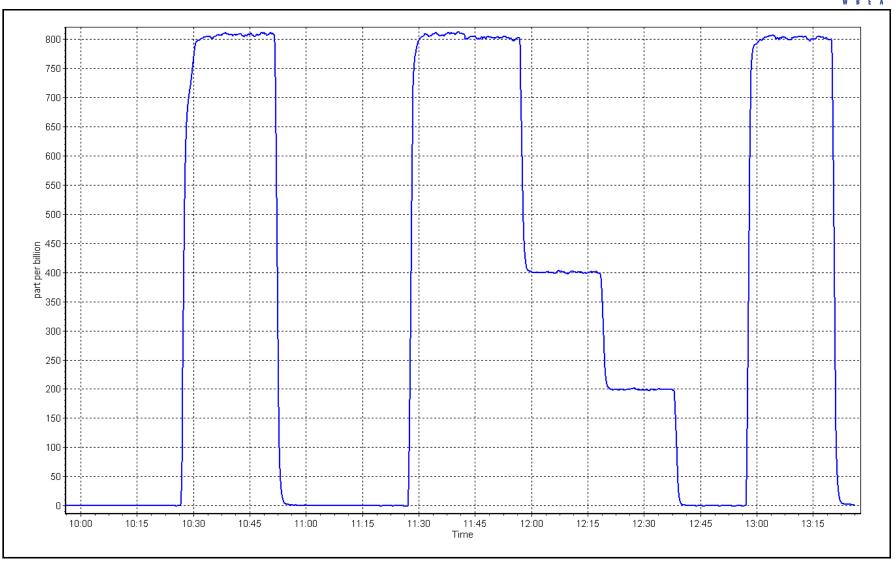
Calibration Date: March 19, 2024 **Previous Calibration:** February 15, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:09 End Time (MST): 13:26 Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999999	≥0.995				
801.6	802.0	0.9996	Correlation Coefficient	0.555555	20.333				
400.8	400.4	1.0011	Slope	1.000614	0.90 - 1.10				
199.9	199.4	1.0026	Slope	1.000014	0.90 - 1.10				
			- Intercept	-0.364904	+/-30				



SO2 Calibration Plot Date: March 19, 2024 Location: Mildred Lake







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Mildred Lake

Calibration Date: March 26, 2024

Start time (MST): 10:09 Reason: Routine Station number: AMS02

Last Cal Date: February 2, 2024

End time (MST): 14:42

Rem Gas Exp Date: NA

Diff between cyl:

**Calibration Standards** 

Cal Gas Exp Date: January 4, 2025 Cal Gas Concentration: 5.29 ppm

Cal Gas Cylinder #: CC345191

Removed Cal Gas Conc: 5.29 ppm Removed Gas Cyl #: NA

Calibrator Make/Model: API T700 Serial Number: 1185 ZAG Make/Model: **API T701** Serial Number: 4891

**Analyzer Information** 

Analyzer make: Thermo 43iQTL Analyzer serial #: 12113311966 Global G150 Converter serial #: 2022-198 Converter make:

0 - 100 ppb Analyzer Range

> **Finish** <u>Start</u>

**Start** <u>Finish</u> 1.000964 Backgd or Offset: Calibration slope: 0.998393 1.68 1.67 0.020800 Calibration intercept: -0.039204 Coeff or Slope: 0.731 0.731

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4924	75.6	80.0	80.6	0.994
as found 2nd point	4962	37.8	40.0	40.3	0.995
as found 3rd point	4981	18.9	20.0	19.9	1.010
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4924	75.6	80.0	80.1	0.999
second point	4962	37.8	40.0	40.1	0.997
third point	4981	18.9	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	80.2	0.997
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber char	nge:	20-Sep-23		Ave Corr Factor	1.000
Date of last converter effi	ciency test:	March 26, 2024			efficiency

Baseline Corr As found: 80.5 79.82 0.8% Prev response: \*% change: -0.039196 Baseline Corr 2nd AF pt: 40.2 AF Slope: 1.007679 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999981 19.8 \* = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. Ran SOx scrubber check after calibrator zero. No

adjustments made.

Calibration Performed By: Braiden Boutilier

Notes:



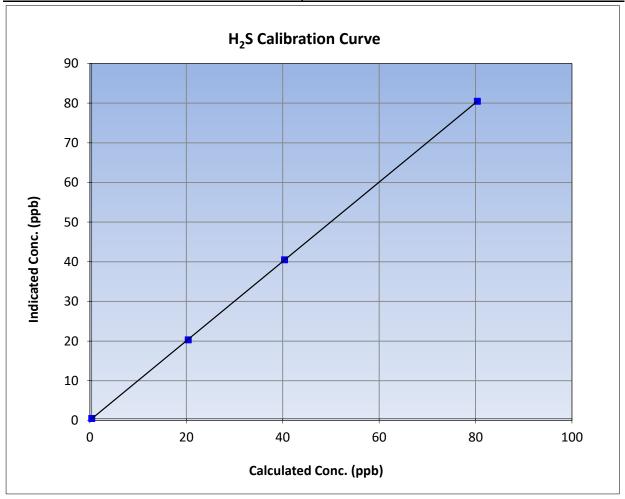
## H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 2, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:09 End Time (MST): 14:42 Analyzer make: Thermo 43iQTL Analyzer serial #: 12113311966

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999992	≥0.995				
80.0	80.1	0.9986	Correlation Coefficient	0.999992	20.995				
40.0	40.1	0.9974	Slope	1.000964	0.90 - 1.10				
20.0	19.9	1.0049	Slope	1.000904	0.90 - 1.10				
			- Intercept	0.020800	+/-3				

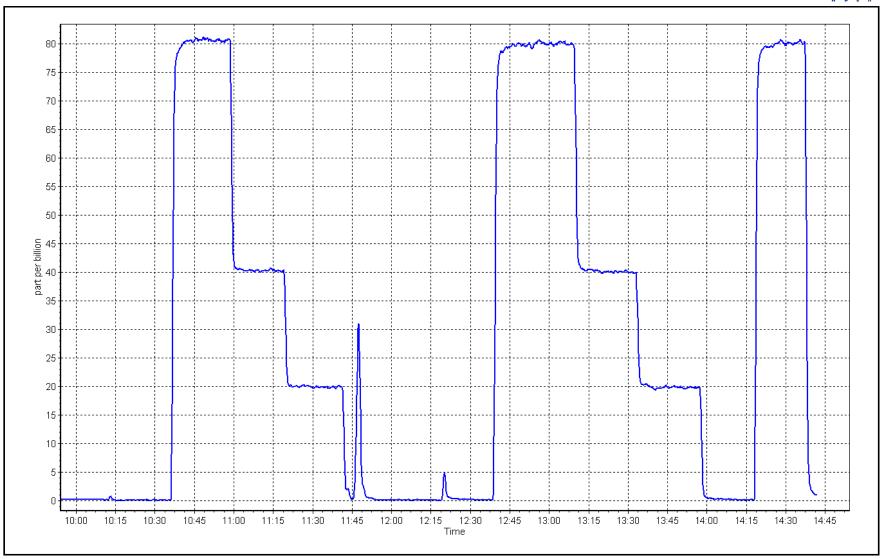


H<sub>2</sub>S Calibration Plot

Date: March 26, 2024

Location: Mildred Lake







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Mildred Lake

Calibration Date: March 7, 2024

Start time (MST): 10:24
Reason: Routine

Station number: AMS02

Removed Gas Expiry:

Last Cal Date: February 15, 2024

End time (MST): 13:21

#### **Calibration Standards**

Gas Cert Reference: CC501209 Cal Gas Expiry Date: August 12, 2024

CH4 Cal Gas Conc. 500.2 ppm CH4 Equiv Conc. 1048.6 ppm

C3H8 Cal Gas Conc. 199.4 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 500.2 ppm CH4 Equiv Conc. 1048.6 ppm

Removed C3H8 Conc. 199.4 ppm Diff between cyl (THC): Diff between cyl (CH $_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 1185 ZAG make/model: Teledyne API T701 Serial Number: 4891

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1180320039

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.73E-04 2.92E-04 NMHC SP Ratio: 6.02E-05 6.17E-05 CH4 Retention time: 15.9 16.3 NMHC Peak Area: 142620 146130 Zero Chromatogram: **OFF** ON Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	16.82	16.56	1.016
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	16.82	16.84	0.999
second point	4960	40.1	8.41	8.38	1.004
third point	4980	20.0	4.19	4.18	1.005
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.76	1.004
			,	Average Correction Factor	1.003
Baseline Corr AF:	16.56	Prev response	16.78	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibi	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.80	9.02	0.975
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.80	8.81	0.998
second point	4960	40.1	4.40	4.38	1.005
third point	4980	20.0	2.19	2.19	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.80	8.74	1.007
			A	verage Correction Factor	1.002
Baseline Corr AF:	9.02	Prev response	8.76	*% change	2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4	Cal	libration	Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.02	7.54	1.064
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.02	8.02	1.000
second point	4960	40.1	4.01	4.00	1.003
third point	4980	20.0	2.00	1.99	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	8.02	1.000
			Av	erage Correction Factor	1.004
Baseline Corr AF:	7.54	Prev response	8.01	*% change	-6.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		_
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.998749		1.001195	
THC Cal Offset:		-0.021919		-0.017905	
CH4 Cal Slope:		1.000498		1.000469	
CH4 Cal Offset:		-0.013049		-0.008450	
NMHC Cal Slope:		0.996921		1.001609	
NMHC Cal Offset:		-0.008470		-0.009255	

Notes: Sample inlet filters changed after as founds. Adjusted span only.

Calibration Performed By: Jan Castro



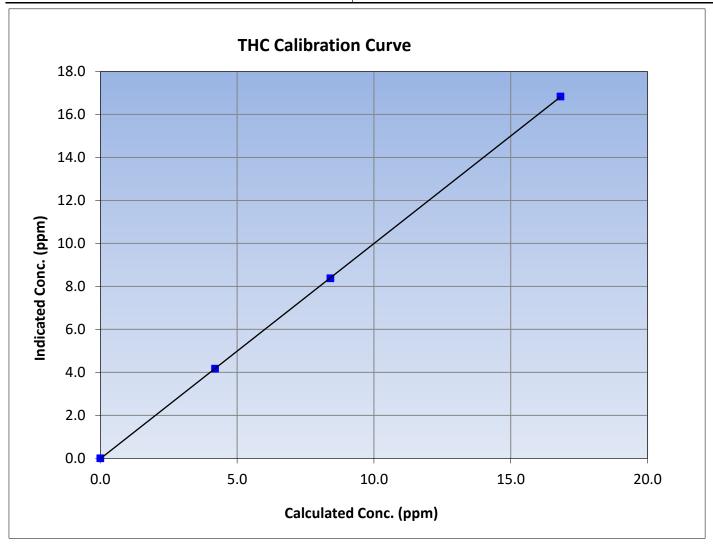
## **THC Calibration Summary**

Version-06-2022

#### **Station Information**

March 7, 2024 **Previous Calibration:** Calibration Date: February 15, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:24 End Time (MST): 13:21 Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
16.82	16.84	0.9990	Correlation Coemicient	0.555552	20.333
8.41	8.38	1.0041	Slope	1.001195	0.90 - 1.10
4.19	4.18	1.0046	Slope	1.001193	0.90 - 1.10
			Intercept	-0.017905	+/-0.5





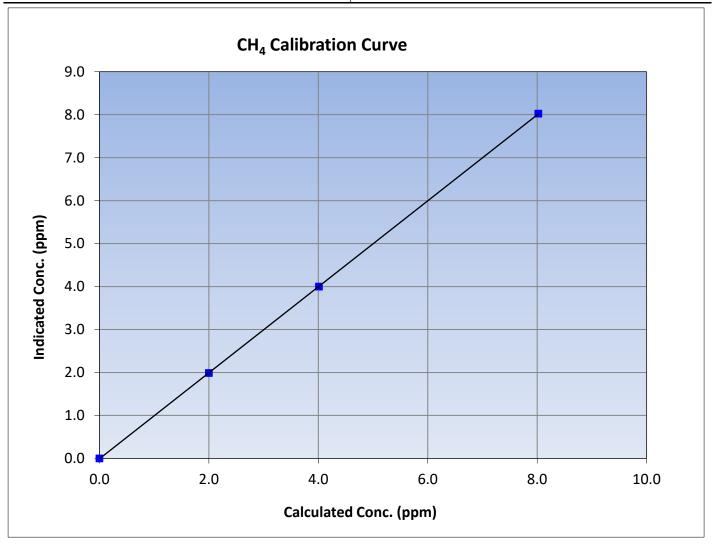
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

March 7, 2024 Calibration Date: **Previous Calibration:** February 15, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:24 End Time (MST): 13:21 Analyzer make: Analyzer serial #: 1180320039 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
8.02	8.02	1.0000	Correlation Coemicient	0.999995	20.333
4.01	4.00	1.0031	Slope	1.000469	0.90 - 1.10
2.00	1.99	1.0075	Siope	1.000409	0.90 - 1.10
			Intercept	-0.008450	+/-0.5





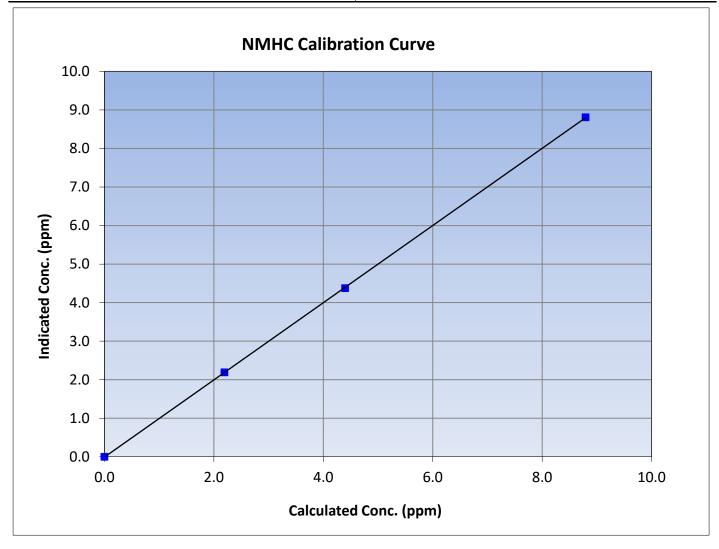
## **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

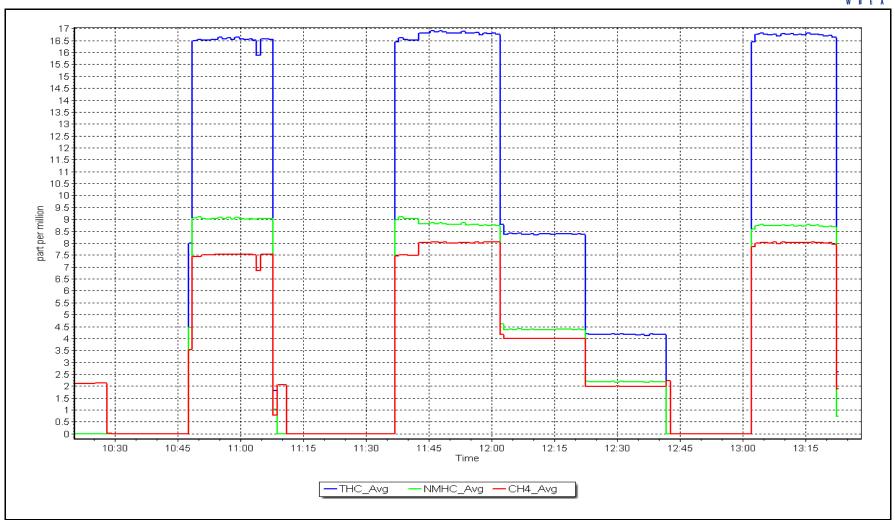
March 7, 2024 Calibration Date: **Previous Calibration:** February 15, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:24 End Time (MST): 13:21 Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
8.80	8.81	0.9983	Correlation Coemicient	0.555500	20.333
4.40	4.38	1.0052	Slope	1.001609	0.90 - 1.10
2.19	2.19	1.0020	Slope	1.001009	0.90 - 1.10
			Intercept	-0.009255	+/-0.5



NMHC Calibration Plot Date: March 7, 2024 Location: Mildred Lake







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS04 BUFFALO VIEWPOINT MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024







## SO<sub>2</sub> Calibration Report

Version-01-2020

**Finish** 

#### **Station Information**

Station Name: **Buffalo Viewpoint** 

March 21, 2024 Calibration Date:

Start time (MST): 6:18 Routine Reason:

Station number: AMS04

February 9, 2024 Last Cal Date:

End time (MST): 11:15

**Calibration Standards** 

Cal Gas Concentration: 50.87

Cal Gas Cylinder #: CC446753

Removed Cal Gas Conc: 50.87 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701**  ppm Cal Gas Exp Date: March 10, 2031

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 3808 Serial Number: 362

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Analyzer Range 0 - 1000 ppb

**Finish** Start Start Calibration slope: 1.000873 Backgd or Offset: 24.1 0.999358

24.7 Calibration intercept: 0.554368 -0.325433 Coeff or Slope: 0.875 0.867

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.8	
as found span	4921	78.6	799.7	657.1	1.217
as found 2nd point	4961	39.3	399.8	327.9	1.219
as found 3rd point	4980	19.6	199.4	164.1	1.215
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	
high point	4921	78.6	799.7	800.0	1.000
second point	4961	39.3	399.8	400.4	0.999
third point	4980	19.6	199.4	198.6	1.004
as left zero	5000	0.0	0.0	0.0	
as left span	4921	78.6	799.7	798.8	1.001
		•	Averag	e Correction Factor	1.001

Baseline Corr As found: Previous response 799.78 -21.9% 656.30 \*% change Baseline Corr 2nd AF pt: 327.10 AF Slope: 0.820651 AF Intercept: 0.456142 163.30 AF Correlation: 0.999997

Baseline Corr 3rd AF pt: \* = > +/-5% change initiates investigation

Notes: External Valve and Filter Folder replaced. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay



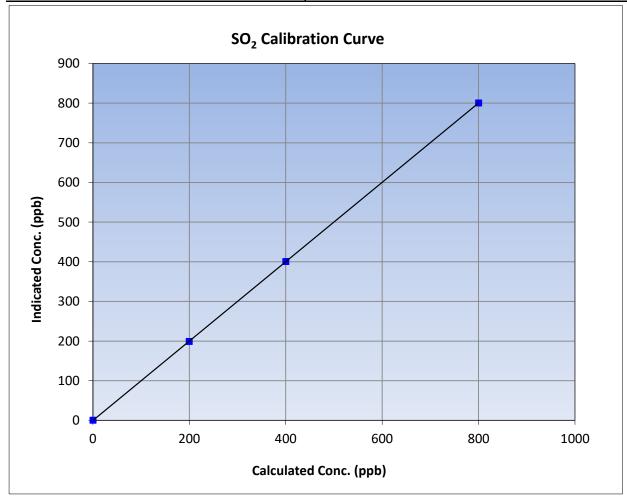
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

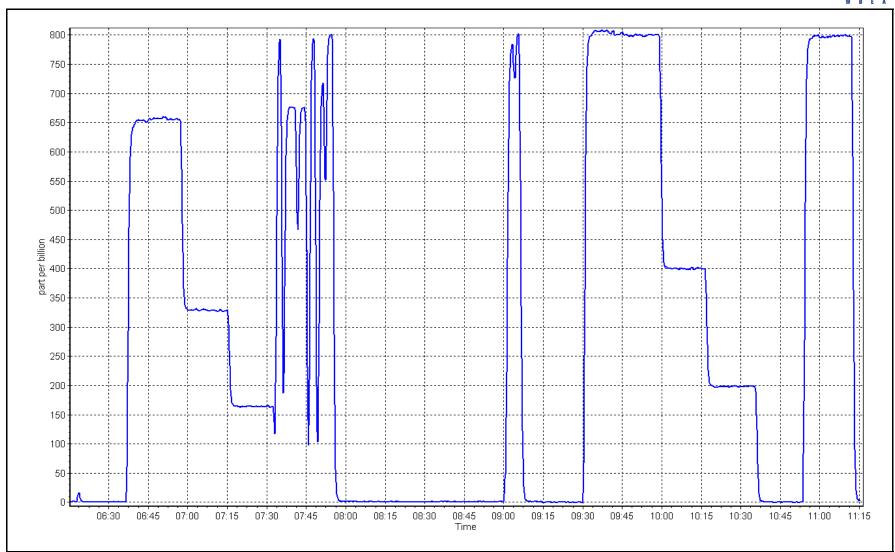
Calibration Date: March 21, 2024 **Previous Calibration:** February 9, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:18 End Time (MST): 11:15 Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	-0.1		Correlation Coefficient	0.999998	≥0.995		
799.7	800.0	0.9997	Correlation Coefficient	0.555556	20.333		
399.8	400.4	0.9985	Slope	1.000873	0.90 - 1.10		
199.4	198.6	1.0042	Slope	1.000873	0.90 - 1.10		
			- Intercept	-0.325433	+/-30		



**SO2 Calibration Plot** Date: March 21, 2024 Location: Buffalo Viewpoint







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: **Buffalo Viewpoint** 

Calibration Date: March 20, 2024 Start time (MST): 6:00

Routine Reason:

Station number: AMS04

Last Cal Date: February 29, 2024

End time (MST): 10:20

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.42 ppm

ppm

Cal Gas Cylinder #: CC345266

Removed Cal Gas Conc: 5.42 Removed Gas Cyl #: NA Calibrator Make/Model: API T700

ZAG Make/Model: **API T701H** 

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3808 Serial Number: 362

**Analyzer Information** 

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1008841400

Global Converter serial #: 2022-200 Converter make:

0 - 100 ppb Analyzer Range

> **Finish** <u>Start</u>

**Start** <u>Finish</u> 0.997925 0.995649 Backgd or Offset: Calibration slope: 1.09 1.09 Calibration intercept: 0.202175 0.182120 Coeff or Slope: 1.130 1.130

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4926	74.1	80.3	80.6	0.998
as found 2nd point	4963	37.0	40.1	40.3	0.998
as found 3rd point	4982	18.5	20.1	20.1	1.003
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4926	74.1	80.3	80.1	1.003
second point	4963	37.0	40.1	40.3	0.995
third point	4982	18.5	20.1	20.0	1.003
as left zero	5000	0.0	0.0	0.3	
as left span	4926	74.1	80.3	80.0	1.004
SO2 Scrubber Check	4920	80.0	800.0	0.2	
Date of last scrubber chang	ge:	16-May-23	_	Ave Corr Factor	1.000
Date of last converter effic		efficiency			

Date of last converter efficiency test: efficiency							
Baseline Corr As found:	80.5	Prev response:	80.36	*% change:	0.2%		
Baseline Corr 2nd AF pt:	40.2	AF Slope:	1.002622	AF Intercept:	0.062213		

Baseline Corr 3rd AF pt: 20.0 0.999998 AF Correlation:

\* = > +/-5% change initiates investigation

Sox scrubber checked after the calibrator zero. No adjustments done. Notes:

Calibration Performed By: Melissa Lemay



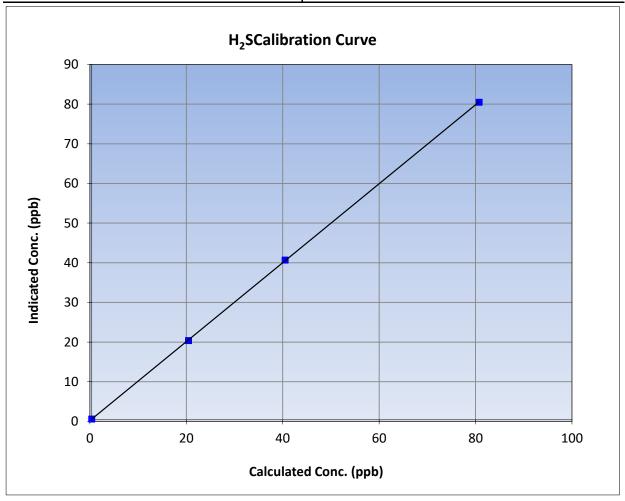
## H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 29, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:00 End Time (MST): 10:20 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1008841400

Calibration Data							
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999983	≥0.995		
80.3	80.1	1.0028	Correlation Coefficient	0.555505	20.993		
40.1	40.3	0.9952	Slope	0.995649	0.90 - 1.10		
20.1	20.0	1.0026	Slope	0.333043	0.90 - 1.10		
			- Intercept	0.182120	+/-3		

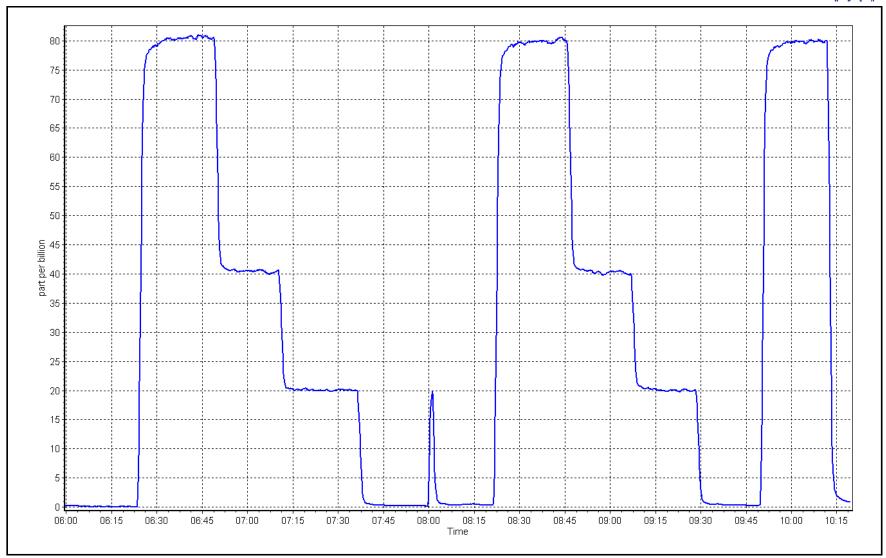


H<sub>2</sub>S Calibration Plot

Date: March 20, 2024

Location: Buffalo Viewpoint







## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Buffalo Viewpoint

Calibration Date: March 21, 2024

Start time (MST): 6:18
Reason: Routine

Station number: AMS04

Last Cal Date: February 9, 2024

End time (MST): 11:14

#### **Calibration Standards**

Gas Cert Reference: NA Cal Gas Expiry Date: March 10, 1931

CH4 Cal Gas Conc. 497.2 ppm CH4 Equiv Conc. 1058.2 ppm

C3H8 Cal Gas Conc. 204.0 ppm

Removed Gas Cert: NA Removed Gas Expiry:

Removed CH4 Conc. 497.2 ppm CH4 Equiv Conc. 1058.2 ppm

Removed C3H8 Conc. 204.0 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: API T700 Serial Number: 3808 ZAG make/model: API T701 Serial Number: 362

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1426262594

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

Baseline Corr 3rd AF:

NA

CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 4.21E-04 4.25E-04 NMHC SP Ratio: 1.08E-04 1.10E-04 CH4 Retention time: 13.7 13.7 NMHC Peak Area: 81432 80500 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	78.6	16.64	16.58	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	16.64	16.65	0.999
second point	4961	39.3	8.32	8.34	0.997
third point	4980	19.6	4.15	4.16	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4921	78.6	16.64	16.69	0.997
			,	Average Correction Factor	0.998
Baseline Corr AF:	16.58	Prev response	16.61	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

\* = > +/-5% change initiates investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

Set Point	Dil air flow rate	NMHC Calibrate  Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4921	78.6	8.82	8.78	1.004	
as found 2nd point	-					
as found 3rd point						
new cylinder response	-					
calibrator zero	5000	0.0	0.00	0.00		
high point	4921	78.6	8.82	8.82	1.000	
second point	4961	39.3	4.41	4.43	0.995	
third point	4980	19.6	2.20	2.22	0.990	
as left zero	5000	0.0	0.00	0.00		
as left span	4921	78.6	8.82	8.86	0.995	
·			Avera	ge Correction Factor	0.995	
Baseline Corr AF:	8.78	Prev response	8.81	*% change	-0.2%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
as found zero	5000	0.0	0.00	0.00		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
	4921	78.6	7.82	7.80		
as found span as found 2nd point	4921	/8.0	7.82	7.80	1.003	
as found 3rd point						
new cylinder response						
	5000	0.0	0.00	0.00		
calibrator zero	5000	0.0	0.00	0.00	 0 999	
calibrator zero high point	4921	78.6	7.82	7.82	0.999	
calibrator zero high point second point	4921 4961	78.6 39.3	7.82 3.91	7.82 3.91	0.999 1.000	
calibrator zero high point second point third point	4921 4961 4980	78.6 39.3 19.6	7.82 3.91 1.95	7.82 3.91 1.94	0.999 1.000 1.004	
calibrator zero high point second point third point as left zero	4921 4961 4980 5000	78.6 39.3 19.6 0.0	7.82 3.91 1.95 0.00	7.82 3.91 1.94 0.00	0.999 1.000 1.004	
calibrator zero high point second point third point as left zero	4921 4961 4980	78.6 39.3 19.6	7.82 3.91 1.95 0.00 7.82	7.82 3.91 1.94 0.00 7.83	0.999 1.000 1.004  0.998	
calibrator zero high point second point third point as left zero as left span	4921 4961 4980 5000 4921	78.6 39.3 19.6 0.0 78.6	7.82 3.91 1.95 0.00 7.82	7.82 3.91 1.94 0.00 7.83 age Correction Factor	0.999 1.000 1.004  0.998 1.001	
calibrator zero high point second point third point as left zero as left span  Baseline Corr AF:	4921 4961 4980 5000 4921 7.80	78.6 39.3 19.6 0.0 78.6	7.82 3.91 1.95 0.00 7.82	7.82 3.91 1.94 0.00 7.83 age Correction Factor *% change	0.999 1.000 1.004  0.998	
calibrator zero high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4961 4980 5000 4921 7.80	78.6 39.3 19.6 0.0 78.6 Prev response AF Slope:	7.82 3.91 1.95 0.00 7.82	7.82 3.91 1.94 0.00 7.83 age Correction Factor *% change AF Intercept:	0.999 1.000 1.004  0.998 1.001 -0.1%	
calibrator zero high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4961 4980 5000 4921 7.80	78.6 39.3 19.6 0.0 78.6  Prev response AF Slope: AF Correlation:	7.82 3.91 1.95 0.00 7.82 Avera	7.82 3.91 1.94 0.00 7.83 age Correction Factor *% change	0.999 1.000 1.004  0.998 1.001 -0.1%	
calibrator zero high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4961 4980 5000 4921 7.80	78.6 39.3 19.6 0.0 78.6  Prev response AF Slope: AF Correlation: Calibration	7.82 3.91 1.95 0.00 7.82 Avera	7.82 3.91 1.94 0.00 7.83 age Correction Factor *% change AF Intercept: *=>+/-5% change initiat	0.999 1.000 1.004  0.998 1.001 -0.1%	
calibrator zero high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	4921 4961 4980 5000 4921 7.80	78.6 39.3 19.6 0.0 78.6  Prev response AF Slope: AF Correlation:	7.82 3.91 1.95 0.00 7.82 Avera	7.82 3.91 1.94 0.00 7.83 age Correction Factor *% change AF Intercept:	0.999 1.000 1.004  0.998 1.001 -0.1%	

0.010460

0.999537

-0.004306

0.996864

0.013566

Notes:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Hydrogen Cylinder Replaced. Span adjusted.

0.008071

1.001043

-0.004702

0.999701

0.013373

Calibration Performed By: Melissa Lemay



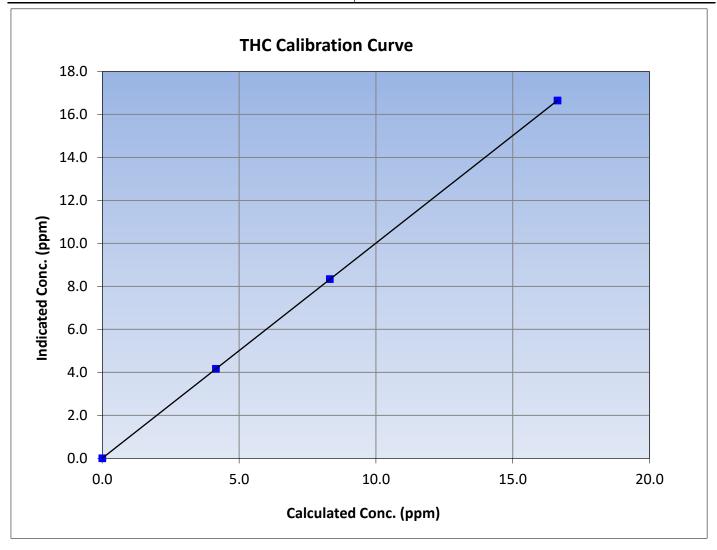
## **THC Calibration Summary**

Version-06-2022

#### **Station Information**

March 21, 2024 **Previous Calibration:** Calibration Date: February 9, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:18 End Time (MST): 11:14 Analyzer make: Thermo 55i Analyzer serial #: 1426262594

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.99999	≥0.995
16.64	16.65	0.9993	Correlation Coemicient	0.555555	20.333
8.32	8.34	0.9972	Slope	1.000586	0.90 - 1.10
4.15	4.16	0.9965	Slope	1.000380	0.90 - 1.10
			Intercept	0.008071	+/-0.5





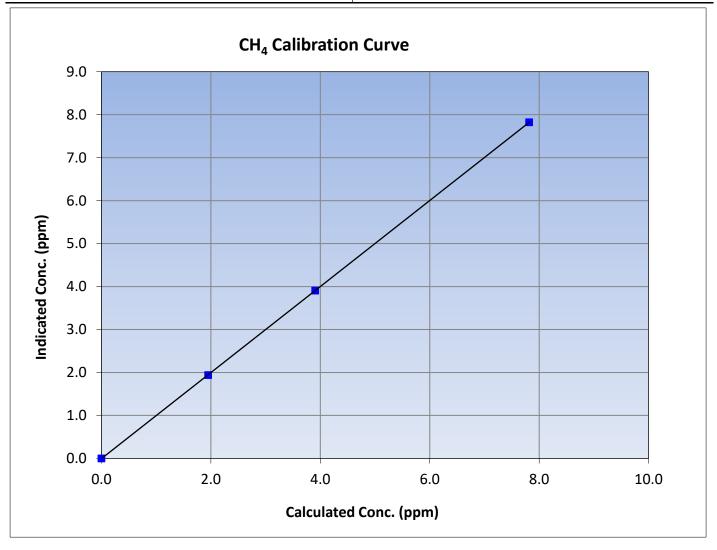
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

March 21, 2024 Calibration Date: **Previous Calibration:** February 9, 2024 Station Name: **Buffalo Viewpoint** AMS04 Station Number: Start Time (MST): 6:18 End Time (MST): 11:14 Analyzer make: Thermo 55i Analyzer serial #: 1426262594

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Cc/Ic) Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
7.82	7.82	0.9993	Correlation Coemicient	0.555556	20.333
3.91	3.91	1.0004	Slope	1.001043	0.90 - 1.10
1.95	1.94	1.0042	Siope	1.001043	0.90 - 1.10
			Intercept	-0.004702	+/-0.5





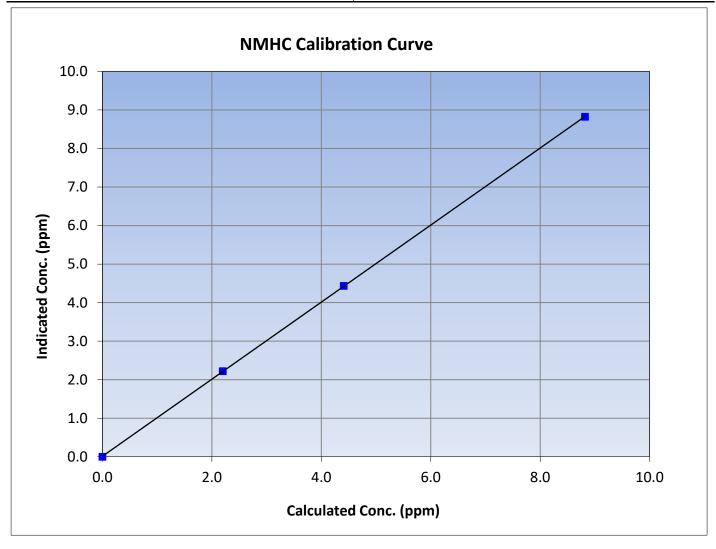
## **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

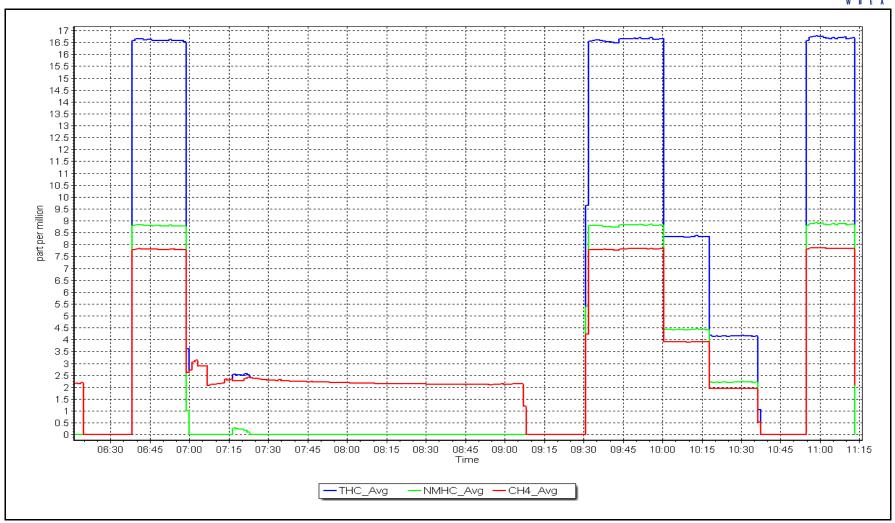
March 21, 2024 **Previous Calibration:** Calibration Date: February 9, 2024 Station Name: **Buffalo Viewpoint** AMS04 Station Number: Start Time (MST): 6:18 End Time (MST): 11:14 Analyzer make: Thermo 55i Analyzer serial #: 1426262594

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999989	≥0.995	
8.82	8.82	0.9997	Correlation Coemicient	0.999969	20.333	
4.41	4.43	0.9946	Slope	0.999701	0.90 - 1.10	
2.20	2.22	0.9898	Slope	0.999701	0.90 - 1.10	
			Intercept	0.013373	+/-0.5	



NMHC Calibration Plot Date: March 21, 2024 Location: Buffalo Viewpoint







Calibrator Model:

ZAG make/model:

## **Wood Buffalo Environmental Association**

# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: **Buffalo Viewpoint** 

Calibration Date: March 1, 2024

Start time (MST): 6:50 Routine Reason:

Station number: AMS04

Last Cal Date: February 12, 2024

48.80

ppm

End time (MST): 11:56

#### **Calibration Standards**

NO Gas Cylinder #: Cal Gas Expiry Date: November 3, 1932 CC324979

NOX Cal Gas Conc: 48.90 NO Cal Gas Conc: 48.80 ppm ppm Removed Cylinder #: Removed Gas Exp Date: NA NA

Removed Gas NOX Conc: 48.90 Removed Gas NO Conc: ppm NOX gas Diff:

**API T700** 

**API T701** 

NO gas Diff:

Serial Number: 3808 Serial Number: 362

#### **Analyzer Information**

Analyzer make: API T200 Analyzer serial #: 721

NOX Range (ppb): 0 - 1000 ppb

<u>Finish</u> **Finish** Start Start NO coeff or slope: 1.162 1.162 NO bkgnd or offset: -0.6 -0.6 NOX coeff or slope: NOX bkgnd or offset: 1.154 1.154 -0.3 -0.3 NO2 coeff or slope: Reaction cell Press: 1.000 1.000 4.3 4.3

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.001294	0.995753
NO <sub>x</sub> Cal Offset:	-0.213331	-0.374543
NO Cal Slope:	0.999626	0.993186
NO Cal Offset:	-0.914344	-1.315833
NO <sub>2</sub> Cal Slope:	0.997058	0.998315
NO <sub>2</sub> Cal Offset:	-0.192985	1.614021



## NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dilu	ution Calibratio	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1		
as found span	4918	81.8	800.0	798.4	1.6	792.8	789.1	3.6	1.0091	1.0118
as found 2nd										
as found 3rd										
new cyl resp	4918	81.8	800.0	798.4	1.6					
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.5	-0.2		
high point	4918	81.8	800.0	798.4	1.6	796.5	792.7	3.7	1.0044	1.0072
second point	4959	40.9	400.0	399.2	0.8	397.9	393.8	4.1	1.0053	1.0137
third point	4980	20.4	199.5	199.1	0.4	197.4	194.9	2.5	1.0106	1.0215
as left zero	5000	0.0	0.0	0.0	0.0	0.4	1.0	-0.6		
as left span	4918	81.8	800.0	402.7	397.3	787.1	393.9	393.2	1.0164	1.0223
							Average C	Correction Factor	1.0068	1.0141
Corrected As fo	ound NO <sub>X</sub> =	792.7 ppb	NO =	788.9 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	e NO <sub>x</sub> =	-1.0%
Previous Respo	nse NO <sub>x</sub> =	800.9 ppb	NO =	797.2 ppb				*Percent Chang	e NO =	-1.1%
Baseline Corr 2	nd pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO =	NA ppb	As foun	d NO r <sup>2</sup> :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				G	PT Calibration	Data				
								NO2 Correction fac	tor (Cc/Ic)	
O3 Setpo	int (nnh)	Indicated NO Re		ated NO Drop ntration (ppb)	Calculated No concentration (pp	O2 In	dicated NO2 stration (ppb) (Ic)	Calibration Limit = 0	0 95-1 05 Conve	rter Efficiency n Limit = 96-104%

Notes:

as found GPT zero
as found GPT point (400 ppb NO2)
as found GPT point (200 ppb NO2)
as found GPT point (100 ppb NO2)

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

No maintenance or adjustsments done.

397.6

198.0

100.9

Average Correction Factor

0.9993

0.9921

0.9637

0.9850

397.3

196.4

97.2

Calibration Performed By:

Melissa Lemay

394.1

595.0

694.2

789.8

789.8

789.8

100.1%

100.8%

103.8%

101.5%



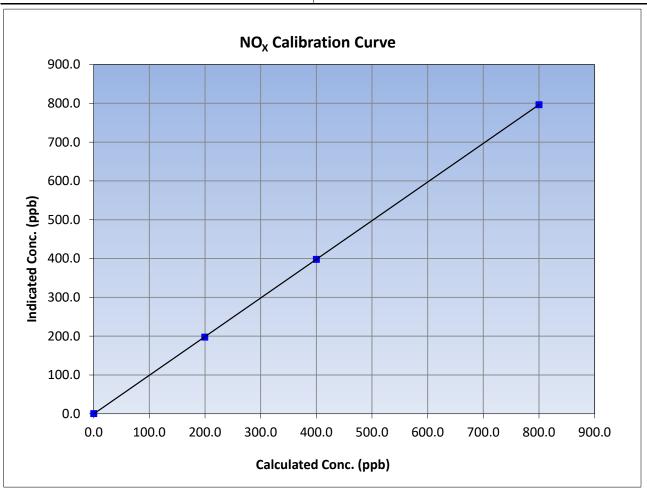
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 1, 2024 Previous Calibration: February 12, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:50 End Time (MST): 11:56 Analyzer serial #: Analyzer make: **API T200** 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999996	≥0.995
800.0	796.5	1.0044	Correlation Coefficient	0.999990	20.333
400.0	397.9	1.0053	Slope	0.995753	0.90 - 1.10
199.5	197.4	1.0106	Slope	0.995755	0.90 - 1.10
			Intercept	-0.374543	+/-20





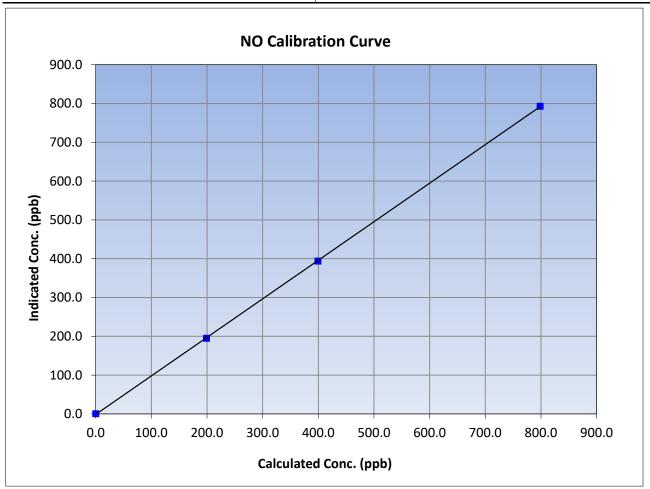
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 1, 2024 Previous Calibration: February 12, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:50 End Time (MST): 11:56 Analyzer make: **API T200** Analyzer serial #: 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999975	≥0.995
798.4	792.7	1.0072	Correlation Coefficient	0.555575	20.333
399.2	393.8	1.0137	Slope	0.993186	0.90 - 1.10
199.1	194.9	1.0215	Зюре	0.993160	0.90 - 1.10
			Intercept	-1.315833	+/-20





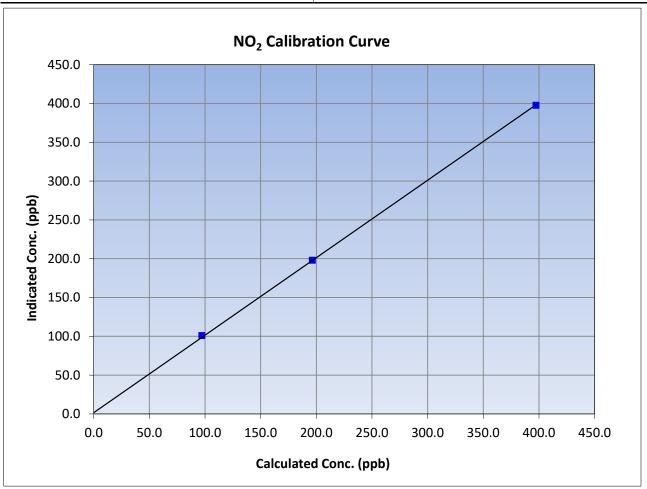
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 1, 2024 Previous Calibration: February 12, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:50 End Time (MST): 11:56 Analyzer serial #: Analyzer make: **API T200** 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999899	≥0.995
397.3	397.6	0.9993	correlation coemicient	0.999899	20.993
196.4	198.0	0.9921	Slope	0.998315	0.90 - 1.10
97.2	100.9	0.9637	Slope	0.996515	0.90 - 1.10
			Intercept	1.614021	+/-20



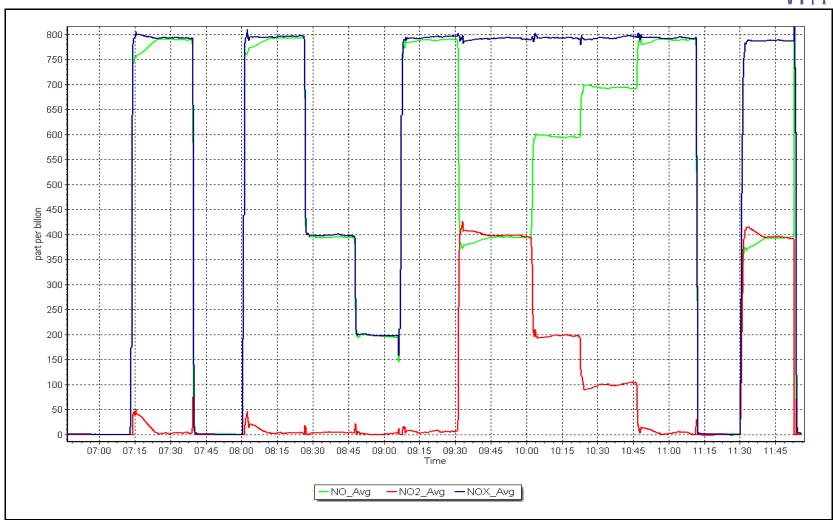
NO<sub>x</sub> Calibration Plot

Date:

March 1, 2024

Location: Buffalo Viewpoint







# O<sub>3</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Buffalo Viewpoint

Calibration Date: March 15, 2024

Start time (MST): 8:57
Reason: Routine

Station number: AMS04

Last Cal Date: February 9, 2024

End time (MST): 11:15

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: API T700 Serial Number: 3808 ZAG Make/Model: API T701 Serial Number: 362

**Analyzer Information** 

Analyzer make: API T400 Analyzer serial #: 2961

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: -2.2 Calibration slope: 0.999029 1.004971 -2.2 -0.120000 Coeff or Slope: Calibration intercept: 0.420000 1.011 1.011

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Pollit	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.6	
as found span	5000	990.7	400.0	401.9	0.995
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.3	
high point	5000	991.2	400.0	401.8	0.996
second point	5000	819.1	200.0	200.9	0.996
third point	5000	710.9	100.0	100.6	0.994
as left zero	5000	0.0	0.0	-0.5	
as left span	5000	992.5	400.0	402.1	0.995
			Averag	ge Correction Factor	0.995
Baseline Corr As found:	402.5	Previous respons	e 400.0	*% change	0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope	e:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay

\* = > +/-5% change initiates investigation



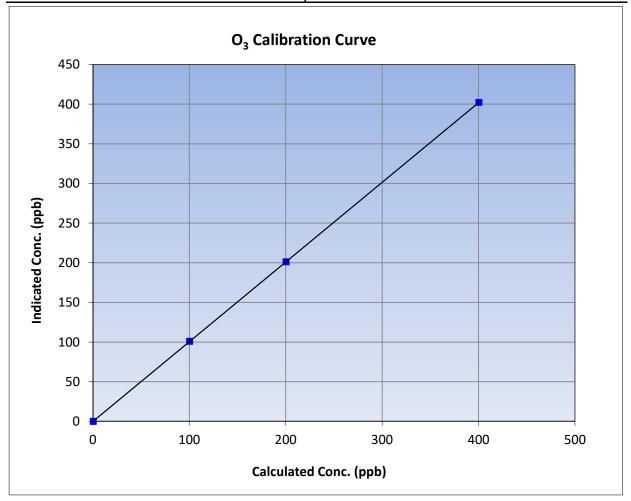
### O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 15, 2024 **Previous Calibration:** February 9, 2024 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:57 End Time (MST): 11:15 Analyzer make: **API T400** Analyzer serial #: 2961

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-0.3		Correlation Coefficient	0.999999	≥0.995			
400.0	401.8	0.9955	Correlation coefficient	0.555555	20.333			
200.0	200.9	0.9955	Slope	1.004971	0.90 - 1.10			
100.0	100.6	0.9940	Slope	1.004371	0.90 - 1.10			
			- Intercept	-0.120000	+/- 5			

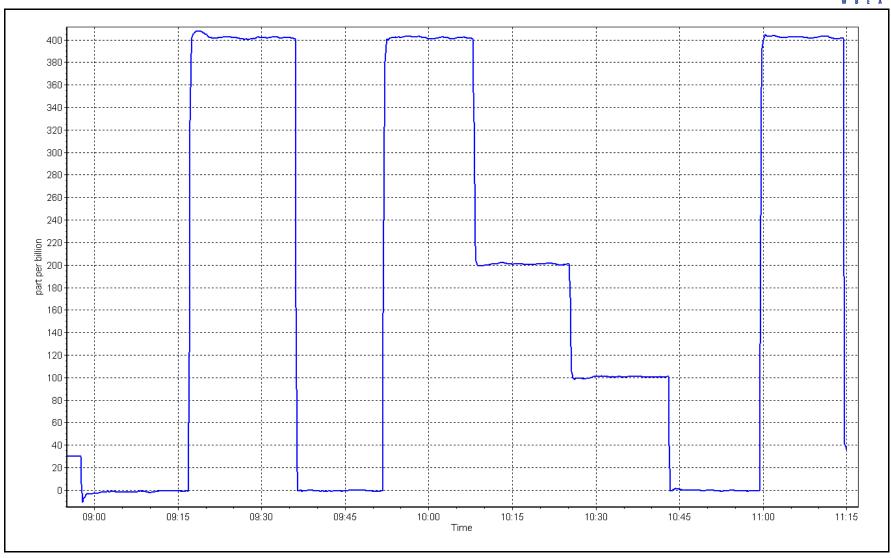


O<sub>3</sub> Calibration Plot

Date: March 15, 2024

Location: Buffalo Viewpoint







Notes:

Melissa Lemay

Calibration by:

### **Wood Buffalo Environmental Association**

### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024 **Station Information** Station Name: **Buffalo Viewpoint** Station number: AMS 04 Calibration Date: March 20, 2024 Last Cal Date: February 27, 2024 Start time (MST): 10:22 End time (MST): 11:01 Analyzer Make: **API T640** S/N: 321 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 1451 Temp/RH standard: S/N: 1451 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> As found Measured <u>Adjusted</u> (Limits) As left T (°C) -13.6 -13.4 -13.6 +/- 2 °C P (mmHg) 741.9 743.6 741.9 +/- 10 mmHg Flow (LPM) 5.00 5.14 5.00 +/- 0.25 LPM PW% (pump) 41 41 >80% Zero Verification PM w/o HEPA: 5.5 0.0 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check PM Inlet observation: Inlet Head Clean Alignment Factor On: ✓ **Quarterly Calibration Test** 10.9 **Expiry Date:** 6-10-2024 Refractive Index: **SPAN DUST** Lot No.: 100128-050-042 As found Adjusted (Limits) <u>Parameter</u> Post maintenance As left **PMT Peak Test** +/- 0.5 Date Optical Chamber Cleaned: February 27, 2024 Date Disposable Filter Changed: February 27, 2024 Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: February 27, 2024 Date RH/T Sensor Cleaned: February 27, 2024 No adjustments done. Leak check passed.



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS05 MANNIX MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



### **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Mannix

March 20, 2024 Calibration Date:

Start time (MST): 10:21 Routine Reason:

Station number: AMS05

> February 2, 2024 Last Cal Date:

> > January 12, 2029

End time (MST): 13:30

**Calibration Standards** 

Cal Gas Concentration: 50.02

Cal Gas Cylinder #: XC026809B

Removed Cal Gas Conc: 50.02

Removed Gas Cyl #: NA Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701H** 

ppm

Rem Gas Exp Date: NA ppm

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 621

Serial Number: 832

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1008841399

Analyzer Range 0 - 1000 ppb

**Finish** Start

**Finish** Start Calibration slope: 1.005098 Backgd or Offset: 9.1 9.6 1.004227 Calibration intercept: -0.020000 -0.700000 Coeff or Slope: 0.944 0.944

### SO<sub>2</sub> Calibration Data

Cat Daint	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.6	
as found span	4920	80.0	800.3	802.0	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.0	800.3	804.2	0.995
second point	4960	40.0	400.2	400.8	0.998
third point	4980	20.0	200.1	199.8	1.001
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.0	800.3	805.5	0.994
			Averag	ge Correction Factor	0.998
		_			

Baseline Corr As found: 801.40 Previous response 803.68 \*% change -0.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Adjusted the zero.

Calibration Performed By: Max Farrell



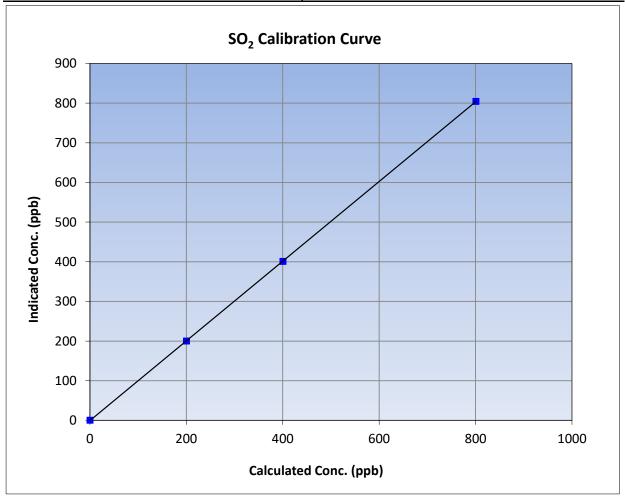
### **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 2, 2024 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:21 End Time (MST): 13:30 Analyzer make: Thermo 43i Analyzer serial #: 1008841399

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999995	≥0.995				
800.3	804.2	0.9952	Correlation Coefficient	0.555555	20.993				
400.2	400.8	0.9984	Slope	1.005098	0.90 - 1.10				
200.1	199.8	1.0014	Slope	1.003036	0.90 - 1.10				
			- Intercept	-0.700000	+/-30				



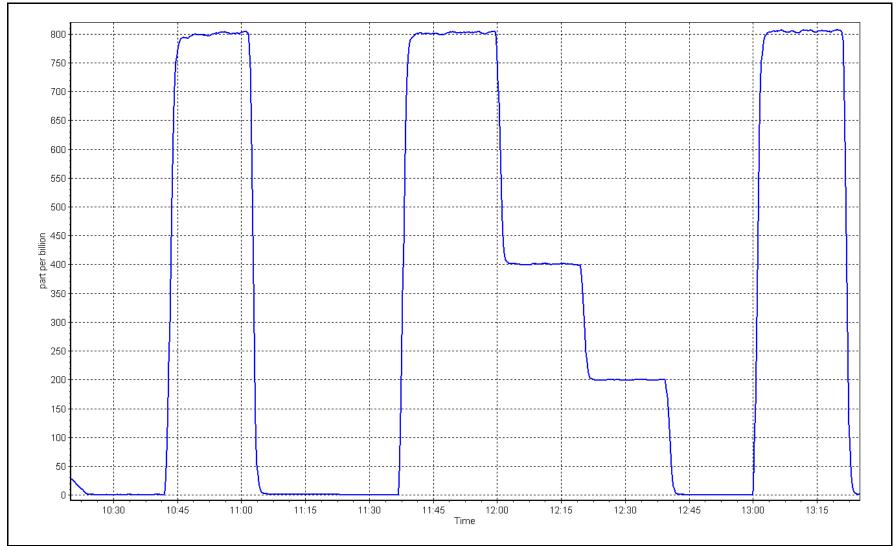
**SO2 Calibration Plot** 

Date:

March 20, 2024

Location: Mannix







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Mannix

Calibration Date: March 12, 2024

Start time (MST): 9:28 Reason: Routine Station number: AMS05

Last Cal Date: February 15, 2024

End time (MST): 14:17

**Calibration Standards** 

November 15, 2026 Cal Gas Concentration: 4.96 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: DT0037363

Removed Cal Gas Conc: Rem Gas Exp Date: 4.96 ppm Removed Gas Cyl #: Diff between cyl:

Calibrator Make/Model: API T700 1845 Serial Number: ZAG Make/Model: **API T701H** Serial Number: 832

**Analyzer Information** 

Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326169 Global Converter serial #: 2022225 Converter make:

Analyzer Range 0 - 100 ppb

**Finish Start** <u>Finish</u> <u>Start</u> 0.997116 Backgd or Offset: Calibration slope: 1.008837 1.24 1.23 -0.017688 Calibration intercept: 0.022150 Coeff or Slope: 0.998 0.978

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4919	80.6	80.0	81.4	0.982
as found 2nd point	4960	40.3	40.0	40.7	0.982
as found 3rd point	4980	20.2	20.0	20.1	0.997
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	80.6	80.0	79.8	1.002
second point	4960	40.3	40.0	39.7	1.007
third point	4980	20.2	20.0	19.9	1.007
as left zero	5000	0.0	0.0	0.1	
as left span	4919	80.6	80.0	81.0	0.987
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber ch	ange:			Ave Corr Factor	1.005
Date of last converter e	fficiency test:		efficiency		

Date of last scrubber change	iency test: efficie			1.005	
Date of last converter efficie	ncy test:			e	fficiency
Baseline Corr As found:	81.4	Prev response:	80.69	*% change:	0.9%

0.9% Baseline Corr 2nd AF pt: 40.7 AF Slope: 1.019272 AF Intercept: -0.118001 AF Correlation: 0.999983 Baseline Corr 3rd AF pt: 20.1

\* = > +/-5% change initiates investigation

Changed the inlet filter after as founds. Ran a SO2 scrubber test after calibrator zero. Adjusted the Notes: span.

Calibration Performed By: Max Farrell



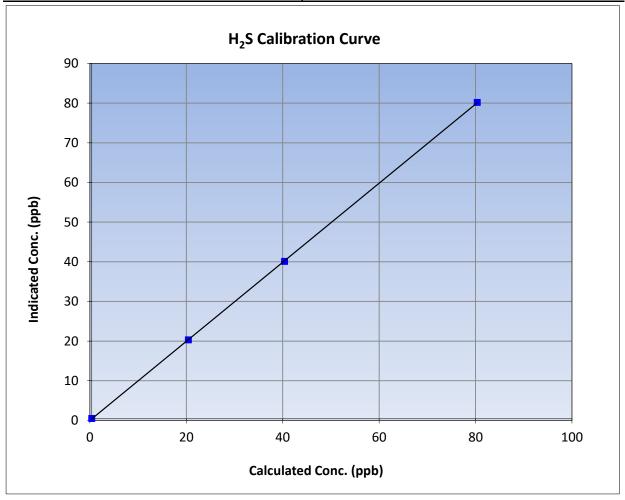
### H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 15, 2024 Station Name: Mannix Station Number: AMS05 Start Time (MST): 9:28 End Time (MST): 14:17 Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326169

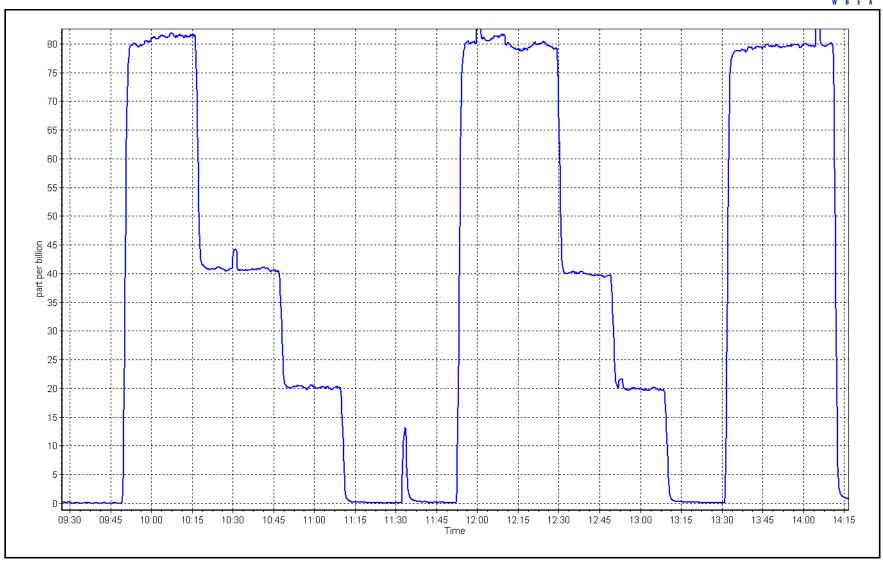
Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.1		Correlation Coefficient	0.999987	≥0.995			
80.0	79.8	1.0020	Correlation Coefficient	0.333367	20.333			
40.0	39.7	1.0069	Slope	0.997116	0.90 - 1.10			
20.0	19.9	1.0069	Slope	0.997110	0.90 - 1.10			
			- Intercept	-0.017688	+/-3			



Location: Mannix

Date: March 12, 2024







### THC / CH<sub>4</sub> / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

ppm

#### **Station Information**

Station Name: Mannix

Calibration Date: March 10, 2024

Start time (MST): 9:30

Reason: Maintenance Baseline drop

Station number: AMS 05

Last Cal Date: February 27, 2024

End time (MST): 12:08

### **Calibration Standards**

Gas Cert Reference: XCO268098 Cal Gas Expiry Date: January 12, 2029

CH4 Cal Gas Conc. 504.9 ppm CH4 Equiv Conc. 1076.6 ppm

C3H8 Cal Gas Conc. 207.9 ppm

Removed Gas Cert:

Removed CH4 Conc. 504.9 ppm CH4 Equiv Conc. 1076.6

Removed CH4 Conc. 504.9 ppm CH4 Equiv Conc. 1076.6

Removed C3H8 Conc. 207.9 ppm Diff between cyl (THC): Diff between cyl (CH $_4$ ): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 621 ZAG make/model: API T701 Serial Number: 5613

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1152430011

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 2.98E-04 2.74E-04 NMHC SP Ratio: 4.94E-05 4.75E-05 CH4 Retention time: 16.4 16.0 NMHC Peak Area: 185404 192745

Zero Chromatogram: ON ON Flat Baseline: OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	17.23	16.62	1.036
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	17.23	17.20	1.002
second point	4960	40.0	8.61	8.61	1.001
third point	4980	20.0	4.31	4.30	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	17.23	17.16	1.004
			-	Average Correction Factor	1.002
Baseline Corr AF:	16.62	Prev response	17.24	*% change	-3.7%

Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation

OFF



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

11 V L A					VE131011-00-20
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.15	9.26	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	9.15	9.13	1.002
second point	4960	40.0	4.57	4.58	0.999
third point	4980	20.0	2.29	2.29	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.15	9.07	1.009
			Aver	age Correction Factor	1.001
Baseline Corr AF:	9.26	Prev response	9.15	*% change	1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	

CH4 Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc	) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.0	8.08	7.37	1.097			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.0	8.08	8.07	1.001			
second point	4960	40.0	4.04	4.03	1.002			
third point	4980	20.0	2.02	2.01	1.005			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.0	8.08	8.09	0.999			
			Av	erage Correction Factor	1.003			
Baseline Corr AF:	7.37	Prev response	8.09	*% change	-9.9%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			
		Calibration	Statistics					
		<u>Start</u>		<u>Finish</u>				
THC Cal Slope:		1.000620		0.998544				
THC Cal Offset:		0.007200		-0.000400				
CH4 Cal Slope:		0.999873		0.999590				
CH4 Cal Offset:		0.014400		-0.004600				
NMHC Cal Slope:		1.001368		0.998095				

-0.006800

Notes:

NMHC Cal Offset:

CH4 chromatogram displayed the peak edge on the back hitting the CH4 window timing; adjusted carrier pressure from 28.0 to 30.0 psi and calibrated channels, no further response dips noted.

0.003800

Calibration Performed By: Kelly Baragar



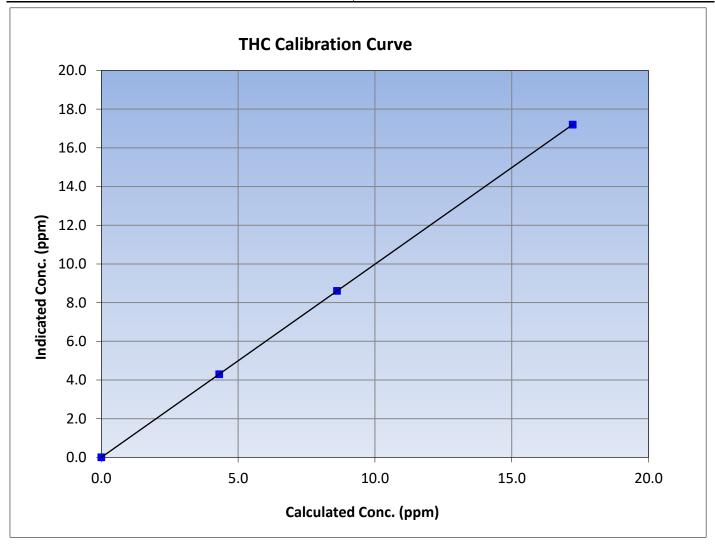
### **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 10, 2024 Calibration Date: **Previous Calibration:** February 27, 2024 Station Name: AMS 05 Mannix Station Number: Start Time (MST): 9:30 End Time (MST): 12:08 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
17.23	17.20	1.0016	Correlation Coemicient	1.000000	20.333
8.61	8.61	1.0009	Slope	0.998544	0.90 - 1.10
4.31	4.30	1.0024	Siope		0.30 - 1.10
			Intercept	-0.000400	+/-0.5





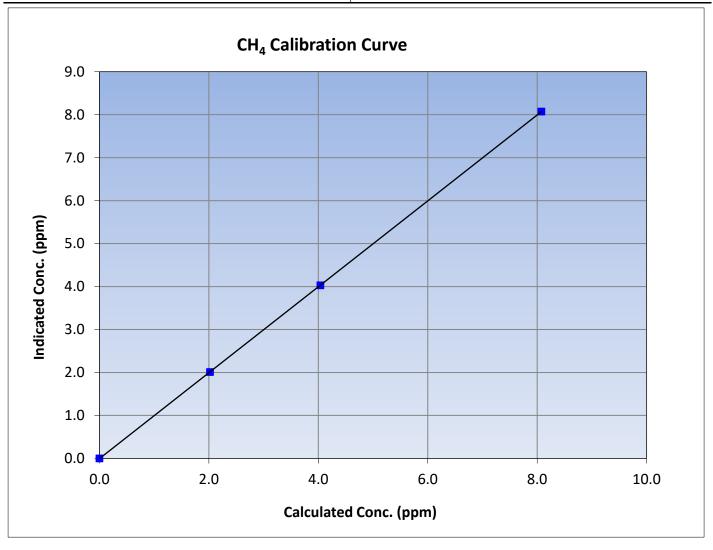
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

March 10, 2024 Calibration Date: **Previous Calibration:** February 27, 2024 Station Name: AMS 05 Mannix Station Number: Start Time (MST): 9:30 End Time (MST): 12:08 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
8.08	8.07	1.0007	Correlation Coemicient	0.555550	20.333
4.04	4.03	1.0023	Slope	0.999590	0.90 - 1.10
2.02	2.01	1.0048	Slope	0.555550	0.90 - 1.10
		·	Intercept	-0.004600	+/-0.5





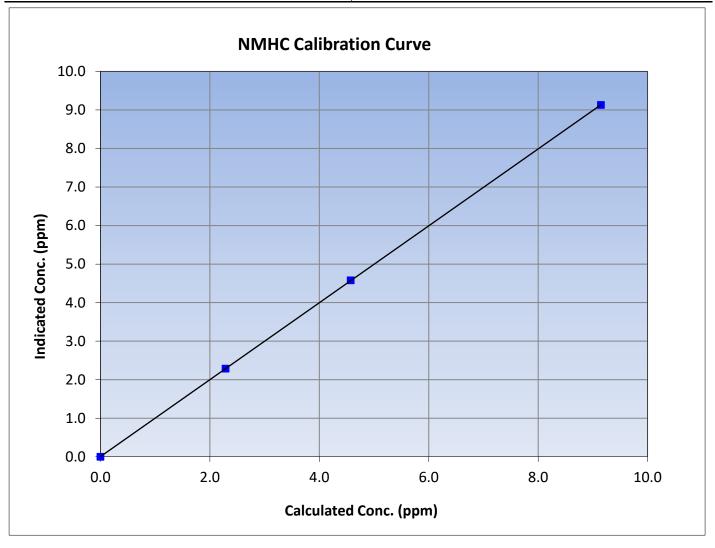
### **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

March 10, 2024 Calibration Date: **Previous Calibration:** February 27, 2024 Station Name: AMS 05 Mannix Station Number: Start Time (MST): 9:30 End Time (MST): 12:08 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
9.15	9.13	1.0019	Correlation Coemicient	0.333336	20.555
4.57	4.58	0.9993	Slope	0.998095	0.90 - 1.10
2.29	2.29	1.0004	Slope	0.996093	0.90 - 1.10
			Intercept	0.003800	+/-0.5

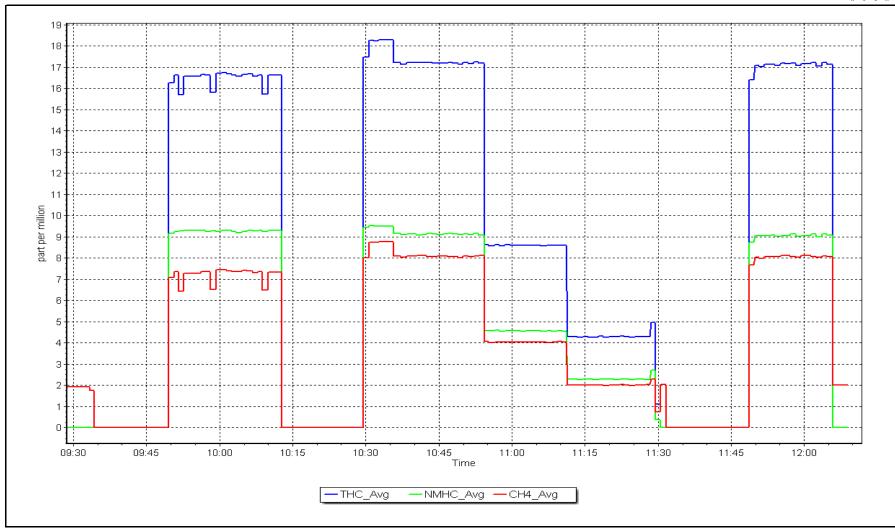


**NMHC Calibration Plot** 

Date: March 10, 2024

Location: Mannix







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Mannix Station Name:

Calibration Date: March 13, 2024

Start time (MST): 8:52 Reason: Removal Station number: AMS 05

Last Cal Date: March 10, 2024

End time (MST): 10:12

### **Calibration Standards**

Gas Cert Reference: XCO268098 Cal Gas Expiry Date: January 12, 2029

CH4 Cal Gas Conc. 504.9 CH4 Equiv Conc. 1076.6 ppm ppm

207.9 C3H8 Cal Gas Conc. ppm

Removed Gas Cert:

Removed CH4 Conc. 504.9 ppm

Removed C3H8 Conc. 207.9 ppm Diff between cyl ( $CH_4$ ):

Calibrator Model: **API T700** ZAG make/model: **API T701** 

Removed Gas Expiry:

CH4 Equiv Conc. 1076.6 ppm

Diff between cyl (THC):

Diff between cyl (NM): Serial Number: 621

Serial Number: 5613

#### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

Zero Chromatogram:

CH4 Range (ppm): 0 - 10 ppm

Analyzer serial #: 1152430011

**Finish** Start CH4 SP Ratio: 2.74E-04 NA CH4 Retention time: 16.0 NA

ON

OFF

NMHC SP Ratio: NMHC Peak Area:

Flat Baseline:

4.75E-05 192745 OFF

**Start** 

NA NA OFF

**Finish** 

**THC Calibration Data** 

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	17.23	17.12	1.006
as found 2nd point	4960	40.0	8.61	8.59	1.003
as found 3rd point	4980	20.0	4.31	4.28	1.007
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					

as left span				17.16	
	Average Correction Factor				
Baseline Corr AF:	17.12	Prev response	17.20	*% change	-0.5%
Baseline Corr 2nd AF:	8.6	AF Slope:	0.994185	AF Intercept:	0.003200
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.15	9.52	0.961
as found 2nd point	4960	40.0	4.57	4.75	0.964
as found 3rd point	4980	20.0	2.29	2.37	0.966
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span				9.07	
			Aver	age Correction Factor	
Baseline Corr AF:	9.52	Prev response	9.13	*% change	4.0%
Baseline Corr 2nd AF:	4.7	AF Slope:	1.040898	AF Intercept:	-0.008000
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999996	* = > +/-5% change initia	tes investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	8.08	7.60	1.063
as found 2nd point	4960	40.0	4.04	3.84	1.051
as found 3rd point	4980	20.0	2.02	1.91	1.058
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span				8.09	
				age Correction Factor	
Baseline Corr AF:	7.60	Prev response	8.07	*% change	-6.2%
Baseline Corr 2nd AF:	3.84	AF Slope:	0.941063	AF Intercept:	0.012000
Baseline Corr 3rd AF:	1.91	AF Correlation:	0.999958	* = > +/-5% change initia	tes investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.998544			
THC Cal Offset:		-0.000400			
CH4 Cal Slope:		0.999590			
CH4 Cal Offset:		-0.004600			
NMHC Cal Slope:		0.998095			
1					

Notes: Removal Calibration.

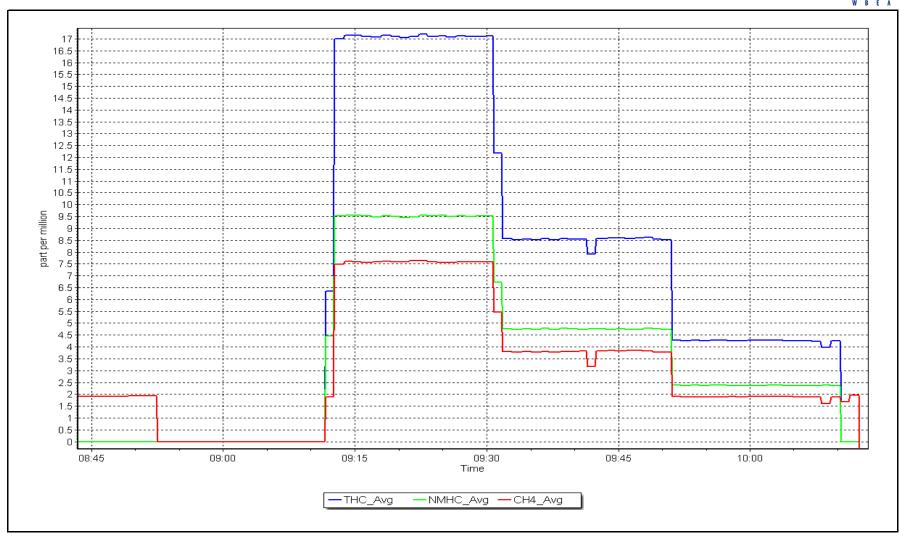
0.003800

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

Date: March 13, 2024 Location: Mannix







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

ppm

#### **Station Information**

Mannix Station Name: Calibration Date: March 13, 2024

Start time (MST): 11:08 Install Reason:

Station number: AMS 05

Last Cal Date: NA End time (MST): 13:25

### **Calibration Standards**

Gas Cert Reference: XCO268098 Cal Gas Expiry Date: January 12, 2029

CH4 Cal Gas Conc. 504.9 CH4 Equiv Conc. 1076.6 ppm ppm

207.9 C3H8 Cal Gas Conc. ppm

Removed Gas Cert:

Removed CH4 Conc. 504.9 ppm

Removed C3H8 Conc. 207.9 ppm

Diff between cyl ( $CH_4$ ):

Calibrator Model: **API T700** ZAG make/model: **API T701**  Removed Gas Expiry:

CH4 Equiv Conc. 1076.6

Diff between cyl (THC):

Diff between cyl (NM): Serial Number: 621

Serial Number: 5613

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1170050130

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

**Finish** Start Start Finish CH4 SP Ratio: NA 2.76E-04 NMHC SP Ratio: 5.97E-05 NA CH4 Retention time: NA 14.4 NMHC Peak Area: NA 153276 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	17.23	17.22	1.000
second point	4960	40.0	8.61	8.59	1.002
third point	4980	20.0	4.31	4.30	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	17.23	17.30	0.996
			,	Average Correction Factor	1.002
Baseline Corr AF:	NA	Prev response	NA	*% change	NA

Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

\* = > +/-5% change initiates investigation Baseline Corr 3rd AF: AF Correlation: NA



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.0	9.15	9.15	1.000
second point	4960	40.0	4.57	4.60	0.994
third point	4980	20.0	2.29	2.32	0.987
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.15	9.23	0.991
·			Avera	age Correction Factor	0.994
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
	Dir dir How Tute	Source gas now rate	care corre (ppm) (ce)	ma cone (ppm) (ic)	CI 2 0.55 1.05
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.0	8.08	8.07	1.001
second point	4960	40.0	4.04	3.99	1.012
hird point	4980	20.0	2.02	1.98	1.021
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.06	1.002
			Avera	age Correction Factor	1.011
Baseline Corr AF:	NA	Prev response	NA Avera	age Correction Factor *% change	1.011 NA
	NA NA	Prev response AF Slope:			
Baseline Corr 2nd AF:		•		*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:	NA	*% change AF Intercept:	NA
Baseline Corr 2nd AF:	NA	AF Slope: AF Correlation:	NA	*% change AF Intercept:	NA
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope:	NA	AF Slope: AF Correlation: Calibration	NA	*% change AF Intercept:  * = > +/-5% change initiate	NA
Baseline Corr 2nd AF: Baseline Corr 3rd AF:	NA	AF Slope: AF Correlation: Calibration	NA	*% change AF Intercept:  * = > +/-5% change initiate  Finish	NA
Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope: THC Cal Offset:	NA	AF Slope: AF Correlation: Calibration	NA	*% change AF Intercept:  * = > +/-5% change initiate  Finish 0.999917	NA
Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope:	NA	AF Slope: AF Correlation: Calibration	NA	*% change AF Intercept:  * = > +/-5% change initiate  Finish 0.999917 -0.008000	NA

Notes: Install calibration. Sample inlet filter changed. Adjusted span only.

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

0.016600



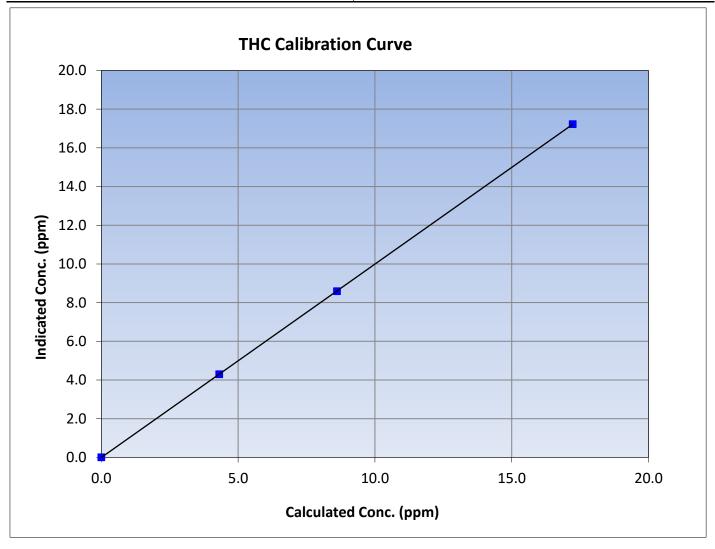
### **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 13, 2024 Calibration Date: **Previous Calibration:** NA Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 11:08 End Time (MST): 13:25 Analyzer make: Analyzer serial #: 1170050130 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.99999	≥0.995
17.23	17.22	1.0002	Correlation Coemicient	0.555555	20.555
8.61	8.59	1.0023	Slope	0.999917	0.90 - 1.10
4.31	4.30	1.0027	Siope		0.30 - 1.10
			Intercept	-0.008000	+/-0.5





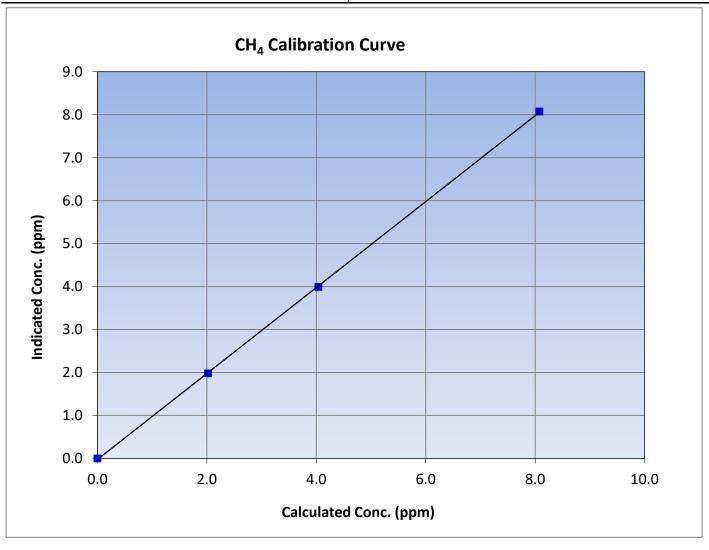
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 13, 2024 **Previous Calibration:** NA Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 11:08 End Time (MST): 13:25 Analyzer make: Analyzer serial #: 1170050130 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999953	≥0.995
8.08	8.07	1.0009	Correlation Coemicient	0.555555	20.999
4.04	3.99	1.0118	Slope	1.000113	0.90 - 1.10
2.02	1.98	1.0205	Siope	1.000113	0.90 - 1.10
			Intercept	-0.024200	+/-0.5





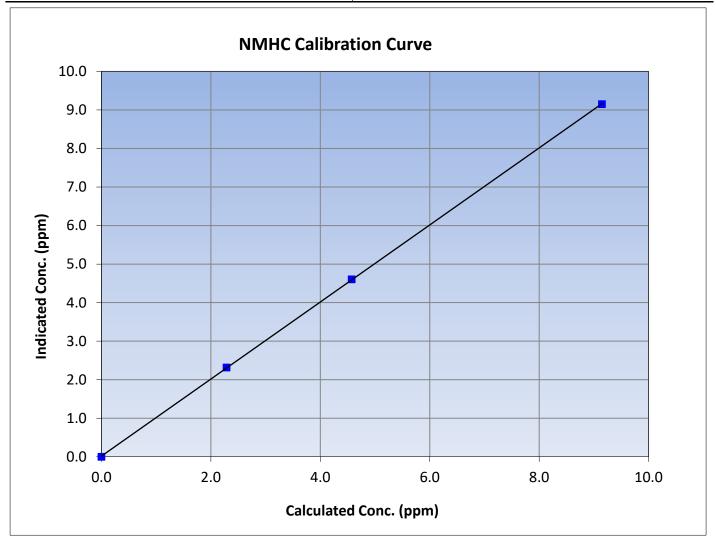
### **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

March 13, 2024 Calibration Date: **Previous Calibration:** NA Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 11:08 End Time (MST): 13:25 Analyzer make: Analyzer serial #: 1170050130 Thermo 55i

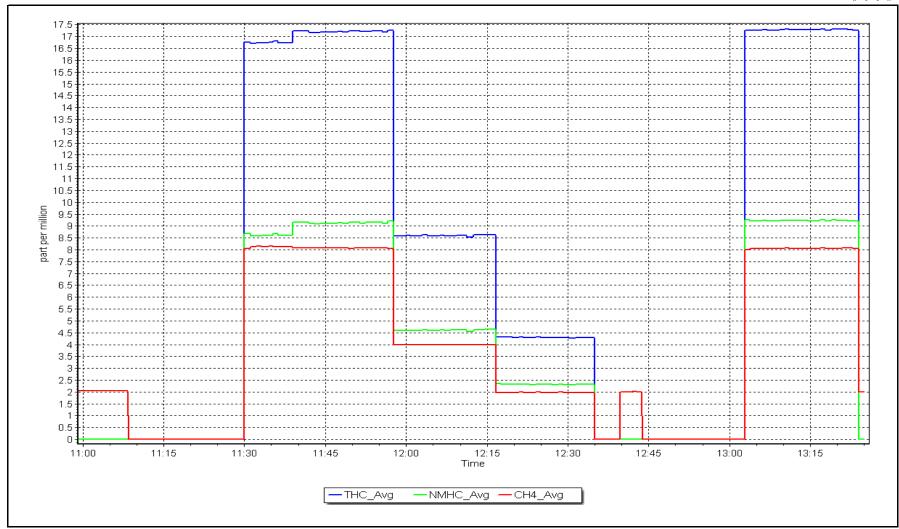
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999984	≥0.995
9.15	9.15	0.9995	Correlation Coefficient		20.993
4.57	4.60	0.9937	Slope	0.999769	0.90 - 1.10
2.29	2.32	0.9874	Slope		0.90 - 1.10
			Intercept	0.016600	+/-0.5



Date: March 13, 2024

Location: Mannix







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

# AMS06 PATRICIA MCINNES MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



### **SO<sub>2</sub> Calibration Report**

Version-01-2020

**Station Information** 

Station Name: Patricia McInnes

March 7, 2024 Calibration Date:

10:20 Start time (MST): Routine Station number: AMS06

February 6, 2024 Last Cal Date: End time (MST):

14:15

Reason:

**Calibration Standards** 

Cal Gas Concentration: 49.78

Cal Gas Cylinder #: AAL070632

Removed Cal Gas Conc: 49.78

Removed Gas Cyl #: N/A

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701**  Cal Gas Exp Date: September 9, 2024

Rem Gas Exp Date: N/A

Diff between cyl:

Serial Number: 3566

Serial Number: 5608

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

ppm

Calibration slope: 0.996386 0.997030 Calibration intercept: 1.161262 1.560821 Backgd or Offset: 17.7

**Finish** Start

17.7 0.922 Coeff or Slope: 0.922

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4920	80.3	799.5	794.9	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.3	799.5	798.0	1.002
second point	4960	40.2	400.2	401.2	0.998
third point	4980	20.1	200.1	202.5	0.988
as left zero	5000	0.0	0.0	0.4	
as left span	4920	80.3	799.5	797.9	1.002
			Averag	ge Correction Factor	0.996

Baseline Corr As found: 794.70 Previous response 797.74 \*% change -0.4% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Max Farrell



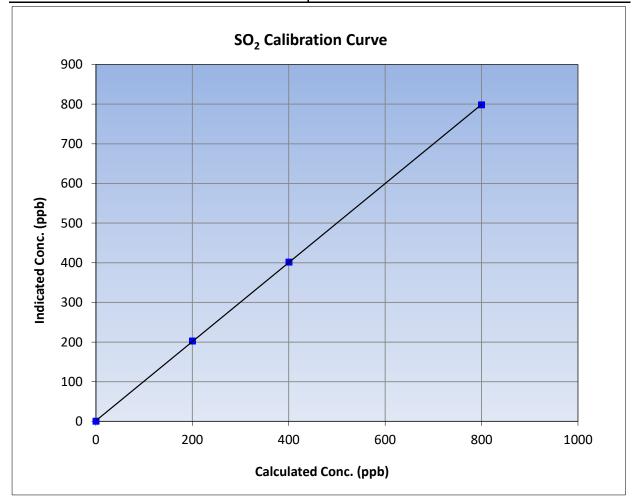
### **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

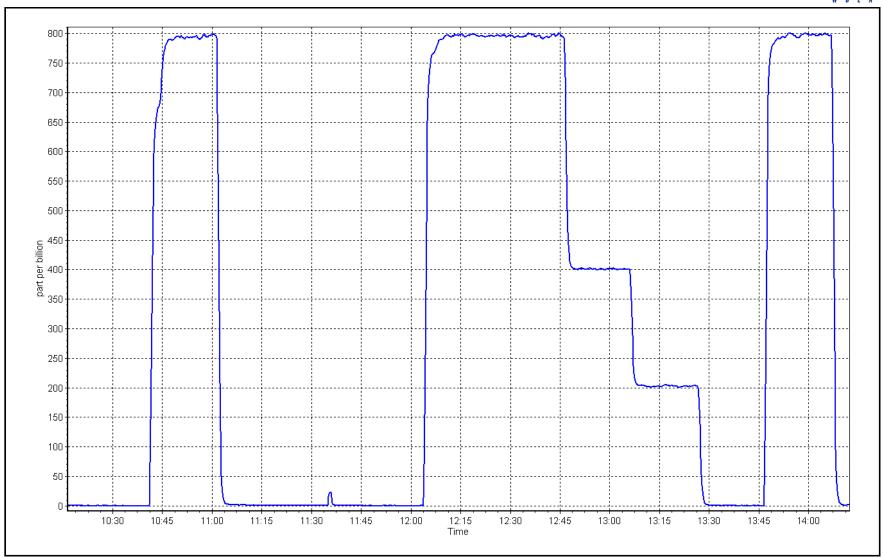
Calibration Date: March 7, 2024 **Previous Calibration:** February 6, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 10:20 End Time (MST): 14:15 Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999987	≥0.995		
799.5	798.0	1.0018	- Correlation Coefficient				
400.2	401.2	0.9976	Clana	0.997030	0.90 - 1.10		
200.1	202.5	0.9882	Slope		0.90 - 1.10		
			- Intercept	1.560821	+/-30		



SO2 Calibration Plot Date: March 7, 2024 Location: Patricia McInnes







### **TRS Calibration Report**

Version-11-2021

1.150

**Station Information** 

Patricia McInnes Station Name: Calibration Date: March 8, 2024

Start time (MST): 9:29 Reason: Routine Station number: AMS 06

Last Cal Date: February 7, 2024

End time (MST): 13:30

Coeff or Slope:

1.150

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: February 14, 2025 5.328 ppm

Cal Gas Cylinder #: CC506659

Removed Cal Gas Conc: 5.328 ppm Rem Gas Exp Date: N/A Removed Gas Cyl #: N/A Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3566 ZAG Make/Model: **API T701** Serial Number: 4602

0.280242

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358 Converter make: CDN-101 Converter serial #: 517

Analyzer Range 0 - 100 ppb

Calibration intercept:

Start **Finish Finish Start** Calibration slope: 0.994029 0.993746 Backgd or Offset: 1.95 1.95

0.540147

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.1	80.0	80.1	1.000
as found 2nd point	4963	37.5	40.0	40.3	0.994
as found 3rd point	4981	18.8	20.0	20.6	0.977
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4925	75.1	80.0	79.9	1.002
second point	4963	37.5	40.0	40.4	0.989
third point	4981	18.8	20.0	20.8	0.963
as left zero	5000	0.0	0.0	0.2	
as left span	4925	75.1	80.0	80.9	0.989
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chang	ge:	December 20, 2021		Ave Corr Factor	0.985
Date of last converter effic		efficiency			

Baseline Corr As found: 80.0 79.83 0.2% Prev response: \*% change: Baseline Corr 2nd AF pt: 40.2 AF Slope: 0.998032 AF Intercept: 0.340131

Baseline Corr 3rd AF pt: AF Correlation: \* = > +/-5% change initiates investigation

Changed the inlet filter after as founds. Ran a SO2 scrubber check after calibrator zero. No Notes:

adjustments made.

0.999958

Calibration Performed By: Max Farrell

20.5



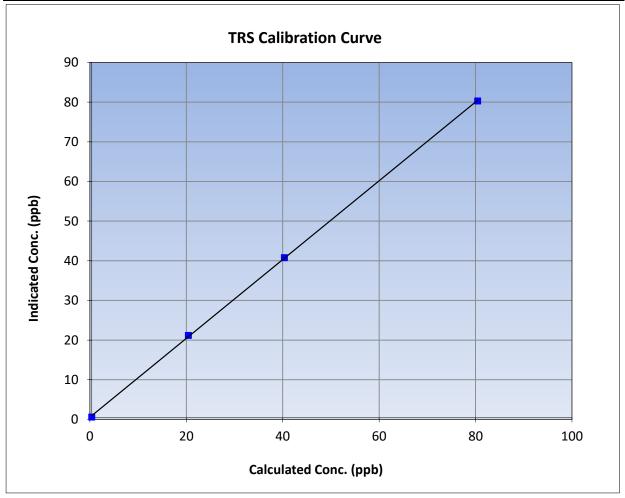
### **TRS Calibration Summary**

Version-11-2021

### **Station Information**

Calibration Date: March 8, 2024 **Previous Calibration:** February 7, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:29 End Time (MST): 13:30 Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999916	≥0.995		
80.0	79.9	1.0016	Correlation Coefficient	0.555510	_0.999		
40.0	40.4	0.9890	Slope	0.993746	0.90 - 1.10		
20.0	20.8	0.9632	Slope		0.30 - 1.10		
			- Intercept	0.540147	+/-3		

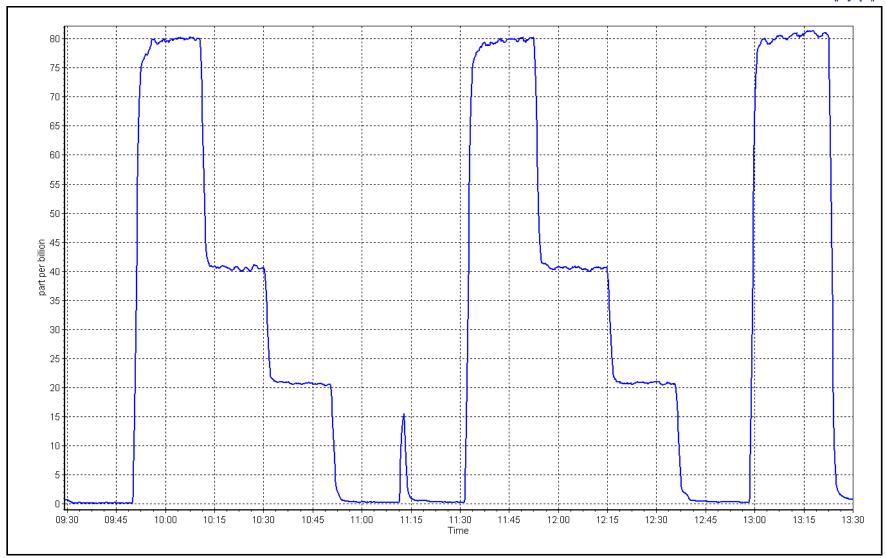


TRS Calibration Plot

Date: March 8, 2024









# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Patricia McInnes Station Name:

Calibration Date: March 7, 2024

Start time (MST): 10:20

Routine Reason:

Station number: AMS06

Last Cal Date: February 6, 2024

End time (MST): 14:15

### **Calibration Standards**

Gas Cert Reference: AAL070632 Cal Gas Expiry Date: September 9, 2024

CH4 Cal Gas Conc. 501.6 CH4 Equiv Conc. 1066.2 ppm ppm

205.3 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 501.6 CH4 Equiv Conc. 1066.2 ppm ppm

Removed C3H8 Conc. 205.3 Diff between cyl (THC): ppm Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 3566 ZAG make/model: **API T701** Serial Number: 4602

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148495

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

Baseline Corr 3rd AF:

NA

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.15E-04 2.21E-04 NMHC SP Ratio: 4.71E-05 4.84E-05 CH4 Retention time: 14.2 14.2 NMHC Peak Area: 192619 187266 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	17.12	16.81	1.018
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.12	17.12	1.000
second point	4960	40.2	8.57	8.58	0.999
third point	4980	20.1	4.29	4.35	0.986
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.12	1.000
			,	Average Correction Factor	0.995
Baseline Corr AF:	16.81	Prev response	17.05	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

\* = > +/-5% change initiates investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

II D L K					VEI SIOTI-00-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919.7	80.3	9.07	8.94	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919.7	80.3	9.07	9.07	1.000
second point	4960	40.2	4.54	4.56	0.995
third point	4980	20.1	2.27	2.32	0.979
as left zero	5000	0.0	0.00	0.00	
as left span	4919.7	80.3	9.07	9.08	0.999
·			Avei	rage Correction Factor	0.991
Baseline Corr AF:	8.93	Prev response	9.04	*% change	-1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
		Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	1.022
as found span	4919.7	80.3	8.06	7.88	1.023
as found 2nd point					
as found 3rd point					
new cylinder response	5000	0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00	4 004
high point	4919.7	80.3	8.06	8.05	1.001
second point	4960	40.2	4.03	4.02	1.004
third point	4980	20.1	2.02	2.03	0.995
as left zero	5000	0.0	0.00	0.00	4 004
as left span	4919.7	80.3	8.06	8.04	1.001
Pacalina Cars AF:	7.00	Drov rosponse		rage Correction Factor	1.000
Baseline Corr AF: Baseline Corr 2nd AF:	7.88	Prev response	8.00	*% change	-1.6%
	NA	AF Correlation		AF Intercept:  * = > +/-5% change initiat	os investigation
Baseline Corr 3rd AF:	NA	AF Correlation:		- > +/-5% Change initial	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.994828		0.998467	
THC Cal Offset:		0.012664		0.026638	
CH4 Cal Slope:		0.993816		0.998356	
CH4 Cal Offset:		-0.003140		0.002848	
NMHC Cal Slope:		0.995576		0.998464	

Notes: Changed the inlet filter and reconnected the instrument to a H2 generator. Adjusted the span only.

0.016404

Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.024190



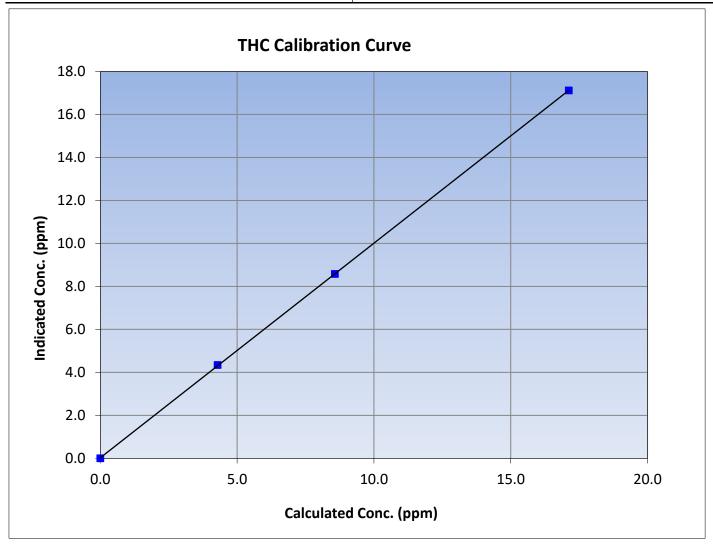
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 7, 2024 **Previous Calibration:** Calibration Date: February 6, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 10:20 End Time (MST): 14:15 Analyzer make: Thermo 55i Analyzer serial #: 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
17.12	17.12	1.0003	Correlation Coemicient	0.555560	20.555
8.57	8.58	0.9993	Slope	0.998467	0.90 - 1.10
4.29	4.35	0.9864	Slope	0.336407	0.90 - 1.10
			Intercept	0.026638	+/-0.5





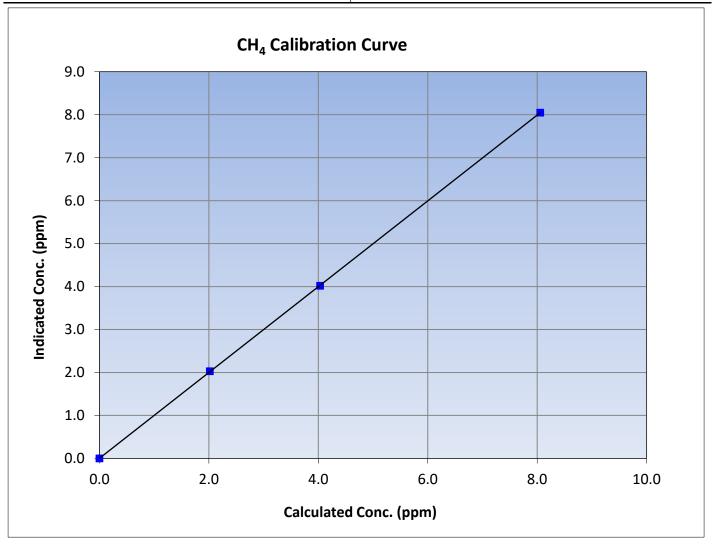
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

March 7, 2024 Calibration Date: **Previous Calibration:** February 6, 2024 Station Name: Patricia McInnes AMS06 Station Number: Start Time (MST): 10:20 End Time (MST): 14:15 Analyzer make: Analyzer serial #: Thermo 55i 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999993	≥0.995
8.06	8.05	1.0010	Correlation Coefficient	0.555555	20.333
4.03	4.02	1.0037	Slope	0.998356	0.90 - 1.10
2.02	2.03	0.9948	Siope	0.556550	0.90 - 1.10
			Intercept	0.002848	+/-0.5





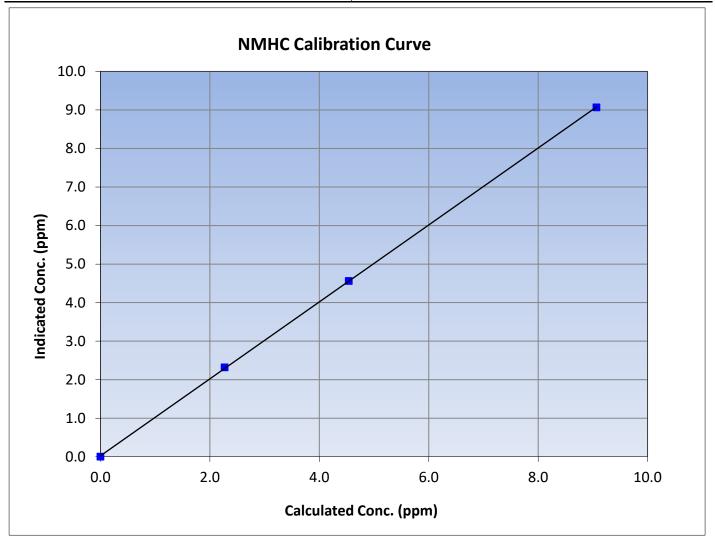
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

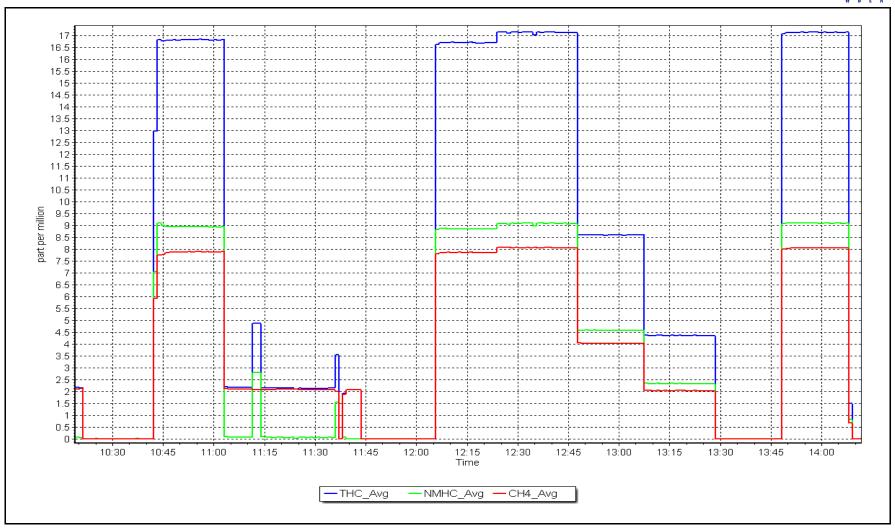
March 7, 2024 **Previous Calibration:** Calibration Date: February 6, 2024 Station Name: Patricia McInnes AMS06 Station Number: Start Time (MST): 10:20 End Time (MST): 14:15 Analyzer make: Thermo 55i Analyzer serial #: 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999968	≥0.995
9.07	9.07	0.9999	Correlation Coemicient	0.555508	20.333
4.54	4.56	0.9952	Slope	0.998464	0.90 - 1.10
2.27	2.32	0.9791	Slope	0.556404	0.90 - 1.10
			Intercept	0.024190	+/-0.5



NMHC Calibration Plot Date: March 7, 2024 Location: Patricia McInnes







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Patricia McInnes

Calibration Date: March 5, 2024

Start time (MST): 9:58
Reason: Routine

Station number: AMS06

Last Cal Date: February 5, 2024

End time (MST): 14:41

#### **Calibration Standards**

NO Gas Cylinder #: T30YCWN Cal Gas Expiry Date: April 11, 2025

NOX Cal Gas Conc: 47.94 ppm NO Cal Gas Conc: 46.39 ppm

Removed Cylinder #: N/A Removed Gas Exp Date: N/A

Removed Gas NOX Conc: 47.94 ppm Removed Gas NO Conc: 46.39 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3566 ZAG make/model: Teledyne API T701 Serial Number: 4602

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1172750022

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.825 0.825 NO bkgnd or offset: 3.2 3.2 NOX coeff or slope: 0.987 0.987 NOX bkgnd or offset: 3.9 3.9 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 157.2 157.2

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.000023	1.002416
NO <sub>x</sub> Cal Offset:	2.315635	1.975128
NO Cal Slope:	1.002417	1.003032
NO Cal Offset:	1.022423	1.382192
NO <sub>2</sub> Cal Slope:	0.999140	0.999602
NO <sub>2</sub> Cal Offset:	-0.524585	-0.538439



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.2	-0.4		
as found span	4914	86.2	826.5	799.7	26.7	832.5	804.7	27.8	0.9927	0.9938
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.4	-0.4		
high point	4914	86.2	826.5	799.7	26.7	829.5	803.0	26.6	0.9963	0.9959
second point	4957	43.1	413.2	399.9	13.4	417.0	403.1	13.9	0.9910	0.9920
third point	4978	21.6	207.1	200.4	6.7	211.7	203.3	8.4	0.9784	0.9858
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.3	-0.4		
as left span	4914	86.2	826.5	399.1	427.3	827.0	402.2	424.8	0.9993	0.9924
							Average C	Correction Factor	0.9885	0.9913
Corrected As fo	ound NO <sub>X</sub> =	832.7 ppb	NO =	804.5 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO <sub>X</sub> =	0.5%
Previous Respo	nse NO <sub>X</sub> =	828.8 ppb	NO =	802.7 ppb				*Percent Chan	ge NO =	0.2%
Baseline Corr 2	nd pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$	:	Nx SI:	Nx Int:	
Baseline Corr 3	rd pt $NO_x =$	NA ppb	NO =	NA ppb	As foun	d NO r <sup>2</sup> :	:	NO SI:	NO Int:	
					As foun	d $NO_2 r^2$	:	NO2 SI:	NO <sub>2</sub> Int:	
				G	GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated No concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	801.3		400.7	427.3		426.7	1.001	5	99.9%
2nd GPT point	(200 ppb O3)	801.3		604.0	224.0		223.3	1.0032	2	99.7%
3rd GPT point	(100 ppb O3)	801.3	·	703.3	124.7	·	124.0	1.0058	3	99.4%

Notes:

Changed the inlet filter after as founds. No adjustments made.

Average Correction Factor

1.0035

Calibration Performed By:

Max Farrell

99.7%



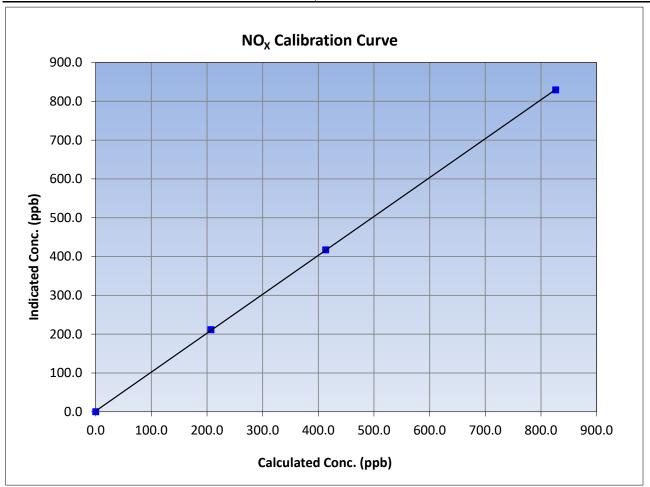
# NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 5, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:58 End Time (MST): 14:41 Analyzer serial #: Analyzer make: Thermo 42i 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999974	≥0.995
826.5	829.5	0.9963	Correlation Coefficient	0.333374	20.555
413.2	417.0	0.9910	Slope	1.002416	0.90 - 1.10
207.1	211.7	0.9784	Slope	1.002410	0.90 - 1.10
			Intercept	1.975128	+/-20





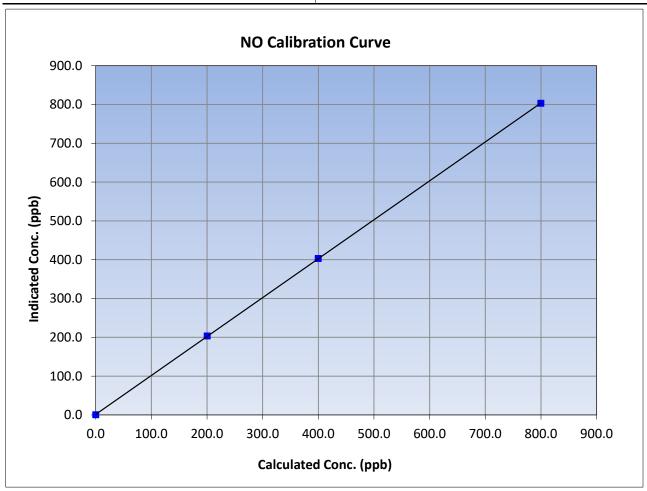
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 5, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:58 End Time (MST): 14:41 Analyzer make: Thermo 42i Analyzer serial #: 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999993	≥0.995
799.7	803.0	0.9959	Correlation Coefficient	0.555555	20.995
399.9	403.1	0.9920	Slope	1.003032	0.90 - 1.10
200.4	203.3	0.9858	Slope	1.005052	0.90 - 1.10
			Intercept	1.382192	+/-20





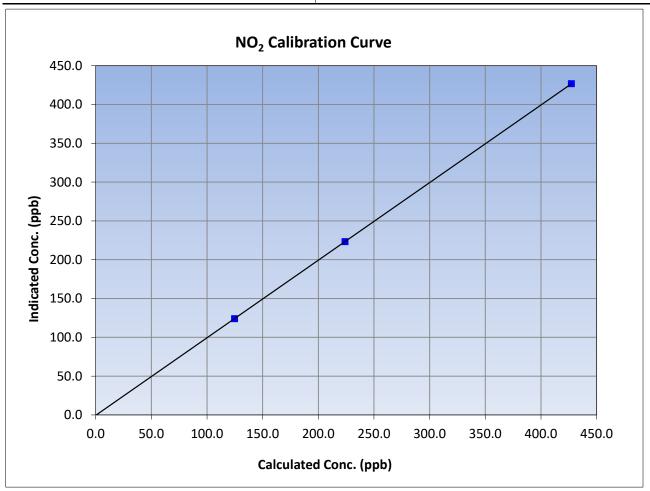
# NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 5, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:58 End Time (MST): 14:41 Analyzer make: Thermo 42i Analyzer serial #: 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999999	≥0.995
427.3	426.7	1.0015	Correlation Coefficient	0.555555	20.333
224.0	223.3	1.0032	Slope	0.999602	0.90 - 1.10
124.7	124.0	1.0058	Зюре	0.999002	0.90 - 1.10
	·		Intercept	-0.538439	+/-20

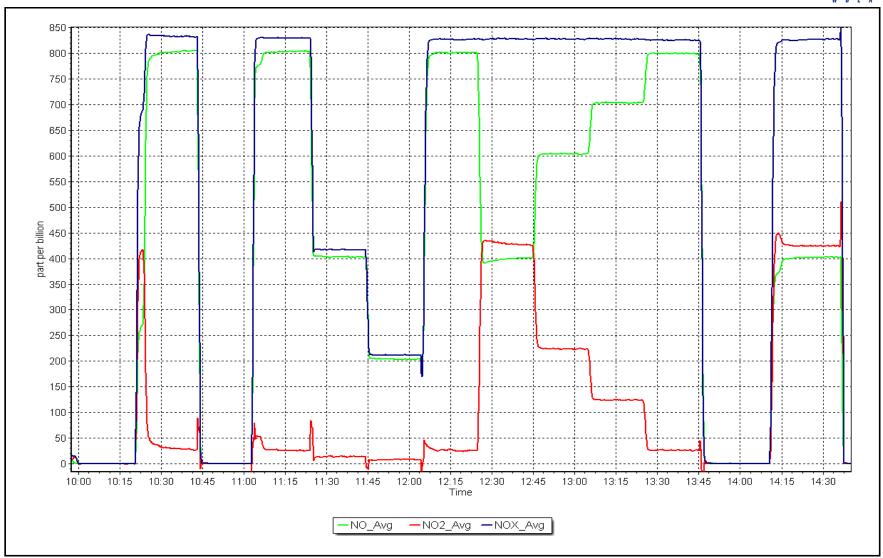


NO<sub>x</sub> Calibration Plot

Date: March 5, 2024

Location: Patricia McInnes







# O<sub>3</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Patricia McInnes

Calibration Date: March 22, 2024

Start time (MST): 9:25 Reason: Routine Station number: AMS06

Last Cal Date: February 16, 2024

End time (MST): 12:32

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: API T700 ZAG Make/Model: API T701 Serial Number: 3566 Serial Number: 4602

Analyzer serial #: 1300156234

**Analyzer Information** 

Analyzer make: Thermo 49i

Analyzer Range 0 - 500 ppb

Start Finish

<u>Start</u>

<u>Finish</u>

Calibration slope: Calibration intercept: 1.003629

1.004200

Backgd or Offset: Coeff or Slope: -0.2 1.026 -0.2 1.026

O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	800.0	0.0	0.0	
as found span	5000	1303.0	400.0	401.0	0.998
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.2	
high point	5000	1303.0	400.0	401.4	0.997
second point	5000	966.5	200.0	199.9	1.001
third point	5000	794.3	100.0	98.8	1.012
as left zero	5000	800.0	0.0	0.2	
as left span	5000	1303.0	400.0	401.8	0.996
			Averag	ge Correction Factor	1.003
Baseline Corr As found:	401.0	Previous response	e 400.6	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope	:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	:		
				* = > +/-5% change initiat	es investigation

Notes: Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Max Farrell



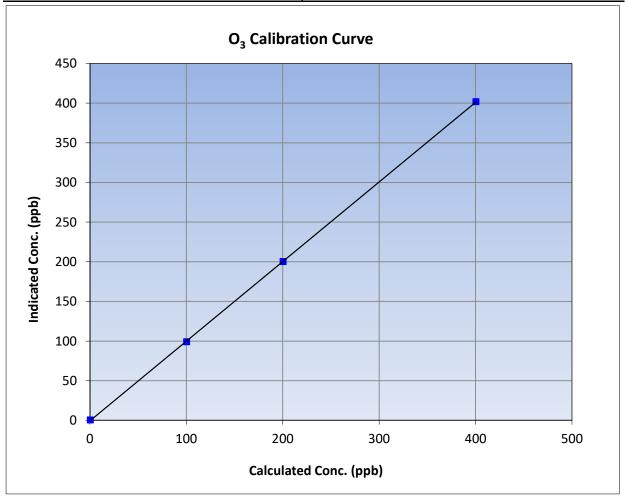
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 22, 2024 **Previous Calibration:** February 16, 2024 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:25 End Time (MST): 12:32 Analyzer make: Thermo 49i Analyzer serial #: 1300156234

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.2		Correlation Coefficient	0.999979	≥0.995				
400.0	401.4	0.9965	Correlation Coemicient	0.333373	20.995				
200.0	199.9	1.0005	Slope	1.004200	0.90 - 1.10				
100.0	98.8	1.0121	Зюре	1.004200	0.90 - 1.10				
			- Intercept	-0.660000	+/- 5				

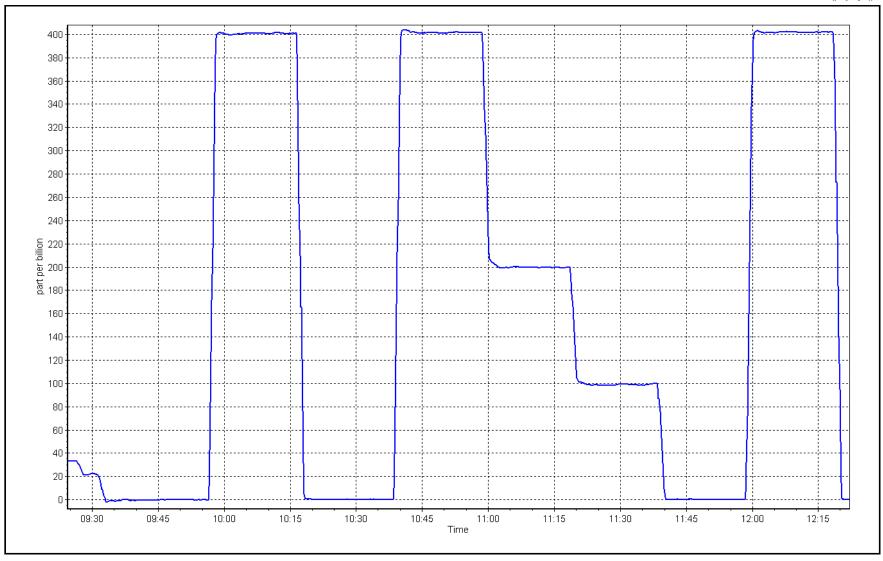


O<sub>3</sub> Calibration Plot

Date: March 22, 2024

Location: Patricia McInnes







Calibration by:

Max Farrell

# **Wood Buffalo Environmental Association**

# **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informa	tion		
Station Name: Calibration Date: Start time (MST):	Patricia McInnes March 22, 2024 12:49		Station number: AN Last Cal Date: Fel End time (MST): 13	bruary 16, 2024	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N: 76	6	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		S/N: 38 S/N: 38		
		Monthly Calibratio	on Test		
<u>Parameter</u> T (°C) P (mmHg) Flow (LPM) PW% (pump)	<u>As found</u> -7.9 737.9 5.01 42	<u>Measured</u> -8.2 740.4 5.12	<u>As left</u> -7.9 737.9 5.01 42	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM >80%
Zero Verification	PM w/o HEPA:	7.3	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be PM Inlet observation : SPAN DUST	Inlet Head Clean  Refractive Index:	_	Alignment Factor On :	tenance leak check  11-23-202	3
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	10.9	10.9	10.9		+/- 0.5
Date Optical Chaml Date Disposable Filt Post- maintenance Zero Veri	ter Changed:		22, 2024 22, 2024 :0	<0.2 ug/m3	
		Annual Mainten	ance		
Date Sample Tub Date RH/T Senso	-	•	.3, 2023 .3, 2023		
Notes:	Quarterl	y calibrations compl	ete. Leak check passed, no	o adjustments made	



# TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-05-2023

Station	Intorm	ation

Station Name: Patricia McInnes

NOX Cal Date: March 6, 2024

9:40 Start time (MST):

NH3 Cal Date: March 6, 2024

Start time (MST): 13:30 Routine

Reason:

Station number:

Last Cal Date: February 21, 2024

AMS 06

14:00 End time (MST):

Last Cal Date: February 21, 2024

NA

16:00 End time (MST):

Removed cyl Expiry:

#### **Calibration Standards**

NOX Cal Gas Conc: 47.94 NO Gas Cylinder #: T30YCWN ppm NO Cal Gas Conc: 46.39 NO Cal Gas Expiry: April 11, 2025 ppm

Removed NOX Conc: 47.94 Removed Cylinder #: ppm NA 46.39 Removed cyl Expiry: NA Removed NO Conc: ppm

NOX gas Diff: NO gas Diff:

NH3 Cal Gas Conc: 76.29 NH3 Gas Cylinder #: EB0108520 ppm

NH3 Cal Gas Expiry: August 22, 2024 Removed NH3 Conc: 76.29 Removed Cylinder #:

ppm

NH3 gas Diff: Calibrator Model:

**API T700** Serial Number: 3566 ZAG make/model: **API T701** Serial Number: 4602

### **Analyzer Information**

Analyzer model: Teledyne API T201 Analyzer serial #: 808 Converter model: Teledyne API T501 Converter serial #: 484 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 4.80 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 26.6

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.854	0.854	TN coefficient:	0.849	0.849
NOX coefficient:	0.848	0.848	NO bkgrnd:	-0.985	-0.985
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.562	-0.562
NH3 coefficient:	0.891	0.896	TN bkgrnd:	5.018	5.018

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.995140	0.992580
NO <sub>X</sub> Cal Offset:	2.256598	1.257688
NO Cal Slope:	0.997671	0.996357
NO Cal Offset:	1.183452	-0.056315
NO <sub>2</sub> Cal Slope:	0.997218	1.001744
NO <sub>2</sub> Cal Offset:	0.194612	-0.225723
NH3 Cal Slope:	1.010551	1.000069
NH3 Cal Offset:	1.110139	3.359353
TN Cal Slope:	1.017335	1.006770
TN Cal Offset:	2.438080	4.605099



# **TN - NOX - NH<sub>3</sub> Calibration Report**

Version-05-2023

### **Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-2.1	0.0	-2.0		
as found NO	4914	86.2	826.5	826.5		824.9	822.4	2.5	1.002	
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.0	0.2	-1.2		
high NO point	4914	86.2	826.5	826.5		825.9	821.0	4.8	1.001	
NO/O3 point	4914	86.2	826.5	826.5		824.0	820.3	3.5	1.003	
as found NH3	3417	82.6	1800.6		1800.6	1824.0		1811.0	0.987	0.994
new NH3 cyl rp	3417	82.6	1800.6		1800.6					
first NH3	3417	82.6	1800.6		1800.6	1814.1		1801.4	0.993	1.000
second NH3	3454	45.9	1000.5		1000.5	1015.0		1006.5	0.986	0.994
third NH3	3477	22.9	499.2		499.2	513.0		507.3	0.973	0.984
				•	•	•	Average Co	rrection Factor	1.0018	0.9925

Corrected As found TN = 827 ppb  $NO_X = 822.4$  ppb NH3 = 1813.0 ppb NH3 = 1813.0 ppb  $NO_X = 824.7$  p

\*Percent Change TN = -2.0%

\*Percent Change NO<sub>X</sub> = -0.3%

\*Percent Change NH3 = -0.4%

\* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 89.1%

NH3 Current Converter Efficiency = 89.6%



# NO<sub>X</sub> - NO - NO<sub>2</sub> Calibration Report

Version-05-2023

### **Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-2.1		
as found span	4914	86.2	826.5	799.7	826.5	822.4	795.6	824.9	1.0049	1.0052
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.5	-1.0		
high point	4914	86.2	826.5	799.7	826.5	821.0	797.6	825.9	1.0066	1.0027
second point	4957	43.1	413.2	399.9	413.2	412.1	396.4	413.5	1.0028	1.0088
third point	4978	21.6	207.1	200.4	207.1	207.8	200.2	208.7	0.9967	1.0011
							Average C	Correction Factor	1.0020	1.0042
Baseline Corr A	As fnd TN =	827 ppb	NO <sub>X</sub> = 822.4	ppb NO =	795.5 ppb			*Percent Chang	e TN=	-2.0%
Previous Respo	onse TN =	843.2 ppb	NO <sub>X</sub> = 824.7	ppb NO =	799.1 ppb			*Percent Chang	e NO <sub>x</sub> =	-0.3%
								*Percent Chang	e NO =	-0.4%
								* = > +/-5% change	initiates investigati	ion

#### = > +/-5% change initiates investigation

### **GPT Calibration Data**

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	-0.1		
calibration zero			0.0	-0.3		
1st GPT point (400 ppb O3)	793.2	394.3	425.6	426.1	0.9989	100.1%
2nd GPT point (200 ppb O3)	793.2	600.4	219.5	219.7	0.9992	100.1%
3rd GPT point (100 ppb O3)	793.2	696.5	123.4	123.5	0.9994	100.1%
				Average Correction Factor	0.9991	100.1%

Notes:

Changed the inlet filter after as founds. Adjusted the NH3 span only.

Calibration Performed By:

Max Farrell



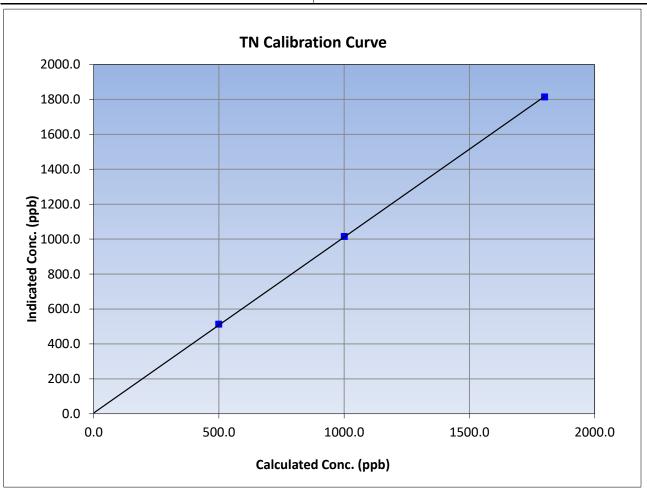
# **TN Calibration Summary**

Version-05-2023

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 21, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:40 End Time (MST): 14:00 Teledyne API T201 Analyzer make: Analyzer serial #: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-1.0		Correlation Coefficient	0.999952	≥0.995
1800.6	1814.1	0.9926	correlation coefficient	0.555552	E0.555
1000.5	1015.0	0.9857	Slope	1.006770	0.90 - 1.10
499.2	513.0	0.9730	Slope	1.000770	0.90 - 1.10
			Intercept	4.605099	+/-20





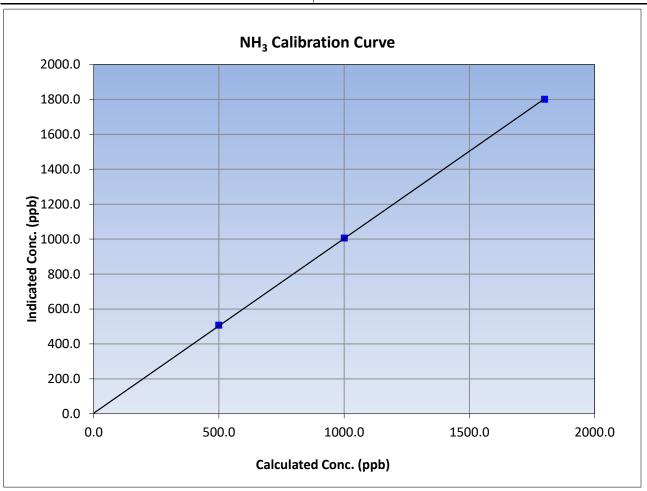
### NH<sub>3</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 21, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:40 End Time (MST): 14:00 Teledyne API T201 Analyzer serial #: Analyzer make: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-1.2		Correlation Coefficient	0.999968	≥0.995
1800.6	1801.4	0.9996	Correlation Coefficient	0.555508	20.555
1000.5	1006.5	0.9941	Slope	1.000069	0.90 - 1.10
499.2	507.3	0.9840	Slope	1.000009	0.90 - 1.10
			Intercept	3.359353	+/-20





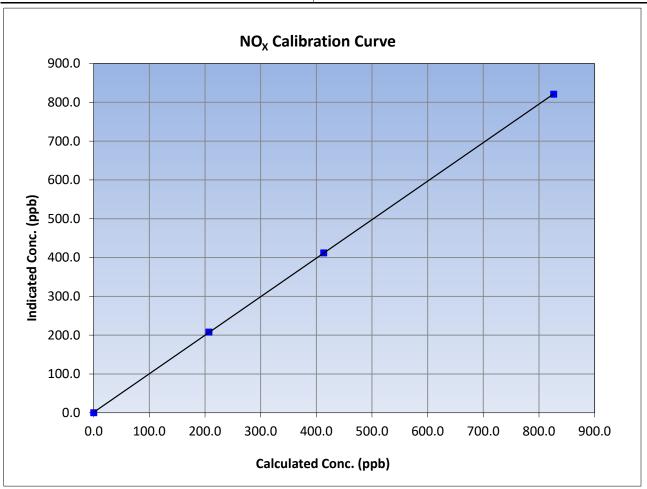
# NO<sub>x</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 21, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:40 End Time (MST): 14:00 Teledyne API T201 Analyzer serial #: Analyzer make: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999992	≥0.995
826.5	821.0	1.0066	Correlation Coefficient	0.555552	20.333
413.2	412.1	1.0028	Slope	0.992580	0.90 - 1.10
207.1	207.8	0.9967	Slope	0.992560	0.90 - 1.10
			Intercept	1.257688	+/-20





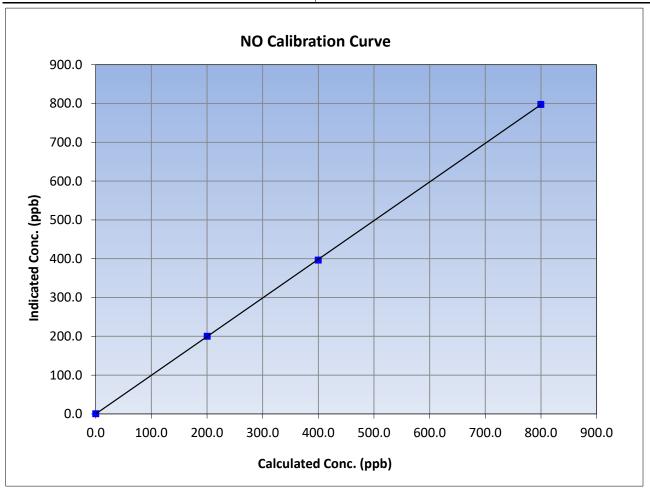
### **NO Calibration Summary**

Version-05-2023

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 21, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:40 End Time (MST): 14:00 Analyzer make: Teledyne API T201 Analyzer serial #: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999985	≥0.995
799.7	797.6	1.0027	Correlation Coefficient	0.999965	20.333
399.9	396.4	1.0088	Slope	0.996357	0.90 - 1.10
200.4	200.2	1.0011	Slope	0.990557	0.90 - 1.10
			Intercept	-0.056315	+/-20





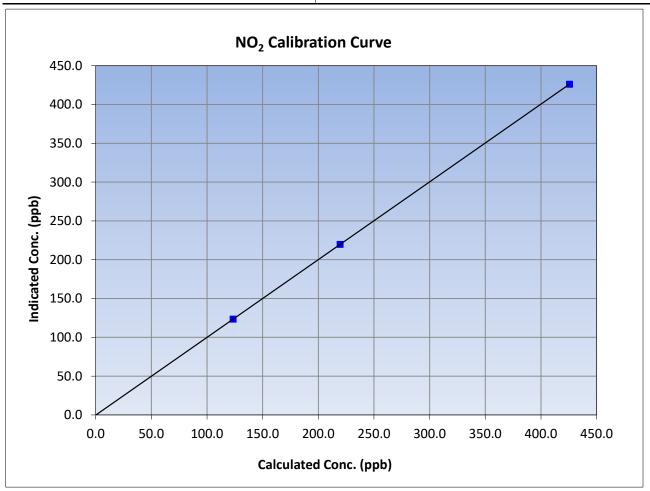
# NO<sub>2</sub> Calibration Summary

Version-05-2023

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 21, 2024 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:40 End Time (MST): 14:00 Teledyne API T201 Analyzer serial #: Analyzer make: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	1.000000	≥0.995
425.6	426.1	0.9989	Correlation Coefficient	1.000000	20.993
219.5	219.7	0.9992	Slope	1.001744	0.90 - 1.10
123.4	123.5	0.9994	Slope	1.001744	0.90 - 1.10
			Intercept	-0.225723	+/-20

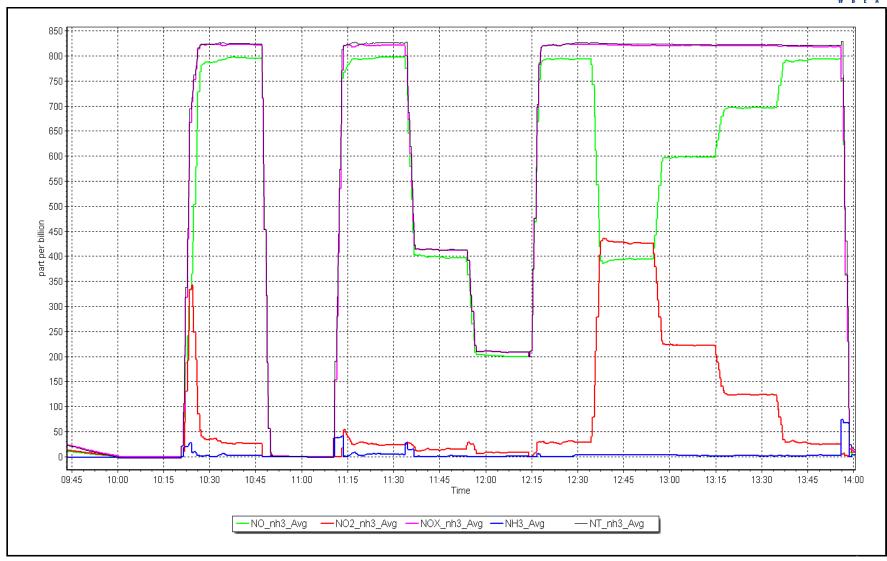


NO<sub>x</sub> Calibration Plot

Date: March 6, 2024

Location: Patricia McInnes



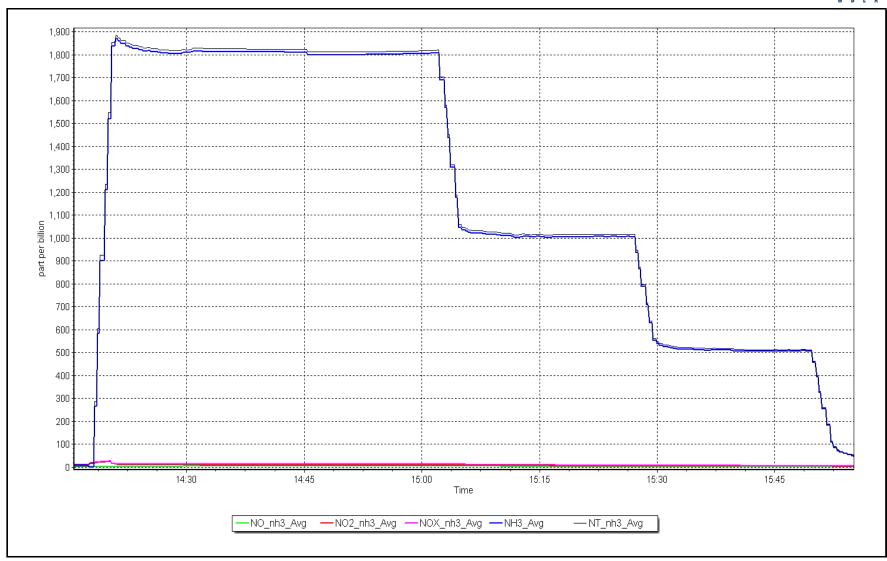


NH<sub>3</sub> Calibration Plot

Date: March 6, 2024

Location: Patricia McInnes







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS07 ATHABASCA VALLEY MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

**Finish** 

Start

#### **Station Information**

Station Name: Athabasca Valley

March 22, 2024 Calibration Date:

9:41 Start time (MST): Routine Reason:

Station number: AMS07

> February 2, 2024 Last Cal Date:

End time (MST): 13:02

**Calibration Standards** 

Cal Gas Concentration: 50.06

Cal Gas Cylinder #: CC320556

Removed Cal Gas Conc: 50.06 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API 701H** 

Baseline Corr 3rd AF pt:

Cal Gas Exp Date: March 10, 2031

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3805 Serial Number: 198

**Analyzer Information** 

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1507864683

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

ppm

Calibration slope: 1.000577 Backgd or Offset: 2.70 2.60 1.002036 0.845 Calibration intercept: 1.783896 1.744314 Coeff or Slope: 0.852

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration Correction factor (Co	
	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	
as found span	4920	79.8	799.0	802.7	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	79.8	799.0	799.8	0.999
second point	4960	39.9	399.5	404.1	0.989
third point	4980	20.0	200.2	202.4	0.989
as left zero	5000	0.0	0.0	0.0	
as left span	4920	79.8	799.0	801.8	0.996
			Averag	ge Correction Factor	0.992
Pacolina Corr Ac found	902.70	Provious rospons	902.40	*0/ chango	0.0%

Baseline Corr As found: 802.70 Previous response \*% change 802.40 0.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



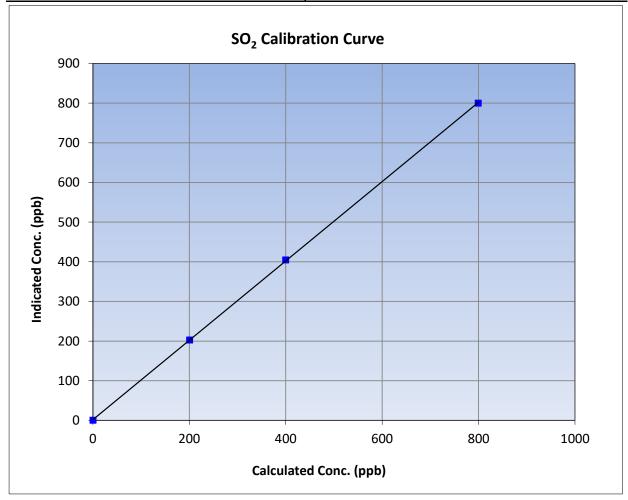
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

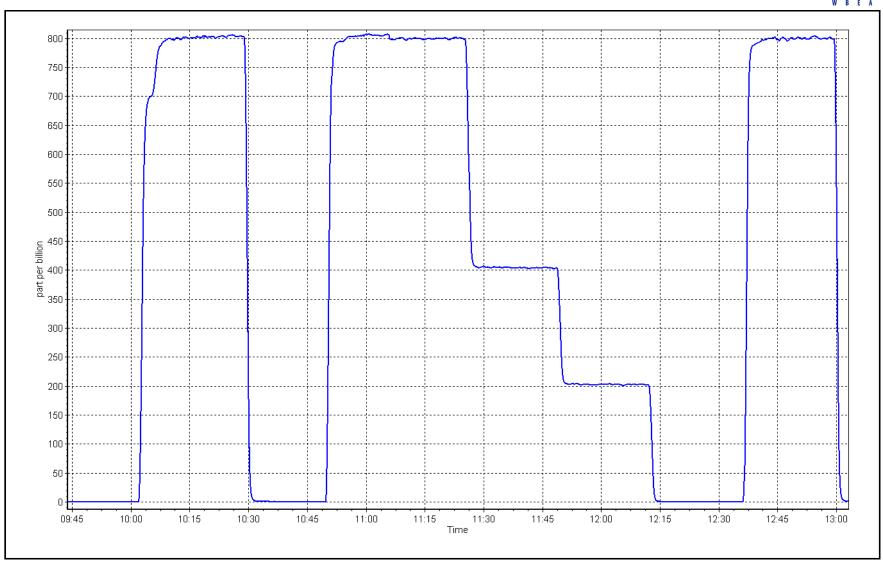
Calibration Date: March 22, 2024 **Previous Calibration:** February 2, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:41 End Time (MST): 13:02 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1507864683

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999967	≥0.995	
799.0	799.8	0.9990	Correlation Coefficient	0.333307	20.333	
399.5	404.1	0.9886	Slope	1.000577	0.90 - 1.10	
200.2	202.4	0.9893	Slope		0.30 - 1.10	
			- Intercept	1.744314	+/-30	



SO2 Calibration Plot Date: March 22, 2024 Location: Athabasca Valley





# W B E A

### **Wood Buffalo Environmental Association**

### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Athabasca Valley Calibration Date: March 7, 2024

Start time (MST): 10:12
Reason: Routine

Station number: AMS07

Last Cal Date: February 22, 2024

End time (MST): 15:05

**Calibration Standards** 

Cal Gas Concentration: 5.25 ppm Cal Gas Exp Date: January 3, 2026

ppm

Cal Gas Cylinder #: CC504080

Removed Cal Gas Conc: 5.25
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API T701H

Rem Gas Exp Date: NA

Diff between cyl:
Serial Number: 3805
Serial Number: 198

**Analyzer Information** 

Analyzer make: Thermo 43i LTE Analyzer serial #: 1180540018

Converter make: CDN-101 Converter serial #: 551

Analyzer Range 0 - 100 ppb

Start **Finish Start** <u>Finish</u> 1.017941 Calibration slope: 0.998195 Backgd or Offset: 2.40 2.40 0.901 Coeff or Slope: Calibration intercept: 0.157770 0.217844 0.901

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.5	79.3	79.3	1.001
as found 2nd point	4962	37.7	39.6	39.7	1.000
as found 3rd point	4981	18.9	19.8	20.3	0.982
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4925	75.5	79.3	79.4	0.999
second point	4962	37.7	39.6	39.8	0.995
third point	4981	18.9	19.9	19.9	0.998
as left zero	5000	0.0	0.0	0.5	
as left span	4925	75.5	79.3	79.1	1.003
SO2 Scrubber Check	4920	79.2	800.4	0.4	
Date of last scrubber chan	ge:	25-Feb-22		Ave Corr Factor	0.997
Date of last converter efficiency test:		April 22, 2022		92.6%	efficiency

Date of last converter efficie	ncy test:	April 22, 2022		92.6%	efficiency
Baseline Corr As found:	79.2	Prev response:	80.85	*% change:	-2.1%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.997616	AF Intercept:	0.257692

Baseline Corr 3rd AF pt: 20.2 AF Correlation: 0.999974

\* = > +/-5% change initiates investigation

Notes: No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



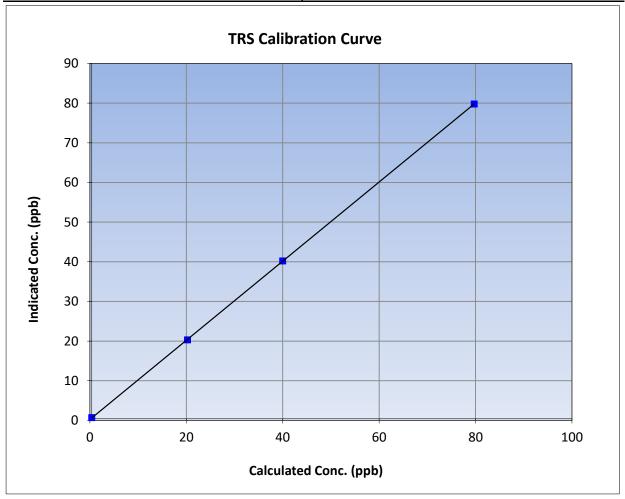
# **TRS Calibration Summary**

Version-11-2021

### **Station Information**

**Previous Calibration:** Calibration Date: March 7, 2024 February 22, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:12 End Time (MST): 15:05 Analyzer make: CDN-101 Analyzer serial #: 551

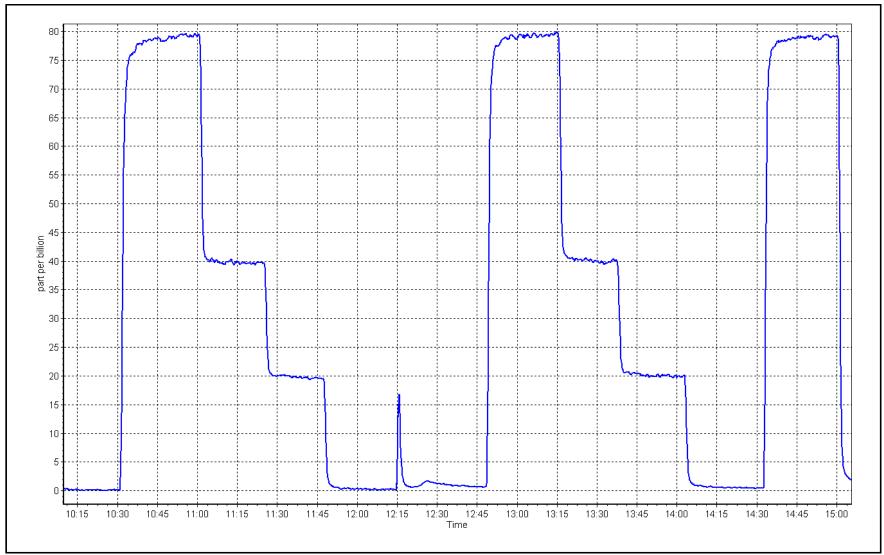
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999992	≥0.995	
79.3	79.4	0.9989	Correlation Coefficient	0.333332	20.993	
39.6	39.8	0.9952	Slope	0.998195	0.90 - 1.10	
19.9	19.9	0.9978	Slope		0.30 - 1.10	
			- Intercept	0.217844	+/-3	



TRS Calibration Plot

Date: March 7, 2024 Location: Athabasca Valley







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Athabasca Valley

Calibration Date: March 22, 2024

Start time (MST): 9:41
Reason: Routine

Station number: AMS07

Last Cal Date: February 20, 2024

End time (MST): 13:02

### **Calibration Standards**

Gas Cert Reference: CC320556 Cal Gas Expiry Date: March 10, 2031

CH4 Cal Gas Conc. 496.0 ppm CH4 Equiv Conc. 1059.8 ppm

C3H8 Cal Gas Conc. 205.0 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 496.0 ppm CH4 Equiv Conc. 1059.8 ppm

Removed C3H8 Conc. 205.0 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: API T700 Serial Number: 3805 ZAG make/model: API 701H Serial Number: 198

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 12227620777

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Finish Finish** Start Start CH4 SP Ratio: 2.45E-04 2.56E-04 NMHC SP Ratio: 4.93E-05 5.14E-05 CH4 Retention time: 13.4 13.4 NMHC Peak Area: 182375 175223

Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	79.8	16.91	16.26	1.040		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	79.8	16.91	16.86	1.003		
second point	4960	39.9	8.46	8.42	1.005		
third point	4980	20.0	4.24	4.23	1.003		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	79.8	16.91	16.85	1.004		
			Δ	Average Correction Factor	1.004		
Baseline Corr AF:	16.26	Prev response	16.96	*% change	-4.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
D 1: 0 2 145				* / 50/ shares initiates investigation			

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	9.00	8.68	1.037
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	9.00	8.96	1.005
second point	4960	39.9	4.50	4.49	1.003
third point	4980	20.0	2.26	2.26	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.00	8.94	1.006
			Aver	rage Correction Factor	1.003
Baseline Corr AF:	8.68	Prev response	9.05	*% change	-4.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point as found zero	Dil air flow rate	Source gas flow rate 0.0	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> :
		CH4 Calibra	tion Data		
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	7.92	7.58	1.044
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	7.92	7.90	1.002
second point	4960	39.9	3.96	3.93	1.007
third point	4980	20.0	1.98	1.97	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	7.92	7.91	1.001
				rage Correction Factor	1.005
Baseline Corr AF:	7.58	Prev response	7.91	*% change	-4.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001667		0.996773	
THC Cal Offset:		0.015848		-0.002926	

Notes: Span adjusted.

0.999012

0.001263

1.004116

0.014385

Calibration Performed By: Aswin Sasi Kumar

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

0.998463

-0.008332

0.995057

0.005807



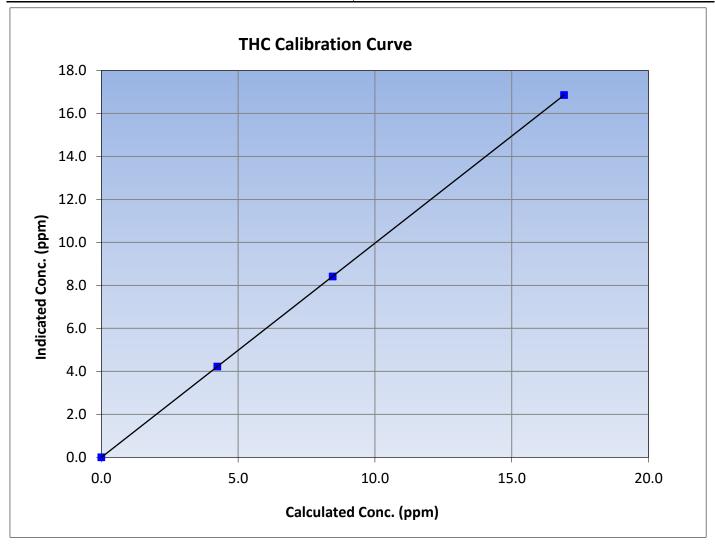
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 22, 2024 **Previous Calibration:** Calibration Date: February 20, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:41 End Time (MST): 13:02 Analyzer make: Thermo 55i Analyzer serial #: 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.99999	≥0.995
16.91	16.86	1.0032	Correlation Coefficient	0.55555	20.333
8.46	8.42	1.0047	Slope	0.996773	0.90 - 1.10
4.24	4.23	1.0033			0.90 - 1.10
			Intercept	-0.002926	+/-0.5





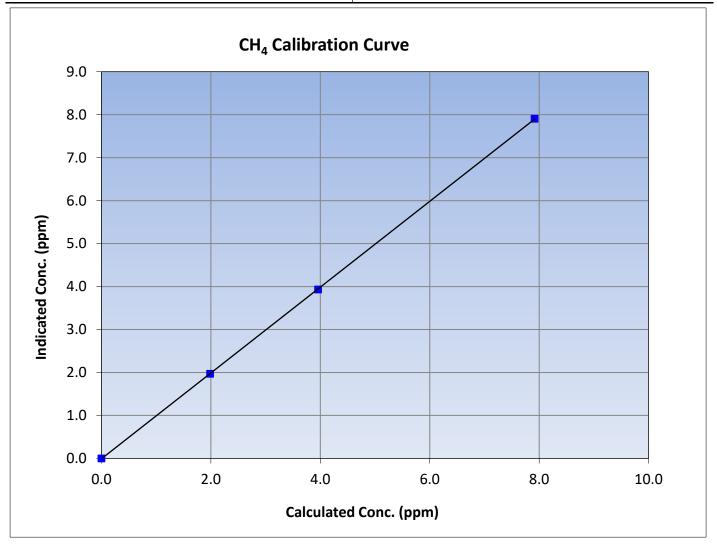
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

March 22, 2024 Calibration Date: **Previous Calibration:** February 20, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:41 End Time (MST): 13:02 Analyzer make: Thermo 55i Analyzer serial #: 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
7.92	7.90	1.0017			20.555
3.96	3.93	1.0069	Slope	0.998463	0.90 - 1.10
1.98	1.97	1.0071			0.30 - 1.10
		·	Intercept	-0.008332	+/-0.5





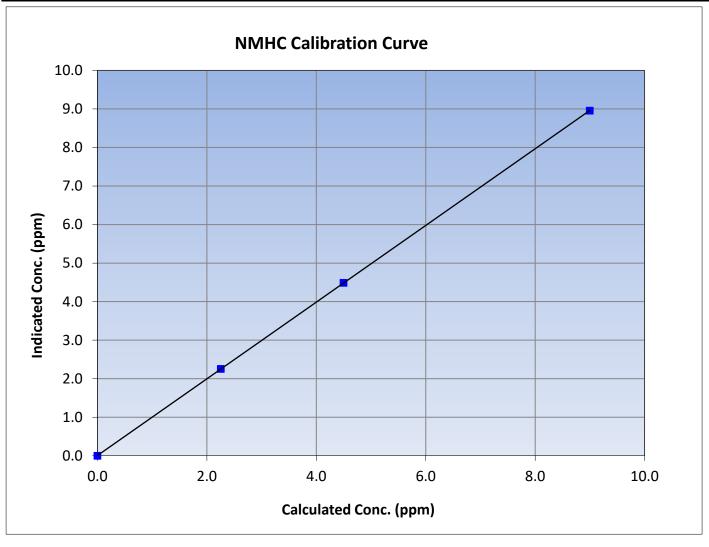
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

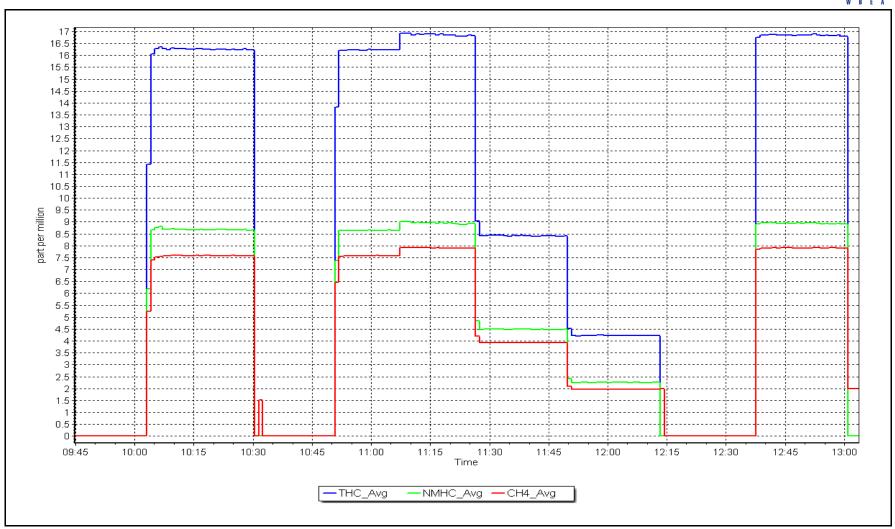
March 22, 2024 **Previous Calibration:** Calibration Date: February 20, 2024 Station Name: AMS07 Athabasca Valley Station Number: Start Time (MST): 9:41 End Time (MST): 13:02 Analyzer make: Thermo 55i Analyzer serial #: 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
9.00	8.96	1.0047	Correlation Coefficient	0.555550	20.993
4.50	4.49	1.0029	Slope	0.995057	0.90 - 1.10
2.26	2.26	1.0000			0.90 - 1.10
			Intercept	0.005807	+/-0.5



NMHC Calibration Plot Date: March 22, 2024 Location: Athabasca Valley







### THC / CH<sub>4</sub> / NMHC Calibration Report

### **Station Information**

Station Name: Athabasca Valley Station number: AMS 07 Calibration Date: March 26, 2024 Last Cal Date: March 22, 2024 Start time (MST): 9:00 End time (MST): 13:10

Reason: Maintenance Investigation of intermittent baseline drop to zero

#### **Calibration Standards**

CC320556 March 10, 2031 Gas Cert Reference: Cal Gas Expiry Date: CH4 Cal Gas Conc. 496.0 ppm CH4 Equiv Conc. 1059.8 ppm C3H8 Cal Gas Conc. 205.0 ppm NA Removed Gas Cert: NA Removed Gas Expiry: Removed CH4 Conc. 496.0 ppm CH4 Equiv Conc. 1059.8 ppm Removed C3H8 Conc. Diff between cyl (THC): 205.0 ppm Diff between cyl (NM): Diff between cyl (CH<sub>4</sub>): Teledyne API T700 3805 Calibrator Model: Serial Number:

Zero Air Gen model: Teledyne API T701H Serial Number: 198

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 12227620777 THC Range: 0 - 20 ppm NMHC/CH4 Range: 0 - 10 ppm

**Finish Finish** Start **Start** CH4 SP Ratio: 2.55E-04 5.32E-05 2.56E-04 NMHC SP Ratio: 5.14E-05 CH4 Retention time: 13.4 13.4 NMHC Peak Area: 175223 169129 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4920	79.8	16.91	16.87	1.003
As found Mid point	4960	39.9	8.46	8.42	1.004
As found Low point	4980	20.0	4.24	4.25	0.998
New cylinder response					
Baseline Corr AF:	16.87	Prev response	16.86	*% change	0.1%
Baseline Corr 2nd AF:	8.42	AF Slope:	0.996733	AF Intercept:	0.005868
Baseline Corr 3rd AF:	4.25	AF Correlation:	0.999997	* = > +/-5% change initiate	es investigation

### **THC Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	79.8	16.91	16.96	0.997
Mid point	4960	39.9	8.46	8.50	0.995
Low point	4980	20.0	4.24	4.28	0.990
As left zero	5000	0.0	0.00	0.00	
As left span	4920	79.8	16.91	17.07	0.991
			Avera	ge Correction Factor	0.994

Notes: Instrument was dipping from baseline readings to zero; replaced actuator.



# Wood Buffalo Environmental Association THC / CH<sub>4</sub> / NMHC Calibration Report

### NMHC As Found Data

		141411167151	Curra Buta		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4920	79.8	9.00	8.96	1.005
As found Mid point	4960	39.9	4.50	4.49	1.003
As found Low point	4980	20.0	2.26	2.27	0.992
New cylinder response					
Baseline Corr AF:	8.96	Prev response	8.96	*% change	0.0%
Baseline Corr 2nd AF:	4.49	AF Slope:	0.994360	AF Intercept:	0.012803
Baseline Corr 3rd AF:	2.27	AF Correlation:	0.999989	* = > +/-5% change initia	ntes investigation

### **NMHC Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	79.8	9.00	9.04	0.995
Mid point	4960	39.9	4.50	4.56	0.986
Low point	4980	20.0	2.26	2.31	0.975
As left zero	5000	0.0	0.00	0.00	
As left span	4920	79.8	9.00	9.18	0.980
			Avera	ge Correction Factor	0.985

### **CH4 As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic- AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4920	79.8	7.92	7.91	1.001
As found Mid point	4960	39.9	3.96	3.94	1.005
As found Low point	4980	20.0	1.98	1.97	1.005
New cylinder response					
Baseline Corr AF:	7.91	Prev response	7.90	*% change	0.2%
Baseline Corr 2nd AF:	3.94	AF Slope:	0.999430	AF Intercept:	-0.006935
Baseline Corr 3rd AF:	1.97	AF Correlation:	0.999994	* = > +/-5% change initia	ites investigation

### **CH4 Calibration Data**

Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration	Indicated concentration	Correction factor (Cc/Ic)
Set i onit	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	79.8	7.92	7.92	1.000
Mid point	4960	39.9	3.96	3.93	1.006
Low point	4980	20.0	1.98	1.97	1.008
As left zero	5000	0.0	0.00	0.00	
As left span	4920	79.8	7.92	7.89	1.003
			Avera	ge Correction Factor	1.005

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	0.996773	1.002451
THC Cal Offset:	-0.002926	0.015044
CH4 Cal Slope:	0.998463	1.000657
CH4 Cal Offset:	-0.008332	-0.011935
NMHC Cal Slope:	0.995057	1.003673
NMHC Cal Offset:	0.005807	0.027380

Calibration Performed By: Kelly Baragar

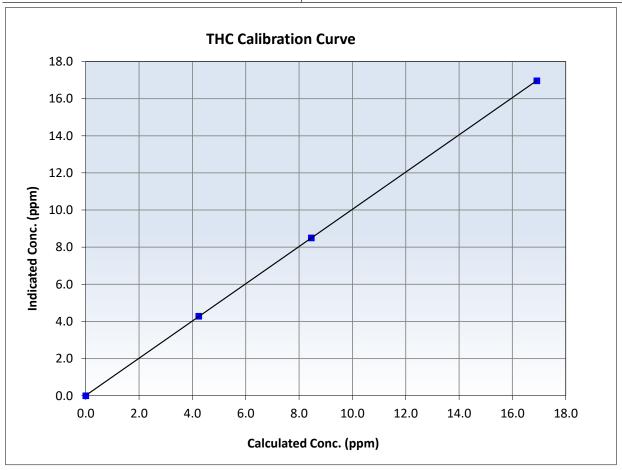


# Wood Buffalo Environmental Association THC Calibration Summary

### **Station Information**

March 26, 2024 Previous Calibration: March 22, 2024 Calibration Date: Station Name: Athabasca Valley Station Number: **AMS 07** Start Time (MST): 9:00 End Time (MST): 13:10 Analyzer make: Thermo 55i Analyzer serial #: 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
16.91 8.46	16.96 8.50	0.9971 0.9952	Slope	1.002451	0.90 - 1.10
4.24	4.28	0.9902	Intercept	0.015044	+/-0.5



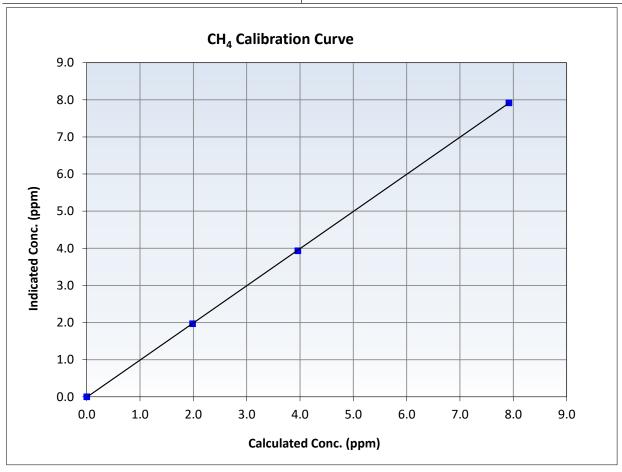


# **Wood Buffalo Environmental Association CH<sub>4</sub> Calibration Summary**

### **Station Information**

March 26, 2024 **Previous Calibration:** March 22, 2024 Calibration Date: Station Name: Athabasca Valley Station Number: **AMS 07** Start Time (MST): 9:00 End Time (MST): 13:10 Analyzer serial #: Analyzer make: Thermo 55i 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999985	≥0.995
7.92 3.96	7.92 3.93	0.9997 1.0064	Slope	1.000657	0.90 - 1.10
1.98	1.97	1.0081	Intercept	-0.011935	+/-0.5



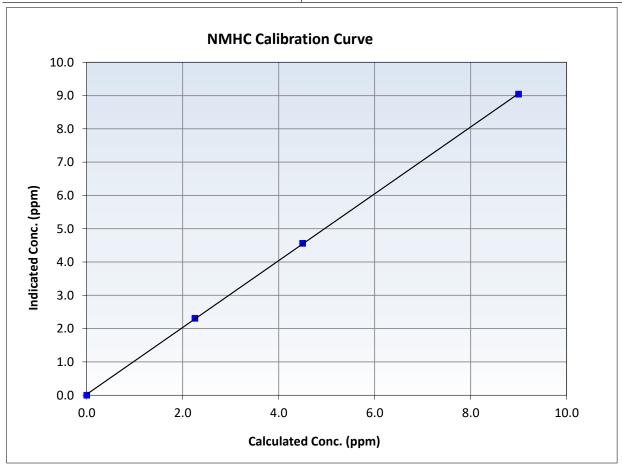


# Wood Buffalo Environmental Association NMHC Calibration Summary

### **Station Information**

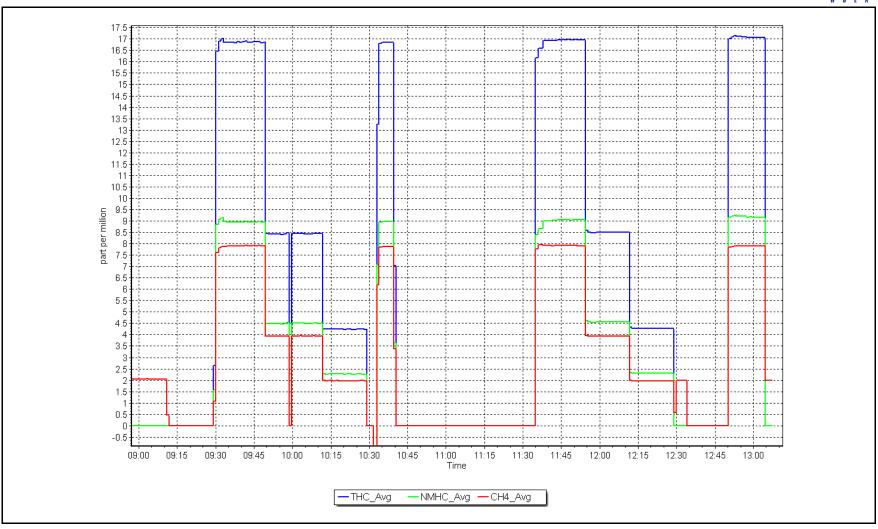
March 26, 2024 Previous Calibration: March 22, 2024 Calibration Date: Station Name: Athabasca Valley Station Number: **AMS 07** Start Time (MST): 9:00 End Time (MST): 13:10 Analyzer make: Thermo 55i Analyzer serial #: 12227620777

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999956	≥0.995
9.00 4.50	9.04 4.56	0.9951 0.9857	Slope	1.003673	0.90 - 1.10
2.26	2.31	0.9749	Intercept	0.027380	+/-0.5



Date: March 26, 2024 Location: Athabasca Valley







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

### **Station Information**

Station Name: Athabasca Valley

Calibration Date: March 5, 2024

Start time (MST): 10:14
Reason: Routine

Station number: AMS07

Last Cal Date: February 27, 2024

End time (MST): 15:26

### **Calibration Standards**

NO Gas Cylinder #: DT0033919 Cal Gas Expiry Date: January 9, 2032

NOX Cal Gas Conc: 60.10 ppm NO Cal Gas Conc: 59.90 ppm

Removed Cylinder #: N/A Removed Gas Exp Date: N/A

Removed Gas NOX Conc: 60.10 ppm Removed Gas NO Conc: 59.90 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: API T700 Serial Number: 3805 ZAG make/model: API T701H Serial Number: 198

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1160120024

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.079 1.075 NO bkgnd or offset: 7.6 7.6 NOX coeff or slope: 0.990 1.005 NOX bkgnd or offset: 7.8 7.9 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 214.5 214.5

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.995415	0.999973
NO <sub>x</sub> Cal Offset:	2.191943	1.651897
NO Cal Slope:	0.999970	0.998014
NO Cal Offset:	2.371891	1.431946
NO <sub>2</sub> Cal Slope:	0.995591	1.008548
NO <sub>2</sub> Cal Offset:	-1.458446	1.193739



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1		
as found span	4933	66.8	803.0	800.3	2.7	795.6	799.0	-3.5	1.0093	1.0016
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4933	66.8	803.0	800.3	2.7	803.3	799.0	4.3	0.9996	1.0016
second point	4966	33.4	401.5	400.2	1.3	405.3	402.8	2.5	0.9907	0.9935
third point	4983	16.7	200.7	200.1	0.7	203.3	201.7	1.6	0.9874	0.9920
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
as left span	4933	66.8	803.0	400.9	402.1	8.808	399.0	409.7	0.9928	1.0048
							Average C	orrection Factor	0.9926	0.9957
Corrected As f	ound NO <sub>X</sub> =	795.8 ppb	NO =	799.1 ppb	* = > +/-5%	% change initiates	nvestigation	*Percent Chang	ge NO <sub>X</sub> =	-0.7%
Previous Respo	onse NO <sub>X</sub> =	801.5 ppb	NO =	802.6 ppb				*Percent Chang	ge NO =	-0.4%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$1 \qquad NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setp	pint (ppb)	Indicated NO Ref		cated NO Drop centration (ppb)	Calculated NC concentration (pp		dicated NO2 tration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	l GPT zero									
as found GPT po	int (400 ppb NO2)									
as found GPT po	int (200 ppb NO2)									
as found GPT po	int (100 ppb NO2)									
1st GPT poin	t (400 ppb O3)	796.5		397.1	402.1		405.9	0.9906	;	101.0%
2nd GPT poin	t (200 ppb O3)	796.5		599.0	200.2		204.2	0.9803		102.0%

100.7

103.7

Average Correction Factor

0.9708

0.9805

Notes: Span adjusted.

698.5

Calibration Performed By: Aswin Sasi Kumar

3rd GPT point (100 ppb O3)

796.5

103.0%

102.0%



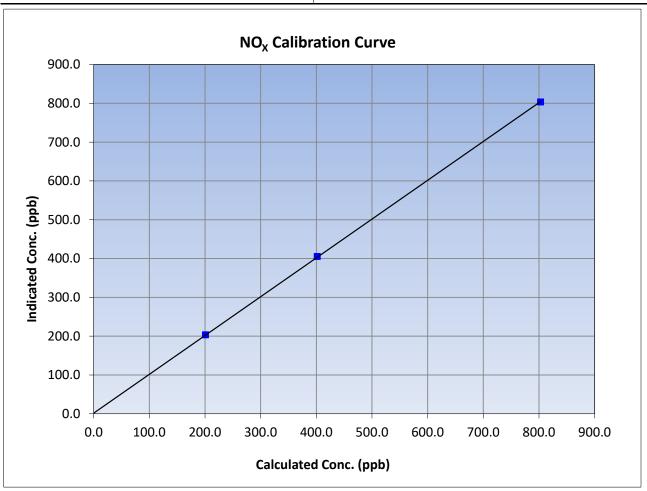
# NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 27, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:14 End Time (MST): 15:26 Analyzer serial #: Analyzer make: Thermo 42i 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999971	≥0.995	
803.0	803.3	0.9996	Correlation Coefficient	0.555571	20.999	
401.5	405.3	0.9907	Slope	0.999973	0.90 - 1.10	
200.7	203.3	0.9874	Slope	0.999975	0.90 - 1.10	
			Intercept	1.651897	+/-20	





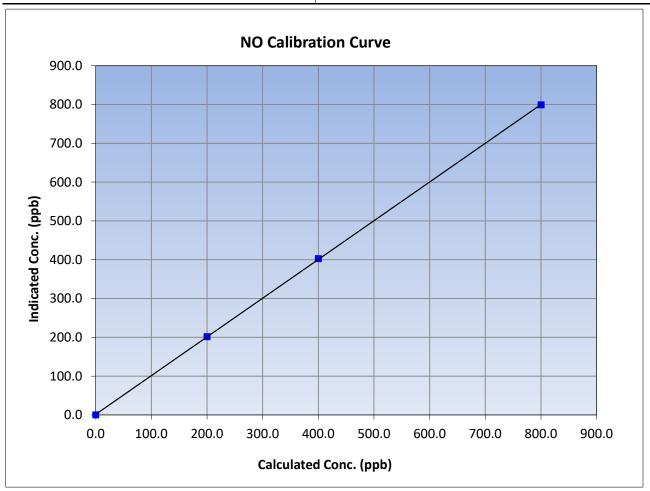
# **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 27, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:14 End Time (MST): 15:26 Analyzer make: Thermo 42i Analyzer serial #: 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999978	≥0.995
800.3	799.0	1.0016	Correlation Coefficient	0.555576	20.333
400.2	402.8	0.9935	Slope	0.998014	0.90 - 1.10
200.1	201.7	0.9920	Siope	0.556014	0.90 - 1.10
			Intercept	1.431946	+/-20





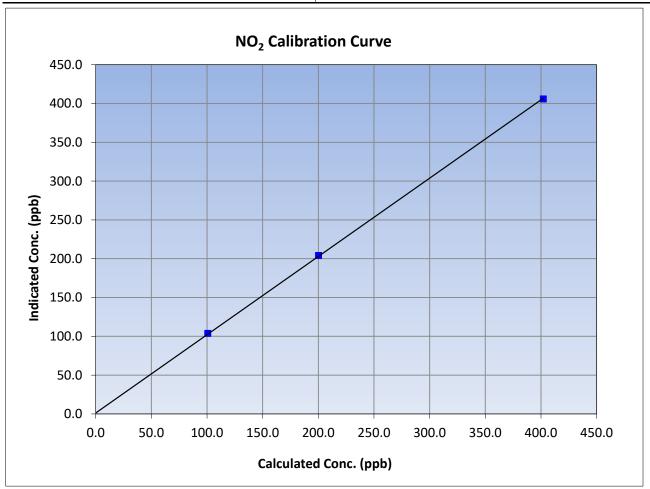
# NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 5, 2024 Previous Calibration: February 27, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:14 End Time (MST): 15:26 Analyzer serial #: Analyzer make: Thermo 42i 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999950	≥0.995
402.1	405.9	0.9906	correlation coemicient	0.55550	20.333
200.2	204.2	0.9803	Slope	1.008548	0.90 - 1.10
100.7	103.7	0.9708	Slope	1.006546	0.90 - 1.10
	<u> </u>		Intercept	1.193739	+/-20

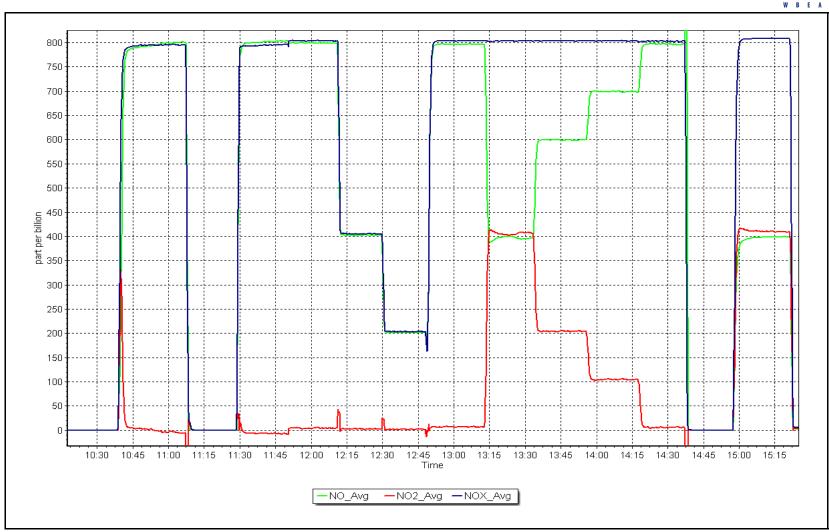


NO<sub>x</sub> Calibration Plot

Date: March 5, 2024

Location: Athabasca Valley







# O<sub>3</sub> Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: March 27, 2024

Start time (MST): 6:05 Reason: Routine Station number: AMS07

Last Cal Date: February 16, 2024

End time (MST): 9:23

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: T700 Serial Number: 3805 ZAG Make/Model: T701H Serial Number: 198

**Analyzer Information** 

Analyzer make: Thermo 49i Analyzer serial #: 1152220023

Analyzer Range 0 - 500 ppb

Start Finish Start Finish 0.993629 Backgd or Offset: Calibration slope: 0.993286 -1.6 -1.6 1.040000 Coeff or Slope: Calibration intercept: 0.100000 1.549 1.549

### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-1.0	
as found span	5000	1522.8	400.0	397.5	1.006
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.7	
high point	5000	1523.6	400.0	398.4	1.004
second point	5000	1088.1	200.0	199.7	1.002
third point	5000	880.5	100.0	100.9	0.991
as left zero	5000	0.0	0.0	-1.2	
as left span	5000	1522.4	400.0	398.7	1.003
			Avera	ge Correction Factor	0.999
Baseline Corr As found:	398.5	Previous respons	e 397.4	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

\* = > +/-5% change initiates investigation

Notes: No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay



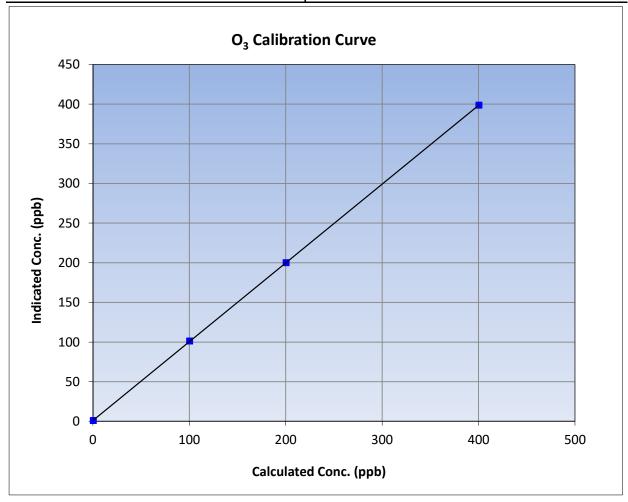
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 27, 2024 **Previous Calibration:** February 16, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 6:05 End Time (MST): 9:23 Analyzer make: Thermo 49i Analyzer serial #: 1152220023

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.7		Correlation Coefficient	0.999996	≥0.995					
400.0	398.4	1.0040	Correlation Coefficient	0.555550	20.333					
200.0	199.7	1.0015	Slope	0.993629	0.90 - 1.10					
100.0	100.9	0.9911	Slope	0.993029	0.90 - 1.10					
			Intercept	1.040000	+/- 5					

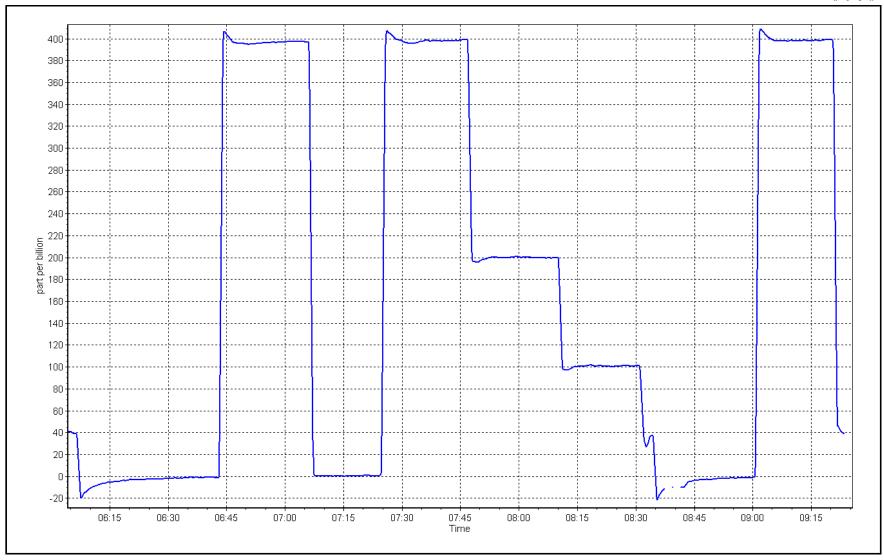


O<sub>3</sub> Calibration Plot

Date: March 27, 2024

Location: Athabasca Valley







# **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informatio	n		
Station Name:	Athabasca Valley		Station number:	AMS 07	
Calibration Date:	March 27, 2024		Last Cal Date:	February 27, 2024	
Start time (MST):	5:27		End time (MST):	6:12	
Analyzer Make:			S/N:	645	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388753	
Temp/RH standard:	Alicat FP-25BT		S/N:	388753	
		Monthly Calibration 1	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-5.4	-5.8	-5.4		+/- 2 °C
P (mmHg)	735.9	735	735.9		+/- 10 mmHg
Flow (LPM)	5.01	4.8	5.02	✓	+/- 0.25 LPM
PW% (pump)	37		37		>80%
Zero Verification	PM w/o HEPA:	4.0	PM w/ HEPA:	0.0	<0.2 ug/m3
PM Inlet observation :	Inlet Head Clean	Quarterly Calibration	gnment Factor On :	<b>V</b>	
	Rofractivo Indov	•		October 6, 2	n24
SPAN DUST	Refractive Index: Lot No.:	10.9 100128-050-042	Expiry Date:	October 6, 2	J2 <del>4</del>
					(1. t. )
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					+/- 0.5
Date Optical Cham	ber Cleaned:	February 2	7, 2024		
Date Disposable Fil	ter Changed:	February 2	7, 2024		
Post- maintenance Zero Ver	ification:	PM w/ HEPA:		<0.2 ug/m3	
		Annual Maintenand	ce		
Data Camania Tub	o Classado	Dogganahan	- 2022		
Date Sample Tub Date RH/T Senso		December : December :			
	·				
Notes:		Flow Adjust	ed. Leak check pas	sed.	
Calibration by:	Melissa Lemay				



# **CO Calibration Report**

Version-01-2020

**Finish** 

**Station Information** 

Station Name: Athabasca Valley

Calibration Date: March 27, 2024

Start time (MST): 9:20

Reason: Routine

Station number: AMS07

Last Cal Date: February 23, 2024

End time (MST): 12:19

**Calibration Standards** 

Cal Gas Concentration: 3,000 ppm

Cal Gas Cylinder #: LL66942

Removed Cal Gas Conc: 3,000 Removed Gas Cyl #: NA

Calibrator Make/Model: API T700
ZAG Make/Model: API 700H

Cal Gas Exp Date: December 12, 2026

<u>Start</u>

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3805

Serial Number: 198

**Analyzer Information** 

Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

ppm

Analyzer Range: 0 - 50 ppm

<u>Start</u> <u>Finish</u>

 Calibration slope:
 0.996688
 0.995632
 Backgd or Offset:
 4.425
 4.642

 Calibration intercept:
 0.062533
 0.048509
 Coeff or Slope:
 1.087
 1.087

**CO Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4933	66.7	40.0	39.9	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.0	39.9	1.004
second point	4967	33.3	20.0	20.0	0.999
third point	4983	16.7	10.0	10.1	0.997
as left zero	5000	0.0	0.0	0.0	
as left span	4933	66.7	40.0	39.7	1.008
			Avera	ge Correction Factor	1.000

Baseline Corr As found: 39.82 Prev response: 39.95 \*% change: -0.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Zero adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay



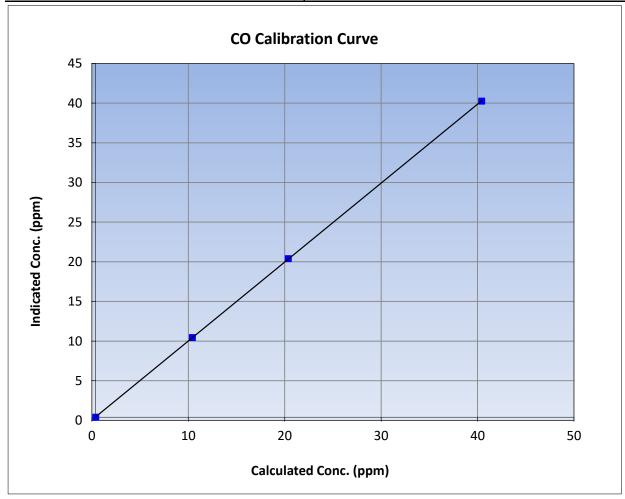
# **CO Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 27, 2024 **Previous Calibration:** February 23, 2024 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:20 End Time (MST): 12:19 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

	Calibration Data									
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.0		Correlation Coefficient	0.999991	≥0.995					
40.0	39.9	1.0041	Correlation Coefficient	0.555551	20.993					
20.0	20.0	0.9989	Slope	0.995632	0.90 - 1.10					
10.0	10.1	0.9971	Siope	0.995052	0.90 - 1.10					
			- Intercept	0.048509	+/-1.5					

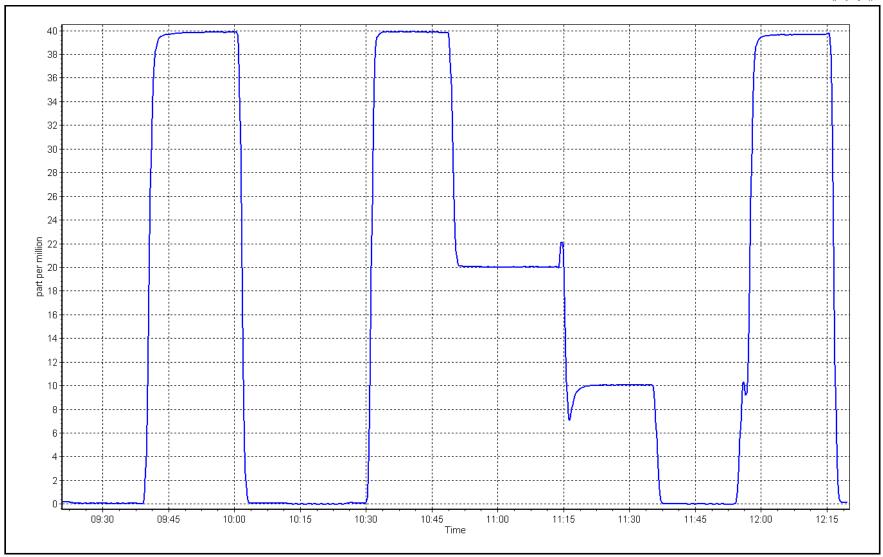


**CO Calibration Plot** 

Date: March 27, 2024

Location: Athabasca Valley







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS08 FORT CHIPEWYAN MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# SO<sub>2</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Fort Chipewyan

March 20, 2024 Calibration Date:

Start time (MST): 12:08 Routine

Reason:

Station number: AMS08

> Last Cal Date: February 15, 2024

End time (MST): 14:47

**Calibration Standards** 

ppm

ppm

Cal Gas Concentration: 49.84

Cal Gas Cylinder #: CC196697

Removed Cal Gas Conc: 49.84

Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: January 6, 2030

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3252 Serial Number: 135

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE

Analyzer Range 0 - 1000 ppb

Analyzer serial #: 1136451241

**Finish** <u>Start</u>

Calibration slope: 0.994207 Backgd or Offset:

Start

Finish

1.003858 1.83 1.83 Coeff or Slope: Calibration intercept: 1.596267 0.615265 0.989 0.989

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
	(Seem)	(Seem)	concentration (pps) (cc)	(pps) (ic)	2111111 0.55 1.05
as found zero	5000	0.0	0.0	-0.4	
as found span	4920	80.3	800.4	798.5	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4920	80.3	800.4	804.3	0.995
second point	4960	40.2	400.7	401.4	0.998
third point	4980	20.1	200.4	203.8	0.983
as left zero	5000	0.0	0.0	-0.3	
as left span	4920	80.3	800.4	802.6	0.997
			Averag	ge Correction Factor	0.992

Baseline Corr As found: 798.90 Previous response 797.34 \*% change 0.2%

Changed out inlet filter after as found. No adjustment made. Notes:

Calibration Performed By: Morgan Voyageur \* = > +/-5% change initiates investigation



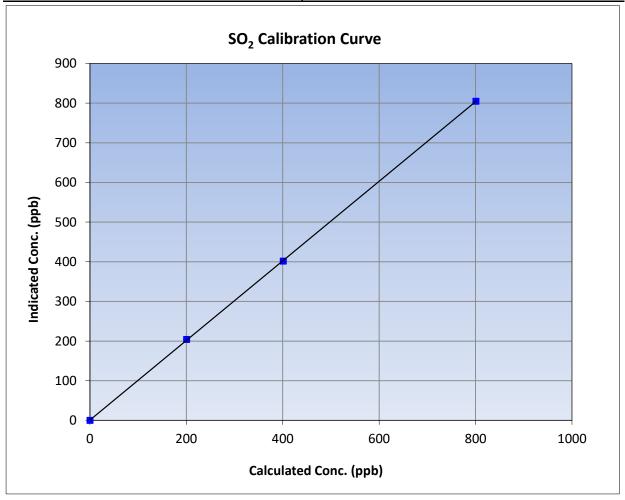
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

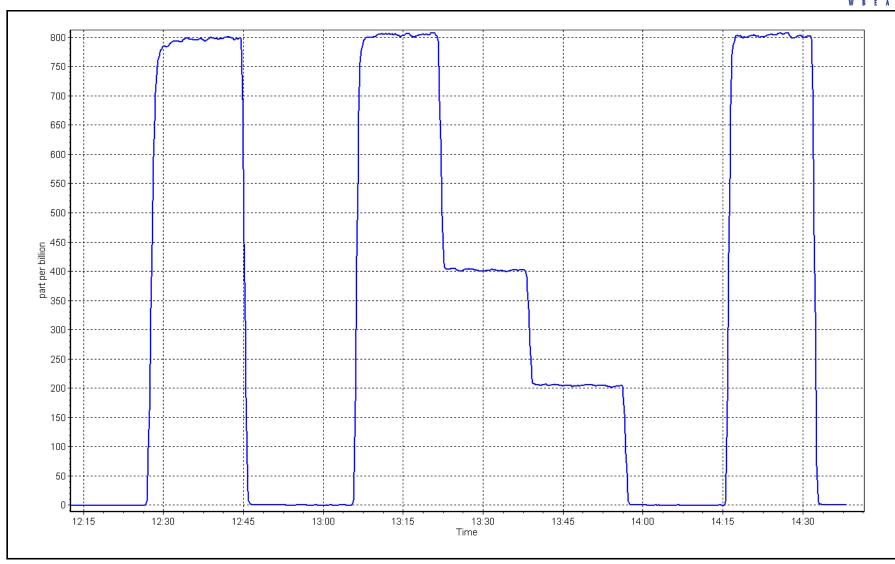
Calibration Date: March 20, 2024 **Previous Calibration:** February 15, 2024 Station Name: December 13, 2023 Station Number: Fort Chipewyan Start Time (MST): 12:08 End Time (MST): 14:47 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1136451241

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	-0.2		Correlation Coefficient	0.999980	≥0.995			
800.4	804.3	0.9951	Correlation Coefficient	0.555500	20.993			
400.7	401.4	0.9983	Slope	1.003858	0.90 - 1.10			
200.4	203.8	0.9831	Siope	1.005656	0.90 - 1.10			
			Intercept	0.615265	+/-30			



SO2 Calibration Plot Date: March 20, 2024 Location: Fort Chipewyan





### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Fort Chipewyan Calibration Date: March 20, 2024

Start time (MST): 14:46 Routine Reason:

Station number: AMS08

Last Cal Date: February 13, 2024

End time (MST): 18:33

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: February 9, 2024 4.97 ppm

Cal Gas Cylinder #: EY0002276

Removed Cal Gas Conc: Rem Gas Exp Date: NA 4.97 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3252 ZAG Make/Model: Teledyne API T701 Serial Number: 135

**Analyzer Information** 

Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169744

CDN-101 Converter serial #: 14639 Converter make:

0 - 100 ppb Analyzer Range

Baseline Corr 3rd AF pt:

<u>Start</u> **Finish Start** <u>Finish</u> 0.991000 Calibration slope: 1.003284 Backgd or Offset: 0.99 0.98 0.578560 Calibration intercept: 0.498794 Coeff or Slope: 0.741 0.754

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.5	
as found span	4920	80.5	80.0	78.5	1.026
as found 2nd point	4960	40.2	40.0	39.9	1.014
as found 3rd point	4980	20.1	20.0	19.9	1.030
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.6	
high point	4920	80.5	80.0	80.8	0.990
second point	4960	40.2	40.0	40.6	0.984
third point	4980	20.1	20.0	20.4	0.979
as left zero	5000	0.0	0.0	0.7	
as left span	4920	80.5	80.0	81.4	0.983
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	
Date of last scrubber cha	nge:	March 7, 2022		Ave Corr Factor	0.985
Date of last converter efficiency test:		March 15, 2022		100.7%	efficiency
Baseline Corr As found:	78.0	Prev response:	79.87	*% change:	-2.4%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.975855	AF Intercept:	0.558435

Sampled inlet filter changed after as founds. Scrubber check passed. Adjusted span. Notes:

0.999950

AF Correlation:

Calibration Performed By: Morgan Voyageur

19.4

\* = > +/-5% change initiates investigation



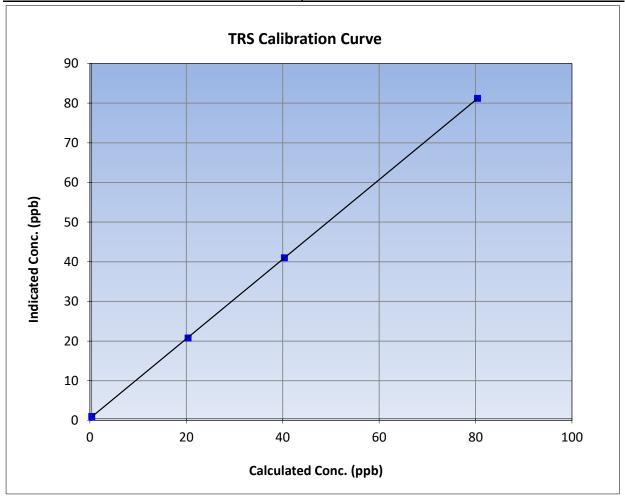
# **TRS Calibration Summary**

Version-11-2021

### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 13, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 14:46 End Time (MST): 18:33 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169744

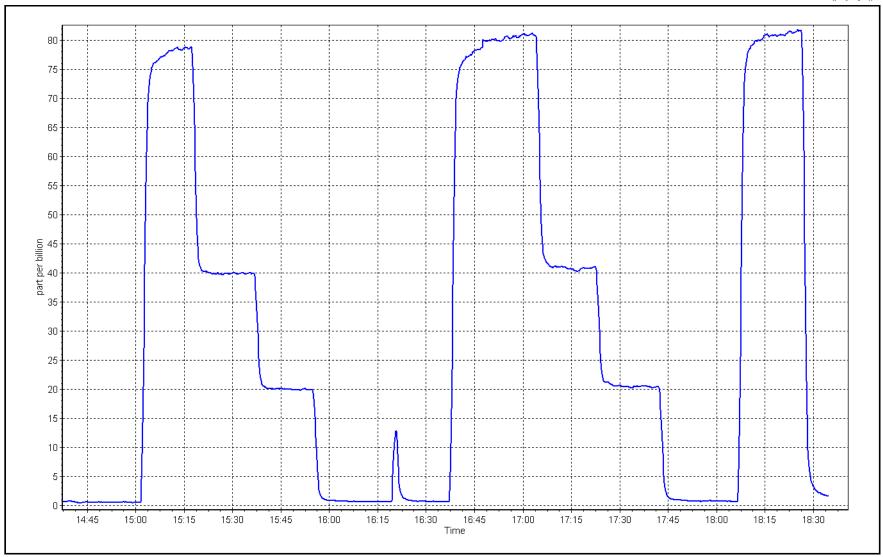
Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.6		Correlation Coefficient	0.999991	≥0.995			
80.0	80.8	0.9902	Correlation Coefficient	0.555551	20.993			
40.0	40.6	0.9842	Slope	1.003284	0.90 - 1.10			
20.0	20.4	0.9794	Slope	1.003284	0.90 - 1.10			
			Intercept	0.498794	+/-3			



**TRS Calibration Plot** Date: March 20, 2024

Location: Fort Chipewyan







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Fort Chipewyan

Calibration Date: March 20, 2024

Start time (MST): 7:54
Reason: Routine

Station number: AMS08

Last Cal Date: February 21, 2024

End time (MST): 12:13

### **Calibration Standards**

NO Gas Cylinder #: DT0046831 Cal Gas Expiry Date: January 9, 2032

NOX Cal Gas Conc: 60.20 ppm NO Cal Gas Conc: 60.00 ppm

Removed Cylinder #: DT0046831 Removed Gas Exp Date: January 9, 2032

Removed Gas NOX Conc: 60.20 ppm Removed Gas NO Conc: 60.00 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3252 ZAG make/model: Teledyne API T701H Serial Number: 135

### **Analyzer Information**

Analyzer make: API T200 Analyzer serial #: 4460

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.154	1.200	NO bkgnd or offset:	-2.5	-2.5
NOX coeff or slope:	1.152	1.194	NOX bkgnd or offset:	-2.2	-2.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	2.9	2.9

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.997032	0.995037
NO <sub>x</sub> Cal Offset:	2.294675	3.395408
NO Cal Slope:	0.998455	0.998540
NO Cal Offset:	1.134987	1.155021
NO <sub>2</sub> Cal Slope:	1.001043	0.993301
NO <sub>2</sub> Cal Offset:	0.109543	0.722793



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibration	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	1.2	1.2	0.0		
as found span	4933	66.7	803.1	800.4	2.7	774.0	767.4	6.3	1.0376	1.0431
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.3	1.4	-0.1		
high point	4933	66.7	803.1	800.4	2.7	801.1	800.3	0.8	1.0025	1.0002
second point	4967	33.3	400.9	399.6	1.3	404.5	400.8	4.0	0.9911	0.9969
third point	4983	16.7	201.1	200.4	0.7	204.8	200.5	4.3	0.9818	0.9995
as left zero	5000	0.0	0.0	0.0	0.0	1.3	1.3	0.0		
as left span	4933	66.7	803.1	391.1	412.0	785.6	377.7	407.9	1.0223	1.0356
							Average C	Correction Factor	0.9918	0.9989
Corrected As fo	ound NO <sub>X</sub> =	772.8 ppb	NO:	= 766.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO <sub>x</sub> =	-3.9%
Previous Respo	onse NO <sub>X</sub> =	803.0 ppb	NO:	= 800.3 ppb				*Percent Chang	ge NO =	-4.5%
Baseline Corr 2	nd pt NO <sub>X</sub> =	NA ppb	NO:	= NA ppb	As foun	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO:	= NA ppb	As foun	d NO r <sup>2</sup> :		NO SI:	NO Int:	
	, ,				As foun	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Reconcentration		licated NO Drop centration (ppb)	Calculated N concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									

Notes:

as found GPT point (200 ppb NO2) as found GPT point (100 ppb NO2)

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Sample inlet filters changed after as found. Adjusted span.

409.2

206.2

98.7

Average Correction Factor

1.0068

0.9965

0.9977

1.0003

412.0

205.5

98.5

Calibration Performed By: Morgan Voyageur

790.9

790.9

790.9

381.6

588.1

695.1

99.3%

100.4%

100.2%

100.0%



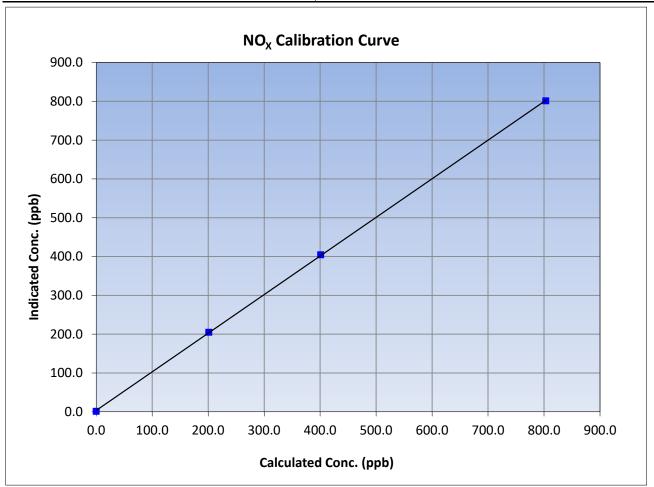
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 21, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 7:54 End Time (MST): 12:13 Analyzer serial #: Analyzer make: **API T200** 12:13:00 PM

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	1.3		Correlation Coefficient	0.999963	≥0.995
803.1	801.1	1.0025	correlation coemicient	0.555505	20.333
400.9	404.5	0.9911	Slope	0.995037	0.90 - 1.10
201.1	204.8	0.9818	Slope	0.555057	0.30 - 1.10
			Intercept	3.395408	+/-20





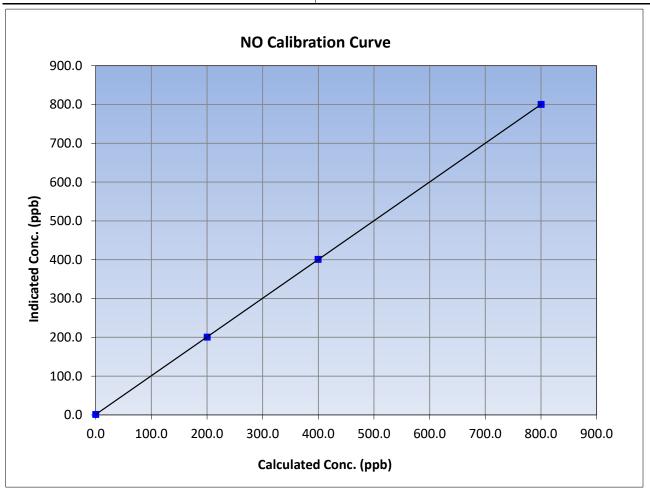
### **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 21, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 7:54 End Time (MST): 12:13 Analyzer make: **API T200** Analyzer serial #: 12:13:00 PM

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	1.4		Correlation Coefficient	0.999997	≥0.995
800.4	800.3	1.0002	Correlation Coefficient	0.333337	20.333
399.6	400.8	0.9969	Slope	0.998540	0.90 - 1.10
200.4	200.5	0.9995	Siope	0.996540	0.90 - 1.10
			Intercept	1.155021	+/-20





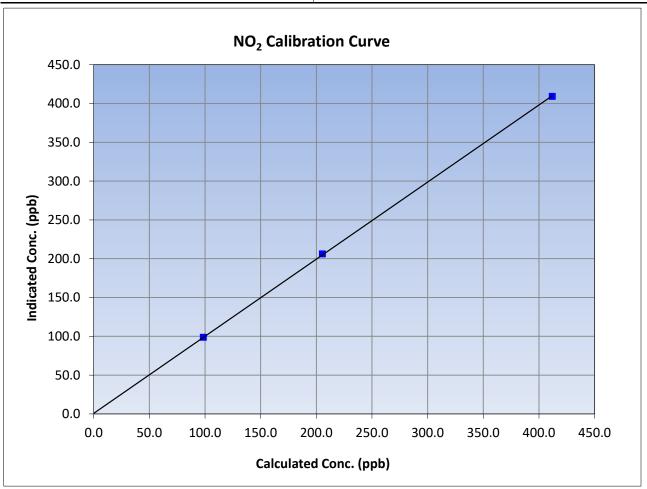
# NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 21, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 7:54 End Time (MST): 12:13 Analyzer make: **API T200** Analyzer serial #: 12:13:00 PM

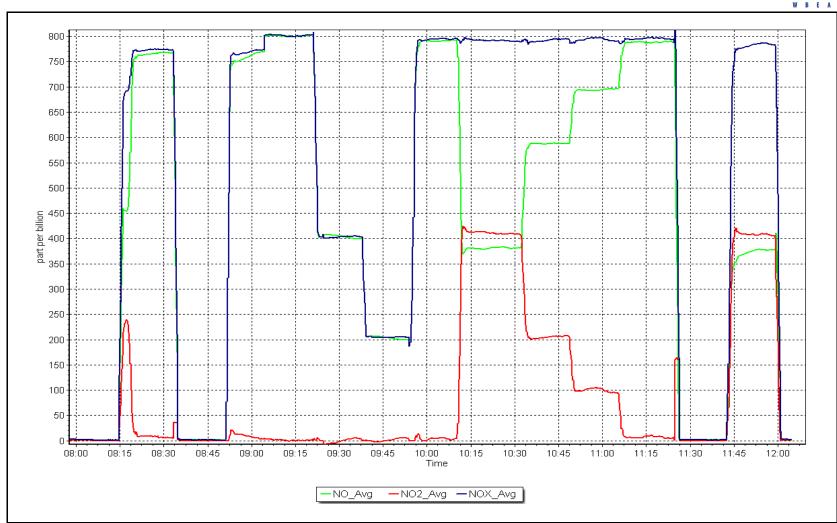
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999966	≥0.995
412.0	409.2	1.0068	correlation coefficient	0.999900	20.333
205.5	206.2	0.9965	Slope	0.993301	0.90 - 1.10
98.5	98.7	0.9977	Slope	0.995501	0.90 - 1.10
			Intercept	0.722793	+/-20



NO<sub>X</sub> Calibration Plot Date:

Location: Fort Chipewyan





March 20, 2024



## O<sub>3</sub> Calibration Report

Version-01-2020

Station Information

Station Name: Fort Chipewyan

March 19, 2024 Calibration Date:

Start time (MST): 7:14 Reason: Routine Station number: AMS08

Last Cal Date: February 6, 2024 End time (MST): 10:05

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3252 ZAG Make/Model: Teledyne API T701 Serial Number: 135

**Analyzer Information** 

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3872

**Finish** Start

Calibration slope: 1.027914 Backgd or Offset:

Start -2.0

**Finish** -2.0

0.994571 0.100000 Coeff or Slope: Calibration intercept: 0.240000 1.036 1.036

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration (	Correction factor (Cc/Ic)
Set Point	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	5000	913.0	400.0	399.0	1.003
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	914.7	400.0	397.9	1.005
second point	5000	786.4	200.0	199.3	1.004
third point	5000	701.3	100.0	99.1	1.009
as left zero	5000	0.0	0.0	1.1	
as left span	5000	963.3	400.0	398.0	1.005
			Averag	ge Correction Factor	1.006

Baseline Corr As found: -3.2% 398.8 Previous response 411.4 \*% change

AF Correlation:

Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

\* = > +/-5% change initiates investigation

Changed out inlet filter after as found. No adjustments made. During as founds entered PPB point Notes:

instead of GPTPS point.

Calibration Performed By: Matthew C

NA

Baseline Corr 3rd AF pt:



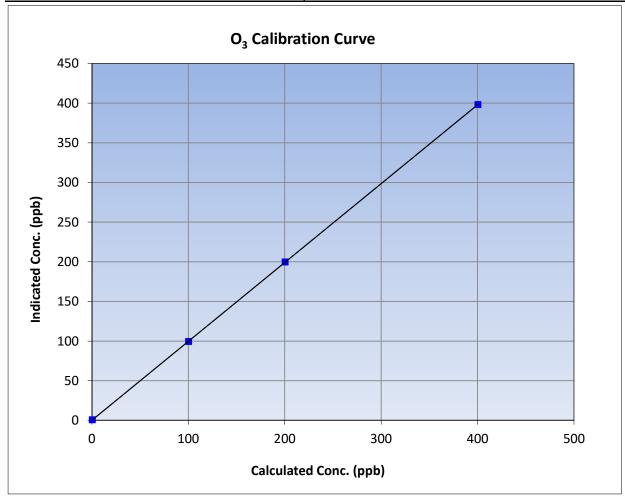
## O<sub>3</sub> Calibration Summary

Version-01-2020

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 6, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 7:14 End Time (MST): 10:05 Analyzer make: Teledyne API T400 Analyzer serial #: 3872

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.3		Correlation Coefficient	0.999996	≥0.995			
400.0	397.9	1.0053	Correlation Coefficient	0.555550	20.993			
200.0	199.3	1.0035	Slope	0.994571	0.90 - 1.10			
100.0	99.1	1.0091	Slope	0.554571	0.90 - 1.10			
			- Intercept	0.100000	+/- 5			

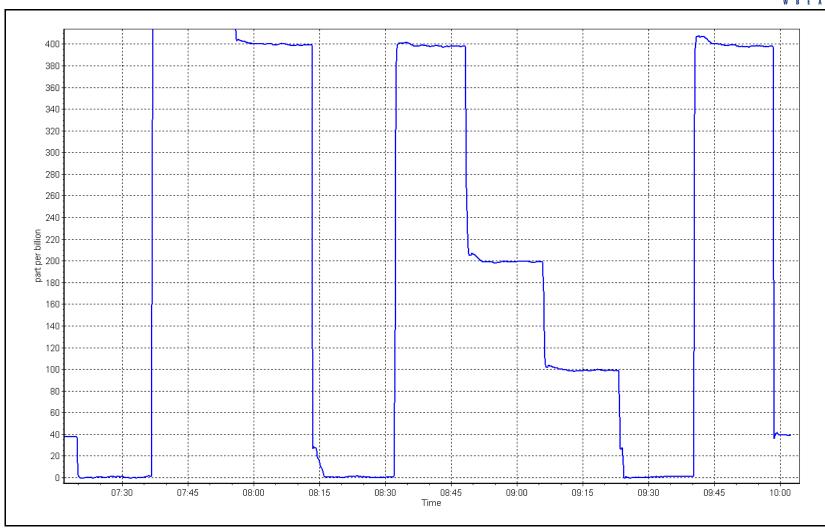


O<sub>3</sub> Calibration Plot

Date: March 19, 2024

Location: Fort Chipewyan







Notes:

Morgan Voyageur

Calibration by:

#### **Wood Buffalo Environmental Association**

#### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024 **Station Information** Station Name: Fort Chipewyan Station number: AMS 08 Last Cal Date: February 20, 2024 Calibration Date: March 20, 2024 Start time (MST): 13:10 End time (MST): 14:03 Analyzer Make: Teledyne API T640 S/N: 319 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388754 Temp/RH standard: S/N: 388754 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> As found Measured As left <u>Adjusted</u> (Limits) T (°C) -12.90 -12.45 -12.90 +/- 2 °C P (mmHg) 751.10 752.5 751.10 +/- 10 mmHg Flow (LPM) 5.00 5.01 5.00 +/- 0.25 LPM PW% (pump) 42% 42% >80% Zero Verification PM w/o HEPA: 3.40 0.00 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check PM Inlet observation: Inlet Head Clean Alignment Factor On: **Quarterly Calibration Test** Refractive Index: 10.90 Expiry Date: 10-Jun-24 **SPAN DUST** Lot No.: 100128-050-042 As found **Adjusted** <u>Parameter</u> Post maintenance As left (Limits) **PMT Peak Test** +/- 0.5 Date Optical Chamber Cleaned: February 20, 2024 Date Disposable Filter Changed: February 20, 2024 Post- maintenance Zero Verification: 0.00 PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: July 25, 2023 Date RH/T Sensor Cleaned: July 25, 2023

No adjustments needed.



## **CO Calibration Report**

Version-01-2020

**Station Information** 

Station Name: Fort Chipewyan

Calibration Date: March 19, 2024

Start time (MST): 14:47

Reason: Routine Station number: AMS08

> Last Cal Date: February 6, 2024

End time (MST): 17:32

**Calibration Standards** 

Cal Gas Concentration: 3,030

Cal Gas Cylinder #: ALM014846

Removed Cal Gas Conc: 3,030

Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701H** 

December 1, 2028 Cal Gas Exp Date:

Rem Gas Exp Date: NA

Diff between cyl: 3252 Serial Number:

Serial Number: 135

**Analyzer Information** 

Analyzer make: API T300 Analyzer serial #: 3505

ppm

ppm

Analyzer Range: 0 - 50 ppm

Finish Start

0.994000

<u>Start</u>

Finish -0.015

Calibration slope: 0.997054 Backgd or Offset: -0.014 Coeff or Slope: Calibration intercept: 0.374934 0.100939 0.998 1.007

#### **CO Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.36	
as found span	4933	66.7	40.4	40.8	0.991
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4934	66.7	40.4	40.3	1.002
second point	4967	33.3	20.2	20.4	0.992
third point	4983	16.7	10.1	10.2	0.992
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.4	40.0	1.010
	Average Correction Factor				0.995

Baseline Corr As found: 40.44 Prev response: 40.56 \*% change: -0.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Changed inlet filter after as founds. Adjustments made to span and zero. Notes:

Calibration Performed By: Morgan Voyageur



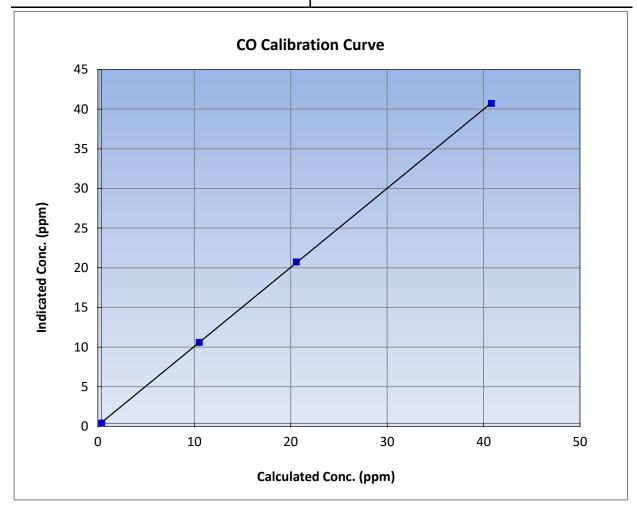
## **CO Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 6, 2024 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 14:47 End Time (MST): 17:32 Analyzer make: **API T300** Analyzer serial #: 3505

Calibration Data								
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999971	≥0.995			
40.4	40.3	1.0021	Correlation Coefficient	0.999971	20.993			
20.2	20.4	0.9916	Slope	0.997054	0.90 - 1.10			
10.1	10.2	0.9922	Siope	0.997054	0.90 - 1.10			
			- Intercept	0.100939	+/-1.5			

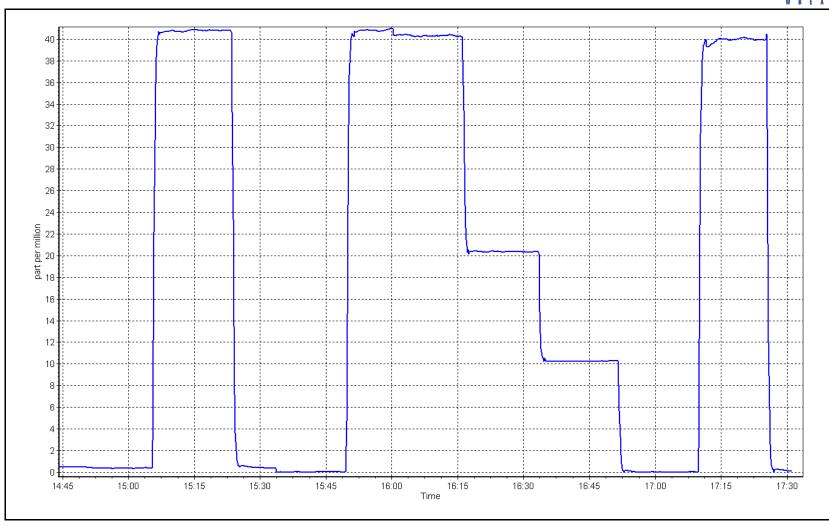


**CO Calibration Plot** 

Date: March 19, 2024

Location: Fort Chipewyan







## CO<sub>2</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Fort Chipewyan

March 19, 2024 Calibration Date:

Start time (MST): 12:16

Reason: Routine Station number: AMS08

> February 6, 2024 Last Cal Date:

> > December 1, 2028

End time (MST): 14:46

**Calibration Standards** 

Cal Gas Concentration: 60,220 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: ALM014846

Removed Cal Gas Conc: 60,220 Rem Gas Exp Date: NA ppm Diff between cyl: Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3252 N2 Gen Make/Model: NG 5000 Serial Number: 135

**Analyzer Information** 

Analyzer make: Teledyne API T360 Analyzer serial #: 289

Analyzer Range 0 - 2,000 ppm

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.000467 1.011498 -0.063 -0.063 Calibration intercept: -10.320000 -16.020000 Coeff or Slope: 1.094 1.094

CO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	3000	0.0	0.0	-4.9	
as found span	2920	80.0	1605.9	1614.8	0.994
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-4.9	
high point	2920	80.0	1605.9	1621.2	0.991
second point	2960	40.0	802.9	768.6	1.045
third point	2980	20.0	401.5	393.6	1.020
as left zero	3000	0.0	0.0	-4.8	
as left span	2960	40.0	802.9	766.9	1.047
			Avera	ge Correction Factor	1.018

Baseline Corr As found: 1619.70 Prev response: 1596.30 \*% change: 1.4%

Baseline Corr 2nd AF pt: AF Slope: NA AF Intercept:

Baseline Corr 3rd AF pt: AF Correlation: NA \* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as found. No adjustments made.

Calibration Performed By: Morgan Voyageur



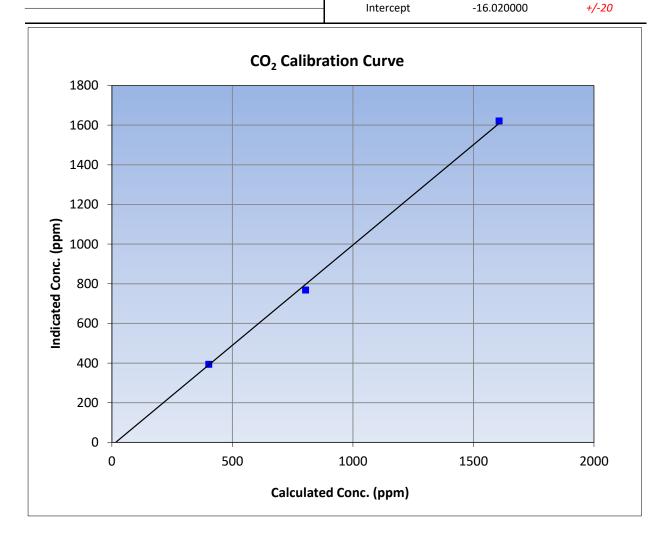
# **CO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date	March 19, 2024	<b>Previous Calibration</b>	February 6, 2024
Station Name	Fort Chipewyan	Station Number	AMS08
Start Time (MST)	12:16	End Time (MST)	14:46
Analyzer make	Teledyne API T360	Analyzer serial #	289

Calibration Data								
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-4.9		Correlation Coefficient	0.999265	≥0.995			
1605.9	1621.2	0.9905	Correlation coefficient	0.999203	20.333			
802.9	768.6	1.0447	Slope	1.011498	0.90 - 1.10			
401.5	393.6	1.0200	Slope	1.011490	0.30 - 1.10			

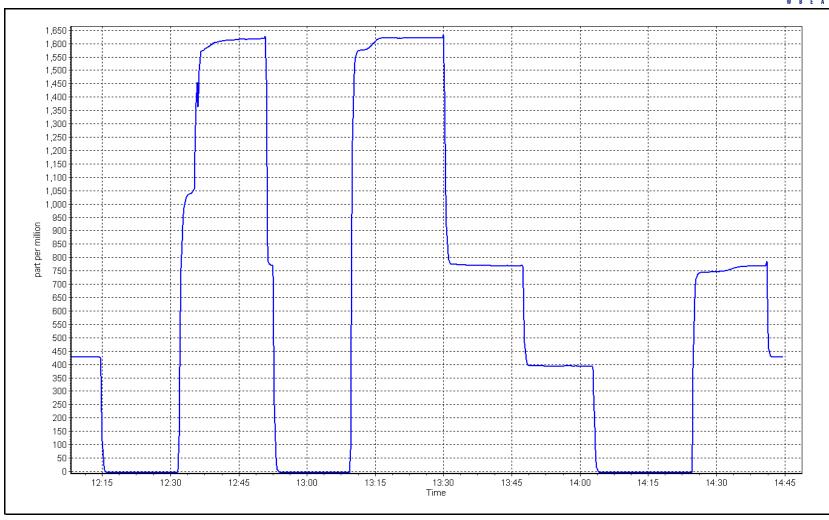


CO<sub>2</sub> Calibration Plot

Date: March 19, 2024

Location: Fort Chipewyan







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS09 BARGE LANDING MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Station number:

End time (MST):

Last Cal Date:

AMS09

13:14

February 16, 2024

Version-01-2020

**Station Information** 

Station Name: Barge Landing

March 6, 2024 Calibration Date:

Start time (MST): Routine Reason:

10:04

**Calibration Standards** 

Cal Gas Concentration: 49.96

Cal Gas Cylinder #: CC151285

Removed Cal Gas Conc: 49.96 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701** 

ppm Cal Gas Exp Date: January 5, 2025

> Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3812

Serial Number: 4888

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1118148498

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

Calibration slope: 0.999855 1.001110 Calibration intercept:

0.931270 0.391536 Start

10.2

**Finish** 10.2

Backgd or Offset: 0.963 Coeff or Slope: 0.963

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
	(	(555)	(4)	(FF-7 (7	
as found zero	5000	0.0	0.0	-0.3	
as found span	4919	80.2	801.5	802.3	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	80.2	801.5	802.9	0.998
second point	4959	40.1	400.8	401.1	0.999
third point	4980	20.0	199.8	200.9	0.995
as left zero	5000	0.0	0.0	0.1	
as left span	4919	80.2	801.5	803.2	0.998
·			Averag	ge Correction Factor	0.997

Baseline Corr As found: 802.60 Previous response 802.30 \*% change 0.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Sean Bala



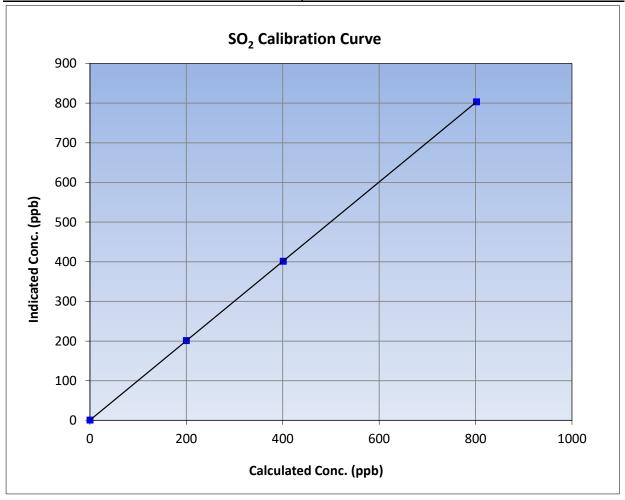
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

March 6, 2024 Calibration Date: **Previous Calibration:** February 16, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:04 End Time (MST): 13:14 Analyzer make: Thermo 43i Analyzer serial #: 1118148498

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.3		Correlation Coefficient	0.999999	≥0.995			
801.5	802.9	0.9982	Correlation Coefficient	0.555555	20.993			
400.8	401.1	0.9991	Slope	1.001110	0.90 - 1.10			
199.8	200.9	0.9947	Slope	1.001110	0.90 - 1.10			
			- Intercept	0.391536	+/-30			



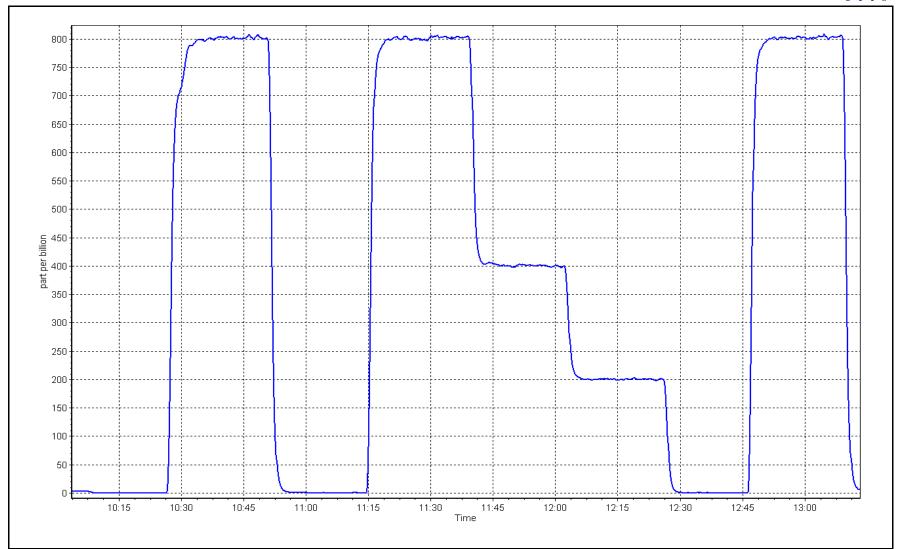
**SO2 Calibration Plot** 

Date:

March 6, 2024

Location: Barge Landing







ZAG Make/Model:

### **Wood Buffalo Environmental Association**

### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Barge Landing Calibration Date: March 7, 2024

Start time (MST): 10:14
Reason: Routine

Station number: AMS09

Last Cal Date: February 1, 2024

End time (MST): 14:30

**Calibration Standards** 

Cal Gas Concentration: 5.171 ppm Cal Gas Exp Date: August 22, 2026

Cal Gas Cylinder #: CC511415

**API T701** 

Removed Cal Gas Conc: 5.171
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700

ppm Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3812

Serial Number: 4888

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

Converter make: CDN-101 Converter serial #: 519

Analyzer Range 0 - 100 ppb

**Finish** <u>Finish</u> <u>Start</u> <u>Start</u> 0.999264 1.000835 Backgd or Offset: Calibration slope: 2.93 2.84 Calibration intercept: 0.119396 0.139405 Coeff or Slope: 1.201 1.170

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4923	77.4	80.0	81.5	0.982
as found 2nd point	4961	38.7	40.0	41.0	0.976
as found 3rd point	4981	19.3	20.0	20.3	0.983
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4923	77.4	80.0	80.2	0.998
second point	4961	38.7	40.0	40.3	0.993
third point	4981	19.3	20.0	20.1	0.993
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.4	80.0	80.4	0.996
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber chang	ge:	28-Feb-23	_	Ave Corr Factor	0.995
Date of last converter effic	Date of last converter efficiency test:				

Date of last converter efficiency test:					
Baseline Corr As found:	81.5	Prev response:	80.10	*% change:	1.7%
Baseline Corr 2nd AF pt:	41.0	AF Slope:	1.018680	AF Intercept:	0.039717

Baseline Corr 3rd AF pt: 20.3 AF Correlation: 0.999987

\* = > +/-5% change initiates investigation

Notes:

Changed sample inlet filter after as founds. SOx scrubber check done after calibrator zero.

Adjusted span only.

Calibration Performed By: Sean Bala



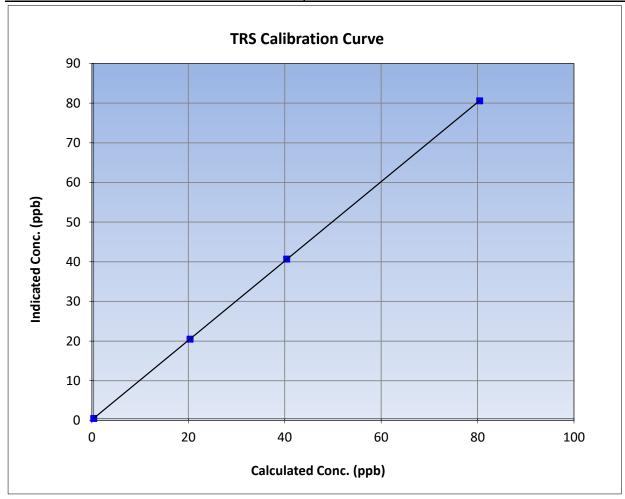
## **TRS Calibration Summary**

Version-11-2021

#### **Station Information**

March 7, 2024 **Previous Calibration:** Calibration Date: February 1, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:14 End Time (MST): 14:30 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

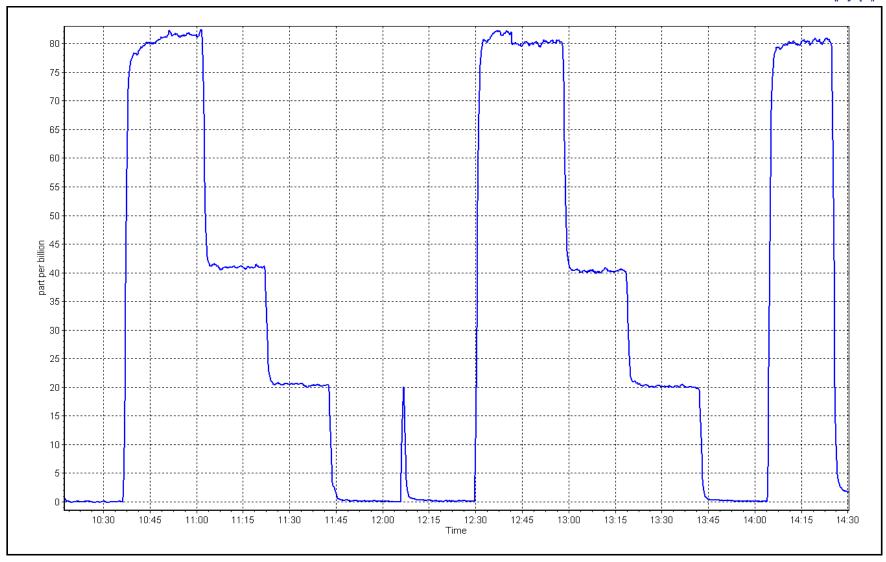
Calibration Data										
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.1		Correlation Coefficient	0.999996	≥0.995					
80.0	80.2	0.9980	Correlation Coefficient	0.999990	20.993					
40.0	40.3	0.9932	Slope	1.000835	0.90 - 1.10					
20.0	20.1	0.9930	Slope	1.000655	0.90 - 1.10					
			- Intercept	0.139405	+/-3					



**TRS Calibration Plot** Date: March 7, 2024

Location: Barge Landing







## THC / CH<sub>4</sub> / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

#### **Station Information**

Station Name: Barge Landing

Calibration Date: March 6, 2024

Start time (MST): 10:04 Reason: Routine Station number: AMS09

Last Cal Date: February 16, 2024

End time (MST): 13:14

**Calibration Standards** 

Gas Cert Reference: CC151285 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.6 ppm CH4 Equiv Conc. 1067.1 ppm

C3H8 Cal Gas Conc. 207.1 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.6 ppm CH4 Equiv Conc. 1067.1 ppm

Removed C3H8 Conc. 207.1 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: API T700 Serial Number: 3812 ZAG make/model: API T701 Serial Number: 4888

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1331259521

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

ppm CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start **Start** CH4 SP Ratio: 2.58E-04 2.58E-04 NMHC SP Ratio: 4.37E-05 4.37E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 209298 209298 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic) C		CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00 0.00	
as found span	4919	80.2	17.12	17.09	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	17.12	17.04	1.004
second point	4960	40.1	8.56	8.50	1.007
third point	4980	20.0	4.27	4.26	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	17.12	17.05	1.004
				e Correction Factor	1.004
Baseline Corr AF:	17.09	Prev response	17.12	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

C-+ D :	Dil -i- fl	NMHC Calibr		Indiana to a VIII	CE 1 imit 0 05 1 0
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000			0.00	1.002
as found span	4919	80.2	9.14	9.12	1.002
ns found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	80.2	9.14	9.08	1.006
second point	4960	40.1	4.57	4.53	1.009
hird point	4980	20.0	2.28	2.27	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	9.14	9.09	1.005
				rage Correction Factor	1.006
Baseline Corr AF:	9.12	Prev response	9.11	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra  Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	7.98	7.98	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	80.2	7.98	7.97	1.002
second point	4960	40.1	3.99	3.97	1.005
hird point	4980	20.0	1.99	1.99	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	7.96	1.002
·			Ave	rage Correction Factor	1.002
Baseline Corr AF:	7.98	Prev response	8.00	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		0.999215		0.995217	
THC Cal Offset:		0.010853		0.001033	
CH4 Cal Slope:		1.001638		0.997716	
CH4 Cal Offset:		0.008070		-0.000741	
Cri+ Car Oriset.		0.000070		0.000741	

Notes: Changed inlet filter after as founds. No adjustment made.

0.997023

0.003583

Calibration Performed By: Sean Bala

NMHC Cal Slope:

NMHC Cal Offset:

0.993146

0.001575



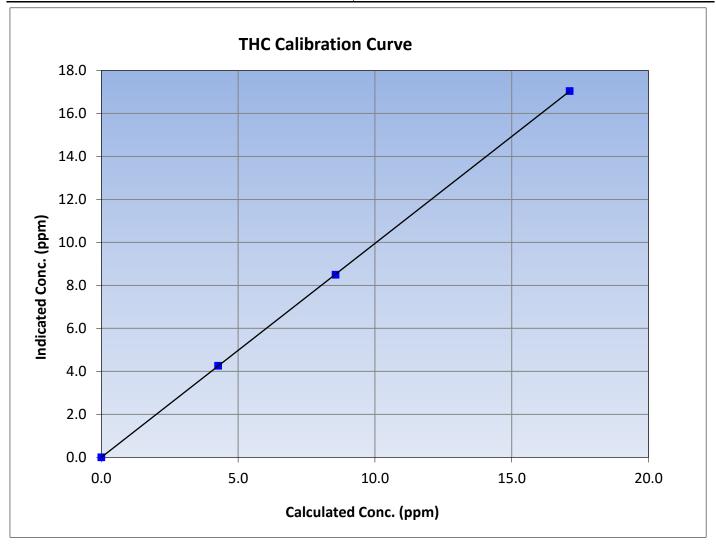
## **THC Calibration Summary**

Version-06-2022

#### **Station Information**

March 6, 2024 **Previous Calibration:** Calibration Date: February 16, 2024 Station Name: Station Number: AMS09 **Barge Landing** Start Time (MST): 10:04 End Time (MST): 13:14 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
17.12	17.04	1.0044	Correlation Coemicient	0.999997	20.993
8.56	8.50	1.0067	Slope	0.995217	0.90 - 1.10
4.27	4.26	1.0015	Зюре	0.993217	0.30 - 1.10
			Intercept	0.001033	+/-0.5





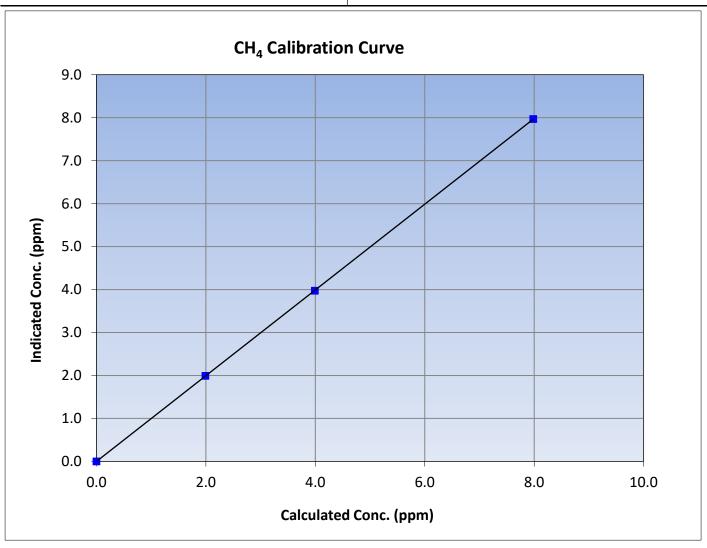
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 16, 2024 Station Name: AMS09 **Barge Landing** Station Number: Start Time (MST): 10:04 End Time (MST): 13:14 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
7.98	7.97	1.0020	Correlation Coemicient	0.555557	20.933
3.99	3.97	1.0047	Slope	0.997716	0.90 - 1.10
1.99	1.99	1.0002	Slope	0.337710	0.90 - 1.10
		·	Intercept	-0.000741	+/-0.5





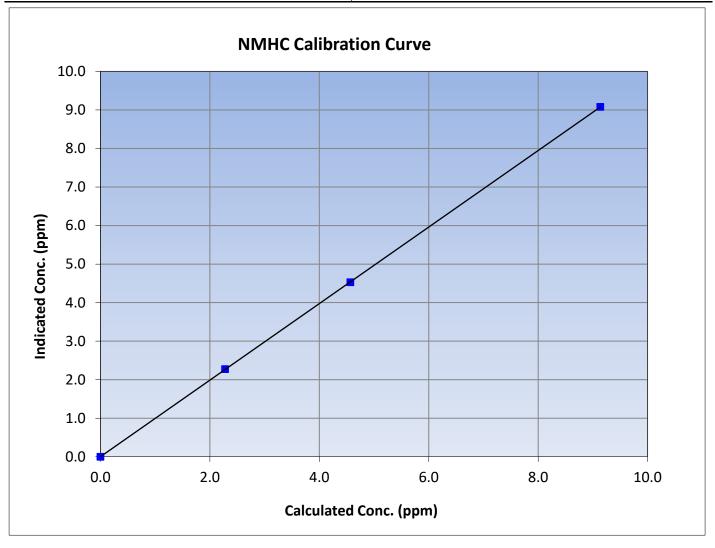
## **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

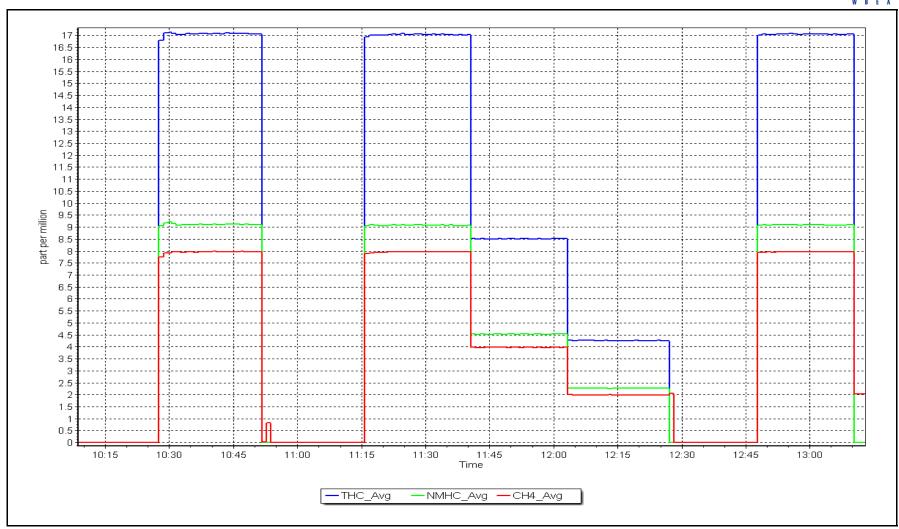
March 6, 2024 Calibration Date: **Previous Calibration:** February 16, 2024 Station Name: AMS09 **Barge Landing** Station Number: Start Time (MST): 10:04 End Time (MST): 13:14 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
9.14	9.08	1.0065	Correlation Coemicient	0.555557	20.333
4.57	4.53	1.0085	Slope	0.993146	0.90 - 1.10
2.28	2.27	1.0027	Slope	0.993140	0.90 - 1.10
			Intercept	0.001575	+/-0.5



NMHC Calibration Plot Date: March 6, 2024 Location: Barge Landing







## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Barge Landing Calibration Date: March 28, 2024

Start time (MST): 9:43

Cylinder Change Reason:

Removed Gas Expiry:

Station number: AMS09

Last Cal Date: March 6, 2024

End time (MST): 12:24

**Calibration Standards** 

Gas Cert Reference: CC151285 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.6 CH4 Equiv Conc. 1067.1 ppm ppm

207.1 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.6 CH4 Equiv Conc. ppm 1067.1 ppm

Removed C3H8 Conc. Diff between cyl (THC): 207.1 ppm Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 3812 ZAG make/model: **API T701** Serial Number: 4888

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1331259521

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Finish Start **Start** Finish CH4 SP Ratio: 2.58E-04 2.58E-04 NMHC SP Ratio: 4.37E-05 4.37E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 209298 209298 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	17.12	16.88	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	17.12	16.66	1.028
second point					
third point					
as left zero					
as left span	·				

				e Correction Factor	1.028	
Baseline Corr AF:	16.88	Prev response	17.04	*% change	-0.9%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates i	nvestigation	



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.0
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	9.14	8.95	1.021
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	9.14	8.83	1.035
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	1.035
Baseline Corr AF:	8.95	Prev response	9.08	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
CARA	D:1-: (1	CH4 Calibra		1.1	CE 11: 11: 0 0E 4.6
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
	5000 4919	0.0 80.2	0.00 7.98	0.00 7.93	1 007
as found span	4919	80.2	7.98	7.93	1.007
as found 2nd point					
as found 3rd point					
new cylinder response	F000	0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00 7.84	1.010
high point	4919	80.2	7.98	7.84	1.018
second point					
third point as left zero					
as left span			Avor	age Correction Factor	1.018
Baseline Corr AF:	7.93	Prev response	7.96	*% change	-0.5%
Baseline Corr Ar.		·	7.90	_	-0.5%
	NA	AF Correlation		AF Intercept:  * = > +/-5% change initiat	os investigation
Baseline Corr 3rd AF:	NA	AF Correlation:		- > +/ -5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.995217		0.973222	
THC Cal Offset:		0.001033		0.000000	
CH4 Cal Slope:		0.997716		0.981863	
CH4 Cal Offset:		-0.000741		0.000000	
NMHC Cal Slope:		0.993146		0.966000	
VIVALIC C-I Oft :		0.004 575		0.00000	

Notes: Nitrogen Cylinder Change.

0.001575

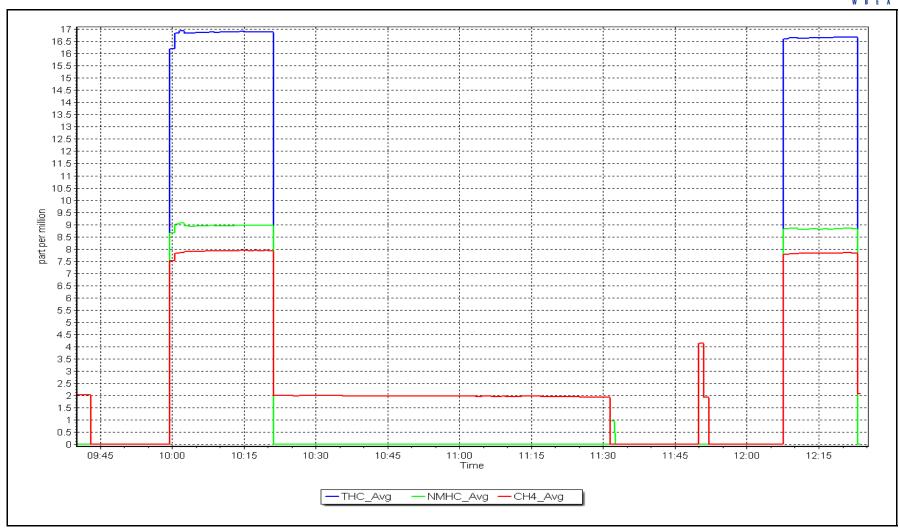
Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: March 28, 2024 Location: Barge Landing







## NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

ppm

#### **Station Information**

Station Name: Barge Landing

Calibration Date: March 22, 2024

Start time (MST): 8:51
Reason: Routine

Station number: AMS09

Last Cal Date: February 13, 2024

End time (MST): 13:14

#### **Calibration Standards**

NO Gas Cylinder #: T2Y1KDH Cal Gas Expiry Date: November 17, 2026
NOX Cal Gas Conc: 47.38 ppm NO Cal Gas Conc: 46.94 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.38 ppm Removed Gas NO Conc: 46.94

NOX gas Diff: NO gas Diff:

Calibrator Model: API T700 Serial Number: 3812 ZAG make/model: API T701 Serial Number: 4888

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1426262593

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.120 1.094 NO bkgnd or offset: 10.3 10.0 NOX coeff or slope: 0.998 0.998 NOX bkgnd or offset: 10.3 10.6 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 176.5 181.0

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.999459	1.000294
NO <sub>x</sub> Cal Offset:	0.518402	0.198498
NO Cal Slope:	0.998611	0.999838
NO Cal Offset:	-0.704018	-0.783809
NO <sub>2</sub> Cal Slope:	1.004419	0.999826
NO <sub>2</sub> Cal Offset:	0.978163	-1.024158



## NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Di	lution Calibration	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3		
as found span	4915	85.3	808.3	800.7	7.5	832.9	821.1	11.6	0.970	0.975
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2		
high point	4915	85.3	808.3	800.7	7.5	808.4	800.2	8.2	1.000	1.001
second point	4957	42.6	403.7	400.0	3.7	404.6	398.9	5.7	0.998	1.003
third point	4979	21.3	201.8	200.0	1.9	202.1	198.1	3.9	0.999	1.009
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2		
as left span	4915	85.3	808.3	418.0	390.2	799.3	408.8	390.4	1.011	1.023
							Average C	Correction Factor	0.999	1.004
Corrected As fo	ound NO <sub>X</sub> =	833.3 ppb	NO	= 821.2 ppb	* = > +/-5	5% change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	3.0%
revious Respo	nse NO <sub>x</sub> =	808.3 ppb	NO	= 798.9 ppb				*Percent Chang	ge NO =	2.7%
Baseline Corr 2	nd pt NO <sub>x</sub> =	NA ppb	NO	= NA ppb	As four	nd NO <sub>x</sub> r <sup>2</sup> :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO	= NA ppb	As four	nd NO r <sup>2</sup> :		NO SI:	NO Int:	
					As four	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
					GPT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Reconcentration		dicated NO Drop ncentration (ppb)	Calculated N concentration (p		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency on Limit = 96-104%
as found	GPT zero									

Notes:

Changed sample inlet filter after as founds. Adjusted span only.

389.5

199.3

103.0

Average Correction Factor

1.002

1.007

1.019

1.009

390.2

200.6

105.0

Calibration Performed By:

as found GPT point (100 ppb NO2)

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Sean Bala

407.7

597.3

692.9

790.4

790.4

790.4

99.8%

99.3%

98.1%

99.1%



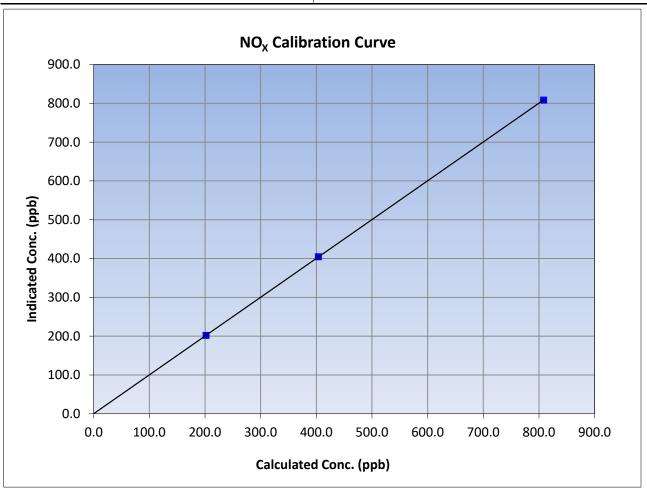
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 22, 2024 Previous Calibration: February 13, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 8:51 End Time (MST): 13:14 Analyzer serial #: Analyzer make: Thermo 42i 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999999	≥0.995
808.3	808.4	0.9998	Correlation Coefficient	0.555555	20.993
403.7	404.6	0.9978	Slope	1.000294	0.90 - 1.10
201.8	202.1	0.9986	Slope	1.000294	0.30 - 1.10
			Intercept	0.198498	+/-20





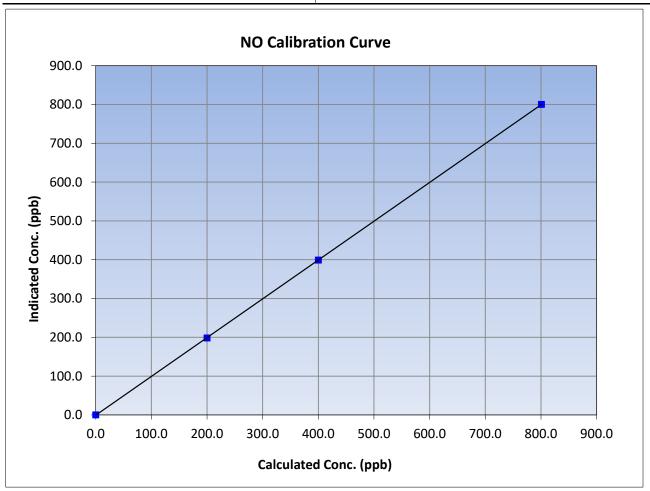
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 22, 2024 Previous Calibration: February 13, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 8:51 End Time (MST): 13:14 Analyzer make: Thermo 42i Analyzer serial #: 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999994	≥0.995
800.7	800.2	1.0007	Correlation Coefficient	0.333334	20.333
400.0	398.9	1.0027	Slope	0.999838	0.90 - 1.10
200.0	198.1	1.0094	Slope	0.555656	0.50 - 1.10
			Intercept	-0.783809	+/-20





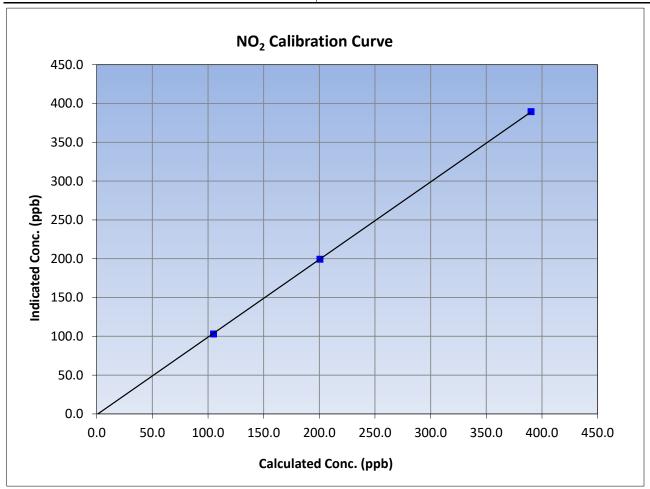
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 22, 2024 Previous Calibration: February 13, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 8:51 End Time (MST): 13:14 Analyzer serial #: Analyzer make: Thermo 42i 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999978	≥0.995
390.2	389.5	1.0018	Correlation Coefficient	0.333376	20.333
200.6	199.3	1.0066	Slope	0.999826	0.90 - 1.10
105.0	103.0	1.0195	Slope	0.999620	0.90 - 1.10
			Intercept	-1.024158	+/-20

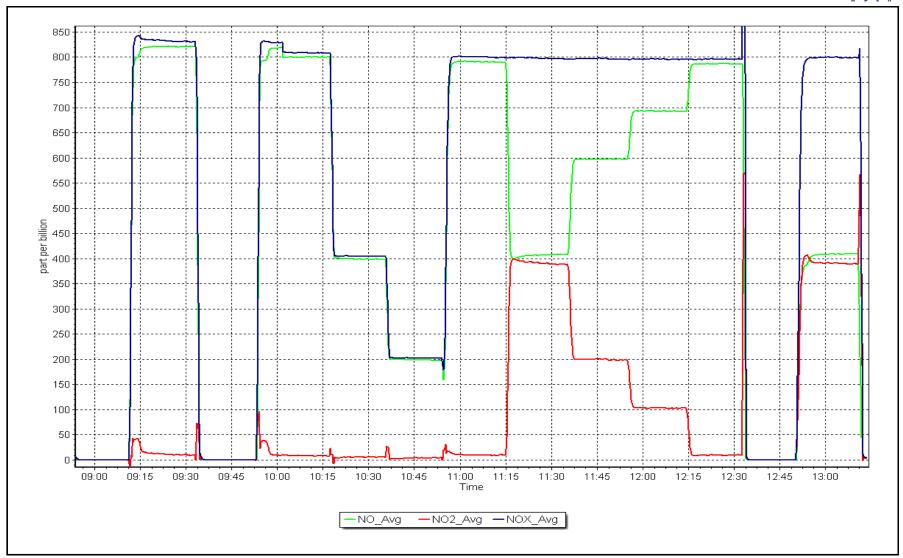


NO<sub>x</sub> Calibration Plot

Date: March 22, 2024

Location: Barge Landing







# T640 PM<sub>2.5</sub> CALIBRATION

Version-01-2024

Station Information							
Station Name:	Barge Landing		Station number: A	MS 09			
Calibration Date:	March 22, 2024		Last Cal Date: F	: February 16, 2024			
Start time (MST):	9:43		:54				
Analyzer Make:	API T640		S/N: 8	44			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	Alicat FP-25BT		S/N: 3	88746			
Temp/RH standard:	Alicat FP-25BT		S/N: 3	88746			
		Monthly Calibration	Test				
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)		
T (°C)	-12.60	-12.62	-12.60		+/- 2 °C		
P (mmHg)	741.80	749.69	741.80		+/- 10 mmHg		
Flow (LPM)	4.99	4.97	4.99		+/- 0.25 LPM		
PW% (pump)	39.00		39.00		>80%		
Zero Verification	PM w/o HEPA:	17.80	PM w/ HEPA:	0.2	<0.2 ug/m3		
Nicker Aleks Is also also also will be		and a standard and a standard and a standard					
Note: this leak check will be							
PM Inlet observation :	Inlet Head Clean	Ali	gnment Factor On :	✓			
		Quarterly Calibration	Test				
SPAN DUST	Refractive Index:	10.9 Expiry Date:		June 10, 2024			
SPAN DUST	Lot No.:	100128-050-042					
<u>Parameter</u>	As found	Post maintenance As left		<u>Adjusted</u>	(Limits)		
PMT Peak Test					+/- 0.5		
Date Optical Cham		January 22, 2024					
Date Disposable Fil	ter Changed:	January 22, 2024					
Post- maintenance Zero Verification:		PM w/ HEPA:		<0.2 ug/m3			
Data Campila Tuba Classadi August 22, 2022							
Nata Sample Tuh	ne Cleaned:	Annual Maintenan					
Date Sample Tub Date RH/T Senso		Annual Maintenan  August 23  August 23	, 2023				
•		August 23	, 2023				
Date RH/T Senso	or Cleaned:	August 23 August 23	s, 2023 s, 2023	chack naccod			
•	or Cleaned:	August 23	s, 2023 s, 2023	check passed.			



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS11 LOWER CAMP MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Lower Camp

Calibration Date: March 26, 2024

Start time (MST): 10:47

Station number: AMS11

Last Cal Date: February 15, 2024

End time (MST): 14:43

Reason: Routine

#### **Calibration Standards**

Cal Gas Concentration: 49.25 ppm

Cal Gas Cylinder #: CC2216 Removed Cal Gas Conc: 49.25

Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3807

Serial Number: 196

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer se

Analyzer Range 0 - 1000 ppb

Start Finish

ppm

Calibration slope: 0.997880 0.994478 Backgd or Offset: Calibration intercept: -0.244782 0.097406 Coeff or Slope:

Analyzer serial #: 100841398

<u>Start</u> 14.5

1.034

Finish 14.7 1.034

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
	(555)	(000)	(4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,	(FF-5) (1-5)	
as found zero	5000	0.0	0.0	0.9	
as found span	4932	81.4	799.6	797.6	1.003
as found 2nd point	4959	40.7	400.9	397.9	1.008
as found 3rd point	4981	20.4	200.9	200.1	1.004
new cylinder response					
calibrator zero	5000	0.0	0.0	1.2	
high point	4932	81.4	799.6	796.1	1.004
second point	4959	40.7	400.9	397.6	1.008
third point	4981	20.4	200.9	199.2	1.008
as left zero	5000	0.0	0.0	1.3	
as left span	4932	81.4	799.6	799.2	1.001
•			Averag	ge Correction Factor	1.007
			_		

Baseline Corr As found: 796.70 Previous response 797.71 -0.1% \*% change Baseline Corr 2nd AF pt: 397.00 AF Slope: 0.996365 AF Intercept: 0.036126 199.20 AF Correlation: 0.999989 Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Mohammed Kashif



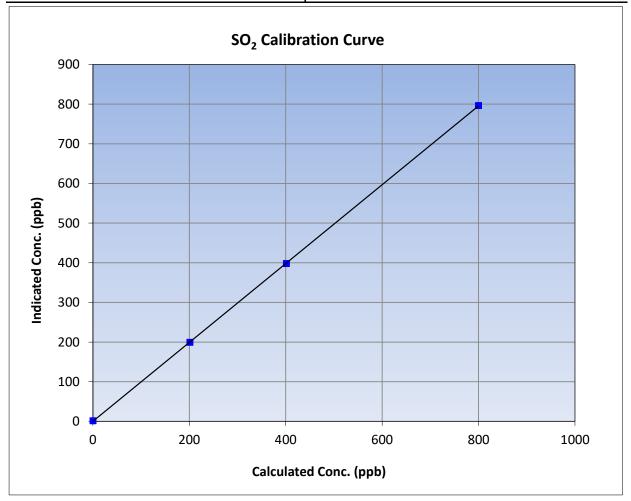
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 15, 2024 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:47 End Time (MST): 14:43 Analyzer make: Thermo 43i Analyzer serial #: 100841398

Calibration Data						
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	1.2		Correlation Coefficient	0.999989	≥0.995	
799.6	796.1	1.0045	Correlation Coefficient	0.333363	20.333	
400.9	397.6	1.0083	Slope	0.994478	0.90 - 1.10	
200.9	199.2	1.0085	Slope	0.334476	0.90 - 1.10	
			Intercept	0.097406	+/-30	

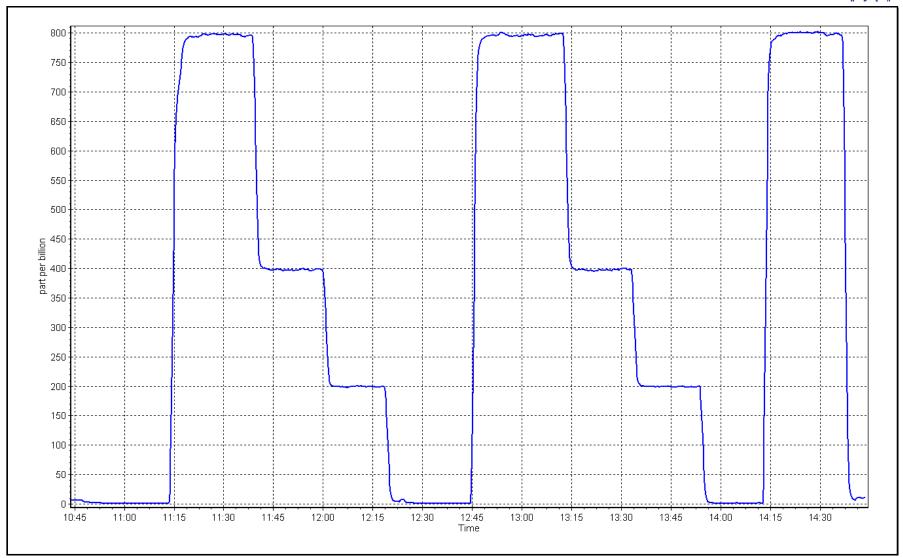


**SO2 Calibration Plot** 

Date: March 26, 2024

Location: Lower Camp





# W B E A

### **Wood Buffalo Environmental Association**

### H<sub>2</sub>S Calibration Report

Version-11-2021

<u>Finish</u>

**Station Information** 

Station Name: Lower Camp

Calibration Date: March 25, 2024

Start time (MST): 9:34
Reason: Removal

Station number: AMS11

Last Cal Date: February 29, 2024

End time (MST): 11:22

**Calibration Standards** 

Cal Gas Concentration: 5.429 ppm Cal Gas Exp Date: January 4, 2025

ppm

Cal Gas Cylinder #: CC501097

Removed Cal Gas Conc: 5.429
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700

ZAG Make/Model: API T701H

Cai Gas Exp Date. January 4, 2025

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3807 Serial Number: 196

**Analyzer Information** 

Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Converter make: NA Converter serial #: NA

Analyzer Range 0 - 100 ppb

<u>Start</u> <u>Finish</u>

Calibration slope: 1.011205 Calibration intercept: -0.085817 <u>Start</u>

Backgd or Offset: 15.8 NA Coeff or Slope: 1.015 NA

### H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4926	73.6	79.9	80.2	0.995
as found 2nd point	4963	36.8	40.0	40.3	0.989
as found 3rd point	4982	18.6	20.2	20.2	0.995
new cylinder response					

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
calibrator zero				-0.1	
high point					
second point					
third point					
as left zero					
as left span					
SO2 Scrubber Check	4935	81.5	812.3	0.3	
Date of last scrubber chan	ge:			Ave Corr Factor	
Date of last converter effic	iency test:				efficiency
Baseline Corr As found:	80.3	Prev response:	80.73	*% change:	-0.5%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.005049	AF Intercept:	-0.045255
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999987		

Notes: Removal calibration. Ran SO2 scrubber check after as found span and it passed.

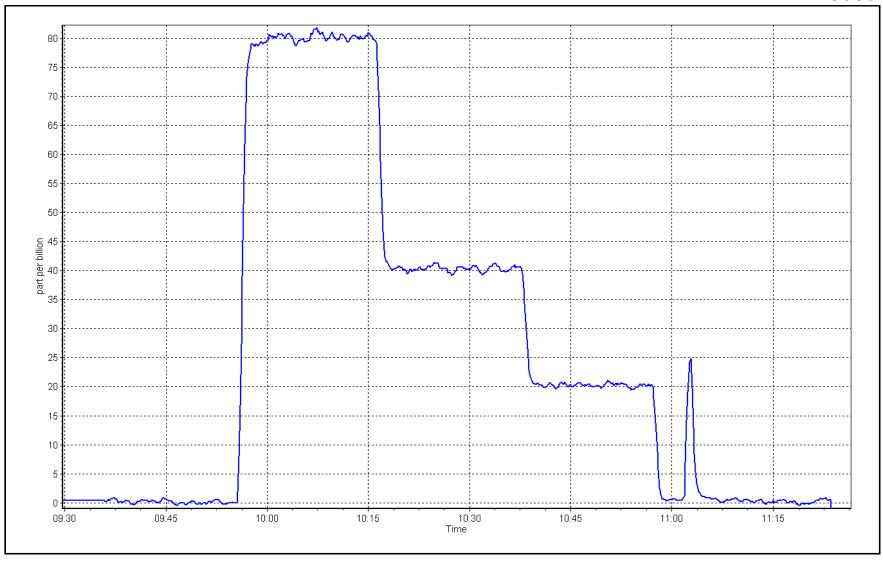
Calibration Performed By: Mohammed Kashif

\* = > +/-5% change initiates investigation

Date: March 25, 2024

Location: Lower Camp







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Lower Camp Calibration Date: March 25, 2024

Start time (MST): 13:00 Install

Reason:

Station number: AMS11 Last Cal Date: NA

End time (MST): 15:29

**Calibration Standards** 

Cal Gas Exp Date: January 4, 2025 Cal Gas Concentration: 5.429 ppm

Cal Gas Cylinder #: CC501097

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.429 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: API T700 3807 Serial Number: ZAG Make/Model: **API T701H** Serial Number: 196

**Analyzer Information** 

Analyzer make: Thermo 43iQ Analyzer serial #: 1203169745

Global G150 Converter serial #: 2022-223 Converter make:

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish** <u>Start</u> <u>Finish</u> 1.012278 Backgd or Offset: 3.01 Calibration slope: NA NA -0.364532 Coeff or Slope: 0.817 Calibration intercept: NA NA

H<sub>2</sub>S As Found Data

Baseline Adjusted Calculated Dilution air flow rate Source gas flow rate Indicated Correction factor concentration (ppb) Set Point (Cc/(Ic-AFzero)) (sccm) (sccm) concentration (ppb) (Ic) (Cc) Limit = 0.90-1.10

as found zero as found span as found 2nd point

as found 3rd point new cylinder response

Notes:

H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4926	73.6	79.9	80.5	0.993
second point	4963	36.8	40.0	40.2	0.994
third point	4982	18.6	20.2	20.0	1.010
as left zero	5000	0.0	0.0	-0.2	
as left span	4926	73.6	79.9	80.7	0.990
SO2 Scrubber Check	4935	81.5	812.3	0.0	
Date of last scrubber chan	ge.			Ave Corr Factor	0 999

Date of last converter efficiency test: efficiency

Baseline Corr As found: Prev response: NA NA \*% change: NA Baseline Corr 2nd AF pt: NA AF Slope: NA AF Intercept: NA Baseline Corr 3rd AF pt: NA AF Correlation: NA

\* = > +/-5% change initiates investigation

Changed sample inlet filter. Adjusted both zero and span. Ran scrubber check after cal zero and it passed.

Calibration Performed By: Mohammed Kashif



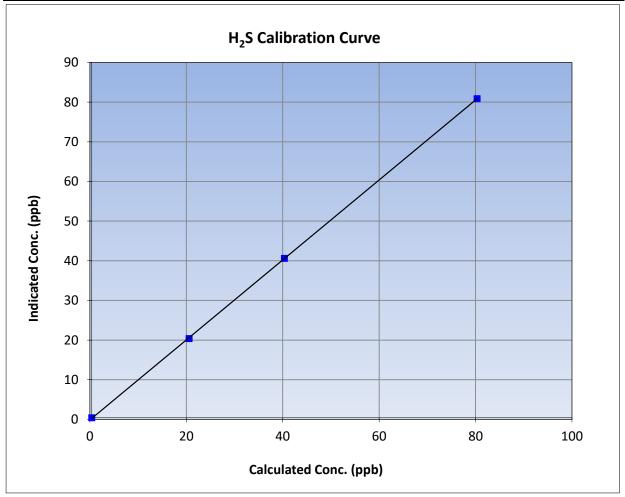
# H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

Calibration Date: March 25, 2024 **Previous Calibration:** NA Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 13:00 End Time (MST): 15:29 Analyzer make: Thermo 43iQ Analyzer serial #: 1203169745

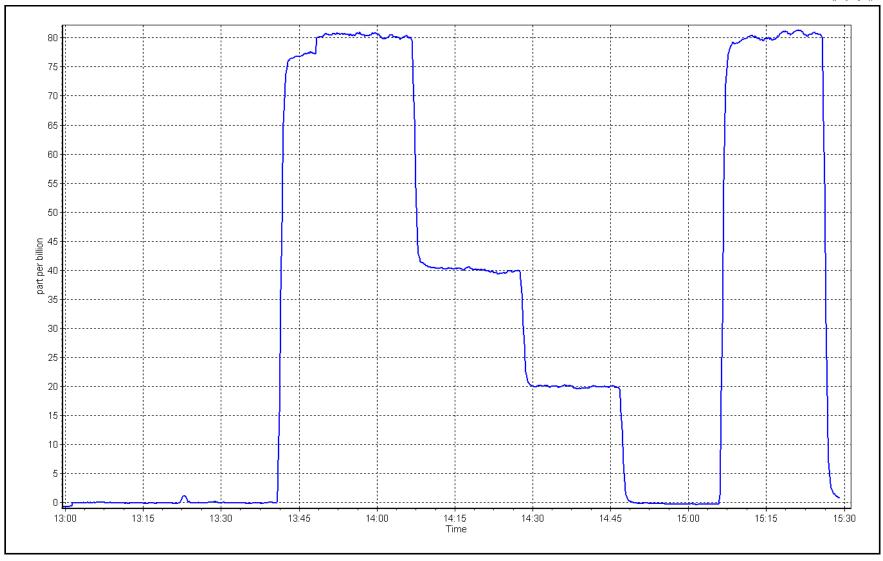
Calibration Data								
Calculated concentration Indicated concentration Correction (ppb) (Cc) (ppb) (Ic) (Cc)			Statistical Evaluation		<u>Limits</u>			
0.0			Correlation Coefficient	0.999989	≥0.995			
79.9	80.5	0.9928	Correlation Coefficient	0.555565	20.993			
40.0	40.2	0.9940	Slope	1.012278	0.90 - 1.10			
20.2	20.0	1.0097	Slope	1.012276	0.90 - 1.10			
			- Intercept	-0.364532	+/-3			



Date: March 25, 2024

Location: Lower Camp







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Lower Camp Station Name:

Calibration Date: March 26, 2024

Start time (MST): 10:47 Routine Reason:

Station number: AMS11

Last Cal Date: February 15, 2024

End time (MST): 14:43

### **Calibration Standards**

Gas Cert Reference: CC2216 Cal Gas Expiry Date: February 23, 2025 CH4 Cal Gas Conc. 502.0 ppm

ppm

ppm

205.5 C3H8 Cal Gas Conc. ppm

Removed Gas Cert:

Removed CH4 Conc. 502.0

Removed C3H8 Conc. 205.5 Diff between cyl ( $CH_4$ ):

Calibrator Model: **API T700** ZAG make/model: **API T701**  CH4 Equiv Conc. 1067.1 ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1067.1 ppm

Diff between cyl (THC): Diff between cyl (NM):

> Serial Number: 3807 Serial Number: 196

#### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm Analyzer serial #: 1505164381

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.88E-04 2.68E-04 NMHC SP Ratio: 5.30E-05 4.81E-05 CH4 Retention time: 14.6 14.6 NMHC Peak Area: 173476 190907 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4932	81.4	17.33	18.90	0.917
as found 2nd point	4959	40.7	8.69	9.37	0.927
as found 3rd point	4981	20.4	4.35	4.69	0.928
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4932	81.4	17.33	17.30	1.001
second point	4959	40.7	8.69	8.63	1.006
third point	4981	20.4	4.35	4.31	1.009
as left zero	5000	0.0	0.00	0.00	
as left span	4932	81.4	17.33	17.52	0.989
			Av	erage Correction Factor	1.005
Baseline Corr AF:	18.90	Prev response	17.33	*% change	8.3%
Baseline Corr 2nd AF:	9.4	AF Slope:	1.091445	AF Intercept:	-0.044688
Baseline Corr 3rd AF:	4.7	AF Correlation:	0.999957	* = > +/-5% change initiat	es investigation



as found zero

as found span

as found 2nd point

as found 3rd point

new cylinder response

Baseline Corr 3rd AF:

Baseline Corr 3rd AF:

Notes:

Set Point

Dil air flow rate

5000

4932

4959

4981

# **Wood Buffalo Environmental Association**

# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit</i> = 0.95-1.05	
0.0	0.00	0.00		
81.4	9.18	10.10	0.909	
40.7	4.60	5.02	0.916	
20.4	2.31	2.51	0.917	
0.0	0.00	0.00		
81.4	9.18	9.16	1.001	

calibrator zero 5000 high point 4932 second point 40.7 4.58 1.004 4959 4.60 third point 4981 20.4 2.31 2.29 1.008 as left zero 5000 0.0 0.00 0.00 as left span 4932 81.4 9.18 9.29 0.988 **Average Correction Factor** 1.005 Baseline Corr AF: 10.10 9.18 Prev response \*% change 9.1% Baseline Corr 2nd AF: AF Slope: 5.0 1.100657 AF Intercept: -0.016446

**NMHC Calibration Data** 

\* = > +/-5% change initiates investigation 2.5 AF Correlation: 0.999982

#### **CH4 Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4932	81.4	8.15	8.81	0.926
as found 2nd point	4959	40.7	4.09	4.34	0.941
as found 3rd point	4981	20.4	2.05	2.18	0.940
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4932	81.4	8.15	8.14	1.002
second point	4959	40.7	4.09	4.06	1.008
third point	4981	20.4	2.05	2.03	1.010
as left zero	5000	0.0	0.00	0.00	
as left span	4932	81.4	8.15	8.23	0.991
			Ave	erage Correction Factor	1.006
Baseline Corr AF:	8.81	Prev response	8.15	*% change	7.5%
Baseline Corr 2nd AF:	4.34	AF Slope:	1.080823	AF Intercept:	-0.027841

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	1.001990	0.999083
THC Cal Offset:	-0.033339	-0.021522
CH4 Cal Slope:	1.001462	0.998771
CH4 Cal Offset:	-0.014179	-0.011567
NMHC Cal Slope:	1.002471	0.999149
NMHC Cal Offset:	-0.018960	-0.009354

AF Correlation:

Hydrogen generator was swapped with cylinder then performed as founds. Changed sample inlet filter after MAF's. Investigation was made and suspecting that the switch from the H2 generator to an H2 cylinder as the fuel source may have caused the off-limits readings, as the setup, diagnostics, and chromatograms appeared normal. Adjusted span only.

0.999919

Mohammed Kashif

2.18

Calibration Performed By:



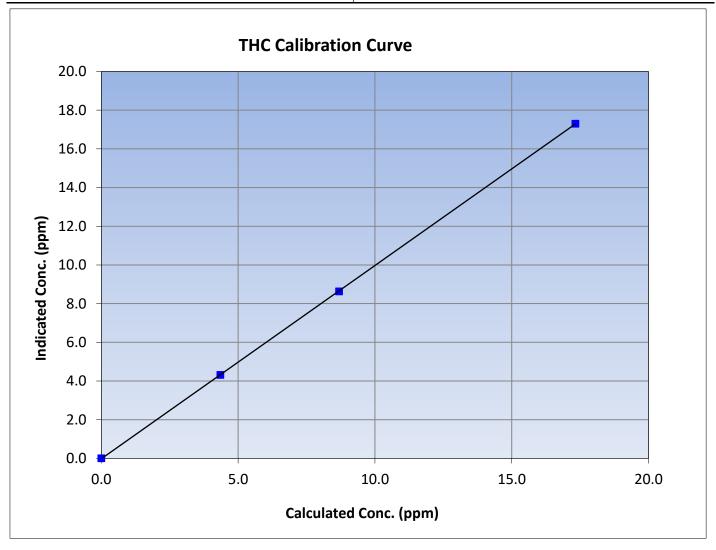
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 26, 2024 Calibration Date: **Previous Calibration:** February 15, 2024 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:47 End Time (MST): 14:43 Analyzer make: Analyzer serial #: Thermo 55i 1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.33	17.30	1.0013	Correlation Coemicient	0.999991	20.555
8.69	8.63	1.0061	Slope	0.999083	0.90 - 1.10
4.35	4.31	1.0090	Slope	0.999083	0.30 - 1.10
		·	Intercept	-0.021522	+/-0.5





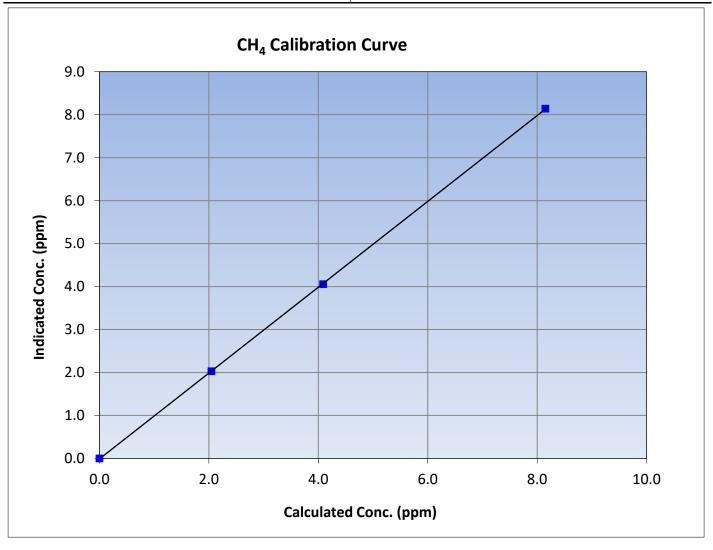
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 15, 2024 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:47 End Time (MST): 14:43 Analyzer make: Analyzer serial #: Thermo 55i 1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999987	≥0.995
8.15	8.14	1.0016	Correlation Coefficient	0.999907	20.333
4.09	4.06	1.0078	Clara	0.998771	0.90 - 1.10
2.05	2.03	1.0097	Slope	0.996771	0.90 - 1.10
		·	Intercept	-0.011567	+/-0.5





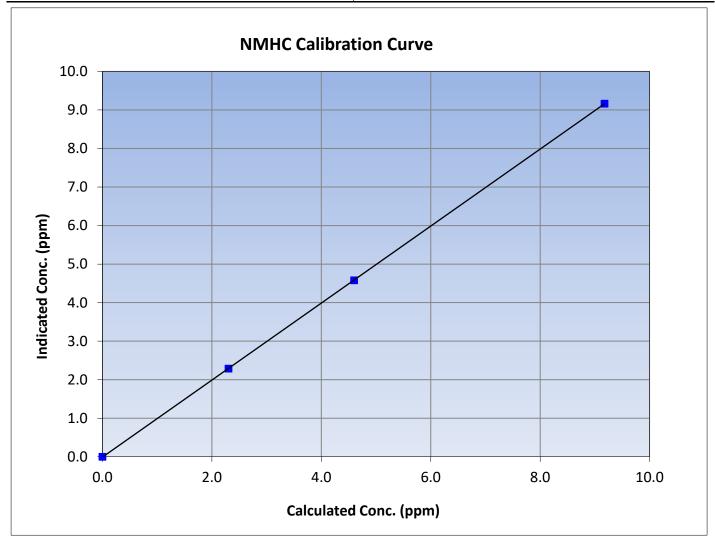
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

March 26, 2024 Calibration Date: **Previous Calibration:** February 15, 2024 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:47 End Time (MST): 14:43 Analyzer make: Thermo 55i Analyzer serial #: 1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.18	9.16	1.0013	Correlation Coemicient	0.555555	20.333
4.60	4.58	1.0045	Slope	0.999149	0.90 - 1.10
2.31	2.29	1.0083	Slope	0.555145	0.90 - 1.10
			Intercept	-0.009354	+/-0.5

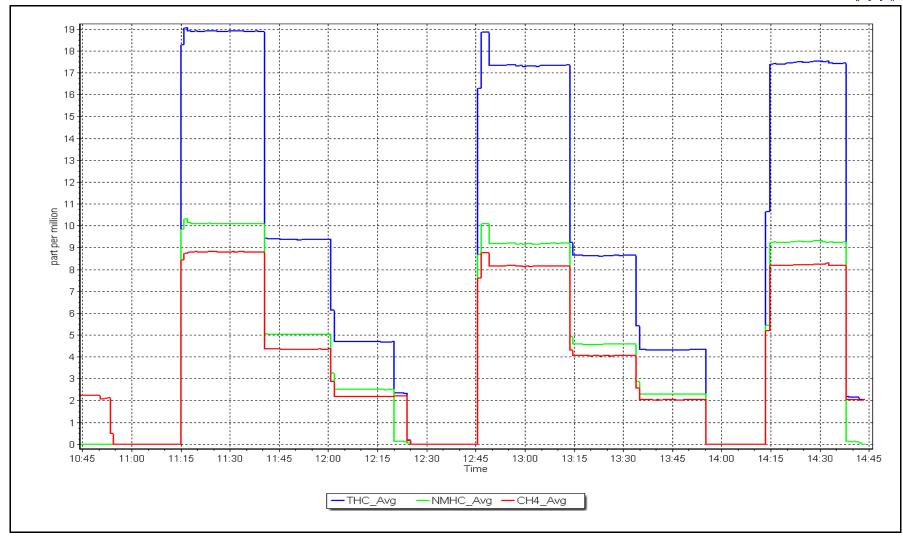


**NMHC Calibration Plot** 

Date: March 26, 2024

Location: Lower Camp







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS13 FORT MCKAY SOUTH MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Fort McKay South

March 12, 2024 Calibration Date:

Start time (MST): 10:23

Routine Reason:

Station number: AMS13

> February 12, 2024 Last Cal Date:

End time (MST): 13:35

**Calibration Standards** 

Cal Gas Concentration: 50.55

Cal Gas Cylinder #: CC260812

Removed Cal Gas Conc: 50.55 Removed Gas Cyl #: N/A

Calibrator Make/Model: **API T700** ZAG Make/Model: **API 701** 

ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date: N/A

Diff between cyl:

Serial Number: 2448 Serial Number: 1117

**Analyzer Information** 

Analyzer make: API T100

Analyzer Range 0 - 1000 ppb

**Finish Start** 

ppm

Calibration slope: 1.003642 Calibration intercept: -2.718121

Baseline Corr 3rd AF pt:

Analyzer serial #: 599

**Start** Backgd or Offset:

Coeff or Slope:

90.0 0.711 **Finish** 90.0 0.711

SO<sub>2</sub> Calibration Data

1.002127

-2.338170

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.1	799.7	798.9	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	79.1	799.7	800.2	0.999
second point	4961	39.5	399.3	396.9	1.006
third point	4980	19.8	200.2	195.5	1.024
as left zero	5000	0.0	0.0	0.2	
as left span	4921	79.1	799.7	800.4	0.999
·			Aver	age Correction Factor	1.010
Baseline Corr As found:	799.00	Previous response	799.88	*% change	-0.1%

Baseline Corr As found: 799.00 Previous response 799.88 \*% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. No adjustments made.

AF Correlation:

Calibration Performed By: Sean Bala

NA



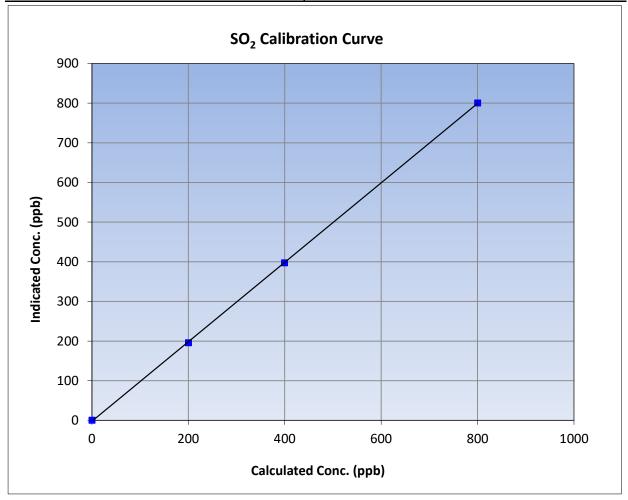
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

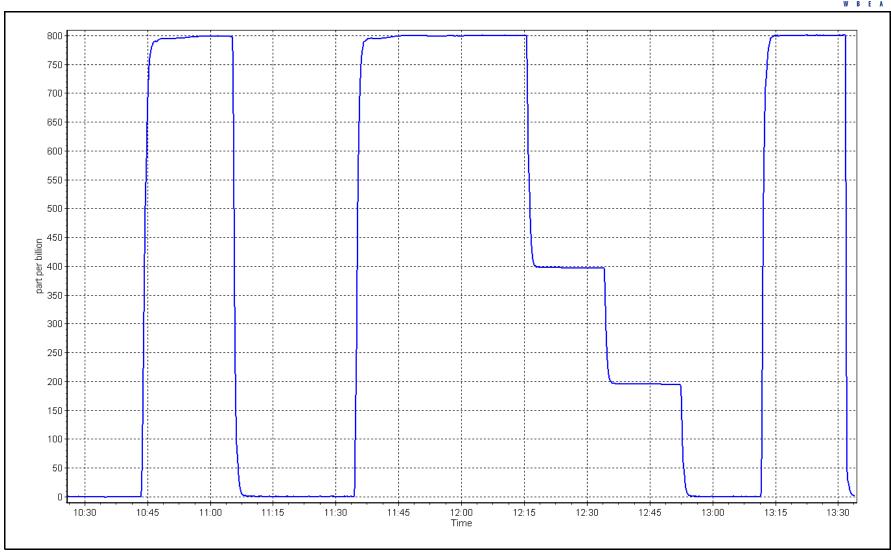
Calibration Date: March 12, 2024 **Previous Calibration:** February 12, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:23 End Time (MST): 13:35 Analyzer make: **API T100** Analyzer serial #: 599

	Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>					
0.0	0.2		Correlation Coefficient	0.999954	≥0.995					
799.7	800.2	0.9994	Correlation Coefficient	0.555554	20.333					
399.3	396.9	1.0061	Slope	1.002127	0.90 - 1.10					
200.2	195.5	1.0240	Slope	1.002127	0.90 - 1.10					
			- Intercept	-2.338170	+/-30					



SO2 Calibration Plot Date: March 12, 2024





Location: Fort McKay South



### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Fort McKay South Calibration Date: March 21, 2024

Start time (MST): 10:06 Reason: Routine Station number: AMS13

Last Cal Date: February 6, 2024

End time (MST): 14:19

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.34 ppm

ppm

Cal Gas Cylinder #: CC500241 Removed Cal Gas Conc: 5.34

Removed Gas Cyl #: NA Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API 701

Rem Gas Exp Date: NA

Diff between cyl: 2448 Serial Number: Serial Number: 1117

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

CDN-101 Converter serial #: 521 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> <u>Finish</u> **Finish** <u>Start</u> 1.001638 1.007879 Backgd or Offset: Calibration slope: 4.15 4.15 Calibration intercept: -0.302148 -0.422268 Coeff or Slope: 1.157 1.157

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.4	
as found span	4925	75.5	80.6	81.1	0.989
as found 2nd point	4962	37.7	40.3	40.0	0.997
as found 3rd point	4981	18.9	20.2	19.5	1.014
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)			Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.3	
high point	4925	75.5	80.6	80.9	0.997
second point	4962	37.7	40.3	40.1	1.004
third point	4981	18.9	20.2	19.8	1.019
as left zero	5000	0.0	0.0	0.1	
as left span	4925	75.5	80.6	80.1	1.007
SO2 Scrubber Check	4921	79.1	791.0	0.1	
Date of last scrubber change	e:	20-Mar-20		Ave Corr Factor	1.007

Date of last scrubber change:	20-Mar-20	Ave Corr Factor 1.007
Date of last converter efficiency test:	NA	efficiency

Baseline Corr As found: 81.5 Prev response: 80.46 \*% change: Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.012557 AF Intercept: -0.662257 AF Correlation: Baseline Corr 3rd AF pt: 19.9 0.999953

\* = > +/-5% change initiates investigation

Changed the inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. No Notes: adjustment made.

Calibration Performed By: Sean Bala 1.3%



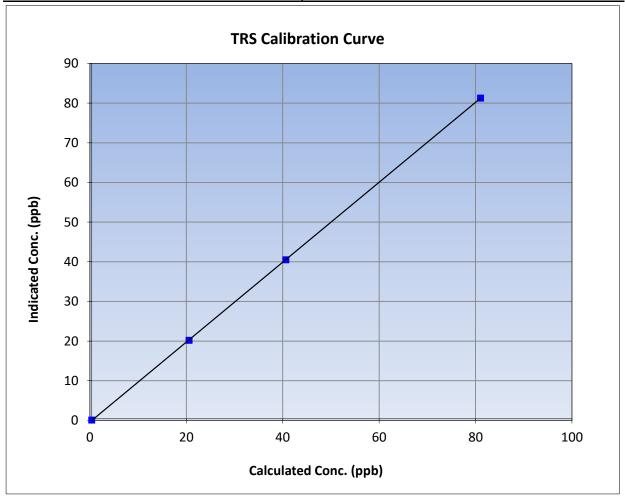
### **TRS Calibration Summary**

Version-11-2021

### **Station Information**

**Previous Calibration:** Calibration Date: March 21, 2024 February 6, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:06 End Time (MST): 14:19 Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

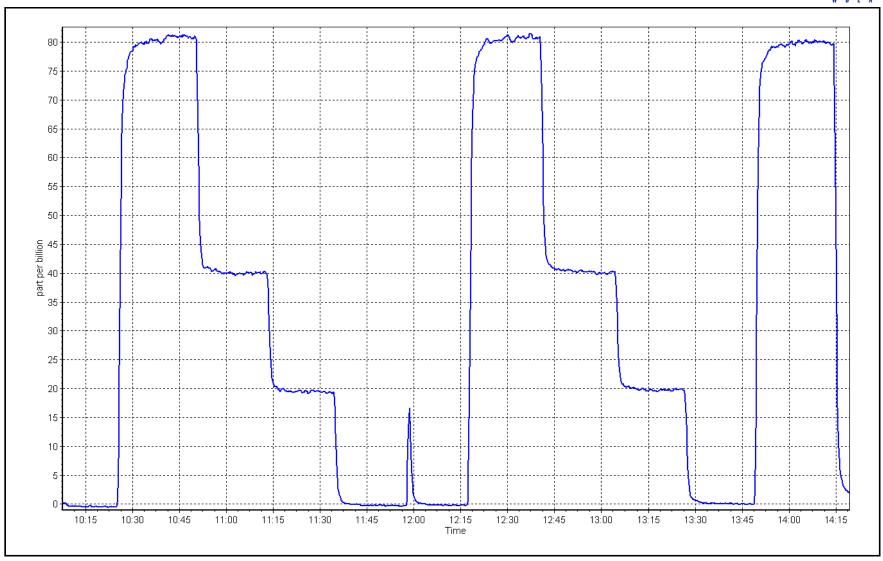
	Calibration Data								
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	-0.3		Correlation Coefficient	0.999990	≥0.995				
80.6	80.9	0.9966	Correlation Coefficient	0.555550	20.995				
40.3	40.1	1.0041	Slope	1.007879	0.90 - 1.10				
20.2	19.8	1.0195	Зюре	1.007879	0.90 - 1.10				
			- Intercept	-0.422268	+/-3				



**TRS Calibration Plot** Date: March 21, 2024

Location: Fort McKay South







CH4 Cal Gas Conc.

## **Wood Buffalo Environmental Association**

# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Fort McKay South

Calibration Date: March 12, 2024

Start time (MST): 10:23 Reason: Routine Station number: AMS13

Removed Gas Expiry:

Last Cal Date: February 12, 2024

End time (MST): 13:35

### **Calibration Standards**

Gas Cert Reference: CC260812 Cal Gas Expiry Date: December 29, 2028

CH4 Equiv Conc. 1077.5 ppm

C3H8 Cal Gas Conc. 208.7 ppm

503.6

Removed Gas Cert: NA

Removed CH4 Conc. 503.6 ppm CH4 Equiv Conc. 1077.5 ppm

Removed C3H8 Conc. 208.7 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: API T700 Serial Number: 2448 ZAG make/model: API701 Serial Number: 1117

ppm

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1172750023

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

n CH4 Range (ppm): 0 - 10 ppm

Finish Start **Finish** Start CH4 SP Ratio: 2.94E-04 2.95E-04 NMHC SP Ratio: 5.07E-05 4.83E-05 CH4 Retention time: 15.20 15.20 NMHC Peak Area: 1879773 179256 Zero Chromatogram: OFF OFF Flat Baseline: ON OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.02		
as found span	4921	79.1	17.05	16.83	1.013	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4921	79.1	17.05	17.02	1.001	
second point	4961	39.5	8.51	8.42	1.011	
third point	4980	19.8	4.27	4.11	1.039	
as left zero	5000	0.0	0.00	0.00		
as left span	4921	79.1	17.05	17.07	0.999	
			,	Average Correction Factor	1.017	
Baseline Corr AF:	16.81	Prev response	16.99	*% change	-1.1%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

					Version-00-20
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.1	9.08	8.80	1.031
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.1	9.08	9.12	0.996
second point	4961	39.5	4.53	4.52	1.004
third point	4980	19.8	2.27	2.19	1.040
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	9.08	9.13	0.994
·			Avera	age Correction Factor	1.013
Baseline Corr AF:	8.80	Prev response	9.07	*% change	-3.0%
Baseline Corr 2nd AF:				AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> .
as found zero	5000	0.0	0.00	0.02	
as found span	4921	79.1	7.97	8.03	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.1	7.97	7.91	1.007
second point	4961	39.5	3.98	3.90	1.020
third point	4980	19.8	1.99	1.92	1.039
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	7.97	7.94	1.004
				age Correction Factor	1.022
Baseline Corr AF:	8.01	Prev response	7.93	*% change	1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000652		1.001286	
THC Cal Offset:		-0.065578		-0.078556	
CH4 Cal Slope:		1.000073		0.994805	
CH4 Cal Offset:		-0.040797		-0.034188	
NMHC Cal Slope:		1.001197		1.007213	
				0.04==60	

Notes: Changed inlet filter after as founds. Do zero chromatogram and Adjusted span.

-0.024180

Calibration Performed By: Sean Bala

NMHC Cal Offset:

-0.045569



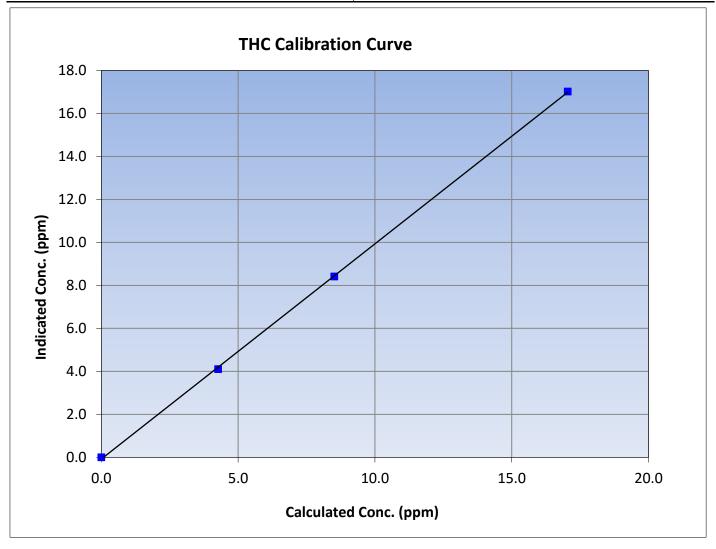
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 12, 2024 **Previous Calibration:** Calibration Date: February 12, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:23 End Time (MST): 13:35 Analyzer make: Thermo 55i Analyzer serial #: 1172750023

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999901	≥0.995	
17.05	17.02	1.0013	Correlation Coemicient	0.999901	20.333	
8.51	8.42	1.0110	Slope	1.001286	0.90 - 1.10	
4.27	4.11	1.0393	Slope	1.001280	0.90 - 1.10	
			Intercept	-0.078556	+/-0.5	





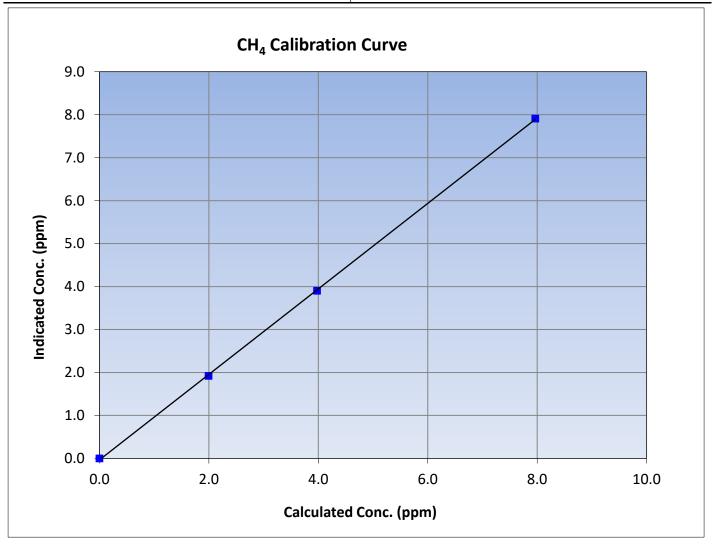
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

March 12, 2024 Calibration Date: **Previous Calibration:** February 12, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:23 End Time (MST): 13:35 Analyzer make: Thermo 55i Analyzer serial #: 1172750023

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999914	≥0.995	
7.97	7.91	1.0072	Correlation Coefficient	0.333314	20.555	
3.98	3.90	1.0197	Slope	0.994805	0.90 - 1.10	
1.99	1.92	1.0393	Siope	0.334603	0.90 - 1.10	
			Intercept	-0.034188	+/-0.5	





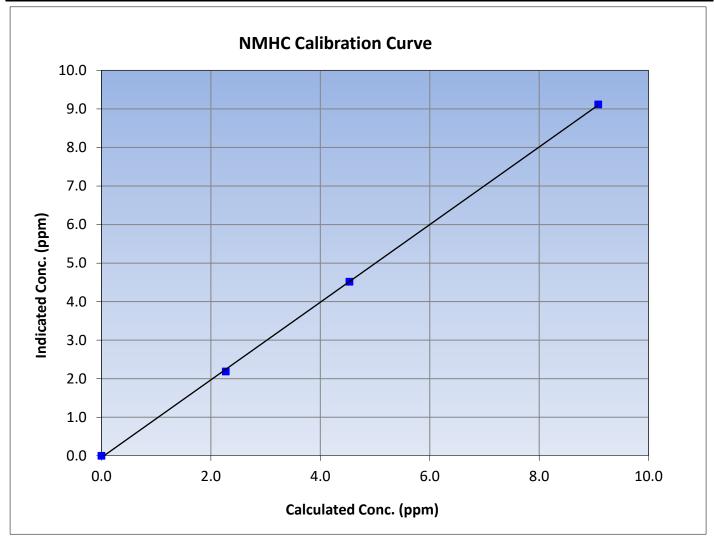
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

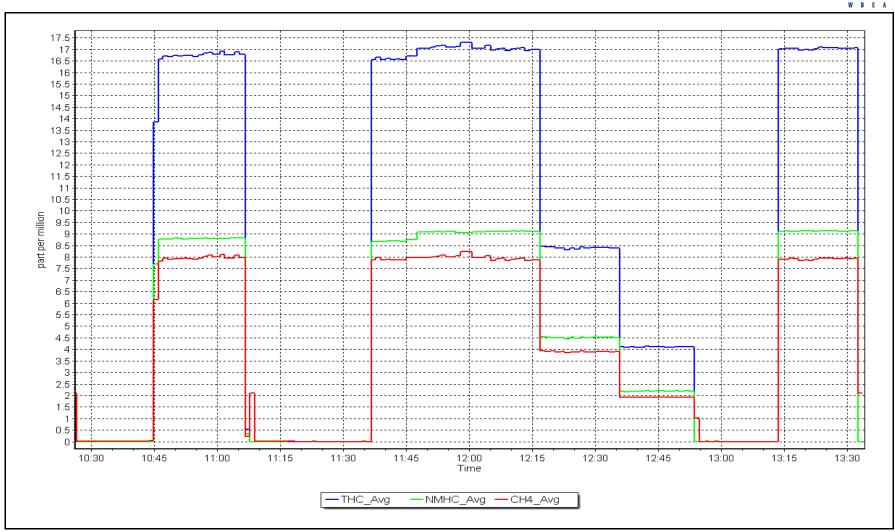
March 12, 2024 **Previous Calibration:** Calibration Date: February 12, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:23 End Time (MST): 13:35 Analyzer make: Thermo 55i Analyzer serial #: 1172750023

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999875	≥0.995	
9.08	9.12	0.9960	Correlation Coemicient	0.999675	20.993	
4.53	4.52	1.0039	Slope	1.007213	0.90 - 1.10	
2.27	2.19	1.0397	Slope	1.007213	0.90 - 1.10	
			Intercept	-0.045569	+/-0.5	



NMHC Calibration Plot Date: March 12, 2024 Location: Fort McKay South







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

### **Station Information**

Station Name: Fort McKay South

Calibration Date: March 27, 2024

Start time (MST): 8:42
Reason: Routine

Station number: AMS 13

Last Cal Date: February 20, 2024

47.88

ppm

End time (MST): 12:47

#### **Calibration Standards**

NO Gas Cylinder #: T2UP1RP Cal Gas Expiry Date: November 17, 2026

NOX Cal Gas Conc: 48.25 ppm NO Cal Gas Conc: 47.88 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NOX Conc: 48.25 ppm Removed Gas NO Conc:

NOX gas Diff:

NO gas Diff:

Calibrator Model: API T700 Serial Number: 2448 ZAG make/model: API T701 Serial Number: 1117

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1410661329

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.128 1.128 NO bkgnd or offset: 10.1 10.1 NOX coeff or slope: 0.999 0.999 NOX bkgnd or offset: 10.2 10.2 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 156.4 157.3

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.999462	0.994114
NO <sub>x</sub> Cal Offset:	-1.952788	-1.991485
NO Cal Slope:	1.002954	0.997692
NO Cal Offset:	-2.771571	-2.930061
NO <sub>2</sub> Cal Slope:	1.000409	0.999151
NO <sub>2</sub> Cal Offset:	-0.685310	-1.075362



# $NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dil	lution Calibration	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4917	83.5	805.7	799.5	6.2	802.3	796.4	5.9	1.0042	1.0039
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
high point	4917	83.5	805.7	799.5	6.2	800.1	796.4	3.8	1.0070	1.0039
second point	4958	41.8	403.4	400.3	3.1	397.7	394.5	3.2	1.0143	1.0147
third point	4979	20.9	201.7	200.1	1.5	196.6	194.0	2.6	1.0259	1.0317
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4917	83.5	805.7	383.6	422.1	802.2	378.3	423.9	1.0044	1.0141
							Average C	Correction Factor	1.0157	1.0168
Corrected As fo	ound NO <sub>X</sub> =	802.4 ppb	NO =	796.5 ppb	* = > +/-5	5% change initiates	investigation	*Percent Chang	ge NO <sub>X</sub> =	-0.1%
Previous Respo	onse NO <sub>x</sub> =	803.3 ppb	NO =	799.1 ppb				*Percent Chang	ge NO =	-0.3%
Baseline Corr 2	2nd pt NO <sub>X</sub> =	NA ppb	1 = ON		As foun	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3		* *	NO = 1	NA ppb	As foun	nd NO r <sup>2</sup> :	:	NO SI:	NO Int:	
	•	• •			As found	3		NO2 SI:	NO <sub>2</sub> Int:	
				•	GPT Calibration	n Data				
O3 Setpo	oint (ppb)	Indicated NO Referer concentration (ppb		rated NO Drop entration (ppb)	Calculated No concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0.	0.95-1.05	verter Efficiency vion Limit = 96-104%
as found	GPT zero									
as found GPT poi	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)			<del>_</del>						
1st GPT point	(400 ppb O3)	790.9		375.0	422.1		421.1	1.0023		99.8%
2nd GPT point	t (200 ppb O3)	790.9		583.6	213.5		212.0	1.0070	,	99.3%
3rd GPT point	t (100 ppb O3)	790.9		686.4	110.7		108.2	1.0229	, <u> </u>	97.8%
						<del></del>	orrection Factor	r 1.0107	,	98.9%

Notes:

Changed inlet filter after as founds. No adjustment made. Used 2nd NO reference point due to drift.

Calibration Performed By:

Sean Bala



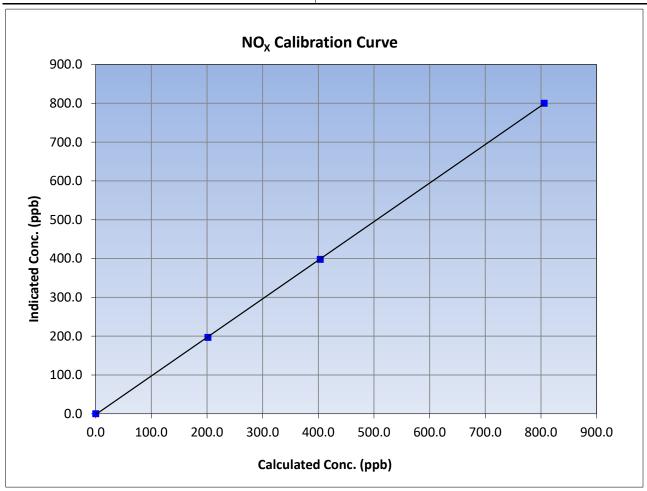
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 27, 2024 Previous Calibration: February 20, 2024 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 8:42 End Time (MST): 12:47 Analyzer serial #: Analyzer make: Thermo 42i 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999968	≥0.995
805.7	800.1	1.0070	Correlation Coefficient	0.555500	20.333
403.4	397.7	1.0143	Slope	0.994114	0.90 - 1.10
201.7	196.6	1.0259	Slope	0.994114	0.90 - 1.10
			Intercept	-1.991485	+/-20





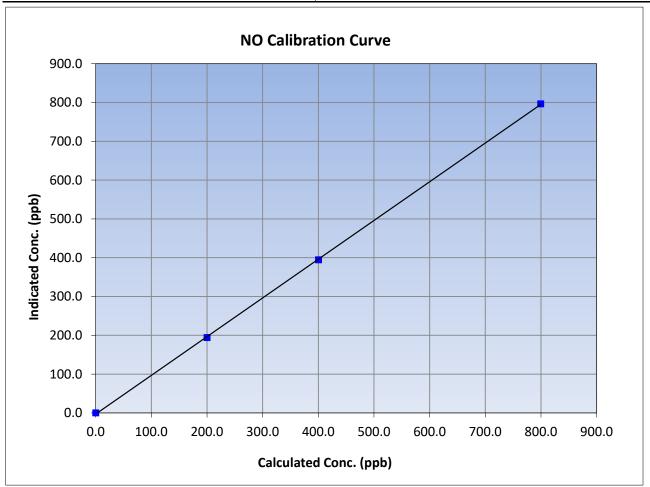
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 27, 2024 Previous Calibration: February 20, 2024 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 8:42 End Time (MST): 12:47 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999933	≥0.995
799.5	796.4	1.0039	Correlation Coefficient	0.999933	20.333
400.3	394.5	1.0147	Slope	0.997692	0.90 - 1.10
200.1	194.0	1.0317	Slope	0.557052	0.90 - 1.10
			Intercept	-2.930061	+/-20





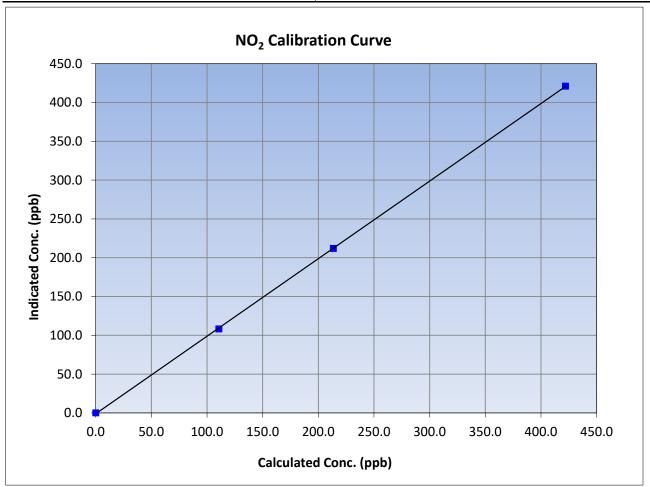
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 27, 2024 Previous Calibration: February 20, 2024 Station Name: Fort McKay South Station Number: **AMS 13** Start Time (MST): 8:42 End Time (MST): 12:47 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999968	≥0.995
422.1	421.1	1.0023	Correlation Coefficient	0.999908	20.333
213.5	212.0	1.0070	Slope	0.999151	0.90 - 1.10
110.7	108.2	1.0229	Slope	0.555151	0.90 - 1.10
			Intercept	-1.075362	+/-20

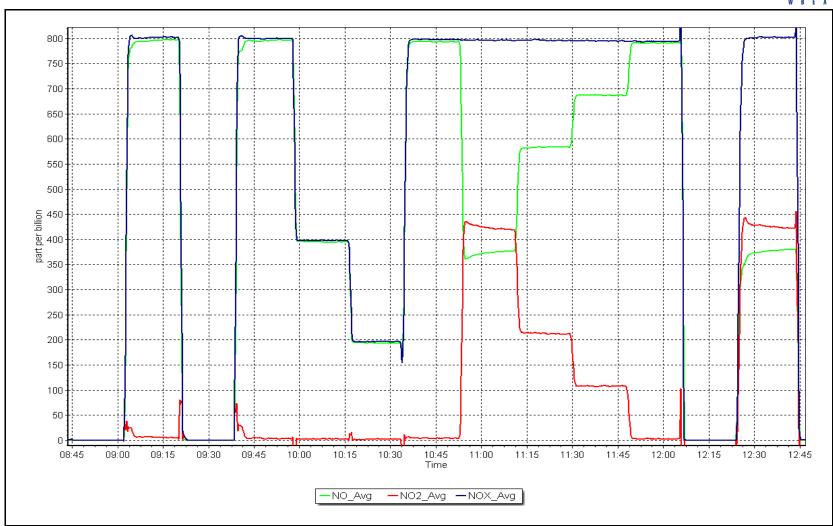


NO<sub>x</sub> Calibration Plot

Date: March 27, 2024

Location: Fort McKay South







# O<sub>3</sub> Calibration Report

Version-01-2020

Finish

4.0

0.984

Station Information

Station Name: Fort McKay South

March 5, 2024 Calibration Date:

Start time (MST): 10:38 Reason: Routine Station number: AMS13

Last Cal Date: February 2, 2024

End time (MST): 14:11

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 2448 ZAG Make/Model: Teledyne API T701 Serial Number: 1117

**Analyzer Information** 

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3871

Start Finish Start 0.999371 Backgd or Offset: Calibration slope: 1.000914 3.7 0.560000 Coeff or Slope: Calibration intercept: 0.740000 0.970

### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.5	
as found span	5000	989.8	400.0	395.1	1.012
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.3	
high point	5000	989.8	400.0	399.7	1.001
second point	5000	849.9	200.0	201.4	0.993
third point	5000	745.1	100.0	101.0	0.990
as left zero	5000	0.0	0.0	-0.5	
as left span	5000	989.8	400.0	400.1	1.000
			Avera	ge Correction Factor	0.995
Baseline Corr As found:	395.6	Previous response	e 401.1	*% change	-1.4%

Baseline Corr 2nd AF pt: AF Slope: AF Intercept: NA

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. Adjusted zero and span.

Calibration Performed By: Sean Bala



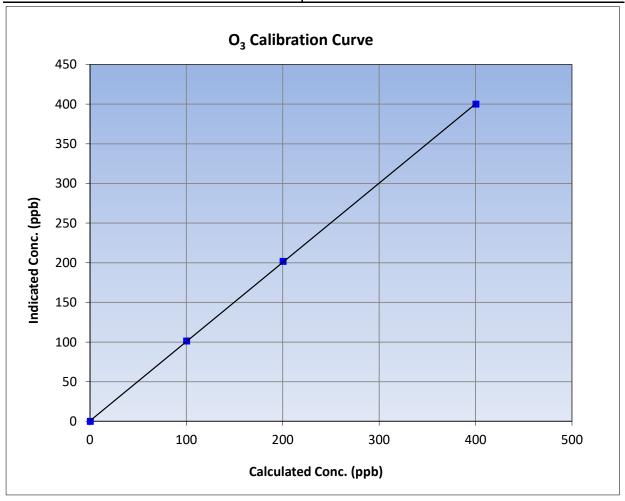
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 2, 2024 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:38 End Time (MST): 14:11 Analyzer make: Teledyne API T400 Analyzer serial #: 3871

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	-0.3		Correlation Coefficient	0.999974	≥0.995		
400.0	399.7	1.0008	Correlation Coefficient	0.333374	20.993		
200.0	201.4	0.9930	Slope	0.999371	0.90 - 1.10		
100.0	101.0	0.9901	Slope	0.333371	0.90 - 1.10		
			- Intercept	0.560000	+/- 5		



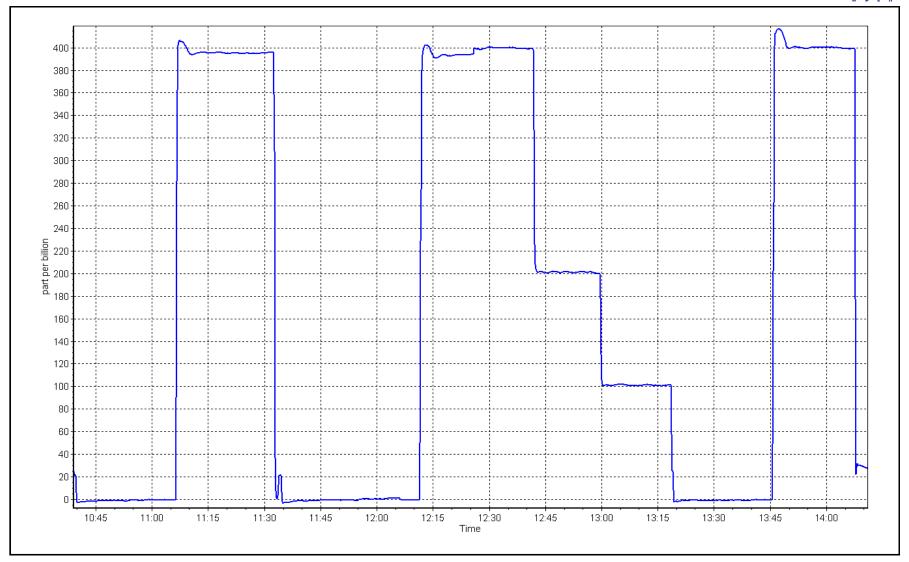
O<sub>3</sub> Calibration Plot

Date: M

March 5, 2024

Location: Fort McKay South







# **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informatio	n		
Station Name: Calibration Date: Start time (MST):	Fort McKay South March 27, 2024 8:48		Station number: Last Cal Date: End time (MST):	February 20, 2024	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	1335	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		•	388746 388746	
		Monthly Calibration	Гest		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-6.70	-7.02	-6.70		+/- 2 °C
P (mmHg)	732.00	734.24	732.00		+/- 10 mmHg
Flow (LPM)	5.02	4.92	5.02		+/- 0.25 LPM
PW% (pump)	46.00		46.00		>80%
Zero Verification	PM w/o HEPA:	5.10	PM w/ HEPA:	0.00	<0.2 ug/m3
PM Inlet observation :  SPAN DUST	Refractive Index:	Quarterly Calibration 10.9 100128-050-042	Test Expiry Date:	√ June 10, 20	24
Darameter	As found		As loft	Adjusted	(Lineita)
<u>Parameter</u> PMT Peak Test	<u>AS TOUTIU</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits) +/- 0.5
Date Optical Chamber Cleaned: Date Disposable Filter Changed:		January 22 January 22			
Post- maintenance Zero Verification:		PM w/ HEPA:		<0.2 ug/m3	
		Annual Maintenan	ce		
Data Canania Tah	Classicali	l 20	2022		
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		June 29, June 29,			
,	•				
Notes:	lı	nlet head cleaned. No a	djustment made. Le	ak check passed.	
Calibration by:	Sean Bala				



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS14 ANZAC MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Anzac

March 7, 2024 Calibration Date:

Start time (MST): 11:15 Routine Reason:

Station number: **AMS 14** 

> February 7, 2024 Last Cal Date:

End time (MST):

14:37

#### **Calibration Standards**

Cal Gas Concentration: 49.95

Cal Gas Cylinder #: CC279389

Removed Cal Gas Conc: 49.95 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** API T701H ZAG Make/Model:

ppm Cal Gas Exp Date: January 5, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3060 Serial Number: 357

### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

Calibration slope: 1.005467 Backgd or Offset: 0.994566 Calibration intercept: -0.897563 -1.163959 Coeff or Slope: Start 25.6

0.812

**Finish** 26.4 0.836

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/lc)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.7	
as found span	4938	80.3	799.3	773.9	1.033
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.1	
high point	4938	80.3	799.3	803.3	0.995
second point	4979	40.2	400.1	400.9	0.998
third point	4998	20.2	201.1	198.1	1.015
as left zero	5000	0.0	0.0	1.2	
as left span	4938	80.3	799.3	796.8	1.003
		_	Averag	ge Correction Factor	1.003

Baseline Corr As found: 773.20 Previous response 794.03 -2.7% \*% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Adjusted span only.

Calibration Performed By: Mohammed Kashif



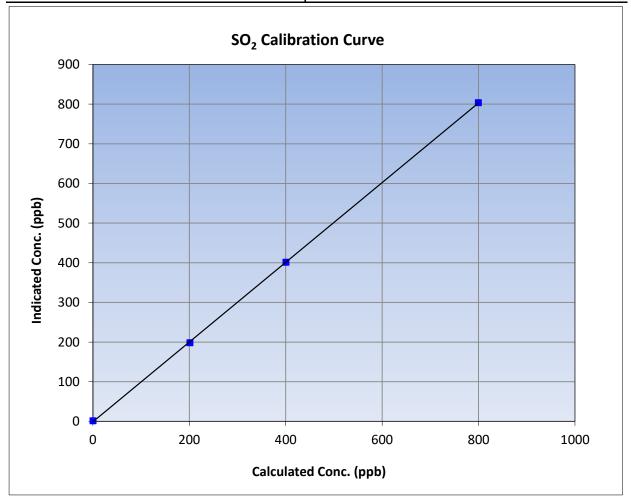
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 7, 2024 **Previous Calibration:** February 7, 2024 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 11:15 End Time (MST): 14:37 Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	1.1		Correlation Coefficient	0.999960	≥0.995	
799.3	803.3	0.9950	Correlation Coefficient	0.555500	20.333	
400.1	400.9	0.9979	Slope	1.005467	0.90 - 1.10	
201.1	198.1	1.0150	Siope	1.005467	0.90 - 1.10	
			- Intercept	-1.163959	+/-30	



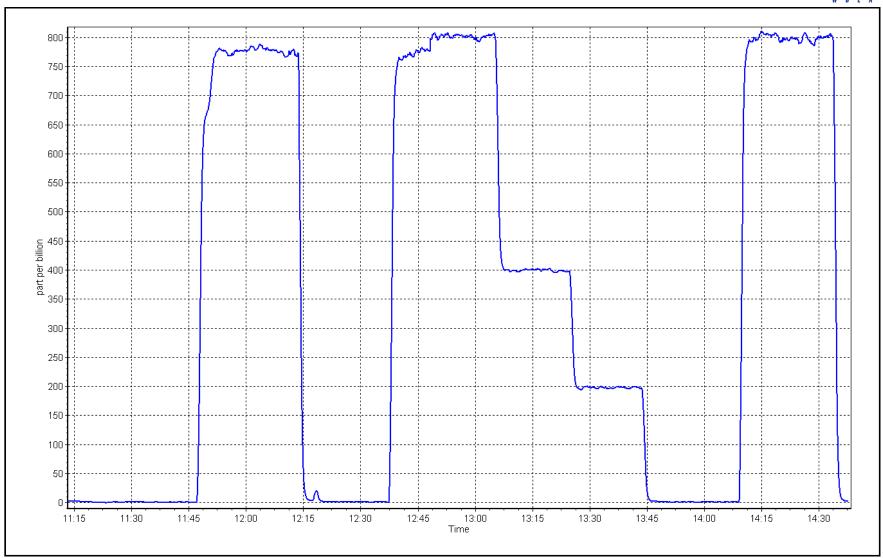
**SO2 Calibration Plot** 

Date:

March 7, 2024

Location: Anzac







### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Anzac

Calibration Date: March 27, 2024

Start time (MST): 9:47

Reason: Routine Station number: AMS14

> Last Cal Date: February 12, 2024

End time (MST): 13:58

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.15 ppm

ppm

Cal Gas Cylinder #: CC510379

Removed Cal Gas Conc: 5.15 Removed Gas Cyl #: NA Calibrator Make/Model: API T700

ZAG Make/Model: **API 701H**  Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3060 Serial Number: 357

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153582

CD Nova CDN-101 Converter serial #: 503 Converter make:

0 - 100 ppb Analyzer Range

> **Finish** <u>Start</u>

<u>Finish</u> <u>Start</u> 1.003735 1.000445 Backgd or Offset: 2.29 Calibration slope: 2.30 -0.045344 Calibration intercept: -0.085416 Coeff or Slope: 0.984 0.984

#### **TRS As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4938	77.9	80.0	80.5	0.992
as found 2nd point	4973	38.9	40.0	40.3	0.989
as found 3rd point	4997	19.5	20.0	19.8	1.006
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4938	77.9	80.0	79.9	1.001
second point	4973	38.9	40.0	40.1	0.996
third point	4997	19.5	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.1	
as left span	4938	77.9	80.0	78.6	1.017
SO2 Scrubber Check	4936	80.3	800.4	0.0	
Date of last scrubber cha	nge:	<u> </u>		Ave Corr Factor	1.003
Date of last converter eff	iciency test:				efficiency

Date of last scrubber change	2:			Ave Corr Factor	1.003
Date of last converter efficie	ncy test:			e	fficiency
Baseline Corr As found:	80.6	Prev response:	80.20	*% change:	0.5%

Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.009059 Baseline Corr 3rd AF pt: AF Correlation: 0.999978 19.9

\* = > +/-5% change initiates investigation

AF Intercept:

-0.185387

Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator Notes: zero. No adjustments made.

Calibration Performed By: Mohammed Kashif



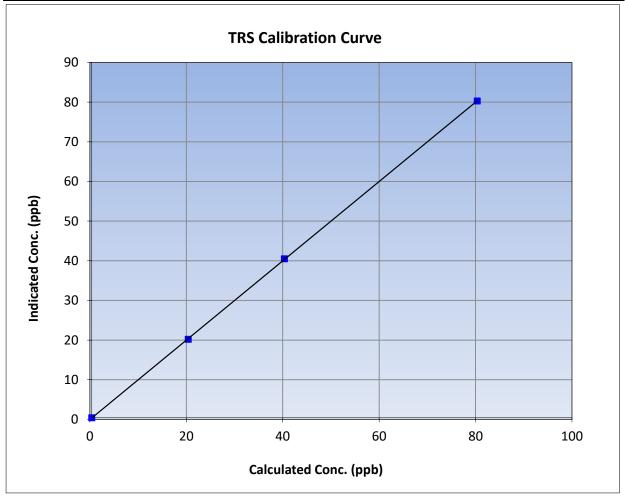
# **TRS Calibration Summary**

Version-11-2021

### **Station Information**

**Previous Calibration:** Calibration Date: March 27, 2024 February 12, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 9:47 End Time (MST): 13:58 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153582

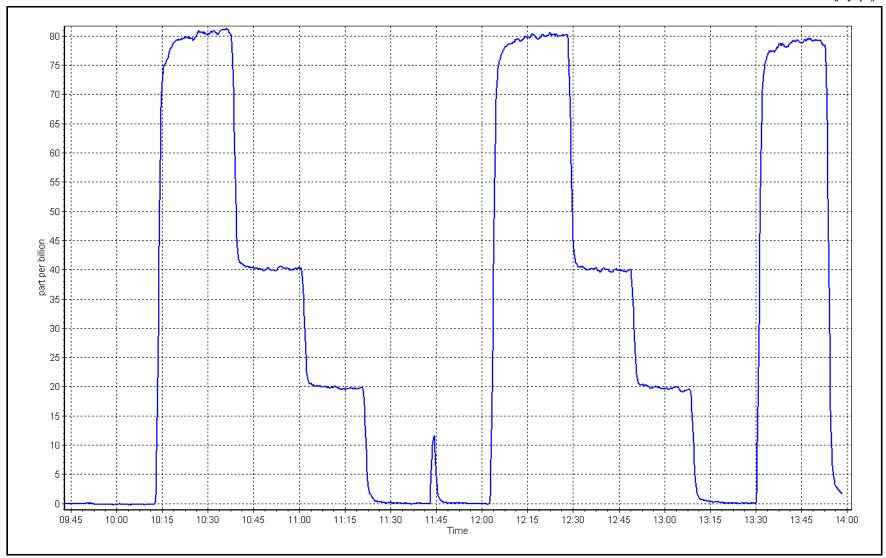
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.0		Correlation Coefficient	0.999982	≥0.995		
80.0	79.9	1.0006	Correlation Coefficient	0.999962	20.555		
40.0	40.1	0.9964	Slope	1.000445	0.90 - 1.10		
20.0	19.8	1.0107	Slope	1.000445	0.90 - 1.10		
			- Intercept	-0.045344	+/-3		



Date: March 27, 2024

Location: Anzac







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Anzac

Calibration Date: March 7, 2024

Start time (MST): 11:15
Reason: Routine

Station number: AMS14

Last Cal Date: February 3, 2024

End time (MST): 14:37

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC279389 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 499.3 ppm CH4 Equiv Conc. 1068.8 ppm

C3H8 Cal Gas Conc. 207.1 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 499.3 ppm CH4 Equiv Conc. 1068.8 ppm

Removed C3H8 Conc. 207.1 ppm Diff between cyl (THC): Diff between cyl (CH $_4$ ): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 3060 ZAG make/model: API 701H Serial Number: 357

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.25E-04 2.25E-04 NMHC SP Ratio: 4.11E-05 4.11E-05 CH4 Retention time: 13.30 13.30 NMHC Peak Area: 221451 221451 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	17.10	17.05	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	17.10	17.01	1.006
second point	4979	40.2	8.56	8.41	1.018
third point	4998	20.2	4.30	4.17	1.032
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.00	1.006
			,	Average Correction Factor	1.019
Baseline Corr AF:	17.05	Prev response	17.09	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
D !! C 2 LAE				* / :-:-:	

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

					VC151011 00 Z
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	9.11	9.09	1.002
as found 2nd point	.500			3.00	
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	9.11	9.07	1.005
second point	4979	40.2	4.56	4.51	1.012
third point	4998	20.2	2.29	2.24	1.025
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	9.11	9.06	1.006
20 .0.t opa	.500			rage Correction Factor	1.014
Baseline Corr AF:	9.09	Prev response	9.12	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:	3.12	AF Intercept:	0.070
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	7.99	7.96	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	7.99	7.94	1.007
second point	4979	40.2	4.00	3.91	1.024
third point	4998	20.2	2.01	1.93	1.042
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	7.99	7.95	1.006
ı				rage Correction Factor	1.024
Baseline Corr AF:	7.96	Prev response	7.97	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>	otatistics	<u>Finish</u>	
THC Cal Slope:		1.002044		0.995891	
THC Cal Offset:		-0.050467		-0.064367	
				0.995346	
CH4 Cal Offset:		1.002402			
CH4 Cal Offset:		-0.039003		-0.040562	
NMHC Cal Slope:		1.001944		0.995954	

Notes: Sample inlet filter changed after as founds. No adjustments needed.

-0.011066

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.023403



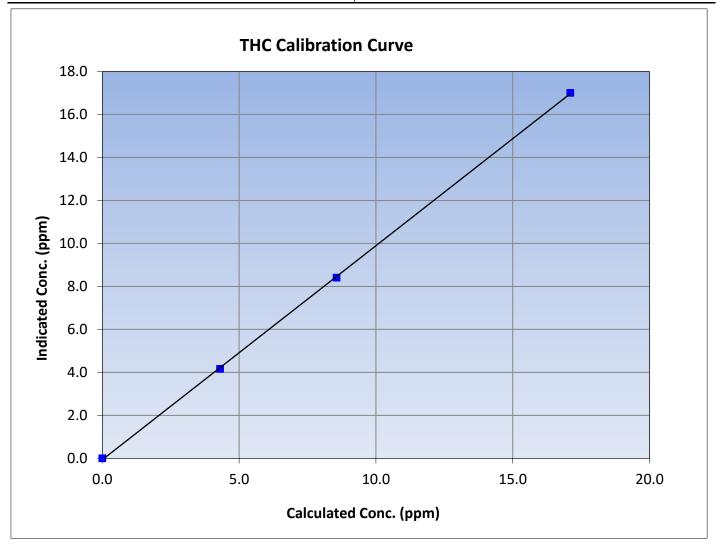
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 7, 2024 **Previous Calibration:** Calibration Date: February 3, 2024 Station Name: AMS14 Anzac Station Number: Start Time (MST): 11:15 End Time (MST): 14:37 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999932	≥0.995
17.10	17.01	1.0057	Correlation Coefficient	0.555552	20.333
8.56	8.41	1.0177	Slope	0.995891	0.90 - 1.10
4.30	4.17	1.0325	Зюре	0.993891	0.30 - 1.10
			Intercept	-0.064367	+/-0.5





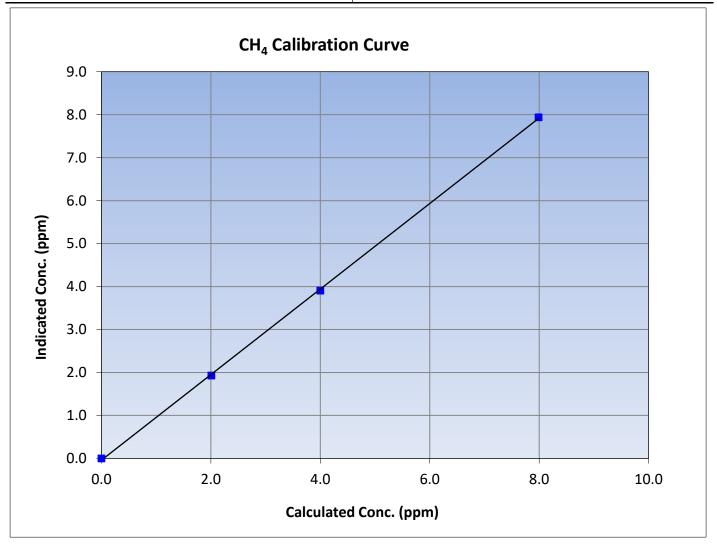
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 7, 2024 **Previous Calibration:** February 3, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:15 End Time (MST): 14:37 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999871	≥0.995
7.99	7.94	1.0066	Correlation Coemicient	0.555671	20.333
4.00	3.91	1.0241	Slope	0.995346	0.90 - 1.10
2.01	1.93	1.0419	Slope		0.90 - 1.10
			Intercept	-0.040562	+/-0.5





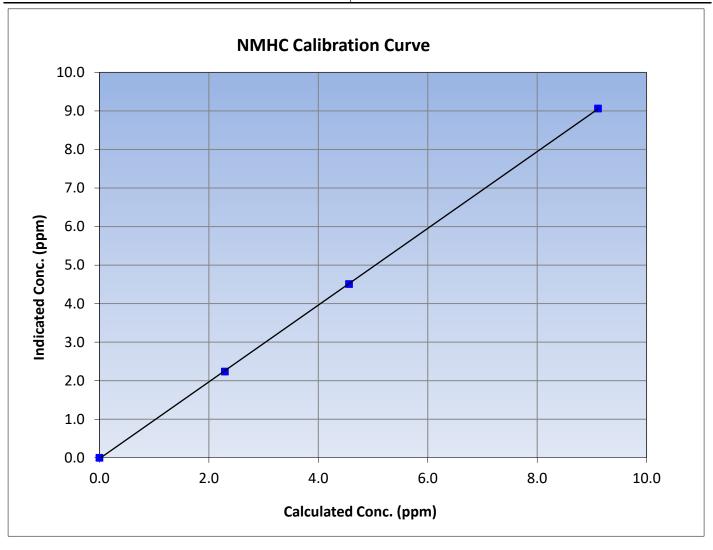
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

March 7, 2024 Calibration Date: **Previous Calibration:** February 3, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:15 End Time (MST): 14:37 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999969	≥0.995
9.11	9.07	1.0053	Correlation Coemicient	0.555505	20.333
4.56	4.51	1.0121	Slope	0.995954	0.90 - 1.10
2.29	2.24	1.0248	Slope		0.90 - 1.10
			Intercept	-0.023403	+/-0.5

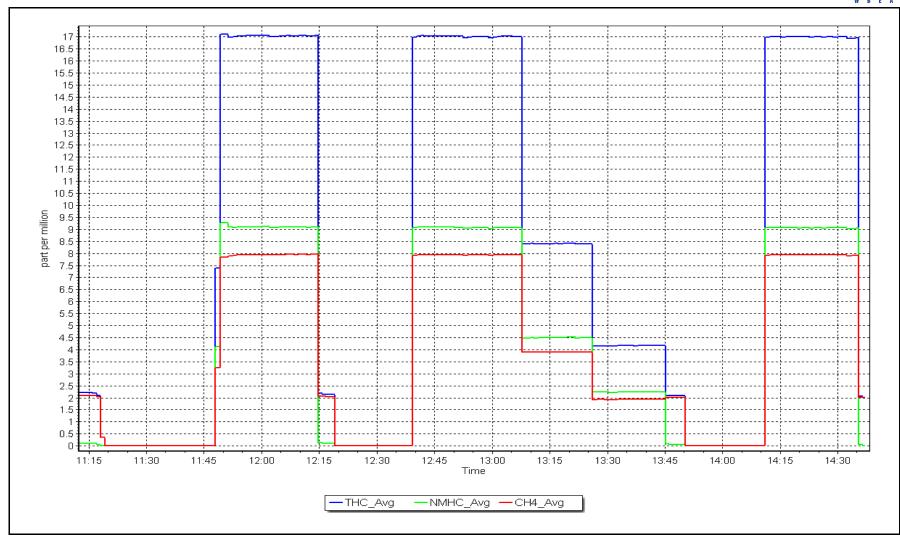


**NMHC Calibration Plot** 

Date: March 7, 2024

Location: Anzac







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Anzac

Calibration Date: March 14, 2024

Start time (MST): 10:34
Reason: Routine

Station number: AMS14

Last Cal Date: February 6, 2024

End time (MST): 15:25

NO gas Diff:

### **Calibration Standards**

NO Gas Cylinder #: DT0037092 Cal Gas Expiry Date: May 16, 2031

NOX Cal Gas Conc: 60.7 ppm NO Cal Gas Conc: 60.4 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 60.7 ppm Removed Gas NO Conc: 60.4 ppm

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3060 ZAG make/model: Teledyne API 701H Serial Number: 357

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1426262592

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.411 1.411 NO bkgnd or offset: 3.8 3.8 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 3.8 3.8 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 160.0 160.0

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.001051	0.993607
NO <sub>x</sub> Cal Offset:	-0.650468	-0.629791
NO Cal Slope:	1.006866	0.999912
NO Cal Offset:	-1.970746	-2.109531
NO <sub>2</sub> Cal Slope:	0.997816	0.994068
NO <sub>2</sub> Cal Offset:	-1.058817	-1.527274



# $NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilution (	Calibration Data	a				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as found span	4934	66.3	804.8	800.9	4.0	802.3	798.8	3.4	1.0032	1.0026
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4934	66.3	804.8	800.9	4.0	799.2	799.5	-0.2	1.0070	1.0017
second point	4985	33.2	401.6	399.6	2.0	398.6	397.0	1.7	1.0075	1.0066
third point	5004	16.7	201.9	200.9	1.0	199.0	196.4	2.6	1.0146	1.0229
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4934	66.3	804.8	416.8	388.1	800.0	414.3	385.8	1.0060	1.0059
							Average (	Correction Factor	1.0097	1.0104
Corrected As fo	ound NO <sub>X</sub> =	802.4 ppb	NO =	799.0 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO <sub>X</sub> =	-0.3%
Previous Respon	nse NO <sub>X</sub> =	805.0 ppb	NO =	804.4 ppb				*Percent Chang	ge NO =	-0.7%
Baseline Corr 2r	nd pt $NO_X = N$	IA ppb	NO =	NA ppb	As foun	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt $NO_X = N$	IA ppb	NO =	NA ppb	As foun	d NO $r^2$ :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	

### **GPT Calibration Data**

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	796.2	412.1	388.1	385.0	1.0080	99.2%
2nd GPT point (200 ppb O3)	796.2	608.4	191.8	188.5	1.0174	98.3%
3rd GPT point (100 ppb O3)	796.2	701.6	98.6	94.7	1.0409	96.1%
			Av	verage Correction Factor	1.0221	97.9%

Notes:

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Mohammed Kashif



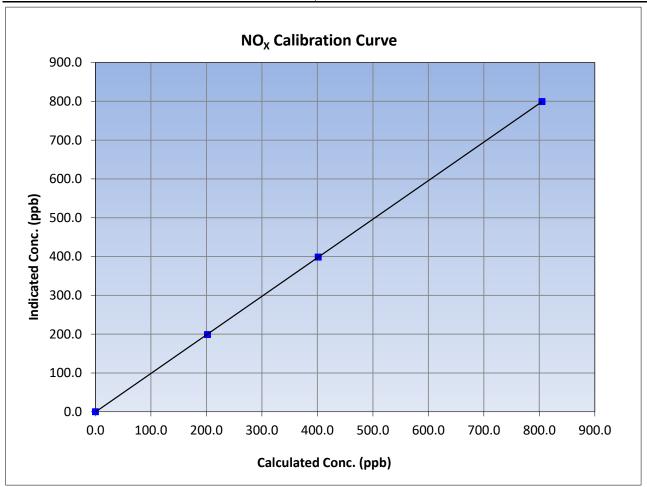
# NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 6, 2024 Station Name: Station Number: AMS14 Anzac Start Time (MST): 10:34 End Time (MST): 15:25 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
804.8	799.2	1.0070	Correlation Coefficient	0.999990	20.333
401.6	398.6	1.0075	Slope	0.993607	0.90 - 1.10
201.9	199.0	1.0146	Slope		
			Intercept	-0.629791	+/-20





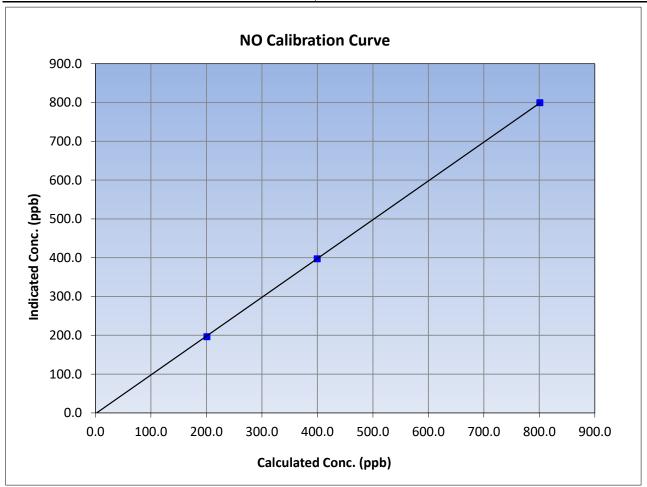
### **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 6, 2024 Station Name: Station Number: AMS14 Anzac Start Time (MST): 10:34 End Time (MST): 15:25 Analyzer make: Analyzer serial #: Thermo 42i 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999970	≥0.995
800.9	799.5	1.0017	Correlation Coefficient	0.555570	20.333
399.6	397.0	1.0066	Slope	0.999912	0.90 - 1.10
200.9	196.4	1.0229	Slope	0.999912	0.90 - 1.10
			Intercept	-2.109531	+/-20





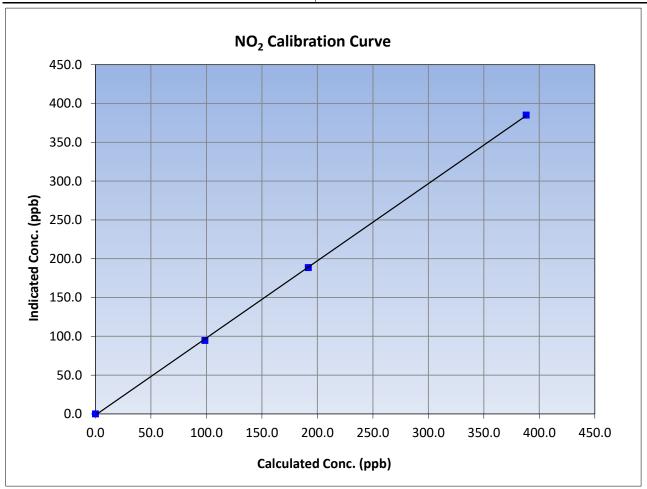
# NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 14, 2024 Previous Calibration: February 6, 2024 Station Name: Station Number: AMS14 Anzac Start Time (MST): 10:34 End Time (MST): 15:25 Analyzer serial #: Analyzer make: Thermo 42i 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999917	≥0.995
388.1	385.0	1.0080	Correlation Coefficient	0.555517	20.993
191.8	188.5	1.0174	Slope	0.994068	0.90 - 1.10
98.6	94.7	1.0409	Slope	0.994008	0.50 - 1.10
			Intercept	-1.527274	+/-20

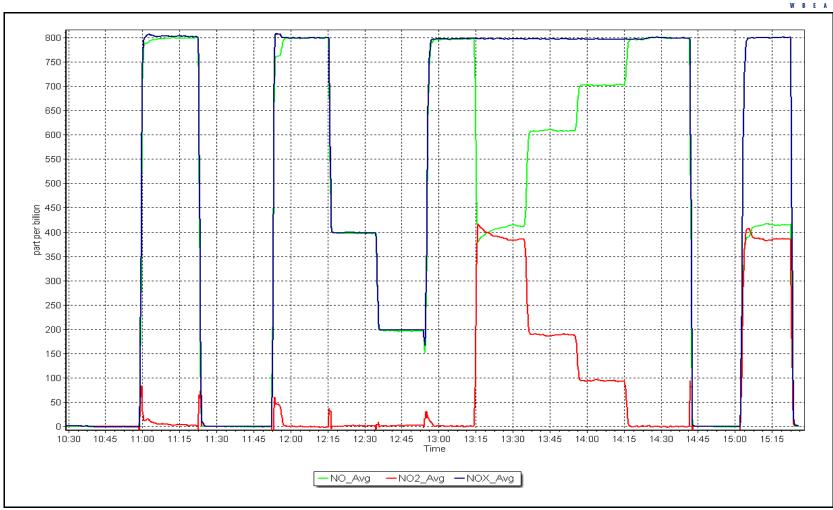


NO<sub>x</sub> Calibration Plot

Date: March 14, 2024

Location: Anzac







# O<sub>3</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Anzac

Calibration Date: March 6, 2024

Start time (MST): 11:54
Reason: Routine

Station number: AMS14

Last Cal Date: February 5, 2024

End time (MST): 14:34

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: API T700 Serial Number: 3060 ZAG Make/Model: API 701H Serial Number: 357

**Analyzer Information** 

Analyzer make: Thermo 49i Analyzer serial #: 1426262595

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 0.999057 1.004629 1.4 1.4 0.840000 Coeff or Slope: Calibration intercept: -0.260000 1.620 1.620

O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.7	
as found span	5000	918.8	400.0	403.2	0.992
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.7	
high point	5000	918.8	400.0	402.4	0.994
second point	5000	803.8	200.0	202.5	0.988
third point	5000	709.8	100.0	101.0	0.990
as left zero	5000	0.0	0.0	0.4	
as left span	5000	918.8	400.0	403.9	0.990
			Averag	ge Correction Factor	0.991
Baseline Corr As found:	402.5	Previous response	e 399.4	*% change	0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope	:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	:		

Sample inlet filter changed after as founds. No adjustments required.

Calibration Performed By: Mohammed Kashif

Notes:

\* = > +/-5% change initiates investigation



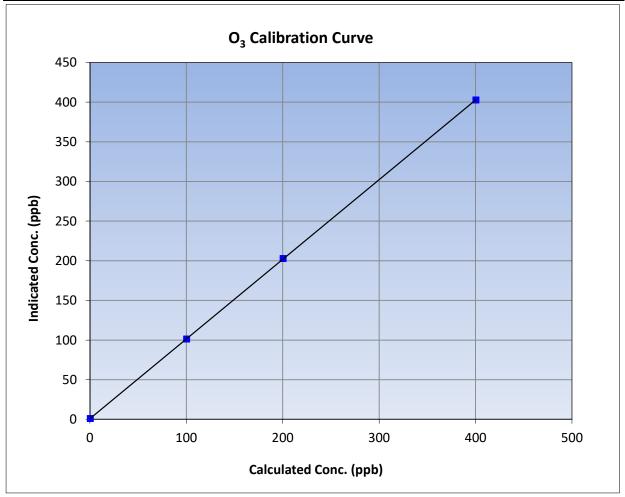
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 5, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:54 End Time (MST): 14:34 Analyzer make: Thermo 49i Analyzer serial #: 1426262595

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.7		Correlation Coefficient	0.999992	≥0.995		
400.0	402.4	0.9940	correlation coefficient	0.555552			
200.0	202.5	0.9877	Slope	1.004629	0.90 - 1.10		
100.0	101.0	0.9901	Зюре	1.004029	0.90 - 1.10		
			- Intercept	0.840000	+/- 5		

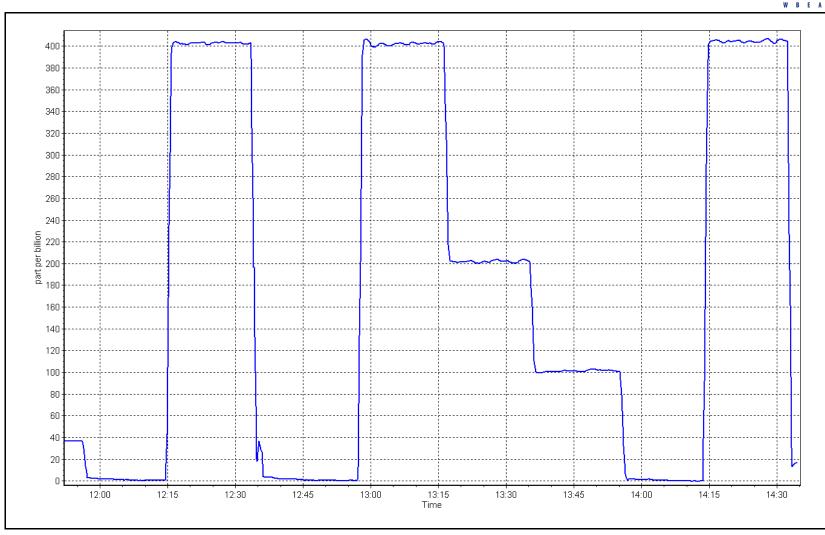


O<sub>3</sub> Calibration Plot

Date: March 6, 2024

Location: Anzac







# **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informatio	n		
Station Name:	Anzac		Station number:		
Calibration Date: Start time (MST):	March 27, 2024 12:49		End time (MST):	February 26, 2024 13:08	
Analyzer Make: Particulate Fraction:	AP T640 PM2.5		S/N:	825	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		•	388749 388749	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-5.8	-6.11	-5.8		+/- 2 °C
P (mmHg)	712.1	713.18	712.1		+/- 10 mmHg
Flow (LPM)	5.00	4.975	5.00		+/- 0.25 LPM
PW% (pump)	40		40		>80%
Zero Verification	PM w/o HEPA:	3.1	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be PM Inlet observation :	completed before the Inlet Head Clean	Alig	gnment Factor On :	aintenance leak check	
		Quarterly Calibration	Test		
SPAN DUST	Refractive Index: Lot No.:		Expiry Date:		
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					+/- 0.5
Date Optical Cham	ber Cleaned:	December (	6, 2023		
Date Disposable Fi	lter Changed:	December (	6, 2023	•	
Post- maintenance Zero Ver	rification:	PM w/ HEPA:		<0.2 ug/m3	
		Annual Maintenand	ce		
Date Sample Tub	oo Cloanod:	July 6. 2	022		
Date RH/T Senso		July 6, 2 July 6, 2			
Notes:		No adjustments made.	Leak check passed.	. Head cleaned.	
Calibration by:	Mohammed Kashif	-	·		



# **Wind Speed/Direction Calibration Report**

Version-10-2022

### **Station Information**

Station Name: Anzac Station Number: AMS 14

Calibration Date: March 11, 2024 Prev Cal Date: August 23, 2023

Start Time (MST): 10:00 End Time (MST): 13:16
Tower Height (m): 20.0 Reason: Routine

#### **Wind Speed Information**

Sensor make/model: Met One 010C-1 Serial Number: E5132
WS Calibrator: MetOne 053 Serial Number: CA05231

			% Error
Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	Limit = +/- 1.5%
0	0.0	0.0	
200	20.2	20.2	0.2%
400	39.4	39.4	0.1%
600	58.6	58.6	0.1%
800	77.8	77.8	0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		1.000000	≥0.9995
Calculated slope		0.999465	0.90 - 1.10
Calculated intercept		-0.013446	+/- 2

### **Wind Direction Information**

Sensor make/model: Met One 020C-1 Serial Number: Z1048

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 13:34 Calc Declination\*: 13.23 Degrees

Deadband calc: -1.1 degrees (Limit 4 deg) \*- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	1.0	
90	89.9	0.0%
180	180.0	0.0%
270	270.6	0.2%
356	359.1	0.9%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999972	≥0.9995
Calculated slope		0.994477	0.90 - 1.10
Calculated intercept		0.072574	+/- 4

Performed WS and WD calibration. Noticed that the screw at the bottom or the 180-degree notch at the top of the WD sensor was not precisely facing south; instead, it was off by 20 degrees towards the SW. Realigned the WD so that the screw/180-degree notch is now facing south. The WS bearings seem to be in good condition.

Notes:

Calibration Performed By: Mohammed Kashif and Max Farrell



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS17 WAPASU MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024

# W R E A

### **Wood Buffalo Environmental Association**

# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Wapasu Station number: AMS17

Calibration Date: March 6, 2024 Last Cal Date: February 6, 2024

Start time (MST): 11:10 End time (MST): 14:18

Reason: Routine

#### **Calibration Standards**

Cal Gas Concentration: 50.38 ppm Cal Gas Exp Date: January 12, 2029

Cal Gas Cylinder #: ALM066507

Removed Cal Gas Conc: 50.38 ppm Rem Gas Exp Date: n/a

Removed Gas Cyl #:  $\underline{n/a}$  Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: API 701H Serial Number: 359

### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 1218153459

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:1.0014381.003695Backgd or Offset:13.413.2

Calibration intercept: -1.359391 -1.998962 Coeff or Slope: 1.111 1.098

### SO<sub>2</sub> Calibration Data

Set Point	Set Point Dilution air flow rate (sccm)		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05	
as found zero	5000	0.0	0.0	0.2		
as found span	4921	79.4	800.0	808.0	0.990	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.0	0.1		
high point	4921	79.4	800.0	802.5	0.997	
second point	4960	39.7	400.0	396.9	1.008	
third point	4980	19.8	199.5	197.2	1.012	
as left zero	5000	0.0	0.0	0.4		
as left span	4920	79.4	800.1	801.8	0.998	
·			Averag	ge Correction Factor	1.005	
Baseline Corr As found:	807.80	Previous response	799.76	*% change	1.0%	

Baseline Corr As found: 807.80 Previous response 799.76 \*% change 1.0%
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

\* = > +/-5% change initiates investigation



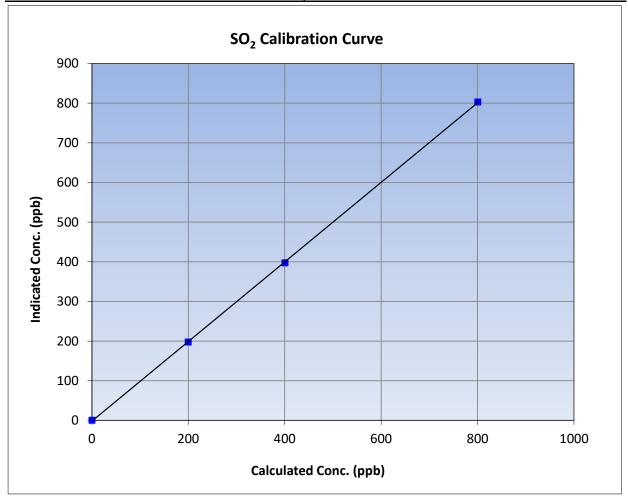
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 6, 2024 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:10 End Time (MST): 14:18 Analyzer make: Thermo 43i Analyzer serial #: 1218153459

Calibration Data									
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999958	≥0.995				
800.0	802.5	0.9968	Correlation Coefficient	0.555550	20.993				
400.0	396.9	1.0079	Slope	1.003695	0.90 - 1.10				
199.5	197.2	1.0117	Slope	1.003093	0.90 - 1.10				
			- Intercept	-1.998962	+/-30				



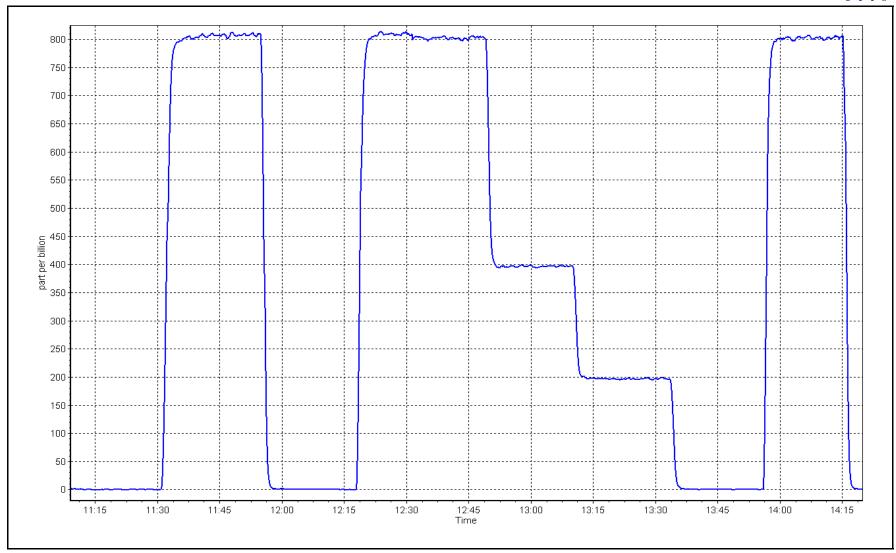
**SO2 Calibration Plot** 

Date:

March 6, 2024

Location: Wapasu







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Wapasu Station Name:

Calibration Date: March 12, 2024

Start time (MST): 10:12 Reason:

Routine

Station number: AMS17

> Last Cal Date: February 12, 2024

End time (MST): 15:15

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: September 16, 2024 5.076 ppm

Cal Gas Cylinder #: CC511852

Removed Cal Gas Conc: 5.076 Rem Gas Exp Date: n/a ppm Removed Gas Cyl #: Diff between cyl: n/a

Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: **API T701H** Serial Number: 359

**Analyzer Information** 

Analyzer make: Thermo 450i Analyzer serial #: 1218153583

Converter serial #: n/a Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish Start** <u>Finish</u> 1.010139 0.995282 Backgd or Offset: 11.7 Calibration slope: 12.2 0.220812 0.340790 Calibration intercept: Coeff or Slope: 1.096 1.114

### H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.3	
as found span	4921	78.8	80.0	82.5	0.973
as found 2nd point	4961	39.4	40.0	40.8	0.988
as found 3rd point	4980	19.7	20.0	20.2	1.005
new cylinder response					

### H<sub>2</sub>S Calibration Data

Set Point	Set Point Dilution air flow rate (sccm)		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.6	
high point	4921	78.8	80.0	80.1	0.999
second point	4961	39.4	40.0	40.0	1.000
third point	4980	19.7	20.0	20.0	1.000
as left zero	5000	0.0	0.0	0.8	
as left span	4921	78.8	80.0	79.5	1.006
SO2 Scrubber Check	4921	79.4	800.0	-0.2	
Date of last scrubber chang	ge:	n/a	•	Ave Corr Factor	1.000
Date of last converter effic	iency test:	n/a			efficiency

Date of last scrubber change	:	n/a		Ave Corr Factor	1.000	
Date of last converter efficiency test:		n/a		efficiency		
Baseline Corr As found:	82.2	Prev response:	81.03	*% change:	1.4%	

Baseline Corr 2nd AF pt: 40.5 AF Slope: 1.029425 Baseline Corr 3rd AF pt: 19.9 AF Correlation: 0.999899

\* = > +/-5% change initiates investigation

AF Intercept:

Span adjusted. Notes:

Calibration Performed By: Aswin Sasi Kumar -0.079189



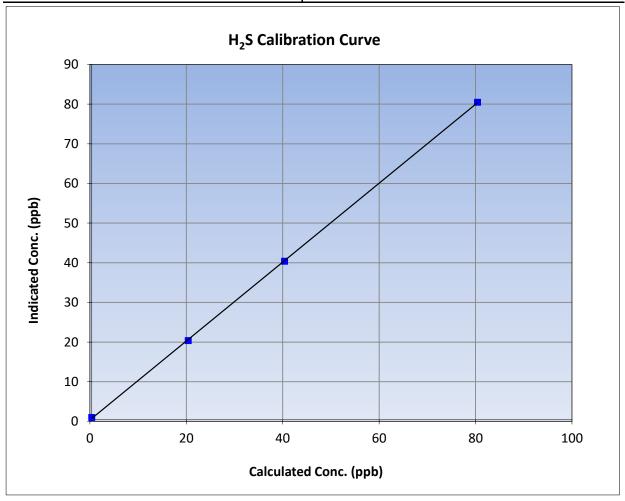
# H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 12, 2024 Station Name: 2024-03-12 Station Number: Wapasu Start Time (MST): 10:12 End Time (MST): 15:15 Analyzer make: Thermo 450i Analyzer serial #: 1218153583

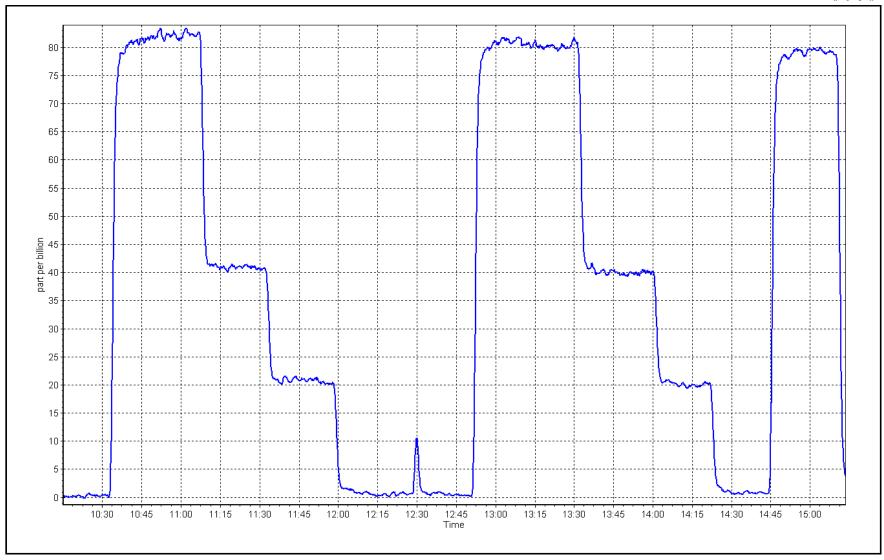
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.6		Correlation Coefficient	0.999951	≥0.995				
80.0	80.1	0.9988	Correlation coefficient	0.555551	20.333				
40.0	40.0	0.9999	Slope	0.995282	0.90 - 1.10				
20.0	20.0	1.0000	Slope	0.993262	0.90 - 1.10				
			- Intercept	0.340790	+/-3				



Date: March 12, 2024

Location: Wapasu





# **THC Calibration Report**

Version-01-2020

**Station Information** 

Station Name: Wapasu

March 6, 2024 Calibration Date:

Start time (MST): 11:10

Routine Reason:

Station number: AMS17

> Last Cal Date: February 6, 2024

End time (MST):

14:18

**Calibration Standards** 

ALM066507 Gas Cert Reference: Cal Gas Expiry Date: January 12, 2029

CH4 Cal Gas Conc. 503.5 ppm CH4 Equiv Conc. 1076.3 ppm

C3H8 Cal Gas Conc. 208.3 ppm

Removed Gas Cert: n/a Removed Gas Expiry: n/a

Removed CH4 Conc. 503.5 CH4 Equiv Conc. 1076.3 ppm ppm

Removed C3H8 Conc. Diff between cyl: 208.3 ppm

Calibrator Make/Model: **API T700** Serial Number: 2449 ZAG Make/Model: **API 701H** Serial Number: 359

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 0.992396 0.992946 3.020 3.020

0.028821 Coefficient: Calibration intercept: 0.034435 4.390 4.390

**THC Calibration Data** 

Set Point Dilution air flow rate (sccm)		Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.05	
as found span	4921	79.4	17.09	17.07	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.09	
high point	4921	79.4	17.09	17.09 17.04	
second point	4960	39.7	8.55	8.45	1.011
third point	4980	19.8	4.26	4.23	1.008
as left zero	5000	0.0	0.00	0.04	
as left span	4921	79.4	17.09	17.09	1.000
			Aver	age Correction Factor	1.007
Baseline Corr As found:	17.02	Previous response	17.00	*% change	0.1%

Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



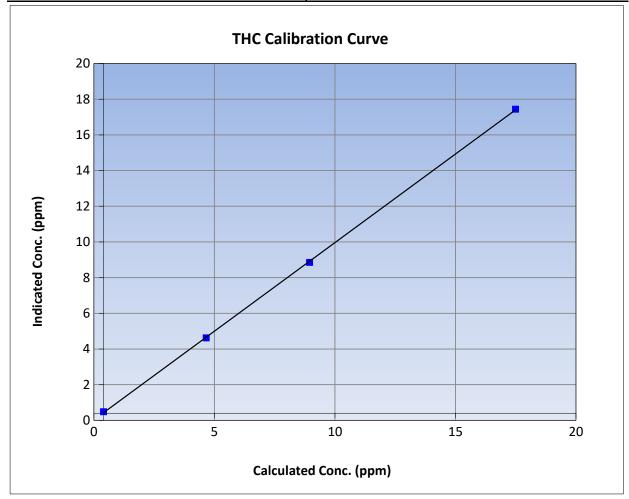
# **THC Calibration Summary**

Version-01-2020

### **Station Information**

**Previous Calibration:** Calibration Date: March 6, 2024 February 6, 2024 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:10 End Time (MST): 14:18 Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352

Calibration Data								
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.09		Correlation Coefficient	0.999939	≥0.995			
17.09	17.04	1.0031	Correlation Coefficient	0.999939	20.993			
8.55	8.45	1.0109	Slope	0.992946	0.90 - 1.10			
4.26	4.23	1.0084	Slope	0.332340	0.90 - 1.10			
			- Intercept	0.028821	+/-1.5			



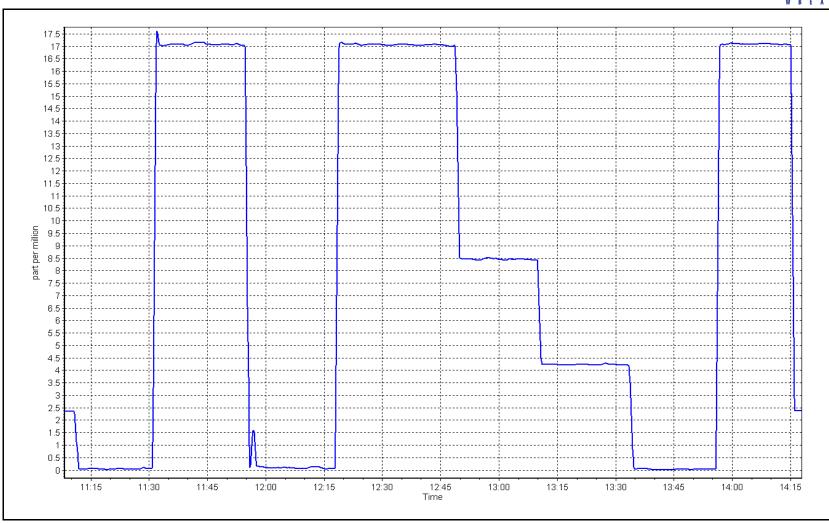
**THC Calibration Plot** 

Date:

March 6, 2024

Location: Wapasu







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

NO gas Diff:

Version-04-2020

#### **Station Information**

Station Name: Wapasu Station number: AMS17

Calibration Date: March 26, 2024 Last Cal Date: February 13, 2024

Start time (MST): 6:47 End time (MST): 11:06

Reason: Routine

### **Calibration Standards**

NO Gas Cylinder #: T375YK8 Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: 49.11 ppm NO Cal Gas Conc: 48.07 ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NOX Conc: 49.11 ppm Removed Gas NO Conc: 48.07 ppm

NOX gas Diff:

Calibrator Model: API T700 Serial Number: 2449 ZAG make/model: API T701H Serial Number: 359

### **Analyzer Information**

Analyzer make: Thermo Scientific 42iQ Analyzer serial #: 12300522720

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.264 1.345 NO bkgnd or offset: 8.1 9.7 NOX coeff or slope: 0.986 0.994 NOX bkgnd or offset: 9.8 8.1 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 386.5 386.5

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.998991	1.004319
NO <sub>x</sub> Cal Offset:	-5.260000	-4.540000
NO Cal Slope:	1.001959	1.001930
NO Cal Offset:	-5.660000	-5.200000
NO <sub>2</sub> Cal Slope:	0.995634	1.007870
NO <sub>2</sub> Cal Offset:	-1.245592	1.467173



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.8	0.0		
as found span	4917	83.2	817.2	799.9	17.3	774.3	761.2	13.1	1.0554	1.0508
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2		
high point	4917	83.2	817.2	799.9	17.3	819.3	799.7	19.6	0.9974	1.0002
second point	4958	41.6	408.6	399.9	8.7	400.8	390.3	10.5	1.0194	1.0247
third point	4979	20.8	204.3	200.0	4.3	198.2	191.7	6.6	1.0308	1.0431
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1		
as left span	4917	83.2	817.2	393.7	423.5	828.1	399.9	428.2	0.9868	0.9844
							Average C	orrection Factor	1.0159	1.0227
Corrected As fo	ound NO <sub>X</sub> =	775.1 ppb	NO =	762.0 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO <sub>X</sub> =	-4.6%
Previous Respo	nse NO <sub>X</sub> =	811.1 ppb	NO =	795.8 ppb				*Percent Chang	ge NO =	-4.4%
Baseline Corr 2r	nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$d NO_X r^2$	:	Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d NO r <sup>2</sup>	:	NO SI:	NO Int:	
					As found	d $NO_2 r^2$	:	NO2 SI:	NO <sub>2</sub> Int:	
				G	PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		cated NO Drop centration (ppb)	Calculated NC concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found (	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
as found GPT poir	nt (200 ppb NO2)									
as found GPT poir	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	807.1		400.9	423.5		427.5	0.9907	7	L00.9%
2nd GPT point	(200 ppb O3)	807.1		601.6	222.8		226.5	0.9837	7 1	L01.7%
2 and CDT and last	(100 ppb O3)	807.1		706.5	117.9		122.3	0.9641	1	L03.7%

Notes:

Diagonstics similar to last month. Zero and Span adjusted.

Average Correction Factor

0.9795

Calibration Performed By:

Melissa Lemay

102.1%



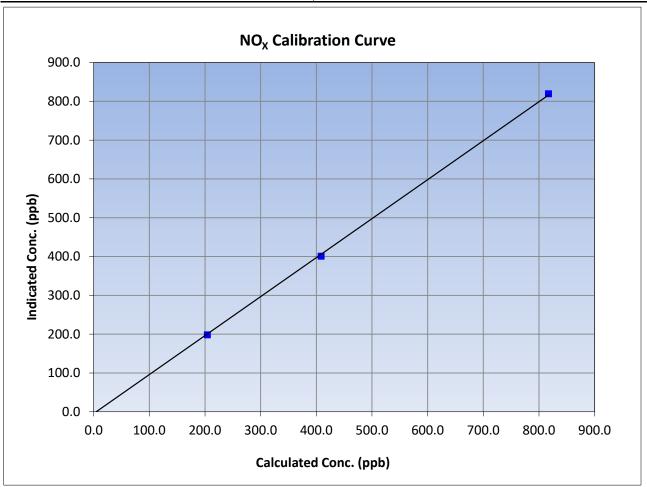
### NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 13, 2024 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 6:47 End Time (MST): 11:06 Analyzer serial #: Analyzer make: Thermo Scientific 42iQ 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999838	≥0.995
817.2	819.3	0.9974	Correlation Coefficient	0.555656	20.993
408.6	400.8	1.0194	Slope	1.004319	0.90 - 1.10
204.3	198.2	1.0308	Siope	1.004519	0.90 - 1.10
			Intercept	-4.540000	+/-20





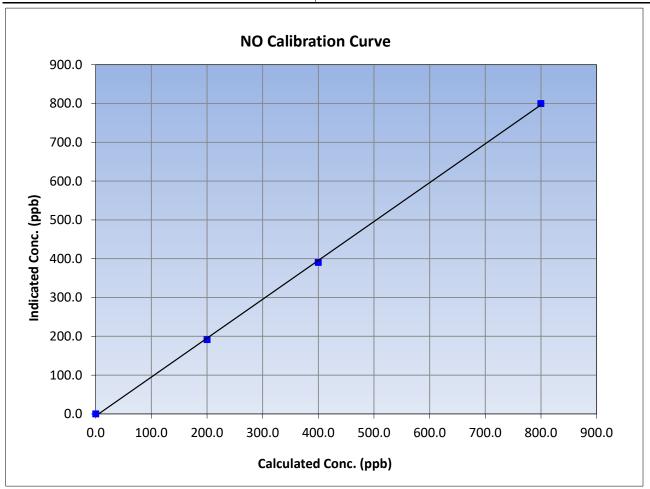
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 13, 2024 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 6:47 End Time (MST): 11:06 Analyzer make: Thermo Scientific 42iQ Analyzer serial #: 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999777	≥0.995
799.9	799.7	1.0002	Correlation Coefficient	0.555111	20.333
399.9	390.3	1.0247	Slope	1.001930	0.90 - 1.10
200.0	191.7	1.0431	Slope	1.001930	0.90 - 1.10
			Intercept	-5.200000	+/-20





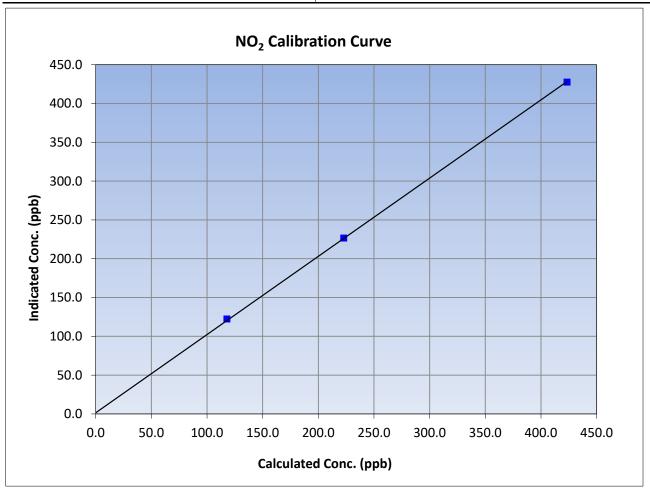
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

February 13, 2024 Calibration Date: March 26, 2024 Previous Calibration: Station Name: Station Number: AMS17 Wapasu Start Time (MST): 6:47 End Time (MST): 11:06 Analyzer serial #: Analyzer make: Thermo Scientific 42iQ 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999922	≥0.995
423.5	427.5	0.9907	Correlation Coefficient	0.333322	20.995
222.8	226.5	0.9837	Slope	1.007870	0.90 - 1.10
117.9	122.3	0.9641	Slope	1.007670	0.90 - 1.10
			Intercept	1.467173	+/-20

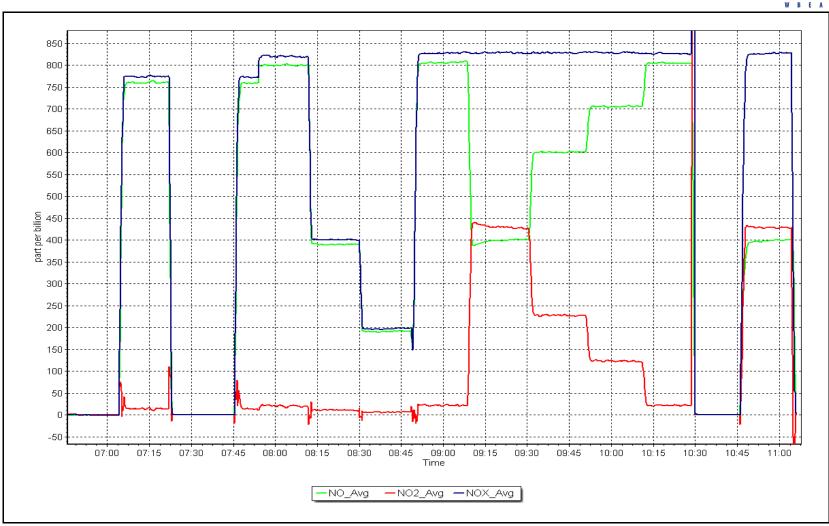


NO<sub>x</sub> Calibration Plot

Date: March 26, 2024

Location: Wapasu







# O<sub>3</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Wapasu

Calibration Date: March 11, 2024

Start time (MST): 10:43
Reason: Routine

Station number: AMS17

Last Cal Date: February 9, 2024

End time (MST): 14:02

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: API T701H Serial Number: 359

**Analyzer Information** 

Analyzer make: API T400 Analyzer serial #: 3870

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.006914 1.000657 -1.8 -1.8 -0.340000 Coeff or Slope: 1.013 Calibration intercept: -0.560000 1.027

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	
as found span	5000	1077.3	400.0	403.8	0.991
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.2	
high point	5000	1077.3	400.0	400.2	1.000
second point	5000	900.3	200.0	199.5	1.003
third point	5000	789.5	100.0	99.2	1.008
as left zero	5000	0.0	0.0	0.2	
as left span	5000	1077.3	400.0	403.8	0.991
			Avera	ge Correction Factor	1.003
Baseline Corr As found:	403.8	Previous respons	e 402.2	*% change	0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

\* = > +/-5% change initiates investigation

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



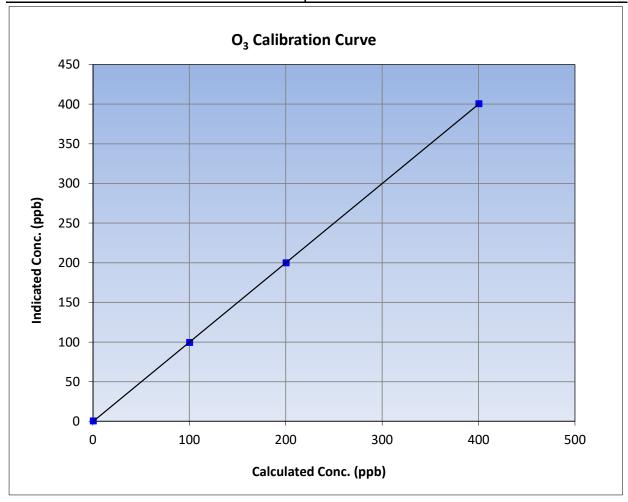
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 11, 2024 **Previous Calibration:** February 9, 2024 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:43 End Time (MST): 14:02 Analyzer make: **API T400** Analyzer serial #: 3870

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999992	≥0.995	
400.0	400.2	0.9995	Correlation coefficient	0.333332	20.993	
200.0	199.5	1.0025	Slope	1.000657	0.90 - 1.10	
100.0	99.2	1.0081	Slope	1.000037	0.90 - 1.10	
			Intercept	-0.340000	+/- 5	

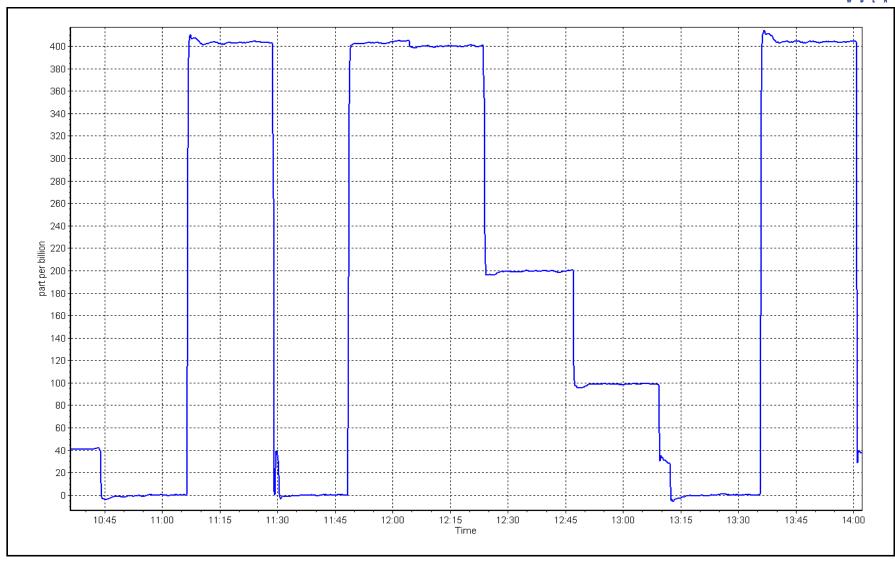


O<sub>3</sub> Calibration Plot

Date: March 11, 2024

Location: Wapasu







### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Information	n		
Station Name: Calibration Date: Start time (MST):	Wapasu March 26, 2024 6:49		Station number: AN Last Cal Date: Fe End time (MST): 7:2	bruary 15, 2024	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N: 11	83	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		S/N: 38 S/N: 38		
		Monthly Calibration T	est		
<u>Parameter</u> T (°C) P (mmHg) Flow (LPM)	<u>As found</u> -5.6 710.5 5.00	<u>Measured</u> -5.4 713.4 4.97	<u>As left</u> -5.6 710.5 5.00	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg
PW% (pump)	3.00	4.97	3.00		+/- 0.25 LPM >80%
Zero Verification	PM w/o HEPA:	6.5	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be PM Inlet observation :  SPAN DUST  Parameter PMT Peak Test	Refractive Index: Lot No.: As found		nment Factor On :	Adjusted	(Limits) +/- 0.5
Date Optical Cham	ber Cleaned:	February 13	3, 2024		
Date Disposable Fil	ter Changed:	February 13	3, 2024		
Post- maintenance Zero Ver	ification:	PM w/ HEPA:		<0.2 ug/m3	
		Annual Maintenand	ee		
Date Sample Tub Date RH/T Senso	-				
Notes:		No adjustments	done. Leak Check Pa	ssed.	
Calibration by:	Melissa Lemay				



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS18 STONY MOUNTAIN MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



### SO<sub>2</sub> Calibration Report

Version-01-2020

**Finish** 

#### **Station Information**

Station Name: Stony Mountain

March 1, 2024 Calibration Date:

Start time (MST): 12:27 Routine Reason:

Station number: **AMS 18** 

February 1, 2024 Last Cal Date:

End time (MST): 16:39

#### **Calibration Standards**

Cal Gas Concentration: 49.40

Cal Gas Cylinder #: CC463851

Removed Cal Gas Conc: 49.40 Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API 701H Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 2658 Serial Number: 360

### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

ppm

ppm

Analyzer Range 0 - 1000 ppb

**Finish** Start Calibration slope: 1.000733 Backgd or Offset: 1.002503 Calibration intercept: -0.043083

22.9 22.9 0.800 0.276595 Coeff or Slope: 0.800

Start

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	0.2	
as found span	4919	81.0	800.3	797.4	1.004
as found 2nd point	4959	40.5	400.2	398.3	1.005
as found 3rd point	4979	20.2	199.6	197.4	1.011
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4919	81.0	800.3	801.1	0.999
second point	4959	40.5	400.2	401.2	0.997
third point	4979	20.2	199.6	199.3	1.002
as left zero	5000	0.0	0.0	0.7	
as left span	4919	81.0	800.3	804.2	0.995
·			Avera	ge Correction Factor	0.999
1: 0 4 5 1	707.00		000.04	*0/ 1	0.60/

Baseline Corr As found: 797.20 Previous response 802.24 \*% change -0.6% Baseline Corr 2nd AF pt: 398.10 AF Slope: 0.996778 AF Intercept: -0.564209 AF Correlation: 0.99995 Baseline Corr 3rd AF pt: 197.20

\* = > +/-5% change initiates investigation

Notes: Inlet filter changed after as founds. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



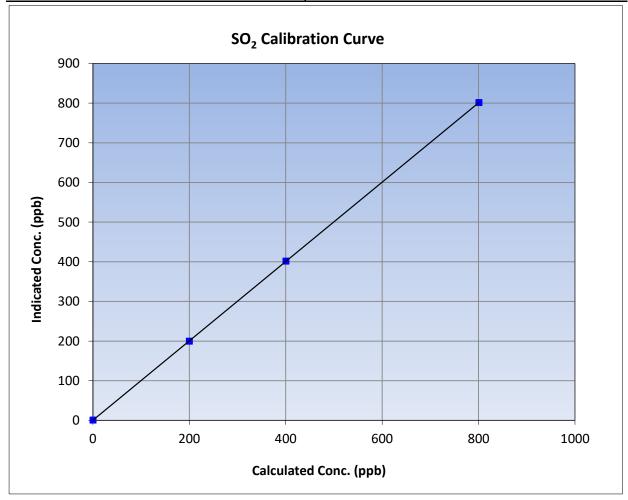
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 1, 2024 **Previous Calibration:** February 1, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 12:27 End Time (MST): 16:39 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.6		Correlation Coefficient	0.999998	≥0.995		
800.3	801.1	0.9990	Correlation Coefficient	0.555556	20.993		
400.2	401.2	0.9975	Slope	1.000733	0.90 - 1.10		
199.6	199.3	1.0015	Slope	1.000733	0.90 - 1.10		
			Intercept	0.276595	+/-30		



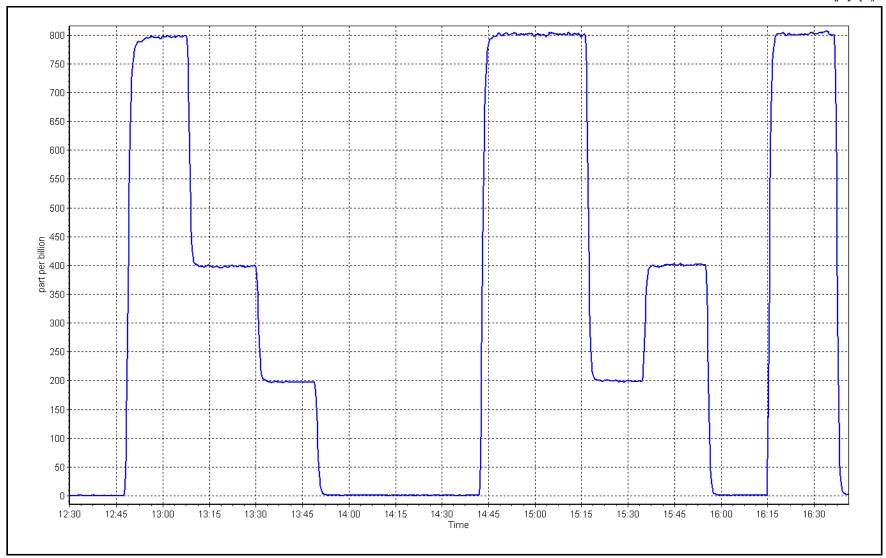
**SO2 Calibration Plot** 

Date:

March 1, 2024

Location: Stony Mountain





# W B E A

ZAG Make/Model:

### **Wood Buffalo Environmental Association**

### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Stony Mountain Calibration Date: March 27, 2024

Start time (MST): 10:13
Reason: Routine

Station number: AMS18

Last Cal Date: February 15, 2024

360

End time (MST): 14:50

Serial Number:

**Calibration Standards** 

Cal Gas Concentration: 5.479 ppm Cal Gas Exp Date: January 4, 2025

Cal Gas Cylinder #: CC500395

Removed Cal Gas Conc: 5.479 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl: Calibrator Make/Model: Teledyne API T700 Serial Number: 2658

Teledyne API T701

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

Converter make: CD Nova CDN-101 Converter serial #: 555

Analyzer Range 0 - 100 ppb

Start **Finish Start** <u>Finish</u> Calibration slope: 0.995441 1.002157 Backgd or Offset: 2.66 2.66 0.240997 Calibration intercept: 0.301088 Coeff or Slope: 1.157 1.157

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.2	
as found span	4927	73.0	80.0	82.0	0.978
as found 2nd point	4964	36.5	40.0	41.2	0.975
as found 3rd point	4983	18.3	20.0	20.4	0.992
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4927	73.0	80.0	80.4	0.995
second point	4964	36.5	40.0	40.4	0.990
third point	4983	18.3	20.0	20.2	0.992
as left zero	5000	0.0	0.0	0.4	
as left span	4927	73.0	80.0	79.9	1.001
SO2 Scrubber Check	4923	77.1	771.0	0.1	
Date of last scrubber chan	ge:	17-Dec-21		Ave Corr Factor	0.992
Date of last converter effic		efficiency			

Baseline Corr As found: 81.8 79.93 2.3% Prev response: \*% change: Baseline Corr 2nd AF pt: 0.100632 41.0 AF Slope: 1.024019 AF Intercept: Baseline Corr 3rd AF pt: 20.2 AF Correlation: 0.999977

\* = > +/-5% change initiates investigation

Notes: Scrubber check completed after calibrator zero. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



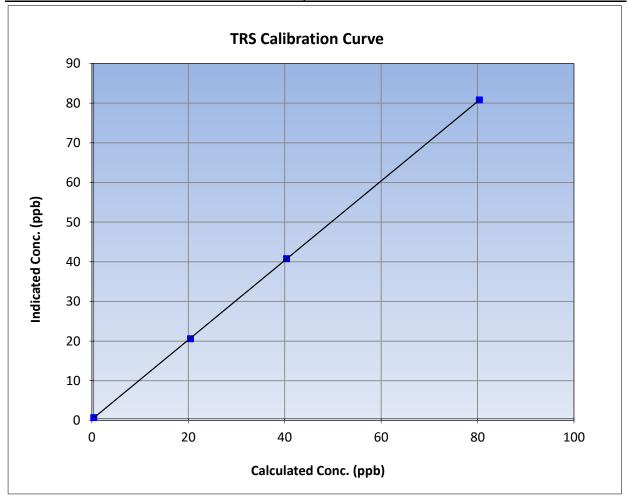
### **TRS Calibration Summary**

Version-11-2021

### **Station Information**

Calibration Date: March 27, 2024 **Previous Calibration:** February 15, 2024 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 10:13 End Time (MST): 14:50 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

Calibration Data							
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evaluation		<u>Limits</u>		
0.0	0.3		Correlation Coefficient	0.999992	≥0.995		
80.0	80.4	0.9949	Correlation Coefficient	0.999992	20.993		
40.0	40.4	0.9899	Slope	1.002157	0.90 - 1.10		
20.0	20.2	0.9925	Slope	1.002137	0.90 - 1.10		
			- Intercept	0.240997	+/-3		

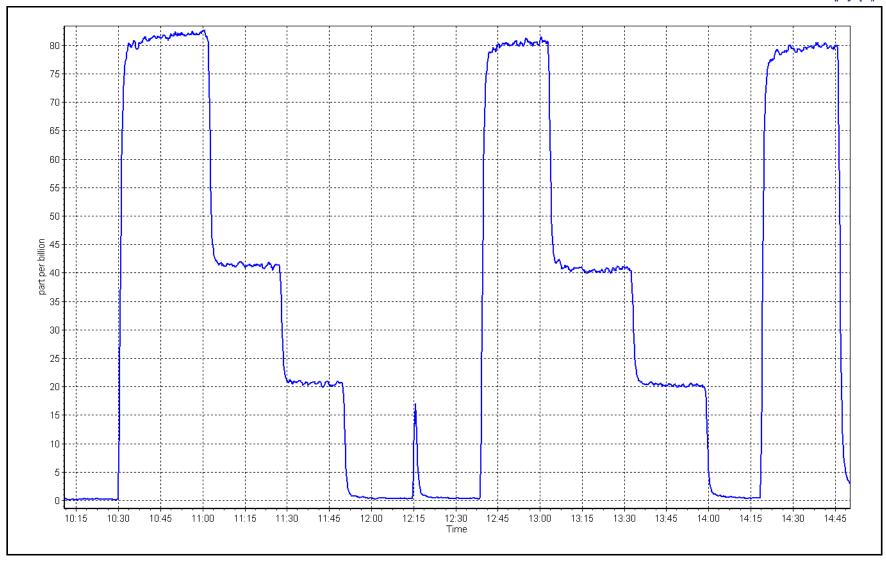




Date: March 27, 2024

Location: Stony Mountain







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Stony Mountain

Calibration Date: March 1, 2024

Start time (MST): 12:27
Reason: Routine

Station number: AMS 18

Last Cal Date: February 1, 2024

End time (MST): 16:39

### **Calibration Standards**

Gas Cert Reference: CC463851 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC): Diff between cyl (CH $_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 2658
ZAG make/model: Teledyne API T701H Serial Number: 360

### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Analyzer serial #: 1193585647

**Finish** Start Start Finish CH4 SP Ratio: 2.88E-04 3.10E-04 NMHC SP Ratio: 5.97E-05 5.89E-05 CH4 Retention time: 15.8 16.2 NMHC Peak Area: 153566 156523 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc	:) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.09	
as found span	4919	81.0	17.28	16.25	1.064
as found 2nd point	4959	40.5	8.64	8.28	1.044
as found 3rd point	4979	20.2	4.31	4.15	1.038
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.0	17.28	17.35	0.996
second point	4959	40.5	8.64	8.73	0.990
third point	4979	20.2	4.31	4.37	0.986
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	17.28	17.51	0.987
			A۱	verage Correction Factor	0.991
Baseline Corr AF:	16.16	Prev response	17.18	*% change	-6.3%
Baseline Corr 2nd AF:	8.2	AF Slope:	0.935180	AF Intercept:	0.123368
Baseline Corr 3rd AF:	4.1	AF Correlation:	0.999947	* = > +/-5% change initiat	es investigation



as found zero

as found span

high point

third point

second point

as found 2nd point

as found 3rd point

new cylinder response calibrator zero

Set Point

Dil air flow rate

5000

4919

4959

4979

5000

4919

4959

4979

# **Wood Buffalo Environmental Association**

# THC / CH<sub>4</sub> / NMHC Calibration Report

2.29

Version-06-2022

0.991

Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
0.0	0.00	0.00	
81.0	9.17	9.02	1.017
40.5	4.58	4.50	1.018
20.2	2.29	2.26	1.010
			_
0.0	0.00	0.00	
81.0	9.17	9.22	0.995
40.5	4.58	4.64	0.988

2.31

1.005151

0.009635

as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	9.17	9.25	0.991
			Ave	erage Correction Factor	0.991
Baseline Corr AF:	9.02	Prev response	9.09	*% change	-0.9%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.982616	AF Intercept:	0.004996
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999995	* = > +/-5% change initiates	investigation

20.2

**NMHC Calibration Data** 

### **CH4 Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.09			
as found span	4919	81.0	8.11	7.23	1.122		
as found 2nd point	4959	40.5	4.06	3.77	1.075		
as found 3rd point	4979	20.2	2.02	1.89	1.071		
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4919	81.0	8.11	8.14	0.997		
second point	4959	40.5	4.06	4.10	0.991		
third point	4979	20.2	2.02	2.02 2.06			
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.0	8.11	8.26	0.982		
			Aver	age Correction Factor	0.989		
Baseline Corr AF:	7.15	Prev response	8.09	*% change	-13.2%		
Baseline Corr 2nd AF:	3.69	AF Slope:	0.881432	AF Intercept:	0.118371		
Baseline Corr 3rd AF:	1.80	AF Correlation:	0.999693	* = > +/-5% change initiat	es investigation		
		Calibration	Statistics				
		<u>Start</u>		<u>Finish</u>			
THC Cal Slope:		0.993093		1.003678			
THC Cal Offset:		0.015393		0.027639			
CH4 Cal Slope:		0.997044		1.002169			
CH4 Cal Offset:		-0.003610	0.018204				

0.989722

0.019003

Zero at 0.08 ppm. Span points had dips present and CH4 span was 12% low. Re-did zero

chromatogram to adjust zero. Calibrated span to adjust RT.

Calibration Performed By: Aswin Sasi Kumar

NMHC Cal Slope:

NMHC Cal Offset:

Notes:



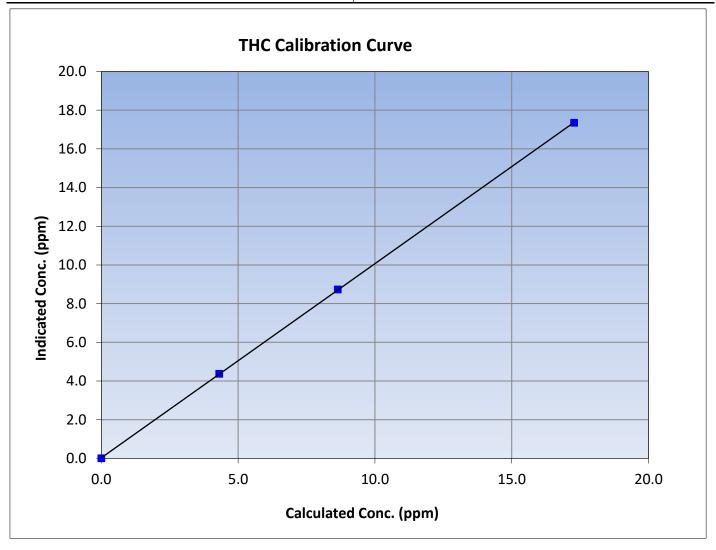
# **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 1, 2024 Calibration Date: **Previous Calibration:** February 1, 2024 Station Name: **AMS 18** Stony Mountain Station Number: Start Time (MST): 12:27 End Time (MST): 16:39 Analyzer make: Thermo 55i Analyzer serial #: 1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
17.28	17.35	0.9959	Correlation Coefficient	0.555560	20.333
8.64	8.73	0.9896	Slope	1.003678	0.90 - 1.10
4.31	4.37	0.9864	Slope	1.003076	0.90 - 1.10
			Intercept	0.027639	+/-0.5





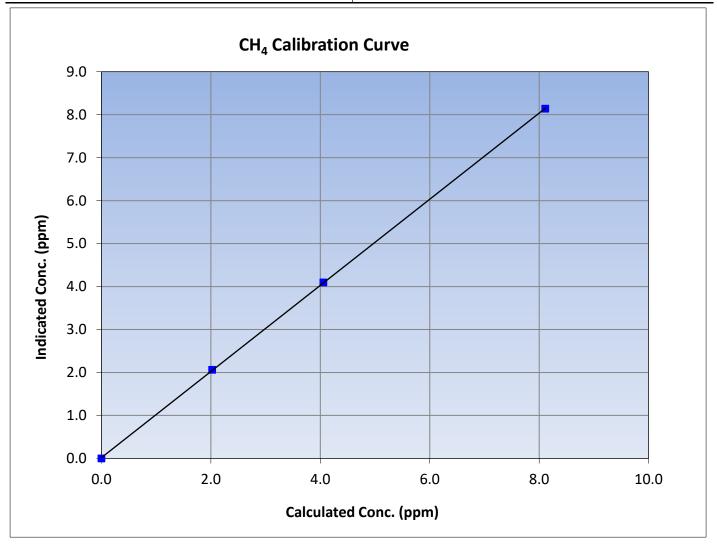
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 1, 2024 **Previous Calibration:** February 1, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 12:27 End Time (MST): 16:39 Analyzer make: Analyzer serial #: Thermo 55i 1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient 0.999977		≥0.995
8.11	8.14	0.9968	Correlation Coefficient	0.999977	20.993
4.06	4.10	0.9907	Slope	1.002169	0.90 - 1.10
2.02	2.06	0.9809	Slope	1.002109	0.90 - 1.10
			Intercept	0.018204	+/-0.5





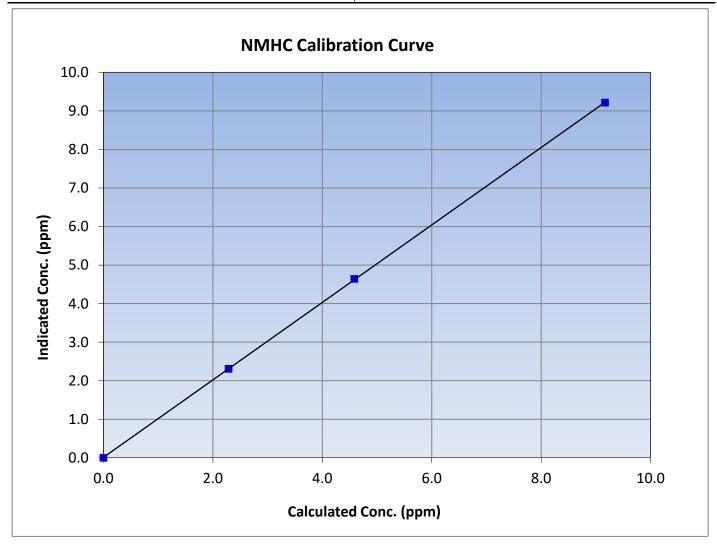
# **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

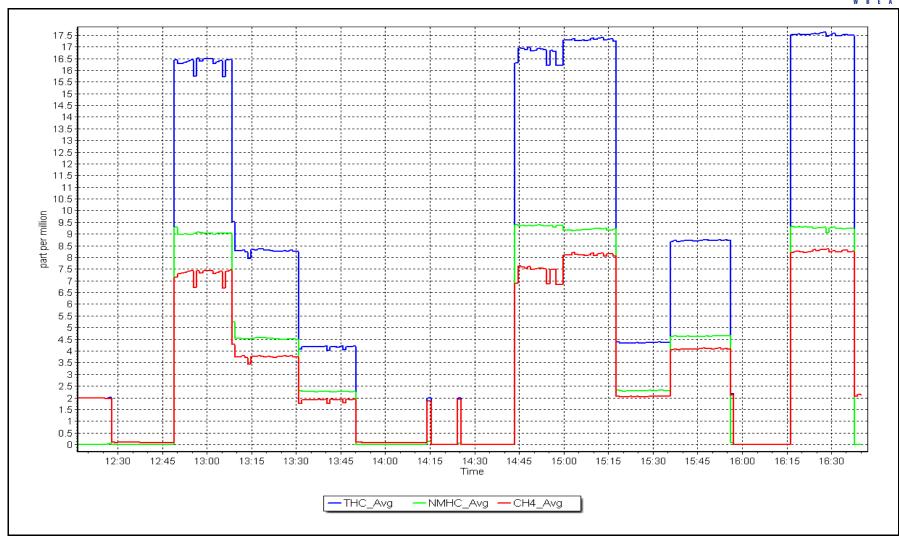
Calibration Date: March 1, 2024 **Previous Calibration:** February 1, 2024 Station Name: **AMS 18** Stony Mountain Station Number: Start Time (MST): 12:27 End Time (MST): 16:39 Analyzer make: Thermo 55i Analyzer serial #: 1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
9.17	9.22	0.9949	Correlation Coemicient	0.999960	20.993
4.58	4.64	0.9883	Slope	1.005151	0.90 - 1.10
2.29	2.31	0.9912	Slope	1.005151	0.90 - 1.10
			Intercept	0.009635	+/-0.5



NMHC Calibration Plot Date: March 1, 2024 Location: Stony Mountain







# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

ppm

#### **Station Information**

Station Name: Stony Mountain Calibration Date: March 15, 2024

Start time (MST): 11:18

Reason: Cylinder Change

Station number: AMS 18

Last Cal Date: March 1, 2024

End time (MST): 13:23

### **Calibration Standards**

Gas Cert Reference: CC463851 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.8 ppm CH4 Equiv Conc. 1066.8

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC): Diff between cyl (CH $_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701H Serial Number: 360

#### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm

Analyzer serial #: 1193585647

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 3.10E-04 3.10E-04 NMHC SP Ratio: 5.89E-05 5.89E-05 CH4 Retention time: 16.2 16.2 NMHC Peak Area: 156523 156523 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.04	
as found span	4919	81.0	17.28 16.88		1.024
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.08	
high point	4919	81.0	17.28	16.68	1.036
second point					
third point					
as left zero					
as left span					

				Average Correction Factor	1.036
Baseline Corr AF:	16.84	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

0.15.1	-u . a	NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	4.042
as found span	4919	81.0	9.17	9.05	1.013
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.0	9.17	8.94	1.025
second point					
third point					
as left zero					
as left span					
				age Correction Factor	1.025
Baseline Corr AF:	9.05	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.04	
as found span	4919	81.0	8.11	7.83	1.036
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.08	
high point	4919	81.0	8.11	7.74	1.049
second point					
third point					
as left zero					
as left span					
us tere spari			Aver	age Correction Factor	1.049
Baseline Corr AF:	7.79	Prev response	NA	*% change	NA NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
basenine con Sia Ai.	IVA	Calibration	Statistics	, , , , , , , , , , , , , , , , , , , ,	<u> </u>
			Jialistics	Einich	
THE Call Class at		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		NA		NA	
THC Cal Offset:		NA		NA	
CH4 Cal Slope:		NA		NA	
CH4 Cal Offset:		NA		NA	
NMHC Cal Slope:		NA		NA	

Notes: H2 cylinder change

NA

Calibration Performed By: Moahmmed Kashif

NMHC Cal Offset:

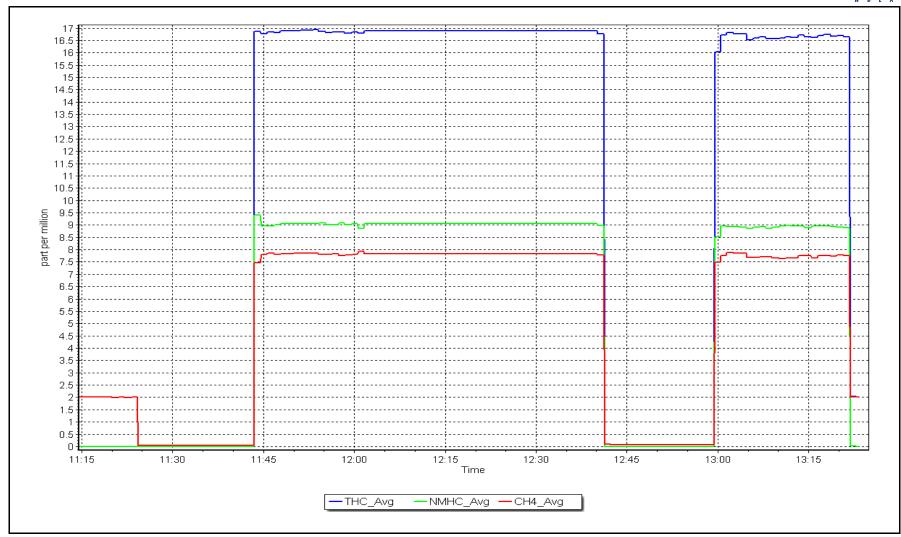
NA

**NMHC Calibration Plot** 

Date: March 15, 2024

Location: Stony Mountain







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Stony Mountain

Calibration Date: March 26, 2024

Start time (MST): 10:15
Reason: Routine

Station number: AMS 18

Last Cal Date: February 21, 2024

End time (MST): 15:06

#### **Calibration Standards**

NO Gas Cylinder #: T26DHGA Cal Gas Expiry Date: November 17, 2026

NOX Cal Gas Conc: 48.28 ppm NO Cal Gas Conc: 47.58 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 48.28 ppm Removed Gas NO Conc: 47.58 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701 Serial Number: 13779

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1336160088

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.104 1.119 NO bkgnd or offset: 3.1 3.1 NOX coeff or slope: 0.995 0.994 NOX bkgnd or offset: 3.1 3.2 NO2 coeff or slope: 0.999 0.999 Reaction cell Press: 253.2 254.7

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.001950	0.998146
NO <sub>x</sub> Cal Offset:	-1.100000	-0.500000
NO Cal Slope:	1.001421	0.998819
NO Cal Offset:	-1.260000	-0.600000
NO <sub>2</sub> Cal Slope:	1.009656	0.999802
NO <sub>2</sub> Cal Offset:	1.192503	0.793514



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)		Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correctio factor (Cc/lc Limit = 0.95-1.
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as found span	4916	84.0	811.1	799.3	11.8	800.8	787.8	12.9	1.0129	1.0147
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1		
high point	4916	84.0	811.1	799.3	11.8	809.1	797.8	11.3	1.0025	1.0019
second point	4958	42.0	405.6	399.7	5.9	404.8	399.2	5.5	1.0019	1.0012
third point	4979	21.0	202.8	199.8	2.9	200.9	197.8	3.2	1.0093	1.0103
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4916	84.0	811.1	370.3	440.8	824.0	371.2	452.4	0.9843	0.9977
							Average C	orrection Factor	1.0046	1.0045
Corrected As fo	ound NO <sub>X</sub> =	800.9 ppb	NO	= 788.0 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO <sub>x</sub> =	-1.3%
Previous Respo	onse NO <sub>X</sub> =	811.6 ppb	NO	= 799.2 ppb				*Percent Chang	ge NO =	-1.4%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO	= NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO <sub>x</sub> =	NA ppb	NO	= NA ppb	As found	$1   NO r^2$ :		NO SI:	NO Int:	
	, ,				As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Reconcentration		dicated NO Drop ncentration (ppb)	Calculated NC concentration (pp		dicated NO2 tration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	I GPT zero									
as found GPT po	int (400 ppb NO2)									
as found GPT po	int (200 ppb NO2)									
as found GPT po	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	796.8		367.8	440.8		440.9	0.9997		100.0%
2nd GPT poin	it (200 ppb O3)	796.8		587.9	220.7		222.4	0.9922	:	100.8%

115.1

116.1

Average Correction Factor

Notes: Span adjusted.

693.5

Calibration Performed By: Aswin Sasi Kumar

3rd GPT point (100 ppb O3)

796.8

100.9%

100.6%

0.9910

0.9943



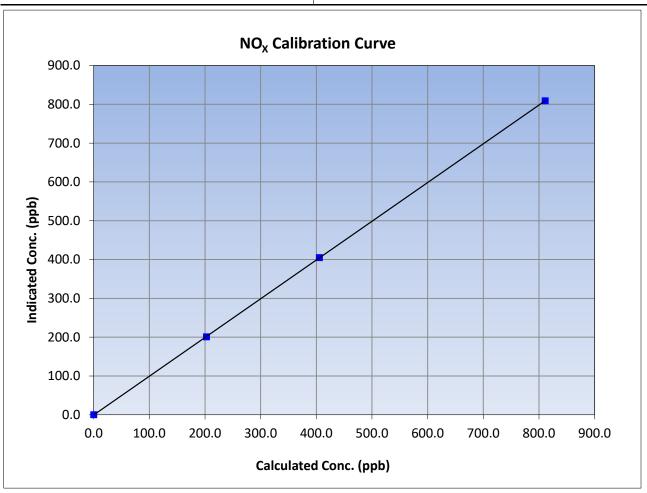
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 21, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 10:15 End Time (MST): 15:06 Analyzer serial #: Analyzer make: Thermo 42i 1336160088

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
811.1	809.1	1.0025	Correlation Coefficient	0.999990	20.333
405.6	404.8	1.0019	Slope	0.998146	0.90 - 1.10
202.8	200.9	1.0093	Slope	0.996140	0.90 - 1.10
			Intercept	-0.500000	+/-20





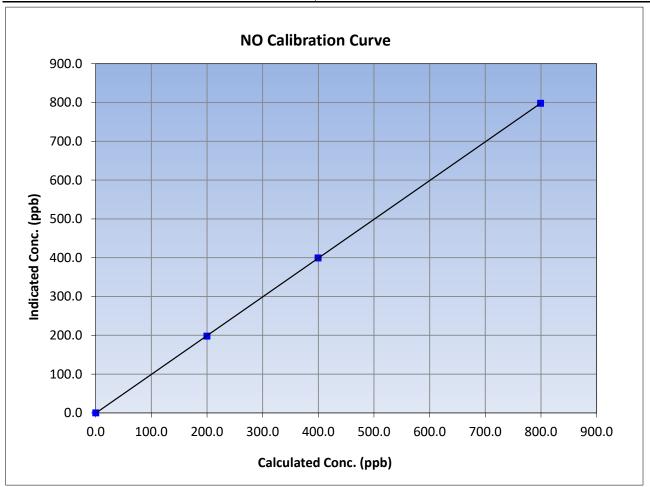
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 21, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 10:15 End Time (MST): 15:06 Analyzer make: Thermo 42i Analyzer serial #: 1336160088

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999994	≥0.995
799.3	797.8	1.0019	Correlation Coefficient	0.555554	20.333
399.7	399.2	1.0012	Slope	0.998819	0.90 - 1.10
199.8	197.8	1.0103	Slope	0.556615	0.90 - 1.10
			Intercept	-0.600000	+/-20





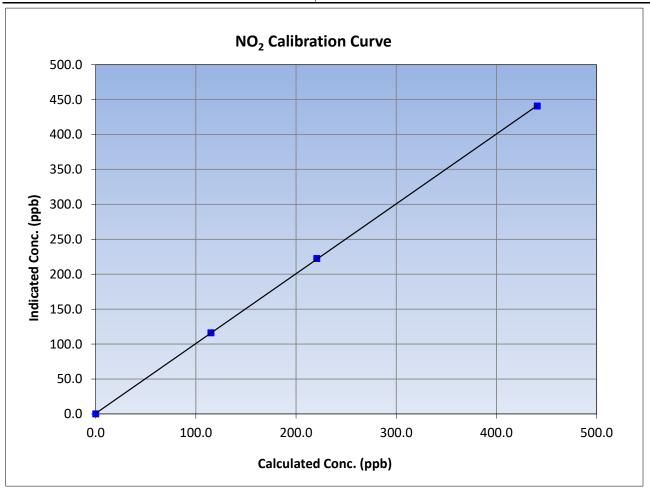
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 21, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 10:15 End Time (MST): 15:06 Analyzer serial #: Analyzer make: Thermo 42i 1336160088

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999982	≥0.995
440.8	440.9	0.9997	Correlation Coefficient	0.555562	20.333
220.7	222.4	0.9922	Slope	0.999802 0.90	0.90 - 1.10
115.1	116.1	0.9910	Slope	0.999602	0.90 - 1.10
			Intercept	0.793514	+/-20

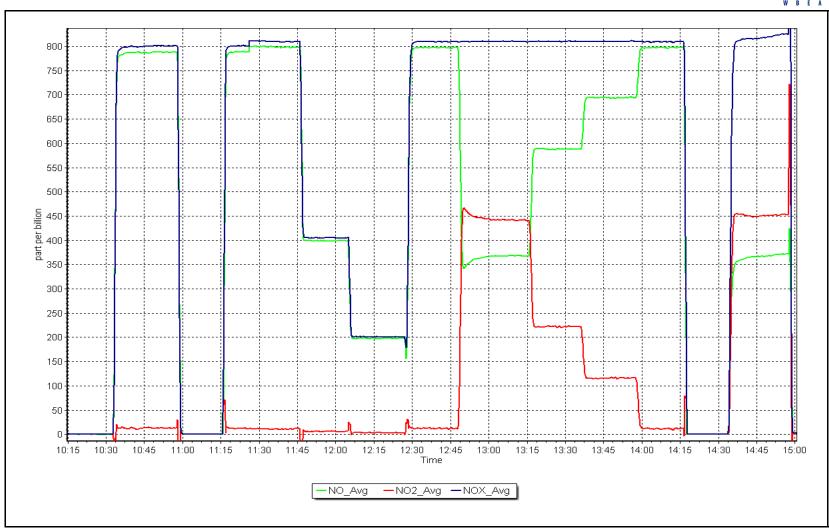


NO<sub>x</sub> Calibration Plot

Date: March 26, 2024

Location: Stony Mountain







# O<sub>3</sub> Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: March 20, 2024

Start time (MST): 10:39 Reason: Routine Station number: AMS18

Last Cal Date: February 14, 2024

End time (MST): 13:44

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 ZAG Make/Model: Teledyne API 701H Serial Number: 360

**Analyzer Information** 

Analyzer make: API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 825

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.002057 0.995743 0.3 0.3 Coeff or Slope: Calibration intercept: 0.340000 0.220000 0.982 0.982

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	NA	0.0	0.1	
as found span	4804	1141.9	400.0	400.0	1.000
as found 2nd point					
as found 3rd point					
calibrator zero	5000	NA	0.0	0.1	
high point	4888	1138.1	400.0	398.3	1.004
second point	4888	884.5	200.0	199.9	1.001
third point	4888	741.4	100.0	99.6	1.004
as left zero	5000	NA	0.0	0.5	
as left span	4812	1097.9	400.0	401.7	0.996
			Avera	ge Correction Factor	1.003
Baseline Corr As found:	399.9	Previous respons	e 401.2	*% change	-0.3%
Baseline Corr 2nd AF nt	NA	AF Slone	٠.	AF Intercent:	

Baseline Corr 2nd AF pt: AF Slope: NΑ AF Intercept: Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



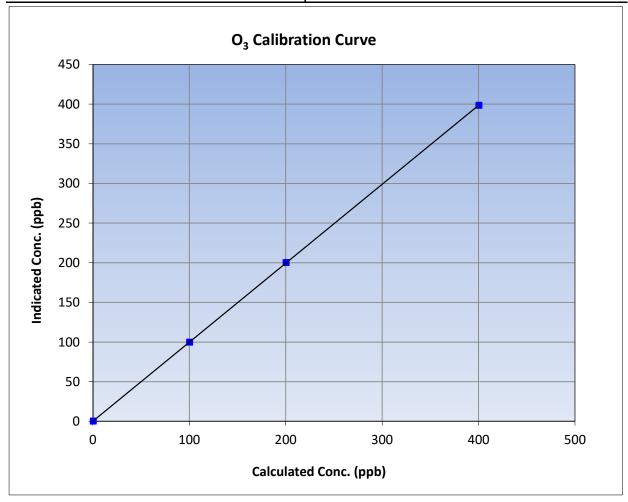
# O<sub>3</sub> Calibration Summary

Version-01-2020

### **Station Information**

Calibration Date: March 20, 2024 **Previous Calibration:** February 14, 2024 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 10:39 End Time (MST): 13:44 Analyzer make: **API T400** Analyzer serial #: 825

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999996	≥0.995		
400.0	398.3	1.0043	Correlation Coefficient	0.555550	20.333		
200.0	199.9	1.0005	Slope	0.995743	0.90 - 1.10		
100.0	99.6	1.0040	Slope	0.333743	0.90 - 1.10		
			Intercept	0.220000	+/- 5		

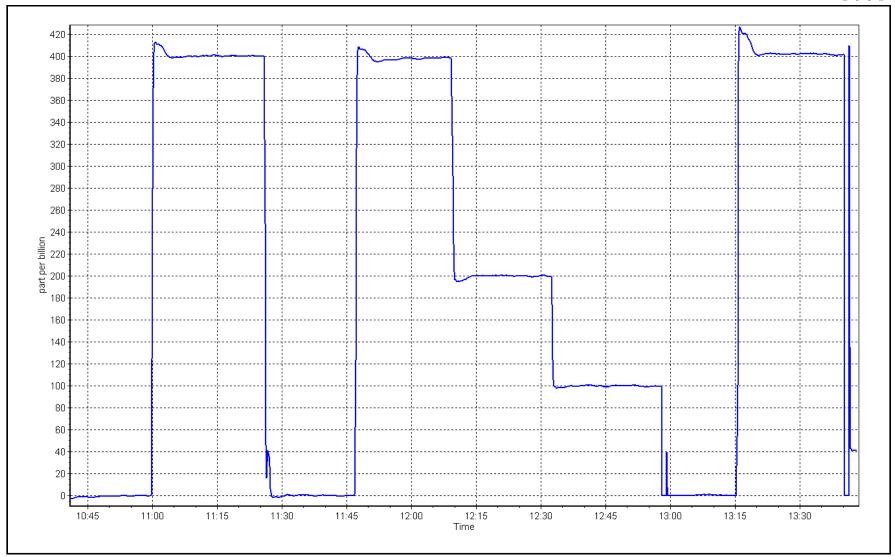


O<sub>3</sub> Calibration Plot

Date: March 20, 2024

Location: Stony Mountain







### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

Station Information							
Station Name:	Stony Mountain		Station number: AN	1S 18			
Calibration Date:	March 27, 2024		Last Cal Date: Fel	February 21, 2024			
Start time (MST):	13:13	End time (MST): 14:30					
Analyzer Make:	API T640		S/N: 11	62			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	Alicat FP-25BT	S/N: 388748					
Temp/RH standard:	Alicat FP-25BT	S/N: 388748					
		Monthly Calibration	Test				
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)		
T (°C)	-6	-5.7	-6		+/- 2 °C		
P (mmHg)	696.3	696.19	696.3		+/- 10 mmHg		
Flow (LPM)	4.94	5.03	4.94		+/- 0.25 LPM		
PW% (pump)	39		39		>80%		
Zero Verification	PM w/o HEPA:	4.1	PM w/ HEPA:	0.0	<0.2 ug/m3		
Note: this leak check will be PM Inlet observation :	Inlet Head Clean	Ali	gnment Factor On :	✓			
		Quarterly Calibration	lest				
SPAN DUST	Refractive Index:	10.9	Expiry Date:	October 10, 2	024		
	Lot No.:	100128-050-042					
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)		
PMT Peak Test	N/A	N/A			+/- 0.5		
Date Optical Chamber Cleaned: February 21, 2024							
Date Disposable Fil	-	February 21, 2024					
Post- maintenance Zero Verification:		PM w/ HEPA:		<0.2 ug/m3			
		Annual Maintenan	се				
Data Sample Tuh	o Cleaned:	August 30	1 2022				
Date Sample Tube Cleaned:  Date RH/T Sensor Cleaned:		August 30, 2022 August 30, 2022					
Notes:		Flow, pressure and to	emp checked. Leak che	ck passed.			
Calibration by:	Aswin Sasi Kumar						



### **CO Calibration Report**

Version-01-2020

**Station Information** 

Station Name: Stony Mountain

Calibration Date: March 14, 2024

Start time (MST): 10:10

Reason: Routine

Station number: AMS 18

Last Cal Date: February 5, 2024

End time (MST): 13:21

**Calibration Standards** 

Cal Gas Concentration: 3,080 ppm Cal Gas Exp Date: November 4, 2028

Cal Gas Cylinder #: EB0065608

Removed Cal Gas Conc: 3,080 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 ZAG Make/Model: Teledyne API T701H Serial Number: 355

**Analyzer Information** 

Analyzer make: API T300 Analyzer serial #: 3504

Analyzer Range: 0 - 50 ppm

third point

as left zero

as left span

Start Finish Finish Start Calibration slope: 0.989898 0.996462 Backgd or Offset: -0.010 -0.010 Calibration intercept: 0.085783 0.037795 Coeff or Slope: 0.901 0.905

Calculated Correction factor Indicated concentration Dilution air flow rate Source gas flow rate Set Point concentration (ppm) (Cc/Ic) (sccm) (sccm) (ppm) (Ic) (Cc) Limit = 0.95-1.050.0 as found zero 5000 0.0 0.1 4933 66.7 41.1 40.9 1.004 as found span as found 2nd point as found 3rd point new cylinder response calibrator zero 0.0 0.0 5000 0.0 ---high point 4933 66.7 41.1 40.9 1.005 second point 4966 33.3 20.5 20.7 0.993

**CO Calibration Data** 

Baseline Corr As found: 40.82 Prev response: 40.76 \*% change: 0.1%
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:
Baseline Corr 3rd AF pt: NA AF Correlation:

16.7

0.0

66.7

\* = > +/-5% change initiates investigation

10.3

0.0

41.1

10.2

0.0

41.0

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

4983

5000

4933

1.005

----

1.003



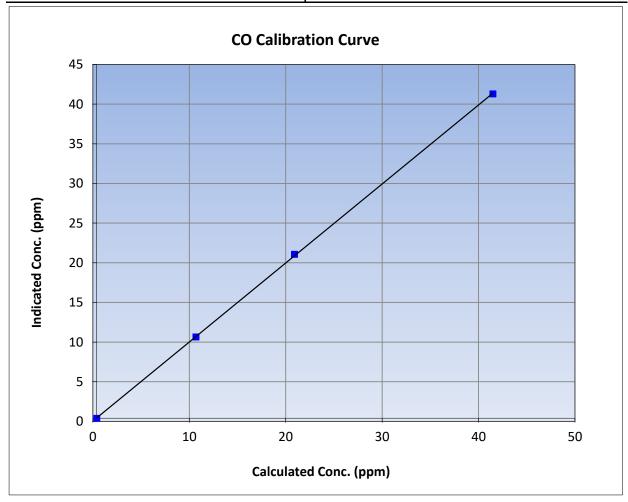
### **CO Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 14, 2024 **Previous Calibration:** February 5, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 10:10 End Time (MST): 13:21 Analyzer make: **API T300** Analyzer serial #: 3504

Calibration Data							
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.0		Correlation Coefficient	0.999947	≥0.995		
41.1	40.9	1.0046	Correlation Coefficient	0.555547	20.333		
20.5	20.7	0.9925	Slope	0.996462	0.90 - 1.10		
10.3	10.2	1.0047	Slope	0.990402	0.90 - 1.10		
			Intercept	0.037795	+/-1.5		

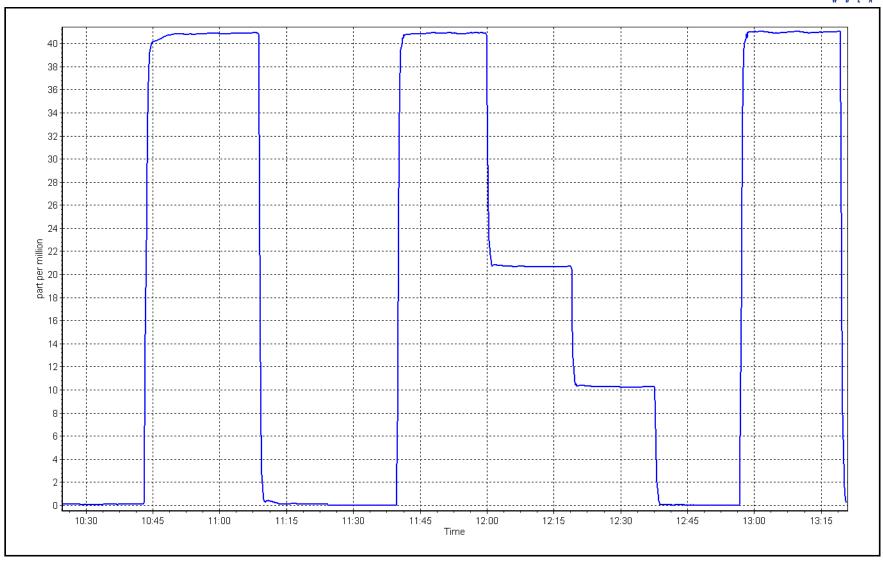


**CO Calibration Plot** 

Date: March 14, 2024

Location: Stony Mountain







# **CO<sub>2</sub> Calibration Report**

Station number:

End time (MST):

**AMS 18** 

13:53

Version-01-2020

**Station Information** 

Station Name: Stony Mountain

Calibration Date: March 21, 2024 Last Cal Date: February 7, 2024

Start time (MST): 10:40

Routine Reason:

**Calibration Standards** 

Cal Gas Concentration: November 4, 2028 59100 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: EB0065608

Removed Cal Gas Conc: 59,100 Rem Gas Exp Date: NA ppm

Diff between cyl: Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 N2 Gen Make/Model: Peak Scientific Serial Number: 771048317

**Analyzer Information** 

Analyzer make: API T360 Analyzer serial #: 489

Analyzer Range 0 - 2,000 ppm

**Finish** Start Start Finish Backgd or Offset: Calibration slope: 1.030319 1.000660 -0.037 -0.037 Coeff or Slope: Calibration intercept: -5.680000 -4.780000 0.945 0.939

CO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05
as found zero	3000	0.0	0.0	-0.4	
as found span	2920	80.0	1576.0	1613.0	0.977
as found 2nd point					
as found 3rd point					
new cylinder response					_
calibrator zero	3000	0.0	0.0	0.0	
high point	2920	80.0	1576.0	1576.5	1.000
second point	2960	40.0	788.0	775.8	1.016
third point	2980	20.0	394.0	388.4	1.014
as left zero	3000	0.0	0.0	-0.2	
as left span	2930	80.0	1570.8	1576.3	0.996
			Avera	ge Correction Factor	1.010

Baseline Corr As found: 1613.40 Prev response: 1618.10 \*% change: -0.3%

Baseline Corr 2nd AF pt: AF Slope: AF Intercept: NA

Baseline Corr 3rd AF pt: AF Correlation: NA \* = > +/-5% change initiates investigation

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



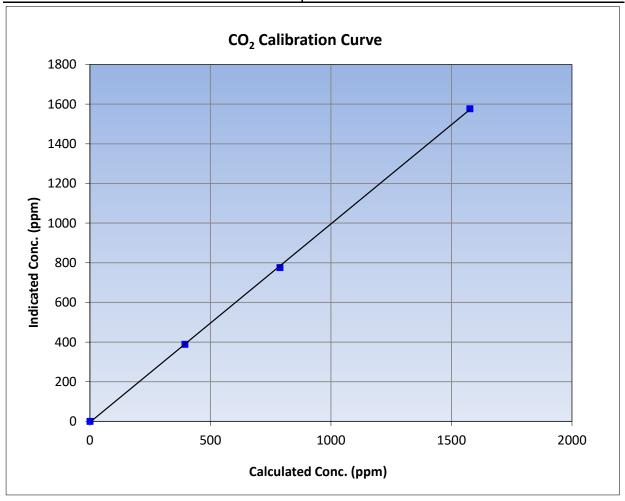
# CO<sub>2</sub> Calibration Summary

Version-01-2020

#### **Station Information**

Calibration Date	March 21, 2024	<b>Previous Calibration</b>	February 7, 2024
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:40	End Time (MST)	13:53
Analyzer make	API T360	Analyzer serial #	489

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999923	≥0.995
1576.0	1576.5	0.9997	Correlation Coefficient	0.555525	20.993
788.0	775.8	1.0157	Slope	1.000660	0.90 - 1.10
394.0	388.4	1.0144	Slope	1.000000	0.90 - 1.10
			- Intercept	-4.780000	+/-10

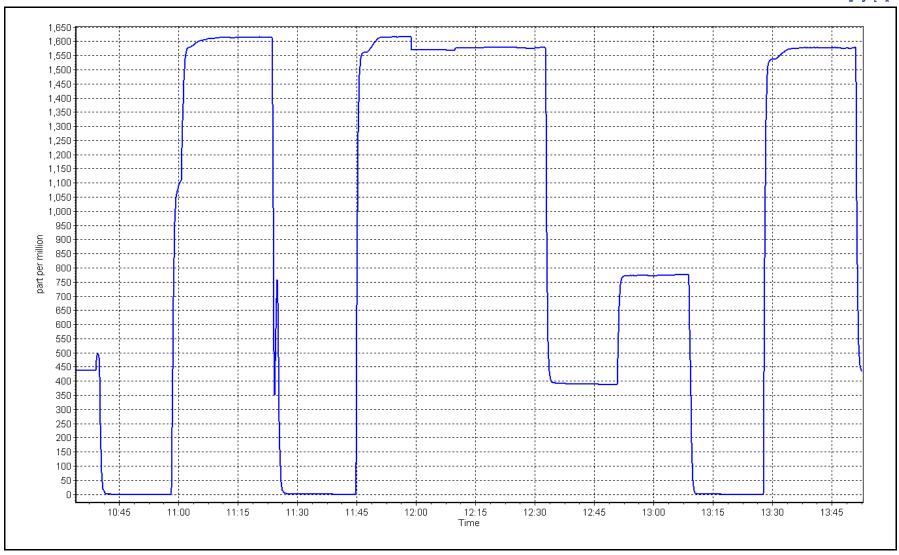


CO<sub>2</sub> Calibration Plot

Date: March 21, 2024

Location: Stony Mountain







## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

## AMS19 FIREBAG MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Last Cal Date:

Version-01-2020

#### **Station Information**

Station Name: **Firebag** 

March 12, 2024 Calibration Date:

Start time (MST): 10:17 Routine Reason:

Station number: **AMS 19** 

February 27, 2024 End time (MST): 13:53

**Calibration Standards** 

Cal Gas Concentration: 49.29

Cal Gas Cylinder #: CC716618

Removed Cal Gas Conc: 49.29

Removed Gas Cyl #: Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701** 

ppm Cal Gas Exp Date: February 23, 2025

> Rem Gas Exp Date: Diff between cyl:

Serial Number: 1607 Serial Number: 1118

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1410661308

ppm

Analyzer Range 0 - 1000 ppb

**Finish Finish** Start Start Calibration slope: 1.003793 0.997705 Backgd or Offset: 10.5 10.5 0.991 Calibration intercept: 0.237576 0.418240 Coeff or Slope: 0.984

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	4999	0.0	0.0	0.0	
as found span	4919	81.1	799.5	794.4	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	4999	0.0	0.0	0.1	
high point	4919	81.1	799.5	797.8	1.002
second point	4959	40.6	400.3	400.2	1.000
third point	4980	20.3	200.1	200.2	1.000
as left zero	4999	0.0	0.0	0.1	
as left span	4919	81.1	799.5	799.5	1.000
			Averag	ge Correction Factor	1.001

Baseline Corr As found: 794.40 Previous response 802.74 \*% change -1.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By: **Braiden Boutilier** 



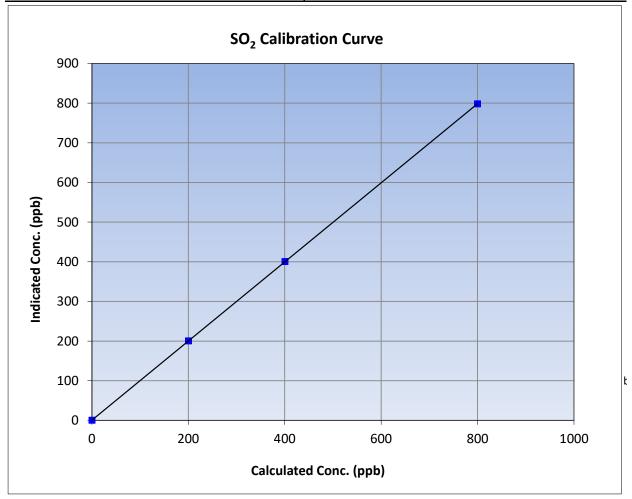
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 27, 2024 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 10:17 End Time (MST): 13:53 Analyzer make: Thermo 43i Analyzer serial #: 1410661308

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999999	≥0.995		
799.5	797.8	1.0021	Correlation Coefficient	0.555555	20.993		
400.3	400.2	1.0002	Slope	0.997705	0.90 - 1.10		
200.1	200.2	0.9995	Slope	0.997703	0.90 - 1.10		
			- Intercept	0.418240	+/-30		

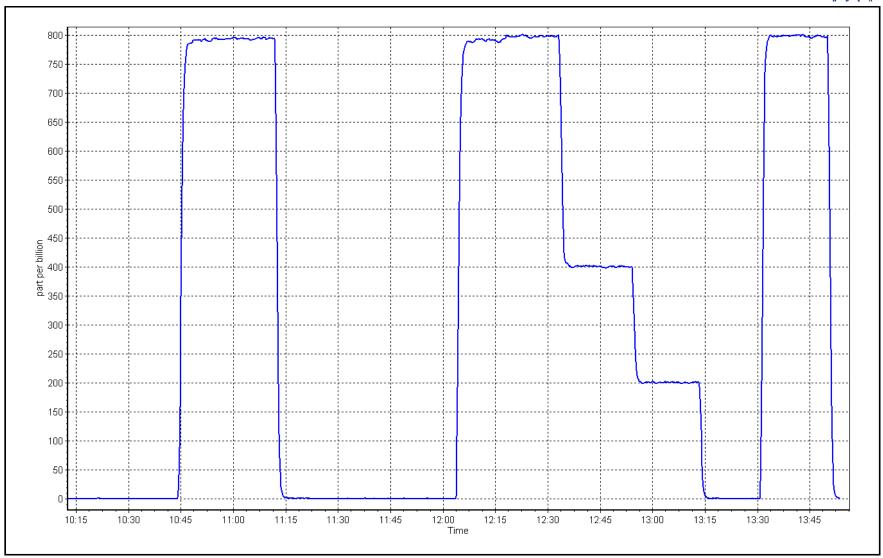


SO2 Calibration Plot

Date: March 12, 2024

Location: Firebag







## H<sub>2</sub>S Calibration Report

Station number:

Version-11-2021

**Station Information** 

Station Name: Firebag

Calibration Date: March 5, 2024

Start time (MST): 12:36 Reason: Routine Last Cal Date: Fnd time (MST) AMS19 February 1, 2024

End time (MST): 18:10

**Calibration Standards** 

Cal Gas Concentration: 5.114 ppm Cal Gas Exp Date: February 5, 2024

Cal Gas Cylinder #: CC517427

Removed Cal Gas Conc: 5.114 ppm Rem Gas Exp Date: n/a Removed Gas Cyl #: n/a Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 1607 ZAG Make/Model: Teledyne API T701 Serial Number: 1118

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680032

Converter make: Global Converter serial #: 2022-222

Analyzer Range 0 - 100 ppb

**Finish Start** <u>Finish</u> <u>Start</u> 0.999337 Backgd or Offset: 2.77 Calibration slope: 1.000909 3.22 Calibration intercept: -0.061541 -0.081535 Coeff or Slope: 1.198 1.166

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.4	
as found span	4922	78.2	80.0	77.8	1.033
as found 2nd point	4961	39.1	40.0	39.3	1.028
as found 3rd point	4980	19.6	20.0	19.8	1.033
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4922	78.2	80.0	79.8	1.002
second point	4961	39.1	40.0	40.0	1.000
third point	4980	19.6	20.0	19.9	1.007
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.2	80.0	79.2	1.010
SO2 Scrubber Check	4922	78.3	800.2	0.0	
Date of last scrubber chan	ge:	January 18, 2023	_	Ave Corr Factor	1.003
Date of last converter effic	ciency test:	n/a			efficiency

Date of last scrubber change	2:	January 18, 2023		Ave Corr Factor	1.003
Date of last converter efficie	ency test:	n/a			efficiency
Baseline Corr As found:	77.4	Prev response:	79.99	*% change:	-3.3%

Baseline Corr 2nd AF pt: 38.9 AF Slope: 0.968037 AF Intercept: Baseline Corr 3rd AF pt: 19.4 AF Correlation: 0.999991

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Ran SOx scrubber check after cal zero. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier

0.439136



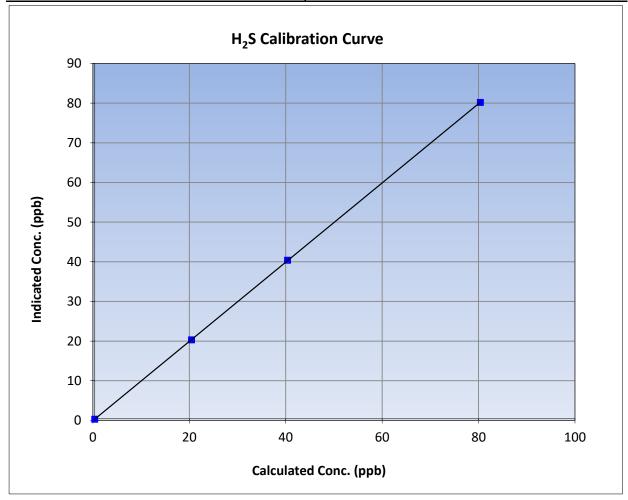
# H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 1, 2024 Station Name: Firebag Station Number: AMS19 Start Time (MST): 12:36 End Time (MST): 18:10 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680032

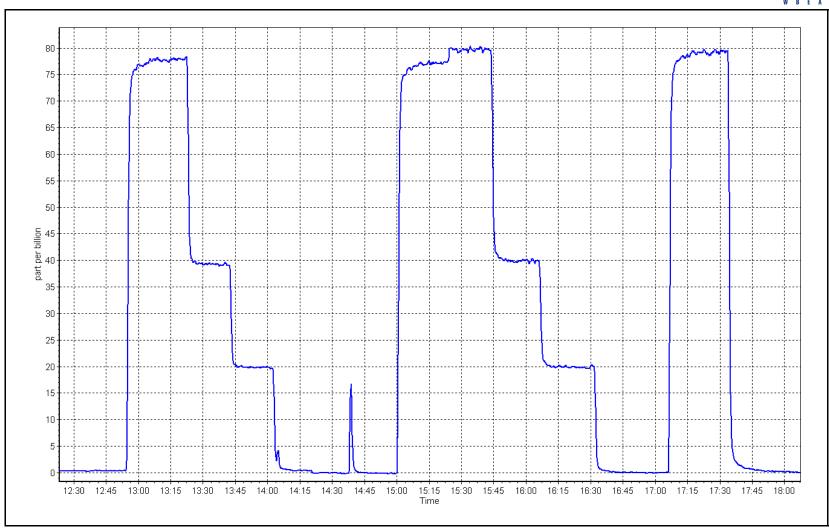
Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	-0.1		Correlation Coefficient	0.999995	≥0.995		
80.0	79.8	1.0023	Correlation Coefficient	0.55555	20.333		
40.0	40.0	0.9998	Slope	0.999337	0.90 - 1.10		
20.0	19.9	1.0075	Slope	0.555557	0.90 - 1.10		
			- Intercept	-0.081535	+/-3		



Date: March 5, 2024

Location: Firebag







## **THC Calibration Report**

Version-01-2020

**Station Information** 

Station Name: **Firebag** 

March 12, 2024 Calibration Date:

Start time (MST): 10:32

Routine Reason:

Station number: **AMS 19** 

> February 27, 2024 Last Cal Date:

End time (MST):

13:53

**Calibration Standards** 

CC716618 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

C3H8 Cal Gas Conc. 205.9 ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

205.9 Removed C3H8 Conc. Diff between cyl: ppm Calibrator Make/Model: **API T700** Serial Number:

1607 ZAG Make/Model: **API T701** Serial Number: 1118

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Analyzer Range: 0 - 20 ppm

Start Finish **Finish** Start Calibration slope: Background: 1.002921 1.003849 2.03 2.15

-0.040348 Coefficient: Calibration intercept: -0.061568 3.764 3.788

**THC Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	4999	0.0	0.00	0.04	
as found span	4919	81.1	17.31	17.35	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	4999	0.0	0.00	0.02	
high point	4919	81.1	17.31	17.37	0.996
second point	4959	40.6	8.66	8.60	1.007
third point	4980	20.3	4.33	4.27	1.015
as left zero	5000	0.0	0.00	-0.04	
as left span	4919	81.1	17.31	17.49	0.989
			Averag	e Correction Factor	1.006

Baseline Corr As found: 17.31 17.29 Previous response \*% change 0.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Changed sample inlet filter after as founds. Changed out hydrogen cylinder. Adjusted zero.

Calibration Performed By: **Braiden Boutilier**  \* = > +/-5% change initiates investigation



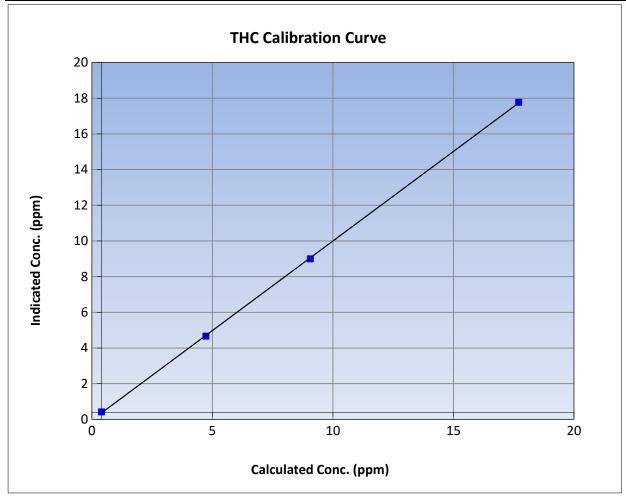
## **THC Calibration Summary**

Version-01-2020

#### **Station Information**

March 12, 2024 February 27, 2024 **Previous Calibration:** Calibration Date: Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 10:32 End Time (MST): 13:53 Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Calibration Data							
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Lir</u>		<u>Limits</u>		
0.00	0.02		Correlation Coefficient	0.999941	≥0.995		
17.31	17.37	0.9963	Correlation Coefficient	0.555541	20.995		
8.66	8.60	1.0075	Slope	1.003849	0.90 - 1.10		
4.33	4.27	1.0149	Slope	1.003649	0.90 - 1.10		
			- Intercept	-0.040348	+/-1.5		

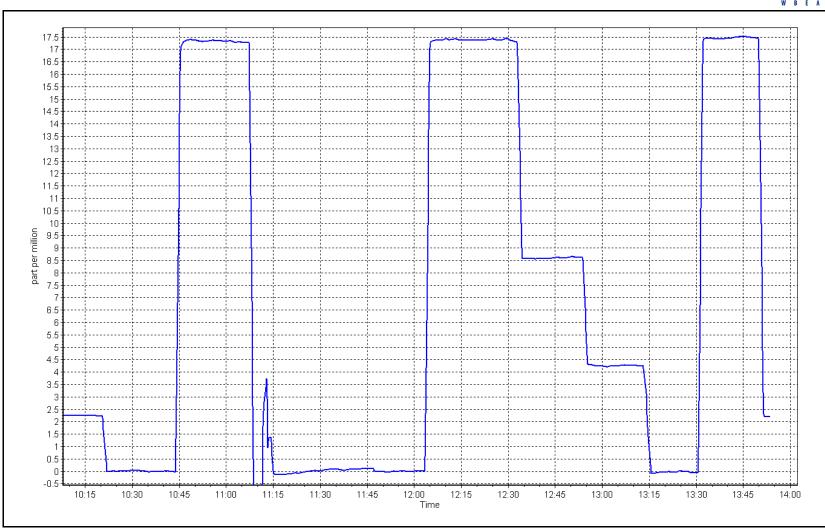


**THC Calibration Plot** 

Date: March 12, 2024

Location: Firebag







## **THC Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Firebag

March 20, 2024 Calibration Date:

Start time (MST): 11:13

Reason: Maintenance Station number: **AMS 19** 

> Last Cal Date: March 12, 2024

End time (MST):

13:43

**Calibration Standards** 

CC716618 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

C3H8 Cal Gas Conc. 205.9 ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

Removed C3H8 Conc. 205.9 Diff between cyl: ppm

1607 Calibrator Make/Model: **API T700** Serial Number: ZAG Make/Model: **API T701H** Serial Number: 201

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Analyzer Range: 0 - 20 ppm

Start Finish Finish <u>Start</u>

Calibration slope: Background: 1.003849 2.15 2.15 -0.040348 Coefficient: Calibration intercept: 3.788 3.788

**THC Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	4999	0.0	0.00	-0.06	
as found span	4919	81.1	17.31	17.55	0.986
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	-0.07	
as left span	4919	81.1	17.31	17.56	0.985
			Averag	ge Correction Factor	
Baseline Corr As found:	17.61	Previous response	17.33	*% change	1.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes: Swapped ZAG due to leak. Removed T701 SN: 1118, installed T701H SN: 201.

**Braiden Boutilier** Calibration Performed By:

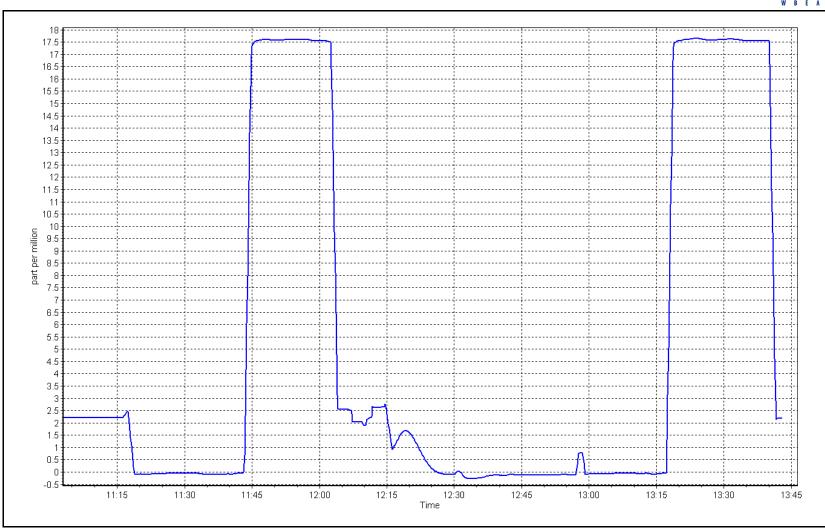
\* = > +/-5% change initiates investigation

**THC Calibration Plot** 

Date: March 20, 2024

Location: Firebag







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

ppm

#### **Station Information**

Station Name: **Firebag** 

Calibration Date: March 21, 2024

9:41 Start time (MST): Reason: Routine Station number: AMS 19

Last Cal Date: February 13, 2024

End time (MST): 14:49

#### **Calibration Standards**

NO Gas Cylinder #: DT0044018 Cal Gas Expiry Date: November 3, 2031

NOX Cal Gas Conc: NO Cal Gas Conc: 48.9 48.7 ppm ppm Removed Cylinder #: Removed Gas Exp Date: n/a n/a

Removed Gas NOX Conc: 48.9 ppm Removed Gas NO Conc: 48.7

NOX gas Diff:

NO gas Diff: Calibrator Model: Teledyne API T700 Serial Number: 1607 ZAG make/model: Teledyne API T701 Serial Number: 201

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1410661309

NOX Range (ppb): 0 - 1000 ppb

Start **Finish Finish Start** NO coeff or slope: 1.081 1.040 NO bkgnd or offset: 7.6 7.3 NOX coeff or slope: 0.996 0.995 NOX bkgnd or offset: 7.7 7.4 222.0 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 216.5

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.006289	0.993092
NO <sub>x</sub> Cal Offset:	0.400360	-0.219382
NO Cal Slope:	1.006923	0.994756
NO Cal Offset:	0.340247	-0.699633
NO <sub>2</sub> Cal Slope:	0.998051	1.011032
NO <sub>2</sub> Cal Offset:	-0.640112	-1.734028



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3		
as found span	4918	82.1	802.9	799.7	3.3	840.0	835.0	4.2	0.9559	0.9577
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
high point	4918	82.1	802.9	799.7	3.3	797.6	795.3	2.3	1.0067	1.0055
second point	4959	41.1	402.0	400.3	1.6	397.9	396.6	1.3	1.0102	1.0094
third point	4980	20.5	200.5	199.7	0.8	199.3	197.6	1.7	1.0060	1.0105
as left zero	4999	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
as left span	4918	82.1	802.9	395.7	407.3	785.5	373.4	412.1	1.0222	1.0596
							Average C	Correction Factor	1.0076	1.0084
Corrected As fo	ound NO <sub>X</sub> =	840.3 ppb	NO =	835.0 ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chang	ge NO <sub>x</sub> =	3.8%
Previous Respo	onse NO <sub>X</sub> =	808.4 ppb	NO =	805.5 ppb				*Percent Chan	ge NO =	3.5%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO <sub>x</sub> =	NA ppb	NO =	NA ppb	As foun	d $NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	PT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 tration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT po	int (400 ppb NO2)									
as found GPT po	int (200 ppb NO2)									
as found GPT po	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	777.7		373.7	407.3		411.1	0.9907	7 :	100.9%
2nd GPT poin	t (200 ppb O3)	777.7		576.1	204.9		204.0	1.0043	3	99.6%
3rd GPT poin	t (100 ppb O3)	777.7		678.5	102.5		100.5	1.0197	7	98.1%

Notes:

Changed sample inlet filters after as founds. Adjusted span.

Average Correction Factor

Calibration Performed By:

Braiden Boutilier

99.5%

1.0049



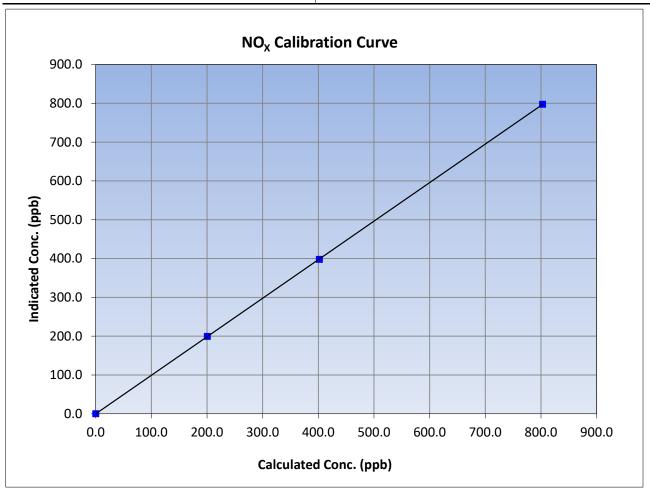
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 21, 2024 **Previous Calibration:** February 13, 2024 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:41 End Time (MST): 14:49 Analyzer serial #: Analyzer make: Thermo 42i 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
802.9	797.6	1.0067	Correlation Coefficient	0.999990	20.555
402.0	397.9	1.0102	Slope	0.993092	0.90 - 1.10
200.5	199.3	1.0060	Slope	0.993092	0.90 - 1.10
			Intercept	-0.219382	+/-20





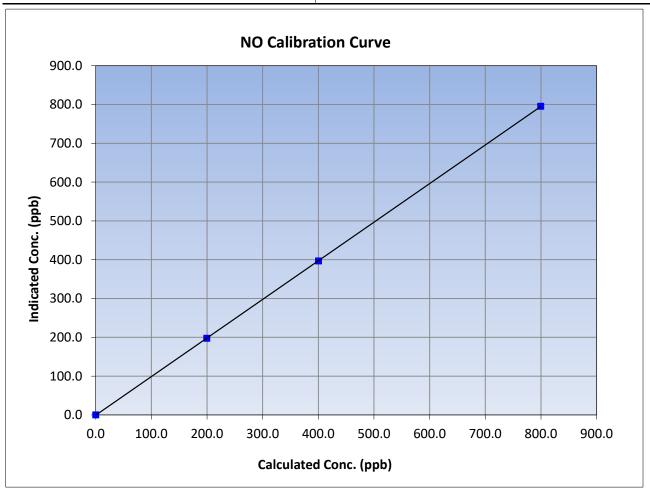
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 21, 2024 **Previous Calibration:** February 13, 2024 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:41 End Time (MST): 14:49 Analyzer make: Thermo 42i Analyzer serial #: 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999995	≥0.995
799.7	795.3	1.0055	Correlation Coefficient	0.555555	20.333
400.3	396.6	1.0094	Slope	0.994756	0.90 - 1.10
199.7	197.6	1.0105	Slope	0.554750	0.90 - 1.10
		_	Intercept	-0.699633	+/-20





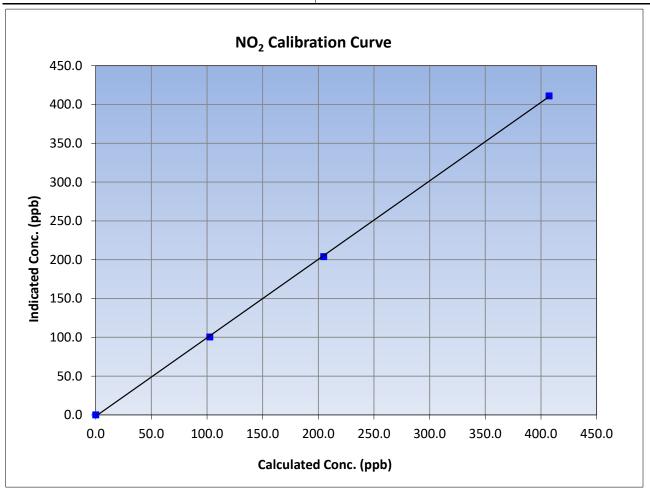
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 21, 2024 **Previous Calibration:** February 13, 2024 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:41 End Time (MST): 14:49 Analyzer serial #: Analyzer make: Thermo 42i 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999913	≥0.995
407.3	411.1	0.9907	Correlation Coefficient	0.999913	20.333
204.9	204.0	1.0043	Slope	1.011032	0.90 - 1.10
102.5	100.5	1.0197	Slope	1.011052	0.30 - 1.10
			Intercept	-1.734028	+/-20

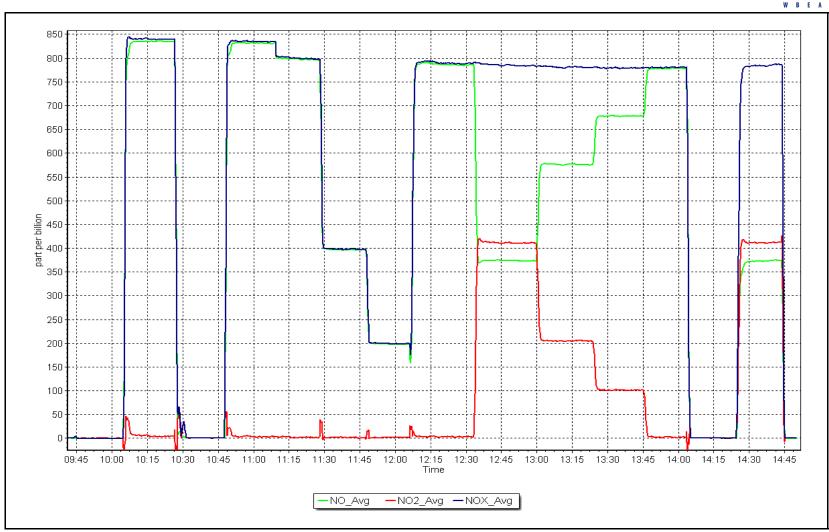


NO<sub>x</sub> Calibration Plot

Date: March 21, 2024

Location: Firebag







## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

## AMS20 MACKAY RIVER MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: MacKay River

March 7, 2024 Calibration Date:

Start time (MST): 8:24 Routine Reason:

Station number: AMS20

> February 20, 2024 Last Cal Date:

End time (MST): 11:17

#### **Calibration Standards**

Cal Gas Concentration: 49.22 ppm Cal Gas Exp Date: February 23, 2025

Cal Gas Cylinder #: CC306868

Removed Cal Gas Conc: 49.22 ppm Rem Gas Exp Date: NA Diff between cyl: Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: Teledyne API T700 Serial Number: 1220 ZAG Make/Model: Teledyne API 701 Serial Number: 4522

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 1501301450

Analyzer Range 0 - 1000 ppb

**Finish Finish** Start Start Calibration slope: 1.004391 1.004703 Backgd or Offset: 19.7 19.7

0.965 Calibration intercept: 2.870973 2.311780 Coeff or Slope: 0.965

#### SO<sub>2</sub> Calibration Data

0.6 802.7	0.997
802.7	0.997
0.0	
805.9	0.993
403.9	0.992
206.8	0.966
0.1	
806.6	0.992
verage Correction Facto	r 0.984
*% change	
,	0.1 806.6 erage Correction Facto

Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Zero adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay \* = > +/-5% change initiates investigation



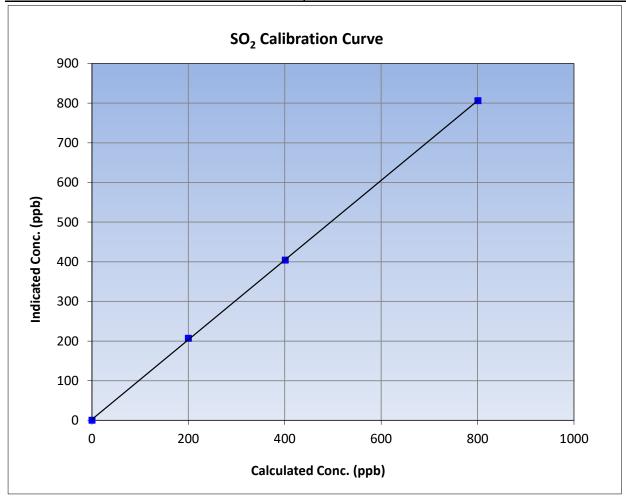
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 7, 2024 **Previous Calibration:** February 20, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:24 End Time (MST): 11:17 Analyzer make: Thermo 43i Analyzer serial #: 1501301450

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999942	≥0.995			
800.3	805.9	0.9930	Correlation Coefficient	0.333342	20.993			
400.7	403.9	0.9920	Slope	1.004703	0.90 - 1.10			
199.8	206.8	0.9663	Slope	1.004703	0.90 - 1.10			
			- Intercept	2.311780	+/-30			



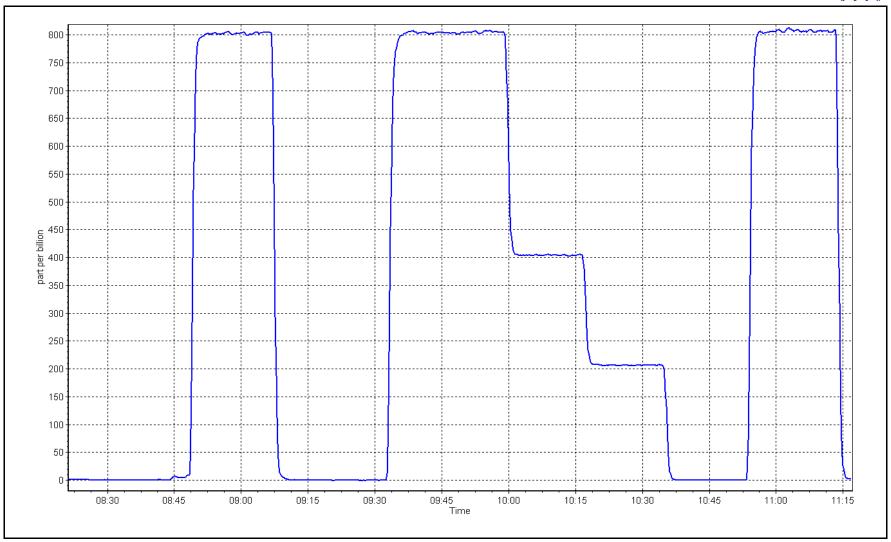
**SO2 Calibration Plot** 

Date:

March 7, 2024

Location: MacKay River





# W B E A

## **Wood Buffalo Environmental Association**

## H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: MacKay River

Calibration Date: March 5, 2024 Start time (MST): 8:10

Reason: Routine

Station number: AMS20

Last Cal Date: February 1, 2024

End time (MST): 12:11

**Calibration Standards** 

Cal Gas Concentration: 5.12 ppm Cal Gas Exp Date: January 3, 2026

Cal Gas Cylinder #: CC515997

Removed Cal Gas Conc: 5.12 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 1220 ZAG Make/Model: Teledyne API 701 Serial Number: 4522

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1236656117

Converter make: Global Converter serial #: 2022-226

Analyzer Range 0 - 100 ppb

**Finish Start** <u>Finish</u> <u>Start</u> 0.975111 Backgd or Offset: Calibration slope: 0.987249 3.19 3.19 0.699032 Calibration intercept: 0.499237 Coeff or Slope: 1.113 1.113

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.2	
as found span	4922	78.1	80.0	78.7	1.019
as found 2nd point	4961	39.0	39.9	39.8	1.008
as found 3rd point	4980	19.5	20.0	20.4	0.989
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05		
calibrator zero	5000	0.0	0.0	0.4			
high point	4922	78.1	80.0	78.6	1.018		
second point	4961	39.0	40.0	39.8	1.004		
third point	4980	19.5	20.0	20.5	0.975		
as left zero	5000	0.0	0.0	0.4			
as left span	4922	78.1	80.0	78.4	1.021		
SO2 Scrubber Check	4982	81.3	802.8	-0.1			
Date of last scrubber chang	ge:	May 25, 2023		Ave Corr Factor	0.999		
Date of last converter effic	Date of last converter efficiency test: efficiency						

Baseline Corr As found:	78.5	Prev response:	79.45	*% change:	-1.2%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.979587	AF Intercept:	0.519121
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999924		

No maintenance and adjustments done. Sox scrubber checked after the calibrator zero.

Calibration Performed By: Melissa Lemay

Notes:

\* = > +/-5% change initiates investigation



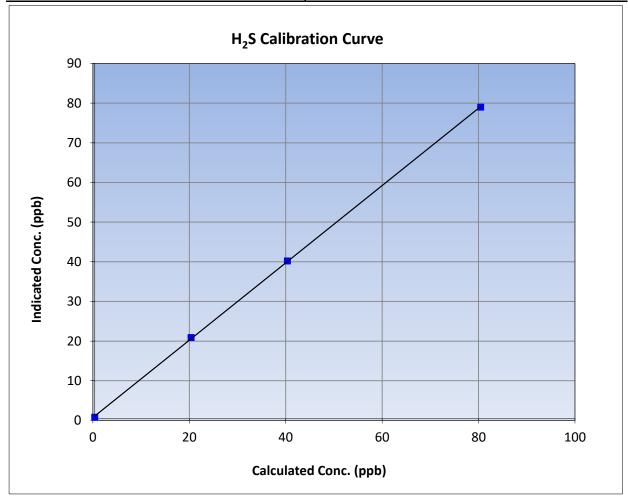
# H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 1, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:10 End Time (MST): 12:11 Analyzer make: Thermo 43i TLE Analyzer serial #: 1236656117

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.4		Correlation Coefficient	0.999933	≥0.995		
80.0	78.6	1.0183	Correlation Coefficient	0.555555	20.333		
40.0	39.8	1.0042	Slope	0.975111	0.90 - 1.10		
20.0	20.5	0.9749	Slope	0.973111	0.30 - 1.10		
			- Intercept	0.699032	+/-3		

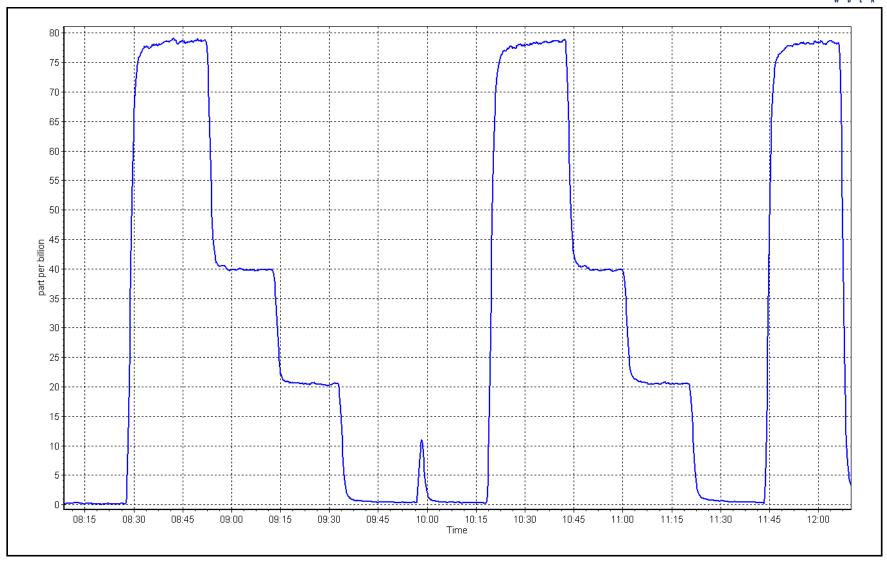


H<sub>2</sub>S Calibration Plot

Date: March 5, 2024

Location: MacKay River







## **THC Calibration Report**

Version-01-2020

**Station Information** 

Station Name: MacKay River

Calibration Date: March 7, 2024

Start time (MST): 8:24

Reason: Routine

Station number: AMS20

Last Cal Date: February 20, 2024

End time (MST): 11:16

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC306868 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.40 ppm CH4 Equiv Conc. 1066.45 ppm

C3H8 Cal Gas Conc. <u>206.20</u> ppm

Removed Gas Cert: NA

Removed CH4 Conc. 499.40 ppm CH4 Equiv Conc. 1066.45 ppm

Removed C3H8 Conc. 206.20 ppm Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 1220 ZAG Make/Model: Teledyne API 701 Serial Number: 4522

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

Analyzer Range: 0 - 20 ppm

Baseline Corr 3rd AF pt:

Start Finish Finish Start Background: Calibration slope: 0.999403 0.997159 3.480 3.610 0.028212 Coefficient: 6.010 Calibration intercept: 0.034183 5.950

**THC Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentrat (ppm) (Cc)	ion Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.13	
as found span	4919	81.3	17.34	17.37	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.02	
high point	4919	81.3	17.34	17.31	1.002
second point	4959	40.7	8.68	8.68	1.000
third point	4980	20.3	4.33	4.41	0.982
as left zero	5000	0.0	0.00	-0.02	
as left span	4919	81.3	17.34	17.35	0.999
			P	Average Correction Factor	0.995
Baseline Corr As found:	17.23	Previous response	17.36	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes: No maintenance done. Zero and span adjusted.

AF Correlation:

Calibration Performed By: Melissa Lemay

NA

\* = > +/-5% change initiates investigation



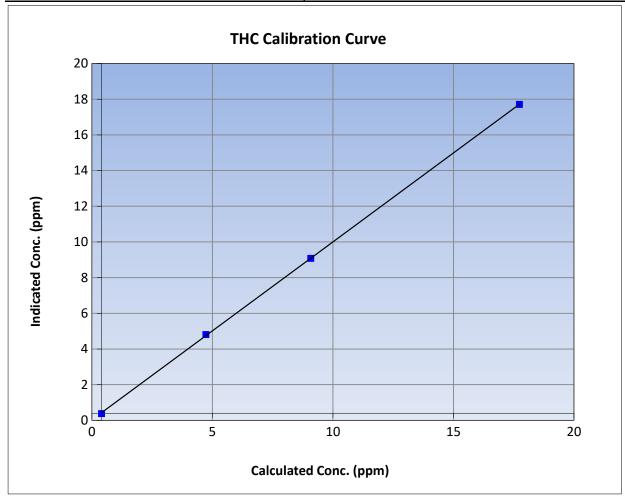
## **THC Calibration Summary**

Version-01-2020

#### **Station Information**

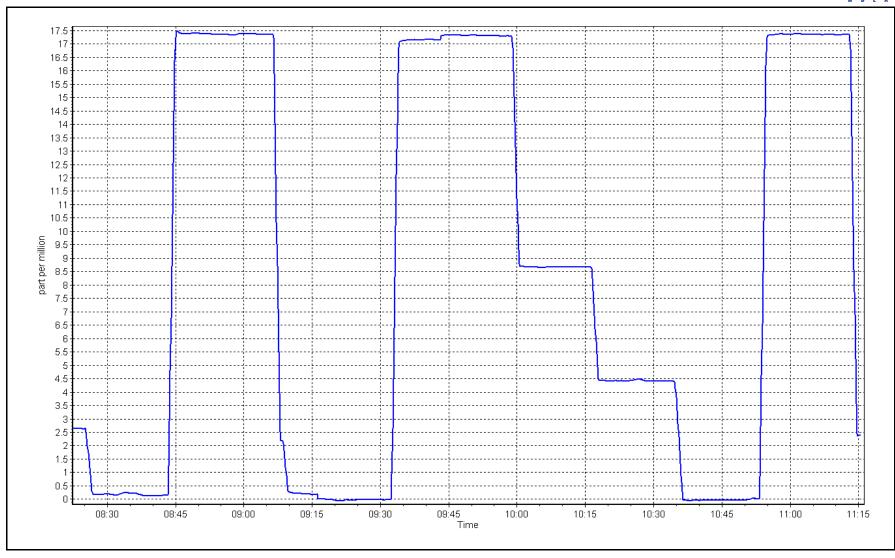
February 20, 2024 **Previous Calibration:** Calibration Date: March 7, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:24 End Time (MST): 11:16 Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

Calibration Data							
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>			
0.00	-0.02		Correlation Coefficient	0.999962	≥0.995		
17.34	17.31	1.0019	Correlation Coefficient	0.333302	20.333		
8.68	8.68	1.0004	Slope	0.997159	0.90 - 1.10		
4.33	4.41	0.9820	Slope	0.55/155	0.30 - 1.10		
			- Intercept	0.028212	+/-1.5		



THC Calibration Plot Date: March 7, 2024 Location: MacKay River







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: MacKay River

Calibration Date: March 6, 2024

Start time (MST): 7:55
Reason: Routine

Station number: AMS20

Last Cal Date: February 8, 2024

End time (MST): 12:13

Cal Gas Expiry Date: April 13, 2025

NO gas Diff:

#### **Calibration Standards**

NO Gas Cylinder #: T376265

NOX Cal Gas Conc: 49.19 ppm NO Cal Gas Conc: 48.04 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 49.19 ppm Removed Gas NO Conc: 48.04 ppm

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 1220 ZAG make/model: Teledyne API 701 Serial Number: 4522

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1505164379

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.990 0.990 NO bkgnd or offset: 2.8 2.8 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 3.0 3.0 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 166.6 166.6

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.994581	1.001037
NO <sub>x</sub> Cal Offset:	3.602279	3.662215
NO Cal Slope:	0.995045	1.001142
NO Cal Offset:	2.502804	2.942582
NO <sub>2</sub> Cal Slope:	1.000946	0.998215
NO <sub>2</sub> Cal Offset:	-1.281410	-0.831656



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	lution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2		
as found span	4917	83.3	819.5	800.3	19.2	826.8	805.1	21.5	0.9911	0.9940
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1		
high point	4917	83.3	819.5	800.3	19.2	822.3	802.9	19.4	0.9965	0.9968
second point	4958	41.7	410.3	400.7	9.6	415.6	405.0	10.6	0.9872	0.9893
third point	4979	20.8	204.6	199.9	4.8	212.7	206.2	6.6	0.9621	0.9692
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1		
as left span	4917	83.3	819.5	442.5	377.0	818.4	441.3	377.0	1.0013	1.0027
							Average C	Correction Factor	0.9819	0.9851
Corrected As fo	ound NO <sub>X</sub> =	827.0 ppb	NO =	805.1 ppb	* = > +/-5%	change initiates i	investigation	*Percent Chang	ge NO <sub>X</sub> =	1.0%
Previous Respo	onse NO <sub>x</sub> =	818.6 ppb	NO =	798.8 ppb				*Percent Chang	ge NO =	0.8%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	ord pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As found	NO r <sup>2</sup> :		NO SI:	NO Int:	
					As found	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration [	Data				
O3 Setpo	pint (ppb)	Indicated NO Res		cated NO Drop entration (ppb)	Calculated NO concentration (ppb		dicated NO2 stration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	(400 ppb O3)	799.7		441.9	377.0		375.8	1.0031		99.7%

Notes:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

No adjustments or maintenance done.

204.1

114.2

Average Correction Factor

1.0062

1.0180

1.0091

205.4

116.3

Calibration Performed By:

Melissa Lemay

613.5

702.6

799.7

799.7

99.4%

98.2%

99.1%



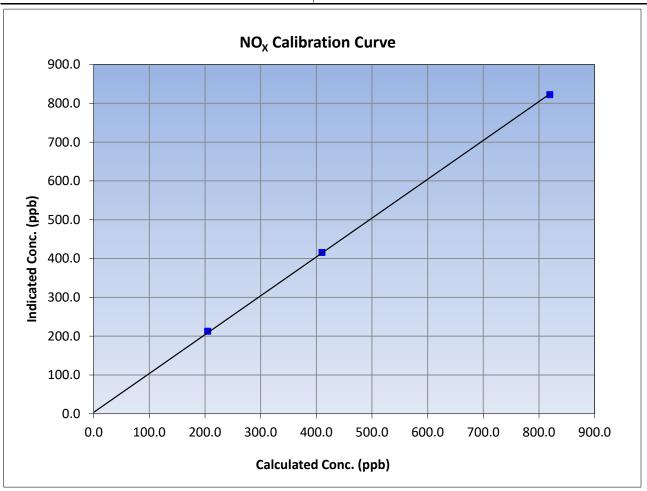
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 8, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:55 End Time (MST): 12:13 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999902	≥0.995
819.5	822.3	0.9965	Correlation Coefficient		20.555
410.3	415.6	0.9872	Slope	1.001037	0.90 - 1.10
204.6	212.7	0.9621	Siope		0.90 - 1.10
			Intercept	3.662215	+/-20





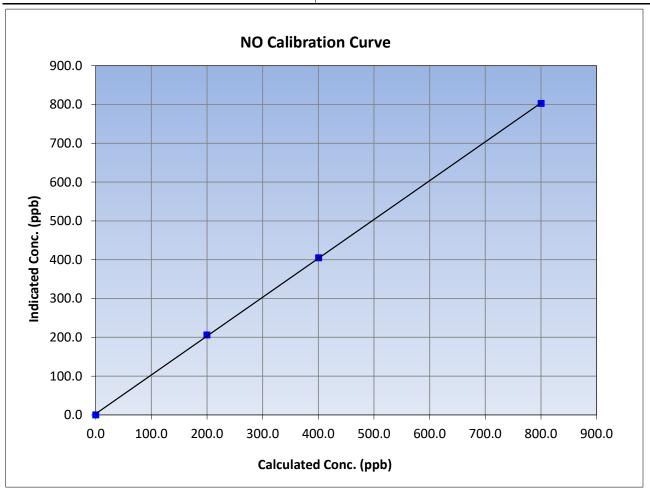
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 8, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:55 End Time (MST): 12:13 Analyzer make: Thermo 42i Analyzer serial #: 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999941	≥0.995
800.3	802.9	0.9968	Correlation Coefficient		20.333
400.7	405.0	0.9893	Slope	1.001142	0.90 - 1.10
199.9	206.2	0.9692	Siope		0.30 - 1.10
			Intercept	2.942582	+/-20





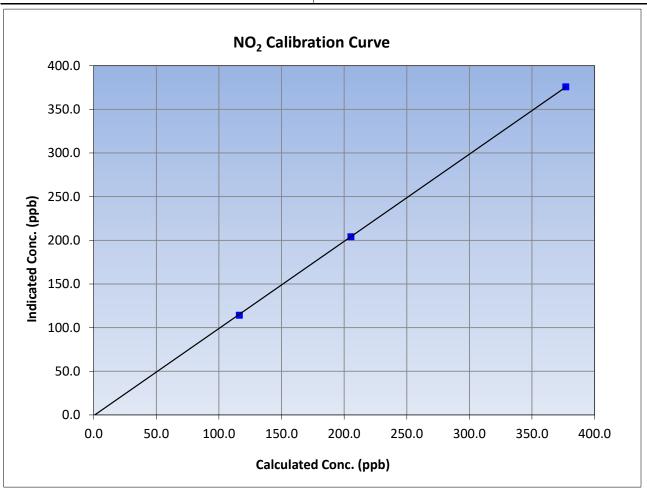
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 8, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:55 End Time (MST): 12:13 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999978	≥0.995
377.0	375.8	1.0031	Correlation Coefficient		20.333
205.4	204.1	1.0062	Slope	0.998215	0.90 - 1.10
116.3	114.2	1.0180	Siope		0.90 - 1.10
			Intercept	-0.831656	+/-20



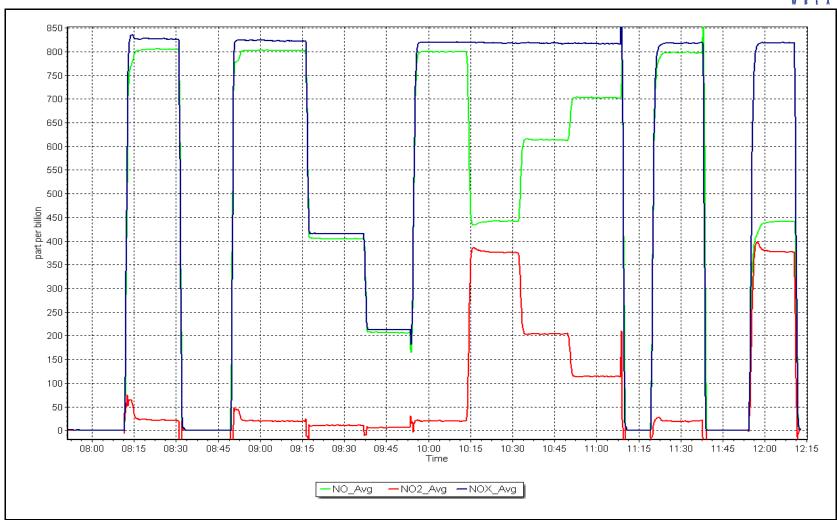
 $NO_X$  Calibration Plot

Date:

March 6, 2024

Location: MacKay River







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS21 CONKLIN MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



### **SO<sub>2</sub> Calibration Report**

11:44

Version-01-2020

#### **Station Information**

Station Name: Conklin Station number: AMS21

Calibration Date: March 18, 2024 Last Cal Date: February 8, 2024

Start time (MST): 8:41 End time (MST):

Reason: Routine

**Calibration Standards** 

Cal Gas Concentration: 49.93 ppm Cal Gas Exp Date: January 5, 2025

Cal Gas Cylinder #: CC259455

Removed Cal Gas Conc: 49.93 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API 7700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701 Serial Number: 691

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:0.9977190.997419Backgd or Offset:28.728.3

Calibration intercept: 0.997/19 0.997/19 Backgd or Offset: 28.7 28.3 Calibration intercept: 1.675879 1.855817 Coeff or Slope: 0.914 0.901

### SO<sub>2</sub> Calibration Data

Cat Daint	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.2	
as found span	4920	80.2	8.008	809.8	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	0.5	
high point	4920	80.2	8.008	800.0	1.001
second point	4960	40.1	400.4	401.8	0.997
third point	4980	20.0	200.1	202.9	0.986
as left zero	5005	0.0	0.0	0.4	
as left span	4920	80.2	8.008	801.0	1.000
			Averag	ge Correction Factor	0.995
		_	_	•	•

Baseline Corr As found: 809.60 Previous response 800.69 \*% change 1.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept:

NA AF Slope: AF Intercept:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By: Jan Castro



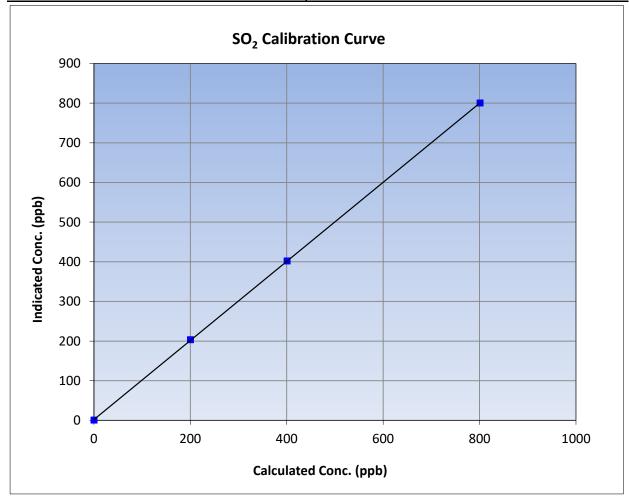
### **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 18, 2024 **Previous Calibration:** February 8, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:41 End Time (MST): 11:44 Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.5		Correlation Coefficient	0.999987	≥0.995			
800.8	800.0	1.0011	Correlation Coefficient	0.555507	20.993			
400.4	401.8	0.9966	Slope	0.997419	0.90 - 1.10			
200.1	202.9	0.9863	Slope	0.997419	0.90 - 1.10			
			- Intercept	1.855817	+/-30			



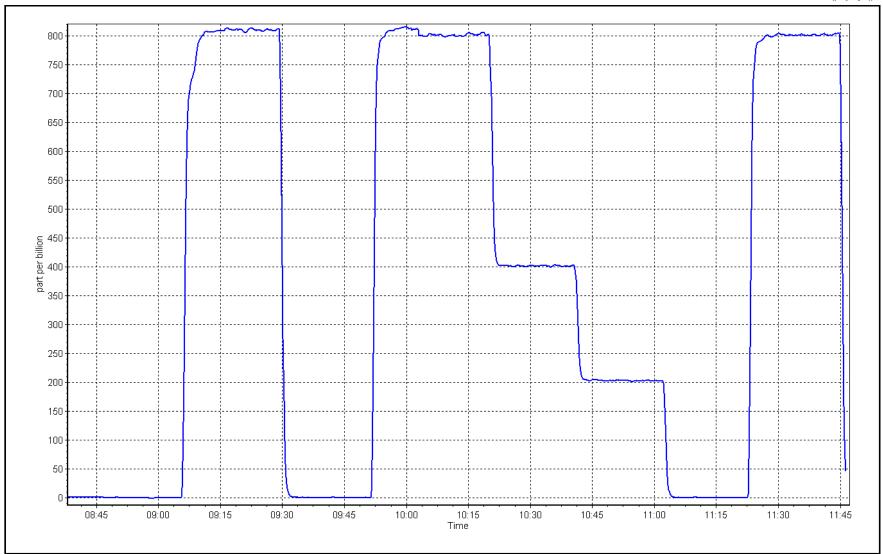
SO2 Calibration Plot

Date:

March 18, 2024

Location: Conklin







### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Conklin

Calibration Date: March 21, 2024

Start time (MST): 9:23 Reason:

Routine

Station number: AMS21

> Last Cal Date: February 12, 2024

End time (MST): 14:55

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.00 ppm

Cal Gas Cylinder #: CC501204

Removed Cal Gas Conc: 5.00 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 3810 Serial Number: ZAG Make/Model: Teledyne API 701H Serial Number: 691

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

CD-Nova 101 Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

Start **Finish Start** <u>Finish</u> 1.000286 Backgd or Offset: 2.77 Calibration slope: 1.001571 2.4 0.140000 Calibration intercept: 0.420000 Coeff or Slope: 0.980 0.998

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4920	80.0	80.0	79.6	1.005
as found 2nd point	4960	40.0	40.0	40.0	1.000
as found 3rd point	4980	20.0	20.0	20.3	0.985
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.0	80.0	80.0	1.000
second point	4960	40.0	40.0	40.5	0.988
third point	4980	20.0	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.0	80.0	79.7	1.004
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha	nge:		•	Ave Corr Factor	0.994
Date of last converter eff	iciency test:				efficiency

Date of last scrubber change	:			Ave Corr Factor	0.994
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	79.6	Prev response:	80.55	*% change:	-1.2%

0.993571 Baseline Corr 2nd AF pt: 40.0 AF Slope: AF Correlation: Baseline Corr 3rd AF pt: 20.3 0.999970

\* = > +/-5% change initiates investigation

AF Intercept:

0.200000

Changed sample inlet filter after multiple as founds. SO2 scrubber check done after calibrator zero Notes: and it passed. Adjusted zero and span.

Calibration Performed By: Jan Castro



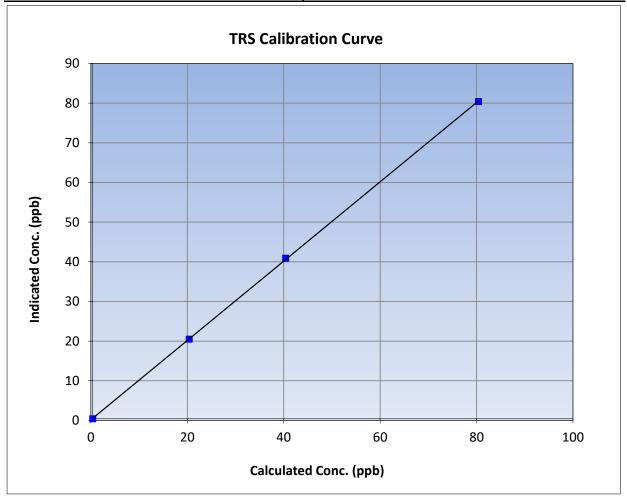
### **TRS Calibration Summary**

Version-11-2021

### **Station Information**

Calibration Date: March 21, 2024 **Previous Calibration:** February 12, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:23 End Time (MST): 14:55 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999952	≥0.995			
80.0	80.0	1.0000	Correlation Coefficient	0.555552	20.333			
40.0	40.5	0.9877	Slope	1.000286	0.90 - 1.10			
20.0	20.1	0.9950	Slope	1.000280	0.90 - 1.10			
			- Intercept	0.140000	+/-3			

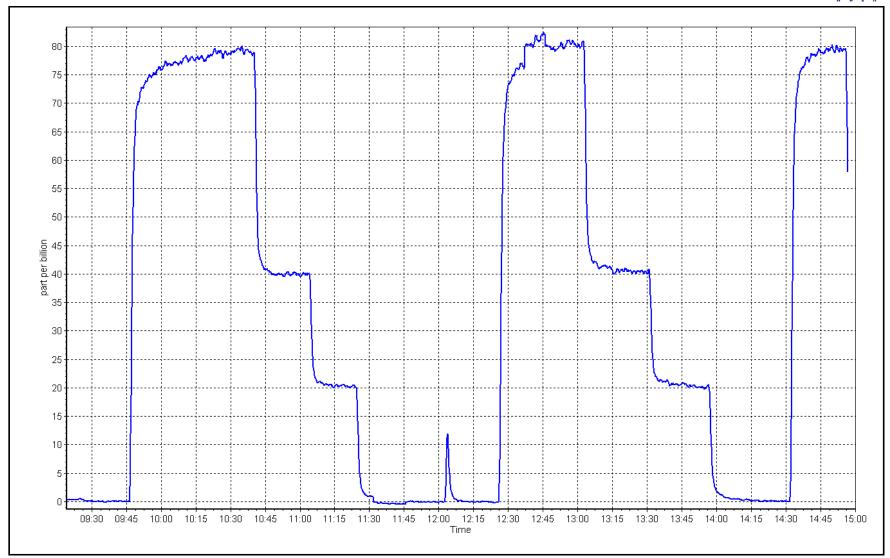




Date: March 21, 2024

Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin

Calibration Date: March 5, 2024

Start time (MST): 12:58
Reason: Routine

Station number: AMS21

Removed Gas Expiry: NA

Last Cal Date: February 8, 2024 End time (MST): 17:51

**Calibration Standards** 

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: Teledyne API T700 Serial Number: 3810
ZAG make/model: Teledyne API 701H Serial Number: 691

**Analyzer Information** 

Analyzer make: Thermo 55i Analyzer serial #: 1193585649

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

Start **Finish Finish Start** 3.60E-04 NMHC SP Ratio: CH4 SP Ratio: 3.71E-04 7.57E-05 7.48E-05 17.4 17.4 NMHC Peak Area: CH4 Retention time: 120807 122143 ON ON Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4920	80.2	17.13	16.77	1.021
as found 2nd point	4960	40.1	8.56	8.44	1.014
as found 3rd point	4980	20.0	4.28	4.26	1.004
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	
high point	4920	80.2	17.13	17.11	1.001
second point	4960	40.1	8.56	8.63	0.992
third point	4980	20.0	4.28	4.39	0.976
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.09	1.002
			Av	verage Correction Factor	0.990
Baseline Corr AF:	16.75	Prev response	17.16	*% change	-2.4%
Baseline Corr 2nd AF:	8.4	AF Slope:	0.977405	AF Intercept:	0.047951
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999977	* = > +/-5% change initiat	es investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.15	0.999
as found 2nd point	4960	40.1	4.57	4.61	0.991
as found 3rd point	4980	20.0	2.28	2.33	0.981
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.12	1.002
second point	4960	40.1	4.57	4.62	0.990
third point	4980	20.0	2.28	2.34	0.976

**NMHC Calibration Data** 

as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.10	1.005
			Ave	erage Correction Factor	0.989
Baseline Corr AF:	9.15	Prev response	9.18	*% change	-0.3%
Baseline Corr 2nd AF:	4.6	AF Slope:	0.999605	AF Intercept:	0.025410
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999963	•	

### **CH4 Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4920	80.2	7.99	7.62	1.048
as found 2nd point	4960	40.1	3.99	3.83	1.042
as found 3rd point	4980	20.0	2.00	1.93	1.032
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	
high point	4920	80.2	7.99	7.99	0.999
second point	4960	40.1	3.99	4.01	0.996
third point	4980	20.0	2.00	2.05	0.976
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	8.00	0.999
			Aver	age Correction Factor	0.990
Baseline Corr AF:	7.61	Prev response	7.98	*% change	-5.0%
Baseline Corr 2nd AF:	3.82	AF Slope:	0.951755	AF Intercept:	0.023140
Baseline Corr 3rd AF:	1.92	AF Correlation:	0.999988	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		<u>Finish</u>	
THC Cal Slope:		1.000154		0.996984	
THC Cal Offset:		0.033769		0.062768	
CH4 Cal Slope:		0.997762		0.998048	
CH4 Cal Offset:		0.015158		0.026159	

Changed sample inlet filter and pump after multi point as founds. Adjusted zero and span. Notes:

1.002131

0.018811

Calibration Performed By: Mohammed Kashif

NMHC Cal Slope:

NMHC Cal Offset:

0.996179

0.036609



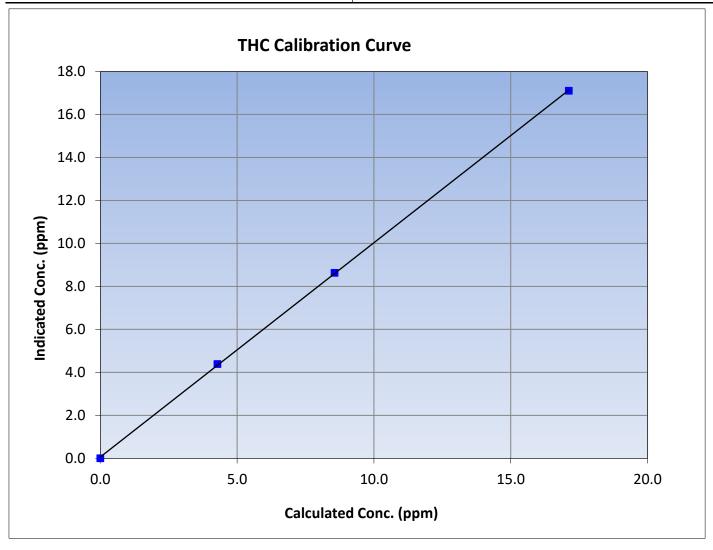
### **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 5, 2024 **Previous Calibration:** Calibration Date: February 8, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 12:58 End Time (MST): 17:51 Analyzer make: Thermo 55i Analyzer serial #: 1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.01		Correlation Coefficient	0.999949	≥0.995
17.13	17.11	1.0010	Correlation Coefficient	0.555545	20.993
8.56	8.63	0.9924	Slope	0.996984	0.90 - 1.10
4.28	4.39	0.9757	Slope	0.990964	0.90 - 1.10
		·	Intercept	0.062768	+/-0.5





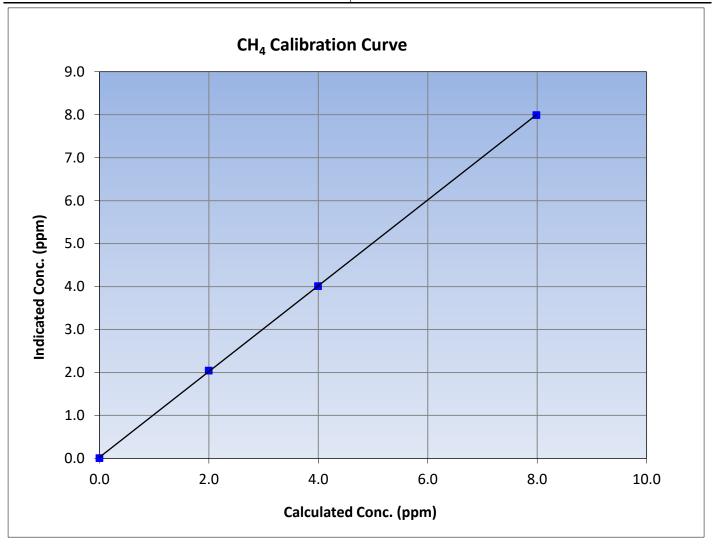
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 5, 2024 **Previous Calibration:** February 8, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 12:58 End Time (MST): 17:51 Analyzer make: Analyzer serial #: 1193585649 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.01		Correlation Coefficient	0.999966	≥0.995
7.99	7.99	0.9995	Correlation Coemicient	0.999900	20.333
3.99	4.01	0.9955	Slope	0.998048	0.90 - 1.10
2.00	2.05	0.9758	Slope		0.90 - 1.10
			Intercept	0.026159	+/-0.5





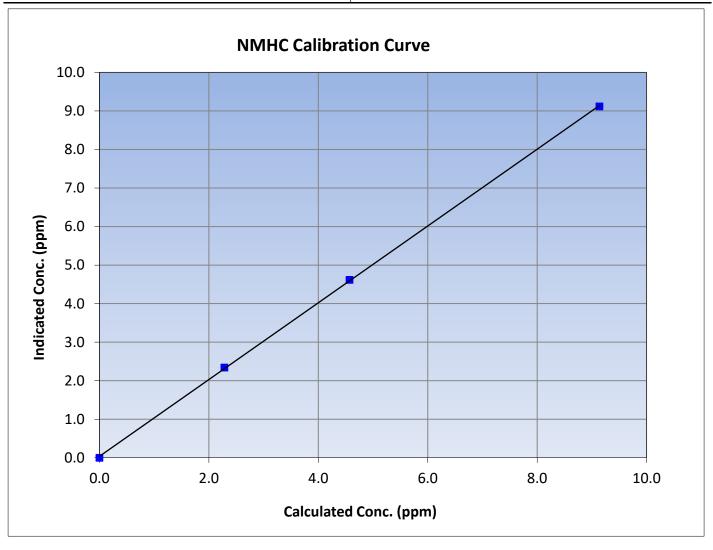
### **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

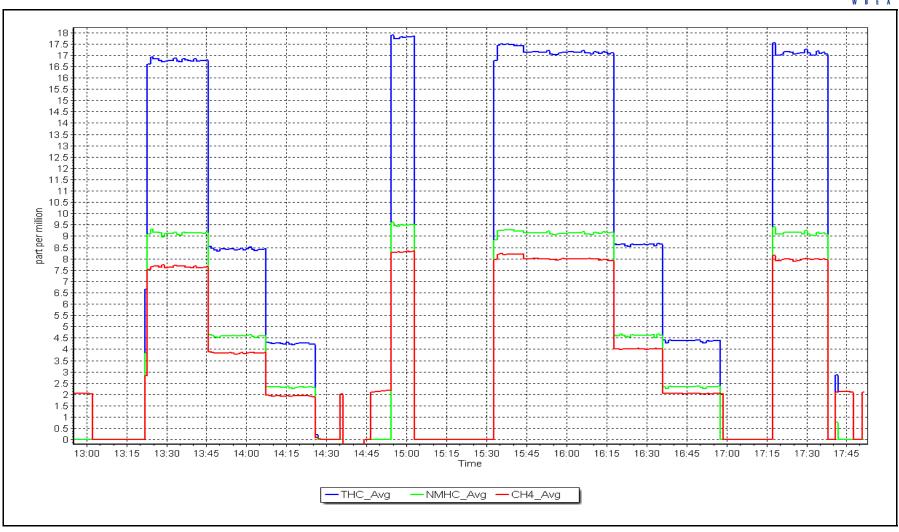
Calibration Date: March 5, 2024 **Previous Calibration:** February 8, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 12:58 End Time (MST): 17:51 Analyzer make: Analyzer serial #: 1193585649 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999922	≥0.995
9.14	9.12	1.0022	Correlation Coefficient	0.555522	20.333
4.57	4.62	0.9895	Slope	0.996179	0.90 - 1.10
2.28	2.34	0.9755	Siope	0.550175	0.90 - 1.10
			Intercept	0.036609	+/-0.5



NMHC Calibration Plot Date: March 5, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin
Calibration Date: March 9, 2024
Start time (MST): 12:10

Start time (MST): 12:10 Reason: Removal Station number: AMS21

Last Cal Date: March 5, 2024

End time (MST): 13:54

Removed Gas Expiry: NA

### **Calibration Standards**

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1193585649

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Start Finish Finish Start** CH4 SP Ratio: 3.60E-04 NMHC SP Ratio: NA 7.48E-05 NA NMHC Peak Area: CH4 Retention time: 17.4 NA 122143 NA ON ON Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.54	0.976
as found 2nd point	4960	40.1	8.56	8.79	0.974
as found 3rd point	4980	20.0	4.28	4.46	0.960
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Av	erage Correction Factor	
Baseline Corr AF:	17.54	Prev response	17.14	*% change	2.3%
Baseline Corr 2nd AF:	8.8	AF Slope:	1.022850	AF Intercept:	0.033987
Baseline Corr 3rd AF:	4.5	AF Correlation:	0.999979	* = > +/-5% change initiates	investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.24	0.989
as found 2nd point	4960	40.1	4.57	4.65	0.984
as found 3rd point	4980	20.0	2.28	2.36	0.966
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	
Baseline Corr AF:	9.24	Prev response	9.14	*% change	1.1%
Baseline Corr 2nd AF:	4.6	AF Slope:	1.009284	AF Intercept:	0.027215
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999959	* = > +/-5% change initia	tes investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.</i> (
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	8.30	0.962
as found 2nd point	4960	40.1	3.99	4.14	0.964
as found 3rd point	4980	20.0	2.00	2.09	0.953
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	
Baseline Corr AF:	8.30	Prev response	8.00	*% change	3.7%
Baseline Corr 2nd AF:	4.14	AF Slope:	1.038417	AF Intercept:	0.006372
Baseline Corr 3rd AF:	2.09	AF Correlation:	0.999991	* = > +/-5% change initia	tes investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.996984		NA	
THC Cal Offset:		0.062768		NA	
CH4 Cal Slope:		0.998048		NA	
CH4 Cal Offset:		0.026159		NA	
NMHC Cal Slope:		0.996179		NA	
Mivilie cai siope.		0.330173		INA	

Notes: Removed due to dipping occurring after calibration and maintenance done on March 5. Installing analyzer SN: 1118148494.

0.036609

Calibration Performed By: Braiden Boutilier

NMHC Cal Offset:

NMHC Calibration Plot Date: March 9, 2024

Location: Conklin





### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin
Calibration Date: March 9, 2024

Start time (MST): 13:50 Reason: Install Station number: AMS21

Last Cal Date: March 5, 2024

End time (MST): 18:25

Removed Gas Expiry: NA

### **Calibration Standards**

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl ( $CH_4$ ):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Start Finish Start Finish** CH4 SP Ratio: NA 3.06E-04 NMHC SP Ratio: NA 4.91E-05 NMHC Peak Area: CH4 Retention time: NA 13.8 NA 186157 **OFF** OFF Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.07	1.003
second point	4960	40.1	8.56	8.63	0.992
third point	4980	20.0	4.28	4.38	0.978
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.09	1.002
			Į.	Average Correction Factor	0.991
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	9.14	9.08	1.007
second point	4960	40.1	4.57	4.62	0.990
hird point	4980	20.0	2.28	2.34	0.976
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.06	1.009
			Avera	age Correction Factor	0.991
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
as found zero as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	7.99	7.99	
second point	4960				0.999
· · · · · · · · · · · · · · · · · · ·		40.1	3.99	4.02	0.999 0.994
hird point		40.1 20.0	3.99 2.00	4.02 2.04	0.994
· · · · · · · · · · · · · · · · · · ·	4980	20.0	2.00	2.04	
as left zero		20.0	2.00 0.00		0.994 0.980
as left zero	4980 5000	20.0 0.0	2.00 0.00 7.99	2.04 0.00 8.03	0.994 0.980 
as left zero as left span	4980 5000	20.0 0.0 80.2	2.00 0.00 7.99	2.04 0.00	0.994 0.980  0.995
third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4980 5000 4920	20.0 0.0 80.2 Prev response	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change	0.994 0.980  0.995 0.991
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4980 5000 4920 NA	20.0 0.0 80.2 Prev response AF Slope:	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor	0.994 0.980  0.995 0.991 NA
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation:	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept:	0.994 0.980  0.995 0.991 NA
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate	0.994 0.980  0.995 0.991 NA
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate	0.994 0.980  0.995 0.991 NA
as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  THC Cal Slope:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start NA	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate  Finish 0.995216	0.994 0.980  0.995 0.991 NA
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope: THC Cal Offset:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start NA NA	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate  Finish 0.995216 0.062766	0.994 0.980  0.995 0.991 NA
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope:	4980 5000 4920 NA NA	20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start NA	2.00 0.00 7.99 Avera	2.04 0.00 8.03 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate  Finish 0.995216	0.994 0.980  0.995 0.991 NA

Notes: Install calibration. Adjusted span.

NA

Calibration Performed By: Braiden Boutilier

NMHC Cal Offset:

0.043208



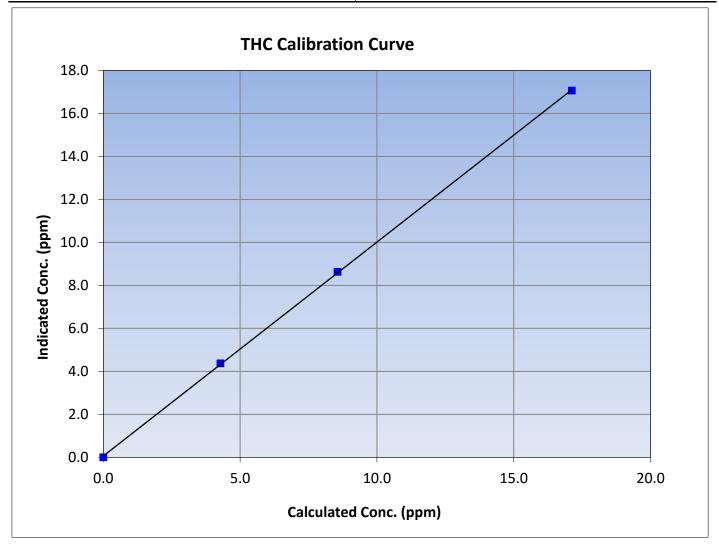
### **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 9, 2024 Calibration Date: **Previous Calibration:** March 5, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 13:50 End Time (MST): 18:25 Analyzer make: Thermo 55i Analyzer serial #: 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999936	≥0.995
17.13	17.07	1.0032	Correlation Coemicient	0.999930	20.333
8.56	8.63	0.9922	Slope	0.995216	0.90 - 1.10
4.28	4.38	0.9781	Slope	0.993210	0.90 - 1.10
			Intercept	0.062766	+/-0.5





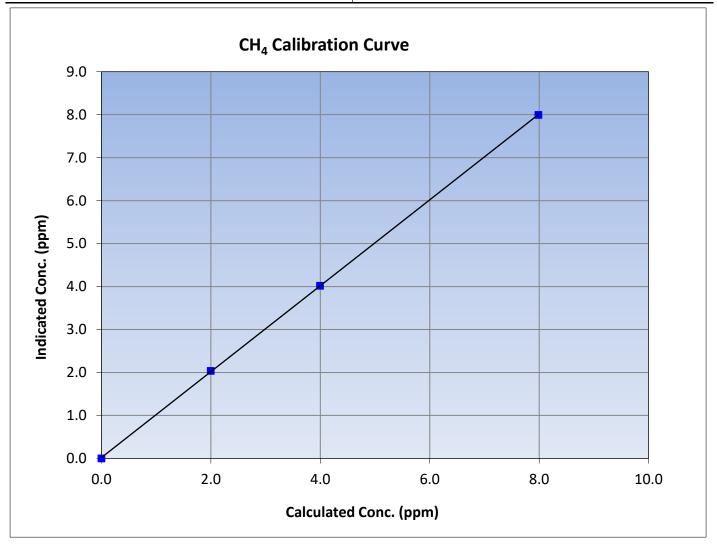
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 9, 2024 **Previous Calibration:** March 5, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 13:50 End Time (MST): 18:25 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999972	≥0.995
7.99	7.99	0.9990	Correlation Coefficient	0.333372	20.993
3.99	4.02	0.9938	Slope	0.999651	0.90 - 1.10
2.00	2.04	0.9801	Slope	0.999031	0.90 - 1.10
			Intercept	0.019559	+/-0.5





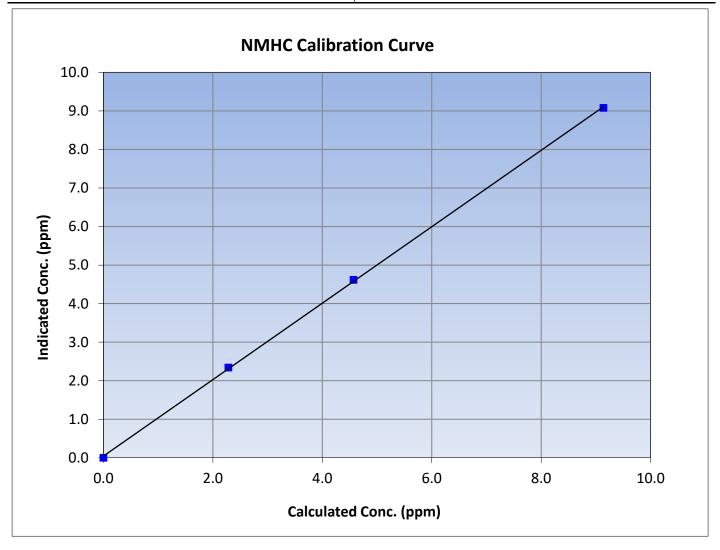
### **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

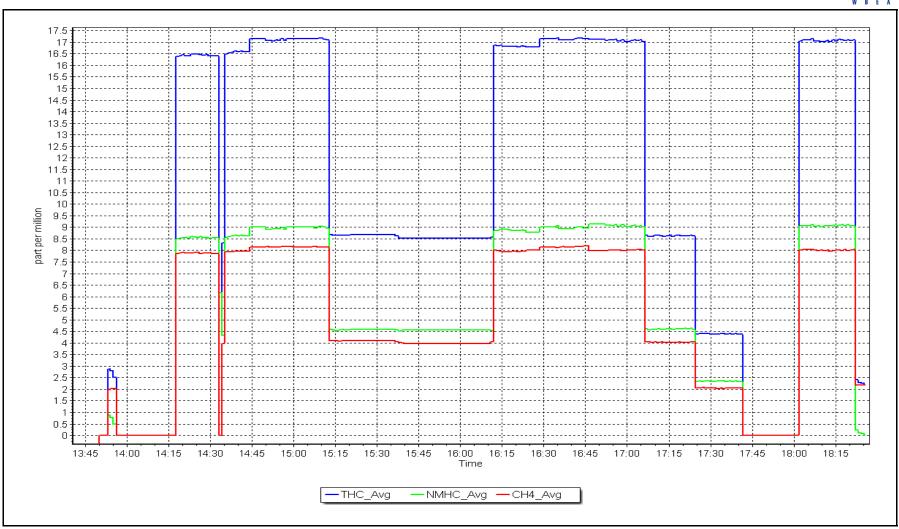
Calibration Date: March 9, 2024 **Previous Calibration:** March 5, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 13:50 End Time (MST): 18:25 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999884	≥0.995
9.14	9.08	1.0065	Correlation Coemicient	0.555004	20.555
4.57	4.62	0.9900	Slope	0.991840	0.90 - 1.10
2.28	2.34	0.9764	Slope	0.551640	0.90 - 1.10
			Intercept	0.043208	+/-0.5



NMHC Calibration Plot Date: March 9, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin
Calibration Date: March 15, 2024

Start time (MST): 8:37

Reason: Cylinder Change

Station number: AMS21

Last Cal Date: March 5, 2024

End time (MST): 10:44

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Start Finish Start Finish** 3.06E-04 CH4 SP Ratio: NA NMHC SP Ratio: NA 4.91E-05 NMHC Peak Area: CH4 Retention time: NA 13.8 NA 186157 **OFF** OFF Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.07	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	16.86	16.86	1.000
second point					
third point					
as left zero					
as left snan					

			A۱	verage Correction Factor	1.000
Baseline Corr AF:	17.07	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	tes investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
is found span	4920	80.2	9.14	9.24	0.989
ns found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	9.14	9.16	0.998
second point					
hird point					
as left zero					
as left span					
ı			Avera	age Correction Factor	0.998
Baseline Corr AF:	9.24	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
s found span	4920	80.2	7.99	7.83	1.020
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	7.99	7.70	1.037
second point					
third point					
as left zero					
as left span					
			Avera	age Correction Factor	1.037
Baseline Corr AF:	7.83	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		<u>Finish</u>	
THC Cal Slope:		NA		1.000264	
THC Cal Offset:		NA		0.000000	
CH4 Cal Slope:		NA		0.964313	
CH4 Cal Offset:		NA		0.000000	
NMHC Cal Slope:		NA NA		1.002054	
NAME Cal Officet		N A		0.000000	

Notes: H2 and N2 cylinder changed after as founds. Sample inlet filters changed before calibrator zero. No adjustment made.

NA

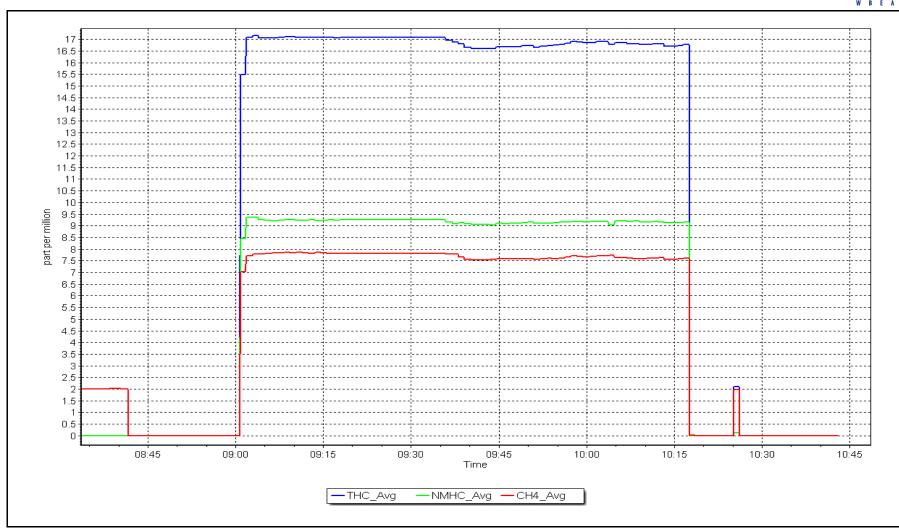
Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: March 15, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin

Calibration Date: March 18, 2024

Start time (MST): 8:41

Reason: Maintenance

Station number: AMS21

Removed Gas Expiry: NA

Last Cal Date: March 9, 2024

End time (MST): 11:44

### **Calibration Standards**

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

Baseline Corr 3rd AF:

NA

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

Start **Finish Finish Start** 3.04E-04 CH4 SP Ratio: 3.06E-04 NMHC SP Ratio: 4.91E-05 4.82E-05 NMHC Peak Area: CH4 Retention time: 13.8 13.8 186157 189786 **OFF** OFF Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.45	0.982
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.15	0.999
second point	4960	40.1	8.56	8.63	0.992
third point	4980	20.0	4.28	4.41	0.971
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.07	1.003
				Average Correction Factor	0.987
Baseline Corr AF:	17.45	Prev response	17.11	*% change	2.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

\* = > +/-5% change initiates investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.37	0.976
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.14	1.000
second point	4960	40.1	4.57	4.62	0.989
third point	4980	20.0	2.28	2.36	0.968
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.11	1.003
			Aver	age Correction Factor	0.986
Baseline Corr AF:	9.37	Prev response	9.11	*% change	2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	8.08	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	8.01	0.997
second point	4960	40.1	3.99	4.01	0.996
third point	4980	20.0	2.00	2.05	0.976
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.96	1.003
			Ave	erage Correction Factor	0.990
Baseline Corr AF:	8.08	Prev response	8.00	*% change	1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.995216		0.999299	
THC Cal Offset:		0.062766		0.059171	
CH4 Cal Slope:		0.999651		1.000967	
CH4 Cal Offset:		0.019559		0.018960	
NMHC Cal Slope:		0.991840		0.997617	
NMHC Cal Offset:		0.043208		0.040611	

Maintenance calibration to address baseline dipping. Changed sample inlet filters after as founds.

Adjusted span only.

Calibration Performed By: Jan Castro

Notes:



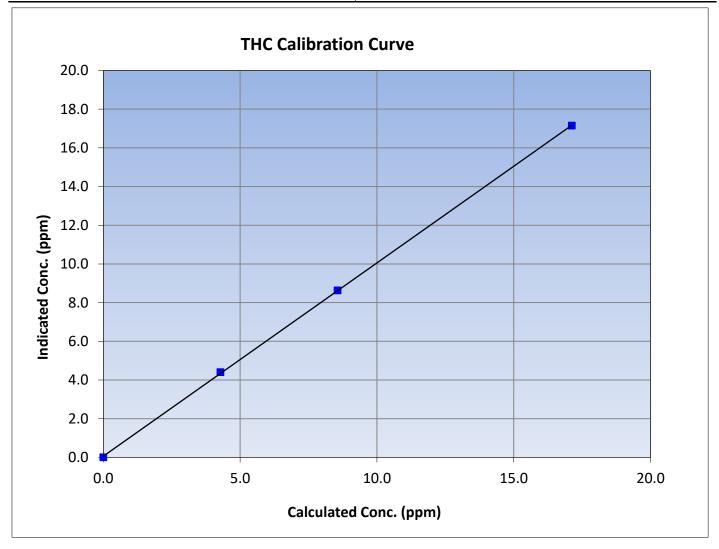
### **THC Calibration Summary**

Version-06-2022

### **Station Information**

March 18, 2024 Calibration Date: **Previous Calibration:** March 9, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:41 End Time (MST): 11:44 Analyzer make: Thermo 55i Analyzer serial #: 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999943	≥0.995
17.13	17.15	0.9987	Correlation Coefficient	0.555545	20.993
8.56	8.63	0.9922	Slope	0.999299	0.90 - 1.10
4.28	4.41	0.9715			0.90 - 1.10
			Intercept	0.059171	+/-0.5





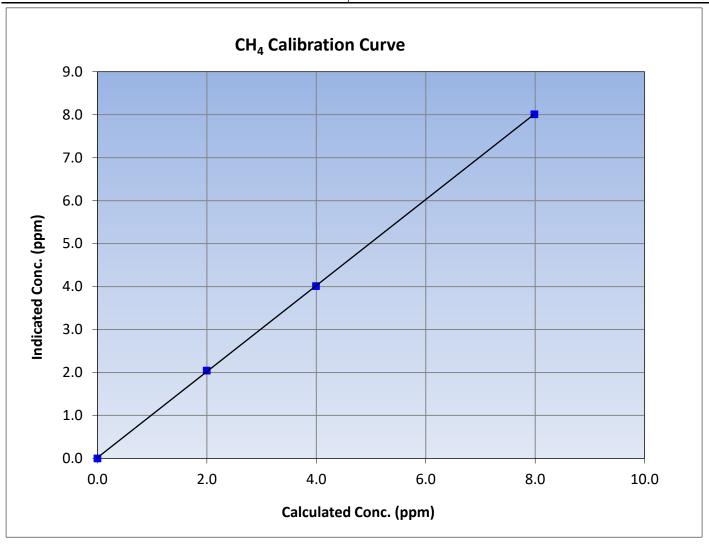
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

### **Station Information**

Calibration Date: March 18, 2024 **Previous Calibration:** March 9, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:41 End Time (MST): 11:44 Analyzer make: Analyzer serial #: 1118148494 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999965	≥0.995
7.99	8.01	0.9973			20.333
3.99	4.01	0.9955	Slope	1.000967	0.90 - 1.10
2.00	2.05	0.9758			0.90 - 1.10
			Intercept	0.018960	+/-0.5





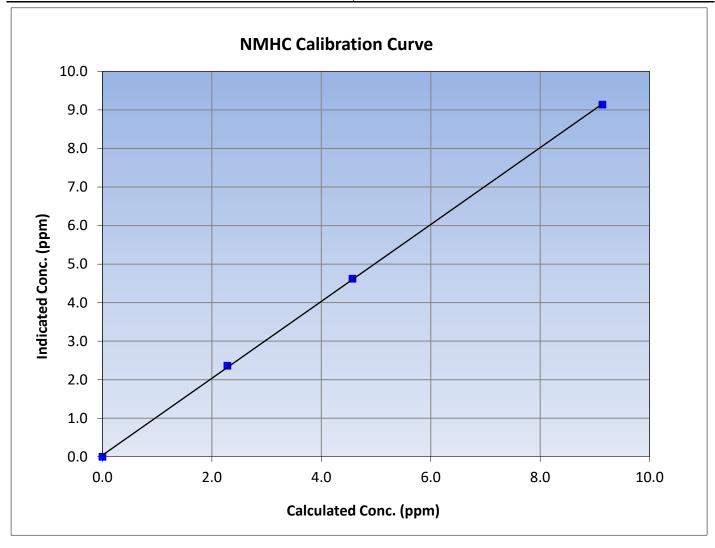
### **NMHC Calibration Summary**

Version-06-2022

### **Station Information**

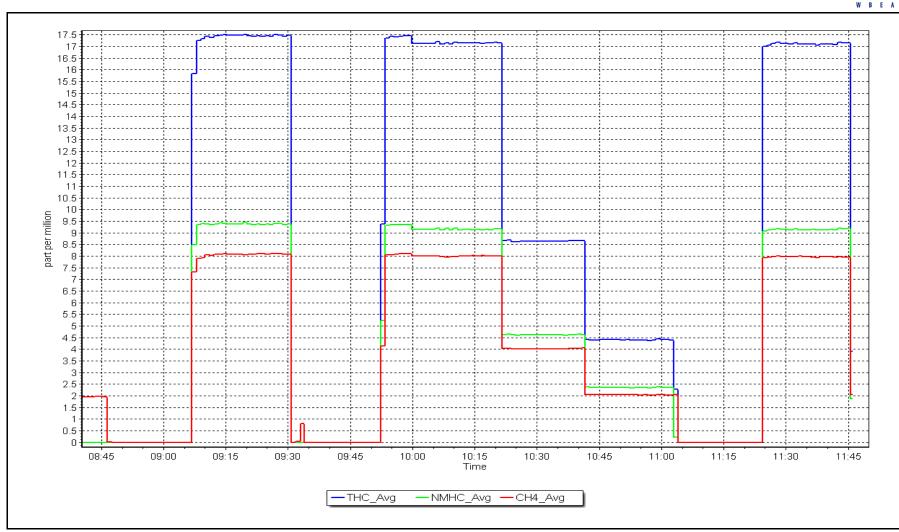
March 18, 2024 Calibration Date: **Previous Calibration:** March 9, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:41 End Time (MST): 11:44 Analyzer make: Thermo 55i Analyzer serial #: 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999909	≥0.995
9.14	9.14	1.0001			20.333
4.57	4.62	0.9893	Slope	0.997617	0.90 - 1.10
2.28	2.36	0.9677			0.90 - 1.10
			Intercept	0.040611	+/-0.5



NMHC Calibration Plot Date: March 18, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin

Calibration Date: March 19, 2024

Start time (MST): 9:34

Reason: Maintenance

Station number: AMS21

Removed Gas Expiry: NA

Last Cal Date: March 18, 2024

End time (MST): 11:37

**Calibration Standards** 

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

Change ZAG

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC): Diff between cyl (CH<sub>d</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

**Analyzer Information** 

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

<u>Start</u> **Finish Start Finish** 3.04E-04 3.04E-04 NMHC SP Ratio: CH4 SP Ratio: 4.82E-05 4.82E-05 NMHC Peak Area: 189786 CH4 Retention time: 13.8 13.8 189786 **OFF** OFF Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	16.74	1.023
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	16.74	1.023
second point					
third point					
as left zero					
as left span					

			Av	erage Correction Factor	1.023
Baseline Corr AF:	16.74	Prev response	17.11	*% change	-2.2%
Baseline Corr 2nd AF:	NA	AF Slope:	AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.11	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.11	1.003
second point					
third point					
as left zero					
as left span					
•			Aver	age Correction Factor	1.003
Baseline Corr AF:	9.11	Prev response	9.11	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	7.63	1.046
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	7.63	1.046
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	1.046
Baseline Corr AF:	7.63	Prev response	8.00	*% change	-4.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.995216		0.977506	
THC Cal Offset:		0.062766		0.000000	
CH4 Cal Slope:		0.999651		0.955923	
CH4 Cal Offset:		0.019559		0.000000	
NMHC Cal Slope:		0.991840		0.996802	
ivivii ic cai siope.		0.331040		0.330002	

Notes: ZAG was replaced after as founds. No adjustment made.

0.043208

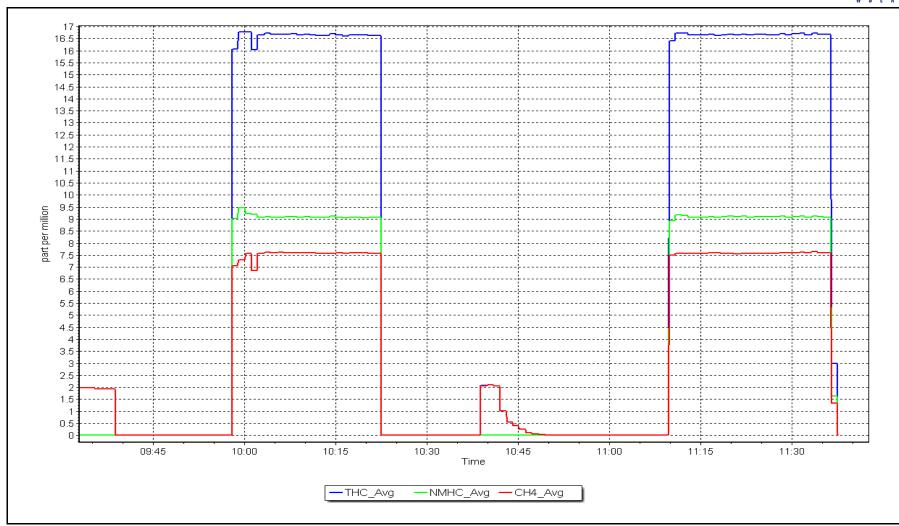
Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: March 19, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Conklin

Calibration Date: March 20, 2024

Start time (MST): 9:23 Reason: Removal Station number: AMS21

Last Cal Date: March 18, 2024

End time (MST): 10:47

Removed Gas Expiry: NA

### **Calibration Standards**

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 497.9 ppm CH4 Equiv Conc. 1067.7 ppm

Removed C3H8 Conc. 207.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>): Diff between cyl (NM): Calibrator Model: Teledyne API T700 Serial Number:

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Start Finish Start Finish** CH4 SP Ratio: 3.04E-04 NMHC SP Ratio: NA 4.82E-05 NA NMHC Peak Area: 189786 CH4 Retention time: 13.8 NA NA **OFF** OFF Flat Baseline: OFF OFF Zero Chromatogram:

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.09	1.002
as found 2nd point	4960	40.1	8.56	8.62	0.994
as found 3rd point	4980	20.0	4.27	4.40	0.971
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Ave	Average Correction Factor			
Baseline Corr AF:	17.09	Prev response	17.11	*% change	-0.1%		
Baseline Corr 2nd AF:	8.6	AF Slope:	0.995642	AF Intercept:	0.069188		
Baseline Corr 3rd AF:	4.4	AF Correlation:	0.999923	* = > +/-5% change initiates investigation			



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

11 9 L A					VEI SIUII-UU-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.04	1.011
as found 2nd point	4960	40.1	4.57	4.54	1.006
as found 3rd point	4980	20.0	2.28	2.33	0.978
new cylinder response					
calibrator zero					
nigh point					
second point					
hird point					
as left zero					
as left span					
			Avera	age Correction Factor	
Baseline Corr AF:	9.04	Prev response	9.11	*% change	-0.8%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.986540	AF Intercept:	0.035018
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999919	* = > +/-5% change initial	tes investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
s found span	4920	80.2	7.99	8.04	0.993
as found 2nd point	4960	40.1	3.99	4.07	0.981
as found 3rd point	4980	20.0	1.99	2.07	0.963
new cylinder response					
calibrator zero					
nigh point					
second point					
hird point					
as left zero					
as left span					
			Avera	age Correction Factor	
Baseline Corr AF:	8.04	Prev response	8.00	*% change	0.5%
Baseline Corr 2nd AF:	4.07	AF Slope:	1.004757	AF Intercept:	0.035968
Baseline Corr 3rd AF:	2.07	AF Correlation:	0.999907	* = > +/-5% change initial	tes investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.995216		NA NA	
THC Cal Offset:		0.062766		NA	
CH4 Cal Slope:		0.999651		NA	
CH4 Cal Offset:		0.019559		NA	
NMHC Cal Slope:		0.991840		NA	

Baseline dipping during daily system checks. Removing instrument for further troubleshooting in the

0.043208

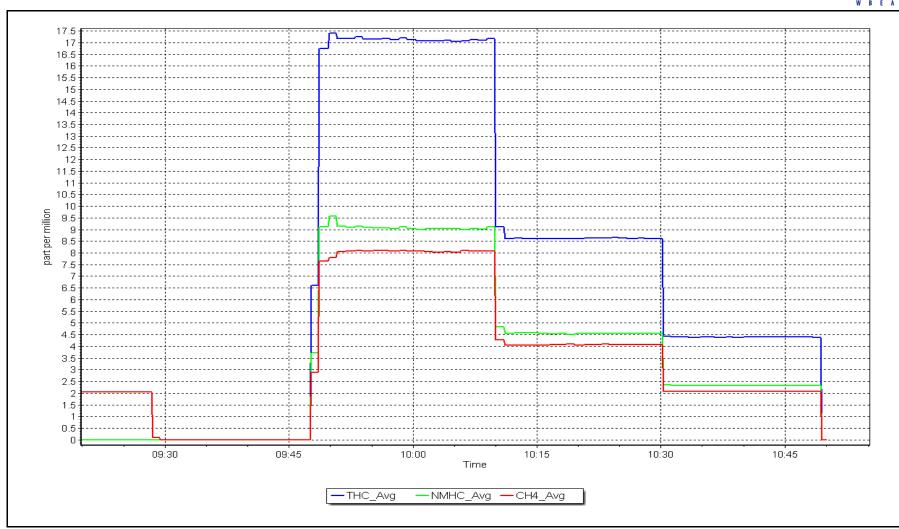
Calibration Performed By: Jan Castro

NMHC Cal Offset:

Notes:

NMHC Calibration Plot Date: March 20, 2024 Location: Conklin







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Conklin Station Name: Calibration Date: March 20, 2024

Start time (MST): 11:24 Install Reason:

Station number: AMS21 Last Cal Date: NA

End time (MST): 13:35

Removed Gas Expiry: NA

#### **Calibration Standards**

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 CH4 Equiv Conc. 1067.7 ppm ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NΑ

497.9 Removed CH4 Conc. CH4 Equiv Conc. 1067.7 ppm ppm

Removed C3H8 Conc. Diff between cyl (THC): 207.2 ppm Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 953

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1331259520

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

**Start Finish Start Finish** CH4 SP Ratio: NA 2.55E-04 NMHC SP Ratio: NA 5.96E-05 15.0 NMHC Peak Area: CH4 Retention time: NA NA 153262 **OFF** ON Flat Baseline: OFF OFF Zero Chromatogram:

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero							
as found span							
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.01			
high point	4920	80.2	17.13	17.04	1.005		
second point	4960	40.1	8.56	8.59	0.997		
third point	4980	20.0	4.28	4.36	0.982		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	17.13	17.00	1.008		
			P	Average Correction Factor	0.995		
Baseline Corr AF:	NA	Prev response	NA	*% change	NA		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.11	1.003
second point	4960	40.1	4.57	4.59	0.995
third point	4980	20.0	2.28	2.33	0.980
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.11	1.003
			Avera	age Correction Factor	0.993
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero			, , , ,		
as rourid zero					
as found span					
as found span as found 2nd point					
as found span as found 2nd point					
as found span as found 2nd point as found 3rd point new cylinder response					
as found span as found 2nd point as found 3rd point new cylinder response	5000	0.0	0.00	0.01	
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4920	0.0 80.2	0.00 7.99	0.01 7.93	1.007
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point	4920 4960				
es found span es found 2nd point es found 3rd point new cylinder response calibrator zero nigh point second point	4920	80.2	7.99	7.93	1.007
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point second point	4920 4960	80.2 40.1	7.99 3.99	7.93 3.99	1.007 1.000
as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point second point third point as left zero	4920 4960 4980	80.2 40.1 20.0	7.99 3.99 2.00	7.93 3.99 2.03	1.007 1.000 0.984
as found span as found 2nd point as found 3rd point as left zero as left span	4920 4960 4980 5000	80.2 40.1 20.0 0.0	7.99 3.99 2.00 0.00 7.99	7.93 3.99 2.03 0.00	1.007 1.000 0.984
as found span as found 2nd point as found 3rd point as left zero as left span	4920 4960 4980 5000	80.2 40.1 20.0 0.0	7.99 3.99 2.00 0.00 7.99	7.93 3.99 2.03 0.00 7.88	1.007 1.000 0.984  1.013
	4920 4960 4980 5000 4920	80.2 40.1 20.0 0.0 80.2	7.99 3.99 2.00 0.00 7.99	7.93 3.99 2.03 0.00 7.88 age Correction Factor	1.007 1.000 0.984  1.013 0.997
as found span as found 2nd point as found 3rd point as light point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920	80.2 40.1 20.0 0.0 80.2	7.99 3.99 2.00 0.00 7.99	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as light point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2 Prev response AF Slope:	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as light point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept:	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as light point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as left point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start NA	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept: *=>+/-5% change initiat  **Finish* 0.993227	1.007 1.000 0.984  1.013 0.997 NA
as found span as found 2nd point as found 3rd point as left zero as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF: Braseline Corr 3rd AF:  THC Cal Slope: THC Cal Offset:	4920 4960 4980 5000 4920 NA	80.2 40.1 20.0 0.0 80.2  Prev response AF Slope: AF Correlation: Calibration Start NA NA	7.99 3.99 2.00 0.00 7.99 Avera	7.93 3.99 2.03 0.00 7.88 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat  Finish 0.993227 0.057164	1.007 1.000 0.984  1.013 0.997 NA

Notes: Install calibration. Adjusted zero and span. Use zero chromatogram

NA

Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.029409



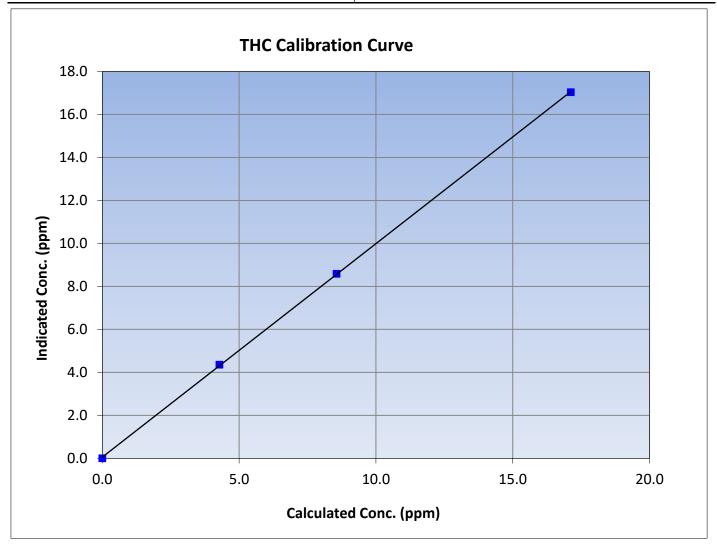
## **THC Calibration Summary**

Version-06-2022

#### **Station Information**

March 20, 2024 **Previous Calibration:** NA Calibration Date: Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:24 End Time (MST): 13:35 Analyzer make: Thermo 55i Analyzer serial #: 1331259520

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.01		Correlation Coefficient	0.999959	≥0.995	
17.13	17.04	1.0050	Correlation Coemicient	0.55555	20.333	
8.56	8.59	0.9968	Slope	0.993227	0.90 - 1.10	
4.28	4.36	0.9822	Slope	0.993227	0.90 - 1.10	
			Intercept	0.057164	+/-0.5	





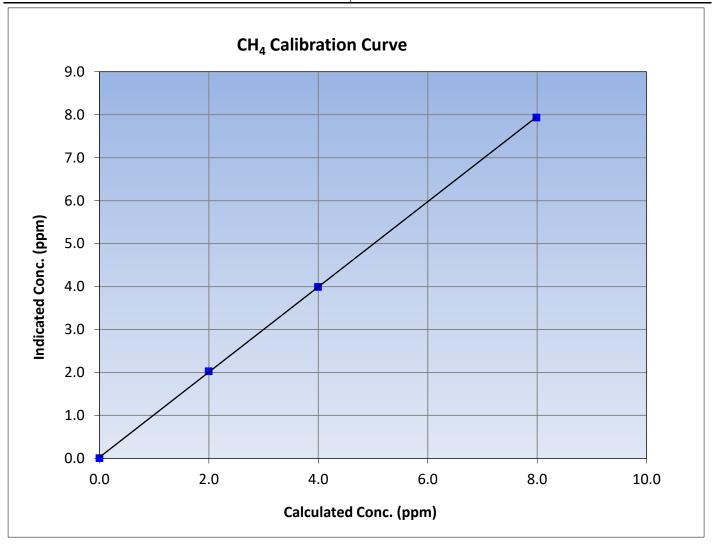
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

March 20, 2024 Calibration Date: **Previous Calibration:** NA Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:24 End Time (MST): 13:35 Analyzer make: Analyzer serial #: Thermo 55i 1331259520

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.01		Correlation Coefficient	0.999969	≥0.995
7.99	7.93	1.0066	Correlation Coemicient	0.555505	20.333
3.99	3.99	1.0000	Slope	0.991351	0.90 - 1.10
2.00	2.03	0.9845	Siope	0.551551	0.90 - 1.10
			Intercept	0.026556	+/-0.5





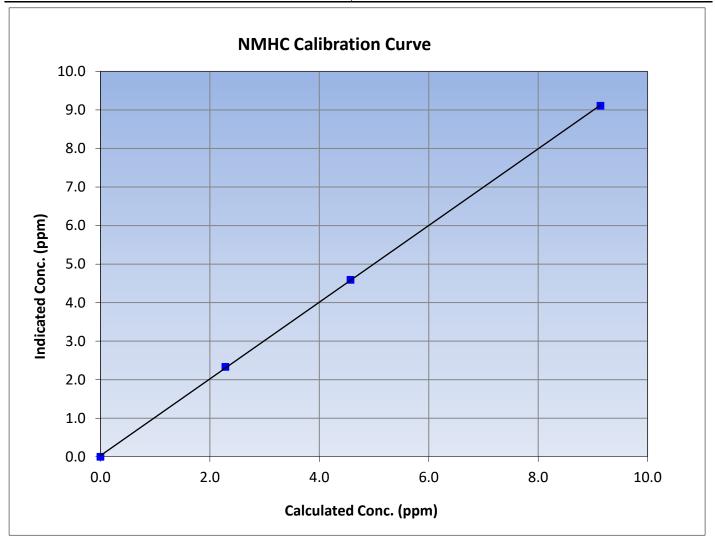
## **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

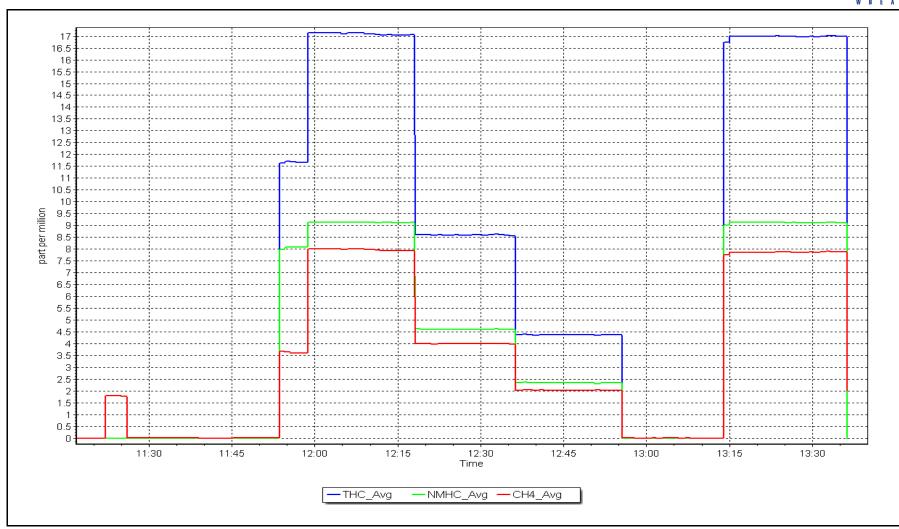
March 20, 2024 Calibration Date: **Previous Calibration:** NA Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:24 End Time (MST): 13:35 Analyzer make: Analyzer serial #: 1331259520 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999952	≥0.995
9.14	9.11	1.0032	Correlation Coefficient	0.555552	20.333
4.57	4.59	0.9949	Slope	0.995229	0.90 - 1.10
2.28	2.33	0.9797	Slope	0.993229	0.90 - 1.10
			Intercept	0.029409	+/-0.5



NMHC Calibration Plot Date: March 20, 2024 Location: Conklin







## NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Conklin

Calibration Date: March 26, 2024

Start time (MST): 8:56 Reason:

Routine

Station number: AMS21

Last Cal Date: February 14, 2024

End time (MST): 13:29

#### **Calibration Standards**

NO Gas Cylinder #: SA18828 Cal Gas Expiry Date: November 3, 2031

NOX Cal Gas Conc: 48.90 NO Cal Gas Conc: 48.80 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 48.90 ppm 48.80 ppm

NOX gas Diff: NO gas Diff:

Teledyne API T700 Serial Number: 3810 Calibrator Model: ZAG make/model: Teledyne API T701H Serial Number: 364

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1501663731

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.050 1.004 NO bkgnd or offset: 10.5 10.1 NOX coeff or slope: 0.993 0.993 NOX bkgnd or offset: 10.6 10.2 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 150.6 147.3

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.993108	0.994854
NO <sub>x</sub> Cal Offset:	2.428003	2.228020
NO Cal Slope:	0.994636	1.000020
NO Cal Offset:	1.768002	1.008029
NO <sub>2</sub> Cal Slope:	1.004592	0.996734
NO <sub>2</sub> Cal Offset:	-0.278421	-0.362609



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dilı	ution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4918	82.0	802.0	800.1	1.9	837.8	836.6	1.1	0.9572	0.9564
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4918	82.0	802.0	800.3	1.6	799.0	801.0	-1.7	1.0037	0.9992
second point	4959	41.0	401.0	400.2	0.8	402.2	401.2	1.0	0.9970	0.9974
third point	4980	20.5	200.5	200.1	0.4	203.8	202.4	1.4	0.9837	0.9884
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4918	82.0	802.0	385.6	416.3	796.6	382.9	413.7	1.0067	1.0071
							Average C	Correction Factor	0.9948	0.9950
Corrected As fo	ound NO <sub>X</sub> =	837.9 ppb	NO =	836.7 ppb	* = > +/-5%	% change initiates	investigation	*Percent Chan	ge NO <sub>X</sub> =	4.7%
Previous Respo	onse NO <sub>X</sub> =	798.9 ppb	NO =	797.6 ppb				*Percent Chan	ge NO =	4.7%
Baseline Corr 2	2nd pt NO <sub>X</sub> =	NA ppb	NO =		As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	$3rd pt NO_x =$	NA ppb	NO =	NA ppb	As found	$d = NO r^2$ :		NO SI:	NO Int:	
	-	-			As found	d $NO_2 r^2$ :		NO2 SI: ;	NO <sub>2</sub> Int:	
				G	GPT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Refere concentration (pp		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 atration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	erter Efficiency on Limit = 96-104%
as found	d GPT zero									
as found GPT po	oint (400 ppb NO2)									
as found GPT po	oint (200 ppb NO2)									
as found GPT po	oint (100 ppb NO2)									
1st GPT point	it (400 ppb O3)	797.7		383.0	416.3		415.1	1.0030		99.7%
2nd GPT poin	nt (200 ppb O3)	797.7		593.2	206.1		204.1	1.0100		99.0%
3rd GPT poin	nt (100 ppb O3)	797.7		696.4	102.9		102.3	1.0063		99.4%
						Average Co	rrection Factor	r 1.0064	4	99.4%

Notes:

Changed sample inlet filter after as founds. Adjusted Span only. Used 2nd NO reference point because of drift.

Calibration Performed By:

Jan Castro



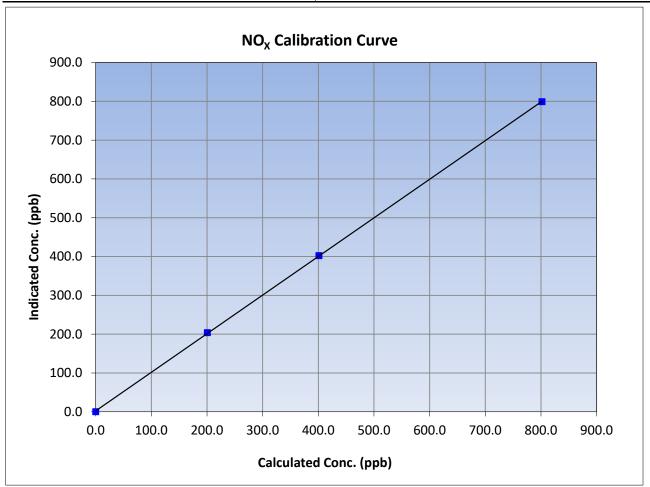
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 14, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:56 End Time (MST): 13:29 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999967	≥0.995
802.0	799.0	1.0037	Correlation Coefficient	0.555507	20.333
401.0	402.2	0.9970	Slope	0.994854	0.90 - 1.10
200.5	203.8	0.9837	Slope	0.994654	0.90 - 1.10
			Intercept	2.228020	+/-20





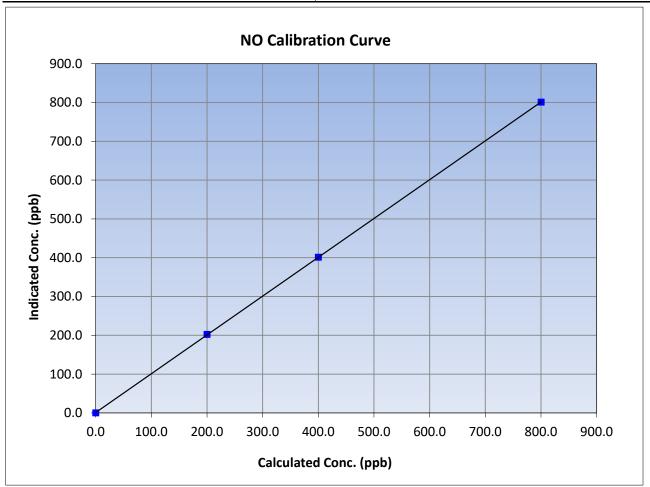
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 14, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:56 End Time (MST): 13:29 Analyzer make: Thermo 42i Analyzer serial #: 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999992	≥0.995
800.3	801.0	0.9992	correlation coefficient	0.999992	20.333
400.2	401.2	0.9974	Slope	1.000020	0.90 - 1.10
200.1	202.4	0.9884	Slope	1.000020	0.90 - 1.10
			Intercept	1.008029	+/-20





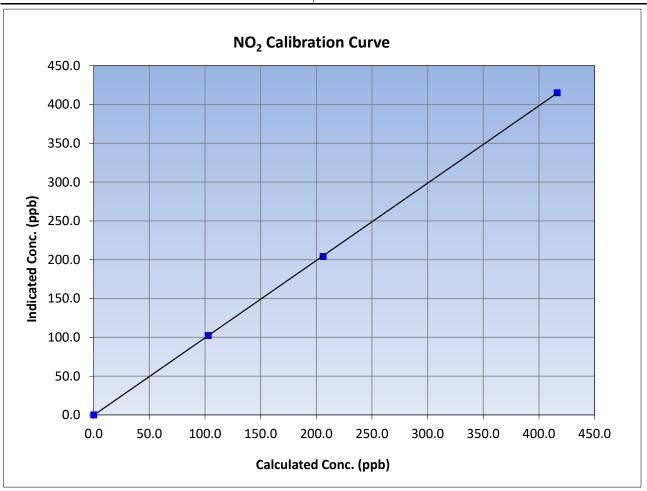
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 14, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 8:56 End Time (MST): 13:29 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999985	≥0.995
416.3	415.1	1.0030	Correlation Coefficient	0.999965	20.333
206.1	204.1	1.0100	Slope	0.996734	0.90 - 1.10
102.9	102.3	1.0063	Slope	0.990754	0.90 - 1.10
			Intercept	-0.362609	+/-20

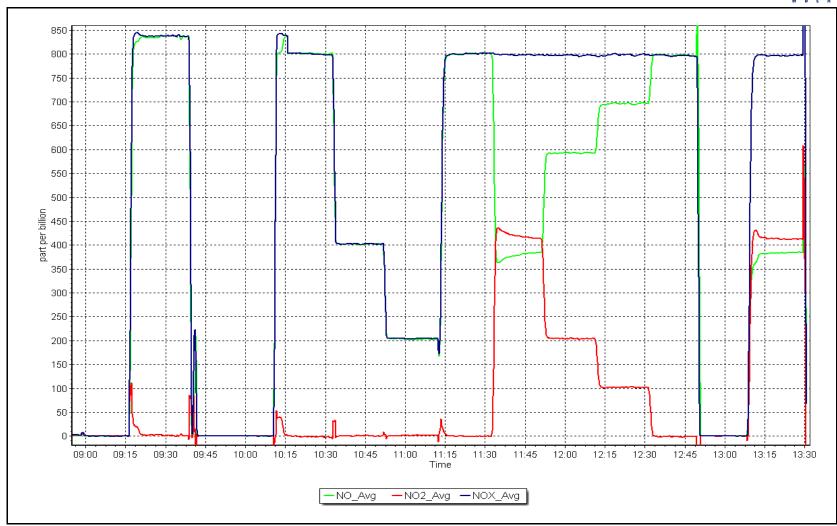


NO<sub>x</sub> Calibration Plot

Date:

March 26, 2024 Location: Conklin







## O<sub>3</sub> Calibration Report

Version-01-2020

Station Information

Station Name: Conklin

Calibration Date: March 15, 2024

Start time (MST): 10:47
Reason: Routine

Station number: AMS21

Last Cal Date: February 1, 2024

End time (MST): 14:15

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701H Serial Number: 691

**Analyzer Information** 

Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.001543 0.999171 -1.2 -1.1 Coeff or Slope: Calibration intercept: 0.180000 0.320000 0.998 0.998

#### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	800.0	0.0	0.2	
as found span	5000	954.0	400.0	399.7	1.001
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.1	
high point	5000	951.2	400.0	399.9	1.000
second point	5000	807.8	200.0	200.2	0.999
third point	5000	703.5	100.0	100.5	0.995
as left zero	5000	800.0	0.0	0.0	
as left span	5000	951.6	400.0	401.0	0.998
			Avera	ge Correction Factor	0.998
Baseline Corr As found: Baseline Corr 2nd AF pt:	399.5 NA	Previous response AF Slope		*% change AF Intercept:	-0.3%

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Sample inlet filters changed after as founds. No adjustment made.

Calibration Performed By: Jan Castro



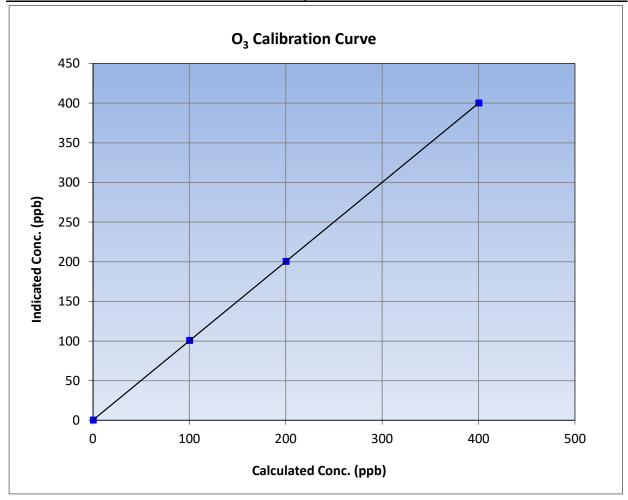
## O<sub>3</sub> Calibration Summary

Version-01-2020

#### **Station Information**

Calibration Date: March 15, 2024 **Previous Calibration:** February 1, 2024 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:47 End Time (MST): 14:15 Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Ic) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.1		Correlation Coefficient	0.999999	≥0.995				
400.0	399.9	1.0003	Correlation Coefficient	0.555555	20.333				
200.0	200.2	0.9990	Slope	0.999171	0.90 - 1.10				
100.0	100.5	0.9950	Slope	0.5551/1	0.90 - 1.10				
			- Intercept	0.320000	+/- 5				

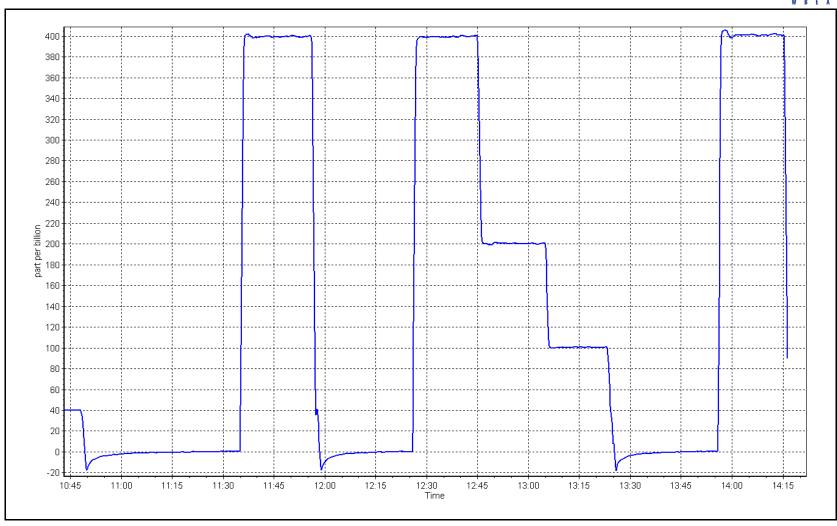


O<sub>3</sub> Calibration Plot

Date: March 15, 2024

Location: Conklin







#### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024 **Station Information** Station Name: Conklin Station number: AMS 21 March 18, 2024 Calibration Date: Last Cal Date: February 12, 2024 Start time (MST): 11:24 End time (MST): 12:17 Analyzer Make: **API T640** S/N: 326 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388754 Temp/RH standard: S/N: 388754 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> Measured <u>Adjusted</u> (Limits) As found As left T (°C) 7.80 7.26 7.80 +/- 2 °C P (mmHg) 708.90 710.90 708.90 +/- 10 mmHg Flow (LPM) 5.01 5.05 5.01 +/- 0.25 LPM PW% (pump) 39.00 39.00 >80% Zero Verification PM w/o HEPA: 0.00 4.30 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet Head Clean Alignment Factor On: ✓ PM Inlet observation: **Quarterly Calibration Test** 10.90 Refractive Index: Expiry Date: September 29, 2024 **SPAN DUST** Lot No.: 100128-050-040 As found Adjusted (Limits) <u>Parameter</u> Post maintenance As left **PMT Peak Test** 9.10 11.10 11.10 +/- 0.5 Date Optical Chamber Cleaned: March 18, 2024 Date Disposable Filter Changed: March 18, 2024 Post- maintenance Zero Verification: 0.00 PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: December 7, 2023 Date RH/T Sensor Cleaned: December 7, 2023

Notes: Verified flow, pressure, temperature and pump power.Leak check passed. No adjustment made.

Calibration by: Jan Castro



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS22 JANVIER MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

**AMS 22** 

Version-01-2020

#### **Station Information**

Station Name: Janvier Station number:

Calibration Date: March 1, 2024 Last Cal Date: February 23, 2024

Start time (MST): 12:47 End time (MST): 16:54

Reason: Routine

#### **Calibration Standards**

Cal Gas Concentration: 50.11 ppm Cal Gas Exp Date: January 18, 2029

Cal Gas Cylinder #: CC281519

Removed Cal Gas Conc: 50.11 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Analyzer Range 0 - 1000 ppb

**Finish Finish** Start Start Calibration slope: 1.000307 1.001522 Backgd or Offset: 24.0 23.8 Calibration intercept: 1.464248 0.764071 Coeff or Slope: 1.035 1.035

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.3	
as found span	4920	79.8	799.8	799.3	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4920	79.8	799.8	801.4	0.998
second point	4960	39.9	399.9	402.0	0.995
third point	4980	20.0	200.4	201.5	0.995
as left zero	5000	0.0	0.0	0.3	
as left span	4920	79.8	799.8	801.9	0.997
·			Averag	ge Correction Factor	0.996
Baseline Corr As found:	799.00	Previous response	801.50	*% change	-0.3%

Baseline Corr As found: 799.00 Previous response 801.50 \*% change -0.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept:

NA AF Slope: AF Intercept:

\* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Rene Chamberland



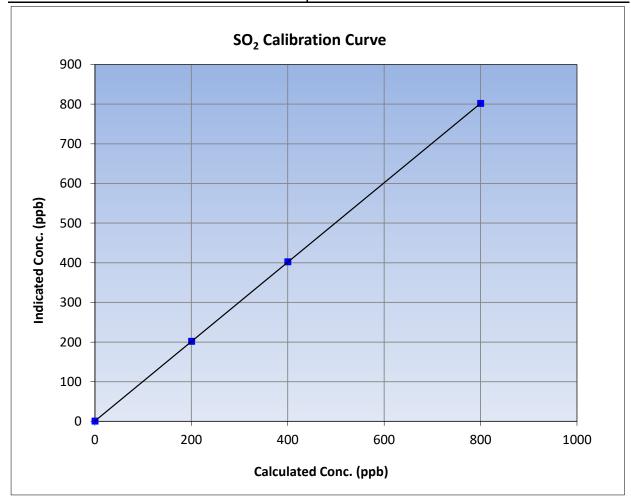
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 1, 2024 **Previous Calibration:** February 23, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 12:47 End Time (MST): 16:54 Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.4		Correlation Coefficient	0.999998	≥0.995				
799.8	801.4	0.9980	- Correlation Coefficient	0.999996	20.995				
399.9	402.0	0.9947	Slope	1.001522	0.90 - 1.10				
200.4	201.5	0.9947	Slope	1.001522	0.90 - 1.10				
			- Intercept	0.764071	+/-30				



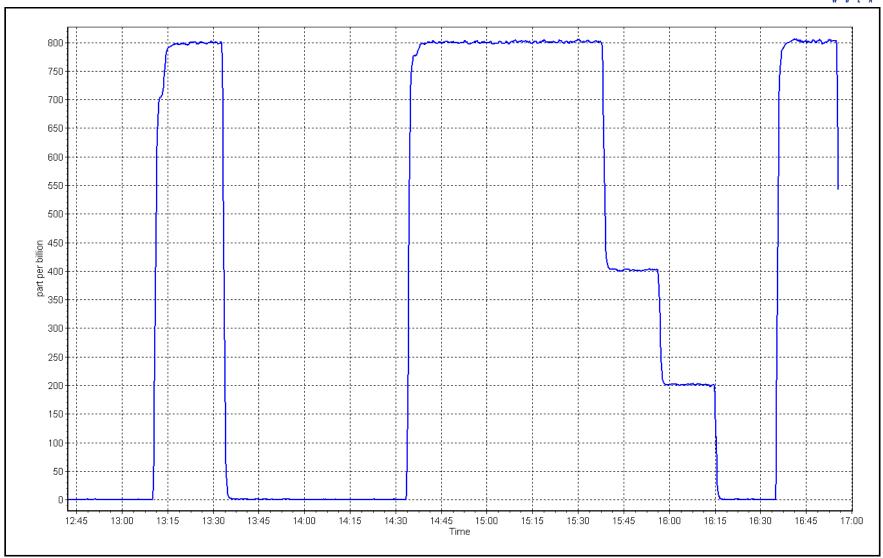
**SO2 Calibration Plot** 

Date:

March 1, 2024

Location: Janvier







## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Janvier
Calibration Date: March 11, 2024

Start time (MST): 10:50

Reason:

Maintenance

Station number: AMS 22

Last Cal Date: Ma

End time (MST):

March 1, 2024

13:16

**Calibration Standards** 

Cal Gas Concentration: 50.11

Cal Gas Cylinder #: CC281519

Removed Cal Gas Conc: 50.11
Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: January 18, 2029

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3806 Serial Number: 4890

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1152430006

ppm

ppm

Analyzer Range 0 - 1000 ppb

Start Finish

 Calibration slope:
 1.001522
 0.999806

 Calibration intercept:
 0.764071
 0.664437

Backgd or Offset: 23.8

Backgd or Offset: 23.8 Coeff or Slope: 1.035 23.6 1.022

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	79.8	799.8	799.8	1.000
second point	4960	39.9	399.9	401.5	0.996
third point	4980	20.0	200.4	201.0	0.997
as left zero	5000	0.0	0.0	0.7	
as left span	4920	79.8	799.8	802.7	0.996
			Averag	ge Correction Factor	0.998

Baseline Corr As found: NA Previous response NA \*% change NA Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

No as founds completed because the pump was dead on arrival. Replaced the pump. Adjusted span

only.

Calibration Performed By: Rene Chamberland



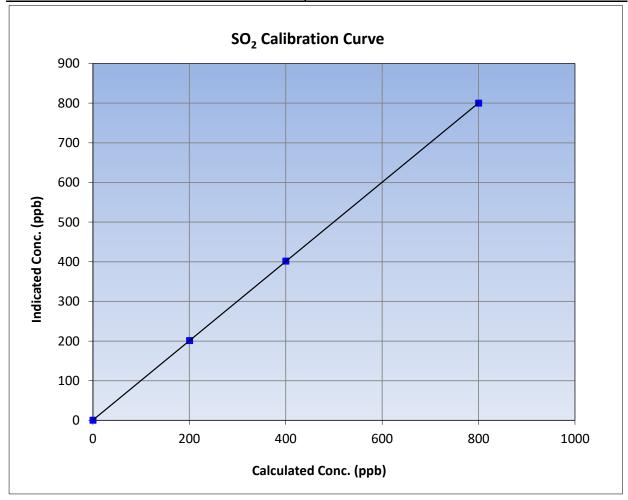
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 11, 2024 **Previous Calibration:** March 1, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:50 End Time (MST): 13:16 Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Calibration Data									
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.2		Correlation Coefficient	0.999996	≥0.995				
799.8	799.8	1.0000	Correlation Coefficient	0.555550	20.333				
399.9	401.5	0.9960	Slope	0.999806	0.90 - 1.10				
200.4	201.0	0.9972	Slope	0.555600	0.90 - 1.10				
			- Intercept	0.664437	+/-30				



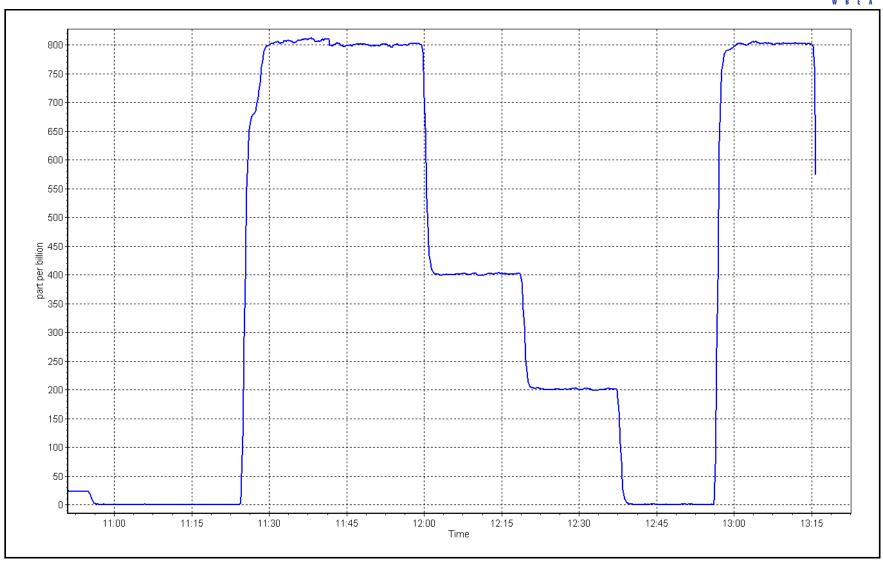
**SO2 Calibration Plot** 

Date:

March 11, 2024

Location: Janvier







#### TRS Calibration Report

Version-11-2021

**Station Information** 

Station Name: Janvier

Calibration Date: March 26, 2024

Start time (MST): 10:52 Reason: Routine Station number: AMS22

Last Cal Date: February 22, 2024

End time (MST): 14:47

**Calibration Standards** 

Cal Gas Concentration: November 15, 2026 5.02 ppm Cal Gas Exp Date:

CC424047 Cal Gas Cylinder #:

Removed Cal Gas Conc: 5.02 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 4890

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

Converter serial #: 587 Converter make: CDN-101

Analyzer Range 0 - 100 ppb

> **Finish** <u>Finish</u> <u>Start</u> <u>Start</u> 0.996235 0.989096 Backgd or Offset: 3.64

Calibration slope: 3.65 Calibration intercept: 0.440650 0.440430 Coeff or Slope: 1.188 1.188

#### **TRS As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.2	
as found span	4920	79.7	80.0	79.8	1.005
as found 2nd point	4960	39.8	40.0	40.3	0.997
as found 3rd point	4980	19.9	20.0	20.3	0.994
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4920	79.7	80.0	79.5	1.007
second point	4960	39.8	40.0	40.1	0.997
third point	4980	19.9	20.0	20.3	0.984
as left zero	5000	0.0	0.0	0.4	
as left span	4920	79.7	80.0	79.5	1.007
SO2 Scrubber Check	4920	79.8	798.0	0.0	
Date of last scrubber chang	ge:	_	_	Ave Corr Factor	0.996
				,	

Date of last scrubber change	e:			Ave Corr Factor	0.996	
Date of last converter efficie	ency test:			e	fficiency	
Baseline Corr As found:	79.6	Prev response:	80.16	*% change:	-0.7%	

Prev response: Baseline Corr 2nd AF pt: 40.1 AF Slope: 0.994237 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999974 20.1

\* = > +/-5% change initiates investigation

0.360568

Changed the inlet filter after as founds. Ran an SO2 scrubber check after the calibrator zero. No Notes: adjustments made.

Calibration Performed By: Rene Chamberland



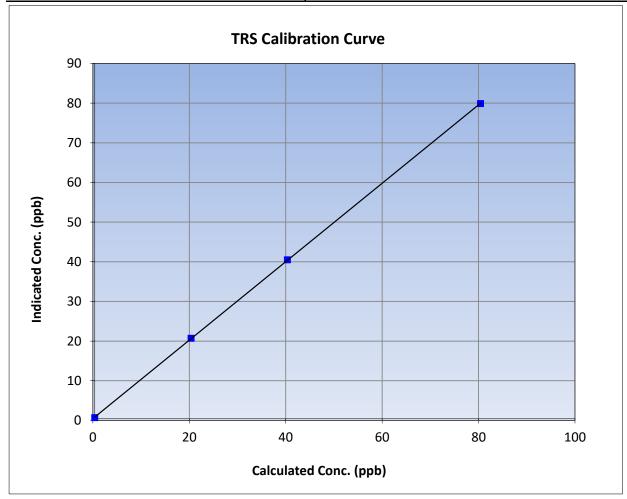
### **TRS Calibration Summary**

Version-11-2021

#### **Station Information**

Calibration Date: March 26, 2024 **Previous Calibration:** February 22, 2024 Station Name: Janvier Station Number: AMS22 Start Time (MST): 10:52 End Time (MST): 14:47 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.3		Correlation Coefficient	0.999984	≥0.995				
80.0	79.5	1.0066	Correlation Coefficient	0.333364	20.993				
40.0	40.1	0.9965	Slope	0.989096	0.90 - 1.10				
20.0	20.3	0.9842	Slope	0.989090	0.90 - 1.10				
			- Intercept	0.440430	+/-3				

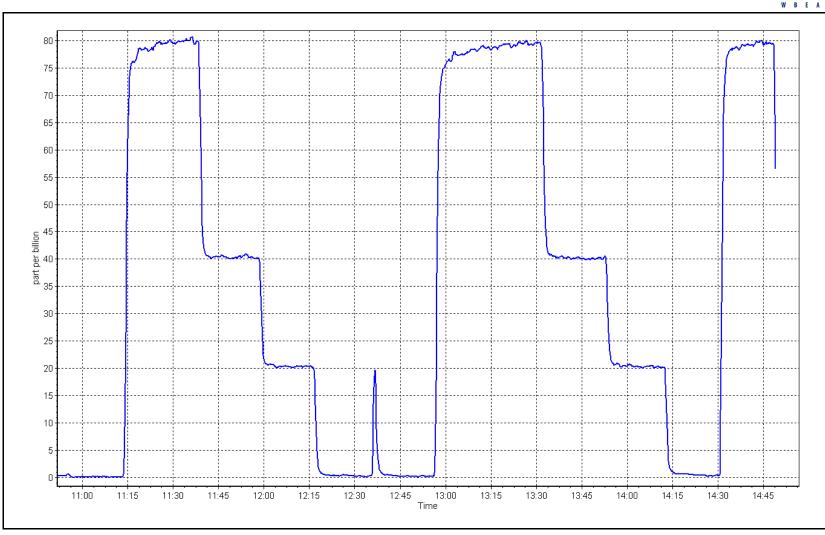


TRS Calibration Plot

Date: March 26, 2024

Location: Janvier







## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

#### **Station Information**

Station Name: Janvier

Calibration Date: March 1, 2024

Start time (MST): 12:47 Routine Reason:

Station number: AMS 22

Last Cal Date: February 29, 2024

End time (MST): 16:54

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 CH4 Equiv Conc. 1075.9 ppm ppm

208.4 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NA

Removed CH4 Conc. 502.8 CH4 Equiv Conc. 1075.9 ppm ppm

Removed C3H8 Conc. 208.4 Diff between cyl (THC): ppm

Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: Teledyne API 700 Serial Number: 3806 ZAG make/model: Teledyne API 701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

Analyzer serial #: 1317958219

CH4 Range (ppm): 0 - 10 ppm

**Finish** Start Start Finish CH4 SP Ratio: 2.890E-04 2.390E-04 NMHC SP Ratio: 5.52E-05 5.42E-05 CH4 Retention time: 13.1 11.7 NMHC Peak Area: 165825 168687

Zero Chromatogram: OFF OFF Flat Baseline: OFF

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	17.17	17.04	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	17.17	17.15	1.001
second point	4960	39.9	8.59	8.51	1.009
third point	4980	20.0	4.30	4.27	1.009
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	17.17	17.13	1.002
			,	Average Correction Factor	1.006
Baseline Corr AF:	17.04	Prev response	17.17	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation

OFF



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	9.15	9.19	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	79.8	9.15	9.12	1.003
second point	4960	39.9	4.57	4.57	1.002
hird point	4980	20.0	2.29	2.29	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.15	9.14	1.000
			A	verage Correction Factor	1.002
Baseline Corr AF:	9.19	Prev response	9.15	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
as found zero	5000	0.0	0.00	0.00	
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co		CF <i>Limit=</i> 0.95-1.05
as found span	4920	79.8	8.03	7.86	1.022
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	79.8	8.03	8.03	0.999
second point	4960	39.9	4.01	3.94	1.018
hird point	4980	20.0	2.01	1.98	1.018
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	8.03	7.99	1.005
			A	verage Correction Factor	1.012
Baseline Corr AF:	7.86	Prev response	8.02	*% change	-2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		0.999432		0.999011	
THC Cal Offset:		0.007396		-0.026194	
CH4 Cal Slope:		0.999247		1.001182	
5 5d. 5.0pc.		0.000=			

Notes:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Changed the inlet filter and H2 cylinder after as founds. Adjusted the carrier run pressure. Adjusted the window timings. Adjusted the span.

-0.029561

0.996756

0.003768

Calibration Performed By: Rene Chamberland

0.002236

0.999206

0.005960



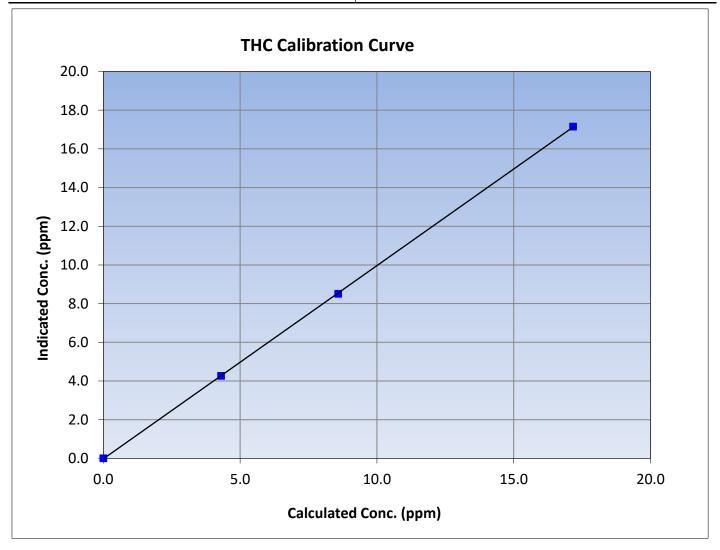
## **THC Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 1, 2024 **Previous Calibration:** February 29, 2024 Station Name: AMS 22 Janvier Station Number: Start Time (MST): 12:47 End Time (MST): 16:54 Analyzer make: Thermo 55i Analyzer serial #: 1317958219

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999981	≥0.995
17.17	17.15	1.0012	Correlation Coemicient	0.555501	20.333
8.59	8.51	1.0092	Slope	0.999011	0.90 - 1.10
4.30	4.27	1.0086	Зюре	0.999011	0.90 - 1.10
		·	Intercept	-0.026194	+/-0.5





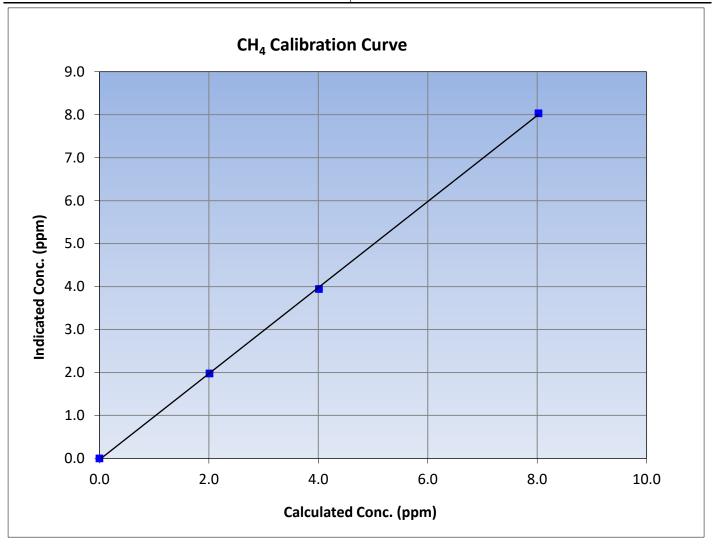
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

#### **Station Information**

Calibration Date: March 1, 2024 **Previous Calibration:** February 29, 2024 Station Name: AMS 22 Janvier Station Number: Start Time (MST): 12:47 End Time (MST): 16:54 Analyzer make: Analyzer serial #: 1317958219 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999896	≥0.995
8.03	8.03	0.9994	Correlation Coefficient	0.555650	20.333
4.01	3.94	1.0179	Slope	1.001182	0.90 - 1.10
2.01	1.98	1.0183	Slope	1.001182	0.90 - 1.10
			Intercept	-0.029561	+/-0.5





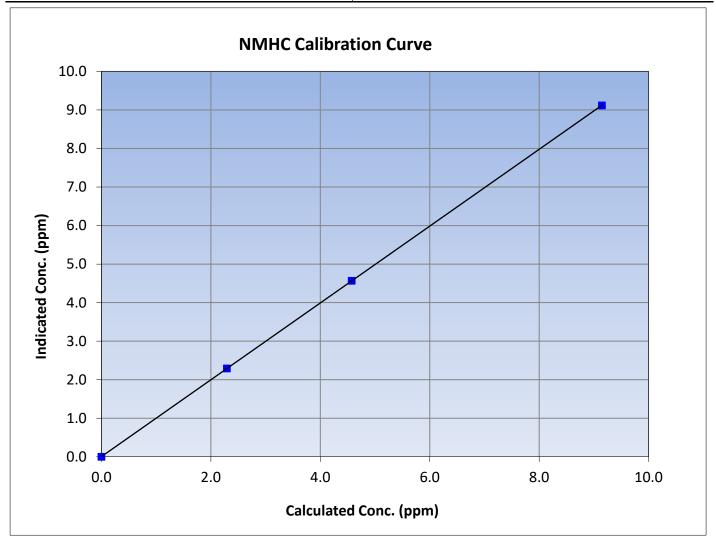
## **NMHC Calibration Summary**

Version-06-2022

#### **Station Information**

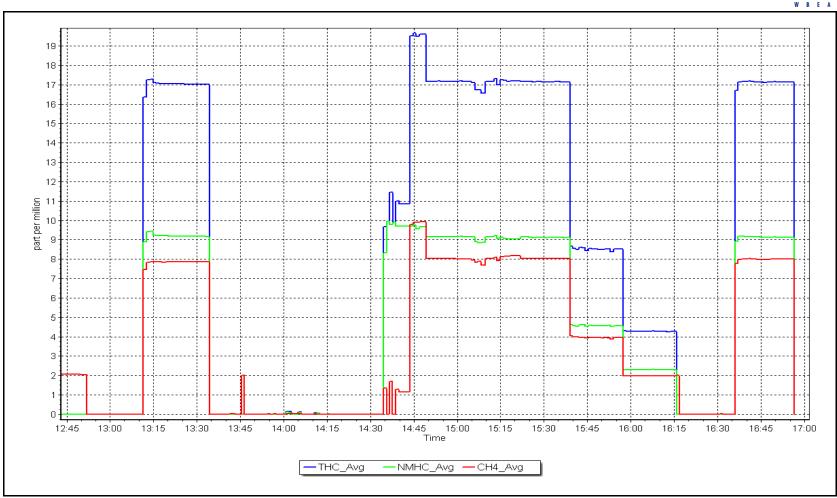
Calibration Date: March 1, 2024 **Previous Calibration:** February 29, 2024 Station Name: AMS 22 Janvier Station Number: Start Time (MST): 12:47 End Time (MST): 16:54 Analyzer make: Analyzer serial #: 1317958219 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.99999	≥0.995
9.15	9.12	1.0031	Correlation Coemicient	0.555555	20.993
4.57	4.57	1.0018	- Slope	0.996756	0.90 - 1.10
2.29	2.29	1.0002		0.990730	0.50 - 1.10
			- Intercept	0.003768	+/-0.5



NMHC Calibration Plot Date: March 1, 2024 Location: Janvier







## THC / CH<sub>4</sub> / NMHC Calibration Report

Station number: AMS 22

End time (MST): 12:46

Removed Gas Expiry: NA

Flat Baseline:

OFF

Last Cal Date: March 1, 2024

Version-06-2022

#### **Station Information**

Station Name: Janvier
Calibration Date: March 22, 2024

Start time (MST): 11:21

Reason: Cylinder Change

11:21

**Calibration Standards** 

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

C3H8 Cal Gas Conc. 208.4 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

Removed C3H8 Conc. 208.4 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API 700 Serial Number: 3806 ZAG make/model: Teledyne API 701 Serial Number: 4890

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1317958219

OFF

THC Range (ppm): 0 - 20 ppm

Zero Chromatogram:

NMHC Range (ppm): 0 - 10 ppm CH4 Range (ppm): 0 - 10 ppm

OFF

**Finish** Start Start Finish CH4 SP Ratio: 2.390E-04 2.390E-04 NMHC SP Ratio: 5.42E-05 5.42E-05 CH4 Retention time: 11.7 11.7 NMHC Peak Area: 168687 168687

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	79.8	17.17	17.43	0.985	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero						
high point						
second point						
third point						
as left zero	5000	0.0	0.00	0.00		
as left span	4920	79.8	17.17	17.58	0.977	
			Aver	age Correction Factor		
Baseline Corr AF:	17.43	Prev response	17.13	*% change	1.7%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		

OFF



as found zero

as found span

calibrator zero high point

as found 2nd point as found 3rd point new cylinder response

Set Point

Dil air flow rate

5000

4920

## **Wood Buffalo Environmental Association**

## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
0.0	0.00	0.00	
79.8	9.15	9.13	1.002

 second point

 third point

 as left zero
 5000
 0.0
 0.00
 0.00
 --- 

 as left span
 4920
 79.8
 9.15
 9.23
 0.991

 Average Correction Factor

**NMHC Calibration Data** 

Baseline Corr AF: 9.13 Prev response 9.12 \*% change 0.1%
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation

#### **CH4 Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	79.8	8.03	8.29	0.968	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero						
high point						
second point						
third point						
as left zero	5000	0.0	0.00	0.00		
as left span	4920	79.8	8.03	8.35	0.961	
			Aver	age Correction Factor		
Baseline Corr AF:	8.29	Prev response	8.00	*% change	3.5%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		

 Calibration Statistics

 Start
 Finish

 THC Cal Slope:
 0.999011

 THC Cal Offset:
 -0.026194

 CH4 Cal Slope:
 1.001182

 CH4 Cal Offset:
 -0.029561

 NMHC Cal Slope:
 0.996756

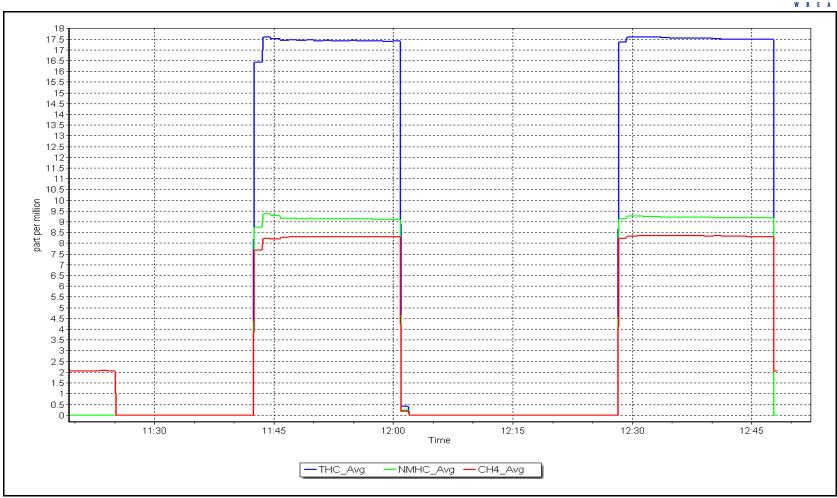
 NMHC Cal Offset:
 0.003768

Notes: Changed the N2 cylinder after as founds.

Calibration Performed By: Rene Chamberland

NMHC Calibration Plot Date: March 22, 2024 Location: Janvier







## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Station Name: Janvier
Calibration Date: March 25, 2024

Start time (MST): 10:19

Reason: Maintenance

Ct-ti-

Station number: AMS 22 Last Cal Date: March 1, 2024

End time (MST): 13:53

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

C3H8 Cal Gas Conc. 208.4 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

Removed C3H8 Conc. 208.4 ppm Diff between cyl (THC): Diff between cyl (CH<sub>d</sub>): Diff between cyl (NM):

Calibrator Model: Teledyne API 700 Serial Number: 3806

ZAG make/model: Teledyne API 701 Serial Number: 4890

### **Analyzer Information**

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

Analyzer serial #: 1317958219

CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 2.390E-04 2.360E-04 NMHC SP Ratio: 5.42E-05 5.52E-05 CH4 Retention time: 11.7 11.6 NMHC Peak Area: 168687 165650 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	17.17	17.27	0.994
as found 2nd point	4960	39.9	8.59	8.57	1.002
as found 3rd point	4980	20.0	4.30	4.28	1.006
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	17.17	17.17	1.000
second point	4960	39.9	8.59	8.54	1.006
third point	4980	20.0	4.30	4.27	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	17.17	17.20	0.998
			Av	erage Correction Factor	1.005
Baseline Corr AF:	17.27	Prev response	17.13	*% change	0.8%
Baseline Corr 2nd AF:	8.6	AF Slope:	1.006545	AF Intercept:	-0.033818
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999979	* = > +/-5% change initiates investigation	



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

NINAL	-1	Cali	hra	tion	Data
IAIAII	IC	Call	vı a	LIUII	Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	9.15	9.04	1.012
as found 2nd point	4960	39.9	4.57	4.50	1.016
as found 3rd point	4980	20.0	2.29	2.25	1.019
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	9.15	9.14	1.001
second point	4960	39.9	4.57	4.57	1.001
third point	4980	20.0	2.29	2.30	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.15	9.18	0.996
			Aver	rage Correction Factor	1.000
Baseline Corr AF:	9.04	Prev response	9.12	*% change	-0.9%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.989007	AF Intercept:	-0.010210
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999993	* = > +/-5% change initiates investigation	

## **CH4 Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	79.8	8.03	8.23	0.975	
as found 2nd point	4960	39.9	4.01	4.07	0.986	
as found 3rd point	4980	20.0	2.01	2.03	0.992	
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	79.8	8.03	8.03	0.999	
second point	4960	39.9	4.01	3.97	1.011	
third point	4980	20.0	2.01	1.97	1.019	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	79.8	8.03	8.02	1.001	
			Aver	age Correction Factor	1.010	
Baseline Corr AF:	8.23	Prev response	8.00	*% change	2.7%	
Baseline Corr 2nd AF:	4.07	AF Slope:	1.026422	AF Intercept:	-0.023208	
Baseline Corr 3rd AF:	2.03	AF Correlation:	0.999956	* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		0.999011		1.000249		
THC Cal Offset:		-0.026194	-0.023996			
CH4 Cal Slope:		1.001182	1.001651			
CH4 Cal Offset:		-0.029561	-0.024958			
NMHC Cal Slope:		0.996756	0.999256			
NMHC Cal Offset:		0.003768		0.000762		

Notes: Changed the pump after as founds. Adjusted span only.

Calibration Performed By: Rene Chamberland



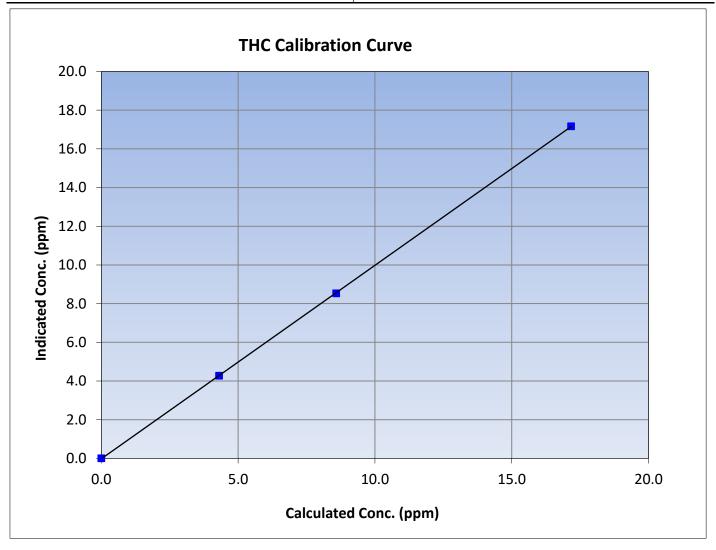
## **THC Calibration Summary**

Version-06-2022

## **Station Information**

March 25, 2024 Calibration Date: **Previous Calibration:** March 1, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:19 End Time (MST): 13:53 Analyzer make: Analyzer serial #: 1317958219 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999988	≥0.995
17.17	17.17	1.0001	Correlation Coefficient	0.333366	20.333
8.59	8.54	1.0060	Slope	1.000249	0.90 - 1.10
4.30	4.27	1.0083	Slope	1.000249	0.90 - 1.10
			Intercept	-0.023996	+/-0.5





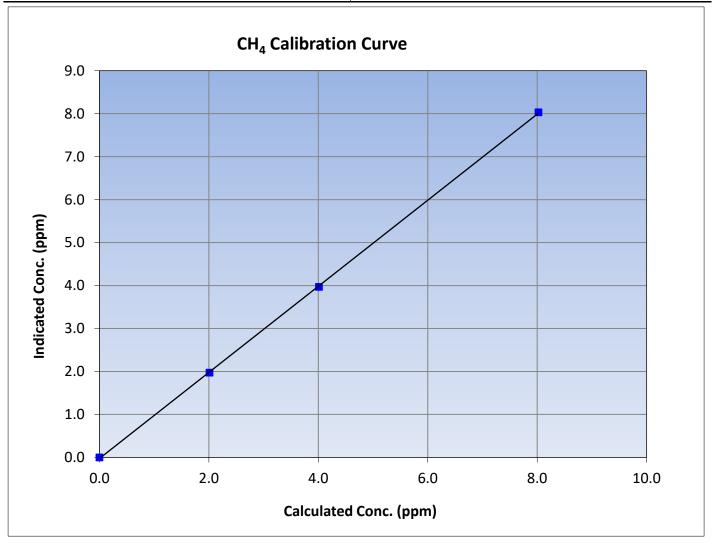
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

## **Station Information**

Calibration Date: March 25, 2024 **Previous Calibration:** March 1, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:19 End Time (MST): 13:53 Analyzer make: Analyzer serial #: 1317958219 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999949	≥0.995
8.03	8.03	0.9994	Correlation Coemicient	0.999949	20.333
4.01	3.97	1.0109	Slope	1.001651	0.90 - 1.10
2.01	1.97	1.0194	Slope	1.001031	0.90 - 1.10
			Intercept	-0.024958	+/-0.5





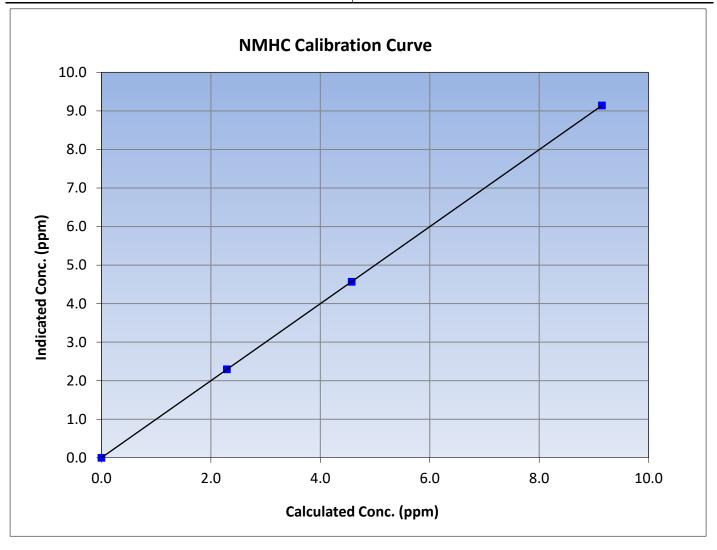
## **NMHC Calibration Summary**

Version-06-2022

## **Station Information**

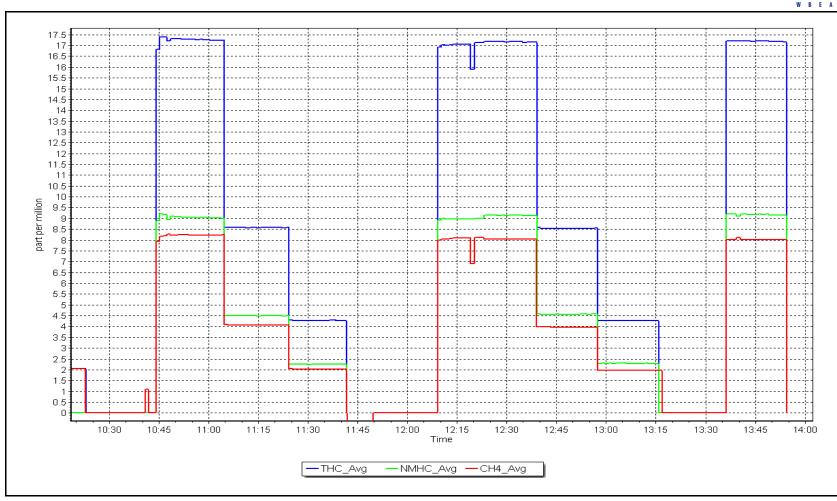
March 25, 2024 Calibration Date: **Previous Calibration:** March 1, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:19 End Time (MST): 13:53 Analyzer make: Analyzer serial #: 1317958219 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999999	≥0.995
9.15	9.14	1.0006	Correlation Coemicient	0.999999	20.993
4.57	4.57	1.0014	Slope	0.999256	0.90 - 1.10
2.29	2.30	0.9989	Slope	0.999230	0.90 - 1.10
			Intercept	0.000762	+/-0.5



NMHC Calibration Plot Date: March 25, 2024 Location: Janvier







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

### **Station Information**

Station Name: Janvier

Calibration Date: March 27, 2024

Start time (MST): 10:25 Reason: Routine Station number: AMS 22

Last Cal Date: February 28, 2024

End time (MST): 14:26

### **Calibration Standards**

NO Gas Cylinder #: DT0047765 Cal Gas Expiry Date: March 11, 2031

NOX Cal Gas Conc: 48.90 ppm NO Cal Gas Conc: 48.80 ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NOX Conc: 48.90 ppm Removed Gas NO Conc: 48.80 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3806 ZAG make/model: Teledyne API T701 Serial Number: 691

## **Analyzer Information**

Analyzer make: Teledyne API T200 Analyzer serial #: 833

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.840	0.853	NO bkgnd or offset:	0.0	0.0
NOX coeff or slope:	0.835	0.845	NOX bkgnd or offset:	-0.2	-0.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.3	6.4

## **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.000594	1.003829
NO <sub>x</sub> Cal Offset:	0.484102	0.024109
NO Cal Slope:	0.999460	1.005929
NO Cal Offset:	-0.576026	-0.915862
NO <sub>2</sub> Cal Slope:	1.004914	0.998553
NO <sub>2</sub> Cal Offset:	0.223696	-0.654801



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as found span	4918	82.0	802.0	800.3	1.6	791.5	782.9	8.6	1.0132	1.0223
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.2		
high point	4918	82.0	802.0	800.3	1.6	805.3	804.4	0.9	0.9959	0.9949
second point	4960	41.0	400.9	400.1	0.8	402.0	401.8	0.3	0.9973	0.9957
third point	4980	20.5	200.5	200.1	0.4	201.2	198.8	2.4	0.9964	1.0063
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.1	0.4		
as left span	4918	82.0	802.0	400.6	401.3	797.6	397.0	400.6	1.0055	1.0091
							Average C	Correction Factor	0.9965	0.9990
Corrected As fo	und NO <sub>x</sub> =	791.3 ppb	NO	= 782.9 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO <sub>X</sub> =	-1.5%
Previous Respor	nse NO <sub>x</sub> =	802.9 ppb	NO	= 799.3 ppb				*Percent Chang	ge NO =	-2.1%
Baseline Corr 2r	nd pt NO <sub>X</sub> =	NA ppb	NO	= NA ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt NO <sub>x</sub> =	NA ppb	NO	= NA ppb	As foun	d NO $r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				G	PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found (	GPT zero									
as found GPT poin	nt (400 ppb NO2)									
as found GPT poin	nt (200 ppb NO2)									
as found GPT poin	nt (100 ppb NO2)									
1st GPT point (	(400 ppb O3)	799.8		400.1	401.3		400.6	1.0018	3	99.8%
2nd GPT point	(200 ppb O3)	799.8		606.7	194.7		193.1	1.0085		99.2%
3rd GPT point	(100 ppb O3)	799.8		705.8	95.6		94.2	1.0153	}	98.5%

Notes:

Changed the inlet filter after as founds. Adjusted span only.

Average Correction Factor

1.0085

Calibration Performed By:

Rene Chamberland

99.2%



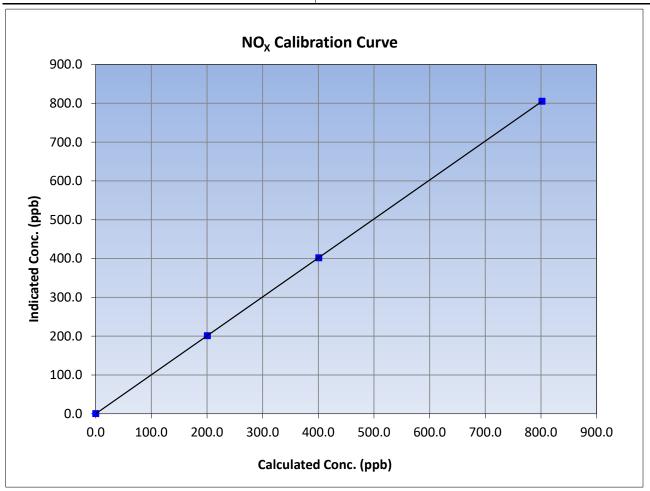
## NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 27, 2024 **Previous Calibration:** February 28, 2024 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 10:25 End Time (MST): 14:26 Analyzer make: Teledyne API T200 Analyzer serial #: 833

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999999	≥0.995	
802.0	805.3	0.9959	Correlation Coefficient	0.555555	=0.993	
400.9	402.0	0.9973	Slope	1.003829	0.90 - 1.10	
200.5	201.2	0.9964	Slope	1.003629	0.90 - 1.10	
			Intercept	0.024109	+/-20	





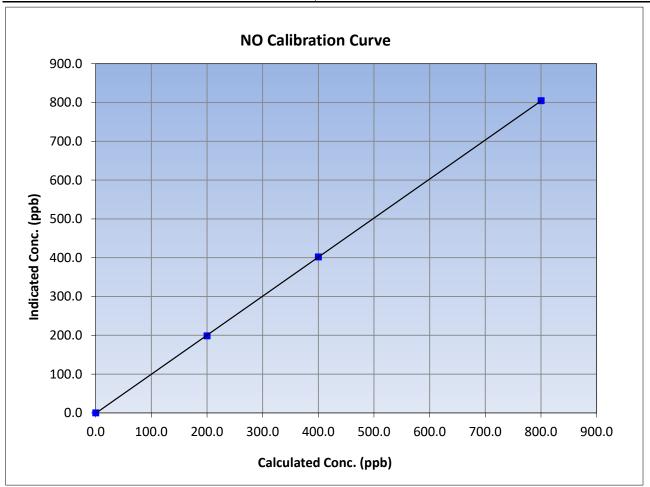
## **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 27, 2024 **Previous Calibration:** February 28, 2024 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 10:25 End Time (MST): 14:26 Analyzer make: Teledyne API T200 Analyzer serial #: 833

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999990	≥0.995
800.3	804.4	0.9949	Correlation Coefficient	0.555550	20.993
400.1	401.8	0.9957	Slope	1.005929	0.90 - 1.10
200.1	198.8	1.0063	Slope	1.005929	0.90 - 1.10
			Intercept	-0.915862	+/-20





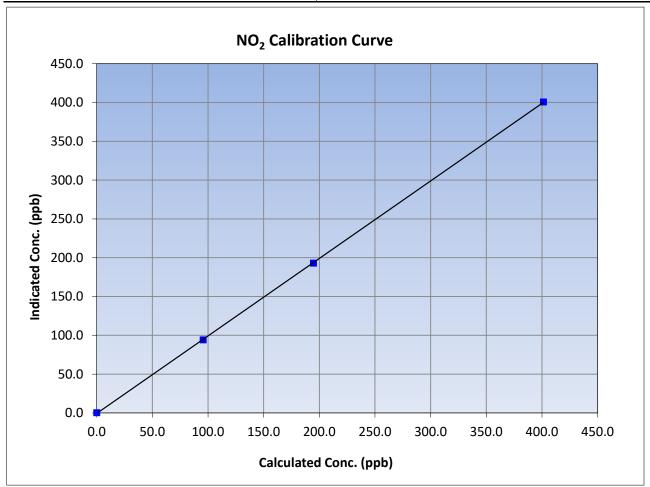
## NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 27, 2024 Previous Calibration: February 28, 2024 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 10:25 End Time (MST): 14:26 Analyzer serial #: Analyzer make: Teledyne API T200 833

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999979	≥0.995
401.3	400.6	1.0018	Correlation Coefficient	0.555575	20.333
194.7	193.1	1.0085	Slope	0.998553	0.90 - 1.10
95.6	94.2	1.0153	Slope	0.556555	0.90 - 1.10
			Intercept	-0.654801	+/-20

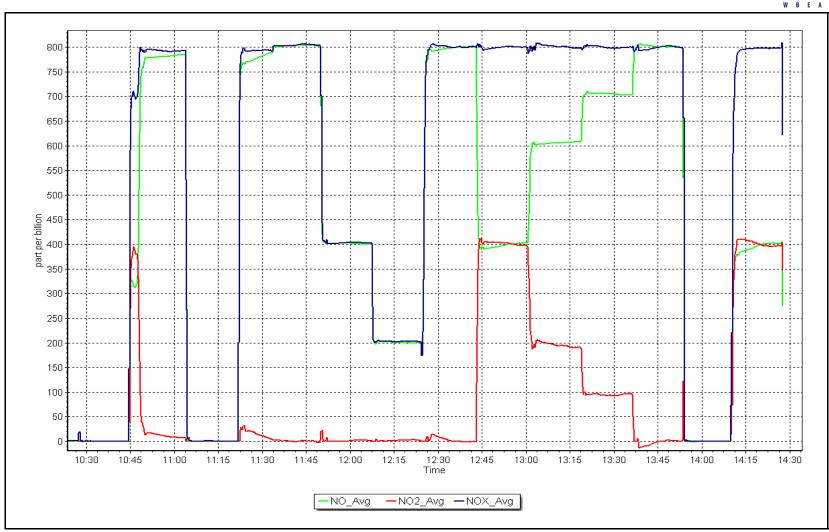


NO<sub>x</sub> Calibration Plot

Date: March 27, 2024

Location: Janvier







## O<sub>3</sub> Calibration Report

Version-01-2020

**Station Information** 

Station Name: Janvier

Calibration Date: March 22, 2024

Start time (MST): 12:45
Reason: Routine

Station number: AMS 22

Last Cal Date: February 20, 2024

End time (MST): 15:04

**Calibration Standards** 

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701H Serial Number: 691

**Analyzer Information** 

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 7046

Analyzer Range o 300 pps

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.003229 1.003829 2.2 2.2 0.480000 Coeff or Slope: Calibration intercept: 0.560000 1.027 1.027

### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	800.0	0.0	0.1	
as found span	4895	905.3	400.0	402.2	0.995
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.2	
high point	4895	905.3	400.0	401.8	0.996
second point	4895	756.7	200.0	201.6	0.992
third point	4895	656.1	100.0	101.0	0.990
as left zero	5000	800.0	0.0	1.0	
as left span	4895	904.3	400.0	404.5	0.989
			Avera	ge Correction Factor	0.993
Baseline Corr As found:	402.1	Previous respons	e 401.9	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope	<u>:</u> :	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Rene Chamberland

\* = > +/-5% change initiates investigation



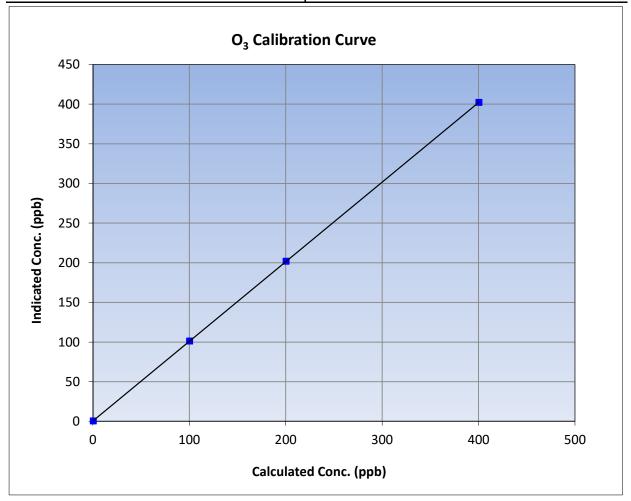
## O<sub>3</sub> Calibration Summary

Version-01-2020

## **Station Information**

Calibration Date: March 22, 2024 **Previous Calibration:** February 20, 2024 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 12:45 End Time (MST): 15:04 Analyzer make: Teledyne API T400 Analyzer serial #: 7046

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.2		Correlation Coefficient	0.999997	≥0.995				
400.0	401.8	0.9955	Correlation Coefficient	0.555557	20.333				
200.0	201.6	0.9921	Slope	1.003829	0.90 - 1.10				
100.0	101.0	0.9901	Slope	1.003629	0.90 - 1.10				
			- Intercept	0.480000	+/- 5				

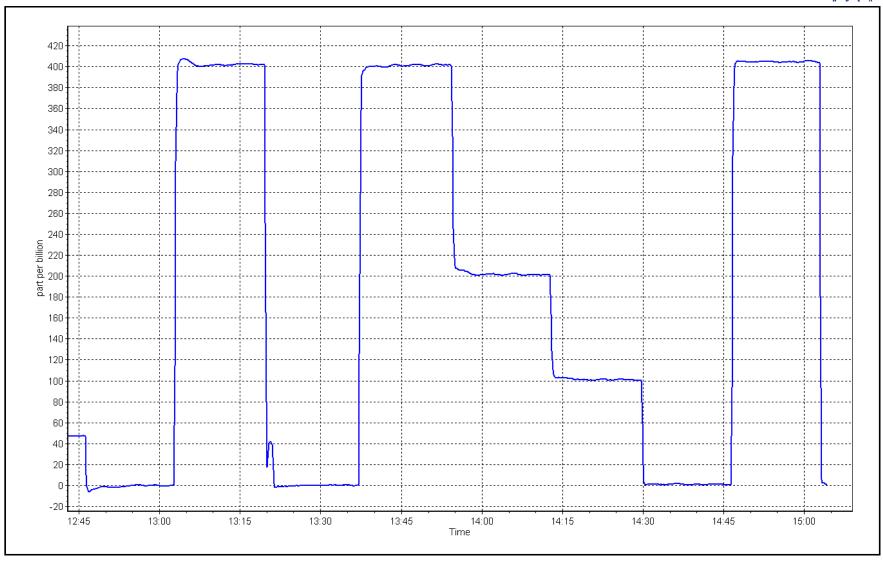


O<sub>3</sub> Calibration Plot

Date: March 22, 2024

Location: Janvier







## **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station information	on		
Station Name: Calibration Date: Start time (MST):	Janvier March 26, 2024 11:09		Station number: Last Cal Date: End time (MST):	February 28, 2024	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N:	325	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		•	388752 388752	
		Monthly Calibration	Test		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-1.5	-1.7	-1.5		+/- 2 °C
P (mmHg)	714.9	715.71	714.9		+/- 10 mmHg
Flow (LPM)	5.01	5.078	5.01		+/- 0.25 LPM
PW% (pump)	39		39		>80%
Zero Verification	PM w/o HEPA:	3.3	PM w/ HEPA:	0.0	<0.2 ug/m3
PM Inlet observation :	Inlet Head Clean	Quarterly Calibration		lung 10, 20	24
SPAN DUST	Refractive Index: Lot No.:	10.9 100128-050-042	Expiry Date:	June 10, 20	24
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					10.9 +/- 0.5
Date Optical Cham Date Disposable Fil		January 24 January 24	•		
Post- maintenance Zero Ver	rification:	PM w/ HEPA:		<0.2 ug/m3	
		Annual Maintenan	ice		
Date Sample Tub	oo Cloanod:	July 20	2022		
Date RH/T Senso		July 26, July 26,			
Neter	,	Orified flow temperate	uro, and procesure. La	ak chock passed	
Notes:	\	erified flow, temperatu	are, anu pressure. Le	ак спеск раззей.	
Calibration by:	Rene Chamberland				



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS23 FORT HILLS MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Fort Hills

Calibration Date: March 8, 2024

Start time (MST): 8:46
Reason: Routine

Station number: AMS23

Last Cal Date: February 7, 2024

End time (MST): 11:34

**Calibration Standards** 

Cal Gas Concentration: 49.76

Cal Gas Cylinder #: CC281425

Removed Cal Gas Conc: 49.76

Removed Gas Cyl #: N/A

Calibrator Make/Model: API T700 ZAG Make/Model: API T701 ppm Cal Gas Exp Date: January 5, 2025

Rem Gas Exp Date: N/A

Diff between cyl: Serial Number: 451

Serial Number: 5611

Coeff or Slope:

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1160290012

Analyzer Range 0 - 1000 ppb

Start Finish

ppm

 Calibration slope:
 1.000522
 1.003512

 Calibration intercept:
 -0.903438
 -0.524217

Backgd or Offset: 18.5

1.063

Finish 18.5 1.063

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.3	799.1	802.5	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.3	799.1	801.7	0.997
second point	4960	40.2	400.1	400.7	0.998
third point	4980	20.1	200.0	199.4	1.003
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.3	799.1	804.9	0.993
·			Averag	ge Correction Factor	0.999

Baseline Corr As found: 802.60 Previous response 798.61 \*% change 0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

AF Correlation:

\* = > +/-5% change initiates investigation

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

NA

Baseline Corr 3rd AF pt:



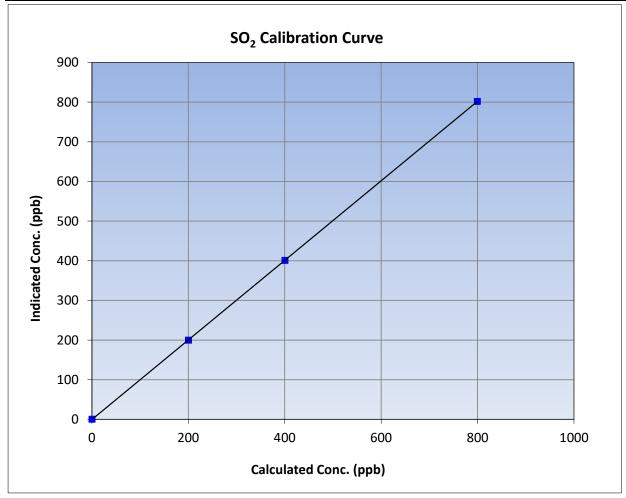
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

## **Station Information**

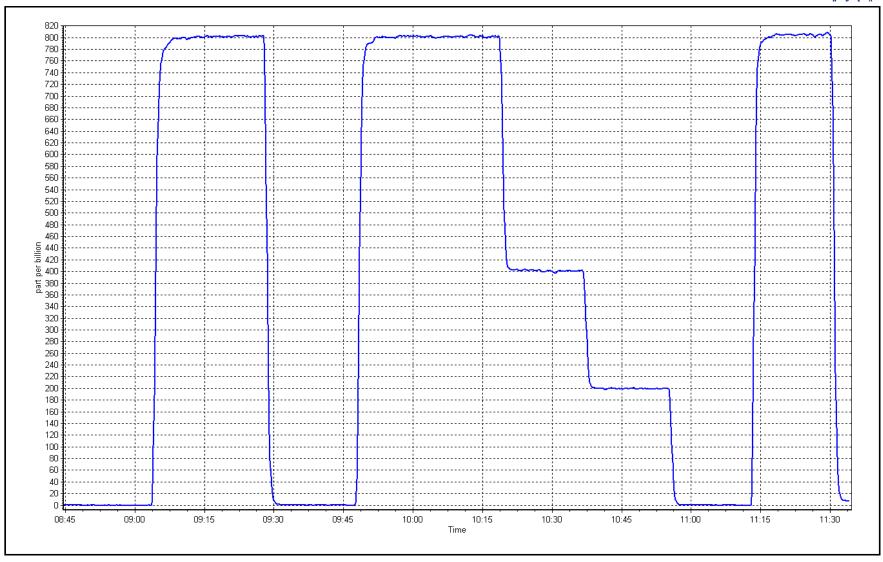
Calibration Date: March 8, 2024 **Previous Calibration:** February 7, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:46 End Time (MST): 11:34 Analyzer make: Thermo 43i Analyzer serial #: 1160290012

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.2		Correlation Coefficient	0.999996	≥0.995				
799.1	801.7	0.9968	Correlation Coefficient	0.555550	20.333				
400.1	400.7	0.9984	Slope	1.003512	0.90 - 1.10				
200.0	199.4	1.0032	Зюре	1.003312	0.90 - 1.10				
			- Intercept	-0.524217	+/-30				



SO2 Calibration Plot Date: March 8, 2024 Location: Fort Hills







## TRS Calibration Report

Version-11-2021

**Station Information** 

Station Name: Fort Hills

Calibration Date: March 13, 2024

Start time (MST): 7:00 Reason: Routine Station number: AMS23

> Last Cal Date: February 13, 2024

End time (MST): 11:26

**Calibration Standards** 

Cal Gas Concentration: February 5, 2024 5.20 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517372

Removed Cal Gas Conc: 5.20 Removed Gas Cyl #: N/A

Calibrator Make/Model: API T700 ZAG Make/Model: **API T701** 

Rem Gas Exp Date: N/A ppm

Diff between cyl: 451 Serial Number: Serial Number: 5611

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1300156232

Converter serial #: 594 Converter make: CDN-101

Analyzer Range 0 - 100 ppb

> Start **Finish**

<u>Finish</u> <u>Start</u> 1.010172 0.991459 Backgd or Offset: Calibration slope: 1.96 1.96 Calibration intercept: -0.218012 -0.038309 Coeff or Slope: 1.160 1.160

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4923	77.0	80.0	77.9	1.027
as found 2nd point	4962	38.5	40.0	39.3	1.018
as found 3rd point	4981	19.2	19.9	19.7	1.013
new cylinder response					

### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.0	80.0	79.3	1.009
second point	4962	38.5	40.0	39.6	1.010
third point	4981	19.2	19.9	19.7	1.013
as left zero	5000	0.0	0.0	0.0	
as left span	4923	77.0	80.0	80.9	0.989
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chang	ge:			Ave Corr Factor	1.010

Date of last scrubber change	:			Ave Corr Factor	1.010	
Date of last converter efficie	ncy test:	March 13, 2024		102.7%	efficiency	
Baseline Corr As found:	77.9	Prev response:	80.60	*% change:	-3.5%	

Baseline Corr 2nd AF pt: 39.3 AF Slope: 0.973033 Baseline Corr 3rd AF pt: AF Correlation: 0.999970 19.7

\* = > +/-5% change initiates investigation

0.181374

AF Intercept:

Converter efficiency test done after the third as found point at 102.7%. Pump changed out. SOx Notes:

scrubber checked after the third point. No adjustments done.

Calibration Performed By: Melissa Lemay



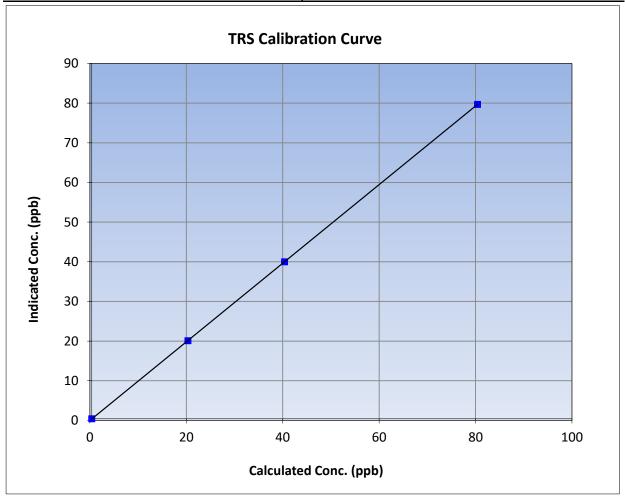
## **TRS Calibration Summary**

Version-11-2021

## **Station Information**

Calibration Date: March 13, 2024 **Previous Calibration:** February 13, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 7:00 End Time (MST): 11:26 Analyzer make: Thermo 43i TLE Analyzer serial #: 1300156232

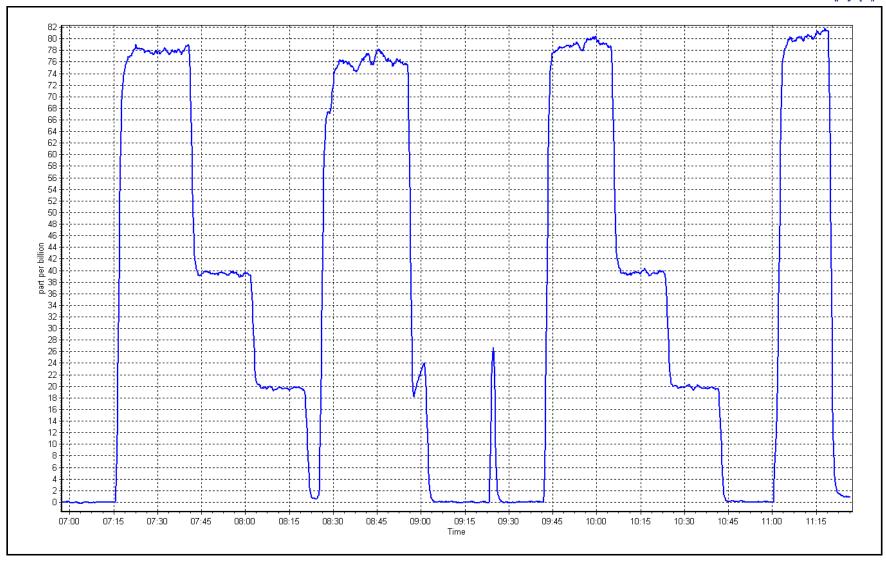
	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999999	≥0.995				
80.0	79.3	1.0089	Correlation Coefficient	0.555555	20.333				
40.0	39.6	1.0100	Slope	0.991459	0.90 - 1.10				
19.9	19.7	1.0126	Slope	0.551455	0.90 - 1.10				
			- Intercept	-0.038309	+/-3				



TRS Calibration Plot

Date: March 13, 2024 Location: Fort Hills







## THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

### **Station Information**

Fort Hills Station Name:

Calibration Date: March 8, 2024

Start time (MST): 8:46 Reason: Routine Station number: AMS23

Last Cal Date: February 7, 2024

End time (MST): 11:33

## **Calibration Standards**

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 500.2 CH4 Equiv Conc. 1070.6 ppm ppm

207.4 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: N/A Removed Gas Expiry: N/A

Removed CH4 Conc. 500.2 CH4 Equiv Conc. 1070.6 ppm ppm

Removed C3H8 Conc. Diff between cyl (THC): 207.4 ppm Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 451 ZAG make/model: **API T701** Serial Number: 5611

### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1193585648

THC Range (ppm): 0 - 20 ppm NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

**Finish** Finish Start Start CH4 SP Ratio: 2.31E-04 2.35E-04 NMHC SP Ratio: 4.93E-05 4.99E-05 CH4 Retention time: 13.0 13.2 NMHC Peak Area: 186451 183614 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	17.19	17.29	0.994
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.19	17.27	0.995
second point	4960	40.2	8.61	8.65	0.996
third point	4980	20.1	4.30	4.35	0.988
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.19	17.24	0.997
			А	verage Correction Factor	0.993
Baseline Corr AF:	17.29	Prev response	17.21	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation



# THC / CH<sub>4</sub> / NMHC Calibration Report

Version-06-2022

C-+ D :	Dil -i- fl	NMHC Calibr		to disease to control	CE Limit 0.05 d.05
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	0.002
as found span	4920	80.3	9.16	9.23	0.993
ns found 2nd point					
as found 3rd point					
new cylinder response	5000				
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.3	9.16	9.16	1.000
second point	4960	40.2	4.59	4.63	0.991
hird point	4980	20.1	2.29	2.36	0.970
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	9.16	9.14	1.002
				rage Correction Factor	0.987
Baseline Corr AF:	9.23	Prev response	9.21	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra  Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 5
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.03	8.07	0.996
as found 2nd point					
s found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.3	8.03	8.12	0.989
second point	4960	40.2	4.02	4.02	1.000
hird point	4980	20.1	2.01	1.99	1.010
as left zero	5000	0.0	0.00	0.00	
is left span	4920	80.3	8.03	8.11	0.991
·			Avei	rage Correction Factor	1.000
Baseline Corr AF:	8.07	Prev response	8.00	*% change	0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		0.999507		1.004093	
THC Cal Offset:		0.025608		0.011596	
CH4 Cal Slope:		0.997953		1.012136	
CH4 Cal Offset:		-0.014037		-0.025657	
Cri- Cui Oriset.		0.014037		0.025057	

Notes:

NMHC Cal Slope:

NMHC Cal Offset:

Span adjusted. No maintenance done.

0.997614

0.036452

Calibration Performed By: Melissa Lemay

1.000996

0.041641



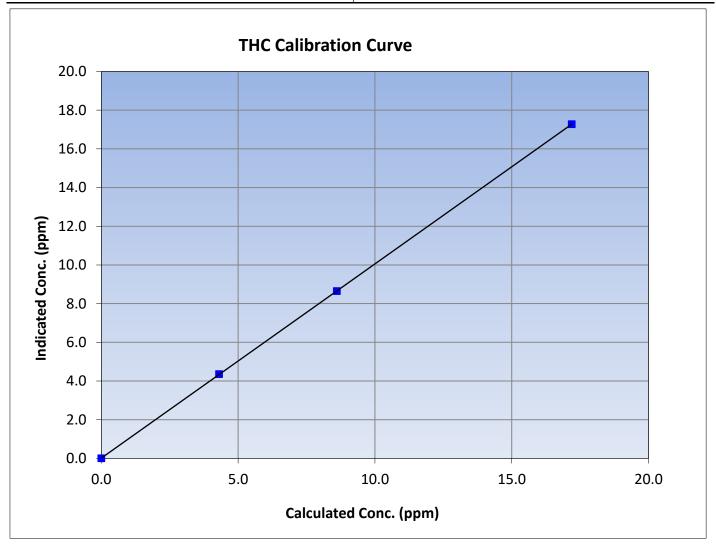
## **THC Calibration Summary**

Version-06-2022

## **Station Information**

Calibration Date: March 8, 2024 **Previous Calibration:** February 7, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:46 End Time (MST): 11:33 Analyzer make: Analyzer serial #: 1193585648 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
17.19	17.27	0.9953	Correlation Coemicient	0.999990	20.333
8.61	8.65	0.9956	Slope	1.004093	0.90 - 1.10
4.30	4.35	0.9884	Slope	1.004093	0.90 - 1.10
			Intercept	0.011596	+/-0.5





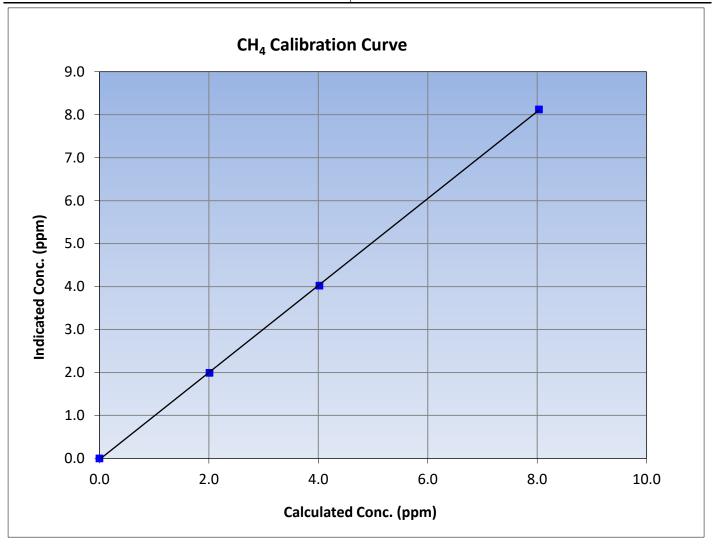
# **CH<sub>4</sub> Calibration Summary**

Version-06-2022

## **Station Information**

Calibration Date: March 8, 2024 **Previous Calibration:** February 7, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:46 End Time (MST): 11:33 Analyzer make: Analyzer serial #: 1193585648 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999949	≥0.995
8.03	8.12	0.9891	Correlation Coemicient		20.333
4.02	4.02	1.0001	Slope	1.012136	0.90 - 1.10
2.01	1.99	1.0099	Siope	1.012130	0.90 - 1.10
			Intercept	-0.025657	+/-0.5





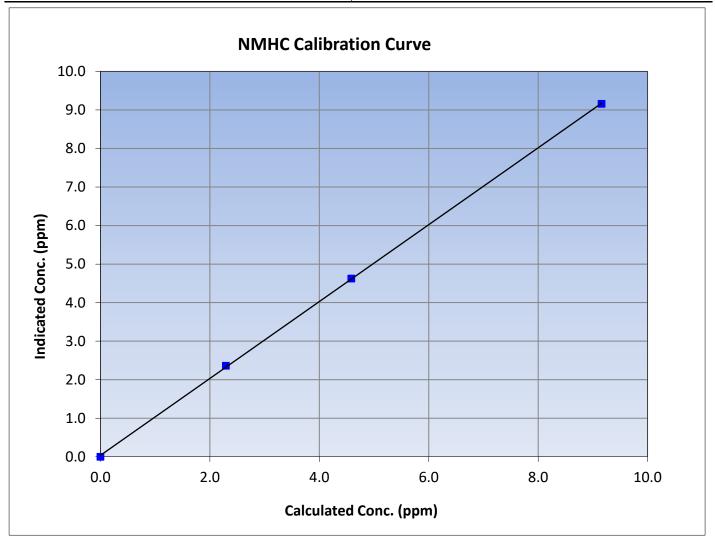
## **NMHC Calibration Summary**

Version-06-2022

## **Station Information**

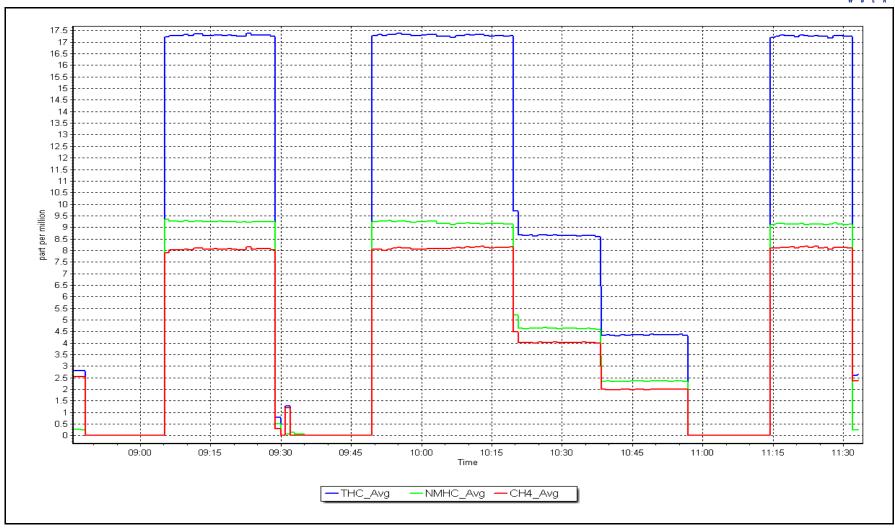
Calibration Date: March 8, 2024 **Previous Calibration:** February 7, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:46 End Time (MST): 11:33 Analyzer make: Thermo 55i Analyzer serial #: 1193585648

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999927	≥0.995
9.16	9.16	1.0002	Correlation Coemicient	0.999927	20.333
4.59	4.63	0.9914	Slope	0.997614	0.90 - 1.10
2.29	2.36	0.9703	Slope	0.997014	0.90 - 1.10
			Intercept	0.036452	+/-0.5



NMHC Calibration Plot Date: March 8, 2024 Location: Fort Hills







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

### **Station Information**

Station Name: Fort Hills Station number: AMS23

Calibration Date: March 12, 2024 Last Cal Date: February 2, 2024 Start time (MST): 6:55 End time (MST): 11:35

Start time (MST): 6:55
Reason: Routine

### **Calibration Standards**

NO Gas Cylinder #: CC358149 Cal Gas Expiry Date: January 5, 2032

NOX Cal Gas Conc: 60.3 ppm NO Cal Gas Conc: 60.1 ppm

Removed Cylinder #: CC332703 Removed Gas Exp Date: January 28, 2024

Removed Gas NOX Conc: 49.7 ppm Removed Gas NO Conc: 49.7 ppm

NOX gas Diff:1.0%NO gas Diff:2.1%Calibrator Model:Teledyne API T700Serial Number:451ZAG make/model:Teledyne API T701Serial Number:5611

## **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1152430007

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.102	1.132	NO bkgnd or offset:	3	3.1
NOX coeff or slope:	0.990	0.996	NOX bkgnd or offset:	3.2	3.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	170.3	170.3

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.002680	0.998626
NO <sub>x</sub> Cal Offset:	0.104366	-0.173464
NO Cal Slope:	1.001767	0.998303
NO Cal Offset:	-0.976340	-1.451679
NO <sub>2</sub> Cal Slope:	1.002767	1.002264
NO <sub>2</sub> Cal Offset:	0.602578	0.618019



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1		
as found span	4920	80.5	800.2	800.2	0.0	767.0	762.9	4.1	1.043	1.049
as found 2nd										
as found 3rd										
new cyl resp	4934	66.3	799.5	796.9	2.7	774.1	775.2	-1.1	1.0329	1.0280
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
high point	4934	66.3	799.5	796.9	2.7	798.4	794.9	3.5	1.001	1.002
second point	4967	33.2	400.4	399.0	1.3	399.6	396.1	3.5	1.002	1.007
third point	4983	16.6	200.2	199.5	0.7	199.3	196.1	3.3	1.005	1.018
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
as left span	4934	66.3	799.5	479.3	320.3	801.0	477.0	324.1	0.998	1.005
							Average C	Correction Factor	1.003	1.009
Corrected As fo	ound NO <sub>X</sub> =	767.0 ppb	NO =	762.9 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO <sub>X</sub> =	-4.6%
Previous Respo	onse NO <sub>X</sub> =	802.4 ppb	NO =	800.6 ppb				*Percent Chang	ge NO =	-4.9%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As found	$1   NO r^2$ :		NO SI:	NO Int:	
					As found	$1 NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	

### **GPT Calibration Data**

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	792.8	475.2	320.3	321.1	0.997	100.3%
2nd GPT point (200 ppb O3)	792.8	636.4	159.1	160.9	0.989	101.2%
3rd GPT point (100 ppb O3)	792.8	712.7	82.8	83.8	0.987	101.3%
			,	Average Correction Factor	0.991	100.9%

Notes:

Calibration gas changed. Span adjusted.

Calibration Performed By:

Melissa Lemay



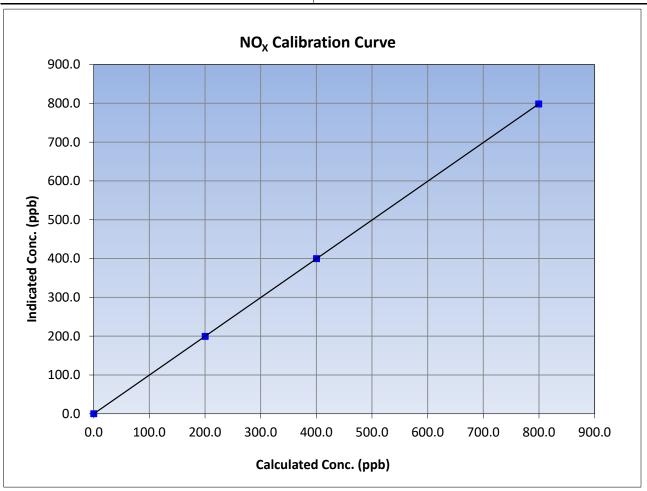
## NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 2, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 6:55 End Time (MST): 11:35 Analyzer serial #: Analyzer make: Thermo 42i 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.99999	≥0.995
799.5	798.4	1.0014	Correlation Coefficient	0.55555	20.993
400.4	399.6	1.0019	Slope	0.998626	0.90 - 1.10
200.2	199.3	1.0046	Slope	0.998020	0.90 - 1.10
			Intercept	-0.173464	+/-20





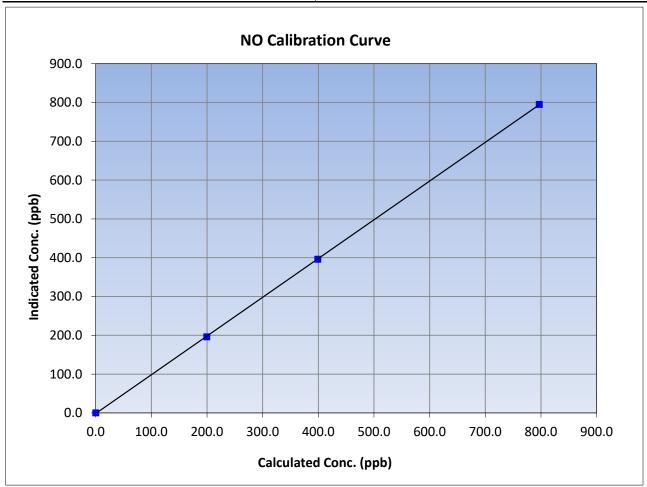
## **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 2, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 6:55 End Time (MST): 11:35 Analyzer make: Thermo 42i Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999980	≥0.995
796.9	794.9	1.0025	Correlation Coefficient	0.555500	20.333
399.0	396.1	1.0074	Slope	0.998303	0.90 - 1.10
199.5	196.1	1.0176	Slope	0.556505	0.90 - 1.10
			Intercept	-1.451679	+/-20





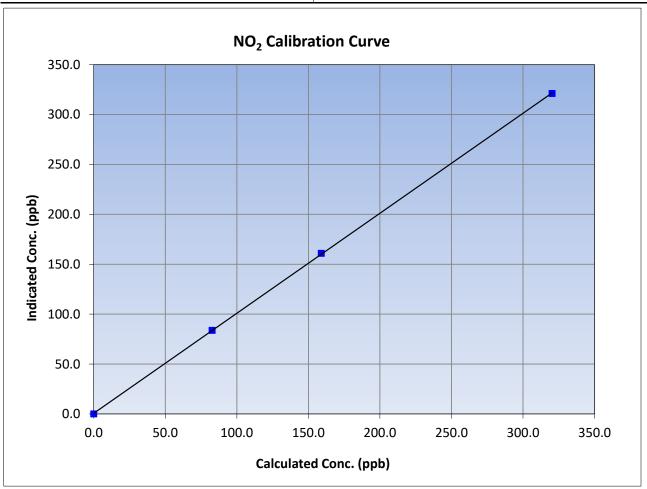
## NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 2, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 6:55 End Time (MST): 11:35 Analyzer make: Thermo 42i Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999974	≥0.995
320.3	321.1	0.9974	Correlation Coefficient	0.333374	20.333
159.1	160.9	0.9885	Slope	1.002264	0.90 - 1.10
82.8	83.8	0.9875	Slope	1.002204	0.90 - 1.10
			Intercept	0.618019	+/-20

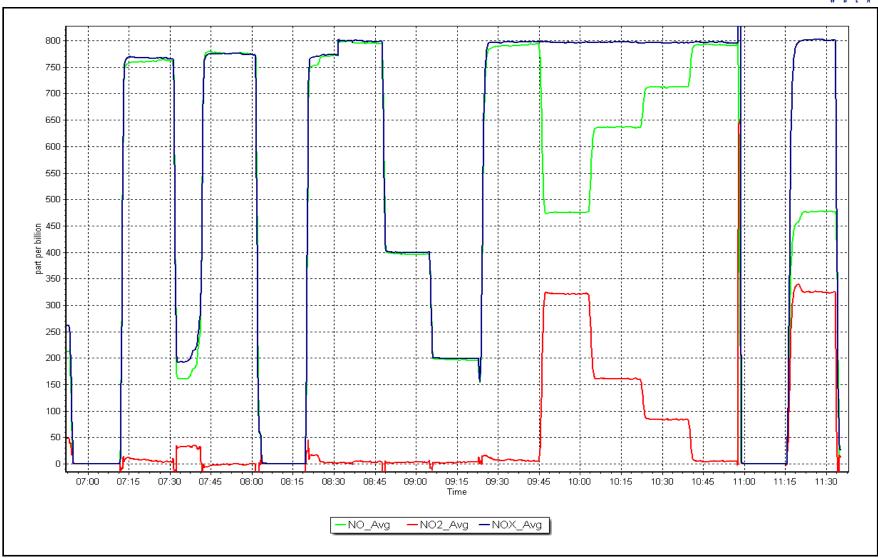


NO<sub>x</sub> Calibration Plot

Date: March 12, 2024

Location: Fort Hills







### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024 **Station Information** Station Name: Fort Hills Station number: AMS 23 Calibration Date: March 8, 2024 Last Cal Date: February 7, 2024 Start time (MST): 8:04 End time (MST): 8:39 Analyzer Make: **API T640** S/N: 1546 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388753 Temp/RH standard: S/N: 388753 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> As found Measured <u>Adjusted</u> (Limits) As left T (°C) -11.3 -11.5 -11.3 +/- 2 °C P (mmHg) 735.6 735 735.6 +/- 10 mmHg Flow (LPM) 5 4.86 5 +/- 0.25 LPM PW% (pump) 44 44 >80% Zero Verification PM w/o HEPA: 6.8 0.0 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check PM Inlet observation: Inlet Head Clean Alignment Factor On: ✓ **Quarterly Calibration Test** 10.9 Expiry Date: 10-Jun-24 Refractive Index: **SPAN DUST** Lot No.: 100128-050-042 As found Adjusted (Limits) <u>Parameter</u> Post maintenance As left **PMT Peak Test** +/- 0.5 Date Optical Chamber Cleaned: February 7, 2024 Date Disposable Filter Changed: February 7, 2024 Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: October 17, 2023 Date RH/T Sensor Cleaned: October 17, 2023

Notes: No adjustments done. Leak check passed.

Calibration by: Melissa Lemay



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS25 WASKŌW OHCI PIMÂTISIWIN MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Waskow ohci Pimatisiwin Station number: AMS25

Calibration Date: March 11, 2024 Last Cal Date: February 16, 2024

Start time (MST): 6:53 End time (MST): 11:11

Reason: Routine

#### **Calibration Standards**

Cal Gas Concentration: 49.7 ppm Cal Gas Exp Date: March 10, 2031

Cal Gas Cylinder #: CC342445

Removed Cal Gas Conc: 50.54 ppm Rem Gas Exp Date: December 29, 2028

Removed Gas Cyl #: CC437219 Diff between cyl: -0.5% Calibrator Make/Model: API T700 Serial Number: 747 ZAG Make/Model: API T701 Serial Number: 4765

### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 1118148497

Analyzer Range 0 - 1000 ppb

**Finish Finish** Start Start Calibration slope: 1.004302 1.002469 Backgd or Offset: 10.8 11.2 Calibration intercept: 0.123899 0.048260 Coeff or Slope: 1.030 1.056

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.2	800.5	793.2	1.009
as found 2nd point	4960	39.6	400.3	396.6	1.009
as found 3rd point	4980	19.8	200.1	198.1	1.010
new cylinder response	4920	80.5	800.1	789.0	1.014
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.5	800.1	801.9	0.998
second point	4960	40.2	399.6	401.2	0.996
third point	4980	20.1	199.8	200.0	0.999
as left zero	5000	0.0	0.0	-0.1	
as left span	4921	79.2	787.2	801.6	0.982
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	793.30	Previous response	804.09	*% change	-1.4%
Baseline Corr 2nd AF pt:	396.70	AF Slope	: 0.991040	AF Intercept:	-0.155868
Baseline Corr 3rd AF pt:	198.20	AF Correlation	1.000000		

Notes: Calibration Gas Changed. Pump Changed. Span adjusted.

Calibration Performed By: Melissa Lemay

\* = > +/-5% change initiates investigation



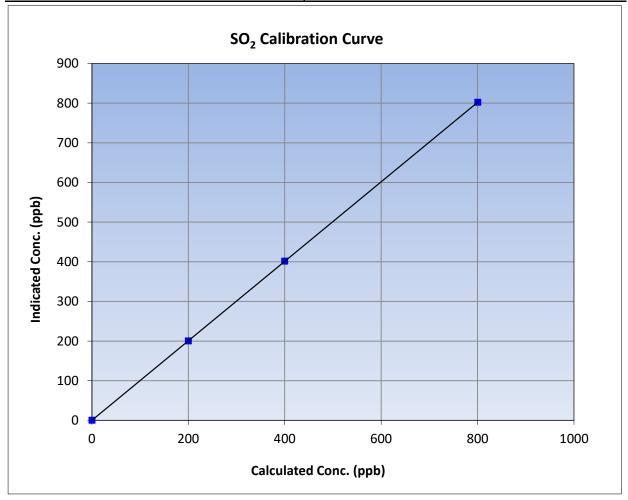
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 11, 2024 **Previous Calibration:** February 16, 2024 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 6:53 End Time (MST): 11:11 Analyzer make: Thermo 43i Analyzer serial #: 1118148497

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999999	≥0.995	
800.1	801.9	0.9977	Correlation Coefficient	0.555555	20.993	
399.6	401.2	0.9959	Slope	1.002469	0.90 - 1.10	
199.8	200.0	0.9990	Slope	1.002409	0.90 - 1.10	
			Intercept	0.048260	+/-30	

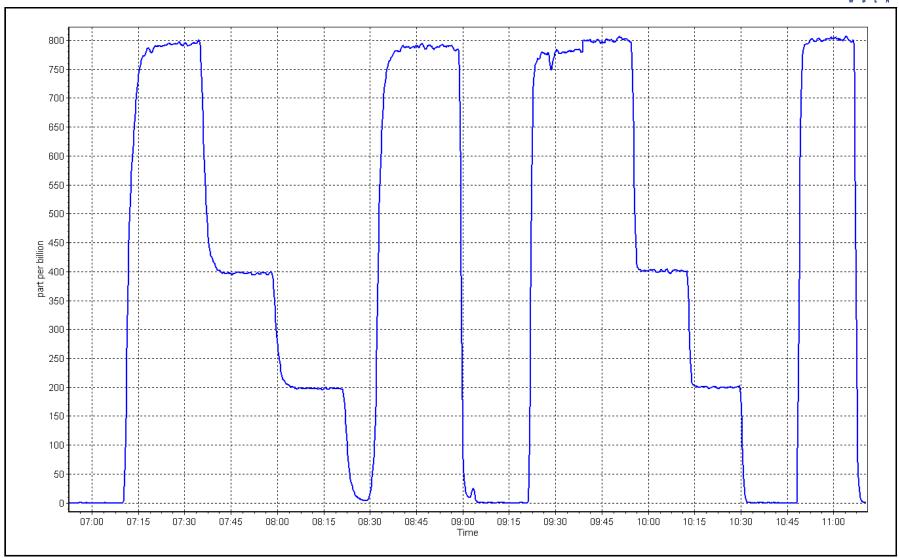


**SO2 Calibration Plot** 

Date: March 11, 2024

Location: Waskow ohci Pimatisiwin







### H<sub>2</sub>S Calibration Report

Station number:

AMS25

10:30

Version-11-2021

**Station Information** 

Station Name: Waskow ohci Pimatisiwin

Calibration Date: March 18, 2024 Last Cal Date: February 14, 2024

Start time (MST): 6:20 End time (MST):

Reason: Routine

**Calibration Standards** 

Cal Gas Concentration: 4.97 ppm Cal Gas Exp Date: January 3, 2026

Cal Gas Cylinder #: CC517099

Removed Cal Gas Conc: 4.97 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 747

ZAG Make/Model: API T701 Serial Number: 261

**Analyzer Information** 

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146
Converter make: Global G-150 Converter serial #: 2022-219

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> 1.005840 1.008429 Backgd or Offset: 3.30 Calibration slope: 3.30 0.120000 Calibration intercept: 0.060000 Coeff or Slope: 1.113 1.113

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.0	79.5	80.5	0.986
as found 2nd point	4960	40.0	39.7	40.3	0.983
as found 3rd point	4980	20.0	19.9	20.2	0.979
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.0	79.5	80.2	0.991
second point	4960	40.0	39.7	40.3	0.986
third point	4980	20.0	19.9	20.1	0.988
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.0	800.0	809.5	0.988
SO2 Scrubber Check	4921	79.2	0.008	0.0	
Date of last scrubber chang	ge:	20-Jun-23		Ave Corr Factor	0.988
Date of last converter efficiency test:					efficiency

Baseline Corr As found: 80.6 79.98 0.8% Prev response: \*% change: 1.013894 -0.020000 Baseline Corr 2nd AF pt: 40.4 AF Slope: AF Intercept: Baseline Corr 3rd AF pt: 20.3 0.999995 AF Correlation:

\* = > +/-5% change initiates investigation

Notes: SOx scrubber checked after the calibrator zero. No adjustments done.

Calibration Performed By: Melissa Lemay



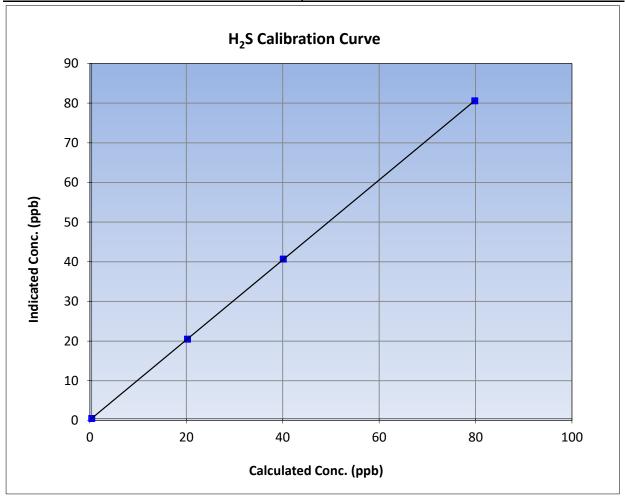
# H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

Calibration Date: March 18, 2024 **Previous Calibration:** February 14, 2024 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 6:20 End Time (MST): 10:30 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146

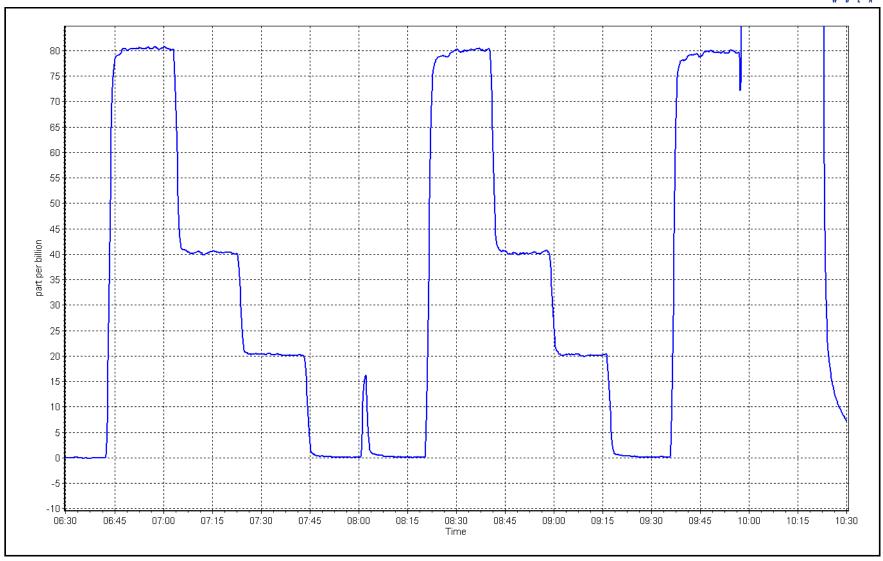
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999995	≥0.995	
79.5	80.2	0.9907	Correlation coefficient	0.99999	20.993	
39.7	40.3	0.9858	Slope	1.008429	0.90 - 1.10	
19.9	20.1	0.9883	Slope	1.008429	0.90 - 1.10	
			- Intercept	0.120000	+/-3	



Date: March 18, 2024

Location: Waskow ohci Pimatisiwin







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS26 CHRISTINA LAKE MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Christina Lake Station Name:

March 22, 2024 Calibration Date:

Start time (MST): 9:42 Routine Reason:

Station number: **AMS 26** 

> February 3, 2024 Last Cal Date:

End time (MST): 12:28

**Calibration Standards** 

Cal Gas Concentration: 49.56

Cal Gas Cylinder #:

CC362134 Removed Cal Gas Conc: 49.56

Removed Gas Cyl #: <u>NA</u> Calibrator Make/Model: **API T700** ZAG Make/Model: API T701H

ppm

ppm Rem Gas Exp Date: NA

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 281 Serial Number: 832

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1152430005

Analyzer Range 0 - 1000 ppb

**Finish** Start

Calibration slope: 0.998578 0.997322 Calibration intercept: 0.236006 0.975976 Backgd or Offset: Coeff or Slope: Start 25.8 0.944

February 23, 2025

**Finish** 25.8 0.956

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	` ' '
	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4919	80.8	800.9	791.2	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.7	
high point	4919	80.8	800.9	799.7	1.002
second point	4960	40.4	400.4	400.2	1.001
third point	4980	20.2	200.2	201.1	0.996
as left zero	5000	0.0	0.0	0.8	
as left span	4919	80.8	800.9	799.6	1.002
			Averag	ge Correction Factor	0.999

Baseline Corr As found: 791.10 Previous response 800.02 -1.1% \*% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Sample inlet filters changed after as founds. Adjusted span only.

Calibration Performed By: Jan Castro



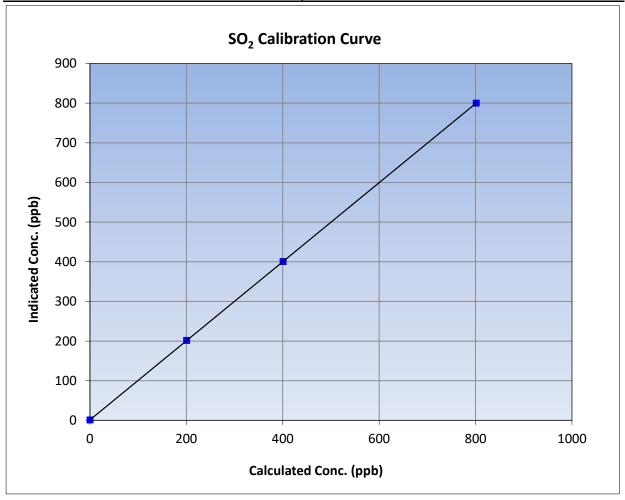
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 22, 2024 **Previous Calibration:** February 3, 2024 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 9:42 End Time (MST): 12:28 Analyzer make: Thermo 43i Analyzer serial #: 1152430005

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.7		Correlation Coefficient	0.999999	≥0.995	
800.9	799.7	1.0015	Correlation Coefficient	0.33333	20.333	
400.4	400.2	1.0005	Slope	0.997322	0.90 - 1.10	
200.2	201.1	0.9956	Slope	0.997322	0.90 - 1.10	
			- Intercept	0.975976	+/-30	



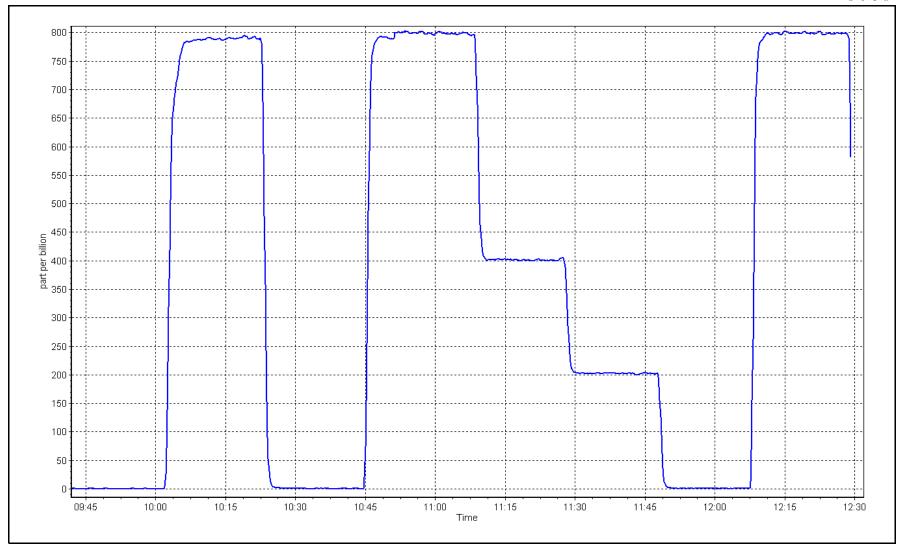
**SO2 Calibration Plot** 

Date:

March 22, 2024

Location: Christina Lake







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Christina Lake Calibration Date: March 12, 2024

Start time (MST): 9:49

Reason: Routine Station number: AMS26

> Last Cal Date: February 7, 2024

End time (MST): 14:18

**Calibration Standards** 

November 15, 2026 Cal Gas Concentration: 5.05 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: DT0014831

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.05 ppm Removed Gas Cyl #: Diff between cyl:

Calibrator Make/Model: API T700 3253 Serial Number: ZAG Make/Model: **API T701H** Serial Number: 832

**Analyzer Information** 

Analyzer make: Thermo 450i Analyzer serial #: 1180030032

Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

**Finish** <u>Finish</u> <u>Start</u> <u>Start</u> 0.996996 Backgd or Offset: 34.5 Calibration slope: 1.008427 35.0 Calibration intercept: 0.358415 Coeff or Slope: 1.086 1.064 0.258384

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.8	
as found span	4921	79.2	80.0	81.8	0.988
as found 2nd point	4960	39.6	40.0	41.7	0.978
as found 3rd point	4980	19.8	20.0	21.4	0.971
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	79.2	80.0	80.2	0.997
second point	4960	39.6	40.0	40.0	1.000
third point	4980	19.8	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.5	
as left span	4921	79.2	80.0	80.0	1.000
SO2 Scrubber Check	4919	80.8	808.0	-0.1	
Date of last scrubber chang	ge:	27-Feb-19	_	Ave Corr Factor	0.993
Date of last converter effic		efficiency			

Date of last scrubber change	2:	27-Feb-19		Ave Corr Factor	0.993
Date of last converter efficie	ency test:			e	fficiency
Baseline Corr As found:	81.0	Prev response:	80.92	*% change:	0.1%

Baseline Corr 2nd AF pt: 40.9 AF Slope: 1.011713 Baseline Corr 3rd AF pt: 0.999962 20.6 AF Correlation:

\* = > +/-5% change initiates investigation

AF Intercept:

Changed sample inlet filters after multipoint as founds. SO2 scrubber check after calibrator zero Notes: done and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro 1.018369



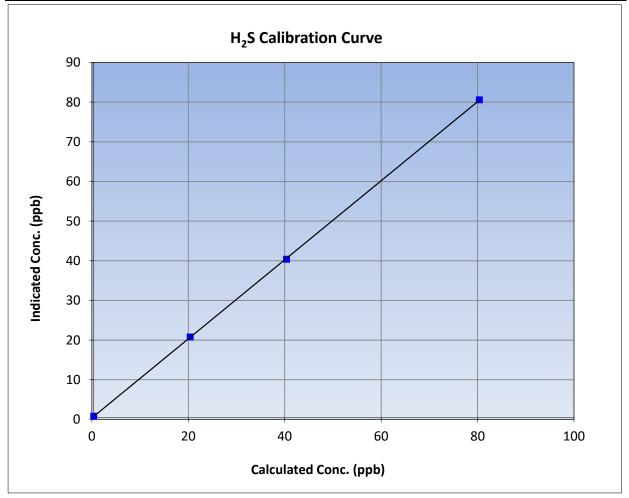
# H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

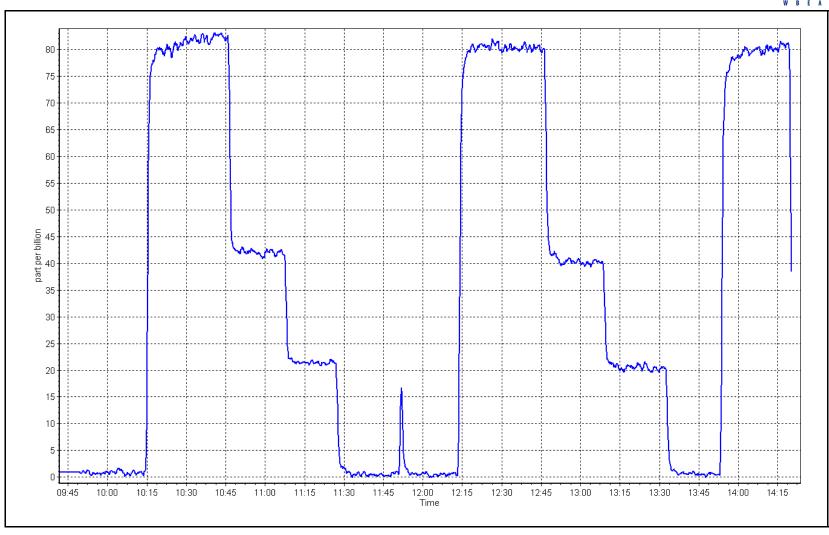
Calibration Date: March 12, 2024 **Previous Calibration:** February 7, 2024 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 9:49 End Time (MST): 14:18 Analyzer make: Thermo 450i Analyzer serial #: 1180030032

Calibration Data						
		Correction factor (Cc/Ic)	Statistical Evaluation <u>Lim.</u>		<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999978	≥0.995	
80.0	80.2	0.9974	Correlation Coefficient	0.555576	20.995	
40.0	40.0	1.0000	Slope	0.996996	0.90 - 1.10	
20.0	20.4	0.9803	Slope	0.550550	0.90 - 1.10	
			- Intercept	0.358415	+/-3	



Date: March 12, 2024 Location: Christina Lake







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Christina Lake

Calibration Date: March 13, 2024

Start time (MST): 9:33 Reason: Routine Station number: AMS26

Last Cal Date: February 13, 2024

End time (MST): 13:54

#### **Calibration Standards**

NO Gas Cylinder #: CC755290 Cal Gas Expiry Date: January 3, 2031

NOX Cal Gas Conc: NO Cal Gas Conc: 48.70 48.90 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 48.90 ppm 48.70 ppm

NOX gas Diff:

NO gas Diff: Serial Number: Calibrator Model: **API T700** 3253 ZAG make/model: **API T701H** Serial Number: 832

### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1173480006

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.325 1.318 NO bkgnd or offset: 2.5 2.5 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 3.3 3.3 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 162.5 162.8

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.999923	1.000066
NO <sub>x</sub> Cal Offset:	0.266541	0.766423
NO Cal Slope:	0.998413	0.999129
NO Cal Offset:	0.406737	0.606305
NO <sub>2</sub> Cal Slope:	1.003805	1.004655
NO <sub>2</sub> Cal Offset:	0.175464	0.153346



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.2	-0.7		
as found span	4918	82.1	802.9	799.6	3.3	811.1	804.8	6.3	0.9899	0.9936
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.7	0.0	-0.7		
high point	4918	82.1	802.9	799.6	3.3	803.0	799.2	3.8	0.9999	1.0005
second point	4959	41.1	401.9	400.3	1.6	403.5	401.0	2.4	0.9962	0.9983
third point	4980	20.5	200.5	199.7	0.8	202.7	200.6	2.1	0.9890	0.9953
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.1	-0.7		
as left span	4918	82.1	802.9	421.0	381.9	800.4	423.2	377.1	1.0032	0.9949
							Average C	orrection Factor	0.9950	0.9980
Corrected As fo	ound NO <sub>X</sub> =	812.0 ppb	NO :	= 805.0 ppb	* = > +/-59	6 change initiates	investigation	*Percent Chang	ge NO <sub>X</sub> =	1.1%
Previous Respo	onse NO <sub>X</sub> =	803.1 ppb	NO :	= 798.8 ppb				*Percent Chang	ge NO =	0.8%
Baseline Corr 2	nd pt NO <sub>X</sub> =	NA ppb	NO :	= NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>X</sub> =	NA ppb	NO :	= NA ppb	As found	$1 \qquad NO r^2$ :		NO SI:	NO Int:	
					As found	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated NC concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	797.5		418.9	381.9		383.4	0.9960		100.4%
		797.5		606.8	194.0		195.4	0.9928		100.7%

Notes:

Changed sample inlet filter after as founds. Adjusted span only.

99.1

Average Correction Factor

0.9847

0.9912

97.6

Calibration Performed By:

3rd GPT point (100 ppb O3)

Jan Castro

703.2

797.5

101.6%

100.9%



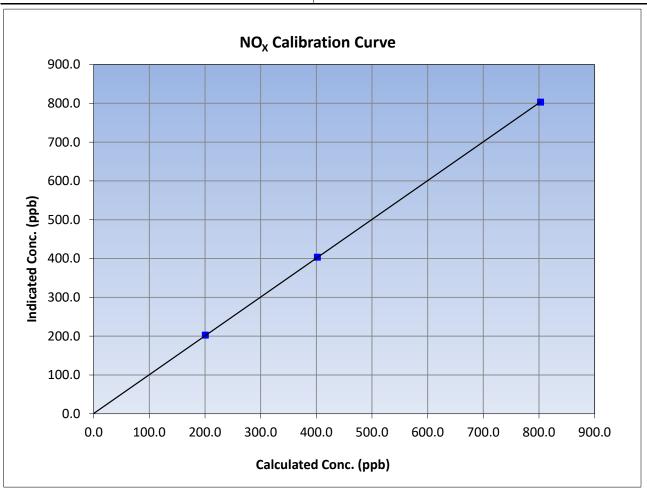
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 13, 2024 Previous Calibration: February 13, 2024 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 9:33 End Time (MST): 13:54 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.7		Correlation Coefficient	0.999985	≥0.995
802.9	803.0	0.9999	Correlation Coefficient	0.999963	20.993
401.9	403.5	0.9962	Slope	1.000066	0.90 - 1.10
200.5	202.7	0.9890	Slope	1.000000	0.90 - 1.10
			Intercept	0.766423	+/-20





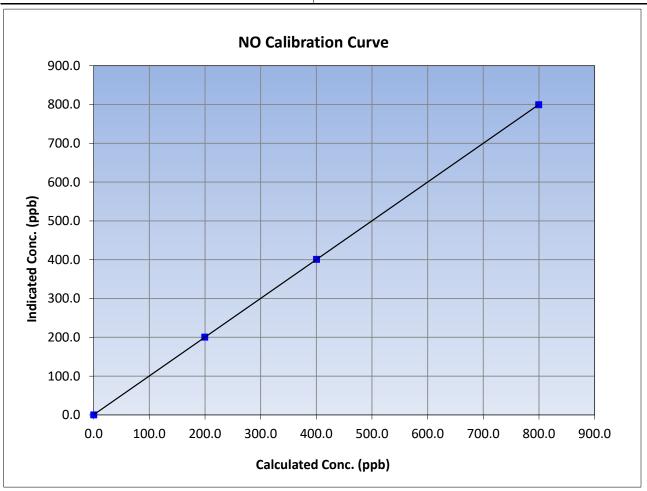
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 13, 2024 Previous Calibration: February 13, 2024 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 9:33 End Time (MST): 13:54 Analyzer make: Thermo 42i Analyzer serial #: 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999997	≥0.995	
799.6	799.2	1.0005	Correlation Coefficient	0.55557	20.993	
400.3	401.0	0.9983	Slope	0.999129	0.90 - 1.10	
199.7	200.6	0.9953	Slope	0.999129	0.90 - 1.10	
			Intercept	0.606305	+/-20	





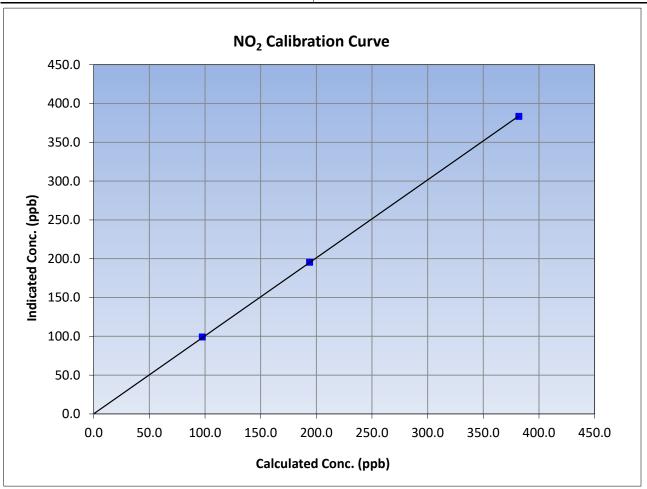
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 13, 2024 Previous Calibration: February 13, 2024 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 9:33 End Time (MST): 13:54 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.7		Correlation Coefficient	0.999977	≥0.995
381.9	383.4	0.9960	Correlation Coefficient	0.333377	20.333
194.0	195.4	0.9928	Slope	1.004655	0.90 - 1.10
97.6	99.1	0.9847	Slope	1.004055	0.90 - 1.10
			Intercept	0.153346	+/-20

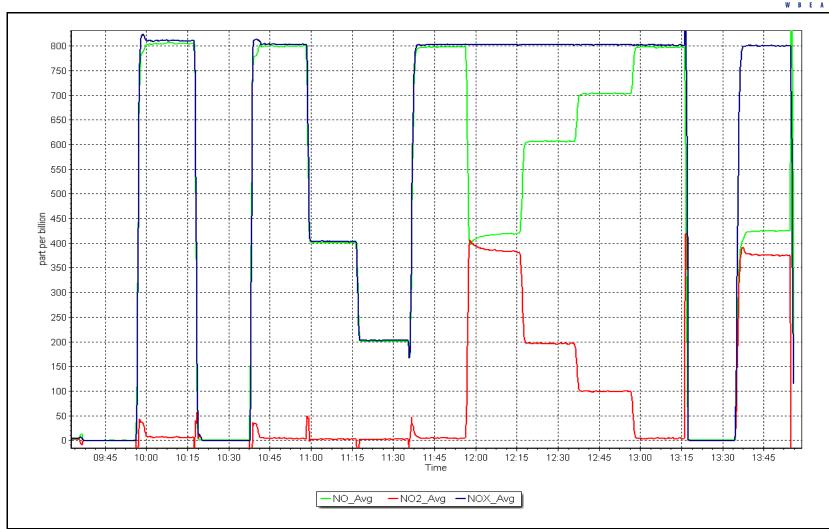


NO<sub>x</sub> Calibration Plot

Date: March 13, 2024

Location: Christina Lake







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS27 JACKFISH 2/3 MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Jackfish 2/3

March 8, 2024 Calibration Date:

Start time (MST): 11:47

Routine Reason:

Station number: **AMS 27** 

> February 14, 2024 Last Cal Date:

End time (MST): 14:46

**Calibration Standards** 

ppm

Cal Gas Concentration: 50.58

Cal Gas Cylinder #: SG9133974BAL

Removed Cal Gas Conc: 50.58 Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: **API T700** ZAG Make/Model: API 701

Rem Gas Exp Date: NA ppm

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 3811

Serial Number: 268

Analyzer serial #: 12124313138

**Analyzer Information** 

**Finish** 

Analyzer make: Thermo 43iQ-TL

Analyzer Range 0 - 1000 ppb

**Start** Calibration slope: 1.006935 Calibration intercept:

-2.579017

1.003248 Backgd or Offset: -1.638441 Coeff or Slope: **Start** 8.4 0.960

December 29, 2028

<u>Finish</u> 8.7 0.983

SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4921	79.1	800.2	783.5	1.021
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4921	79.1	800.2	802.2	0.997
second point	4961	39.5	399.5	398.1	1.004
third point	4980	19.8	200.3	197.2	1.016
as left zero	5000	0.0	0.0	0.5	
as left span	4921	79.1	800.2	807.8	0.991
			Averag	ge Correction Factor	1.006
Baseline Corr As found:	783.30	Previous response	803.13	*% change	-2.5%

Baseline Corr 2nd AF pt: NA AF Slope: NA AF Correlation: Baseline Corr 3rd AF pt:

Notes:

AF Intercept:

\* = > +/-5% change initiates investigation

Changed the sample inlet filter after as founds. Adjusted span only.

Calibration Performed By: Mohammed Kashif



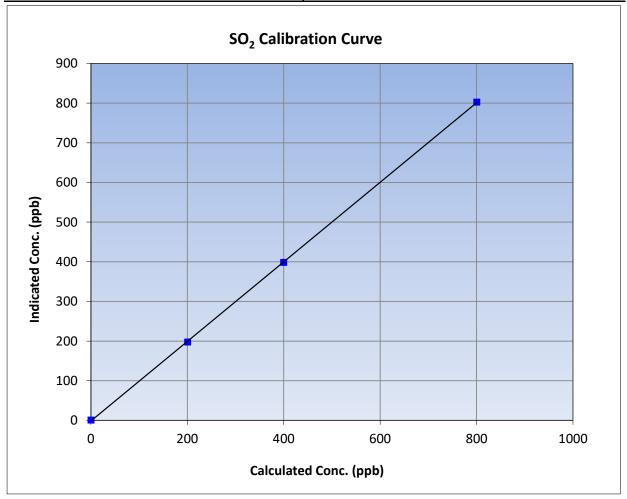
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

### **Station Information**

Calibration Date: March 8, 2024 **Previous Calibration:** February 14, 2024 Station Name: Jackfish 2/3 Station Number: **AMS 27** Start Time (MST): 11:47 End Time (MST): 14:46 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 12124313138

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.5		Correlation Coefficient	0.999968	≥0.995			
800.2	802.2	0.9975	Correlation coefficient	0.555506	20.993			
399.5	398.1	1.0036	Slope	1.003248	0.90 - 1.10			
200.3	197.2	1.0157	Slope	1.003246	0.90 - 1.10			
			- Intercept	-1.638441	+/-30			



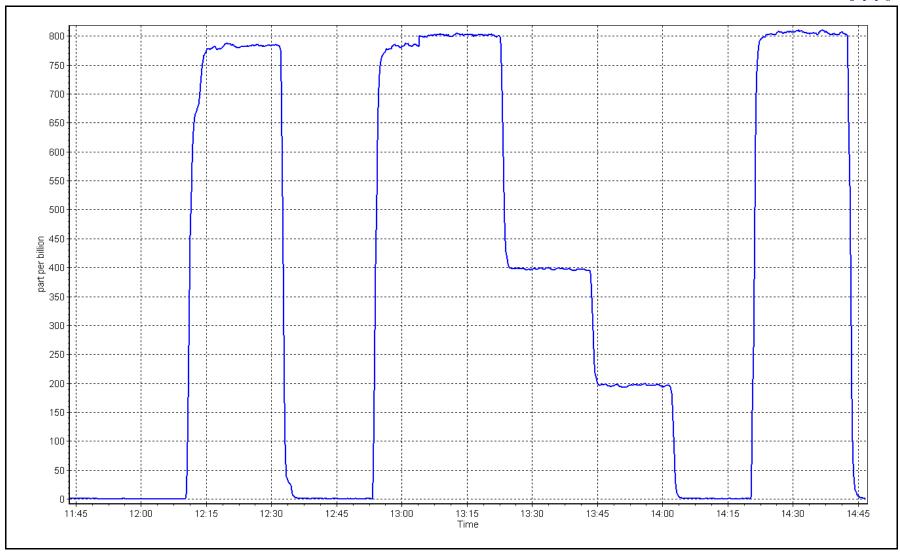
**SO2 Calibration Plot** 

Date:

March 8, 2024

Location: Jackfish 2/3







### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Jackfish 2/3

Calibration Date: March 12, 2024

Start time (MST): 8:57 Reason: Routine Station number: AMS27

Last Cal Date: February 22, 2024

End time (MST): 13:18

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.41 ppm

Cal Gas Cylinder #: CC345023

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.41 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: API T700 Serial Number: 3811 ZAG Make/Model: **API 701** Serial Number: 268

**Analyzer Information** 

Analyzer make: **API T101** Analyzer serial #: 621 Converter serial #:

Converter make:

Analyzer Range 0 - 100 ppb

> <u>Start</u> **Finish**

<u>Finish</u> <u>Start</u> 1.014173 Backgd or Offset: 29.9 Calibration slope: 1.013890 29.9 Calibration intercept: -0.217825 -0.277753 Coeff or Slope: 0.965 0.965

#### H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.3	
as found span	4926	74.1	80.2	81.9	0.983
as found 2nd point	4963	37.0	40.0	40.6	0.993
as found 3rd point	4982	18.5	20.0	19.9	1.021
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4926	74.1	80.2	81.2	0.987
second point	4963	37.0	40.0	40.2	0.996
third point	4982	18.5	20.0	19.6	1.021
as left zero	5000	0.0	0.0	0.2	
as left span	4926	74.1	80.2	81.1	0.989
SO2 Scrubber Check	4921	79.1	791.0	0.1	
Date of last scrubber chan	ge:	_	_	Ave Corr Factor	1.001
D . C1					cc: ·

Date of last scrubber change	2:			Ave Corr Factor	1.001
Date of last converter efficie	ncy test:			ef	ficiency
Baseline Corr As found:	81.6	Prev response:	81.07	*% change:	0.6%

Baseline Corr As found: 81.6 81.07 Prev response: Baseline Corr 2nd AF pt: 40.3 AF Slope: 1.020445 AF Correlation: Baseline Corr 3rd AF pt: 0.999891 19.6

\* = > +/-5% change initiates investigation

-0.097632

AF Intercept:

Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator Notes: zero. No adjustments made.

Calibration Performed By: Mohammed Kashif



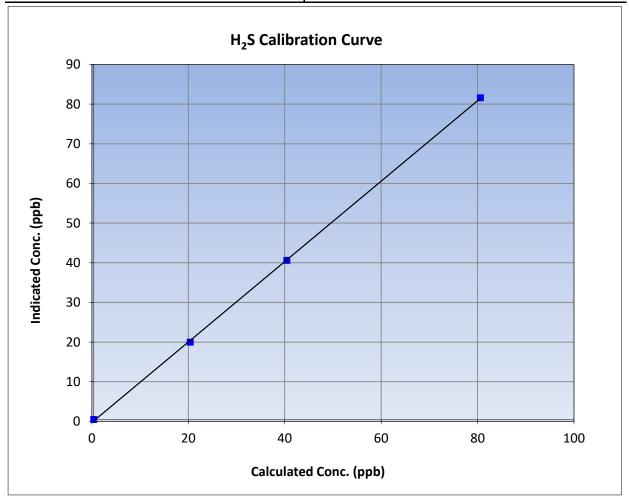
# H<sub>2</sub>S Calibration Summary

Version-11-2021

### **Station Information**

Calibration Date: March 12, 2024 **Previous Calibration:** February 22, 2024 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 8:57 End Time (MST): 13:18 Analyzer make: API T101 Analyzer serial #: 621

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999900	≥0.995		
80.2	81.2	0.9874	Correlation coefficient	0.555500	20.333		
40.0	40.2	0.9959	Slope	1.014173	0.90 - 1.10		
20.0	19.6	1.0212	Slope	1.014175	0.90 - 1.10		
			- Intercept	-0.277753	+/-3		

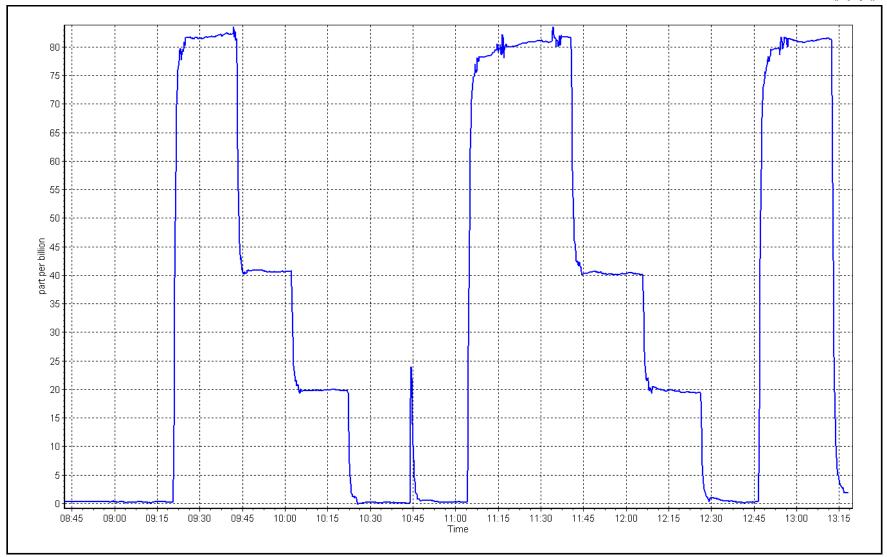


H<sub>2</sub>S Calibration Plot

Date: March 12, 2024

Location: Jackfish 2/3







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Jackfish 2/3

Calibration Date: March 19, 2024

Start time (MST): 11:48
Reason: Routine

Station number: AMS27

Last Cal Date: February 22, 2024

End time (MST): 18:16

#### **Calibration Standards**

NO Gas Cylinder #: CC757838 Cal Gas Expiry Date: January 9, 2032

NOX Cal Gas Conc: 60.30 ppm NO Cal Gas Conc: 60.20 ppm

Removed Cylinder #: T2Y1P35 Removed Gas Exp Date: December 11, 2023

Removed Gas NOX Conc: 51.44 ppm Removed Gas NO Conc: 50.40 ppm

NOX gas Diff:0.4%NO gas Diff:0.9%Calibrator Model:API T700Serial Number:3811ZAG make/model:API T701Serial Number:268

### **Analyzer Information**

Analyzer make: API T200 Analyzer serial #: 722

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.227	1.236	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.207	1.217	NOX bkgnd or offset:	1.2	1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.1	3.2

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.006157	0.998635
NO <sub>x</sub> Cal Offset:	-3.917080	-3.655643
NO Cal Slope:	1.005101	1.002024
NO Cal Offset:	-3.480285	-4.335475
NO <sub>2</sub> Cal Slope:	0.998557	0.991424
NO <sub>2</sub> Cal Offset:	0.165718	-0.986298



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)		Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1		
as found span	4921	79.4	816.8	800.3	16.5	806.4	787.3	19.2	1.0129	1.0165
as found 2nd										
as found 3rd										
new cyl resp	4942	66.5	800.6	799.3	1.3	793.6	793.2	0.4	1.0089	1.0077
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1		
high point	4942	66.5	800.6	799.3	1.3	797.5	798.7	-1.3	1.0039	1.0008
second point	4979	33.3	400.6	399.9	0.7	395.3	394.6	0.7	1.0134	1.0136
third point	4996	16.6	199.7	199.4	0.3	191.5	190.6	0.8	1.0428	1.0460
as left zero	5000	0.0	0.0	0.0	0.0	1.9	1.0	1.0		
as left span	4942	66.5	800.6	417.2	390.6	796.2	412.8	383.4	1.0056	1.0107
							Average C	orrection Factor	1.0200	1.0201
Corrected As fo	ound NO <sub>X</sub> =	806.6 ppb	NO	= 787.4 ppb	* = > +/-5%	6 change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	-1.4%
Previous Respo	nse NO <sub>X</sub> =	817.9 ppb	NO	= 800.9 ppb				*Percent Chan	ge NO =	-1.7%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO	= NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO	= NA ppb	As found	$1 \qquad NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				•	GPT Calibration I	Data				
O3 Setpoint (ppb)			Indicated NO Reference Indicated NO Drop concentration (ppb)		Calculated NO2 Indicated NO2 concentration (ppb) (Cc) concentration (ppb) (Ic)		Calibration Limit = 0.95-1.05		rter Efficiency n Limit = 96-104%	
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
as found GPT poir	nt (200 ppb NO2)									
as found GPT poir	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	798.7		409.4	390.6		386.3	1.0112	2	98.9%
2nd GPT point (200 ppb O3)		798.7		622.9	177.1		175.5	1.0093		99.1%
3rd GPT point	(100 ppb O3)	798.7		710.4	89.6		86.1	1.0410	)	96.1%

Notes:

Changed the NO calibration gas cylinder after as founds. Changed the inlet filter. Adjusted span only

Average Correction Factor

1.0205

Calibration Performed By: Mohammed Kashif

98.0%



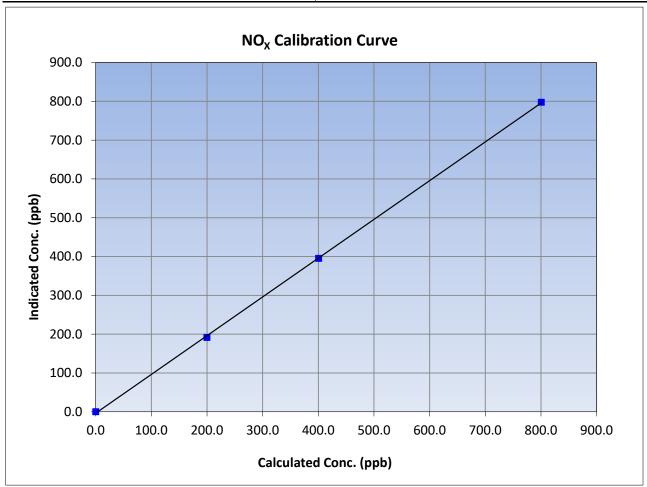
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 19, 2024 Previous Calibration: February 22, 2024 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 11:48 End Time (MST): 18:16 Analyzer serial #: Analyzer make: 722 **API T200** 

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999897	≥0.995
800.6	797.5	1.0039	Correlation Coefficient	0.333637	
400.6	395.3	1.0134	Slope	0.998635	0.90 - 1.10
199.7	191.5	1.0428	Slope	0.996033	0.50 1.10
			Intercept	-3.655643	+/-20





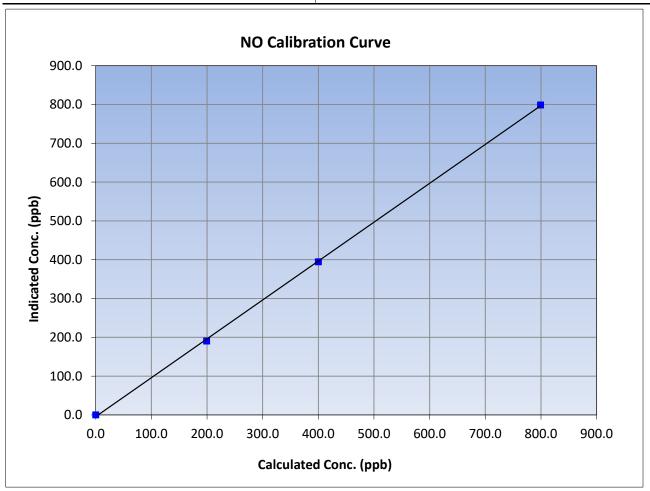
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 19, 2024 Previous Calibration: February 22, 2024 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 11:48 End Time (MST): 18:16 Analyzer make: **API T200** Analyzer serial #: 722

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999853	≥0.995
799.3	798.7	1.0008	Correlation Coefficient	0.555655	20.333
399.9	394.6	1.0136	Slope	1.002024	0.90 - 1.10
199.4	190.6	1.0460	Slope	1.002024	0.30 - 1.10
			Intercept	-4.335475	+/-20





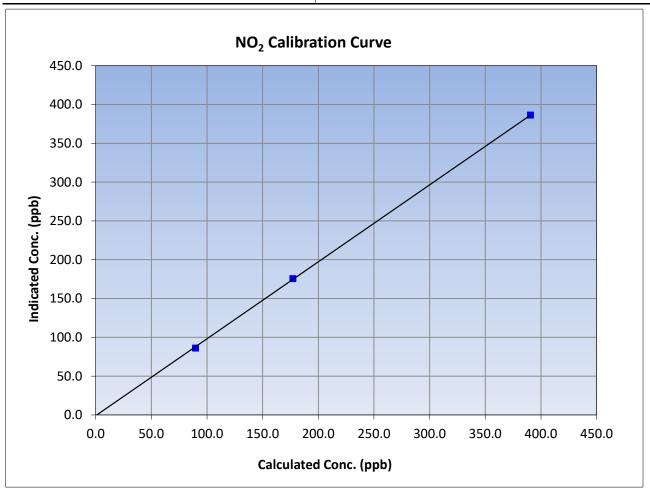
## NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 19, 2024 Previous Calibration: February 22, 2024 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 11:48 End Time (MST): 18:16 Analyzer serial #: Analyzer make: **API T200** 722

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999943	≥0.995
390.6	386.3	1.0112	Correlation Coefficient	0.555545	20.333
177.1	175.5	1.0093	Slope	0.991424	0.90 - 1.10
89.6	86.1	1.0410	Slope	0.551424	0.50 1.10
			Intercept	-0.986298	+/-20

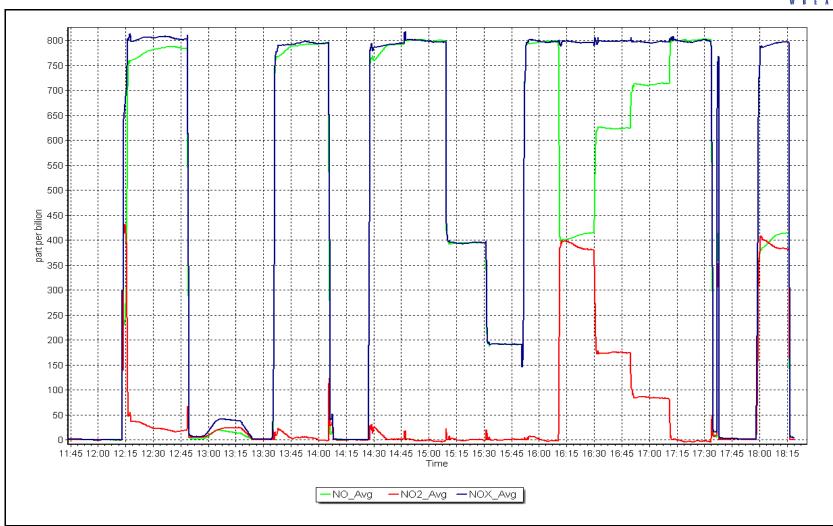


NO<sub>x</sub> Calibration Plot

Date: March 19, 2024

Location: Jackfish 2/3







### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS29 SURMONT 2 MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Surmont 2

March 8, 2024 Calibration Date:

10:55 Start time (MST): Routine Reason:

Station number: AMS29

February 5, 2024 Last Cal Date:

End time (MST): 14:36

**Calibration Standards** 

Cal Gas Concentration: 49.21

Cal Gas Cylinder #: CC356008

Removed Cal Gas Conc: 49.21 Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: February 23, 2025

> Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 5472

Serial Number: 4698

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Analyzer Range 0 - 1000 ppb

**Finish** Start

ppm

ppm

0.998273 1.007141 Backgd or Offset:

Start 12.9

**Finish** 12.9 0.939

Calibration slope: Calibration intercept: -1.525570 -1.805499 Coeff or Slope: 0.939

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (	Correction factor (Cc/Ic)
Sectionic	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.2	
as found span	4919	81.3	800.1	803.0	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4919	81.3	800.1	805.0	0.994
second point	4959	40.7	400.6	400.5	1.000
third point	4979	20.3	199.8	197.8	1.010
as left zero	5000	0.0	0.0	-0.2	
as left span	4919	81.3	800.1	803.0	0.996
	Average Correction Factor				1.001

Baseline Corr As found: 803.20 Previous response 797.20 \*% change 0.7% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By: **Braiden Boutilier** 



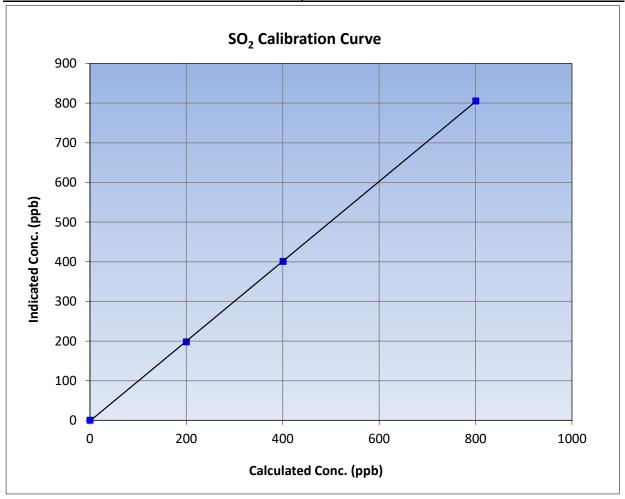
### **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 8, 2024 **Previous Calibration:** February 5, 2024 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:55 End Time (MST): 14:36 Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999977	≥0.995				
800.1	805.0	0.9939	Correlation coefficient	0.333377	20.993				
400.6	400.5	1.0002	Slope	1.007141	0.90 - 1.10				
199.8	197.8	1.0102	- зюре	1.00/141	0.90 - 1.10				
			- Intercept	-1.805499	+/-30				

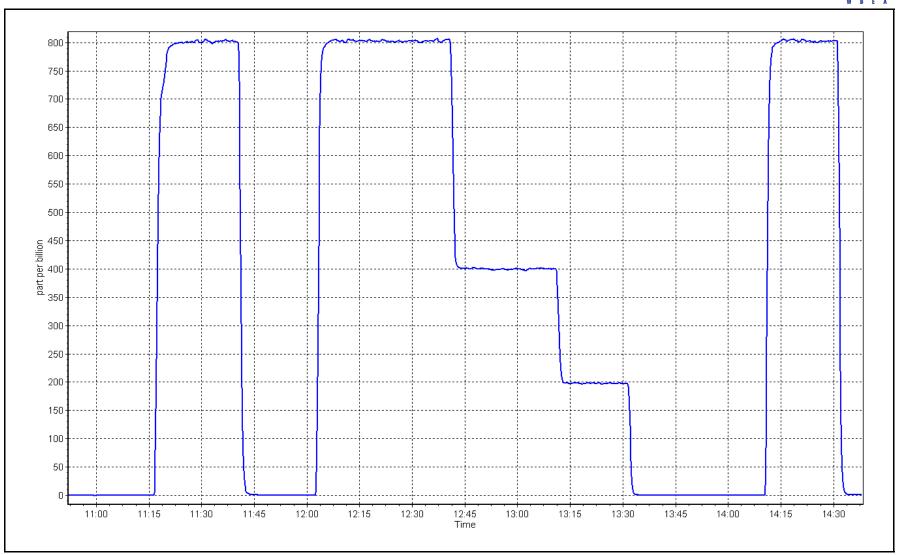


**SO2 Calibration Plot** 

Date: March 8, 2024

Location: Surmont 2







#### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Surmont 2

Calibration Date: March 7, 2024

Start time (MST): 11:11

Reason: Routine Station number: AMS29

> Last Cal Date: February 12, 2024

End time (MST): 16:14

**Calibration Standards** 

Cal Gas Exp Date: January 4, 2025 Cal Gas Concentration: 5.391 ppm

Cal Gas Cylinder #: CC508338

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.391 ppm Removed Gas Cyl #: CC508338 Diff between cyl:

Calibrator Make/Model: Teledyne API T700 5472 Serial Number: ZAG Make/Model: Teledyne API T701 Serial Number: 4698

**Analyzer Information** 

Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

Global Converter serial #: 2022-220 Converter make:

0 - 100 ppb Analyzer Range

**Finish Start** <u>Finish</u> <u>Start</u> 0.997613 Backgd or Offset: Calibration slope: 1.004326 0.92 0.92 Calibration intercept: -0.142791 0.017447 Coeff or Slope: 1.074 1.074

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4926	74.2	80.0	80.7	0.990
as found 2nd point	4963	37.2	40.1	40.4	0.990
as found 3rd point	4982	18.6	20.1	19.8	1.008
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Set Point Dilution air flow rate Set (sccm)		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4926 74.2 80.0		79.9	1.001	
second point	4963	37.2	40.1	39.9	1.005
third point	4982	18.6	20.1	20.0	1.003
as left zero	5000	0.0	0.0	0.1	
as left span	4926	74.2	80.0	80.0	1.000
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chan	ge:	<u> </u>	_	Ave Corr Factor	1.003
Data of last convertor offic	aio nou tost.			· ·	officional

Date of last scrubber change:	Ave Corr Factor	1.003
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 80.8 80.21 0.7% Prev response: \*% change: Baseline Corr 2nd AF pt: 40.5 AF Slope: 1.011474 AF Intercept: -0.243249 Baseline Corr 3rd AF pt: AF Correlation: 0.999976 19.9

\* = > +/-5% change initiates investigation

Notes:

Changed sample inlet filter after as founds. No adjustments made. Scrubber check done after cal zero, passed.

Calibration Performed By: Braiden Boutilier



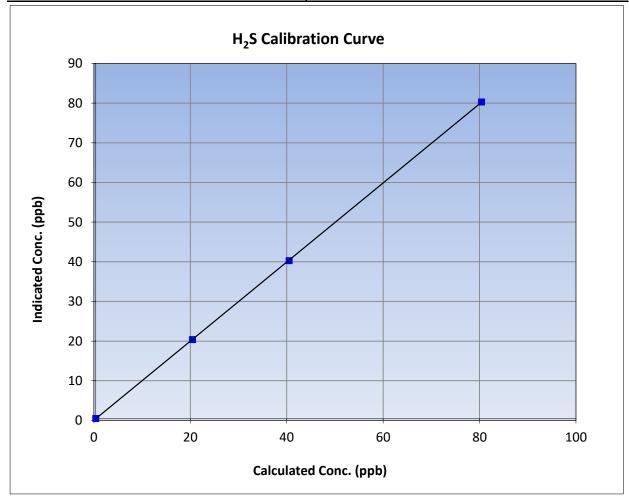
### H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 7, 2024 **Previous Calibration:** February 12, 2024 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 11:11 End Time (MST): 16:14 Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

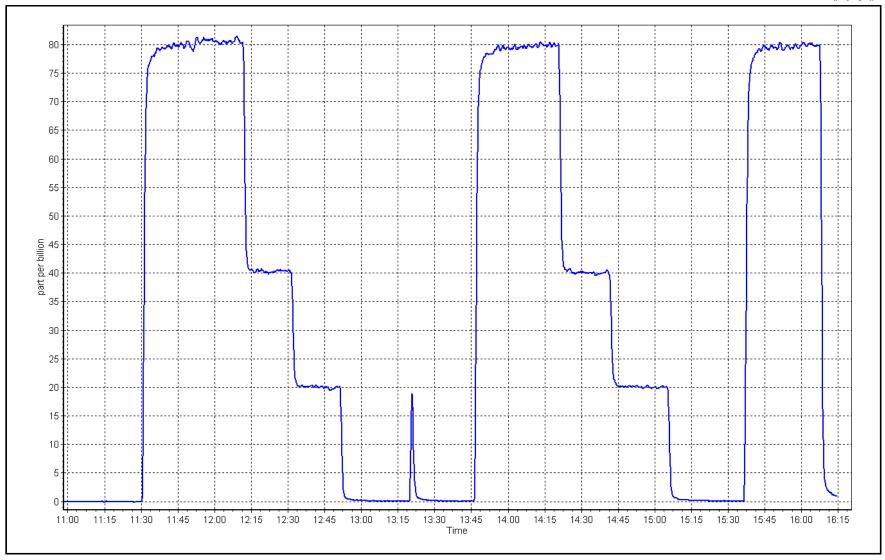
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>					
0.0	0.1		Correlation Coefficient	0.999992	≥0.995				
80.0	79.9	1.0013	Correlation Coefficient	0.555552	20.993				
40.1	39.9	1.0052	Slope	0.997613	0.90 - 1.10				
20.1	20.0	1.0027	Slope	0.997013	0.90 - 1.10				
			- Intercept	0.017447	+/-3				



Date: March 7, 2024

Location: Surmont 2







### **THC Calibration Report**

Version-01-2020

#### **Station Information**

Surmont 2 Station Name:

March 8, 2024 Calibration Date:

Start time (MST): 10:55

Routine Reason:

Station number: AMS29

> February 26, 2024 Last Cal Date:

End time (MST): 14:36

**Calibration Standards** 

CC356008 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.0 ppm CH4 Equiv Conc. 1064.7 ppm

C3H8 Cal Gas Conc. 205.7 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 499.0 CH4 Equiv Conc. 1064.7 ppm ppm

205.7 Diff between cyl: Removed C3H8 Conc. ppm

Calibrator Make/Model: Teledyne API T700 Serial Number: 5472 ZAG Make/Model: Teledyne API T701 Serial Number: 4698

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 0.995247 1.004976 3.62 3.64

-0.063439 Coefficient: Calibration intercept: -0.136283 4.021 4.046

#### **THC Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Concentration (ppm)		Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.09	
as found span	4918	81.3	17.31	17.20	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.02	
high point	4918	81.3	17.31	17.36	0.997
second point	4959	40.6	8.65	8.60	1.005
third point	4979	20.3	4.32	4.24	1.020
as left zero	5000	0.0	0.00	-0.07	
as left span	4918	81.3	17.31	17.44	0.993
			Ave	rage Correction Factor	1.008
Baseline Corr As found:	17.29	Previous response	17.10	*% change	1.1%
D !! O O ! A.E .		4 5 61		A=	

Baseline Corr 2nd AF pt: AF Slope: AF Intercept: NA

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Small span adjustment made.

Calibration Performed By: **Braiden Boutilier** 



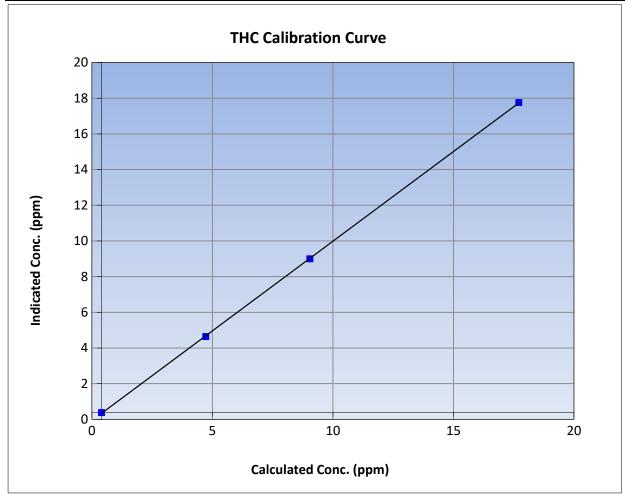
### **THC Calibration Summary**

Version-01-2020

#### **Station Information**

February 26, 2024 **Previous Calibration:** Calibration Date: March 8, 2024 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:55 End Time (MST): 14:36 Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.00	-0.02		Correlation Coefficient	0.999970	≥0.995				
17.31	17.36	0.9974	Correlation Coefficient	0.555570	20.333				
8.65	8.60	1.0053	Slope	1.004976	0.90 - 1.10				
4.32	4.24	1.0199	Slope	1.004970	0.30 - 1.10				
			- Intercept	-0.063439	+/-1.5				

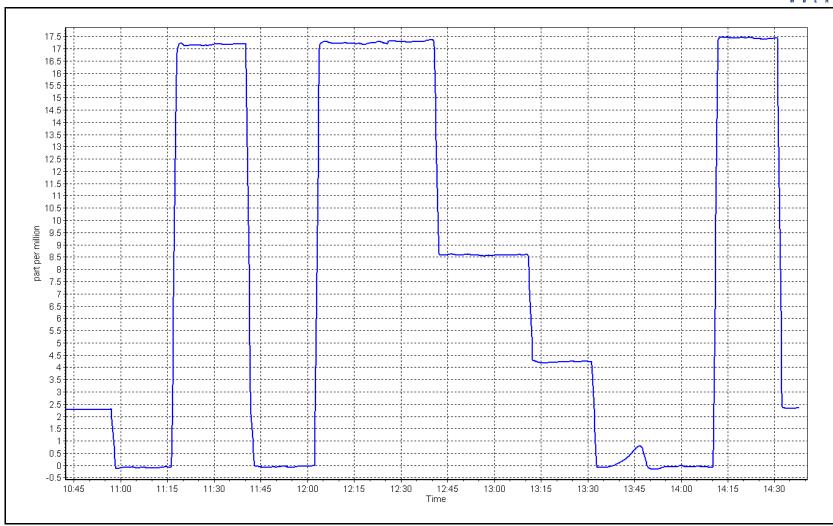


**THC Calibration Plot** 

Date: March 8, 2024

Location: Surmont 2







### NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Surmont 2

Calibration Date: March 6, 2024

Start time (MST): 11:05

Routine Reason:

Station number: AMS29

Last Cal Date: February 6, 2024

End time (MST): 16:48

#### **Calibration Standards**

T12YYFE NO Gas Cylinder #: Cal Gas Expiry Date: October 30, 2024

NOX Cal Gas Conc: 47.46 NO Cal Gas Conc: 47.46 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: Removed Gas NO Conc: 47.46 ppm 47.46 ppm

NOX gas Diff:

NO gas Diff: Calibrator Model: Teledyne API T700 Serial Number: 5472 ZAG make/model: Teledyne API T701 Serial Number: 4698

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1170050148

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.390	1.414	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	1.4	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	175.3	174.7

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.999594	1.000767
NO <sub>x</sub> Cal Offset:	-1.052309	-1.012410
NO Cal Slope:	0.998306	1.000380
NO Cal Offset:	-1.451708	-1.452150
NO <sub>2</sub> Cal Slope:	0.998502	0.998848
NO <sub>2</sub> Cal Offset:	-0.096658	0.144949



### NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic)  Limit = 0.95-1.05	NO Correction factor (Cc/Ic
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0		
as found span	4916	84.2	799.2	799.2	0.0	787.5	784.7	2.8	1.0149	1.0185
as found 2nd	1310	01.2	, , , , , ,	, , , , , ,	0.0	707.3	,,,,,	2.0	1.01.13	1.0103
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4916	84.2	799.2	799.2	0.0	798.9	798.4	0.5	1.0004	1.0010
second point	4958	42.1	399.6	399.6	0.0	399.5	398.6	0.9	1.0003	1.0025
third point	4979	21.1	200.3	200.3	0.0	197.8	196.9	0.9	1.0125	1.0172
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as left span	4916	84.2	799.2	409.5	389.7	793.8	403.3	390.5	1.0068	1.0154
							Average C	orrection Factor	1.0044	1.0069
Corrected As fo	ound NO <sub>X</sub> =	787.7 ppb	NO =	784.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO <sub>X</sub> =	-1.3%
revious Respo	nse NO <sub>x</sub> =	797.8 ppb	NO =	796.4 ppb				*Percent Chang	ge NO =	-1.5%
Baseline Corr 2	nd pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3			NO =	NA ppb	As found	d $NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated NC concentration (pp		dicated NO2 tration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	793.2		403.5	389.7		389.1	1.0015		99.8%
2nd GPT point	(200 ppb O3)	793.2		602.6	190.6	·	191.3	0.9963	-	.00.4%

Notes:

3rd GPT point (100 ppb O3)

Changed sample inlet filter after as founds. Adjusted span.

96.4

Average Correction Factor

1.0031

1.0003

96.7

Calibration Performed By:

Braiden Boutilier

696.5

793.2

99.7%

100.0%



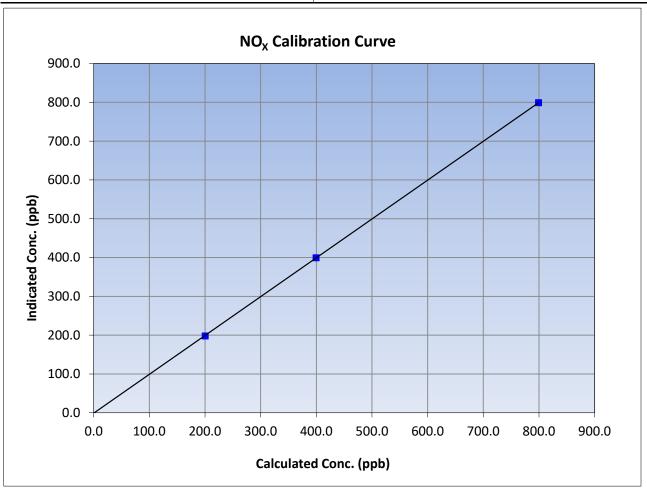
### NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 6, 2024 Station Name: Station Number: AMS29 Surmont 2 Start Time (MST): 11:05 End Time (MST): 16:48 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999989	≥0.995	
799.2	798.9	1.0004	Correlation Coefficient	0.999909	20.999	
399.6	399.5	1.0003	Slope	1.000767	0.90 - 1.10	
200.3	197.8	1.0125	Slope	1.000767	0.90 - 1.10	
			Intercept	-1.012410	+/-20	





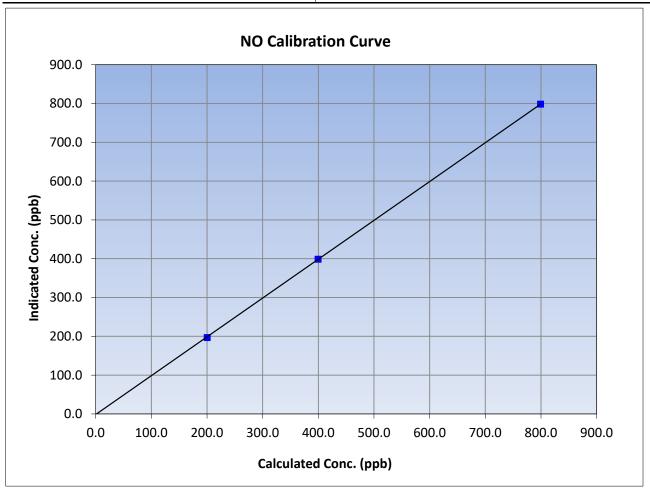
### **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 6, 2024 Previous Calibration: February 6, 2024 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 11:05 End Time (MST): 16:48 Analyzer make: Analyzer serial #: 1170050148 Thermo 42i

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999983	≥0.995
799.2	798.4	1.0010	Correlation Coefficient	0.555505	20.333
399.6	398.6	1.0025	Slope	1.000380	0.90 - 1.10
200.3	196.9	1.0172	Зюре	1.000360	0.90 - 1.10
			Intercept	-1.452150	+/-20





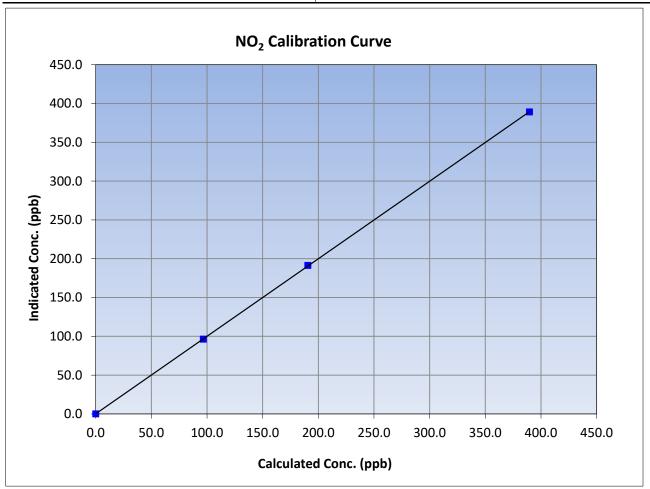
### NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

February 6, 2024 Calibration Date: March 6, 2024 Previous Calibration: Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 11:05 End Time (MST): 16:48 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999990	≥0.995
389.7	389.1	1.0015	Correlation Coefficient	0.555550	20.333
190.6	191.3	0.9963	Slope	0.998848	0.90 - 1.10
96.7	96.4	1.0031	Зюре	0.550040	0.90 - 1.10
	·		Intercept	0.144949	+/-20

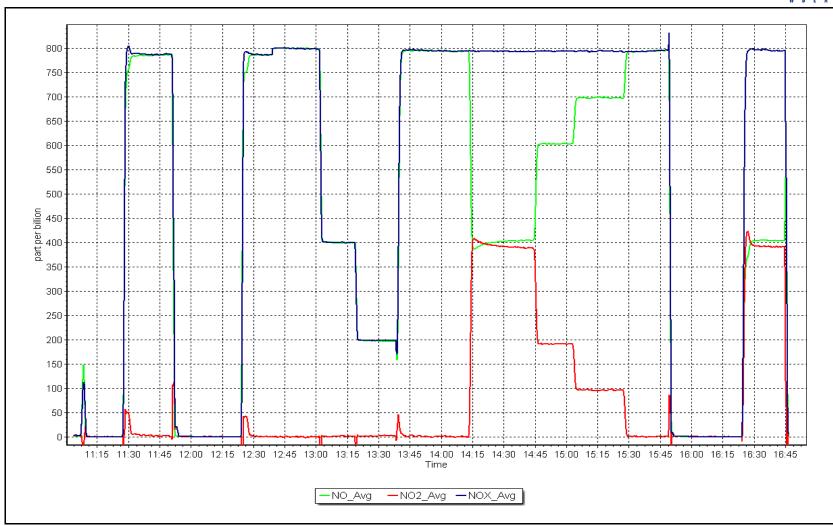


NO<sub>x</sub> Calibration Plot

Date: March 6, 2024

Location: Surmont 2







Calibration by:

Braiden Boutilier

### **Wood Buffalo Environmental Association**

### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024

		Station Informa	tion		
Station Name: Calibration Date: Start time (MST):	Surmont March 8, 2024 10:59		Station number: Last Cal Date: End time (MST):	February 12, 2024	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	253	
Flow Meter Make/Model: Temp/RH standard:	Alicat FP-25BT Alicat FP-25BT		•	388754 388754	
		Monthly Calibration	on Test		
<u>Parameter</u> T (°C) P (mmHg) Flow (LPM)	<u>As found</u> -0.9 710.0 4.99	<u>Measured</u> -0.43 711.07 5.128	<u>As left</u> -0.9 710.0 4.99	Adjusted	(Limits) +/- 2 °C +/- 10 mmHg +/- 0.25 LPM
PW% (pump)	36		36		>80%
Zero Verification	PM w/o HEPA:	3.1	_ PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be PM Inlet observation :	completed before the Inlet Head Clean		will serve as the pre ma	aintenance leak check	
		Quarterly Calibrati	on Test		
SPAN DUST	Refractive Index:	10.9	Expiry Date:	June 10, 20	24
SPAIN DOST	Lot No.:	100128-050-042			
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					+/- 0.5
Date Optical Chaml Date Disposable Filt	-	February 12, 2024 February 12, 2024			
Post- maintenance Zero Verification:		PM w/ HEPA:		<0.2 ug/m3	
		Annual Mainten	ance		
Date Sample Tub	e Cleaned:	October	· 25, 2023		
Date RH/T Sensor Cleaned:		October 25, 2023			
Notes:		No adjustme	ents made. Leak check	passed.	

# W R F A

### **Wood Buffalo Environmental Association**

### **Wind Speed/Direction Calibration Report**

Version-10-2022

**Station Information** 

Surmont 2 Station Name: Station Number: **AMS 29** March 7, 2024 Prev Cal Date: Calibration Date: June 8, 2023 Start Time (MST): 11:11 End Time (MST): 15:38 Tower Height (m): 10.0 Reason: Install

**Wind Speed Information** 

Sensor make/model: Met One 010C-1 Serial Number: W15275 WS Calibrator: MetOne 053 Serial Number: P15103

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.1 -0.2% 400 39.4 39.4 0.1% 600 58.6 58.5 0.0% 800 77.8 77.6 -0.3%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999997	≥0.9995
Calculated slope		1.001844	0.90 - 1.10
Calculated intercept		-0.029522	+/- 2

#### Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: A2005

As Found Declination (deg east of True North): 13° E As Left Declination (deg east of True North): 13° E Solar noon time (MST): 12:34 Calc Declination\*: 13.12° E Degrees

Deadband calc: NA degrees (Limit 4 deg ) \*- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0		
90		_
180		_
270		
357		

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )			≥0.9995
Calculated slope			0.90 - 1.10
Calculated intercept			+/- 4

Notes: WS install. Verified tower alignment using solar noon and a compass.

Calibration Performed By: Braiden Boutilier



#### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS30 ELLS RIVER MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



Removed Gas Cyl #:

### **Wood Buffalo Environmental Association**

### **SO<sub>2</sub> Calibration Report**

End time (MST):

**AMS 30** 

13:30

Version-01-2020

**Station Information** 

Station number: Station Name: Ells River

March 6, 2024 February 5, 2024 Calibration Date: Last Cal Date:

Start time (MST): 10:27 Routine Reason:

**Calibration Standards** 

Cal Gas Concentration: 50.53

Cal Gas Cylinder #: CC494126

Removed Cal Gas Conc: 50.53

Calibrator Make/Model: **API T700** ZAG Make/Model: API T701H ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date: ppm

Diff between cyl:

Serial Number: 3061 Serial Number: 358

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Analyzer Range 0 - 1000 ppb

**Finish** Start

**Finish** <u>Start</u> Calibration slope: 1.000960 1.000331 Backgd or Offset: 9.5 9.5 0.982 Calibration intercept: -2.235937 -2.815894 Coeff or Slope: 0.982

SO<sub>2</sub> Calibration Data

Cat Daint	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (	Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.4	
as found span	4921	79.2	800.4	799.6	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.2	800.4	799.3	1.001
second point	4960	39.6	400.2	396.0	1.011
third point	4980	19.8	200.1	194.5	1.029
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.2	800.4	799.7	1.001
			Averag	ge Correction Factor	1.014
Baseline Corr As found:	800.00	Previous response	798.90	*% change	0.1%

Baseline Corr As found: Previous response % change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA Baseline Corr 3rd AF pt: AF Correlation:

Notes: Inlet filter changed after As Founds, no adjustments made.

Calibration Performed By: Jan Castro \* = > +/-5% change initiates investigation



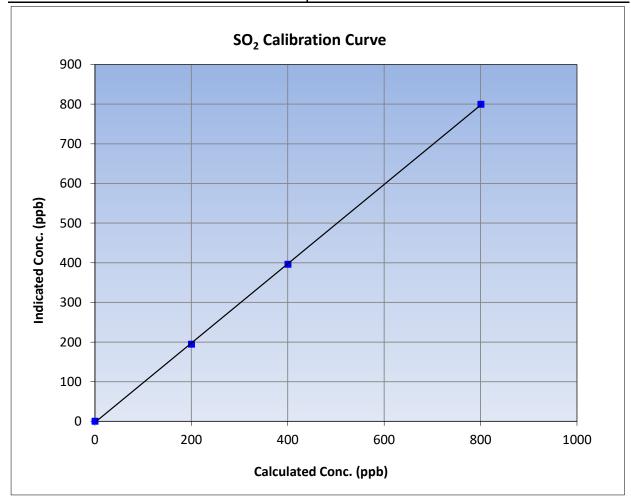
### **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 5, 2024 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:27 End Time (MST): 13:30 Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Calibration Data						
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999939	≥0.995	
800.4	799.3	1.0013	Correlation Coefficient	0.55555	20.333	
400.2	396.0	1.0107	Slope	1.000331	0.90 - 1.10	
200.1	194.5	1.0288	Slope	1.000331	0.90 - 1.10	
			- Intercept	-2.815894	+/-30	



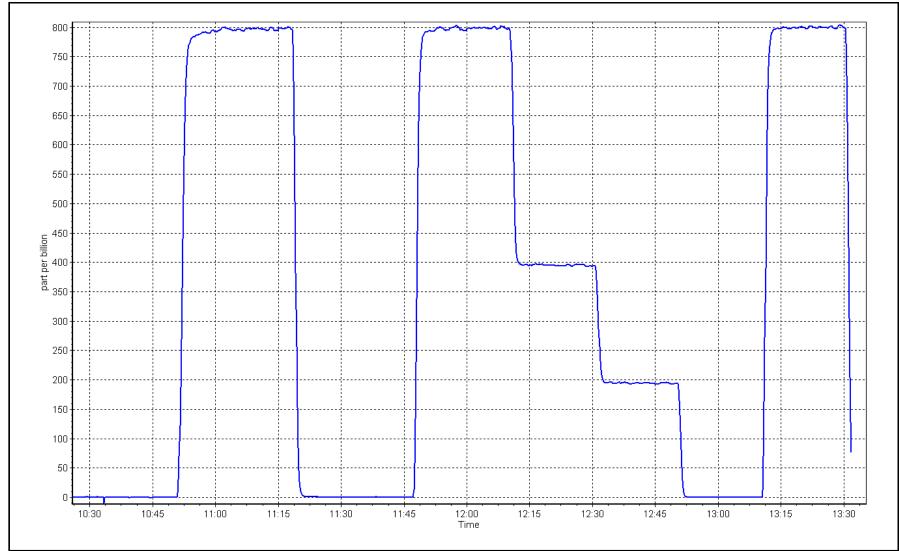
SO2 Calibration Plot

Date:

March 6, 2024

Location: Ells River







#### **TRS Calibration Report**

Version-11-2021

**Station Information** 

Station Name: Ells River

Calibration Date: March 11, 2024

Start time (MST): 9:11
Reason: Routine

Station number: AMS30

Last Cal Date: February 6, 2024

End time (MST): 13:40

**Calibration Standards** 

Cal Gas Concentration: 4.99 ppm Cal Gas Exp Date: November 15, 2026

Cal Gas Cylinder #: CC505806

Removed Cal Gas Conc: 4.99 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3061 ZAG Make/Model: API T701H Serial Number: 358

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1410661331

Converter make: CDN - 101 Converter serial #: 562

Analyzer Range 0 - 100 ppb

 Start
 Finish
 Start
 Finish

 Calibration slope:
 1.002473
 1.002902
 Backgd or Offset:
 1.64
 1.64

 Calibration slope:
 1.002473
 1.002902
 Backgd or Offset:
 1.64
 1.64

 Calibration intercept:
 0.159591
 -0.080433
 Coeff or Slope:
 1.060
 1.060

**TRS As Found Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.2	80.0	79.4	1.007
as found 2nd point	4960	40.1	40.0	39.7	1.006
as found 3rd point	4980	20.0	20.0	19.4	1.024
new cylinder response					

#### **TRS Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4920	80.2	80.0	80.2	0.998
second point	4960	40.1	40.0	40.0	1.000
third point	4980	20.0	20.0	20.0	0.998
as left zero	5000	0.0	0.0	0.4	
as left span	4920	80.2	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.2	800.4	0.2	
Date of last scrubber chang	ge:	N/A		Ave Corr Factor	0.999
Date of last converter effic	iency test:	N/A		·	efficiency

Date of last scrubber change	2:	N/A		Ave Corr Factor	0.999	
Date of last converter efficie	ency test:	N/A		ef	ficiency	
Baseline Corr As found:	79.5	Prev response:	80.39	*% change:	-1.1%	

Baseline Corr 2nd AF pt: 39.8 AF Slope: 0.994769 AF Intercept:
Baseline Corr 3rd AF pt: 19.5 AF Correlation: 0.999976

\* = > +/-5% change initiates investigation

-0.220738

Notes: Change inlet filters after multipoint as founds. SO2 scrubber check done after calibrator zero, passed. No adjustment made.

Calibration Performed By: Jan Castro



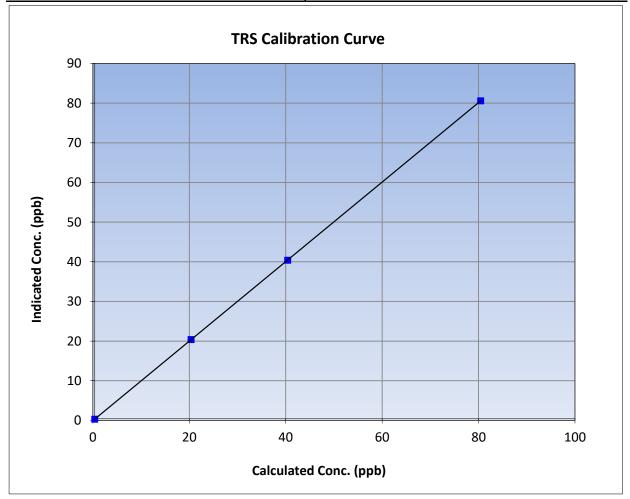
### **TRS Calibration Summary**

Version-11-2021

#### **Station Information**

March 11, 2024 **Previous Calibration:** Calibration Date: February 6, 2024 Station Name: Ells River Station Number: AMS30 Start Time (MST): 9:11 End Time (MST): 13:40 Analyzer make: Thermo 43i TLE Analyzer serial #: 1410661331

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>		
0.0	-0.1		Correlation Coefficient	0.999998	≥0.995	
80.0	80.2	0.9980	Correlation Coefficient	0.555556	20.333	
40.0	40.0	1.0005	Slope	1.002902	0.90 - 1.10	
20.0	20.0	0.9980	Slope	1.002902	0.90 - 1.10	
			- Intercept	-0.080433	+/-3	

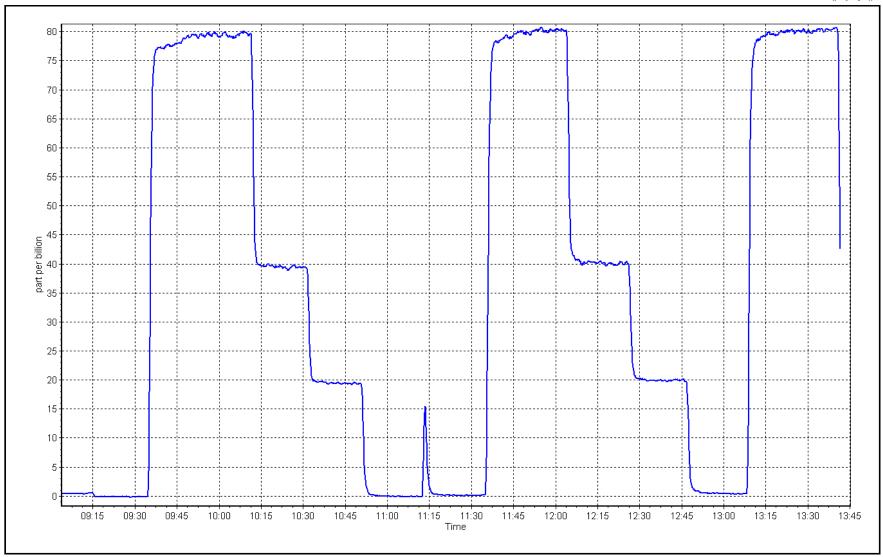


**TRS Calibration Plot** 

Date: March 11, 2024

Location: Ells River







### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-01-2020

#### **Station Information**

Ells River Station Name:

Calibration Date: March 6, 2024

Start time (MST): 10:27 Reason: Routine Station number: AMS 30

Last Cal Date: February 5, 2024

End time (MST): 13:30

#### **Calibration Standards**

Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CC494126 CH4 Cal Gas Conc. 499.7 ppm

C3H8 Cal Gas Conc. 209.2 ppm

Removed Gas Cert:

Removed CH4 Conc. 499.7 ppm 209.2 ppm

Removed C3H8 Conc.

Diff between cyl ( $CH_4$ ):

Calibrator Model: **API T700** ZAG make/model: **API T701H**  CH4 Equiv Conc. 1075.0 ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1075.0 ppm

Diff between cyl (THC): Diff between cyl (NM):

> Serial Number: 3061 Serial Number: 358

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1181490018

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Start Finish Start Finish 2.53E-04 2.53E-04 NMHC SP Ratio: 6.42E-05 6.42E-05

CH4 SP Ratio: CH4 Retention time: 14.2 NMHC Peak Area: 14.2 141799 141799

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	17.03	16.97	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	17.03	16.98	1.003
second point	4960	39.6	8.51	8.46	1.006
third point	4980	19.8	4.26	4.14	1.030
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	17.02	1.000
				Average Correction Factor	1.013
Baseline Corr AF:	16.97	Prev response	17.01	*% change	-0.2%

Baseline Corr 2nd AF: NA AF Slope: AF Intercept: \* = > +/-5% change initiates investigation Baseline Corr 3rd AF: NA AF Correlation:



### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-01-2020

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.11	9.07	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4921	79.2	9.11	9.12	0.999
second point	4960	39.6	4.56	4.55	1.002
third point	4980	19.8	2.28	2.22	1.026
as left zero	5000	0	0.00	0.00	
as left span	4921	79.2	9.11	9.11	1.000
·			Aver	age Correction Factor	1.009
Baseline Corr AF:	9.07	Prev response	9.14	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
as found zero	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	7.91	7.90	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
	5000	0.0	0.00	0.00	
<u> </u>	4921	79.2	7.91	7.86	1.007
second point	4921 4960	79.2 39.6	7.91 3.96	7.86 3.91	1.007 1.013
second point third point	4921 4960 4980	79.2 39.6 19.8	7.91 3.96 1.98	7.86 3.91 1.91	1.007 1.013 1.034
second point third point as left zero	4921 4960 4980 5000	79.2 39.6 19.8 0.0	7.91 3.96 1.98 0.00	7.86 3.91 1.91 0.00	1.007 1.013 1.034
second point third point as left zero	4921 4960 4980	79.2 39.6 19.8	7.91 3.96 1.98 0.00 7.91	7.86 3.91 1.91 0.00 7.91	1.007 1.013 1.034  1.000
second point third point as left zero as left span	4921 4960 4980 5000 4921	79.2 39.6 19.8 0.0 79.2	7.91 3.96 1.98 0.00 7.91	7.86 3.91 1.91 0.00 7.91 rage Correction Factor	1.007 1.013 1.034  1.000 1.018
second point third point as left zero as left span Baseline Corr AF:	4921 4960 4980 5000 4921 7.90	79.2 39.6 19.8 0.0 79.2	7.91 3.96 1.98 0.00 7.91	7.86 3.91 1.91 0.00 7.91 rage Correction Factor *% change	1.007 1.013 1.034  1.000
high point second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4960 4980 5000 4921 7.90 NA	79.2 39.6 19.8 0.0 79.2 Prev response AF Slope:	7.91 3.96 1.98 0.00 7.91	7.86 3.91 1.91 0.00 7.91 age Correction Factor *% change AF Intercept:	1.007 1.013 1.034  1.000 1.018 0.3%
second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4960 4980 5000 4921 7.90	79.2 39.6 19.8 0.0 79.2	7.91 3.96 1.98 0.00 7.91	7.86 3.91 1.91 0.00 7.91 rage Correction Factor *% change	1.007 1.013 1.034  1.000 1.018 0.3%
second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4960 4980 5000 4921 7.90 NA	79.2 39.6 19.8 0.0 79.2 Prev response AF Slope:	7.91 3.96 1.98 0.00 7.91 Aver	7.86 3.91 1.91 0.00 7.91 age Correction Factor *% change AF Intercept:	1.007 1.013 1.034  1.000 1.018 0.3%
second point third point as left zero as left span  Baseline Corr AF: Baseline Corr 2nd AF:	4921 4960 4980 5000 4921 7.90 NA	79.2 39.6 19.8 0.0 79.2  Prev response AF Slope: AF Correlation:	7.91 3.96 1.98 0.00 7.91 Aver	7.86 3.91 1.91 0.00 7.91 age Correction Factor *% change AF Intercept:	1.007 1.013 1.034  1.000 1.018 0.3%
second point third point as left zero as left span Baseline Corr AF:	4921 4960 4980 5000 4921 7.90 NA	79.2 39.6 19.8 0.0 79.2  Prev response AF Slope: AF Correlation: Calibration	7.91 3.96 1.98 0.00 7.91 Aver	7.86 3.91 1.91 0.00 7.91 rage Correction Factor *% change AF Intercept: * = > +/-5% change initiate	1.007 1.013 1.034  1.000 1.018 0.3%

Notes: Inlet filter changed after As Founds, no adjustment made.

-0.052740

0.997247

-0.019157

1.006266

-0.033582

Calibration Performed By: Jan Castro

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

-0.050339

0.994937

-0.025157

1.002917

-0.025982



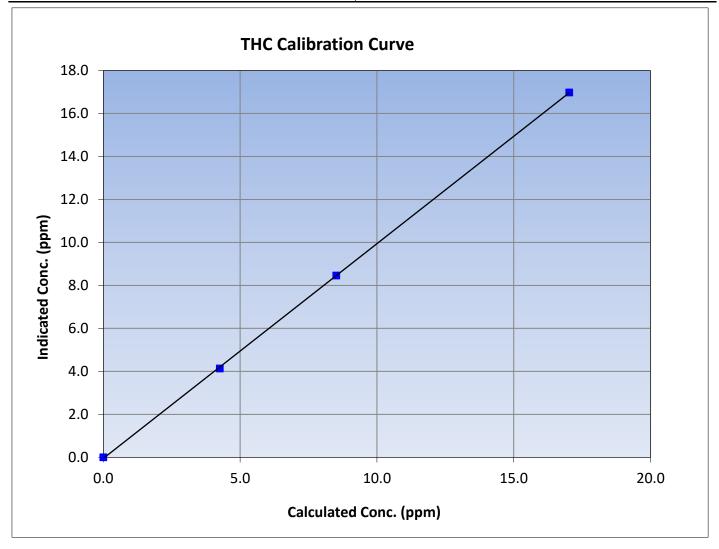
### **THC Calibration Summary**

Version-01-2020

#### **Station Information**

March 6, 2024 **Previous Calibration:** Calibration Date: February 5, 2024 Station Name: Ells River AMS 30 Station Number: Start Time (MST): 10:27 End Time (MST): 13:30 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999953	≥0.995
17.03	16.98	1.0028			20.993
8.51	8.46	1.0065	- Slope	0.999234	0.90 - 1.10
4.26	4.14	1.0295			0.90 - 1.10
			Intercept	-0.050339	+/-0.5





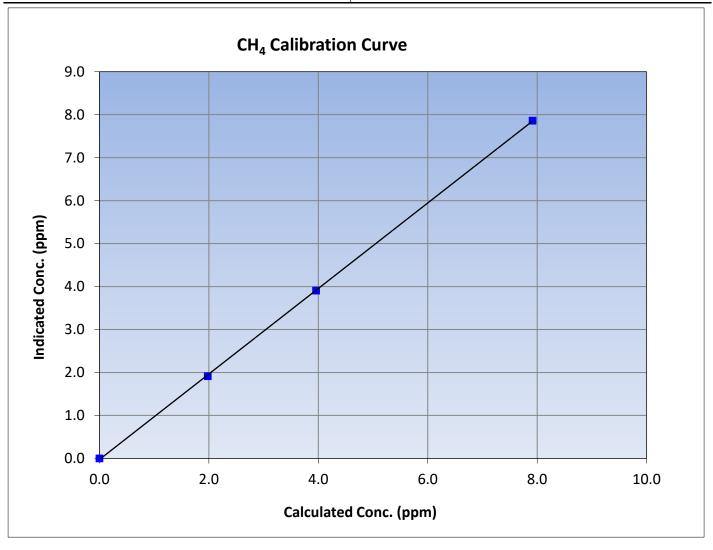
### **CH<sub>4</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 6, 2024 **Previous Calibration:** February 5, 2024 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:27 End Time (MST): 13:30 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999951	≥0.995
7.91	7.86	1.0070			20.333
3.96	3.91	1.0130	Slope	0.994937	0.90 - 1.10
1.98	1.91	1.0339			0.90 - 1.10
			Intercept	-0.025157	+/-0.5





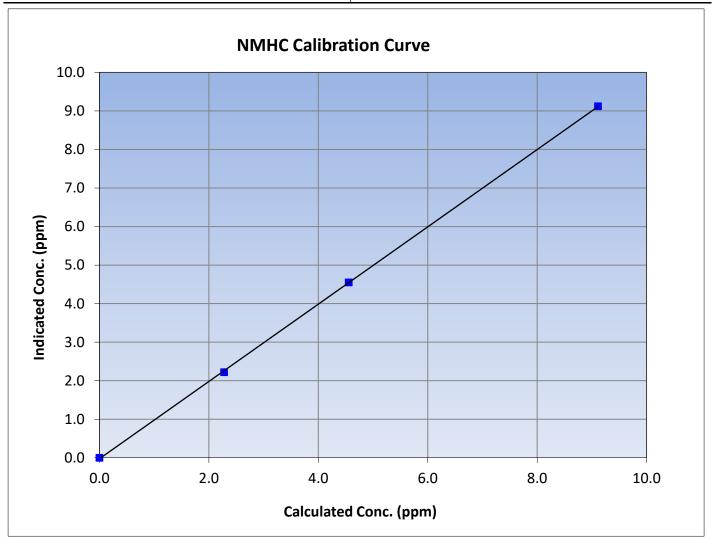
### **NMHC Calibration Summary**

Version-01-2020

#### **Station Information**

March 6, 2024 Calibration Date: **Previous Calibration:** February 5, 2024 Station Name: Ells River AMS 30 Station Number: Start Time (MST): 10:27 End Time (MST): 13:30 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999952	≥0.995
9.11	9.12	0.9992	Correlation Coefficient	0.999952	20.993
4.56	4.55	1.0017	Slope	1.002917	0.90 - 1.10
2.28	2.22	1.0258			0.90 - 1.10
			Intercept	-0.025982	+/-0.5

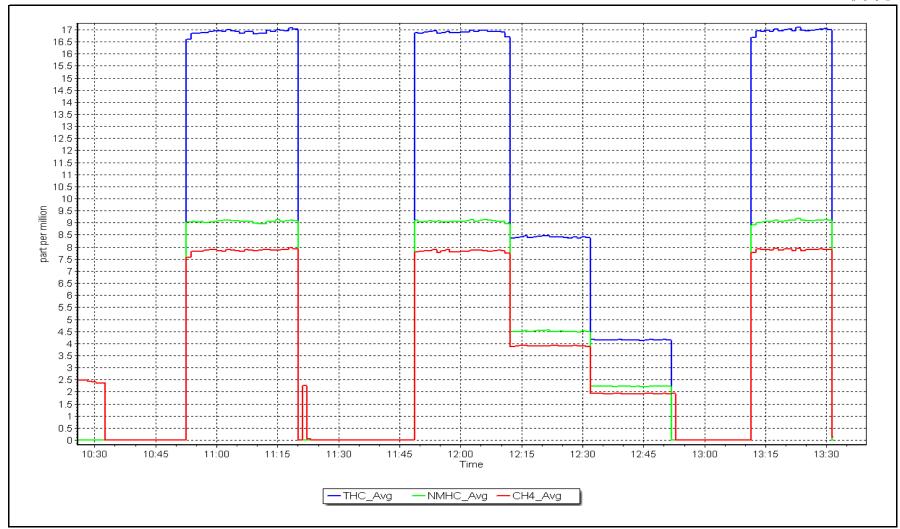


NMHC Calibration Plot

Date: March 6, 2024

Location: Ells River







### THC / CH<sub>4</sub> / NMHC Calibration Report

Removed Gas Expiry:

Version-01-2020

#### **Station Information**

Ells River Station Name: Calibration Date: March 23, 2024

Start time (MST): 10:46

Reason: Maintenance Station number: AMS 30

Last Cal Date: March 6, 2024

End time (MST): 14:13

#### **Calibration Standards**

Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CC494126 CH4 Cal Gas Conc. 499.7 CH4 Equiv Conc. 1075.0 ppm

ppm C3H8 Cal Gas Conc. 209.2

ppm Removed Gas Cert:

Removed CH4 Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm

Removed C3H8 Conc. 209.2 ppm Diff between cyl (THC): Diff between cyl ( $CH_4$ ): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 3061 ZAG make/model: **API T701H** Serial Number: 358

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1181490018

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Start Finish Start Finish CH4 SP Ratio: 2.53E-04 2.55E-04 NMHC SP Ratio: 6.18E-05 6.42E-05

CH4 Retention time: 14.6 NMHC Peak Area: 14.2 141799 147488

#### **THC Calibration Data**

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	17.03	17.24	0.987
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	17.03	16.99	1.002
second point	4960	39.6	8.51	8.44	1.009
third point	4980	19.8	4.26	4.17	1.020
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	17.09	0.997
				Average Correction Factor	1.011
Baseline Corr AF:	17.24	Prev response	16.96	*% change	1.6%
Baseline Corr 2nd AF	NA	AF Slone:		AF Intercent:	

Baseline Corr 2nd AF: NA AF Slope: AF Intercept: \* = > +/-5% change initiates investigation Baseline Corr 3rd AF: NA AF Correlation:



### THC / CH<sub>4</sub> / NMHC Calibration Report

Version-01-2020

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.11	9.40	0.970
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
nigh point	4921	79.2	9.11	9.09	1.003
second point	4960	39.6	4.56	4.53	1.006
hird point	4980	19.8	2.28	2.24	1.016
as left zero	5000	0	0.00	0.00	
as left span	4921	79.2	9.11	9.18	0.993
			Avera	age Correction Factor	1.008
Baseline Corr AF:	9.40	Prev response	9.11	*% change	3.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Sat Doint	Dil air flow rate	CH4 Calibra		Ind conc (nnm) (Ic)	CE Limit = 0.95-1.05
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero		Source gas flow rate	Calc conc (ppm) (Cc)		
as found zero as found span as found 2nd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4921	Source gas flow rate 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91	0.00 7.84	
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4921 5000	Source gas flow rate 0.0 79.2 0.0	Calc conc (ppm) (Cc) 0.00 7.91	0.00 7.84 0.00	1.009
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point	5000 4921 5000 4921	0.0 79.2 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91	0.00 7.84 0.00 7.91	1.009
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point second point	5000 4921 5000	Source gas flow rate 0.0 79.2 0.0	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91 3.96	0.00 7.84 0.00	1.009
es found zero es found span es found 2nd point es found 3rd point new cylinder response calibrator zero nigh point second point chird point	5000 4921 5000 4921 4960	0.0 79.2 0.0 79.2 0.0 79.2 39.6	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91	0.00 7.84 0.00 7.91 3.91	1.009  1.001 1.013
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero nigh point second point third point as left zero	5000 4921 5000 4921 4960 4980	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91 3.96 1.98 0.00	0.00 7.84 0.00 7.91 3.91 1.93	1.009  1.001 1.013 1.025
es found zero es found span es found 2nd point es found 3rd point new cylinder response calibrator zero nigh point second point chird point es left zero	5000 4921 5000 4921 4960 4980 5000	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91 3.96 1.98 0.00 7.91	0.00 7.84 0.00 7.91 3.91 1.93 0.00 7.91	1.009  1.001 1.013 1.025
as found zero as found span as found 2nd point as found 3rd point as calibrator zero aigh point as cond point as left zero as left span	5000 4921 5000 4921 4960 4980 5000	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91 3.96 1.98 0.00 7.91	0.00 7.84 0.00 7.91 3.91 1.93 0.00 7.91 age Correction Factor	1.009 1.009 1.001 1.013 1.025  1.001
as found zero as found span	5000 4921 5000 4921 4960 4980 5000 4921	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0	Calc conc (ppm) (Cc) 0.00 7.91  0.00 7.91 3.96 1.98 0.00 7.91 Avera	0.00 7.84 0.00 7.91 3.91 1.93 0.00 7.91	1.009  1.001 1.013 1.025  1.001 1.013

Notes: Dips in instrument response. Chromatograms indicating peak has shifted. Span adjusted.

**Start** 

0.999234

-0.050339

0.994937

-0.025157

1.002917

-0.025982

Calibration Performed By: Aswin Sasi Kumar

THC Cal Slope:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

**Finish** 

0.999013

-0.041938

1.000221

-0.027957

0.997951

-0.014182



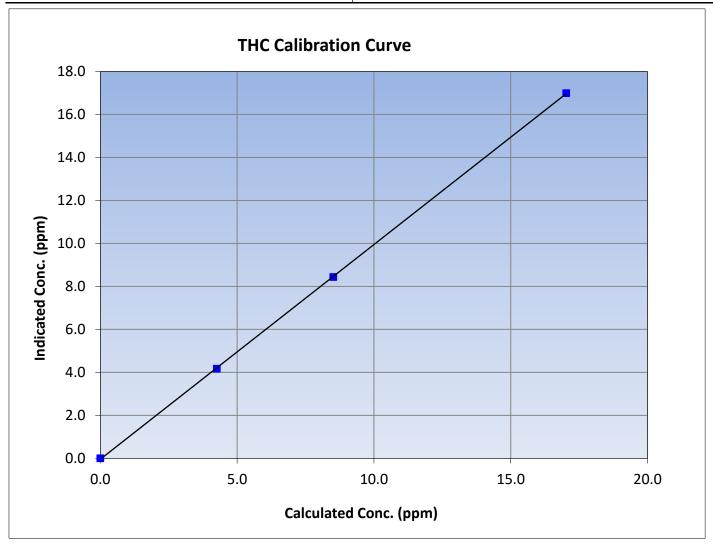
### **THC Calibration Summary**

Version-01-2020

#### **Station Information**

March 23, 2024 **Previous Calibration:** Calibration Date: March 6, 2024 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:46 End Time (MST): 14:13 Analyzer make: Analyzer serial #: Thermo 55i 1181490018

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999972	≥0.995
17.03	16.99	1.0021			20.333
8.51	8.44	1.0090	Slope	0.999013	0.90 - 1.10
4.26	4.17	1.0204			0.90 - 1.10
			Intercept	-0.041938	+/-0.5





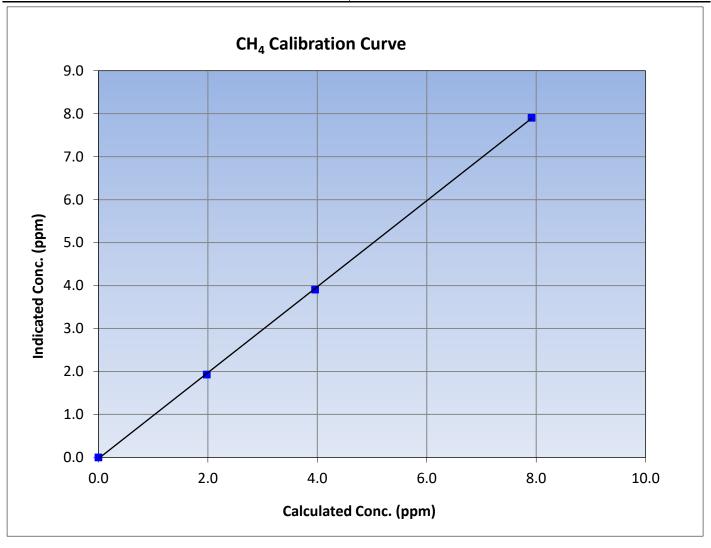
### **CH<sub>4</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

March 23, 2024 Calibration Date: **Previous Calibration:** March 6, 2024 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:46 End Time (MST): 14:13 Analyzer make: Analyzer serial #: Thermo 55i 1181490018

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999939	≥0.995
7.91	7.91	1.0011			20.333
3.96	3.91	1.0130	Slope	1.000221	0.90 - 1.10
1.98	1.93	1.0253			0.90 - 1.10
			Intercept	-0.027957	+/-0.5





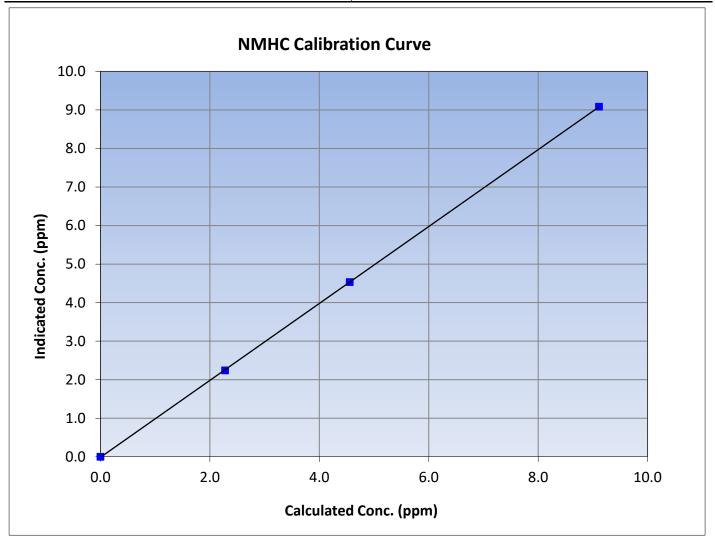
### **NMHC Calibration Summary**

Version-01-2020

#### **Station Information**

March 23, 2024 Calibration Date: **Previous Calibration:** March 6, 2024 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:46 End Time (MST): 14:13 Analyzer make: Analyzer serial #: Thermo 55i 1181490018

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999988	≥0.995
9.11	9.09	1.0030			20.333
4.56	4.53	1.0057	Slope	0.997951	0.90 - 1.10
2.28	2.24	1.0162			0.90 - 1.10
			Intercept	-0.014182	+/-0.5

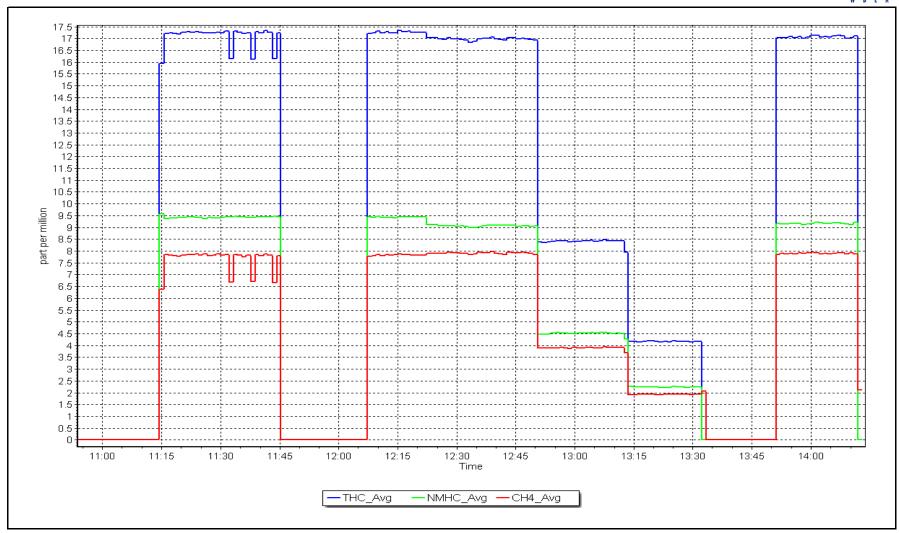


NMHC Calibration Plot

Date: March 23, 2024 L

Location: Ells River







### THC / CH<sub>4</sub> / NMHC Calibration Report

#### **Station Information**

Station Name: Ells River Calibration Date: March 25, 2024

Start time (MST): 10:45 Reason: Removal Station number: AMS 30 Last Cal Date: March 23, 2024

1075.0

ppm

End time (MST): N/A

#### **Calibration Standards**

CC494126 Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 499.7 CH4 Equiv Conc. 1075.0 ppm ppm C3H8 Cal Gas Conc. 209.2 ppm Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 499.7 CH4 Equiv Conc. ppm Removed C3H8 Conc. Diff between cyl (THC): 209.2 ppm

Diff between cyl (NM): Diff between cyl (CH<sub>4</sub>): Serial Number: 3061 Calibrator Model: **API T700** Zero Air Gen model: **API T701H** Serial Number: 358

#### **Analyzer Information**

Analyzer make: Thermo 55i Analyzer serial #: 1181490018 NMHC/CH4 Range: 0 - 10 ppm THC Range: 0 - 20 ppm

Start **Finish Finish Start** CH4 SP Ratio: 2.55E-04 NMHC SP Ratio: N/A 6.42E-05 N/A CH4 Retention time: 14.2 N/A NMHC Peak Area: 141799 N/A

Zero Chromatogram: OFF Flat Baseline: OFF

#### **THC As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4921	79.2	17.03	17.02	1.000
As found Mid point	4960	39.6	8.51	8.39	1.015
As found Low point	4980	19.8	4.26	4.15	1.025
New cylinder response					
Baseline Corr AF:	17.02	Prev response	16.97	*% change	0.3%
Baseline Corr 2nd AF:	8.39	AF Slope:	1.000771	AF Intercept:	-0.065537
Baseline Corr 3rd AF:	4.15	AF Correlation:	0.999921	* = > +/-5% change initiate	es investigation

#### **THC Calibration Data**

	Dilution air flow rate	Source gas flow rate	Calculated concentration	Indicated concentration	Correction factor
Set Point	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (Ic)	(Cc/(Ic-AFzero))
	(SCCIII)	(SCCIII)	(ppiii) (CC)	(ppiii) (ic)	Limit = 0.95-1.05

Calibrator zero High point Mid point Low point As left zero As left span

**Average Correction Factor** 

Notes: Removal calibration, will complete maintenance at the WBEAC.



# Wood Buffalo Environmental Association THC / CH<sub>4</sub> / NMHC Calibration Report

#### **NMHC As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic- AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4921	79.2	9.11	9.02	1.010
As found Mid point	4960	39.6	4.56	4.46	1.022
As found Low point	4980	19.8	2.28	2.19	1.039
New cylinder response					
Baseline Corr AF:	9.02	Prev response	9.08	47116	
Baseline Corr 2nd AF:	4.46	AF Slope:	0.991705	AF Intercept:	-0.035779
Baseline Corr 3rd AF:	2.19	AF Correlation:	0.999927	* = > +/-5% change initiat	es investigation
		NMHC Calib	ration Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc)  Limit = 0.95-1.05

Calibrator zero High point Mid point Low point As left zero As left span

Average Correction Factor

#### **CH4 As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.00	
As found High point	4921	79.2	7.91	8.00	0.990
As found Mid point	4960	39.6	3.96	3.93	1.007
As found Low point	4980	19.8	1.98	1.96	1.010
New cylinder response					
Baseline Corr AF:	8.00	Prev response	7.89	*% change	1.4%
Baseline Corr 2nd AF:	3.93	AF Slope:	1.011209	AF Intercept:	-0.029758
Baseline Corr 3rd AF:	1.96	AF Correlation:	0.999903	* = > +/-5% change initia	ites investigation

#### **CH4 Calibration Data**

Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>

Calibrator zero High point Mid point Low point As left zero As left span

Average Correction Factor

<u>Finish</u>

#### **Calibration Statistics**

 Start

 THC Cal Slope:
 0.999013

 THC Cal Offset:
 -0.041938

 CH4 Cal Slope:
 1.000221

 CH4 Cal Offset:
 -0.027957

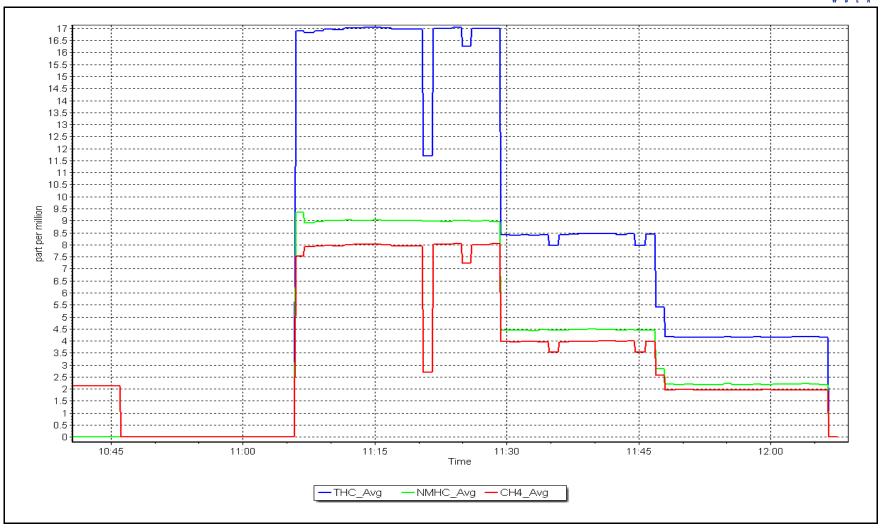
 NMHC Cal Slope:
 0.997951

 NMHC Cal Offset:
 -0.014182

Calibration Performed By: Aswin Sasi Kumar

Date: March 25, 2024 Location: Ells River







### THC / CH<sub>4</sub> / NMHC Calibration Report

#### **Station Information**

Station Name: Ells River
Calibration Date: March 25, 2024

Start time (MST): 12:28 Reason: Install Station number: AMS 30 Last Cal Date: N/A End time (MST): 16:30

#### **Calibration Standards**

Gas Cert Reference: CC494126 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm

C3H8 Cal Gas Conc. 209.2 ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm Removed C3H8 Conc. 209.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>):

Calibrator Model:

API T700

Serial Number: 3061

Zero Air Gen model:

API T701H

Diff between cyl (NM):

Serial Number: 358

**Analyzer Information** 

Analyzer make: Thermo 55i Analyzer serial #: 1193585649

THC Range: 0 - 20 ppm NMHC/CH4 Range: 0 - 10 ppm

**Start Finish Finish Start** CH4 SP Ratio: 3.64E-04 NMHC SP Ratio: 6.38E-05 N/A N/A CH4 Retention time: N/A 17.0 NMHC Peak Area: N/A 142822 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

#### **THC As Found Data**

Set Point Dilution air flow rate Source gas flow rate Calculated concentration Indicated concentration Correction factor (sccm) (sccm) (ppm) (Cc) (ppm) (Ic) (Cc/(Ic-AFzero)) Limit = 0.90-1.10

As found zero

As found High point

As found Mid point

As found Low point

New cylinder response

Baseline Corr AF: NA Prev response NA \*% change NA
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation

#### **THC Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	
High point	4921	79.2	17.03	17.04	0.999
Mid point	4960	39.6	8.51	8.47	1.005
Low point	4980	19.8	4.26	4.17	1.021
As left zero	5000	0.0	0.00	0.00	
As left span	4921	79.2	17.03	17.72	0.961
			Avera	ge Correction Factor	1.008

Notes: Install calibration. As left CH4 high.



Calibration Performed By:

Aswin Sasi Kumar

# Wood Buffalo Environmental Association THC / CH<sub>4</sub> / NMHC Calibration Report

### NMHC As Found Data

W B E A		NMHC As Fo	ound Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(I AFzero)) Limit = 0.90-1.10
As found zero As found High point As found Mid point As found Low point New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	47116	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		NMHC Calib	ration Data		
Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration	Indicated concentration (	Correction factor (Cc/Id
Jet i omt	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (lc)	<i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	
High point	4921	79.2	9.11	9.11	1.000
Mid point	4960	39.6	4.56	4.53	1.007
Low point	4980	19.8	2.28	2.23	1.020
As left zero	5000	0.0	0.00	0.00	
As left span	4921	79.2	9.11	9.19	0.992
is iere spain	.522	75.2		ge Correction Factor	1.009
		CH4 As Fo	und Data		
		CH4 AS I O	una Data		Baseline Adjusted
					•
	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration ( (ppm) (Ic)	Correction factor (Cc/( AFzero)) <u>Limit = 0.90-1.10</u>
As found zero As found High point As found Mid point As found Low point					AFzero))
As found zero As found High point As found Mid point As found Low point New cylinder response					AFzero))
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF:	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (ic)	AFzero)) <i>Limit</i> = 0.90-1.10
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF:	(sccm)	(sccm)  Prev response	(ppm) (Cc)	(ppm) (ic)  *% change	AFzero))  Limit = 0.90-1.10
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF:	(sccm) NA NA	(sccm)  Prev response AF Slope:	(ppm) (Cc)	(ppm) (ic)  *% change AF Intercept:	AFzero))  Limit = 0.90-1.10
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF:	(sccm) NA NA	Prev response AF Slope: AF Correlation:	(ppm) (Cc)	(ppm) (ic)  *% change AF Intercept:	AFzero))  Limit = 0.90-1.10  NA  es investigation
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	(sccm)  NA NA NA NA Dilution air flow rate	Prev response AF Slope: AF Correlation: CH4 Calibra Source gas flow rate	(ppm) (Cc)  NA  ation Data  Calculated concentration	*% change AF Intercept:  * = > +/-5% change initiat	AFzero)) Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point Calibrator zero	NA NA NA NA Dilution air flow rate (sccm)	Prev response AF Slope: AF Correlation: CH4 Calibra Source gas flow rate (sccm)	(ppm) (Cc)  NA  ation Data  Calculated concentration (ppm) (Cc)	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration ((ppm) (Ic)	AFzero)) Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point Calibrator zero High point	NA NA NA NA Dilution air flow rate (sccm)	Prev response AF Slope: AF Correlation: CH4 Calibra Source gas flow rate (sccm) 0.0	(ppm) (Cc)  NA  ation Data  Calculated concentration (ppm) (Cc)  0.00	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration ((ppm) (Ic)  0.00	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I  Limit = 0.95-1.05
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point Calibrator zero High point Mid point	NA NA NA Dilution air flow rate (sccm)  5000 4921	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2	NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93	AFzero)) Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l Limit = 0.95-1.05
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point	NA NA NA Dilution air flow rate (sccm)  5000 4921 4960	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00  7.91  3.96	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95	NA  es investigation  Correction factor (Cc/Limit = 0.95-1.05   0.999  1.003
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Low point As left zero	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0	(ppm) (Cc)  NA  Action Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/ Limit = 0.95-1.05  0.999 1.003 1.022
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Low point As left zero	NA NA NA Dilution air flow rate (sccm)  5000 4921 4960 4980	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0  79.2  39.6  19.8	(ppm) (Cc)  NA  Action Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91	*% change AF Intercept: * = > +/-5% change initiat  Indicated concentration ( (ppm) (Ic)  0.00  7.93  3.95  1.94	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999  1.003  1.022
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Low point As left zero	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Low point As left zero	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero As left span	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor  Finish	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero As left span  THC Cal Slope: THC Cal Offset:	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start 0.999013 -0.041938	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor  Finish 1.001973 -0.044740	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/l  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero As left span  THC Cal Slope: THC Cal Offset: CH4 Cal Slope:	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start 0.999013 -0.041938 1.000221	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor  Finish 1.001973 -0.044740 1.003138	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero As left span  THC Cal Slope: THC Cal Offset: CH4 Cal Slope: CH4 Cal Offset:	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start 0.999013 -0.041938 1.000221 -0.027957	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept: * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor  Finish 1.001973 -0.044740 1.003138 -0.021558	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I  Limit = 0.95-1.05   0.999 1.003 1.022 0.928
As found zero As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:  Set Point  Calibrator zero High point Mid point Low point As left zero As left span  THC Cal Slope: THC Cal Offset: CH4 Cal Slope:	(sccm)  NA NA NA  NA  Dilution air flow rate (sccm)  5000 4921 4960 4980 5000	Prev response AF Slope: AF Correlation:  CH4 Calibra  Source gas flow rate (sccm)  0.0 79.2 39.6 19.8 0.0 79.2  Calibration  Start 0.999013 -0.041938 1.000221	(ppm) (Cc)  NA  Ation Data  Calculated concentration (ppm) (Cc)  0.00 7.91 3.96 1.98 0.00 7.91 Avera	*% change AF Intercept:  * = > +/-5% change initiat  Indicated concentration (ppm) (Ic)  0.00 7.93 3.95 1.94 0.00 8.53 ge Correction Factor  Finish 1.001973 -0.044740 1.003138	AFzero))  Limit = 0.90-1.10  NA  es investigation  Correction factor (Cc/I  Limit = 0.95-1.05   0.999 1.003 1.022 0.928

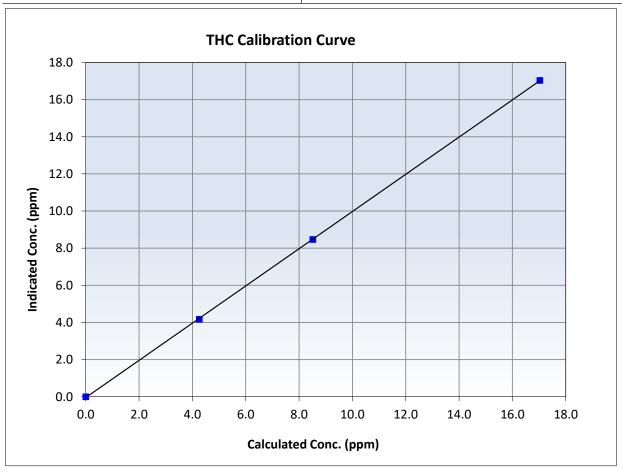


# Wood Buffalo Environmental Association THC Calibration Summary

#### **Station Information**

March 25, 2024 Previous Calibration: N/A Calibration Date: Station Name: Ells River Station Number: AMS 30 Start Time (MST): 12:28 End Time (MST): 16:30 Analyzer make: Analyzer serial #: 1193585649 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999968	≥0.995
17.03 8.51	17.04 8.47	0.9995 1.0050	Slope	1.001973	0.90 - 1.10
4.26	4.17	1.0207	Intercept	-0.044740	+/-0.5



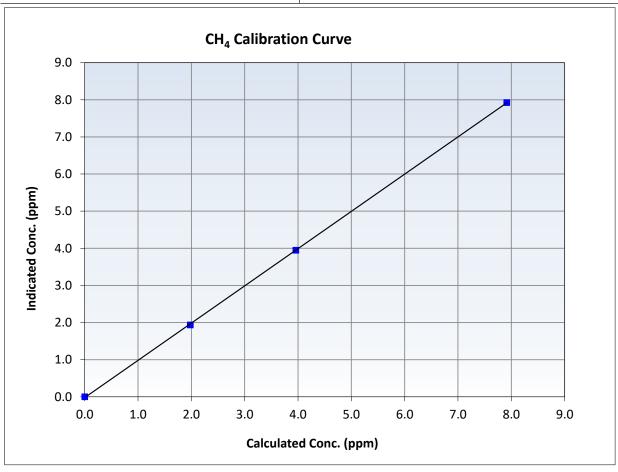


# **Wood Buffalo Environmental Association CH<sub>4</sub> Calibration Summary**

#### **Station Information**

March 25, 2024 **Previous Calibration:** N/A Calibration Date: Station Name: Ells River Station Number: AMS 30 Start Time (MST): 12:28 End Time (MST): 16:30 Analyzer make: Analyzer serial #: 1193585649 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999963	≥0.995
7.91 3.96	7.93 3.95	0.9986 1.0028	Slope	1.003138	0.90 - 1.10
1.98	1.94	1.0222	Intercept	-0.021558	+/-0.5



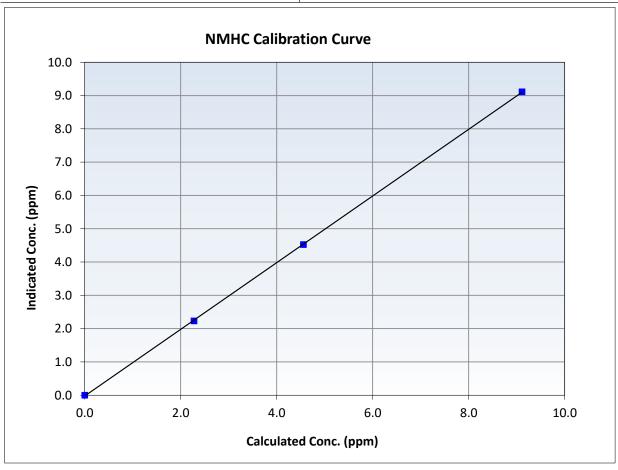


# Wood Buffalo Environmental Association NMHC Calibration Summary

#### **Station Information**

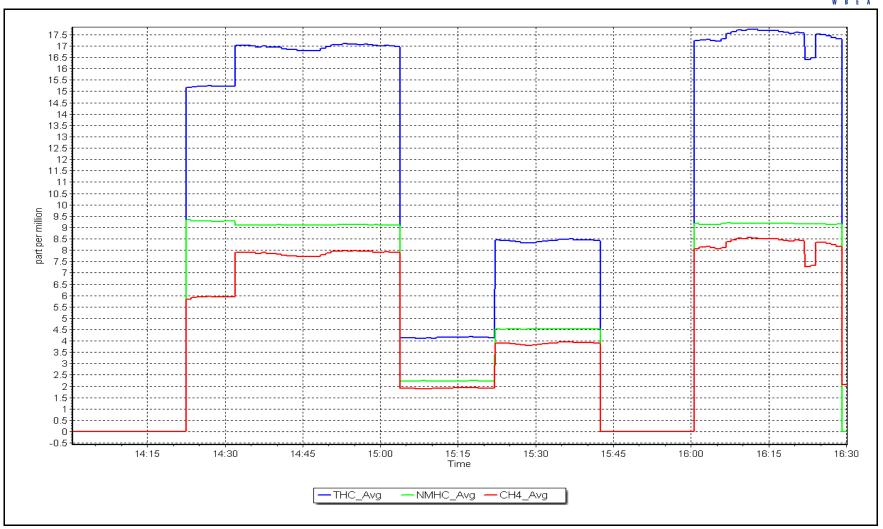
March 25, 2024 Previous Calibration: N/A Calibration Date: Station Name: Ells River Station Number: AMS 30 Start Time (MST): 12:28 End Time (MST): 16:30 Analyzer make: Analyzer serial #: 1193585649 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999969	≥0.995
9.11 4.56	9.11 4.53	1.0000 1.0068	Slope	1.001236	0.90 - 1.10
2.28	2.23	1.0198	Intercept	-0.023782	+/-0.5



Date: March 25, 2024 Location: Ells River







### THC / CH<sub>4</sub> / NMHC Calibration Report

#### **Station Information**

Station Name: Ells River
Calibration Date: March 28, 2024

Start time (MST): 13:43 Reason: Install Station number: AMS 30 Last Cal Date: N/A End time (MST): 16:05

#### **Calibration Standards**

Gas Cert Reference: CC494126 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm

C3H8 Cal Gas Conc. 209.2 ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm Removed C3H8 Conc. 209.2 ppm Diff between cyl (THC):

Diff between cyl (CH<sub>4</sub>):

Calibrator Model:

API T700

Serial Number: 3061

Zero Air Gen model:

API T701H

Serial Number: 358

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430011

THC Range: 0 - 20 ppm NMHC/CH4 Range: 0 - 10 ppm

**Start Finish Finish Start** CH4 SP Ratio: 3.07E-04 6.43E-05 N/A NMHC SP Ratio: N/A CH4 Retention time: N/A 17.4 NMHC Peak Area: N/A 141658 Zero Chromatogram: OFF Flat Baseline: OFF OFF

#### **THC As Found Data**

Set Point Dilution air flow rate Source gas flow rate Calculated concentration Indicated concentration (sccm) (sccm) (ppm) (Cc) (ppm) (Ic) (Cc/(Ic-AFzero))

Limit = 0.90-1.10

As found zero

As found High point

As found Mid point

As found Low point

New cylinder response

Baseline Corr AF: NA Prev response NA \*% change NA
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF: NA AF Correlation: \*=>+/-5% change initiates investigation

#### **THC Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	
High point	4921	79.2	17.03	17.05	0.999
Mid point	4960	39.6	8.51	8.50	1.002
Low point	4980	19.8	4.26	4.22	1.010
As left zero	5000	0.0	0.00	0.00	
As left span	4921	79.2	17.03	17.14	0.994
			Avera	ge Correction Factor	1.003

Notes: Install calibration. Adjusted zero and span. Use zero chromatogram.



Calibration Performed By:

Jan Castro

# Wood Buffalo Environmental Association THC / CH<sub>4</sub> / NMHC Calibration Report

#### **NMHC As Found Data**

W B E A		NMHC As F	ound Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(lo AFzero)) Limit = 0.90-1.10
As found zero As found High point As found Mid point As found Low point New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	47116	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation
		NMHC Calib	ration Data		
Cat Daint	Dilution air flow rate	Source gas flow rate	Calculated concentration	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (lc)	<i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	
High point	4921	79.2	9.11	9.15	0.996
Mid point	4960	39.6	4.56	4.60	0.991
Low point	4980	19.8	2.28	2.29	0.996
As left zero	5000	0.0	0.00	0.00	
As left span	4921	79.2	9.11	9.28	0.982
, to re-re-spain	.522	75.2		ge Correction Factor	0.994
		CH4 As Fo	und Data		
		CH4 AS FO	unu Data		Baseline Adjusted
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	
As found High point As found Mid point As found Low point New cylinder response Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation
		CH4 Calibra	ation Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic  Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	
High point	4921	79.2	7.91	7.90	1.001
Mid point	4960	39.6	3.96	3.90	1.014
Low point	4980	19.8	1.98	1.93	1.027
As left zero	5000	0.0	0.00	0.00	
As left span	4921	79.2	7.91	7.85	1.008
			Avera	ge Correction Factor	1.014
		Calibration	Statistics		
		Start		<u>Finish</u>	
THC Cal Slope:		NA		1.002121	
THC Cal Offset:		NA		-0.024340	
CH4 Cal Slope:		NA		1.000048	
CH4 Cal Offset:		NA		-0.029357	
NMHC Cal Slope:		NA		1.003946	
NMHC Cal Offset:		NA		0.005416	
5 53. 5561.				2.230.20	

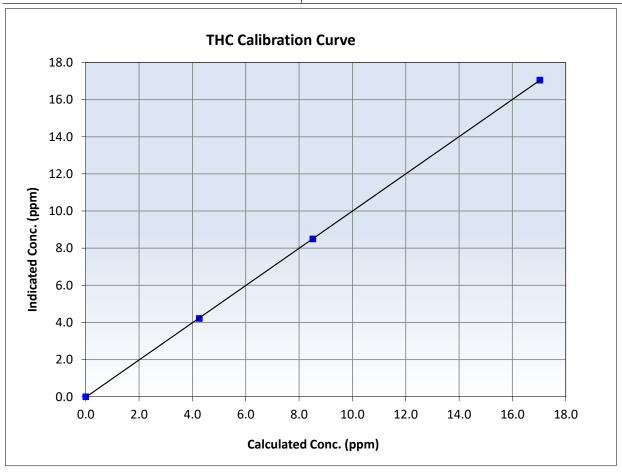


# Wood Buffalo Environmental Association THC Calibration Summary

#### **Station Information**

March 28, 2024 Previous Calibration: N/A Calibration Date: Station Name: Ells River Station Number: AMS 30 Start Time (MST): 13:43 End Time (MST): 16:05 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.03 8.51	17.05 8.50	0.9987 1.0017	Slope	1.002121	0.90 - 1.10
4.26	4.22	1.0100	Intercept	-0.024340	+/-0.5



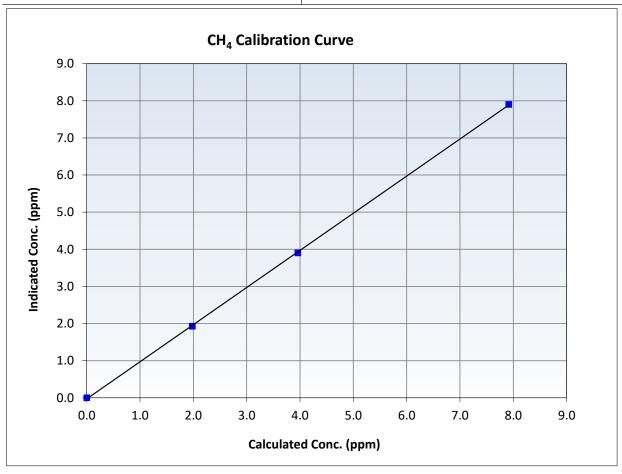


# **Wood Buffalo Environmental Association CH<sub>4</sub> Calibration Summary**

#### **Station Information**

March 28, 2024 **Previous Calibration:** N/A Calibration Date: Station Name: Ells River Station Number: AMS 30 Start Time (MST): 13:43 End Time (MST): 16:05 Analyzer serial #: Analyzer make: 1152430011 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999932	≥0.995
7.91 3.96	7.90 3.90	1.0014 1.0138	Slope	1.000048	0.90 - 1.10
1.98	1.93	1.0269	Intercept	-0.029357	+/-0.5



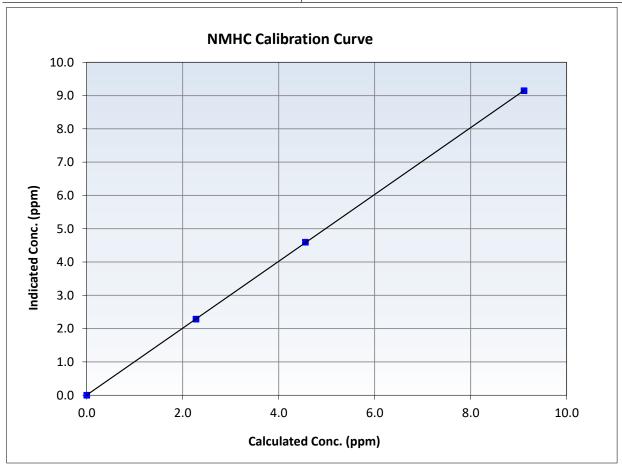


# Wood Buffalo Environmental Association NMHC Calibration Summary

#### **Station Information**

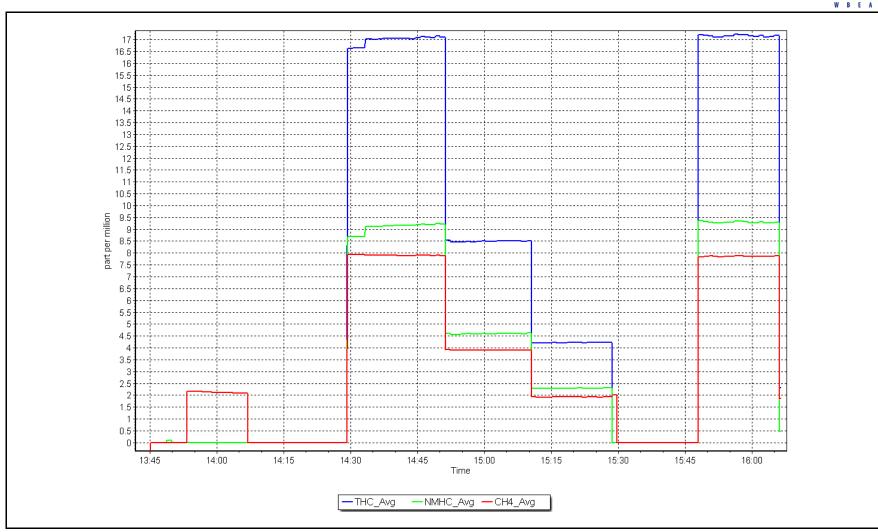
March 28, 2024 Previous Calibration: N/A Calibration Date: Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 13:43 End Time (MST): 16:05 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
9.11 4.56	9.15 4.60	0.9963 0.9910	Slope	1.003946	0.90 - 1.10
2.28	2.29	0.9958	Intercept	0.005416	+/-0.5



Date: March 28, 2024 Location: Ells River







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Ells River Station number: AMS 30

Calibration Date: March 8, 2024 Last Cal Date: February 23, 2024 End time (MST): 14:08

Start time (MST): 9:39 Reason: Routine

**Calibration Standards** 

DT0027487 NO Gas Cylinder #: Cal Gas Expiry Date: January 9, 2032

NOX Cal Gas Conc: 59.3 NO Cal Gas Conc: 59.1 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 59.3 ppm 59.1 ppm

NOX gas Diff:

NO gas Diff: **API T700** Serial Number: 3061 Calibrator Model: ZAG make/model: **API T701H** Serial Number: 358

**Analyzer Information** 

Analyzer make: Thermo 42i Analyzer serial #: 710321429

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.182 1.182 NO bkgnd or offset: 14.0 13.9 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 13.9 13.8 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 188.7 192.4

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	0.998634	0.999616
NO <sub>x</sub> Cal Offset:	-0.718485	-0.638284
NO Cal Slope:	0.999588	1.002443
NO Cal Offset:	-1.719843	-1.418930
NO <sub>2</sub> Cal Slope:	1.005754	0.996723
NO <sub>2</sub> Cal Offset:	0.149457	-0.460536



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as found span	4932	67.7	803.0	800.3	2.7	807.4	804.4	3.0	0.9945	0.9949
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4932	67.7	803.0	800.3	2.7	802.2	801.4	1.0	1.0010	0.9986
second point	4966	33.8	400.9	399.5	1.4	400.3	398.7	1.6	1.0015	1.0021
third point	4983	16.9	200.4	199.8	0.7	198.6	197.2	1.4	1.0093	1.0130
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4932	67.7	803.0	423.2	379.8	805.0	425.8	379.7	0.9975	0.9938
							Average C	orrection Factor	1.0039	1.0046
Corrected As for	X	807.5 ppb 801.2 ppb	NO = NO =		* = > +/-59	% change initiates	investigation	*Percent Chang	- ^	0.8%
•			_					`		0.876
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	- ^		Nx SI:	Nx Int:	
Baseline Corr 3	$rd pt NO_X =$	NA ppb	NO =	NA ppb	As found	d NO r <sup>2</sup> :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Reconcentration		cated NO Drop centration (ppb)	Calculated NC concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = C	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	int (400 ppb NO2)									

Notes:

as found GPT point (200 ppb NO2) as found GPT point (100 ppb NO2)

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Changed sample inlet filters after as founds. No adjustment made.

378.5

186.0

97.4

Average Correction Factor

1.0035

1.0092

1.0114

1.0080

379.8

187.7

98.5

Calibration Performed By: Jan Castro

798.5

798.5

798.5

421.4

613.5

702.7

99.7%

99.1%

98.9%

99.2%



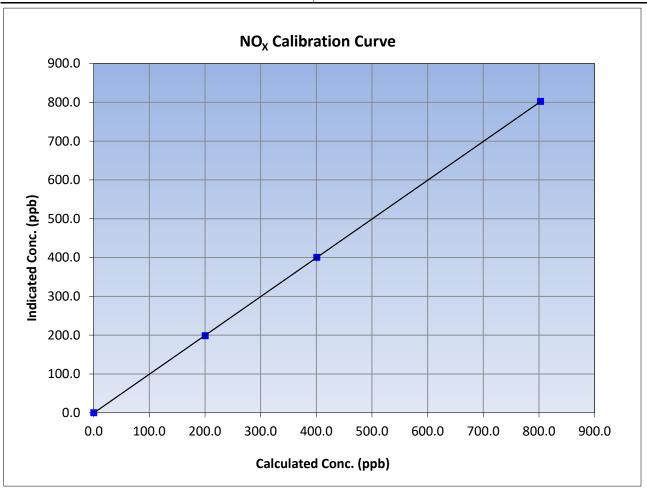
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 8, 2024 Previous Calibration: February 23, 2024 Station Name: Ells River Station Number: AMS 30 Start Time (MST): 9:39 End Time (MST): 14:08 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999995	≥0.995
803.0	802.2	1.0010	Correlation Coefficient	0.555555	20.333
400.9	400.3	1.0015	Slope	0.999616	0.90 - 1.10
200.4	198.6	1.0093	Slope	0.999010	0.90 - 1.10
<u> </u>			Intercept	-0.638284	+/-20





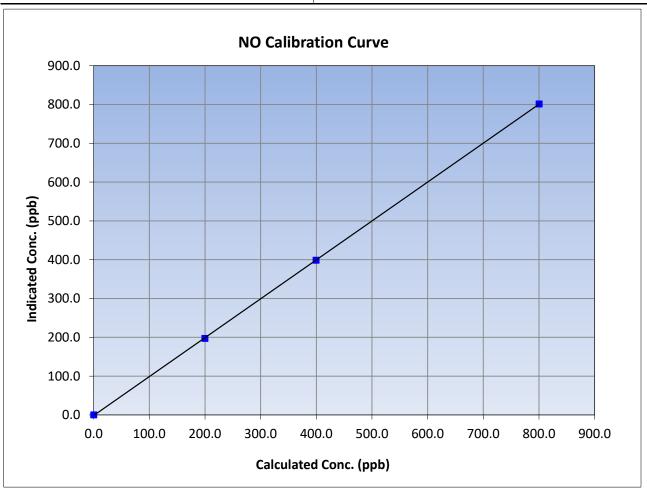
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 8, 2024 Previous Calibration: February 23, 2024 Station Name: Ells River Station Number: AMS 30 Start Time (MST): 9:39 End Time (MST): 14:08 Analyzer make: Thermo 42i Analyzer serial #: 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999985	≥0.995
800.3	801.4	0.9986	Correlation Coefficient	0.999965	20.993
399.5	398.7	1.0021	Slope	1.002443	0.90 - 1.10
199.8	197.2	1.0130	Slope	1.002445	0.90 - 1.10
			Intercept	-1.418930	+/-20





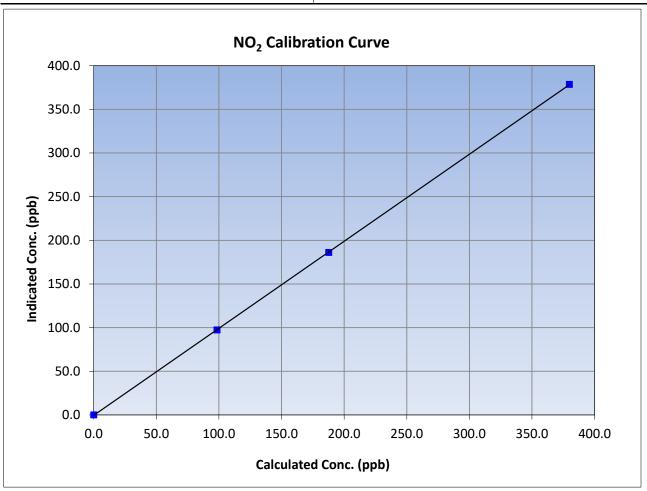
# NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 8, 2024 Previous Calibration: February 23, 2024 Station Name: Ells River Station Number: AMS 30 Start Time (MST): 9:39 End Time (MST): 14:08 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999987	≥0.995
379.8	378.5	1.0035	Correlation Coefficient	0.555567	≥0.333
187.7	186.0	1.0092	Slope	0.996723	0.90 - 1.10
98.5	97.4	1.0114	Slope	0.990723	0.90 - 1.10
·			Intercept	-0.460536	+/-20

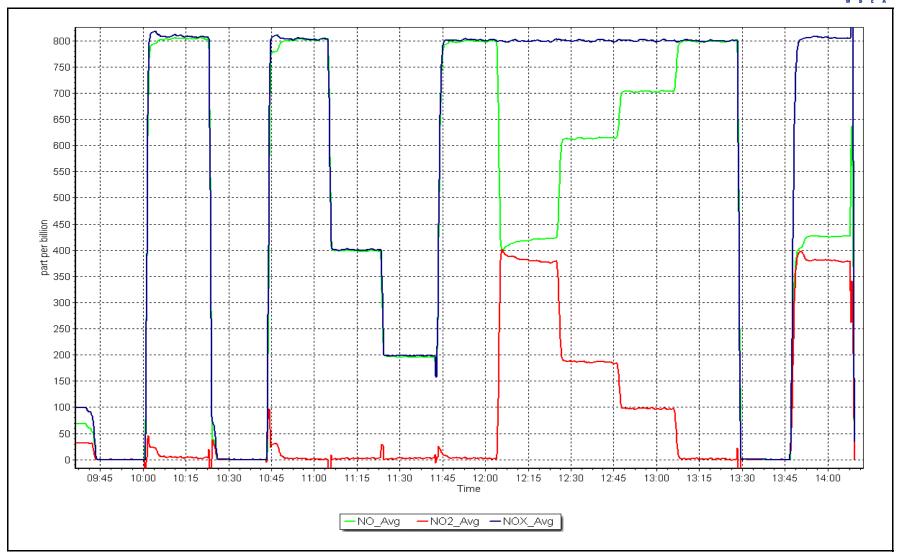


NO<sub>X</sub> Calibration Plot

Date: March 8, 2024

Location: Ells River







#### **T640 PM<sub>2.5</sub> CALIBRATION**

Version-01-2024 **Station Information** Station number: AMS 30 Last Cal Date: February 23, 2024

Station Name: Ells River Calibration Date: March 8, 2024 Start time (MST): 11:06 End time (MST): 11:18 Analyzer Make: **API T640** S/N: 875 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388754 Temp/RH standard: S/N: 388754 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> Measured <u>Adjusted</u> (Limits) As found As left T (°C) -2.90 -3.02 -2.90 +/- 2 °C P (mmHg) 731.40 733.13 731.40 +/- 10 mmHg Flow (LPM) 5.01 5.03 5.01 +/- 0.25 LPM PW% (pump) 52.00 52.00 >80% Zero Verification PM w/o HEPA: 0.00 10.60 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet Head Clean Alignment Factor On: ✓ PM Inlet observation: **Quarterly Calibration Test** 10.90 Expiry Date: September 29, 2024 Refractive Index: **SPAN DUST** Lot No.: 100128-050-040 As found Adjusted (Limits) <u>Parameter</u> Post maintenance As left **PMT Peak Test** +/- 0.5 Date Optical Chamber Cleaned: January 22, 2024 Date Disposable Filter Changed: January 22, 2024 Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: October 27, 2023 Date RH/T Sensor Cleaned: February 23, 2024 Verified flow, temperature and pressure. Leak check passed. No adjustment made. Notes:

Calibration by: Jan Castro



### WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

### AMS501 LEISMER MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



## **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station number: Station Name: Leismer AMS501

February 8, 2024 Calibration Date: March 15, 2024 Last Cal Date:

End time (MST): Start time (MST): 8:35 11:19

Routine Reason:

#### **Calibration Standards**

Cal Gas Concentration: 50.52 ppm Cal Gas Exp Date: December 29, 2028

CC274266 Cal Gas Cylinder #:

Removed Cal Gas Conc: <u>50.52</u> ppm Rem Gas Exp Date: NA Removed Gas Cyl #: <u>NA</u>

Diff between cyl:

Calibrator Make/Model: **API T700** Serial Number: 2659 ZAG Make/Model: API 701 Serial Number: 4427

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 1160290011

Analyzer Range 0 - 1000 ppb

**Finish Finish** Start <u>Start</u> Calibration slope: 1.007642 Backgd or Offset: 19.8 1.003086 19.8 0.981 Calibration intercept: -1.136075 -1.456115 Coeff or Slope: 0.981

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.2	800.2	804.1	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.2	800.2	805.2	0.994
second point	4960	39.6	400.2	402.3	0.995
third point	4980	19.8	200.1	197.7	1.012
as left zero	5000	0.0	0.0	-0.1	
as left span	4921	79.2	800.2	808.2	0.990
·			Averag	ge Correction Factor	1.000
Baseline Corr As found:	804.20	Previous response	801.54	*% change	0.3%

% change 0.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA Baseline Corr 3rd AF pt: AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. No adjustment made.

Calibration Performed By: Sean Bala



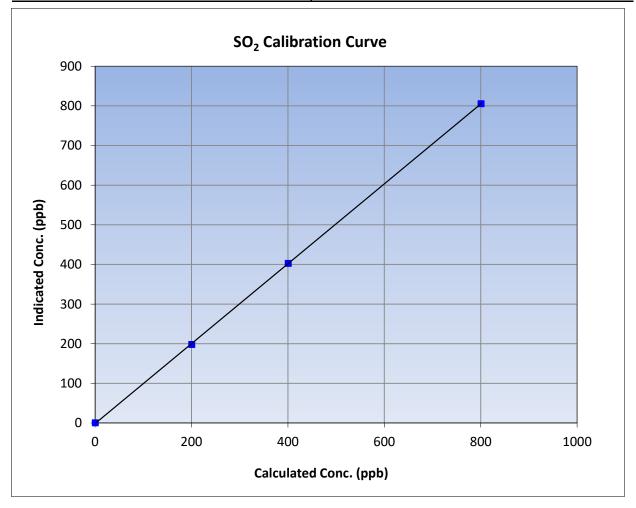
## **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 15, 2024 **Previous Calibration:** February 8, 2024 Station Name: Station Number: AMS501 Leismer Start Time (MST): 10:02 End Time (MST): 11:19 Analyzer make: Thermo 43i Analyzer serial #: 1160290011

	Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.1		Correlation Coefficient	0.999975	≥0.995				
800.2	805.2	0.9938	Correlation Coefficient	0.555575	20.333				
400.2	402.3	0.9947	Slope	1.007642	0.90 - 1.10				
200.1	197.7	1.0120	Slope	1.007042	0.90 - 1.10				
			- Intercept	-1.456115	+/-30				

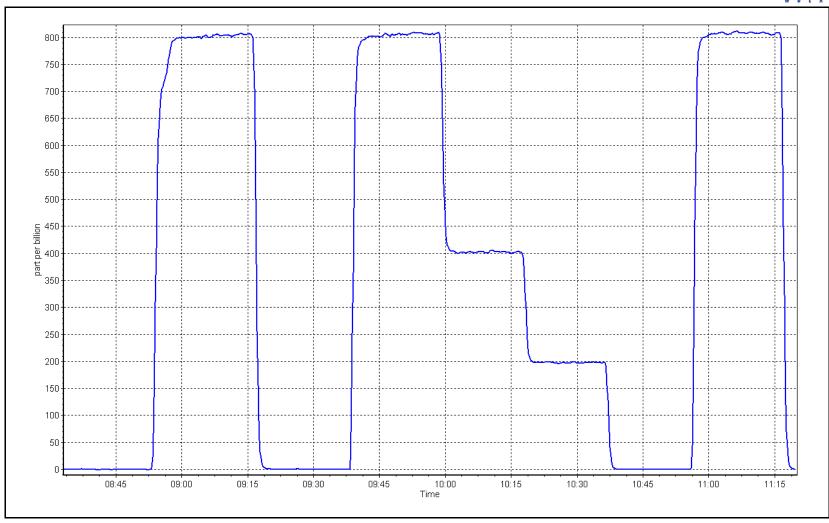


SO2 Calibration Plot

Date: March 15, 2024

Location: Leismer







# Wood Buffalo Environmental Association SO<sub>2</sub> Calibration Report

#### **Station Information**

Station Name:LeismerStation number: AMS 501Calibration Date:April 8, 2024Last Cal Date: March 15, 2024Start time (MST):11:25End time (MST): 12:55

Reason: Removal

#### **Calibration Standards**

Cal Gas Concentration: 50.52 ppm Cal Gas Exp Date: December 29, 2028

Cal Gas Cylinder #: CC274266

Removed Cal Gas Conc:50.52ppmRem Gas Exp Date: NARemoved Gas Cyl #:NADiff between cyl:Calibrator Model:Teledyne API T700Serial Number: 2659Zero Air Gen Model:Teledyne API T701Serial Number: 4427

#### **Analyzer Information**

Analyzer make: Thermo 43i Serial Number: 1160290011

Analyzer Range: 0-1000 ppb

Start **Finish Start Finish** Calibration slope: 1.007642 NA Backgd or Offset: 19.8 19.9 Calibration intercept: -1.456115 NA Coeff or Slope: 0.981 0.981

#### SO<sub>2</sub> As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/(Ic-AFzero) Limit = 0.90-1.10
As found zero	5000	0.0	0.0	-0.3	
As found High point	4921	79.2	800.2	804.0	0.995
As found Mid point	4960	39.6	400.2	400.7	0.998
As found Low point	4980	19.8	200.1	197.2	1.013
New cylinder response					
Baseline Corr As found:	804.3	Previous response	804.9	*% change	-0.1%
Baseline Corr 2nd AF pt:	401.0	AF Slope:	1.006485	AF Intercept:	-1.976071
Baseline Corr 3rd AF pt:	197.5	AF Correlation:	0.999978	* = > +/-5% change initiate	es investigation

#### SO<sub>2</sub> Calibration Data

	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	(ppb) (Ic)	(Cc/Ic)
	(SCCIII)	(SCCIII)	(Cc)	(ppb) (ic)	Limit = 0.95-1.05

Calibrator zero High point Mid point Low point As left zero As left span

Average Correction Factor:

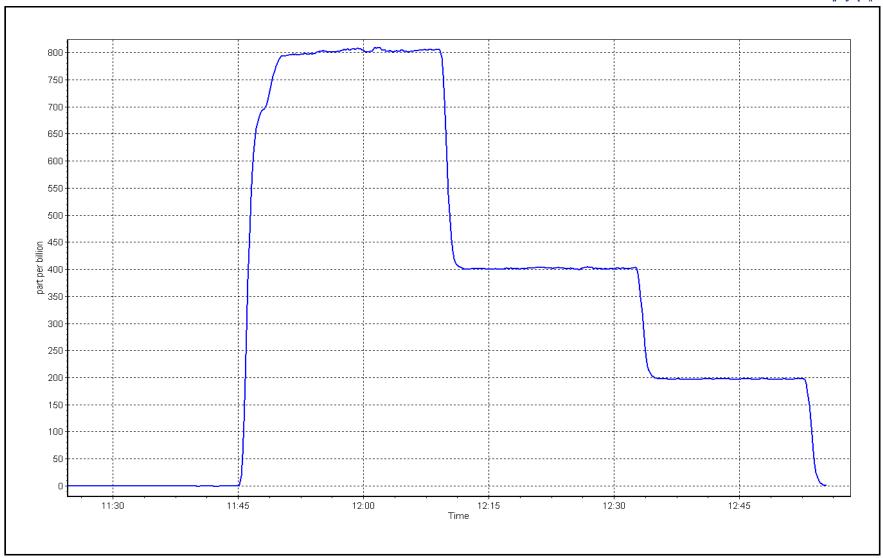
Notes: As founds completed for station removal planned for April 10.

Calibration Performed By: Braiden Boutilier

Pacolino Adjusted

SO2 Calibration Plot Date: April 8, 2024 Location: Leismer





### H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Leismer Calibration Date: March 13, 2024

Start time (MST): 8:31 Reason: Routine

Station number: AMS501

Last Cal Date: February 7, 2024

End time (MST): 12:28

**Calibration Standards** 

Cal Gas Concentration: 5.14 ppm

Cal Gas Cylinder #: CC511843

Removed Cal Gas Conc: 5.14 Removed Gas Cyl #: NA

Calibrator Make/Model: API T700 ZAG Make/Model: **API 701** 

Cal Gas Exp Date: September 16, 2024

Rem Gas Exp Date: NA Diff between cyl:

2659 Serial Number: Serial Number: 4427

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020

ppm

Global G150 Converter serial #: 2022-218 Converter make:

0 - 100 ppb Analyzer Range

> **Finish** <u>Start</u>

<u>Finish</u> <u>Start</u> 1.010290 Backgd or Offset: Calibration slope: 1.011575 3.57 3.57 Calibration intercept: -0.138211 Coeff or Slope: -0.158186 1.128 1.128

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4922	77.8	80.0	80.1	0.997
as found 2nd point	4961	38.9	40.0	40.2	0.992
as found 3rd point	4981	19.4	19.9	19.7	1.007
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4922	77.8	80.0	80.7	0.991
second point	4961	38.9	40.0	40.3	0.992
third point	4981	19.4	19.9	19.8	1.007
as left zero	5000	0.0	0.0	-0.1	
as left span	4922	77.8	80.0	80.8	0.990
SO2 Scrubber Check	4921	79.2	792.0	0.0	
Date of last scrubber ch	ange:	24-Feb-23		Ave Corr Factor	0.997
Date of last converter e	fficiency test:	December 1, 2022			efficiency
Baseline Corr As found:	80.2	Prev response:	80.75	*% change:	-0.7%

Baseline Corr 2nd AF pt: 40.3 AF Slope: 1.003860 AF Intercept: Baseline Corr 3rd AF pt: 19.8 AF Correlation: 0.999979

\* = > +/-5% change initiates investigation

-0.138334

Changed inlet filter after as founds. Scrubber test done after calibrator zero. No adjustment made. Notes:

Calibration Performed By: Sean Bala



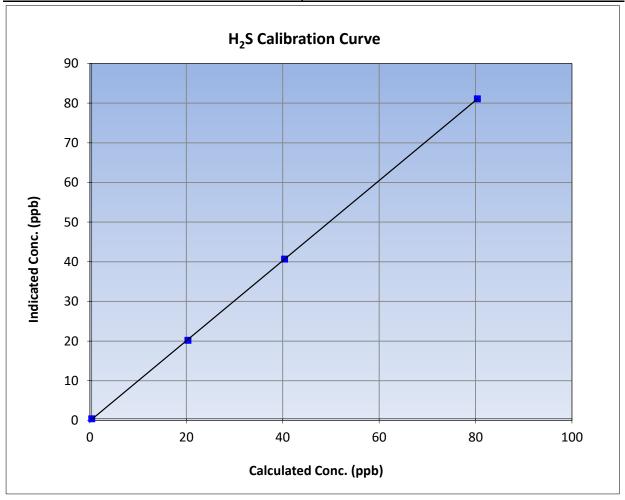
## H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 13, 2024 **Previous Calibration:** February 7, 2024 Station Name: Station Number: AMS501 Leismer Start Time (MST): 8:31 End Time (MST): 12:28 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020

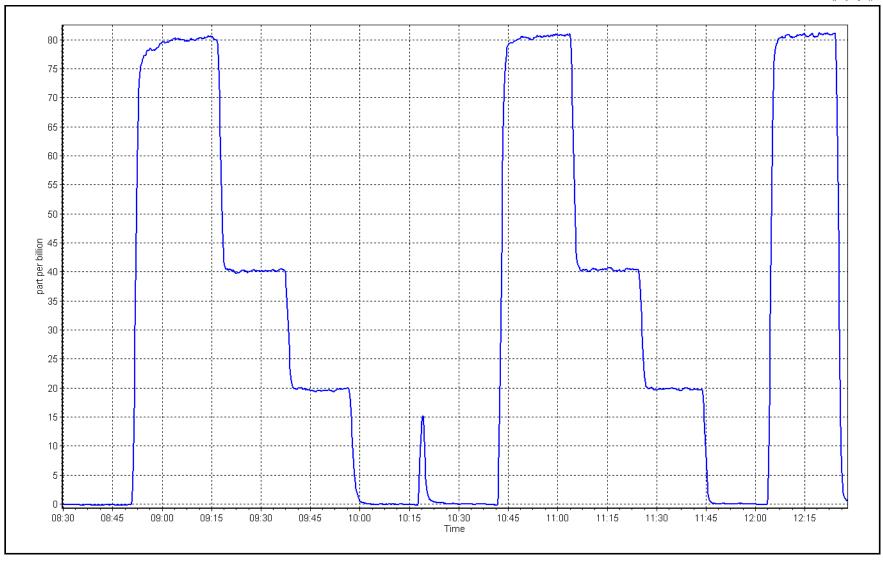
Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999982	≥0.995			
80.0	80.7	0.9911	Correlation Coefficient	0.333362	20.993			
40.0	40.3	0.9923	Slope	1.010290	0.90 - 1.10			
19.9	19.8	1.0072	Slope	1.010290	0.90 - 1.10			
			- Intercept	-0.138211	+/-3			



Date: March 13, 2024

Location: Leismer







# Wood Buffalo Environmental Association H2S Calibration Report

#### **Station Information**

Station Name:LeismerStation number:AMS 501Calibration Date:April 8, 2024Last Cal Date:March 13, 2024Start time (MST):12:53End time (MST):14:50

Reason: Removal

#### **Calibration Standards**

Cal Gas Concentration: 5.14 ppm Cal Gas Exp Date: September 16, 2024

Cal Gas Cylinder #: CC511843

Removed Cal Gas Conc: 5.14 ppm Rem Gas Exp Date: NA

Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 2659
ZAG Make/Model: Teledyne API T701 Serial Number: 4427

#### **Analyzer Information**

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020 Converter make: Global G150 Converter serial #: 2022-218

Analyzer Range 0 - 100 ppb Converter Temp: 325.0 degC

<u>Start</u> <u>Finish</u> <u>Start</u> <u>Finish</u> Calibration slope: Backgd or Offset: 1.010290 NA 3.57 3.61 Calibration intercept: -0.138211 NA Coeff or Slope: 1.128 1.128

#### **H2S As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.0	-0.2	
As found High point	4922	77.8	80.0	80.4	0.992
As found Mid point	4961	38.9	40.0	40.4	0.985
As found Low point	4981	19.4	19.9	19.6	1.007
New cylinder response					
Baseline Corr As found:	80.6	Prev response:	80.67	*% change:	-0.1%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.009433	AF Intercept:	-0.258261
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999953	* = > +/-5% change initiate	es investigation

#### **H2S Calibration Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					
SO2 Scrubber Check	4921	79.2	800.2	0.0	
Date of last scrubber c	hange:			Ave Corr Factor	
Date of last converter	efficiency test:			_	

Notes: As founds completed for station removal planned for April 10. Scrubber check passed.

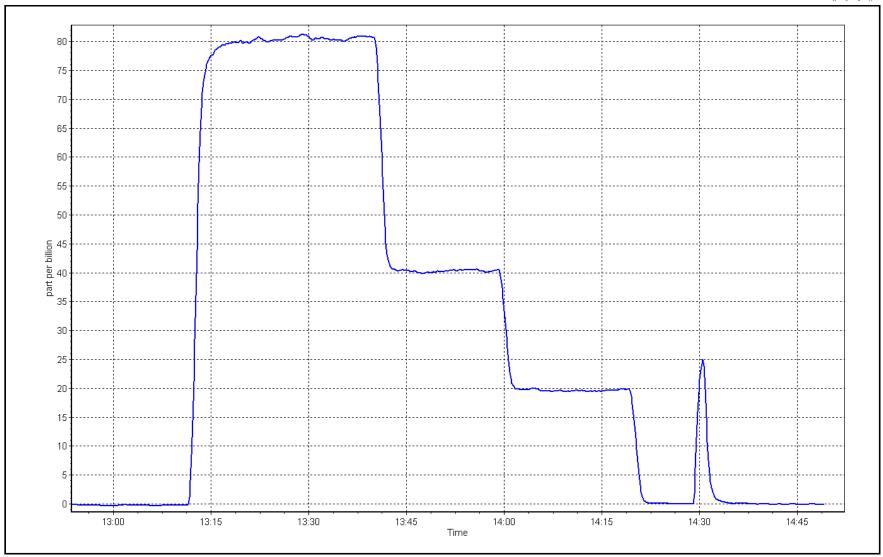
Calibration Performed By: Braiden Boutilier

**H2S Calibration Plot** 

Date: April 8, 2024

Location: Leismer







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Leismer Station number: AMS501

Calibration Date: March 26, 2024 Last Cal Date: February 21, 2024

Start time (MST): 8:34

Reason: Routine

#### **Calibration Standards**

October 30, 2024 NO Gas Cylinder #: T26811M Cal Gas Expiry Date: NOX Cal Gas Conc: NO Cal Gas Conc: 47.46 ppm ppm 47.39 Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NO Conc: Removed Gas NOX Conc: 47.46 ppm 47.39 ppm

NOX gas Diff:

Calibrator Model: API T700 ZAG make/model: API 701

NO gas Diff:

End time (MST): 12:55

Serial Number: 2659 Serial Number: 4427

#### **Analyzer Information**

Analyzer make: Thermo 42i Analyzer serial #: 1218153356

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.186 1.186 NO bkgnd or offset: 3.5 3.5 NOX coeff or slope: 0.991 0.991 NOX bkgnd or offset: 3.5 3.5 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 166.5 166.5

#### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.006425	1.003601
NO <sub>x</sub> Cal Offset:	-3.447999	-2.208002
NO Cal Slope:	1.006912	1.004712
NO Cal Offset:	-4.347977	-3.327979
NO <sub>2</sub> Cal Slope:	0.999948	1.002364
NO <sub>2</sub> Cal Offset:	0.272718	0.612715



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

Dilution Calibration Data										
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3		
as found span	4916	84.4	801.1	799.9	1.2	812.4	809.5	2.8	0.9860	0.9881
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
high point	4916	84.4	801.1	799.9	1.2	802.5	801.6	0.9	0.9982	0.9979
second point	4958	42.2	400.5	400.0	0.6	399.9	398.0	1.9	1.0016	1.0049
third point	4979	21.1	200.3	200.0	0.3	195.5	193.5	2.0	1.0244	1.0335
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.2		
as left span	4916	84.4	801.1	400.4	400.7	800.7	403.0	397.8	1.0005	0.9935
							Average C	Correction Factor	1.0081	1.0121
Corrected As fo	ound NO <sub>X</sub> =	812.3 ppb	NO =	= 809.7 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	1.2%
Previous Respo	nse NO <sub>X</sub> =	802.8 ppb	NO =	801.1 ppb				*Percent Chan	ge NO =	1.1%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO =	NA ppb	As foun	d $NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				(	PT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
as found GPT poir	nt (200 ppb NO2)									
as found GPT poir	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	799.5		400.0	400.7		402.1	0.996	5 :	L00.4%
2nd GPT point	(200 ppb O3)	799.5		614.0	186.7		187.8	0.9940	) :	100.6%
3rd GPT point	(100 ppb O3)	799.5		709.4	91.3	·	92.6	0.9858	3	L01.4%

Notes:

Changed inlet filter after as founds. Adjusted span only.

Average Correction Factor

0.9921

Calibration Performed By:

Sean Bala

100.8%



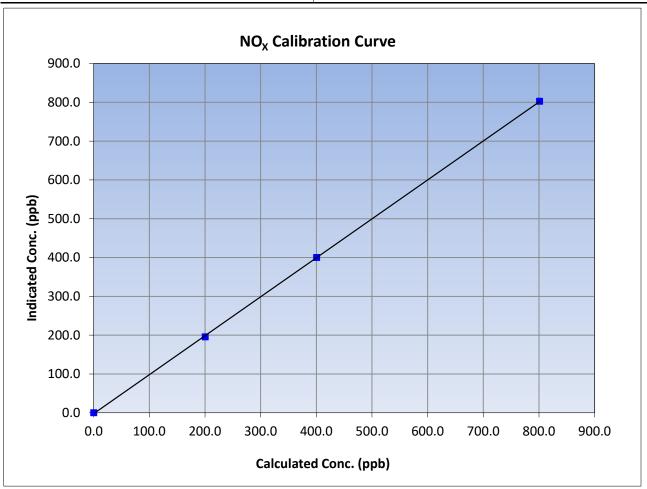
## NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 21, 2024 Station Name: Station Number: AMS501 Leismer Start Time (MST): 8:34 End Time (MST): 12:55 Analyzer serial #: Analyzer make: Thermo 42i 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999951	≥0.995
801.1	802.5	0.9982	Correlation Coefficient		20.993
400.5	399.9	1.0016	Slope	1.003601	0.90 - 1.10
200.3	195.5	1.0244	Slope	1.005001	0.90 - 1.10
			Intercept	-2.208002	+/-20





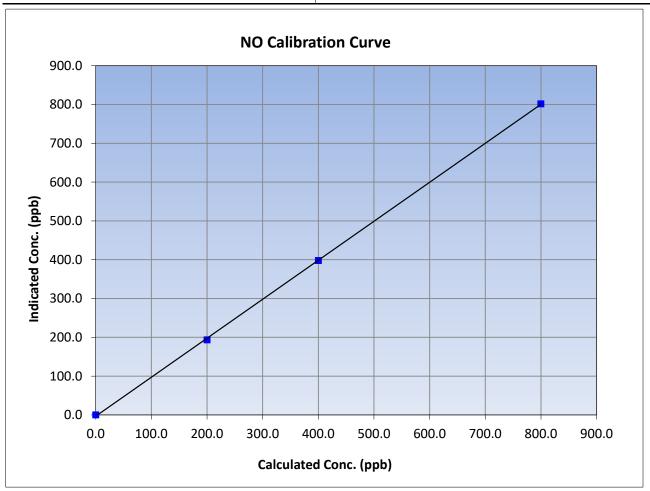
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 21, 2024 Station Name: Station Number: AMS501 Leismer Start Time (MST): 8:34 End Time (MST): 12:55 Analyzer make: Thermo 42i Analyzer serial #: 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999916	≥0.995
799.9	801.6	0.9979	Correlation Coefficient		20.555
400.0	398.0	1.0049	Slope	1.004712	0.90 - 1.10
200.0	193.5	1.0335	Slope	1.004712	0.90 - 1.10
			Intercept	-3.327979	+/-20





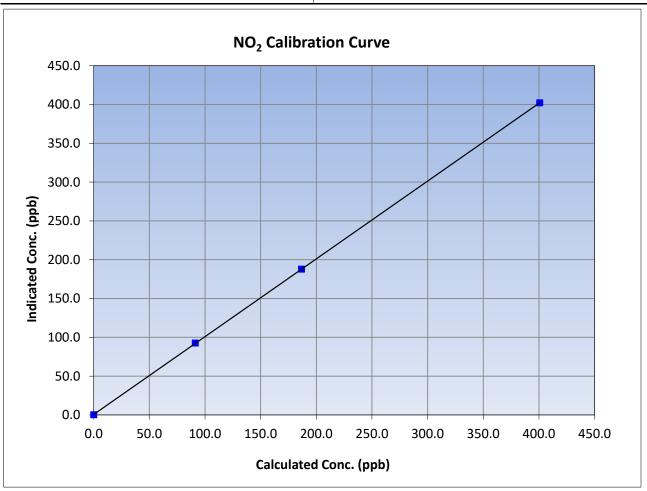
# NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 26, 2024 Previous Calibration: February 21, 2024 Station Name: Station Number: AMS501 Leismer Start Time (MST): 8:34 End Time (MST): 12:55 Analyzer serial #: Analyzer make: Thermo 42i 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999995	≥0.995
400.7	402.1	0.9965	Correlation Coefficient	0.555555	20.993
186.7	187.8	0.9940	Slope	1.002364	0.90 - 1.10
91.3	92.6	0.9858	Slope	1.002304	0.90 - 1.10
			Intercept	0.612715	+/-20



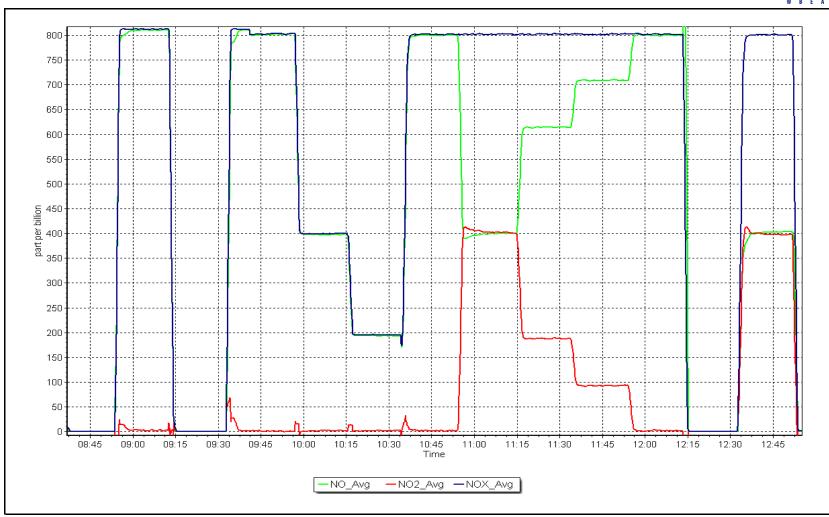
 $\mathrm{NO}_{\mathrm{X}}$  Calibration Plot

Date:

March 26, 2024

Location: Leismer







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

#### **Station Information**

Station Name: Leismer
Station number: AMS 501
Calibration Date: April 9, 2024
Last Cal Date: March 26, 2024

Start time (MST): 10:47 End time (MST): 13:52 Reason: Removal

#### **Calibration Standards**

NO Gas Cylinder #: T26811M Cal Gas Expiry Date: October 30, 2024 NOX Cal Gas Conc: 47.46 ppm NO Cal Gas Conc: 47.39 ppm

NO gas Diff:

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.46 ppm Removed Gas NO Conc: 47.39 ppm

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2659
ZAG make/model: Teledyne API T701 Serial Number: 4427

#### **As Found Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) Limit = 0.90 - 1.10	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) Limit = 0.90 - 1.10
As found zero	5000	0	0.0	0.0	0.0	-0.1	-0.2	0.1		
AF High point	4916	84.4	801.1	799.9	1.2	794.3	791.8	2.5	1.0084	1.0099
AF Mid point	4958	42.2	400.5	400.0	0.6	393.1	391.5	1.6	1.0187	1.0211
AF Low point	4979	21.1	200.3	200.0	0.3	192.3	189.5	2.7	1.0409	1.0542
New cyl resp										
Previous Respo	onse NO <sub>x</sub> =	801.7 ppb	NO = 800.3	ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chan	ge NO <sub>x</sub> =	-0.9%
Baseline Corr	1st pt $NO_X =$	794.4 ppb	NO = 792.0	ppb	As Four	nd Statistics		*Percent Chan	ge NO =	-1.1%
Baseline Corr 2	2nd pt $NO_X =$	393.2 ppb	NO = 391.7	ppb	As foun	$NO_X r^2$ :	0.999922	Nx SI: 0.9937	71 Nx Int:	-3.388
Baseline Corr 3	Brd pt $NO_X =$	192.4 ppb	NO = 189.7	ppb	As foun	nd NO r <sup>2</sup> :	0.999870	NO SI: 0.9930	95 NO Int:	-4.388
					As foun	$NO_2 r^2$ :	0.999917	NO2 SI: 0.9970	NO <sub>2</sub> Int:	1.858

#### **As Found GPT Calibration Data**

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Correction factor (Cc/(Ic-AFzero))  Limit = 0.90 - 1.10	Converter Efficiency  Limit = 96-104%
As Found GPT zero			0.0	0.1		
As found high GPT point	790.8	391.5	400.5	400.3	1.0005	100.0%
As found mid GPT point	790.8	610.0	182.0	184.5	0.9863	101.4%
As found low GPT point	790.8	702.7	89.3	92.3	0.9673	103.4%



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Analyzer Informat	<u>ion</u>	Calibration Statistics	<u>i</u>		
Analyzer Make:	Thermo 42i	Serial Number: 1170050148		<u>Start</u>	ļ
NOX Range (ppb):	0 - 1000 ppb		NO <sub>x</sub> Cal Slope:	1.003601	

Instrument Settings						NO <sub>x</sub> Cal Offset:	-2.208002	NA
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	NO Cal Slope:	1.004712	NA
NO coeff or slope:	1.186	1.186	NO bkgnd or offset:	3.5	3.5	NO Cal Offset:	-3.327979	NA
NOX coeff or slope:	0.991	0.991	NOX bkgnd or offset:	3.5	3.5	NO <sub>2</sub> Cal Slope:	1.002364	NA
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	166.5	166.2	NO <sub>2</sub> Cal Offset:	0.612715	NA

#### **Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
Cal zero High point Mid point Low point As left zero As left span										
							Average Co	orrection Factor	r	

#### **GPT Calibration Data**

Average Correction Factor

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic)  Limit = 0.95-1.05	Converter Efficiency  Limit = 96-104%
Cal zero High GPT point						
Mid GPT point						
Low GPT point						

As founds completed for station removal planned for April 10. Notes:

Calibration Performed By: **Braiden Boutilier**  **Finish** 

NA

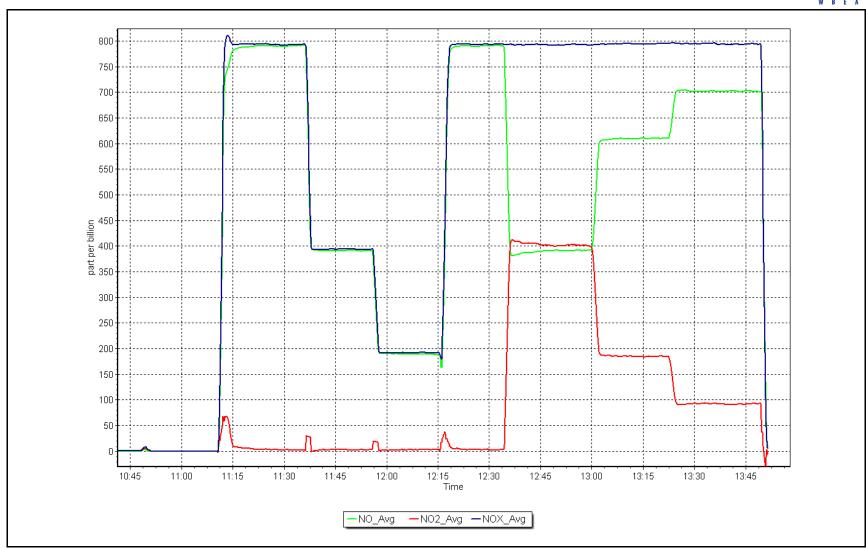
NO<sub>X</sub> Calibration Plot

Date: April 9, 2024

Loc

Location: Leismer





# W R E A

# **Wood Buffalo Environmental Association**

## **Wind Speed/Direction Calibration Report**

Version-10-2022

**Station Information** 

Station Name: Leismer Station Number: AMS 501

Calibration Date: April 9, 2024 Prev Cal Date: September 11, 2023

Start Time (MST): 12:37 End Time (MST): 13:30
Tower Height (m): 9.8 Reason: Removal

**Wind Speed Information** 

Sensor make/model: Met One 010C-1 Serial Number: Y18362 WS Calibrator: MetOne 053 Serial Number: P15103

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.1 -0.2% 400 39.4 39.4 0.1% 58.5 600 58.6 0.0% 800 77.8 77.8 0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999999	≥0.9995
Calculated slope		0.998868	0.90 - 1.10
Calculated intercept		0.028930	+/- 2

#### Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: R14654

As Found Declination (deg east of True North): 13.3 As Left Declination (deg east of True North): NA Solar noon time (MST): 12:37 Calc Declination\*: 13.3 Degrees

Deadband calc: -0.6 degrees (Limit 4 deg ) \*- calculated declination as per NOAA website

% Error (based on 357 $^{\circ}$  FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	2.4	
90	91.6	0.4%
180	180.4	0.1%
270	270.2	0.1%
357	360.0	0.8%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999963	≥0.9995
Calculated slope		1.000158	0.90 - 1.10
Calculated intercept		-1.552811	+/- 4

Notes: As founds done for the station removal planned for April 10.

Calibration Performed By: Braiden Boutilier



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

## AMS505 SAWBONES BAY MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



ZAG Make/Model:

## **Wood Buffalo Environmental Association**

# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Sawbones Bay

March 18, 2024 Calibration Date:

Start time (MST): 9:40 Routine Reason:

Station number: AMS505

February 15, 2024 Last Cal Date:

End time (MST): 12:37

#### **Calibration Standards**

Cal Gas Concentration: 51.4 ppm

Cal Gas Cylinder #: EY0000672

Removed Cal Gas Conc:

Calibrator Make/Model: Teledyne API T700

EY0000672 Removed Gas Cyl #:

51.40

Rem Gas Exp Date: February 15, 2029 ppm

Cal Gas Exp Date:

Diff between cyl:

Serial Number: 5112

Teledyne API T701H Serial Number: 690

#### **Analyzer Information**

Analyzer make: Thermo 43i Analyzer serial #: 0710321323

Analyzer Range 0 - 1000 ppb

**Finish** Start

Start

February 15, 2029

**Finish** 

Calibration slope: 1.004096 0.999393 Backgd or Offset: 20.1 20.5 1.008 Calibration intercept: -1.272603 -1.051659 Coeff or Slope: 0.989

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (	Correction factor (Cc/Ic)
Set Pollit	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.1	
as found span	4922	77.8	799.8	792.5	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4922	77.8	799.8	798.6	1.002
second point	4961	38.9	399.9	399.0	1.002
third point	4981	19.5	200.4	197.2	1.016
as left zero	5000	0.0	0.0	-0.3	
as left span	4922	77.8	799.8	791.4	1.011
			Averag	ge Correction Factor	1.007

Baseline Corr As found: 792.40 Previous response 801.82 \*% change -1.2% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter. Adjusted span only.

Calibration Performed By: Sean Bala



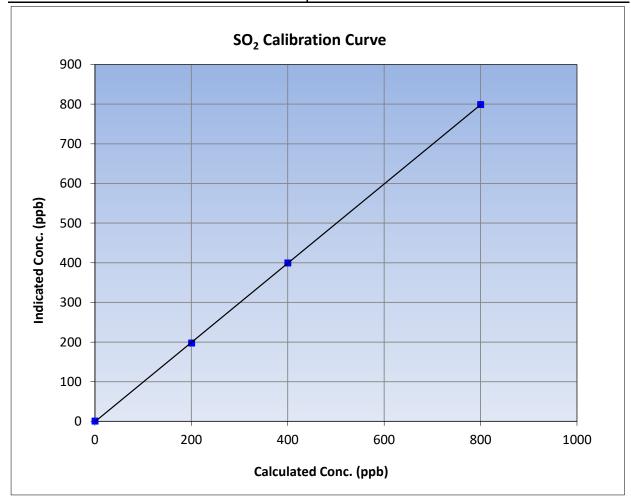
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

Calibration Date: March 18, 2024 **Previous Calibration:** February 15, 2024 Station Name: Station Number: AMS505 Sawbones Bay Start Time (MST): 9:40 End Time (MST): 12:37 Analyzer make: Thermo 43i Analyzer serial #: 0710321323

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.3		Correlation Coefficient	0.999982	≥0.995				
799.8	798.6	1.0015	Correlation Coefficient	0.999962	20.995				
399.9	399.0	1.0023	Slope	0.999393	0.90 - 1.10				
200.4	197.2	1.0164	Siope	0.333333	0.90 - 1.10				
			- Intercept	-1.051659	+/-30				

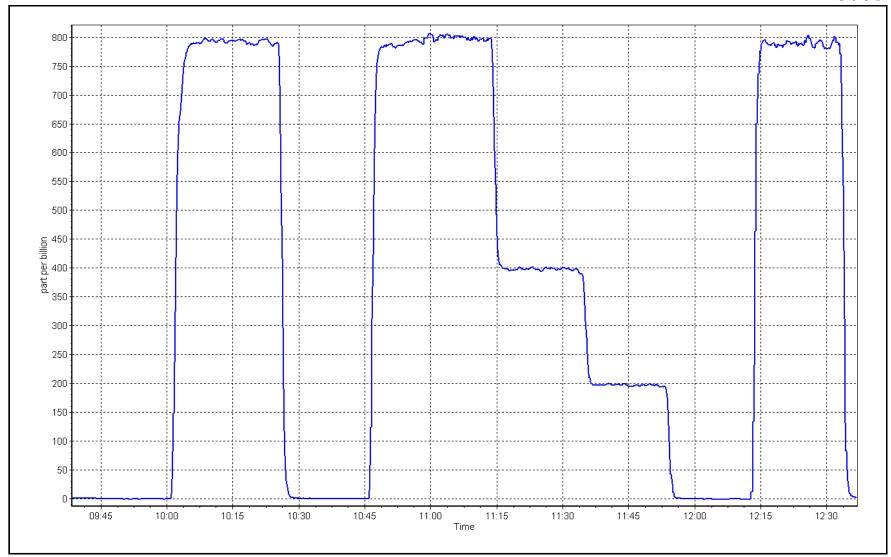


**SO2 Calibration Plot** 

Date: March 18, 2024

Location: Sawbones Bay





# W B E A

## **Wood Buffalo Environmental Association**

## H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Sawbones Bay Calibration Date: March 19, 2024

Start time (MST): 8:37
Reason: Routine

Station number: AMS505

Last Cal Date: February 22, 2024

End time (MST): 12:23

**Calibration Standards** 

Cal Gas Concentration: 5.15 ppm Cal Gas Exp Date: February 5, 2024

Cal Gas Cylinder #: CC517397

Removed Cal Gas Conc: 5.15 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl: Calibrator Make/Model: Teledybe API T700 Serial Number: 5112 ZAG Make/Model: Teledybe API T701 Serial Number: 690

**Analyzer Information** 

Analyzer make: Thermo 43iQ Analyzer serial #: 12113311965
Converter make: Global 150 Converter serial #: 2022-224

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> 1.015068 Backgd or Offset: Calibration slope: 1.014500 1.01 1.01 -0.077888 0.002254 Calibration intercept: Coeff or Slope: 1.119 1.119

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4922	77.7	80.0	81.7	0.978
as found 2nd point	4961	38.8	40.0	40.6	0.982
as found 3rd point	4981	19.4	20.0	20.1	0.989
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4922	77.7	80.0	81.2	0.986
second point	4961	38.8	40.0	40.7	0.982
third point	4981	19.4	20.0	20.2	0.989
as left zero	5000	0.0	0.0	0.1	
as left span	4922	77.7	80.0	81.2	0.986
SO2 Scrubber Check	4922	77.8	778.0	0.0	
Date of last scrubber char	nge:			Ave Corr Factor	0.986
Date of last converter effi	ciency test:				efficiency

bace or last sel abbet change.				AVC COIT TUCTOR	0.500	
Date of last converter efficien	cy test:				efficiency	
Baseline Corr As found:	81.8	Prev response:	81.12	*% change:	0.8%	

Baseline Corr 2nd AF pt:40.7AF Slope:1.022781Baseline Corr 3rd AF pt:20.2AF Correlation:0.999991

\* = > +/-5% change initiates investigation

AF Intercept:

Notes: Changed inlet filter after as founds. No adjustment made.

Calibration Performed By: Sean Bala

-0.217686



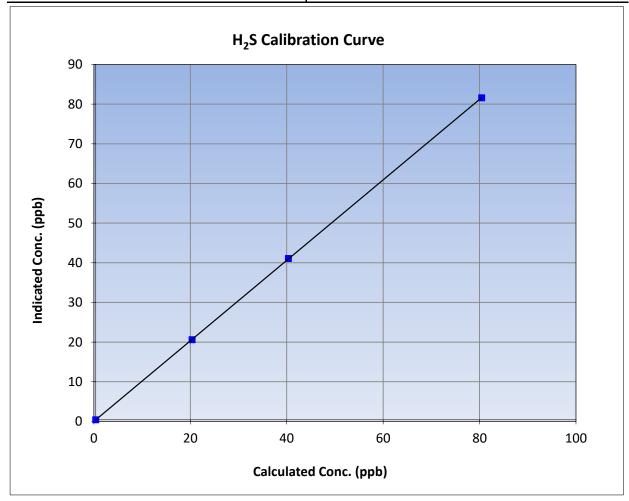
# H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 19, 2024 **Previous Calibration:** February 22, 2024 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:37 End Time (MST): 12:23 Analyzer make: Thermo 43iQ Analyzer serial #: 12113311965

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Ic) (Cc/Ic) Statistical Evaluation Limits								
0.0	0.0		Correlation Coefficient	0.999993	≥0.995			
80.0	81.2	0.9857	Correlation Coefficient	0.555555	20.333			
40.0	40.7	0.9820	Slope	1.015068	0.90 - 1.10			
20.0	20.2	0.9891	Slope	1.013008	0.30 - 1.10			
			- Intercept	0.002254	+/-3			

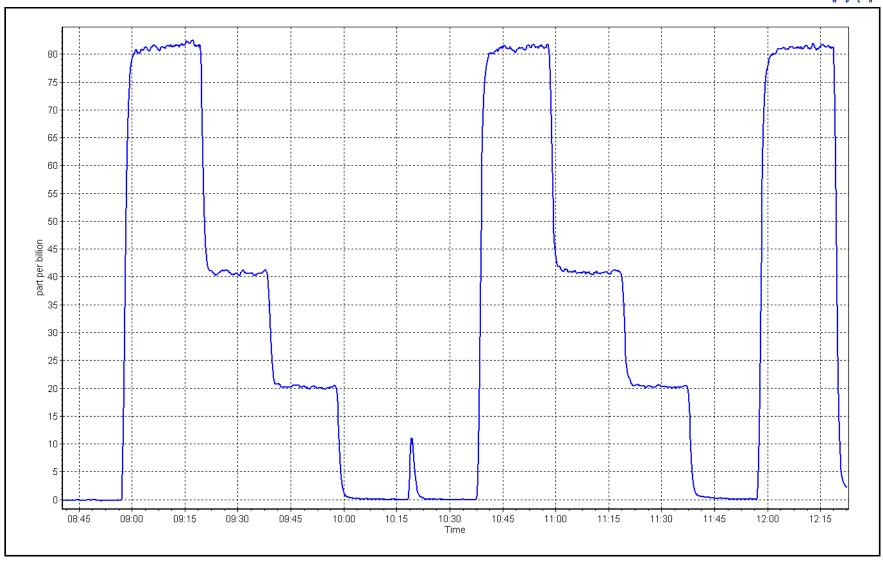


H<sub>2</sub>S Calibration Plot

Date: March 19, 2024

Location: Sawbones Bay







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Sawbones Bay

Calibration Date: March 20, 2024

Start time (MST): 8:36
Reason: Routine

Station number: AMS505

Last Cal Date: February 14, 2024

End time (MST): 12:47

#### **Calibration Standards**

NO Gas Cylinder #: T1FY3PK Cal Gas Expiry Date: March 14, 2025

NOX Cal Gas Conc: 47.94 ppm NO Cal Gas Conc: 47.94 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.94 ppm Removed Gas NO Conc: 47.94 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: API T700 Serial Number: 5112 ZAG make/model: API T701H Serial Number: 690

#### **Analyzer Information**

Analyzer make: API T200 Analyzer serial #: 4260

NOX Range (ppb): 0 - 1000 ppb

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.054 1.045 NO bkgnd or offset: 0.4 -1.1 NOX coeff or slope: 1.052 1.044 NOX bkgnd or offset: -0.1 1.3 NO2 coeff or slope: NA NA Reaction cell Press: 8.0 8.0

#### **Calibration Statistics**

<u>s</u>	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope: 1.0	01650	1.001550
NO <sub>X</sub> Cal Offset: -1.7	730586	-1.470566
NO Cal Slope: 1.0	01864	1.000349
NO Cal Offset: -1.9	930254	-1.350176
NO <sub>2</sub> Cal Slope: 1.0	000683	1.002397
NO <sub>2</sub> Cal Offset: -0.3	373004	0.386621



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2		
as found span	4917	83.4	799.6	799.6	0.0	806.0	803.1	2.9	0.9920	0.9956
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3		
high point	4917	83.4	799.6	799.6	0.0	799.7	798.9	0.8	0.9998	1.0008
second point	4958	41.7	399.8	399.8	0.0	399.0	398.7	0.4	1.0021	1.0029
third point	4979	20.9	200.4	200.4	0.0	197.8	197.4	0.3	1.0131	1.0152
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.7	-0.4		
as left span	4916	83.4	799.7	338.3	461.4	795.3	336.6	458.6	1.0056	1.0052
							Average C	Correction Factor	1.0050	1.0063
Corrected As fo	ound NO <sub>X</sub> =	806.4 ppb	NO:	= 803.3 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	0.9%
Previous Respo	nse NO <sub>X</sub> =	799.2 ppb	NO	= 799.1 ppb				*Percent Chan	ge NO =	0.5%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO:	= NA ppb	As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO <sub>x</sub> =	NA ppb	NO:	= NA ppb	As found	$1   NO r^2$ :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
					GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	794.6		333.2	461.4		462.5	0.9976	5 1	100.2%
2nd GPT poin	(200 ppb O3)	794.6		546.9	247.7		248.9	0.9952	2	100.5%
3rd GPT point	(100 ppb O3)	794.6		647.1	147.5		149.1	0.9893	3	01.1%

Notes:

Changed inlet filter after as founds. Adjusted span.

Average Correction Factor

0.9940

Calibration Performed By:

Sean Bala

100.6%



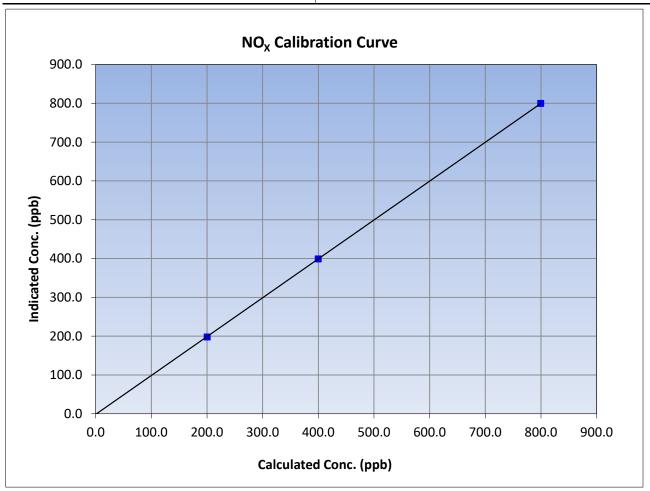
# NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 14, 2024 Station Name: Station Number: AMS505 Sawbones Bay Start Time (MST): 8:36 End Time (MST): 12:47 Analyzer serial #: Analyzer make: **API T200** 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999991	≥0.995
799.6	799.7	0.9998	Correlation Coefficient	0.555551	20.333
399.8	399.0	1.0021	Slope	1.001550	0.90 - 1.10
200.4	197.8	1.0131	Slope	1.001550	0.90 - 1.10
			Intercept	-1.470566	+/-20





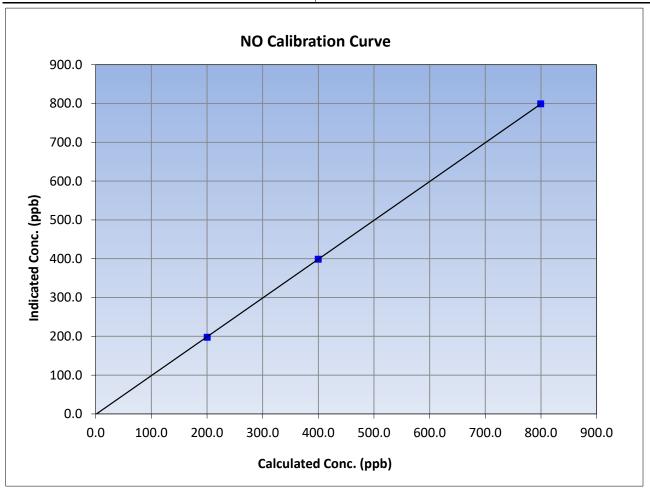
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 14, 2024 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:36 End Time (MST): 12:47 Analyzer make: **API T200** Analyzer serial #: 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999987	≥0.995
799.6	798.9	1.0008	Correlation Coefficient	0.555567	20.993
399.8	398.7	1.0029	Slope	1.000349	0.90 - 1.10
200.4	197.4	1.0152	Зюре	1.000349	0.90 - 1.10
			Intercept	-1.350176	+/-20





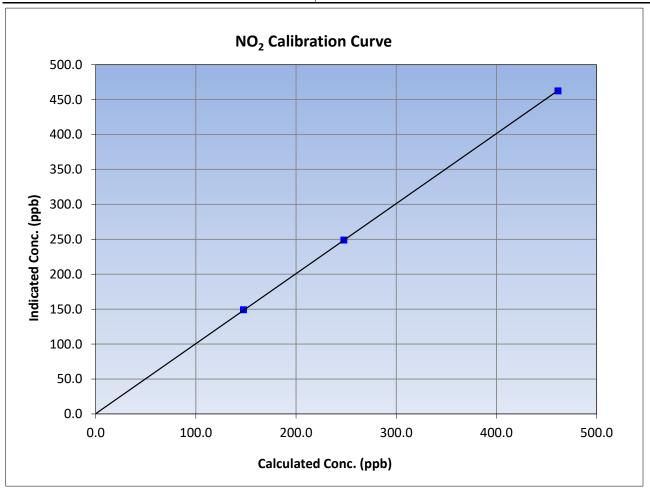
# NO<sub>2</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 14, 2024 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:36 End Time (MST): 12:47 Analyzer serial #: Analyzer make: **API T200** 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999988	≥0.995
461.4	462.5	0.9976	Correlation Coefficient	0.333366	20.333
247.7	248.9	0.9952	Slope	1.002397	0.90 - 1.10
147.5	149.1	0.9893	Slope	1.002597	0.90 - 1.10
			Intercept	0.386621	+/-20

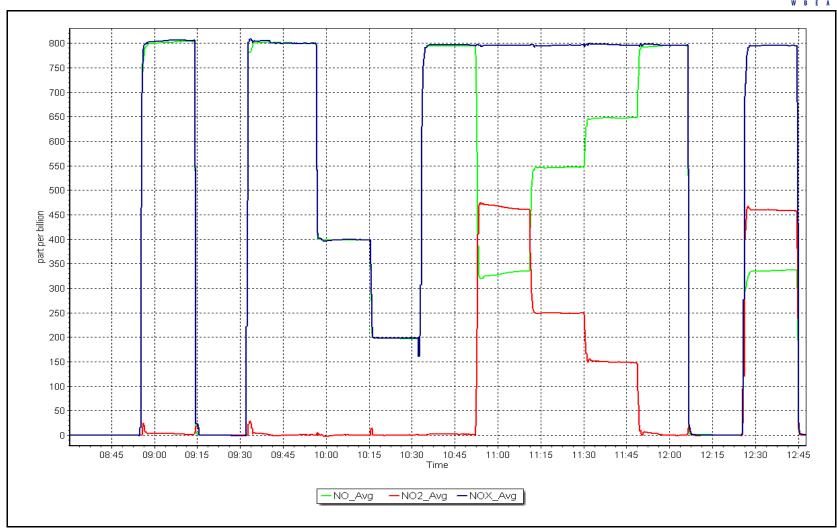


NO<sub>x</sub> Calibration Plot

Date:

March 20, 2024 Location: Sawbones Bay







## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

## AMS507 KIRBY SOUTH MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

#### **Station Information**

Station Name: Kirby South

Calibration Date: March 14, 2024

Start time (MST): 8:30 Reason: Routine Station number: AMS 507

Last Cal Date: February 15, 2024

End time (MST): 12:29

**Calibration Standards** 

Cal Gas Concentration: 49.18

Cal Gas Cylinder #: CC303554

Removed Cal Gas Conc: 49.18
Removed Gas Cyl #: NA

Calibrator Make/Model: API T750 ZAG Make/Model: API T751H ppm Cal Gas Exp Date: February 23, 2025

ppm Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 281 Serial Number: 321

**Analyzer Information** 

Analyzer make: Thermo 43i Analyzer serial #: 1173410001

Analyzer Range 0 - 1000 ppb

<u>Start</u> <u>Finish</u>

 Calibration slope:
 0.999677
 0.995804
 Backgd or Offset:
 18.8

 Calibration intercept:
 -1.668567
 0.311657
 Coeff or Slope:
 0.889

<u>Start</u> 18.8 <u>Finish</u> 21.7 0.906

#### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/lc)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	3.0	
as found span	4919	81.3	799.6	780.0	1.025
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4919	81.3	799.6	797.2	1.003
second point	4959	40.7	400.3	397.2	1.008
third point	4980	20.3	199.7	200.2	0.997
as left zero	5000	0.0	0.0	0.5	
as left span	4919	81.3	799.6	792.4	1.009
			Averag	ge Correction Factor	1.003

Baseline Corr As found: 777.00 Previous response 797.69 \*% change -2.7% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept.

NA AF Slope: AF Intercept.

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier



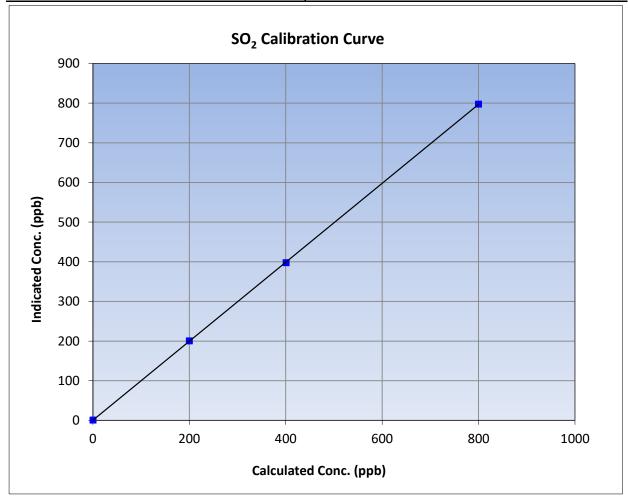
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

#### **Station Information**

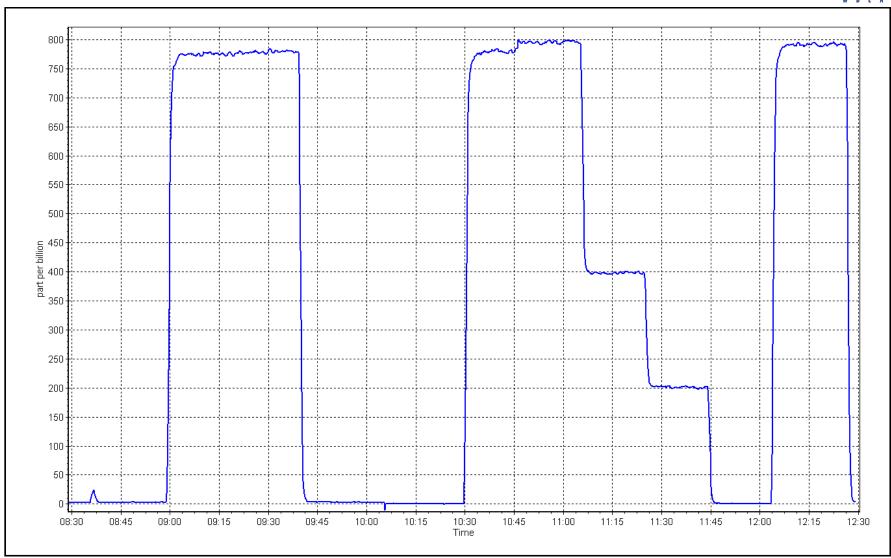
Calibration Date: March 14, 2024 **Previous Calibration:** February 15, 2024 Station Name: Kirby South Station Number: AMS 507 Start Time (MST): 8:30 End Time (MST): 12:29 Analyzer make: Thermo 43i Analyzer serial #: 1173410001

Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation Limits								
0.0	0.4	4 Correlation Coefficient		0.999986	≥0.995			
799.6	797.2	1.0030	Correlation Coefficient	0.555500	20.333			
400.3	397.2	1.0079	Slope	0.995804	0.90 - 1.10			
199.7	200.2	0.9973	Slope	0.555604	0.90 - 1.10			
			- Intercept	0.311657	+/-30			



SO2 Calibration Plot Date: March 14, 2024 Location: Kirby South







ZAG Make/Model:

## **Wood Buffalo Environmental Association**

## H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Kirby South

Calibration Date: March 13, 2024

Start time (MST): 11:15

Reason: Routine Station number: AMS507

> Last Cal Date: February 15, 2024

End time (MST): 17:28

**Calibration Standards** 

November 15, 2026 Cal Gas Concentration: 5.05 Cal Gas Exp Date:

Cal Gas Cylinder #: DT0019762

Removed Cal Gas Conc: 5.05 Removed Gas Cyl #: DT0019762 Calibrator Make/Model: API T750

**API T751H** 

Rem Gas Exp Date: NA ppm

> Diff between cyl: 281 Serial Number: Serial Number: 321

**Analyzer Information** 

Analyzer make: Thermo 43i TLE Analyzer serial #: 1150840012 Global Converter serial #: 2022-197 Converter make:

Analyzer Range 0 - 100 ppb

> **Finish** <u>Start</u>

<u>Finish</u> <u>Start</u> 0.996813 Backgd or Offset: Calibration slope: 0.998813 1.74 1.73 Calibration intercept: 0.219035 0.139039 Coeff or Slope: 1.041 1.052

#### H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.2	80.0	81.1	0.985
as found 2nd point	4960	39.6	40.0	40.6	0.983
as found 3rd point	4980	19.8	20.0	20.3	0.980
new cylinder response					

#### H<sub>2</sub>S Calibration Data

Set Point	Set Point Dilution air flow rate (sccm)		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4921	79.2	80.0	79.8	1.002
second point	4960	39.6	40.0	40.1	0.997
third point	4980	19.8	20.0	20.2	0.990
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	80.0	79.7	1.004
SO2 Scrubber Check	4919	80.0	800.2	0.1	
Date of last scrubber chang	ge:	25-Jul-23	_	Ave Corr Factor	0.997
Date of last converter effic	·	efficiency			

Date of last scrubber change		25-Jui-25		Ave Corr Factor	0.997
Date of last converter efficiency test: efficien					
Baseline Corr As found:	81.2	Prev response:	80.12	*% change:	1.3%

Baseline Corr 2nd AF pt: 40.7 AF Slope: 1.014815 0.999997 Baseline Corr 3rd AF pt: 20.4 AF Correlation:

\* = > +/-5% change initiates investigation

AF Intercept:

-0.040976

Changed sample inlet filter after as founds. Ran SOx scrubber check after cal zero, passed. Notes: Adjusted span.

Calibration Performed By: Braiden Boutilier



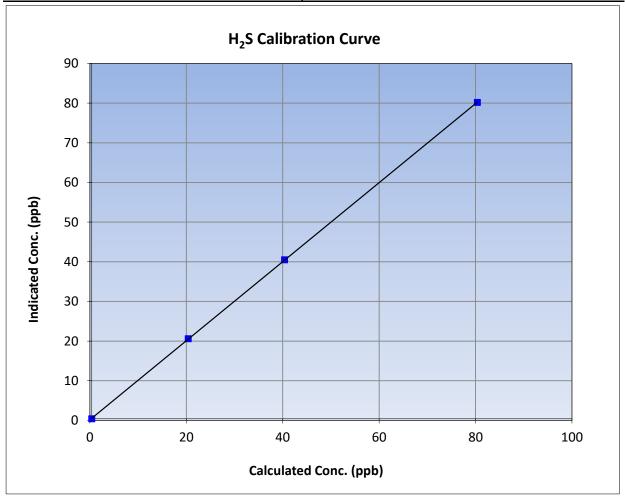
# H<sub>2</sub>S Calibration Summary

Version-11-2021

#### **Station Information**

Calibration Date: March 13, 2024 **Previous Calibration:** February 15, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 11:15 End Time (MST): 17:28 Thermo 43i-TLE Analyzer make: Analyzer serial #: 1150840012

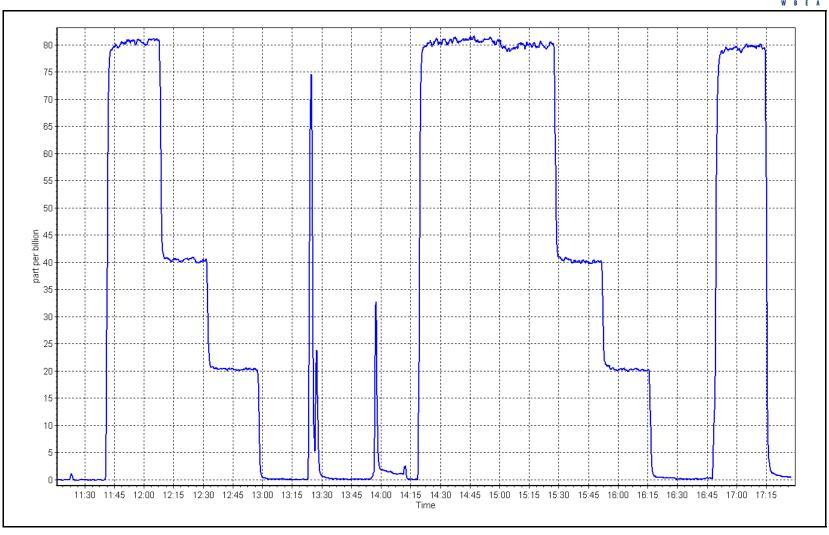
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>					
0.0	0.0		Correlation Coefficient	0.999986	≥0.995				
80.0	79.8	1.0024	Correlation Coefficient	0.555500	20.333				
40.0	40.1	0.9975	Slope	0.996813	0.90 - 1.10				
20.0	20.2	0.9900	Slope	0.990613	0.90 - 1.10				
			- Intercept	0.139039	+/-3				



H<sub>2</sub>S Calibration Plot Date: March 13, 2024

Location: Kirby South







# **THC Calibration Report**

Version-01-2020

#### **Station Information**

Kirby South Station Name:

March 14, 2024 Calibration Date:

Start time (MST): 8:30

Routine Reason:

Station number: AMS507

> February 22, 2024 Last Cal Date:

End time (MST):

12:29

**Calibration Standards** 

CC303554 Gas Cert Reference: Cal Gas Expiry Date: March 23, 2025

CH4 Equiv Conc. 1061.7 ppm

1061.7

ppm

CH4 Cal Gas Conc. 496.6 ppm C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA

Removed Gas Expiry: NA Removed CH4 Conc. 496.6 CH4 Equiv Conc.

ppm Removed C3H8 Conc. 205.5 Diff between cyl: ppm

Calibrator Make/Model: **API T750** Serial Number: 281 ZAG Make/Model: **API T751H** Serial Number: 321

**Analyzer Information** 

Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 0.998323 0.997260 2.30 2.15 0.004217 Coefficient: Calibration intercept: 0.032189 3.728 3.701

**THC Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated  Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.15	
as found span	4919	81.3	17.26	17.23	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.02	
high point	4919	81.3	17.26	17.22	1.002
second point	4959	40.7	8.64	8.60	1.005
third point	4980	20.3	4.31	4.35	0.991
as left zero	5000	0.0	0.00	-0.06	
as left span	4919	81.3	17.26	17.08	1.011
			Aver	age Correction Factor	1.000
Baseline Corr As found:	17.38	Previous response	17.27	*% change	0.7%

Baseline Corr 2nd AF pt: AF Slope: AF Intercept: NA

Baseline Corr 3rd AF pt: NA AF Correlation:

\* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Adjusted zero.

Calibration Performed By: **Braiden Boutilier** 



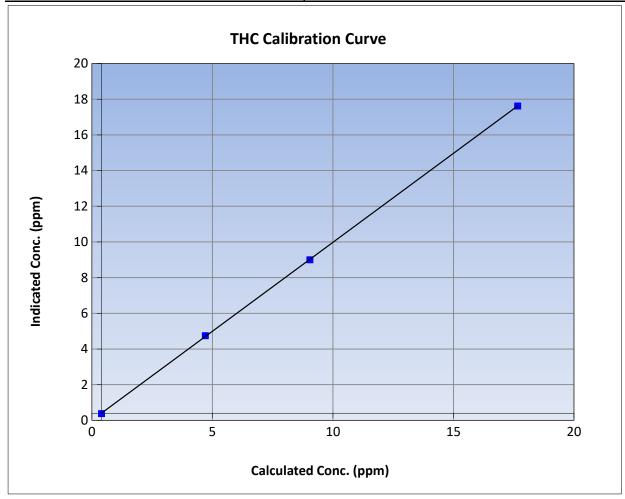
# **THC Calibration Summary**

Version-01-2020

#### **Station Information**

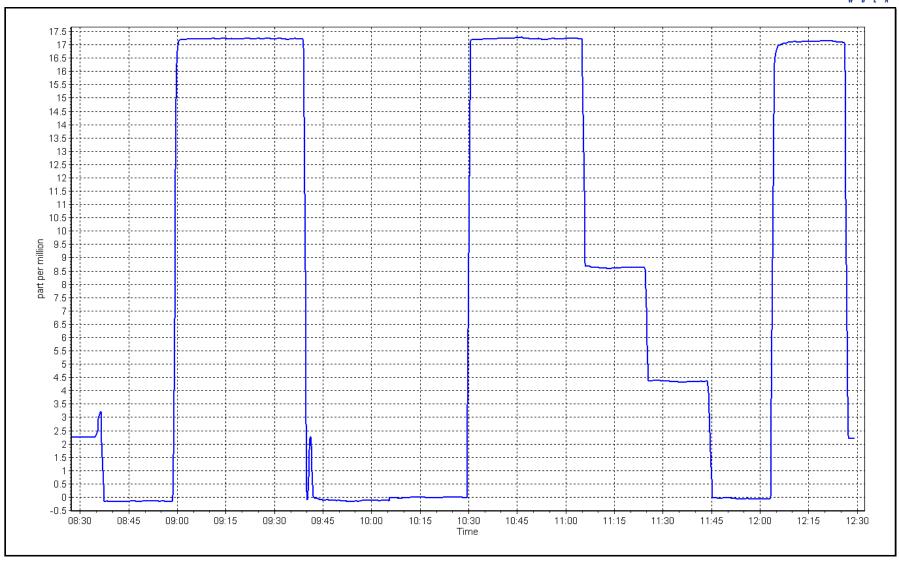
March 14, 2024 **Previous Calibration:** Calibration Date: February 22, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:30 End Time (MST): 12:29 Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)  Correction factor (Cc/Ic)		Statistical Evalua	<u>Limits</u>					
0.00	-0.02		Correlation Coefficient	0.999981	≥0.995				
17.26	17.22	1.0025	Correlation Coefficient	0.999901	20.995				
8.64	8.60	1.0050	Slope	0.997260	0.90 - 1.10				
4.31	4.35	0.9913	Slope	0.997200	0.90 - 1.10				
			- Intercept	0.004217	+/-1.5				



THC Calibration Plot Date: March 14, 2024 Location: Kirby South







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

#### **Station Information**

Station Name: Kirby South

March 13, 2024 Calibration Date:

Start time (MST): 11:12 Reason: Removal Station number: AMS507

> Last Cal Date: February 15, 2024

End time (MST): 13:20

#### **Calibration Standards**

T34ULGL NO Gas Cylinder #: Cal Gas Expiry Date: March 8, 2025

NO Cal Gas Conc: NOX Cal Gas Conc: 49.39 49.02 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 49.39 ppm 49.02 ppm

NOX gas Diff:

**API T700** Calibrator Model: ZAG make/model: **API 701H** 

NO gas Diff: Serial Number: 3804 Serial Number: 880

#### **Analyzer Information**

Analyzer make: Thermo 42iQ Analyzer serial #: 1182340006

NOX Range (ppb): 0 - 1000 ppb

NO<sub>2</sub> Cal Offset:

**Start Finish** <u>Start</u> **Finish** NO coeff or slope: 1.383 1.383 NO bkgnd or offset: 1.7 1.7 NOX coeff or slope: 0.998 0.998 NOX bkgnd or offset: 1.8 1.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 210.24 260.25

#### **Calibration Statistics**

Start Finish NO<sub>x</sub> Cal Slope: 1.009303 0.999789 NO<sub>x</sub> Cal Offset: -4.671552 -5.004402 NO Cal Slope: 1.014663 1.001150 NO Cal Offset: -5.705997 -5.612277 NO<sub>2</sub> Cal Slope: 1.003572

1.309741



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0		
as found span	4919	81.0	800.1	794.1	6.0	828.0	812.0	15.6	0.9663	0.9780
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1		
high point	4919	81.0	800.1	794.1	6.0	797.7	792.5	5.2	1.0030	1.0020
second point	4960	40.5	400.1	397.1	3.0	391.4	387.8	3.6	1.0221	1.0239
third point	4980	20.2	199.5	198.0	1.5	190.6	187.9	2.7	1.0469	1.0540
as left zero										
as left span										
							Average C	orrection Factor	1.0240	1.0266
Corrected As fo	ound NO <sub>X</sub> =	828.5 ppb	NO =	812.5 ppb	* = > +/-59	6 change initiates	investigation	*Percent Chan	ge NO <sub>x</sub> =	3.1%
Previous Respo	onse NO <sub>X</sub> =	802.9 ppb	NO =	800.2 ppb				*Percent Chan	ge NO =	1.5%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =		As found	$NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO <sub>x</sub> =	NA ppb	NO =	dqq AN	As found	$NO r^2$ :		NO SI:	NO Int:	
	, ,				As found	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				G	GPT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Ref concentration (		cated NO Drop entration (ppb)	Calculated NC concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	l GPT zero									
as found GPT poi	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)									
2nd GPT poin	it (200 ppb O3)									
3rd GPT poin	t (100 ppb O3)									
						Average Co	orrection Factor			

Notes:

Analyzer does meet internal criteria. Maintenance planned for tomorrow.

Calibration Performed By:

Braiden Boutilier



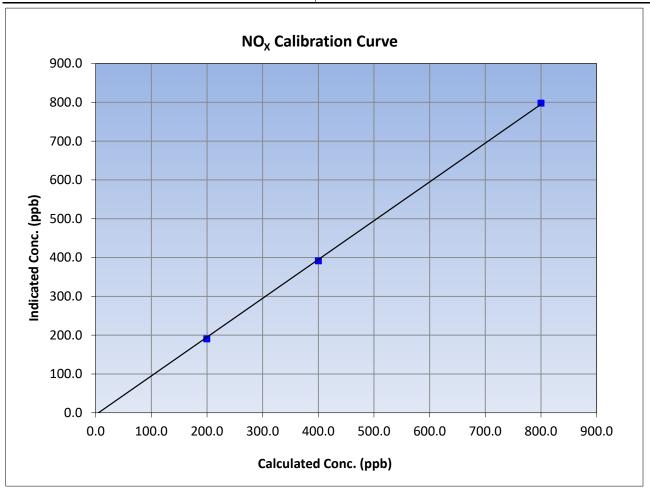
# NO<sub>x</sub> Calibration Summary

Version-04-2020

#### **Station Information**

Calibration Date: March 13, 2024 Previous Calibration: February 15, 2024 Station Name: Station Number: AMS507 Kirby South Start Time (MST): 11:12 End Time (MST): 13:20 Analyzer serial #: Analyzer make: Thermo 42iQ 1182340006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999836	≥0.995
800.1	797.7	1.0030	Correlation Coefficient	0.999830	20.333
400.1	391.4	1.0221	Slope	0.999789	0.90 - 1.10
199.5	190.6	1.0469	Slope	0.999769	0.90 - 1.10
			Intercept	-5.004402	+/-20





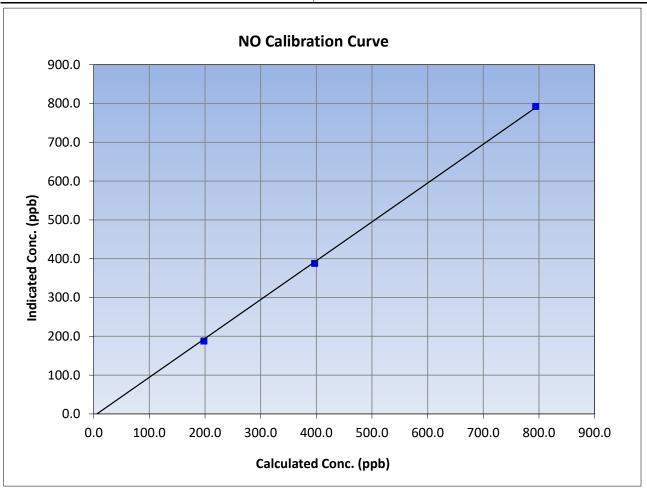
## **NO Calibration Summary**

Version-04-2020

#### **Station Information**

Calibration Date: March 13, 2024 Previous Calibration: February 15, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 11:12 End Time (MST): 13:20 Analyzer make: Thermo 42iQ Analyzer serial #: 1182340006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999774	≥0.995
794.1	792.5	1.0020	Correlation Coefficient	0.555774	20.333
397.1	387.8	1.0239	Slope	1.001150	0.90 - 1.10
198.0	187.9	1.0540	Slope	1.001130	0.90 - 1.10
	<u> </u>		Intercept	-5.705997	+/-20

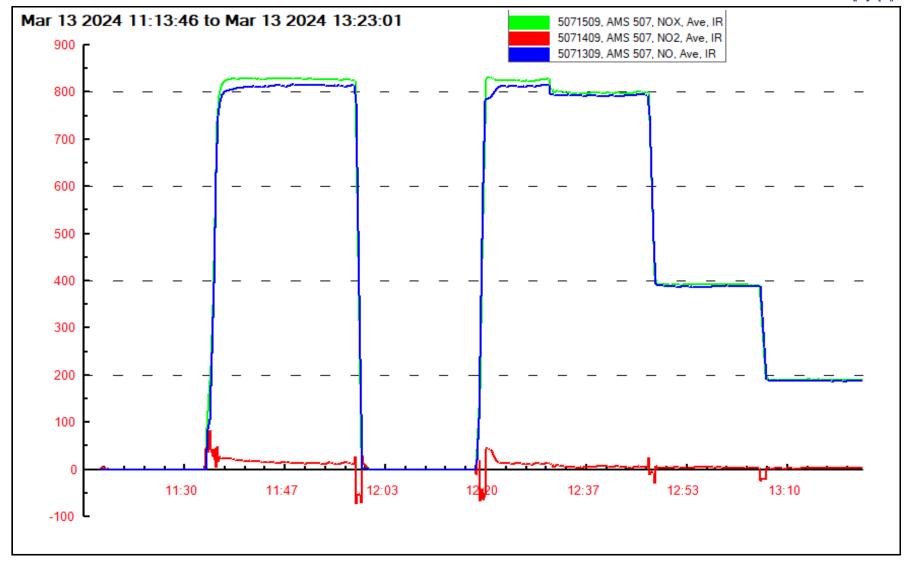


Date:

March 13, 2024

Location: Kirby South







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

AMS507

15:00

NO gas Diff:

March 13, 2024

Station number:

End time (MST):

Last Cal Date:

Version-04-2020

#### **Station Information**

Station Name: Kirby South

Calibration Date: March 15, 2024

Start time (MST): 10:30

Reason: Install

**Calibration Standards** 

NO Gas Cylinder #: T34ULGL Cal Gas Expiry Date: March 8, 2025

NOX Cal Gas Conc: 49.39 ppm NO Cal Gas Conc: 49.02 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 49.39 ppm Removed Gas NO Conc: 49.02 ppm

NOX gas Diff:

Calibrator Model: API T700 Serial Number: 3804 ZAG make/model: API 701H Serial Number: 880

**Analyzer Information** 

Analyzer make: Thermo 42iQ Analyzer serial #: 12400232071

NOX Range (ppb): 0 - 1000 ppb

**Start Finish Start Finish** NO coeff or slope: NA 1.097 NO bkgnd or offset: NA 1.8 NOX coeff or slope: 0.996 NOX bkgnd or offset: NA NA 2.5 NO2 coeff or slope: NA 1.000 Reaction cell Press: NA 196.86

**Calibration Statistics** 

Start Finish NO<sub>x</sub> Cal Slope: NA 1.000646 NO<sub>x</sub> Cal Offset: -4.504120 NA NO Cal Slope: NA 1.002372 NO Cal Offset: NA -5.105630 NO<sub>2</sub> Cal Slope: NA 0.996340 NO<sub>2</sub> Cal Offset: 0.258912 NA



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow		Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found span										
as found 2nd										
as found 3rd										-
new cyl resp									<u> </u>	·
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2		
high point	4919	81.0	800.1	794.1	6.0	798.4	793.6	4.8	1.0022	1.0007
second point	4960	40.5	400.1	397.1	3.0	393.1	389.7	3.4	1.0177	1.0189
third point	4980	20.2	199.5	198.0	1.5	191.5	189.0	2.5	1.0420	1.0478
as left zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.5		
as left span	4919	81.0	800.1	407.5	392.6	802.0	407.9	393.7	0.9977	0.9991
							Average C	Correction Factor	1.0206	1.0225
Corrected As fo	ound NO <sub>X</sub> =	NA ppb	NO = NA	A ppb	* = > +/-5	% change initiates i	investigation	*Percent Chang	ge NO <sub>X</sub> =	NA
Previous Respo	onse NO <sub>X</sub> =	NA ppb	NO = NA	A ppb				*Percent Chang	ge NO =	NA
Baseline Corr 2	2nd pt NO <sub>X</sub> =	NA ppb	NO = NA	A ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3		NA ppb	NO = NA	A ppb	As found	d $NO r^2$ :		NO SI:	NO Int:	
	•				As found	d $NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				•	GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Reference concentration (ppt		ed NO Drop ration (ppb)	Calculated NC concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	791.2	4	04.6	392.6		391.1	1.0038	8	99.6%
2nd GPT poin	t (200 ppb O3)	791.2	6	17.0	180.2		180.4	0.9989	9 :	100.1%
3rd GPT point	t (100 ppb O3)	791.2	7/	09.4	87.8		87.9	0.9988	3	100.1%

Notes:

Install calibration. Adjusted zero and span.

Calibration Performed By:

Braiden Boutilier



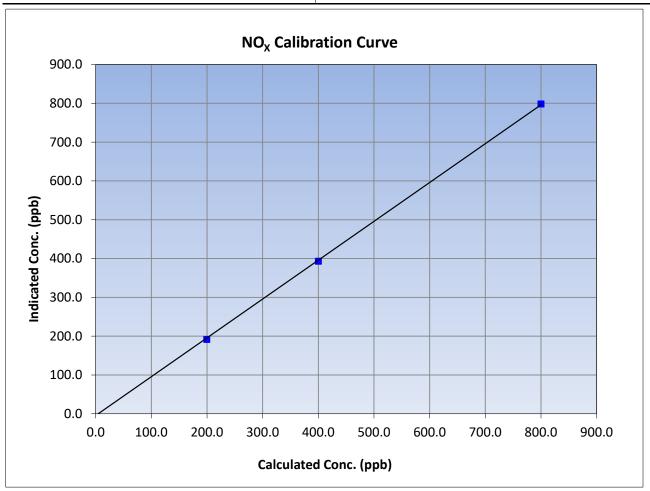
# NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 15, 2024 Previous Calibration: March 13, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 10:30 End Time (MST): 15:00 Analyzer serial #: Analyzer make: Thermo 42iQ 12400232071

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999878	≥0.995
800.1	798.4	1.0022	Correlation Coefficient	0.333676	20.993
400.1	393.1	1.0177	Slope	1.000646	0.90 - 1.10
199.5	191.5	1.0420	Slope	1.000646	0.90 - 1.10
			Intercept	-4.504120	+/-20





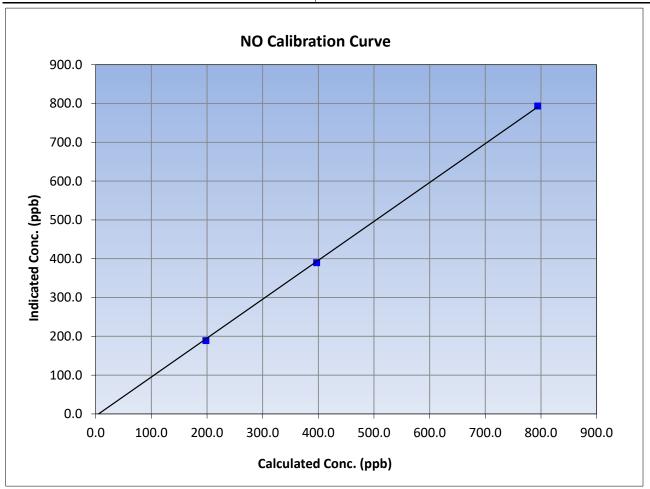
# **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 15, 2024 Previous Calibration: March 13, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 10:30 End Time (MST): 15:00 Analyzer make: Thermo 42iQ Analyzer serial #: 12400232071

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999824	≥0.995
794.1	793.6	1.0007	correlation coefficient	0.555024	20.333
397.1	389.7	1.0189	Slope	1.002372	0.90 - 1.10
198.0	189.0	1.0478	Slope	1.002372	0.90 - 1.10
			Intercept	-5.105630	+/-20





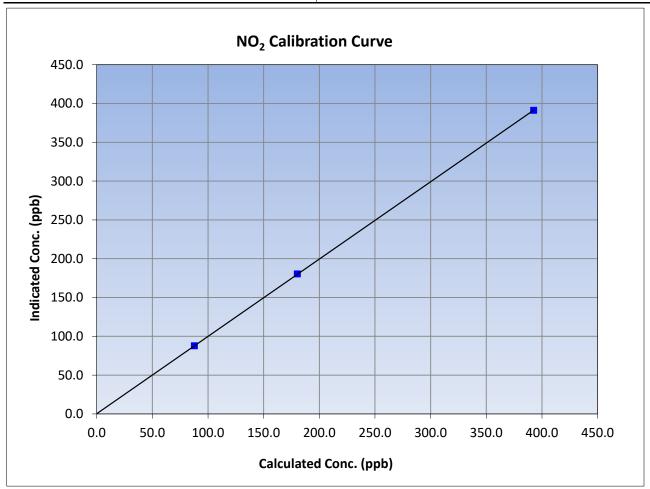
# NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 15, 2024 Previous Calibration: March 13, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 10:30 End Time (MST): 15:00 Analyzer serial #: Analyzer make: Thermo 42iQ 12400232071

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999992	≥0.995
392.6	391.1	1.0038	Correlation Coefficient	0.555552	20.333
180.2	180.4	0.9989	Slope	0.996340	0.90 - 1.10
87.8	87.9	0.9988	Slope	0.990540	0.90 - 1.10
			Intercept	0.258912	+/-20

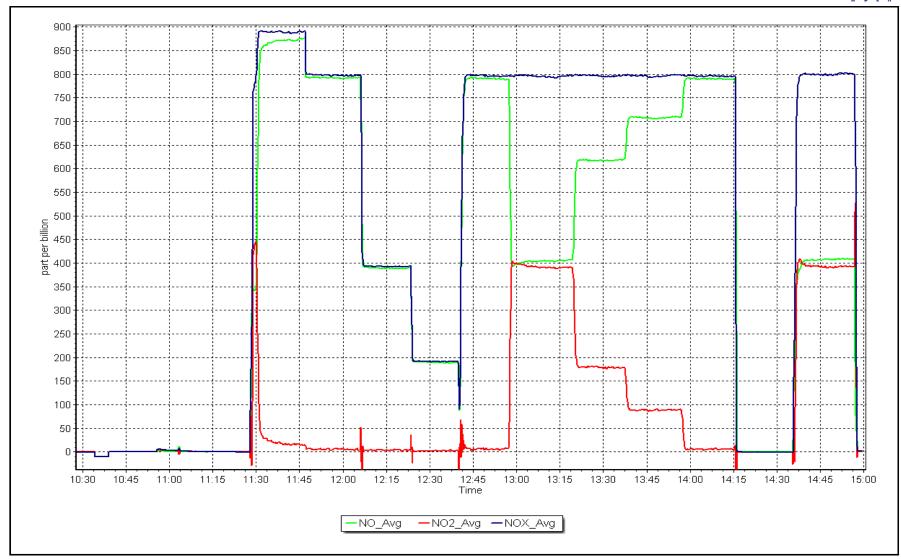


NO<sub>x</sub> Calibration Plot

Date: March 15, 2024

Location: Kirby South







# WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

# AMS511 BLACKGOLD MARCH 2024

Operations, Data Collection, QA/QC, Data Validation and Reporting by: Wood Buffalo Environmental Association Fort McMurray, Alberta

April 30, 2024



# **SO<sub>2</sub> Calibration Report**

Version-01-2020

### **Station Information**

Station Name: Blackgold Station number: AMS511

Calibration Date: March 21, 2024 Last Cal Date: February 21, 2024

Start time (MST): 8:12 End time (MST): 11:16

Reason: Routine

### **Calibration Standards**

Cal Gas Concentration: 50.06 ppm Cal Gas Exp Date: January 5, 2029

Cal Gas Cylinder #: CC147416

Removed Cal Gas Conc: 50.06 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API 7700 Serial Number: 2445 ZAG Make/Model: Teledyne API 701 Serial Number: 138

# **Analyzer Information**

Analyzer make: Thermo scientific Analyzer serial #: 1160290014

Analyzer Range 0 - 1000 ppb

Baseline Corr 3rd AF pt:

**Finish Finish** Start Start Calibration slope: 1.003517 1.008482 Backgd or Offset: 36.0 38.0 Calibration intercept: 0.290852 -0.070301 Coeff or Slope: 1.202 1.202

# SO<sub>2</sub> Calibration Data

5000	0.0			
	0.0	0.0	2.1	
4926	79.9	799.0	806.7	0.990
5000	0.0	0.0	-0.4	
4926	79.9	799.0	805.5	0.992
4968	40.0	399.8	403.5	0.991
4987	20.0	200.0	201.8	0.991
5000	0.0	0.0	-0.1	
4926	80.0	800.0	806.8	0.992
		Averag	e Correction Factor	0.991
804.60 ΝΔ	•		*% change	0.3%
	5000 4926 4968 4987 5000 4926	4926 79.9  5000 0.0  4926 79.9  4968 40.0  4987 20.0  5000 0.0  4926 80.0  804.60 Previous response	4926     79.9     799.0       5000     0.0     0.0       4926     79.9     799.0       4968     40.0     399.8       4987     20.0     200.0       5000     0.0     0.0       4926     80.0     800.0       Average       804.60     Previous response     802.12	4926     79.9     799.0     806.7       5000     0.0     -0.4       4926     79.9     799.0     805.5       4968     40.0     399.8     403.5       4987     20.0     200.0     201.8       5000     0.0     -0.1       4926     80.0     800.0     806.8       Average Correction Factor       804.60     Previous response     802.12     *% change

Notes: Changed the sample inlet filter after as founds. Adjusted zero only.

AF Correlation:

Calibration Performed By: Mohammed Kashif

NA

\* = > +/-5% change initiates investigation



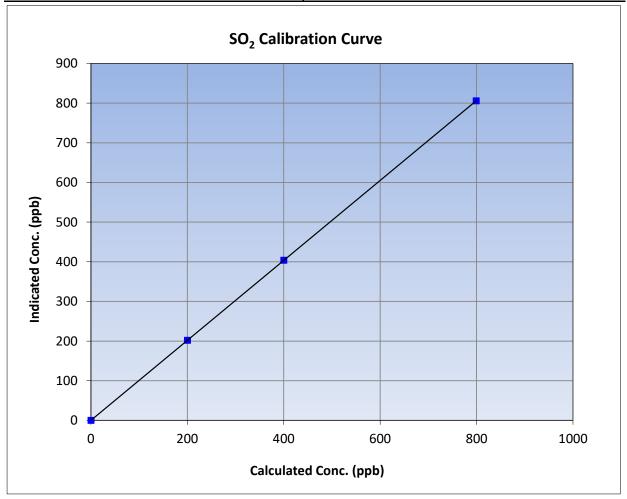
# **SO<sub>2</sub> Calibration Summary**

Version-01-2020

# **Station Information**

Calibration Date: March 21, 2024 **Previous Calibration:** February 21, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:12 End Time (MST): 11:16 Analyzer make: Thermo scientific Analyzer serial #: 1160290014

Calibration Data							
Calculated concentration Indicated concentration Correction fa (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>		
0.0	-0.4		Correlation Coefficient	0.999999	≥0.995		
799.0	805.5	0.9920	Correlation coefficient	0.555555	20.993		
399.8	403.5	0.9909	Slope	1.008482	0.90 - 1.10		
200.0	201.8	0.9909	Slope	1.006462	0.90 - 1.10		
			- Intercept	-0.070301	+/-30		

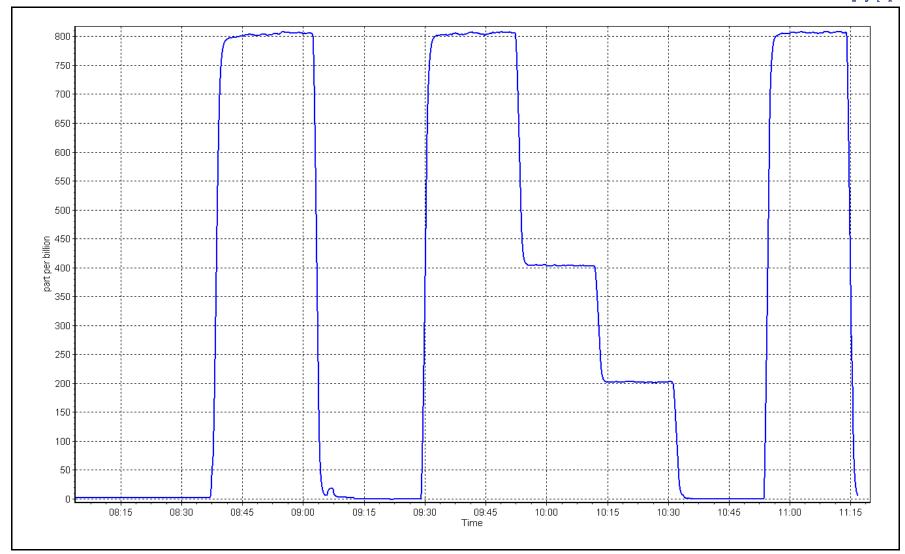


**SO2 Calibration Plot** 

Date:

March 21, 2024







# Wood Buffalo Environmental Association SO<sub>2</sub> Calibration Report

# **Station Information**

Station Name:BlackgoldStation number: AMS 511Calibration Date:April 4, 2024Last Cal Date: March 21, 2024Start time (MST):12:31End time (MST): 13:59Reason:Removal

### **Calibration Standards**

Cal Gas Concentration: 50.06 ppm Cal Gas Exp Date: January 5, 2029

Cal Gas Cylinder #: CC147416

Removed Cal Gas Conc:50.06ppmRem Gas Exp Date: NARemoved Gas Cyl #:NADiff between cyl:Calibrator Model:Teledyne API T700Serial Number: 2445Zero Air Gen Model:Teledyne API 701Serial Number: 138

# **Analyzer Information**

Analyzer make: Thermo scientific Serial Number: 1160290014

Analyzer Range: 0 - 1000 ppb

Start **Finish Start Finish** Calibration slope: 1.008482 NA Backgd or Offset: 38.0 NA Calibration intercept: -0.070301 NA Coeff or Slope: 1.202 NA

### SO<sub>2</sub> As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) Limit = 0.90-1.10
As found zero	5000	0.0	0.0	-1.5	
As found High point	4926	79.9	799.0	812.7	0.981
As found Mid point	4968	40.0	399.8	406.1	0.981
As found Low point	4987	20.0	200.0	201.4	0.986
New cylinder response					
Baseline Corr As found:	814.2	Previous response	805.7	*% change	1.0%
Baseline Corr 2nd AF pt:	407.6	AF Slope:	1.019395	AF Intercept:	-1.811745
Baseline Corr 3rd AF pt:	202.9	AF Correlation:	0.999998	* = > +/-5% change initiate	es investigation

### SO<sub>2</sub> Calibration Data

	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	(ppb) (Ic)	(Cc/Ic)
	(Sceni)	(Scciii)	(Cc)	(ppb) (ic)	Limit = 0.95-1.05

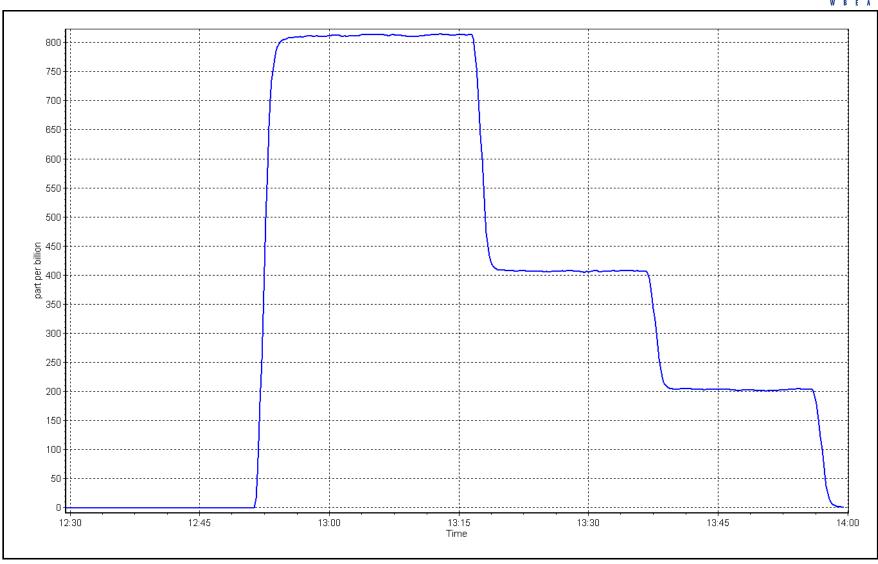
Calibrator zero High point Mid point Low point As left zero As left span

Average Correction Factor:	
----------------------------	--

Notes: Removal Calibration.

Calibration Performed By: Mohammed Kashif

SO2 Calibration Plot Date: April 4, 2024





# H<sub>2</sub>S Calibration Report

Version-11-2021

**Station Information** 

Station Name: Blackgold Calibration Date:

Start time (MST): 8:14 Reason:

March 28, 2024

Routine

Station number: AMS511

Last Cal Date: February 8, 2024

End time (MST): 12:11

**Calibration Standards** 

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.139 ppm

ppm

Cal Gas Cylinder #: CC511397

Removed Cal Gas Conc: 5.139 Removed Gas Cyl #: NA Calibrator Make/Model: API T700

ZAG Make/Model: **API T701** 

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 2445 Serial Number: 138

**Analyzer Information** 

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090 Global G150 Converter serial #: 2022-227 Converter make:

0 - 100 ppb Analyzer Range

**Finish Start** <u>Finish</u> <u>Start</u> 0.998919 0.999918 Backgd or Offset: Calibration slope: 3.49 3.48 Calibration intercept: 0.140727 0.180786 Coeff or Slope: 1.189 1.189

H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4922	77.8	80.0	80.3	0.997
as found 2nd point	4961	38.9	40.0	40.2	0.997
as found 3rd point	4981	19.5	20.0	20.3	0.992
new cylinder response					

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4922	77.8	80.0	80.1	0.998
second point	4961	38.9	40.0	40.3	0.992
third point	4981	19.5	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.3	
as left span	4922	77.9	80.0	80.1	0.999
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber chang	ge:	<u> </u>	_	Ave Corr Factor	0.996
				,	cc

Date of last scrubber change:				Ave Corr Factor	0.996
Date of last converter efficier	ncy test:			eff	ficiency
Baseline Corr As found:	80.2	Prev response:	80.02	*% change:	0.2%

Baseline Corr 2nd AF pt: 40.1 AF Slope: 1.002494 Baseline Corr 3rd AF pt: 20.2 AF Correlation: 0.999998

\* = > +/-5% change initiates investigation

0.140643

AF Intercept:

Notes:

Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. No adjustments made.

Calibration Performed By: Mohammed Kashif



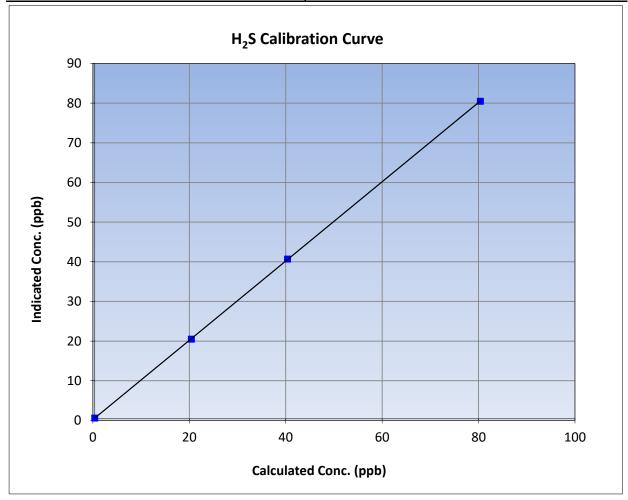
# H<sub>2</sub>S Calibration Summary

Version-11-2021

# **Station Information**

Calibration Date: March 28, 2024 **Previous Calibration:** February 8, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:14 End Time (MST): 12:11 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090

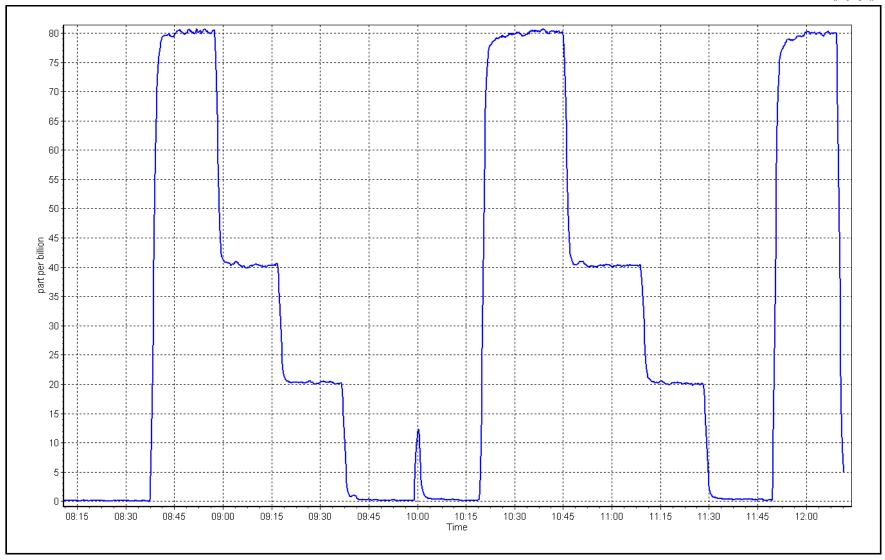
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999990	≥0.995		
80.0	80.1	0.9983	Correlation Coefficient	0.555550	20.993		
40.0	40.3	0.9921	Slope	0.999918	0.90 - 1.10		
20.0	20.1	0.9970	Slope	0.555516	0.90 - 1.10		
			- Intercept	0.180786	+/-3		



H<sub>2</sub>S Calibration Plot

Date: March 28, 2024







# Wood Buffalo Environmental Association H<sub>2</sub>S Calibration Report

### **Station Information**

Station Name:BlackgoldStation number:AMS 511Calibration Date:April 4, 2024Last Cal Date:March 28, 2024Start time (MST):10:32End time (MST):12:31Reason:Removal

### **Calibration Standards**

Cal Gas Concentration: 5.14 ppm Cal Gas Exp Date: January 3, 2026

Cal Gas Cylinder #: CC511397

Removed Cal Gas Conc: 5.14 ppm Rem Gas Exp Date: NA

Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 2445 ZAG Make/Model: API T701 Serial Number: 138

### **Analyzer Information**

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090 Converter make: Global G150 Converter serial #: 2022-227

Analyzer Range 0 - 100 ppb Converter Temp: 325 degC

<u>Start</u> **Finish Start Finish** Calibration slope: Backgd or Offset: 0.999918 NA 3.5 NA Calibration intercept: 0.180786 NA Coeff or Slope: 1.189 NA

### H<sub>2</sub>S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
As found zero	5000	0.0	0.0	0.1	
As found High point	4922	77.8	80.0	80.8	0.991
As found Mid point	4961	38.9	40.0	40.6	0.987
As found Low point	4981	19.5	20.0	20.3	0.992
New cylinder response					
Baseline Corr As found:	80.7	Prev response:	80.14	*% change:	0.7%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.009496	AF Intercept:	0.120568
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999995	* = > +/-5% change initiate	es investigation

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
			( /		

Calibrator zero

High point

Mid point

Low point

As left zero

As left span

SO2 Scrubber Check

Date of last scrubber change:

Notes:

Date of last converter efficiency test:

Removal Calibartion. Ran SO2 scrubber check after as found span and it passed.

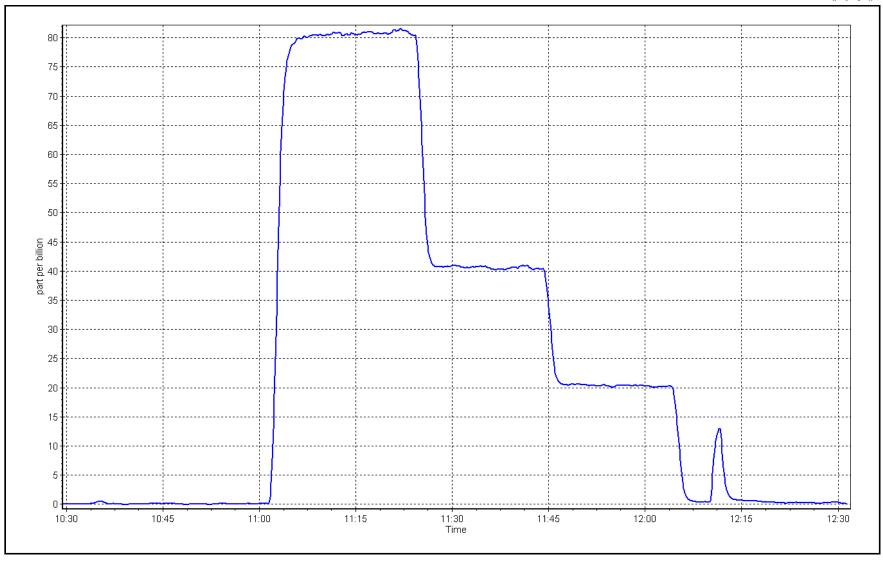
Calibration Performed By: Mohammed Kashif

Ave Corr Factor

H<sub>2</sub>S Calibration Plot

Date: April 4, 2024







# **THC Calibration Report**

Version-01-2020

### **Station Information**

Station Name: Blackgold

Calibration Date: March 21, 2024

Start time (MST): 8:12

Reason: Routine

Station number: AMS511

Last Cal Date: February 21, 2024

End time (MST): 11:16

Removed Gas Expiry: NA

**Calibration Standards** 

Gas Cert Reference: CC147416 Cal Gas Expiry Date: January 5, 2029

CH4 Cal Gas Conc. 498.90 ppm CH4 Equiv Conc. 1070.90 ppm

C3H8 Cal Gas Conc. <u>208.00</u> ppm

Removed Gas Cert: NA

Removed CH4 Conc. 498.90 ppm CH4 Equiv Conc. 1070.90 ppm

Removed C3H8 Conc. <u>208.00</u> ppm Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 2445 ZAG Make/Model: Teledyne API 701 Serial Number: 138

**Analyzer Information** 

Analyzer make: Thermo 51i-LT Analyzer serial #: 1317958295

Analyzer Range: 0 - 20 ppm

Start Finish Finish <u>Start</u> Background: Calibration slope: 0.982206 1.001619 0.89 0.89 -0.016488 -0.026162 Coefficient: Calibration intercept: 0.567 0.567

**THC Calibration Data** 

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentratio (ppm) (Cc)	n Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.07	
as found span	4920	79.9	17.11	17.20	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.07	
high point	4920	79.9	17.11	17.18	0.996
second point	4960	40.0	8.57	8.47	1.012
third point	4980	20.0	4.28	4.20	1.021
as left zero	5000	0.0	0.00	0.06	
as left span	4926	80.0	17.11	17.23	0.993
			Av	erage Correction Factor	1.010
Baseline Corr As found:	17.13	Previous response	16.79	*% change	2.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes: Changed the sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Mohammed Kashif

\* = > +/-5% change initiates investigation



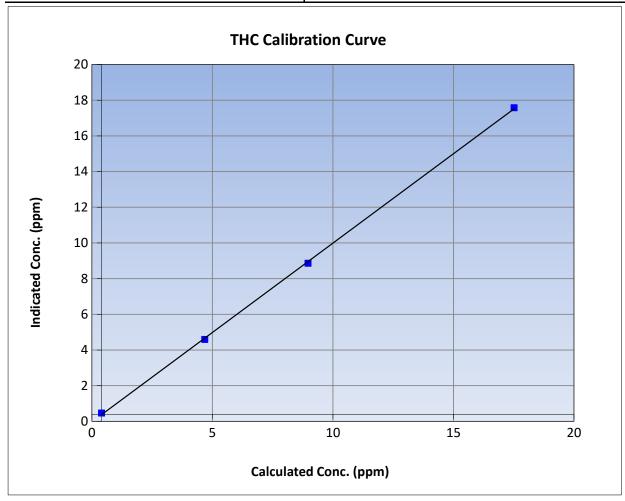
# **THC Calibration Summary**

Version-01-2020

# **Station Information**

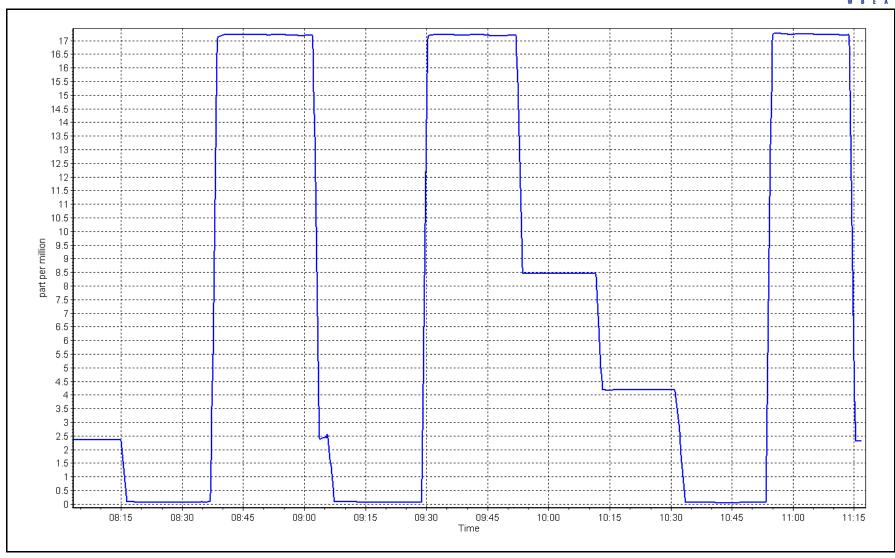
March 21, 2024 **Previous Calibration:** Calibration Date: February 21, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:12 End Time (MST): 11:16 Analyzer make: Thermo 51i-LT Analyzer serial #: 1317958295

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.00	0.07		Correlation Coefficient	0.999843	≥0.995				
17.11	17.18	0.9964	Correlation Coefficient	0.333643	20.333				
8.57	8.47	1.0118	Slope	1.001619	0.90 - 1.10				
4.28	4.20	1.0209	Slope	1.001019	0.90 - 1.10				
			- Intercept	-0.026162	+/-1.5				



THC Calibration Plot Date: March 21, 2024 Location: Blackgold







# **Wood Buffalo Environmental Association THC Calibration Report**

# **Station Information**

Blackgold Station number: Station Name: AMS 511 Calibration Date: April 4, 2024 Last Cal Date: March 21, 2024 12:31 Start time (MST): End time (MST): 13:59

Removal Reason:

# **Calibration Standards**

Gas Cert Reference: CC147416 Cal Gas Expiry Date: January 5, 2029 CH4 Equiv Conc. CH4 Cal Gas Conc. 498.9 ppm 1070.9 ppm

C3H8 Cal Gas Conc. 208.0 ppm

Removed Gas Expiry: NA Removed Gas Cert: NA

Removed CH4 Conc. 498.9 CH4 Equiv Conc. 1070.9 ppm ppm

Diff between cyl: Removed C3H8 Conc. 208.0 ppm

Calibrator Make/Model: Teledyne API T700 Serial Number: 2445 ZAG Make/Model: Teledyne API 701 Serial Number: 138

### **Analyzer Information**

Analyzer make: Thermo 51i-LT Analyzer serial #: 1317958295

Analyzer Range: 0 - 20 ppm

Start Finish Start **Finish** Calibration slope: 1.001619 NA Background: 0.890 NA Calibration intercept: -0.026162 NA Coefficient: 0.567 NA

### **THC As Found Data**

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/(Ic- AFzero) Limit = 0.90-1.10
As found zero	5000	0.0	0.00	0.08	
As found High point	4920	79.9	17.11	17.17	1.001
As found Mid point	4960	40.0	8.57	8.43	1.025
As found Low point	4980	20.0	4.28	4.17	1.045
New cylinder response					
Baseline Corr As found:	17.10	Previous response	17.11	*% change	-0.1%
Baseline Corr 2nd AF pt:	8.36	AF Slope:	1.001424	AF Intercept:	-0.037948
Baseline Corr 3rd AF pt:	4.10	AF Correlation:	0.999774	* = > +/-5% change initia	tes investigation

### **THC Calibration Data**

Set Point	Dilution air flow rate	Source gas flow rate	Calculated Concentration	Indicated Concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (Ic)	Limit = 0.95-1.05

Calibrator zero High point Mid point Low point As left zero

As left span

**Average Correction Factor** 

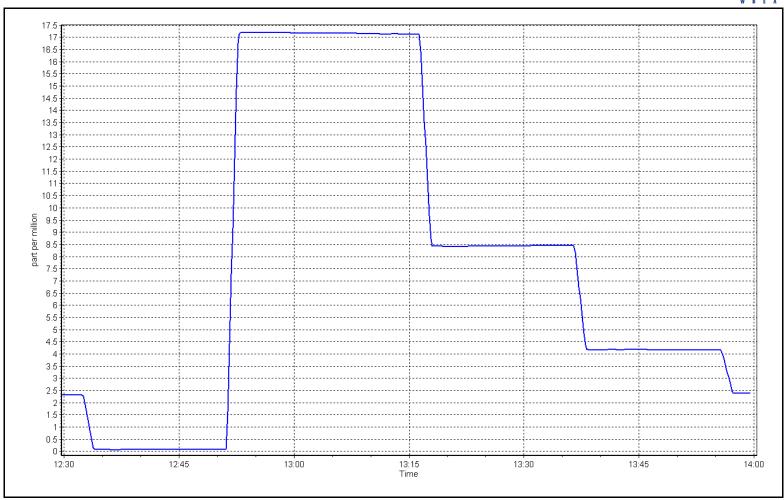
Removal Calibration. Notes:

Calibration Performed By: Mohammed Kashif Raseline Adjusted

**THC Calibration Plot** 

Date: April 4, 2024







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

### **Station Information**

Station Name: Blackgold Station number: AMS511

Calibration Date: March 20, 2024 Last Cal Date: February 23, 2024 Start time (MST): 8:47 End time (MST): 13:20

Start time (MST): 8:47
Reason: Routine

### **Calibration Standards**

NO Gas Cylinder #: T0F8P52 Cal Gas Expiry Date: August 16, 2026

NOX Cal Gas Conc: 47.43 ppm NO Cal Gas Conc: 47.43 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.43 ppm Removed Gas NO Conc: 47.43 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2445 ZAG make/model: Teledyne API T701 Serial Number: 138

# **Analyzer Information**

Analyzer make: Teledyne API T200 Analyzer serial #: 7029

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.041	1.041	NO bkgnd or offset:	0.2	0.2
NOX coeff or slope:	1.038	1.038	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.2	4.2

### **Calibration Statistics**

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope:	1.016612	1.015442
NO <sub>x</sub> Cal Offset:	0.426960	0.386974
NO Cal Slope:	1.015955	1.015028
NO Cal Offset:	-0.193015	0.006993
NO <sub>2</sub> Cal Slope:	1.002724	1.000776
NO <sub>2</sub> Cal Offset:	0.288096	0.123095



# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

Version-04-2020

				Dilı	ution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow co	alculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4916	84.4	800.6	800.6	0.0	810.9	809.5	1.6	0.9872	0.9889
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0		
high point	4916	84.4	800.6	800.6	0.0	813.0	812.5	0.6	0.9847	0.9853
second point	4958	42.2	400.3	400.3	0.0	407.4	406.5	1.0	0.9826	0.9848
third point	4979	21.1	200.2	200.2	0.0	203.8	203.2	0.6	0.9821	0.9850
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4916	84.4	800.6	399.9	400.7	807.6	410.6	396.8	0.9913	0.9738
							Average C	Correction Factor	0.9831	0.9850
Corrected As fo	ound NO <sub>X</sub> =	811.0 ppb	NO =	809.6 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO <sub>x</sub> =	-0.4%
Previous Respo	onse NO <sub>X</sub> =	814.3 ppb	NO =	813.1 ppb				*Percent Chang	ge NO =	-0.4%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$ :		Nx SI:	Nx Int:	
Baseline Corr 3	3rd pt NO <sub>X</sub> =	NA ppb	NO =	NA ppb	As found	$1   NO r^2$ :		NO SI:	NO Int:	
					As found	$NO_2 r^2$ :		NO2 SI:	NO <sub>2</sub> Int:	
				e	GPT Calibration [	Data				
O3 Setpo	oint (ppb)	Indicated NO Referen		icated NO Drop centration (ppb)	Calculated NO concentration (ppt		dicated NO2 atration (ppb) (Ic)	NO2 Correction factorized Calibration Limit = As Found Limit = C	0.95-1.05 Calibratio	erter Efficiency on Limit = 96-104%
as found	d GPT zero									
as found GPT po	oint (400 ppb NO2)									
as found GPT po	oint (200 ppb NO2)		<u> </u>							
as found GPT po	oint (100 ppb NO2)									
1st GPT point	it (400 ppb O3)	809.3		408.6	400.7		401.2	0.9988	3 :	100.1%
2nd GPT noin	nt (200 ppb O3)	809.3		638.7	170.6		170.5	1.0006		99.9%
2.10 C po	· <u></u>									
•	nt (100 ppb O3)	809.3		726.4	82.9		83.5	0.9928	3	100.7%

Notes:

Changed the sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Mohammed Kashif



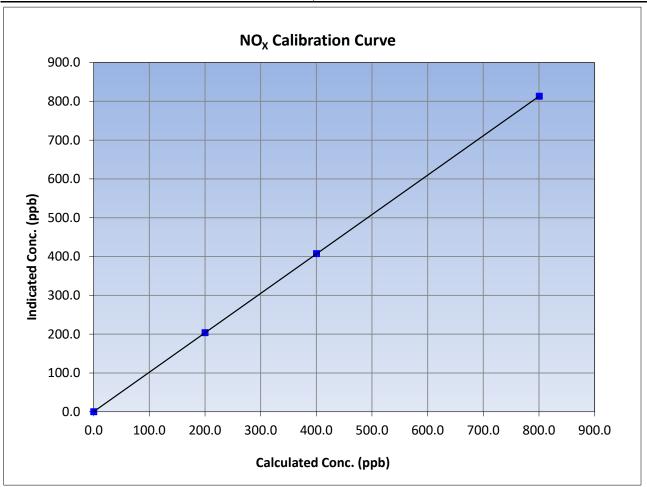
# NO<sub>x</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 23, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:47 End Time (MST): 13:20 Analyzer serial #: Analyzer make: Teledyne API T200 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999998	≥0.995
800.6	813.0	0.9847	Correlation Coefficient	0.333336	20.333
400.3	407.4	0.9826	Slope	1.015442	0.90 - 1.10
200.2	203.8	0.9821	Slope	1.015442	0.90 - 1.10
			Intercept	0.386974	+/-20





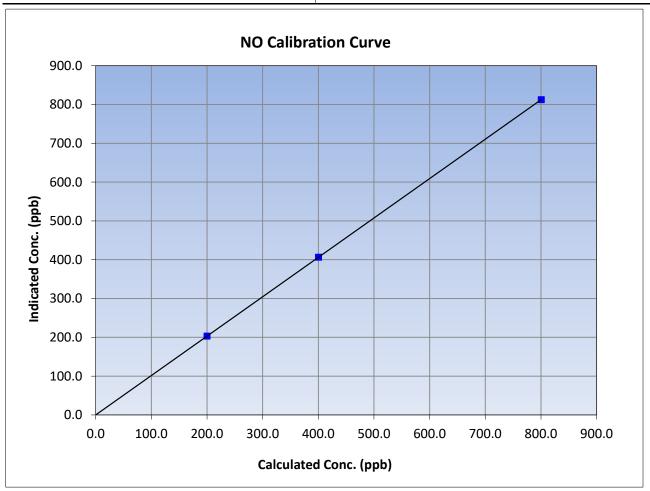
# **NO Calibration Summary**

Version-04-2020

### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 23, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:47 End Time (MST): 13:20 Analyzer make: Teledyne API T200 Analyzer serial #: 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	1.000000	≥0.995
800.6	812.5	0.9853	Correlation Coefficient	1.000000	20.333
400.3	406.5	0.9848	Slope	1.015028	0.90 - 1.10
200.2	203.2	0.9850	Slope	1.013028	0.90 - 1.10
			Intercept	0.006993	+/-20





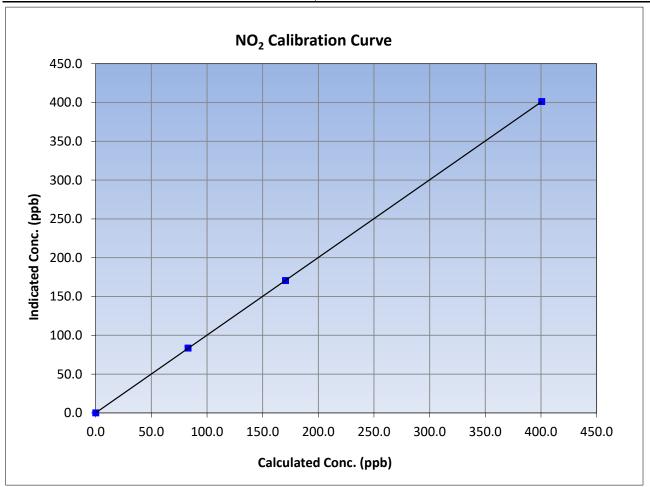
# NO<sub>2</sub> Calibration Summary

Version-04-2020

### **Station Information**

Calibration Date: March 20, 2024 Previous Calibration: February 23, 2024 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 8:47 End Time (MST): 13:20 Analyzer serial #: Analyzer make: Teledyne API T200 7029

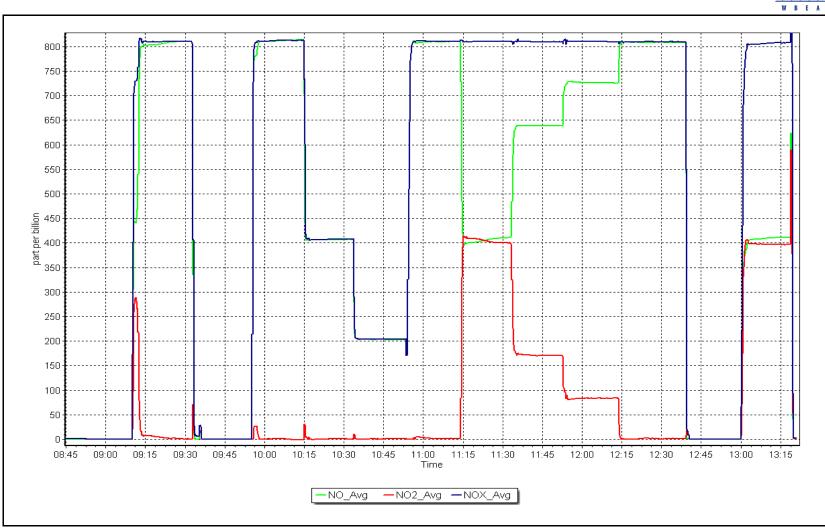
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
400.7	401.2	0.9988	Correlation Coefficient	0.999990	20.333
170.6	170.5	1.0006	Slope	1.000776	0.90 - 1.10
82.9	83.5	0.9928	Slope	1.000770	0.90 - 1.10
			Intercept	0.123095	+/-20



NO<sub>x</sub> Calibration Plot

Date: March 20, 2024







# NO<sub>X</sub> \ NO \ NO<sub>2</sub> Calibration Report

### **Station Information**

Blackgold Station Name: AMS 511 Station number: Calibration Date: April 5, 2024 Last Cal Date: March 20, 2024

Start time (MST): 10:55 End time (MST): 14:16 Reason: Removal

### **Calibration Standards**

T0F8P52 NO Gas Cylinder #: Cal Gas Expiry Date: August 16, 2026 NOX Cal Gas Conc: 47.43 NO Cal Gas Conc: 47.43 ppm ppm Removed Gas Exp Date: NA

Removed Cylinder #: NA

Removed Gas NO Conc: 47.43 ppm Removed Gas NOX Conc: 47.43 ppm

NO gas Diff:

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2445 ZAG make/model: Teledyne API T701 Serial Number: 138

### **As Found Dilution Calibration Data**

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) Limit = 0.90 - 1.10	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) Limit = 0.90 - 1.10
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
AF High point	4916	84.4	800.6	800.6	0.0	812.7	809.4	3.4	0.9851	0.9889
AF Mid point	4958	42.2	400.3	400.3	0.0	407.3	404.7	2.6	0.9828	0.9889
AF Low point	4979	21.1	200.2	200.2	0.0	203.2	201.7	1.5	0.9850	0.9918
New cyl resp										
Previous Respo	onse NO <sub>X</sub> =	813.3 ppb	NO = 812.6	ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chan	ge NO <sub>x</sub> =	-0.1%
Baseline Corr 1	Lst pt $NO_X =$	812.7 ppb	NO = 809.5	ppb	As Four	nd Statistics		*Percent Chan	ge NO =	-0.4%
Baseline Corr 2	2nd pt $NO_X =$	407.3 ppb	NO = 404.8	ppb	As foun	d $NO_X r^2$ :	0.999998	Nx SI: 1.0152	.99 Nx Int:	0.187
Baseline Corr 3	Brd pt $NO_X =$	203.2 ppb	NO = 201.8	ppb	As foun	d NO r <sup>2</sup> :	0.999999	NO SI: 1.0114	NO Int:	-0.333
					As foun	d $NO_2 r^2$ :	0.999985	NO2 SI: 1.0000	NO <sub>2</sub> Int:	0.838

### **As Found GPT Calibration Data**

Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) Limit = 0.90 - 1.10	Converter Efficiency  Limit = 96-104%
		0.0	0.1		
809.6	411.4	398.2	398.7	0.9987	100.1%
809.6 809.6	641.9 727.8	167.7 81.8	169.2 83.1	0.9911 0.9844	100.9% 101.6%
	concentration (ppb) 809.6	concentration (ppb) concentration (ppb) 809.6 411.4 809.6 641.9	concentration (ppb)         concentration (ppb)         concentration (ppb) (Cc)            0.0           809.6         411.4         398.2           809.6         641.9         167.7	concentration (ppb)         concentration (ppb)         concentration (ppb) (Cc)         concentration (ppb) (Ic)            0.0         0.1           809.6         411.4         398.2         398.7           809.6         641.9         167.7         169.2	Indicated NO Reference concentration (ppb)



# $NO_X \setminus NO \setminus NO_2$ Calibration Report

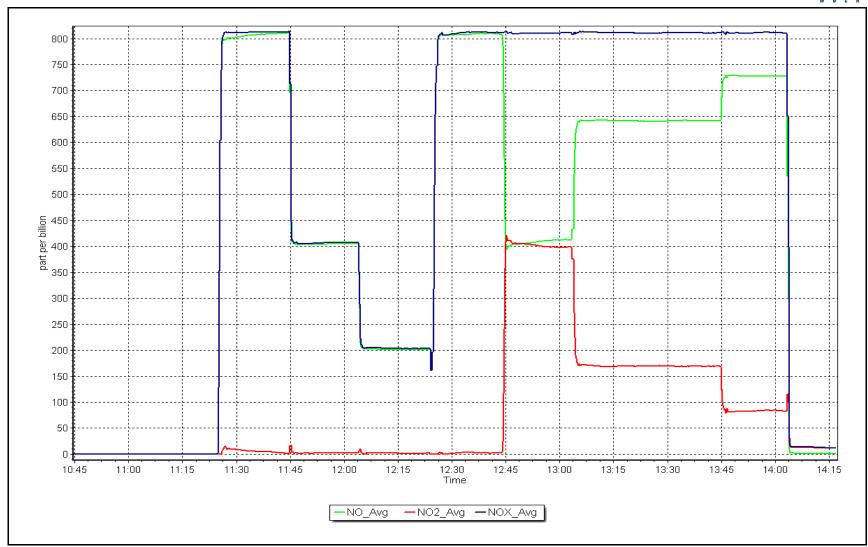
Analyzer Informati	<u>ion</u>					Calibra	ation Statistic	<u>:s</u>	
Analyzer Make: NOX Range (ppb):	Teledyne API T200 0 - 1000 ppb		Number: 70	29			l Slope: l Offset:	<u>Start</u> 1.015442 0.386974	<u>Finish</u>
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	NO Cal	Slope:	1.015028	
NO coeff or slope:	1.041		bkgnd or offset:	0.2	NA	NO Cal		0.006993	
NOX coeff or slope:	1.038		bkgnd or offset:	0.4	NA		l Slope:	1.000776	
NO2 coeff or slope:	1.000	NA Read	tion cell Press:	4.2	NA	NO <sub>2</sub> Ca	l Offset:	0.123095	
			<u>Dil</u>	ution Calibrat	ion Data				
Set Point	on flow rate Source gas s sccm) rate (sccr	concentration	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)  Limit = 0.95-1.05
Cal zero High point Mid point Low point As left zero As left span						Average C	orrection Facto	r	
O3 Setpoint (ppl	n)		icated NO Drop centration (ppb)	Calculated N concentration (p	O2 In	dicated NO2 ntration (ppb) (Ic)	NO2 Correction f.		verter Efficiency mit = 96-104%
Cal zero High GPT point Mid GPT point Low GPT point					Average Co	orrection Factor		I	
Notes:				Rer	noval Calibratio	n.			
Calibration Per	formed By:	Mohammed	Kashif						

NO<sub>X</sub> Calibration Plot

Date:

April 5, 2024





# W B E A

# **Wood Buffalo Environmental Association**

# **Wind Speed/Direction Calibration Report**

Version-10-2022

**Station Information** 

Station Name: Black gold Station Number: AMS 511

Calibration Date: April 8, 2024 Prev Cal Date: September 28, 2023

Start Time (MST): 11:15 End Time (MST): 11:33

Tower Height (m): 10.0 Reason: Removal

**Wind Speed Information** 

Sensor make/model: Met One 010C-1 Serial Number: B10017 WS Calibrator: MetOne 053 Serial Number: P15103

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.1 -0.3% 400 39.4 39.4 0.1% 600 58.6 58.7 0.2% 800 77.8 77.8 0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999999	≥0.9995
Calculated slope		0.998137	0.90 - 1.10
Calculated intercept		0.028665	+/- 2

### **Wind Direction Information**

Sensor make/model: Met One 020C-1 Serial Number: D13603

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): NA Solar noon time (MST): 13:21 Calc Declination\*: 13.8 Degrees

Deadband calc: -2.7 degrees (Limit 4 deg) \*- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%	
0	0.1		
90	89.4	-0.2%	
180	179.4	-0.2%	
270	271.8	0.5%	
358	359.8	0.5%	

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r <sup>2</sup> )		0.999984	≥0.9995
Calculated slope		0.993497	0.90 - 1.10
Calculated intercept		0.693651	+/- 4

Notes: Removal calibration.

Calibration Performed By: Mohammed Kashif and Devin Russel



# End of Report