

Unit 3 - 805 Memorial Drive Fort McMurray, AB T9K 0K4 P: 780,799,4420 E: info@wbea,org wbea.org

Wood Buffalo Environmental Association

MARCH 2023 MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING
April 29, 2023

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 2023

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

April 29, 2023



Calibration slope:

Calibration intercept:

Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date:

Start time (MST): 15:30 Reason:

March 13, 2023

Routine

Station number: AMS01

February 1, 2023 Last Cal Date: End time (MST):

18:20

Calibration Standards

Cal Gas Concentration: 49.19

Cal Gas Cylinder #: CC486642

Removed Cal Gas Conc: 49.19

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: 3565

Serial Number: 5609

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

ppm

0.998801 -0.333078

1.000943 -0.132808 Backgd or Offset:

Start 19.0

Finish 19.4 0.897

Coeff or Slope: 0.891

SO₂ 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	5000	0.0	0.0	0.2	
as found span	4918	81.3	799.9	795.0	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4918	81.3	799.9	801.2	0.998
second point	4959	40.7	400.4	399.2	1.003
third point	4979	20.3	199.7	200.2	0.998
as left zero	5000	0.0	0.0	0.3	
as left span	4918	81.3	799.9	800.3	1.000
			Averag	ge Correction Factor	1.000
	_	•			_

Baseline Corr As found: 794.80 Previous response 798.65 -0.5% *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

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

Calibration Performed By: Rene Chamberland * = > +/-5% change initiates investigation



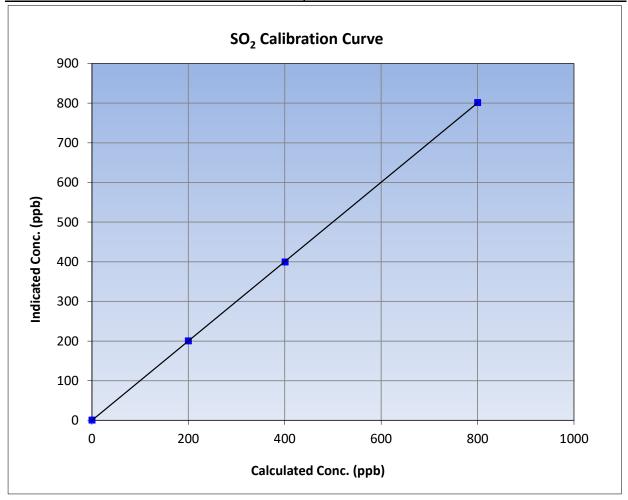
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 15:30 End Time (MST): 18:20 Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

	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			
799.9	801.2	0.9984	Correlation coefficient	0.333332	20.333			
400.4	399.2	1.0031	Slope	1.000943	0.90 - 1.10			
199.7	200.2	0.9977	Slope	1.000343	0.90 - 1.10			
			- Intercept	-0.132808	+/-30			

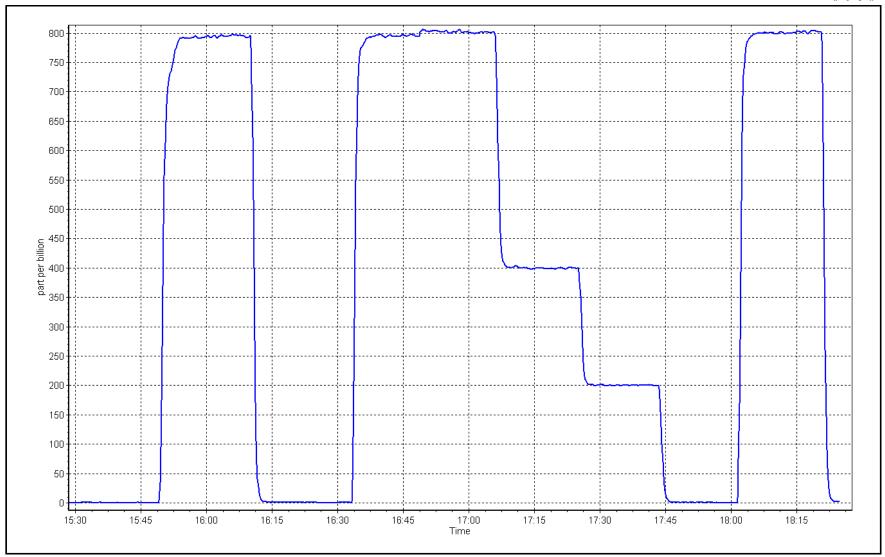


SO2 Calibration Plot

Date:

March 13, 2023







TRS Calibration Report

Station number:

AMS01

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 13, 2023 Last Cal Date: February 13, 2023

Start time (MST): 9:58 End time (MST): 15:33

Reason: Routine

Calibration Standards

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

Cal Gas Cylinder #: CC511749

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

Calibrator Make/Model: Teledyne API T700 Serial Number: 3565
ZAG Make/Model: Teledyne API T701 Serial Number: 5609

Analyzer Information

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

Converter make: CD Nova Converter serial #: 470

Analyzer Range 0 - 100 ppb

Notes:

Start Finish Start Finish
Calibration slope: 0.995507 1.000364 Backgd or Offset: 2.30 2.27

Calibration intercept: 0.995507 1.000364 Backgo of Offset: 2.30 2.27
Calibration intercept: 0.059999 0.439997 Coeff or Slope: 0.919 0.919

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	79.0	1.013
as found 2nd point	4960	39.2	40.0	39.5	1.013
as found 3rd point	4980	19.6	20.0	19.9	1.005
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	80.3	0.996
second point	4960	39.2	40.0	40.7	0.983
third point	4980	19.6	20.0	20.6	0.971
as left zero	5000	0.0	0.0	1.0	
as left span	4921	78.4	80.0	79.4	1.007
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chan	ge:	December 17, 2021		Ave Corr Factor	0.983

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	0.983
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 79.0 79.69 Prev response: *% change: -0.9% 0.060001 Baseline Corr 2nd AF pt: 39.5 AF Slope: 0.986934 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999995 19.9 * = > +/-5% change initiates investigation

Inlet filter change and scrubber check completed after as founds. No adjustments made.

Calibration Performed By: Rene Chamberland



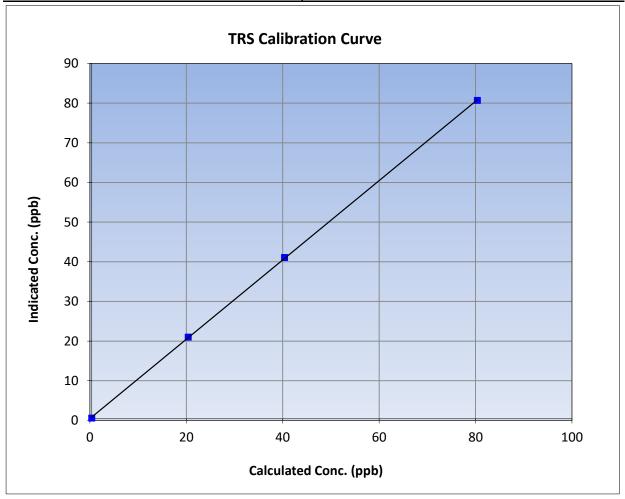
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 13, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:58 End Time (MST): 15:33 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

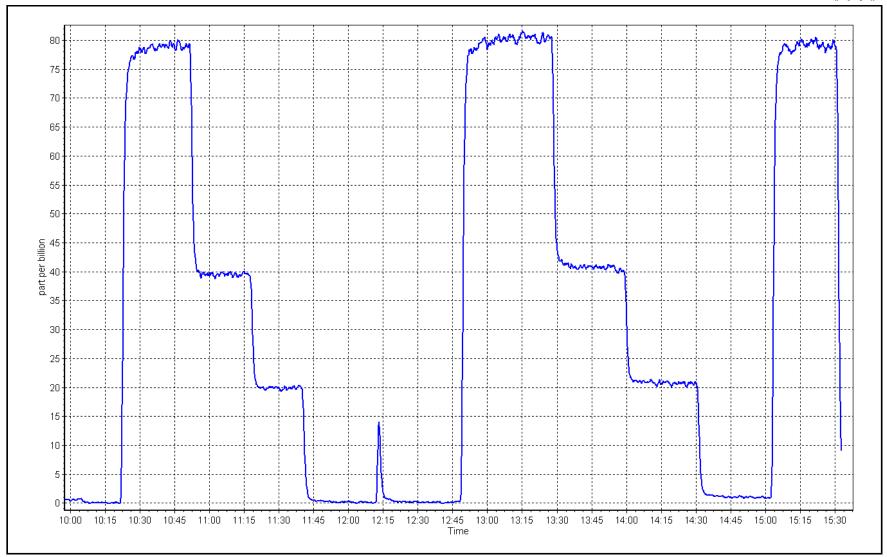
	Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.2		Correlation Coefficient	0.999952	≥0.995			
80.0	80.3	0.9962	Correlation Coefficient	0.999932	20.995			
40.0	40.7	0.9828	Slope	1.000364	0.90 - 1.10			
20.0	20.6	0.9708	Slope	1.000304	0.90 - 1.10			
			- Intercept	0.439997	+/-3			





Date: March 13, 2023







H₂S Calibration Report

Station number:

AMS01

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 13, 2023 Last Cal Date: February 13, 2023

Start time (MST): 9:58 End time (MST): 15:33

Reason: Routine

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: 5609

Analyzer Information

Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

Converter make: Thermo Converter Converter serial #: N/A

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> 0.996946 0.996518 Backgd or Offset: Calibration slope: 1.95 1.94 0.401597 Calibration intercept: 0.361624 Coeff or Slope: 1.014 1.014

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	0.1	
as found span	4921	78.4	80.0	79.7	1.005
as found 2nd point	4960	39.2	40.0	40.3	0.995
as found 3rd point	4980	19.6	20.0	20.3	0.990
new cylinder response					

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	5000	0.0	0.0	0.4	
high point	4921	78.4	80.0	80.1	0.999
second point	4961	39.2	40.0	40.3	0.992
third point	4980	19.6	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.6	
as left span	4921	78.4	80.0	79.1	1.011
SO2 Scrubber Check	4919	81.3	813.0	-0.2	
Date of last scrubber chan	ge:	March 21, 2022	•	Ave Corr Factor	0.992
Date of last converter effic	ciency test:	<u> </u>	<u> </u>	·	efficiency

Date of last scrubber change	2:	March 21, 2022		Ave Corr Factor	0.992
Date of last converter efficie	ency test:			ef	ficiency
Baseline Corr As found:	79.6	Prev response:	80.09	*% change:	-0.6%

0.299997 Baseline Corr 2nd AF pt: 40.2 AF Slope: 0.994559 AF Intercept: Baseline Corr 3rd AF pt: 0.999964 20.2 AF Correlation: * = > +/-5% change initiates investigation

Inlet filter change and scrubber check completed after as founds. No adjustments made.

Calibration Performed By: Rene Chamberland

Notes:



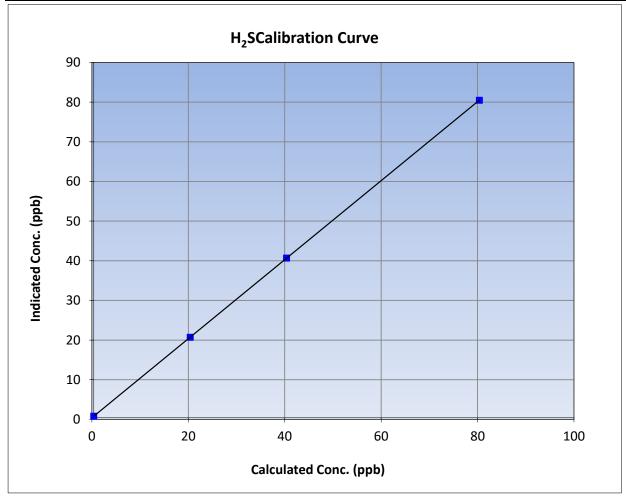
H₂S Calibration Summary

Version-11-2021

Station Information

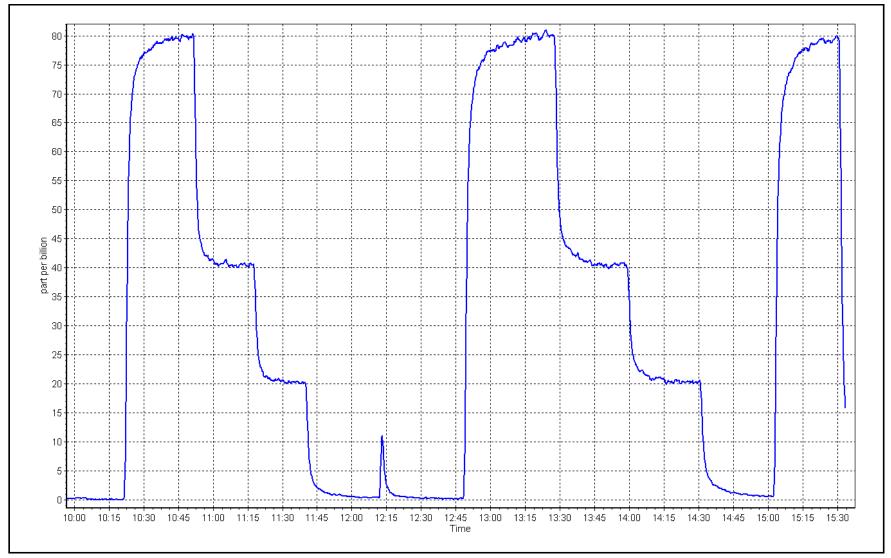
Calibration Date: March 13, 2023 **Previous Calibration:** February 13, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:58 End Time (MST): 15:33 Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

	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	0.999999	≥0.995			
80.0	80.1	0.9987	Correlation Coefficient	0.55555	20.993			
40.0	40.3	0.9923	Slope	0.996518	0.90 - 1.10			
20.0	20.3	0.9851	Slope	0.990318	0.90 - 1.10			
			- Intercept	0.401597	+/-3			



Date: March 13, 2023 Loca







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 13, 2023

Start time (MST): 15:30

Reason: Routine

CH4 Cal Gas Conc.

Removed CH4 Conc.

Diff between cyl (CH₄):

Baseline Corr 3rd AF:

Station number: AMS01

Last Cal Date: February 1, 2023

End time (MST): 18:20

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025 CC486642

> CH4 Equiv Conc. 1063.1 ppm

C3H8 Cal Gas Conc. 205.6 ppm

Removed Gas Cert: NA

497.7

497.7

NA

Removed Gas Expiry: NA ppm CH4 Equiv Conc. 1063.1 ppm

Removed C3H8 Conc. 205.6 Diff between cyl (THC): ppm

Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 5609

ppm

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

Start Finish Start Finish CH4 SP Ratio: 2.52E-04 2.64E-04 NMHC SP Ratio: 5.06E-05 5.52E-05

CH4 Retention time: 14.4 14.4 NMHC Peak Area: 181561 166551

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	17.29	16.20	1.067
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	17.29	17.32	0.998
second point	4959	40.7	8.65	8.62	1.004
third point	4980	20.3	4.32	4.32	0.998
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.29	17.35	0.997
			,	Average Correction Factor	1.000
Baseline Corr AF:	16.20	Prev response	17.19	*% change	-6.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:



THC / CH₄ / NMHC Calibration Report

Version-01-2020

					VC151011 01 20
		NINALIC Callibra	ation Date		
C. I. D. J. I.	Dilata (la contra	NMHC Calibr		1. 1 / / / / /	05.11.11.0.05.4.0
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0	0.00	0.00	4.007
as found span	4918	81.3	9.19	8.46	1.087
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
nigh point	4918	81.3	9.19	9.22	0.998
second point	4959	40.7	4.60	4.60	1.000
hird point	4980	20.3	2.30	2.31	0.993
as left zero	5000	0	0.00	0.00	
as left span	4918	81.3	9.19	9.24	0.996
			Ave	rage Correction Factor	0.997
Baseline Corr AF:	8.46	Prev response	9.14	*% change	-8.0%
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> .
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	7.74	1.046
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	8.11	0.998
second point	4959	40.7	4.05	4.02	1.009
third point	4980	20.3	2.02	2.01	1.004
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	8.09	8.11	0.998
20 1010 00011	1310	01.0		rage Correction Factor	1.004
Baseline Corr AF:	7.74	Prev response	8.05	*% change	-4.1%
Baseline Corr 2nd AF:	NA	AF Slope:	0.03	AF Intercept:	7.170
Baseline Corr 3rd AF:	NA NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Jasellile Coll Stu Al .	IVA		Chatiatian	- 17 570 change initiae	es investigation
		Calibration	Statistics		
T110 0 101		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.995861		1.001736	
THC Cal Offset:		-0.022506		-0.010696	
CH4 Cal Slope:		0.996625		1.001692	
CH4 Cal Offset:		-0.014967		-0.013161	
NMHC Cal Slope:		0.994978		1.001763	
				0.00005	

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

-0.007938

Calibration Performed By: Rene Chamberland

NMHC Cal Offset:

0.002265



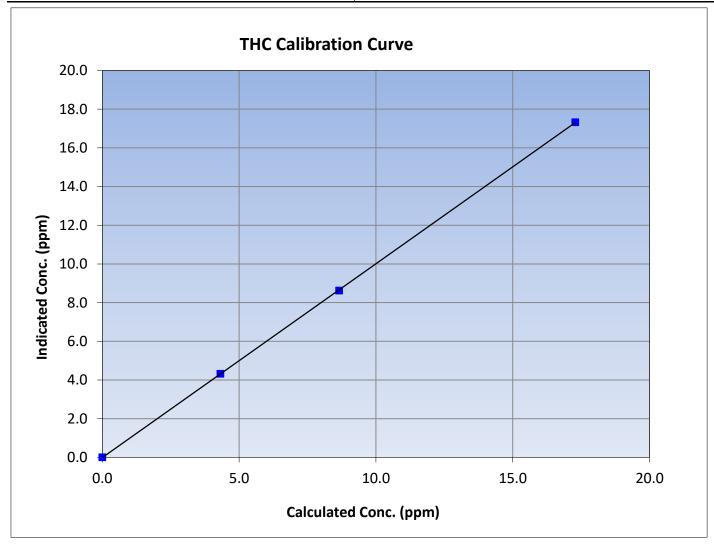
THC Calibration Summary

Version-01-2020

Station Information

March 13, 2023 **Previous Calibration:** Calibration Date: February 1, 2023 Station Name: Station Number: AMS01 Bertha Ganter-Fort McKay Start Time (MST): 15:30 End Time (MST): 18:20 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	0.999988	≥0.995	
17.29	17.32	0.9979	Correlation Coefficient	0.333366	20.333	
8.65	8.62	1.0039	Slope	1.001736	0.90 - 1.10	
4.32	4.32	0.9982	Slope	1.001/30	0.90 - 1.10	
			Intercept	-0.010696	+/-0.5	





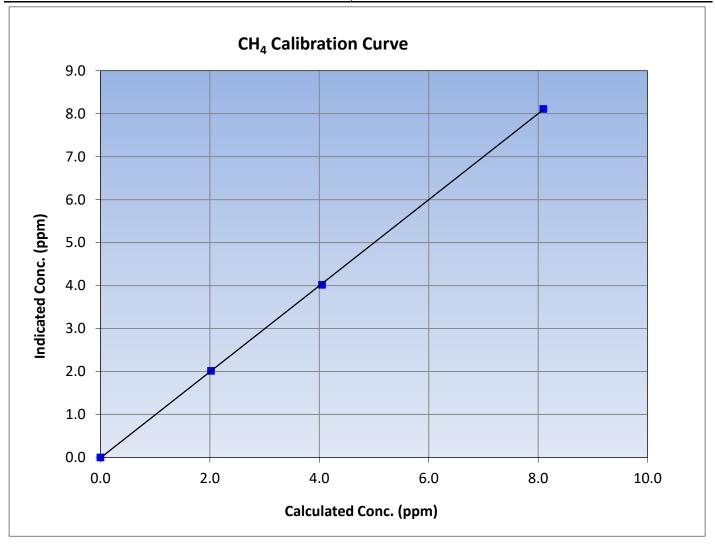
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 15:30 End Time (MST): 18:20 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	0.999968	≥0.995	
8.09	8.11	0.9982	Correlation Coemicient	0.999900	20.333	
4.05	4.02	1.0085	Slope	1.001692	0.90 - 1.10	
2.02	2.01	1.0043	Slope	1.001092	0.90 - 1.10	
			Intercept	-0.013161	+/-0.5	





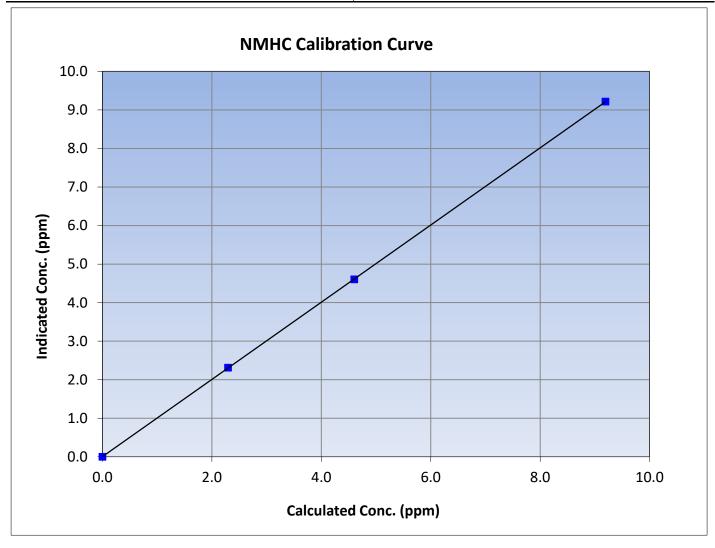
NMHC Calibration Summary

Version-01-2020

Station Information

March 13, 2023 **Previous Calibration:** Calibration Date: February 1, 2023 Station Name: AMS01 Bertha Ganter-Fort McKay Station Number: Start Time (MST): 15:30 End Time (MST): 18:20 Analyzer make: Thermo 55i Analyzer serial #: 1180320040

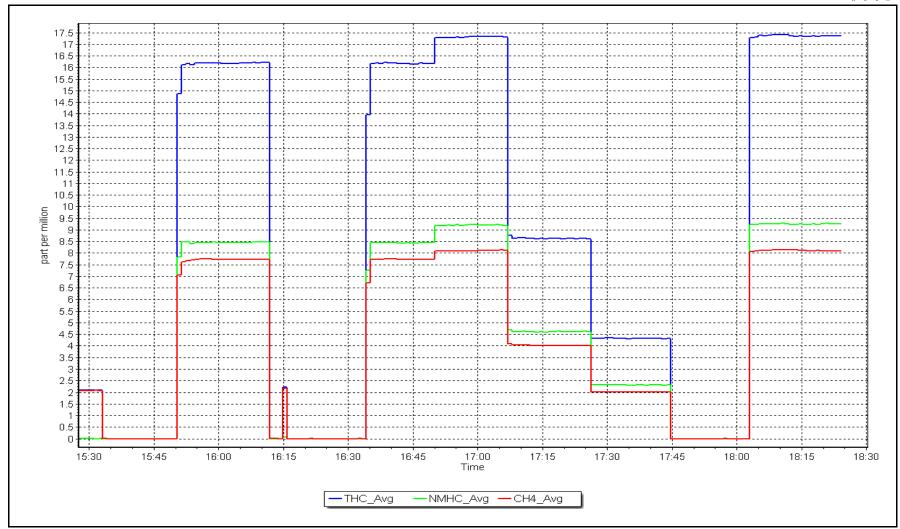
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.19	9.22	0.9977	Correlation Coemicient	0.555555	20.333
4.60	4.60	1.0001	Slope	1.001763	0.90 - 1.10
2.30	2.31	0.9929	Slope	1.001703	0.90 - 1.10
			Intercept	0.002265	+/-0.5



NMHC Calibration Plot

Date: March 13, 2023







NO_X \ NO \ NO₂ Calibration Report

Station number: AMS01

End time (MST): 15:36

NO gas Diff:

Serial Number:

Serial Number:

Last Cal Date: February 2, 2023

3565

5609

Version-04-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 3, 2023

Start time (MST): 10:39

Reason: Routine

Calibration Standards

T2Y1P9L NO Gas Cylinder #: Cal Gas Expiry Date: December 11, 2023 NOX Cal Gas Conc: 50.84 50.04 ppm NO Cal Gas Conc: ppm Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NO Conc: Removed Gas NOX Conc: 50.84 ppm 50.04 ppm

NOX gas Diff:

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

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: 1.440 1.458 NO bkgnd or offset: 6.8 6.9 NOX coeff or slope: 0.990 0.990 NOX bkgnd or offset: 7.0 6.9 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 194.8 196.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997218	0.999171
NO _x Cal Offset:	0.060000	-0.060000
NO Cal Slope:	0.998701	1.000071
NO Cal Offset:	-0.400000	-0.880000
NO ₂ Cal Slope:	0.997388	0.998181
NO ₂ Cal Offset:	-0.442888	-0.132907



NO_X \ NO \ NO₂ 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	0.0		
as found span	4920	80.0	813.4	800.6	12.8	803.7	788.4	15.5	1.0121	1.0155
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.1		
high point	4920	80.0	813.4	800.6	12.8	812.8	800.3	12.5	1.0008	1.0004
second point	4960	40.0	406.7	400.3	6.4	406.5	399.2	7.3	1.0005	1.0028
third point	4980	20.0	203.4	200.2	3.2	202.4	197.9	4.4	1.0047	1.0114
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2		
as left span	4920	80.0	813.4	388.4	425.0	809.6	385.1	424.4	1.0047	1.0087
							Average C	Correction Factor	1.0020	1.0049
Corrected As fo	ound NO _X =	803.5 ppb	NO =	788.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	-1.0%
Previous Respo	onse NO _X =	811.2 ppb	NO =	799.2 ppb				*Percent Chan	ge NO =	-1.4%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	$Srd pt NO_x =$	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated No concentration (pp		dicated 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 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)	796.5		384.3	425.0		424.4	1.0014	4	99.9%
2nd GPT poin	t (200 ppb O3)	796.5		594.2	215.1		213.9	1.0056	5	99.4%
3rd GPT point	t (100 ppb O3)	796.5		697.0	112.3		112.1	1.0018	3	99.8%

Notes:

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

Average Correction Factor

1.0029

Calibration Performed By:

Rene Chamberland

99.7%



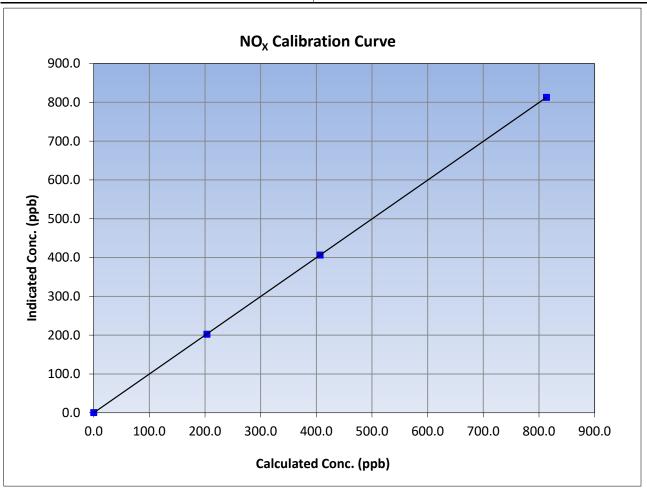
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 2, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:39 End Time (MST): 15:36 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	0.4		Correlation Coefficient	0.999998	≥0.995	
813.4	812.8	1.0008	Correlation Coefficient	0.555556	20.993	
406.7	406.5	1.0005	Slope	0.999171	0.90 - 1.10	
203.4	202.4	1.0047	Siope	0.999171	0.90 - 1.10	
			Intercept	-0.060000	+/-20	





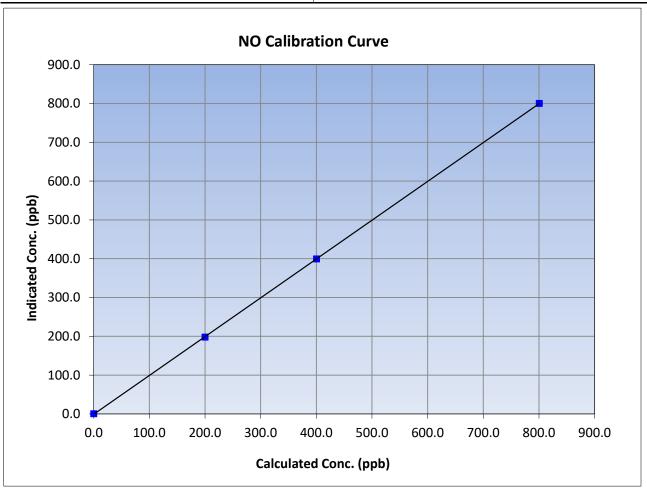
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 2, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:39 End Time (MST): 15:36 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	0.999990	≥0.995	
800.6	800.3	1.0004	Correlation Coefficient	0.555550	20.999	
400.3	399.2	1.0028	Slope	1.000071	0.90 - 1.10	
200.2	197.9	1.0114	Slope	1.000071	0.30 - 1.10	
			Intercept	-0.880000	+/-20	





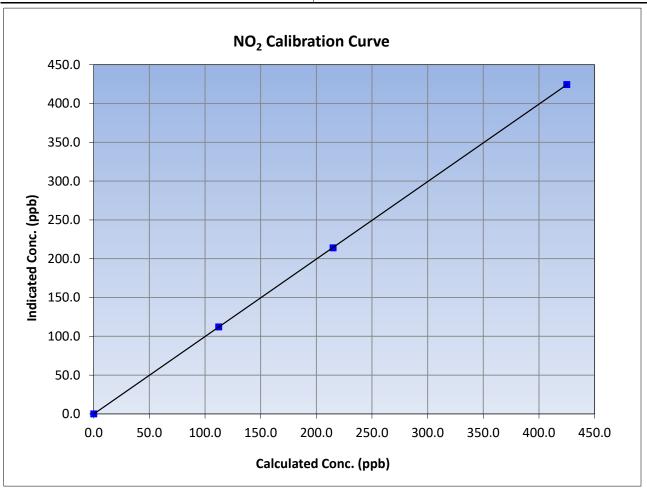
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 2, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:39 End Time (MST): 15:36 Analyzer serial #: Analyzer make: Thermo 42i 1218153357

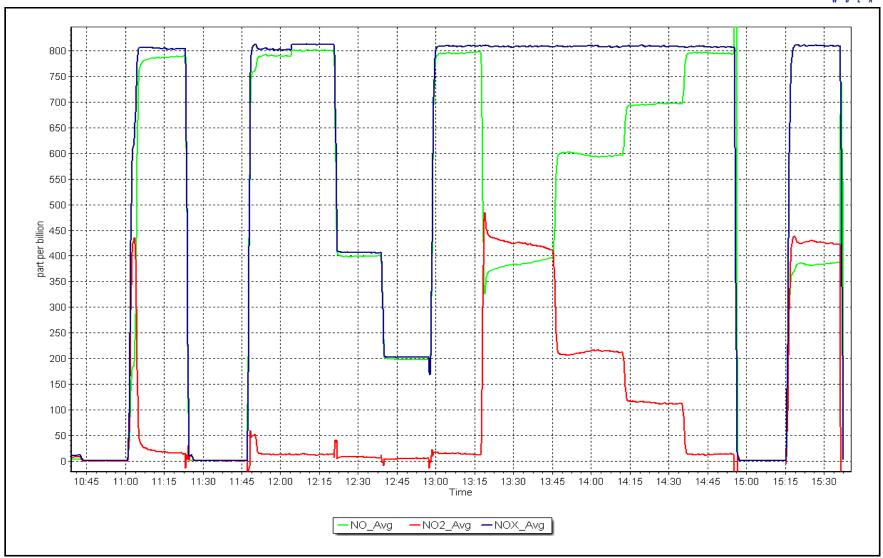
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999994	≥0.995	
425.0	424.4	1.0014	Correlation Coefficient	0.555554	20.333	
215.1	213.9	1.0056	Slope	0.998181	0.90 - 1.10	
112.3	112.1	1.0018	Зюре	0.550101	0.90 - 1.10	
			Intercept	-0.132907	+/-20	



NO_x Calibration Plot

Date: March 3, 2023







O₃ Calibration Report

Station number: AMS01

End time (MST): 14:20

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 1, 2023 Last Cal Date: February 8, 2023

Start time (MST): 11:28

Reason: Routine

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3565 ZAG Make/Model: Teledyne API T701 Serial Number: 5609

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 1107

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.000086 0.999829 2.4 2.5 Coeff or Slope: Calibration intercept: 0.760000 0.780000 1.016 1.025

O₃ 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	0.3	
as found span	5000	855.5	400.0	398.3	1.004
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	855.5	400.0	400.3	0.999
second point	5000	738.6	200.0	201.5	0.993
third point	5000	649.2	100.0	100.9	0.991
as left zero	5000	0.0	0.0	0.3	
as left span	5000	855.5	400.0	401.0	0.998
			Avera	ge Correction Factor	0.994
Baseline Corr As found:	398.0	Previous respons	e 400.8	*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope	e:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:	•	

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



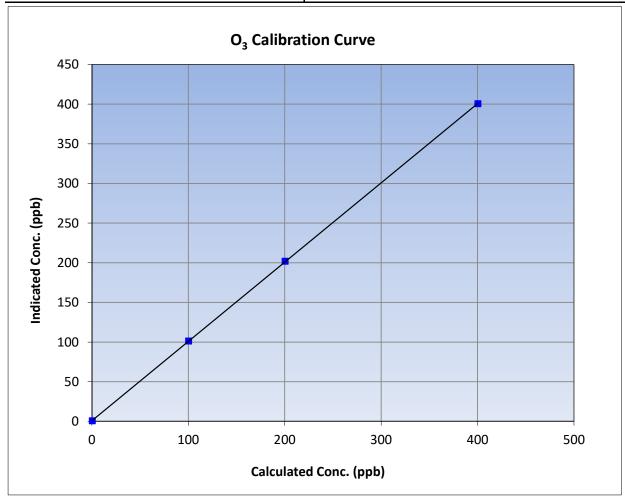
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 1, 2023 **Previous Calibration:** February 8, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:28 End Time (MST): 14:20 Analyzer make: Teledyne API T400 Analyzer serial #: 1107

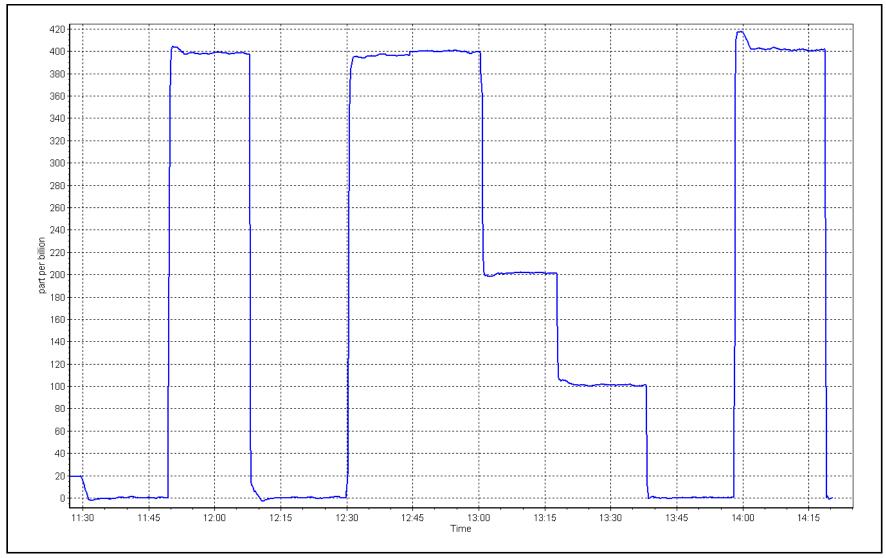
Calibration Data									
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.3		Correlation Coefficient	0.999989	≥0.995				
400.0	400.3	0.9993	Correlation Coefficient	0.555565	20.993				
200.0	201.5	0.9926	Slope	0.999829	0.90 - 1.10				
100.0	100.9	0.9911	Slope	0.333623	0.90 - 1.10				
			- Intercept	0.780000	+/- 5				



O₃ Calibration Plot

Date: March 1, 2023







Calibration by:

Rene Chamberland

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	n		
Station Name: Calibration Date: Start time (MST):	Fort McKay - Bertha (March 30, 2023 11:13	Santer	Station number: Last Cal Date: End time (MST):	February 16, 2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	306	
Flow Meter Make/Model:	Delta Cal			1450	
Temp/RH standard:	Delta Cal			1450	
_		Monthly Calibration			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	Adjusted	(Limits)
T (°C)	-2.9	-2.4	-2.9		+/- 2 °C
P (mmHg)	733.5	734.1	733.5		+/- 10 mmHg
flow (LPM)	5.03	5.00	5.03		+/- 0.25 LPM
Leak Test:	Date of check:	March 30, 2023	Last Cal Date:	February 16, 2023	_
	PM w/o HEPA:	13.2	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be Inlet cleaning:	completed before the Inlet Head		serve as the pre ma	intenance leak check	
		Quarterly Calibration	Test		
Parameter	As found			Adjusted	(Limite)
Parameter	As found	Post maintenance	As left	<u>Adjusted</u>	(Limits)
PMT Peak Test	9.5	11	11		10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	13	w/ HEPA:	0
Date Optical Cham	ber Cleaned:	March 30	, 2023		<0.2 ug/m3
Disposable Filte	r Changed:	March 30	, 2023		
		Annual Maintenan	ce		
Date Sample Tub	-	August 31			
Date RH/T Senso	or Cleaned:	December 1	19, 2022		
Notes:		and pressure verified. Lea			
	changed. Pivit pe	ak test within limits post	manitenance, no adjus	stinents made. inlet nead	a ciedilea.



CO Calibration Report

Station number:

AMS01

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 8, 2023 Last Cal Date: February 15, 2023

Start time (MST): 10:59 End time (MST): 14:22

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: 5609

Analyzer Information

Analyzer make: Teledyne API T300 Analyzer serial #: 3520

Analyzer Range: 0 - 50 ppm

Start Finish Finish Start Calibration slope: 1.001201 1.002977 Backgd or Offset: -0.012 -0.012 Calibration intercept: 0.093816 0.109828 Coeff or Slope: 0.991 0.996

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 40.9 0.993 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 40.6 40.7 0.997 second point 4966 33.3 20.2 20.7 0.980 third point 4983 16.7 10.2 10.3 0.990 5000 0.0 0.0 0.0 as left zero ---as left span 2960 40.0 40.5 40.2 1.010 Average Correction Factor 0.989 Baseline Corr As found: 40.72 Prev response: 40.70 *% change: 0.1% 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. Adjusted zero only.

Calibration Performed By: Rene Chamberland

* = > +/-5% change initiates investigation



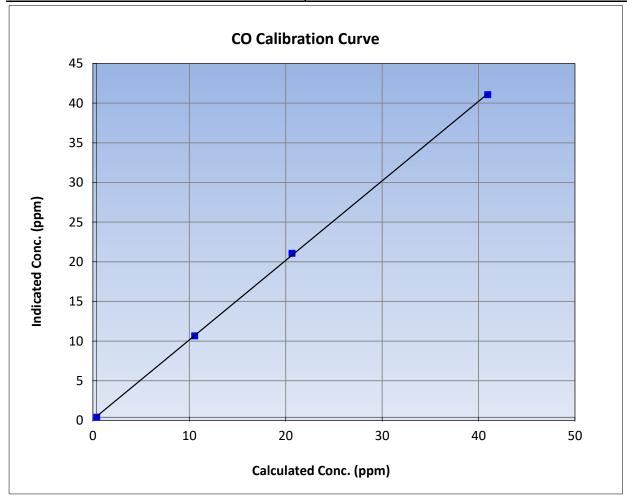
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 8, 2023 **Previous Calibration:** February 15, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:59 End Time (MST): 14:22 Analyzer make: Teledyne API T300 Analyzer serial #: 3520

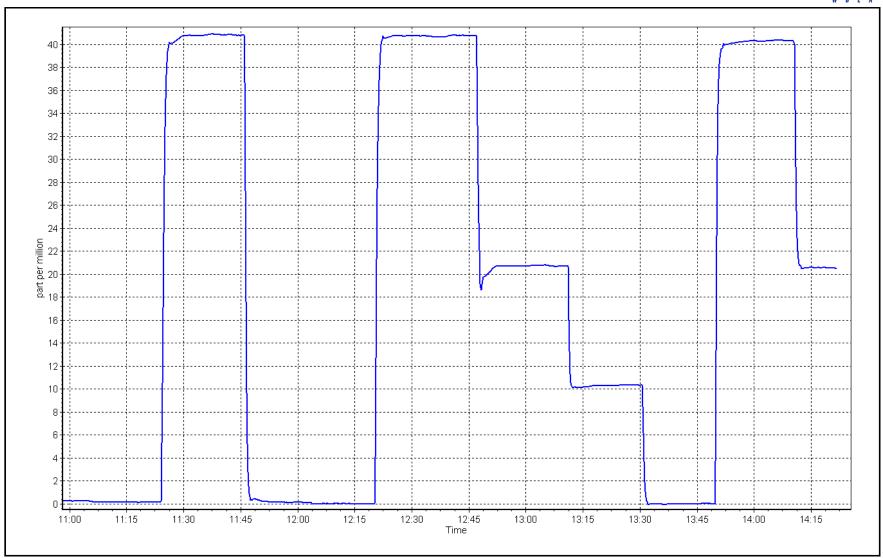
Calibration Data									
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999903	≥0.995				
40.6	40.7	0.9972	Correlation Coefficient	0.999903	20.993				
20.2	20.7	0.9796	Slope	1.002977	0.90 - 1.10				
10.2	10.3	0.9897	Slope	1.002977	0.90 - 1.10				
			- Intercept	0.109828	+/-1.5				



CO Calibration Plot

Date: March 8, 2023







CO₂ Calibration Report

Station number:

AMS01

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: March 7, 2023 Last Cal Date: February 7, 2023

Start time (MST): 10:47 End time (MST): 14:38

Reason: Routine

Calibration Standards

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

Cal Gas Cylinder #: ALM042207

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

Calibrator Make/Model: Teledyne API T700 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

Start **Finish** Start **Finish** Backgd or Offset: Calibration slope: 0.999874 1.002067 0.037 0.037 Calibration intercept: -5.820000 -4.460000 Coeff or Slope: 0.883 0.880

CO₂ 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	-0.3	
as found span	2920	80.0	1605.3	1617.9	0.992
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.2	
high point	2920	80.0	1605.3	1606.1	1.000
second point	2960	40.0	802.7	798.4	1.005
third point	2980	20.0	401.3	393.0	1.021
as left zero	3000	0.0	0.0	-0.4	
as left span	2960	40.0	802.7	785.7	1.022
			Avera	ge Correction Factor	1.009

Baseline Corr As found: 1618.20 Prev response: 1599.31 *% change: 1.2%

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.

Calibration Performed By: Rene Chamberland



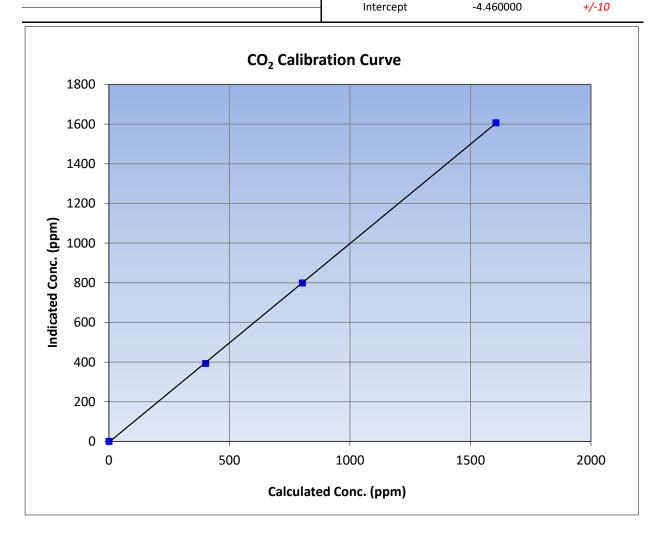
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	March 7, 2023	Previous Calibration	February 7, 2023
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS01
Start Time (MST)	10:47	End Time (MST)	14:38
Analyzer make	Teledyne API 360	Analyzer serial #	442

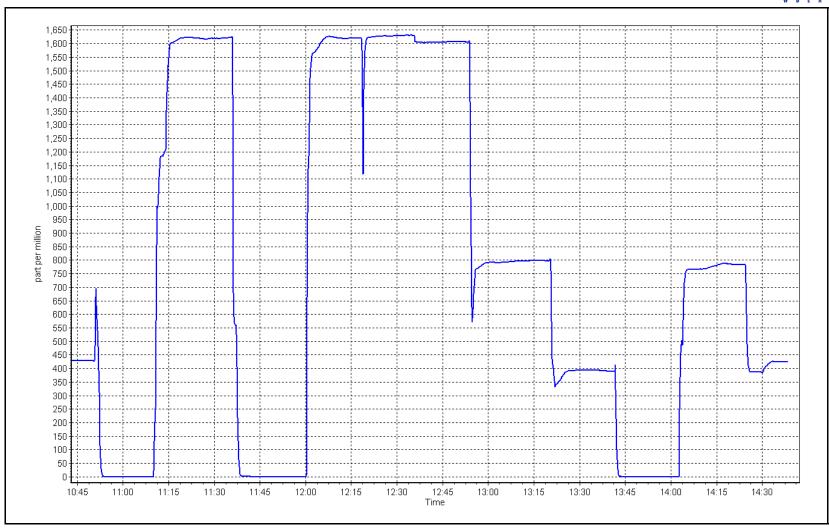
Calibration Data									
Calculated concentration (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>					
0.0	-0.2		Correlation Coefficient	0.999967	≥0.995				
1605.3	1606.1	0.9995	correlation coefficient	0.555507					
802.7	798.4	1.0053	Slope	1.002067	0.90 - 1.10				
401.3	393.0	1.0212	Slope	1.002007	0.90 - 1.10				
			Intercent	4.460000	./10				



CO₂ Calibration Plot

Date: March 7, 2023







TN - NO_x - NH₃ Calibration Report

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

NOX Cal Date: March 30, 2023

10:04 Start time (MST):

March 30, 2023 NH3 Cal Date:

Start time (MST): 15:35

Routine Reason:

Station number: AMS01

Last Cal Date: February 17, 2023

15:15 End time (MST):

Last Cal Date: February 17, 2023

20:02 End time (MST):

Calibration Standards

NOX Cal Gas Conc: 50.84 NO Gas Cylinder #: T2Y1P9L ppm NO Cal Gas Conc: 50.04 NO Cal Gas Expiry: March 3, 2028 ppm

Removed NOX Conc: 50.84 Removed Cylinder #: ppm NA 50.04 Removed cyl Expiry: NA Removed NO Conc: ppm

NOX gas Diff: NO gas Diff:

NH3 Cal Gas Conc: 72.93 NH3 Gas Cylinder #: CC281298 ppm

NH3 Cal Gas Expiry: February 28, 2023

Removed NH3 Conc: 72.93 Removed Cylinder #: ppm Removed cyl Expiry: NA

NH3 gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 5609

Analyzer Information

Analyzer model: Teledyne API T201 Analyzer serial #: 808 Converter model: Teledyne API T501 Converter serial #: 824 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 5.20 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 468

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.833	0.828	TN coefficient:	0.828	0.828
NOX coefficient:	0.834	0.829	NO bkgrnd:	-11.017	-0.727
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-10.278	0.384
NH3 coefficient:	0.854	0.911	TN bkgrnd:	-4.631	2.561

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000885	1.002051
NO _x Cal Offset:	0.380000	-1.360000
NO Cal Slope:	0.999215	1.003626
NO Cal Offset:	-0.780000	-1.700000
NO ₂ Cal Slope:	0.999881	1.006842
NO ₂ Cal Offset:	0.372129	-0.842838
NH3 Cal Slope:	1.010718	1.004604
NH3 Cal Offset:	-8.022555	-2.552362
TN Cal Slope:	1.015098	1.007959
TN Cal Offset:	-7.787324	-2.846246



TN - NOX - NH₃ Calibration Report

Version-11-2021

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	1.6	3.8	-2.2		
as found NO	4920	80.0	813.4	813.4		824.0	826.4	-2.4	0.987	
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high NO point	4920	80.0	813.4	813.4		814.8	815.0	0.0	0.998	
NO/O3 point	4920	80.0	813.4	813.4		808.0	808.8	-0.9	1.007	
as found NH3	3413	86.4	1800.6		1800.6	1819.1		1813.1	0.990	0.993
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1819.1		1813.1	0.990	0.993
second NH3	3452	48.0	1000.2		1000.2	989.9		987.2	1.010	1.013
third NH3	3476	24.0	500.1		500.1	506.9		505.7	0.987	0.989
							Average Co	rrection Factor	1.0025	0.9984

Corrected As found TN = 822.4 ppb NO_X = 822.6 ppb NH3 = 1815.3 ppb NO_X = 817.9 ppb NO_X = 814.5 ppb NO_X = 1811.9 ppb

*Percent Change TN = 0.5%

*Percent Change NO_X = 1.0%

*Percent Change NH3 = 0.2%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 85.4%

NH3 Current Converter Efficiency = 91.1%



NO_X - NO - NO₂ Calibration Report

Version-11-2021

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	3.8	3.9	1.6		
as found span	4920	80.0	813.4	800.6	813.4	826.4	810.3	824.0	0.9843	0.9881
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1		
high point	4920	80.0	813.4	800.6	813.4	815.0	802.4	814.8	0.9981	0.9978
second point	4960	40.0	406.7	400.3	406.7	403.8	400.0	404.6	1.0072	1.0008
third point	4980	20.0	203.4	200.2	203.4	202.2	197.1	202.8	1.0057	1.0155
							Average C	orrection Factor	1.0037	1.0047
Baseline Corr A	s fnd TN =	822.4 ppb	NO _X = 822.6	ppb NO =	806.4 ppb			*Percent Chang	e TN=	0.5%
Previous Respo	nse TN =	817.9 ppb	NO _X = 814.5	ppb NO =	799.2 ppb			*Percent Chang	e NO _x =	1.0%
								*Percent Chang	e NO =	0.9%
								* = > +/-5% change i	nitiates investigat	ion

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	0.1		
1st GPT point (400 ppb O3)	793.7	387.7	418.8	421.2	0.9943	100.6%
2nd GPT point (200 ppb O3)	793.7	597.5	209.0	209.5	0.9976	100.2%
3rd GPT point (100 ppb O3)	793.7	693.1	113.4	112.1	1.0116	98.9%
				Average Correction Factor	1.0012	99.9%

Notes:

Changed the inlet filter. Adjusted both zero and span. Adjusted the NH3 span.

Calibration Performed By:

Rene Chamberland



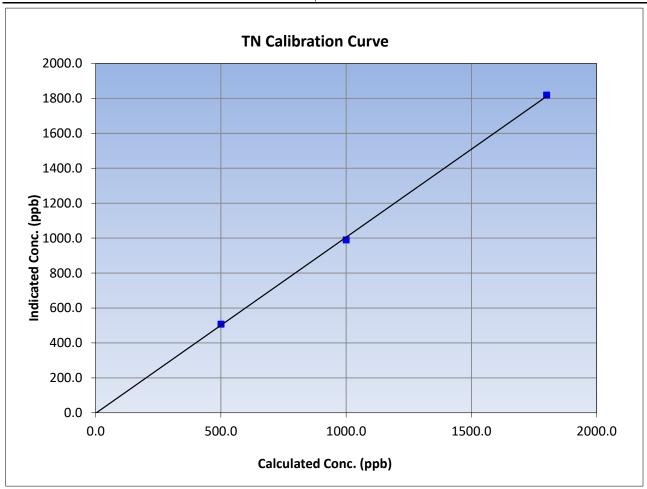
TN Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:04 End Time (MST): 15:15 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	-0.1		Correlation Coefficient	0.999819	≥0.995
1800.6	1819.1	0.9899	Correlation Coefficient	0.999619	20.555
1000.2	989.9	1.0104	Slope	1.007959	0.90 - 1.10
500.1	506.9	0.9866	Slope	1.007959	0.90 - 1.10
			Intercept	-2.846246	+/-20





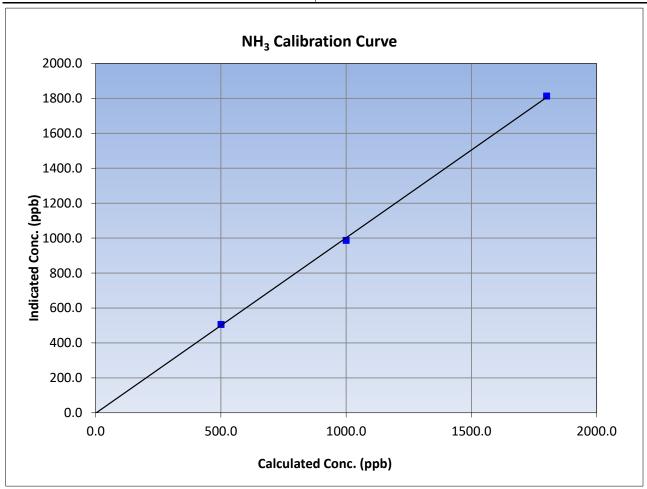
NH₃ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:04 End Time (MST): 15:15 Analyzer make: Teledyne API T201 808 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	0.999825	≥0.995
1800.6	1813.1	0.9931	Correlation Coefficient	0.333623	20.555
1000.2	987.2	1.0132	Slope	1.004604	0.90 - 1.10
500.1	505.7	0.9889	Slope	1.004004	0.90 - 1.10
			Intercept	-2.552362	+/-20





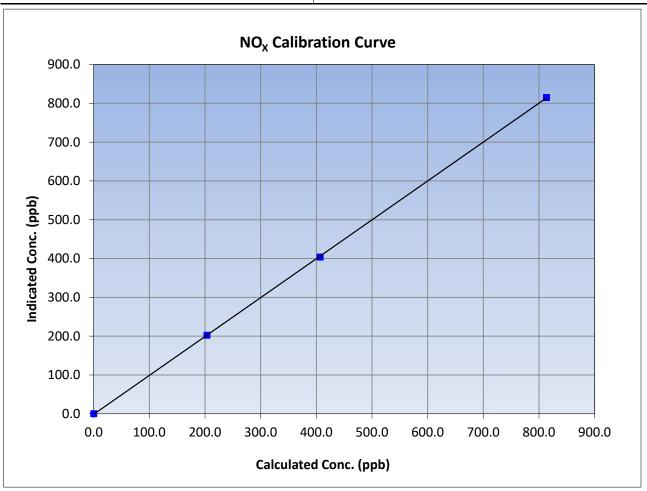
NO_x Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:04 End Time (MST): 15:15 Analyzer make: Teledyne API T201 808 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999975	≥0.995
813.4	815.0	0.9981	Correlation Coefficient	0.555575	20.333
406.7	403.8	1.0072	Slope	1.002051	0.90 - 1.10
203.4	202.2	1.0057	Slope	1.002051	0.90 - 1.10
			Intercept	-1.360000	+/-20





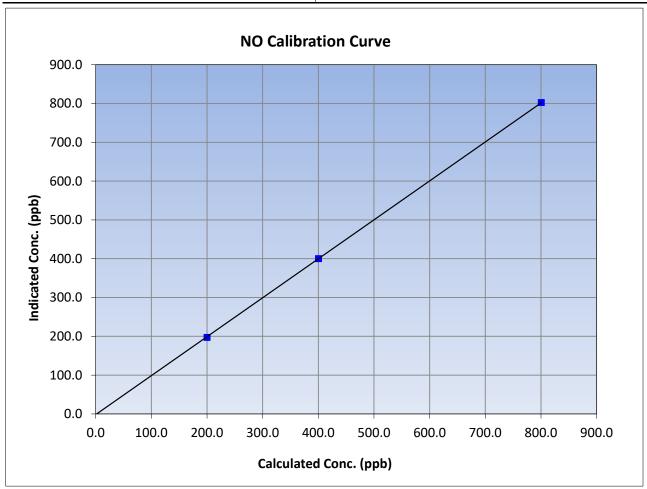
NO Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:04 End Time (MST): 15:15 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	-0.1		Correlation Coefficient	0.999980	≥0.995
800.6	802.4	0.9978	Correlation Coefficient	0.55550	20.555
400.3	400.0	1.0008	Slope	1.003626	0.90 - 1.10
200.2	197.1	1.0155	Slope	1.003020	0.90 - 1.10
			Intercept	-1.700000	+/-20





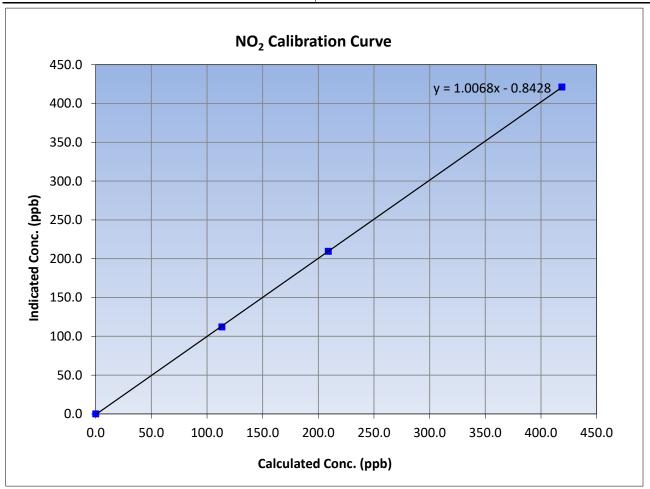
NO₂ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:04 End Time (MST): 15:15 Analyzer make: Teledyne API T201 808 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	0.999973	≥0.995	
418.8	421.2	0.9943	Correlation Coefficient	0.333373	20.555	
209.0	209.5	0.9976	Slope	1.006842	0.90 - 1.10	
113.4	112.1	1.0116	Slope	1.000642	0.90 - 1.10	
			Intercept	-0.842838	+/-20	

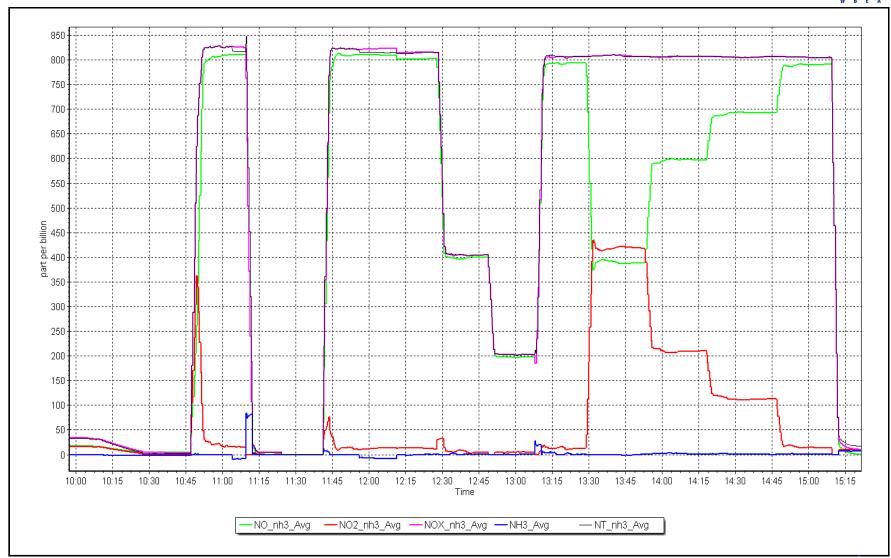


NO_x Calibration Plot

Date: March 30, 2023

Location: Bertha Ganter-Fort McKay



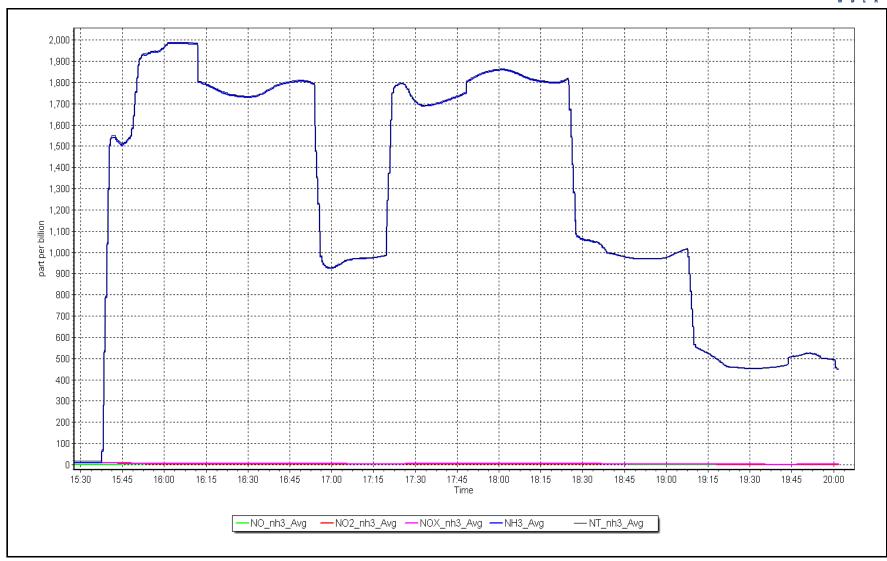


NH₃ Calibration Plot

Date: March 30, 2023

March 30, 2023 Location: Bertha Ganter-Fort McKay







TN - NO_x - NH₃ Calibration Report

Version-11-2021

Station Information

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

NOX Cal Date: March 31, 2023 Last Cal Date: February 17, 2023

9:35 Start time (MST): End time (MST): 14:10

NH3 Cal Date: March 31, 2023 Last Cal Date: February 17, 2023

Start time (MST): 14:30 17:00 End time (MST):

Maintenance Reason:

Calibration Standards

NOX Cal Gas Conc: NO Gas Cylinder #: T2Y1P9L 50.84 ppm NO Cal Gas Conc: 50.04 NO Cal Gas Expiry: March 3, 2028 ppm

Removed NOX Conc: 50.84 Removed Cylinder #: ppm NA 50.04 Removed cyl Expiry: NA Removed NO Conc: ppm

NOX gas Diff: NO gas Diff:

NH3 Cal Gas Conc: 72.93 NH3 Gas Cylinder #: CC281298 ppm

NH3 Cal Gas Expiry: February 28, 2023 Removed NH3 Conc: 72.93

Removed Cylinder #: ppm Removed cyl Expiry: NA

NH3 gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 5609

Analyzer Information

Analyzer model: Teledyne API T201 Analyzer serial #: 808 Converter model: Teledyne API T501 Converter serial #: 824 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 5.20 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 466

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.828	0.850	TN coefficient:	0.828	0.850
NOX coefficient:	0.829	0.854	NO bkgrnd:	-0.727	-1.529
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.384	-1.049
NH3 coefficient:	0.911	0.937	TN bkgrnd:	2.561	3.877

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002051	1.003400
NO _X Cal Offset:	-1.360000	-1.540000
NO Cal Slope:	1.003626	0.999800
NO Cal Offset:	-1.700000	-1.960000
NO ₂ Cal Slope:	1.006842	1.014549
NO ₂ Cal Offset:	-0.842838	0.808984
NH3 Cal Slope:	1.004604	0.996086
NH3 Cal Offset:	-2.552362	-1.322705
TN Cal Slope:	1.007959	0.999769
TN Cal Offset:	-2.846246	-1.287257



NH3 Current Converter Efficiency = 93.7%

Wood Buffalo Environmental Association

TN - NOX - NH₃ Calibration Report

Version-11-2021

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										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high NO point	4920	80.0	813.4	813.4		815.0	816.0	-1.1	0.998	
NO/O3 point										
as found NH3										
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1800.3		1793.6	1.000	1.004
second NH3	3452	48.0	1000.2		1000.2	996.3		992.7	1.004	1.008
third NH3	3476	24.0	500.1		500.1	498.5		496.5	1.003	1.007
							Average C	Correction Factor	0.9981	1.0062
Corrected As fou	und TN =	NA ppb	NO _X = NA	ppb NH3 =	NA ppb			*Percent Chang	e TN=	NA
Previous Respon	nse TN =	NA ppb	$NO_X = NA$	ppb NH3 =	NA ppb			*Percent Chang	e NO _x =	NA
								*Percent Chang	e NH3 =	NA
NH3 Previous Converter Efficiency = 91.1% * => +/-5% change initiates investigation								_		ion



NO_X - NO - NO₂ Calibration Report

Version-11-2021

Dilution	Cal:	مرد ندوسوا	Data
Dilution	t.an	bration	บลเล

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										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-0.1		
high point	4920	80.0	813.4	800.6	813.4	816.0	799.9	815.0	0.9969	1.0009
second point	4960	40.0	406.7	400.3	406.7	404.1	396.1	404.1	1.0065	1.0107
third point	4980	20.0	203.4	200.2	203.4	202.1	197.0	202.1	1.0062	1.0160
							Average C	Correction Factor	1.0032	1.0092
Baseline Corr As	fnd TN =	NA ppb	NO _X = NA	ppb NO =	NA ppb			*Percent Change	e TN=	NA
Previous Respon	ise TN =	NA ppb	$NO_X = NA$	ppb NO =	NA ppb			*Percent Change	e NO _x =	NA
								*Percent Change	e NO =	NA
								* = > +/-5% change i	nitiates investigati	ion

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						
calibration zero			0.0	0.0		
1st GPT point (400 ppb O3)	788.1	394.5	406.4	413.2	0.9835	101.7%
2nd GPT point (200 ppb O3)	788.1	589.7	211.2	214.0	0.9869	101.3%
3rd GPT point (100 ppb O3)	788.1	692.4	108.5	112.7	0.9627	103.9%
			-	Average Correction Factor	0.9777	102.3%

As founds were skipped because they were done yesterday. Changed out the pump and scrubber pack. Changed out the vent line. Adjusted both zero and Notes: span. Adjusted the NH3 span. Used the 2nd GPT reference point.

Calibration Performed By: Rene Chamberland



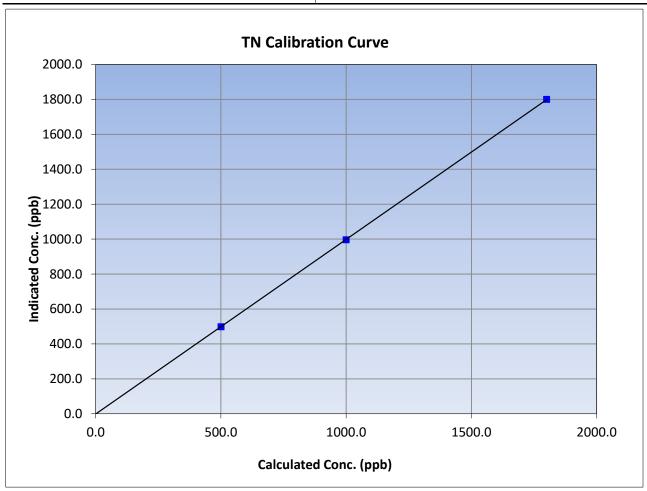
TN Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 31, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:35 End Time (MST): 14:10 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	-0.1		Correlation Coefficient	0.999995	≥0.995
1800.6	1800.3	1.0002	Correlation Coefficient	0.99999	20.555
1000.2	996.3	1.0039	Slope	0.999769	0.90 - 1.10
500.1	498.5	1.0032	Slope	0.999709	0.90 - 1.10
			Intercept	-1.287257	+/-20





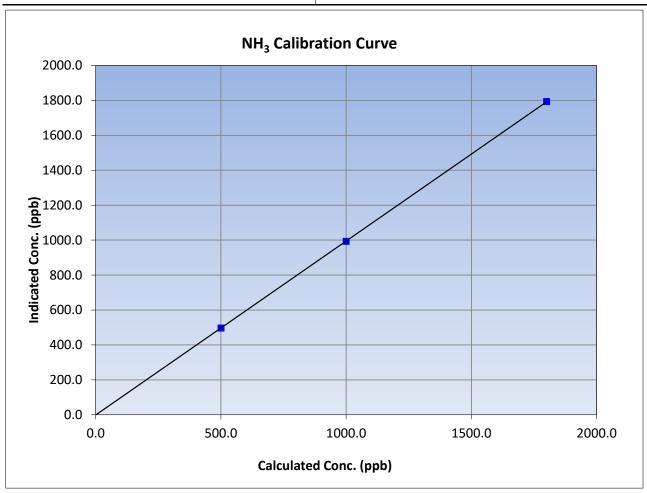
NH₃ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 31, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:35 End Time (MST): 14:10 Analyzer make: Teledyne API T201 808 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	0.999995	≥0.995
1800.6	1793.6	1.0039	Correlation Coefficient	0.99999	20.333
1000.2	992.7	1.0075	Slope	0.996086	0.90 - 1.10
500.1	496.5	1.0072	Slope	0.990060	0.90 - 1.10
			Intercept	-1.322705	+/-20





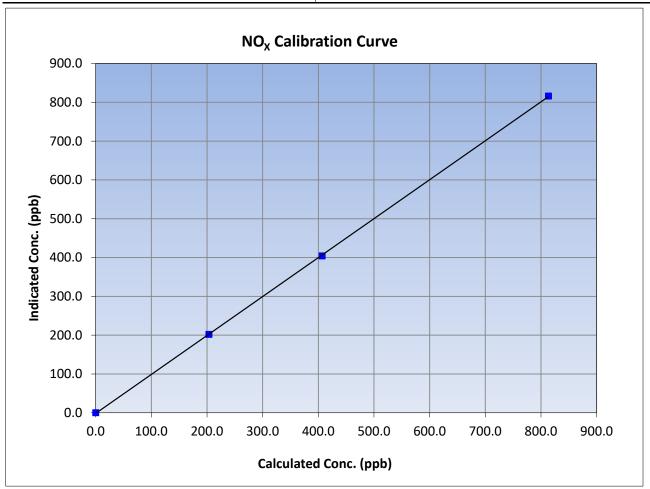
NO_x Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 31, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:35 End Time (MST): 14:10 Analyzer make: Teledyne API T201 808 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999971	≥0.995
813.4	816.0	0.9969	Correlation Coefficient	0.555571	20.333
406.7	404.1	1.0065	Slope	1.003400	0.90 - 1.10
203.4	202.1	1.0062	Slope	1.005400	0.30 - 1.10
			Intercept	-1.540000	+/-20





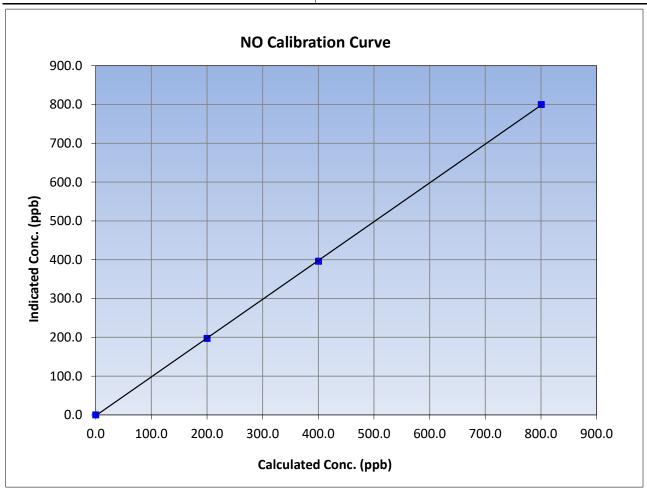
NO Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 31, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:35 End Time (MST): 14:10 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	0.0		Correlation Coefficient	0.999966	≥0.995
800.6	799.9	1.0009	correlation coefficient	0.333300	20.333
400.3	396.1	1.0107	Slope	0.999800	0.90 - 1.10
200.2	197.0	1.0160	Siope	0.555600	0.30 - 1.10
			Intercept	-1.960000	+/-20





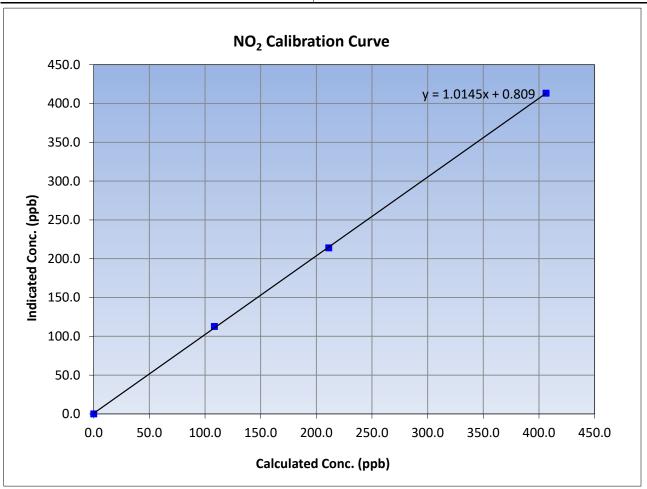
NO₂ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 31, 2023 Previous Calibration: February 17, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:35 End Time (MST): 14:10 Analyzer make: Teledyne API T201 808 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999945	≥0.995
406.4	413.2	0.9835	Correlation Coefficient	0.555545	20.333
211.2	214.0	0.9869	Slope	1.014549	0.90 - 1.10
108.5	112.7	0.9627	Slope	1.014549	0.90 - 1.10
			Intercept	0.808984	+/-20

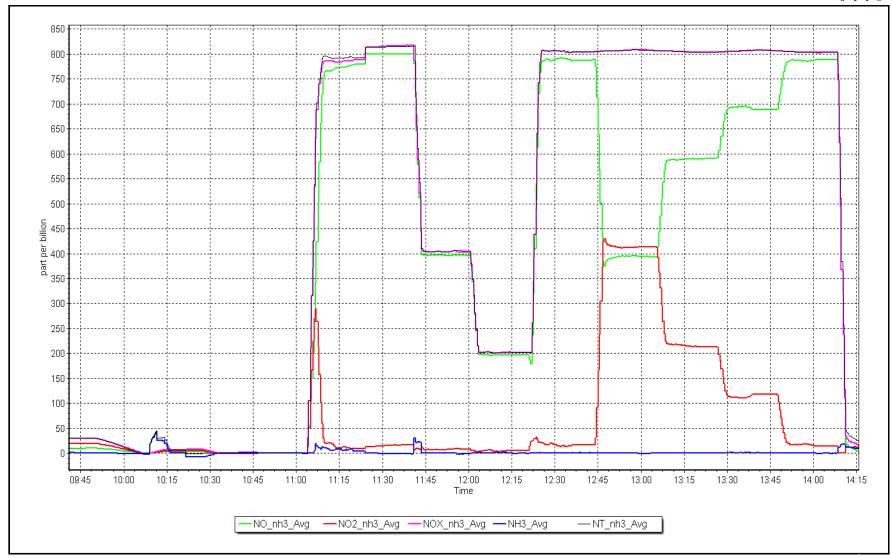


NO_x Calibration Plot

Date: March 31, 2023

Location: Bertha Ganter-Fort McKay





NH₃ Calibration Plot

Date: March 31, 2023

Location: Bertha Ganter-Fort McKay







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Station number:

AMS02

August 12, 2024

Version-01-2020

Station Information

Mildred Lake Station Name:

March 8, 2023 February 8, 2023 Calibration Date: Last Cal Date:

Start time (MST): 9:53 AM End time (MST): 12:58

Routine Reason:

Calibration Standards

Cal Gas Concentration: 49.98 ppm

Cal Gas Cylinder #: CC501209

Removed Cal Gas Conc: 49.98

Calibrator Make/Model: **API T700**

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

> Serial Number: 1185

Cal Gas Exp Date:

ZAG Make/Model: **API T701** Serial Number: 5608

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.002096 Backgd or Offset: 17.9 18.0 1.002695 0.811

Calibration intercept: -0.144667 -0.984595 Coeff or Slope: 0.827

SO₂ 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)	(556)	(pps) (es)	(PP=) (.0)	2 0.50 2.00
as found zero	5000	0.0	0.0	0.4	
as found span	4920	80.2	801.6	817.9	0.980
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	
high point	4920	80.2	801.6	803.1	0.998
second point	4960	40.1	400.8	399.3	1.004
third point	4980	20.0	199.9	199.1	1.004
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.2	801.6	802.9	0.998
			Averag	ge Correction Factor	1.002

Baseline Corr As found: 817.50 Previous response 803.66 1.7% *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

Changed inlet filter after as founds. Adjusted zero and span.

Calibration Performed By: Sean Bala

Notes:

* = > +/-5% change initiates investigation



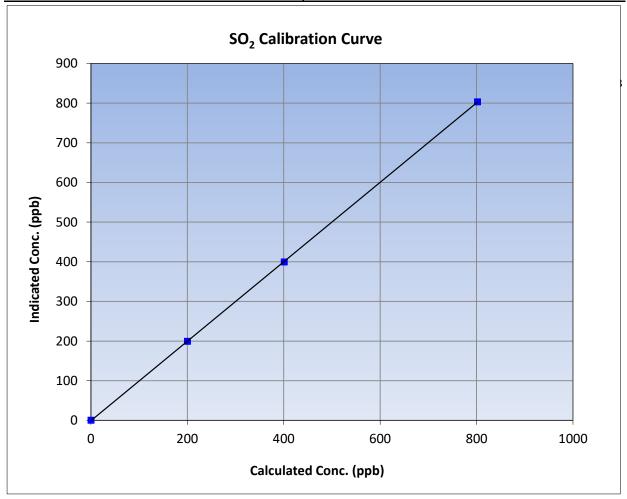
SO₂ Calibration Summary

Version-01-2020

Station Information

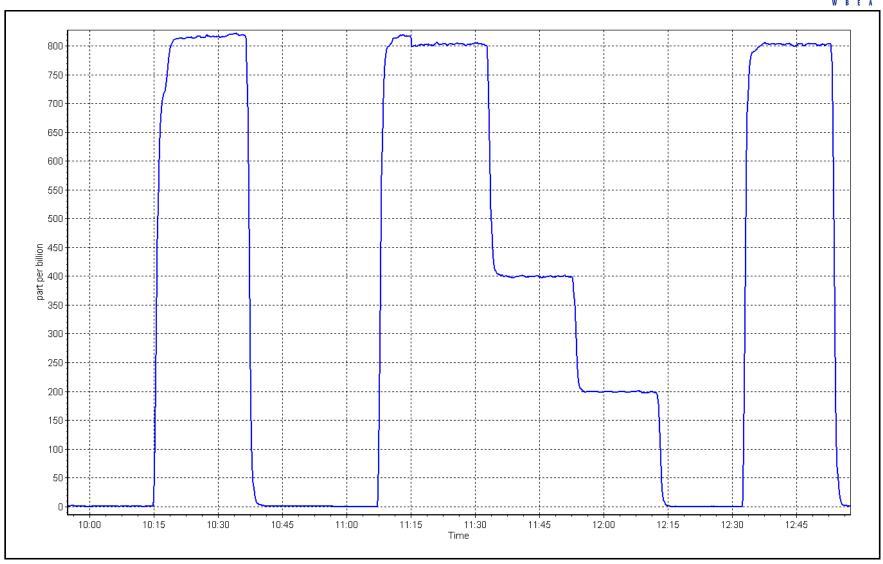
Calibration Date: March 8, 2023 **Previous Calibration:** February 8, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 9:53 End Time (MST): 12:58 Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

		Calib	ration 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	0.999991	≥0.995
801.6	803.1	0.9982	Correlation coefficient	0.555551	20.333
400.8	399.3	1.0038	Slope	1.002096	0.90 - 1.10
199.9	199.1	1.0041	Slope	1.002090	0.90 - 1.10
			- Intercept	-0.984595	+/-30



SO2 Calibration Plot Date: March 8, 2023 Location: Mildred Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mildred Lake

Calibration Date: March 16, 2023

Start time (MST): 9:45 Reason: Routine Station number: AMS02

Last Cal Date: February 6, 2023

End time (MST): 12:45

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC345191

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

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

Rem Gas Exp Date: NA

Diff between cyl:

1185 Serial Number: Serial Number: 5608

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> 1.007251 Backgd or Offset: Calibration slope: 0.993964 1.83 1.83 0.000807 Calibration intercept: -0.059204 Coeff or Slope: 0.844 0.844

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	-0.1	
as found span	4924	75.6	80.0	81.4	0.981
as found 2nd point	4962	37.8	40.0	40.8	0.978
as found 3rd point	4981	18.9	20.0	20.1	0.990
new cylinder response					

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	5000	0.0	0.0	0.0	
high point	4924	75.6	80.0	80.5	0.994
second point	4962	37.8	40.0	40.5	0.988
third point	4981	18.9	20.0	20.0	1.000
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	81.6	0.980
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber chang	ge:	12-Sep-22		Ave Corr Factor	0.994
Date of last converter effic	iency test:				efficiency

Baseline Corr As found:	81.5	Prev response:	79.45	*% change:	2.5%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.019824	AF Intercept:	-0.139184
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999986		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



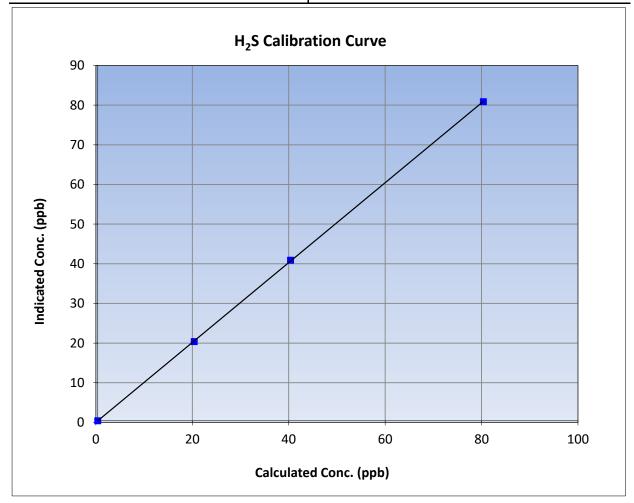
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 16, 2023 **Previous Calibration:** February 6, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 9:45 End Time (MST): 12:45 Analyzer make: **API T700** Analyzer serial #: 1185

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	0.999980	≥0.995			
80.0	80.5	0.9937	Correlation coefficient	0.333360	20.333			
40.0	40.5	0.9875	Slope	1.007251	0.90 - 1.10			
20.0	20.0	0.9998	Slope	1.007231	0.30 - 1.10			
			Intercept	0.000807	+/-3			

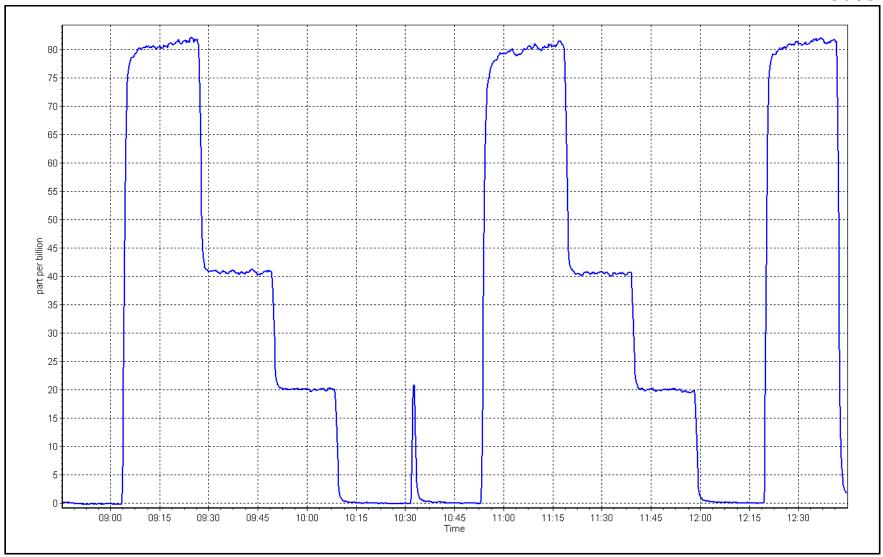


H₂S Calibration Plot

Date: March 16, 2023

Location: Mildred Lake







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Mildred Lake Station Name:

Calibration Date: March 8, 2023

Start time (MST): 9:53 Reason: Routine Station number: AMS02

Last Cal Date: February 8, 2023

End time (MST): 12:58

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: NΑ

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

Removed C3H8 Conc. 199.4 Diff between cyl (THC): ppm

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: 5608

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320038

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: 2.80E-04 2.84E-04 NMHC SP Ratio: 4.43E-04 4.45E-04 CH4 Retention time: 14.4 14.6 NMHC Peak Area: 198634 197833 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	4920	80.2	16.82	16.79	1.001
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	16.82	1.000
second point	4960	40.1	8.41	8.37	1.005
third point	4980	20.0	4.19	4.15	1.010
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.87	0.997
			,	Average Correction Factor	1.005
Baseline Corr AF:	16.79	Prev response	16.79	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
D !: C 2 AE				* / totale	

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

II V L A					VELSIO11-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
is found span	4920	80.2	8.80	8.83	0.996
s found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	8.80	8.79	1.000
second point	4960	40.1	4.40	4.39	1.001
hird point	4980	20.0	2.19	2.19	1.002
is left zero	5000	0.0	0.00	0.00	
is left span	4920	80.2	8.80	8.83	0.996
				werage Correction Factor	1.001
Baseline Corr AF:	8.83	Prev response	8.79	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
is found zero	5000	0.0	0.00	0.00	
s found span	4920	80.2	8.02	7.96	1.007
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	8.02	8.02	1.000
second point	4960	40.1	4.01	3.97	1.010
hird point	4980	20.0	2.00	1.96	1.019
is left zero	5000	0.0	0.00	0.00	
is left span	4920	80.2	8.02	8.04	0.998
				verage Correction Factor	1.010
Baseline Corr AF:	7.96	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		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.999735		1.000469	
THC Cal Offset:		-0.023917		-0.025314	
CH4 Cal Slope:		0.999431		1.001069	
CH4 Cal Offset:		-0.023056		-0.023053	

Notes: Changed inlet filter and N2 cylinder after as founds. Adjusted span.

1.000064

-0.001060

Calibration Performed By: Sean Bala

NMHC Cal Slope:

NMHC Cal Offset:

0.999791

-0.002261



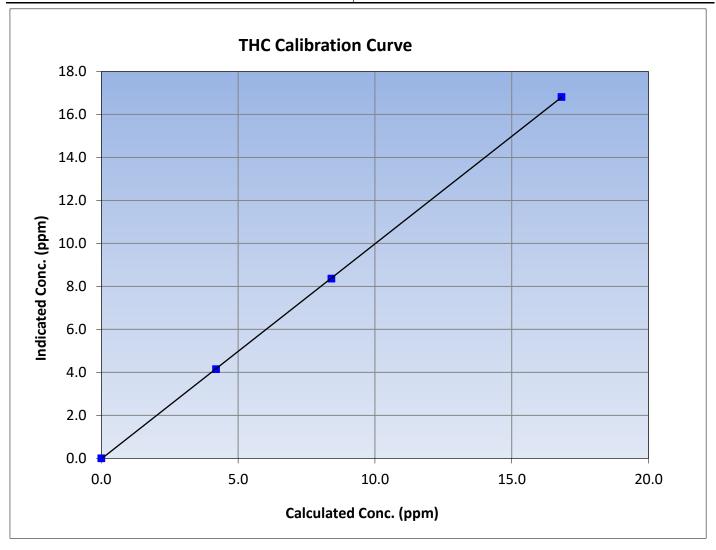
THC Calibration Summary

Version-06-2022

Station Information

March 8, 2023 Calibration Date: **Previous Calibration:** February 8, 2023 Station Name: Mildred Lake AMS02 Station Number: 9:53 Start Time (MST): End Time (MST): 12:58 Analyzer make: Analyzer serial #: 1180320038 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	0.999989	≥0.995
16.82	16.82	1.0001	Correlation Coefficient	0.555565	20.333
8.41	8.37	1.0050	Slope	1.000469	0.90 - 1.10
4.19	4.15	1.0104	Slope	1.000409	0.90 - 1.10
			Intercept	-0.025314	+/-0.5





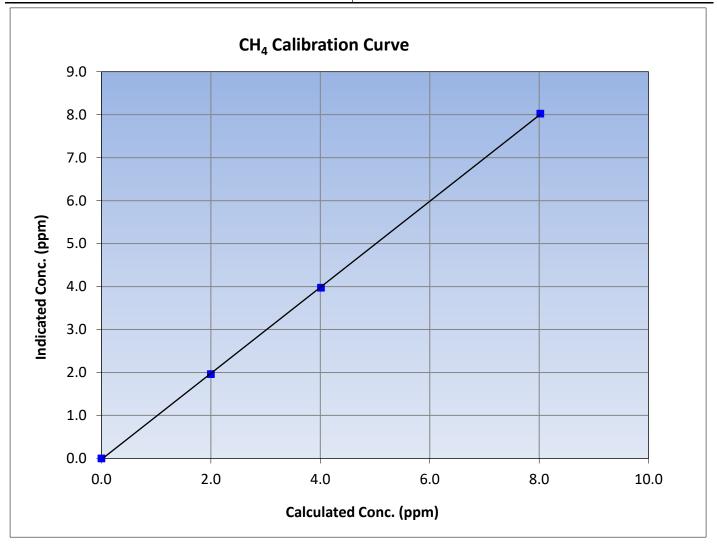
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: March 8, 2023 **Previous Calibration:** February 8, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 9:53 End Time (MST): 12:58 Analyzer make: Analyzer serial #: 1180320038 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	0.999959	≥0.995
8.02	8.02	1.0000	Correlation Coemicient	0.999959	20.333
4.01	3.97	1.0100	Slope	1.001069	0.90 - 1.10
2.00	1.96	1.0193	Slope	1.001009	0.90 - 1.10
			Intercept	-0.023053	+/-0.5





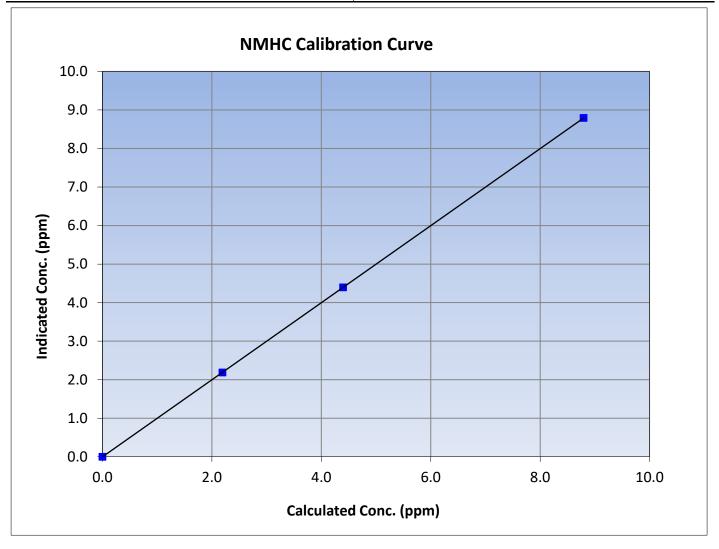
NMHC Calibration Summary

Version-06-2022

Station Information

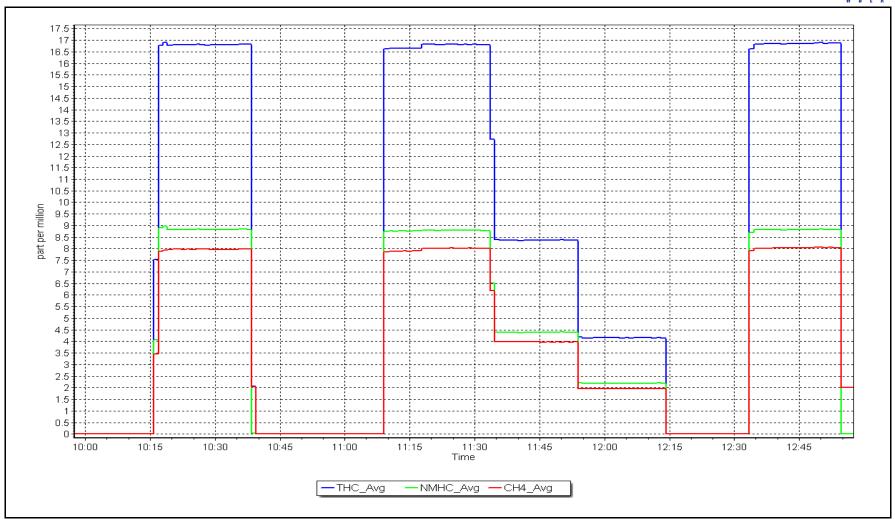
Calibration Date: March 8, 2023 **Previous Calibration:** February 8, 2023 Station Name: AMS02 Mildred Lake Station Number: Start Time (MST): 9:53 End Time (MST): 12:58 Analyzer make: Analyzer serial #: 1180320038 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
8.80	8.79	1.0004	Correlation Coefficient		20.333
4.40	4.39	1.0008	Slope	0.999791	0.90 - 1.10
2.19	2.19	1.0025	Slope	0.333731	0.50 - 1.10
			Intercept	-0.002261	+/-0.5



NMHC Calibration Plot Date: March 8, 2023 Location: Mildred Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT MARCH 2023

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

April 29, 2023







SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: **Buffalo Viewpoint**

March 28, 2023 Calibration Date:

Start time (MST): 6:30 Routine Reason:

Station number: AMS04

> February 10, 2023 Last Cal Date:

End time (MST): 9:25

Calibration Standards

Cal Gas Concentration: 50.02

Cal Gas Cylinder #: CC470284

Removed Cal Gas Conc: 50.02 Removed Gas Cyl #: NA

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701** ppm Cal Gas Exp Date: September 9, 2028

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 3808 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.998701 0.996516 Backgd or Offset: 21.5 22.1 0.869 Calibration intercept: 1.140000 -0.920000 Coeff or Slope: 0.869

SO₂ 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	4920	80.0	800.3	794.6	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4920	80.0	800.3	796.7	1.005
second point	4960	40.0	400.2	398.2	1.005
third point	4980	20.0	200.1	197.4	1.014
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.0	800.3	797.8	1.003
			Averag	ge Correction Factor	1.008
Baseline Corr As found:	794 20	Previous resnonse	800.42	*% change	-0.8%

Baseline Corr As found: 794.20 Previous response 800.42 % change -0.8% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA Baseline Corr 3rd AF pt: AF Correlation:

* = > +/-5% change initiates investigation

Notes: No Maintenance done. Zero Adjusted.

Calibration Performed By: Melissa Lemay



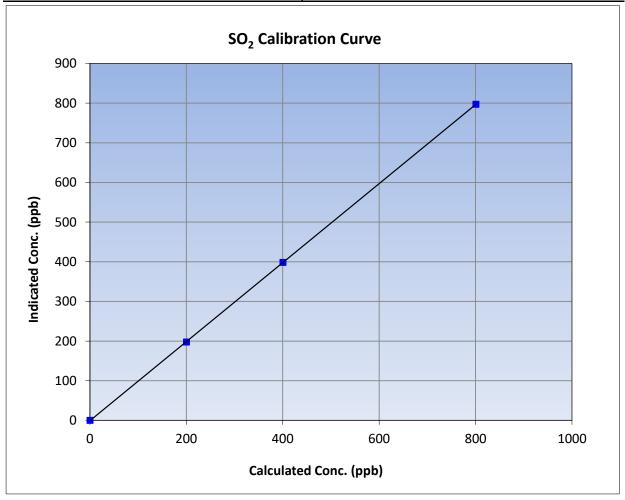
SO₂ Calibration Summary

Version-01-2020

Station Information

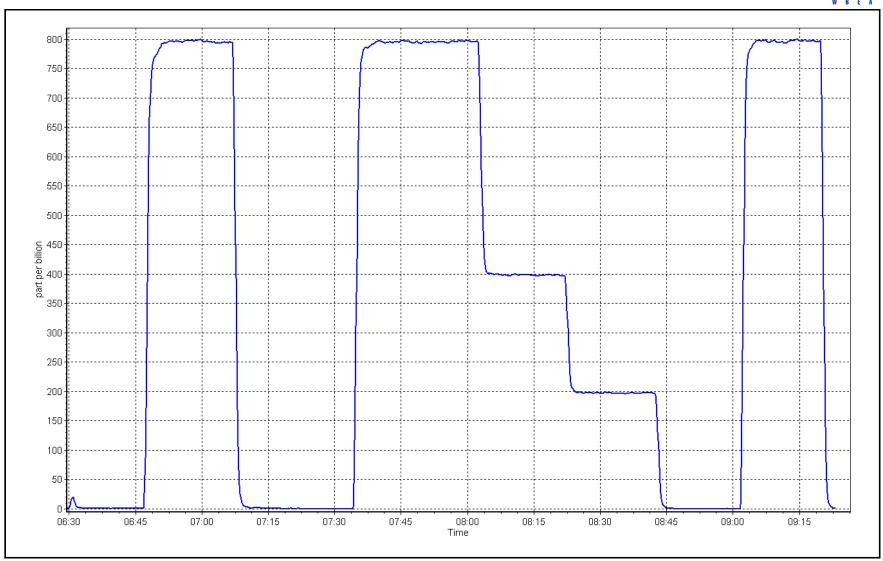
Calibration Date: March 28, 2023 **Previous Calibration:** February 10, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:30 End Time (MST): 9:25 Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Calibration Data						
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.3		Correlation Coefficient	0.999995	≥0.995	
800.3	796.7	1.0045	Correlation coefficient		20.333	
400.2	398.2	1.0049	Slope	0.996516	0.90 - 1.10	
200.1	197.4	1.0136	Slope	0.990310	0.30 - 1.10	
			- Intercept	-0.920000	+/-30	



SO2 Calibration Plot Date: March 28, 2023 Location: Buffalo Viewpoint







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: March 8, 2023

Start time (MST): 8:50 Reason: Routine Station number: AMS04

Last Cal Date: February 15, 2023

End time (MST): 12:30

Calibration Standards

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

Cal Gas Cylinder #: CC345266

Removed Cal Gas Conc: 5.42 ppm Rem Gas Exp Date: January 4, 2025

Removed Gas Cyl #: CC345266 Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3808 ZAG Make/Model: API T701H Serial Number: 362

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1336160094

Converter make: NA Converter serial #: NA

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.001200 0.995796 Backgd or Offset: 18.7 Calibration slope: 18.7 0.201944 Calibration intercept: 0.162167 Coeff or Slope: 1.080 1.080

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	0.3	
as found span	4926	74.1	80.3	80.6	1.000
as found 2nd point	4963	37.0	40.1	40.7	0.993
as found 3rd point	4982	18.5	20.1	20.0	1.018
new cylinder response					

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	5000	0.0	0.0	0.4	
high point	4926	74.1	80.3	80.3	1.000
second point	4963	37.0	40.1	40.0	1.003
third point	4982	18.5	20.1	20.0	1.003
as left zero	5000	0.0	0.0	0.4	
as left span	4926	74.1	80.3	81.0	0.992
SO2 Scrubber Check	4920	80.0	800.0	-0.2	
Date of last scrubber chan	ge:			Ave Corr Factor	1.002

Date of last converter efficiency test: effi						
Baseline Corr As found:	80.3	Prev response:	80.58	*% change:	-0.4%	
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.001624	AF Intercept:	0.222271	

Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.001624
Baseline Corr 3rd AF pt: 19.7 AF Correlation: 0.999944

* = > +/-5% change initiates investigation

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

Calibration Performed By: Melissa Lemay



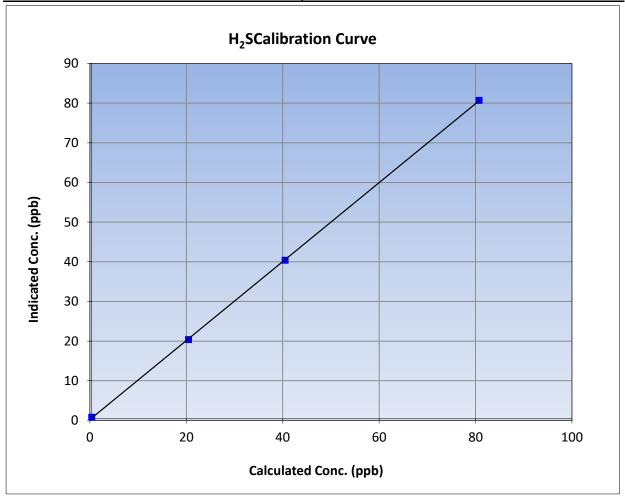
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 **Previous Calibration:** February 15, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:50 End Time (MST): 12:30 Analyzer make: Thermo 450i Analyzer serial #: 1336160094

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	0.999971	≥0.995				
80.3	80.3	1.0003	Correlation Coefficient	0.555571	20.993				
40.1	40.0	1.0027	Slope	0.995796	0.90 - 1.10				
20.1	20.0	1.0026	Slope	0.333730	0.90 - 1.10				
			- Intercept	0.201944	+/-3				

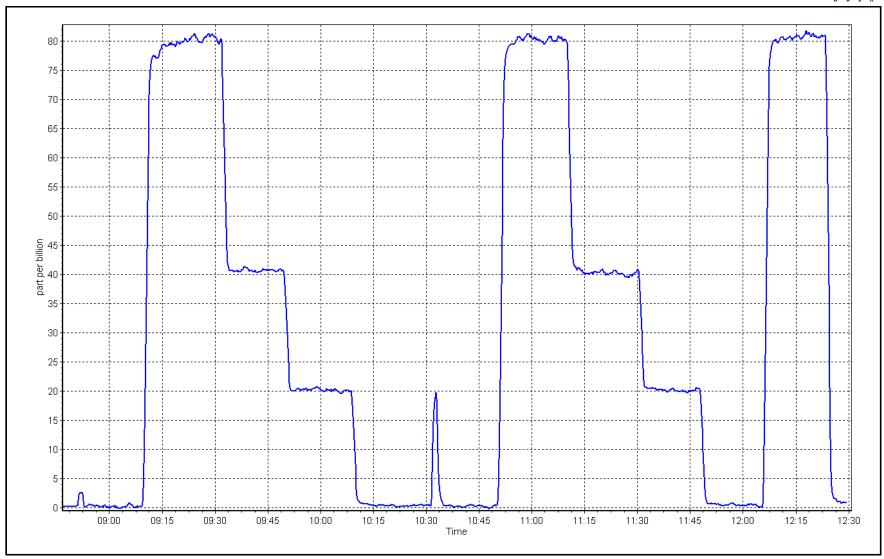


H₂S Calibration Plot

Date: March 8, 2023

Location: Buffalo Viewpoint







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: March 28, 2023

Start time (MST): 6:30 Reason: Removal Station number: AMS04

Last Cal Date: February 10, 2023

End time (MST): 8:45

Calibration Standards

Gas Cert Reference: CC470284 Cal Gas Expiry Date: September 9, 2028

CH4 Cal Gas Conc. 497.8 ppm CH4 Equiv Conc. 1062.9 ppm

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 497.8 ppm CH4 Equiv Conc. 1062.9 ppm

Removed C3H8 Conc. 205.5 ppm Diff between cyl (THC):

Diff between cyl (CH.):

Diff between cyl (NM):

Diff between cyl (CH₄): Diff between cyl (NM):

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 CH4 Range (ppm): 0 - 10 ppm

 Start
 Finish
 Start
 Finish

 CH4 SP Ratio:
 3.070E-04
 3.190E-04
 NMHC SP Ratio:
 6.120E-05
 6.400E-05

CH4 Retention time: 13.6 13.6 NMHC Peak Area: 147690 141169

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	17.01	16.75	1.015
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	17.01	17.02	0.999
second point	4960	40.0	8.50	8.33	1.021
third point	4980	20.0	4.25	4.10	1.037
as left zero					
as left span					

			Ave	rage Correction Factor	1.019
Baseline Corr AF:	16.75	Prev response	17.01	*% change	-1.5%
Baseline Corr 2nd AF:	NA	AF Slope:	AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		



THC / CH₄ / 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	0.00	0.00	
as found span	4920	80.0	9.04	8.85	1.022
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	9.04	9.00	1.005
second point	4960	40.0	4.52	4.46	1.014
third point	4980	20.0	2.26	2.21	1.023
as left zero					
as left span					
ı			Aver	age Correction Factor	1.014
Baseline Corr AF:	8.85	Prev response	9.03	*% change	-2.0%
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>
as found zero as found span	5000 4920	0.0 80.0	0.00 7.96	0.00 7.90	1.008
as found 2nd point	4920	80.0	7.90	7.90	1.006
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	7.96	8.02	0.993
second point	4960	40.0	3.98	3.87	1.029
third point	4980	20.0	1.99	1.88	1.059
as left zero	4300	20.0	1.33	1.00	1.059
as left span					
as left spair			Δνατ	age Correction Factor	1.027
Baseline Corr AF:	7.90	Prev response	7.99	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:	7.33	AF Intercept:	-1.1/0
Baseline Corr 3rd AF:	NA NA	AF Correlation:		* = > +/-5% change initiat	es investigation
basellile Coll Stu Ar.	IVA		Chatistics	7 17 370 change initiate	es investigation
		Calibration	Statistics		
T110 - 1-1		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.004640		1.002691	
THC Cal Offset:		-0.080000		-0.098000	
CH4 Cal Slope:		1.011594		1.010302	
CH4 Cal Offset:		-0.070000		-0.078000	
NMHC Cal Slope:		0.999400		0.996366	
NIVALIC Cal Officeti		0.00000		0.024000	

Notes: Removal Due to third point being 6% low. Span was adjusted, before finding out third point was low.

-0.006000

Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

-0.024000



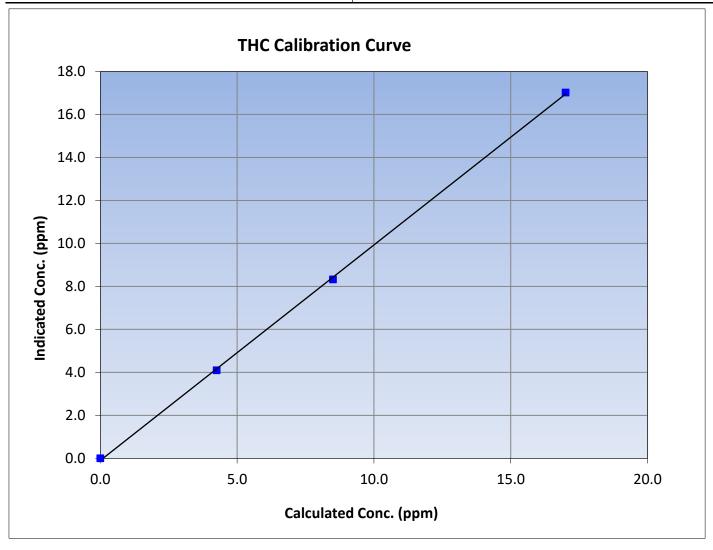
THC Calibration Summary

Version-01-2020

Station Information

March 28, 2023 **Previous Calibration:** Calibration Date: February 10, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:30 End Time (MST): 8:45 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	0.999825	≥0.995
17.01	17.02	0.9992			20.333
8.50	8.33	1.0208	Slope	1.002691	0.90 - 1.10
4.25	4.10	1.0370	Slope		0.90 - 1.10
			Intercept	-0.098000	+/-0.5





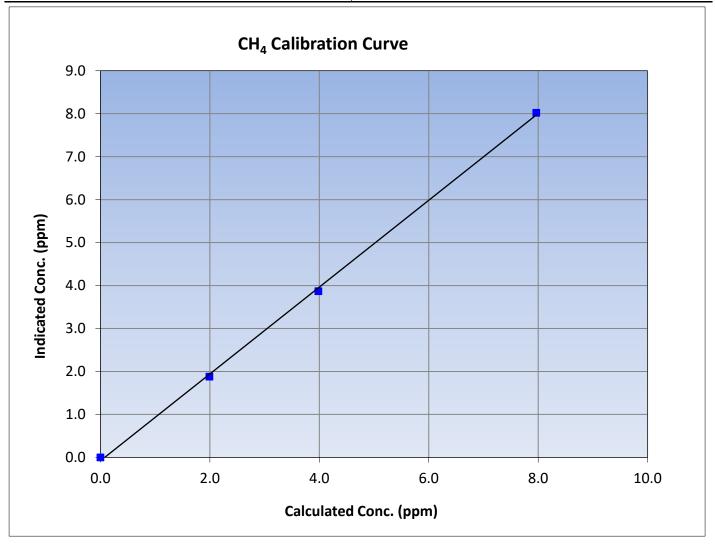
CH₄ Calibration Summary

Version-01-2020

Station Information

March 28, 2023 Calibration Date: **Previous Calibration:** February 10, 2023 Station Name: **Buffalo Viewpoint** AMS04 Station Number: Start Time (MST): 6:30 End Time (MST): 8:45 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	0.999512	≥0.995
7.96	8.02	0.9931	Correlation Coefficient		20.333
3.98	3.87	1.0290	Slope	1.010302	0.90 - 1.10
1.99	1.88	1.0591	Slope		0.90 - 1.10
			Intercept	-0.078000	+/-0.5





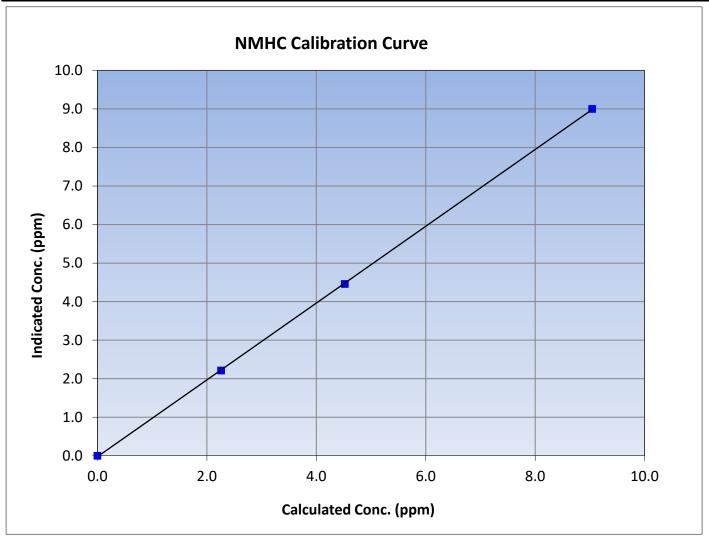
NMHC Calibration Summary

Version-01-2020

Station Information

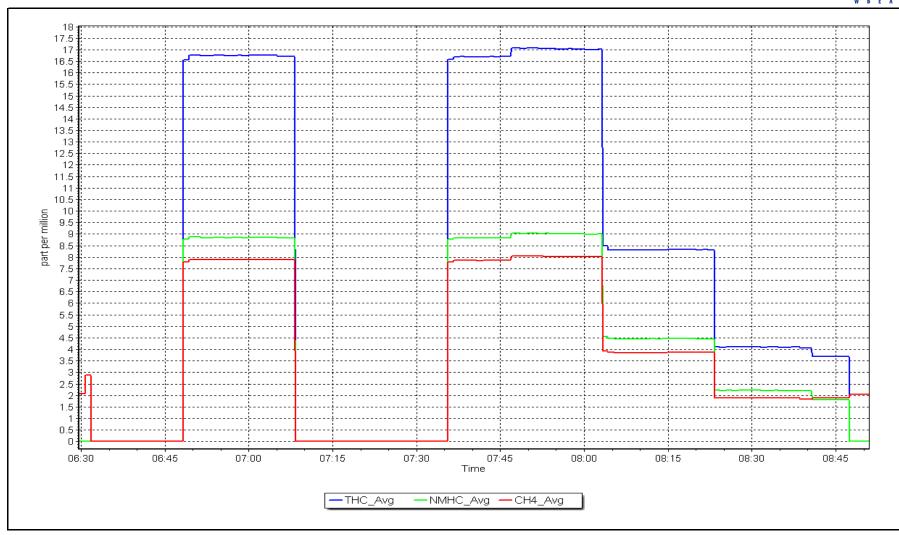
March 28, 2023 **Previous Calibration:** Calibration Date: February 10, 2023 Station Name: **Buffalo Viewpoint** AMS04 Station Number: Start Time (MST): 6:30 End Time (MST): 8:45 Analyzer make: Thermo 55i Analyzer serial #: 1426262594

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999965	≥0.995
9.04	9.00	1.0047			20.993
4.52	4.46	1.0137	Slope	0.996366	0.90 - 1.10
2.26	2.21	1.0229	Slope		0.50 - 1.10
			Intercept	-0.024000	+/-0.5



NMHC Calibration Plot Date: March 28, 2023 Location: Buffalo Viewpoint







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: March 29, 2023

Start time (MST): 8:24 Reason: Install Station number: AMS04

Last Cal Date:

End time (MST): 10:37

Calibration Standards

Gas Cert Reference: CC470284 Cal Gas Expiry Date: September 9, 2028

CH4 Cal Gas Conc. 497.8 ppm CH4 Equiv Conc. 1062.9 ppm

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 497.8 ppm CH4 Equiv Conc. 1062.9 ppm

Removed C3H8 Conc. 205.5 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 #: 1222762077

THC Range (ppm): 0 - 20 ppm

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

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

 CH4 SP Ratio:
 1.860E-04
 NMHC SP Ratio:
 3.820E-05

 CH4 Retention time:
 12.0
 NMHC Peak Area:
 236627

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	80.0	17.01	17.00	1.000
second point	4960	40.0	8.50	8.50	1.000
third point	4980	20.0	4.25	4.22	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	17.01	17.07	0.996
			A	Average Correction Factor	1.003
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 / CH₄ / 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= 0.95-1.0</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	9.04	9.04	1.000
second point	4960	40.0	4.52	4.51	1.002
third point	4980	20.0	2.26	2.24	1.009
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.04	9.04	1.000
			Avera	age Correction Factor	1.004
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
		-			
as found zero		Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	
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	7.96	7.97	0.999
second point	4960	40.0	3.98	3.99	0.998
third point	4980	20.0	1.99	1.99	1.001
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	7.96	8.02	0.993
				age Correction Factor	0.999
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
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:				1.000205	
THC Cal Offset:				-0.012000	
CH4 Cal Slope:				1.000832	
CH4 Cal Offset:				0.000000	
NMHC Cal Slope:				1.000411	
NINALIC CAL Offers.				0.010000	

Notes: Removed 55i not linear. Install calibration. Use zero chromatogram to NO. Span adjusted.

Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

-0.010000



THC Calibration Summary

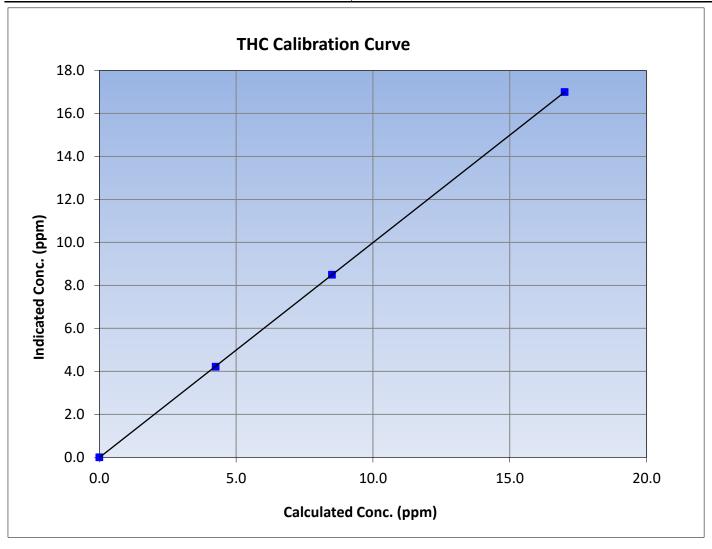
Version-01-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration:

Station Name:Buffalo ViewpointStation Number:AMS04Start Time (MST):8:24End Time (MST):10:37Analyzer make:Thermo 55iAnalyzer serial #:1222762077

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
17.01	17.00	1.0004	Correlation Coemicient		20.333
8.50	8.50	1.0004	Slope	1.000205	0.90 - 1.10
4.25	4.22	1.0075	Slope	1.000203	0.90 - 1.10
			Intercept	-0.012000	+/-0.5





CH₄ Calibration Summary

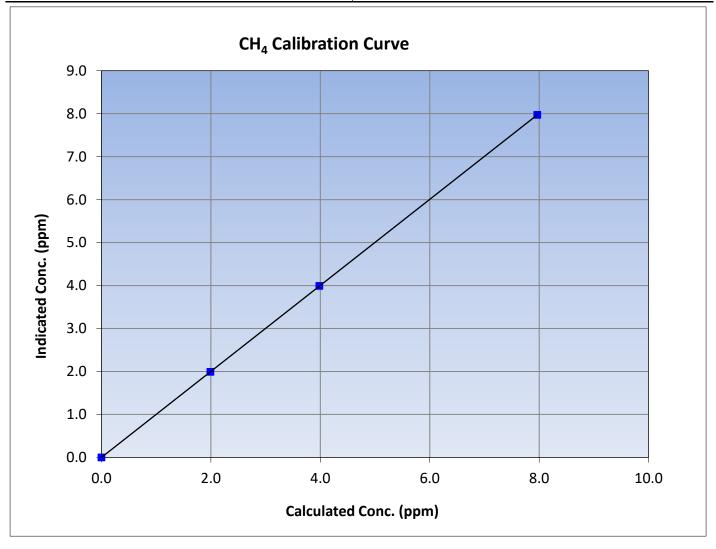
Version-01-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration:

Station Name:Buffalo ViewpointStation Number:AMS04Start Time (MST):8:24End Time (MST):10:37Analyzer make:Thermo 55iAnalyzer serial #:1222762077

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
7.96	7.97	0.9993	Correlation Coefficient		20.993
3.98	3.99	0.9981	Slope	1.000832	0.90 - 1.10
1.99	1.99	1.0006	Siope		0.90 - 1.10
			Intercept	0.000000	+/-0.5





NMHC Calibration Summary

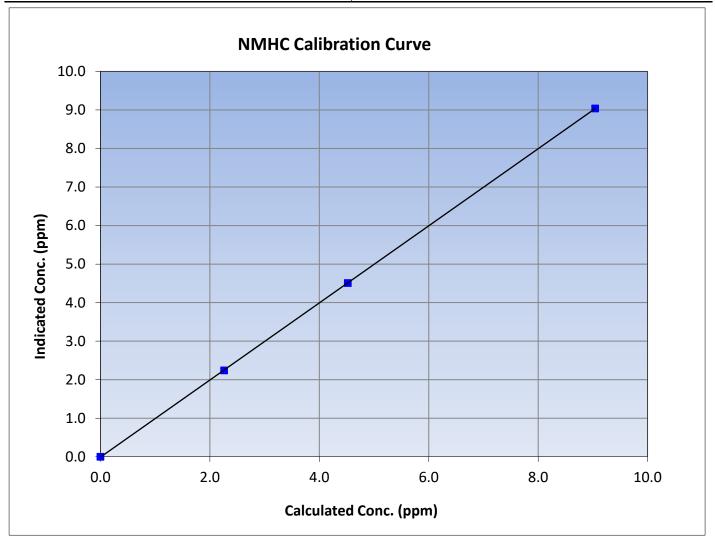
Version-01-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration:

Station Name:Buffalo ViewpointStation Number:AMS04Start Time (MST):8:24End Time (MST):10:37Analyzer make:Thermo 55iAnalyzer serial #:1222762077

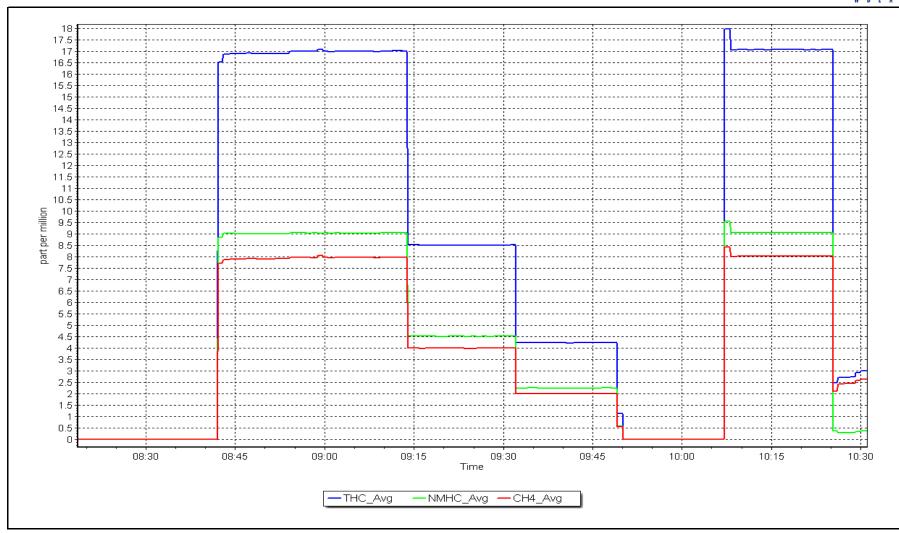
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999994	≥0.995
9.04	9.04	1.0002	Correlation Coemicient		20.999
4.52	4.51	1.0024	Slope	1.000411	0.90 - 1.10
2.26	2.24	1.0092	Slope		0.90 - 1.10
			Intercept	-0.010000	+/-0.5



NMHC Calibration Plot Date: March 29, 2023

Location: Buffalo Viewpoint







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: March 3, 2023

Start time (MST): 8:07
Reason: Routine

Station number: AMS04

Last Cal Date: February 14, 2023

End time (MST): 12:49

Calibration Standards

NO Gas Cylinder #: T36RH1F Cal Gas Expiry Date: August 18, 2023

NOX Cal Gas Conc: 51.16 ppm NO Cal Gas Conc: 50.91 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 51.16 ppm Removed Gas NO Conc: 50.91 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: API T700 Serial Number: 2445 ZAG make/model: API T701 Serial Number: 362

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 723

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.998 0.998 NO bkgnd or offset: -9.0 -2.1 NOX coeff or slope: 0.992 0.992 NOX bkgnd or offset: -9.0 -1.7 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 7.3 7.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000759	0.998743
NO _x Cal Offset:	0.966826	0.546857
NO Cal Slope:	1.004151	1.004711
NO Cal Offset:	-0.053156	-0.973240
NO ₂ Cal Slope:	0.994427	0.992216
NO ₂ Cal Offset:	-0.612933	0.603575



NO_X \ NO \ NO₂ 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/lc) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	4.5	3.4	1.2		
as found span	4922	78.1	799.1	795.2	3.9	799.2	797.1	2.1	0.9999	0.9976
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.3	-0.2		
high point	4922	78.1	799.1	795.2	3.9	798.6	798.8	-0.2	1.0006	0.9955
second point	4961	39.1	400.1	398.1	2.0	399.7	397.8	2.0	1.0009	1.0008
third point	4981	19.5	199.5	198.5	1.0	200.8	197.6	3.1	0.9935	1.0047
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4922	78.1	799.1	366.2	432.9	799.2	363.5	435.8	0.9999	1.0074
							Average C	orrection Factor	0.9984	1.0003
Corrected As fo	ound NO _X =	794.7 ppb	NO =	793.7 ppb	* = > +/-5%	6 change initiates i	investigation	*Percent Chang	ge NO _X =	-0.8%
Previous Respo	onse NO _X =	800.7 ppb	NO =	798.4 ppb				*Percent Chang	ge NO =	-0.6%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$I NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	$Srd pt NO_X =$	NA ppb	NO =	NA ppb	As found	$I \qquad NO r^2$:		NO SI:	NO Int:	
					As found	$I \qquad NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration [Data				
O3 Setpo	pint (ppb)	Indicated NO Reconcentration		cated NO Drop centration (ppb)	Calculated NO concentration (ppl		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	t (400 ppb O3)	796.4		367.4	432.9		429.6	1.0077	·	99.2%

Notes:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

No maintenance done. Zero adjusted.

217.7

111.1

Average Correction Factor

1.0014

0.9973

1.0021

218.0

110.8

Calibration Performed By:

Melissa Lemay

582.3

689.5

796.4

796.4

99.9%

100.3%

99.8%



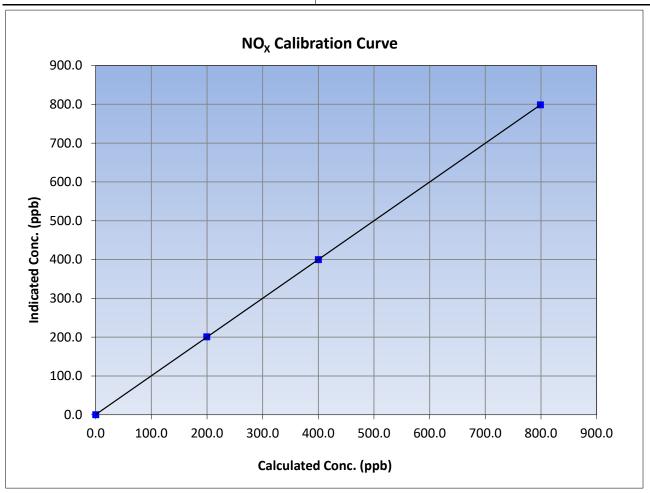
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 14, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:07 End Time (MST): 12:49 Analyzer make: **API T200** 723 Analyzer serial #:

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	
799.1	798.6	1.0006	Correlation Coefficient	0.555550	20.333	
400.1	399.7	1.0009	Slope	0.998743	0.90 - 1.10	
199.5	200.8	0.9935	Slope	0.996745	0.90 - 1.10	
			Intercept	0.546857	+/-20	





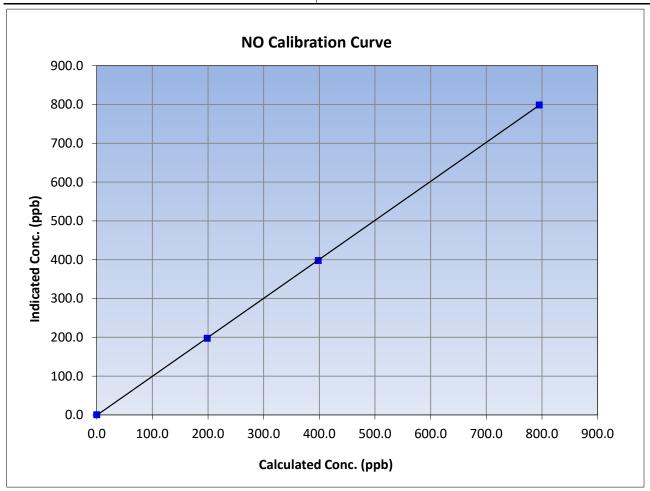
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 14, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:07 End Time (MST): 12:49 Analyzer make: **API T200** Analyzer serial #: 723

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999987	≥0.995	
795.2	798.8	0.9955	Correlation Coefficient	0.333367	20.333	
398.1	397.8	1.0008	Slope	1.004711	0.90 - 1.10	
198.5	197.6	1.0047	Slope	1.004711	0.90 - 1.10	
			Intercept	-0.973240	+/-20	





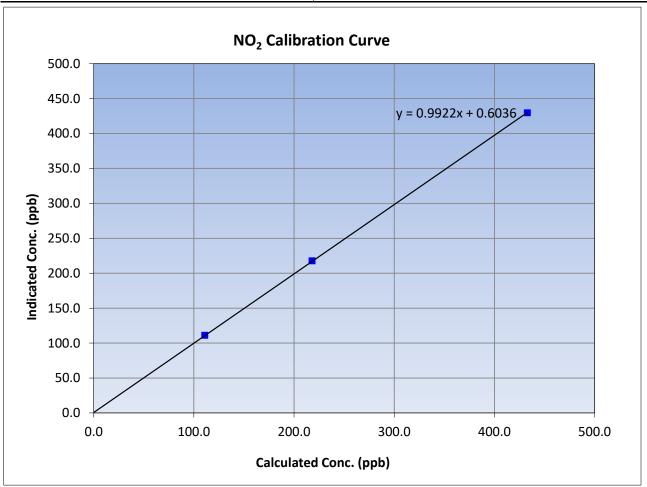
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 14, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:07 End Time (MST): 12:49 Analyzer make: **API T200** 723 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	0.999981	≥0.995
432.9	429.6	1.0077	Correlation Coefficient	0.555501	20.993
218.0	217.7	1.0014	Slope	0.992216	0.90 - 1.10
110.8	111.1	0.9973	Slope	0.992210	0.90 - 1.10
			Intercept	0.603575	+/-20



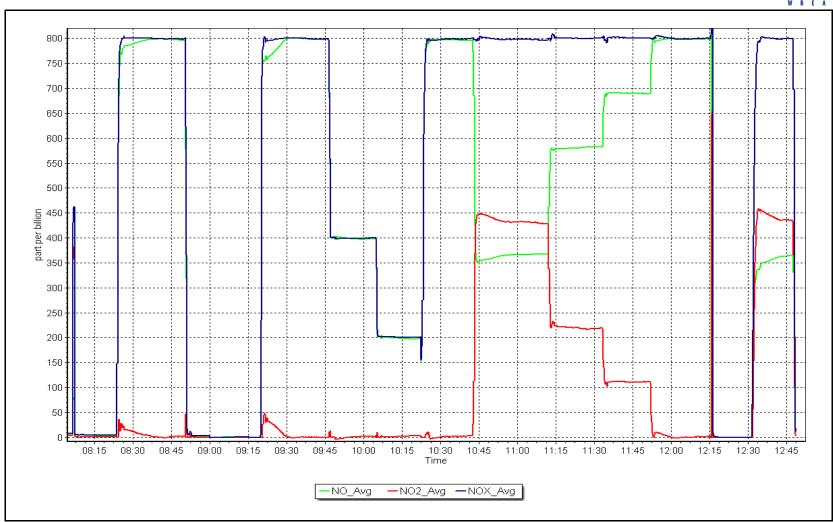
NO_x Calibration Plot

Date:

March 3, 2023

Location: Buffalo Viewpoint







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: **Buffalo Viewpoint**

Calibration Date: March 6, 2023

Start time (MST): 7:14 Reason: As Found

Station number: AMS04 Last Cal Date: February 10, 2023

End time (MST): 8:35

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: API T700 Serial Number: 2445 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: Calibration slope: 0.988657 -3.3 -3.3 Coeff or Slope: Calibration intercept: 3.560000 1.065 1.065

O₃ 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	-0.2	
as found span	5000	1158.5	400.0	382.2	1.047
as found 2nd point	5000	915.0	200.0	194.9	1.026
as found 3rd point	5000	784.5	100.0	99.9	1.001
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

		Average Correction Factor					
Baseline Corr As found:	382.4	Previous response	399.0	*% change	-4.3%		
Baseline Corr 2nd AF pt:	-187.3	AF Slope:	0.953257	AF Intercept:	2.380000		
Baseline Corr 3rd AF pt:	-95.0	AF Correlation:	0.999784				
				* = > +/-5% change initiates	investigation		

As founds done with the station calibrator. Station calibrator not working properly. Analyzer Notes:

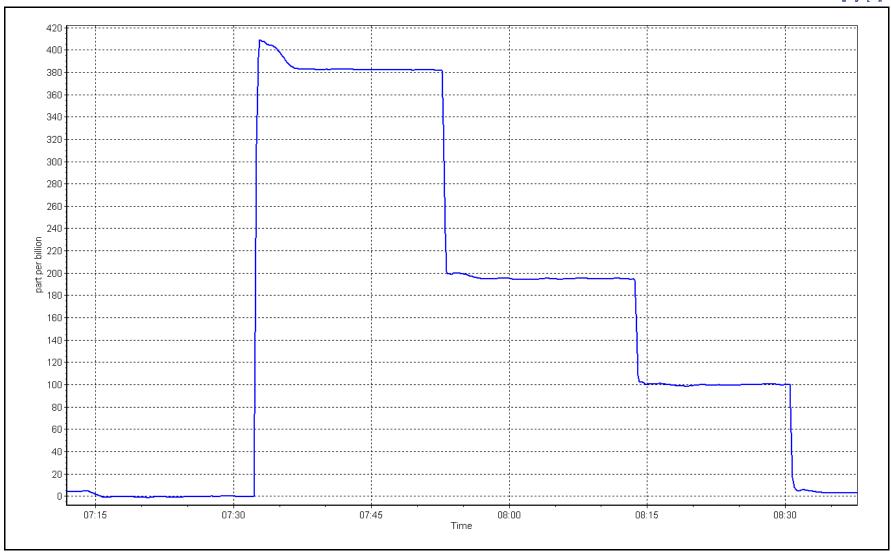
maintenance- Lamp changed, Leak check passed.

Calibration Performed By: Melissa Lemay O₃ Calibration Plot

Date: March 6, 2023

Location: Buffalo Viewpoint







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: March 7, 2023

Start time (MST): 9:20 Reason: Routine Station number: AMS04

Last Cal Date: March 6, 2023

End time (MST): 11:39

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: Calibration slope: 0.988657 0.996114 -3.3 -5.3 Coeff or Slope: Calibration intercept: 3.560000 1.880000 1.065 1.178

O₃ 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					
as found span					
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	970.8	400.0	399.6	1.001
second point	5000	806.0	200.0	201.7	0.992
third point	5000	697.0	100.0	103.2	0.969
as left zero	5000	0.0	0.0	1.2	
as left span	5000	971.2	400.0	399.2	1.002
			Averag	ge Correction Factor	0.987
Baseline Corr As found:	NA	Previous response	e NA	*% change	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:	:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:	:		

Station calibrator was replaced. Analyzer maintenance- Lamp changed, Leak check passed. Span

adjusted.

Calibration Performed By: Melissa Lemay

Notes:

* = > +/-5% change initiates investigation



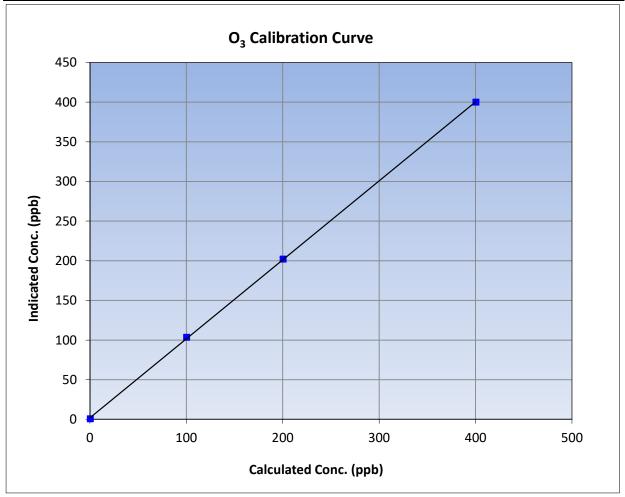
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 7, 2023 **Previous Calibration:** March 6, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 9:20 End Time (MST): 11:39 Analyzer make: **API T400** Analyzer serial #: 2961

	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	0.999927	≥0.995					
400.0	399.6	1.0010	Correlation Coefficient	0.333327	20.995					
200.0	201.7	0.9916	Slope	0.996114	0.90 - 1.10					
100.0	103.2	0.9690	Slope	0.990114	0.90 - 1.10					
			- Intercept	1.880000	+/- 5					

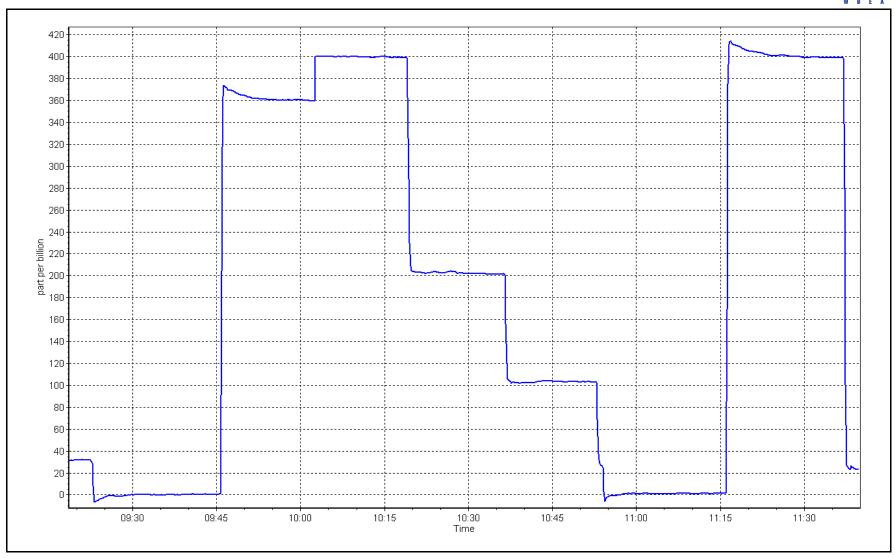


O₃ Calibration Plot

Date: March 7, 2023

Location: Buffalo Viewpoint







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	n		
Station Name:	Buffalo Viewpoint		Station number:		
Calibration Date: Start time (MST):	March 28, 2023 9:26		End time (MST):	February 15, 2023 10:33	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	844	
Flow Meter Make/Model:	AliCat		S/N:	228085	
Temp/RH standard:	AliCat		S/N:	228085	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-11.4	-11.5	-11.4		+/- 2 °C
P (mmHg)	736.3	738.1	736.1		+/- 10 mmHg
flow (LPM)	5	4.8	5		+/- 0.25 LPM
Leak Test:	Date of check:	March 28, 2023	Last Cal Date:	February 15, 2023	
	PM w/o HEPA:	5	PM w/ HEPA:	0	<0.2 ug/m3
		Quarterly Calibration	Test		
<u>Parameter</u>	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.5		10.5		10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	-	March 28,			<0.2 ug/m3
Disposable Filte	r Changed:	March 28,	2023	-	
		Annual Maintenand	ce		
Date Sample Tub	oe Cleaned:	September 1	.5, 2022		
Date RH/T Senso	or Cleaned:	September 1		- -	
	•	eadings once in a while be	0.	,	•
Notes:	was showing no rea	adings before cleaning, aft cleaning. Pump at 80	•		k failed after
Calibration by:	Melissa Lemay				



Station Name:

Calibration Date: Start time (MST):

Analyzer Make:

Particulate Fraction:

Temp/RH standard:

Flow Meter Make/Model:

Parameter

T (°C)

P (mmHg)

flow (LPM)

Leak Test:

Inlet cleaning:

Parameter

PMT Peak Test

Post-maintenance leak check:

Date Optical Chamber Cleaned:

Disposable Filter Changed:

Buffalo Viewpoint

As found

-4

728.6

5

As found

10.4

PM w/o HEPA:

Inlet Head

March 29, 2023

6:29

API T640

PM2.5

AliCat

AliCat

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION Version-01-2023 **Station Information** Station number: AMS 04 Last Cal Date: End time (MST): 7:09 S/N: 322 S/N: 228085 S/N: 228085 **Monthly Calibration Test** Measured As left Adjusted (Limits) -3.85 -4 +/- 2 °C 729.9 728.6 +/- 10 mmHg 4.95 5 +/- 0.25 LPM Date of check: March 29, 2023 Last Cal Date: 5.9 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 **Quarterly Calibration Test** Post maintenance As left <u>Adjusted</u> (Limits) 10.4 10.9 +/- 0.5 PM w/o HEPA: March 28, 2023 <0.2 ug/m3 March 28, 2023 **Annual Maintenance**

Date Sample Tube Cleaned: September 15, 2022 Date RH/T Sensor Cleaned: September 15, 2022

Install Calibration.

Notes:

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Mannix Station number: AMS05

Calibration Date: March 2, 2023 Last Cal Date: February 21, 2023

Start time (MST): 10:34 End time (MST): 14:43

Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.02 ppm Cal Gas Exp Date: January 12, 2029

Cal Gas Cylinder #: XC026809B

Removed Cal Gas Conc: 50.02 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 621
ZAG Make/Model: API T701H Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1008841399

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.996758 0.999400 Backgd or Offset: 8.8 9.1 -0.080000 0.920 Calibration intercept: -0.280000 Coeff or Slope: 0.914

SO₂ 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	-0.1	
as found span	4920	80.0	800.3	792.2	1.010
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	799.4	1.001
second point	4960	40.0	400.2	400.5	0.999
third point	4980	20.0	200.1	198.6	1.007
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.0	800.3	803.8	0.996
			Averag	ge Correction Factor	1.003
Baseline Corr As found:	792.30	Previous response	797.65	*% change	-0.7%

Baseline Corr As found: 792.30 Previous response 797.65 ** change -0.7%
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



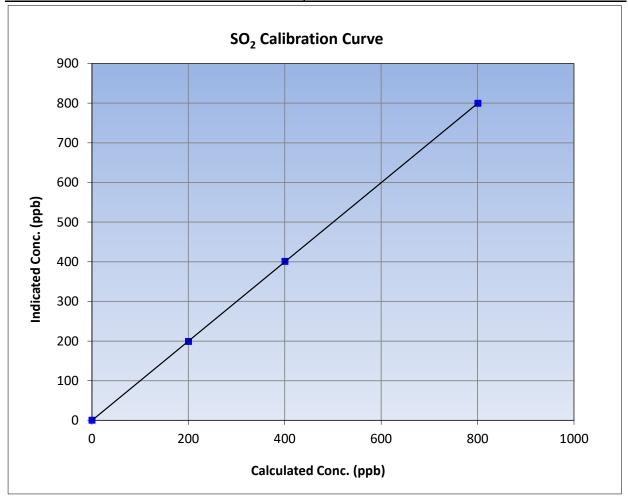
SO₂ Calibration Summary

Version-01-2020

Station Information

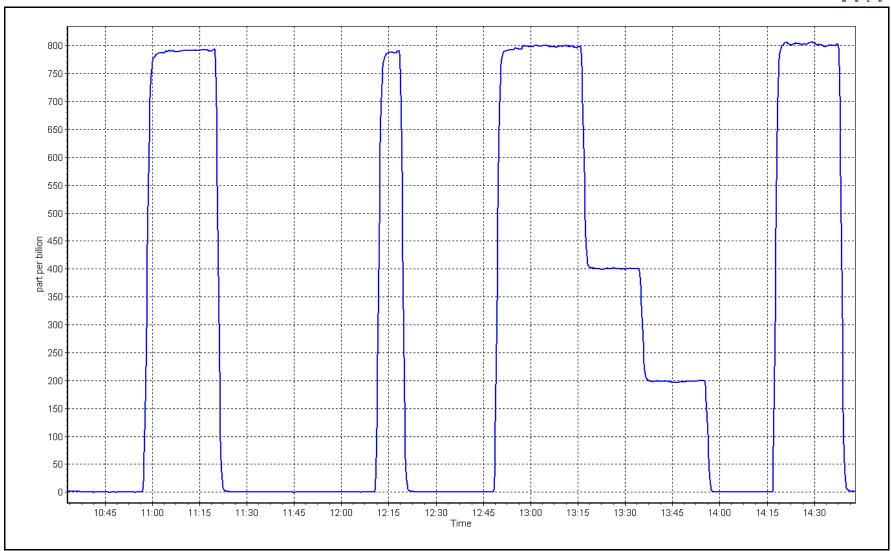
Calibration Date: March 2, 2023 **Previous Calibration:** February 21, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:34 End Time (MST): 14:43 Analyzer make: Thermo 43i Analyzer serial #: 1008841399

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	ation	<u>Limits</u>							
0.0	0.1		Correlation Coefficient	0.999994	≥0.995					
800.3	799.4	1.0012	Correlation Coefficient	0.555554	20.333					
400.2	400.5	0.9992	Slope	0.999400	0.90 - 1.10					
200.1	198.6	1.0075	Slope	0.555400	0.90 - 1.10					
			Intercept	-0.280000	+/-30					



SO2 Calibration Plot Date: March 2, 2023 Location: Mannix







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mannix

Calibration Date: March 15, 2023

Start time (MST): 8:52 Reason: Routine Station number: AMS05

Last Cal Date: February 15, 2023

End time (MST): 13:37

Calibration Standards

Cal Gas Concentration: 4.92 ppm Cal Gas Exp Date: February 9, 2024

Cal Gas Cylinder #: EY0002433

Removed Cal Gas Conc: 4.92 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

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

Analyzer Information

Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

Converter make: Global Converter serial #: 2022-196

Analyzer Range 0 - 100 ppb

StartFinishStartFinishCalibration slope:0.9986130.988329Backgd or Offset:2.092.07

 Calibration slope:
 0.998613
 0.988329
 Backgd or Offset:
 2.09
 2.07

 Calibration intercept:
 0.220652
 0.380632
 Coeff or Slope:
 0.822
 0.822

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 span	4919	81.3	80.0	79.0	1.015
as found 2nd point	4960	40.7	40.0	40.1	1.004
as found 3rd point	4980	20.3	20.0	20.2	0.999
new cylinder response					

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	5000	0.0	0.0	0.3	
high point	4919	81.3	80.0	79.4	1.007
second point	4960	40.7	40.0	40.0	1.001
third point	4980	20.3	20.0	20.2	0.989
as left zero	5000	0.0	0.0	0.4	
as left span	4919	81.3	80.0	80.0	1.000
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber chang	ge:	_	_	Ave Corr Factor	0.999
D . C1					CC1 1

Date of last scrubber change:	Ave Corr Factor	0.999
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 78.8 80.10 -1.7% Prev response: *% change: Baseline Corr 2nd AF pt: 39.9 AF Slope: 0.984332 AF Intercept: 0.420538 Baseline Corr 3rd AF pt: 0.999953 20.0 AF Correlation:

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. No adjustments made.

Calibration Performed By: Sean Bala



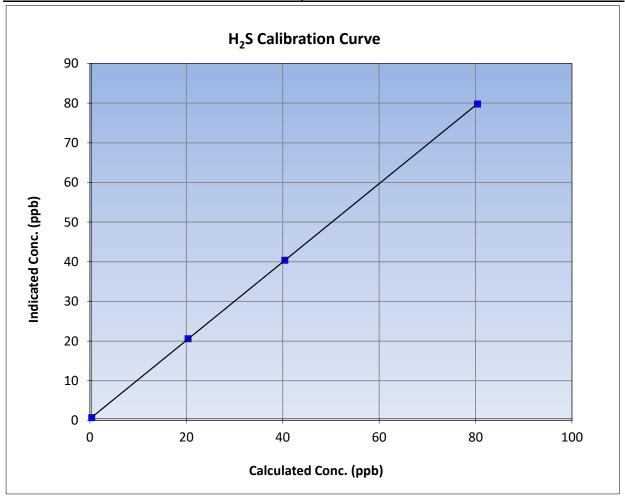
H₂S Calibration Summary

Version-11-2021

Station Information

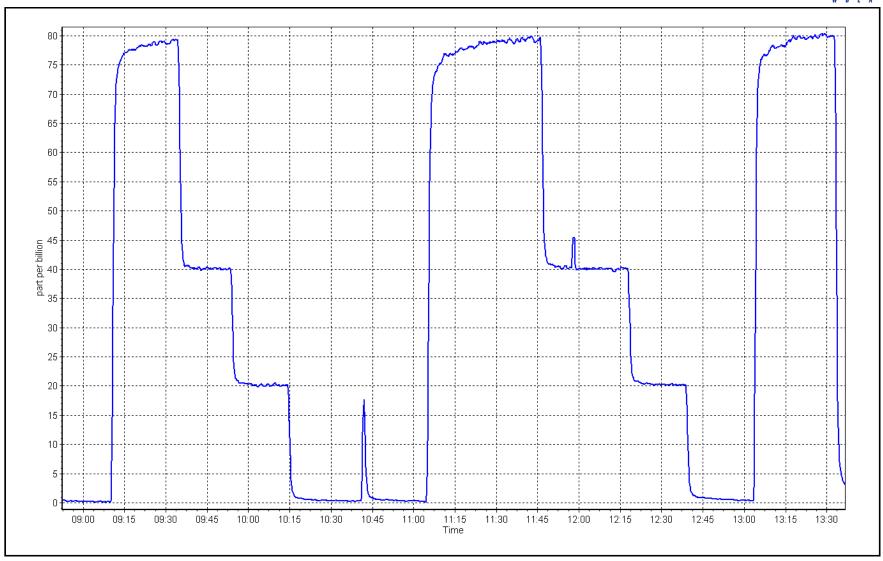
Calibration Date: March 15, 2023 **Previous Calibration:** February 15, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 8:52 End Time (MST): 13:37 Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

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	0.999995	≥0.995		
80.0	79.4	1.0075	Correlation Coefficient	0.555555	20.993		
40.0	40.0	1.0011	Slope	0.988329	0.90 - 1.10		
20.0	20.2	0.9888	Slope	0.300323	0.90 - 1.10		
			- Intercept	0.380632	+/-3		



Date: March 15, 2023 Location: Mannix







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Mannix Station Name:

Calibration Date: March 2, 2023

Start time (MST): 10:34

Reason: Routine

Station number: AMS05

Last Cal Date: February 21, 2023

End time (MST): 14:43

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

C3H8 Cal Gas Conc. 207.9 ppm

Removed Gas Expiry: Removed Gas Cert: NA

Removed CH4 Conc. 504.9 ppm CH4 Equiv Conc. 1076.6 ppm

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

Calibrator Model: **API T700** Serial Number: 621 ZAG make/model: **API T701H** Serial Number: 832

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

> Start Finish Start Finish

CH4 SP Ratio: 2.56E-04 2.58E-04 NMHC SP Ratio: 4.36E-05 4.50E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 209913 203233

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	17.06	1.010
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	17.23	1.000
second point	4960	40.0	8.61	8.61	1.000
third point	4980	20.0	4.31	4.29	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	17.23	17.29	0.996
			,	Average Correction Factor	1.001
Baseline Corr AF:	17.06	Prev response	17.17	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

WDEA					Version-01-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0	0.00	0.00	
as found span	4920	80	9.15	9.01	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
nigh point	4920	80	9.15	9.15	0.999
second point	4960	40	4.57	4.59	0.996
hird point	4980	20	2.29	2.30	0.996
as left zero	5000	0	0.00	0.00	
as left span	4920	80	9.15	9.22	0.992
			A	Average Correction Factor	0.997
Baseline Corr AF:	9.01	Prev response	9.12	*% change	-1.3%
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) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
Set Point as found zero	Dil air flow rate 5000	Source gas flow rate 0.0	Calc conc (ppm) (0	0.00 Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found span	4920	80.0	8.08	8.05	1.004
as found 2nd point	4920	80.0	0.00	8.03	1.004
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	4.02	1.001
third point	4980	20.0	2.02	2.00	1.003
as left zero	5000	0.0	0.00	0.00	1.012
as left span	4920	80.0	8.08	8.07	1.001
as left spair	4920	80.0		Average Correction Factor	1.001
Baseline Corr AF:	8.05	Prev response	8.05	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:	0.05	AF Intercept:	0.070
Baseline Corr 3rd AF:	NA NA	AF Correlation:		* = > +/-5% change initiat	es investigation
baselille Coll Stu Al .	IVA		Ctatistics	- 17 576 Gridinge militae	es investigation
		Calibration	Statistics		
THE C C		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.997356		1.000262	
THC Cal Offset:		-0.010200		-0.006600	
CH4 Cal Slope:		0.997864		0.999646	
CH4 Cal Offset:		-0.012000		-0.011800	

Notes: Sample inlet filter changed after as founds. Zero chromatogram was used. Span was adjusted.

0.997020

0.000600

Calibration Performed By: Sean Bala

NMHC Cal Slope:

NMHC Cal Offset:

1.000469

0.005800



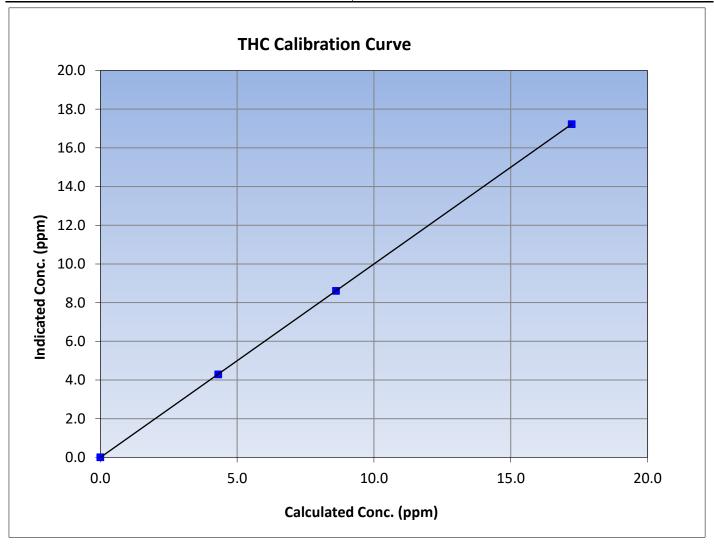
THC Calibration Summary

Version-01-2020

Station Information

March 2, 2023 Calibration Date: **Previous Calibration:** February 21, 2023 Station Name: AMS05 Mannix Station Number: Start Time (MST): 10:34 End Time (MST): 14:43 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	0.99999	≥0.995	
17.23	17.23	1.0000	Correlation Coefficient	0.555555	20.333	
8.61	8.61	1.0005	Slope	1.000262	0.90 - 1.10	
4.31	4.29	1.0034	Slope	1.000202	0.90 - 1.10	
			Intercept	-0.006600	+/-0.5	





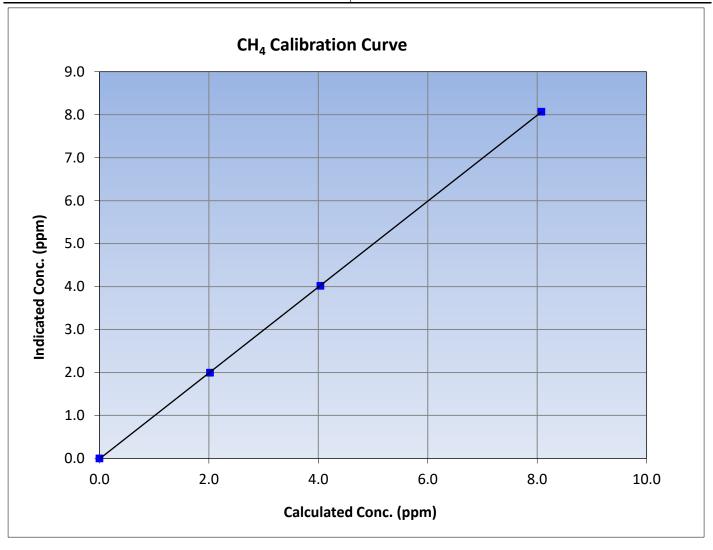
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 21, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:34 End Time (MST): 14:43 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	0.999990	≥0.995
8.08	8.07	1.0010	Correlation Coefficient		20.333
4.04	4.02	1.0050	Slope	0.999646	0.90 - 1.10
2.02	2.00	1.0118	Slope	0.333040	0.90 - 1.10
			Intercept	-0.011800	+/-0.5





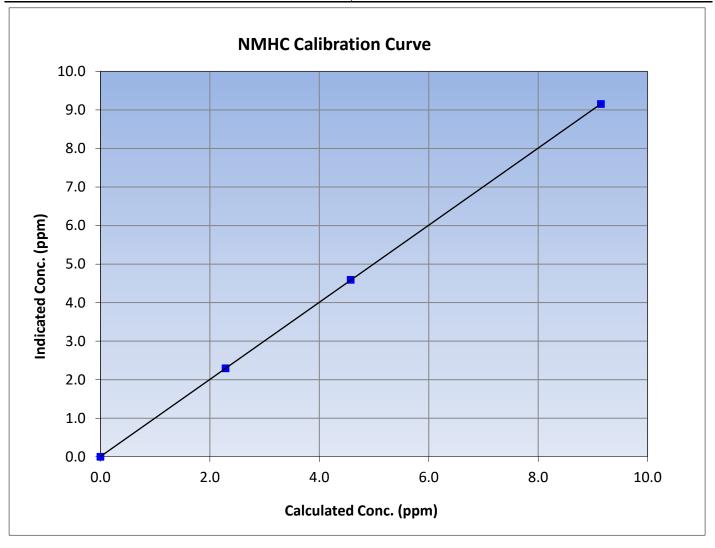
NMHC Calibration Summary

Version-01-2020

Station Information

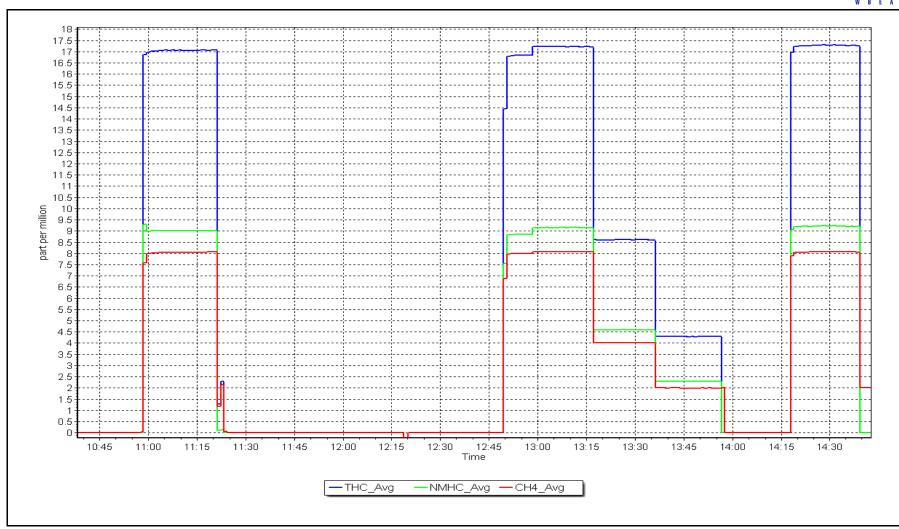
March 2, 2023 Calibration Date: **Previous Calibration:** February 21, 2023 Station Name: AMS05 Mannix Station Number: Start Time (MST): 10:34 End Time (MST): 14:43 Analyzer make: Thermo 55i Analyzer serial #: 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
9.15	9.15	0.9994	Correlation Coemicient	0.555557	20.333
4.57	4.59	0.9965	Slope	1.000469	0.90 - 1.10
2.29	2.30	0.9960	Slope	1.000409	0.90 - 1.10
			Intercept	0.005800	+/-0.5



NMHC Calibration Plot Date: March 2, 2023 Location: Mannix







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Mannix

Calibration Date: March 10, 2023

Start time (MST): 9:30

Reason: Maintenance

Station number: AMS05

Last Cal Date: March 2, 2023

End time (MST): 10:56

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: NA Removed Gas Expiry:

Removed CH4 Conc. 504.9 ppm CH4 Equiv Conc. 1076.6 ppm

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

Diff between cyl (CH₄):

Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 621 ZAG make/model: API T701H Serial Number: 832

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

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

CH4 SP Ratio: 2.58E-04 NA NMHC SP Ratio: 4.50E-05 NA CH4 Retention time: 15.00 NA NMHC Peak Area: 203233 NA

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	17.42	0.989
second point					
third point					
as left zero					
as left span					

			А	verage Correction Factor	0.989
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 / CH₄ / 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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80	9.15	9.39	0.974
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	0.974
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	CH4 Calibra Source gas flow rate	tion Data 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	8.08	8.03	1.006
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	1.006
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
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000262		1.011204	
THC Cal Offset:		-0.006600		0.000000	
CH4 Cal Slope:		0.999646		0.993637	
CH4 Cal Offset:		-0.011800		0.000000	
NMHC Cal Slope:		1.000469		1.026827	
NMHC Cal Offset:		0.005800		0.000000	

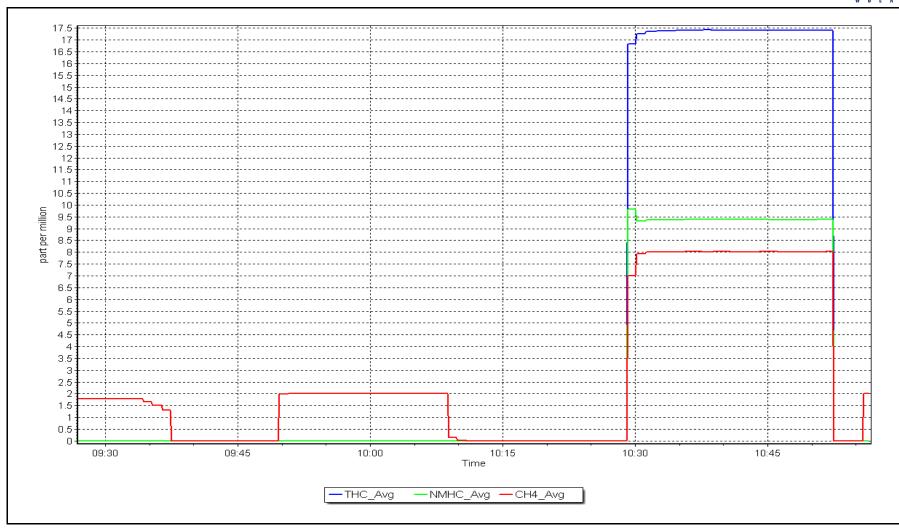
Notes:

Low dilution pressure caused insufficient air supply which affected the instrument baseline and zero-span sequence. Was not able to generate as founds due this issue. Replaced the Zero Air Generator.

Calibration Performed By: Karan Pandit

NMHC Calibration Plot Date: March 10, 2023 Location: Mannix







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-01-2020

Station Information

Station Name: Mannix
Calibration Date: March 16, 2023

Start time (MST): 9:33

Reason: Cylinder Change

Station number: AMS05

Last Cal Date: March 2, 2023

End time (MST): 11:15

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: NA

Removed CH4 Conc. 504.9 ppm CH4 Equiv Conc. 1076.6 ppm

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

Diff between cyl (CH₄): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 621 ZAG make/model: API T701H Serial Number: 832

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

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

CH4 SP Ratio: 2.58E-04 NA NMHC SP Ratio: 4.50E-05 NA CH4 Retention time: 15.00 NA NMHC Peak Area: 203233 NA

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	17.45	0.987
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	17.44	0.988
second point					
third point					
as left zero					
as left span					

			Ave	erage Correction Factor	0.988
Baseline Corr AF:	17.45	Prev response	17.22	*% change	1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates	investigation



THC / CH₄ / NMHC Calibration Report

Version-01<u>-2020</u>

H D L A					Version-01-2
		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= 0.95-1.0</i>
as found zero	5000	0	0.00	0.00	
as found span	4920	80.0	9.15	9.41	0.972
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.0	9.15	9.40	0.973
second point					
third point					
as left zero					
as left span					
-			Aver	age Correction Factor	0.973
Baseline Corr AF:	9.41	Prev response	9.16	*% change	2.7%
Baseline Corr 2nd AF:	NA	AF Slope:	0.20	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	80.0	8.08	8.03	1.006
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	8.04	1.005
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	1.005
Baseline Corr AF:	8.03	Prev response	8.06	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:	2.00	AF Intercept:	2,
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
243511116 0011 014 711 1	. 47 1	Calibration	Statistics		
			Jansiics	Einich	
THC Cal Class		<u>Start</u>		<u>Finish</u>	
THC Cal Offsat:		1.000262		1.012133	
THC Cal Offset:		-0.006600		0.000000	
CH4 Cal Slope:		0.999646		0.994875	
CH4 Cal Offset:		-0.011800		0.000000	
NMHC Cal Slope:		1.000469		1.027373	

Notes:

NMHC Cal Offset:

Nitrogen cylinder changed after as founds.

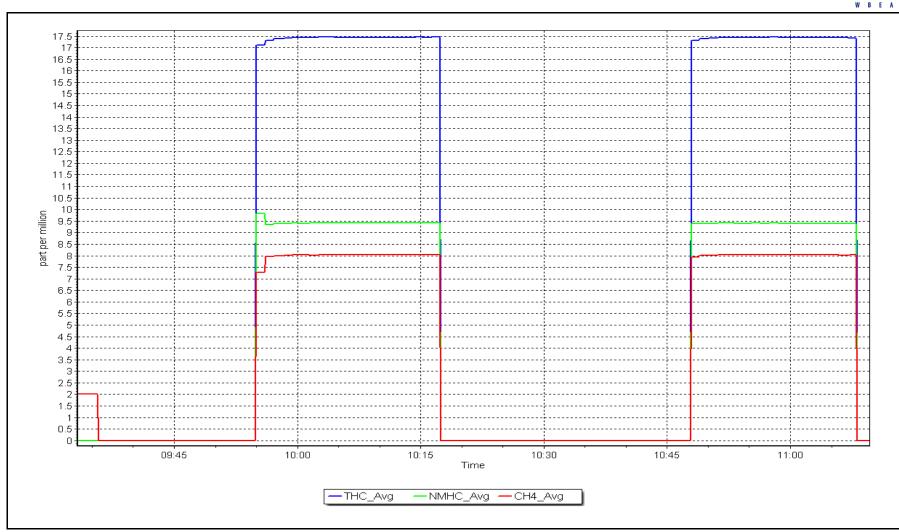
0.000000

0.005800

Calibration Performed By: Karan Pandit

NMHC Calibration Plot Date: March 16, 2023 Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES MARCH 2023

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

April 29, 2023



Calibration slope:

Calibration intercept:

Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: March 13, 2023

Start time (MST): 9:37 Routine Reason:

Station number: AMS06

February 16, 2023 Last Cal Date:

End time (MST): 13:59

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** ppm Cal Gas Exp Date: September 9, 2024

Rem Gas Exp Date: N/A

Diff between cyl:

Serial Number: 689 Serial Number: 3566

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

0.991070 0.993085 1.541481 1.621614 Backgd or Offset: Coeff or Slope: Start 17.2 0.907 **Finish** 17.2 0.907

SO₂ 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	799.5	789.8	1.012
as found 2nd point	4960	40.2	400.2	397.5	1.007
as found 3rd point	4980	20.1	200.1	201.2	0.995
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	
high point	4920	80.3	799.5	792.9	1.008
second point	4960	40.2	400.2	399.7	1.001
third point	4980	20.1	200.1	201.3	0.994
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.3	799.5	793.0	1.008
			Averag	e Correction Factor	1.001

Baseline Corr As found: 789.70 Previous response 795.48 -0.7% *% change Baseline Corr 2nd AF pt: 397.40 AF Slope: 0.986609 AF Intercept: 1.882706 201.10 0.999977 Baseline Corr 3rd AF pt: AF Correlation:

* = > +/-5% change initiates investigation

Completed multipoint as founds to complete maintenance for the NMHC. Changed the inlet filter Notes:

after as founds. No adjustments made.

Calibration Performed By: Max Farrell



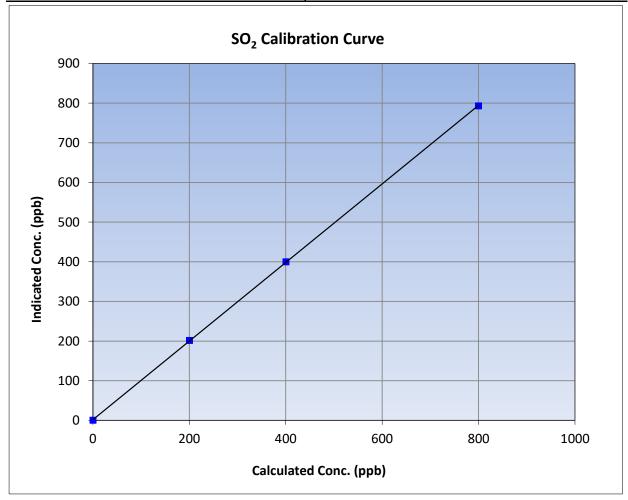
SO₂ Calibration Summary

Version-01-2020

Station Information

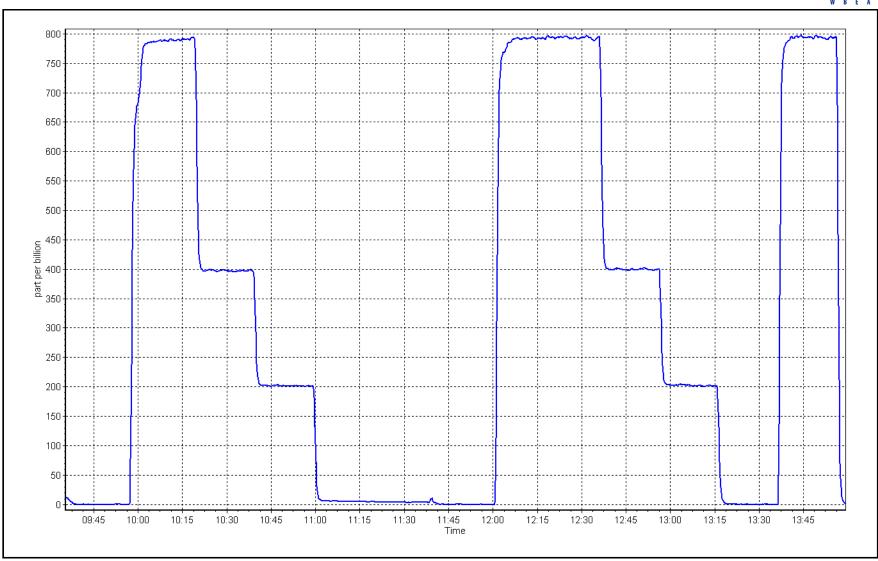
Calibration Date: March 13, 2023 **Previous Calibration:** February 16, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:37 End Time (MST): 13:59 Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	-0.1		Correlation Coefficient	0.999977	≥0.995			
799.5	792.9	1.0083	Correlation Coefficient	0.555511	20.993			
400.2	399.7	1.0013	Slope	0.991070	0.90 - 1.10			
200.1	201.3	0.9941	Slope	0.991070	0.90 - 1.10			
			- Intercept	1.621614	+/-30			



SO2 Calibration Plot Date: March 13, 2023 Location: Patricia McInnes







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Patricia McInnes Calibration Date: March 15, 2023

Start time (MST): 8:55 Reason: Routine Station number: AMS 06

Last Cal Date: February 6, 2023

End time (MST): 13:18

Rem Gas Exp Date: N/A

Calibration Standards

March 2, 2023 Cal Gas Concentration: Cal Gas Exp Date: 5.38 ppm

ppm

Cal Gas Cylinder #: EY0000809

Removed Cal Gas Conc: 5.38 Removed Gas Cyl #: N/A

Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3566 ZAG Make/Model: API T701 H Serial Number: 689

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358 Converter serial #: 2022-195 Converter make: Global G150

Analyzer Range 0 - 100 ppb

Start **Finish Start** <u>Finish</u> Calibration slope: 0.990341 0.997060 Backgd or Offset: 1.82 1.84 Calibration intercept: 0.217319 0.257193 Coeff or Slope: 1.049 1.070

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	4926	74.3	79.9	77.6	1.030
as found 2nd point	4963	37.2	40.0	39.2	1.021
as found 3rd point	4981	18.6	20.0	20.0	1.001
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	4926	74.3	79.9	79.9	1.001
second point	4963	37.2	40.0	40.2	0.996
third point	4981	18.6	20.0	20.4	0.981
as left zero	5000	0.0	0.0	0.2	
as left span	4926	74.3	79.9	79.8	1.002
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chang	ge:	December 20, 2021		Ave Corr Factor	0.992
D . C1					CC1 .

Date of last scrubber change:	December 20, 2021	Ave Corr Factor	0.992
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 77.6 79.39 Prev response: *% change: -2.3% Baseline Corr 2nd AF pt: 39.2 AF Slope: 0.968755 AF Intercept: 0.297750 Baseline Corr 3rd AF pt: AF Correlation: 0.999932 20.0

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell



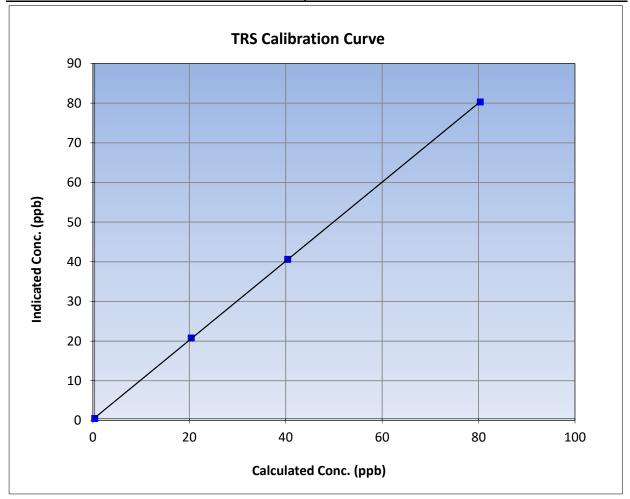
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 15, 2023 **Previous Calibration:** February 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:55 End Time (MST): 13:18 Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358

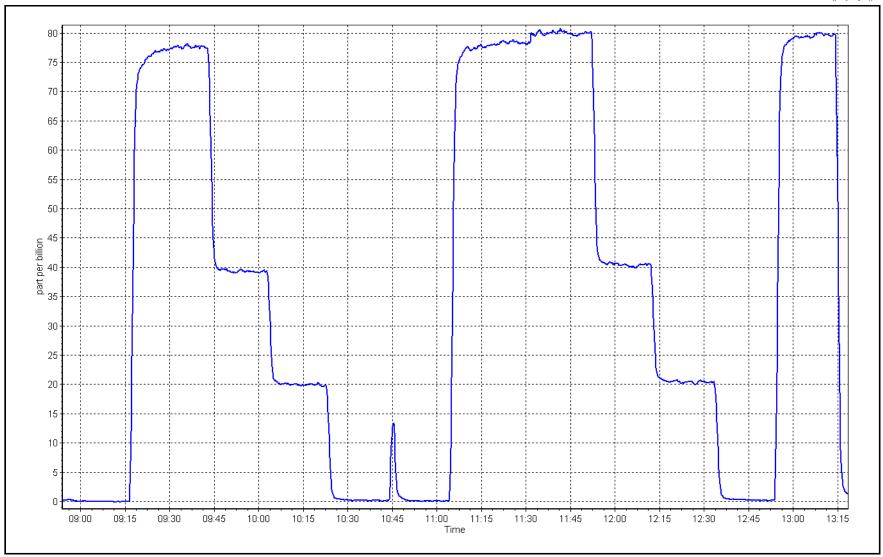
Calibration Data							
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation Limits							
0.0	0.1		Correlation Coefficient	0.999981	≥0.995		
79.9	79.9	1.0005	Correlation Coefficient	0.555501	20.993		
40.0	40.2	0.9957	Slope	0.997060	0.90 - 1.10		
20.0	20.4	0.9811	Slope	0.997000	0.90 - 1.10		
			- Intercept	0.257193	+/-3		



TRS Calibration Plot

Date: March 15, 2023 Location: Patricia McInnes







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: March 13, 2023

Start time (MST): 9:37
Reason: Routine

Station number: AMS06

Last Cal Date: February 25, 2023

End time (MST): 13:59

Calibration Standards

Gas Cert Reference: AAL070632 Cal Gas Expiry Date: September 9, 2024 CH4 Cal Gas Conc. 501.6 ppm CH4 Equiv Conc. 1066.2 ppm

CH4 Cal Gas Conc. 501.6 ppm CH4 Equiv Cor C3H8 Cal Gas Conc. 205.3 ppm

Removed Gas Ref. N/A Removed Gas Expiry: N/A

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

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

Diff between cyl (CH₄): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 3566 ZAG make/model: API T701 Serial Number: 261

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320037

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: 3.26E-04 3.33E-04 NMHC SP Ratio: 5.79E-05 5.86E-05 CH4 Retention time: 14 14.0 NMHC Peak Area: 156880 154840

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	16.91	1.013
as found 2nd point	4960	40.2	8.57	8.45	1.015
as found 3rd point	4980	20.1	4.29	4.26	1.007
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	17.12	17.15	0.998
second point	4960	40.2	8.57	8.57	1.000
third point	4980	20.1	4.29	4.32	0.992
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.16	0.998
			Avei	rage Correction Factor	0.997
Baseline Corr AF:	16.91	Prev response	17.13	*% change	-1.3%
Baseline Corr 2nd AF:	8.4	AF Slope:	0.986971	AF Intercept:	0.006195
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC	Cali	bration	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	4920	80.3	9.07	8.99	1.008
as found 2nd point	4960	40.2	4.54	4.51	1.007
as found 3rd point	4980	20.1	2.27	2.27	1.002
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.3	9.07	9.08	0.999
second point	4960	40.2	4.54	4.55	0.997
third point	4980	20.1	2.27	2.29	0.990
as left zero	5000	0	0.00	0.00	
as left span	4920	80.3	9.07	9.08	0.998
			Ave	erage Correction Factor	0.996
Baseline Corr AF:	8.99	Prev response	9.08	*% change	-0.9%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.991315	AF Intercept:	0.006759
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999997	* = > +/-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	80.3	8.06	7.92	1.017
as found 2nd point	4960	40.2	4.03	3.94	1.023
as found 3rd point	4980	20.1	2.02	1.99	1.013
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.07	0.998
second point	4960	40.2	4.03	4.02	1.003
third point	4980	20.1	2.02	2.03	0.994
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.06	8.07	0.998
			Ave	rage Correction Factor	0.998
Baseline Corr AF:	7.92	Prev response	8.05	*% change	-1.7%
Baseline Corr 2nd AF:	3.94	AF Slope:	0.982351	AF Intercept:	-0.000765
Baseline Corr 3rd AF:	1.99	AF Correlation:	0.999986	* = > +/-5% change initiates investigation	

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	1.000813	1.000848
THC Cal Offset:	-0.008055	0.007935
CH4 Cal Slope:	1.000524	1.001093
CH4 Cal Offset:	-0.008597	-0.000603
NMHC Cal Slope:	1.001070	1.000428
NMHC Cal Offset:	0.000542	0.009337

Notes: Completed multipoint as founds due to H2 generator requiring routine maintenance. Adjusted the span only.

Calibration Performed By: Max Farrell



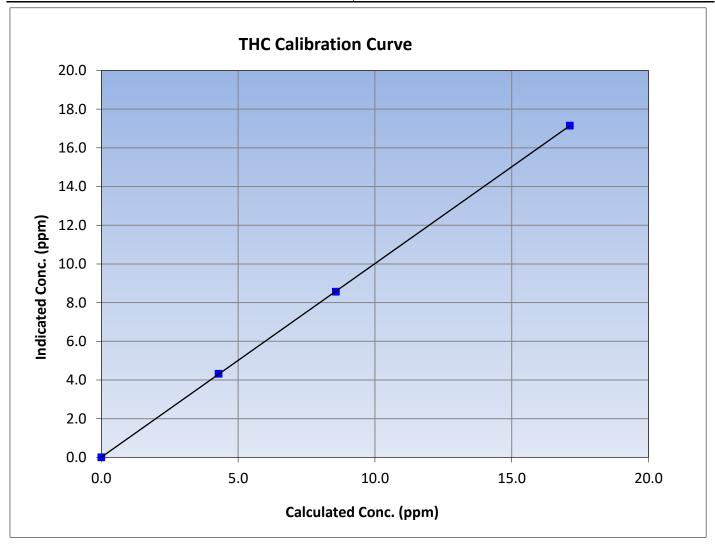
THC Calibration Summary

Version-01-2020

Station Information

March 13, 2023 Calibration Date: **Previous Calibration:** February 25, 2023 Station Name: Patricia McInnes AMS06 Station Number: Start Time (MST): 9:37 End Time (MST): 13:59 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999994	≥0.995
17.12	17.15	0.9985	Correlation Coefficient	0.555554	20.993
8.57	8.57	1.0005	Slope	1.000848	0.90 - 1.10
4.29	4.32	0.9919	Slope		0.30 - 1.10
			Intercept	0.007935	+/-0.5





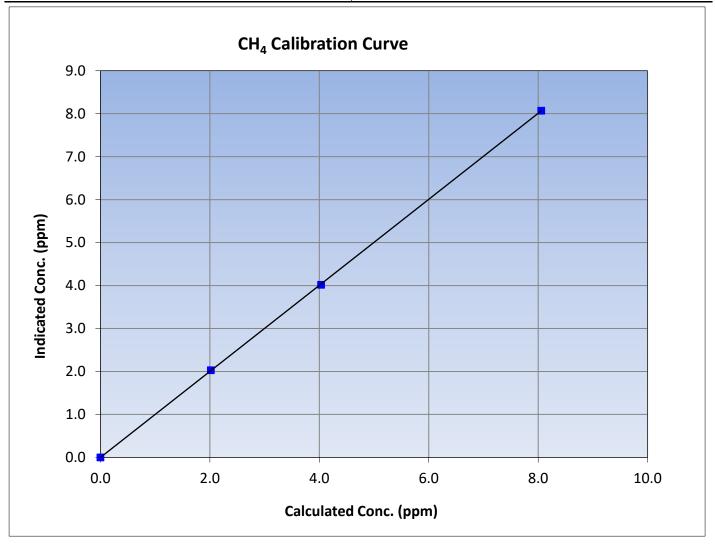
CH₄ Calibration Summary

Version-01-2020

Station Information

March 13, 2023 Calibration Date: **Previous Calibration:** February 25, 2023 Station Name: AMS06 Patricia McInnes Station Number: Start Time (MST): 9:37 End Time (MST): 13:59 Analyzer make: Analyzer serial #: 1180320037 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	0.999987	≥0.995
8.06	8.07	0.9982	Correlation Coefficient	0.333307	20.333
4.03	4.02	1.0034	Slope	1.001093	0.90 - 1.10
2.02	2.03	0.9938	Slope		0.90 - 1.10
			Intercept	-0.000603	+/-0.5





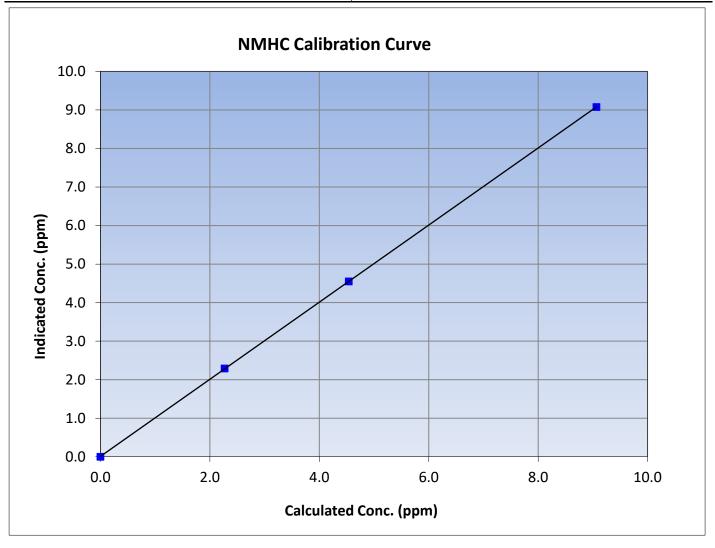
NMHC Calibration Summary

Version-01-2020

Station Information

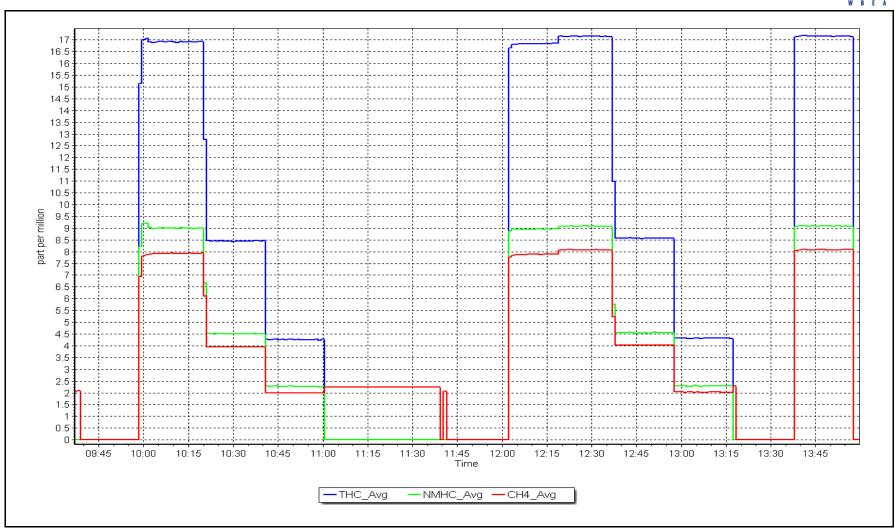
March 13, 2023 **Previous Calibration:** Calibration Date: February 25, 2023 Station Name: Patricia McInnes AMS06 Station Number: Start Time (MST): 9:37 End Time (MST): 13:59 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

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
9.07	9.08	0.9989	Correlation Coefficient	0.555555	20.993
4.54	4.55	0.9974	Slope	1.000428	0.90 - 1.10
2.27	2.29	0.9902	Slope	1.000426	0.90 - 1.10
			Intercept	0.009337	+/-0.5



NMHC Calibration Plot Date: March 13, 2023 Location: Patricia McInnes







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: March 24, 2023

Start time (MST): 8:53

CH4 Cal Gas Conc.

Reason: Cylinder Change

Station number: AMS06

Last Cal Date: March 13, 2023

End time (MST): 10:20

Calibration Standards

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

CH4 Equiv Conc. 1066.2 ppm

Removed Gas Expiry: N/A

C3H8 Cal Gas Conc. 205.3 ppm

Removed Gas Ref. N/A

501.6

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

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

Diff between cyl (CH₄): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 3566 ZAG make/model: API T701 Serial Number: 261

ppm

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320037

THC Range (ppm): 0 - 20 ppm

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

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

 CH4 SP Ratio:
 3.33E-04
 3.33E-04
 NMHC SP Ratio:
 5.86E-05
 5.86E-05

 CH4 Retention time:
 14
 14.0
 NMHC Peak Area:
 154840
 154840

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	17.15	0.998
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	17.13	1.000
second point					
third point					
as left zero					
as left span					

			Ave	erage Correction Factor	1.000
Baseline Corr AF:	17.15	Prev response	17.15	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:	AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		



THC / CH₄ / 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	4920	80.3	9.07	9.13	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.3	9.07	9.11	0.995
second point					
third point					
as left zero					
as left span					
			Ave	rage Correction Factor	0.995
Baseline Corr AF:	9.13	Prev response	9.08	*% change	0.6%
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	tion Data Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 3
as found zero	5000	0.0	0.00	0.00	CF LIIIIIL = 0.93-1.03
as found span	4920	80.3	8.06	8.02	1.004
as found 2nd point	4920	60.3	8.00	0.02	1.004
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.02	1.004
second point	4320	00.5	8.00	0.02	1.004
third point					
as left zero					
as left span					
45 TOTO PATE			Ave	rage Correction Factor	1.004
Baseline Corr AF:	8.02	Prev response	8.06	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:	2.00	AF Intercept:	3.2,5
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
			Statistics	Finish	
TUC Cal Classe		<u>Start</u>		<u>Finish</u>	
THC Cal Offsat:		1.000848		1.000481	
THC Cal Offset:		0.007935		0.000000	
CH4 Cal Offsate		1.001093		0.995569	
CH4 Cal Offset:		-0.000603		0.000000	
NMHC Cal Slope:		1.000428		1.005175	

Notes: Cylinder change.

0.009337

Calibration Performed By: Sean Bala

NMHC Cal Offset:

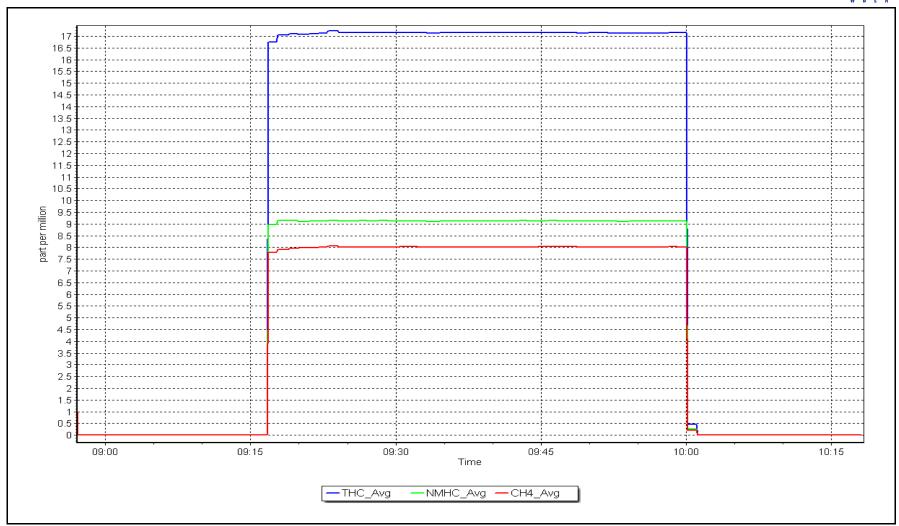
0.000000

NMHC Calibration Plot Date:

Date: March 24, 2023 Local

Location: Patricia McInnes







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: March 7, 2023

Start time (MST): 9:33
Reason: Routine

Station number: AMS06

Last Cal Date: February 2, 2023

End time (MST): 14:21

Calibration Standards

NO Gas Cylinder #: T26D9MR Cal Gas Expiry Date: August 18, 2023

NOX Cal Gas Conc: 52.51 ppm NO Cal Gas Conc: 51.98 ppm

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

Removed Gas NOX Conc: 52.51 ppm Removed Gas NO Conc: 51.98 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3566 ZAG make/model: Teledyne API T701 Serial Number: 689

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1172750022

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 0.818 0.818 NO bkgnd or offset: 3.2 3.2 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 3.8 3.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 155.1 155.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004307	0.993329
NO _x Cal Offset:	2.260596	2.240132
NO Cal Slope:	1.003971	0.991966
NO Cal Offset:	1.260503	1.559980
NO ₂ Cal Slope:	1.009891	1.003238
NO ₂ Cal Offset:	0.497022	1.111866



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	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	-0.4	0.0	-0.5		
as found span	4923	76.9	807.6	799.5	8.2	805.4	792.5	12.9	1.0027	1.0088
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.1		
high point	4923	76.9	807.6	799.5	8.2	803.4	793.9	9.6	1.0052	1.0070
second point	4962	38.5	404.3	400.2	4.1	404.8	399.3	5.6	0.9988	1.0024
third point	4981	19.2	201.6	199.6	2.0	204.9	200.9	4.0	0.9841	0.9935
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.3	-0.3		
as left span	4923	76.9	807.6	389.9	417.8	801.2	384.2	417.1	1.0080	1.0147
							Average C	orrection Factor	0.9960	1.0010
Corrected As fo	ound NO _x =	805.8 ppb	NO =	792.5 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _X =	-0.9%
Previous Respo	nse NO _X =	813.3 ppb	NO =	803.9 ppb				*Percent Chang	ge NO =	-1.4%
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 _X =	NA ppb	NO =	NA ppb	As foun	d NO r ² :	, •	NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:	í	NO2 SI:	NO ₂ Int:	
				G	iPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Refere concentration (ppl		cated NO Drop entration (ppb)	Calculated No concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction factorized Calibration Limit = As Found Limit = C	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)									-
	nt (100 nnh NO2)									
as found GPT poir	III (100 ppb NO2)							0.00=		100 40/
as found GPT point 1st GPT point		791.9		382.3	417.8		419.6	0.9956	5 <u>1</u>	100.4%
· · · · · · · · · · · · · · · · · · ·	(400 ppb O3)	791.9 791.9		382.3 587.1	417.8 213.0		419.6 215.3	0.9956		100.4% 101.1%
1st GPT point	t (200 ppb O3)								1 1	

Notes:

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

Calibration Performed By:

Max Farrell



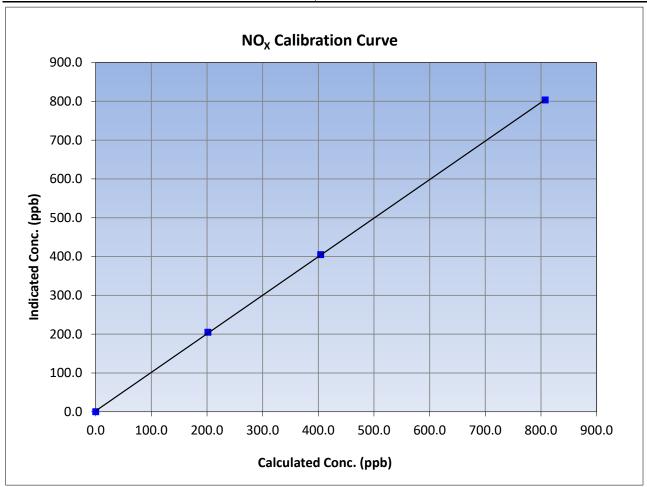
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 7, 2023 Previous Calibration: February 2, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:33 End Time (MST): 14:21 Analyzer serial #: Analyzer make: Thermo 42i 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Statistical Evaluation		ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999964	≥0.995
807.6	803.4	1.0052	Correlation Coefficient	0.555504	20.993
404.3	404.8	0.9988	Slope	0.993329	0.90 - 1.10
201.6	204.9	0.9841	Slope	0.995529	0.90 - 1.10
			Intercept	2.240132	+/-20





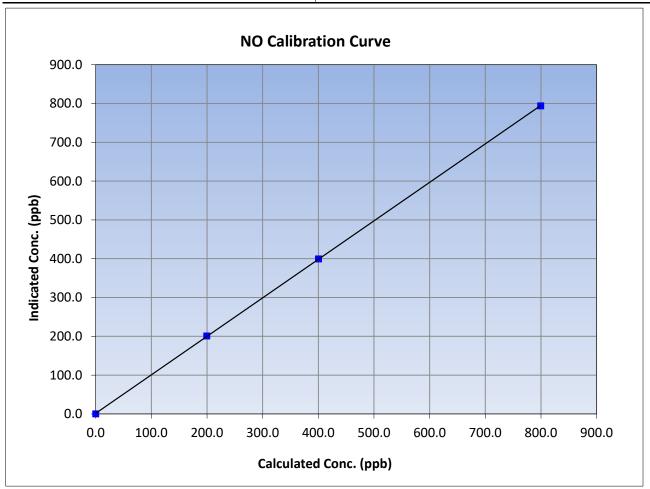
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 7, 2023 Previous Calibration: February 2, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:33 End Time (MST): 14:21 Analyzer make: Thermo 42i Analyzer serial #: 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	tion factor (Cc/Ic) Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999987	≥0.995
799.5	793.9	1.0070	Correlation Coefficient	0.555567	20.333
400.2	399.3	1.0024	Slope	0.991966	0.90 - 1.10
199.6	200.9	0.9935	Slope	0.991900	0.90 - 1.10
			Intercept	1.559980	+/-20





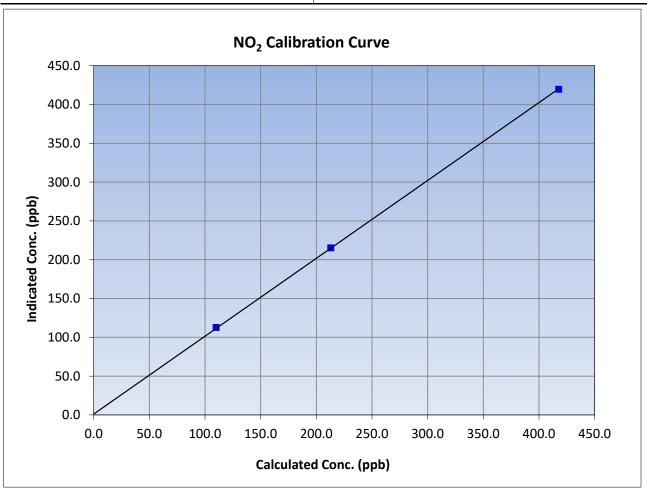
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 7, 2023 Previous Calibration: February 2, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:33 End Time (MST): 14:21 Analyzer make: Thermo 42i Analyzer serial #: 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999960	≥0.995
417.8	419.6	0.9956	Correlation Coefficient	0.555500	20.993
213.0	215.3	0.9891	Slope	1.003238	0.90 - 1.10
110.0	112.7	0.9756	Slope	1.005256	0.30 - 1.10
			Intercept	1.111866	+/-20

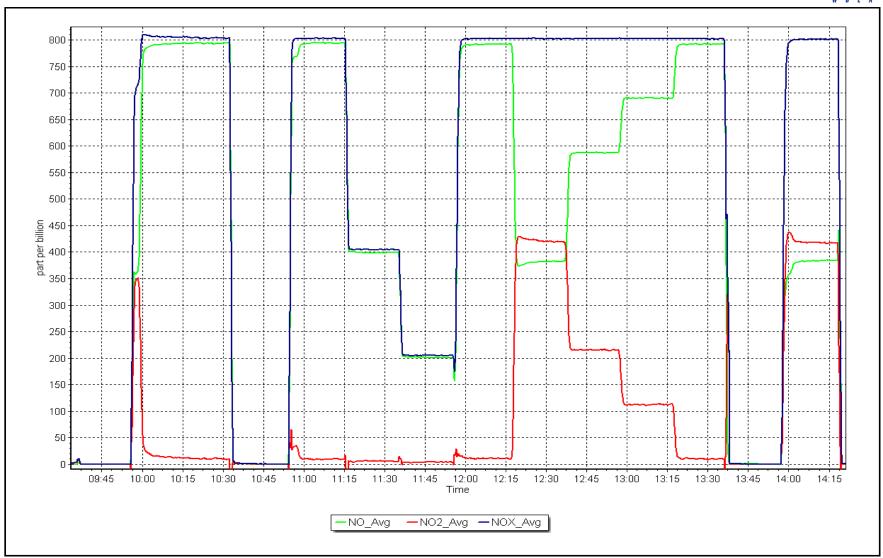


NO_x Calibration Plot

Date: March 7, 2023

Location: Patricia McInnes







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: March 9, 2023

Start time (MST): 11:10
Reason: Routine

Station number: AMS06

Last Cal Date: February 8, 2023

End time (MST): 14:11

Calibration Standards

O3 generation mode: Photometer

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

Serial Number: 3566 Serial Number: 689

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1300156234

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.005057 1.005771 -1.2 -1.2 0.940000 Coeff or Slope: Calibration intercept: 1.240000 1.019 1.019

O₃ 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	1303.0	400.0	402.5	0.994
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.2	
high point	5000	1303.0	400.0	402.8	0.993
second point	5000	966.5	200.0	202.7	0.987
third point	5000	794.3	100.0	102.1	0.979
as left zero	5000	800.0	0.0	0.4	
as left span	5000	1303.0	400.0	404.6	0.989
			Avera	ge Correction Factor	0.986
Baseline Corr As found:	402.3	Previous respons	e 403.3	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	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: Max Farrell

* = > +/-5% change initiates investigation



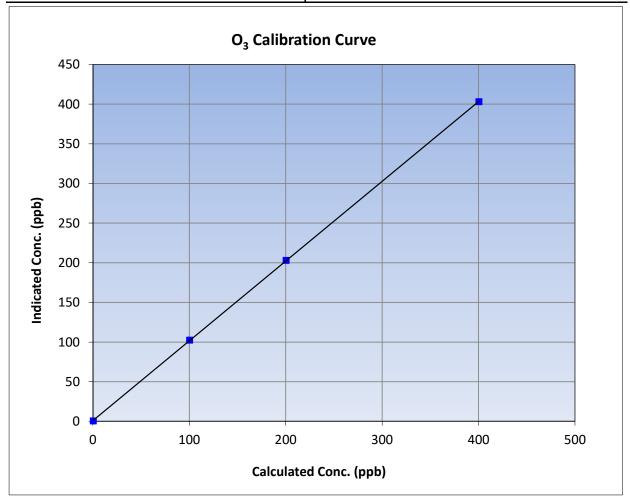
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 8, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 11:10 End Time (MST): 14:11 Analyzer make: Thermo 49i Analyzer serial #: 1300156234

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	0.999984	≥0.995		
400.0	402.8	0.9930	Correlation Coefficient	0.333304	20.333		
200.0	202.7	0.9867	Slope	1.005771	0.90 - 1.10		
100.0	102.1	0.9794	Slope	1.003771	0.90 - 1.10		
			- Intercept	0.940000	+/- 5		

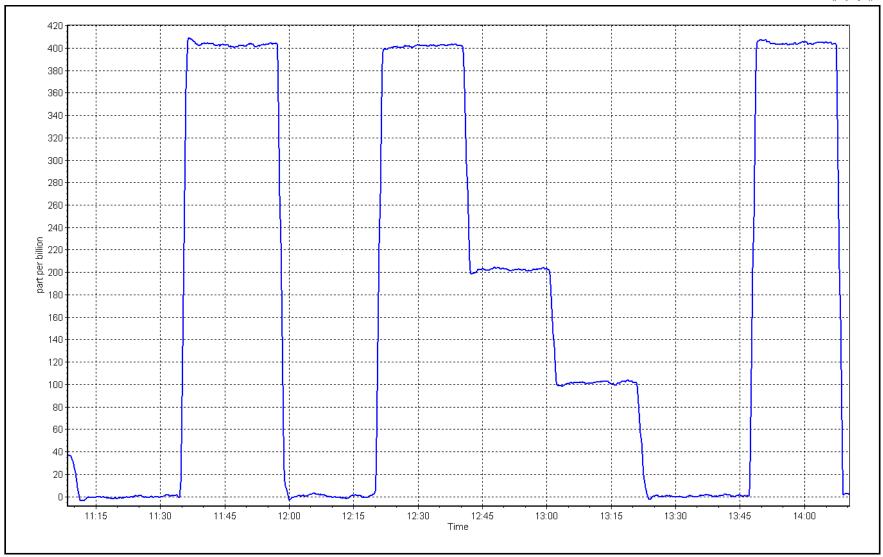


O₃ Calibration Plot

Date: March 9, 2023

Location: Patricia McInnes







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information					
Station Name:	Patricia McInnes	Station number: AMS 06					
Calibration Date:	March 15, 2023		Last Cal Date:	February 16, 2023			
Start time (MST):	13:50		End time (MST):	14:17			
Analyzer Make:	API T640		S/N:	766			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	Delta Cal		S/N:	628			
Temp/RH standard:	Delta Cal		S/N:	628			
		Monthly Calibration To	est				
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	(Limits)		
T (°C)	-8.4	-7.5	-8.4		+/- 2 °C		
P (mmHg)	727.8	725.5	727.8		+/- 10 mmHg		
flow (LPM)	5	5.14	5		+/- 0.25 LPM		
Leak Test:	Date of check:	March 15, 2023	Last Cal Date:	February 16, 2023			
Note: this leak check will be	PM w/o HEPA:	9.4	PM w/ HEPA:	0	<0.2 ug/m3		
		Quarterly Calibration T	est				
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)		
PMT Peak Test					11.3 +/- 0.5		
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:			
Date Optical Cham	ber Cleaned:	January 9, 2	2023		<0.2 ug/m3		
Disposable Filte	r Changed:	January 9, 2023					
		Annual Maintenance	2				
Date Sample Tub Date RH/T Senso	-	August 28, August 28,	-				
Date Kily i Selist	or cleaned.	August 26,	2020				
Notes:	PMT Peak	test completed in Januar	y. Leak check passe	ed. No adjustments ma	de.		
Calibration by:	Max Farrell						



TN - NO_x - NH₃ Calibration Report

Version-11-2021

Station	Intorm	ation

Station Name: Patricia McInnes Station number: AMS 06

NOX Cal Date: March 8, 2023 Last Cal Date: February 7, 2023

Start time (MST): 9:25 14:00 End time (MST):

NH3 Cal Date: March 8, 2023 Last Cal Date: February 7, 2023

Start time (MST): 14:30 End time (MST): 16:05

Routine Reason:

Calibration Standards

NOX Cal Gas Conc: NO Gas Cylinder #: T26D9MR 52.51 ppm NO Cal Gas Conc: 51.98 NO Cal Gas Expiry: August 18, 2023 ppm

Removed NOX Conc: 52.51 Removed Cylinder #: N/A ppm Removed NO Conc: 51.98 Removed cyl Expiry: N/A ppm

NOX gas Diff: NO gas Diff:

CC430800 NH3 Cal Gas Conc: 73.9 NH3 Gas Cylinder #: ppm

NH3 Cal Gas Expiry: January 7, 2023

Removed NH3 Conc: 73.9 Removed Cylinder #: ppm Removed cyl Expiry:

NH3 gas Diff:

Calibrator Model: **API T700** Serial Number: 3566 ZAG make/model: **API T701** Serial Number: 689

Analyzer Information

Analyzer model: API T201 Analyzer serial #: 152 Converter model: API T501 Converter serial #: 147 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 5.70 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 531

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.853	0.823	TN coefficient:	0.851	0.822
NOX coefficient:	0.855	0.824	NO bkgrnd:	-0.1	-0.1
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.0	0.0
NH3 coefficient:	0.951	0.951	TN bkgrnd:	0.0	0.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.994899	0.999337
NO _x Cal Offset:	2.960281	1.041887
NO Cal Slope:	0.994939	0.997013
NO Cal Offset:	1.319966	2.119639
NO ₂ Cal Slope:	0.993439	0.993721
NO ₂ Cal Offset:	1.205483	-1.386593
NH3 Cal Slope:	0.998917	1.005985
NH3 Cal Offset:	8.375709	7.240605
TN Cal Slope:	1.004451	1.011422
TN Cal Offset:	8.831802	7.102178



TN - NOX - NH₃ Calibration Report

Version-11-2021

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	0.8	-0.1	0.9		
as found NO	4923	76.9	807.6	807.6		838.4	835.4	3.1	0.963	
calibrator zero	5000	0.0	0.0	0.0	0.0	0.7	-0.4	1.1		
high NO point	4923	76.9	807.6	807.6		809.4	808.3	1.2	0.998	
NO/O3 point	4923	76.9	807.6	807.6		804.1	803.3	1.0	1.004	
as found NH3	3415	85.3	1801.0		1801.0	1824.2		1814.8	0.987	0.992
new NH3 cyl rp										
first NH3	3415	85.3	1801.0		1801.0	1824.2		1814.8	0.987	0.992
second NH3	3453	47.4	1000.8		1000.8	1024.7		1019.0	0.977	0.982
third NH3	3476	23.7	500.4		500.4	518.8		516.1	0.965	0.970
							Average Co	rrection Factor	1.0011	0.9814

Corrected As found TN = 837.6 ppb $NO_X = 835.5 \text{ ppb}$ NH3 = 1813.9 ppb TN = 820 ppb **Previous Response** $NO_x = 806.4 \text{ ppb}$ NH3 = 1807.5 ppb *Percent Change TN = 2.1%

*Percent Change $NO_X = 3.5\%$ *Percent Change

NH3 = 0.4%

NH3 Previous Converter Efficiency = 95.1%

NH3 Current Converter Efficiency = 95.1% * = > +/-5% change initiates investigation



NO_X - NO - NO₂ Calibration Report

Version-11-2021

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	-0.1	0.4	0.8		
as found span	4923	76.9	807.6	799.5	807.6	835.4	824.9	838.4	0.9667	0.9692
new NO cyl rp										_
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	0.1	0.7		
high point	4923	76.9	807.6	799.5	807.6	808.3	798.0	809.4	0.9991	1.0018
second point	4962	38.5	404.3	400.2	404.3	403.1	402.7	408.0	1.0030	0.9939
third point	4981	19.2	201.6	199.6	201.6	205.8	202.8	208.7	0.9798	0.9842
							Average C	orrection Factor	0.9940	0.9933
Baseline Corr A	s fnd TN =	837.6 ppb	NO _X = 835.5	ppb NO =	824.5 ppb			*Percent Chang	e TN=	2.1%
Previous Respo	nse TN =	820 ppb	$NO_X = 806.4$	ppb NO =	796.7 ppb			*Percent Chang	e NO _x =	3.5%
								*Percent Chang	e NO =	3.4%
								* = > +/-5% change i	nitiates investigati	on

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	-0.5		
calibration zero			0.0	-0.5		
1st GPT point (400 ppb O3)	798.2	378.1	428.3	425.0	1.0077	99.2%
2nd GPT point (200 ppb O3)	798.2	586.4	220.0	215.7	1.0197	98.1%
3rd GPT point (100 ppb O3)	798.2	688.9	117.5	115.1	1.0204	98.0%
			-	Average Correction Factor	1.0159	98.4%

Notes:

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

Calibration Performed By:

Max Farrell



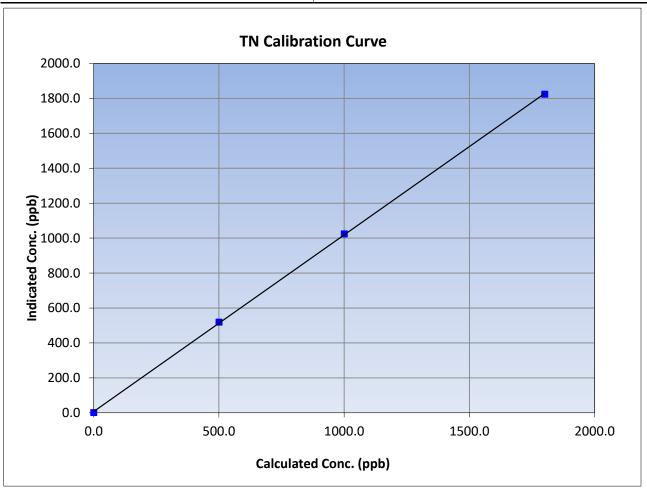
TN Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:25 End Time (MST): 14:00 Analyzer make: **API T201** Analyzer serial #: 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	orrection factor (Cc/Ic) Statistical Evaluation		<u>Limits</u>
0.0	0.7		Correlation Coefficient	0.999933	≥0.995
1801.0	1824.2	0.9873	Correlation Coefficient	0.999933	20.333
1000.8	1024.7	0.9767	Slope	1.011422	0.90 - 1.10
500.4	518.8	0.9646	Slope	1.011422	0.90 - 1.10
			Intercept	7.102178	+/-20





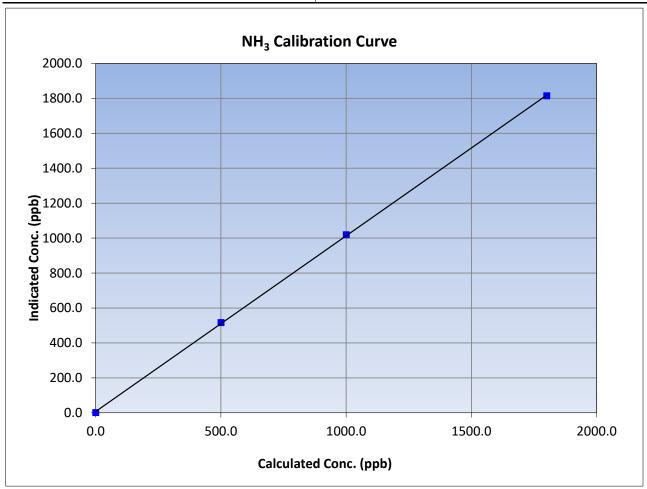
NH₃ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:25 End Time (MST): 14:00 Analyzer make: **API T201** Analyzer serial #: 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	1.1		Correlation Coefficient	0.999938	≥0.995
1801.0	1814.8	0.9924	Correlation Coefficient	0.55555	20.333
1000.8	1019.0	0.9822	Slope	1.005985	0.90 - 1.10
500.4	516.1	0.9696	Slope	1.005965	0.90 - 1.10
			Intercept	7.240605	+/-20





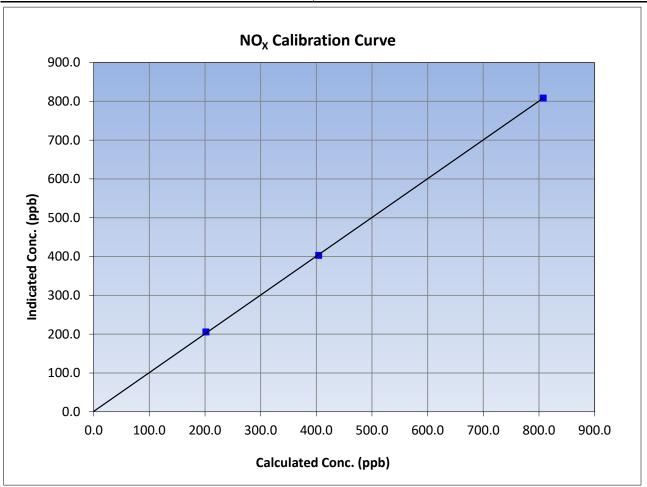
NO_x Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:25 End Time (MST): 14:00 Analyzer serial #: Analyzer make: **API T201** 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999953	≥0.995
807.6	808.3	0.9991	Correlation Coefficient	0.555555	20.333
404.3	403.1	1.0030	Slope	0.999337 0.90	0.90 - 1.10
201.6	205.8	0.9798	Зюре	0.55557	0.90 - 1.10
			Intercept	1.041887	+/-20





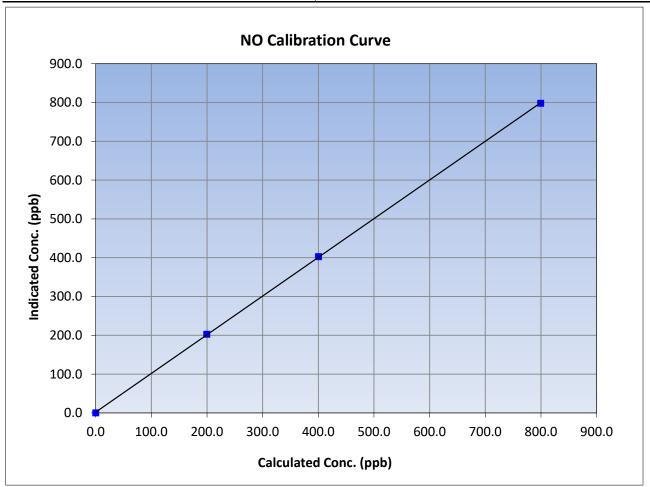
NO Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:25 End Time (MST): 14:00 Analyzer make: **API T201** Analyzer serial #: 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999969	≥0.995
799.5	798.0	1.0018	Correlation Coefficient	0.333303	20.993
400.2	402.7	0.9939	Slope	0.997013 0.90	0.90 - 1.10
199.6	202.8	0.9842	Slope	0.997013	0.30 - 1.10
			Intercept	2.119639	+/-20





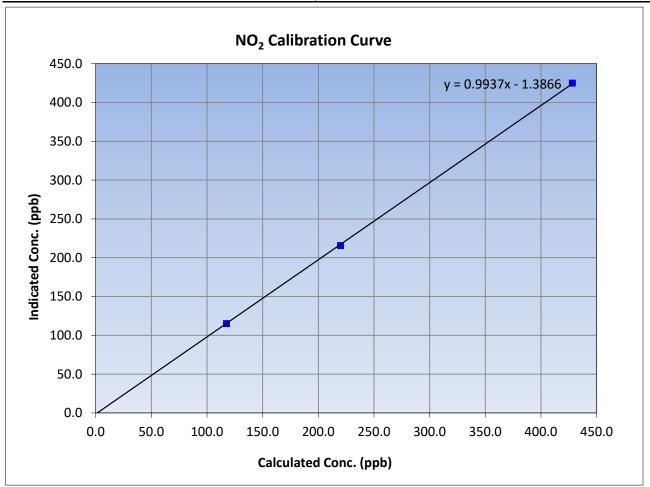
NO₂ Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:25 End Time (MST): 14:00 Analyzer serial #: Analyzer make: **API T201** 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.5		Correlation Coefficient	0.999962	≥0.995
428.3	425.0	1.0077	Correlation Coefficient	0.999902	20.333
220.0	215.7	1.0197	Slope	0.993721 0.90	0.90 - 1.10
117.5	115.1	1.0204	Slope	0.993721	0.90 - 1.10
			Intercept	-1.386593	+/-20

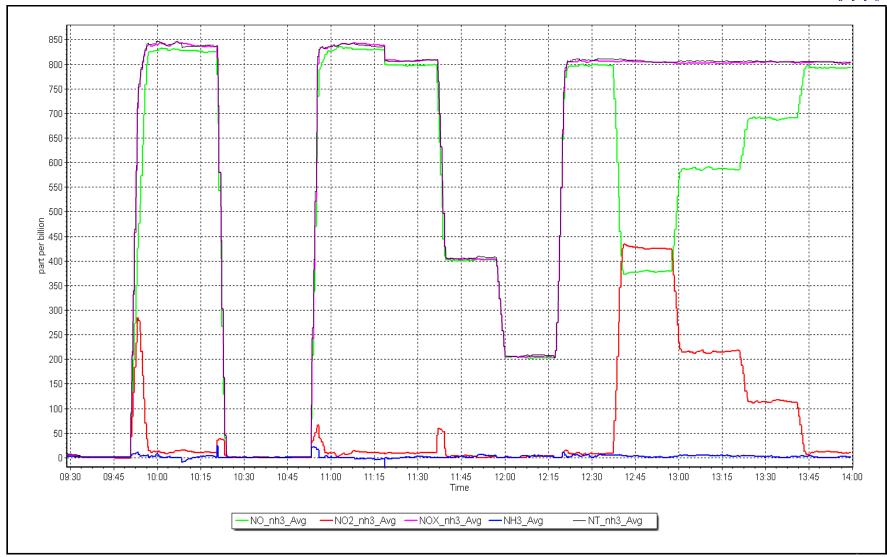


NO_x Calibration Plot

Date: March 8, 2023

Location: Patricia McInnes





NH₃ Calibration Plot

Date: March 8, 2023

Location: Patricia McInnes







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Athabasca Valley

Calibration Date: March 9, 2023

Start time (MST): 10:56 Reason: Routine Station number: AMS07

Last Cal Date: February 1, 2023

End time (MST): 13:35

Calibration Standards

Cal Gas Concentration: 50.52

Cal Gas Cylinder #: CC282115

Removed Cal Gas Conc: 50.52
Removed Gas Cyl #: NA

Calibrator Make/Model: API T700 ZAG Make/Model: API 701H ppm Cal Gas Exp Date: December 29, 2028

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

<u>Start</u> <u>Finish</u> 0.998179 0.995896 Backgd or Offset:

ppm

 Calibration slope:
 0.998179
 0.995896
 Backgd or Offset:
 2.70
 2.70

 Calibration intercept:
 1.983813
 2.083550
 Coeff or Slope:
 0.857
 0.857

SO₂ 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	4921	79.3	801.2	797.2	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.3	801.2	798.4	1.004
second point	4960	39.6	400.2	403.4	0.992
third point	4980	19.8	200.1	202.1	0.990
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.2	800.2	800.7	0.999
			Averag	ge Correction Factor	0.995

Baseline Corr As found: 797.30 Previous response 801.72 *% change -0.6% 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

Start

Notes: No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay



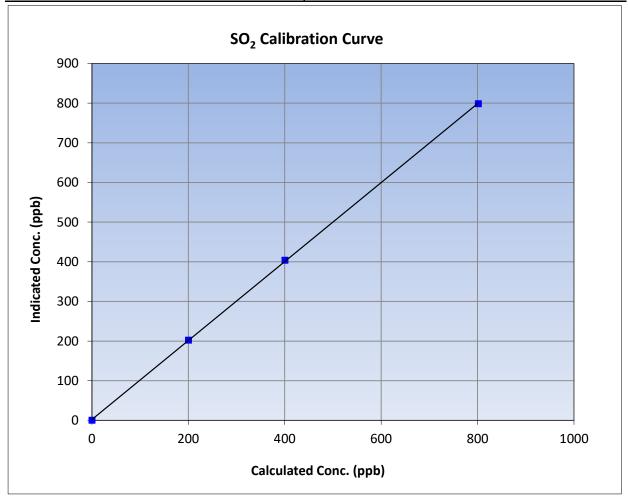
SO₂ Calibration Summary

Version-01-2020

Station Information

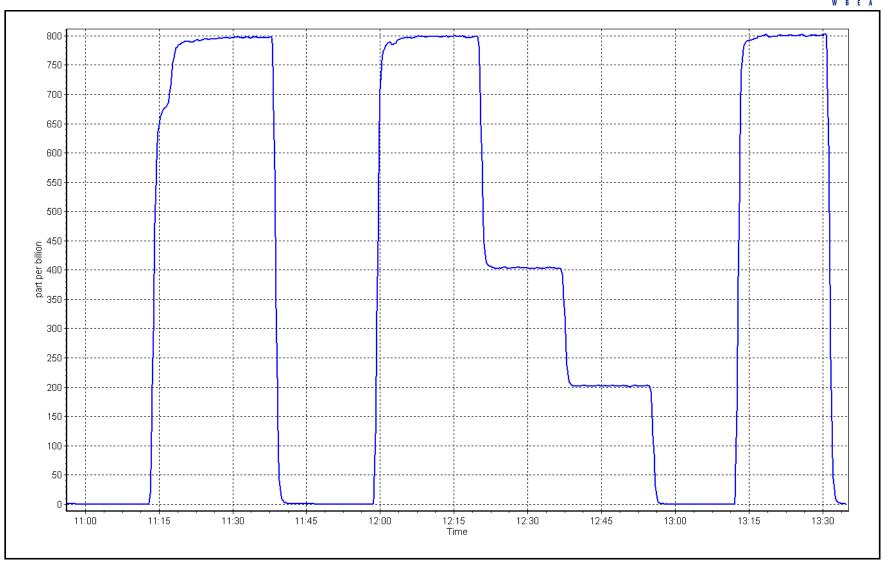
Calibration Date: March 9, 2023 **Previous Calibration:** February 1, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:56 End Time (MST): 13:35 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1507864683

		Calib	ration 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	0.999957	≥0.995
801.2	798.4	1.0035	Correlation Coefficient	0.555557	20.993
400.2	403.4	0.9919	Slope	0.995896	0.90 - 1.10
200.1	202.1	0.9899	Slope	0.555650	0.90 - 1.10
			- Intercept	2.083550	+/-30



SO2 Calibration Plot Date: March 9, 2023 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 13, 2023 Start time (MST): 7:52

Start time (MST): 7:52 Reason: Routine Station number: AMS07

Last Cal Date: February 6, 2023

End time (MST): 11:54

Calibration Standards

Cal Gas Concentration: 4.94 ppm Cal Gas Exp Date: February 9, 2024

Cal Gas Cylinder #: EY0002277

Removed Cal Gas Conc: 4.94 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

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

StartFinishStartFinishCalibration slope:0.9888070.993485Backgd or Offset:2.332.20

Calibration slope: 0.988807 0.993485 Backgd or Offset: 2.33 2.20 Calibration intercept: 0.421592 0.081597 Coeff or Slope: 0.886 0.841

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	4918	81.6	80.6	84.5	0.954
as found 2nd point	4959	40.8	40.3	42.2	0.955
as found 3rd point	4980	20.4	20.2	20.9	0.964
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	4918	81.6	80.6	80.2	1.005
second point	4959	40.8	40.3	40.2	1.003
third point	4980	20.4	20.2	19.9	1.013
as left zero	5000	0.0	0.0	0.1	
as left span	4918	81.6	80.6	79.6	1.013
SO2 Scrubber Check	4921	79.2	800.2	-0.1	
Date of last scrubber chan	ge:	25-Feb-22		Ave Corr Factor	1.007
Date of last converter effic	iency test:	April 22, 2022	•	98.5%	efficiency

Date of last converter efficiency test: April 22, 2022 98.5% efficiency

Baseline Corr As found: 84.5 Prev response: 80.15 *% change: 5.2%

Baseline Corr 2nd AF pt:42.2AF Slope:1.048907Baseline Corr 3rd AF pt:20.9AF Correlation:0.999992

* = > +/-5% change initiates investigation

AF Intercept:

Notes: Sox scrubber checked after calibrator zero. Span adjusted.

Calibration Performed By: Melissa Lemay

-0.098313



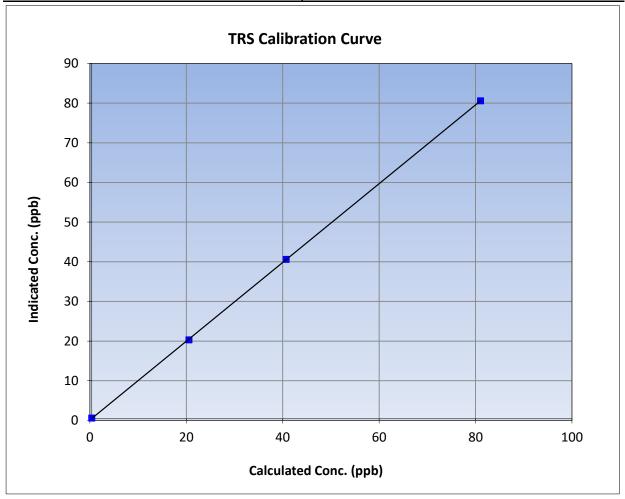
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 6, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:52 End Time (MST): 11:54 Analyzer make: CDN-101 Analyzer serial #: 551

		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	0.999983	≥0.995
80.6	80.2	1.0053	Correlation coefficient	0.555565	20.333
40.3	40.2	1.0028	Slope	0.993485	0.90 - 1.10
20.2	19.9	1.0127	Slope	0.555465	0.30 - 1.10
			- Intercept	0.081597	+/-3

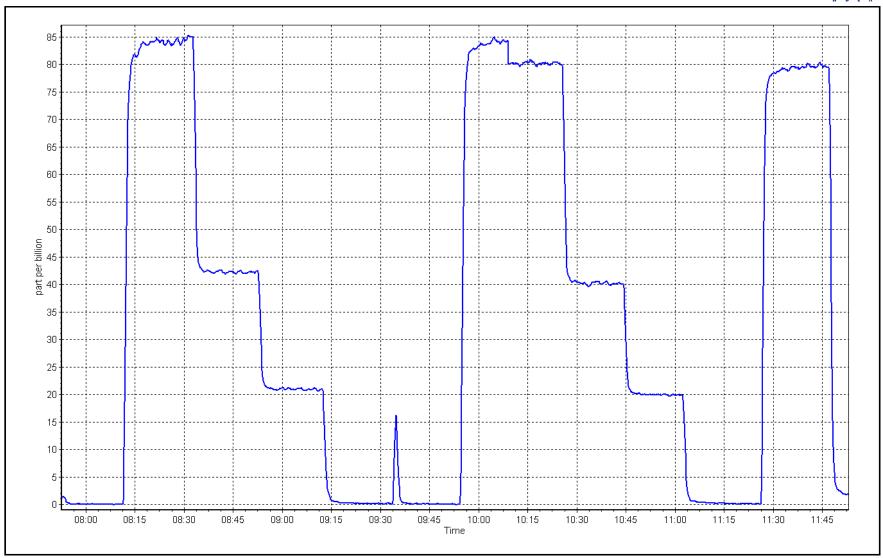


TRS Calibration Plot

Date: March 13, 2023

Location: Athabasca Valley







Removed Gas Cert:

Removed CH4 Conc.

Removed C3H8 Conc.

Calibrator Model:

ZAG make/model:

Diff between cyl (CH_4):

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Athabasca Valley Station Name:

Calibration Date: March 9, 2023

10:57 Start time (MST): Reason: Routine Station number: AMS07

Last Cal Date: February 1, 2023

1075.1

ppm

End time (MST): 13:34

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CC282115 CH4 Equiv Conc. 1075.1 ppm

CH4 Cal Gas Conc. 501.2 ppm C3H8 Cal Gas Conc. 208.7 ppm

501.2

208.7

API T700

API 701H

NA

ppm

ppm

Diff between cyl (THC):

Diff between cyl (NM):

Serial Number: 3805

Removed Gas Expiry: NA

CH4 Equiv Conc.

Serial Number: 198

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1317958219

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Start **Finish** Start Finish 0.000270 0.000270 NMHC SP Ratio: 4.42E-05 4.42E-05

CH4 SP Ratio: CH4 Retention time: NMHC Peak Area: 13.4 13.4 205840 205840

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	79.3	17.05	17.01	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	17.05	16.97	1.005
second point	4960	39.6	8.52	8.48	1.004
third point	4980	19.8	4.26	4.27	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	16.98	1.003
			Ave	erage Correction Factor	1.002

Baseline Corr AF: 17.01 Prev response 17.16 -0.9% *% change

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

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

	54 . 0	NMHC Calibr			05.11.11.0.05.15
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	79.3	9.10	9.14	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	9.10	9.12	0.998
second point	4960	39.6	4.55	4.57	0.995
third point	4980	19.8	2.27	2.30	0.988
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	9.09	9.12	0.997
			Avera	age Correction Factor	0.994
Baseline Corr AF:	9.14	Prev response	9.16	*% change	-0.2%
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	CH4 Calibra Source gas flow rate	tion Data Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 3
	Dil air flow rate			Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero		Source gas flow rate	Calc conc (ppm) (Cc)		CF <i>Limit= 0.95-1.0</i> 5
as found zero as found span	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
Set Point 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	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	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 calibrator zero	5000 4921	Source gas flow rate 0.0 79.3	Calc conc (ppm) (Cc) 0.00 7.95	0.00 7.87	1.010
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4921 5000	Source gas flow rate 0.0 79.3	Calc conc (ppm) (Cc) 0.00 7.95	0.00 7.87 0.00	1.010
as found zero as found span as found 2nd point	5000 4921 5000 4921	0.0 79.3 0.0 79.3	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95	0.00 7.87 0.00 7.86	1.010
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4921 5000 4921 4960	0.0 79.3 0.0 79.3 39.6	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95 3.97	0.00 7.87 0.00 7.86 3.91	1.010 1.011 1.015
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	0.0 79.3 0.0 79.3 0.0 79.3 39.6 19.8	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95 3.97 1.98	0.00 7.87 0.00 7.86 3.91 1.97	1.010 1.011 1.015 1.008
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	5000 4921 5000 4921 4960 4980 5000	0.0 79.3 0.0 79.3 0.0 79.3 39.6 19.8 0.0	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95 3.97 1.98 0.00 7.94	0.00 7.87 0.00 7.86 3.91 1.97 0.00	1.010 1.011 1.015 1.008
as found zero as found span as found 2nd point as found 3rd point as left zero as left span	5000 4921 5000 4921 4960 4980 5000	0.0 79.3 0.0 79.3 0.0 79.3 39.6 19.8 0.0	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95 3.97 1.98 0.00 7.94	0.00 7.87 0.00 7.86 3.91 1.97 0.00 7.86	1.010 1.011 1.015 1.008 1.010
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4921 5000 4921 4960 4980 5000 4921	0.0 79.3 0.0 79.3 0.0 79.3 39.6 19.8 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.95 0.00 7.95 3.97 1.98 0.00 7.94 Avera	0.00 7.87 0.00 7.86 3.91 1.97 0.00 7.86 age Correction Factor	1.010 1.011 1.015 1.008 1.010 1.011

Start

1.004980

0.021918

1.006293

-0.000176

1.004211

0.018094

Notes:

THC Cal Slope:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

No Maintenance or adjustments done.

Finish

0.994780

0.013474

0.988322

-0.000211

1.001323

0.012086

Calibration Performed By: Melissa Lemay



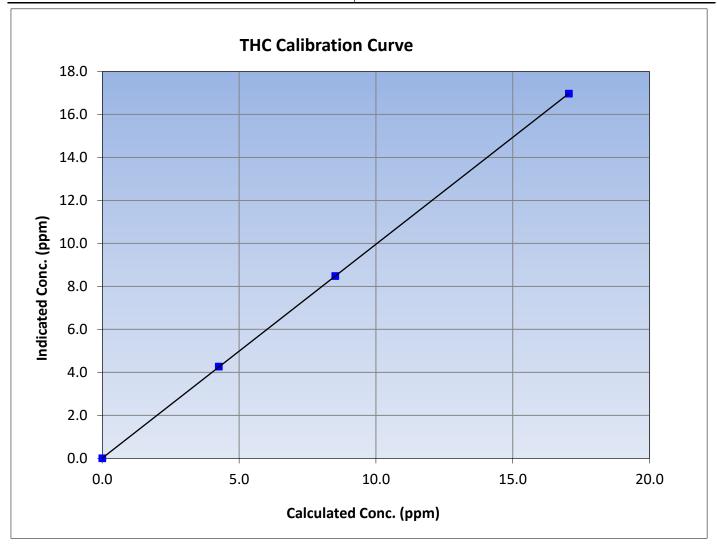
THC Calibration Summary

Version-01-2020

Station Information

March 9, 2023 **Previous Calibration:** Calibration Date: February 1, 2023 Station Name: Station Number: AMS07 Athabasca Valley Start Time (MST): 10:57 End Time (MST): 13:34 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	0.999996	≥0.995
17.05	16.97	1.0046	Correlation Coemicient	0.555550	20.333
8.52	8.48	1.0042	Slope	0.994780	0.90 - 1.10
4.26	4.27	0.9971	Slope	0.554760	0.90 - 1.10
			Intercept	0.013474	+/-0.5





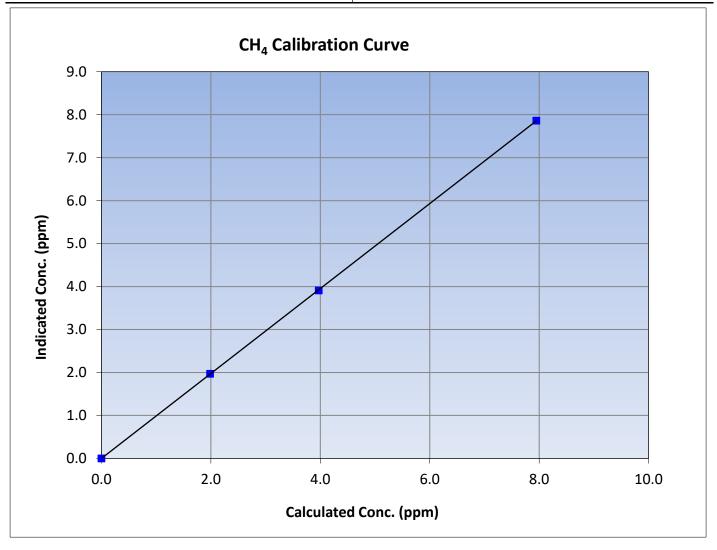
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 1, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:57 End Time (MST): 13:34 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	0.999992	≥0.995
7.95	7.86	1.0113	Correlation Coemicient	0.999992	20.993
3.97	3.91	1.0153	Slope	0.988322	0.90 - 1.10
1.98	1.97	1.0075	Зюре	0.988322	0.30 - 1.10
			Intercept	-0.000211	+/-0.5





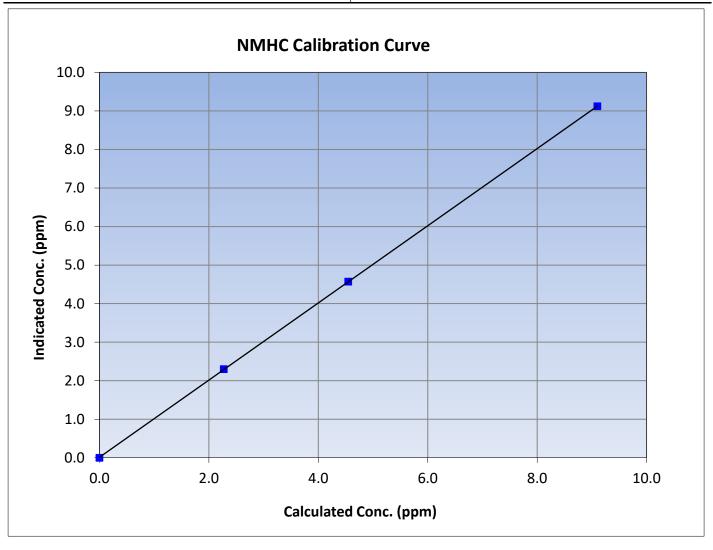
NMHC Calibration Summary

Version-01-2020

Station Information

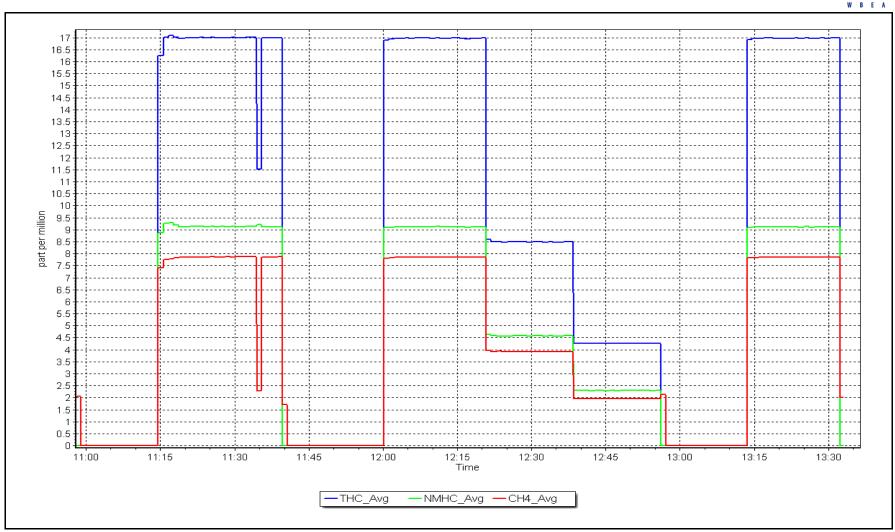
Calibration Date: March 9, 2023 **Previous Calibration:** February 1, 2023 Station Name: AMS07 Athabasca Valley Station Number: Start Time (MST): 10:57 End Time (MST): 13:34 Analyzer make: Thermo 55i Analyzer serial #: 1317958219

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
9.10	9.12	0.9980	Correlation Coemicient	0.555552	20.333
4.55	4.57	0.9947	Slope	1.001323	0.90 - 1.10
2.27	2.30	0.9882	Slope	1.001323	0.90 - 1.10
			Intercept	0.012086	+/-0.5



NMHC Calibration Plot Date: March 9, 2023 Location: Athabasca Valley







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley Station number: AMS07
Calibration Date: March 31, 2023 Last Cal Date: March 9, 2023

Start time (MST): 8:45 End time (MST): 9:58

Reason: Cylinder Change Hydrogen cylinder change

Calibration Standards

Gas Cert Reference: CC282115 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 501.2 ppm CH4 Equiv Conc. 1075.1 ppm

C3H8 Cal Gas Conc. 208.7 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 501.2 ppm CH4 Equiv Conc. 1075.1 ppm

Removed C3H8 Conc. 208.7 ppm Diff between cyl (THC): Diff between cyl (CH_a): Diff between cyl (CH_a):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1317958219

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:
 0.000270
 0.000270
 NMHC SP Ratio:
 4.42E-05
 4.42E-05

CH4 Retention time: 13.4 13.4 NMHC Peak Area: 205840 205840

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	79.3	17.05	16.74	1.019
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	17.05	16.73	1.019
second point					
third point					
as left zero			0.00		
as left snan					

			Ave	rage Correction Factor	1.019
Baseline Corr AF:	16.74	Prev response	16.97	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates i	nvestigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

W B E A					Version-01-2
		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	0.00	0.00	
as found span	4921	79.3	9.10	8.98	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	9.10	8.97	1.015
second point					
third point					
as left zero					
as left span					
1			Aver	age Correction Factor	1.015
Baseline Corr AF:	8.98	Prev response	9.13	*% change	-1.6%
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	4921	79.3	7.95	7.76	1.024
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	7.95	7.76	1.024
second point					
third point					
as left zero					
as left span					
'			Aver	age Correction Factor	1.024
Baseline Corr AF:	7.76	Prev response	7.86	*% change	-1.2%
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>		<u>Finish</u>	
THC Cal Slope:		0.994780		0.981205	
THC Cal Offset:		0.013474		0.000000	
CH4 Cal Slope:		0.988322		0.976278	
CH4 Cal Offset:		-0.000211		0.000000	
NMHC Cal Slope:		1.001323		0.985508	
ivivine cai siope:		1.001323		0.505508	

Notes: Hydrogen cylinder changed.

0.012086

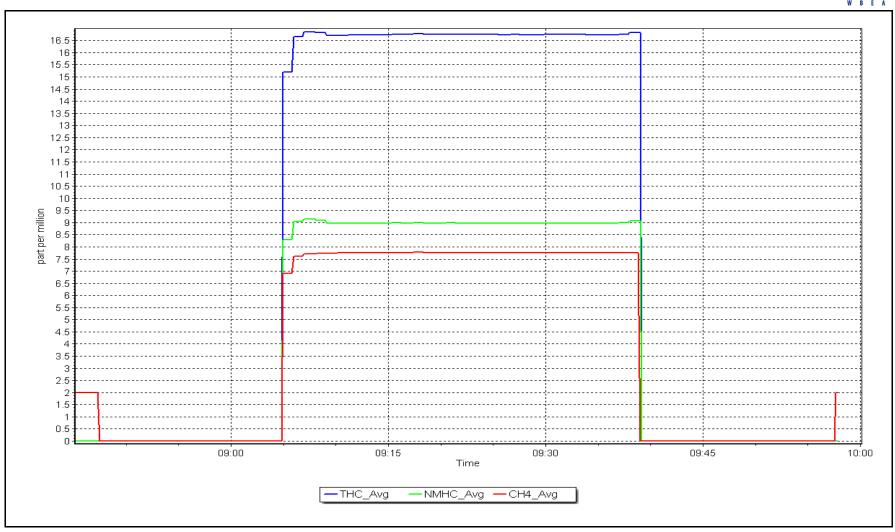
Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: March 31, 2023 Location: Athabasca Valley







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Athabasca Valley

Calibration Date: March 10, 2023

Start time (MST): 7:40
Reason: Routine

Station number: AMS07

Last Cal Date: February 7, 2023

End time (MST): 12:10

Calibration Standards

NO Gas Cylinder #: T2Y1KA4 Cal Gas Expiry Date: November 30, 2023
NOX Cal Gas Conc: 50.92 ppm NO Cal Gas Conc: 49.92 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 50.92 ppm Removed Gas NO Conc: 49.92

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

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.048 1.048 NO bkgnd or offset: 7.3 7.3 NOX coeff or slope: 0.995 0.995 NOX bkgnd or offset: 7.5 7.5 197.9 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 201.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.991039	0.997475
NO _x Cal Offset:	1.157178	1.358498
NO Cal Slope:	0.991042	0.997406
NO Cal Offset:	0.933204	1.054447
NO ₂ Cal Slope:	1.000742	1.001683
NO ₂ Cal Offset:	0.457636	0.681681



NO_X \ NO \ NO₂ 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	-0.1	0.0		
as found span	4920	80.2	816.7	800.7	16.0	817.5	799.6	17.9	0.9991	1.0014
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1		
high point	4920	80.2	816.7	800.7	16.0	815.1	798.8	16.3	1.0020	1.0024
second point	4960	40.1	408.4	400.4	8.0	410.3	402.0	8.3	0.9953	0.9959
third point	4980	20.0	203.7	199.7	4.0	205.0	200.4	4.6	0.9936	0.9964
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1		
as left span	4920	80.2	816.7	398.9	417.8	820.6	397.4	423.3	0.9953	1.0037
							Average C	orrection Factor	0.9970	0.9982
Corrected As fo	ound NO _X =	817.6 ppb	NO =	799.7 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	0.9%
Previous Respo	onse NO _X =	810.6 ppb	NO =	794.4 ppb				*Percent Chang	ge NO =	0.7%
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	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	$1 NO r^2$:		NO SI:	NO Int:	
					As found	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

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)	797.1	395.3	417.8	419.0	0.9972	100.3%
2nd GPT point (200 ppb O3)	797.1	599.1	214.0	215.1	0.9951	100.5%

797.1 699.2 113.9 115.6 0.9856 101.5% 3rd GPT point (100 ppb O3) 0.9926 100.7% Average Correction Factor Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

CALS 172

NO2 Correction factor (Cc/Ic)



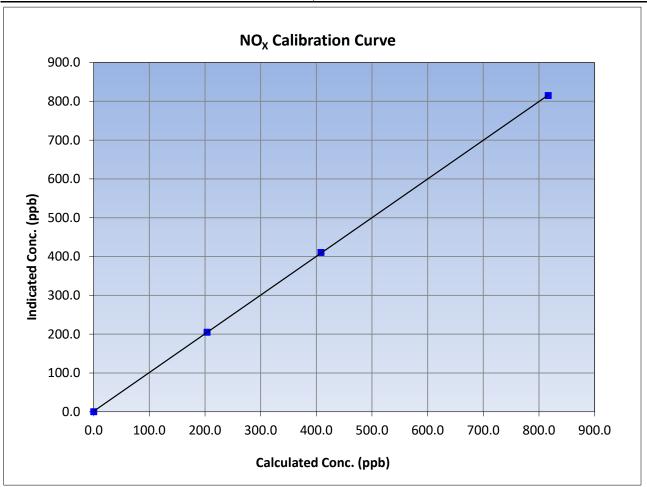
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 10, 2023 Previous Calibration: February 7, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:40 End Time (MST): 12:10 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	0.2		Correlation Coefficient	0.999986	≥0.995
816.7	815.1	1.0020	Correlation Coefficient	0.555560	20.993
408.4	410.3	0.9953	Slope	0.997475	0.90 - 1.10
203.7	205.0	0.9936	Slope	0.997475	0.90 - 1.10
			Intercept	1.358498	+/-20





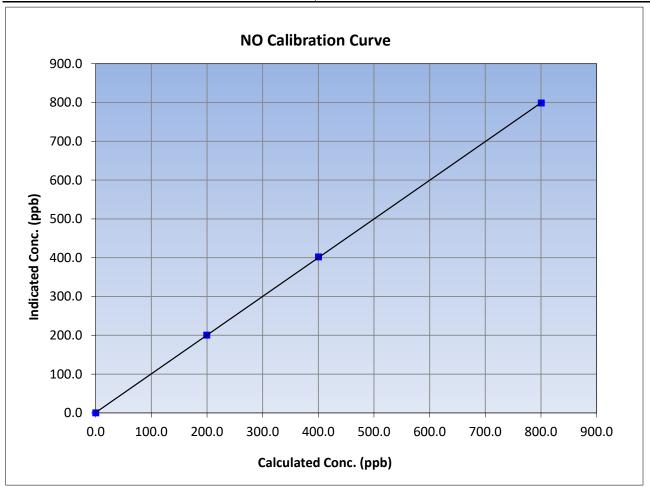
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 10, 2023 Previous Calibration: February 7, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:40 End Time (MST): 12:10 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	0.1		Correlation Coefficient	0.999988	≥0.995
800.7	798.8	1.0024	Correlation Coefficient	0.555500	20.333
400.4	402.0	0.9959	Slope	0.997406	0.90 - 1.10
199.7	200.4	0.9964	Slope	0.997400	0.90 - 1.10
			Intercept	1.054447	+/-20





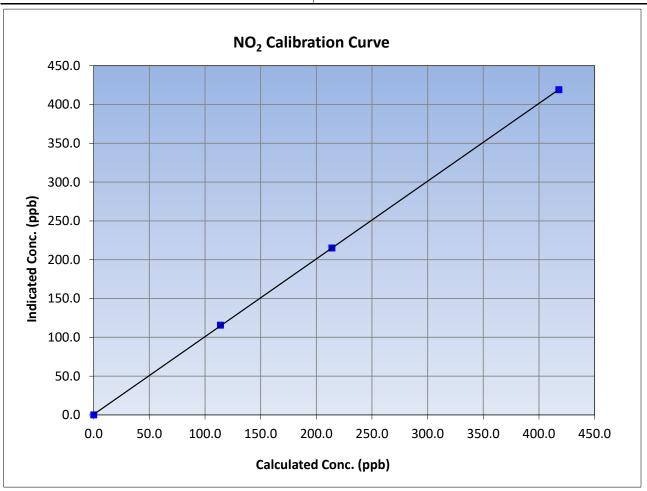
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 10, 2023 Previous Calibration: February 7, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:40 End Time (MST): 12:10 Analyzer serial #: Analyzer make: Thermo 42i 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999989	≥0.995	
417.8	419.0	0.9972	Correlation Coefficient	0.555505	20.333	
214.0	215.1	0.9951	Slope	1.001683	0.90 - 1.10	
113.9	115.6	0.9856	Slope	1.001003	0.90 - 1.10	
			Intercept	0.681681	+/-20	

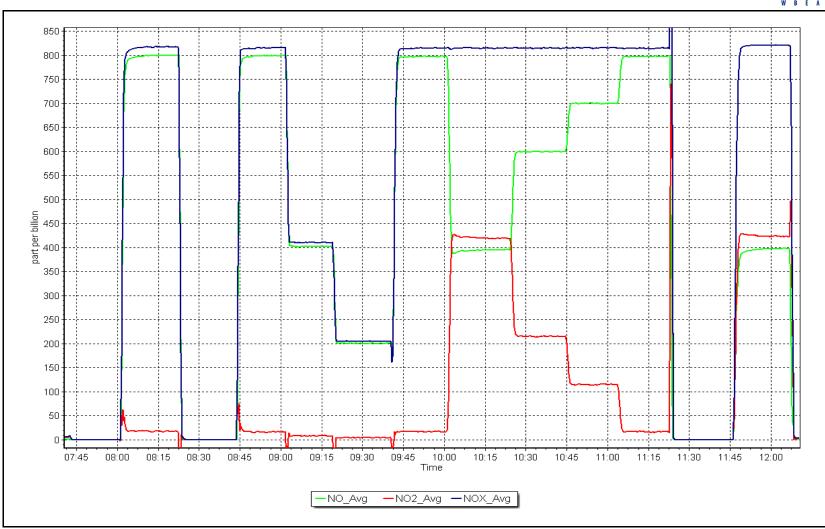


NO_x Calibration Plot

Date: March 10, 2023

Location: Athabasca Valley







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: March 9, 2023

Start time (MST): 7:22 Reason: Routine Station number: AMS07

Last Cal Date: February 8, 2023

End time (MST): 10:23

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 #: 1507964700

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 0.995429 0.994371 -0.6 -0.6 2.260000 Coeff or Slope: Calibration intercept: 1.600000 1.119 1.170

O₃ 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	0.1	
as found span	5000	1383.2	400.0	388.9	1.029
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.5	
high point	5000	1383.7	400.0	398.9	1.003
second point	5000	1022.2	200.0	202.7	0.987
third point	5000	843.8	100.0	103.0	0.971
as left zero	5000	0.0	0.0	0.1	
as left span	5000	1380.2	400.0	396.8	1.008
			Averag	ge Correction Factor	0.987
Baseline Corr As found:	388.8	Previous respons	e 399.8	*% change	-2.8%
Baseline Corr 2nd AF pt:	NA	AF Slope	<u>:</u> :	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: No Maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

* = > +/-5% change initiates investigation



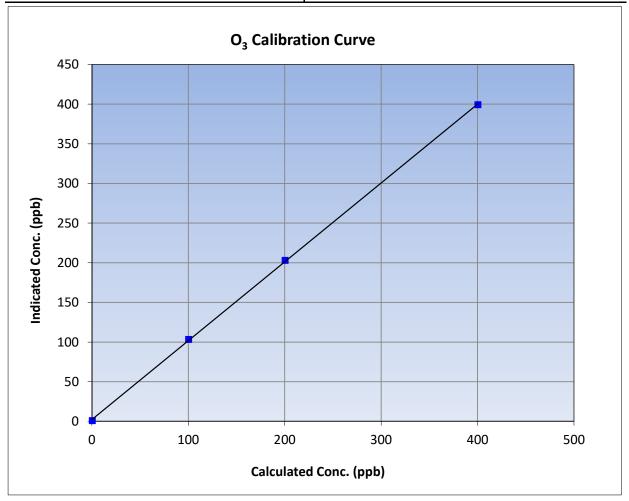
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 8, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 7:22 End Time (MST): 10:23 Analyzer make: Thermo 49i Analyzer serial #: 1507964700

Calibration Data							
Calculated concentration Indicated concentration Correction fac (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.5		Correlation Coefficient	0.999902	≥0.995		
400.0	398.9	1.0028	0028		20.333		
200.0	202.7	0.9867	Slope	0.994371	0.90 - 1.10		
100.0	103.0	0.9709	Slope	0.9945/1	0.90 - 1.10		
			Intercept	2.260000	+/- 5		

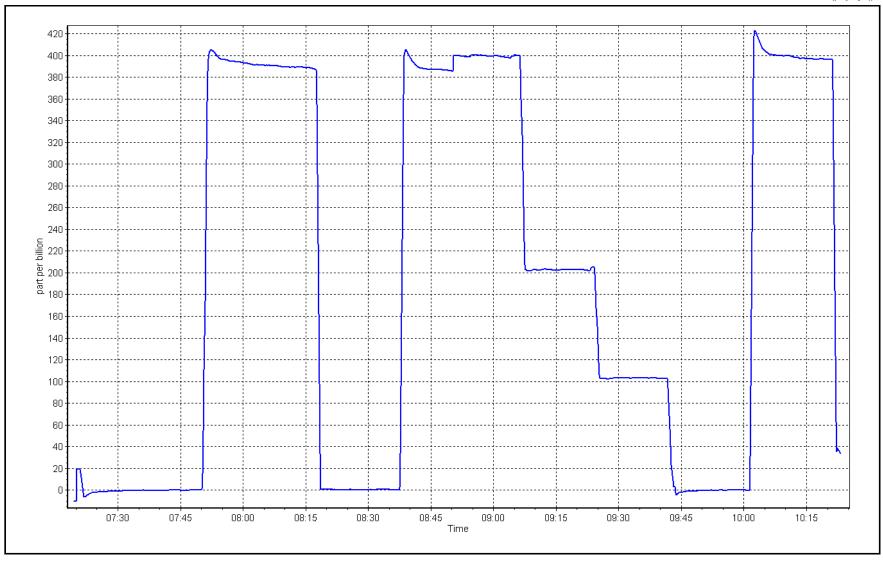


O₃ Calibration Plot

Date: March 9, 2023

Location: Athabasca Valley







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1		
Station Name:	Athabasca Valley		Station number:	AMS 07	
Calibration Date:	March 31, 2023		Last Cal Date:	February 1, 2023	
Start time (MST):	8:21		End time (MST):	8:43	
Analyzer Make:	API T640		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 T	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-3.9	-3	-3.9		+/- 2 °C
P (mmHg)	733.9	732.6	733.9		+/- 10 mmHg
flow (LPM)	5	5.17	5		+/- 0.25 LPM
Leak Test:	Date of check:	March 31, 2023	Last Cal Date:	February 1, 2023	
	PM w/o HEPA:	7.7	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be			serve as the pre ma	intenance leak check	
Inlet cleaning:	Inlet Head	✓			
		Quarterly Calibration 1	Test		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test					10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	ber Cleaned:	February 1,	, 2023	· · · —	<0.2 ug/m3
Disposable Filter	r Changed:	February 1,	, 2023	•	
		Annual Maintenanc	e		
Date Sample Tub	oe Cleaned:	December 5	5, 2022		
Date RH/T Sensor Cleaned:		December 5			
Notes:		No adjustmer	nts done. Head clea	aned.	
Calibration by:	Melissa Lemay				



CO Calibration Report

Version-01-2020

Station Information

Athabasca Valley Station Name:

Calibration Date: March 14, 2023

8:44 Start time (MST):

Reason: Routine Station number: AMS07

> Last Cal Date: February 8, 2023

End time (MST): 11:48

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**

API 700H ZAG Make/Model:

Cal Gas Exp Date: December 12, 2026

Rem Gas Exp Date: NA

Diff between cyl:

3805 Serial Number: Serial Number: 198

Analyzer Information

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

ppm

Analyzer Range: 0 - 50 ppm

Finish Start

Calibration slope: 0.997345 0.998030

<u>Start</u> Backgd or Offset:

Finish 3.773

3.651 Coeff or Slope: Calibration intercept: 0.018531 0.026535 1.079 1.079

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	40.2	0.997
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	1.002
second point	4967	33.3	20.0	20.1	0.996
third point	4983	16.7	10.0	10.0	1.000
as left zero	5000	0.0	0.0	0.0	
as left span	4933	66.7	40.0	39.9	1.003
	_	_	Avera	ge Correction Factor	1.000

Baseline Corr As found: 40.08 Prev response: 39.93 *% change: 0.4% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

No Maintenance done. Zero adjusted. Notes:

Calibration Performed By: Melissa Lemay



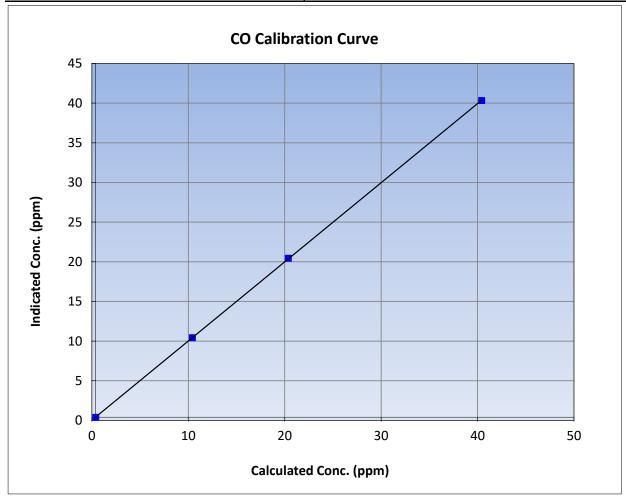
CO Calibration Summary

Version-01-2020

Station Information

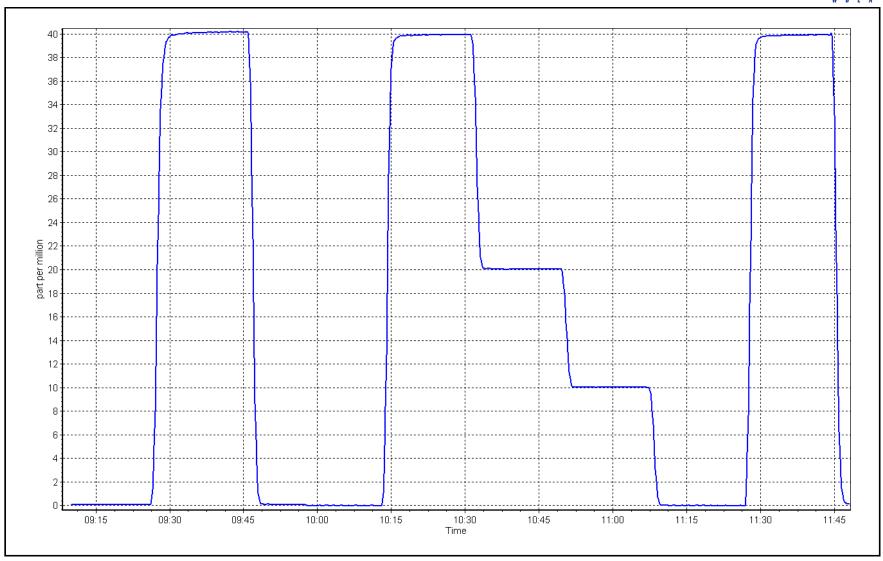
Calibration Date: March 14, 2023 **Previous Calibration:** February 8, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:44 End Time (MST): 11:48 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

Calibration Data									
Calculated concentration (ppm) (Cc)	ation	<u>Limits</u>							
0.0	0.0		Correlation Coefficient	0.999988	≥0.995				
40.0	39.9	1.0023	Correlation Coefficient	0.333366	20.993				
20.0	20.1	0.9964	Slope	0.998030	0.90 - 1.10				
10.0	10.0	1.0001	Slope	0.556050	0.90 - 1.10				
			- Intercept	0.026535	+/-1.5				



CO Calibration Plot Date: March 14, 2023 Location: Athabasca Valley







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort Chipewyan

Calibration Date: March 13, 2023

Start time (MST): 10:22 Reason: Routine Station number: AMS08

Last Cal Date: February 10, 2023

End time (MST): 13:08

Calibration Standards

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

Analyzer serial #: 1136451241

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3252 Serial Number: 260

Analyzer Information

Analyzer make: Thermo 43i-TLE

Analyzer Range 0 - 1000 ppb

Start Finish

ppm

ppm

Calibration slope: 0.996661 Calibration intercept: 1.336570 0.998816 0.356495

Backgd or Offset:

<u>Start</u> 1.32 <u>Finish</u> 1.27

0.981

Coeff or Slope: 1.006

SO₂ 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	0.1	
as found span	4920	80.3	800.4	815.6	0.981
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4920	80.3	800.4	800.2	1.000
second point	4960	40.2	400.7	399.3	1.004
third point	4980	20.1	200.4	201.4	0.995
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.3	800.4	782.3	1.023
			Averag	ge Correction Factor	1.000

Baseline Corr As found: 815.50 Previous response 799.05 *% change 2.0% *= > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit



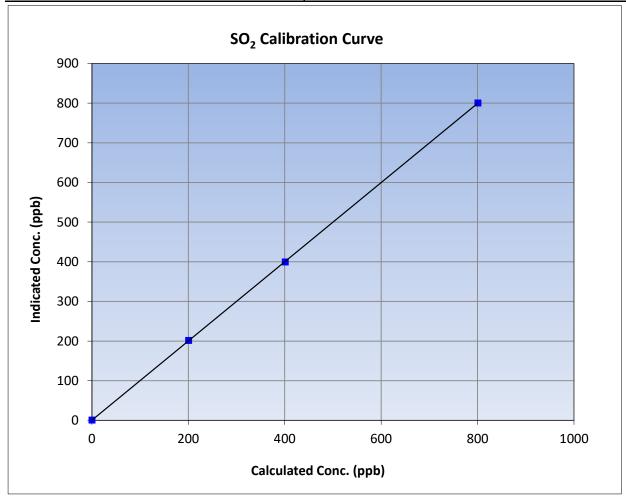
SO₂ Calibration Summary

Version-01-2020

Station Information

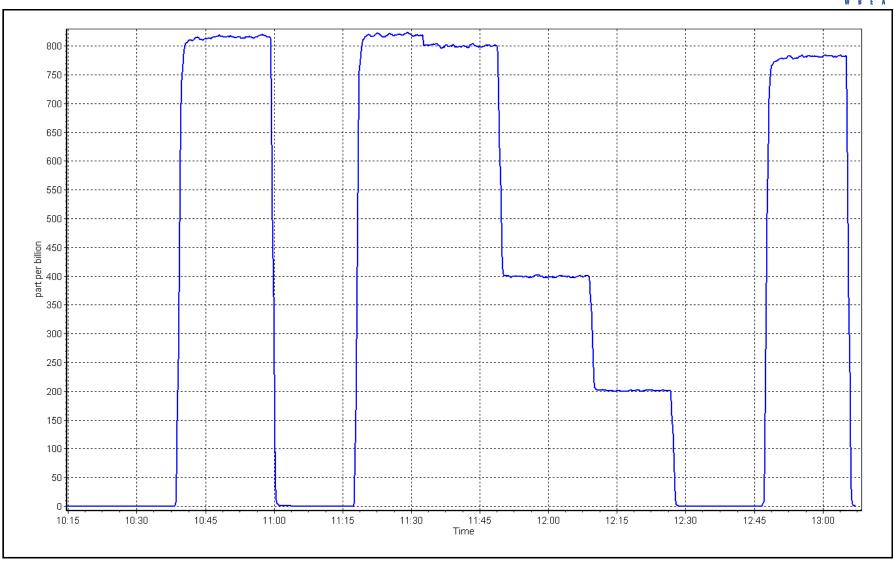
Calibration Date: March 13, 2023 **Previous Calibration:** February 10, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 10:22 End Time (MST): 13:08 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1136451241

Calibration Data									
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.3		Correlation Coefficient	0.999992	≥0.995				
800.4	800.2	1.0002	Correlation Coefficient	0.333332	20.993				
400.7	399.3	1.0035	Slope	0.998816	0.90 - 1.10				
200.4	201.4	0.9948	Slope	0.556610	0.90 - 1.10				
			- Intercept	0.356495	+/-30				



SO2 Calibration Plot Date: March 13, 2023 Location: Fort Chipewyan







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort Chipewyan

Calibration Date: March 12, 2023 Start time (MST): 11:41

Reason: Routine Station number: AMS08

> Last Cal Date: February 10, 2023

End time (MST): 16:35

Calibration Standards

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

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: 260

Analyzer Information

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

CDN-101 Converter serial #: 14639 Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.000139 0.995571 Backgd or Offset: Calibration slope: 1.43 1.37 0.018651 Calibration intercept: 0.058837 Coeff or Slope: 0.743 0.717

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	80.5	80.0	81.6	0.981
as found 2nd point	4960	40.2	40.0	41.1	0.972
as found 3rd point	4980	20.1	20.0	20.4	0.979
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	80.5	80.0	79.7	1.004
second point	4960	40.2	40.0	39.8	1.004
third point	4980	20.1	20.0	19.8	1.009
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.5	80.0	77.6	1.031
SO2 Scrubber Check	4919.7	80.3	803.0	0.0	
Date of last scrubber cha	nge:	March 7, 2022		Ave Corr Factor	1.006
Date of last converter eff	iciency test:	March 15, 2022		100.7%	efficiency

Date of last scrubber change	te of last scrubber change:			Ave Corr Factor	1.006	
Date of last converter efficie	ncy test:	March 15, 2022		100.7%	efficiency	
Baseline Corr As found:	81.6	Prev response:	80.08	*% change:	1.9%	

Prev response: Baseline Corr 2nd AF pt: 41.1 AF Slope: 1.020278 AF Intercept: Baseline Corr 3rd AF pt: 20.4 AF Correlation: 0.999976

* = > +/-5% change initiates investigation

Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. Notes: Adjusted the span only.

Calibration Performed By: Karan Pandit 0.079245



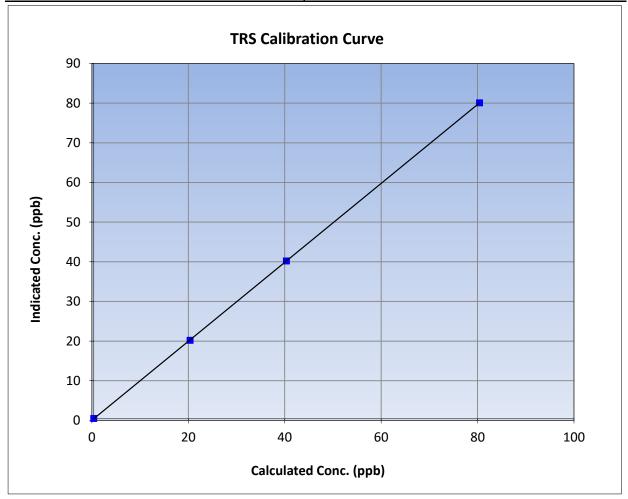
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 12, 2023 **Previous Calibration:** February 10, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 11:41 End Time (MST): 16:35 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169744

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation									
0.0	0.1		Correlation Coefficient	0.999994	≥0.995				
80.0	79.7	1.0039	Correlation coefficient	0.555554	20.333				
40.0	39.8	1.0039	Slope	0.995571	0.90 - 1.10				
20.0	19.8	1.0090	Slope	0.993371	0.90 - 1.10				
			- Intercept	0.018651	+/-3				

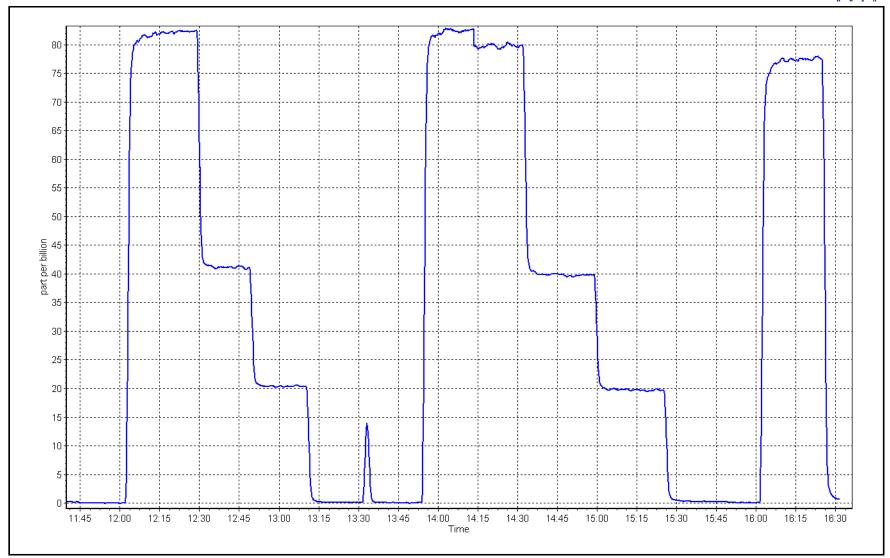




Date: March 12, 2023

Location: Fort Chipewyan







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort Chipewyan

Calibration Date: March 13, 2023

Start time (MST): 7:00 Reason: Routine Station number: AMS08

Last Cal Date: February 6, 2023

End time (MST): 12:23

Calibration Standards

NO Gas Cylinder #: CC363447 Cal Gas Expiry Date: February 2, 2024

NOX Cal Gas Conc: 48.80 ppm NO Cal Gas Conc: 48.80 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 48.80 ppm Removed Gas NO Conc: 48.80 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3252 ZAG make/model: Teledyne API T701H Serial Number: 260

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1426262592

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.844 1.882 NO bkgnd or offset: 6.9 7.9 NOX coeff or slope: 0.993 0.995 NOX bkgnd or offset: 6.9 8.1 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 252.6 256.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.986463	1.000657
NO _x Cal Offset:	2.200000	0.680000
NO Cal Slope:	0.990518	1.001428
NO Cal Offset:	1.180000	0.260000
NO ₂ Cal Slope:	0.996180	1.016898
NO ₂ Cal Offset:	-1.402288	0.900918



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	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	2.6	2.6	0.0		
as found span	4918	82.0	800.3	800.3	0.0	787.2	788.3	-1.1	1.0167	1.0152
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	800.3	800.3	0.0	801.3	801.7	-0.3	0.9988	0.9983
second point	4959	41.0	400.2	400.2	0.0	400.8	400.7	0.2	0.9984	0.9987
third point	4980	20.5	200.1	200.1	0.0	202.4	201.3	1.1	0.9885	0.9939
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2		
as left span	4918	82.0	800.3	423.2	377.1	796.2	411.1	385.1	1.0052	1.0295
							Average C	Correction Factor	0.9952	0.9970
Corrected As fo	ound NO _X =	784.6 ppb	NO =	785.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _X =	-0.9%
Previous Respo	nse NO _X =	791.7 ppb	NO =	793.9 ppb				*Percent Chang	ge NO =	-1.0%
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 _X =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	PT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Refere concentration (pp		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 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)									
		790.4		413.3	377.1		383.4	0.9836	5 .	101.7%
1st GPT point	(400 ppb O3)	730.4		110.0						
1st GPT point 2nd GPT point		790.4		599.2	191.2		197.1	0.9701	l :	103.1%
•	t (200 ppb O3)				191.2 94.3		197.1 97.1	0.9701 0.9712		103.1% 103.0%

Notes:

Sample inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By: Karan Pandit



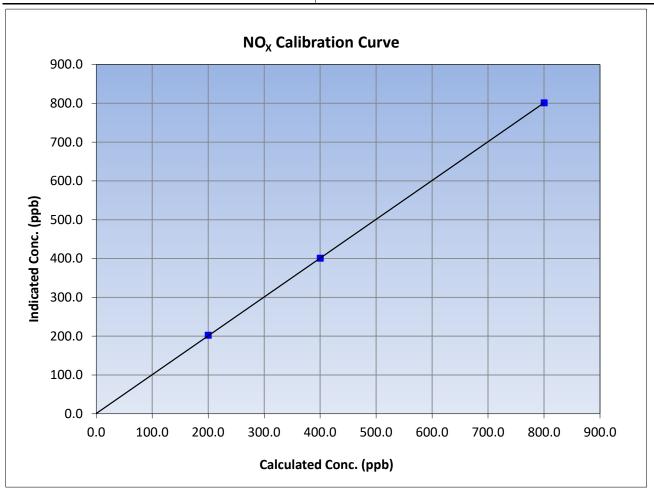
NO_x Calibration Summary

Version-04-2020

Station Information

February 6, 2023 Calibration Date: March 13, 2023 Previous Calibration: Station Name: Station Number: AMS08 Fort Chipewyan Start Time (MST): 7:00 End Time (MST): 12:23 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	-0.3		Correlation Coefficient	0.999990	≥0.995
800.3	801.3	0.9988	correlation coemicient	0.555550	20.333
400.2	400.8	0.9984	Slope	1.000657	0.90 - 1.10
200.1	202.4	0.9885	Slope	1.000057	0.90 - 1.10
			Intercept	0.680000	+/-20





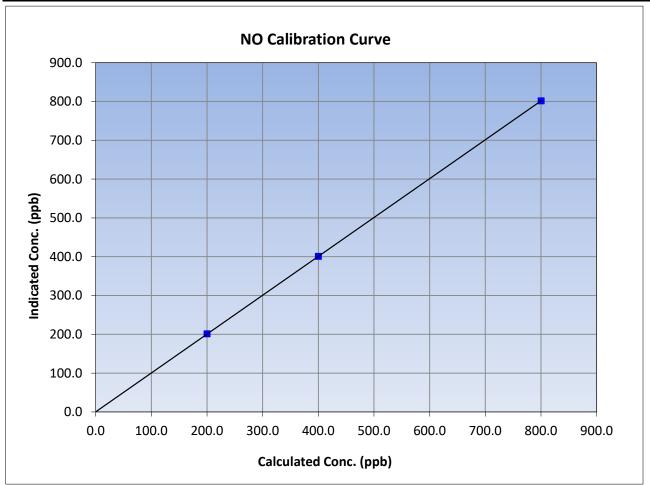
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 13, 2023 Previous Calibration: February 6, 2023 Station Name: Station Number: AMS08 Fort Chipewyan Start Time (MST): 7:00 End Time (MST): 12:23 Analyzer make: Thermo 42i Analyzer serial #: 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	0.999998	≥0.995
800.3	801.7	0.9983	correlation coefficient	0.555556	20.333
400.2	400.7	0.9987	Slope	1.001428	0.90 - 1.10
200.1	201.3	0.9939	Slope	1.001426	0.90 - 1.10
			Intercept	0.260000	+/-20





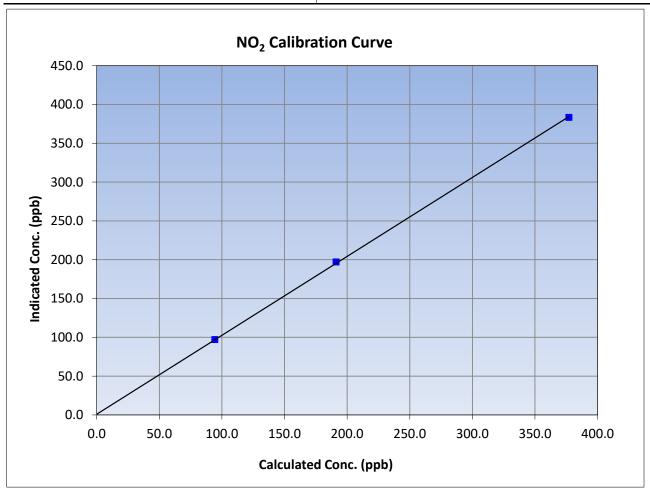
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 13, 2023 Previous Calibration: February 6, 2023 Station Name: Station Number: AMS08 Fort Chipewyan Start Time (MST): 7:00 End Time (MST): 12:23 Analyzer serial #: Analyzer make: Thermo 42i 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999933	≥0.995
377.1	383.4	0.9836	Correlation Coefficient	0.999933	20.333
191.2	197.1	0.9701	Slope	1.016898	0.90 - 1.10
94.3	97.1	0.9712	Slope	1.010090	0.90 - 1.10
			Intercept	0.900918	+/-20

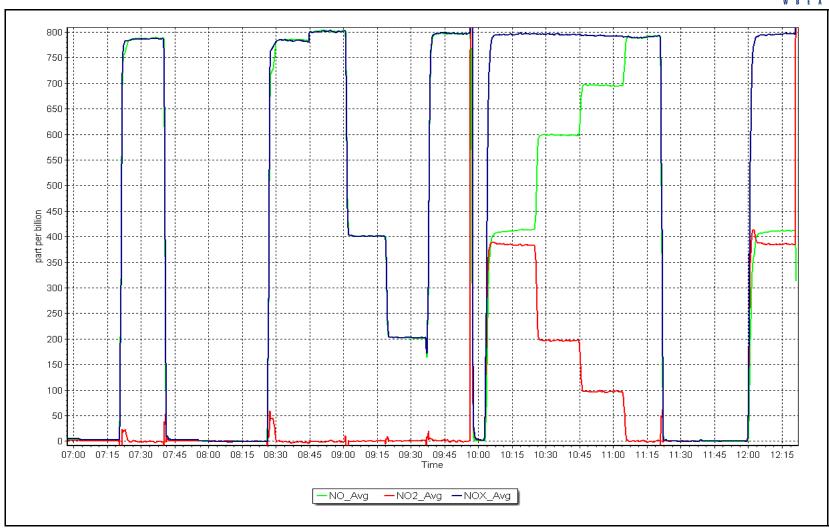


NO_x Calibration Plot

Date: March 13, 2023

Location: Fort Chipewyan







O₃ Calibration Report

Version-01-2020

-2.0

Station Information

Station Name: Fort Chipewyan

Calibration Date: March 13, 2023

Start time (MST): 13:05 Reason: Routine Station number: AMS08

Last Cal Date: February 6, 2023

End time (MST): 15:48

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3252 ZAG Make/Model: Teledyne API T701 Serial Number: 260

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3872

Finish Start Finish Start Backgd or Offset: Calibration slope: 1.007143 1.002171 -2.0 -0.880000 Coeff or Slope: Calibration intercept: -0.600000 1.036 1.036

O₃ 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	1.1	
as found span	5000	963.6	400.0	400.8	0.998
as found 2nd point					
as found 3rd point					
calibrator zero	5000	NA	0.0	0.5	
high point	5000	961.7	400.0	400.6	0.999
second point	5000	810.3	200.0	199.1	1.005
third point	5000	701.3	100.0	97.8	1.022
as left zero	5000	NA	0.0	0.4	
as left span	5000	963.3	400.0	401.3	0.997
			Avera	ge Correction Factor	1.009
Baseline Corr As found:	399 7	Previous resnonse	402.3	*% change	-0.6%

Previous response Baseline Corr As found: 399.7 402.3 % change -0.6% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Karan Pandit



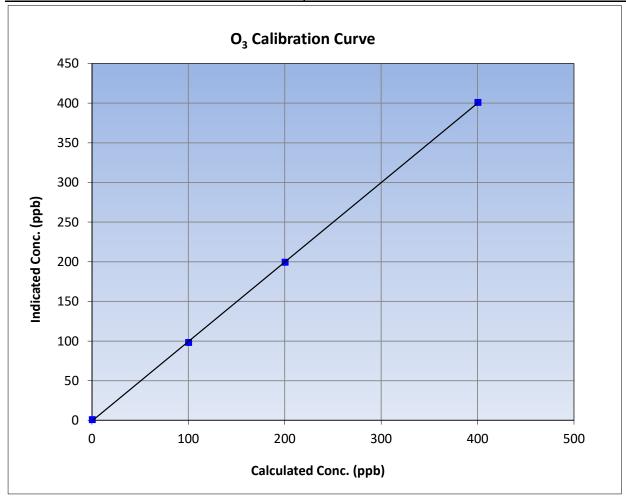
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 6, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 13:05 End Time (MST): 15:48 Analyzer make: Teledyne API T400 Analyzer serial #: 3872

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	0.999945	≥0.995			
400.0	400.6	0.9985	Correlation coefficient	0.555545	20.993			
200.0	199.1	1.0045	Slope	1.002171	0.90 - 1.10			
100.0	97.8	1.0225	Slope	1.002171	0.90 - 1.10			
			- Intercept	-0.880000	+/- 5			

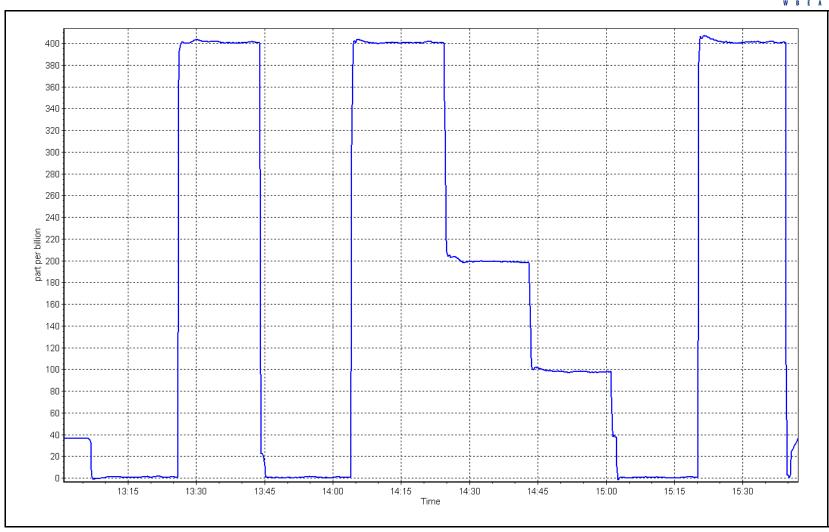


O₃ Calibration Plot

Date: March 13, 2023

Location: Fort Chipewyan







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1		
Station Name:	Fort Chipewyan		Station number:	AMS 08	
Calibration Date:	March 13, 2023		Last Cal Date:	February 15, 2023	
Start time (MST):	9:43		End time (MST):	11:24	
Analyzer Make:	API		S/N:	216	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Delta Cal		S/N:	1212	
Temp/RH standard:	Delta Cal		S/N:	1212	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)
T (°C)	-18.9	-18.5	-18.9		+/- 2 °C
P (mmHg)	741.0	739.6	741.0		+/- 10 mmHg
flow (LPM)	5.01	4.98	5.01		+/- 0.25 LPM
Leak Test:	Date of check:	March 13, 2023	Last Cal Date:	February 15, 2023	
	PM w/o HEPA:	5.4	PM w/ HEPA:	0.0	<0.2 ug/m3
Inlet cleaning :	Inlet Head	Quarterly Calibration	C ost		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	11.0	11.2	11.2		11.3 +/- 0.5
Post-maintenance	a laak chack:	PM w/o HEPA:	8.4	w/ HEPA:	0.0
Date Optical Cham	-	March 13,		W/ HEFA.	<0.2 ug/m3
Disposable Filte	-	March 13,			
		Annual Maintenanc	e		
Date Sample Tub	pe Cleaned:	July 14, 2	022		
Date RH/T Senso	or Cleaned:	July 14, 2	022		
Notes:	Pump chan	ged after leak check. Op	tical chamber clean	ed. No adjustments r	nade.
Calibration by:	Karan Pandit				



CO Calibration Report

Station number:

End time (MST):

AMS08

12:05

December 1, 2028

Version-01-2020

Station Information

Station Name: Fort Chipewyan

Calibration Date: March 13, 2023 Last Cal Date: February 14, 2023

Start time (MST): 7:12

Reason: Maintenance

Calibration Standards

Cal Gas Concentration: 3,030 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: ALM014846

Removed Cal Gas Conc: 3,030 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 5272 ZAG Make/Model: API T701H Serial Number: 197

Analyzer Information

Analyzer make: API T300 Analyzer serial #: 3505

Analyzer Range: 0 - 50 ppm

<u>Finish</u> Start **Finish** <u>Start</u> Calibration slope: 0.983508 0.998892 Backgd or Offset: -0.013 -0.014 Coeff or Slope: 0.996 Calibration intercept: 0.322926 0.030961 0.987

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	0.21	
as found span	4933	66.7	40.4	40.7	0.993
as found 2nd point	4967	33.3	20.2	20.6	0.978
as found 3rd point	4983	16.7	10.1	10.4	0.975
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4934	66.7	40.4	40.4	1.002
second point	4967	33.3	20.2	20.3	0.993
third point	4983	16.7	10.1	10.1	1.004
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.4	39.4	1.026
			Avera	ge Correction Factor	1.000
Baseline Corr As found:	40.48	Prev response:	40.08	*% change:	1.0%
Baseline Corr 2nd AF pt:	20.4	AF Slope:	1.001720	AF Intercept:	0.266590
Baseline Corr 3rd AF pt:	10.2	AF Correlation:	0.999965		

Peaked the IR source and changed the sample inlet filter after as founds. Adjusted the zero and span.

Calibration Performed By: Karan Pandit

Notes:

* = > +/-5% change initiates investigation



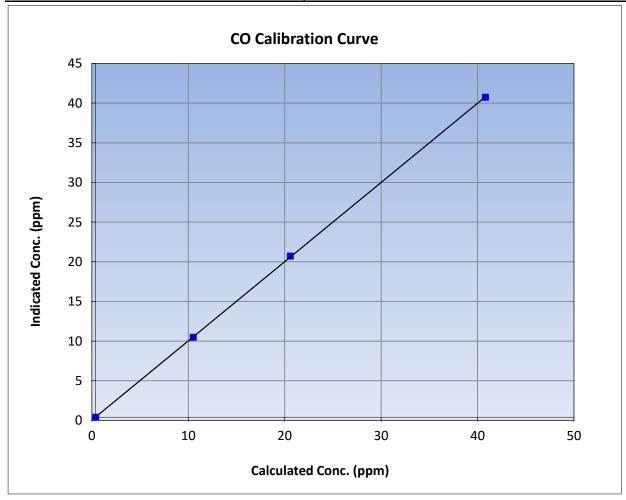
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 14, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 7:12 End Time (MST): 12:05 Analyzer make: **API T300** Analyzer serial #: 3505

Calibration Data								
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999973	≥0.995			
40.4	40.4	1.0016	Correlation Coefficient	0.555575	20.993			
20.2	20.3	0.9931	Slope	0.998892	0.90 - 1.10			
10.1	10.1	1.0040	Slope	0.556652	0.90 - 1.10			
			- Intercept	0.030961	+/-1.5			

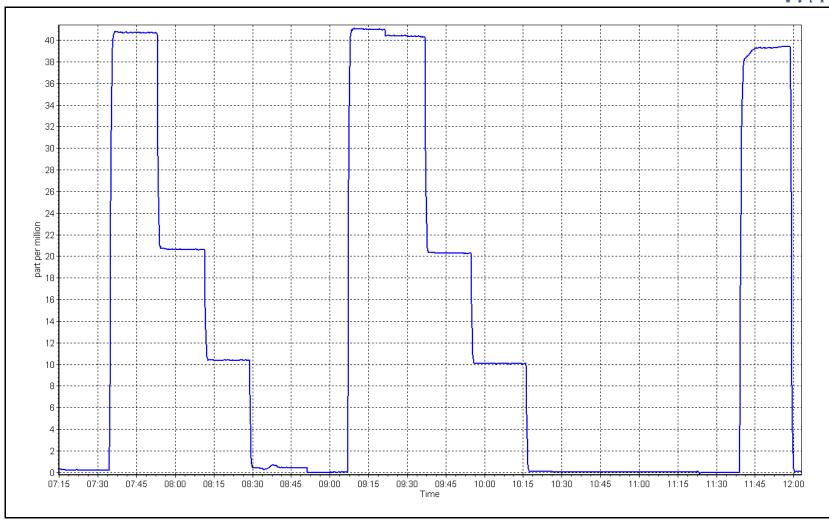


CO Calibration Plot

Date: March 13, 2023

Location: Fort Chipewyan







CO₂ Calibration Report

Station number:

End time (MST):

AMS08

15:55

Version-01-2020

Station Information

Station Name: Fort Chipewyan

March 12, 2023 February 15, 2023 Calibration Date: Last Cal Date:

Start time (MST): 11:46

Reason: Routine

Calibration Standards

Cal Gas Concentration: December 1, 2028 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: 5272 N2 Gen Make/Model: NG 5000 Serial Number: 771048318

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: 1.006830 0.998937 0.019 0.006 Calibration intercept: -1.740000 -4.820000 Coeff or Slope: 1.011 1.018

CO₂ 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	0.9	
as found span	2920	80.0	1605.9	1626.3	0.987
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	
high point	2920	80.0	1605.9	1605.8	1.000
second point	2960	40.0	802.9	782.6	1.026
third point	2980	20.0	401.5	399.7	1.004
as left zero	3000	0.0	0.0	0.0	
as left span	2960	40.0	802.9	779.8	1.030
			Avera	ge Correction Factor	1.010

Baseline Corr As found: 1625.40 Prev response: 1615.09 *% change: 0.6%

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

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

Notes: Sample inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By: Karan Pandit



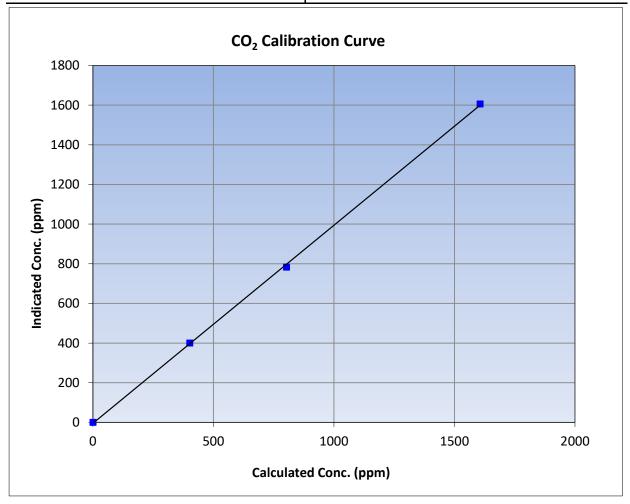
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	March 12, 2023	Previous Calibration	February 15, 2023
Station Name	Fort Chipewyan	Station Number	AMS08
Start Time (MST)	11:46	End Time (MST)	15:55
Analyzer make	Teledyne API T360	Analyzer serial #	289

Calibration Data								
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-0.1		Correlation Coefficient	0.999793	≥0.995			
1605.9	1605.8	1.0000	Correlation Coefficient	0.333733	20.333			
802.9	782.6	1.0260	Slope	0.998937	0.90 - 1.10			
401.5	399.7	1.0044	Slope	0.556557	0.90 - 1.10			
			- Intercept	-4.820000	+/-20			

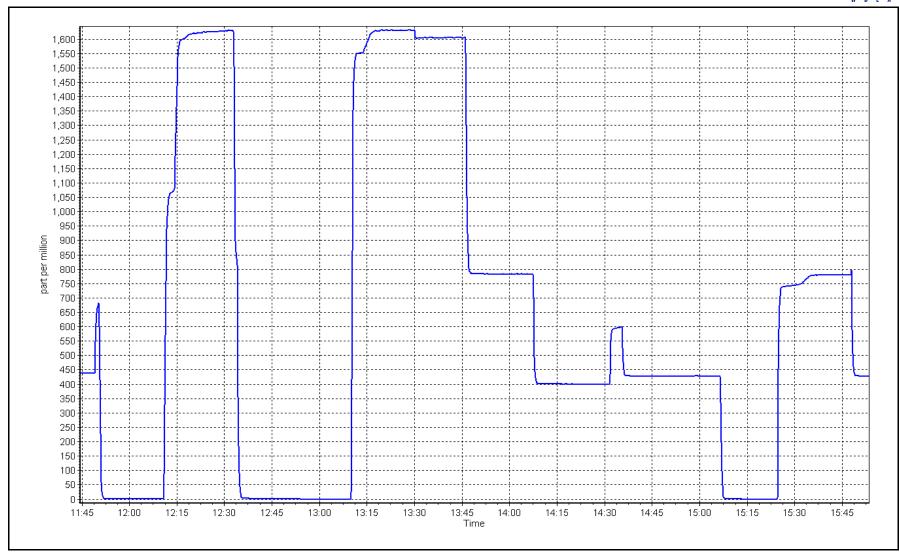


CO₂ Calibration Plot

Date: March 12, 2023

Location: Fort Chipewyan







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Station number:

Version-01-2020

Finish

Station Information

Station Name: Barge Landing

March 10, 2023 Calibration Date:

10:58 Start time (MST): Routine Reason:

Last Cal Date:

February 3, 2023

AMS09

Start

End time (MST): 14:05

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

1.002493 Calibration slope: 1.001709 Backgd or Offset: 9.8 9.7 0.986 Calibration intercept: 0.431711 0.631572 Coeff or Slope: 0.986

SO₂ 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	5000	0.0	0.0	0.1	
as found span	4919	80.2	801.5	801.7	1.000
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	803.3	0.998
second point	4959	40.1	400.8	402.3	0.996
third point	4980	20.0	199.8	201.1	0.994
as left zero	5000	0.0	0.0	0.2	
as left span	4919	80.2	801.5	808.0	0.992
			Averag	ge Correction Factor	0.996
acalina Carr As faund.	001.00	Draviaus raspans	002.02	*0/ abanaa	0.20/

Baseline Corr As found: 801.60 Previous response 803.92 *% 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 sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Ryan Power



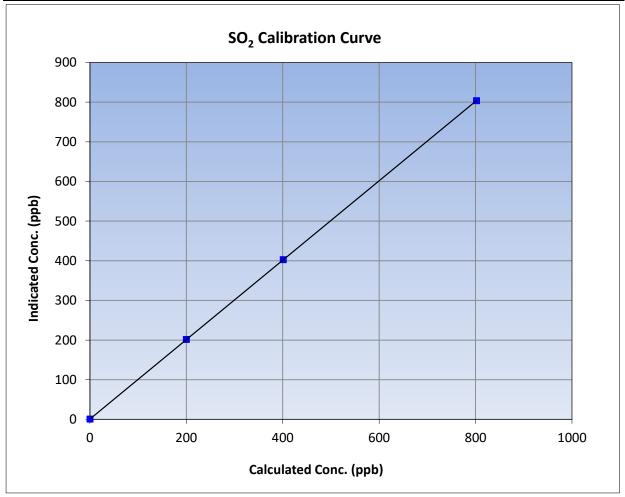
SO₂ Calibration Summary

Version-01-2020

Station Information

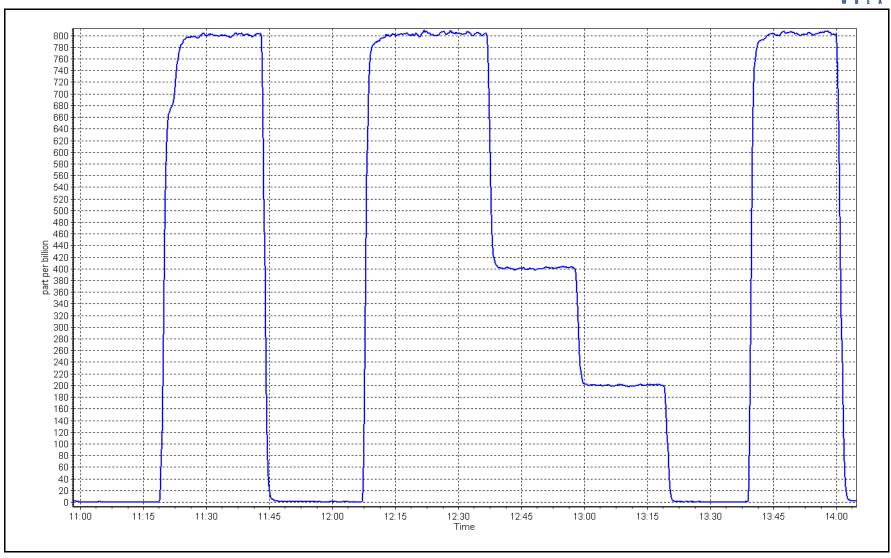
Calibration Date: March 10, 2023 **Previous Calibration:** February 3, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:58 End Time (MST): 14:05 Analyzer make: Thermo 43i Analyzer serial #: 1118148498

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	803.3	0.9977	Correlation Coefficient	0.555555	20.993			
400.8	402.3	0.9962	Slope	1.001709	0.90 - 1.10			
199.8	201.1	0.9937	Slope	1.001709	0.90 - 1.10			
			- Intercept	0.631572	+/-30			



SO2 Calibration Plot Date: March 10, 2023 Location: Barge Landing







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Barge Landing

Calibration Date: March 23, 2023

Start time (MST): 9:07 Reason:

Routine

Station number: AMS09

> Last Cal Date: February 28, 2023

End time (MST): 13:47

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: September 2, 2024 4.87 ppm

Cal Gas Cylinder #: EY0002346

Removed Cal Gas Conc: Rem Gas Exp Date: NA 4.87 ppm Removed Gas Cyl #: Diff between cyl: NA

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

Analyzer Information

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

CDN-101 Converter serial #: 519 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> Calibration slope: 1.006146 Backgd or Offset: 2.76 1.003148 2.65

-0.000990 0.019102 Calibration intercept: Coeff or Slope: 1.094 1.130

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	4918	82.1	80.0	77.5	1.032
as found 2nd point	4959	41.1	40.0	38.7	1.034
as found 3rd point	4979	20.5	20.0	19.2	1.040
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	4918	82.1	80.0	80.5	0.993
second point	4959	41.1	40.0	40.2	0.996
third point	4979	20.5	20.0	20.2	0.989
as left zero	5000	0.0	0.0	0.0	
as left span	4918	82.1	80.0	80.3	0.996
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber change	ge:	28-Feb-23	_	Ave Corr Factor	0.993
Data of last convertor offici	Data of last converter officional tests				

Date of last scrubber change:	28-Feb-23	Ave Corr Factor	0.993
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 77.5 80.21 -3.5% Prev response: *% change: Baseline Corr 2nd AF pt: -0.080930 38.7 AF Slope: 0.969709 AF Intercept: 0.999995 Baseline Corr 3rd AF pt: AF Correlation: 19.2

* = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. SOx scrubber check done after calibrator zero. Notes: Adjusted span.

Calibration Performed By: Braiden Boutilier



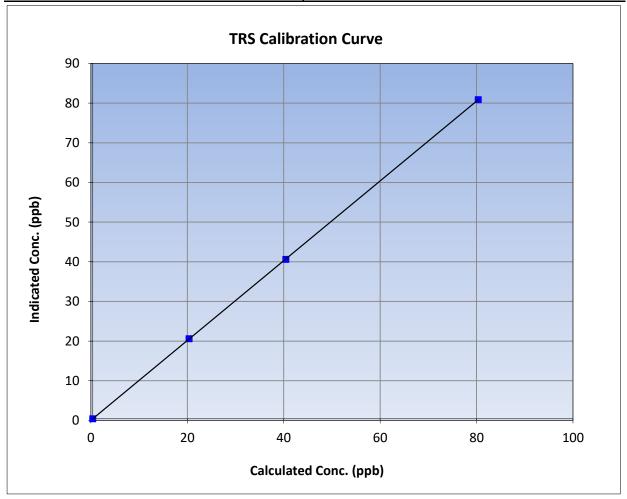
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: Calibration Date: March 23, 2023 February 28, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:07 End Time (MST): 13:47 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

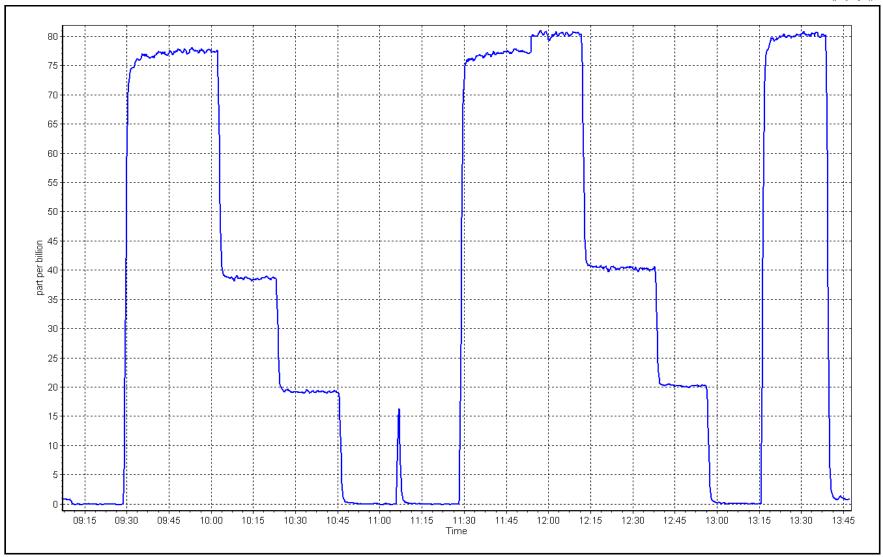
Calibration Data							
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.0		Correlation Coefficient	0.999995	≥0.995		
80.0	80.5	0.9933	Correlation Coefficient	0.99999	20.993		
40.0	40.2	0.9958	Slope	1.006146	0.90 - 1.10		
20.0	20.2	0.9886	Slope	1.000140	0.90 - 1.10		
			- Intercept	0.019102	+/-3		



TRS Calibration Plot

Date: March 23, 2023 Location: Barge Landing







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Barge Landing

Calibration Date: March 10, 2023

Start time (MST): 10:58
Reason: Routine

Station number: AMS09

Last Cal Date: February 3, 2023

End time (MST): 14:03

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 Gas Expiry: 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 (CH₄): 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 #: 1170050131

THC Range (ppm): 0 - 100 ppm

NMHC Range (ppm): 0 - 50 ppm CH4 Range (ppm): 0 - 50 ppm

 Start
 Finish
 Start
 Finish

 CH4 SP Ratio:
 1.99E-04
 2.03E-04
 NMHC SP Ratio:
 4.28E-05
 4.30E-05

CH4 Retention time: 12.2 12.6 NMHC Peak Area: 213327 212383

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	16.69	1.026	
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	17.11	1.000	
second point	4960	40.1	8.56	8.50	1.007	
third point	4980	20.0	4.27	4.23	1.010	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	80.2	17.12	17.12	1.000	
			,	Average Correction Factor	1.006	
Baseline Corr AF:	16.69	Prev response	17.10	*% change	-2.4%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		

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

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

					VC151011 01 20
		NINALIC Calibr	etien Dete		
Set Point	Dil air flow rate	NMHC Calibr 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	0.0	
is found span	4919	80.2	9.14	9.07	1.008
s found 2nd point	1323	00.2	3.11	3.07	1.000
s found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	80.2	9.14	9.14	1.000
econd point	4960	40.1	4.57	4.55	1.003
hird point	4980	20	2.28	2.27	1.002
is left zero	5000	0	0.00	0.00	
is left span	4919	80.2	9.14	9.14	0.999
is tere spari	4313	00.2		rage Correction Factor	1.002
Baseline Corr AF:	9.07	Prev response	9.08	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:	3.00	AF Intercept:	0.170
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Justinie Con Gru 7 ii i		7ti con ciación.			
		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> 5
s found zero	5000	0.0	0.00	0.00	
s found span	4919	80.2	7.98	7.63	1.047
s found 2nd point					
s found 3rd point					-
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	80.2	7.98	7.97	1.001
econd point	4960	40.1	3.99	3.95	1.011
hird point	4980	20.0	1.99	1.95	1.020
is left zero	5000	0.0	0.00	0.00	
is left span	4919	80.2	7.98	7.98	1.000
,				rage Correction Factor	1.011
Baseline Corr AF:	7.63	Prev response	8.02	*% change	-5.2%
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:		1.001427		0.999991	
THC Cal Offset:		-0.043961		-0.027960	
CH4 Cal Slope:		1.007423		0.999623	
CH4 Cal Offset:		-0.020126		-0.022149	
NAME COLC		0.020120		4 000225	

Notes: Changed sample inlet filter after as founds. Calibrated span to adjust CH4 RT, no dipping in signal

0.996127

-0.024834

Calibration Performed By: Ryan Power

NMHC Cal Slope:

NMHC Cal Offset:

1.000225

-0.005211



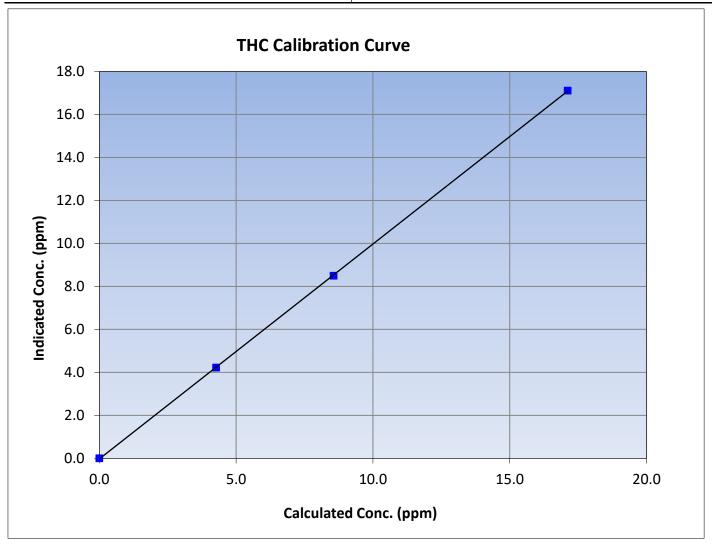
THC Calibration Summary

Version-01-2020

Station Information

March 10, 2023 **Previous Calibration:** Calibration Date: February 3, 2023 Station Name: Station Number: AMS09 Barge Landing Start Time (MST): 10:58 End Time (MST): 14:03 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

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
17.12	17.11	1.0004	Correlation Coefficient	0.333364	20.333
8.56	8.50	1.0073	Slope	0.999991	0.90 - 1.10
4.27	4.23	1.0101	Slope		0.90 - 1.10
			Intercept	-0.027960	+/-0.5





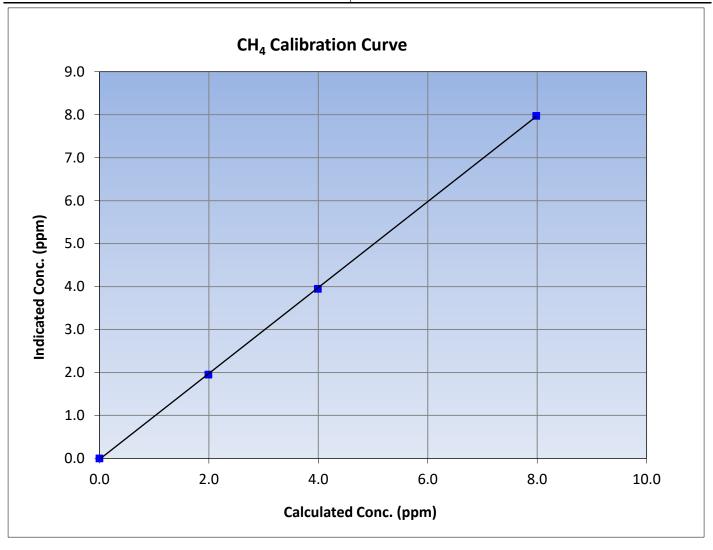
CH₄ Calibration Summary

Version-01-2020

Station Information

March 10, 2023 Calibration Date: **Previous Calibration:** February 3, 2023 Station Name: AMS09 **Barge Landing** Station Number: Start Time (MST): 10:58 End Time (MST): 14:03 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999960	≥0.995
7.98	7.97	1.0014	Correlation Coemicient		20.333
3.99	3.95	1.0113	Slope	0.999623	0.90 - 1.10
1.99	1.95	1.0197	Slope	0.999023	0.90 - 1.10
			Intercept	-0.022149	+/-0.5





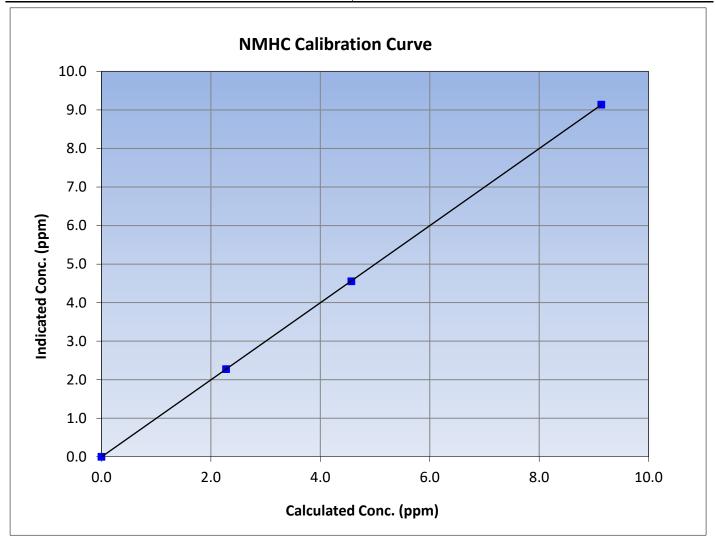
NMHC Calibration Summary

Version-01-2020

Station Information

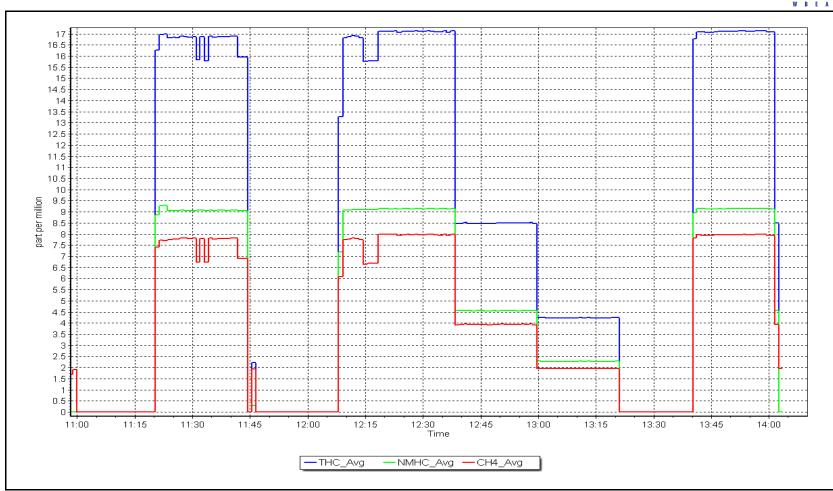
March 10, 2023 Calibration Date: **Previous Calibration:** February 3, 2023 Station Name: AMS09 Barge Landing Station Number: Start Time (MST): 10:58 End Time (MST): 14:03 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

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
9.14	9.14	0.9997	Correlation Coemicient		20.333
4.57	4.55	1.0034	Slope	1.000225	0.90 - 1.10
2.28	2.27	1.0018	Зюре	1.000223	0.90 - 1.10
			Intercept	-0.005211	+/-0.5



NMHC Calibration Plot Date: March 10, 2023 Location: Barge Landing







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Barge Landing

Calibration Date: March 20, 2023

Start time (MST): 8:10

Reason: Maintenance

Station number: AMS09

Last Cal Date: March 10, 2023

End time (MST): 12:16

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 Gas Expiry: 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 #: 1170050131

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:
 2.03E-04
 2.16E-04
 NMHC SP Ratio:
 4.30E-05
 4.38E-05

CH4 Retention time: 12.6 13.0 NMHC Peak Area: 212383 208794

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	0.02	
as found span	4919	80.2	17.12	16.55	1.034
as found 2nd point	4960	40.1	8.56	7.90	1.083
as found 3rd point	4980	20.0	4.27	4.08	1.046
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	17.12	17.10	1.001
second point	4960	40.1	8.56	8.49	1.008
third point	4980	20.0	4.27	4.24	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	17.12	17.08	1.002
	•			Average Correction Factor	1.005
Dosalina Carr A.F.	16.52	Drawrasaansa	17.00	*0/ shangs	2.40/

				0.460 00000.0	
Baseline Corr AF:	16.53	Prev response	17.09	*% change	-3.4%
Baseline Corr 2nd AF:	7.9	AF Slope:	0.964242	AF Intercept:	-0.081318
Baseline Corr 3rd AF	4 1	AF Correlation:	0 999323	* = > +/-5% change initiate	s investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC 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	0.0			
as found span	4919	80.2	9.14	9.11	1.003		
as found 2nd point	4960	40.1	4.57	4.5	1.006		
as found 3rd point	4980	20.0	2.28	2.26	1.008		
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4919	80.2	9.14	9.13	1.001		
second point	4960	40.1	4.57	4.55	1.004		
third point	4980	20	2.28	2.28	0.999		
as left zero	5000	0	0.00	0.00			
as left span	4919	80.2	9.14	9.11	1.003		
			Aver	age Correction Factor	1.001		
Baseline Corr AF:	9.11	Prev response	9.13	*% change	-0.3%		
Baseline Corr 2nd AF:	4.5	AF Slope:	0.997337	AF Intercept:	-0.007421		
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999996	* = > +/-5% change initiate	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	0.02	
as found span	4919	80.2	7.98	7.44	1.073
as found 2nd point	4960	40.1	3.99	3.24	1.232
as found 3rd point	4980	20.0	1.99	1.82	1.094
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	7.98	7.96	1.003
second point	4960	40.1	3.99	3.95	1.010
third point	4980	20.0	1.99	1.96	1.016
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	7.97	1.002
			Aver	age Correction Factor	1.010
Baseline Corr AF:	7.42	Prev response	7.96	*% change	-7.2%
Baseline Corr 2nd AF:	3.22	AF Slope:	0.924642	AF Intercept:	-0.097893
Baseline Corr 3rd AF:	1.80	AF Correlation:	0.994383	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.999991		0.998949	
THC Cal Offset:		-0.027960		-0.021159	
CH4 Cal Slope:		0.999623	0.997790		
CH4 Cal Offset:		-0.022149	-0.015750		
NMHC Cal Slope:		1.000225	0.998962		
NMHC Cal Offset:		-0.005211		-0.001412	

Notes: CH4 channel dipping. Actuator and pump changed. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay



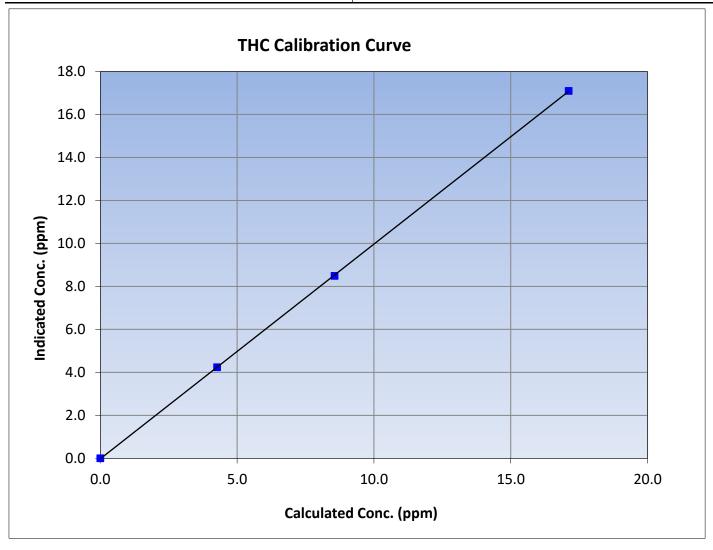
THC Calibration Summary

Version-01-2020

Station Information

March 20, 2023 **Previous Calibration:** Calibration Date: March 10, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 8:10 End Time (MST): 12:16 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

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	17.10	1.0011	Correlation Coefficient		20.333
8.56	8.49	1.0080	Slope	0.998949	0.90 - 1.10
4.27	4.24	1.0067	Slope	0.336343	0.90 - 1.10
			Intercept	-0.021159	+/-0.5





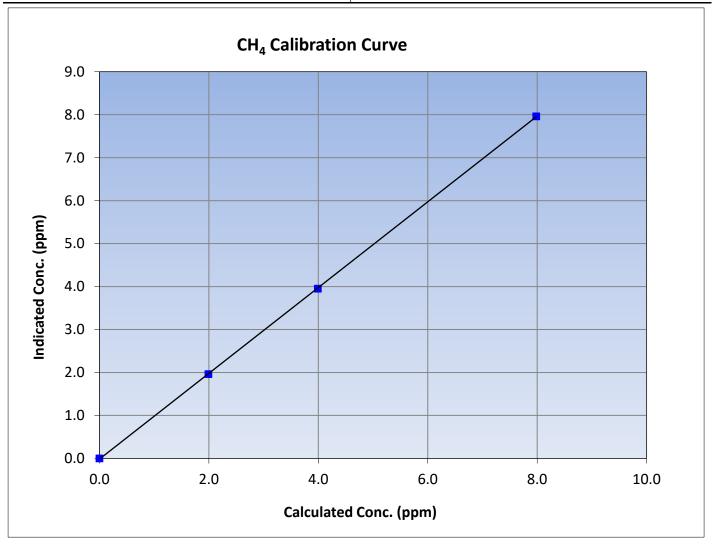
CH₄ Calibration Summary

Version-01-2020

Station Information

March 20, 2023 Calibration Date: **Previous Calibration:** March 10, 2023 Station Name: **Barge Landing** Station Number: AMS09 Start Time (MST): 8:10 End Time (MST): 12:16 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999979	≥0.995
7.98	7.96	1.0029	Correlation Coemicient		20.333
3.99	3.95	1.0103	Slope	0.997790	0.90 - 1.10
1.99	1.96	1.0155	Slope	0.337730	0.90 - 1.10
			Intercept	-0.015750	+/-0.5





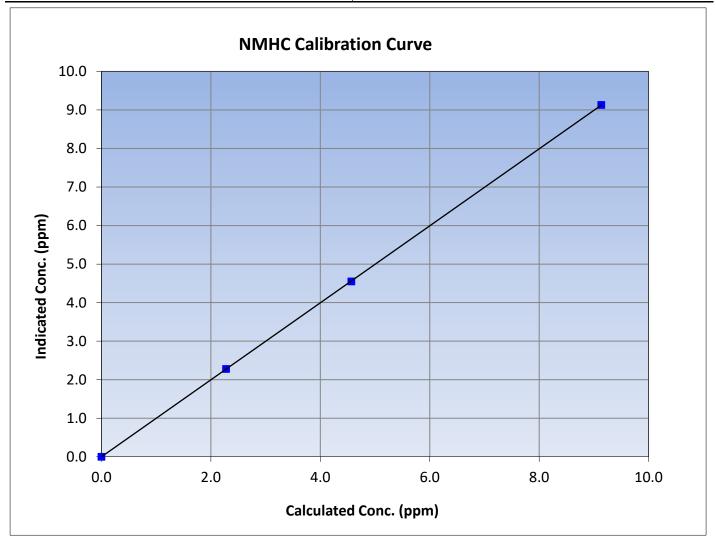
NMHC Calibration Summary

Version-01-2020

Station Information

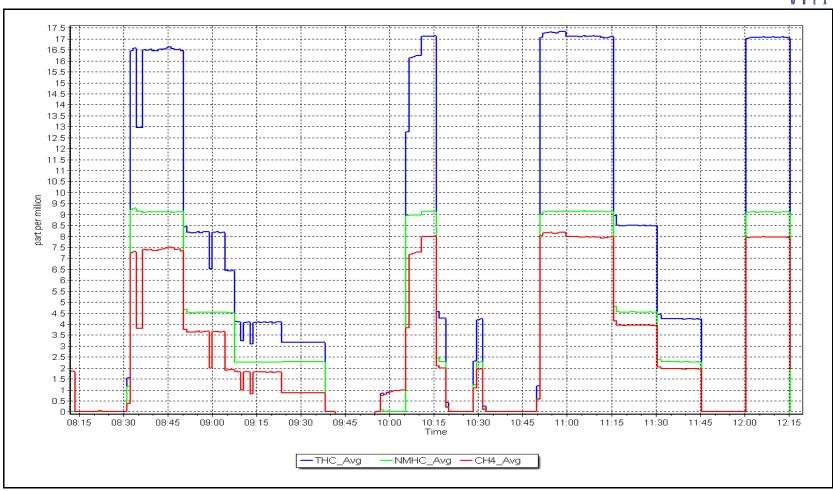
March 20, 2023 Calibration Date: **Previous Calibration:** March 10, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 8:10 End Time (MST): 12:16 Analyzer make: Thermo 55i Analyzer serial #: 1170050131

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
9.14	9.13	1.0007	Correlation Coemicient		20.333
4.57	4.55	1.0038	Slope	0.998962	0.90 - 1.10
2.28	2.28	0.9992	Зюре	0.998902	0.30 - 1.10
			Intercept	-0.001412	+/-0.5



NMHC Calibration Plot Date: March 20, 2023 Location: Barge Landing







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Barge Landing

Calibration Date: March 28, 2023

Start time (MST): 10:37 Reason: Install Station number: AMS09

Last Cal Date: March 20, 2023

End time (MST): 16:45

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 Gas Expiry: 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 #: 1193585649

THC Range (ppm): 0 - 100 ppm

NMHC Range (ppm): 0 - 50 ppm CH4 Range (ppm): 0 - 50 ppm

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

CH4 SP Ratio: 2.49E-04 NMHC SP Ratio: 4.79E-05
CH4 Retention time: 15.2 NMHC Peak Area: 190949

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	0.00					
high point	4919	80.2	17.12	17.09	1.002				
second point	4960	40.1	8.56	8.52	1.004				
third point	4980	20.0	4.27	4.28	0.998				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	80.2	17.12	17.10	1.001				
			А	verage Correction Factor	1.001				
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				

CALS 226



THC / CH₄ / 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= 0.95-1.0</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	4919	80.2	9.14	9.13	1.001
second point	4960	40.1	4.57	4.56	1.002
third point	4980	20	2.28	2.30	0.993
as left zero	5000	0	0.00	0.00	
as left span	4919	80.2	9.14	9.13	1.001
·			Aver	age Correction Factor	0.998
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 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>
	Dit all How rate	Source gas now rate	Calc coric (ppiri) (CC)	ind conc (ppin) (ic)	CF LIIIII = 0.33-1.03
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	4919	80.2	7.98	7.96	1.003
second point	4960	40.1	3.99	3.96	1.007
:hird point	4980	20.0	1.99	1.98	1.004
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	7.98	1.001
·			Aver	age Correction Factor	1.005
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
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		<u></u>		0.997787	
THC Cal Offset:				0.002047	
CH4 Cal Slope:				0.996643	
CH4 Cal Offset:				-0.003745	
				0.998523	
NMHC Cal Slope:				0.998523	

Notes:

NMHC Cal Offset:

Replaced after a failed nightly span, the baseline also drifted to around 1 ppm THC. Adjusted window timings and span, used new zero chromatogram.

0.006592

Calibration Performed By: Braiden Boutilier



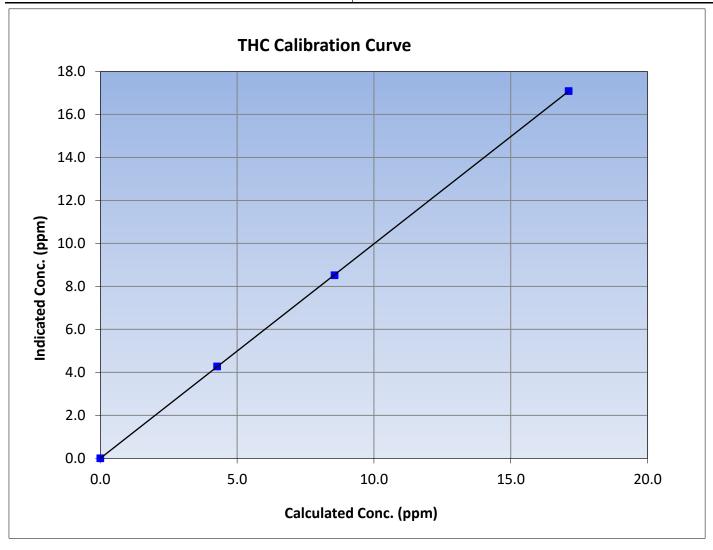
THC Calibration Summary

Version-01-2020

Station Information

March 28, 2023 **Previous Calibration:** Calibration Date: March 20, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:37 End Time (MST): 16:45 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	0.00		Correlation Coefficient	0.999995 ≥0	≥0.995
17.12	17.09	1.0017	Correlation Coefficient	0.999995	20.993
8.56	8.52	1.0045	Slope	0.997787	0.90 - 1.10
4.27	4.28	0.9978	Slope	0.997767	0.90 - 1.10
			Intercept	0.002047	+/-0.5





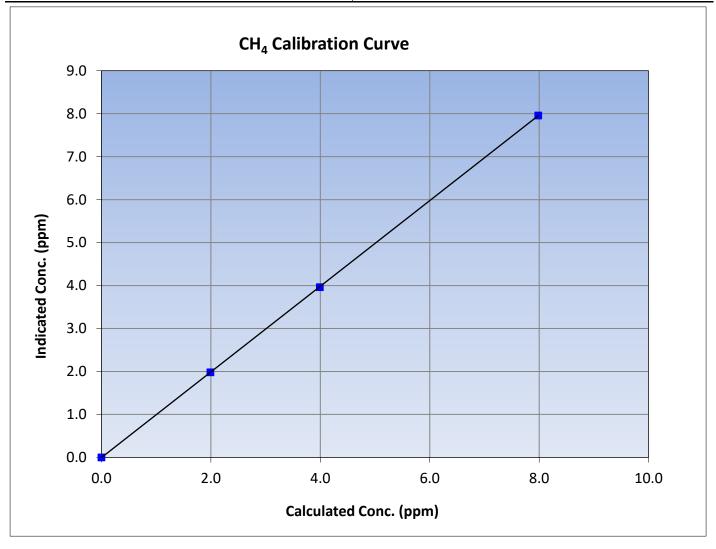
CH₄ Calibration Summary

Version-01-2020

Station Information

March 28, 2023 Calibration Date: **Previous Calibration:** March 20, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:37 End Time (MST): 16:45 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	0.999996	≥0.995
7.98	7.96	1.0032	Correlation Coemicient	0.999990	20.993
3.99	3.96	1.0070	Slope	0.996643	0.90 - 1.10
1.99	1.98	1.0042	Slope	0.990043	0.90 - 1.10
			Intercept	-0.003745	+/-0.5





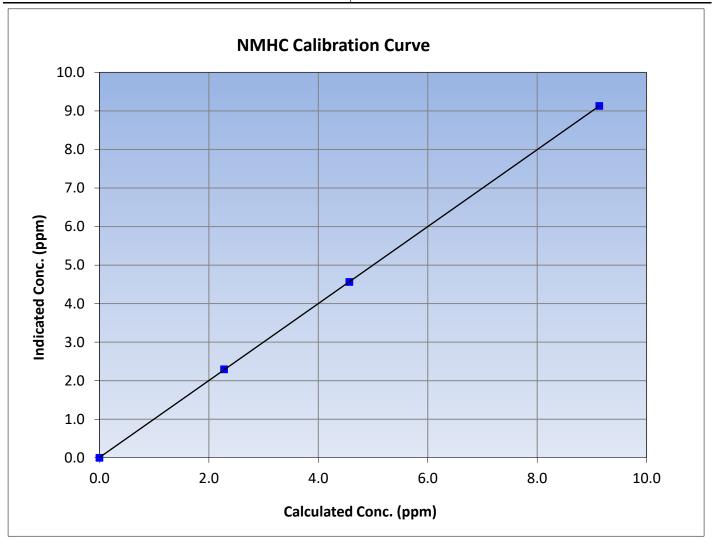
NMHC Calibration Summary

Version-01-2020

Station Information

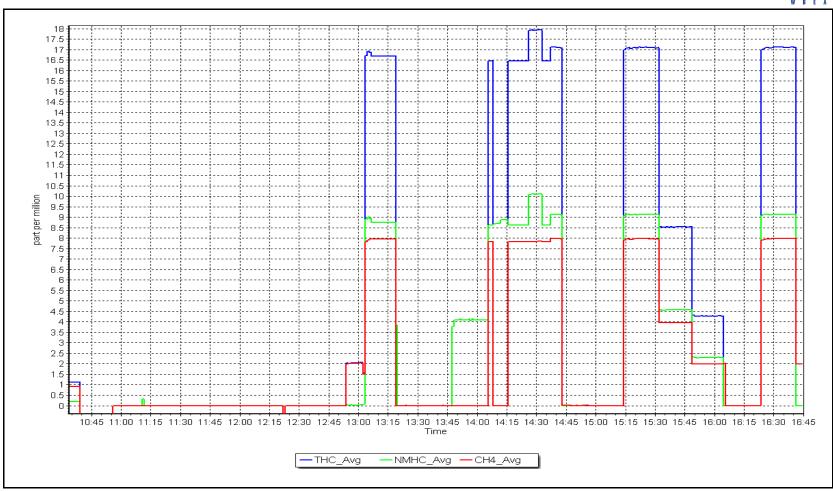
March 28, 2023 Calibration Date: **Previous Calibration:** March 20, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:37 End Time (MST): 16:45 Analyzer make: Thermo 55i Analyzer serial #: 1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	n Coefficient 0.999994 ≥0	≥0.995
9.14	9.13	1.0007	Correlation Coefficient	0.555554	20.999
4.57	4.56	1.0016	Slope	0.998523	0.90 - 1.10
2.28	2.30	0.9926	Siope	0.336323	0.90 - 1.10
			Intercept	0.006592	+/-0.5



NMHC Calibration Plot Date: March 28, 2023 Location: Barge Landing







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Barge Landing

Calibration Date: March 15, 2023

Start time (MST): 9:45
Reason: Routine

Station number: AMS09

Last Cal Date: February 22, 2023

End time (MST): 15:12

NO gas Diff:

Calibration Standards

NO Gas Cylinder #: DT0036634 Cal Gas Expiry Date: January 28, 2024

NOX Cal Gas Conc: 50.00 ppm NO Cal Gas Conc: 49.70 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 50.00 ppm Removed Gas NO Conc: 49.70 ppm

NOX 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: 1.146 1.175 NO bkgnd or offset: 10.3 10.5 NOX coeff or slope: 0.996 0.995 NOX bkgnd or offset: 10.6 10.3 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 179.2 175.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998455	0.998241
NO _x Cal Offset:	0.648644	0.748819
NO Cal Slope:	1.000928	1.000056
NO Cal Offset:	-0.732611	-0.352413
NO ₂ Cal Slope:	1.000063	1.001921
NO ₂ Cal Offset:	-1.156786	-0.892005



NO_X \ NO \ NO₂ 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 = 0.95-1.03
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4919	80.5	805.1	800.3	4.8	787.0	781.9	5.1	1.023	1.023
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	4919	80.5	805.1	800.3	4.8	804.0	800.0	3.4	1.001	1.000
second point	4959	40.2	402.1	399.7	2.4	402.7	399.6	3.1	0.998	1.000
third point	4979	20.1	201.0	199.8	1.2	201.9	198.7	3.2	0.996	1.006
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4919	80.5	805.1	450.4	354.7	799.3	445.0	354.3	1.007	1.012
							Average C	Correction Factor	0.998	1.002
Corrected As fo	ound NO _X =	787.1 ppb	NO =	= 782.0 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-2.2%
Previous Respo	onse NO _X =	804.5 ppb	NO =	800.3 ppb				*Percent Chang	ge NO =	-2.3%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	- ^		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
					GPT Calibration	Data				
O3 Setpo	oint (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 on 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)	794.5		444.6	354.7		354.9	1.000		100.0%
2nd GPT poin	t (200 ppb O3)	794.5		664.2	135.1		133.8	1.010		99.0%
3rd GPT point	t (100 ppb O3)	794.5		728.8	70.5		69.2	1.019		98.1%

Notes:

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

Average Correction Factor

1.010

Calibration Performed By:

Braiden Boutilier

99.1%



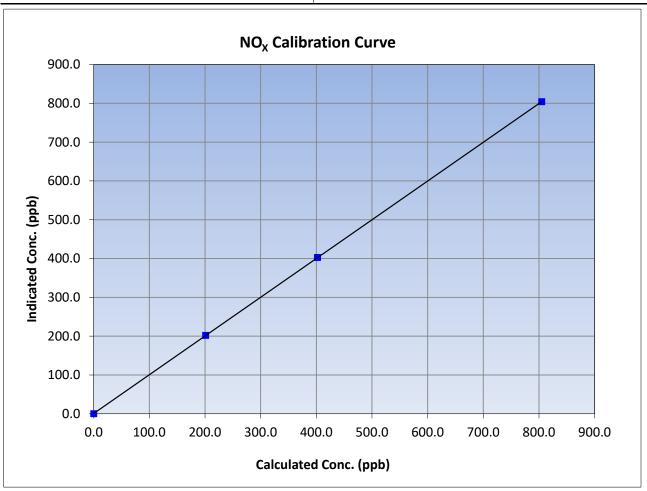
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 22, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:45 End Time (MST): 15:12 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	0.1		Correlation Coefficient	0.999997	≥0.995
805.1	804.0	1.0013	Correlation Coefficient	0.55557	20.333
402.1	402.7	0.9984	Slope	0.998241	0.90 - 1.10
201.0	201.9	0.9957	Slope	0.996241	0.90 - 1.10
			Intercept	0.748819	+/-20





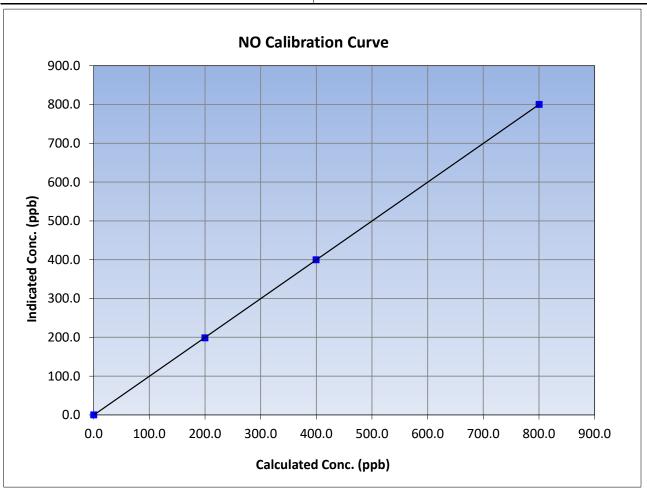
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 22, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:45 End Time (MST): 15:12 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	0.999997	≥0.995
800.3	800.0	1.0003	Correlation Coefficient	0.55557	20.333
399.7	399.6	1.0001	Slope	1.000056	0.90 - 1.10
199.8	198.7	1.0057	Slope	1.000030	0.90 - 1.10
			Intercept	-0.352413	+/-20





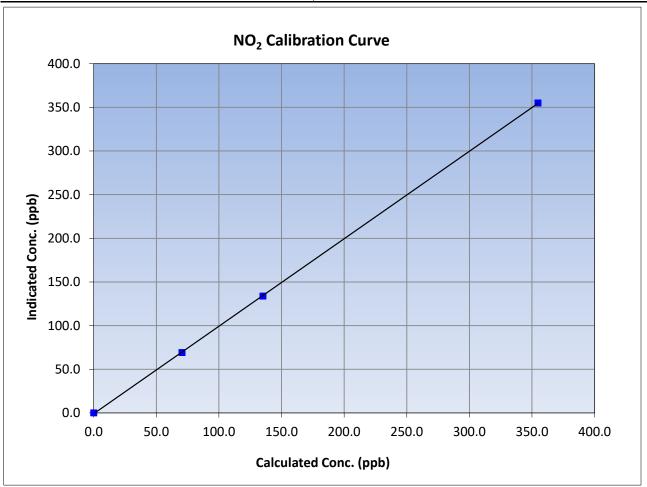
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 22, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:45 End Time (MST): 15:12 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	0.0		Correlation Coefficient	0.999975	≥0.995
354.7	354.9	0.9995	Correlation Coefficient	0.555575	20.333
135.1	133.8	1.0099	Slope	1.001921	0.90 - 1.10
70.5	69.2	1.0192	Slope	1.001921	0.90 - 1.10
			Intercept	-0.892005	+/-20

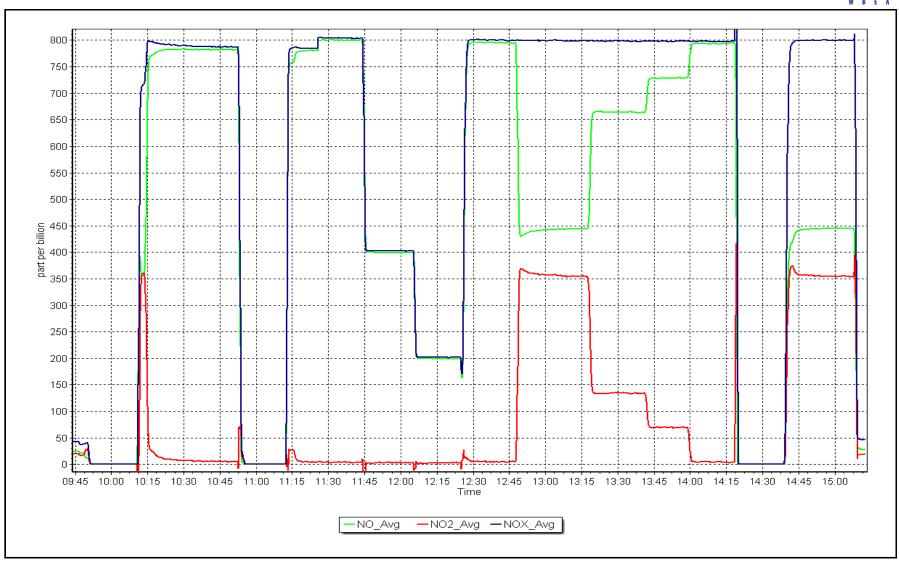


NO_x Calibration Plot

Date: March 15, 2023

Location: Barge Landing







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1			
Station Name:	Barge Landing		Station number:			
Calibration Date:	March 23, 2023		Last Cal Date:		2023	
Start time (MST):	12:14		End time (MST):	12:44		
Analyzer Make:	API T640		S/N:	321		
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 To	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>.</u>	<u>Adjusted</u>	(Limits)
T (°C)	0.0	-0.66	0.0			+/- 2 °C
P (mmHg)	727.6	729.67	727.6			+/- 10 mmHg
flow (LPM)	5.02	5.032	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	March 23, 2023	Last Cal Date:	February 2	8, 2023	
	PM w/o HEPA:	5.7	PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be			erve as the pre mai	ntenance lea	ık check	
Inlet cleaning:	Inlet Head					
		Quarterly Calibration T	est			
<u>Parameter</u>	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	-	-		•		11.3 +/- 0.5
Post-maintenance		PM w/o HEPA:	-	w/ HEPA: _		-
Date Optical Chamb	-	February 28				<0.2 ug/m3
Disposable Filter	Changed:	February 28	, 2023			
		Assessed Baladana and	_			
		Annual Maintenance	е			
Date Sample Tub	e Cleaned:	November 15	5, 2022			
Date RH/T Senso	r Cleaned:	November 15	5, 2022			
		No adjustments	made. Leak check p	accod		
Notes:		ivo aujustinents	made. Leak Check p	Jasseu.		
Calibration by:	Braiden Boutilier					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS11 LOWER CAMP MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: **Lower Camp**

March 7, 2023 Calibration Date: Last Cal Date:

Start time (MST): 10:53

Routine Reason:

Station number: AMS11

February 7, 2023

End time (MST): 14:06

Calibration Standards

Cal Gas Concentration: 49.25 ppm Cal Gas Exp Date: February 23, 2025

Cal Gas Cylinder #: CC2216

Removed Cal Gas Conc: 49.25 Rem Gas Exp Date: NA ppm Diff between cyl: Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3807 ZAG Make/Model: Teledyne API T701 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 100841398

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.995374 Backgd or Offset: 14.3 14.0 0.992304

Calibration intercept: -0.508143 -0.208611 Coeff or Slope: 1.051 1.051

SO₂ 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	0.0	
as found span	4919	81.3	8.008	798.2	1.003
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	8.008	797.6	1.004
second point	4959	40.7	400.9	397.2	1.009
third point	4980	20.3	199.9	199.1	1.004
as left zero	5000	0.0	0.0	0.4	
as left span	4919	81.3	8.008	798.1	1.003
			Averag	ge Correction Factor	1.006
	•	•	•	•	_

Baseline Corr As found: 798.20 Previous response 794.09 *% change 0.5% 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: Mohammed Kashif



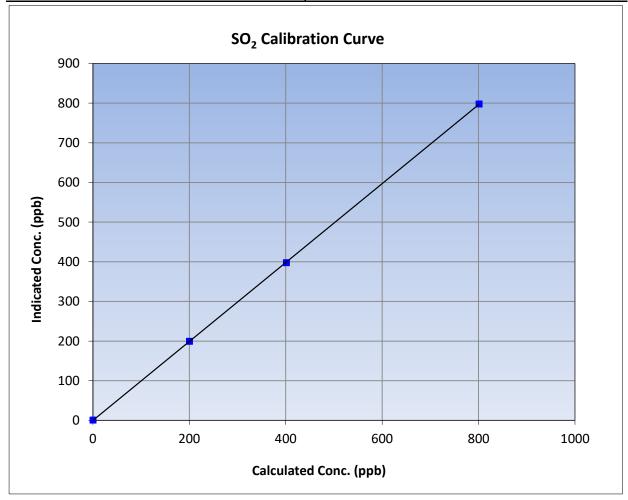
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 7, 2023 **Previous Calibration:** February 7, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:53 End Time (MST): 14:06 Analyzer make: Thermo 43i Analyzer serial #: 100841398

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Ic) (Cc/Ic) Statistical Evaluation Limits									
0.0	0.4		Correlation Coefficient	0.999989	≥0.995				
800.8	797.6	1.0040	Correlation coefficient	0.555565	20.993				
400.9	397.2	1.0094	Slope	0.995374	0.90 - 1.10				
199.9	199.1	1.0042	Slope	0.333374	0.90 - 1.10				
			- Intercept	-0.208611	+/-30				



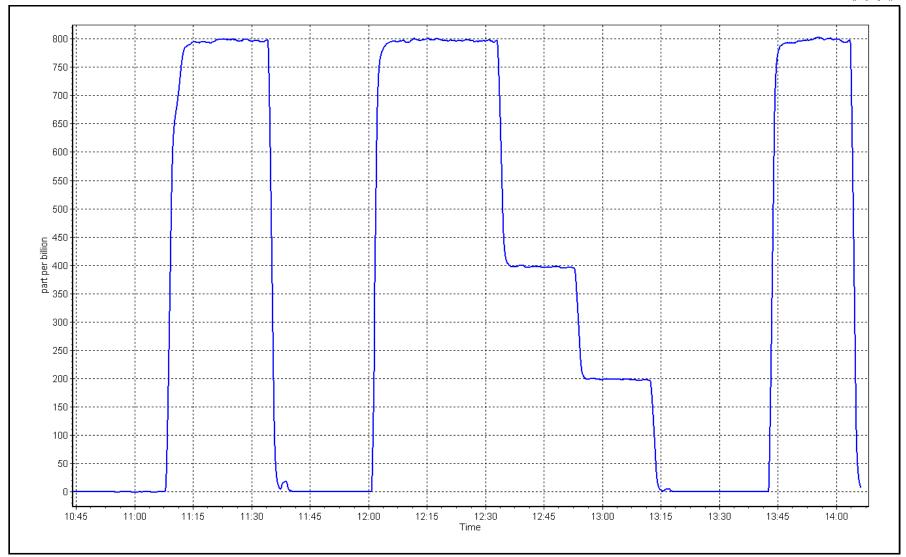
SO2 Calibration Plot

Date:

March 7, 2023

Location: Lower Camp







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Lower Camp

Calibration Date: March 28, 2023

Start time (MST): 9:47

Reason: Routine Station number: AMS11

> Last Cal Date: February 8, 2023

End time (MST): 16:03

Calibration Standards

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

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**

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3807 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.026375 Backgd or Offset: Calibration slope: 0.997193 14.0 13.9 Calibration intercept: 0.454865 0.532956 Coeff or Slope: 1.043 1.043

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	0.4	
as found span	4926	73.6	79.9	79.2	1.014
as found 2nd point	4963	36.8	40.0	40.3	1.001
as found 3rd point	4982	18.6	20.2	20.1	1.025
new cylinder response					

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	5000	0.0	0.0	0.4	
high point	4926	73.6	79.9	82.4	0.970
second point	4963	36.8	40.0	41.9	0.954
third point	4982	18.6	20.2	21.2	0.953
as left zero	5000	0.0	0.0	1.7	
as left span	4926	73.6	79.9	80.2	0.997
SO2 Scrubber Check	4919	81.1	811.0	1.7	
Date of last scrubber chang	ge:	<u> </u>	_	Ave Corr Factor	0.959

Date of last scrubber change:	Ave Corr Factor	0.959
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 78.8 80.15 Prev response: Baseline Corr 2nd AF pt: 39.9 AF Slope: 0.987574 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999922 19.7

* = > +/-5% change initiates investigation

-1.7%

0.416680

*% change:

Notes:

Changed the inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. No adjustments made.

Calibration Performed By: Mohammed Kashif



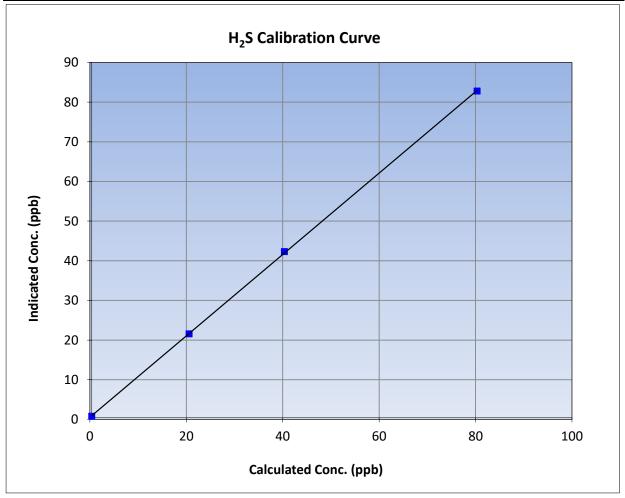
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 28, 2023 **Previous Calibration:** February 8, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:47 End Time (MST): 16:03 Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999953	≥0.995	
79.9	82.4	0.9699	Correlation Coefficient	0.999933	20.333	
40.0	41.9	0.9537	Slope	1.026375	0.90 - 1.10	
20.2	21.2	0.9525	Slope	1.020373	0.90 - 1.10	
			- Intercept	0.532956	+/-3	

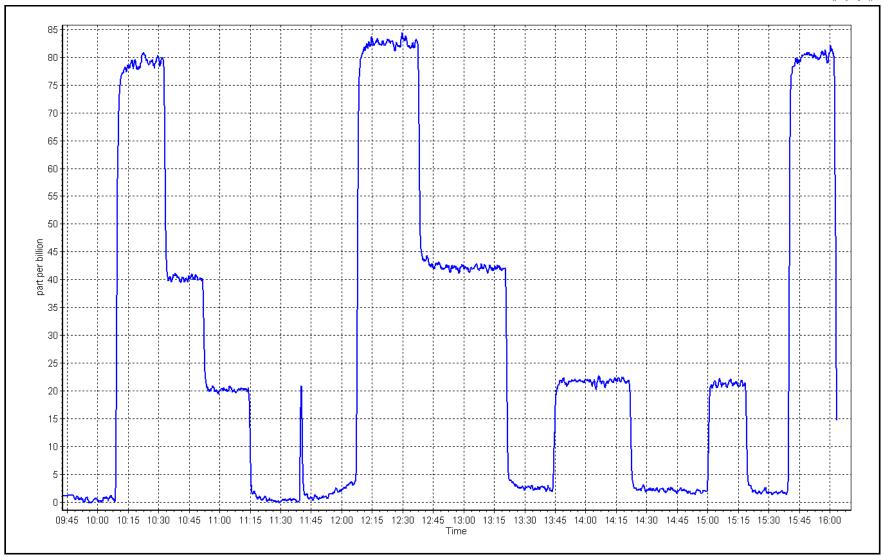


H₂S Calibration Plot

Date: March 28, 2023

Location: Lower Camp







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-01-2020

Station Information

Station Name: Lower Camp

Calibration Date: March 7, 2023

Start time (MST): 10:53 Reason: Routine Station number: AMS11

Last Cal Date: February 7, 2023

End time (MST): 14:06

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025 CC2216

CH4 Cal Gas Conc. 502.0 CH4 Equiv Conc. 1067.1 ppm ppm

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert:

Removed CH4 Conc. 502.0 ppm CH4 Equiv Conc. 1067.1 ppm

Removed C3H8 Conc. 205.5 ppm Diff between cyl (THC):

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

Calibrator Model: **API T700** Serial Number: 3807 ZAG make/model: **API T701** Serial Number: 196

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1505164381

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: 3.09E-04 3.02E-04 NMHC SP Ratio: 5.97E-05 5.86E-05 CH4 Retention time: NMHC Peak Area: 14.0 13.8 153551 156599

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	5000	0.0	0.00	0.00		
as found span	4919	81.3	17.35	17.71	0.980	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4919	81.3	17.35	17.32	1.002	
second point	4959	40.7	8.69	8.62	1.008	
third point	4980	20.3	4.33	4.30	1.007	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.3	17.35	17.42	0.996	
			Д	Average Correction Factor	1.006	
Baseline Corr AF:	17.71	Prev response	17.41	*% change	1.7%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		



THC / CH₄ / NMHC Calibration Report

Version-01-2020

Set Point	Dil air flow rate	NMHC Calibrate Source gas flow rate		Indiana (nom) /I-\	CE Limit- 0.0E 4.05
as found zero	5000	0.0	Calc conc (ppm) (Cc) 0.00	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
				0.00	0.002
as found span	4919	81.3	9.19	9.35	0.983
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	1.004
nigh point	4919	81.3	9.19	9.16	1.004
second point	4959	40.7	4.60	4.56	1.010
hird point	4980	20.3	2.29	2.28	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	9.19	9.22	0.997
				erage Correction Factor	1.007
Baseline Corr AF:	9.35	Prev response	9.19	*% change	1.6%
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	4919	81.3	8.16	8.37	0.975
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.3	8.16	8.16	1.000
second point	4959	40.7	4.09	4.06	1.007
hird point	4980	20.3	2.04	2.03	1.006
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	8.16	8.20	0.995
			Ave	erage Correction Factor	1.004
Baseline Corr AF:	8.37	Prev response	8.22	*% change	1.8%
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:		1.004951		0.998030	
THC Cal Offset:		-0.022988		-0.019190	
CH4 Cal Slope:		1.008833		1.000126	
CH4 Cal Offset:		-0.014688		-0.010089	
				2.02000	

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

1.001278

-0.007900

Calibration Performed By: Mohammed Kashif

NMHC Cal Slope:

NMHC Cal Offset:

0.996404

-0.009301



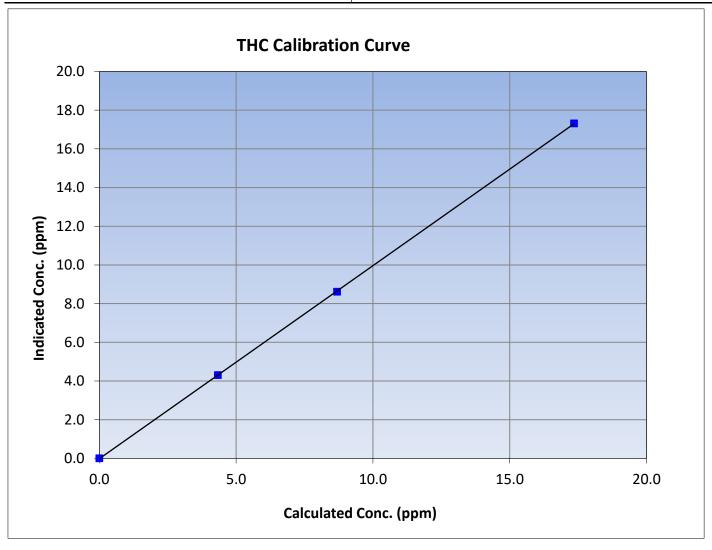
THC Calibration Summary

Version-01-2020

Station Information

March 7, 2023 Calibration Date: **Previous Calibration:** February 7, 2023 Station Name: AMS11 **Lower Camp** Station Number: Start Time (MST): 10:53 End Time (MST): 14:06 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	0.999988	≥0.995
17.35	17.32	1.0020			20.333
8.69	8.62	1.0082	Slope	0.998030	0.90 - 1.10
4.33	4.30	1.0070			0.30 - 1.10
			Intercept	-0.019190	+/-0.5





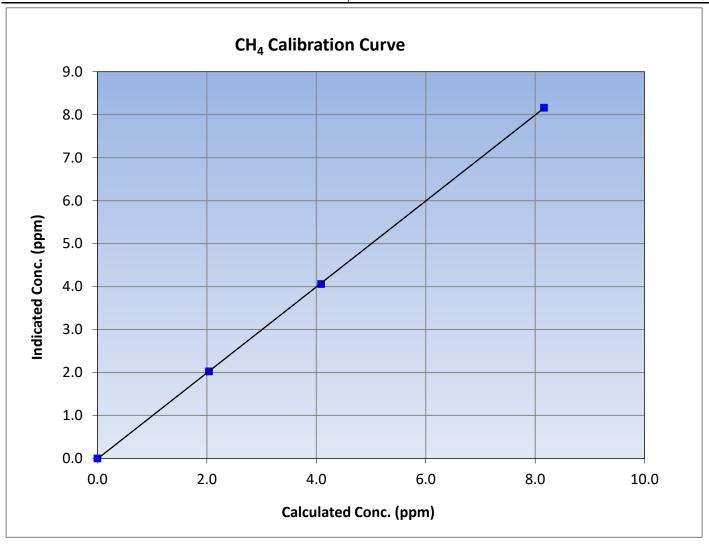
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 7, 2023 **Previous Calibration:** February 7, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:53 End Time (MST): 14:06 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
8.16	8.16	1.0000			20.333
4.09	4.06	1.0065	Slope	1.000126	0.90 - 1.10
2.04	2.03	1.0059			0.90 - 1.10
			Intercept	-0.010089	+/-0.5





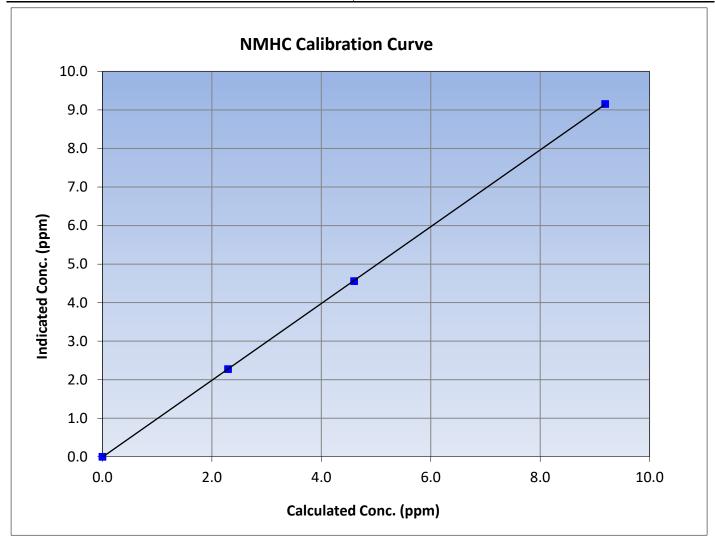
NMHC Calibration Summary

Version-01-2020

Station Information

March 7, 2023 Calibration Date: **Previous Calibration:** February 7, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 10:53 End Time (MST): 14:06 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	0.999990	≥0.995
9.19	9.16	1.0036			20.999
4.60	4.56	1.0095	- Slope	0.996404	0.90 - 1.10
2.29	2.28	1.0080			0.30 - 1.10
			Intercept	-0.009301	+/-0.5



NMHC Calibration Plot

Date: March 7, 2023

Location: Lower Camp

part per million

10:45

11:00

11:15

11:30

11:45

12:00

THC_Avg

12:15

12:30

—NMHC_Avg — CH4_Avg

12:45

13:00

13:15

13:30

13:45

14:00



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

March 2, 2023 Calibration Date:

Start time (MST): 10:07 Routine Reason:

Station number: AMS13

> February 2, 2023 Last Cal Date:

End time (MST): 16:10

Calibration Standards

Cal Gas Concentration: 50.55

Cal Gas Cylinder #: CC260812

Removed Cal Gas Conc: 50.55 Removed Gas Cyl #:

API T700

N/A

Calibrator Make/Model: ZAG Make/Model: API 701 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 serial #: 599

ppm

ppm

Analyzer Range 0 - 1000 ppb

Finish Start

Start

Finish

Calibration slope: 1.006516 Backgd or Offset: 77.5 80.5 1.001413 0.735 Calibration intercept: -2.738219 -2.298208 Coeff or Slope: 0.735

SO₂ 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	1.2	
as found span	4921	79.1	799.7	802.7	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4921	79.1	799.7	803.8	0.995
second point	4961	39.5	399.3	398.6	1.002
third point	4980	19.8	200.2	196.4	1.019
as left zero	5000	0.0	0.0	0.3	
as left span	4921	79.1	799.7	798.9	1.001
			Averag	ge Correction Factor	1.005

Baseline Corr As found: 801.50 Previous response 798.08 *% 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. Adjusted zero only.

Calibration Performed By: Karan Pandit



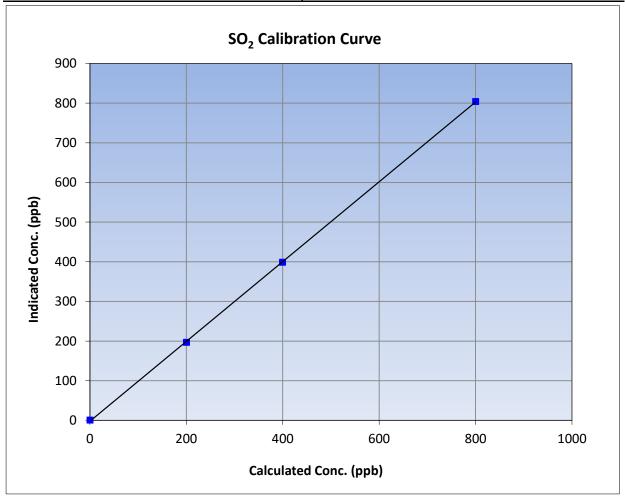
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 2, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:07 End Time (MST): 16:10 Analyzer make: **API T100** Analyzer serial #: 599

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	0.999952	≥0.995	
799.7	803.8	0.9949	Correlation coefficient	0.555552	20.333	
399.3	398.6	1.0018	Slope	1.006516	0.90 - 1.10	
200.2	196.4	1.0193	Slope	1.000310	0.90 - 1.10	
			- Intercept	-2.298208	+/-30	

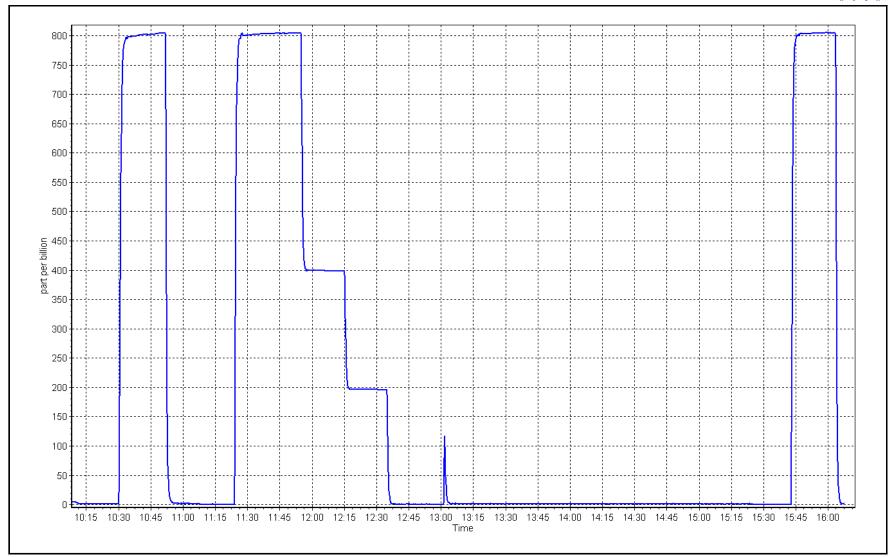


SO2 Calibration Plot

Date: March 2, 2023

Location: Fort McKay South







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort McKay South

Calibration Date: March 1, 2023 Start time (MST): 9:43

Routine Reason:

Station number: AMS13

> Last Cal Date: February 7, 2023

End time (MST): 14:15

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.34 ppm

Cal Gas Cylinder #: CC500241

Removed Cal Gas Conc: Rem Gas Exp Date: 5.34 ppm Removed Gas Cyl #: Diff between cyl: NA Calibrator Make/Model: Teledyne API T700 2448 Serial Number: ZAG Make/Model: Teledyne API 701 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> 1.002489 0.987178 Backgd or Offset: Calibration slope: 3.69 3.69 Calibration intercept: -0.082182 0.057822 Coeff or Slope: 1.120 1.120

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	80.6	79.2	1.019
as found 2nd point	4962	37.7	40.3	39.4	1.025
as found 3rd point	4981	18.9	20.2	19.4	1.046
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	75.5	80.6	79.7	1.012
second point	4962	37.7	40.3	39.8	1.012
third point	4981	18.9	20.2	19.8	1.019
as left zero	5000	0.0	0.0	0.4	
as left span	4925	75.5	80.6	79.8	1.010
SO2 Scrubber Check	4921	79.1	791.0	0.0	
Date of last scrubber change	e:	20-Mar-20		Ave Corr Factor	1.014
Data of last assume a efficia		NIA			- ff: -: ·

Date of last scrubber change:	20-Mar-20	Ave Corr Factor 1.014
Date of last converter efficiency test:	NA	efficiency

Prev response:

Baseline Corr 2nd AF pt: 39.3 AF Slope: 0.982925 AF Intercept: AF Correlation: Baseline Corr 3rd AF pt: 0.999954 19.3

* = > +/-5% change initiates investigation

*% change:

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

80.74

Calibration Performed By: Sean Bala

79.1

Baseline Corr As found:

-2.1%

-0.142149



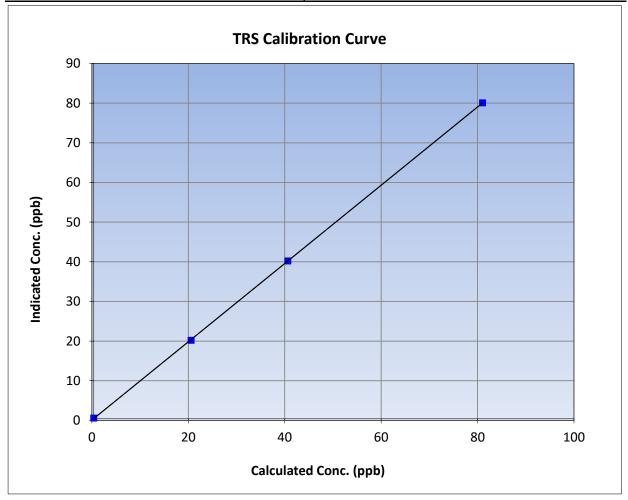
TRS Calibration Summary

Version-11-2021

Station Information

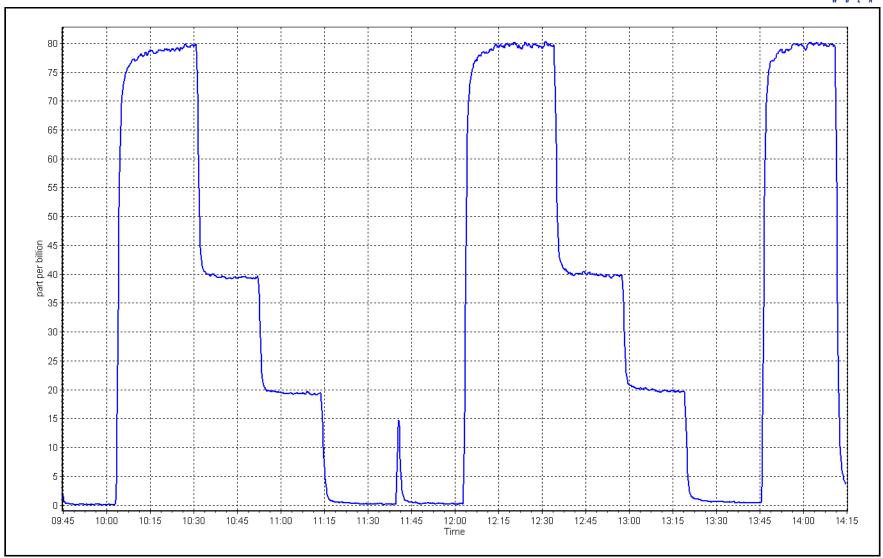
Previous Calibration: Calibration Date: March 1, 2023 February 7, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 9:43 End Time (MST): 13:36 Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

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	0.999984	≥0.995	
80.6	79.7	1.0116	Correlation Coefficient	0.333304	20.333	
40.3	39.8	1.0117	Slope	0.987178	0.90 - 1.10	
20.2	19.8	1.0195	Slope	0.36/1/6	0.30 - 1.10	
			- Intercept	0.057822	+/-3	



TRS Calibration Plot Date: March 1, 2023 Location: Fort McKay South







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

Calibration Date: March 2, 2023

Start time (MST): 10:07

Reason: Maintenance

Station number: AMS13

Last Cal Date: February 2, 2023

End time (MST): 16:10

Calibration Standards

Gas Cert Reference: CC260812 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 503.6 ppm CH4 Equiv Conc. 1077.5 ppm

CH4 Cal Gas Conc. 503.6 ppm CH4 Equiv Conc. 1077.5 C3H8 Cal Gas Conc. 208.7 ppm

C3H8 Cal Gas Conc. 208.7 ppm

Removed Gas Cert: NA Removed Gas Expiry: 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 (CH₄): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 2448 ZAG make/model: API 701 Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430012

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:
 2.39E-04
 NMHC SP Ratio:
 4.69E-05
 4.70E-05

CH4 Retention time: 12.0 12.0 NMHC Peak Area: 193720 193333

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	5000	0.0	0.00	0.00	
as found span	4921	79.1	17.05	16.85	1.012
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	17.07	0.999
second point	4961	39.5	8.51	8.35	1.019
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	17.06	0.999
			Д	Average Correction Factor	1.019
Baseline Corr AF:	16.85	Prev response	16.98	*% change	-0.8%

Baseline Corr AF: 16.85 Prev response 16.98 *% change -0.8%
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

rce gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)
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	0.00	0.00	
as found span	4921	79.1	9.08	8.88	1.023
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4921	79.1	9.08	9.10	0.998
second point	4961	39.5	4.53	4.47	1.015
third point	4980	19.8	2.27	2.21	1.027
as left zero	5000	0	0.00	0.00	
as left span	4921	79.1	9.08	9.08	1.000
			,	Average Correction Factor	1.013
Baseline Corr AF:	8.88	Prev response	9.04	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		

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	0.00		
as found span	4921	79.1	7.97	7.97	0.999	
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	7.97	1.000	
second point	4961	39.5	3.98	3.89	1.023	
third point	4980	19.8	1.99	1.89	1.053	
as left zero	5000	0.0	0.00	0.00		
as left span	4921	79.1	7.97	7.99	0.997	
			A	Average Correction Factor	1.025	
Baseline Corr AF:	7.97	Prev response	7.94	*% change	0.4%	
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>
THC Cal Slope:	1.002074	1.003410
THC Cal Offset:	-0.104181	-0.099393
CH4 Cal Slope:	1.003774	1.003172
CH4 Cal Offset:	-0.056196	-0.058596
NMHC Cal Slope:	1.000594	1.003631
NMHC Cal Offset:	-0.047785	-0.040597

Changed the inlet filter after as founds. Enabled and captured a new zero chromatogram, and adjusted Notes: the span. Enabled use flat baseline as well. Maintenance to be continued next day.

Calibration Performed By: Karan Pandit



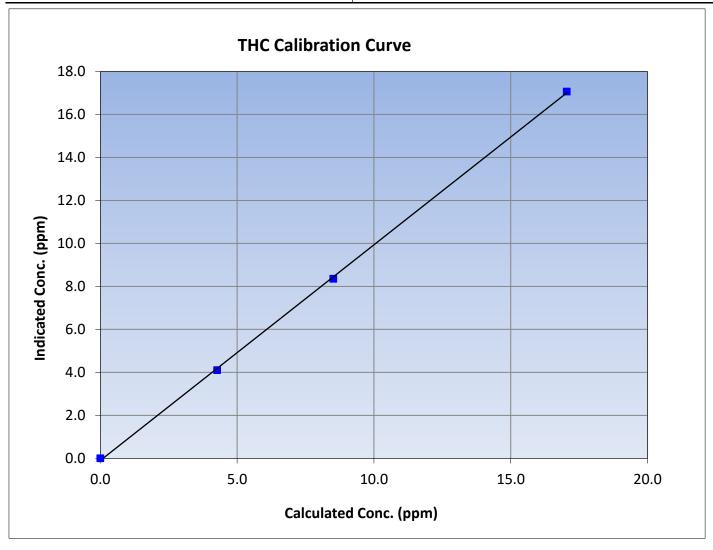
THC Calibration Summary

Version-01-2020

Station Information

March 2, 2023 **Previous Calibration:** Calibration Date: February 2, 2023 Station Name: Fort McKay South Station Number: AMS13 10:07 Start Time (MST): End Time (MST): 16:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999832 ≥	≥0.995
17.05	17.07	0.9988	Correlation Coemicient		20.333
8.51	8.35	1.0189	Slope	1.003410	0.90 - 1.10
4.27	4.11	1.0387	Slope	1.003410	0.90 - 1.10
			Intercept	-0.099393	+/-0.5





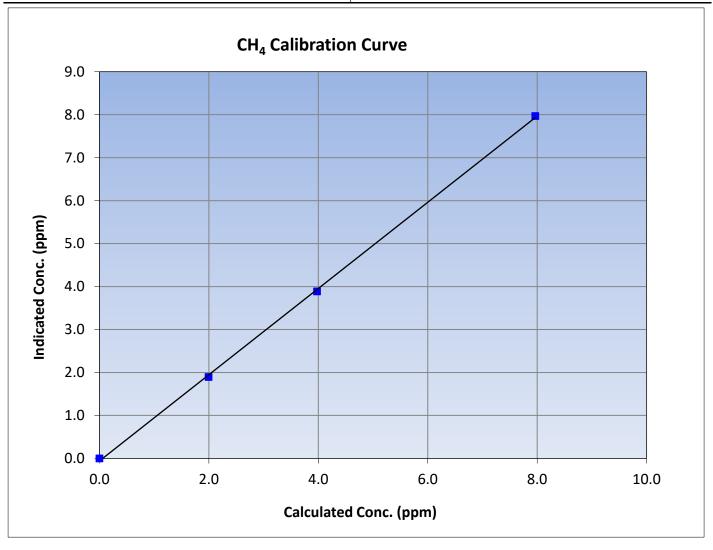
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 2, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:07 End Time (MST): 16:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999743	≥0.995	
7.97	7.97	0.9998	Correlation Coemicient	0.333743	20.555	
3.98	3.89	1.0234	Slope	1.003172	0.90 - 1.10	
1.99	1.89	1.0530	Slope	1.003172	0.90 - 1.10	
			Intercept	-0.058596	+/-0.5	





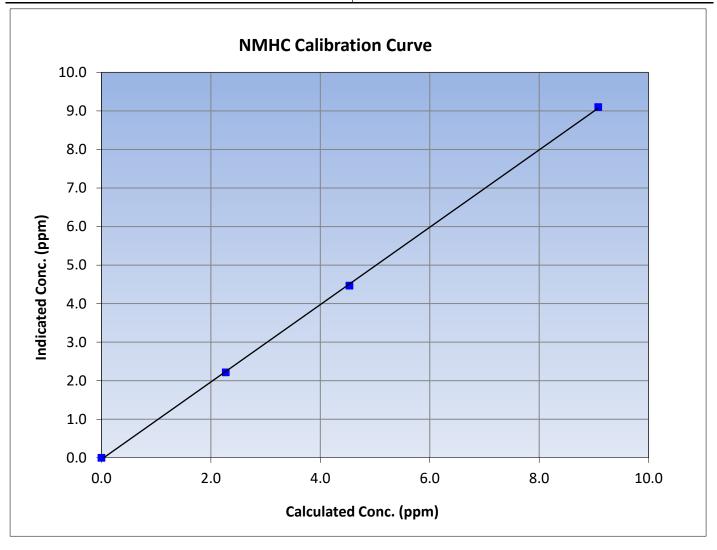
NMHC Calibration Summary

Version-01-2020

Station Information

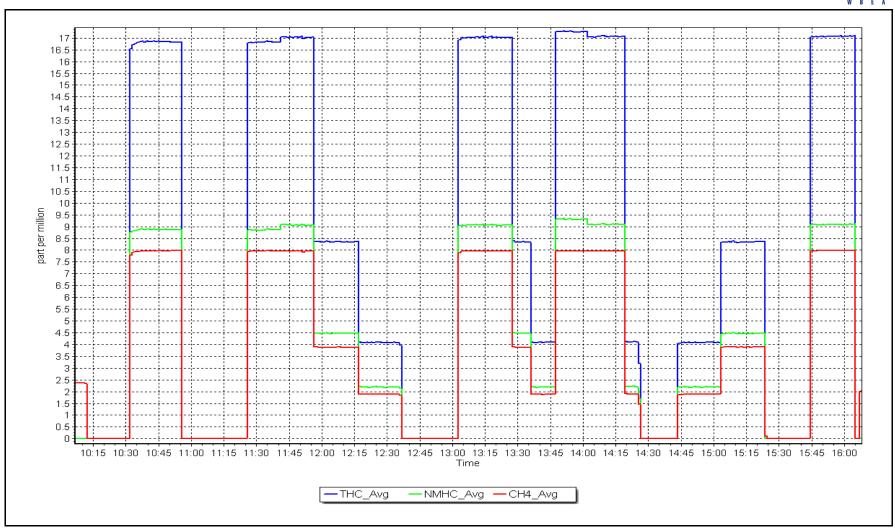
March 2, 2023 Calibration Date: **Previous Calibration:** February 2, 2023 Station Name: Fort McKay South Station Number: AMS13 10:07 Start Time (MST): End Time (MST): 16:10 Analyzer make: Thermo 55i Analyzer serial #: 1152430012

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999894	≥0.995
9.08	9.10	0.9978	Correlation Coemicient	0.999694	20.993
4.53	4.47	1.0147	Slope	1.003631	0.90 - 1.10
2.27	2.21	1.0266	Slope	1.003031	0.90 - 1.10
			Intercept	-0.040597	+/-0.5



NMHC Calibration Plot Date: March 2, 2023 Location: Fort McKay South







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Fort McKay South Station Name: Calibration Date: March 3, 2023

10:12 Start time (MST): Reason: Removal Station number: AMS13

Last Cal Date: March 2, 2023

End time (MST): 10:53

Removed Gas Expiry: NA

Calibration Standards

Gas Cert Reference: CC260812 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 503.6 CH4 Equiv Conc. 1077.5 ppm ppm

C3H8 Cal Gas Conc. 208.7 ppm

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 (CH₄): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 2448 ZAG make/model: **API 701** Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430012

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: 2.39E-04 2.39E-04 NMHC SP Ratio: 4.70E-05 4.70E-05 CH4 Retention time: NMHC Peak Area: 12.0 12.0 193333 193333

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	79.1	17.05	17.18	0.992
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Avera	age Correction Factor		
Baseline Corr AF:	17.18	Prev response	16.98	*% change	1.2%	
Baseline Corr 2nd AF:	NA	AF Slope:	AF Intercept:			
Baseline Corr 3rd AF:	Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates inve					



THC / CH₄ / NMHC Calibration Report

Version-01-2020

Set Point as found zero	D:1 -1 - (1 1 -		ation Data			
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>	
as rouna zero	5000	0	0.00	0.00		
as found span	4921	79.1	9.08	9.19	0.988	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero						
high point						
second point						
third point						
as left zero						
as left span						
			Avera	age Correction Factor		
Baseline Corr AF:	9.19	Prev response	9.04	*% change	1.6%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		
Set Point	Dil air flow rate	CH4 Calibra	tion Data 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	79.1	7.97	7.99	0.998	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero						
high point						
second point						
third point						
as left zero						
as left span						
			Avera	age Correction Factor		
Baseline Corr AF:	7.99	Prev response	7.94	*% change	0.6%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation	
		Calibration	Statistics			
		<u>Start</u>		Finish		
THC Cal Slope:		1.002074				
THC Cal Offset:		-0.104181				
CH4 Cal Slope:		1.003774				
CH4 Cal Offset:		-0.056196				

Notes: Removal calibration. Just zero and span to validate yesterday calibration/maintenance.

1.000594

-0.047785

Calibration Performed By: Sean Bala

NMHC Cal Slope:

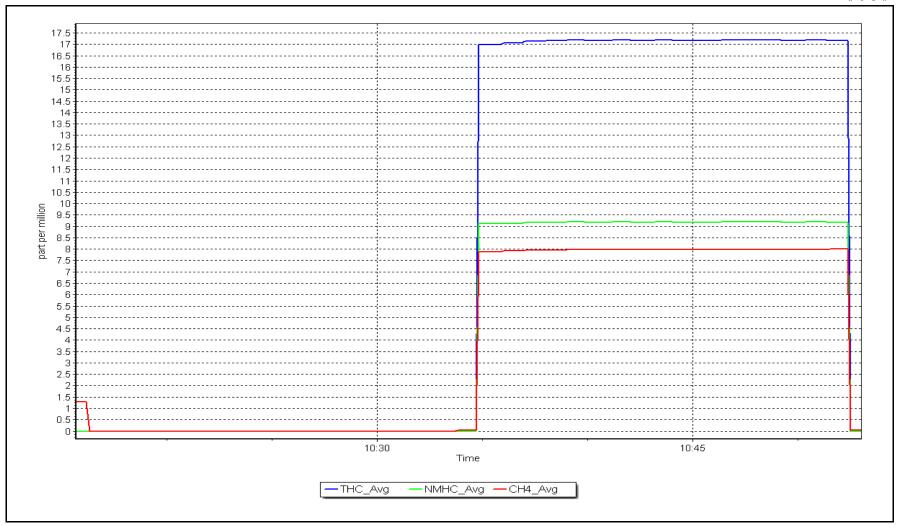
NMHC Cal Offset:

NMHC Calibration Plot

Date: March 3, 2023

Location: Fort McKay South







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Fort McKay South Station Name: Calibration Date: March 3, 2023

11:08 Start time (MST):

Reason: Install Station number: AMS13

Last Cal Date: March 2, 2023

End time (MST): 15:19

Calibration Standards

Gas Cert Reference: CC260812 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 503.6 CH4 Equiv Conc. 1077.5 ppm ppm

C3H8 Cal Gas Conc. 208.7 ppm

Removed Gas Cert: NA

Removed Gas Expiry: 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 (CH₄): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 2448 ZAG make/model: **API 701** Serial Number: 1117

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

Start Finish Start **Finish** CH4 SP Ratio: NA 2.16E-04 NMHC SP Ratio: 5.11E-04 NA CH4 Retention time: NMHC Peak Area: NA 12.8 NA 177635

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	4921	79.1	17.05	17.10	0.997
second point	4961	39.5	8.51	8.42	1.011
third point	4980	19.8	4.27	4.13	1.034
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	17.05	17.20	0.991
			A	Average Correction Factor	1.014
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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

		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= 0.95-1.0</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
nigh point	4921	79.1	9.08	9.13	0.995
second point	4960	39.5	4.53	4.50	1.007
third point	4980	19.8	2.27	2.21	1.027
as left zero	5000	0	0.00	0.00	
as left span	4921	79.1	9.08	9.16	0.991
			Avera	age Correction Factor	1.010
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
		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					
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	4921	79.1	7.97	7.98	0.999
second point	4960	39.5	3.98	3.92	1.016
hird point	4980	19.8	1.99	1.91	1.042
as left zero	5000	0.0	0.00	0.00	
ıs left span	4921	79.1	7.97	8.03	0.992
			Avera	age Correction Factor	1.019
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
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		NA		1.005694	
THC Cal Offset:		NA		-0.086175	
		14/7		0.00017	
		NΔ		1 003875	
CH4 Cal Offset: CH4 Cal Offset:		NA NA		1.003875 -0.046747	

Install calibration. First CH4 3rd point was failing 5.6%. Do a zero chromatogram and use zero

Notes: chromatogram. Noticed that the alarm for Detector and filter temperature is on/off. Readjust it to

NA

175° C and it clears off the alarms. Adjusted span.

Calibration Performed By: Sean Bala

NMHC Cal Offset:

-0.039766



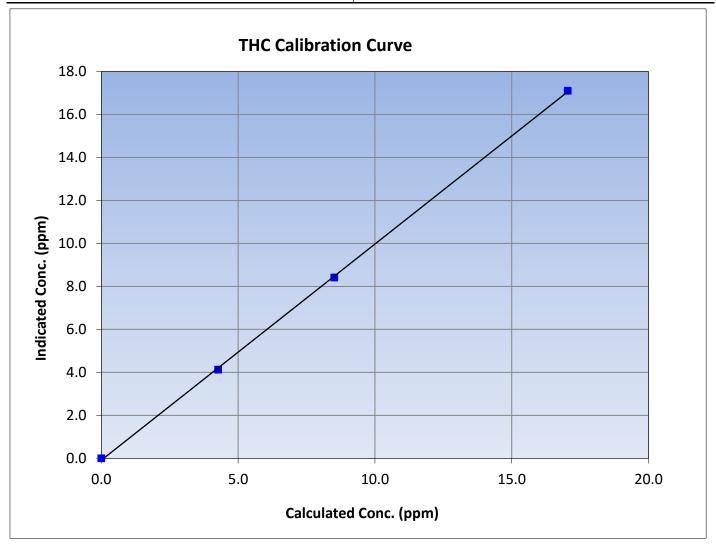
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: March 3, 2023 March 2, 2023 Station Name: Station Number: Fort McKay South AMS13 11:08 Start Time (MST): End Time (MST): 15:19 Analyzer make: Thermo 55i Analyzer serial #: 1170050130

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999883	≥0.995	
17.05	17.10	0.9966	Correlation Coefficient	0.555665	20.333	
8.51	8.42	1.0110	Slope	1.005694	0.90 - 1.10	
4.27	4.13	1.0340	Slope	1.003034	0.90 - 1.10	
			Intercept	-0.086175	+/-0.5	





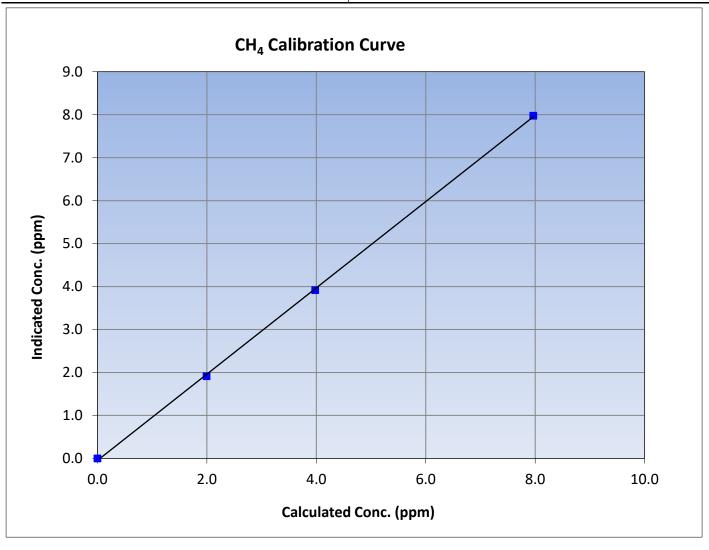
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 3, 2023 **Previous Calibration:** March 2, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 11:08 End Time (MST): 15:19 Analyzer make: Thermo 55i Analyzer serial #: 1170050130

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999841	≥0.995
7.97	7.98	0.9987	Correlation Coefficient	0.333041	20.999
3.98	3.92	1.0160	Slope	1.003875	0.90 - 1.10
1.99	1.91	1.0420	Siope	1.003673	0.90 - 1.10
			Intercept	-0.046747	+/-0.5





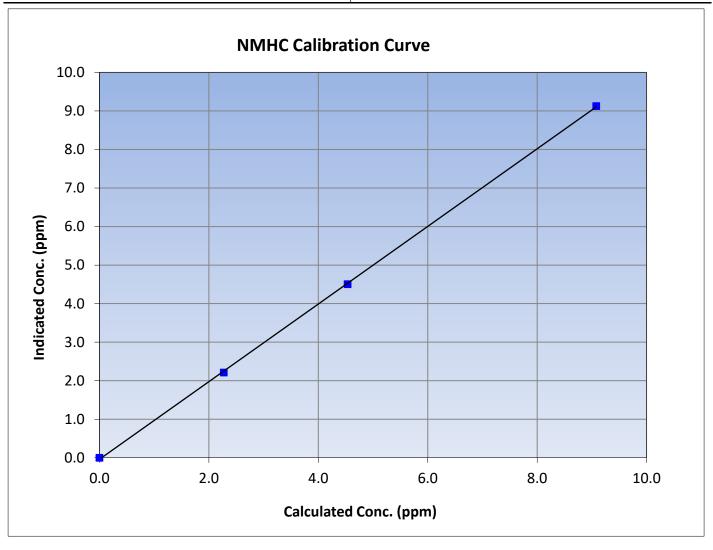
NMHC Calibration Summary

Version-01-2020

Station Information

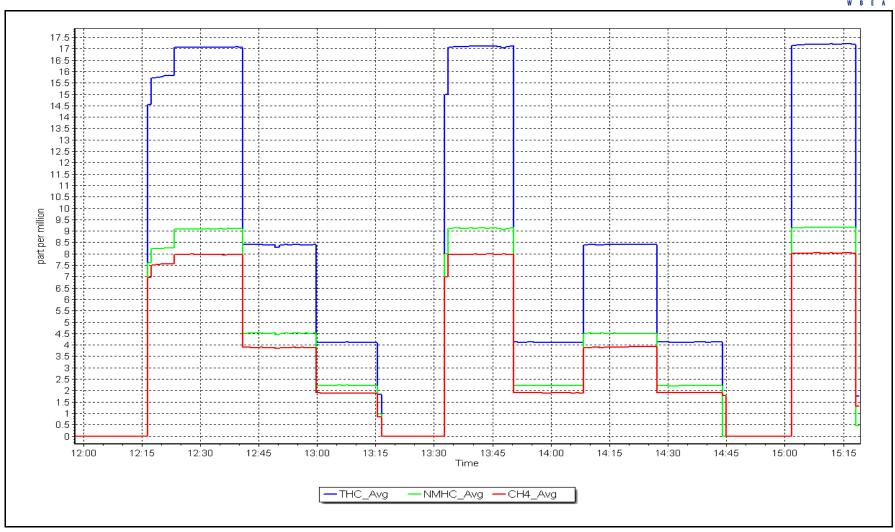
Calibration Date: March 3, 2023 **Previous Calibration:** March 2, 2023 Station Name: Fort McKay South Station Number: AMS13 11:08 Start Time (MST): End Time (MST): 15:19 Analyzer make: Thermo 55i Analyzer serial #: 1170050130

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999913	≥0.995
9.08	9.13	0.9949	Correlation Coefficient	0.555515	20.333
4.53	4.50	1.0072	Slope	1.007142	0.90 - 1.10
2.27	2.21	1.0270	Slope	1.007142	0.30 - 1.10
		·	Intercept	-0.039766	+/-0.5



NMHC Calibration Plot Date: March 3, 2023 Location: Fort McKay South







NOX gas Diff:

Calibrator Model:

ZAG make/model:

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Fort McKay South

Calibration Date: March 23, 2023

Start time (MST): 8:20 Reason: Routine Station number: AMS 13

Last Cal Date: February 10, 2023

End time (MST): 12:59

Calibration Standards

NO Gas Cylinder #: T2Y1P76 Cal Gas Expiry Date: December 11, 2023

NOX Cal Gas Conc: 50.98 ppm NO Cal Gas Conc: 49.32 ppm

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

API T700

API T701

Removed Gas NOX Conc: 50.98 ppm Removed Gas NO Conc: 49.32

NO gas Diff:

Serial Number: 2448
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: 1.204 1.213 NO bkgnd or offset: 9.5 9.7 NOX coeff or slope: 0.992 0.992 NOX bkgnd or offset: 9.7 9.6 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 192.6 196.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999138	1.000036
NO _x Cal Offset:	-2.151243	-2.351272
NO Cal Slope:	1.002334	1.002705
NO Cal Offset:	-3.145082	-3.225164
NO ₂ Cal Slope:	0.996233	0.998357
NO ₂ Cal Offset:	-0.877794	-0.332208



NO_X \ NO \ NO₂ 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/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	0.0		
as found span	4919	81.1	826.9	800.0	26.9	823.1	794.6	28.5	1.0046	1.0067
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	4919	81.1	826.9	800.0	26.9	825.7	800.4	25.3	1.0014	0.9994
second point	4960	40.6	413.9	400.4	13.5	410.4	396.9	13.5	1.0085	1.0089
third point	4980	20.3	207.0	200.2	6.7	202.4	194.3	8.1	1.0226	1.0305
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as left span	4919	81.1	826.9	379.9	447.0	836.8	381.6	455.2	0.9881	0.9954
							Average C	Correction Factor	1.0108	1.0129
Corrected As fo	ound NO _X =	823.3 ppb	NO =	794.8 ppb	* = > +/-5%	% change initiates i	investigation	*Percent Chang	ge NO _X =	-0.1%
Previous Respo	nse NO _X =	824.0 ppb	NO =	798.7 ppb				*Percent Chang	ge NO =	-0.5%
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 _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 ₂ Int:	
				G	GPT Calibration I	Data				
O3 Setpo	int (ppb)	Indicated NO Reference concentration (ppt		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = C	0.95-1.05	erter Efficiency on 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)	795.0		374.9	447.0		446.2	1.0018	3	99.8%
2nd GPT point	(200 ppb O3)	795.0		583.1	238.8		237.8	1.0043	3	99.6%
3rd GPT point	(100 ppb O3)	795.0		688.9	133.0		132.2	1.0062	2	99.4%
						Average Co	orrection Factor	r 1.0041	l	99.6%

Notes:

Changed the inlet filter after as founds. Used 2nd NO reference point due to drift. Adjusted span only.

Calibration Performed By:

Sean Bala



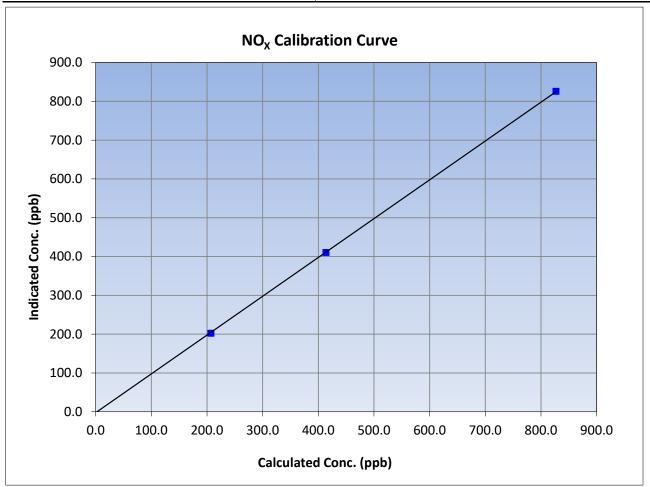
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 10, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 8:20 End Time (MST): 12:59 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	0.999966	≥0.995
826.9	825.7	1.0014	Correlation Coefficient	0.999900	20.333
413.9	410.4	1.0085	Slope	1.000036	0.90 - 1.10
207.0	202.4	1.0226	Slope	1.000056	0.90 - 1.10
			Intercept	-2.351272	+/-20





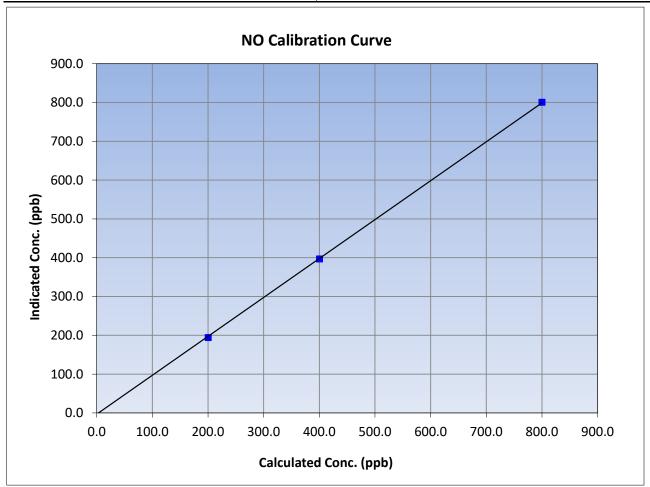
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 10, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 8:20 End Time (MST): 12:59 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	0.999930	≥0.995
800.0	800.4	0.9994	Correlation Coefficient	0.55550	20.333
400.4	396.9	1.0089	Slope	1.002705	0.90 - 1.10
200.2	194.3	1.0305	Slope	1.002703	0.90 - 1.10
			Intercept	-3.225164	+/-20





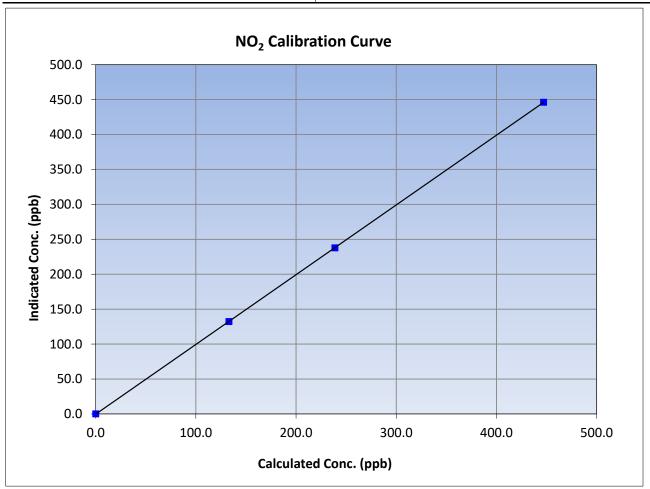
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 10, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 8:20 End Time (MST): 12:59 Analyzer serial #: Analyzer make: Thermo 42i 1410661329

Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0		Correlation Coefficient	0 000007	≥0.995	
446.2	1.0018	Correlation Coefficient	0.55557	20.333	
237.8	1.0043	Slone	0.000257	0.90 - 1.10	
132.2	1.0062	Siope	0.556557	0.90 - 1.10	
		Intercept	-0.332208	+/-20	
	(ppb) (Ic) 0.0 446.2 237.8	(ppb) (lc) Correction factor (Cc/lc) 0.0 446.2 1.0018 237.8 1.0043	Correction factor (Cc/Ic) Statistical Evaluary	Correction factor (Cc/Ic) Statistical Evaluation	

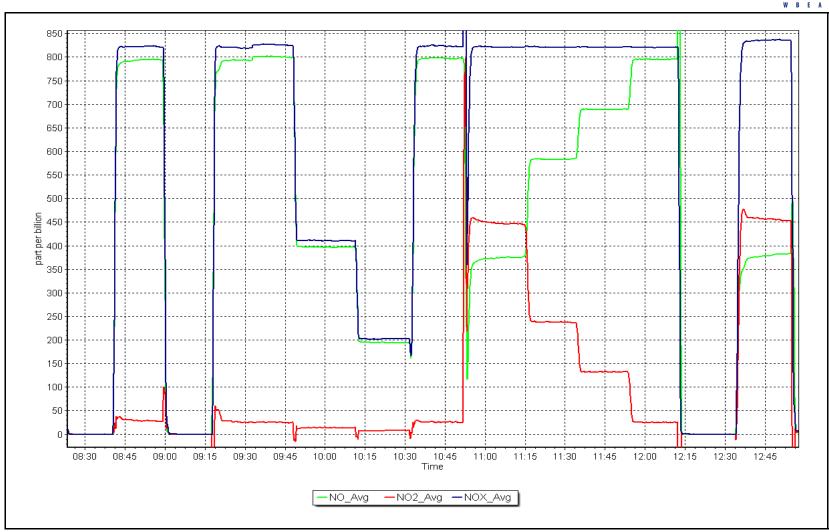


NO_x Calibration Plot

Date: March 23, 2023

Location: Fort McKay South







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

Calibration Date: March 22, 2023

Start time (MST): 8:54
Reason: Routine

Station number: AMS13

Last Cal Date: February 3, 2023

End time (MST): 12:20

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

<u>FIIIISII</u> 0.007996 <u>Start</u>

<u>Finish</u>

Calibration slope: Calibration intercept: 0.997629 1.040000 0.997886 0.320000 Backgd or Offset: Coeff or Slope: 2.7 0.962 3.7 0.964

O₃ Calibration Data

Cal Batal	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	
as found span	5000	969.9	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	980.6	400.0	399.1	1.002
second point	5000	838.0	200.0	200.4	0.998
third point	5000	735.3	100.0	100.6	0.994
as left zero	5000	0.0	0.0	-1.0	
as left span	5000	979.1	400.0	400.8	0.998
			Avera	ge Correction Factor	0.998
Baseline Corr As found:	399.1	Previous response	e 400.1	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope	:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	:		

Notes: Changed inlet filter after as founds. Zero adjusted.

Calibration Performed By: Sean Bala

* = > +/-5% change initiates investigation



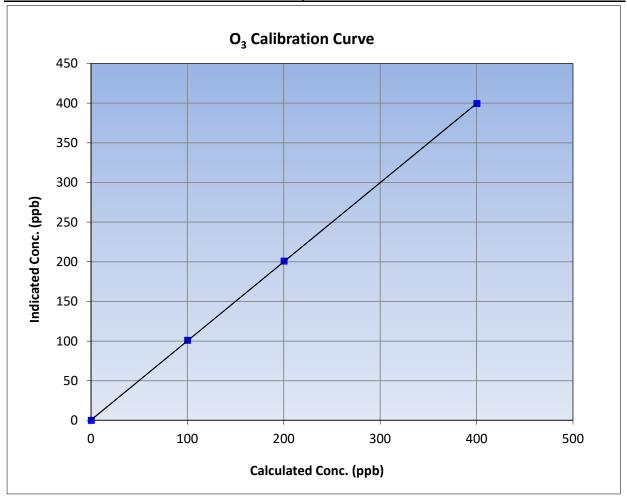
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 22, 2023 **Previous Calibration:** February 3, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 8:54 End Time (MST): 12:20 Analyzer make: Teledyne API T400 Analyzer serial #: 3871

Calibration Data						
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	
400.0	399.1	1.0023	Correlation Coefficient	0.333366	20.333	
200.0	200.4	0.9980	Slope	0.997886	0.90 - 1.10	
100.0	100.6	0.9940	Slope	0.997660	0.90 - 1.10	
			- Intercept	0.320000	+/- 5	

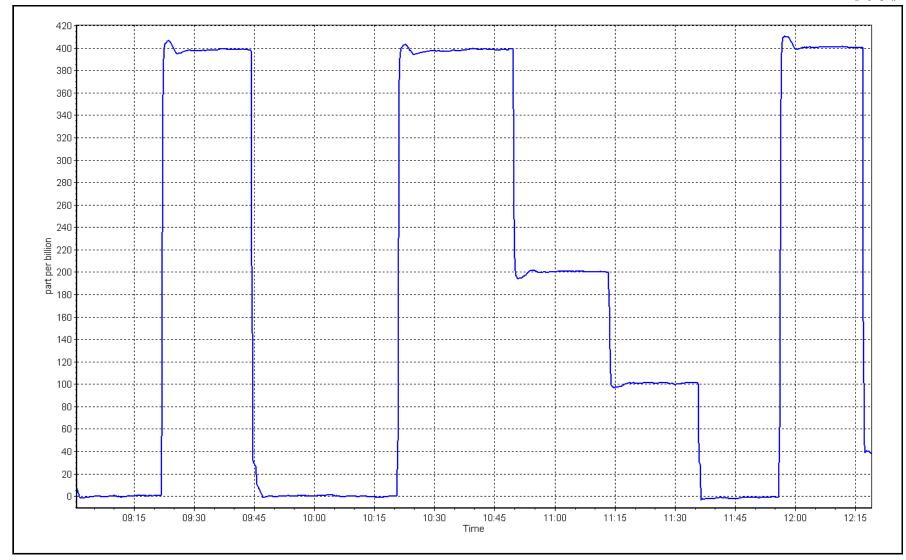


O₃ Calibration Plot

Date: March 22, 2023

Location: Fort McKay South







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	n		_
Station Name:	Fort McKay South		Station number:	AMS 13	
Calibration Date:	March 22, 2023		Last Cal Date:	February 16, 2023	
Start time (MST):	9:34		End time (MST):	11:32	
Analyzer Make:	API T640		S/N:	319	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Delta Cal		S/N:	141229	
Temp/RH standard:	Delta Cal		S/N:	141229	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)
T (°C)	-7.3	-6.9	-7.3		+/- 2 °C
P (mmHg)	729.5	729.1	729.5		+/- 10 mmHg
flow (LPM)	5.01	5.02	5.01		+/- 0.25 LPM
Leak Test:	Date of check:	March 22, 2023	Last Cal Date:	February 16, 2023	
Note: this leak check will be	PM w/o HEPA:	7.2	PM w/ HEPA:	0.0	<0.2 ug/m3
		Quarterly Calibration	Test .		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.9	11.1	10.7	<u>//ajusteu</u>	10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	29.1	w/ HEPA:	0.0
Date Optical Cham		March 22,		.,	<0.2 ug/m3
Disposable Filte	r Changed:	March 22,	2023		
		Annual Maintenanc	e		
Date Sample Tub	be Cleaned:				
Date RH/T Senso	-				
	•				
Notes:		Inlet inspected and cle	aned. Pump was re	placed as well.	
Calibration by:	Sean Bala				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS14 ANZAC MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Anzac

March 17, 2023 Calibration Date:

Start time (MST): 6:45 Routine Reason:

Station number: **AMS 14**

February 21, 2023 Last Cal Date: 9:16

End time (MST):

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 ppm

Diff between cyl:

Serial Number: 5239 Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.997012 0.993711 Calibration intercept: -1.045321 -1.625104 Start

Backgd or Offset: 25.1 25.1 0.795 Coeff or Slope: 0.795

SO₂ 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	0.4	
as found span	4920	80.1	800.2	800.0	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4920	80.1	800.2	797.3	1.004
second point	4960	40.0	399.6	395.5	1.010
third point	4980	20.0	199.8	195.6	1.021
as left zero	5000	0.0	0.0	0.5	
as left span	4920	80.1	800.2	795.1	1.006
			Averag	ge Correction Factor	1.012

Baseline Corr As found: 799.60 Previous response 794.11 *% 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: No Maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



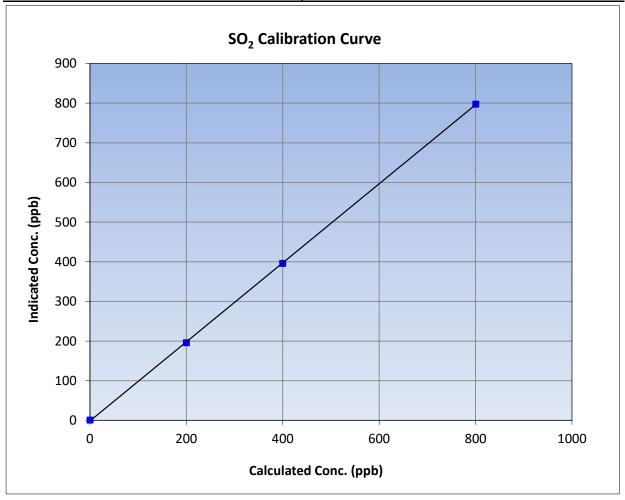
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 17, 2023 **Previous Calibration:** February 21, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 6:45 End Time (MST): 9:16 Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999967	≥0.995	
800.2	797.3	1.0036	Correlation Coefficient	0.555507	20.333	
399.6	395.5	1.0104	Slope	0.997012	0.90 - 1.10	
199.8	195.6	1.0215	Slope	0.997012	0.90 - 1.10	
			Intercept	-1.625104	+/-30	



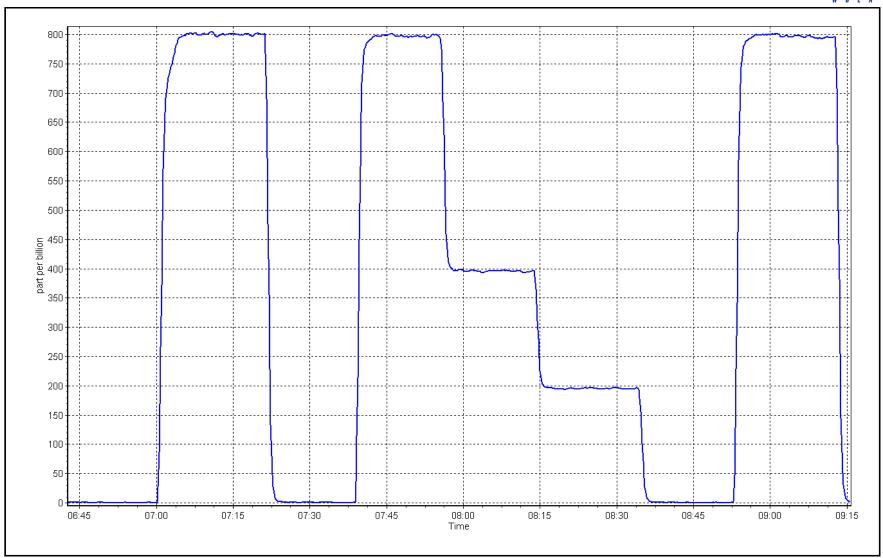
SO2 Calibration Plot

Date:

March 17, 2023

Location: Anzac





W B E A

Wood Buffalo Environmental Association

TRS Calibration Report

Station number:

Version-11-2021

Station Information

Station Name: Anzac

Calibration Date: March 1, 2023

Start time (MST): 8:49
Reason: Routine

Last Cai Date: End time (MST

Last Cal Date: February 3, 2023

AMS14

End time (MST): 12:51

Rem Gas Exp Date: NA

Diff between cyl:

Calibration Standards

Cal Gas Concentration: 5.38 ppm Cal Gas Exp Date: February 3, 2023

Cal Gas Cylinder #: EY0000859

Removed Cal Gas Conc: 5.38 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700

Calibrator Make/Model: API T700 Serial Number: 5252 ZAG Make/Model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540019

Converter make: CD Nova CDN-101 Converter serial #: 503

Analyzer Range 0 - 100 ppb

Start **Finish Start** <u>Finish</u> 1.004840 1.004840 Backgd or Offset: 5.76 Calibration slope: 5.66 0.178882 Calibration intercept: -0.021121 Coeff or Slope: 1.008 1.031

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	0.3	
as found span	4925	74.3	80.0	78.7	1.020
as found 2nd point	4962	37.2	40.0	39.2	1.029
as found 3rd point	4981	18.6	20.0	19.4	1.048
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	0.5	
high point	4925	74.3	80.0	80.7	0.991
second point	4962	37.2	40.0	40.2	0.996
third point	4981	18.6	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.5	
as left span	4925	74.3	80.0	80.4	0.995
SO2 Scrubber Check	4920	80.0	800.0	-0.1	
Date of last scrubber chan	ge:			Ave Corr Factor	0.996
- 41 44					

Date of last scrubber change:	Ave Corr Factor	0.996
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 78.4 80.32 -2.5% Prev response: *% change: Baseline Corr 2nd AF pt: 0.019323 38.9 AF Slope: 0.982257 AF Intercept: Baseline Corr 3rd AF pt: 0.999942 19.1 AF Correlation: * = > +/-5% change initiates investigation

Notes: Scrubber checked after the calibrator zero. No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay



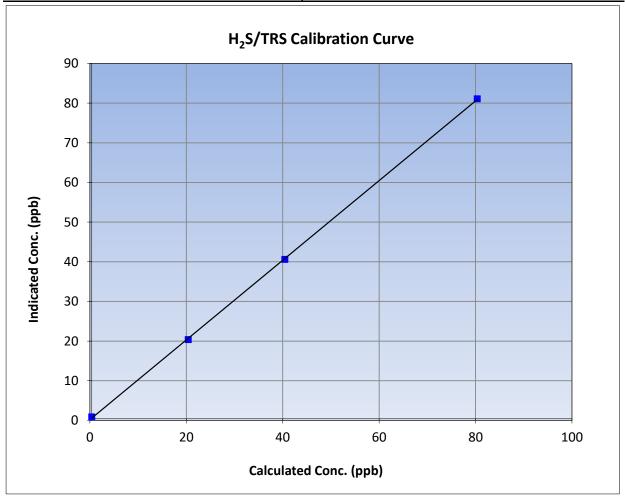
TRS Calibration Summary

Version-11-2021

Station Information

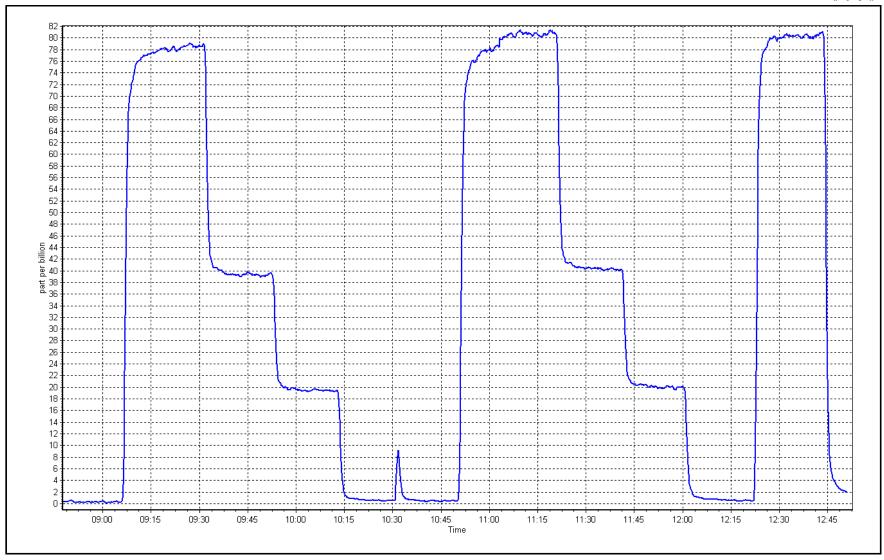
Calibration Date: March 1, 2023 **Previous Calibration:** February 3, 2023 Station Name: Station Number: AMS14 Anzac Start Time (MST): 8:49 End Time (MST): 12:51 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540019

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	0.999926	≥0.995					
80.0	80.7	0.9908	Correlation Coefficient	0.333320	20.993					
40.0	40.2	0.9959	Slope	1.004840	0.90 - 1.10					
20.0	20.0	1.0008	Slope	1.004640	0.90 - 1.10					
			- Intercept	0.178882	+/-3					



Date: March 1, 2023 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: March 1, 2023

Start time (MST): 7:45

Reason: Cylinder Change

Station number: AMS 14

Last Cal Date: February 21, 2023

End time (MST): 8:51

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 Gas Expiry: 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 (CH₄): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 5252

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

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

CH4 SP Ratio: 3.85E-04 3.85E-04 NMHC SP Ratio: 4.46E-05 4.46E-05 CH4 Retention time: 12.00 12.00 NMHC Peak Area: 204554 204554

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	80.1	17.12	17.02	1.006	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.1	17.12	16.98	1.008	
second point						
third point						
as left zero						
as left snan						

			Ave	erage Correction Factor	1.008
Baseline Corr AF:	17.02	Prev response	16.92	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates i	nvestigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

II D L A					VEISIOII-01-2
		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= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	9.12	9.02	1.011
as found 2nd point	.525			3.02	
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	9.12	9.00	1.013
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	1.013
Baseline Corr AF:	9.02	Prev response	9.01	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:	5.02	AF Intercept:	0.2/5
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	80.1	8.00	7.99	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	8.00	7.98	1.002
second point					
third point					
as left zero					
as left span					
as .c spa			Aver	age Correction Factor	1.002
Baseline Corr AF:	7.99	Prev response	7.98	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	3.2.0
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
baseline con Starat.	14/1	Calibration	Statistics	. 5	
			Statistics	Finish	
THC Cal Class		<u>Start</u>			
THC Cal Slope:		0.988889		0.991693	
THC Cal Offset:		-0.013842		0.000000	
CH4 Cal Slope:		0.999568		0.997671	
CH4 Cal Offset:		-0.016046		0.000000	
NMHC Cal Slope:		0.989676		0.986890	

Notes: Nitrogen Cylinder Change

-0.015788

Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

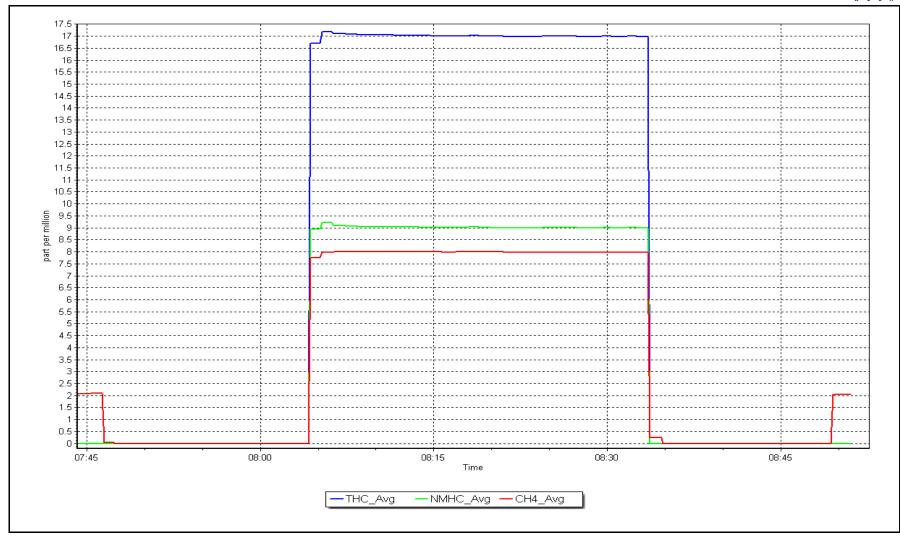
0.000000

NMHC Calibration Plot

Date: March 1, 2023

Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: March 17, 2023

Start time (MST): 6:45 Reason: Routine Station number: AMS 14

Last Cal Date: February 21, 2023

End time (MST): 9:15

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 Gas Expiry: 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 (CH_4):

Calibrator Model: API T700 Serial Number: 5252 ZAG make/model: API 701H Serial Number: 357

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

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

 CH4 SP Ratio:
 3.85E-04
 3.85E-04
 NMHC SP Ratio:
 4.46E-05
 4.46E-05

 CH4 Retention time:
 12.00
 12.00
 NMHC Peak Area:
 204554
 204554

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	80.1	17.12	17.02	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	17.12	17.04	1.005
second point	4960	40.0	8.55	8.50	1.006
third point	4980	20.0	4.28	4.21	1.016
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	17.12	16.97	1.009
			,	Average Correction Factor	1.009
Baseline Corr AF:	17.02	Prev response	16.92	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

					V C151011 01 2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	9.12	9.09	1.004
as found 2nd point			<u>-</u>		
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.1	9.12	9.10	1.003
second point	4960	40.0	4.56	4.54	1.004
:hird point	4980	20.0	2.28	2.24	1.017
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	9.12	9.06	1.007
'				verage Correction Factor	1.008
Baseline Corr AF:	9.09	Prev response	9.01	*% change	0.8%
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) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found span	4920	80.1	8.00	7.93	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.1	8.00	7.94	1.007
second point	4960	40.0	3.99	3.97	1.006
hird point	4980	20.0	2.00	1.97	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	8.00	7.91	1.011
2	7.02	D		verage Correction Factor	1.009
Baseline Corr AF:	7.93	Prev response	7.98	*% change	-0.6%
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:		0.988889		0.996031	
THC Cal Offset:		-0.013842		-0.019815	
CH4 Cal Slope:		0.999568		0.993278	
CITA C T OLL		0.046046		0.004047	

Notes: No adjustments done. Hydrogen Cylinder changed out.

-0.016046

0.989676

-0.015788

Calibration Performed By: Melissa Lemay

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

-0.004047

0.998568

-0.013765



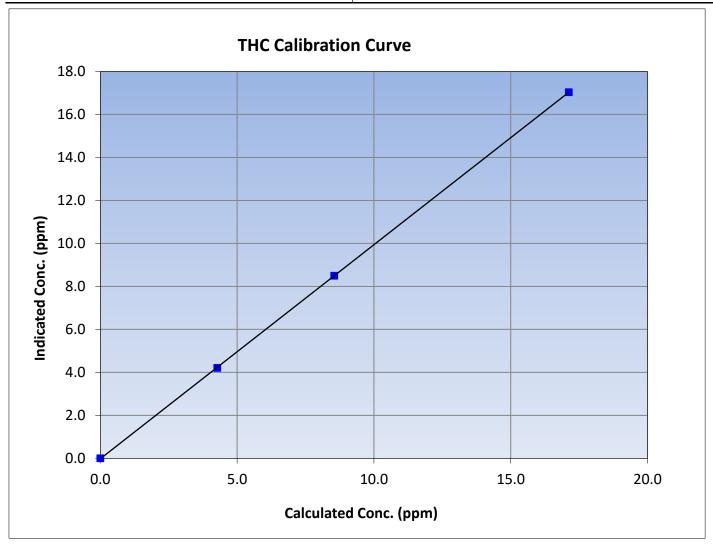
THC Calibration Summary

Version-01-2020

Station Information

March 17, 2023 **Previous Calibration:** Calibration Date: February 21, 2023 Station Name: **AMS 14** Anzac Station Number: Start Time (MST): 6:45 End Time (MST): 9:15 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	0.999992	≥0.995
17.12	17.04	1.0048	Correlation Coemicient	0.555552	20.333
8.55	8.50	1.0060	Slope	0.996031	0.90 - 1.10
4.28	4.21	1.0155	Slope	0.990031	0.90 - 1.10
			Intercept	-0.019815	+/-0.5





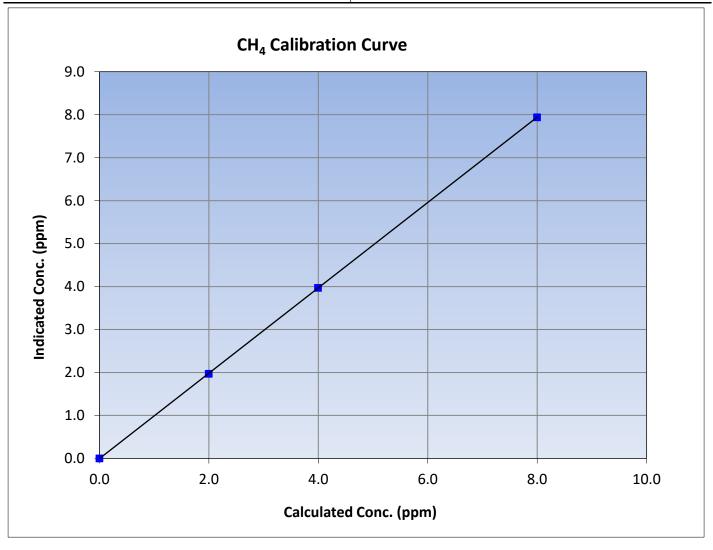
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 17, 2023 **Previous Calibration:** February 21, 2023 Station Name: **AMS 14** Anzac Station Number: Start Time (MST): 6:45 End Time (MST): 9:15 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	0.999996	≥0.995
8.00	7.94	1.0074	Correlation Coefficient	0.555550	20.333
3.99	3.97	1.0061	Slope	0.993278	0.90 - 1.10
2.00	1.97	1.0138	Slope	0.993276	0.30 - 1.10
			Intercept	-0.004047	+/-0.5





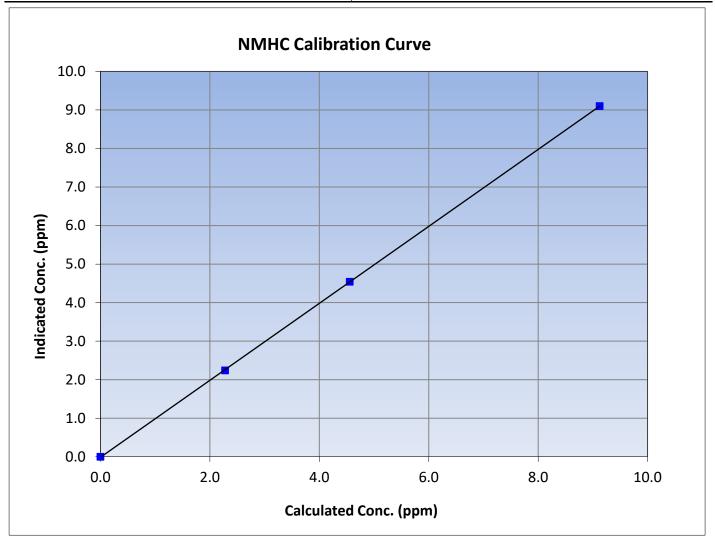
NMHC Calibration Summary

Version-01-2020

Station Information

March 17, 2023 Calibration Date: **Previous Calibration:** February 21, 2023 Station Name: **AMS 14** Anzac Station Number: Start Time (MST): 6:45 End Time (MST): 9:15 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	0.999985	≥0.995
9.12	9.10	1.0026	Correlation Coemicient	0.555505	20.999
4.56	4.54	1.0036	Slope	0.998568	0.90 - 1.10
2.28	2.24	1.0170	Slope	0.556506	0.90 - 1.10
			Intercept	-0.013765	+/-0.5

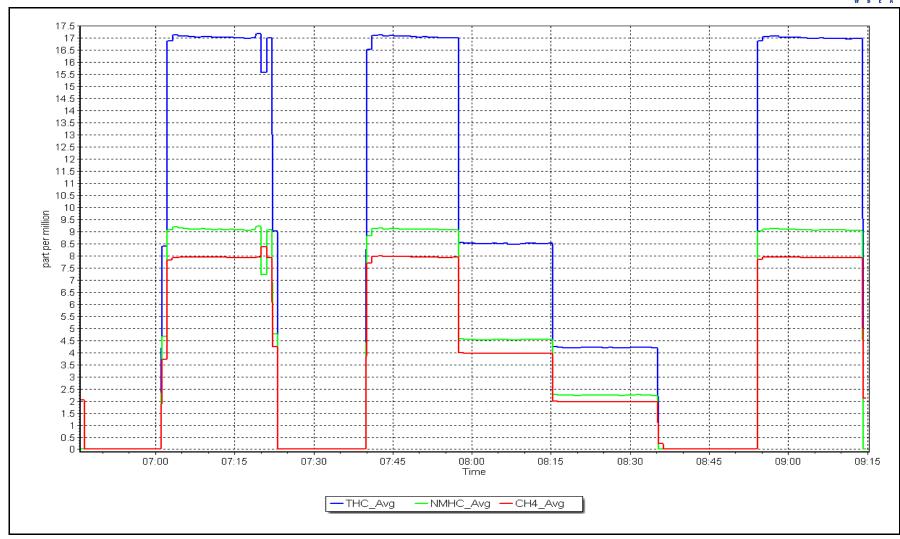


NMHC Calibration Plot

Date: March 17, 2023

Location: Anzac







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Anzac

Calibration Date: March 2, 2023

Start time (MST): 7:45
Reason: Routine

Station number: AMS 14

Last Cal Date: February 2, 2023

End time (MST): 12:16

NO gas Diff:

Calibration Standards

NO Gas Cylinder #: T2Y1P8D Cal Gas Expiry Date: December 11, 2023

NOX Cal Gas Conc: 50.92 ppm NO Cal Gas Conc: 50.05 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 50.92 ppm Removed Gas NO Conc: 50.05 ppm

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 5239 ZAG make/model: Teledyne API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1426262592

NOX Range (ppb): 0 - 1000 ppb

Start <u>Finish</u> <u>Start</u> <u>Finish</u> NO coeff or slope: 1.361 1.361 NO bkgnd or offset: 3.7 3.7 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 3.7 3.7 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 158.5 163.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.011937	0.993239
NO _x Cal Offset:	-0.743109	-0.747177
NO Cal Slope:	1.013337	0.995505
NO Cal Offset:	-1.947043	-2.010875
NO ₂ Cal Slope:	1.000011	0.999852
NO ₂ Cal Offset:	0.089892	0.368111



NO_X \ NO \ NO₂ 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	-0.2	0.4		
as found span	4921	78.6	800.5	786.8	13.7	796.8	781.7	15.1	1.0047	1.0066
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.2		
high point	4921	78.6	800.5	786.8	13.7	794.7	782.1	12.6	1.0073	1.0061
second point	4961	39.3	400.2	393.4	6.8	396.7	389.1	7.6	1.0088	1.0110
third point	4980	19.6	199.6	196.2	3.4	196.3	191.1	5.2	1.0169	1.0267
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3		
as left span	4921	78.6	800.5	396.5	404.0	791.4	387.9	403.5	1.0115	1.0223
							Average C	orrection Factor	1.0110	1.0146
Corrected As for	und NO _X =	796.6 ppb	NO =	781.9 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO _X =	-1.6%
Previous Respor	nse NO _X =	809.3 ppb	NO =	795.4 ppb				*Percent Chan	ge NO =	-1.7%
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	d pt NO _x =	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 ₂ Int:	
				6	GPT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated No concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05 Calibratio	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)	776.1		385.8	404.0		404.2	0.999	4 :	100.1%
2nd GPT point	(200 ppb O3)	776.1		591.4	198.4		198.8	0.997	9 :	100.2%
3rd GPT point	(100 ppb O3)	776.1		683.8	106.0		106.5	0.995	1 :	100.5%

Notes:

No maintenance or adjustments done.

Average Correction Factor

100.3%

0.9975



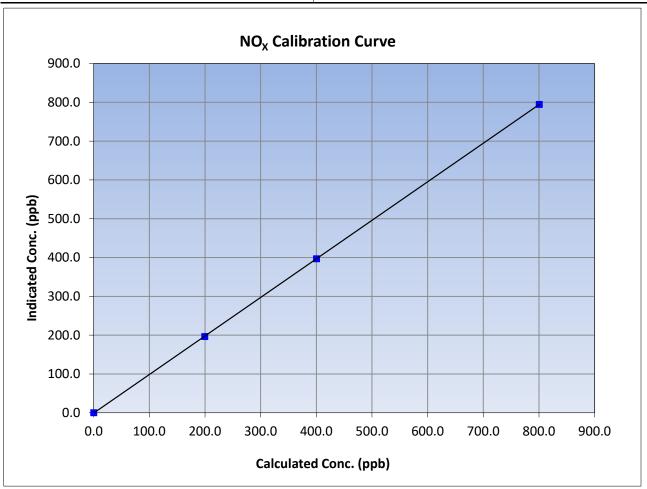
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 2, 2023 Previous Calibration: February 2, 2023 Station Name: Station Number: AMS 14 Anzac Start Time (MST): 7:45 End Time (MST): 12:16 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	0.2		Correlation Coefficient	0.999993	≥0.995
800.5	794.7	1.0073	Correlation Coefficient	0.555555	20.333
400.2	396.7	1.0088	Slope	0.993239	0.90 - 1.10
199.6	196.3	1.0169	Slope	0.995259	0.90 - 1.10
			Intercept	-0.747177	+/-20





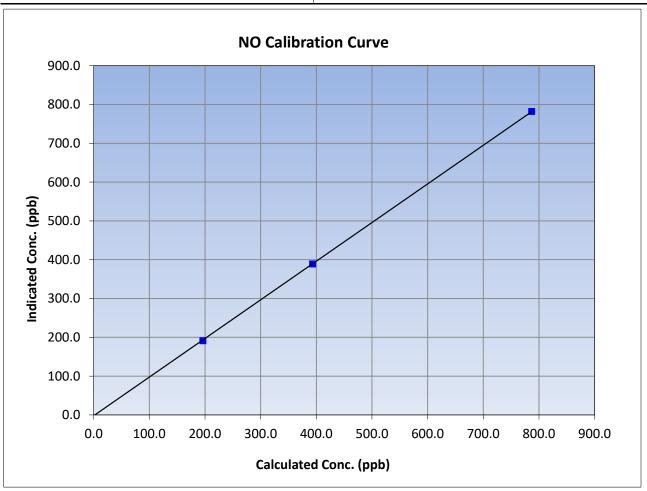
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 2, 2023 Previous Calibration: February 2, 2023 Station Name: Station Number: AMS 14 Anzac Start Time (MST): 7:45 End Time (MST): 12:16 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999972	≥0.995
786.8	782.1	1.0061	Correlation Coefficient	0.333372	20.333
393.4	389.1	1.0110	Slope	0.995505	0.90 - 1.10
196.2	191.1	1.0267	Slope	0.995505	0.90 - 1.10
			Intercept	-2.010875	+/-20





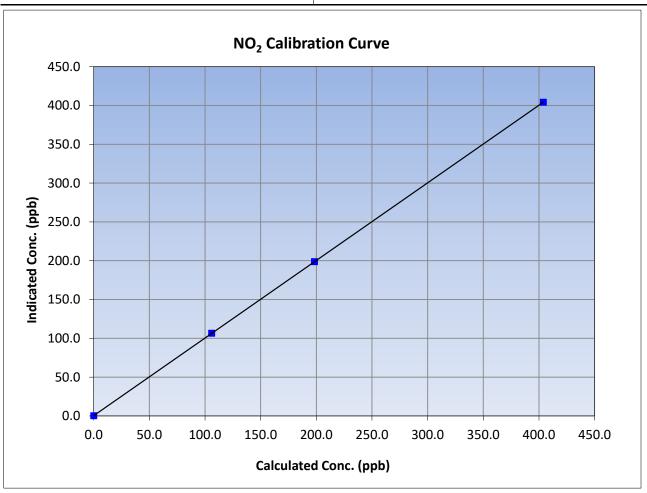
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 2, 2023 Previous Calibration: February 2, 2023 Station Name: Station Number: AMS 14 Anzac Start Time (MST): 7:45 End Time (MST): 12:16 Analyzer serial #: Analyzer make: Thermo 42i 1426262592

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
404.0	404.2	0.9994	Correlation Coefficient	0.55555	20.333
198.4	198.8	0.9979	Slope	0.999852	0.90 - 1.10
106.0	106.5	0.9951	Slope	0.999652	0.90 - 1.10
			Intercept	0.368111	+/-20

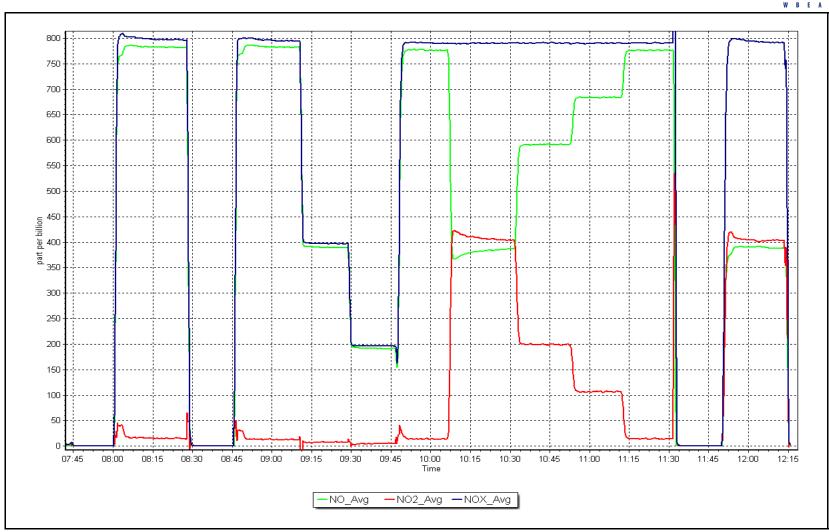


NO_x Calibration Plot

Date: March 2, 2023

Location: Anzac







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: March 30, 2023

Start time (MST): 7:34
Reason: Routine

Station number: AMS14

Last Cal Date: February 21, 2023

End time (MST): 10:25

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: API T700 Serial Number: 5239 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: 0.995743 1.001686 0.9 0.9 0.080000 Coeff or Slope: Calibration intercept: 0.420000 1.499 1.516

O₃ Calibration Data

Cat Daint	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	
as found span	5000	883.9	400.0	395.6	1.011
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.5	
high point	5000	885.2	400.0	400.5	0.999
second point	5000	771.0	200.0	200.6	0.997
third point	5000	671.5	100.0	100.9	0.991
as left zero	5000	0.0	0.0	0.0	
as left span	5000	881.6	400.0	402.7	0.993
			Averag	ge Correction Factor	0.996
Baseline Corr As found:	395.7	Previous response	e 398.7	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

* = > +/-5% change initiates investigation



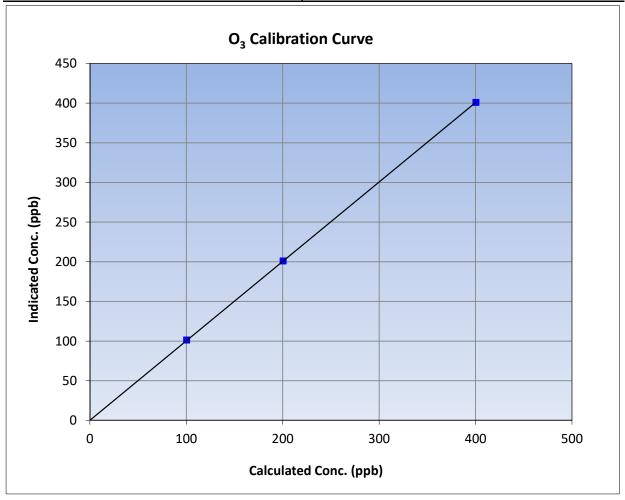
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 30, 2023 **Previous Calibration:** February 21, 2023 Station Name: Anzac Station Number: AMS14 Start Time (MST): 7:34 End Time (MST): 10:25 Analyzer make: Thermo 49i Analyzer serial #: 1426262595

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	-0.5		Correlation Coefficient	0.999990	≥0.995				
400.0	400.5	0.9988	Correlation Coefficient	0.555550	20.993				
200.0	200.6	0.9970	Slope	1.001686	0.90 - 1.10				
100.0	100.9	0.9911	Slope	1.001080	0.90 - 1.10				
			- Intercept	0.080000	+/- 5				

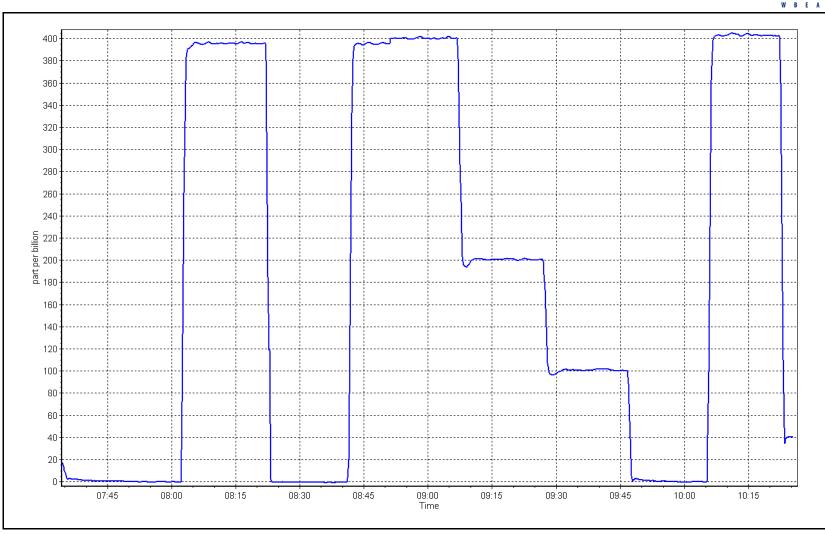


O₃ Calibration Plot

Date: March 30, 2023

Location: Anzac







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	า		
Station Name:	Anzac		Station number:	AMS 14	
Calibration Date:	March 30, 2023		Last Cal Date:	February 22, 2023	
Start time (MST):	6:25		End time (MST):	7:27	
Analyzer Make:	API T640		S/N:	825	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25		S/N:	388753	
Temp/RH standard:	Alicat FP-25		S/N:	388753	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	As left	<u>Adjuste</u>	d (Limits)
T (°C)	-15	-14.8	-15		+/- 2 °C
P (mmHg)	715.2	716.2	715.2		+/- 10 mmHg
flow (LPM)	5	5.09	5		+/- 0.25 LPM
Leak Test:	Date of check:	March 30, 2023	Last Cal Date:	February 22, 2023	
	PM w/o HEPA:	3.2	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be	completed before the Inlet Head		serve as the pre ma	intenance leak check	
		Quarterly Calibration	Toct		
Davasatav	A = £=	•		مغمدناه	d (timeter)
<u>Parameter</u>	<u>As found</u> 9.1	Post maintenance	As left	Adjuste	_
PMT Peak Test	9.1	10	10.8	V	10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	100	w/ HEPA:	0
Date Optical Cham	nber Cleaned:	March 30,	2023		<0.2 ug/m3
Disposable Filte	r Changed:	March 30,	2023		
		Annual Maintenanc	e		
Date Sample Tul	be Cleaned:	June 21, 2	2022		
Date RH/T Sense	or Cleaned:	June 21, 2			
Notes:	PMT adjusted after of	cleaning. Zero and Flow	also checked before	e and after cleaning.	Head Cleaned.
NOTES.					
Calibration by:	Melissa Lemay				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu Station number: AMS17

Calibration Date: March 9, 2023 Last Cal Date: February 14, 2023

Start time (MST): 10:07 End time (MST): 13:28

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 #: 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:1.0000680.999724Backgd or Offset:12.512.4

Calibration intercept: -1.979730 -1.859598 Coeff or Slope: 1.099 1.099

SO₂ 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
	(Sceni)	(seem)	concentration (ppb) (cc)	(ρρυ) (ιε)	LITTIC = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4921	79.4	800.0	797.9	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	79.4	800.0	799.5	1.001
second point	4960	39.7	400.0	395.3	1.012
third point	4980	19.8	199.5	196.7	1.014
as left zero	5000	0.0	0.0	0.5	
as left span	4920	79.4	800.1	802.2	0.997
			Averag	ge Correction Factor	1.009

Baseline Corr As found: 797.80 Previous response 798.04 *% change 0.0%

Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Karan Pandit

* = > +/-5% change initiates investigation



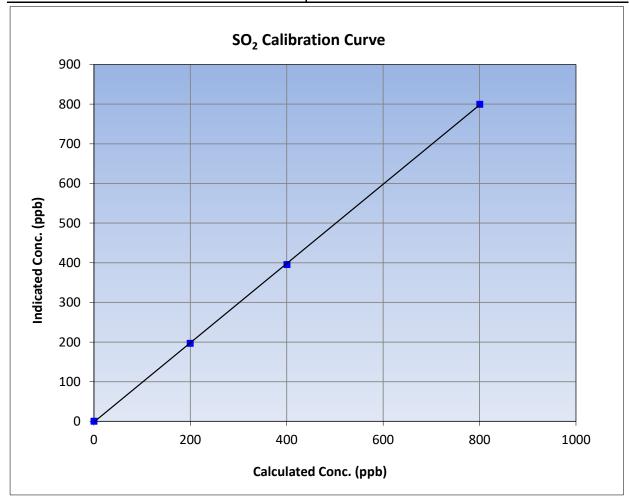
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 14, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:07 End Time (MST): 13:28 Analyzer make: Thermo 43i Analyzer serial #: 1218153459

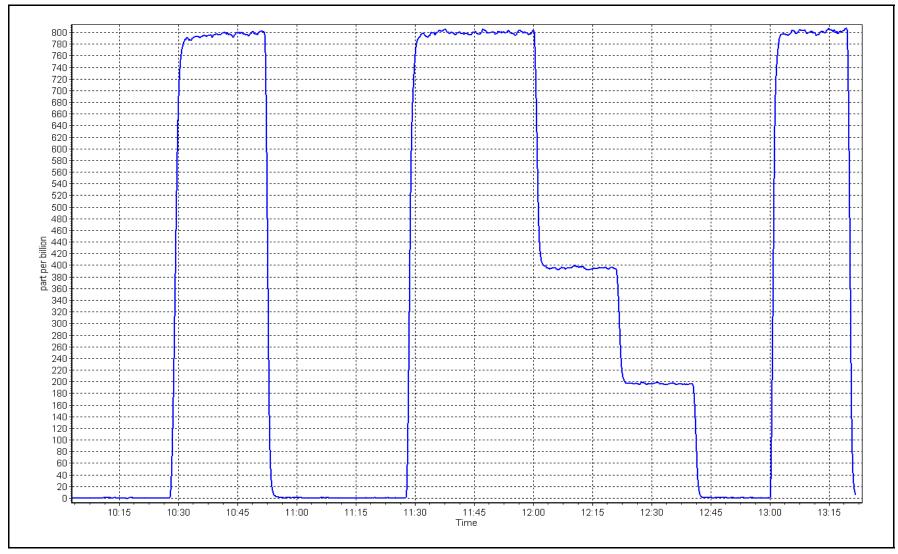
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.2		Correlation Coefficient	0.999956	≥0.995				
800.0	799.5	1.0006	- Correlation Coefficient	0.999950	20.995				
400.0	395.3	1.0120	Slope	0.999724	0.90 - 1.10				
199.5	196.7	1.0143	Slope	0.333724	0.90 - 1.10				
			- Intercept	-1.859598	+/-30				



SO2 Calibration Plot Date: March 9, 2023

Location: Wapasu





W B E A

Wood Buffalo Environmental Association

H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Wapasu

Calibration Date: March 8, 2023

Start time (MST): 10:19
Reason: Routine

Station number: AMS17

Last Cal Date: February 16, 2023

End time (MST): 14:42

Calibration Standards

Cal Gas Concentration: 5.076 ppm Cal Gas Exp Date: September 16, 2024

Cal Gas Cylinder #: CC511852

Removed Cal Gas Conc: 5.076 ppm Rem Gas Exp Date: n/a Removed Gas Cyl #: n/a Diff between cyl:

Removed Gas Cyl #: n/a Diff between cyl:
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 make: n/a Converter serial #: n/a

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> Calibration slope: 0.995568 0.990568 Backgd or Offset: 12.7 13.0 0.180784 Calibration intercept: 0.080792 Coeff or Slope: 1.085 1.085

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	0.1	
as found span	4921	78.8	80.0	79.7	1.005
as found 2nd point	4961	39.4	40.0	40.1	1.000
as found 3rd point	4980	19.7	20.0	20.1	1.000
new cylinder response					

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	5000	0.0	0.0	0.5	
high point	4921	78.8	80.0	79.6	1.005
second point	4961	39.4	40.0	39.6	1.010
third point	4980	19.7	20.0	19.7	1.015
as left zero	5000	0.0	0.0	0.7	
as left span	4921	78.8	80.0	78.5	1.019
SO2 Scrubber Check	4921	79.4	0.008	-0.2	
Date of last scrubber chan	ge:	n/a		Ave Corr Factor	1.010
Date of last converter effic	ciency test:	n/a			efficiency

Date of last converter efficie	ency test:	n/a		ϵ	eniciency	
Baseline Corr As found:	79.6	Prev response:	79.73	*% change:	-0.2%	
Baseline Corr 2nd AF pt:	40.0	AF Slope:	0.994854	AF Intercept:	0.180802	

Baseline Corr 3rd AF pt: 20.0 AF Correlation: 0.999992

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Karan Pandit



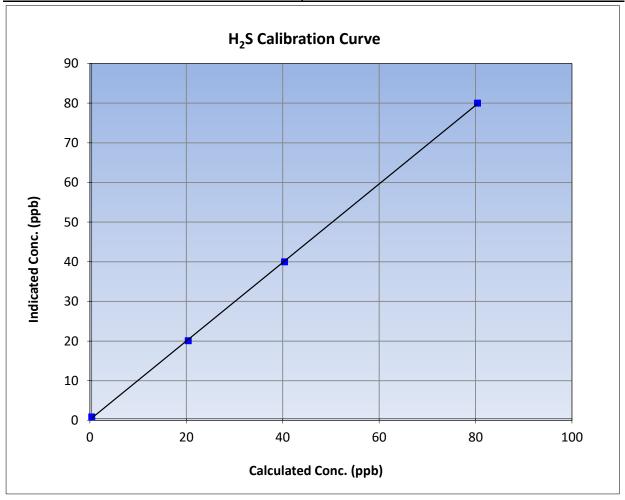
H₂S Calibration Summary

Version-11-2021

Station Information

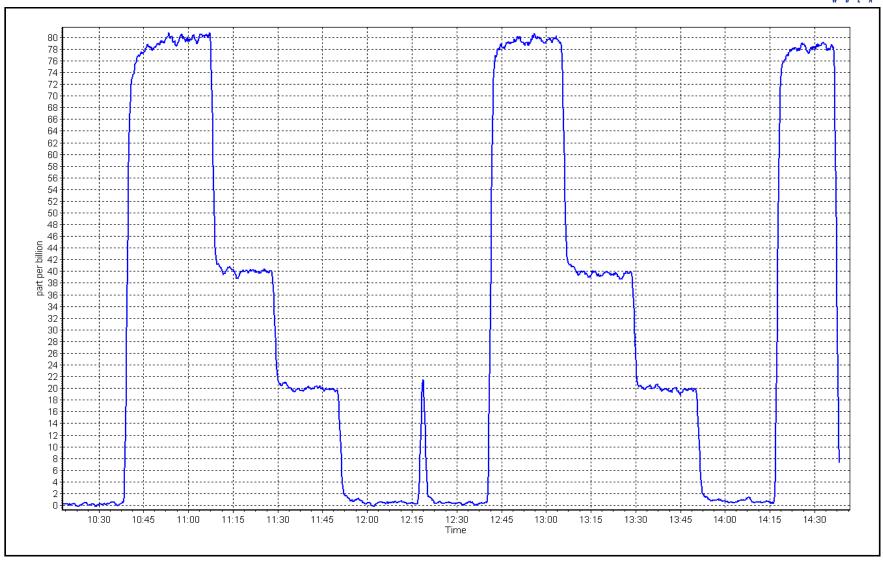
Calibration Date: March 8, 2023 **Previous Calibration:** February 16, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:19 End Time (MST): 14:42 Analyzer make: Thermo 450i Analyzer serial #: 1218153583

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	0.999925	≥0.995				
80.0	79.6	1.0050	Correlation Coefficient	0.555525	20.993				
40.0	39.6	1.0100	Slope	0.990568	0.90 - 1.10				
20.0	19.7	1.0153	Slope	0.990308	0.90 - 1.10				
			- Intercept	0.180784	+/-3				



Location: Wapasu





Date: March 8, 2023



THC Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

March 9, 2023 Calibration Date:

Start time (MST): 10:07

Routine Reason:

Station number: AMS17

> February 14, 2023 Last Cal Date:

End time (MST): 13:28

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: 1.011424 1.000425 3.090 3.140

-0.058335 Coefficient: Calibration intercept: -0.037301 4.324 4.250

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentrat (ppm) (Cc)	lndicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.08	
as found span	4921	79.4	17.09	17.48	0.978
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.03	
high point	4921	79.4	17.09	17.07	1.001
second point	4960	39.7	8.55	8.43	1.014
third point	4980	19.8	4.26	4.20	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.4	17.09	17.07	1.001
			Av	erage Correction Factor	1.010
Baseline Corr As found:	17.40	Previous response	17.25	*% change	0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes: Sample inlet filter changed after as founds. Adjusted the zero and span.

AF Correlation:

Calibration Performed By: Karan Pandit

NA

Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation



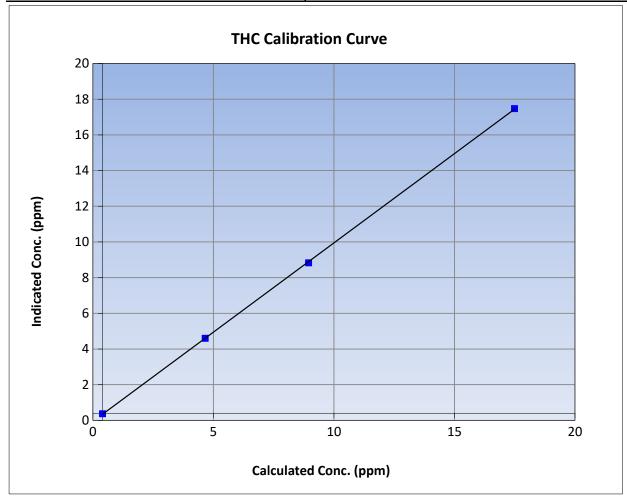
THC Calibration Summary

Version-01-2020

Station Information

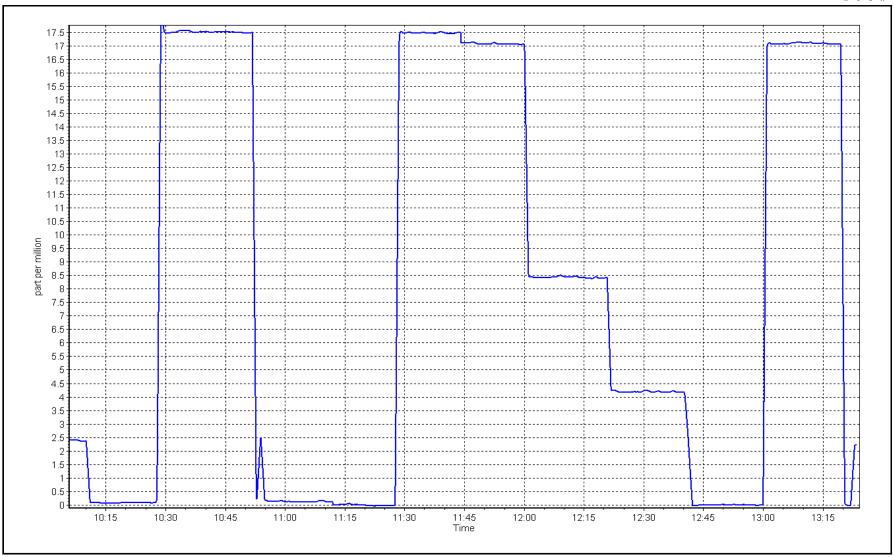
Previous Calibration: Calibration Date: March 9, 2023 February 14, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): End Time (MST): 10:07 13:28 Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352

Calibration Data							
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.00	-0.03		Correlation Coefficient	0.999961	≥0.995		
17.09	17.07	1.0011	Correlation Coefficient	0.555501	20.333		
8.55	8.43	1.0141	Slope	1.000425	0.90 - 1.10		
4.26	4.20	1.0139	Slope	1.000423	0.90 - 1.10		
			- Intercept	-0.058335	+/-1.5		



THC Calibration Plot Date: March 9, 2023 Location: Wapasu







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Wapasu Station number: AMS17

Calibration Date: March 23, 2023 Last Cal Date: February 23, 2023 End time (MST): 14:05

Start time (MST): 9:09

Reason: Routine

Calibration Standards

NO Gas Cylinder #: T375YK8 Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: NO Cal Gas Conc: 49.11 ppm ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NOX Conc: Removed Gas NO Conc: 49.11 ppm 48.07 ppm

NOX gas Diff:

NO gas Diff: Calibrator Model: **API T700** Serial Number: 2449 ZAG make/model: **API T701H** Serial Number: 359

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:	0.820	0.820	NO bkgnd or offset:	0.1	0.1
NOX coeff or slope:	0.812	0.812	NOX bkgnd or offset:	-0.4	-0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.5	4.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.989719	0.987970
NO _x Cal Offset:	-1.420000	-1.020000
NO Cal Slope:	0.990300	0.989414
NO Cal Offset:	-1.880000	-1.920000
NO ₂ Cal Slope:	0.986936	0.999015
NO ₂ Cal Offset:	-0.501997	0.401105



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dile	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	0.2	-0.3	0.6		
as found span	4917	83.2	817.2	799.9	17.3	805.1	788.1	17.1	1.0150	1.0150
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3		
high point	4917	83.2	817.2	799.9	17.3	807.2	790.4	16.8	1.0124	1.0120
second point	4958	41.6	408.6	399.9	8.7	401.3	392.9	8.5	1.0182	1.0179
third point	4979	20.8	204.3	200.0	4.3	200.1	194.1	6.1	1.0210	1.0302
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.2		
as left span	4917	83.2	817.2	410.0	407.2	798.5	394.7	403.8	1.0234	1.0387
							Average C	Correction Factor	r 1.0172	1.0201
Corrected As fo	ound NO _X =	804.9 ppb	NO =	788.4 ppb	* = > +/-5°	% change initiates i	investigation	*Percent Chang	ge NO _X =	-0.3%
Previous Respo	onse NO _X =	807.4 ppb	NO =	790.2 ppb				*Percent Chang	ge NO =	-0.2%
Baseline Corr 2	2nd pt NO _X =	NA ppb	NO =		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 ₂ Int:	
				e	GPT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Referer concentration (ppb		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	= 0.95-1.05	erter Efficiency on 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)	784.9		395.0	407.2		407.2	1.0000	0	100.0%
2nd GPT poin	t (200 ppb O3)	784.9		589.8	212.4		212.5	0.9996	6	100.0%
3rd GPT poin	t (100 ppb O3)	784.9		689.7	112.5		113.0	0.9956	6	100.4%
			· <u></u>			Average Co	orrection Factor	r 0.9984	4	100.2%

Notes:

Sample inlet filter changed after as founds. No adjustments made. Used the second NO reference point.

Calibration Performed By:

Karan Pandit



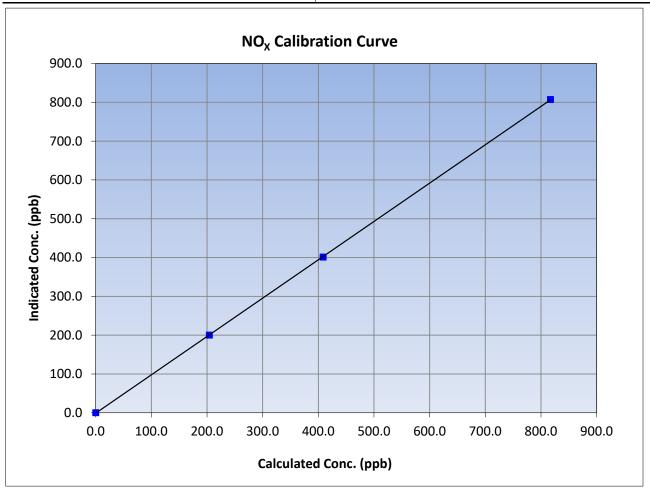
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 9:09 End Time (MST): 14:05 Analyzer serial #: Analyzer make: Teledyne API T200 833

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
817.2	807.2	1.0124	Correlation Coefficient		20.993
408.6	401.3	1.0182	Slope	0.987970	0.90 - 1.10
204.3	200.1	1.0210	Slope	0.367370	0.90 - 1.10
			Intercept	-1.020000	+/-20





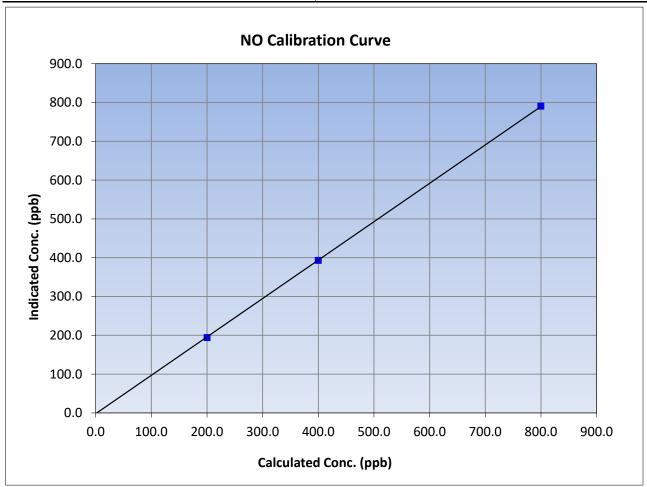
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 9:09 End Time (MST): 14:05 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	0.999976	≥0.995
799.9	790.4	1.0120	Correlation Coefficient		20.993
399.9	392.9	1.0179	Slope	0.989414	0.90 - 1.10
200.0	194.1	1.0302	Slope	0.505414	0.90 - 1.10
			Intercept	-1.920000	+/-20





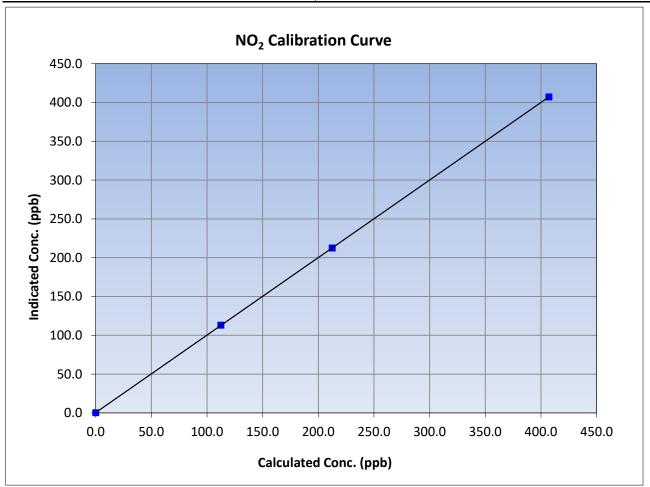
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 23, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 9:09 End Time (MST): 14:05 Analyzer serial #: Analyzer make: Teledyne API T200 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
407.2	407.2	1.0000	Correlation Coefficient		20.993
212.4	212.5	0.9996	Slope	0.999015	0.90 - 1.10
112.5	113.0	0.9956	Slope	0.999015	0.90 - 1.10
			Intercept	0.401105	+/-20



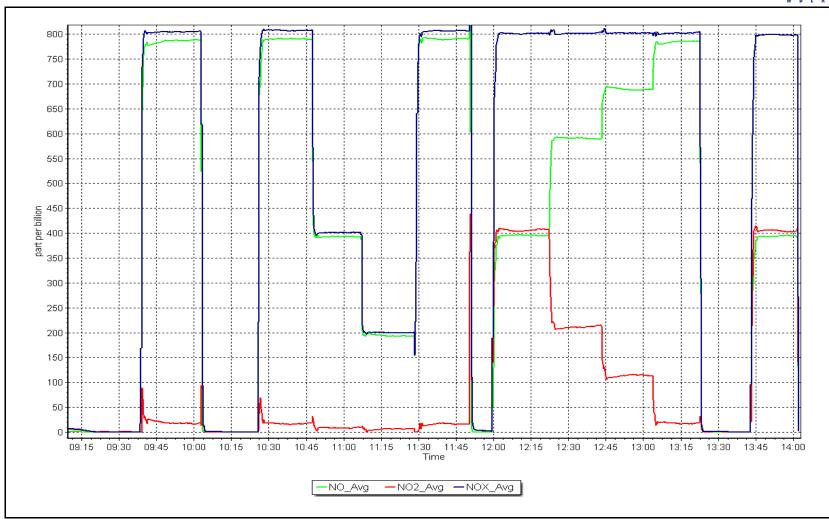
NO_x Calibration Plot

Date:

March 23, 2023

Location: Wapasu







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

Calibration Date: March 3, 2023

Start time (MST): 10:33
Reason: Routine

Station number: AMS17

End time (MST): 13:30

Last Cal Date: February 6, 2023

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: 1.005686 1.006086 -1.8 -1.8 -0.540000 Coeff or Slope: Calibration intercept: -0.320000 1.020 1.020

O₃ 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	-0.3	
as found span	5000	1077.3	400.0	403.4	0.992
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.1	
high point	5000	1077.3	400.0	402.1	0.995
second point	5000	900.3	200.0	200.5	0.998
third point	5000	789.5	100.0	99.6	1.004
as left zero	5000	0.0	0.0	-0.1	
as left span	5000	1077.3	400.0	406.3	0.984
			Averag	ge Correction Factor	0.999
Baseline Corr As found:	403.7	Previous respons	e 402.0	*% change	0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Karan Pandit

* = > +/-5% change initiates investigation



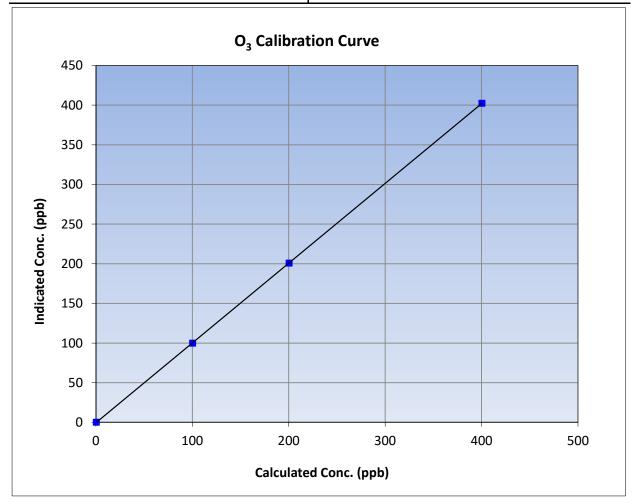
O₃ Calibration Summary

Version-01-2020

Station Information

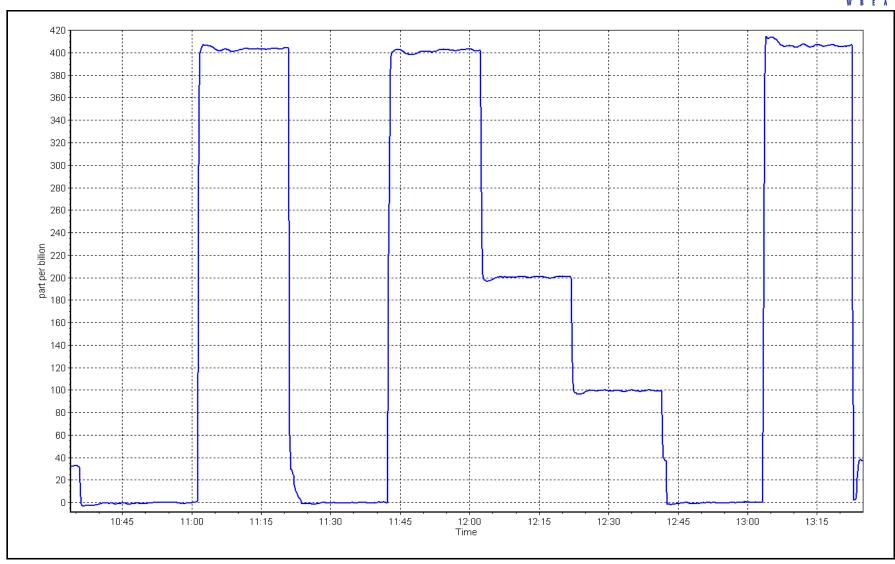
Calibration Date: March 3, 2023 **Previous Calibration:** February 6, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:33 End Time (MST): 13:30 Analyzer make: **API T400** Analyzer serial #: 3870

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	-0.1		Correlation Coefficient	0.999995	≥0.995			
400.0	402.1	0.9948	Correlation coefficient	0.99999	20.993			
200.0	200.5	0.9975	Slope	1.006086	0.90 - 1.10			
100.0	99.6	1.0040	Slope	1.000080	0.90 - 1.10			
			- Intercept	-0.540000	+/- 5			



O₃ Calibration Plot Date: March 3, 2023 Location: Wapasu







Calibration by:

Karan Pandit

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	n			
Station Name:	Wapasu		Station number:	AMS 17		
Calibration Date:	March 23, 2023		Last Cal Date:	,	3, 2023	
Start time (MST):	10:50		End time (MST):	12:02		
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	1183		
Flow Meter Make/Model:	Delta Cal		S/N:	1102		
Temp/RH standard:	Delta Cal		S/N:	1102		
		Monthly Calibration T	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-1.8	-1.8	-1.8			+/- 2 °C
P (mmHg)	706.9	708.4	706.9			+/- 10 mmHg
flow (LPM)	5.02	5.06	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	March 23, 2023	Last Cal Date:	February	23, 2023	
	PM w/o HEPA:	4.8	PM w/ HEPA:	0.		<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will	serve as the pre ma	intenance le	ak check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration				
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test	11.0	11.1	11.1			10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:	8.1	w/ HEPA:		0.0
Date Optical Chaml	ber Cleaned:	March 23,		. ′ .		<0.2 ug/m3
Disposable Filter	Changed:	March 23,	2023	•		
	_			•		
		Annual Maintenand	ce			
Date Sample Tub	-			•		
Date RH/T Senso	r Cleaned:					
Notes:	No adjustme	ents made. Leak check p	assed. Optical cham	nber and inle	et head clea	ned.
	,		•			



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN MARCH 2023

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

April 29, 2023

SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

March 30, 2023 Calibration Date:

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

Station number: **AMS 18**

February 17, 2023 Last Cal Date:

End time (MST): 12:52

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

Coeff or Slope:

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

ppm

Calibration slope: 1.008829 1.006974 Calibration intercept: -0.882227 -1.482948

Start Backgd or Offset:

23.0 0.817 **Finish** 22.9 0.817

SO₂ 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)	Limit = 0.95-1.05
as found zero	5009	0.0	0.0	-0.6	
as found span	4919	81.0	800.3	801.6	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4919	81.0	800.3	804.6	0.995
second point	4959	40.5	400.2	402.1	0.995
third point	4979	20.2	199.6	197.4	1.011
as left zero	5000	0.0	0.0	-0.5	
as left span	4919	81.0	800.3	803.1	0.996
			Avera	ge Correction Factor	1.000

Baseline Corr As found: 802.20 Previous response 806.46 -0.5% *% 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. No adjustments were made

Calibration Performed By: Karan Pandit



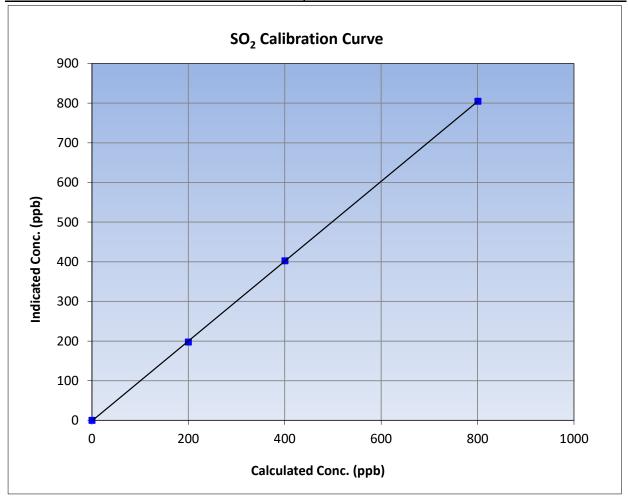
SO₂ Calibration Summary

Version-01-2020

Station Information

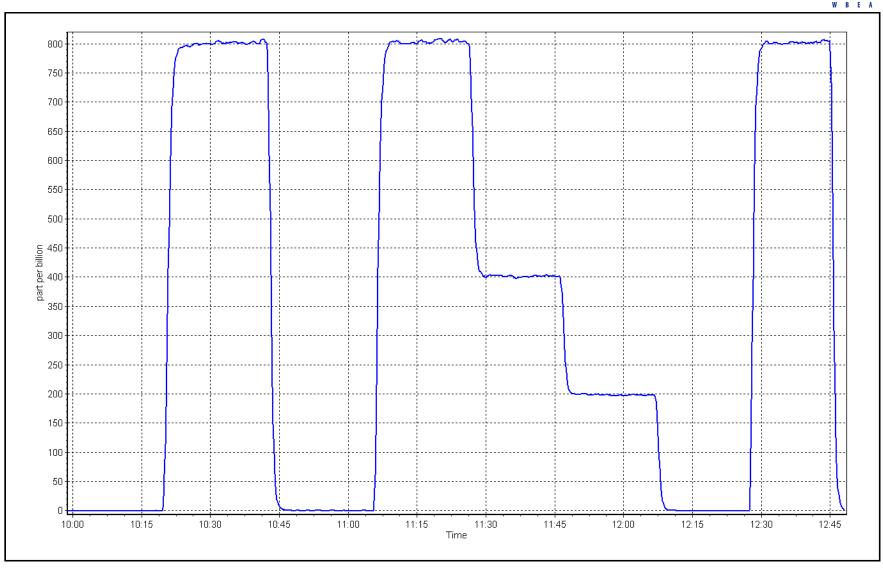
Calibration Date: March 30, 2023 **Previous Calibration:** February 17, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 9:58 End Time (MST): 12:52 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	-0.2		Correlation Coefficient	0.999982	≥0.995			
800.3	804.6	0.9946	Correlation Coefficient	0.333362	20.333			
400.2	402.1	0.9952	Slope	1.006974	0.90 - 1.10			
199.6	197.4	1.0112	Slope	1.000374	0.90 - 1.10			
			Intercept	-1.482948	+/-30			



SO2 Calibration Plot Date: March 30, 2023 Location: Stony Mountain







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Stony Mountain Calibration Date: March 7, 2023

Start time (MST): 10:34 Reason: Routine Station number: AMS18

Last Cal Date: February 13, 2023

360

End time (MST): 14:45

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.479 ppm

Cal Gas Cylinder #: CC500395

Removed Cal Gas Conc: 5.479 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: NA Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 ZAG Make/Model: Teledyne API T701 Serial Number:

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

Converter serial #: 555 Converter make: CD Nova CDN-101

Analyzer Range 0 - 100 ppb

Start **Finish** <u>Finish</u> <u>Start</u> Calibration slope: 1.000870 1.005159 Backgd or Offset: 2.56 2.63 0.260882 Calibration intercept: 0.161019 Coeff or Slope: 1.151 1.151

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	4927	73.0	80.0	80.7	0.992
as found 2nd point	4964	36.5	40.0	40.8	0.983
as found 3rd point	4983	18.3	20.0	20.3	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	0.2	
high point	4927	73.0	80.0	80.6	0.992
second point	4964	36.5	40.0	40.6	0.985
third point	4983	18.3	20.0	20.4	0.983
as left zero	5000	0.0	0.0	0.3	
as left span	4927	73.0	80.0	80.6	0.992
SO2 Scrubber Check	4923	77.1	771.0	0.1	
Date of last scrubber chang	ge:	17-Dec-21		Ave Corr Factor	0.987
Date of last converter effic	iency test:		•	•	efficiency

Baseline Corr As found: 80.6 80.22 Prev response: *% change: 0.5% Baseline Corr 2nd AF pt: 40.7 AF Slope: 1.008159 AF Intercept: 0.180871

0.999966 Baseline Corr 3rd AF pt: 20.2 AF Correlation:

* = > +/-5% change initiates investigation

Notes:

Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. No adjustments made.

Calibration Performed By: Karan Pandit



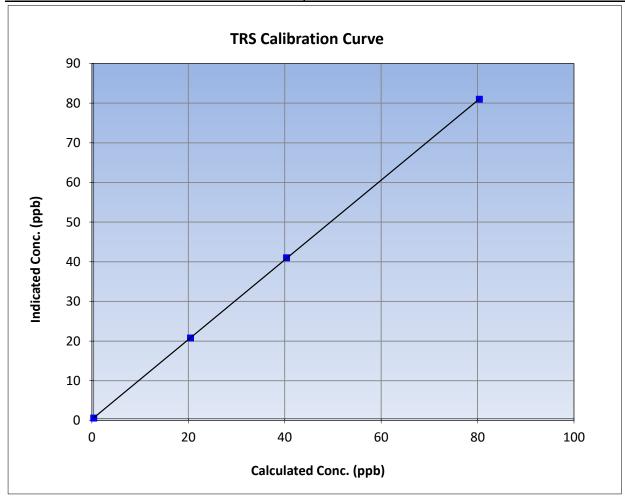
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 7, 2023 **Previous Calibration:** February 13, 2023 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 10:34 End Time (MST): 14:45 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

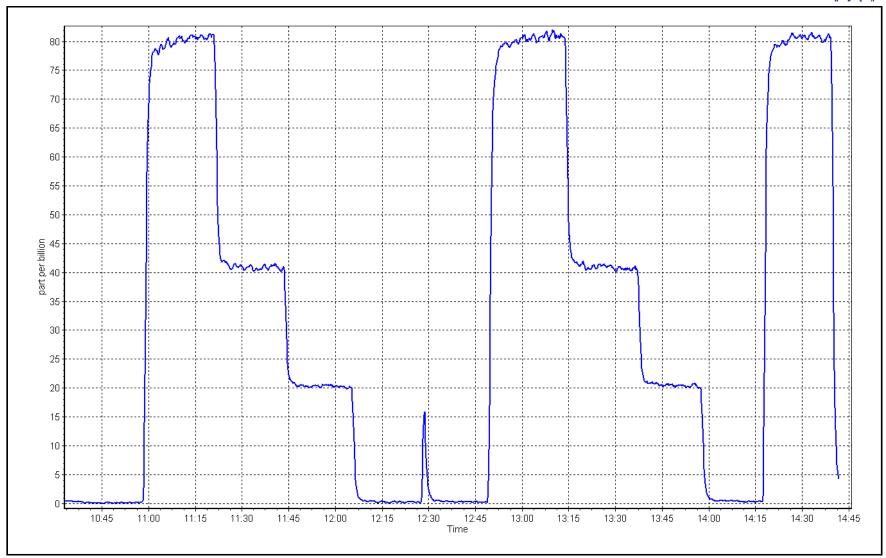
Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	0.2		Correlation Coefficient	0.999992	≥0.995			
80.0	80.6	0.9925	Correlation Coefficient	0.999992	20.993			
40.0	40.6	0.9850	Slope	1.005159	0.90 - 1.10			
20.0	20.4	0.9827	Slope	1.003139	0.90 - 1.10			
			- Intercept	0.260882	+/-3			



TRS Calibration Plot

Date: March 7, 2023 Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Stony Mountain Station Name:

Calibration Date: March 30, 2023

Start time (MST): 9:58 Reason: Routine Station number: AMS 18

Last Cal Date: February 17, 2023

End time (MST): 12:52

Removed Gas Expiry: NA

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025 CC463851

CH4 Cal Gas Conc. 500.8 CH4 Equiv Conc. 1066.8 ppm ppm

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 Diff between cyl (THC): ppm Diff between cyl (NM):

Diff between cyl (CH₄):

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701H Serial Number: 360

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

Start Finish Start Finish CH4 SP Ratio: 3.06E-04 3.06E-04 NMHC SP Ratio: 5.66E-05 5.66E-05 CH4 Retention time: 14.60 14.60 NMHC Peak Area: 162130 162130

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	81.0	17.28	17.31	0.998
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	17.28	17.23	1.003
second point	4959	40.5	8.64	8.60	1.004
third point	4979	20.2	4.31	4.28	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	17.28	17.26	1.001
			,	Average Correction Factor	1.005
Baseline Corr AF:	17.31	Prev response	17.32	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

					VCISION OF 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	81.0	9.17	9.16	1.001
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	9.10	1.007
second point	4959	40.5	4.58	4.56	1.006
hird point	4979	20.2	2.29	2.27	1.006
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81	9.17	9.09	1.009
•			Aver	age Correction Factor	1.006
Baseline Corr AF:	9.16	Prev response	9.16	*% change	-0.1%
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= 0.95-1.0</i>
as found span	4919	81.0	8.11	8.15	0.995
as found 2nd point	4515	01.0	0.11	0.13	0.555
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.0	8.11	8.12	0.999
second point	4959	40.5	4.06	4.04	1.003
third point	4979	20.2	2.02	2.01	1.009
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.17	0.993
<u>'</u>				age Correction Factor	1.004
Baseline Corr AF:	8.15	Prev response	8.15	*% change	0.0%
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>		Finish	
THC Cal Slope:		1.002575		0.997054	
THC Cal Offset:		-0.009777		-0.008797	
CH4 Cal Slope:		1.007610		1.001440	
CHACLOSS :		0.000000		0.044200	

Notes: Sample inlet filter changed after as founds. No adjustments were made

-0.020602

0.998345

0.010426

Calibration Performed By: Karan Pandit

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

-0.011209

0.992924

0.002412



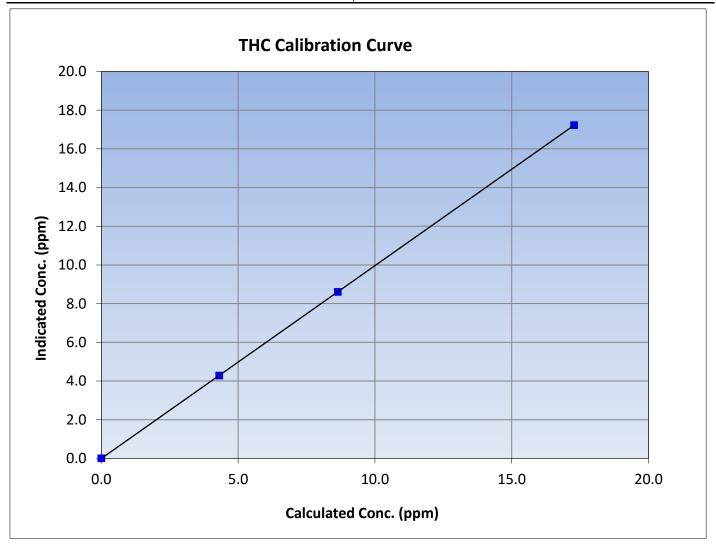
THC Calibration Summary

Version-01-2020

Station Information

March 30, 2023 Calibration Date: **Previous Calibration:** February 17, 2023 Station Name: **AMS 18** Stony Mountain Station Number: Start Time (MST): 9:58 End Time (MST): 12:52 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	0.999999	≥0.995	
17.28	17.23	1.0032	Correlation Coefficient	0.55555	20.333	
8.64	8.60	1.0045	Slope	0.997054	0.90 - 1.10	
4.31	4.28	1.0071	Slope	0.997034	0.30 - 1.10	
			Intercept	-0.008797	+/-0.5	





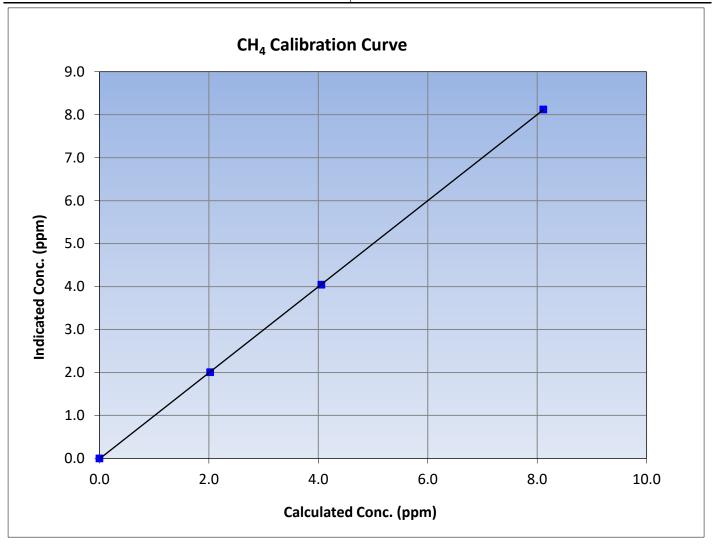
CH₄ Calibration Summary

Version-01-2020

Station Information

March 30, 2023 Calibration Date: **Previous Calibration:** February 17, 2023 Station Name: **AMS 18** Stony Mountain Station Number: Start Time (MST): 9:58 End Time (MST): 12:52 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	0.999991	≥0.995
8.11	8.12	0.9991	Correlation Coemicient	0.555551	20.333
4.06	4.04	1.0034	Slope	1.001440	0.90 - 1.10
2.02	2.01	1.0088	Slope	1.001440	0.90 - 1.10
			Intercept	-0.011209	+/-0.5





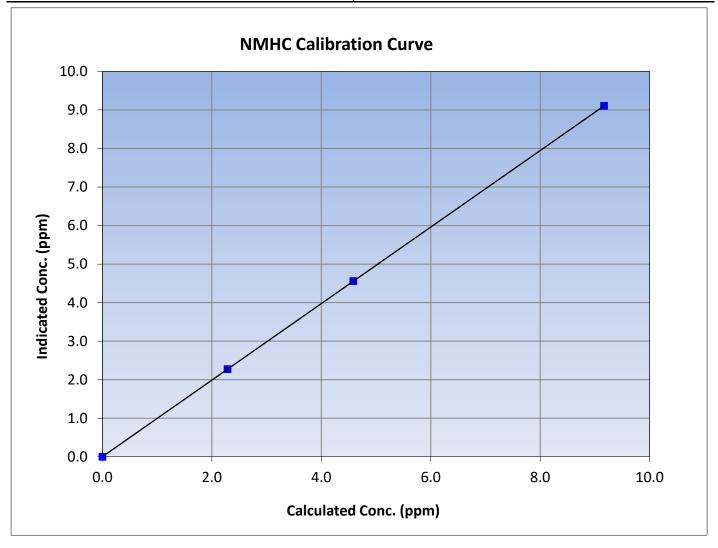
NMHC Calibration Summary

Version-01-2020

Station Information

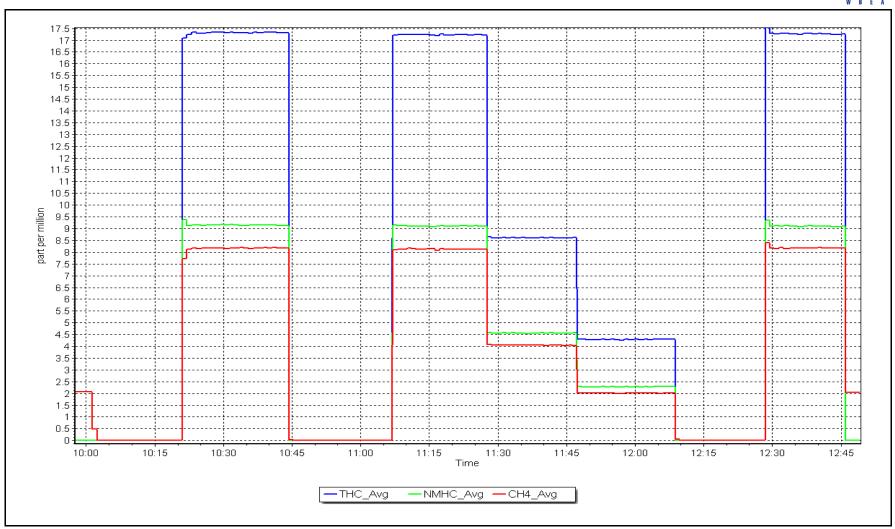
March 30, 2023 Calibration Date: **Previous Calibration:** February 17, 2023 Station Name: **AMS 18** Stony Mountain Station Number: Start Time (MST): 9:58 End Time (MST): 12:52 Analyzer make: Analyzer serial #: 1180320039 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
9.17	9.10	1.0071	Correlation Coefficient	1.000000	20.333
4.58	4.56	1.0058	Slope	0.992924	0.90 - 1.10
2.29	2.27	1.0056	Slope	0.552524	0.90 - 1.10
			Intercept	0.002412	+/-0.5



NMHC Calibration Plot Date: March 30, 2023 Location: Stony Mountain







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Stony Mountain

Calibration Date: March 22, 2023

Start time (MST): 9:43
Reason: Routine

Station number: AMS 18

Last Cal Date: February 22, 2023

End time (MST): 14:15

Calibration Standards

NO Gas Cylinder #: T2XX7ME Cal Gas Expiry Date: January 14, 2024

NOX Cal Gas Conc: 50.48 ppm NO Cal Gas Conc: 49.22 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 50.48 ppm Removed Gas NO Conc: 49.22 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API 701H Serial Number: 360

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: 1.043 1.062 NO bkgnd or offset: 2.9 3.0 NOX coeff or slope: 0.987 0.984 NOX bkgnd or offset: 3.0 2.9 NO2 coeff or slope: 0.999 0.999 Reaction cell Press: 222.7 223.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002587	0.999873
NO _x Cal Offset:	0.289742	-0.210265
NO Cal Slope:	1.003123	1.002239
NO Cal Offset:	-0.910073	-0.950426
NO ₂ Cal Slope:	0.999064	0.999365
NO ₂ Cal Offset:	0.020158	-0.185598



NO_X \ NO \ NO₂ 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	0.0	-0.1	0.1		
as found span	4919	81.3	820.8	800.3	20.5	809.4	786.6	22.9	1.0140	1.0174
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0		
high point	4919	81.3	820.8	800.3	20.5	820.4	801.2	19.2	1.0004	0.9988
second point	4959	40.7	410.9	400.7	10.3	411.1	401.3	9.8	0.9996	0.9984
third point	4980	20.3	204.9	199.8	5.1	204.0	197.6	6.4	1.0046	1.0112
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.1		
as left span	4919	81.3	820.8	362.9	457.9	821.8	358.8	463.0	0.9987	1.0113
							Average C	Correction Factor	1.0015	1.0028
Corrected As fo	ound NO _X =	809.4 ppb	NO =	786.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	-1.7%
Previous Respo	onse NO _X =	823.2 ppb	NO =	801.9 ppb				*Percent Chan	ge NO =	-1.9%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	GPT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated No concentration (pp		dicated 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)	799.3		361.9	457.9		457.4	1.0013	1	99.9%
2nd GPT poin	t (200 ppb O3)	799.3		588.6	231.2		231.1	1.0004	1	100.0%
3rd GPT point	t (100 ppb O3)	799.3		695.6	124.2		123.5	1.0056	õ	99.4%

Notes:

Sample inlet filter changed after as founds. Adjusted the span only.

Average Correction Factor

1.0023

Calibration Performed By:

Karan Pandit

99.8%



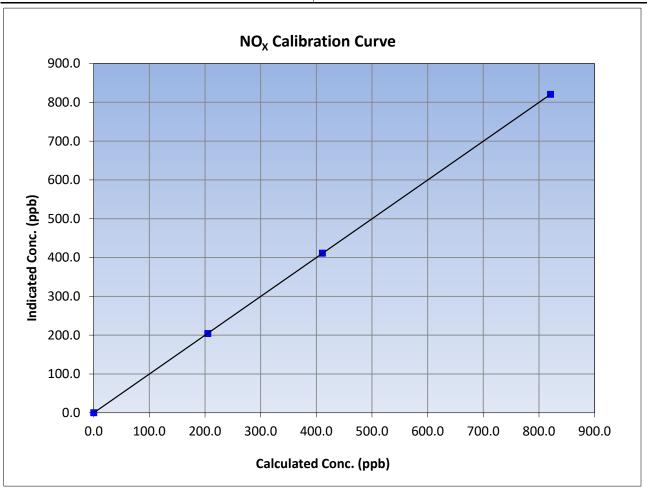
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 22, 2023 Previous Calibration: February 22, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 9:43 End Time (MST): 14:15 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	0.999998	≥0.995
820.8	820.4	1.0004	Correlation Coefficient	0.55555	20.333
410.9	411.1	0.9996	Slope	0.999873	0.90 - 1.10
204.9	204.0	1.0046	Slope	0.999675	0.90 - 1.10
			Intercept	-0.210265	+/-20





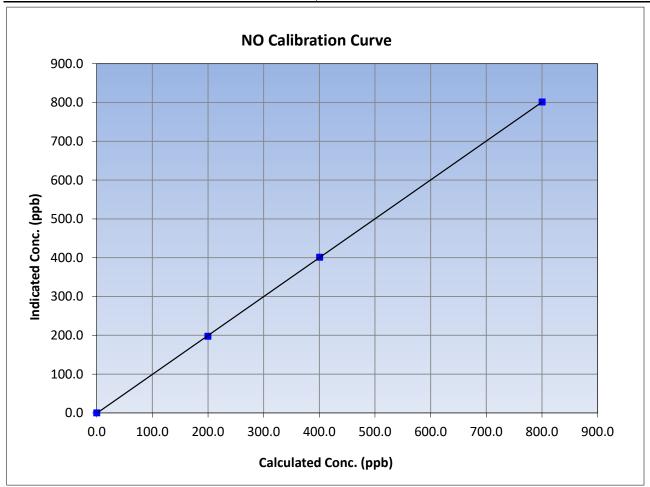
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 22, 2023 Previous Calibration: February 22, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 9:43 End Time (MST): 14:15 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	0.999988	≥0.995
800.3	801.2	0.9988	Correlation Coefficient	0.555500	20.993
400.7	401.3	0.9984	Slope	1.002239	0.90 - 1.10
199.8	197.6	1.0112	Slope	1.002239	0.90 - 1.10
			Intercept	-0.950426	+/-20





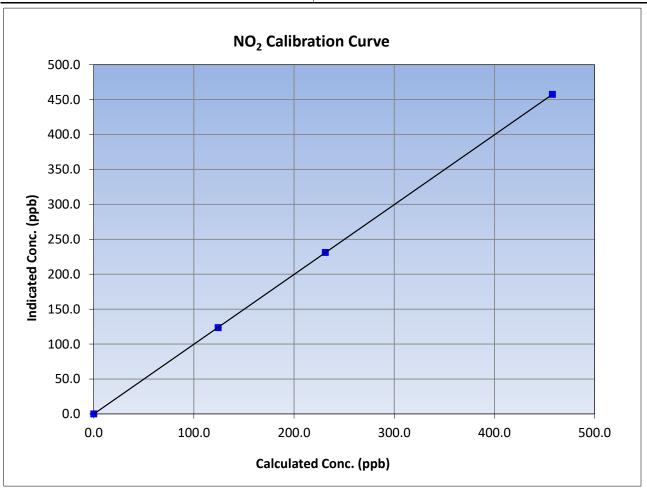
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 22, 2023 Previous Calibration: February 22, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 9:43 End Time (MST): 14:15 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	0.999998	≥0.995
457.9	457.4	1.0011	Correlation Coefficient	0.55555	20.333
231.2	231.1	1.0004	Slope	0.999365	0.90 - 1.10
124.2	123.5	1.0056	Slope	0.999303	0.90 - 1.10
			Intercept	-0.185598	+/-20

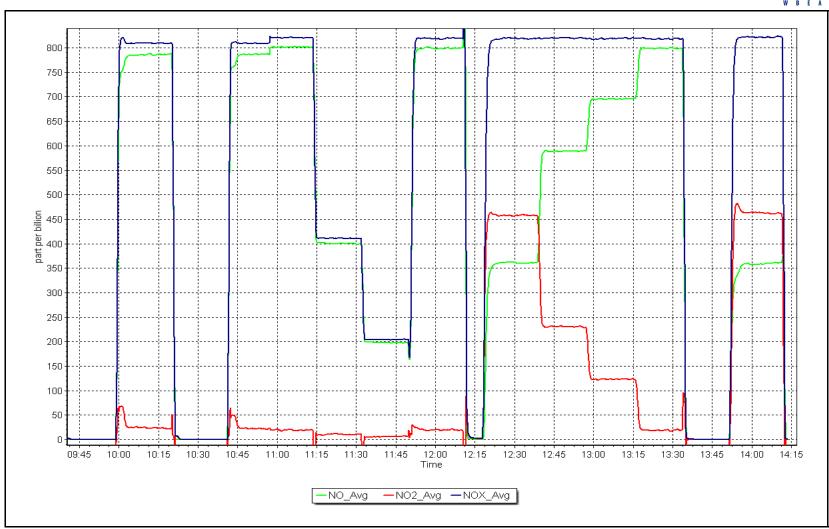


NO_x Calibration Plot

Date: March 22, 2023

Location: Stony Mountain







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	ı		
Station Name:	Stony Mountain		Station number:	AMS 18	
Calibration Date:	March 22, 2023		Last Cal Date:	February 24, 2023	
Start time (MST):	11:05		End time (MST):	12:06	
Analyzer Make:	API T640		S/N:	1335	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Delta Cal		S/N:	1102	
Temp/RH standard:	Delta Cal		S/N:	1102	
		Monthly Calibration To	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-3.1	-3.2	-3.1		+/- 2 °C
P (mmHg)	692.0	693.3	692.0		+/- 10 mmHg
flow (LPM)	4.99	4.95	4.99		+/- 0.25 LPM
Leak Test:	Date of check:	March 22, 2023	Last Cal Date:	February 24, 2023	
Note: this leak check will be	PM w/o HEPA:	6.7	PM w/ HEPA:	0.0	<0.2 ug/m3
Inlet cleaning :	Inlet Head	Quarterly Calibration 1	est		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.0	10.4	11.0	<u> </u>	10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	8.6	w/ HEPA:	0.0
Date Optical Cham		March 22,		w, ner	<0.2 ug/m3
Disposable Filte	-	March 22,			<u> </u>
		Annual Maintenance	e		
Date Sample Tub	oe Cleaned:	August 30,	2022		
Date RH/T Senso	or Cleaned:	August 30,	2022		
Notes:	No adjustments made	to temperature, pressure	or flow. Optical cham	nber and inlet head clear	ied. Leak check
	-		d. PMT adjusted.		
Calibration by:	Karan Pandit				



CO Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: March 24, 2023

Start time (MST): 9:30

Reason: Routine

Station number: AMS 18

Last Cal Date: February 24, 2023

December 1, 2028

End time (MST): 12:18

Cal Gas Exp Date:

Calibration Standards

Cal Gas Concentration: 3,050 ppm

Cal Gas Cylinder #: ALM063503

Removed Cal Gas Conc: 3,050 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 T701 Serial Number: 360

Analyzer Information

Analyzer make: API T300 Analyzer serial #: 3504

Analyzer Range: 0 - 50 ppm

StartFinishStartFinishCalibration slope:0.9978921.002302Backgd or Offset:-0.009-0.009

Calibration intercept: 0.161801 0.205803 Coeff or Slope: 0.904 0.904

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	40.7	40.9	0.994
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4933	66.7	40.7	40.9	0.995
second point	4966	33.3	20.3	20.8	0.978
third point	4983	16.7	10.2	10.4	0.982
as left zero	3000	0.0	0.0	0.2	
as left span	2960	40.0	40.7	41.1	0.991
			Avera	ge Correction Factor	0.985
Baseline Corr As found:	40.80	Prev response:	40.77	*% change:	0.1%

Baseline Corr As found: 40.80 Prev response: 40.77 *% change: 0.1% 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 made.

Calibration Performed By: Karan Pandit

Notes:

* = > +/-5% change initiates investigation



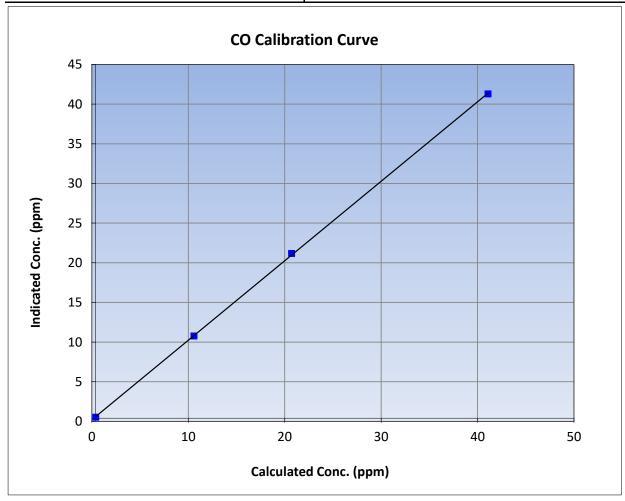
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 24, 2023 **Previous Calibration:** February 24, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 9:30 End Time (MST): 12:18 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	0.1		Correlation Coefficient	0.999939	≥0.995				
40.7	40.9	0.9949	Correlation Coefficient	0.55555	20.993				
20.3	20.8	0.9781	Slope	1.002302	0.90 - 1.10				
10.2	10.4	0.9824	Slope	1.002302	0.90 - 1.10				
			- Intercept	0.205803	+/-1.5				

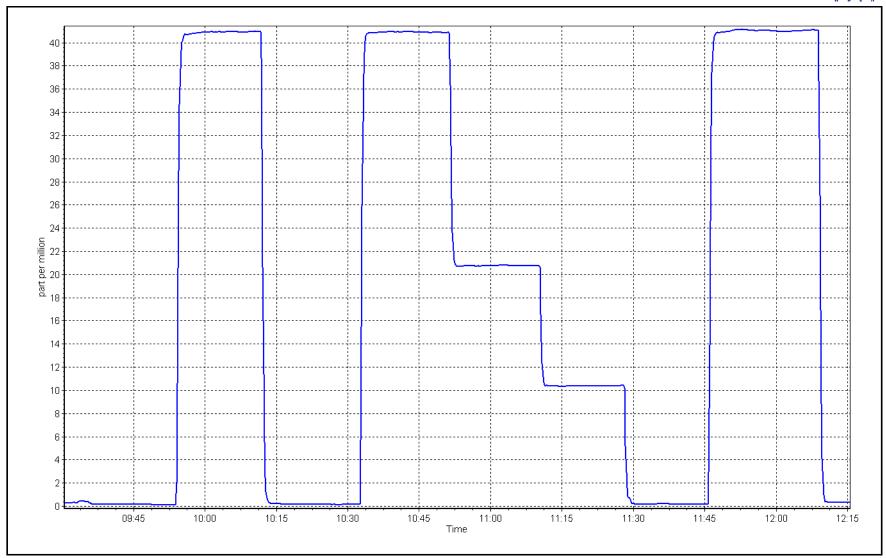


CO Calibration Plot

Date: March 24, 2023

Location: Stony Mountain







CO₂ Calibration Report

AMS 18

Version-01-2020

Station Information

Station Name: Stony Mountain Station number:

Calibration Date: March 29, 2023 Last Cal Date: February 8, 2023

Start time (MST): 9:42 End time (MST): 13:18

Reason: Maintenance

Calibration Standards

Cal Gas Concentration: 60,220 ppm Cal Gas Exp Date: December 1, 2026

Cal Gas Cylinder #: ALM063503

Removed Cal Gas Conc: 60,220 ppm Rem Gas Exp Date: NA

Removed Gas Cyl #: NA Diff between cyl:

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 #: 283

Analyzer Range 0 - 2,000 ppm

Start **Finish** Start Finish Backgd or Offset: Calibration slope: 0.999561 1.008751 -0.059 -0.059 Coeff or Slope: Calibration intercept: 1.700000 4.460000 1.066 1.066

CO₂ 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	0.6	
as found span	2920	80.0	1605.9	1612.7	0.996
as found 2nd point	2960	40.0	802.9	815.4	0.985
as found 3rd point	2980	20.0	401.5	405.9	0.989
new cylinder response					
calibrator zero	3000	0.0	0.0	0.5	
high point	2920	80.0	1605.9	1620.5	0.991
second point	2960	40.0	802.9	822.1	0.977
third point	2980	20.0	401.5	409.6	0.980
as left zero	3000	0.0	0.0	0.5	
as left span	2930	80.0	1600.5	1619.4	0.988
			Avera	ge Correction Factor	0.983
Baseline Corr As found:	1612.10	Prev response:	1606.86	*% change:	0.3%
Baseline Corr 2nd AF pt:	814.8	AF Slope:	1.004019	AF Intercept:	3.260000
Baseline Corr 3rd AF pt:	405.3	AF Correlation:	0.999964		

Notes: Pump and sample inlet filter changed after multipoint as founds. No adjustments made.

Calibration Performed By: Karan Pandit

* = > +/-5% change initiates investigation



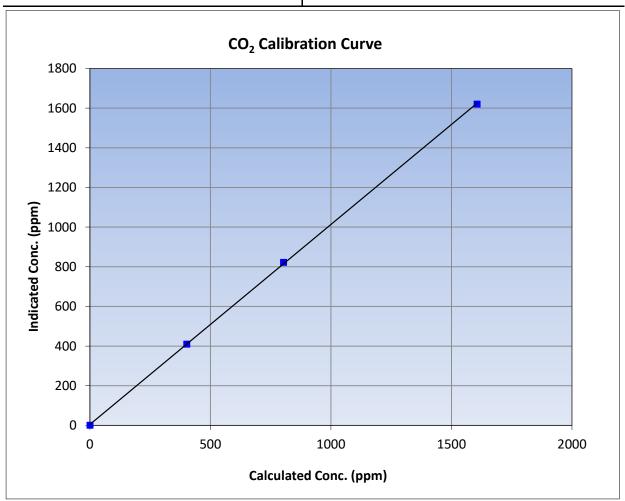
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	March 29, 2023	Previous Calibration	February 8, 2023
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	9:42	End Time (MST)	13:18
Analyzer make	API T360	Analyzer serial #	283

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999937	≥0.995
1605.9	1620.5	0.9910	Correlation Coefficient	0.555557	20.993
802.9	822.1	0.9767	Slope	1.008751	0.90 - 1.10
401.5	409.6	0.9801	Slope	1.008/31	0.90 - 1.10
			Intercept	4.460000	+/-10

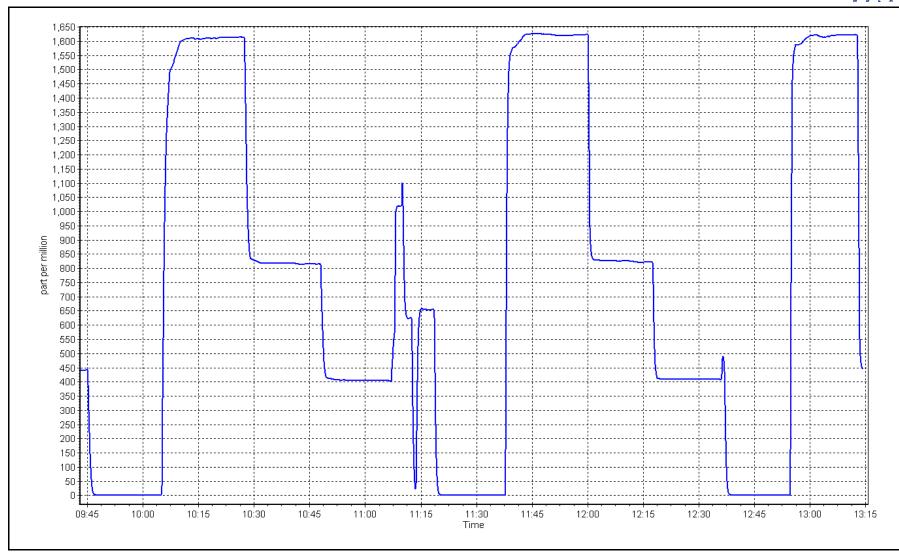


CO₂ Calibration Plot

Date: March 29, 2023

Location: Stony Mountain







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS19 FIREBAG MARCH 2023

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

April 29, 2023







SO₂ Calibration Report

14:43

Version-01-2020

Station Information

Station Name: Firebag Station number: AMS 19

Calibration Date: March 7, 2023 Last Cal Date: February 7, 2023

Start time (MST): 11:15 End time (MST):

Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.29 ppm Cal Gas Exp Date: February 23, 2025

Cal Gas Cylinder #: CC716618

Removed Cal Gas Conc: 49.29 ppm Rem Gas Exp Date: Removed Gas Cyl #: Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 1607

ZAG Make/Model: API T701 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1410661308

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:0.9981051.000420Backgd or Offset:10.310.0

Calibration intercept: -0.121714 -0.181972 Coeff or Slope: 0.987 0.976

SO₂ 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	4999	0.0	0.0	-0.2	
as found span	4919	81.1	799.5	808.0	0.989
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	799.7	1.000
second point	4959	40.6	400.3	400.3	1.000
third point	4980	20.3	200.1	199.6	1.003
as left zero	4999	0.0	0.0	0.0	
as left span	4919	81.1	799.5	799.4	1.000
			Averag	1.001	

Baseline Corr As found: 808.20 Previous response 797.83 *% change 1.3% 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:

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

Calibration Performed By: Braiden Boutilier

* = > +/-5% change initiates investigation



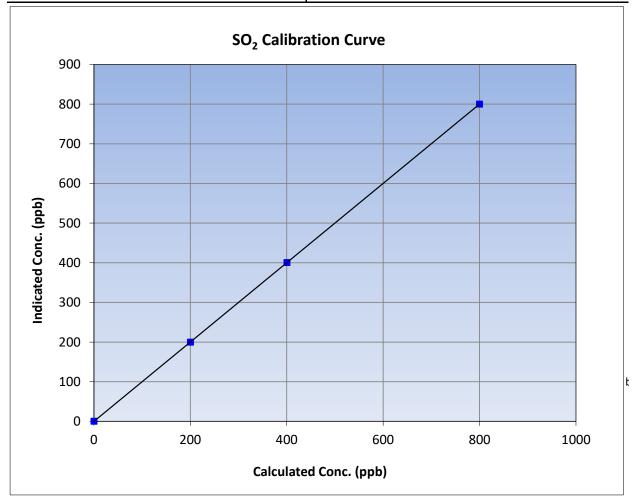
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 7, 2023 **Previous Calibration:** February 7, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 11:15 End Time (MST): 14:43 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	799.7	0.9997						
400.3	400.3	0.9999	Slope	1.000420	0.90 - 1.10			
200.1	199.6	1.0025						
			- Intercept	-0.181972	+/-30			

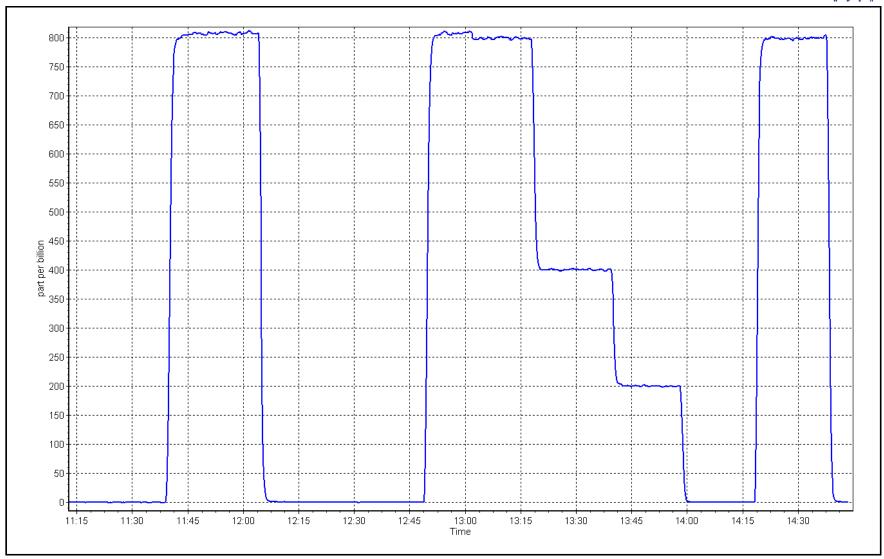


SO2 Calibration Plot

Date: March 7, 2023

Location: Firebag







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Firebag

Calibration Date: March 2, 2023 Last Cal Date: February 6, 2023

Start time (MST): 11:30 Reason: Routine End time (MST): 16:07

Station number:

AMS19

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.114 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517427

Removed Cal Gas Conc: Rem Gas Exp Date: n/a 5.114 ppm Removed Gas Cyl #: Diff between cyl: n/a

Calibrator Make/Model: Teledyne API T700 1607 Serial Number: ZAG Make/Model: Teledyne API T701 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090

Global Converter serial #: 2022-222 Converter make:

Analyzer Range 0 - 100 ppb

Finish <u>Start</u> <u>Finish</u> <u>Start</u> 0.997909 1.003769 Backgd or Offset: Calibration slope: 2.96 3.18

Calibration intercept: 0.038321 Coeff or Slope: 0.979 0.990 0.118481

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	0.1	
as found span	4922	78.2	80.0	79.3	1.010
as found 2nd point	4961	39.1	40.0	39.8	1.007
as found 3rd point	4980	19.6	20.0	20.0	1.007
new cylinder response					

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	5000	0.0	0.0	0.0	
high point	4922	78.2	80.0	80.3	0.996
second point	4961	39.1	40.0	40.2	0.995
third point	4980	19.6	20.0	20.2	0.992
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.2	80.0	80.1	0.998
SO2 Scrubber Check	4922	78.3	800.2	0.0	
Date of last scrubber chang	ge:	December 9, 2021	_	Ave Corr Factor	0.994
D . Cl		,			cc

Date of last scrubber change:	December 9, 2021	Ave Corr Factor 0.994
Date of last converter efficiency test:	n/a	efficiency

Baseline Corr As found: 79.2 79.93 Prev response: *% change: -0.9% 0.138629 Baseline Corr 2nd AF pt: 39.7 AF Slope: 0.990191 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999998 19.9

* = > +/-5% change initiates investigation

SOx scrubber check done after calibrator zero. Adjusted zero and span. Changed sample inlet filter Notes:

after MPAF's.

Calibration Performed By: Braiden Boutilier



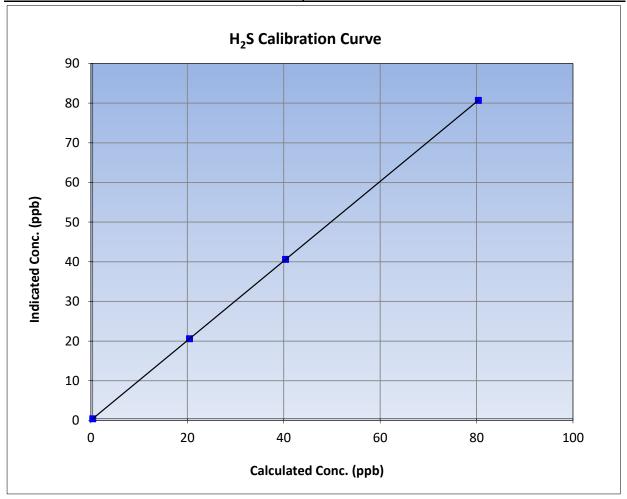
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 6, 2023 Station Name: Firebag Station Number: AMS19 Start Time (MST): 11:30 End Time (MST): 16:07 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090

	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	80.3	0.9960	Correlation Coefficient	0.555555	20.993				
40.0	40.2	0.9948	Slope	1.003769	0.90 - 1.10				
20.0	20.2	0.9925	Slope	1.003709	0.90 - 1.10				
			- Intercept	0.038321	+/-3				

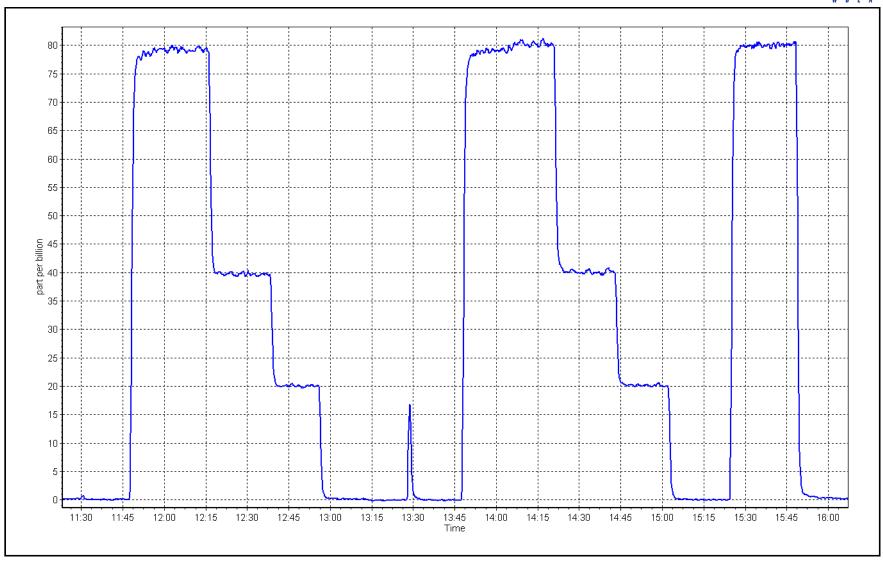


H₂S Calibration Plot

Date: March 2, 2023

Location: Firebag







THC Calibration Report

Version-01-2020

Station Information

Station Name: Firebag Station number: AMS 19

Calibration Date: March 7, 2023 Last Cal Date: February 7, 2023

Start time (MST): 11:15 End time (MST): 14:43

Reason: Routine

Calibration Standards

Gas Cert Reference: CC716618 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 ppm Diff between cyl:

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
 Start
 Finish

 Calibration slope:
 0.986792
 0.998521
 Background:
 2.11
 2.24

Calibration intercept: 0.033117 -0.017736 Coefficient: 3.748 3.732

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	0.12	
as found span	4919	81.1	17.31	17.56	0.985
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	17.29	1.001
second point	4959	40.6	8.66	8.59	1.009
third point	4980	20.3	4.33	4.28	1.012
as left zero	5000	0.0	0.00	0.05	
as left span	4919	81.1	17.31	17.35	0.997
			Avera	ge Correction Factor	1.007

Baseline Corr As found: 17.44 Previous response 17.11 *% change 1.9%

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. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier

* = > +/-5% change initiates investigation



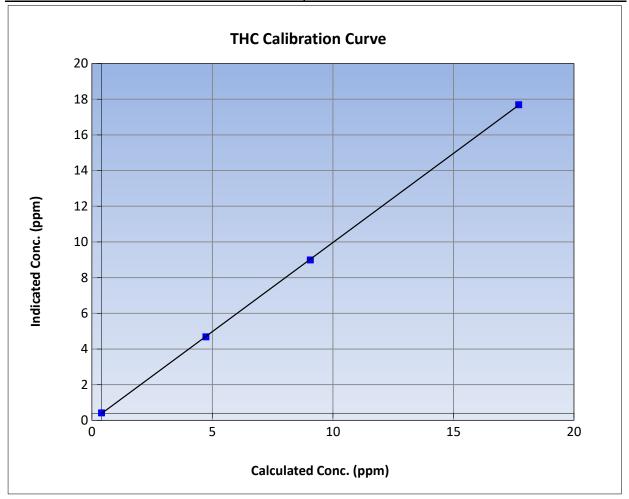
THC Calibration Summary

Version-01-2020

Station Information

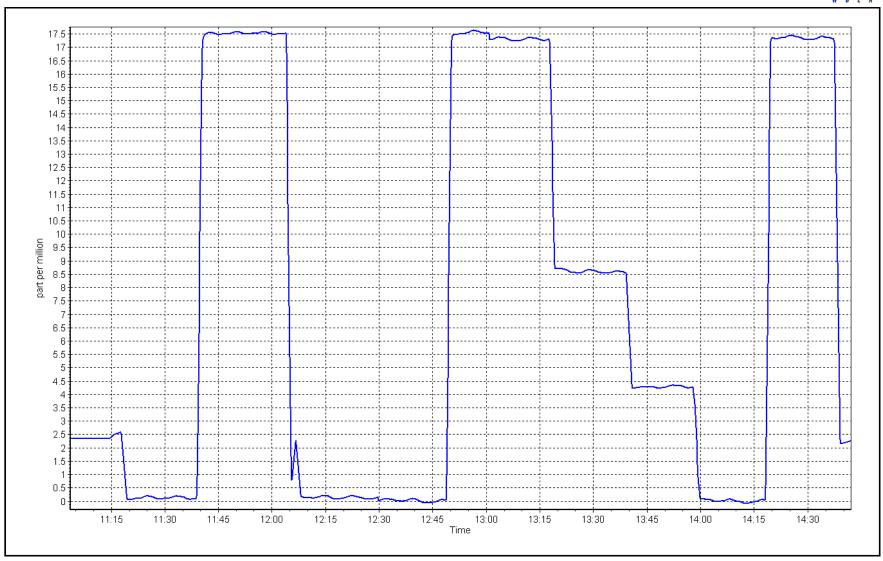
Previous Calibration: Calibration Date: March 7, 2023 February 7, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 11:15 End Time (MST): 14:43 Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Calibration Data								
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor Statistical Evaluation						
0.00	0.02		Correlation Coefficient	0.999969	≥0.995			
17.31	17.29	1.0009	Correlation Coefficient	0.555505	20.995			
8.66	8.59	1.0086	Slope	0.998521	0.90 - 1.10			
4.33	4.28	1.0115	Slope	0.996321	0.90 - 1.10			
			- Intercept	-0.017736	+/-1.5			



THC Calibration Plot Date: March 7, 2023 Location: Firebag







NO_X \ NO \ NO₂ Calibration Report

End time (MST): 16:11

Version-04-2020

Station Information

Station Name: **Firebag** Station number: AMS 19

Calibration Date: March 3, 2023 Last Cal Date: February 8, 2023

11:14 Start time (MST): Reason: Routine

Calibration Standards

NO Gas Cylinder #: T2Y1K63 Cal Gas Expiry Date: November 30, 2023

NOX Cal Gas Conc: NO Cal Gas Conc: 49.40 51.12 ppm ppm

Removed Cylinder #: Removed Gas Exp Date: n/a n/a Removed Gas NOX Conc: 51.12 ppm Removed Gas NO Conc: 49.40 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 1607 ZAG make/model: Teledyne API T701 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1410661309

NOX Range (ppb): 0 - 1000 ppb

Start **Finish Finish Start** 7.2 NO coeff or slope: 1.041 1.041 NO bkgnd or offset: 7.3 NOX bkgnd or offset: NOX coeff or slope: 0.996 0.996 7.3 7.3 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 210.9 206.6

Calibration Statistics

<u>Start</u>	<u>Finish</u>
0.997423	0.994815
0.135510	0.755137
0.998470	0.993858
-0.351682	0.287575
0.999864	1.003159
-0.568980	0.561215
	0.997423 0.135510 0.998470 -0.351682 0.999864



NO_X \ NO \ NO₂ 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	-0.2	-0.2	-0.1		
as found span	4919	81.0	828.1	800.3	27.9	825.0	794.6	30.1	1.0038	1.0071
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4919	81.0	828.1	800.3	27.9	824.0	795.3	29.1	1.0050	1.0063
second point	4960	40.5	414.0	400.1	13.9	413.7	398.6	15.1	1.0008	1.0038
third point	4980	20.2	206.5	199.6	6.9	206.5	198.7	7.8	1.0001	1.0044
as left zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4919	81.0	828.1	364.8	463.4	827.0	358.3	468.3	1.0014	1.0181
							Average C	Correction Factor	1.0020	1.0048
Corrected As for	und NO _X =	825.2 ppb	NO =	794.8 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-0.1%
Previous Respor	nse NO _X =	826.1 ppb	NO =	798.7 ppb				*Percent Chang	ge NO =	-0.5%
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	d 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 ₂ Int:	
				6	PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		cated 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 Calibratio	rter Efficiency n Limit = 96-104%
as found 0	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)	793.1		357.6	463.4		465.2	0.9961	1	100.4%
2nd GPT point	(200 ppb O3)	793.1		575.8	245.2		246.5	0.9946		100.5%
3rd GPT point ((100 ppb O3)	793.1		686.4	134.6		136.2	0.9880) :	101.2%

Notes:

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

Average Correction Factor

0.9929

Calibration Performed By:

Braiden Boutilier

100.7%



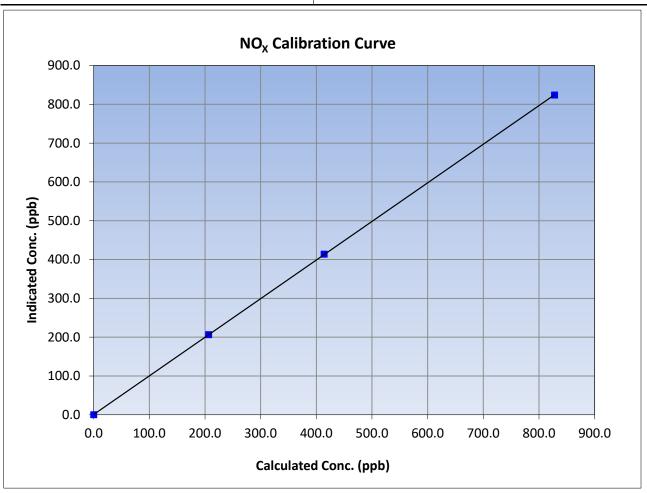
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 8, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 11:14 End Time (MST): 16:11 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	0.999994	≥0.995
828.1	824.0	1.0050	Correlation Coefficient	0.555554	20.993
414.0	413.7	1.0008	Slope	0.994815	0.90 - 1.10
206.5	206.5	1.0001	Slope	0.994613	0.90 - 1.10
			Intercept	0.755137	+/-20





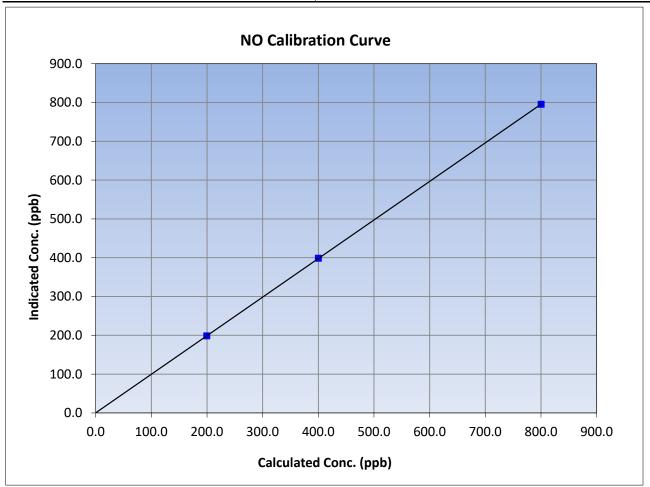
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 8, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 11:14 End Time (MST): 16:11 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	-0.1		Correlation Coefficient	0.999998	≥0.995
800.3	795.3	1.0063	Correlation Coefficient	0.999998	20.333
400.1	398.6	1.0038	Slope	0.993858	0.90 - 1.10
199.6	198.7	1.0044	Slope	0.993636	0.90 - 1.10
			Intercept	0.287575	+/-20





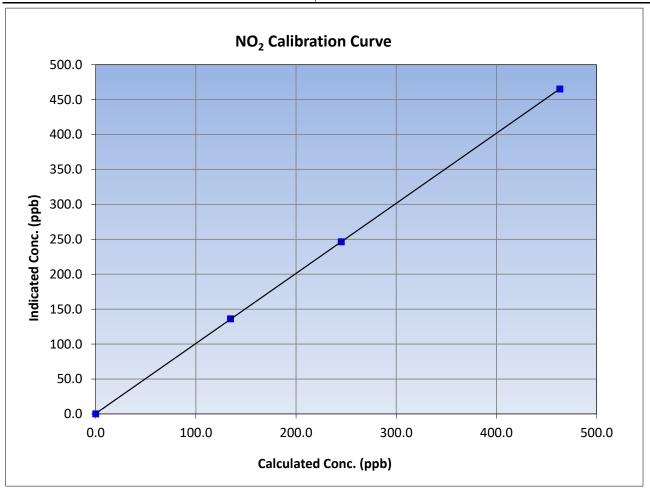
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 3, 2023 Previous Calibration: February 8, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 11:14 End Time (MST): 16:11 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	0.1		Correlation Coefficient	0.999994	≥0.995
463.4	465.2	0.9961	Correlation Coefficient	0.555554	20.333
245.2	246.5	0.9946	Slope	1.003159	0.90 - 1.10
134.6	136.2	0.9880	Slope	1.005159	0.90 - 1.10
			Intercept	0.561215	+/-20

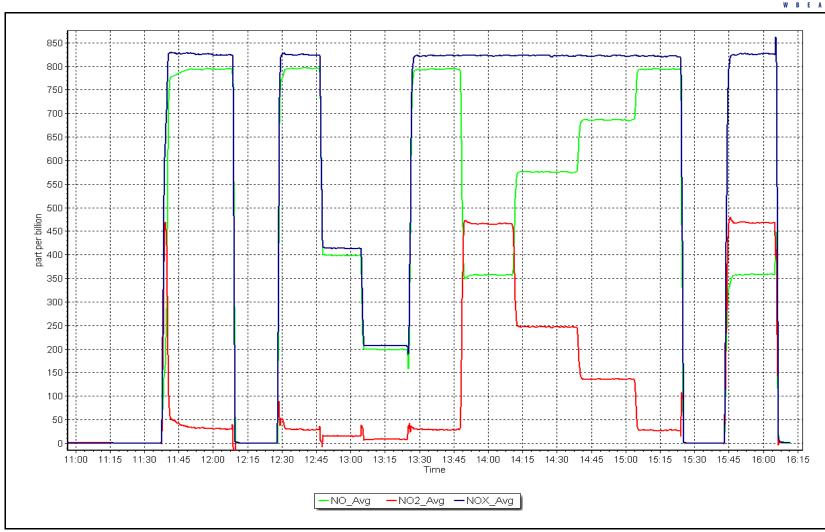


NO_x Calibration Plot

Date: March 3, 2023

Location: Firebag







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS20 MACKAY RIVER MARCH 2023

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

April 29, 2023

W B E A

Wood Buffalo Environmental Association

SO₂ Calibration Report

Station number:

End time (MST):

AMS20

14:17

Version-01-2020

Station Information

Station Name: MacKay River

Calibration Date: March 1, 2023 Last Cal Date: February 1, 2023

Start time (MST): 10:51

Reason: Routine

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 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 Analyzer serial #: 1501301450

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.999451 0.992140 Backgd or Offset: 18.6 19.1 0.974 Calibration intercept: 2.850831 3.311046 Coeff or Slope: 0.974

SO₂ 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	4919	81.3	800.3	794.1	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	81.3	800.3	796.0	1.005
second point	4959	40.7	400.7	401.5	0.998
third point	4980	20.3	199.8	205.4	0.973
as left zero	5000	0.0	0.0	-0.1	
as left span	4919	81.3	800.3	796.6	1.005
_			Averag	ge Correction Factor	0.992
	704.00		000.50	* 0/ 1	4.40/

Baseline Corr As found: 794.20 Previous response 802.68 *% change -1.1%
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Sample inlet filter changed after as founds. No adjustments required.

Calibration Performed By: Mohammed Kashif

* = > +/-5% change initiates investigation



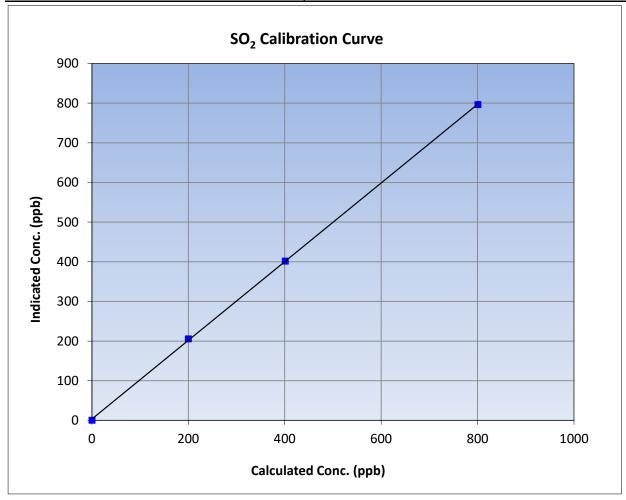
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 1, 2023 **Previous Calibration:** February 1, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:51 End Time (MST): 14:17 Analyzer make: Thermo 43i Analyzer serial #: 1501301450

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	0.999921	≥0.995			
800.3	796.0	1.0054	Correlation Coefficient	0.333321	20.993			
400.7	401.5	0.9979	Slope	0.992140	0.90 - 1.10			
199.8	205.4	0.9728	Siope	0.332140	0.90 - 1.10			
			- Intercept	3.311046	+/-30			

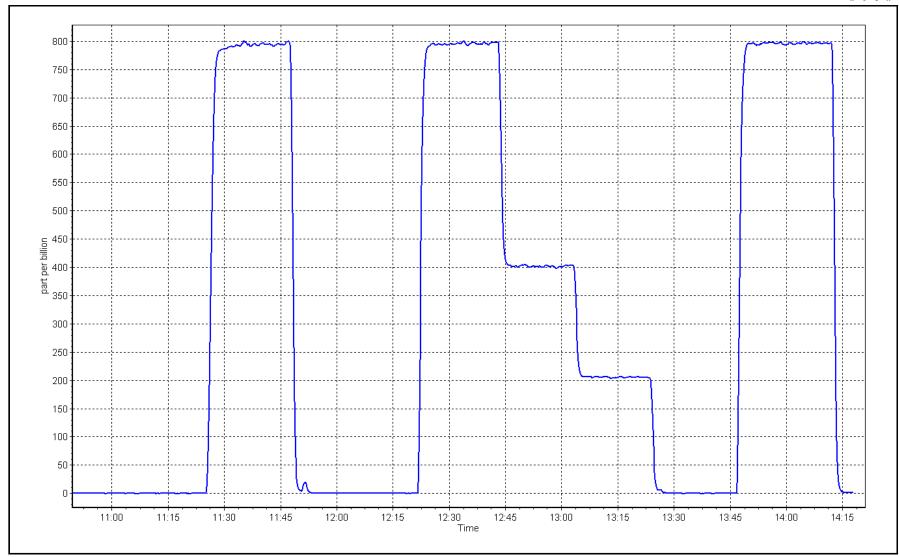


SO2 Calibration Plot Da

Date: March 1, 2023

Location: MacKay River







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: MacKay River

Calibration Date: March 2, 2023 Start time (MST): 10:17

Reason: Routine

Station number: AMS20

Last Cal Date: February 13, 2023

End time (MST): 15:13

Calibration Standards

Cal Gas Concentration: 4.87 ppm Cal Gas Exp Date: May 5, 2023

Cal Gas Cylinder #: EY0001922

Removed Cal Gas Conc: 4.87 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: Teledyne API T101 Analyzer serial #: 196

Converter make: Internal Converter serial #: NA

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.990859 1.005578 Backgd or Offset: 47.9 Calibration slope: 46.3 Calibration intercept: 0.878999 0.338970 Coeff or Slope: 0.981 0.991

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	0.5	
as found span	4918	82.1	80.0	81.0	0.993
as found 2nd point	4959	41.1	40.0	41.3	0.981
as found 3rd point	4979	20.5	20.0	21.3	0.960
new cylinder response					

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	5000	0.0	0.0	-0.1	
high point	4918	82.1	80.0	80.5	0.993
second point	4959	41.1	40.0	40.9	0.979
third point	4979	20.5	20.0	20.8	0.960
as left zero	5000	0.0	0.0	0.2	
as left span	4918	82.1	80.0	79.9	1.001
SO2 Scrubber Check	4919	80.0	800.2	0.1	
Date of last scrubber chan	ge:	December 15, 2020)	Ave Corr Factor	0.977

Date of last scrubbe	er change:	December 15, 2020	Ave Corr Factor	0.977
Date of last convert	er efficiency test:			efficiency

Baseline Corr As found: 80.5 80.11 Prev response: *% change: 0.5% Baseline Corr 2nd AF pt: 40.8 AF Slope: 1.004434 AF Intercept: 0.879013 Baseline Corr 3rd AF pt: 20.8 AF Correlation: 0.999898

Notes: Changed inlet filter after multi point as founds. Performed scrubber test after calibrator zero.

Adjusted zero only.

Calibration Performed By: Mohammed Kashif

* = > +/-5% change initiates investigation



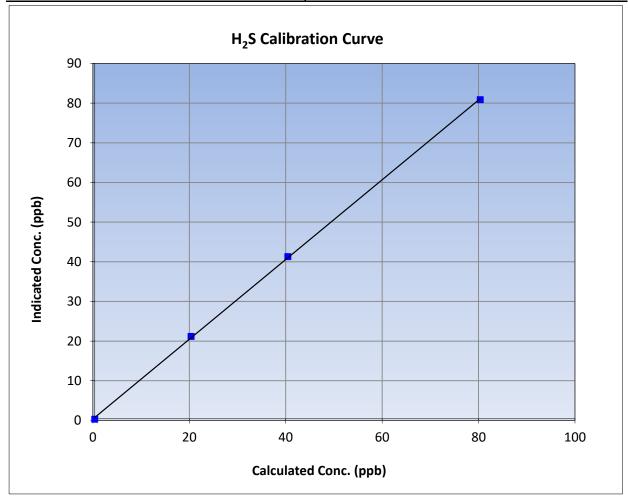
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 13, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:17 End Time (MST): 15:13 Analyzer make: Teledyne API T101 Analyzer serial #: 196

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	0.999860	≥0.995			
80.0	80.5	0.9933	Correlation Coefficient	0.333600	20.993			
40.0	40.9	0.9787	Slope	1.005578	0.90 - 1.10			
20.0	20.8	0.9600	Slope	1.005578	0.90 - 1.10			
			- Intercept	0.338970	+/-3			

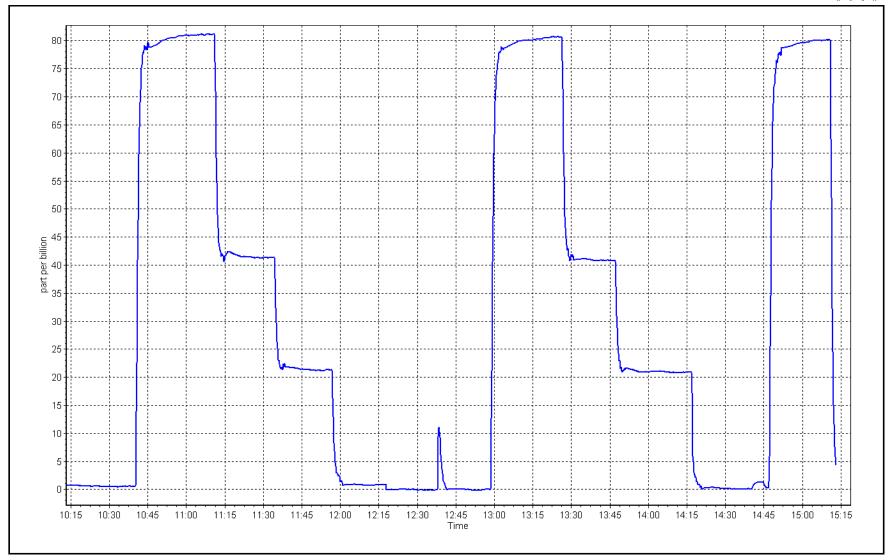


H₂S Calibration Plot

Date: March 2, 2023

Location: MacKay River







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: MacKay River
Calibration Date: March 8, 2023

Start time (MST): 10:20 Reason: Maintenance Station number: AMS20 Last Cal Date: March 2, 2023

End time (MST): 15:58

Calibration Standards

Cal Gas Concentration: 4.87 ppm Cal Gas Exp Date: May 5, 2023

Cal Gas Cylinder #: EY0001922

Removed Cal Gas Conc: 4.87 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: Teledyne API T101 Analyzer serial #: 196
Converter make: Internal Converter serial #: NA

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.999432 Backgd or Offset: 47.9 44.9 Calibration slope: 1.005578 Calibration intercept: 0.338970 0.479018 Coeff or Slope: 1.008 0.991

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	-1.4	
as found span	4918	82.1	80.0	77.8	1.010
as found 2nd point	4959	41.1	40.0	38.7	0.998
as found 3rd point	4979	20.5	20.0	19.0	0.979
new cylinder response					

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	5000	0.0	0.0	0.1	
high point	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.7	0.984
third point	4979	20.5	20.0	20.8	0.960
as left zero	5000	0.0	0.0	0.2	
as left span	4918	82.1	80.0	79.4	1.007
6026 11 61					

SO2 Scrubber Check

Notes:

Date of last scrubber change	::	December 15, 2020		Ave Corr Factor	0.980
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	79.2	Prev response:	80.75	*% change:	-2.0%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.988429	AF Intercept:	-1.060971
Baseline Corr 3rd AF pt:	20.4	AF Correlation:	0.999916		

Adjusted zero and span.

Calibration Performed By: Mohammed Kashif

* = > +/-5% change initiates investigation



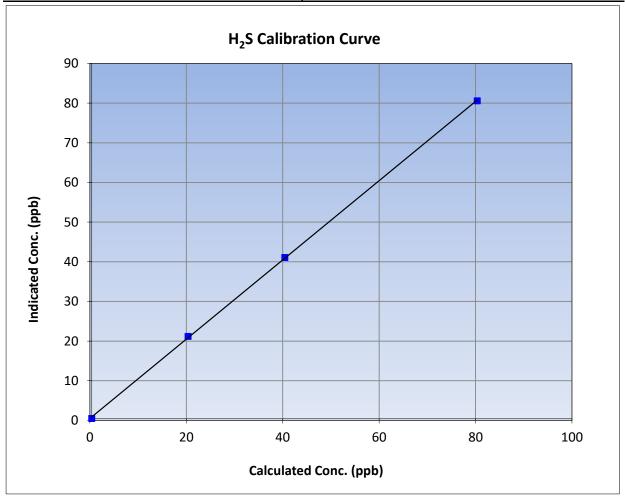
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 8, 2023 **Previous Calibration:** March 2, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:20 End Time (MST): 15:58 Analyzer make: Teledyne API T101 Analyzer serial #: 196

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	0.999897	≥0.995			
80.0	80.2	0.9971	Correlation Coefficient	0.333637	20.995			
40.0	40.7	0.9836	Slope	0.999432	0.90 - 1.10			
20.0	20.8	0.9600	Зюре	0.333432	0.90 - 1.10			
			- Intercept	0.479018	+/-3			

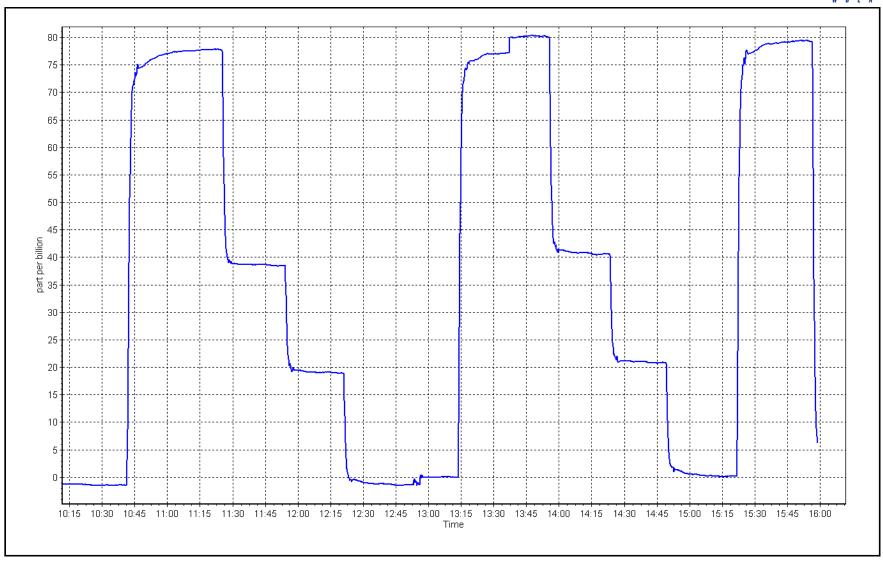


H₂S Calibration Plot

Date: March 8, 2023

Location: MacKay River







THC Calibration Report

AMS20

14:17

February 1, 2023

Station number:

End time (MST):

Removed Gas Expiry: NA

Last Cal Date:

Version-01-2020

Station Information

Station Name: MacKay River

Calibration Date: March 1, 2023

Start time (MST): 10:51
Reason: Routine

Start time (MST): March 1, 20

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. 206.20 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

Finish Finish Start Start Background: Calibration slope: 0.996170 0.993043 3.440 2.870 0.145942 Coefficient: Calibration intercept: 0.044213 5.402 5.253

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	-0.46	
as found span	4919	81.3	17.34	17.22	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.05	
high point	4919	81.3	17.34	17.29	1.003
second point	4959	40.7	8.68	8.89	0.977
third point	4980	20.3	4.33	4.50	0.963
as left zero	5000	0.0	0.00	0.12	
as left span	4919	81.3	17.34	17.12	1.013
			Av	erage Correction Factor	0.981
Baseline Corr As found:	17.68	Previous response	17.32	*% change	2.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes: Sample inlet filter changed after as founds. Adjusted zero only.

Calibration Performed By: Mohammed Kashif

* = > +/-5% change initiates investigation



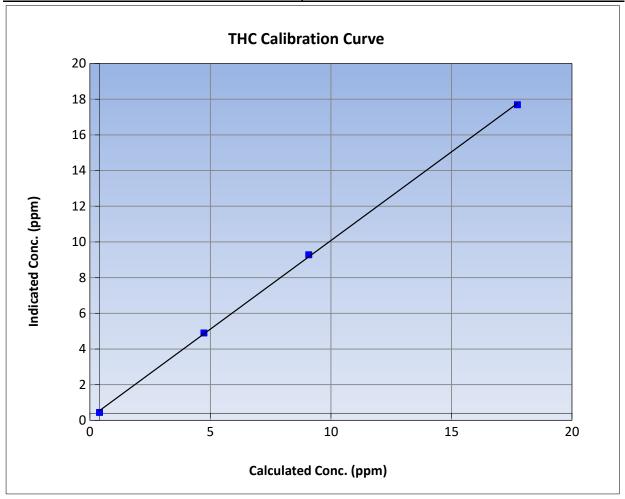
THC Calibration Summary

Version-01-2020

Station Information

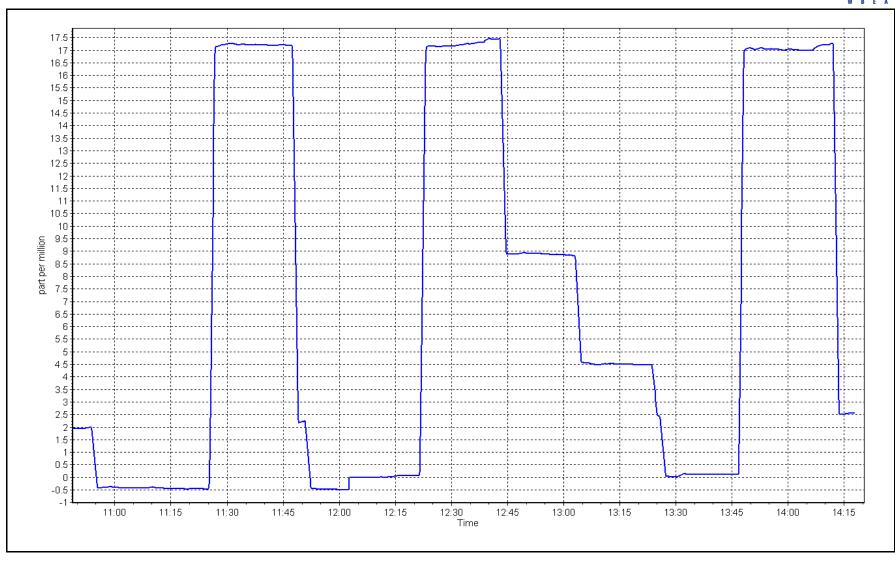
Previous Calibration: Calibration Date: March 1, 2023 February 1, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:51 End Time (MST): 14:17 Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

Calibration Data								
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.05		Correlation Coefficient	0.999803	≥0.995			
17.34	17.29	1.0027	Correlation Coefficient	0.555605	20.333			
8.68	8.89	0.9770	Slope	0.993043	0.90 - 1.10			
4.33	4.50	0.9625	Slope	0.555045	0.30 - 1.10			
			Intercept	0.145942	+/-1.5			



THC Calibration Plot Date: March 1, 2023 Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: MacKay River

Calibration Date: March 9, 2023

Start time (MST): 10:48
Reason: Routine

Station number: AMS20

Last Cal Date: February 2, 2023

End time (MST): 15:41

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>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.364	1.412	NO bkgnd or offset:	3.8	3.9
NOX coeff or slope:	0.990	0.990	NOX bkgnd or offset:	3.8	3.9
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	176.8	182.5

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.993580	1.000735
NO _x Cal Offset:	3.070250	3.529487
NO Cal Slope:	0.997347	1.004217
NO Cal Offset:	1.531522	2.250337
NO ₂ Cal Slope:	0.998061	1.000187
NO ₂ Cal Offset:	-1.818500	-1.449451



NO_X \ NO \ NO₂ 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/lc) 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	83.3	819.5	800.3	19.2	803.5	784.2	19.3	1.0199	1.0205
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	4917	83.3	819.5	800.3	19.2	822.2	805.0	17.3	0.9967	0.9942
second point	4956	41.7	410.4	400.8	9.6	415.0	405.3	9.7	0.9890	0.9890
third point	4979	20.8	204.6	199.9	4.8	212.4	205.6	6.8	0.9635	0.9721
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4917	83.3	819.5	462.2	357.3	813.3	455.6	357.7	1.0076	1.0145
							Average C	orrection Factor	0.9830	0.9851
Corrected As f	ound NO _X =	803.6 ppb	NO =	784.3 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-1.7%
Previous Respo	onse NO _X =	817.3 ppb	NO =	799.7 ppb				*Percent Chang	ge NO =	-2.0%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	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)	795.4	457.3	357.3	356.9	1.0010	99.9%
2nd GPT point (200 ppb O3)	795.4	618.1	196.5	194.1	1.0121	98.8%
3rd GPT point (100 ppb O3)	795.4	703.8	110.8	107.7	1.0284	97.2%
				verage Correction Factor	1.0138	98.6%

Notes:

Adjusted span only.

Calibration Performed By:

Mohammed Kashif



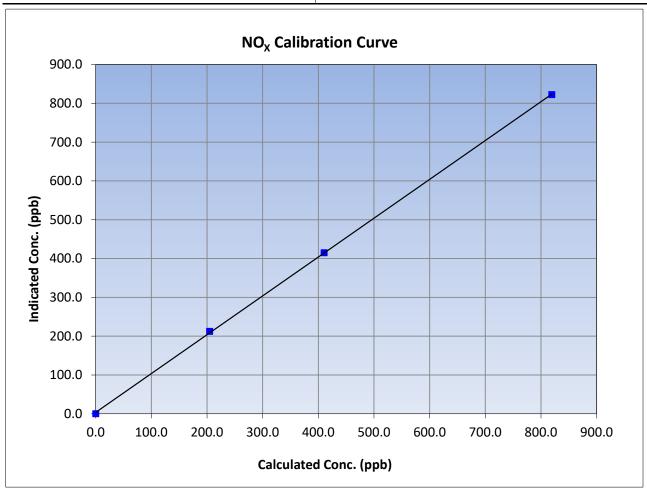
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 9, 2023 Previous Calibration: February 2, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:48 End Time (MST): 15:41 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	0.999916	≥0.995	
819.5	822.2	0.9967	Correlation Coefficient	0.999910	20.993	
410.4	415.0	0.9890	Slope	1.000735	0.90 - 1.10	
204.6	212.4	0.9635	Slope		0.30 - 1.10	
			Intercept	3.529487	+/-20	





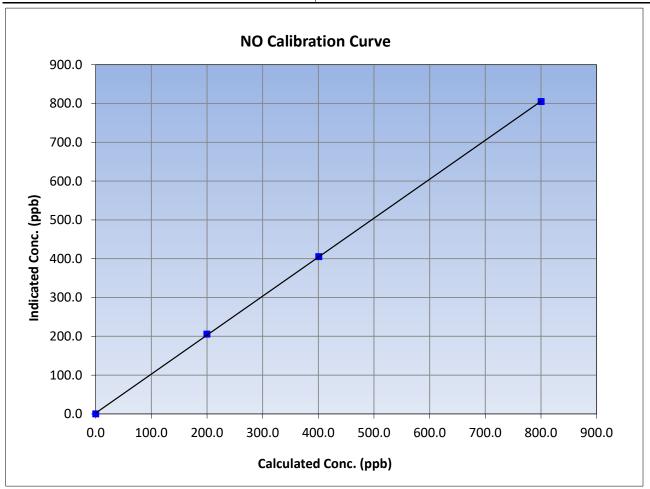
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 9, 2023 Previous Calibration: February 2, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:48 End Time (MST): 15:41 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	0.0		Correlation Coefficient	0.999963	≥0.995	
800.3	805.0	0.9942	Correlation Coefficient	0.555505	20.993	
400.8	405.3	0.9890	Slope	1.004217	0.90 - 1.10	
199.9	205.6	0.9721	Slope	1.004217	0.90 - 1.10	
			Intercept	2.250337	+/-20	





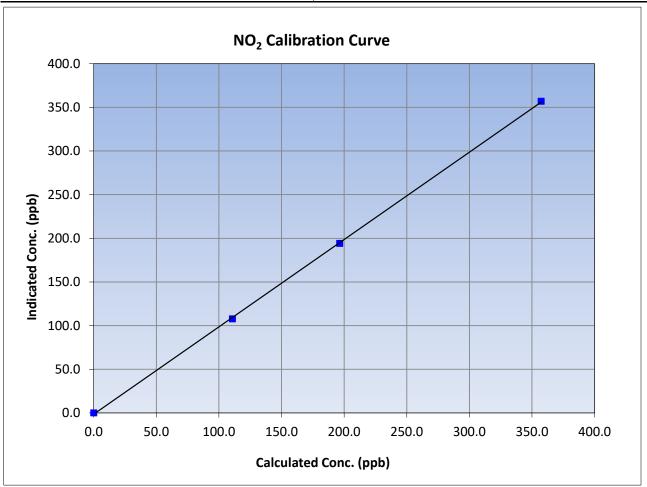
NO₂ Calibration Summary

Version-04-2020

Station Information

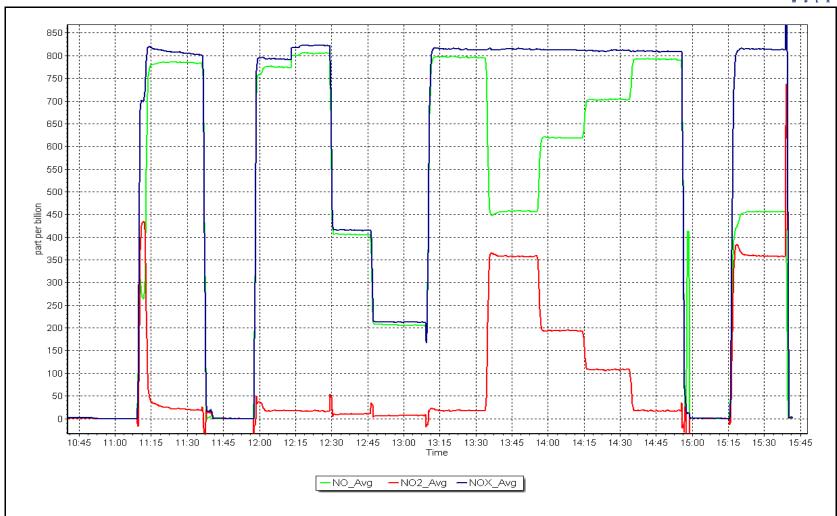
Calibration Date: March 9, 2023 Previous Calibration: February 2, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 10:48 End Time (MST): 15:41 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999897	≥0.995
357.3	356.9	1.0010	Correlation Coefficient	0.555657	20.333
196.5	194.1	1.0121	Slope	1.000187	0.90 - 1.10
110.8	107.7	1.0284	Slope		0.90 - 1.10
			Intercept	-1.449451	+/-20



NO_x Calibration Plot Date: March 9, 2023 Location: MacKay River







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS21 CONKLIN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

End time (MST):

13:00

Version-01-2020

Station Information

Station Name: Conklin Station number: AMS21

Calibration Date: March 3, 2023 Last Cal Date: February 6, 2023

Start time (MST): 10:17
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 #: Diff between cyl:

Calibrator Make/Model: Teledyne API 7700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701 Serial Number: 262

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:0.9998881.005625Backgd or Offset:27.928.6

Calibration intercept: 0.415841 0.356047 Coeff or Slope: 0.914 0.914

SO₂ 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	5005	0.0	0.0	0.3	
as found span	4920	80.2	8.008	800.9	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	-0.1	
high point	4920	80.2	8.008	805.6	0.994
second point	4960	40.1	400.4	402.9	0.994
third point	4980	20.0	200.1	202.3	0.989
as left zero	5005	0.0	0.0	-0.1	
as left span	4920	80.2	8.008	802.5	0.998
			Averag	0.992	
		_	•	•	•

Baseline Corr As found: 800.60 Previous response 801.17 *% 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: Adjusted the zero only.

Calibration Performed By: Denny Ray Estador



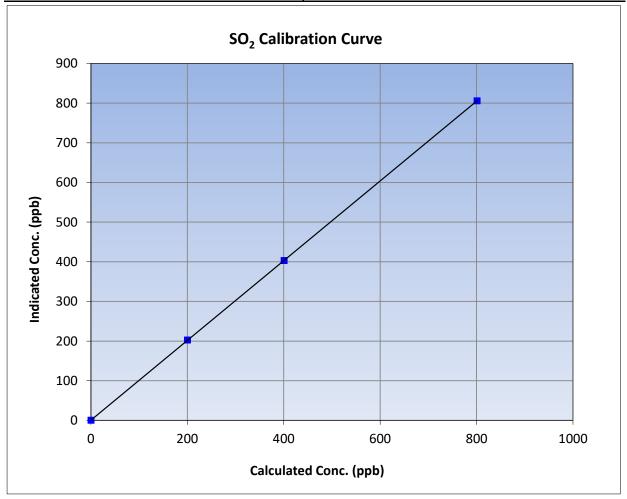
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 3, 2023 **Previous Calibration:** February 6, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:17 End Time (MST): 13:00 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	-0.1		Correlation Coefficient	0.999998	≥0.995	
800.8	805.6	0.9941	Correlation Coefficient	0.555556	20.993	
400.4	402.9	0.9939	Slope	1.005625	0.90 - 1.10	
200.1	202.3	0.9892	Slope	1.003023	0.90 - 1.10	
			- Intercept	0.356047	+/-30	

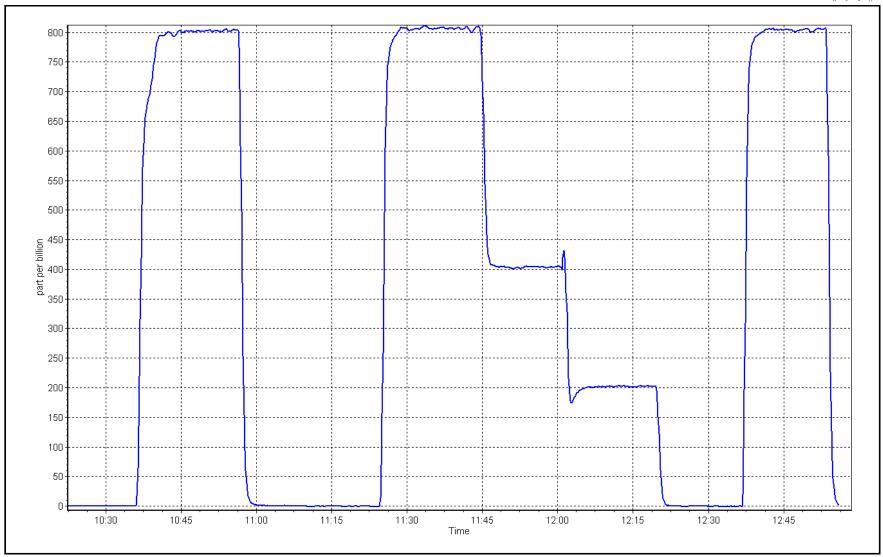


SO2 Calibration Plot

Date: March 3, 2023

Location: Conklin





TRS Calibration Report

Version-11-2021

Station Information

Station Name: Conklin

Calibration Date: March 22, 2023

Start time (MST): 9:27

Routine Reason:

Station number: AMS21

> Last Cal Date: February 8, 2023

Cal Gas Exp Date: April 16, 2022

End time (MST): 13:20

Calibration Standards

Cal Gas Concentration: 5.03 ppm

Cal Gas Cylinder #: CC505493

Removed Cal Gas Conc: 5.03 Removed Gas Cyl #: NA

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

ppm

Rem Gas Exp Date: NA

Diff between cyl:

Analyzer serial #:

Serial Number: 3810 Serial Number: 263

Analyzer Information

Analyzer make: Thermo 43i-TLE

CD-Nova 101 Converter make:

0 - 100 ppb Analyzer Range

Baseline Corr As found:

Start

0.983711 Calibration slope: Calibration intercept: 0.237934 **Finish**

1.019442 0.237078

Backgd or Offset: Coeff or Slope:

Converter serial #: NA

Start 2.8 0.951

1236656116

<u>Finish</u> 2.9 0.991

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	4921	79.5	80.0	77.3	1.029
as found 2nd point	4960	39.8	40.0	39.2	1.011
as found 3rd point	4980	19.9	20.0	19.7	0.996
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	4921	79.5	80.0	81.5	0.981
second point	4960	39.8	40.0	41.5	0.965
third point	4980	19.9	20.0	20.8	0.962
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.5	80.0	81.0	0.987
SO2 Scrubber Check	4920	80.2	802.0	-0.1	
Date of last scrubber ch	ange:			Ave Corr Factor	0.970

Date of last scrubber change:	Ave Corr Factor	0.970
Date of last converter efficiency test:		efficiency

78.90

Prev response: Baseline Corr 2nd AF pt: 39.6 AF Slope: 0.969850 0.999866 Baseline Corr 3rd AF pt: AF Correlation: 20.1

77.7

* = > +/-5% change initiates investigation

*% change:

AF Intercept:

Adjusted the span only. Notes:

Calibration Performed By: Denny Ray Estador -1.5%

-0.001815



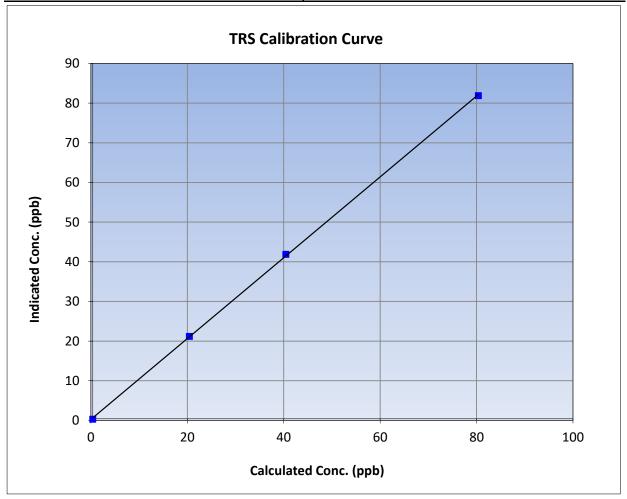
TRS Calibration Summary

Version-11-2021

Station Information

March 22, 2023 **Previous Calibration:** Calibration Date: February 8, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:27 End Time (MST): 13:20 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

	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	0.999889	≥0.995					
80.0	81.5	0.9812	Correlation coefficient	0.555005	20.993					
40.0	41.5	0.9648	Slope	1.019442	0.90 - 1.10					
20.0	20.8	0.9625	Slope	1.019442	0.90 - 1.10					
			- Intercept	0.237078	+/-3					

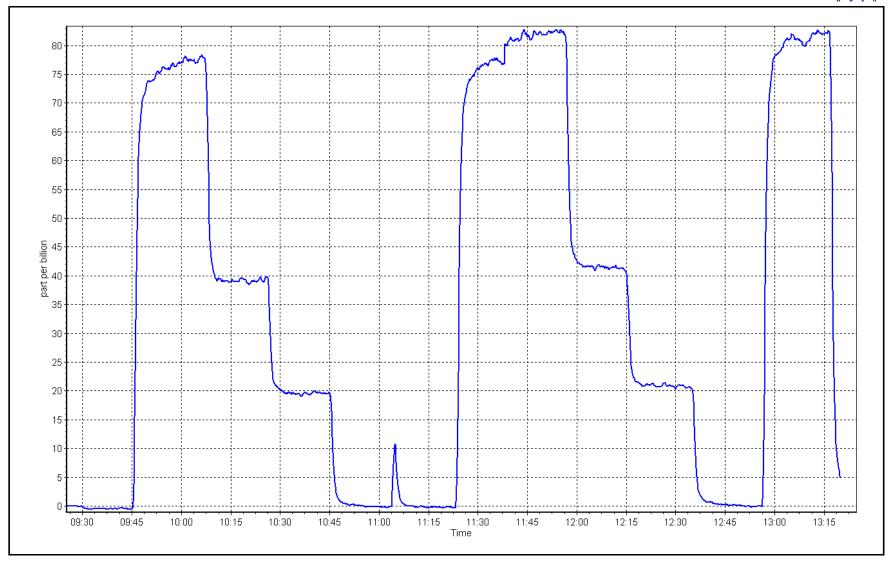




Date: March 22, 2023

Location: Conklin







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Conklin

Calibration Date: March 3, 2023

Start time (MST): 10:17
Reason: Routine

Station number: AMS21

Last Cal Date: February 3, 2023

End time (MST): 13:00

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 (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810
ZAG make/model: Teledyne API 701 Serial Number: 691

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 118148495

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: 1.86E-04 1.86E-04 NMHC SP Ratio: 4.56E-05 4.56E-05 CH4 Retention time: 12.60 12.60 NMHC Peak Area: 200658 200658

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	80.2	17.13	17.22	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	80.2	17.13	17.20	0.996
second point	4960	40.1	8.56	8.64	0.992
third point	4980	20.0	4.27	4.34	0.985
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.10	1.001
			ļ	Average Correction Factor	0.991
Baseline Corr AF:	17.22	Prev response	17.14	*% 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 / CH₄ / 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	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.17	0.997
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	9.17	0.997
second point	4960	40.1	4.57	4.60	0.993
third point	4980	20.0	2.28	2.31	0.985
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.10	1.005
				erage Correction Factor	0.992
Baseline Corr AF:	9.17	Prev response	9.14	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF: NA AF Correlation: *=>+/-5%				* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)		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	8.05	0.992
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
	5000	0.0	0.00	0.00	
high point	5000 4920	0.0 80.2	0.00 7.99	0.00 8.03	0.994
		***	7.99 3.99		
high point second point third point	4920 4960 4980	80.2 40.1 20.0	7.99 3.99 1.99	8.03 4.03 2.03	0.994
high point second point	4920 4960	80.2 40.1 20.0 0.0	7.99 3.99 1.99 0.00	8.03 4.03 2.03 0.00	0.994 0.990
high point second point third point	4920 4960 4980	80.2 40.1 20.0	7.99 3.99 1.99 0.00 7.99	8.03 4.03 2.03 0.00 8.00	0.994 0.990 0.984 0.998
high point second point third point as left zero as left span	4920 4960 4980 5000 4920	80.2 40.1 20.0 0.0 80.2	7.99 3.99 1.99 0.00 7.99	8.03 4.03 2.03 0.00 8.00 erage Correction Factor	0.994 0.990 0.984 0.998 0.989
high point second point third point as left zero as left span Baseline Corr AF:	4920 4960 4980 5000 4920	80.2 40.1 20.0 0.0 80.2	7.99 3.99 1.99 0.00 7.99	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change	0.994 0.990 0.984 0.998
high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 8.05 NA	80.2 40.1 20.0 0.0 80.2 Prev response AF Slope:	7.99 3.99 1.99 0.00 7.99	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change AF Intercept:	0.994 0.990 0.984 0.998 0.989 0.6%
high point second point third point as left zero as left span Baseline Corr AF:	4920 4960 4980 5000 4920	80.2 40.1 20.0 0.0 80.2	7.99 3.99 1.99 0.00 7.99	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change	0.994 0.990 0.984 0.998 0.989 0.6%
high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 8.05 NA	80.2 40.1 20.0 0.0 80.2 Prev response AF Slope:	7.99 3.99 1.99 0.00 7.99 Av 8.00	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change AF Intercept: * = > +/-5% change initiat	0.994 0.990 0.984 0.998 0.989 0.6%
high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 8.05 NA	80.2 40.1 20.0 0.0 80.2 Prev response AF Slope: AF Correlation:	7.99 3.99 1.99 0.00 7.99 Av 8.00	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change AF Intercept:	0.994 0.990 0.984 0.998 0.989 0.6%
high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4920 4960 4980 5000 4920 8.05 NA	80.2 40.1 20.0 0.0 80.2 Prev response AF Slope: AF Correlation: Calibration	7.99 3.99 1.99 0.00 7.99 Av 8.00	8.03 4.03 2.03 0.00 8.00 erage Correction Factor *% change AF Intercept: * = > +/-5% change initiat	0.994 0.990 0.984 0.998 0.989 0.6%

Notes: No adjustments made. Changed N2 cylinder after the as founds.

1.001541

-0.002053

0.996416

0.033041

Calibration Performed By: Denny Ray Estador

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

1.005332

0.011959

1.002247

0.014236



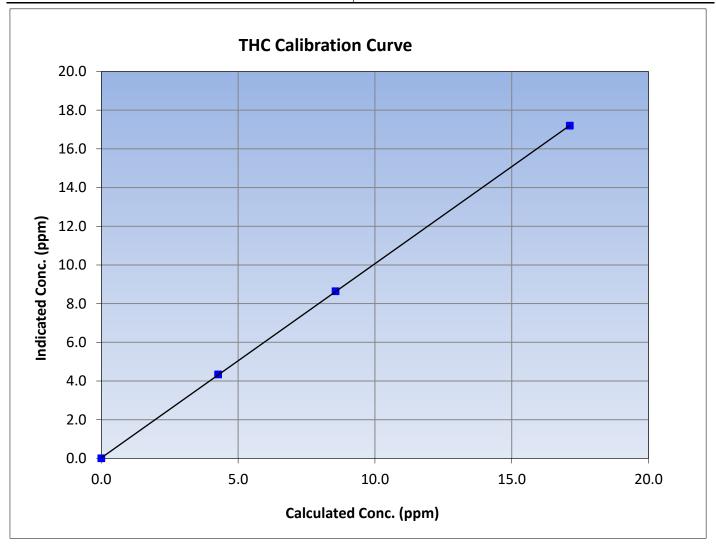
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: March 3, 2023 **Previous Calibration:** February 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:17 End Time (MST): 13:00 Analyzer make: Analyzer serial #: 118148495 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	0.999989	≥0.995
17.13	17.20	0.9957	Correlation Coemicient	0.555565	20.333
8.56	8.64	0.9915	Slope	1.003632	0.90 - 1.10
4.27	4.34	0.9845	Slope	1.003032	0.90 - 1.10
			Intercept	0.026595	+/-0.5





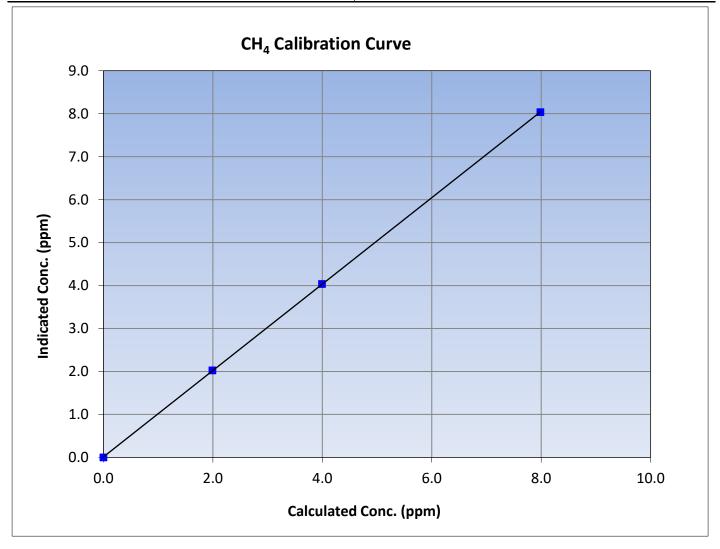
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: March 3, 2023 **Previous Calibration:** February 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:17 End Time (MST): 13:00 Analyzer make: Analyzer serial #: 118148495 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	0.999990	≥0.995
7.99	8.03	0.9940	Correlation Coemicient	0.999990	20.993
3.99	4.03	0.9899	Slope	1.005332	0.90 - 1.10
1.99	2.03	0.9835	Slope	1.005552	0.90 - 1.10
			Intercept	0.011959	+/-0.5





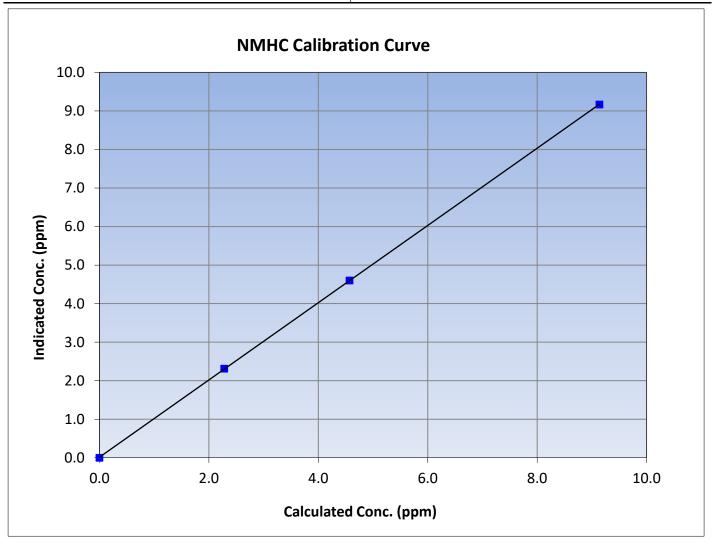
NMHC Calibration Summary

Version-06-2022

Station Information

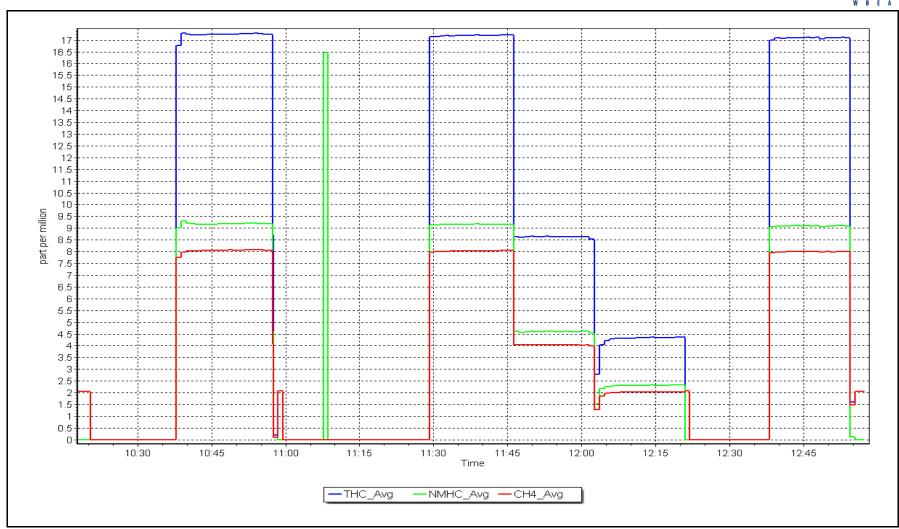
Calibration Date: March 3, 2023 **Previous Calibration:** February 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:17 End Time (MST): 13:00 Analyzer make: Analyzer serial #: 118148495 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999989	≥0.995
9.14	9.17	0.9970	Correlation Coemicient	0.555565	20.333
4.57	4.60	0.9932	Slope	1.002247	0.90 - 1.10
2.28	2.31	0.9854	Slope	1.002247	0.90 - 1.10
			Intercept	0.014236	+/-0.5



NMHC Calibration Plot Date: March 3, 2023 Location: Conklin







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Conklin

Calibration Date: March 17, 2023

Start time (MST): 9:45

Reason: Cylinder Change

Station number: AMS21

Last Cal Date: March 3, 2023

End time (MST): 11:30

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 (CH₄): Diff between cyl (NM):

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701 Serial Number: 691

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 118148495

THC Range (ppm): 0 - 20 ppm

Baseline Corr 3rd AF:

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

Start Finish Start Finish

CH4 SP Ratio: 1.86E-04 1.86E-04 NMHC SP Ratio: 4.56E-05 4.56E-05 CH4 Retention time: 12.60 12.60 NMHC Peak Area: 200658 200658

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	17.78	0.963
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	80.2	17.13	17.69	0.968
			Avera	age Correction Factor	
Baseline Corr AF:	17.78	Prev response	17.21	*% change	3.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

NA

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

NMHC	Cali	brati	on 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	9.57	0.955
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	80.2	9.14	9.49	0.963
			Avera	age Correction Factor	
Baseline Corr AF:	9.57	Prev response	9.17	*% change	4.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es 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	80.2	7.99	8.20	0.974
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	80.2	7.99	8.20	0.974
			Ave	rage Correction Factor	
Baseline Corr AF:	8.20	Prev response	8.04	*% change	2.0%
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:		1.003632			
THC Cal Offset:		0.026595			
CH4 Cal Slope:		1.005332			
CH4 Cal Offset:		0.011959			
NMHC Cal Slope:		1.002247			
NMHC Cal Offset:		0.014236			

Notes: Replaced H2 Cylinder.

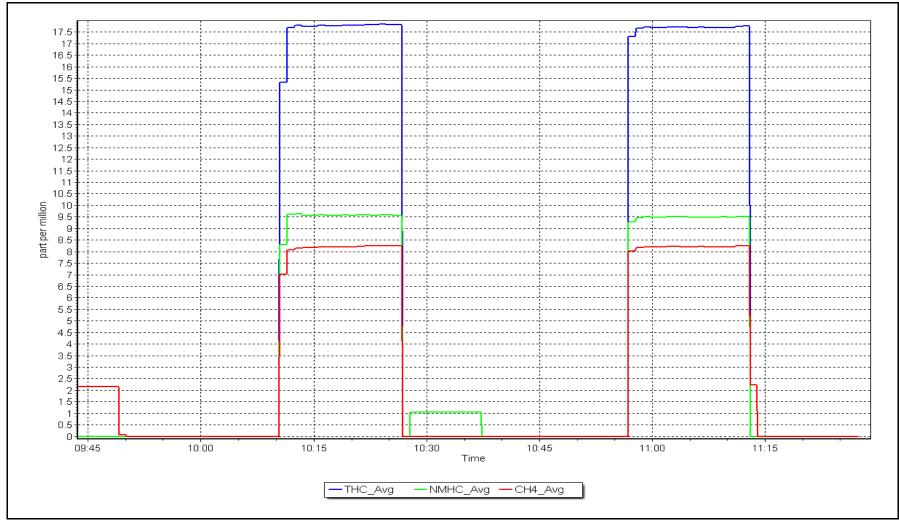
Calibration Performed By: Denny Ray Estador

NMHC Calibration Plot

Date: March 17, 2023

Location: Conklin







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Conklin Station number: AMS21

Calibration Date: March 29, 2023 Last Cal Date: February 24, 2023 Start time (MST): 9:37 End time (MST): 13:35

Start time (MST): 9:37
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T2Y1P1H Cal Gas Expiry Date: December 11, 2023

NOX Cal Gas Conc: 51.09 ppm NO Cal Gas Conc: 50.39 ppm

Removed Cylinder #: n/a Removed Gas Exp Date: n/a

Removed Gas NOX Conc: 51.09 ppm Removed Gas NO Conc: 50.39 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T750 Serial Number: 282 ZAG make/model: Teledyne API T701 Serial Number: 361

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1501663731

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.144 1.144 NO bkgnd or offset: 11.6 11.6 NOX coeff or slope: 1.001 1.001 NOX bkgnd or offset: 11.8 11.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 224.3 220.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004927	1.009334
NO _x Cal Offset:	1.765059	2.026079
NO Cal Slope:	1.004393	1.010890
NO Cal Offset:	0.961963	0.963352
NO ₂ Cal Slope:	1.001583	1.002951
NO ₂ Cal Offset:	-0.384496	-0.706596



NO_X \ NO \ NO₂ 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	-0.2	-0.2	0.0		
as found span	4921	79.4	811.2	800.1	11.1	822.7	809.4	13.3	0.9861	0.9885
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	4921	79.4	811.2	800.1	11.1	819.9	809.4	10.5	0.9894	0.9885
second point	4960	39.7	405.7	400.1	5.6	412.2	405.6	6.6	0.9842	0.9865
third point	4980	19.8	202.3	199.6	2.8	208.6	204.0	4.6	0.9699	0.9782
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4921	79.4	811.2	370.5	440.7	818.3	378.8	439.6	0.9914	0.9782
							Average C	orrection Factor	0.9812	0.9844
Corrected As fo	ound NO _x =	822.9 ppb	NO =	809.6 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _X =	0.7%
Previous Respo	onse NO _X =	817.0 ppb	NO =	804.6 ppb				*Percent Chang	ge NO =	0.6%
Baseline Corr 2	2nd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d NO r^2 :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI: ;	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	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)	805.0	375.4	440.7	441.7	0.9978	100.2%
2nd GPT point (200 ppb O3)	805.0	598.0	218.1	217.6	1.0024	99.8%
3rd GPT point (100 ppb O3)	805.0	701.9	114.2	113.2	1.0090	99.1%
				Average Correction Factor	1.0030	99.7%

Notes:

No adjustments required.

Calibration Performed By:

Denny Ray Estador



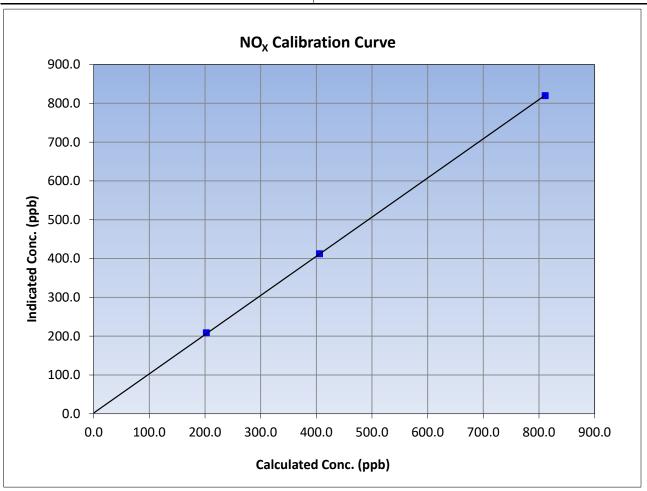
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration: February 24, 2023 Station Name: Station Number: AMS21 Conklin Start Time (MST): 9:37 End Time (MST): 13:35 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999969	≥0.995	
811.2	819.9	0.9894	Correlation Coefficient	0.555505	20.535	
405.7	412.2	0.9842	Slope	1.009334	0.90 - 1.10	
202.3	208.6	0.9699	Slope	1.009554	0.90 - 1.10	
			Intercept	2.026079	+/-20	





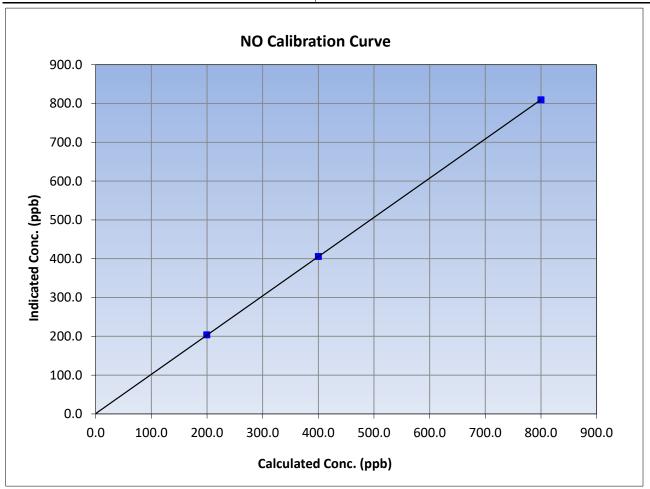
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration: February 24, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:37 End Time (MST): 13:35 Analyzer make: Analyzer serial #: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999992	≥0.995	
800.1	809.4	0.9885	Correlation Coefficient	0.555552	20.333	
400.1	405.6	0.9865	Slope	1.010890	0.90 - 1.10	
199.6	204.0	0.9782	Зюре	1.010690	0.50 - 1.10	
	<u> </u>		Intercept	0.963352	+/-20	





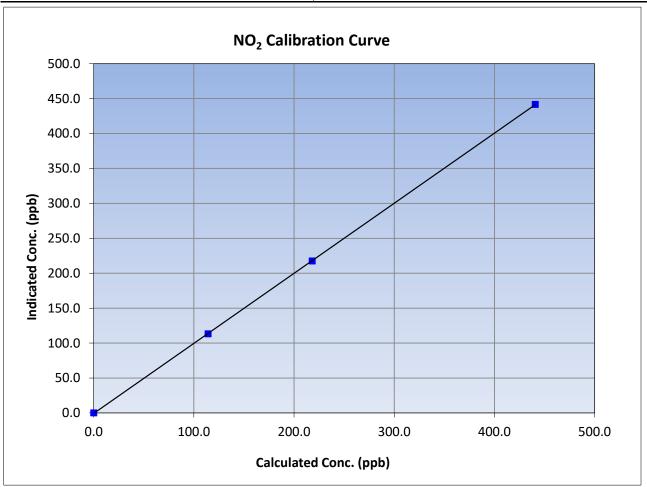
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 Previous Calibration: February 24, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:37 End Time (MST): 13:35 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999988	≥0.995	
440.7	441.7	0.9978	Correlation Coefficient	0.555566	20.993	
218.1	217.6	1.0024	Slope	1.002951	0.90 - 1.10	
114.2	113.2	1.0090	Slope	1.002931	0.90 - 1.10	
			Intercept	-0.706596	+/-20	

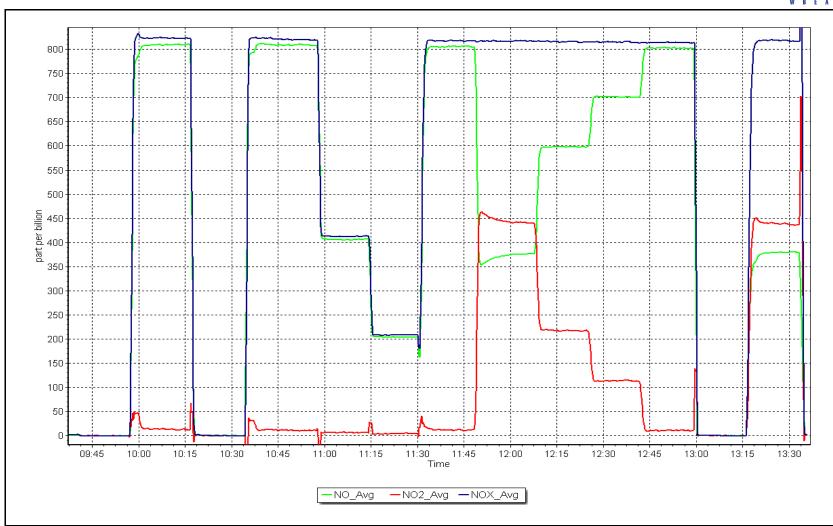


NO_x Calibration Plot

Date: March 29, 2023

Location: Conklin







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Conklin

Calibration Date: March 9, 2023 Last Cal Date: February 3, 2023

Start time (MST): 10:34
Reason: Routine

End time (MST): 13:26

Station number: AMS21

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701 Serial Number: 263

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Analyzer Range 0 - 500 ppb

Baseline Corr 3rd AF pt:

Start Finish Start Finish Backgd or Offset: -0.7 Calibration slope: 1.001543 1.000343 -0.7 0.240000 Coeff or Slope: 1.002 Calibration intercept: 0.380000 1.002

O₃ 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	935.6	400.0	400.0	1.000
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.2	
high point	5000	933.0	400.0	400.0	1.000
second point	5000	799.4	200.0	201.0	0.995
third point	5000	701.9	100.0	100.4	0.996
as left zero	5000	0.0	0.0	-0.3	
as left span	5000	936.0	400.0	403.4	0.992
			Avera	ge Correction Factor	0.997
Baseline Corr As found: Baseline Corr 2nd AF pt:	400.5 NA	Previous respons AF Slope		*% change AF Intercept:	-0.1%

* = > +/-5% change initiates investigation

AF Correlation:

Notes: No adjustments made.

Calibration Performed By: Denny Ray Estador

NA



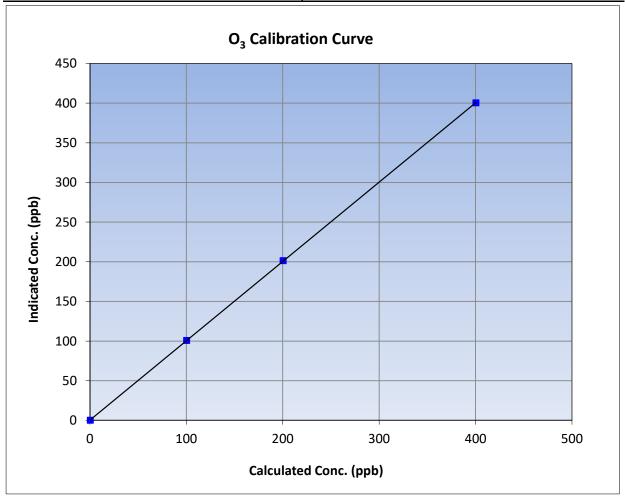
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:34 End Time (MST): 13:26 Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	-0.2		Correlation Coefficient	0.999991	≥0.995				
400.0	400.0	1.0000	Correlation Coefficient	0.999991	20.995				
200.0	201.0	0.9950	Slope	1.000343	0.90 - 1.10				
100.0	100.4	0.9960	Зюре	1.000343	0.90 - 1.10				
			- Intercept	0.240000	+/- 5				

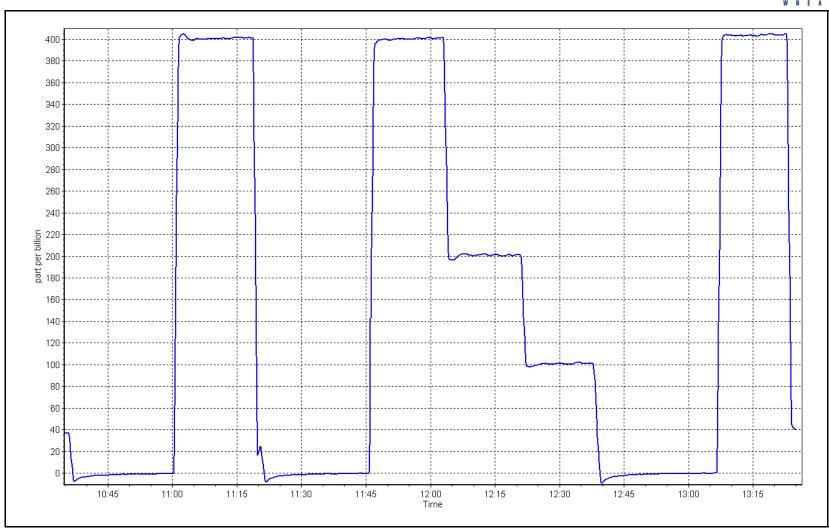


O₃ Calibration Plot

Date: March 9, 2023

Location: Conklin







Calibration by:

Denny Ray Estador

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	l				
Station Name:	Conklin	Station number: AMS 21					
Calibration Date:	March 29, 2023		Last Cal Date:	, ,	2023		
Start time (MST):	10:02		End time (MST):	11:10			
Analyzer Make:	API T640		S/N:	1547			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	DeltaCal		S/N:	QE /			
Temp/RH standard:	DeltaCal		S/N:				
Temp, Kir Standard.	Deitacai	Monthly Calibration Te		334			
Darameter	As found				Adjusted	(Limite)	
<u>Parameter</u> T (°C)	<u>As found</u> -0.2	<u>Measured</u> -0.4	As left		<u>Adjusted</u>	(Limits) +/- 2 °C	
	-	-	-0.2			•	
P (mmHg)	710.8	707.4	710.8			+/- 10 mmHg	
flow (LPM)	5	5.06	5			+/- 0.25 LPM	
Leak Test:	Date of check:	March 29, 2023	Last Cal Date:	February			
Note: this leak check will be	PM w/o HEPA:	3.6	PM w/ HEPA:	intonanco lo		<0.2 ug/m3	
Inlet cleaning:	Inlet Head		erve as the pre mai	interiance ie	ak CHECK		
illet cleatiling.	illet Head						
		Quarterly Calibration T	est				
<u>Parameter</u>	As found	Quarterly Calibration T Post maintenance	est As left		Adjusted	(Limits)	
<u>Parameter</u> PMT Peak Test	<u>As found</u> 11.1				Adjusted 🗸	(Limits) 10.9 +/- 0.5	
PMT Peak Test	11.1	Post maintenance 11.9	As left 11			10.9 +/- 0.5	
PMT Peak Test Post-maintenance	11.1 leak check:	Post maintenance 11.9 PM w/o HEPA:	As left 11 3.3	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml	11.1 leak check: ber Cleaned:	Post maintenance 11.9 PM w/o HEPA: March 29,	As left 11 3.3 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance	11.1 leak check: ber Cleaned:	Post maintenance 11.9 PM w/o HEPA:	As left 11 3.3 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml	11.1 leak check: ber Cleaned:	Post maintenance 11.9 PM w/o HEPA: March 29,	As left 11 3.3 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml	11.1 leak check: ber Cleaned:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	w/ HEPA: _		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml	11.1 leak check: ber Cleaned:	Post maintenance 11.9 PM w/o HEPA: March 29,	As left 11 3.3 2023 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter	11.1 leak check: ber Cleaned: Changed:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	11.1 leak check: ber Cleaned: Changed:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter	11.1 leak check: ber Cleaned: Changed:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	11.1 leak check: ber Cleaned: Changed:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	w/ HEPA:		10.9 +/- 0.5	
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	11.1 leak check: ber Cleaned: Changed:	Post maintenance 11.9 PM w/o HEPA: March 29, March 29,	As left 11 3.3 2023 2023	,		10.9 +/- 0.5	



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS22 JANVIER MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

Calibration Date: March 15, 2023

Start time (MST): 10:37 Reason: Routine Station number: AMS 22

Last Cal Date: February 22, 2023

End time (MST): 14:05

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

ppm 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

Analyzer Range 0 - 1000 ppb

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

Calibration slope: 1.000663 0.998449 Backgd or Offset: Calibration intercept: 0.364554 0.464715 Coeff or Slope:

<u>Start</u> 21.4

1.031

Finish 21.5 1.022

SO₂ 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 iouilu zero	5000	0.0	0.0	0.1	
as found span	4920	79.8	799.8	803.6	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	79.8	799.8	798.6	1.001
second point	4960	39.9	399.9	400.6	0.998
third point	4980	20.0	200.4	200.5	1.000
as left zero	5000	0.0	0.0	0.4	
as left span	4920	79.8	799.8	800.8	0.999
			Averag	ge Correction Factor	1.000

Baseline Corr As found: 803.50 Previous response 800.68 *% change 0.4% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Inlet filter changed after as founds. Adjusted span only.

Calibration Performed By: Rene Chamberland



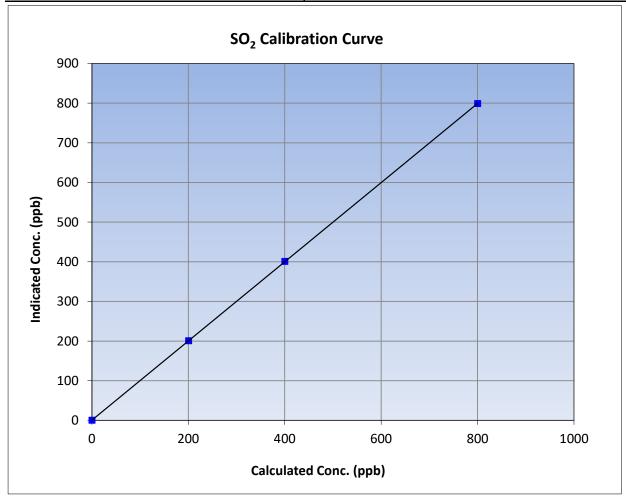
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 15, 2023 **Previous Calibration:** February 22, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:37 End Time (MST): 14:05 Analyzer make: Thermo 43i Analyzer serial #: 1152430006

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	0.999997	≥0.995				
799.8	798.6	1.0015	Correlation Coefficient	0.555557	20.333				
399.9	400.6	0.9982	0.9982 Slane 0.00	0.998449	0.90 - 1.10				
200.4	200.5	0.9997	- Slope	0.556445	0.90 - 1.10				
			- Intercept	0.464715	+/-30				



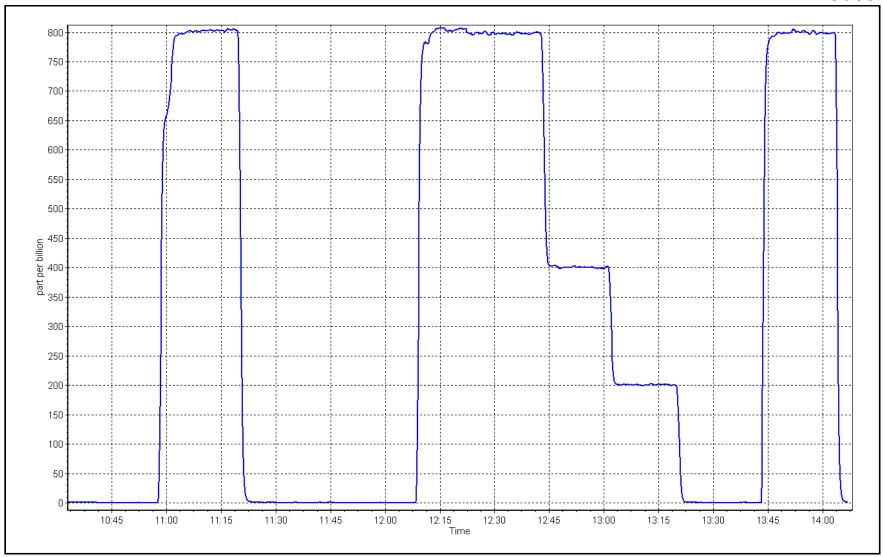
SO2 Calibration Plot

Date:

March 15, 2023

Location: Janvier







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Janvier

Calibration Date: March 29, 2023

Start time (MST): 10:46 Reason: Routine Station number: AMS22

> Last Cal Date: February 24, 2023

End time (MST): 15:08

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: April 16, 2022 5.03 ppm

Cal Gas Cylinder #: DT0018680

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.03 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 3806 Serial Number: 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

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> Backgd or Offset: 3.50 Calibration slope: 1.002650 0.999222 3.56 0.140953 Calibration intercept: 0.120931 Coeff or Slope: 1.239 1.220

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	79.5	80.0	80.2	0.999
as found 2nd point	4960	39.8	40.0	40.8	0.984
as found 3rd point	4980	19.9	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	0.1	
high point	4920	79.5	80.0	80.0	1.000
second point	4960	39.8	40.0	40.3	0.994
third point	4980	19.9	20.0	20.1	0.996
as left zero	5000	0.0	0.0	0.2	
as left span	4920	79.5	80.0	79.9	1.001
SO2 Scrubber Check	4920	79.8	798.0	0.1	
Date of last scrubber ch	ange:			Ave Corr Factor	0.996
Date of last converter e	fficiency test:	•	•	efficiency	

	Date of last serabber chang	С.			AVC COIT TUCTOT	0.550	
Date of last converter efficiency test:						efficiency	
	Baseline Corr As found:	80.1	Prev response:	80.32	*% change:	-0.3%	

Baseline Corr 2nd AF pt: 40.7 AF Slope: 1.000369 Baseline Corr 3rd AF pt: 0.999919 20.5 AF Correlation:

* = > +/-5% change initiates investigation

0.400787

AF Intercept:

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

Calibration Performed By: Rene Chamberland



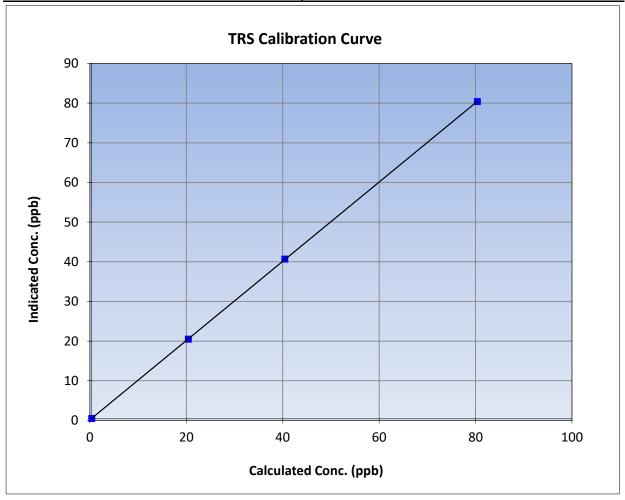
TRS Calibration Summary

Version-11-2021

Station Information

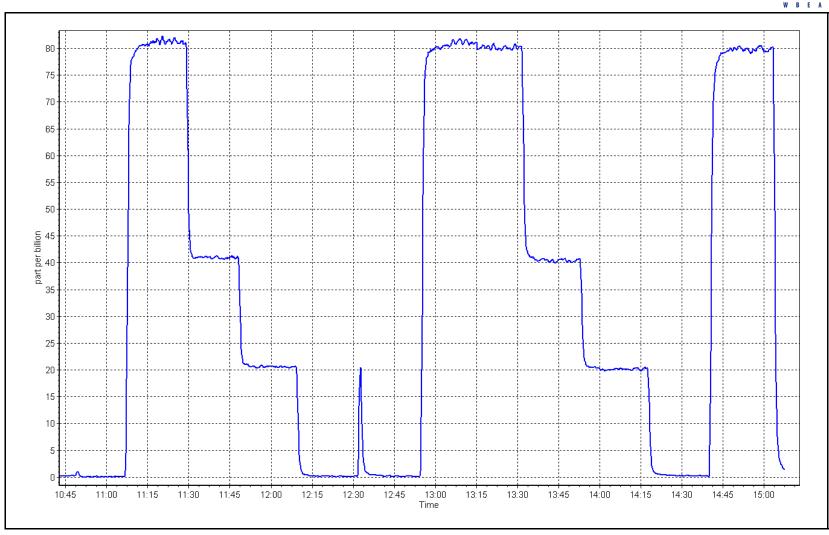
Calibration Date: March 29, 2023 **Previous Calibration:** February 24, 2023 Station Name: Station Number: AMS22 Janvier Start Time (MST): 10:46 End Time (MST): 15:08 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

	Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.1		Correlation Coefficient	0.999991	≥0.995			
80.0	80.0	0.9998	Correlation Coefficient	0.555551	20.993			
40.0	40.3	0.9936	Slope	0.999222	0.90 - 1.10			
20.0	20.1	0.9960	Slope	0.333222	0.90 - 1.10			
			- Intercept	0.140953	+/-3			



Date: March 29, 2023 Location: Janvier







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

Calibration Date: March 15, 2023

Start time (MST): 10:37 Reason: Routine Station number: AMS 22

Last Cal Date: February 22, 2023

End time (MST): 14:05

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: N/A Removed Gas Expiry: N/A

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 (CH₄): 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 #: 1172750023

THC Range (ppm): 0 - 20 ppm

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

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

CH4 SP Ratio: 2.180E-04 2.150E-04 NMHC SP Ratio: 4.50E-05 4.51E-05 CH4 Retention time: 13.20 NMHC Peak Area: 203120 202703

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	0.00			
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	5000	0.0	0.00	0.00			
high point	4920	79.8	17.17	17.16	1.001		
second point	4960	39.9	8.59	8.55	1.005		
third point	4980	20.0	4.30	4.25	1.013		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	79.8	17.17	17.25	0.996		
			A	verage Correction Factor	1.006		
Baseline Corr AF:	17.43	Prev response	17.21	*% change	1.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation				



THC / CH₄ / NMHC Calibration Report

Version-01-2020

Set Point	Dil air flow rate	NMHC Calibr 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	0.00	0.00		
as found span	4920	79.8	9.15	9.40	0.974	
as found 2nd point	.525	, , , ,	5.25	51.10	0.07.	
as found 3rd point						
new cylinder response						
calibrator zero	5000	0	0.00	0.00		
high point	4920	79.8	9.15	9.10	1.005	
second point	4960	39.9	4.57	4.55	1.006	
third point	4980	20.0	2.29	2.26	1.013	
as left zero	5000	0	0.00	0.00		
as left span	4920	79.8	9.15	9.16	0.999	
·			Ave	rage Correction Factor	1.008	
Baseline Corr AF:	9.40	Prev response	9.17	*% change	2.4%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation: * = > +/-5% chang			nge initiates 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= 0.95-1.0</i>	
as found zero as found span	4920	79.8	8.03	8.04	0.999	
as found 2nd point	4920	79.0	6.03	0.04	0.999	
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	79.8	8.03	8.06	0.996	
second point	4960	39.9	4.01	4.00	1.003	
third point	4980	20.0	2.01	1.99	1.013	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	79.8	8.03	8.09	0.992	
P -	<u> </u>			rage Correction Factor	1.004	
Baseline Corr AF:	8.04	Prev response	8.05	*% change	-0.1%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
·		Calibration	Statistics			
				Finish		
		SLUIT				
THC Cal Slone:		<u>Start</u> 1 003856				
THC Cal Slope:		1.003856		1.000168		
THC Cal Slope: THC Cal Offset: CH4 Cal Slope:						

Notes: Changed the inlet filter and H2/N2 cylinders after as founds. Adjusted span only.

-0.017766

1.003078

-0.009039

Calibration Performed By: Rene Chamberland

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

-0.018965

0.995905

-0.008823



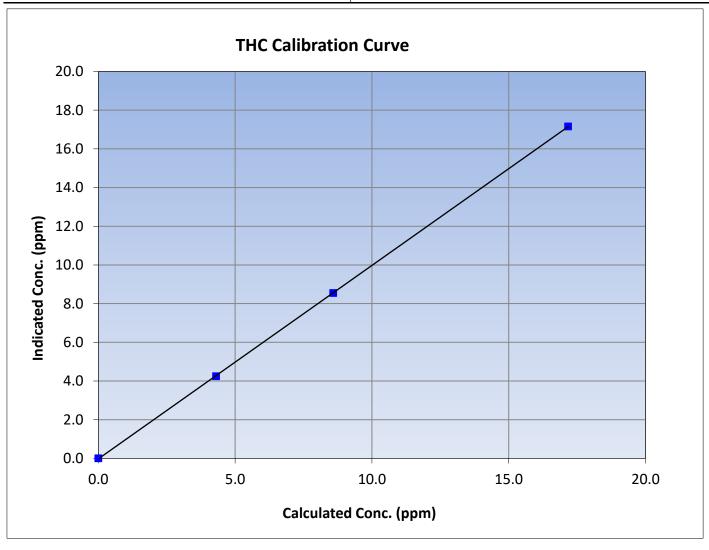
THC Calibration Summary

Version-01-2020

Station Information

March 15, 2023 Calibration Date: **Previous Calibration:** February 22, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:37 End Time (MST): 14:05 Analyzer make: Analyzer serial #: 1172750023 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	17.16	1.0006	Correlation Coemicient	0.333366	20.333
8.59	8.55	1.0045	Slope	1.000168	0.90 - 1.10
4.30	4.25	1.0129	Slope	1.000108	0.90 - 1.10
			Intercept	-0.027388	+/-0.5





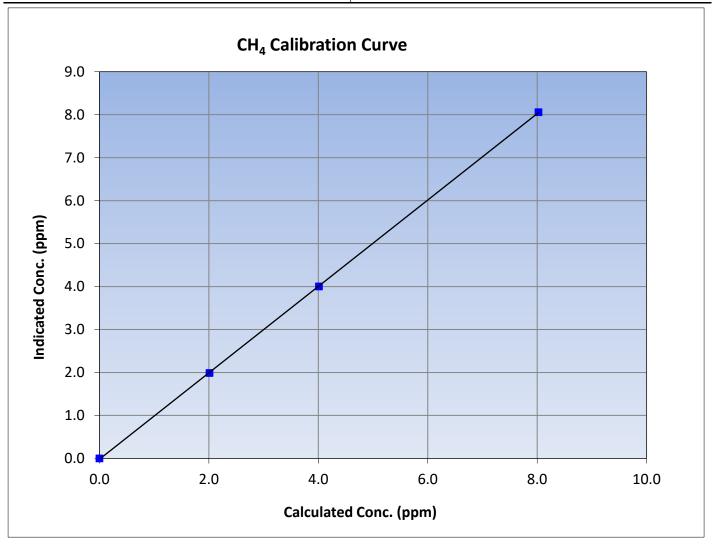
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 15, 2023 **Previous Calibration:** February 22, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:37 End Time (MST): 14:05 Analyzer make: Analyzer serial #: 1172750023 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999974	≥0.995
8.03	8.06	0.9958	Correlation Coemicient	0.555574	20.333
4.01	4.00	1.0026	Slope	1.005284	0.90 - 1.10
2.01	1.99	1.0127	Slope	1.003284	0.90 - 1.10
		·	Intercept	-0.018965	+/-0.5





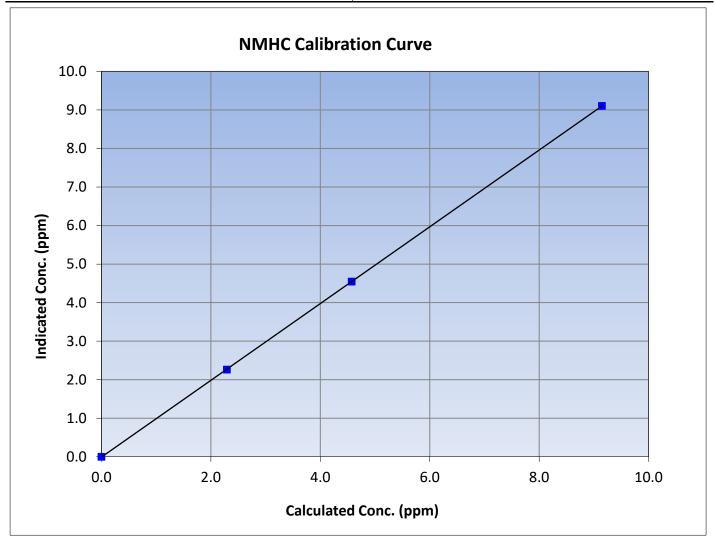
NMHC Calibration Summary

Version-01-2020

Station Information

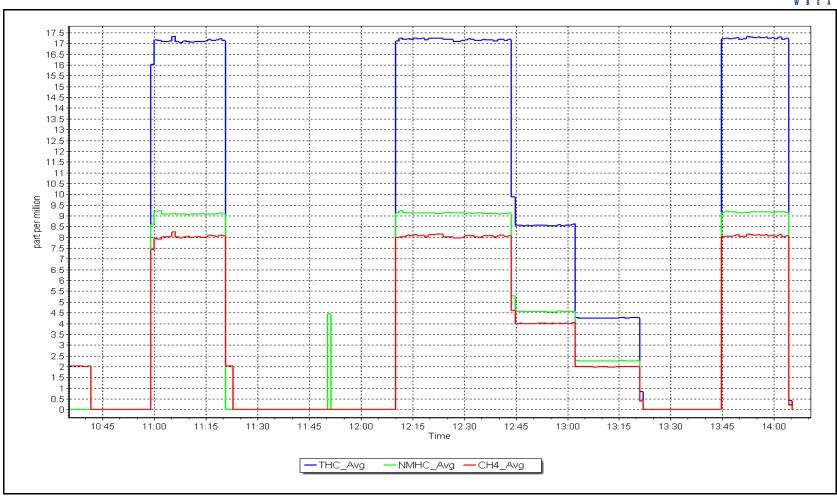
Calibration Date: March 15, 2023 **Previous Calibration:** February 22, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 10:37 End Time (MST): 14:05 Analyzer make: Analyzer serial #: 1172750023 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.15	9.10	1.0047	Correlation Coemicient	0.999995	20.993
4.57	4.55	1.0063	Slope	0.995905	0.90 - 1.10
2.29	2.26	1.0130	Зюре	0.993903	0.30 - 1.10
			Intercept	-0.008823	+/-0.5



NMHC Calibration Plot Date: March 15, 2023 Location: Janvier







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Janvier Station number: AMS 22

Calibration Date: March 9, 2023 Last Cal Date: February 23, 2023 Start time (MST): 12:20 End time (MST): 17:03

Start time (MST): 12:20 Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC424183 Cal Gas Expiry Date: April 16, 2023

NOX Cal Gas Conc: 48.60 ppm NO Cal Gas Conc: 48.60 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 48.60 ppm Removed Gas NO Conc: 48.60 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3806 ZAG make/model: Teledyne API T701 Serial Number: 4890

Analyzer Information

Analyzer make: Teledyne API T200 Analyzer serial #: 7117

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.019	1.019	NO bkgnd or offset:	-0.3	-0.3
NOX coeff or slope:	1.009	1.009	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.1	5.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000016	1.001316
NO _x Cal Offset:	0.328470	0.648371
NO Cal Slope:	0.999486	1.001644
NO Cal Offset:	-0.011076	0.008462
NO ₂ Cal Slope:	0.999574	1.000730
NO ₂ Cal Offset:	0.324675	0.876715



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution 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 = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as found span	4918	82.3	799.9	799.9	0.0	798.3	796.4	1.9	1.0020	1.0044
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
high point	4918	82.3	799.9	799.9	0.0	801.4	801.2	0.2	0.9981	0.9984
second point	4959	41.2	400.4	400.4	0.0	401.6	401.4	0.2	0.9971	0.9976
third point	4980	20.6	200.2	200.2	0.0	202.0	200.1	1.9	0.9911	1.0005
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2		
as left span	4918	82.3	799.9	408.7	391.2	800.6	417.0	383.6	0.9991	0.9801
							Average C	Correction Factor	0.9955	0.9989
Corrected As fo	ound NO _X =	798.3 ppb	NO =	796.4 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	-0.2%
Previous Respo	onse NO _X =	800.2 ppb	NO =	799.5 ppb				*Percent Chang	ge NO =	-0.4%
Baseline Corr 2	2nd pt NO _x =	NA ppb	NO =	NA ppb	As found	$1 NO_x r^2$:		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	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration I	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 tration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency on 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)	800.5		409.3	391.2		391.9	0.9982	2	100.2%

Notes:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

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

193.3

94.9

Average Correction Factor

0.9928

0.9779

0.9896

191.9

92.8

Calibration Performed By:

800.5

800.5

Rene Chamberland

608.6

707.7

100.7%

102.3%

101.1%



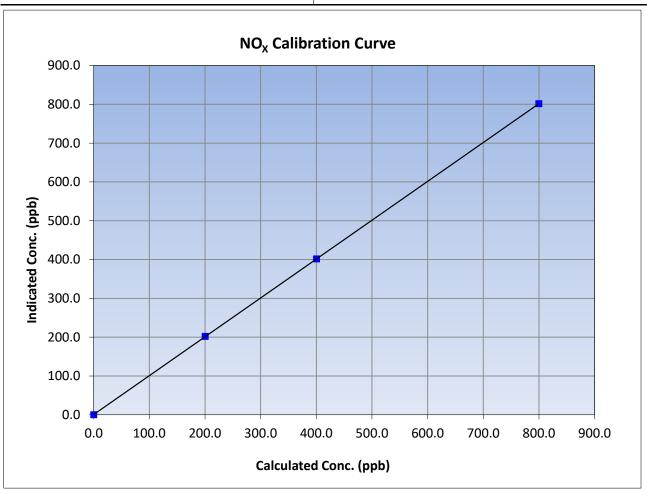
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 9, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 12:20 End Time (MST): 17:03 Analyzer make: Teledyne API T200 Analyzer serial #: 7117

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
799.9	801.4	0.9981	Correlation Coefficient	0.555550	20.993
400.4	401.6	0.9971	Slope	1.001316	0.90 - 1.10
200.2	202.0	0.9911	Slope	1.001510	0.90 - 1.10
			Intercept	0.648371	+/-20





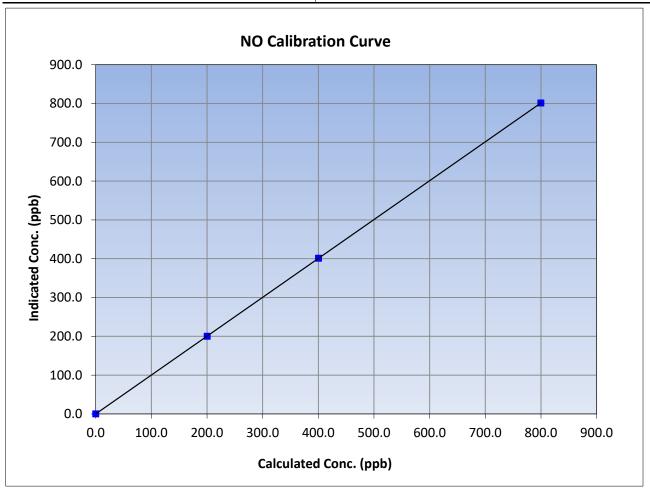
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 9, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 12:20 End Time (MST): 17:03 Analyzer make: Teledyne API T200 Analyzer serial #: 7117

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999999	≥0.995
799.9	801.2	0.9984	Correlation Coefficient	0.555555	20.333
400.4	401.4	0.9976	Slope	1.001644	0.90 - 1.10
200.2	200.1	1.0005	Slope	1.001044	0.90 - 1.10
			Intercept	0.008462	+/-20





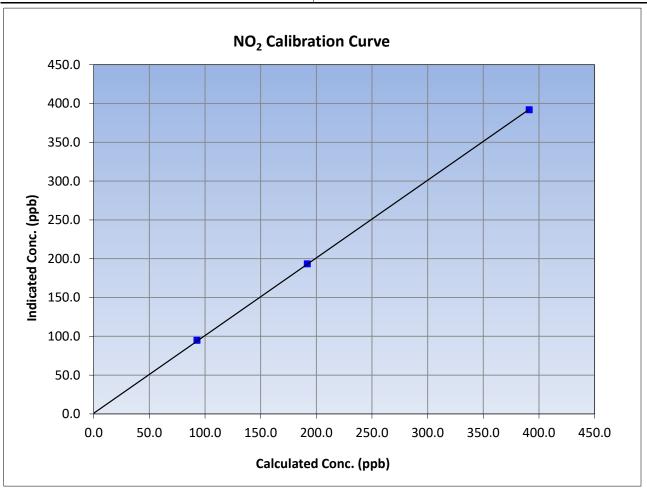
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 9, 2023 Previous Calibration: February 23, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 12:20 End Time (MST): 17:03 Analyzer serial #: Analyzer make: Teledyne API T200 7117

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999966	≥0.995
391.2	391.9	0.9982	Correlation Coefficient	0.555500	20.333
191.9	193.3	0.9928	Slope	1.000730	0.90 - 1.10
92.8	94.9	0.9779	Slope	1.000730	0.90 - 1.10
			Intercept	0.876715	+/-20

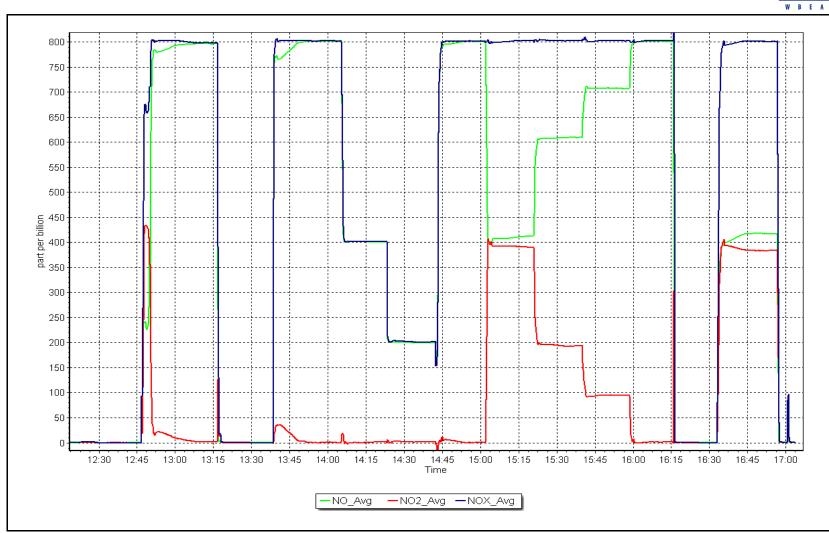


NO_x Calibration Plot

Date: March 9, 2023

Location: Janvier







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

Calibration Date: March 28, 2023

Start time (MST): 10:33 Reason: Routine Station number: AMS 22

Last Cal Date: February 14, 2023

End time (MST): 13:26

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 201

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3869

Start Finish

1.000057 1.000429

Start Backgd or Offset: -2.0

Finish

Calibration slope: 0.000000 Calibration intercept: 0.440000

Coeff or Slope:

1.011

-2.0 1.011

O₃ 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)	<i>Limit = 0.95-1.05</i>
as found zero	5000	800.0	0.0	-0.1	
as found span	4893	899.1	400.0	399.3	1.002
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.2	
high point	4893	899.1	400.0	400.3	0.999
second point	4893	753.4	200.0	199.9	1.001
third point	4893	655.7	100.0	99.9	1.001
as left zero	5000	800.0	0.0	0.1	
as left span	4816	899.1	400.0	401.0	0.998
·			Averag	ge Correction Factor	1.000

Baseline Corr As found: -0.3% 399.4 Previous response 400.5 *% change AF Intercept:

Baseline Corr 2nd AF pt: NA AF Slope: Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



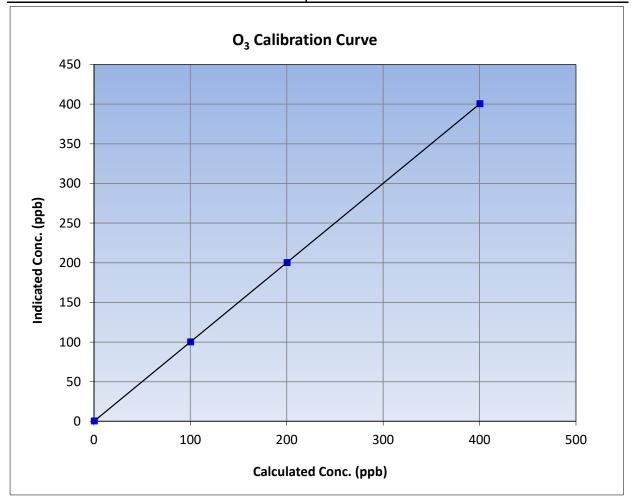
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 28, 2023 **Previous Calibration:** February 14, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 10:33 End Time (MST): 13:26 Analyzer make: Teledyne API T400 Analyzer serial #: 3869

Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	0.2		Correlation Coefficient	0.999999	≥0.995			
400.0	400.3	0.9993	- Correlation Coefficient	0.999999	20.995			
200.0	199.9	1.0005	Slope	1.000429	0.90 - 1.10			
100.0	99.9	1.0010	Slope	1.000429	0.90 - 1.10			
			- Intercept	0.000000	+/- 5			

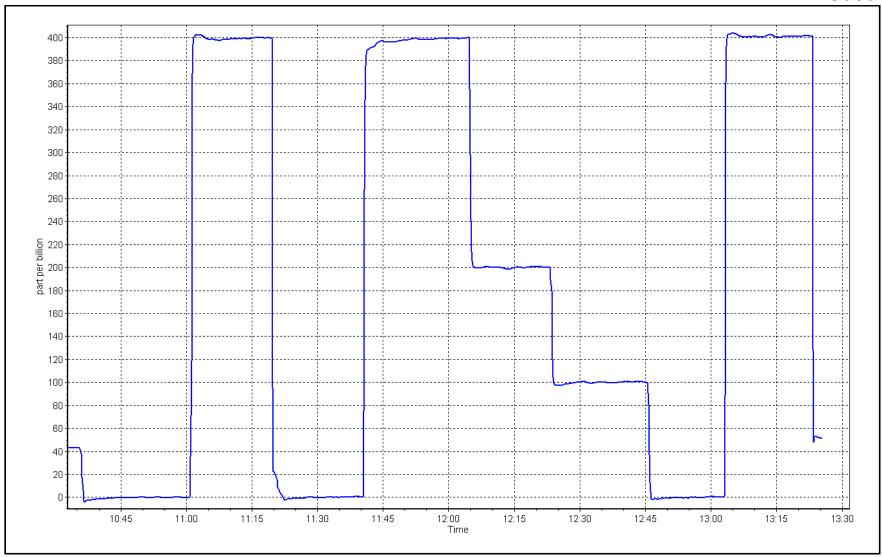


O₃ Calibration Plot

Date: March 28, 2023

Location: Janvier







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Janvier		Station number:	AMS 22		
Calibration Date:	March 29, 2023		Last Cal Date:	•	4, 2023	
Start time (MST):	12:11		End time (MST):	13:33		
Analyzer Make:	Teledyne API T640		S/N:	325		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N:	1450		
Temp/RH standard:	Delta Cal		S/N:	1450		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	0.6	0	0.6			+/- 2 °C
P (mmHg)	716.4	714.9	716.4			+/- 10 mmHg
flow (LPM)	5.01	4.88	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	March 29, 2023	Last Cal Date:	February	24, 2023	
	PM w/o HEPA:	3	PM w/ HEPA:	C		<0.2 ug/m3
Note: this leak check will be		_	erve as the pre mai	ntenance le	eak check	
Inlet cleaning:	Inlet Head					
		Quarterly Calibration T	est			
Parameter	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenance		PM w/o HEPA:	2022	w/ HEPA:		
Date Optical Cham Disposable Filter	-	January 26, January 26,				<0.2 ug/m3
Bisposable i inter	- Indiaged.	Junuary 20,				
		Annual Maintenance	2			
Date Sample Tub	e Cleaned:	October 6,	2022			
Date RH/T Senso	or Cleaned:	October 6,	2022			
Notes:		Verified flow, temperate	ure, and pressure. Leak	test passed.		
Calibration by:	Rene Chamberland					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS23 FORT HILLS MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

AMS23

14:55

Start

Version-01-2020

Finish

Station Information

Fort Hills Station Name: Station number:

March 2, 2023 February 1, 2023 Calibration Date: Last Cal Date:

ppm

Start time (MST): 11:31

Routine Reason:

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

End time (MST):

Rem Gas Exp Date: N/A

Diff between cyl: Serial Number:

451 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290012

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.995960 Backgd or Offset: 18.5 0.997162 18.1 Calibration intercept: -0.103174 -0.582785 Coeff or Slope: 1.048 1.053

SO₂ 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	-0.1	
as found span	4920	80.3	799.1	791.0	1.010
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	795.5	1.005
second point	4960	40.2	400.1	398.0	1.005
third point	4980	20.1	200.0	197.5	1.013
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.3	799.1	799.2	1.000
·			Averag	ge Correction Factor	1.008
Baseline Corr As found:	791.10	Previous response	796.73	*% change	-0.7%

Previous response % change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA Baseline Corr 3rd AF pt: AF Correlation:

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

Calibration Performed By: Max Farrell * = > +/-5% change initiates investigation



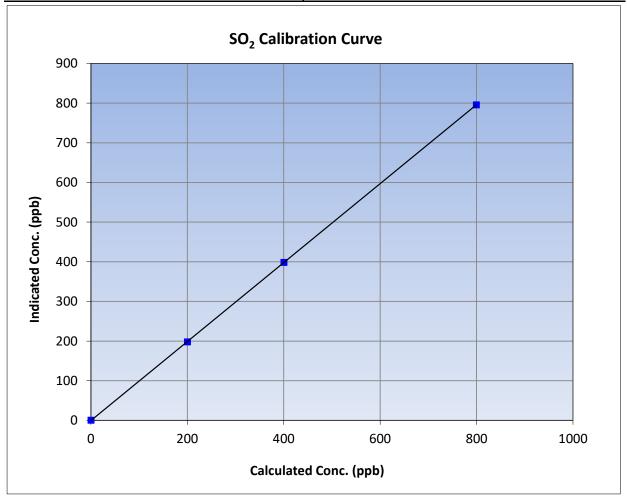
SO₂ Calibration Summary

Version-01-2020

Station Information

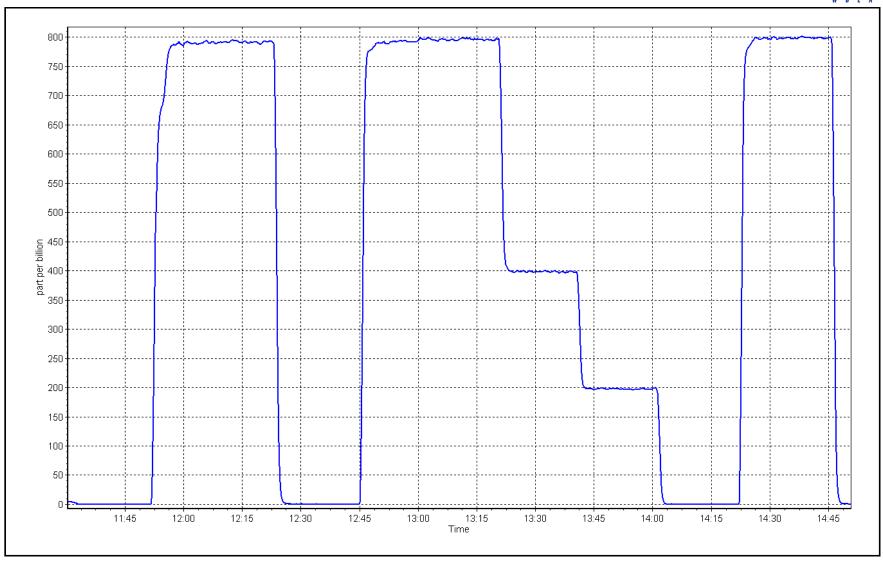
Calibration Date: March 2, 2023 **Previous Calibration:** February 1, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 11:31 End Time (MST): 14:55 Analyzer make: Thermo 43i Analyzer serial #: 1160290012

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Lim</u>						
0.0	0.2		Correlation Coefficient	0.999994	≥0.995				
799.1	795.5	1.0045	Correlation coefficient	0.333334	20.993				
400.1	398.0	1.0052	Slope	0.995960	0.90 - 1.10				
200.0	197.5	1.0128	Slope	0.993900	0.90 - 1.10				
			- Intercept	-0.582785	+/-30				



SO2 Calibration Plot Date: March 2, 2023 Location: Fort Hills







TRS Calibration Report

Station number:

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Fort Hills

Calibration Date: March 17, 2023

Start time (MST): 9:03 Reason: Removal Last Cal Date:

End time (MST): 12:00

AMS23

February 14, 2023

<u>Start</u>

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.20 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517372

Removed Cal Gas Conc: Rem Gas Exp Date: N/A 5.20 ppm Removed Gas Cyl #: Diff between cyl: N/A

Calibrator Make/Model: API T700 451 Serial Number: ZAG Make/Model: **API T701** Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43iQ TLE Analyzer serial #: 12113311965

Converter serial #: 594 Converter make: CDN-101

Analyzer Range 0 - 100 ppb

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

1.004890 Backgd or Offset: Calibration slope: 0.96 N/A Calibration intercept: -0.158196 Coeff or Slope: 0.714 N/A

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	4923	77.0	80.0	80.2	1.000
as found 2nd point	4962	38.5	40.0	40.1	1.002
as found 3rd point	4981	19.2	19.9	19.9	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					
high point					
second point					
third point					
as left zero					
as left span					
SO2 Scrubber Check	4922	78.3	783.0		
Date of last scrubber chang	ge:	_	_	Ave Corr Factor	_
Data of last convertor offic	ionov toot.			·	officional

Date of last scrubber change	last scrubber change: Ave Corr Factor					
Date of last converter efficie	(efficiency				
Baseline Corr As found:	80.0	Prev response:	80.24	*% change:	-0.3%	
Baseline Corr 2nd AF pt:	39.9	AF Slope:	1.000887	AF Intercept:	0.081840	
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999989			
				* = > +/-5% change initiates	s investigation	

Pump flow on the instrument is dropping and the readings spiking during the drop, changed the Notes:

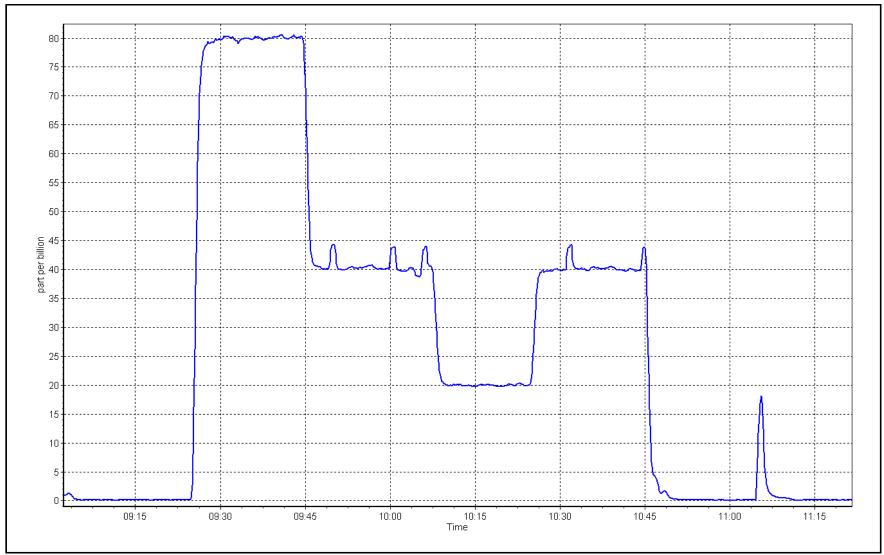
pump and still getting the same problem, removing the instrument to replace it with a new one.

Calibration Performed By: Max Farrell **TRS Calibration Plot**

Date: March 17, 2023

Location: Fort Hills







TRS Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS23

18:56

February 14, 2023

Version-11-2021

Station Information

Station Name: Fort Hills

Calibration Date: March 17, 2023

Start time (MST): 14:30

Reason: Install

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.20 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517372

Removed Cal Gas Conc: Rem Gas Exp Date: N/A 5.20 ppm Removed Gas Cyl #: Diff between cyl: N/A

Calibrator Make/Model: API T700 451 Serial Number: ZAG Make/Model: **API T701** Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43iQ TLE Analyzer serial #: 1300156232

Converter make: CDN-101 Converter serial #: 594

Analyzer Range 0 - 100 ppb

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

Backgd or Offset: 1.75 Calibration slope: 0.998462 -0.258331 Coeff or Slope: 1.031 Calibration intercept:

TRS 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 = 0.90-1.10as found zero as found span

as found 2nd point as found 3rd point 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	77.0	80.0	79.8	1.003
second point	4962	38.5	40.0	39.5	1.013
third point	4981	19.2	19.9	19.3	1.034
as left zero	5000	0.0	0.0	0.0	
as left span	4923	77.0	80.0	79.0	1.013

SO2 Scrubber Check

Date of last scrubber change:	Ave Corr Factor	1.016
Date of last converter efficiency test:		efficiency

Baseline Corr As found: NA Prev response: 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

Notes:

Installing a new green tagged TRS due to noise issues. Scrubber test was completed earlier today. Adjusted the span only.

Calibration Performed By: Rene Chamberland



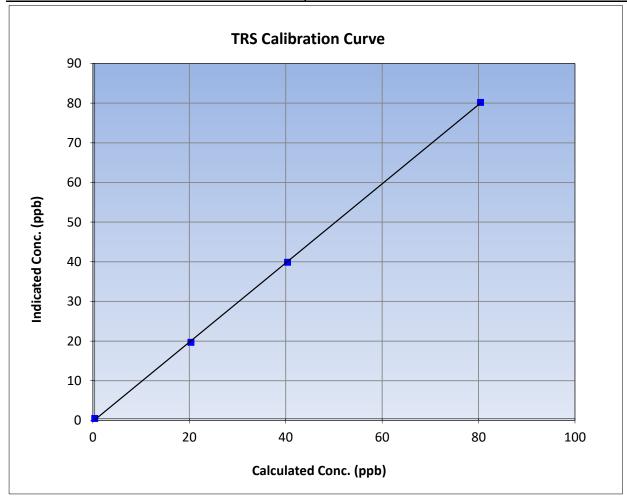
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 17, 2023 **Previous Calibration:** February 14, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 14:30 End Time (MST): 18:56 Analyzer make: Thermo 43iQ 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	0.1		Correlation Coefficient	0.999908	≥0.995				
80.0	79.8	1.0025	Correlation Coefficient	0.555506	20.993				
40.0	39.5	1.0126	Slope	0.998462	0.90 - 1.10				
19.9	19.3	1.0336	Slope	0.556402	0.90 - 1.10				
			- Intercept	-0.258331	+/-3				

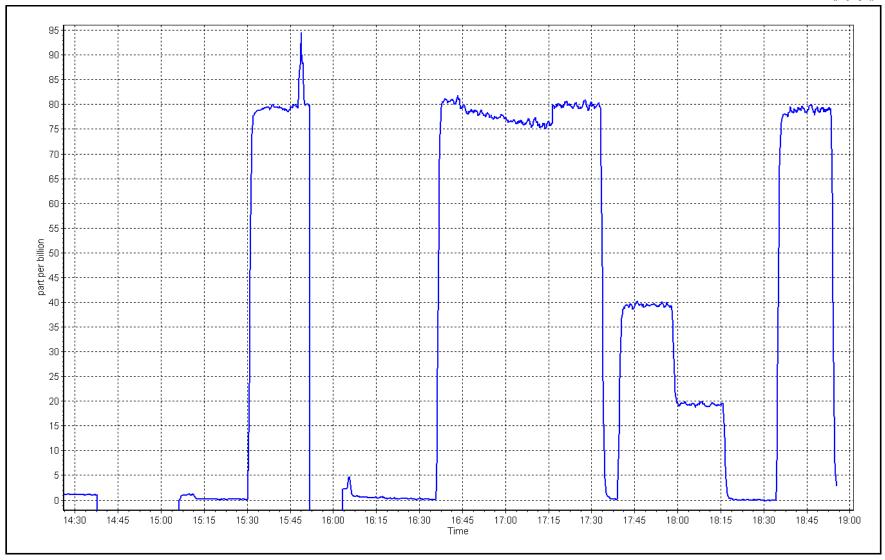


TRS Calibration Plot

Date: March 17, 2023

Location: Fort Hills







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Fort Hills Station Name:

Calibration Date: March 2, 2023

Start time (MST): 11:31 Reason: Routine

Station number: AMS23

Removed Gas Expiry: N/A

Last Cal Date: February 1, 2023

End time (MST): 14:55

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: January 5, 2025 CC281425

CH4 Cal Gas Conc. 500.2 CH4 Equiv Conc. 1070.6 ppm ppm

C3H8 Cal Gas Conc. 207.4 ppm

Removed Gas Cert: N/A

Removed CH4 Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm

Removed C3H8 Conc. 207.4 ppm Diff between cyl (THC): 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

Start Finish Start Finish CH4 SP Ratio: 2.28E-04 2.36E-04 NMHC SP Ratio: 5.24E-05 5.02E-05

CH4 Retention time: NMHC Peak Area: 13.0 13.0 183429 175506

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	17.19	16.62	1.035
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	17.21	0.999
second point	4960	40.2	8.61	8.62	0.998
third point	4980	20.1	4.30	4.33	0.994
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.19	17.23	0.998
			,	Average Correction Factor	0.997
Pacalina Carr AE	16.62	Drov rosponso	17 27	*0/ change	2.09/

Baseline Corr AF: Prev response 16.62 17.27 *% change -3.9% Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

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



THC / CH₄ / NMHC Calibration Report

Version-01-2020

W D L A					Version-01-2
		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	80.3	9.16	8.80	1.040
s found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.3	9.16	9.18	0.998
second point	4960	40.2	4.59	4.63	0.990
hird point	4980	20.1	2.29	2.36	0.974
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	9.16	9.18	0.998
				erage Correction Factor	0.987
Baseline Corr AF:	8.80	Prev response	9.20	*% change	-4.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Cat Daint	Dil air flau rata	CH4 Calibra) Ind cons (nam) (Is)	CE Limit- 0.05 1.0
Set Point as found zero	Dil air flow rate 5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc)) Ind conc (ppm) (Ic) 0.00	CF <i>Limit= 0.95-1.0</i>
as found span	4920	80.3		7.81	1.028
as found 2nd point	4920	80.5	8.03	7.01	1.028
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.3	8.03	8.03	1.000
second point	4960	40.2	4.02	3.99	1.000
:hird point	4980	20.1	2.01	1.98	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.03	8.06	0.997
is left spair	4320	00.5		erage Correction Factor	1.009
Baseline Corr AF:	7.81	Prev response	8.06	*% change	-3.2%
Baseline Corr 2nd AF:	NA	AF Slope:	0.00	AF Intercept:	3.270
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
baseline con sta At.	19/3	Calibration	Statistics	, 0	
			Jansiics	Finish	
THE Cal Class		<u>Start</u>		<u>Finish</u>	
THC Cal Office:		1.005188		1.000597	
THC Cal Offset:		-0.012392		0.010408	
CH4 Cal Slope:		1.007325		1.000840	
CH4 Cal Offset:		-0.029242		-0.020438	

Notes: Changed the inlet filter and the N2 cylinder after as founds. Adjusted the span only.

1.003089

0.017251

Calibration Performed By: Max Farrell

NMHC Cal Slope:

NMHC Cal Offset:

1.000146

0.031047



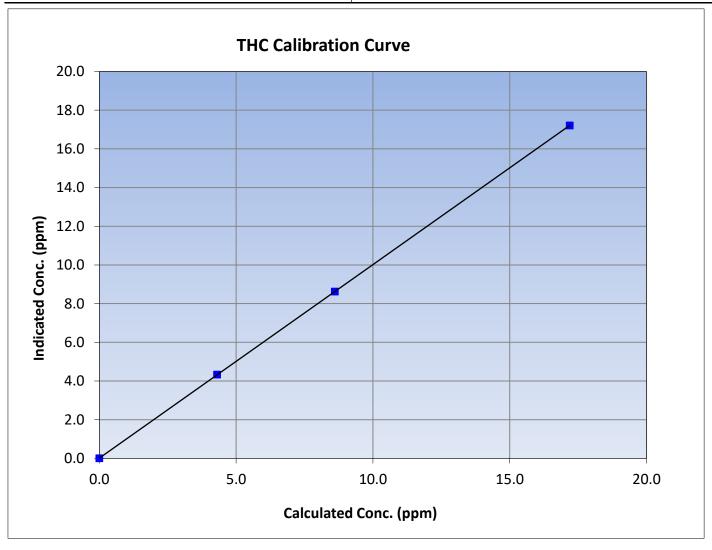
THC Calibration Summary

Version-01-2020

Station Information

March 2, 2023 Calibration Date: **Previous Calibration:** February 1, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 11:31 End Time (MST): 14:55 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	0.999998	≥0.995
17.19	17.21	0.9990	Correlation Coemicient	0.555556	20.333
8.61	8.62	0.9981	Slope	1.000597	0.90 - 1.10
4.30	4.33	0.9939	Slope	1.000397	0.90 - 1.10
			Intercept	0.010408	+/-0.5





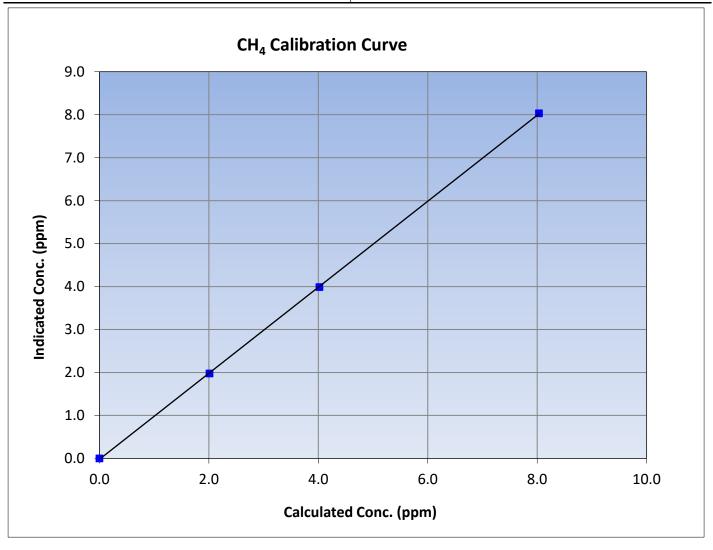
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 1, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 11:31 End Time (MST): 14:55 Analyzer make: Analyzer serial #: Thermo 55i 1193585648

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999969	≥0.995	
8.03	8.03	1.0002	Correlation Coemicient	0.555505	20.555	
4.02	3.99	1.0081	Slope	1.000840	0.90 - 1.10	
2.01	1.98	1.0181	Siope	1.000640	0.90 - 1.10	
			Intercept	-0.020438	+/-0.5	





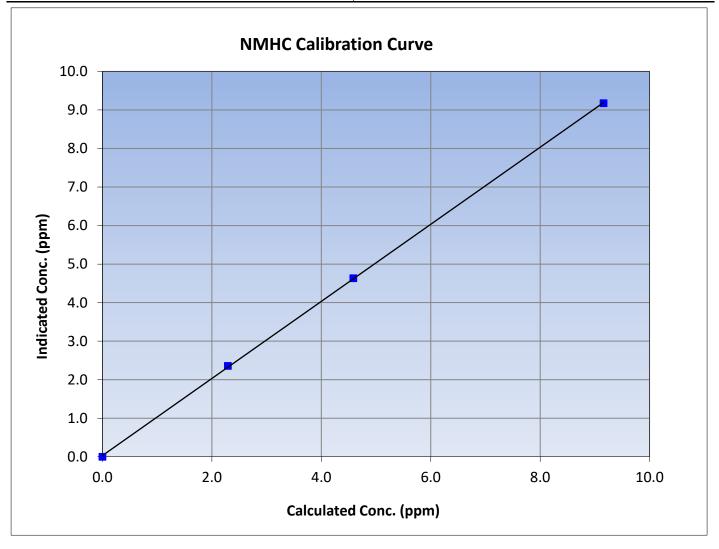
NMHC Calibration Summary

Version-01-2020

Station Information

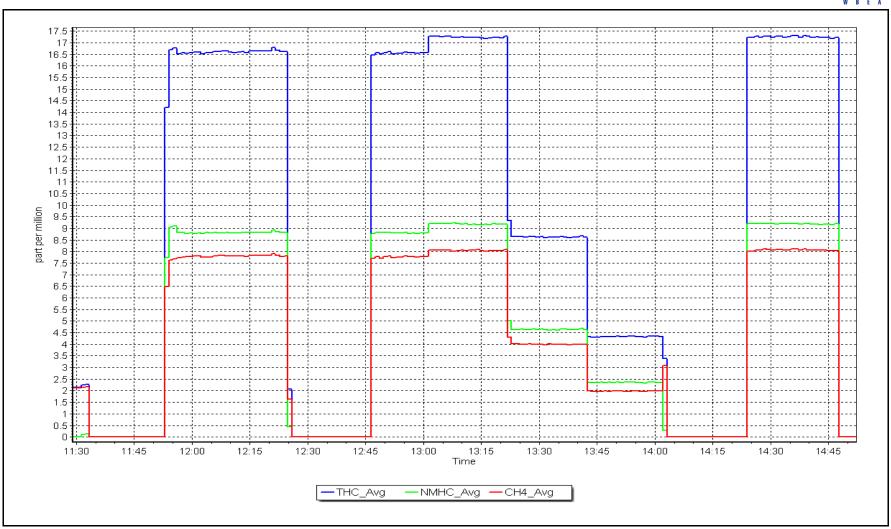
March 2, 2023 Calibration Date: **Previous Calibration:** February 1, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 11:31 End Time (MST): 14:55 Analyzer make: Analyzer serial #: 1193585648 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999947	≥0.995	
9.16	9.18	0.9982	Correlation Coemicient	0.999947	20.933	
4.59	4.63	0.9897	Slope	1.000146	0.90 - 1.10	
2.29	2.36	0.9736	Slope	1.000140	0.90 - 1.10	
			Intercept	0.031047	+/-0.5	



NMHC Calibration Plot Date: March 2, 2023 Location: Fort Hills







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort Hills Station number: AMS23

Calibration Date: March 1, 2023 Last Cal Date: February 23, 2023 End time (MST): 18:08

Start time (MST): 10:10

Reason: Maintenance

Calibration Standards

NO Gas Cylinder #: CC332703 Cal Gas Expiry Date: January 28, 2024

NOX Cal Gas Conc: NO Cal Gas Conc: 49.7 49.7 ppm ppm

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

49.7 Removed Gas NO Conc: Removed Gas NOX Conc: ppm 49.7 ppm

NOX gas Diff: NO gas Diff:

Teledyne API T750 Serial Number: Calibrator Model: 275 ZAG make/model: Teledyne API T751H Serial Number: 307

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1152430007

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.815 1.025 NO bkgnd or offset: 5.1 2.8 NOX coeff or slope: 0.996 0.995 NOX bkgnd or offset: 5.6 3.1 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 266.3 155

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004364	0.992756
NO _x Cal Offset:	0.065025	0.201484
NO Cal Slope:	1.005722	0.995756
NO Cal Offset:	-0.434914	-1.598210
NO ₂ Cal Slope:	0.999767	0.998881
NO ₂ Cal Offset:	-0.637319	0.599000



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

-	•		_					-	
n	ш	utior	1 (3	п	hr	21	n		lata
\mathbf{u}	ш	uuui	ı Ca	ш	v	au	UII		Jala

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	4920	80.5	800.2	800.2	0.0	762.0	759.4	2.6	1.050	1.054
as found 2nd	4960	40.2	399.6	399.6	0.0	383.4	381.4	2.0	1.0422	1.0476
as found 3rd	4980	20.1	199.8	199.8	0.0	190.5	188.6	1.9	1.0488	1.0593
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.5	0.3	1.3		
high point	4920	80.5	800.2	800.2	0.0	795.2	796.1	-0.9	1.006	1.005
second point	4960	40.2	399.6	399.6	0.0	396.3	395.4	0.9	1.008	1.011
third point	4980	20.1	199.8	199.8	0.0	197.2	195.4	1.8	1.013	1.022
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4920	80.5	800.2	443.5	356.7	792.7	435.4	357.3	1.009	1.019
							Average C	Correction Factor	1.009	1.013
Corrected As fo	ound NO _X =	762.2 ppb	NO =	759.4 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-5.4%
Previous Respo	onse NO _X =	803.7 ppb	NO =	804.3 ppb				*Percent Chang	ge NO =	-5.9%
Baseline Corr 2	2nd pt $NO_X =$	383.6 ppb	NO =	381.4 ppb	As foun	d $NO_X r^2$:	0.999980	Nx SI: 0.9528	04 Nx Int:	0.555
Baseline Corr 3	Brd pt $NO_X =$	190.7 ppb	NO =	188.6 ppb	As foun	d NO r ² :	0.999983	NO SI: 0.9497	92 NO Int:	0.034
					As foun	d $NO_2 r^2$:	1.000000	NO2 SI: 1.0008	74 NO ₂ Int:	-0.200

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero			0.0	-0.2		
as found GPT point (400 ppb NO2)	756.7	413.3	343.4	343.5	0.9997	100.0%
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	790.8	434.1	356.7	357.2	0.999	100.1%
2nd GPT point (200 ppb O3)	790.8	615.0	175.8	176.0	0.999	100.1%
3rd GPT point (100 ppb O3)	790.8	701.3	89.5	89.2	1.003	99.7%
			ļ	Average Correction Factor	1.000	100.0%

Notes:

Completed multipoint as founds. Found the leak that caused the low chamber pressure and fixed the leak. Adjusted the span.

Calibration Performed By:

Max Farrell



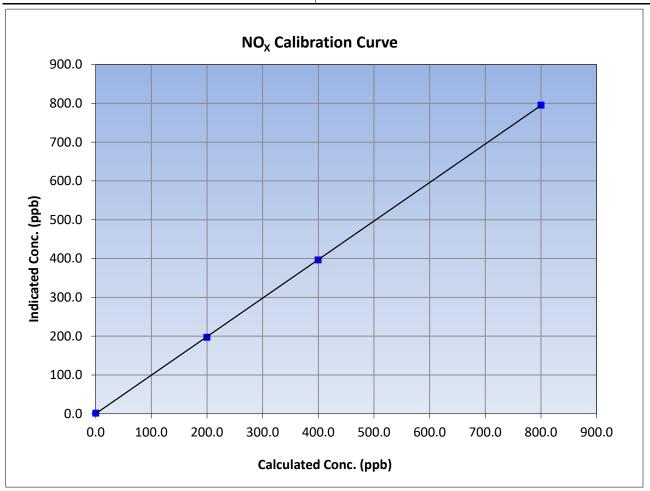
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 1, 2023 Previous Calibration: February 23, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 10:10 End Time (MST): 18:08 Analyzer serial #: Analyzer make: Thermo 42i 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	1.5		Correlation Coefficient	0.999988	≥0.995
800.2	795.2	1.0063	correlation coemicient	0.555500	20.333
399.6	396.3	1.0083	Slope	0.992756	0.90 - 1.10
199.8	197.2	1.0131	Slope	0.992750	0.90 - 1.10
			Intercept	0.201484	+/-20





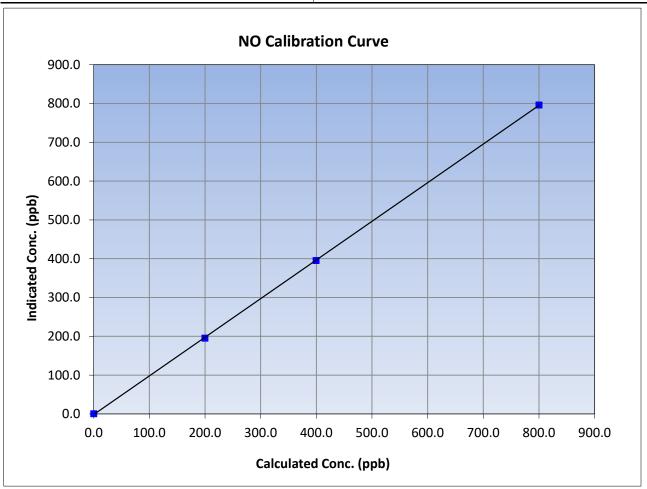
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 1, 2023 Previous Calibration: February 23, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 10:10 End Time (MST): 18:08 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	0.3		Correlation Coefficient	0.999974	≥0.995
800.2	796.1	1.0051	Correlation Coefficient	0.333374	20.333
399.6	395.4	1.0106	Slope	0.995756	0.90 - 1.10
199.8	195.4	1.0225	Slope	0.993730	0.50 1.10
			Intercept	-1.598210	+/-20





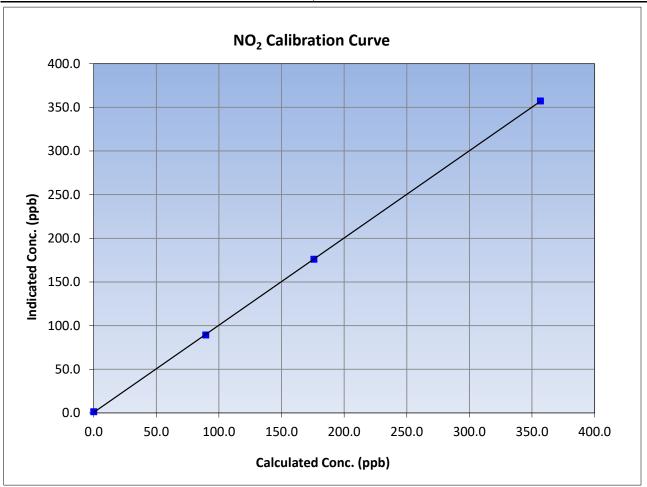
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 1, 2023 Previous Calibration: February 23, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 10:10 End Time (MST): 18:08 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	1.3		Correlation Coefficient	0.999982	≥0.995
356.7	357.2	0.9986	Correlation Coefficient	0.555562	20.993
175.8	176.0	0.9989	Slope	0.998881	0.90 - 1.10
89.5	89.2	1.0034	Slope		0.50 1.10
			Intercept	0.599000	+/-20

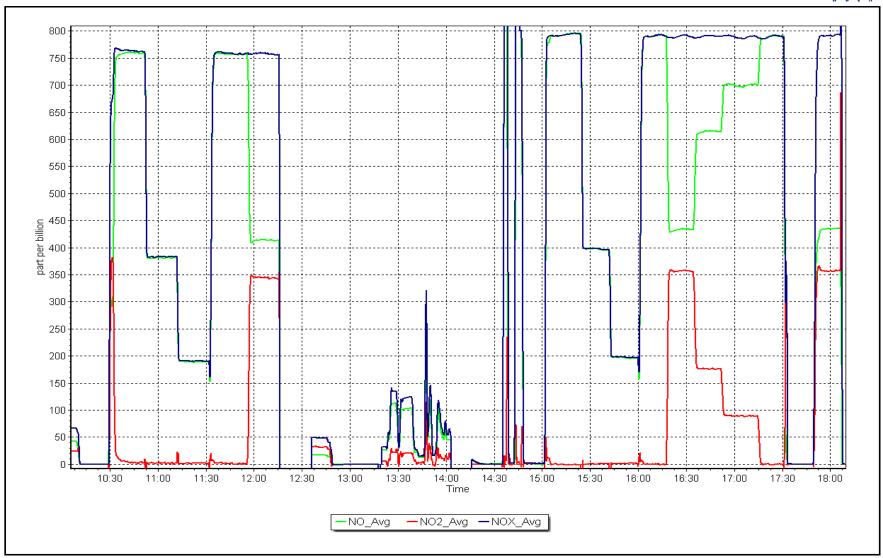


NO_X Calibration Plot

Date: March 1, 2023

Location: Fort Hills







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	n		
Station Name:	Fort Hills		Station number:	AMS 23	
Calibration Date:	March 18, 2023		Last Cal Date:	February 17, 2023	
Start time (MST):	12:37		End time (MST):	13:25	
Analyzer Make:	API T640		S/N:	1546	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388755	
Temp/RH standard:	Alicat FP-25BT		S/N:	388755	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	4.6	4.48	4.6		+/- 2 °C
P (mmHg)	735.81	735	735.81		+/- 10 mmHg
flow (LPM)	5.00	4.948	5.00		+/- 0.25 LPM
Leak Test:	Date of check:	March 18, 2023	Last Cal Date:	February 17, 2023	_
Note: this leak check will be	PM w/o HEPA:	NA	PM w/ HEPA:	NA	<0.2 ug/m3
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	Test		
<u>Parameter</u>	As found	Post maintenance	As left	<u>Adjusted</u>	(Limits)
PMT Peak Test	NA	11.2	11.2		11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	8.7	w/ HEPA:	0.0
Date Optical Cham	ber Cleaned:	March 18, 2023			<0.2 ug/m3
Disposable Filte	r Changed:	March 18,	2023		
		Annual Maintenanc	ce		
Date Sample Tub	oe Cleaned:	September 2	6, 2022		
Date RH/T Senso	or Cleaned:	September 2	.6, 2022		
Notes:	Analyzer DOA	A. Removed asset: 11458	8, installed asset: 12	1808. No adjustments	made.
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Waskow ohci Pimatisiwin Station number: AMS25

Calibration Date: March 15, 2023 Last Cal Date: January 3, 2023

Start time (MST): 10:00 End time (MST): 12:12

Reason: Install

Calibration Standards

Cal Gas Concentration: 52.4 ppm Cal Gas Exp Date: October 19, 2022

Cal Gas Cylinder #: ET0016672

Removed Cal Gas Conc: 52.4 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 Analyzer serial #: 1118148497

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:0.9997831.006789Backgd or Offset:11.010.1

Calibration intercept: -0.314119 -0.116149 Coeff or Slope: 1.212 1.039

SO₂ 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	0.0	
high point	4924	76.3	799.6	804.6	0.994
second point	4962	38.2	400.3	403.9	0.991
third point	4981	19.1	200.2	200.6	0.998
as left zero	5000	0.0	0.0	0.4	
as left span	4924	76.3	799.6	808.9	0.988
			Averag	e Correction Factor	0.994

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:

Install calibration from power being put back on. Flash lamp adjustment and Initial flash reference

Notes: done. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay

* = > +/-5% change initiates investigation



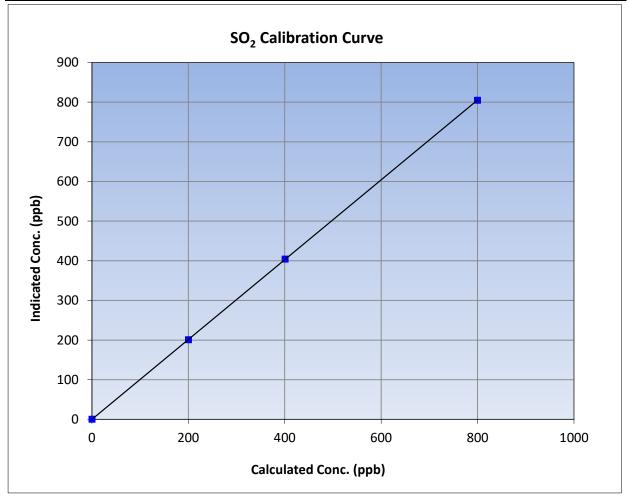
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 15, 2023 **Previous Calibration:** January 3, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 10:00 End Time (MST): 12:12 Analyzer make: Thermo 43i Analyzer serial #: 1118148497

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	0.999995	≥0.995		
799.6	804.6	0.9938	Correlation Coefficient	0.555555	20.333		
400.3	403.9	0.9911	Slope	1.006789	0.90 - 1.10		
200.2	200.6	0.9978	Slope	1.000769	0.30 - 1.10		
			- Intercept	-0.116149	+/-30		



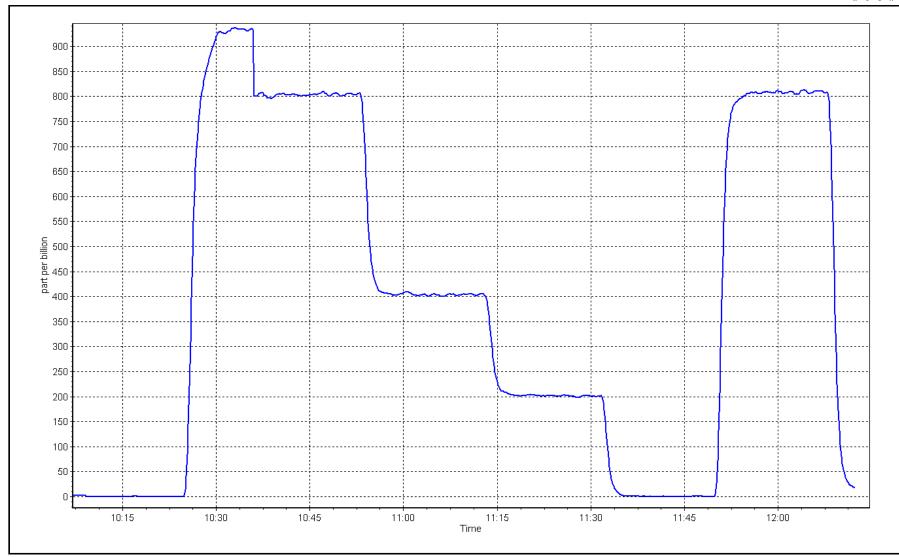
SO2 Calibration Plot

Date:

March 15, 2023

Location: Waskow ohci Pimatisiwin







H₂S Calibration Report

Station number:

AMS25

Version-11-2021

Station Information

Station Name: Waskow ohci Pimatisiwin

Calibration Date: March 16, 2023 Last Cal Date: January 11, 2023

Start time (MST): 7:20 End time (MST): 10:14

Reason: Install

Calibration Standards

Cal Gas Concentration: 4.90 ppm Cal Gas Exp Date: May 5, 2023

Cal Gas Cylinder #: LL119538

Removed Cal Gas Conc: 4.90 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 747

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: Thermo 43C Converter serial #: 328702539

Analyzer Range 0 - 100 ppb

StartFinishStartFinishCalibration slope:1.0027381.003738Backgd or Offset:3.33.3

Calibration slope: 1.002/38 1.003/38 Backgd or Offset: 3.3 3.3 Calibration intercept: 0.341605 0.281608 Coeff or Slope: 1.085 1.085

H₂S As Found Data

Set Point Dilution air flow rate Source gas flow rate (sccm) (sccm) (sccm) (Sccm) (CC) (CC) (CC) (CC/(IC-AFzero)) (CC) (CC/(IC-AFzero)) (CC/(I

as found zero

as found 2nd point

as found 3rd point new cylinder response

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	5000	0.0	0.0	0.2	
high point	4918	81.6	80.0	80.5	0.993
second point	4959	40.8	40.0	40.5	0.987
third point	4980	20.4	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.2	
as left span	4912	88.3	800.0	803.0	0.996
SO2 Scrubber Check	4924	76.3	800.0	0.2	
Date of last scrubber chang	ge:	19-Jul-10		Ave Corr Factor	0.987

 Date of last scrubber change:
 19-Jul-10
 Ave Corr Factor
 0.987

 Date of last converter efficiency test:
 efficiency

Baseline Corr As found: NA *% change: Prev response: NA 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

Sox scrubber checked after the calibrator zero. No adjustments done. Install Calibration after

Notes: power put back on.

Calibration Performed By: Melissa Lemay



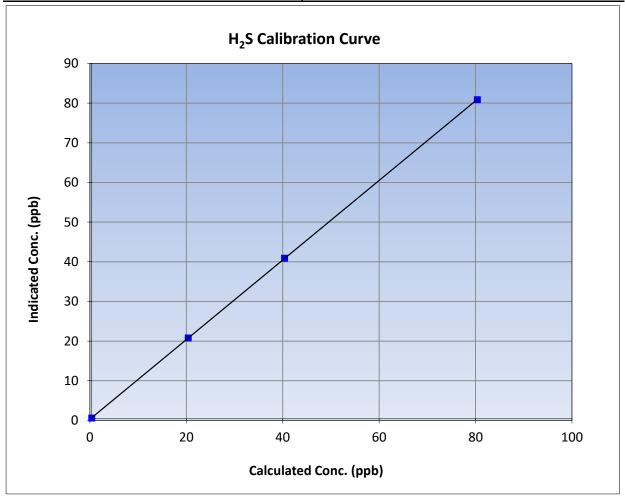
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 16, 2023 **Previous Calibration:** January 11, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 7:20 End Time (MST): 10:14 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146

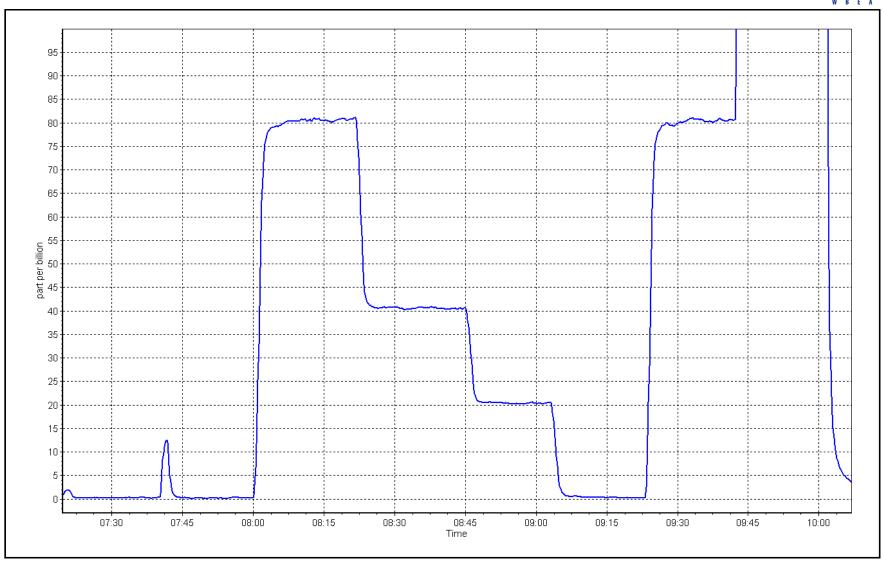
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999994	≥0.995	
80.0	80.5	0.9935	Correlation Coefficient	0.555554	20.995	
40.0	40.5	0.9873	Slope	1.003738	0.90 - 1.10	
20.0	20.4	0.9799	Slope	1.003736	0.90 - 1.10	
			- Intercept	0.281608	+/-3	



Date: March 16, 2023

Location: Waskow ohci Pimatisiwin







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Christina Lake Station Name:

March 23, 2023 Calibration Date:

Start time (MST): 10:41

Routine Reason:

Station number: **AMS 26**

> February 14, 2023 Last Cal Date:

End time (MST): 13:40

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 T701**

ppm Cal Gas Exp Date: February 23, 2025

ppm Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 2447 Serial Number: 953

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1173410001

Analyzer Range 0 - 1000 ppb

Finish Start

Backgd or Offset:

Start 16.4

Finish

Calibration slope: 0.994255 0.990536 16.5 0.929 Calibration intercept: -2.695113 -2.994790 Coeff or Slope: 0.929

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
Set Fornt	(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	4919	80.6	799.0	789.9	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4919	80.6	799.0	790.4	1.011
second point	4960	40.3	399.4	389.9	1.024
third point	4980	20.2	200.2	192.9	1.038
as left zero	5000	0.0	0.0	0.3	
as left span	4919	80.6	799.0	788.2	1.014
			Averag	ge Correction Factor	1.024

Baseline Corr As found: 789.90 Previous response 791.69 *% change -0.2% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



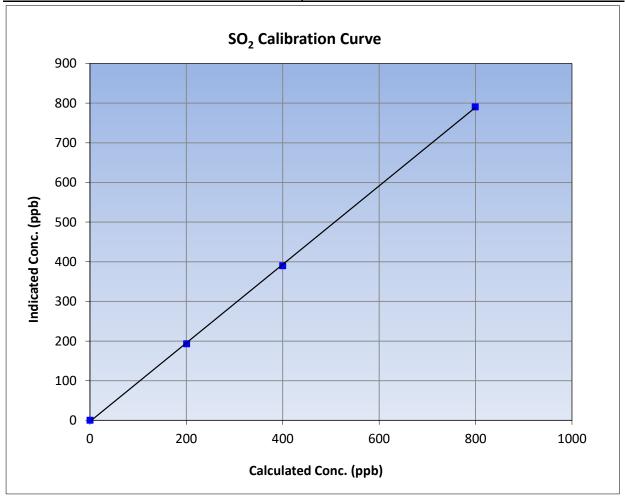
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 23, 2023 **Previous Calibration:** February 14, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 10:41 End Time (MST): 13:40 Analyzer make: Thermo 43i Analyzer serial #: 1173410001

	Calibration Data										
Calculated concentration (ppb) (Cc)	ation	<u>Limits</u>									
0.0	0.2		Correlation Coefficient	0.999919	≥0.995						
799.0	790.4	1.0108	Correlation coefficient	0.555515	20.333						
399.4	389.9	1.0244	Slope	0.990536	0.90 - 1.10						
200.2	192.9	1.0379	Slope	0.990330	0.90 - 1.10						
			- Intercept	-2.994790	+/-30						

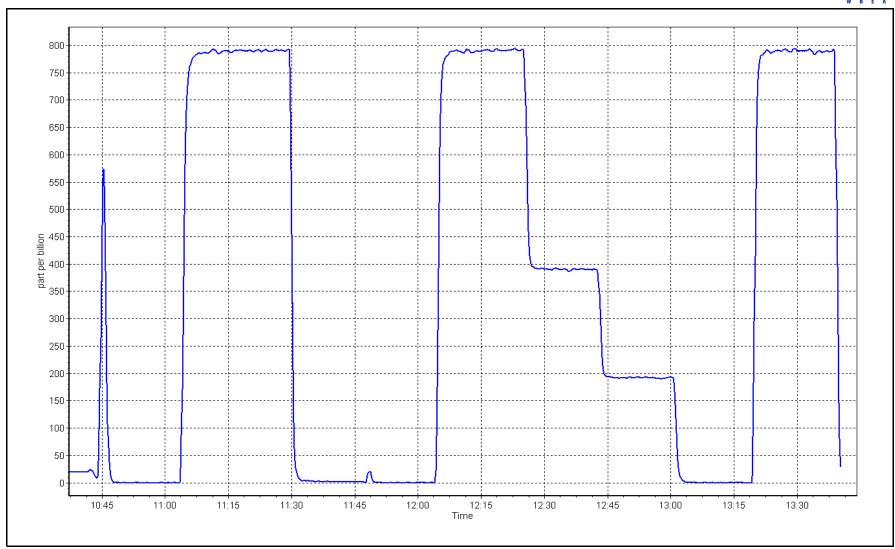


SO2 Calibration Plot

Date: March 23, 2023

Location: Christina Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Christina Lake

Calibration Date: March 22, 2023

Start time (MST): 10:38 Reason: Routine Station number: AMS26

> Last Cal Date: February 15, 2023

End time (MST): 15:04

Calibration Standards

February 9, 2024 Cal Gas Concentration: 4.89 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: EY0002466

Removed Cal Gas Conc: Rem Gas Exp Date: NA 4.89 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: API T700 2447 Serial Number: ZAG Make/Model: **API T701** Serial Number: 953

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> 0.979904 Backgd or Offset: Calibration slope: 0.996758 33.6 33.6 Calibration intercept: 0.098881 0.438608 Coeff or Slope: 1.125 1.125

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	0.5	
as found span	4918	81.8	80.0	80.6	0.999
as found 2nd point	4959	40.9	40.0	40.4	1.003
as found 3rd point	4979	20.4	20.0	20.1	1.018
new cylinder response					

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	5000	0.0	0.0	0.6			
high point	4918	81.8	80.0	78.9	1.014		
second point	4959	40.9	40.0	39.6	1.010		
third point	4979	20.4	20.0	19.8	1.008		
as left zero	5000	0.0	0.0	0.6			
as left span	4918	81.8	80.0	80.8	0.990		
SO2 Scrubber Check	4919	80.6	806.1	0.1			
Date of last scrubber chang	ge:	27-Feb-19		Ave Corr Factor	1.011		
Date of last converter effic	Date of last converter efficiency test: efficiency						

Date of last scrubber change	:	27-Feb-19		Ave Corr Factor	1.011
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	80.1	Prev response:	79.84	*% change:	0.3%

Baseline Corr 2nd AF pt: 39.9 AF Slope: 1.002613 0.999975 Baseline Corr 3rd AF pt: 19.6 AF Correlation:

* = > +/-5% change initiates investigation

0.319026

AF Intercept:

Changed sample inlet filter after MAF's, changed zero/span valve before calibrator zero. Ran Notes:

scrubber check after calibrator zero. No adjustments made.

Calibration Performed By: Mohammed Kashif



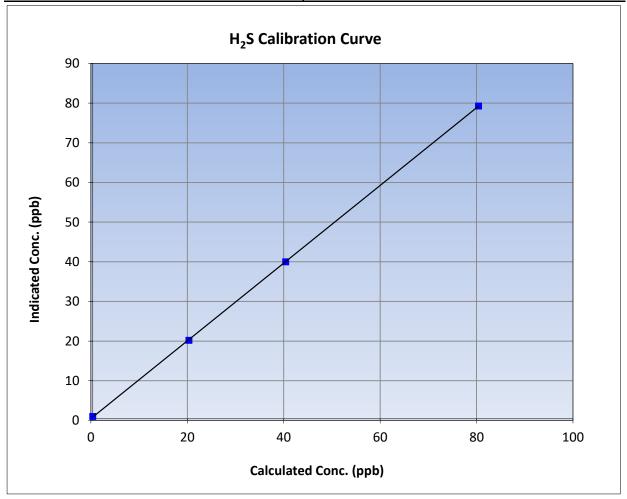
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 22, 2023 **Previous Calibration:** February 15, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 10:38 End Time (MST): 15:04 Analyzer make: Thermo 450i Analyzer serial #: 1180030032

	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	0.999980	≥0.995						
80.0	78.9	1.0140	Correlation Coefficient	0.555500	20.993						
40.0	39.6	1.0101	Slope	0.979904	0.90 - 1.10						
20.0	19.8	1.0078	Slope	0.373304	0.90 - 1.10						
			- Intercept	0.438608	+/-3						

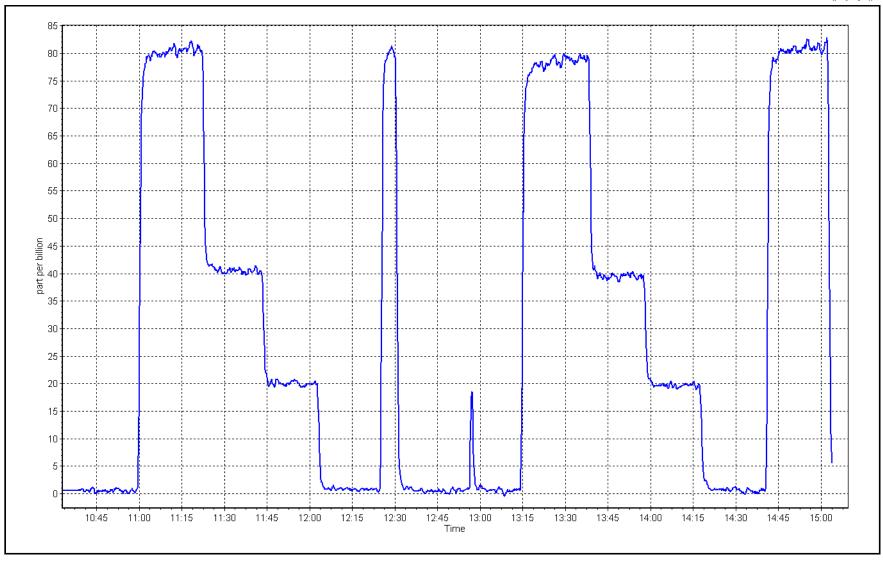


H₂S Calibration Plot

Date: March 22, 2023

Location: Christina Lake







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Christina Lake

Calibration Date: March 29, 2023

Start time (MST): 10:57 Routine Reason:

Station number: AMS 26

Last Cal Date: February 16, 2023

End time (MST): 15:06

Calibration Standards

NO Gas Cylinder #: T2Y1P4C Cal Gas Expiry Date: November 12, 2023 NOX Cal Gas Conc: NO Cal Gas Conc: 50.82 50.02 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 50.82 ppm 50.02 ppm

NOX gas Diff:

NO gas Diff: **API T700** Serial Number: Calibrator Model: 2447 ZAG make/model: **API T701** Serial Number: 953

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1173480006

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.713 1.713 NO bkgnd or offset: 2.8 2.9 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 2.9 2.9 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 191.9 191.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000661	0.989754
NO _x Cal Offset:	-1.500000	-1.920000
NO Cal Slope:	1.000043	0.990261
NO Cal Offset:	-2.080000	-2.780000
NO ₂ Cal Slope:	1.003073	1.001972
NO ₂ Cal Offset:	-0.020912	0.216428



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow co	alculated NOx oncentration (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	0.0	-0.1	0.0		
as found span	4920	80.0	813.1	800.3	12.8	804.3	788.3	16.0	1.0110	1.0152
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	4920	80.0	813.1	800.3	12.8	803.9	791.1	12.8	1.0115	1.0117
second point	4960	40.0	406.6	400.2	6.4	399.4	392.3	7.1	1.0179	1.0200
third point	4980	20.0	203.3	200.1	3.2	197.3	192.3	5.0	1.0303	1.0405
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1		
as left span	4920	80.0	813.1	398.4	414.7	807.0	389.8	417.0	1.0076	1.0221
							Average C	Correction Factor	1.0199	1.0240
Corrected As fo	ound NO _X =	804.3 ppb	NO =	788.4 ppb	* = > +/-5.	% change initiates i	investigation	*Percent Chang	ge NO _X =	-1.0%
Previous Respo	onse NO _X =	812.2 ppb	NO =	798.3 ppb				*Percent Chang	ge NO =	-1.3%
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	Brd 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 ₂ Int:	
				e	GPT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Reference concentration (ppb)		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac 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 poi	int (400 ppb NO2)									
	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	789.7		387.8	414.7		415.8	0.9974	4	100.3%
2nd GDT noin	nt (200 ppb O3)	789.7		595.4	207.1		207.3	0.9990	J :	100.1%
Zilu GF i politi	· '' /									
·	t (100 ppb O3)	789.7		697.0	105.5		106.5	0.9906	5	100.9%

Notes:

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

Calibration Performed By: Mohammed Kashif



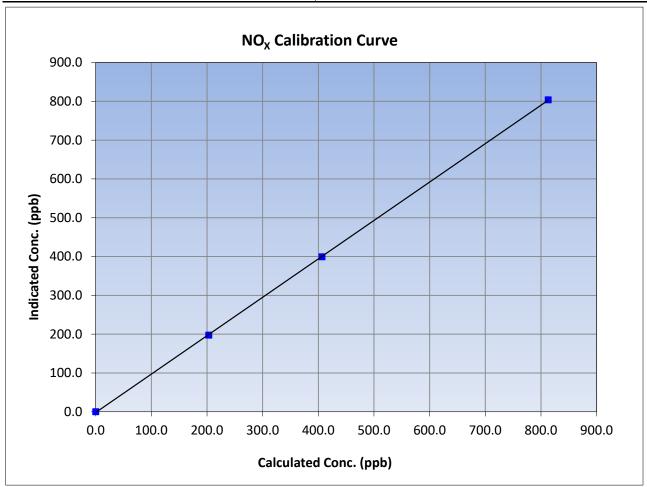
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 **Previous Calibration:** February 16, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 10:57 End Time (MST): 15:06 Analyzer serial #: Analyzer make: Thermo 42i 14:00

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999971	≥0.995
813.1	803.9	1.0115	Correlation Coefficient	0.55571	20.333
406.6	399.4	1.0179	Slope	0.989754	0.90 - 1.10
203.3	197.3	1.0303	Slope	0.363734	0.90 - 1.10
			Intercept	-1.920000	+/-20





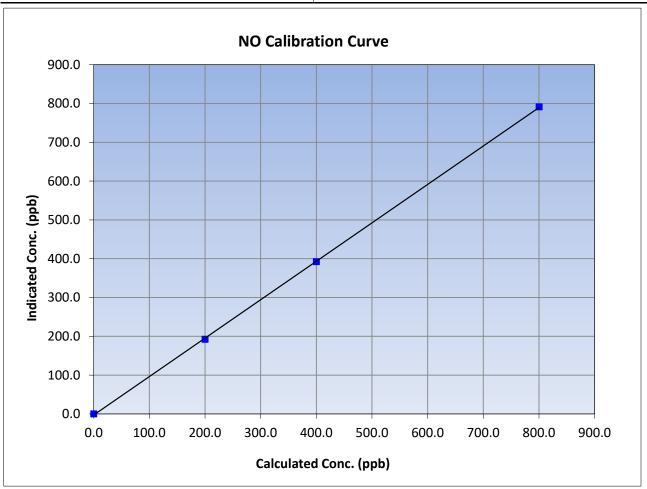
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 **Previous Calibration:** February 16, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 10:57 End Time (MST): 15:06 Analyzer make: Analyzer serial #: 14:00 Thermo 42i

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999939	≥0.995
800.3	791.1	1.0117	Correlation Coefficient	0.333333	20.555
400.2	392.3	1.0200	Slope	0.990261	0.90 - 1.10
200.1	192.3	1.0405	Slope	0.990201	0.90 - 1.10
			Intercept	-2.780000	+/-20





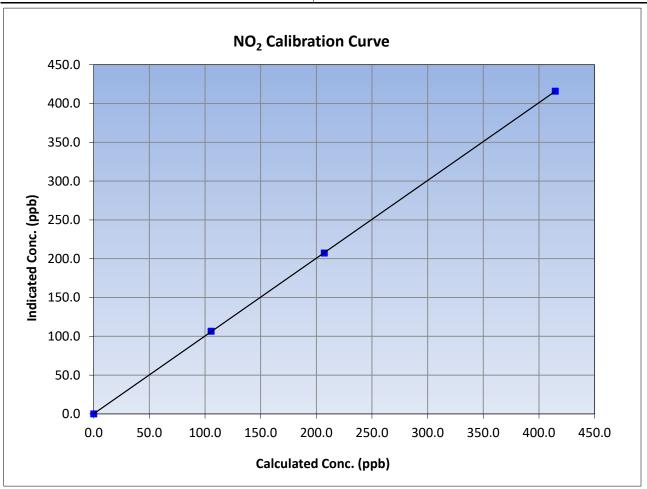
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 29, 2023 **Previous Calibration:** February 16, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 10:57 End Time (MST): 15:06 Analyzer serial #: Analyzer make: 14:00 Thermo 42i

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
414.7	415.8	0.9974	Correlation Coefficient	0.555554	20.993
207.1	207.3	0.9990	Slope	1.001972	0.90 - 1.10
105.5	106.5	0.9906	Slope	1.001972	0.90 - 1.10
			Intercept	0.216428	+/-20

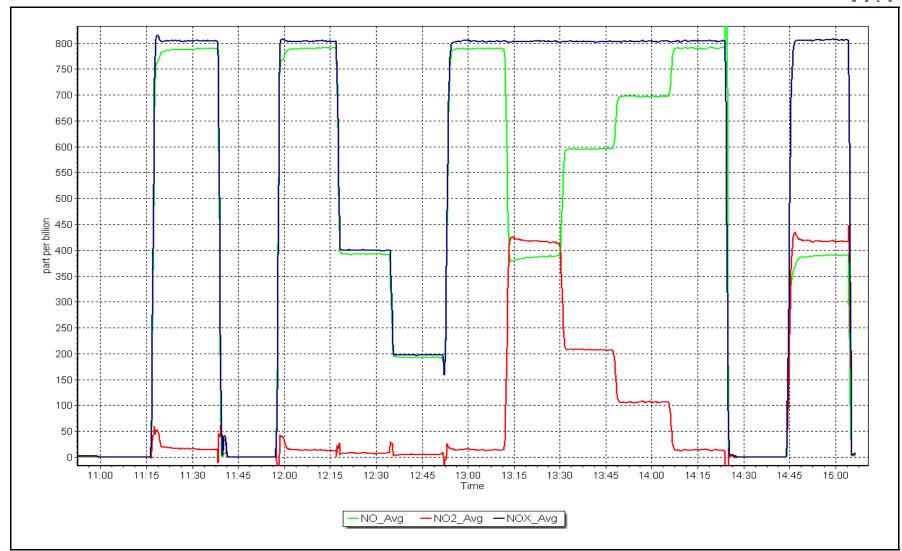


NO_X Calibration Plot

Date: March 29, 2023

Location: Christina Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS27 JACKFISH 2/3 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Jackfish 2/3

Calibration Date: March 8, 2023 Start time (MST): 10:52

Reason: Routine

Station number: AMS 27

Last Cal Date: February 14, 2023

End time (MST): 13:45

Calibration Standards

Cal Gas Concentration: 50.58

Cal Gas Cylinder #: SG9133974BAL

Removed Cal Gas Conc: 50.58
Removed Gas Cyl #: NA

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

Baseline Corr 3rd AF pt:

ppm Cal Gas Exp Date: December 29, 2028

ppm Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3811 Serial Number: 135

Analyzer Information

Analyzer make: Thero 43iQ Analyzer serial #: 12124313138

Analyzer Range 0 - 1000 ppb

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

 Calibration slope:
 1.001161
 1.002034
 Backgd or Offset:
 7.4
 7.8

 Calibration intercept:
 -1.757862
 -2.538384
 Coeff or Slope:
 0.979
 0.990

SO₂ 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	4921	79.1	800.2	790.0	1.013
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4921	79.1	800.2	800.5	1.000
second point	4961	39.5	399.5	396.6	1.007
third point	4980	19.8	200.3	195.6	1.024
as left zero	5000	0.0	0.0	0.2	
as left span	4921	79.1	800.2	800.2	1.000
			Avera	ge Correction Factor	1.010

Baseline Corr As found: 789.80 Previous response 799.33 *% change -1.2%

AF Correlation:

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

* = > +/-5% change initiates investigation

Start

Notes: Adjusted both zero & span.

Calibration Performed By: Denny Ray Estador

NA



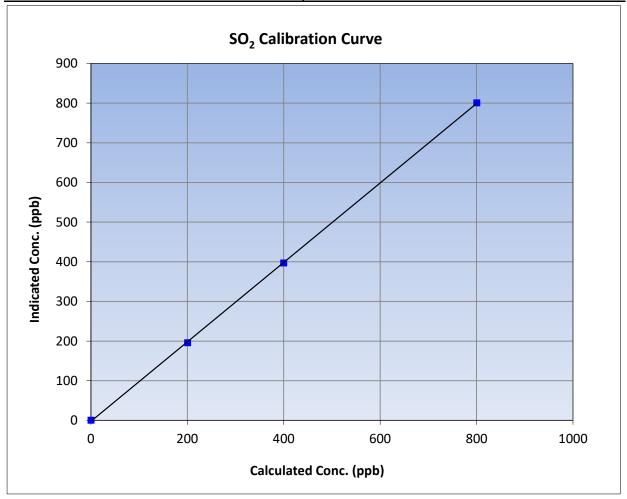
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 8, 2023 **Previous Calibration:** February 14, 2023 Station Name: Jackfish 2/3 Station Number: **AMS 27** Start Time (MST): 10:52 End Time (MST): 13:45 Analyzer make: Thero 43iQ 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	0.0		Correlation Coefficient	0.999954	≥0.995					
800.2	800.5	0.9996	Correlation coefficient	0.555554	20.333					
399.5	396.6	1.0074	Slope	1.002034	0.90 - 1.10					
200.3	195.6	1.0241	Slope	1.002034	0.90 - 1.10					
			- Intercept	-2.538384	+/-30					



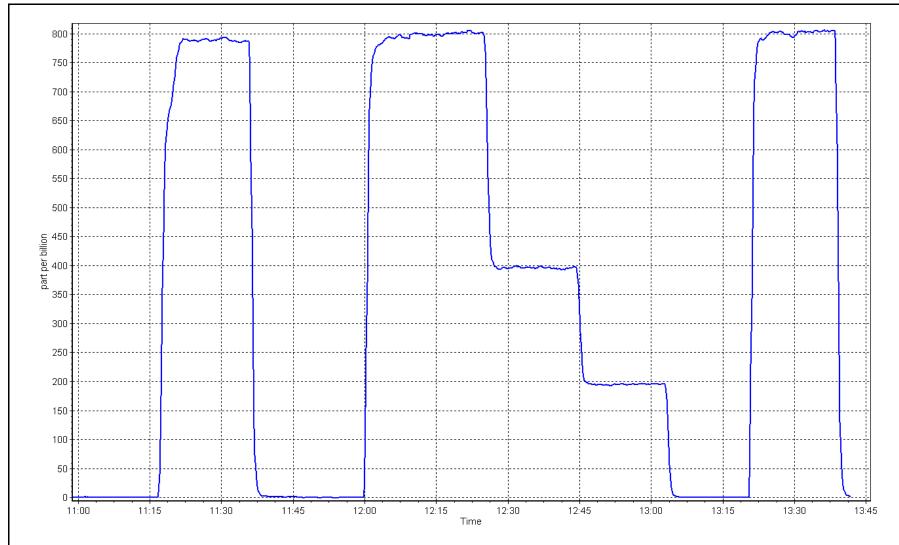
SO2 Calibration Plot

Date:

March 8, 2023

Location: Jackfish 2/3





H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Jackfish 2/3

Calibration Date: March 23, 2023

Start time (MST): 9:29

Reason: Routine Station number: AMS27

> Last Cal Date: February 7, 2023

End time (MST): 13:37

Calibration Standards

Cal Gas Exp Date: January 4, 2025 Cal Gas Concentration: 5.41 ppm

ppm

Cal Gas Cylinder #: CC345023

Removed Cal Gas Conc: 5.41 Removed Gas Cyl #: NA

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3811 Serial Number: 135

Analyzer Information

Analyzer make: **API T101** Analyzer serial #: 621

Converter make:

Analyzer Range 0 - 100 ppb

> <u>Start</u> **Finish** 0.983812

Calibration slope: 1.000628 Calibration intercept: -0.177928 Converter serial #:

<u>Finish</u> <u>Start</u> Backgd or Offset: 25.4 25.4 Coeff or Slope: 0.949 0.949

H₂S As Found Data

-0.138417

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	80.2	80.4	0.998
as found 2nd point	4963	37.0	40.0	39.9	1.006
as found 3rd point	4982	18.5	20.0	19.5	1.032
new cylinder response					

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	5000	0.0	0.0	0.2	
high point	4926	74.1	80.2	78.9	1.016
second point	4963	37.0	40.0	39.1	1.024
third point	4982	18.5	20.0	19.2	1.042
as left zero	5000	0.0	0.0	0.2	
as left span	4926	74.1	80.2	79.0	1.015
SO2 Scrubber Check	4921	79.1	791.0	0.0	
Date of last scrubber char	nge:			Ave Corr Factor	1.027
Date of last converter effi	ciency test:				efficiency

Date of last schubber change	: .			Ave Corr Factor	1.027
Date of last converter efficie	6	efficiency			
Baseline Corr As found:	80.3	Prev response:	80.05	*% change:	0.3%

Baseline Corr 2nd AF pt: 39.8 AF Slope: 1.003909 0.999925 Baseline Corr 3rd AF pt: 19.4 AF Correlation:

* = > +/-5% change initiates investigation

AF Intercept:

No adjustments made. Notes:

Calibration Performed By: Denny Ray Estador -0.217940



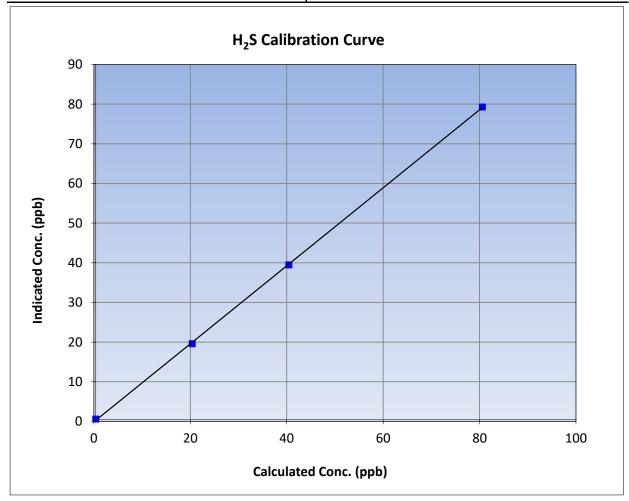
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 23, 2023 **Previous Calibration:** February 7, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 9:29 End Time (MST): 13:37 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	0.2		Correlation Coefficient	0.999916	≥0.995					
80.2	78.9	1.0162	Correlation coefficient	0.555510	20.333					
40.0	39.1	1.0239	Slope	0.983812	0.90 - 1.10					
20.0	19.2	1.0424	Slope	0.963612	0.90 - 1.10					
			- Intercept	-0.138417	+/-3					

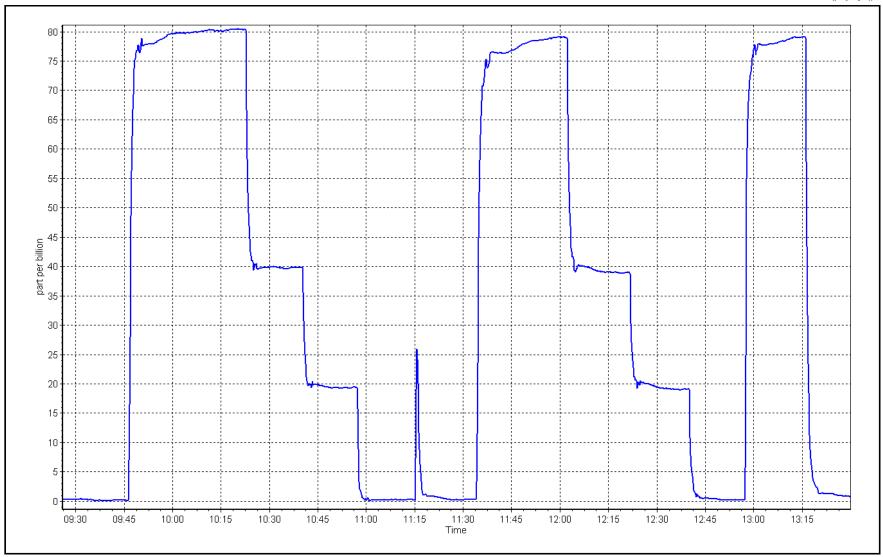


H₂S Calibration Plot

Date: March 23, 2023

Location: Jackfish 2/3







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Jackfish 2/3

Calibration Date: March 28, 2023

Start time (MST): 9:45
Reason: Routine

Station number: AMS27

Last Cal Date: February 22, 2023

End time (MST): 13:50

NO gas Diff:

Calibration Standards

NO Gas Cylinder #: T2Y1P35 Cal Gas Expiry Date: December 11, 2023

NOX Cal Gas Conc: 51.44 ppm NO Cal Gas Conc: 50.40 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 51.44 ppm Removed Gas NO Conc: 50.40 ppm

NOX gas Diff:

Calibrator Model: API T700 Serial Number: 3811 ZAG make/model: 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:	1.241	1.241	NO bkgnd or offset:	0.9	0.9
NOX coeff or slope:	1.228	1.228	NOX bkgnd or offset:	0.9	0.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.4	4.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998669	0.998179
NO _x Cal Offset:	-3.017307	-4.217263
NO Cal Slope:	1.000287	0.998789
NO Cal Offset:	-2.020303	-3.720948
NO ₂ Cal Slope:	0.990573	0.995821
NO ₂ Cal Offset:	-1.100427	-0.727241



$NO_X \setminus NO \setminus NO_2$ 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	0.0	-0.2	0.2		
as found span	4921	79.4	816.8	800.3	16.5	810.0	796.9	13.2	1.0084	1.0043
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	4921	79.4	816.8	800.3	16.5	813.6	797.5	16.1	1.0039	1.0035
second point	4960	39.7	408.5	400.2	8.3	400.2	393.9	6.2	1.0206	1.0160
third point	4980	19.8	203.7	199.6	4.1	195.7	192.2	3.5	1.0409	1.0385
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.2		
as left span	4921	79.4	816.8	412.5	417.7	807.6	403.3	404.3	1.0114	1.0228
							Average C	Correction Factor	1.0218	1.0193
Corrected As fo	ound NO _x =	810.0 ppb	NO =	797.1 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-0.3%
Previous Respo	nse NO _x =	812.7 ppb	NO =	798.5 ppb				*Percent Chang	ge NO =	-0.2%
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 _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 ₂ Int:	
				(GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		ated NO Drop entration (ppb)	Calculated NC concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction far Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									

O3 Setpoint (ppb)	concentration (ppb)	concentration (ppb)	concentration (ppb) (Co	c) concentration (ppb) (Ic)	As Found Limit = 0.90-1.10	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)	796.1	394.9	417.7	414.9	1.0068	99.3%
2nd GPT point (200 ppb O3)	796.1	609.4	203.2	203.6	0.9981	100.2%
3rd GPT point (100 ppb O3)	796.1	707.9	104.7	101.1	1.0357	96.5%
			A	Average Correction Factor	1.0135	98.7%

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador



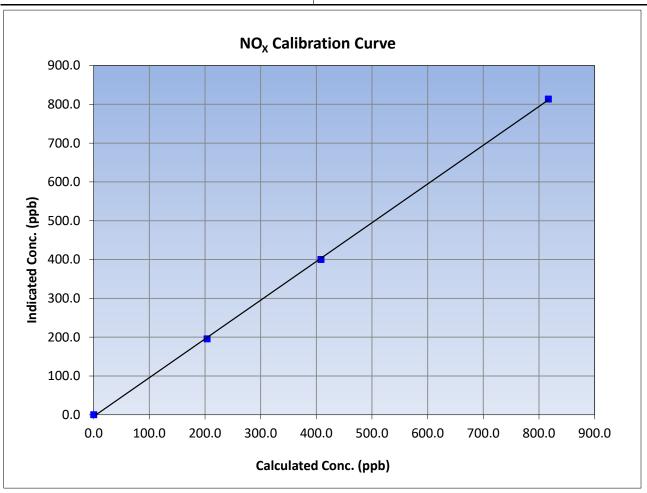
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 28, 2023 **Previous Calibration:** February 22, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 9:45 End Time (MST): 13:50 Analyzer make: **API T200** Analyzer serial #: 4460

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999872	≥0.995
816.8	813.6	1.0039	Correlation Coefficient	0.333072	20.555
408.5	400.2	1.0206	Slope	0.998179	0.90 - 1.10
203.7	195.7	1.0409	Slope	0.996179	0.90 - 1.10
			Intercept	-4.217263	+/-20





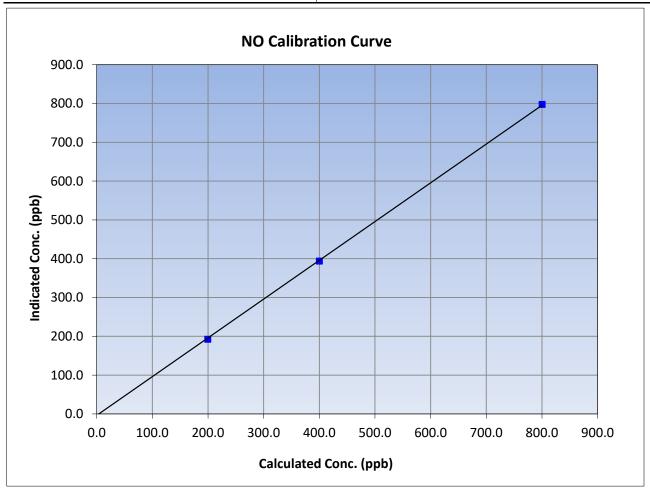
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 28, 2023 **Previous Calibration:** February 22, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 9:45 End Time (MST): 13:50 Analyzer make: **API T200** Analyzer serial #: 4460

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999906	≥0.995
800.3	797.5	1.0035	Correlation Coefficient	0.555500	20.333
400.2	393.9	1.0160	Slope	0.998789	0.90 - 1.10
199.6	192.2	1.0385	Slope	0.556765	0.30 - 1.10
			Intercept	-3.720948	+/-20





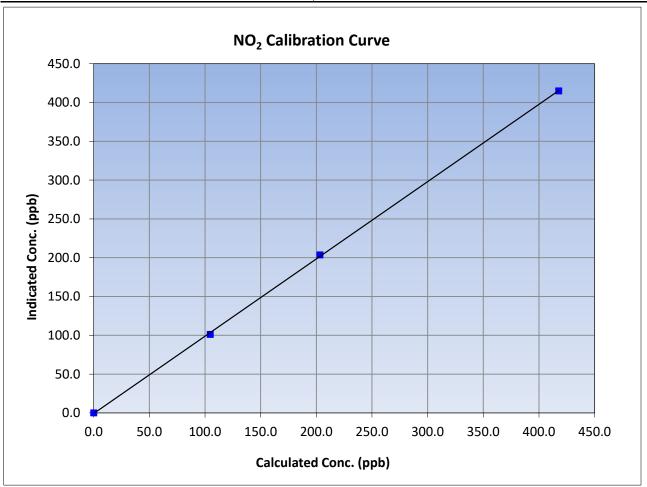
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 28, 2023 **Previous Calibration:** February 22, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 9:45 End Time (MST): 13:50 Analyzer serial #: Analyzer make: **API T200** 4460

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999887	≥0.995
417.7	414.9	1.0068	Correlation Coefficient	0.555667	20.555
203.2	203.6	0.9981	Slope	0.995821	0.90 - 1.10
104.7	101.1	1.0357	Slope	0.993621	0.90 - 1.10
			Intercept	-0.727241	+/-20

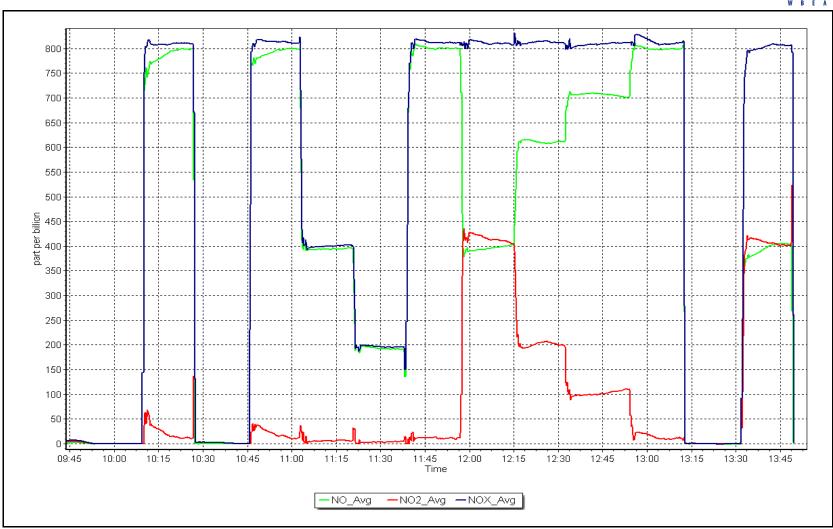


NO_x Calibration Plot

Date: March 28, 2023

Location: Jackfish 2/3







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS29 SURMONT 2 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Finish

12.4 0.934

Station Information

Station Name: Surmont 2

Calibration Date: March 13, 2023

Start time (MST): 10:09

Routine Reason:

Station number: AMS29

> Last Cal Date: February 16, 2023

> > February 23, 2025

Start

13:27 End time (MST):

Calibration Standards

Cal Gas Concentration: 49.21 ppm

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

Rem Gas Exp Date: NA ppm

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 5258

Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.999443 1.006112 Backgd or Offset: 12.5 Calibration intercept: -2.985140 -2.145180

Coeff or Slope: 0.934

SO₂ 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	-0.5	
as found span	4919	81.3	800.1	798.8	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4919	81.3	800.1	804.0	0.995
second point	4959	40.7	400.6	399.3	1.003
third point	4979	20.3	199.8	197.5	1.012
as left zero	5000	0.0	0.0	0.0	
as left span	4919	81.3	800.1	803.0	0.996
			Averag	ge Correction Factor	1.003

Baseline Corr As found: 799.30 Previous response 796.68 *% 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 sample inlet filter after as founds. No adjustments made.

Calibration Performed By: **Braiden Boutilier**



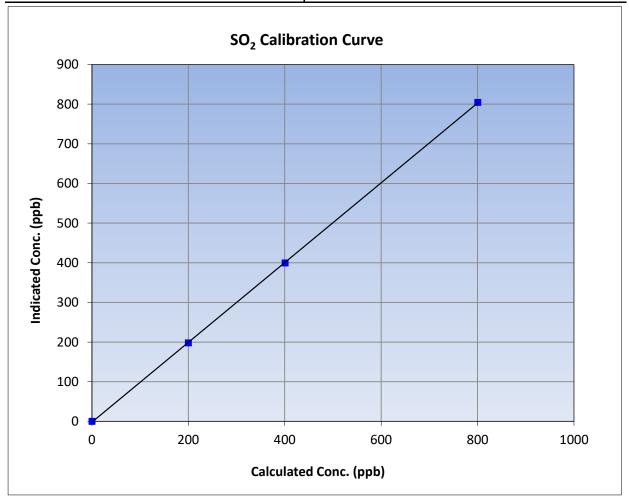
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 13, 2023 **Previous Calibration:** February 16, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:09 End Time (MST): 13:27 Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evaluation		<u>Limits</u>		
0.0	-0.3		Correlation Coefficient	0.999974	≥0.995		
800.1	804.0	0.9952	Correlation coefficient	0.555574	20.333		
400.6	399.3	1.0032	Slope	1.006112	0.90 - 1.10		
199.8	197.5	1.0117	Slope	1.000112	0.90 - 1.10		
			- Intercept	-2.145180	+/-30		



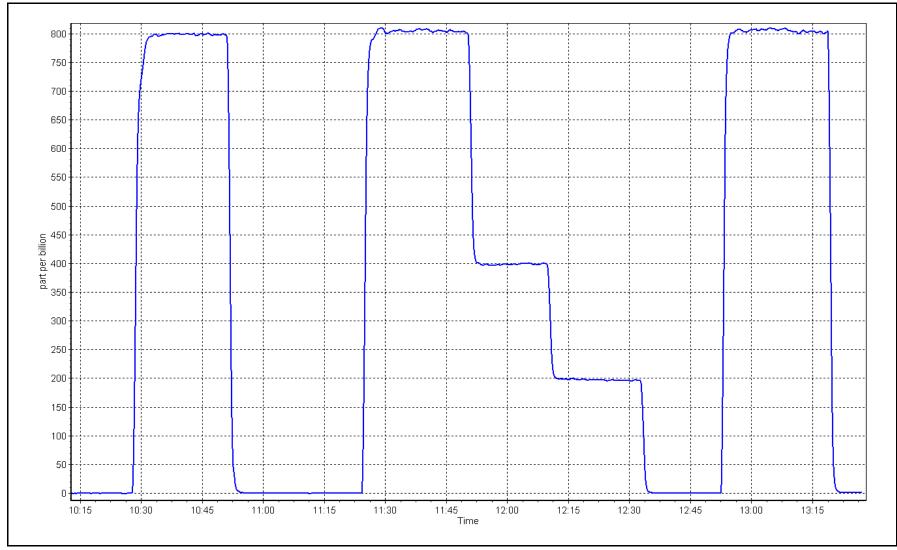
SO2 Calibration Plot

Date:

March 13, 2023

Location: Surmont 2







THC Calibration Report

Version-01-2020

Station Information

Surmont 2 Station Name:

March 13, 2023 Calibration Date:

Start time (MST): 10:09

Routine Reason:

Station number: AMS29

> February 16, 2023 Last Cal Date:

End time (MST): 13:27

Calibration Standards

CC356008 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.0 CH4 Equiv Conc. 1064.7 ppm 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 Removed C3H8 Conc. ppm Diff between cyl:

5258 Calibrator Make/Model: Teledyne API T700 Serial Number: ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 0.995950 1.008880 4.36 4.62

Coefficient: Calibration intercept: 0.026135 -0.118074 5.223 5.286

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	0.11	
as found span	4918	81.3	17.31	17.22	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.06	
high point	4918	81.3	17.31	17.37	0.997
second point	4959	40.7	8.67	8.62	1.005
third point	4979	20.3	4.32	4.17	1.036
as left zero	5000	0.0	0.00	-0.17	
as left span	4918	81.3	17.31	17.40	0.995
			Averag	ge Correction Factor	1.013
Baseline Corr As found:	17.11	Previous response	17.27	*% change	-1.0%
Baseline Corr 2nd AE nt:	NΛ	AF Slone:		AF Intercent:	

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

Baseline Corr 3rd AF pt: AF Correlation: NA

* = > +/-5% change initiates investigation

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

Calibration Performed By: **Braiden Boutilier**



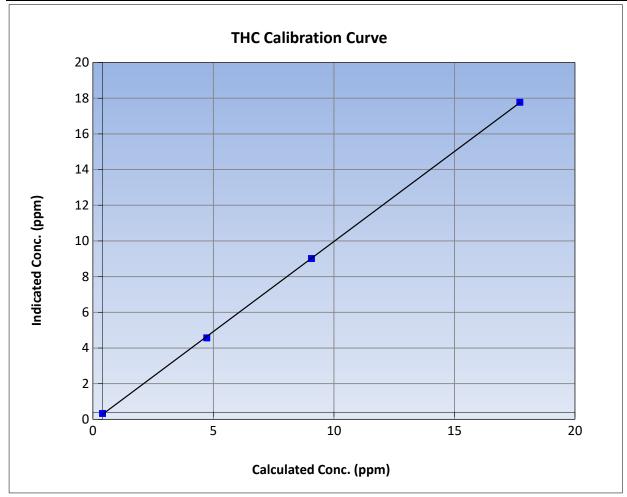
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: March 13, 2023 February 16, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:09 End Time (MST): 13:27 Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Calibration Data							
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	Statistical Evaluation			
0.00	-0.06		Correlation Coefficient	0.999950	≥0.995		
17.31	17.37	0.9968	Correlation Coefficient	0.555550	20.993		
8.67	8.62	1.0054	Slope	1.008880	0.90 - 1.10		
4.32	4.17	1.0357	Slope	1.008880	0.90 - 1.10		
			- Intercept	-0.118074	+/-1.5		

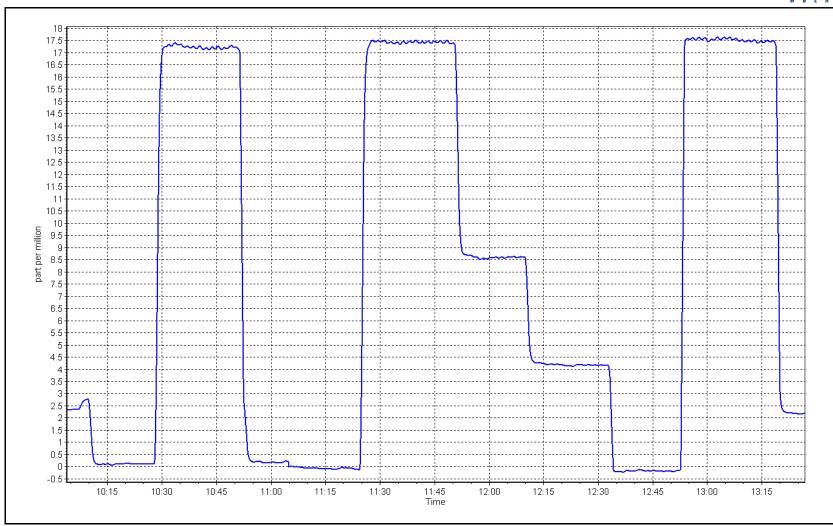


THC Calibration Plot

Date: March 13, 2023

Location: Surmont 2







H₂S Calibration Report

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Surmont 2

Calibration Date: March 29, 2023

Start time (MST): 10:05 Reason: Removal Station number: AMS29

Last Cal Date: February 13, 2023

End time (MST): 12:20

Calibration Standards

Cal Gas Concentration: 5.391 ppm Cal Gas Exp Date: January 4, 2025

Cal Gas Cylinder #: CC508338

Calibrator Make/Model: Teledyne API T700 Serial Number: 5258 ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1170050142

Converter make: Internal Converter serial #: NA

Analyzer Range 0 - 100 ppb

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

Calibration slope: 0.994905 Backgd or Offset: 17.0 17.0 Calibration intercept: -0.062658 Coeff or Slope: 1.024 1.024

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 span	4926	74.2	80.0	83.0	0.962
as found 2nd point	4963	37.2	40.1	41.5	0.962
as found 3rd point	4982	18.6	20.1	20.3	0.978
new cylinder response					-

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					
second point					
third point					
as left zero			•		
as left span					

SO2 Scrubber Check

Date of last scrubber change:		15-Apr-21	Ave Corr Factor			
Date of last converter efficiency test:					efficiency	
Baseline Corr As found: Baseline Corr 2nd AF pt:	83.2 41.7	Prev response: AF Slope:	79.53 1.041475	*% change: AF Intercept:	4.4% -0.344531	
Baseline Corr 3rd AF pt:	20.5	AF Slope. AF Correlation:	0.999978	Ar intercept.	-0.344331	
				* = > 1 / E0/ change initiate	s investigation	

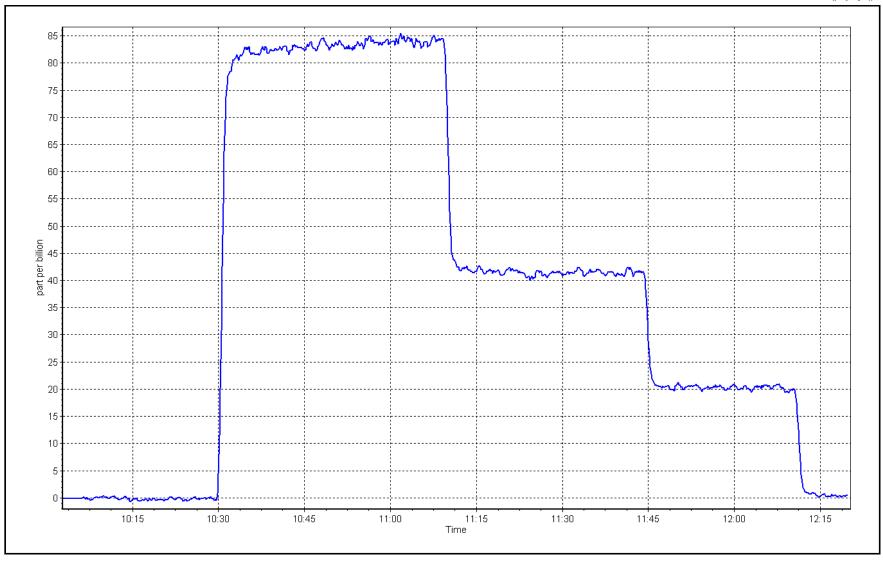
Notes: As founds done in preparation to swap the 450i with a 43iQ-TLE with an external converter.

Calibration Performed By: Braiden Boutilier

Date: March 29, 2023

Location: Surmont 2







H₂S Calibration Report

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Surmont 2 Calibration Date: March 30, 2023

Start time (MST): 9:33

Reason: Install Station number: AMS29

> Last Cal Date: March 29, 2023

End time (MST): 15:27

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 5258 Serial Number: ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

Global Converter serial #: 2022-223 Converter make:

Analyzer Range 0 - 100 ppb

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

1.002040 Backgd or Offset: Calibration slope: 1.22 -0.162687 Coeff or Slope: 1.043 Calibration intercept:

H₂S 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 = 0.90-1.10as found zero as found span

as found 2nd point as found 3rd point new cylinder response

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	5000	0.0	0.0	0.0	
high point	4926	74.2	80.0	80.1	0.999
second point	4963	37.2	40.1	39.9	1.005
third point	4982	18.6	20.1	19.8	1.013
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.2	80.0	80.4	0.995
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chang	ξe:	30-Mar-23		Ave Corr Factor	1.006

Date of last converter efficiency test: efficiency

Baseline Corr As found: NA *% change: Prev response: NA 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

Install calibration. Swapped the 450i with a 43iQ-TLE and external global converter. Adjusted zero Notes: and span.

Calibration Performed By: Braiden Boutilier



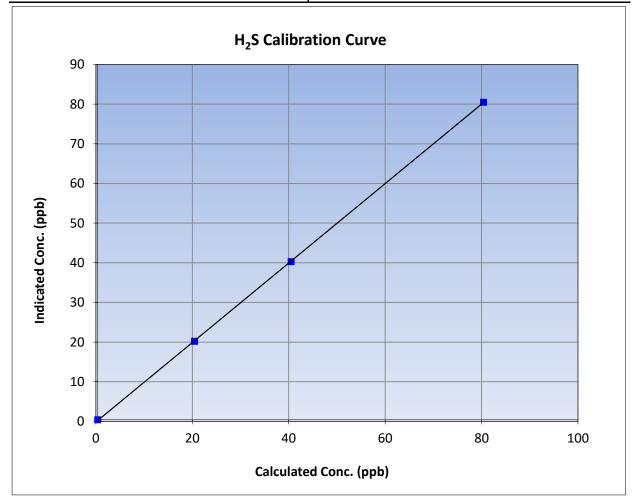
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 30, 2023 **Previous Calibration:** March 29, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 9:33 End Time (MST): 15:27 Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

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	0.999980	≥0.995			
80.0	80.1	0.9988	Correlation coefficient	0.555500	20.333			
40.1	39.9	1.0052	Slope	1.002040	0.90 - 1.10			
20.1	19.8	1.0128	Slope	1.002040	0.90 - 1.10			
			- Intercept	-0.162687	+/-3			

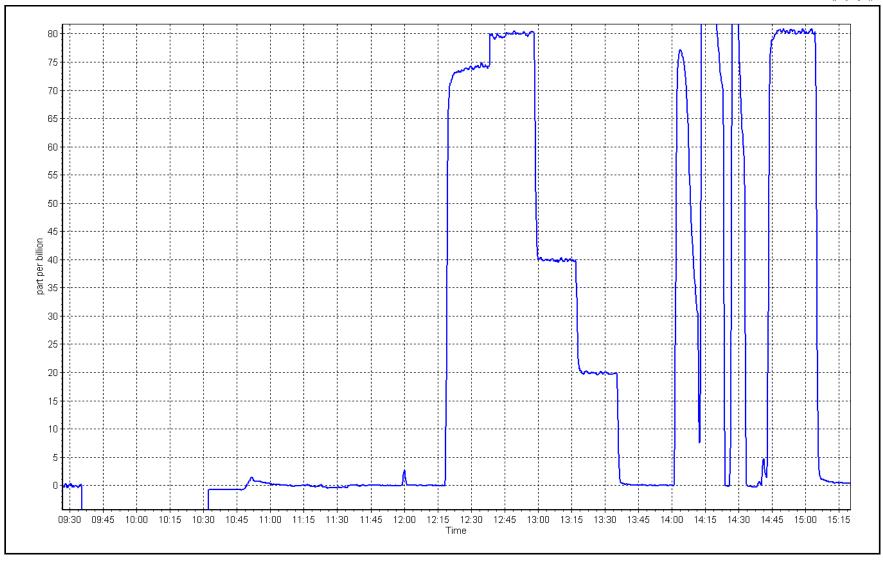


H₂S Calibration Plot

Date: March 30, 2023

Location: Surmont 2







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Surmont 2 Station Name:

March 13, 2023 Calibration Date:

Start time (MST): 14:15 Reason: **GPT Check** Station number: AMS29

Last Cal Date: February 22, 2023

End time (MST): 16:55

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: 47.46 ppm Removed Gas NO Conc: 47.46 ppm

NOX gas Diff:

NO gas Diff: Teledyne API T700 Serial Number: 5258 Calibrator Model: ZAG make/model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1170050148

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.340 1.340 NO bkgnd or offset: 1.3 1.3 NOX coeff or slope: 0.998 0.998 NOX bkgnd or offset: 1.4 1.4 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 168.4 168.4

Calibration Statistics

Start **Finish**

NO_x Cal Slope: 1.000440 NO_x Cal Offset: 0.326827 NO Cal Slope: 1.000353 NO Cal Offset: -0.592834 NO₂ Cal Slope: 1.006976 NO₂ Cal Offset: 1.486191



NO_X \ NO \ NO₂ 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 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	0.0		
as found span	4916	84.2	799.2	799.2	0.0	783.8	778.8	5.1	1.0196	1.0262
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0		
as left span	4916	84.2	799.2	416.8	382.4	780.2	397.9	382.2	1.0243	1.0475
							Average C	orrection Factor		
Corrected As fo	und NO _X =	783.8 ppb	NO :	778.8 ppb	* = > +/-5	% change initiate	es investigation	*Percent Chan	ge NO _x =	-2.1%
Previous Respo	nse NO _x =	799.9 ppb	NO :	= 798.9 ppb				*Percent Chan	ge NO =	-2.6%
Baseline Corr 2			NO:		As foun	d NO _x r	2.	Nx SI:	Nx Int:	
	' ^	• •		1.1.	As foun	**		NO SI:		
Baseline Corr 3	rd pt $NO_X =$	NA ppb	NO :	NA ppb		-			NO Int:	
					As foun	d NO ₂ r	² :	NO2 SI:	NO ₂ Int	
				G	PT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Refe concentration (p		icated NO Drop centration (ppb)	Calculated No concentration (pp		Indicated NO2 entration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05	erter Efficiency on 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)	778.8		396.4	382.4		384.0	0.995	8	100.4%
2nd GPT point	(200 ppb O3)									
3rd GPT point	(100 ppb O3)									
						Average (Correction Factor	0.995	8	100.4%

Notes:

Checking the output of the calibrator prior to the monthly NOx calibration. GPTPS 400 ozone point generated, GPT 400 ozone point checked.

Calibration Performed By:

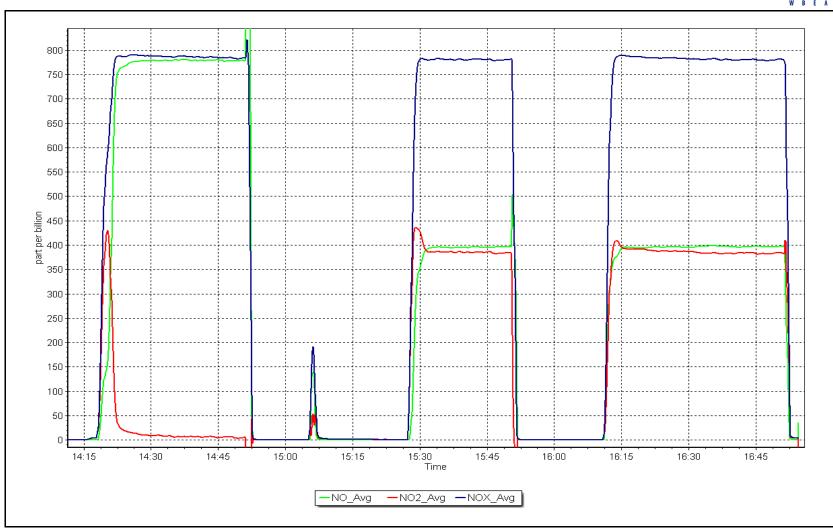
Braiden Boutilier

NO_x Calibration Plot

Date:

March 13, 2023 Location: Surmont 2







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Surmont 2 Station number: AMS29

Calibration Date: March 16, 2023 Last Cal Date: February 22, 2023

Start time (MST): 10:06 End time (MST): 15:50

Reason: Routine

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 NO Conc: Removed Gas NOX Conc: 47.46 ppm 47.46 ppm

NOX gas Diff:

NO gas Diff: Teledyne API T700 Serial Number: 5258 Calibrator Model: ZAG make/model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1170050148

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.340 1.357 NO bkgnd or offset: 1.3 1.3 NOX coeff or slope: 0.998 0.996 NOX bkgnd or offset: 1.4 1.4 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 168.4 175.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000440	0.999093
NO _x Cal Offset:	0.326827	-1.251932
NO Cal Slope:	1.000353	0.999707
NO Cal Offset:	-0.592834	-1.991859
NO ₂ Cal Slope:	1.006976	0.998536
NO ₂ Cal Offset:	1.486191	0.601598



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibration	Data				
Set Point	Dilution flow rate (sccm)	Source gas flow	Calculated NOx concentration (ppb) (Cc)	Calculated NO 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/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.0		
as found span	4916	84.2	799.2	799.2	0.0	790.1	788.0	2.1	1.0115	1.0142
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	4916	84.2	799.2	799.2	0.0	797.4	797.7	-0.3	1.0023	1.0019
second point	4958	42.1	399.6	399.6	0.0	398.6	397.2	1.4	1.0025	1.0061
third point	4979	21.1	200.3	200.3	0.0	196.9	195.9	1.0	1.0172	1.0223
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4916	84.2	799.2	412.9	386.3	790.0	403.0	387.1	1.0116	1.0246
							Average Co	orrection Factor	1.0073	1.0101
Corrected As fo	ound NO _X =	790.2 ppb	NO =	788.2 ppb	* = > +/-5%	change initiates i	nvestigation	*Percent Chang	ge NO _x =	-1.2%
Previous Respo	nse NO _X =	799.9 ppb	NO =	798.9 ppb				*Percent Chang	ge NO =	-1.4%
Baseline Corr 2		NA ppb	NO =		As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO r ² :		NO SI:	NO Int:	:
	·	• •			As found	$NO_2 r^2$:		NO2 SI:	NO ₂ Int	ı
				G	GPT Calibration D	ata				
O3 Setpo	int (ppb)	Indicated NO Refere concentration (pp		eated NO Drop entration (ppb)	Calculated NO2 concentration (ppb)		dicated NO2 atration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibrati	erter Efficiency on 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)	788.5		402.2	386.3		386.2	1.0003	3	100.0%
2nd GPT point	t (200 ppb O3)	788.5		587.0	201.5		201.6	0.9995	5	100.0%
3rd GPT point	(100 ppb O3)	788.5		688.7	99.8		101.2	0.9862	2	101.4%
						Average Co	rrection Factor	0.9953	3	100.5%

Notes:

Changed sample inlet filter after as founds. Adjusted span. Second high NO reference point used for Indicated NO reference concentrations.

Calibration Performed By:

Braiden Boutilier



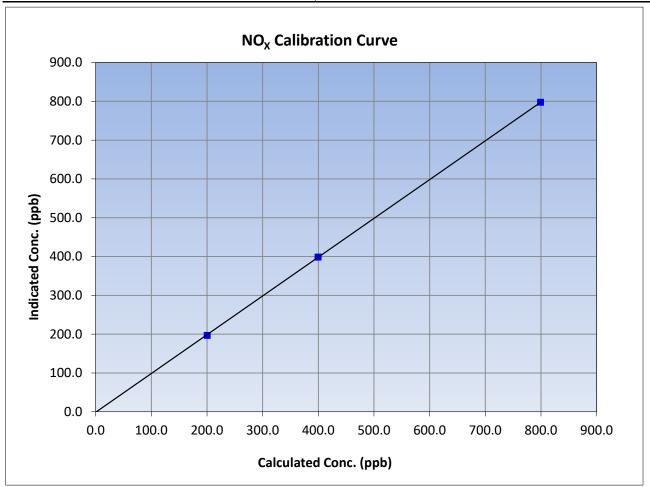
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 16, 2023 Previous Calibration: February 22, 2023 Station Name: Station Number: AMS29 Surmont 2 Start Time (MST): 10:06 End Time (MST): 15:50 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	0.999984	≥0.995
799.2	797.4	1.0023	Correlation Coefficient	0.333304	20.993
399.6	398.6	1.0025	Slope	0.999093	0.90 - 1.10
200.3	196.9	1.0172	Slope	0.999095	0.90 - 1.10
			Intercept	-1.251932	+/-20





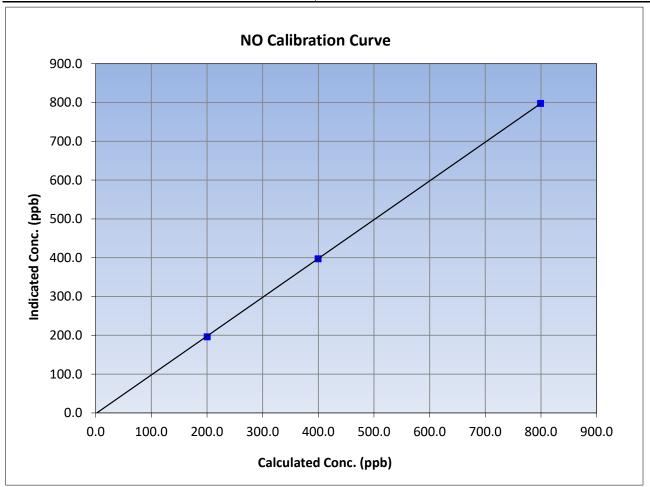
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 16, 2023 Previous Calibration: February 22, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:06 End Time (MST): 15:50 Analyzer make: Thermo 42i Analyzer serial #: 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999972	≥0.995
799.2	797.7	1.0019	Correlation Coefficient	0.333372	20.333
399.6	397.2	1.0061	Slope	0.999707	0.90 - 1.10
200.3	195.9	1.0223	Slope	0.999707	0.90 - 1.10
			Intercept	-1.991859	+/-20





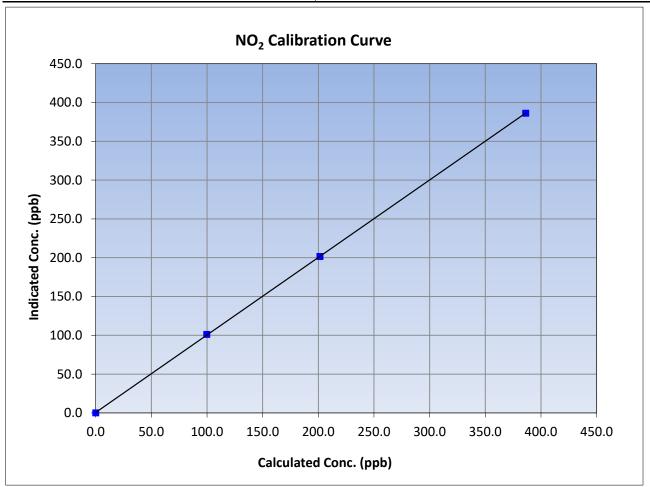
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 16, 2023 Previous Calibration: February 22, 2023 Station Name: Station Number: AMS29 Surmont 2 Start Time (MST): 10:06 End Time (MST): 15:50 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999984	≥0.995
386.3	386.2	1.0003	Correlation Coefficient	0.555504	20.333
201.5	201.6	0.9995	Slope	0.998536	0.90 - 1.10
99.8	101.2	0.9862	Slope	0.996550	0.90 - 1.10
			Intercept	0.601598	+/-20

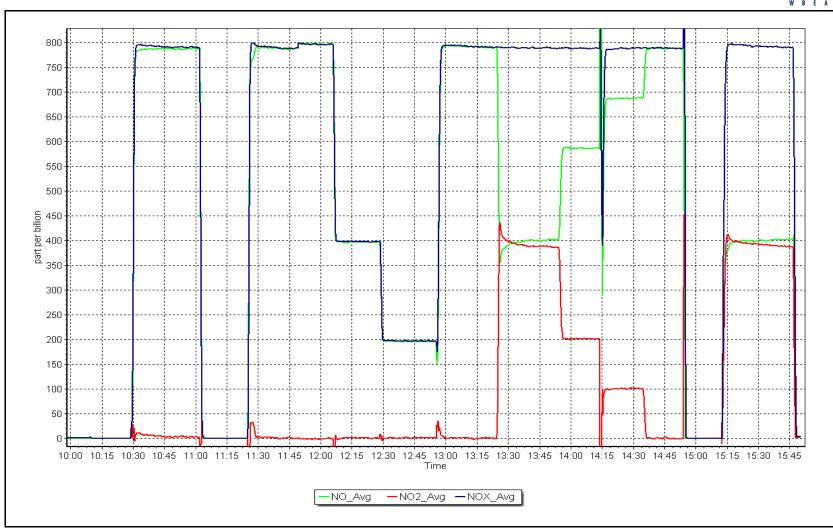


NO_x Calibration Plot

Date:

March 16, 2023 Location: Surmont 2







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information						
Station Name:	Surmont 2	Station number: AMS 29						
Calibration Date:	March 13, 2023		Last Cal Date:	February 17, 2023				
Start time (MST):	13:04		End time (MST):	14:09				
Analyzer Make:	API T640		S/N:	253				
Particulate Fraction:	PM2.5		ŕ					
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388753				
Temp/RH standard:	Alicat FP-25BT		S/N:	388753				
		Monthly Calibration Te						
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)			
T (°C)	-5.7	-5.4	-5.7		+/- 2 °C			
P (mmHg)	706.8	707.77	706.8		+/- 10 mmHg			
flow (LPM)	4.99	4.962	4.99		+/- 0.25 LPM			
Leak Test:	Date of check:	March 13, 2023	Last Cal Date:	February 17, 2023				
	PM w/o HEPA:	3.7	PM w/ HEPA:	0	<0.2 ug/m3			
Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre ma	intenance leak check				
Inlet cleaning:	Inlet Head							
-		Quarterly Calibration T	ost					
Paramotor	As found	Post maintenance	As left	Adjusted	(Limits)			
<u>Parameter</u> PMT Peak Test	AS IOUIIU	<u>rost maintenance</u>	Asiert	Aujusteu	11.3 +/- 0.5			
PIVIT PEAK TEST					11.3 +/- 0.5			
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:				
Date Optical Cham	ber Cleaned:	February 17			<0.2 ug/m3			
Disposable Filter	r Changed:	February 17	2023					
		Annual Maintenance						
Date Sample Tub	-	September 30						
Date RH/T Senso	or Cleaned:	October 6,	2022					
Notes:		No adjustments	made, Leak check	passed.				
Calibration by:	Braiden Boutilier							



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS30 ELLS RIVER MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Ells River Station number: AMS 30

Calibration Date: March 1, 2023 Last Cal Date: February 15, 2023

Start time (MST): 9:43 End time (MST): 12:45

Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.53 ppm Cal Gas Exp Date: December 29, 2028

Cal Gas Cylinder #: CC494126

Removed Cal Gas Conc: 50.53 ppm Rem Gas Exp Date: Removed Gas Cyl #: 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 Analyzer serial #: 1008841397

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:1.0061721.004115Backgd or Offset:9.28.9

Calibration intercept: -2.436019 -2.615941 Coeff or Slope: 0.988 0.988

SO₂ 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)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.5	
as found span	4921	79.2	800.4	800.1	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4921	79.2	800.4	802.6	0.997
second point	4960	39.6	400.2	397.2	1.008
third point	4980	19.8	200.1	196.2	1.020
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.2	800.4	801.7	0.998
			Averag	ge Correction Factor	1.008

Baseline Corr As found: 800.60 Previous response 802.87 *% 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: Adjusted the zero only.

Calibration Performed By: Denny Ray Estador



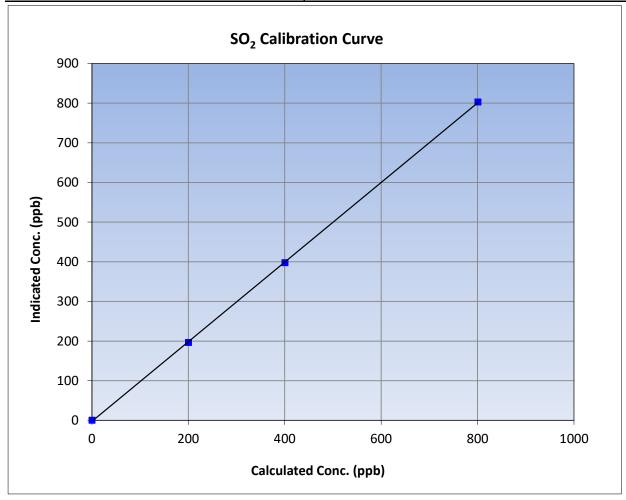
SO₂ Calibration Summary

Version-01-2020

Station Information

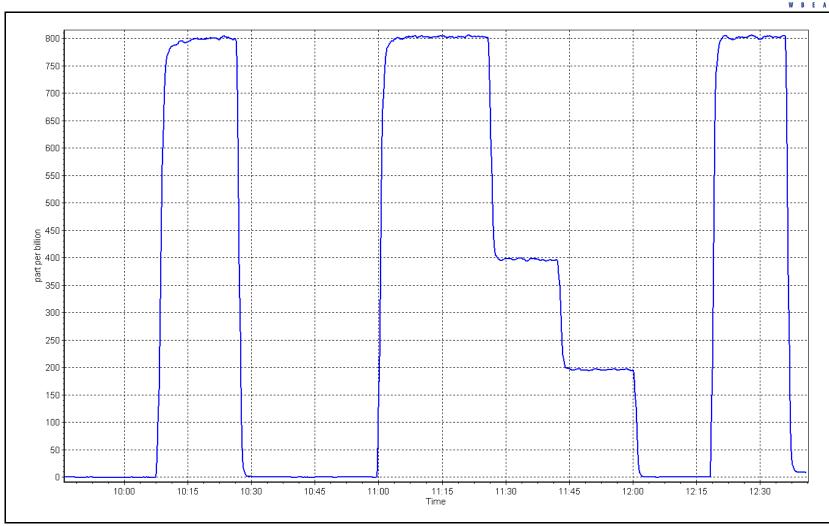
Calibration Date: March 1, 2023 **Previous Calibration:** February 15, 2023 Station Name: Ells River Station Number: AMS 30 Start Time (MST): 9:43 End Time (MST): 12:45 Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Calibration Data								
Calculated concentration Indicated concentration								
0.0	0.0		Correlation Coefficient	0.999949	≥0.995			
800.4	802.6	0.9972	Correlation Coefficient	0.333343	20.993			
400.2	397.2	1.0076	Slope	1.004115	0.90 - 1.10			
200.1	196.2	1.0199	Slope	1.004113	0.90 - 1.10			
			- Intercept	-2.615941	+/-30			



SO2 Calibration Plot Date: March 1, 2023 Location: Ells River







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Ells River

Calibration Date: March 2, 2023

Start time (MST): 9:39 Reason: Routine Station number: AMS30

Last Cal Date: February 13, 2023

End time (MST): 13:20

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: February 9, 2024 5.08 ppm

Cal Gas Cylinder #: EY0002443

Removed Cal Gas Conc: 5.08 Rem Gas Exp Date: ppm Removed Gas Cyl #: 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

CDN - 101 Converter serial #: 555 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> Calibration slope: 0.999493 0.998207 Backgd or Offset: 1.57 1.57 0.040843 0.060852 Calibration intercept: Coeff or Slope: 1.092 1.092

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	78.7	80.0	79.3	1.008
as found 2nd point	4961	39.4	40.0	39.4	1.016
as found 3rd point	4980	19.7	20.0	19.5	1.026
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	4921	78.7	80.0	79.9	1.001
second point	4961	39.4	40.0	40.0	1.001
third point	4980	19.7	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.4	
as left span	4921	78.7	80.0	80.3	0.996
SO2 Scrubber Check	4921	79.2	800.4	-0.1	
Date of last scrubber char	nge:	N/A	_	Ave Corr Factor	1.001
Date of last converter efficiency test:		N/A		95.1%	efficiency

Date of last scrubber change	:	N/A		Ave Corr Factor	1.001	
Date of last converter efficiency test:		N/A		95.1%	efficiency	
Baseline Corr As found:	79.3	Prev response:	79.96	*% change:	-0.8%	

Prev response: Baseline Corr 2nd AF pt: 39.4 AF Slope: 0.992773 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999971 19.5

* = > +/-5% change initiates investigation

No adjustments made. Notes:

Calibration Performed By: Denny Ray Estador -0.198955



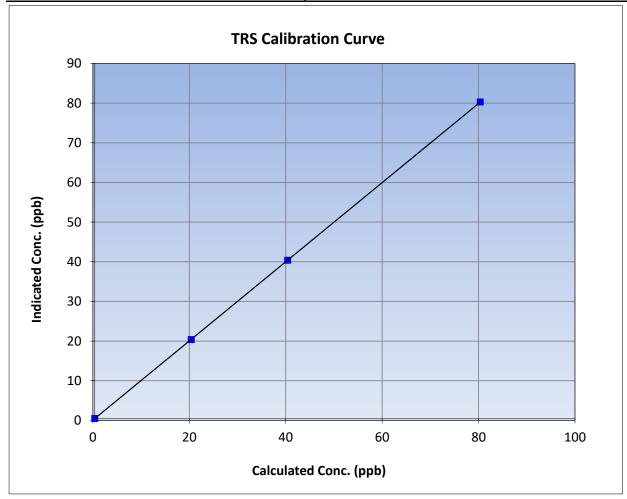
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 2, 2023 **Previous Calibration:** February 13, 2023 Station Name: Ells River Station Number: AMS30 Start Time (MST): 9:39 End Time (MST): 13:20 Analyzer make: Thermo 43i TLE Analyzer serial #: 1410661331

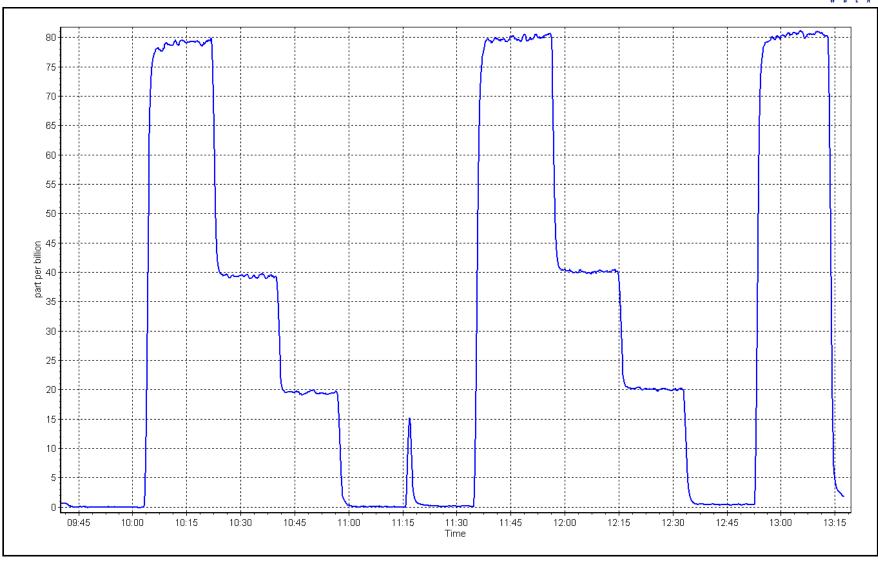
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999999	≥0.995				
80.0	79.9	1.0008	Correlation coefficient	0.555555	20.993				
40.0	40.0	1.0007	Slope	0.998207	0.90 - 1.10				
20.0	20.0	1.0008	Slope	0.998207	0.90 - 1.10				
			- Intercept	0.060852	+/-3				



TRS Calibration Plot

Date: March 2, 2023 Location: Ells River







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Ells River Station Name:

Calibration Date: March 1, 2023

Start time (MST): 9:43 Reason: Routine Station number: AMS 30

Last Cal Date: February 10, 2023

End time (MST): 12:45

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):

Baseline Corr 3rd AF:

NA

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 #: 1193585650

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Start Finish Start Finish

0.000234 CH4 SP Ratio: 0.000236 NMHC SP Ratio: 4.96E-05 4.19E-05 CH4 Retention time: 14.2 NMHC Peak Area: 13.6 183767 217301

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	16.46	1.035
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	8.40	1.014
third 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	17.01	1.001
			,	Average Correction Factor	1.012
Baseline Corr AF:	16.46	Prev response	16.88	*% change	-2.6%

Baseline Corr AF: Prev response 16.46 16.88 *% change Baseline Corr 2nd AF: NA AF Slope: AF Intercept: * = > +/-5% change initiates investigation -0.023379



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC 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 0.00		0.00							
as found span	4921	79.2	9.11	8.74	1.043						
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	9.11	1.001						
second point	4960	39.6	4.56	4.52	1.008						
third point	4980	19.8	2.28	2.25	1.014						
as left zero	5000	0	0.00	0.00							
as left span	4921	79.2	9.11	9.13	0.998						
			Aver	rage Correction Factor	1.008						
Baseline Corr AF:	8.74	Prev response	9.00	*% change	-3.0%						
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:							
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation						
		0114 O 111									
		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							
as found span	4024	70.2	7.01	7 72	1 025						

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	4921	79.2	7.91	7.72	1.025				
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	7.91	7.89	1.003				
second point	4960	39.6	3.96	3.88	1.020				
third point	4980	19.8	1.98	1.92	1.029				
as left zero	5000	0.0	0.00	0.00					
as left span	4921	79.2	7.91	7.89	1.004				
			Ave	erage Correction Factor	1.017				
Baseline Corr AF:	7.72	Prev response	7.89	*% change	-2.2%				
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>		<u>Finish</u>					
THC Cal Slope:		0.994670		0.998858					
THC Cal Offset:		-0.054336		-0.050537					
CH4 Cal Slope:		1.000380		0.997766					
CH4 Cal Offset:		-0.030757		-0.031956					
NMHC Cal Slope:		0.989848		1.000170					

Notes: Changed N2 cylinder after the as founds. Adjusted the span.

-0.023379

Calibration Performed By: Denny Ray Estador

NMHC Cal Offset:

-0.018781



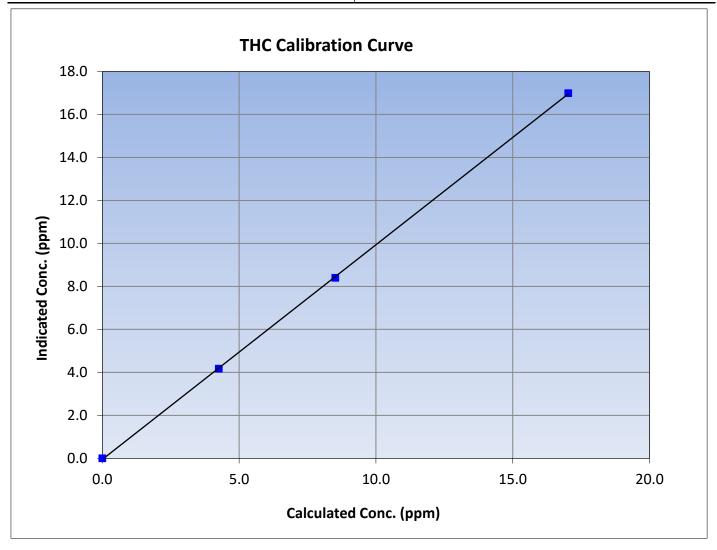
THC Calibration Summary

Version-01-2020

Station Information

March 1, 2023 **Previous Calibration:** Calibration Date: February 10, 2023 Station Name: Ells River AMS 30 Station Number: Start Time (MST): 9:43 End Time (MST): 12:45 Analyzer make: Analyzer serial #: 1193585650 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
17.03	16.99	1.0021	Correlation Coemicient	0.555552	20.333
8.51	8.40	1.0135	Slope	0.998858	0.90 - 1.10
4.26	4.17	1.0209	Slope	0.998838	0.30 - 1.10
		·	Intercept	-0.050537	+/-0.5





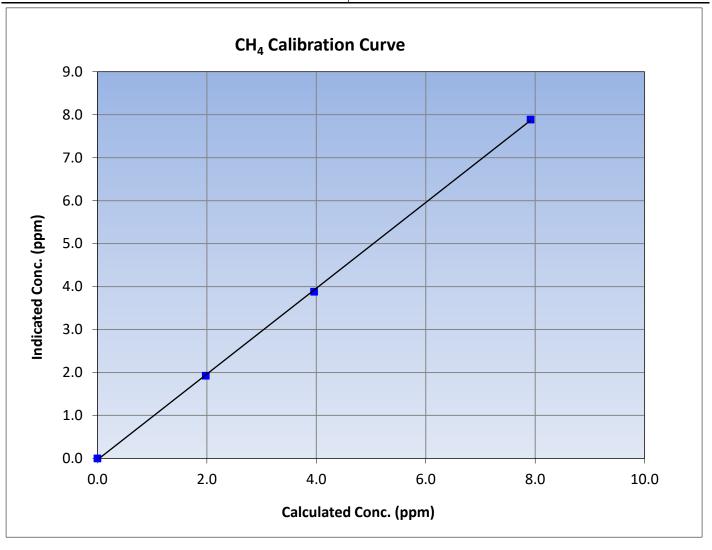
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: March 1, 2023 **Previous Calibration:** February 10, 2023 Station Name: AMS 30 Ells River Station Number: Start Time (MST): 9:43 End Time (MST): 12:45 Analyzer make: Analyzer serial #: Thermo 55i 1193585650

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999907	≥0.995
7.91	7.89	1.0034	Correlation Coemicient	0.555507	20.333
3.96	3.88	1.0198	Slope	0.997766	0.90 - 1.10
1.98	1.92	1.0285	Slope	0.997700	0.90 - 1.10
		·	Intercept	-0.031956	+/-0.5





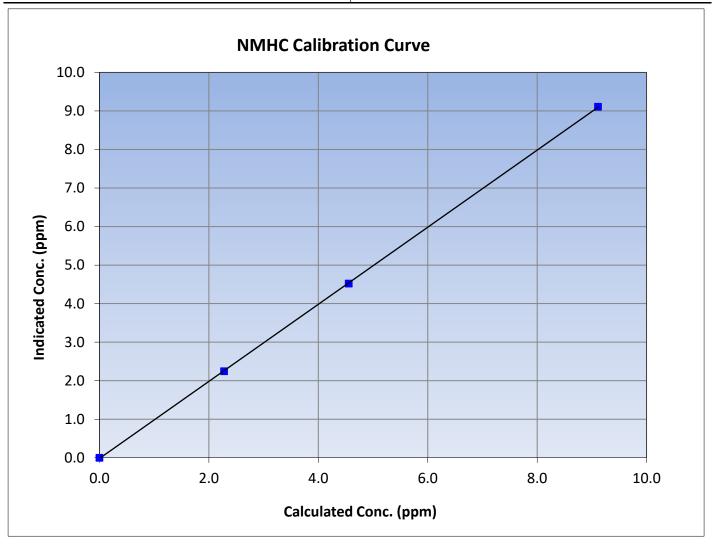
NMHC Calibration Summary

Version-01-2020

Station Information

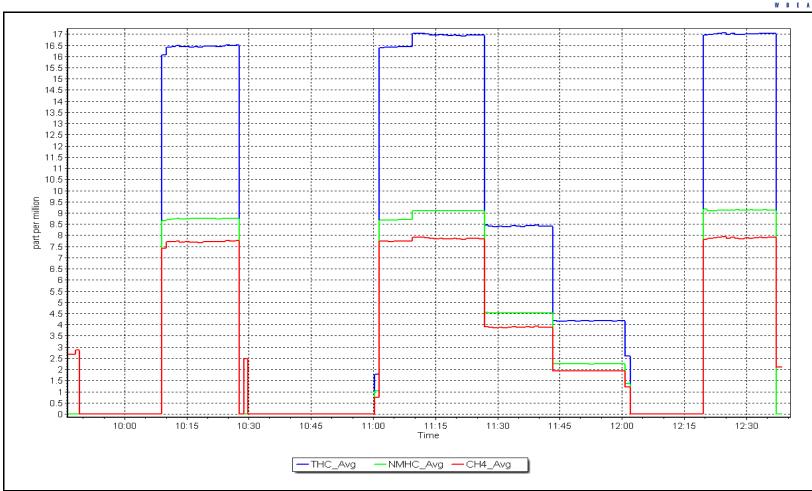
March 1, 2023 Calibration Date: **Previous Calibration:** February 10, 2023 Station Name: Ells River AMS 30 Station Number: Start Time (MST): 9:43 End Time (MST): 12:45 Analyzer make: Analyzer serial #: 1193585650 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999979	≥0.995	
9.11	9.11	1.0006	Correlation Coemicient	0.999979	20.333	
4.56	4.52	1.0077	Slope	1.000170	0.90 - 1.10	
2.28	2.25	1.0144	Slope	1.000170	0.90 - 1.10	
			Intercept	-0.018781	+/-0.5	



NMHC Calibration Plot Date: March 1, 2023 Location: Ells River







NO_X \ NO \ NO₂ Calibration Report

End time (MST): 13:40

Version-04-2020

Station Information

Station Name: Ells River Station number: AMS 30

Calibration Date: March 15, 2023 Last Cal Date: February 1, 2023

Start time (MST): 9:24 Reason: Routine

Calibration Standards

T2Y1P2R NO Gas Cylinder #: Cal Gas Expiry Date: December 11, 2023 NOX Cal Gas Conc: NO Cal Gas Conc: 49.97 50.83 ppm ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NO Conc: Removed Gas NOX Conc: 50.83 ppm 49.97 ppm

NOX gas Diff: NO gas Diff: **API T700** Serial Number: 3061 Calibrator Model:

Serial Number: 358 ZAG make/model: **API T701H**

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: 1.029 1.029 NO bkgnd or offset: 12.5 12.5 NOX coeff or slope: 0.992 0.992 NOX bkgnd or offset: 12.4 12.4 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 185.1 182.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001096	0.999129
NO _x Cal Offset:	-0.800000	-0.900000
NO Cal Slope:	1.001429	0.999714
NO Cal Offset:	-1.540000	-1.740000
NO ₂ Cal Slope:	1.001609	1.002165
NO ₂ Cal Offset:	0.350570	0.164860



NO_X \ NO \ NO₂ 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 NOs 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	-0.3	-0.3	0.0		
as found span	4920	80.0	813.3	799.5	13.8	814.8	800.0	14.7	0.9981	0.9994
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	4920	80.0	813.3	799.5	13.8	812.1	798.3	13.9	1.0015	1.0015
second point	4960	40.0	406.6	399.8	6.9	404.9	397.3	7.6	1.0043	1.0062
third point	4980	20.0	203.3	199.9	3.4	201.5	196.3	5.1	1.0090	1.0182
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4920	80.0	813.3	432.3	381.0	812.3	423.3	389.0	1.0012	1.0213
							Average C	orrection Factor	1.0049	1.0087
Corrected As fo	ound NO _X =	815.1 ppb	NO	= 800.3 ppb	* = > +/-5	% change initiat	es investigation	*Percent Chang	ge NO _x =	0.2%
Previous Respo	nse NO _x =	813.4 ppb	NO	= 799.1 ppb				*Percent Chang	ge NO =	0.1%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO	= NA ppb	As foun	d NO _x i	r ² :	Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO	= NA ppb	As foun	d NO	r ² :	NO SI:	NO Int:	
					As foun	d NO ₂	r ² :	NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		dicated NO Drop ncentration (ppb)	Calculated No concentration (pp		Indicated NO2 centration (ppb) (Ic)	NO2 Correction far Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency on Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									

Notes:

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 adjusments have been made.

381.9

190.9

103.9

Average Correction Factor

0.9975

0.9972

0.9938

0.9962

381.0

190.4

103.3

Calibration Performed By: Denny Ray Estador

793.6

793.6

793.6

426.4

617.0

704.1

100.2%

100.3%

100.6%

100.4%



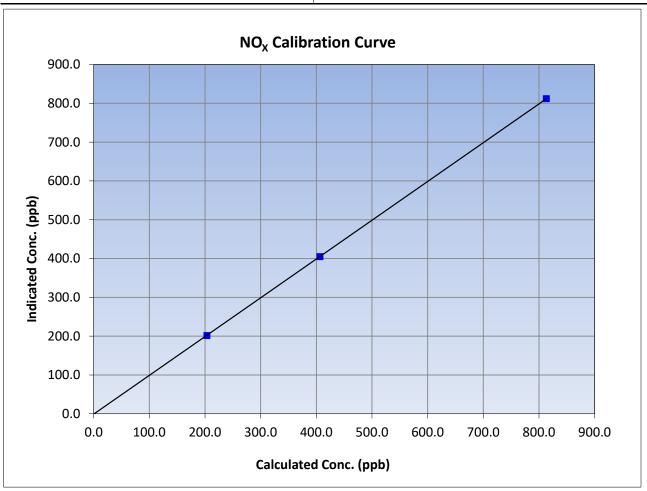
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 9:24 End Time (MST): 13:40 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	0.999996	≥0.995	
813.3	812.1	1.0015	Correlation Coefficient	0.999990	20.555	
406.6	404.9	1.0043	Slope	0.999129	0.90 - 1.10	
203.3	201.5	1.0090	Slope	0.999129	0.90 - 1.10	
			Intercept	-0.900000	+/-20	





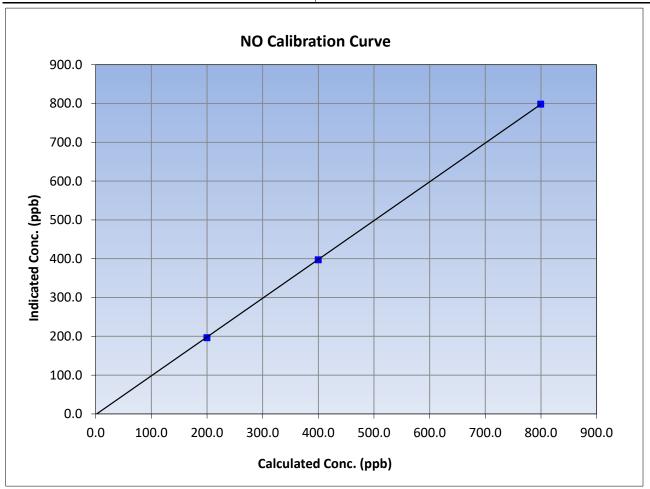
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 9:24 End Time (MST): 13:40 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	-0.1		Correlation Coefficient	0.999981	≥0.995
799.5	798.3	1.0015	Correlation Coefficient	0.555501	20.333
399.8	397.3	1.0062	Slope	0.999714	0.90 - 1.10
199.9	196.3	1.0182	Slope		
			Intercept	-1.740000	+/-20





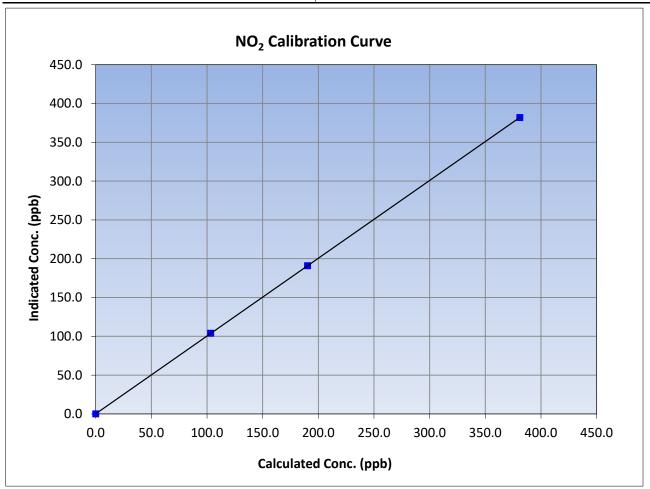
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 15, 2023 Previous Calibration: February 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 9:24 End Time (MST): 13:40 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	0.0		Correlation Coefficient	0.999999	≥0.995
381.0	381.9	0.9975	Correlation Coefficient	0.555555	20.333
190.4	190.9	0.9972	Slope	1.002165	0.90 - 1.10
103.3	103.9	0.9938	Slope	1.002103	0.90 - 1.10
	<u> </u>		Intercept	0.164860	+/-20

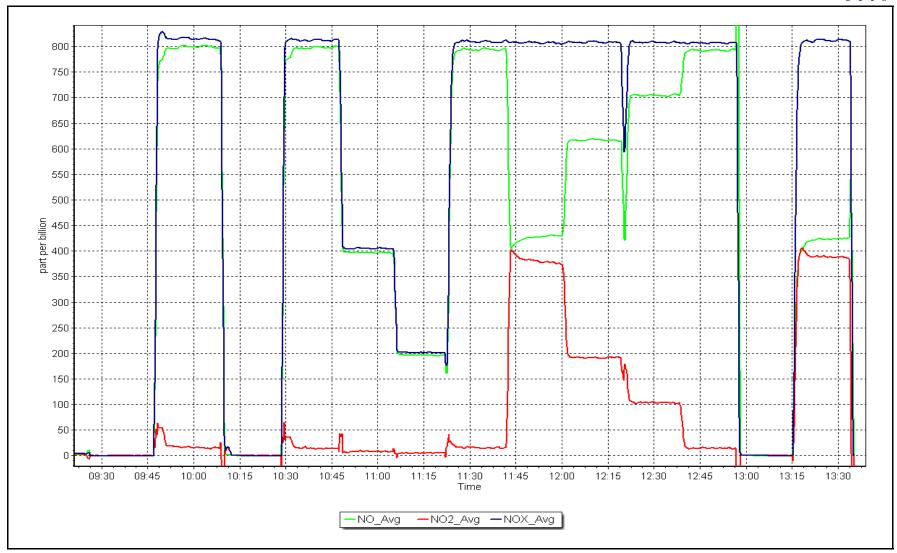


NO_X Calibration Plot

Date: March 15, 2023

Location: Ells River







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1				
Station Name:	Ells River Station number			AMS 30			
Calibration Date:	March 16, 2023 Last Cal Dat			te: February 17, 2023			
Start time (MST):	9:41		End time (MST):	10:50			
Analyzer Make:	API T640		S/N:	875			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	Delta Cal		S/N:	954			
Temp/RH standard:	Delta Cal	ta Cal S/N:			: 954		
		Monthly Calibration To	est				
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)	
T (°C)	-11	-11	-11			+/- 2 °C	
P (mmHg)	739.3	736.7	739.3			+/- 10 mmHg	
flow (LPM)	5.01	5.05	5.01			+/- 0.25 LPM	
Leak Test:	Date of check:	March 16, 2023	Last Cal Date:	February	17, 2023		
	PM w/o HEPA:	4.2	PM w/ HEPA:	(<0.2 ug/m3	
Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre ma	intenance le	eak check		
Inlet cleaning:	Inlet Head						
		Quarterly Calibration 1	oct.				
Daramotor	As found				Adjusted	(Limita)	
<u>Parameter</u> PMT Peak Test	<u>As found</u> 8.7	Post maintenance 10.8	<u>As left</u> 10.8		<u>Adjusted</u>	(Limits)	
PINIT Peak Test	8.7	10.8	10.8			10.9 +/- 0.5	
Post-maintenance	e leak check:	PM w/o HEPA:	4.9	w/ HEPA:		0	
Date Optical Chamber Cleaned:		March 16, 2023				<0.2 ug/m3	
Disposable Filte	r Changed:	March 16, 2023					
		Annual Maintenance	е				
Date Sample Tub	ne Cleaned:						
Date RH/T Sensor Cleaned:							
	•						
		No. of Contract of					
Notes:		No adjustments i	made. Inlet head st	iii clean.			
Calibration by:	Denny Ray Estador						
candiation by.	Denny Nay Estaudi						



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS506 JACKFISH 1 MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

Station number:

AMS 506

Version-01-2020

0.966

Station Information

Station Name: Jackfish 1

Calibration Date: March 9, 2023 Last Cal Date: February 14, 2023

Start time (MST): 10:58 End time (MST): 13:43

Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.52 ppm Cal Gas Exp Date: December 29, 2028

Cal Gas Cylinder #: CC274266

Calibration intercept:

Removed Cal Gas Conc: 50.52 ppm Rem Gas Exp Date: NA

Removed Gas Cyl #: NA Diff between cyl:

-1.536060

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

StartFinishStartFinishCalibration slope:1.0043001.001172Backgd or Offset:18.9

-1.416002

SO₂ 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	-0.6	
as found span	4921	79.2	800.2	794.0	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4921	79.2	800.2	800.1	1.000
second point	4960	39.6	400.2	399.3	1.002
third point	4980	19.8	200.1	197.2	1.015
as left zero	5000	0.0	0.0	-0.3	
as left span	4921	79.2	800.2	801.7	0.998
			Average Correction Factor		1.006
Baseline Corr As found:	794.60	Previous response	802.11	*% change	-0.9%

Baseline Corr As found: 794.60 Previous response 802.11 ** change -0.9% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

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

Baseline Corr 3rd AF pt: NA AF Correlation:

Coeff or Slope:

0.960

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

Calibration Performed By: Sean Bala

* = > +/-5% change initiates investigation



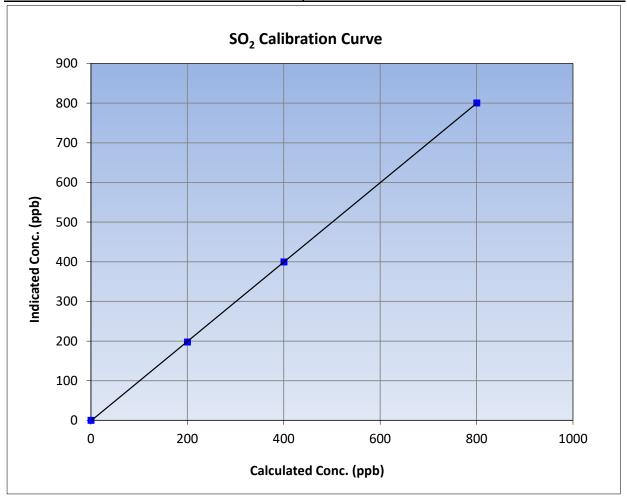
SO₂ Calibration Summary

Version-01-2020

Station Information

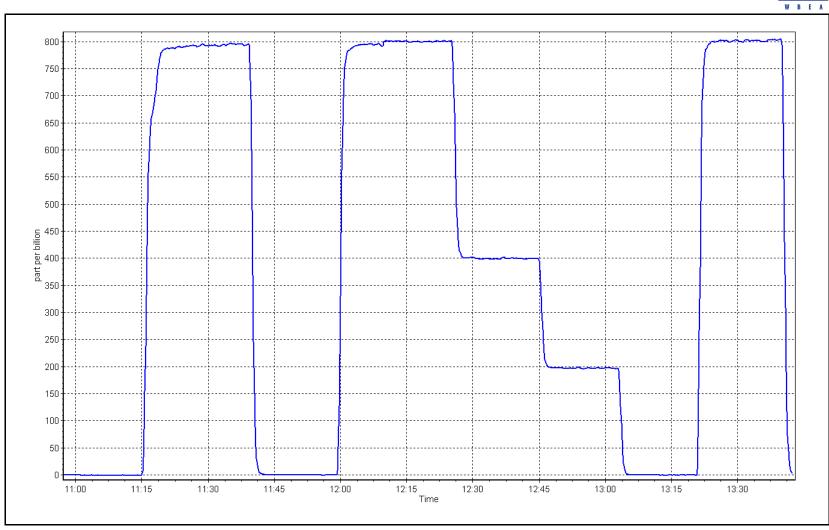
Calibration Date: March 9, 2023 **Previous Calibration:** February 14, 2023 Station Name: Jackfish 1 Station Number: AMS 506 Start Time (MST): 10:58 End Time (MST): 13:43 Analyzer make: Thermo 43i Analyzer serial #: 1160290011

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	0.999987	≥0.995		
800.2	800.1	1.0001	Correlation coefficient				
400.2	399.3	1.0021	Slope	1.001172	0.90 - 1.10		
200.1	197.2	1.0145	Slope	1.001172	0.90 - 1.10		
			- Intercept	-1.416002	+/-30		



SO2 Calibration Plot Date: March 9, 2023 Location: Jackfish 1







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Jackfish 1

Calibration Date: March 29, 2023

Start time (MST): 8:21 Reason: Routine Station number: AMS506

Rem Gas Exp Date: NA

Diff between cyl:

Last Cal Date: February 24, 2023

2659

4427

End time (MST): 12:06

Calibration Standards

Cal Gas Exp Date: September 16, 2024 Cal Gas Concentration: 5.14 ppm

ppm

Cal Gas Cylinder #: CC511843

Removed Cal Gas Conc: 5.14 Removed Gas Cyl #: NA

Calibrator Make/Model: API T700 Serial Number: ZAG Make/Model: **API 701** Serial Number:

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020 Global G150 Converter serial #: 2022-218 Converter make:

0 - 100 ppb Analyzer Range

> **Finish Start** <u>Finish</u> <u>Start</u> 0.995862 1.005003 Backgd or Offset: 1.04

Calibration slope: 3.42 Calibration intercept: 0.041428 -0.178301 Coeff or Slope: 0.720 1.090

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	-0.5	
as found span	4922	77.8	80.0	76.4	1.040
as found 2nd point	4961	38.9	40.0	38.1	1.036
as found 3rd point	4981	19.4	19.9	18.4	1.055
new cylinder response					

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	5000	0.0	0.0	-0.1	
high point	4922	77.8	80.0	80.2	0.997
second point	4961	38.9	40.0	40.1	0.997
third point	4981	19.4	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.0	
as left span	4922	77.8	80.0	80.1	0.999
SO2 Scrubber Check	4921	79.2	792.0	0.1	
Date of last scrubber char	nge:	24-Feb-23		Ave Corr Factor	1.002
Date of last converter eff	iciency test:	December 1, 2022			efficiency

Baseline Corr As found: 76.9 79.69 -3.6% Prev response: *% change: -0.579245 Baseline Corr 2nd AF pt: 38.6 AF Slope: 0.962861 AF Intercept: AF Correlation: Baseline Corr 3rd AF pt: 0.999973 18.9

Cahnged inlet filter after multi-point as founds. Scrubber test done and passed after calibrator Notes:

zero. Adjusted zero and span.

Calibration Performed By: Sean Bala * = > +/-5% change initiates investigation



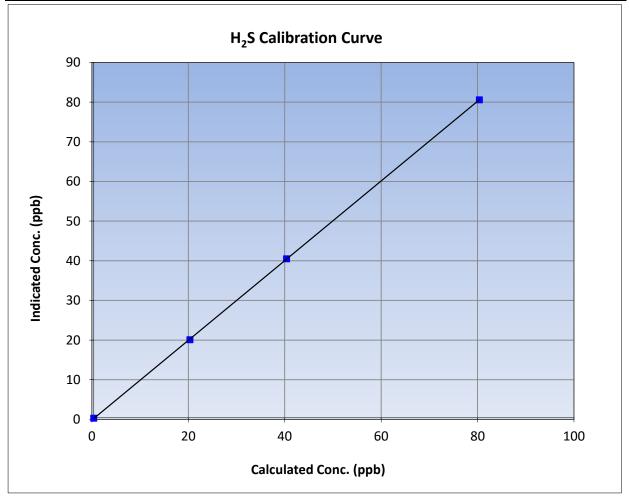
H₂S Calibration Summary

Version-11-2021

Station Information

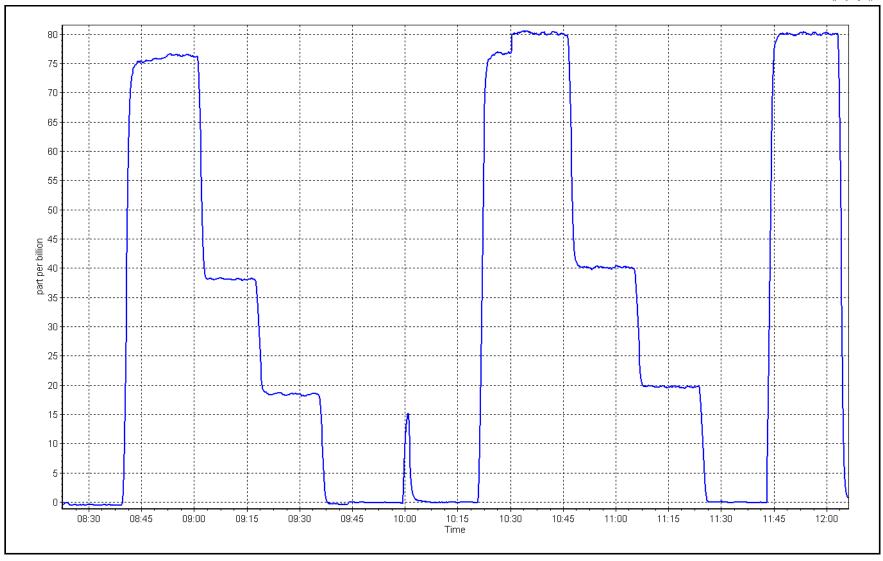
Calibration Date: March 29, 2023 **Previous Calibration:** February 24, 2023 Station Name: Jackfish 1 Station Number: AMS506 Start Time (MST): 8:21 End Time (MST): 12:06 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020

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	0.999989	≥0.995				
80.0	80.2	0.9973	Correlation Coefficient	0.555505	20.993				
40.0	40.1	0.9973	Slope	1.005003	0.90 - 1.10				
19.9	19.7	1.0123	Slope	1.003003	0.90 - 1.10				
			- Intercept	-0.178301	+/-3				



Date: March 29, 2023 Location: Jackfish 1







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Jackfish 1

Calibration Date:

Start time (MST): 8:22 Routine Reason:

March 30, 2023

Station number: AMS506

Last Cal Date: February 15, 2023

End time (MST): 12:36

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 Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NOX Conc: Removed Gas NO Conc: 47.46 ppm 47.39 ppm

NOX gas Diff:

Calibrator Model: **API T700** ZAG make/model: **API 701**

NO gas Diff:

Serial Number: 2659 Serial Number: 4427

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1218153356

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.144	1.130	NO bkgnd or offset:	3.3	3.2
NOX coeff or slope:	0.992	0.993	NOX bkgnd or offset:	3.4	3.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	173.4	172.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999791	1.003601
NO _x Cal Offset:	-1.047992	-0.808032
NO Cal Slope:	1.001240	1.002854
NO Cal Offset:	-2.087973	-1.627998
NO ₂ Cal Slope:	0.999204	1.003399
NO ₂ Cal Offset:	-0.347850	0.523900



NO_X \ NO \ NO₂ 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	0.1	0.1	0.0		
as found span	4916	84.4	801.1	799.9	1.2	812.2	807.9	4.2	0.9863	0.9901
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
high point	4916	84.4	801.1	799.9	1.2	803.1	800.9	2.2	0.9975	0.9987
second point	4958	42.2	400.5	400.0	0.6	402.3	400.2	2.1	0.9956	0.9994
third point	4979	21.1	200.3	200.0	0.3	198.1	196.0	2.2	1.0110	1.0203
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4916	84.4	801.1	401.7	399.4	803.4	404.6	398.7	0.9971	0.9928
							Average C	Correction Factor	1.0014	1.0061
Corrected As fo	und NO _X =	812.1 ppb	NO	= 807.8 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	1.5%
Previous Respor	nse NO _X =	799.8 ppb	NO	= 798.8 ppb				*Percent Chang	ge NO =	1.1%
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 ² :	:	NO SI:	NO Int:	
					As found	d $NO_2 r^2$:	NO2 SI:	NO ₂ Int:	
				G	PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		dicated NO Drop	Calculated NO concentration (pp		ndicated 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)	799.5		401.3	399.4		401.0	0.9960		100.4%
2nd GPT point	(200 ppb O3)	799.5		587.7	213.0		214.4	0.9934		100.7%
3rd GPT point	(100 ppb O3)	799.5		689.3	111.4		112.9	0.9866	j :	101.4%

Notes:

Adjusted the span only.

Average Correction Factor

Calibration Performed By:

Sean Bala

100.8%

0.9920



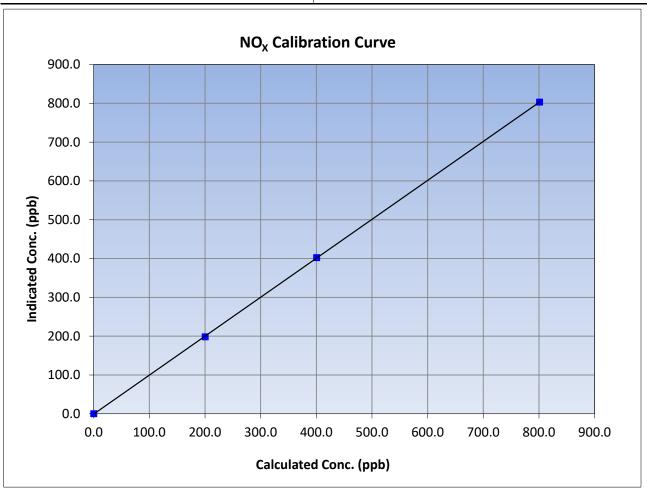
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 15, 2023 Station Name: Jackfish 1 Station Number: AMS506 Start Time (MST): 8:22 End Time (MST): 12:36 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	0.999981	≥0.995
801.1	803.1	0.9975	Correlation Coefficient	0.555501	20.555
400.5	402.3	0.9956	Slope	1.003601	0.90 - 1.10
200.3	198.1	1.0110	Slope	1.005001	0.90 - 1.10
			Intercept	-0.808032	+/-20





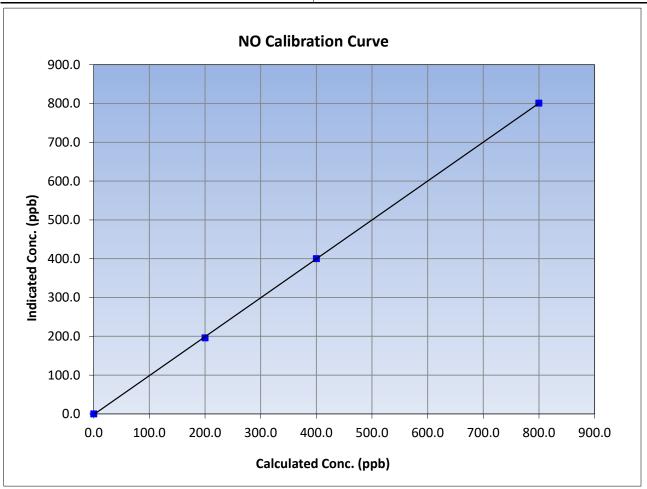
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 15, 2023 Station Name: Jackfish 1 Station Number: AMS506 Start Time (MST): 8:22 End Time (MST): 12:36 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	0.2		Correlation Coefficient	0.999964	≥0.995
799.9	800.9	0.9987	Correlation Coefficient	0.555504	20.333
400.0	400.2	0.9994	Slope	1.002854	0.90 - 1.10
200.0	196.0	1.0203	Slope	1.002654	0.90 - 1.10
			Intercept	-1.627998	+/-20





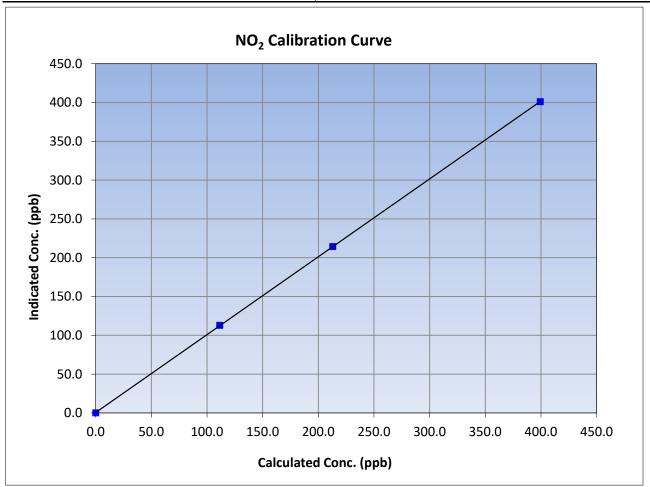
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 30, 2023 Previous Calibration: February 15, 2023 Station Name: Jackfish 1 Station Number: AMS506 Start Time (MST): 8:22 End Time (MST): 12:36 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	0.0		Correlation Coefficient	0.999991	≥0.995
399.4	401.0	0.9960	Correlation Coefficient	0.555551	20.333
213.0	214.4	0.9934	Slope	1.003399	0.90 - 1.10
111.4	112.9	0.9866	Slope	1.005599	0.90 - 1.10
			Intercept	0.523900	+/-20

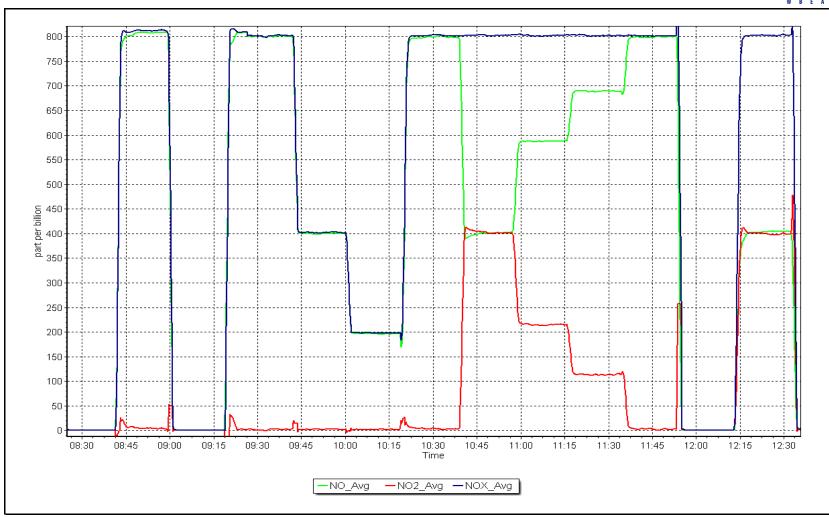


NO_x Calibration Plot

Date: March 30, 2023

Location: Jackfish 1







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS508 KIRBY NORTH MARCH 2023

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

April 29, 2023



SO₂ Calibration Report

AMS508

14:04

Version-01-2020

Station Information

Station Name: Kirby North Station number:

Calibration Date: March 9, 2023 Last Cal Date: February 2, 2023

ppm

Start time (MST): 8:48
Reason: Routine

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 T700
ZAG Make/Model: API T701H

ppm Cal Gas Exp Date: February 23, 2025

End time (MST):

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3804

Serial Number: 3804 Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.997350 Backgd or Offset: 19.2 19.6 1.001676 Calibration intercept: -1.468267 -0.929311 Coeff or Slope: 1.151 1.151

SO₂ Calibration Data

6 (5) (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	0.8	
as found span	4919	81.3	799.6	796.3	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	81.3	799.6	797.3	1.003
second point	4959	40.7	400.3	397.4	1.007
third point	4980	20.3	199.7	197.2	1.012
as left zero	5000	0.0	0.0	0.1	
as left span	4919	81.3	799.6	795.2	1.006
			Averag	ge Correction Factor	1.008
Baseline Corr As found:	795.50	Previous response	799.49	*% change	-0.5%

Baseline Corr As found: 795.50 Previous response 799.49 *% change -0.5%
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.

Calibration Performed By: Braiden Boutilier



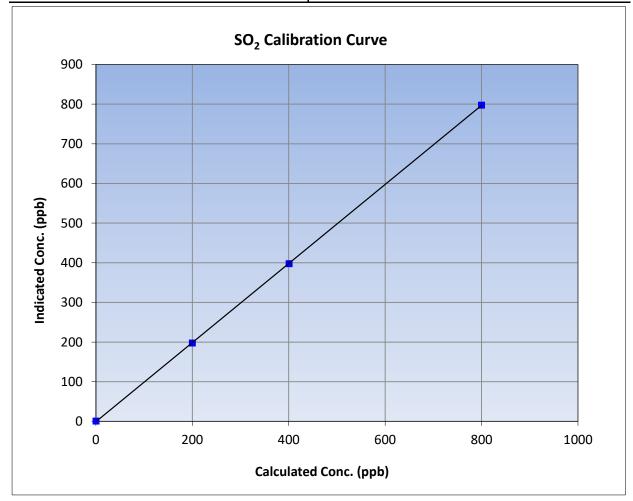
SO₂ Calibration Summary

Version-01-2020

Station Information

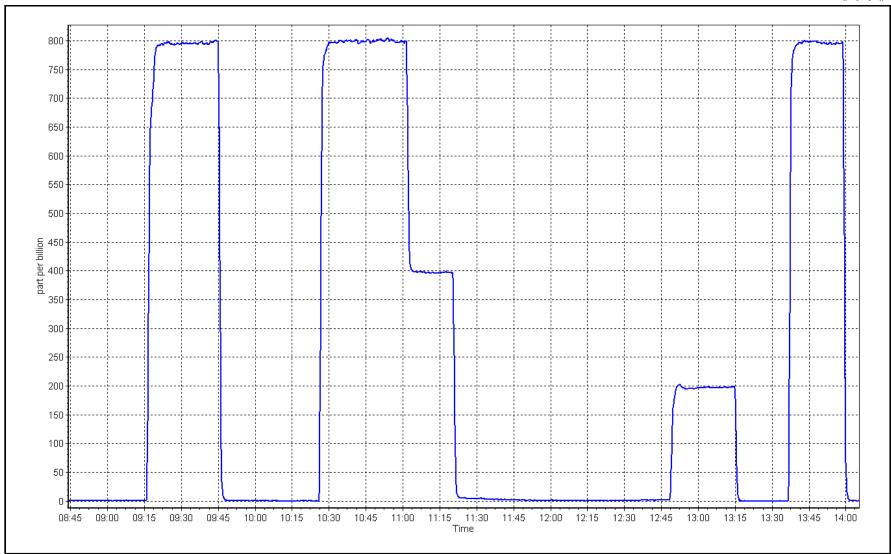
Calibration Date: March 9, 2023 **Previous Calibration:** February 2, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 8:48 End Time (MST): 14:04 Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

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	0.999989	≥0.995				
799.6	797.3	1.0029	- Correlation Coefficient	0.333363	20.995				
400.3	397.4	1.0074	Slope	0.997350	0.90 - 1.10				
199.7	197.2	1.0125	Slope	0.997550	0.90 - 1.10				
			- Intercept	-0.929311	+/-30				



SO2 Calibration Plot Date: March 9, 2023 Location: Kirby North







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Kirby North

Calibration Date: March 9, 2023

Start time (MST): 8:48 Reason: Routine Station number: AMS508

Last Cal Date: February 15, 2023

282

322

End time (MST): 15:13

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.167 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517378 Removed Cal Gas Conc:

Rem Gas Exp Date: NA 5.167 ppm Removed Gas Cyl #: Diff between cyl: NA Calibrator Make/Model: API T750 Serial Number: ZAG Make/Model: **API 751H** Serial Number:

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1150840012 Global Converter serial #: 2022-197 Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.007456 Backgd or Offset: Calibration slope: 0.995603 1.70 1.67 -0.140937 Calibration intercept: -0.101015 Coeff or Slope: 1.022 1.009

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 span	4923	77.4	80.0	81.5	0.979
as found 2nd point	4961	38.8	40.1	40.5	0.985
as found 3rd point	4981	19.3	19.9	20.2	0.978
new cylinder response					

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	5000	0.0	0.0	-0.1	
high point	4923	77.4	80.0	80.5	0.994
second point	4961	38.8	40.1	40.1	1.000
third point	4981	19.3	19.9	20.0	0.997
as left zero	5000	0.0	0.0	0.0	
as left span	4923	77.4	80.0	78.6	1.018
SO2 Scrubber Check	4920	79.8	798.0	0.1	
Date of last scrubber chang	ge:	21-Sep-22		Ave Corr Factor	0.997
Date of last converter efficiency test: effici					efficiency

Baseline Corr As found: 81.7 79.53 Prev response: *% change: 2.7% 1.021025 Baseline Corr 2nd AF pt: 40.7 AF Slope: AF Intercept: -0.240889 AF Correlation: Baseline Corr 3rd AF pt: 0.999985 20.4 * = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. Adjusted span. Ran scrubber check after cal zero. Notes:

Second Sox scrubber check passed after hydrating the scrubber beads.

Calibration Performed By: Braiden Boutilier



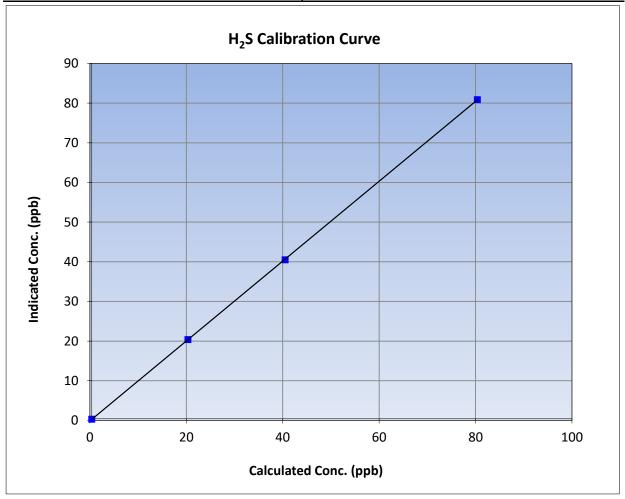
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: March 9, 2023 **Previous Calibration:** February 15, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 8:48 End Time (MST): 15:13 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	-0.1		Correlation Coefficient	0.999991	≥0.995			
80.0	80.5	0.9935	Correlation Coefficient	0.555551	20.993			
40.1	40.1	0.9999	Slope	1.007456	0.90 - 1.10			
19.9	20.0	0.9972	Siope	1.007456	0.90 - 1.10			
			- Intercept	-0.140937	+/-3			

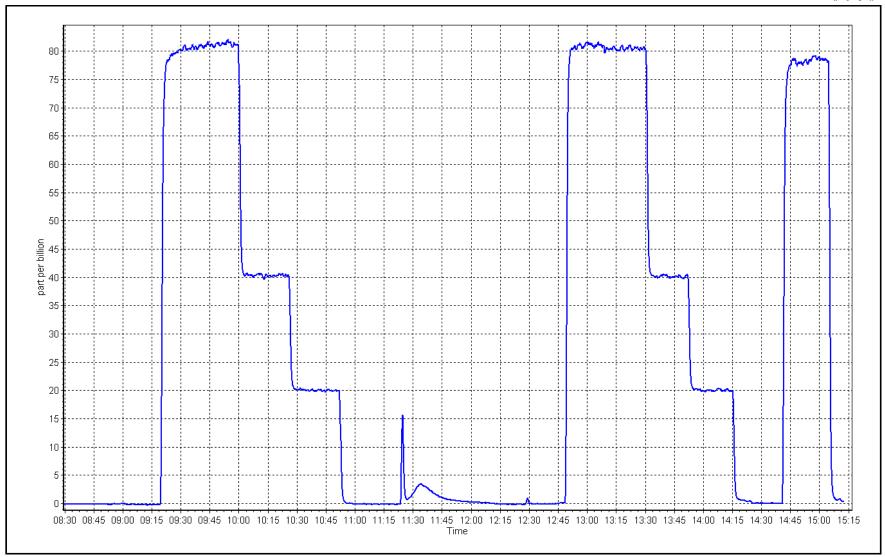


H₂S Calibration Plot

Date: March 9, 2023

Location: Kirby North







THC Calibration Report

Version-01-2020

Station Information

Station Name: Kirby North

Calibration Date: March 9, 2023

Start time (MST): 8:48
Reason: Routine

Station number: AMS508

Last Cal Date: February 4, 2023

End time (MST): 14:04

Calibration Standards

Gas Cert Reference: CC303554 Cal Gas Expiry Date: March 23, 2025

CH4 Cal Gas Conc. 496.6 ppm CH4 Equiv Conc. 1061.7 ppm

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 496.6 ppm CH4 Equiv Conc. 1061.7 ppm

Removed C3H8 Conc. 205.5 ppm Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3804 ZAG Make/Model: API T701H Serial Number: 880

Analyzer Information

Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

Start Finish **Finish** <u>Start</u> Calibration slope: Background: 1.002675 0.998186 2.70 2.86 0.031226 Coefficient: Calibration intercept: -0.018187 3.796 3.706

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentratio (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.19	
as found span	4919	81.3	17.26	17.80	0.970
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.06	
high point	4919	81.3	17.26	17.29	0.998
second point	4959	40.7	8.64	8.60	1.005
third point	4980	20.3	4.31	4.34	0.993
as left zero	5000	0.0	0.00	0.12	
as left span	4919	81.3	17.26	17.32	0.997
		•	Aver	age Correction Factor	0.999
Baseline Corr As found:	17.61	Previous response	17.29	*% change	1.8%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier



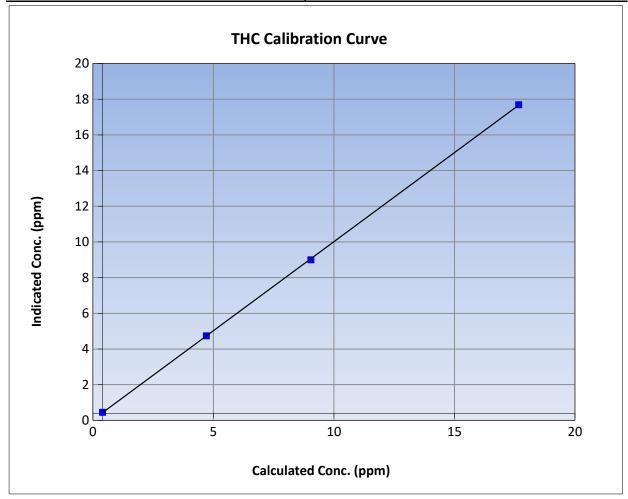
THC Calibration Summary

Version-01-2020

Station Information

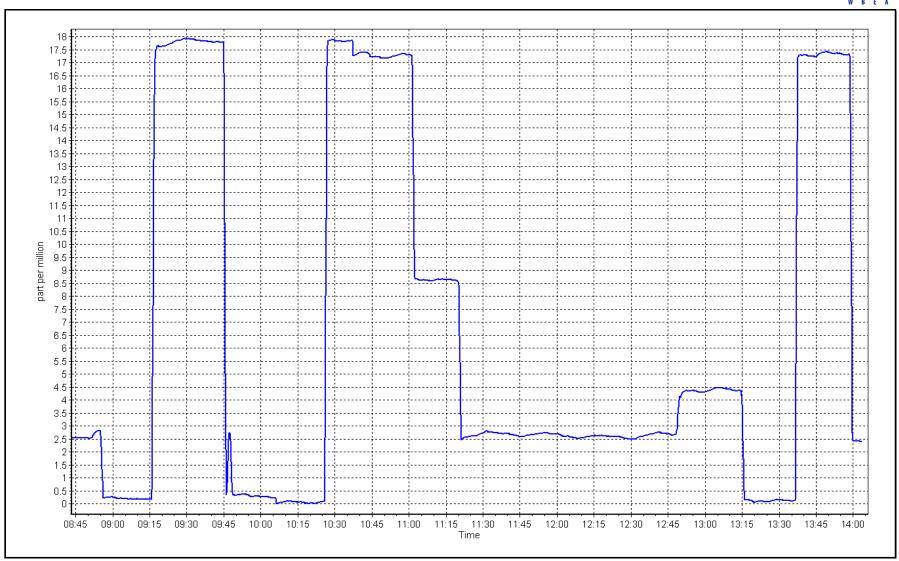
February 4, 2023 **Previous Calibration:** Calibration Date: March 9, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 8:48 End Time (MST): 14:04 Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Calibration Data								
Calculated Concentration (ppm) (Cc)	Concentration (ppm) Statistical Evaluation			ation	<u>Limits</u>			
0.00	0.06		Correlation Coefficient	0.999970	≥0.995			
17.26	17.29	0.9984	Correlation Coefficient	0.999970	20.993			
8.64	8.60	1.0050	Slope	0.998186	0.90 - 1.10			
4.31	4.34	0.9929	Slope	0.556160	0.30 - 1.10			
			- Intercept	0.031226	+/-1.5			



THC Calibration Plot Date: March 9, 2023 Location: Kirby North







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Kirby North

Calibration Date: March 8, 2023

Start time (MST): 11:35 Routine Reason:

Station number: AMS508

> Last Cal Date: February 1, 2023

End time (MST): 17:03

Calibration Standards

T34ULGL NO Gas Cylinder #: Cal Gas Expiry Date: March 8, 2025

NOX Cal Gas Conc: 49.39 NO Cal Gas Conc: 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: API T200 Analyzer serial #: 7029

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.026 1.026 NO bkgnd or offset: 0.1 0.1 NOX coeff or slope: 1.023 NOX bkgnd or offset: 0.3 1.023 0.3 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 4.8 5.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002073	0.997146
NO _x Cal Offset:	-1.391610	-1.392505
NO Cal Slope:	1.001077	0.996559
NO Cal Offset:	-2.093883	-2.174660
NO ₂ Cal Slope:	0.998942	1.007853
NO ₂ Cal Offset:	-0.787844	0.638504



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow	alculated NOx oncentration (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	-0.2	0.0		
as found span	4919	81.0	800.1	794.1	6.0	780.8	774.4	6.3	1.0247	1.0255
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	4919	81.0	800.1	794.1	6.0	797.1	790.3	6.8	1.0038	1.0048
second point	4960	40.5	400.0	397.0	3.0	396.8	392.4	4.5	1.0081	1.0118
third point	4980	20.2	199.5	198.0	1.5	196.3	193.0	3.3	1.0164	1.0261
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1		
as left span	4919	81.0	800.1	415.1	385.0	792.0	408.2	383.8	1.0103	1.0170
							Average C	orrection Factor	1.0094	1.0142
Corrected As fo	ound NO _X =	781.0 ppb	NO =	774.6 ppb	* = > +/-5%	6 change initiates	investigation	*Percent Chan	ge NO _x =	-2.5%
Previous Respo	onse NO _X =	800.4 ppb	NO =	792.9 ppb				*Percent Chan	ge NO =	-2.4%
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 _x =	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 ₂ Int:	
				G	PT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Reference concentration (ppt		ated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 atration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05	erter Efficiency on 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	(400 ppb O3)	788.7		409.7	385.0		388.3	0.991	5	100.9%
2nd GPT poin	t (200 ppb O3)	788.7		594.2	200.5		203.0	0.987	7	101.2%
3rd GPT poin	t (100 ppb O3)	788.7		697.1	97.6		99.8	0.977	9	102.3%
	-					Average Co	rrection Factor	0.985	7	101.5%

Notes:

Changed sample inlet filter after as founds. No adjustments made. Second High NO reference point used for converter efficiency.

Calibration Performed By:

Braiden Boutilier



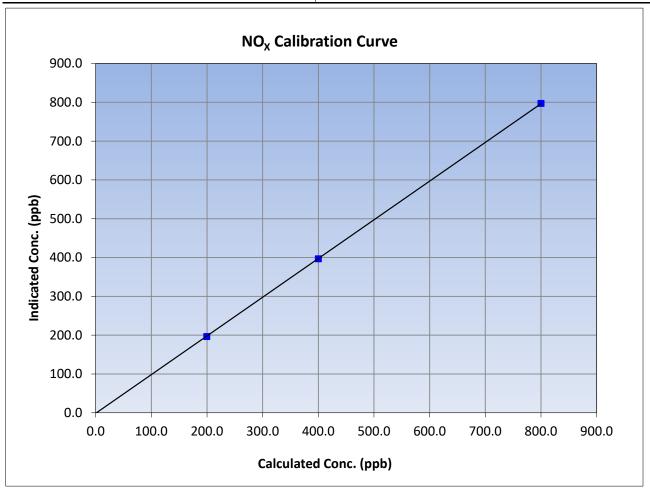
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 1, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 11:35 End Time (MST): 17:03 Analyzer serial #: Analyzer make: **API T200** 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999988	≥0.995
800.1	797.1	1.0038	Correlation Coefficient	0.555566	20.333
400.0	396.8	1.0081	Slope	0.997146	0.90 - 1.10
199.5	196.3	1.0164	Slope	0.557140	0.90 - 1.10
			Intercept	-1.392505	+/-20





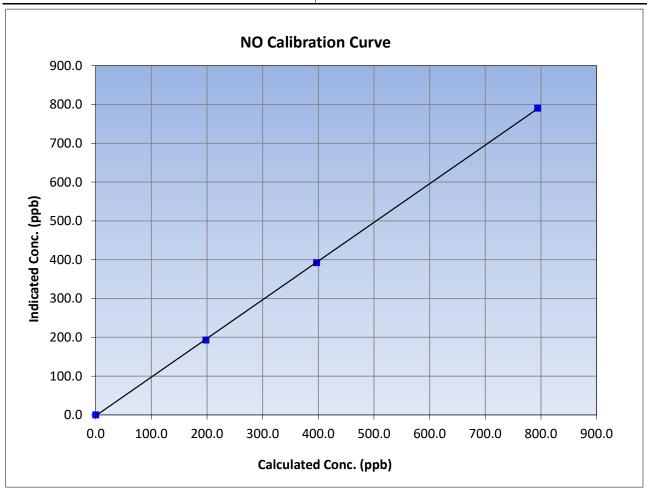
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 1, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 11:35 End Time (MST): 17:03 Analyzer make: **API T200** Analyzer serial #: 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999966	≥0.995
794.1	790.3	1.0048	Correlation Coefficient	0.555500	20.993
397.0	392.4	1.0118	Slope	0.996559	0.90 - 1.10
198.0	193.0	1.0261	Siope	0.990339	0.30 - 1.10
			Intercept	-2.174660	+/-20





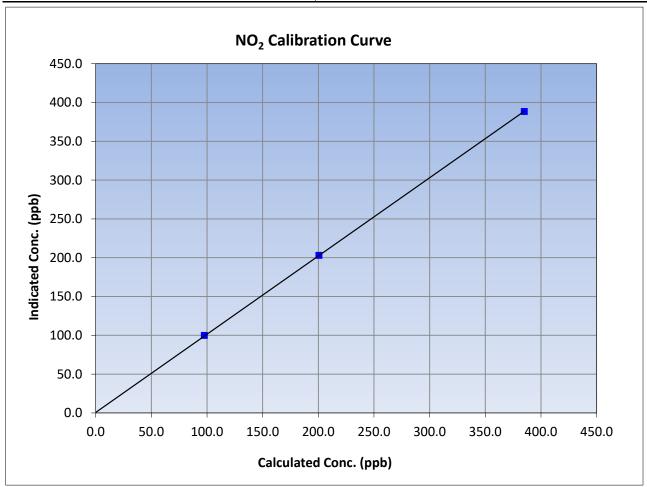
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: March 8, 2023 Previous Calibration: February 1, 2023 Station Name: Kirby North Station Number: AMS508 Start Time (MST): 11:35 End Time (MST): 17:03 Analyzer make: **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	0.999983	≥0.995
385.0	388.3	0.9915	Correlation Coefficient	0.555565	E0.555
200.5	203.0	0.9877	Slope	1.007853	0.90 - 1.10
97.6	99.8	0.9779	Зюре	1.007655	0.90 - 1.10
			Intercept	0.638504	+/-20

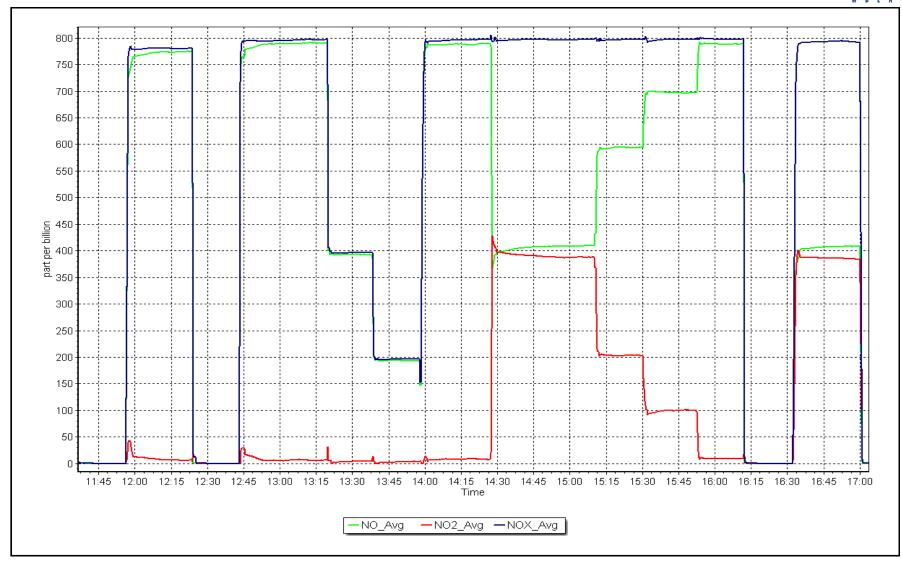


NO_x Calibration Plot

Date: March 8, 2023

Location: Kirby North







End of Report