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Wood Buffalo Environmental Association

SEPTEMBER 2023 MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING October 30, 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 SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

End time (MST):

13:11

Version-01-2020

Station Information

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

Calibration Date: September 12, 2023 Last Cal Date: August 1, 2023

Start time (MST): 9:52

Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.21 ppm Cal Gas Exp Date: March 10, 2031

Cal Gas Cylinder #: CC418809

Removed Cal Gas Conc: 49.21 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA 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 Analyzer serial #: JC1501301448

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.999839 Backgd or Offset: 19.2 19.3 0.999194 0.890 Calibration intercept: 0.086933 -0.113750 Coeff or Slope: 0.886

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	0.2	
as found span	4918	81.3	800.3	796.0	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4918	81.3	800.3	800.2	1.000
second point	4959	40.7	400.6	400.4	1.000
third point	4979	20.3	199.8	199.0	1.004
as left zero	5000	0.0	0.0	0.7	
as left span	4918	81.3	800.3	800.2	1.000
			Averag	ge Correction Factor	1.002
Baseline Corr As found:	795.80	Previous response	e 799.71	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope	•	AF Intercept:	

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



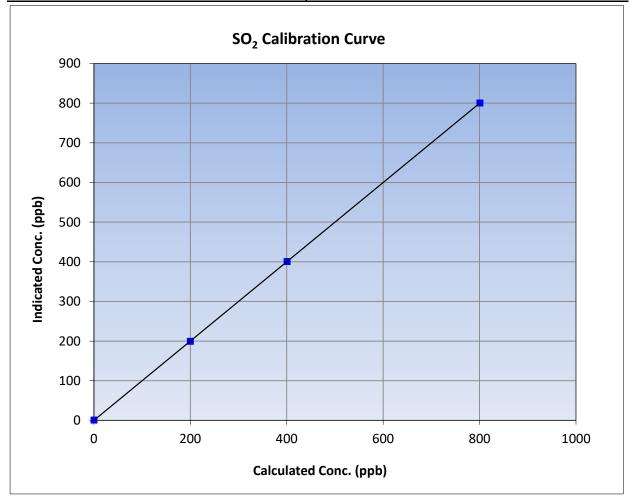
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 12, 2023 **Previous Calibration:** August 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:52 End Time (MST): 13:11 Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999998	≥0.995
800.3	800.2	1.0001	Correlation coefficient	0.555556	20.333
400.6	400.4	1.0005	Slope	0.999839	0.90 - 1.10
199.8	199.0	1.0041	Slope	0.555655	0.90 - 1.10
			- Intercept	-0.113750	+/-30

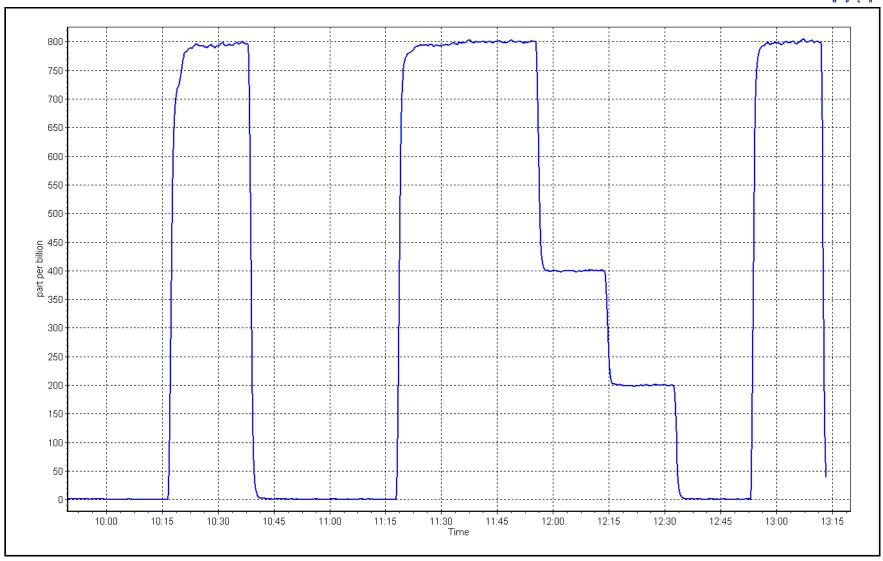


SO2 Calibration Plot

Date: September 12, 2023

Location: Bertha Ganter-Fort McKay







TRS Calibration Report

Station number:

End time (MST):

AMS01

14:50

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 11, 2023 Last Cal Date: August 28, 2023

Start time (MST): 9:15

Routine Reason:

Calibration Standards

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

Cal Gas Cylinder #: CC511749

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

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

Analyzer Information

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

Converter serial #: 470 Converter make: CD Nova

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> 1.000364 0.995649 Backgd or Offset: 2.29 2.26 Calibration slope: 0.279998 0.906 Calibration intercept: 0.140000 Coeff or Slope: 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	0.2	
as found span	4921	78.4	80.0	78.7	1.019
as found 2nd point	4960	39.2	40.0	40.0	1.005
as found 3rd point	4980	19.6	20.0	20.1	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	0.3	
high point	4921	78.4	80.0	79.9	1.001
second point	4960	39.2	40.0	40.2	0.995
third point	4980	19.6	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.3	
as left span	4921	78.4	80.0	81.0	0.988
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chan	ge:	December 17, 2021		Ave Corr Factor	0.997

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	0.997
Date of last converter efficiency test:			efficiency
		·	·

Baseline Corr As found: 78.5 80.16 Prev response: *% change: -2.1% 0.419995 Baseline Corr 2nd AF pt: 39.8 AF Slope: 0.980934 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999939 19.9 * = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



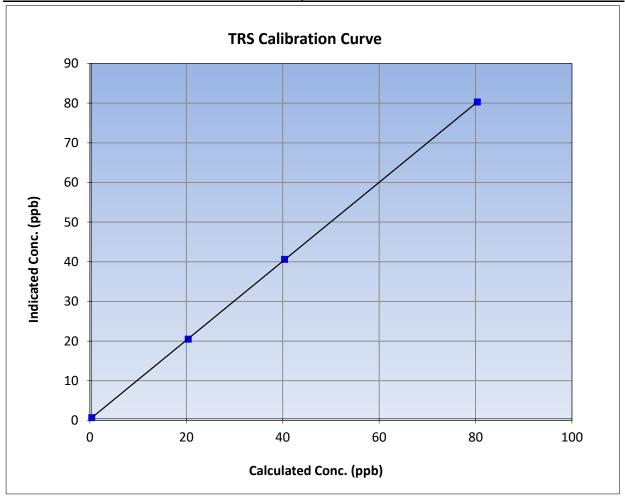
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 28, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:15 End Time (MST): 14:50 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999995	≥0.995
80.0	79.9	1.0012	Correlation Coefficient	0.99999	20.993
40.0	40.2	0.9950	Slope	0.995649	0.90 - 1.10
20.0	20.1	0.9949	Slope	0.333043	0.90 - 1.10
			- Intercept	0.279998	+/-3

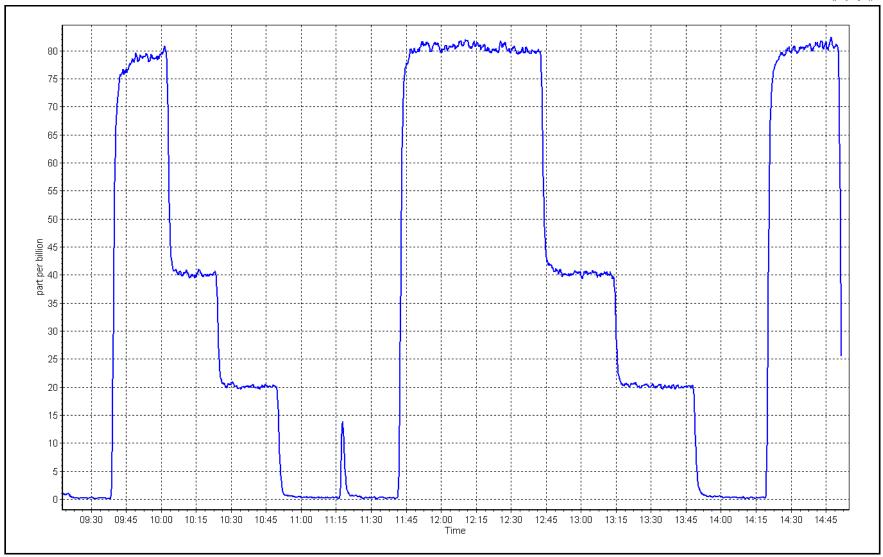




Date: September 11, 2023

Location: Bertha Ganter-Fort McKay







H₂S Calibration Report

Station number:

End time (MST):

AMS01

14:50

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 11, 2023 Last Cal Date: August 28, 2023

Start time (MST): 9:15

Reason: Routine

Calibration Standards

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

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> 0.997856 Backgd or Offset: Calibration slope: 1.003143 1.74 1.70 Calibration intercept: 0.096765 0.156776 Coeff or Slope: 1.014 0.997

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	78.4	80.0	82.9	0.963
as found 2nd point	4960	39.2	40.0	41.5	0.961
as found 3rd point	4980	19.6	20.0	20.4	0.975
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	78.4	80.0	79.8	1.002
second point	4960	39.2	40.0	40.4	0.990
third point	4980	19.6	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.7	
as left span	4922	78.4	80.0	77.7	1.029
SO2 Scrubber Check	4919	81.3	813.0	0.1	
Date of last scrubber chang	ge:	March 21, 2022	<u> </u>	Ave Corr Factor	0.996
Date of last converter effic	ciency test:			·	efficiency

						•
Baseline Corr As found:	83.0	Prev response:	80.31	*% change:	3.2%	
Baseline Corr 2nd AF pt:	41.6	AF Slope:	1.039213	AF Intercept:	-0.183330	
Baseline Corr 3rd AF pt:	20.5	AF Correlation:	0.999984			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



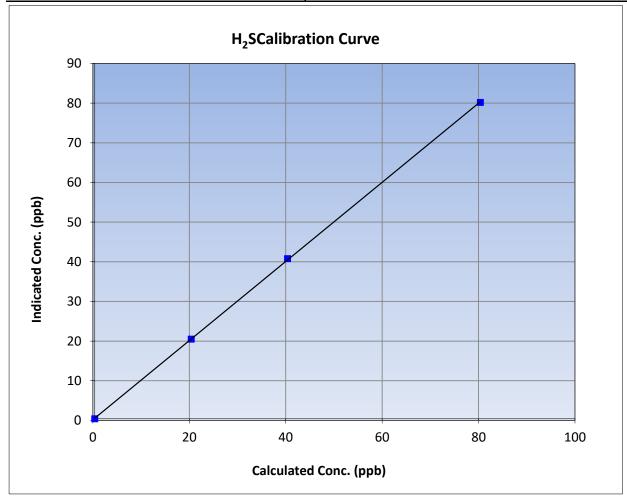
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 28, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:15 End Time (MST): 14:50 Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

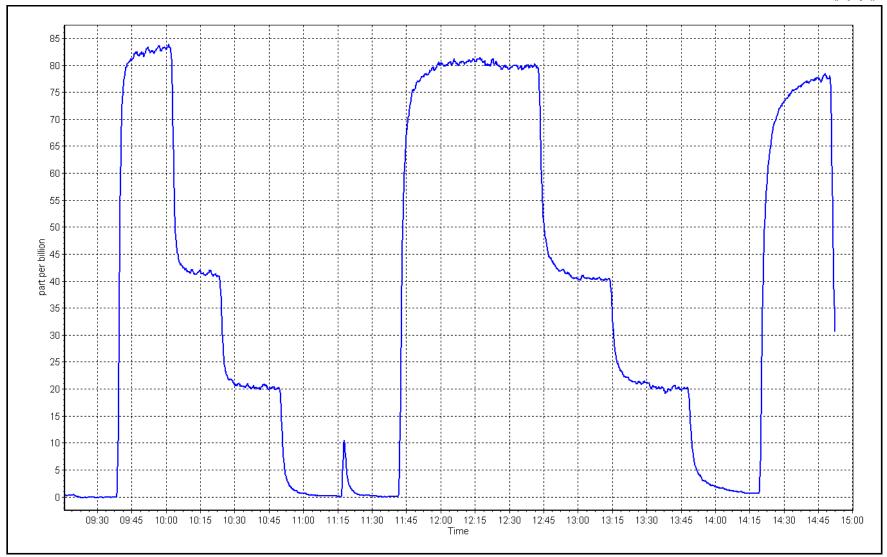
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999954	≥0.995
80.0	79.8	1.0022	Correlation Coefficient	0.555554	20.333
40.0	40.4	0.9901	Slope	0.997856	0.90 - 1.10
20.0	20.1	0.9949	Slope	0.337630	0.90 - 1.10
			- Intercept	0.156776	+/-3



Date: September 11, 2023

Location: Bertha Ganter-Fort McKay







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 12, 2023

Start time (MST): 9:52 Reason: Routine Station number: AMS01

Last Cal Date: August 1, 2023

End time (MST): 13:11

Calibration Standards

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

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

C3H8 Cal Gas Conc. 205.3 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

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

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

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

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

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 2.97E-04 CH4 SP Ratio: 2.91E-04 NMHC SP Ratio: 6.42E-05 6.33E-05 CH4 Retention time: 14.6 14.6 NMHC Peak Area: 145218 143189

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	4918	81.3	17.27	17.04	1.013
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4918	81.3	17.27	17.23	1.002
second point	4959	40.7	8.64	8.50	1.017
third point	4980	20.3	4.31	4.23	1.020
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.27	17.28	0.999
			,	Average Correction Factor	1.013
Baseline Corr AF:	17.04	Prev response	17.18	*% change	-0.8%
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	5000	0	0.00	0.00	
as found span	4918	81.3	9.18	9.09	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4918	81.3	9.18	9.15	1.003
second point	4959	40.7	4.60	4.56	1.008
third point	4980	20.3	2.29	2.29	1.003
as left zero	5000	0	0.00	0.00	
as left span	4918	81.3	9.18	9.19	0.999
			Avera	age Correction Factor	1.005
Baseline Corr AF:	9.09	Prev response	9.15	*% change	-0.7%
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	4918	81.3	8.09	7.95	1.017
as found 2nd point					
as found 3rd point					
new cylinder response		0.0			
calibrator zero	5000	0.0		0.00	
high point	4040		0.00	0.00	
	4918	81.3	8.09	8.08	1.001
•	4959	81.3 40.7	8.09 4.05	8.08 3.94	1.001 1.028
second point third point	4959 4980	81.3 40.7 20.3	8.09 4.05 2.02	8.08 3.94 1.94	1.001 1.028 1.039
third point as left zero	4959 4980 5000	81.3 40.7 20.3 0.0	8.09 4.05 2.02 0.00	8.08 3.94 1.94 0.00	1.001 1.028 1.039
third point as left zero	4959 4980	81.3 40.7 20.3	8.09 4.05 2.02 0.00 8.09	8.08 3.94 1.94 0.00 8.09	1.001 1.028 1.039 1.000
third point as left zero as left span	4959 4980 5000 4918	81.3 40.7 20.3 0.0 81.3	8.09 4.05 2.02 0.00 8.09	8.08 3.94 1.94 0.00 8.09 age Correction Factor	1.001 1.028 1.039 1.000 1.023
third point as left zero as left span Baseline Corr AF:	4959 4980 5000 4918 7.95	81.3 40.7 20.3 0.0 81.3	8.09 4.05 2.02 0.00 8.09	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change	1.001 1.028 1.039 1.000
third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4959 4980 5000 4918 7.95 NA	81.3 40.7 20.3 0.0 81.3 Prev response AF Slope:	8.09 4.05 2.02 0.00 8.09	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change AF Intercept:	1.001 1.028 1.039 1.000 1.023 -1.0%
•	4959 4980 5000 4918 7.95	81.3 40.7 20.3 0.0 81.3 Prev response AF Slope: AF Correlation:	8.09 4.05 2.02 0.00 8.09 Aver:	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change	1.001 1.028 1.039 1.000 1.023 -1.0%
third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4959 4980 5000 4918 7.95 NA	81.3 40.7 20.3 0.0 81.3 Prev response AF Slope: AF Correlation: Calibration	8.09 4.05 2.02 0.00 8.09 Aver:	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.001 1.028 1.039 1.000 1.023 -1.0%
third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	4959 4980 5000 4918 7.95 NA	81.3 40.7 20.3 0.0 81.3 Prev response AF Slope: AF Correlation: Calibration Start	8.09 4.05 2.02 0.00 8.09 Aver:	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.001 1.028 1.039 1.000 1.023 -1.0%
third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	4959 4980 5000 4918 7.95 NA	81.3 40.7 20.3 0.0 81.3 Prev response AF Slope: AF Correlation: Calibration	8.09 4.05 2.02 0.00 8.09 Aver:	8.08 3.94 1.94 0.00 8.09 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.001 1.028 1.039 1.000 1.023 -1.0%

Notes: Changed the inlet filter and H2 cylinder after as founds. Adjusted span only.

0.999108

-0.047957

0.995361

0.009863

Calibration Performed By: Rene Chamberland

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

1.000577

-0.051154

0.996780

-0.004336



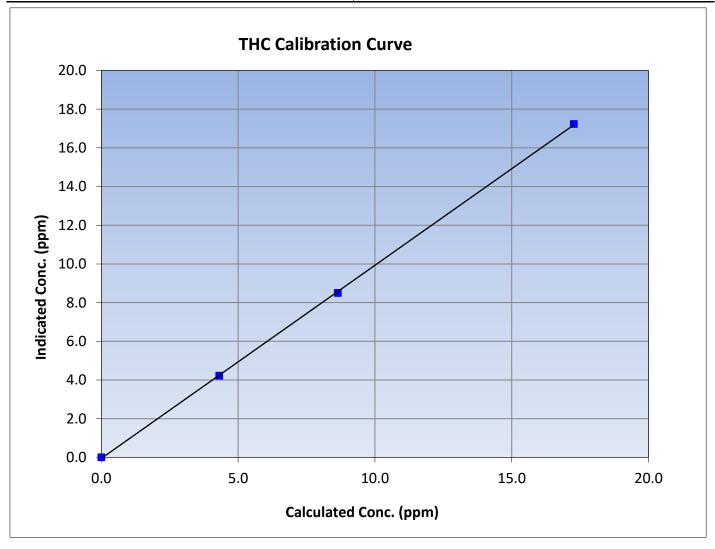
THC Calibration Summary

Version-01-2020

Station Information

September 12, 2023 Calibration Date: **Previous Calibration:** August 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:52 End Time (MST): 13:11 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	0.999926	≥0.995
17.27	17.23	1.0021	Correlation Coemicient	0.333320	20.333
8.64	8.50	1.0174	Slope	0.998565	0.90 - 1.10
4.31	4.23	1.0201	Slope	0.996303	0.90 - 1.10
			Intercept	-0.056289	+/-0.5





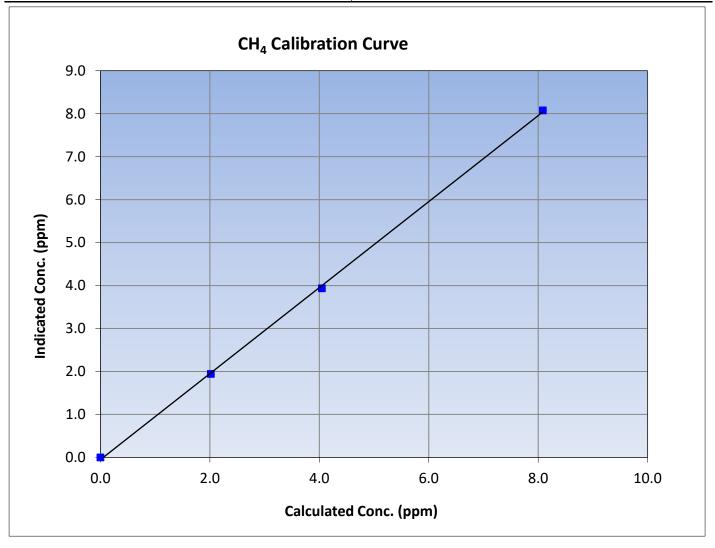
CH₄ Calibration Summary

Version-01-2020

Station Information

September 12, 2023 Calibration Date: **Previous Calibration:** August 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:52 End Time (MST): 13:11 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	0.999758	≥0.995
8.09	8.08	1.0011	Correlation Coefficient	0.555756	20.999
4.05	3.94	1.0283	Slope	1.000577	0.90 - 1.10
2.02	1.94	1.0395	Зюре	1.000577	0.30 - 1.10
			Intercept	-0.051154	+/-0.5





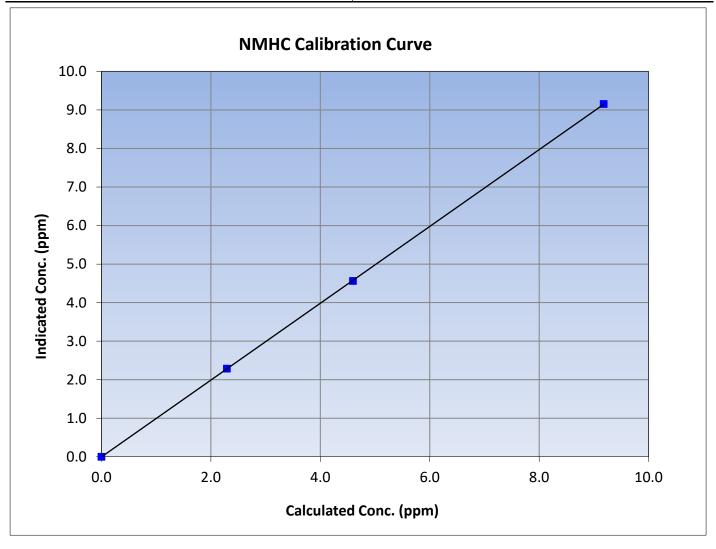
NMHC Calibration Summary

Version-01-2020

Station Information

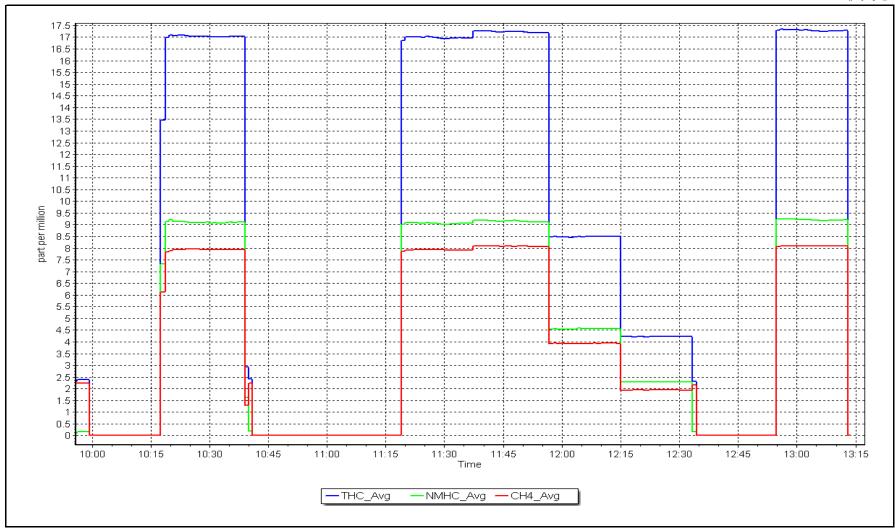
September 12, 2023 Calibration Date: **Previous Calibration:** August 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:52 End Time (MST): 13:11 Analyzer make: Thermo 55i Analyzer serial #: 1180320040

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999993	≥0.995
9.18	9.15	1.0030	Correlation Coemicient	0.999995	20.993
4.60	4.56	1.0076	Slope 0.99678	0.996780	0.90 - 1.10
2.29	2.29	1.0031	Slope	0.990760	0.90 - 1.10
			Intercept	-0.004336	+/-0.5



Location: Bertha Ganter-Fort McKay





Date: September 12, 2023



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 6, 2023

Start time (MST): 9:57

Reason: Routine

Station number: AMS01

Last Cal Date: August 25, 2023

End time (MST): 14:43

NO gas Diff:

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

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1218153357

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.348 1.357 NO bkgnd or offset: 6.9 7.0 NOX coeff or slope: 0.992 0.991 NOX bkgnd or offset: 7.7 7.1 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 189.5 188.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000155	0.999396
NO _x Cal Offset:	-0.260000	-0.540000
NO Cal Slope:	0.998858	0.999215
NO Cal Offset:	-1.280000	-1.080000
NO ₂ Cal Slope:	1.001610	1.001909
NO ₂ Cal Offset:	0.629963	-0.228647



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/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	0.4		
as found span	4920	80.0	813.4	800.6	12.8	809.0	789.2	19.8	1.0055	1.0145
as found 2nd		-								
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1		
high point	4920	80.0	813.4	800.6	12.8	812.7	799.6	13.0	1.0009	1.0013
second point	4960	40.0	406.7	400.3	6.4	405.5	398.1	7.5	1.0030	1.0056
third point	4980	20.0	203.4	200.2	3.2	202.4	197.9	4.5	1.0047	1.0114
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
as left span	4920	80.0	813.4	402.2	411.2	813.3	403.7	409.5	1.0002	0.9964
							Average C	Correction Factor	r 1.0029	1.0061
Corrected As fo	ound NO _X =	808.6 ppb	NO =	789.2 ppb	* = > +/-5%	% change initiates i	investigation	*Percent Chang	.ge NO _x =	-0.6%
Previous Respo	onse NO _X =	813.3 ppb	NO =	798.4 ppb				*Percent Chang	ge NO =	-1.2%
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 Referen concentration (ppb)		icated NO Drop centration (ppb)	Calculated NC concentration (ppl		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	= 0.95-1.05 Calibratio	erter Efficiency on Limit = 96-104%
as found	d GPT zero									
as found GPT poi	oint (400 ppb NO2)									
as found GPT poi	oint (200 ppb NO2)									
as found GPT poi	oint (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	797.7		399.3	411.2		411.8	0.9985	5	100.1%
2nd GPT poin	nt (200 ppb O3)	797.7		595.2	215.3		215.5	0.9991	1	100.1%
2.10 C po										
	it (100 ppb O3)	797.7		696.0	114.5		114.3	1.0017	7	99.8%

Notes:

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

Calibration Performed By:

Rene Chamberland



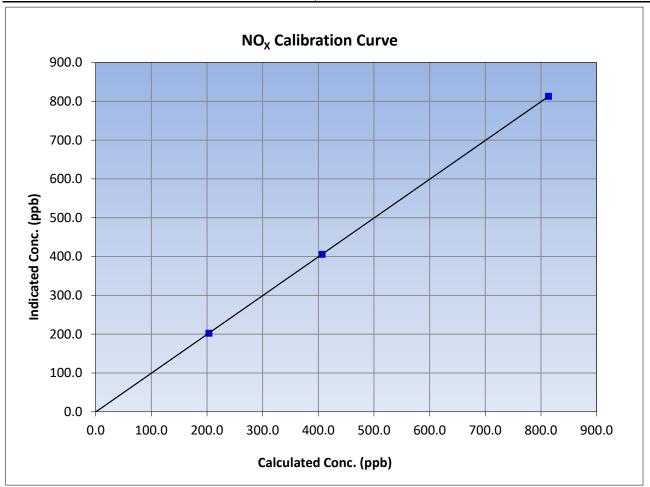
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 25, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:57 End Time (MST): 14:43 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	0.999998	≥0.995
813.4	812.7	1.0009	Correlation Coefficient	0.555556	20.333
406.7	405.5	1.0030	Slope	0.999396 0.90	0.90 - 1.10
203.4	202.4	1.0047	Slope	0.999590	0.90 - 1.10
			Intercept	-0.540000	+/-20





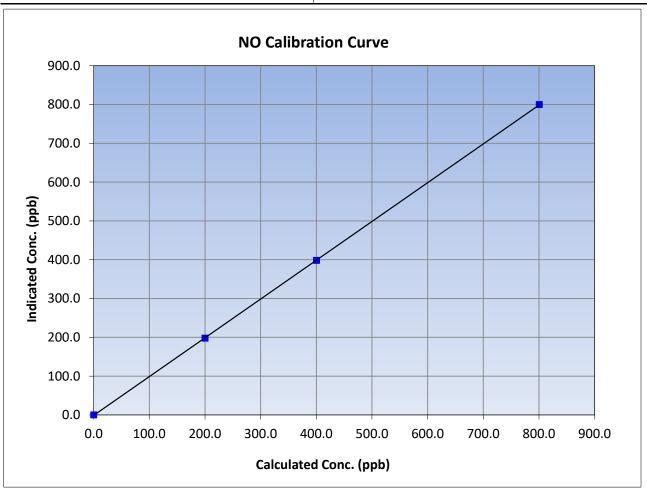
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 25, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:57 End Time (MST): 14:43 Analyzer make: Analyzer serial #: Thermo 42i 1218153357

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999990	≥0.995
800.6	799.6	1.0013	Correlation Coefficient	0.555550	20.993
400.3	398.1	1.0056	Slope	0.999215	0.90 - 1.10
200.2	197.9	1.0114	Slope	0.999215	0.90 - 1.10
			Intercept	-1.080000	+/-20





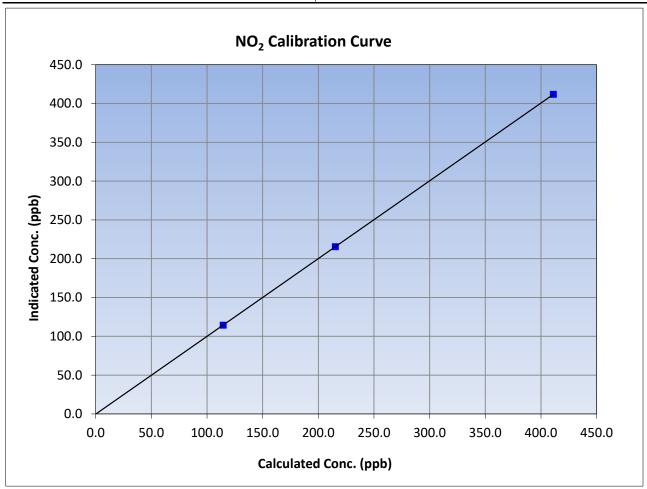
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 25, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:57 End Time (MST): 14:43 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	0.999999	≥0.995
411.2	411.8	0.9985	Correlation Coefficient	0.555555	20.993
215.3	215.5	0.9991	Slope	1.001909	0.90 - 1.10
114.5	114.3	1.0017	Slope	1.001909	0.90 - 1.10
			Intercept	-0.228647	+/-20

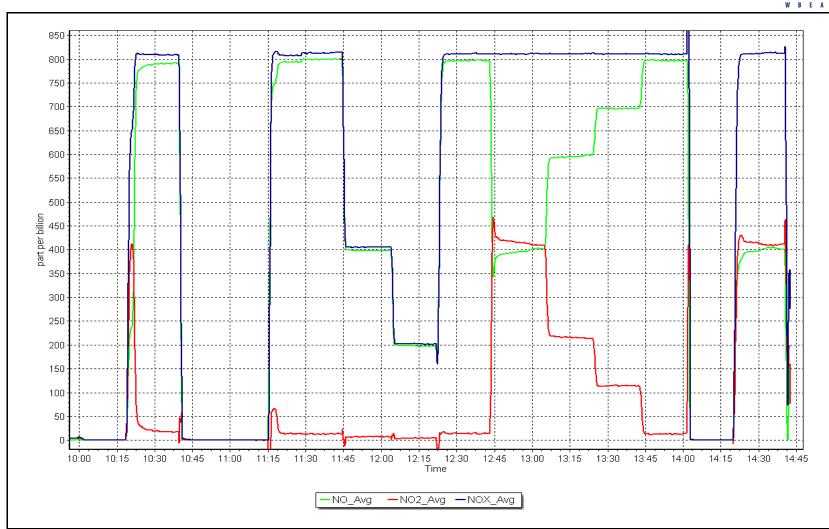


NO_x Calibration Plot

Date: September 6, 2023

Location: Bertha Ganter-Fort McKay







O₃ Calibration Report

Station number: AMS01

End time (MST): 12:21

Version-01-2020

Finish

3.2

1.010

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 1, 2023 Last Cal Date: August 10, 2023

Start time (MST): 9:40

Reason: Routine

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 1107

Finish Start Start Backgd or Offset: Calibration slope: 1.001743 0.999943 3.2

Coeff or Slope: Calibration intercept: -0.080000 0.060000

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	-0.1	
as found span	5000	863.1	400.0	400.3	0.999
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.0	
high point	5000	863.1	400.0	400.0	1.000
second point	5000	742.5	200.0	200.1	1.000
third point	5000	651.7	100.0	100.1	0.999
as left zero	5000	0.0	0.0	0.1	
as left span	5000	863.1	400.0	404.4	0.989
			Avera	ge Correction Factor	1.000

Baseline Corr As found: 400.4 400.6 Previous response *% 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

1.010

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

Rene Chamberland Calibration Performed By:



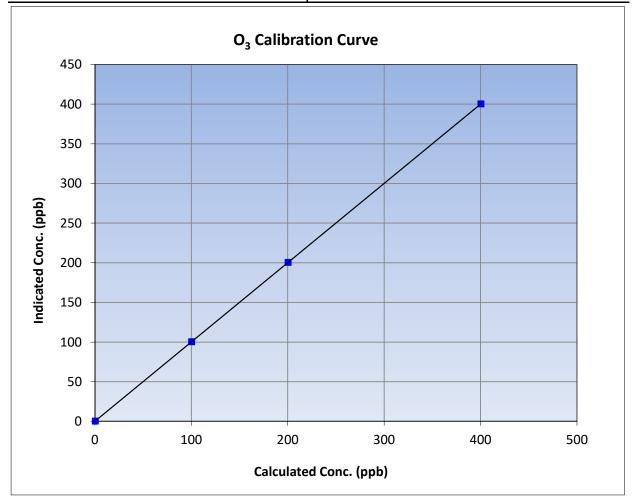
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 10, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:40 End Time (MST): 12:21 Analyzer make: Teledyne API T400 Analyzer serial #: 1107

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.0		Correlation Coefficient	1.000000	≥0.995					
400.0	400.0	1.0000	- Correlation Coefficient	1.000000	20.993					
200.0	200.1	0.9995	Slope	0.999943	0.90 - 1.10					
100.0	100.1	0.9990	Slope	0.333345	0.90 - 1.10					
			- Intercept	0.060000	+/- 5					

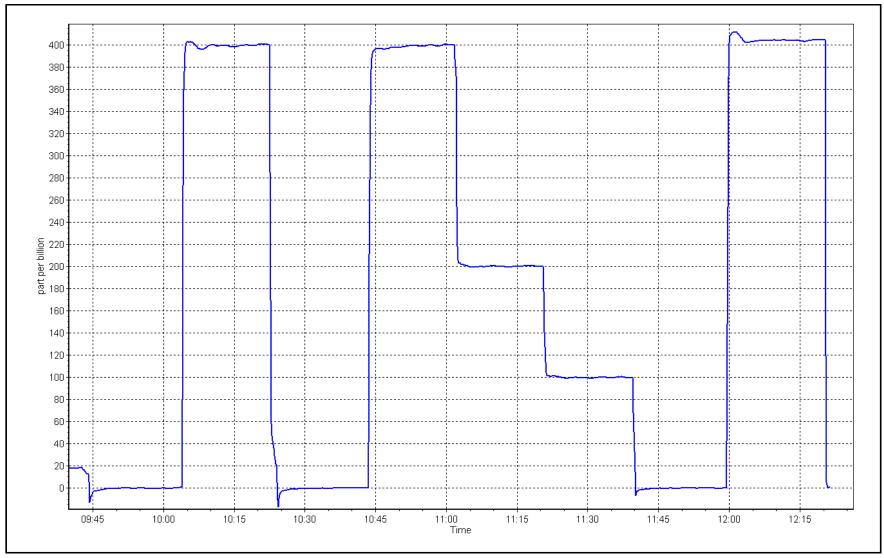


O₃ Calibration Plot

Date: September 1, 2023

Location: Bertha Ganter-Fort McKay







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Fort McKay - Bertha G	Ganter	Station number:	AMS 01		
Calibration Date:	September 14, 2023		Last Cal Date:		2023	
Start time (MST):	9:51		End time (MST):	11:18		
Analyzer Make:	Teledyne API T640		S/N: :	324		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N: :	1450		
Temp/RH standard:	Delta Cal		S/N:	1450		
		Monthly Calibration To	est			
<u>Parameter</u>	As found	Measured	As left		<u>Adjusted</u>	(Limits)
T (°C)	17.1	16.1	17.1			+/- 2 °C
P (mmHg)	736.3	735	736.3			+/- 10 mmHg
flow (LPM)	5.01	5.12	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	September 14, 2023	Last Cal Date:	August 2	3, 2023	
	PM w/o HEPA:	70.1	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be		· <u> </u>	erve as the pre main	tenance lea	k check	
Inlet cleaning:	Inlet Head					
		Quarterly Calibration T	'est			
<u>Parameter</u>	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	10.5	11.1	11.1			10.9 +/- 0.5
						,
Post-maintenance		PM w/o HEPA:	75.3	w/ HEPA:		0
Date Optical Cham	-	September 1	<u> </u>			<0.2 ug/m3
Disposable Filter	r Changed:	September 1	4, 2023			
		Annual Maintenanc				
		Annual Maintenance	=			
Date Sample Tub	e Cleaned:	September 1	4, 2023			
Date RH/T Senso	or Cleaned:	September 1	4, 2023			
Notes:	Flow, temperature. a	nd pressure all within limits	s. Leak checks passed.	Displosable	filter change	d. PMT peak
113163.	•	rified. Optical chamber and	•	-	_	•
Calibration by:	Rene Chamberland					



CO Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 14, 2023

Start time (MST): 9:28

Reason: Routine

Station number: AMS01

Last Cal Date: August 21, 2023

End time (MST): 13:07

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 #: NA 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: 1.001990 1.000977 Backgd or Offset: -0.012 -0.012 Calibration intercept: 0.159827 0.127800 Coeff or Slope: 0.992 0.990

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 0.992 as found span as found 2nd point as found 3rd point new cylinder response calibrator zero 0.0 5000 0.0 0.0 ---high point 4933 66.7 40.6 40.6 0.999 second point 4966 33.3 20.2 20.6 0.982 third point 4983 16.7 10.2 10.3 0.986 0.0 0.0 0.0 as left zero 5000 ---as left span 2960 40.0 40.5 40.1 1.011 Average Correction Factor 0.989 Baseline Corr As found: 40.81 Prev response: 40.80 *% change: 0.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: NA * = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



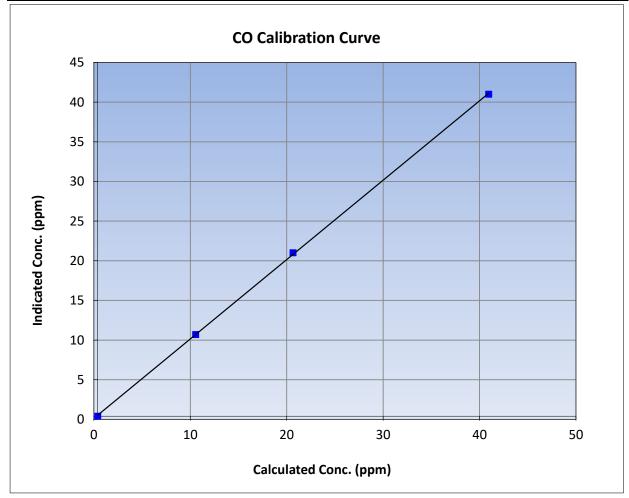
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 14, 2023 **Previous Calibration:** August 21, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:28 End Time (MST): 13:07 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	0.999915	≥0.995				
40.6	40.6	0.9987	Correlation Coefficient	0.999913	20.993				
20.2	20.6	0.9820	Slope	1.000977	0.90 - 1.10				
10.2	10.3	0.9858	Slope	1.000377	0.90 - 1.10				
			- Intercept	0.127800	+/-1.5				

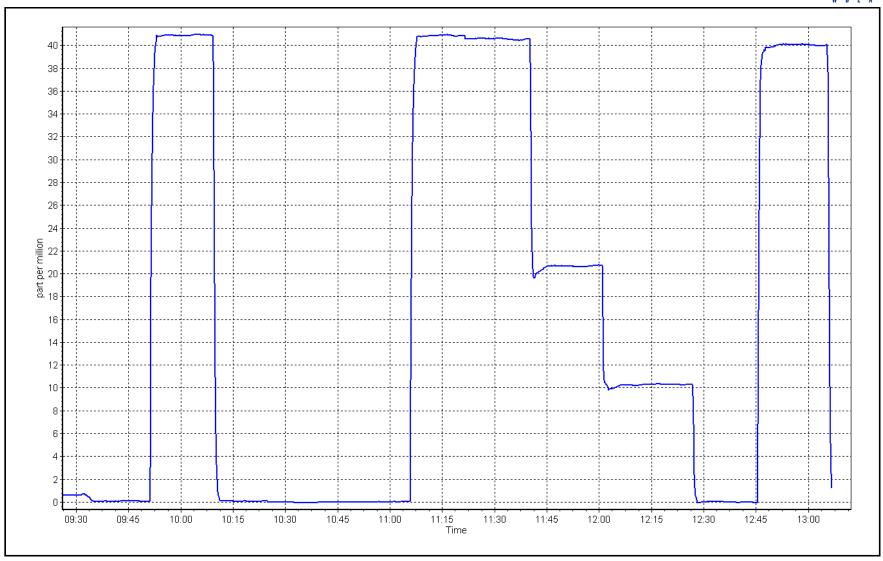


CO Calibration Plot

Date: September 14, 2023

Location: Bertha Ganter-Fort McKay







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: September 5, 2023

Start time (MST): 9:56

Reason: Routine

cKav Station number: AMS01

Last Cal Date: August 11, 2023

End time (MST): 13:23

Calibration Standards

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

Cal Gas Cylinder #: ALM042207

Removed Cal Gas Conc: 60,200 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA 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: 1.000529 1.001868 0.045 0.045 Calibration intercept: -5.380000 -5.320000 Coeff or Slope: 0.874 0.875

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	-0.2	
as found span	2920	80.0	1605.3	1596.2	1.006
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	1605.3	1605.8	1.000
second point	2960	40.0	802.7	795.9	1.009
third point	2980	20.0	401.3	391.5	1.025
as left zero	3000	0.0	0.0	0.0	
as left span	2960	40.0	802.7	784.7	1.023
			Avera	ge Correction Factor	1.011

Baseline Corr As found: 1596.40 Prev response: 1600.80 *% change: -0.3%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



Calculated concentration Indicated concentration

(ppm) (Ic)

(ppm) (Cc)

Wood Buffalo Environmental Association

CO₂ Calibration Summary

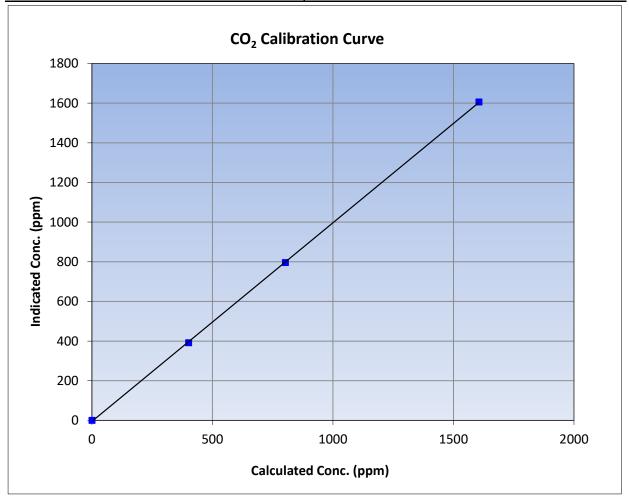
Version-01-2020

Station Information

Calibration Date	September 5, 2023	Previous Calibration	August 11, 2023
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS01
Start Time (MST)	9:56	End Time (MST)	13:23
Analyzer make	Teledyne API 360	Analyzer serial #	442

Calibr			
Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
	Correlation Coefficient	0.999948	≥0.995
0.9997			

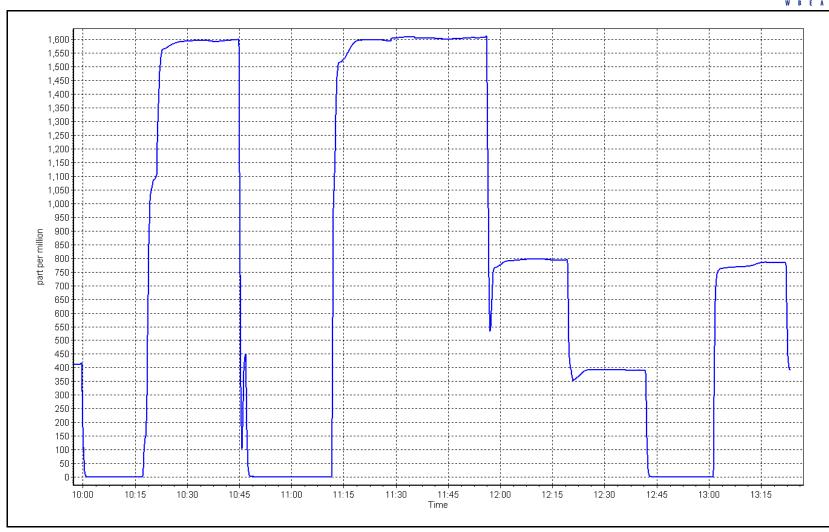
0.1 Correlation C	oefficient 0.999948 ≥0.995
505.8 0.9997 Correlation C	Definition 0.555548 20.555
95.9 1.0085 Slop	e 1.001868
91.5 1.0251	1.001608 0.90 - 1.10
Interc	ept -5.320000 +/-10
	•



Date: September 5, 2023

Location: Bertha Ganter-Fort McKay







TN - NO_x - NH₃ Calibration Report

Version-05-2023

Station Information

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

NOX Cal Date: September 7, 2023 Last Cal Date: August 23, 2023

9:23 14:39 Start time (MST): End time (MST):

NH3 Cal Date: September 8, 2023 Last Cal Date: August 23, 2023

Start time (MST): 9:21 13:30 End time (MST):

Routine 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

NO gas Diff:

NH3 Cal Gas Conc: 74.90 NH3 Gas Cylinder #: CC744566 ppm

> December 21, 2023 NH3 Cal Gas Expiry:

Removed NH3 Conc: 74.90 Removed Cylinder #: NA ppm

NH3 gas Diff:

NOX gas Diff:

Removed cyl Expiry: NA Calibrator Model: Teledyne API T700 Serial Number: 3565 ZAG make/model: Teledyne API T701 Serial Number: 5609

Analyzer Information

Analyzer model: Teledyne API T201 Analyzer serial #: 475 Converter model: Teledyne API T501 Converter serial #: 824 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 5.00 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 512

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.987	0.996	TN coefficient:	0.989	1.001
NOX coefficient:	0.987	0.999	NO bkgrnd:	-0.9	-0.9
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.3	-0.3
NH3 coefficient:	0.973	0.995	TN bkgrnd:	1.2	1.2

Calibration Statistics

<u>Start</u> <u>Fir</u>	<u>nish</u>
NO _X Cal Slope: 0.998131 0.99	9916
NO _X Cal Offset: -2.040000 -2.00	00000
NO Cal Slope: 0.998944 0.99	9929
NO Cal Offset: -2.460000 -2.38	80000
NO ₂ Cal Slope: 0.999734 0.99	7369
NO ₂ Cal Offset: 0.074243 0.08	36604
NH3 Cal Slope: 1.003610 1.00	3196
NH3 Cal Offset: 0.576979 -1.08	81485
TN Cal Slope: 1.006104 1.00	5635
TN Cal Offset: 0.744017 -0.79	93819



TN - NOX - NH₃ Calibration Report

Version-05-2023

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0		
as found NO	4920	80.0	813.4	813.4		816.0	815.0	0.9	0.997	
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
high NO point	4920	80.0	813.4	813.4		812.9	813.0	-0.2	1.001	
NO/O3 point	4920	80.0	813.4	813.4		814.1	811.0	3.6	0.999	
as found NH3	3416	84.1	1799.7		1799.7	1844.9		1839.9	0.976	0.978
new NH3 cyl rp										
first NH3	3416	84.1	1799.7		1799.7	1809.9		1805.4	0.994	0.997
second NH3	3453	46.7	999.4		999.4	1003.0		1000.0	0.996	0.999
third NH3	3477	23.4	500.8		500.8	502.3		500.7	0.997	1.000
							Average Co	rrection Factor	0.9999	0.9988

Corrected As found TN = 816.3 ppb NO_X = 815.3 ppb NH3 = 1839.9 ppb Previous Response TN = 819.1 ppb NO_X = 809.9 ppb NH3 = 1806.8 ppb

*Percent Change TN = -0.3%

*Percent Change $NO_X = 0.7\%$ *Percent Change NH3 = 1.8%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 97.3% NH3 Current Converter Efficiency = 99.5%



NO_X - NO - NO₂ Calibration Report

Version-05-2023

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.6		
as found span	4920	80.0	813.4	800.6	813.4	805.0	793.3	807.5	1.0105	1.0093
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.3	0.1		
high point	4920	80.0	813.4	800.6	813.4	813.0	799.8	812.9	1.0005	1.0011
second point	4960	40.0	406.7	400.3	406.7	401.9	395.8	402.2	1.0120	1.0114
third point	4980	20.0	203.4	200.2	203.4	200.4	195.6	200.2	1.0148	1.0233
							Average C	orrection Factor	1.0091	1.0119
Baseline Corr A	s fnd TN =	808.1 ppb	$NO_X = 805.4$	ppb NO =	793.5 ppb			*Percent Chang	e TN=	-1.4%
Previous Respo	nse TN =	819.1 ppb	$NO_X = 809.9$	ppb NO =	797.3 ppb			*Percent Chang	e NO _x =	-0.6%
·								*Percent Chang	e NO =	-0.5%
								* = > +/-5% change	initiates investigat	ion

^{* = &}gt; +/-5% change initiates investigation

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	-0.2		
calibration zero			0.0	-0.2		
1st GPT point (400 ppb O3)	795.8	395.2	413.4	411.9	1.0036	99.6%
2nd GPT point (200 ppb O3)	795.8	595.5	213.1	213.8	0.9967	100.3%
3rd GPT point (100 ppb O3)	795.8	695.4	113.2	112.6	1.0053	99.5%
			Į.	verage Correction Factor	1.0019	99.8%

Notes: Changed the inlet filter after as founds. Adjusted NOx/NO/TN span. Adjusted NH3 span.

Calibration Performed By: Rene Chamberland



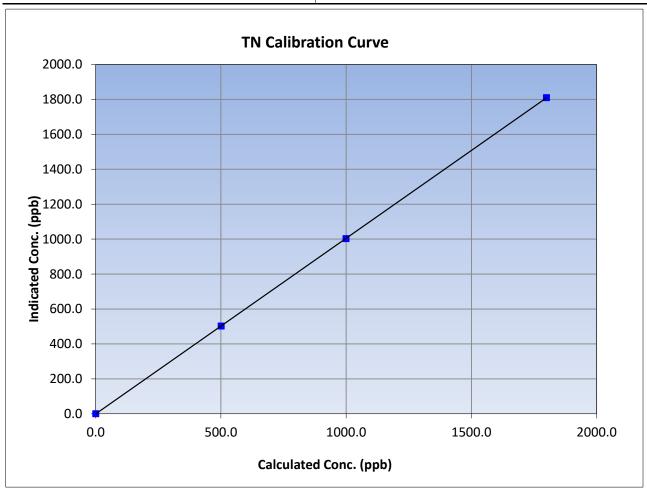
TN Calibration Summary

Version-05-2023

Station Information

Calibration Date: September 8, 2023 Previous Calibration: August 23, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:23 End Time (MST): 14:39 Analyzer make: Teledyne API T201 Analyzer serial #: 475

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999998	≥0.995
1799.7	1809.9	0.9944	Correlation Coefficient	0.555556	20.993
999.4	1003.0	0.9964	Slope	1.005635	0.90 - 1.10
500.8	502.3	0.9969	Slope	1.005055	
			Intercept	-0.793819	+/-20





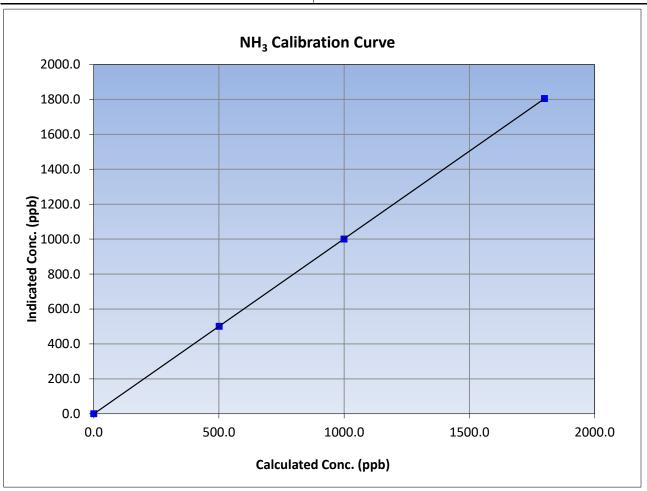
NH₃ Calibration Summary

Version-05-2023

Station Information

Calibration Date: September 8, 2023 Previous Calibration: August 23, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:23 End Time (MST): 14:39 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999997	≥0.995
1799.7	1805.4	0.9969	Correlation Coefficient	0.555557	20.333
999.4	1000.0	0.9994	Slope	1.003196	0.90 - 1.10
500.8	500.7	1.0001	Slope	1.005190	0.90 - 1.10
			Intercept	-1.081485	+/-20





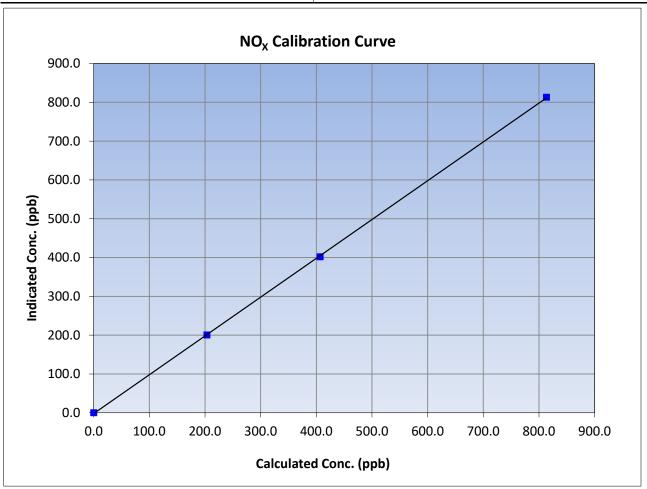
NO_x Calibration Summary

Version-05-2023

Station Information

Calibration Date: September 7, 2023 Previous Calibration: August 23, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:23 End Time (MST): 14:39 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999957	≥0.995
813.4	813.0	1.0005	Correlation Coefficient	0.555557	20.333
406.7	401.9	1.0120	Slope	0.999916	0.90 - 1.10
203.4	200.4	1.0148	Slope	0.999910	0.90 - 1.10
			Intercept	-2.000000	+/-20





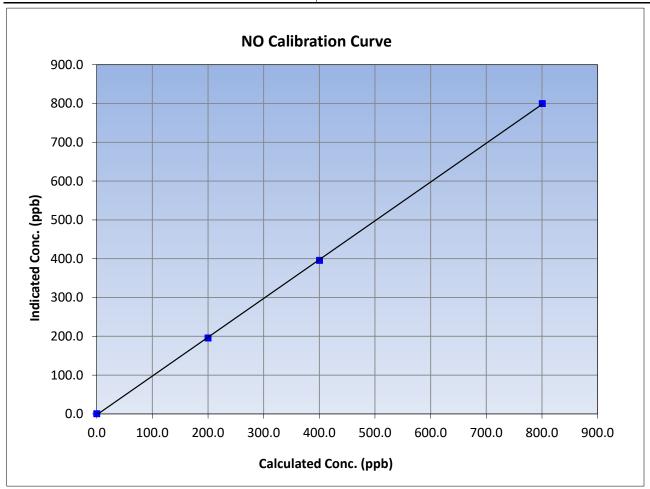
NO Calibration Summary

Version-05-2023

Station Information

Calibration Date: September 7, 2023 Previous Calibration: August 23, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:23 End Time (MST): 14:39 Analyzer make: Teledyne API T201 Analyzer serial #: 475

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999946	≥0.995
800.6	799.8	1.0011	Correlation Coefficient	0.555540	20.993
400.3	395.8	1.0114	Slope	0.999929	0.90 - 1.10
200.2	195.6	1.0233	Siope	0.333323	0.30 - 1.10
			Intercept	-2.380000	+/-20





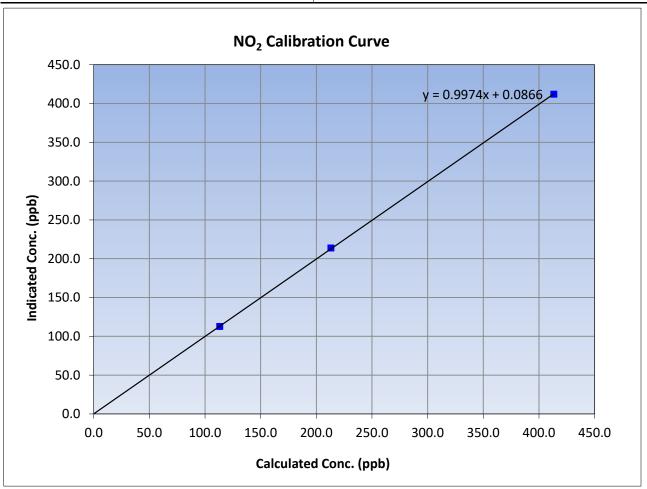
NO₂ Calibration Summary

Version-05-2023

Station Information

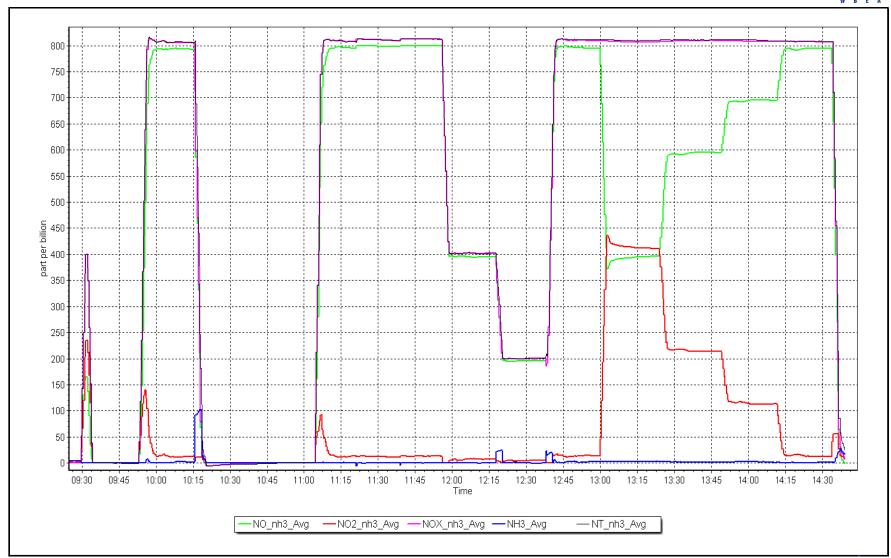
Calibration Date: September 7, 2023 Previous Calibration: August 23, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 9:23 End Time (MST): 14:39 Analyzer make: Teledyne API T201 Analyzer serial #: 475

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999980	≥0.995
413.4	411.9	1.0036	correlation coefficient	0.555560	20.993
213.1	213.8	0.9967	Slope	0.997369	0.90 - 1.10
113.2	112.6	1.0053	Slope	0.997309	0.90 - 1.10
	<u> </u>		Intercept	0.086604	+/-20



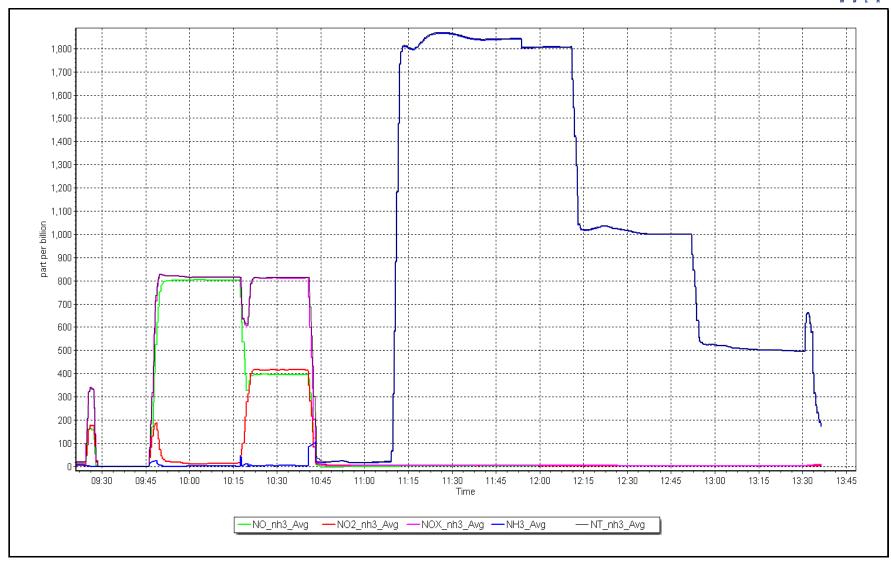
Date: September 7, 2023 Location: Bertha Ganter-Fort McKay





Date: September 8, 2023 Location: Bertha Ganter-Fort McKay







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Finish

17.5 0.774

Station Information

Mildred Lake Station Name:

October 20, 2023 Calibration Date:

Start time (MST): 9:27 Routine Reason:

Station number: AMS02

September 25, 2023 Last Cal Date:

End time (MST): 12:30

Calibration Standards

Cal Gas Concentration: 49.98

Cal Gas Cylinder #: CC501209

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

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

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 1185 Serial Number: 4891

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

Analyzer Range 0 - 1000 ppb

Finish Start Start Calibration slope: 0.995496 0.999174 Backgd or Offset: 18.1 Calibration intercept: 0.154391 0.714964 Coeff or Slope: 0.797

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	80.2	801.6	813.0	0.986
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.7	
high point	4920	80.2	801.6	801.7	1.000
second point	4960	40.1	400.8	401.2	0.999
third point	4980	20.0	199.9	200.5	0.997
as left zero	5000	0.0	0.0	0.5	
as left span	4920	80.2	801.6	805.2	0.996
			Averag	ge Correction Factor	0.999
Baseline Corr As found:	812.60	Previous response	798.19	*% change	1.8%

Previous response % change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA Baseline Corr 3rd AF pt: AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Aswin Sasi Kumar



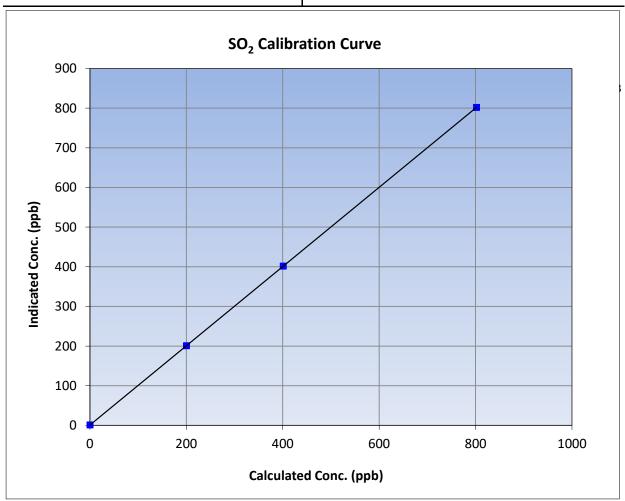
SO₂ Calibration Summary

Version-01-2020

Station Information

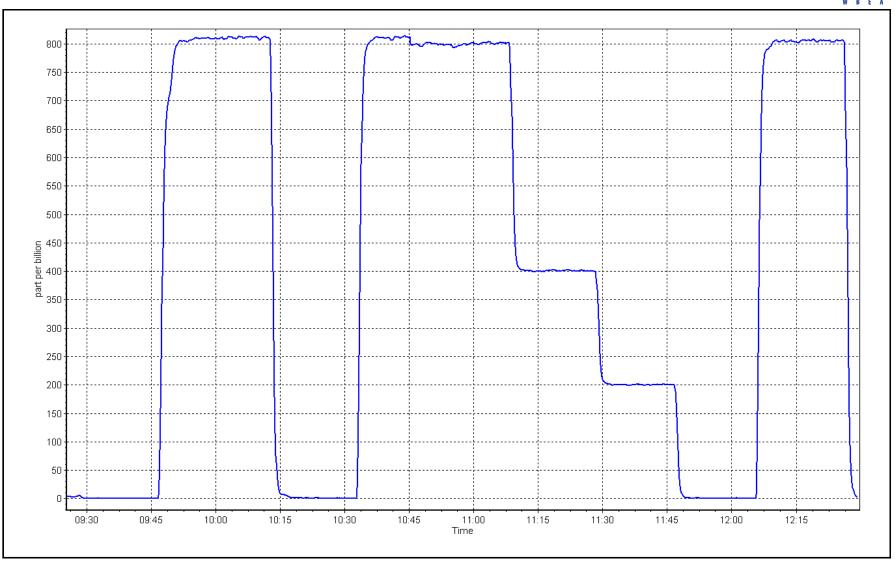
Calibration Date: October 20, 2023 **Previous Calibration:** September 25, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 9:27 End Time (MST): 12:30 Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.7		Correlation Coefficient	1.000000	≥0.995				
801.6	801.7	0.9999	Correlation Coefficient	1.000000	20.995				
400.8	401.2	0.9991	Slope	0.999174	0.90 - 1.10				
199.9	200.5	0.9971	Slope		0.30 - 1.10				
			- Intercept	0.714964	+/-30				



SO2 Calibration Plot Date: October 20, 2023 Location: Mildred Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mildred Lake

Calibration Date: October 25, 2023

Start time (MST): 6:45

Reason: Routine Station number: AMS02

> Last Cal Date: September 20, 2023

End time (MST): 10:54

Calibration Standards

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

Cal Gas Cylinder #: CC345191

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.29 ppm Removed Gas Cyl #: Diff between cyl: NA

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

<u>Start</u> **Finish Start** <u>Finish</u> 1.002536 Backgd or Offset: Calibration slope: 1.004536 1.78 1.71

Calibration intercept: 0.220806 -0.059198 Coeff or Slope: 0.781 0.754

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	0.0	
as found span	4924	75.6	80.0	83.2	0.961
as found 2nd point	4962	37.8	40.0	41.6	0.961
as found 3rd point	4981	18.9	20.0	20.6	0.971
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	80.1	0.999
second point	4962	37.8	40.0	40.2	0.995
third point	4981	18.9	20.0	19.8	1.010
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	80.7	0.991
SO2 Scrubber Check	4920	80.2	802.0	0.1	
Date of last scrubber chang	ge:	20-Sep-23		Ave Corr Factor	1.001
Date of last converter effic	iencv test:				efficiency

Baseline Corr As found: 83.2 Prev response: 80.57 3.2% *% change:

Baseline Corr 2nd AF pt: 41.6 AF Slope: 1.040969 0.999993 Baseline Corr 3rd AF pt: 20.6 AF Correlation:

* = > +/-5% change initiates investigation

AF Intercept:

Sox scrubber checked after the calibrated zero. Span adjusted. Notes:

Calibration Performed By: Melissa Lemay -0.079168



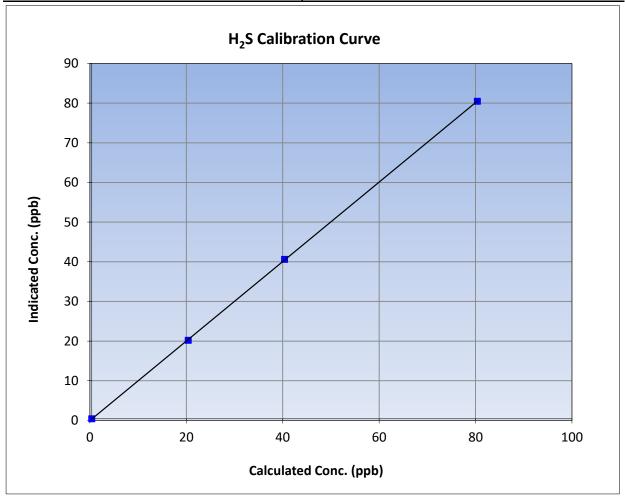
H₂S Calibration Summary

Version-11-2021

Station Information

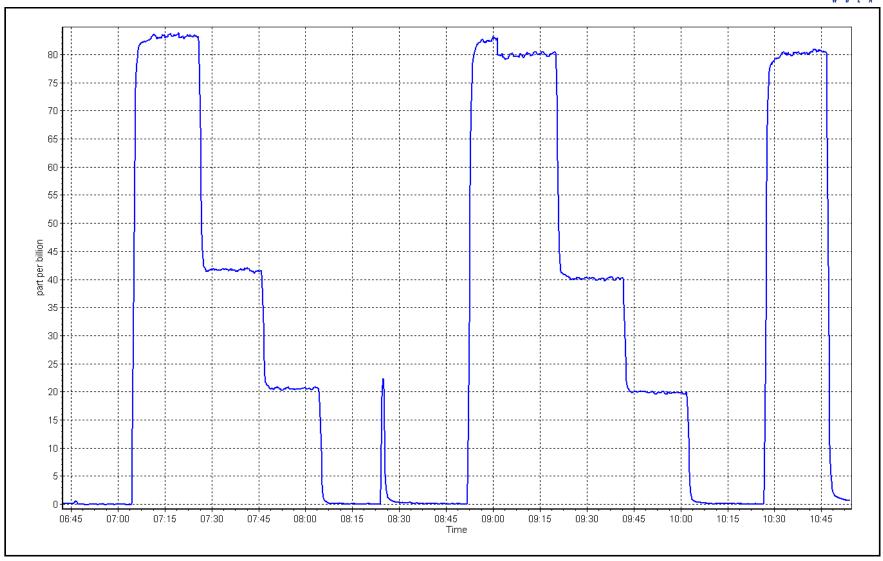
Calibration Date: October 25, 2023 **Previous Calibration:** September 20, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 6:45 End Time (MST): 10:54 Analyzer make: Thermo 43iQTL Analyzer serial #: 12113311966

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999981	≥0.995			
80.0	80.1	0.9986	Correlation Coefficient	0.555501	20.993			
40.0	40.2	0.9949	Slope	1.002536	0.90 - 1.10			
20.0	19.8	1.0099	Slope	1.002550	0.90 - 1.10			
			- Intercept	-0.059198	+/-3			



Date: October 25, 2023 Location: Mildred Lake







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Mildred Lake

Calibration Date: October 20, 2023

Start time (MST): 9:27 Reason: Routine Station number: AMS02

Last Cal Date: September 25, 2023

End time (MST): 12:30

Calibration Standards

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

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

C3H8 Cal Gas Conc. 199.4 ppm

Removed Gas Cert: NA

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

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

Calibrator Model: Teledyne API T700 Serial Number: 1185

ZAG make/model: Teledyne API T701 Serial Number: 1185

ZHO make/model: Teledyne API T701 Serial Number: 4891

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 Start Start Finish CH4 SP Ratio: 2.99E-04 3.04E-04 NMHC SP Ratio: 4.58E-05 4.59E-05 CH4 Retention time: 14.6 14.8 NMHC Peak Area: 192179 191592 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	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	16.67	1.009
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	16.76	1.003
second point	4960	40.1	8.41	8.36	1.006
third point	4980	20.0	4.19	4.16	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.78	1.002
			Д	Average Correction Factor	1.006
Baseline Corr AF:	16.67	Prev response	16.78	*% change	-0.7%
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 Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.80	8.78	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.80	8.79	1.001
second point	4960	40.1	4.40	4.41	0.997
third point	4980	20.0	2.19	2.21	0.991
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.80	8.83	0.997
			Aver	age Correction Factor	0.996
Baseline Corr AF:	8.78	Prev response	8.79	*% 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	
as found span	4920	80.2	8.02	7.88	1.018
as found 2nd point	4320	00.2	0.02	7.00	1.010
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.02	7.97	1.007
second point	4960	40.1	4.01	3.94	1.018
third point	4980	20.0	2.00	1.95	1.025
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	7.96	1.008
			Aver	age Correction Factor	1.017
Baseline Corr AF:	7.88	Prev response	7.99	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics	<u>. </u>	
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:				<u>Finish</u> 0.996697	
THC Cal Slope: THC Cal Offset:		<u>Start</u>			

Notes: Span adjusted.

0.999502

-0.025057

0.998932

0.008542

Calibration Performed By: Aswin Sasi Kumar

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

0.994304

-0.023065

0.998828

0.011943



THC Calibration Summary

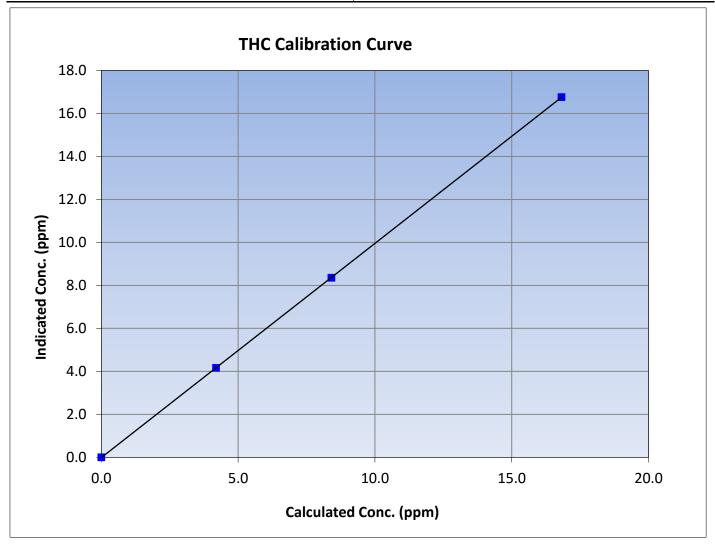
Version-06-2022

Station Information

Calibration Date: October 20, 2023 Previous Calibration: September 25, 2023

Station Name:Mildred LakeStation Number:AMS02Start Time (MST):9:27End Time (MST):12:30Analyzer make:Thermo 55iAnalyzer serial #:1180320038

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	
16.82	16.76	1.0035	Correlation Coefficient	0.555557	20.333	
8.41	8.36	1.0065	Slope	0.996697	0.90 - 1.10	
4.19	4.16	1.0073	Slope	0.990097	0.90 - 1.10	
			Intercept	-0.011323	+/-0.5	





CH₄ Calibration Summary

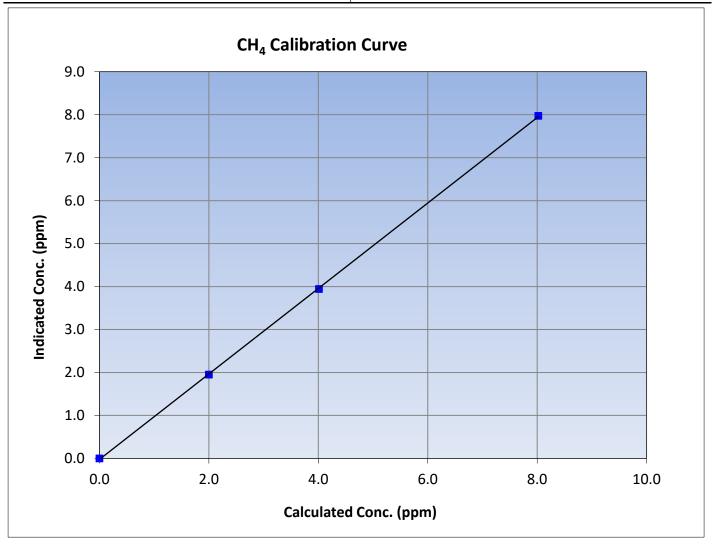
Version-06-2022

Station Information

Calibration Date: October 20, 2023 Previous Calibration: September 25, 2023

Station Name:Mildred LakeStation Number:AMS02Start Time (MST):9:27End Time (MST):12:30Analyzer make:Thermo 55iAnalyzer serial #:1180320038

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999954	≥0.995
8.02	7.97	1.0066	Correlation Coemicient	0.555554	20.333
4.01	3.94	1.0179	Slope	0.994304	0.90 - 1.10
2.00	1.95	1.0250	Siope		0.90 - 1.10
			Intercept	-0.023065	+/-0.5





NMHC Calibration Summary

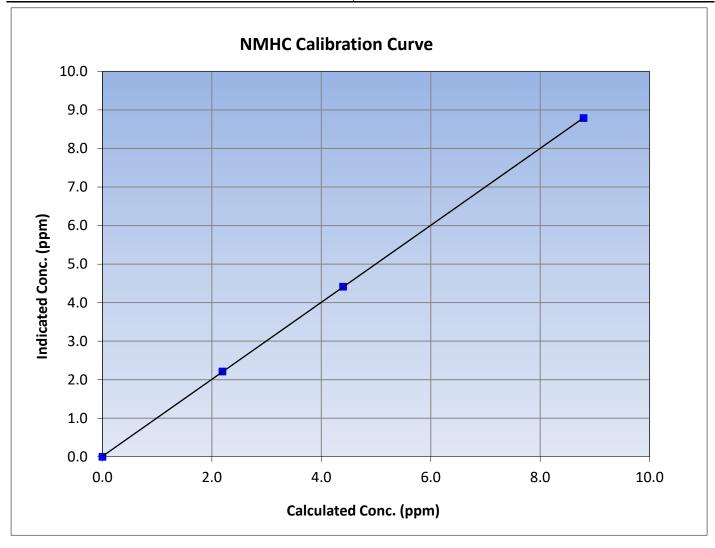
Version-06-2022

Station Information

Calibration Date: October 20, 2023 Previous Calibration: September 25, 2023

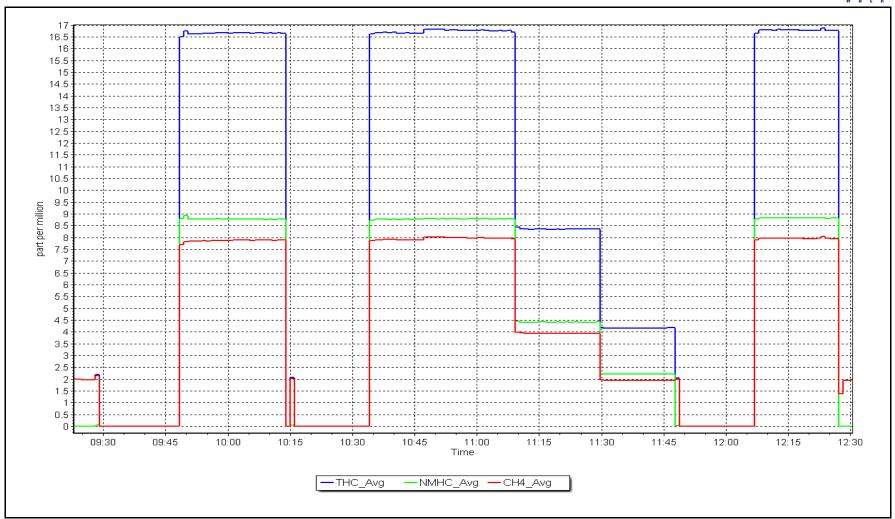
Station Name:Mildred LakeStation Number:AMS02Start Time (MST):9:27End Time (MST):12:30Analyzer make:Thermo 55iAnalyzer serial #:1180320038

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
8.80	8.79	1.0006	Correlation Coemicient	0.555551	20.933
4.40	4.41	0.9965	Slope	0.998828	0.90 - 1.10
2.19	2.21	0.9911	Slope	0.996626	0.90 - 1.10
			Intercept	0.011943	+/-0.5



NMHC Calibration Plot Date: October 20, 2023 Location: Mildred Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT SEPTEMBER 2023

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

October 30, 2023







SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint Calibration Date: September 13, 2023

Start time (MST): 8:35
Reason: Routine

Station number: AMS04

Last Cal Date: August 9, 2023 End time (MST): 11:20

Calibration Standards

Cal Gas Concentration: 50.87

Cal Gas Cylinder #: CC446753

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

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

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3808 Serial Number: 362

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Analyzer Range 0 - 1000 ppb

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

ppm

ppm

Calibration slope: 0.999657 0.994771 Backgd or Offset: Calibration intercept: 0.974700 2.033465 Coeff or Slope:

<u>Start</u> 22.1

0.860

*Finish*22.1
0.860

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	
		78.6			
as found span	4921	/8.6	799.7	800.5	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.0	
high point	4921	78.6	799.7	796.3	1.004
second point	4961	39.3	399.8	402.6	0.993
third point	4980	19.6	199.4	199.9	0.998
as left zero	5000	0.0	0.0	0.8	
as left span	4921	78.6	799.7	798.4	1.002
			Averag	ge Correction Factor	0.998

Baseline Corr As found:800.10Previous response800.44*% change0.0%Baseline Corr 2nd AF pt:NAAF Slope:AF Intercept:Baseline Corr 3rd AF pt:NAAF Correlation:

* = > +/-5% change initiates investigation

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



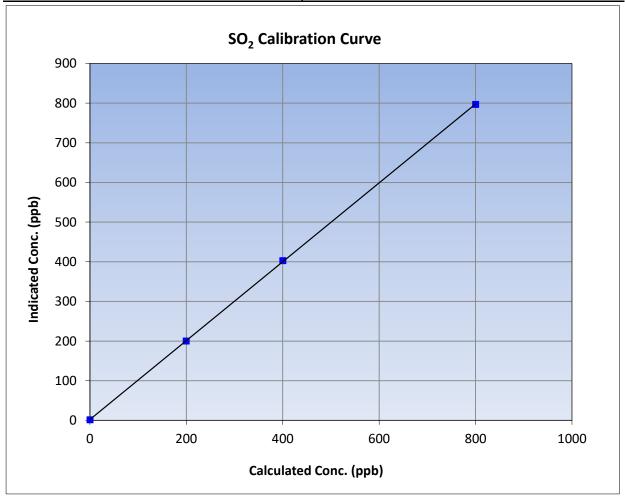
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 13, 2023 **Previous Calibration:** August 9, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:35 End Time (MST): 11:20 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	1.0		Correlation Coefficient	0.999968	≥0.995			
799.7	796.3	1.0043	Correlation Coefficient	0.555506	20.333			
399.8	402.6	0.9931	Slope	0.994771	0.90 - 1.10			
199.4	199.9	0.9976	Siope	0.994771	0.90 - 1.10			
			- Intercept	2.033465	+/-30			

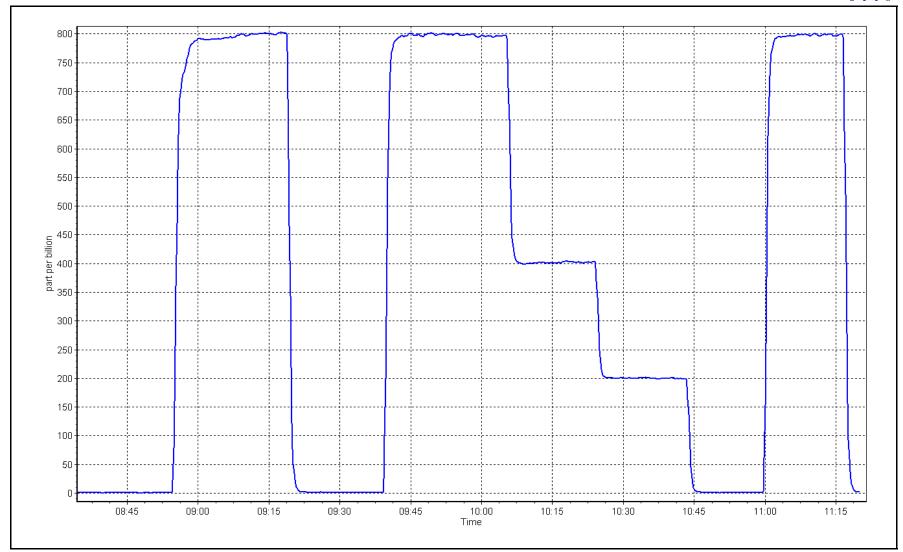


SO2 Calibration Plot

Date: September 13, 2023 Lo

Location: Buffalo Viewpoint







H₂S Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS04

10:13

August 2, 2023

Start

1.8

1.095

Version-11-2021

Station Information

Station Name: **Buffalo Viewpoint** Calibration Date: September 1, 2023

Start time (MST): 6:15 Reason: Routine

Cal Gas Concentration:

Calibration slope:

5.42

Calibration Standards Cal Gas Exp Date: January 4, 2025 ppm

Cal Gas Cylinder #: CC345266

Removed Cal Gas Conc: 5.42 Removed Gas Cyl #: NA

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

Rem Gas Exp Date: NA ppm

> Diff between cyl: Serial Number: 3808

Serial Number: 362

Analyzer Information

Analyzer make: Thermo 43i-LTE

Global Converter make:

Analyzer serial #: 1008841400 Converter serial #: 2022-200

0 - 100 ppb Analyzer Range

> <u>Start</u> 1.000770

Finish 1.004754 -0.037663

Backgd or Offset: Coeff or Slope: <u>Finish</u> 1.8 1.095

Calibration intercept: -0.097733

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	4926	74.1	80.3	80.9	0.992
as found 2nd point	4963	37.0	40.1	40.5	0.988
as found 3rd point	4982	18.5	20.1	20.1	0.993
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	4926	74.1	80.3	80.6	0.997
second point	4963	37.0	40.1	40.4	0.993
third point	4982	18.5	20.1	20.1	0.998
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.1	80.3	80.1	1.003
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber chang	ge:	16-May-23		Ave Corr Factor	0.996
Date of last converter effici	iency test:			<u> </u>	efficiency

Date of last scrubber change	:	16-May-23		Ave Corr Factor	0.996
Date of last converter efficie	ncy test:			6	efficiency
Baseline Corr As found:	81.0	Prev response:	80.29	*% change:	0.9%

Baseline Corr 2nd AF pt: 40.6 AF Slope: 1.008738 Baseline Corr 3rd AF pt: 20.2 0.999995 AF Correlation:

* = > +/-5% change initiates investigation

AF Intercept:

-0.077596

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

Calibration Performed By: Melissa Lemay



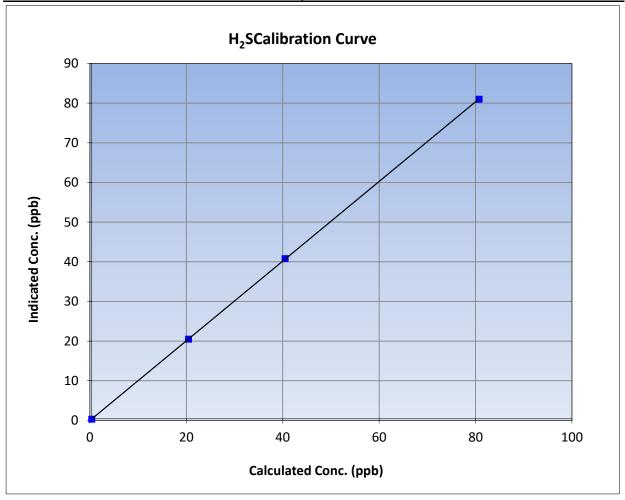
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 2, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:15 End Time (MST): 10:13 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1008841400

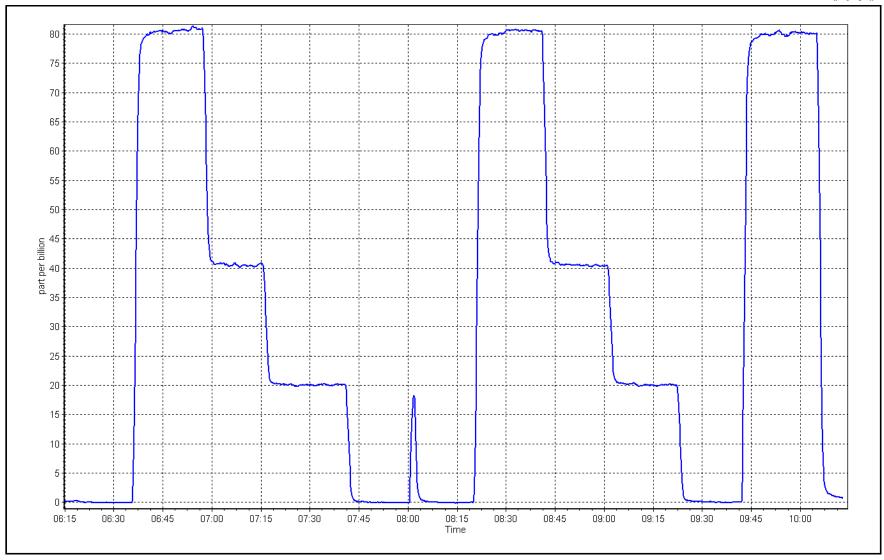
Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-0.1		Correlation Coefficient	0.999992	≥0.995			
80.3	80.6	0.9966	Correlation Coefficient	0.333332	20.993			
40.1	40.4	0.9928	Slope	1.004754	0.90 - 1.10			
20.1	20.1	0.9976	Slope	1.004754	0.90 - 1.10			
			Intercept	-0.037663	+/-3			



Date: September 1, 2023

Location: Buffalo Viewpoint







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: September 13, 2023

Start time (MST): 8:35
Reason: Routine

Station number: AMS04

Last Cal Date: August 9, 2023

End time (MST): 11:19

Calibration Standards

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

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

C3H8 Cal Gas Conc. 204.0 ppm

Removed Gas Cert: NA

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

Removed C3H8 Conc. 204.0 ppm Diff between cyl (THC): Diff between cyl (CH $_4$): Diff between cyl (NM):

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

Finish Finish Start Start CH4 SP Ratio: 1.86E-04 1.91E-04 NMHC SP Ratio: 3.96E-05 4.09E-05 CH4 Retention time: 11.8 11.8 NMHC Peak Area: 222570 215814 Zero Chromatogram: OFF OFF Flat Baseline: ON ON

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	78.6	16.64	16.16	1.029
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	16.64	16.62	1.001
second point	4961	39.3	8.32	8.28	1.004
third point	4980	19.6	4.15	4.12	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4921	78.6	16.64	16.63	1.000
			Д	Average Correction Factor	1.004
Baseline Corr AF:	16.16	Prev response	16.64	*% change	-2.9%
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-06-2022

		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	4921	78.6	8.82	8.55	1.032
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	8.82	8.81	1.001
second point	4961	39.3	4.41	4.40	1.002
third point	4980	19.6	2.20	2.19	1.004
as left zero	5000	0.0	0.00	0.00	
as left span	4921	78.6	8.82	8.80	1.002
			А	verage Correction Factor	1.002
Baseline Corr AF:	8.55	Prev response	8.82	*% change	-3.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra Source gas flow rate	Calc conc (ppm) (C	(c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
***************************************					CF <i>Limit= 0.95-1.05</i>
as found zero	5000 4921	0.0 78.6	0.00 7.82	0.00 7.61	1.027
as found span as found 2nd point	4921	76.0	7.02	7.01	1.027
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	7.82	7.82	1.000
second point	4961 4980	39.3 19.6	3.91 1.95	3.88	1.007
third point as left zero			0.00	1.94	1.005
	5000 4921	0.0 78.6	7.82	0.00 7.83	
as left span	4921	/8.0			0.998
Baseline Corr AF:	7.61	Prev response	7.82	verage Correction Factor *% change	1.004 -2.7%
Baseline Corr Ar.		AF Slope:	7.02	AF Intercept:	-2.770
	NA	•		* = > +/-5% change initiat	os investigation
Baseline Corr 3rd AF:	NA	AF Correlation:		- > +/ -3/0 Change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000360		0.999330	
THC Cal Offset:		-0.005535		-0.015543	
CH4 Cal Slope:		1.000736		1.000443	
CH4 Cal Offset:		-0.005903		-0.009902	

1.000144

-0.000833

Notes:

NMHC Cal Slope:

NMHC Cal Offset:

Span adjusted. No maintenance done.

0.999120

-0.003636

Calibration Performed By: Melissa Lemay



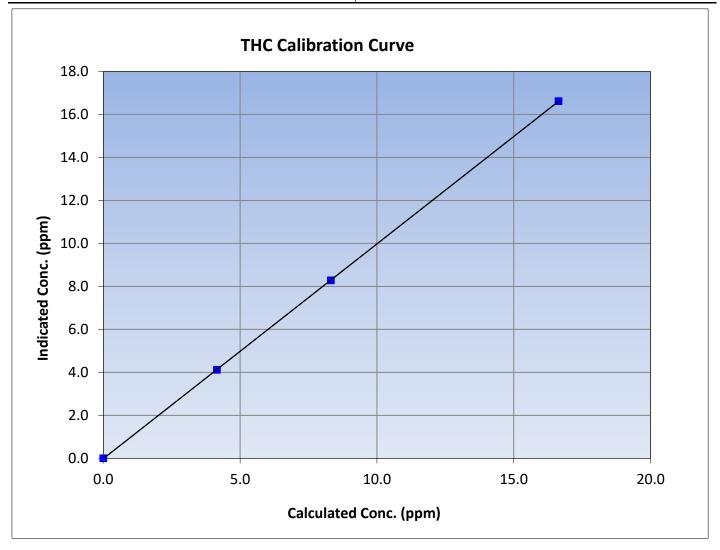
THC Calibration Summary

Version-06-2022

Station Information

September 13, 2023 **Previous Calibration:** Calibration Date: August 9, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:35 End Time (MST): 11:19 Analyzer make: Thermo 55i Analyzer 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	0.999995	≥0.995
16.64	16.62	1.0010	Correlation Coemicient	0.999995	20.993
8.32	8.28	1.0045	Slope	0.999330	0.90 - 1.10
4.15	4.12	1.0069	Slope	0.555550	0.90 - 1.10
			Intercept	-0.015543	+/-0.5





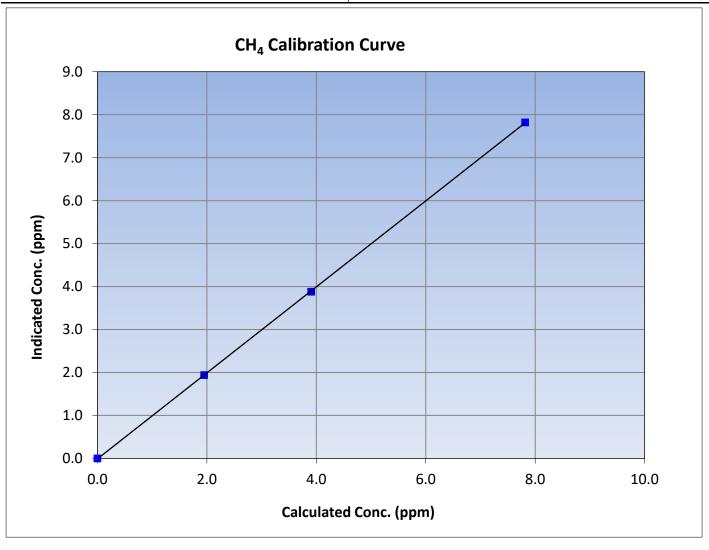
CH₄ Calibration Summary

Version-06-2022

Station Information

September 13, 2023 Calibration Date: **Previous Calibration:** August 9, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:35 End Time (MST): 11:19 Analyzer make: Analyzer serial #: Thermo 55i 1222762077

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient		≥0.995	
7.82	7.82	0.9996	Correlation Coefficient	0.999983	20.333	
3.91	3.88	1.0072	Slope	1.000443	0.90 - 1.10	
1.95	1.94	1.0047	Siope	1.000443	0.90 - 1.10	
			Intercept	-0.009902	+/-0.5	





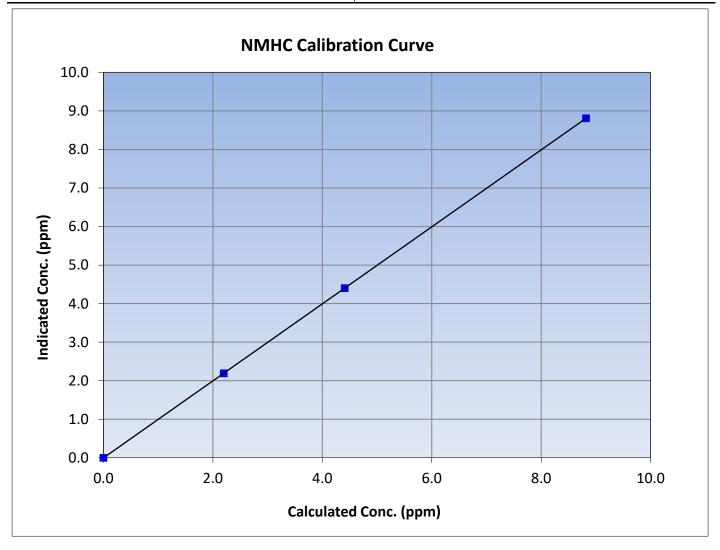
NMHC Calibration Summary

Version-06-2022

Station Information

September 13, 2023 Calibration Date: **Previous Calibration:** August 9, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 8:35 End Time (MST): 11:19 Analyzer make: Thermo 55i Analyzer serial #: 1222762077

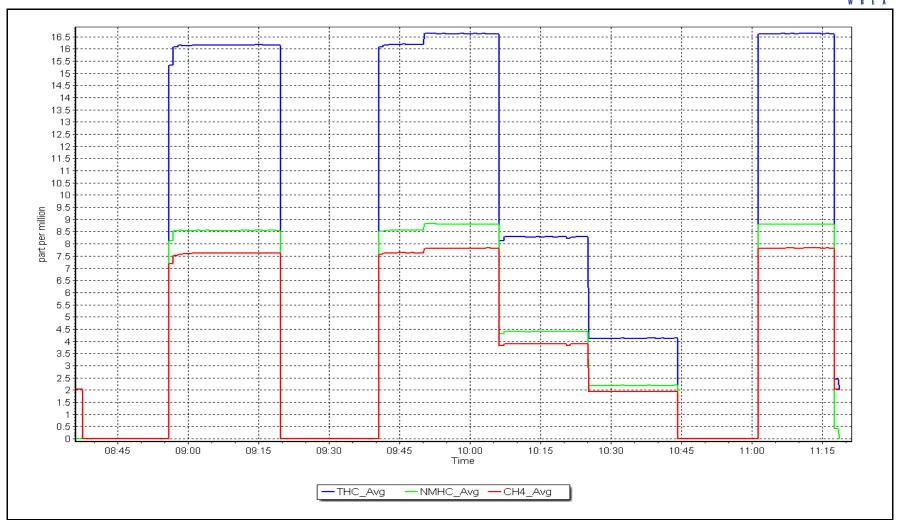
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.99999	≥0.995	
8.82	8.81	1.0011	Correlation Coefficient	0.555555	20.333	
4.41	4.40	1.0021	Slope	0.999120	0.90 - 1.10	
2.20	2.19	1.0042	Slope	0.999120	0.90 - 1.10	
			Intercept	-0.003636	+/-0.5	



Date: September 13, 2023

Location: Buffalo Viewpoint







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: September 8, 2023

Start time (MST): 5:45
Reason: Routine

Station number: AMS04

Last Cal Date: August 25, 2023

End time (MST): 10:53

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: 3808 ZAG make/model: API T701 Serial Number: 362

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 721

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.121	1.164	NO bkgnd or offset:	-0.6	-0.6
NOX coeff or slope:	1.119	1.159	NOX bkgnd or offset:	-0.3	-0.3
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:	1.000803	1.001176
NO _x Cal Offset:	0.426473	0.046144
NO Cal Slope:	1.000459	1.001222
NO Cal Offset:	-0.993702	-0.434177
NO ₂ Cal Slope:	0.991739	0.996415
NO ₂ Cal Offset:	2.285236	-1.016897



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	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/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.8	0.2	0.6		
as found span	4922	78.1	799.1	795.2	3.9	767.9	762.5	5.4	1.0406	1.0429
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.4	0.1		
high point	4922	78.1	799.1	795.2	3.9	800.2	795.9	4.3	0.9986	0.9991
second point	4961	39.1	400.1	398.1	2.0	400.7	398.5	2.2	0.9984	0.9990
third point	4981	19.5	199.5	198.5	1.0	199.1	197.0	2.1	1.0020	1.0078
as left zero	5000	0.0	0.0	0.0	0.0	0.7	1.1	-0.4		
as left span	4922	78.1	799.1	384.1	415.0	794.9	385.1	409.9	1.0053	0.9974
							Average Co	orrection Factor	0.9997	1.0020
Corrected As fo	ound NO _X =	767.1 ppb	NO =	762.3 ppb	* = > +/-5%	change initiates i	investigation	*Percent Chang	ge NO _x =	-4.3%
Previous Respo	onse NO _X =	800.2 ppb	NO =	794.6 ppb				*Percent Chang	ge NO =	-4.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _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:	
				G	iPT Calibration D	ata				
O3 Setpo	oint (ppb)	Indicated NO Refere concentration (ppl		cated NO Drop entration (ppb)	Calculated NO2 concentration (ppb)		dicated NO2 atration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	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)	796.8		385.7	415.0		412.7	1.0056	;	99.4%
2nd GPT point	t (200 ppb O3)	796.8		586.5	214.2		213.0	1.0057	, <u> </u>	99.4%
3rd GPT point	t (100 ppb O3)	796.8		691.5	109.2		105.9	1.0312	<u>)</u>	97.0%

Notes:

No Maintenance Done. Span adjusted. Due to drifting during the GPT the 2nd NO ref point used.

Calibration Performed By: Melissa Lemay



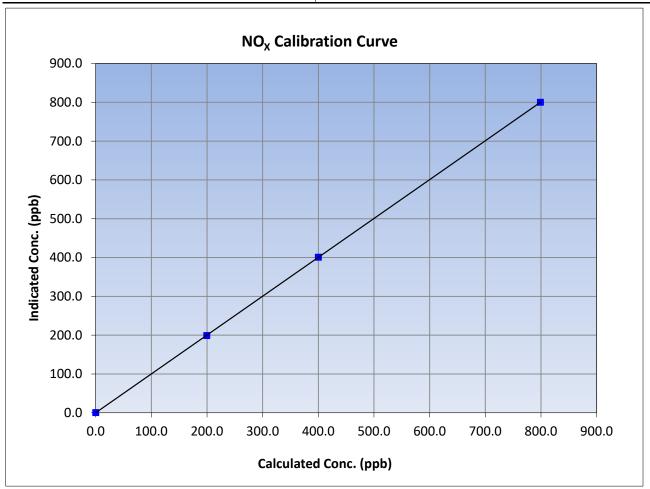
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 8, 2023 Previous Calibration: August 25, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 5:45 End Time (MST): 10:53 Analyzer serial #: Analyzer make: **API T200** 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999998	≥0.995
799.1	800.2	0.9986	Correlation Coefficient	0.555556	20.993
400.1	400.7	0.9984	Slope	1.001176	0.90 - 1.10
199.5	199.1	1.0020	Slope	1.001176	0.90 - 1.10
			Intercept	0.046144	+/-20





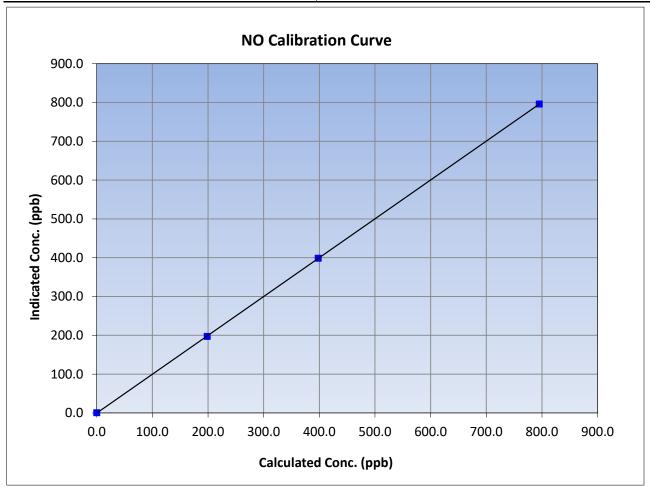
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 8, 2023 Previous Calibration: August 25, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 5:45 End Time (MST): 10:53 Analyzer make: **API T200** Analyzer serial #: 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999992	≥0.995
795.2	795.9	0.9991	Correlation Coefficient	0.555552	20.333
398.1	398.5	0.9990	Slope	1.001222	0.90 - 1.10
198.5	197.0	1.0078	Slope	1.001222	0.90 - 1.10
			Intercept	-0.434177	+/-20





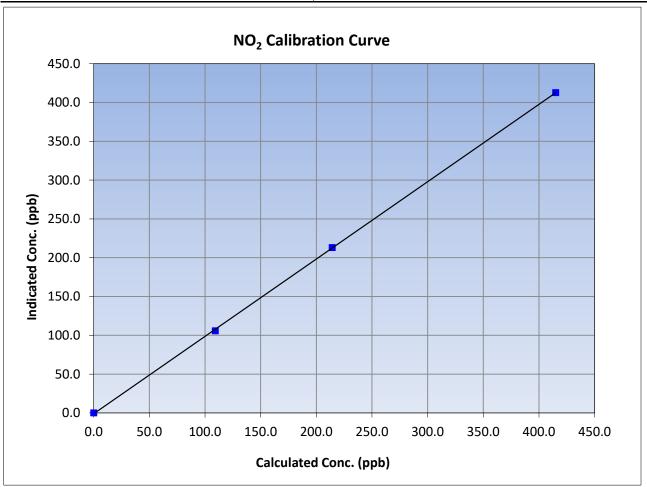
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 8, 2023 Previous Calibration: August 25, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 5:45 End Time (MST): 10:53 Analyzer make: **API T200** Analyzer serial #: 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999944	≥0.995
415.0	412.7	1.0056	Correlation Coefficient	0.555544	20.333
214.2	213.0	1.0057	Slope	0.996415	0.90 - 1.10
109.2	105.9	1.0312	Slope	0.550415	0.90 - 1.10
			Intercept	-1.016897	+/-20

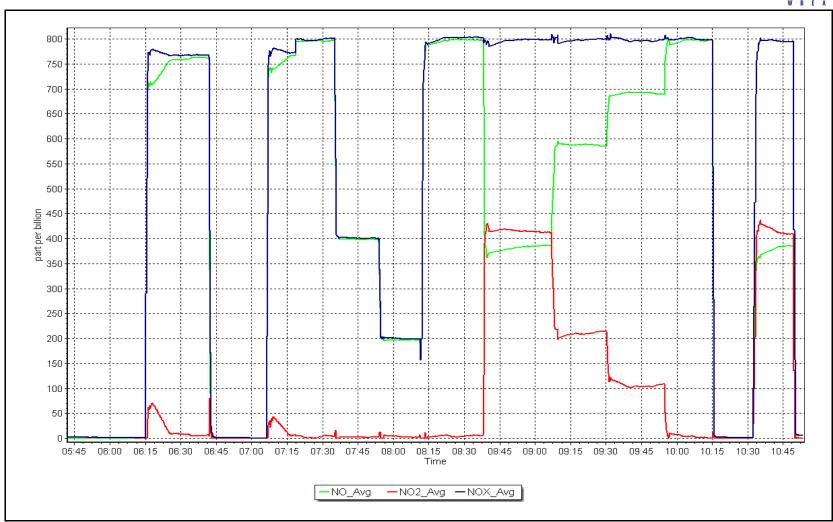


NO_x Calibration Plot

Date: September 8, 2023

Location: Buffalo Viewpoint







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: September 13, 2023

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

Last Cal Date: August 9, 2023 End time (MST): 8:38

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 Range 0 - 500 ppb

Start Finish

<u>misn</u> 97486 Backgd or Offset: <u>Start</u>

<u>Finish</u>

Calibration slope: Calibration intercept: 0.996114 0.480000 0.997486 -0.460000

Coeff or Slope:

Analyzer serial #: 2961

-2.6 1.008 -2.6 1.008

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	-0.9	
high point	5000	984.5	400.0	398.2	1.005
second point	5000	816.9	200.0	199.6	1.002
third point	5000	707.7	100.0	99.5	1.005
as left zero	5000	0.0	0.0	0.3	
as left span	5000	989.6	400.0	399.2	1.002
			Averag	ge Correction Factor	1.004
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:	:		
				* = > +/-5% change initiat	es investigation

Notes: No as founds as pump had died and flow is at 0.0cc/min. Pump replaced. No adjustments done.

Calibration Performed By: Melissa Lemay



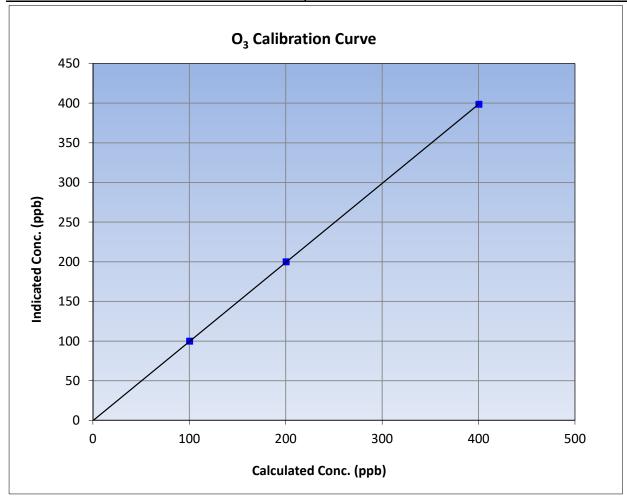
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 13, 2023 **Previous Calibration:** August 9, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:30 End Time (MST): 8:38 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	-0.9		Correlation Coefficient	0.999992	≥0.995
400.0	398.2	1.0045	Correlation coefficient	0.333332	20.333
200.0	199.6	1.0020	Slope	0.997486	0.90 - 1.10
100.0	99.5	1.0050	Slope	0.557460	0.90 - 1.10
			- Intercept	-0.460000	+/- 5

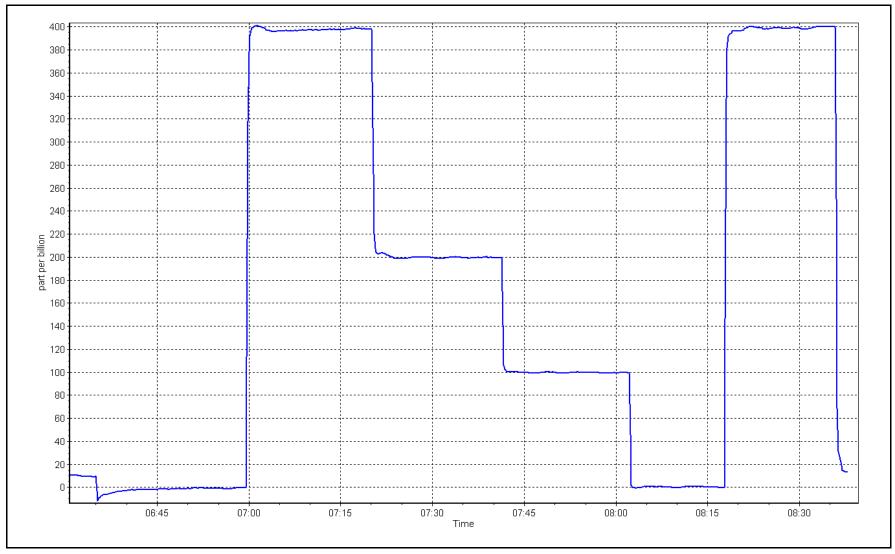


O₃ Calibration Plot

Date: September 13, 2023

Location: Buffalo Viewpoint







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date: Start time (MST):	Buffalo Viewpoint September 13, 2023 7:09		Station number: Last Cal Date: End time (MST):	August 31,	2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	322		
Flow Meter Make/Model:	Deltacal		S/N:	1451		
Temp/RH standard:	Deltacal		S/N:			
		Monthly Calibration Te	st			
<u>Parameter</u>	As found	Measured	<u>As left</u>		Adjusted	(Limits)
T (°C)	11.1	11.3	11.1			+/- 2 °C
P (mmHg)	723	724.5	723			+/- 10 mmHg
flow (LPM)	5.03	4.93	5.03			+/- 0.25 LPM
Leak Test:	Date of check: _ PM w/o HEPA:	September 13, 2023 200	Last Cal Date: _ PM w/ HEPA:	August 3		<0.2 ug/m3
Inlet cleaning :	Inlet Head					
_		Quarterly Calibration To				
<u>Parameter</u>	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	10.5	10.5	10.5			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	21.8	w/ HEPA:		0
Date Optical Cham	ber Cleaned:	September 13	, 2023			<0.2 ug/m3
Disposable Filte	r Changed:	September 13	, 2023			
		Annual Maintenance				
Date Sample Tub	ne Cleaned	May 23, 20	123			
Date RH/T Sensor Cleaned:		May 23, 2023				
Notes:		No adjustments done. Leak (check done before ar	nd after clea	ning.	
Calibration by:	Melissa Lemay					

W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Buffalo Viewpoint Station Number: AMS 04

Calibration Date: September 29, 2023 Prev Cal Date: October 6, 2022

Start Time (MST): 6:48 End Time (MST): 8:13
Tower Height (m): 10m Reason: Removal

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: Y4520 WS Calibrator: MetOne 053 Serial Number: R10866

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.1 -0.3% 400 39.4 39.4 0.1% 58.7 600 58.6 0.2% 800 77.8 77.8 0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999999	0.999998	≥0.9995
Calculated slope	0.999979	0.998443	0.90 - 1.10
Calculated intercept	-0.013577	0.026636	+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: V11346

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 12:12:43 Calc Declination*: 13.67 Degrees

Deadband calc:

-1.4 degrees (Limit 4 deg)

*- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.0	
90	90.5	0.1%
180	179.4	-0.2%
270	269.7	-0.1%
357	358.4	0.4%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999994	0.999987	≥0.9995
Calculated slope	1.000909	0.997772	0.90 - 1.10
Calculated intercept	-0.427281	0.200128	+/- 4

Notes: WS was removed, WD was just calibrated.

Calibration Performed By: Melissa Lemay

W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Buffalo Viewpoint Station Number: AMS 04

Calibration Date: September 29, 2023 Prev Cal Date: October 6, 2022

Start Time (MST): 6:48 End Time (MST): 8:13
Tower Height (m): 10m Reason: Install

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: Y3176
WS Calibrator: MetOne 053 Serial Number: R10866

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.2 0.2% 400 39.4 39.4 0.1% 600 58.6 58.8 0.4% 800 77.8 77.8 0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999996	≥0.9995
Calculated slope		0.998429	0.90 - 1.10
Calculated intercept		-0.012747	+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: V11346

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 12:12;43 Calc Declination*: 13.67 Degrees

Deadband calc: -1.4 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.0	
90	90.5	0.1%
180	179.4	-0.2%
270	269.7	-0.1%
357	358.4	0.4%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999994	0.999987	≥0.9995
Calculated slope	1.000909	0.997772	0.90 - 1.10
Calculated intercept	-0.427281	0.200128	+/- 4

Notes: Old WS removed, New WS installed.

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Mannix Station number: AMS05

Calibration Date: September 15, 2023 Last Cal Date: August 15, 2023 Start time (MST): 9:07 End time (MST): 12:30

Start time (MST): 9:07 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

StartFinishStartFinishCalibration slope:0.9992570.998615Backgd or Offset:8.98.9

Calibration intercept: 0.999257 0.998015 Backgd or Offset: 8.9 8.9 8.9 Calibration intercept: 0.220000 0.320000 Coeff or Slope: 0.930 0.930

SO₂ Calibration Data

5000 4920	0.0 80.0	0.0 800.3	(ppb) (Ic) 0.4 797.9	Limit = 0.95-1.05 1.003
4920	80.0	800.3	797.9	1.003
5000	0.0	0.0	0.7	
4920	80.0	800.3	799.2	1.001
4960	40.0	400.2	401.3	0.997
4980	20.0	200.1	198.7	1.007
5000	0.0	0.0	0.8	
4920	80.0	800.3	802.8	0.997
		Averag	e Correction Factor	1.002
	5000 4920 4960 4980 5000 4920	4920 80.0 4960 40.0 4980 20.0 5000 0.0	4920 80.0 800.3 4960 40.0 400.2 4980 20.0 200.1 5000 0.0 0.0 4920 80.0 800.3	4920 80.0 800.3 799.2 4960 40.0 400.2 401.3 4980 20.0 200.1 198.7 5000 0.0 0.0 0.8

Baseline Corr As found: 797.50 Previous response 799.95 *% change -0.3% 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:

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

Calibration Performed By: Max Farrell

* = > +/-5% change initiates investigation



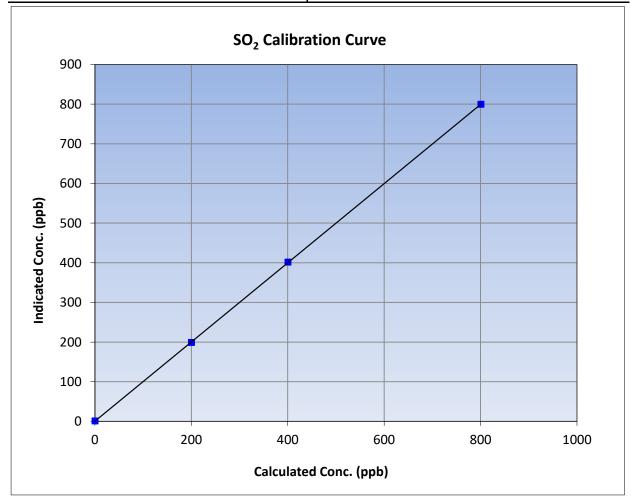
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 15, 2023 **Previous Calibration:** August 15, 2023 Station Name: Mannix Station Number: AMS05 9:07 Start Time (MST): End Time (MST): 12:30 Analyzer make: Thermo 43i Analyzer serial #: 1008841399

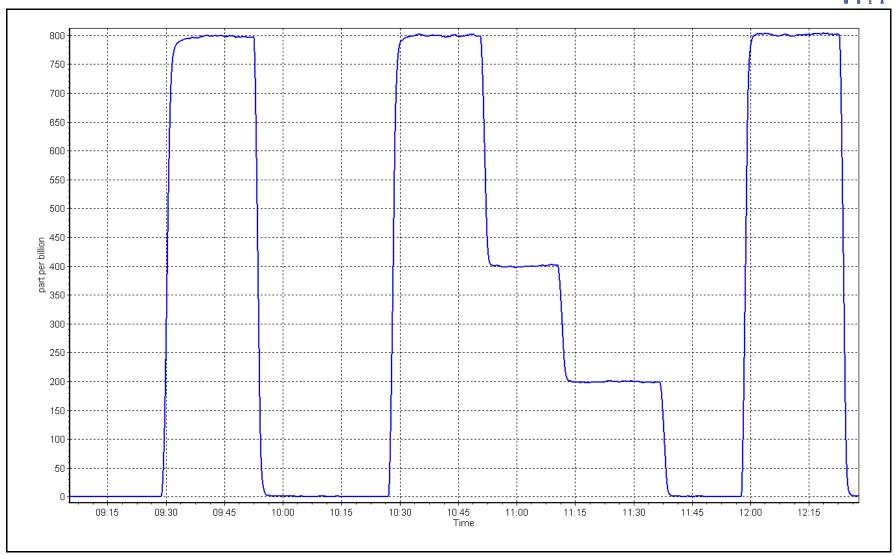
Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.7		Correlation Coefficient	0.999988	≥0.995			
800.3	799.2	1.0014	Correlation Coefficient	0.333366	20.333			
400.2	401.3	0.9972	Slope	0.998615	0.90 - 1.10			
200.1	198.7	1.0069	Slope	0.996013	0.90 - 1.10			
			- Intercept	0.320000	+/-30			



SO2 Calibration Plot

Date: September 15, 2023 Location: Mannix







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mannix

Calibration Date: September 18, 2023

Start time (MST): 9:12

Reason: Routine Station number: AMS05

> Last Cal Date: August 22, 2023

End time (MST): 13:50

Calibration Standards

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

Cal Gas Cylinder #: EY0002433

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

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

Analyzer Information

Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

Global Converter serial #: 2022-196 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 1.000615 0.994760 Backgd or Offset: Calibration slope: 2.18 2.18 0.380518 Calibration intercept: 0.200559 Coeff or Slope: 0.866 0.866

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	4919	81.3	80.0	84.4	0.949
as found 2nd point	4960	40.7	40.0	40.5	0.991
as found 3rd point	4980	20.3	20.0	20.7	0.970
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	4919	81.3	80.0	79.8	1.002
second point	4960	40.7	40.0	40.5	0.989
third point	4980	20.3	20.0	20.3	0.984
as left zero	5000	0.0	0.0	0.5	
as left span	4919	81.3	80.0	77.3	1.035
SO2 Scrubber Check	4920	80.0	800.0	-0.1	
Date of last scrubber char	nge:			Ave Corr Factor	0.992
Date of last converter effi		efficiency			

Date of last scrubber change	2:			Ave Corr Factor	0.992
Date of last converter efficie	ency test:			(efficiency
Baseline Corr As found:	84.3	Prev response:	80.24	*% change:	4.8%

Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.053162 Baseline Corr 3rd AF pt: AF Correlation: 0.999441 20.6

* = > +/-5% change initiates investigation

-0.438733

AF Intercept:

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

Calibration Performed By: Max Farrell



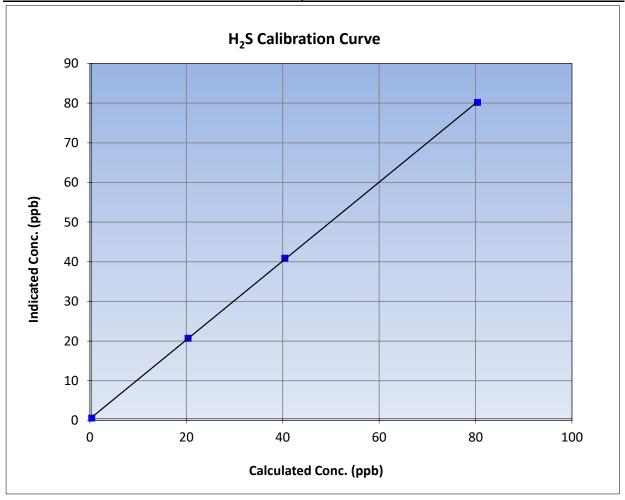
H₂S Calibration Summary

Version-11-2021

Station Information

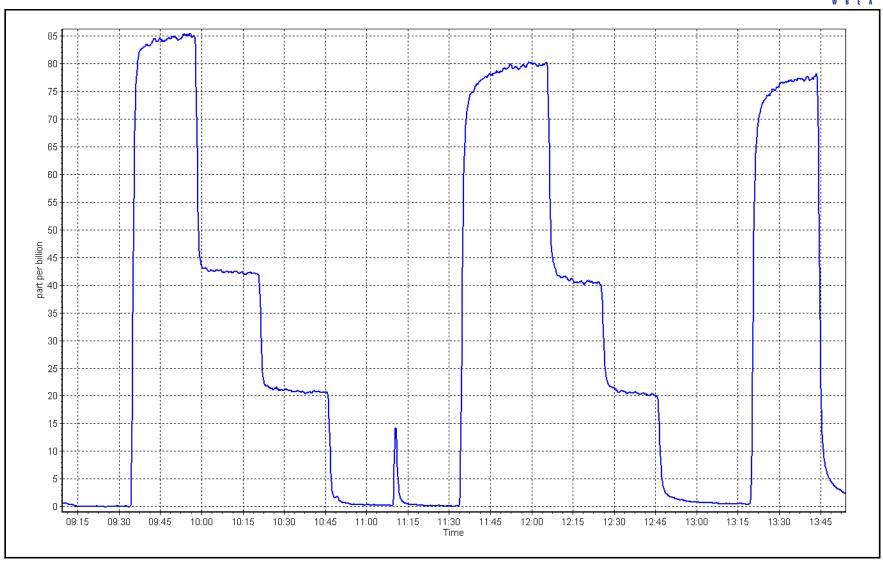
Calibration Date: September 18, 2023 **Previous Calibration:** August 22, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 9:12 End Time (MST): 13:50 Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

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	0.999959	≥0.995			
80.0	79.8	1.0024	Correlation Coefficient	0.555555	20.333			
40.0	40.5	0.9887	Slope	0.994760	0.90 - 1.10			
20.0	20.3	0.9839	Slope	0.554700	0.90 - 1.10			
			Intercept	0.380518	+/-3			



Date: September 18, 2023 Location: Mannix







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

End time (MST): 14:16

Version-06-2022

Station Information

Mannix Station Name:

Station number: AMS 05 Calibration Date: September 8, 2023 Last Cal Date: August 15, 2023

Start time (MST): 12:43

Cylinder Change N2 Cylinder change Reason:

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

207.9 C3H8 Cal Gas Conc. ppm

Removed Gas Cert:

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

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430011

THC Range (ppm): 0 - 20 ppm

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

Finish Finish Start Start CH4 SP Ratio: 2.62E-05 2.62E-05 NMHC SP Ratio: 4.44E-05 4.44E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 206221 206221 Zero Chromatogram: ON OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	17.23	17.35	0.993
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	17.47	0.986
second point					
third point					
as left zero					
as left span					

			A	verage Correction Factor	0.986
Baseline Corr AF:	17.35	Prev response	17.22	*% change	0.7%
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-06-2022

II D L A					VEISIOII-00-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.15	9.25	0.989
as found 2nd point	.525		0.20	3.23	0.000
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	9.15	9.25	0.989
second point					
third point					
as left zero					
as left span					
It -			Aver	age Correction Factor	0.989
Baseline Corr AF:	9.25	Prev response	9.16	*% change	1.0%
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	8.10	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	80.0	8.08	8.22	0.983
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	0.983
Baseline Corr AF:	8.10	Prev response	8.07	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		<u>Finish</u>	
THC Cal Slope:		0.998929		1.014049	
THC Cal Offset:		0.017200		0.000000	
CH4 Cal Slope:		0.999731		1.017033	
CH4 Cal Offset:		-0.006600		0.000000	
NMHC Cal Slope:		0.998220		1.010976	
ivivine cai siope:		0.996220		1.010976	

Notes: Changed the N2 cylinder.

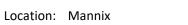
0.023800

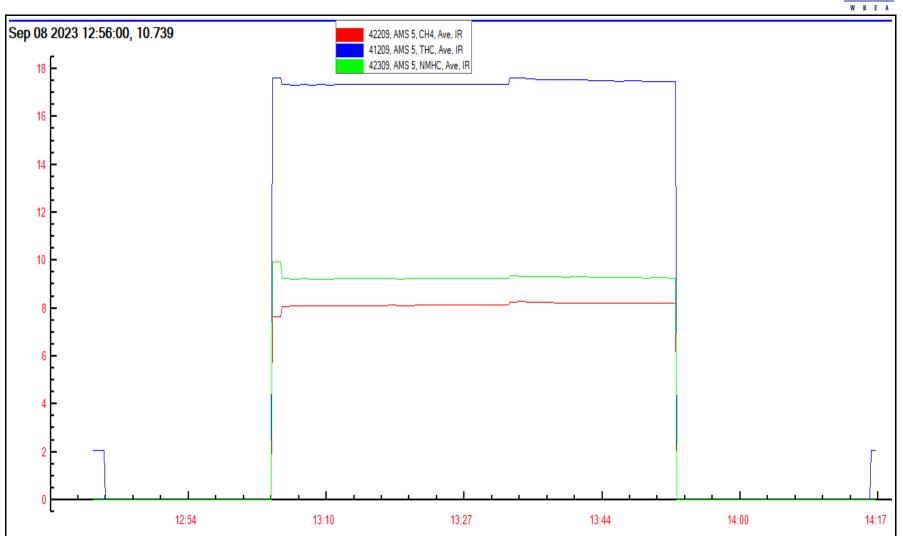
Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.000000

Date: September 8, 2023 Location:







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Flat Baseline:

OFF

Version-06-2022

Station Information

Station Name: Mannix

Calibration Date: September 15, 2023

Start time (MST): 9:07
Reason: Routine

Station number: AMS 05

Last Cal Date: August 15, 2023

End time (MST): 12:30

Calibration Standards

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

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

C3H8 Cal Gas Conc. 207.9 ppm

Removed Gas Cert:

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

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430011

THC Range (ppm): 0 - 20 ppm

ON

Zero Chromatogram:

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

ON

Finish Finish Start Start CH4 SP Ratio: 2.62E-05 2.62E-05 NMHC SP Ratio: 4.44E-05 4.44E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 206221 206221

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	17.23	1.000
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	17.08	1.009
second point	4960	40.0	8.61	8.53	1.009
third point	4980	20.0	4.31	4.27	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	17.23	17.23	1.000
			,	Average Correction Factor	1.009
Baseline Corr AF:	17.23	Prev response	17.22	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

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

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

OFF



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					V C 1 5 1 0 1 1 0 0 2 0
		NINALIC Calibr	otion Data		
C-t D-i-t	Dil air flannusta	NMHC Calibr		lad see (2.22) (12)	CE Limit 0.05.4.0
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.15	9.16	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	9.15	9.07	1.009
second point	4960	40.0	4.57	4.55	1.005
third point	4980	20.0	2.29	2.29	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.15	9.17	0.997
				age Correction Factor	1.005
Baseline Corr AF:	9.16	Prev response	9.16	*% change	0.0%
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	4920	80.0	8.08	8.07	1.001
as found 2nd point	1320	00.0	0.00	0.07	1.001
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	8.08	8.01	1.008
second point	4960	40.0	4.04	3.99	1.014
third point	4980	20.0	2.02	1.99	1.017
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.06	1.003
as iere span	1320	00.0		age Correction Factor	1.013
Baseline Corr AF:	8.07	Prev response	8.07	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:	0.07	AF Intercept:	0.170
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Jaseline Con Sta Air.	IVA	Calibration	Statistics	,	
			Statistics	Finish	
THE C-LEL-		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.998929		0.991126	
THC Cal Offset:		0.017200		0.001000	
CH4 Cal Slope:		0.999731		0.992078	
CH4 Cal Offset:		-0.006600		-0.010800	
NMHC Cal Slope:		0.998220		0.990661	
				0.044000	

Notes: Changed the inlet filter and the H2 cylinder after as founds. No adjustments made.

0.023800

Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.011800



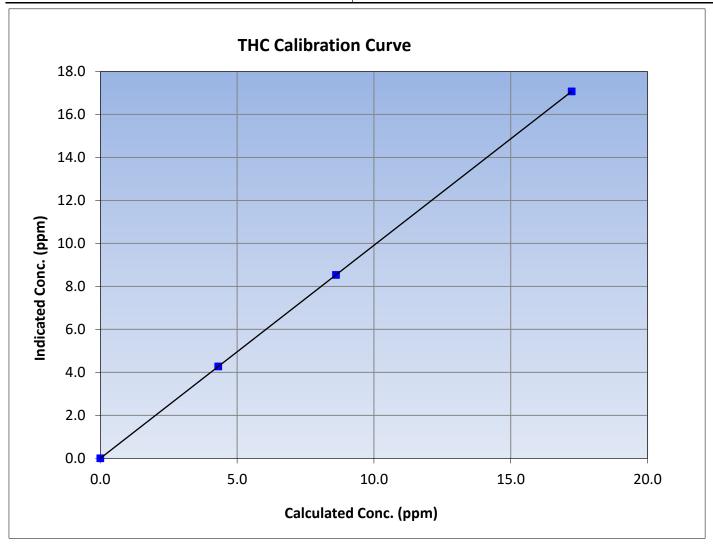
THC Calibration Summary

Version-06-2022

Station Information

September 15, 2023 Calibration Date: **Previous Calibration:** August 15, 2023 Station Name: Mannix Station Number: **AMS 05** 9:07 Start Time (MST): End Time (MST): 12:30 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

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
17.23	17.08	1.0088	Correlation Coemicient	1.000000	20.993
8.61	8.53	1.0093	Slope	0.991126	0.90 - 1.10
4.31	4.27	1.0078	Slope		0.90 - 1.10
			Intercept	0.001000	+/-0.5





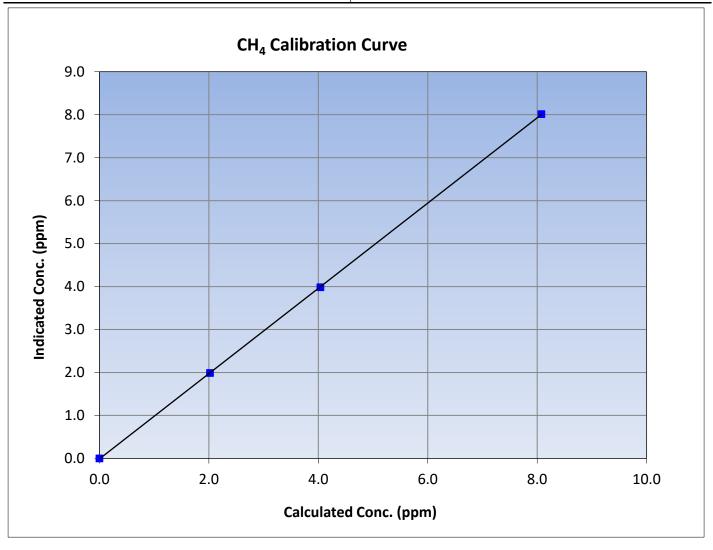
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 15, 2023 **Previous Calibration:** August 15, 2023 Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 9:07 End Time (MST): 12:30 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	8.01	1.0084	Correlation Coefficient		20.933
4.04	3.99	1.0136	Slono	0.992078	0.90 - 1.10
2.02	1.99	1.0169	Slope		0.90 - 1.10
			Intercept	-0.010800	+/-0.5





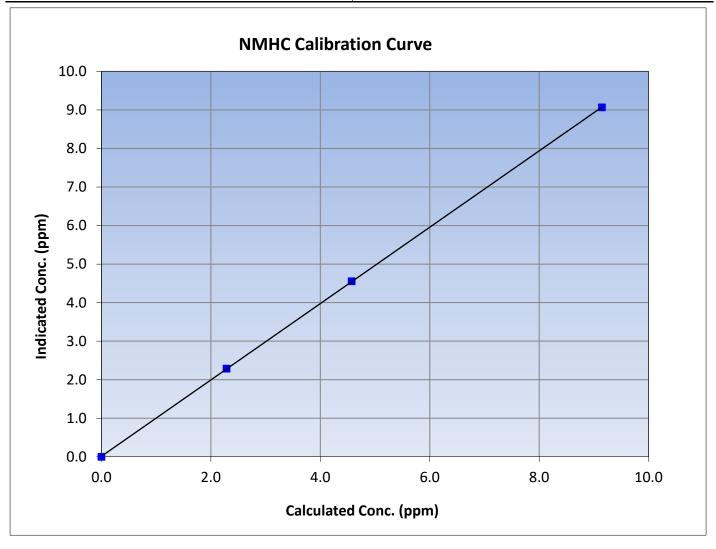
NMHC Calibration Summary

Version-06-2022

Station Information

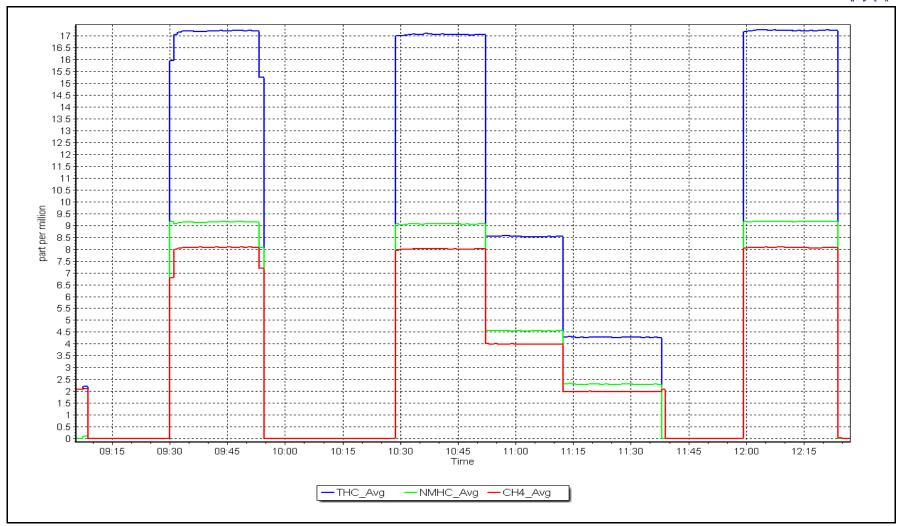
Calibration Date: September 15, 2023 **Previous Calibration:** August 15, 2023 Station Name: Mannix Station Number: **AMS 05** 9:07 Start Time (MST): End Time (MST): 12:30 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
9.15	9.07	1.0089	Correlation Coefficient		20.993
4.57	4.55	1.0048	Slope	0.990661	0.90 - 1.10
2.29	2.29	1.0000	Slope	0.990001	0.90 - 1.10
			Intercept	0.011800	+/-0.5



Date: September 15, 2023 Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06 PATRICIA MCINNES SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

September 14, 2023 Calibration Date:

Start time (MST): 9:23 Routine Reason:

Station number: AMS06 Last Cal Date:

> End time (MST): 12:30

August 17, 2023

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: 3566

Serial Number: 5608

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

Start

Finish

Calibration slope: 1.000605 Backgd or Offset: 17.2 17.4 1.007062 0.911 Calibration intercept: -0.099843 1.660053 Coeff or Slope: 0.901

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	-0.3	
as found span	4920	80.3	799.5	791.3	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	80.3	799.5	800.9	0.998
second point	4960	40.2	400.2	402.7	0.994
third point	4980	20.1	200.1	203.6	0.983
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.3	799.5	802.6	0.996
			Averag	ge Correction Factor	0.992

Baseline Corr As found: 791.60 805.01 -1.7% Previous response *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell



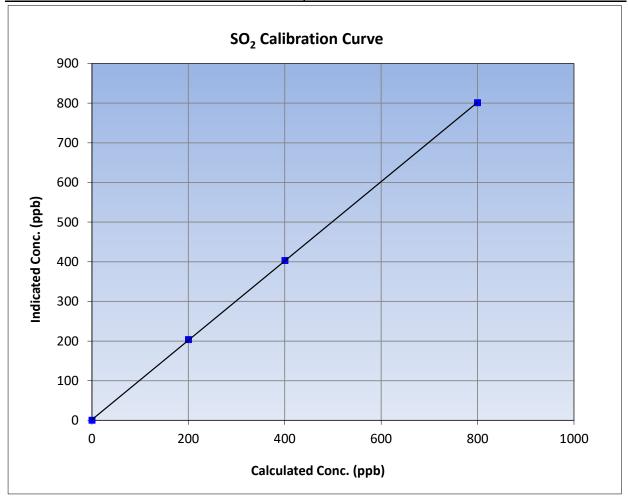
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 14, 2023 **Previous Calibration:** August 17, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:23 End Time (MST): 12:30 Analyzer make: Thermo 43i Analyzer serial #: 1160290013

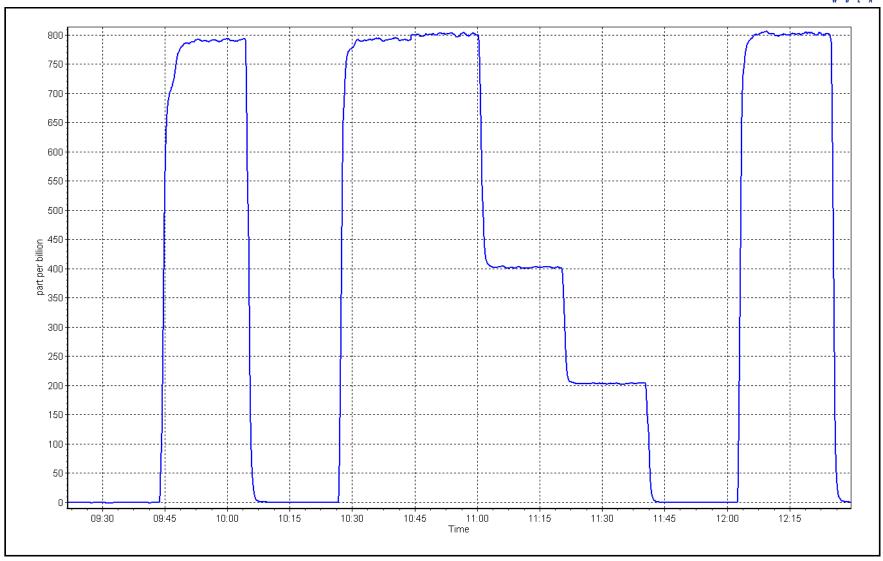
Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.1		Correlation Coefficient	0.999982	≥0.995			
799.5	800.9	0.9982	Correlation Coefficient	0.333362	20.333			
400.2	402.7	0.9939	Slope	1.000605	0.90 - 1.10			
200.1	203.6	0.9829	Slope	1.000003	0.90 - 1.10			
			- Intercept	1.660053	+/-30			



SO2 Calibration Plot Date: September 14, 2023

Location: Patricia McInnes







TRS Calibration Report

Version-11-2021

Station Information

Patricia McInnes Station Name: Calibration Date: September 22, 2023

Start time (MST): 9:15 Reason: Routine Station number: AMS 06

Last Cal Date: August 28, 2023

End time (MST): 13:48

Calibration Standards

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

Cal Gas Cylinder #: EY0000809

Removed Cal Gas Conc: 5.38 ppm Rem Gas Exp Date: N/A

Removed Gas Cyl #: N/A Diff between cyl:

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

Analyzer Information

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

Converter make: CDN-101 Analyzer Range 0 - 100 ppb

Start **Finish Finish Start** Calibration slope: 0.988760 1.004636 Backgd or Offset: 2.06 2.05

Calibration intercept: -0.002363 0.217058 Coeff or Slope: 1.187 1.189

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	76.4	1.046
as found 2nd point	4963	37.2	40.0	38.2	1.048
as found 3rd point	4981	18.6	20.0	19.4	1.032
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	80.5	0.993
second point	4963	37.2	40.0	40.4	0.991
third point	4981	18.6	20.0	20.5	0.976
as left zero	5000	0.0	0.0	0.2	
as left span	4926	74.3	79.9	81.1	0.986
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chang	ge:	December 20, 2021		Ave Corr Factor	0.987

SO2 Scrubber Check	4920	80.3	803.0	0.0		
Date of last scrubber change:		December 20, 2021		Ave Corr Factor	0.987	
Date of last converter efficiency	y test:				efficiency	

Baseline Corr As found: 76.4 79.04 Prev response: *% change: -3.5% Baseline Corr 2nd AF pt: 38.2 AF Slope: 0.954453 AF Intercept: 0.098235 Baseline Corr 3rd AF pt: 19.4 AF Correlation: 0.999981

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell



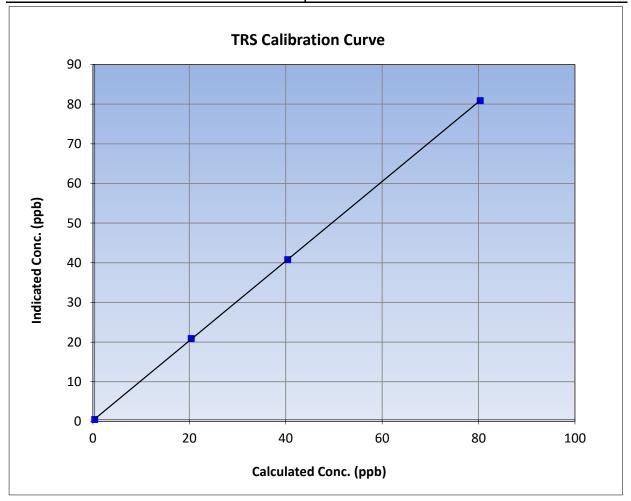
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 28, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:15 End Time (MST): 13:48 Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358

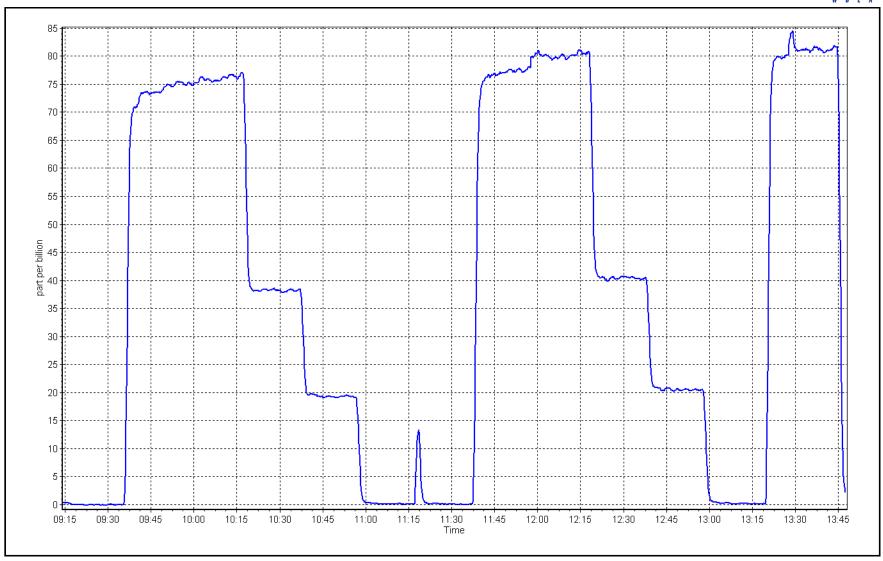
Calibration Data								
Calculated concentration Indicated concentration Co (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.1		Correlation Coefficient	0.999987	≥0.995			
79.9	80.5	0.9931	Correlation coefficient	0.555507	20.333			
40.0	40.4	0.9907	Slope	1.004636	0.90 - 1.10			
20.0	20.5	0.9764	Slope	1.004030	0.90 - 1.10			
			Intercept	0.217058	+/-3			



TRS Calibration Plot

Date: September 22, 2023 Location: Patricia McInnes







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Patricia McInnes Station Name:

Calibration Date: September 14, 2023

Start time (MST): 9:23 Routine Reason:

Station number: AMS06

Last Cal Date: August 17, 2023

End time (MST): 12:30

Calibration Standards

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

ppm C3H8 Cal Gas Conc. 205.3 ppm

Removed Gas Cert:

CH4 Cal Gas Conc.

Removed CH4 Conc. 501.6 ppm

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

Calibrator Model: **API T700**

ZAG make/model: **API T701**

CH4 SP Ratio:

CH4 Retention time:

Zero Chromatogram:

CH4 Equiv Conc. 1066.2 ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1066.2 ppm

Diff between cyl (THC): Diff between cyl (NM):

> Serial Number: 3566 Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 55i

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

CH4 Range (ppm): 0 - 10 ppm

Analyzer serial #: 1118148495

OFF

501.6

Finish Start 2.11E-04 14.0

2.12E-04 14.0

NMHC SP Ratio:

NMHC Peak Area:

4.72E-05 192120

Start

Finish 4.80E-05 189064

Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4920	80.3	17.12	17.01	1.007
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	17.15	0.998
second point	4960	40.2	8.57	8.62	0.994
third point	4980	20.1	4.29	4.37	0.980
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.14	0.999
	•		,	Average Correction Factor	0.991
Baseline Corr AF:	17.00	Prev response	17.06	*% change	-0.4%

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

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

		NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4919.7	80.3	9.07	8.98	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919.7	80.3	9.07	9.09	0.997
second point	4960	40.2	4.54	4.59	0.988
third point	4980	20.1	2.27	2.35	0.967
as left zero	5000	0.0	0.00	0.00	
as left span	4919.7	80.3	9.07	9.09	0.997
				age Correction Factor	0.984
Baseline Corr AF:	8.97	Prev response	9.02	*% 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 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	4919.7	80.3	8.06	8.03	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919.7	80.3	8.06	8.06	0.999
second point	4960	40.2	4.03	4.03	1.001
third point	4980	20.1	2.02	2.03	0.995
as left zero	5000	0.0	0.00	0.00	
as left span	4919.7	80.3	8.06	8.05	1.001
			Aver	age Correction Factor	0.999
Baseline Corr AF:	8.03	Prev response	8.03	*% 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>		<u>Finish</u>	
THC Cal Slope:		0.993295		1.000464	
THC Cal Offset:		0.049653		0.038421	
CH4 Cal Slope:		0.996285		1.000059	
CH4 Cal Offset:		0.004651		0.001844	
NMHC Cal Slope:		0.990348		1.000823	

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

0.045403

Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.036578



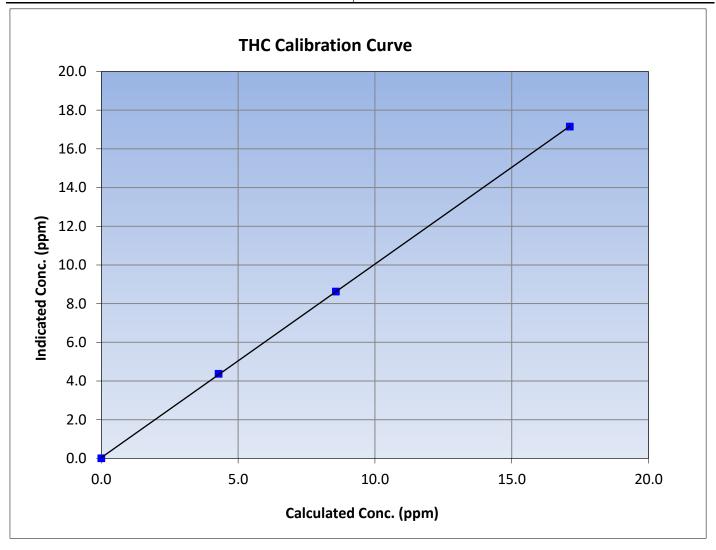
THC Calibration Summary

Version-06-2022

Station Information

September 14, 2023 Calibration Date: **Previous Calibration:** August 17, 2023 Station Name: Patricia McInnes Station Number: AMS06 9:23 Start Time (MST): End Time (MST): 12:30 Analyzer make: Thermo 55i Analyzer serial #: 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999976	≥0.995
17.12	17.15	0.9982	Correlation Coemicient	0.999976	20.993
8.57	8.62	0.9943	Slope	1.000464	0.90 - 1.10
4.29	4.37	0.9801	Slope	1.000404	0.90 - 1.10
			Intercept	0.038421	+/-0.5





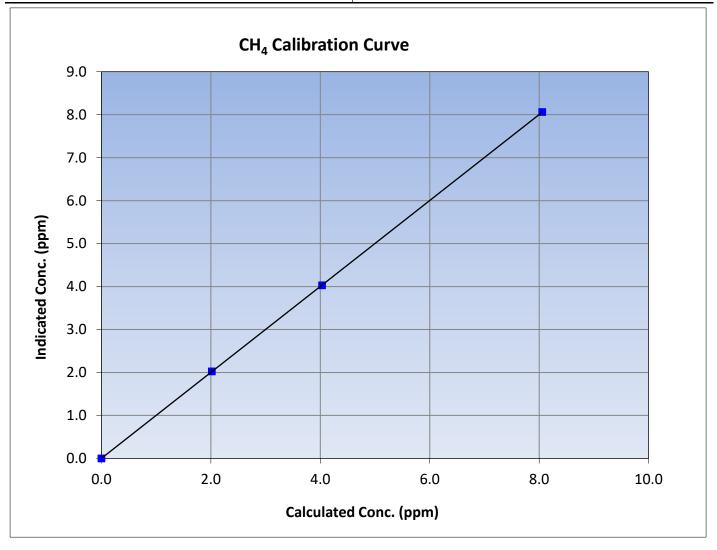
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 14, 2023 **Previous Calibration:** August 17, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:23 End Time (MST): 12:30 Analyzer make: Analyzer serial #: Thermo 55i 1118148495

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	
8.06	8.06	0.9995	Correlation Coemicient	0.555550	20.333	
4.03	4.03	1.0014	Slope	1.000059	0.90 - 1.10	
2.02	2.03	0.9953	Slope	1.000039	0.90 - 1.10	
		·	Intercept	0.001844	+/-0.5	





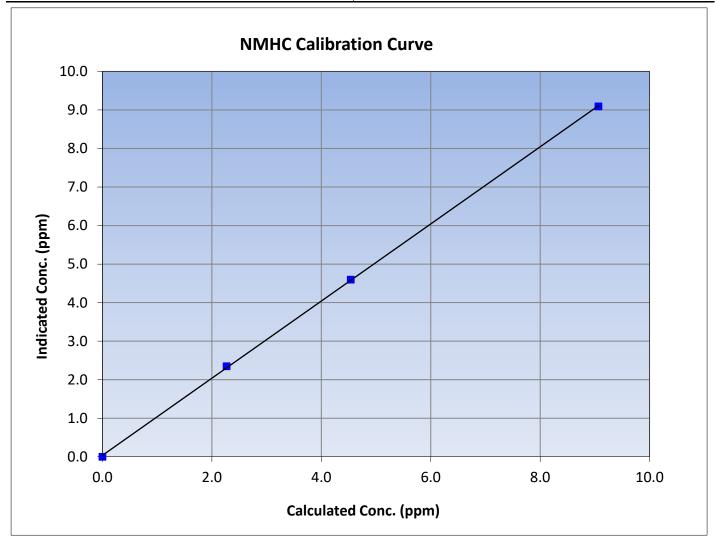
NMHC Calibration Summary

Version-06-2022

Station Information

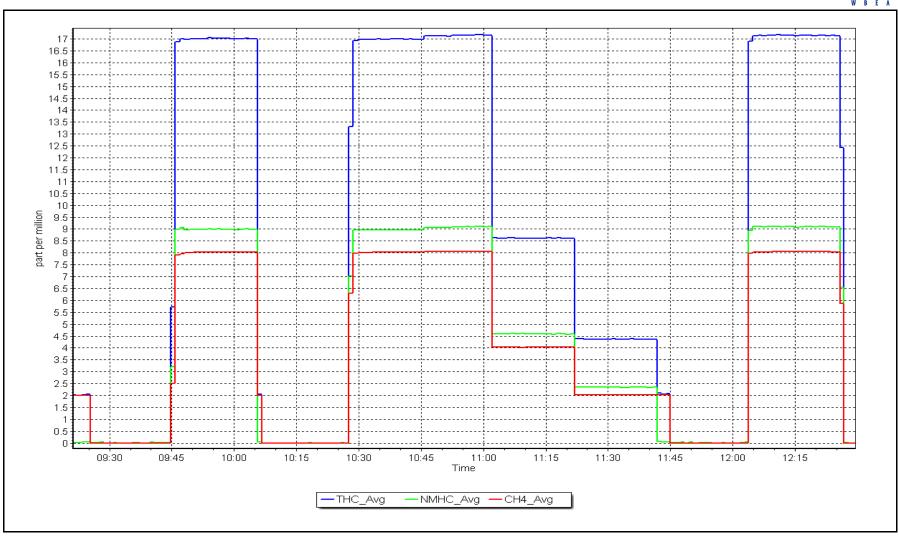
September 14, 2023 Calibration Date: **Previous Calibration:** August 17, 2023 Station Name: Patricia McInnes Station Number: AMS06 9:23 Start Time (MST): End Time (MST): 12:30 Analyzer make: Thermo 55i Analyzer serial #: 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999925	≥0.995	
9.07	9.09	0.9970	Correlation Coemicient	0.999923	20.333	
4.54	4.59	0.9880	Slope	1.000823	0.90 - 1.10	
2.27	2.35	0.9670	Slope	1.000823	0.90 - 1.10	
			Intercept	0.036578	+/-0.5	



Date: September 14, 2023 Location: Patricia McInnes







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: September 20, 2023 Start time (MST): 7:57

Reason: Routine

Station number: AMS06

Last Cal Date: August 9, 2023

End time (MST): 12:41

Calibration Standards

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

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

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

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

NOX gas Diff: NO gas Diff:

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

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1172750022

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 0.815 0.825 NO bkgnd or offset: 3.2 3.2 NOX coeff or slope: 0.986 0.987 NOX bkgnd or offset: 3.9 3.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 157.2 157.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.992318	0.997367
NO _x Cal Offset:	2.277330	2.676082
NO Cal Slope:	0.995327	0.999173
NO Cal Offset:	1.003845	1.382870
NO ₂ Cal Slope:	0.998809	1.001949
NO ₂ Cal Offset:	-0.587092	0.485373



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				D:I		- D-4-				
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	0.6	0.6	0.0		
as found span	4914	86.2	826.5	799.7	26.7	815.7	788.9	26.8	1.0132	1.0137
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.4	0.1		
high point	4914	86.2	826.5	799.7	26.7	825.9	800.0	25.9	1.0007	0.9997
second point	4957	43.1	413.2	399.9	13.4	415.8	401.3	14.4	0.9938	0.9964
third point	4978	21.6	207.1	200.4	6.7	211.5	202.7	8.7	0.9793	0.9888
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.0		
as left span	4914	86.2	826.5	400.4	426.0	825.8	403.4	422.4	1.0008	0.9926
							Average C	orrection Factor	0.9913	0.9950
Corrected As fo	ound NO _X =	815.1 ppb	NO =	788.3 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	-0.9%
Previous Respo	onse NO _X =	822.4 ppb	NO =	797.0 ppb				*Percent Chang	ge NO =	-1.1%
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	Brd 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:	
				(GPT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Ref		ated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 tration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	erter Efficiency on 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)	800.1		400.8	426.0		427.0	0.9977	7	100.2%

Notes:

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

221.9

121.8

Average Correction Factor

0.9933

0.9928

0.9946

220.4

120.9

Calibration Performed By:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Max Farrell

606.4

705.9

800.1

800.1

100.7%

100.7%

100.5%



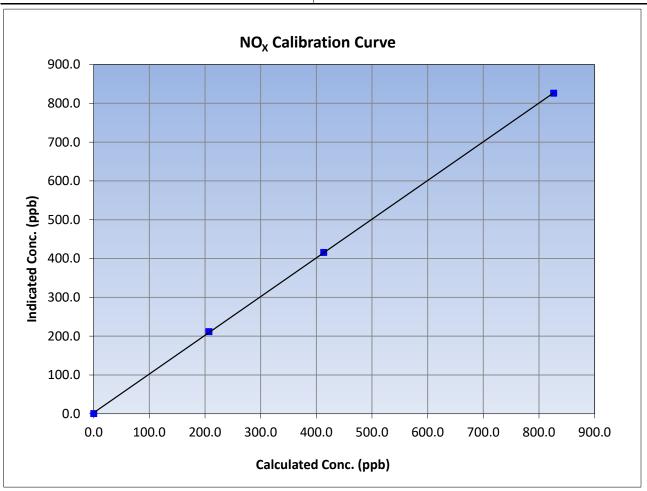
NO_X Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 9, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 7:57 End Time (MST): 12:41 Analyzer serial #: Analyzer make: Thermo 42i 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999968	≥0.995
826.5	825.9	1.0007	correlation coefficient	0.555508	20.333
413.2	415.8	0.9938	Slope	0.997367	0.90 - 1.10
207.1	211.5	0.9793	Slope	0.997307	0.90 - 1.10
			Intercept	2.676082	+/-20





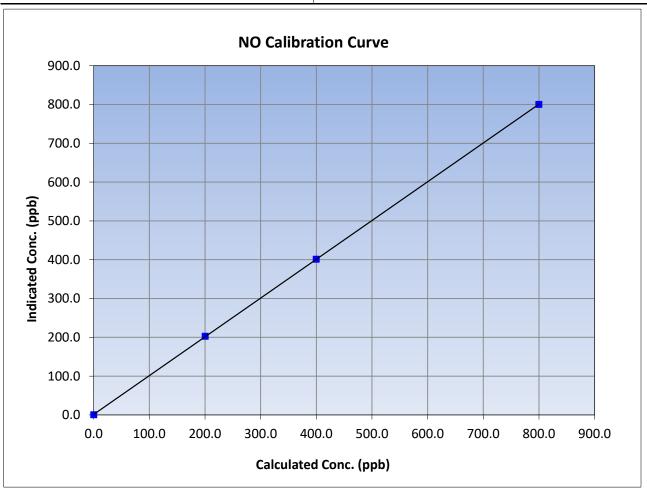
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 9, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 7:57 End Time (MST): 12:41 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	0.4		Correlation Coefficient	0.999993	≥0.995
799.7	800.0	0.9997	Correlation Coefficient	0.555555	20.333
399.9	401.3	0.9964	Slope	0.999173	0.90 - 1.10
200.4	202.7	0.9888	Slope	0.999175	0.90 - 1.10
			Intercept	1.382870	+/-20





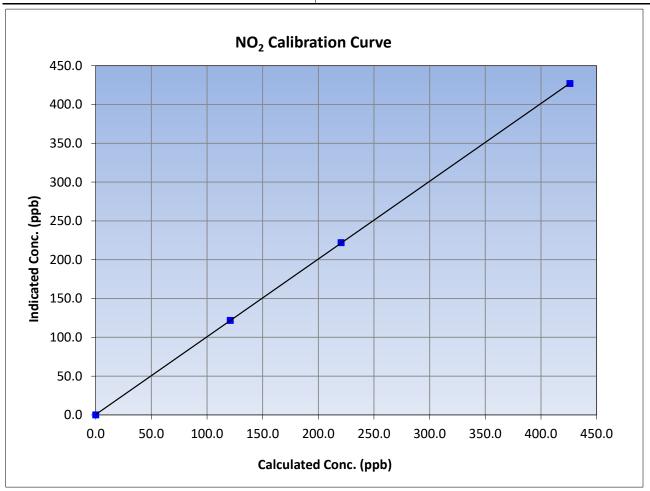
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 9, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 7:57 End Time (MST): 12:41 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	0.999994	≥0.995
426.0	427.0	0.9977	correlation coefficient	0.555554	20.993
220.4	221.9	0.9933	Slope	1.001949	0.90 - 1.10
120.9	121.8	0.9928	Slope	1.001949	0.90 - 1.10
			Intercept	0.485373	+/-20

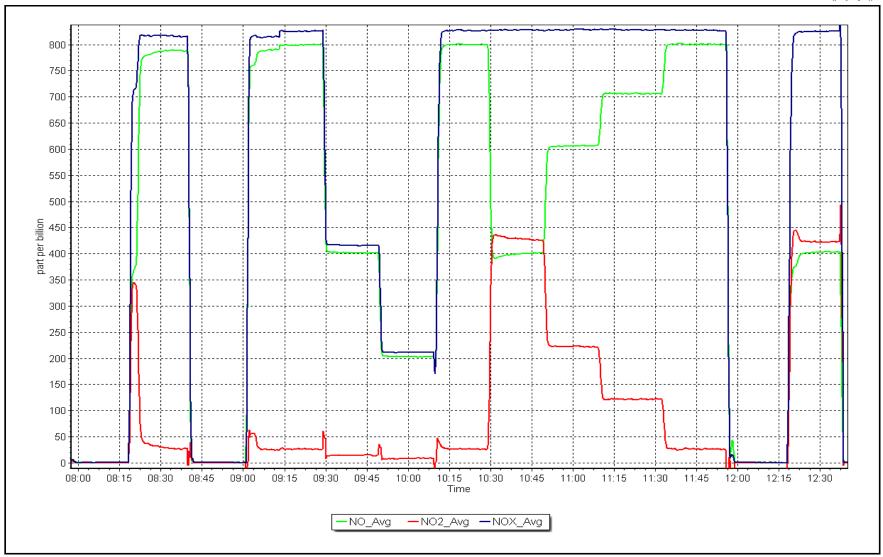


NO_x Calibration Plot

Date: September 20, 2023

Location: Patricia McInnes







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: September 5, 2023

Start time (MST): 9:53
Reason: Routine

Station number: AMS06

Last Cal Date: August 11, 2023

End time (MST): 13:03

Serial Number: 3566

Serial Number: 4602

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1300156234

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.002629 1.005743 -0.2 -0.2 -0.480000 Coeff or Slope: Calibration intercept: 0.540000 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	-0.3	
as found span	5000	1303.0	400.0	400.5	0.999
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	-0.2	
high point	5000	1303.0	400.0	401.9	0.995
second point	5000	966.5	200.0	200.7	0.997
third point	5000	794.3	100.0	99.7	1.003
as left zero	5000	800.0	0.0	-0.5	
as left span	5000	1303.0	400.0	403.4	0.992
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	400.8	Previous response	e 401.6	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope	:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	:		

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

Calibration Performed By: Max Farrell

* = > +/-5% change initiates investigation



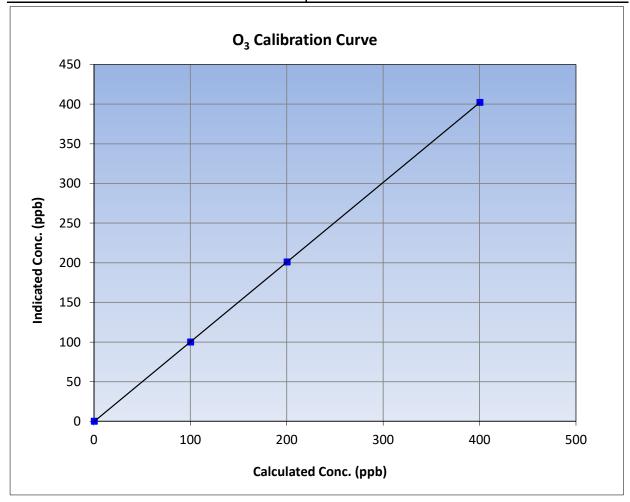
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 11, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:53 End Time (MST): 13:03 Analyzer make: Thermo 49i Analyzer serial #: 1300156234

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	-0.2		Correlation Coefficient	0.999997	≥0.995		
400.0	401.9	0.9953	Correlation Coefficient	0.55557	20.333		
200.0	200.7	0.9965	Slope	1.005743	0.90 - 1.10		
100.0	99.7	1.0030	Slope	1.003743	0.90 - 1.10		
			Intercept	-0.480000	+/- 5		

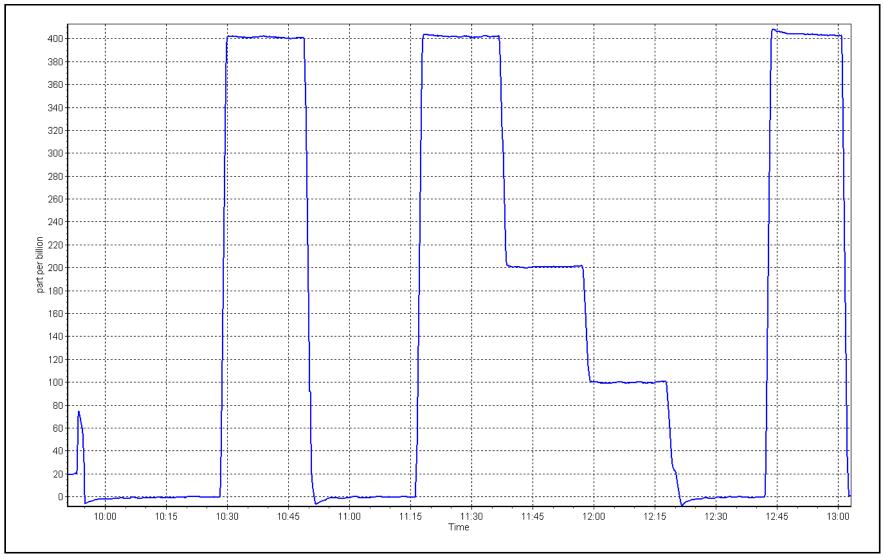


O₃ Calibration Plot

Date: September 5, 2023

Location: Patricia McInnes







Calibration by:

Max Farrell

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name:	Patricia McInnes		Station number:	AMS 06	
Calibration Date:	September 22, 2023			August 24, 2023	
Start time (MST):	12:54		End time (MST):	13:53	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	766	
Flow Meter Make/Model:	ALICAT FP-25		S/N:	388755	
Temp/RH standard:	ALICAT FP-25		S/N:	388755	
		Monthly Calibration Te	est		
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)
T (°C)	23.1	23.1	23.1		+/- 2 °C
P (mmHg)	726.5	727.8	726.5		+/- 10 mmHg
flow (LPM)	5.02	4.97	5.02		+/- 0.25 LPM
Leak Test:	Date of check:	September 22, 2023	Last Cal Date:	August 24, 2023	
	PM w/o HEPA:	8.5	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will so	erve as the pre mai	ntenance leak check	
Inlet cleaning:	Inlet Head	✓			
		Quarterly Calibration T	ost		
Parameter	As found	Quarterly Calibration T		Δdiustad	(Limits)
Parameter	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
<u>Parameter</u> PMT Peak Test	<u>As found</u> 11.0			Adjusted	(Limits) 10.9 +/- 0.5
	11.0	Post maintenance	<u>As left</u>	Adjusted W/ HEPA:	
PMT Peak Test	11.0	Post maintenance 11.0	As left 11.0 4.7		10.9 +/- 0.5
PMT Peak Test Post-maintenance	11.0 e leak check: ber Cleaned:	Post maintenance 11.0 PM w/o HEPA:	As left 11.0 4.7 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham	11.0 e leak check: ber Cleaned:	Post maintenance 11.0 PM w/o HEPA: September 22	As left 11.0 4.7 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham	11.0 e leak check: ber Cleaned:	Post maintenance 11.0 PM w/o HEPA: September 22	As left 11.0 4.7 2, 2023 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter	11.0 e leak check: sber Cleaned: r Changed:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22	As left 11.0 4.7 2, 2023 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter Date Sample Tub	11.0 e leak check: sber Cleaned: r Changed:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22 Annual Maintenance April 13, 2	As left 11.0 4.7 2, 2023 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter	11.0 e leak check: sber Cleaned: r Changed:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22 Annual Maintenance	As left 11.0 4.7 2, 2023 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter Date Sample Tub	11.0 e leak check: sber Cleaned: r Changed:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22 Annual Maintenance April 13, 2	As left 11.0 4.7 2, 2023 2, 2023		10.9 +/- 0.5
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter Date Sample Tuk Date RH/T Senso	11.0 e leak check: aber Cleaned: r Changed: pe Cleaned: pr Cleaned:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22 Annual Maintenance April 13, 2 April 13, 2	As left 11.0 4.7 2, 2023 2, 2023 2, 2023 2, 2023 2, 2023 2, 2023 2, 2023 2, 2023	w/ HEPA:	10.9 +/- 0.5 0 <0.2 ug/m3
PMT Peak Test Post-maintenance Date Optical Cham Disposable Filter Date Sample Tub	11.0 e leak check: aber Cleaned: r Changed: pe Cleaned: pr Cleaned:	Post maintenance 11.0 PM w/o HEPA: September 22 September 22 Annual Maintenance April 13, 2 April 13, 2	As left 11.0 4.7 2, 2023 2, 2023	w/ HEPA:	10.9 +/- 0.5 0 <0.2 ug/m3



TN - NO_x - NH₃ Calibration Report

Version-05-2023

Station Information

Station Name: Patricia McInnes NOX Cal Date: September 12, 2023

8:00 Start time (MST):

NH3 Cal Date: September 12, 2023

Start time (MST): 13:45

Routine Reason:

Station number: AMS 06 Last Cal Date: August 3, 2023

13:45 End time (MST):

Last Cal Date: August 3, 2023

NA

End time (MST): 15:48

Calibration Standards

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

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

NOX gas Diff: NO gas Diff:

NH3 Cal Gas Conc: 77.8 NH3 Gas Cylinder #: CC710812 ppm NH3 Cal Gas Expiry: March 30, 2023

Removed NH3 Conc: 77.8 Removed Cylinder #: ppm

NH3 gas Diff:

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

Analyzer Information

Analyzer model: Teledyne API T201 Analyzer serial #: 152 Converter model: Teledyne API T501 Converter serial #: 147 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 6.50 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 542

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.794	0.788	TN coefficient:	0.794	0.789
NOX coefficient:	0.796	0.787	NO bkgrnd:	-0.1	-0.1
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.0	0.0
NH3 coefficient:	0.908	0.908	TN bkgrnd:	0.0	0.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.003439	1.000369
NO _x Cal Offset:	1.455068	1.915538
NO Cal Slope:	0.997870	1.000758
NO Cal Offset:	0.164066	0.303018
NO ₂ Cal Slope:	1.000820	1.006122
NO ₂ Cal Offset:	-0.026033	-2.141943
NH3 Cal Slope:	1.002680	0.985048
NH3 Cal Offset:	5.795340	7.896031
TN Cal Slope:	1.008130	0.991160
TN Cal Offset:	5.548239	7.076683



TN - NOX - NH₃ Calibration Report

Version-05-2023

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.1	0.4		
as found NO	4914	86.2	826.5	826.5		827.2	831.3	-4.2	0.999	
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	-0.9	1.2		
high NO point	4914	86.2	826.5	826.5		828.3	826.9	1.6	0.998	
NO/O3 point	4914	86.2	826.5	826.5		829.6	826.1	3.5	0.996	
as found NH3	3419	81.0	1800.5		1800.5	1786.0		1776.0	1.008	1.014
new NH3 cyl rp										
first NH3	3419	81.0	1800.5		1800.5	1786.0		1776.0	1.008	1.014
second NH3	3455	45.0	1000.3		1000.3	1006.5		1000.8	0.994	0.999
third NH3	3478	22.5	500.1		500.1	507.2		505.1	0.986	0.990
							Average Co	rrection Factor	0.9970	1.0011

Corrected As found TN = 826.7 ppb NO_X = 831.2 ppb NH3 = 1775.6 ppb NO_X = 830.7 ppb NO_X = 830.7 ppb NH3 = 1811.1 ppb

*Percent Change TN = -1.5%

*Percent Change $NO_X = 0.1\%$

*Percent Change NH3 = -2.0%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 90.8%

NH3 Current Converter Efficiency = 90.8%



NO_X - NO - NO₂ Calibration Report

Version-05-2023

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.5	0.5		
as found span	4914	86.2	826.5	799.7	826.5	831.3	801.3	827.2	0.9942	0.9980
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.9	0.2	0.3		
high point	4914	86.2	826.5	799.7	826.5	826.9	800.6	828.3	0.9995	0.9989
second point	4957	43.1	413.2	399.9	413.2	417.8	400.5	414.9	0.9891	0.9984
third point	4978	21.6	207.1	200.4	207.1	211.2	201.0	211.3	0.9807	0.9971
							Average C	orrection Factor	0.9897	0.9982
Baseline Corr A	s fnd TN =	826.7 ppb	NO _X = 831.2	ppb NO =	800.8 ppb			*Percent Change	e TN=	-1.5%
Previous Respo	onse TN =	838.7 ppb	$NO_X = 830.7$	ppb NO =	798.2 ppb			*Percent Change	e NO _X =	0.1%
								*Percent Change	e NO =	0.3%
								* = > +/-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	-0.5		
calibration zero			0.0	-1.2		
1st GPT point (400 ppb O3)	798.4	402.0	423.1	424.2	0.9975	100.3%
2nd GPT point (200 ppb O3)	798.4	603.1	222.0	220.5	1.0069	99.3%
3rd GPT point (100 ppb O3)	798.4	701.7	123.4	121.2	1.0183	98.2%
			А	verage Correction Factor	1.0076	99.3%

Notes: Changed the inlet filter after as founds. Adjusted the NOX span. Had to run GPTPS points for the calibrator photometer to set the lamp voltage accurately midway through the GPT calibration.

Calibration Performed By: Max Farrell



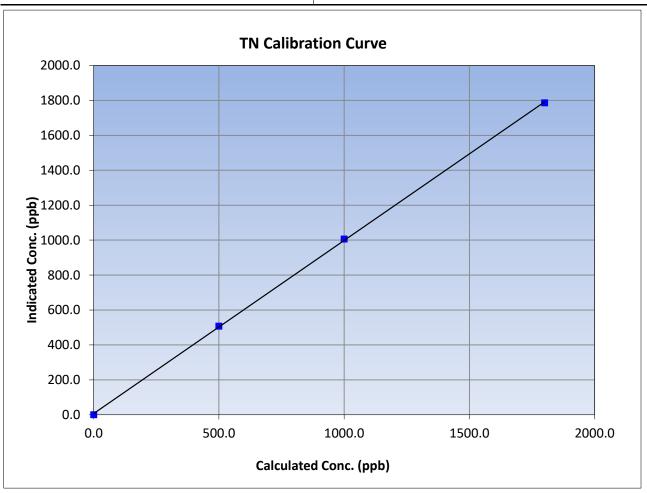
TN Calibration Summary

Version-05-2023

Station Information

August 3, 2023 Calibration Date: September 12, 2023 Previous Calibration: Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:00 End Time (MST): 13:45 Analyzer make: Teledyne 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	0.3		Correlation Coefficient	0.999907	≥0.995
1800.5	1786.0	1.0081	Correlation Coefficient	0.555507	20.993
1000.3	1006.5	0.9938	Slope	0.991160	0.90 - 1.10
500.1	507.2	0.9859	Slope	0.991100	0.90 - 1.10
			Intercept	7.076683	+/-20





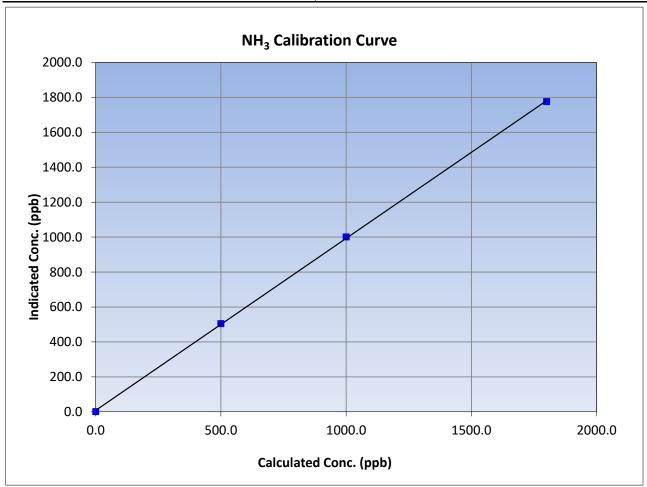
NH₃ Calibration Summary

Version-05-2023

Station Information

August 3, 2023 Calibration Date: September 12, 2023 Previous Calibration: Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:00 End Time (MST): 13:45 Analyzer serial #: Analyzer make: Teledyne API T201 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	1.2		Correlation Coefficient	0.999911	≥0.995
1800.5	1776.0	1.0138	Correlation Coefficient	0.555511	20.333
1000.3	1000.8	0.9995	Slope	0.985048	0.90 - 1.10
500.1	505.1	0.9900	Slope	0.965046	0.90 - 1.10
			Intercept	7.896031	+/-20





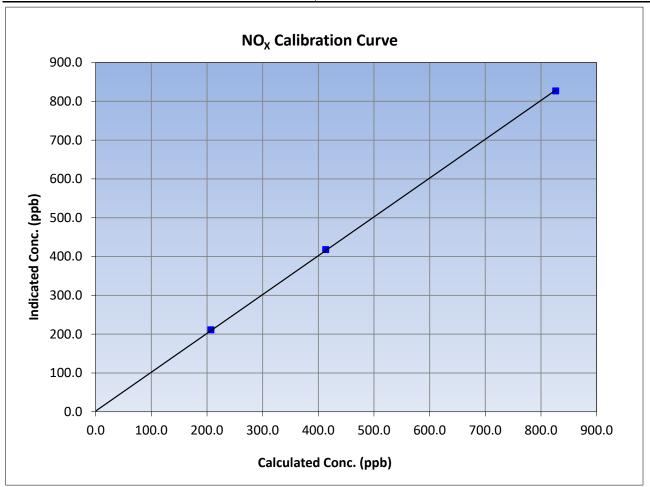
NO_x Calibration Summary

Version-05-2023

Station Information

August 3, 2023 Calibration Date: September 12, 2023 Previous Calibration: Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:00 End Time (MST): 13:45 Analyzer serial #: Analyzer make: Teledyne API T201 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.9		Correlation Coefficient	0.999942	≥0.995
826.5	826.9	0.9995	Correlation Coefficient	0.555542	20.333
413.2	417.8	0.9891	Slope	1.000369	0.90 - 1.10
207.1	211.2	0.9807	Slope	1.000309	0.90 - 1.10
			Intercept	1.915538	+/-20





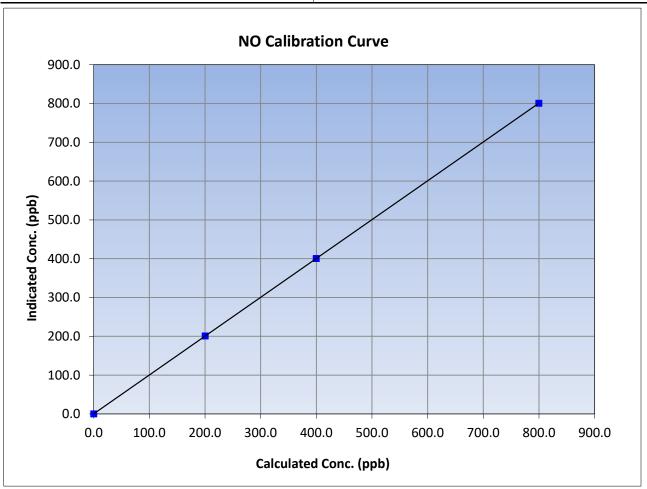
NO Calibration Summary

Version-05-2023

Station Information

August 3, 2023 Calibration Date: September 12, 2023 Previous Calibration: Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:00 End Time (MST): 13:45 Analyzer make: Teledyne 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	0.2		Correlation Coefficient	1.000000	≥0.995
799.7	800.6	0.9989	correlation coemicient	1.000000	20.993
399.9	400.5	0.9984	Slope	1.000758	0.90 - 1.10
200.4	201.0	0.9971	Siope	1.000736	0.90 - 1.10
			Intercept	0.303018	+/-20





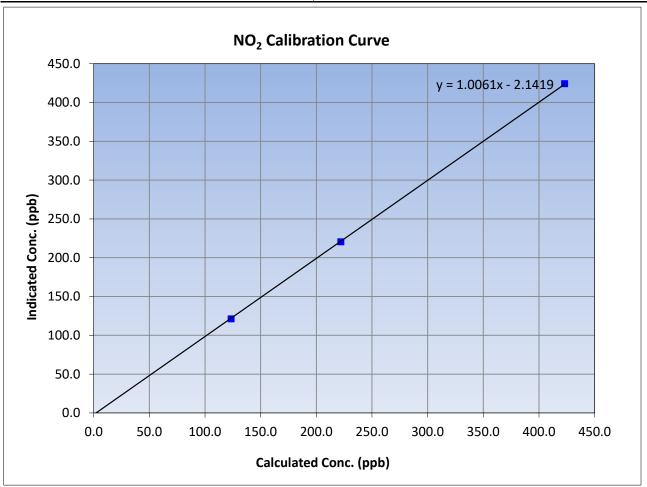
NO₂ Calibration Summary

Version-05-2023

Station Information

Calibration Date: September 12, 2023 Previous Calibration: August 3, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 8:00 End Time (MST): 13:45 Analyzer serial #: Analyzer make: Teledyne API T201 152

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-1.2		Correlation Coefficient	0.999974	≥0.995
423.1	424.2	0.9975	Correlation Coefficient	0.333374	20.333
222.0	220.5	1.0069	Slope	1.006122	0.90 - 1.10
123.4	121.2	1.0183	Slope	1.000122	0.90 - 1.10
			Intercept	-2.141943	+/-20

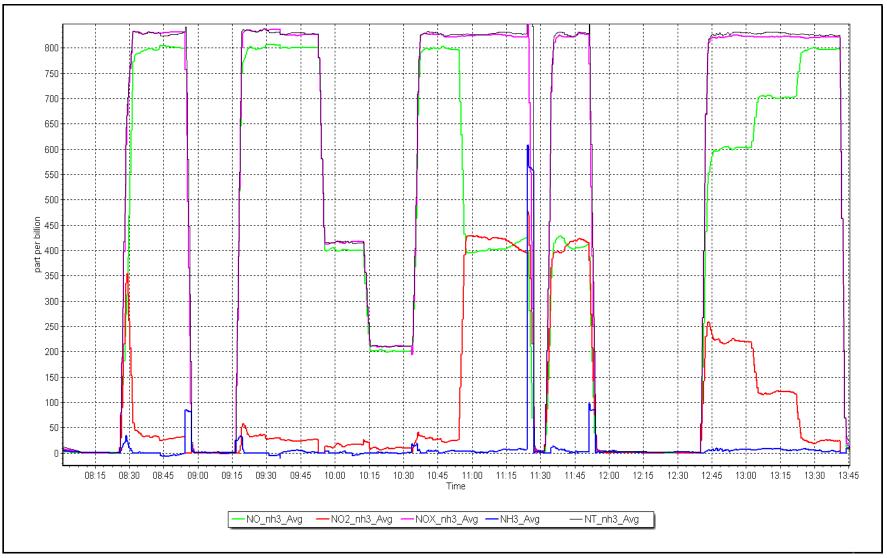


NO_x Calibration Plot

Date: September 12, 2023

Location: Patricia McInnes





Date: September 12, 2023 Location: Patricia McInnes







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Athabasca Valley September 6, 2023 Calibration Date:

Start time (MST): 8:50 Routine Reason:

Station number: AMS07 Last Cal Date: August 9, 2023

End time (MST):

12:35

Start

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

ppm

Analyzer Range 0 - 1000 ppb

Finish Start Calibration slope: 0.992516 0.997338

Backgd or Offset: 2.61 2.61 0.834 Calibration intercept: 1.503428 1.942886 Coeff or Slope: 0.834

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	4921	79.3	801.2	794.4	1.009
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	795.6	1.007
second point	4960	39.6	400.2	401.9	0.996
third point	4980	19.8	200.1	201.1	0.995
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	800.2	798.7	1.002
			Averag	ge Correction Factor	0.999

Baseline Corr As found: 794.50 Previous response 800.57 *% change -0.8% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



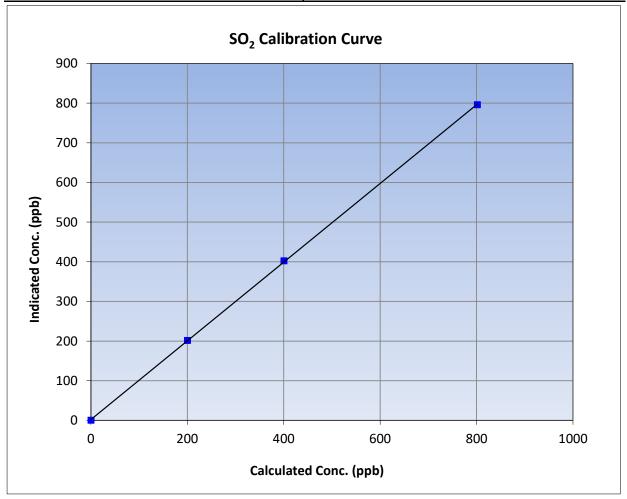
SO₂ Calibration Summary

Version-01-2020

Station Information

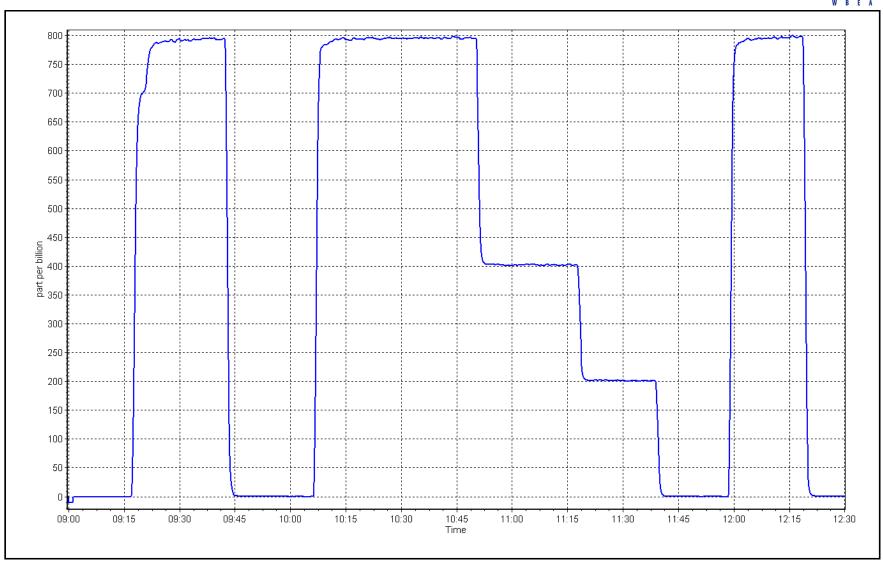
Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:50 End Time (MST): 12:35 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1507864683

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999960	≥0.995				
801.2	795.6	1.0070	Correlation Coefficient	0.555500	20.333				
400.2	401.9	0.9956	Slope	0.992516	0.90 - 1.10				
200.1	201.1	0.9949	Siope	0.992510	0.90 - 1.10				
			- Intercept	1.942886	+/-30				



SO2 Calibration Plot Date: September 6, 2023 Location: Athabasca Valley





TRS Calibration Report

Version-11-2021

Station Information

Station Name: Athabasca Valley Calibration Date: September 18, 2023

Start time (MST): 9:07

Routine Reason:

Station number: AMS07

> Last Cal Date: August 2, 2023

End time (MST): 14:06

Rem Gas Exp Date: NA

Diff between cyl:

Calibration Standards

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

Cal Gas Cylinder #: CC504080

Removed Cal Gas Conc: 5.25 ppm Removed Gas Cyl #: NA

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

CDN-101 Converter serial #: 551 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish Start** <u>Finish</u> Calibration slope: 1.005977 1.012468 Backgd or Offset: 2.33 2.33 -0.002341 Coeff or Slope: 0.899 Calibration intercept: -0.002158 0.899

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4925	75.5	79.3	80.9	0.979
as found 2nd point	4962	37.7	39.6	40.4	0.977
as found 3rd point	4981	18.9	19.8	20.0	0.987
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	4925	75.5	79.3	80.4	0.986
second point	4962	37.7	39.6	39.9	0.993
third point	4981	18.9	19.9	20.1	0.988
as left zero	5000	0.0	0.0	0.2	
as left span	4925	75.5	79.3	80.2	0.989
SO2 Scrubber Check	4921	79.2	800.2	0.0	
Date of last scrubber char	ige:	25-Feb-22		Ave Corr Factor	0.989
Date of last converter effi	ciency test:	April 22, 2022		92.6%	efficiency

Baseline Corr As found: 81.0 79.74 1.6% Prev response: *% change: Baseline Corr 2nd AF pt: -0.162195 40.5 AF Slope: 1.022703 AF Intercept: Baseline Corr 3rd AF pt: 20.1 AF Correlation: 0.999992

No adjustments needed. Notes:

Calibration Performed By: Aswin Sasi Kumar * = > +/-5% change initiates investigation



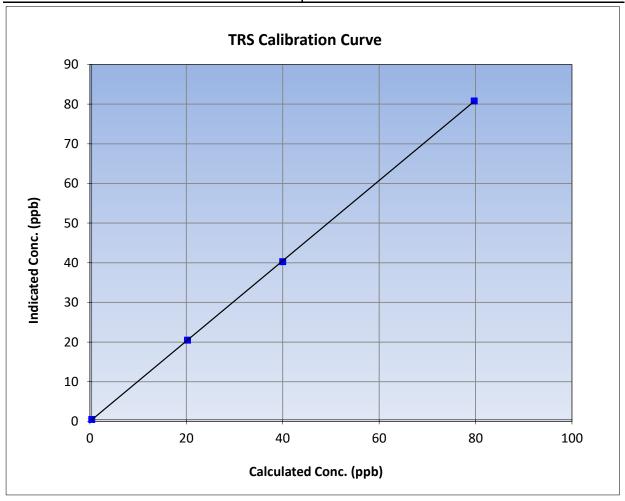
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 18, 2023 **Previous Calibration:** August 2, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:07 End Time (MST): 14:06 Analyzer make: CDN-101 Analyzer serial #: 551

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	0.999983	≥0.995	
79.3	80.4	0.9865	Correlation Coefficient			
39.6	39.9	0.9927	Slope	1.012468	0.90 - 1.10	
19.9	20.1	0.9879	Slope		0.30 - 1.10	
			- Intercept	-0.002341	+/-3	

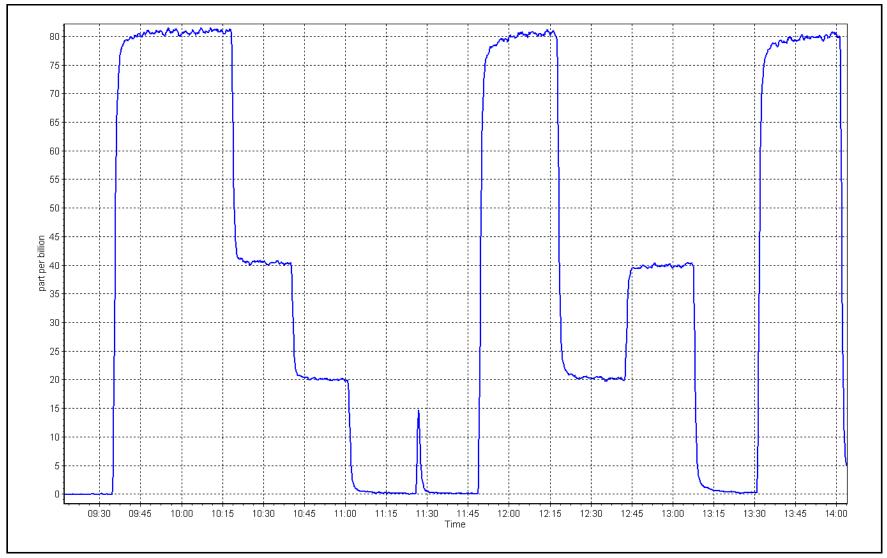




Date: September 18, 2023

Location: Athabasca Valley







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Athabasca Valley Station Name: Calibration Date: September 6, 2023

Start time (MST): 8:50 Reason: Routine Station number: AMS07

Last Cal Date: August 9, 2023

End time (MST): 12:35

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CC282115 CH4 Cal Gas Conc. 501.2 CH4 Equiv Conc. 1075.1 ppm 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 Diff between cyl (THC):

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430012

THC Range (ppm): 0 - 20 ppm

Baseline Corr 3rd AF:

NMHC Range (ppm): 0 - 10 ppm

14.2

NA

CH4 Range (ppm): 0 - 10 ppm

198820

NMHC Peak Area:

Start Finish Start Finish CH4 SP Ratio: 0.000256 0.000249 NMHC SP Ratio: 4.57E-05 4.17E-05 CH4 Retention time: 14.0

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	18.03	0.944
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	17.03	1.000
second point	4960	39.6	8.52	8.51	1.001
third point	4980	19.8	4.26	4.29	0.993
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	16.97	1.004
				Average Correction Factor	0.998
Baseline Corr AF:	18.03	Prev response	16.99	*% change	5.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

* = > +/-5% change initiates investigation

218242



THC / CH₄ / NMHC Calibration Report

Version-01-2020

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.09	9.91	0.917
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	9.09	9.09	1.000
second point	4960	39.6	4.55	4.56	0.996
third point	4980	19.8	2.27	2.33	0.977
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	9.09	9.06	1.004
·			Avera	age Correction Factor	0.991
Baseline Corr AF:	9.91	Prev response	9.08	*% change	8.4%
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			Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
Set Point as found zero	Dil air flow rate	CH4 Calibra Source gas flow rate 0.0	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero		Source gas flow rate	Calc conc (ppm) (Cc)		
as found zero as found span	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
	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 79.2	Calc conc (ppm) (Cc) 0.00 7.94	0.00 8.13	0.977
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 79.2 0.0	Calc conc (ppm) (Cc) 0.00 7.94	0.00 8.13	0.977
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	0.0 79.2 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.94 0.00 7.94	0.00 8.13 0.00 7.94	 0.977 1.000
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 79.2 0.0 79.2 0.0 79.2 39.6	Calc conc (ppm) (Cc) 0.00 7.94 0.00 7.94 3.97	0.00 8.13 0.00 7.94 3.95	 0.977 1.000 1.006
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	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8	Calc conc (ppm) (Cc) 0.00 7.94 0.00 7.94 3.97 1.98	0.00 8.13 0.00 7.94 3.95 1.96	 0.977 1.000 1.006 1.013
as found zero as found span as found 2nd point	5000 4921 5000 4921 4960 4980 5000	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0	0.00 7.94 0.00 7.94 0.00 7.94 3.97 1.98 0.00 7.94	0.00 8.13 0.00 7.94 3.95 1.96 0.00	1.000 1.006 1.013
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 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0	0.00 7.94 0.00 7.94 0.00 7.94 3.97 1.98 0.00 7.94	0.00 8.13 0.00 7.94 3.95 1.96 0.00 7.91	1.000 1.006 1.013
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 as left span	5000 4921 5000 4921 4960 4980 5000 4921	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.94 0.00 7.94 3.97 1.98 0.00 7.94 Avera	0.00 8.13 0.00 7.94 3.95 1.96 0.00 7.91 age Correction Factor	1.000 1.006 1.013 1.004 1.006

Notes: As found NM 9% high. Chromatograms look normal. Span adjusted.

Start

0.996468

0.018660

0.996465

-0.000558

0.996357

0.019418

Calibration Performed By: Aswin Sasi Kumar

THC Cal Slope:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Finish

0.999300

0.010060

1.001057

-0.015758

0.997865

0.025418



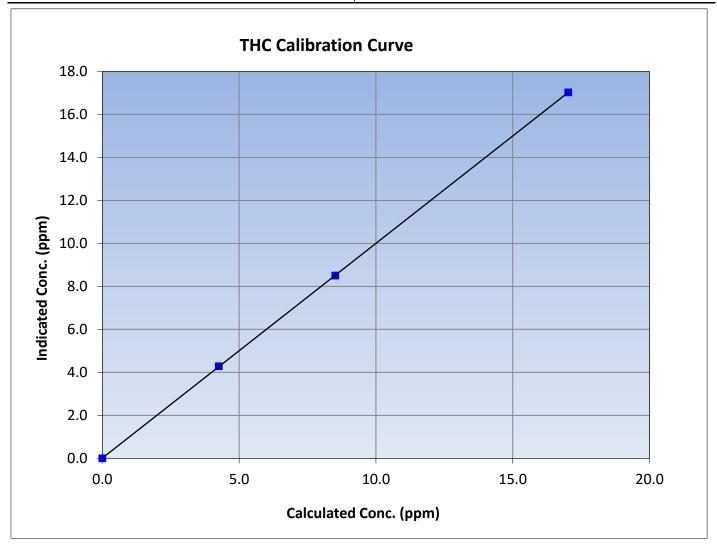
THC Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:50 End Time (MST): 12:35 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	0.999996	≥0.995
17.03	17.03	1.0001			20.333
8.52	8.51	1.0009	Slope	0.999300	0.90 - 1.10
4.26	4.29	0.9934	Slope	0.999300	0.30 - 1.10
			Intercept	0.010060	+/-0.5





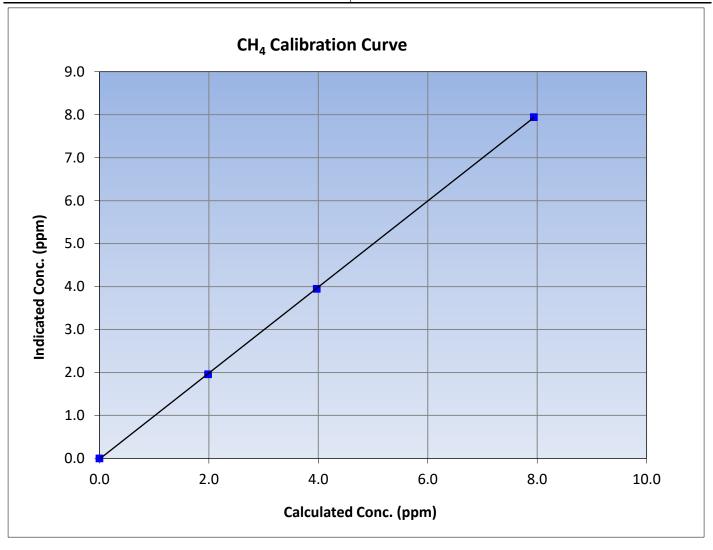
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:50 End Time (MST): 12:35 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	0.999981	≥0.995
7.94	7.94	0.9997			20.333
3.97	3.95	1.0063	- Slope	1.001057	0.90 - 1.10
1.98	1.96	1.0132			0.30 - 1.10
			Intercept	-0.015758	+/-0.5





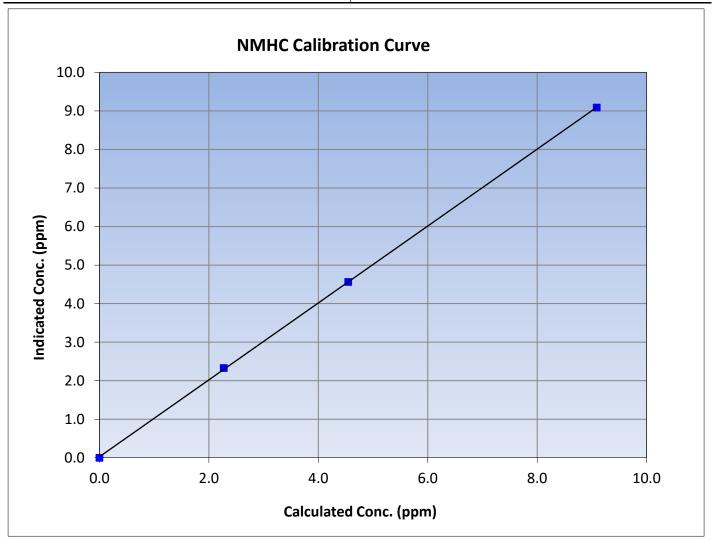
NMHC Calibration Summary

Version-01-2020

Station Information

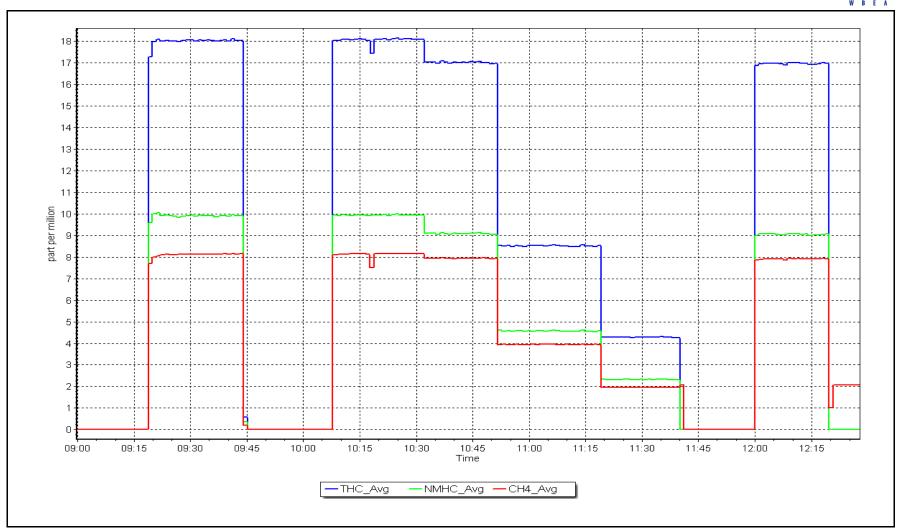
Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:50 End Time (MST): 12:35 Analyzer make: Thermo 55i Analyzer serial #: 1152430012

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999959	≥0.995
9.09	9.09	1.0003		0.55555	20.333
4.55	4.56	0.9965	Slope	0.997865	0.90 - 1.10
2.27	2.33	0.9767	Slope	0.997803	0.90 - 1.10
		·	Intercept	0.025418	+/-0.5



Date: September 6, 2023 Location: Athabasca Valley







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Athabasca Valley

50.92

Calibration Date: September 15, 2023

Start time (MST): 8:45
Reason: Routine

Station number: AMS07

Last Cal Date: August 14, 2023

End time (MST): 14:00

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

ppm

Removed Gas NOX Conc:

NOX gas Diff:

Calibrator Model: API T700
ZAG make/model: API T701H

NO gas Diff:

Removed Gas NO Conc:

Serial Number: 3805 Serial Number: 198

49.92

ppm

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: 1.080 1.075 NO bkgnd or offset: 7.6 7.6 NOX coeff or slope: 0.994 0.995 NOX bkgnd or offset: 7.8 7.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 211.7 210.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002539	1.000426
NO _x Cal Offset:	0.999372	1.179077
NO Cal Slope:	1.002515	1.000774
NO Cal Offset:	1.115453	0.875112
NO ₂ Cal Slope:	0.998415	0.997679
NO ₂ Cal Offset:	0.146993	1.130689



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 = 0.95-1.0
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	822.0	806.0	16.5	0.9936	0.9934
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	4920	80.2	816.7	800.7	16.0	817.5	801.6	15.8	0.9991	0.9989
second point	4960	40.1	408.4	400.4	8.0	411.0	402.6	8.5	0.9936	0.9944
third point	4980	20.0	203.7	199.7	4.0	205.4	200.9	4.6	0.9916	0.9939
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4920	80.2	816.7	394.7	422.0	825.0	400.0	425.3	0.9900	0.9867
							Average C	orrection Factor	0.9948	0.9957
Corrected As fo	ound NO _X =	821.9 ppb	NO =	805.9 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	e NO _x =	0.3%
Previous Respo	nse NO _X =	819.8 ppb	NO =	803.8 ppb				*Percent Chang	e NO =	0.3%
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 foun	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref concentration (icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	rter 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)									

Notes:

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Span adjusted. Used second GPT reference.

421.6

214.2

116.9

Average Correction Factor

1.0010

0.9946

0.9824

0.9927

422.0

213.0

114.8

Calibration Performed By:

Aswin Sasi Kumar

395.2

604.2

702.4

801.2

801.2

801.2

99.9%

100.5%

101.8%

100.7%



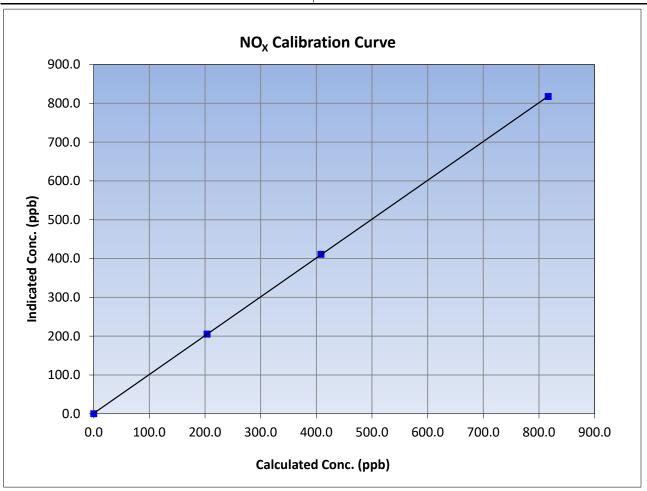
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 15, 2023 Previous Calibration: August 14, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:45 End Time (MST): 14:00 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	0.2		Correlation Coefficient	0.999991	≥0.995
816.7	817.5	0.9991	Correlation Coefficient	0.999991	20.995
408.4	411.0	0.9936	Slope	1.000426	0.90 - 1.10
203.7	205.4	0.9916	Slope	1.000420	0.30 - 1.10
			Intercept	1.179077	+/-20





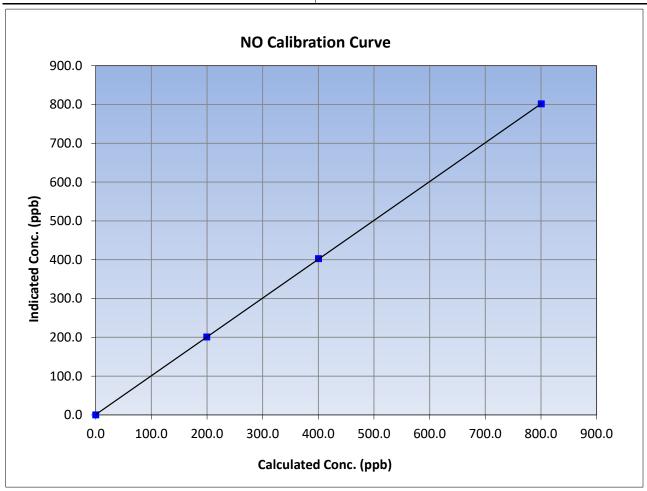
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 15, 2023 Previous Calibration: August 14, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:45 End Time (MST): 14:00 Analyzer make: Thermo 42i Analyzer serial #: 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999994	≥0.995
800.7	801.6	0.9989	Correlation Coefficient	0.555554	20.333
400.4	402.6	0.9944	Slope	1.000774	0.90 - 1.10
199.7	200.9	0.9939	Slope	1.000774	0.90 - 1.10
			Intercept	0.875112	+/-20





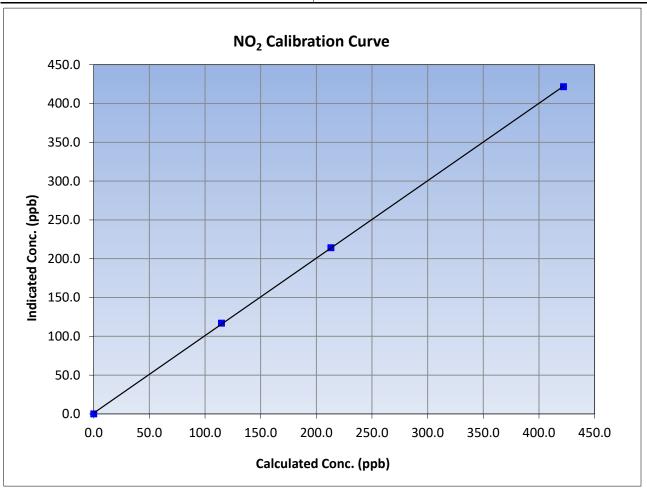
NO₂ Calibration Summary

Version-04-2020

Station Information

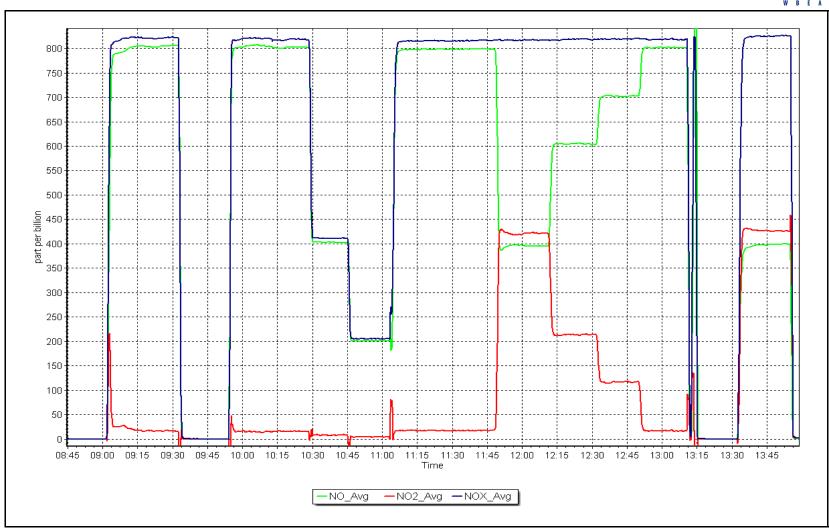
Calibration Date: September 15, 2023 Previous Calibration: August 14, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 8:45 End Time (MST): 14:00 Analyzer serial #: Analyzer make: Thermo 42i 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999965	≥0.995
422.0	421.6	1.0010	correlation coemicient	0.555505	20.333
213.0	214.2	0.9946	Slope	0.997679	0.90 - 1.10
114.8	116.9	0.9824	Slope	0.997679	0.90 - 1.10
			Intercept	1.130689	+/-20



Date: September 15, 2023 Location: Athabasca Valley







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: September 20, 2023

Start time (MST): 9:53
Reason: Routine

Station number: AMS07

Last Cal Date: August 11, 2023

End time (MST): 15:20

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1152220023

Analyzer Range 0 - 500 ppb

Start Finish Start Finish 0.997143 Backgd or Offset: -2.6 -2.6 Calibration slope: 0.999171 0.600000 Coeff or Slope: Calibration intercept: 0.320000 1.522 1.522

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	-0.6	
as found span	5000	1414.8	400.0	397.5	1.006
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.2	
high point	5000	1415.7	400.0	399.3	1.002
second point	5000	1039.9	200.0	200.1	1.000
third point	5000	856.2	100.0	100.8	0.992
as left zero	5000	0.0	0.0	-0.9	
as left span	5000	1416.0	400.0	400.5	0.999
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	398.1	Previous respons	e 400.0	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

* = > +/-5% change initiates investigation



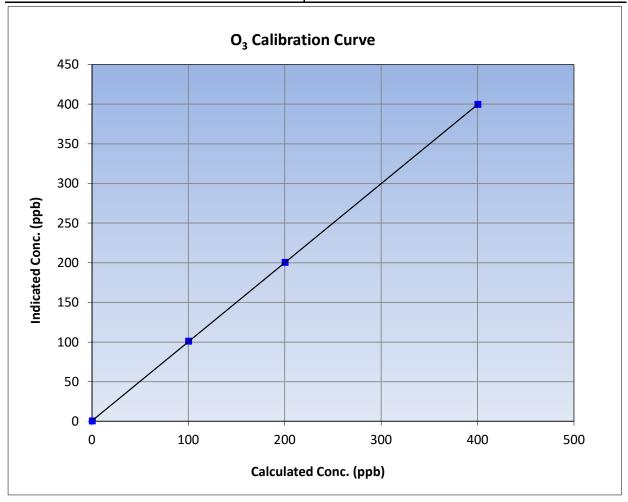
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 20, 2023 **Previous Calibration:** August 11, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 9:53 End Time (MST): 15:20 Analyzer make: Thermo 49i Analyzer serial #: 1152220023

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.2		Correlation Coefficient	0.999995	≥0.995			
400.0	399.3	1.0018	Correlation Coefficient	0.555555	20.993			
200.0	200.1	0.9995	Slope	0.997143	0.90 - 1.10			
100.0	100.8	0.9921	Slope	0.557145	0.90 - 1.10			
			Intercept	0.600000	+/- 5			

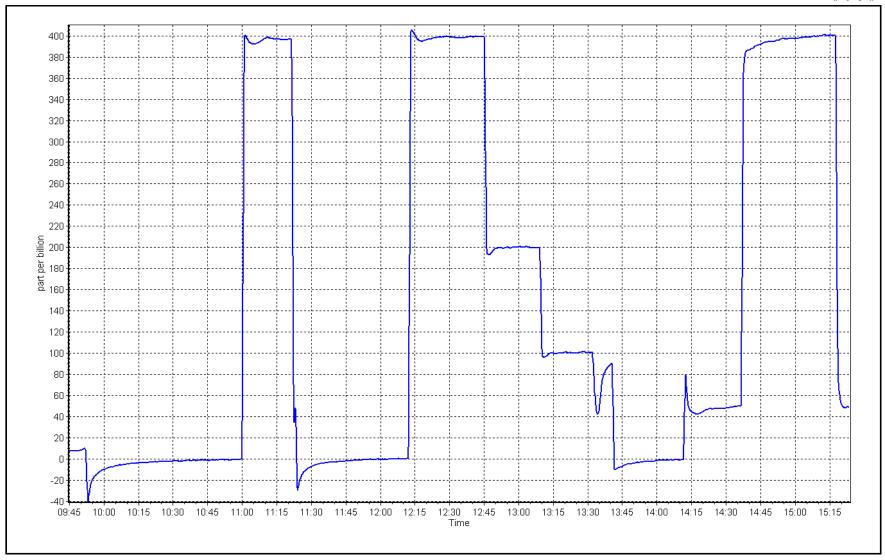


O₃ Calibration Plot

Date: September 20, 2023

Location: Athabasca Valley







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Athabasca Valley		Station number:	AMS 07		
Calibration Date:	September 27, 2023		Last Cal Date:	August 28, 2	023	
Start time (MST):	12:16		End time (MST):	13:48		
Analyzer Make:	API T640		S/N:	871		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388748		
Temp/RH standard:	Alicat FP-25BT		S/N:	388748		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		Adjusted	(Limits)
T (°C)	21.0	20.3	21			+/- 2 °C
P (mmHg)	728.3	737.74	728.3			+/- 10 mmHg
flow (LPM)	5.01	5.07	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	September 27, 2023	Last Cal Date:	August 28	3, 2023	
	PM w/o HEPA:	5.3	PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will se	erve as the pre main	tenance leal	k check	
Inlet cleaning:	Inlet Head	\checkmark				
		Occasional Collings in T				
		Quarterly Calibration T				
<u>Parameter</u>	As found	Post maintenance	As left		<u>Adjusted</u>	(Limits)
PMT Peak Test	10	10	11.2		✓	10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:	5.3	w/ HEPA:	(0.0
Date Optical Cham	ber Cleaned:	September 27	7, 2023	_		<0.2 ug/m3
Disposable Filter	· Changed:	August 28, 1	2023			
		Annual Maintenance				
Date Sample Tub	e Cleaned:	December 5,	2022			
Date RH/T Senso	r Cleaned:	December 5,				
Notes:	Temp, flow	and pressure checked. Le	ak check passed. Ch	namber clear	ned. No issu	ies.
Calibration by:	Aswin Sasi Kumar					



CO Calibration Report

Station number:

AMS07

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: September 27, 2023 Last Cal Date: August 16, 2023

Start time (MST): 10:36 End time (MST): 13:40

Reason: Routine

Calibration Standards

Cal Gas Concentration: 3,000 ppm Cal Gas Exp Date: December 12, 2026

Cal Gas Cylinder #: LL66942

Removed Cal Gas Conc: 3,000 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 700H Serial Number: 198

Analyzer Information

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

Analyzer Range: 0 - 50 ppm

StartFinishStartFinishCalibration slope:0.9994581.003398Backgd or Offset:4.225

Calibration intercept: 0.036542 0.092559 Coeff or Slope: 1.086 1.086

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	0.996
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	40.2	0.996
second point	4967	33.3	20.0	20.3	0.985
third point	4983	16.7	10.0	10.2	0.983
as left zero	5000	0.0	0.0	0.1	
as left span	4933	66.7	40.0	40.2	0.996
			Avera	ge Correction Factor	0.988

Baseline Corr As found: 40.06 Prev response: 40.04 *% change: 0.1%
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: No adjustment needed.

Calibration Performed By: Aswin Sasi Kumar



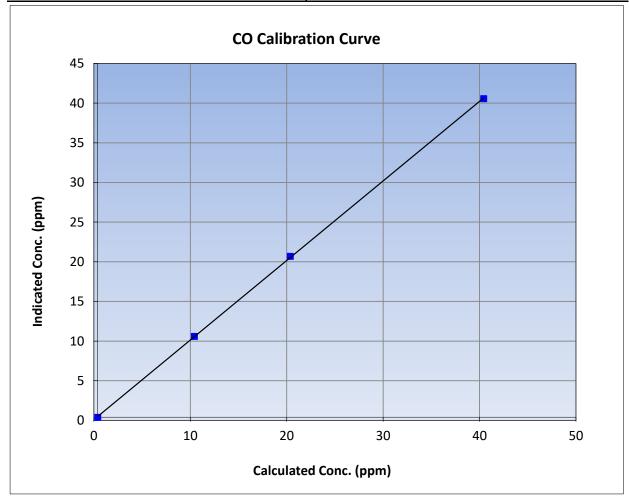
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 27, 2023 **Previous Calibration:** August 16, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:36 End Time (MST): 13:40 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

Calibration Data								
Calculated concentration Indicated concentration Correction factor (ppm) (Cc) (ppm) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999956	≥0.995			
40.0	40.2	0.9963	Correlation Coefficient	0.99990	20.993			
20.0	20.3	0.9851	Slope	1.003398	0.90 - 1.10			
10.0	10.2	0.9834	Slope	1.005556	0.90 - 1.10			
			- Intercept	0.092559	+/-1.5			

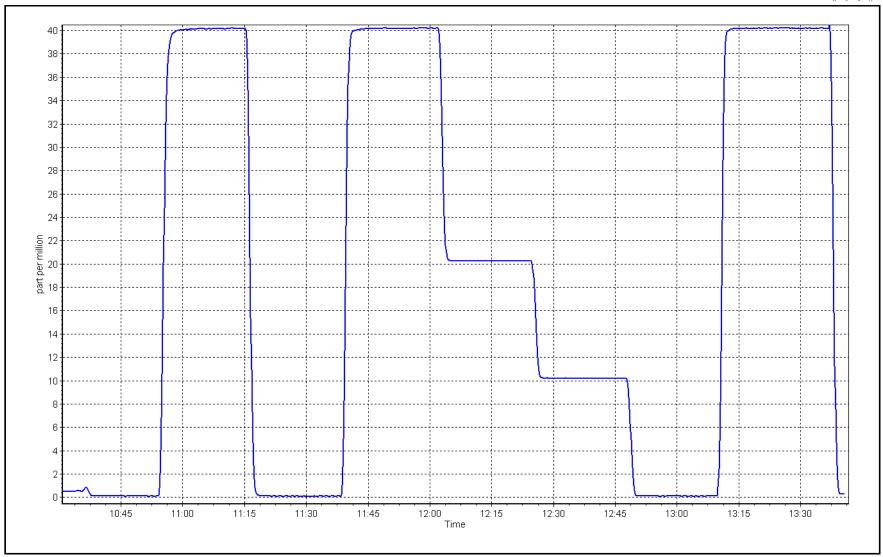


CO Calibration Plot

Date: September 27, 2023

Location: Athabasca Valley







Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Athabasca Valley Station Number: AMS 07

Calibration Date: September 20, 2023 Prev Cal Date: October 4, 2022

Start Time (MST): 11:56 End Time (MST): 14:57
Tower Height (m): 10.0 Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: G3212
WS Calibrator: MetOne 053 Serial Number: P15103

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error Limit = +/- 1.5%
0	0.0	0.0	
200	20.2	20.1	-0.3%
400	39.4	39.4	0.1%
600	58.6	58.5	-0.1%
800	77.8	77.8	0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999999	≥0.9995
Calculated slope		0.999473	0.90 - 1.10
Calculated intercept		0.026227	+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: R14656

As Found Declination (deg east of True North): As Left Declination (deg east of True North):

Solar noon time (MST): 12:17 Calc Declination*: 13.17 Degrees

Deadband calc: 6.0 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.7	
90	86.9	-0.9%
 180	177.3	-0.8%
270	265.9	-1.1%
357	351.7	-1.5%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999979	≥0.9995
Calculated slope		1.014605	0.90 - 1.10
Calculated intercept		0.332308	+/- 4

Notes: Wind speed sensor in good condition, wind direction sensor failed, replaced with sensor s/n:D13602.

Install calibration paperwork for new wind direction sensor completed seperately.

Calibration Performed By: Aswin Sasi Kumar

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Athabasca Valley Station Number: **AMS 07** Station Name:

September 20, 2023 Prev Cal Date: October 4, 2022 Calibration Date:

11:56 Start Time (MST): End Time (MST): 14:57 Tower Height (m): 10.0 Reason: Install

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: WS Calibrator: MetOne 053 Serial Number:

% Error

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	Limit = +/- 1.5%
0	0.0		
200	20.2		
400	39.4		
600	58.6		
800	77.8		

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)			≥0.9995
Calculated slope			0.90 - 1.10
Calculated intercept			+/- 2

Wind Direction Information

Met One 020C-1 D13602 Sensor make/model: Serial Number:

As Found Declination (deg east of True North): As Left Declination (deg east of True North):

Solar noon time (MST): 12:17 Calc Declination*: 13.17 Degrees

Deadband calc: -2.6 degrees (Limit 4 deg) * - calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.8	
90	86.9	-0.9%
180	180.9	0.3%
270	271.2	0.3%
357	360.4	1.0%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999921	≥0.9995
Calculated slope		0.989273	0.90 - 1.10
Calculated intercept		1.299119	+/- 4

Install calibration for new Wind Direction sensor, swapped sensor S/N: R14656 with sensor S/N: D13602 Notes: during annual routine calibration.

Calibration Performed By: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Station number:

End time (MST):

AMS08

13:31

Version-01-2020

Station Information

Station Name: Fort Chipewyan

September 6, 2023 Last Cal Date: Calibration Date: August 14, 2023

Start time (MST): 10:53

Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.84 ppm Cal Gas Exp Date: January 6, 2030

Cal Gas Cylinder #: CC196697

Removed Cal Gas Conc: 49.84 Rem Gas Exp Date: NA ppm

Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 3060 ZAG Make/Model: Teledyne API T701 Serial Number: 260

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1136451241

Analyzer Range 0 - 1000 ppb

Finish Start Finish <u>Start</u> Backgd or Offset: 4.64 Calibration slope: 1.000314 1.004228 4.65

Calibration intercept: -0.543305 -1.764623 Coeff or Slope: 0.963 0.963

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	-2.4	
as found span	4920	80.3	800.4	799.8	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-2.1	
high point	4920	80.3	800.4	802.4	0.997
second point	4960	40.2	400.7	399.1	1.004
third point	4980	20.1	200.4	200.9	0.997
as left zero	5000	0.0	0.0	-2.2	
as left span	4920	80.3	800.4	802.6	0.997
			Averag	ge Correction Factor	1.000

Baseline Corr As found: 802.20 800.09 Previous response *% change 0.3%

changed inlet filters after as founds. no adjustments Notes:

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



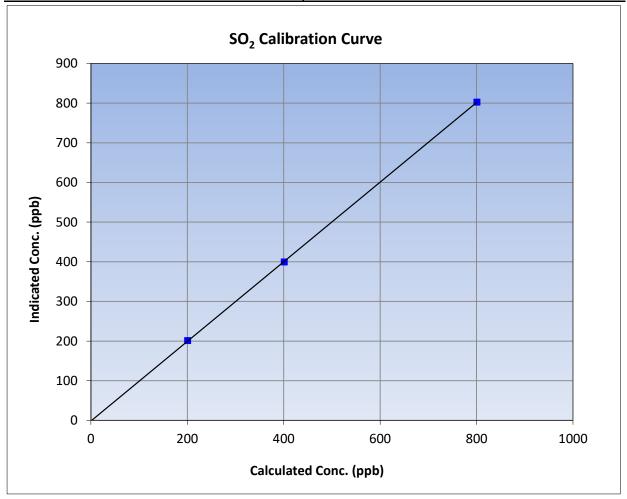
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 14, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 10:53 End Time (MST): 13:31 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1136451241

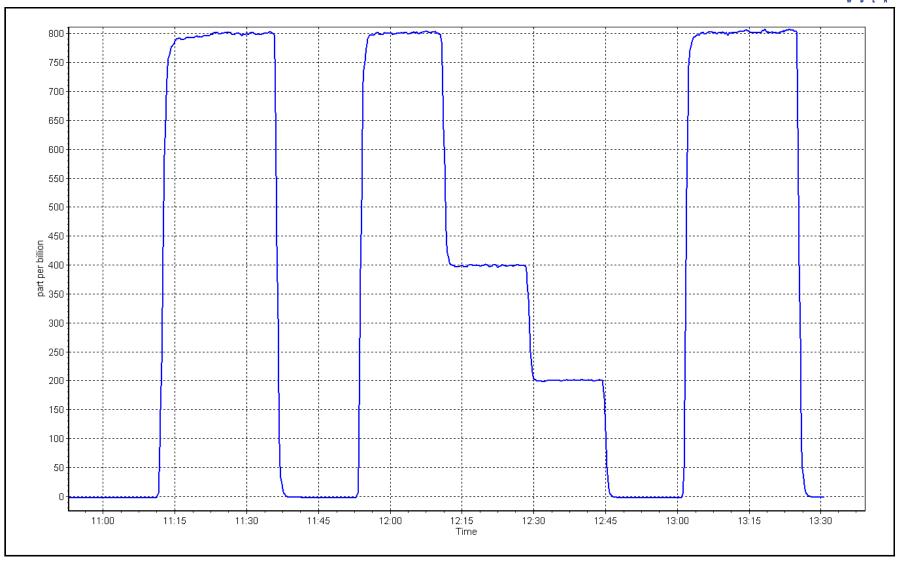
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	-2.1		Correlation Coefficient	0.999987	≥0.995	
800.4	802.4	0.9975	Correlation Coefficient	0.555567	20.333	
400.7	399.1	1.0040	Slope	1.004228	0.90 - 1.10	
200.4	200.9	0.9973	Slope	1.004226	0.90 - 1.10	
			- Intercept	-1.764623	+/-30	



SO2 Calibration Plot Date: September 6, 2023

Location: Fort Chipewyan





TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort Chipewyan

Calibration Date: September 21, 2023

Start time (MST): 12:29

Routine Reason:

Station number: AMS08

> Last Cal Date: August 24, 2023

End time (MST): 16:20

Calibration Standards

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

Cal Gas Cylinder #: EY0002276

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

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

Analyzer Information

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

CDN-101 Converter serial #: 14639 Converter make:

0 - 100 ppb Analyzer Range

Start **Finish Start** <u>Finish</u> 0.999424 Calibration slope: 1.011429 Backgd or Offset: 1.00 0.99

0.338843 Calibration intercept: 0.458863 Coeff or Slope: 0.752 0.752

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	4920	80.5	80.0	80.2	1.003
as found 2nd point	4960	40.2	40.0	40.1	1.006
as found 3rd point	4980	20.1	20.0	20.5	0.994
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.4	
high point	4920	80.5	80.0	81.4	0.983
second point	4960	40.2	40.0	40.4	0.989
third point	4980	20.1	20.0	20.7	0.965
as left zero	5000	0.0	0.0	0.6	
as left span	4920	80.5	80.0	81.6	0.981
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	
Date of last scrubber cha	ange:	March 7, 2022	<u> </u>	Ave Corr Factor	0.979
Date of last converter ef	ficiency test:	March 15, 2022		100.7%	efficiency

Date of last scrubber change:	March 7, 2022	Ave Corr Factor 0.979
Date of last converter efficiency test:	March 15, 2022	100.7% efficiency

Baseline Corr As found: 79.8 Prev response: 80.42 *% change: -0.8% Baseline Corr 2nd AF pt: 39.7 AF Slope: 0.996428 AF Intercept: 0.438656 Baseline Corr 3rd AF pt: AF Correlation: 0.999986 20.1

* = > +/-5% change initiates investigation

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

Calibration Performed By: Matthew Courtoreille



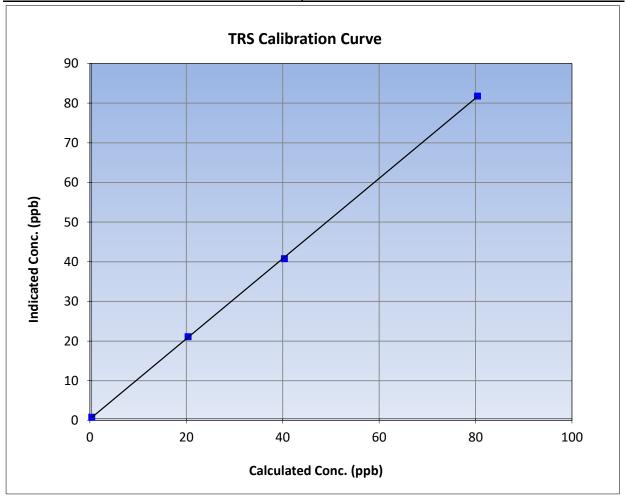
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 21, 2023 **Previous Calibration:** August 24, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 12:29 End Time (MST): 16:20 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169744

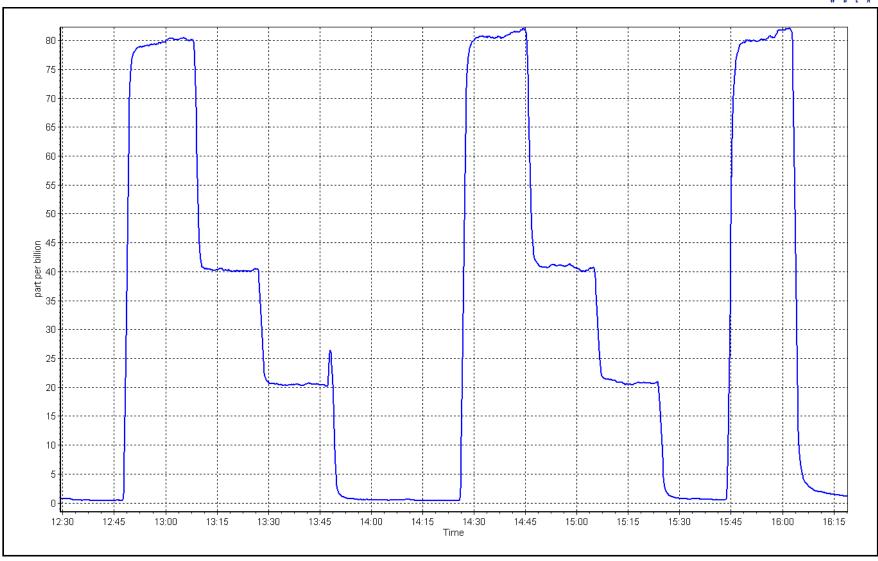
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999952	≥0.995	
80.0	81.4	0.9829	Correlation Coefficient	0.999932	20.993	
40.0	40.4	0.9890	Slope	1.011429	0.90 - 1.10	
20.0	20.7	0.9652	Slope	1.011429	0.90 - 1.10	
			- Intercept	0.338843	+/-3	





Date: September 21, 2023 Location: Fort Chipewyan







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort Chipewyan Station number: AMS08

Calibration Date: September 21, 2023 Last Cal Date: August 29, 2023 Start time (MST): 7:30 End time (MST): 11:41

Start time (MST): 7:30 Reason: Routine

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: 3060 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: 1.020 1.078 NO bkgnd or offset: 9.2 9.8 NOX coeff or slope: 0.992 0.992 NOX bkgnd or offset: 10.1 10.7 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 147.0 145.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.996773	0.993131
NO _x Cal Offset:	0.340000	1.940000
NO Cal Slope:	0.997515	0.994931
NO Cal Offset:	-0.520000	1.260000
NO ₂ Cal Slope:	1.009480	0.991090
NO ₂ Cal Offset:	1.358955	-1.074507



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Set Point Dilution flow rate (sccm) Source gas flow rate (sccm) concentration (ppb) (Cc) concentration (ppb) (Cc) concentration (ppb) (Ic) concentration (Ic) concentration (Ic) concentration (Ic) concentration (Ic) concentration (Ic) concentration (Ic) concentratio					Dil	ution Calibration	n Data				
as found span 4918 82.0 800.3 800.3 0.0 755.5 754.6 1.2 1.0593 1.0 as found 2nd as found 2nd as found 2nd as found 2nd as found 3rd new cyl resp calibrator zero 5000 0.0 0.0 0.0 0.0 0.0 795.8 796.9 0.1 1.0057 1.0 second point 4959 41.0 400.2 400.2 0.0 400.6 400.4 0.3 0.9989 0.9 third point 4980 20.5 200.1 200.1 0.0 202.0 200.8 1.1 0.9905 0.9 as left zero 5000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Set Point			concentration	Calculated NO concentration	Calculated NO2 concentration	Indicated NOx concentration	concentration	concentration	(Cc/Ic)	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found 2nd as found 3rd as found 3rd as found 3rd calibrator zero 5000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.5	0.2		
as found 3rd new cyl resp calibrator zero 5000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	as found span	4918	82.0	800.3	800.3	0.0	755.5	754.6	1.2	1.0593	1.0606
Calibrator zero S000	as found 2nd										
calibrator zero 5000 0.0 0.0 0.0 0.0 0.3 0.4 0.0	as found 3rd										
high point 4918 82.0 800.3 800.3 0.0 795.8 796.9 -0.1 1.0057 1.00	new cyl resp										
Second point 4959	calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.4	0.0		
Third point 4980 20.5 200.1 200.1 0.0 202.0 200.8 1.1 0.9905 0.9 as left zero 5000 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 as left span 4918 82.0 800.3 404.3 396.0 793.1 403.1 389.8 1.0091 1.0 Corrected As found NO _x = 754.8 ppb NO = 754.1 ppb *=> +/-5% change initiates investigation *Percent Change NO _x = -5.7% Previous Response NO _x = 798.1 ppb NO = 797.8 ppb NO = 797.8 ppb *Percent Change NO = -5.8% Baseline Corr 2nd pt NO _x = NA ppb NO = NA ppb As found NO _x t ² NX S! NX Int: Baseline Corr 3rd pt NO _x = NA ppb NO = NA ppb As found NO _x t ² NO S! NO 2 Int: As found NO _x t ² NO S! NO 2 Int: As found NO _x t ² NO S! NO 2 Int: As found Solution Solution	high point	4918	82.0	800.3	800.3	0.0	795.8	796.9	-0.1	1.0057	1.0043
As left zero	second point	4959	41.0	400.2	400.2	0.0	400.6	400.4	0.3	0.9989	0.9994
As left span 4918 82.0 800.3 404.3 396.0 793.1 403.1 389.8 1.0091 1.00	third point	4980	20.5	200.1	200.1	0.0	202.0	200.8	1.1	0.9905	0.9964
Average Correction Factor O.9984 1.00	as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.3		
Corrected As found NO _x = 754.8 ppb NO = 754.1 ppb *=> +/-5% change initiates investigation *Percent Change NO _x = -5.7% Previous Response NO _x = 798.1 ppb NO = 797.8 ppb *Percent Change NO = -5.8% Baseline Corr 2nd pt NO _x = NA ppb NO = NA ppb As found NO _x r ² : Nx SI: Nx Int: Baseline Corr 3rd pt NO _x = NA ppb NO = NA ppb As found NO _x r ² : NO SI: NO Int: As found NO ₂ r ² : NO SI: NO Int: GPT Calibration Data GPT Calibration Data GPT Calibration Data GPT Calibration Data as found GPT zero as found GPT zero as found GPT point (400 ppb NO2) as found GPT point (200 ppb NO2) 1st GPT point (400 ppb O3) 797.8 401.8 396.0 392.5 1.0089 99.1% 2nd GPT point (200 ppb O3) 797.8 597.4 200.4 196.6 1.0193 98.1%	as left span	4918	82.0	800.3	404.3	396.0	793.1	403.1	389.8	1.0091	1.0030
Previous Response NO _x = 798.1 ppb NO = 797.8 ppb NO = 797.8 ppb NO = 797.8 ppb NO = 797.8 ppb NO = 797.8 ppb NO = 797.8 ppb NO = NA ppb NO = NA ppb As found NO _x r ² : Nx SI: Nx Int: Baseline Corr 3rd pt NO _x = NA ppb NO = NA ppb NO = NA ppb As found NO r ² : NO SI: NO Int: As found NO ₂ r ² : NO2 SI: NO2 Int: GPT Calibration Data GPT Calibration Data GPT Calibration (ppb) Concentration								Average C	Correction Factor	0.9984	1.0000
Baseline Corr 2nd pt NO _X = NA ppb NO = NA ppb As found NO _X r ² : NX SI: NX Int: Baseline Corr 3rd pt NO _X = NA ppb NO = NA ppb As found NO r ² : NO SI: NO Int: As found NO ₂ r ² : NO SI: NO Int: O3 Setpoint (ppb) Indicated NO Reference concentration (ppb) Concentration (ppb) Concentration (ppb) Concentration (ppb) Concentration (ppb) (IC) Concentration (ID) Concent	Corrected As fo	ound NO _X =	754.8 ppb	NO :	= 754.1 ppb	* = > +/-5%	% change initiates i	investigation	*Percent Chan	ge NO _X =	-5.7%
Baseline Corr 3rd pt NO _X = NA ppb NO = NA ppb As found NO r ² : NO SI: NO Int: As found NO _Z r ² : NO SI: NO Int: As found NO _Z r ² : NO SI: NO _Z Int:	Previous Respo	nse NO _X =	798.1 ppb	NO :	= 797.8 ppb				*Percent Chan	ge NO =	-5.8%
As found NO ₂ r ² : NO2 SI: NO ₂ Int: GPT Calibration Data	Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO :	= NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
As found NO ₂ r ² : NO2 SI: NO ₂ Int: GPT Calibration Data Set point (ppb) Indicated NO Reference concentration (ppb) Indicated NO Drop concentration (ppb) Calculated NO2 concentration (ppb) (IC) Indicated NO2 concentration (ppb) (IC) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Baseline Corr 3	rd pt NO _X =	NA ppb	NO :	= NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
O3 Setpoint (ppb) Indicated NO Reference concentration (ppb) Indicated NO Drop concentration (ppb) (Cc) Indicated NO2 concentration (ppb) (Ic) Indicated NO2 conce		·				As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
O3 Setpoint (ppb)					•	GPT Calibration	Data				
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) 797.8 401.8 396.0 392.5 1.0089 99.1% 2nd GPT point (200 ppb O3) 797.8 597.4 200.4 196.6 1.0193 98.1%	O3 Setpo	pint (ppb)							Calibration Limit =	0.95-1.05	
as found GPT point (200 ppb NO2) as found GPT point (100 ppb NO2) 1st GPT point (400 ppb O3) 797.8 401.8 396.0 392.5 1.0089 99.1% 2nd GPT point (200 ppb O3) 797.8 597.4 200.4 196.6 1.0193 98.1%	as found	GPT zero	-								
as found GPT point (100 ppb NO2) 1st GPT point (400 ppb O3) 797.8 401.8 396.0 392.5 1.0089 99.1% 2nd GPT point (200 ppb O3) 797.8 597.4 200.4 196.6 1.0193 98.1%	as found GPT poi	nt (400 ppb NO2)									
1st GPT point (400 ppb 03) 797.8 401.8 396.0 392.5 1.0089 99.1% 2nd GPT point (200 ppb 03) 797.8 597.4 200.4 196.6 1.0193 98.1%	as found GPT poi	nt (200 ppb NO2)									
2nd GPT point (200 ppb O3) 797.8 597.4 200.4 196.6 1.0193 98.1%	as found GPT poi	nt (100 ppb NO2)									
	1st GPT point	(400 ppb O3)			401.8	396.0			1.0089	9	99.1%
3rd GPT point (100 ppb O3) 797.8 597.1 200.7 196.6 1.0209 98.0%	2nd GPT point	t (200 ppb O3)	797.8		597.4	200.4		196.6	1.0193	3	98.1%
	3rd GPT point	(100 ppb O3)	797.8		597.1	200.7		196.6	1.0209	9	98.0%

Notes:

sampled inlet filter changed after as founds. Made adjustment to high point span.

Average Correction Factor

1.0164

Calibration Performed By: Matthew C

98.4%



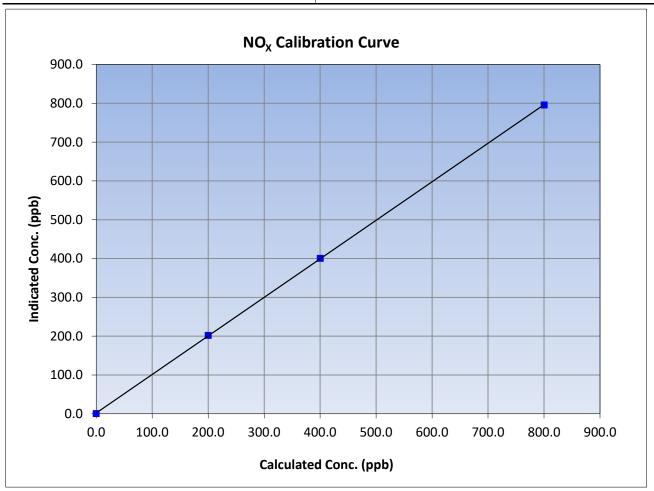
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 21, 2023 Previous Calibration: August 29, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 8:30 End Time (MST): 11:41 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	Coefficient 0.999980 ≥0.995	≥0.995
800.3	795.8	1.0057	correlation coemicient	0.555500	20.333
400.2	400.6	0.9989	Slope	0.993131	0.90 - 1.10
200.1	202.0	0.9905	Slope	0.995151	0.90 - 1.10
			Intercept	1.940000	+/-20





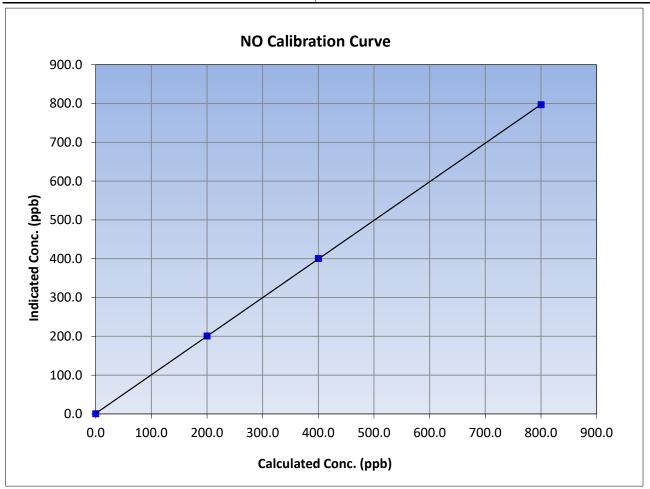
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 21, 2023 Previous Calibration: August 29, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 8:30 End Time (MST): 11:41 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	0.4		Correlation Coefficient	0.999993	≥0.995
800.3	796.9	1.0043	Correlation Coefficient	0.555555	20.993
400.2	400.4	0.9994	Slope	0.994931	0.90 - 1.10
200.1	200.8	0.9964	Slope	0.994951	0.90 - 1.10
			Intercept	1.260000	+/-20





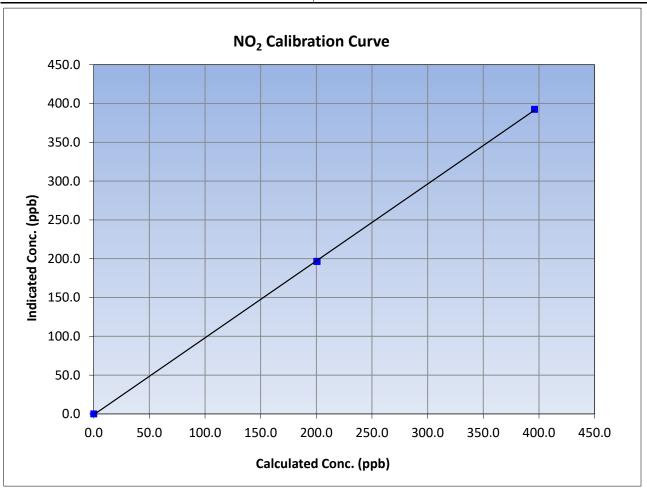
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 21, 2023 Previous Calibration: August 29, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 8:30 End Time (MST): 11:41 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	0.0		Correlation Coefficient	0.999938	≥0.995
396.0	392.5	1.0089	Correlation Coefficient	0.555556	≥0.993
200.4	196.6	1.0193	Slope	0.991090	0.90 - 1.10
200.7	196.6	1.0209	Slope	0.551050	0.90 - 1.10
			Intercept	-1.074507	+/-20

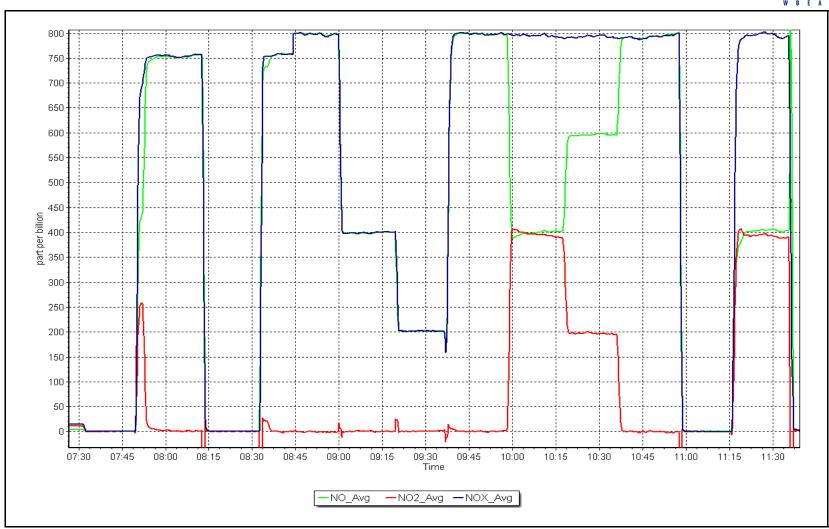


NO_x Calibration Plot

Date: September 21, 2023

Location: Fort Chipewyan







O₃ Calibration Report

Version-01-2020

Station Information

Fort Chipewyan Station Name:

September 6, 2023 Calibration Date:

Start time (MST): 8:19

Reason: Routine Station number: AMS08

Last Cal Date: August 14, 2023

End time (MST): 10:49

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

Start Finish Start Finish Backgd or Offset: -2.0 Calibration slope: 1.018771 1.018086 -2.0 -0.940000 Coeff or Slope: Calibration intercept: -0.760000 1.036 1.036

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	913.0	400.0	406.8	0.983
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.0	
high point	5000	914.7	400.0	406.8	0.983
second point	5000	786.4	200.0	202.1	0.990
third point	5000	701.3	100.0	100.0	1.000
as left zero	5000	0.0	0.0	0.5	
as left span	5000	963.3	400.0	408.7	0.979
			Averag	ge Correction Factor	0.991
Baseline Corr As found:	406.9	Previous response		*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Morgan Voyageur



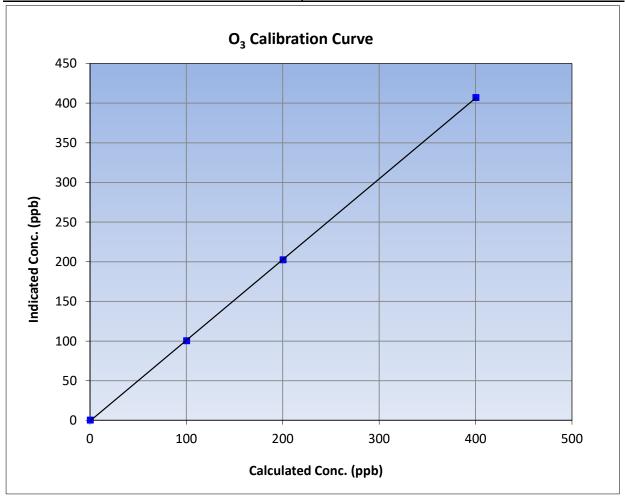
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 14, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 8:19 End Time (MST): 10:49 Analyzer make: Teledyne API T400 Analyzer serial #: 3872

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999975	≥0.995			
400.0	406.8	0.9833	Correlation Coefficient	0.555575	20.333			
200.0	202.1	0.9896	Slope	1.018086	0.90 - 1.10			
100.0	100.0	1.0000	Slope	1.018080	0.90 - 1.10			
			- Intercept	-0.940000	+/- 5			

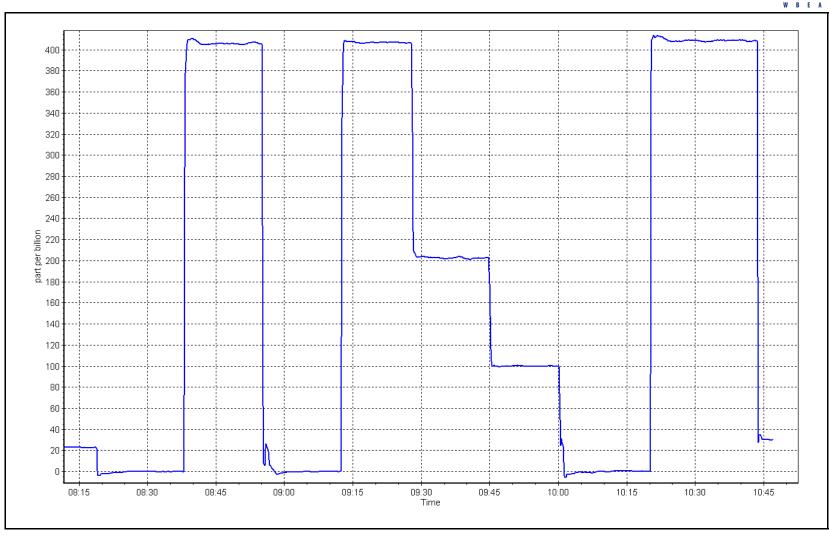


O₃ Calibration Plot

Date: September 6, 2023

Location: Fort Chipewyan







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date: Start time (MST):	Fort Chipewyan September 21, 2023 14:37		Station number: Last Cal Date: End time (MST):	August 24,2	2023	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N:	216		
Flow Meter Make/Model:	FP-25		S/N:	388747		
Temp/RH standard:	FP-25		S/N:	388747		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	As left		Adjusted	(Limits)
T (°C)	17.0	17.7	17.0			+/- 2 °C
P (mmHg)	735.9	739.4	735.9			+/- 10 mmHg
flow (LPM)	5.01	5.10	5.01		✓	+/- 0.25 LPM
Leak Test:	Date of check: _ PM w/o HEPA:	September 20, 2023 71.2	Last Cal Date: PM w/ HEPA:	July25 0.		<0.2 ug/m3
Inlet cleaning :	Inlet Head					
_		Quarterly Calibration T				
<u>Parameter</u>	As found	Post maintenance	As left		<u>Adjusted</u>	(Limits)
PMT Peak Test	11.1	11.0	11.2			11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	24.5	w/ HEPA:	(0.0
Date Optical Cham	-	July 25, 20		•		<0.2 ug/m3
Disposable Filte	r Changed: _	July 25, 2023				
		Annual Maintenance	•			
Date Sample Tul	oe Cleaned:	July 25, 20	023			
Date RH/T Senso	-	July 25, 20				
Notes:		flow was adj	usted to5.01 was 5.03	3.		
Calibration by:	Matthew Courtoreille					



CO Calibration Report

Version-01-2020

Station Information

Fort Chipewyan Station Name:

Calibration Date: September 22, 2023

8:48 Start time (MST):

Reason: Routine Station number: AMS08

> Last Cal Date: August 30, 2023

> > December 1, 2028

End time (MST): 11:58

Cal Gas Exp Date:

Calibration Standards

Cal Gas Concentration: 3,030 ppm

Cal Gas Cylinder #: ALM014846

Removed Cal Gas Conc: Rem Gas Exp Date: NA 3,030 ppm

Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: **API T700** 3060 Serial Number: 260 ZAG Make/Model: **API T701H** Serial Number:

Analyzer Information

Analyzer make: API T300 Analyzer serial #: 3505

Analyzer Range: 0 - 50 ppm

Finish Start Finish <u>Start</u> 1.000563 Calibration slope: 0.995357 Backgd or Offset: -0.013 -0.014

Coeff or Slope: Calibration intercept: 0.050947 0.028916 0.999 1.006

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	0.24	
as found span	4933	66.7	40.4	40.6	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4934	66.7	40.4	40.4	1.000
second point	4967	33.3	20.2	20.3	0.994
third point	4983	16.7	10.1	10.1	0.998
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.4	40.3	1.003
·			Avera	ge Correction Factor	0.997
Baseline Corr As found:	40.36	Prev response:	40.29	*% change:	0.2%
_ ,, , ,					

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Changed inlet filter after as founds. Adjustments made to Zero point and high point. Notes:

Calibration Performed By: Matthew C



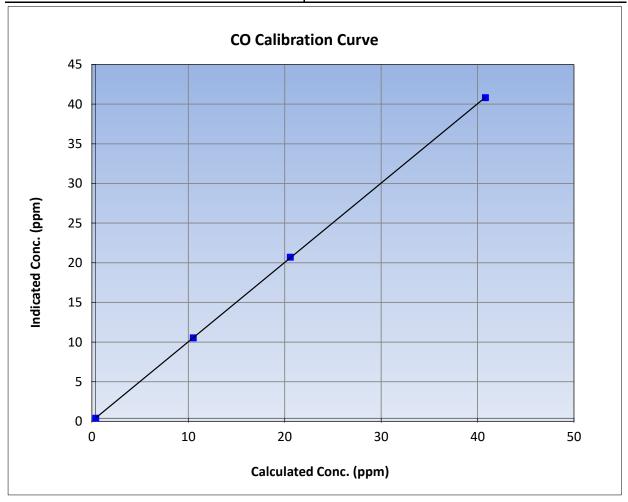
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 30, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 8:48 End Time (MST): 11:58 Analyzer make: **API T300** Analyzer serial #: 3505

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	0.999990	≥0.995			
40.4	40.4	0.9996	Correlation coefficient	0.999990	20.993			
20.2	20.3	0.9941	Slope	1.000563	0.90 - 1.10			
10.1	10.1	0.9980	Slope	1.000303	0.90 - 1.10			
			Intercept	0.028916	+/-1.5			

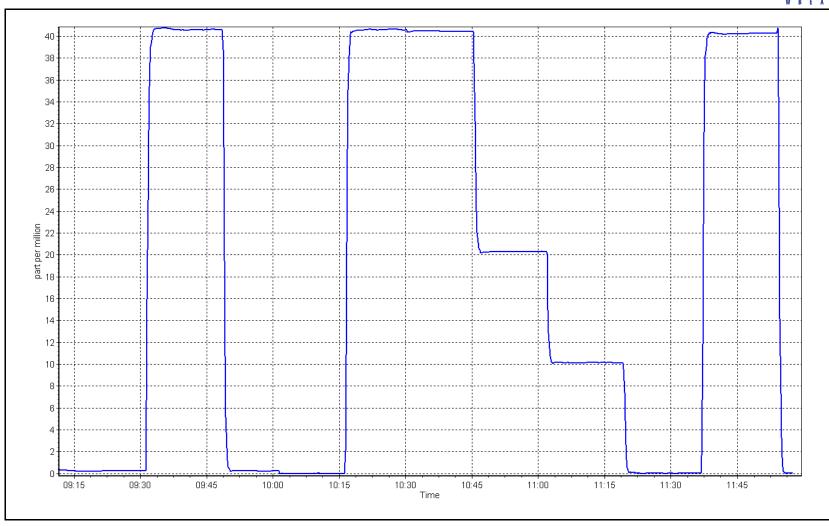


CO Calibration Plot

Date: September 22, 2023

Location: Fort Chipewyan







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort Chipewyan

September 22, 2023 Calibration Date:

Start time (MST): 12:00

Routine Reason:

Station number:

Last Cal Date: August 28, 2023

AMS08

End time (MST): 14:59

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: 3252 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: 0.997557 0.989394 0.008 0.008 Calibration intercept: -1.000000 -0.140000 Coeff or Slope: 1.019 1.019

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	0.7	
as found span	2920	80.0	1605.9	1592.6	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	1.0	
high point	2920	80.0	1605.9	1593.3	1.008
second point	2960	40.0	802.9	781.6	1.027
third point	2980	20.0	401.5	404.0	0.994
as left zero	3000	0.0	0.0	1.4	
as left span	2960	40.0	802.9	778.7	1.031
			Avera	ge Correction Factor	1.010

1600.94 Baseline Corr As found: 1591.90 Prev response: *% 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: Changed inlet filter after as found.

Calibration Performed By: Matthew C



Calculated concentration Indicated concentration

(ppm) (Ic)

1.0

1593.3

781.6

404.0

(ppm) (Cc)

0.0

1605.9

802.9

401.5

Wood Buffalo Environmental Association

CO₂ Calibration Summary

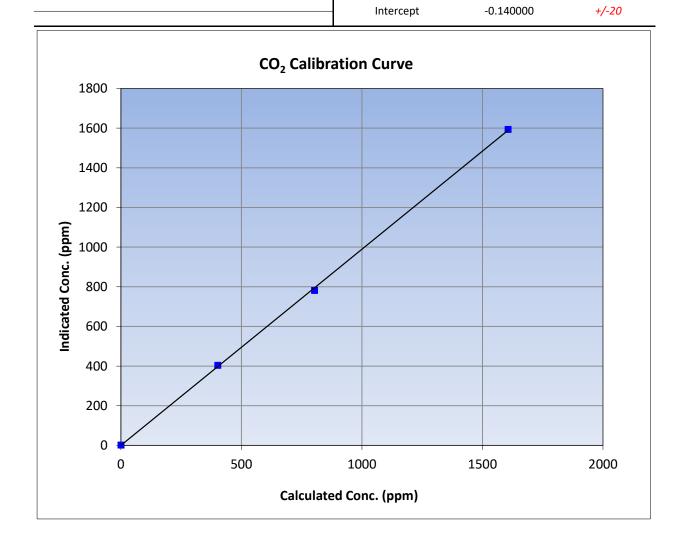
Version-01-2020

Station Information

Calibration Date	September 22, 2023	Previous Calibration	August 28, 2023
Station Name	Fort Chipewyan	Station Number	AMS08
Start Time (MST)	12:00	End Time (MST)	19:06
Analyzer make	Teledyne API T360	Analyzer serial #	289

0.9937

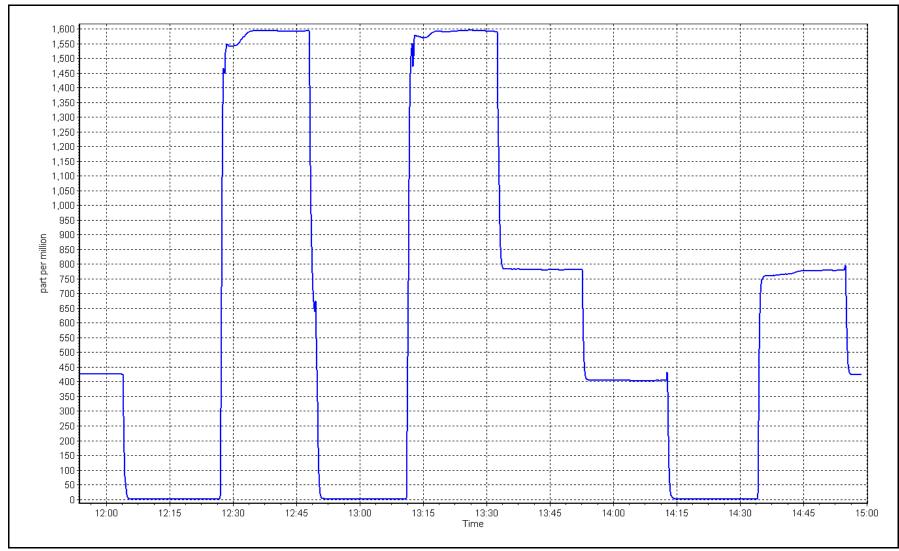
Calibr			
Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
	Correlation Coefficient	0.999833	≥0.995
1.0079	correlation coefficient	0.555055	20.555
1.0273	Slope	0.989394	0.90 - 1.10
0.0027	Jupe	0.505554	0.30 - 1.10



CO₂ Calibration Plot

Date: September 22, 2023 Location: Fort Chipewyan







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09 BARGE LANDING SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Barge Landing

September 5, 2023 Calibration Date:

Start time (MST): 9:50

Routine Reason:

Station number: AMS09

> Last Cal Date: August 15, 2023

End time (MST): 13:09

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:

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

0.998231

1.000440

Backgd or Offset:

Start 9.7

January 5, 2025

Finish

Calibration slope: 10.3 0.979 Calibration intercept: 0.050728 -0.648667 Coeff or Slope: 0.975

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	4919	80.2	801.5	798.0	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	80.2	801.5	801.7	1.000
second point	4959	40.1	400.8	399.1	1.004
third point	4980	20.0	199.8	199.6	1.001
as left zero	5000	0.0	0.0	-0.3	
as left span	4919	80.2	801.5	801.0	1.001
			Averag	ge Correction Factor	1.002

Baseline Corr As found: 797.80 800.12 *% change -0.3% Previous response Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



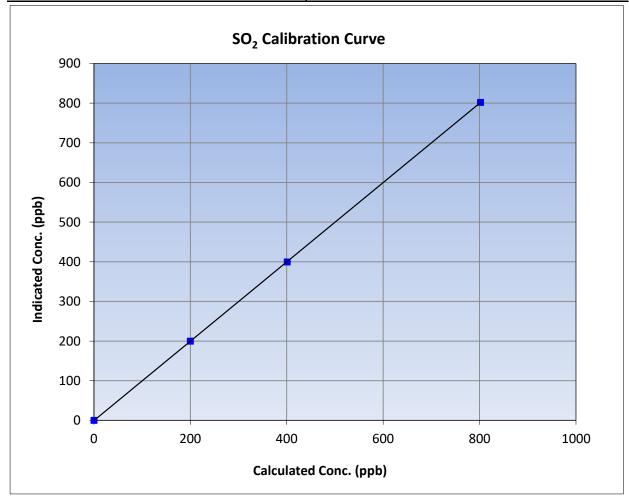
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 15, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:50 End Time (MST): 13:09 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	0.999995	≥0.995		
801.5	801.7	0.9997	Correlation coefficient	0.555555	20.993		
400.8	399.1	1.0041	Slope	1.000440	0.90 - 1.10		
199.8	199.6	1.0012	Slope	1.000440	0.90 - 1.10		
			- Intercept	-0.648667	+/-30		

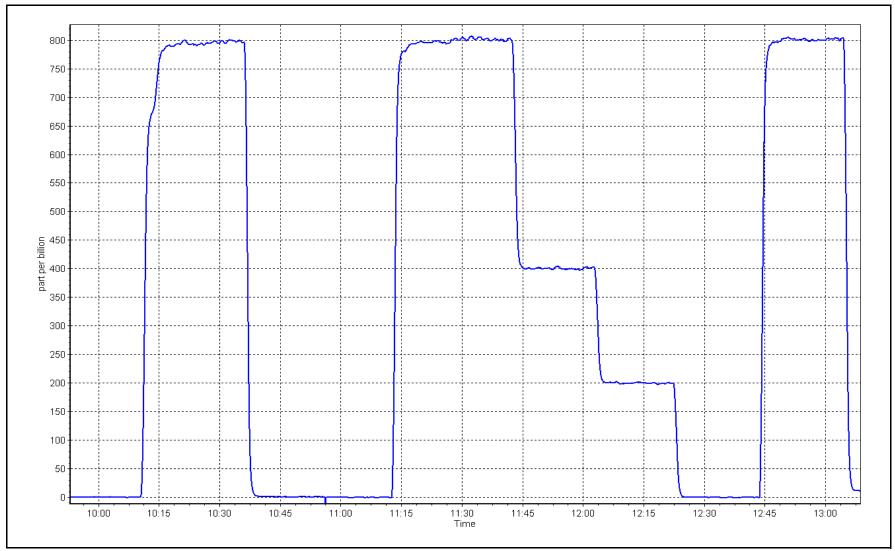


SO2 Calibration Plot

Date: September 5, 2023

Location: Barge Landing







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Barge Landing Calibration Date: September 7, 2023

Start time (MST): Routine Reason:

9:21

Station number: AMS09

Last Cal Date: August 8, 2023

End time (MST): 13:23

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

Finish <u>Finish</u> <u>Start</u> <u>Start</u> Calibration slope: 1.007720 1.001003 Backgd or Offset: 2.77 2.77 -0.060968 -0.000950 Calibration intercept: Coeff or Slope: 1.134 1.134

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	4918	82.1	80.0	79.2	1.007
as found 2nd point	4959	41.1	40.0	39.3	1.013
as found 3rd point	4979	20.5	20.0	19.7	1.003
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	4918	82.1	80.0	80.0	1.000
second point	4959	41.1	40.0	40.1	0.998
third point	4979	20.5	20.0	20.1	0.993
as left zero	5000	0.0	0.0	0.0	
as left span	4918	82.1	80.0	80.7	0.991
SO2 Scrubber Check	4920	80.2	802.0	-0.1	
Date of last scrubber chan	ge:	28-Feb-23		Ave Corr Factor	0.997
Date of last converter efficiency test: efficiency					

Date of last scrubber change	2:	28-Feb-23		Ave Corr Factor	0.997
Date of last converter efficie	ency test:			(efficiency
Baseline Corr As found:	79.4	Prev response:	80.52	*% change:	-1.4%

Baseline Corr 2nd AF pt: 39.5 AF Slope: 0.992283 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999983 19.9

* = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. SOx scrubber check done after calibrator zero. No Notes: adjustment made.

Calibration Performed By: Sean Bala -0.220830



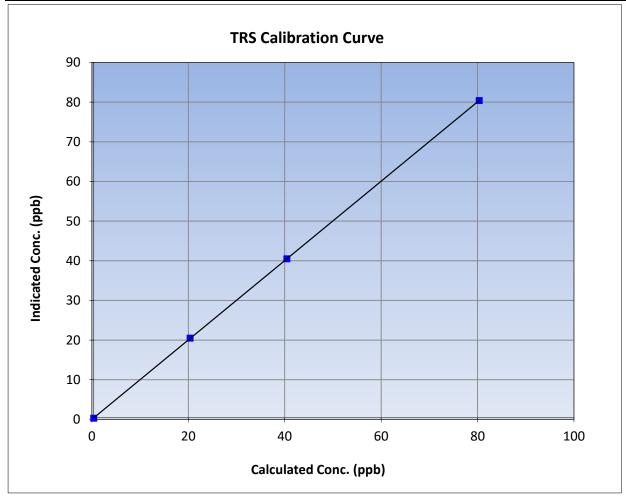
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: Calibration Date: September 7, 2023 August 8, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:21 End Time (MST): 13:23 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

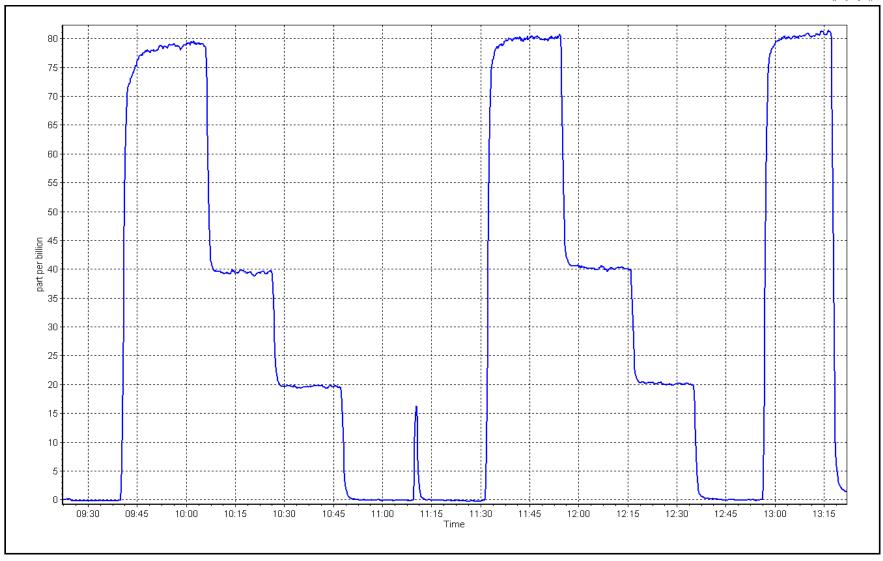
Calibration Data							
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	-0.1		Correlation Coefficient	0.999993	≥0.995		
80.0	80.0	0.9995	Correlation Coefficient	0.55555	20.995		
40.0	40.1	0.9983	Slope	1.001003	0.90 - 1.10		
20.0	20.1	0.9935	Slope	1.001003	0.90 - 1.10		
			- Intercept	-0.000950	+/-3		





Date: September 7, 2023 Location: Barge Landing







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Barge Landing

Calibration Date: September 5, 2023

Start time (MST): 9:50 Routine Reason:

Station number: AMS09

Last Cal Date: August 15, 2023

End time (MST): 13:09

Calibration Standards

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

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

207.1 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NA

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

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1193585649

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: 2.51E-04 2.52E-04 NMHC SP Ratio: 4.87E-05 4.87E-05 CH4 Retention time: 15.20 15.40 NMHC Peak Area: 187816 187823 Zero Chromatogram: OFF ON Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	17.12	17.10	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	80.2	17.12	17.15	0.999
second point	4960	40.1	8.56	8.54	1.002
third point	4980	20.0	4.27	4.28	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	17.12	17.19	0.996
				e Correction Factor	0.999
Baseline Corr AF:	17.10	Prev response	17.13	*% change	-0.2%
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

II D L A					VEISIOII-00-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
is found span	4919	80.2	9.14	9.15	0.999
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	9.14	9.15	0.998
second point	4960	40.1	4.57	4.57	1.000
hird point	4980	20.0	2.28	2.29	0.993
is left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	9.14	9.21	0.992
			А	verage Correction Factor	0.997
Baseline Corr AF:	9.15	Prev response	9.14	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra Source gas flow rate	Calc conc (ppm) (C	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	80.2	7.98	7.95	1.004
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	7.99	0.999
second point	4960	40.1	3.99	3.98	1.004
hird point	4980	20.0	1.99	1.99	1.001
as left zero	5000	0.0	0.00	0.00	
is left span	4919	80.2	7.98	7.98	1.000
			А	verage Correction Factor	1.001
Baseline Corr AF:	7.95	Prev response	7.99	*% 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:		1.000663		1.001164	
THC Cal Offset:		0.001260		-0.002739	
CH4 Cal Slope:		1.002197		1.000766	
CH4 Cal Offset:		-0.007135		-0.005136	

Changed sample inlet filter after as founds. Do a zero chromatogram and use zero chromatogram.

Adjusted span.

0.999486

0.007995

Calibration Performed By: Sean Bala

NMHC Cal Slope:

NMHC Cal Offset:

Notes:

1.001350

0.002797



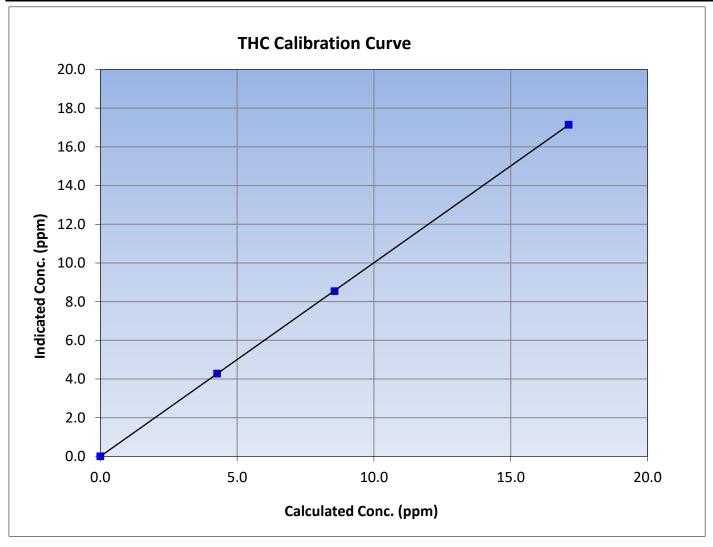
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 15, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:50 End Time (MST): 13:09 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	0.999996	≥0.995
17.12	17.15	0.9985	Correlation Coefficient		20.999
8.56	8.54	1.0018	Slope	1.001164	0.90 - 1.10
4.27	4.28	0.9968	Slope		0.90 - 1.10
			Intercept	-0.002739	+/-0.5





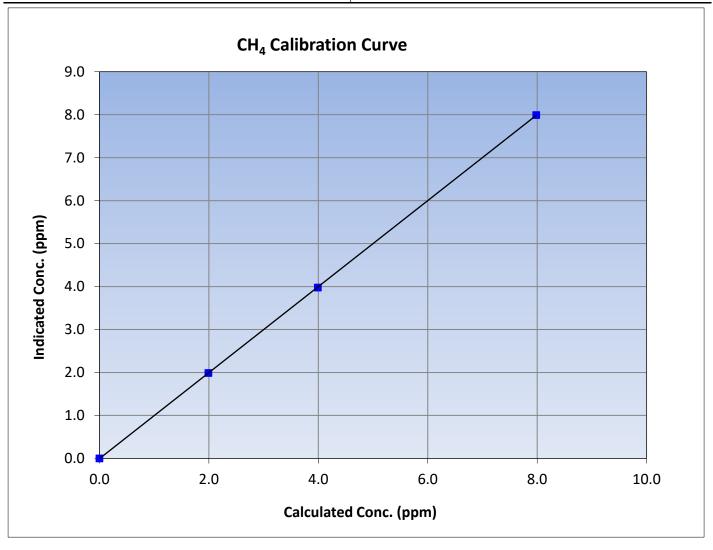
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 15, 2023 Station Name: **Barge Landing** Station Number: AMS09 Start Time (MST): 9:50 End Time (MST): 13:09 Analyzer make: Analyzer serial #: Thermo 55i 1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999993	≥0.995
7.98	7.99	0.9991	Correlation Coefficient		20.333
3.99	3.98	1.0039	Slope	1.000766	0.90 - 1.10
1.99	1.99	1.0007			0.90 - 1.10
			Intercept	-0.005136	+/-0.5





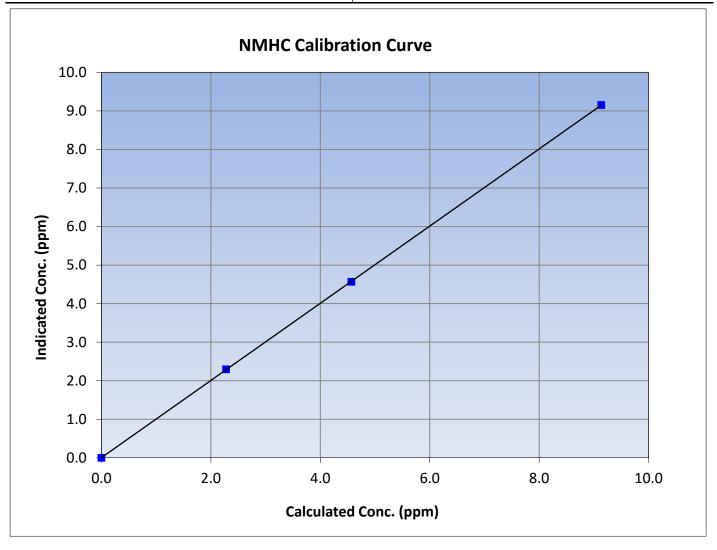
NMHC Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 15, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:50 End Time (MST): 13:09 Analyzer make: Thermo 55i Analyzer serial #: 1193585649

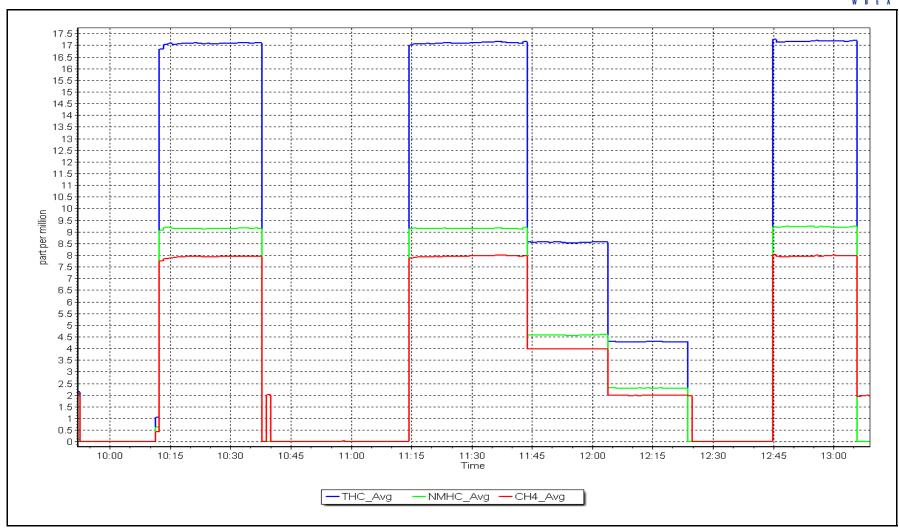
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
9.14	9.15	0.9981	Correlation Coefficient	0.555550	20.993
4.57	4.57	1.0001	Slope	1.001350	0.90 - 1.10
2.28	2.29	0.9931	Slope	1.001330	0.90 - 1.10
			Intercept	0.002797	+/-0.5



NMHC Calibration Plot

Date: September 5, 2023 Location: Barge Landing







NO_X \ NO \ NO₂ Calibration Report

NO gas Diff:

Version-04-2020

Station Information

Station Name: Barge Landing Station number: AMS09

Calibration Date: September 6, 2023 Last Cal Date: August 23, 2023 Start time (MST): 9:23 End time (MST): 13:53

Start time (MST): 9:23
Reason: Routine

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: 1.157 1.162 NO bkgnd or offset: 10.6 10.6 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 10.9 10.8 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 174.9 175.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999930	1.000087
NO _x Cal Offset:	0.929269	1.049154
NO Cal Slope:	1.001426	1.000827
NO Cal Offset:	-0.332141	-0.572366
NO ₂ Cal Slope:	1.000531	1.000344
NO ₂ Cal Offset:	0.173936	0.677077



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/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	0.4	-0.3	0.6		
as found span	4919	80.5	805.1	800.3	4.8	804.5	794.9	9.5	1.001	1.007
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	-0.1	0.5		
high point	4919	80.5	805.1	800.3	4.8	805.8	800.5	5.4	0.999	1.000
second point	4959	40.2	402.1	399.7	2.4	403.7	399.4	4.3	0.996	1.001
third point	4979	20.1	201.0	199.8	1.2	202.6	198.8	3.8	0.992	1.005
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2		
as left span	4919	80.5	805.1	439.6	365.5	804.2	437.0	367.2	1.001	1.006
							Average C	orrection Factor	0.996	1.002
Corrected As fo	ound NO _X =	804.1 ppb	NO =	795.2 ppb	* = > +/-5%	6 change initiates	investigation	*Percent Chang	ge NO _x =	-0.2%
Previous Respo	nse NO _x =	806.0 ppb	NO =	801.1 ppb				*Percent Chang	ge NO =	-0.7%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _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	int (ppb)	Indicated NO Ref concentration (icated NO Drop centration (ppb)	Calculated NC concentration (ppl		dicated NO2 stration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 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)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	797.4		436.7	365.5		366.3	0.998		100.2%

Notes:

Changed sample inlet filter after as founds. Adjusted span.

142.6

76.4

Average Correction Factor

0.995

0.987

0.994

141.9

75.4

Calibration Performed By:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Sean Bala

660.3

726.8

797.4

797.4

100.5%

101.3%

100.7%



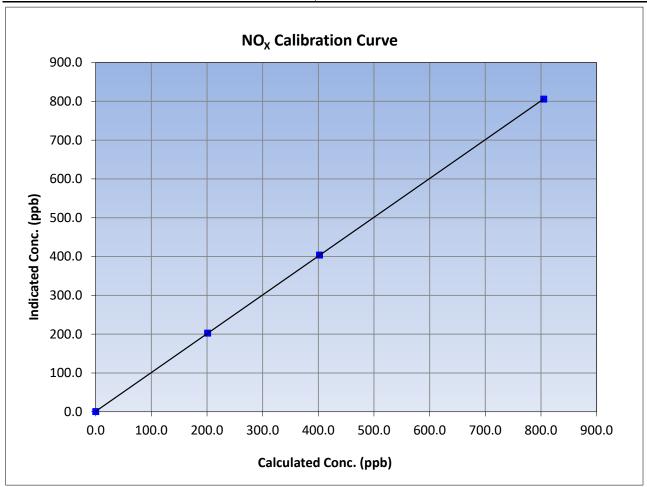
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 23, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:23 End Time (MST): 13:53 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	0.4		Correlation Coefficient	0.999997	≥0.995
805.1	805.8	0.9991	Correlation Coefficient	0.333337	20.993
402.1	403.7	0.9959	Slope	1.000087	0.90 - 1.10
201.0	202.6	0.9923	Зюре	1.000087	0.90 - 1.10
			Intercept	1.049154	+/-20





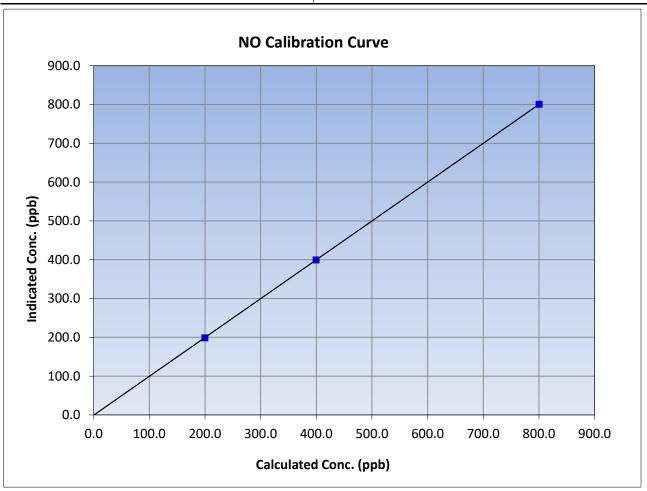
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 23, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:23 End Time (MST): 13:53 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	0.999998	≥0.995
800.3	800.5	0.9997	Correlation Coefficient	0.333336	20.333
399.7	399.4	1.0006	Slope	1.000827	0.90 - 1.10
199.8	198.8	1.0052	Slope	1.000827	0.90 - 1.10
			Intercept	-0.572366	+/-20





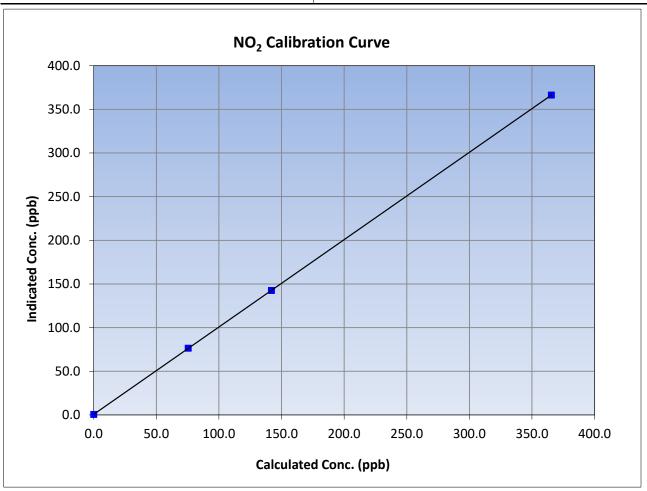
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 23, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:23 End Time (MST): 13:53 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	0.5		Correlation Coefficient	0.999999	≥0.995
365.5	366.3	0.9979	Correlation Coefficient	0.55555	20.993
141.9	142.6	0.9953	Slope	1.000344	0.90 - 1.10
75.4	76.4	0.9873	Slope	1.000544	0.30 - 1.10
			Intercept	0.677077	+/-20

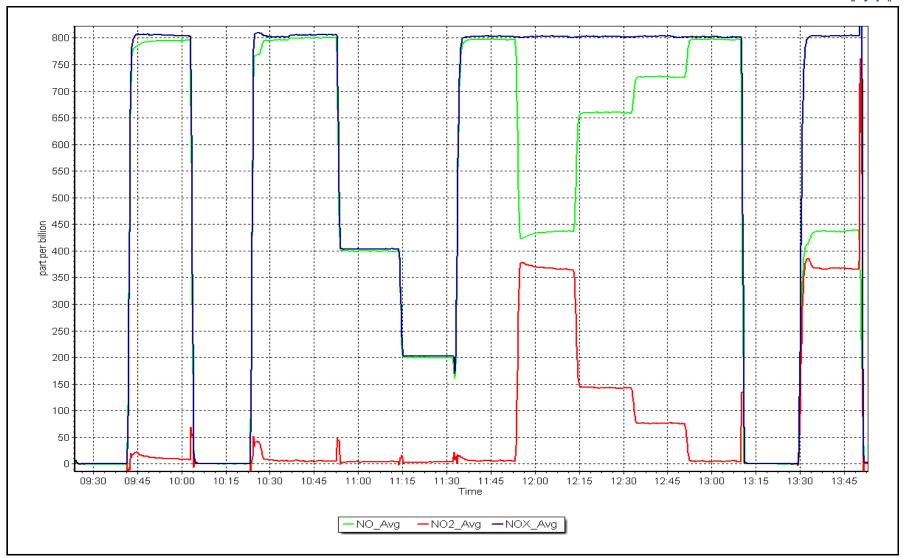


NO_x Calibration Plot

Date: September 6, 2023

Location: Barge Landing







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name: Calibration Date: Start time (MST):	Barge Landing September 7, 2023 11:38		Station number: Last Cal Date: End time (MST):	August 23, 2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	321	
Flow Meter Make/Model:	DeltaCal		S/N:	1451	
Temp/RH standard:	DeltaCal		S/N:	1451	
		Monthly Calibration To	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	15.3	14.3	15.3		+/- 2 °C
P (mmHg)	730.7	731.5	730.7		+/- 10 mmHg
flow (LPM)	5.05	5.03	5.05		+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	September 7, 2023 64.4	Last Cal Date: PM w/ HEPA:	August 23, 2023 0.0	<0.2 ug/m3
		Quarterly Calibration 1	est		
<u>Parameter</u>	As found	Post maintenance	As left	<u>Adjusted</u>	(Limits)
PMT Peak Test	<u> </u>		<u> </u>		10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	ber Cleaned:	August 23,	2023		<0.2 ug/m3
Disposable Filte	r Changed:	September 7, 2023			
		Annual Maintenance	2		
Date Sample Tub	ne Cleaned:	August 23,	2023		
Date RH/T Senso	•	August 23,	-		
Notes:	Inlet head looks goo	od. No adjustments made smo	e. Leak check passed	d. Filter was changed d	ue to recent
Calibration by:	Sean Bala	30			



T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date: Start time (MST):	Barge Landing September 29, 2023 9:23		Station number: Last Cal Date: End time (MST):	September	7, 2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	321		
Flow Meter Make/Model:	DeltaCal		S/N:	1451		
Temp/RH standard:	DeltaCal		S/N:	1451		
		Monthly Calibration Te	st			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	8.3	8.6	8.3			+/- 2 °C
P (mmHg)	732.3	733.5	732.3			+/- 10 mmHg
flow (LPM)	4.99	4.98	4.99			+/- 0.25 LPM
Leak Test: Note: this leak check will be	PM w/o HEPA:	September 29, 2023 43.6	Last Cal Date: PM w/ HEPA:	0.	0	<0.2 ug/m3
Inlet cleaning :	Inlet Head		To do the promise			
		Quarterly Calibration Te	est			
<u>Parameter</u> PMT Peak Test	As found	Post maintenance	<u>As left</u>		Adjusted	(Limits) 10.9 +/- 0.5
Post-maintenance	a leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham		August 23, 2	.023	W/ IILI A.		<0.2 ug/m3
Disposable Filter	Changed:	September 7,				
		Annual Maintenance				
Date Sample Tub	e Cleaned:	August 23, 2	023			
Date RH/T Senso	-	August 23, 2				
Notes:		Remov	val calibration.			
140103.						
Calibration by:	Sean Bala					



T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name:	Barge Landing		Station number:	AMS 09	
Calibration Date:	September 29, 2023		Last Cal Date:	NA	
Start time (MST):	9:52		End time (MST):	10:27	
Analyzer Make:	API T640		S/N:	844	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	DeltaCal		S/N:	1451	
Temp/RH standard:	DeltaCal		S/N:	1451	
		Monthly Calibration Te	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	8.6	8.4	8.6		+/- 2 °C
P (mmHg)	727.3	733.5	727.3		+/- 10 mmHg
flow (LPM)	4.99	4.89	4.99		+/- 0.25 LPM
Leak Test:	Date of check:	September 29, 2023	Last Cal Date:	NA	
	PM w/o HEPA:	36.3	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be			rve as the pre main	tenance leak check	
Inlet cleaning:	Inlet Head	\checkmark			
		Quarterly Calibration T	est		
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	ber Cleaned:				<0.2 ug/m3
Disposable Filte	r Changed:				
		Annual Maintenance	2		
Date Sample Tub	oe Cleaned:	August 23,	2023		
Date RH/T Senso	<u> </u>	August 23, 2			
		Insta	all calibration.		
Notes:					
Calibration by:	Sean Bala				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11 LOWER CAMP SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Station number:

End time (MST):

AMS11

12:49

Version-01-2020

Station Information

Station Name: Lower Camp

Calibration Date: September 22, 2023 Last Cal Date: August 10, 2023

Start time (MST): 9:53

Reason: Routine

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

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

StartFinishStartFinishCalibration slope:1.0018121.005149Backgd or Offset:14.814.7

Calibration intercept: 0.110451 -0.308964 Coeff or Slope: 1.034 1.034

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	0.5	
as found span	4919	81.3	8.008	802.8	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.7	
high point	4919	81.3	8.008	805.4	0.994
second point	4959	40.7	400.9	401.2	0.999
third point	4980	20.3	199.9	200.3	0.998
as left zero	5000	0.0	0.0	0.8	
as left span	4919	81.3	8.008	806.8	0.993
			Averag	ge Correction Factor	0.997
Baseline Corr As found:	802.30	Previous response	802.32	*% change	0.0%

Baseline Corr As found: 802.30 Previous response 802.32 ** change 0.0%
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. No adjustments made.

Calibration Performed By: Mohammed Kashif



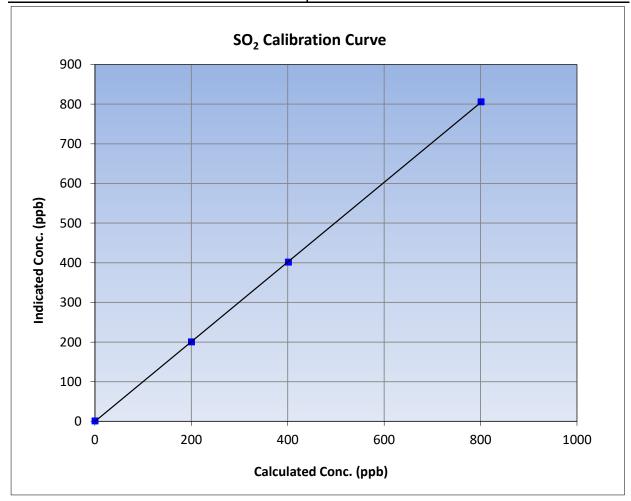
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 10, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:53 End Time (MST): 12:49 Analyzer make: Thermo 43i Analyzer serial #: 100841398

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.7		Correlation Coefficient	0.999989	≥0.995			
800.8	805.4	0.9942	Correlation coefficient	0.555565	20.333			
400.9	401.2	0.9993	Slope	1.005149	0.90 - 1.10			
199.9	200.3	0.9982	Slope	1.005149	0.90 - 1.10			
			Intercept	-0.308964	+/-30			

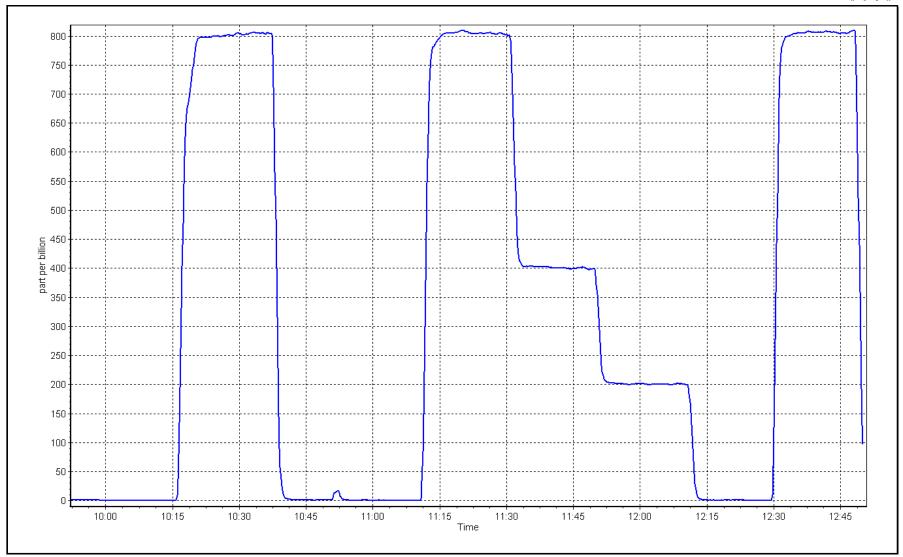


SO2 Calibration Plot

Date: September 22, 2023

Location: Lower Camp







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: **Lower Camp**

Calibration Date: September 12, 2023

Start time (MST): 9:08

Routine Reason:

Station number: AMS11

> Last Cal Date: August 29, 2023

End time (MST): 13:01

Rem Gas Exp Date: NA

Calibration Standards

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

Cal Gas Cylinder #: CC501097

Removed Cal Gas Conc: 5.429 ppm Removed Gas Cyl #: NA

Diff between cyl: Calibrator Make/Model: API T700 Serial Number: 3807 ZAG Make/Model: **API T701H** 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> 1.024520 Backgd or Offset: 14.2 Calibration slope: 1.017077 14.1 -0.427099 Calibration intercept: -0.466446 Coeff or Slope: 1.001 1.001

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	73.6	79.9	80.9	0.984
as found 2nd point	4963	36.8	40.0	40.6	0.977
as found 3rd point	4982	18.6	20.2	20.0	0.995
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	4926	73.6	79.9	81.4	0.982
second point	4963	36.8	40.0	40.6	0.984
third point	4982	18.6	20.2	20.3	0.995
as left zero	5000	0.0	0.0	-0.3	
as left span	4926	73.6	79.9	81.9	0.976
SO2 Scrubber Check	4919	81.1	811.0	0.2	
Date of last scrubber chang	ge:	_	_	Ave Corr Factor	0.987
				,	

Date of last scrubbe	r cnange:			Ave Corr Factor	0.987
Date of last converte	er efficiency test:				efficiency
Baseline Corr As fou	ınd: 81.2	Prev response:	80.82	*% change:	0.5%

Baseline Corr As found: 81.2 80.82 Prev response: Baseline Corr 2nd AF pt: 40.9 AF Slope: 1.017348 AF Correlation: Baseline Corr 3rd AF pt: 20.3 0.999964

* = > +/-5% change initiates investigation

AF Intercept:

Notes:

Changed sample inlet filter after as founds. Completed SO2 scrubber check after calibrator zero. No adjustments required.

Calibration Performed By: Mohammed Kashif -0.325940



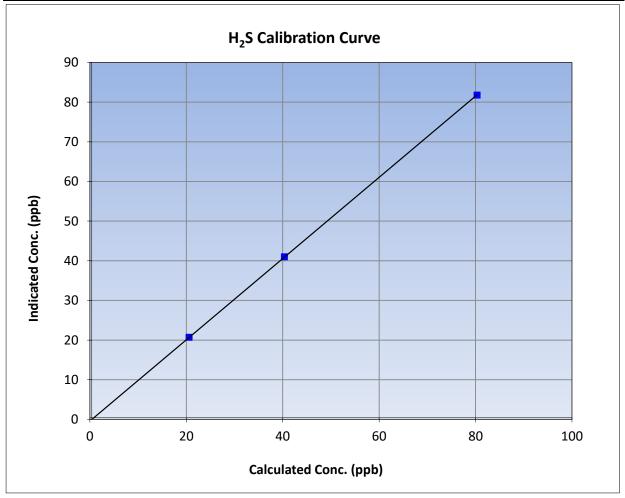
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 12, 2023 **Previous Calibration:** August 29, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:08 End Time (MST): 13:01 Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

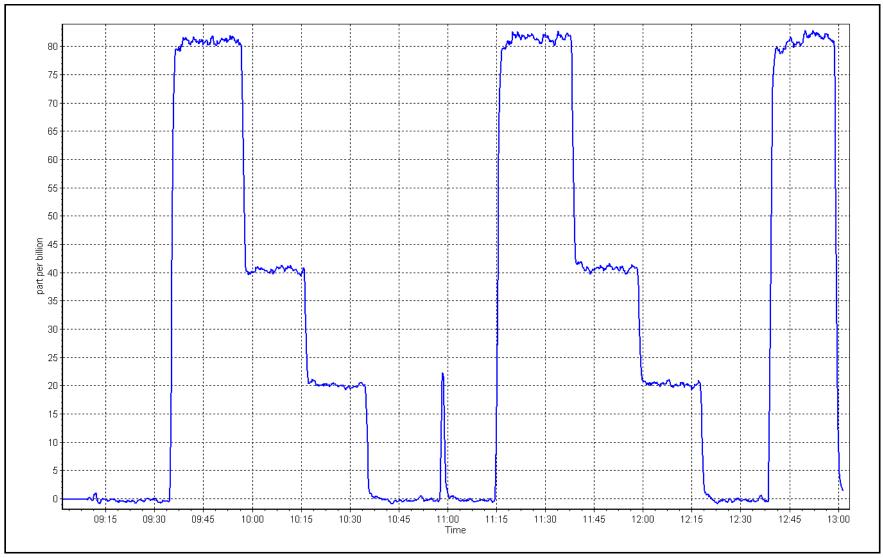
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	-0.5		Correlation Coefficient	0.999995	≥0.995		
79.9	81.4	0.9818	Correlation Coefficient	0.55555	20.995		
40.0	40.6	0.9842	Clana	1.024520	0.90 - 1.10		
20.2	20.3	0.9948	- Slope	1.024320	0.90 - 1.10		
			- Intercept	-0.427099	+/-3		



Date: September 12, 2023

Location: Lower Camp







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Lower Camp

Calibration Date: September 22, 2023

Start time (MST): 9:53
Reason: Routine

Station number: AMS11

Last Cal Date: August 10, 2023

End time (MST): 12:49

Calibration Standards

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

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

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: Removed Gas Expiry:

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 (CH_4):

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: 2.99E-04 2.99E-04 NMHC SP Ratio: 5.79E-05 5.79E-05 CH4 Retention time: 14.0 NMHC Peak Area: 14.0 158468 158468

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	17.18	1.010		
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	17.26	1.005		
second point	4959	40.7	8.69	8.58	1.012		
third point	4980	20.3	4.33	4.28	1.011		
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.3	17.35	17.36	0.999		
			Д	Average Correction Factor	1.009		
Baseline Corr AF:	17.18	Prev response	17.26	*% change	-0.5%		
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

					V C 151011 01 20
		NINALIC Calibra	ontion Data		
		NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	9.19	9.09	1.010
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	9.19	9.14	1.005
second point	4959	40.7	4.60	4.55	1.012
third point	4980	20.3	2.29	2.27	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	9.19	9.18	1.001
			Aver	age Correction Factor	1.010
Baseline Corr AF:	9.09	Prev response	9.14	*% 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 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	81.3	8.16	8.09	1.009
as found 2nd point	1323	01.0	0.20	0.03	1.003
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	8.16	8.13	1.004
second point	4959	40.7	4.09	4.04	1.013
third point	4980	20.3	2.04	2.02	1.010
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	8.16	8.18	0.998
as iere span	1323	01.0		age Correction Factor	1.009
Baseline Corr AF:	8.09	Prev response	8.12	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:	0.12	AF Intercept:	0.470
Baseline Corr 3rd AF:	NA NA	AF Correlation:		* = > +/-5% change initiat	res investigation
Jaselille Coll Stu Al .	IVA	Calibration	Chatistics	- 17 575 Gridinge militar	.com/conganon
			Statistics	Finish	
THC C-1 C		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.996495		0.995046	
THC Cal Offset:		-0.024788		-0.021788	
CH4 Cal Slope:		0.996527		0.995660	
CH4 Cal Offset:		-0.015486		-0.010886	
NMHC Cal Slope:		0.996217		0.994824	
				0.044704	

Notes: Changed sample inlet filter and N2 cylinder after as founds. No adjustments made.

-0.009301

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.011701



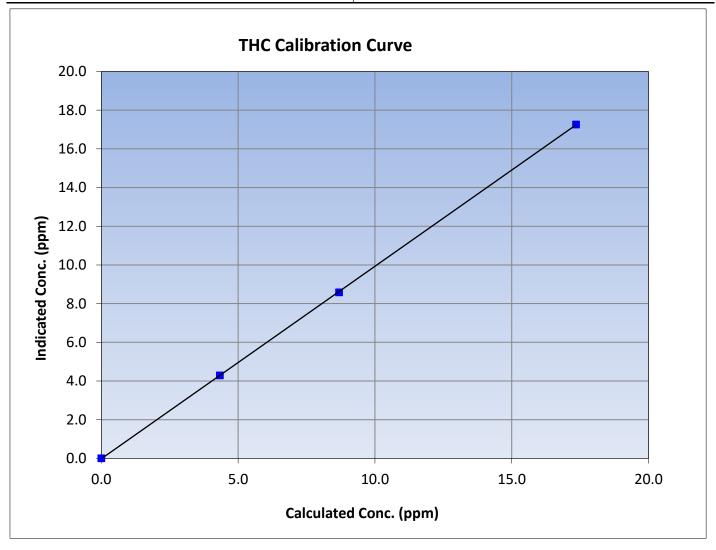
THC Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 10, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:53 End Time (MST): 12:49 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	0.999985	≥0.995
17.35	17.26	1.0051	Correlation Coemicient	0.333363	20.993
8.69	8.58	1.0120	Slope	0.995046	0.90 - 1.10
4.33	4.28	1.0113			0.90 - 1.10
			Intercept	-0.021788	+/-0.5





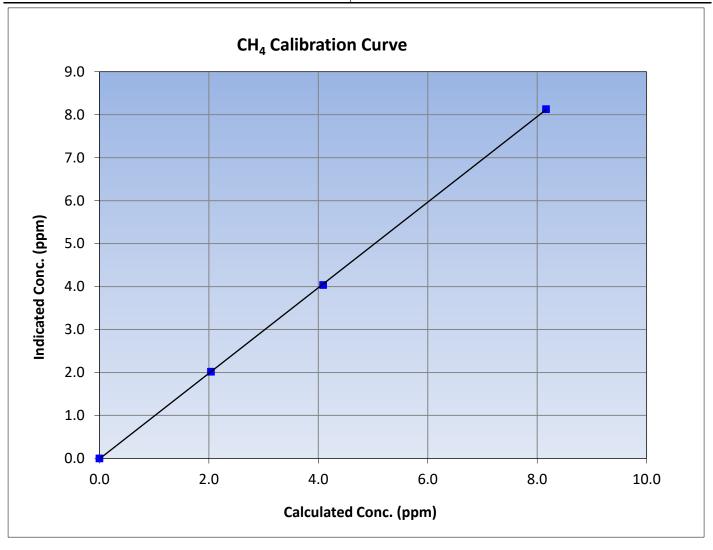
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 10, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:53 End Time (MST): 12:49 Analyzer make: Analyzer serial #: Thermo 55i 1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999979	≥0.995
8.16	8.13	1.0043			20.933
4.09	4.04	1.0125	Slope	0.995660	0.90 - 1.10
2.04	2.02	1.0104			0.90 - 1.10
			Intercept	-0.010886	+/-0.5





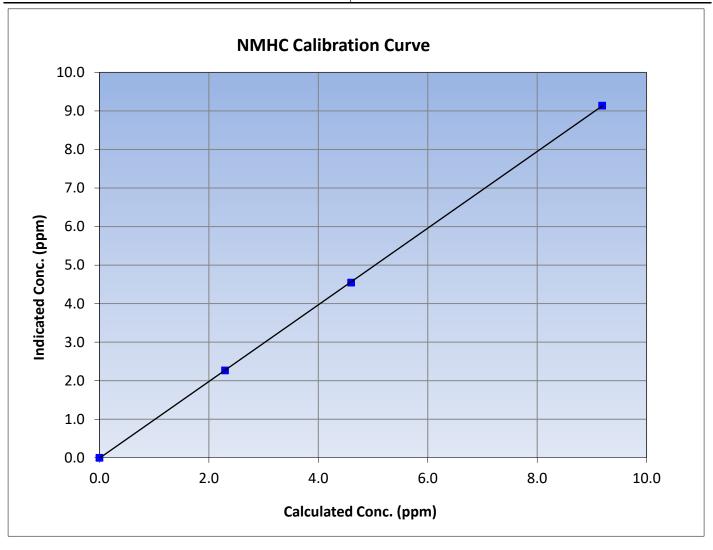
NMHC Calibration Summary

Version-01-2020

Station Information

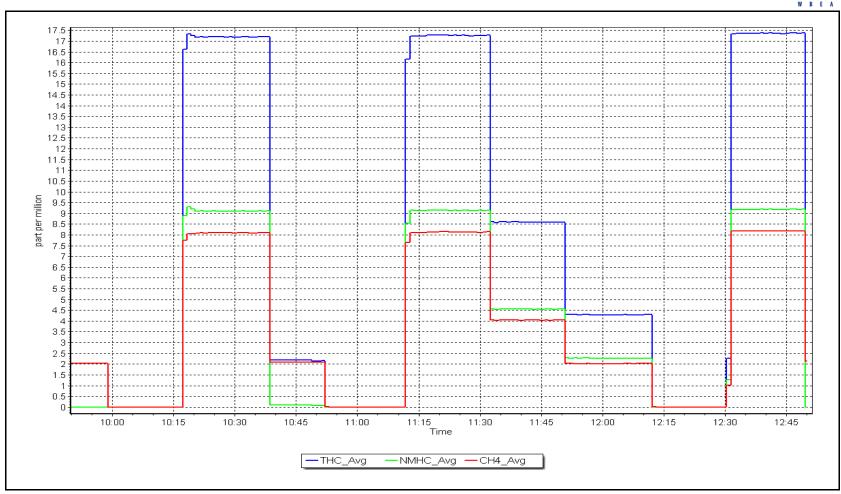
Calibration Date: September 22, 2023 **Previous Calibration:** August 10, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 9:53 End Time (MST): 12:49 Analyzer make: Thermo 55i Analyzer serial #: 1505164381

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
9.19	9.14	1.0054			20.333
4.60	4.55	1.0117	Slope	0.994824	0.90 - 1.10
2.29	2.27	1.0120			0.90 - 1.10
			Intercept	-0.011701	+/-0.5



Date: September 22, 2023 Location: Lower Camp







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

September 15, 2023 Calibration Date:

Start time (MST): 8:52 Routine Reason:

Station number: AMS13

Last Cal Date:

End time (MST): 13:30

August 16, 2023

Calibration Standards

Cal Gas Concentration: 50.55

Cal Gas Cylinder #: CC260812

Removed Cal Gas Conc: 50.55

Removed Gas Cyl #: N/A

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

ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date: N/A

Diff between cyl:

Serial Number: 2448 Serial Number: 1117

Analyzer Information

Analyzer make: API T100 Analyzer serial #: 599

ppm

Analyzer Range 0 - 1000 ppb

Finish Start

1.002886

1.002912

Backgd or Offset:

Start 86.3

Finish 86.3

Calibration slope: 0.715 Calibration intercept: -2.078412 -1.537784 Coeff or Slope: 0.715

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	0.3	
as found span	4921	79.1	799.7	800.7	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4921	79.1	799.7	801.2	0.998
second point	4961	39.5	399.3	398.8	1.001
third point	4980	19.8	200.2	196.6	1.018
as left zero	5000	0.0	0.0	0.6	
as left span	4921	79.1	799.7	800.6	0.999
			Averag	ge Correction Factor	1.006

Baseline Corr As found: 800.40 Previous response 799.91 *% change 0.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



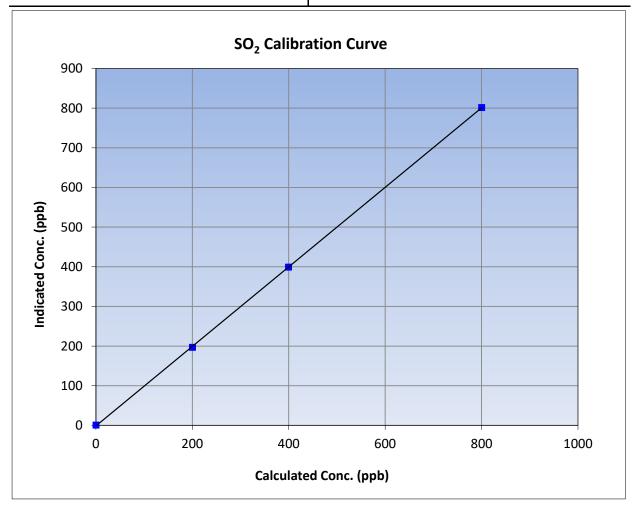
SO₂ Calibration Summary

Version-01-2020

Station Information

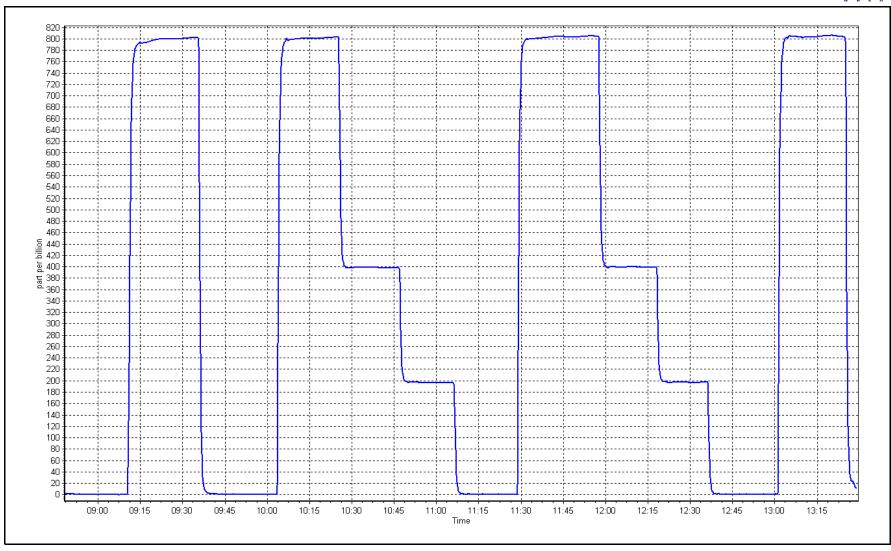
Calibration Date: September 15, 2023 **Previous Calibration:** August 16, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 8:52 End Time (MST): 13:30 Analyzer make: **API T100** Analyzer serial #: 599

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999967	≥0.995	
799.7	801.2	0.9981	Correlation coefficient	0.999907	20.993	
399.3	398.8	1.0013	Slope	1.002912	0.90 - 1.10	
200.2	196.6	1.0182	Slope	1.002912	0.90 - 1.10	
			Intercept	-1.537784	+/-30	



SO2 Calibration Plot Date: September 15, 2023 Location: Fort McKay South







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort McKay South Calibration Date: September 19, 2023

Start time (MST): 8:50

Reason: Routine Station number: AMS13

> Last Cal Date: August 15, 2023

End time (MST): 12:44

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: NA 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> 1.004479 1.004193 Backgd or Offset: 3.77 Calibration slope: 3.77 -0.442262 Calibration intercept: -0.502377 Coeff or Slope: 1.130 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	-0.2	
as found span	4925	75.5	80.6	81.6	0.986
as found 2nd point	4962	37.7	40.3	40.3	0.994
as found 3rd point	4981	18.9	20.2	19.7	1.014
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	4925	75.5	80.6	80.7	0.999
second point	4962	37.7	40.3	39.8	1.012
third point	4981	18.9	20.2	19.5	1.035
as left zero	5000	0.0	0.0	0.0	
as left span	4925	75.5	80.6	79.2	1.018
SO2 Scrubber Check	4921	79.1	791.0	0.0	
Date of last scrubber change	e:	20-Mar-20		Ave Corr Factor	1.015
Data afficiation official		NIA			- ff: -: · ·

Date of last scrubber change:	20-Mar-20	Ave Corr Factor 1.015
Date of last converter efficiency test:	NA	efficiency

Baseline Corr As found: 81.8 80.48 Prev response: *% change: 1.6% Baseline Corr 2nd AF pt: 40.5 AF Slope: 1.016526 AF Intercept: -0.502263 AF Correlation: Baseline Corr 3rd AF pt: 19.9 0.999938

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



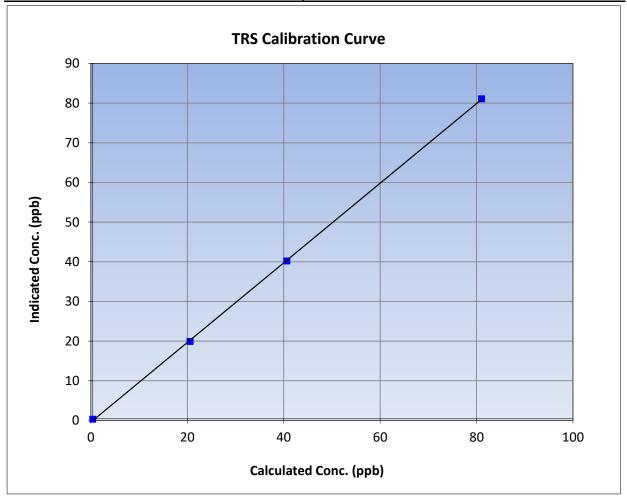
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 19, 2023 **Previous Calibration:** August 15, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 8:50 End Time (MST): 12:44 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	-0.1		Correlation Coefficient	0.999918	≥0.995	
80.6	80.7	0.9991	Correlation Coefficient	0.555510	20.993	
40.3	39.8	1.0117	Clana	1.004193	0.90 - 1.10	
20.2	19.5	1.0352	- Slope	1.004193	0.90 - 1.10	
			- Intercept	-0.442262	+/-3	

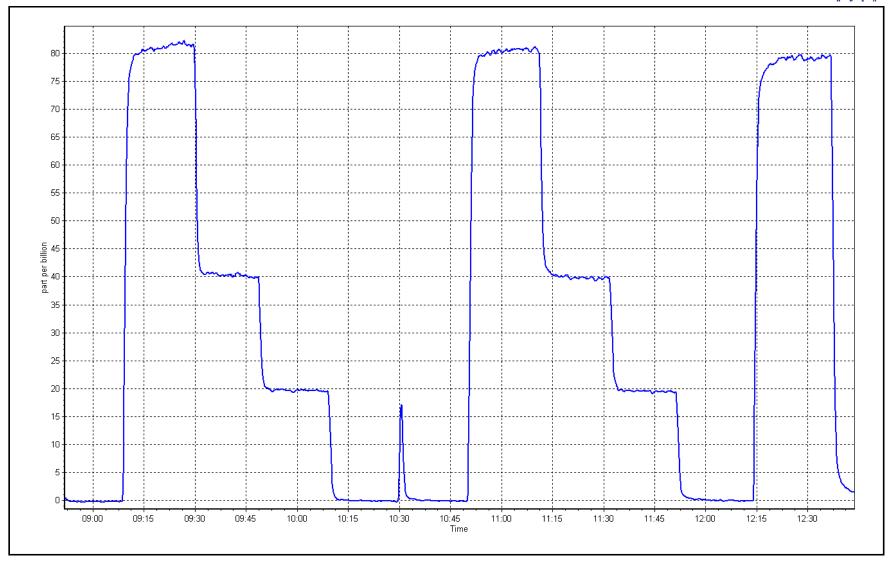


TRS Calibration Plot

Date: September 19, 2023

Location: Fort McKay South







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Fort McKay South Station Name:

Calibration Date: September 15, 2023

Start time (MST): 8:52 Routine Reason:

Station number: AMS13

Last Cal Date: August 16, 2023

End time (MST): 13:30

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

208.7 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NA Removed Gas Expiry:

Removed CH4 Conc. 503.6 CH4 Equiv Conc. 1077.5 ppm ppm

Removed C3H8 Conc. Diff between cyl (THC): 208.7 ppm Diff between cyl (CH_4): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 2448 ZAG make/model: **API701** Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 11700501330

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: 2.22E-04 2.24E-04 NMHC SP Ratio: 4.70E-04 5.16E-05 CH4 Retention time: 12.80 13.00 NMHC Peak Area: 193345 176051 Zero Chromatogram: ON ON Flat Baseline: ON OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.1	17.05	17.05	1.000
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	0.998
second point	4961	39.5	8.51	8.41	1.012
third point	4980	19.8	4.27	4.12	1.035
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	17.05	17.05	1.000
			,	Average Correction Factor	1.015
Baseline Corr AF:	17.05	Prev response	17.02	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
D !: C 2 AE		450 L		* / :-:-:	

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					VE151011 00 2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.1	9.08	9.16	0.992
as found 2nd point	4321	75.1	3.00	3.10	0.552
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4921	79.1	9.08	9.10	0.998
	4961	39.5	4.53	4.51	1.004
second point					
third point	4980	19.8	2.27	2.22	1.024
as left zero	5000	0.0	0.00	0.00	4.004
as left span	4921	79.1	9.08	9.07	1.001
- II O 15	2.16			rage Correction Factor	1.009
Baseline Corr AF:	9.16	Prev response	9.07	*% change	0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
CARA	D:1. : (1	CH4 Calibra		1.1	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	0.00	0.00	4.000
as found span	4921	79.1	7.97	7.90	1.009
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	7.97	0.999
second point	4961	39.5	3.98	3.90	1.021
third point	4980	19.8	1.99	1.91	1.047
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	7.97	7.98	0.998
				rage Correction Factor	1.022
Baseline Corr AF:	7.90	Prev response	7.96	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.003320		1.003320	
THC Cal Offset:		-0.078975		-0.078975	
CH4 Cal Slope:		1.004551		1.004551	
CH4 Cal Offset:		-0.047351		-0.047351	
NMHC Cal Slope:		1.002546		1.002546	
				0.000=60	

Notes: Changed inlet filter after as founds. 3rd point was failing need to goback and used zero chromatogram and flat baseline was turned off. Adjusted span.

-0.032763

Calibration Performed By: Sean Bala

NMHC Cal Offset:

-0.032763



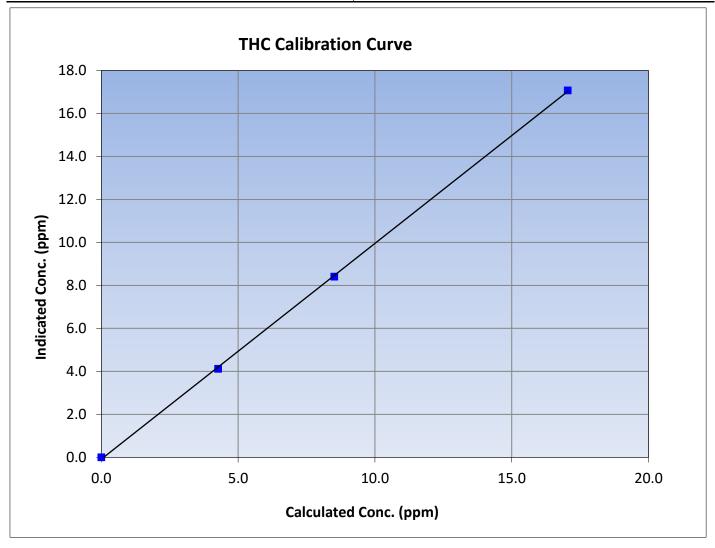
THC Calibration Summary

Version-06-2022

Station Information

September 15, 2023 **Previous Calibration:** Calibration Date: August 16, 2023 Station Name: Fort McKay South Station Number: AMS13 8:52 Start Time (MST): End Time (MST): 13:30 Analyzer make: Thermo 55i Analyzer serial #: 11700501330

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999889	≥0.995
17.05	17.07	0.9984	Correlation Coemicient	0.333663	20.333
8.51	8.41	1.0123	Slope	1.003830	0.90 - 1.10
4.27	4.12	1.0350	Slope	1.003830	0.90 - 1.10
			Intercept	-0.083774	+/-0.5





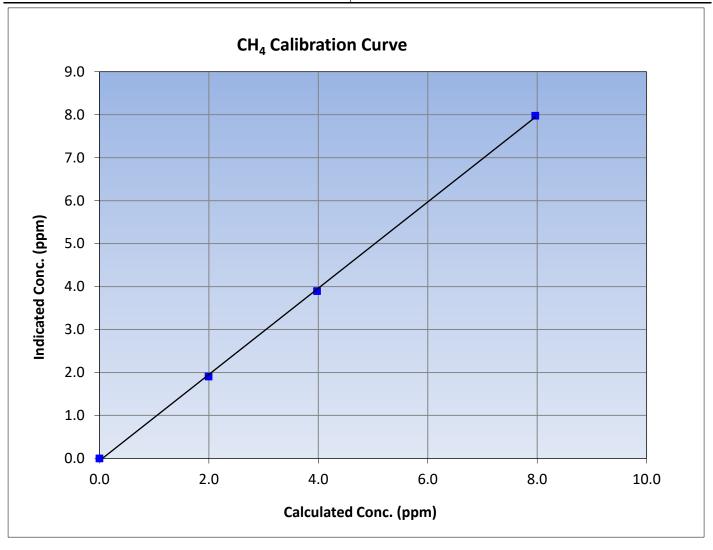
CH₄ Calibration Summary

Version-06-2022

Station Information

September 15, 2023 Calibration Date: **Previous Calibration:** August 16, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 8:52 End Time (MST): 13:30 Analyzer make: Thermo 55i Analyzer serial #: 11700501330

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999781	≥0.995
7.97	7.97	0.9991	Correlation Coemicient		20.933
3.98	3.90	1.0213	Slope	1.003588	0.90 - 1.10
1.99	1.91	1.0469	Slope	1.005566	0.90 - 1.10
			Intercept	-0.053796	+/-0.5





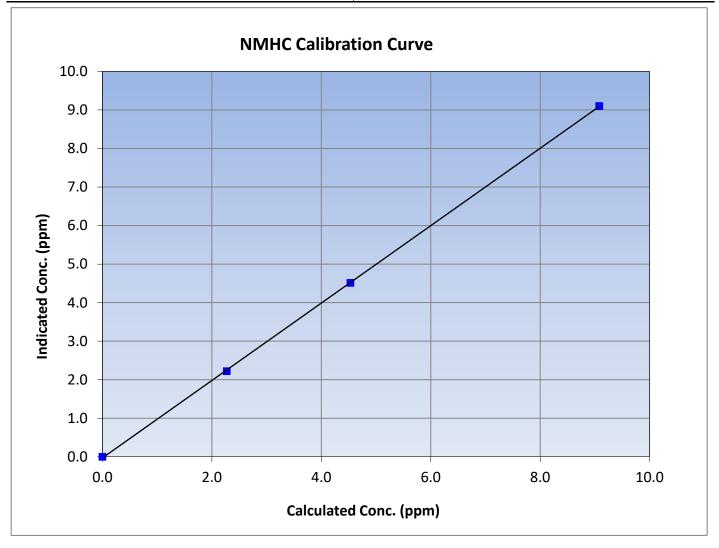
NMHC Calibration Summary

Version-06-2022

Station Information

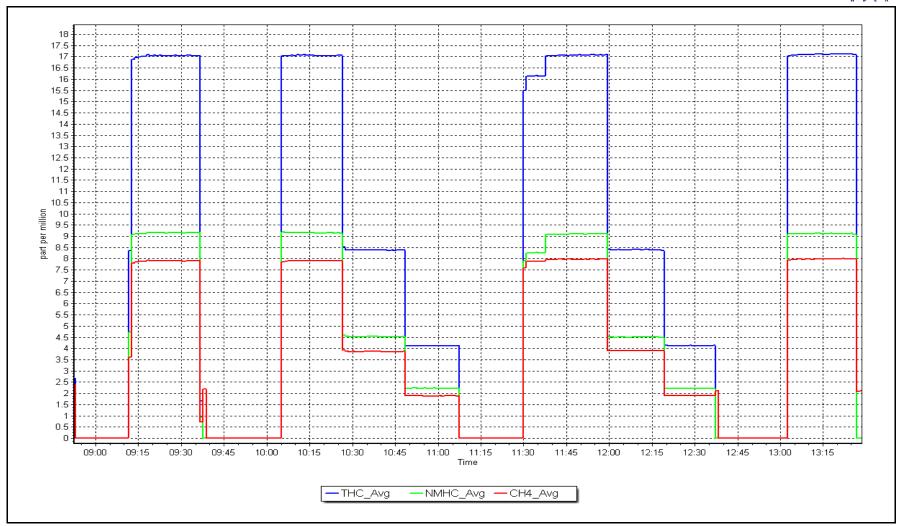
September 15, 2023 Calibration Date: **Previous Calibration:** August 16, 2023 Station Name: Fort McKay South Station Number: AMS13 8:52 Start Time (MST): End Time (MST): 13:30 Analyzer make: Thermo 55i Analyzer serial #: 11700501330

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999949	≥0.995
9.08	9.10	0.9975	Correlation Coemicient	0.999949	20.333
4.53	4.51	1.0043	Slope	1.004357	0.90 - 1.10
2.27	2.22	1.0243	Slope	1.004557	0.90 - 1.10
			Intercept	-0.029978	+/-0.5



Date: September 15, 2023 Location: Fort McKay South







NO_X \ NO \ NO₂ Calibration Report

Station number: AMS 13

End time (MST): 13:48

NO gas Diff:

Last Cal Date: August 24, 2023

Version-04-2020

Station Information

Station Name: Fort McKay South

Start time (MST): 9:11
Reason: Routine

Calibration Date: September 26, 2023

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

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

NOX gas Diff:

Calibrator Model: API T700 Serial Number: 2448 ZAG make/model: API T701 Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1410661329

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.113 1.120 NO bkgnd or offset: 9.5 10.1 NOX coeff or slope: 0.991 0.991 NOX bkgnd or offset: 9.7 10.8 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 160.8 158.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.996609	0.999304
NO _x Cal Offset:	-1.710896	-1.811346
NO Cal Slope:	0.999177	1.002205
NO Cal Offset:	-2.764638	-2.825167
NO ₂ Cal Slope:	0.995830	0.995992
NO ₂ Cal Offset:	-0.645143	-1.479105



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Di	ution Calibration	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/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	0.7	0.2	0.5		
as found span	4919	81.1	826.9	800.0	26.9	823.8	794.0	29.9	1.0037	1.0075
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	81.1	826.9	800.0	26.9	825.4	800.3	25.1	1.0018	0.9996
second point	4960	40.6	413.9	400.4	13.5	411.0	397.1	13.9	1.0071	1.0084
third point	4980	20.3	207.0	200.2	6.7	203.0	195.0	8.0	1.0195	1.0268
as left zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.4	-0.3		
as left span	4919	80.1	816.8	372.3	444.5	830.2	382.6	447.5	0.9839	0.9731
							Average C	Correction Factor	1.0095	1.0116
Corrected As fo	ound NO _X =	823.1 ppb	NO =	793.8 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	0.1%
Previous Respo	nse NO _x =	822.4 ppb	NO =	796.5 ppb				*Percent Chang	ge NO =	-0.3%
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 found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	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)	798.5		380.9	444.5		442.2	1.0053	3	99.5%
2nd GPT poin	t (200 ppb O3)	798.5		590.0	235.4		232.2	1.0139)	98.6%
3rd GPT point	(100 ppb O3)	798.5		692.7	132.7		129.0	1.0289	9	97.2%

Notes:

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

Average Correction Factor

1.0160

Calibration Performed By:

Sean Bala

98.4%



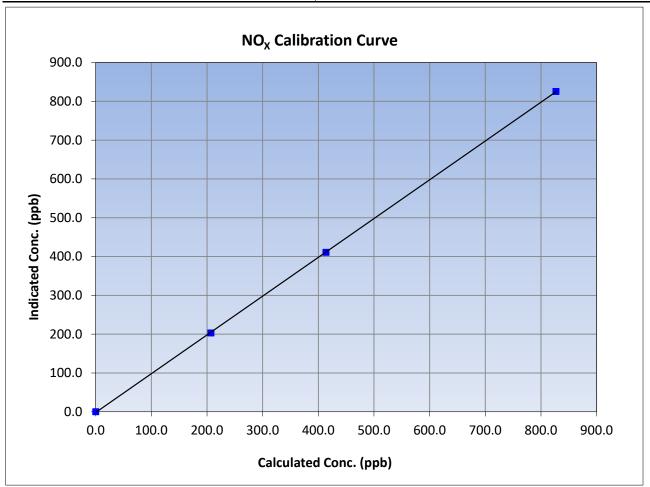
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 26, 2023 Previous Calibration: August 24, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 9:11 End Time (MST): 13:48 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	0.999975	≥0.995
826.9	825.4	1.0018	Correlation Coefficient	0.333373	20.993
413.9	411.0	1.0071	Slope	0.999304	0.90 - 1.10
207.0	203.0	1.0195	Slope		0.90 - 1.10
			Intercept	-1.811346	+/-20





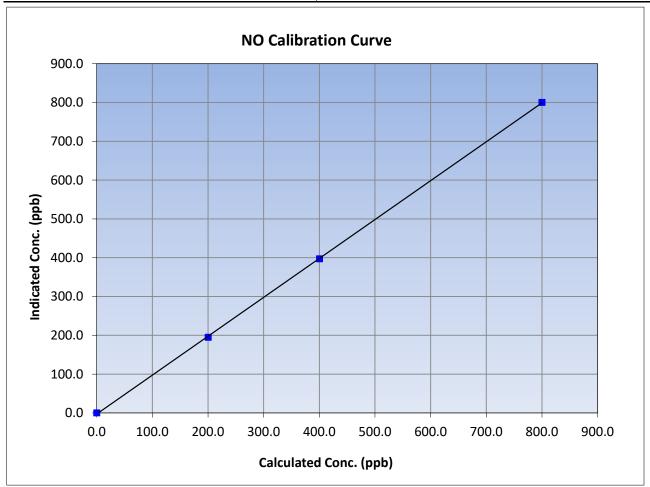
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 26, 2023 Previous Calibration: August 24, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 9:11 End Time (MST): 13:48 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic) Correction factor (Cc/Ic		Statistical Evalu	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999943	≥0.995
800.0	800.3	0.9996	Correlation Coefficient	0.333343	20.993
400.4	397.1	1.0084	Slope	1.002205	0.90 - 1.10
200.2	195.0	1.0268	Slope	1.002205	0.90 - 1.10
			Intercept	-2.825167	+/-20





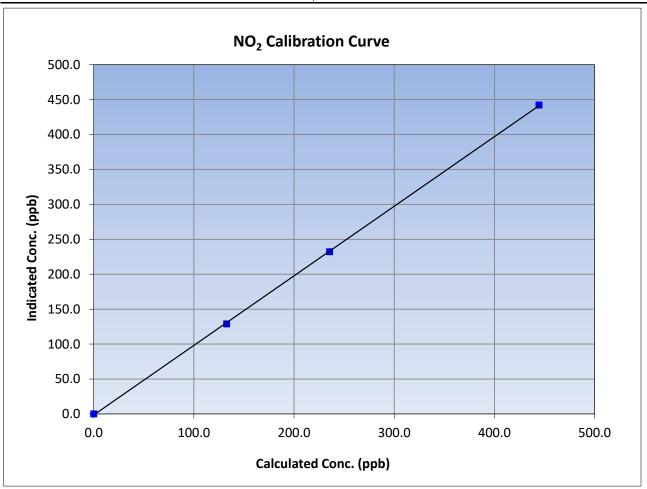
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 26, 2023 Previous Calibration: August 24, 2023 Station Name: Fort McKay South Station Number: **AMS 13** Start Time (MST): 9:11 End Time (MST): 13:48 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

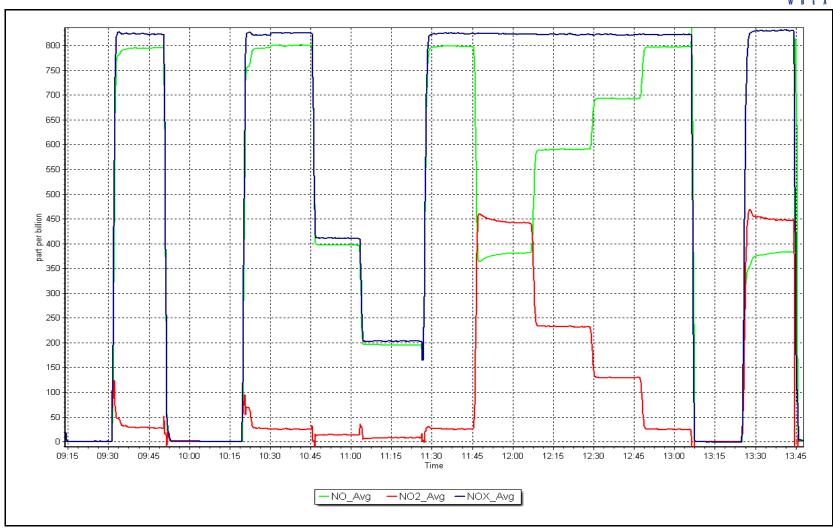
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999934	≥0.995
444.5	442.2	1.0053	Correlation Coefficient	0.555554	20.333
235.4	232.2	1.0139	Slope	0.995992	0.90 - 1.10
132.7	129.0	1.0289	Зюре		0.90 - 1.10
			Intercept	-1.479105	+/-20



Date: September 26, 2023

Location: Fort McKay South







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

Calibration Date: September 8, 2023

Start time (MST): 9:00 Reason: Routine Station number: AMS13

Last Cal Date: August 11, 2023

End time (MST): 12:32

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

_

StartFinishCalibration slope:0.9975430.999886Backgd or Offset:Calibration intercept:1.1800001.020000Coeff or Slope:

 Start
 Finish

 2.4
 2.4

 0.963
 0.967

O₃ Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration (Correction factor (Cc/Ic)
Set Follit	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.3	
as found span	5000	977.0	400.0	397.2	1.007
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	977.0	400.0	400.5	0.999
second point	5000	838.0	200.0	201.7	0.992
third point	5000	735.9	100.0	101.5	0.985
as left zero	5000	0.0	0.0	-0.2	
as left span	5000	977.0	400.0	401.6	0.996
			Averag	ge Correction Factor	0.992

Baseline Corr As found: 397.5 Previous response 400.2 *% change -0.7% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



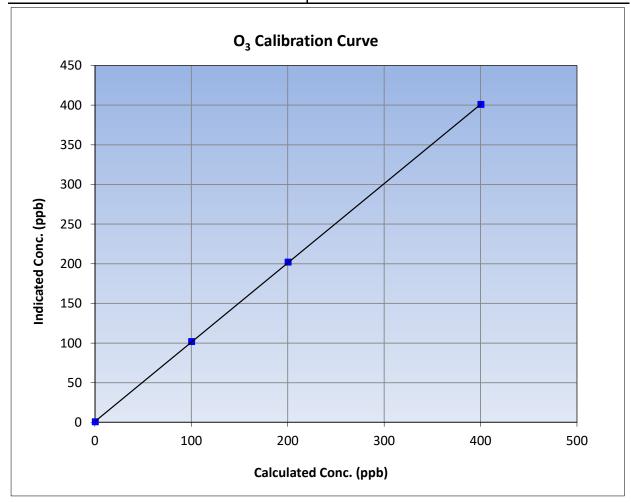
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 8, 2023 **Previous Calibration:** August 11, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 9:00 End Time (MST): 12:32 Analyzer make: Teledyne API T400 Analyzer serial #: 3871

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>			
0.0	0.3		Correlation Coefficient	0.999983	≥0.995		
400.0	400.5	0.9988	Correlation Coefficient	0.999983	20.993		
200.0	201.7	0.9916	Slope	0.999886	0.90 - 1.10		
100.0	101.5	0.9852	Slope	0.555660	0.90 - 1.10		
			Intercept	1.020000	+/- 5		

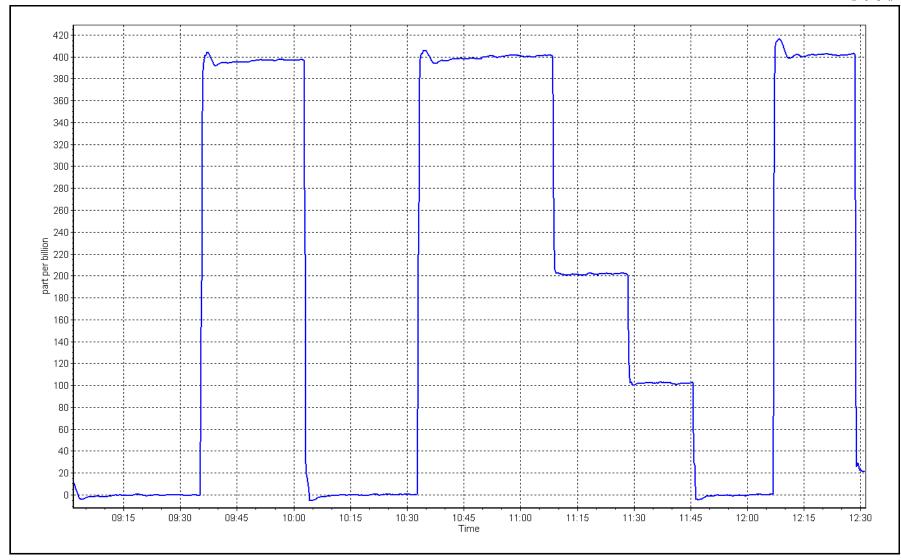


O₃ Calibration Plot

Date: September 8, 2023

Location: Fort McKay South







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name: Calibration Date: Start time (MST):	Fort McKay South September 26, 2023 11:03		Station number: Last Cal Date: End time (MST):	August 24, 2023	
Analyzer Make:	API T640		S/N:		
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Delta Cal		S/N:	1451	
Temp/RH standard:	Delta Cal		S/N:	1451	
		Monthly Calibration Te	st		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	19.0	19	19.0		+/- 2 °C
P (mmHg)	727.2	727.5	727.2		+/- 10 mmHg
flow (LPM)	5.01	5.03	5.01		+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	September 26, 2023 21.4	Last Cal Date: PM w/ HEPA:	August 24, 2023 0.0	<0.2 ug/m3
Note: this leak check will be	-				<0.2 ug/m3
Inlet cleaning:	Inlet Head		ve as and pre ma	The state of the s	
	et i i edu				
		Quarterly Calibration To	est		
<u>Parameter</u>	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test					10.9 +/- 0.5
		244 / 11524		/	
Post-maintenance Date Optical Cham		PM w/o HEPA: June 29, 20	122	w/ HEPA:	<0.2 ug/m3
Disposable Filter	-	July 26, 20		•	10.2 ug/1113
4	_	,		•	
		Annual Maintenance			
Data Canada Tub	on Clarent	l 20, 20	122		
Date Sample Tub Date RH/T Senso	-	June 29, 20 June 29, 20			
Dute Mily i Sense	-	Julie 23, 20	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
	Inlet head clean and	inspected. Leak check pas	sed. No adjustmen	nt made. Quarterly calib	oration will be
Notes:		done once	e filter is available.		
Calibration by:	Sean Bala				



T640 PM_{2.5} CALIBRATION

Version-01-2023

_	_	Station Information			_
Station Name: Calibration Date: Start time (MST):	Fort McKay South September 29, 2023 10:52		Station number: Last Cal Date: End time (MST):	September 26, 2023	1
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	319	
Flow Meter Make/Model:	Delta Cal		S/N:	1451	
Temp/RH standard:	Delta Cal		S/N:	1451	
		Monthly Calibration Tes	st		
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>	<u>Adjuste</u>	<u>d</u> (Limits)
T (°C)	8.8	8.9	8.8		+/- 2 °C
P (mmHg)	734.1	734.0	734.1		+/- 10 mmHg
flow (LPM)	4.99	4.97	4.99		+/- 0.25 LPM
Leak Test: Note: this leak check will be	PM w/o HEPA:	September 29, 2023 36.8 quarterly work and will se	PM w/ HEPA:	September 26, 202 0.0	<0.2 ug/m3
Inlet cleaning:	Inlet Head		ive as the pre mai	menance leak eneck	
et eleag	ce.r.cau				
		Quarterly Calibration Te	est		
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>	<u>Adjuste</u>	<u>d</u> (Limits)
PMT Peak Test					10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Chaml		June 29, 20	23	w/ HEFA.	<0.2 ug/m3
Disposable Filter	-	July 26, 202			.
		Annual Maintenance			
Date Sample Tub	e Cleaned:	June 29, 20	23		
Date RH/T Senso	r Cleaned:	June 29, 20	23		
		Remov	al calibration.		
Notes:					
Calibration by:	Sean Bala				



Calibration by:

Sean Bala

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023 **Station Information** Fort McKay South Station Name: Station number: AMS 13 September 29, 2023 Last Cal Date: NA Calibration Date: 11:08 End time (MST): 11:41 Start time (MST): Analyzer Make: **API T640** S/N: 1335 PM2.5 Particulate Fraction: Flow Meter Make/Model: Delta Cal S/N: 1451 Temp/RH standard: Delta Cal S/N: 1451 **Monthly Calibration Test** <u>Parameter</u> As found Measured As left **Adjusted** (Limits) T (°C) +/- 2 °C 9.40 8.90 9.40 P (mmHg) 734.00 735.00 734.00 +/- 10 mmHg flow (LPM) 5.00 5.00 4.90 +/- 0.25 LPM Leak Test: Date of check: September 29, 2023 Last Cal Date: NA PM w/o HEPA: 24.4 PM w/ HEPA: 0.0 <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet Head Inlet cleaning: **Quarterly Calibration Test** As found Post maintenance Adjusted (Limits) Parameter As left **PMT Peak Test** 10.9 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: Date Optical Chamber Cleaned: <0.2 ug/m3 Disposable Filter Changed: **Annual Maintenance** Date Sample Tube Cleaned: June 29, 2023 Date RH/T Sensor Cleaned: June 29, 2023 Install calibration. Notes:

W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Fort McKay South Station Number: AMS 13

Calibration Date: September 15, 2023 Prev Cal Date: October 5, 2022

Start Time (MST): 11:17 End Time (MST): 13:09
Tower Height (m): 9.5 Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: WS Calibrator: MetOne 053 Serial Number:

				% Error
_	Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	Limit = +/- 1.5%
	0	0.0	0.0	
	200	20.2	20.3	0.7%
	400	39.4	39.4	0.1%
	600	58.6	58.7	0.2%
	800	77.8	77.8	0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999998	0.999998	≥0.9995
Calculated slope	1.001527	0.999451	0.90 - 1.10
Calculated intercept	-0.014138	-0.052868	+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number:

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 13:21 Calc Declination*: 13.73 Degrees

Deadband calc: 0.0 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357 $^{\circ}$ FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.5	
90	88.1	-0.5%
180	178.5	-0.4%
270	268.3	-0.5%
357	357.5	0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999936	0.999963	≥0.9995
Calculated slope	1.015820	0.999751	0.90 - 1.10
Calculated intercept	-0.298621	0.864506	+/- 4

Notes: Veified true north using solar noon.

Calibration Performed By: Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS14 ANZAC SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Anzac September 6, 2023 Calibration Date:

Start time (MST): 9:23 Routine Reason:

Station number: **AMS 14** Last Cal Date: August 9, 2023

End time (MST):

12:34

Calibration Standards

Cal Gas Concentration: 49.95

Cal Gas Cylinder #: CC279389

Removed Cal Gas Conc: 49.95 Removed Gas Cyl #: NA

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

ppm Cal Gas Exp Date: January 5, 2025

> Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3060 Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

1.015152

Start 25.2

Finish 25.2

Calibration slope: 1.017069 Backgd or Offset: 0.798 Calibration intercept: -1.929538 -1.850638 Coeff or Slope: 0.798

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
Set i ome	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.5	
as found span	4938	80.3	799.3	809.4	0.987
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.0	
high point	4938	80.3	799.3	812.8	0.983
second point	4979	40.2	400.1	402.7	0.993
third point	4998	20.2	201.1	200.4	1.003
as left zero	5000	0.0	0.0	0.9	
as left span	4938	80.3	799.3	814.6	0.981
			Averag	ge Correction Factor	0.993

Baseline Corr As found: 808.90 Previous response 809.45 *% change -0.1% 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 made.

Calibration Performed By: Mohammed Kashif



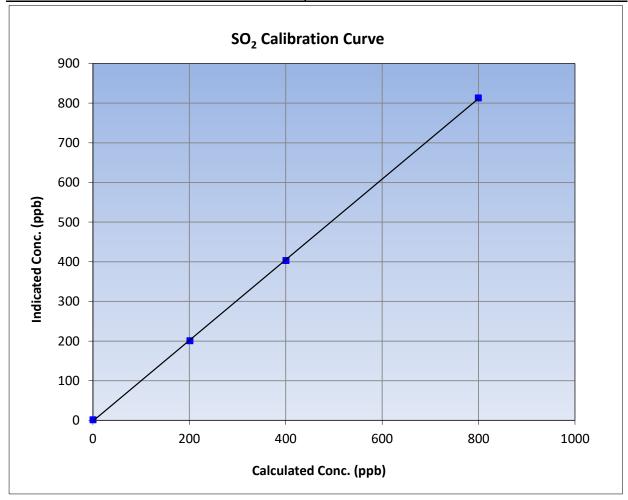
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 9:23 End Time (MST): 12:34 Analyzer make: Thermo 43i Analyzer serial #: 0710321322

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	1.0		Correlation Coefficient	0.999940	≥0.995
799.3	812.8	0.9834	Correlation Coefficient	0.555540	20.333
400.1	402.7	0.9934	Slope	1.017069	0.90 - 1.10
201.1	200.4	1.0033	Slope	1.017009	0.90 - 1.10
			- Intercept	-1.850638	+/-30

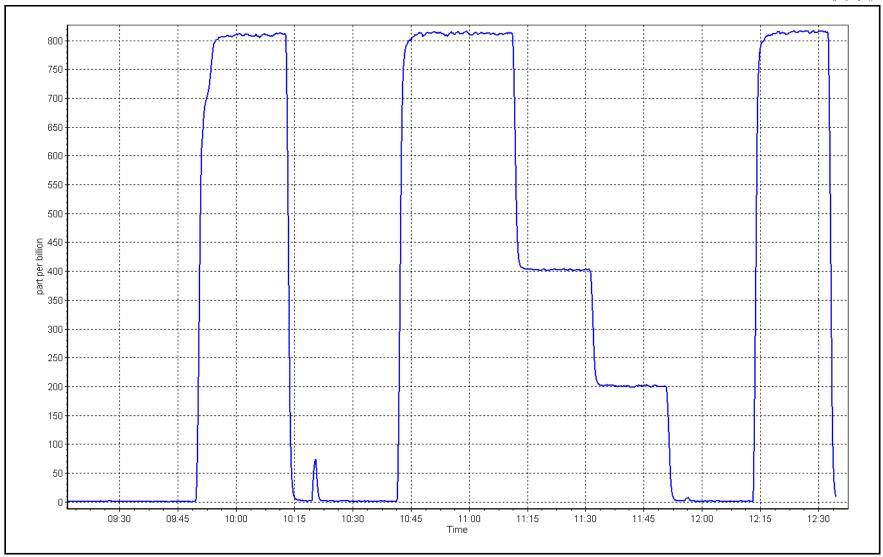


SO2 Calibration Plot

Date: September 6, 2023

Location: Anzac







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Anzac Calibration Date: September 7, 2023

Start time (MST): 9:47

Routine Reason:

Station number: AMS14

> Last Cal Date: August 4, 2023

End time (MST): 14:09

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.15 ppm

Cal Gas Cylinder #: CC510379

Removed Cal Gas Conc: 5.15 Removed Gas Cyl #: NA Calibrator Make/Model: API T700 ZAG Make/Model: **API 701H**

Rem Gas Exp Date: NA ppm

Diff between cyl: Serial Number: 3060 Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153582

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

0 - 100 ppb Analyzer Range

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

<u>Finish</u> <u>Start</u> Calibration slope: 0.992584 Backgd or Offset: 0.991300 2.30 2.31 0.992 Calibration intercept: -0.125436 -0.245370 Coeff or Slope: 0.992

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	4938	77.9	80.0	79.6	1.002
as found 2nd point	4973	38.9	40.0	39.8	0.999
as found 3rd point	4997	19.5	20.0	19.6	1.011
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	4938	77.9	80.0	79.2	1.009
second point	4973	38.9	40.0	39.3	1.017
third point	4997	19.5	20.0	19.5	1.026
as left zero	5000	0.0	0.0	-0.1	
as left span	4938	77.9	80.0	78.1	1.024
SO2 Scrubber Check	4936	80.3	800.4	0.0	
Date of last scrubber cha	ange:	_		Ave Corr Factor	1.017
Date of last converter ef		efficiency			

Date of last scrubber change	Ave Corr Factor	1.017			
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	79.8	Prev response:	79.16	*% change:	0.8%

Baseline Corr As found: Prev response: 79.16 Baseline Corr 2nd AF pt: 40.0 AF Slope: 0.998628 Baseline Corr 3rd AF pt: AF Correlation: 0.999988 19.8

* = > +/-5% change initiates investigation

-0.245351

AF Intercept:

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

Calibration Performed By: Mohammed Kashif



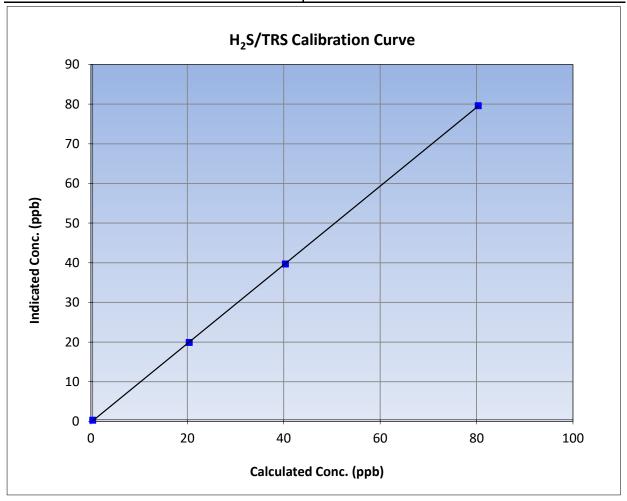
TRS Calibration Summary

Version-11-2021

Station Information

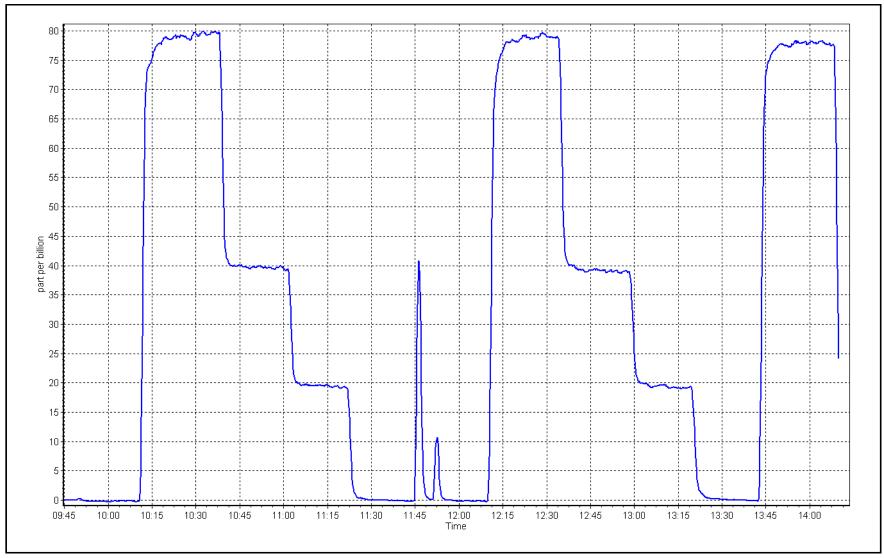
Calibration Date: September 7, 2023 **Previous Calibration:** August 4, 2023 Station Name: Station Number: AMS14 Anzac Start Time (MST): 9:47 End Time (MST): 14:09 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153582

		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	0.999984	≥0.995
80.0	79.2	1.0095	Correlation Coefficient	0.555564	20.333
40.0	39.3	1.0167	Slope	0.992584	0.90 - 1.10
20.0	19.5	1.0262	Slope	0.332364	0.90 - 1.10
			- Intercept	-0.245370	+/-3



Date: September 7, 2023 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: September 6, 2023

Start time (MST): 9:23
Reason: Routine

Station number: AMS 14

Last Cal Date: August 9, 2023

End time (MST): 12:34

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: 3060

ZAG make/model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

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

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

CH4 SP Ratio: 3.90E-04 3.75E-04 NMHC SP Ratio: 4.53E-05 4.49E-05 CH4 Retention time: 12.20 12.20 NMHC Peak Area: 201206 203038

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	17.10	17.55	0.975
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	17.10	17.13	0.999
second point	4979	40.2	8.56	8.52	1.005
third point	4998	20.2	4.30	4.24	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.13	0.998
				Average Correction Factor	1.006
Baseline Corr AF:	17.55	Prev response	17.21	*% change	2.0%
Baseline Corr 2nd AF:	NA	AF Slone:		AF Intercent:	

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

					VE151011 01 20
			ation Data		
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>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	9.11	9.21	0.990
s found 2nd point	4936	80.3	9.11	9.21	0.990
is found 3rd point					
•					
new cylinder response	F000	0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4938	80.3	9.11	9.12	0.999
econd point	4979	40.2	4.56	4.54	1.006
hird point	4998	20.2	2.29	2.25	1.018
is left zero	5000	0.0	0.00	0.00	
is left span	4938	80.3	9.11	9.12	0.999
				rage Correction Factor	1.008
Baseline Corr AF:	9.21	Prev response	9.07	*% change	1.5%
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	4938	80.3	7.99	8.34	0.958
as found 2nd point	4330	00.5	7.55	0.54	0.550
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4938	80.3	7.99	8.01	0.998
econd point	4979	40.2	4.00	3.98	1.004
hird point	4998	20.2	2.01	1.99	1.011
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	7.99	8.01	0.997
is left spair	4530	60.5		rage Correction Factor	1.004
Baseline Corr AF:	8.34	Prev response	8.13	*% change	2.5%
Baseline Corr 2nd AF:		•	0.13	•	2.3/0
	NA	AF Completion		AF Intercept: * = > +/-5% change initiat	os investigation
Baseline Corr 3rd AF:	NA	AF Correlation:		- > +/-5% Change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.007749		1.002474	
THC Cal Offset:		-0.029955		-0.037684	
CH4 Cal Slope:		1.019842		1.003084	
CH4 Cal Offset:		-0.015535		-0.015639	
NMHC Cal Slope:		0.997110		1.001701	
				0.004044	

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

-0.015020

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.021844



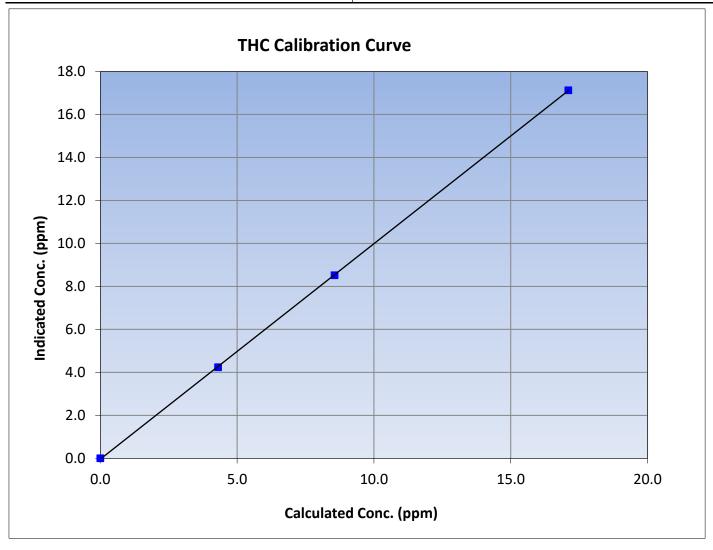
THC Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 9:23 End Time (MST): 12:34 Analyzer make: Analyzer serial #: 1118148494 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	0.999978	≥0.995
17.10	17.13	0.9985	Correlation Coemicient	0.333376	20.333
8.56	8.52	1.0048	Slope	1.002474	0.90 - 1.10
4.30	4.24	1.0145	Slope	1.002474	0.90 - 1.10
			Intercept	-0.037684	+/-0.5





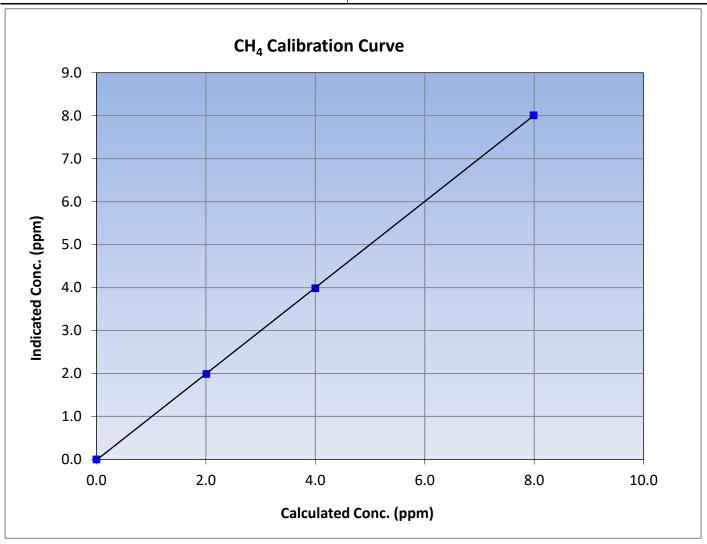
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 9:23 End Time (MST): 12:34 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999981	≥0.995
7.99	8.01	0.9977	Correlation Coemicient	0.555561	20.999
4.00	3.98	1.0040	Slope	1.003084	0.90 - 1.10
2.01	1.99	1.0110	Slope	1.003064	0.90 - 1.10
			Intercept	-0.015639	+/-0.5





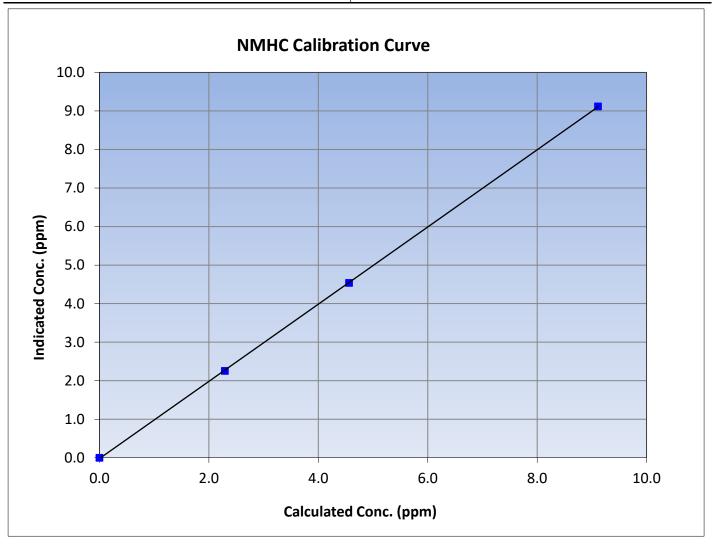
NMHC Calibration Summary

Version-01-2020

Station Information

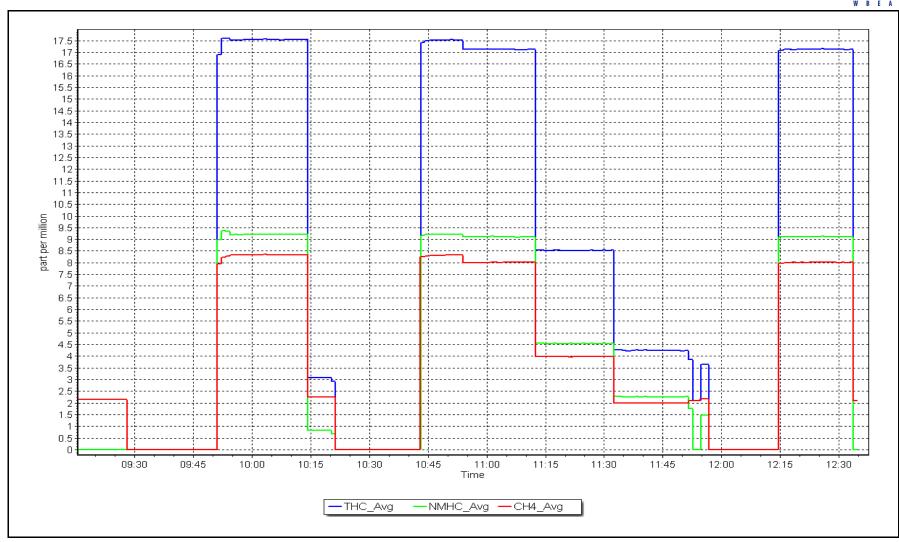
Calibration Date: September 6, 2023 **Previous Calibration:** August 9, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 9:23 End Time (MST): 12:34 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999974	≥0.995
9.11	9.12	0.9995	Correlation Coemicient	0.999974	20.993
4.56	4.54	1.0056	Slope	1.001701	0.90 - 1.10
2.29	2.25	1.0175	Slope	1.001701	0.90 - 1.10
			Intercept	-0.021844	+/-0.5



Date: September 6, 2023 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: September 25, 2023

Start time (MST): 10:47

Reason: Cylinder Change

Station number: AMS 14

Last Cal Date: September 6, 2023

End time (MST): 12:24

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: 3060 ZAG make/model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1118148494

THC Range (ppm): 0 - 20 ppm

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

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

CH4 SP Ratio: 3.75E-04 NA NMHC SP Ratio: 4.49E-05 NA CH4 Retention time: 12.20 NA NMHC Peak Area: 203038 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	4938	80.3	17.10	17.17	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	17.10	17.17	0.996
second point					
third point					
as left zero					
as left snan					

			Ave	erage Correction Factor	0.996
Baseline Corr AF:	17.17	Prev response	17.11	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

					V C151011 01 20
		NINALIC Calibra	ation Data		
Cat Daint	Dil air flannasta	NMHC Calibr		lad (CF Limit 0.0F 1.0
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
	5000	0.0	0.00	0.00	
as found span	4938	80.3	9.11	9.14	0.997
as found 2nd point					
as found 3rd point					
new cylinder response	5000				
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	9.11	9.14	0.997
second point					
third point					
as left zero					
as left span					
				age Correction Factor	0.997
Baseline Corr AF:	9.14	Prev response	9.11	*% change	0.4%
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		Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 5
as found zero	5000	0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found span	4938	80.3	7.99	8.03	0.995
as found 2nd point	4936	80.3	7.33	8.03	0.993
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	7.99	8.03	0.995
	4936	80.3	7.99	0.05	0.995
second point					
third point					
as left zero					
as left span			Augus	and Correction Factor	0.005
Danalina Cama A.F.	0.02	Duo		rage Correction Factor	0.995
Baseline Corr AF:	8.03	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:		1.002474		1.004050	
THC Cal Offset:		-0.037684		0.000000	
CH4 Cal Slope:		1.003084		1.004817	
CH4 Cal Offset:		-0.015639		0.000000	
NMHC Cal Slope:		1.001701		1.003378	

Notes: Hydrogen cylinder change.

-0.021844

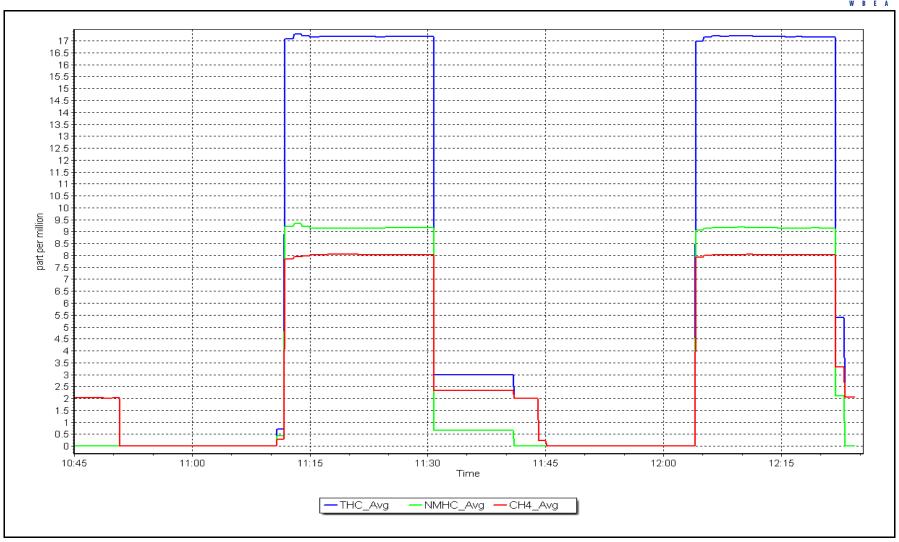
Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

0.000000

Date: September 25, 2023 Location: Anzac







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Anzac

Calibration Date: September 5, 2023

Start time (MST): 10:22 Reason: Routine Station number: AMS 14

Last Cal Date: August 15, 2023

End time (MST): 15:14

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: 3060 ZAG make/model: Teledyne API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1426262592

NOX Range (ppb): 0 - 1000 ppb

Start <u>Finish</u> <u>Start</u> **Finish** NO coeff or slope: 1.375 1.411 NO bkgnd or offset: 3.7 3.8 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 3.8 3.7 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 161.2 160.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.986023	1.000191
NO _x Cal Offset:	-0.615739	-0.708567
NO Cal Slope:	0.987256	1.000876
NO Cal Offset:	-2.172778	-2.586342
NO ₂ Cal Slope:	1.000092	1.002633
NO ₂ Cal Offset:	0.381307	0.926052



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibratio	on 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 NC concentratio (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	4936	80.2	814.1	800.2	13.9	794.6	777.5	17.0	1.0246	1.0292
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.0	0.6		
high point	4936	80.2	814.1	800.2	13.9	814.2	799.6	14.6	0.9999	1.0008
second point	4979	40.1	406.8	399.9	7.0	405.5	396.4	9.0	1.0033	1.0088
third point	4999	20.1	203.9	200.4	3.5	202.1	195.4	6.6	1.0090	1.0258
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.0	0.5		
as left span	4936	80.2	814.1	413.5	400.6	813.5	410.1	403.4	1.0008	1.0083
							Average C	orrection Factor	1.0041	1.0118
Corrected As fo	ound NO _X =	794.4 ppb	NO =	= 777.7 ppb	* = > +/-5	% change initia	ates investigation	*Percent Chang	ge NO _X =	-1.0%
Previous Respo	nse NO _X =	802.1 ppb	NO =	787.8 ppb				*Percent Chang	ge NO =	-1.3%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	nd NO _x	_ζ r ² :	Nx SI:	Nx Int:	
Baseline Corr 3	ord pt NO _X =	NA ppb	NO =	NA ppb	As foun	nd NO) r ² :	NO SI:	NO Int:	
					As foun	nd NO ₂	_? r ² :	NO2 SI:	NO ₂ Int:	
				e	GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Refere concentration (pp		icated NO Drop centration (ppb)	Calculated No concentration (pp		Indicated NO2 incentration (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 poir	nt (400 ppb NO2)									
as found GPT poir as found GPT poir										
· · · · · · · · · · · · · · · · · · ·	int (200 ppb NO2)									
as found GPT poir	int (200 ppb NO2) int (100 ppb NO2)	797.5		410.8	400.6		402.5	0.9953	3 1	100.5%
as found GPT poir	int (200 ppb NO2) int (100 ppb NO2) t (400 ppb O3)	797.5 797.5		410.8 607.4	400.6 204.0		402.5 205.4	0.9953 0.9932		100.5% 100.7%
as found GPT poir as found GPT poir 1st GPT point	int (200 ppb NO2) int (100 ppb NO2) t (400 ppb O3) t (200 ppb O3)								2 1	

Notes:

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

Calibration Performed By: Mohammed Kashif



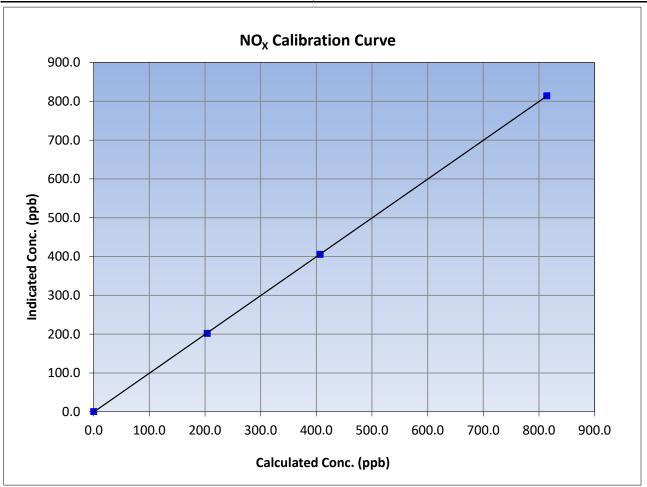
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 5, 2023 Previous Calibration: August 15, 2023 Station Name: Station Number: **AMS 14** Anzac Start Time (MST): 10:22 End Time (MST): 15:14 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	0.5		Correlation Coefficient	0.999990	≥0.995
814.1	814.2	0.9999	Correlation Coefficient	0.555550	20.555
406.8	405.5	1.0033	Slope	1.000191	0.90 - 1.10
203.9	202.1	1.0090	Slope	1.000191	0.90 - 1.10
			Intercept	-0.708567	+/-20





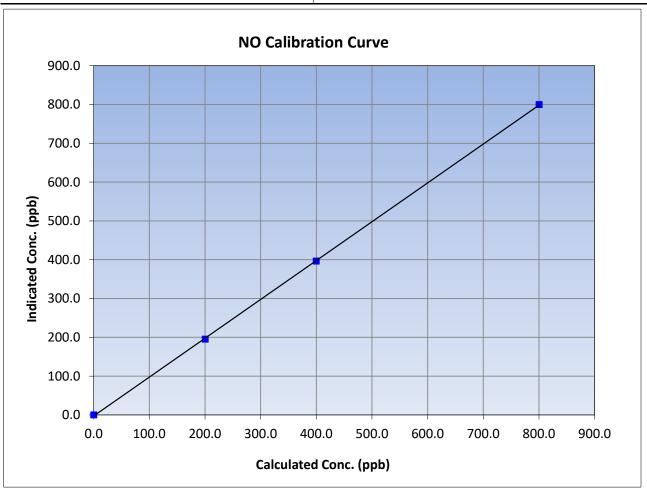
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 5, 2023 Previous Calibration: August 15, 2023 Station Name: Station Number: **AMS 14** Anzac Start Time (MST): 10:22 End Time (MST): 15:14 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	0.0		Correlation Coefficient	0.999952	≥0.995
800.2	799.6	1.0008	Correlation Coefficient	0.999932	20.555
399.9	396.4	1.0088	Slope	1.000876	0.90 - 1.10
200.4	195.4	1.0258	Slope	1.000876	0.90 - 1.10
			Intercept	-2.586342	+/-20





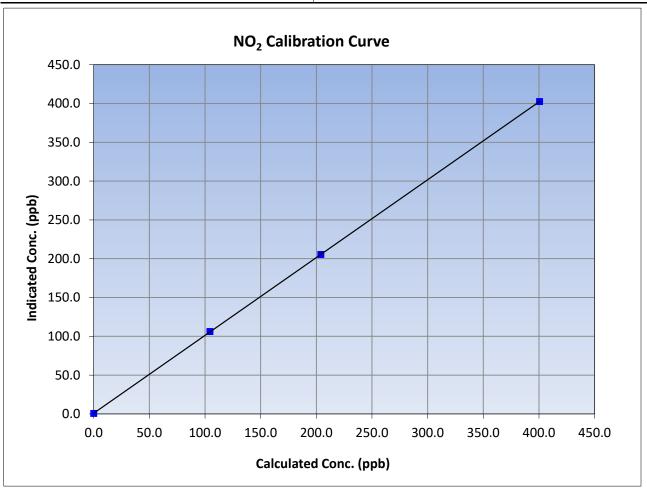
NO₂ Calibration Summary

Version-04-2020

Station Information

August 15, 2023 Calibration Date: September 5, 2023 Previous Calibration: Station Name: Station Number: **AMS 14** Anzac Start Time (MST): 10:22 End Time (MST): 15:14 Analyzer serial #: Analyzer make: Thermo 42i 1426262592

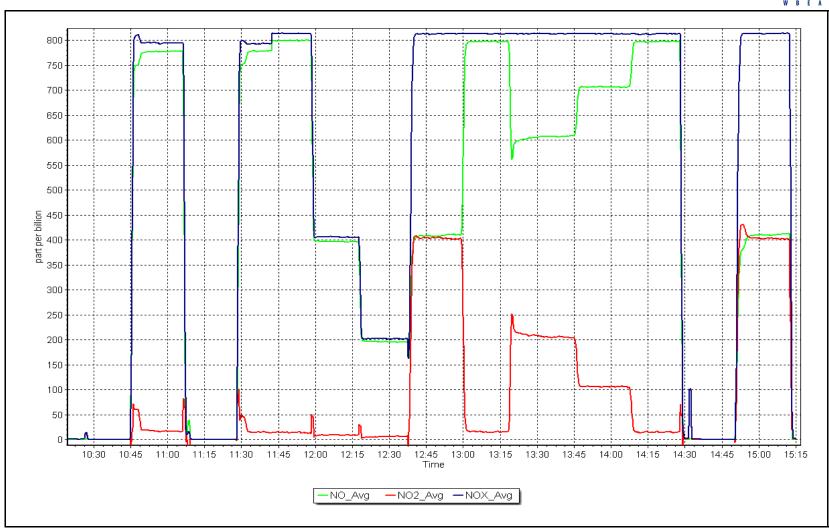
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999996	≥0.995
400.6	402.5	0.9953	Correlation Coefficient	0.555550	20.555
204.0	205.4	0.9932	Slope	1.002633	0.90 - 1.10
104.4	106.1	0.9841	Slope	1.002055	0.90 - 1.10
			Intercept	0.926052	+/-20



Date: September 5, 2023 Loc

Location: Anzac







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: September 1, 2023

Start time (MST): 8:47
Reason: Routine

Station number: AMS14

Last Cal Date: August 1, 2023

End time (MST): 11:53

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: API T700 ZAG Make/Model: API 701H Serial Number: 3060 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: 0.999171 1.004857 1.3 1.4 Coeff or Slope: Calibration intercept: 0.520000 -2.500000 1.550 1.604

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	0.2	
as found span	5000	920.5	400.0	386.6	1.035
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.1	
high point	5000	920.5	400.0	400.7	0.998
second point	5000	793.4	200.0	197.3	1.014
third point	5000	686.0	100.0	95.3	1.049
as left zero	5000	0.0	0.0	0.2	
as left span	5000	920.5	400.0	405.1	0.987
			Avera	ge Correction Factor	1.020
Baseline Corr As found:	386.4	Previous respons	e 400.2	*% change	-3.6%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



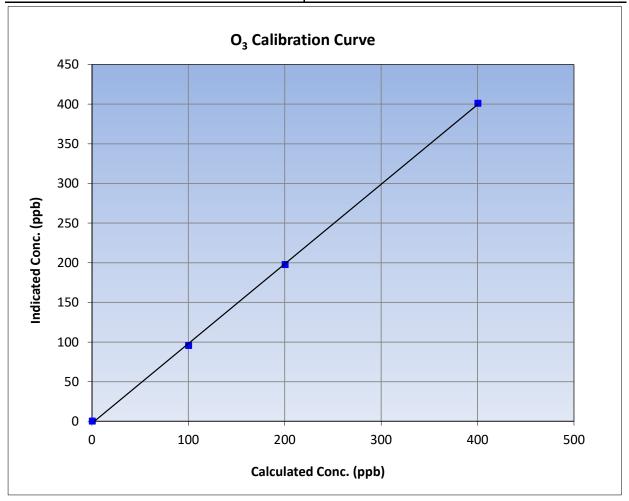
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 1, 2023 Station Name: Anzac Station Number: AMS14 Start Time (MST): 8:47 End Time (MST): 11:53 Analyzer make: Thermo 49i Analyzer serial #: 1426262595

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999808	≥0.995	
400.0	400.7	0.9983	Correlation coefficient	0.999000	20.993	
200.0	197.3	1.0137	Slope	1.004857	0.90 - 1.10	
100.0	95.3	1.0493	Slope	1.004657	0.90 - 1.10	
			Intercept	-2.500000	+/- 5	

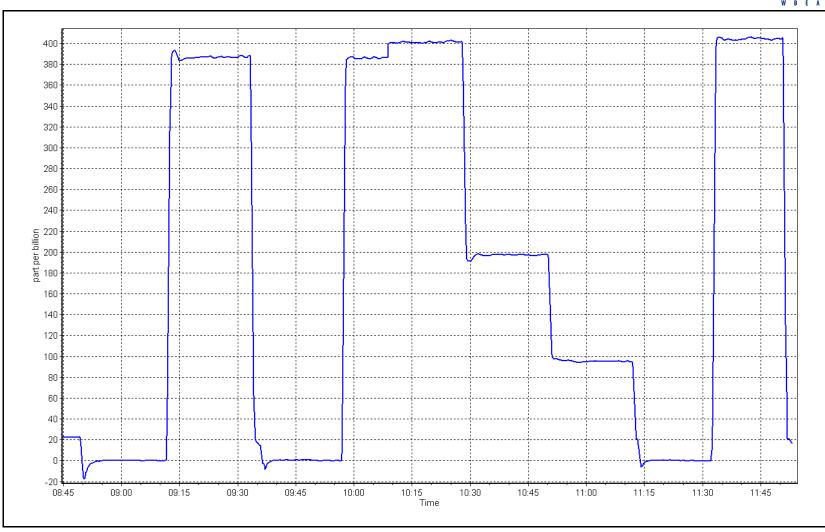


O₃ Calibration Plot

Date: September 1, 2023

Location: Anzac







Calibration by:

Mohammed Kashif

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1		
Station Name:	Anzac		Station number:	AMS 14	
Calibration Date:	September 8, 2023		Last Cal Date:	August 1, 2023	
Start time (MST):	11:00		End time (MST):	12:21	
Analyzer Make:	API T640		S/N:	825	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25		S/N:	388749	
Temp/RH standard:	Alicat FP-25		S/N:	388749	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)
T (°C)	20.5	22.4	20.5		+/- 2 °C
P (mmHg)	719.9	719.6	719.9		+/- 10 mmHg
flow (LPM)	4.99	4.81	4.99		+/- 0.25 LPM
Leak Test:	Date of check:	September 8, 2023	Last Cal Date:	August 1, 2023	=
	PM w/o HEPA:	9.9	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be	•		serve as the pre ma	intenance leak check	
Inlet cleaning:	Inlet Head	✓			
		Quarterly Calibration	Test		
<u>Parameter</u>	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	11.9	11.6	10.9	<u>,</u> ✓	10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:	9.4	w/ HEPA:	0
Date Optical Chaml	-	September 8	·		<0.2 ug/m3
Disposable Filter	Changed:	September 8	3, 2023		
		Annual Maintenanc	e		
Date Sample Tub	e Cleaned:	July 6, 20	023		
Date RH/T Senso	-	July 6, 20			
	- -	-			
Notes:	Performed quarterl	y maintenance and leak	check passed. Adju	sted PMT peak test. H	ead cleaned.



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

13:41

Version-01-2020

Station Information

Station number: Station Name: Wapasu AMS17

September 5, 2023 Calibration Date: Last Cal Date: August 3, 2023

10:51 Start time (MST): End time (MST):

Routine Reason:

Calibration Standards

Cal Gas Concentration: 50.38 ppm Cal Gas Exp Date: January 12, 2029

Cal Gas Cylinder #: ALM066507

Removed Cal Gas Conc: <u>50.38</u> ppm Rem Gas Exp Date: n/a

Diff between cyl: Removed Gas Cyl #: n/a

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

Finish Finish Start Start Calibration slope: 1.001653 Backgd or Offset: 12.6 12.6 1.003838 Calibration intercept: -2.099065 -1.759511 Coeff or Slope: 1.111 1.111

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	4921	79.4	800.0	800.2	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	79.4	800.0	801.0	0.999
second point	4960	39.7	400.0	396.7	1.008
third point	4980	19.8	199.5	196.7	1.014
as left zero	5000	0.0	0.0	0.3	
as left span	4920	79.4	800.1	802.8	0.997
			Averag	ge Correction Factor	1.007
Baseline Corr As found:	800.10	Previous response	800.94	*% change	-0.1%

% change

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

* = > +/-5% change initiates investigation

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

Calibration Performed By: Aswin Sasi Kumar



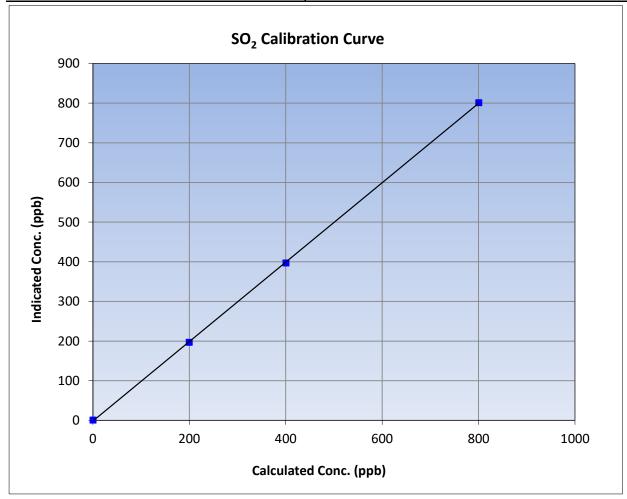
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 3, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 10:51 End Time (MST): 13:41 Analyzer make: Thermo 43i Analyzer serial #: 1218153459

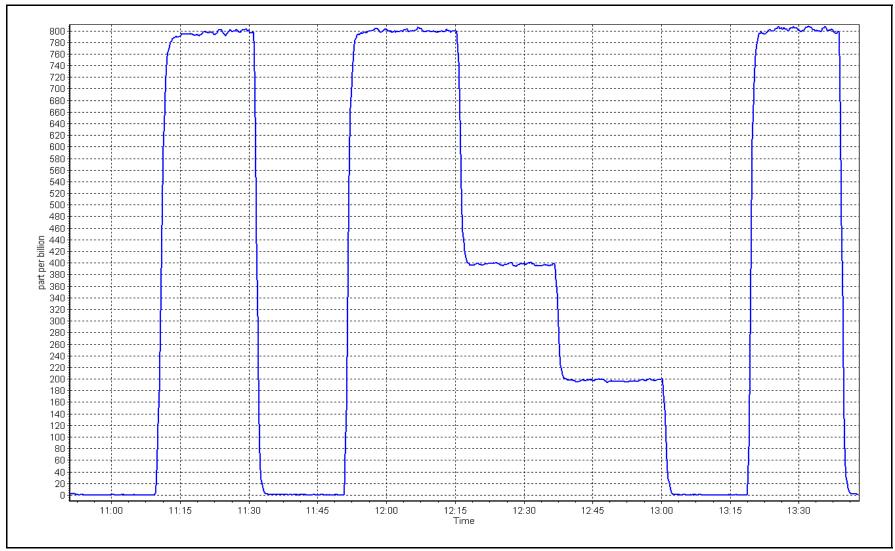
Calibration Data							
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evaluation		<u>Limits</u>		
0.0	0.4		Correlation Coefficient	0.999961	≥0.995		
800.0	801.0	0.9987	Correlation Coefficient	0.555501	20.993		
400.0	396.7	1.0084	Slope	1.001653	0.90 - 1.10		
199.5	196.7	1.0143	- Slope	1.001055	0.90 - 1.10		
			- Intercept	-1.759511	+/-30		



SO2 Calibration Plot

Date: September 5, 2023 Location: Wapasu







H₂S Calibration Report

Version-11-2021

Station Information

Wapasu Station Name: Calibration Date: September 7, 2023

Start time (MST): 10:41

Reason: Routine Station number: AMS17

Last Cal Date: August 8, 2023

End time (MST): 15:30

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC511852

Removed Cal Gas Conc: 5.076 Removed Gas Cyl #: n/a

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

Rem Gas Exp Date: n/a Diff between cyl:

Serial Number: 2449 Serial Number: 359

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1218153583

Converter serial #: n/a Converter make: n/a

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.990569 Backgd or Offset: Calibration slope: 0.996998 13.1 12.2 Calibration intercept: -0.219241 Coeff or Slope: -0.219239 1.116 1.114

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	82.2	0.972
as found 2nd point	4961	39.4	40.0	41.5	0.961
as found 3rd point	4980	19.7	20.0	20.4	0.976
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	4921	78.8	80.0	79.4	1.008
second point	4961	39.4	40.0	38.7	1.033
third point	4980	19.7	20.0	19.5	1.026
as left zero	5000	0.0	0.0	0.5	
as left span	4921	78.8	80.0	76.5	1.046
SO2 Scrubber Check	4921	79.4	800.0	-0.1	
Date of last scrubber chan	ige:	n/a		Ave Corr Factor	1.022
Date of last converter effic	ciency test:	n/a	_	_	efficiency

Date of last scrubber change	: .	ii/ a		Ave Con Factor	1.022
Date of last converter efficie	ency test:	n/a			efficiency
Baseline Corr As found:	82.3	Prev response:	79.54	*% change:	3.4%

Baseline Corr 2nd AF pt: 41.6 AF Slope: 1.029710 0.999953 Baseline Corr 3rd AF pt: 20.5 AF Correlation:

* = > +/-5% change initiates investigation

AF Intercept:

Changed the inlet filter after as founds. Span adjusted. Notes:

Calibration Performed By: Aswin Sasi Kumar -0.039159



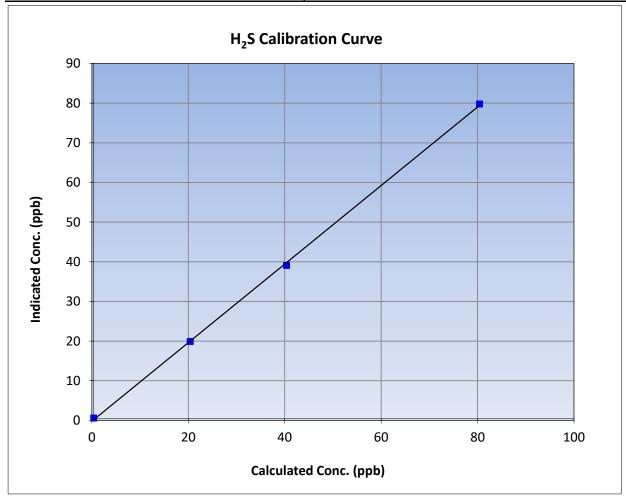
H₂S Calibration Summary

Version-11-2021

Station Information

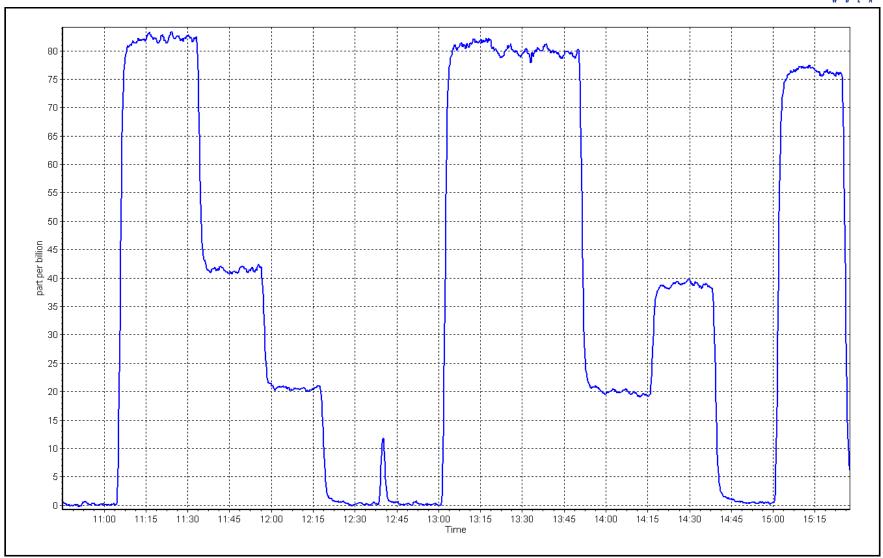
Calibration Date: September 7, 2023 **Previous Calibration:** August 8, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 10:41 End Time (MST): 15:30 Analyzer make: Thermo 450i Analyzer serial #: 1218153583

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999764	≥0.995	
80.0	79.4	1.0076	Correlation coefficient	0.333704	20.993	
40.0	38.7	1.0335	Slope	0.990569	0.90 - 1.10	
20.0	19.5	1.0257	Slope	0.990309	0.90 - 1.10	
			- Intercept	-0.219241	+/-3	



Date: September 7, 2023 Location: Wapasu





W B E A

Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

Calibration Date: September 5, 2023

Start time (MST): 10:51

Reason: Routine

Station number: AMS17

Last Cal Date: August 3, 2023

End time (MST): 13:41

Calibration Standards

Gas Cert Reference: ALM066507 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 ppm CH4 Equiv Conc. 1076.3 ppm

Removed C3H8 Conc. <u>208.3</u> ppm Diff between cyl:

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
 Start
 Finish

 Calibration slope:
 0.999409
 1.001763
 Background:
 3.300
 3.300

Calibration intercept: -0.080737 -0.062338 Coefficient: 4.460 4.460

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	-0.05	
as found span	4921	79.4	17.09	17.07	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	
high point	4921	79.4	17.09	17.12	0.999
second point	4960	39.7	8.55	8.40	1.018
third point	4980	19.8	4.26	4.18	1.019
as left zero	5000	0.0	0.00	-0.02	
as left span	4920	79.4	17.09	17.15	0.997
			Aver	age Correction Factor	1.012
Baseline Corr As found:	17.12	Previous response	17.00	*% change	0.7%

Baseline Corr As found: 17.12 Previous response 17.00 *% change 0.7
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



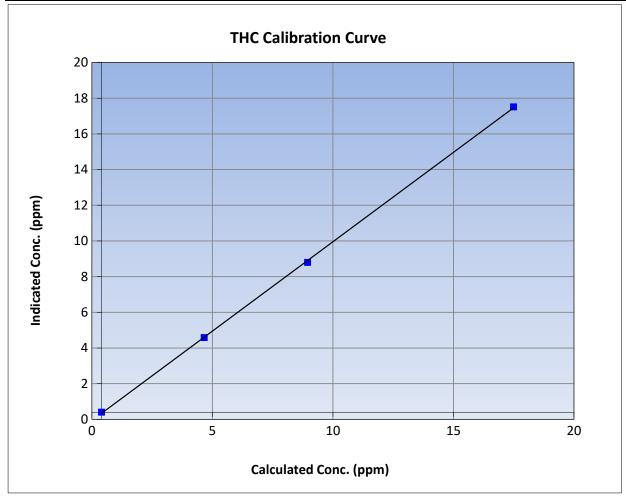
THC Calibration Summary

Version-01-2020

Station Information

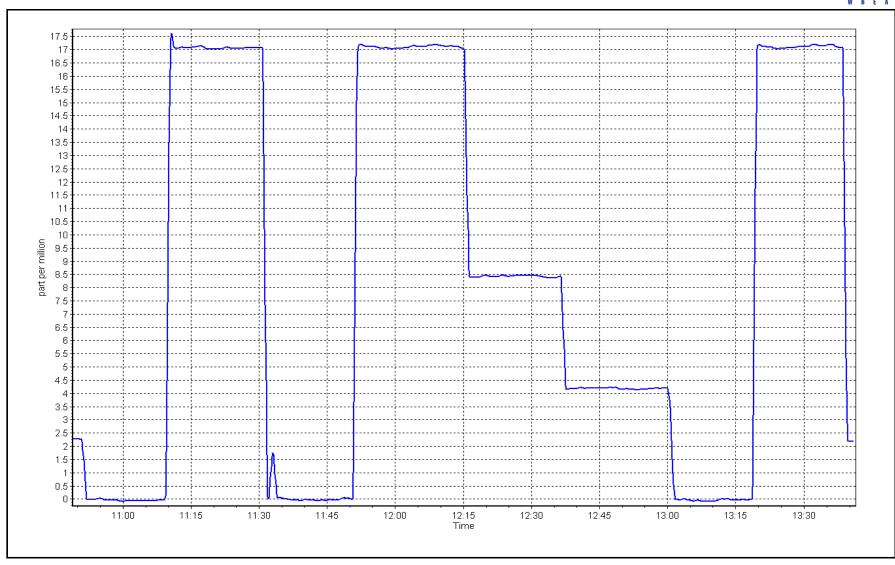
Previous Calibration: Calibration Date: September 5, 2023 August 3, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 10:51 End Time (MST): 13:41 Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352

Calibration Data						
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.00	0.01		Correlation Coefficient	0.999884	≥0.995	
17.09	17.12	0.9986	Correlation Coefficient	0.555004	20.995	
8.55	8.40	1.0177	Slope	1.001763	0.90 - 1.10	
4.26	4.18	1.0187	Slope	1.001703	0.30 - 1.10	
			- Intercept	-0.062338	+/-1.5	



THC Calibration Plot Date: September 5, 2023 Location: Wapasu







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Wapasu

Calibration Date: September 22, 2023

Start time (MST): 10:27 Reason: Routine Station number: AMS17

Last Cal Date: August 15, 2023

End time (MST): 15:37

Cal Gas Expiry Date: April 13, 2025

Calibration Standards

NO Gas Cylinder #: T375YK8

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

NOX gas Diff:

NO gas Diff: Calibrator Model: **API T700** Serial Number: 2449 Serial Number: 359 ZAG make/model: **API T701H**

Analyzer Information

Analyzer make: Thermo Scientific 42iQ Analyzer serial #: 12300522720

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.212	1.269	NO bkgnd or offset:	9	9.0
NOX coeff or slope:	0.992	0.989	NOX bkgnd or offset:	9.1	9.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	383.1	363.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001480	1.000361
NO _x Cal Offset:	-3.500000	-3.500000
NO Cal Slope:	0.999458	1.002373
NO Cal Offset:	-3.960000	-4.480000
NO ₂ Cal Slope:	0.998776	0.998879
NO ₂ Cal Offset:	-0.422855	-1.541001



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	0.0	0.1	-0.2		
as found span	4917	83.2	817.2	799.9	17.3	762.5	746.2	16.3	1.0717	1.0719
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1		
high point	4917	83.2	817.2	799.9	17.3	816.4	800.1	16.4	1.0010	0.9997
second point	4958	41.6	408.6	399.9	8.7	401.8	392.7	9.1	1.0169	1.0184
third point	4979	20.8	204.3	200.0	4.3	198.1	192.2	5.9	1.0313	1.0404
as left zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2		
as left span	4917	83.2	817.2	398.3	418.9	805.1	389.9	415.2	1.0150	1.0214
							Average C	orrection Factor	1.0164	1.0195
Corrected As fo	ound NO _X =	762.5 ppb	NO =	746.1 ppb	* = > +/-5%	change initiates	investigation	*Percent Chang	ge NO _x =	-6.9%
Previous Respo	nse NO _X =	814.9 ppb	NO =	795.5 ppb				*Percent Chang	ge NO =	-6.6%
Baseline Corr 2	nd pt $NO_X =$	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	
				G	iPT Calibration D	ata				
O3 Setpo	int (ppb)	Indicated NO Refer concentration (p		cated NO Drop centration (ppb)	Calculated NO2 concentration (ppb		dicated NO2 ntration (ppb) (Ic)	NO2 Correction factorized and Calibration Limit = As Found Limit = Co.	0.95-1.05 Calibrati	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 point (100 ppb NO2)										
1st GPT point	(400 ppb O3)	797.8		396.2	418.9		417.8	1.0026	5	99.7%
2nd GPT point	(200 ppb O3)	797.8		593.7	221.4		218.9	1.0114	1	98.9%
3rd GPT point	(100 ppb O3)	797.8		694.6	120.5		117.0	1.0300)	97.1%
						Average Co	rrection Factor	1.0147	7	98.6%

Span adjusted. Notes:

Calibration Performed By: Aswin Sasi Kumar



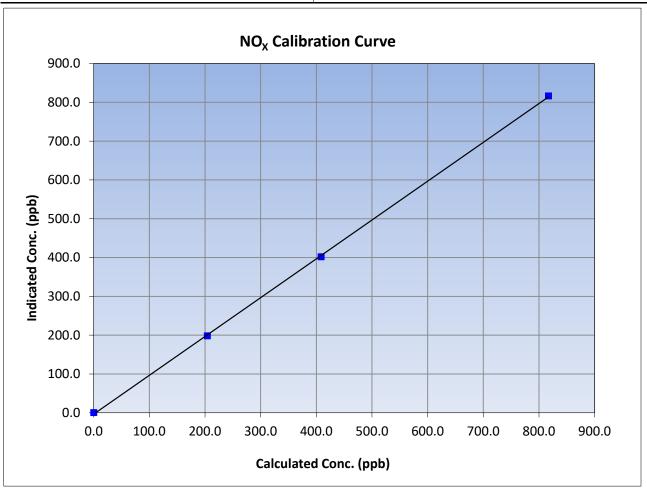
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 22, 2023 Previous Calibration: August 15, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:27 End Time (MST): 15:37 Analyzer serial #: Analyzer make: Thermo Scientific 42iQ 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999891	≥0.995
817.2	816.4	1.0010	Correlation Coefficient		
408.6	401.8	1.0169	Slope	1.000361	0.90 - 1.10
204.3	198.1	1.0313	Slope	1.000501	0.90 - 1.10
			Intercept	-3.500000	+/-20





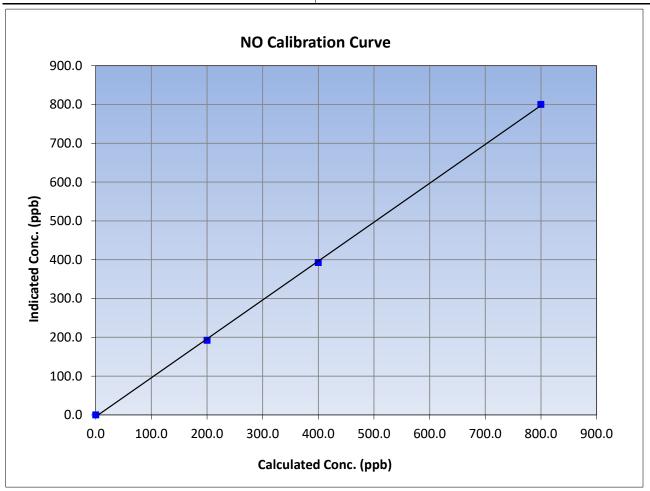
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 22, 2023 Previous Calibration: August 15, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:27 End Time (MST): 15:37 Analyzer make: Thermo Scientific 42iQ Analyzer serial #: 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999836	≥0.995
799.9	800.1	0.9997	Correlation Coefficient	0.555650	
399.9	392.7	1.0184	Slope	1.002373	0.90 - 1.10
200.0	192.2	1.0404	Slope	1.002373	0.50 1.10
			Intercept	-4.480000	+/-20





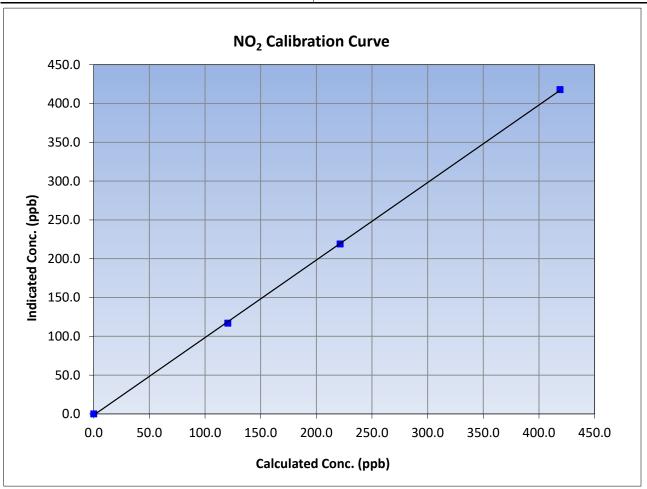
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 22, 2023 Previous Calibration: August 15, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 10:27 End Time (MST): 15:37 Analyzer serial #: Analyzer make: Thermo Scientific 42iQ 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999922	≥0.995
418.9	417.8	1.0026	Correlation Coefficient		
221.4	218.9	1.0114	Slope	0.998879	0.90 - 1.10
120.5	117.0	1.0300	Slope	0.556675	0.90 - 1.10
	·		Intercept	-1.541001	+/-20

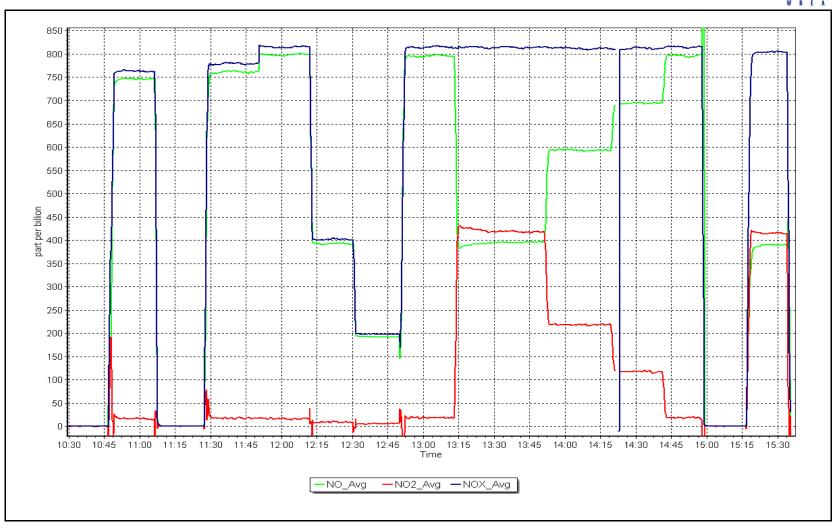


NO_x Calibration Plot

Date: September 22, 2023

Location: Wapasu







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

Calibration Date: September 14, 2023

Start time (MST): 10:20 Reason: Routine

ntember 14, 2023

End time (MST): 14:08

Station number: AMS17

Last Cal Date: August 31, 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: 1.009629 1.004971 -1.8 -1.8 -1.120000 Coeff or Slope: 1.014 Calibration intercept: -0.060000 1.026

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
	5000	0.0	0.0	0.0	
as found zero	5000	0.0	0.0	-0.8	
as found span	5000	1077.3	400.0	397.8	1.006
as found 2nd point	5000	900.3	200.0	197.4	1.013
as found 3rd point	5000	789.5	100.0	97.7	1.024
calibrator zero	5000	0.0	0.0	-0.3	
high point	5000	1077.3	400.0	401.1	0.997
second point	5000	900.3	200.0	200.0	1.000
third point	5000	789.5	100.0	98.2	1.018
as left zero	5000	0.0	0.0	0.4	
as left span	5000	1077.3	400.0	406.0	0.985
			Averag	ge Correction Factor	1.005
Baseline Corr As found:	398.6	Previous respons	e 403.8	*% change	-1.3%
Baseline Corr 2nd AF pt:	198.2	AF Slope	e: 0.997171	AF Intercept:	-1.480000
Baseline Corr 3rd AF pt:	98.5	AF Correlation	n: 0.999986		
				* = > +/-5% change initia	tes investigation

Notes: Sample pump changed out. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



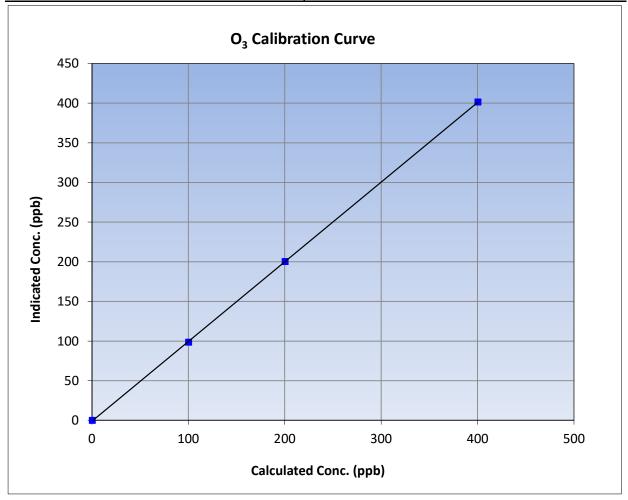
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 14, 2023 **Previous Calibration:** August 31, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 10:20 End Time (MST): 14:08 Analyzer make: **API T400** Analyzer serial #: 3870

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>				
0.0	-0.3		Correlation Coefficient	0.999976	≥0.995			
400.0	401.1	0.9973	Correlation Coefficient					
200.0	200.0	1.0000	Slope	1.004971	0.90 - 1.10			
100.0	98.2	1.0183	Slope	1.004371	0.30 - 1.10			
			- Intercept	-1.120000	+/- 5			

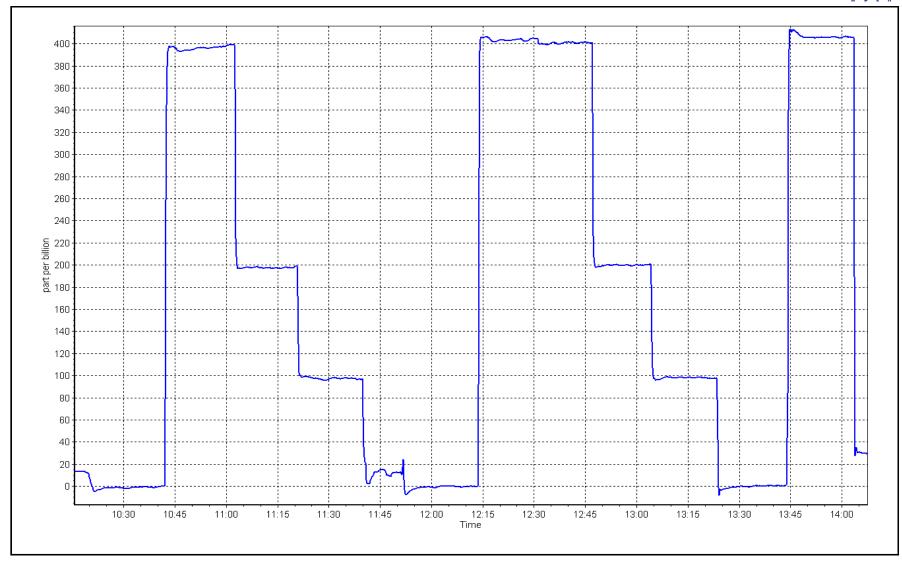


O₃ Calibration Plot

Date: September 14, 2023 L

Location: Wapasu







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Wapasu		Station number:	AMS 17		
Calibration Date:	September 22, 2023		Last Cal Date:		2023	
Start time (MST):	13:18		End time (MST):	15:02		
Analyzer Make:	API T640		S/N:	1183		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388748		
Temp/RH standard:	Alicat FP-25BT		S/N:	388748		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	22.2	23.0	22.2			+/- 2 °C
P (mmHg)	713.7	715.2	713.7			+/- 10 mmHg
flow (LPM)	5.02	4.98	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	September 22, 2023	Last Cal Date:	August 1	15, 2023	
	PM w/o HEPA:	9.3	PM w/ HEPA:	0.		<0.2 ug/m3
Note: this leak check will be	·	· <u> </u>	rve as the pre main	tenance lea	ak check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration To	est			
Parameter	As found	Post maintenance	<u>As left</u>		Adjusted	(Limits)
PMT Peak Test	11.2		11.2			10.9 +/- 0.5
						•
Post-maintenance		PM w/o HEPA:	10.9	w/ HEPA:	(0.0
Date Optical Cham	<u> </u>	September 22				<0.2 ug/m3
Disposable Filte	r Changed:	September 22	2, 2023			
		Annual Maintenance				
		Annual Maintenance				
Date Sample Tub	oe Cleaned:					
Date RH/T Senso	or Cleaned:					
					1 (*1)	
Notes:	remp, pressur	e and flow checked. Leak	спеск passed. Char	nber cleane	eu, fliter SWa	ippea.
Calibration by:	Acuin Caci Var					
Calibration by:	Aswin Sasi Kumar					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

September 8, 2023 Calibration Date:

Start time (MST): 11:06 Reason:

Routine

Station number: **AMS 18**

> Last Cal Date: August 10, 2023

End time (MST): 15:33

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

ppm Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 2658 Serial Number: 360

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

ppm

Analyzer Range 0 - 1000 ppb

Finish Start Calibration slope: 1.004073 0.999906

Calibration intercept: -0.542544 -1.183922

Finish Start Backgd or Offset: 22.6 22.2 0.795 Coeff or Slope: 0.808

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	0.2	
as found span	4919	81.0	800.3	808.3	0.990
as found 2nd point	4959	40.5	400.2	403.4	0.992
as found 3rd point	4979	20.2	199.6	201.1	0.993
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4919	81.0	800.3	799.6	1.001
second point	4959	40.5	400.2	398.6	1.004
third point	4979	20.2	199.6	196.8	1.014
as left zero	5000	0.0	0.0	0.4	
as left span	4919	81.0	800.3	799.7	1.001
			Averag	ge Correction Factor	1.006

Baseline Corr As found: 808.10 Previous response 803.00 0.6% *% change Baseline Corr 2nd AF pt: 403.20 AF Slope: 1.009927 AF Intercept: -0.241517 200.90 AF Correlation: 0.999998 Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



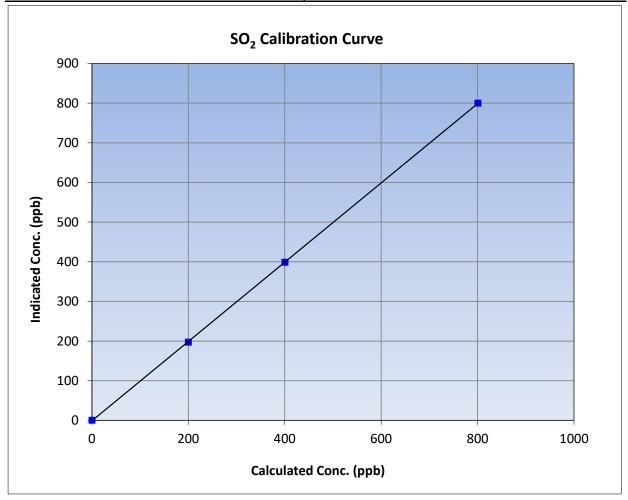
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 8, 2023 **Previous Calibration:** August 10, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:06 End Time (MST): 15:33 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

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	0.999986	≥0.995				
800.3	799.6	1.0009	Correlation Coefficient	0.333360	20.993				
400.2	398.6	1.0040	Slope	0.999906	0.90 - 1.10				
199.6	196.8	1.0143	Slope	0.999900	0.90 - 1.10				
			- Intercept	-1.183922	+/-30				

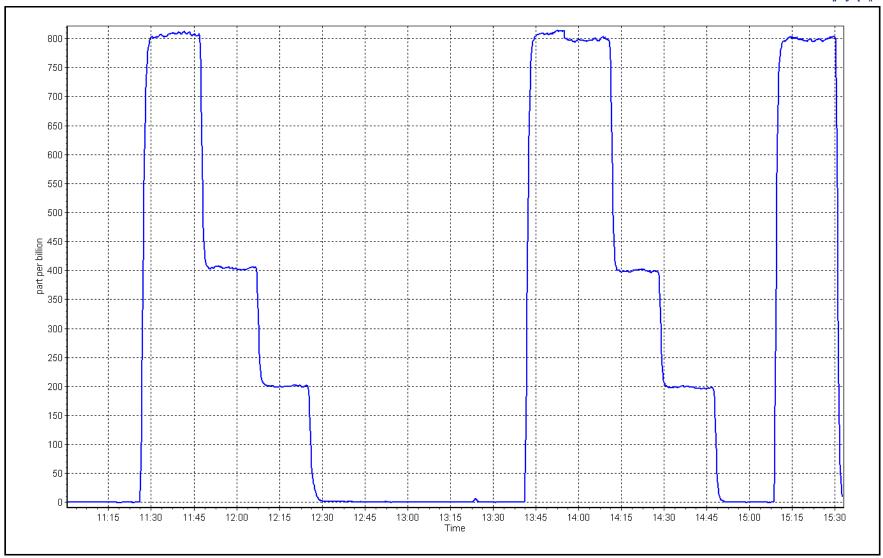


SO2 Calibration Plot

Date: September 8, 2023

Location: Stony Mountain







TRS Calibration Report

Station number:

End time (MST):

AMS18

14:38

Version-11-2021

Station Information

Station Name: Stony Mountain

Calibration Date: September 25, 2023 Last Cal Date: August 24, 2023

Start time (MST): 9:30

Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.479 ppm Cal Gas Exp Date: January 4, 2025

Cal Gas Cylinder #: CC500395

Removed Cal Gas Conc: 5.479 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 ZAG Make/Model: Teledyne API T701 Serial Number: 360

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

Converter make: CD Nova CDN-101 Converter serial #: 555

Analyzer Range 0 - 100 ppb

Start **Finish Start** <u>Finish</u> Calibration slope: 1.005299 Backgd or Offset: 0.993582 2.66 2.66 -0.019011 Calibration intercept: 0.341175 Coeff or Slope: 1.189 1.173

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	82.0	0.977
as found 2nd point	4964	36.5	40.0	41.1	0.975
as found 3rd point	4983	18.3	20.0	20.4	0.988
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	4927	73.0	80.0	80.4	0.995	
second point	4964	36.5	40.0	40.3	0.992	
third point	4983	18.3	20.0	19.9	1.007	
as left zero	5000	0.0	0.0	0.3		
as left span	4927	73.0	80.0	77.6	1.031	
SO2 Scrubber Check	4923	77.1	771.0	0.1		
Date of last scrubber chang	ge:	17-Dec-21	_	Ave Corr Factor	0.998	
Date of last converter effic	Date of last converter efficiency test: efficiency					

Date of last scrubber change	2:	17-Dec-21		Ave Corr Factor	0.998
Date of last converter efficie	ency test:			ef	ficiency
Baseline Corr As found:	81.9	Prev response:	79.82	*% change:	2.5%

Baseline Corr 2nd AF pt: 41.0 AF Slope: 1.024877 AF Intercept: 0.020582
Baseline Corr 3rd AF pt: 20.3 AF Correlation: 0.999988

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



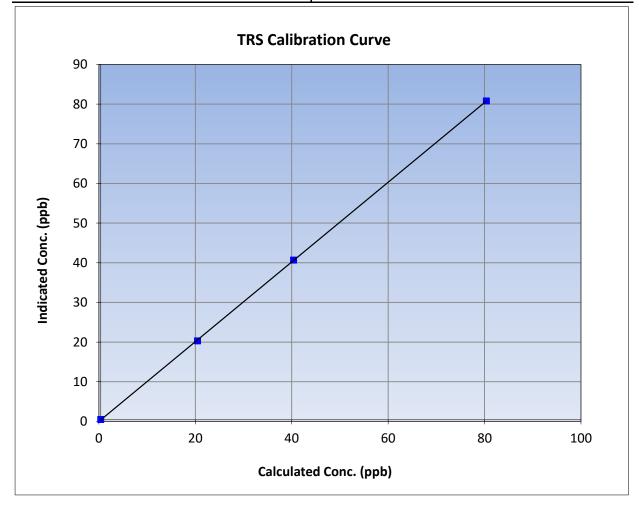
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 25, 2023 **Previous Calibration:** August 24, 2023 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 9:30 End Time (MST): 14:38 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

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	0.999977	≥0.995			
80.0	80.4	0.9949	Correlation coefficient	0.555577	20.333			
40.0	40.3	0.9924	Slope	1.005299	0.90 - 1.10			
20.0	19.9	1.0074	Slope	1.005299	0.90 - 1.10			
			- Intercept	-0.019011	+/-3			

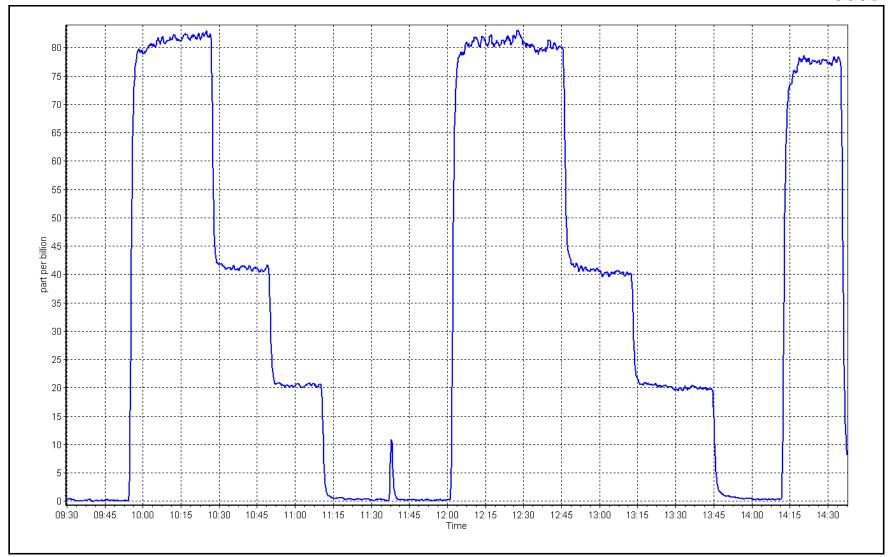




Date: September 25, 2023

Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain
Calibration Date: September 8, 2023

Start time (MST): 13:00 Reason: Install Station number: AMS 18
Last Cal Date: N/A

End time (MST): 15:33

Calibration Standards

Gas Cert Reference: CC463851 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC):

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

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701H Serial Number: 360

Analyzer Information

Analyzer make: Thermo 55i 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:
 N/A
 2.23E-04
 NMHC SP Ratio:
 N/A
 4.19E-05

CH4 Retention time: N/A 12.9 NMHC Peak Area: N/A 186711

Zero Chromatogram: OFF Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
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	81.0	17.28	17.34	0.997
second point	4959	40.5	8.64	8.62	1.003
third point	4979	20.2	4.31	4.26	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	17.28	17.31	0.998
			Avera	ge 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 initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.0	9.17	9.24	0.992
second point	4959	40.5	4.58	4.61	0.995
third point	4979	20.2	2.29	2.30	0.996
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	9.17	9.17	1.000
			Ave	rage Correction Factor	0.994
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
as found zero					
as found span as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.0	8.11	8.11	1.000
second point	4959	40.5	4.06	4.01	1.012
chird point	4979	20.2	2.02	1.96	1.030
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.14	0.997
35 Tere spari	4313	01.0		rage Correction Factor	1.014
Baseline Corr AF:	NA	Prev response	NA	*% change	NA NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
saseline con sia / ii .	14/1	Calibration	Statistics		<u> </u>
			Statistics	Einich	
THC Cal Classes		<u>Start</u>		<u>Finish</u>	
THC Cal Slope: THC Cal Offset:				1.004309 -0.036379	
CH4 Cal Offset:				1.001484	
CH4 Cal Offset:				-0.032618	
NMHC Cal Slope:				1.007917	

Notes: Install calibration . Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

NMHC Cal Offset:

-0.005959



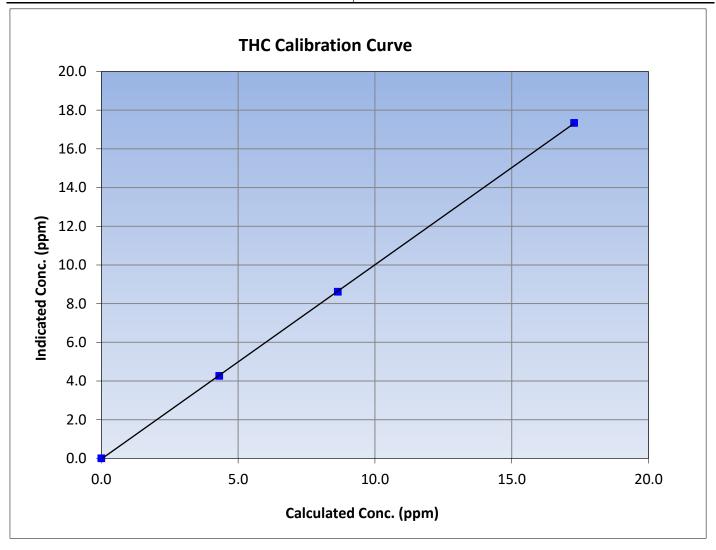
THC Calibration Summary

Version-06-2022

Station Information

N/A Calibration Date: September 8, 2023 **Previous Calibration:** Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 13:00 End Time (MST): 15:33 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	0.999979	≥0.995
17.28	17.34	0.9966	Correlation Coemicient	0.999979	20.993
8.64	8.62	1.0028	Slope	1.004309	0.90 - 1.10
4.31	4.26	1.0116	Slope	1.004309	0.90 - 1.10
			Intercept	-0.036379	+/-0.5





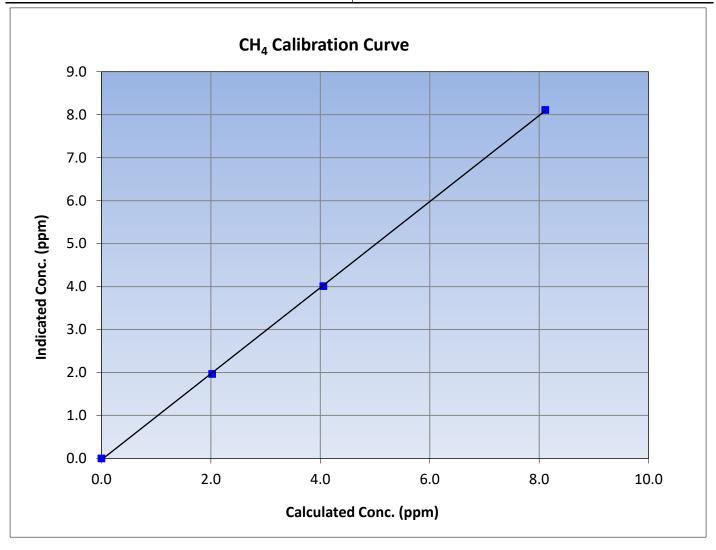
CH₄ Calibration Summary

Version-06-2022

Station Information

N/A Calibration Date: September 8, 2023 **Previous Calibration:** Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 13:00 End Time (MST): 15:33 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	0.999926	≥0.995	
8.11	8.11	1.0004	Correlation Coefficient	0.555520	20.333	
4.06	4.01	1.0117	Slope	1.001484	0.90 - 1.10	
2.02	1.96	1.0303	Slope	1.001464	0.90 - 1.10	
			Intercept	-0.032618	+/-0.5	





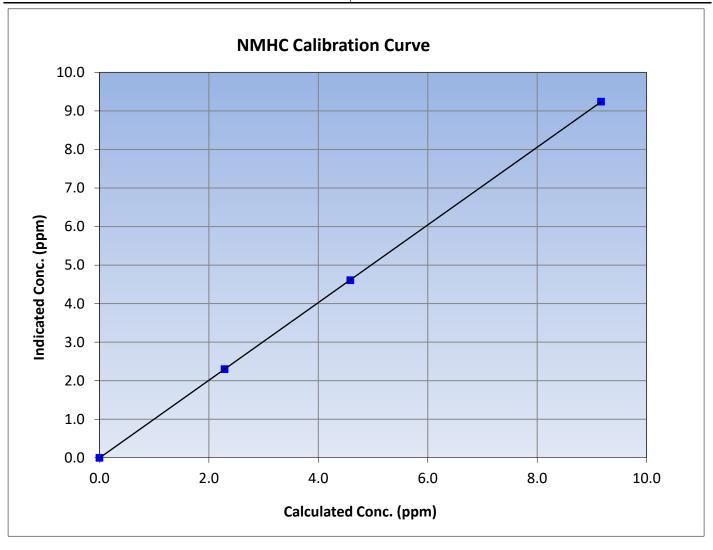
NMHC Calibration Summary

Version-06-2022

Station Information

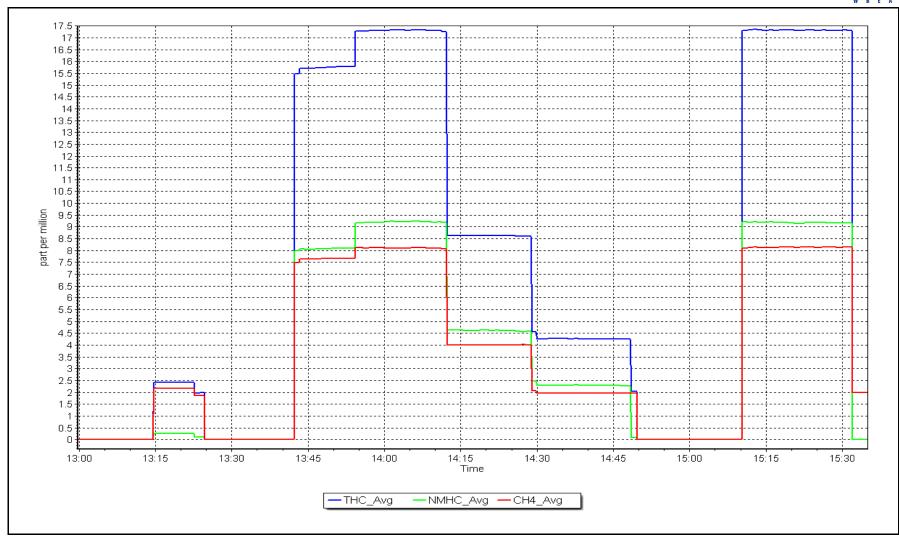
N/A Calibration Date: September 8, 2023 **Previous Calibration:** Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 13:00 End Time (MST): 15:33 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
9.17	9.24	0.9923	Correlation Coefficient	0.33337	20.999
4.58	4.61	0.9954	Slope	1.007917	0.90 - 1.10
2.29	2.30	0.9956	Slope		0.90 - 1.10
			Intercept	-0.005959	+/-0.5



Date: September 8, 2023 Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain

Calibration Date: September 8, 2023

Start time (MST): 11:05 Reason: Removal Station number: AMS 18

Last Cal Date: August 26, 2023

End time (MST): N/A

Calibration Standards

Gas Cert Reference: CC463851 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC):

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

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701H Serial Number: 360

Analyzer Information

Analyzer make: Thermo 55i 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: 3.37E-04 N/A NMHC SP Ratio: 6.89E-05 N/A CH4 Retention time: 15.6 N/A NMHC Peak Area: 133711 N/A

Zero Chromatogram: ON Flat Baseline: ON

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	0.02	
as found span	4919	81.0	17.28	16.26	1.063
as found 2nd point	4959	40.5	8.64	7.98	1.083
as found 3rd point	4979	20.2	4.31	4.08	1.057
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Ave	erage Correction Factor		
Baseline Corr AF:	16.24	Prev response	17.28	*% change	-6.4%	
Baseline Corr 2nd AF:	8.0	AF Slope:	0.938700	AF Intercept:	-0.010991	
Baseline Corr 3rd AF:	4.1	AF Correlation:	0.999854	* = > +/-5% change initiates	investigation	



THC / CH₄ / NMHC Calibration Report

Version-06-2022

W D L A					Version-00-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
s found span	4919	81.0	9.17	8.94	1.026
as found 2nd point	4959	40.5	4.58	4.49	1.022
as found 3rd point	4979	20.2	2.29	2.25	1.015
new cylinder response		<u> </u>			
alibrator zero					
nigh point					
second point					
hird point					
is left zero					
as left span					
			Avera	age Correction Factor	
Baseline Corr AF:	8.94	Prev response	9.17	*% change	-2.6%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.974079	AF Intercept:	0.012979
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999990	* = > +/-5% change initiat	
		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>
is found zero	5000	0.0	0.00	0.02	
is found span	4919	81.0	8.11	7.33	1.107
s found 2nd point	4959	40.5	4.06	3.49	1.162
as found 3rd point	4979	20.2	2.02	1.82	1.109
new cylinder response	1373	20.2	2.02	1.02	1.103
calibrator zero					
nigh point					
econd point					
hird point					
as left zero					
is left span					
			Avera	age Correction Factor	
Baseline Corr AF:	7.31	Prev response	8.11	*% change	-11.0%
Baseline Corr 2nd AF:	3.47	AF Slope:	0.898987	AF Intercept:	-0.024170
Baseline Corr 3rd AF:	1.80	AF Correlation:	0.999188	* = > +/-5% change initiat	
Addenne Con Grava.	1.00	Calibration			
		Start	Julistics	Finish	
THC Cal Slope:		0.999923		N/A	
•					
THC Cal Offset:		-0.001977		N/A	
CH4 Cal Slope:		0.999791		N/A	
CH4 Cal Offset:		-0.001608		N/A	
NMHC Cal Slope:		1.000027		N/A	

Notes: Removing instrument due to dips. Further maintenance to be conducted at the WBEA Centre.

-0.000569

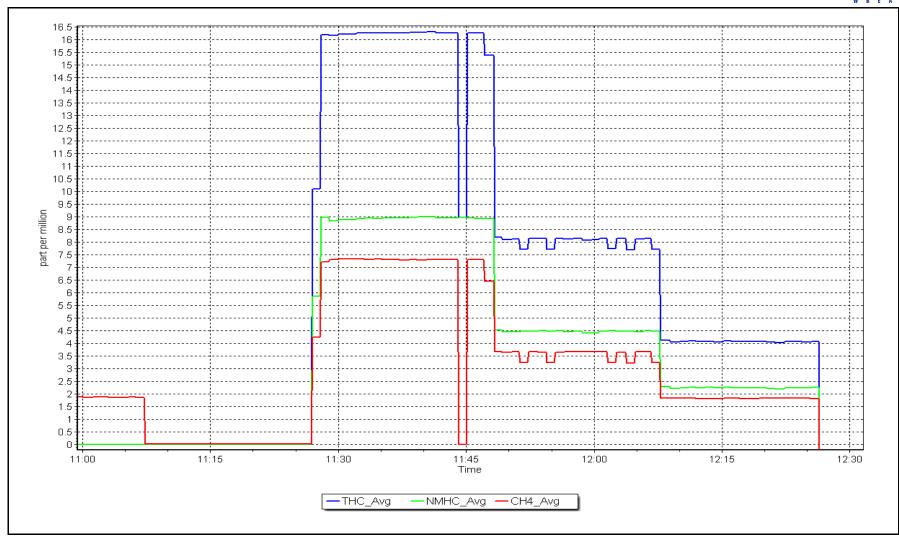
Calibration Performed By: Aswin Sasi Kumar

NMHC Cal Offset:

N/A

Date: September 8, 2023 Location: Stony Mountain







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Stony Mountain Station number: AMS 18

Calibration Date: September 19, 2023 Last Cal Date: August 30, 2023 Start time (MST): 10:20 End time (MST): 15:04

Start time (MST): 10:20 Reason: Routine

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

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.993 1.029 NO bkgnd or offset: 2.8 2.9 NOX coeff or slope: 0.984 0.984 NOX bkgnd or offset: 2.9 2.8 NO2 coeff or slope: 0.999 0.999 Reaction cell Press: 230.6 235.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000289	1.000359
NO _x Cal Offset:	-0.209933	-0.310049
NO Cal Slope:	0.999824	1.001795
NO Cal Offset:	-1.429814	-1.669844
NO ₂ Cal Slope:	1.011795	0.998696
NO ₂ Cal Offset:	-0.075280	-0.059273



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				511	ution Colibustics	Dete				
					ution Calibration					
Cat Daint	Dilution flow rate	Source gas flow	Calculated NOx	Calculated NO	Calculated NO2	Indicated NOx	Indicated NO	Indicated NO2	NOx Correction factor	
Set Point	(sccm)	rate (sccm)	concentration (ppb) (Cc)	concentration (ppb) (Cc)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	concentration (ppb) (Ic)	concentration (ppb) (Ic)	(Cc/lc) Limit = 0.95-1.05	factor (Cc/lc <i>Limit</i> = 0.95-1.
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as found span	4919	81.3	820.8	800.3	20.5	810.0	786.2	24.2	1.0133	1.0179
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.1	0.2		
high point	4919	81.3	820.8	800.3	20.5	821.0	8.008	20.3	0.9997	0.9993
second point	4959	40.7	410.9	400.7	10.3	410.7	399.2	11.5	1.0006	1.0037
third point	4980	20.3	204.9	199.8	5.1	203.8	196.5	7.3	1.0056	1.0169
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.1	0.3		
as left span	4919	81.3	820.8	383.2	437.6	824.0	384.7	439.5	0.9961	0.9960
							Average C	Correction Factor	1.0019	1.0066
Corrected As fo	ound NO _X =	809.8 ppb	NO =	786.2 ppb	* = > +/-5%	change initiates	investigation	*Percent Chang	ge NO _x =	-1.4%
Previous Respo	onse NO _X =	820.8 ppb	NO =	798.7 ppb				*Percent Chang	ge NO =	-1.6%
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	NO r ² :	:	NO SI:	NO Int:	
					As found	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration D	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		cated NO Drop centration (ppb)	Calculated NO2 concentration (ppb		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	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)	797.7		380.6	437.6		437.1	1.0011	[99.9%
					2212		222 =	4 0000		00.007

Notes:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Sample inlet filter changed after as founds. Span adjusted.

223.7

121.3

Average Correction Factor

1.0022

1.0040

1.0024

224.2

121.8

Calibration Performed By:

Aswin Sasi Kumar

594.0

696.4

797.7

797.7

99.8%

99.6%

99.8%



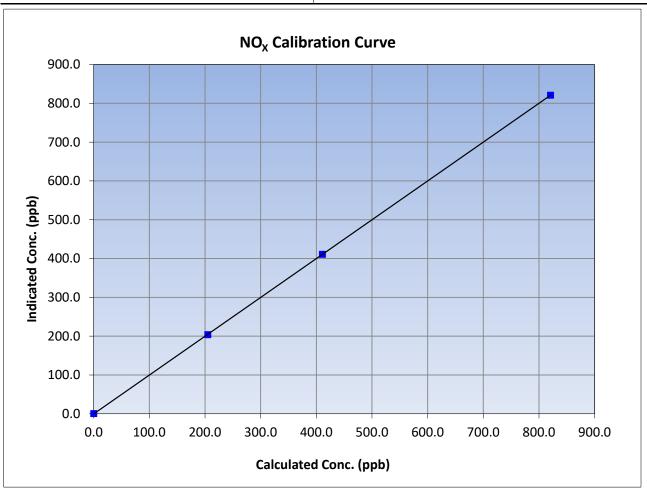
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 30, 2023 Station Name: **Stony Mountain** Station Number: **AMS 18** Start Time (MST): 10:20 End Time (MST): 15:04 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	0.4		Correlation Coefficient	0.999996	≥0.995
820.8	821.0	0.9997	Correlation Coefficient	0.999990	20.333
410.9	410.7	1.0006	Slope	1.000359	0.90 - 1.10
204.9	203.8	1.0056	Slope	1.000559	0.90 - 1.10
			Intercept	-0.310049	+/-20





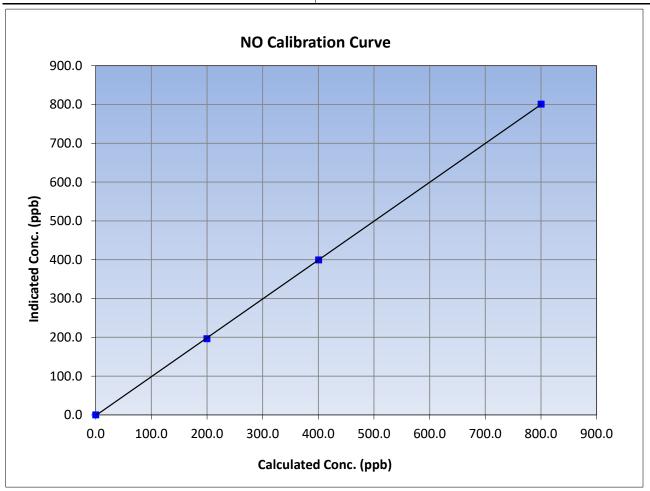
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 30, 2023 Station Name: **Stony Mountain** Station Number: **AMS 18** Start Time (MST): 10:20 End Time (MST): 15:04 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	0.1		Correlation Coefficient	0.999977	≥0.995
800.3	8.008	0.9993	Correlation Coefficient	0.333377	20.333
400.7	399.2	1.0037	Slope	1.001795	0.90 - 1.10
199.8	196.5	1.0169	Slope	1.001795	0.90 - 1.10
			Intercept	-1.669844	+/-20





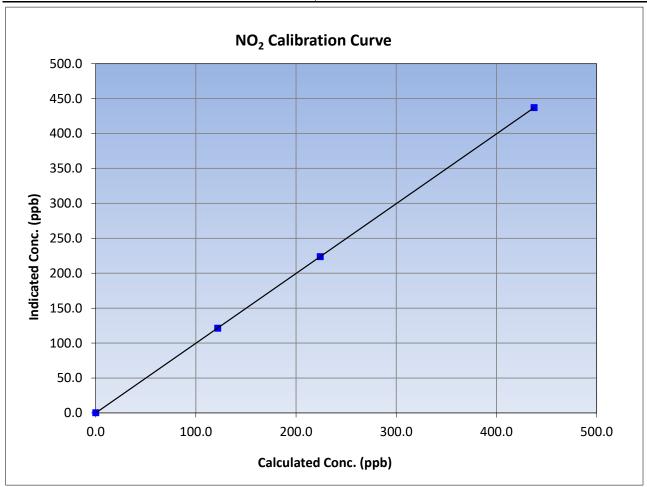
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 30, 2023 Station Name: **Stony Mountain** Station Number: **AMS 18** Start Time (MST): 10:20 End Time (MST): 15:04 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	0.2		Correlation Coefficient	0.999998	≥0.995
437.6	437.1	1.0011	Correlation Coefficient	0.55555	20.333
224.2	223.7	1.0022	Slope	0.998696	0.90 - 1.10
121.8	121.3	1.0040	Slope	0.556050	0.90 - 1.10
			Intercept	-0.059273	+/-20

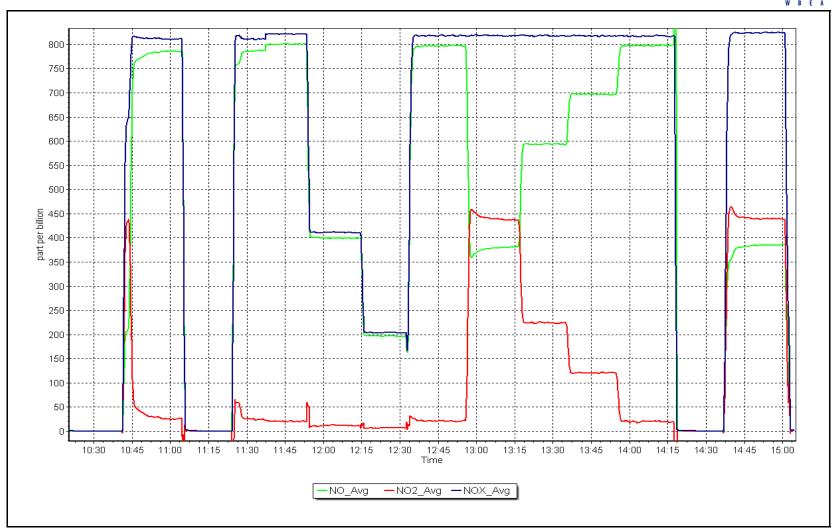


NO_x Calibration Plot

Date: September 19, 2023

Location: Stony Mountain







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: September 21, 2023

Start time (MST): 11:21 Reason: Routine Station number: AMS18

Last Cal Date: August 23, 2023

End time (MST): 14:13

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T750 Serial Number: 282 ZAG Make/Model: Teledyne API T751H Serial Number: 321

Analyzer Information

Analyzer make: API T400 Analyzer serial #: 825

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.003086 1.003943 1.300 1.300 -0.340000 Coeff or Slope: Calibration intercept: 0.360000 1.002 0.996

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	800.0	0.0	0.1	
as found span	4888	1096.9	400.0	404.5	0.989
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.4	
high point	4888	1101.7	400.0	401.4	0.997
second point	4888	863.9	200.0	200.7	0.997
third point	4888	741.4	100.0	98.9	1.011
as left zero	5000	800.0	0.0	0.2	
as left span	4812	1097.9	400.0	413.6	0.967
			Averag	ge Correction Factor	1.001
Baseline Corr As found: Baseline Corr 2nd AF pt:	404.4 NA	Previous respons AF Slope		*% change AF Intercept:	0.7%

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Using portable calibrator for the calibration. Span

adjusted.

Calibration Performed By: Aswin Sasi Kumar



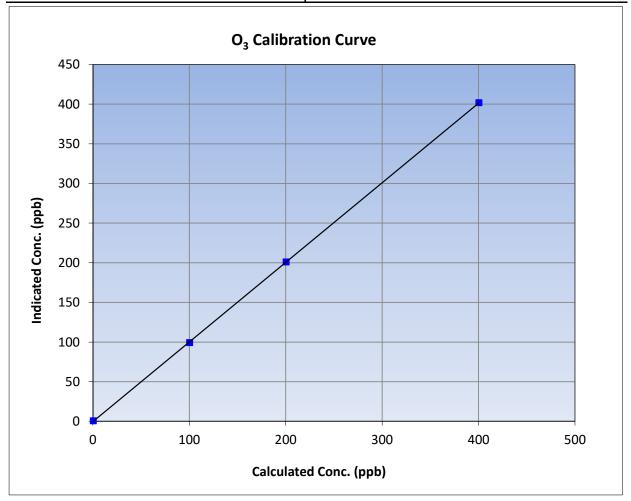
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 21, 2023 **Previous Calibration:** August 23, 2023 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 11:21 End Time (MST): 14:13 Analyzer make: **API T400** Analyzer serial #: 825

	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	0.999978	≥0.995				
400.0	401.4	0.9965	Correlation Coefficient	0.333376	20.333				
200.0	200.7	0.9965 Slope 1.0039	1.003943	0.90 - 1.10					
100.0	98.9	1.0111	Slope	1.003343	0.90 - 1.10				
			- Intercept	-0.340000	+/- 5				

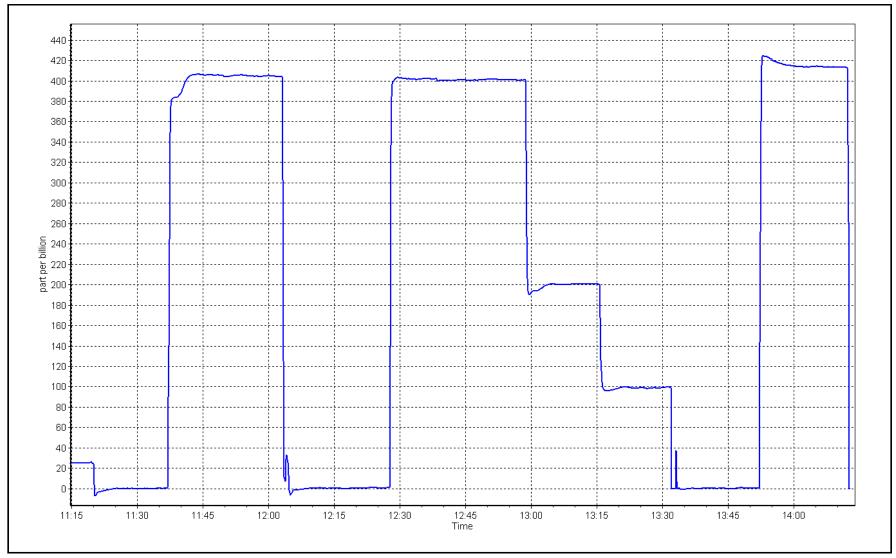


O₃ Calibration Plot

Date: September 21, 2023

Location: Stony Mountain







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Stony Mountain		Station number:	AMS 18		
Calibration Date:	September 25, 2023		Last Cal Date:	_	2023	
Start time (MST):	13:16		End time (MST):	14:37		
Analyzer Make:	API T640		S/N:	1162		
Particulate Fraction:	PM2.5		,			
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388748		
Temp/RH standard:	Alicat FP-25BT		·	388748		
		Monthly Calibration Te	est			
Parameter	As found	Measured	As left		<u>Adjusted</u>	(Limits)
T (°C)	21.3	21.5	21.3			+/- 2 °C
P (mmHg)	702.4	704.3	702.4			+/- 10 mmHg
flow (LPM)	4.94	5.05	4.94			+/- 0.25 LPM
Leak Test:	Date of check:	September 25, 2023	Last Cal Date:	August 3	0, 2023	
	PM w/o HEPA:	3.9	PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will se	erve as the pre main	tenance lea	k check	
Inlet cleaning:	Inlet Head	✓				
		Overtenty Calibration T				
Davassatas	A = £== d	Quarterly Calibration T			المحاد، . علم ما	(Linette)
<u>Parameter</u>	As found	Post maintenance	As left		<u>Adjusted</u>	(Limits)
PMT Peak Test	11.1		11.1			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	3.9	w/ HEPA:	(0.0
Date Optical Cham	ber Cleaned:	September 25	5, 2023	-		<0.2 ug/m3
Disposable Filte	r Changed:	September 25	5, 2023			
		Annual Maintenance	2			
Date Sample Tub	oe Cleaned:	August 30, 2	2022			
Date RH/T Senso	or Cleaned:	August 30, 2	2022			
Notes:		No adju	istments needed.			
Calibration by:	Aswin Sasi Kumar					



CO Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: September 11, 2023

Start time (MST): 10:43

Reason: Routine

Station number: AMS 18

Last Cal Date: August 21, 2023

December 1, 2028

End time (MST): 13:00

Calibration Standards

Cal Gas Concentration: 3,050 ppm Cal Gas Exp Date:

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

Finish Start Finish <u>Start</u> Calibration slope: 0.999692 0.995840 Backgd or Offset: -0.010 -0.010 Calibration intercept: 0.079759 0.085810 Coeff or Slope: 0.906 0.906

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	
as found span	4933	66.7	40.7	40.6	1.002
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	40.7	40.5	1.004
second point	4966	33.3	20.3	20.5	0.990
third point	4983	16.7	10.2	10.2	1.002
as left zero					
as left span					

Average Correction Factor 0.999

Baseline Corr As found: 40.61 Prev response: 40.76 *% 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

Sample inlet filter changed after as founds. No adjustments needed. Power to the station went out

during third point. No as lefts done.

Calibration Performed By: Aswin Sasi Kumar

Notes:



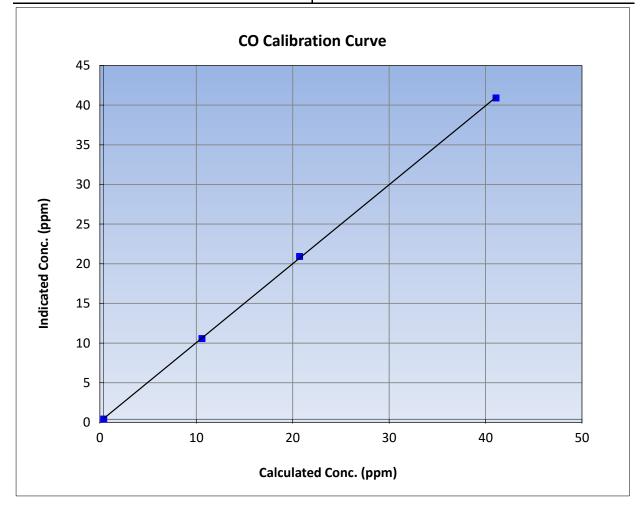
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 21, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 10:43 End Time (MST): 13:00 Analyzer make: **API T300** Analyzer serial #: 3504

Calibration Data							
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.0		Correlation Coefficient	0.999938	≥0.995		
40.7	40.5	1.0042	Correlation Coefficient		20.995		
20.3	20.5	0.9901	Slope	0.995840	0.90 - 1.10		
10.2	10.2	1.0017	Slope	0.555640	0.90 - 1.10		
			Intercept	0.085810	+/-1.5		

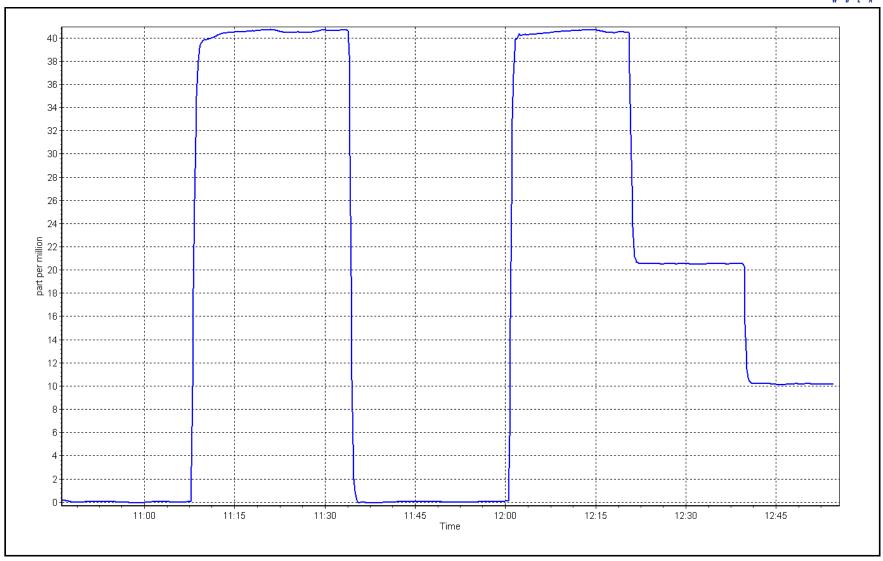


CO Calibration Plot

Date: September 11, 2023

Location: Stony Mountain







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain Station number: AMS 18

Calibration Date: September 12, 2023 Last Cal Date: August 31, 2023

Start time (MST): 10:20 End time (MST): 14:20

Reason: Routine

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 #: 288

Analyzer Range 0 - 2,000 ppm

Start Finish Start Finish 0.999777 Backgd or Offset: Calibration slope: 1.000937 0.041 -0.002 Calibration intercept: -4.800000 -1.960000 Coeff or Slope: 1.009 1.051

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	3.0	
as found span	2920	80.0	1605.9	1602.0	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	3.3	
high point	2920	80.0	1605.9	1608.2	0.999
second point	2960	40.0	802.9	792.1	1.014
third point	2980	20.0	401.5	398.2	1.008
as left zero	3000	0.0	0.0	3.5	
as left span	2930	80.0	1600.5	1609.9	0.994
			Avera	ge Correction Factor	1.007

Baseline Corr As found: 1599.00 Prev response: 1602.57 *% change: -0.2%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Zero and span adjusted. Third point failed, performed linearity adjustment. Span and mid point

checked. Zero point re-checked after mid point.

Calibration Performed By: Aswin Sasi Kumar



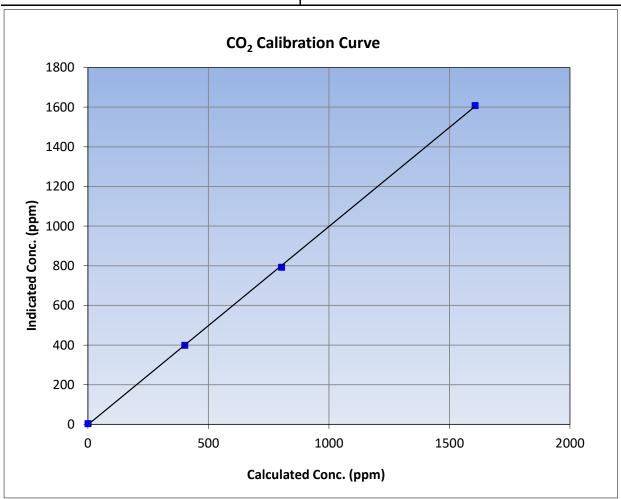
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date September 12, 2023		Previous Calibration	August 31, 2023
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:20	End Time (MST)	14:20
Analyzer make	API T360	Analyzer serial #	288

Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	3.3		Correlation Coefficient	0.999910	≥0.995
1605.9	1608.2	0.9985	Correlation Coefficient		
802.9	792.1	1.0137	Slope	0.999777	0.90 - 1.10
401.5	398.2	1.0082	Slope		
			- Intercept	-1.960000	+/-10

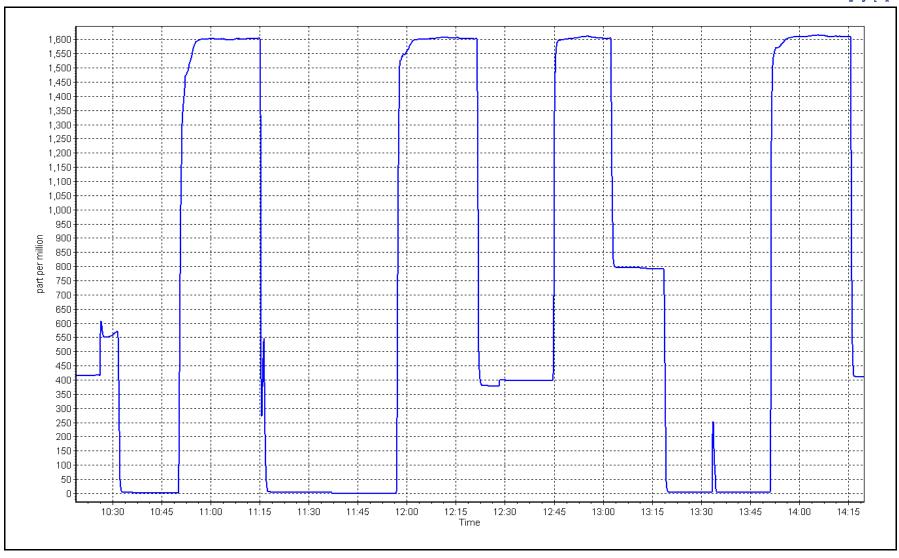


CO₂ Calibration Plot

Date: September 12, 2023

Location: Stony Mountain







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain Station number: **AMS 18** September 29, 2023 Last Cal Date: Calibration Date: NA Start time (MST): 11:20 End time (MST): 16:00

Reason: Install

Calibration Standards

Cal Gas Concentration: December 1, 2026 60,220 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: ALM063503

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: 2658 N2 Gen Make/Model: Peak Scientific Serial Number: 771048317

Analyzer Information

Analyzer make: API T360 Analyzer serial #: 489

Analyzer Range 0 - 2,000 ppm

Start Finish Start Finish Backgd or Offset: Calibration slope: NA 0.998830 NA -0.002 Calibration intercept: NA -5.420000 Coeff or Slope: NA 1.051

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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	1.4	
high point	2920	80.0	1605.9	1606.7	0.999
second point	2960	40.0	802.9	779.0	1.031
third point	2980	20.0	401.5	398.2	1.008
as left zero	3000	0.0	0.0	5.5	
as left span	2930	80.0	1600.5	1613.7	0.992
			Avera	ge Correction Factor	1.013

Baseline Corr As found: NA Prev response: NA *% change: NA

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

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

Notes: Instrument installation calibration, linearity adjustment performed.

Calibration Performed By: Kelly Baragar



Analyzer make

Wood Buffalo Environmental Association

CO₂ Calibration Summary

Analyzer serial #

Version-01-2020

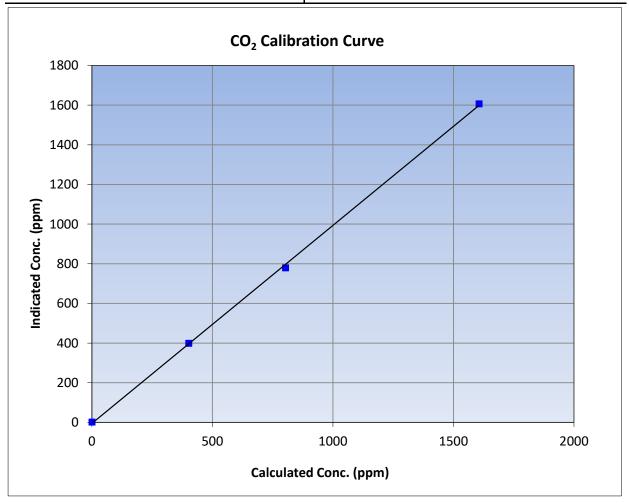
489

Calibration Date	September 29, 2023	Previous Calibration	NA
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:20	End Time (MST)	16:00

API T360

Station Information

Calibration Data							
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	1.4		Correlation Coefficient	0.999696 ≥	≥0.995		
1605.9	1606.7	0.9995	Correlation Coefficient		20.995		
802.9	779.0	1.0307	Slope	0.998830	0.90 - 1.10		
401.5	398.2	1.0082	Slope	0.556650	0.90 - 1.10		
			- Intercept	-5.420000	+/-10		

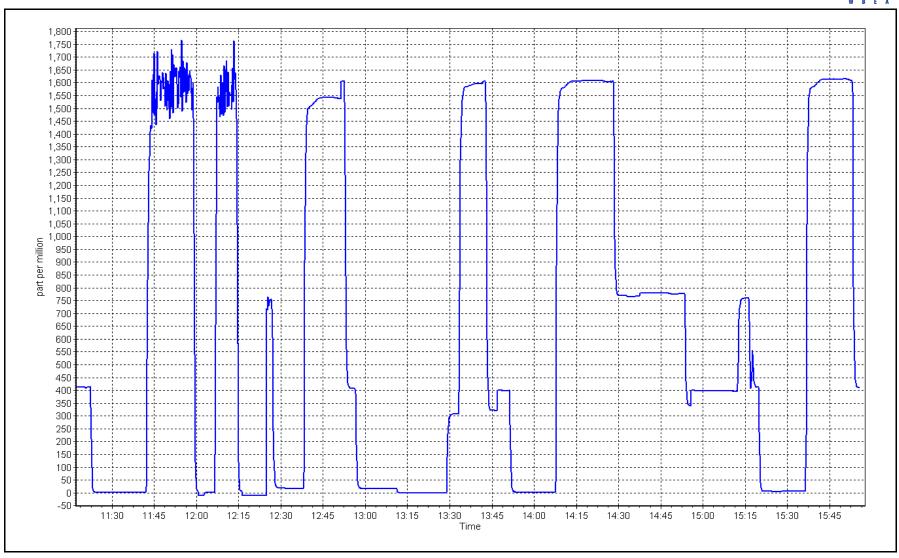


CO₂ Calibration Plot

Date: September 29, 2023

Location: Stony Mountain





W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Stony Mountain Station Number: AMS 18

Calibration Date: September 28, 2023 Prev Cal Date: August 24, 2023

Start Time (MST): 11:40 End Time (MST): 12:18

Tower Height (m): 20.0 Reason: Removal

Wind Speed Information

Sensor make/model: NA Serial Number: NA WS Calibrator: NA Serial Number: NA

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)			≥0.9995
Calculated slope			0.90 - 1.10
Calculated intercept			+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: D14057

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 13:27 Calc Declination*: 13.2 Degrees

Deadband calc: -1.8 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.4	
90	86.9	-0.9%
180	178.5	-0.4%
270	269.1	-0.2%
357	359.2	0.6%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999920	≥0.9995
Calculated slope		0.993367	0.90 - 1.10
Calculated intercept		1.758093	+/- 4

Notes: Removing WD sensor on the 20m tower due to suspect data. Crossarm aligned with true north.

Calibration Performed By: Rene, Ryan, & Devin

W B F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Stony Mountain Station Number: Station Name: **AMS 18** Prev Cal Date: Calibration Date: September 28, 2023 NA 12:00 Start Time (MST): 12:20 End Time (MST): Tower Height (m): 20.0 Reason: Install

Wind Speed Information

Sensor make/model: NA Serial Number: NA WS Calibrator: NA Serial Number: NA

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)			≥0.9995
Calculated slope			0.90 - 1.10
Calculated intercept			+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: C21021

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): 13:27 Calc Declination*: 13.2 Degrees

Deadband calc: -2.2 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357 $^{\circ}$ FS)

Indicated Direction (Degrees) (IV)	Limit = +/- 1.0%
0.4	
89.9	0.0%
179.4	-0.2%
270.3	0.1%
359.6	0.7%
	0.4 89.9 179.4 270.3

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999977	≥0.9995
Calculated slope		0.994666	0.90 - 1.10
Calculated intercept		0.477464	+/- 4

Notes: Installing new WD sensors on the 20m tower. Crossarm aligned with true north. No issues to note.

Calibration Performed By: Rene, Ryan & Devin



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19 FIREBAG SEPTEMBER 2023

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

October 30, 2023







SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Firebag Station number: AMS 19

Calibration Date: September 28, 2023 Last Cal Date: August 14, 2023 Start time (MST): 9:43 End time (MST): 14:03

Start time (MST): 9:43
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

Finish Finish Start Start Calibration slope: 0.999292 Backgd or Offset: 10.3 10.8 1.001265 0.975 Calibration intercept: 0.897402 0.237822 Coeff or Slope: 1.002

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	4999	0.0	0.0	0.5	
as found span	4919	81.1	799.5	823.0	0.971
as found 2nd point	4959	40.6	400.3	412.2	0.971
as found 3rd point	4980	20.3	200.1	206.6	0.969
new cylinder response					
calibrator zero	4999	0.0	0.0	-0.1	
high point	4919	81.1	799.5	798.8	1.001
second point	4959	40.6	400.3	400.9	0.998
third point	4980	20.3	200.1	200.2	1.000
as left zero	4999	0.0	0.0	0.0	
as left span	4919	81.1	799.5	796.0	1.004
			Avera	ge Correction Factor	1.000
Baseline Corr As found:	822.50	Previous response	801.38	*% change	2.6%
Baseline Corr 2nd AF pt:	411.70	AF Slope	: 1.028697	AF Intercept:	0.572269
Baseline Corr 3rd AF pt:	206.10	AF Correlation	: 1.000000		
				* = > +/-5% change initiate	es investigation

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

Calibration Performed By: Braiden Boutilier



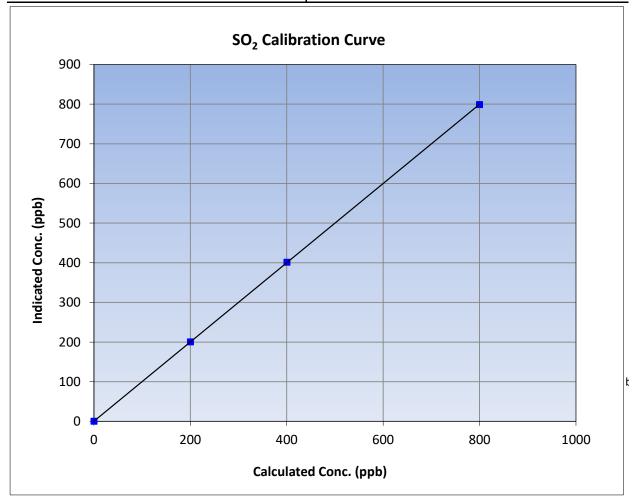
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 14, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 9:43 End Time (MST): 14:03 Analyzer make: Thermo 43i Analyzer serial #: 1410661308

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
799.5	798.8	1.0008	Correlation Coefficient	0.555556	20.993
400.3	400.9	0.9984	Slope	0.999292	0.90 - 1.10
200.1	200.2	0.9995	Siope	0.999292	0.90 - 1.10
			- Intercept	0.237822	+/-30

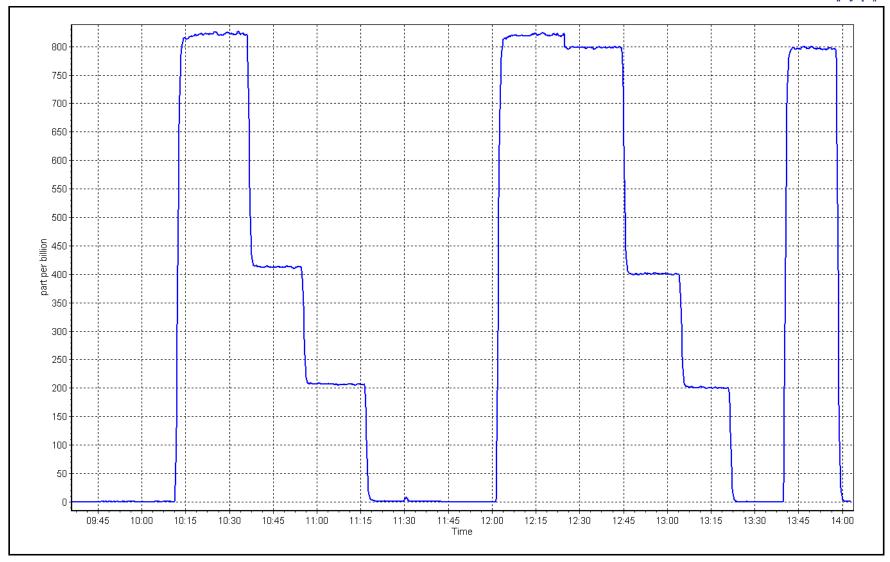


SO2 Calibration Plot

Date: September 28, 2023

Location: Firebag







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: **Firebag**

Calibration Date: September 11, 2023

Start time (MST): 10:05

Reason: Routine Station number: AMS19

> Last Cal Date: August 10, 2023

End time (MST): 14:43

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.114 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517427

Removed Cal Gas Conc: 5.114 Rem Gas Exp Date: n/a ppm Removed Gas Cyl #: Diff between cyl: n/a

Calibrator Make/Model: Teledyne API T700 Serial Number: 1607 ZAG Make/Model: Teledyne API T701 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680032

Global Converter serial #: 2022-222 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 0.993765 Backgd or Offset: 2.55 2.53 Calibration slope: 1.000053 Calibration intercept: -0.081596 -0.161463 Coeff or Slope: 1.122 1.122

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	4922	78.2	80.0	80.2	0.995
as found 2nd point	4961	39.1	40.0	40.0	0.995
as found 3rd point	4980	19.6	20.0	19.7	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	-0.2	
high point	4922	78.2	80.0	79.3	1.009
second point	4961	39.1	40.0	39.6	1.010
third point	4980	19.6	20.0	19.8	1.013
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.2	80.0	78.5	1.019
SO2 Scrubber Check	4922	78.3	800.2	0.1	
Date of last scrubber chan	ge:	January 18, 2023	_	Ave Corr Factor	1.010
Date of last converter effic	ciency test:	n/a		·	efficiency

Date of last converter efficie	ricy test.	πγα		,	Cificiency	
Baseline Corr As found:	80.4	Prev response:	79.90	*% change:	0.6%	
Baseline Corr 2nd AF pt:	40.2	AF Slope:	1.006339	AF Intercept:	-0.301622	
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999988			

* = > +/-5% change initiates investigation

Changed sample inlet filter after MPAF's. Ran SOx scrubber check after cal zero. No adjustments Notes: needed.

Calibration Performed By: Braiden Boutilier



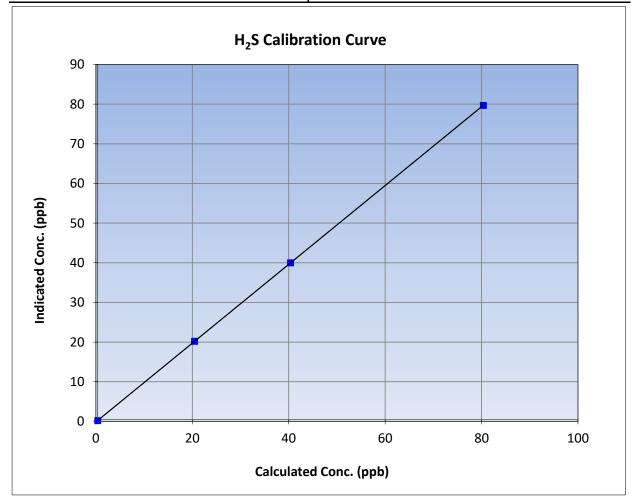
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 10, 2023 Station Name: Firebag Station Number: AMS19 Start Time (MST): 10:05 End Time (MST): 14:43 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680032

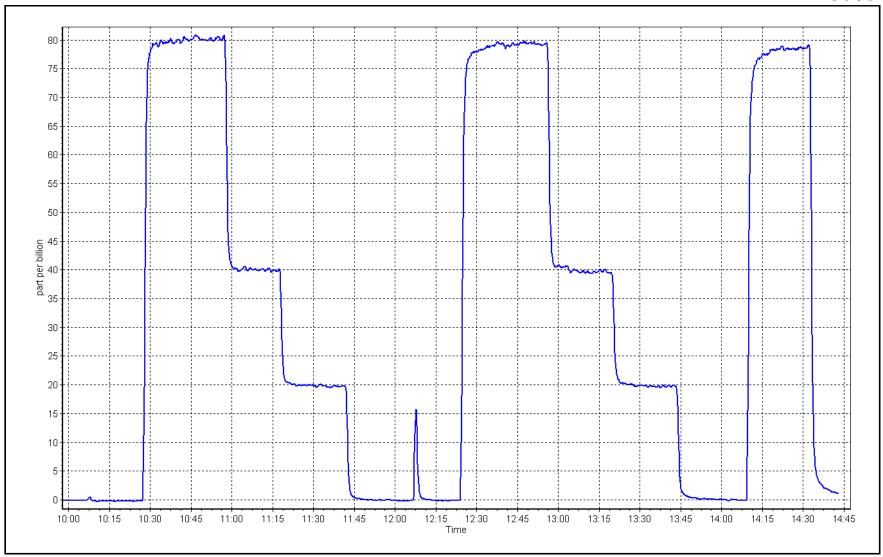
Calibration Data					
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999999	≥0.995
80.0	79.3	1.0086	Correlation coefficient	0.555555	20.333
40.0	39.6	1.0099	Slope	0.993765	0.90 - 1.10
20.0	19.8	1.0125	Slope	0.993703	0.90 - 1.10
			- Intercept	-0.161463	+/-3



Date: September 11, 2023

Location: Firebag







THC Calibration Report

Version-01-2020

Station Information

Station Name: **Firebag**

September 28, 2023 Calibration Date:

9:43 Start time (MST): Routine Reason:

Station number: **AMS 19**

Last Cal Date: August 29, 2023

End time (MST):

14:03

Calibration Standards

CC716618 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.7 CH4 Equiv Conc. 1066.9 ppm ppm

C3H8 Cal Gas Conc. 205.9 ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

205.9 Diff between cyl: Removed C3H8 Conc. ppm

Calibrator Make/Model: **API T700** Serial Number: 1607 ZAG Make/Model: **API T701** Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 0.994308 0.998771 3.27 3.48

Coefficient: Calibration intercept: -0.010322 -0.052126 3.762 3.796

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.00	0.05	
as found span	4919	81.1	17.31	17.21	1.006
as found 2nd point	4959	40.6	8.66	8.60	1.007
as found 3rd point	4980	20.3	4.33	4.44	0.976
new cylinder response					
calibrator zero	4999	0.0	0.00	-0.01	
high point	4919	81.1	17.31	17.27	1.002
second point	4959	40.6	8.66	8.53	1.016
third point	4980	20.3	4.33	4.26	1.016
as left zero	5000	0.0	0.00	-0.03	
as left span	4919	81.1	17.31	17.41	0.994
			Avera	ge Correction Factor	1.011
Baseline Corr As found:	17.16	Previous response	17.20	*% change	-0.2%
Baseline Corr 2nd AF pt:	8.55	AF Slope:	0.989495	AF Intercept:	0.078885
Baseline Corr 3rd AF pt:	4.39	AF Correlation:	0.999944		

Notes: Multipoint as founds done prior to installing firmware update. Adjusted zero and span.

Calibration Performed By: **Braiden Boutilier** * = > +/-5% change initiates investigation



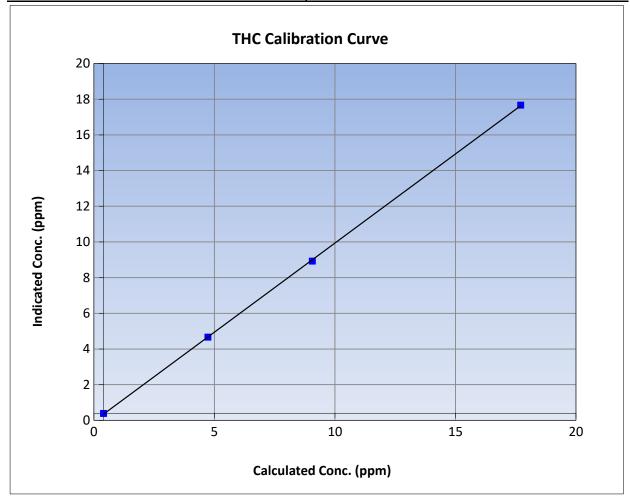
THC Calibration Summary

Version-01-2020

Station Information

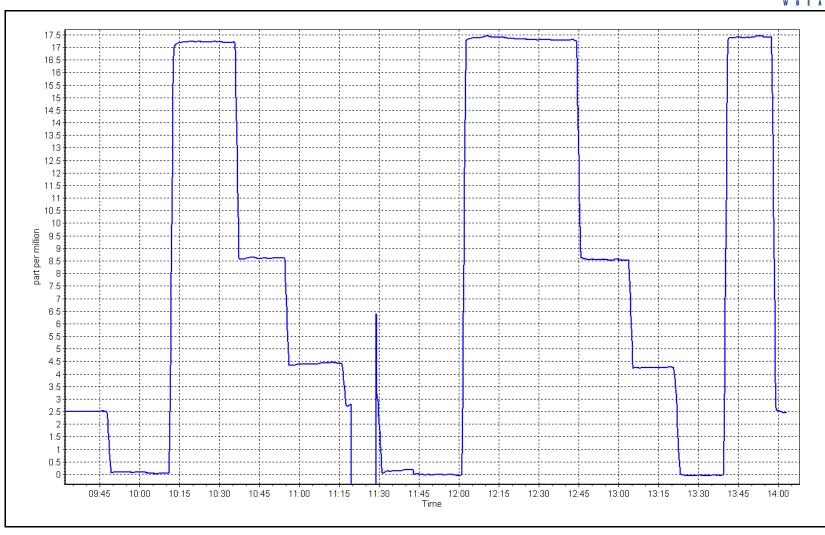
September 28, 2023 **Previous Calibration:** Calibration Date: August 29, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 9:43 End Time (MST): 14:03 Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.00	-0.01		Correlation Coefficient	0.999948	≥0.995				
17.31	17.27	1.0020	Correlation Coefficient	0.555546	20.333				
8.66	8.53	1.0157	Slope	0.998771	0.90 - 1.10				
4.33	4.26	1.0158	Slope	0.556771	0.90 - 1.10				
			- Intercept	-0.052126	+/-1.5				



Date: September 28, 2023 Location: Firebag







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Firebag

Calibration Date: September 29, 2023

Start time (MST): 9:49
Reason: Routine

Station number: AMS 19

Last Cal Date: August 16, 2023

End time (MST): 14:53

Calibration Standards

NO Gas Cylinder #: T2Y1K63 Cal Gas Expiry Date: November 30, 2023

NOX Cal Gas Conc: 51.12 ppm NO Cal Gas Conc: 49.40 ppm

Removed Cylinder #: n/a Removed Gas Exp Date: n/a
Removed Gas NOX Conc: 51.12 ppm Removed Gas NO Conc: 49.40

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** NO coeff or slope: 1.112 1.098 NO bkgnd or offset: 7.8 7.6 NOX coeff or slope: 0.993 0.993 NOX bkgnd or offset: 7.8 8.6 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 213.1 213.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998001	0.998622
NO _x Cal Offset:	1.176081	0.176163
NO Cal Slope:	0.999755	1.000897
NO Cal Offset:	0.048770	0.249004
NO ₂ Cal Slope:	1.004673	0.998565
NO ₂ Cal Offset:	0.372474	-1.744715



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	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/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.0	0.0	0.0	0.8	-0.2	1.0		
as found span	4919	81.0	828.1	800.3	27.9	847.0	816.0	31.3	0.9777	0.9807
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4		
high point	4919	81.0	828.1	800.3	27.9	827.0	801.0	25.8	1.0014	0.9991
second point	4960	40.5	414.0	400.1	13.9	413.6	401.2	12.4	1.0010	0.9973
third point	4980	20.2	206.5	199.6	6.9	207.2	200.0	7.2	0.9967	0.9978
as left zero	4999	0.0	0.0	0.0	0.0	-0.7	0.0	-0.7		
as left span	4919	81.0	828.1	364.1	464.1	827.0	365.1	461.9	1.0014	0.9972
							Average Co	Correction Factor	0.9997	0.9981
Corrected As fo	ound NO _X =	846.2 ppb	NO =	816.2 ppb	* = > +/-5%	change initiates i	investigation	*Percent Chang	ge NO _X =	2.2%
Previous Respo	onse NO _X =	827.7 ppb	NO =	800.1 ppb				*Percent Chang	ge NO =	2.0%
Baseline Corr 2	2nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt $NO_X =$	NA ppb	NO =	NA ppb	As found	NO r ² :		NO SI:	NO Int:	
	·	-			As found	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				e	GPT Calibration D)ata				
O3 Setpo	oint (ppb)	Indicated NO Referer concentration (ppb		cated NO Drop centration (ppb)	Calculated NO2 concentration (ppb)		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction factorized Calibration Limit = As Found Limit = C	0.95-1.05 Calibratio	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)	800.0		363.8	464.1		462.5	1.0034		99.7%
2nd GPT point	it (200 ppb O3)	800.0		582.9	245.0		242.0	1.0122		98.8%
				691.6	136.3		133.0	1.0245	5	97.6%
3rd GPT point	t (100 ppb O3)	800.0		091.0	130.3		133.0	1.024		37.070

Notes:

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

Calibration Performed By: Braiden Boutilier



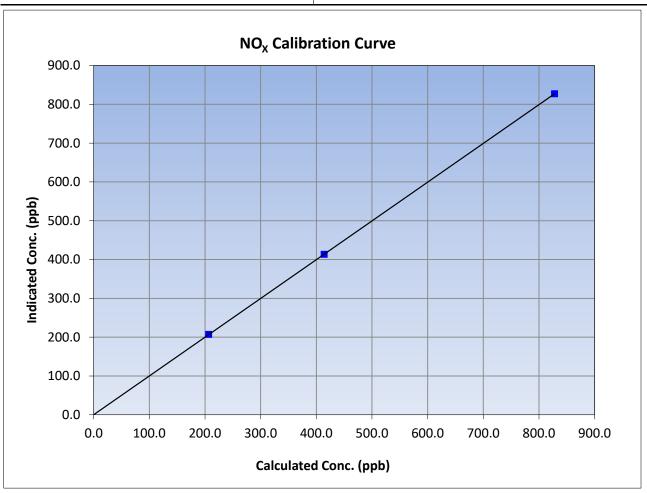
NO_x Calibration Summary

Version-04-2020

Station Information

September 29, 2023 Calibration Date: Previous Calibration: August 16, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:49 End Time (MST): 14:53 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	-0.4		Correlation Coefficient	0.999997	≥0.995	
828.1	827.0	1.0014	Correlation Coefficient	0.55557	20.999	
414.0	413.6	1.0010	Slope	0.998622	0.90 - 1.10	
206.5	207.2	0.9967	Slope	0.998022	0.90 - 1.10	
			Intercept	0.176163	+/-20	





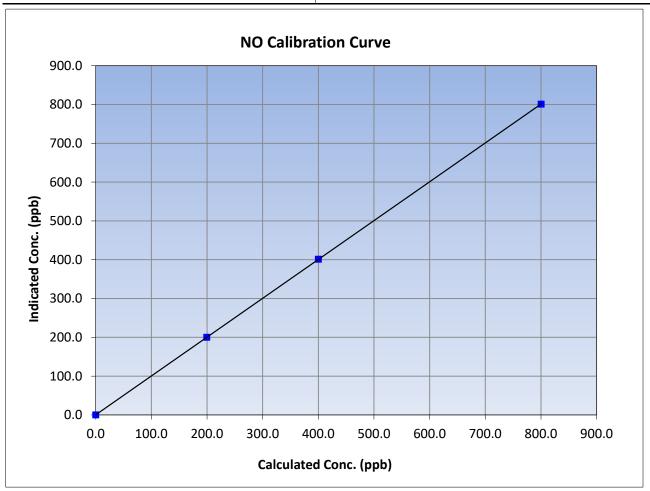
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 29, 2023 Previous Calibration: August 16, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:49 End Time (MST): 14:53 Analyzer make: Thermo 42i Analyzer serial #: 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999999	≥0.995	
800.3	801.0	0.9991	Correlation Coefficient	0.555555	20.993	
400.1	401.2	0.9973	Slope	1.000897	0.90 - 1.10	
199.6	200.0	0.9978	Slope	1.000697	0.90 - 1.10	
			Intercept	0.249004	+/-20	





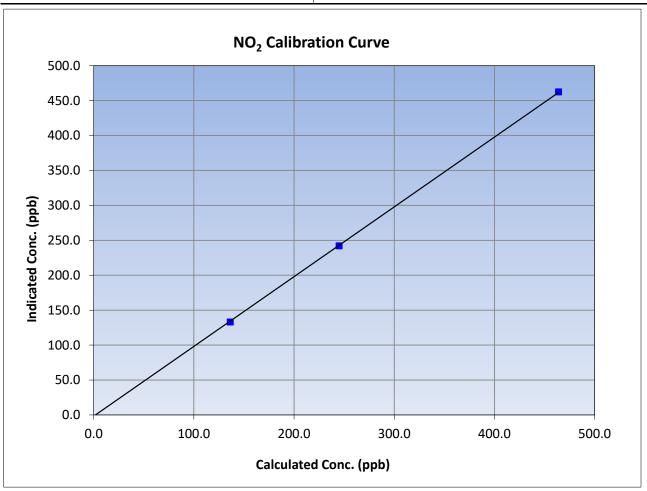
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 29, 2023 Previous Calibration: August 16, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 9:49 End Time (MST): 14:53 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	-0.4		Correlation Coefficient	0.999956	≥0.995	
464.1	462.5	1.0034	Correlation Coefficient	0.99990	20.555	
245.0	242.0	1.0122	Slope	0.998565	0.90 - 1.10	
136.3	133.0	1.0245	Slope	0.996303	0.90 - 1.10	
			Intercept	-1.744715	+/-20	

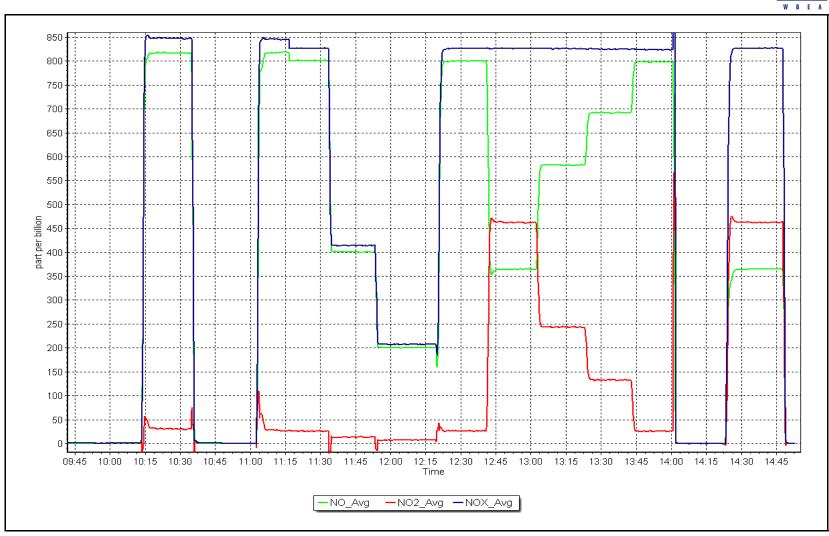


NO_x Calibration Plot

Date: September 29, 2023

Location: Firebag







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20 MACKAY RIVER SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

AMS20

Version-01-2020

Station Information

Station Name: MacKay River Station number:

Calibration Date: September 12, 2023 Last Cal Date: August 8, 2023 Start time (MST): 7:46 End time (MST): 10:25

Start time (MST): 7:46
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

StartFinishStartFinishCalibration slope:0.9978650.998878Backgd or Offset:18.218.2

Calibration intercept: 2.431247 3.251492 Coeff or Slope: 0.945 0.945

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	5000	0.0	0.0	0.4	
as found span	4919	81.3	800.3	802.0	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4919	81.3	800.3	801.8	0.998
second point	4959	40.7	400.7	403.2	0.994
third point	4980	20.3	199.8	206.7	0.967
as left zero	5000	0.0	0.0	0.6	
as left span	4919	81.3	800.3	802.5	0.997
			Averag	ge Correction Factor	0.986

Baseline Corr As found: 801.60 Previous response 800.99 *% change 0.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept:

NA AF Slope: AF Intercept:

* = > +/-5% change initiates investigation

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



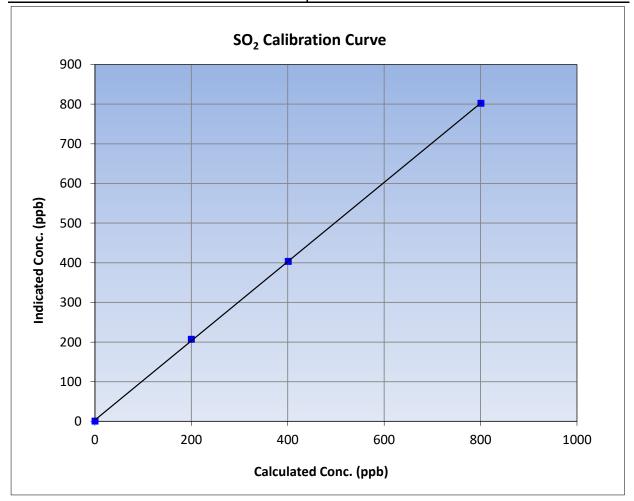
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 12, 2023 **Previous Calibration:** August 8, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:46 End Time (MST): 10:25 Analyzer make: Thermo 43i Analyzer serial #: 1501301450

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	0.999934	≥0.995				
800.3	801.8	0.9981	- Correlation Coefficient	0.333334	20.995				
400.7	403.2	0.9937	Slope	0.998878	0.90 - 1.10				
199.8	206.7	0.9667	Slope	0.996676	0.90 - 1.10				
			- Intercept	3.251492	+/-30				

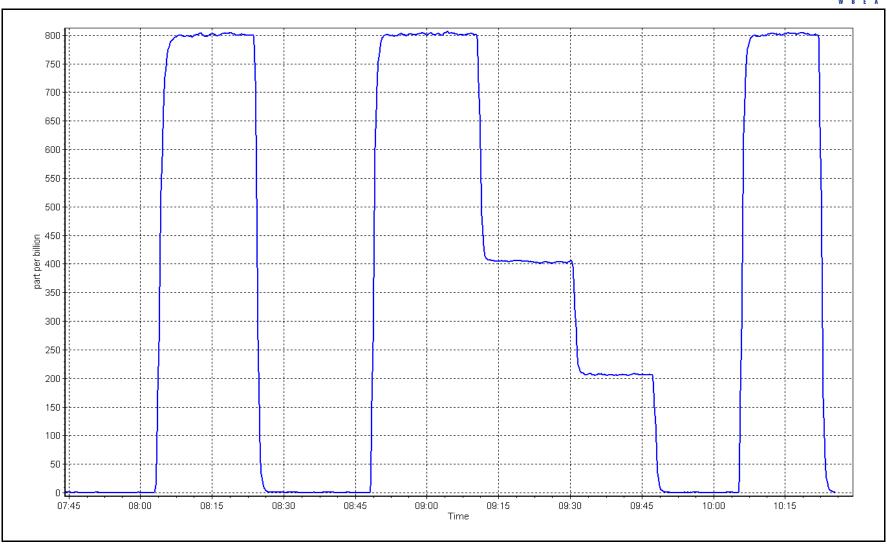


SO2 Calibration Plot

Date: September 12, 2023

Location: MacKay River







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: MacKay River Calibration Date: September 11, 2023

Start time (MST): 6:58

Reason: Routine Station number: AMS20

Last Cal Date: August 4, 2023

End time (MST): 11:07

Calibration Standards

Cal Gas Exp Date: January 3, 2026 Cal Gas Concentration: 5.12 ppm

Cal Gas Cylinder #: CC515997

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.12 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 1220 Serial Number: ZAG Make/Model: Teledyne API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 43iQ TLE Analyzer serial #: 12124313139

Global Converter serial #: 2022-226 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 0.994521 0.995379 Backgd or Offset: 0.91 Calibration slope: 1.0 0.407078 Calibration intercept: 0.287104 Coeff or Slope: 0.501 0.535

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	78.1	80.0	86.7	0.923
as found 2nd point	4961	39.0	39.9	43.6	0.918
as found 3rd point	4980	19.5	20.0	22.1	0.908
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	4922	78.1	80.0	80.0	1.000
second point	4961	39.0	40.0	40.2	0.994
third point	4980	19.5	20.0	20.6	0.972
as left zero	5000	0.0	0.0	0.2	
as left span	4922	78.1	80.0	79.0	1.013
SO2 Scrubber Check	4919	80.0	800.2	0.0	
Date of last scrubber chang	ge:	May 25, 2023		Ave Corr Factor	0.989
Date of last converter efficiency test: efficiency					

Baseline Corr As found: 86.6 Prev response: 79.82 *% change: 7.8%

Baseline Corr 2nd AF pt: 43.5 AF Slope: 1.081621 Baseline Corr 3rd AF pt: 22.0 AF Correlation: 0.999975

* = > +/-5% change initiates investigation

AF Intercept:

0.301040

Lamp voltage slowly going up causing the spans to go up. Changing Lamp didn't work, continued Notes:

calibration. Sox scrubber checked after calibrator zero. Span adjusted.

Calibration Performed By: Melissa Lemay



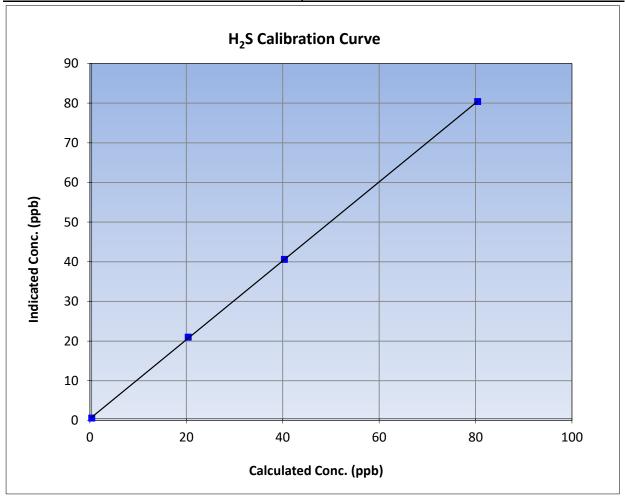
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 4, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 6:58 End Time (MST): 11:07 Analyzer make: Thermo 43iQ TLE Analyzer serial #: 12124313139

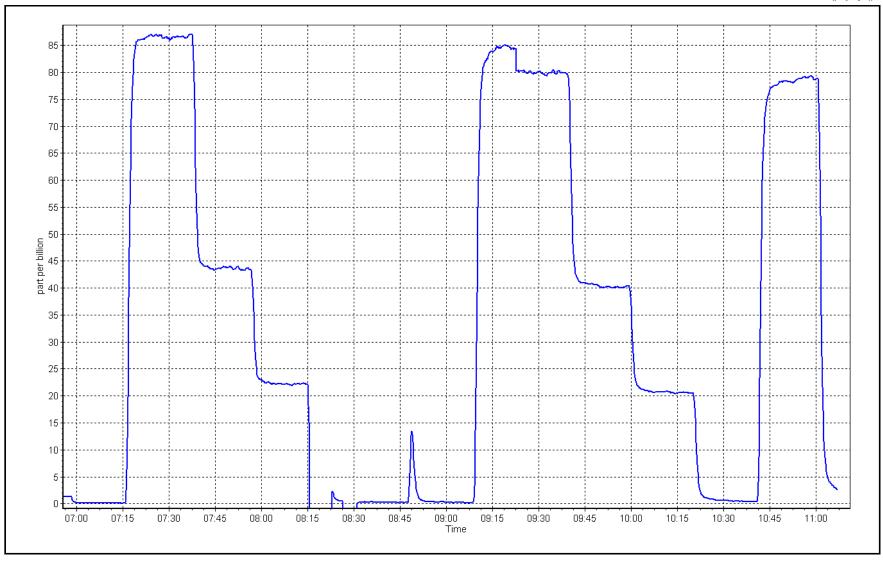
Calibration Data									
Calculated concentration Indicated concentration (ppb) (Ic) Correction factor (ppb) (Cc) (ppb) (Ic) Correction factor (Cc/Ic) Statistical Evaluation									
0.0	0.2		Correlation Coefficient	0.999965	≥0.995				
80.0	80.0	1.0004	Correlation coefficient	0.999903	20.333				
40.0	40.2	0.9942	Slope	0.995379	0.90 - 1.10				
20.0	20.6	0.9717	Slope	0.333373	0.30 - 1.10				
			- Intercept	0.407078	+/-3				



Date: September 11, 2023

Location: MacKay River







THC Calibration Report

Version-01-2020

Station Information

Station Name: MacKay River

Calibration Date: September 12, 2023

Start time (MST): 7:46
Reason: Routine

Station number: AMS20

Last Cal Date: August 8, 2023

End time (MST): 10:24

Removed Gas Expiry: NA

Calibration Standards

Gas Cert Reference: CC306868 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.40 ppm CH4 Equiv Conc. 1066.45 ppm

C3H8 Cal Gas Conc. <u>206.20</u> ppm

Removed Gas Cert: NA

Removed CH4 Conc. 499.40 ppm CH4 Equiv Conc. 1066.45 ppm

Removed C3H8 Conc. 206.20 ppm Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 1220 ZAG Make/Model: Teledyne API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

Analyzer Range: 0 - 20 ppm

Baseline Corr 3rd AF pt:

Start Finish Finish Start Calibration slope: Background: 0.992565 0.991950 3.090 3.330 Coefficient: Calibration intercept: 0.123818 0.123233 5.465 5.583

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentrati (ppm) (Cc)	ion Indicated Concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.19	
as found span	4919	81.3	17.34	17.23	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.10	
high point	4919	81.3	17.34	17.33	1.001
second point	4959	40.7	8.68	8.69	0.999
third point	4980	20.3	4.33	4.48	0.966
as left zero	5000	0.0	0.00	-0.07	
as left span	4919	81.3	17.34	17.26	1.005
			А	verage Correction Factor	0.989
Baseline Corr As found:	17.04	Previous response	17.33	*% change	-1.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes: No maintenance done. Zero and Span adjusted.

AF Correlation:

Calibration Performed By: Melissa Lemay

NA

* = > +/-5% change initiates investigation



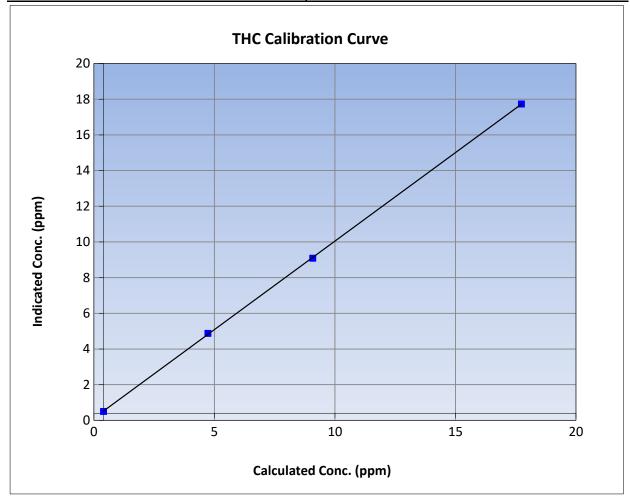
THC Calibration Summary

Version-01-2020

Station Information

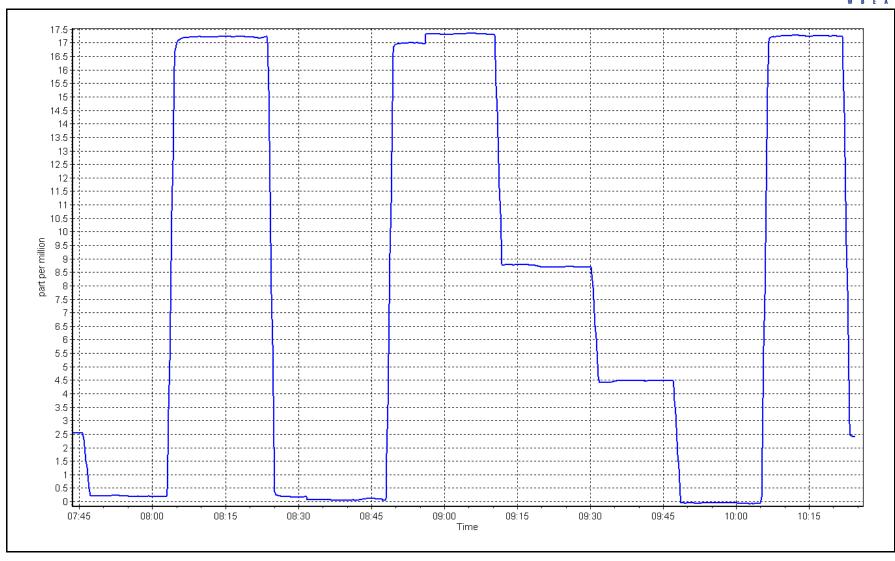
Previous Calibration: Calibration Date: September 12, 2023 August 8, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:46 End Time (MST): 10:24 Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

Calibration Data						
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.00	0.10		Correlation Coefficient	0.999960	≥0.995	
17.34	17.33	1.0005	Correlation Coefficient	0.999900	20.993	
8.68	8.69	0.9990	Slope	0.991950	0.90 - 1.10	
4.33	4.48	0.9664	Slope	0.551550	0.90 - 1.10	
			- Intercept	0.123233	+/-1.5	



THC Calibration Plot Date: September 12, 2023 Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: MacKay River Calibration Date: September 14, 2023

Start time (MST): 6:40 Reason: Routine Station number: AMS20

August 3, 2023 Last Cal Date:

End time (MST): 10:50

Calibration Standards

T376265 NO Gas Cylinder #: Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: NO Cal Gas Conc: 49.19 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NO Conc: Removed Gas NOX Conc: 49.19 ppm 48.04 ppm NO gas Diff:

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:	1.503	1.536	NO bkgnd or offset:	4.2	4.3
NOX coeff or slope:	0.992	0.992	NOX bkgnd or offset:	4.2	4.3
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	182.5	182.5

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.986386	0.996495
NO _x Cal Offset:	3.150520	3.649884
NO Cal Slope:	0.988909	0.997991
NO Cal Offset:	1.711850	2.330879
NO ₂ Cal Slope:	1.003108	1.001543
NO ₂ Cal Offset:	1.350779	-0.862665



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/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	0.2		
as found span	4917	83.3	819.5	800.3	19.2	800.3	780.6	19.7	1.0239	1.0252
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.1	0.3		
high point	4917	83.3	819.5	800.3	19.2	819.0	800.2	18.7	1.0006	1.0001
second point	4956	41.7	410.4	400.8	9.6	413.1	402.6	10.4	0.9935	0.9956
third point	4979	20.8	204.6	199.9	4.8	211.6	204.6	7.0	0.9671	0.9768
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.1	0.3		
as left span	4917	83.3	819.5	442.1	377.4	818.7	438.7	380.0	1.0009	1.0077
							Average C	orrection Factor	0.9871	0.9909
Corrected As fo	ound NO _X =	800.2 ppb	NO =	780.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-1.4%
Previous Respo	nse NO _X =	811.5 ppb	NO =	793.1 ppb				*Percent Chang	ge NO =	-1.6%
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:	
				(GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated N concentration (pp		ndicated NO2 entration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	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)									

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 maintenance done. Span adjusted.

377.8

204.0

113.6

Average Correction Factor

0.9988

1.0057

1.0172

1.0072

377.4

205.2

115.6

Calibration Performed By:

Melissa Lemay

437.8

610.0

699.6

796.0

796.0

796.0

100.1%

99.4%

98.3%

99.3%



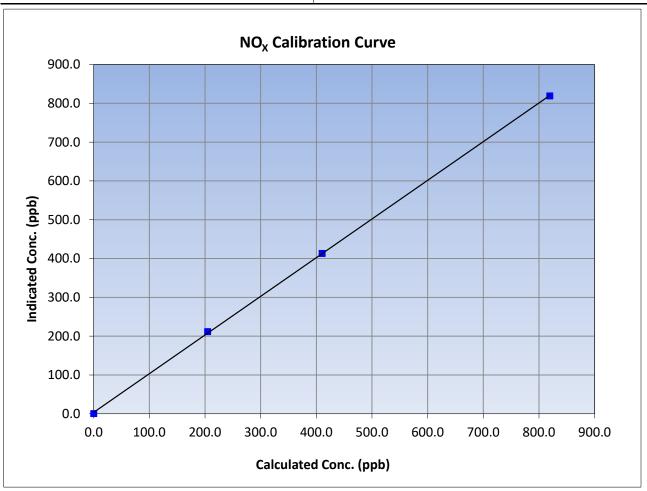
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 14, 2023 Previous Calibration: August 3, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 6:40 End Time (MST): 10:50 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999922	≥0.995
819.5	819.0	1.0006	Correlation Coefficient	0.333322	20.995
410.4	413.1	0.9935	Slope	0.996495	0.90 - 1.10
204.6	211.6	0.9671	Slope	0.990495	0.90 - 1.10
			Intercept	3.649884	+/-20





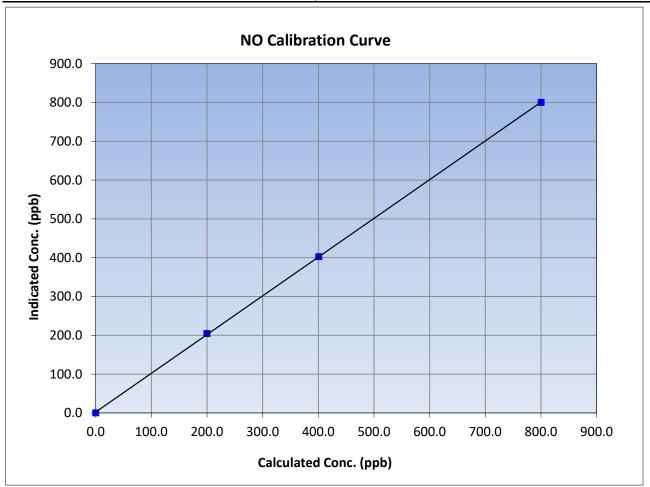
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 14, 2023 Previous Calibration: August 3, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 6:40 End Time (MST): 10:50 Analyzer make: Thermo 42i Analyzer serial #: 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999961	≥0.995
800.3	800.2	1.0001	Correlation Coefficient	0.999901	20.333
400.8	402.6	0.9956	Slope	0.997991	0.90 - 1.10
199.9	204.6	0.9768	Slope	0.557551	0.90 - 1.10
			Intercept	2.330879	+/-20





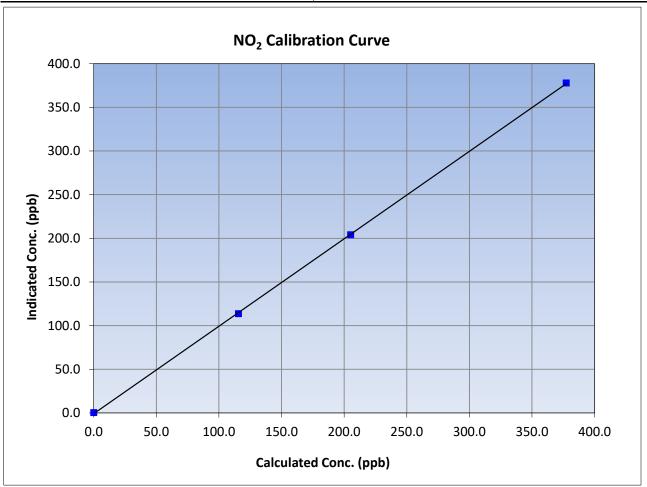
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 14, 2023 Previous Calibration: August 3, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 6:40 End Time (MST): 10:50 Analyzer make: Thermo 42i Analyzer serial #: 1505164379

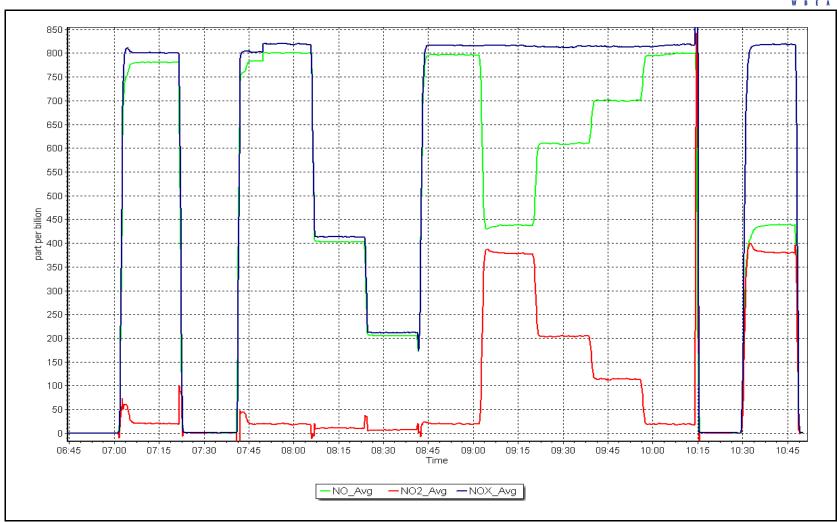
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999949	≥0.995
377.4	377.8	0.9988	Correlation Coefficient	0.333343	20.993
205.2	204.0	1.0057	Slope	1.001543	0.90 - 1.10
115.6	113.6	1.0172	Slope	1.001545	0.90 - 1.10
			Intercept	-0.862665	+/-20



Date: September 14, 2023

Location: MacKay River





W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: MacKay River Station Number: AMS 20

Calibration Date: September 12, 2023 Prev Cal Date: August 23, 2022

Start Time (MST): 9:13 End Time (MST): 9:43
Tower Height (m): 10m Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: Y18363 WS Calibrator: MetOne 053 Serial Number: P15103

% Error Shaft RPM Calculated Speed (K/hr) (Cv) Indicated Speed (K/hr) (Iv) *Limit = +/- 1.5%* 0.0 0.0 0 200 20.2 20.2 0.2% 400 39.4 39.4 0.1% 58.7 600 58.6 0.2% 800 77.8 77.8 0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999999	0.999999	≥0.9995
Calculated slope	0.998857	0.998949	0.90 - 1.10
Calculated intercept	0.030366	-0.013169	+/- 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: N9937

As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14 Solar noon time (MST): NA Calc Declination*: NA Degrees

Deadband calc:

2.9 degrees (Limit 4 deg)

*- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	0.0	
90	89.0	-0.3%
180	179.2	-0.2%
270	270.5	0.1%
357	354.1	-0.8%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)	0.999946	0.999969	≥0.9995
Calculated slope	1.009899	1.004747	0.90 - 1.10
Calculated intercept	0.928586	-0.011707	+/- 4

Notes: WS/WD passed the Torque test. WD head replaced, due to crack.

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS21 CONKLIN SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

AMS21

Version-01-2020

Station Information

Station Name: Conklin Station number:

Calibration Date: September 26, 2023 Last Cal Date: August 3, 2023 Start time (MST): 11:10 End time (MST): 14:32

Start time (MST): 11:10
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: 691

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:1.0069091.000644Backgd or Offset:26.826.8

Calibration intercept: 0.556149 0.775866 Coeff or Slope: 0.883 0.883

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	5005	0.0	0.0	0.2	
as found span	4920	80.2	8.008	799.5	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	0.3	
high point	4920	80.2	8.008	802.0	0.999
second point	4960	40.1	400.4	401.4	0.998
third point	4980	20.0	200.1	201.7	0.992
as left zero	5005	0.0	0.0	0.3	
as left span	4920	80.2	8.008	803.0	0.997
			Averag	e Correction Factor	0.996
<u> </u>					

Baseline Corr As found: 799.30 Previous response 806.93 *% change -1.0%

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. No adjustments made.

Calibration Performed By: Braiden Boutilier



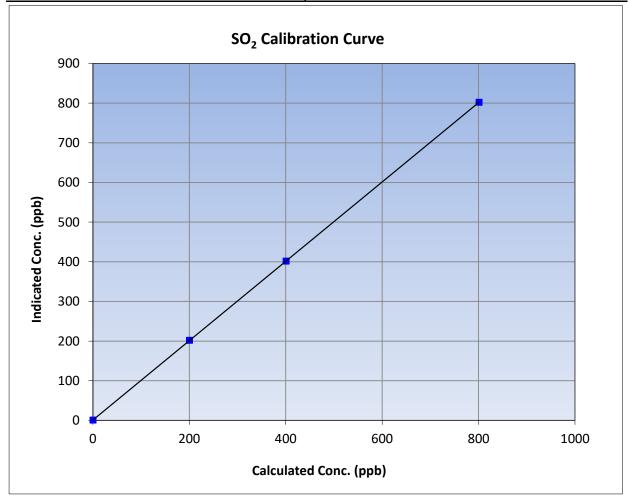
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 26, 2023 **Previous Calibration:** August 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:10 End Time (MST): 14:32 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	0.3		Correlation Coefficient	0.999998	≥0.995		
800.8	802.0	0.9986	Correlation Coefficient	0.999996	20.333		
400.4	401.4	0.9976	Slope	1.000644	0.90 - 1.10		
200.1	201.7	0.9922	Slope		0.90 - 1.10		
			Intercept	0.775866	+/-30		

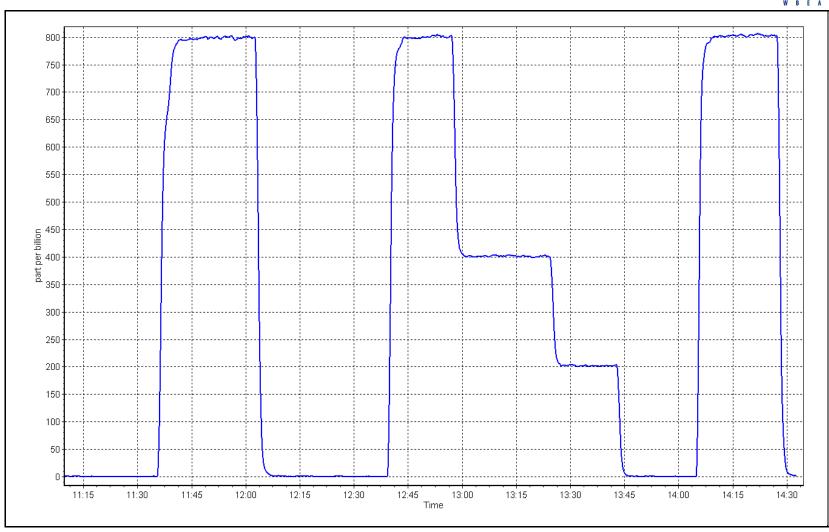


SO2 Calibration Plot

Date: September 26, 2023

Location: Conklin







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Conklin

Calibration Date: September 14, 2023

Start time (MST): 9:30

Reason: Routine Station number:

Last Cal Date: August 24, 2023

AMS21

End time (MST): 13:34

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.00 ppm

Cal Gas Cylinder #: CC501204

Removed Cal Gas Conc: 5.00 ppm Removed Gas Cyl #: NA Calibrator Make/Model: API T700

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3810 Serial Number: 691

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

CD-Nova 101 Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

Baseline Corr As found:

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

Start <u>Finish</u> 1.004857 1.007429 Backgd or Offset: Calibration slope: 2.4 2.4 0.140000 0.958 Calibration intercept: 0.280000 Coeff or Slope: 0.958

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4920	80.0	80.0	80.5	0.994
as found 2nd point	4960	40.0	40.0	40.4	0.990
as found 3rd point	4980	20.0	20.0	20.3	0.985
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.0	80.0	80.7	0.991
second point	4960	40.0	40.0	40.5	0.988
third point	4980	20.0	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.3	
as left span	4920	80.0	80.0	79.7	1.004
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha	ange:			Ave Corr Factor	0.988

Date of last scrubber change:	Ave Corr Factor	0.988
Date of last converter efficiency test:		efficiency

80.67

Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.005714 Baseline Corr 3rd AF pt: 20.3 AF Correlation: 0.999993

* = > +/-5% change initiates investigation

*% change:

AF Intercept:

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

Prev response:

Calibration Performed By: Mohammed Kashif

80.5

-0.2%

0.100000



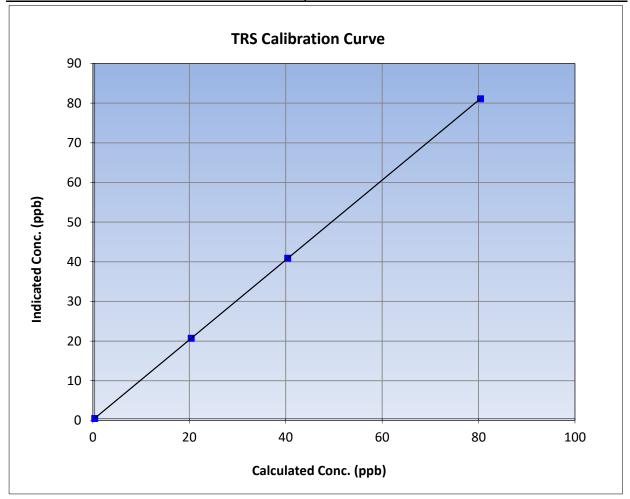
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 14, 2023 **Previous Calibration:** August 24, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:30 End Time (MST): 13:34 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

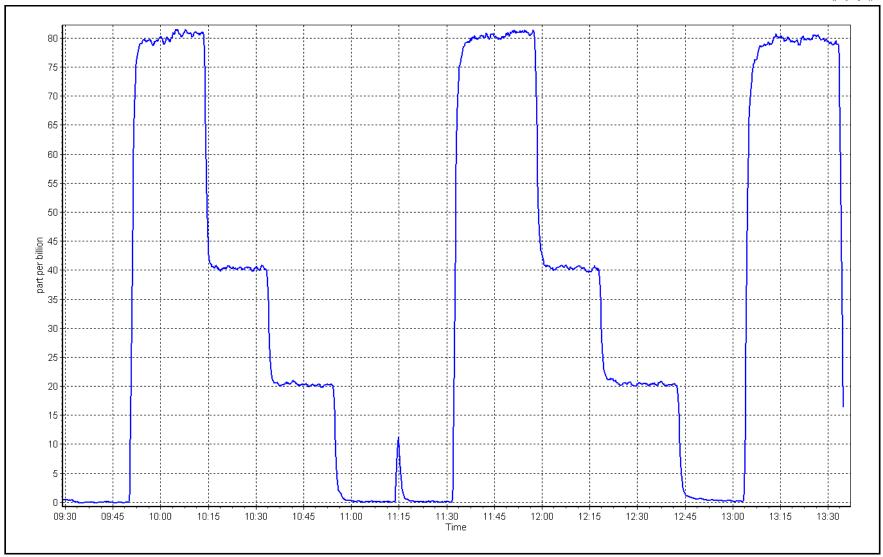
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999998	≥0.995		
80.0	80.7	0.9913	Correlation Coefficient	0.55555	20.993		
40.0	40.5	0.9877	Slope	1.007429	0.90 - 1.10		
20.0	20.3	0.9852	Зюре		0.90 - 1.10		
			- Intercept	0.140000	+/-3		



TRS Calibration Plot

Date: September 14, 2023 Location: Conklin







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Conklin Station Name:

Calibration Date: September 26, 2023

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

Station number: AMS21

Last Cal Date: August 3, 2023

End time (MST): 14:32

Removed Gas Expiry: NA

Calibration Standards

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 CH4 Equiv Conc. 1067.7 ppm ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NΑ

Removed CH4 Conc. 497.9 CH4 Equiv Conc. 1067.7 ppm ppm

Removed C3H8 Conc. Diff between cyl (THC): 207.2 ppm

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

Calibrator Model: Teledyne API T700 Serial Number: 3810 ZAG make/model: Teledyne API 701H Serial Number: 691

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259521

THC Range (ppm): 0 - 20 ppm

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

> <u>Star</u>t **Finish Finish Start**

CH4 SP Ratio: 2.29E-04 2.29E-04 NMHC SP Ratio: 5.09E-05 5.09E-05 12.00 12.00 CH4 Retention time: NMHC Peak Area: 179681 179681

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	4920	80.2	17.13	16.95	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	80.2	17.13	17.10	1.001
second point	4960	40.1	8.56	8.54	1.003
third point	4980	20.0	4.27	4.28	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.02	1.006
			P	Average Correction Factor	1.001
Baseline Corr AF:	16.95	Prev response	17.09	*% change	-0.9%
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

Set Point	Dil air flow rate	NMHC Calibr		Ind conc (nom) (Is)	CE Limite 0.05 4.05
		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	1.010
as found span	4920	80.2	9.14	8.98	1.018
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.08	1.007
second point	4960	40.1	4.57	4.56	1.003
third point	4980	20.0	2.28	2.29	0.995
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.02	1.013
			Ave	rage Correction Factor	1.002
Baseline Corr AF:	8.98	Prev response	9.13	*% change	-1.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	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	4920	80.2	7.99	7.97	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	8.02	0.996
second point	4960	40.1	3.99	3.98	1.003
third point	4980	20.0	1.99	1.99	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.99	0.999
•			Ave	rage Correction Factor	1.000
Baseline Corr AF:	7.97	Prev response	7.96	*% 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>		<u>Finish</u>	
THC Cal Slope:		0.997914		0.998108	
THC Cal Offset:		0.005170		0.004967	
CH4 Cal Slope:		0.998322		1.004174	
CH4 Cal Offset:		-0.008057		-0.009247	
NMHC Cal Slope:		0.997658		0.992770	
		5.557,656		5.552,70	

0.012827

Notes:

NMHC Cal Offset:

Replaced Nitrogen cylinder. No adjustments made.

0.013615

Calibration Performed By: Braiden Boutilier



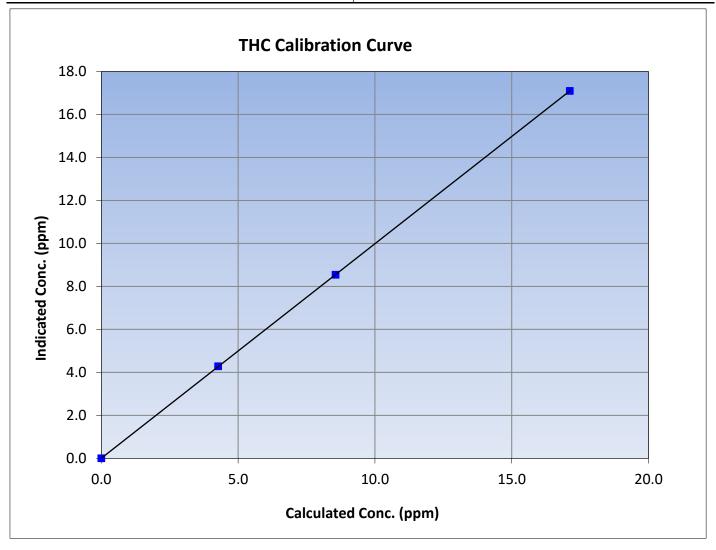
THC Calibration Summary

Version-06-2022

Station Information

September 26, 2023 Calibration Date: **Previous Calibration:** August 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:10 End Time (MST): 14:32 Analyzer make: Analyzer serial #: 1331259521 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
17.13	17.10	1.0015	Correlation Coefficient	0.333336	20.333
8.56	8.54	1.0027	Slope	0.998108	0.90 - 1.10
4.27	4.28	0.9974	Slope	0.556106	0.90 - 1.10
		·	Intercept	0.004967	+/-0.5





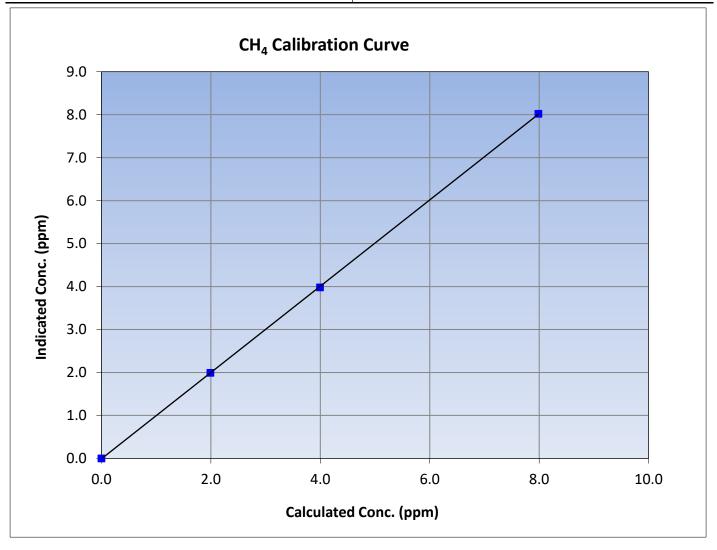
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 26, 2023 **Previous Calibration:** August 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:10 End Time (MST): 14:32 Analyzer make: Analyzer serial #: 1331259521 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	0.999983	≥0.995
7.99	8.02	0.9958	Correlation Coemicient	0.333363	20.333
3.99	3.98	1.0033	Slope	1.004174	0.90 - 1.10
1.99	1.99	0.9998	Slope	1.004174	0.90 - 1.10
			Intercept	-0.009247	+/-0.5





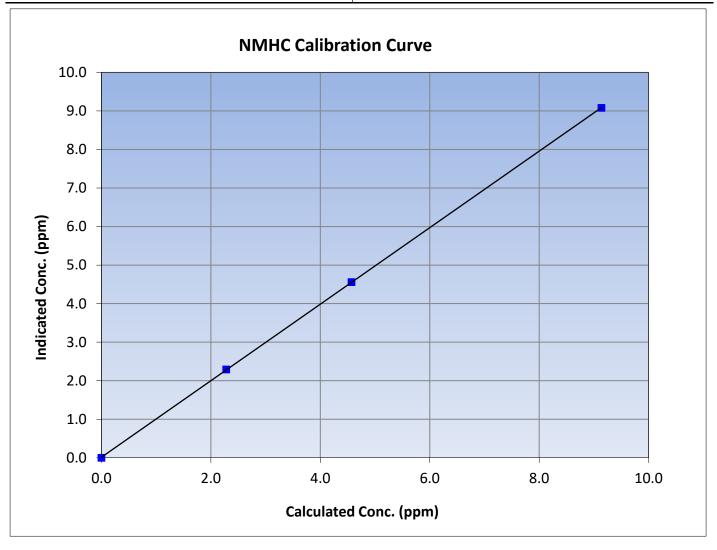
NMHC Calibration Summary

Version-06-2022

Station Information

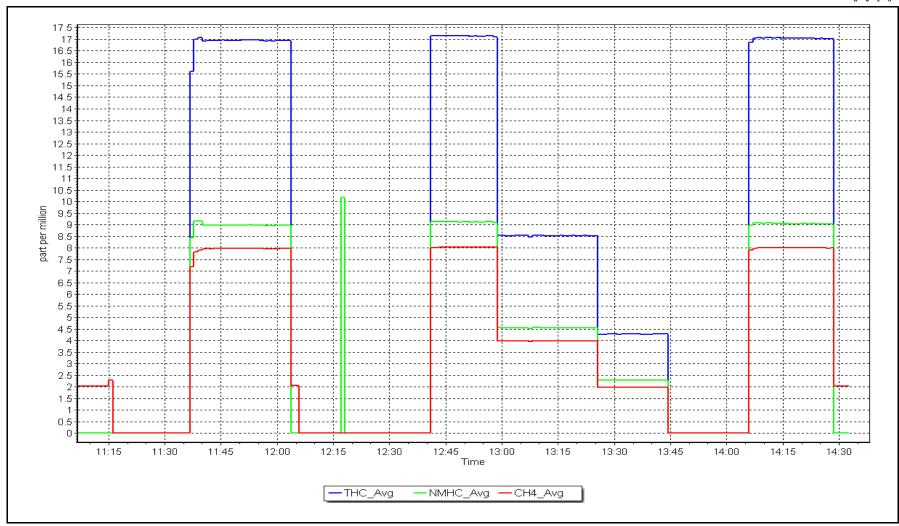
September 26, 2023 Calibration Date: **Previous Calibration:** August 3, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:10 End Time (MST): 14:32 Analyzer make: Analyzer serial #: 1331259521 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999990	≥0.995
9.14	9.08	1.0065	Correlation Coemicient	0.555550	20.333
4.57	4.56	1.0028	Slope	0.992770	0.90 - 1.10
2.28	2.29	0.9953	Slope	0.332770	0.90 - 1.10
			Intercept	0.013615	+/-0.5



Date: September 26, 2023 Location: Conklin







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Conklin

Calibration Date: September 21, 2023

Start time (MST): 10:27 Reason: Routine Station number: AMS21

Last Cal Date: August 10, 2023

End time (MST): 14:53

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 T700 Serial Number: 3810 ZAG make/model: Teledyne API T701H Serial Number: 691

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: 1.120 1.104 NO bkgnd or offset: 11.2 11 NOX coeff or slope: 1.000 1.000 NOX bkgnd or offset: 11.4 11.1 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 167.6 167.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998758	0.993898
NO _x Cal Offset:	1.603828	2.303154
NO Cal Slope:	0.999738	0.994967
NO Cal Offset:	0.741061	1.360599
NO ₂ Cal Slope:	1.000498	0.989964
NO ₂ Cal Offset:	0.217772	-0.688924



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibration	n Data				
Set Point E	Dilution flow rate (sccm)	Source gas flow	alculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4921	79.4	811.2	800.1	11.1	829.1	815.4	13.7	0.9785	0.9812
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	4921	79.4	811.2	800.1	11.1	807.5	796.9	10.7	1.0046	1.0041
second point	4960	39.7	405.7	400.1	5.6	406.6	399.8	6.8	0.9977	1.0008
third point	4980	19.8	202.3	199.6	2.8	205.6	201.5	4.1	0.9841	0.9903
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4921	79.4	811.2	389.2	422.0	811.1	393.9	417.2	1.0002	0.9881
							Average C	Correction Factor	0.9955	0.9984
Corrected As fou	und NO _X =	829.2 ppb	NO =	815.5 ppb	* = > +/-5%	% change initiates i	investigation	*Percent Chang	ge NO _X =	2.1%
Previous Respon	ise NO _X =	811.8 ppb	NO =	800.6 ppb				*Percent Chang	ge NO =	1.8%
Baseline Corr 2nd			NO =		As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3rd	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:	
				e	GPT Calibration [Data				
O3 Setpoin	nt (ppb)	Indicated NO Reference concentration (ppt		cated NO Drop entration (ppb)	Calculated NO concentration (ppt		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	erter Efficiency on Limit = 96-104%
as found G	PT zero									
as found GPT point	t (400 ppb NO2)									
as found GPT point	t (200 ppb NO2)									
as found GPT point	t (100 ppb NO2)									
1st GPT point (4	400 ppb O3)	800.6		389.7	422.0		417.7	1.0103		99.0%
2nd GPT point ((200 ppb O3)	800.6		592.1	219.6		215.8	1.0177		98.3%
2rd CDT point /	(100 ppb O3)	800.6		697.1	114.6		112.3	1.0206	<u> </u>	98.0%
Stu GPT point (100 pp 000)									

Notes:

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

Calibration Performed By: Rene Chamberland



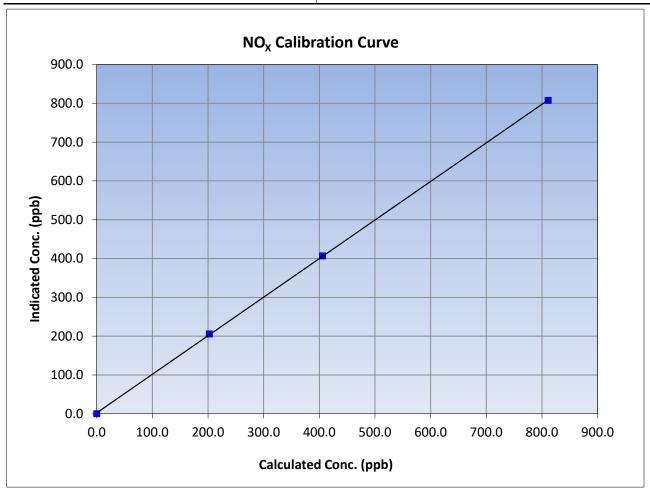
NO_x Calibration Summary

Version-04-2020

Station Information

September 21, 2023 Calibration Date: Previous Calibration: August 10, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:27 End Time (MST): 14:53 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	0.999966	≥0.995	
811.2	807.5	1.0046	Correlation Coefficient	0.555500	20.333	
405.7	406.6	0.9977	Slope	0.993898	0.90 - 1.10	
202.3	205.6	0.9841	Slope	0.333636	0.90 - 1.10	
			Intercept	2.303154	+/-20	





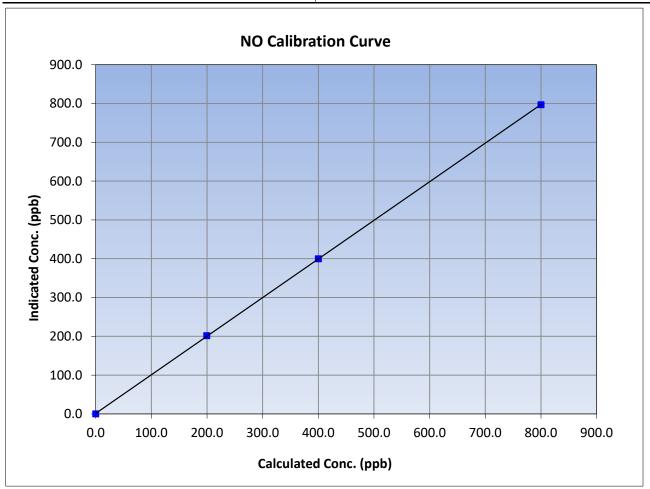
NO Calibration Summary

Version-04-2020

Station Information

September 21, 2023 Calibration Date: Previous Calibration: August 10, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:27 End Time (MST): 14:53 Analyzer make: Analyzer serial #: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999986	≥0.995	
800.1	796.9	1.0041	Correlation Coefficient	0.555560	20.333	
400.1	399.8	1.0008	Slope	0.994967	0.90 - 1.10	
199.6	201.5	0.9903	Siope	0.554507	0.90 - 1.10	
			Intercept	1.360599	+/-20	





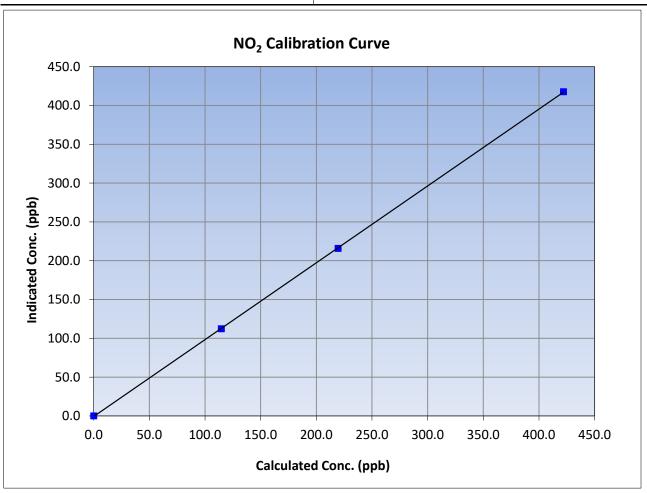
NO₂ Calibration Summary

Version-04-2020

Station Information

September 21, 2023 Calibration Date: Previous Calibration: August 10, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:27 End Time (MST): 14:53 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

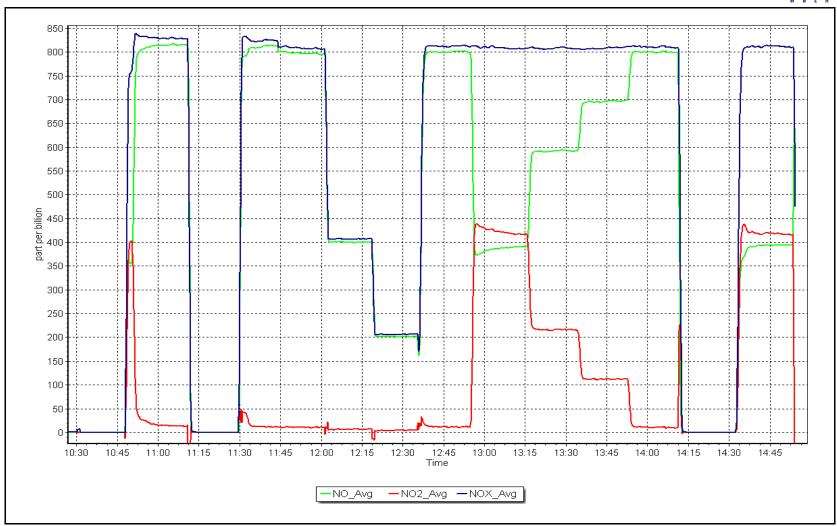
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999978	≥0.995	
422.0	417.7	1.0103	Correlation Coefficient	0.333376	20.555	
219.6	215.8	1.0177	Slope	0.989964	0.90 - 1.10	
114.6	112.3	1.0206	Slope	0.969904	0.90 - 1.10	
			Intercept	-0.688924	+/-20	



Date: September 21, 2023

Location: Conklin







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Conklin

Calibration Date: September 11, 2023

Start time (MST): 10:32 Reason: Routine Station number: AMS21

Last Cal Date: August 15, 2023

End time (MST): 13:51

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701H Serial Number: 691

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: -2.0 Calibration slope: 1.000257 1.001714 -2.0 0.400000 Coeff or Slope: 1.005 Calibration intercept: 1.580000 0.981

O₃ Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration	Correction factor (Cc/Ic)
See Forne	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-1.0	
as found span	5000	951.2	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	950.9	400.0	400.6	0.999
second point	5000	804.0	200.0	201.3	0.994
third point	5000	703.6	100.0	101.4	0.986
as left zero	5000	0.0	0.0	-0.5	
as left span	5000	936.0	400.0	403.0	0.993
			Averag	ge Correction Factor	0.993
Baseline Corr As found:	389.9	Previous respons	e 401.7	*% change	-3.0%
Baseline Corr 2nd AF pt:	NA	AF Slope	e:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

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

Calibration Performed By: Mohammed Kashif

* = > +/-5% change initiates investigation



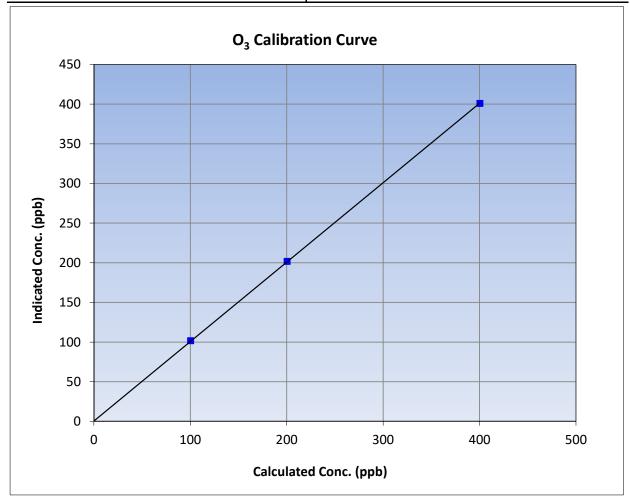
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 11, 2023 **Previous Calibration:** August 15, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:32 End Time (MST): 13:51 Analyzer make: Thermo 49i Analyzer serial #: 1501663734

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	0.999977	≥0.995			
400.0	400.6	0.9985	Correlation Coefficient	0.333311	20.993			
200.0	201.3	0.9935	Slope	1.001714	0.90 - 1.10			
100.0	101.4	0.9862	Slope	1.001/14	0.90 - 1.10			
			Intercept	0.400000	+/- 5			

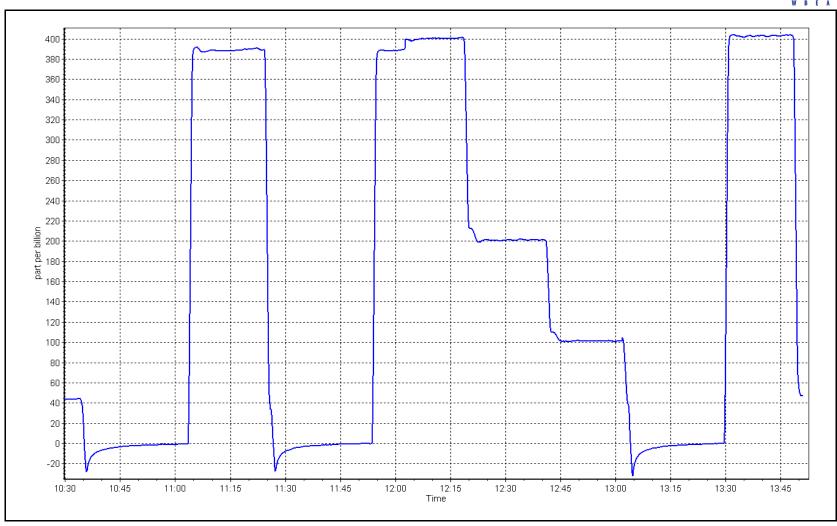


O₃ Calibration Plot

Date: September 11, 2023

Location: Conklin







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name:	Conklin		Station number:	AMS 21	
Calibration Date:	September 26, 2023		Last Cal Date:	August 18, 2023	
Start time (MST):	11:20		End time (MST):	12:35	
Analyzer Make:	API T640		S/N:	326	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat		S/N:	388744	
Temp/RH standard:	Alicat		S/N:	388744	
		Monthly Calibration Tes	it		
<u>Parameter</u>	As found	Measured	As left	<u>Adjusted</u>	(Limits)
T (°C)	22.5	22.58	22.5		+/- 2 °C
P (mmHg)	703.3	705.02	703.3		+/- 10 mmHg
flow (LPM)	5.02	5.127	5.02		+/- 0.25 LPM
Leak Test:	Date of check:	September 26, 2023	Last Cal Date:	August 18, 2023	
	PM w/o HEPA:	14.7	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will serv	e as the pre mainte	enance leak check	
Inlet cleaning:	Inlet Head				
		Quarterly Calibration Te			
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	11.8	11.8	10.8	X	10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	13.1	w/ HEPA:	0
Date Optical Cham	nber Cleaned:	September 26,	2023	· · · · · · · · · · · · · · · · · · ·	<0.2 ug/m3
Disposable Filte	r Changed:	September 26,	2023		
		Annual Maintenance			
Date Sample Tub	be Cleaned:				
Date RH/T Senso	or Cleaned:				
Notes:		Adjusted PMT peak	, both leak checks _I	passed.	
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station number: Station Name: Janvier **AMS 22**

September 28, 2023 Calibration Date: Last Cal Date: August 23, 2023 12:50

Start time (MST): 9:38 End time (MST):

Routine Reason:

Calibration Standards

Cal Gas Concentration: 50.11 ppm Cal Gas Exp Date: January 18, 2029

Cal Gas Cylinder #: CC281519

Removed Cal Gas Conc: 50.11 Rem Gas Exp Date: NA ppm Diff between cyl: Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.005224 1.005095 Backgd or Offset: 21.4 21.4 0.989 Calibration intercept: 1.843010 2.463336 Coeff or Slope: 0.989

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	1.2	
as found span	4920	79.8	799.8	804.0	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.7	
high point	4920	79.8	799.8	805.6	0.993
second point	4960	39.9	399.9	405.8	0.985
third point	4980	20.0	200.4	204.0	0.983
as left zero	5000	0.0	0.0	1.2	
as left span	4920	79.8	799.8	804.6	0.994
			Averag	ge Correction Factor	0.987
Baseline Corr As found:	802.80	Previous response		*% change	-0.4%
Danalia Carrana AF at	N I A	A F Cl		A E 1 - 1 1	

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. No adjustments made.

Calibration Performed By: Max Farrell * = > +/-5% change initiates investigation



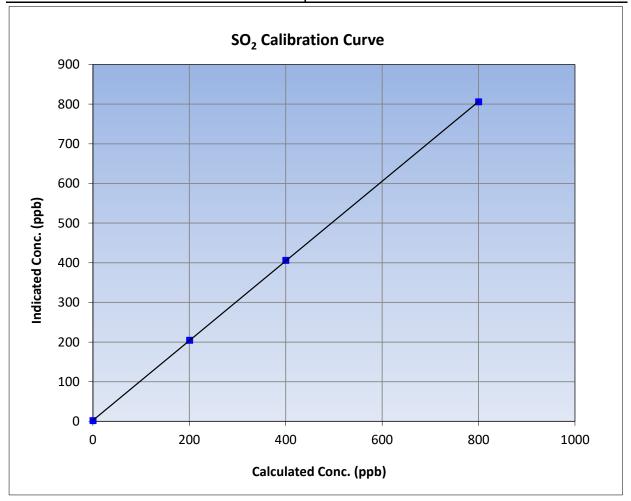
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 23, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 9:38 End Time (MST): 12:50 Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	1.7		Correlation Coefficient	0.999991	≥0.995		
799.8	805.6	0.9928	Correlation coefficient	0.555551	20.333		
399.9	405.8	0.9854	Slope	1.005095	0.90 - 1.10		
200.4	204.0	0.9825	Slope	1.005095	0.90 - 1.10		
			- Intercept	2.463336	+/-30		

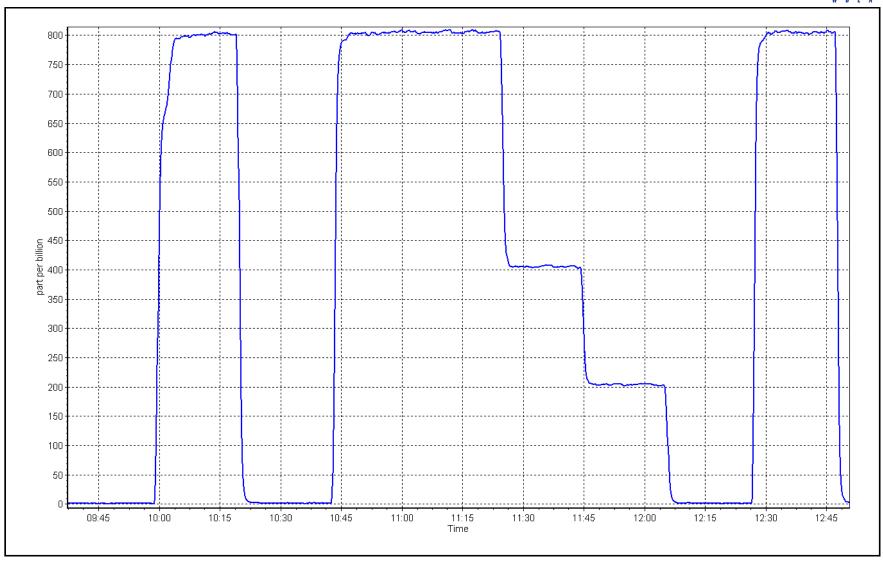


SO2 Calibration Plot

Date: September 28, 2023

Location: Janvier







ZAG Make/Model:

Analyzer Range

Calibration slope:

Calibration intercept:

Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Janvier

Calibration Date: September 21, 2023

Start time (MST): 8:58

Reason: Removal

Station number: Last Cal Date:

Cal Gas Exp Date: April 16, 2022

AMS22 August 29, 2023

End time (MST):

10:25

Calibration Standards

Cal Gas Concentration: 5.03 ppm

Cal Gas Cylinder #: DT0018680

Removed Cal Gas Conc: 5.03 Calibrator Make/Model: Teledyne API T700

Removed Gas Cyl #:

NA

Teledyne API T701

ppm

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number:

3806 Serial Number: 4890

Converter serial #: 587

Analyzer Information

Analyzer make: Thermo 43iQ-TLE

CDN-101 Converter make:

0 - 100 ppb

<u>Start</u> 1.004358 -0.338889 **Finish**

<u>Start</u>

Backgd or Offset: 1.01 Coeff or Slope: 0.926

Analyzer serial #: 1200326169

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	74.1	1.081
as found 2nd point	4960	39.8	40.0	35.4	1.134
as found 3rd point	4980	19.9	20.0	17.2	1.171
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					

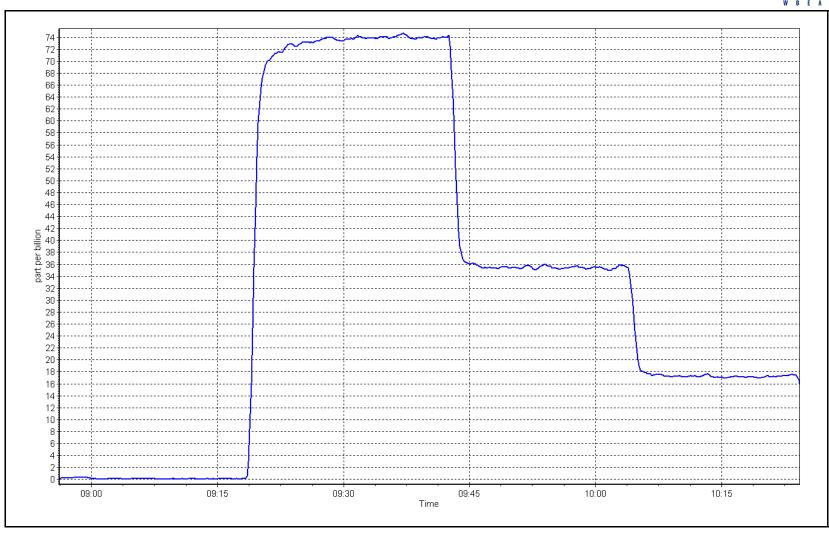
SO2 Scrubber Check

Date of last scrubber change	:			Ave Corr Factor	
Date of last converter efficie	(efficiency			
Baseline Corr As found:	74.0	Prev response:	79.99	*% change:	-8.1%
Baseline Corr 2nd AF pt:	35.3	AF Slope:	0.928759	AF Intercept:	-0.817046
Baseline Corr 3rd AF pt:	17.1	AF Correlation:	0.999168		
				* = > 1 / E0/ change initiates	c investigation

Completed multipoint as founds to replace the instrument due to linearity and drifting issues. Notes:

Calibration Performed By: Max Farrell Date: September 21, 2023 Location: Janvier







TRS Calibration Report

Station number:

End time (MST):

Last Cal Date:

Version-11-2021

Station Information

Station Name: Janvier Calibration Date:

Cal Gas Concentration:

ZAG Make/Model:

Start time (MST): 10:33 Reason: Install

September 21, 2023

Calibration Standards

ppm

5.03

Cal Gas Exp Date: April 16, 2022

AMS22

N/A

13:31

Cal Gas Cylinder #: DT0018680 Removed Cal Gas Conc:

Calibrator Make/Model: Teledyne API T700

5.03 Removed Gas Cyl #: NA

Rem Gas Exp Date: NA ppm Diff between cyl:

3806 Serial Number: Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i-TLE Converter make:

CDN-101

Teledyne API T701

Analyzer serial #: 1151680031

Converter serial #: 587

Analyzer Range 0 - 100 ppb

> <u>Start</u> **Finish** N/A

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

<u>Finish</u>

Calibration slope: Calibration intercept:

1.003650 -0.039106 N/A

Coeff or Slope:

3.04 N/A 1.161 N/A

TRS As Found Data

Calculated Dilution air flow rate Source gas flow rate Set Point (sccm) (sccm) (Cc)

Indicated concentration (ppb) concentration (ppb) (Ic) Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10

as 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	4920	79.5	80.0	80.2	0.997
second point	4960	39.8	40.0	40.2	0.996
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	81.7	0.979
SO2 Scrubber Check	4920	79.8	798.0	0.2	
Date of last scrubber change	ge:			Ave Corr Factor	0.996

Date of last scrubl	er change:	Ave Corr Factor	0.996
Date of last conve	ter 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 in	vestigation

Notes:

Install calibrations after replacement of the analzyer due to linearity and drift issues. Adjusted the span only.

Calibration Performed By:

Max Farrell



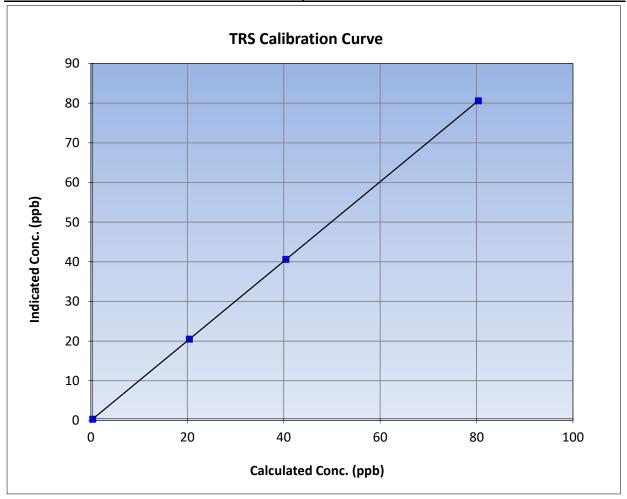
TRS Calibration Summary

Version-11-2021

Station Information

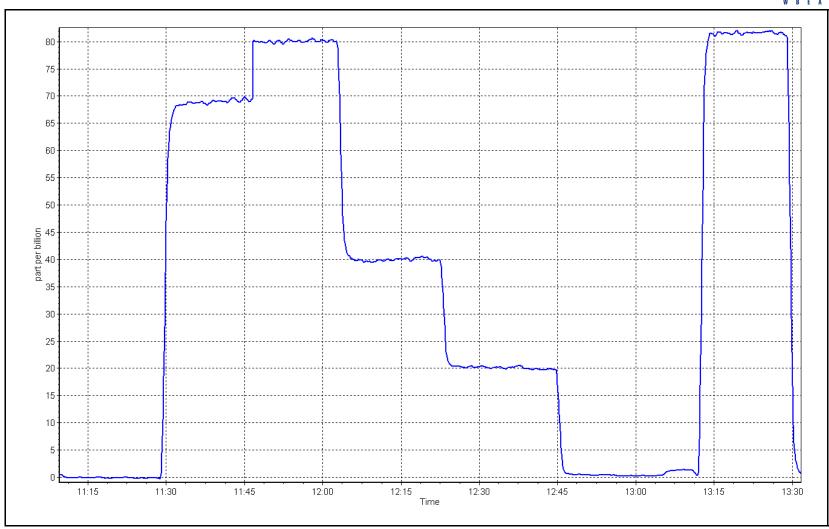
Previous Calibration: N/A Calibration Date: September 21, 2023 Station Name: Janvier Station Number: AMS22 Start Time (MST): 10:33 End Time (MST): 13:31 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

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	0.999997	≥0.995	
80.0	80.2	0.9973	Correlation Coefficient	0.555557	20.333	
40.0	40.2	0.9960	Slope	1.003650	0.90 - 1.10	
20.0	20.1	0.9960	Siope	1.005050	0.90 - 1.10	
			- Intercept	-0.039106	+/-3	



Date: September 21, 2023 Location: Janvier







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Janvier Station Name:

Calibration Date: September 28, 2023

Start time (MST): 9:38 Routine Reason:

Station number: AMS 22

Last Cal Date: August 23, 2023

End time (MST): 12:50

Calibration Standards

Gas Cert Reference: CC281519

CH4 Cal Gas Conc. 502.8 ppm

C3H8 Cal Gas Conc. 208.4 ppm

Removed Gas Cert:

Removed CH4 Conc. 502.8 ppm

Removed C3H8 Conc. 208.4 ppm

Diff between cyl (CH_4):

Calibrator Model: Teledyne API 700 ZAG make/model: Teledyne API 701

Cal Gas Expiry Date: January 18, 2029

CH4 Equiv Conc. 1075.9 ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1075.9 Diff between cyl (THC):

ppm

Diff between cyl (NM):

Serial Number: 3806 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 SP Ratio:

CH4 Retention time:

Zero Chromatogram:

Baseline Corr 3rd AF:

Analyzer serial #: 1172750023

CH4 Range (ppm): 0 - 10 ppm

Finish Start 2.190E-04 2.240E-04

13.6 13.6 OFF OFF

NMHC SP Ratio: NMHC Peak Area:

Flat Baseline:

4.39E-05 208229 OFF

Start

4.50E-05 203170 OFF

Finish

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	79.8	17.17	17.20	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	79.8	17.17	17.18	1.000
second point	4960	39.9	8.59	8.58	1.000
third point	4980	20.0	4.30	4.29	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	17.17	17.49	0.982
			A	Average Correction Factor	1.001
Baseline Corr AF:	17.20	Prev response	17.12	*% change	0.5%

AF Correlation:

Baseline Corr AF: 17.20 Prev response Baseline Corr 2nd AF: NA AF Slope:

NA

AF Intercept:

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					VE151011 00 21
		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	79.8	9.15	9.15	0.999
as found 2nd point	4320	73.0	9.13	9.13	0.333
as found 3rd point					
new cylinder response					
calibrator zero	E000	0.0	0.00	0.00	
	5000 4920	0.0 79.8	0.00	0.00	
high point	4960	39.9	9.15	9.15	1.000
second point			4.57	4.57	1.002
third point	4980	20.0	2.29	2.28	1.005
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.15	9.28	0.986
				rage Correction Factor	1.002
Baseline Corr AF:	9.15	Prev response	9.12	*% 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) (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	79.8	8.03	8.05	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	79.8	8.03	8.03	0.999
second point	4960	39.9	4.01	4.02	0.999
third point	4980	20.0	2.01	2.01	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	8.03	8.21	0.978
				rage Correction Factor	0.999
Baseline Corr AF:	8.05	Prev response	8.00	*% change	0.7%
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:		0.997041		1.000655	
THC Cal Offset:		-0.005391		-0.005800	
CH4 Cal Slope:		0.996940		1.000614	
CH4 Cal Offset:		-0.003162		0.000436	
NMHC Cal Slope:		0.997018		1.000704	
				0.007006	

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

-0.002029

Calibration Performed By: Max Farrell

NMHC Cal Offset:

-0.007036



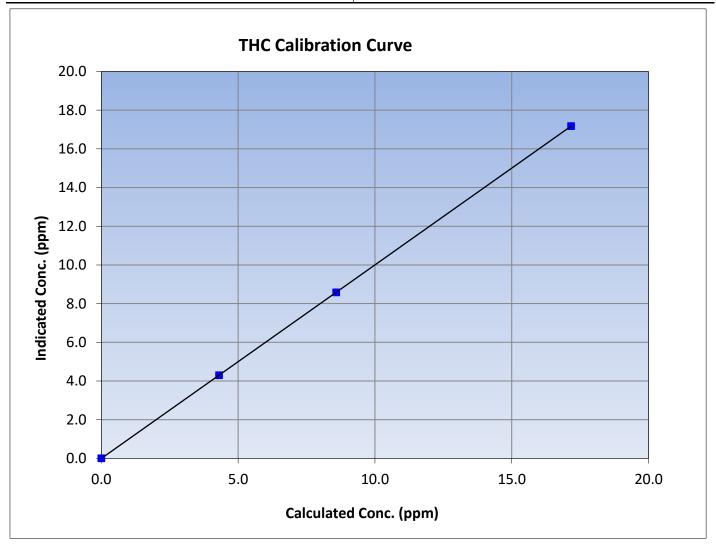
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 23, 2023 Station Name: Janvier Station Number: AMS 22 9:38 Start Time (MST): End Time (MST): 12:50 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	0.999999	≥0.995
17.17	17.18	0.9995	Correlation Coefficient		20.333
8.59	8.58	1.0002	Slope	1.000655	0.90 - 1.10
4.30	4.29	1.0022	Slope	1.000033	0.90 - 1.10
			Intercept	-0.005800	+/-0.5





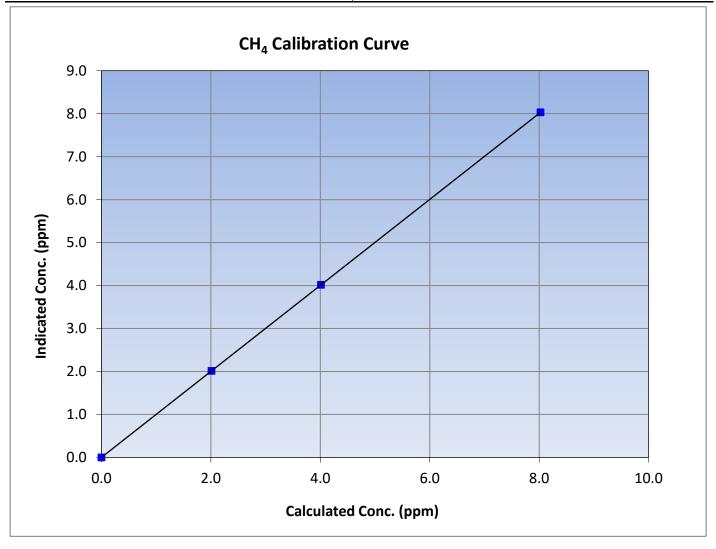
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 23, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 9:38 End Time (MST): 12:50 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	1.000000	≥0.995
8.03	8.03	0.9994	Correlation Coefficient		20.993
4.01	4.02	0.9991	Slope	1.000614	0.90 - 1.10
2.01	2.01	0.9991	Slope	1.000014	0.30 - 1.10
			Intercept	0.000436	+/-0.5





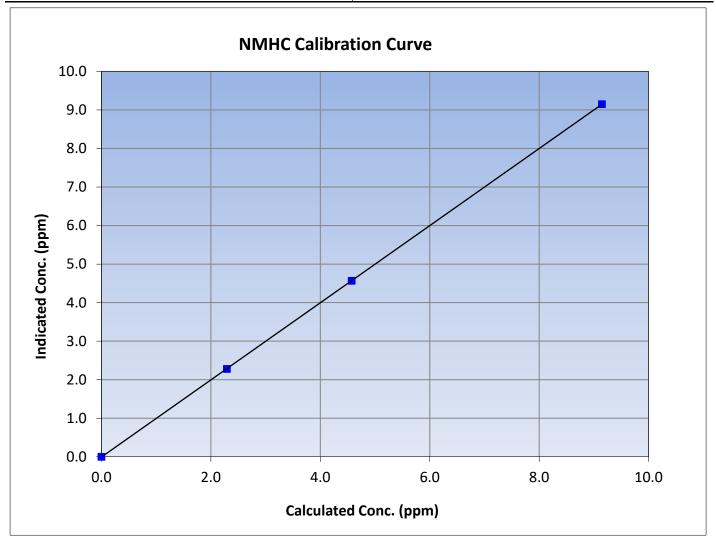
NMHC Calibration Summary

Version-06-2022

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 23, 2023 Station Name: Janvier Station Number: AMS 22 9:38 Start Time (MST): End Time (MST): 12:50 Analyzer make: Analyzer serial #: 1172750023 Thermo 55i

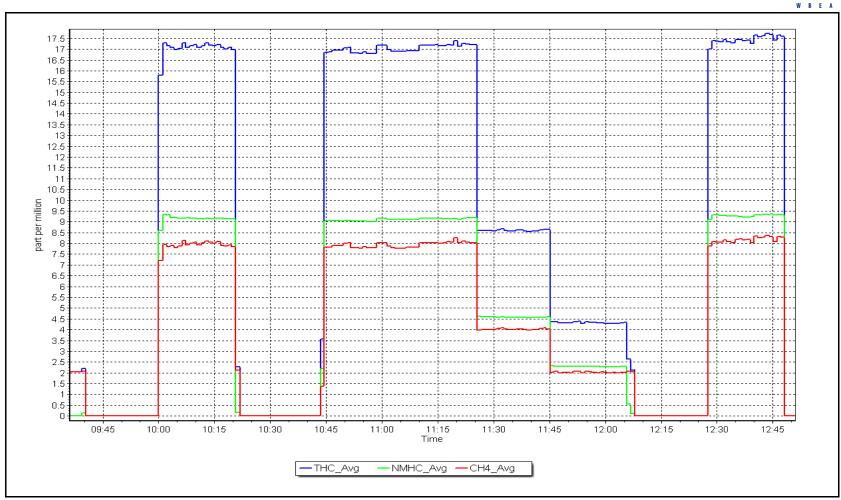
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999997	≥0.995	
9.15	9.15	0.9997	Correlation Coemicient	0.999997	20.333	
4.57	4.57	1.0016	Slope	1.000704	0.90 - 1.10	
2.29	2.28	1.0054	Зюре	1.000704	0.90 - 1.10	
			Intercept	-0.007036	+/-0.5	



NMHC Calibration Plot

Date: September 28, 2023 Location: Janvier







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Janvier

Calibration Date: September 19, 2023

Start time (MST): 9:38
Reason: Routine

Station number: AMS 22

Last Cal Date: August 16, 2023

End time (MST): 14:32

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: 201

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 833

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.808 0.826 NO bkgnd or offset: -5.6 -5.6 NOX coeff or slope: 0.799 0.815 NOX bkgnd or offset: -3.9 -3.9 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 5.0 5.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.995773	0.998659
NO _x Cal Offset:	2.689123	2.728523
NO Cal Slope:	0.994314	0.998929
NO Cal Offset:	1.949881	2.308958
NO ₂ Cal Slope:	1.001315	0.997414
NO ₂ Cal Offset:	-0.151118	-0.454360



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/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	1.5	2.1	-0.5		
as found span	4918	82.3	799.9	799.9	0.0	785.0	779.1	6.0	1.0190	1.0267
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.9	2.3	-0.4		
high point	4918	82.3	799.9	799.9	0.0	801.0	801.3	-0.3	0.9986	0.9983
second point	4959	41.2	400.4	400.4	0.0	403.5	402.5	1.0	0.9924	0.9949
third point	4980	20.6	200.2	200.2	0.0	203.2	202.2	1.0	0.9853	0.9901
as left zero	5000	0.0	0.0	0.0	0.0	1.9	2.3	-0.4		
as left span	4918	82.3	799.9	409.7	390.2	797.0	404.9	392.1	1.0036	1.0119
							Average C	Correction Factor	0.9921	0.9944
Corrected As f	ound NO _X =	783.5 ppb	NO =	777.0 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-2.0%
Previous Respo	onse NO _X =	799.2 ppb	NO =	= 797.3 ppb				*Percent Chan	ge NO =	-2.6%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _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 Setp	pint (ppb)	Indicated NO Ref		icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated 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	GPT zero									
as found GPT po	int (400 ppb NO2)									
as found GPT po	int (200 ppb NO2)									
as found GPT po	int (100 ppb NO2)									
1st GPT poin	t (400 ppb O3)	799.3		409.1	390.2		388.8	1.0036	6	99.6%
2nd GPT poin	t (200 ppb O3)	799.3		599.9	199.4		198.3	1.0055	5	99.4%
3rd GPT poin	t (100 ppb O3)	799.3		699.5	99.8		99.1	1.007	1	99.3%

Notes:

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

Average Correction Factor

1.0054

Calibration Performed By:

Max Farrell

99.5%



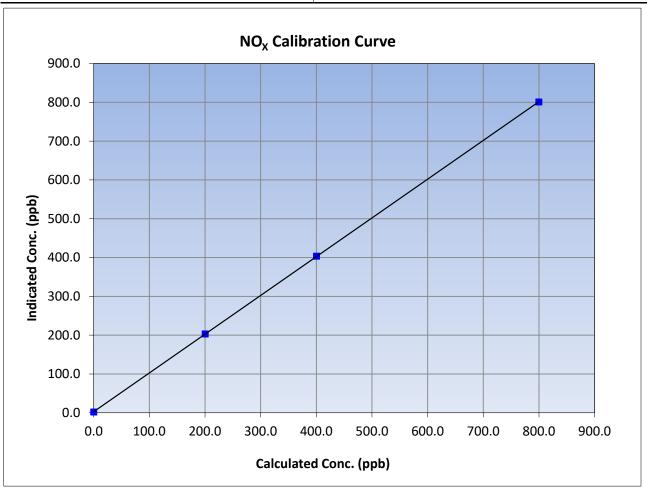
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 **Previous Calibration:** August 16, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 9:38 End Time (MST): 14:32 Analyzer make: **API T200** Analyzer serial #: 833

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	1.9		Correlation Coefficient	0.999994	≥0.995	
799.9	801.0	0.9986	Correlation Coefficient	0.555554	20.993	
400.4	403.5	0.9924	Slope	0.998659	0.90 - 1.10	
200.2	203.2	0.9853	Siope	0.556055	0.90 - 1.10	
			Intercept	2.728523	+/-20	





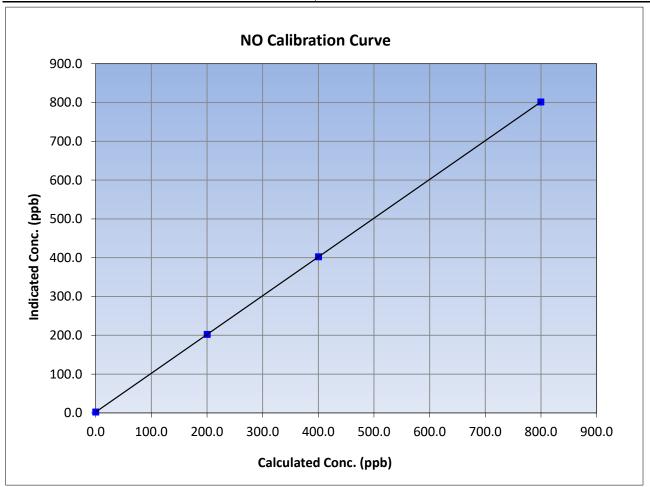
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 16, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 9:38 End Time (MST): 14:32 Analyzer make: **API T200** Analyzer serial #: 833

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	2.3		Correlation Coefficient	1.000000	≥0.995
799.9	801.3	0.9983	Correlation Coefficient	1.000000	20.333
400.4	402.5	0.9949	Slope	0.998929	0.90 - 1.10
200.2	202.2	0.9901	Slope	0.996929	0.90 - 1.10
			Intercept	2.308958	+/-20





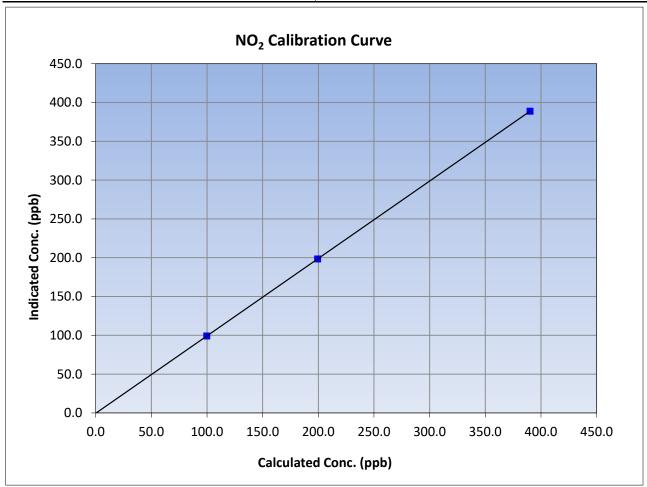
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 16, 2023 Station Name: Station Number: AMS 22 Janvier Start Time (MST): 9:38 End Time (MST): 14:32 Analyzer serial #: Analyzer make: **API T200** 833

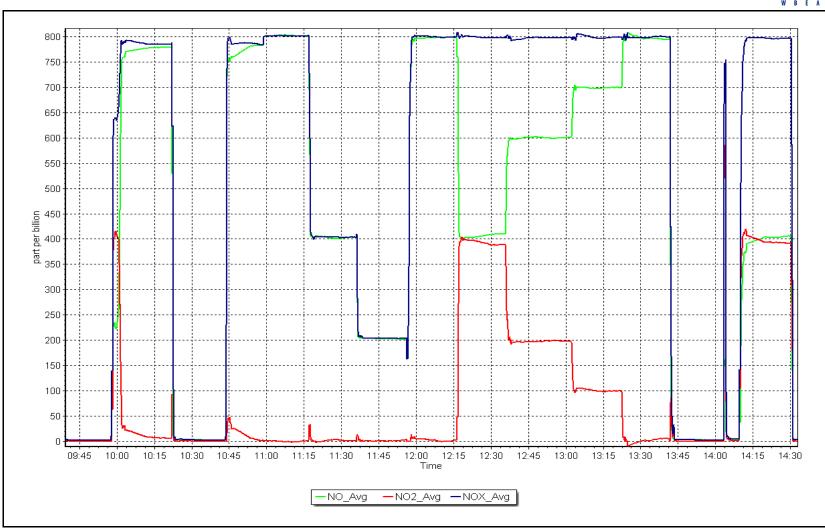
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.4		Correlation Coefficient	1.000000	≥0.995
390.2	388.8	1.0036	correlation coefficient	1.000000	20.993
199.4	198.3	1.0055	Slope	0.997414	0.90 - 1.10
99.8	99.1	1.0071	Slope	0.557414	0.50 - 1.10
			Intercept	-0.454360	+/-20



Date: September 19, 2023

Location: Janvier







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

September 7, 2023 Calibration Date:

Start time (MST): 9:21 Reason: Routine Station number: AMS 22

Last Cal Date: August 18, 2023

End time (MST): 13:45

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 Teledyne API T701H Serial Number: 201 ZAG Make/Model:

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 7046

Finish **Finish** Start Start Calibration slope: 1.001114 1.000914 Backgd or Offset: -0.1 -0.2 Coeff or Slope: Calibration intercept: 2.780000 0.840000 0.922 1.021

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	800.0	0.0	0.7	
as found span	4895	905.3	400.0	359.6	1.112
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.4	
high point	4895	905.3	400.0	400.9	0.998
second point	4895	756.7	200.0	201.5	0.993
third point	4895	656.1	100.0	101.2	0.988
as left zero	5000	800.0	0.0	0.9	
as left span	4895	904.3	400.0	401.6	0.996
			Averag	ge Correction Factor	0.993

Baseline Corr As found: 358.9 Previous response 403.2 *% change -12.4%

AF Correlation:

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

* = > +/-5% change initiates investigation

Completed as found span before the zero by mistake. Changed the inlet filter after as founds. As founds are 11% low due to the O3 pump that was changed recently on the calibrator. Adjusted the

span only. See docit note for more info.

Calibration Performed By: Max Farrell

NA

Baseline Corr 3rd AF pt:

Notes:



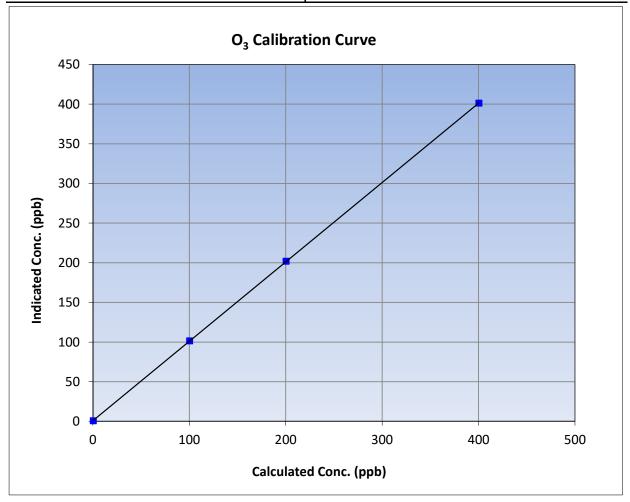
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 7, 2023 **Previous Calibration:** August 18, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 9:21 End Time (MST): 13:45 Analyzer make: Teledyne API T400 Analyzer serial #: 7046

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.4		Correlation Coefficient	0.999993	≥0.995				
400.0	400.9	0.9978	Correlation Coefficient	0.555555	20.333				
200.0	201.5	0.9926	Slope	1.000914	0.90 - 1.10				
100.0	101.2	0.9881	Slope	1.000314	0.90 - 1.10				
			Intercept	0.840000	+/- 5				

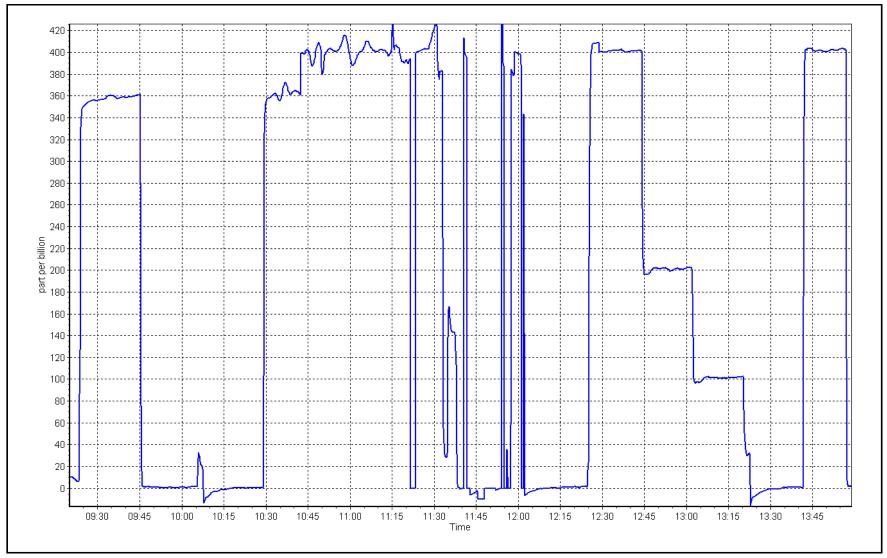


O₃ Calibration Plot

Date: September 7, 2023

Location: Janvier







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Janvier		Station number:	-		
Calibration Date: Start time (MST):	September 28, 2023 12:36		Last Cal Date: A End time (MST):		2023	
start time (Wist).	12.30		Life time (WiSt).	12.54		
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	st			
<u>Parameter</u>	As found	Measured	As left		<u>Adjusted</u>	(Limits)
T (°C)	18.2	17.5	18.2			+/- 2 °C
P (mmHg)	712.2	712.8	712.2			+/- 10 mmHg
flow (LPM)	4.99	5.07	4.99			+/- 0.25 LPM
Leak Test:	_	September 28, 2023	Last Cal Date:	August 2		
Note: this look shock will be	PM w/o HEPA:	7.4	PM w/ HEPA:	tananaa laa		<0.2 ug/m3
Note: this leak check will be	Inlet Head		rve as the pre main	tenance lea	ак спеск	
Inlet cleaning:	met nead					
		Quarterly Calibration T	est			
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham		July 26, 20)23	,		<0.2 ug/m3
Disposable Filte	r Changed:	July 26, 20)23			
		Annual Maintenance				
Date Sample Tub	oe Cleaned:	July 26, 20	023			
Date RH/T Senso	or Cleaned:	July 26, 20)23			
Notes:		No adinates sets	anadad Laab ahadi wasa			
		ivo adjustments	needed. Leak check pass	seu.		
Calibration by:	Max Farrell					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS23 FORT HILLS SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Fort Hills Station Name:

September 7, 2023 Calibration Date:

Start time (MST): 8:18

Routine Reason:

Station number: AMS23

> August 10, 2023 Last Cal Date:

End time (MST):

10:49

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**

Calibration slope:

Calibration intercept:

Cal Gas Exp Date: January 5, 2025

> Rem Gas Exp Date: N/A Diff between cyl:

Serial Number: 451

Coeff or Slope:

Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290012

Analyzer Range 0 - 1000 ppb

Start Finish

ppm

ppm

1.000337 1.002497 -0.563797 -0.744078

Start Backgd or Offset:

17.8 1.040 Finish 17.8 1.031

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	-0.2	
as found span	4920	80.3	799.1	808.9	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.3	799.1	800.6	0.998
second point	4960	40.2	400.1	400.4	0.999
third point	4980	20.1	200.0	198.6	1.007
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.3	799.1	799.1	1.000
			Averag	ge Correction Factor	1.001

Baseline Corr As found: 809.10 Previous response 798.80 *% change 1.3% 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 done. Span adjusted.

Calibration Performed By: Melissa Lemay



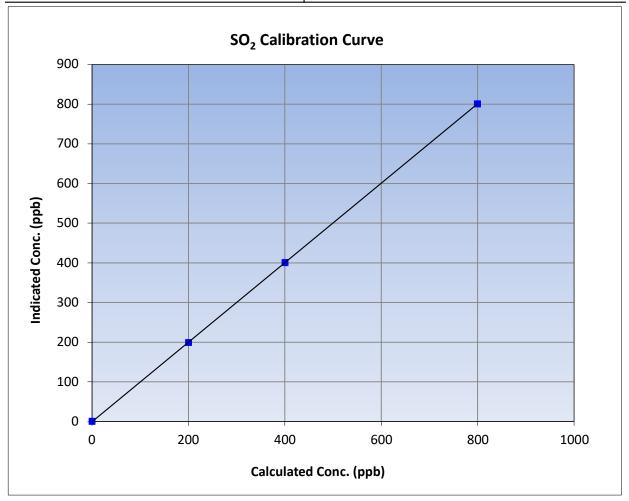
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 7, 2023 **Previous Calibration:** August 10, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:18 End Time (MST): 10:49 Analyzer make: 1160290012 Thermo 43i Analyzer serial #:

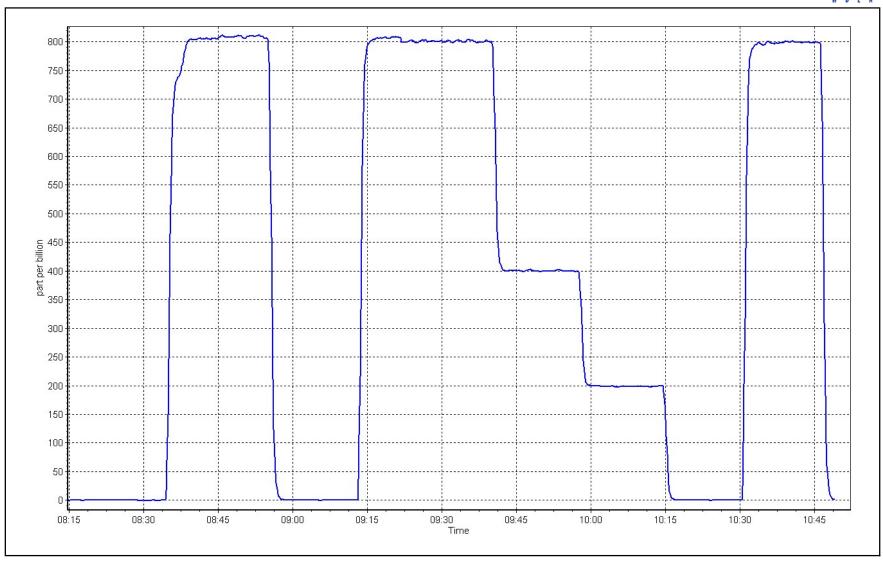
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.1		Correlation Coefficient	0.999994	≥0.995				
799.1	800.6	0.9981	Correlation Coefficient	0.555554	20.333				
400.1	400.4	0.9991	Clana	1.002497	0.90 - 1.10				
200.0	198.6	1.0072	Slope	1.002497	0.90 - 1.10				
			Intercept	-0.744078	+/-30				



SO2 Calibration Plot D

Date: September 7, 2023 Location: Fort Hills





TRS Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS23

11:02

August 17, 2023

Version-11-2021

Station Information

Station Name: Fort Hills

Calibration Date: September 6, 2023

Start time (MST): 6:55 Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.20 ppm Cal Gas Exp Date: February 5, 2024

ppm

Cal Gas Cylinder #: CC517372

Removed Cal Gas Conc: 5.20

Removed Gas Cyl #: N/A Calibrator Make/Model: API T700

ZAG Make/Model: **API T701**

Rem Gas Exp Date: N/A Diff between cyl:

451 Serial Number: Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1300156232

Converter make: CDN-101 Converter serial #: 594

Analyzer Range 0 - 100 ppb

<u>Start</u> <u>Finish</u> <u>Finish</u> <u>Start</u> Backgd or Offset: Calibration slope: 1.011740 1.001459 1.19 1.19 Calibration intercept: 0.002125 0.061824 Coeff or Slope: 1.124 1.124

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	4923	77.0	80.0	78.3	1.020
as found 2nd point	4962	38.5	40.0	39.4	1.013
as found 3rd point	4981	19.2	19.9	19.5	1.018
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.0	80.0	80.0	1.000
second point	4962	38.5	40.0	40.6	0.985
third point	4981	19.2	19.9	19.8	1.007
as left zero	5000	0.0	0.0	0.0	
as left span	4923	77.0	80.0	81.0	0.988
SO2 Scrubber Check	4920	80.3	803.0	-0.1	
Date of last scrubber ch	nange:			Ave Corr Factor	0.998
Date of last converter e	officiency test:				efficiency

Date of last scrubber change	2:			Ave Corr Factor	0.998
Date of last converter efficie	ency test:			et	fficiency
Baseline Corr As found:	78.4	Prev response:	80.94	*% change:	-3.2%

Baseline Corr 2nd AF pt: 39.5 AF Slope: 0.980176 Baseline Corr 3rd AF pt: 0.999981 19.6 AF Correlation:

* = > +/-5% change initiates investigation

AF Intercept:

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

Calibration Performed By: Melissa Lemay -0.018544



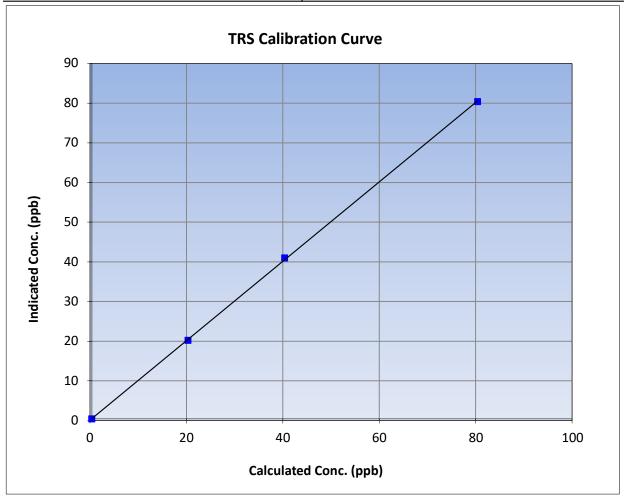
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 6, 2023 **Previous Calibration:** August 17, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 6:55 End Time (MST): 11:02 Analyzer make: 1300156232 Thermo 43i TLE Analyzer serial #:

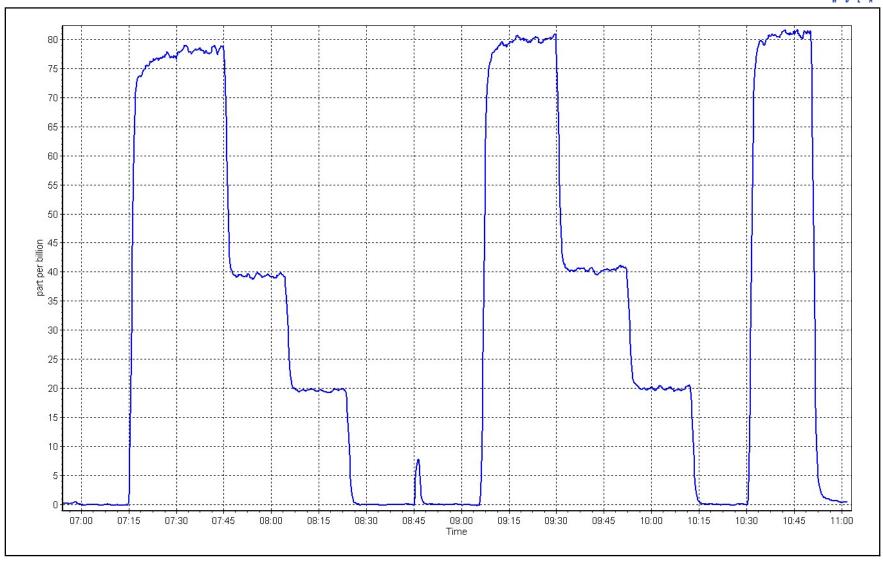
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999907	≥0.995
80.0	80.0	1.0000	Correlation Coefficient	0.555507	20.333
40.0	40.6	0.9852	Slone	1.001459	0.90 - 1.10
19.9	19.8	1.0075	Slope	1.001459	0.90 - 1.10
			Intercept	0.061824	+/-3



TRS Calibration Plot

Date: September 6, 2023 Location: Fort Hills







CH4 Cal Gas Conc.

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Fort Hills

Calibration Date: September 7, 2023

Start time (MST): 8:18
Reason: Routine

Station number: AMS23

Last Cal Date: August 10, 2023

End time (MST): 10:48

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025

CH4 Equiv Conc. 1070.6 ppm

C3H8 Cal Gas Conc. 207.4 ppm

500.2

Removed Gas Cert: N/A Removed Gas Expiry: N/A

ppm

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 (CH₄):

Calibrator Model: API T700

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: 2.39E-04 2.34E-04 NMHC SP Ratio: 5.10E-05 5.21E-05 CH4 Retention time: 13.0 13.0 NMHC Peak Area: 176470 180460

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	17.58	0.978
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	17.28	0.995
second point	4960	40.2	8.61	8.62	0.998
third point	4980	20.1	4.30	4.30	1.001
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.19	17.33	0.992
				Average Correction Factor	0.998
Baseline Corr AF:	17.58	Prev response	17.28	*% change	1.7%
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= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	9.16	9.42	0.972
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	9.16	9.20	0.996
second point	4960	40.2	4.59	4.64	0.988
third point	4980	20.1	2.29	2.33	0.984
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	9.16	9.22	0.993
			Avera	ge Correction Factor	0.989
Baseline Corr AF:	9.42	Prev response	9.22	*% change	2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.03	8.16	0.984
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	8.03	8.07	0.995
second point	4960	40.2	4.02	3.98	1.010
third point	4980	20.1	2.01	1.97	1.021
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.03	8.12	0.989

Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation
		Calibration Statistics	
		<u>Start</u>	<u>Finish</u>
THC Cal Slope:		1.005681	1.005421
THC Cal Offset:		-0.013606	-0.016398
CH4 Cal Slope:		1.005023	1.005916
CH4 Cal Offset:		-0.021648	-0.032039
NMHC Cal Slope:		1.006196	1.003864
NMHC Cal Offset:		0.008043	0.017642

Notes:

Baseline Corr AF:

Baseline Corr 2nd AF:

No maintenance done. Span adjusted.

8.05

Average Correction Factor

*% change

AF Intercept:

Calibration Performed By:

8.16

NA

Melissa Lemay

Prev response

AF Slope:

1.009

1.3%



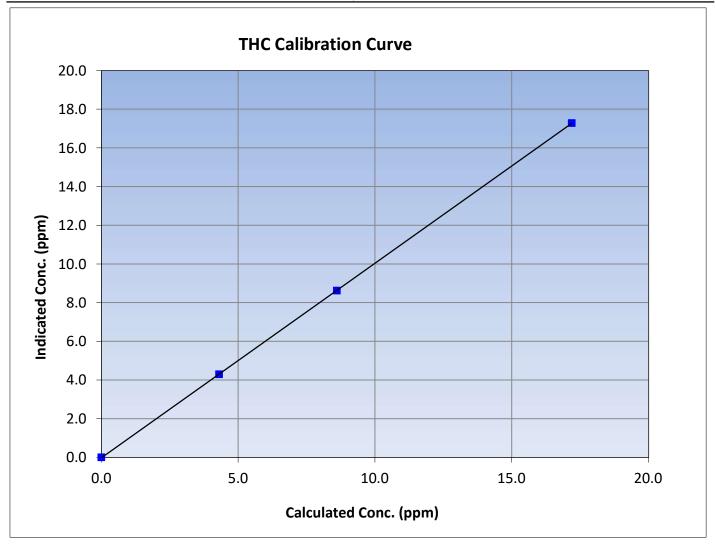
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: September 7, 2023 August 10, 2023 Station Name: Fort Hills Station Number: AMS23 8:18 Start Time (MST): End Time (MST): 10:48 Analyzer make: Thermo 55i Analyzer serial #: 1193585648

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
17.19	17.28	0.9949	Correlation Coefficient	0.55555	20.333
8.61	8.62	0.9985	Slope	1.005421	0.90 - 1.10
4.30	4.30	1.0008	Slope	1.005421	0.90 - 1.10
			Intercept	-0.016398	+/-0.5





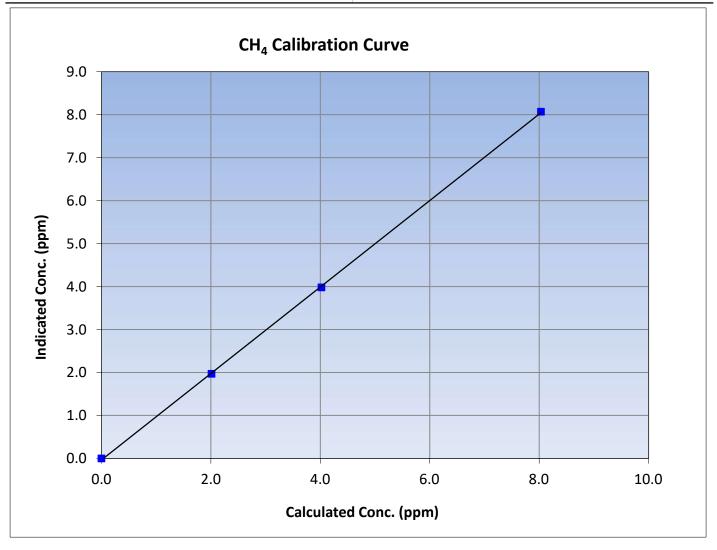
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 7, 2023 **Previous Calibration:** August 10, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:18 End Time (MST): 10:48 Analyzer make: Analyzer serial #: Thermo 55i 1193585648

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999915	≥0.995
8.03	8.07	0.9954	Correlation Coemicient	0.555515	20.333
4.02	3.98	1.0104	Slope	1.005916	0.90 - 1.10
2.01	1.97	1.0207	Slope	1.005916	0.90 - 1.10
			Intercept	-0.032039	+/-0.5





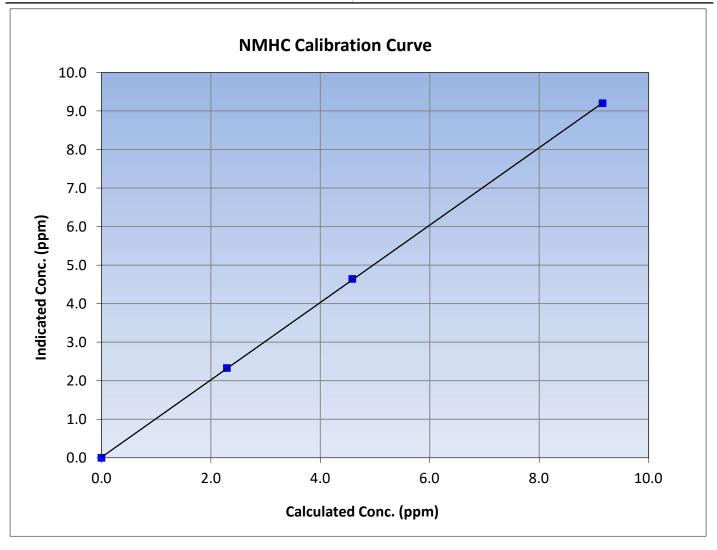
NMHC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: September 7, 2023 August 10, 2023 Station Name: Fort Hills Station Number: AMS23 8:18 Start Time (MST): End Time (MST): 10:48 Analyzer make: Thermo 55i Analyzer serial #: 1193585648

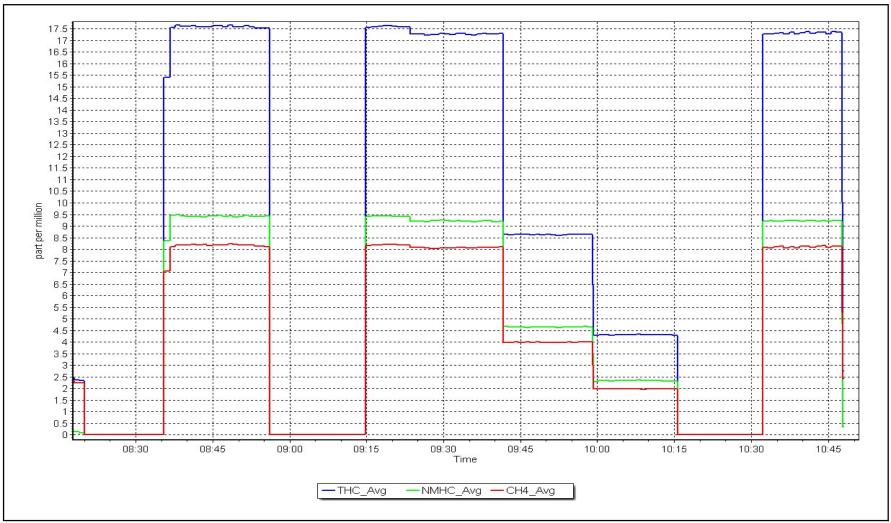
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999980	≥0.995
9.16	9.20	0.9956	Correlation Coefficient	0.999960	20.993
4.59	4.64	0.9882	Slope	1.003864	0.90 - 1.10
2.29	2.33	0.9840	Siope	1.003804	0.90 - 1.10
			Intercept	0.017642	+/-0.5



NMHC Calibration Plot

Date: September 7, 2023 Location: Fort Hills







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Station Name: Fort Hills

Calibration Date: September 27, 2023

Start time (MST): 11:00

Reason: Cylinder Change

Station number: AMS23

Last Cal Date: September 7, 2023

End time (MST): 12:12

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm

C3H8 Cal Gas Conc. 207.4 ppm

Removed Gas Cert: N/A Removed Gas Expiry: 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 (CH₄): 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

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

CH4 SP Ratio: 2.39E-04 2.34E-04 NMHC SP Ratio: 5.21E-05 5.10E-05 CH4 Retention time: 13.0 13.0 NMHC Peak Area: 176470 180460

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	17.33	0.992
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	17.33	0.992
second point					
third point					
as left zero					
as left span					

			Avei	rage Correction Factor	0.992
Baseline Corr AF:	17.33	Prev response	17.27	*% change	0.4%
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

Set Point Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (Ic) CF as found zero 5000 0.0 0.00 0.00 as found span 4920 80.3 9.16 9.18 as found 3rd point as found 3rd point new cylinder response calibrator zero 5000 0.0 0.00 0.00 high point 4920 80.3 9.16 9.18 second point third point as left zero as left zero as left span Average Correction Factor Baseline Corr AF: 9.18 Prev response 9.21 *% change	0.998 0.998
as found span 4920 80.3 9.16 9.18 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 9.16 9.18 second point third point as left zero as left span Average Correction Factor	
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 9.16 9.18 second point third point as left zero as left span Average Correction Factor	
as found 3rd point new cylinder response calibrator zero 5000 0.0 0.00 0.00 high point 4920 80.3 9.16 9.18 second point third point as left zero as left span Average Correction Factor	
new cylinder response calibrator zero 5000 0.0 0.00 0.00 high point 4920 80.3 9.16 9.18 second point third point as left zero as left span Average Correction Factor	
calibrator zero 5000 0.0 0.00 0.00 high point 4920 80.3 9.16 9.18 second point third point as left zero as left span Average Correction Factor	
high point 4920 80.3 9.16 9.18 second point third point as left zero as left span Average Correction Factor	0.998
second point third point as left zero as left span Average Correction Factor	0.330
third point as left zero as left span Average Correction Factor	
as left zero as left span Average Correction Factor	
as left span Average Correction Factor	
Average Correction Factor	
	0.998
2030 110 110 110 110 110 110 110 110 110	-0.4%
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:	0.470
Baseline Corr 3rd AF: NA AF Correlation: *=>+/-5% change initiates in	vestigation
CH4 Calibration Data	
the first the first term of th	Limit= 0.95-1.0
as found zero 5000 0.0 0.00 0.00	
as found span 4920 80.3 8.03 8.14	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 80.3 8.03 8.15	0.986
second point	
third point	
as left zero	
as left span	
Average Correction Factor	0.986
Baseline Corr AF: 8.14 Prev response 8.05 *% change	1.1%
Baseline Corr 2nd AF: NA AF Slope: AF Intercept:	
Baseline Corr 3rd AF: NA AF Correlation: * = > +/-5% change initiates in	vestigation
Calibration Statistics	
<u>Start</u> <u>Finish</u>	
THC Cal Slope: 1.005421 1.008027	
THC Cal Offset: -0.016398 0.000000	
THC Cal Offset: -0.016398 0.000000 CH4 Cal Slope: 1.005916 1.014599	

Notes: Nitrogen cylinder changed.

0.017642

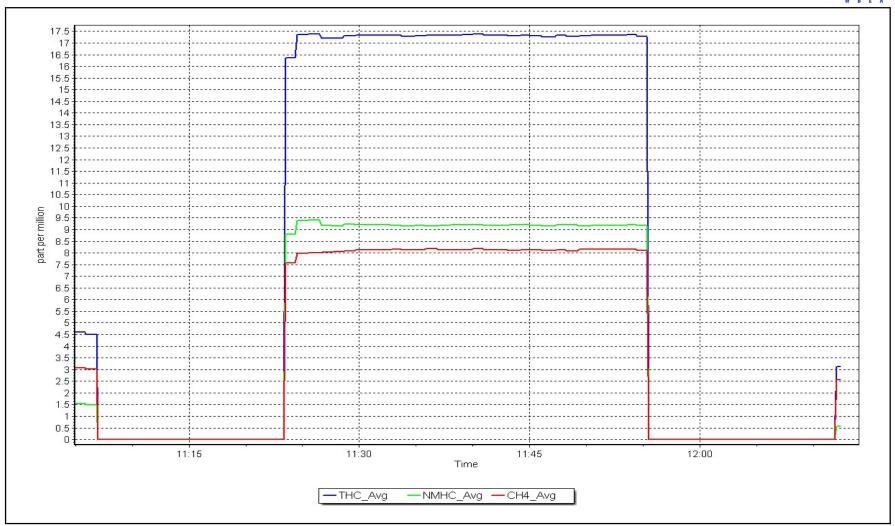
Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

0.000000

Date: September 27, 2023 Location: Fort Hills







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Fort Hills Station Name:

Calibration Date: September 5, 2023

Start time (MST): 7:35 Reason: Routine Station number: AMS23

Last Cal Date: August 1, 2023

rinich

End time (MST): 11:56

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

Removed Gas NO Conc: Removed Gas NOX Conc: 49.7 ppm 49.7 ppm

NOX gas Diff:

NO gas Diff: Teledyne API T700 Serial Number: Calibrator Model: 451 ZAG make/model: Teledyne API T701 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1152430007

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.107	1.076	NO bkgnd or offset:	3.4	3.3
NOX coeff or slope:	0.995	0.991	NOX bkgnd or offset:	3.8	3.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	163.8	163.8

Calibration Statistics

	<u>Start</u>	<u>FINISN</u>
NO _x Cal Slope:	0.999964	0.996239
NO _x Cal Offset:	0.504456	-0.017022
NO Cal Slope:	1.001151	0.998440
NO Cal Offset:	-0.335801	-1.437143
NO ₂ Cal Slope:	0.997897	1.016048
NO ₂ Cal Offset:	-0.698579	0.951555



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ition 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 = 0.95-1.03
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1		
as found span	4920	80.5	800.2	800.2	0.0	826.1	821.4	4.7	0.969	0.974
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	4920	80.5	800.2	800.2	0.0	797.0	797.9	-0.9	1.004	1.003
second point	4960	40.2	399.6	399.6	0.0	398.5	397.5	1.1	1.003	1.005
third point	4980	20.1	199.8	199.8	0.0	198.7	196.4	2.3	1.005	1.017
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as left span	4920	80.5	800.2	455.6	344.6	784.3	436.5	347.8	1.020	1.044
							Average C	orrection Factor	1.004	1.008
Corrected As f	ound NO _x =	826.3 ppb	NO =	821.7 ppb	* = > +/-5	% change initiates i	investigation	*Percent Chang	ge NO _X =	3.1%
Previous Respo	onse NO _x =	800.6 ppb	NO =	800.8 ppb				*Percent Chang	ge NO =	2.5%
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)	783.7	439.1	344.6	350.5	0.983	101.7%
2nd GPT point (200 ppb O3)	783.7	615.3	168.4	173.1	0.973	102.8%
3rd GPT point (100 ppb O3)	783.7	698.9	84.8	87.4	0.970	103.1%
				Average Correction Factor	0.975	102.5%

Notes: No maintenance done. Span adjusted. Due to drifting during the GPT the 2nd NO ref point used.

Calibration Performed By: Melissa Lemay



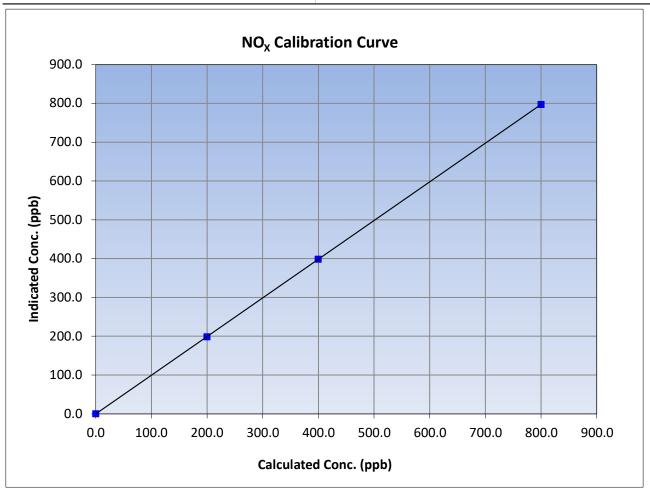
NO_X Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 5, 2023 Previous Calibration: August 1, 2023 Fort Hills AMS23 Station Number: Station Name: Start Time (MST): 7:35 End Time (MST): 11:56 Thermo 42i Analyzer make: Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient		≥0.995
800.2	797.0	1.0040	correlation coefficient	0.999999	20.993
399.6	398.5	1.0027	Slope	0.996239	0.90 - 1.10
199.8	198.7	1.0055	Slope	0.990239	0.30 - 1.10
			Intercept	-0.017022	+/-20





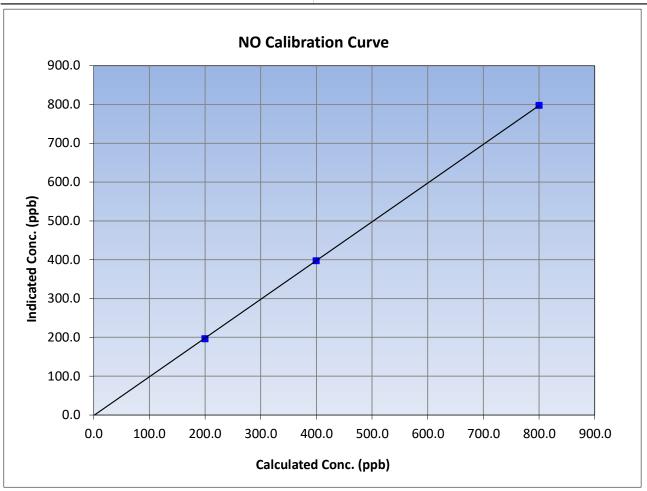
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 5, 2023 Previous Calibration: August 1, 2023 Fort Hills AMS23 Station Name: Station Number: Start Time (MST): 7:35 End Time (MST): 11:56 Thermo 42i Analyzer make: Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999987	≥0.995
800.2	797.9	1.0028	correlation coefficient	0.555507	20.993
399.6	397.5	1.0052	Slope	0.998440	0.90 - 1.10
199.8	196.4	1.0173	Slope	0.336440	0.90 - 1.10
			Intercept	-1.437143	+/-20





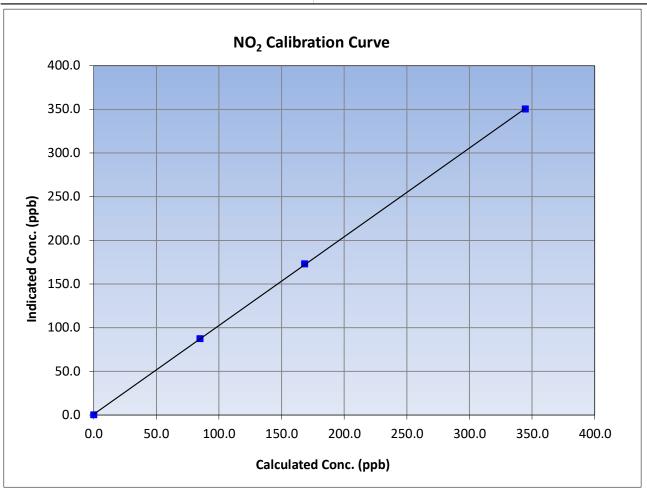
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 5, 2023 Previous Calibration: August 1, 2023 Fort Hills AMS23 Station Name: Station Number: Start Time (MST): 7:35 End Time (MST): 11:56 Thermo 42i Analyzer make: Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999969	≥0.995
344.6	350.5	0.9832	correlation coefficient	0.555505	20.993
168.4	173.1	0.9728	Slope	1.016048	0.90 - 1.10
84.8	87.4	0.9703	Slope	1.010046	0.90 - 1.10
			Intercept	0.951555	+/-20

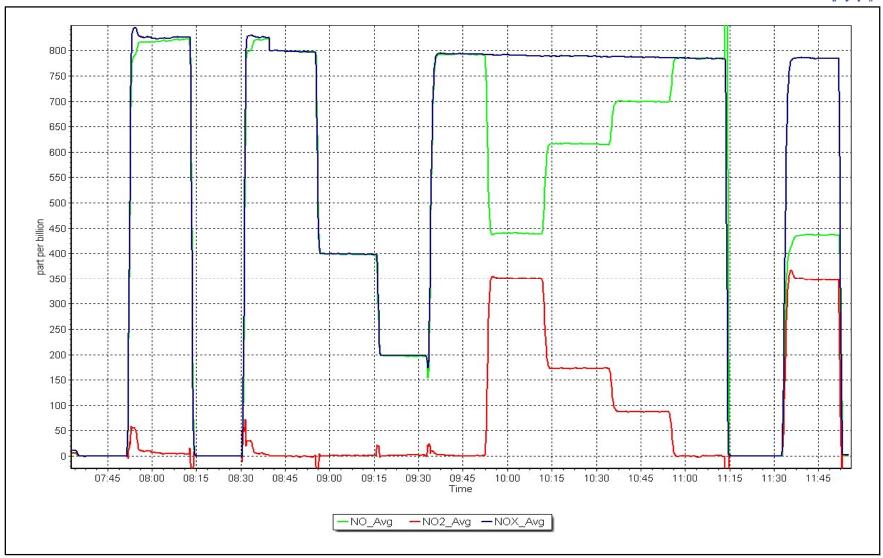


NO_x Calibration Plot

Date: September 5, 2023

Location: Fort Hills







T640 PM_{2.5} CALIBRATION

Version-01-2023

W D L A						Version-01-2023
		Station Information	า			
Station Name:	Fort Hills		Station number:	AMS 23		
Calibration Date:	September 7, 2023		Last Cal Date:	August 17,	2023	
Start time (MST):	6:40		End time (MST):	7:40		
Analyzer Make:	API T640		S/N:	1546		
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	As left		<u>Adjusted</u>	(Limits)
T (°C)	6.9	6.8	6.9			+/- 2 °C
P (mmHg)	732.9	732.1	732.9			+/- 10 mmHg
flow (LPM)	5.00	5.1	5.00			+/- 0.25 LPM
Leak Test:	Date of check:	September 7, 2023	Last Cal Date:	August 1	.7, 2023	
	PM w/o HEPA:	66.1	PM w/ HEPA:	C)	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will	serve as the pre ma	aintenance l	eak check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration	Test			
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test	9	12	10.7		✓	10.9 +/- 0.5
		/				
Post-maintenance		PM w/o HEPA:	65.3	w/ HEPA:		0.0
Date Optical Cham		September 7			<0.2 ug/m3	
Disposable Filte	r Changed:	September 7	7, 2023			
		Annual Maintenanc	e			
Date Sample Tub		May 10, 2				
Date RH/T Senso	or Cleaned:	May 10, 2	2023			
	Leak	check passed before and af	fter cleaning. PMT ac	djusted. Head	d cleaned.	
Notes:						
Calibration by:	Melissa Lemay					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN SEPTEMBER 2023

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

October 30, 2023



ZAG Make/Model:

Wood Buffalo Environmental Association

SO₂ Calibration Report

AMS25

10:28

Version-01-2020

Station Information

Waskow ohci Pimatisiwin Station number: Station Name:

September 28, 2023 Calibration Date: Last Cal Date: August 29, 2023

Start time (MST): 7:25

Routine Reason:

Calibration Standards

Cal Gas Concentration: 50.54 ppm

Cal Gas Cylinder #: CC437219

Removed Cal Gas Conc: 50.54

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

NA

API T701

ppm

Cal Gas Exp Date:

Rem Gas Exp Date: NA

End time (MST):

Diff between cyl:

Serial Number: 747 Serial Number: 4765

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1118148497

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.997792 Calibration intercept: 0.703977

0.990940 0.604127 Backgd or Offset: Coeff or Slope: Start 9.7 0.988

December 29, 2028

Finish 9.7 0.988

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	0.3	
as found span	4921	79.2	800.5	790.9	1.012
as found 2nd point					_
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4921	79.2	800.5	793.8	1.008
second point	4960	39.6	400.3	397.4	1.007
third point	4980	19.8	200.1	199.0	1.006
as left zero	5000	0.0	0.0	0.5	
as left span	4921	79.2	800.5	794.0	1.008
	_	_	Averag	ge Correction Factor	1.007

Baseline Corr As found: 790.60 Previous response 799.46 *% change -1.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



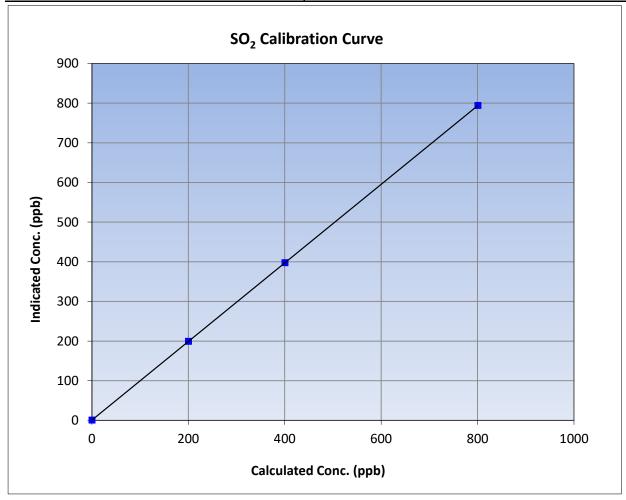
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 29, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 7:25 End Time (MST): 10:28 Analyzer make: Thermo 43i Analyzer serial #: 1118148497

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.5		Correlation Coefficient	1.000000	≥0.995	
800.5	793.8	1.0085	Correlation Coefficient	1.000000	20.993	
400.3	397.4	1.0073	Slope	0.990940	0.90 - 1.10	
200.1	199.0	1.0058	Slope	0.550540	0.90 - 1.10	
			- Intercept	0.604127	+/-30	

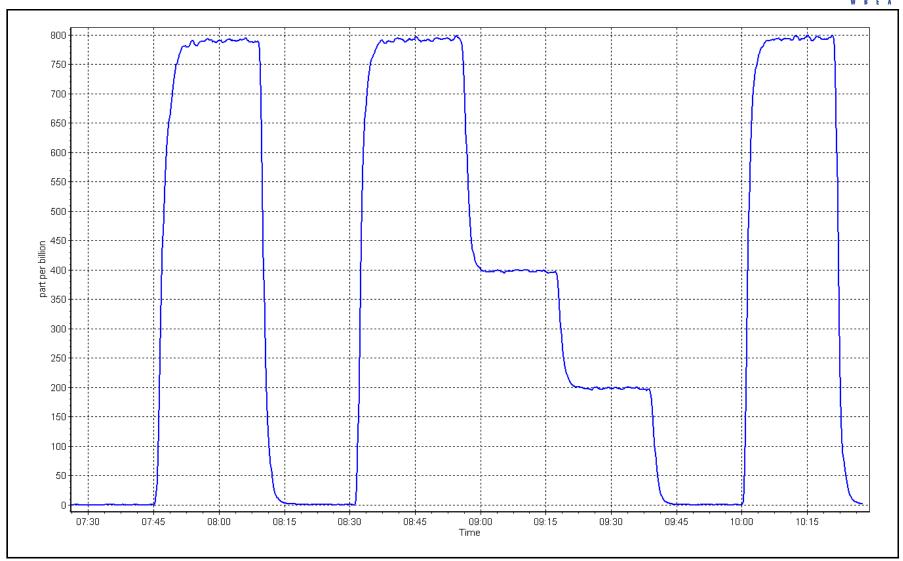


SO2 Calibration Plot

Date: September 28, 2023

Location: Waskow ohci Pimatisiwin







H₂S Calibration Report

Station number:

AMS25

261

Version-11-2021

Station Information

Station Name: Waskow ohci Pimatisiwin

Calibration Date: September 26, 2023 Last Cal Date: August 18, 2023

Start time (MST): 6:45 End time (MST): 11:06

Routine Reason:

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 4.97 ppm

Cal Gas Cylinder #: CC517099

Removed Cal Gas Conc: 4.97 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: NA Calibrator Make/Model: API T700 Serial Number: 747 ZAG Make/Model: **API T701** Serial Number:

Analyzer Information

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146 Global G-150 Converter serial #: 2022-219 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish Start** <u>Finish</u> 0.991600 0.980956 Backgd or Offset: 3.25 Calibration slope: 3.25 0.080000 0.100000 1.079 Calibration intercept: Coeff or Slope: 1.079

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	4920	80.0	79.5	78.6	1.010
as found 2nd point	4960	40.0	39.7	39.6	1.001
as found 3rd point	4980	20.0	19.9	19.7	1.003
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	4920	80.0	79.5	78.0	1.019
second point	4960	40.0	39.7	39.1	1.016
third point	4980	20.0	19.9	19.7	1.008
as left zero	5000	0.0	0.0	0.0	
as left span	4920	80.0	0.008	786.8	1.017
SO2 Scrubber Check	4921	79.2	0.008	-0.1	
Date of last scrubber chan	ge:	20-Jun-23		Ave Corr Factor	1.014
Date of last converter efficiency test:					efficiency

Baseline Corr As found: 78.7 78.87 -0.2% Prev response: *% change: 0.020000 Baseline Corr 2nd AF pt: 39.7 AF Slope: 0.990449 AF Intercept: Baseline Corr 3rd AF pt: 0.999976 19.8 AF Correlation: * = > +/-5% change initiates investigation

SOx scrubber checked after the calibrator zero. No adjustments done.

Calibration Performed By: Melissa Lemay

Notes:



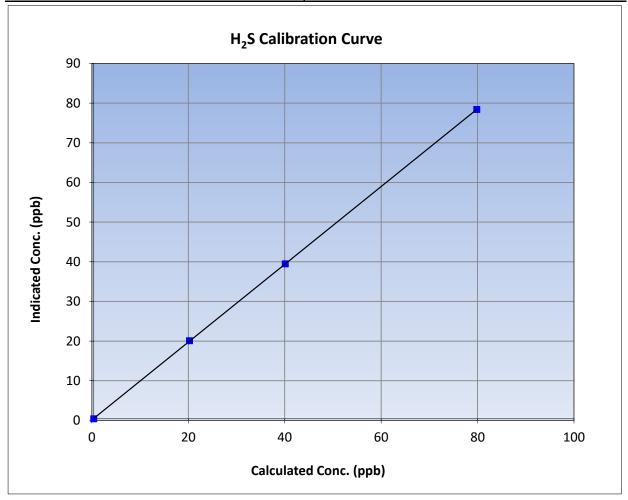
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 26, 2023 **Previous Calibration:** August 18, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 6:45 End Time (MST): 11:06 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146

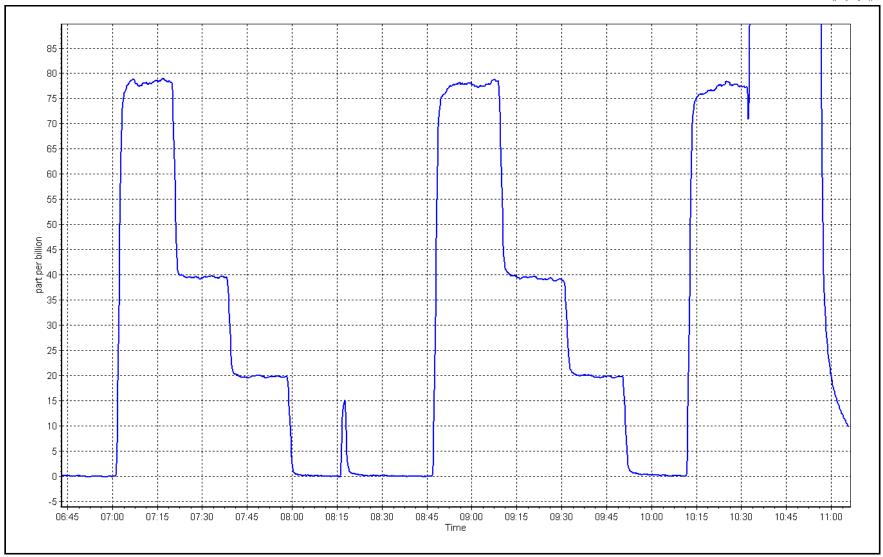
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999992	≥0.995	
79.5	78.0	1.0187	Correlation Coefficient	0.333332	20.993	
39.7	39.1	1.0161	Slope	0.980956	0.90 - 1.10	
19.9	19.7	1.0083	Slope	0.380330	0.90 - 1.10	
			- Intercept	0.100000	+/-3	



Date: September 26, 2023

Location: Waskow ohci Pimatisiwin







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Christina Lake

September 19, 2023 Calibration Date:

Start time (MST): 14:16 Routine Reason:

API T701H

Station number: AMS 26

> Last Cal Date: August 17, 2023

End time (MST): 16:57

Calibration Standards

Cal Gas Concentration: 49.56

Cal Gas Cylinder #: CC362134

Removed Cal Gas Conc: 49.56

Removed Gas Cyl #: <u>NA</u>

ZAG Make/Model:

Calibrator Make/Model: **API T700**

ppm

ppm Rem Gas Exp Date: NA

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 2447 Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1173410001

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 1.018405 Calibration intercept: -2.239175

1.009149 -2.177877

Backgd or Offset: Coeff or Slope: Start 16.2 0.900

February 23, 2025

Finish 16.1 0.900

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	0.5	
as found span	4919	80.6	799.0	804.4	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.8	
high point	4919	80.6	799.0	805.7	0.992
second point	4960	40.3	399.4	399.1	1.001
third point	4980	20.2	200.2	197.1	1.016
as left zero	5000	0.0	0.0	0.7	
as left span	4919	80.6	799.0	807.6	0.989
·			Averag	ge Correction Factor	1.003
Baseline Corr As found:	803.90	Previous response	811.44	*% change	-0.9%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



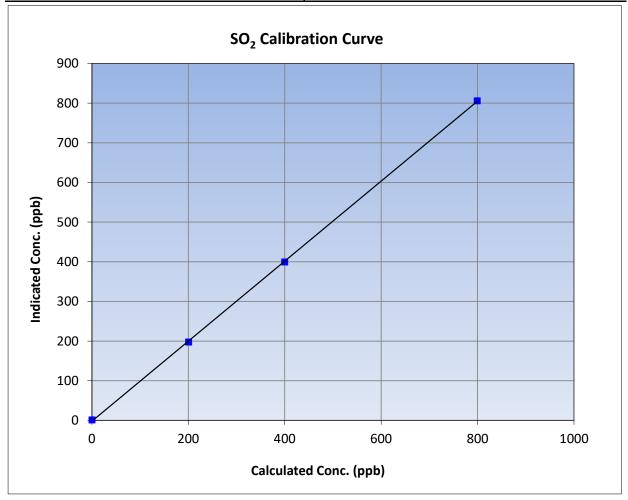
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 19, 2023 **Previous Calibration:** August 17, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 14:16 End Time (MST): 16:57 Analyzer make: Thermo 43i Analyzer serial #: 1173410001

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.8		Correlation Coefficient	0.999937	≥0.995	
799.0	805.7	0.9916	Correlation Coefficient	0.555557	20.333	
399.4	399.1	1.0008	Slope	1.009149	0.90 - 1.10	
200.2	197.1	1.0158	Slope	1.003143	0.90 - 1.10	
			Intercept	-2.177877	+/-30	

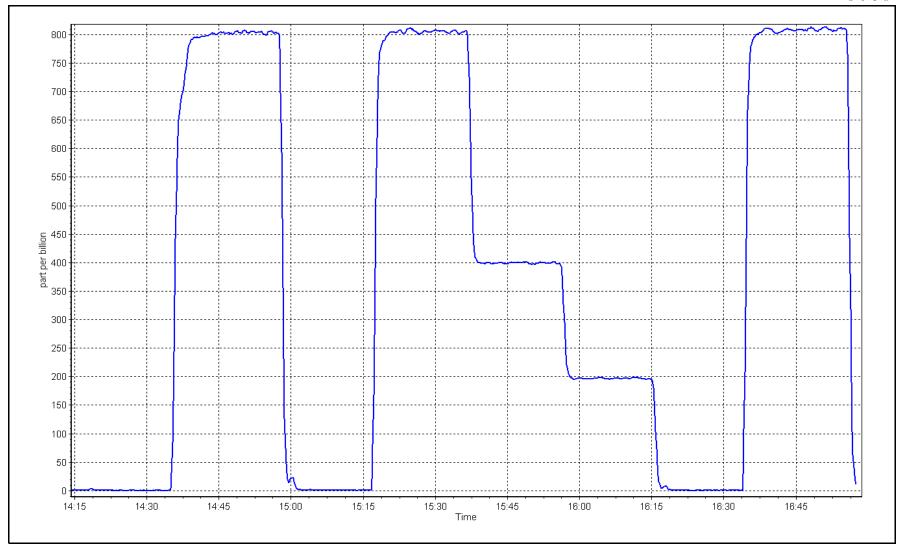


SO2 Calibration Plot

Date: September 19, 2023

Location: Christina Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Christina Lake

Calibration Date: September 20, 2023

Start time (MST): 6:50

Routine Reason:

Station number: AMS26

> Last Cal Date: August 17, 2023 End time (MST): 10:51

Calibration Standards

Cal Gas Concentration: February 9, 2024 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 Serial Number: 2447 ZAG Make/Model: **API T701H** Serial Number: 832

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1180030032

Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.002610 1.010898 Backgd or Offset: 35.0 Calibration slope: 35.4 Calibration intercept: 0.119119 0.179125 Coeff or Slope: 1.093 1.093

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	4918	81.8	80.0	79.2	1.014
as found 2nd point	4959	40.9	40.0	39.8	1.013
as found 3rd point	4979	20.4	20.0	19.5	1.039
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	4918	81.8	80.0	81.1	0.986
second point	4959	40.9	40.0	40.7	0.983
third point	4979	20.4	20.0	20.0	0.998
as left zero	5000	0.0	0.0	0.3	
as left span	4918	81.8	80.0	80.6	0.993
SO2 Scrubber Check	4919	80.6	806.1	0.0	
Date of last scrubber chan	ge:	27-Feb-19		Ave Corr Factor	0.989
Date of last converter effic	<u> </u>	efficiency			

Date of last scrubber change	2:	27-Feb-19		Ave Corr Factor	0.989
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	78.9	Prev response:	80.33	*% change:	-1.8%

0.988332 Baseline Corr 2nd AF pt: 39.5 AF Slope: Baseline Corr 3rd AF pt: AF Correlation: 0.999950 19.2

* = > +/-5% change initiates investigation

AF Intercept:

Changed sample inlet filter after MAF's. Ran scrubber check after calibrator zero. No adjustments Notes: made.

Calibration Performed By: Mohammed Kashif 0.118700



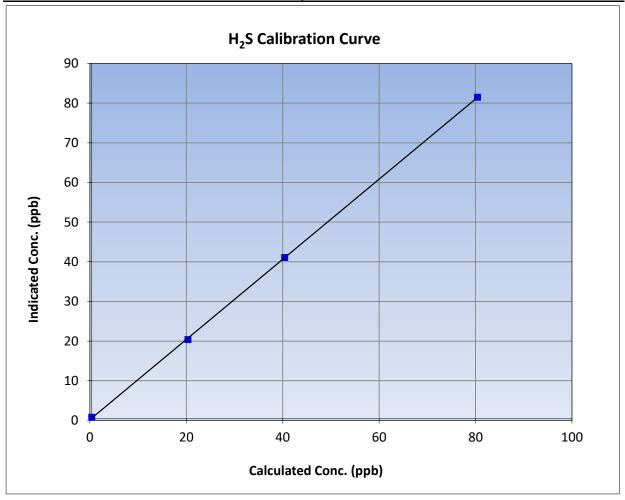
H₂S Calibration Summary

Version-11-2021

Station Information

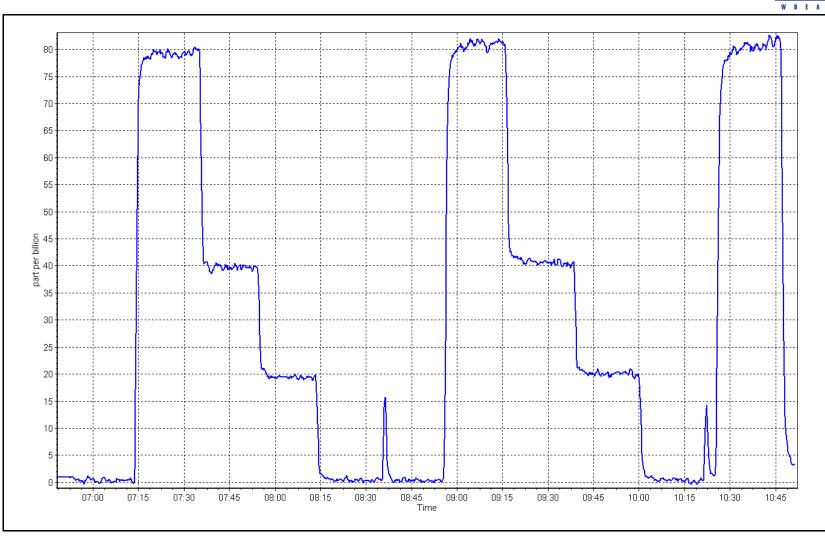
Calibration Date: September 20, 2023 **Previous Calibration:** August 17, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 6:50 End Time (MST): 10:51 Analyzer make: Thermo 450i Analyzer serial #: 1180030032

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999950	≥0.995	
80.0	81.1	0.9865	Correlation Coefficient	0.99990	20.993	
40.0	40.7	0.9828	Slope	1.010898	0.90 - 1.10	
20.0	20.0	0.9977	Slope	1.010090	0.90 - 1.10	
			- Intercept	0.179125	+/-3	



Date: September 20, 2023 Location: Christina Lake







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Christina Lake Station number: AMS26

Calibration Date: September 19, 2023 Last Cal Date: August 17, 2023 Start time (MST): 10:35 End time (MST): 17:46

Start time (MST): 10:35 Reason: Routine

Calibration Standards

NO Gas Cylinder #: T2Y1P4C Cal Gas Expiry Date: November 12, 2023

NOX Cal Gas Conc: 50.82 ppm NO Cal Gas Conc: 50.02 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 50.82 ppm Removed Gas NO Conc: 50.02 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: API T700 Serial Number: 2447 ZAG make/model: API T701H Serial Number: 832

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: 1.370 1.370 NO bkgnd or offset: 2.6 2.6 NOX coeff or slope: 0.991 0.991 NOX bkgnd or offset: 3.4 3.4 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 160.7 161.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.996528	1.000604
NO _x Cal Offset:	-1.780000	-2.180000
NO Cal Slope:	1.001328	1.004213
NO Cal Offset:	-2.380000	-2.740000
NO ₂ Cal Slope:	0.995894	0.995671
NO ₂ Cal Offset:	-1.805192	-0.892478



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	-0.7	-0.2	-0.6		
as found span	4920	80.0	813.1	800.3	12.8	812.6	801.6	11.1	1.0006	0.9984
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	0.0	-0.5		
high point	4920	80.0	813.1	800.3	12.8	812.2	802.2	9.8	1.0011	0.9977
second point	4960	40.0	406.6	400.2	6.4	404.0	398.1	5.9	1.0063	1.0052
third point	4980	20.0	203.3	200.1	3.2	199.4	195.2	4.2	1.0195	1.0250
as left zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.1	-0.6		
as left span	4920	80.0	813.1	394.8	418.3	811.7	395.4	416.2	1.0017	0.9985
							Average C	Correction Factor	1.0090	1.0093
Corrected As fo	ound NO _X =	813.3 ppb	NO =	801.8 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _X =	0.6%
Previous Respo	onse NO _X =	808.5 ppb	NO =	799.0 ppb				*Percent Chang	ge NO =	0.3%
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	PT 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 Calibratio	erter Efficiency on 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)	799.2		393.7	418.3		415.9	1.0058	3	99.4%
2nd GPT poin	t (200 ppb O3)	799.2		595.5	216.5		214.2	1.0107	7	98.9%
3rd GPT noint	t (100 ppb O3)	799.2		700.7	111.3		109.7	1.0146	5	98.6%

Notes:

Changed sample inlet filter after as founds. No adjustments required.

Average Correction Factor

Calibration Performed By: Mohammed Kashif

99.0%

1.0104



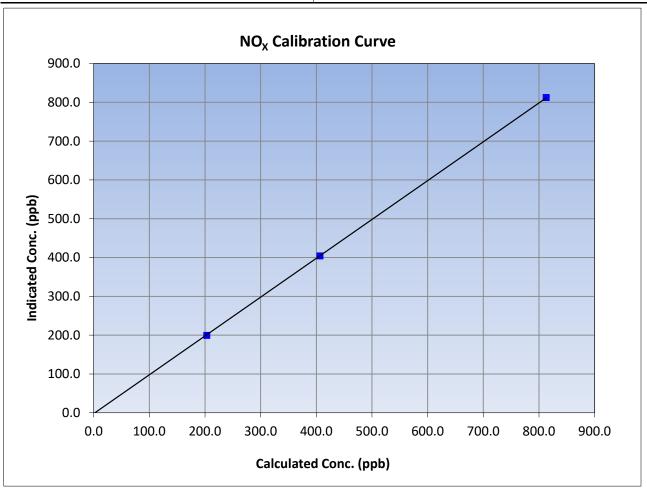
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 17, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 10:35 End Time (MST): 17:46 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.5		Correlation Coefficient	0.999980	≥0.995
813.1	812.2	1.0011	Correlation Coefficient	0.55550	20.333
406.6	404.0	1.0063	Slope	1.000604	0.90 - 1.10
203.3	199.4	1.0195	Slope	1.000004	0.90 - 1.10
			Intercept	-2.180000	+/-20





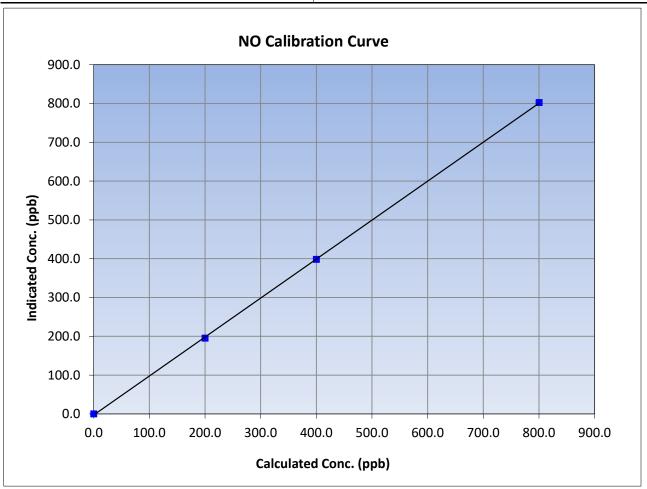
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 17, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 10:35 End Time (MST): 17:46 Analyzer make: Thermo 42i Analyzer serial #: 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999946	≥0.995
800.3	802.2	0.9977	Correlation Coefficient	0.555540	20.993
400.2	398.1	1.0052	Slope	1.004213	0.90 - 1.10
200.1	195.2	1.0250	Slope	1.004213	0.90 - 1.10
			Intercept	-2.740000	+/-20





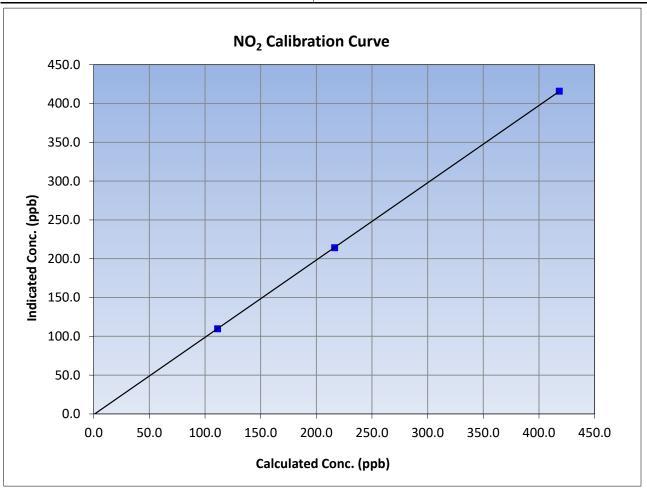
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 19, 2023 Previous Calibration: August 17, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 10:35 End Time (MST): 17:46 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.5		Correlation Coefficient	0.999995	≥0.995
418.3	415.9	1.0058	Correlation Coefficient	0.555555	20.333
216.5	214.2	1.0107	Slope	0.995671	0.90 - 1.10
111.3	109.7	1.0146	Зюре	0.993071	0.90 - 1.10
	<u> </u>		Intercept	-0.892478	+/-20

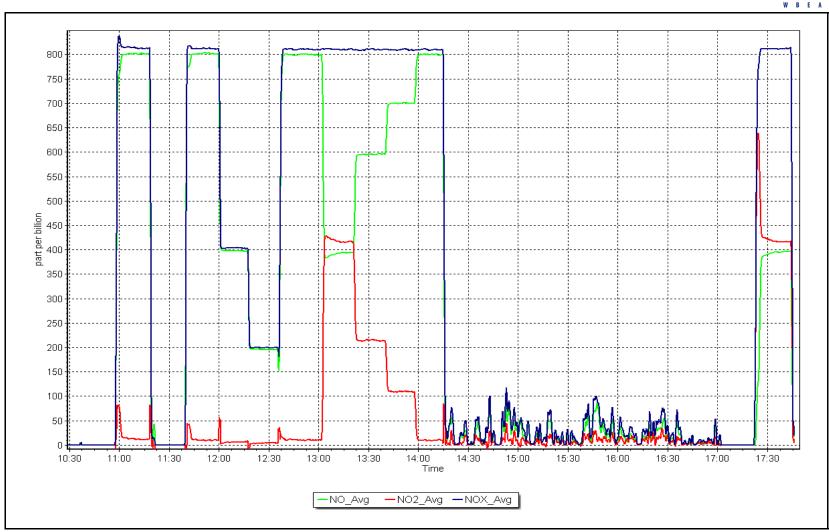


NO_x Calibration Plot

Date: September 19, 2023

Location: Christina Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27 JACKFISH 2/3 SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Jackfish 2/3

Calibration Date: September 28, 2023

Start time (MST): 7:58
Reason: Routine

Station number: AMS 27

Last Cal Date: August 23, 2023

End time (MST): 10:48

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 701 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: Thermo 43iQ Analyzer serial #: 12124313138

Analyzer Range 0 - 1000 ppb

 Start
 Finish
 Start
 Finish

 1.000975
 0.990232
 Backgd or Offset:
 7.2
 7.2

 Calibration slope:
 1.000975
 0.990232
 Backgd or Offset:
 7.2
 7.2

 Calibration intercept:
 -1.618030
 -2.057655
 Coeff or Slope:
 0.891
 0.891

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	0.0	
as found span	4921	79.1	800.2	789.4	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.1	800.2	791.0	1.012
second point	4961	39.5	399.5	393.6	1.015
third point	4980	19.8	200.3	193.4	1.036
as left zero	5000	0.0	0.0	0.3	
as left span	4921	79.1	800.2	792.8	1.009
·			Averag	ge Correction Factor	1.021
Baseline Corr As found:	789.40	Previous response	799.32	*% change	-1.3%

Baseline Corr As found: 789.40 Previous response 799.32 *% change -1.3% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



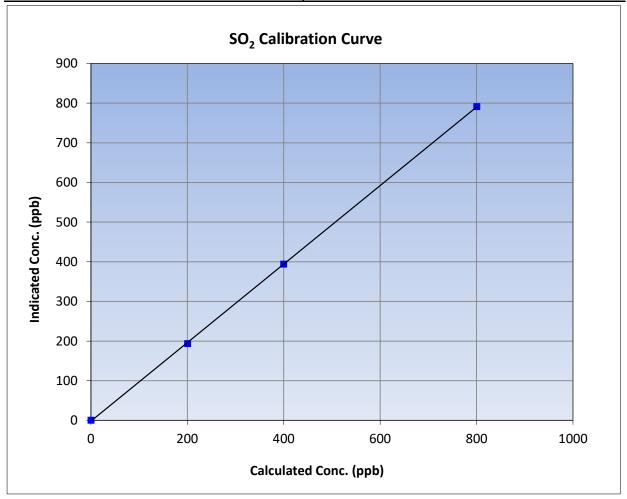
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 28, 2023 **Previous Calibration:** August 23, 2023 Station Name: Jackfish 2/3 Station Number: **AMS 27** Start Time (MST): 7:58 End Time (MST): 10:48 Analyzer make: Thermo 43iQ Analyzer serial #: 12124313138

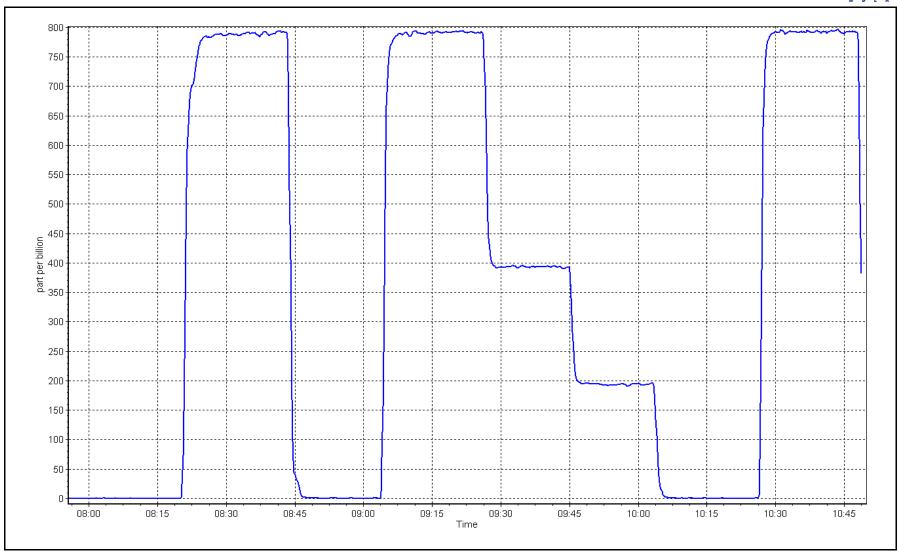
Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.1		Correlation Coefficient	0.999961	≥0.995			
800.2	791.0	1.0116	Correlation coefficient	0.555501	20.333			
399.5	393.6	1.0151	Slope	0.990232	0.90 - 1.10			
200.3	193.4	1.0357	Slope	0.990232	0.90 - 1.10			
			- Intercept	-2.057655	+/-30			



SO2 Calibration Plot

Date: September 28, 2023 Location: Jackfish 2/3







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Jackfish 2/3 Calibration Date: September 27, 2023

Start time (MST): 12:02

Routine Reason:

Station number: AMS27

Last Cal Date: August 2, 2023

End time (MST): 16:13

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.41 ppm

Cal Gas Cylinder #: CC345023

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.41 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: API T700 Serial Number: 3811 ZAG Make/Model: **API 701** Serial Number: 135

Analyzer Information

Analyzer make: **API T101** Analyzer serial #: 621 Converter serial #:

Converter make:

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.002337 Backgd or Offset: Calibration slope: 1.006901 28.3 29.9 -0.137809 Calibration intercept: -0.097803 Coeff or Slope: 0.928 0.944

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	0.7	
as found span	4926	74.1	80.2	83.8	0.965
as found 2nd point	4963	37.0	40.0	41.9	0.972
as found 3rd point	4982	18.5	20.0	20.7	1.001
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	74.1	80.2	80.2	1.000
second point	4963	37.0	40.0	40.2	0.996
third point	4982	18.5	20.0	19.6	1.021
as left zero	5000	0.0	0.0	0.3	
as left span	4926	74.1	80.2	79.6	1.007
SO2 Scrubber Check	4921	79.1	791.0	0.0	
Date of last scrubber cha	ange:		•	Ave Corr Factor	1.006
Date of last converter ef	ficiency test:				efficiency

Date of last scrubber change:	Ave Corr Factor	1.006
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 83.1 80.63 3.0% Prev response: *% change: Baseline Corr 2nd AF pt: 41.2 AF Slope: 1.039259 AF Intercept: 0.342836 Baseline Corr 3rd AF pt: 20.0 AF Correlation: 0.999909

* = > +/-5% change initiates investigation

Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator Notes: zero. Adjusted both zero and span.

Calibration Performed By: Mohammed Kashif



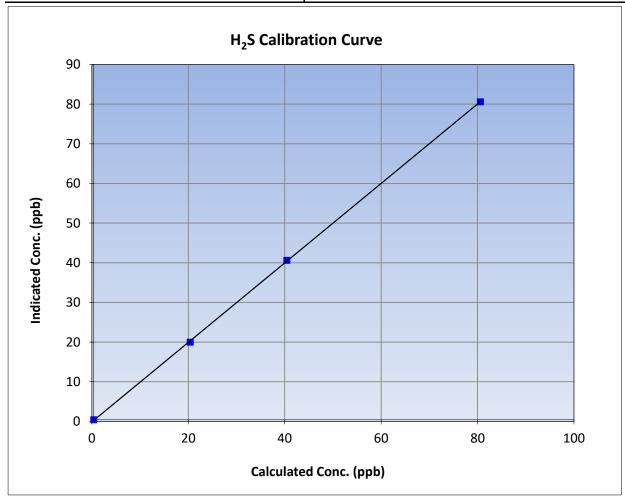
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 27, 2023 **Previous Calibration:** August 2, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 12:02 End Time (MST): 16:13 Analyzer make: **API T101** Analyzer serial #: 621

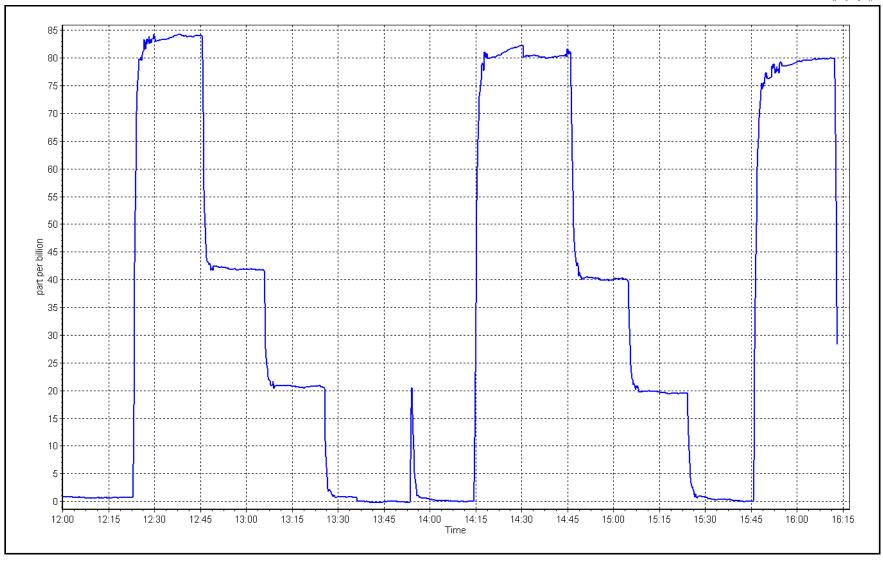
Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999952	≥0.995			
80.2	80.2	0.9997	Correlation Coefficient	0.555552	20.333			
40.0	40.2	0.9959	Slope	1.002337	0.90 - 1.10			
20.0	19.6	1.0212	Slope	1.002557	0.90 - 1.10			
			- Intercept	-0.137809	+/-3			



Date: September 27, 2023

Location: Jackfish 2/3







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Jackfish 2/3 Station number: AMS27

Calibration Date: September 28, 2023 Last Cal Date: August 8, 2023

Start time (MST): 10:49 End time (MST): 15:19

Reason: Routine

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: NO gas Diff:

Calibrator Model: API T700 Serial Number: 3811 ZAG make/model: API T701 Serial Number: 135

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 722

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.109	1.123	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.087	1.110	NOX bkgnd or offset:	1.2	1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.6	7.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000358	0.997982
NO _x Cal Offset:	-1.195601	-1.996793
NO Cal Slope:	1.010851	1.003585
NO Cal Offset:	-1.717915	-2.899642
NO ₂ Cal Slope:	0.972010	0.994749
NO ₂ Cal Offset:	0.660630	-0.945227



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	-0.2	-0.9	0.7		
as found span	4921	79.4	816.8	800.3	16.5	796.1	786.3	9.8	1.0260	1.0178
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	4921	79.4	816.8	800.3	16.5	814.2	801.9	12.3	1.0032	0.9980
second point	4960	39.7	408.5	400.2	8.3	404.6	396.7	7.8	1.0095	1.0088
third point	4980	19.8	203.7	199.6	4.1	199.2	194.9	4.3	1.0226	1.0241
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.6	-0.6		
as left span	4921	79.4	816.8	420.5	399.2	812.4	416.0	396.3	1.0054	1.0108
							Average C	orrection Factor	1.0118	1.0103
Corrected As for	und NO _X =	796.3 ppb	NO	= 787.2 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _X =	-2.5%
Previous Respor	nse NO _x =	815.9 ppb	NO	= 807.3 ppb				*Percent Chang	ge NO =	-2.5%
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	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:	
				(PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found (GPT zero									
as found GPT point (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)	798.4		415.7	399.2		396.1	1.0079)	99.2%
2nd GPT point	(200 ppb O3)	798.4		618.9	196.0		195.4	1.0031		99.7%
3rd GPT point ((100 ppb O3)	798.4		713.0	101.9		98.1	1.0389		96.3%

Notes:

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

Average Correction Factor

1.0166

Calibration Performed By: Mohammed Kashif 98.4%



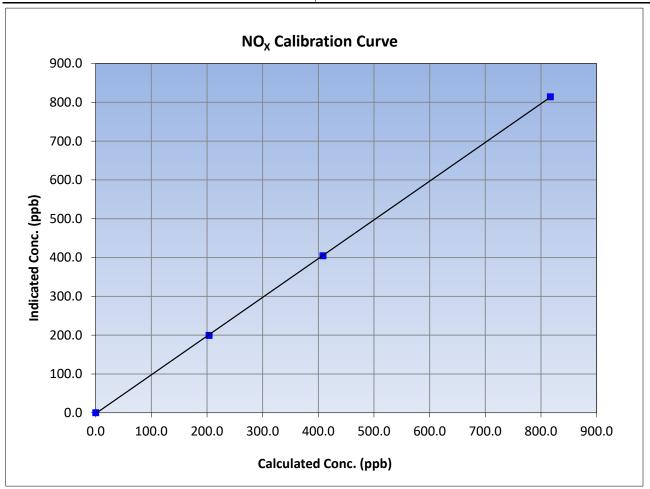
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 28, 2023 Previous Calibration: August 8, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 10:49 End Time (MST): 15:19 Analyzer serial #: Analyzer make: **API T200** 722

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999970	≥0.995
816.8	814.2	1.0032	Correlation Coefficient		
408.5	404.6	1.0095	Slope	0.997982	0.90 - 1.10
203.7	199.2	1.0226	Slope	0.997962	0.50 1.10
			Intercept	-1.996793	+/-20





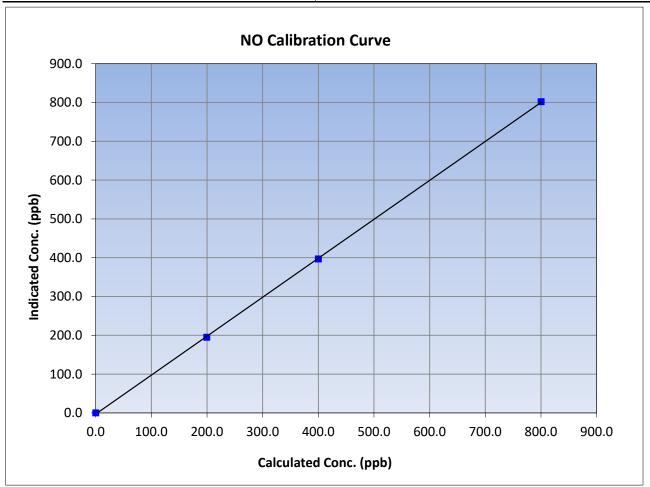
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 28, 2023 Previous Calibration: August 8, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 10:49 End Time (MST): 15:19 Analyzer make: **API T200** Analyzer serial #: 722

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999939	≥0.995
800.3	801.9	0.9980	Correlation Coefficient	0.999939	20.333
400.2	396.7	1.0088	Slope	1.003585	0.90 - 1.10
199.6	194.9	1.0241	Slope	1.005363	0.50 1.10
			Intercept	-2.899642	+/-20





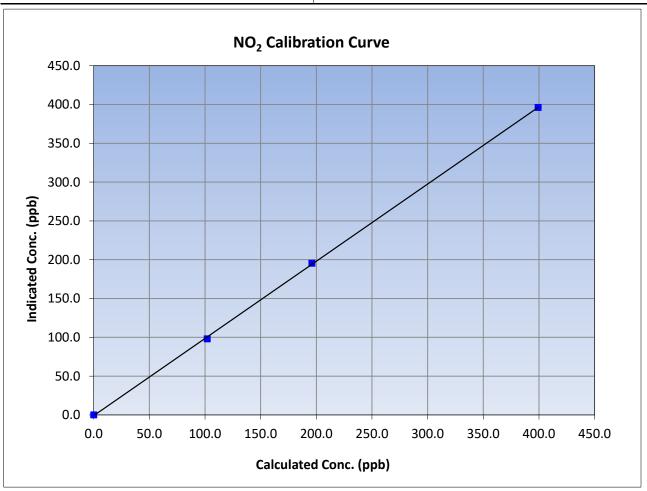
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 28, 2023 Previous Calibration: August 8, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 10:49 End Time (MST): 15:19 Analyzer serial #: Analyzer make: **API T200** 722

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999902	≥0.995
399.2	396.1	1.0079	Correlation Coefficient	0.999902	20.333
196.0	195.4	1.0031	Slope	0.994749	0.90 - 1.10
101.9	98.1	1.0389	Slope	0.994749	0.30 - 1.10
			Intercept	-0.945227	+/-20

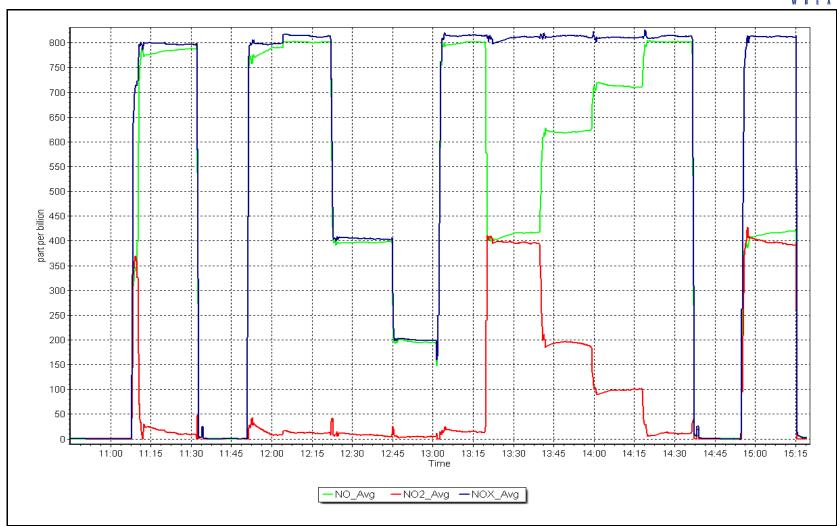


NO_x Calibration Plot

Date: September 28, 2023

Location: Jackfish 2/3







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS29 SURMONT 2 SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Surmont 2

September 5, 2023 Calibration Date: Last Cal Date:

Start time (MST): 10:41

Routine Reason:

Station number: AMS29

End time (MST): 13:37

August 8, 2023

Calibration Standards

Cal Gas Concentration: 49.21 ppm Cal Gas Exp Date: February 23, 2025

Cal Gas Cylinder #: CC356008

Removed Cal Gas Conc: 49.21 Rem Gas Exp Date: NA ppm Diff between cyl: Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: Teledyne API T700 Serial Number: 5472 ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.008955 Backgd or Offset: 13.1 13.2 1.001658

0.942 Calibration intercept: -0.685685 -2.265490 Coeff or Slope: 0.942

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	-0.6	
as found span	4919	81.3	800.1	802.0	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.5	
high point	4919	81.3	800.1	806.0	0.993
second point	4959	40.7	400.6	400.7	1.000
third point	4979	20.3	199.8	197.8	1.010
as left zero	5000	0.0	0.0	-0.3	
as left span	4919	81.3	800.1	806.0	0.993
	•		Averag	ge Correction Factor	1.001
			_	•	

Baseline Corr As found: 802.60 Previous response 800.75 *% 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: **Braiden Boutilier**



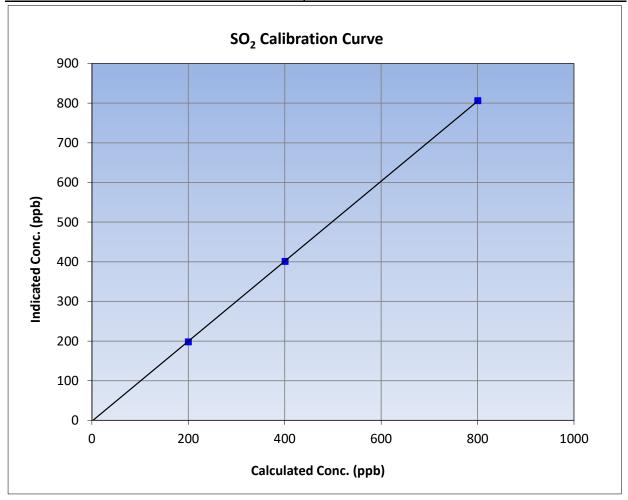
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 5, 2023 **Previous Calibration:** August 8, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:41 End Time (MST): 13:37 Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>				
0.0	-0.5		Correlation Coefficient	0.999978	≥0.995			
800.1	806.0	0.9927	Correlation Coefficient		20.333			
400.6	400.7	0.9997	Slope	1.008955	0.90 - 1.10			
199.8	197.8	1.0102	Slope	1.008333	0.90 - 1.10			
			Intercept	-2.265490	+/-30			

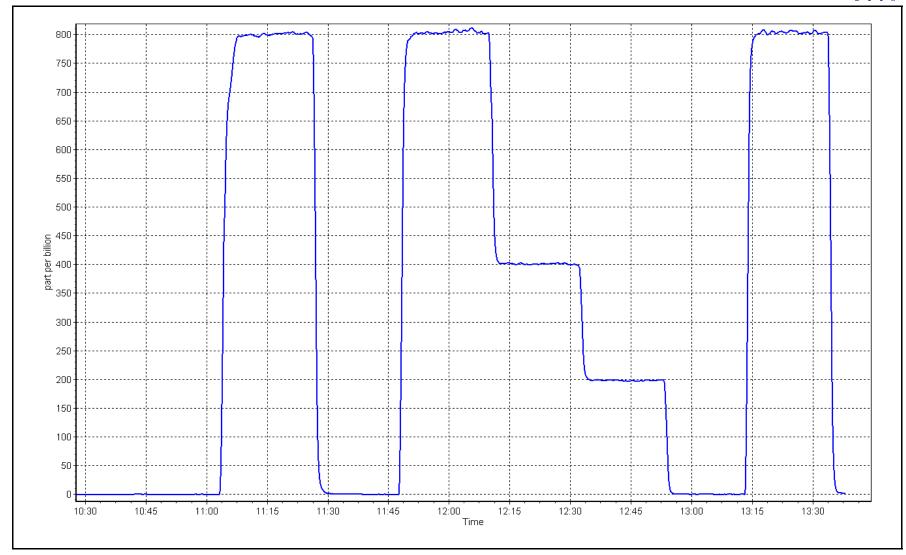




Date: September 5, 2023

Location: Surmont 2







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Surmont 2 Calibration Date: September 7, 2023

Start time (MST): Reason: Routine

10:14

Station number: AMS29

> Last Cal Date: August 1, 2023

End time (MST): 15:47

Calibration Standards

Cal Gas Exp Date: January 4, 2025 Cal Gas Concentration: 5.391 ppm

Cal Gas Cylinder #: CC508338

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.391 ppm Removed Gas Cyl #: CC508338 Diff between cyl:

Calibrator Make/Model: Teledyne API T700 5472 Serial Number: ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

Global Converter serial #: 2022-223 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 1.001190 1.005044 Backgd or Offset: Calibration slope: 0.82 0.83 -0.142944 Calibration intercept: -0.182890 Coeff or Slope: 1.060 1.049

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	79.8	1.000
as found 2nd point	4963	37.2	40.1	39.7	1.005
as found 3rd point	4982	18.6	20.1	20.1	0.988
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	4926	74.2	80.0	80.3	0.996
second point	4963	37.2	40.1	40.1	1.000
third point	4982	18.6	20.1	20.0	1.003
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.2	80.0	79.3	1.009
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chan	ge:			Ave Corr Factor	1.000

Date of last scrubber change:	Ave Corr Factor	1.000
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 80.0 79.91 Prev response: *% change: 0.1% Baseline Corr 2nd AF pt: 39.9 AF Slope: 0.998614 AF Intercept: -0.142639 Baseline Corr 3rd AF pt: 0.999972 20.3 AF Correlation: * = > +/-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



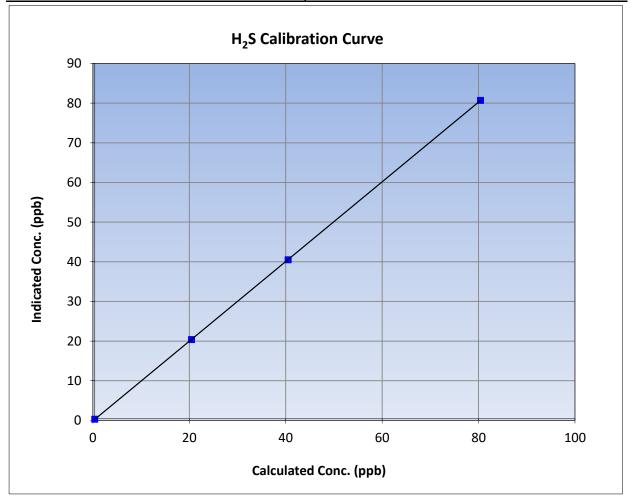
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 7, 2023 **Previous Calibration:** August 1, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:14 End Time (MST): 15:47 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	-0.1		Correlation Coefficient	0.999998	≥0.995					
80.0	80.3	0.9963	Correlation Coefficient	0.555550	20.993					
40.1	40.1	1.0002	Slope	1.005044	0.90 - 1.10					
20.1	20.0	1.0027	Slope	1.003044	0.90 - 1.10					
			- Intercept	-0.142944	+/-3					



H₂S Calibration Plot

Date: September 7, 2023

Location: Surmont 2







H₂S Calibration Report

Station number:

End time (MST):

AMS29

16:20

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Surmont 2

Calibration Date: September 19, 2023 Last Cal Date: September 7, 2023

Start time (MST): 10:09

Reason: Maintenance

Calibration Standards

Cal Gas Concentration: 5.391 ppm Cal Gas Exp Date: January 4, 2025

Cal Gas Cylinder #: CC508338

Removed Cal Gas Conc: 5.391 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: CC508338 Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 5472 ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

Converter make: Global Converter serial #: 2022-220

Analyzer Range 0 - 100 ppb

 Start
 Finish
 Start

 ope:
 1.005044
 1.005327
 Backgd or Offset:
 0.83

 Calibration slope:
 1.005044
 1.005327
 Backgd or Offset:
 0.83
 1.19

 Calibration intercept:
 -0.142944
 -0.202877
 Coeff or Slope:
 1.060
 1.080

H₂S As Found Data

Set Point Dilution air flow rate Source gas flow rate (sccm) (sccm) (sccm) Calculated Concentration (ppb) (Cc) Concentration (ppb) (Ic) (Cc/(Ic-AFzero)) Limit = 0.90-1.10

as 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	80.3	0.996
second point	4963	37.2	40.1	40.1	1.000
third point	4982	18.6	20.1	19.7	1.018
as left zero	5000	0.0	0.0	-0.1	
as left span	4926	74.2	80.0	80.1	0.999

SO2 Scrubber Check

Notes:

Date of last scrubber change:

Ave Corr Factor

1.005

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

Swapped old converter out with a new one as it was DOA. Calibrated after replacement. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier



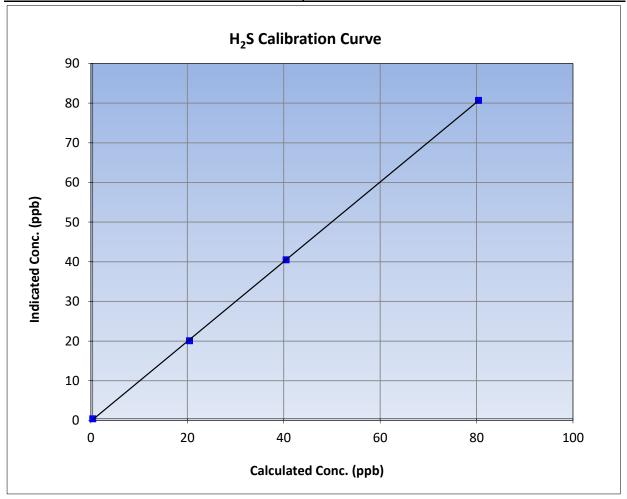
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 19, 2023 **Previous Calibration:** September 7, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:09 End Time (MST): 16:20 Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

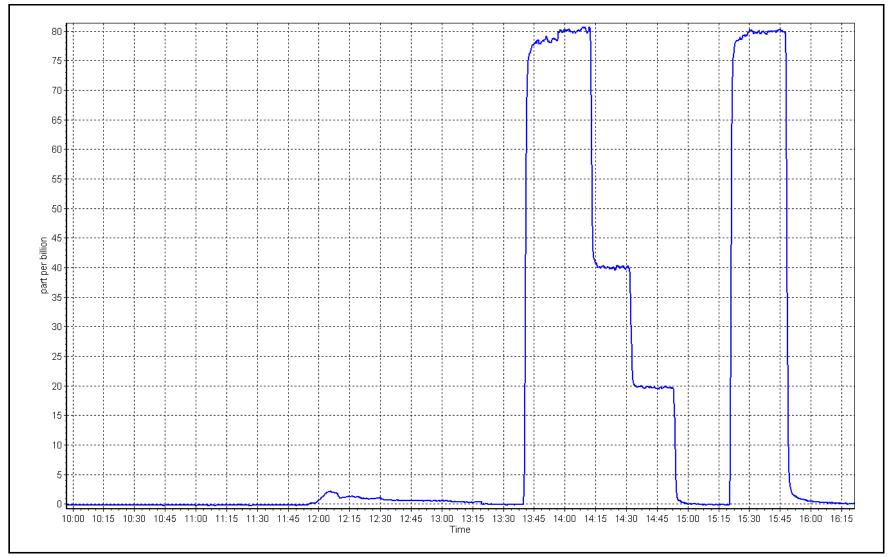
Calibration Data										
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.0		Correlation Coefficient	0.999968	≥0.995					
80.0	80.3	0.9963	Correlation Coefficient	0.333300	20.993					
40.1	40.1	1.0002	Slope	1.005327	0.90 - 1.10					
20.1	19.7	1.0180	Slope	1.005327	0.90 - 1.10					
			- Intercept	-0.202877	+/-3					



Date: September 19, 2023

Location: Surmont 2







CH4 Cal Gas Conc.

Baseline Corr 3rd AF pt:

Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name: Surmont 2

Calibration Date: September 5, 2023

Start time (MST): 10:31 Reason: Routine Station number: AMS29

Last Cal Date: August 8, 2023

End time (MST): 13:37

Calibration Standards

Gas Cert Reference: CC356008 Cal Gas Expiry Date: February 23, 2025

ppm CH4 Equiv Conc. 1064.7 ppm

C3H8 Cal Gas Conc. <u>205.7</u> ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 499.0 ppm CH4 Equiv Conc. 1064.7 ppm

Removed C3H8 Conc. 205.7 ppm Diff between cyl:

499.0

Calibrator Make/Model: Teledyne API T700 Serial Number: 5472 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: 1.000971 1.006607 3.64 3.64 -0.029039 Coefficient: Calibration intercept: -0.017870 3.987 3.987

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate Calculated Concentration Concentration (sccm) (ppm) (Cc) (Ic)		Concentration (ppm)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.01	
as found span	4918	81.3	17.31	17.42	0.994
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.03	
high point	4918	81.3	17.31	17.43	0.993
second point	4959	40.6	8.65	8.64	1.001
third point	4979	20.3	4.32	4.27	1.013
as left zero	5000	0.0	0.00	-0.02	
as left span	4918	81.3	17.31	17.45	0.992
			Av	erage Correction Factor	1.002
Baseline Corr As found:	17.43	Previous response	17.31	*% change	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

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

AF Correlation:

Calibration Performed By: Braiden Boutilier

NA

* = > +/-5% change initiates investigation



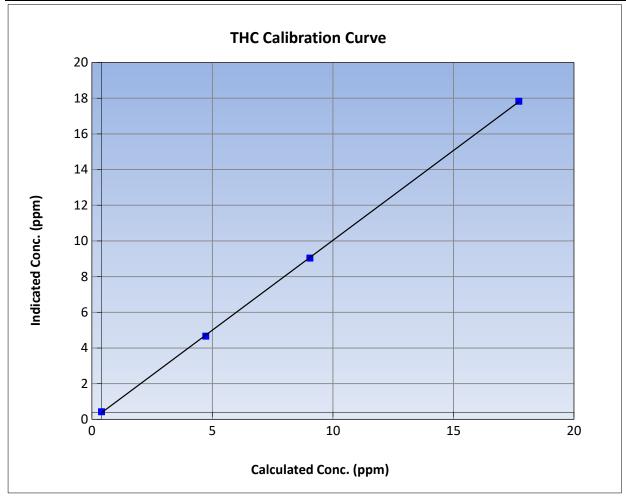
THC Calibration Summary

Version-01-2020

Station Information

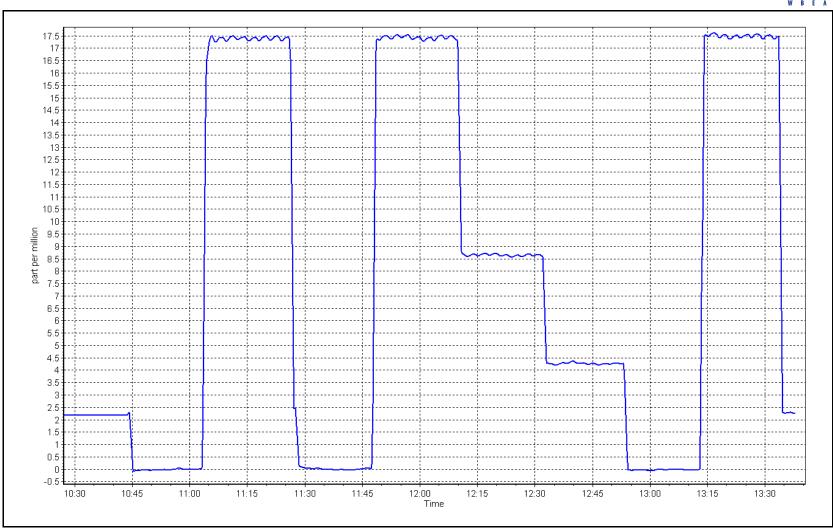
Previous Calibration: Calibration Date: September 5, 2023 August 8, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:31 End Time (MST): 13:37 Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

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	0.999949	≥0.995					
17.31	17.43	0.9933	Correlation Coefficient	0.555545	20.995					
8.65	8.64	1.0007	Slope	1.006607	0.90 - 1.10					
4.32	4.27	1.0129	Slope	1.000007	0.90 - 1.10					
			- Intercept	-0.029039	+/-1.5					



Date: September 5, 2023 Location: Surmont 2







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Surmont 2 Station number: AMS29

Calibration Date: September 6, 2023 Last Cal Date: August 9, 2023 Start time (MST): 9:45 End time (MST): 15:02

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 NOX Conc: Removed Gas NO Conc: 47.46 ppm 47.46 ppm

NOX gas Diff:

NO gas Diff: Calibrator Model: Teledyne API T700 Serial Number: 5472 ZAG make/model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1170050148

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.370	1.386	NO bkgnd or offset:	1.3	1.4
NOX coeff or slope:	0.995	0.996	NOX bkgnd or offset:	1.4	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	176.2	178.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000454	0.997951
NO _x Cal Offset:	-0.253155	0.647509
NO Cal Slope:	1.000066	0.996977
NO Cal Offset:	-0.992422	-0.611801
NO ₂ Cal Slope:	1.000433	0.993705
NO ₂ Cal Offset:	0.227914	1.353170



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Oilution 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	0.4	0.0	0.4		
as found span	4916	84.2	799.2	799.2	0.0	788.8	789.0	-0.2	1.0132	1.0129
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.2	0.4		
high point	4916	84.2	799.2	799.2	0.0	798.0	796.3	1.7	1.0015	1.0036
second point	4958	42.1	399.6	399.6	0.0	400.0	398.2	1.8	0.9990	1.0035
third point	4979	21.1	200.3	200.3	0.0	200.2	197.7	2.5	1.0004	1.0130
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.1	0.4		
as left span	4916	84.2	799.2	411.4	387.8	792.2	402.9	389.3	1.0088	1.0211
							Average C	orrection Factor	1.0003	1.0067
Corrected As fou	und NO _x =	788.4 ppb	NO:	= 789.0 ppb	* = > +/-5%	% change initiates	investigation	*Percent Chang	ge NO _X =	-1.4%
Previous Respon	ise NO _x =	799.3 ppb	NO:	= 798.3 ppb				*Percent Chang	ge NO =	-1.2%
Baseline Corr 2n	d pt NO _X =	NA ppb	NO:	= NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3rd	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:	
				(GPT Calibration	Data				
O3 Setpoin	nt (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated NC concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found G	iPT zero									
as found GPT point	t (400 ppb NO2)									
as found GPT point	t (200 ppb NO2)									
as found GPT point	t (100 ppb NO2)									
1st GPT point (4	400 ppb O3)	789.8		402.0	387.8		386.4	1.0036	5	99.6%
2nd GPT point ((200 ppb O3)	789.8		601.7	188.1		188.3	0.9989) :	100.1%
3rd GPT point (100 ppb O3)	789.8		696.5	93.3		95.3	0.9790) :	L02.1%

Notes:

Changed sample inlet filter after as founds. Adjusted span.

Average Correction Factor

Calibration Performed By:

Braiden Boutilier

100.6%

0.9939



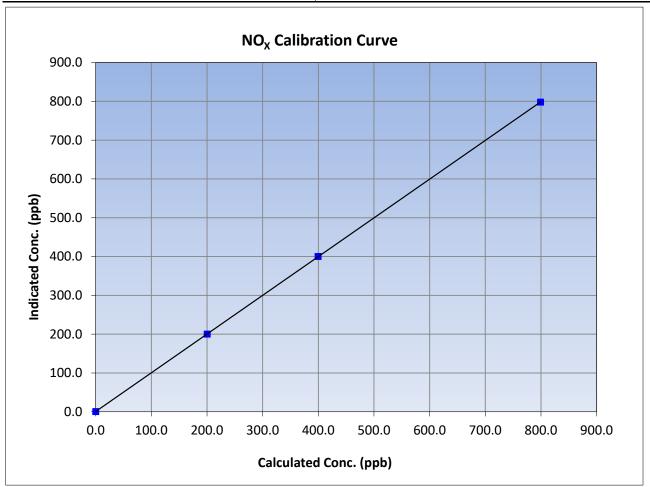
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 9:45 End Time (MST): 15:02 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	0.6		Correlation Coefficient	0.999999	≥0.995
799.2	798.0	1.0015	Correlation Coefficient	0.999999	20.993
399.6	400.0	0.9990	Slope	0.997951	0.90 - 1.10
200.3	200.2	1.0004	Siope	0.997931	0.30 - 1.10
			Intercept	0.647509	+/-20





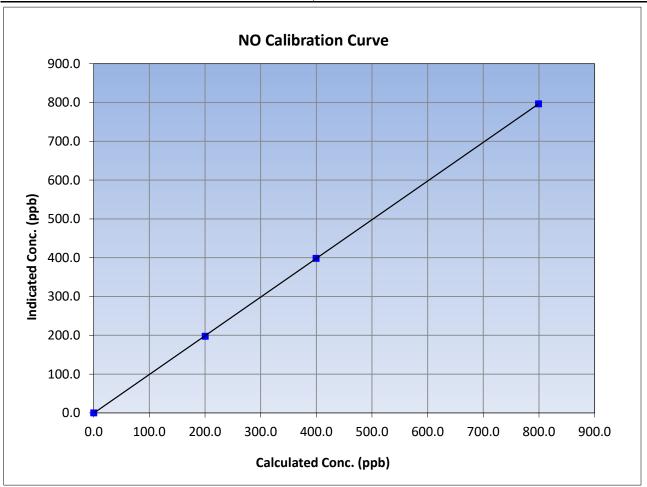
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Surmont 2 Station Number: AMS29 9:45 Start Time (MST): End Time (MST): 15:02 Analyzer make: Thermo 42i Analyzer serial #: 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Limit</u>		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999992	≥0.995
799.2	796.3	1.0036	Correlation Coefficient	0.555552	20.993
399.6	398.2	1.0035	Slope	0.996977	0.90 - 1.10
200.3	197.7	1.0130	Slope	0.550577	0.90 - 1.10
			Intercept	-0.611801	+/-20





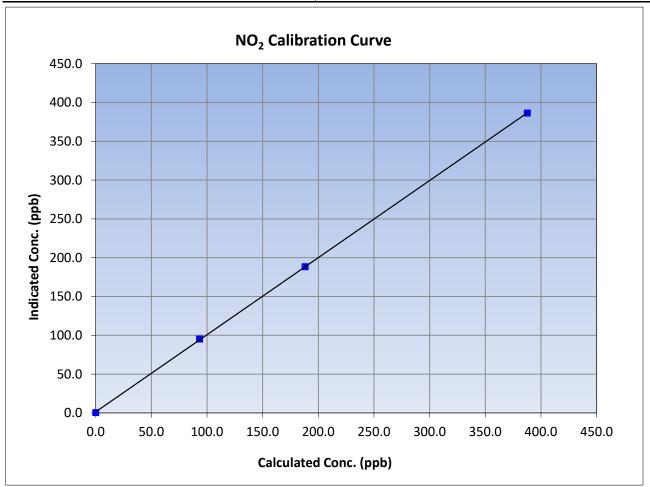
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 9:45 End Time (MST): 15:02 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

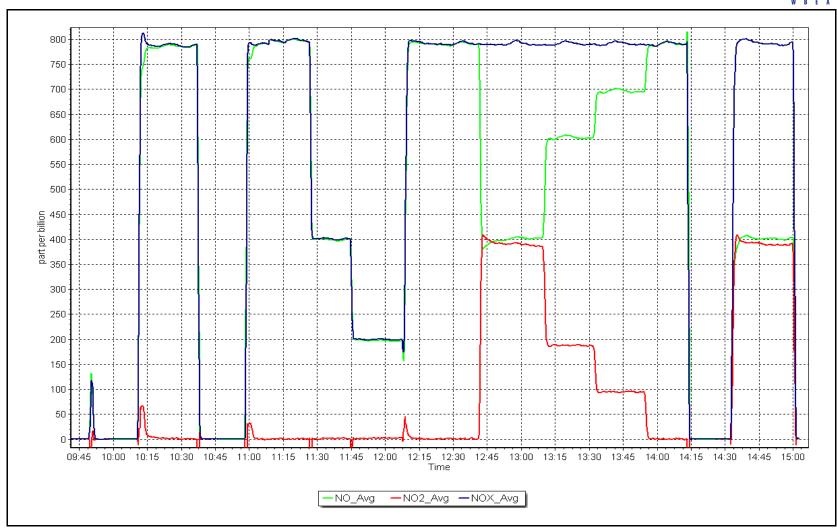
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Limits</u>		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999969	≥0.995
387.8	386.4	1.0036	Correlation Coefficient	0.555505	20.993
188.1	188.3	0.9989	Slope	0.993705	0.90 - 1.10
93.3	95.3	0.9790	Slope	0.995705	0.90 - 1.10
			Intercept	1.353170	+/-20



NO_x Calibration Plot

Date: September 6, 2023 Location: Surmont 2







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	l			
Station Name:	Surmont 2		Station number:	AMS 29		
Calibration Date:	September 7, 2023		Last Cal Date:	August 9, 2	023	
Start time (MST):	11:46		End time (MST):	14:35		
Analyzer Make:	API T640		S/N:	253		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388750		
Temp/RH standard:	Alicat FP-25BT		S/N:	388750		
		Monthly Calibration To	est			
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	15.2	14.71	15.2			+/- 2 °C
P (mmHg)	708.8	710.30	708.8			+/- 10 mmHg
flow (LPM)	4.99	5.160	4.99			+/- 0.25 LPM
Leak Test:	Date of check:	September 7, 2023	Last Cal Date:	August	9, 2023	
	PM w/o HEPA:	52.1	PM w/ HEPA:	(<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 1	est			
Parameter	As found	Post maintenance	<u>As left</u>		Adjusted	(Limits)
PMT Peak Test	11.1	11.0	11.0			11.3 +/- 0.5
.		204 / 11524	52.4	/		
Post-maintenance Date Optical Cham		PM w/o HEPA: September 7	52.1	w/ HEPA:		0.0 <0.2 ug/m3
Disposable Filter	•	September 7	·			10.2 ug/1113
.,			,			
		Annual Maintenanc	e			
Date Sample Tub	e Cleaned:	September 3	0, 2022			
Date RH/T Senso	or Cleaned:	October 6,	2022			
Notes:		No adj	ustments made.			
Calibration by:	Braiden Boutilier					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30 ELLS RIVER SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Ells River Station Name: September 1, 2023 Calibration Date:

9:04 Start time (MST): Routine Reason:

Station number: **AMS 30** August 1, 2023 Last Cal Date:

End time (MST): 11:40

Calibration Standards

Cal Gas Concentration: 50.53

Cal Gas Cylinder #: CC494126

Removed Cal Gas Conc: 50.53 Removed Gas Cyl #:

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

Baseline Corr 3rd AF pt:

ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date:

Diff between cyl:

Serial Number: 3061 Serial Number: 358

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

Calibration slope: 0.999617 1.006471 Calibration intercept: -2.615868 -2.616011 Backgd or Offset:

Coeff or Slope:

Start 9.6

0.988

Finish 9.6 0.994

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)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.3	
as found span	4921	79.2	800.4	798.8	1.002
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	804.2	0.995
second point	4960	39.6	400.2	399.0	1.003
third point	4980	19.8	200.1	196.1	1.020
as left zero	5000	0.0	0.0	-0.1	
as left span	4921	79.2	800.4	805.5	0.994
·			Averag	ge Correction Factor	1.006
Baseline Corr As found:	799 10	Previous resnonse	797 <i>11</i>	*% change	0.2%

Baseline Corr As found: 799.10 Previous response 797.44 % change 0.2% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Adjusted the span only.

Calibration Performed By: **Denny Ray Estador**



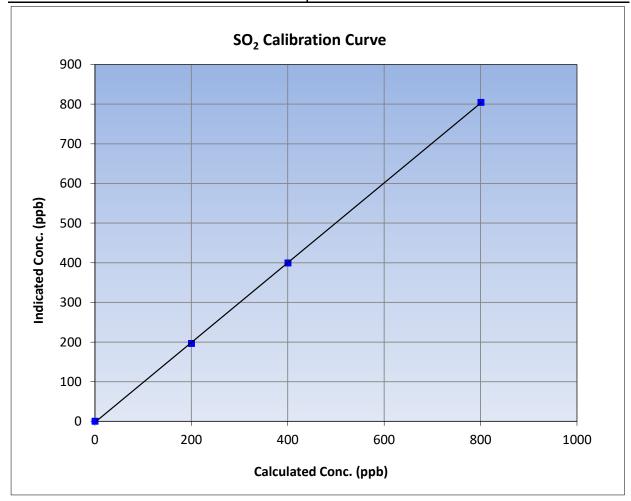
SO₂ Calibration Summary

Version-01-2020

Station Information

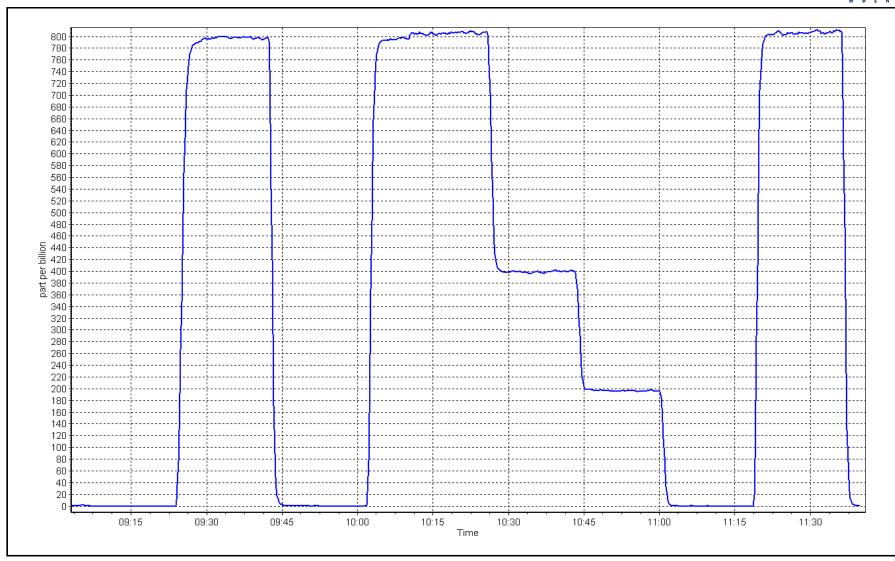
Calibration Date: September 1, 2023 **Previous Calibration:** August 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 9:04 End Time (MST): 11:40 Analyzer make: Thermo 43i Analyzer serial #: 1008841397

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999952	≥0.995
800.4	804.2	0.9952	- Correlation Coefficient	0.999952	20.995
400.2	399.0	1.0031	Slope	1.006471	0.90 - 1.10
200.1	196.1	1.0204	Slope	1.000471	0.90 - 1.10
			- Intercept	-2.616011	+/-30



SO2 Calibration Plot Date: September 1, 2023 Location: Ells River







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Ells River

Calibration Date: September 7, 2023

Start time (MST): 8:23

Reason: Routine Station number: AMS30

> Last Cal Date: August 16, 2023

End time (MST): 12:15

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 #: 562 Converter make:

0 - 100 ppb Analyzer Range

Start **Finish Start** <u>Finish</u> Calibration slope: 1.001492 Backgd or Offset: 1.003494 1.63 1.60

-0.079138 Calibration intercept: -0.199209 Coeff or Slope: 1.136 1.136

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	80.5	0.993
as found 2nd point	4961	39.4	40.0	40.0	1.001
as found 3rd point	4980	19.7	20.0	19.8	1.011
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	80.1	0.998
second point	4961	39.4	40.0	39.9	1.003
third point	4980	19.7	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.1	
as left span	4921	78.7	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.2	800.4	0.0	
Date of last scrubber chang	ge:	N/A		Ave Corr Factor	1.004
Date of last converter effic	iency test:	N/A			efficiency

Date of last scrubber change	:	N/A		Ave Corr Factor	1.004
Date of last converter efficie	ncy test:	N/A		e	efficiency
Baseline Corr As found:	80.5	Prev response:	80.04	*% change:	0.6%

Baseline Corr 2nd AF pt: 40.0 AF Slope: 1.007781 AF Intercept: Baseline Corr 3rd AF pt: 19.8 AF Correlation: 0.999971

* = > +/-5% change initiates investigation

No adjustments made. Notes:

Calibration Performed By: Denny Ray Estador -0.199243



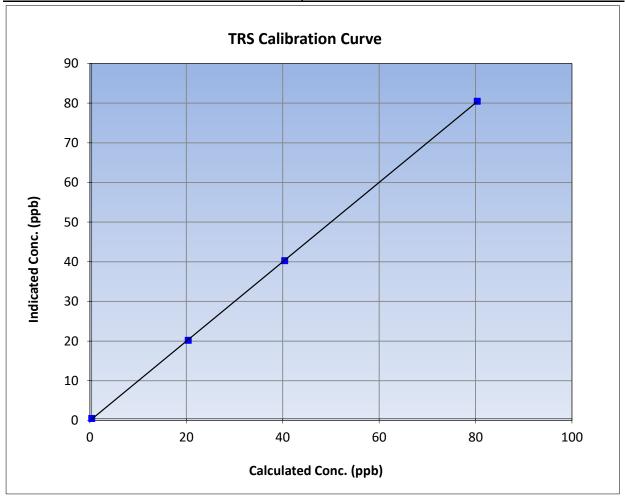
TRS Calibration Summary

Version-11-2021

Station Information

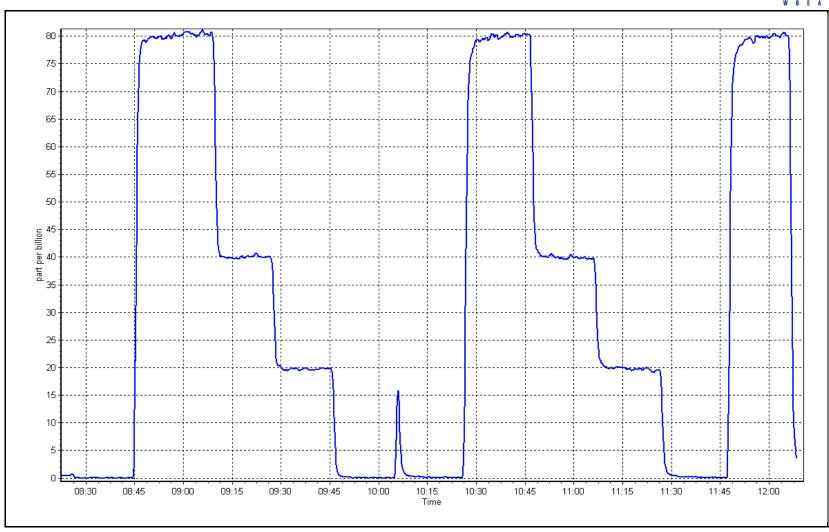
Calibration Date: September 7, 2023 **Previous Calibration:** August 16, 2023 Station Name: Ells River Station Number: AMS30 Start Time (MST): 8:23 End Time (MST): 12:15 Analyzer make: Thermo 43i TLE Analyzer serial #: 1410661331

		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	0.999977	≥0.995
80.0	80.1	0.9983	Correlation Coefficient	0.555511	20.333
40.0	39.9	1.0032	Slope	1.001492	0.90 - 1.10
20.0	19.8	1.0109	Slope	1.001492	0.90 - 1.10
			- Intercept	-0.079138	+/-3



Date: September 7, 2023 Location: Ells River







THC / CH₄ / NMHC Calibration Report

Version-01-2020

ppm

Station Information

Station Name: Ells River
Calibration Date: September 1, 2023

Start time (MST): 9:04
Reason: Routine

Station number: AMS 30

Last Cal Date: August 1, 2023

End time (MST): 11:40

Calibration Standards

Gas Cert Reference: CC494126 Cal Gas Expiry Date: December 29, 2028 CH4 Cal Gas Conc. 499.7 ppm CH4 Equiv Conc. 1075.0 ppm

C3H8 Cal Gas Conc. 209.2 ppm

Removed Gas Cert:

Removed CH4 Conc. 499.7 ppm

Removed C3H8 Conc. 209.2 ppm

Diff between cyl (CH₄):

Baseline Corr 3rd AF:

NA

Calibrator Model: API T700 ZAG make/model: API T701H Removed Gas Expiry:

CH4 Equiv Conc. 1075.0

Diff between cyl (THC):

Diff between cyl (NM):

Serial Number: 3061 Serial Number: 358

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1181490018

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

CH4 Range (ppm): 0 - 10 ppm

Start Finish Start Finish 0.000244 CH4 SP Ratio: 0.000252 NMHC SP Ratio: 4.67E-05 4.53E-05 CH4 Retention time: 14.2 201064 14.4 NMHC Peak Area: 195284

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	16.71	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	79.2	17.03	17.01	1.001
second point	4960	39.6	8.51	8.43	1.010
third point	4980	19.8	4.26	4.15	1.027
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	17.08	0.997
			,	Average Correction Factor	1.013
Baseline Corr AF:	16.71	Prev response	17.14	*% change	-2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-01-2020

		NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.11	8.89	1.025
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	9.08	1.003
second point	4960	39.6	4.56	4.50	1.012
third point	4980	19.8	2.28	2.21	1.031
as left zero	5000	0	0.00	0.00	
as left span	4921	79.2	9.11	9.15	0.996
			Aver	age Correction Factor	1.015
Baseline Corr AF:	8.89	Prev response	9.22	*% change	-3.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	7.91	7.82	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					

as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	7.91	7.93	0.998
second point	4960	39.6	3.96	3.93	1.008
third point	4980	19.8	1.98	1.94	1.022
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.91	7.94	0.997
				Average Correction Factor	1.009
Baseline Corr AF:	7.82	Prev response	7.92	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates i	nvestigation
		Calibration Sta	atistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.010450		1.000637	
THC Cal Offset:		-0.062141		-0.057538	
CH4 Cal Slope:		1.003947		1.002936	
CH4 Cal Offset:		-0.026358		-0.025358	
NMHC Cal Slope:		1.016086		0.998741	
•					

Notes: Adjusted the span only.

-0.035983

Calibration Performed By: Denny Ray Estador

NMHC Cal Offset:

-0.032581



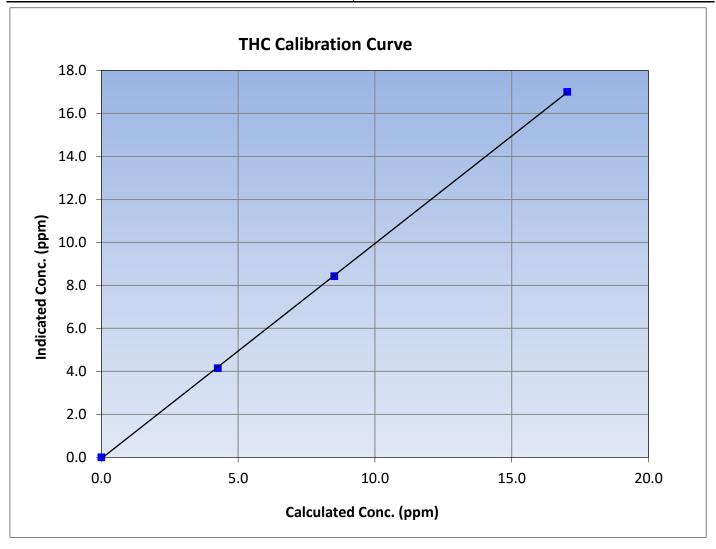
THC Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 1, 2023 Station Name: Ells River Station Number: **AMS 30** 9:04 Start Time (MST): End Time (MST): 11:40 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999948	≥0.995
17.03	17.01	1.0010	Correlation Coefficient	0.999946	20.993
8.51	8.43	1.0098	Slope	1.000637	0.90 - 1.10
4.26	4.15	1.0268	Slope	1.000037	0.90 - 1.10
			Intercept	-0.057538	+/-0.5





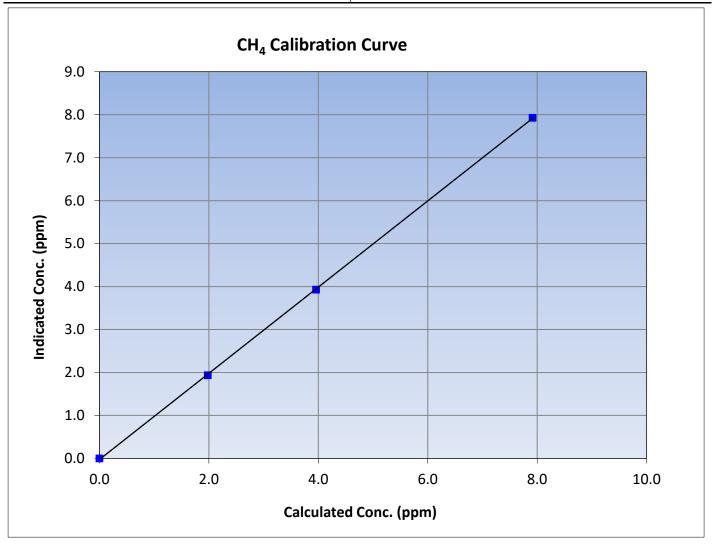
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 9:04 End Time (MST): 11:40 Analyzer make: Analyzer serial #: 1181490018 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	0.999952	≥0.995
7.91	7.93	0.9985	Correlation Coemicient	0.555552	20.333
3.96	3.93	1.0079	Slope	1.002936	0.90 - 1.10
1.98	1.94	1.0216	Slope	1.002930	0.90 - 1.10
			Intercept	-0.025358	+/-0.5





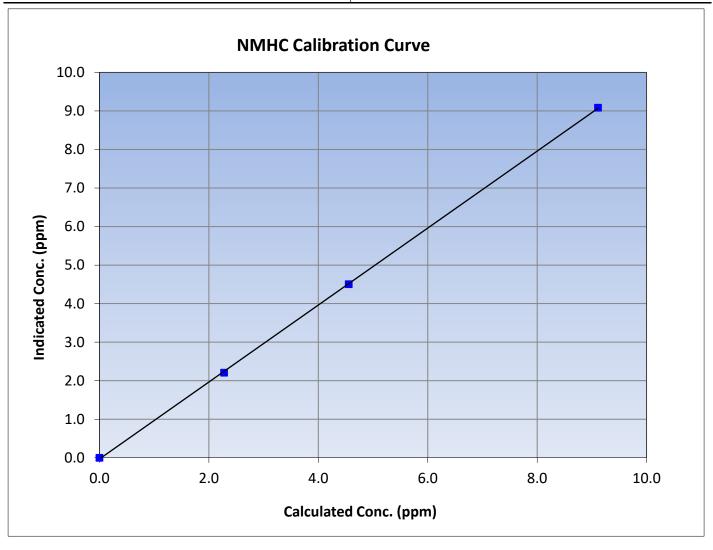
NMHC Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 1, 2023 **Previous Calibration:** August 1, 2023 Station Name: Ells River Station Number: AMS 30 9:04 Start Time (MST): End Time (MST): 11:40 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

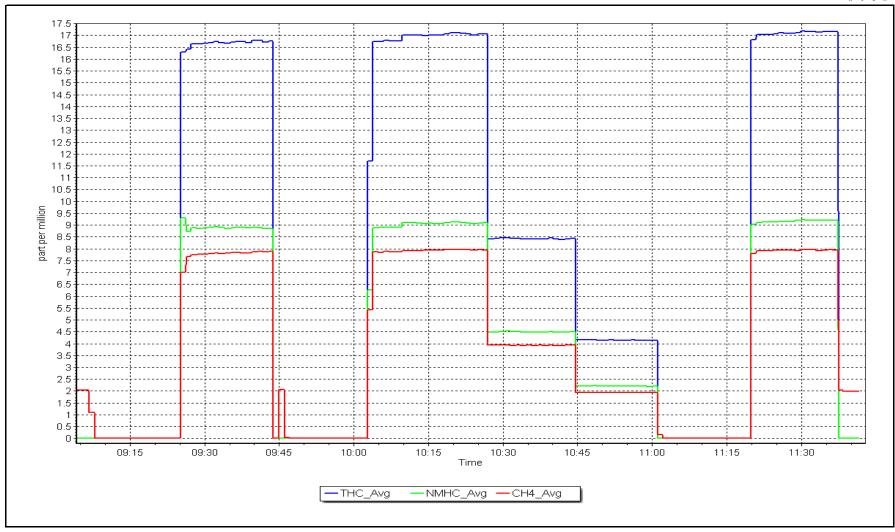
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999941	≥0.995
9.11	9.08	1.0031	Correlation Coemicient	0.333341	20.333
4.56	4.50	1.0117	Slope	0.998741	0.90 - 1.10
2.28	2.21	1.0314	Slope	0.556741	0.90 - 1.10
			Intercept	-0.032581	+/-0.5



NMHC Calibration Plot

Date: September 1, 2023 Location: Ells River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Ells River Station number: AMS 30 Calibration Date: September 6, 2023 Last Cal Date: August 9, 2023

Start time (MST): 8:39 Reason: Routine End time (MST): 12:55

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: ZAG make/model: **API T701H** Serial Number: 358

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 710321429

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.099 1.129 NO bkgnd or offset: 13.5 13.8 NOX coeff or slope: 0.989 0.986 NOX bkgnd or offset: 13.5 13.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 188.1 189.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004722	0.996459
NO _x Cal Offset:	-1.140000	-1.100000
NO Cal Slope:	1.006504	1.000500
NO Cal Offset:	-2.140000	-2.240000
NO ₂ Cal Slope:	1.001553	0.993934
NO ₂ Cal Offset:	0.383629	-0.960703



$NO_X \setminus NO \setminus NO_2$ 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/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	-0.2	-0.3	0.1		
as found span	4920	80.0	813.3	799.5	13.8	793.2	777.5	15.7	1.0253	1.0283
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	4920	80.0	813.3	799.5	13.8	809.9	798.7	11.2	1.0042	1.0010
second point	4960	40.0	406.6	399.8	6.9	403.4	396.7	6.7	1.0080	1.0077
third point	4980	20.0	203.3	199.9	3.4	200.5	195.7	4.7	1.0141	1.0214
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.2		
as left span	4920	80.0	813.3	423.7	389.6	812.6	426.0	386.5	1.0008	0.9946
							Average C	orrection Factor	1.0088	1.0100
Corrected As fo	ound NO _X =	793.4 ppb	NO =	777.8 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-2.8%
Previous Respo	onse NO _X =	816.0 ppb	NO =	802.6 ppb				*Percent Chang	ge NO =	-3.2%
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:	

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)	796.0	420.2	389.6	387.0	1.0066	99.3%
2nd GPT point (200 ppb O3)	796.0	620.1	189.7	186.4	1.0175	98.3%
3rd GPT point (100 ppb O3)	796.0	707.0	102.8	100.4	1.0235	97.7%
				Average Correction Factor	1.0159	98.4%

Notes:

Adjusted the span only.

Calibration Performed By: Denny Ray Estador



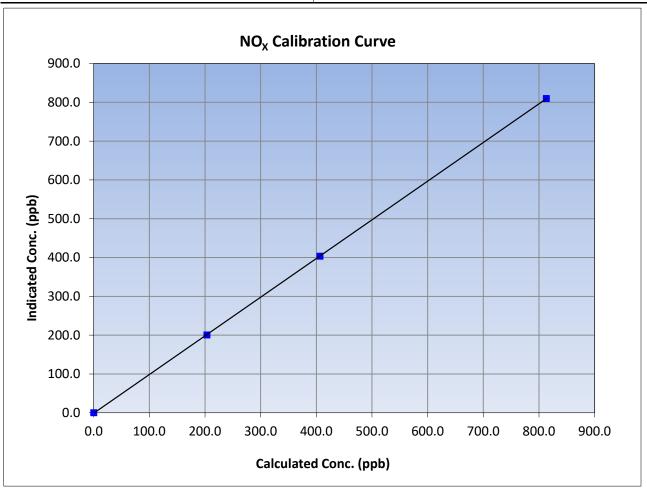
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 8:39 End Time (MST): 12:55 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999991	≥0.995	
813.3	809.9	1.0042	Correlation Coefficient	0.555551	20.333	
406.6	403.4	1.0080	Slope	0.996459	0.90 - 1.10	
203.3	200.5	1.0141	Slope	0.990459	0.90 - 1.10	
			Intercept	-1.100000	+/-20	





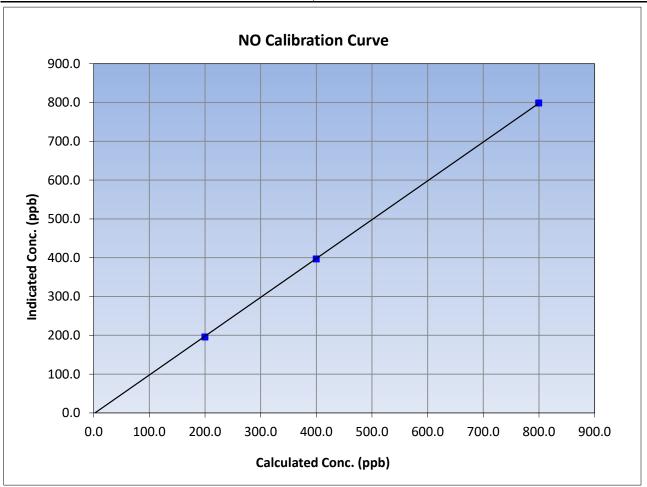
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Ells River Station Number: **AMS 30** 8:39 Start Time (MST): End Time (MST): 12:55 Analyzer make: Thermo 42i Analyzer serial #: 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999970	≥0.995
799.5	798.7	1.0010	Correlation Coefficient	0.555570	20.333
399.8	396.7	1.0077	Slope	1.000500	0.90 - 1.10
199.9	195.7	1.0214	Slope	1.000500	0.90 - 1.10
			Intercept	-2.240000	+/-20





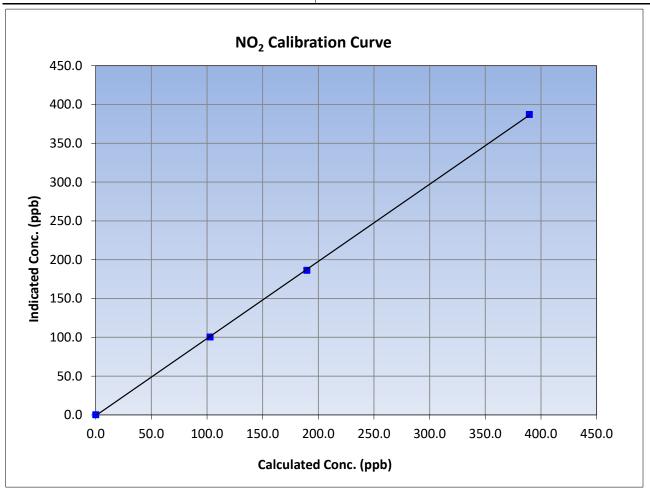
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 6, 2023 Previous Calibration: August 9, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 8:39 End Time (MST): 12:55 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	Statistical Evaluation		
0.0	0.2		Correlation Coefficient	0.999952	≥0.995	
389.6	387.0	1.0066	Correlation Coefficient	0.999932	20.333	
189.7	186.4	1.0175	Slope	0.993934	0.90 - 1.10	
102.8	100.4	1.0235	Slope	0.333334	0.90 - 1.10	
			Intercept	-0.960703	+/-20	

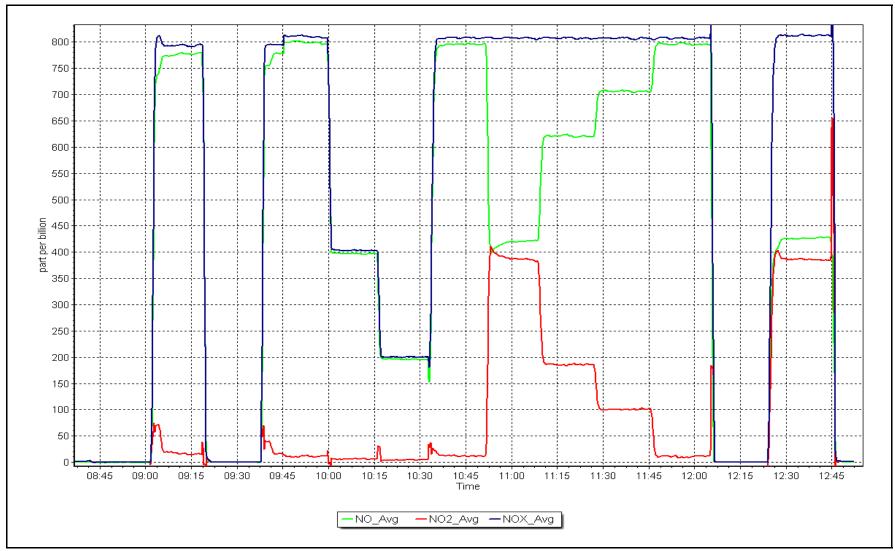


NO_X Calibration Plot

Date: September 6, 2023

Location: Ells River







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Ells River			າດາາ			
Calibration Date: Start time (MST):	September 8, 2023 11:28		Last Cal Date: A End time (MST):		2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	875		
Tarticulate Fraction.	1 1012.3					
Flow Meter Make/Model:	Alicat		•	388751		
Temp/RH standard:	Alicat		,	388751		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	19.7	19.5	19.7		Ш	
P (mmHg)	733.6	735.9	733.6		Ш	+/- 10 mmHg
flow (LPM)	4.98	4.75	4.98			+/- 0.25 LPM
Leak Test:	Date of check:	September 8, 2023	Last Cal Date:	August 2	25, 2023	
	PM w/o HEPA:	17.4	PM w/ HEPA:	0	<u></u>	<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			
<u>Parameter</u>	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	10.6	10.2	10.8		<u></u> ✓	10.9 +/- 0.5
Deet week to be a seen	Land, alonado	DN4 /- UEDA	12.6	/ LIEDA		0
Post-maintenance Date Optical Cham		PM w/o HEPA: 12.6 September 8, 2023		w/ HEPA:		0 <0.2 ug/m3
Disposable Filter		September 8			10.2 ug/1113	
.,			,			
		Annual Maintenana				
		Annual Maintenance	2			
Date Sample Tub	e Cleaned:					
Date RH/T Senso						
	•					
Notes:		Adjusted PMT pea	ık test. Inlet head st	ill clean.		
Calibration by:	Denny Ray Estador					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS505 SAWBONES BAY SEPTEMBER 2023

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

October 30, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Sawbones Bay September 22, 2023 Calibration Date:

Start time (MST): 8:28 Routine Reason:

Station number: AMS505 Last Cal Date: August 9, 2023

End time (MST): 11:18

Cal Gas Exp Date:

February 15, 2029

Calibration Standards

Cal Gas Concentration: 51.4 ppm

Cal Gas Cylinder #: EY0000672

Removed Cal Gas Conc: 51.40 Rem Gas Exp Date: February 15, 2029 ppm

EY0000672 Removed Gas Cyl #: Diff between cyl:

Calibrator Make/Model: Teledyne API T700 Serial Number: 5112 ZAG Make/Model: Teledyne API T701H Serial Number: 690

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 0710321323

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.000823 1.000437 Backgd or Offset: 19.2 19.3 0.995 Calibration intercept: -0.552184 -0.691921 Coeff or Slope: 0.995

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	4922	77.8	799.8	799.2	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4922	77.8	799.8	799.6	1.000
second point	4961	38.9	399.9	400.1	1.000
third point	4981	19.5	200.4	197.9	1.013
as left zero	5000	0.0	0.0	0.5	
as left span	4922	77.8	799.8	804.3	0.994
,			Avera	ge Correction Factor	1.004
Baseline Corr As found:	799.10	Previous response	799.92	*% change	-0.1%
Decelled Control AF at	N I A	A E Cl		A = 1 - 1 1	

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

NA Baseline Corr 3rd AF pt: AF Correlation:

Notes: Changed inlet filter. Adjusted span only.

Calibration Performed By: Sean Bala * = > +/-5% change initiates investigation



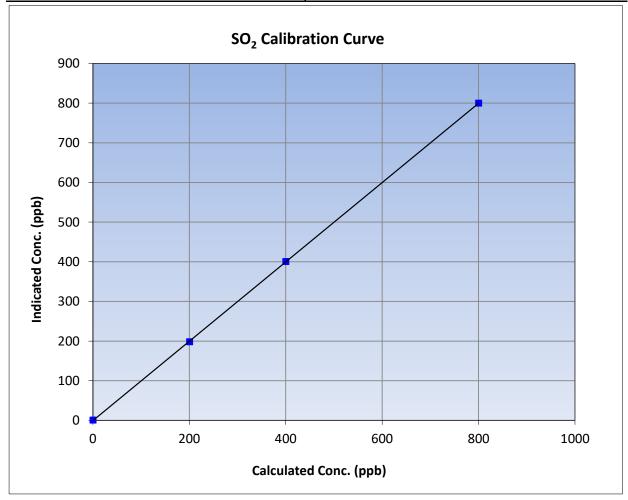
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: September 22, 2023 **Previous Calibration:** August 9, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:28 End Time (MST): 11:18 Analyzer make: Thermo 43i Analyzer serial #: 0710321323

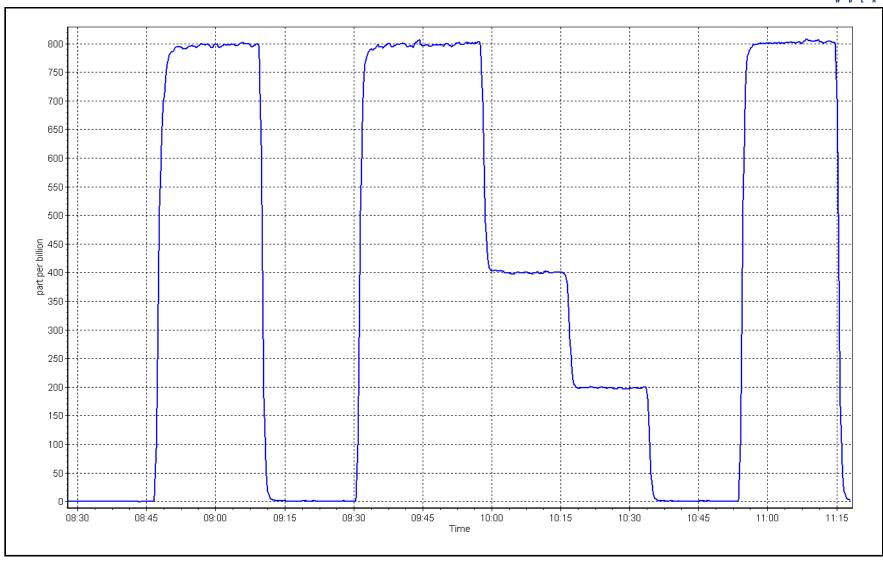
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.4		Correlation Coefficient	0.999984	≥0.995				
799.8	799.6	1.0003	Correlation Coefficient	0.333304	20.993				
399.9	400.1	0.9995	Slope	1.000437	0.90 - 1.10				
200.4	197.9	1.0128	Slope	1.000437	0.90 - 1.10				
			Intercept	-0.691921	+/-30				



SO2 Calibration Plot

Date: September 22, 2023 Location: Sawbones Bay







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Sawbones Bay Calibration Date: September 21, 2023

Start time (MST): 8:18

Reason: Routine Station number: AMS505

> Last Cal Date: August 30, 2023

End time (MST): 12:16

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.15 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517397

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.15 ppm Removed Gas Cyl #: Diff between cyl: NA Calibrator Make/Model: Teledybe API T700 5112 Serial Number: ZAG Make/Model: Teledybe API T701 Serial Number: 690

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1228021057 Global 150 Converter serial #: 2022-224 Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.003503 Backgd or Offset: Calibration slope: 0.998506 2.21 2.21 0.081954 Calibration intercept: -0.018155 Coeff or Slope: 1.021 1.021

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	77.7	80.0	80.8	0.992
as found 2nd point	4961	38.8	40.0	40.5	0.989
as found 3rd point	4981	19.4	20.0	20.1	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	0.1	
high point	4922	77.7	80.0	80.4	0.995
second point	4961	38.8	40.0	40.2	0.994
third point	4981	19.4	20.0	20.1	0.994
as left zero	5000	0.0	0.0	0.2	
as left span	4922	77.7	80.0	80.1	0.999
SO2 Scrubber Check	4922	77.8	778.0	0.0	
Date of last scrubber char	ige:	_	_	Ave Corr Factor	0.995
Date of last converter effi	ciency test:			<u> </u>	efficiency

Date of last scrubber change	2:			Ave Corr Factor	0.995
Date of last converter efficie	ency test:				efficiency
Baseline Corr As found:	80.7	Prev response:	79.90	*% change:	1.0%

0.062101 Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.009071 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999992 20.0 * = > +/-5% change initiates investigation

Changed inlet filter after calibrator zero. Scrubber check and passed after calibrator zero. No Notes: adjustment made.

Calibration Performed By: Sean Bala



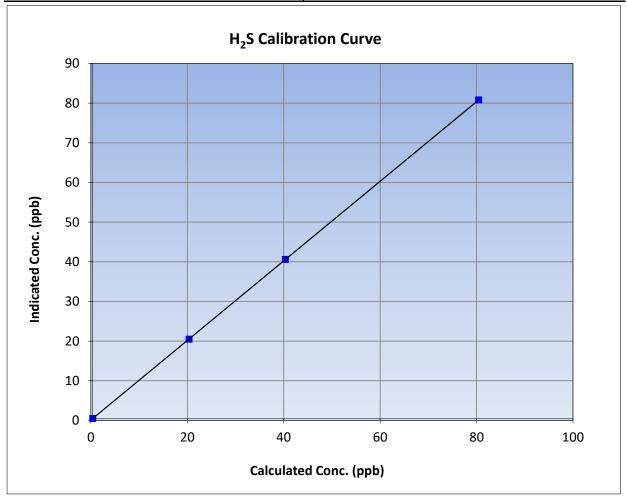
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: September 21, 2023 **Previous Calibration:** August 30, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:18 End Time (MST): 12:16 Analyzer make: Thermo 43iQ Analyzer serial #: 1228021057

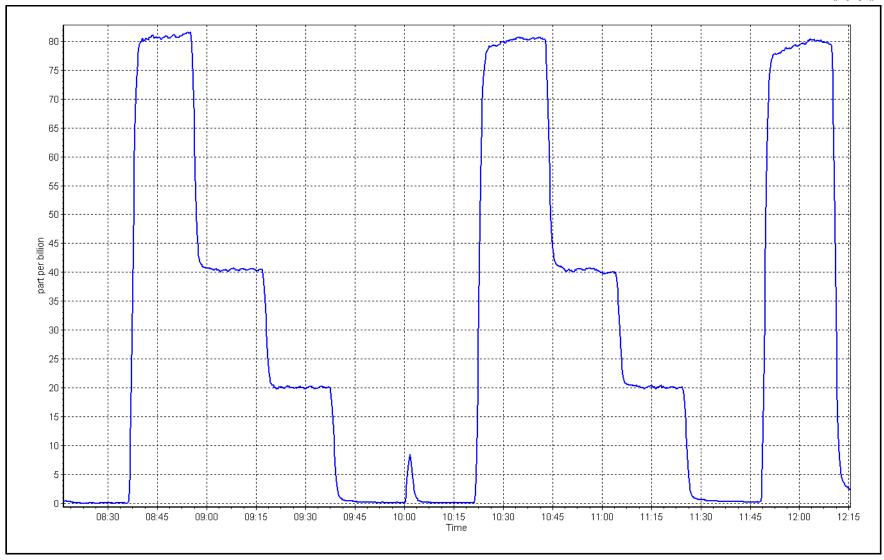
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	1.000000	≥0.995				
80.0	80.4	0.9955	Correlation Coefficient	1.000000	20.993				
40.0	40.2	0.9942	Slope	1.003503	0.90 - 1.10				
20.0	20.1	0.9940	Slope	1.003303	0.90 - 1.10				
			- Intercept	0.081954	+/-3				



Date: September 21, 2023

Location: Sawbones Bay







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Sawbones Bay Calibration Date: September 20, 2023

Start time (MST): 8:36 Routine Reason:

Station number: AMS505 Last Cal Date: August 4, 2023

End time (MST): 13:00

Calibration Standards

NO Gas Cylinder #: T1FY3PK Cal Gas Expiry Date: January 14, 2024 NOX Cal Gas Conc: NO Cal Gas Conc: 47.94 47.94 ppm ppm Removed Gas Exp Date: January 14, 2024 Removed Cylinder #: T1FY3PK ppm

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

NOX gas Diff: NO gas Diff:

Calibrator Model: Serial Number: **API T700** 5112 ZAG make/model: **API T701H** Serial Number: 690

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 4260

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.038	1.055	NO bkgnd or offset:	-0.1	0.4
NOX coeff or slope:	1.036	1.052	NOX bkgnd or offset:	3.1	1.3
NO2 coeff or slope:	NA	NA	Reaction cell Press:	8.3	7.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.003179	1.001507
NO _x Cal Offset:	-3.190449	-1.530484
NO Cal Slope:	1.001620	1.001793
NO Cal Offset:	-2.069911	-1.830393
NO ₂ Cal Slope:	1.000764	0.999010
NO ₂ Cal Offset:	-1.369113	0.464663



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				ווט	ution Calibratio	JII 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	0.7	0.0	0.6		
as found span	4917	83.4	799.6	799.6	0.0	786.4	783.8	2.6	1.0168	1.0201
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1		
high point	4917	83.4	799.6	799.6	0.0	799.7	799.9	-0.3	0.9998	0.9996
second point	4958	41.7	399.8	399.8	0.0	398.8	398.2	0.6	1.0026	1.0041
third point	4979	20.9	200.4	200.4	0.0	197.6	197.1	0.5	1.0141	1.0167
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3		
as left span	4916	83.4	799.7	339.8	459.9	793.6	335.7	457.9	1.0077	1.0123
							Average C	orrection Factor	1.0055	1.0068
Corrected As fo	ound NO _X =	785.7 ppb	NO =	783.8 ppb	* = > +/-5	5% change initiates	investigation	*Percent Chang	ge NO _x =	-1.7%
revious Respo	onse NO _X =	798.9 ppb	NO =	798.8 ppb				*Percent Chang	ge NO =	-1.9%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	nd NO r ² :		NO SI:	NO Int:	
					As foun	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	PT Calibration	Data				
O3 Setpo	oint (ppb)	Indicated NO Ref		rated NO Drop entration (ppb)	Calculated N concentration (p _l		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	rter Efficiency on Limit = 96-104%
as found										
as found GPT poi	nt (400 ppb NO2)									

Notes:

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

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

459.5

256.5

152.7

Average Correction Factor

1.0009

0.9977

0.9941

0.9975

459.9

255.9

151.8

Calibration Performed By:

Sean Bala

335.3

539.3

643.4

795.2

795.2

795.2

99.9%

100.2%

100.6%

100.2%



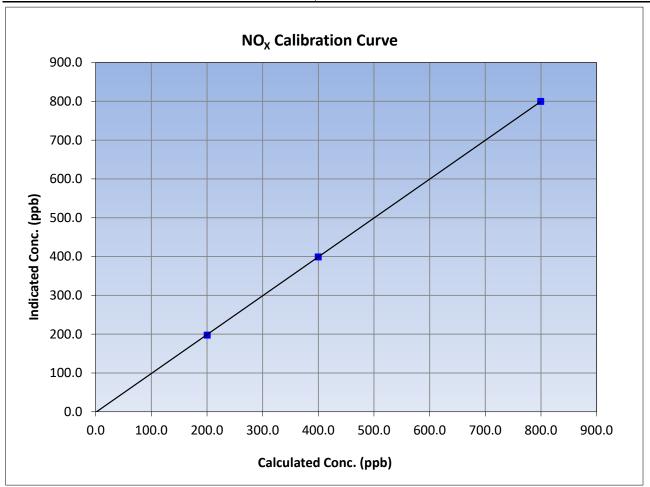
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 4, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:36 End Time (MST): 13:00 Analyzer serial #: Analyzer make: **API T200** 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999988	≥0.995
799.6	799.7	0.9998	Correlation Coefficient	0.555566	20.993
399.8	398.8	1.0026	Slope	1.001507	0.90 - 1.10
200.4	197.6	1.0141	Slope	1.001507	0.90 - 1.10
			Intercept	-1.530484	+/-20





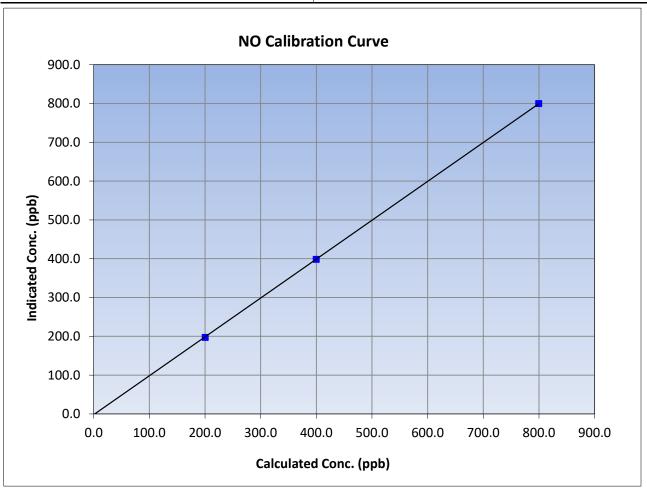
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 4, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:36 End Time (MST): 13:00 Analyzer make: **API T200** Analyzer serial #: 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999981	≥0.995
799.6	799.9	0.9996	Correlation Coefficient	0.555501	20.993
399.8	398.2	1.0041	Slope	1.001793	0.90 - 1.10
200.4	197.1	1.0167	Slope	1.001793	0.90 - 1.10
			Intercept	-1.830393	+/-20





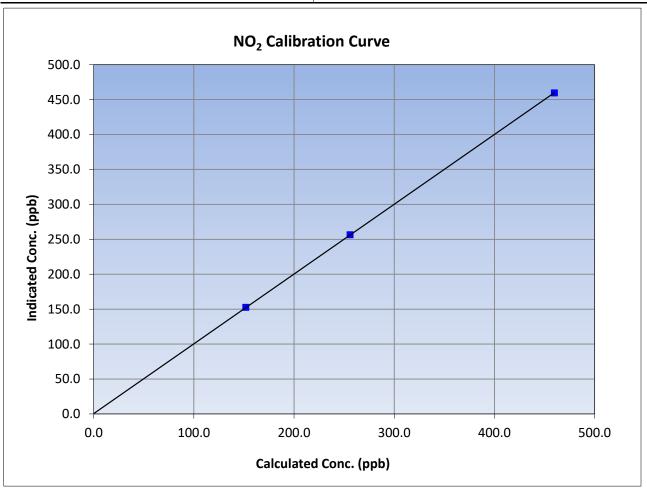
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 20, 2023 Previous Calibration: August 4, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:36 End Time (MST): 13:00 Analyzer make: **API T200** Analyzer serial #: 4260

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999991	≥0.995
459.9	459.5	1.0009	Correlation Coefficient	0.555551	20.333
255.9	256.5	0.9977	Slope	0.999010	0.90 - 1.10
151.8	152.7	0.9941	Slope	0.999010	0.90 - 1.10
			Intercept	0.464663	+/-20

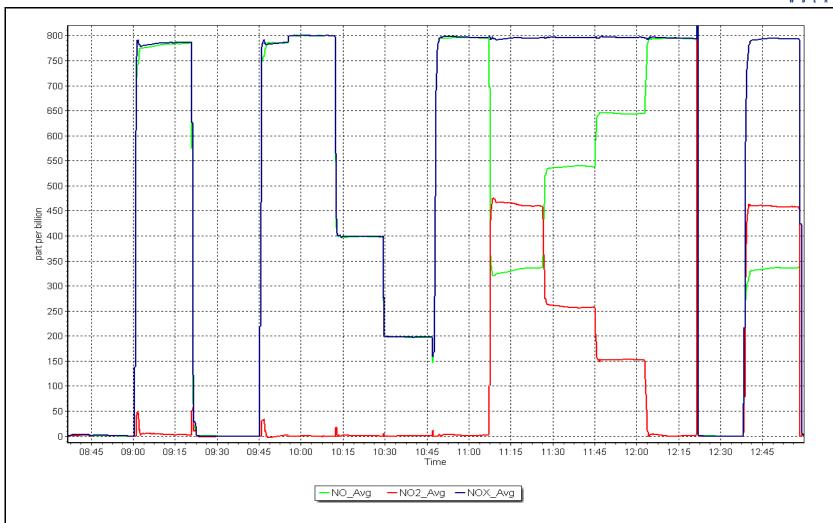


NO_x Calibration Plot

Date: September 20, 2023

Location: Sawbones Bay







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS507 KIRBY SOUTH SEPTEMBER 2023

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

October 29, 2023



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Kirby South September 14, 2023 Calibration Date:

Start time (MST): 9:47 Routine Reason:

Station number: AMS 507 Last Cal Date: August 3, 2023

End time (MST): 12:39

Calibration Standards

Cal Gas Concentration: 49.18

Cal Gas Cylinder #: CC303554 49.18

Removed Cal Gas Conc: Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701H** ppm Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3804

Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

ppm

Analyzer Range 0 - 1000 ppb

Finish Start

0.999847 Calibration slope: 1.004608 Calibration intercept: -1.128170 -0.669160 Start

* = > +/-5% change initiates investigation

Finish

Backgd or Offset: 19.0 20.1 Coeff or Slope: 1.135 1.135

SO₂ Calibration Data

Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
5000	0.0	0.0	0.8	
4919	81.3	799.6	804.0	0.995
5000	0.0	0.0	-0.4	
4919	81.3	799.6	803.0	0.996
4959	40.7	400.3	400.7	0.999
4980	20.3	199.7	200.1	0.998
5000	0.0	0.0	-0.5	
4919	81.3	799.6	803.0	0.996
•	•	Averag	e Correction Factor	0.998
	(sccm) 5000 4919 5000 4919 4959 4980 5000	(sccm) (sccm) 5000 0.0 4919 81.3 5000 0.0 4919 81.3 4959 40.7 4980 20.3 5000 0.0	(sccm) (sccm) concentration (ppb) (Cc) 5000 0.0 0.0 4919 81.3 799.6 5000 0.0 0.0 4919 81.3 799.6 4959 40.7 400.3 4980 20.3 199.7 5000 0.0 0.0 4919 81.3 799.6	(sccm) concentration (ppb) (Cc) (ppb) (Ic) 5000 0.0 0.0 0.8 4919 81.3 799.6 804.0 5000 0.0 0.0 -0.4 4919 81.3 799.6 803.0 4959 40.7 400.3 400.7 4980 20.3 199.7 200.1 5000 0.0 0.0 -0.5

Baseline Corr As found: 803.20 Previous response 798.37 *% change 0.6% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

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

Calibration Performed By: **Braiden Boutilier**



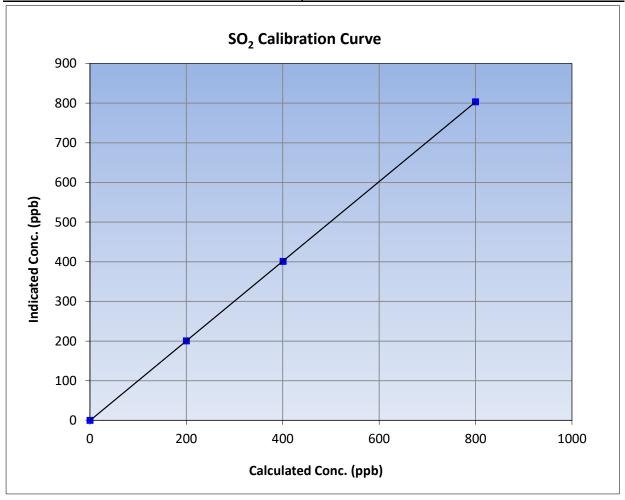
SO₂ Calibration Summary

Version-01-2020

Station Information

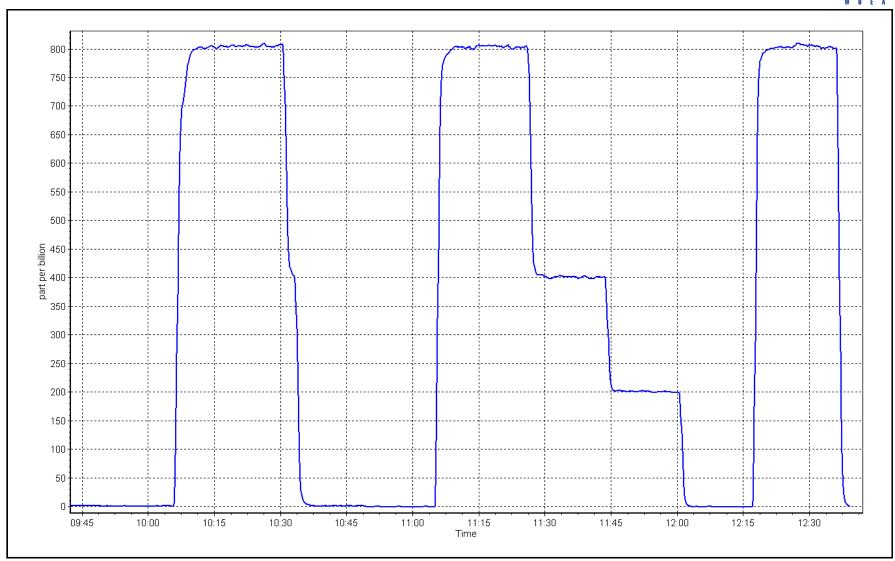
Calibration Date: September 14, 2023 **Previous Calibration:** August 3, 2023 Station Name: Kirby South Station Number: AMS 507 Start Time (MST): 9:47 End Time (MST): 12:39 Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	-0.4		Correlation Coefficient	0.999997	≥0.995				
799.6	803.0	0.9958	Correlation Coefficient	0.555557	20.333				
400.3	400.7	0.9991	Slope	1.004608	0.90 - 1.10				
199.7	200.1	0.9978	Slope	1.004008	0.90 - 1.10				
			- Intercept	-0.669160	+/-30				



SO2 Calibration Plot Date: September 14, 2023 Location: Kirby South







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Kirby South Calibration Date: September 14, 2023

Start time (MST): 12:39

Reason: Routine Station number: AMS507

Last Cal Date: August 2, 2023

End time (MST): 17:10

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 T700 Serial Number: 3804 ZAG Make/Model: **API T701H** Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1150840012

Global Converter serial #: 2022-197 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 1.001457 0.992888 Backgd or Offset: Calibration slope: 1.53 1.54 0.019018 Calibration intercept: 0.019070 Coeff or Slope: 1.048 1.048

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	0.0	
as found span	4923	77.4	80.0	79.5	1.006
as found 2nd point	4961	38.8	40.1	39.5	1.015
as found 3rd point	4981	19.3	19.9	19.7	1.012
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	igh point 4923		80.0	79.5	1.006	
second point	4961	38.8	40.1	39.7	1.010	
third point	4981	19.3	19.9	19.8	1.007	
as left zero	5000	0.0	0.0	0.2		
as left span	4923	77.4	80.0	79.0	1.012	
SO2 Scrubber Check	4919	80.0	800.2	-0.1		
Date of last scrubber chang	ge:	25-Jul-23		Ave Corr Factor	1.008	
Date of last converter efficiency test: efficiency						

Date of last scrubber change:	25-Jul-23	Ave Corr Factor	1.008
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 79.5 80.11 Prev response: *% change: -0.8% Baseline Corr 2nd AF pt: 39.5 AF Slope: 0.994027 AF Intercept: -0.120860 Baseline Corr 3rd AF pt: 0.999975 19.7 AF Correlation:

* = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. Scrubber check done after MPAF's, passed. No Notes: adjustments made.

Calibration Performed By: Braiden Boutilier



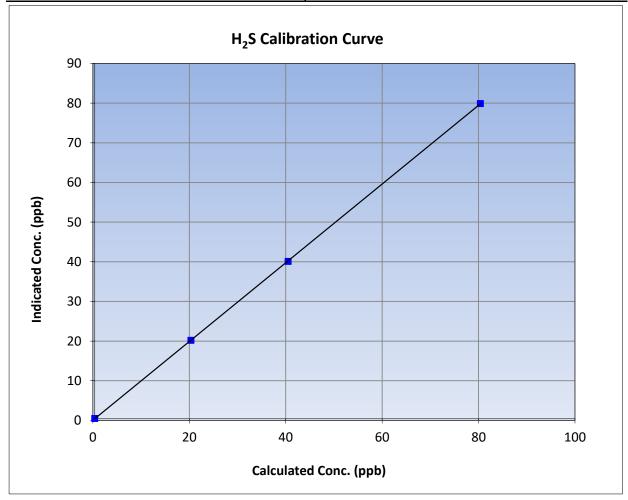
H₂S Calibration Summary

Version-11-2021

Station Information

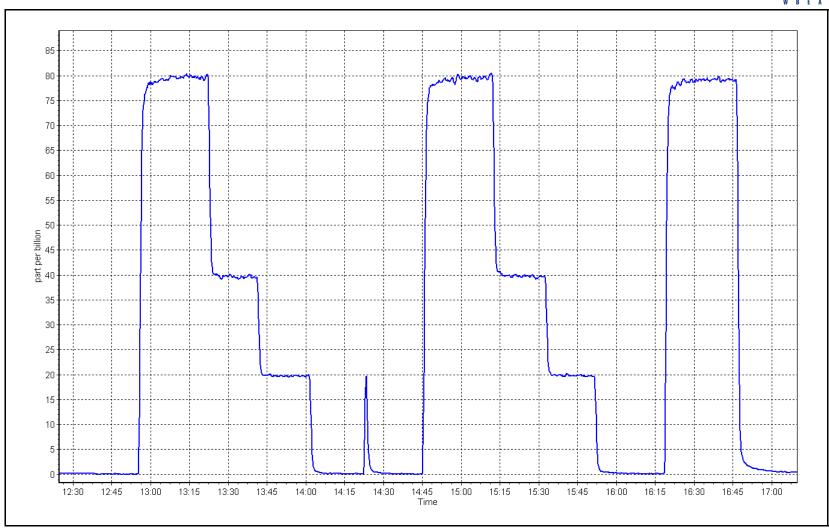
Calibration Date: September 14, 2023 **Previous Calibration:** August 2, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 12:39 End Time (MST): 17:10 Thermo 43i-TLE Analyzer make: Analyzer serial #: 1150840012

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	0.999992	≥0.995				
80.0	79.5	1.0060	Correlation Coefficient	0.555552	20.993				
40.1	39.7	1.0100	Slope	0.992888	0.90 - 1.10				
19.9	19.8	1.0072	Slope	0.332000	0.90 - 1.10				
			- Intercept	0.019018	+/-3				



Date: September 14, 2023 Location: Kirby South







CH4 Cal Gas Conc.

Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name: Kirby South
Calibration Date: September 14, 2023

Start time (MST): 9:47

Reason: Routine

Station number: AMS507

Last Cal Date: August 3, 2023

End time (MST): 12:39

Calibration Standards

Gas Cert Reference: CC303554 Cal Gas Expiry Date: March 23, 2025

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:

496.6

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

StartFinishStartFinishCalibration slope:0.9993810.999942Background:2.642.83

Calibration intercept: -0.016800 0.005209 Coefficient: 3.799 3.975

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	-0.07	
as found span	4919	81.3	17.26	16.50	1.046
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.04	
high point	4919	81.3	17.26	17.29	0.998
second point	4959	40.7	8.64	8.61	1.004
third point	4980	20.3	4.31	4.30	1.003
as left zero	5000	0.0	0.00	0.01	
as left span	4919	81.3	17.26	17.18	1.005
			Aver	age Correction Factor	1.002
Baseline Corr As found:	16.57	Previous response	17.24	*% change	-4.0%
- 11 1					

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

Baseline Corr 3rd AF pt: NA AF Correlation:

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

Calibration Performed By: Braiden Boutilier

* = > +/-5% change initiates investigation



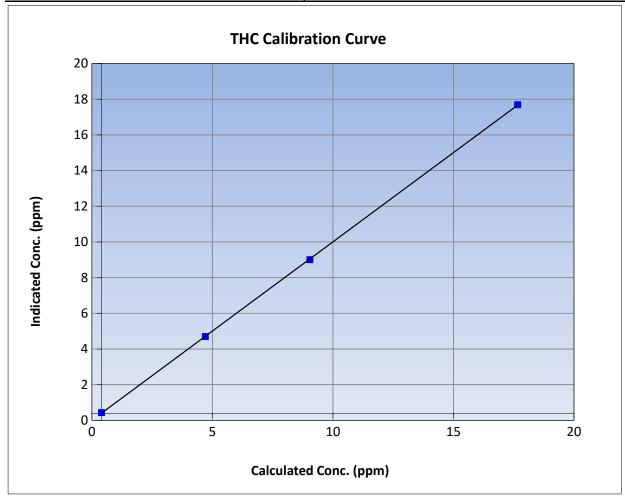
THC Calibration Summary

Version-01-2020

Station Information

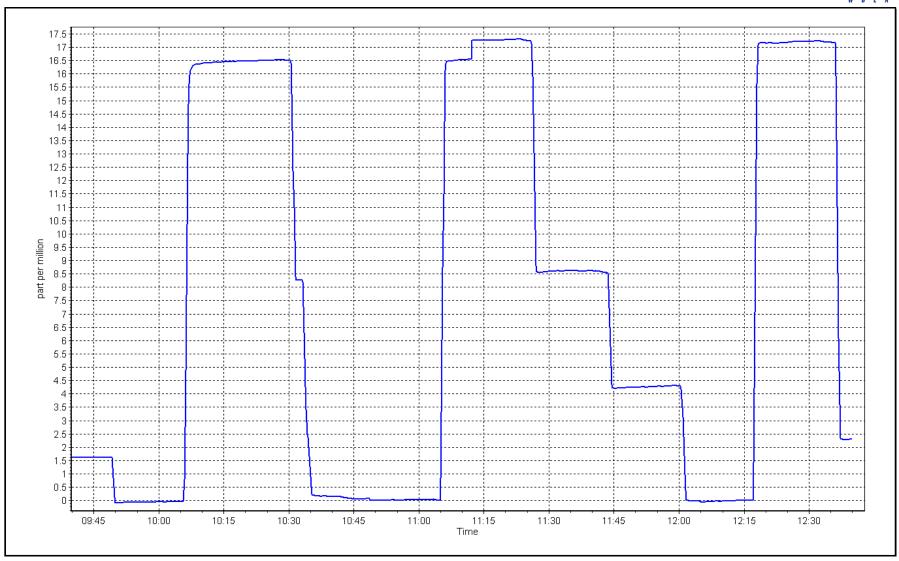
Previous Calibration: Calibration Date: September 14, 2023 August 3, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 9:47 End Time (MST): 12:39 Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.00	0.04		Correlation Coefficient	0.999980	≥0.995				
17.26	17.29	0.9984	Correlation Coefficient	0.999980	20.995				
8.64	8.61	1.0038	Slope	0.999942	0.90 - 1.10				
4.31	4.30	1.0029	Slope	0.333342	0.90 - 1.10				
			- Intercept	0.005209	+/-1.5				



THC Calibration Plot Date: September 14, 2023 Location: Kirby South







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Kirby South Calibration Date: September 15, 2023

Start time (MST): 8:45 Reason: Routine Station number: AMS507 August 3, 2023 Last Cal Date:

End time (MST): 13:40

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:

NO gas Diff: **API T700** Serial Number: 3804 Calibrator Model: ZAG make/model: **API 701H** Serial Number: 880

Analyzer Information

Analyzer make: Thermo 42iQ Analyzer serial #: 1182340006

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.485 1.485 NO bkgnd or offset: 1.5 1.5 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 1.6 1.6 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 160.75 167.97

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.006090	1.009702
NO _x Cal Offset:	-4.471991	-4.611056
NO Cal Slope:	1.005987	1.011497
NO Cal Offset:	-5.373912	-5.412656
NO ₂ Cal Slope:	1.007635	1.004706
NO ₂ Cal Offset:	1.168421	1.319502



$NO_X \setminus NO \setminus NO_2$ 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	-0.3	-0.3	0.0		
as found span	4919	81.0	800.1	794.1	6.0	804.0	798.9	5.1	0.9952	0.9940
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	4919	81.0	800.1	794.1	6.0	806.0	801.0	5.0	0.9927	0.9914
second point	4960	40.5	400.0	397.0	3.0	395.5	391.9	3.6	1.0114	1.0131
third point	4980	20.2	199.5	198.0	1.5	193.5	190.8	2.7	1.0312	1.0379
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0		
as left span	4919	81.0	800.1	379.9	420.2	803.0	381.6	420.9	0.9964	0.9956
							Average C	Correction Factor	1.0118	1.0141
Corrected As fou	und NO _X =	804.3 ppb	NO =	799.2 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO _X =	0.5%
Previous Respon	ise NO _X =	800.5 ppb	NO =	793.5 ppb				*Percent Chan	ge NO =	0.7%
Baseline Corr 2n	d pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3rd	d pt NO _x =	NA ppb	NO =	NA ppb	As foun	d $NO r^2$:		NO SI:	NO Int:	
	, ,				As found	2		NO2 SI:	NO ₂ Int:	
				G	PT Calibration	Data				
O3 Setpoir	nt (ppb)	Indicated NO Ref		cated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found G	iPT zero									
as found GPT point	t (400 ppb NO2)									
as found GPT point	t (200 ppb NO2)									
as found GPT point	t (100 ppb NO2)									
1st GPT point (4	400 ppb O3)	797.2		383.0	420.2		422.6	0.994	3 :	100.6%
2nd GPT point ((200 ppb O3)	797.2		622.1	181.1		185.2	0.977	8	102.3%
3rd GPT point (100 ppb O3)	797.2		716.0	87.2		89.2	0.977	5	102.3%

Notes:

No adjustments made.

Average Correction Factor

0.9832

Calibration Performed By:

Braiden Boutilier

101.7%



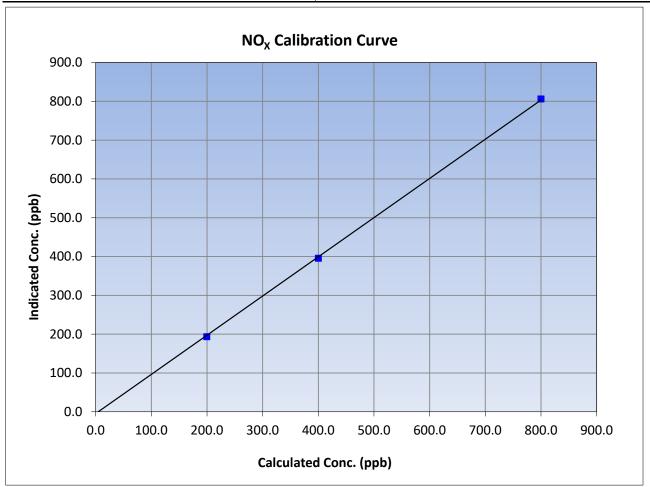
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 15, 2023 Previous Calibration: August 3, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:45 End Time (MST): 13:40 Analyzer serial #: Analyzer make: Thermo 42iQ 1182340006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999853	≥0.995
800.1	806.0	0.9927	Correlation Coefficient	0.999833	20.333
400.0	395.5	1.0114	Slope	1.009702	0.90 - 1.10
199.5	193.5	1.0312	Slope	1.009702	0.90 - 1.10
			Intercept	-4.611056	+/-20





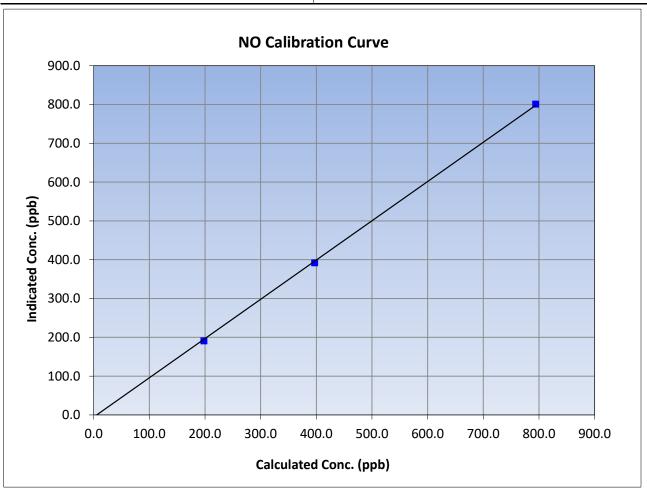
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 15, 2023 Previous Calibration: August 3, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:45 End Time (MST): 13:40 Analyzer make: Thermo 42iQ Analyzer serial #: 1182340006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999796	≥0.995
794.1	801.0	0.9914	Correlation Coefficient	0.333730	20.993
397.0	391.9	1.0131	Slope	1.011497	0.90 - 1.10
198.0	190.8	1.0379	Slope	1.011497	0.90 - 1.10
			Intercept	-5.412656	+/-20





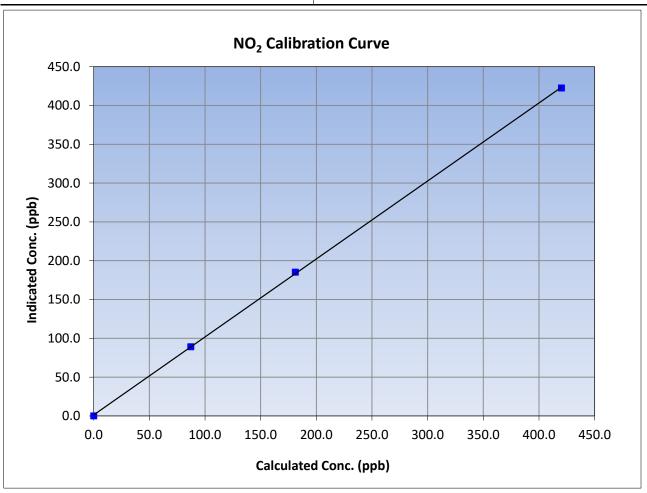
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: September 15, 2023 Previous Calibration: August 3, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:45 End Time (MST): 13:40 Analyzer serial #: Analyzer make: Thermo 42iQ 1182340006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999936	≥0.995
420.2	422.6	0.9943			
181.1	185.2	0.9778	Slope	1.004706	0.90 - 1.10
87.2	89.2	0.9775			
			Intercept	1.319502	+/-20

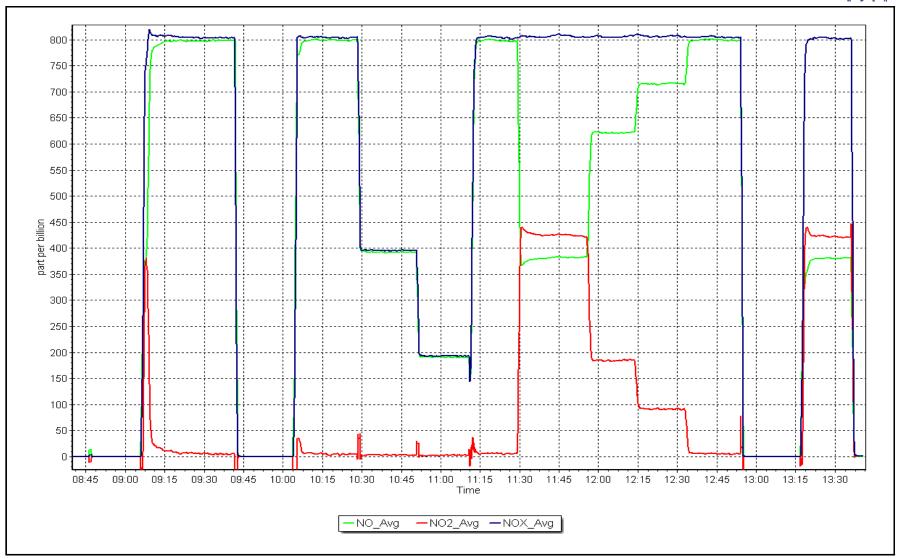


NO_x Calibration Plot

Date: September 15, 2023

Location: Kirby South







End of Report