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Wood Buffalo Environmental Association

JANUARY 2024 MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING February 29, 2024

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS01 BERTHA GANTER - FORT MCKAY JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Station number:

End time (MST):

AMS01

14:54

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

December 13, 2023 Calibration Date: January 11, 2024 Last Cal Date:

Start time (MST): 11:21

Routine Reason:

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

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

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 0.999624 Backgd or Offset: 20.0 19.6 0.998738

0.891 Calibration intercept: -0.153291 -0.113430 Coeff or Slope: 0.887

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4918	81.3	800.3	794.3	1.008
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	399.8	1.002
third point	4979	20.3	199.8	199.3	1.003
as left zero	5000	0.0	0.0	0.4	
as left span	4918	81.3	800.3	801.2	0.999
			Avera	ge Correction Factor	1.002

Baseline Corr As found: 794.20 Previous response 799.10 -0.6% *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

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

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



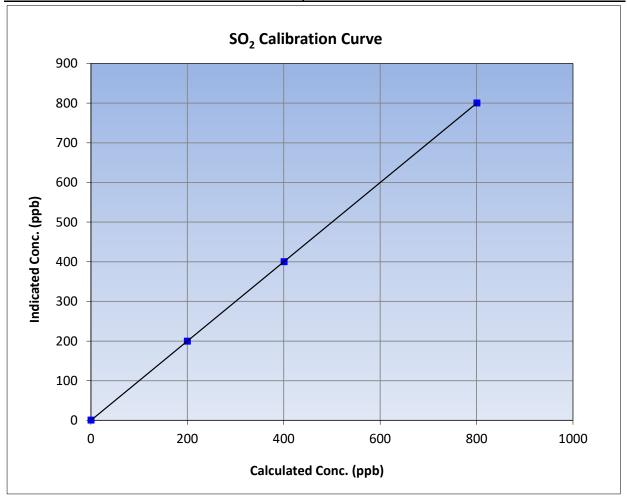
SO₂ Calibration Summary

Version-01-2020

Station Information

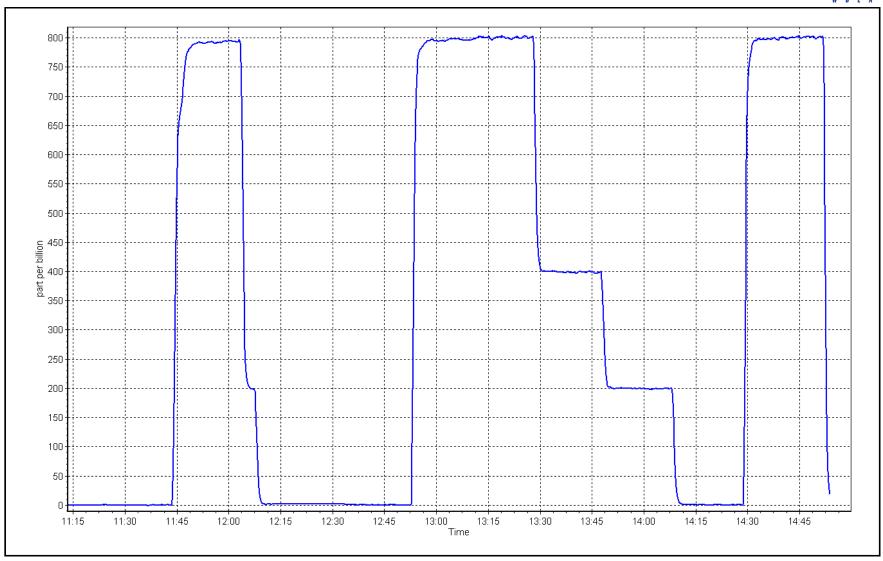
Calibration Date: January 11, 2024 **Previous Calibration:** December 13, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:21 End Time (MST): 14:54 Analyzer make: Thermo 43i Analyzer serial #: JC1501301448

		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	399.8	1.0020	Slope	0.999624	0.90 - 1.10
199.8	199.3	1.0026	Slope	0.555024	0.90 - 1.10
			- Intercept	-0.113430	+/-30



SO2 Calibration Plot Date: December 13, 2023







TRS Calibration Report

Station number:

End time (MST):

AMS01

16:52

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 25, 2024 Last Cal Date: December 12, 2023

Start time (MST): 11:01

Routine Reason:

Calibration Standards

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

Cal Gas Cylinder #: CC511749

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

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

Analyzer Information

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

Converter serial #: 470 Converter make: CD Nova

Analyzer Range 0 - 100 ppb

> **Finish** <u>Finish</u> <u>Start</u> <u>Start</u> 0.999507 0.994364 Backgd or Offset: 2.25 2.32

Calibration slope: 0.300000 Calibration intercept: 0.219996 Coeff or Slope: 0.904 0.937

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	4921	78.4	80.0	77.6	1.032
as found 2nd point	4960	39.2	40.0	38.8	1.034
as found 3rd point	4980	19.6	20.0	19.4	1.036
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	78.4	80.0	79.8	1.002
second point	4960	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.4	
as left span	4921	78.4	80.0	79.1	1.011
SO2 Scrubber Check	4919	81.3	813.0	0.1	
Date of last scrubber chang	ge:	December 17, 2021		Ave Corr Factor	0.995

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	0.995
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 77.5 80.17 Prev response: *% change: -3.5% Baseline Corr 2nd AF pt: 38.7 AF Slope: 0.969076 AF Intercept: 0.060000 Baseline Corr 3rd AF pt: AF Correlation: 0.999999 19.3 * = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland



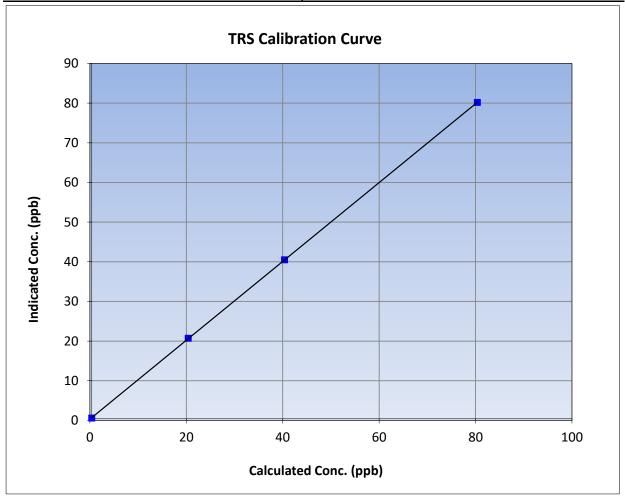
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 25, 2024 **Previous Calibration:** December 12, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:01 End Time (MST): 16:52 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461

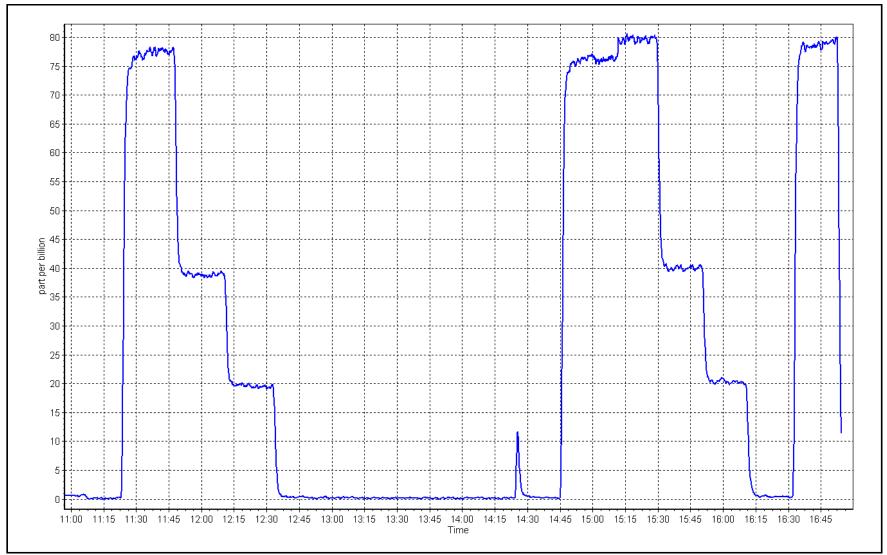
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999993	≥0.995
80.0	79.8	1.0024	Correlation Coefficient	0.999993	20.993
40.0	40.1	0.9975	Slope	0.994364	0.90 - 1.10
20.0	20.3	0.9851	Slope	0.334304	0.90 - 1.10
			- Intercept	0.300000	+/-3





Date: January 25, 2024







H₂S Calibration Report

Station number:

End time (MST):

AMS01

16:52

Version-11-2021

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 25, 2024 Last Cal Date: December 12, 2023

Start time (MST): 11:01

Reason: Routine

Calibration Standards

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

Cal Gas Cylinder #: CC511749

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

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

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

Analyzer Information

Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

Converter make: Global Converter serial #: 2022-221

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.998712 Backgd or Offset: Calibration slope: 0.985566 1.72 2.45 Calibration intercept: 0.536834 0.176812 Coeff or Slope: 1.009 0.992

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	4922	78.4	80.0	78.2	1.026
as found 2nd point	4960	39.2	40.0	39.7	1.015
as found 3rd point	4980	19.6	20.0	20.1	1.010
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4922	78.4	80.0	80.1	0.998
second point	4960	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	20.0	1.000
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.4	80.0	79.9	1.001
SO2 Scrubber Check	4919	81.3	813.0	0.1	
Date of last scrubber chang	ge:	January 25, 2024		Ave Corr Factor	0.999
Data of last assume the office				· ·	- CC: -: ·

Date of last scrubber change:	January 25, 2024	Ave Corr Factor	0.999
Date of last converter efficiency test:			efficiency

Baseline Corr As found: 77.9 Prev response: 79.34 *% change: -1.9% 0.516858 Baseline Corr 2nd AF pt: 39.4 AF Slope: 0.973468 AF Intercept: Baseline Corr 3rd AF pt: 0.999955 19.8 AF Correlation:

* = > +/-5% change initiates investigation

Inlet filter change and scrubber check completed after as founds. Replaced the converter. Notes: Changed out the scrubber beads. Removed the hydrator. Adjusted both zero and span.

Calibration Performed By: Rene Chamberland



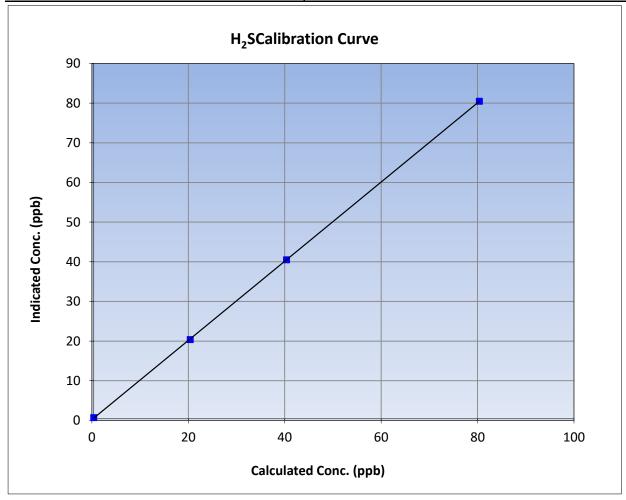
H₂S Calibration Summary

Version-11-2021

Station Information

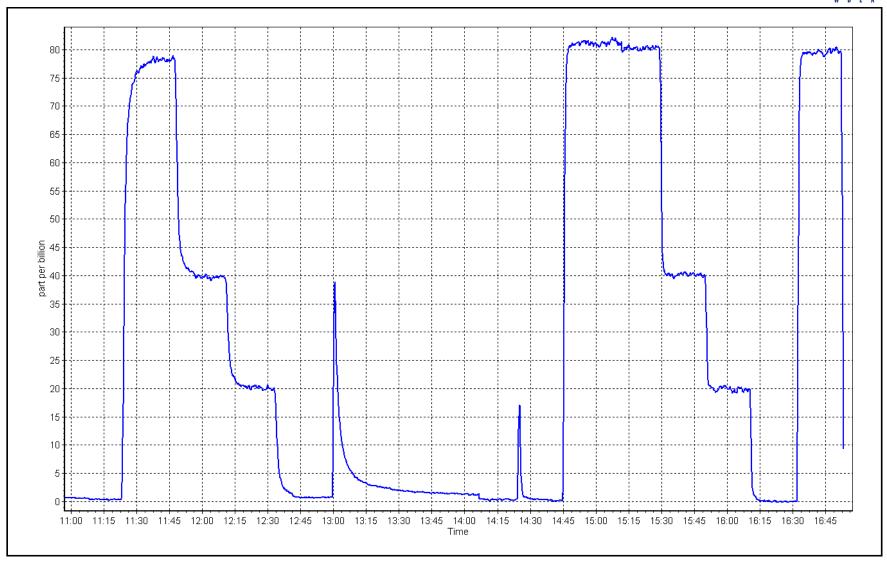
Calibration Date: January 25, 2024 **Previous Calibration:** December 12, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:01 End Time (MST): 16:52 Analyzer make: Thermo 43iQTL Analyzer serial #: 1200326167

		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999988	≥0.995
80.0	80.1	0.9985	Correlation Coefficient	0.555566	20.993
40.0	40.1	0.9975	Slope	0.998712	0.90 - 1.10
20.0	20.0	0.9999	Slope	0.556712	0.90 - 1.10
			- Intercept	0.176812	+/-3



Date: January 25, 2024







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 11, 2024

Start time (MST): 11:21

Routine Reason:

Station number: AMS01

Last Cal Date: December 13, 2023

End time (MST): 14:54

Removed Gas Expiry: NA

Analyzer serial #: 1180320040

Calibration Standards

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

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

205.3 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NΑ

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

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

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

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

Analyzer Information

Analyzer make: Thermo 55i

NA

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

Baseline Corr 3rd AF:

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 3.04E-04 4.37E-04 NMHC SP Ratio: 7.01E-05 7.11E-05 CH4 Retention time: 14.6 16.7 NMHC Peak Area: 131151 129269

Zero Chromatogram: ON ON Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	17.27	17.46	0.989
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	17.21	1.003
second point	4959	40.7	8.64	8.53	1.013
third point	4980	20.3	4.31	4.27	1.011
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.27	17.43	0.990
				Average Correction Factor	1.009
Baseline Corr AF:	17.46	Prev response	17.16	*% change	1.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

* = > +/-5% change initiates investigation

OFF



THC / CH₄ / NMHC Calibration Report

Version-06-2022

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0	0.00	0.00	
as found span	4918	81.3	9.18	9.38	0.978
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	9.18	9.15	1.003
second point	4959	40.7	4.60	4.57	1.007
third point	4980	20.3	2.29	2.29	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	9.18	9.29	0.989
			Avera	age Correction Factor	1.004
Baseline Corr AF:	9.38	Prev response	9.12	*% change	2.8%
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		Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 3
		CH4 Calibra	tion Data		
	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 5
as found zero	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span		Source gas flow rate	Calc conc (ppm) (Cc)	,,,	
as found zero as found span as found 2nd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4918	Source gas flow rate 0.0 81.3	Calc conc (ppm) (Cc) 0.00 8.09	0.00 8.07	1.001
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4918 5000	Source gas flow rate 0.0 81.3	Calc conc (ppm) (Cc) 0.00 8.09	0.00 8.07	1.001
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4918 5000 4918	0.0 81.3 0.0 81.3	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09	0.00 8.07 0.00 8.07	1.001
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4918 5000 4918 4959	0.0 81.3 0.0 81.3 40.7	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05	0.00 8.07 0.00 8.07 3.97	1.001 1.002 1.020
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 4918 5000 4918 4959 4980	0.0 81.3 0.0 81.3 40.7 20.3	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02	0.00 8.07 0.00 8.07 3.97 1.98	1.001
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 4918 5000 4918 4959 4980 5000	0.0 81.3 0.0 81.3 40.7	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00	0.00 8.07 0.00 8.07 3.97	1.001 1.002 1.020 1.021
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 4918 5000 4918 4959 4980	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15	1.001 1.002 1.020 1.021
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 4918 5000 4918 4959 4980 5000	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15 age Correction Factor	1.001 1.002 1.020 1.021 0.993
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 Baseline Corr AF:	5000 4918 5000 4918 4959 4980 5000 4918	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09 Average	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15	1.001 1.002 1.020 1.021 0.993 1.014
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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4918 5000 4918 4959 4980 5000 4918	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3 Prev response	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09 Average	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15 age Correction Factor *% change	1.001 1.002 1.020 1.021 0.993 1.014 0.4%
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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4918 5000 4918 4959 4980 5000 4918 8.07 NA	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3 Prev response AF Slope:	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09 Avera	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15 age Correction Factor *% change AF Intercept:	1.001 1.001 1.002 1.020 1.021 0.993 1.014 0.4%
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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4918 5000 4918 4959 4980 5000 4918 8.07 NA	O.0 81.3 O.0 81.3 40.7 20.3 O.0 81.3 Prev response AF Slope: AF Correlation: Calibration	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09 Avera	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.001 1.001 1.002 1.020 1.021 0.993 1.014 0.4%
Set Point 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 Baseline Corr AF: Baseline Corr 3rd AF: Baseline Corr 3rd AF:	5000 4918 5000 4918 4959 4980 5000 4918 8.07 NA	0.0 81.3 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3 Prev response AF Slope: AF Correlation:	Calc conc (ppm) (Cc) 0.00 8.09 0.00 8.09 4.05 2.02 0.00 8.09 Avera	0.00 8.07 0.00 8.07 3.97 1.98 0.00 8.15 age Correction Factor *% change AF Intercept:	1.001 1.002 1.020 1.021 0.993 1.014 0.4%

Notes:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Changed out the inlet filter after as founds. Lowered the carrier run pressure and adjusted the window timings. Adjusted span only.

0.998653

-0.029405

0.996266

-0.001592

Calibration Performed By: Rene Chamberland

1.002253

-0.062393

0.994150

-0.004590



THC Calibration Summary

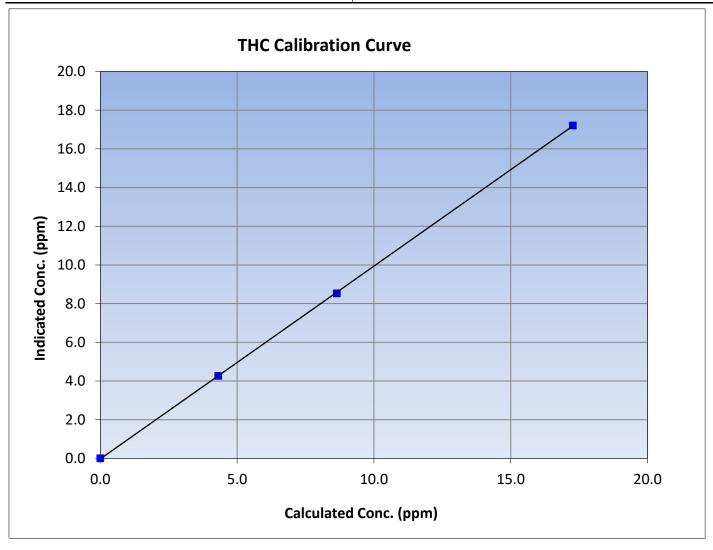
Version-06-2022

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 13, 2023

Station Name:Bertha Ganter-Fort McKayStation Number:AMS01Start Time (MST):11:21End Time (MST):14:54Analyzer make:Thermo 55iAnalyzer 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	0.999972	≥0.995
17.27	17.21	1.0033	Correlation Coemicient	0.555572	20.333
8.64	8.53	1.0129	Slope	0.996788	0.90 - 1.10
4.31	4.27	1.0107	Slope	0.990788	0.30 - 1.10
		·	Intercept	-0.028998	+/-0.5





CH₄ Calibration Summary

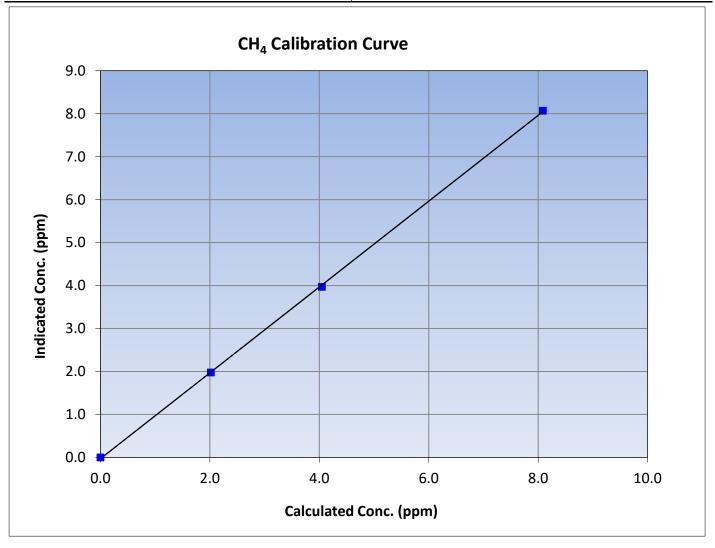
Version-06-2022

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 13, 2023

Station Name:Bertha Ganter-Fort McKayStation Number:AMS01Start Time (MST):11:21End Time (MST):14:54Analyzer make:Thermo 55iAnalyzer 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	0.999900	≥0.995
8.09	8.07	1.0019	Correlation Coemicient	0.555500	20.333
4.05	3.97	1.0200	Slope	0.998653	0.90 - 1.10
2.02	1.98	1.0211	Slope	0.996033	0.90 - 1.10
			Intercept	-0.029405	+/-0.5





NMHC Calibration Summary

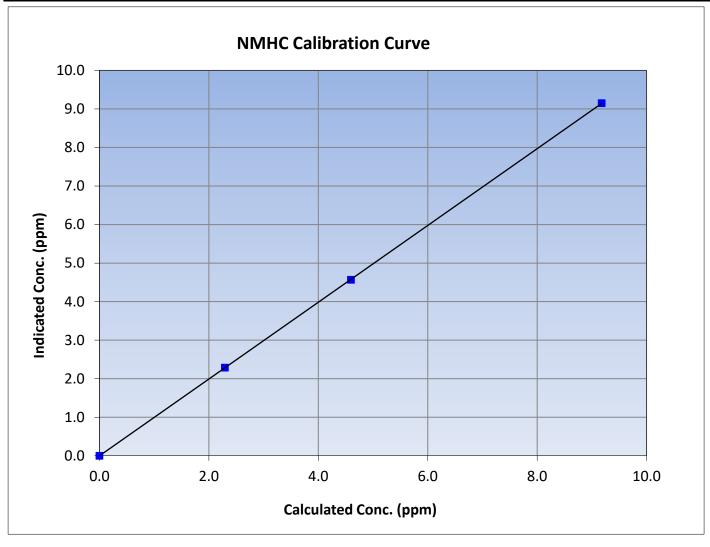
Version-06-2022

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 13, 2023

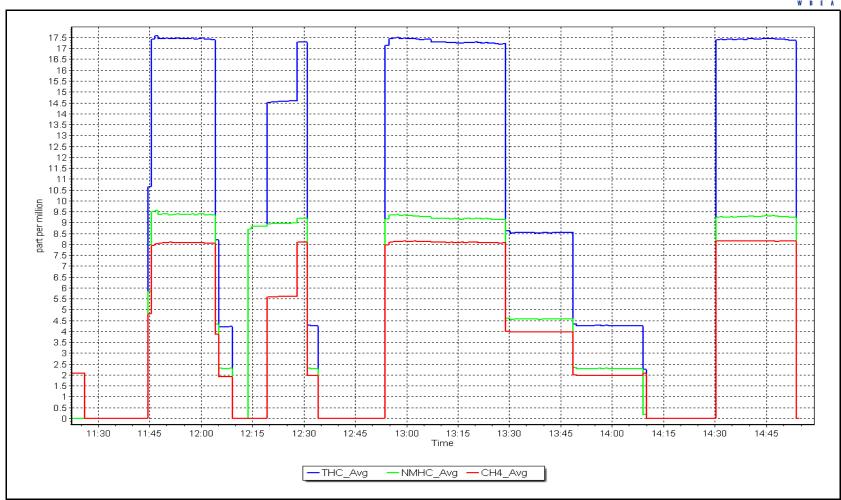
Station Name:Bertha Ganter-Fort McKayStation Number:AMS01Start Time (MST):11:21End Time (MST):14:54Analyzer make:Thermo 55iAnalyzer serial #:1180320040

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.18	9.15	1.0034	Correlation Coemicient	0.555555	20.333
4.60	4.57	1.0068	Slope	0.996266	0.90 - 1.10
2.29	2.29	1.0018	Slope	0.990200	0.90 - 1.10
			Intercept	-0.001592	+/-0.5



Date: January 11, 2024







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 22, 2024

Start time (MST): 11:08

Cylinder Change Reason:

Station number: AMS01

Last Cal Date: January 11, 2024

End time (MST): 15:30

Removed Gas Expiry: NA

Calibration Standards

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

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

205.3 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: NΑ

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

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

Diff between cyl (CH_4):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320040

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

CH4 Range (ppm): 0 - 10 ppm

Finish Start Start Finish CH4 SP Ratio: 4.37E-04 4.37E-04 NMHC SP Ratio: 7.11E-05 7.11E-05 CH4 Retention time: 16.7 16.7 NMHC Peak Area: 129269 129269 OFF

Zero Chromatogram: ON ON Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	17.27	17.61	0.980
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.27	19.66	0.878
			Aver	age Correction Factor	
Baseline Corr AF:	17.61	Prev response	17.18	*% change	2.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

NMHC	Cali	brati	on Data	£
------	------	-------	---------	---

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4918	81.3	9.18	9.33	0.985
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	9.18	10.61	0.865
			Avei	rage Correction Factor	
Baseline Corr AF:	9.33	Prev response	9.15	*% change	1.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation

CH4 Calibration Data

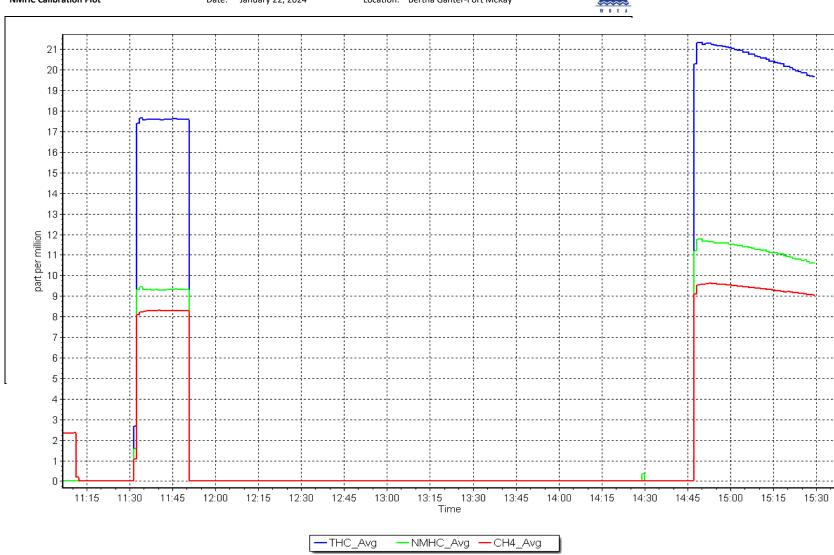
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	8.09	8.29	0.976
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	8.09	9.05	0.893
			Ave	rage Correction Factor	
Baseline Corr AF:	8.29	Prev response	8.05	*% change	2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.996788			
THC Cal Offset:		-0.028998			
CH4 Cal Slope:		0.998653			
CH4 Cal Offset:		-0.029405			
NMHC Cal Slope:		0.996266			
NMHC Cal Offset:		-0.001592			

Notes:

Changed out the H2 and N2 cylinders.

Calibration Performed By: Rene Chamberland

NMHC Calibration Plot Date: January 22, 2024 Location: Bertha Ganter-Fort McKay





NO_X \ NO \ NO₂ Calibration Report

Station number: AMS01

End time (MST): 16:01

NO gas Diff:

Last Cal Date: December 4, 2023

Version-04-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 4, 2024

Start time (MST): 11:08

Reason: Routine

Calibration Standards

T2Y1P9L NO Gas Cylinder #: Cal Gas Expiry Date: December 11, 2023 NOX Cal Gas Conc: NO Cal Gas Conc: 50.04 50.84 ppm 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: 4890

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1218153357

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.431	1.442	NO bkgnd or offset:	7.3	7.1
NOX coeff or slope:	0.989	0.992	NOX bkgnd or offset:	8.0	7.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	199.2	199.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000323	1.000562
NO _x Cal Offset:	-0.720000	0.220000
NO Cal Slope:	1.001285	0.999101
NO Cal Offset:	-1.280000	-0.740000
NO ₂ Cal Slope:	1.001111	1.003895
NO ₂ Cal Offset:	-0.531962	0.627156



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dile	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 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	-1.0	-0.3	-0.7		
as found span	4920	80.0	813.4	800.6	12.8	808.3	792.1	16.1	1.0064	1.0108
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1		
high point	4920	80.0	813.4	800.6	12.8	813.7	799.3	14.5	0.9997	1.0017
second point	4960	40.0	406.7	400.3	6.4	408.2	399.6	8.5	0.9964	1.0018
third point	4980	20.0	203.4	200.2	3.2	203.3	198.0	5.4	1.0003	1.0109
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4920	80.0	813.4	413.0	400.4	809.8	414.2	395.6	1.0045	0.9972
							Average C	Correction Factor	0.9988	1.0048
Corrected As fo	ound NO _X =	809.3 ppb	NO =	792.4 ppb	* = > +/-5	5% change initiates i	investigation	*Percent Chang	ge NO _x =	-0.5%
Previous Respon	nse NO _x =	813.0 ppb	NO =	800.4 ppb				*Percent Chang	ge NO =	-1.0%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	$NO_X r^2$:		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	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				e	GPT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Referer concentration (ppb		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	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
as found GPT poir	nt (200 ppb NO2)									
as found GPT poir	nt (100 ppb NO2)									
1st GPT point		795.1		407.5	400.4	-	402.4	0.9950) 1	100.5%
2nd GPT point	(200 ppb O3)	795.1		601.0	206.9		208.3	0.9933	3	100.7%
		705.4		C00 C	109.3		111.1	0.9838	,	101.6%
3rd GPT point	(100 ppb O3)	795.1		698.6	109.3		111.1	0.9630	<u> </u>	101.0%

Notes:

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

Calibration Performed By:

Rene Chamberland



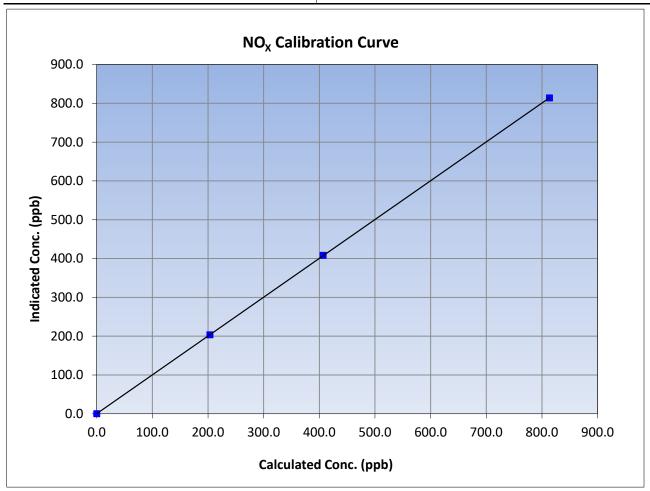
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 4, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:08 End Time (MST): 16:01 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	0.0		Correlation Coefficient	0.999996	≥0.995
813.4	813.7	0.9997	Correlation Coefficient	0.999990	E0.333
406.7	408.2	0.9964	Slope	1.000562	0.90 - 1.10
203.4	203.3	1.0003	Siope		0.30 - 1.10
			Intercept	0.220000	+/-20





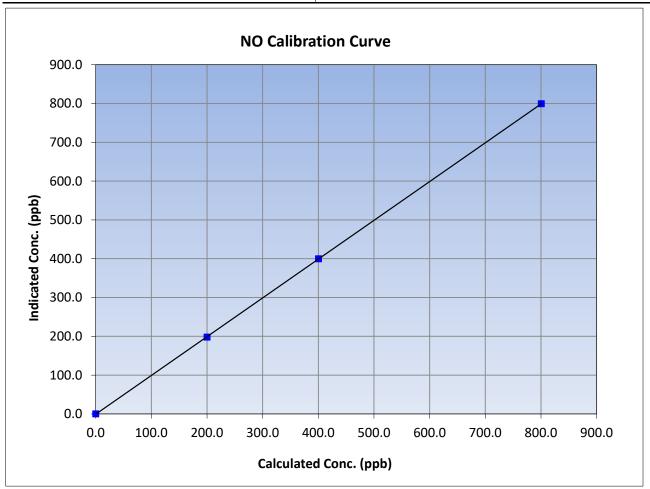
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 4, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:08 End Time (MST): 16:01 Analyzer make: Analyzer serial #: Thermo 42i 1218153357

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999994	≥0.995
800.6	799.3	1.0017	Correlation Coefficient	0.555554	20.333
400.3	399.6	1.0018	Slope	0.999101	0.90 - 1.10
200.2	198.0	1.0109	Slope	0.999101	0.90 - 1.10
			Intercept	-0.740000	+/-20





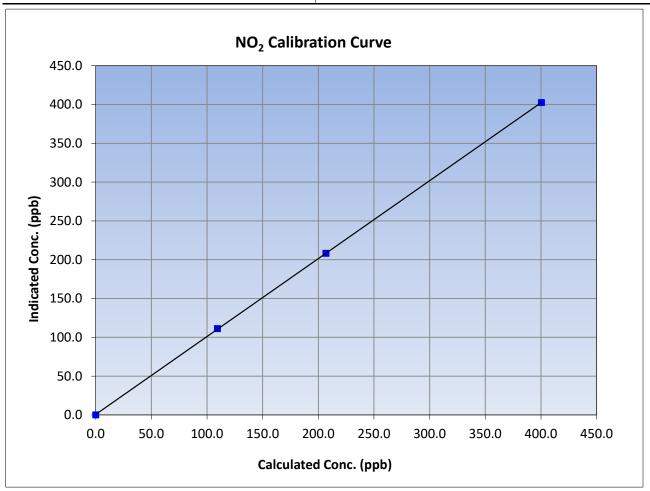
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 4, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:08 End Time (MST): 16:01 Analyzer serial #: Analyzer make: Thermo 42i 1218153357

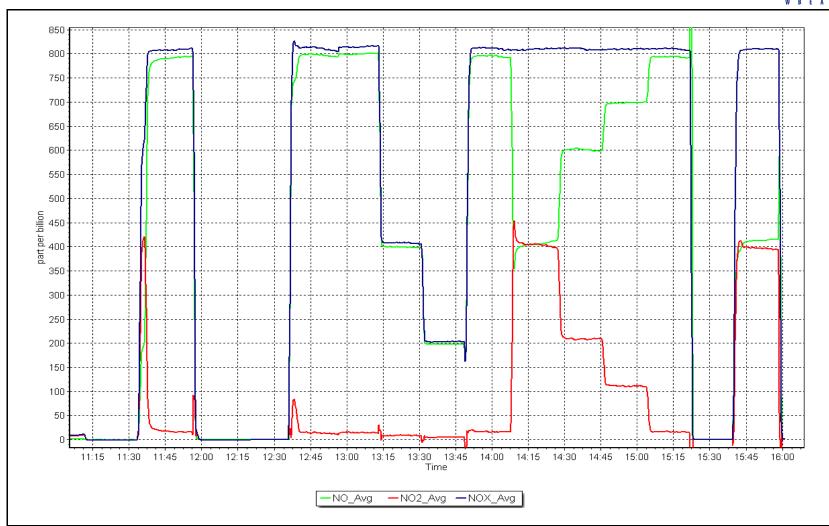
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999990	≥0.995
400.4	402.4	0.9950	Correlation Coefficient	0.555550	20.333
206.9	208.3	0.9933	Slope	1.003895	0.90 - 1.10
109.3	111.1	0.9838	Slope	1.005695	0.90 - 1.10
			Intercept	0.627156	+/-20



NO_x Calibration Plot

Date: January 4, 2024







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 3, 2024

Start time (MST): 10:48

Reason: Routine Station number: AMS01

Last Cal Date: December 1, 2023

End time (MST): 13:46

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 1107

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.004914 0.999800 3.8 4.8 Coeff or Slope: Calibration intercept: 0.040000 0.360000 1.012 1.014

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	0.5	
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	0.2	
high point	5000	863.1	400.0	400.0	1.000
second point	5000	742.5	200.0	201.0	0.995
third point	5000	651.7	100.0	100.1	0.999
as left zero	5000	0.0	0.0	0.0	
as left span	5000	863.1	400.0	403.6	0.991
			Avera	ge Correction Factor	0.998
Baseline Corr As found:	399.8	Previous respons	e 402.0	*% change	-0.6%
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: Changed the inlet filter after as founds. Adjusted zero only.

Calibration Performed By: Rene Chamberland



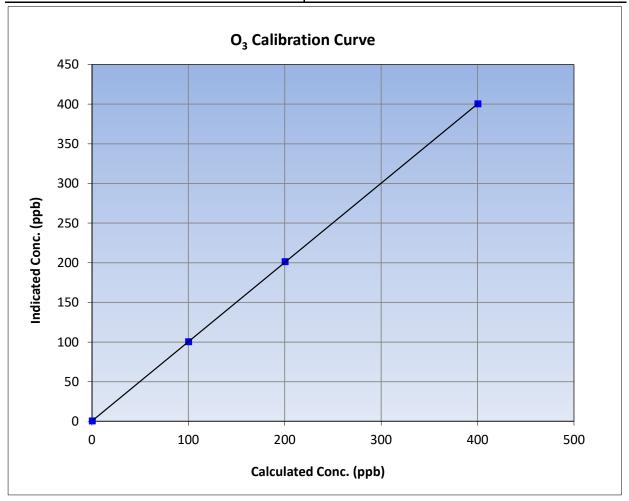
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 1, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:48 End Time (MST): 13:46 Analyzer make: Teledyne API T400 Analyzer serial #: 1107

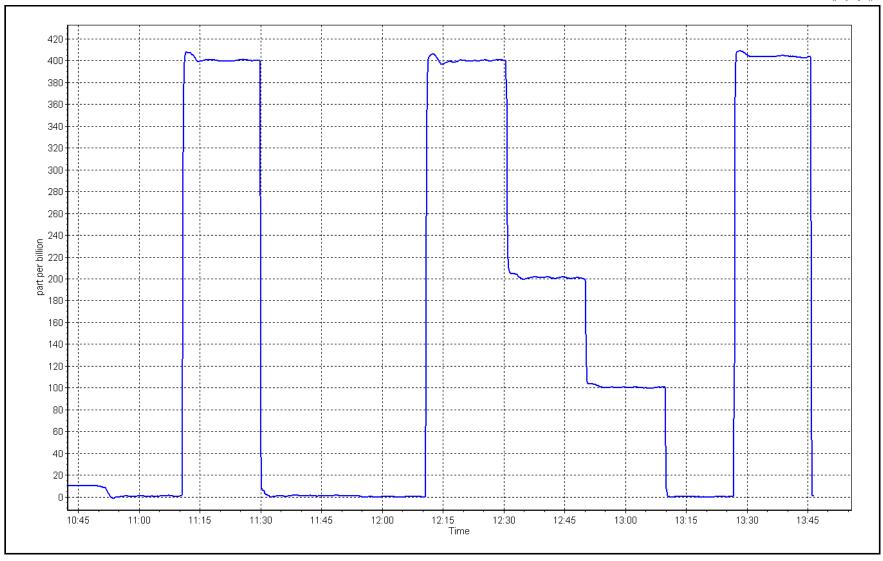
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999993	≥0.995	
400.0	400.0	1.0000	Correlation Coefficient			
200.0	201.0	0.9950	Slope	0.999800	0.90 - 1.10	
100.0	100.1	0.9990	Slope	0.555600	0.90 - 1.10	
			Intercept	0.360000	+/- 5	



O₃ Calibration Plot

Date: January 3, 2024







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date:	Fort McKay - Bertha G January 26, 2024	Santer	Station number: Last Cal Date:	December 1	12, 2023	
Start time (MST):	11:37		End time (MST):	13:49		
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N:	324		
Flow Meter Make/Model:	Alicat		S/N:	388752		
Temp/RH standard:	Alicat		S/N:	388752		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	<u>Measured</u>	As left		Adjusted	(Limits)
T (°C)	-5.7	-6.3	-5.7			+/- 2 °C
P (mmHg)	736.2	735.4	736.2			+/- 10 mmHg
flow (LPM)	5.01	5.15	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	January 26, 2024	Last Cal Date:	December	12, 2023	
	PM w/o HEPA:	34.2	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will se	erve as the pre main	itenance lea	k check	
		Quarterly Calibration T	·est			
Parameter	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	10.5	11	11			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	13.5	w/ HEPA:		0
Date Optical Cham		January 26, 2024		,		<0.2 ug/m3
Disposable Filte	r Changed:	January 26,	2024			
		Annual Maintenance	e			
Date Sample Tube Cleaned:		September 14, 2023				
Date RH/T Sensor Cleaned:		January 26, 2024				
Notes:	Flow, temperature, a	and pressure all within limit	•			nits. Optical
Calibration by:	Rene Chamberland	·	·	J		



CO Calibration Report

Station number:

AMS01

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 8, 2024 Last Cal Date: December 11, 2023

Start time (MST): 10:38 End time (MST): 14:00

Reason: Routine

Calibration Standards

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

Cal Gas Cylinder #: ALM042207

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

Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3565

ZAG Make/Model: Teledyne API T701 Serial Number: 3565

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

Analyzer Information

Analyzer make: Teledyne API T300 Analyzer serial #: 3520

Analyzer Range: 0 - 50 ppm

Start Finish Finish Start Calibration slope: 1.001201 1.000186 Backgd or Offset: -0.013 -0.013 Calibration intercept: 0.203827 0.241822 Coeff or Slope: 0.989 0.983

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 0.2 4933 66.7 40.6 41.0 0.989 as found span as found 2nd point as found 3rd point new cylinder response calibrator zero 0.0 5000 0.0 0.1 ---high point 4933 66.7 40.6 40.7 0.998 second point 4966 33.3 20.2 20.8 0.974 third point 4983 16.7 10.2 10.5 0.972 5000 0.0 0.0 0.1 as left zero ---as left span 2960 40.0 40.5 40.2 1.010 Average Correction Factor 0.981 Baseline Corr As found: 40.79 Prev response: 40.81 *% change: 0.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: NA

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

Calibration Performed By: Rene Chamberland

* = > +/-5% change initiates investigation



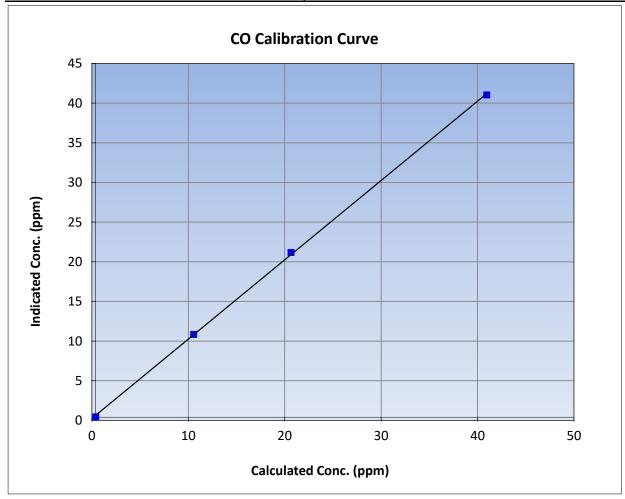
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** December 11, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 10:38 End Time (MST): 14:00 Analyzer make: Teledyne API T300 Analyzer serial #: 3520

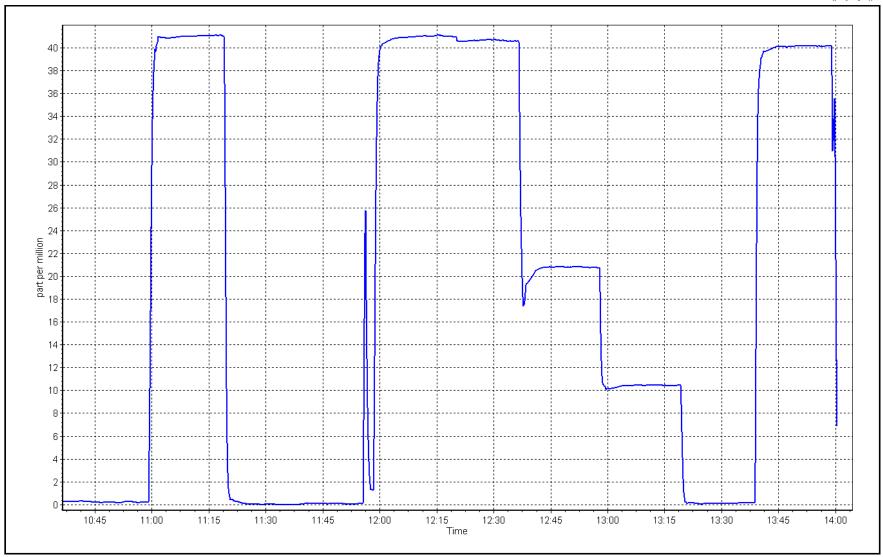
Calibration Data						
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999843	≥0.995	
40.6	40.7	0.9977	Correlation Coefficient			
20.2	20.8	0.9745	Slope	1.000186	0.90 - 1.10	
10.2	10.5	0.9717	Slope	1.000180	0.90 - 1.10	
			- Intercept	0.241822	+/-1.5	



CO Calibration Plot

Date: January 8, 2024







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Bertha Ganter-Fort McKay

Calibration Date: January 5, 2024

Start time (MST): 11:19
Reason: Routine

Station number: AMS01

Last Cal Date: December 8, 2023

End time (MST): 14:30

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: 1.000878 1.001967 0.045 0.045 Calibration intercept: -5.800000 -5.940000 Coeff or Slope: 0.875 0.876

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	1597.8	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	0.2	
high point	2920	80.0	1605.3	1605.4	1.000
second point	2960	40.0	802.7	795.9	1.009
third point	2980	20.0	401.3	389.6	1.030
as left zero	3000	0.0	0.0	-0.1	
as left span	2960	40.0	802.7	786.7	1.020
		•	Avera	ge Correction Factor	1.013

Baseline Corr As found: 1598.00 Prev response: 1600.94 *% 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: Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By: Rene Chamberland



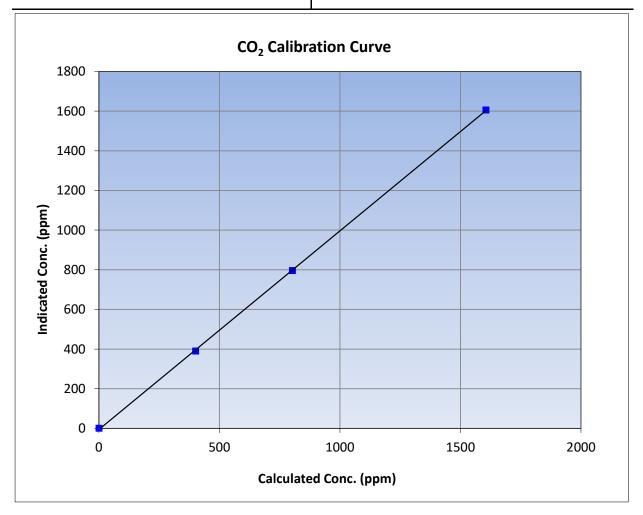
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	January 5, 2024	Previous Calibration	December 8, 2023
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS01
Start Time (MST)	11:19	End Time (MST)	14:30
Analyzer make	Teledyne API 360	Analyzer serial #	442

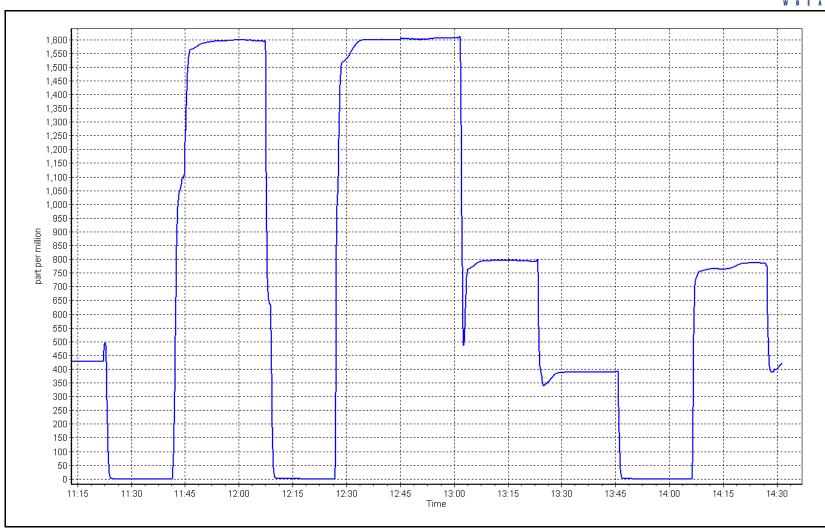
Calibration Data							
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999933	≥0.995		
1605.3	1605.4	1.0000	Correlation Coefficient				
802.7	795.9	1.0085	Slope	1.001967	0.90 - 1.10		
401.3	389.6	1.0301	Siope	1.001967	0.90 - 1.10		
			Intercept	-5.940000	+/-10		



CO₂ Calibration Plot

Date: January 5, 2024







TN - NO_x - NH₃ Calibration Report

Version-05-2023

Station Information

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

NOX Cal Date: January 9, 2024 Last Cal Date: December 6, 2023

12:23 16:55 Start time (MST): End time (MST):

NH3 Cal Date: January 10, 2024 Last Cal Date: December 7, 2023

Start time (MST): 11:10 14:15 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: December 11, 2023 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: 76.58 NH3 Gas Cylinder #: CC743587 ppm

> NH3 Cal Gas Expiry: August 22, 2024

Removed NH3 Conc: 76.58 Removed Cylinder #: ppm

NH3 gas Diff:

NOX gas Diff:

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

Analyzer Information

Analyzer model: Teledyne API T201 Analyzer serial #: 475 Converter model: Teledyne API T501 Converter serial #: 824 NH3 Range (ppb): 0 - 2000 ppb Reaction cell Press: 5.50 NOX Range (ppb): 0 - 1000 ppb Sample Flow: 514

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.987	0.964	TN coefficient:	0.989	0.968
NOX coefficient:	0.989	0.967	NO bkgrnd:	-0.9	-0.9
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.3	-0.3
NH3 coefficient:	0.932	0.932	TN bkgrnd:	1.2	1.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004707	0.998960
NO _x Cal Offset:	-2.480000	-2.460000
NO Cal Slope:	1.004525	0.998530
NO Cal Offset:	-3.440000	-2.840000
NO ₂ Cal Slope:	0.995838	0.997727
NO ₂ Cal Offset:	-1.454892	-0.655687
NH3 Cal Slope:	1.001746	1.004832
NH3 Cal Offset:	-2.214411	-8.183521
TN Cal Slope:	1.004330	1.007188
TN Cal Offset:	-1.994595	-8.051061



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	-1.2	-1.2	0.0		
as found NO	4920	80.0	813.4	813.4		812.1	813.0	-0.6	1.002	
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2		
high NO point	4920	80.0	813.4	813.4		812.4	811.8	0.9	1.001	
NO/O3 point	4920	80.0	813.4	813.4		8.808	806.7	1.8	1.006	
as found NH3	3416	84.1	1840.1		1840.1	1808.1		1803.9	1.018	1.020
new NH3 cyl rp										
first NH3	3418	82.2	1798.5		1798.5	1808.1		1803.9	0.995	0.997
second NH3	3454	45.7	1000.0		1000.0	994.7		992.0	1.005	1.008
third NH3	3477	22.8	498.9		498.9	486.4		484.9	1.026	1.029
							Average Co	rrection Factor	1.0035	1.0113

Corrected As found TN = 813.3 ppb NO_X = 814.2 ppb NH3 = 1803.9 ppb Previous Response TN = 815 ppb NO_X = 814.8 ppb NH3 = 1841.1 ppb

*Percent Change TN = -0.2%

*Percent Change $NO_X = -0.1\%$

*Percent Change NH3 = -2.1% * = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 93.2% NH3 Current Converter Efficiency = 93.2%



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	0.0	0.1		
as found span	4920	80.0	813.4	800.6	813.4	835.2	819.5	835.4	0.9739	0.9770
new NO cyl rp										_
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.3		
high point	4920	80.0	813.4	800.6	813.4	811.8	798.5	812.4	1.0020	1.0027
second point	4960	40.0	406.7	400.3	406.7	401.2	394.2	401.3	1.0138	1.0155
third point	4980	20.0	203.4	200.2	203.4	199.3	194.9	200.0	1.0204	1.0270
							Average C	Correction Factor	1.0121	1.0151
Baseline Corr A	s fnd TN =	835.3 ppb	NO _X = 835.1	ppb NO =	819.5 ppb			*Percent Change	e TN=	2.4%
Previous Respo	nse TN =	815 ppb	$NO_X = 814.8$	ppb NO =	800.8 ppb			*Percent Change	e NO _x =	2.4%
								*Percent Change	e NO =	2.3%
								* = > +/-5% change i	nitiates investigati	ion

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	0.0		
calibration zero			0.0	-0.2		
1st GPT point (400 ppb O3)	794.2	387.9	419.1	417.5	1.0038	99.6%
2nd GPT point (200 ppb O3)	794.2	600.9	206.1	205.5	1.0029	99.7%
3rd GPT point (100 ppb O3)	794.2	694.2	112.8	110.9	1.0171	98.3%
			A	verage Correction Factor	1.0080	99.2%

Notes:

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

Calibration Performed By:

Rene Chamberland



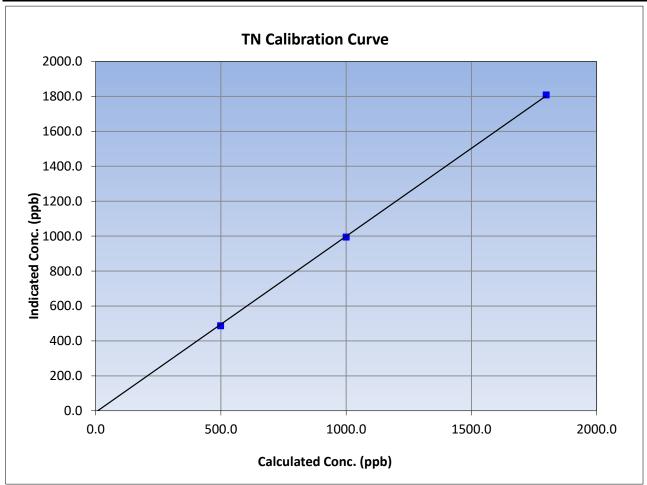
TN Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 6, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:10 End Time (MST): 14:15 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999907	≥0.995
1798.5	1808.1	0.9947	Correlation Coefficient	0.555507	20.333
1000.0	994.7	1.0053	Slope	1.007188	0.90 - 1.10
498.9	486.4	1.0256	Slope	1.007188	0.90 - 1.10
			Intercept	-8.051061	+/-20





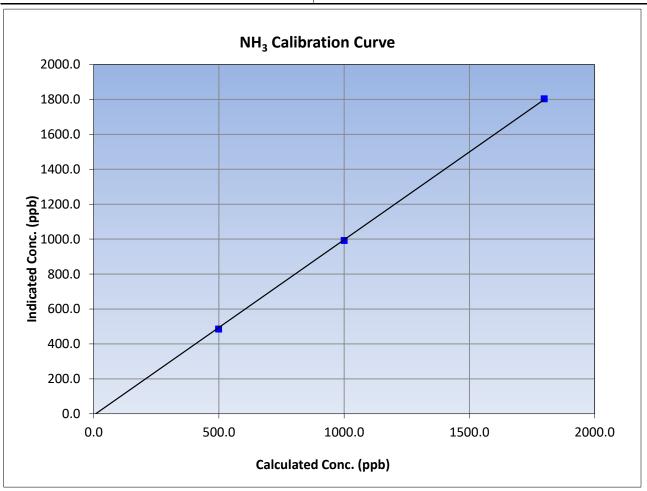
NH₃ Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 6, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 11:10 End Time (MST): 14:15 Analyzer make: Teledyne API T201 475 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999901	≥0.995
1798.5	1803.9	0.9970	Correlation Coefficient	0.999901	20.333
1000.0	992.0	1.0081	Slope	1.004832	0.90 - 1.10
498.9	484.9	1.0288	Slope	1.004652	0.90 - 1.10
			Intercept	-8.183521	+/-20





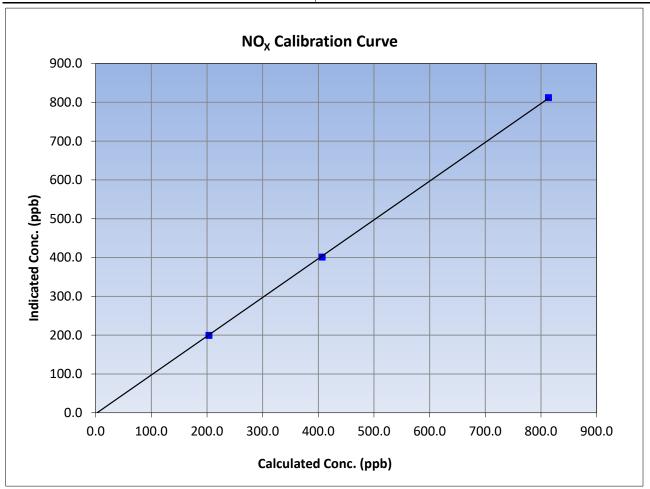
NO_x Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 6, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 12:23 End Time (MST): 16:55 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	0.999952	≥0.995
813.4	811.8	1.0020	Correlation Coefficient	0.555552	20.555
406.7	401.2	1.0138	Slope	0.998960	0.90 - 1.10
203.4	199.3	1.0204	Slope	0.996900	0.90 - 1.10
			Intercept	-2.460000	+/-20





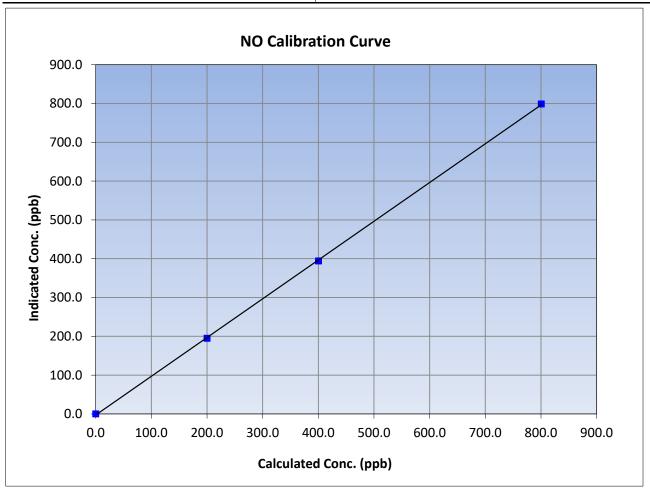
NO Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 6, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 12:23 End Time (MST): 16:55 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	0.999932	≥0.995
800.6	798.5	1.0027	Correlation Coefficient	0.555552	E0.333
400.3	394.2	1.0155	Slope	0.998530	0.90 - 1.10
200.2	194.9	1.0270	Slope	0.996550	0.90 - 1.10
			Intercept	-2.840000	+/-20





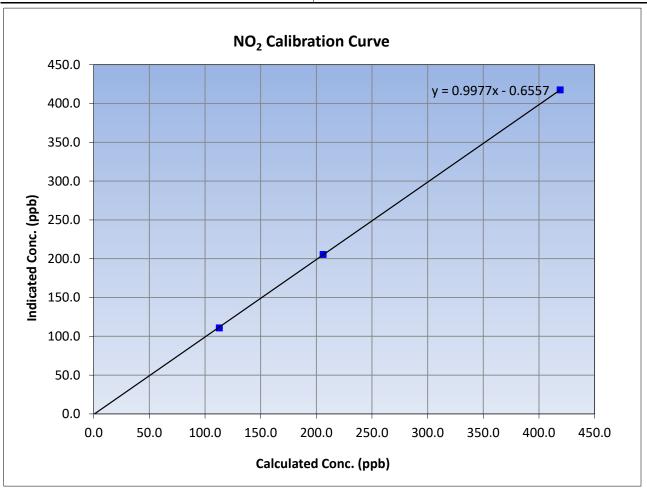
NO₂ Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 6, 2023 Station Name: Bertha Ganter-Fort McKay Station Number: AMS01 Start Time (MST): 12:23 End Time (MST): 16:55 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	0.999985	≥0.995
419.1	417.5	1.0038	Correlation Coefficient	0.555505	20.333
206.1	205.5	1.0029	Slope	0.997727	0.90 - 1.10
112.8	110.9	1.0171	Зюре	0.997727	0.90 - 1.10
			Intercept	-0.655687	+/-20

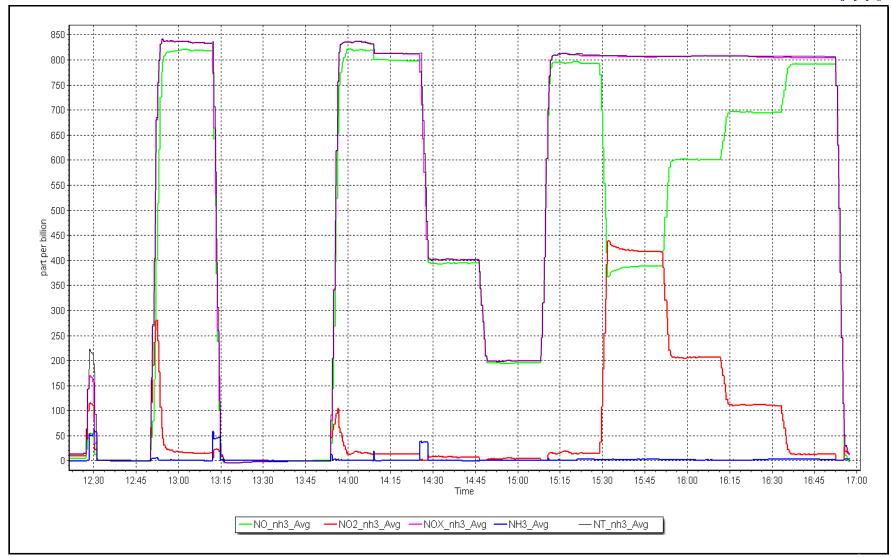


NO_x Calibration Plot

Date: January 9, 2024

Location: Bertha Ganter-Fort McKay



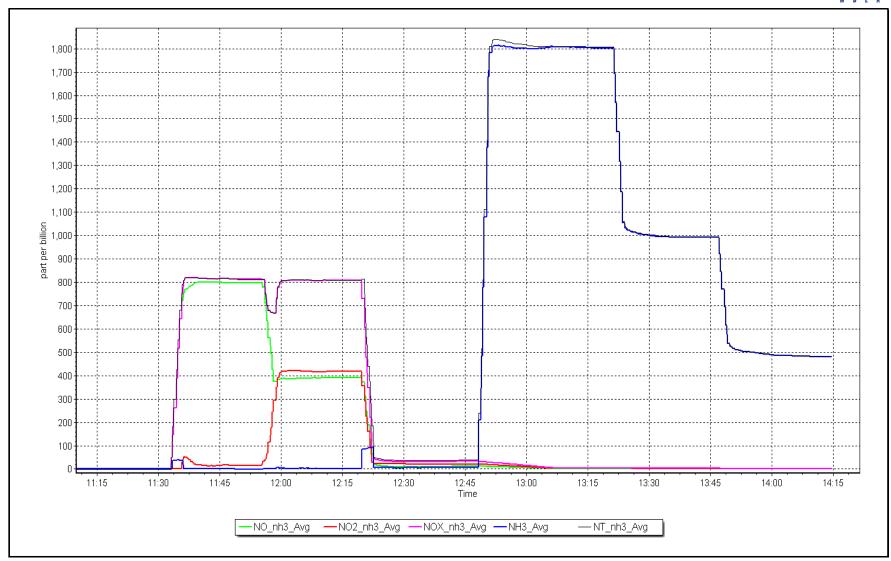


NH₃ Calibration Plot

Date: January 10, 2024

Location: Bertha Ganter-Fort McKay







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Finish

18.4 0.795

Station Information

Station Name: Mildred Lake

Calibration Date: January 1, 2024

Start time (MST): 11:18
Reason: Routine

Station number: AMS02

Last Cal Date: December 8, 2023

End time (MST): 14:47

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

ppm Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 1185 Serial Number: 4891

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

Analyzer Range 0 - 1000 ppb

Start Finish

 Calibration slope:
 1.000671
 0.994869

 Calibration intercept:
 -0.784833
 0.074375

sgd or Offset: Start 18.6

Backgd or Offset: 18.6 Coeff or Slope: 0.775

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.8	
as found span	4920	80.2	801.6	784.2	1.022
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.2	801.6	797.8	1.005
second point	4960	40.1	400.8	398.2	1.007
third point	4980	20.0	199.9	199.5	1.002
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.2	801.6	810.0	0.990
		_	Averag	ge Correction Factor	1.005

Baseline Corr As found: 785.00 Previous response 801.40 *% change -2.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

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

NA AF Slope: AF Intercept:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier



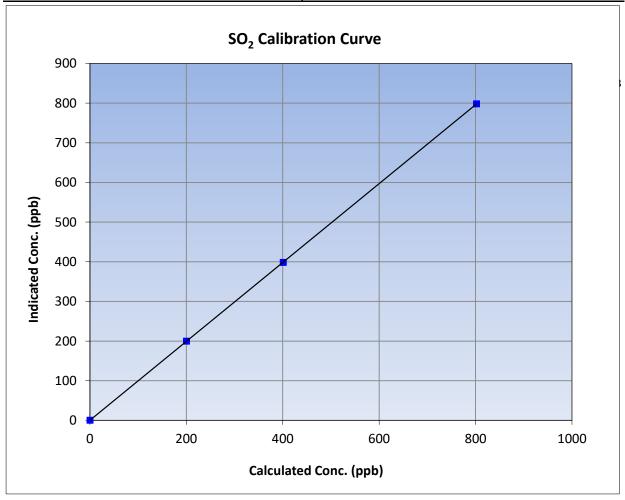
SO₂ Calibration Summary

Version-01-2020

Station Information

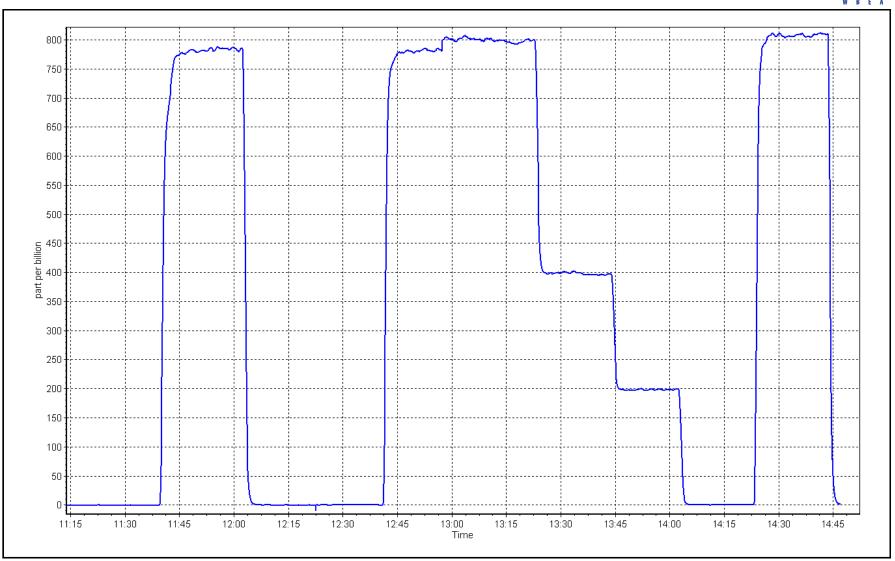
Calibration Date: January 1, 2024 **Previous Calibration:** December 8, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 11:18 End Time (MST): 14:47 Analyzer make: Thermo 43i Analyzer serial #: JC1404901075

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic) Statistical Evaluation							
0.0	0.0		Correlation Coefficient	0.999998	≥0.995		
801.6	797.8	1.0048	Correlation Coefficient	0.555556	20.993		
400.8	398.2	1.0066	Slope	0.994869	0.90 - 1.10		
199.9	199.5	1.0021	Slope	0.334603	0.90 - 1.10		
			Intercept	0.074375	+/-30		



SO2 Calibration Plot Date: January 1, 2024 Location: Mildred Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mildred Lake

Calibration Date: January 10, 2024

Start time (MST): 10:25 Reason: Routine Station number: AMS02

Last Cal Date: December 18, 2023

End time (MST): 15:50

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC345191

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

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 1185 Serial Number: 5608

Analyzer Information

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

Analyzer Range 0 - 100 ppb

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

Start <u>Finish</u> 1.001107 Backgd or Offset: Calibration slope: 1.008965 1.70 1.68 0.040801 Calibration intercept: -0.059195 Coeff or Slope: 0.740 0.740

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	79.3	1.009
as found 2nd point	4962	37.8	40.0	39.8	1.005
as found 3rd point	4981	18.9	20.0	19.9	1.005
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	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	19.9	1.005
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	79.7	1.004
SO2 Scrubber Check	4920	80.2	802.0	0.1	
Date of last scrubber chang	ge:	20-Sep-23	_	Ave Corr Factor	0.999
Date of last converter effic		efficiency			

						•
Baseline Corr As found:	79.3	Prev response:	80.65	*% change:	-1.7%	
Baseline Corr 2nd AF pt:	39.8	AF Slope:	0.991249	AF Intercept:	0.060795	
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999995			

* = > +/-5% change initiates investigation

Scrubber check done after cal zero, passed. No adjustments made. Notes:

Calibration Performed By: Braiden Boutilier



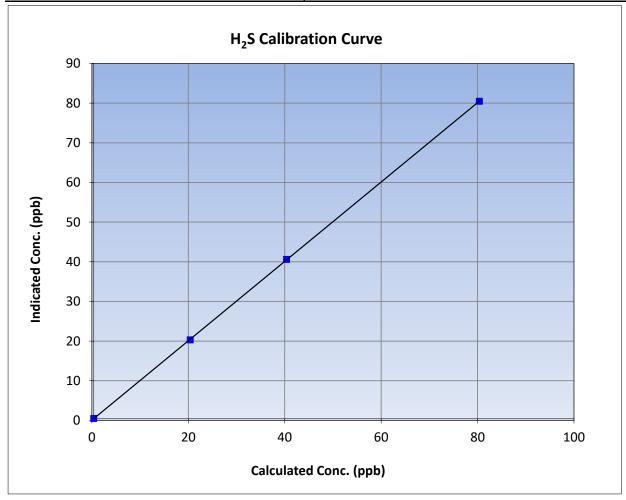
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 18, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:25 End Time (MST): 15:50 Analyzer make: Thermo 43iQTL Analyzer serial #: 12113311966

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999987	≥0.995				
80.0	80.1	0.9986	Correlation Coefficient	0.555507	20.993				
40.0	40.2	0.9949	Slope	1.001107	0.90 - 1.10				
20.0	19.9	1.0049	Slope	1.001107	0.90 - 1.10				
			- Intercept	0.040801	+/-3				

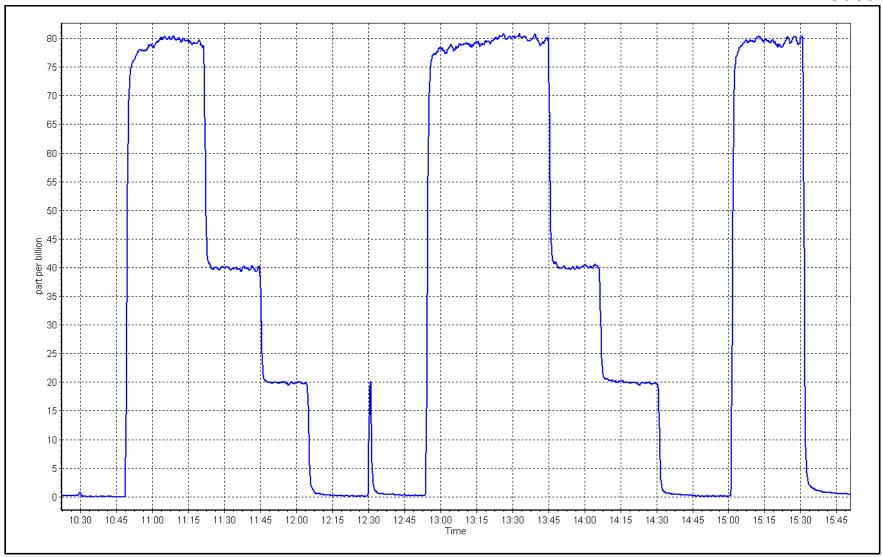


H₂S Calibration Plot

Date: January 10, 2024

Location: Mildred Lake







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Mildred Lake

Calibration Date: January 1, 2024

Start time (MST): 11:18
Reason: Routine

Station number: AMS02

Last Cal Date: December 23, 2023

End time (MST): 14:47

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):

Diff between cyl (CH₄): Diff between cyl (NM): Calibrator Model: Teledyne API T700 Serial Number: 1185

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320039

THC Range (ppm): 0 - 20 ppm

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

Finish Finish Start Start CH4 SP Ratio: 2.63E-04 2.62E-04 NMHC SP Ratio: 6.75E-05 6.18E-05 CH4 Retention time: 15.5 15.3 NMHC Peak Area: 130400 142482 Zero Chromatogram: **OFF** OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	16.82	17.66	0.952
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	16.79	1.002
second point	4960	40.1	8.41	8.35	1.007
third point	4980	20.0	4.19	4.15	1.011
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.64	1.011
			A	Average Correction Factor	1.007
Baseline Corr AF:	17.66	Prev response	16.84	*% change	4.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
				* / FO/ also assistation	

Baseline Corr 3rd AF:

NA

AF Correlation:

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

		NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	,	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.80	9.60	0.916
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	8.80	8.78	1.002
second point	4960	40.1	4.40	4.41	0.998
hird point	4980	20.0	2.19	2.19	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.80	8.65	1.017
				verage Correction Factor	1.000
Baseline Corr AF:	9.60	Prev response	8.83	*% change	8.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
as found zero	5000	0.0	0.00	0.00	
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.02	8.06	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.2	8.02	8.00	1.003
second point	4960	40.1	4.01	3.95	1.016
hird point	4980	20.0	2.00	1.96	1.022
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	7.99	1.005
				verage Correction Factor	1.014
Baseline Corr AF:	8.06	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 initiate	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000046		0.998824	
THC Cal Offset:		0.020295		-0.024719	
CH4 Cal Slope:		0.998148		0.998021	

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

-0.004054

1.001244

0.025148

Calibration Performed By: Braiden Boutilier

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

-0.025858

0.998479

0.003536



THC Calibration Summary

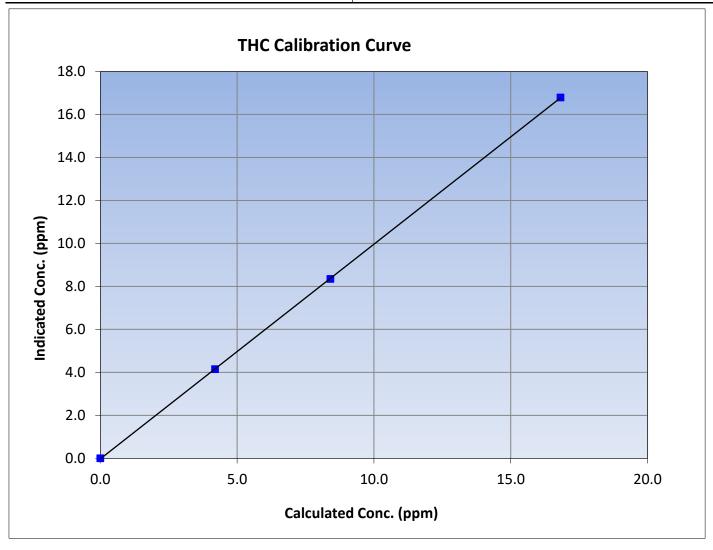
Version-06-2022

Station Information

Calibration Date: January 1, 2024 Previous Calibration: December 23, 2023
Station Name: Mildred Lake Station Number: AMS02
Start Time (MST): 11:18 End Time (MST): 14:47

Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999989	≥0.995
16.82	16.79	1.0017	Correlation Coefficient	0.333363	20.333
8.41	8.35	1.0071	Slope	0.998824	0.90 - 1.10
4.19	4.15	1.0111	Slope		0.30 - 1.10
			Intercept	-0.024719	+/-0.5





CH₄ Calibration Summary

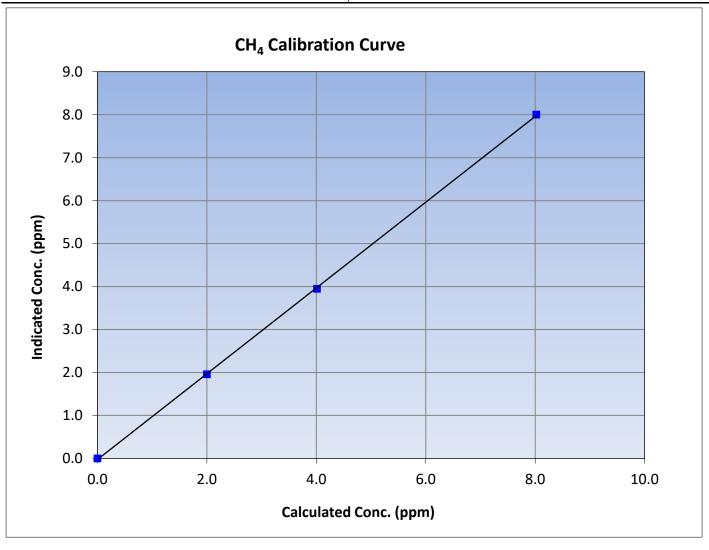
Version-06-2022

Station Information

Calibration Date:January 1, 2024Previous Calibration:December 23, 2023Station Name:Mildred LakeStation Number:AMS02Start Time (MST):11:18End Time (MST):14:47

Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999938	≥0.995
8.02	8.00	1.0029	Correlation Coemicient	0.555556	20.555
4.01	3.95	1.0163	Slope	0.998021	0.90 - 1.10
2.00	1.96	1.0224	Slope		0.50 - 1.10
			Intercept	-0.025858	+/-0.5





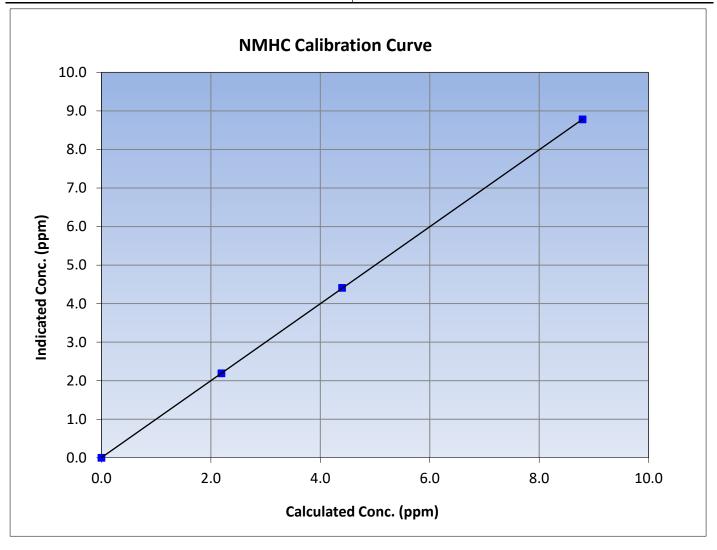
NMHC Calibration Summary

Version-06-2022

Station Information

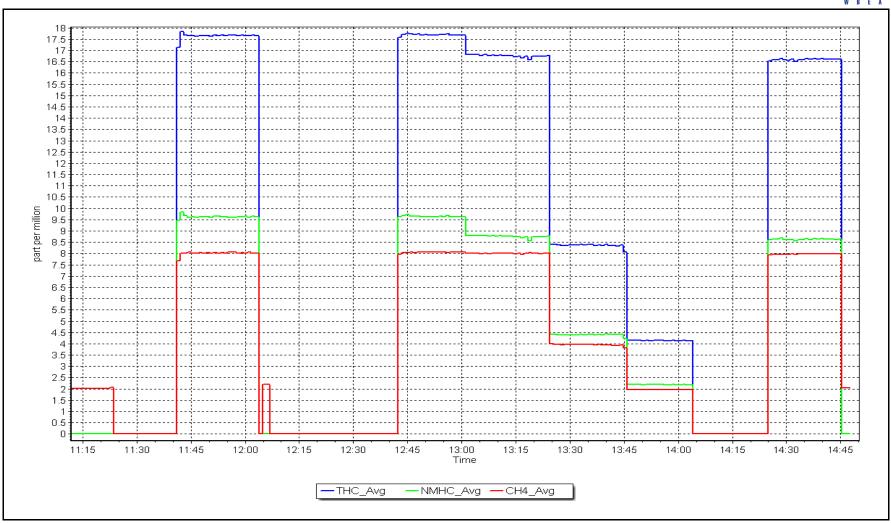
Calibration Date: January 1, 2024 **Previous Calibration:** December 23, 2023 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 11:18 End Time (MST): 14:47 Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
8.80	8.78	1.0017	Correlation Coefficient	0.333333	20.555
4.40	4.41	0.9979	Slope	0.998479	0.90 - 1.10
2.19	2.19	1.0016	Slope		0.90 - 1.10
			Intercept	0.003536	+/-0.5



NMHC Calibration Plot Date: January 1, 2024 Location: Mildred Lake







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Mildred Lake Station Name:

Calibration Date: January 25, 2024

Start time (MST): 10:26

Maintenance Reason:

Station number: AMS02

Last Cal Date: January 1, 2024

End time (MST): 13:46

Calibration Standards

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

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

C3H8 Cal Gas Conc. 199.4 ppm

Removed Gas Cert: NΑ

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

Removed C3H8 Conc. 199.4 Diff between cyl (THC): ppm Diff between cyl (CH_4): Diff between cyl (NM):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320039

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

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.62E-04 2.62E-04 NMHC SP Ratio: 6.08E-05 6.18E-05 CH4 Retention time: 15.3 15.5 NMHC Peak Area: 142482 144769 Zero Chromatogram: **OFF** OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	16.82	16.95	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	80.2	16.82	16.81	1.000
second point	4960	40.1	8.41	8.43	0.998
third point	4980	20.0	4.19	4.19	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.76	1.003
			A۱	verage Correction Factor	0.999
Baseline Corr AF:	16.95	Prev response	16.77	*% change	1.0%
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	9.00	0.977
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	2.20	0.996
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.80	8.79	1.001
			Aver	age Correction Factor	0.998
Baseline Corr AF:	9.00	Prev response	8.79	*% change	2.4%
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	7.95	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	8.02	8.02	1.000
second point	4960	40.1	4.01	4.02	0.998
third point	4980	20.0	2.00	1.99	1.004
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	7.97	1.006
			Aver	age Correction Factor	1.001
Baseline Corr AF:	7.95	Prev response	7.98	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Baseline Corr 3rd AF:	1177				
Baseline Corr 3rd AF:	14/ (Calibration	Statistics		
Baseline Corr 3rd AF:	IV.	Calibration <u>Start</u>	Statistics	<u>Finish</u>	
Baseline Corr 3rd AF: THC Cal Slope:	W.		Statistics	<i>Finish</i> 0.999652	
Baseline Corr 3rd AF: THC Cal Slope: THC Cal Offset:	100	<u>Start</u>	Statistics		

0.998021

-0.025858

0.998479

0.003536

Notes:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Swapped Hydrogen cylinder. Adjusted span.

1.000099

-0.001651

0.999219

0.006941

Calibration Performed By: Braiden Boutilier



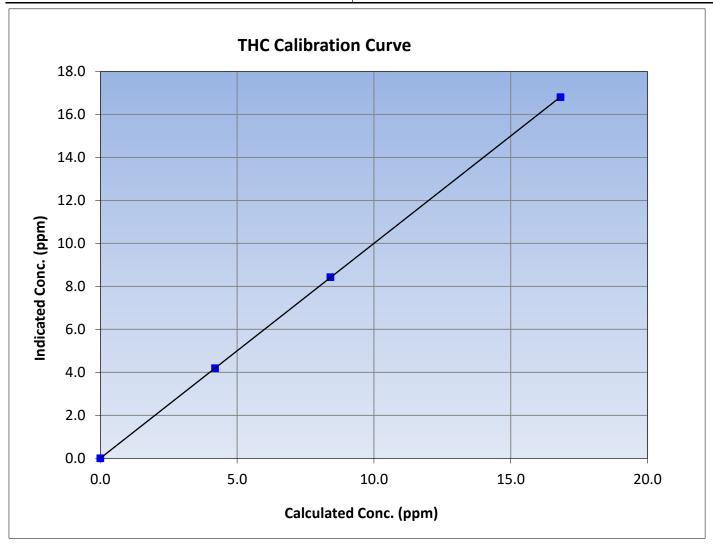
THC Calibration Summary

Version-06-2022

Station Information

January 25, 2024 **Previous Calibration:** Calibration Date: January 1, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:26 End Time (MST): 13:46 Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
16.82	16.81	1.0005	Correlation Coefficient	0.555557	20.333
8.41	8.43	0.9975	Slope	0.999652	0.90 - 1.10
4.19	4.19	1.0000	Slope	0.999032	0.90 - 1.10
			Intercept	0.005690	+/-0.5





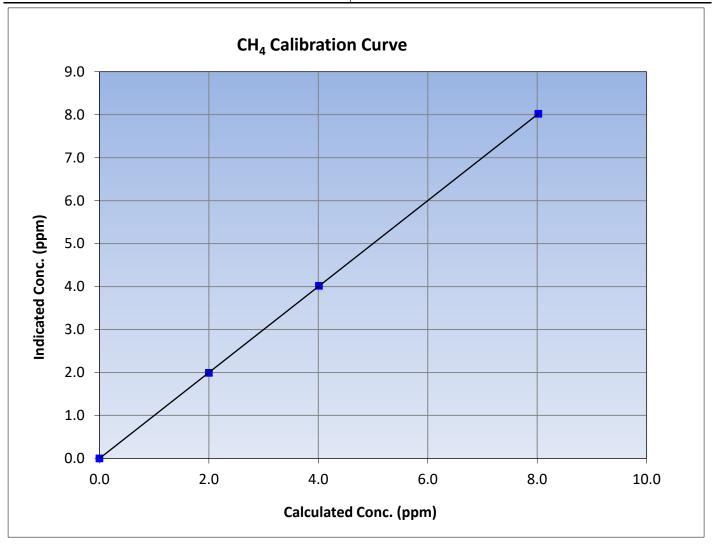
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 25, 2024 **Previous Calibration:** January 1, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:26 End Time (MST): 13:46 Analyzer make: Analyzer serial #: 1180320039 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999997	≥0.995
8.02	8.02	1.0004	Correlation Coefficient	0.555557	20.933
4.01	4.02	0.9984	Slope	1.000099	0.90 - 1.10
2.00	1.99	1.0044		1.000099	0.30 - 1.10
			Intercept	-0.001651	+/-0.5





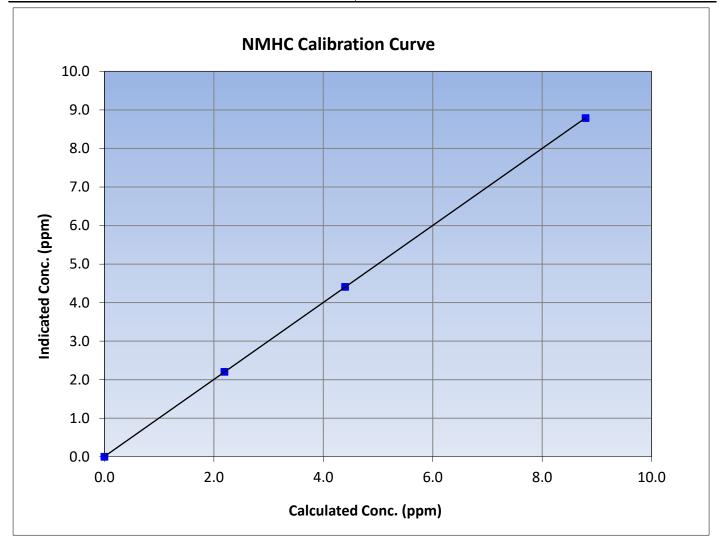
NMHC Calibration Summary

Version-06-2022

Station Information

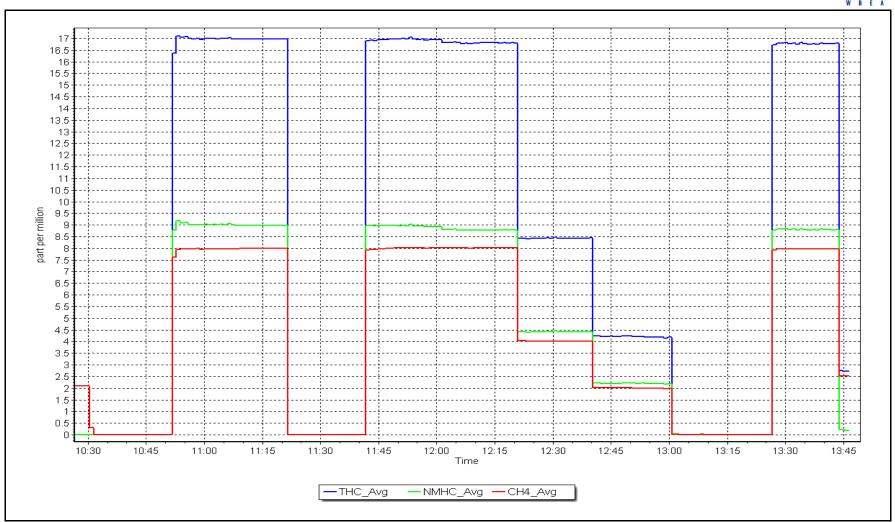
Calibration Date: January 25, 2024 **Previous Calibration:** January 1, 2024 Station Name: Mildred Lake Station Number: AMS02 Start Time (MST): 10:26 End Time (MST): 13:46 Analyzer make: Thermo 55i Analyzer serial #: 1180320039

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
8.80	8.79	1.0006	Correlation Coefficient	0.555550	20.993
4.40	4.41	0.9972	Slope	0.999219	0.90 - 1.10
2.19	2.20	0.9961			0.90 - 1.10
			Intercept	0.006941	+/-0.5



NMHC Calibration Plot Date: January 25, 2024 Location: Mildred Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT JANUARY 2024

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

February 29, 2024







SO₂ Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS04

10:35

December 14, 2023

March 10, 2031

Version-01-2020

Finish

Station Information

Station Name: **Buffalo Viewpoint**

January 17, 2024 Calibration Date:

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

Calibration Standards

Cal Gas Concentration: 50.87

Cal Gas Cylinder #: CC446753

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

Calibrator Make/Model: **API T700** ZAG Make/Model: **API T701** ppm Cal Gas Exp Date:

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 3808 Serial Number: 362

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Analyzer Range 0 - 1000 ppb

Finish Start Start Calibration slope: 0.998629 0.986256 Backgd or Offset: 24.1

23.8 0.864 Calibration intercept: 0.434228 0.211572 Coeff or Slope: 0.873

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	78.6	799.7	804.5	0.994
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4921	78.6	799.7	789.2	1.013
second point	4961	39.3	399.8	394.2	1.014
third point	4980	19.6	199.4	196.6	1.014
as left zero	5000	0.0	0.0	0.3	
as left span	4921	78.6	799.7	786.9	1.016
			Averag	ge Correction Factor	1.014

Baseline Corr As found: 804.60 Previous response 799.08 *% change 0.7% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

Notes: Span adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay * = > +/-5% change initiates investigation



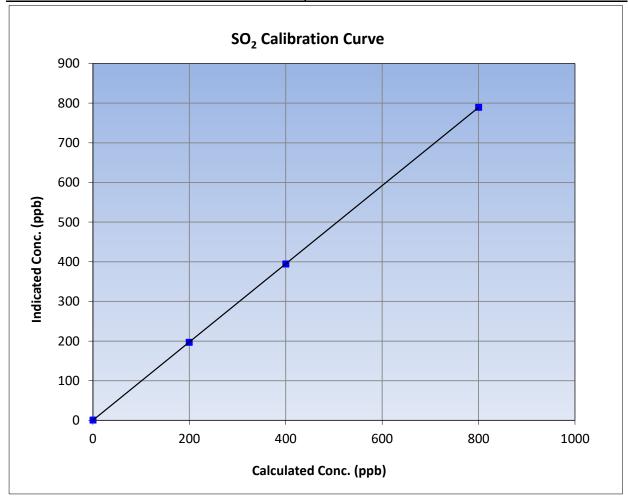
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 17, 2024 **Previous Calibration:** December 14, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 7:34 End Time (MST): 10:35 Analyzer make: Thermo 43i Analyzer serial #: JC1327300932

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.6		Correlation Coefficient	0.999999	≥0.995		
799.7	789.2	1.0134	Correlation Coefficient		20.333		
399.8	394.2	1.0142	Slope	0.986256	0.90 - 1.10		
199.4	196.6	1.0144	Slope	0.980230	0.90 - 1.10		
			- Intercept	0.211572	+/-30		

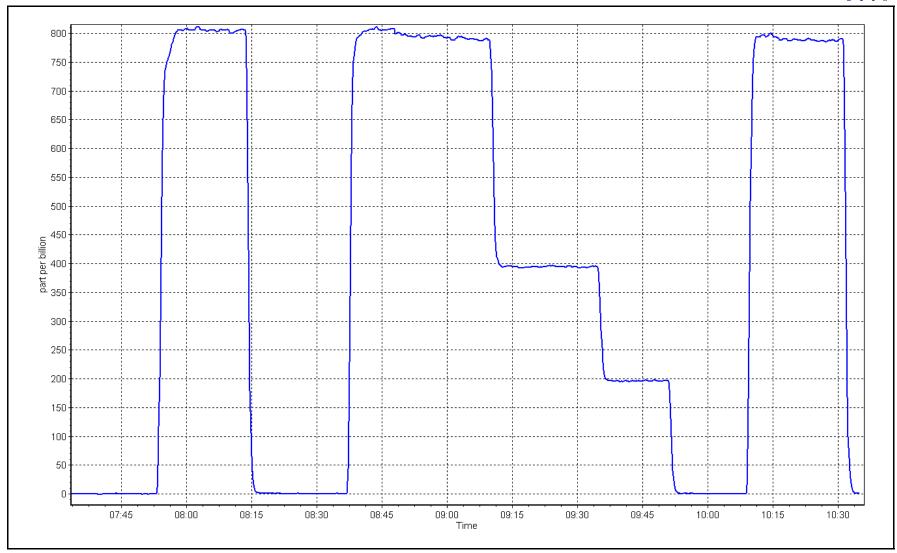


SO2 Calibration Plot

Date: January 17, 2024

Location: Buffalo Viewpoint







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: **Buffalo Viewpoint**

Calibration Date: January 11, 2024 Start time (MST): 7:34

Routine Reason:

Station number: AMS04

> Last Cal Date: December 8, 2023

End time (MST): 12:10

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC345266

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

ZAG Make/Model: **API T701H**

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3808 Serial Number: 362

Analyzer Information

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

Global Converter serial #: 2022-200 Converter make:

0 - 100 ppb Analyzer Range

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

<u>Start</u> <u>Finish</u> 1.000346 0.996076 Backgd or Offset: Calibration slope: 1.83 1.87 Calibration intercept: 0.042159 0.242122 Coeff or Slope: 1.143 1.115

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	78.0	1.031
as found 2nd point	4963	37.0	40.1	39.5	1.018
as found 3rd point	4982	18.5	20.1	19.6	1.028
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4926	74.1	80.3	80.2	1.002
second point	4963	37.0	40.1	40.4	0.993
third point	4982	18.5	20.1	20.0	1.003
as left zero	5000	0.0	0.0	0.4	
as left span	4926	74.1	80.3	80.2	1.002
SO2 Scrubber Check	4920	80.0	800.0	-0.1	
Date of last scrubber chang	ge:	16-May-23	_	Ave Corr Factor	0.999
Date of last converter effic	iency test:				efficiency

Date of last converter efficiency test.						
Baseline Corr As found:	77.9	Prev response:	80.39	*% change:	-3.2%	
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.970320	AF Intercept:	0.221672	

Baseline Corr 3rd AF pt: 19.5 AF Correlation: 0.999947

* = > +/-5% change initiates investigation

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

Calibration Performed By: Melissa Lemay



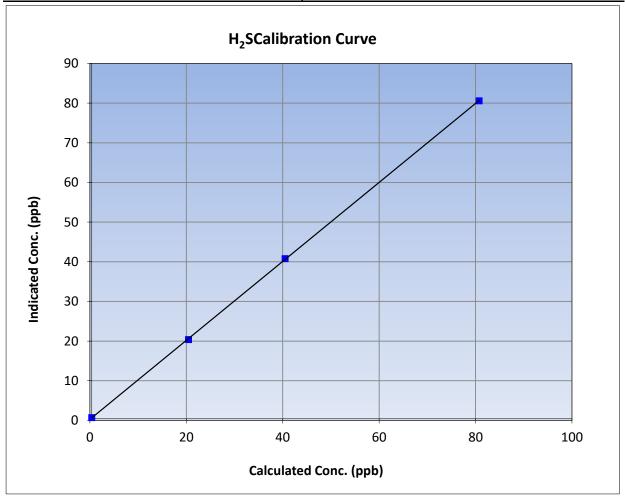
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 11, 2024 **Previous Calibration:** December 8, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 7:34 End Time (MST): 12:10 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1008841400

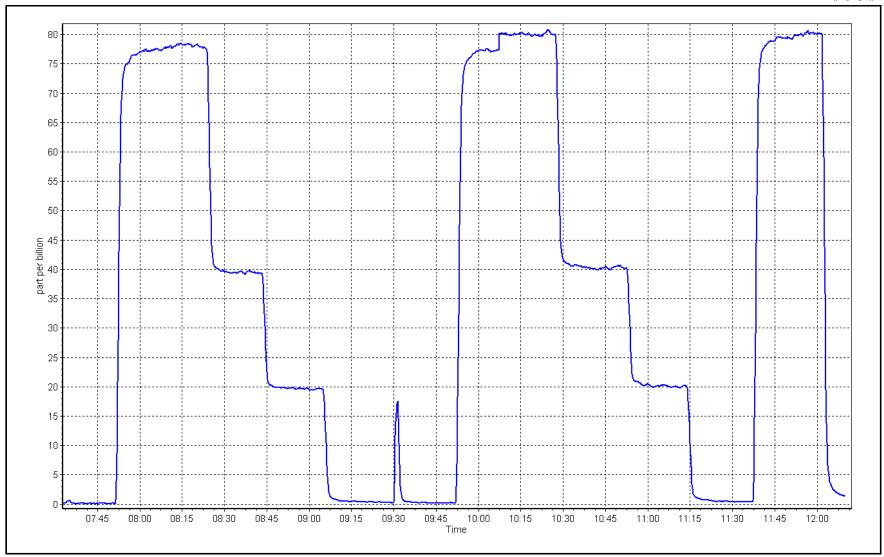
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.3		Correlation Coefficient	0.999973	≥0.995		
80.3	80.2	1.0015	Correlation Coefficient	0.555575	20.993		
40.1	40.4	0.9928	Slope	0.996076	0.90 - 1.10		
20.1	20.0	1.0026	Slope	0.990070	0.90 - 1.10		
			- Intercept	0.242122	+/-3		



Date: January 11, 2024

Location: Buffalo Viewpoint







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: January 17, 2024

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

Station number: AMS04

Last Cal Date: December 14, 2023

End time (MST): 10:33

Calibration Standards

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

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

C3H8 Cal Gas Conc. 204.0 ppm

Removed Gas Cert: NA Removed Gas Expiry:

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

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 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: 2.03E-04 2.10E-04 NMHC SP Ratio: 4.45E-05 4.60E-05 CH4 Retention time: 11.8 11.8 NMHC Peak Area: 198327 191608 Zero Chromatogram: OFF OFF Flat Baseline: ON 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	0.00	
as found span	4921	78.6	16.64	16.11	1.033
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	8.20	1.014
third point	4980	19.6	4.15	4.03	1.029
as left zero	5000	0.0	0.00	0.00	
as left span	4921	78.6	16.64	16.60	1.002
			,	Average Correction Factor	1.015
Baseline Corr AF:	16.11	Prev response	16.60	*% change	-3.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
D 1: 0 2 145				* > / F0/ abanca initia	

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-202
		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	4921	78.6	8.82	8.52	1.035
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	8.82	8.80	1.002
second point	4961	39.3	4.41	4.37	1.009
third point	4980	19.6	2.20	2.15	1.023
as left zero	5000	0.0	0.00	0.00	
as left span	4921	78.6	8.82	8.80	1.002
			Avera	age Correction Factor	1.011
Baseline Corr AF:	8.52	Prev response	8.80	*% change	-3.3%
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	78.6	7.82	7.58	1.031
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	7.82	7.82	1.000
second point	4961	39.3	3.91	3.83	1.020
third point	4980	19.6	1.95	1.88	1.037
as left zero	5000	0.0	0.00	0.00	

Baseline Corr 2nd AF: NA Baseline Corr 3rd AF: NA		AF Slope:	AF Intercept:
		AF Correlation:	* = > +/-5% change initiates investigation
		Calibration Statistic	cs
		<u>Start</u>	<u>Finish</u>
THC Cal Slope:		1.001050	1.000639
THC Cal Offset:		-0.055556	-0.067561
CH4 Cal Slope:		1.002202	1.002348
CH4 Cal Offset:		-0.035913	-0.043914
NMHC Cal Slope:		1.000029	0.999123
NMHC Cal Offset:		-0.019643	-0.023647

78.6

Prev response

Notes:

as left span

Baseline Corr AF:

No maintenance done. Span adjusted.

7.82

7.80

7.80

*% change

Average Correction Factor

Calibration Performed By: Melissa Lemay

4921

7.58

1.002

1.019

-2.9%



THC Calibration Summary

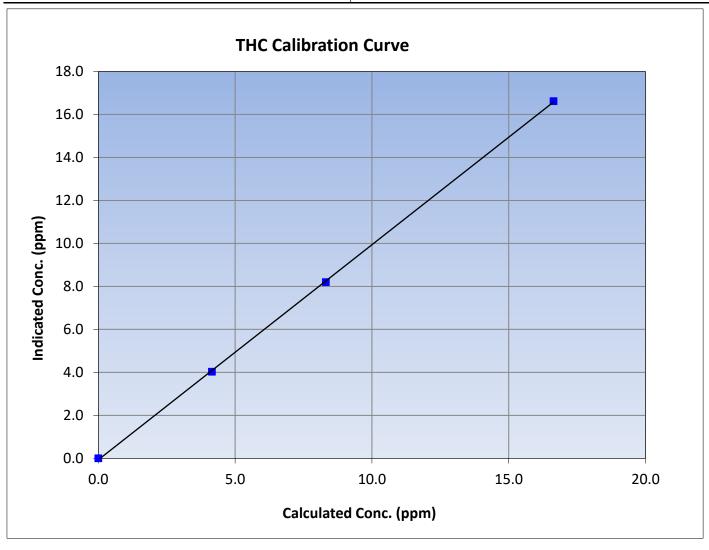
Version-06-2022

Station Information

Calibration Date: January 17, 2024 Previous Calibration: December 14, 2023

Station Name:Buffalo ViewpointStation Number:AMS04Start Time (MST):7:34End Time (MST):10:33Analyzer make:Thermo 55iAnalyzer serial #:1222762077

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999920	≥0.995
16.64	16.62	1.0010	Correlation Coemicient	0.999920	20.333
8.32	8.20	1.0143	Slope	1.000639	0.90 - 1.10
4.15	4.03	1.0294	Slope	1.000039	0.90 - 1.10
			Intercept	-0.067561	+/-0.5





CH₄ Calibration Summary

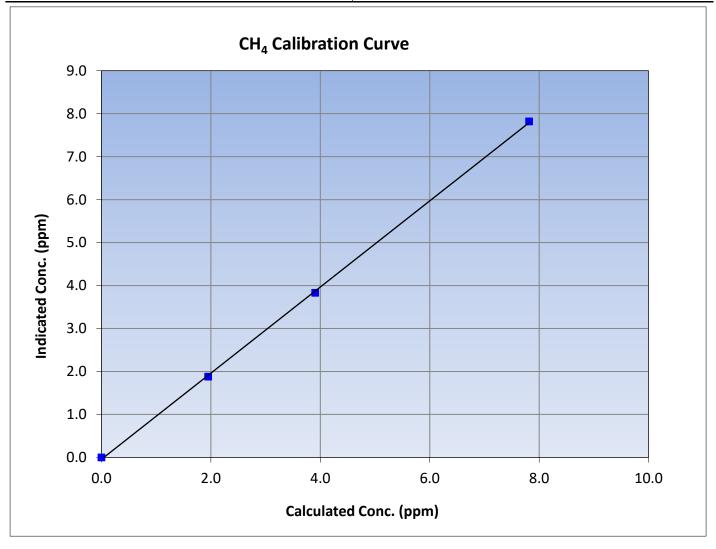
Version-06-2022

Station Information

Calibration Date: January 17, 2024 Previous Calibration: December 14, 2023

Station Name:Buffalo ViewpointStation Number:AMS04Start Time (MST):7:34End Time (MST):10:33Analyzer make:Thermo 55iAnalyzer serial #:1222762077

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999836	≥0.995
7.82	7.82	0.9996	Correlation Coemicient	0.999656	20.993
3.91	3.83	1.0203	Slope	1.002348	0.90 - 1.10
1.95	1.88	1.0368	Зюре	1.002348	0.30 - 1.10
			Intercept	-0.043914	+/-0.5





NMHC Calibration Summary

Version-06-2022

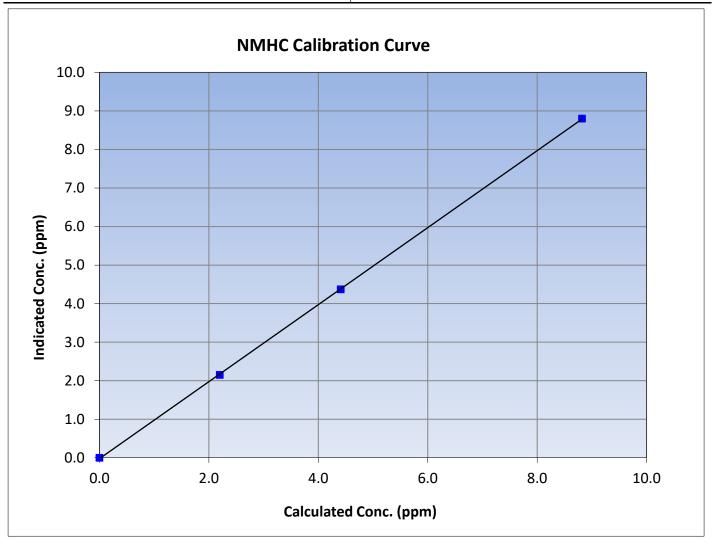
Station Information

Calibration Date: January 17, 2024 Previous Calibration: December 14, 2023
Station Name: Station Number: AMS04

Start Time (MST): 7:34 End Time (MST): 10:33

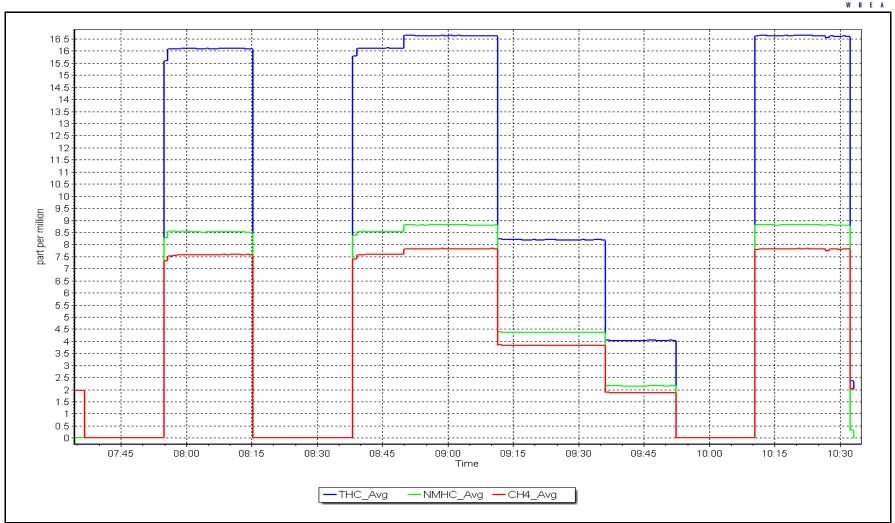
Analyzer make: Thermo 55i Analyzer serial #: 1222762077

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999967	≥0.995
8.82	8.80	1.0022	Correlation Coemicient	0.555507	20.333
4.41	4.37	1.0090	Slope	0.999123	0.90 - 1.10
2.20	2.15	1.0229	Slope	0.333123	0.90 - 1.10
			Intercept	-0.023647	+/-0.5



NMHC Calibration Plot Date: January 17, 2024 Location: Buffalo Viewpoint







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: January 26, 2024

Start time (MST): 9:20

Reason: Cylinder Change

Station number: AMS04

Removed Gas Expiry:

Last Cal Date: January 17, 2024

End time (MST): 10:46

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 (CH_4):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1222762077

THC Range (ppm): 0 - 20 ppm

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

Finish Finish Start Start CH4 SP Ratio: 2.10E-04 2.10E-04 NMHC SP Ratio: 4.60E-05 4.60E-05 CH4 Retention time: 11.8 11.8 NMHC Peak Area: 191608 191608

Zero Chromatogram: OFF OFF Flat Baseline: ON ON

THC Calibration Data

Set Point	Set Point Dil air flow rate		Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4921	78.6	16.64	16.39	1.015	
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	16.38	1.016	
second point						
third point						
as left zero						
as left span						

			Ave	erage Correction Factor	1.016	
Baseline Corr AF:	16.39	Prev response	16.58	*% change	-1.2%	
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

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	78.6	8.82	8.70	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	78.6	8.82	8.65	1.020
second point					
third point					
as left zero					
as left span					
F -			Aver	age Correction Factor	1.020
Baseline Corr AF:	8.70	Prev response	8.79	*% change	-1.0%
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	4921	78.6	7.82	7.69	1.016
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4921	78.6	7.82	7.72	1.013
second point					
third point					
as left zero					
as left span					
				age Correction Factor	1.013
Baseline Corr AF:	7.69	Prev response	7.79	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000639		0.984598	
THC Cal Offset:		-0.067561		0.000000	
CH4 Cal Slope:		1.002348		0.987641	
CH4 Cal Offset:		-0.043914		0.000000	
NMHC Cal Slope:		0.999123		0.980767	
NIVALIC C-1 Off.		0.000647		0.000000	

Notes: Hydrogen Cylinder Changed.

-0.023647

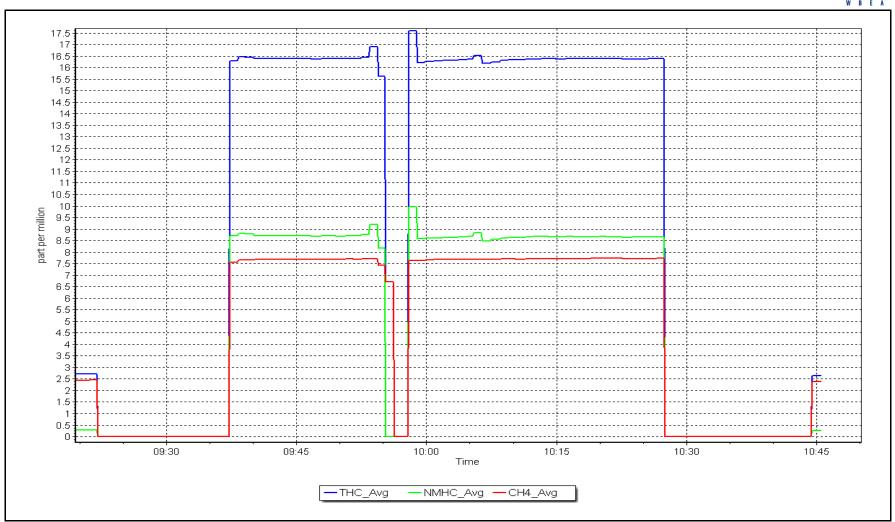
Calibration Performed By: Melissa Lemay

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: January 26, 2024 Location: Buffalo Viewpoint







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: **Buffalo Viewpoint**

Calibration Date: January 12, 2024

Start time (MST): 6:43 Routine Reason:

Station number: AMS04

Last Cal Date: December 11, 2023

End time (MST): 11:43

Calibration Standards

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

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

NOX gas Diff:

NO gas Diff: Calibrator Model: **API T700** Serial Number: 3808 ZAG make/model: Serial Number: **API T701** 362

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 721

NOX Range (ppb): 0 - 1000 ppb

<u>Finish</u> **Finish** Start Start NO coeff or slope: 1.163 1.182 NO bkgnd or offset: -0.6 -0.6 NOX coeff or slope: NOX bkgnd or offset: 1.148 1.169 -0.3 -0.3 NO2 coeff or slope: Reaction cell Press: 1.000 1.000 4.4 4.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000893	1.000181
NO _x Cal Offset:	-0.273094	-0.473674
NO Cal Slope:	1.000600	1.002304
NO Cal Offset:	-1.154426	-1.574438
NO ₂ Cal Slope:	0.986885	0.987754
NO ₂ Cal Offset:	-0.475922	-0.437615



$NO_X \setminus NO \setminus NO_2$ 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/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	0.4	-0.5		
as found span	4918	81.8	800.0	798.4	1.6	787.8	788.2	-0.4	1.0155	1.0129
as found 2nd										
as found 3rd										
new cyl resp	4918	81.8	800.0	798.4	1.6					
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.7	-0.1		
high point	4918	81.8	800.0	798.4	1.6	800.2	799.7	0.4	0.9998	0.9984
second point	4959	40.9	400.0	399.2	0.8	399.1	397.7	1.4	1.0023	1.0038
third point	4980	20.4	199.5	199.1	0.4	198.1	195.5	2.6	1.0070	1.0184
as left zero	5000	0.0	0.0	0.0	0.0	0.6	0.9	-0.4		
as left span	4918	81.8	800.0	398.5	401.5	793.1	402.8	390.3	1.0087	0.9893
							Average C	orrection Factor	1.0030	1.0068
Corrected As fo	ound NO _X =	787.8 ppb	NO =	787.8 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	-1.6%
Previous Respo	onse NO _X =	800.5 ppb	NO =	797.7 ppb				*Percent Chang	ge NO =	-1.3%
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:	

GPT Calibration Data

As found

 $NO_2 r^2$:

NO2 SI:

NO₂ Int:

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)	796.8	396.9	401.5	396.3	1.0132	98.7%
2nd GPT point (200 ppb O3)	796.8	595.2	203.2	200.3	1.0147	98.6%
3rd GPT point (100 ppb O3)	796.8	696.2	102.2	100.1	1.0213	97.9%
			Α	verage Correction Factor	1.0164	98.4%

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay



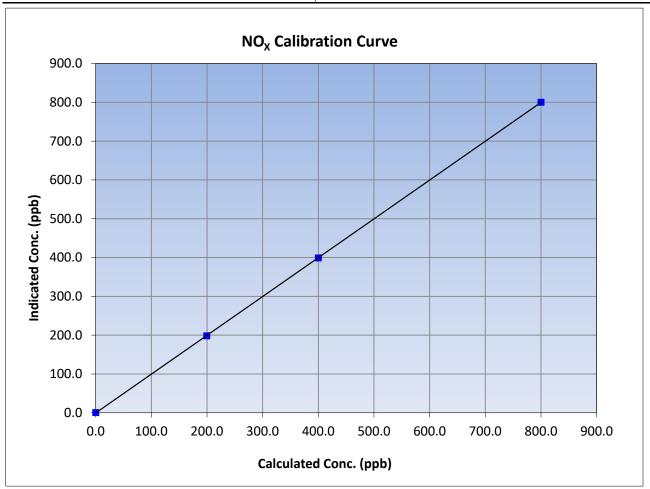
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 12, 2024 Previous Calibration: December 11, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:43 End Time (MST): 11:43 Analyzer make: **API T200** 721 Analyzer serial #:

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999993	≥0.995	
800.0	800.2	0.9998	Correlation Coefficient	0.555555	20.333	
400.0	399.1	1.0023	Slope	1.000181	0.90 - 1.10	
199.5	198.1	1.0070	Slope	1.000161	0.90 - 1.10	
			Intercept	-0.473674	+/-20	





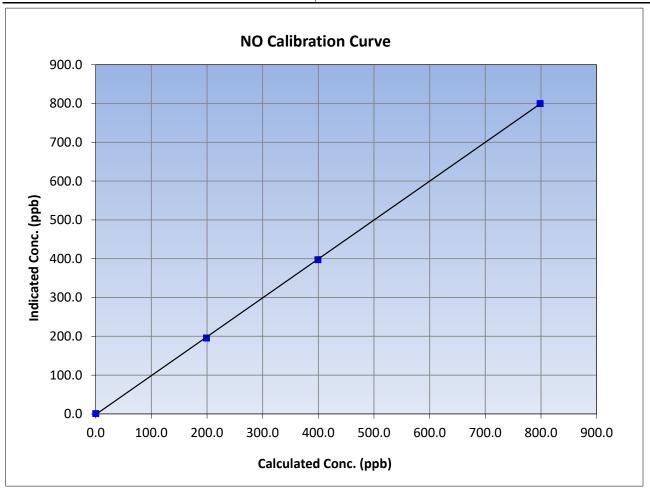
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 12, 2024 Previous Calibration: December 11, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:43 End Time (MST): 11:43 Analyzer make: **API T200** Analyzer serial #: 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.7		Correlation Coefficient	0.999963	≥0.995	
798.4	799.7	0.9984	Correlation Coefficient	0.555505	20.333	
399.2	397.7	1.0038	Slope	1.002304	0.90 - 1.10	
199.1	195.5	1.0184	Slope	1.002304	0.90 - 1.10	
			Intercept	-1.574438	+/-20	





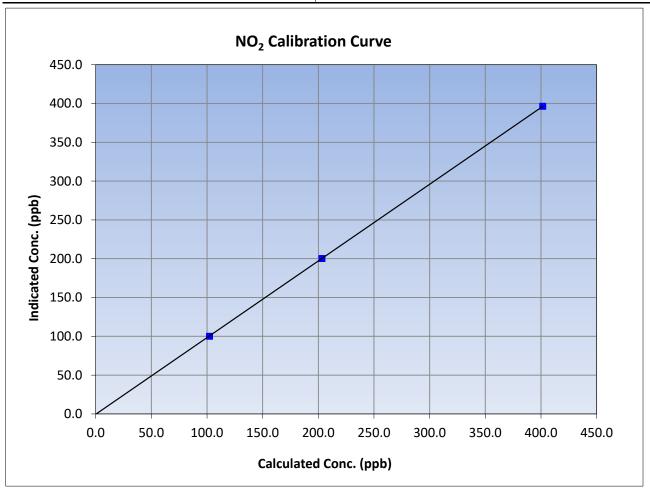
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 12, 2024 Previous Calibration: December 11, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 6:43 End Time (MST): 11:43 Analyzer serial #: Analyzer make: **API T200** 721

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999996	≥0.995	
401.5	396.3	1.0132	Correlation Coefficient	0.555550	20.333	
203.2	200.3	1.0147	Slope	0.987754	0.90 - 1.10	
102.2	100.1	1.0213	Slope	0.967754	0.30 - 1.10	
			Intercept	-0.437615	+/-20	

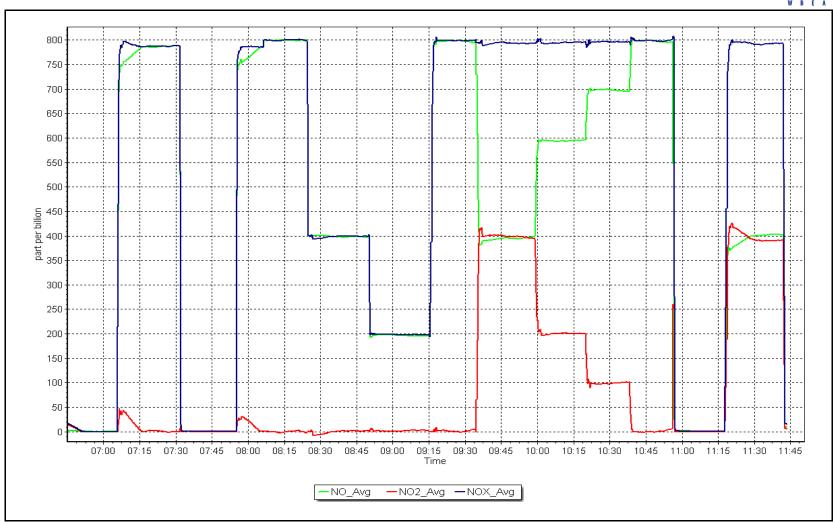


NO_x Calibration Plot

Date: January 12, 2024

Location: Buffalo Viewpoint







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Buffalo Viewpoint

Calibration Date: January 8, 2024

Start time (MST): 10:10 Reason: Routine Station number: AMS04

Last Cal Date: December 12, 2023

End time (MST): 12:52

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: API T400 Analyzer serial #: 2961

Analyzer Range 0 - 500 ppb

Start Finish Start Finish 1.002571 Backgd or Offset: Calibration slope: 1.001229 -3.5 -3.5 0.800000 Coeff or Slope: Calibration intercept: 0.760000 1.011 1.011

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	5000	982.6	400.0	401.8	0.996
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.9	
high point	5000	984.0	400.0	401.8	0.996
second point	5000	812.4	200.0	201.5	0.993
third point	5000	702.1	100.0	100.8	0.992
as left zero	5000	0.0	0.0	1.1	
as left span	5000	984.8	400.0	401.7	0.996
			Averag	ge Correction Factor	0.993
Baseline Corr As found:	401.6	Previous respons		*% change	0.1%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: No adjustments and maintenance done.

Calibration Performed By: Melissa Lemay



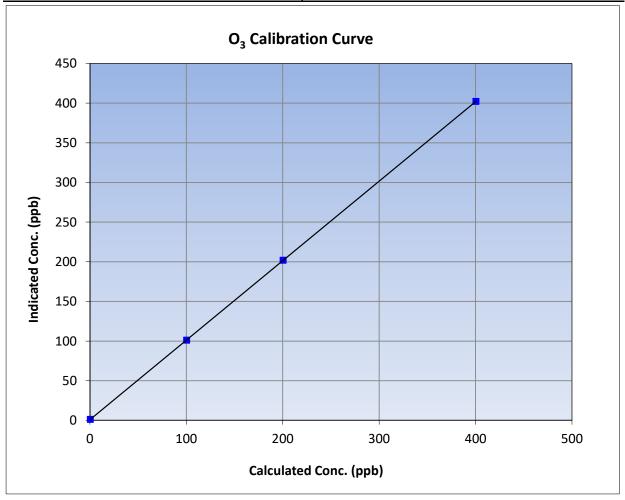
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** December 12, 2023 Station Name: **Buffalo Viewpoint** Station Number: AMS04 Start Time (MST): 10:10 End Time (MST): 12:52 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	0.999999	≥0.995			
400.0	401.8	0.9955	Correlation Coefficient	0.555555	20.333			
200.0	201.5	0.9926	Slope	1.002571	0.90 - 1.10			
100.0	100.8	0.9921	Slope	1.002371	0.30 - 1.10			
			- Intercept	0.800000	+/- 5			

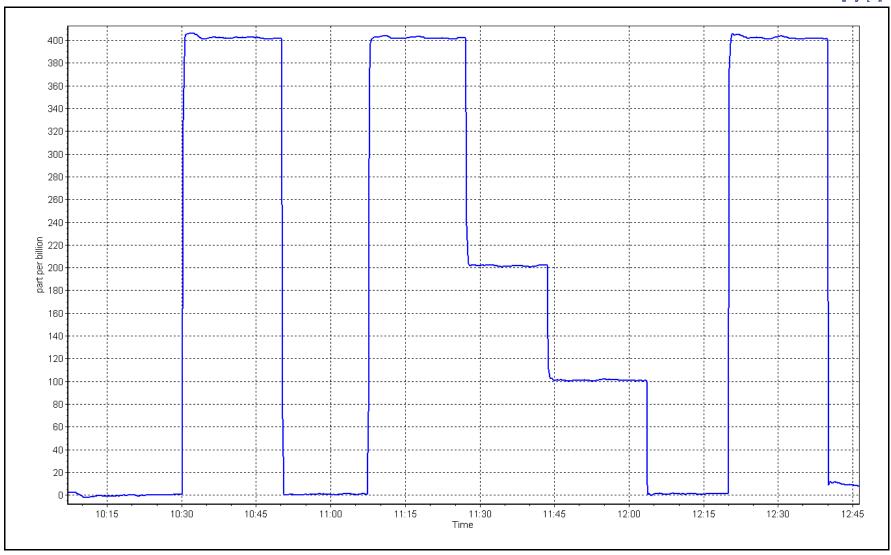


O₃ Calibration Plot

Date: January 8, 2024

Location: Buffalo Viewpoint







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date: Start time (MST):	Buffalo Viewpoint January 17, 2024 10:35		Station number: Last Cal Date: End time (MST):	December 2	21, 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	est			
<u>Parameter</u>	As found	Measured	As left		<u>Adjusted</u>	(Limits)
T (°C)	-19.2	-20.2	-19.2			+/- 2 °C
P (mmHg)	731.8	733.4	731.8			+/- 10 mmHg
flow (LPM)	5.00	5.13	5.00			+/- 0.25 LPM
Leak Test:	Date of check: PM w/o HEPA:	January 17, 2024 2.9	Last Cal Date: PM w/ HEPA:	December		<0.2 ug/m3
Inlet cleaning :	Inlet Head	Quarterly Calibration T	est			
Parameter	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	<u> </u>	<u> </u>	<u></u>			10.9 +/- 0.5
Post-maintenance Date Optical Cham Disposable Filter	ber Cleaned:	PM w/o HEPA:		w/ HEPA:		<0.2 ug/m3
		Annual Maintenance	2			
Date Sample Tub	e Cleaned:	November 28	3, 2023			
Date RH/T Senso	-	May 23, 20				
Notes:	Melissa Lemav	No adjustments done.	Leak check passed. H	ead cleaned		



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Mannix

January 19, 2024 Calibration Date:

Start time (MST): 10:15

Reason:

ZAG Make/Model:

Routine

API T701H

Station number: AMS05

December 8, 2023 Last Cal Date:

January 12, 2029

End time (MST): 13:45

Calibration Standards

Cal Gas Concentration: 50.02

Cal Gas Cylinder #: XC026809B

Removed Cal Gas Conc: 50.02

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

ppm

Rem Gas Exp Date: NA ppm

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 621

Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1008841399

Analyzer Range 0 - 1000 ppb

Finish Start

Start

Finish

1.007440 Calibration slope: 1.003770 Backgd or Offset: 9.1 9.1 0.944 Calibration intercept: 0.280000 0.040000 Coeff or Slope: 0.944

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.4	
as found span	4920	80.0	800.3	804.3	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.7	
high point	4920	80.0	800.3	803.7	0.996
second point	4960	40.0	400.2	401.4	0.997
third point	4980	20.0	200.1	200.2	0.999
as left zero	5000	0.0	0.0	0.7	
as left span	4920	80.0	800.3	805.3	0.994
			Averag	ge Correction Factor	0.997

Baseline Corr As found: 803.90 Previous response 806.55 -0.3% *% 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. No adjustments made.

Calibration Performed By: Max Farrell



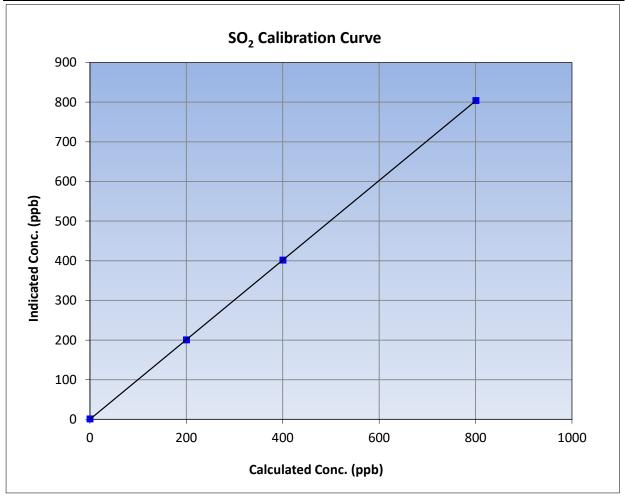
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 19, 2024 **Previous Calibration:** December 8, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:15 End Time (MST): 13:45 Analyzer make: Thermo 43i Analyzer serial #: 1008841399

Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.7		Correlation Coefficient	0.999997	≥0.995			
800.3	803.7	0.9958	Correlation Coefficient	0.555557	20.993			
400.2	401.4	0.9969	Slope	1.003770	0.90 - 1.10			
200.1	200.2	0.9994	- зюре	1.005770	0.90 - 1.10			
			- Intercept	0.040000	+/-30			



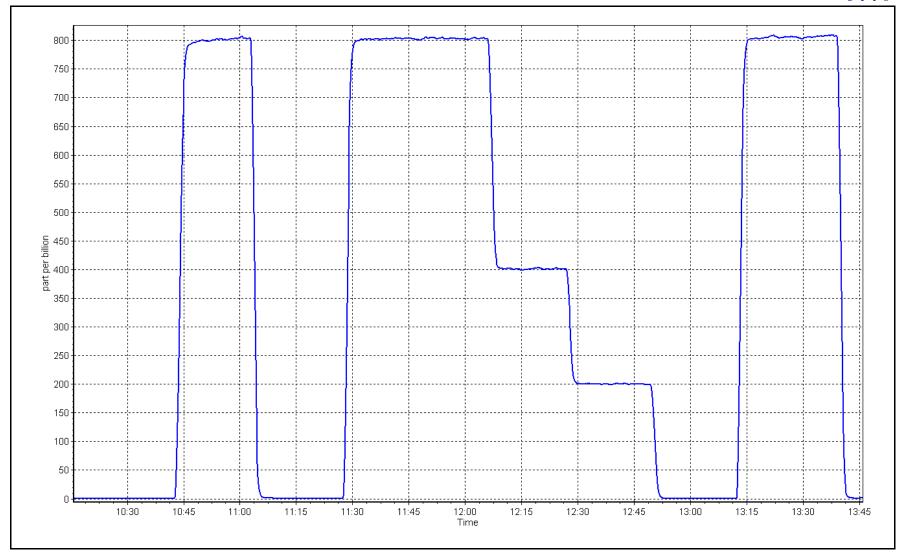
SO2 Calibration Plot

Date:

January 19, 2024

Location: Mannix







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Mannix

Station number: AMS05 Calibration Date: January 4, 2024 Last Cal Date: December 12, 2023

Start time (MST): 10:07 End time (MST): 16:36

Reason: Cylinder Change and Maintenance

Calibration Standards

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

Cal Gas Cylinder #: DT0037363

Removed Cal Gas Conc: 4.92 Rem Gas Exp Date: February 9, 2024 ppm

EY0002433 Removed Gas Cyl #: Diff between cyl: -1.5% 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:

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.971240 Backgd or Offset: Calibration slope: 0.988046 2.18 2.18 Calibration intercept: 0.440521 0.762815 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	0.2	
as found span	4919	81.3	80.0	78.5	1.022
as found 2nd point	4960	40.7	40.0	40.5	0.994
as found 3rd point	4980	20.3	20.0	20.0	1.009
new cylinder response	4919	80.6	80.0	77.3	1.034

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	0.8	
high point	4919	80.6	80.0	78.4	1.020
second point	4960	40.3	40.0	39.7	1.007
third point	4980	20.2	20.0	20.1	0.997
as left zero	5000	0.0	0.0	1.0	
as left span	4919	80.6	80.0	76.8	1.041
SO2 Scrubber Check	4920	80.0	800.0	-0.1	
Date of last scrubber chan	ge:	_		Ave Corr Factor	1.008
Data of last samuelles office					- ff: -: · ·

Date of last scrubber change:	Ave Corr Factor	1.008
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 78.3 79.48 Prev response: *% change: -1.5% Baseline Corr 2nd AF pt: 40.3 AF Slope: 0.979340 AF Intercept: 0.520256 Baseline Corr 3rd AF pt: 19.8 AF Correlation: 0.999755

* = > +/-5% change initiates investigation

Completed multipoint as founds. Changed the external pump as a preventative maintenance. Notes: Changed the cal gas cylinder because its getting low. Instrument has a very slow response, could

be the new gas. Will monitor and swap it out if needed. No adjustments made.

Calibration Performed By: Max Farrell



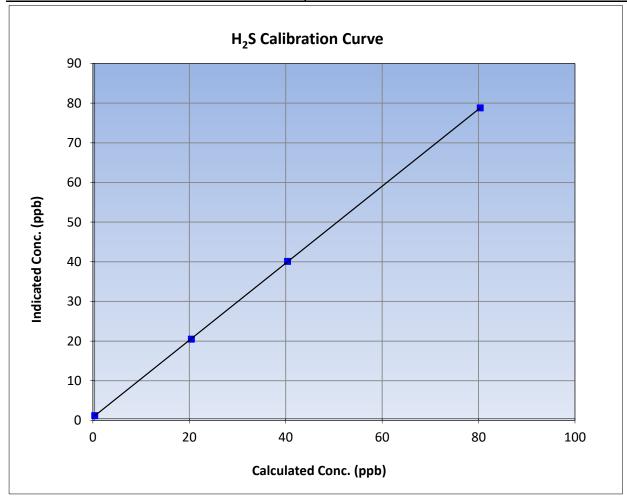
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 12, 2023 Station Name: Mannix Station Number: AMS05 Start Time (MST): 10:07 End Time (MST): 16:36 Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

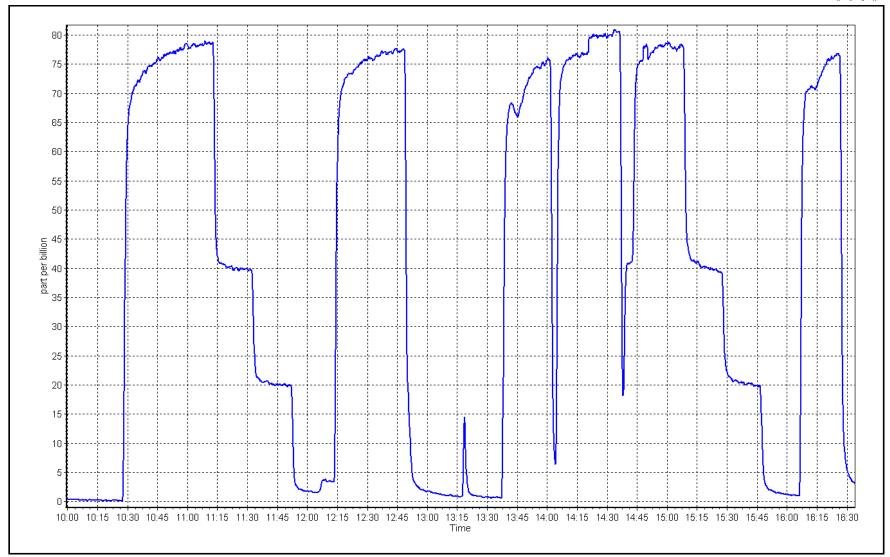
Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.8		Correlation Coefficient	0.999991	≥0.995			
80.0	78.4	1.0199	Correlation Coefficient	0.555551	20.993			
40.0	39.7	1.0069	Slope	0.971240	0.90 - 1.10			
20.0	20.1	0.9969	Slope	0.371240	0.30 - 1.10			
			- Intercept	0.762815	+/-3			



Date: January 4, 2024

Location: Mannix







H₂S Calibration Report

Version-11-2021

Finish

Station Information

Station Name: Mannix
Calibration Date: January 9, 2024

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

Station number: AMS05

Last Cal Date: January 4, 2024

End time (MST): 11:55

Calibration Standards

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

Cal Gas Cylinder #: DT0037363

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

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

Analyzer Information

Analyzer make: Thermo 43iQTL Analyzer serial #: 1203169745

Converter make: Global Converter serial #: 2022-196

Analyzer Range 0 - 100 ppb

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

Calibration slope:0.971240Backgd or Offset:2.18Calibration intercept:0.762815Coeff or Slope: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	0.3	
as found span	4919	81.3	80.6	76.8	1.054
as found 2nd point	4960	40.7	40.4	39.6	1.027
as found 3rd point	4980	20.3	20.1	20.0	1.022
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero					
high point					
second point					
third point					
as left zero			•		
as left span					

SO2 Scrubber Check

Date of last scrubber change	::		Ave Corr Factor		
Date of last converter efficie	(efficiency			
Baseline Corr As found: Baseline Corr 2nd AF pt:	76.5 39.3	Prev response: AF Slope:	79.09 0.947493	*% change: AF Intercept:	-3.4% 0.740376
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999774	·	
				* = > +/-5% change initiates	sinvestigation

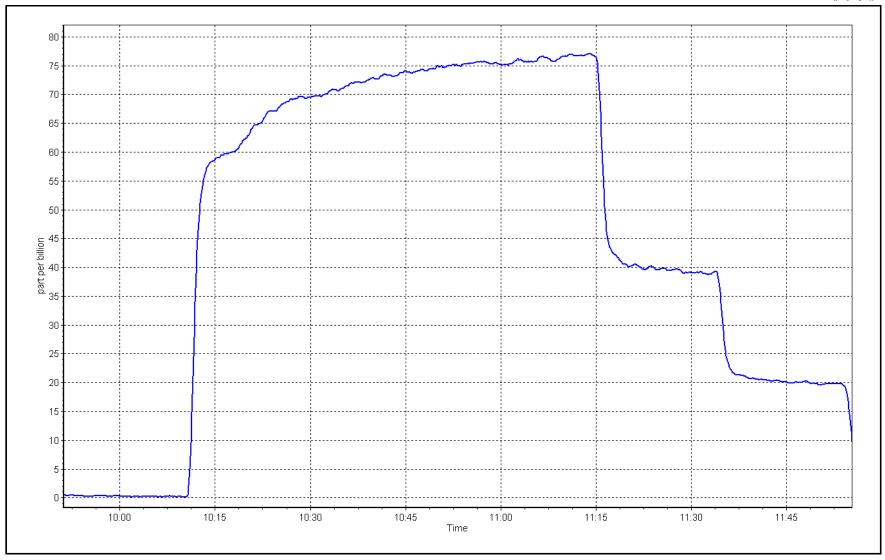
Notes: Spans are very slow to reach target. Removal calibration to swap out the instrument.

Calibration Performed By: Max Farrell

Date: January 9, 2024

Location: Mannix







H₂S Calibration Report

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Mannix

Calibration Date: January 10, 2024

Start time (MST): 10:23

Reason: Install Station number: AMS05

Last Cal Date:

End time (MST): 13:30

Calibration Standards

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

Cal Gas Cylinder #: DT0037363

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

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

Analyzer Information

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

Analyzer Range 0 - 100 ppb

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

0.999261 Backgd or Offset: Calibration slope: 1.27 0.182265 Coeff or Slope: 1.022 Calibration intercept:

H₂S As Found Data

Baseline Adjusted Calculated Dilution air flow rate Source gas flow rate Indicated Correction factor concentration (ppb) Set Point (Cc/(Ic-AFzero)) (sccm) (sccm) concentration (ppb) (Ic) (Cc) Limit = 0.90-1.10as found zero as found span

as found 2nd point as found 3rd point new cylinder response

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	80.6	80.0	80.0	1.000
second point	4960	40.3	40.0	40.3	0.992
third point	4980	20.2	20.0	20.2	0.992
as left zero	5000	0.0	0.0	0.6	
as left span	4919	80.6	80.0	79.9	1.001
SO2 Scrubber Check	4920	80.0	800.0	0.6	
Date of last scrubber chan	ge:		<u> </u>	Ave Corr Factor	0.994

Date of last converter efficiency test: efficiency

Baseline Corr As found: NA *% change: Prev response: NA NA Baseline Corr 2nd AF pt: NA AF Slope: NA AF Intercept: NA Baseline Corr 3rd AF pt: NA AF Correlation: NA * = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell



H₂S Calibration Summary

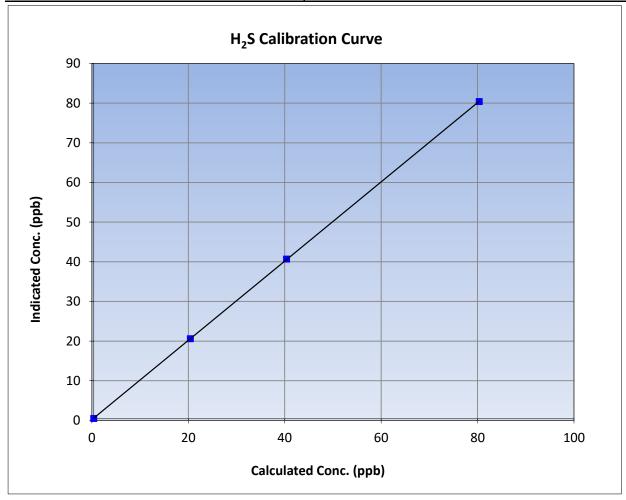
Version-11-2021

Station Information

Calibration Date: January 10, 2024 Previous Calibration:

Station Name:MannixStation Number:AMS05Start Time (MST):10:23End Time (MST):13:30Analyzer make:Thermo 43iQTLAnalyzer serial #:1200326169

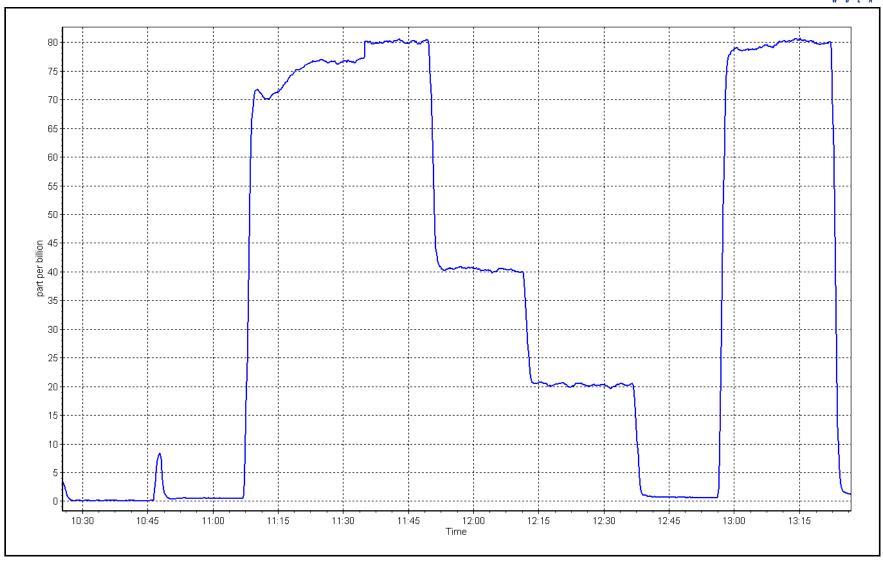
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999988	≥0.995		
80.0	80.0	0.9995	Correlation Coefficient	0.555566	20.993		
40.0	40.3	0.9919	Clana	0.999261	0.90 - 1.10		
20.0	20.2	0.9920	- Slope	0.999201	0.90 - 1.10		
			- Intercept	0.182265	+/-3		



Date: January 10, 2024

Location: Mannix







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Mannix

Calibration Date: January 19, 2024

Start time (MST): 10:15
Reason: Routine

Station number: AMS 05

Last Cal Date: December 8, 2023

End time (MST): 13:45

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

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

Finish Finish Start Start CH4 SP Ratio: 2.61E-05 2.64E-05 NMHC SP Ratio: 4.48E-05 4.43E-05 CH4 Retention time: 15.00 15.20 NMHC Peak Area: 204322 206470

Zero Chromatogram: ON ON Flat Baseline: 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	80.0	17.23	17.28	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	17.23	17.23	1.000	
second point	4960	40.0	8.61	8.61	1.001	
third point	4980	20.0	4.31	4.29	1.003	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.0	17.23	17.22	1.000	
			Д	Average Correction Factor	1.001	
Baseline Corr AF:	17.28	Prev response	17.21	*% change	0.4%	
Baseline 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

11 V L A					VEISIOII-00-20
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.15	9.28	0.986
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	9.15	1.000
second point	4960	40.0	4.57	4.58	0.999
third point	4980	20.0	2.29	2.28	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	9.15	9.17	0.998
•			Avera	age Correction Factor	1.001
Baseline Corr AF:	9.28	Prev response	9.19	*% change	1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	8.08	8.00	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	8.08	8.09	0.999
second point	4960	40.0	4.04	4.03	1.003
third point	4980	20.0	2.02	2.01	1.004
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.05	1.003
			Avera	age Correction Factor	1.002
Baseline Corr AF:	8.00	Prev response	8.02	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.999274		1.000521	
THC Cal Offset:		-0.003400		-0.007800	
CH4 Cal Slope:		0.993789		1.001401	
CH4 Cal Offset:		-0.005600		-0.007000	
NMHC Cal Slope:		1.003992		0.999969	
				0.004.000	

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

0.002200

Calibration Performed By: Max Farrell

NMHC Cal Offset:

-0.001200



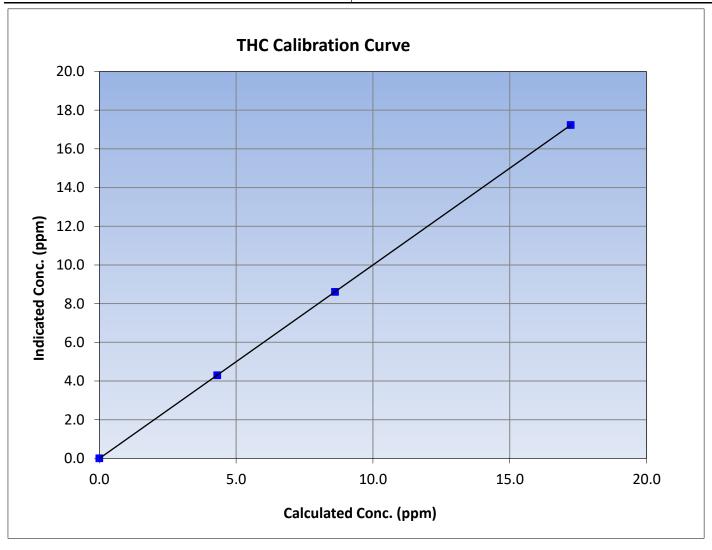
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 19, 2024 **Previous Calibration:** December 8, 2023 Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 10:15 End Time (MST): 13:45 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	0.999999	≥0.995
17.23	17.23	0.9997			20.333
8.61	8.61	1.0008	Slope	1.000521	0.90 - 1.10
4.31	4.29	1.0031			0.90 - 1.10
			Intercept	-0.007800	+/-0.5





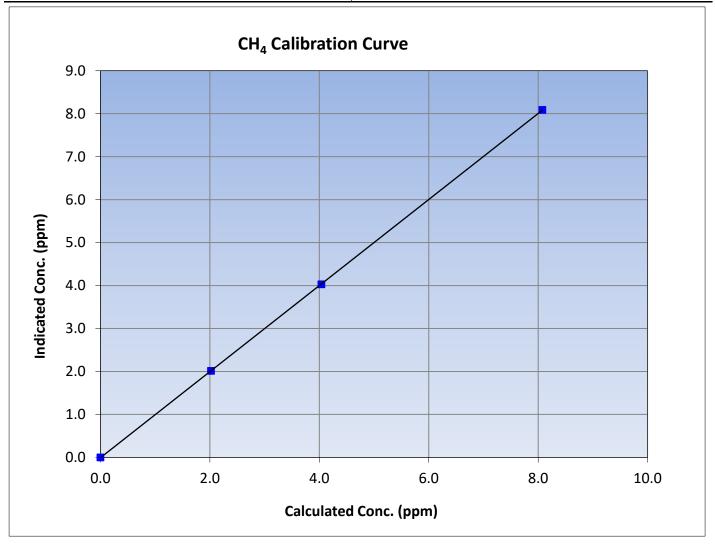
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 19, 2024 **Previous Calibration:** December 8, 2023 Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 10:15 End Time (MST): 13:45 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	0.999995	≥0.995
8.08	8.09	0.9988	Correlation Coefficient	0.555555	20.333
4.04	4.03	1.0025	Slope	1.001401	0.90 - 1.10
2.02	2.01	1.0038			0.50 - 1.10
			Intercept	-0.007000	+/-0.5





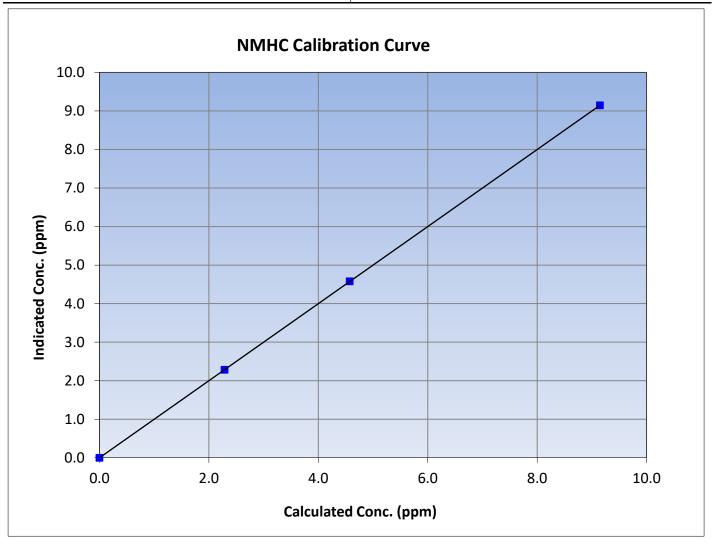
NMHC Calibration Summary

Version-06-2022

Station Information

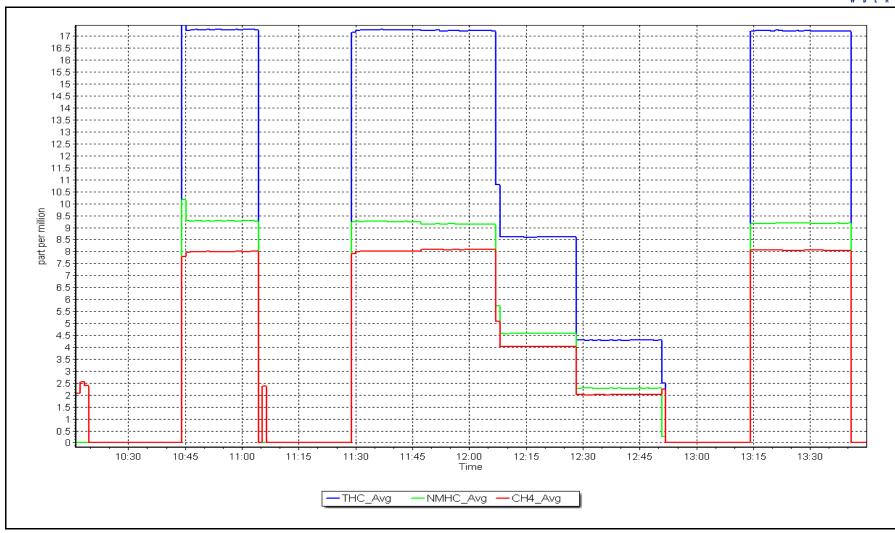
Calibration Date: January 19, 2024 **Previous Calibration:** December 8, 2023 Station Name: Mannix Station Number: **AMS 05** Start Time (MST): 10:15 End Time (MST): 13:45 Analyzer make: Analyzer serial #: Thermo 55i 1152430011

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999999	≥0.995
9.15	9.15	1.0003	Correlation Coefficient	0.555555	20.333
4.57	4.58	0.9993	Clama	0.999969	0.90 - 1.10
2.29	2.28	1.0026	Slope		0.90 - 1.10
			Intercept	-0.001200	+/-0.5



Date: January 19, 2024 Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: January 5, 2024

Start time (MST): 10:32 Reason: Routine Station number: AMS06

Last Cal Date: December 13, 2023

End time (MST): 14:50

Calibration Standards

Cal Gas Concentration: 49.78

Cal Gas Cylinder #: AAL070632

Removed Cal Gas Conc: 49.78

Removed Gas Cyl #: N/A

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

Rem Gas Exp Date: N/A

Diff between cyl:

Serial Number: 3566

Serial Number: 5608

Coeff or Slope:

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290013

Analyzer Range 0 - 1000 ppb

Start Finish

ppm

ppm

 Calibration slope:
 1.003106
 0.999660

 Calibration intercept:
 1.659655
 1.240714

Backgd or Offset: Start 17.7

17.7

0.922

17.7 0.922

Finish

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.3	799.5	797.8	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.3	799.5	800.2	0.999
second point	4960	40.2	400.2	400.8	0.999
third point	4980	20.1	200.1	203.3	0.984
as left zero	5000	0.0	0.0	0.2	
as left span	4920	80.3	799.5	799.3	1.000
			Averag	ge Correction Factor	0.994

Baseline Corr As found: 797.90 Previous response 803.61 *% change -0.7% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

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

NA AF Slope: AF Intercept.

* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. No adjustments made. Maintenance completed to the H2

gen for the THC instrument after as founds.

Calibration Performed By: Max Farrell



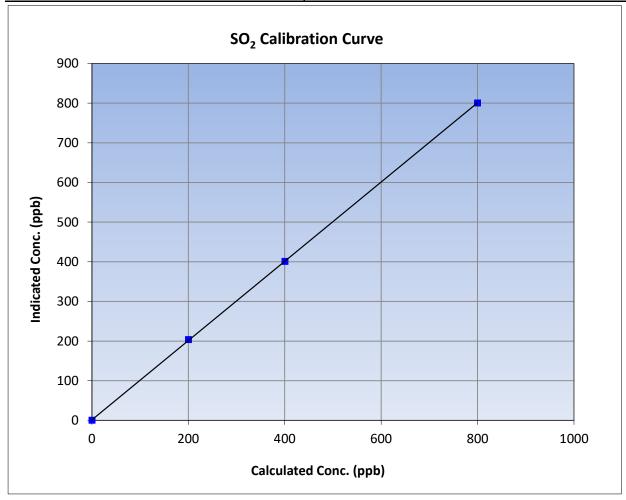
SO₂ Calibration Summary

Version-01-2020

Station Information

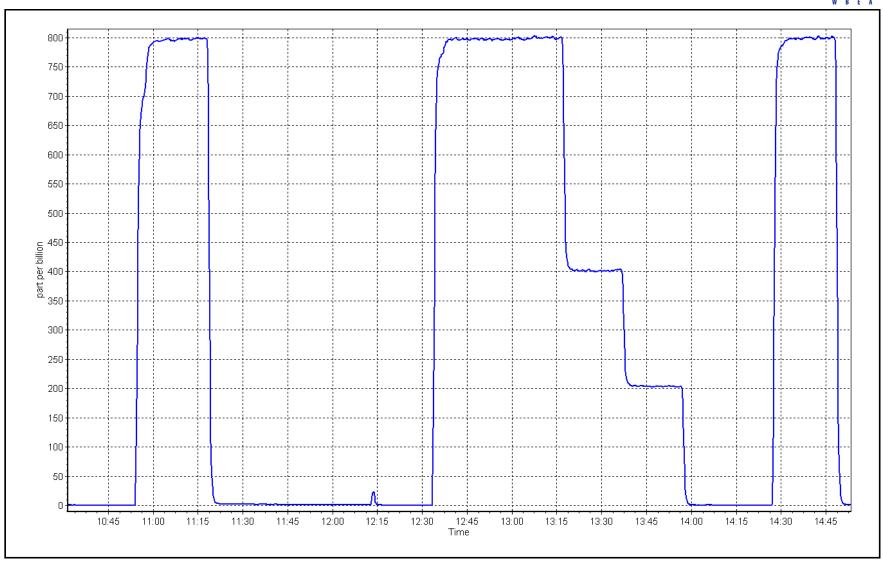
Calibration Date: January 5, 2024 **Previous Calibration:** December 13, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 10:32 End Time (MST): 14:50 Analyzer make: Thermo 43i Analyzer serial #: 1160290013

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	0.999983	≥0.995	
799.5	800.2	0.9991	Correlation Coefficient	0.555505	20.333	
400.2	400.8	0.9986	Slope	0.999660	0.90 - 1.10	
200.1	203.3	0.9843	Slope		0.90 - 1.10	
			- Intercept	1.240714	+/-30	



SO2 Calibration Plot Date: January 5, 2024 Location: Patricia McInnes







TRS Calibration Report

Version-11-2021

Station Information

Patricia McInnes Station Name:

Calibration Date: January 18, 2024 Start time (MST): 9:31

Reason: Routine Station number: AMS 06

> Last Cal Date: December 7, 2023

End time (MST): 13:47

Calibration Standards

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

Cal Gas Cylinder #: CC506659

Removed Cal Gas Conc: 5.328 ppm Rem Gas Exp Date: N/A

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

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

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: 0.991885 1.002314 Backgd or Offset: 2.01 1.95 Calibration intercept: 0.580307 0.440228 Coeff or Slope: 1.168 1.150

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.1	80.0	81.2	0.987
as found 2nd point	4963	37.5	40.0	41.2	0.972
as found 3rd point	4981	18.8	20.0	21.0	0.959
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4925	75.1	80.0	80.5	0.994
second point	4963	37.5	40.0	40.7	0.982
third point	4981	18.8	20.0	20.7	0.968
as left zero	5000	0.0	0.0	0.3	
as left span	4925	75.1	80.0	80.7	0.992
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chan	ge:	December 20, 2021		Ave Corr Factor	0.981
Date of last converter effic	iency test:				efficiency

Baseline Corr As found: 79.96 1.4% 81.1 Prev response: *% change: Baseline Corr 2nd AF pt: 41.1 AF Slope: 1.011741 AF Intercept: 0.460263

Baseline Corr 3rd AF pt: 20.9 AF Correlation: 0.999902 * = > +/-5% change initiates investigation

Notes:

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

Calibration Performed By: Max Farrell



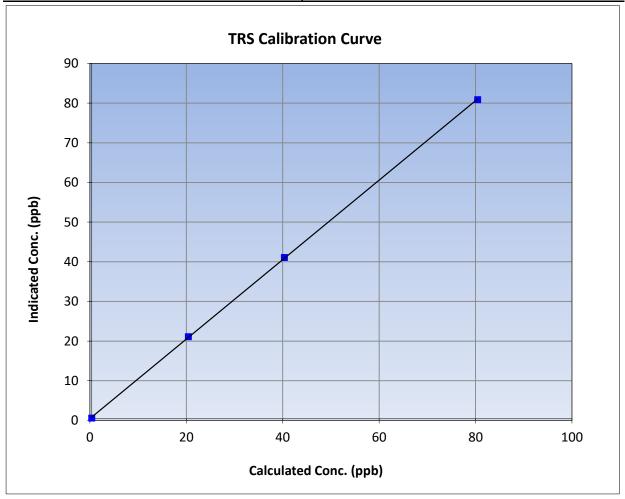
TRS Calibration Summary

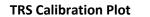
Version-11-2021

Station Information

Calibration Date: January 18, 2024 **Previous Calibration:** December 7, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:31 End Time (MST): 13:47 Analyzer make: Thermo 43i TLE Analyzer serial #: 1218153358

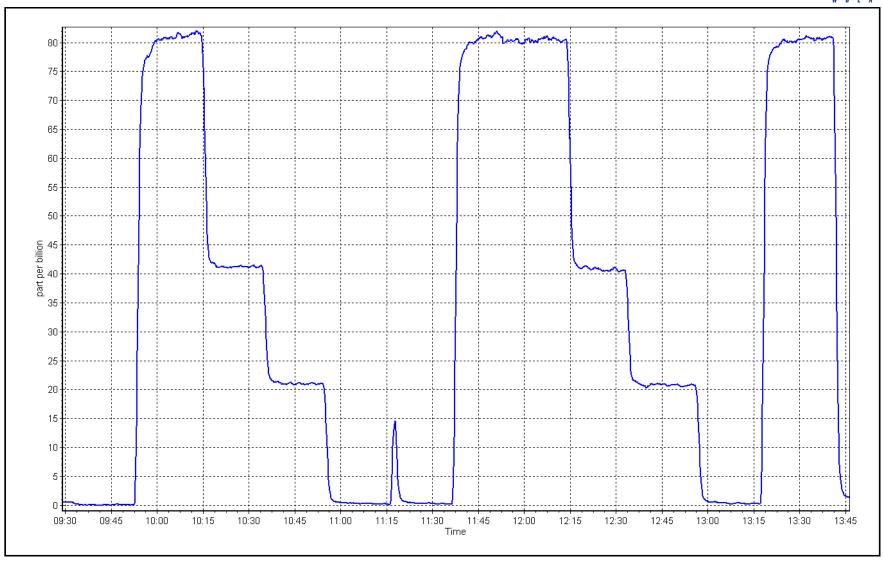
Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999955	≥0.995	
80.0	80.5	0.9941	Correlation Coefficient	0.999933	20.993	
40.0	40.7	0.9817	Slope	1.002314	0.90 - 1.10	
20.0	20.7	0.9678	Slope	1.002314	0.90 - 1.10	
			- Intercept	0.440228	+/-3	





Date: January 18, 2024 Location: Patricia McInnes







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Patricia McInnes Station Name:

Calibration Date: January 5, 2024

Start time (MST): 10:32 Routine Reason:

Station number: AMS06

Last Cal Date: December 13, 2023

End time (MST): 14:50

Calibration Standards

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

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

205.3 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: Removed Gas Expiry:

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

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

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1118148495

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

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.17E-04 2.17E-04 NMHC SP Ratio: 4.91E-05 4.81E-05 CH4 Retention time: 14.0 14.0 NMHC Peak Area: 184991 188492 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4920	80.3	17.12	17.37	0.986
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	17.16	0.998
second point	4960	40.2	8.57	8.68	0.988
third point	4980	20.1	4.29	4.44	0.965
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	17.12	17.21	0.995
			А	verage Correction Factor	0.984
Baseline Corr AF:	17.36	Prev response	17.18	*% change	1.0%
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

					Version oo z
		NINALIC Calibr	ation Data		
Cat Daint	Dil air flass sata	NMHC Calibr		lad	CE Limit 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	0.01	
as found span	4919.7	80.3	9.07	9.36	0.969
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	4.60	0.988
third point	4980	20.1	2.27	2.34	0.969
as left zero	5000	0.0	0.00	0.00	
as left span	4919.7	80.3	9.07	9.17	0.989
			Aver	age Correction Factor	0.985
Baseline Corr AF:	9.35	Prev response	9.13	*% change	2.4%
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	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919.7	80.3	8.06	8.01	1.006
as found 2nd point	4313.7	00.5	0.00	0.01	1.000
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919.7	80.3	8.06	8.07	0.998
second point	4960	40.2	4.03	4.08	0.988
third point	4980	20.1	2.02	2.10	0.961
as left zero	5000	0.0	0.00	0.00	
as left span	4919.7	80.3	8.06	8.04	1.001
as iert spari	4313.7	00.5		age Correction Factor	0.982
Baseline Corr AF:	8.01	Prev response	8.05	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:	6.05	AF Intercept:	-0.076
		AF Slope. AF Correlation:		* = > +/-5% change initiat	es investigation
Baseline Corr 3rd AF:	NA		C	- > 1/-5/0 Change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001451		1.000106	
THC Cal Offset:		0.034020		0.074604	
CH4 Cal Slope:		0.999322		0.999043	
CH4 Cal Offset:		0.004445		0.039427	
NMHC Cal Slope:		1.003545		1.001025	
				0.004===	

Notes: Changed the inlet filter and completed maintenance on the H2 generator after as founds. Adjusted the span only.

0.028776

Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.034777



THC Calibration Summary

Version-06-2022

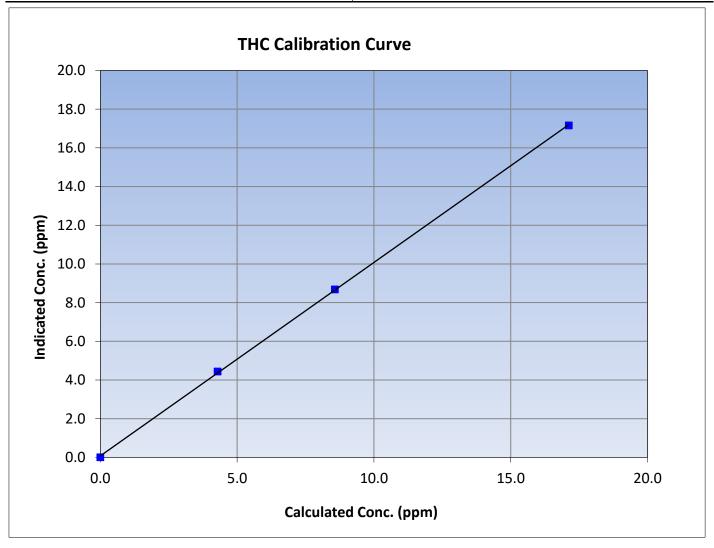
Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023
Station Name: Patricia McInnes Station Number: AMS06

Start Time (MST): 10:32 End Time (MST): 14:50

Analyzer make: Thermo 55i Analyzer serial #: 1118148495

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999913	≥0.995
17.12	17.16	0.9976	Correlation Coefficient	0.555515	20.333
8.57	8.68	0.9878	Slope	1.000106	0.90 - 1.10
4.29	4.44	0.9653	Slope	1.000100	0.90 - 1.10
			Intercept	0.074604	+/-0.5





Start Time (MST):

Wood Buffalo Environmental Association

CH₄ Calibration Summary

End Time (MST):

Version-06-2022

14:50

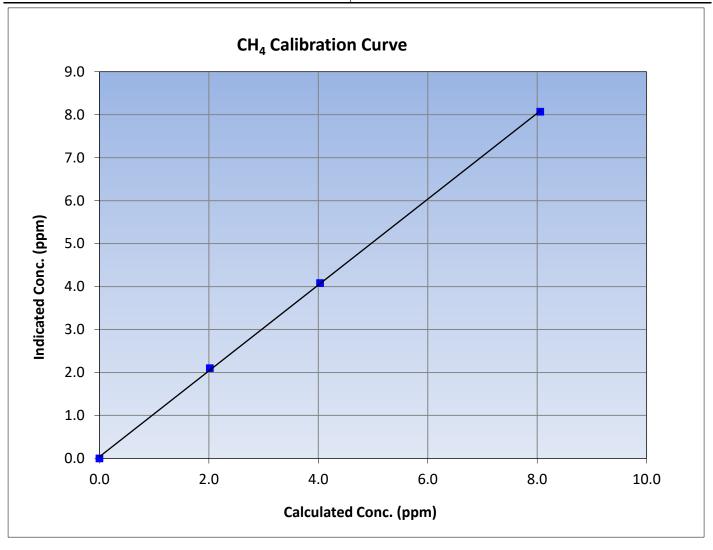
Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023 Station Name: Patricia McInnes Station Number: AMS06

Analyzer make: Thermo 55i Analyzer serial #: 1118148495

10:32

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999888	≥0.995
8.06	8.07	0.9982	Correlation Coefficient	0.333000	20.333
4.03	4.08	0.9882	Slope	0.999043	0.90 - 1.10
2.02	2.10	0.9611	Slope	0.999043	0.90 - 1.10
		·	Intercept	0.039427	+/-0.5





NMHC Calibration Summary

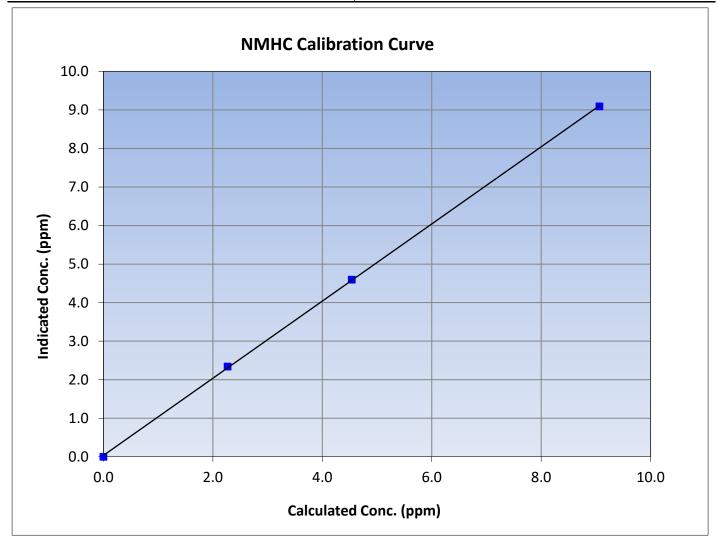
Version-06-2022

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023

Station Name:Patricia McInnesStation Number:AMS06Start Time (MST):10:32End Time (MST):14:50Analyzer make:Thermo 55iAnalyzer serial #:1118148495

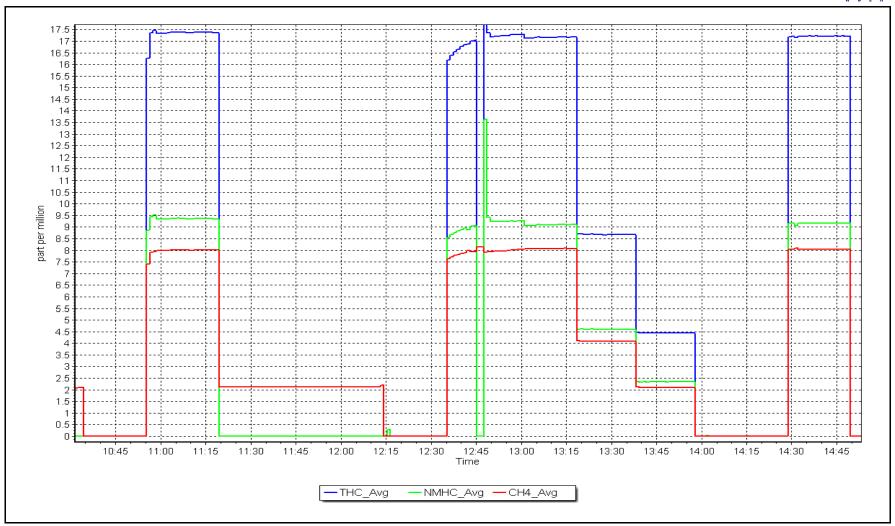
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999933	≥0.995
9.07	9.09	0.9970	Correlation Coefficient	0.555555	20.333
4.54	4.60	0.9878	Slope	1.001025	0.90 - 1.10
2.27	2.34	0.9691	Slope	1.001023	
			Intercept	0.034777	+/-0.5



NMHC Calibration Plot Date: January 5, 2024

Location: Patricia McInnes







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: January 8, 2024

Start time (MST): 9:54

Reason: Routine Station number: AMS06

Last Cal Date: December 4, 2023

End time (MST): 14:46

Calibration Standards

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

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

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

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

NOX gas Diff: NO gas Diff:

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

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1172750022

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 0.825 0.825 NO bkgnd or offset: 3.2 3.2 NOX coeff or slope: 0.987 0.987 NOX bkgnd or offset: 3.9 3.9 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:	0.992028	0.998293
NO _x Cal Offset:	2.457352	1.916153
NO Cal Slope:	0.993713	0.999944
NO Cal Offset:	1.244073	1.062930
NO ₂ Cal Slope:	0.998330	0.999549
NO ₂ Cal Offset:	-0.223314	-1.654321



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				ווט	ution Calibration	ni Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO: concentration (ppb) (Cc)		Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.3	-0.5		
as found span	4914	86.2	826.5	799.7	26.7	828.3	800.3	27.9	0.9978	0.9993
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.4	-0.2		
high point	4914	86.2	826.5	799.7	26.7	826.0	800.4	25.6	1.0005	0.9992
second point	4957	43.1	413.2	399.9	13.4	415.5	401.3	14.2	0.9945	0.9964
third point	4978	21.6	207.1	200.4	6.7	210.4	202.1	8.4	0.9844	0.9917
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.7	-0.3		
as left span	4914	86.2	826.5	799.7	26.7	819.5	794.6	24.8	1.0085	1.0065
							Average C	orrection Factor	0.9932	0.9958
Corrected As fo	und NO _X =	828.5 ppb	NO	= 800.0 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	0.7%
revious Respo	nse NO _x =	822.3 ppb	NO	= 795.9 ppb				*Percent Chang	ge NO =	0.5%
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	d NO r ² :		NO SI:	NO Int:	
				• •	As foun	2		NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Ref		dicated NO Drop ncentration (ppb)	Calculated N concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
	nt (200 ppb NO2)									

Notes:

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

419.7

219.9

119.4

Average Correction Factor

1.0029

1.0083

1.0312

1.0141

420.9

221.7

123.1

Calibration Performed By:

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Max Farrell

402.3

601.5

700.1

796.5

796.5

796.5

99.7%

99.2%

97.0%

98.6%



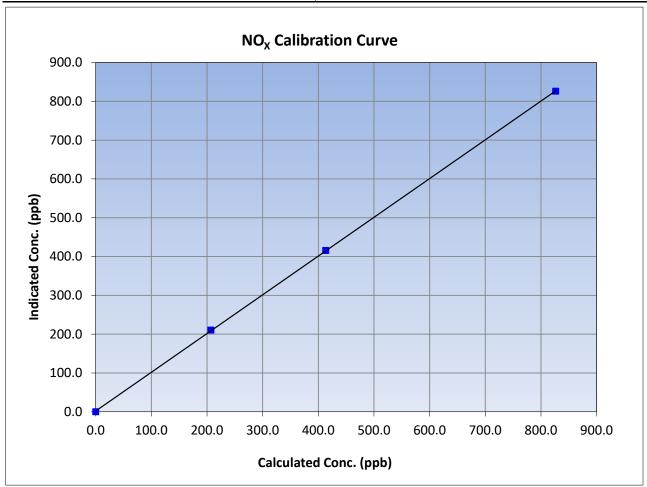
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 8, 2024 Previous Calibration: December 4, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:54 End Time (MST): 14:46 Analyzer serial #: Analyzer make: Thermo 42i 1172750022

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999978	≥0.995
826.5	826.0	1.0005	Correlation Coefficient	0.333376	20.333
413.2	415.5	0.9945	Slope	0.998293	0.90 - 1.10
207.1	210.4	0.9844	Зюре	0.556255	0.90 - 1.10
			Intercept	1.916153	+/-20





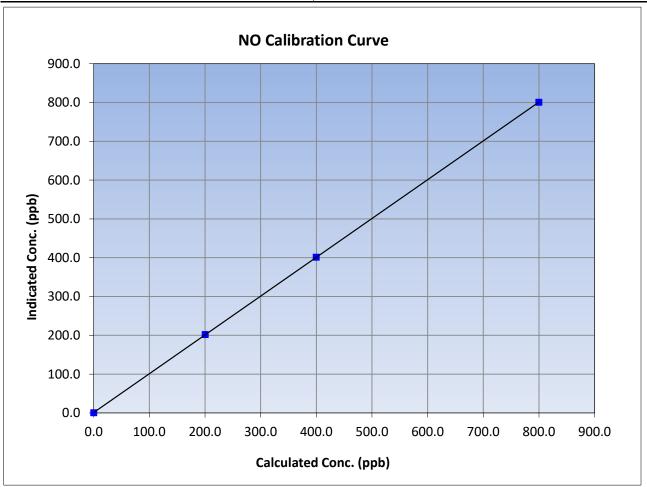
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 8, 2024 Previous Calibration: December 4, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:54 End Time (MST): 14:46 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	0.999997	≥0.995
799.7	800.4	0.9992	Correlation Coefficient	0.333337	20.333
399.9	401.3	0.9964	Slope	0.999944	0.90 - 1.10
200.4	202.1	0.9917	Slope	0.999944	0.90 - 1.10
			Intercept	1.062930	+/-20





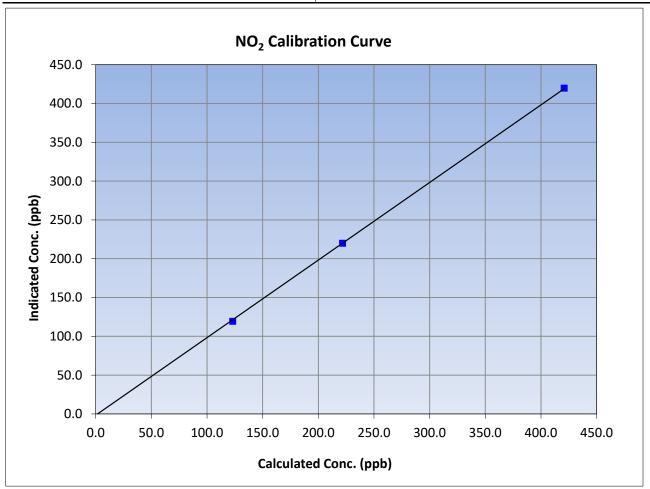
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 8, 2024 Previous Calibration: December 4, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 9:54 End Time (MST): 14:46 Analyzer serial #: Analyzer make: Thermo 42i 1172750022

Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
-0.2		Correlation Coefficient	0 000031	≥0.995
419.7	1.0029	correlation coemicient	0.55551	20.333
219.9	1.0083	Slone	0.000540	0.90 - 1.10
119.4	1.0312	Slope	0.999549	0.90 - 1.10
·		Intercept	-1.654321	+/-20
	(ppb) (lc) -0.2 419.7 219.9	(ppb) (lc) Correction factor (Cc/lc) -0.2 419.7 1.0029 219.9 1.0083	Correction factor (Cc/Ic) Statistical Evaluary -0.2	Correction factor (Cc/Ic) Statistical Evaluation -0.2

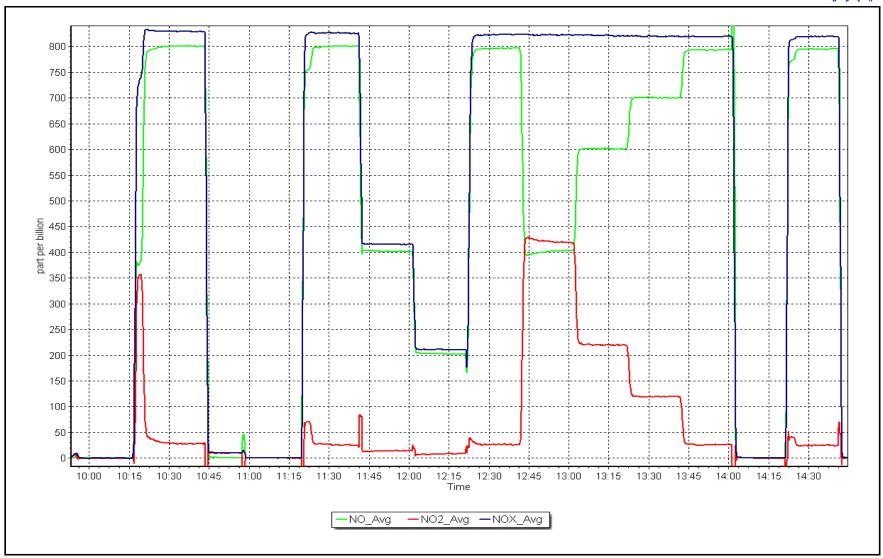


NO_x Calibration Plot

Date: January 8, 2024

Location: Patricia McInnes







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Patricia McInnes

Calibration Date: January 2, 2024

Start time (MST): 11:52

Reason: Maintenance

Station number: AMS06

Last Cal Date: December 18, 2023

End time (MST): 15:41

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1300156234

Analyzer Range 0 - 500 ppb

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.007657 1.003886 -0.2 -0.2 -1.480000 Coeff or Slope: Calibration intercept: -1.340000 1.039 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
as found zero	5000	800.0	0.0	-0.3	
as found span	5000	1303.0	400.0	402.4	0.994
as found 2nd point	5000	966.5	200.0	199.2	1.004
as found 3rd point	5000	794.3	100.0	98.0	1.020
calibrator zero	5000	800.0	0.0	0.1	
high point	5000	1303.0	400.0	400.9	0.998
second point	5000	966.5	200.0	198.4	1.008
third point	5000	794.3	100.0	97.4	1.027
as left zero	5000	800.0	0.0	0.2	
as left span	5000	1303.0	400.0	402.8	0.993
			Averag	ge Correction Factor	1.011
Baseline Corr As found:	402.7	Previous respons	e 401.7	*% change	0.2%
Baseline Corr 2nd AF pt:	-203.2	AF Slope	e: 1.008257	AF Intercept:	-1.620000
Baseline Corr 3rd AF pt:	-101.2	AF Correlation	n: 0.999951		
				* = > +/-5% change initia	tes investigation

Notes: Changed the external pump and the inlet filter after multipoint as founds. Adjusted the span.

Calibration Performed By: Max Farrell



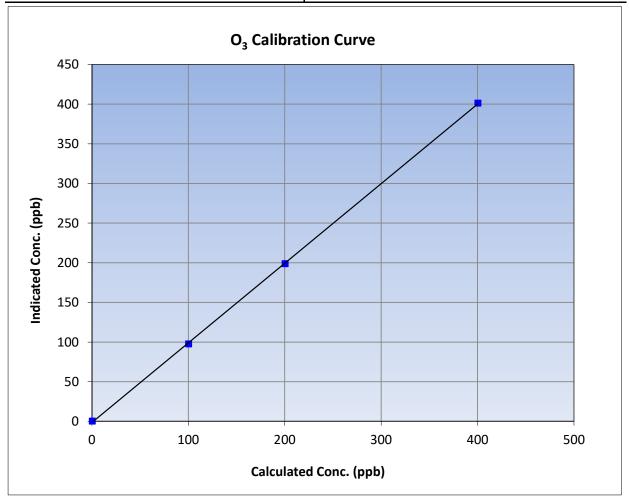
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 2, 2024 **Previous Calibration:** December 18, 2023 Station Name: Patricia McInnes Station Number: AMS06 Start Time (MST): 11:52 End Time (MST): 15:41 Analyzer make: Thermo 49i Analyzer serial #: 1300156234

	Calibration Data										
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evalua	Statistical Evaluation							
0.0	0.1		Correlation Coefficient	0.999929	≥0.995						
400.0	400.9	0.9978	Correlation Coefficient	0.999929	20.995						
200.0	198.4	1.0081	Slope	1.003886	0.90 - 1.10						
100.0	97.4	1.0267	Siope	1.005660	0.90 - 1.10						
			Intercept	-1.480000	+/- 5						

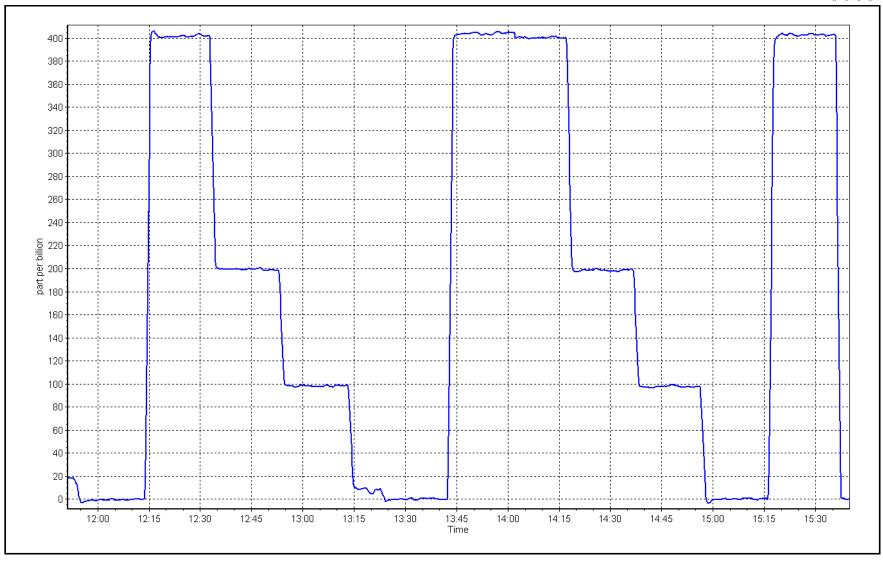


O₃ Calibration Plot

Date: January 2, 2024

Location: Patricia McInnes







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1			
Station Name:	Patricia McInnes		Station number:			
Calibration Date:	January 18, 2024 14:03		Last Cal Date: End time (MST):		., 2023	
Start time (MST):	14.05		End time (MST).	15.01		
Analyzer Make:	API T640		S/N:	766		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	ALICAT FP-25		S/N:	388755		
Temp/RH standard:	ALICAT FP-25		S/N:	388755		
		Monthly Calibration T	est			
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-15.5	-15.1	-15.5			+/- 2 °C
P (mmHg)	741.7	743.8	741.7			+/- 10 mmHg
flow (LPM)	5.02	5.15	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	January 18, 2024	Last Cal Date:	December	1, 2023	
	PM w/o HEPA:	7.9	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be			serve as the pre ma	intenance lea	ak check	
Inlet cleaning:	Inlet Head	\checkmark				
		Quarterly Calibration	Test			
<u>Parameter</u>	<u>As found</u>	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance		PM w/o HEPA:		w/ HEPA:		
Date Optical Cham	-	December 1	•			<0.2 ug/m3
Disposable Filte	r Changed:	December 1	., 2023	•		
		A I Adat				
		Annual Maintenanc	e			
Date Sample Tub	oe Cleaned:	April 13, 2	2023			
Date RH/T Senso	or Cleaned:	April 13, 2	2023			
Notos	Quarterly calib	orations completed last r	nonth. Leak check p	assed, no ad	djustments	made.
Notes:						
Calibration by:	Max Farrell					



TN - NO_X - NH₃ Calibration Report

Version-05-2023

C			
Station	Int	Orm	Nation
Jialion		ULLI	ıatıvıı

Station Name: Patricia McInnes

NOX Cal Date: January 16, 2024

Start time (MST): 9:28

NH3 Cal Date: January 16, 2024

Start time (MST): 13:32

Reason: Routine

Station number: AMS 06

Last Cal Date: December 6, 2023

End time (MST): 13:31

Last Cal Date: December 6, 2023

End time (MST): 15:10

Calibration Standards

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

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

NOX gas Diff: NO gas Diff:

NH3 Cal Gas Conc: 76.29 ppm NH3 Gas Cylinder #: EB0108520 NH3 Cal Gas Expiry: August 22, 2024

Removed NH3 Conc: 76.29 ppm Removed Cylinder #: NA

NH3 gas Diff:

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

Removed cyl Expiry: NA T700 Serial Number: 3566

API T701 Serial Number: 4602

Analyzer Information

Analyzer model: Teledyne API T201

Converter model: Teledyne API T501

NH3 Range (ppb): 0 - 2000 ppb

Reaction cell Press: 4.80

NOX Range (ppb): 0 - 1000 ppb

Sample Flow: 26.6

Start **Finish Start Finish** NO coefficient: 0.854 0.854 TN coefficient: 0.849 0.849 NOX coefficient: 0.848 0.848 NO bkgrnd: -0.985 -0.985 NO2 coefficient: 1.000 1.000 NOX bkgrnd: -0.562 -0.562 NH3 coefficient: 0.891 0.891 TN bkgrnd: 5.018 5.018

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997270	1.000699
NO_X Cal Offset:	0.936426	1.395952
NO Cal Slope:	0.997858	1.003275
NO Cal Offset:	0.443186	0.522150
NO ₂ Cal Slope:	1.001189	0.994054
NO ₂ Cal Offset:	-1.443145	-1.155779
NH3 Cal Slope:	1.005013	1.000855
NH3 Cal Offset:	3.755107	2.210125
TN Cal Slope:	1.011495	1.008599
TN Cal Offset:	4.256407	2.771030



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	-1.9	0.2	-2.0		
as found NO	4914	86.2	826.5	826.5		827.9	826.0	1.7	0.998	
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.2	0.4	-1.6		
high NO point	4914	86.2	826.5	826.5		828.0	828.0	0.0	0.998	
NO/O3 point	4914	86.2	826.5	826.5		827.0	824.2	2.8	0.999	
as found NH3	3417	82.6	1800.6		1800.6	1816.3		1801.7	0.991	0.999
new NH3 cyl rp	3417	82.6	1800.6		1800.6					
first NH3	3417	82.6	1800.6		1800.6	1816.3		1801.7	0.991	0.999
second NH3	3454	45.9	1000.5		1000.5	1014.7		1006.8	0.986	0.994
third NH3	3477	22.9	499.2		499.2	510.0		505.1	0.979	0.988
	_		_	_		_	Average Co	rrection Factor	0.9987	0.9938

Corrected As found TN = 829.8 ppb $NO_X = 825.8 \text{ ppb}$ NH3 = 1803.7 ppb **Previous Response** TN = 840.2 ppb $NO_x = 825.1 \text{ ppb}$ NH3 = 1813.4 ppb *Percent Change TN = -1.3%

*Percent Change $NO_X = 0.1\%$ *Percent Change NH3 = -0.5%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 89.1%

NH3 Current Converter Efficiency = 89.1%



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	0.2	0.0	-1.9		
as found span	4914	86.2	826.5	799.7	826.5	826.0	794.7	827.9	1.0005	1.0063
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	-1.2		
high point	4914	86.2	826.5	799.7	826.5	828.0	803.0	828.0	0.9981	0.9959
second point	4957	43.1	413.2	399.9	413.2	415.2	401.0	416.5	0.9953	0.9972
third point	4978	21.6	207.1	200.4	207.1	209.8	202.5	211.2	0.9872	0.9897
							Average C	Correction Factor	0.9935	0.9943
Baseline Corr A	s fnd TN =	829.8 ppb	NO _X = 825.8	ppb NO =	794.7 ppb			*Percent Chang	e TN=	-1.3%
Previous Respo	nse TN =	840.2 ppb	NO _X = 825.1	ppb NO =	798.5 ppb			*Percent Chang	e NO _x =	0.1%
								*Percent Chang	e NO =	-0.5%
								* = > +/-5% change	initiates investigati	ion

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	0.1		
calibration zero			0.0	0.2		
1st GPT point (400 ppb O3)	800.3	399.8	427.2	424.2	1.0071	99.3%
2nd GPT point (200 ppb O3)	800.3	600.2	226.8	224.0	1.0126	98.8%
3rd GPT point (100 ppb O3)	800.3	700.7	126.3	122.7	1.0295	97.1%
				Average Correction Factor	1.0164	98.4%

Notes:

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

Calibration Performed By:

Max Farrell



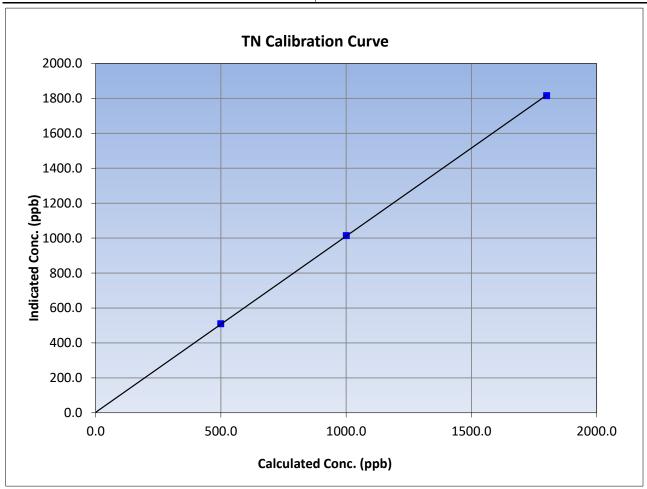
TN Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:28 End Time (MST): 13:31 Analyzer make: Teledyne API T201 Analyzer serial #: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-1.2		Correlation Coefficient	0.999975	≥0.995
1800.6	1816.3	0.9914		0.999975	
1000.5	1014.7	0.9860	Slope	1.008599	0.90 - 1.10
499.2	510.0	0.9788		1.006599	0.90 - 1.10
			Intercept	2.771030	+/-20





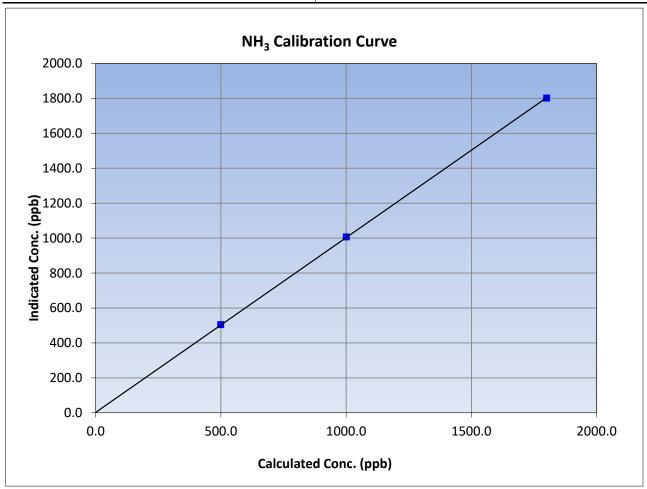
NH₃ Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:28 End Time (MST): 13:31 Teledyne API T201 Analyzer serial #: Analyzer make: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-1.6		Correlation Coefficient	0.999976	≥0.995
1800.6	1801.7	0.9994		0.555570	
1000.5	1006.8	0.9938	Slope	1.000855	0.90 - 1.10
499.2	505.1	0.9883		1.000655	0.90 - 1.10
			Intercept	2.210125	+/-20





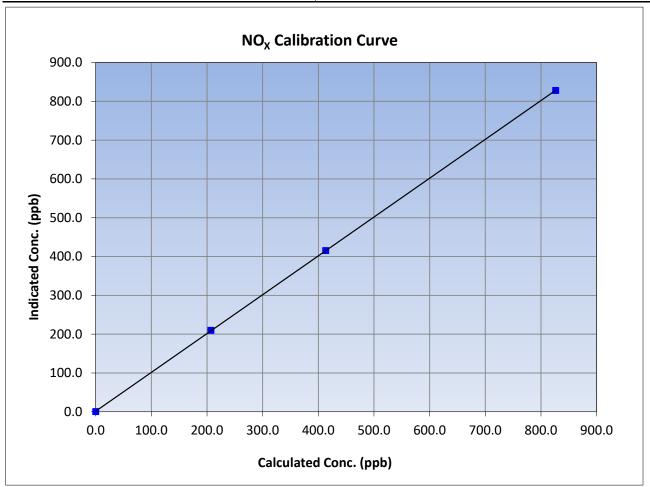
NO_x Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:28 End Time (MST): 13:31 Teledyne API T201 Analyzer serial #: Analyzer make: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999993	≥0.995
826.5	828.0	0.9981		0.999993	
413.2	415.2	0.9953	Slope	1.000699	0.90 - 1.10
207.1	209.8	0.9872		1.000099	
			Intercept	1.395952	+/-20





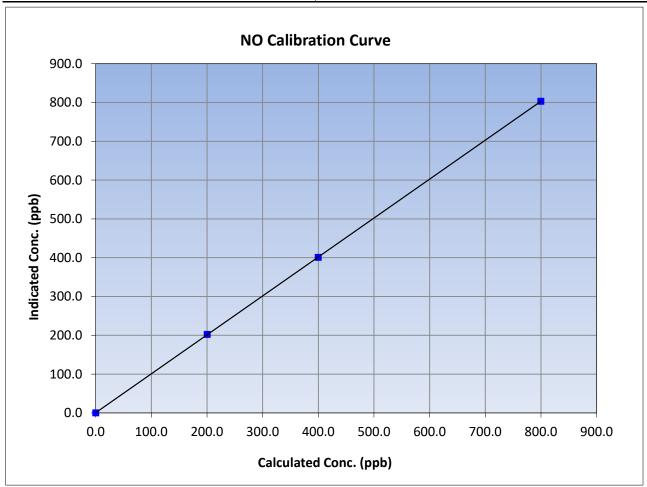
NO Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:28 End Time (MST): 13:31 Analyzer make: Teledyne API T201 Analyzer serial #: 808

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999996	≥0.995
799.7	803.0	0.9959		0.555550	
399.9	401.0	0.9972	Slope	1.003275	0.90 - 1.10
200.4	202.5	0.9897		1.003273	0.90 - 1.10
			Intercept	0.522150	+/-20





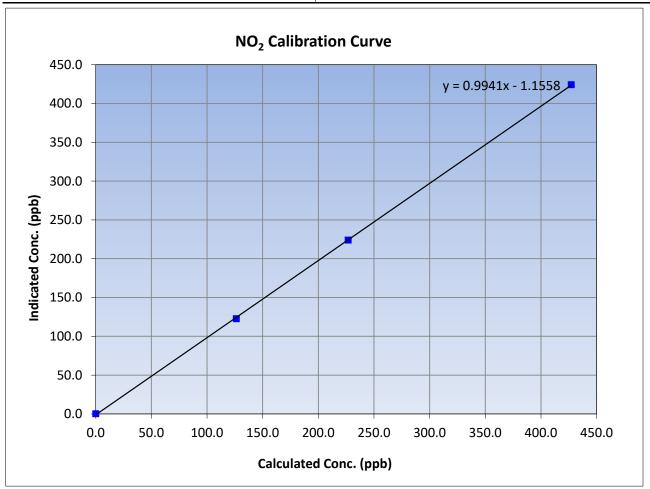
NO₂ Calibration Summary

Version-05-2023

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 6, 2023 Station Name: Patricia McInnes Station Number: AMS 06 Start Time (MST): 9:28 End Time (MST): 13:31 Analyzer serial #: Analyzer make: Teledyne API T201 808

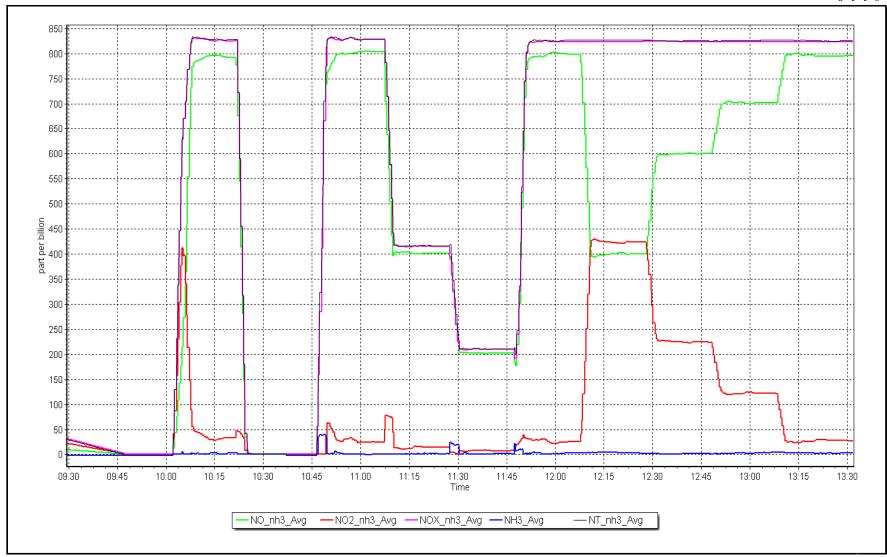
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999945	≥0.995
427.2	424.2	1.0071		0.333343	
226.8	224.0	1.0126	Slope	0.994054	0.90 - 1.10
126.3	122.7	1.0295		0.554054	0.30 - 1.10
			Intercept	-1.155779	+/-20



NO_x Calibration Plot

Date: January 16, 2024 Location: Patricia McInnes



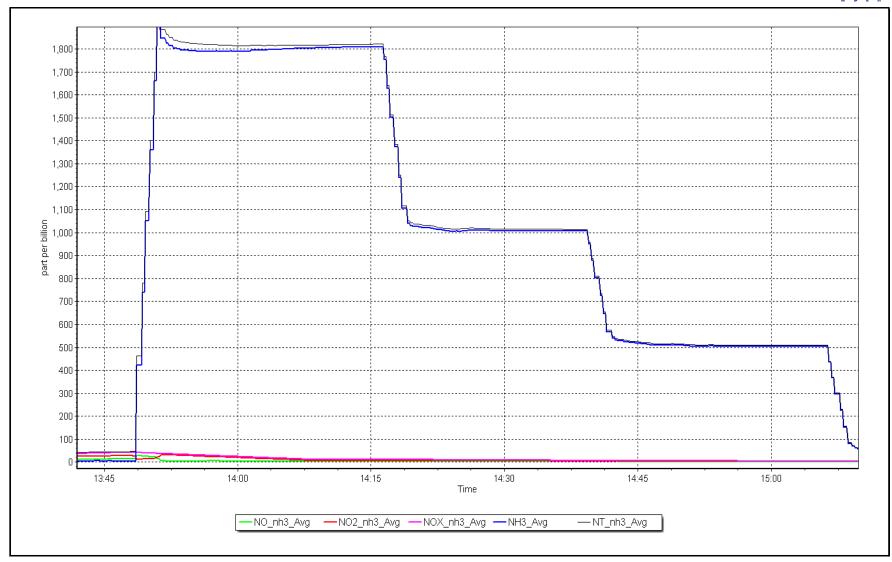


NH₃ Calibration Plot

Date: January 16, 2024

Location: Patricia McInnes







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: January 18, 2024

Start time (MST): 10:20

Routine Reason:

Station number: AMS07

> December 15, 2023 Last Cal Date:

> > 198

End time (MST): 16:00

Calibration Standards

Cal Gas Concentration: 50.06

Cal Gas Cylinder #: CC320556

Removed Cal Gas Conc: 50.52

Removed Gas Cyl #: CC282115 Calibrator Make/Model: **API T700** ZAG Make/Model: **API 701H**

ppm Cal Gas Exp Date: March 10, 2031

> Rem Gas Exp Date: December 29, 2028 -0.3% Diff between cyl: Serial Number: 3805

Analyzer Information

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

1.003653

2.143576

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

Calibration slope: 0.998820 Calibration intercept: 2.284124

Serial Number:

Backgd or Offset: Coeff or Slope: Start 2.59 0.834 **Finish** 2.62 0.846

SO₂ Calibration Data

Set Point	Set Point Dilution air flow rate (sccm)		Calculated concentration (ppb) (Cc)		Correction factor (Cc/lc) Limit = 0.95-1.05	
as found zero	5000	0.0	0.0	0.0		
as found span	4921	79.2	800.2	791.9	1.010	
as found 2nd point						
as found 3rd point						
new cylinder response	4920	79.8	799.0	788.2	1.014	
calibrator zero	5000	0.0	0.0	0.2		
high point	4920	79.8	799.0	802.4	0.996	
second point	4960	39.9	399.5	406.1	0.984	
third point	4980	20.0	200.2	203.7	0.983	
as left zero	5000	0.0	0.0 0.0			
as left span	4920	79.8	799.0	800.1	0.999	
			Avera	ge Correction Factor	0.987	

Baseline Corr As found: 791.90 Previous response 801.54 -1.2% *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

Notes: Calibration gas swapped out after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



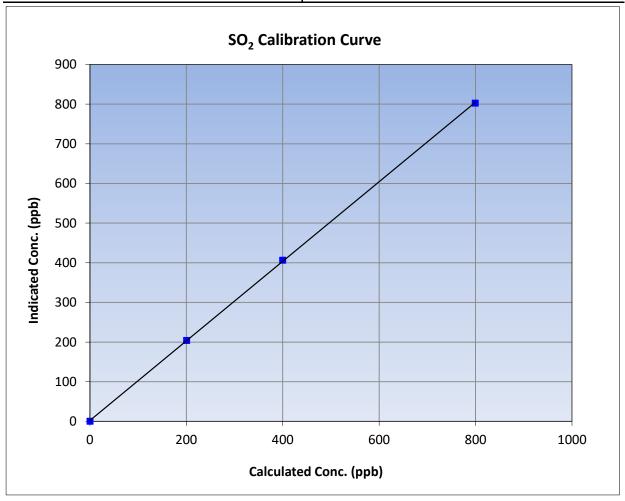
SO₂ Calibration Summary

Version-01-2020

Station Information

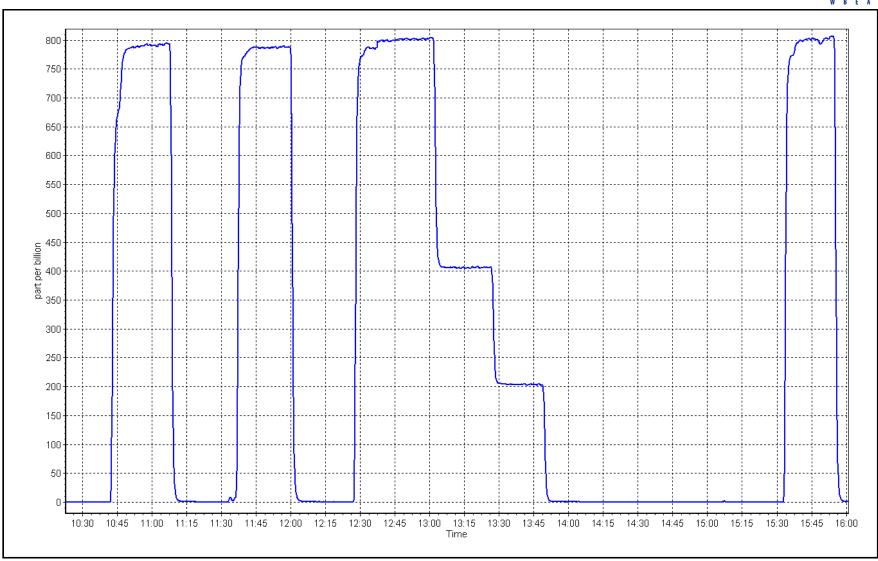
Calibration Date: January 18, 2024 **Previous Calibration:** December 15, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:20 End Time (MST): 16:00 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1507864683

	Calibration Data									
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>					
0.0	0.2		Correlation Coefficient	0.999955	≥0.995					
799.0	802.4	0.9957	Correlation Coefficient	0.999955	20.993					
399.5	406.1	0.9837	Slope	1.003653	0.90 - 1.10					
200.2	203.7	0.9830	Slope	1.003033	0.90 - 1.10					
			- Intercept	2.143576	+/-30					



SO2 Calibration Plot Date: January 18, 2024 Location: Athabasca Valley







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Athabasca Valley Calibration Date: January 9, 2024

Start time (MST): 10:00
Reason: Routine

Station number: AMS07

Last Cal Date: December 31, 2023

End time (MST): 14:00

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC504080

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

Rem Gas Exp Date: NA

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

Analyzer Information

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

Converter make: CDN-101 Converter serial #: 551

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> Calibration slope: 1.012033 1.004826 Backgd or Offset: 2.40 2.35 -0.062267 0.237795 Coeff or Slope: 0.906 Calibration intercept: 0.893

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	77.8	1.020
as found 2nd point	4962	37.7	39.6	39.0	1.018
as found 3rd point	4981	18.9	19.8	19.4	1.028
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4925	75.5	79.3	79.9	0.993
second point	4962	37.7	39.6	40.1	0.988
third point	4981	18.9	19.9	20.2	0.983
as left zero	5000	0.0	0.0	0.6	
as left span	4925	75.5	79.3	79.4	0.999
SO2 Scrubber Check	4920	79.2	800.4	0.4	
Date of last scrubber char	nge:	25-Feb-22		Ave Corr Factor	0.988
Date of last converter efficiency test: April 22, 2022			92.6%	efficiency	

Baseline Corr As found: 77.7 80.16 -3.2% Prev response: *% change: Baseline Corr 2nd AF pt: 0.057909 38.9 AF Slope: 0.981028 AF Intercept: AF Correlation: 0.999991 Baseline Corr 3rd AF pt: 19.3

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

* = > +/-5% change initiates investigation



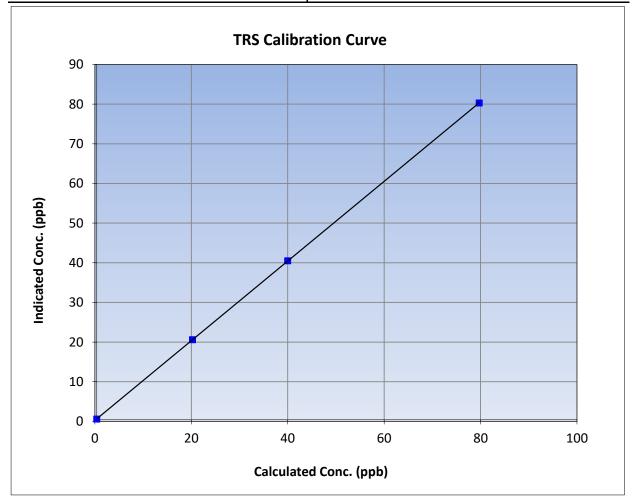
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 9, 2024 **Previous Calibration:** December 31, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:00 End Time (MST): 14:00 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	0.2		Correlation Coefficient	0.999998	≥0.995					
79.3	79.9	0.9926	Correlation coefficient	0.555556	20.333					
39.6	40.1	0.9878	Slope	1.004826	0.90 - 1.10					
19.9	20.2	0.9830	Slope	1.004820	0.90 - 1.10					
			- Intercept	0.237795	+/-3					

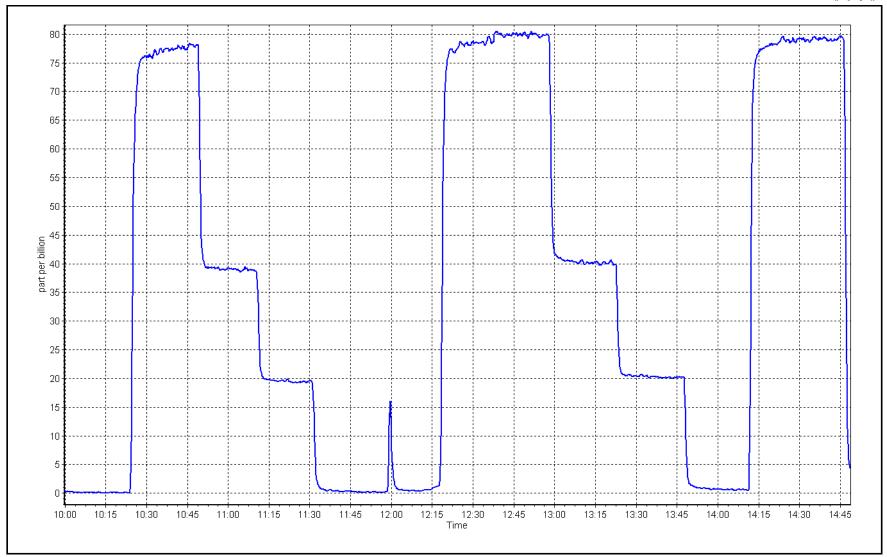




Date: January 9, 2024

Location: Athabasca Valley







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Athabasca Valley

Calibration Date: January 18, 2024

Start time (MST): 10:20 Reason: Routine Station number: AMS07

Last Cal Date: December 15, 2023

End time (MST): 16:00

Calibration Standards

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

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

C3H8 Cal Gas Conc. 205.0 ppm

Removed Gas Cert: CC282115 Removed Gas Expiry: December 29, 2028

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

Removed C3H8 Conc. 208.7 ppm Diff between cyl (THC): 1.9% Diff between cyl (CH_4): 0.5% Diff between cyl (NM): 3.2%

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

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

Finish Start Start Finish CH4 SP Ratio: 0.000251 NMHC SP Ratio: 4.42E-05 N/A N/A CH4 Retention time: 13.8 N/A NMHC Peak Area: 205554 N/A

Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	17.03	17.25	0.987
as found 2nd point					
as found 3rd point					
new cylinder response	4920	79.8	16.91	17.47	0.968
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	16.91	17.02	0.994
second point	4960	39.9	8.46	8.51	0.994
third point	4980	20.0	4.24	4.26	0.995
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	16.91	17.03	0.993
			Av	verage Correction Factor	0.994
Baseline Corr AF:	17.25	Prev response	17.14	*% change	0.6%

Baseline Corr AF: 17.25 Prev response 17.14 *% change 0.6
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 Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	9.09	9.16	0.993
as found 2nd point					
as found 3rd point					
new cylinder response	4920	79.8	9.00	9.37	0.960
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	9.00	9.10	0.989
second point	4960	39.9	4.50	4.59	0.980
third point	4980	20.0	2.26	2.33	0.967
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.00	9.12	0.987
			Aver	age Correction Factor	0.979
Baseline Corr AF:	9.16	Prev response	9.18	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
		Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
Set Point	Dil air flow rate	CH4 Calibrat		Indicans (nam) (Is)	CF Limit- 0.0F 1.0F
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	7.94	8.09	0.982
as found 2nd point					
as found 3rd point					
new cylinder response					
,	4920	79.8	7.92	8.10	0.977
	5000	0.0	0.00	0.00	
calibrator zero high point					
calibrator zero high point	5000	0.0	0.00	0.00	
calibrator zero high point second point	5000 4920	0.0 79.8	0.00 7.92	0.00 7.92	0.999
calibrator zero high point second point third point	5000 4920 4960	0.0 79.8 39.9	0.00 7.92 3.96	0.00 7.92 3.92	0.999 1.009
calibrator zero	5000 4920 4960 4980	0.0 79.8 39.9 20.0	0.00 7.92 3.96 1.98	0.00 7.92 3.92 1.93	0.999 1.009 1.028
calibrator zero high point second point third point as left zero	5000 4920 4960 4980 5000	0.0 79.8 39.9 20.0 0.0	0.00 7.92 3.96 1.98 0.00 7.92	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor	0.999 1.009 1.028
calibrator zero high point second point third point as left zero as left span	5000 4920 4960 4980 5000	0.0 79.8 39.9 20.0 0.0	0.00 7.92 3.96 1.98 0.00 7.92	0.00 7.92 3.92 1.93 0.00 7.92	0.999 1.009 1.028
calibrator zero high point second point third point as left zero	5000 4920 4960 4980 5000 4920	0.0 79.8 39.9 20.0 0.0 79.8	0.00 7.92 3.96 1.98 0.00 7.92	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor	0.999 1.009 1.028 1.000 1.012
calibrator zero high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4920 4960 4980 5000 4920	0.0 79.8 39.9 20.0 0.0 79.8	0.00 7.92 3.96 1.98 0.00 7.92	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor *% change	0.999 1.009 1.028 1.000 1.012 1.5%
calibrator zero high point second point third point as left zero as left span Baseline Corr AF:	5000 4920 4960 4980 5000 4920 8.09 NA	0.0 79.8 39.9 20.0 0.0 79.8 Prev response AF Slope:	0.00 7.92 3.96 1.98 0.00 7.92 Avers	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor *% change AF Intercept:	0.999 1.009 1.028 1.000 1.012 1.5%
calibrator zero high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4920 4960 4980 5000 4920 8.09 NA	0.0 79.8 39.9 20.0 0.0 79.8 Prev response AF Slope: AF Correlation:	0.00 7.92 3.96 1.98 0.00 7.92 Avers	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor *% change AF Intercept:	0.999 1.009 1.028 1.000 1.012 1.5%
calibrator zero high point second point third point as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4920 4960 4980 5000 4920 8.09 NA	0.0 79.8 39.9 20.0 0.0 79.8 Prev response AF Slope: AF Correlation: Calibration	0.00 7.92 3.96 1.98 0.00 7.92 Avers	0.00 7.92 3.92 1.93 0.00 7.92 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate	0.999 1.009 1.028 1.000 1.012 1.5%

0.000457

1.005894

-0.023559

1.006942

0.023816

Notes:

THC Cal Offset:

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Calibration cylinder swapped out after as founds. Span adjusted. Could not get as left diagnostics due to instrument going offline during as lefts.

-0.000562

1.002531

-0.029927

1.009365

0.028966

Calibration Performed By: Aswin Sasi Kumar



THC Calibration Summary

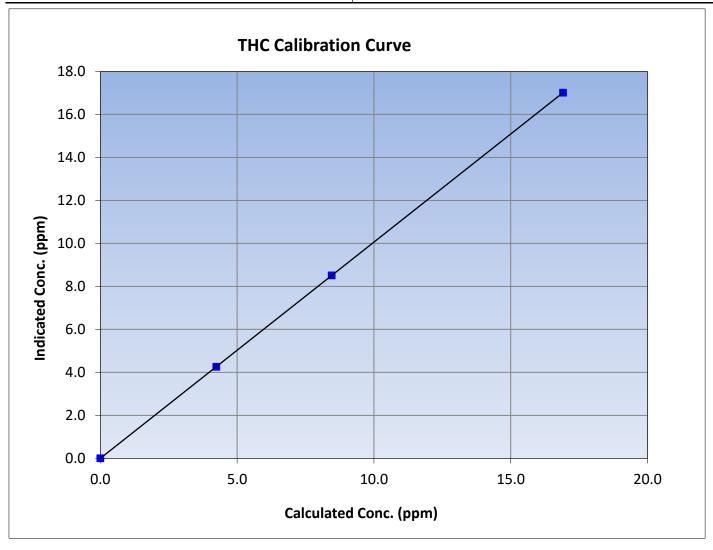
Version-06-2022

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 15, 2023

Station Name:Athabasca ValleyStation Number:AMS07Start Time (MST):10:20End Time (MST):16:00Analyzer make:Thermo 55iAnalyzer 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	1.000000	≥0.995
16.91	17.02	0.9939	Correlation Coemicient	1.000000	20.333
8.46	8.51	0.9935	Slope	1.006214	0.90 - 1.10
4.24	4.26	0.9946	Slope	1.000214	0.30 - 1.10
			Intercept	-0.000562	+/-0.5





CH₄ Calibration Summary

Version-06-2022

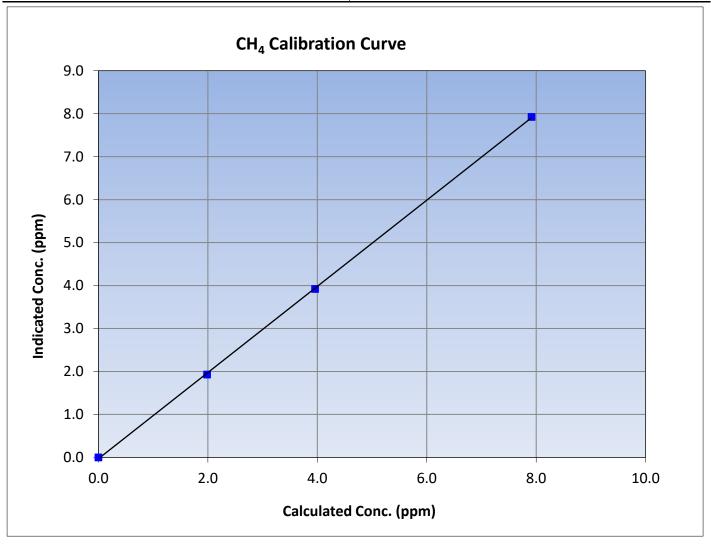
Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 15, 2023
Station Name: Athabasca Valley Station Number: AMS07

Start Time (MST): 10:20 End Time (MST): 16:00

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	0.999935	≥0.995
7.92	7.92	0.9993	Correlation Coemicient	0.999955	20.995
3.96	3.92	1.0092	Slope	1.002531	0.90 - 1.10
1.98	1.93	1.0280	Slope	1.002331	0.90 - 1.10
			Intercept	-0.029927	+/-0.5





NMHC Calibration Summary

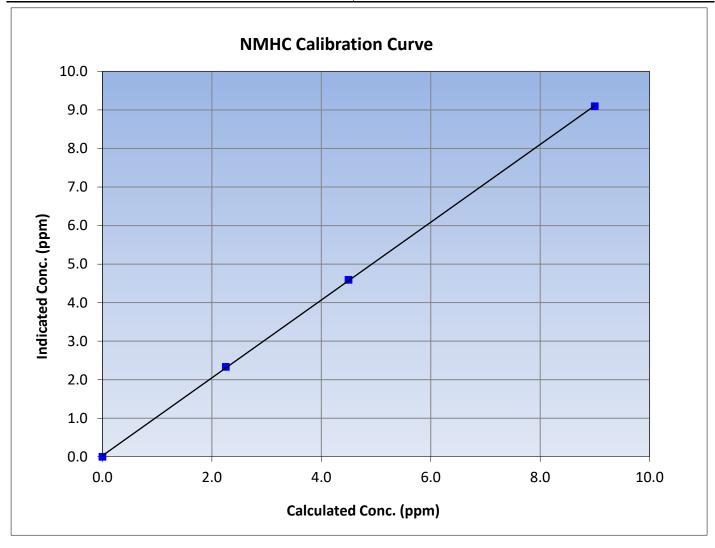
Version-06-2022

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 15, 2023 Station Name: Station Number: AMS07

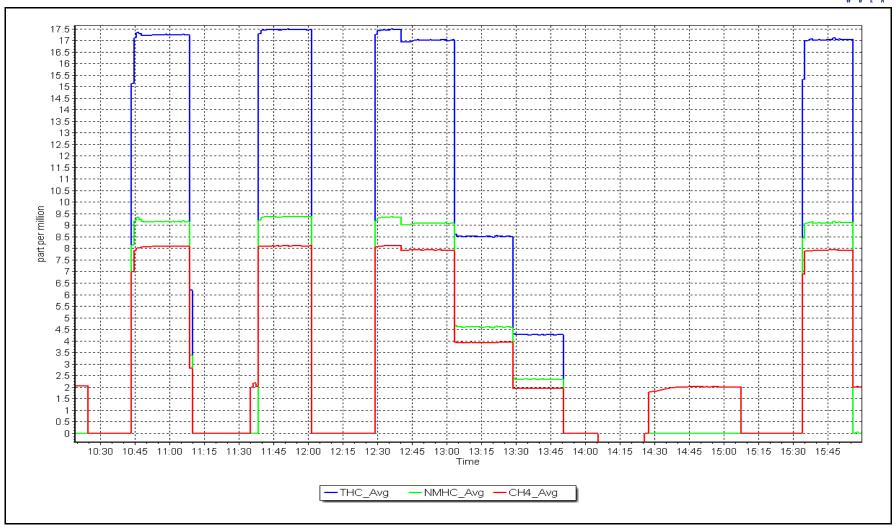
Start Time (MST): 10:20 End Time (MST): 16:00
Analyzer make: Thermo 55i Analyzer serial #: 1152430012

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999953	≥0.995
9.00	9.10	0.9893	Correlation Coefficient	0.999933	20.333
4.50	4.59	0.9803	Slope	1.009365	0.90 - 1.10
2.26	2.33	0.9674	Slope	1.009303	0.90 - 1.10
			Intercept	0.028966	+/-0.5



NMHC Calibration Plot Date: January 18, 2024 Location: Athabasca Valley







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Athabasca Valley

Calibration Date: January 5, 2024

Start time (MST): 10:20 Reason: Routine Station number: AMS07

Last Cal Date: December 13, 2023

End time (MST): 16:00

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

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

NOX gas Diff: NO gas Diff:

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

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1160120024

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.095 1.092 NO bkgnd or offset: 7.7 7.7 NOX coeff or slope: 0.994 0.994 NOX bkgnd or offset: 7.9 7.9 Reaction cell Press: NO2 coeff or slope: 1.000 1.000 212.7 216.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999335	0.998118
NO _x Cal Offset:	1.718942	1.478599
NO Cal Slope:	1.000317	1.000317
NO Cal Offset:	1.435177	1.135182
NO ₂ Cal Slope:	0.998685	1.000671
NO ₂ Cal Offset:	0.269234	0.394845



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/lc) 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	821.5	804.0	17.6	0.9942	0.9959
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
high point	4920	80.2	816.7	800.7	16.0	815.6	801.2	14.4	1.0014	0.9994
second point	4960	40.1	408.4	400.4	8.0	411.0	403.1	8.0	0.9936	0.9932
third point	4980	20.0	203.7	199.7	4.0	205.2	201.4	3.8	0.9926	0.9915
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4920	80.2	816.7	398.9	417.8	820.7	399.2	421.7	0.9952	0.9992
							Average C	orrection Factor	0.9959	0.9947
Corrected As fou	und NO _X =	821.6 ppb	NO =	= 804.1 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chan	ge NO _x =	0.5%
Previous Respon	ise NO _x =	817.9 ppb	NO =	= 802.4 ppb				*Percent Chan	ge NO =	0.2%
Baseline Corr 2n	d pt NO _X =	NA ppb	NO =	NA ppb	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:	
				(GPT Calibration	Data				
O3 Setpoir	nt (ppb)	Indicated NO Ref		icated 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 (400 ppb O3)	798.4		396.6	417.8		418.4	0.9987	7	100.1%
2nd GPT point ((200 ppb O3)	798.4		599.7	214.7		215.4	0.9969) :	100.3%
3rd GPT point (100 ppb O3)	798.4		698.4	116.0		116.7	0.9943	3	100.6%

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

100.3%

0.9966

Average Correction Factor



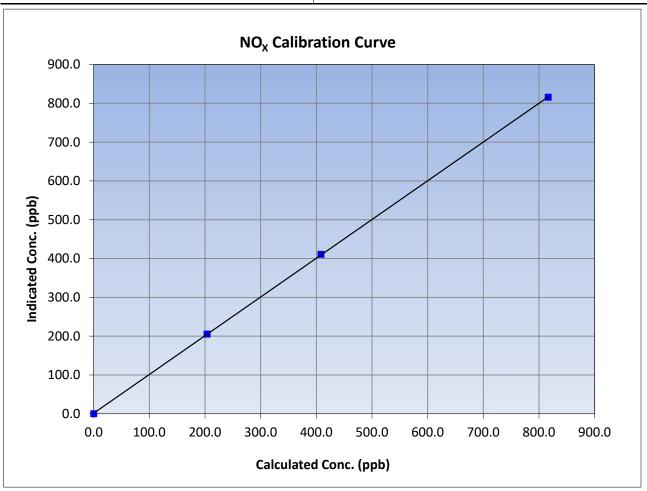
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:20 End Time (MST): 16:00 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	0.2		Correlation Coefficient	0.999982	≥0.995
816.7	815.6	1.0014	correlation coemicient	0.555562	20.333
408.4	411.0	0.9936	Slope	0.998118	0.90 - 1.10
203.7	205.2	0.9926	Slope	0.990110	0.30 - 1.10
			Intercept	1.478599	+/-20





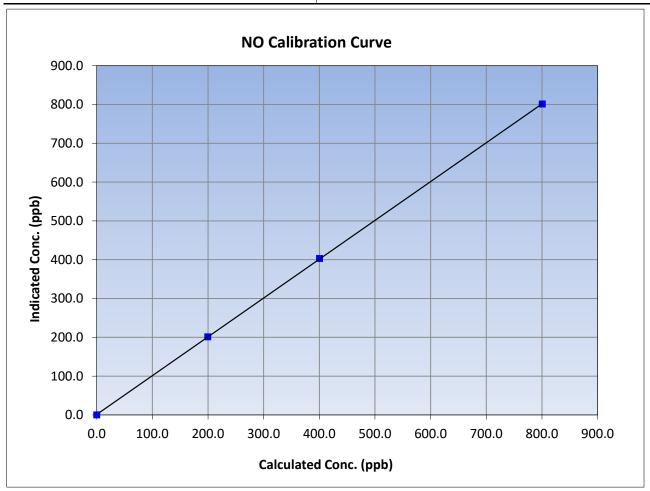
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:20 End Time (MST): 16:00 Analyzer make: Thermo 42i Analyzer serial #: 1160120024

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999987	≥0.995
800.7	801.2	0.9994	Correlation Coefficient	0.999987	20.993
400.4	403.1	0.9932	Slope	1.000317	0.90 - 1.10
199.7	201.4	0.9915	Slope	1.000517	0.90 - 1.10
			Intercept	1.135182	+/-20





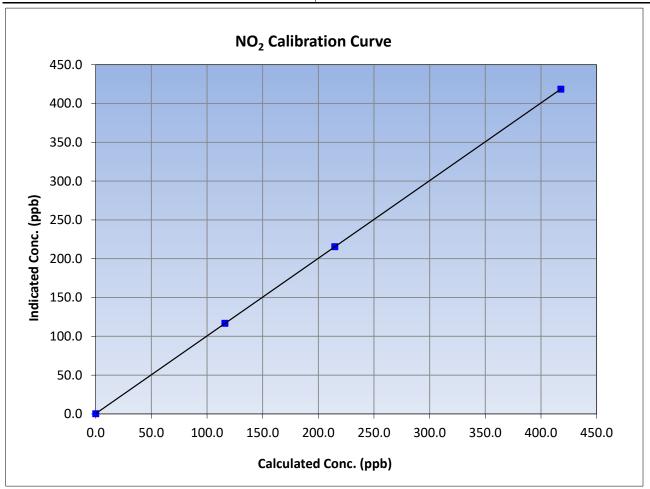
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 13, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 10:20 End Time (MST): 16:00 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	0.2		Correlation Coefficient	0.999999	≥0.995
417.8	418.4	0.9987	Correlation Coefficient	0.555555	20.993
214.7	215.4	0.9969	Slope	1.000671	0.90 - 1.10
116.0	116.7	0.9943	Siope	1.000671	0.90 - 1.10
			Intercept	0.394845	+/-20

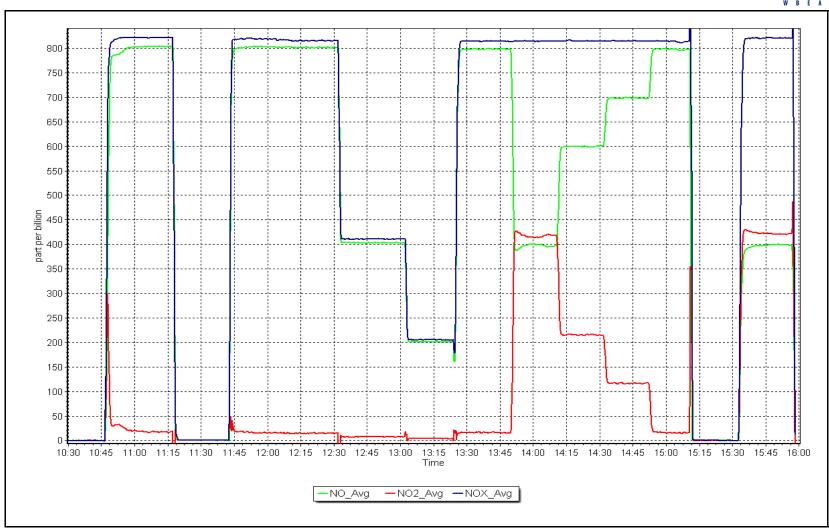


NO_x Calibration Plot

Date: January 5, 2024

Location: Athabasca Valley







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Athabasca Valley

Calibration Date: January 12, 2024

Start time (MST): 12:45
Reason: Routine

Station number: AMS07

Last Cal Date: December 14, 2023

End time (MST): 15:52

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 Backgd or Offset: Calibration slope: 0.994743 0.995143 -2.7 -1.6 0.500000 Coeff or Slope: Calibration intercept: 0.420000 1.549 1.549

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	0.4	
as found span	5000	1414.8	400.0	397.1	1.007
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	1415.7	400.0	398.5	1.004
second point	5000	1039.9	200.0	199.5	1.003
third point	5000	856.2	100.0	100.3	0.997
as left zero	5000	0.0	0.0	0.4	
as left span	5000	1416.0	400.0	399.7	1.001
			Averag	ge Correction Factor	1.001
Baseline Corr As found:	396.7	Previous respons	e 398.3	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope	<u>e</u> :	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

* = > +/-5% change initiates investigation



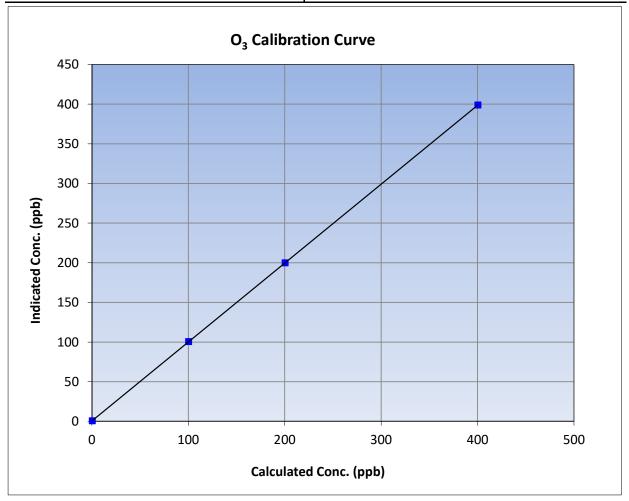
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 12, 2024 **Previous Calibration:** December 14, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 12:45 End Time (MST): 15:52 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	0.3		Correlation Coefficient	0.999999	≥0.995			
400.0	398.5	1.0038	Correlation coefficient	0.555555	20.333			
200.0	199.5	1.0025	Slope	0.995143	0.90 - 1.10			
100.0	100.3	0.9970	Slope	0.555145	0.90 - 1.10			
			- Intercept	0.500000	+/- 5			

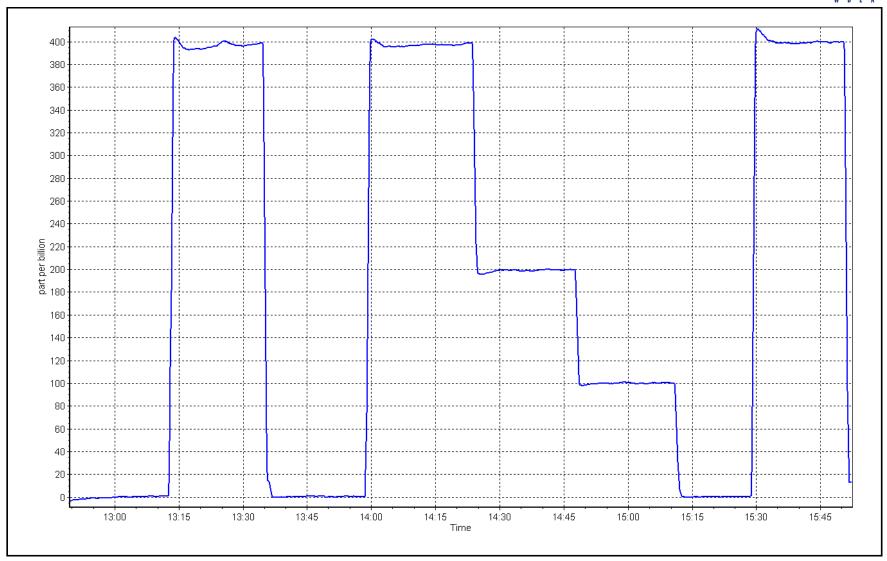


O₃ Calibration Plot

Date: January 12, 2024

Location: Athabasca Valley







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	ı		
Station Name:	Athabasca Valley		Station number:	AMS 07	
Calibration Date:	January 18, 2024			December 13, 2023	
Start time (MST):	14:03		End time (MST):	15:49	
Analyzer Make:	API T640		S/N:	645	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388754	
Temp/RH standard:	Alicat FP-25BT		S/N:	388754	
		Monthly Calibration T	est		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-14.8	-15.7	-14.8		+/- 2 °C
P (mmHg)	756.4	754.2	756.4		+/- 10 mmHg
flow (LPM)	5.01	5.12	5.01		+/- 0.25 LPM
Leak Test:	Date of check:	January 18, 2024	Last Cal Date:	December 13, 2023	
	PM w/o HEPA:	3.5	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be			erve as the pre mair	itenance leak check	
Inlet cleaning:	Inlet Head	✓			
		Quarterly Calibration 1	Test		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	N/A	N/A	N/A		10.9 +/- 0.5
Doot maintanana	a laak ahaalu	DA4/- UEDA.		/	
Post-maintenance Date Optical Cham		PM w/o HEPA: N/A		w/ HEPA:	<0.2 ug/m3
Disposable Filter	_	N/A			10.2 46/1113
·	_	•	_		
		Annual Maintenanc	e		
Date Sample Tub	ne Cleaned:	December 5	5 2022		
Date RH/T Senso	_	December 5	·		
	Lalak basad kasa dan a	fd-bdd			Landa da ada
Notes:	iniet nead trap jar w	as found shattered, repla	aced jar. Temp, flow done.	and pressure checked	. Leaк спеск
Calibration by:	Aswin Sasi Kumar				



CO Calibration Report

Version-01-2020

Station Information

Athabasca Valley Station Name:

Calibration Date: January 2, 2024

11:50 Start time (MST):

Reason: Routine Station number: AMS07

> Last Cal Date: December 8, 2023

End time (MST): 15:24

Calibration Standards

Cal Gas Concentration: 3,000 ppm

Cal Gas Cylinder #: LL66942

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

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

Cal Gas Exp Date: December 12, 2026

> Rem Gas Exp Date: NA Diff between cyl:

3805 Serial Number: 198 Serial Number:

Analyzer Information

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

ppm

Analyzer Range: 0 - 50 ppm

Finish Start

Calibration slope: 1.000200 0.993944

<u>Start</u> 4.331 **Finish** 4.425

Backgd or Offset: Coeff or Slope: Calibration intercept: 0.158544 0.080556 1.087 1.087

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4933	66.7	40.0	40.1	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.0	39.8	1.006
second point	4967	33.3	20.0	20.1	0.995
third point	4983	16.7	10.0	10.1	0.996
as left zero	5000	0.0	0.0	0.0	
as left span	4933	66.7	40.0	39.8	1.006
		_	Avera	ge Correction Factor	0.999

Baseline Corr As found: 39.97 Prev response: 40.19 *% change: -0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: AF Correlation: NA

Zero adjusted. Notes:

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



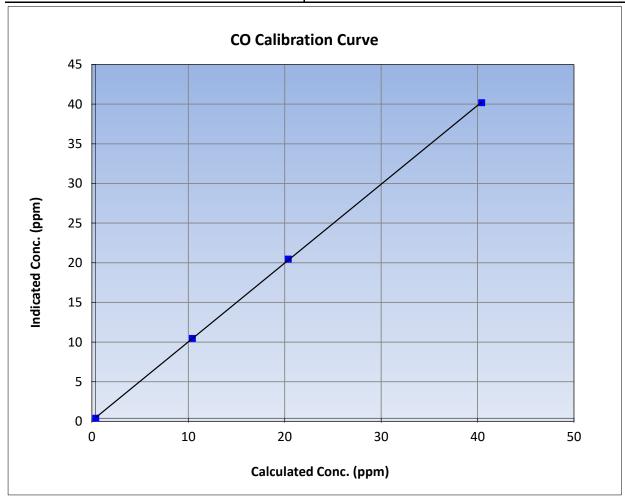
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 2, 2024 **Previous Calibration:** December 8, 2023 Station Name: Athabasca Valley Station Number: AMS07 Start Time (MST): 11:50 End Time (MST): 15:24 Analyzer make: Thermo 48i-LTE Analyzer serial #: 1408761381

Calibration Data								
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999966	≥0.995			
40.0	39.8	1.0058	Correlation Coefficient	0.555500	20.333			
20.0	20.1	0.9955	Slope	0.993944	0.90 - 1.10			
10.0	10.1	0.9961	Slope	0.333344	0.30 - 1.10			
			- Intercept	0.080556	+/-1.5			

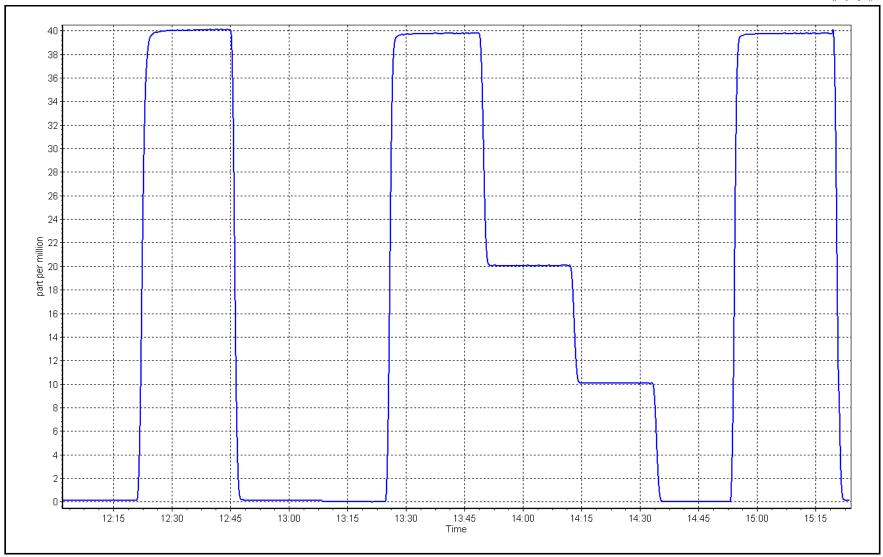


CO Calibration Plot

Date: January 2, 2024

Location: Athabasca Valley







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort Chipewyan

January 18, 2024 Last Cal Date: Calibration Date:

Start time (MST): 15:22

Reason: Routine Station number: AMS08

December 13, 2023

End time (MST): 18:13

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 Diff between cyl: Removed Gas Cyl #: NA

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

Analyzer Information

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

Analyzer Range 0 - 1000 ppb

Start **Finish** Start Finish Backgd or Offset: Calibration slope: 0.988680 1.002560 4.62 4.56

Calibration intercept: -0.942140 -1.305017 Coeff or Slope: 0.965 0.989

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-3.0	
as found span	4920	80.3	800.4	778.7	1.028
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-2.7	
high point	4920	80.3	800.4	800.8	0.999
second point	4960	40.2	400.7	400.0	1.002
third point	4980	20.1	200.4	201.7	0.993
as left zero	5000	0.0	0.0	-2.5	
as left span	4920	80.3	800.4	803.0	0.997
			Averag	ge Correction Factor	0.998

Baseline Corr As found: 781.70 790.38 Previous response *% change -1.1%

* = > +/-5% change initiates investigation

changed inlet filters after as founds. Made adjustment to span. Notes:

Calibration Performed By: Morgan Voyaguer



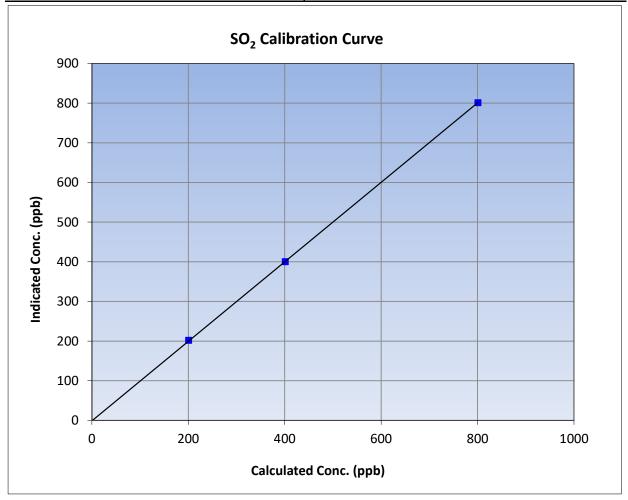
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 18, 2024 **Previous Calibration:** December 13, 2023 Station Name: December 13, 2023 Station Number: Fort Chipewyan Start Time (MST): 15:22 End Time (MST): 18:13 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	-2.7		Correlation Coefficient	0.999981	≥0.995			
800.4	8.008	0.9995	Correlation Coefficient	0.555501	20.333			
400.7	400.0	1.0017	Slope	1.002560	0.90 - 1.10			
200.4	201.7	0.9933	Slope	1.002300	0.90 - 1.10			
			- Intercept	-1.305017	+/-30			

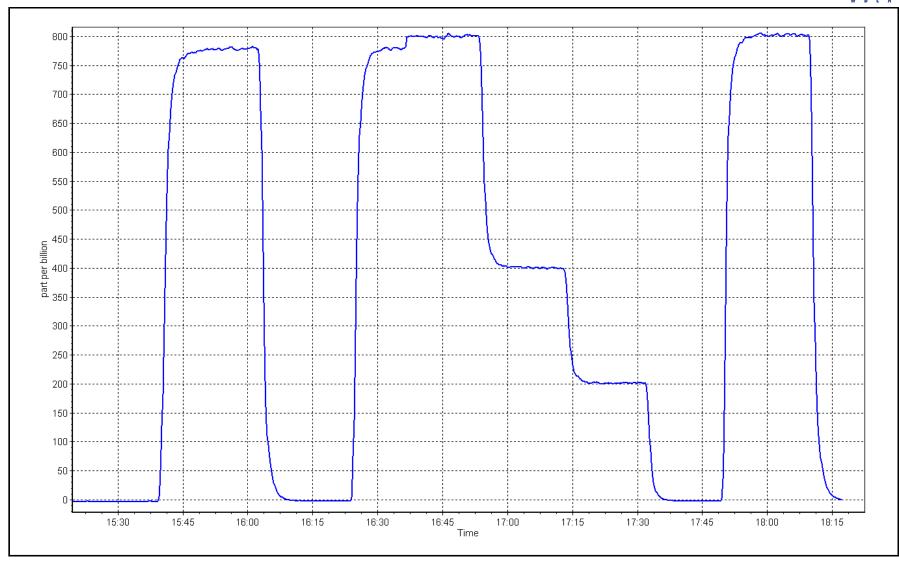


SO2 Calibration Plot

Date: January 18, 2024

Location: Fort Chipewyan







SO₂ Calibration Report

Station number:

AMS08

Version-01-2020

Station Information

Station Name: Fort Chipewyan

Calibration Date: January 31, 2024 Last Cal Date: January 18, 2024

Start time (MST): 7:20

Reason: Maintenance

End time (MST): 22:30

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

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

Analyzer Information

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

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:1.0025600.995420Backgd or Offset:4.561.86

Calibration intercept: -1.305017 1.396452 Coeff or Slope: 0.989 0.989

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-3.1	
as found span	4920	80.3	800.4	796.5	1.005
as found 2nd point	4960	40.2	400.7	396.2	1.011
as found 3rd point	4980	20.1	200.4	200.6	0.999
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4920	80.3	800.4	797.8	1.003
second point	4960	40.2	400.7	399.6	1.003
third point	4980	20.1	200.4	203.4	0.985
as left zero					
as left span					

Average Correction Factor 0.997

801.13

*% change -0.2%

* = > +/-5% change initiates investigation

Notes: Pump replaced after multipoint as founds. Zero adjusted only.

Previous response

Calibration Performed By: Devin Russell

799.60

Baseline Corr As found:



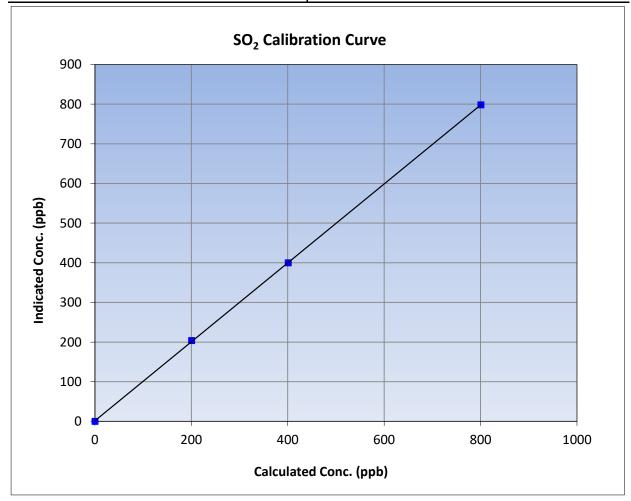
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 31, 2024 **Previous Calibration:** January 18, 2024 Station Name: December 13, 2023 Station Number: Fort Chipewyan Start Time (MST): 7:20 End Time (MST): 22:30 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1136451241

Calibration Data								
Calculated concentration Indicated concentration Correction (ppb) (Cc) (ppb) (Ic) (Cc/			Statistical Evalua	ation	<u>Limits</u>			
0.0	-0.2		Correlation Coefficient	0.999972	≥0.995			
800.4	797.8	1.0032	Correlation Coefficient	0.999972	20.993			
400.7	399.6	1.0027	Slope	0.995420	0.90 - 1.10			
200.4	203.4	0.9850	Siope	0.995420	0.90 - 1.10			
			- Intercept	1.396452	+/-30			

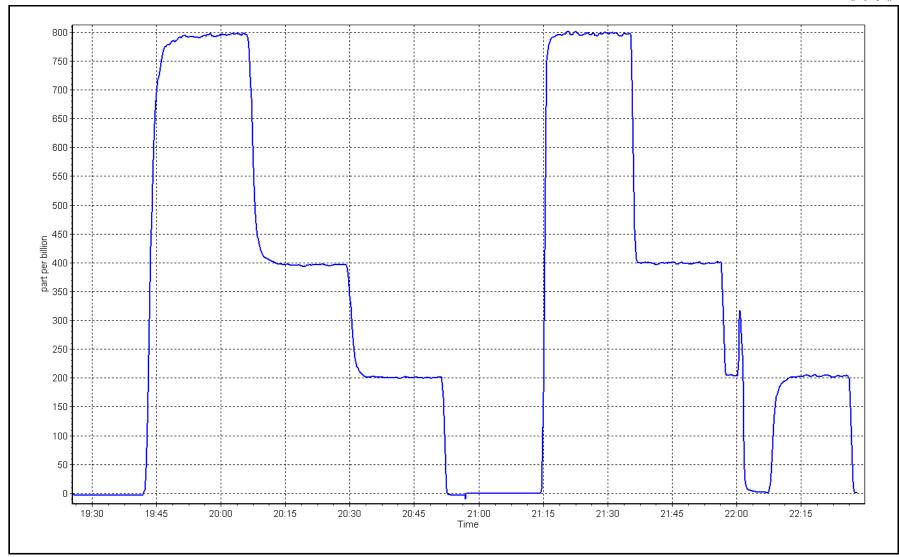


SO2 Calibration Plot

Date: January 31, 2024

Location: Fort Chipewyan





TRS Calibration Report

Station number:

Last Cal Date:

Version-11-2021

Station Information

Station Name: Fort Chipewyan Calibration Date: January 26, 2024

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

End time (MST): 18:28

AMS08

December 15, 2023

Calibration Standards

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

Cal Gas Cylinder #: EY0002276

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

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

Analyzer Information

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

CDN-101 Converter serial #: 14639 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish Start** <u>Finish</u> 0.988139 Calibration slope: 0.988284 Backgd or Offset: 0.99 0.99 0.678668 0.598606 Calibration intercept: Coeff or Slope: 0.741 0.741

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.5	
as found span	4920	80.5	80.0	79.4	1.014
as found 2nd point	4960	40.2	40.0	40.1	1.009
as found 3rd point	4980	20.1	20.0	20.5	0.999
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.5	
high point	4920	80.5	80.0	79.6	1.005
second point	4960	40.2	40.0	40.2	0.994
third point	4980	20.1	20.0	20.4	0.979
as left zero	5000	0.0	0.0	0.6	
as left span	4920	80.5	80.0	79.8	1.003
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	
Date of last scrubber ch	ange:	March 7, 2022		Ave Corr Factor	0.993
Date of last converter efficiency test:		March 15, 2022		100.7%	efficiency

Baseline Corr As found: 78.9 Prev response: 79.74 *% change: -1.1% Baseline Corr 2nd AF pt: 0.658554 39.6 AF Slope: 0.985141 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999982 20.0

* = > +/-5% change initiates investigation

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

Calibration Performed By: Matthew Courtoreille



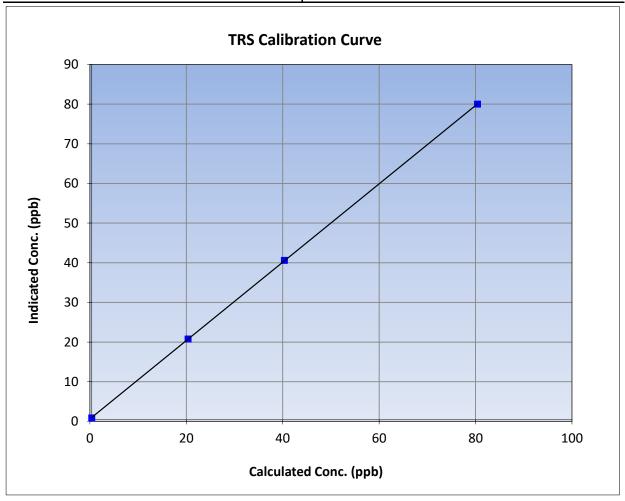
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 26, 2024 **Previous Calibration:** December 15, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 14:46 End Time (MST): 18:28 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169744

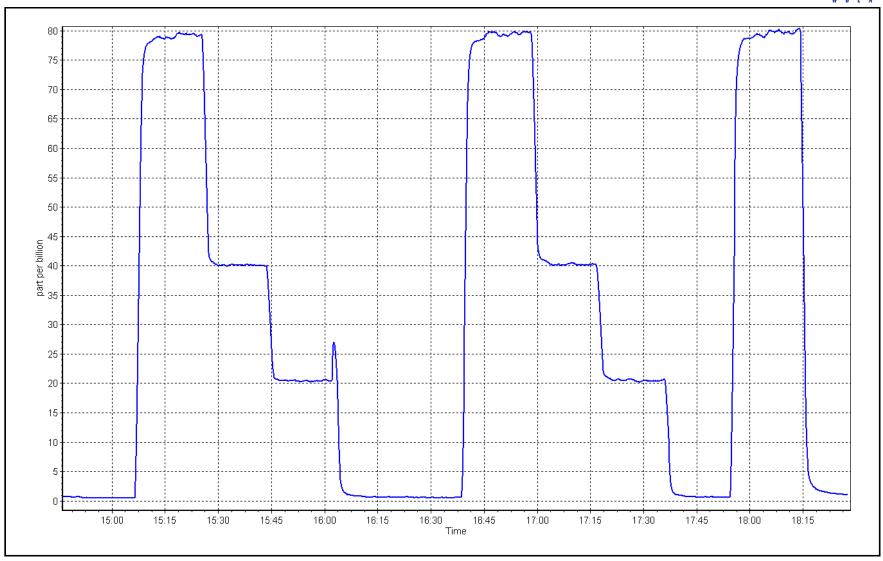
Calibration Data					
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999991	≥0.995
80.0	79.6	1.0051			
40.0	40.2	0.9940	Slope	0.988284	0.90 - 1.10
20.0	20.4	0.9794	Siope		
			- Intercept	0.598606	+/-3



TRS Calibration Plot

Date: January 26, 2024 Location: Fort Chipewyan







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort Chipewyan

Calibration Date: January 10, 2024

Start time (MST): 9:04
Reason: Routine

Station number: AMS08

Last Cal Date: December 7, 2023

End time (MST): 13:32

Calibration Standards

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

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

Removed Cylinder #: NA Removed Gas Exp Date: NA

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

NOX gas Diff: NO gas Diff:

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

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: 1.138 1.138 NO bkgnd or offset: 10.4 10.3 NOX coeff or slope: 0.992 0.992 NOX bkgnd or offset: 11.3 11.3 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 141.2 141.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.993574	1.009182
NO _x Cal Offset:	-0.140000	1.020000
NO Cal Slope:	0.992303	1.007925
NO Cal Offset:	-0.220000	1.260000
NO ₂ Cal Slope:	0.994878	1.010781
NO ₂ Cal Offset:	0.734900	-3.206174



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	-1.4	-0.4	-1.0		
as found span	4918	82.0	800.3	800.3	0.0	808.3	806.6	1.8	0.9901	0.9922
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.3	-0.2	-1.0		
high point	4918	82.0	800.3	800.3	0.0	808.4	808.1	-0.1	0.9900	0.9904
second point	4959	41.0	400.2	400.2	0.0	403.4	402.6	0.8	0.9920	0.9939
third point	4980	20.5	200.1	200.1	0.0	207.0	206.2	0.9	0.9666	0.9703
as left zero	5000	0.0	0.0	0.0	0.0	-1.3	-0.3	-1.0		
as left span	4918	82.0	800.3	394.3	406.0	802.6	404.5	397.8	0.9972	0.9748
							Average C	Correction Factor	0.9828	0.9849
Corrected As fo	ound NO _X =	809.7 ppb	NO	= 807.0 ppb	* = > +/-59	% change initiates	investigation	*Percent Chan	ge NO _x =	1.8%
Previous Respo	nse NO _X =	795.0 ppb	NO	= 793.9 ppb				*Percent Chan	ge NO =	1.6%
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 Setpo	int (ppb)	Indicated NO Ref		dicated NO Drop ecentration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	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)	821.9		415.9	406.0		409.9	0.9905	5 :	101.0%
2nd GPT point	(200 ppb O3)	821.9		612.9	209.0		202.4	1.0326	5	96.8%
3rd GPT point	(100 ppb O3)	821.9		720.4	101.5		100.1	1.0140)	98.6%

Notes:

sampled inlet filter changed after as founds. No adjustments made.

Average Correction Factor

1.0124

Calibration Performed By: Matthew C

98.8%



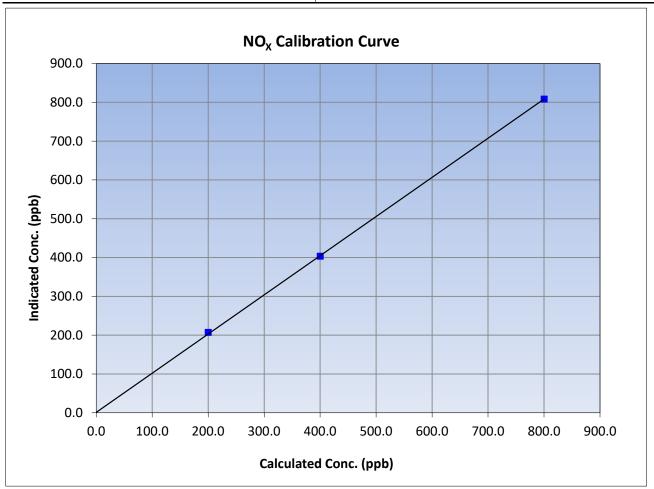
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 7, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 9:04 End Time (MST): 13:32 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	-1.3		Correlation Coefficient	0.999932	≥0.995
800.3	808.4	0.9900	Correlation Coefficient	0.555552	20.333
400.2	403.4	0.9920	Slone	1.009182	0.90 - 1.10
200.1	207.0	0.9666	0.9666 Slope		0.90 - 1.10
			Intercept	1.020000	+/-20





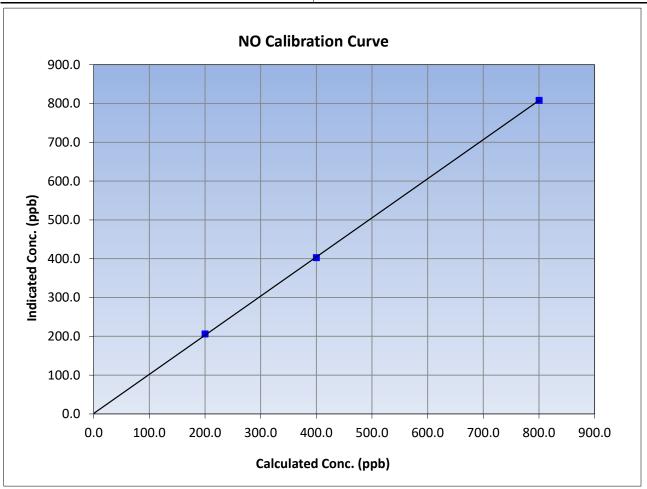
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 7, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 9:04 End Time (MST): 13:32 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	prrection factor (Cc/Ic) Statistical Evaluation		<u>Limits</u>	
0.0	-0.2		Correlation Coefficient	0.999953	≥0.995	
800.3	808.1	0.9904	correlation coemicient	0.999933	20.555	
400.2	402.6	0.9939	Clono	1.007925	0.90 - 1.10	
200.1	206.2	0.9703	0.9703 Slope		0.90 - 1.10	
			Intercept	1.260000	+/-20	





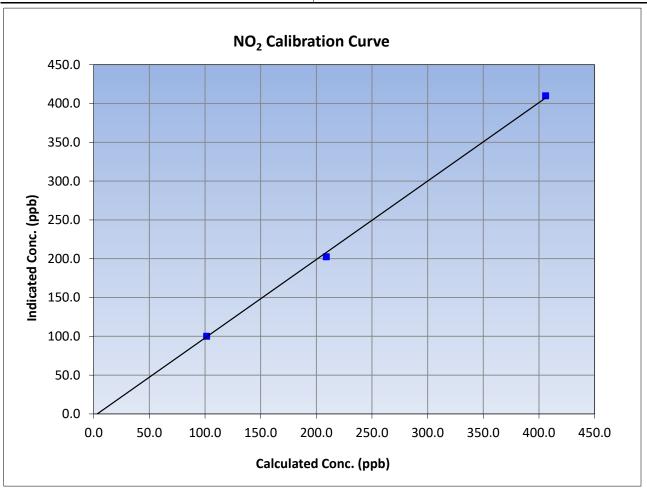
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 7, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 9:04 End Time (MST): 13:32 Analyzer serial #: Analyzer make: Thermo 42i 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	factor (Cc/Ic) Statistical Evaluation		<u>Limits</u>	
0.0	-1.0		Correlation Coefficient	0.999517	≥0.995	
406.0	409.9	0.9905	Correlation Coefficient	0.333317	20.333	
209.0	202.4	1.0326	Slope	1.010781	0.90 - 1.10	
101.5	100.1	1.0140	Slope	1.010781	0.90 - 1.10	
	·		Intercept	-3.206174	+/-20	

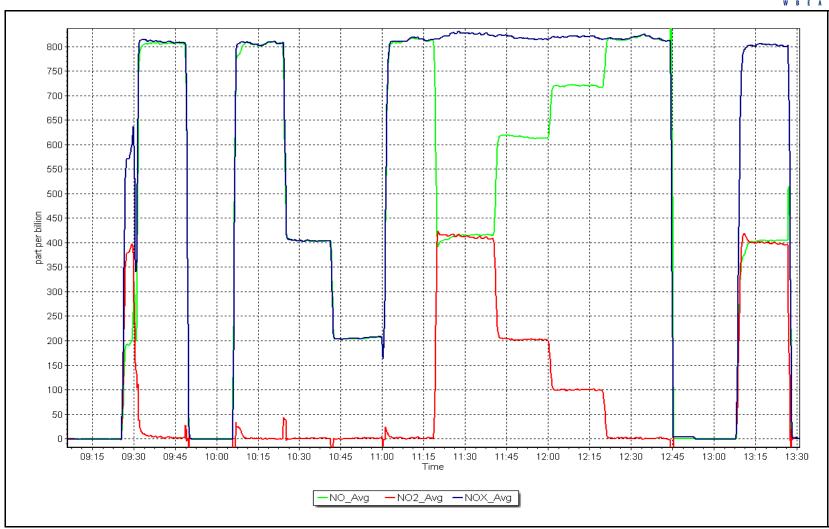


NO_x Calibration Plot

Date: January 10, 2024

Location: Fort Chipewyan







O₃ Calibration Report

Version-01-2020

Station Information

Fort Chipewyan Station Name:

Calibration Date: January 8, 2024

Start time (MST): 10:21 Reason: Routine Station number: AMS08

Last Cal Date: December 7, 2023

End time (MST): 12:53

Calibration Standards

O3 generation mode: Photometer

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

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3872

Start Finish Start Finish Backgd or Offset: -2.0 Calibration slope: 0.969000 0.976343 -2.0 0.340000 Coeff or Slope: Calibration intercept: 0.700000 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	0.3	
as found span	5000	913.0	400.0	393.7	1.016
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	914.7	400.0	390.6	1.024
second point	5000	786.4	200.0	196.4	1.018
third point	5000	701.3	100.0	97.5	1.026
as left zero	5000	0.0	0.0	0.7	
as left span	5000	963.3	400.0	393.3	1.017
			Averag	ge Correction Factor	1.023
Baseline Corr As found:	393.4	Previous response	e 388.3	*% change	1.3%
Baseline Corr 2nd AF pt:	NA	AF Slope	::	AF Intercept:	

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Matthew C



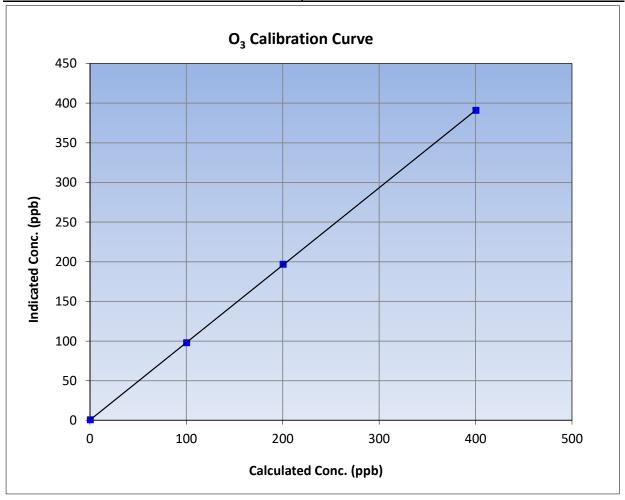
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** December 7, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 10:21 End Time (MST): 12:53 Analyzer make: Teledyne API T400 Analyzer serial #: 3872

	Calibration Data								
Calculated concentration Indicated concentration									
0.0	0.3		Correlation Coefficient	0.999989	≥0.995				
400.0	390.6	1.0241	Correlation Coefficient	0.555565	20.333				
200.0	196.4	1.0183	Slope	0.976343	0.90 - 1.10				
100.0	97.5	1.0256	Slope	0.370343	0.90 - 1.10				
			- Intercept	0.340000	+/- 5				

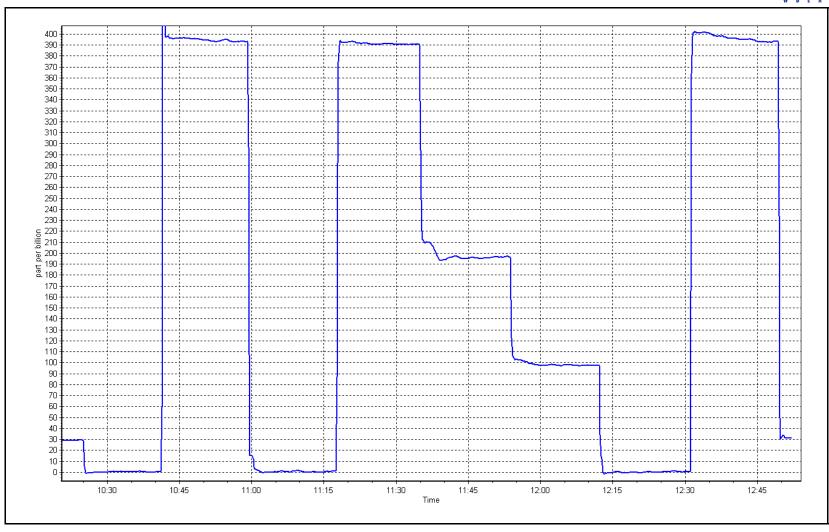


O₃ Calibration Plot

Date: January 8, 2024

Location: Fort Chipewyan







Calibration by:

Devin Russell

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024 **Station Information** Station Name: Fort Chipewyan Station number: AMS 08 January 31, 2024 Calibration Date: Last Cal Date: December 15, 2023 Start time (MST): 18:40 End time (MST): 19:10 Analyzer Make: Teledyne API T640 S/N: 319 Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25BT S/N: 388747 Temp/RH standard: S/N: 388747 Alicat FP-25BT **Monthly Calibration Test** <u>Parameter</u> As found Measured As left <u>Adjusted</u> (Limits) T (°C) 1 -0.6 1 +/- 2 °C P (mmHg) 730.1 731.1 730.1 +/- 10 mmHg Flow (LPM) 5.01 5.08 5.01 +/- 0.25 LPM PW% (pump) 39 39 >80% Zero Verification PM w/o HEPA: 6.7 0.0 PM w/ HEPA: <0.2 ug/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check PM Inlet observation: Inlet Head Clean Alignment Factor On: **Quarterly Calibration Test** Expiry Date: 04-2019 Refractive Index: 11.3 **SPAN DUST** Lot No.: 100128-050-004 As found **Adjusted** <u>Parameter</u> Post maintenance As left (Limits) **PMT Peak Test** +/- 0.5 Date Optical Chamber Cleaned: December 15, 2023 Date Disposable Filter Changed: December 15, 2023 Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3 **Annual Maintenance** Date Sample Tube Cleaned: July 25, 2023 Date RH/T Sensor Cleaned: July 25, 2023 Leak check passed. Flow, temperature, and pressure checked. No adjustments needed. Notes:



CO Calibration Report

Version-01-2020

Station Information

Fort Chipewyan Station Name:

Calibration Date: January 18, 2024

Start time (MST): 13:02

Reason: Routine Station number: AMS08

> December 26, 2023 Last Cal Date:

End time (MST): 15:24

Calibration Standards

Cal Gas Concentration: 3,030

Cal Gas Cylinder #: ALM014846

Removed Cal Gas Conc: 3,030

Removed Gas Cyl #: NA

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

December 1, 2028 Cal Gas Exp Date: ppm

Rem Gas Exp Date: NA

Diff between cyl:

3252 Serial Number: Serial Number: 135

Analyzer Information

Analyzer make: API T300 Analyzer serial #: 3505

ppm

Analyzer Range: 0 - 50 ppm

Finish Start

Calibration slope: 0.994764 0.989053 Backgd or Offset: -0.014

Finish <u>Start</u> -0.014

Coeff or Slope: 0.998 Calibration intercept: 0.168931 0.314884 0.998

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	0.19	
as found span	4933	66.7	40.4	40.3	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4934	66.7	40.4	40.2	1.005
second point	4967	33.3	20.2	20.4	0.992
third point	4983	16.7	10.1	10.4	0.969
as left zero	5000	0.0	0.0	0.1	
as left span	2960	40.0	40.4	40.4	1.000
			Avera	ge Correction Factor	0.989

Baseline Corr As found: 40.07 Prev response: 40.38 *% change: -0.8% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: AF Correlation: NA

* = > +/-5% change initiates investigation

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

Calibration Performed By: Morgan Voyageur



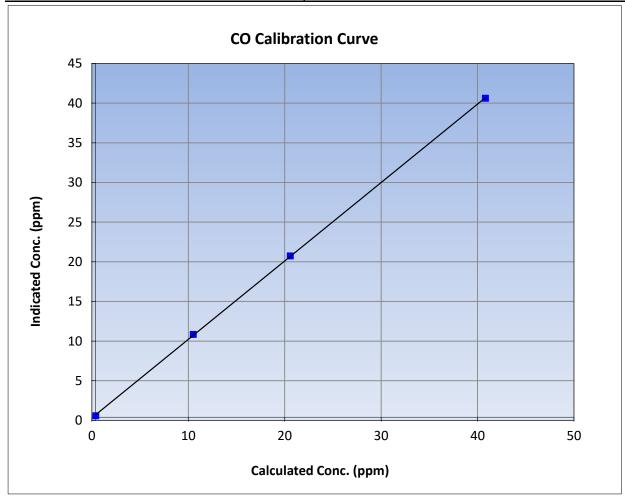
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 18, 2024 **Previous Calibration:** December 26, 2023 Station Name: Fort Chipewyan Station Number: AMS08 Start Time (MST): 13:02 End Time (MST): 15:24 Analyzer make: **API T300** Analyzer serial #: 3505

Calibration Data									
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic) (Cc/Ic) Statistical Evaluation Limits									
0.0	0.2		Correlation Coefficient	0.999955	≥0.995				
40.4	40.2	1.0048	Correlation Coefficient	0.555555	20.993				
20.2	20.4	0.9916	Slope	0.989053	0.90 - 1.10				
10.1	10.4	0.9694	Slope	0.969033	0.90 - 1.10				
			- Intercept	0.314884	+/-1.5				

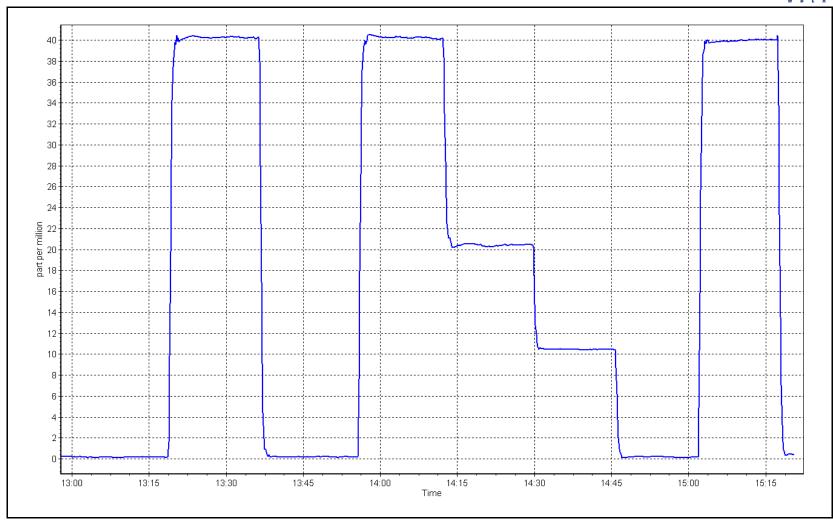


CO Calibration Plot

Date: January 18, 2024

Location: Fort Chipewyan







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort Chipewyan

January 18, 2024 Calibration Date:

Start time (MST): 8:55 Routine

Reason:

Station number: AMS08

> Last Cal Date: December 26, 2023

> > December 1, 2028

End time (MST): 12:57

Calibration Standards

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

Cal Gas Cylinder #: ALM014846

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

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

Analyzer Information

Analyzer make: Teledyne API T360 Analyzer serial #: 289

Analyzer Range 0 - 2,000 ppm

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.001165 0.994632 -0.063 -0.063 Calibration intercept: -2.460000 -6.520000 Coeff or Slope: 1.087 1.085

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	-0.8	
as found span	2920	80.0	1605.9	1623.7	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	
high point	2920	80.0	1605.9	1599.9	1.004
second point	2960	40.0	802.9	771.0	1.041
third point	2980	20.0	401.5	398.3	1.008
as left zero	3000	0.0	0.0	1.9	
as left span	2960	40.0	802.9	770.5	1.042
		•	Avera	ge Correction Factor	1.018

Prev response: Baseline Corr As found: 1624.50 1605.28 *% change: 1.2%

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. Made adjustments to span.

Calibration Performed By: Morgan Voyageur



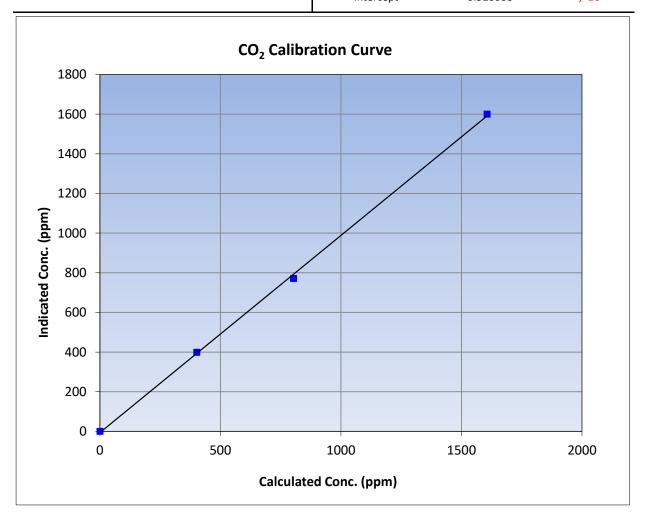
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	January 18, 2024	Previous Calibration	December 26, 2023
Station Name	Fort Chipewyan	Station Number	AMS08
Start Time (MST)	8:55	End Time (MST)	12:57
Analyzer make	Teledyne API T360	Analyzer serial #	289

	Calibration Data									
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	-0.1		Correlation Coefficient	0.999569	≥0.995					
1605.9	1599.9	1.0037	correlation coefficient	0.555505	20.555					
802.9	771.0	1.0414	Slope	0.994632	0.90 - 1.10					
401.5	398.3	1.0080	Slope	0.994652	0.90 - 1.10					
			Intercept	-6.520000	+/-20					

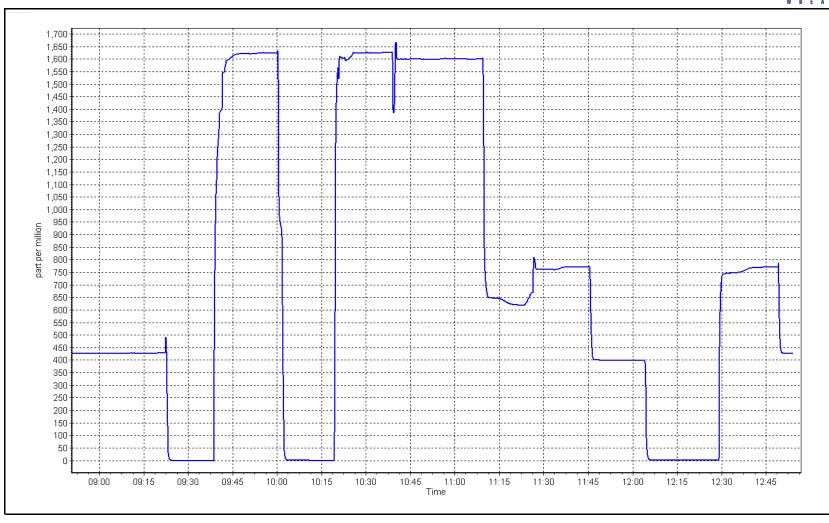


CO₂ Calibration Plot

Date: January 18, 2024

Location: Fort Chipewyan







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Barge Landing

Calibration Date: January 4, 2024

Start time (MST): 10:13
Reason: Routine

Station number: AMS09

Last Cal Date: December 8, 2023

End time (MST): 13:36

Calibration Standards

Cal Gas Concentration: 49.96

Cal Gas Cylinder #: CC151285

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

Calibrator Make/Model: API T700 ZAG Make/Model: API T701 ppm Cal Gas Exp Date: January 5, 2025

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 3812

Serial Number: 4888

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1118148498

ppm

Analyzer Range 0 - 1000 ppb

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

 Calibration slope:
 0.995778
 0.997105

 Calibration intercept:
 0.410488
 0.270160

Backgd or Offset: Start 10.2

ackgd or Offset: 10.2 Coeff or Slope: 0.962 10.2 0.955

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
		(555)	(4)	(FF-7 (7)	
as found zero	5000	0.0	0.0	0.1	
as found span	4919	80.2	801.5	808.3	0.992
as found 2nd point					_
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4919	80.2	801.5	799.1	1.003
second point	4959	40.1	400.8	400.8	1.000
third point	4980	20.0	199.8	199.0	1.004
as left zero	5000	0.0	0.0	0.2	
as left span	4919	80.2	801.5	803.1	0.998
·			Averag	ge Correction Factor	1.002

Baseline Corr As found: 808.20 Previous response 798.51 *% change 1.2% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



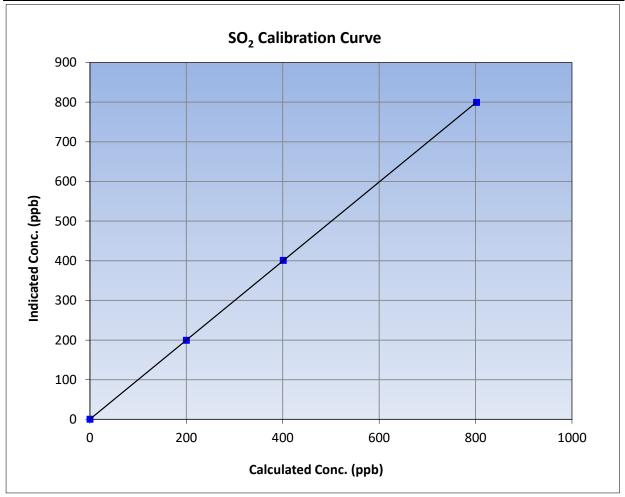
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 8, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:13 End Time (MST): 13:36 Analyzer make: Thermo 43i Analyzer serial #: 1118148498

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.2		Correlation Coefficient	0.999996	≥0.995					
801.5	799.1	1.0030	Correlation Coefficient	0.999990	20.333					
400.8	400.8	0.9999	Slope	0.997105	0.90 - 1.10					
199.8	199.0	1.0042	Slope	0.997103	0.90 - 1.10					
			- Intercept	0.270160	+/-30					



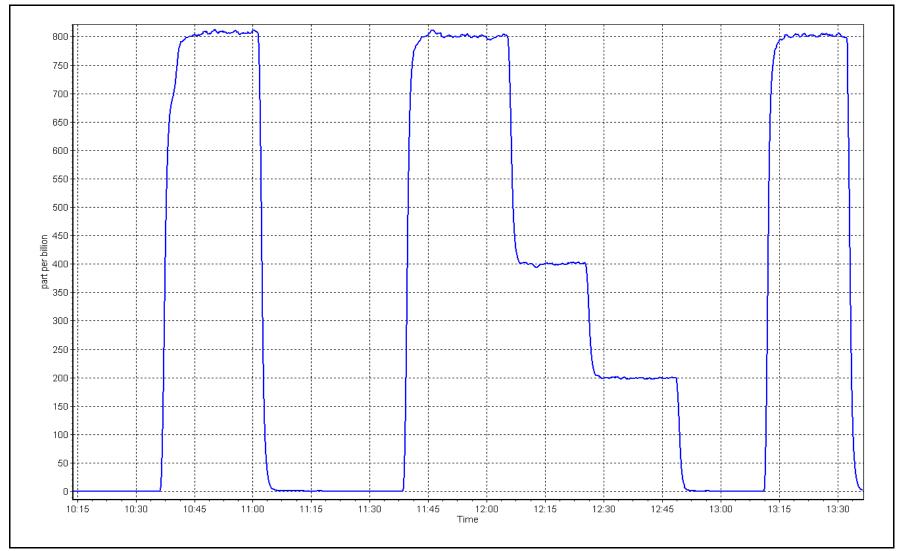
SO2 Calibration Plot

Date:

January 4, 2024

Location: Barge Landing







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Barge Landing Calibration Date: January 9, 2024

Start time (MST): 9:57

Routine Reason:

Station number: AMS09

> Last Cal Date: December 4, 2023

End time (MST): 14:11

Calibration Standards

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

Cal Gas Cylinder #: CC511415

Removed Cal Gas Conc: 5.171 Removed Gas Cyl #: NA Calibrator Make/Model: API T700 ZAG Make/Model: **API T701**

ppm

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3812 Serial Number: 4888

Analyzer Information

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

CDN-101 Converter serial #: 519 Converter make:

0 - 100 ppb Analyzer Range

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

<u>Finish</u> <u>Start</u> 1.008544 Backgd or Offset: Calibration slope: 1.006260 2.88 2.88 Calibration intercept: 0.099474 0.119536 Coeff or Slope: 1.176 1.176

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	77.4	80.0	80.1	0.998
as found 2nd point	4961	38.7	40.0	40.3	0.991
as found 3rd point	4981	19.3	20.0	20.0	0.993
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4923	77.4	80.0	80.8	0.991
second point	4961 38.7		40.0	40.6	0.986
third point	4981	19.3	20.0	20.2	0.988
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.4	80.0	81.3	0.985
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber chan	ge:	28-Feb-23		Ave Corr Factor	0.988
Date of last converter effic	iency test:	<u> </u>	<u> </u>	_	efficiency

Date of last converter efficie	ncy test:			(efficiency
Baseline Corr As found:	80.2	Prev response:	80.64	*% change:	-0.6%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.001977	AF Intercept:	-0.000569

Baseline Corr 3rd AF pt: 0.999984 20.1 AF Correlation:

* = > +/-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



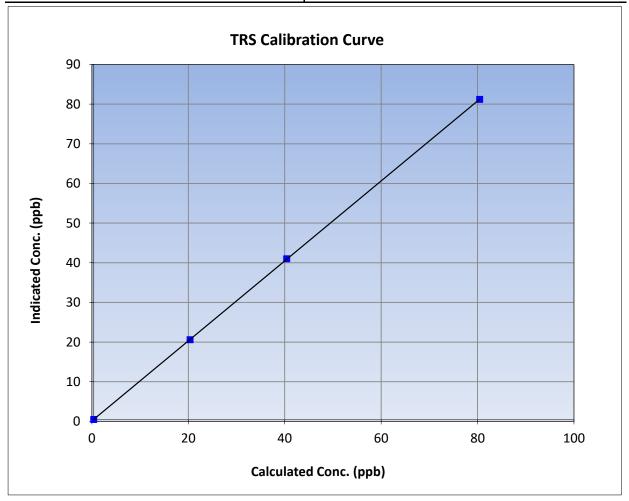
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: December 4, 2023 Calibration Date: January 9, 2024 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 9:57 End Time (MST): 14:11 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1331259320

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.1		Correlation Coefficient	0.999995	≥0.995					
80.0	80.8	0.9906	Correlation Coefficient	0.555555	20.333					
40.0	40.6	0.9859	Slope	1.008544	0.90 - 1.10					
20.0	20.2	0.9881	Slope	1.006544	0.90 - 1.10					
			- Intercept	0.119536	+/-3					

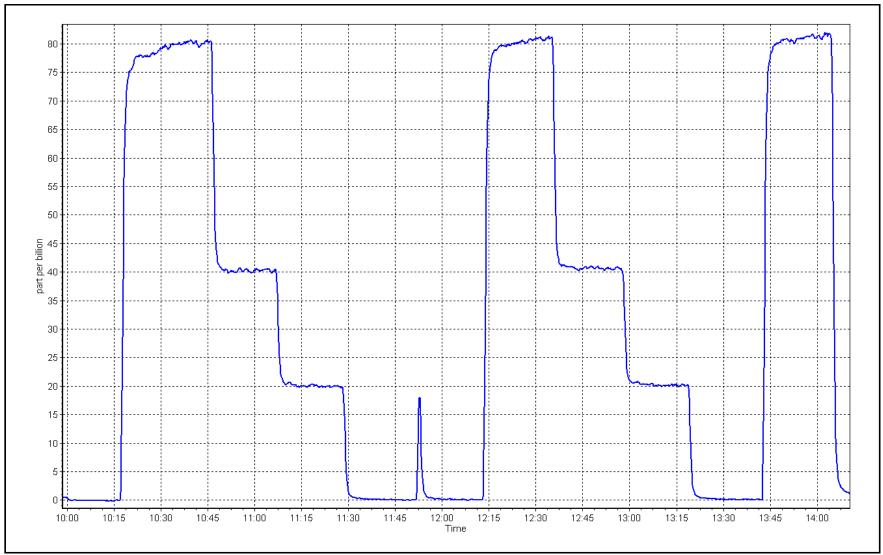




Date: January 9, 2024

Location: Barge Landing







THC / CH₄ / NMHC Calibration Report

Removed Gas Expiry:

Version-06-2022

Station Information

Station Name: Barge Landing

Calibration Date: January 4, 2024

Start time (MST): 10:13
Reason: Routine

Station number: AMS09

Last Cal Date: December 8, 2023

End time (MST): 13:36

Calibration Standards

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

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

C3H8 Cal Gas Conc. 207.1 ppm

Removed Gas Cert: NA

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

Removed C3H8 Conc. 207.1 ppm Diff between cyl (THC): Diff between cyl (CH $_4$): Diff between cyl (NM):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259521

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

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.53E-04 2.58E-04 NMHC SP Ratio: 4.34E-05 4.37E-05 CH4 Retention time: 15.00 15.00 NMHC Peak Area: 210777 209298 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	17.12	16.97	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	80.2	17.12	17.14	0.999
second point	4960	40.1	8.56	8.57	0.999
third point	4980	20.0	4.27	4.29	0.996
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	17.12	17.17	0.997
				e Correction Factor	0.998
Baseline Corr AF:	16.97	Prev response	17.11	*% change	-0.8%
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) (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	4919	80.2	9.14	9.08	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	9.14	9.13	1.000
second point	4960	40.1	4.57	4.56	1.001
third point	4980	20.0	2.28	2.28	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	9.14	9.15	0.998
			А	verage Correction Factor	1.000
Baseline Corr AF:	9.08	Prev response	9.18	*% change	-1.0%
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	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	0.0	0.00	0.00	1.012
as found span	4919	80.2	7.98	7.89	1.012
as found 2nd point					
as found 3rd point					
new cylinder response	F000	0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00 8.00	
nigh point	4919	80.2	7.98		0.998
second point	4960	40.1	3.99	4.01	0.996
third point	4980	20.0	1.99	2.01	0.992
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	8.03	0.995
Baseline Corr AF:	7.89	Drovingnes	7.93	verage Correction Factor	0.995
Baseline Corr AF:		Prev response	7.93	*% change	-0.6%
	NA	AF Complete and		AF Intercept: * = > +/-5% change initiat	os investigation
Baseline Corr 3rd AF:	NA	AF Correlation:		= > +/-5% Change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.999422		1.000804	
THC Cal Offset:		0.000050		0.005458	
CH4 Cal Slope:		0.993236		1.001867	
CH4 Cal Offset:		0.001649		0.006270	

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

1.004440

-0.000799

Calibration Performed By: Sean Bala

NMHC Cal Slope:

NMHC Cal Offset:

0.999587

-0.000411



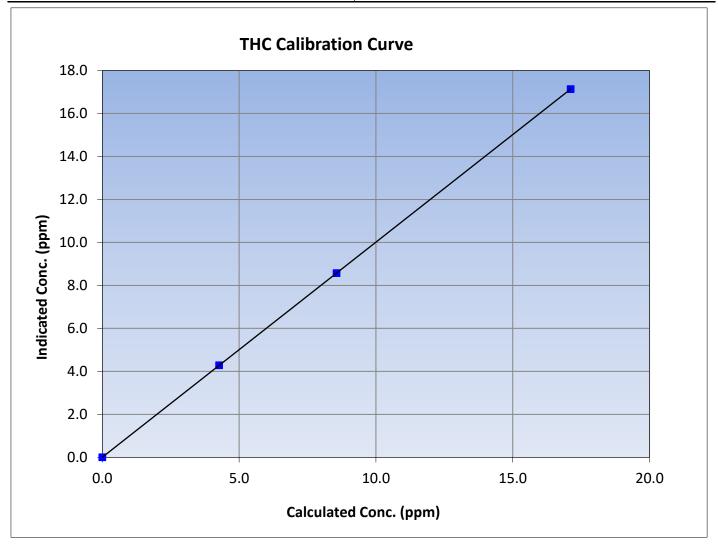
THC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 4, 2024 December 8, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:13 End Time (MST): 13:36 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.99999	≥0.995
17.12	17.14	0.9990	Correlation Coemicient	0.555555	20.333
8.56	8.57	0.9986	Slope	1.000804	0.90 - 1.10
4.27	4.29	0.9961	Slope	1.000804	0.90 - 1.10
			Intercept	0.005458	+/-0.5





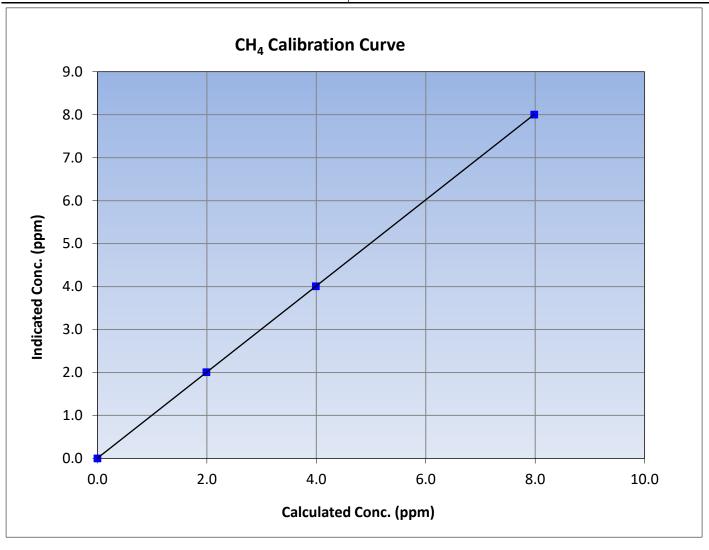
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 8, 2023 Station Name: **Barge Landing** Station Number: AMS09 Start Time (MST): 10:13 End Time (MST): 13:36 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

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
7.98	8.00	0.9977	Correlation Coefficient	0.555557	20.333
3.99	4.01	0.9959	Slope	1.001867	0.90 - 1.10
1.99	2.01	0.9917	Slope	1.001007	0.90 - 1.10
			Intercept	0.006270	+/-0.5





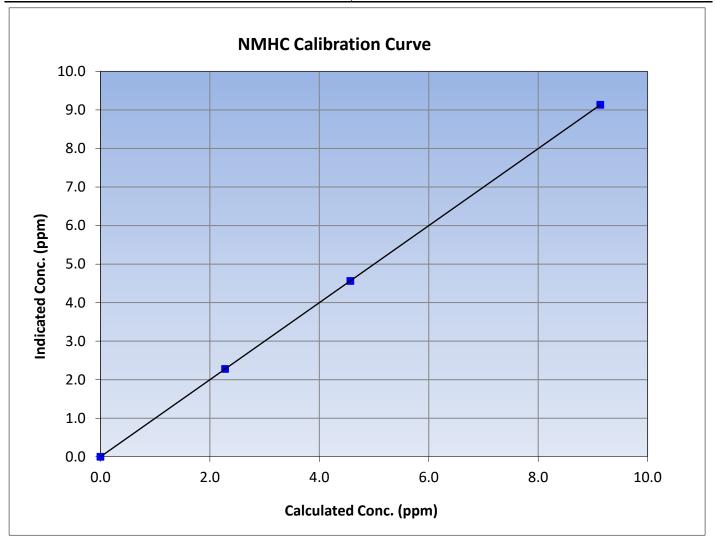
NMHC Calibration Summary

Version-06-2022

Station Information

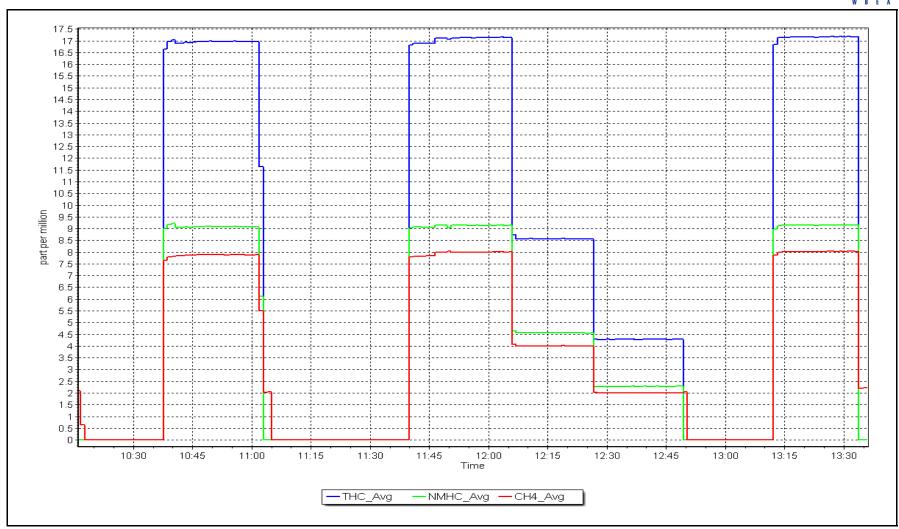
Previous Calibration: Calibration Date: January 4, 2024 December 8, 2023 Station Name: AMS09 Barge Landing Station Number: Start Time (MST): 10:13 End Time (MST): 13:36 Analyzer make: Thermo 55i Analyzer serial #: 1331259521

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999999	≥0.995
9.14	9.13	1.0003	Correlation Coemicient	0.555555	20.333
4.57	4.56	1.0014	Slope	0.999587	0.90 - 1.10
2.28	2.28	0.9996	Slope	0.333367	0.90 - 1.10
			Intercept	-0.000411	+/-0.5



NMHC Calibration Plot Date: January 4, 2024 Location: Barge Landing







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Barge Landing

Calibration Date: January 18, 2024

Start time (MST): 10:31 Reason: Routine Station number: AMS09

Last Cal Date: December 5, 2023

End time (MST): 15:28

Calibration Standards

NO Gas Cylinder #: T2Y1KDH Cal Gas Expiry Date: November 17, 2026 NOX Cal Gas Conc: NO Cal Gas Conc: 47.38 46.94 ppm ppm Removed Cylinder #: DT0036634 Removed Gas Exp Date: January 28, 2024 Removed Gas NO Conc: Removed Gas NOX Conc: 50.00 ppm 49.70 ppm

NOX gas Diff:0.7%NO gas Diff:1.4%Calibrator Model:API T700Serial Number:3812ZAG make/model:API T701Serial 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: 1.151 1.092 NO bkgnd or offset: 10.5 10.0 NOX coeff or slope: 0.992 0.998 NOX bkgnd or offset: 10.8 10.3 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 173.4 180.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999604	0.999176
NO _x Cal Offset:	0.568998	0.418407
NO Cal Slope:	1.000613	0.999039
NO Cal Offset:	-0.472474	-0.303738
NO ₂ Cal Slope:	1.001041	1.005229
NO ₂ Cal Offset:	-0.216477	0.853830



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution Colibuatio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	ution Calibratio Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3		
as found span	4919	80.5	805.1	800.3	4.8	841.6	833.9	7.7	0.957	0.960
as found 2nd										
as found 3rd										
new cyl resp	4915	85.3	808.3	800.7	7.5	851.4	847.2	4.2	0.949	0.945
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.2		
high point	4915	85.3	808.3	800.7	7.5	807.6	799.8	7.7	1.001	1.001
second point	4957	42.6	403.7	400.0	3.7	404.4	399.3	5.1	0.998	1.002
third point	4979	21.3	201.8	200.0	1.9	202.5	198.9	3.6	0.997	1.005
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2		
as left span	4915	85.3	808.3	455.5	352.7	804.8	451.5	353.3	1.004	1.009
							Average C	orrection Factor	0.999	1.003
Corrected As fo	und NO _X =	842.0 ppb	NO =	834.0 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _X =	4.4%
Previous Respo	nse NO _X =	805.3 ppb	NO =	800.3 ppb				*Percent Chang	ge NO =	4.0%
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	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 Setpo	nt (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 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									

Notes:

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

355.0

141.6

77.4

Average Correction Factor

0.994

0.985

0.972

0.983

352.7

139.5

75.2

Calibration Performed By:

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

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Sean Bala

449.2

662.4

726.7

794.4

794.4

794.4

100.7%

101.5%

102.9%

101.7%



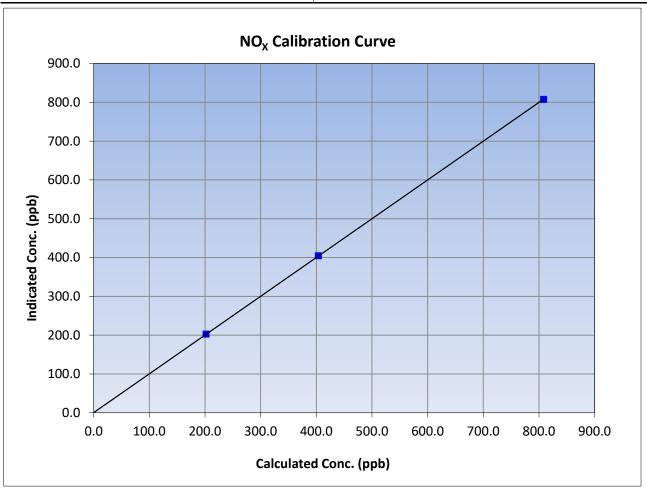
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 5, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:31 End Time (MST): 15:28 Analyzer serial #: Analyzer make: Thermo 42i 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999997	≥0.995
808.3	807.6	1.0008	correlation coemicient	0.555557	20.333
403.7	404.4	0.9983	Slope	0.999176	0.90 - 1.10
201.8	202.5	0.9967	Slope	0.999176	0.90 - 1.10
			Intercept	0.418407	+/-20





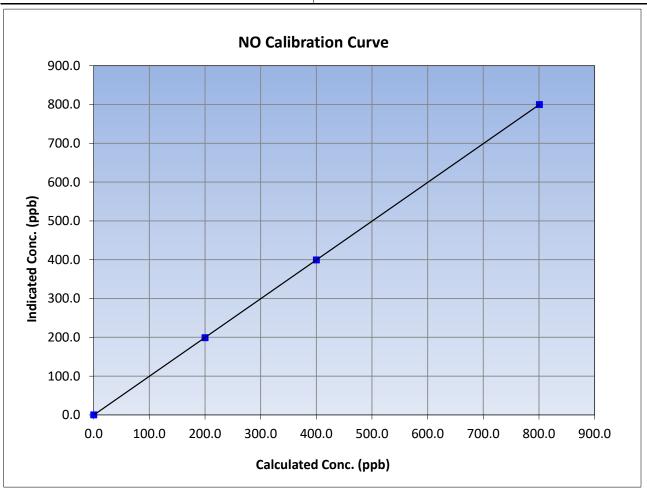
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 5, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:31 End Time (MST): 15:28 Analyzer make: Thermo 42i Analyzer serial #: 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
800.7	799.8	1.0012	Correlation Coefficient	0.99999	20.333
400.0	399.3	1.0017	Slope	0.999039	0.90 - 1.10
200.0	198.9	1.0053	Slope		0.90 - 1.10
			Intercept	-0.303738	+/-20





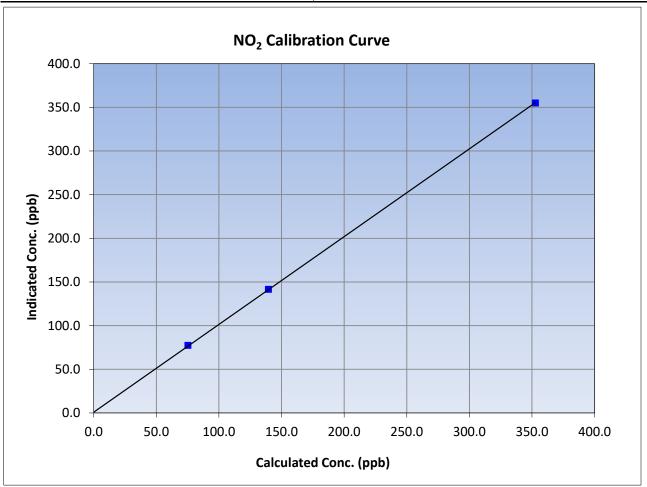
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 5, 2023 Station Name: Barge Landing Station Number: AMS09 Start Time (MST): 10:31 End Time (MST): 15:28 Analyzer serial #: Analyzer make: Thermo 42i 1426262593

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999965	≥0.995
352.7	355.0	0.9935	Correlation Coefficient	0.999903	20.995
139.5	141.6	0.9852	Slope	1.005229	0.90 - 1.10
75.2	77.4	0.9717	Зюре	1.003229	0.50 1.10
			Intercept	0.853830	+/-20

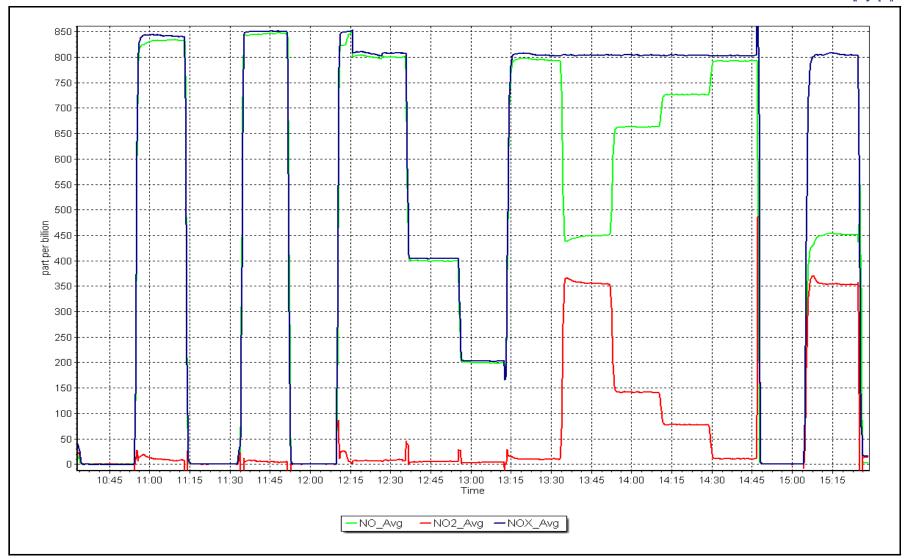


NO_x Calibration Plot

Date: January 18, 2024

Location: Barge Landing







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Barge Landing		Station number:	AMS 09		
Calibration Date:	January 22, 2024		Last Cal Date:		, 2023	
Start time (MST):	10:29		End time (MST):	11:46		
Analyzer Make:	API T640		S/N:	844		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat FP-25		S/N:	388746		
Temp/RH standard:	Alicat FP-25		S/N:	388746		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-22.20	-22.80	-22.20			+/- 2 °C
P (mmHg)	731.20	738.38	731.20			+/- 10 mmHg
flow (LPM)	4.97	4.90	4.97			+/- 0.25 LPM
Leak Test:	Date of check:	January 22, 2024	Last Cal Date:	December	8, 2023	
Note: this leak check will be	PM w/o HEPA:	6.2	PM w/ HEPA:	0.0		<0.2 ug/m3
Inlet cleaning :	Inlet Head	Quarterly Calibration T	·est			
Parameter	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	9.0	11.0	11.0			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	13.9	w/ HEPA:	(0.0
Date Optical Cham		January 22,		,	·	<0.2 ug/m3
Disposable Filte	r Changed:	January 22,	2024			
		Annual Maintenance	e			
Date Sample Tube Cleaned:		August 23,				
Date RH/T Senso	or Cleaned:	August 23,	2023			
Notes:	Inlet head looks god	od. After maintenance PN		ithin limits.	No adjustm	ents made.
		Leak	check passed.			
Calibration by:	Sean Bala					

W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Barge Landing Station Number: AMS 09 December 1, 2023 Prev Cal Date: N/A Calibration Date: Start Time (MST): 12:00 End Time (MST): 14:10 Tower Height (m): 10.0 Reason: Install

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: B4128
WS Calibrator: MetOne 053 Serial Number: P15103

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

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.99999	≥0.9995
Calculated slope		0.998550	0.90 - 1.10
Calculated intercept		0.034415	+/- 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): 13:29 Calc Declination*: 13.72 Degrees

Deadband calc: 1.0 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	0.4	
90	87.4	-0.7%
180	179.1	-0.3%
270	270.0	0.0%
357	356.4	-0.2%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999967	≥0.9995
Calculated slope		0.999287	0.90 - 1.10
Calculated intercept		0.863397	+/- 4

Notes: Installing new 10m WS/WD sensors.

Calibration Performed By: Max Farrell & Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS11 LOWER CAMP

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Finish

14.6

1.034

Station Information

Station Name: Lower Camp

Calibration Date: January 3, 2024

Start time (MST): 10:17 Routine Reason:

Station number: AMS11

December 19, 2023 Last Cal Date:

End time (MST): 13:33

Calibration Standards

Cal Gas Concentration: 49.25 ppm

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

Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3807 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 100841398

Analyzer Range 0 - 1000 ppb

Finish Start Start Calibration slope: 0.998200 1.001184 Backgd or Offset: 14.6 0.350846 Calibration intercept: -0.069544 Coeff or Slope: 1.034

ppm

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	0.6	
as found span	4919	81.3	8.008	799.9	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.0	
high point	4919	81.3	8.008	802.2	0.998
second point	4959	40.7	400.9	400.7	1.001
third point	4980	20.3	199.9	199.1	1.004
as left zero	5000	0.0	0.0	0.9	
as left span	4919	81.3	8.008	800.2	1.001
·			Averag	ge Correction Factor	1.001
Baseline Corr As found:	799.30	Previous response	799.67	*% change	0.0%

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

Calibration Performed By: Mohammed Kashif



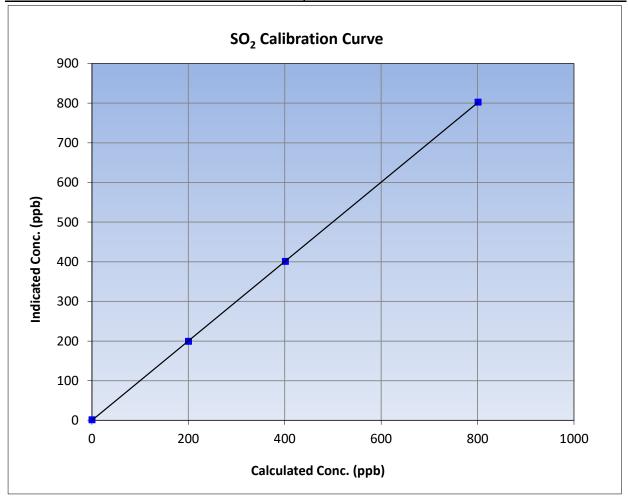
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 19, 2023 Station Name: Lower Camp Station Number: AMS11 Start Time (MST): 10:17 End Time (MST): 13:33 Analyzer make: Thermo 43i Analyzer serial #: 100841398

Calibration 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	0.999992	≥0.995				
800.8	802.2	0.9982	Correlation coefficient	0.333332	20.993				
400.9	400.7	1.0005	Slope	1.001184	0.90 - 1.10				
199.9	199.1	1.0042	Slope	1.001164	0.90 - 1.10				
			- Intercept	-0.069544	+/-30				



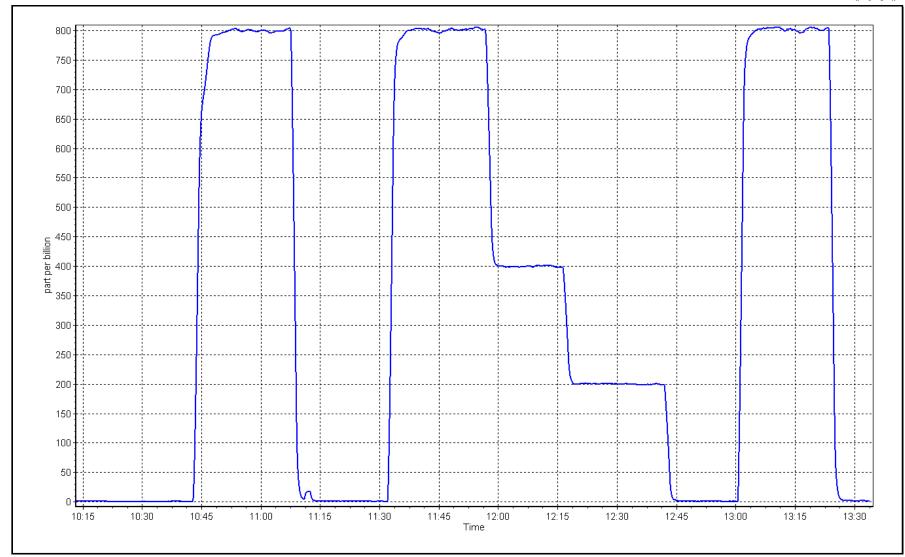
SO2 Calibration Plot

Date:

January 3, 2024

Location: Lower Camp







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Lower Camp

Calibration Date: January 22, 2024

Start time (MST): 11:12 Reason: Routine Station number: AMS11

Last Cal Date: December 20, 2023

End time (MST): 17:17

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC501097

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

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3807 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

Converter make: NA Converter serial #: NA

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.992455 Backgd or Offset: 15.9 Calibration slope: 1.009917 14.8 Calibration intercept: 0.234284 -0.204215 Coeff or Slope: 1.001 1.015

H₂S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.4	
as found span	4926	73.6	79.9	79.4	1.012
as found 2nd point	4963	36.8	40.0	39.9	1.012
as found 3rd point	4982	18.6	20.2	20.3	1.015
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05	
calibrator zero	5000	0.0	0.0	-0.2		
high point	4926	73.6	79.9	79.1	1.010	
second point	4963	36.8	40.0	39.5	1.012	
third point	4982	18.6	20.2	19.8	1.020	
as left zero	5000	0.0	0.0	-0.4		
as left span	4926	73.6	79.9	79.7	1.003	
SO2 Scrubber Check	4919	81.1	811.0	-0.1		
Date of last scrubber char	ige:			Ave Corr Factor	1.014	
Date of last converter efficiency test: efficiency						

Pare 9: 1451 50: 42 20: 51:41:50	•			ALVE COIL LACTOR	1.01.
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	79.0	Prev response:	80.95	*% change:	-2.5%

Baseline Corr 2nd AF pt:39.5AF Slope:0.988733Baseline Corr 3rd AF pt:19.9AF Correlation:0.999999

* = > +/-5% change initiates investigation

0.376111

AF Intercept:

Notes: Changed sample inlet filter after as founds. Adjusted both zero and span. Ran scrubber check after

cal zero. Sox scrubber check passed after hydrating the scrubber beads.

Calibration Performed By: Mohammed Kashif



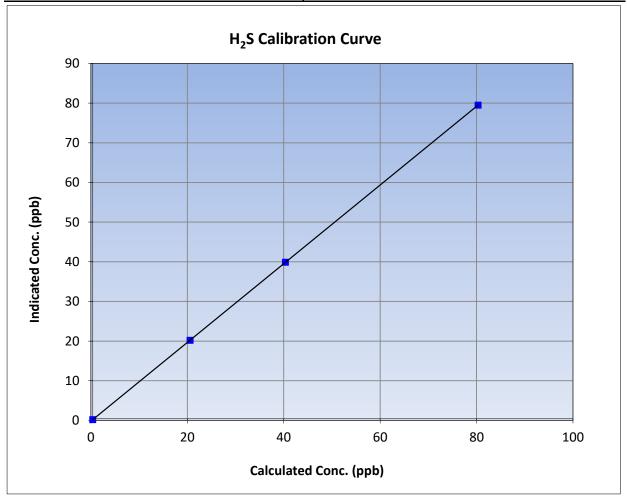
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 22, 2024 **Previous Calibration:** December 20, 2023 Station Name: **Lower Camp** Station Number: AMS11 Start Time (MST): 11:12 End Time (MST): 17:17 Analyzer make: Thermo 450iQ Analyzer serial #: CM20080003

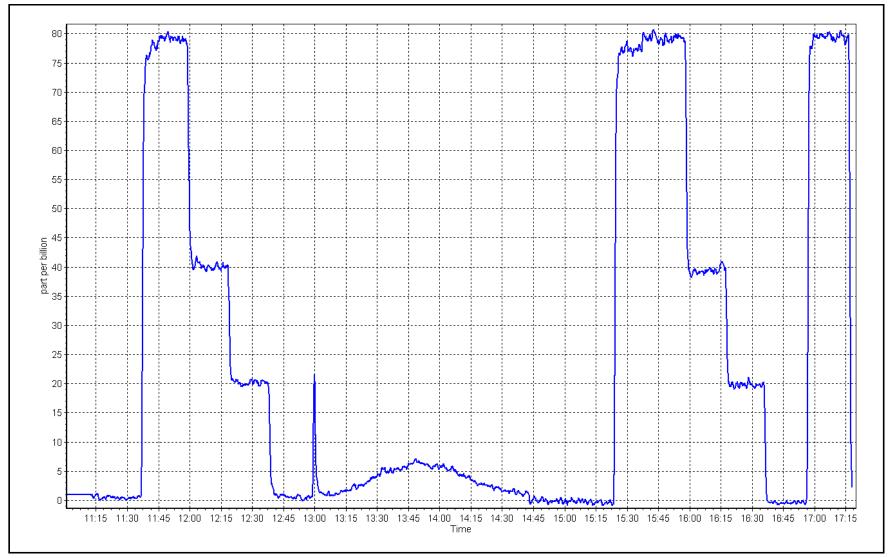
	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	-0.2		Correlation Coefficient	0.999999	≥0.995					
79.9	79.1	1.0104	Correlation coefficient	0.555555	20.993					
40.0	39.5	1.0116	Slope	0.992455	0.90 - 1.10					
20.2	19.8	1.0199	Slope	0.552455	0.90 - 1.10					
			- Intercept	-0.204215	+/-3					



Date: January 22, 2024

Location: Lower Camp







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Lower Camp Station Name:

Calibration Date: January 3, 2024

Start time (MST): 10:17 Routine Reason:

Station number: AMS11

Last Cal Date: December 19, 2023

End time (MST): 13:33

Calibration Standards

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

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

205.5 C3H8 Cal Gas Conc. ppm

Removed Gas Cert:

Removed CH4 Conc. 502.0 ppm

Removed C3H8 Conc. 205.5 ppm

Diff between cyl (CH_4): Calibrator Model: **API T700**

ZAG make/model: **API T701**

ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1067.1 ppm

Diff between cyl (THC):

Diff between cyl (NM):

Serial Number: 3807 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

Analyzer serial #: 1505164381

CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start

CH4 SP Ratio: 3.00E-04 3.00E-04 NMHC SP Ratio: 5.77E-05 5.77E-05 CH4 Retention time: 14.2 14.2 NMHC Peak Area: 158880 158880

Zero Chromatogram: OFF OFF Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	17.35	17.29	1.004
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	17.33	1.001
second point	4959	40.7	8.69	8.64	1.005
third point	4980	20.3	4.33	4.32	1.003
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	17.35	17.41	0.997
		<u> </u>	Av	verage Correction Factor	1.003

Baseline Corr AF: 17.28 Prev response 17.36 *% change -0.4%

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

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

OFF



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					Version-06-20
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
s found span	4919	81.3	9.19	9.21	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	9.19	9.22	0.997
second point	4959	40.7	4.60	4.60	1.001
third point	4980	20.3	2.29	2.30	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.3	9.19	9.22	0.997
				age Correction Factor	0.998
Baseline Corr AF:	9.21	Prev response	9.21	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:	0.22	AF Intercept:	0.070
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	8.16	8.07	1.011
as found 2nd point	.5_5	02.0	0.20	<u> </u>	
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	8.16	8.11	1.006
second point	4959	40.7	4.09	4.05	1.010
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	8.19	0.996
as iere spari	4313	01.0		age Correction Factor	1.009
Baseline Corr AF:	8.07	Prev response	8.15	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:	0.13	AF Intercept:	0.570
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
baseline con Sia Ai.	IVA	Calibration	Ctatistics	, -,g	
			Statistics	Finish	
THE C-LEL-		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001730		0.998445	
THC Cal Offset:		-0.022785		-0.009595	
CH4 Cal Slope:		0.998587		0.993827	
CH4 Cal Offset:		-0.005091		-0.006092	
NMHC Cal Slope:		1.004174		1.002671	

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

-0.017294

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.003503



THC Calibration Summary

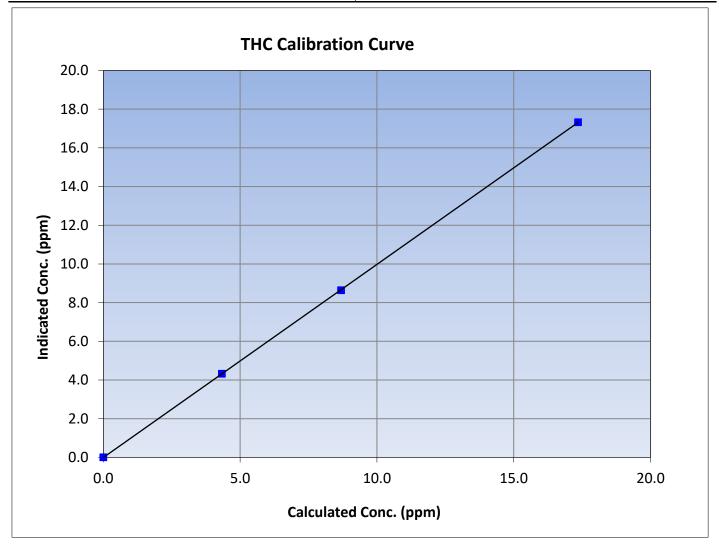
Version-06-2022

Station Information

Calibration Date: January 3, 2024 Previous Calibration: December 19, 2023

Station Name:Lower CampStation Number:AMS11Start Time (MST):10:17End Time (MST):13:33Analyzer make:Thermo 55iAnalyzer serial #:1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
17.35	17.33	1.0015	Correlation Coemicient	0.999995	20.333
8.69	8.64	1.0054	Slope	0.998445	0.90 - 1.10
4.33	4.32	1.0031	Slope	0.556445	0.90 - 1.10
			Intercept	-0.009595	+/-0.5





CH₄ Calibration Summary

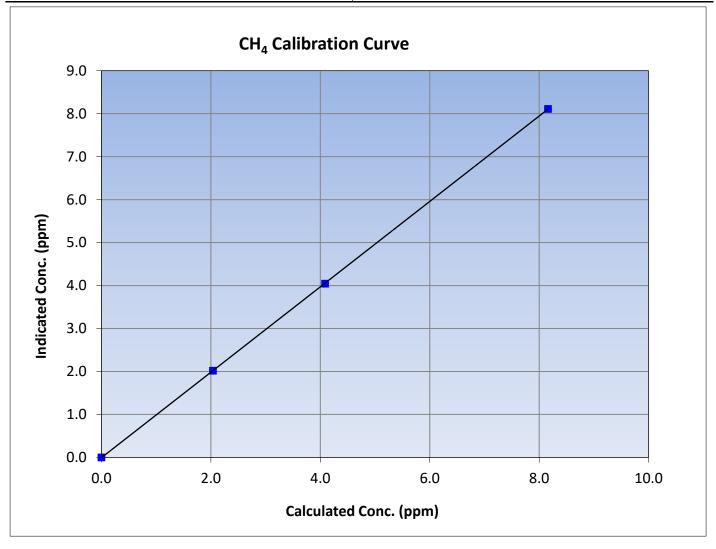
Version-06-2022

Station Information

Calibration Date: January 3, 2024 Previous Calibration: December 19, 2023

Station Name:Lower CampStation Number:AMS11Start Time (MST):10:17End Time (MST):13:33Analyzer make:Thermo 55iAnalyzer serial #:1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
8.16	8.11	1.0063	Correlation Coefficient	0.999995	20.333
4.09	4.05	1.0103	Slope	0.993827	0.90 - 1.10
2.04	2.02	1.0099	Slope	0.993627	0.90 - 1.10
			Intercept	-0.006092	+/-0.5





NMHC Calibration Summary

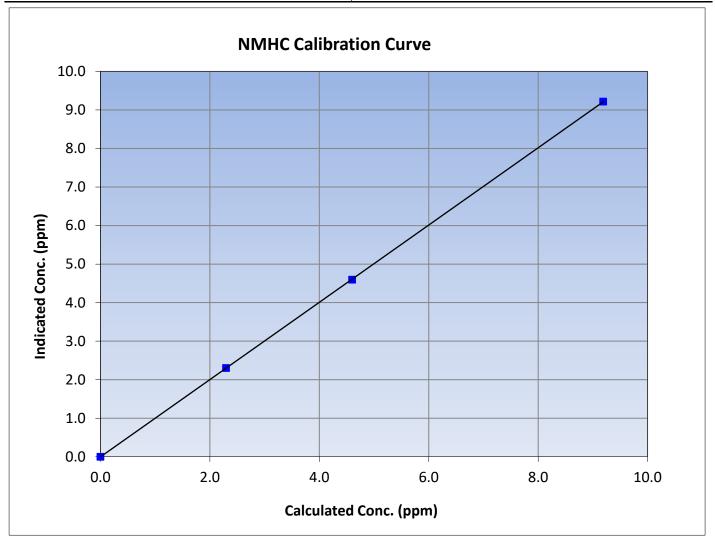
Version-06-2022

Station Information

Calibration Date: January 3, 2024 Previous Calibration: December 19, 2023

Station Name:Lower CampStation Number:AMS11Start Time (MST):10:17End Time (MST):13:33Analyzer make:Thermo 55iAnalyzer serial #:1505164381

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.19	9.22	0.9971	Correlation Coemicient	0.555555	20.333
4.60	4.60	1.0010	Slope	1.002671	0.90 - 1.10
2.29	2.30	0.9971	Slope	1.002071	0.90 - 1.10
			Intercept	-0.003503	+/-0.5

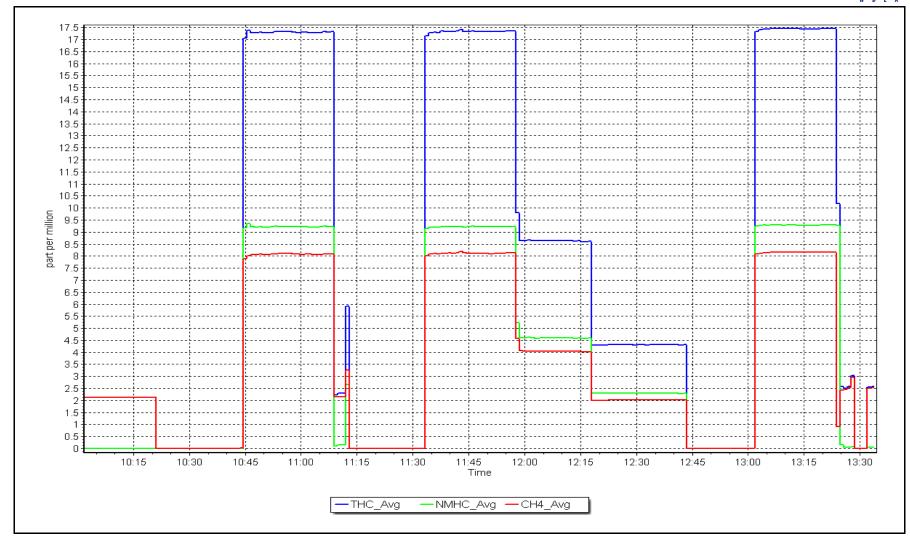


NMHC Calibration Plot

Date: January 3, 2024

Location: Lower Camp







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

Calibration Date: January 15, 2024

Start time (MST): 10:26 Reason: Routine Station number: AMS13

Last Cal Date: December 18, 2023

End time (MST): 13:55

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

50.55 ppm

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

n 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 Finish Start Calibration slope: 1.000755 1.003443 Backgd or Offset: 91.1 87.3 Calibration intercept: -2.857974 -2.798230 Coeff or Slope: 0.709 0.713

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	-1.4	
as found span	4921	79.1	799.7	795.6	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.1	799.7	801.0	0.998
second point	4961	39.5	399.3	396.7	1.007
third point	4980	19.8	200.2	195.0	1.027
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.1	799.7	799.9	1.000
·			Avei	age Correction Factor	1.011
Baseline Corr As found:	797.00	Previous response	9 797.43	*% change	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope	•	AF Intercent:	

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 zero and span.

Calibration Performed By: Sean Bala



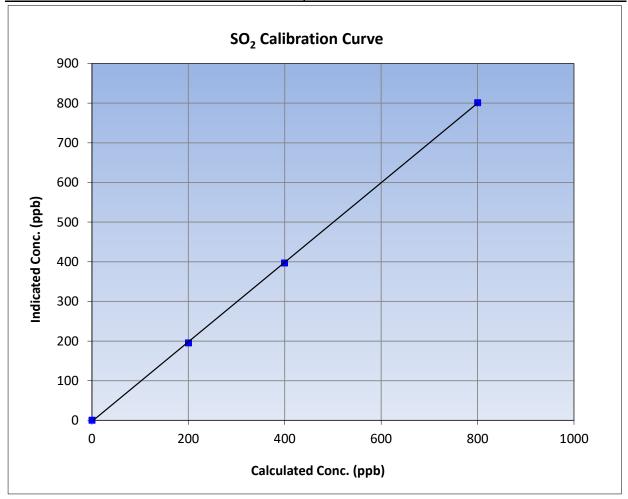
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 15, 2024 **Previous Calibration:** December 18, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:26 End Time (MST): 13:55 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	0.1		Correlation Coefficient	0.999940	≥0.995				
799.7	801.0	0.9984	Correlation Coefficient	0.555540	20.333				
399.3	396.7	1.0066	Slope	1.003443	0.90 - 1.10				
200.2	195.0	1.0266	Slope	1.003443	0.90 - 1.10				
			- Intercept	-2.798230	+/-30				

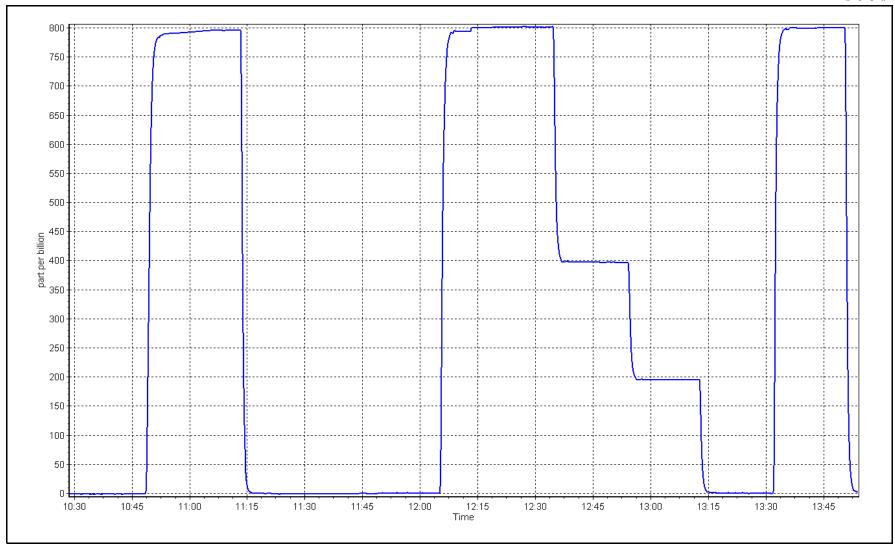


SO2 Calibration Plot

Date: January 15, 2024

Location: Fort McKay South







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort McKay South
Calibration Date: January 17, 2024

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

Station number: AMS13

Last Cal Date: December 5, 2023

End time (MST): 15:16

Calibration Standards

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

Cal Gas Cylinder #: CC500241
Removed Cal Gas Conc: 5.34

Removed Cal Gas Conc: 5.34 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API 701

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 2448 Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

Converter make: CDN-101 Converter serial #: 521

Analyzer Range 0 - 100 ppb

<u>Finish</u> **Finish** <u>Start</u> <u>Start</u> 0.997103 0.997527 Backgd or Offset: Calibration slope: 3.77 4.15 -0.182182 Calibration intercept: -0.142201 Coeff or Slope: 1.130 1.157

TRS As Found Data

Set Point	Dilution air flow rate Sou (sccm)		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.5	80.6	78.6	1.027
as found 2nd point	4962	37.7	40.3	39.1	1.032
as found 3rd point	4981	18.9	20.2	19.4	1.046
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.2	
high point	4925	75.5	80.6	80.2	1.005
second point	4962	37.7	40.3	40.1	1.004
third point	4981	18.9	20.2	19.9	1.014
as left zero	5000	0.0	0.0	0.4	
as left span	4925	75.5	80.6	79.6	1.013
SO2 Scrubber Check	4921	79.1	791.0	0.2	
Date of last scrubber change	e:	20-Mar-20		Ave Corr Factor	1.008

Date of last scrubber change:	20-Mar-20	Ave Corr Factor	1.008
Date of last converter efficiency test:	NA		efficiency

Baseline Corr As found: 78.5 80.25 Prev response: *% change: -2.2% Baseline Corr 2nd AF pt: 39.0 AF Slope: 0.974845 AF Intercept: -0.082177 AF Correlation: Baseline Corr 3rd AF pt: 0.999975 19.3

* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero.

Adjusted zero and span.

Calibration Performed By: Sean Bala



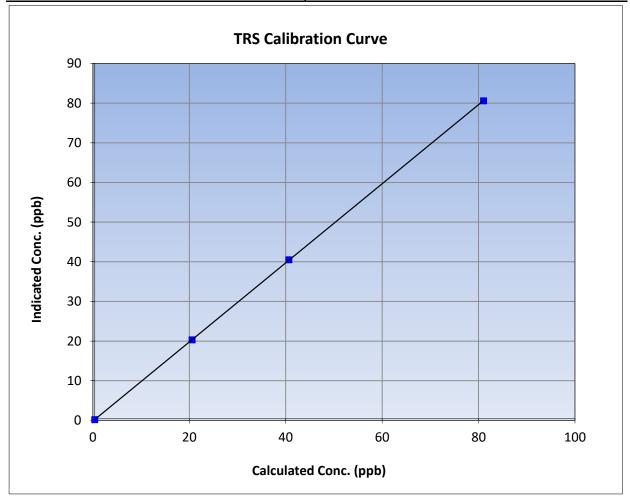
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: Calibration Date: January 17, 2024 December 5, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:24 End Time (MST): 15:16 Analyzer make: Thermo 43i TLE Analyzer serial #: 1180540017

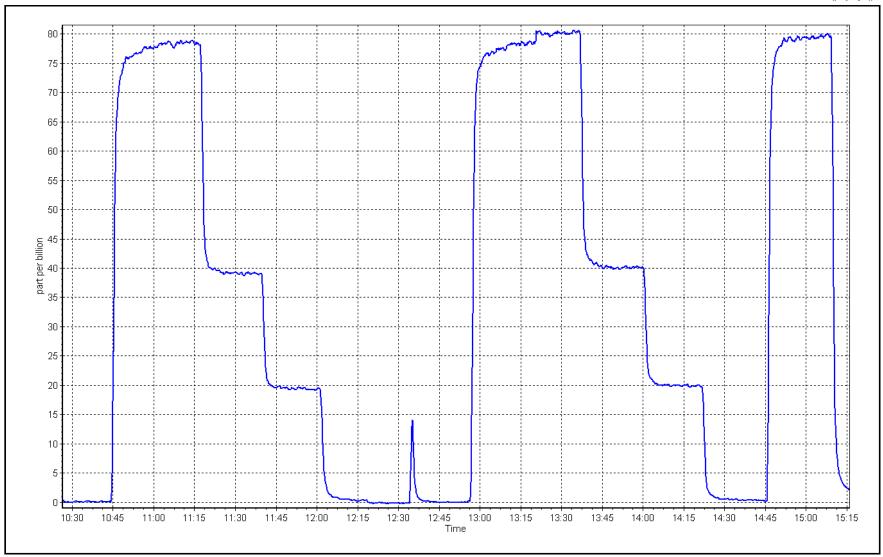
	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	-0.2		Correlation Coefficient	0.999995	≥0.995				
80.6	80.2	1.0053	Correlation coefficient	0.555555	20.993				
40.3	40.1	1.0041	Slope	0.997527	0.90 - 1.10				
20.2	19.9	1.0144	Slope	0.337327	0.90 - 1.10				
			- Intercept	-0.182182	+/-3				





Date: January 17, 2024 Location: Fort McKay South







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Fort McKay South Station Name:

Calibration Date: January 15, 2024

Start time (MST): 10:26 Routine Reason:

Station number: AMS13

Last Cal Date: December 18, 2023

End time (MST): 13:55

Removed Gas Expiry:

Calibration Standards

Gas Cert Reference: CC260812 Cal Gas Expiry Date: December 29, 2028

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

C3H8 Cal Gas Conc. 208.7 ppm

Removed Gas Cert: NA

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

Removed C3H8 Conc. 208.7 Diff between cyl (THC): ppm Diff between cyl (CH₄): 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 #: 1172750023

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: 2.80E-04 2.94E-04 NMHC SP Ratio: 4.70E-05 4.74E-05 CH4 Retention time: 14.80 15.00 NMHC Peak Area: 193260 191512 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.01			
as found span	4921	79.1	17.05	16.37	1.041		
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	17.05	1.000		
second point	4961	39.5	8.51	8.45	1.008		
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	16.89	1.009		
				Average Correction Factor	1.014		
Baseline Corr AF:	16.37	Prev response	17.04	*% change	-4.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			



THC / CH₄ / NMHC Calibration Report

Version-06-2022

Cat Dailat		NMHC Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.1	9.08	8.99	1.010
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	9.08	9.08	1.000
second point	4961	39.5	4.53	4.48	1.013
hird point	4980	19.8	2.27	2.18	1.042
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.1	9.08	8.88	1.022
			Aver	age Correction Factor	1.018
Baseline Corr AF:	8.99	Prev response	9.08	*% change	-1.0%
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	0.01	
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	4921	79.1	7.97	7.39	1.078
as found 2nd point	4921	79.1	7.97	7.59	1.076
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	3.97	
		33.3	3.30		1 002
hird point	498N	19.8	1 99		1.002
	4980 5000	19.8 0.0	1.99 0.00	1.94	1.002 1.027
chird point as left zero as left span	5000	0.0	0.00	1.94 0.00	1.027
			0.00 7.97	1.94 0.00 8.01	1.027 0.995
as left zero as left span	5000	0.0 79.1	0.00 7.97	1.94 0.00 8.01 age Correction Factor	1.027
as left zero	5000 4921	0.0 79.1 Prev response	0.00 7.97 Aver	1.94 0.00 8.01 age Correction Factor *% change	1.027 0.995 1.009
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 7.38	0.0 79.1 Prev response AF Slope:	0.00 7.97 Aver	1.94 0.00 8.01 age Correction Factor	1.027 0.995 1.009 -7.9%
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 7.38 NA	0.0 79.1 Prev response AF Slope: AF Correlation:	0.00 7.97 Aver 7.96	1.94 0.00 8.01 age Correction Factor *% change AF Intercept:	1.027 0.995 1.009 -7.9%
as left zero as left span Baseline Corr AF:	5000 4921 7.38 NA	0.0 79.1 Prev response AF Slope: AF Correlation: Calibration	0.00 7.97 Aver 7.96	1.94 0.00 8.01 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.027 0.995 1.009 -7.9%
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	5000 4921 7.38 NA	0.0 79.1 Prev response AF Slope: AF Correlation: Calibration	0.00 7.97 Aver 7.96	1.94 0.00 8.01 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.027 0.995 1.009 -7.9%
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 7.38 NA	0.0 79.1 Prev response AF Slope: AF Correlation: Calibration	0.00 7.97 Aver 7.96	1.94 0.00 8.01 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.027 0.995 1.009 -7.9%

-0.030586

1.004193

-0.038578

Notes:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Changed inlet filter after as founds. Adjusted span.

-0.024172

1.002658

-0.047981

Calibration Performed By: Sean Bala



THC Calibration Summary

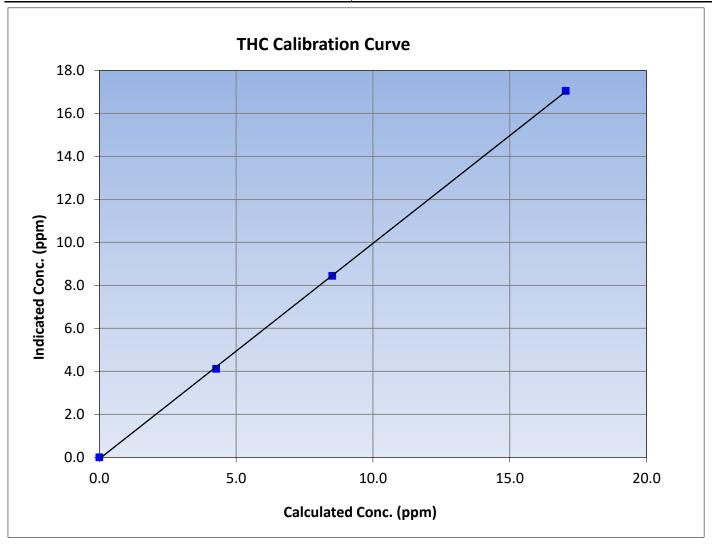
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 18, 2023

Station Name:Fort McKay SouthStation Number:AMS13Start Time (MST):10:26End Time (MST):13:55Analyzer make:Thermo 55iAnalyzer serial #:1172750023

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999916	≥0.995
17.05	17.05	0.9997	Correlation Coemicient	0.999910	20.993
8.51	8.45	1.0079	Slope	1.002747	0.90 - 1.10
4.27	4.12	1.0350	Slope	1.002747	0.90 - 1.10
			Intercept	-0.071954	+/-0.5





CH₄ Calibration Summary

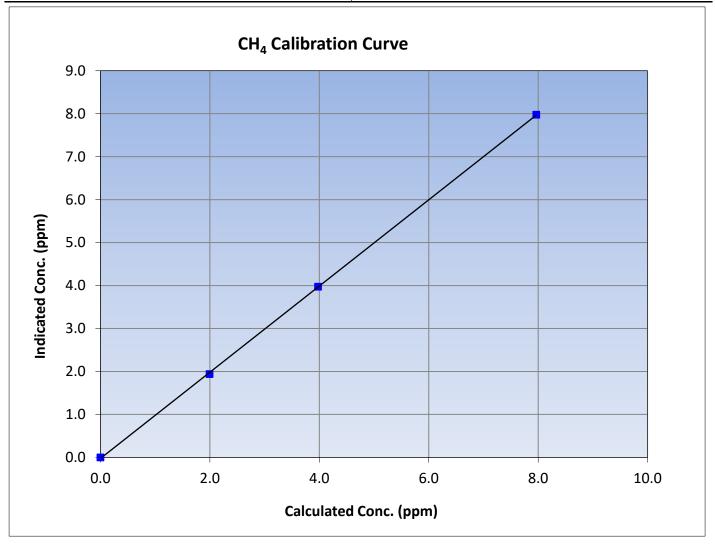
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 18, 2023

Station Name:Fort McKay SouthStation Number:AMS13Start Time (MST):10:26End Time (MST):13:55Analyzer make:Thermo 55iAnalyzer serial #:1172750023

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	<u>Limits</u>		
0.00	0.00		Correlation Coefficient	0.999946	≥0.995	
7.97	7.97	0.9991	Correlation Coefficient	0.555540	20.333	
3.98	3.97	1.0018	Slope	1.003122	0.90 - 1.10	
1.99	1.94	1.0275	Slope	1.003122	0.90 - 1.10	
			Intercept	-0.024172	+/-0.5	





NMHC Calibration Summary

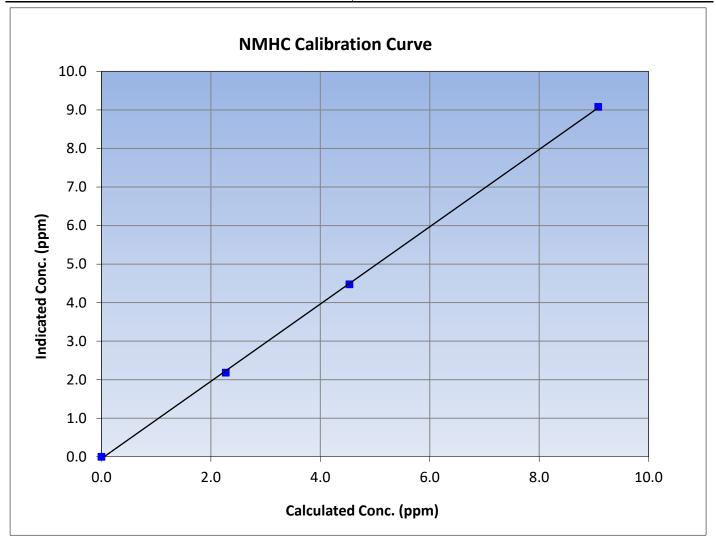
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 18, 2023

Station Name:Fort McKay SouthStation Number:AMS13Start Time (MST):10:26End Time (MST):13:55Analyzer make:Thermo 55iAnalyzer serial #:1172750023

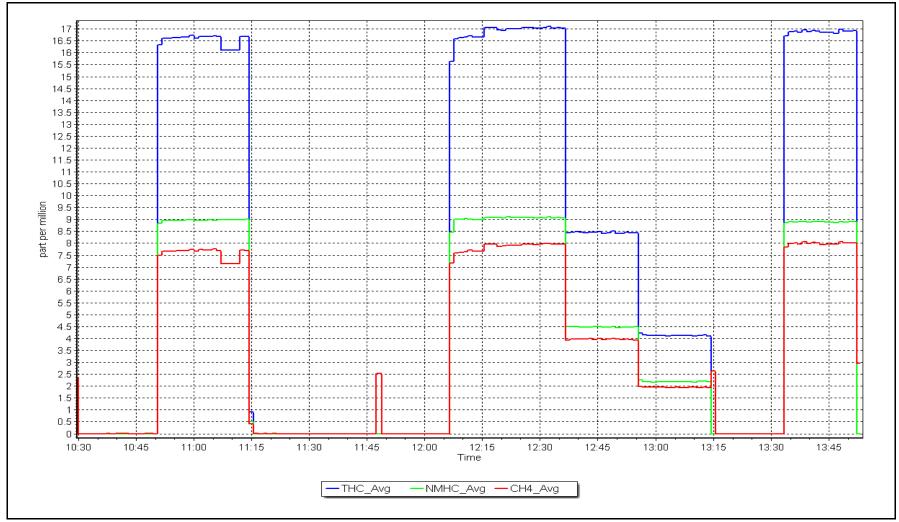
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	<u>Limits</u>		
0.00	0.00		Correlation Coefficient	0.999873	≥0.995	
9.08	9.08	1.0000	Correlation Coemicient	0.333673	20.333	
4.53	4.48	1.0131	Slope	1.002658	0.90 - 1.10	
2.27	2.18	1.0416	Slope	1.002038	0.90 - 1.10	
			Intercept	-0.047981	+/-0.5	



NMHC Calibration Plot Date: January 15, 2024 L

Location: Fort McKay South







ZAG make/model:

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort McKay South

Calibration Date: January 25, 2024

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

Station number: AMS 13

Last Cal Date: December 19, 2023

1117

End time (MST): 14:42

Serial Number:

Calibration Standards

NO Gas Cylinder #: T2UP1RP Cal Gas Expiry Date: November 17, 2026 NOX Cal Gas Conc: NO Cal Gas Conc: 48.25 47.88 ppm ppm Removed Cylinder #: T2Y1P76 Removed Gas Exp Date: December 11, 2023 Removed Gas NO Conc: Removed Gas NOX Conc: 50.98 ppm 49.32 ppm NOX gas Diff: NO gas Diff: -0.1% -1.4% Serial Number: Calibrator Model: **API T700** 2448

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1410661329

NOX Range (ppb): 0 - 1000 ppb

API T701

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.136 1.133 NO bkgnd or offset: 12 10.9 NOX coeff or slope: 0.989 1.001 NOX bkgnd or offset: 12.0 11.0 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 160.5 160.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000174	1.001306
NO _x Cal Offset:	-2.251490	-2.253060
NO Cal Slope:	1.004205	1.003396
NO Cal Offset:	-3.125534	-3.151422
NO ₂ Cal Slope:	1.001643	0.998110
NO ₂ Cal Offset:	-0.703923	-0.700632



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Di	lution 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	-1.3	-1.3	0.0		
as found span	4919	81.1	826.9	800.0	26.9	830.7	802.5	28.2	0.9954	0.9968
as found 2nd										
as found 3rd										
new cyl resp	4917	83.5	805.7	799.5	6.2	798.1	801.4	-3.4	1.0095	0.9976
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4917	83.5	805.7	799.5	6.2	805.6	800.6	4.9	1.0001	0.9986
second point	4958	41.8	403.4	400.3	3.1	400.5	397.0	3.5	1.0072	1.0083
third point	4979	20.9	201.7	200.1	1.5	197.6	194.6	3.0	1.0207	1.0285
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.4	0.1		
as left span	4917	83.5	805.7	376.1	429.6	810.0	378.2	431.8	0.9947	0.9945
							Average C	Correction Factor	1.0093	1.0118
Corrected As fo	ound NO _X =	832.0 ppb	NO =	803.8 ppb	* = > +/-5%	6 change initiates i	investigation	*Percent Chang	ge NO _x =	0.9%
revious Respo	onse NO _X =	824.8 ppb	NO =	800.2 ppb				*Percent Chang	ge NO =	0.4%
aseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
aseline 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:	
					GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 stration (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	int (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	797.2		373.8	429.6		428.5	1.0025	;	99.7%

Notes:

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

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

215.3

110.1

Average Correction Factor

1.0078

1.0134

1.0079

217.0

111.6

Calibration Performed By:

Sean Bala

586.4

691.8

797.2

797.2

99.2%

98.7%

99.2%



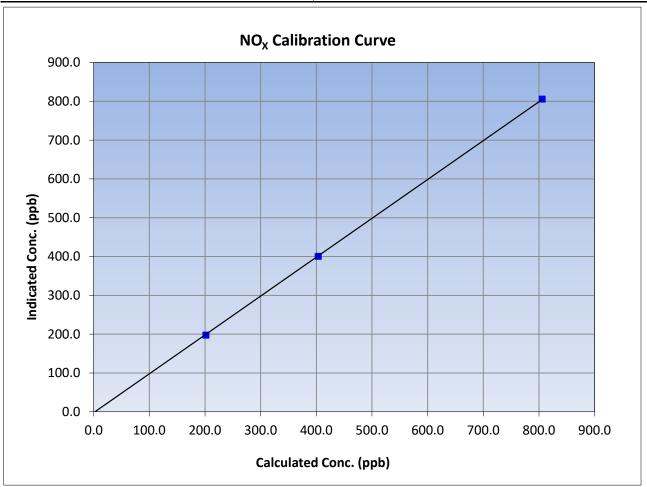
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 Previous Calibration: December 19, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 9:37 End Time (MST): 14:42 Analyzer serial #: Analyzer make: Thermo 42i 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	atistical Evaluation	
0.0	-0.1		Correlation Coefficient	0.999967	≥0.995
805.7	805.6	1.0001	Correlation Coefficient	0.555507	20.993
403.4	400.5	1.0072	Slope	1.001306	0.90 - 1.10
201.7	197.6	1.0207	Slope		0.30 - 1.10
			Intercept	-2.253060	+/-20





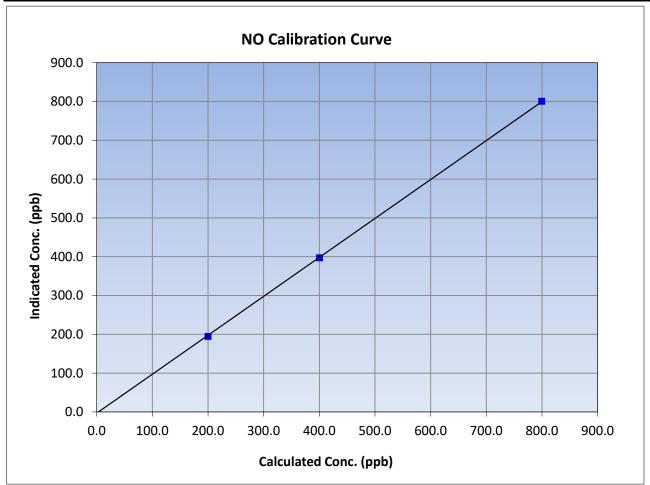
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 **Previous Calibration:** December 19, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 9:37 End Time (MST): 14:42 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Statistical Evaluation		ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999934	≥0.995
799.5	800.6	0.9986	Correlation Coefficient	0.555554	20.333
400.3	397.0	1.0083	Slope	1.003396	0.90 - 1.10
200.1	194.6	1.0285	Slope		0.50 1.10
			Intercept	-3.151422	+/-20





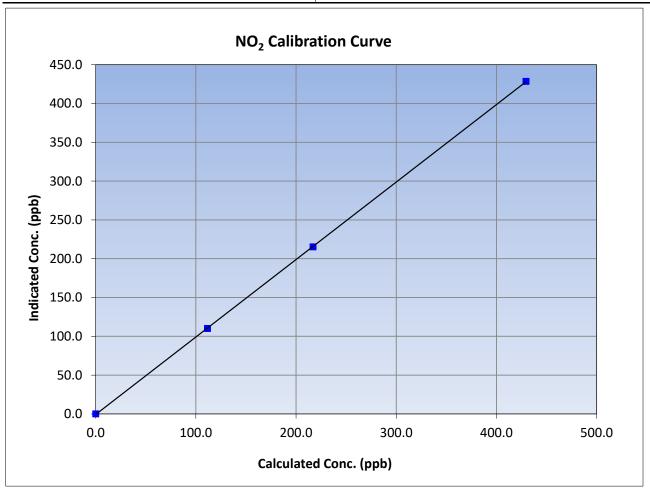
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 **Previous Calibration:** December 19, 2023 Station Name: Fort McKay South Station Number: AMS 13 Start Time (MST): 9:37 End Time (MST): 14:42 Analyzer make: Thermo 42i Analyzer serial #: 1410661329

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999987	≥0.995
429.6	428.5	1.0025	Correlation Coefficient	0.555507	20.993
217.0	215.3	1.0078	Slope	0.998110	0.90 - 1.10
111.6	110.1	1.0134	Зюре	0.996110	0.30 1.10
			Intercept	-0.700632	+/-20

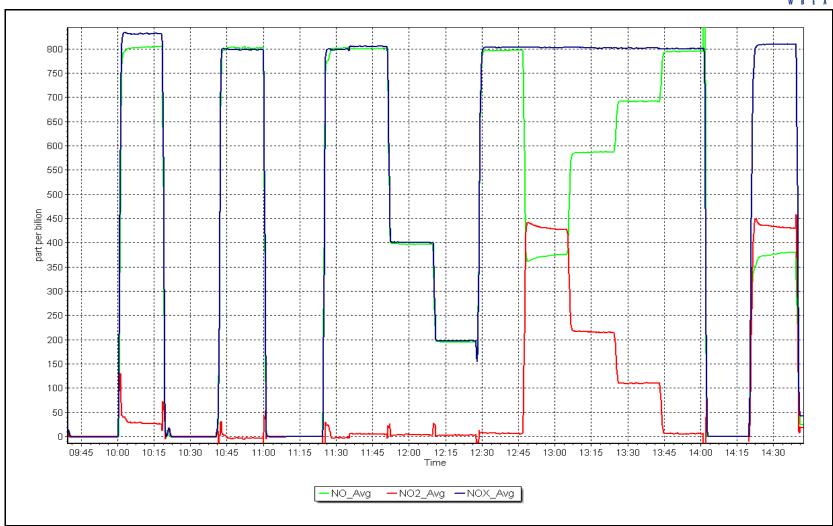


NO_x Calibration Plot

Date: January 25, 2024

Location: Fort McKay South







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Fort McKay South

Calibration Date: January 5, 2024

Start time (MST): 10:02 Reason: Routine Station number: AMS13

Last Cal Date: December 13, 2023

End time (MST): 13:20

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 2448 ZAG Make/Model: Teledyne API T701 Serial Number: 1117

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 3871

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.007857 1.000914 3.9 3.9 0.240000 Coeff or Slope: Calibration intercept: 0.000000 0.971 0.971

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	-0.7	
as found span	5000	989.8	400.0	400.6	0.999
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.4	
high point	5000	989.8	400.0	400.2	1.000
second point	5000	849.9	200.0	201.0	0.995
third point	5000	745.1	100.0	100.8	0.992
as left zero	5000	0.0	0.0	-0.6	
as left span	5000	989.8	400.0	401.4	0.997
			Averag	ge Correction Factor	0.996
Baseline Corr As found:	401.3	Previous respons	e 403.1	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Changed inlet filter after as founds. No adjustment made.

Calibration Performed By: Sean Bala

Notes:

* = > +/-5% change initiates investigation



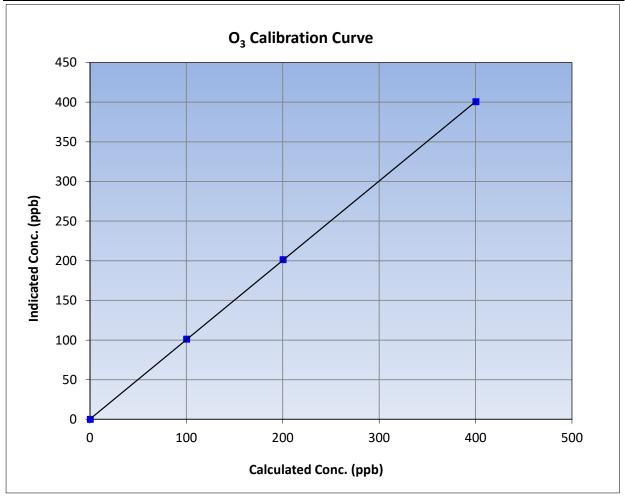
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 5, 2024 **Previous Calibration:** December 13, 2023 Station Name: Fort McKay South Station Number: AMS13 Start Time (MST): 10:02 End Time (MST): 13:20 Analyzer make: Teledyne API T400 Analyzer serial #: 3871

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	-0.4		Correlation Coefficient	0.999987	≥0.995		
400.0	400.2	0.9995	Correlation Coefficient	0.555507			
200.0	201.0	0.9950	Slope	1.000914	0.90 - 1.10		
100.0	100.8	0.9921	Зюре		0.90 - 1.10		
			- Intercept	0.240000	+/- 5		

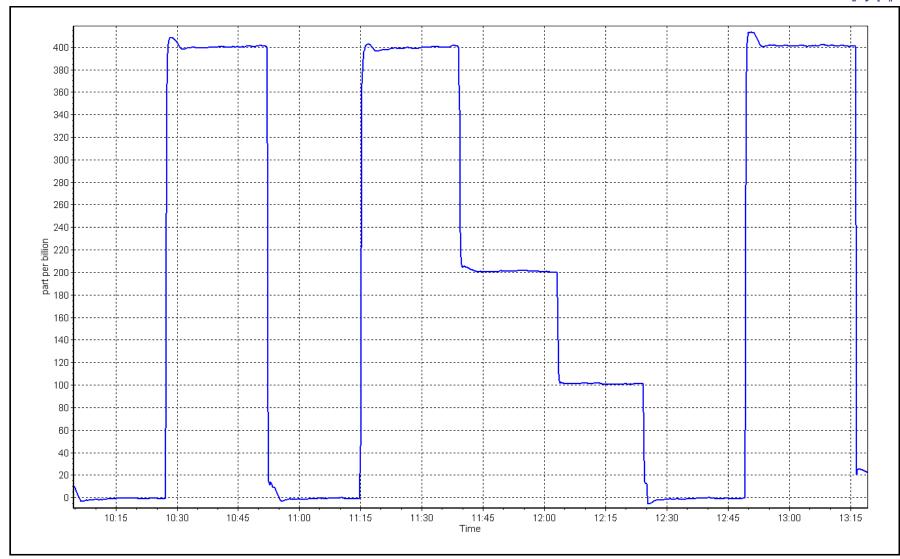


O₃ Calibration Plot

Date: January 5, 2024

Location: Fort McKay South







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	ı				
Station Name:	Fort McKay South		Station number:	AMS 13			
Calibration Date:	January 22, 2024			December 19, 202	23		
Start time (MST):	13:42		End time (MST):	14:43			
Analyzer Make:	API T640		S/N:	1335			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model:	Alicat FP-25		S/N:	388746			
Temp/RH standard:	Alicat FP-25		S/N:	388746			
		Monthly Calibration Te	est				
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjus</u>	ited (Limits)		
T (°C)	-17.70	-18.54	-17.70		+/- 2 °C		
P (mmHg)	735.20	737.20	735.20		+/- 10 mmHg		
flow (LPM)	4.92	4.81	4.92		+/- 0.25 LPM		
Leak Test:	Date of check:	January 22, 2024	Last Cal Date:	December 19, 20	023		
	PM w/o HEPA:	5.6	PM w/ HEPA:	0.0	<0.2 ug/m3		
Note: this leak check will be		<u> </u>	erve as the pre ma	intenance leak che	ck		
Inlet cleaning:	Inlet Head	✓					
		Quarterly Calibration T	est				
<u>Parameter</u>	As found	Post maintenance	As left	Adjus	ited <i>(Limits)</i>		
PMT Peak Test	8.9	10.9	10.9	<u>/(a)as</u>			
TWITT CAR TEST	0.5	10.3	10.5	_	10.5 17 - 0.5		
Post-maintenance	e leak check:	PM w/o HEPA:	5.1	w/ HEPA:	0.0		
Date Optical Cham	-	January 22, 2024		<u>-</u>	<0.2 ug/m3		
Disposable Filte	r Changed:	January 22, 2024		<u>-</u>			
		Annual Maintenance	e				
Data Sampla Tuk	oe Cleaned:	June 29, 2	023				
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		June 29, 2		-			
Notes:		PMT peak test ad	ljusted. Leak check	passed.			
110103.							
Calibration by:	Sean Bala						



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS14 ANZAC

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Finish

25.6 0.812

Station Information

Station Name: Anzac

January 4, 2024 Calibration Date:

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

Station number: **AMS 14**

> December 7, 2023 Last Cal Date:

End time (MST): 14:30

Start

Calibration Standards

Cal Gas Concentration: 49.95

Cal Gas Cylinder #: CC279389

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

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

ppm Cal Gas Exp Date: January 5, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3060 Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

Calibration slope: 0.984326 1.001175 Backgd or Offset: 25.3 Calibration intercept: -1.112464 -1.861173 Coeff or Slope: 0.798

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	0.7	
as found span	4938	80.3	799.3	780.2	1.024
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	1.2	
high point	4938	80.3	799.3	800.3	0.999
second point	4979	40.2	400.1	395.9	1.011
third point	4998	20.2	201.1	197.2	1.020
as left zero	5000	0.0	0.0	1.0	
as left span	4938	80.3	799.3	795.8	1.004
			Averag	ge Correction Factor	1.010
Baseline Corr As found:	779.50	Previous response	785.63	*% change	-0.8%

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

NA Baseline Corr 3rd AF pt: AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



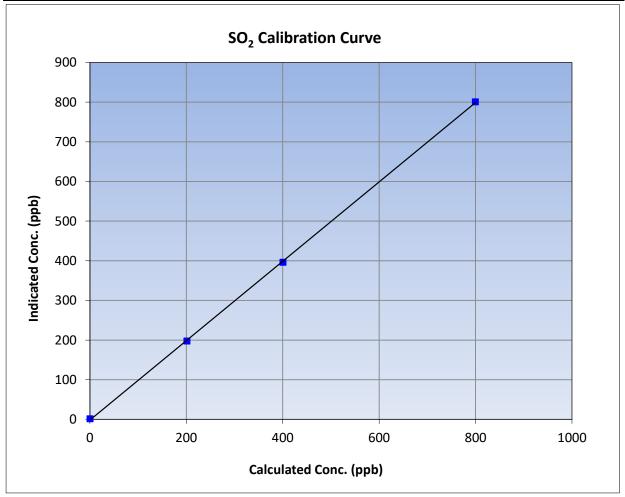
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 7, 2023 Station Name: Anzac Station Number: **AMS 14** Start Time (MST): 11:10 End Time (MST): 14:30 Analyzer make: Thermo 43i Analyzer serial #: 0710321322

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	1.2		Correlation Coefficient	0.999926	≥0.995				
799.3	800.3	0.9987	correlation coefficient	0.555520	20.555				
400.1	395.9	1.0105	Slope	1.001175	0.90 - 1.10				
201.1	197.2	1.0196	Зюре	1.001175	0.90 - 1.10				
			- Intercept	-1.861173	+/-30				



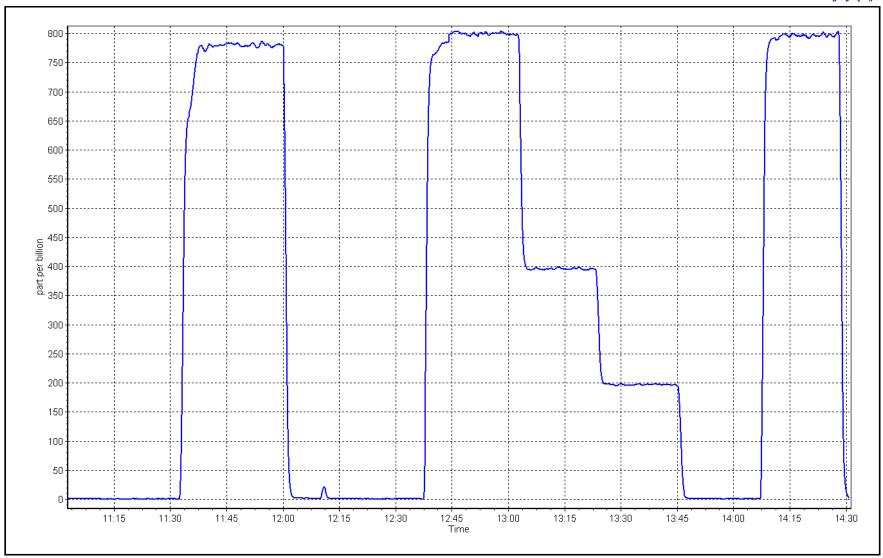
SO2 Calibration Plot

Date:

January 4, 2024

Location: Anzac







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Anzac

Calibration Date: January 18, 2024

Start time (MST): 10:50

Reason: Routine Station number: AMS14

> Last Cal Date: December 5, 2023

End time (MST): 15:13

Calibration Standards

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

ppm

Cal Gas Cylinder #: CC510379

Removed Cal Gas Conc: 5.15 Removed Gas Cyl #: NA Calibrator Make/Model: API T700

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3060 Serial Number: 357

Analyzer Information

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

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

0 - 100 ppb Analyzer Range

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

<u>Finish</u> <u>Start</u> 2.40 1.012453 Backgd or Offset: Calibration slope: 1.011740 2.33 Calibration intercept: -0.265448 -0.065392 Coeff or Slope: 0.992 1.043

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4938	77.9	80.0	77.4	1.032
as found 2nd point	4973	38.9	40.0	38.3	1.041
as found 3rd point	4997	19.5	20.0	19.0	1.048
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4938	77.9	80.0	80.9	0.988
second point	4973	38.9	40.0	40.5	0.987
third point	4997	19.5	20.0	19.9	1.006
as left zero	5000	0.0	0.0	0.3	
as left span	4938	77.9	80.0	80.4	0.994
SO2 Scrubber Check	4936	80.3	800.4	0.0	
Date of last scrubber chan	ge:	<u> </u>		Ave Corr Factor	0.993
D . (1 (C)					cc

Date of last scrubber change	2:			Ave Corr Factor	0.993	
Date of last converter efficie	ncy test:			ef	ficiency	
Baseline Corr As found:	77.5	Prev response:	80.66	*% change:	-4.1%	

Baseline Corr 2nd AF pt: 38.4 AF Slope: 0.969763 Baseline Corr 3rd AF pt: AF Correlation: 0.999970 19.1

* = > +/-5% change initiates investigation

-0.285258

AF Intercept:

Notes:

Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. Adjusted span only.

Calibration Performed By: Mohammed Kashif



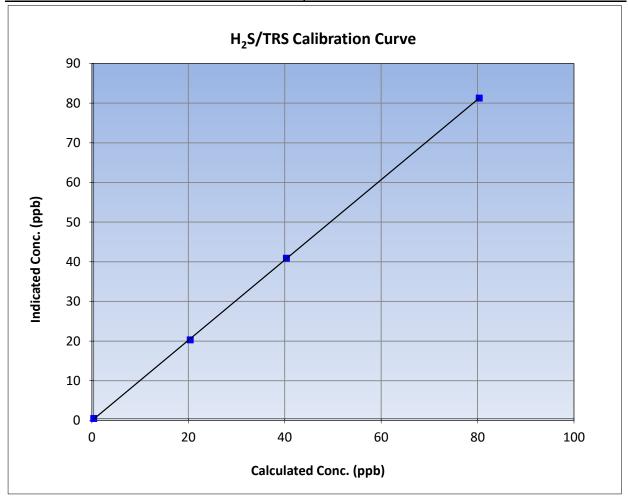
TRS Calibration Summary

Version-11-2021

Station Information

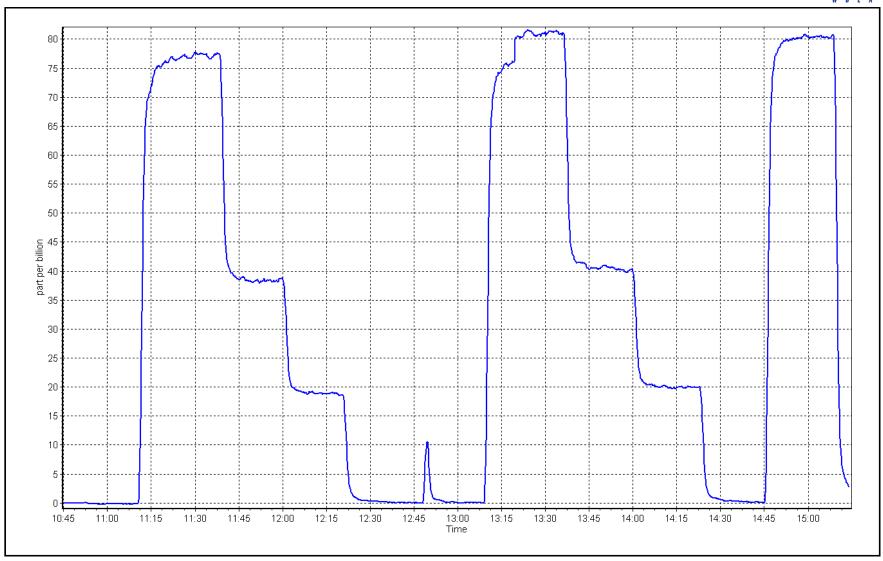
Calibration Date: January 18, 2024 **Previous Calibration:** December 5, 2023 Station Name: Station Number: AMS14 Anzac Start Time (MST): 10:50 End Time (MST): 15:13 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153582

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.1		Correlation Coefficient	0.999965	≥0.995				
80.0	80.9	0.9883	Correlation Coefficient	0.555505	20.333				
40.0	40.5	0.9866	Slope	1.012453	0.90 - 1.10				
20.0	19.9	1.0056	Slope	1.012433	0.90 - 1.10				
			- Intercept	-0.065392	+/-3				



Date: January 18, 2024 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Anzac

Calibration Date: January 4, 2024

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

Station number: AMS14

Last Cal Date: December 7, 2023

End time (MST): 14:30

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 CH4 Conc. 499.3 ppm CH4 Equiv Conc. 1068.8 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

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

Finish Finish Start Start CH4 SP Ratio: 3.72E-04 3.89E-04 NMHC SP Ratio: 4.60E-05 4.60E-05 CH4 Retention time: 12.20 12.60 NMHC Peak Area: 198214 198370 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	17.10	16.83	1.016
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	17.20	0.994
second point	4979	40.2	8.56	8.49	1.008
third point	4998	20.2	4.30	4.23	1.018
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.15	0.997
			Α	verage Correction Factor	1.007
Baseline Corr AF:	16.83	Prev response	17.18	*% change	-2.1%
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					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	
as found span	4938	80.3	9.11	9.20	0.990
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	9.11	9.28	0.982
second point	4979	40.2	4.56	4.54	1.006
third point	4998	20.2	2.29	2.24	1.023
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	9.11	9.12	0.999
·			Avera	age Correction Factor	1.004
Baseline Corr AF:	9.20	Prev response	9.27	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
			***		CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	4.047
as found span	4938	80.3	7.99	7.63	1.047
as found 2nd point					
as found 3rd point					
new cylinder response	F000	0.0	0.00	0.00	
calibrator zero	5000	0.0	0.00	0.00	1.000
high point	4938	80.3	7.99	7.92	1.008
second point	4979 4998	40.2	4.00	3.96 1.99	1.010
third point as left zero	5000	20.2 0.0	2.01 0.00	0.00	1.012
	4938	80.3	7.99	8.02	0.996
as left span	4936	80.3		age Correction Factor	1.010
Baseline Corr AF:	7.63	Prev response	7.91	*% change	-3.7%
Baseline Corr 2nd AF:	NA	AF Slope:	7.51	AF Intercept:	-3.7/0
		AF Slope. AF Correlation:		* = > +/-5% change initiat	tes investigation
Baseline Corr 3rd AF:	NA		C	- > +/ -5/0 Change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.007099		1.007150	
THC Cal Offset:		-0.042334		-0.063715	
CH4 Cal Slope:		0.992465		0.991854	
CH4 Cal Offset:		-0.015977		-0.003590	
NMHC Cal Slope:		1.019691		1.020347	

Notes: Sample inlet filter and Nitrogen cylinder were changed after as founds. Adjusted span only.

-0.026156

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.059525



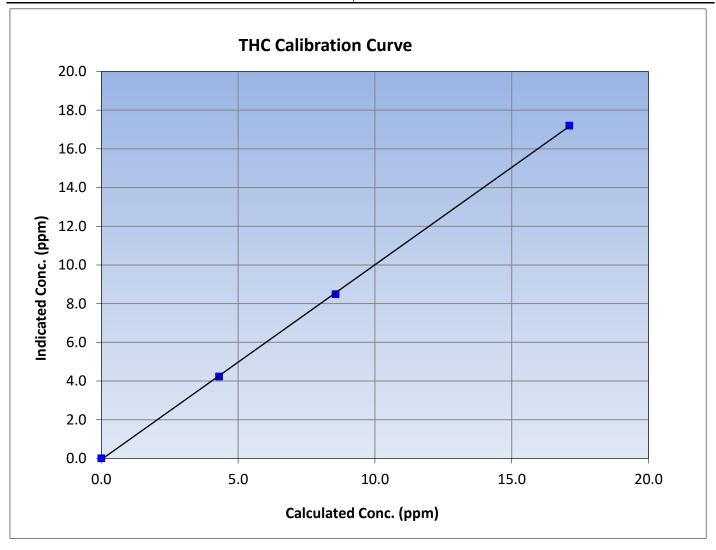
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 7, 2023 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:30 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	0.999927	≥0.995
17.10	17.20	0.9941	Correlation Coefficient	0.333327	20.333
8.56	8.49	1.0078	Slope	1.007150	0.90 - 1.10
4.30	4.23	1.0178	Siope	1.00/130	0.90 - 1.10
			Intercept	-0.063715	+/-0.5





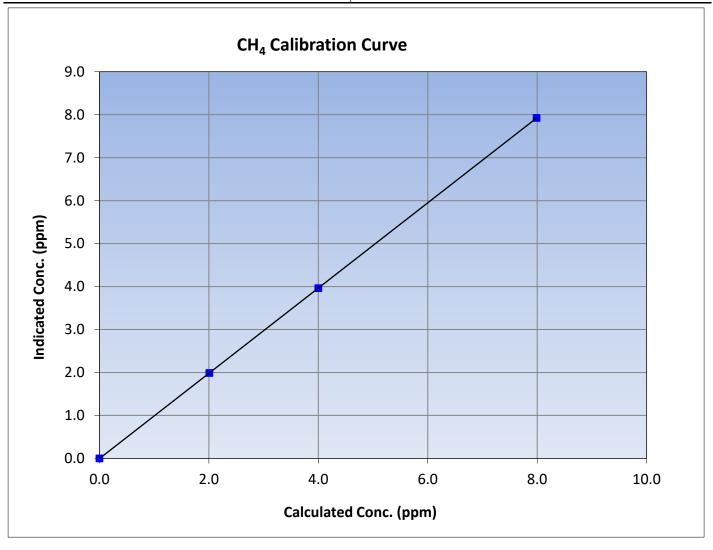
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 4, 2024 **Previous Calibration:** December 7, 2023 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:30 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	0.999999	≥0.995
7.99	7.92	1.0084	Correlation Coemicient	0.555555	20.555
4.00	3.96	1.0099	Slone	0.991854	0.90 - 1.10
2.01	1.99	1.0115	Slope		0.90 - 1.10
			Intercept	-0.003590	+/-0.5





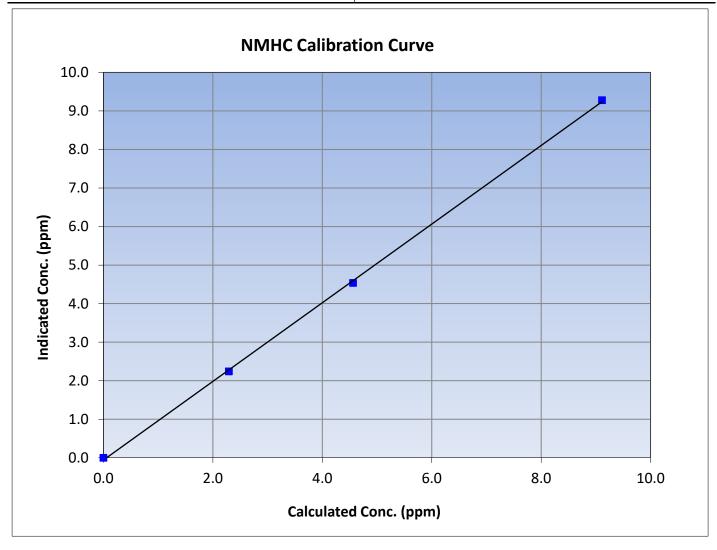
NMHC Calibration Summary

Version-06-2022

Station Information

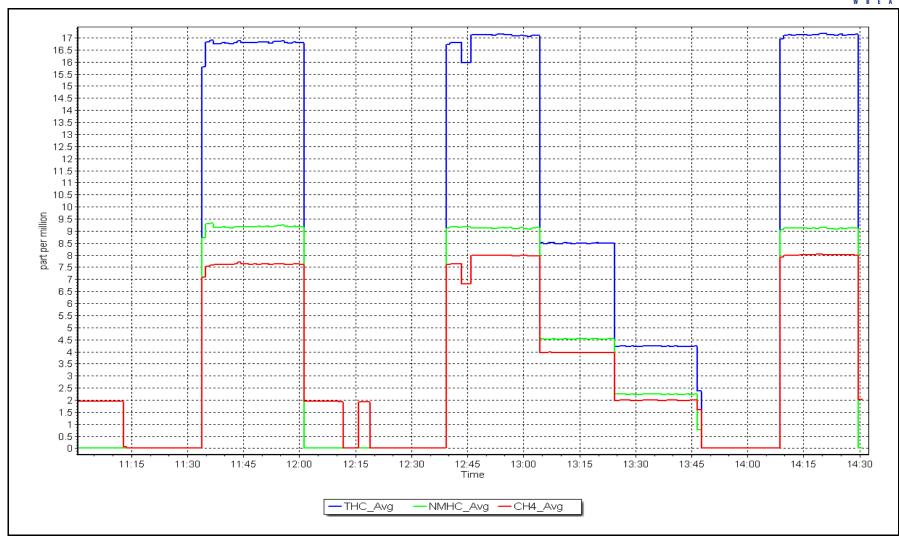
Previous Calibration: Calibration Date: January 4, 2024 December 7, 2023 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:30 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999783	≥0.995
9.11	9.28	0.9821	Correlation Coefficient	0.999765	20.993
4.56	4.54	1.0058	Slope	1.020347	0.90 - 1.10
2.29	2.24	1.0235	Slope	1.020347	0.90 - 1.10
			Intercept	-0.059525	+/-0.5



Date: January 4, 2024 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Anzac

Calibration Date: January 16, 2024

Start time (MST): 11:10

Reason: Maintenance

Station number: AMS14

Last Cal Date: January 4, 2024

End time (MST): 14:54

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

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

Finish Finish Start Start CH4 SP Ratio: 3.89E-04 4.20E-04 NMHC SP Ratio: 4.60E-05 4.60E-05 CH4 Retention time: 12.60 13.00 NMHC Peak Area: 198370 198389 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	:) 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	16.56	1.033
as found 2nd point	4979	40.2	8.56	8.19	1.045
as found 3rd point	4998	20.2	4.30	4.08	1.055
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	17.10	17.05	1.003
second point	4979	40.2	8.56	8.50	1.007
third point	4998	20.2	4.30	4.25	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.14	0.998
			A۱	verage Correction Factor	1.008
Baseline Corr AF:	16.56	Prev response	17.16	*% change	-3.6%
Baseline Corr 2nd AF:	8.2	AF Slope:	0.969546	AF Intercept:	-0.054256
Baseline Corr 3rd AF:	4.1	AF Correlation:	0.999945	* = > +/-5% change initiat	es investigation



Baseline Corr 3rd AF:

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

0.999903

Version-06-2022

* = > +/-5% change initiates investigation

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.00			
as found span	4938	80.3	9.11	9.17	0.993		
as found 2nd point	4979	40.2	4.56	4.52	1.009		
as found 3rd point	4998	20.2	2.29	2.24	1.022		
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4938	80.3	9.11	9.08	1.004		
second point	4979	40.2	4.56	4.54	1.005		
third point	4998	20.2	2.29	2.27	1.012		
as left zero	5000	0.0	0.00	0.00			
as left span	4938	80.3	9.11	9.20	0.991		
			Ave	erage Correction Factor	1.007		
Baseline Corr AF:	9.17	Prev response	9.24	*% change	-0.7%		
Baseline Corr 2nd AF:	4.5	AF Slope:	1.008095	AF Intercept:	-0.039867		

CH4 Calibration Data

AF Correlation:

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	7.99	7.39	1.081
as found 2nd point	4979	40.2	4.00	3.67	1.089
as found 3rd point	4998	20.2	2.01	1.84	1.094
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	7.99	7.97	1.002
second point	4979	40.2	4.00	3.96	1.010
third point	4998	20.2	2.01	1.98	1.015
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	7.99	7.94	1.006
			Avera	age Correction Factor	1.009
Baseline Corr AF:	7.39	Prev response	7.92	*% change	-7.2%
Baseline Corr 2nd AF:	3.67	AF Slope:	0.925403	AF Intercept:	-0.013789
Baseline Corr 3rd AF:	1.84	AF Correlation:	0.999981	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.007150		0.997643	
THC Cal Offset:		-0.063715		-0.024242	
CH4 Cal Slope:		0.991854	0.998476		
CH4 Cal Offset:		-0.003590	-0.016013		
NMHC Cal Slope:		1.020347	0.996574		
NMHC Cal Offset:		-0.059525		-0.007627	

Notes: Adjusted the span only.

Calibration Performed By: Mohammed Kashif

2.2



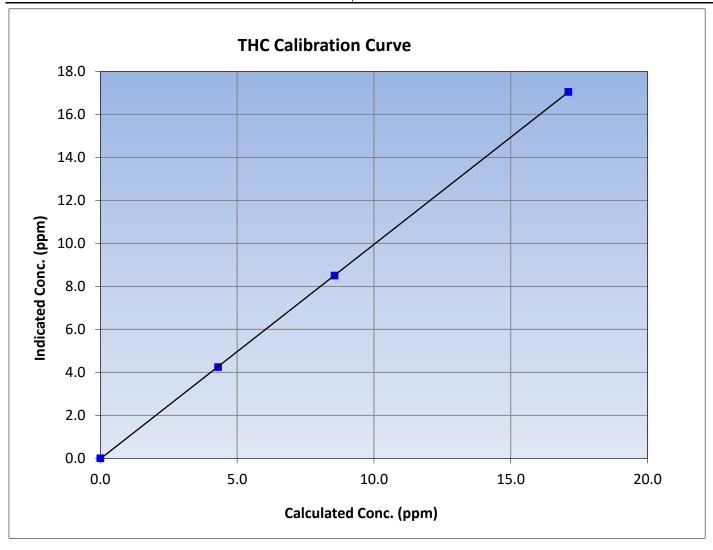
THC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 16, 2024 January 4, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:54 Analyzer make: Thermo 55i Analyzer serial #: 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.10	17.05	1.0030			20.999
8.56	8.50	1.0069	Slope	0.997643	0.90 - 1.10
4.30	4.25	1.0135	Siope		0.90 - 1.10
			Intercept	-0.024242	+/-0.5





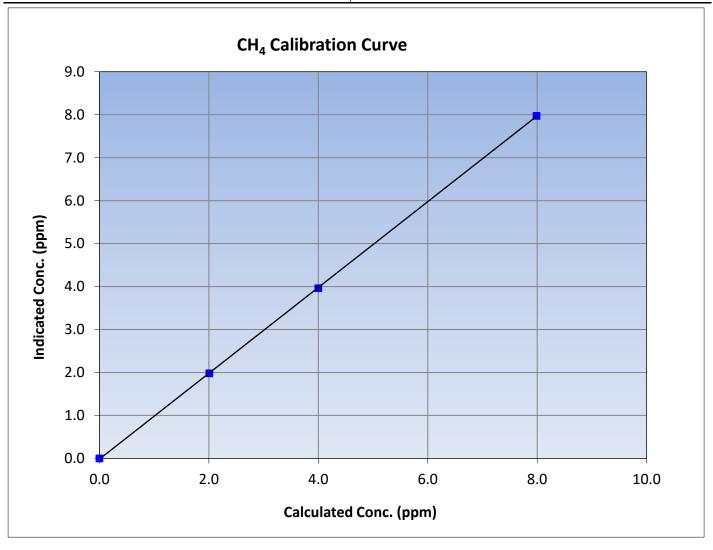
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 16, 2024 **Previous Calibration:** January 4, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:54 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999979	≥0.995
7.99	7.97	1.0022			20.333
4.00	3.96	1.0096	Slope	0.998476	0.90 - 1.10
2.01	1.98	1.0151	Siope		0.90 - 1.10
			Intercept	-0.016013	+/-0.5





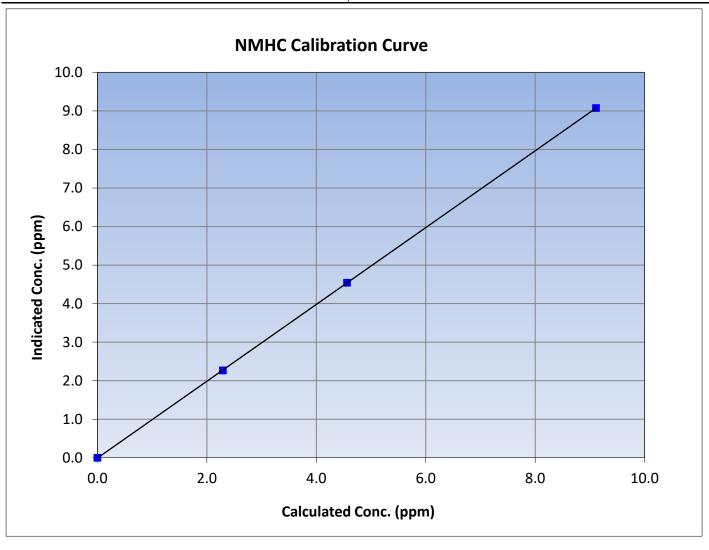
NMHC Calibration Summary

Version-06-2022

Station Information

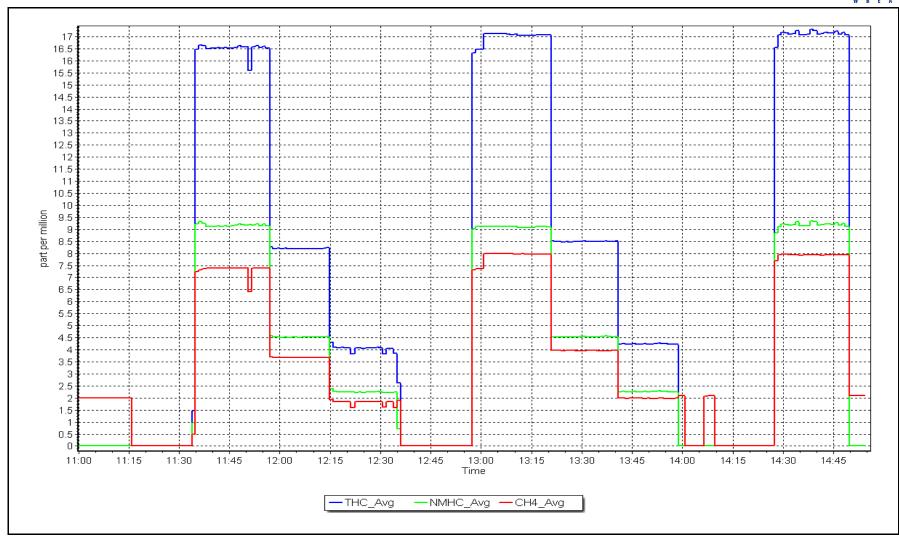
Previous Calibration: Calibration Date: January 16, 2024 January 4, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 11:10 End Time (MST): 14:54 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
9.11	9.08	1.0041			20.333
4.56	4.54	1.0045	Slope	0.996574	0.90 - 1.10
2.29	2.27	1.0122	Siope		0.90 - 1.10
			Intercept	-0.007627	+/-0.5



Date: January 16, 2024 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Anzac

Calibration Date: January 24, 2024

Start time (MST): 10:14

Reason: Maintenance

Station number: AMS14

Last Cal Date: January 16, 2024

End time (MST): 14:30

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

om CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 4.20E-04 4.72E-04 NMHC SP Ratio: 4.60E-05 4.80E-05 CH4 Retention time: 13.00 13.40 NMHC Peak Area: 198389 188364 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	17.10	15.87	1.078
as found 2nd point	4979	40.2	8.56	7.90	1.083
as found 3rd point	4998	20.2	4.30	3.95	1.091
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	17.10	17.13	0.998
second point	4979	40.2	8.56	8.51	1.007
third point	4998	20.2	4.30	4.26	1.010
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.14	0.998
			A	verage Correction Factor	1.005
Baseline Corr AF:	15.87	Prev response	17.04	*% change	-7.4%
Baseline Corr 2nd AF:	7.9	AF Slope:	0.928535	AF Intercept:	-0.026776
Baseline Corr 3rd AF:	3.9	AF Correlation:	0.999987	* = > +/-5% change initiat	es investigation



as found zero

as found span

calibrator zero

second point

high point

third point

as found 2nd point

as found 3rd point

new cylinder response

Set Point

Dil air flow rate

5000

4938

4979

4998

5000

4938

4979

4998

Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

4.56

2.29

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1.006

1.013

Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
0.0	0.00	0.00	
80.3	9.11	8.76	1.040
40.2	4.56	4.33	1.055
20.2	2.29	2.15	1.064
0.0	0.00	0.00	
80.3	9.11	9.15	0.996

4.54

2.26

1.004825

-0.024066

as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	9.11	9.20	0.990
			Ave	erage Correction Factor	1.005
Baseline Corr AF:	8.76	Prev response	9.07	*% change	-3.6%
Baseline Corr 2nd AF:	4.3	AF Slope:	0.962578	AF Intercept:	-0.032175
Baseline Corr 3rd AF:	2.2	AF Correlation:	0.999927	* = > +/-5% change initiates	investigation

40.2

20.2

NMHC Calibration Data

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (lc)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	7.99	7.11	1.124
as found 2nd point	4979	40.2	4.00	3.58	1.118
as found 3rd point	4998	20.2	2.01	1.79	1.122
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4938	80.3	7.99	7.98	1.001
second point	4979	40.2	4.00	3.97	1.008
third point	4998	20.2	2.01	2.00	1.006
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	7.99	7.94	1.006
			Aver	age Correction Factor	1.005
Baseline Corr AF:	7.11	Prev response	7.96	*% change	-12.0%
Baseline Corr 2nd AF:	3.58	AF Slope:	0.889917	AF Intercept:	0.005397
Baseline Corr 3rd AF:	1.79	AF Correlation:	0.999990	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.997643		1.002215	
THC Cal Offset:		-0.024242		-0.033495	
CH4 Cal Slope:		0.998476		0.999209	
CH4 Cal Offset:		-0.016013		-0.009829	

Notes: Adjusted the span only.

0.996574

-0.007627

Calibration Performed By: Mohammed Kashif

NMHC Cal Slope: NMHC Cal Offset:



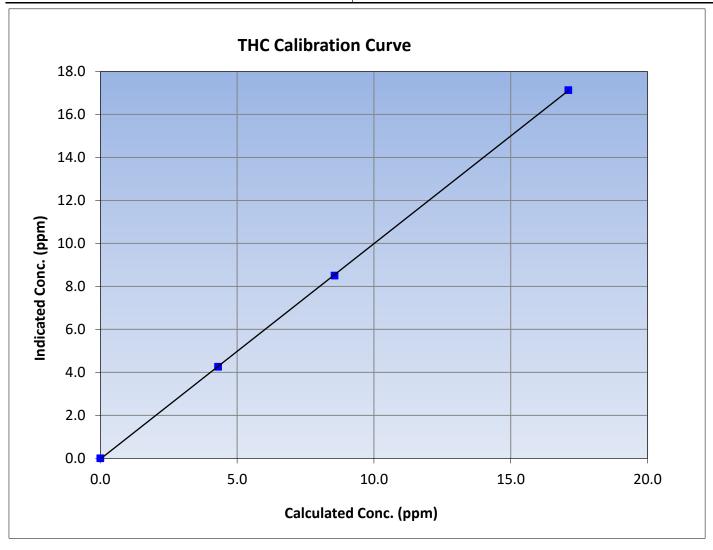
THC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 24, 2024 January 16, 2024 Station Name: Station Number: Anzac AMS14 Start Time (MST): 10:14 End Time (MST): 14:30 Analyzer make: Thermo 55i Analyzer serial #: 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999977	≥0.995
17.10	17.13	0.9983			20.333
8.56	8.51	1.0065	Slope	1.002215	0.90 - 1.10
4.30	4.26	1.0097			0.90 - 1.10
			Intercept	-0.033495	+/-0.5





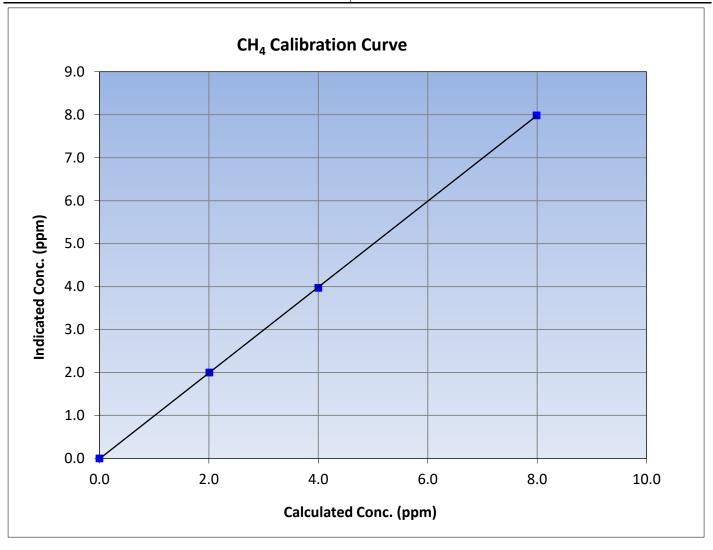
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 24, 2024 **Previous Calibration:** January 16, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 10:14 End Time (MST): 14:30 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	0.999984	≥0.995
7.99	7.98	1.0008	Correlation Coefficient		20.993
4.00	3.97	1.0081	Slope	0.999209	0.90 - 1.10
2.01	2.00	1.0059	Slope		0.90 - 1.10
			Intercept	-0.009829	+/-0.5





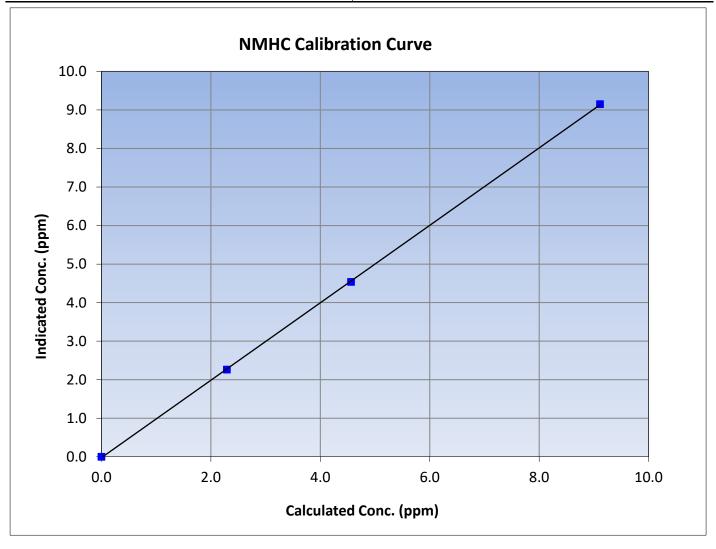
NMHC Calibration Summary

Version-06-2022

Station Information

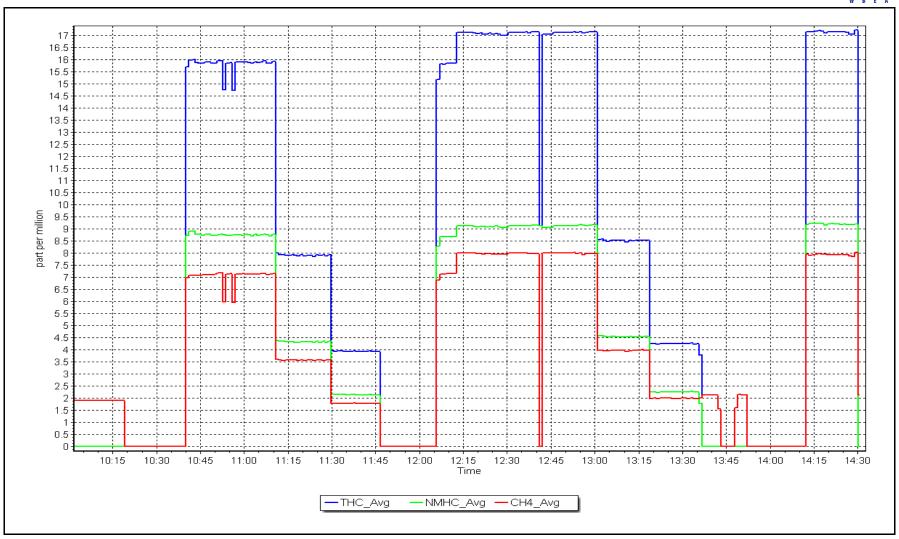
Previous Calibration: Calibration Date: January 24, 2024 January 16, 2024 Station Name: Anzac Station Number: AMS14 Start Time (MST): 10:14 End Time (MST): 14:30 Analyzer make: Analyzer serial #: Thermo 55i 1118148494

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999964	≥0.995
9.11	9.15	0.9961			20.993
4.56	4.54	1.0056	Slope	1.004825	0.90 - 1.10
2.29	2.26	1.0131			0.30 - 1.10
			Intercept	-0.024066	+/-0.5



Date: January 24, 2024 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Anzac

Calibration Date: January 30, 2024

Start time (MST): 9:56 Reason: Removal Station number: AMS14

Last Cal Date: January 24, 2024

End time (MST): 11:20

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 (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

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

Finish Finish Start Start CH4 SP Ratio: 4.72E-04 NA NMHC SP Ratio: 4.80E-05 NA CH4 Retention time: 13.40 NA NMHC Peak Area: 188364 NA Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4938	80.3	17.10	16.08	1.063
as found 2nd point	4979	40.2	8.56	8.08	1.060
as found 3rd point	4998	20.2	4.30	4.02	1.071
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Ave	erage Correction Factor		
Baseline Corr AF:	16.08	Prev response	17.11	*% change	-6.4%	
Baseline Corr 2nd AF:	8.1	AF Slope:	0.941139	AF Intercept:	-0.005949	
Baseline Corr 3rd AF:	4.0	AF Correlation:	0.999989	* = > +/-5% change initiates	investigation	



THC / CH₄ / NMHC Calibration Report

Version-06-2022

WBEA					Version-06-2
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
is found zero	5000	0.0	0.00	0.00	
is found span	4938	80.3	9.11	8.80	1.036
s found 2nd point	4979	40.2	4.56	4.41	1.035
s found 3rd point	4998	20.2	2.29	2.18	1.050
new cylinder response					
alibrator zero					
nigh point					
econd point					-
hird point					-
ns left zero					
is left span					
			Aver	age Correction Factor	
Baseline Corr AF:	8.80	Prev response	9.13	*% change	-3.8%
Baseline Corr 2nd AF:	4.4	AF Slope:	0.966685	AF Intercept:	-0.011819
Baseline Corr 3rd AF:	2.2	AF Correlation:	0.999984	* = > +/-5% change initia	tes investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
is found zero	5000	0.0	0.00	0.00	
is found span	4938	80.3	7.99	7.28	1.097
ns found 2nd point	4979	40.2	4.00	3.67	1.089
s found 3rd point	4998	20.2	2.01	1.83	1.096
new cylinder response					
calibrator zero					
nigh point					
econd point					-
hird point					
is left zero					
is left span					
·			Aver	age Correction Factor	
Baseline Corr AF:	7.28	Prev response	7.97	*% change	-9.5%
Baseline Corr 2nd AF:	3.67	AF Slope:	0.911756	AF Intercept:	0.006471
Baseline Corr 3rd AF:	1.83	AF Correlation:	0.999981	* = > +/-5% change initia	tes investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		1.002215			
THC Cal Offset:		-0.033495			
CH4 Cal Slope:		0.999209			
CH4 Cal Offset:		-0.009829			
NMHC Cal Slope:		1.004825			
www.c.c.l.oss		1.004025			

Notes:

NMHC Cal Offset:

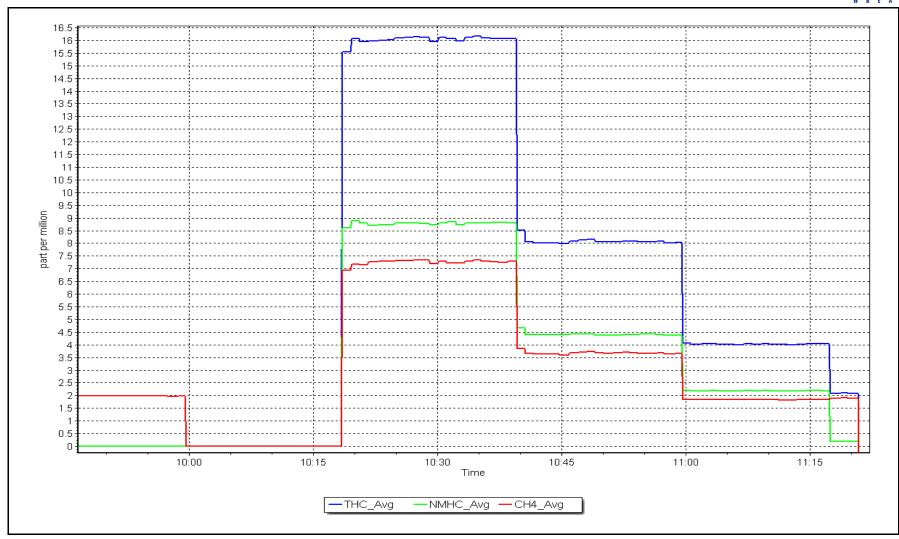
Removal only. Observed no changes in the analyzer's diagnostics, and there were no alarms, but internal maintenance may be required.

Calibration Performed By: Mohammed Kashif

-0.024066

Date: January 30, 2024 Location: Anzac







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Anzac

Calibration Date: January 31, 2024

Start time (MST): 10:32 Reason: Install Station number: AMS14

Last Cal Date: NA End time (MST): 13:28

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 CH4 Conc. 499.3 ppm CH4 Equiv Conc. 1068.8 Removed C3H8 Conc. 207.1 ppm Diff between cyl (THC):

Removed C3H8 Conc. 207.1 ppm Diff between cyl (THC): Diff between cyl (CH $_4$): Diff between cyl (NM):

Calibrator Model: API T700 Serial Number: 3060 ZAG make/model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 12227620776

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: NA 2.53E-04 NMHC SP Ratio: 5.94E-05 NA CH4 Retention time: NA 14.20 NMHC Peak Area: NA 153300

Zero Chromatogram: OFF OFF Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
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	4938	80.3	17.10	17.07	1.002
second point	4979	40.2	8.56	8.42	1.017
third point	4998	20.2	4.30	4.16	1.034
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	17.10	17.03	1.005
			Avera	ge Correction Factor	1.017

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

OFF



THC / CH₄ / NMHC Calibration Report

Version-06-2022

		NMHC Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
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	4938	80.3	9.11	9.09	1.003
second point	4979	40.2	4.56	4.49	1.016
third point	4998	20.2	2.29	2.22	1.031
as left zero	5000	0.0	0.00	0.00	
as left span	4938	80.3	9.11	9.05	1.007
			Avera	age Correction Factor	1.017
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.0
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	4938	80.3	7.99	7.99	1 000
second point	4979	40.2			1.000
hird point		40.2	4.00	3.93	1.000
	4998	20.2	4.00 2.01	3.93 1.94	
as left zero	4998 5000				1.017
		20.2	2.01	1.94	1.017 1.037
as left span	5000	20.2 0.0	2.01 0.00 7.99	1.94 0.00	1.017 1.037
as left span	5000	20.2 0.0	2.01 0.00 7.99	1.94 0.00 7.97	1.017 1.037 1.002
as left zero as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4938	20.2 0.0 80.3	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor	1.017 1.037 1.002 1.018
as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4938 NA	20.2 0.0 80.3 Prev response	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change	1.017 1.037 1.002 1.018 NA
as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope:	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept:	1.017 1.037 1.002 1.018 NA
as left span Baseline Corr AF: Baseline Corr 2nd AF:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope: AF Correlation:	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept:	1.017 1.037 1.002 1.018 NA
as left span Baseline Corr AF:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope: AF Correlation: Calibration	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate	1.017 1.037 1.002 1.018 NA
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope: AF Correlation: Calibration	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate	1.017 1.037 1.002 1.018 NA
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope: AF Correlation: Calibration	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate Finish 1.000080	1.017 1.037 1.002 1.018 NA
Baseline Corr AF: Baseline Corr 2nd AF: Baseline Corr 3rd AF: THC Cal Slope: THC Cal Offset:	5000 4938 NA NA	20.2 0.0 80.3 Prev response AF Slope: AF Correlation: Calibration	2.01 0.00 7.99 Avera	1.94 0.00 7.97 age Correction Factor *% change AF Intercept: * = > +/-5% change initiate Finish 1.000080 -0.078002	1.017 1.037 1.002 1.018 NA

Notes: Installation. Adjusted span only.

Calibration Performed By: Mohammed Kashif

NMHC Cal Offset:

-0.037406



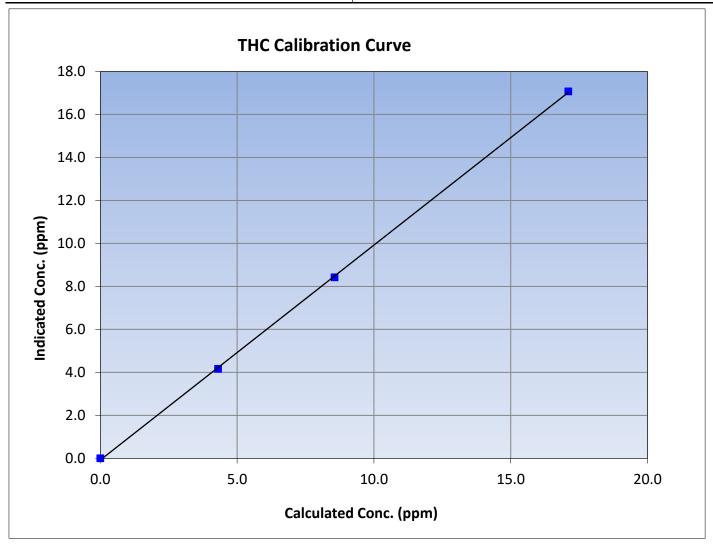
THC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 31, 2024 NA Station Name: Station Number: Anzac AMS14 Start Time (MST): 10:32 End Time (MST): 13:28 Analyzer make: Thermo 55i Analyzer serial #: 12227620776

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999899	≥0.995
17.10	17.07	1.0017	Correlation Coefficient	0.555655	20.333
8.56	8.42	1.0166	Slope	1.000080	0.90 - 1.10
4.30	4.16	1.0337	Slope	1.000000	0.90 - 1.10
			Intercept	-0.078002	+/-0.5





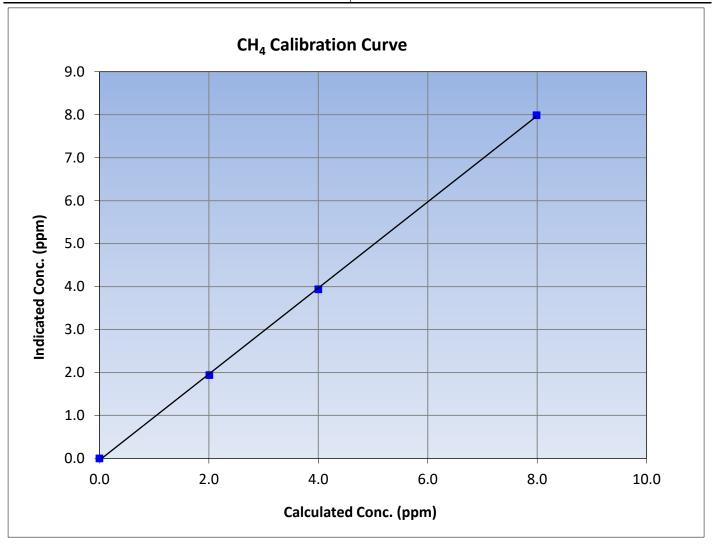
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 31, 2024 **Previous Calibration:** NA Station Name: Anzac Station Number: AMS14 Start Time (MST): 10:32 End Time (MST): 13:28 Analyzer make: Analyzer serial #: Thermo 55i 12227620776

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999874	≥0.995
7.99	7.99	1.0003	Correlation Coemicient	0.555074	20.333
4.00	3.93	1.0165	Slope	1.001814	0.90 - 1.10
2.01	1.94	1.0371	Зюре	1.001814	0.30 - 1.10
			Intercept	-0.041197	+/-0.5





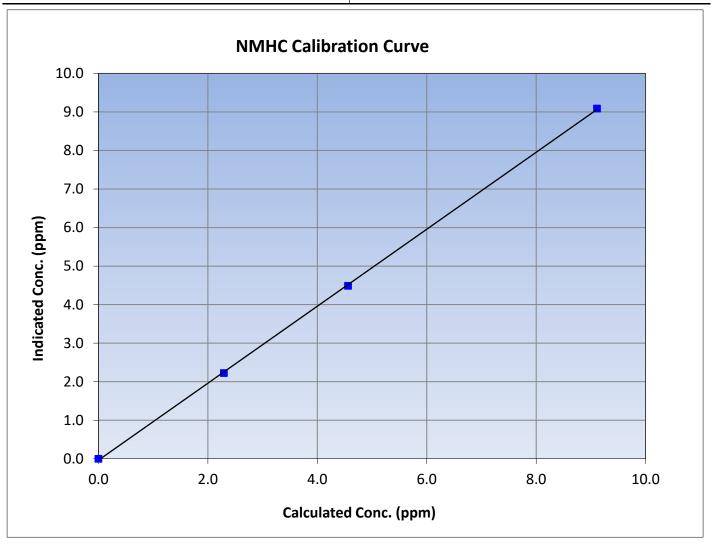
NMHC Calibration Summary

Version-06-2022

Station Information

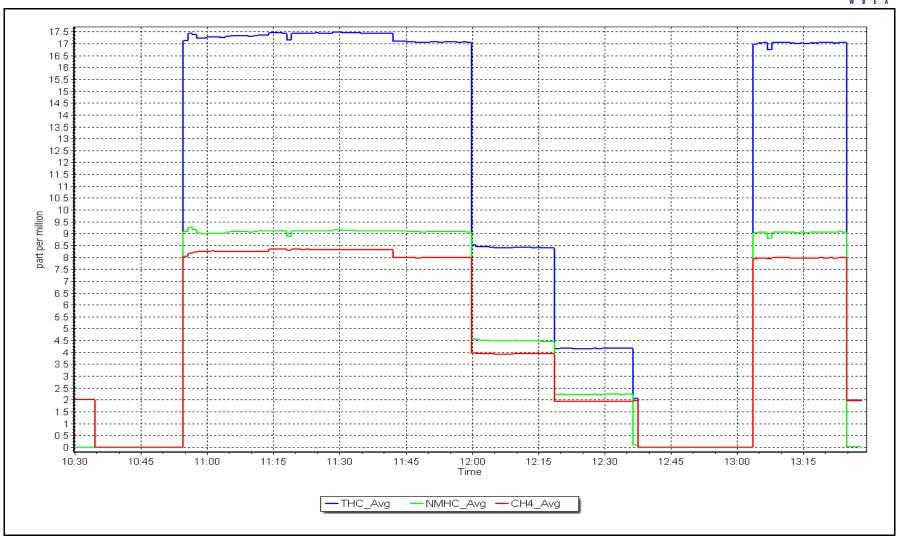
Calibration Date: January 31, 2024 **Previous Calibration:** NA Station Name: Anzac Station Number: AMS14 Start Time (MST): 10:32 End Time (MST): 13:28 Analyzer make: Thermo 55i Analyzer serial #: 12227620776

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999918	≥0.995
9.11	9.09	1.0028	Correlation Coemicient	0.555516	20.333
4.56	4.49	1.0164	Slope	0.998836	0.90 - 1.10
2.29	2.22	1.0313	Siope	0.556650	0.90 - 1.10
			Intercept	-0.037406	+/-0.5



Date: January 31, 2024 Location: Anzac







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Anzac

Calibration Date: January 5, 2024

Start time (MST): 10:50

Reason: Cylinder Change

Station number: AMS14

Last Cal Date: December 4, 2023

End time (MST): 16:45

Calibration Standards

NO Gas Cylinder #: DT0037092 Cal Gas Expiry Date: May 16, 2031

NOX Cal Gas Conc: 60.7 ppm NO Cal Gas Conc: 60.4 ppm

Removed Cylinder #: T2Y1P8D Removed Gas Exp Date: December 11, 2023

Removed Gas NOX Conc: 50.9 ppm Removed Gas NO Conc: 50.1 ppm

NOX gas Diff:-1.7%NO gas Diff:-0.7%Calibrator Model:Teledyne API T700Serial Number:3060ZAG make/model:Teledyne API 701HSerial Number:357

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: 1.411 1.411 NO bkgnd or offset: 3.8 3.8 NOX coeff or slope: 0.996 0.996 NOX bkgnd or offset: 3.8 3.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 158.2 159.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001131	0.995638
NO _x Cal Offset:	-0.568562	-0.669728
NO Cal Slope:	1.001791	1.002181
NO Cal Offset:	-2.406556	-2.129361
NO ₂ Cal Slope:	1.001950	0.992183
NO ₂ Cal Offset:	0.975434	-0.766639



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Source gas flow rate (sccm) 0.0 80.2	Calculated NOx concentration (ppb) (Cc) 0.0 814.1	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
			0.0					LIIIII = 0.95-1.05
80.2	814.1		0.0	-0.1	-0.2	0.2		
		800.2	13.9	825.8	807.6	18.1	0.9859	0.9908
66.3	804.8	800.9	4.0	802.8	802.6	0.3	1.0025	0.9978
0.0	0.0	0.0	0.0	0.1	-0.1	0.1		
66.3	804.8	800.9	4.0	8.008	801.2	-0.5	1.0050	0.9996
33.2	401.6	399.6	2.0	399.5	398.2	1.3	1.0052	1.0035
16.7	201.9	200.9	1.0	199.1	196.6	2.5	1.0141	1.0219
0.0	0.0	0.0	0.0	0.1	-0.1	0.1		
66.3	804.8	416.3	388.6	804.8	414.2	390.7	1.0000	1.0050
					Average C	orrection Factor	1.0081	1.0083
x = 825.9 ppb	NO =	807.8 ppb	* = > +/-5	% change initiates	nvestigation	*Percent Chang	ge NO _X =	1.4%
x= 814.5 ppb	NO =	799.2 ppb				*Percent Chang	ge NO =	1.1%
x = NA ppb	NO =	NA ppb	As foun	$NO_X r^2$:		Nx SI:	Nx Int:	
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:	
×	0.0 66.3 33.2 16.7 0.0 66.3 x = 825.9 ppb x = 814.5 ppb ppb	0.0 0.0 66.3 804.8 33.2 401.6 16.7 201.9 0.0 0.0 66.3 804.8 x = 825.9 ppb NO = x = 814.5 ppb NO = x = NA ppb NO =	0.0 0.0 0.0 66.3 804.8 800.9 33.2 401.6 399.6 16.7 201.9 200.9 0.0 0.0 0.0 66.3 804.8 416.3 x = 825.9 ppb NO = 807.8 ppb x = 814.5 ppb NO = 799.2 ppb NO = NA ppb	0.0 0.0 0.0 0.0 66.3 804.8 800.9 4.0 33.2 401.6 399.6 2.0 16.7 201.9 200.9 1.0 0.0 0.0 0.0 0.0 66.3 804.8 416.3 388.6 X= 825.9 ppb NO = 807.8 ppb *=>+/-5 X= 814.5 ppb NO = 799.2 ppb X= NO = NA ppb As four X= NO = NA ppb As four X= NO = NA ppb As four X= NO = NA ppb As four	0.0 0.0 0.0 0.0 0.1 66.3 804.8 800.9 4.0 800.8 33.2 401.6 399.6 2.0 399.5 16.7 201.9 200.9 1.0 199.1 0.0 0.0 0.0 0.0 0.1 66.3 804.8 416.3 388.6 804.8 x = 825.9 ppb NO = 807.8 ppb * = > +/-5% change initiates in the second	0.0 0.0 0.0 0.0 0.0 0.1 -0.1 66.3 804.8 800.9 4.0 800.8 801.2 33.2 401.6 399.6 2.0 399.5 398.2 16.7 201.9 200.9 1.0 199.1 196.6 0.0 0.0 0.0 0.0 0.0 0.1 -0.1 66.3 804.8 416.3 388.6 804.8 414.2 Average C	0.0 0.0 0.0 0.0 0.1 -0.1 0.1 66.3 804.8 800.9 4.0 800.8 801.2 -0.5 33.2 401.6 399.6 2.0 399.5 398.2 1.3 16.7 201.9 200.9 1.0 199.1 196.6 2.5 0.0 0.0 0.0 0.0 0.1 -0.1 0.1 66.3 804.8 416.3 388.6 804.8 414.2 390.7 Average Correction Factor Average Correction Factor ** = > +/-5% change initiates investigation ** Percent Change X= 814.5 ppb NO = 799.2 ppb ** Percent Change ** Percent Change X= NA ppb NO = NA ppb As found NO _X r ² : NX SI: X= NA ppb NO = NA ppb As found NO r ² : NO SI:	0.0 0.0 0.0 0.0 0.1 -0.1 0.1 66.3 804.8 800.9 4.0 800.8 801.2 -0.5 1.0050 33.2 401.6 399.6 2.0 399.5 398.2 1.3 1.0052 16.7 201.9 200.9 1.0 199.1 196.6 2.5 1.0141 0.0 0.0 0.0 0.0 0.1 -0.1 0.1 66.3 804.8 416.3 388.6 804.8 414.2 390.7 1.0000 x = 825.9 ppb NO = 807.8 ppb *=>+/-5% change initiates investigation *Percent Change NO _x = x = 814.5 ppb NO = 799.2 ppb *Percent Change NO = x = NA ppb NO = NA ppb As found NO _x ² : Nx SI: Nx Int: x = NA ppb NO = NA ppb As found NO r ² : NO SI: NO Int:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.0	415.4	388.6	385.4	1.0082	99.2%
2nd GPT point (200 ppb O3)	800.0	605.2	198.8	195.5	1.0168	98.4%
3rd GPT point (100 ppb O3)	800.0	704.8	99.2	97.1	1.0214	97.9%
	_		Av	erage Correction Factor	1.0155	98.5%

Notes:

Sample inlet filter and cal gas cylinder changed after as founds. No adjustments made.

Calibration Performed By:

Mohammed Kashif



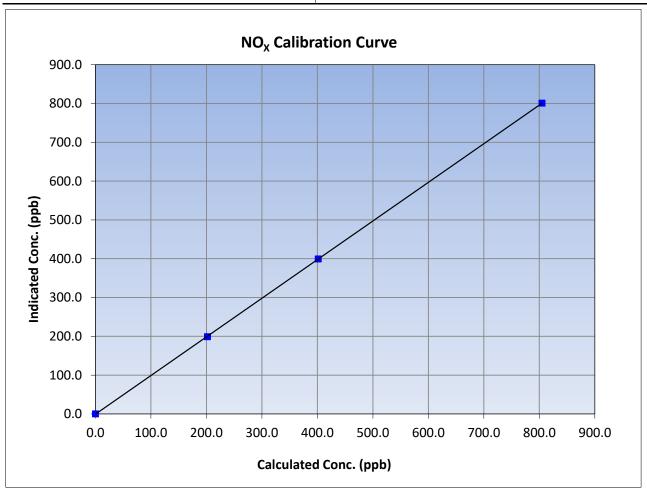
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 4, 2023 AMS14 Anzac Station Number: Station Name: Start Time (MST): 10:50 End Time (MST): 16:45 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999993	≥0.995
804.8	8.008	1.0050	Correlation Coefficient	0.555555	20.993
401.6	399.5	1.0052	Slope	0.995638	0.90 - 1.10
201.9	199.1	1.0141	Slope	0.333036	0.90 - 1.10
		_	Intercept	-0.669728	+/-20





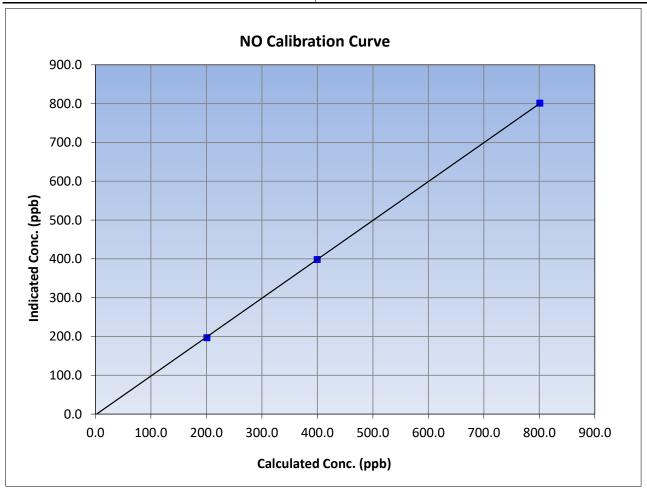
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 4, 2023 AMS14 Station Name: Anzac Station Number: Start Time (MST): 10:50 End Time (MST): 16:45 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999967	≥0.995
800.9	801.2	0.9996	Correlation Coefficient	0.555507	20.993
399.6	398.2	1.0035	Slope	1.002181	0.90 - 1.10
200.9	196.6	1.0219	Slope	1.002181	0.90 - 1.10
		_	Intercept	-2.129361	+/-20





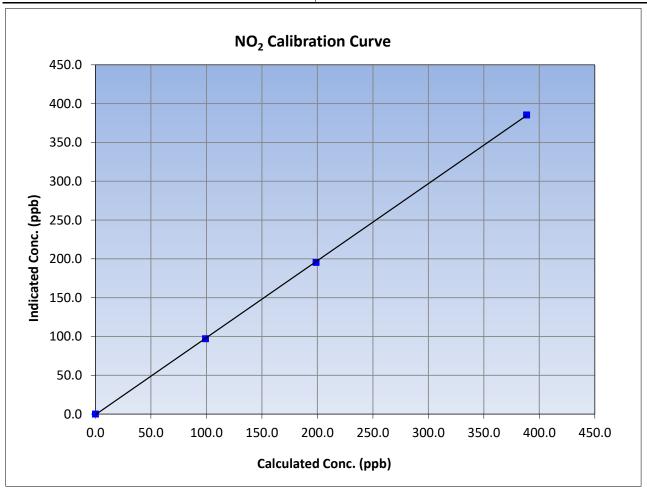
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 Previous Calibration: December 4, 2023 AMS14 Station Name: Anzac Station Number: Start Time (MST): 10:50 End Time (MST): 16:45 Analyzer make: Thermo 42i Analyzer serial #: 1426262592

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999971	≥0.995
388.6	385.4	1.0082	Correlation Coefficient	0.555571	20.333
198.8	195.5	1.0168	Slope	0.992183	0.90 - 1.10
99.2	97.1	1.0214	Slope	0.552165	0.30 - 1.10
			Intercept	-0.766639	+/-20

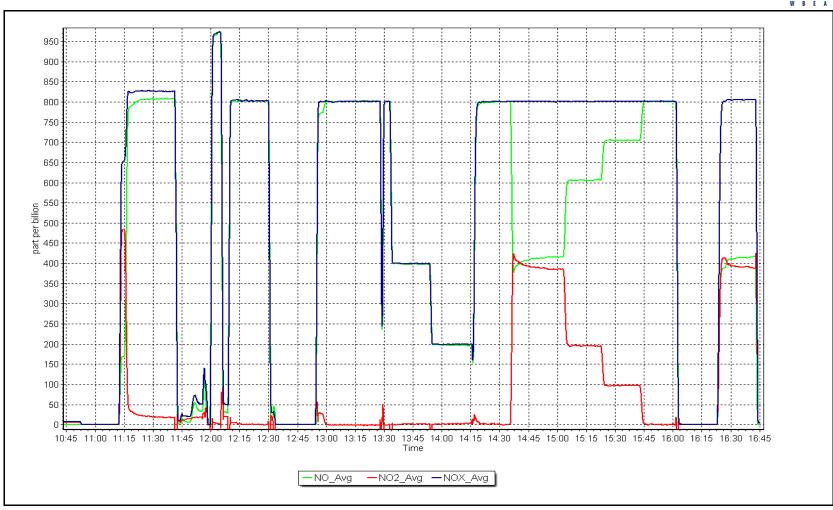


NO_X Calibration Plot

Date: January 5, 2024

Location: Anzac







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Anzac

Calibration Date: January 8, 2024

Start time (MST): 10:48
Reason: Routine

Station number: AMS14

Last Cal Date: December 6, 2023

End time (MST): 13:46

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: 1.002086 1.001343 1.4 1.4 Coeff or Slope: Calibration intercept: -0.040000 -0.260000 1.620 1.620

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.3	
as found span	5000	918.8	400.0	401.6	0.996
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.2	
high point	5000	918.8	400.0	400.4	0.999
second point	5000	803.8	200.0	200.1	1.000
third point	5000	709.8	100.0	99.2	1.008
as left zero	5000	0.0	0.0	-0.2	
as left span	5000	918.8	400.0	406.0	0.985
			Averag	ge Correction Factor	1.002
Baseline Corr As found:	401.3	Previous respons	e 400.8	*% change	0.1%
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. No adjustments required.

Calibration Performed By: Mohammed Kashif



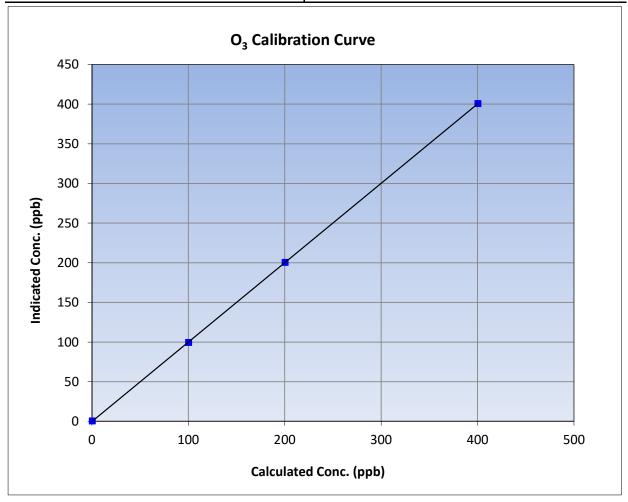
O₃ Calibration Summary

Version-01-2020

Station Information

December 6, 2023 Calibration Date: January 8, 2024 **Previous Calibration:** Station Name: Anzac Station Number: AMS14 Start Time (MST): 10:48 End Time (MST): 13:46 Analyzer make: Thermo 49i Analyzer serial #: 1426262595

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	0.999992	≥0.995			
400.0	400.4	0.9990	Correlation Coefficient	0.333332	20.333			
200.0	200.1	0.9995	Slope	1.001343	0.90 - 1.10			
100.0	99.2	1.0081	Slope	1.001343	0.90 - 1.10			
			Intercept	-0.260000	+/- 5			

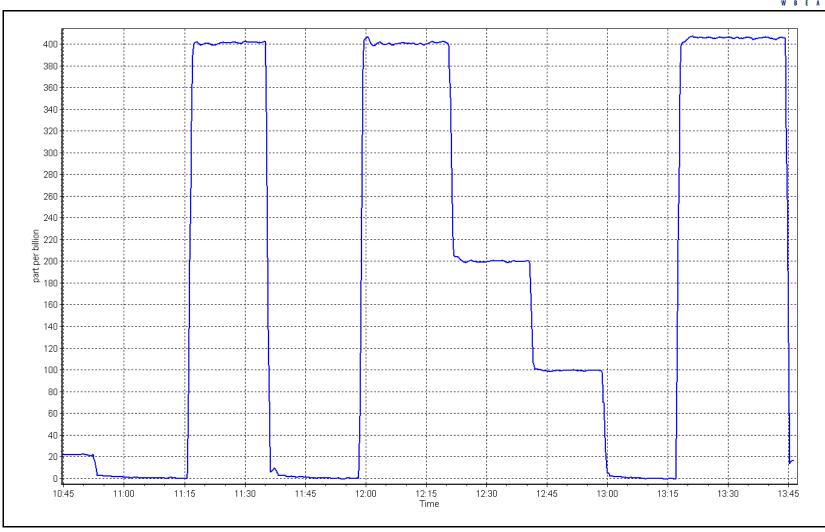


O₃ Calibration Plot

Date: January 8, 2024

Location: Anzac







Calibration by:

Mohammed Kashif

Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1					
Station Name: Calibration Date:	Anzac January 24, 2024			December 6, 2023				
Start time (MST):	12:49		End time (MST):	13:05				
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	825				
Flow Meter Make/Model:	Alicat FP-25		S/N:	388749				
Temp/RH standard:	Alicat FP-25		S/N:	388749				
		Monthly Calibration To	est					
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjust</u>	ted (Limits)			
T (°C)	-7.6	-7.3	-7.6		+/- 2 °C			
P (mmHg)	710.0	710.8	710.0		+/- 10 mmHg			
flow (LPM)	5.00	4.98	5.00		+/- 0.25 LPM			
Leak Test:	Date of check:	January 24, 2024	Last Cal Date:	December 6, 202	23			
	PM w/o HEPA:	13.0	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 m	aintenance leak che	eck			
Inlet cleaning:	Inlet Head	✓						
		Quarterly Calibration 1	est					
Parameter	As found	Quarterly Calibration 1		Adjust	ted (Limite)			
Parameter	As found	Quarterly Calibration 1 Post maintenance	est As left	<u>Adjust</u>				
<u>Parameter</u> PMT Peak Test	<u>As found</u>			Adjust	ted (Limits) 10.9 +/- 0.5			
·								
PMT Peak Test	leak check:	Post maintenance	<u>As left</u>					
PMT Peak Test Post-maintenance	leak check: ber Cleaned:	Post maintenance PM w/o HEPA:	<u>As left</u> , 2023		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml	leak check: ber Cleaned:	Post maintenance PM w/o HEPA: December 6	<u>As left</u> , 2023		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml	leak check: ber Cleaned:	Post maintenance PM w/o HEPA: December 6	<u>As left</u> , 2023		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml	leak check: ber Cleaned:	Post maintenance PM w/o HEPA: December 6	<u>As left</u> , 2023 , 2023		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter	leak check: ber Cleaned: Changed:	Post maintenance PM w/o HEPA: December 6 December 6	As left , 2023 , 2023		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml	leak check: ber Cleaned: Changed:	Post maintenance PM w/o HEPA: December 6 December 6	As left , 2023 , 2023 e		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	leak check: ber Cleaned: Changed:	Post maintenance PM w/o HEPA: December 6 December 6 Annual Maintenance July 6, 20	As left , 2023 , 2023 e		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	leak check: ber Cleaned: Changed:	Post maintenance PM w/o HEPA: December 6 December 6 Annual Maintenance July 6, 20	As left , 2023 , 2023 e		10.9 +/- 0.5			
PMT Peak Test Post-maintenance Date Optical Chaml Disposable Filter Date Sample Tub	leak check: ber Cleaned: Changed:	Post maintenance PM w/o HEPA: December 6 December 6 Annual Maintenance July 6, 20	As left , 2023 , 2023 ee 123 123	w/ HEPA:	10.9 +/- 0.5			



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Station number:

Coeff or Slope:

1.111

AMS17

Version-01-2020

1.111

Station Information

Station Name: Wapasu

Calibration Date: January 8, 2024 Last Cal Date: December 4, 2023

Start time (MST): 11:20 End time (MST): 14:38

Reason: Routine

Calibration Standards

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

Cal Gas Cylinder #: ALM066507

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

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

Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: API 701H Serial Number: 359

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1218153459

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:1.0039811.004353Backgd or Offset:13.413.4

Calibration intercept: -2.098863 -2.079066

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.4	800.0	800.0	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4921	79.4	800.0	803.0	0.996
second point	4960	39.7	400.0	397.2	1.007
third point	4980	19.8	199.5	196.8	1.014
as left zero	5000	0.0	0.0	0.3	
as left span	4920	79.4	800.1	804.8	0.994
			Averag	ge Correction Factor	1.006
	•	_	•	•	_

Baseline Corr As found: 800.10 Previous response 801.06 *% change -0.1%

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

* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



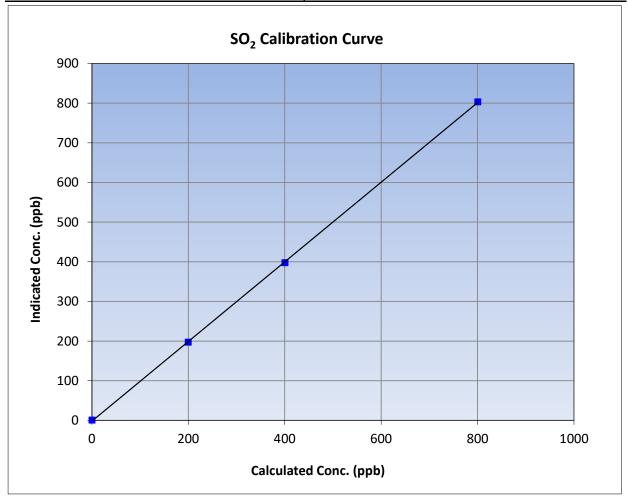
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** December 4, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:20 End Time (MST): 14:38 Analyzer make: Thermo 43i Analyzer serial #: 1218153459

Calibration Data								
Calculated concentration Indicated concentration Cor (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.3		Correlation Coefficient	0.999952	≥0.995			
800.0	803.0	0.9962	Correlation coefficient	0.555552	20.333			
400.0	397.2	1.0072	Slope	1.004353	0.90 - 1.10			
199.5	196.8	1.0138	Slope	1.004333	0.90 - 1.10			
			- Intercept	-2.079066	+/-30			



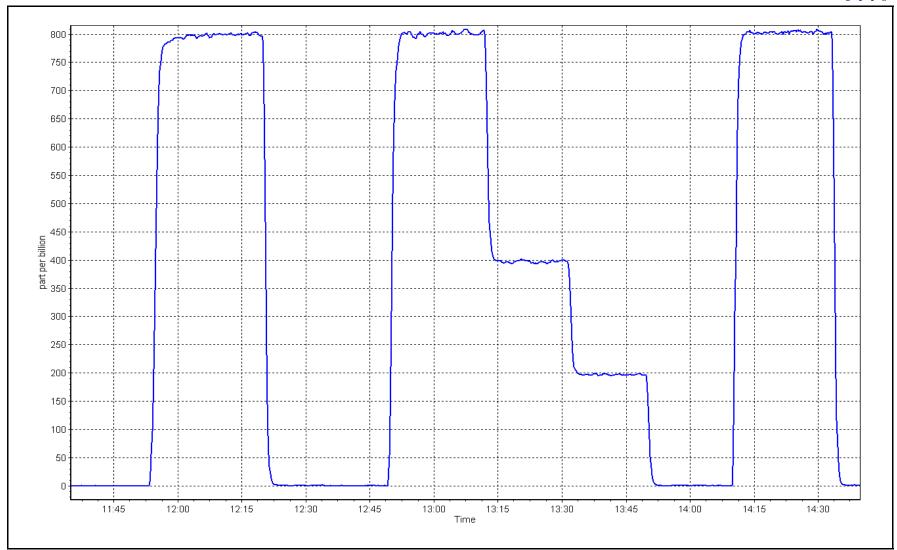
SO2 Calibration Plot

Date:

January 8, 2024

Location: Wapasu







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Wapasu

Calibration Date: January 29, 2024

Start time (MST): Reason: Routine

11:17

Station number: AMS17

> Last Cal Date: December 5, 2023

End time (MST): 15:49

Calibration Standards

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

Cal Gas Cylinder #: CC511852

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

Calibrator Make/Model: API T700 Serial Number: 2449 ZAG Make/Model: **API T701H** Serial Number: 359

Analyzer Information

Analyzer make: Thermo 450i Analyzer serial #: 1218153583

Converter serial #: n/a Converter make:

0 - 100 ppb Analyzer Range

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 1.009996 Backgd or Offset: 12.2 Calibration slope: 1.005283 12.2 -0.299186 Calibration intercept: 0.040787 Coeff or Slope: 1.114 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	0.2	
as found span	4921	78.8	80.0	80.6	0.995
as found 2nd point	4961	39.4	40.0	40.9	0.983
as found 3rd point	4980	19.7	20.0	20.6	0.980
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	80.5	0.994
second point	4961	39.4	40.0	40.2	0.995
third point	4980	19.7	20.0	19.7	1.015
as left zero	5000	0.0	0.0	0.0	
as left span	4921	78.8	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.4	800.0	-0.1	
Date of last scrubber chang	ge:	n/a		Ave Corr Factor	1.001
Date of last converter effic	iency test:	n/a		·	efficiency

8-		, -			
Date of last converter efficie	ncy test:	n/a			efficiency
Baseline Corr As found:	80.4	Prev response:	80.46	*% change:	-0.1%

Baseline Corr 2nd AF pt: 40.7 AF Slope: 1.004425 Baseline Corr 3rd AF pt: AF Correlation: 0.999949 20.4

* = > +/-5% change initiates investigation

AF Intercept:

0.420818

Pump changed out after as founds. No adjustments needed. Notes:

Calibration Performed By: Aswin Sasi Kumar



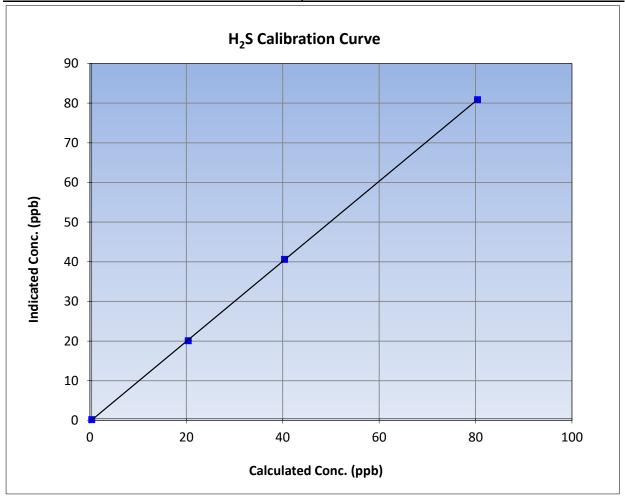
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 29, 2024 **Previous Calibration:** December 5, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:17 End Time (MST): 15:49 Analyzer make: Thermo 450i Analyzer serial #: 1218153583

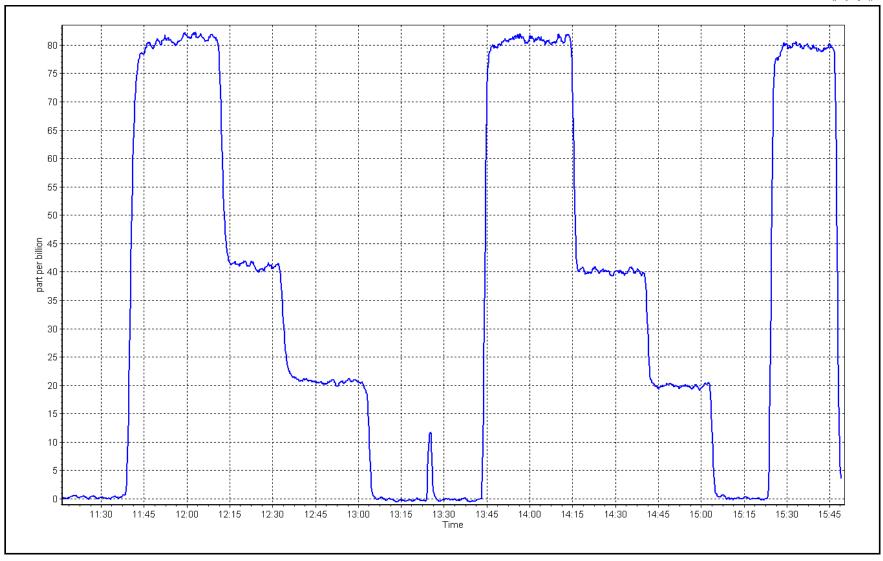
Calibration Data								
Calculated concentration Indicated concentration Co		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-0.2		Correlation Coefficient	0.999983	≥0.995			
80.0	80.5	0.9938	Correlation Coefficient	0.555505	20.333			
40.0	40.2	0.9949	Slope	1.009996	0.90 - 1.10			
20.0	19.7	1.0153	Slope	1.009990	0.90 - 1.10			
			- Intercept	-0.299186	+/-3			



Date: January 29, 2024

Location: Wapasu







THC Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

Calibration Date: January 8, 2024

Start time (MST): 11:20

Reason: Routine

Station number: AMS17

Last Cal Date: December 21, 2023

End time (MST): 14:38

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. 208.3 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 **Finish** Start Calibration slope: Background: 1.011452 0.993554 3.300 3.020 0.002025 Coefficient: Calibration intercept: -0.239261 4.451 4.390

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.24	
as found span	4921	79.4	17.09	17.01	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.06	
high point	4921	79.4	17.09	17.03	1.004
second point	4960	39.7	8.55	8.42	1.015
third point	4980	19.8	4.26	4.21	1.013
as left zero	5000	0.0	0.00	0.01	
as left span	4921	79.4	17.09	17.02	1.004
			Avera	age Correction Factor	1.011
Baseline Corr As found:	17.25	Previous response	17.05	*% change	1.1%
Deceline Com 2nd AF at.	NI A	A.F. Cl		A.F. Lost a	

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

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

* = > +/-5% change initiates investigation



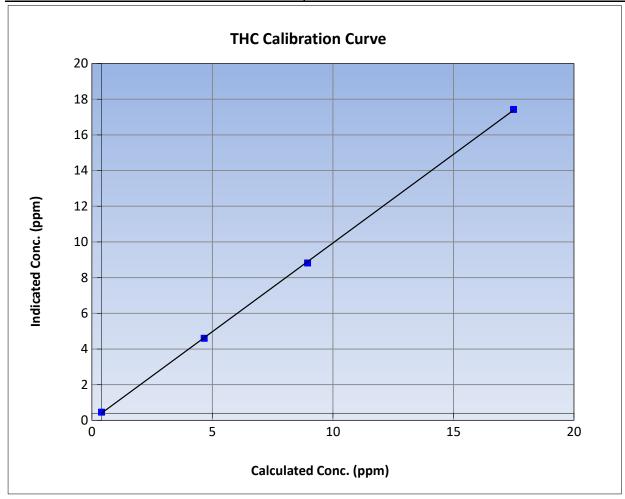
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: January 8, 2024 December 21, 2023 Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:20 End Time (MST): 14:38 Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352

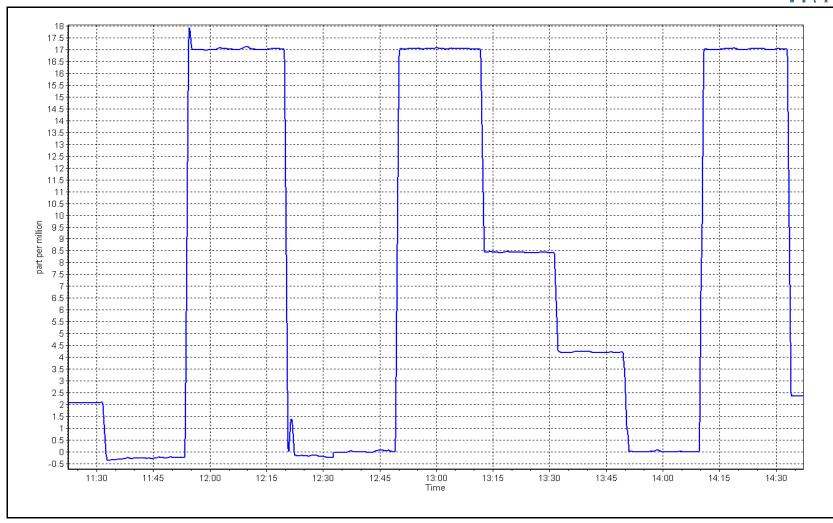
Calibration Data								
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.00	0.06		Correlation Coefficient	0.999931	≥0.995			
17.09	17.03	1.0039	Correlation Coefficient	0.555551	20.333			
8.55	8.42	1.0145	Slope	0.993554	0.90 - 1.10			
4.26	4.21	1.0134	Slope	0.555554	0.30 - 1.10			
			- Intercept	0.002025	+/-1.5			



Date: January 8, 2024

Location: Wapasu







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Wapasu

Calibration Date: January 10, 2024

Start time (MST): 11:15 Reason: Routine Station number: AMS17

Last Cal Date: December 7, 2023

End time (MST): 15:35

Calibration Standards

NO Gas Cylinder #: T375YK8 Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: NO Cal Gas Conc: 49.11 ppm ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NOX Conc: Removed Gas NO Conc: 49.11 ppm 48.07 ppm

NOX gas Diff:

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

Analyzer Information

Analyzer make: 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:	1.264	1.250	NO bkgnd or offset:	8.1	8.1
NOX coeff or slope:	0.989	0.986	NOX bkgnd or offset:	8.1	8.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	326.0	326.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999676	1.003354
NO _x Cal Offset:	-3.080000	-4.920000
NO Cal Slope:	1.000330	1.006788
NO Cal Offset:	-2.740000	-5.500000
NO ₂ Cal Slope:	1.004002	0.997030
NO ₂ Cal Offset:	-0.063828	-0.662092



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	-0.7	-0.6	-0.1		
as found span	4917	83.2	817.2	799.9	17.3	827.8	809.3	18.5	0.9872	0.9884
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	4917	83.2	817.2	799.9	17.3	817.7	802.8	14.8	0.9994	0.9964
second point	4958	41.6	408.6	399.9	8.7	401.4	393.3	8.1	1.0179	1.0169
third point	4979	20.8	204.3	200.0	4.3	196.6	191.6	4.9	1.0392	1.0437
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.5	-0.1		
as left span	4917	83.2	817.2	393.8	423.4	816.8	392.6	424.1	1.0004	1.0029
							Average C	orrection Factor	1.0188	1.0190
Corrected As fo	ound NO _x =	828.5 ppb	NO =	809.9 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	1.8%
Previous Respo	onse NO _X =	813.8 ppb	NO =	797.4 ppb				*Percent Chang	ge NO =	1.5%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	ard 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	pint (ppb)	Indicated NO Ref		ated NO Drop entration (ppb)	Calculated No concentration (pp		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	int (400 ppb NO2)									
· ·	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									

Notes:

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

Change filters after as founds. Adjusted span only.

421.8

220.6

116.5

Average Correction Factor

1.0038

1.0073

1.0138

1.0083

423.4

222.2

118.1

Calibration Performed By:

Aswin Sasi Kumar

393.2

594.4

698.5

799.3

799.3

799.3

99.6%

99.3%

98.6%

99.2%



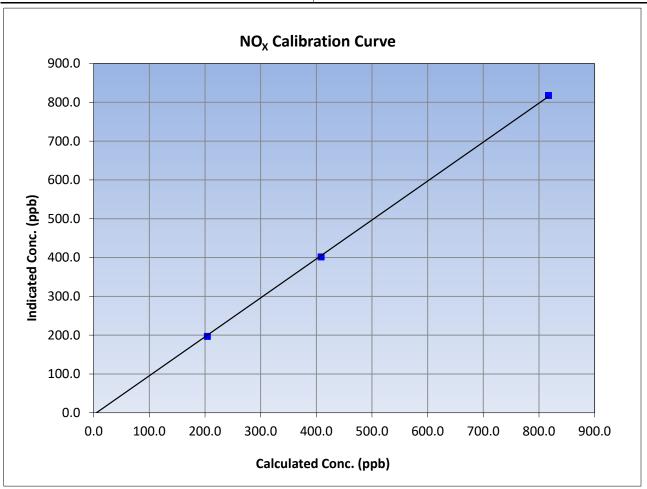
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 11:15 End Time (MST): 15:35 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	-0.5		Correlation Coefficient	0.999858	≥0.995
817.2	817.7	0.9994	Correlation Coefficient	0.555656	20.993
408.6	401.4	1.0179	Clana	1.003354	0.90 - 1.10
204.3	196.6	1.0392	Slope	1.005554	0.30 - 1.10
			Intercept	-4.920000	+/-20





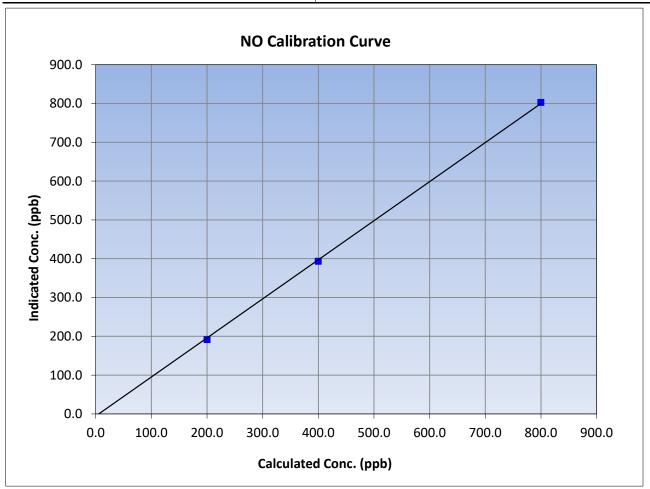
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 11:15 End Time (MST): 15:35 Analyzer make: Thermo Scientific 42iQ Analyzer serial #: 12300522720

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999809	≥0.995
799.9	802.8	0.9964	Correlation Coefficient	0.555005	20.993
399.9	393.3	1.0169	Slope	1.006788	0.90 - 1.10
200.0	191.6	1.0437	Slope	1.000788	0.50 - 1.10
			Intercept	-5.500000	+/-20





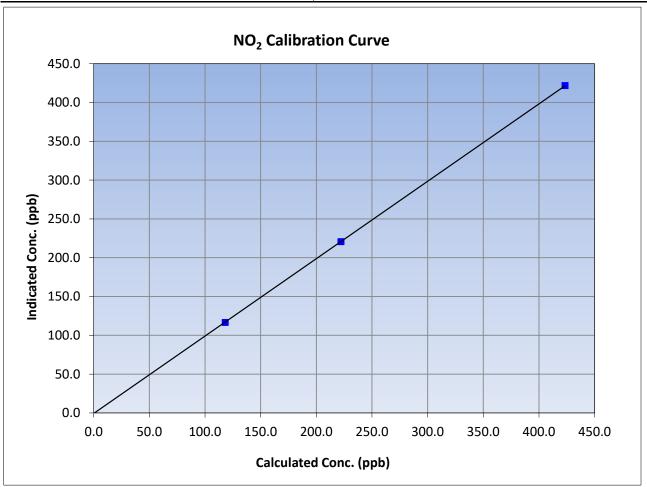
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Station Number: AMS17 Wapasu Start Time (MST): 11:15 End Time (MST): 15:35 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	0.999991	≥0.995
423.4	421.8	1.0038	Correlation Coefficient	0.555551	20.333
222.2	220.6	1.0073	Slope	0.997030	0.90 - 1.10
118.1	116.5	1.0138	Slope	0.997030	0.90 - 1.10
			Intercept	-0.662092	+/-20

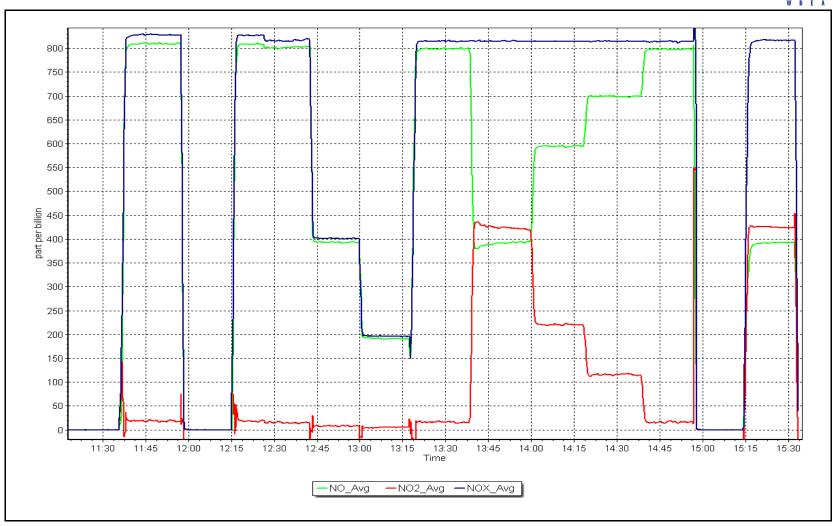


NO_x Calibration Plot

Date: January 10, 2024

Location: Wapasu







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Wapasu

Calibration Date: January 4, 2024

Start time (MST): 11:30
Reason: Routine

Station number: AMS17

Last Cal Date: December 6, 2023

End time (MST): 14:33

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: API T700 ZAG Make/Model: API T701H Serial Number: 2449 Serial Number: 359

Analyzer Information

Analyzer make: API T400 Analyzer serial #: 3870

Analyzer Range 0 - 500 ppb

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

<u>Start</u>

<u>Finish</u>

 Calibration slope:
 1.002943
 1.001714
 Backgd or Offset:
 -1.8
 -1.8

 Calibration intercept:
 -0.540000
 -0.500000
 Coeff or Slope:
 1.014
 1.014

O₃ Calibration Data

Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.7	
as found span	5000	1077.3	400.0	399.3	1.002
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	
high point	5000	1077.3	400.0	400.6	0.999
second point	5000	900.3	200.0	199.4	1.003
third point	5000	789.5	100.0	98.9	1.011
as left zero	5000	0.0	0.0	0.6	
as left span	5000	1077.3	400.0	404.8	0.988
			Averag	ge Correction Factor	1.004

Baseline Corr As found: 398.6 Previous response 400.6 *% change -0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Notes:

* = > +/-5% change initiates investigation



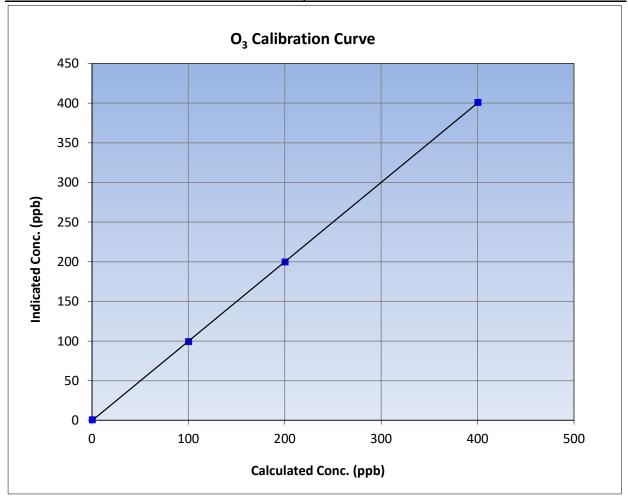
O₃ Calibration Summary

Version-01-2020

Station Information

December 6, 2023 Calibration Date: January 4, 2024 **Previous Calibration:** Station Name: Wapasu Station Number: AMS17 Start Time (MST): 11:30 End Time (MST): 14:33 Analyzer make: **API T400** Analyzer serial #: 3870

	Calibration Data									
Calculated concentration Indicated concentration										
0.0	0.3		Correlation Coefficient	0.999982	≥0.995					
400.0	400.6	0.9985	Correlation Coefficient	0.333362	20.993					
200.0	199.4	1.0030	Slope	1.001714	0.90 - 1.10					
100.0	98.9	1.0111	Slope	1.001/14	0.90 - 1.10					
			- Intercept	-0.500000	+/- 5					

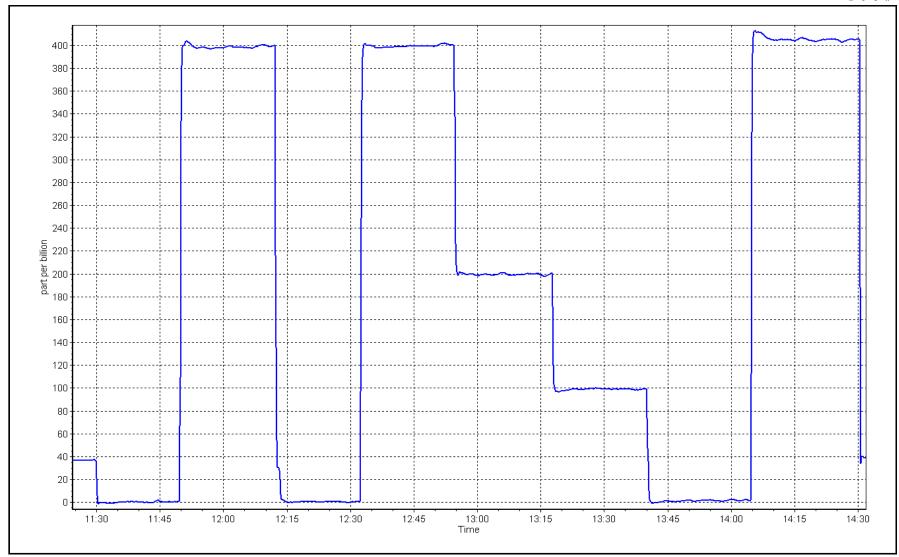


O₃ Calibration Plot

Date: January 4, 2024

Location: Wapasu







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Wapasu		Station number:	AMS 17		
Calibration Date:	January 29, 2024		Last Cal Date:	December 7,	2023	
Start time (MST):	15:10		End time (MST):	15:46		
Analyzer Make:	API T640		S/N:	1183		
Particulate Fraction:	PM2.5		2,			
Flore Basic of Basic /Basics	Alteration Open		C/N.	200754		
Flow Meter Make/Model:	Alicat FP-25BT		•	388751		
Temp/RH standard:	Alicat FP-25BT			388751		
		Monthly Calibration Te	est			
<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	8.6	8.1	8.6			+/- 2 °C
P (mmHg)	707.5	704.2	707.5			+/- 10 mmHg
flow (LPM)	4.97	4.95	4.97			+/- 0.25 LPM
Leak Test:	Date of check:	January 29, 2024	Last Cal Date:	December	7, 2023	
	PM w/o HEPA:	0.9	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	itenance leak	check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration T	ost			
Doromotor	As found				۸ ما:ریونه م	(Linetea)
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	4	Adjusted	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham	nber Cleaned:	October 18,	2023	, <u> </u>		<0.2 ug/m3
Disposable Filte	r Changed:	September 22	2, 2023			
	_		_			
		Annual Maintenance				
		Ailliuai Mailitellalice				
Date Sample Tub	oe Cleaned:					
Date RH/T Senso	-					
	- -					
Notes:		Temp, pressure and flo	ow checked. Leak ch	neck passed.		
Calibration by:	Aswin Sasi Kumar					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN

JANUARY 2024

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

February 29, 2024



Calibration slope:

Calibration intercept:

Wood Buffalo Environmental Association

SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: January 11, 2024

Start time (MST): 11:45

Routine Reason:

Station number: **AMS 18**

> December 19, 2023 Last Cal Date:

End time (MST): 14:53

Calibration Standards

Cal Gas Concentration: 49.40

Cal Gas Cylinder #: CC463851

Removed Cal Gas Conc: 49.40 Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API 701H Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 2658 Serial Number: 360

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

ppm

0.998520 1.005444 -0.124003 -0.422589 Start

Backgd or Offset: 22.4 Coeff or Slope: 0.803 **Finish** 22.5 0.813

SO₂ Calibration Data

Cat Paint	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	0.5	
as found span	4919	81.0	800.3	792.2	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4919	81.0	800.3	804.8	0.994
second point	4959	40.5	400.2	401.2	0.997
third point	4979	20.2	199.6	199.4	1.001
as left zero	5000	0.0	0.0	0.5	
as left span	4919	81.0	800.3	804.4	0.995
			Averag	ge Correction Factor	0.998
Pacalina Carr Ac found	701 70	Dravious raspans	700.07	*0/ change	0.00/

Baseline Corr As found: Previous response *% change 791.70 798.97 -0.9% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

Notes: Inlet filter changed after as founds. Span adjusted.

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



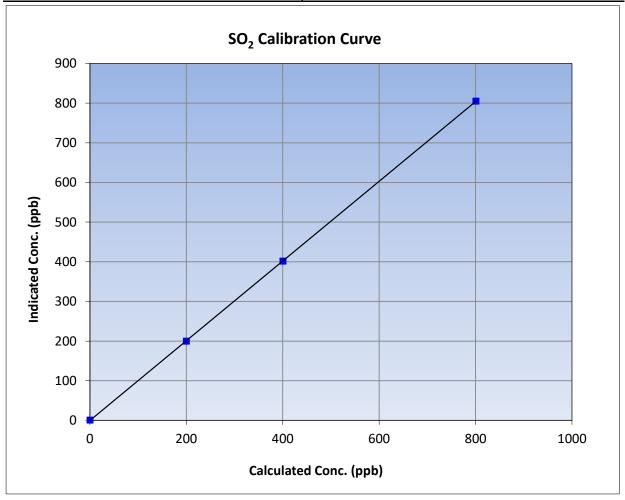
SO₂ Calibration Summary

Version-01-2020

Station Information

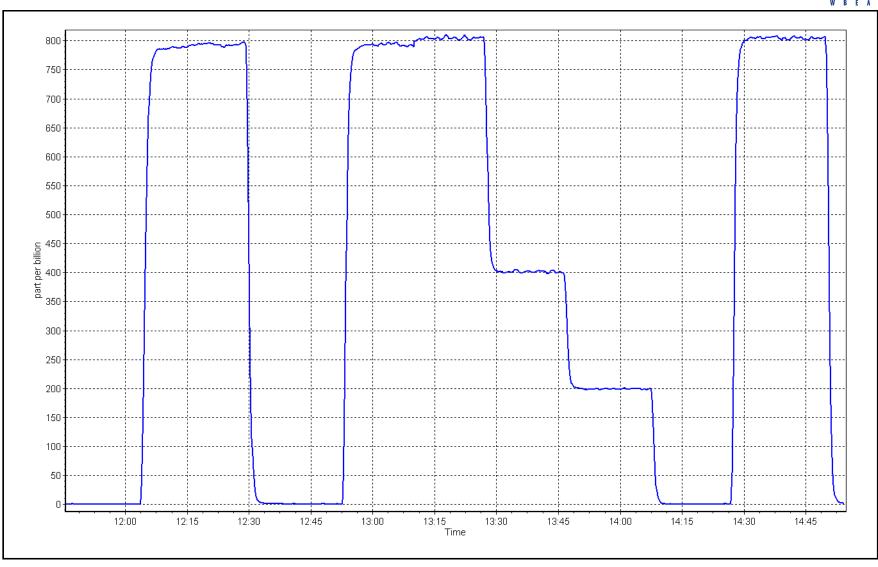
Calibration Date: January 11, 2024 **Previous Calibration:** December 19, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:45 End Time (MST): 14:53 Analyzer make: Thermo 43i Analyzer serial #: JC1501301453

Calibration Data						
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>		
0.0	0.6		Correlation Coefficient	0.999992	≥0.995	
800.3	804.8	0.9944	Correlation Coefficient	0.999992	20.333	
400.2	401.2	0.9975	Slope	1.005444	0.90 - 1.10	
199.6	199.4	1.0010	Slope		0.30 - 1.10	
			- Intercept	-0.422589	+/-30	



SO2 Calibration Plot Date: January 11, 2024 Location: Stony Mountain





W B E A

Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name: Stony Mountain
Calibration Date: January 30, 2024

Start time (MST): 11:15
Reason: Routine

Station number: AMS18

Last Cal Date: December 21, 2023

End time (MST): 15:36

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 1700 Serial Number: 2630

Analyzer Information

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

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

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> Calibration slope: 1.000015 1.000728 Backgd or Offset: 2.66 2.66 Calibration intercept: 0.540982 0.341016 Coeff or Slope: 1.157 1.157

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.2	
as found span	4927	73.0	80.0	82.1	0.977
as found 2nd point	4964	36.5	40.0	41.3	0.973
as found 3rd point	4983	18.3	20.0	20.6	0.983
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4927	73.0	80.0	80.3	0.996
second point	4964	36.5	40.0	40.6	0.985
third point	4983	18.3	20.0	20.3	0.988
as left zero	5000	0.0	0.0	0.4	
as left span	4927	73.0	80.0	79.0	1.013
SO2 Scrubber Check	4923	77.1	771.0	0.0	
Date of last scrubber chang	ge:	17-Dec-21		Ave Corr Factor	0.990
Date of last converter efficiency test:					efficiency

Baseline Corr As found: 81.9 Prev response: 80.54 *% change: 1.7% Baseline Corr 2nd AF pt: 41.1 AF Slope: 1.024592 AF Intercept: 0.180567 Baseline Corr 3rd AF pt: 20.4 AF Correlation: 0.999990

* = > +/-5% change initiates investigation

Notes: Scrubber check completed after calibrator zero. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



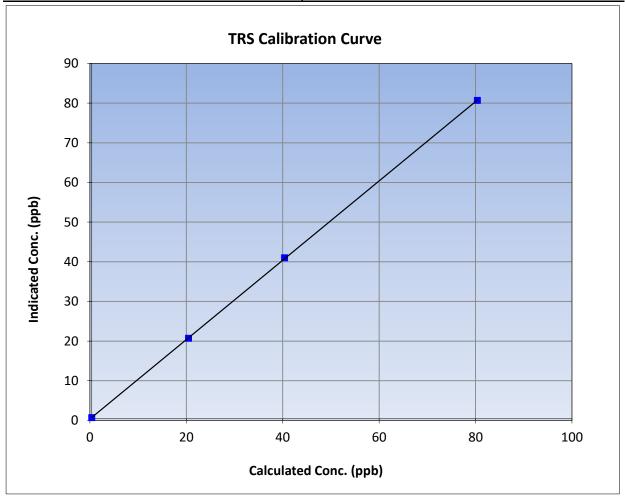
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 30, 2024 **Previous Calibration:** December 21, 2023 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 11:15 End Time (MST): 15:36 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359

Calibration Data						
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/			Statistical Evaluation		<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999978	≥0.995	
80.0	80.3	0.9962	Correlation Coefficient	0.333376		
40.0	40.6	0.9850	Slope	1.000728	0.90 - 1.10	
20.0	20.3	0.9876	Slope	1.000728	0.90 - 1.10	
			- Intercept	0.341016	+/-3	

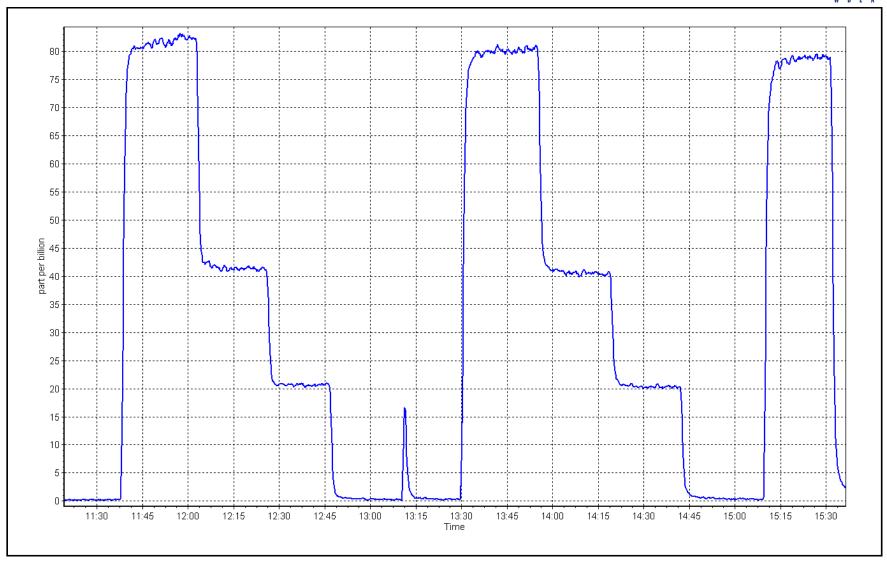




Date: January 30, 2024

Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain

Calibration Date: January 11, 2024

Start time (MST): 11:45
Reason: Routine

Station number: AMS 18

Last Cal Date: December 19, 2023

End time (MST): 14:53

Calibration Standards

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

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

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC): Diff between cyl (CH_4): Diff between cyl (CH_4):

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

om CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.24E-04 2.33E-04 NMHC SP Ratio: 5.04E-05 5.08E-05 CH4 Retention time: 12.7 13.1 NMHC Peak Area: 181790 180289 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	(c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4919	81.0	17.28	17.13	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	81.0	17.28	17.32	0.998	
second point	4959	40.5	8.64	8.64	1.000	
third point	4979	20.2	4.31	4.26	1.011	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.0	17.28	17.40	0.993	
			А	verage Correction Factor	1.003	
Baseline Corr AF:	17.13	Prev response	17.33	*% change	-1.2%	
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

					VC151011 00 20
		NIMALC Calibr	ection 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> 5
as found zero	5000	0.0	0.00	0.00	
s found span	4919	81.0	9.17	9.05	1.013
s found 2nd point	1313	01.0	3.17	3.03	1.015
s found 3rd point					
new cylinder response					
alibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.0	9.17	9.17	0.999
econd point	4959	40.5	4.58	4.61	0.995
hird point	4979	20.2	2.29	2.28	1.002
is left zero	5000	0.0	0.00	0.00	
is left span	4919	81.0	9.17	9.24	0.992
	.5 _5	02.0		rage Correction Factor	0.999
Baseline Corr AF:	9.05	Prev response	9.17	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:	3.17	AF Intercept:	1.570
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>
s found zero	5000	0.0	0.00	0.00	
is found span	4919	81.0	8.11	8.09	1.003
s found 2nd point					
s found 3rd point					
new cylinder response					
alibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.0	8.11	8.14	0.996
econd point	4959	40.5	4.06	4.03	1.006
hird point	4979	20.2	2.02	1.98	1.022
s left zero	5000	0.0	0.00	0.00	
s left span	4919	81.0	8.11	8.17	0.994
			Ave	rage Correction Factor	1.008
Baseline Corr AF:	8.09	Prev response	8.16	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.004329		1.003258	
THC Cal Offset:		-0.027780		-0.027185	
CH4 Cal Slope:		1.010541		1.005442	
CH4 Cal Offset:		-0.037005		-0.028409	
NINALIC C-I CI		0.000.56		1.001.076	

Notes: Span adjusted.

0.998956

0.009225

Calibration Performed By: Aswin Sasi Kumar

NMHC Cal Slope:

NMHC Cal Offset:

1.001076

0.002223



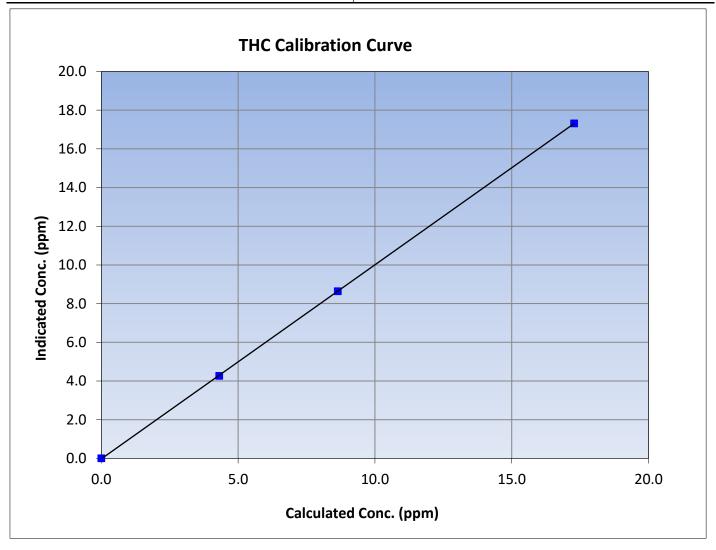
THC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 11, 2024 December 19, 2023 Station Name: **Stony Mountain** Station Number: **AMS 18** Start Time (MST): 11:45 End Time (MST): 14:53 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999987	≥0.995
17.28	17.32	0.9978	Correlation Coefficient	0.999967	20.993
8.64	8.64	1.0001	Slope	1.003258	0.90 - 1.10
4.31	4.26	1.0113	Slope	1.003236	0.90 - 1.10
			Intercept	-0.027185	+/-0.5





Analyzer make:

Wood Buffalo Environmental Association

CH₄ Calibration Summary

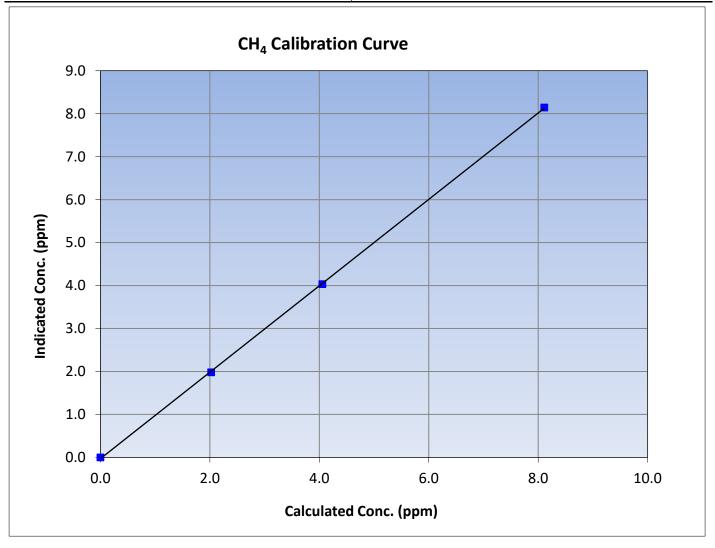
Version-06-2022

Station Information

Calibration Date:January 11, 2024Previous Calibration:December 19, 2023Station Name:Stony MountainStation Number:AMS 18Start Time (MST):11:45End Time (MST):14:53

Thermo 55i Analyzer serial #: 1180320037

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999944	≥0.995
8.11	8.14	0.9962	Correlation Coemicient	0.333344	20.333
4.06	4.03	1.0059	Slope	1.005442	0.90 - 1.10
2.02	1.98	1.0220	Slope	1.003442	0.90 - 1.10
			Intercept	-0.028409	+/-0.5





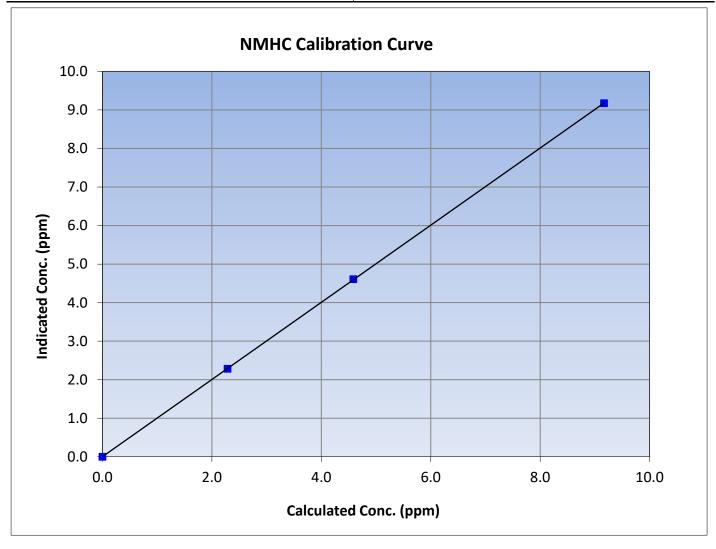
NMHC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 11, 2024 December 19, 2023 Station Name: **Stony Mountain** Station Number: **AMS 18** Start Time (MST): 11:45 End Time (MST): 14:53 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

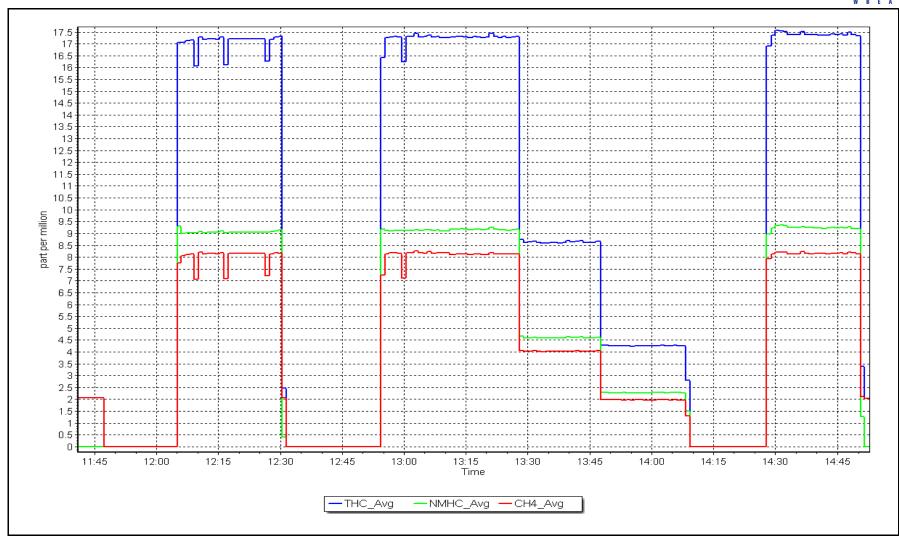
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
9.17	9.17	0.9994	Correlation Coefficient	0.555551	20.993
4.58	4.61	0.9947	Slope	1.001076	0.90 - 1.10
2.29	2.28	1.0017	Зюре	1.001070	0.90 - 1.10
			Intercept	0.002223	+/-0.5



NMHC Calibration Plot

Date: January 11, 2024 Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain

Calibration Date: January 22, 2024

Start time (MST): 11:40

Reason: Maintenance

Station number: AMS 18

Last Cal Date: January 11, 2024

End time (MST): 15:08

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

om CH4 Range (ppm): 0 - 10 ppm

Finish Finish Start Start CH4 SP Ratio: 2.33E-04 2.27E-04 NMHC SP Ratio: 5.08E-05 8.92E-05 CH4 Retention time: 13.1 12.7 NMHC Peak Area: 180289 102774 Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.0	17.28	16.35	1.057
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	17.44	0.991
second point	4959	40.5	8.64	8.62	1.002
third point	4979	20.2	4.31	4.22	1.020
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	17.28	17.22	1.003
			А	verage Correction Factor	1.004
Baseline Corr AF:	16.35	Prev response	17.31	*% change	-5.9%
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

11 V 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	
as found span	4919	81.0	9.17	8.89	1.031
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	9.32	0.984
second point	4959	40.5	4.58	4.61	0.995
third point	4979	20.2	2.29	2.26	1.014
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	9.17	9.12	1.006
·			Aver	age Correction Factor	0.998
Baseline Corr AF:	8.89	Prev response	9.18	*% change	-3.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point	Dil air flow rate	CH4 Calibra Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.0	8.11	7.46	1.088
as found 2nd point	4313	01.0	0.11	7.40	1.000
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.0	8.11	8.12	0.999
second point	4959	40.5	4.06	4.01	1.011
third point	4979	20.2	2.02	1.97	1.027
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.11	1.001
				age Correction Factor	1.012
Baseline Corr AF:	7.46	Prev response	8.13	*% change	-9.0%
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>	Statistics	<u>Finish</u>	
THC Cal Slope:		1.003258		1.011154	
THC Cal Offset:		-0.027185		-0.070367	
CH4 Cal Slope:		1.005442		1.002808	
CH4 Cal Offset:		-0.028409		-0.031814	
NMHC Cal Slope:		1.001076		1.018713	
MINITE Cai Siope:		1.001070		1.010/13	

0.002223

Notes:

NMHC Cal Offset:

Dealing with dips on CH4. N2 changed after As Founds. Low counts on chromoatogram maybe leading to 9% low span. Input board calibrated. Carrier pressure increased 5psi, window adjusted.

-0.038752

Calibration Performed By: Ryan Power



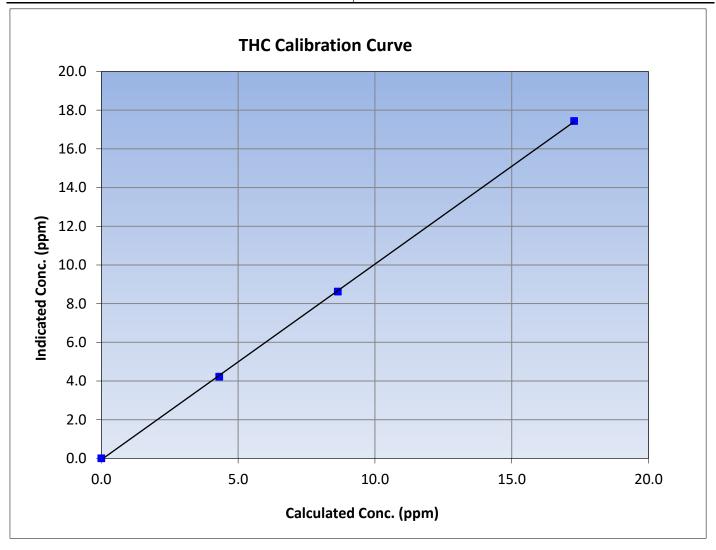
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 22, 2024 **Previous Calibration:** January 11, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:40 End Time (MST): 15:08 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

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
17.28	17.44	0.9908	Correlation Coemicient	0.999925	20.993
8.64	8.62	1.0021	Slope	1.011154	0.90 - 1.10
4.31	4.22	1.0204	Slope	1.011134	0.90 - 1.10
			Intercept	-0.070367	+/-0.5





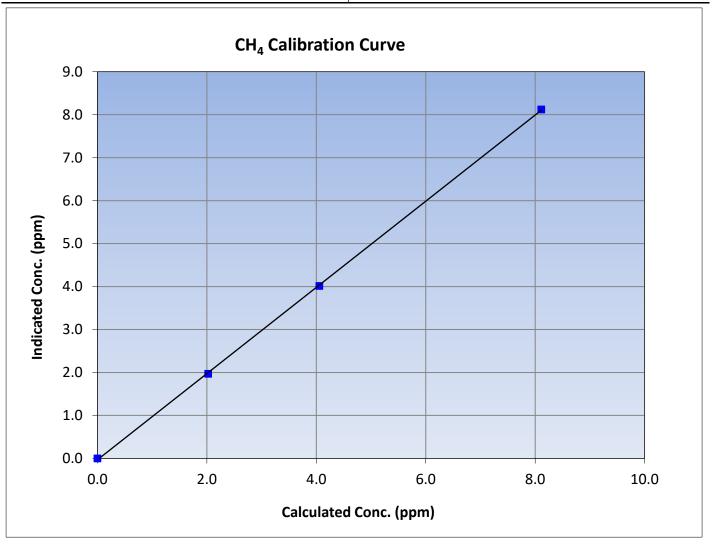
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 22, 2024 **Previous Calibration:** January 11, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:40 End Time (MST): 15:08 Analyzer make: Analyzer serial #: 1180320037 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	0.999928	≥0.995
8.11	8.12	0.9989	Correlation Coemicient	0.999926	20.993
4.06	4.01	1.0107	Slope	1.002808	0.90 - 1.10
2.02	1.97	1.0272	Slope	1.002808	0.90 - 1.10
			Intercept	-0.031814	+/-0.5





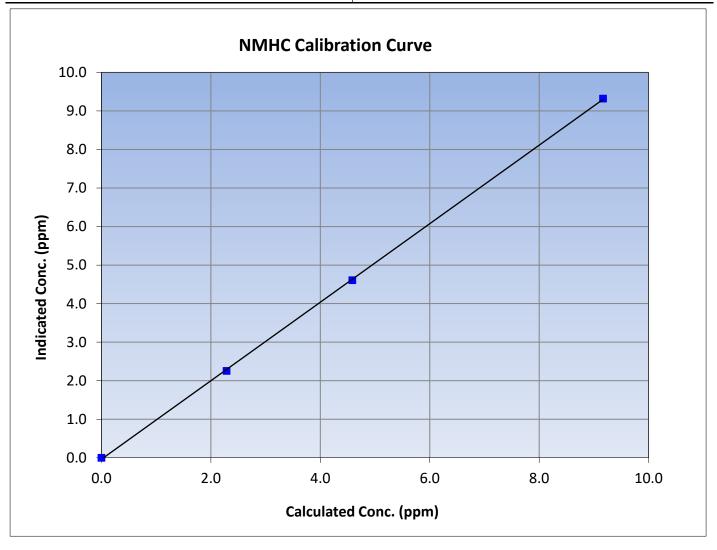
NMHC Calibration Summary

Version-06-2022

Station Information

Previous Calibration: Calibration Date: January 22, 2024 January 11, 2024 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:40 End Time (MST): 15:08 Analyzer make: Thermo 55i Analyzer serial #: 1180320037

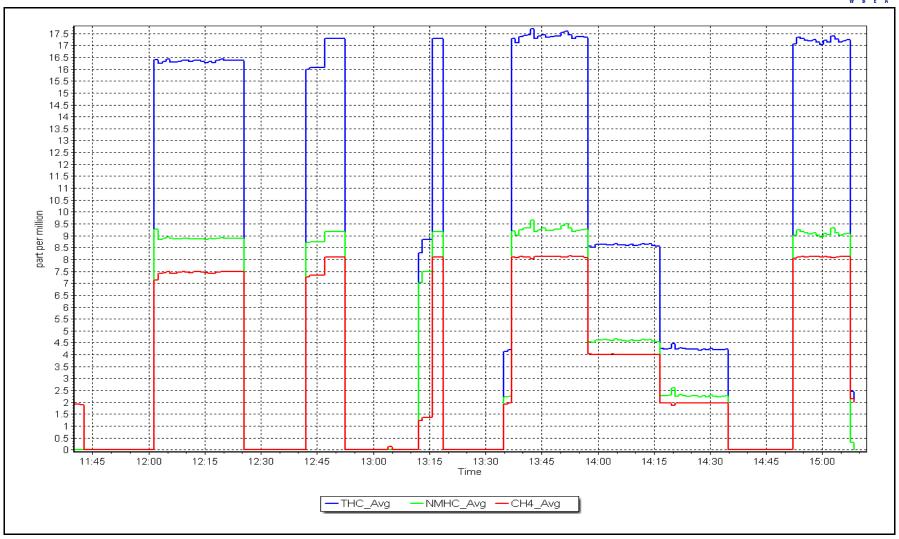
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999921	≥0.995
9.17	9.32	0.9835	Correlation Coemicient	0.333321	20.333
4.58	4.61	0.9949	Slope	1.018713	0.90 - 1.10
2.29	2.26	1.0141	Slope	1.010/13	0.90 - 1.10
			Intercept	-0.038752	+/-0.5



NMHC Calibration Plot

Date: January 22, 2024 Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain

Calibration Date: January 23, 2024

Start time (MST): 12:00 Reason: Removal Station number: AMS 18

Last Cal Date: January 22, 2024

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 (CH $_4$): Diff between cyl (NM):

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

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320037

Cauras ass flaur rata

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

Cat Daint

CH4 Range (ppm): 0 - 10 ppm

Finish Start Start **Finish** CH4 SP Ratio: 2.27E-04 N/A NMHC SP Ratio: 8.92E-05 N/A CH4 Retention time: 12.7 N/A NMHC Peak Area: 102774 N/A Zero Chromatogram: OFF OFF Flat Baseline: OFF OFF

THC Calibration Data

Cala sana (nam) (Ca)

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	0.00	0.00	
as found span	4919	81.0	17.28	17.01	1.016
as found 2nd point	4959	40.5	8.64	8.43	1.025
as found 3rd point	4979	20.2	4.31	4.16	1.037
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Ave	erage Correction Factor		
Baseline Corr AF:	17.01	Prev response	17.40	*% change	-2.3%	
Baseline Corr 2nd AF:	8.4	AF Slope:	0.985558	AF Intercept:	-0.049656	
Baseline Corr 3rd AF:	4.2	AF Correlation:	0.999960	* = > +/-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	5000	0.0	0.00	0.00	
as found span	4919	81.0	9.17	8.92	1.028
as found 2nd point	4959	40.5	4.58	4.46	1.029
as found 3rd point	4979	20.2	2.29	2.18	1.048
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
·			Avera	ge Correction Factor	
Baseline Corr AF:	8.92	Prev response	9.30	*% change	-4.3%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.974470	AF Intercept:	-0.017839
Baseline Corr 3rd AF:	2.2	AF Correlation:	0.999973	* = > +/-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	4919	81.0	8.11	8.09	1.003
as found 2nd point	4959	40.5	4.06	3.98	1.020
as found 3rd point	4979	20.2	2.02	1.97	1.026
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
			Avera	ge Correction Factor	
Baseline Corr AF:	8.09	Prev response	8.10	*% change	-0.2%
Baseline Corr 2nd AF:	3.98	AF Slope:	0.998088	AF Intercept:	-0.031816
Baseline Corr 3rd AF:	1.97	AF Correlation:	0.999901	* = > +/-5% change initiat	es investigation
· · · · · · · · · · · · · · · · · · ·		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.011154			
THC Cal Offset:		-0.070367			
CH4 Cal Slope:		1.002808			
CH4 Cal Offset:		-0.031814			
NMHC Cal Slope:		1.018713			
NMHC Cal Offset:		-0.038752			

Notes: Dips still present after maintenance performed on January 22, 2024. Removing instrument for further maintenance back at the shop

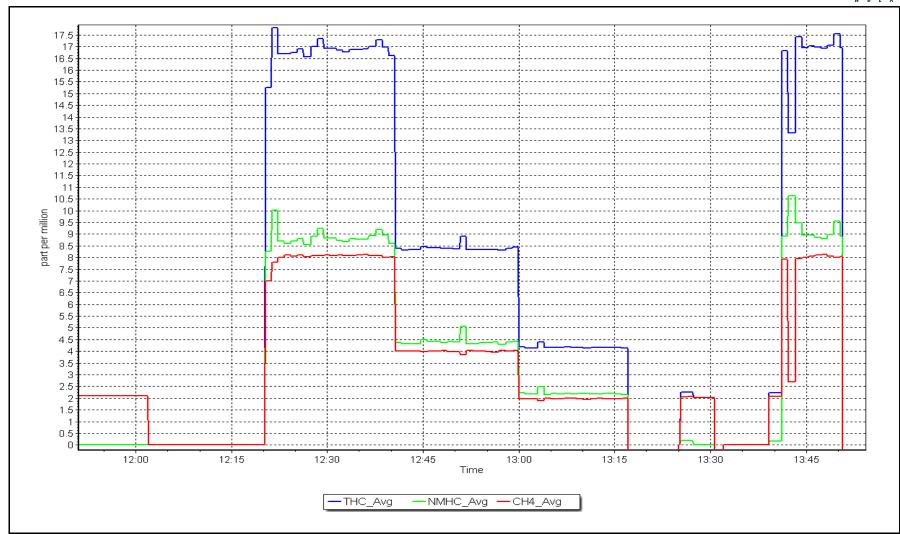
Calibration Performed By: Aswin Sasi Kumar

NMHC Calibration Plot

Date: January 23, 2024

Location: Stony Mountain







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Stony Mountain

Calibration Date: January 23, 2024 Start time (MST): 14:40

Reason: Install

Station number: AMS 18

Last Cal Date:

End time (MST): 16:49

Calibration Standards

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

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

C3H8 Cal Gas Conc. 205.8 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 500.8 ppm CH4 Equiv Conc. 1066.8 ppm

Removed C3H8 Conc. 205.8 ppm Diff between cyl (THC): Diff between cyl (CH_4): Diff between cyl (CH_4):

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 #: 1193585647

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

CH4 Range (ppm): 0 - 10 ppm

StartFinishStartFinishCH4 SP Ratio:3.13E-04NMHC SP Ratio:6.14E-05CH4 Retention time:16.2NMHC Peak Area:149456

Zero Chromatogram: OFF OFF Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
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	17.40	0.993
second point	4959	40.5	8.64	8.74	0.989
third point	4979	20.2	4.31	4.37	0.987
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	17.28	17.59	0.982
			,	Average Correction Factor	0.990
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

OFF



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	9.27	0.989
second point	4959	40.5	4.58	4.64	0.987
third point	4979	20.2	2.29	2.34	0.976
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	9.17	9.42	0.973
			Avera	age Correction Factor	0.984
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.0	8.11	8.13	0.998
second point	4959	40.5	4.06	4.09	0.992
third point	4979	20.2	2.02	2.02	1.000
as left zero	5000	0.0	0.00	0.00	
as left span	4919	81.0	8.11	8.18	0.992
				age Correction Factor	0.997
Baseline Corr AF:	NA	D	NA	*% change	NA
Baseline Corr 2nd AF:	14/5	Prev response	INA	% Change	IVA
baseille Coll Zilu Ar.	NA	AF Slope:	IVA	AF Intercept:	INA
		•	NA.	_	
Baseline Corr 3rd AF:	NA	AF Slope:		AF Intercept: * = > +/-5% change initiate	
Baseline Corr 3rd AF:	NA	AF Slope: AF Correlation:		AF Intercept:	
Baseline Corr 3rd AF: THC Cal Slope:	NA	AF Slope: AF Correlation: Calibration		AF Intercept: * = > +/-5% change initiate	
THC Cal Slope: THC Cal Offset:	NA	AF Slope: AF Correlation: Calibration		AF Intercept: * = > +/-5% change initiate Finish	
Baseline Corr 3rd AF: THC Cal Slope:	NA	AF Slope: AF Correlation: Calibration		AF Intercept: * = > +/-5% change initiate Finish 1.006554	
THC Cal Slope: THC Cal Offset:	NA	AF Slope: AF Correlation: Calibration		AF Intercept: * = > +/-5% change initiate Finish 1.006554 0.018647	

Notes: Install calibration. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

NMHC Cal Offset:

0.014455



THC Calibration Summary

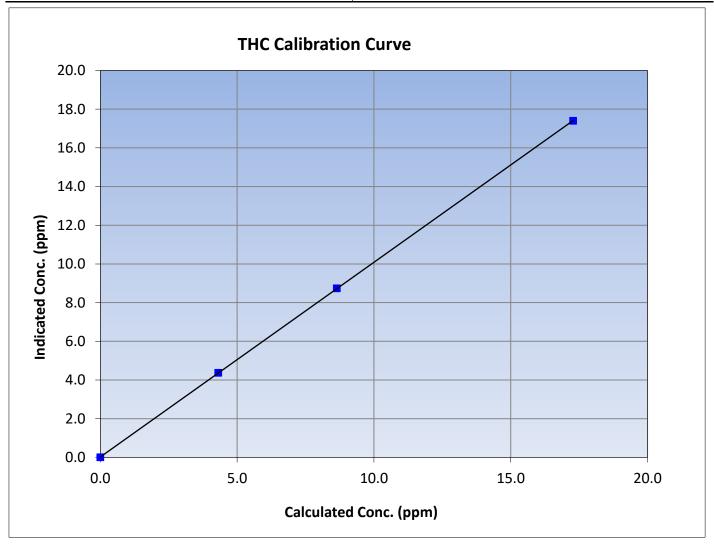
Version-06-2022

Station Information

Calibration Date: January 23, 2024 Previous Calibration:

Station Name:Stony MountainStation Number:AMS 18Start Time (MST):14:40End Time (MST):16:49Analyzer make:Thermo 55iAnalyzer serial #:1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999993	≥0.995
17.28	17.40	0.9932	Correlation Coemicient	0.555555	20.555
8.64	8.74	0.9890	Slope	1.006554	0.90 - 1.10
4.31	4.37	0.9868	Slope	1.000554	0.90 - 1.10
			Intercept	0.018647	+/-0.5





CH₄ Calibration Summary

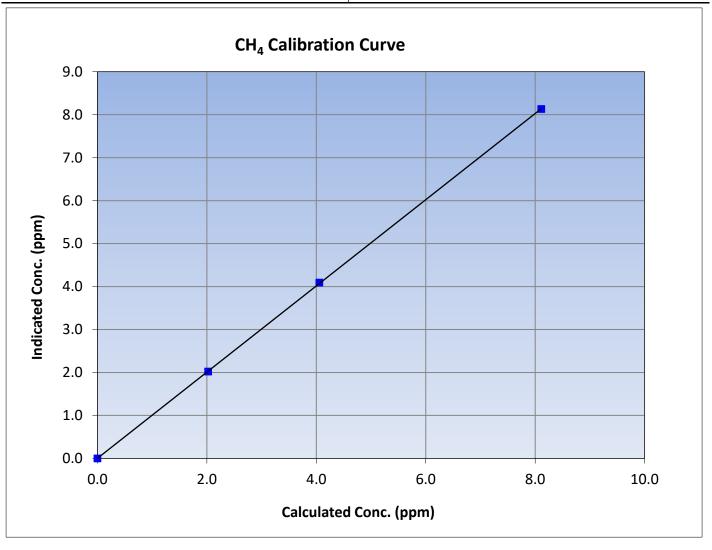
Version-06-2022

Station Information

Calibration Date: January 23, 2024 Previous Calibration:

Station Name:Stony MountainStation Number:AMS 18Start Time (MST):14:40End Time (MST):16:49Analyzer make:Thermo 55iAnalyzer serial #:1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999985	≥0.995
8.11	8.13	0.9977	Correlation Coefficient	0.999965	20.555
4.06	4.09	0.9917	Slope	1.002919	0.90 - 1.10
2.02	2.02	1.0003	Slope	1.002919	0.90 - 1.10
			Intercept	0.002793	+/-0.5





NMHC Calibration Summary

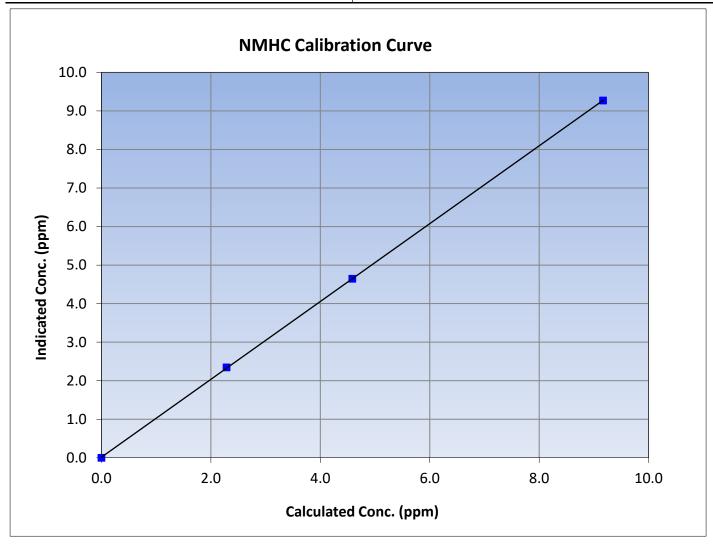
Version-06-2022

Station Information

Calibration Date: January 23, 2024 Previous Calibration:

Station Name:Stony MountainStation Number:AMS 18Start Time (MST):14:40End Time (MST):16:49Analyzer make:Thermo 55iAnalyzer serial #:1193585647

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999987	≥0.995
9.17	9.27	0.9890	Correlation Coemicient	0.333367	20.555
4.58	4.64	0.9872	Slope	1.009996	0.90 - 1.10
2.29	2.34	0.9756	Зюре	1.009990	0.90 - 1.10
			Intercept	0.014455	+/-0.5

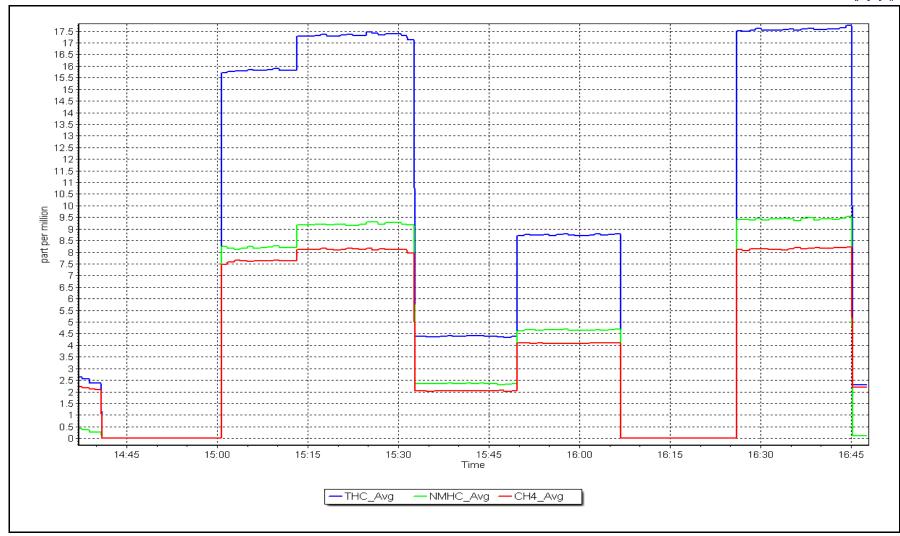


NMHC Calibration Plot

Date: January 23, 2024

Location: Stony Mountain







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Stony Mountain

Calibration Date: January 25, 2024

Start time (MST): 11:25 Reason: Routine Station number: AMS 18

Last Cal Date: December 21, 2023

End time (MST): 16:02

Calibration Standards

NO Gas Cylinder #: T26DHGA Cal Gas Expiry Date: November 17, 2026

NOX Cal Gas Conc: 48.28 ppm NO Cal Gas Conc: 47.58 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 48.28 ppm Removed Gas NO Conc: 47.58 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2658 ZAG make/model: Teledyne API T701 Serial Number: 13779

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1336160088

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.076 1.102 NO bkgnd or offset: 3.0 3.1 NOX coeff or slope: 0.988 0.988 NOX bkgnd or offset: 3.0 3.1 NO2 coeff or slope: 0.999 0.999 Reaction cell Press: 249.1 252.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001069	1.000344
NO _x Cal Offset:	-0.390046	-0.080000
NO Cal Slope:	1.001210	1.001207
NO Cal Offset:	-1.489996	-0.760000
NO ₂ Cal Slope:	1.001477	0.998708
NO ₂ Cal Offset:	1.056533	0.435337



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/lc) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	0.3	-0.1	0.5		
as found span	4916	84.0	811.1	799.3	11.8	790.7	778.5	12.2	1.0258	1.0268
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3		
high point	4916	84.0	811.1	799.3	11.8	811.1	799.6	11.6	1.0000	0.9997
second point	4958	42.0	405.6	399.7	5.9	406.5	399.9	6.6	0.9977	0.9994
third point	4979	21.0	202.8	199.8	2.9	201.8	198.1	3.7	1.0048	1.0088
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4916	84.0	811.1	361.3	449.8	815.0	357.0	458.0	0.9952	1.0122
							Average C	Correction Factor	1.0008	1.0026
Corrected As fo	ound NO _X =	790.4 ppb	NO :	= 778.6 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-2.7%
Previous Respo	nse NO _x =	811.6 ppb	NO :	= 798.8 ppb				*Percent Chang	ge NO =	-2.6%
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 Setpo	pint (ppb)	Indicated NO Ref		licated NO Drop centration (ppb)	Calculated No concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poi	nt (400 ppb NO2)									
as found GPT poi	nt (200 ppb NO2)									
as found GPT poi	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	800.6		362.6	449.8		449.7	1.0001		100.0%
	t (200 ppb O3)	800.6		587.2	225.2		224.9	1.0012	,	99.9%

Notes:

3rd GPT point (100 ppb O3)

Calibration gas cylinder T2XX7ME removed on January 23, 2024. Span adjusted.

116.4

Average Correction Factor

115.7

696.7

Calibration Performed By: Aswin Sasi Kumar

800.6

100.6%

100.2%

0.9936

0.9983



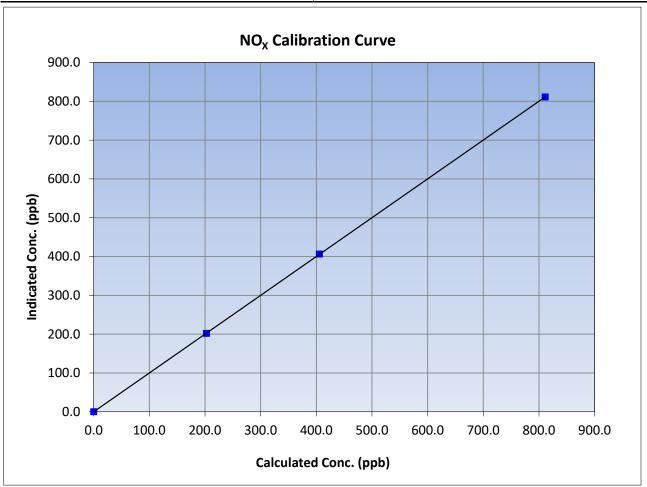
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 Previous Calibration: December 21, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:25 End Time (MST): 16:02 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	0.2		Correlation Coefficient	0.999995	≥0.995
811.1	811.1	1.0000	Correlation Coefficient	0.999995	20.555
405.6	406.5	0.9977	Slope	1.000344	0.90 - 1.10
202.8	201.8	1.0048	Slope	1.000344	0.90 - 1.10
			Intercept	-0.080000	+/-20





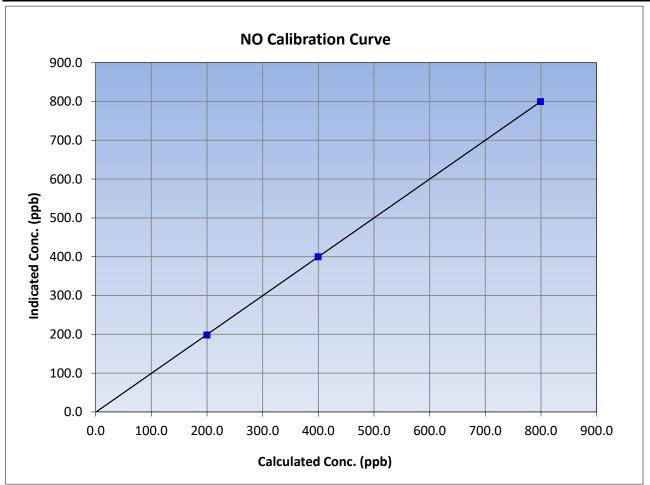
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 Previous Calibration: December 21, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:25 End Time (MST): 16:02 Analyzer make: Thermo 42i Analyzer serial #: 1336160088

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
799.3	799.6	0.9997	Correlation Coefficient	0.555554	20.333
399.7	399.9	0.9994	Slope	1.001207	0.90 - 1.10
199.8	198.1	1.0088	Slope	1.001207	0.90 - 1.10
			Intercept	-0.760000	+/-20





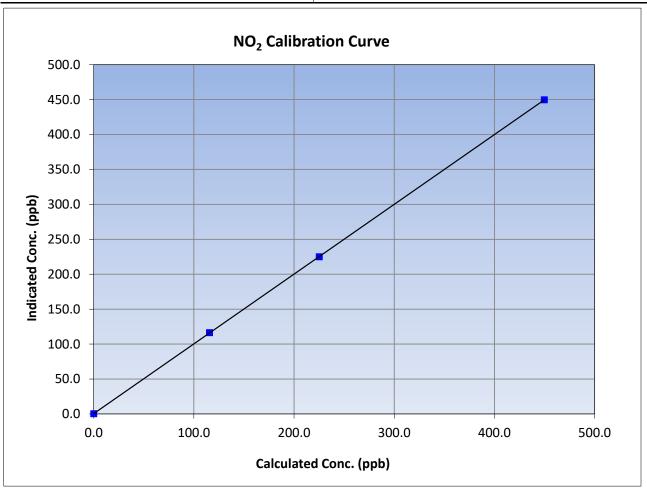
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 25, 2024 Previous Calibration: December 21, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:25 End Time (MST): 16:02 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	0.3		Correlation Coefficient	0.999996	≥0.995
449.8	449.7	1.0001	Correlation Coefficient	0.999990	20.993
225.2	224.9	1.0012	Slope	0.998708	0.90 - 1.10
115.7	116.4	0.9936	Slope	0.556706	0.90 - 1.10
			Intercept	0.435337	+/-20

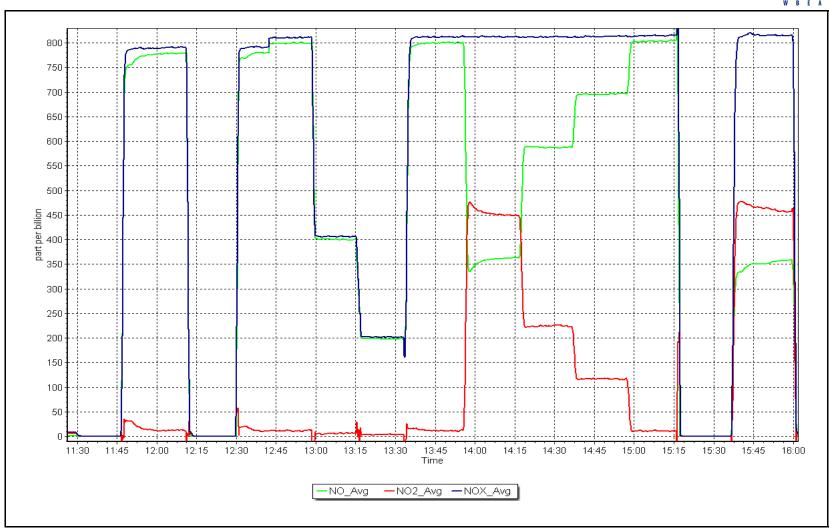


NO_x Calibration Plot

Date: January 25, 2024

Location: Stony Mountain







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: January 24, 2024

Start time (MST): 11:30 Reason: Routine Station number: AMS18

Last Cal Date: December 12, 2023

End time (MST): 15:30

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 2658 ZAG Make/Model: Teledyne API 701H Serial Number: 360

Analyzer Information

Analyzer make: API T400 Analyzer serial #: 825

Analyzer Range 0 - 500 ppb

Start Finish Start Finish 1.002743 Backgd or Offset: -0.7 Calibration slope: 1.002257 2.4 0.020000 Coeff or Slope: 0.971 Calibration intercept: -1.420000 0.978

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	NA	0.0	-1.8	
as found span	4804	1141.9	400.0	400.3	0.999
as found 2nd point	4804	884.5	200.0	201.1	0.995
as found 3rd point	4888	741.4	100.0	99.9	1.001
calibrator zero	5000	NA	0.0	0.0	
high point	4888	1138.1	400.0	401.5	0.996
second point	4888	884.5	200.0	199.4	1.003
third point	4888	741.4	100.0	101.1	0.989
as left zero	5000	NA	0.0	0.0	
as left span	4812	1097.9	400.0	404.0	0.990
			Averag	ge Correction Factor	0.996
Baseline Corr As found:	402.1	Previous response	e 399.5	*% change	0.7%
Baseline Corr 2nd AF pt:	202.9	AF Slope	e: 1.004771	AF Intercept:	-0.960000
Baseline Corr 3rd AF pt:	101.7	AF Correlation	n: 0.999972		
				* = > +/-5% change initia	ites investigation

Notes: Pump changed out after multi-point as founds. Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar



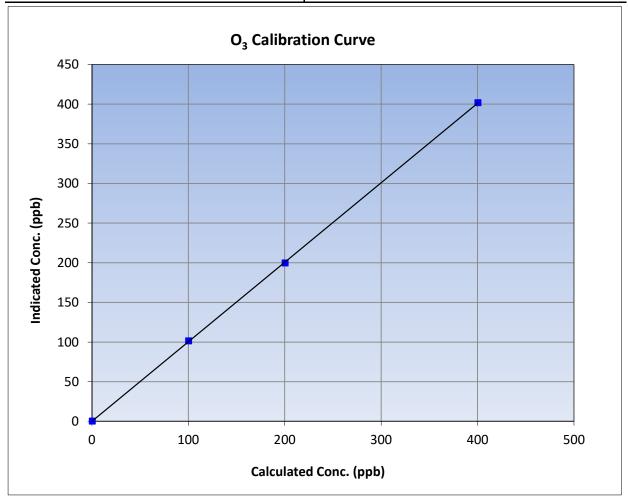
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 24, 2024 **Previous Calibration:** December 12, 2023 Station Name: Stony Mountain Station Number: AMS18 Start Time (MST): 11:30 End Time (MST): 15:30 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	0.0		Correlation Coefficient	0.999975	≥0.995				
400.0	401.5	0.9963	Correlation Coefficient	0.555575	20.333				
200.0	199.4	1.0030	Slope	1.002743	0.90 - 1.10				
100.0	101.1	0.9891	Slope	1.002743	0.90 - 1.10				
			Intercept	0.020000	+/- 5				

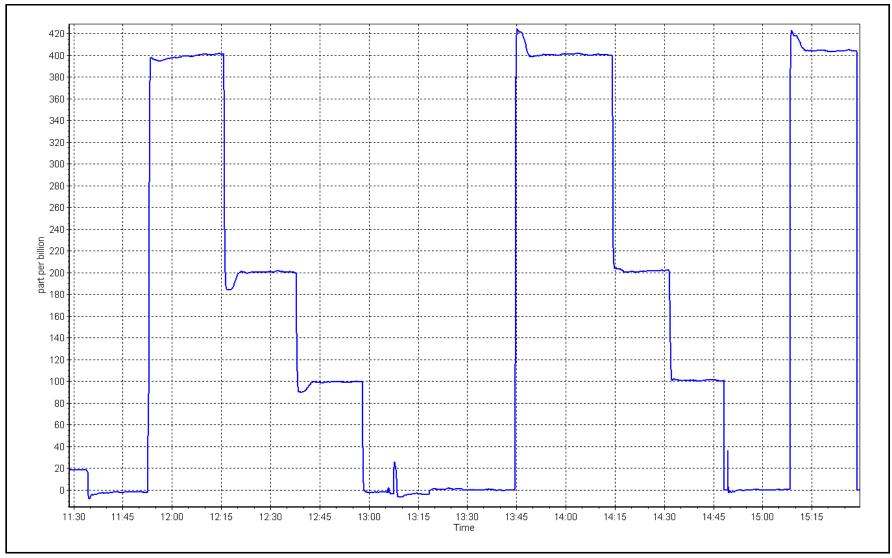


O₃ Calibration Plot

Date: January 24, 2024

Location: Stony Mountain







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name:	Stony Mountain		Station number:	AMS 18	
Calibration Date:	January 30, 2024			December 20, 2023	
Start time (MST):	14:20		End time (MST):	15:27	
Analyzer Make:	API T640		S/N:	1162	
Particulate Fraction:	PM2.5		-,		
Flance Nation Nation (National	Altera ED SEDT		C/NI.	200740	
Flow Meter Make/Model:	Alicat FP-25BT Alicat FP-25BT		•	388748	
Temp/RH standard:	AllCat FF-23B1		•	388748	
_		Monthly Calibration Te			44.4.4
<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	Adjusted	(Limits)
T (°C)	11.9	11.64	11.9		+/- 2 °C
P (mmHg)	691.2	691.09	691.2		+/- 10 mmHg
flow (LPM)	4.97	4.72	5.02	\checkmark	+/- 0.25 LPM
Leak Test:	Date of check:	January 30, 2024	Last Cal Date:	December 20, 2023	
	PM w/o HEPA:	0.8	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be	•	· <u> </u>	erve as the pre mair	ntenance leak check	
Inlet cleaning:	Inlet Head	✓			
		Quarterly Calibration T	est		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	NA	1 ost manifemanee	NA	<u>rtajastea</u>	10.9 +/- 0.5
Tivit i cak rest	1471		1471		10.5 1/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	ber Cleaned:	September 25, 2023			<0.2 ug/m3
Disposable Filte	r Changed:	September 25, 2023			
		Annual Maintenance	2		
Date Sample Tube Cleaned:		August 30, 2022			
Date RH/T Senso	or Cleaned:	August 30, 2	2022		
Notes:		Flo	ow adjusted.		
Calibration by:	Aswin Sasi Kumar				



CO Calibration Report

Version-01-2020

Station Information

Station Name: **Stony Mountain**

Calibration Date: January 17, 2024

Start time (MST): 11:15

Reason: Routine Station number: **AMS 18**

> Last Cal Date: December 12, 2023

End time (MST): 14:15

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: December 1, 2028 3,050 ppm

Cal Gas Cylinder #: ALM063503

Removed Cal Gas Conc: 3,050 Rem Gas Exp Date: NA ppm

Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledyne API T700 2658 Serial Number: Teledyne API T701H 355 ZAG Make/Model: Serial Number:

Analyzer Information

Analyzer make: API T300 Analyzer serial #: 3504

Analyzer Range: 0 - 50 ppm

<u>Finis</u>h Start **Finish** <u>Start</u> Calibration slope: 0.992948 0.999887 Backgd or Offset: -0.010 -0.010 Coeff or Slope: 0.908 Calibration intercept: 0.219785 0.043782 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/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4933	66.7	40.7	41.1	0.991
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	40.7	1.001
second point	4966	33.3	20.3	20.5	0.990
third point	4983	16.7	10.2	10.2	1.001
as left zero	5000	0.0	0.0	0.0	
as left span	4933	66.7	40.7	40.9	0.995
	_	_	Avera	ge Correction Factor	0.997
Baseline Corr As found:	40.89	Prev response:	40.62	*% change:	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

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

* = > +/-5% change initiates investigation

Zero and span adjusted. Notes:

Calibration Performed By: Aswin Sasi Kumar



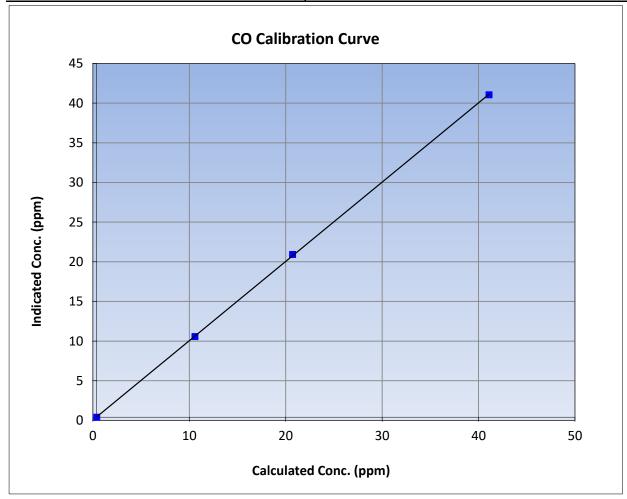
CO Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 17, 2024 **Previous Calibration:** December 12, 2023 Station Name: Stony Mountain Station Number: **AMS 18** Start Time (MST): 11:15 End Time (MST): 14:15 Analyzer make: **API T300** Analyzer serial #: 3504

Calibration Data						
Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic) (Cc/Ic)			Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999961	≥0.995	
40.7	40.7	1.0007	Correlation Coefficient			
20.3	20.5	0.9901	Slope	0.999887	0.90 - 1.10	
10.2	10.2	1.0007	Slope	0.333667	0.90 - 1.10	
			- Intercept	0.043782	+/-1.5	

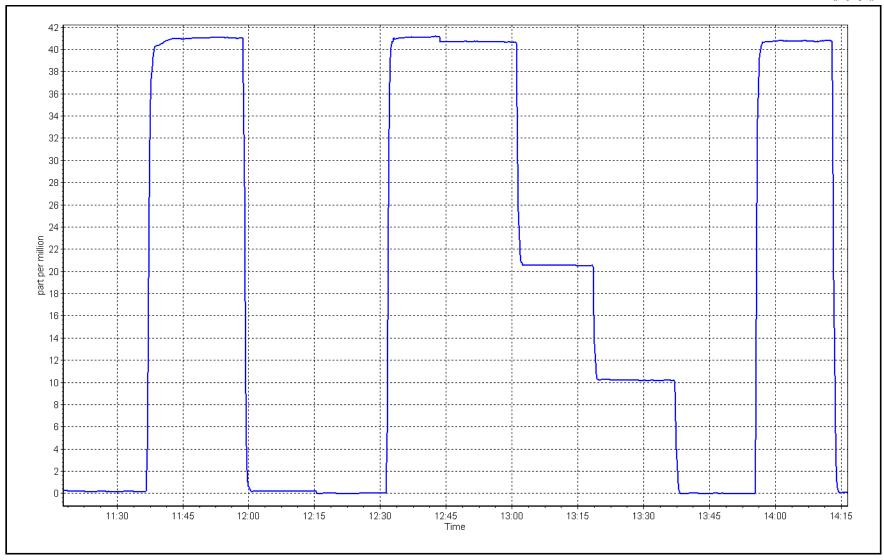


CO Calibration Plot

Date: January 17, 2024

Location: Stony Mountain







CO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Stony Mountain

Calibration Date: January 15, 2024

Start time (MST): 11:37 Routine Reason:

Station number: **AMS 18**

> Last Cal Date: December 20, 2023

End time (MST): 14:36

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: 0.999080 0.996375 -0.037 -0.037 Coeff or Slope: Calibration intercept: -2.620000 -3.620000 0.938 0.938

CO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	3000	0.0	0.0	0.2	
as found span	2920	80.0	1605.9	1597.1	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					_
calibrator zero	3000	0.0	0.0	0.4	
high point	2920	80.0	1605.9	1600.0	1.004
second point	2960	40.0	802.9	789.7	1.017
third point	2980	20.0	401.5	395.5	1.015
as left zero	3000	0.0	0.0	0.1	
as left span	2930	80.0	1600.5	1594.9	1.004
			Avera	ge Correction Factor	1.012

Baseline Corr As found: 1596.90 Prev response: 1601.77 *% change: -0.3%

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

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

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



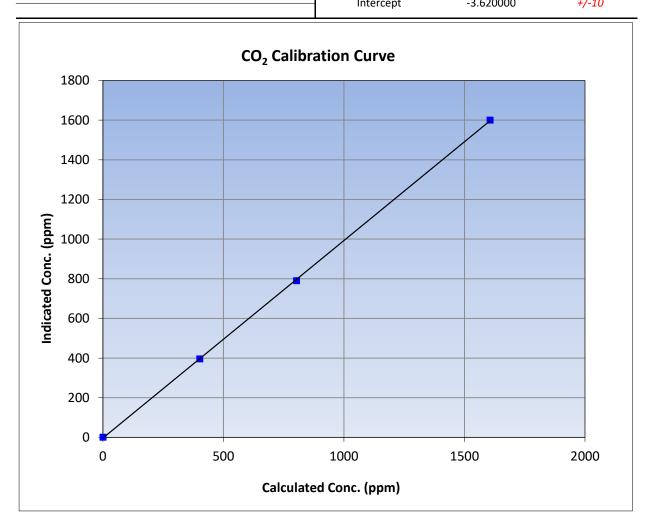
CO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date	January 15, 2024	Previous Calibration	December 20, 2023
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:37	End Time (MST)	14:36
Analyzer make	API T360	Analyzer serial #	489

Calibration Data						
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999947	≥0.995	
1605.9	1600.0	1.0037	correlation coefficient	0.555547	20.555	
802.9	789.7	1.0168	Slope	0.996375	0.90 - 1.10	
401.5	395.5	1.0151	Slope		0.90 - 1.10	
			Intercent	-3 620000	+/-10	

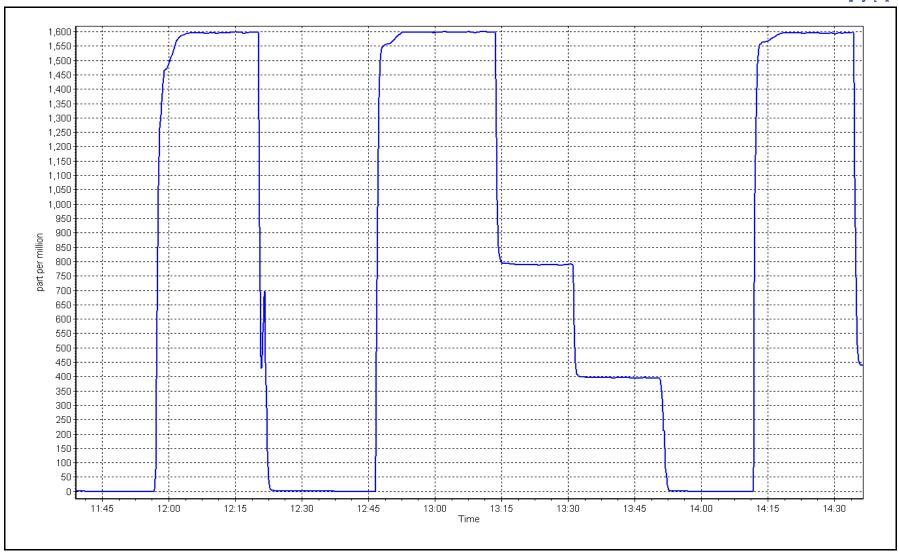


CO₂ Calibration Plot

Date: January 15, 2024

Location: Stony Mountain







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG

JANUARY 2024

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

February 29, 2024







SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: **Firebag**

January 8, 2024 Calibration Date:

Start time (MST): 12:01 Routine Reason:

Station number: **AMS 19**

December 13, 2023 Last Cal Date:

End time (MST): 15:55

Calibration Standards

Cal Gas Concentration: 49.29

Cal Gas Cylinder #: CC716618

Removed Cal Gas Conc: 49.29

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

Removed Gas Cyl #:

ppm Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date:

Diff between cyl:

Serial Number: 1607 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1410661308

ppm

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.005909 0.996990 Backgd or Offset: 10.6 10.5 0.984 Calibration intercept: -0.303040 0.518257 Coeff or Slope: 0.993

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	4999	0.0	0.0	-0.3	
as found span	4919	81.1	799.5	805.0	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	4999	0.0	0.0	-0.1	
high point	4919	81.1	799.5	797.2	1.003
second point	4959	40.6	400.3	400.1	1.000
third point	4980	20.3	200.1	200.5	0.998
as left zero	4999	0.0	0.0	-0.3	
as left span	4919	81.1	799.5	800.0	0.999
			Averag	ge Correction Factor	1.000

Baseline Corr As found: 805.30 Previous response 803.89 *% 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. Adjusted span.

Calibration Performed By: **Braiden Boutilier**



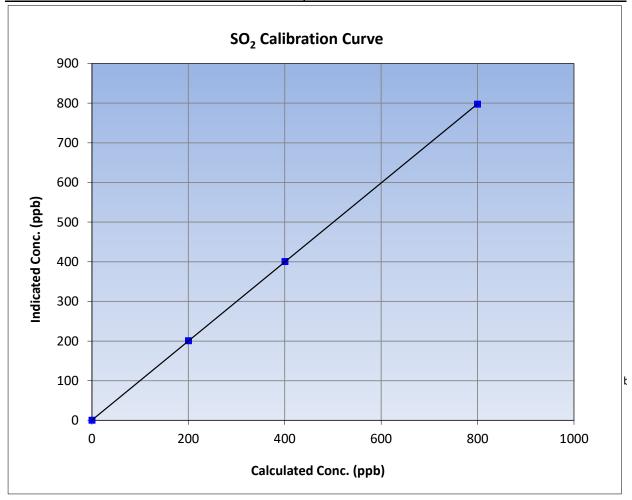
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** December 13, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 12:01 End Time (MST): 15:55 Analyzer make: Thermo 43i Analyzer serial #: 1410661308

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	-0.1		Correlation Coefficient	0.999997	≥0.995				
799.5	797.2	1.0028	Correlation Coefficient	0.555557	20.333				
400.3	400.1	1.0004	Slope	0.996990	0.90 - 1.10				
200.1	200.5	0.9980	Slope	0.990990	0.90 - 1.10				
			Intercept	0.518257	+/-30				

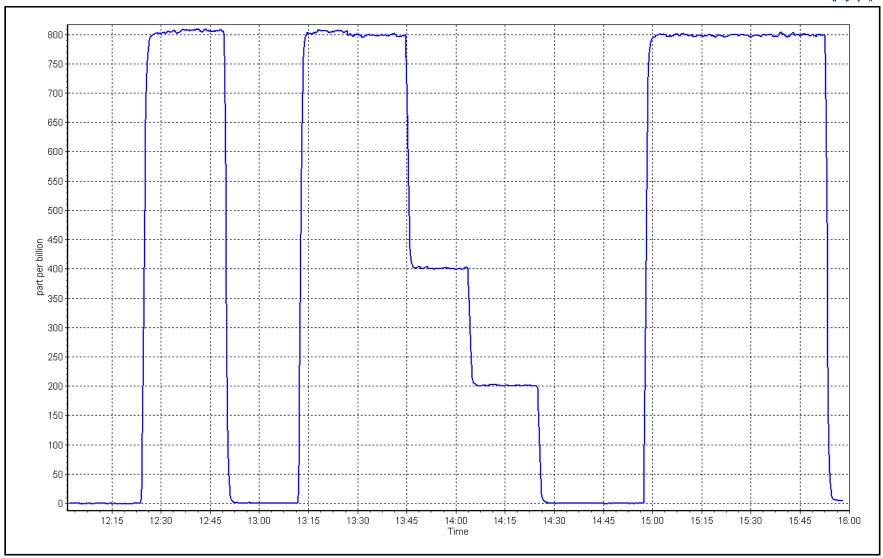


SO2 Calibration Plot

Date: January 8, 2024

Location: Firebag







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: **Firebag**

Calibration Date: January 22, 2024

Start time (MST): 11:22 Reason:

Routine

Station number: AMS19

> Last Cal Date: December 11, 2023

End time (MST): 16:49

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> 1.004771 Backgd or Offset: Calibration slope: 1.000196 2.82 3.38

-0.021722 Calibration intercept: -0.061587 Coeff or Slope: 1.225 1.176

H₂S As Found Data

Set Point	Dilution air flow rate (sccm)	calculated Calculated concentration (p (sccm) (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	77.7	1.032
as found 2nd point	4961	39.1	40.0	39.1	1.028
as found 3rd point	4980	19.6	20.0	19.8	1.023
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	78.2	80.0	80.3	0.996
second point	4961	39.1	40.0	40.2	0.995
third point	4980	19.6	20.0	20.2	0.992
as left zero	5000	0.0	0.0	0.0	
as left span	4922	78.2	80.0	79.8	1.002
SO2 Scrubber Check	4922	78.3	800.2	0.0	
Date of last scrubber chang	ge:	January 18, 2023		Ave Corr Factor	0.994
Date of last converter effic	iency test:	n/a			efficiency

Date of last scrubber change:	January 18, 2023	Ave Corr Factor 0.994
Date of last converter efficiency test:	n/a	efficiency

Baseline Corr As found: 77.5 79.93 Prev response: *% change: -3.1% 0.299057 Baseline Corr 2nd AF pt: 38.9 AF Slope: 0.968467 AF Intercept: Baseline Corr 3rd AF pt: AF Correlation: 0.999992 19.6

* = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. Ran SOx scrubber check after cal zero. Adjusted zero Notes: and span.

Calibration Performed By: Braiden Boutilier



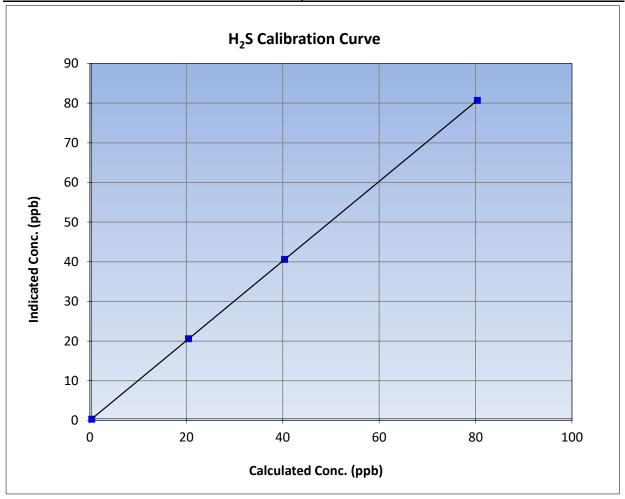
H₂S Calibration Summary

Version-11-2021

Station Information

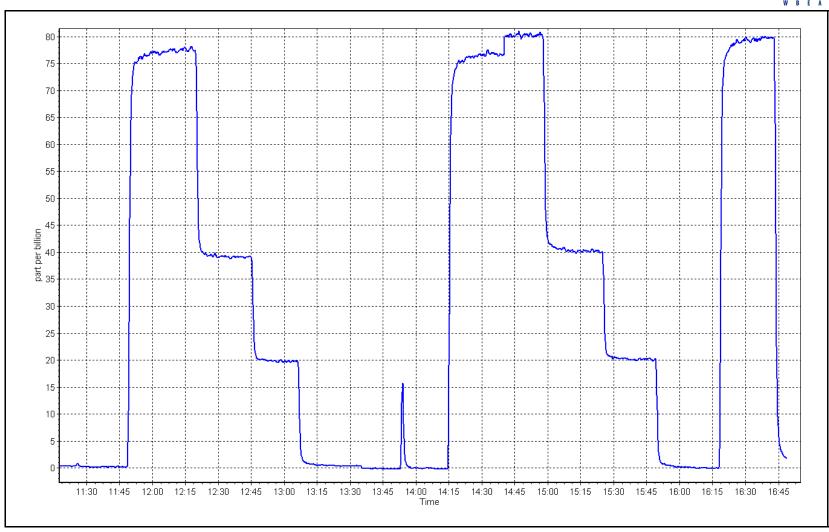
Calibration Date: January 22, 2024 **Previous Calibration:** December 11, 2023 Station Name: Firebag Station Number: AMS19 Start Time (MST): 11:22 End Time (MST): 16:49 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680032

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	-0.1		Correlation Coefficient	0.999996	≥0.995				
80.0	80.3	0.9960	Correlation coefficient	0.999990	20.333				
40.0	40.2	0.9948	Slope	1.004771	0.90 - 1.10				
20.0	20.2	0.9925	Slope	1.004771	0.90 - 1.10				
			- Intercept	-0.021722	+/-3				



Date: January 22, 2024 Location: Firebag







THC Calibration Report

Version-01-2020

Station Information

Station Name: Firebag

Calibration Date: January 8, 2024

Start time (MST): 12:01

Reason: Routine

Station number: AMS 19

Removed Gas Expiry:

Last Cal Date: December 13, 2023

End time (MST): 15:55

Calibration Standards

Gas Cert Reference: CC716618 Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

C3H8 Cal Gas Conc. 205.9 ppm

Removed Gas Cert:

Removed CH4 Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm

Removed C3H8 Conc. 205.9 ppm Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 1607 ZAG Make/Model: API T701 Serial Number: 1118

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Analyzer Range: 0 - 20 ppm

StartFinishStartFinishCalibration slope:0.9980110.995342Background:2.042.03

Calibration intercept: 0.042876 0.045092 Coefficient: 3.793 3.764

THC Calibration Data

Set Point	Dilution air flow rate Source gas flow rate (sccm) (sccm)		Calculated Concentratio (ppm) (Cc)	n Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.00	0.12	
as found span	4919	81.1	17.31	17.50	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	4999	0.0	0.00	0.08	
high point	4919	81.1	17.31	17.31	1.000
second point	4959	40.6	8.66	8.58	1.010
third point	4980	20.3	4.33	4.37	0.990
as left zero	5000	0.0	0.00	0.02	
as left span	4919	81.1	17.31	17.38	0.996
			Avei	age Correction Factor	1.000
Baseline Corr As found:	17.38	Previous response	17.31	*% change	0.4%

Baseline Corr As found: 17.38 Previous response 17.31 *% change 0.4'
Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

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

Calibration Performed By: Braiden Boutilier

* = > +/-5% change initiates investigation



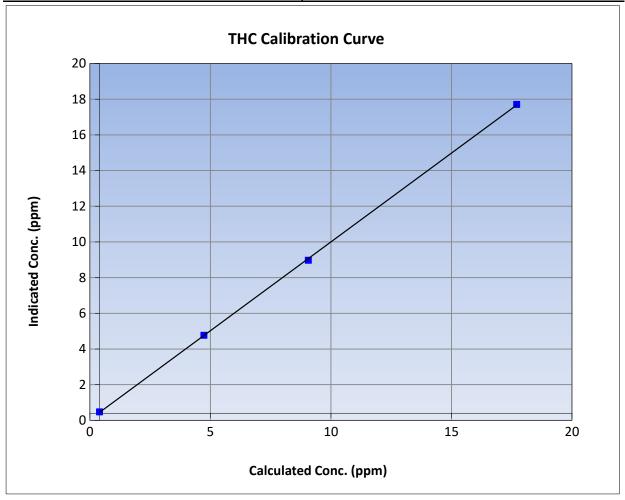
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: January 8, 2024 December 13, 2023 Station Name: Firebag Station Number: **AMS 19** Start Time (MST): 12:01 End Time (MST): 15:55 Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Lim</u>		<u>Limits</u>				
0.00	0.08		Correlation Coefficient	0.999933	≥0.995				
17.31	17.31	0.9997	Correlation Coefficient	0.555555	20.333				
8.66	8.58	1.0098	Slope	0.995342	0.90 - 1.10				
4.33	4.37	0.9905	Slope	0.555542	0.30 - 1.10				
			- Intercept	0.045092	+/-1.5				

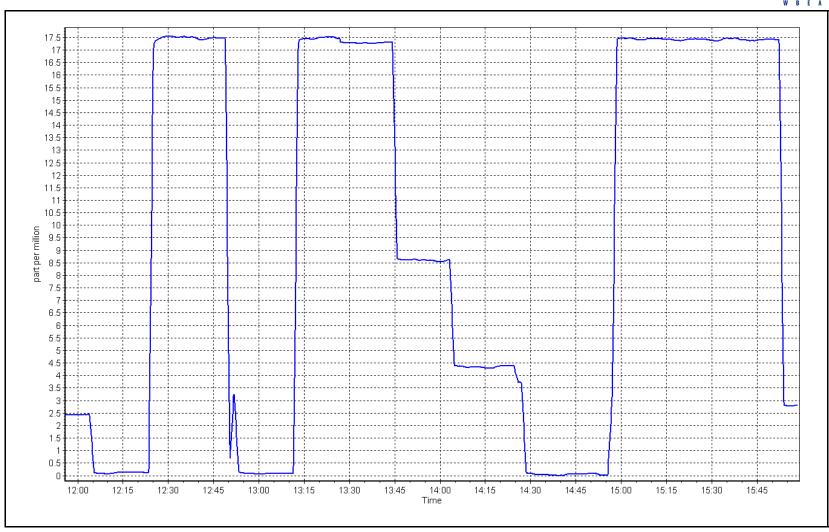


THC Calibration Plot

Date: January 8, 2024

Location: Firebag







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Firebag

Calibration Date: January 23, 2024

Start time (MST): 11:17
Reason: Routine

Station number: AMS 19

Last Cal Date: December 12, 2023

End time (MST): 15:38

NO gas Diff:

Calibration Standards

NO Gas Cylinder #: DT0044018 Cal Gas Expiry Date: November 3, 2031

NOX Cal Gas Conc: 48.9 NO Cal Gas Conc: 48.7 ppm ppm Removed Cylinder #: Removed Gas Exp Date: n/a n/a Removed Gas NOX Conc: Removed Gas NO Conc: 48.9 ppm 48.7 ppm

NOX 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

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.089	1.089	NO bkgnd or offset:	7.6	7.6
NOX coeff or slope:	0.993	0.993	NOX bkgnd or offset:	7.7	7.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	215.5	217.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.005184	1.011351
NO _x Cal Offset:	0.260458	0.260390
NO Cal Slope:	1.007037	1.014424
NO Cal Offset:	-0.099613	-0.039625
NO ₂ Cal Slope:	0.999988	1.000829
NO ₂ Cal Offset:	-1.617748	-0.524220



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibration	n Data				
Set Point	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/lc) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1		
as found span	4919	81.0	792.2	788.9	3.2	810.0	807.0	2.6	0.9780	0.9776
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4919	81.5	797.1	793.8	3.3	806.0	805.0	0.5	0.9889	0.9861
second point	4959	40.7	398.0	396.4	1.6	403.6	402.7	0.9	0.9862	0.9844
third point	4980	20.4	199.5	198.7	0.8	202.0	201.2	0.8	0.9877	0.9876
as left zero	4999	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as left span	4919	81.0	792.2	367.3	424.9	799.6	374.5	425.1	0.9907	0.9808
							Average C	orrection Factor	0.9876	0.9860
Corrected As fo	ound NO _X =	810.3 ppb	NO =	807.2 ppb	* = > +/-5%	6 change initiates i	investigation	*Percent Chan	ge NO _X =	1.7%
Previous Respo	onse NO _X =	796.5 ppb	NO =	794.4 ppb				*Percent Chan	ge NO =	1.6%
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		NA ppb	NO =	NA ppb	As found	$1 \qquad NO r^2$:		NO SI:	NO Int:	
					As found	$NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	GPT Calibration [Data				
O3 Setpo	oint (ppb)	Indicated NO Reference concentration (ppt		cated NO Drop entration (ppb)	Calculated NO concentration (ppt		dicated NO2 atration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	d 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)	797.5		375.9	424.9		424.8	1.0002	1 :	100.0%
2nd GPT poin	nt (200 ppb O3)	797.5		587.8	213.0		212.8	1.0008	3	99.9%
3rd GPT poin	t (100 ppb O3)	797.5		694.5	106.3		105.0	1.0120)	98.8%
						Average Co	rrection Factor	1.0043	3	99.6%

Notes:

Changed sample inlet filters after as founds. No adjustments made. Second high NO reference point used in GPT formulas.

Calibration Performed By:

Braiden Boutilier



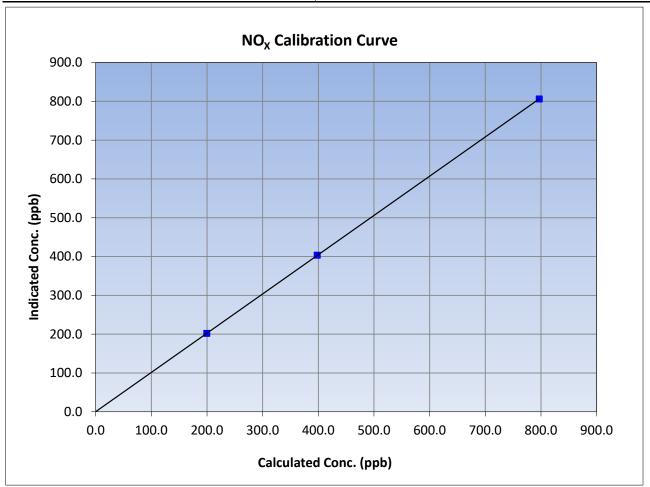
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 23, 2024 **Previous Calibration:** December 12, 2023 Station Name: Station Number: **AMS 19 Firebag** Start Time (MST): 11:17 End Time (MST): 15:38 Analyzer serial #: Analyzer make: Thermo 42i 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999998	≥0.995
797.1	806.0	0.9889	Correlation Coefficient	0.555556	20.333
398.0	403.6	0.9862	Slope	1.011351	0.90 - 1.10
199.5	202.0	0.9877	Slope	1.011551	0.90 - 1.10
			Intercept	0.260390	+/-20





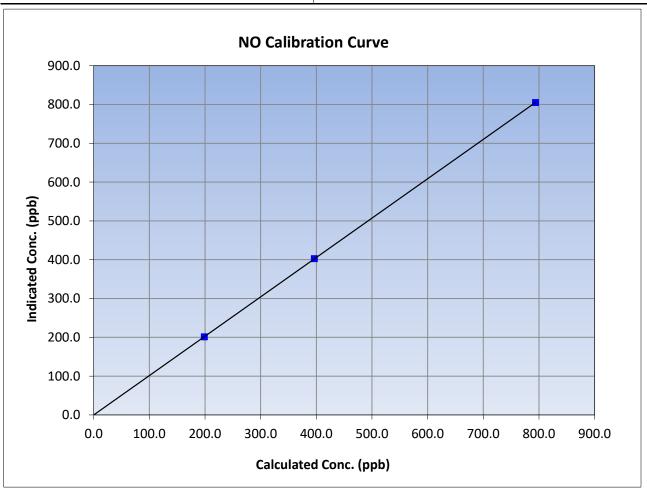
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 23, 2024 **Previous Calibration:** December 12, 2023 Station Name: Station Number: **AMS 19 Firebag** Start Time (MST): 11:17 End Time (MST): 15:38 Analyzer make: Thermo 42i Analyzer serial #: 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999999	≥0.995	
793.8	805.0	0.9861	Correlation Coefficient	0.333333	20.595	
396.4	402.7	0.9844	Slope	1.014424	0.90 - 1.10	
198.7	201.2	0.9876	Slope	1.014424	0.90 - 1.10	
			Intercept	-0.039625	+/-20	





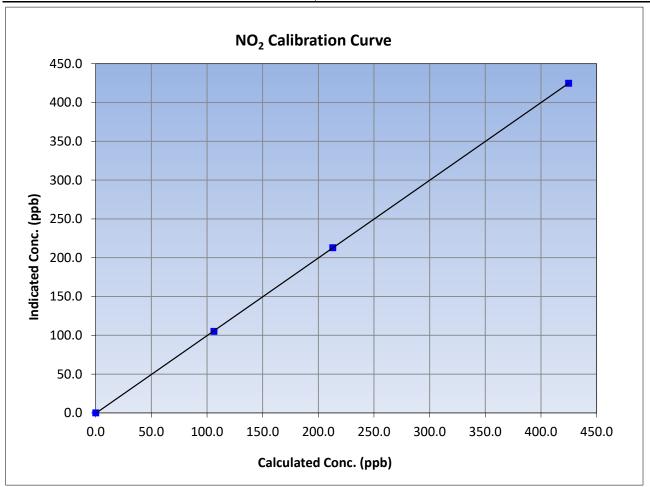
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 23, 2024 **Previous Calibration:** December 12, 2023 Station Name: Station Number: **AMS 19** Firebag Start Time (MST): 11:17 End Time (MST): 15:38 Analyzer serial #: Analyzer make: Thermo 42i 1410661309

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999990	≥0.995	
424.9	424.8	1.0001	Correlation Coefficient	0.555550	20.555	
213.0	212.8	1.0008	Slope	1.000829	0.90 - 1.10	
106.3	105.0	1.0120	Зюре	1.000829	0.90 - 1.10	
			Intercept	-0.524220	+/-20	

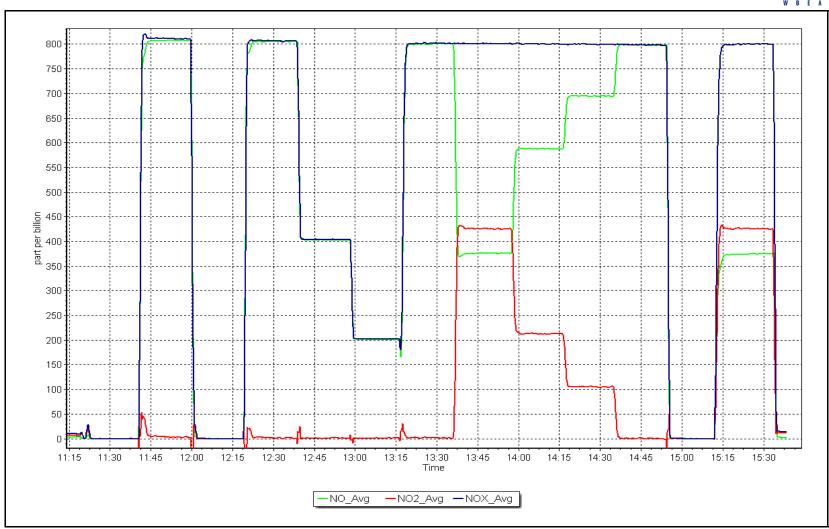


NO_x Calibration Plot

Date: January 23, 2024

Location: Firebag







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Station number:

End time (MST):

AMS20

11:55

Version-01-2020

Station Information

Station Name: MacKay River

Calibration Date: January 16, 2024 Last Cal Date: December 4, 2023

Start time (MST): 8:25

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 #: Diff between cyl:

Removed Gas Cyl #: <u>NA</u> 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:0.9918830.995124Backgd or Offset:18.719.1

Calibration intercept: 3.051032 2.791182 Coeff or Slope: 0.945 0.965

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	4919	81.3	800.3	791.2	1.011
as found 2nd point	4959	40.7	400.7	397.8	1.007
as found 3rd point	4980	20.3	199.8	203.5	0.982
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	81.3	800.3	798.2	1.003
second point	4959	40.7	400.7	401.7	0.997
third point	4980	20.3	199.8	205.1	0.974
as left zero	5000	0.0	0.0	0.3	
as left span	4919	81.3	800.3	799.3	1.001
·			Averag	ge Correction Factor	0.991
Baseline Corr As found:	791.00	Previous response	96.82	*% change	-0.7%
Baseline Corr 2nd AF pt:	397.60	AF Slope	: 0.986157	AF Intercept:	2.831493

Baseline Corr 2nd AF pt: 397.60 AF Slope: 0.986157 AF Intercept: 2.831498
Baseline Corr 3rd AF pt: 203.30 AF Correlation: 0.999939

Notes: Pump Flow was low, replaced pump. Span adjsuted.

Calibration Performed By: Melissa Lemay

* = > +/-5% change initiates investigation



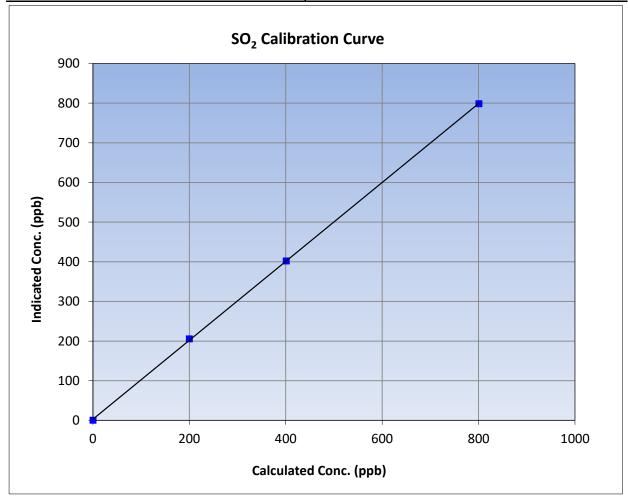
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 16, 2024 **Previous Calibration:** December 4, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:25 End Time (MST): 11:55 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	0.1		Correlation Coefficient	0.999942	≥0.995			
800.3	798.2	1.0026	Correlation Coefficient	0.333342	20.993			
400.7	401.7	0.9974	Slope	0.995124	0.90 - 1.10			
199.8	205.1	0.9743	Siope	0.995124	0.90 - 1.10			
			- Intercept	2.791182	+/-30			



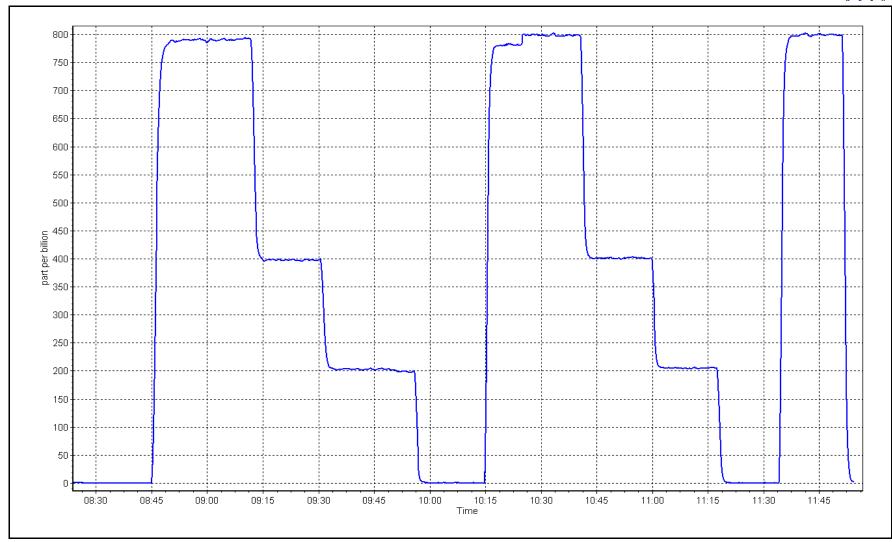
SO2 Calibration Plot

Date:

January 16, 2024

Location: MacKay River





H₂S Calibration Report

Version-11-2021

Station Information

Station Name: MacKay River

Calibration Date: January 3, 2024

Start time (MST): Routine Reason:

8:44

Station number: AMS20 Last Cal Date:

December 5, 2023

End time (MST): 12:49

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 Serial Number: 1220 ZAG Make/Model: Teledyne API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1236656117

Global Converter serial #: 2022-226 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 0.996103 0.991531 Backgd or Offset: Calibration slope: 3.19 3.19 Calibration intercept: 0.439357 0.499365 Coeff or Slope: 1.113 1.113

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	80.4	0.996
as found 2nd point	4961	39.0	39.9	40.6	0.986
as found 3rd point	4980	19.5	20.0	20.6	0.974
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	79.7	1.004
second point	4961	39.0	40.0	40.3	0.992
third point	4980	19.5	20.0	20.6	0.970
as left zero	5000	0.0	0.0	0.3	
as left span	4922	78.1	80.0	79.0	1.013
SO2 Scrubber Check	4982	81.3	802.8	0.0	
Date of last scrubber chang	ge:	May 25, 2023	_	Ave Corr Factor	0.989
Date of last converter effic	iency test:			·	efficiency

Date of last converter enforce	icy test.				zinicienie y	_
Baseline Corr As found:	80.3	Prev response:	80.10	*% change:	0.2%	
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.002738	AF Intercept:	0.359563	
Baseline Corr 3rd AF pt:	20.5	AF Correlation:	0.999950			
				* = > +/-5% change initiates	sinvestigation	

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

Calibration Performed By: Melissa Lemay



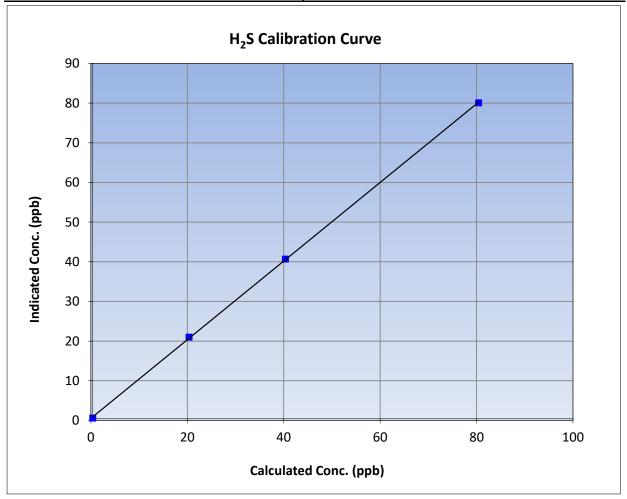
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 5, 2023 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:44 End Time (MST): 12:49 Analyzer make: Thermo 43i TLE Analyzer serial #: 1236656117

	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	0.999935	≥0.995				
80.0	79.7	1.0042	Correlation Coefficient	0.55555	20.993				
40.0	40.3	0.9917	Slope	0.991531	0.90 - 1.10				
20.0	20.6	0.9702	Slope	0.551551	0.90 - 1.10				
			- Intercept	0.499365	+/-3				

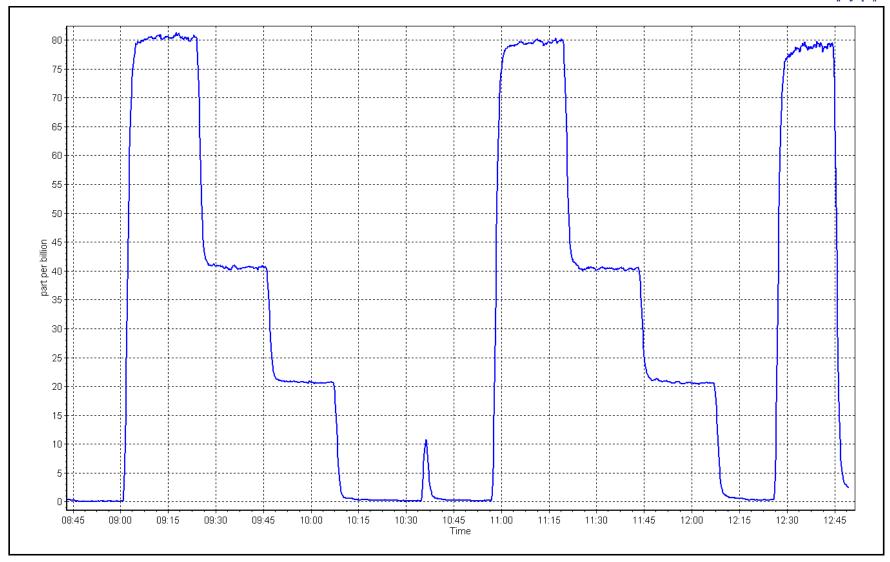


H₂S Calibration Plot

Date: January 3, 2024

Location: MacKay River







THC Calibration Report

Version-01-2020

Station Information

Station Name: MacKay River

January 16, 2024 Calibration Date:

Start time (MST): 8:25 Routine Reason:

Station number: AMS20

> December 4, 2023 Last Cal Date:

End time (MST): 11:54

Removed Gas Expiry: NA

Calibration Standards

CC306868 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.40 CH4 Equiv Conc. 1066.45 ppm ppm

C3H8 Cal Gas Conc. 206.20 ppm

Removed Gas Cert: NA

Removed CH4 Conc. 499.40 CH4 Equiv Conc. 1066.45 ppm ppm

Removed C3H8 Conc. Diff between cyl: 206.20 ppm

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

Start Finish Finish Start Background: Calibration slope: 0.997735 0.987892 3.110 3.110 0.076023 Coefficient: Calibration intercept: 0.026586 5.590 5.590

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	on Indicated Concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.09	
as found span	4919	81.3	17.34	17.26	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	
high point	4919	81.3	17.34	17.19	1.009
second point	4959	40.7	8.68	8.64	1.004
third point	4980	20.3	4.33	4.45	0.973
as left zero	5000	0.0	0.00	0.08	
as left span	4919	81.3	17.34	17.26	1.005
			A	verage Correction Factor	0.995
Baseline Corr As found:	17.18	Previous response	17.33	*% change	-0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

AF Correlation:

Notes:

Baseline Corr 3rd AF pt:

No Adjustments or maintenance done.

Calibration Performed By: Melissa Lemay

NA

* = > +/-5% change initiates investigation



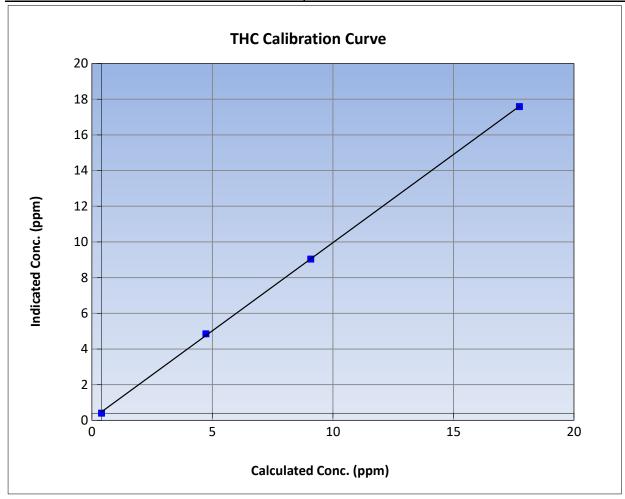
THC Calibration Summary

Version-01-2020

Station Information

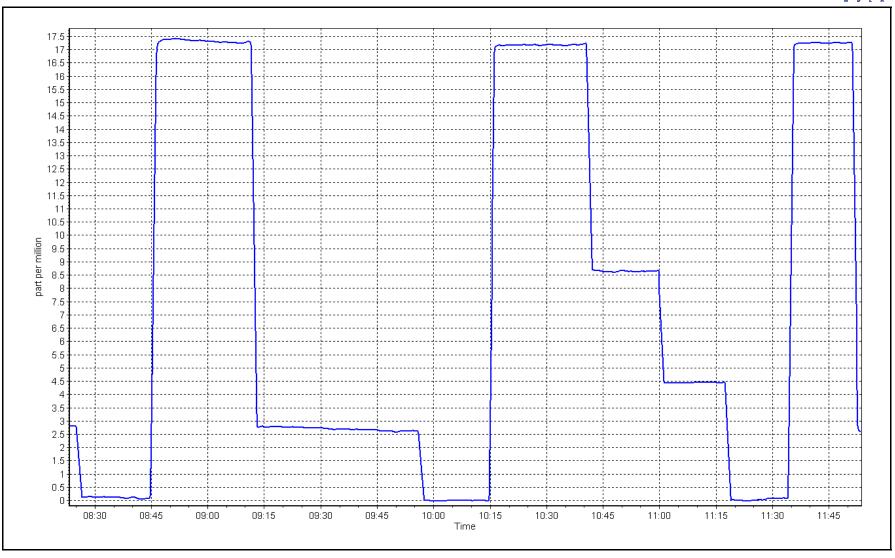
Previous Calibration: December 4, 2023 Calibration Date: January 16, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:25 End Time (MST): 11:54 Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727

	Calibration Data							
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>			
0.00	0.01		Correlation Coefficient	0.999910	≥0.995			
17.34	17.19	1.0089	Correlation Coefficient	0.999910	20.993			
8.68	8.64	1.0044	Slope	0.987892	0.90 - 1.10			
4.33	4.45	0.9729	0.9729 Slope		0.30 - 1.10			
			- Intercept	0.076023	+/-1.5			



THC Calibration Plot Date: January 16, 2024 Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

NO gas Diff:

Version-04-2020

Station Information

Station Name: MacKay River Station number: AMS20

Calibration Date: January 4, 2024 Last Cal Date: December 1, 2023

Start time (MST): 8:34 End time (MST): 11:25

Reason: As Found Clean reaction cell

Calibration Standards

NO Gas Cylinder #: T376265 Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: 49.19 ppm NO Cal Gas Conc: 48.04 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 49.19 ppm Removed Gas NO Conc: 48.04 ppm

NOX gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 1220 ZAG make/model: Teledyne API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1505164379

NOX Range (ppb): 0 - 1000 ppb

Finish <u>Start</u> **Finish Start** NO coeff or slope: 0.981 0.981 NO bkgnd or offset: 4.0 4.0 NOX coeff or slope: 0.997 NOX bkgnd or offset: 0.997 4.1 4.1 NO2 coeff or slope: 0.995 0.995 Reaction cell Press: 194.7 194.7

Calibration Statistics

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

 NO_{x} Cal Slope: 1.007887 NO_{x} Cal Offset: 2.589374 NO Cal Slope: 0.995492 NO Cal Offset: 1.631214 NO_{2} Cal Slope: 1.005354 NO_{2} Cal Offset: 0.716865



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Di	lution	Cal	ibration	Data
UI	IULIOII	Lai	ibratioi	ı vata

						= 0.00				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0		
as found span	4917	83.3	819.5	800.3	19.2	841.7	817.8	23.9	0.9736	0.9786
as found 2nd	4956	41.7	410.4	400.8	9.6	423.3	410.0	13.3	0.9696	0.9777
as found 3rd	4979	20.8	204.6	199.9	4.8	216.2	207.8	8.4	0.9465	0.9618
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero										
as left span										
							Average C	Correction Factor	r	
Corrected As for	und NO _X =	841.7 ppb	NO =	817.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	1.6%
Previous Respor	nse NO _X =	828.5 ppb	NO =	798.3 ppb				*Percent Chan	ge NO =	2.4%
Baseline Corr 2r	nd pt NO _X =	423.3 ppb	NO =	409.9 ppb	As foun	d $NO_X r^2$:	0.999942	Nx SI: 1.0248	Nx Int:	2.749
Baseline Corr 3r	d pt NO _x =	216.2 ppb	NO =	207.7 ppb	As foun	d NO r ² :	0.999978	NO SI: 1.0202	292 NO Int:	1.570
					As foun	d $NO_2 r^2$:	0.999993	NO2 SI: 1.0127	NO ₂ Int:	-0.346

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%	
as found GPT zero			0.0	0.0			
as found GPT point (400 ppb NO2)	808.4	461.5	366.1	370.5	0.9880	101.2%	
as found GPT point (200 ppb NO2)	808.4	626.2	201.4	203.7	0.9885	101.2%	
as found GPT point (100 ppb NO2)	808.4	712.1	115.5	116.0	0.9953	100.5%	
1st GPT point (400 ppb O3)							
2nd GPT point (200 ppb O3)							
3rd GPT point (100 ppb O3)							
	Average Correction Factor						

Notes:

As founds to clean the reaction cell. NO and Nox spans still slowly dropping during calibration.

Calibration Performed By:

Melissa Lemay

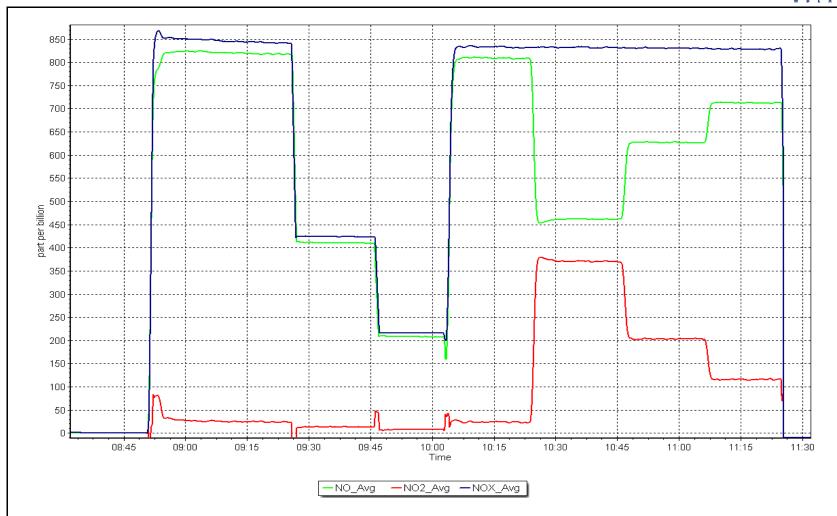
NO_x Calibration Plot

Date:

January 4, 2024

Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: MacKay River Station number: AMS20

Calibration Date: January 5, 2024 Last Cal Date: January 4, 2024

Start time (MST): 8:10 End time (MST): 11:58

Routine Calibration after Cleaning reaction cell Reason:

Calibration Standards

T376265 NO Gas Cylinder #: Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: NO Cal Gas Conc: 49.19 48.04 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:

Teledyne API T700 Serial Number: 1220 Calibrator Model: 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:	0.981	0.904	NO bkgnd or offset:	4.0	3.7
NOX coeff or slope:	0.997	0.992	NOX bkgnd or offset:	4.1	3.7
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	190.9	190.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.007887	0.991609
NO _x Cal Offset:	2.589374	3.242799
NO Cal Slope:	0.995492	0.992474
NO Cal Offset:	1.631214	2.102999
NO ₂ Cal Slope:	1.005354	1.000326
NO ₂ Cal Offset:	0.716865	-2.097451



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow		Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found span										
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.4	0.0		
high point	4917	83.3	819.5	800.3	19.2	814.8	795.8	19.1	1.0057	1.0057
second point	4958	41.7	410.3	400.7	9.6	410.3	399.8	10.5	0.9999	1.0022
third point	4979	20.8	204.6	199.9	4.8	209.8	202.7	7.1	0.9754	0.9860
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.4	0.1		
as left span	4917	83.3	819.5	464.3	355.2	801.8	447.5	354.4	1.0220	1.0375
							Average Co	orrection Factor	0.9937	0.9979
Corrected As fo	ound NO _X =	NA ppb	NO = N	A ppb	* = > +/-5%	% change initiates	investigation	*Percent Chan	ge NO _X =	NA
Previous Respo	nse NO _X =	NA ppb	NO = N	A ppb				*Percent Chan	ge NO =	NA
Baseline Corr 2	nd pt $NO_X =$	• •	NO = N		As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO = NA	A ppb	As found	d NO r^2 :	:	NO SI:	NO Int:	
	•				As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				•	GPT Calibration I	Data				
O3 Setpo	int (ppb)	Indicated NO Refere concentration (pp		ed NO Drop cration (ppb)	Calculated NO concentration (ppl		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	erter Efficiency on Limit = 96-104%
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									
as found GPT poir	nt (200 ppb NO2)									
as found GPT poir	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	786.2	4	50.2	355.2		354.5	1.0019	9	99.8%
2nd GPT point	(200 ppb O3)	786.2	6	509.5	195.9		192.8	1.0159	9	98.4%
3rd GPT point	(100 ppb O3)	786.2	6	92.9	112.5		108.0	1.0413	3	96.0%
						Average Co	orrection Factor	1.0197	7	98.1%

Notes:

Calibration after cleaning the reaction cell. Span adjusted.

Calibration Performed By:

Melissa Lemay



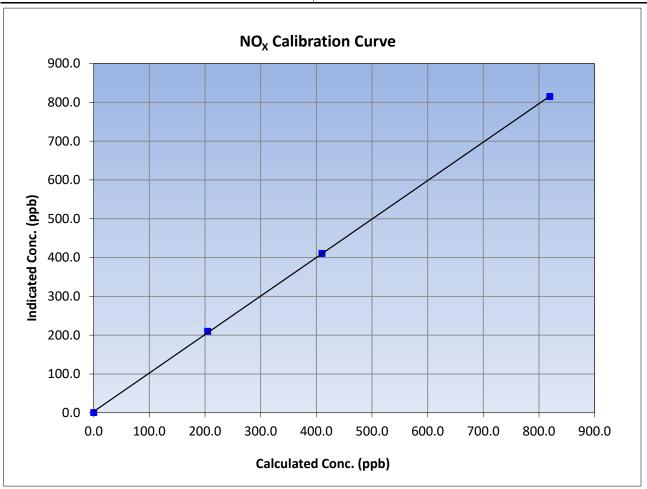
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 **Previous Calibration:** January 4, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:10 End Time (MST): 11:58 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999938	≥0.995
819.5	814.8	1.0057	Correlation Coefficient		20.333
410.3	410.3	0.9999	Slope	0.991609	0.90 - 1.10
204.6	209.8	0.9754	Slope	0.991009	0.90 - 1.10
			Intercept	3.242799	+/-20





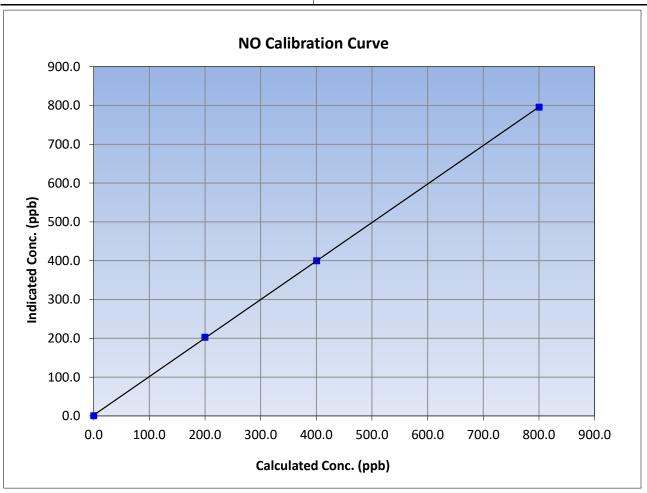
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 **Previous Calibration:** January 4, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:10 End Time (MST): 11:58 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	0.4		Correlation Coefficient	0.999976	≥0.995
800.3	795.8	1.0057	Correlation Coefficient		20.555
400.7	399.8	1.0022	Slope	0.992474	0.90 - 1.10
199.9	202.7	0.9860	Slope	0.992474	0.90 - 1.10
			Intercept	2.102999	+/-20





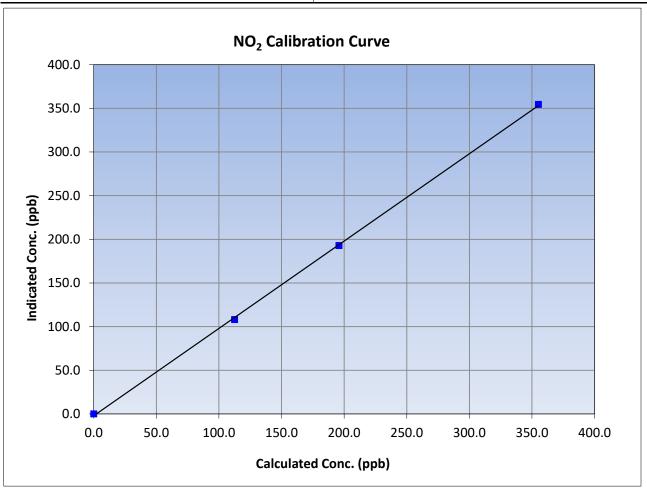
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 5, 2024 **Previous Calibration:** January 4, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 8:10 End Time (MST): 11:58 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999807	≥0.995
355.2	354.5	1.0019	Correlation Coefficient		20.333
195.9	192.8	1.0159	Slope	1.000326	0.90 - 1.10
112.5	108.0	1.0413	Зюре	1.000320	0.90 - 1.10
			Intercept	-2.097451	+/-20

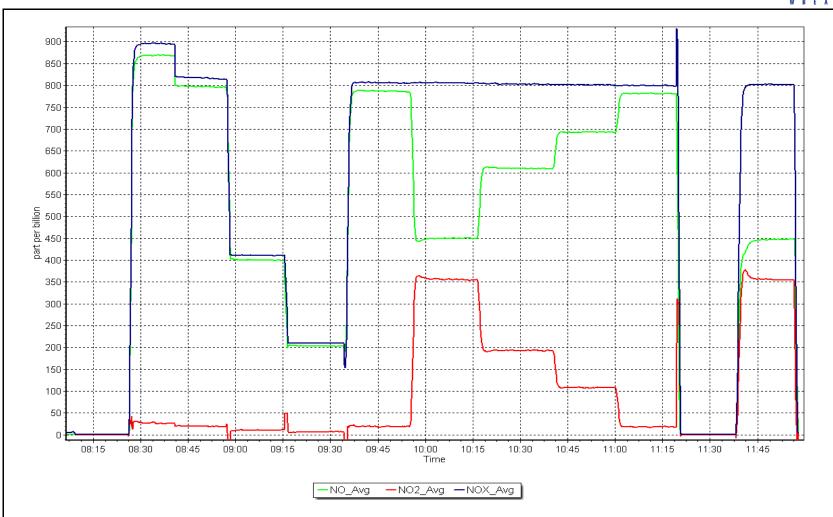


NO_x Calibration Plot Date:

January 5, 2024

Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: MacKay River Station number: AMS20

Calibration Date: January 24, 2024 Last Cal Date: January 5, 2024

Start time (MST): 8:05 End time (MST): 11:04
Reason: As Found Remove Internal Zero/Span Valve, replace O-ring

Calibration Standards

NO Gas Cylinder #: T376265 Cal Gas Expiry Date: April 13, 2025

NOX Cal Gas Conc: 49.19 ppm NO Cal Gas Conc: 48.04 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 49.19 ppm Removed Gas NO Conc: 48.04 ppm

NOX gas Diff: NO 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

Finish <u>Start</u> **Finish Start** NO coeff or slope: 0.904 0.904 NO bkgnd or offset: 3.7 3.7 NOX coeff or slope: 0.992 NOX bkgnd or offset: 0.992 3.7 3.7 NO2 coeff or slope: 0.995 0.995 Reaction cell Press: 188.2 188.2

Calibration Statistics

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



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

NO₂ Int: -0.728

Dilution	Cal	ibrat	ion I	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	0.0	0.1		
as found span	4917	83.3	819.5	800.3	19.2	806.5	786.5	20.0	1.0161	1.0175
as found 2nd	4958	41.7	410.3	400.7	9.6	405.0	394.1	10.9	1.0130	1.0167
as found 3rd	4979	20.8	204.6	199.9	4.8	206.1	199.4	6.6	0.9929	1.0023
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero										
as left span										
							Average Co	orrection Factor	•	
Corrected As fo	ound NO _X =	806.4 ppb	NO =	786.5 ppb	* = > +/-5	5% change initiates	investigation	*Percent Chan	ge NO _X =	-1.2%
Previous Respo	nse NO _X =	815.8 ppb	NO =	796.4 ppb				*Percent Chan	ge NO =	-1.3%
Baseline Corr 2	nd pt NO _X =	404.9 ppb	NO =	394.1 ppb	As foun	$NO_X r^2$:	0.999963	Nx SI: 0.9822	Nx Int:	2.183
Baseline Corr 3	rd pt NO _X =	206.0 ppb	NO =	199.4 ppb	As foun	nd NO r ² :	0.999983	NO SI: 0.9815	522 NO Int:	1.263

GPT Calibration Data

As found

NO₂ r²: 0.999972

NO2 SI: 1.012861

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/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero			0.0	0.1		
as found GPT point (400 ppb NO2)	769.9	429.6	359.5	363.9	0.9878	101.2%
as found GPT point (200 ppb NO2)	769.9	593.8	195.3	196.5	0.9937	100.6%
as found GPT point (100 ppb NO2)	769.9	680.0	109.1	108.9	1.0014	99.9%
1st GPT point (400 ppb O3)						
2nd GPT point (200 ppb O3)						
3rd GPT point (100 ppb O3)						
_	<u> </u>	·	A	verage Correction Factor		

Notes: As founds to do maintenance on the analyzer. Due to drifting during the GPT the 2nd NO ref point used for as found GPT. Internal Valve removed, Reaction cell O ring replaced. Adjusted the PMT.

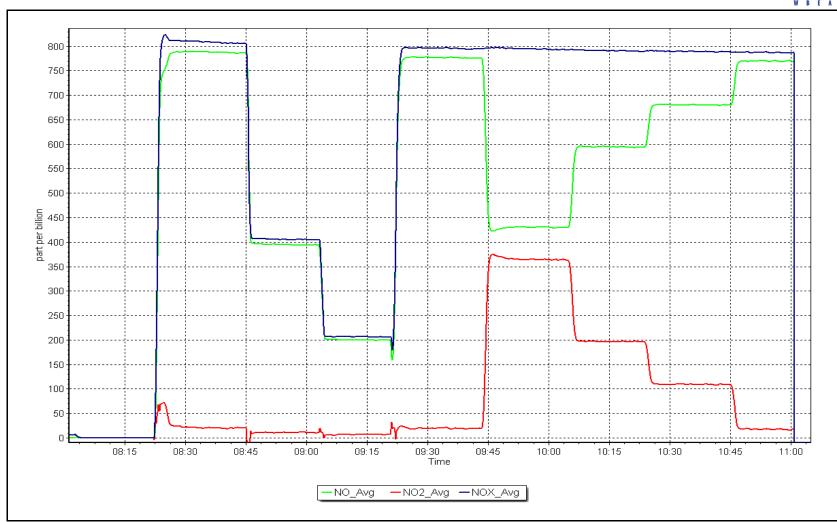
Calibration Performed By: Melissa Lemay

NO_x Calibration Plot

Date: January 24, 2024

Location: MacKay River







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: MacKay River Station number: AMS20

Calibration Date: January 25, 2024 Last Cal Date: January 24, 2024

Start time (MST): 7:46 End time (MST): 11:37

Remove Internal Zero/Span Valve, replace O-ring, Adjusted the PMT Reason: Routine

Calibration Standards

T376265 NO Gas Cylinder #: Cal Gas Expiry Date: April 13, 2025

NO Cal Gas Conc: NOX Cal Gas Conc: 49.19 48.04 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:

Teledyne API T700 Serial Number: 1220 Calibrator Model: ZAG make/model: Teledyne API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1505164379

NOX Range (ppb): 0 - 1000 ppb

Finish <u>Start</u> **Finish Start** NO coeff or slope: 0.904 0.990 NO bkgnd or offset: 3.7 2.8 NOX coeff or slope: 0.992 0.994 NOX bkgnd or offset: 3.0 3.7 NO2 coeff or slope: 0.995 1.000 Reaction cell Press: 164.5 164.5

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.991609	0.997760
NO _x Cal Offset:	3.242799	3.562350
NO Cal Slope:	0.992474	0.996944
NO Cal Offset:	2.102999	2.762658
NO ₂ Cal Slope:	1.000326	1.002101
NO ₂ Cal Offset:	-2.097451	-0.557879



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow		Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found span										
as found 2nd										
as found 3rd										
new cyl resp					·					
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4917	83.3	819.5	800.3	19.2	819.6	799.4	20.3	0.9998	1.0011
second point	4958	41.7	410.3	400.7	9.6	414.0	403.1	10.9	0.9910	0.9940
third point	4979	20.8	204.6	199.9	4.8	211.9	205.1	6.8	0.9657	0.9744
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1		
as left span	4917	83.3	819.5	444.6	374.9	818.3	441.7	376.7	1.0014	1.0066
							Average C	Correction Factor	r 0.9855	0.9898
Corrected As fo	ound NO _X =	NA ppb	NO = NA	A ppb	* = > +/-55	% change initiates	investigation	*Percent Chan	nge NO _x =	= NA
Previous Respo	onse NO _X =	NA ppb	NO = NA	A ppb				*Percent Chan	nge NO =	= NA
Baseline Corr 2	nd pt NO _X =	NA ppb	NO = NA	A ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	:
Baseline Corr 3	rd pt NO _X =	NA ppb	NO = NA	A ppb	As found	d $NO r^2$:		NO SI:	NO Int:	:
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	:
				•	GPT Calibration I	Data				
O3 Setpo	pint (ppb)	Indicated NO Refere concentration (pp		ed NO Drop ration (ppb)	Calculated NC concentration (ppl		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	= 0.95-1.05	erter Efficiency ion 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	4	41.1	374.9		375.3	0.9988	8	100.1%
2nd GPT point	t (200 ppb O3)	796.8	6′	11.9	204.1		203.9	1.0008	8	99.9%
3rd GPT point	(100 ppb O3)	796.8	7/	01.0	115.0		114.0	1.0084	4	99.2%
						Average Co	orrection Factor	r 1.0027	7	99.7%

Notes:

PMT adjusted, Zero/Span Valve removed, O ring replaced.

Calibration Performed By: Melissa Lemay



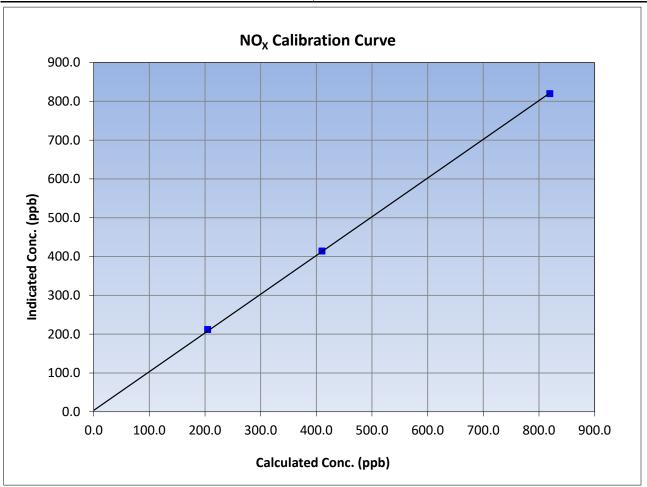
NO_x Calibration Summary

Version-04-2020

Station Information

January 25, 2024 Calibration Date: Previous Calibration: January 24, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:46 End Time (MST): 11:37 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999906	≥0.995
819.5	819.6	0.9998	Correlation Coefficient	0.555500	20.333
410.3	414.0	0.9910	Slope	0.997760	0.90 - 1.10
204.6	211.9	0.9657	Slope	0.557700	0.90 - 1.10
			Intercept	3.562350	+/-20





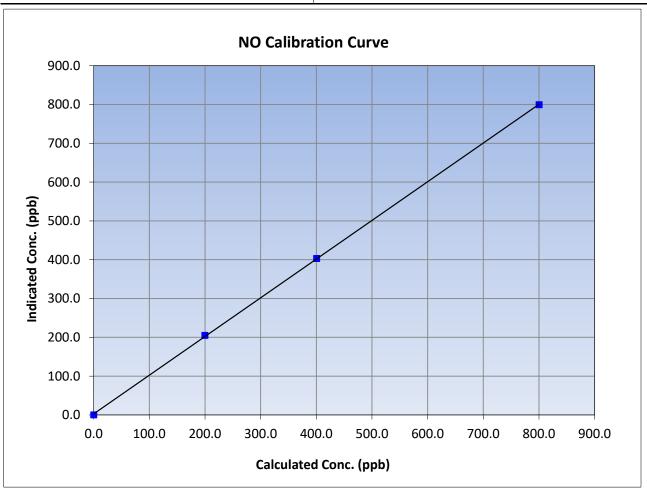
NO Calibration Summary

Version-04-2020

Station Information

January 25, 2024 Calibration Date: Previous Calibration: January 24, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:46 End Time (MST): 11:37 Analyzer make: Thermo 42i Analyzer serial #: 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999944	≥0.995
800.3	799.4	1.0011	Correlation Coefficient	0.333344	20.993
400.7	403.1	0.9940	Slope	0.996944	0.90 - 1.10
199.9	205.1	0.9744	Slope	0.990944	0.90 - 1.10
			Intercept	2.762658	+/-20





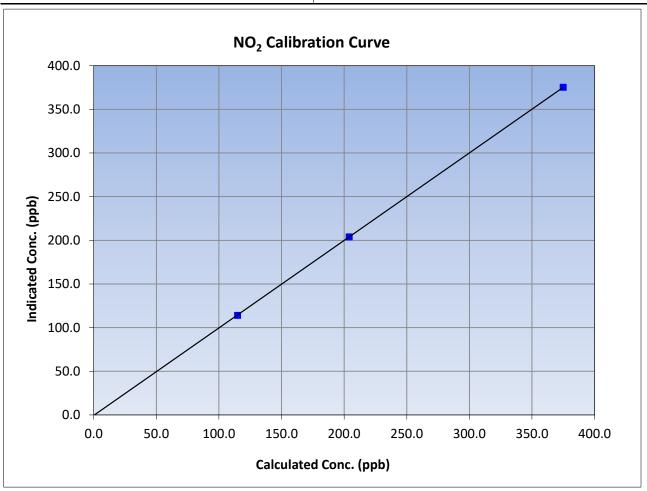
NO₂ Calibration Summary

Version-04-2020

Station Information

January 25, 2024 Calibration Date: Previous Calibration: January 24, 2024 Station Name: MacKay River Station Number: AMS20 Start Time (MST): 7:46 End Time (MST): 11:37 Analyzer serial #: Analyzer make: Thermo 42i 1505164379

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999991	≥0.995
374.9	375.3	0.9988	Correlation Coefficient	0.555551	20.333
204.1	203.9	1.0008	Slope	1.002101	0.90 - 1.10
115.0	114.0	1.0084	Slope	1.002101	0.90 - 1.10
			Intercept	-0.557879	+/-20

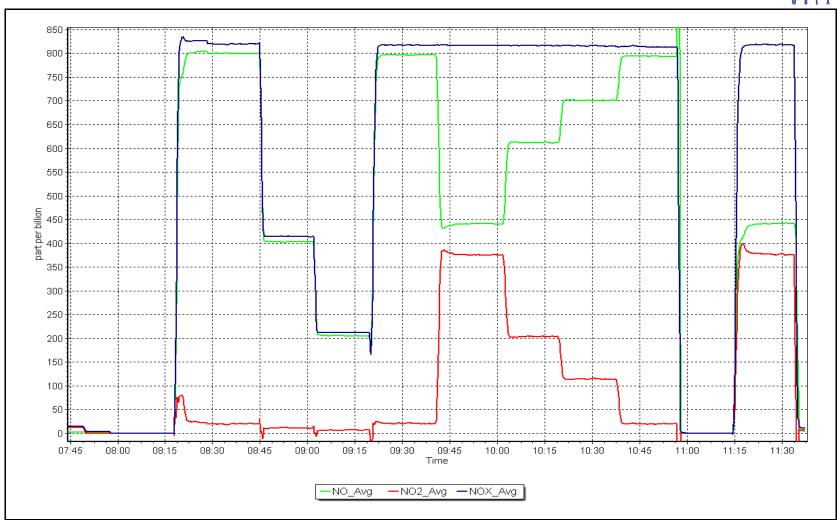


NO_x Calibration Plot

Date: January 25, 2024

Location: MacKay River







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS21

15:03

December 4, 2023

January 5, 2025

Version-01-2020

Station Information

Conklin Station Name:

Calibration Date:

Start time (MST): 11:59 Routine Reason:

January 15, 2024

Calibration Standards

Cal Gas Concentration: 49.93

Cal Gas Cylinder #: CC259455 Removed Cal Gas Conc: 49.93

Removed Gas Cyl #: <u>NA</u>

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

ppm Cal Gas Exp Date:

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3810 Serial Number: 691

Coeff or Slope:

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1428701363

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

Calibration slope: 0.997790 0.995935 Calibration intercept: 0.975766 1.075857

Start Backgd or Offset:

28.6 0.904 **Finish** 28.3 0.911

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
Set Polit	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	-0.1	
as found span	4920	80.2	8.008	791.1	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	0.0	
high point	4920	80.2	8.008	799.9	1.001
second point	4960	40.1	400.4	400.3	1.000
third point	4980	20.0	200.1	202.4	0.989
as left zero	5005	0.0	0.0	-0.1	
as left span	4920	80.2	8.008	800.8	1.000
			Averag	ge Correction Factor	0.997
Baseline Corr As found:	791 20	Previous resnonse	798 57	*% change	-0.9%

Baseline Corr As found: 791.20 Previous response 798.57 % change -0.9% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Jan Castro



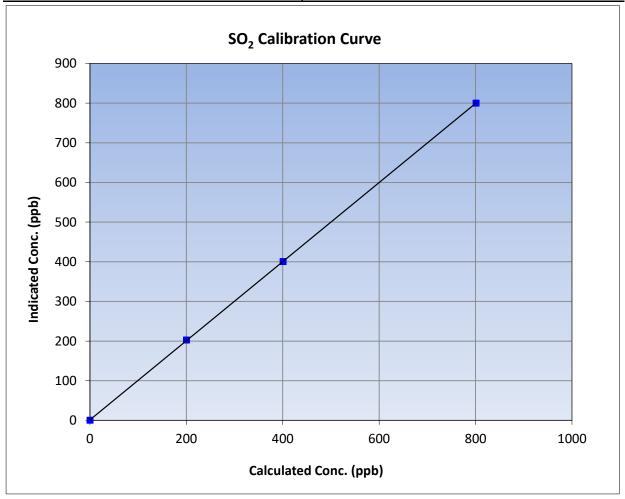
SO₂ Calibration Summary

Version-01-2020

Station Information

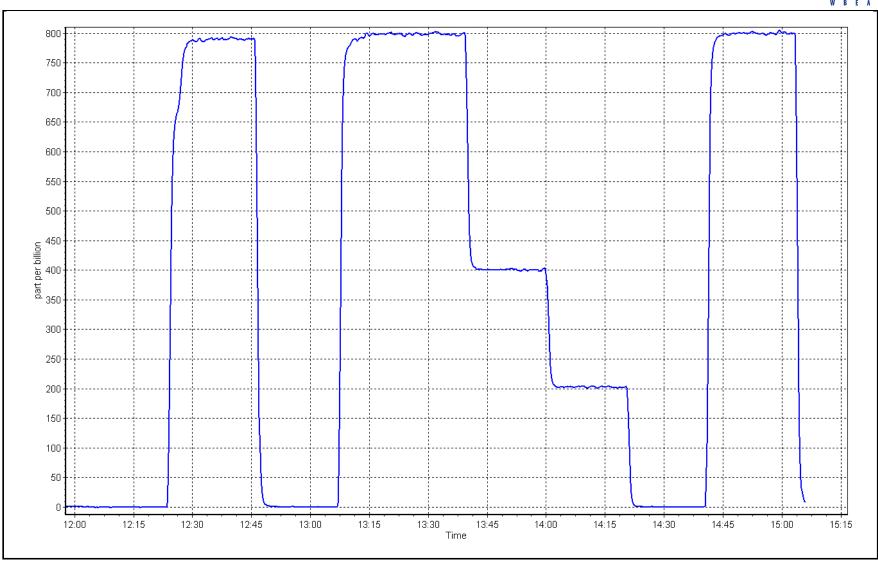
Calibration Date: January 15, 2024 **Previous Calibration:** December 4, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:59 End Time (MST): 15:03 Analyzer make: Thermo 43i Analyzer serial #: 1428701363

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999988	≥0.995				
800.8	799.9	1.0012	Correlation coefficient	0.999988	20.993				
400.4	400.3	1.0003	Slope	0.997790	0.90 - 1.10				
200.1	202.4	0.9887	Slope	0.997790	0.90 - 1.10				
			- Intercept	1.075857	+/-30				



SO2 Calibration Plot Date: January 15, 2024 Location: Conklin







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Conklin

Calibration Date: January 24, 2024

Start time (MST): 10:56

Reason: Routine Station number: AMS21

> Last Cal Date: December 7, 2023

End time (MST): 15:54

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 3, 2026 5.00 ppm

Cal Gas Cylinder #: CC501204

Removed Cal Gas Conc: 5.00 Rem Gas Exp Date: NA ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 3810 ZAG Make/Model: Teledyne API 701H Serial Number: 691

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

CD-Nova 101 Converter serial #: NA Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish Start** <u>Finish</u> 2.44 0.995286 1.011429 Backgd or Offset: Calibration slope: 2.4 0.992

0.300000 Calibration intercept: 0.240000 Coeff or Slope: 0.963

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4920	80.0	80.0	79.9	1.001
as found 2nd point	4960	40.0	40.0	40.0	1.000
as found 3rd point	4980	20.0	20.0	20.3	0.985
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4920	80.0	80.0	81.1	0.986
second point	4960	40.0	40.0	41.0	0.976
third point	4980	20.0	20.0	20.5	0.976
as left zero	5000	0.0	0.0	0.4	
as left span	4920	80.0	80.0	80.9	0.989
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber chan	ge:	_	_	Ave Corr Factor	0.979
D . C1					cc

Date of last scrubber change:	Ave Corr Factor	0.979
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 79.9 79.86 0.0% Prev response: *% change: Baseline Corr 2nd AF pt: 40.0 AF Slope: 0.997429 AF Intercept: 0.140000 Baseline Corr 3rd AF pt: 20.3 AF Correlation: 0.999981

* = > +/-5% change initiates investigation

Notes:

Changed sample inlet filter after as founds. Scrubber check done after calibrator zero and it passed. Adjusted span only.

Calibration Performed By: Jan Castro



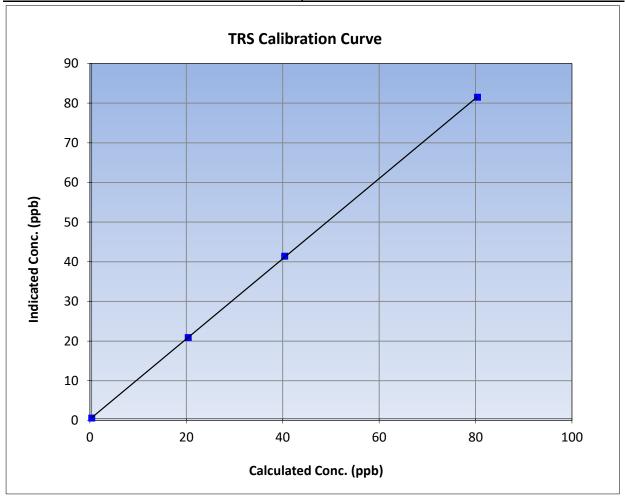
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: Calibration Date: January 24, 2024 December 7, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 10:56 End Time (MST): 15:54 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1236656116

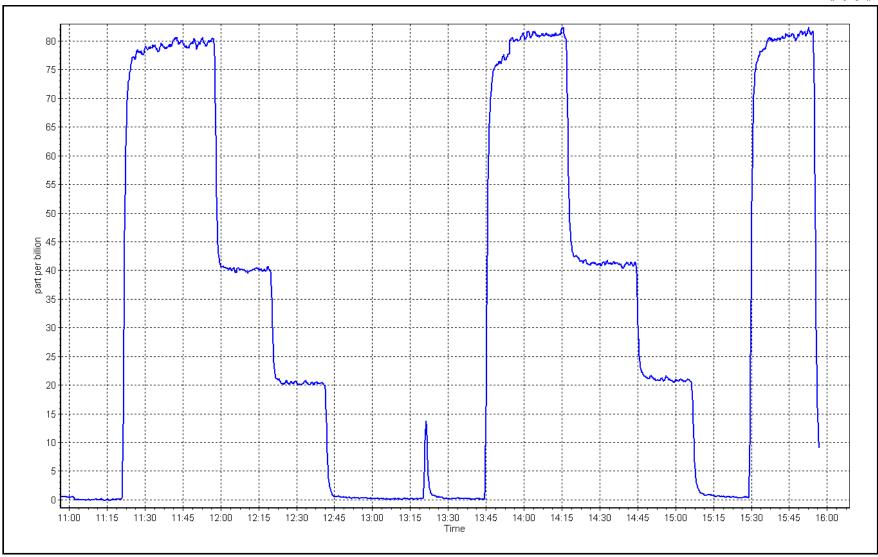
Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999977	≥0.995		
80.0	81.1	0.9864	Correlation Coefficient	0.333311	20.993		
40.0	41.0	0.9756	Slope	1.011429	0.90 - 1.10		
20.0	20.5	0.9756	Slope	1.011429	0.90 - 1.10		
			- Intercept	0.300000	+/-3		





Date: January 24, 2024 Location: Conklin







THC / CH₄ / NMHC Calibration Report

Station number: AMS21

End time (MST): 15:03

Removed Gas Expiry: NA

Last Cal Date: December 14, 2023

Version-06-2022

Station Information

Conklin Station Name:

Calibration Date: January 15, 2024

Start time (MST): 11:59

Routine Reason:

Calibration Standards

Gas Cert Reference: CC259455 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 497.9 CH4 Equiv Conc. 1067.7 ppm ppm

C3H8 Cal Gas Conc. 207.2 ppm

Removed Gas Cert: NΑ

497.9 Removed CH4 Conc. CH4 Equiv Conc. 1067.7 ppm ppm

Removed C3H8 Conc. 207.2 Diff between cyl (THC): 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 #: 1193585649

THC Range (ppm): 0 - 20 ppm

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

Start **Finish Finish Start** CH4 SP Ratio: 3.69E-04 3.86E-04 NMHC SP Ratio: 7.47E-05 7.53E-05 17.2 17.4 NMHC Peak Area: CH4 Retention time: 122336 122333 ON ON Flat Baseline: OFF OFF Zero Chromatogram:

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	16.88	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.02	1.006
second point	4960	40.1	8.56	8.56	1.000
third point	4980	20.0	4.28	4.34	0.987
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.00	1.007
			,	Average Correction Factor	0.998
Baseline Corr AF:	16.88	Prev response	17.11	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

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



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					V C 1 5 1 0 1 0 0 2 0
		NINALIC Callibra	ation Date		
	511 . 0	NMHC Calibr			05.11 11 0.05.40
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	4920	80.2	9.14	9.11	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.11	1.003
second point	4960	40.1	4.57	4.58	0.998
third point	4980	20.0	2.28	2.32	0.984
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	9.10	1.004
			Ave	rage Correction Factor	0.995
Baseline Corr AF:	9.11	Prev response	9.15	*% 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	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	7.77	1.028
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	7.90	1.011
second point	4960	40.1	3.99	3.98	1.003
third point	4980	20.0	2.00	2.02	0.990
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.89	1.012
33 Tere 3 part	1320	00.2		rage Correction Factor	1.001
Baseline Corr AF:	7.77	Prev response	7.96	*% change	-2.5%
Baseline Corr 2nd AF:	NA	AF Slope:	7.50	AF Intercept:	2.370
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Jasenne com Sra Ar.	IVA	Calibration	Statistics	,	
			Statistics	Finish	
THE C-LEL-		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.997358		0.992346	
THC Cal Offset:		0.029967		0.043763	
CH4 Cal Slope:		0.995501		0.988303	
CH4 Cal Offset:		0.011557		0.021954	
NMHC Cal Slope:		0.998993		0.995866	

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

0.018610

Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.021609



THC Calibration Summary

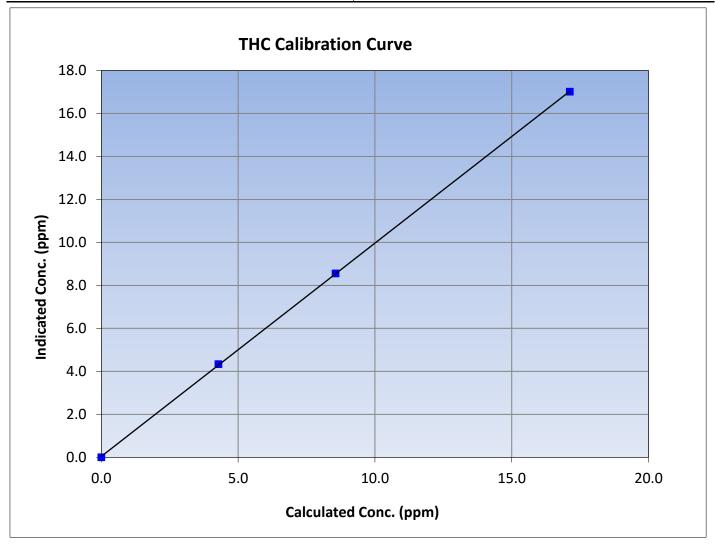
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 14, 2023

Station Name:ConklinStation Number:AMS21Start Time (MST):11:59End Time (MST):15:03Analyzer make:Thermo 55iAnalyzer serial #:1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999970	≥0.995
17.13	17.02	1.0064	Correlation Coemicient	0.333370	20.333
8.56	8.56	1.0003	Slope	0.992346	0.90 - 1.10
4.28	4.34	0.9869	Slope	0.332340	0.90 - 1.10
			Intercept	0.043763	+/-0.5





CH₄ Calibration Summary

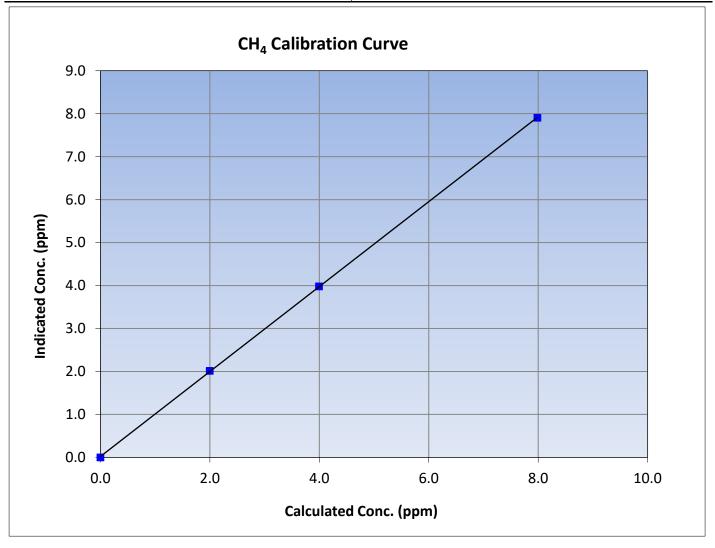
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 14, 2023

Station Name:ConklinStation Number:AMS21Start Time (MST):11:59End Time (MST):15:03Analyzer make:Thermo 55iAnalyzer serial #:1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999965	≥0.995
7.99	7.90	1.0105	Correlation Coefficient	0.555505	20.333
3.99	3.98	1.0030	Slope	0.988303	0.90 - 1.10
2.00	2.02	0.9904	Slope	0.966505	0.90 - 1.10
			Intercept	0.021954	+/-0.5





NMHC Calibration Summary

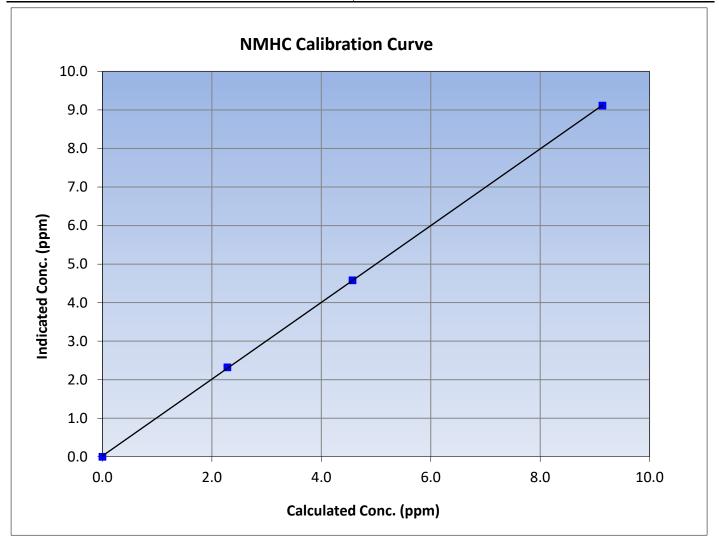
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 14, 2023

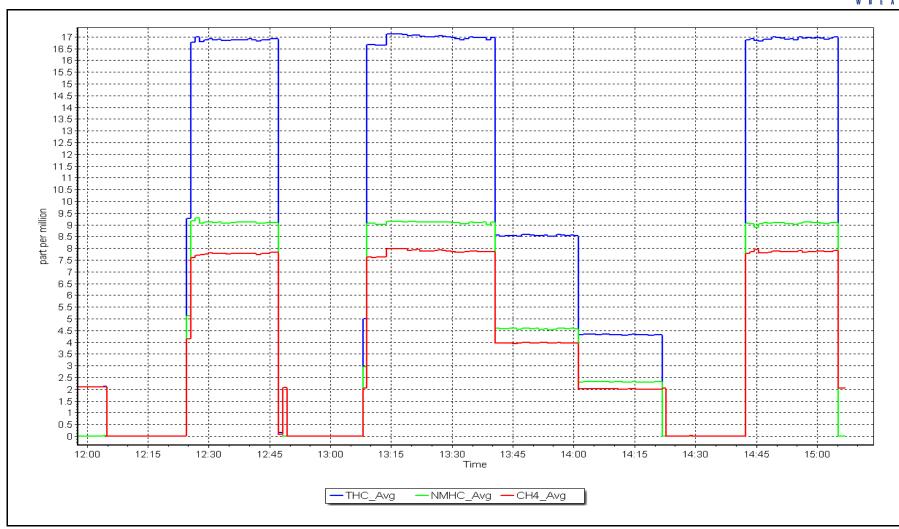
Station Name:ConklinStation Number:AMS21Start Time (MST):11:59End Time (MST):15:03Analyzer make:Thermo 55iAnalyzer serial #:1193585649

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999973	≥0.995
9.14	9.11	1.0028	Correlation Coefficient	0.555575	20.333
4.57	4.58	0.9982	Slope	0.995866	0.90 - 1.10
2.28	2.32	0.9839	Slope	0.993600	0.90 - 1.10
			Intercept	0.021609	+/-0.5



NMHC Calibration Plot Date: January 15, 2024 Location: Conklin







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Conklin Station Name:

Calibration Date: January 25, 2024

Start time (MST): 10:31

Cylinder Change Reason:

Station number: AMS21

Removed Gas Expiry: NA

Last Cal Date: January 15, 2024

End time (MST): 12:58

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

207.2 C3H8 Cal Gas Conc. 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 #: 1193585649

THC Range (ppm): 0 - 20 ppm

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

Start Finish Finish Start 3.69E-04 NMHC SP Ratio: CH4 SP Ratio: 3.86E-04 7.47E-05 7.53E-05 17.2 17.4 NMHC Peak Area: CH4 Retention time: 122336 122333 ON ON Flat Baseline: OFF OFF Zero Chromatogram:

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.33	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.29	0.990
second point					
third point					
as left zero					
as left span					

			Av	erage Correction Factor	0.990
Baseline Corr AF:	17.33	Prev response	17.11	*% change	1.3%
Baseline Corr 2nd AF:	NA	AF Slope:	AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		



THC / CH₄ / NMHC Calibration Report

Version-06-2022

W 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	80.2	9.14	9.13	1.001
as found 2nd point	.525		<u> </u>	5.25	
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.05	1.010
second point					
third point					
as left zero					
as left span					
It -			Aver	age Correction Factor	1.010
Baseline Corr AF:	9.13	Prev response	9.15	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:	0.20	AF Intercept:	0.2,1
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	8.20	0.974
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	8.24	0.969
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	0.969
Baseline Corr AF:	8.20	Prev response	7.96	*% change	2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics	-	•
		Start Start		<u>Finish</u>	
THC Cal Slope:		0.997358		1.009622	
THC Cal Offset:		0.997358		0.000000	
				1.031806	
CH4 Cal Offset:		0.995501			
CH4 Cal Offset:		0.011557		0.000000	
NMHC Cal Slope:		0.998993		0.990237	

Notes: Changed H2 cylinder after as founds. No adjustment made.

0.018610

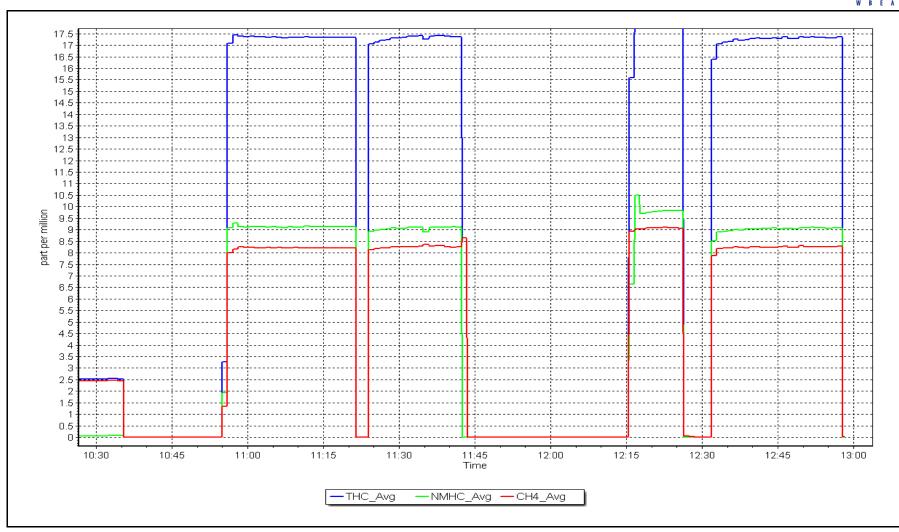
Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.000000

NMHC Calibration Plot Date: January 25, 2024 Location: Conklin







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Conklin

Calibration Date: January 19, 2024

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

Station number: AMS21

Last Cal Date: December 6, 2023

End time (MST): 17:29

Calibration Standards

NO Gas Cylinder #: SA18828 Cal Gas Expiry Date: November 3, 2031 NOX Cal Gas Conc: NO Cal Gas Conc: 48.80 48.80 ppm ppm Removed Cylinder #: T2Y1P1H Removed Gas Exp Date: December 11, 2023 Removed Gas NO Conc: Removed Gas NOX Conc: 51.09 ppm 50.39 ppm

NOX gas Diff:-0.1%NO gas Diff:0.0%Calibrator Model:Teledyne API T700Serial Number:3810ZAG make/model:Teledyne API T701HSerial Number:364

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1501663731

NOX Range (ppb): 0 - 1000 ppb

<u>Start</u> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.077 1.062 NO bkgnd or offset: 10.8 10.6 NOX coeff or slope: 0.999 0.983 NOX bkgnd or offset: 10.9 10.6 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 151.8 152.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.992390	0.997935
NO _x Cal Offset:	2.363089	2.088043
NO Cal Slope:	0.994482	0.999591
NO Cal Offset:	1.080383	1.508039
NO ₂ Cal Slope:	0.991295	0.998906
NO ₂ Cal Offset:	1.480919	0.745906



Set Point

as found zero

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Dilution Calibration Data

Version-04-2020

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
0.0	0.0	-0.2	-0.3	0.0		
800.1	11.1	833.1	816.8	16.4	0.9738	0.9796

4921 79.4 811.2 80 as found span as found 2nd as found 3rd 4918 82.0 800.3 800.3 0.0 821.0 817.0 4.3 0.9748 0.9796 new cyl resp calibrator zero 5000 0.0 0.0 0.0 0.0 -0.1 0.0 -0.1 --------4918 82.0 800.3 800.3 0.0 800.0 801.0 -1.0 1.0004 0.9992 high point 4959 41.0 400.2 400.2 0.0 401.5 401.5 0.0 0.9967 0.9967 second point 4980 20.5 200.1 200.1 0.0 204.6 203.5 1.1 0.9778 0.9831 third point

as left zero

as left span

			Average	Correction Factor	0.9916	0.9930
Corrected As found	$NO_X = 833.3 \text{ ppb}$	NO = 817.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO _X =	3.1%
Previous Response	$NO_X = 807.4 \text{ ppb}$	NO = 796.8 ppb		*Percent Change	NO =	2.5%
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 $NO_2 r^2$:	NO2 SI: ;	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	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)	799.5	386.7	412.8	413.0	0.9995	100.0%
2nd GPT point (200 ppb O3)	799.5	595.7	203.8	203.8	1.0000	100.0%
3rd GPT point (100 ppb O3)	799.5	700.1	99.4	101.5	0.9793	102.1%
				Average Correction Factor	0.9929	100.7%

Notes: Changed the inlet filter and NOx cylinder after as founds. Adjusted Span only. Used the 2nd reference point because of drift. Did not do as left because it will be late to finish.

Calibration Performed By:

Jan Castro

Calculated NOx

concentration

(ppb) (Cc)

0.0

Dilution flow rate Source gas flow

rate (sccm)

0.0

(sccm)

5000



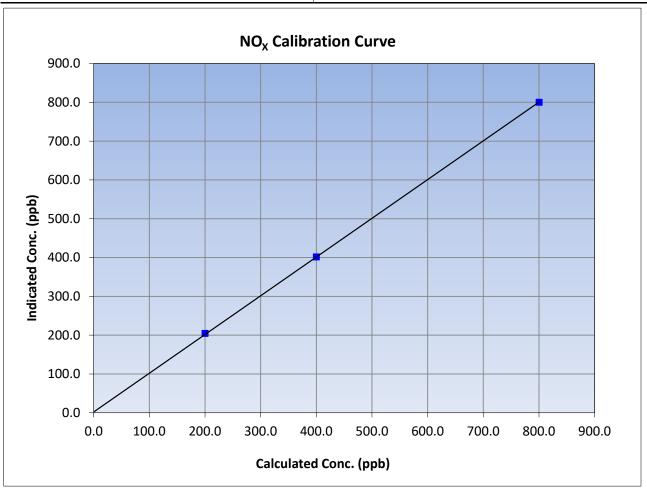
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 19, 2024 Previous Calibration: December 6, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:41 End Time (MST): 17:29 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999961	≥0.995
800.3	800.0	1.0004	correlation coemicient	0.555501	20.993
400.2	401.5	0.9967	Slope	0.997935	0.90 - 1.10
200.1	204.6	0.9778	Slope	0.997955	0.90 - 1.10
			Intercept	2.088043	+/-20





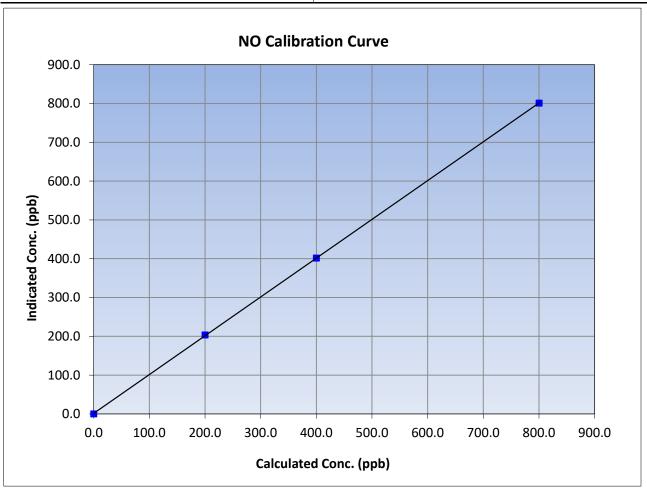
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 19, 2024 Previous Calibration: December 6, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:41 End Time (MST): 17:29 Analyzer make: Thermo 42i Analyzer serial #: 1501663731

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999981	≥0.995
800.3	801.0	0.9992	Correlation Coefficient	0.555501	20.333
400.2	401.5	0.9967	Slope	0.999591	0.90 - 1.10
200.1	203.5	0.9831	Slope	0.999391	0.90 - 1.10
			Intercept	1.508039	+/-20





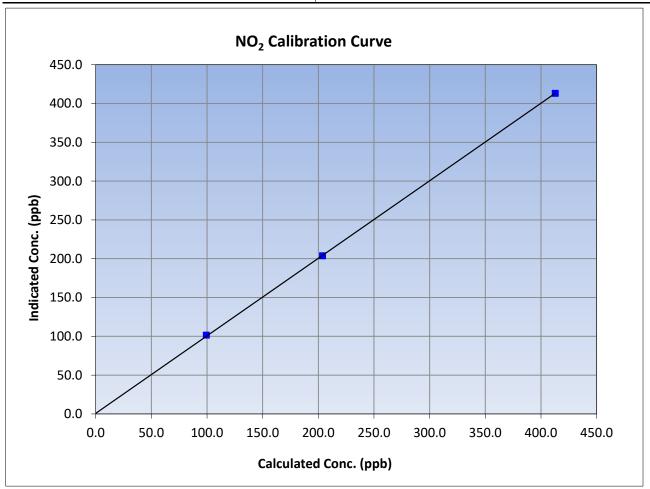
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 19, 2024 Previous Calibration: December 6, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 9:41 End Time (MST): 17:29 Analyzer serial #: Analyzer make: Thermo 42i 1501663731

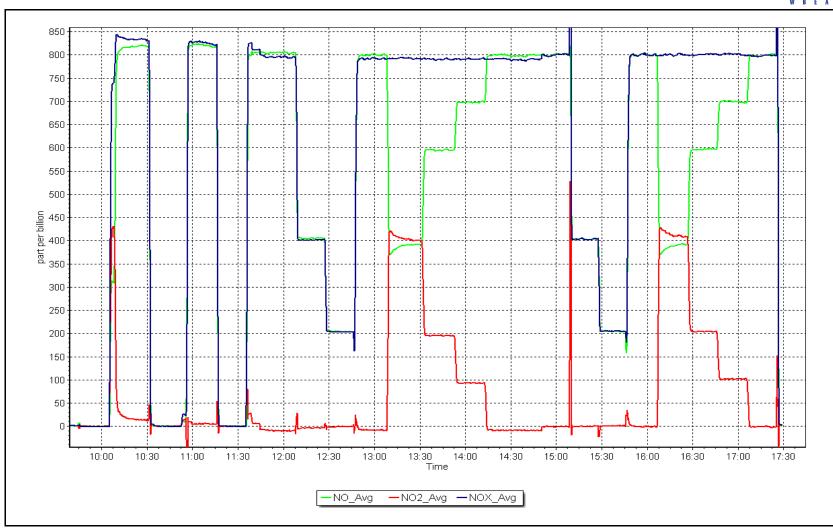
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999966	≥0.995
412.8	413.0	0.9995	Correlation Coefficient	0.555500	20.993
203.8	203.8	1.0000	Slope	0.998906 0.9	0.90 - 1.10
99.4	101.5	0.9793	Slope	0.996900	0.90 - 1.10
			Intercept	0.745906	+/-20



NO_x Calibration Plot

Date: January 19, 2024 Location: Conklin







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Conklin

Calibration Date: January 12, 2024

Start time (MST): 11:25
Reason: Routine

Station number: AMS21

Last Cal Date: December 5, 2023

End time (MST): 14:35

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 1.000771 Backgd or Offset: Calibration slope: 1.001229 -1.2 -1.1 0.740000 Coeff or Slope: 1.005 Calibration intercept: 0.260000 0.999

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/lc) 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	0.2	
high point	5000	950.9	400.0	400.8	0.998
second point	5000	804.0	200.0	201.1	0.995
third point	5000	703.6	100.0	101.4	0.986
as left zero	5000	0.0	0.0	0.8	
as left span	5000	936.0	400.0	402.7	0.993
			Averag	ge Correction Factor	0.993
Baseline Corr As found:	NA	Previous respons	e NA	*% change	NA
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

Notes: Pump DOA, replaced. Adjusted span.

Calibration Performed By: Braiden Boutilier

* = > +/-5% change initiates investigation



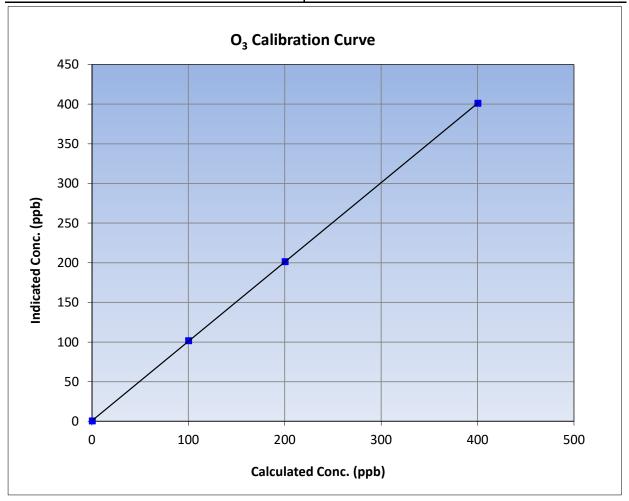
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 12, 2024 **Previous Calibration:** December 5, 2023 Station Name: Conklin Station Number: AMS21 Start Time (MST): 11:25 End Time (MST): 14:35 Analyzer make: Thermo 49i Analyzer serial #: 1501663734

Calibration Data							
		Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999992	≥0.995		
400.0	400.8	0.9980	Correlation coefficient	0.333332	20.333		
200.0	201.1	0.9945	Slope	1.000771	0.90 - 1.10		
100.0	101.4	0.9862	Slope	1.000771	0.90 - 1.10		
			Intercept	0.740000	+/- 5		

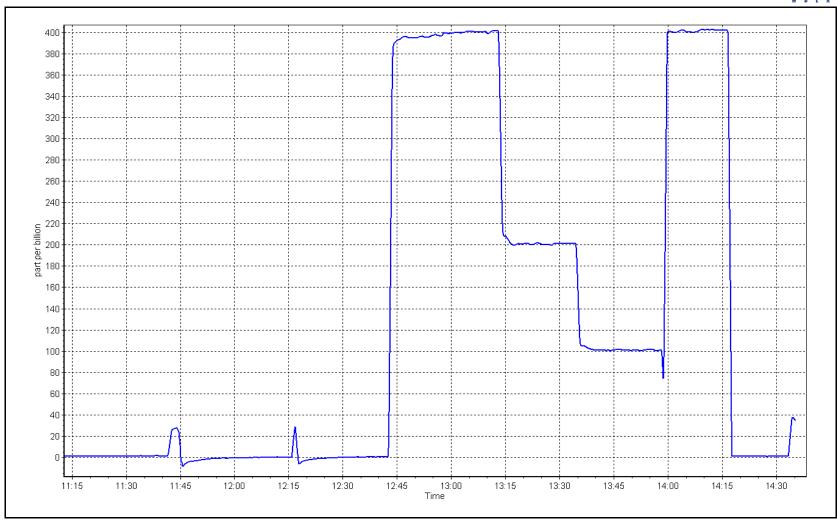


O₃ Calibration Plot

Date: January 12, 2024

Location: Conklin







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information			
Station Name: Conklin Calibration Date: January 25, 2024			Station number: Last Cal Date:	AMS 21 December 7, 2023	
Start time (MST):	11:36		End time (MST):	11:54	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	326	
Flow Meter Make/Model:	ALICAT		S/N:	388754	
Temp/RH standard:	ALICAT		S/N:	388754	
		Monthly Calibration Te	st		
<u>Parameter</u>	As found	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	-8.20	-8.23	-8.20		+/- 2 °C
P (mmHg)	705.00	706.53	705.00		+/- 10 mmHg
flow (LPM)	5.02	5.08	5.02		+/- 0.25 LPM
Leak Test:	Date of check:	January 25, 2024	Last Cal Date:	December 7, 2023	
	PM w/o HEPA:	37.30	PM w/ HEPA:	0.00	<0.2 ug/m3
Note: this leak check will be Inlet cleaning:	completed before the q		ve as the pre mainte	enance leak check	
		Quarterly Calibration Te	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:	December 7, 2023		,	<0.2 ug/m3
Disposable Filte	r Changed:	December 7,	2023		
		Annual Maintenance			
Date Sample Tub	oe Cleaned:	December 7, 2023			
Date RH/T Sensor Cleaned:		December 7,	2023		
Notes:	Verfied flow,	temperature, and pressur	e. Leak check passe	d. No adjustment requi	red.
Calibration by:	Jan Castro				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

January 10, 2024 Calibration Date:

Start time (MST): Routine Reason:

9:50

Station number: **AMS 22**

December 5, 2023 Last Cal Date:

End time (MST): 13:14

Calibration Standards

Cal Gas Concentration: 50.11

Cal Gas Cylinder #: CC281519

Removed Cal Gas Conc: 50.11 Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: January 18, 2029

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3806 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Analyzer Range 0 - 1000 ppb

Finish Start

ppm

ppm

Calibration slope: 0.998449 Backgd or Offset:

Start 23.5

Finish 23.7

1.002679 1.035 Calibration intercept: 0.164515 0.383769 Coeff or Slope: 1.015

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (` ' '
	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4920	79.8	799.8	788.4	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	79.8	799.8	802.1	0.997
second point	4960	39.9	399.9	401.7	0.995
third point	4980	20.0	200.4	201.5	0.995
as left zero	5000	0.0	0.0	0.2	
as left span	4920	79.8	799.8	804.0	0.995
			Averag	ge Correction Factor	0.996

Baseline Corr As found: 788.30 Previous response 798.71 -1.3% *% change Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Jan Castro



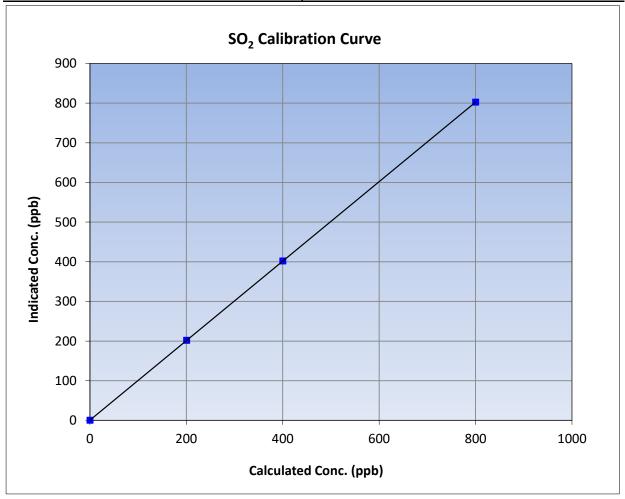
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 5, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 9:50 End Time (MST): 13:14 Analyzer make: Thermo 43i Analyzer serial #: 1152430006

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999999	≥0.995		
799.8	802.1	0.9971	Correlation Coefficient	0.55555	20.993		
399.9	401.7	0.9955	Slope	1.002679	0.90 - 1.10		
200.4	201.5	0.9947	Зюре		0.90 - 1.10		
			- Intercept	0.383769	+/-30		

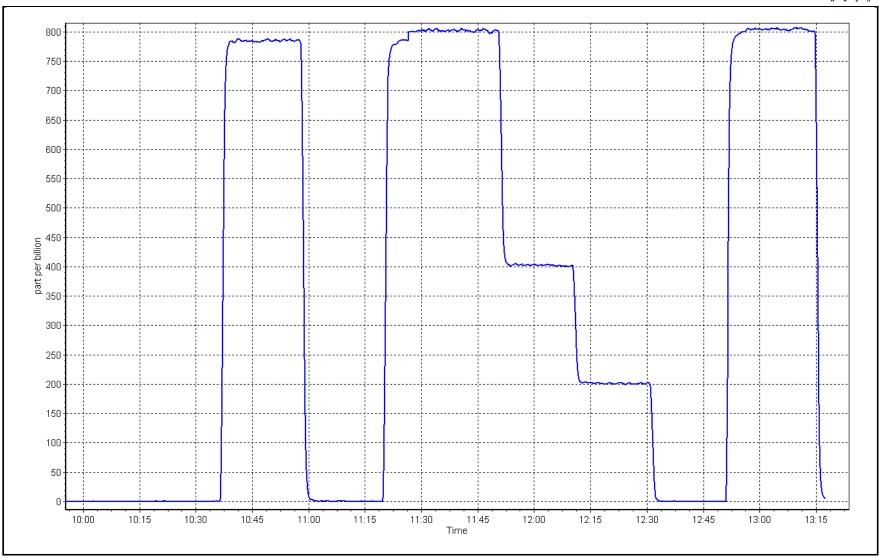


SO2 Calibration Plot

Date: January 10, 2024

Location: Janvier







TRS Calibration Report

Version-11-2021

<u>Finish</u>

Station Information

Station Name: Janvier

Calibration Date: January 24, 2024

Start time (MST): 11:05

Reason: Cylinder Change

Station number: AMS22

Last Cal Date: December 19, 2023

End time (MST): 15:22

Calibration Standards

Cal Gas Concentration: 5.02 ppm Cal Gas Exp Date: April 16, 2022

Cal Gas Cylinder #: CC424047

Removed Cal Gas Conc: 5.03 ppm Rem Gas Exp Date: April 16, 2022

Removed Gas Cyl #: DT0018680 Diff between cyl: -1.3% Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

Converter make: CDN-101 Converter serial #: 587

Analyzer Range 0 - 100 ppb

Start Finish Start

 Calibration slope:
 0.997936
 0.999522
 Backgd or Offset:
 3.59
 3.71

 Calibration intercept:
 0.260962
 0.500639
 Coeff or Slope:
 1.179
 1.205

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.3	
as found span	4920	79.5	80.0	79.3	1.012
as found 2nd point					
as found 3rd point					
new cylinder response	4920	79.7	80.0	78.3	1.022

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	79.7	80.0	80.4	0.995
second point	4960	39.8	40.0	40.6	0.984
third point	4980	19.9	20.0	20.5	0.975
as left zero	5000	0.0	0.0	0.2	
as left span	4920	79.7	80.0	79.6	1.005
SO2 Scrubber Check	4920	79.8	798.0	0.0	
Date of last scrubber chang	ge:	_	<u> </u>	Ave Corr Factor	0.985

Date of last scrubber change:	Ave Corr Factor	0.985
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 79.0 80.08 Prev response: *% change: -1.4% Baseline Corr 2nd AF pt: NA AF Slope: NA AF Intercept: NA AF Correlation: Baseline Corr 3rd AF pt: NA NA * = > +/-5% change initiates investigation

Swapped out the calibration gas after as founds. Changed the inlet filter after cylinder change. Ran

a SO2 scrubber check after calibrator zero. Adjusted the span only.

Calibration Performed By: Max Farrell

Notes:



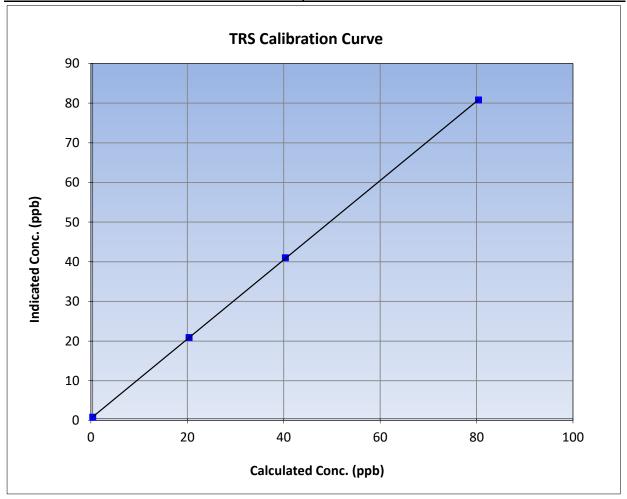
TRS Calibration Summary

Version-11-2021

Station Information

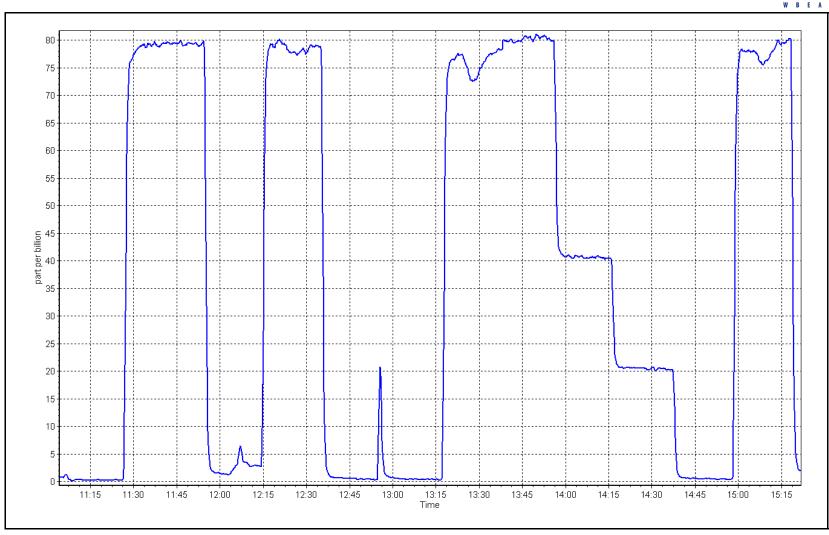
Calibration Date: January 24, 2024 **Previous Calibration:** December 19, 2023 Station Name: Janvier Station Number: AMS22 Start Time (MST): 11:05 End Time (MST): 15:22 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1151680031

	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	0.999988	≥0.995			
80.0	80.4	0.9953	Correlation Coefficient	0.333366	20.993			
40.0	40.6	0.9843	Slope	0.999522	0.90 - 1.10			
20.0	20.5	0.9746	Slope		0.30 - 1.10			
			- Intercept	0.500639	+/-3			



Date: January 24, 2024 Location: Janvier







THC / CH₄ / NMHC Calibration Report

Station number: AMS 22

Version-06-2022

Station Information

Station Name: Janvier

Calibration Date: January 10, 2024 Last Cal Date: December 5, 2023

Start time (MST): 9:50 End time (MST): 13:14

Here to address dipping baseline Reason: Routine

Calibration Standards

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 CH4 Equiv Conc. 1075.9 ppm ppm

208.4 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: Removed Gas Expiry:

Removed CH4 Conc. 502.8 CH4 Equiv Conc. 1075.9 ppm ppm

Removed C3H8 Conc. 208.4 Diff between cyl (THC): ppm

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

Calibrator Model: Teledyne API 700 Serial Number: 3806 ZAG make/model: Teledyne API 701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259520

THC Range (ppm): 0 - 20 ppm

Baseline Corr 3rd AF:

NA

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

Finish Finish Start Start CH4 SP Ratio: 2.560E-04 3.030E-04 NMHC SP Ratio: 5.65E-05 5.17E-05 CH4 Retention time: 15.2 15.6 NMHC Peak Area: 176965 164596 OFF

Zero Chromatogram: **OFF** OFF Flat Baseline: OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.01	
as found span	4920	79.8	17.17	15.32	1.121
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	17.17	17.16	1.000
second point	4960	39.9	8.59	8.62	0.996
third point	4980	20.0	4.30	4.36	0.988
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	17.17	17.11	1.004
			,	Average Correction Factor	0.995
Baseline Corr AF:	15.31	Prev response	17.17	*% change	-12.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	

AF Correlation:

* = > +/-5% change initiates investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

11 D L A					VEISIOII-00-20
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	9.15	8.54	1.071
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	9.15	9.15	1.000
second point	4960	39.9	4.57	4.60	0.995
third point	4980	20.0	2.29	2.32	0.987
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.15	9.08	1.007
•			Avera	age Correction Factor	0.994
Baseline Corr AF:	8.54	Prev response	9.15	*% change	-7.1%
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	0.01	
as found span	4920	79.8	8.03	6.78	1.184
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	8.03	8.01	1.002
second point	4960	39.9	4.01	4.02	0.997
third point	4980	20.0	2.01	2.04	0.988
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	8.03	8.03	0.999
			Avera	age Correction Factor	0.996
Baseline Corr AF:	6.77	Prev response	8.02	*% change	-18.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		0.998979		0.998667	
THC Cal Offset:		0.014795		0.030390	
CH4 Cal Slope:		0.998920		0.997468	
CH4 Cal Offset:		0.005636		0.014235	
NMHC Cal Slope:		0.999269		0.999032	
Titline car stope.		0.555205		0.555052	

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

0.008959

Calibration Performed By: Jan Castro

NMHC Cal Offset:

0.017157



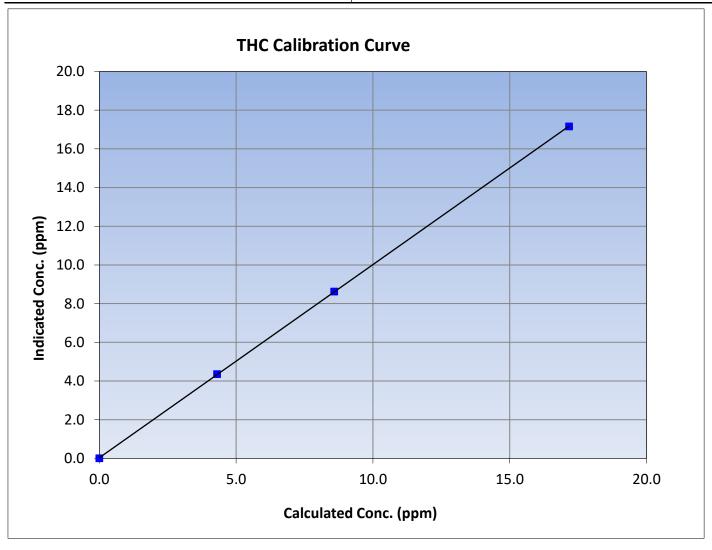
THC Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 5, 2023 Station Name: Janvier Station Number: AMS 22 9:50 Start Time (MST): End Time (MST): 13:14 Analyzer make: Analyzer serial #: 1331259520 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
17.17	17.16	1.0005	Correlation Coefficient	0.333360	20.333
8.59	8.62	0.9959	Slope	0.998667	0.90 - 1.10
4.30	4.36	0.9875			0.90 - 1.10
			Intercept	0.030390	+/-0.5





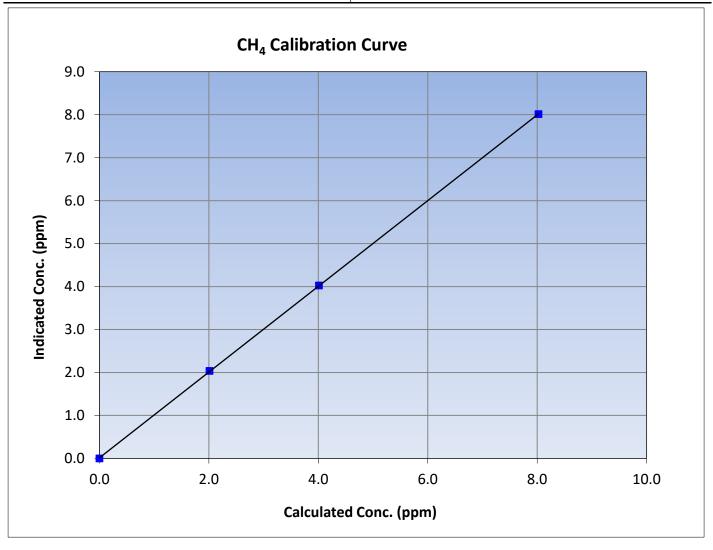
CH₄ Calibration Summary

Version-06-2022

Station Information

Calibration Date: January 10, 2024 **Previous Calibration:** December 5, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 9:50 End Time (MST): 13:14 Analyzer make: Analyzer serial #: Thermo 55i 1331259520

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999986	≥0.995
8.03	8.01	1.0016	Correlation Coefficient	0.333380	20.333
4.01	4.02	0.9974	Slope	0.997468	0.90 - 1.10
2.01	2.04	0.9883	Siope		0.90 - 1.10
			Intercept	0.014235	+/-0.5





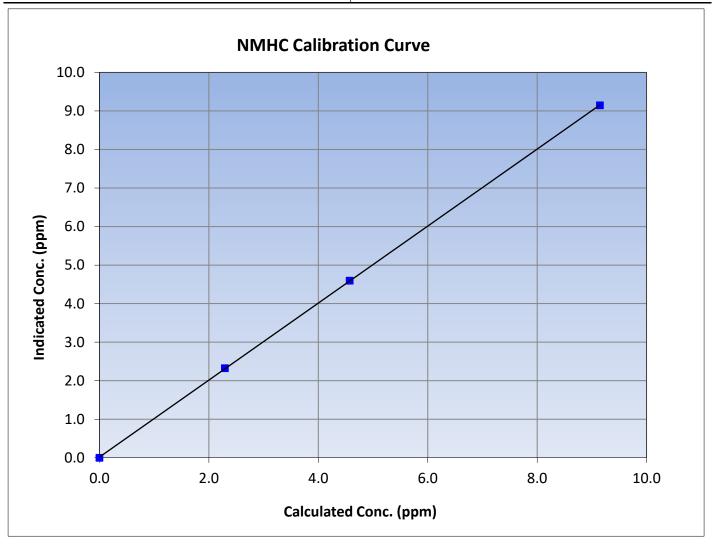
NMHC Calibration Summary

Version-06-2022

Station Information

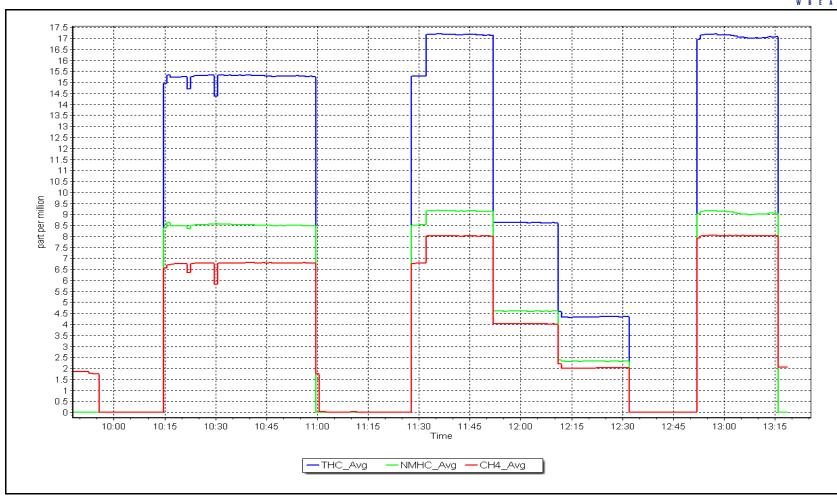
Calibration Date: January 10, 2024 **Previous Calibration:** December 5, 2023 Station Name: Janvier Station Number: AMS 22 9:50 Start Time (MST): End Time (MST): 13:14 Analyzer make: Analyzer serial #: 1331259520 Thermo 55i

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999984	≥0.995
9.15	9.15	1.0001	Correlation Coefficient	0.333304	20.333
4.57	4.60	0.9949	Slone	0.999032	0.90 - 1.10
2.29	2.32	0.9868	Slope		0.90 - 1.10
			Intercept	0.017157	+/-0.5



NMHC Calibration Plot Date: January 10, 2024 Location: Janvier







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Janvier

Calibration Date: January 17, 2024

Start time (MST): 10:52 Reason: Removal Station number: AMS 22

Last Cal Date: January 10, 2024

End time (MST): 12:11

Calibration Standards

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

C3H8 Cal Gas Conc. 208.4 ppm

Removed Gas Cert:

Removed CH4 Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

Removed C3H8 Conc. 208.4 ppm Diff between cyl (THC): Diff between cyl (CH $_4$): Diff between cyl (NM):

Calibrator Model: Teledyne API 700 Serial Number: 3806

ZAG make/model: Teledyne API 701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259520

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

CH4 Range (ppm): 0 - 10 ppm

Removed Gas Expiry:

Finish Finish Start Start CH4 SP Ratio: 3.030E-04 3.030E-04 NMHC SP Ratio: 5.65E-05 5.65E-05 CH4 Retention time: 15.6 15.6 NMHC Peak Area: 164596 164596 Zero Chromatogram: **OFF** OFF Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	17.17	18.45	0.931
as found 2nd point	4960	39.9	8.59	9.25	0.928
as found 3rd point	4980	20.0	4.30	4.67	0.922
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

			Ave			
Baseline Corr AF:	18.45	Prev response	17.18	*% change	6.9%	
Baseline Corr 2nd AF:	9.3	AF Slope:	1.073669	AF Intercept:	0.023477	
Baseline Corr 3rd AF:	4.7	AF Correlation:	0.999992	* = > +/-5% change initiates	investigation	



THC / CH₄ / NMHC Calibration Report

Version-06-2022

					V C131011 00 2
		NMHC Calibr	eation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CE Limit- 0.0E 1.0
as found zero	5000	0.0	0.00	0.00	CF <i>Limit= 0.95-1.0</i>
as found span	4920	79.8			0.958
as found span as found 2nd point					
	4960	39.9	4.57	4.79	0.954
as found 3rd point	4980	20.0	2.29	2.42	0.949
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
- II 0 15	2 ==			age Correction Factor	
Baseline Corr AF:	9.55	Prev response	9.16	*% change	4.1%
Baseline Corr 2nd AF:	4.8	AF Slope:	1.043421	AF Intercept:	0.012460
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999992	* = > +/-5% change initiat	tes investigation
		CIIA Calibra	tion Data		
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	79.8	8.03	8.89	0.903
as found 2nd point	4960	39.9	4.01	4.46	0.900
as found 3rd point					
<u> </u>	4980	20.0	2.01	2.25	0.892
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span			Avor	aga Carraction Factor	
Baseline Corr AF:	8.89	Prov rosponso	8.02	age Correction Factor *% change	9.8%
		Prev response		_	
Baseline Corr 2nd AF:	4.46	AF Correlation	1.106864	AF Intercept: * = > +/-5% change initial	0.013020
Baseline Corr 3rd AF:	2.25	AF Correlation:	0.999990	- > +/-5% Change Milla	tes investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.998667			
THC Cal Offset:		0.030390			
CH4 Cal Slope:		0.997468			
CH4 Cal Offset:		0.014235			
NMHC Cal Slope:		0.999032			

Notes:

NMHC Cal Offset:

Swapping out the instrument due to dips.

0.017157

Calibration Performed By: Max Farrell

NMHC Calibration Plot Date: January 17, 2024 Location: Janvier







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Station Name: Janvier

Calibration Date: January 17, 2024

Start time (MST): 12:28

Reason: Install

Station number: AMS 22

Last Cal Date:

Removed Gas Expiry:

End time (MST): 14:41

Calibration Standards

Gas Cert Reference: CC281519 Cal Gas Expiry Date: January 18, 2029

CH4 Cal Gas Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

C3H8 Cal Gas Conc. 208.4 ppm

Removed Gas Cert:

Removed CH4 Conc. 502.8 ppm CH4 Equiv Conc. 1075.9 ppm

Removed C3H8 Conc. 208.4 ppm Diff between cyl (THC):

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

Calibrator Model: Teledyne API 700 Serial Number: 3806 ZAG make/model: Teledyne API 701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1317958219

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

om CH4 Range (ppm): 0 - 10 ppm

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

CH4 SP Ratio: 2.940E-04 NMHC SP Ratio: 6.33E-05
CH4 Retention time: 13.2 NMHC Peak Area: 144559
Zero Chromatogram: OFF Flat Baseline: 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					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	17.17	17.11	1.004
second point	4960	39.9	8.59	8.55	1.004
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	17.11	1.004
			P	Average Correction Factor	1.003
Baseline Corr AF	NΔ	Prev resnonse	NΔ	*% change	NΔ

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= 0.95-1.0</i>
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	9.15	9.09	1.006
second point	4960	39.9	4.57	4.55	1.005
third point	4980	20.0	2.29	2.30	0.999
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	9.15	9.10	1.005
			Aver	age Correction Factor	1.003
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
Set Point as found zero	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (lc)	CF <i>Limit= 0.95-1.0</i>
	Dil air flow rate	Source gas flow rate	Caic conc (ppm) (Cc)	ina conc (ppm) (ic)	CF Limit= 0.95-1.05
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	79.8	8.03	8.02	1.001
second point	4960	39.9	4.01	4.00	1.003
third point	4980	20.0	2.01	2.00	1.006
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	8.03	8.01	1.002
·			Aver	age Correction Factor	1.003
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		<u> </u>		0.996236	
THC Cal Offset:				0.001413	
CH4 Cal Slope:				0.999459	
CH4 Cal Offset:				-0.005759	
NMHC Cal Slope:				0.993433	
NIVITIC Cal Office				0.555455	

Notes: Swapped out the instrument due to dips and the H2 cylinder as it was getting low. Adjusted the span

Calibration Performed By: Max Farrell

NMHC Cal Offset:

0.007572



THC Calibration Summary

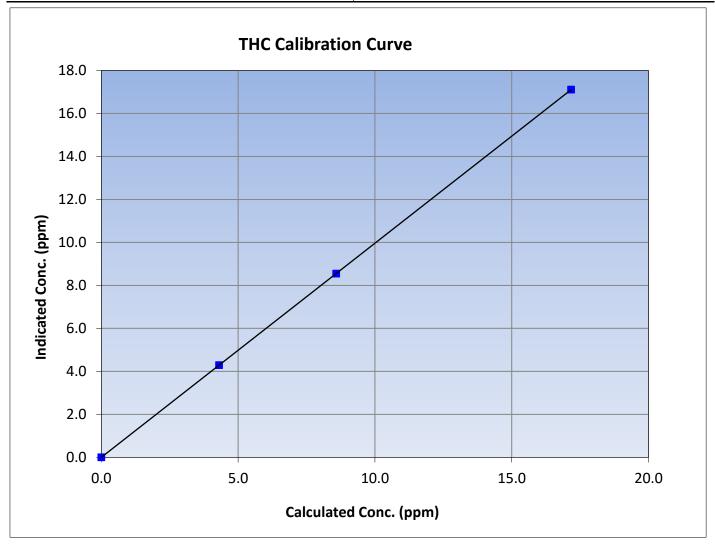
Version-06-2022

Station Information

Calibration Date: January 17, 2024 Previous Calibration:

Station Name:JanvierStation Number:AMS 22Start Time (MST):12:28End Time (MST):14:41Analyzer make:Thermo 55iAnalyzer serial #:1317958219

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
17.17	17.11	1.0036	Correlation Coemicient	1.000000	20.333
8.59	8.55	1.0042	Slope	0.996236	0.90 - 1.10
4.30	4.29	1.0022	Slope	0.990230	0.90 - 1.10
			Intercept	0.001413	+/-0.5





CH₄ Calibration Summary

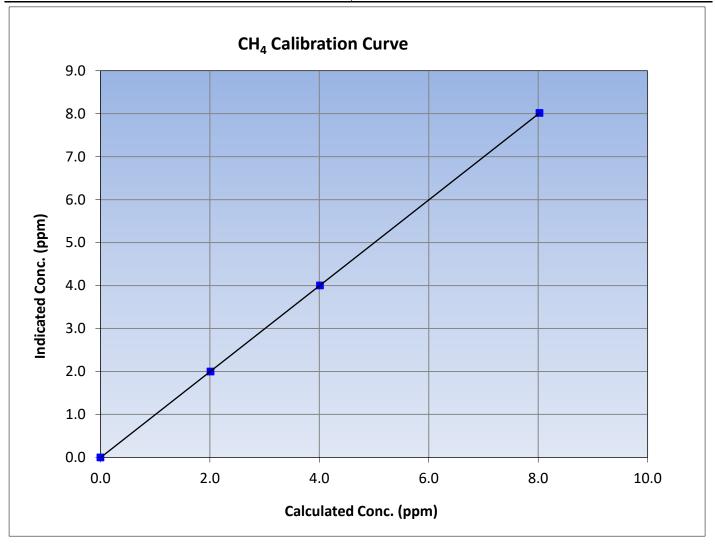
Version-06-2022

Station Information

Calibration Date: January 17, 2024 Previous Calibration:

Station Name:JanvierStation Number:AMS 22Start Time (MST):12:28End Time (MST):14:41Analyzer make:Thermo 55iAnalyzer serial #:1317958219

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999998	≥0.995
8.03	8.02	1.0009	Correlation Coemicient	0.555556	20.333
4.01	4.00	1.0029	Slope	0.999459	0.90 - 1.10
2.01	2.00	1.0061	Slope	0.555455	0.90 - 1.10
			Intercept	-0.005759	+/-0.5





NMHC Calibration Summary

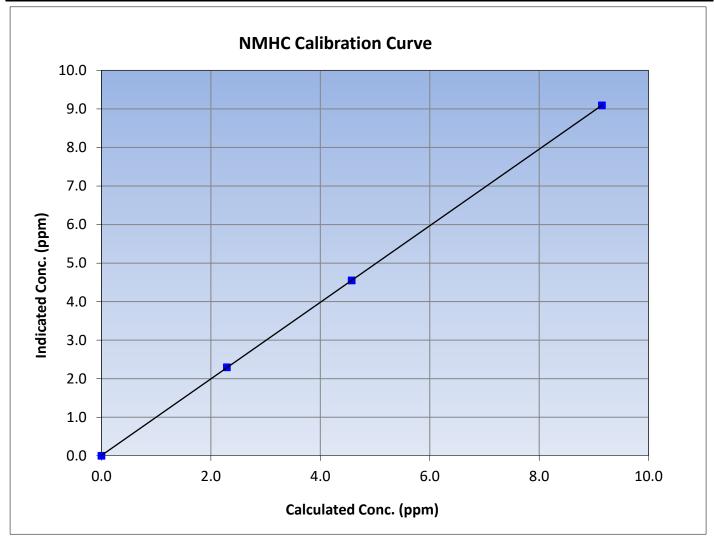
Version-06-2022

Station Information

Calibration Date: January 17, 2024 Previous Calibration:

Station Name:JanvierStation Number:AMS 22Start Time (MST):12:28End Time (MST):14:41Analyzer make:Thermo 55iAnalyzer serial #:1317958219

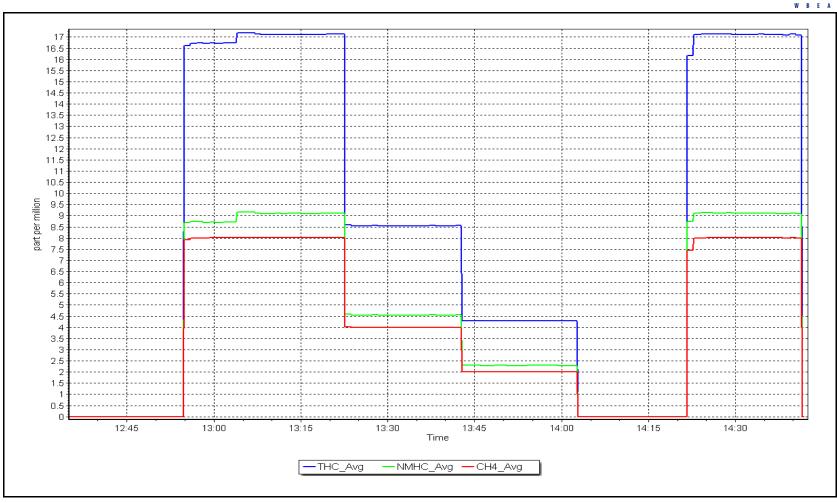
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
9.15	9.09	1.0061	Correlation Coemicient	0.555550	20.333
4.57	4.55	1.0049	Slope	0.993433	0.90 - 1.10
2.29	2.30	0.9989	Slope	0.333433	0.90 - 1.10
			Intercept	0.007572	+/-0.5



NMHC Calibration Plot Date: January 17, 2024

Location: Janvier







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Janvier

Calibration Date: January 15, 2024

Start time (MST): 11:16
Reason: Routine

Station number: AMS 22

Last Cal Date: December 15, 2023

End time (MST): 16:10

Calibration Standards

NO Gas Cylinder #: DT0047765 Cal Gas Expiry Date: March 11, 2031

NOX Cal Gas Conc: 48.90 ppm NO Cal Gas Conc: 48.80 ppm

Removed Cylinder #: Removed Gas Exp Date:

Removed Gas NOX Conc: 48.90 ppm Removed Gas NO Conc: 48.80 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 3806 ZAG make/model: Teledyne API T701 Serial Number: 201

Analyzer Information

Analyzer make: Analyzer serial #:

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.834	0.854	NO bkgnd or offset:	-5.6	0.0
NOX coeff or slope:	0.827	0.849	NOX bkgnd or offset:	-3.9	-0.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.7	5.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.994409	1.000095
NO _x Cal Offset:	2.604040	1.384206
NO Cal Slope:	0.998646	1.000674
NO Cal Offset:	1.684010	0.024014
NO ₂ Cal Slope:	0.995534	1.008342
NO ₂ Cal Offset:	-1.435399	1.498437



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibratio	n Data				
Set Point	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 = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	1.6	2.2	-0.5		
as found span	4918	82.0	802.0	800.3	1.6	773.7	767.4	6.3	1.0365	1.0429
as found 2nd										
as found 3rd			·							
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0		
high point	4918	82.0	802.0	800.3	1.6	802.4	800.9	1.5	0.9995	0.9993
second point	4960	41.0	400.9	400.1	0.8	404.0	400.2	3.8	0.9923	0.9997
third point	4980	20.5	200.5	200.1	0.4	202.6	200.5	2.1	0.9895	0.9978
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3		
as left span	4918	82.0	802.0	424.6	377.3	797.1	406.4	390.7	1.0061	1.0448
							Average C	Correction Factor	0.9938	0.9989
Corrected As fo	ound NO _X =	772.1 ppb	NO =	765.2 ppb	* = > +/-5°	% change initiates i	investigation	*Percent Chang	ge NO _X =	-3.6%
Previous Respo	onse NO _X =	800.1 ppb	NO =	800.9 ppb				*Percent Chang	ge NO =	-4.7%
Baseline Corr 2	2nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	$3rd pt NO_X =$	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		icated NO Drop centration (ppb)	Calculated NC concentration (ppl		dicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = As Found Limit = C	0.95-1.05 Calibratio	erter Efficiency on Limit = 96-104%
as found	d GPT zero									
as found GPT po	oint (400 ppb NO2)									
	oint (200 ppb NO2)									
as found GPT po	pint (100 ppb NO2)									
1st GPT point	it (400 ppb O3)	802.4		426.7	377.3		381.0	0.9904	1 :	101.0%
2nd GPT poin	nt (200 ppb O3)	802.4		609.1	194.9		199.4	0.9776		102.3%
2 1 607	+ (100 pph O2)	802.4		706.7	97.3		100.8	0.9657	7	103.6%
3rd GPT point	(100 ppb 03)	002.4		, 00.,					·	

Notes:

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

Calibration Performed By:

Max Farrell



NO_x Calibration Summary

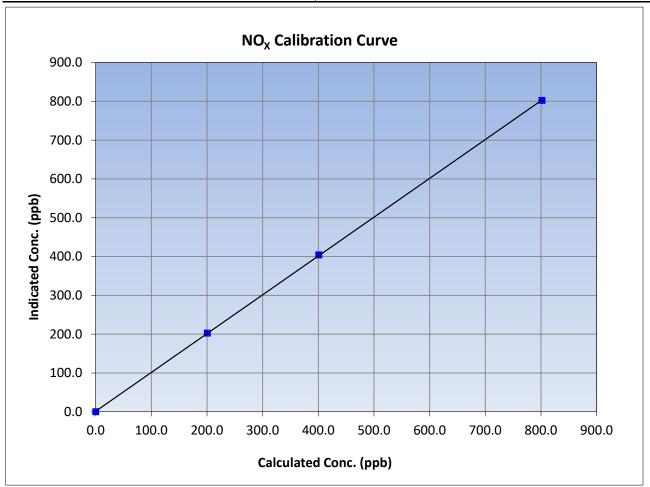
Version-04-2020

Station Information

Calibration Date:January 15, 2024Previous Calibration:December 15, 2023Station Name:JanvierStation Number:AMS 22Start Time (MST):11:16End Time (MST):16:10

Analyzer make: 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	0.999982	≥0.995
802.0	802.4	0.9995	Correlation Coefficient	0.555562	20.333
400.9	404.0	0.9923	Slope	1.000095	0.90 - 1.10
200.5	202.6	0.9895	Slope	1.000093	0.90 - 1.10
			Intercept	1.384206	+/-20





NO Calibration Summary

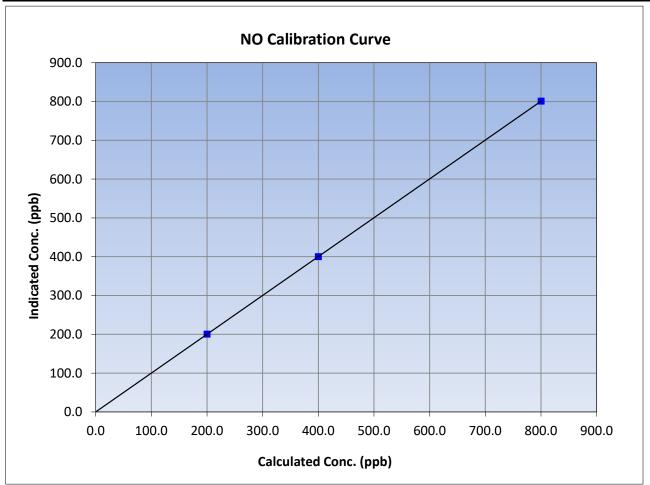
Version-04-2020

Station Information

Calibration Date:January 15, 2024Previous Calibration:December 15, 2023Station Name:JanvierStation Number:AMS 22Start Time (MST):11:16End Time (MST):16:10

Analyzer make: 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	1.000000	≥0.995
800.3	800.9	0.9993	Correlation Coefficient	1.000000	20.333
400.1	400.2	0.9997	Slope	1.000674	0.90 - 1.10
200.1	200.5	0.9978	Slope	1.000674	0.90 - 1.10
			Intercept	0.024014	+/-20





NO₂ Calibration Summary

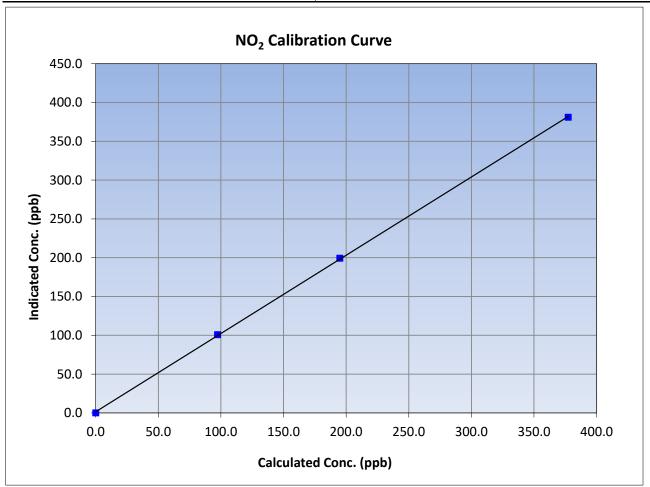
Version-04-2020

Station Information

Calibration Date:January 15, 2024Previous Calibration:December 15, 2023Station Name:JanvierStation Number:AMS 22Start Time (MST):11:16End Time (MST):16:10

Analyzer make: 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	0.999920	≥0.995
377.3	381.0	0.9904	Correlation Coefficient	0.555520	20.333
194.9	199.4	0.9776	Slope	1.008342	0.90 - 1.10
97.3	100.8	0.9657	Slope	1.006542	0.90 - 1.10
			Intercept	1.498437	+/-20

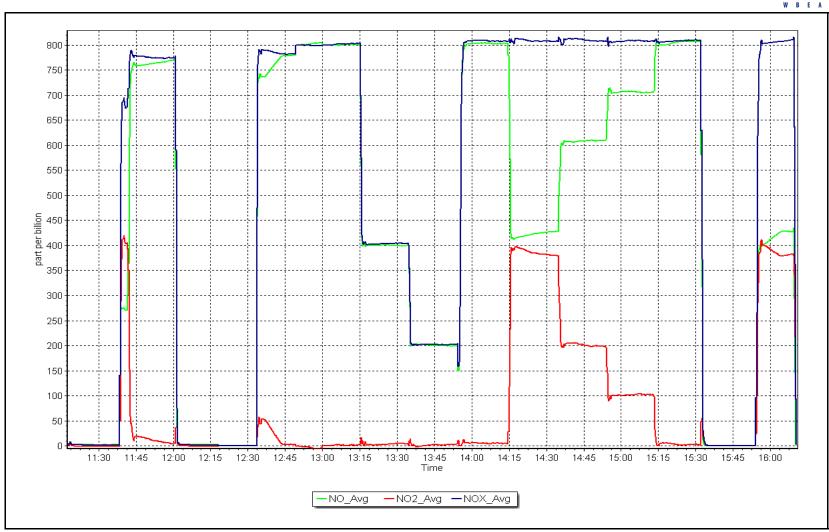


NO_x Calibration Plot

Date: January 15, 2024

Location: Janvier







O₃ Calibration Report

Version-01-2020

Station Information

Station Name: Janvier

Calibration Date: January 3, 2024

Start time (MST): Reason: Routine

11:32

Station number: AMS 22

Last Cal Date: December 11, 2023

End time (MST): 14:21

Calibration Standards

O3 generation mode: Photometer

Calibrator Make/Model: Teledyne API T700 Serial Number: 3806 ZAG Make/Model: Teledyne API T701H Serial Number: 691

Analyzer Information

Analyzer make: Teledyne API T400

Analyzer Range 0 - 500 ppb

Analyzer serial #: 7046

Start Finish Start Finish Backgd or Offset: Calibration slope: 1.003171 1.005200 -0.2 -0.2 Coeff or Slope: Calibration intercept: 0.820000 0.740000 1.021 1.021

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	0.1	
as found span	4895	905.3	400.0	403.6	0.991
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.5	
high point	4895	905.3	400.0	402.8	0.993
second point	4895	756.7	200.0	201.6	0.992
third point	4895	656.1	100.0	101.7	0.983
as left zero	5000	800.0	0.0	0.6	
as left span	4895	904.3	400.0	403.0	0.993
			Averag	ge Correction Factor	0.989
Baseline Corr As found:	403.5	Previous respons	e 402.1	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope	2:	AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation	n:		

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

Calibration Performed By: Max Farrell * = > +/-5% change initiates investigation



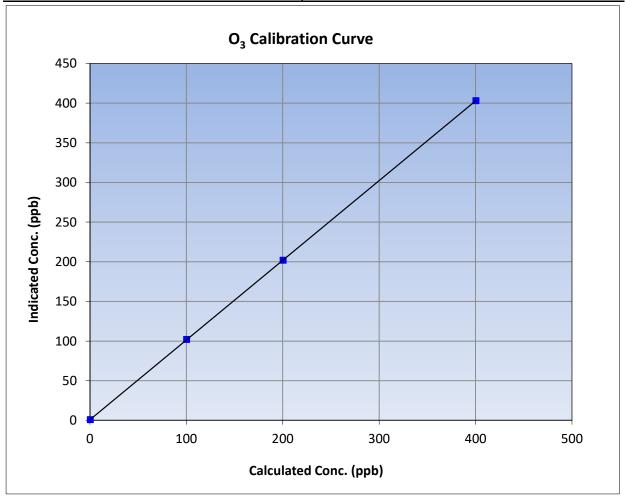
O₃ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 11, 2023 Station Name: Janvier Station Number: AMS 22 Start Time (MST): 11:32 End Time (MST): 14:21 Analyzer make: Teledyne API T400 Analyzer serial #: 7046

Calibration Data						
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evaluation		<u>Limits</u>	
0.0	0.5		Correlation Coefficient	0.999997	≥0.995	
400.0	402.8	0.9930	Correlation Coefficient	0.555557	20.333	
200.0	201.6	0.9921	Slope	1.005200	0.90 - 1.10	
100.0	101.7	0.9833	Siope	1.005200	0.90 - 1.10	
			Intercept	0.740000	+/- 5	

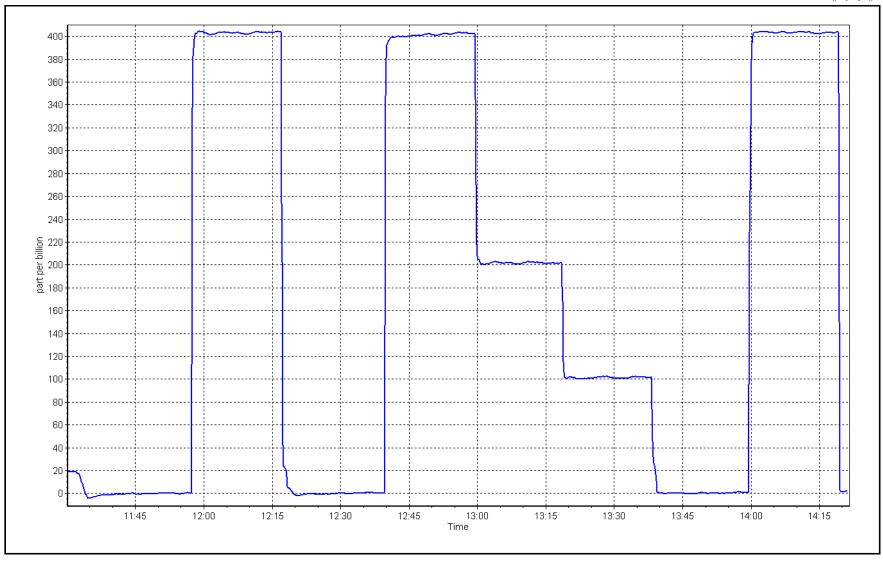


O₃ Calibration Plot

Date: January 3, 2024

Location: Janvier







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name: Calibration Date: Start time (MST):	Janvier January 24, 2024 13:00		Station number: Last Cal Date: End time (MST):	December 2	15, 2023	
Analyzer Make: Particulate Fraction:	Teledyne API T640 PM2.5		S/N:	325		
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	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-4.40	-4.70	-4.40			+/- 2 °C
P (mmHg)	712.5	713.0	712.5			+/- 10 mmHg
flow (LPM)	5.02	5.10	5.02			+/- 0.25 LPM
Leak Test:	Date of check: _ PM w/o HEPA:	January 24, 2024 3.9	Last Cal Date: PM w/ HEPA:	December		<0.2 ug/m3
Inlet cleaning :	Inlet Head					
		Quarterly Calibration To	est			
<u>Parameter</u> PMT Peak Test	<u>As found</u>	Post maintenance	<u>As left</u>		Adjusted	(Limits) 10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham	ber Cleaned:	January 24, 2024		•		<0.2 ug/m3
Disposable Filte	r Changed: _	January 24,	2024			
		Annual Maintenance				
Date Sample Tub	oe Cleaned:	July 26, 20	23			
Date RH/T Senso	or Cleaned:	July 26, 20	23			
Notes:	Monthly and quarterly c	alibration completed. After clea tomorrow to	ning the optical chamb		ot turn back o	n. Will be back
Calibration by:	Max Farrell					



T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Janvier		Station number:	AMS 22		
Calibration Date:	January 25, 2024		Last Cal Date: .	lanuary 24,	2024	
Start time (MST):	9:15		End time (MST):	9:42		
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		Adjusted	(Limits)
T (°C)	-4.40	-4.70	-4.40			+/- 2 °C
P (mmHg)	712.50	713.00	712.5			+/- 10 mmHg
flow (LPM)	5.02	5.10	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	January 25, 2024	Last Cal Date:	January 2	24, 2024	
	PM w/o HEPA:	3.90	PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be			rve as the pre main	tenance lea	ak check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration Te	act			
Paramotor	As found	Post maintenance	As left		Adjusted	(Limits)
<u>Parameter</u> PMT Peak Test	10.10	10.10	10.90		<u>Aujusteu</u> ✓	10.9 +/- 0.5
FIVIT FEAR TEST	10.10	10.10	10.90			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	38.90	w/ HEPA:	0	.00
Date Optical Cham	ber Cleaned:	January 24, 2024				<0.2 ug/m3
Disposable Filter	r Changed:	January 24, 2	2024			
		Annual Maintenance				
Date Sample Tub	oe Cleaned:	July 26, 20	23			
Date RH/T Sensor Cleaned:		July 26, 20	23			
Notes:	·	al chamber cleaning and filter cl	- '			
	disconnected by mistake	which caused the pump to turn now. PMT adjustment of	•		strument is op	erating normal
Calibration by:	Jan Castro					



T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information				
Station Name:	Janvier		Station number:	AMS 22		
Calibration Date:	January 31, 2024		Last Cal Date:		2024	
Start time (MST):	11:35		End time (MST):	12:11		
Analyzer Make:	Teledyne API T640		S/N:	325		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat		S/N:	388752		
Temp/RH standard:	Alicat		S/N:	388752		
		Monthly Calibration Te	est			
<u>Parameter</u>	As found	Measured	As left		<u>Adjusted</u>	(Limits)
T (°C)	6.50	5.96	6.50			+/- 2 °C
P (mmHg)	713.4	714.5	713.4			+/- 10 mmHg
flow (LPM)	5.04	5.09	5.04			+/- 0.25 LPM
Leak Test:	Date of check:	January 31, 2024	Last Cal Date:	January 2	5, 2024	
	PM w/o HEPA:	0.9	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be			rve as the pre main	tenance lea	k check	
Inlet cleaning:	Inlet Head	✓				
		Quarterly Calibration T	est			
Parameter	As found	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test			·		<u> </u>	10.9 +/- 0.5
Post-maintenance		PM w/o HEPA:	2024	w/ HEPA: _		
Date Optical Cham Disposable Filte	=	January 24, 2024 January 24, 2024				<0.2 ug/m3
Disposable Title	- Changea.	January 24,	2024			
		Annual Maintenance	•			
Date Sample Tuk	na Claanad:	July 26, 20	122			
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		July 26, 20	-			
, ,	-	,				
Natar						
Notes:		Verified flow, temperatur	re, and pressure. Leak c	heck passed.		
Calibration by:	Rene Chamberland					

W R F A

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Janvier Station Number: Station Name: AMS 22 November 16, 2023 Prev Cal Date: Calibration Date: N/A Start Time (MST): 13:00 End Time (MST): 14:10 Tower Height (m): 10.0 Reason: Install

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: D16121 WS Calibrator: MetOne 053 Serial Number: P15103

Shaft Ri	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error <i>Limit = +/- 1.5%</i>
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: D14528

As Found Declination (deg east of True North): N/A As Left Declination (deg east of True North): 14 Solar noon time (MST): 13:25 Calc Declination*: 13:02 Degrees

Deadband calc: 4.1 degrees (Limit 4 deg) *- calculated declination as per NOAA website

% Error (based on 357° FS)

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	Limit = +/- 1.0%
0	2.0	
90	86.7	-0.9%
180	178.0	-0.6%
270	266.9	-0.9%
357	354.9	-0.6%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r ²)		0.999924	≥0.9995
Calculated slope		1.008921	0.90 - 1.10
Calculated intercept		0.114807	+/- 4

Notes: Installing new WS/WD sensors for the 10 meter tower, no issues to note. Used a compass to line up the crossarm.

Calibration Performed By: Max Farrell, Jan Castro



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS23 FORT HILLS

JANUARY 2024

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

February 29, 2024



Calibration slope:

Calibration intercept:

Wood Buffalo Environmental Association

SO₂ Calibration Report

Station number:

End time (MST):

Last Cal Date:

AMS23

10:58

December 13, 2023

Version-01-2020

Station Information

Fort Hills Station Name:

Calibration Date:

Start time (MST): 8:08 Routine Reason:

January 15, 2024

Cal Gas Concentration: 49.76

Cal Gas Cylinder #: CC281425

Removed Cal Gas Conc: 49.76 Removed Gas Cyl #: N/A

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

Calibration Standards

Cal Gas Exp Date: January 5, 2025

> Rem Gas Exp Date: N/A Diff between cyl:

Serial Number: 451 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290012

ppm

Analyzer Range 0 - 1000 ppb

Finish Start 0.999893 1.001895

-0.683633 -0.983326 Backgd or Offset:

Coeff or Slope:

Start 18.3 1.058 **Finish** 18.5 1.063

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	4920	80.3	799.1	796.8	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.3	799.1	798.5	1.001
second point	4960	40.2	400.1	398.6	1.004
third point	4980	20.1	200.0	198.0	1.010
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.3	799.1	797.1	1.003
	•		Averag	ge Correction Factor	1.005
		•	•	•	•

Baseline Corr As found: 796.30 Previous response 799.93 *% change -0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

> Notes: No maintenance done. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay * = > +/-5% change initiates investigation



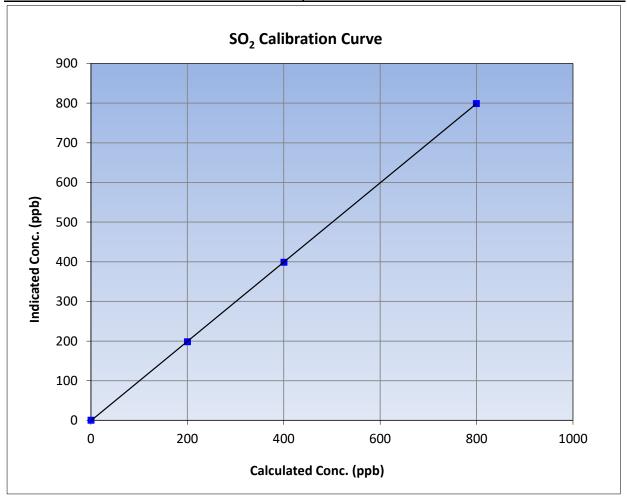
SO₂ Calibration Summary

Version-01-2020

Station Information

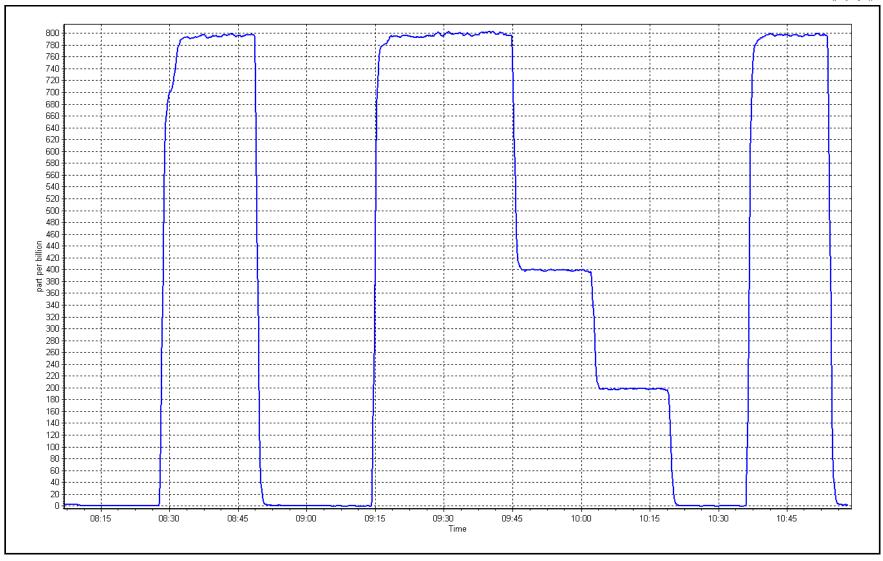
Calibration Date: January 15, 2024 **Previous Calibration:** December 13, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:08 End Time (MST): 10:58 Analyzer make: Thermo 43i Analyzer serial #: 1160290012

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999993	≥0.995				
799.1	798.5	1.0007	Correlation Coefficient	0.555555	20.333				
400.1	398.6	1.0036	Slope	0.999893	0.90 - 1.10				
200.0	198.0	1.0103	Slope	0.555655	0.90 - 1.10				
			- Intercept	-0.983326	+/-30				



SO2 Calibration Plot Date: January 15, 2024 Location: Fort Hills







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Fort Hills

Calibration Date: January 9, 2024

Start time (MST): 8:55

Reason: Routine Station number: AMS23

> Last Cal Date: December 6, 2023

End time (MST): 12:56

Calibration Standards

February 5, 2024 Cal Gas Concentration: 5.20 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC517372

Removed Cal Gas Conc: Rem Gas Exp Date: N/A 5.20 ppm Removed Gas Cyl #: Diff between cyl: N/A

Calibrator Make/Model: API T700 451 Serial Number: ZAG Make/Model: **API T701** Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1300156232

Converter make: CDN-101 Converter serial #: 594

Analyzer Range 0 - 100 ppb

new cylinder response

Notes:

Finish Start <u>Finish</u> <u>Start</u> 0.995462 Backgd or Offset: Calibration slope: 0.991033 1.19 1.19 Calibration intercept: -0.198385 -0.178345 Coeff or Slope: 1.124 1.124

TRS As Found Data Baseline Adjusted Calculated Dilution air flow rate Source gas flow rate Indicated Correction factor Set Point concentration (ppb) (sccm) concentration (ppb) (Ic) (Cc/(Ic-AFzero)) (sccm) (Cc) Limit = 0.90-1.105000 0.0 0.0 as found zero 0.0 ---as found span 4923 77.0 80.0 79.9 1.001 as found 2nd point 4962 38.5 40.0 39.8 1.005 as found 3rd point 4981 19.2 19.9 19.6 1.018

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.0	80.0	79.5	1.006
second point	4962	38.5	40.0	39.7	1.007
third point	4981	19.2	19.9	19.4	1.028
as left zero	5000	0.0	0.0	0.0	
as left span	as left span 4923		80.0	79.2	1.010
SO2 Scrubber Check	4920	80.3	803.0	0.0	
Date of last scrubber chan	ge:			Ave Corr Factor	1.014

Date of last scrubber change:	Ave Corr Factor	1.014
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 79.9 79.09 Prev response: *% change: 1.0% Baseline Corr 2nd AF pt: 39.8 AF Slope: 0.999888 AF Intercept: -0.158204 Baseline Corr 3rd AF pt: 0.999981 19.6 AF Correlation:

* = > +/-5% change initiates investigation

SOx scrubber checked after the calibrator zero. No adjustments done.

Calibration Performed By: Melissa Lemay



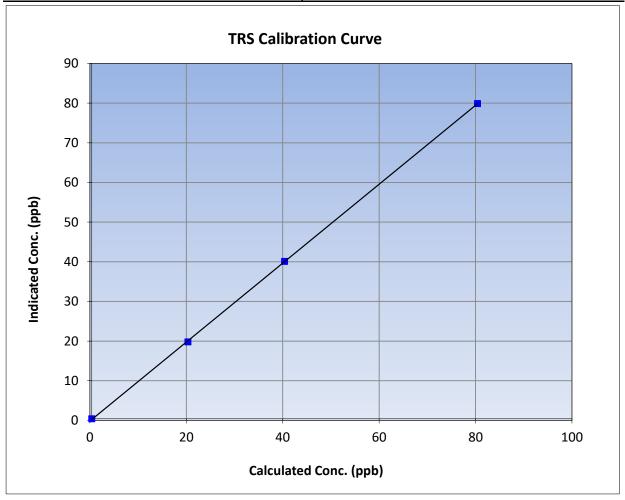
TRS Calibration Summary

Version-11-2021

Station Information

Previous Calibration: December 6, 2023 Calibration Date: January 9, 2024 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 8:55 End Time (MST): 12:56 Analyzer make: Thermo 43i TLE Analyzer serial #: 1300156232

Calibration Data									
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.0		Correlation Coefficient	0.999967	≥0.995				
80.0	79.5	1.0063	Correlation Coefficient	0.555507	20.993				
40.0	39.7	1.0075	Slope	0.995462	0.90 - 1.10				
19.9	19.4	1.0282	Slope	0.555402	0.90 - 1.10				
			- Intercept	-0.178345	+/-3				

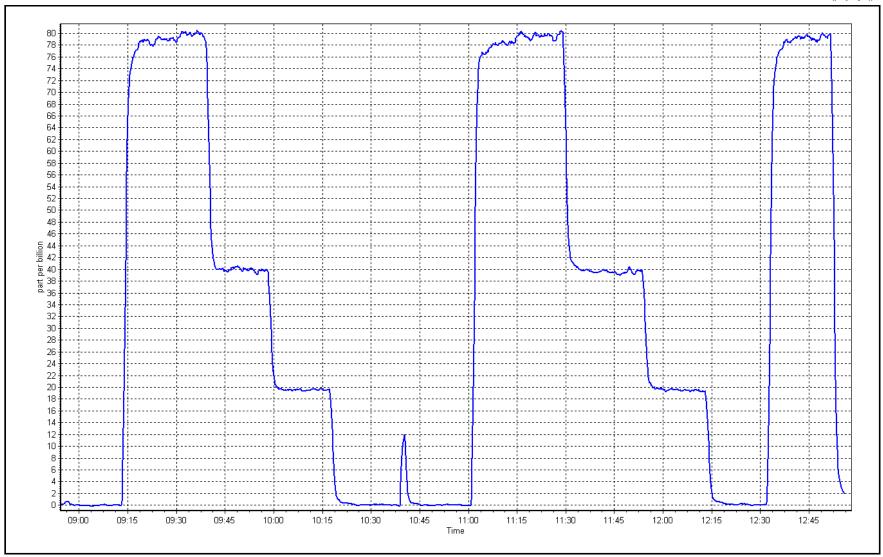




Date: January 9, 2024

Location: Fort Hills







THC / CH₄ / NMHC Calibration Report

Version-06-2022

Station Information

Fort Hills Station Name:

Calibration Date: January 15, 2024

Start time (MST): 8:08 Reason: Routine Station number: AMS23

Removed Gas Expiry: N/A

Analyzer serial #: 1193585648

Last Cal Date: December 13, 2023

End time (MST): 10:56

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025

CH4 Cal Gas Conc. 500.2 CH4 Equiv Conc. 1070.6 ppm ppm

207.4 C3H8 Cal Gas Conc. ppm

Removed Gas Cert: N/A

Removed CH4 Conc. 500.2 CH4 Equiv Conc. 1070.6 ppm ppm

Removed C3H8 Conc. Diff between cyl (THC): 207.4 ppm Diff between cyl (CH_4): Diff between cyl (NM):

Calibrator Model: **API T700** Serial Number: 451 ZAG make/model: **API T701** Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 55i

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: 2.36E-04 2.31E-04 NMHC SP Ratio: 5.09E-05 4.93E-05 CH4 Retention time: 13.0 13.0 NMHC Peak Area: 180787 186451 Zero Chromatogram: ON ON Flat Baseline: OFF OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.3	17.19	17.69	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	17.19	17.33	0.992		
second point	4960	40.2	8.61	8.64	0.996		
third point	4980	20.1	4.30	4.34	0.992		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.3	17.19	17.32	0.993		
			A	verage Correction Factor	0.993		
Baseline Corr AF:	17.69	Prev response	17.24	*% change	2.6%		
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) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	9.16	9.50	0.964
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	9.22	0.993
second point	4960	40.2	4.59	4.62	0.993
third point	4980	20.1	2.29	2.35	0.975
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	9.16	9.19	0.997
			A	verage Correction Factor	0.987
Baseline Corr AF:	9.50	Prev response	9.19	*% change	3.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
as found zero	5000	0.0	0.00	0.00	
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C		CF <i>Limit= 0.95-1.05</i>
as found span	4920	80.3	8.03	8.20	0.980
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4920	80.3	8.03	8.12	0.989
second point	4960	40.2	4.02	4.02	1.000
:hird point	4980	20.1	2.01	1.99	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.03	8.13	0.988
·			A	verage Correction Factor	1.001
Baseline Corr AF:	8.20	Prev response	8.05	*% change	1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		1.001568		1.007788	
THC Cal Offset:		0.017601		-0.007208	
CH4 Cal Slope:		1.004639		1.012164	
cri4 car stope.		1.004033		1.012104	

-0.020048

1.000371

0.031648

Notes:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

Span adjusted. No Maintenance done.

-0.027257

1.005072

0.018048

Calibration Performed By: Melissa Lemay



THC Calibration Summary

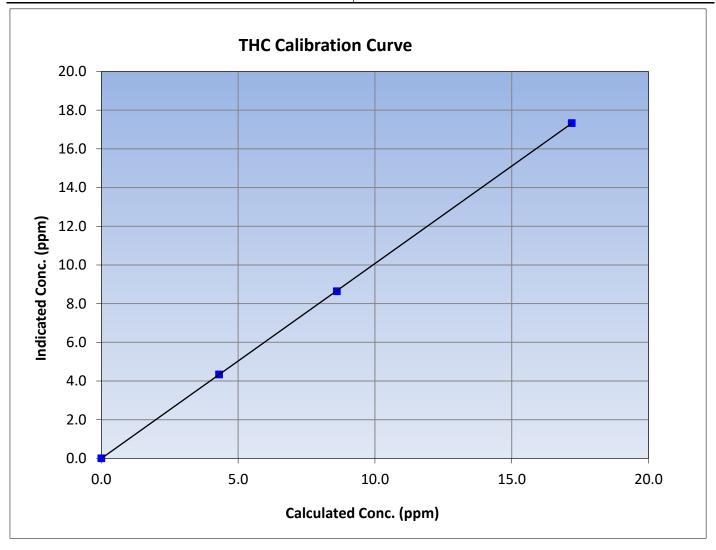
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 13, 2023

Station Name:Fort HillsStation Number:AMS23Start Time (MST):8:08End Time (MST):10:56Analyzer make:Thermo 55iAnalyzer serial #:1193585648

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999994	≥0.995
17.19	17.33	0.9920	Correlation Coefficient	0.555554	20.333
8.61	8.64	0.9962	Slope	1.007788	0.90 - 1.10
4.30	4.34	0.9921	Slope	1.007788	0.90 - 1.10
			Intercept	-0.007208	+/-0.5





CH₄ Calibration Summary

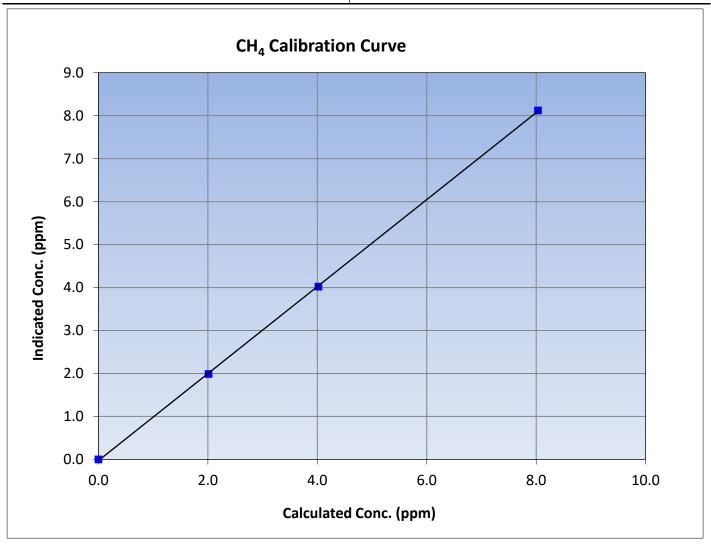
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 13, 2023

Station Name:Fort HillsStation Number:AMS23Start Time (MST):8:08End Time (MST):10:56Analyzer make:Thermo 55iAnalyzer 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	0.999945	≥0.995	
8.03	8.12	0.9893	Correlation Coemicient	0.555545	20.333	
4.02	4.02	1.0004	Slope	1.012164	0.90 - 1.10	
2.01	1.99	1.0120	Slope	1.012104	0.90 - 1.10	
		·	Intercept	-0.027257	+/-0.5	





NMHC Calibration Summary

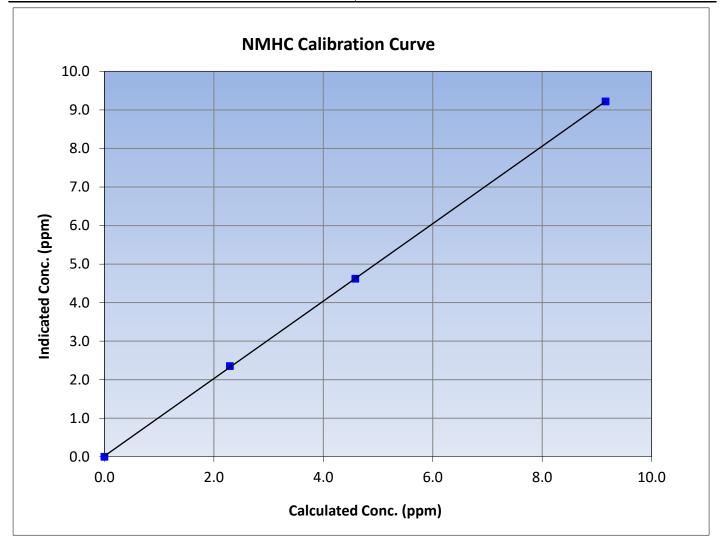
Version-06-2022

Station Information

Calibration Date: January 15, 2024 Previous Calibration: December 13, 2023

Station Name:Fort HillsStation Number:AMS23Start Time (MST):8:08End Time (MST):10:56Analyzer make:Thermo 55iAnalyzer serial #:1193585648

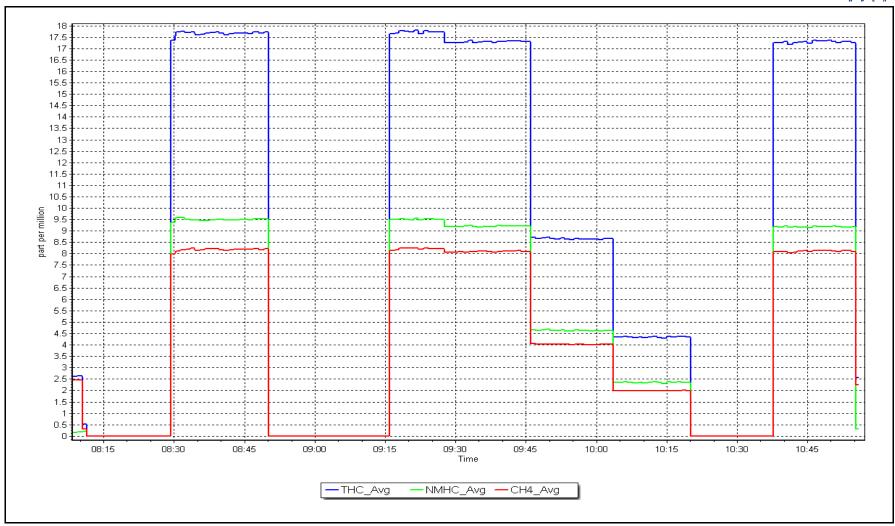
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999974	≥0.995	
9.16	9.22	0.9934	Correlation Coemicient	0.999974	20.333	
4.59	4.62	0.9925	Slope	1.005072	0.90 - 1.10	
2.29	2.35	0.9752	Slope	1.003072	0.90 - 1.10	
			Intercept	0.018048	+/-0.5	



NMHC Calibration Plot Date: January 15, 2024

Location: Fort Hills







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Fort Hills

Calibration Date: January 10, 2024

Start time (MST): 7:35
Reason: Routine

Station number: AMS23

Last Cal Date: December 7, 2023

End time (MST): 12:04

Calibration Standards

NO Gas Cylinder #: CC332703 Cal Gas Expiry Date: January 28, 2024

NOX Cal Gas Conc: 49.7 ppm NO Cal Gas Conc: 49.7 ppm

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

Removed Gas NOX Conc: 49.7 ppm Removed Gas NO Conc: 49.7 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 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> **Finish** <u>Start</u> **Finish** NO coeff or slope: 1.081 1.081 NO bkgnd or offset: 3 3 NOX coeff or slope: 0.989 0.989 NOX bkgnd or offset: 3.2 3.2 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 164.7 162

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999822	0.998780
NO _x Cal Offset:	0.304106	0.244003
NO Cal Slope:	1.001566	1.000209
NO Cal Offset:	-0.455910	-0.556171
NO ₂ Cal Slope:	1.002916	0.999293
NO ₂ Cal Offset:	-0.422416	-0.815351



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 NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2		
as found span	4920	80.5	800.2	800.2	0.0	802.7	800.8	1.8	0.997	0.999
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1		
high point	4920	80.5	800.2	800.2	0.0	798.8	799.6	-0.8	1.002	1.001
second point	4960	40.2	399.6	399.6	0.0	400.8	400.1	0.8	0.997	0.999
third point	4980	20.1	199.8	199.8	0.0	199.4	198.0	1.5	1.002	1.009
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
as left span	4920	80.5	800.2	445.5	354.7	796.4	441.9	354.4	1.005	1.008
							Average C	orrection Factor	1.000	1.003
Corrected As fo	und NO _X =	803.0 ppb	NO	= 800.9 ppb	* = > +/-5%	6 change initiates	investigation	*Percent Chang	ge NO _X =	0.3%
Previous Respo	nse NO _X =	800.3 ppb	NO	= 801.0 ppb				*Percent Chang	ge NO =	0.0%
Baseline Corr 21	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	$1 NO r^2$:	NO SI:	NO Int:	
					As found	$NO_2 r^2$:	NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		dicated NO Drop ecentration (ppb)	Calculated NC concentration (pp		ndicated NO2 ntration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05 Calibratio	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT poir	nt (400 ppb NO2)									

Notes:

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

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

No maintenance done. Span adjusted.

353.9

174.2

89.1

Average Correction Factor

1.002

1.006

1.020

1.009

354.7

175.2

90.9

Calibration Performed By:

Melissa Lemay

442.3

621.8

706.1

797.0

797.0

797.0

99.8%

99.4%

98.0%

99.1%



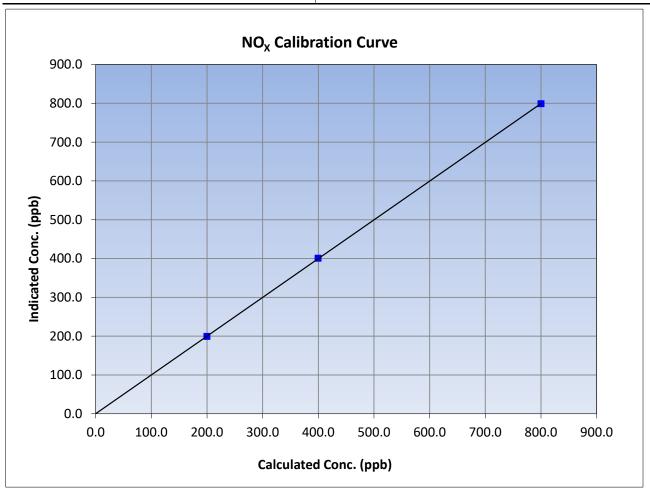
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 7:35 End Time (MST): 12:04 Analyzer serial #: Analyzer make: Thermo 42i 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999992	≥0.995
800.2	798.8	1.0017	correlation coefficient	0.333332	20.333
399.6	400.8	0.9969	Slope	0.998780	0.90 - 1.10
199.8	199.4	1.0020	Slope	0.996760	0.90 - 1.10
			Intercept	0.244003	+/-20





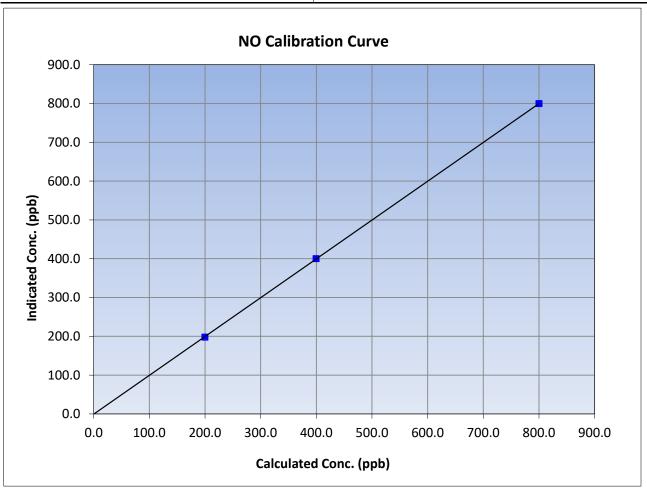
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 7:35 End Time (MST): 12:04 Analyzer make: Thermo 42i Analyzer serial #: 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999992	≥0.995
800.2	799.6	1.0007	Correlation Coefficient	0.333332	20.333
399.6	400.1	0.9987	Slope	1.000209	0.90 - 1.10
199.8	198.0	1.0090	Slope	1.000209	0.90 - 1.10
			Intercept	-0.556171	+/-20





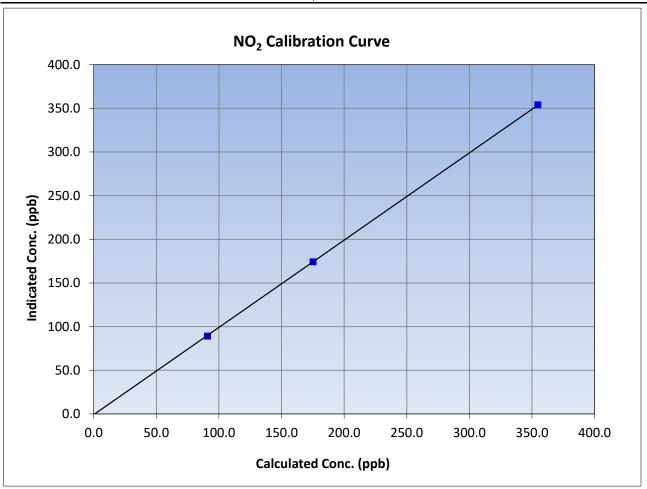
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Fort Hills Station Number: AMS23 Start Time (MST): 7:35 End Time (MST): 12:04 Analyzer serial #: Analyzer make: Thermo 42i 1152430007

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999979	≥0.995
354.7	353.9	1.0023	correlation coefficient	0.333373	20.993
175.2	174.2	1.0057	Slope	0.999293	0.90 - 1.10
90.9	89.1	1.0202	Slope	0.555255	0.90 - 1.10
			Intercept	-0.815351	+/-20

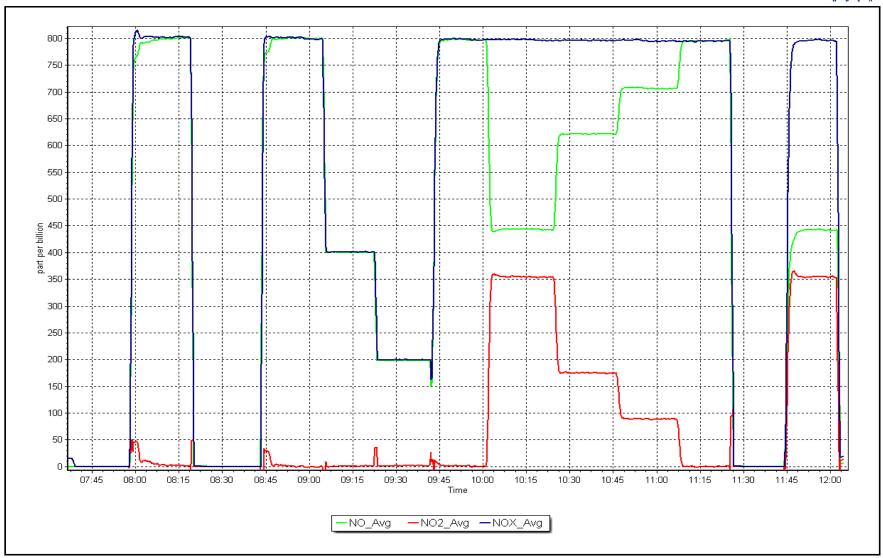


NO_x Calibration Plot

Date: January 10, 2024

Location: Fort Hills







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1			
Station Name:	Fort Hills		Station number:	AMS 23		
Calibration Date:	January 15, 2024		Last Cal Date:	December 1	L3, 2023	
Start time (MST):	10:59		End time (MST):	11:25		
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	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-29.4	-29.7	-29.7			+/- 2 °C
P (mmHg)	748.5	747.9	748.5			+/- 10 mmHg
flow (LPM)	5.00	5.06	5.00			+/- 0.25 LPM
Leak Test:	Date of check:	January 15, 2024	Last Cal Date:	December	13, 2023	
	PM w/o HEPA:	6.8	PM w/ HEPA:	0	1	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will	serve as the pre ma	intenance le	ak check	
Inlet cleaning:	Inlet Head	✓				
			_			
		Quarterly Calibration				44.4.1
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Chamb	ber Cleaned:	November 2	0, 2023	_		<0.2 ug/m3
Disposable Filter	Changed:	November 2	0, 2023			
		Annual Maintenand	e			
Date Sample Tube	e Cleaned:	October 17	. 2023			
Date RH/T Sensor	=	October 17				
	-					
		No odiustments dans	Look abook passed. I	lood alaamad		
No+oo.		No adjustments done.	Leak спеск passed. F	iead cieaned.		
Notes:						



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Waskow ohci Pimatisiwin Station number: AMS25

Calibration Date: January 22, 2024 Last Cal Date: December 19, 2023

Start time (MST): 8:59 End time (MST): 12:20

Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.54 ppm Cal Gas Exp Date: December 29, 2028

Cal Gas Cylinder #: CC437219

Removed Cal Gas Conc: 50.54 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 747
ZAG Make/Model: API T701 Serial Number: 4765

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1118148497

Analyzer Range 0 - 1000 ppb

StartFinishStartFinishCalibration slope:0.9998910.999234Backgd or Offset:11.011.4

Calibration intercept: -0.656026 0.023996 Coeff or Slope: 1.020 1.050

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration	Correction factor (Cc/Ic)
Sec i onit	(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	4921	79.2	800.5	775.4	1.032
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.2	800.5	799.9	1.001
second point	4960	39.6	400.3	400.2	1.000
third point	4980	19.8	200.1	199.8	1.002
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	800.5	805.7	0.994
			Averag	ge Correction Factor	1.001
			Averag	ge Correction Factor	1.001

Baseline Corr As found: 775.60 Previous response 799.78 *% change -3.1% 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 done. Span adjusted.

Calibration Performed By: Melissa Lemay



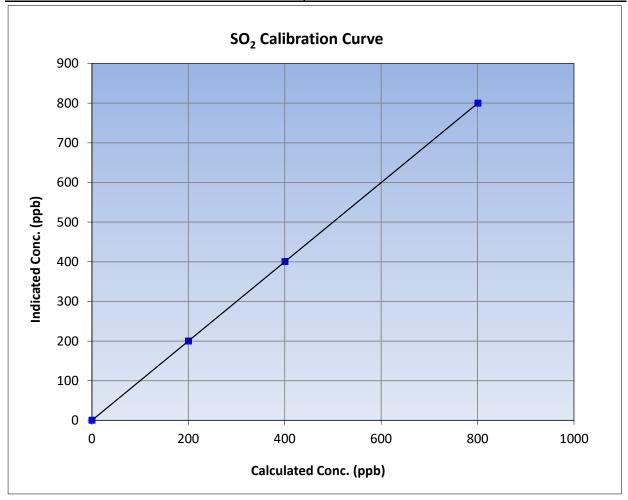
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 22, 2024 **Previous Calibration:** December 19, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 8:59 End Time (MST): 12:20 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	0.1		Correlation Coefficient	1.000000	≥0.995				
800.5	799.9	1.0008	Correlation Coefficient	1.000000	20.993				
400.3	400.2	1.0003	Slope	0.999234	0.90 - 1.10				
200.1	199.8	1.0017	Slope	0.555254	0.90 - 1.10				
			Intercept	0.023996	+/-30				

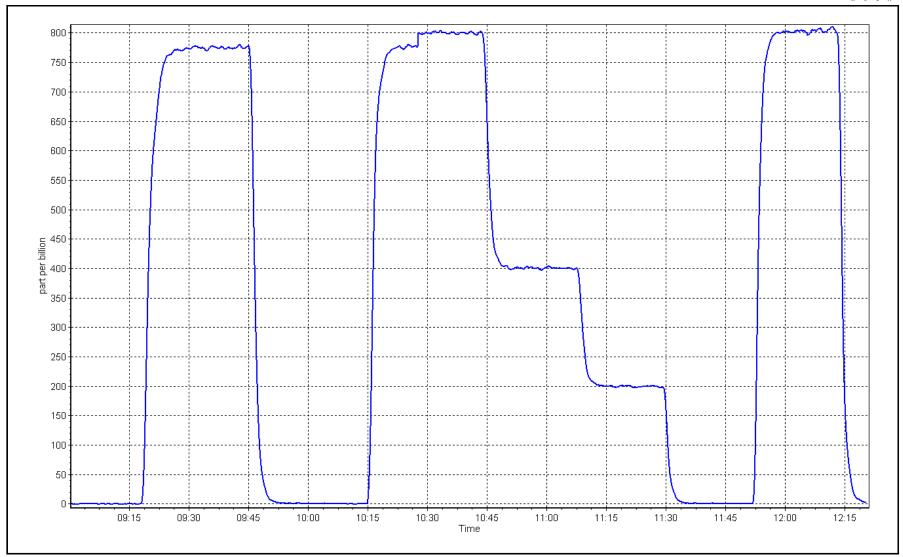


SO2 Calibration Plot

Date: January 22, 2024

Location: Waskow ohci Pimatisiwin







H₂S Calibration Report

Station number:

AMS25

261

Version-11-2021

Station Information

Station Name: Waskow ohci Pimatisiwin

Calibration Date: January 18, 2024 Last Cal Date: December 15, 2023

Start time (MST): 7:14 End time (MST): 12:04

Reason: Routine

Calibration Standards

Cal Gas Concentration: 4.97 ppm Cal Gas Exp Date: January 3, 2026

Cal Gas Cylinder #: CC517099

Removed Cal Gas Conc: 4.97 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 747

ZAG Make/Model: API T701 Serial Number:

Analyzer Information

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146
Converter make: Global G-150 Converter serial #: 2022-219

Analyzer Range 0 - 100 ppb

<u>Start</u> **Finish Start** <u>Finish</u> 1.002531 Backgd or Offset: 3.30 Calibration slope: 1.003251 3.30 0.300000 Calibration intercept: 0.200000 Coeff or Slope: 1.108 1.125

H₂S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4920	80.0	79.5	78.8	1.010
as found 2nd point	4960	40.0	39.7	39.6	1.006
as found 3rd point	4980	20.0	19.9	19.8	1.008
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4920	80.0	79.5	79.9	0.994
second point	4960	40.0	39.7	40.3	0.986
third point	4980	20.0	19.9	20.1	0.988
as left zero	5000	0.0	0.0	0.3	
as left span	4920	80.0	800.0	809.7	0.988
SO2 Scrubber Check	4921	79.2	800.0	0.0	
Date of last scrubber chang	ge:	20-Jun-23		Ave Corr Factor	0.990
Date of last converter effic	iency test:			efficiency	

Date of last scrubber change	2:	20-Jun-23		Ave Corr Factor	0.990
Date of last converter efficie	ncy test:				efficiency
Baseline Corr As found:	78.7	Prev response:	79.91	*% change:	-1.5%

Baseline Corr 2nd AF pt:39.5AF Slope:0.990593Baseline Corr 3rd AF pt:19.7AF Correlation:0.999995

* = > +/-5% change initiates investigation

AF Intercept:

Notes: SOx scrubber checked after the calibrator zero. Span adjusted.

Calibration Performed By: Melissa Lemay

0.140000



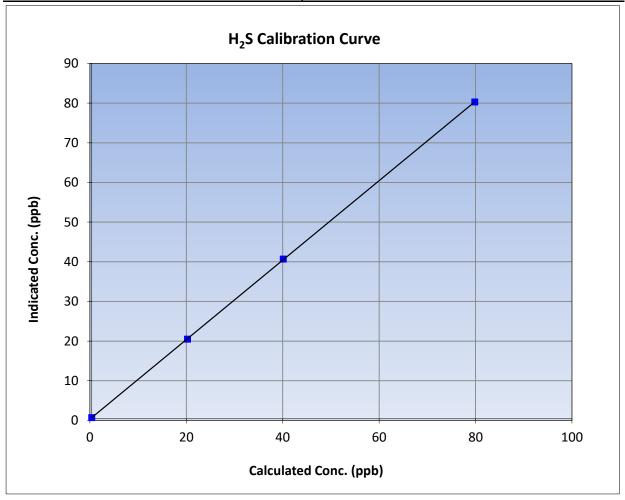
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 18, 2024 **Previous Calibration:** December 15, 2023 Station Name: Waskow ohci Pimatisiwin Station Number: AMS25 Start Time (MST): 7:14 End Time (MST): 12:04 Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146

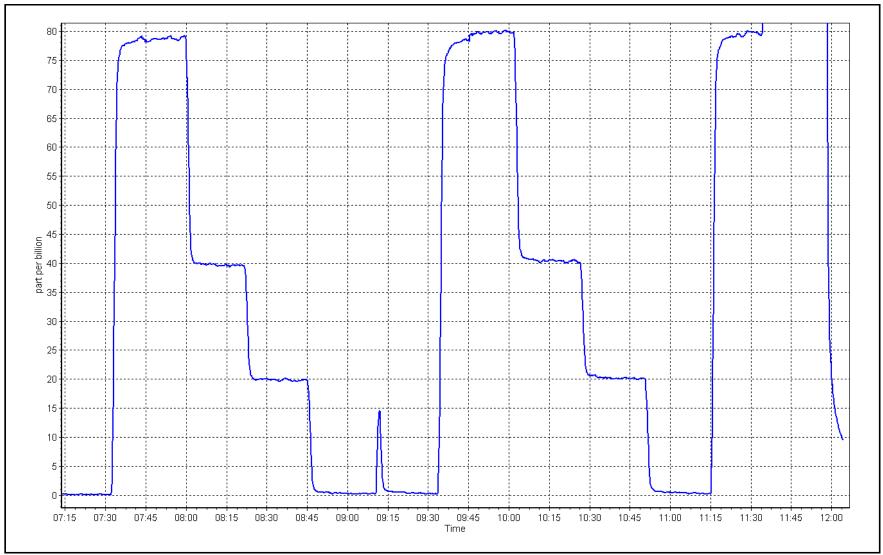
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.3		Correlation Coefficient	0.999987	≥0.995				
79.5	79.9	0.9944	Correlation Coefficient	0.555507	20.333				
39.7	40.3	0.9858	Slope	1.002531	0.90 - 1.10				
19.9	20.1	0.9883	Slope	1.002551	0.90 - 1.10				
			- Intercept	0.300000	+/-3				



Date: January 18, 2024

Location: Waskow ohci Pimatisiwin







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Christina Lake

Calibration Date: January 23, 2024

Start time (MST): 10:28 Routine Reason:

Station number: **AMS 26**

> December 12, 2023 Last Cal Date:

End time (MST): 13:21

Calibration Standards

Cal Gas Concentration: 49.56

Cal Gas Cylinder #: CC362134

Removed Cal Gas Conc: 49.56

Removed Gas Cyl #: <u>NA</u> Calibrator Make/Model: **API T700** ZAG Make/Model: API T701H Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl: Serial Number: 281

Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1173410001

ppm

ppm

Analyzer Range 0 - 1000 ppb

Finish Start

Start

Finish

Calibration slope: 0.996949 0.997965 Backgd or Offset: 15.6 17.9 0.370507 0.900 Calibration intercept: -0.124030 Coeff or Slope: 0.874

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	1.2	
as found span	4919	80.8	800.9	775.9	1.032
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	
high point	4919	80.8	800.9	799.3	1.002
second point	4960	40.4	400.4	399.1	1.003
third point	4980	20.2	200.2	199.9	1.002
as left zero	5000	0.0	0.0	0.0	
as left span	4919	80.8	800.9	798.5	1.003
			Averag	ge Correction Factor	1.002

Baseline Corr As found: 774.70 Previous response 798.85 *% change -3.1% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Jan Castro



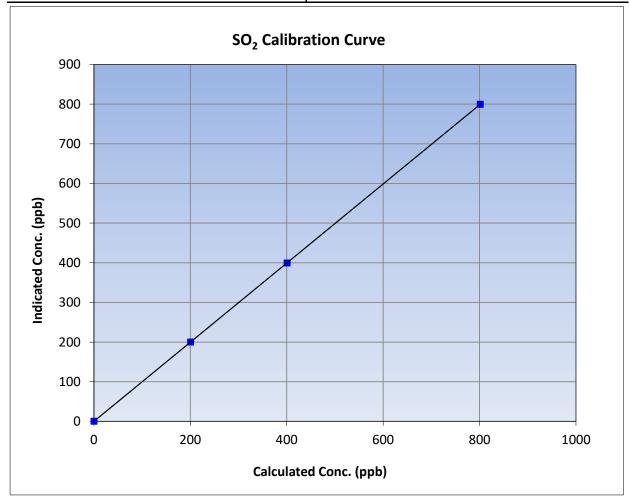
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 23, 2024 **Previous Calibration:** December 12, 2023 Station Name: Christina Lake Station Number: AMS 26 Start Time (MST): 10:28 End Time (MST): 13:21 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	-0.1		Correlation Coefficient	0.999999	≥0.995				
800.9	799.3	1.0020	- Correlation Coefficient	0.999999	20.993				
400.4	399.1	1.0033	Slope	0.997965	0.90 - 1.10				
200.2	199.9	1.0016	Slope	0.557505	0.90 - 1.10				
			- Intercept	-0.124030	+/-30				

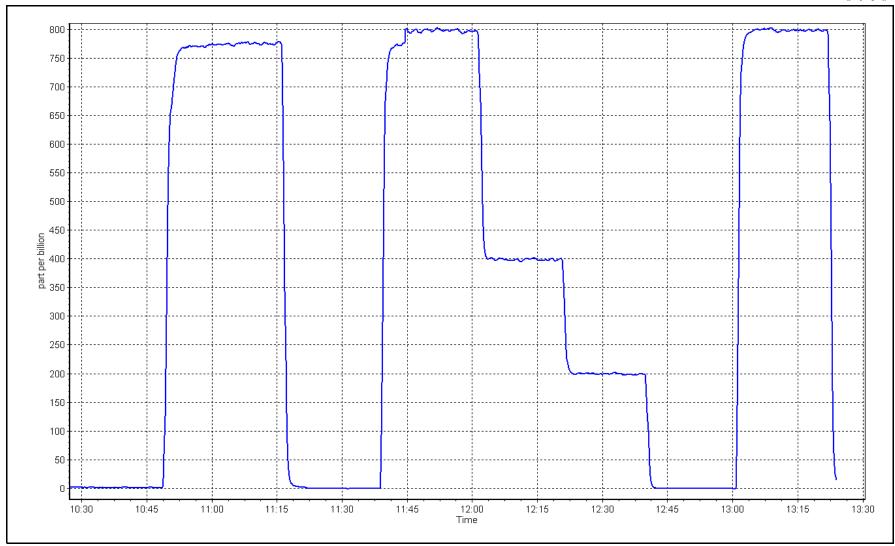


SO2 Calibration Plot

Date: January 23, 2024

Location: Christina Lake







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Christina Lake

Calibration Date: January 17, 2024

Start time (MST): 9:15 Reason: Routine Station number: AMS26

> Last Cal Date: December 19, 2023

End time (MST): 14:15

Calibration Standards

November 15, 2026 Cal Gas Concentration: 5.05 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: DT0014831

Removed Cal Gas Conc: Removed Gas Cyl #:

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

Rem Gas Exp Date: ppm

> Diff between cyl: 3253 Serial Number: 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> 1.001140 Backgd or Offset: Calibration slope: 1.003426 36.2 36.0 Calibration intercept: 0.238387 Coeff or Slope: -0.141605 1.095 1.115

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	-0.9	
as found span	4921	79.2	80.0	78.9	1.002
as found 2nd point	4960	39.6	40.0	38.9	1.005
as found 3rd point	4980	19.8	20.0	19.4	0.985
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	4921	79.2	80.0	80.2	0.997
second point	4960	39.6	40.0	40.5	0.988
third point	4980	19.8	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	80.0	80.9	0.989
SO2 Scrubber Check	4931	80.9	807.1	-0.5	
Date of last scrubber chang	ge:	27-Feb-19		Ave Corr Factor	0.990
Date of last converter efficiency test: efficiency					

Date of last converter efficiency test.								
Baseline Corr As found:	79.8	Prev response:	80.12	*% change:	-0.4%			
Baseline Corr 2nd AF pt:	39.8	AF Slope:	0.995996	AF Intercept:	-0.781590			
Danalina Cana 2nd AE nt.	20.2	A F C - + :	0.000000					

Baseline Corr 3rd AF pt: 20.3 AF Correlation: 0.999969

* = > +/-5% change initiates investigation

Notes:

Changed sample inlet filter after as founds. SO2 scrubber check after calibrator zero done and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro



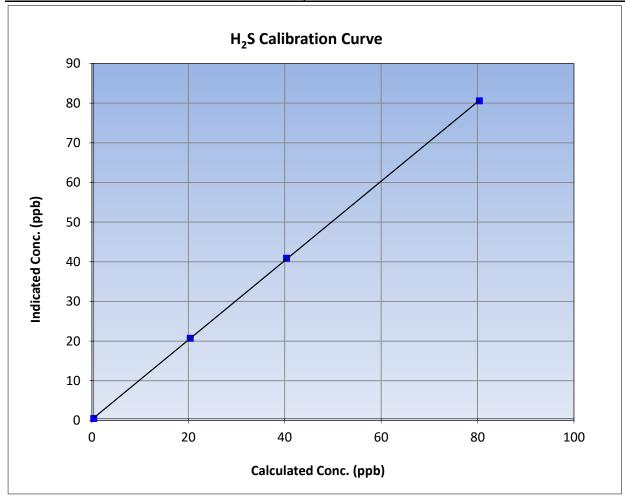
H₂S Calibration Summary

Version-11-2021

Station Information

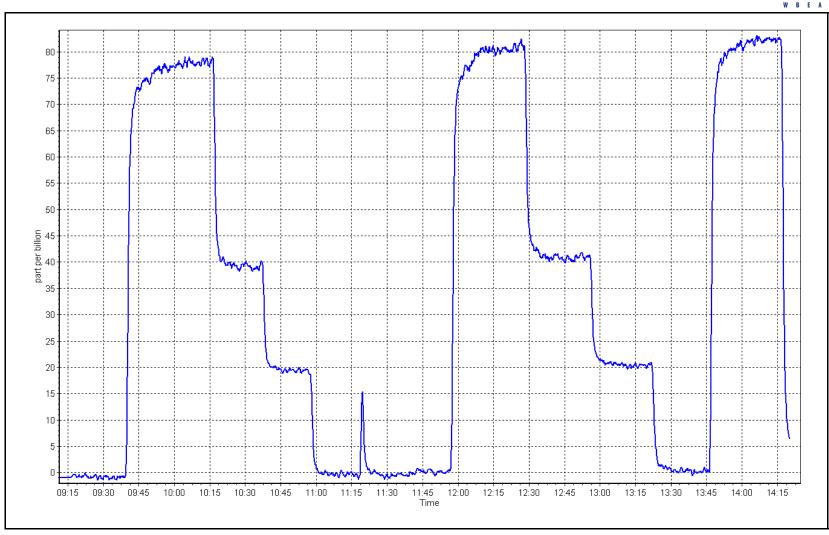
Calibration Date: January 17, 2024 **Previous Calibration:** December 19, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 9:15 End Time (MST): 14:15 Analyzer make: Thermo 450i Analyzer serial #: 1180030032

Calibration Data							
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999977	≥0.995		
80.0	80.2	0.9974	Correlation Coefficient	0.333311	20.993		
40.0	40.5	0.9876	Slope	1.001140	0.90 - 1.10		
20.0	20.3	0.9852	Slope	1.001140	0.90 - 1.10		
			- Intercept	0.238387	+/-3		



Date: January 17, 2024 Location: Christina Lake







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

ppm

Station Information

Station Name: Christina Lake

Calibration Date: January 16, 2024

Start time (MST): 11:17 Routine Reason:

Station number: AMS26

Last Cal Date: December 13, 2023

End time (MST): 16:56

Calibration Standards

NO Gas Cylinder #: CC755290 Cal Gas Expiry Date: January 3, 2031 NOX Cal Gas Conc: NO Cal Gas Conc: 48.90 48.70 ppm ppm

Removed Cylinder #: T2Y1P4C Removed Gas Exp Date: November 12, 2023

Removed Gas NO Conc: Removed Gas NOX Conc: 50.82 ppm 50.02 NOX gas Diff: NO gas Diff: 0.4% 0.5% 3253

Serial Number: Calibrator Model: **API T700** 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: 1.300 1.314 NO bkgnd or offset: 2.5 2.5 NOX coeff or slope: 0.997 0.990 NOX bkgnd or offset: 3.2 3.2 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 160.1 161.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.996416	1.000236
NO _x Cal Offset:	0.160000	0.306500
NO Cal Slope:	0.995088	1.001429
NO Cal Offset:	0.080000	0.426316
NO ₂ Cal Slope:	1.002313	0.997306
NO ₂ Cal Offset:	-0.019410	-0.717929



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	-0.6	-0.1	-0.6		
as found span	4920	80.0	813.1	800.3	12.8	812.0	796.6	15.1	1.0014	1.0047
as found 2nd										
as found 3rd										
new cyl resp	4918	82.1	802.9	799.6	3.3	806.0	798.9	6.7	0.9962	1.0009
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.6	0.1	-0.7		
high point	4918	82.1	802.9	799.6	3.3	803.0	801.0	2.0	0.9999	0.9983
second point	4959	41.1	401.9	400.3	1.6	402.7	401.6	1.1	0.9981	0.9968
third point	4980	20.5	200.5	199.7	0.8	201.8	200.6	1.1	0.9934	0.9953
as left zero	5000	0.0	0.0	0.0	0.0	-0.7	0.0	-0.7		
as left span	4918	82.1	802.9	400.7	402.2	796.2	413.9	382.4	1.0084	0.9682
							Average C	orrection Factor	0.9971	0.9968
Corrected As fo	ound NO _X =	812.6 ppb	NO =	796.7 ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	0.3%
Previous Respo	onse NO _X =	810.4 ppb	NO =	796.5 ppb				*Percent Chang	ge NO =	0.0%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	ord pt NO _X =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.5	401.6	402.2	400.4	1.0045	99.6%
2nd GPT point (200 ppb O3)	800.5	606.9	196.9	195.6	1.0066	99.3%
3rd GPT point (100 ppb O3)	800.5	704.9	98.9	97.9	1.0101	99.0%
				Average Correction Factor	1.0070	99.3%

Notes:

Changed sample inlet filter and NOx cylinder after as founds. Adjusted span only.

Calibration Performed By:

Jan Castro



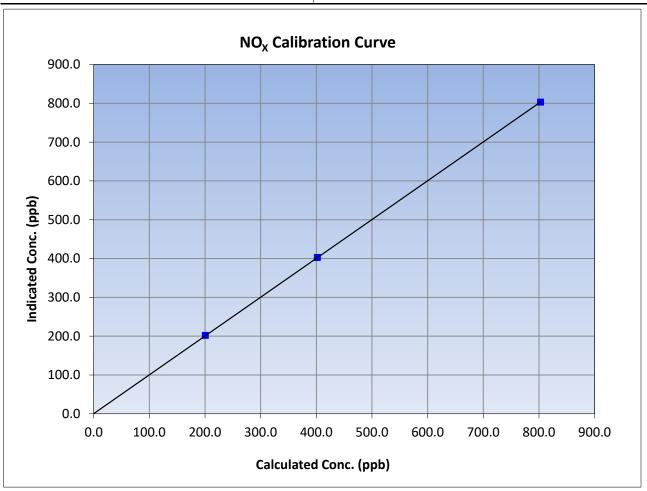
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 13, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 11:17 End Time (MST): 16:56 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.6		Correlation Coefficient	0.999994	≥0.995
802.9	803.0	0.9999	Correlation Coefficient	0.555554	20.333
401.9	402.7	0.9981	Slope	1.000236	0.90 - 1.10
200.5	201.8	0.9934	Slope	1.000230	0.90 - 1.10
			Intercept	0.306500	+/-20





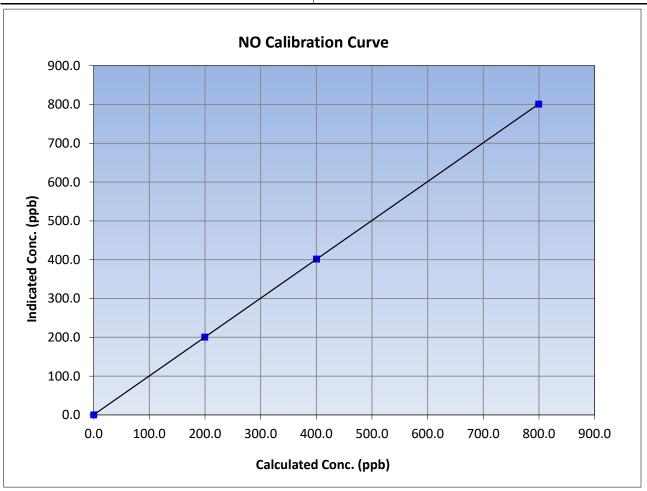
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 13, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 11:17 End Time (MST): 16:56 Analyzer make: Analyzer serial #: Thermo 42i 1173480006

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
799.6	801.0	0.9983	Correlation Coefficient	0.555555	20.993
400.3	401.6	0.9968	Slope	1.001429	0.90 - 1.10
199.7	200.6	0.9953	Slope	1.001429	0.90 - 1.10
			Intercept	0.426316	+/-20





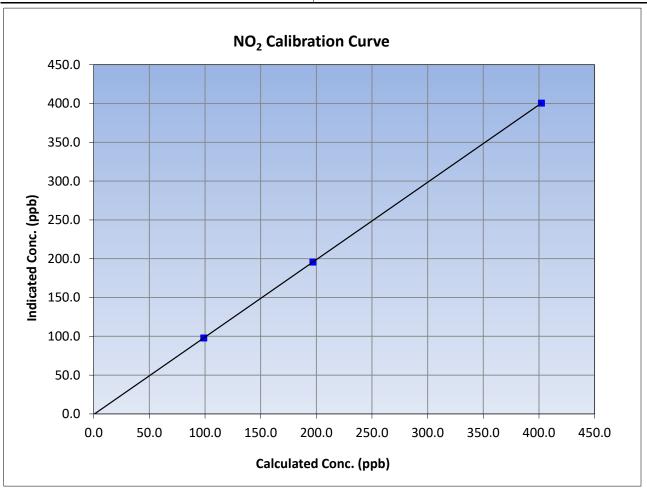
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 16, 2024 Previous Calibration: December 13, 2023 Station Name: Christina Lake Station Number: AMS26 Start Time (MST): 11:17 End Time (MST): 16:56 Analyzer serial #: Analyzer make: Thermo 42i 1173480006

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.7		Correlation Coefficient	1.000000	≥0.995	
402.2	400.4	1.0045	Correlation Coefficient	1.000000	≥0.993	
196.9	195.6	1.0066	Slope	0.997306	0.90 - 1.10	
98.9	97.9	1.0101	Slope	0.997300	0.90 - 1.10	
			Intercept	-0.717929	+/-20	

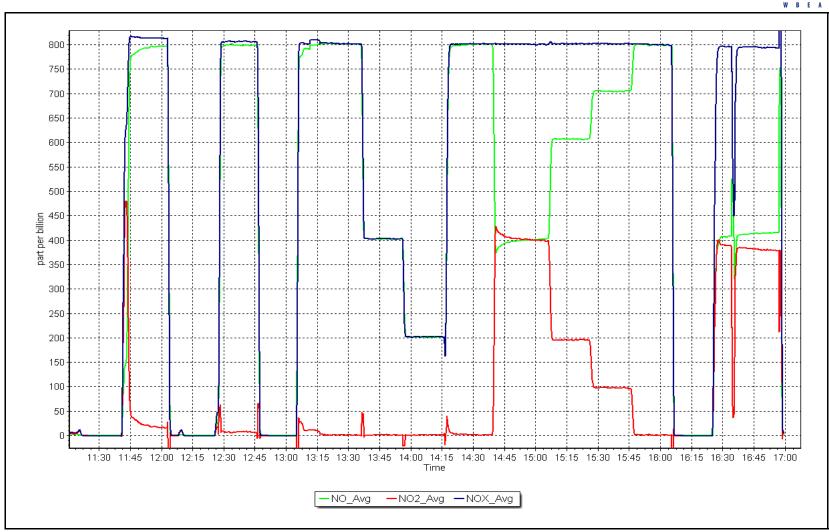


NO_x Calibration Plot

Date: January 16, 2024

Location: Christina Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Jackfish 2/3

Calibration Date: January 12, 2024

Start time (MST): 14:46

Routine Reason:

Station number: **AMS 27**

> December 12, 2023 Last Cal Date:

End time (MST): 17:35

Calibration Standards

Cal Gas Concentration: 50.58

Cal Gas Cylinder #: SG9133974BAL

Removed Cal Gas Conc: 50.58 Removed Gas Cyl #: <u>NA</u>

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

Baseline Corr 3rd AF pt:

ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 3811 Serial Number: 268

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 12124313138

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.989063 1.003874 Backgd or Offset: 7.6 7.8 Coeff or Slope: 0.950 0.977

Calibration intercept: -2.298638 -2.957498

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		
as found zero	5000	0.0	0.0	0.7	
as found span	4921	79.1	800.2	780.7	1.025
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.9	
high point	4921	79.1	800.2	801.8	0.998
second point	4961	39.5	399.5	397.5	1.005
third point	4980	19.8	200.3	193.4	1.036
as left zero	5000	0.0	0.0	0.9	
as left span	4921	79.1	800.2	804.6	0.994
·			Averag	ge Correction Factor	1.013

Baseline Corr As found: 780.00 789.11 *% change -1.2% Previous response

AF Correlation:

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

* = > +/-5% change initiates investigation

Start

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

Calibration Performed By: Mohammed Kashif

NA



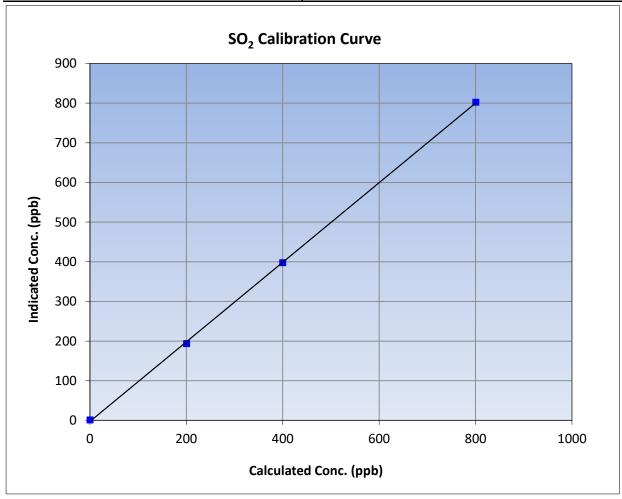
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 12, 2024 **Previous Calibration:** December 12, 2023 Station Name: Jackfish 2/3 Station Number: **AMS 27** Start Time (MST): 14:46 End Time (MST): 17:35 Analyzer make: Thermo 43iQ Analyzer serial #: 12124313138

	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>				
0.0	0.9		Correlation Coefficient	0.999887	≥0.995				
800.2	801.8	0.9980	Correlation coefficient	0.999007	20.993				
399.5	397.5	1.0051	Slope	1.003874	0.90 - 1.10				
200.3	193.4	1.0357	Slope	1.003674	0.90 - 1.10				
			- Intercept	-2.957498	+/-30				

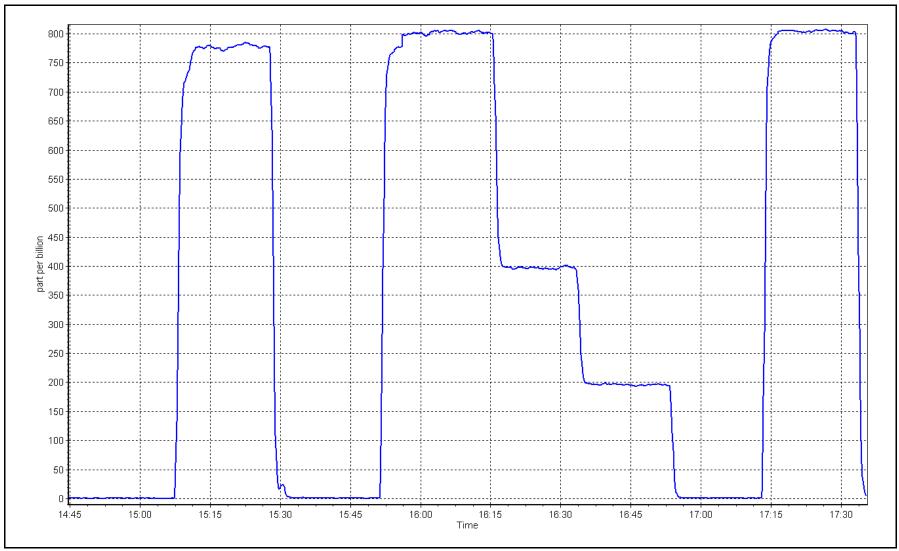


SO2 Calibration Plot

Date: January 12, 2024

Location: Jackfish 2/3







SO₂ Calibration Report

Version-01-2020

Station Information

Jackfish 2/3 Station Name: Calibration Date: January 27, 2024

Start time (MST): 12:18 Install Reason:

Station number: **AMS 27**

Last Cal Date: NA

End time (MST): 14:27

Calibration Standards

Cal Gas Concentration: 50.58

Cal Gas Cylinder #: SG9133974BAL

Removed Cal Gas Conc: 50.58 Removed Gas Cyl #: <u>NA</u>

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

ppm Cal Gas Exp Date: December 29, 2028

Rem Gas Exp Date: NA ppm

Diff between cyl:

Serial Number: 3811 Serial Number: 268

Analyzer Information

Analyzer make: Thermo 43iQ-TL

Analyzer Range 0 - 1000 ppb

Analyzer serial #: 1203169745

Start Finish Start Finish Calibration slope: 1.001831 Backgd or Offset: NA 2.4 NA Calibration intercept: NA -0.817522 Coeff or Slope: NA 0.774

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					
as found span					_
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	79.1	800.2	801.0	0.999
second point	4961	39.5	399.5	400.1	0.999
third point	4980	19.8	200.3	197.8	1.013
as left zero	5000	0.0	0.0	0.2	
as left span	4921	79.1	800.2	798.1	1.003
·			Averag	ge Correction Factor	1.003
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 initiates investigation

Notes: Installation calibrations. Adjusted span only.

Calibration Performed By: Jan Castro



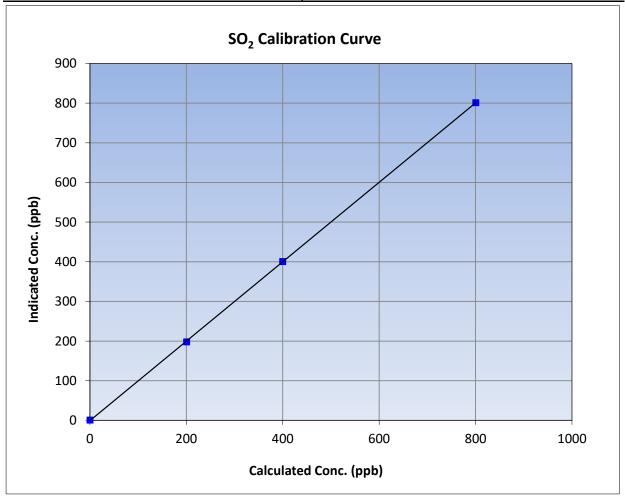
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 27, 2024 **Previous Calibration:** NA Station Name: Jackfish 2/3 Station Number: **AMS 27** Start Time (MST): 12:18 End Time (MST): 14:27 Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1203169745

	Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.4		Correlation Coefficient	0.999982	≥0.995					
800.2	801.0	0.9990	Correlation coefficient	0.999982	20.333					
399.5	400.1	0.9986	Slope	1.001831	0.90 - 1.10					
200.3	197.8	1.0127	- зюре	1.001651	0.90 - 1.10					
			- Intercept	-0.817522	+/-30					



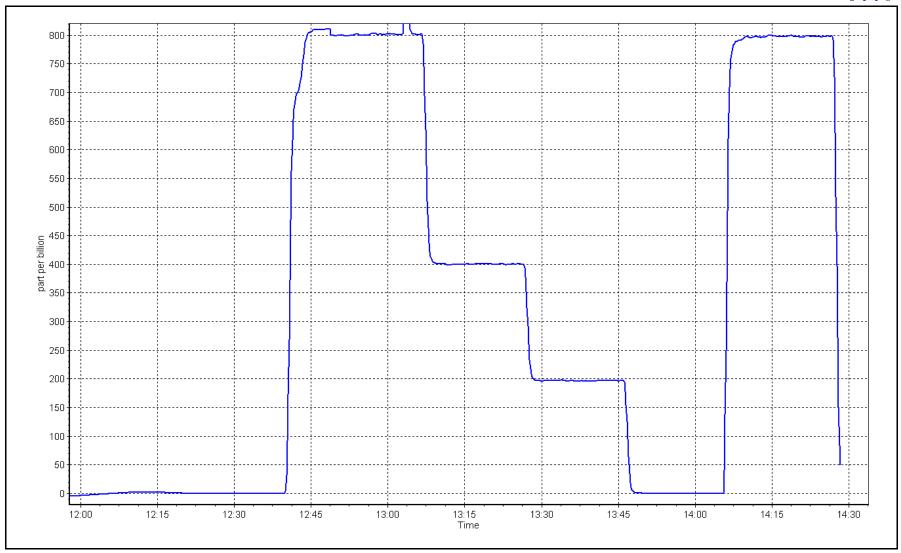
SO2 Calibration Plot

Date:

January 27, 2024

Location: Jackfish 2/3







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Jackfish 2/3

Calibration Date: January 12, 2024

Start time (MST): 8:21 Reason: Routine Station number: AMS27

Last Cal Date: December 11, 2023

End time (MST): 14:45

Calibration Standards

Cal Gas Concentration: Cal Gas Exp Date: January 4, 2025 5.41 ppm

ppm

Cal Gas Cylinder #: CC345023

Removed Cal Gas Conc: 5.41 Removed Gas Cyl #: NA

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

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 3811 Serial Number: 268

Analyzer Information

Analyzer make: **API T101** Analyzer serial #: 621 Converter serial #:

Converter make:

Analyzer Range 0 - 100 ppb

> **Finish** <u>Start</u> 1.010462

Calibration slope: 1.007470 Calibration intercept: -0.217773 <u>Start</u>

Backgd or Offset: Coeff or Slope:

29.9 0.953 <u>Finish</u> 29.9 1.013

H₂S As Found Data

0.002360

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.4	
as found span	4926	74.1	80.2	76.0	1.049
as found 2nd point	4963	37.0	40.0	37.9	1.045
as found 3rd point	4982	18.5	20.0	18.7	1.048
new cylinder response					

H₂S Calibration Data

Set Point	Set Point Dilution air flow rate Source ga (sccm) (sc		Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4926	74.1	80.2	81.0	0.990
second point	4963	37.0	40.0	40.7	0.984
third point	4982	18.5	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.1	
as left span	4926	74.1	80.2	80.6	0.995
SO2 Scrubber Check	4921	79.1	791.0	-0.1	
Date of last scrubber chan	ge:			Ave Corr Factor	0.995
		<u> </u>	<u> </u>	•	

Date of last scrubber change	2:			Ave Corr Factor	0.995	
Date of last converter efficie	ency test:			e	fficiency	
Baseline Corr As found:	76.4	Prev response:	80.56	*% change:	-5.4%	

Baseline Corr 2nd AF pt: 38.3 AF Slope: 0.953017 Baseline Corr 3rd AF pt: AF Correlation: 0.999995 19.1

AF Intercept: -0.358868

* = > +/-5% change initiates investigation Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator

Notes: zero. Adjusted span only.

Calibration Performed By: Mohammed Kashif



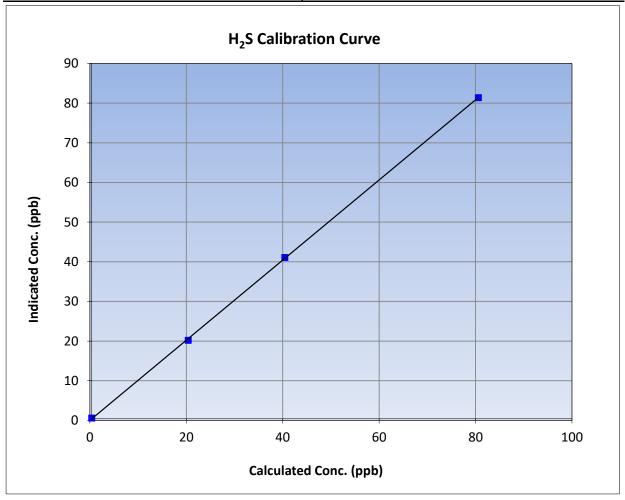
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 12, 2024 **Previous Calibration:** December 11, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 8:21 End Time (MST): 14:45 Analyzer make: API T101 Analyzer serial #: 621

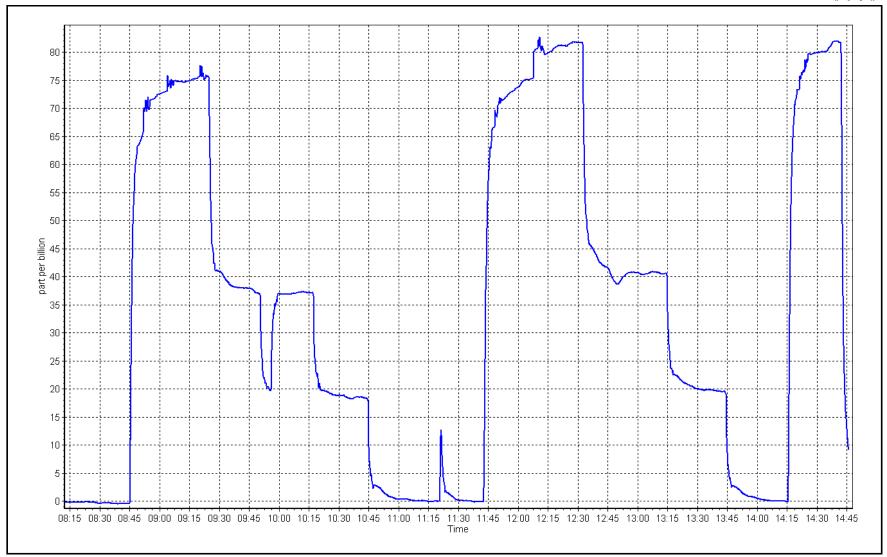
	Calibration Data								
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	0.2		Correlation Coefficient	0.999922	≥0.995				
80.2	81.0	0.9898	Correlation Coefficient	0.333322	20.993				
40.0	40.7	0.9836	Slope	1.010462	0.90 - 1.10				
20.0	19.8	1.0109	Slope	1.010402	0.90 - 1.10				
			- Intercept	0.002360	+/-3				



Date: January 12, 2024

Location: Jackfish 2/3







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Jackfish 2/3

Calibration Date: January 11, 2024

Start time (MST): 12:17 Routine Reason:

Station number: AMS27

Last Cal Date: December 12, 2023

50.40

ppm

End time (MST): 17:58

Calibration Standards

NO Gas Cylinder #: T2Y1P35 Cal Gas Expiry Date: December 11, 2023 NOX Cal Gas Conc: NO Cal Gas Conc: 50.40 51.44 ppm ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: Removed Gas NO Conc: 51.44 ppm

NOX gas Diff:

NO gas Diff: 3811 Calibrator Model: **API T700** Serial Number: ZAG make/model: **API T701** Serial Number: 268

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 722

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.193	1.193	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.169	1.169	NOX bkgnd or offset:	1.2	1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.2	3.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997956	0.992430
NO _x Cal Offset:	-3.637422	-3.538303
NO Cal Slope:	0.996647	0.998816
NO Cal Offset:	-3.021240	-3.680579
NO ₂ Cal Slope:	0.990498	0.979539
NO ₂ Cal Offset:	-1.079298	-1.570350



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibration	ı Data				
Set Point	Dilution flow rate (sccm)	Source gas flow	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.3	-0.4		
as found span	4921	79.4	816.8	800.3	16.5	809.0	793.9	15.1	1.0096	1.0080
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.4	-0.6		
high point	4921	79.4	816.8	800.3	16.5	808.9	798.3	10.6	1.0098	1.0025
second point	4960	39.7	408.5	400.2	8.3	399.8	392.2	7.6	1.0217	1.0204
third point	4980	19.8	203.7	199.6	4.1	195.4	192.8	2.6	1.0425	1.0352
as left zero	5000	0.0	0.0	0.0	0.0	0.9	0.9	0.0		
as left span	4921	79.4	816.8	430.6	402.5	800.1	414.0	386.2	1.0209	1.0401
							Average Co	orrection Factor	1.0247	1.0194
Corrected As fo	ound NO _X =	809.7 ppb	NO =	794.2 ppb	* = > +/-5%	change initiates i	investigation	*Percent Chang	ge NO _x =	-0.2%
Previous Respo	onse NO _X =	811.5 ppb	NO =	794.6 ppb				*Percent Chang	ge NO =	0.0%
Baseline Corr 2			NO =		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:	:
				G	GPT Calibration D	Data				
O3 Setpo	oint (ppb)	Indicated NO Refero		cated NO Drop entration (ppb)	Calculated NO2 concentration (ppb		dicated NO2 atration (ppb) (Ic)	NO2 Correction fac Calibration Limit = 0 As Found Limit = 0	0.95-1.05	erter Efficiency on Limit = 96-104%
as found	l GPT zero									
as found GPT poi	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	796.7		410.7	402.5		393.4	1.0232	<u> </u>	97.7%
2nd GPT poin	it (200 ppb O3)	796.7		620.8	192.4		185.7	1.0362	<u> </u>	96.5%
3rd GPT poin	t (100 ppb O3)	796.7		711.2	102.0		97.9	1.0420)	96.0%
						Average Co	rrection Factor	1.0338	3	96.7%

Notes:

Changed sample inlet filter after as founds. No adjustments made. Third GPT point barely passed intending to investigate further.

Calibration Performed By:

Mohammed Kashif



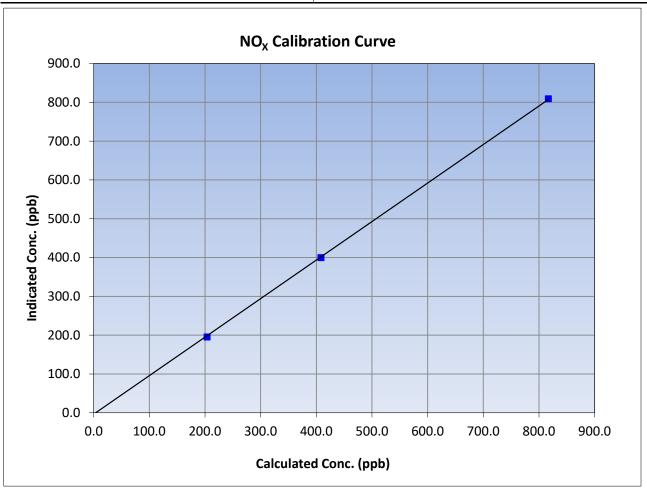
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 12, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 12:17 End Time (MST): 17:58 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	0.999917	≥0.995
816.8	808.9	1.0098	Correlation Coefficient	0.555517	20.333
408.5	399.8	1.0217	Slope	0.992430	0.90 - 1.10
203.7	195.4	1.0425	Slope		0.90 - 1.10
			Intercept	-3.538303	+/-20





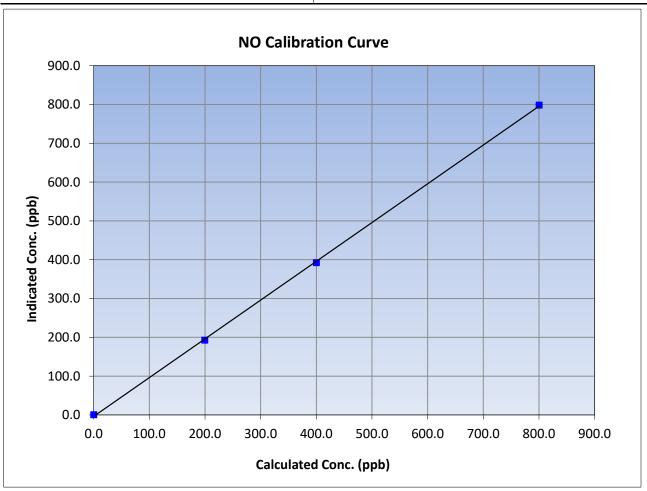
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 12, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 12:17 End Time (MST): 17:58 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	0.4		Correlation Coefficient	0.999866	≥0.995
800.3	798.3	1.0025	Correlation Coefficient	0.555000	20.333
400.2	392.2	1.0204	Slope	0.998816	0.90 - 1.10
199.6	192.8	1.0352	Slope		0.90 - 1.10
			Intercept	-3.680579	+/-20





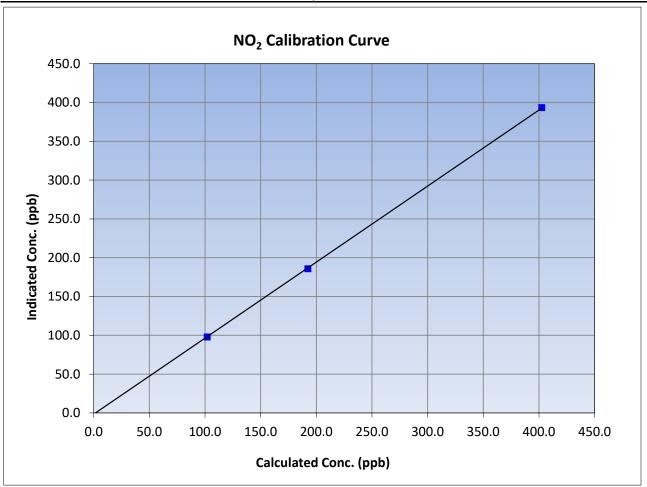
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 12, 2023 Station Name: Jackfish 2/3 Station Number: AMS27 Start Time (MST): 12:17 End Time (MST): 17:58 Analyzer serial #: Analyzer make: 722 **API T200**

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.6		Correlation Coefficient	0.999963	≥0.995
402.5	393.4	1.0232	Correlation Coefficient	0.555505	20.993
192.4	185.7	1.0362	Slone	0.979539	0.90 - 1.10
102.0	97.9	1.0420	Slope		0.90 - 1.10
			Intercept	-1.570350	+/-20

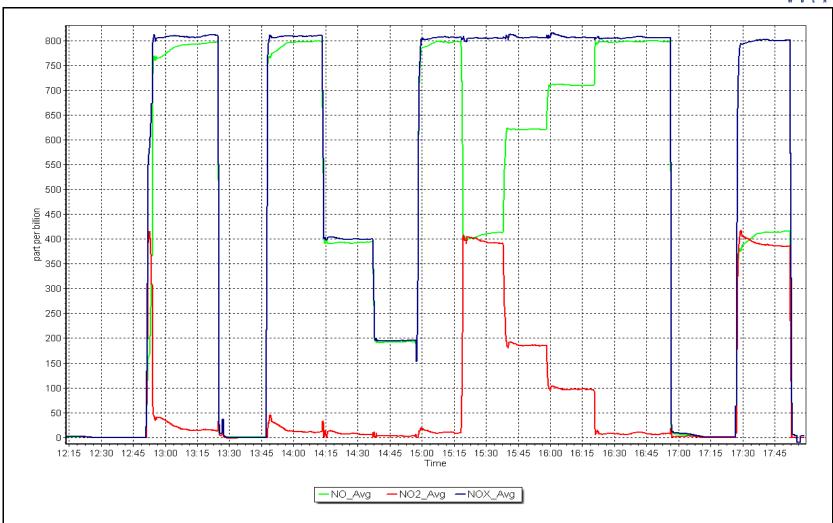


NO_x Calibration Plot

Date: January 11, 2024

Location: Jackfish 2/3







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Surmont 2

Calibration Date: January 5, 2024

Start time (MST): 11:06 Routine Reason:

Station number: AMS29

December 1, 2023 Last Cal Date:

End time (MST):

15:58

Calibration Standards

Cal Gas Concentration: 49.21

Cal Gas Cylinder #: CC356008

Removed Cal Gas Conc: 49.21 Removed Gas Cyl #: <u>NA</u>

Calibrator Make/Model: Teledyne API T700 ZAG Make/Model: Teledyne API T701 Cal Gas Exp Date: February 23, 2025

Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 5472 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1170050150

ppm

ppm

Analyzer Range 0 - 1000 ppb

Finish Start

1.006697 Calibration slope: 1.001159 Calibration intercept: -1.824842 -1.385825

Start Backgd or Offset: 12.5 Coeff or Slope: 0.937 **Finish** 13.5 0.976

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	0.4	
as found span	4919	81.3	800.1	770.7	1.038
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4919	81.3	800.1	800.2	1.000
second point	4959	40.7	400.6	399.4	1.003
third point	4979	20.3	199.8	197.0	1.014
as left zero	5000	0.0	0.0	-0.1	
as left span	4919	81.3	800.1	802.0	0.998
·			Averag	ge Correction Factor	1.006

Baseline Corr As found: 770.30 Previous response 803.64 -4.3% *% 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 sample inlet filter after as founds. Adjusted zero and span.

Calibration Performed By: **Braiden Boutilier**



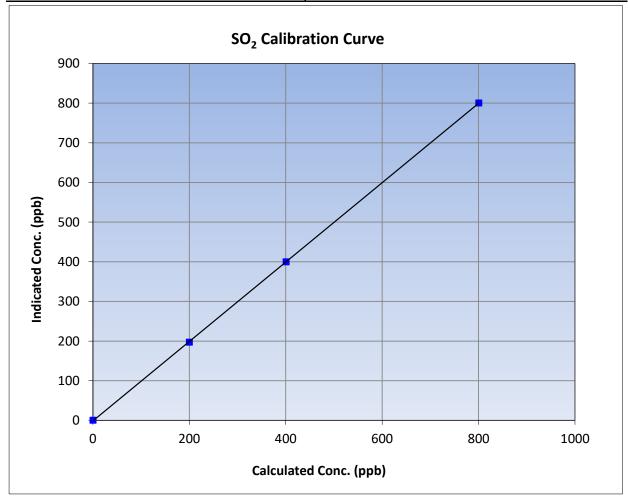
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 5, 2024 **Previous Calibration:** December 1, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 11:06 End Time (MST): 15:58 Analyzer make: Thermo 43i Analyzer serial #: 1170050150

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999986	≥0.995			
800.1	800.2	0.9999	Correlation coefficient	0.333360	20.993			
400.6	399.4	1.0030	Slope	1.001159	0.90 - 1.10			
199.8	197.0	1.0143	Siope	1.001139	0.90 - 1.10			
			- Intercept	-1.385825	+/-30			



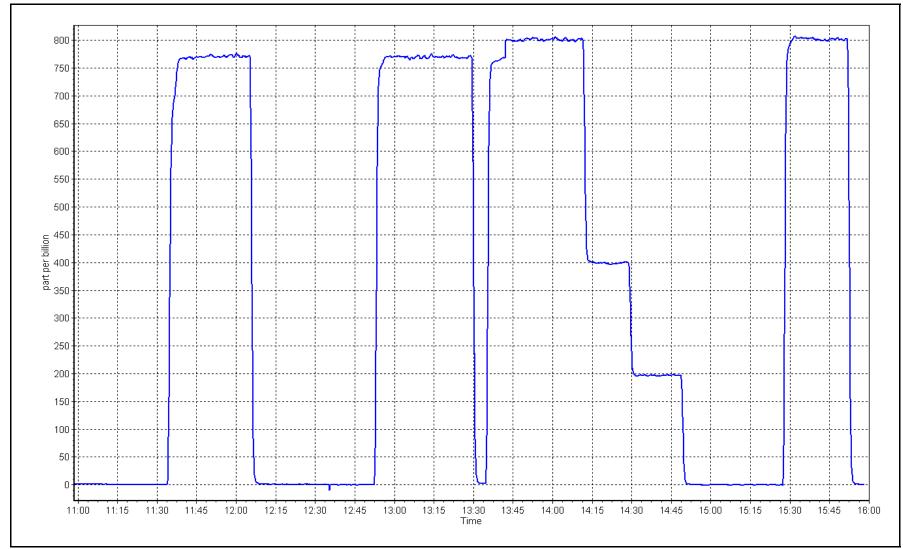
SO2 Calibration Plot

Date:

January 5, 2024

Location: Surmont 2







H₂S Calibration Report

Station number:

Version-11-2021

Station Information

Station Name: Surmont 2

Calibration Date: January 3, 2024

Start time (MST): 10:42 Reason: Routine Last Cal Date:

End time (MST): 15:02

AMS29

December 4, 2023

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 #: 2022-220 Converter make:

0 - 100 ppb Analyzer Range

Finish Start <u>Finish</u> <u>Start</u> 1.003331 1.004616 Backgd or Offset: Calibration slope: 0.92 0.92 Calibration intercept: -0.102938 -0.082920 Coeff or Slope: 1.074 1.074

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	74.2	80.0	80.6	0.991
as found 2nd point	4963	37.2	40.1	40.3	0.993
as found 3rd point	4982	18.6	20.1	20.0	0.998
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	40.2	0.998
third point	4982	18.6	20.1	19.9	1.008
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.2	80.0	80.3	0.996
SO2 Scrubber Check	4919	81.3	813.0	0.0	
Date of last scrubber chan	ge:			Ave Corr Factor	1.001

Date of last scrubber change:	Ave Corr Factor	1.001
Date of last converter efficiency test:		efficiency
	 4	

80.7 Baseline Corr As found: Prev response: 80.19 *% change: 0.6% -0.163146 Baseline Corr 2nd AF pt: 40.4 AF Slope: 1.009188 AF Intercept: AF Correlation: 0.999997 Baseline Corr 3rd AF pt: 20.1 * = > +/-5% change initiates investigation

Changed sample inlet filter after as founds. No adjustments made. Scrubber check done after cal Notes: zero, passed.

Calibration Performed By: Braiden Boutilier



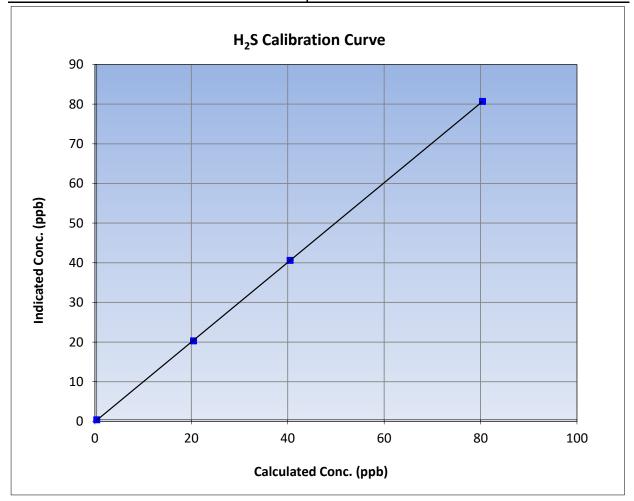
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 4, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:42 End Time (MST): 15:02 Analyzer make: Thermo 43iQ-TLE Analyzer serial #: 1200326170

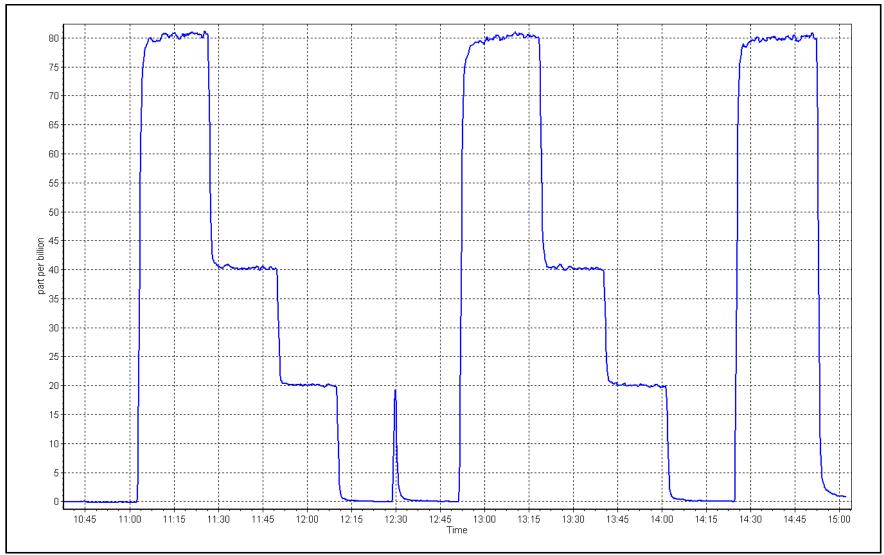
Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	0.0		Correlation Coefficient	0.999991	≥0.995			
80.0	80.3	0.9963	Correlation Coefficient	0.555551	20.333			
40.1	40.2	0.9977	Slope	1.004616	0.90 - 1.10			
20.1	19.9	1.0077	Slope		0.90 - 1.10			
			- Intercept	-0.102938	+/-3			



Date: January 3, 2024

Location: Surmont 2







THC Calibration Report

Version-01-2020

Station Information

Station Name: Surmont 2

Calibration Date: January 5, 2024

Start time (MST): 11:06

Routine Reason:

Station number: AMS29

> December 1, 2023 Last Cal Date:

End time (MST): 15:58

Calibration Standards

CC356008 Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025

CH4 Cal Gas Conc. 499.0 ppm CH4 Equiv Conc. 1064.7 ppm

C3H8 Cal Gas Conc. 205.7 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 499.0 CH4 Equiv Conc. 1064.7 ppm ppm

205.7 Diff between cyl: Removed C3H8 Conc. ppm

Calibrator Make/Model: Teledyne API T700 Serial Number: 5472 ZAG Make/Model: Teledyne API T701 Serial Number: 4297

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Analyzer Range: 0 - 20 ppm

Start Finish Finish Start Calibration slope: Background: 1.007452 1.001735 3.45 3.62

-0.005651 Coefficient: Calibration intercept: -0.027439 4.017 4.021

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.12	
as found span	4918	81.3	17.31	17.60	0.984
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	
high point	4918	81.3	17.31	17.36	0.997
second point	4959	40.6	8.65	8.62	1.003
third point	4979	20.3	4.32	4.31	1.003
as left zero	5000	0.0	0.00	0.13	
as left span	4918	81.3	17.31	17.66	0.980
			Aver	age Correction Factor	1.001
Baseline Corr As found:	17.48	Previous response	17.42	*% change	0.4%

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

Notes: Adjusted zero and span. Excessive noise fixed after reconnecting ethernet cable.

Calibration Performed By: **Braiden Boutilier**



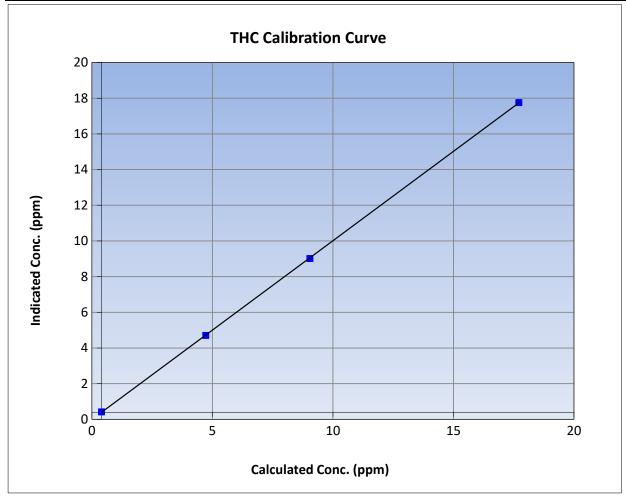
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: December 1, 2023 Calibration Date: January 5, 2024 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 11:06 End Time (MST): 15:58 Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Calibration Data								
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation <u>Limits</u>		<u>Limits</u>			
0.00	0.02		Correlation Coefficient	0.999983	≥0.995			
17.31	17.36	0.9974	Correlation Coefficient	0.999965	20.995			
8.65	8.62	1.0030	Slope	1.001735	0.90 - 1.10			
4.32	4.31	1.0033	Slope	1.001/33	0.90 - 1.10			
			- Intercept	-0.005651	+/-1.5			

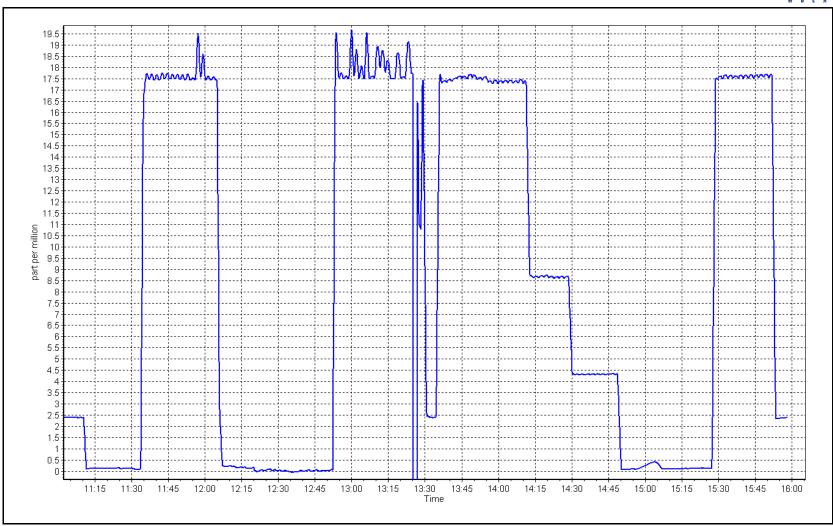


THC Calibration Plot

Date: January 5, 2024

Location: Surmont 2







NO_X \ NO \ NO₂ Calibration Report

Station number: AMS29

End time (MST): 16:24

NO gas Diff:

Last Cal Date: December 5, 2023

Version-04-2020

Station Information

Station Name: Surmont 2

Calibration Date: January 4, 2024

Start time (MST): 10:46

Reason: Routine

Calibration Standards

NO Gas Cylinder #: T12YYFE Cal Gas Expiry Date: October 30, 2024

NOX Cal Gas Conc: 47.46 ppm NO Cal Gas Conc: 47.46 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.46 ppm Removed Gas NO Conc: 47.46 ppm

NOX gas Diff:

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:	1.374	1.390	NO bkgnd or offset:	1.3	1.4
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	1.4	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	173.5	176.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999051	0.998364
NO _x Cal Offset:	0.087651	-0.271978
NO Cal Slope:	1.000223	0.997476
NO Cal Offset:	-1.272240	-0.811525
NO ₂ Cal Slope:	1.001015	1.004575
NO ₂ Cal Offset:	0.481350	0.126759



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilı	ution Calibratior	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	-0.2	-0.3	0.1		
as found span	4916	84.2	799.2	799.2	0.0	793.5	790.0	3.5	1.0072	1.0116
as found 2nd		-								
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4916	84.2	799.2	799.2	0.0	797.0	796.0	0.9	1.0028	1.0040
second point	4958	42.1	399.6	399.6	0.0	400.7	399.6	1.1	0.9973	1.0000
third point	4979	21.1	200.3	200.3	0.0	198.1	196.8	1.4	1.0110	1.0177
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as left span	4916	84.2	799.2	407.2	392.0	792.6	401.0	391.6	1.0083	1.0154
							Average C	Correction Factor	1.0037	1.0072
Corrected As fo	ound NO _X =	793.7 ppb	NO =	790.3 ppb	* = > +/-5%	% change initiates in	investigation	*Percent Chang	ge NO _X =	-0.6%
Previous Respo	onse NO _X =	798.5 ppb	NO =	798.1 ppb				*Percent Chang	ge NO =	-1.0%
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 3rd pt $NO_X = NA$		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 [Data				
O3 Setpo	oint (ppb)	Indicated NO Referen concentration (ppb)		cated NO Drop entration (ppb)	Calculated NO concentration (ppb		dicated 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	d GPT zero									
as found GPT po	oint (400 ppb NO2)									
as found GPT po	oint (200 ppb NO2)									
as found GPT po	oint (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	792.4		400.4	392.0		394.3	0.9942	2	100.6%
	+ (200 pph O2)	792.4		602.1	190.3		190.0	1.0016	6	99.8%
2nd GPT poin	it (200 ppb 03)	752.4								
	nt (100 ppb O3)	792.4		698.6	93.8		95.4	0.9832	2 :	101.7%

Notes:

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:

Braiden Boutilier



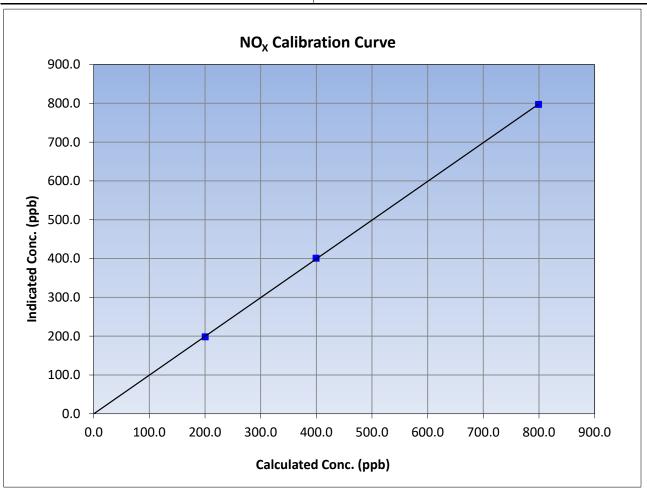
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 Previous Calibration: December 5, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:46 End Time (MST): 16:24 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Statistical Eval		ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999980	≥0.995	
799.2	797.0	1.0028	Correlation Coefficient	0.999980	20.333	
399.6	400.7	0.9973	Slope	0.998364	0.90 - 1.10	
200.3	198.1	1.0110	Slope	0.996504	0.90 - 1.10	
			Intercept	-0.271978	+/-20	





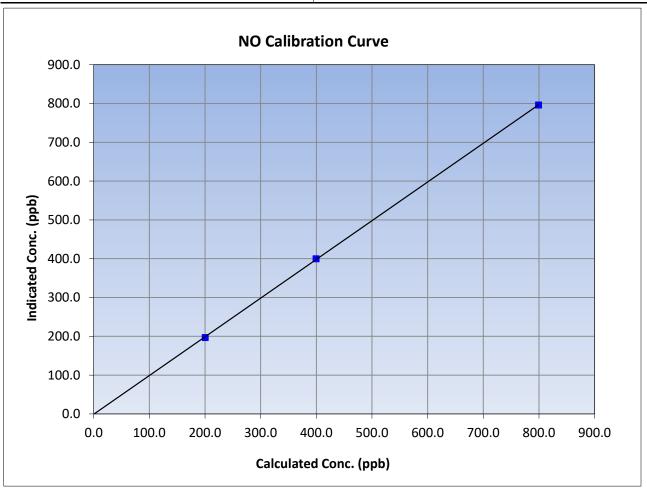
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 Previous Calibration: December 5, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:46 End Time (MST): 16:24 Analyzer make: Thermo 42i Analyzer serial #: 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Statistical Evaluation		ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999975	≥0.995	
799.2	796.0	1.0040	Correlation Coefficient	0.555575	20.333	
399.6	399.6	1.0000	Slope	0.997476	0.90 - 1.10	
200.3	196.8	1.0177	Slope	0.997476	0.90 - 1.10	
			Intercept	-0.811525	+/-20	





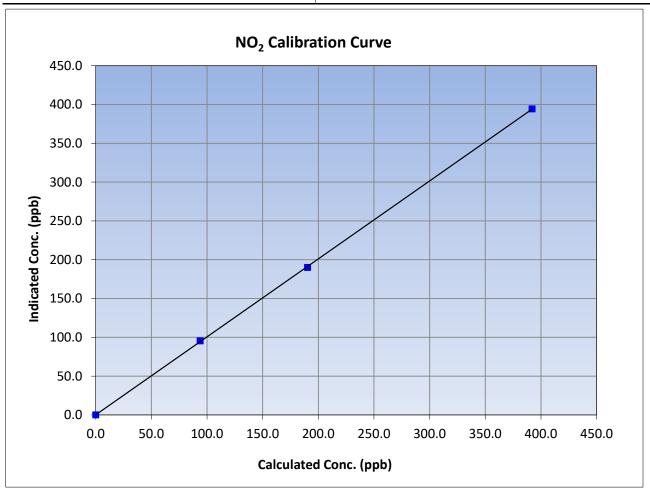
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 4, 2024 Previous Calibration: December 5, 2023 Station Name: Surmont 2 Station Number: AMS29 Start Time (MST): 10:46 End Time (MST): 16:24 Analyzer serial #: Analyzer make: Thermo 42i 1170050148

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	orrection factor (Cc/lc) Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999966	≥0.995	
392.0	394.3	0.9942	Correlation Coefficient	0.555500	20.333	
190.3	190.0	1.0016	Slope	1.004575	0.90 - 1.10	
93.8	95.4	0.9832	Slope	1.004373	0.30 - 1.10	
			Intercept	0.126759	+/-20	

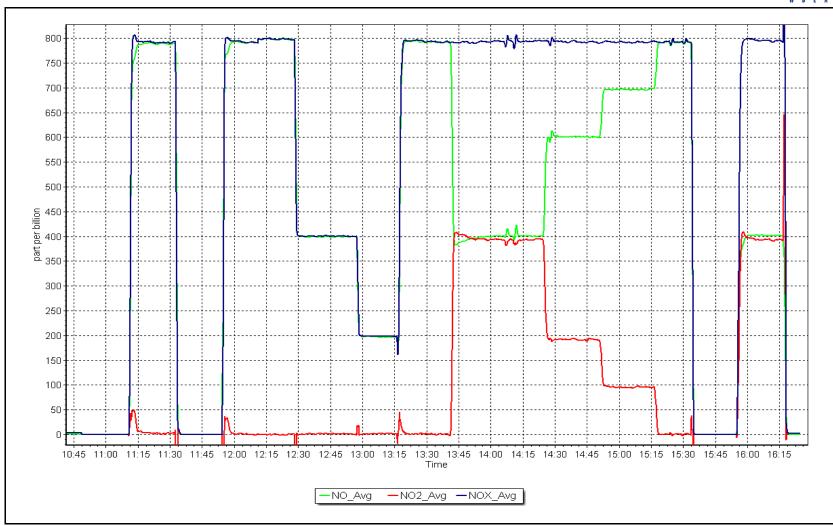


NO_x Calibration Plot

Date:

January 4, 2024 Location: Surmont 2







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	l			
Station Name:	Surmont 2		Station number:			
Calibration Date: Start time (MST):	January 4, 2024 11:40		Last Cal Date: End time (MST):		1, 2023	
Start time (WST).	11.40		Life time (14151).	14.05		
Analyzer Make:	API T640		S/N:	253		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388754		
Temp/RH standard:	Alicat FP-25BT		S/N:	388754		
		Monthly Calibration To	est			
<u>Parameter</u>	As found	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-16.8	-17.27	-16.8			+/- 2 °C
P (mmHg)	711.0	711.28	711.0			+/- 10 mmHg
flow (LPM)	4.95	4.946	4.95			+/- 0.25 LPM
Leak Test:	Date of check:	January 4, 2024	Last Cal Date:	Decembe	er 1, 2023	
A	PM w/o HEPA:	2.9	PM w/ HEPA:		0	<0.2 ug/m3
Note: this leak check will be	•	· ·	erve as the pre ma	intenance i	еак спеск	
Inlet cleaning:	Inlet Head					
		Quarterly Calibration 1	est			
<u>Parameter</u>	As found	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test						11.3 +/- 0.5
Post-maintenance	a laak chack:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham		October 25,	W/ IILFA.		<0.2 ug/m3	
Disposable Filte	-	October 25,				
	- -					
		Annual Maintenanc	e			
Date Sample Tub	oe Cleaned:	October 25, 2023				
Date RH/T Sensor Cleaned:		October 25,				
Notes:		No adjustments	made. Leak check p	oassed.		
Calibration by:	Braiden Boutilier					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Ells River

Calibration Date: January 3, 2024

Start time (MST): 12:27 Routine Reason:

Station number: **AMS 30**

December 1, 2023 Last Cal Date:

End time (MST): 15:33

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** ppm

Rem Gas Exp Date: ppm

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 3061 Serial Number: 358

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 0.999175 Calibration intercept: -2.535883

1.001174 -1.736008 Backgd or Offset: Coeff or Slope: <u>Start</u> 9.5 0.982

December 29, 2028

Finish 9.5 0.982

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	4921	79.2	800.4	800.1	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.2	800.4	800.0	1.000
second point	4960	39.6	400.2	399.5	1.002
third point	4980	19.8	200.1	195.8	1.022
as left zero	5000	0.0	0.0	-0.1	
as left span	4921	79.2	800.4	801.7	0.998
·			Averag	ge Correction Factor	1.008
Baseline Corr As found:	800.40	Previous response	9 797.17	*% change	0.4%

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

* = > +/-5% change initiates investigation

Notes: Inlet filter changed after As Founds, no adjustments made.

Calibration Performed By: Jan Castro



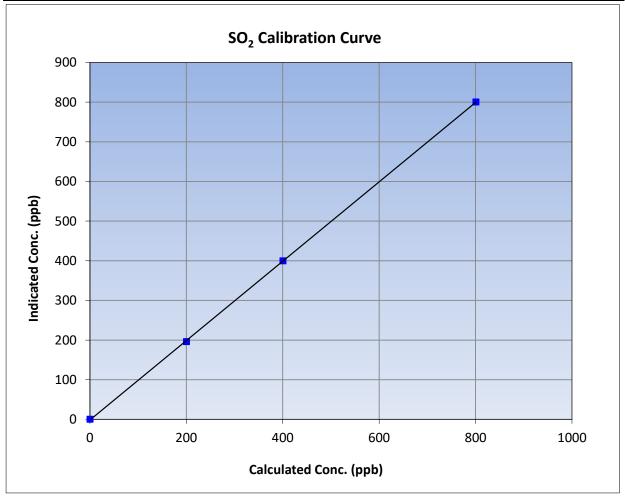
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 1, 2023 Station Name: Ells River Station Number: AMS 30 Start Time (MST): 12:27 End Time (MST): 15:33 Analyzer make: Thermo 43i Analyzer serial #: 1008841397

Calibration Data							
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999967	≥0.995		
800.4	0.008	1.0005	Correlation Coefficient	0.555507	20.995		
400.2	399.5	1.0018	Slope	1.001174	0.90 - 1.10		
200.1	195.8	1.0220	Зюре	1.001174	0.90 - 1.10		
			- Intercept	-1.736008	+/-30		



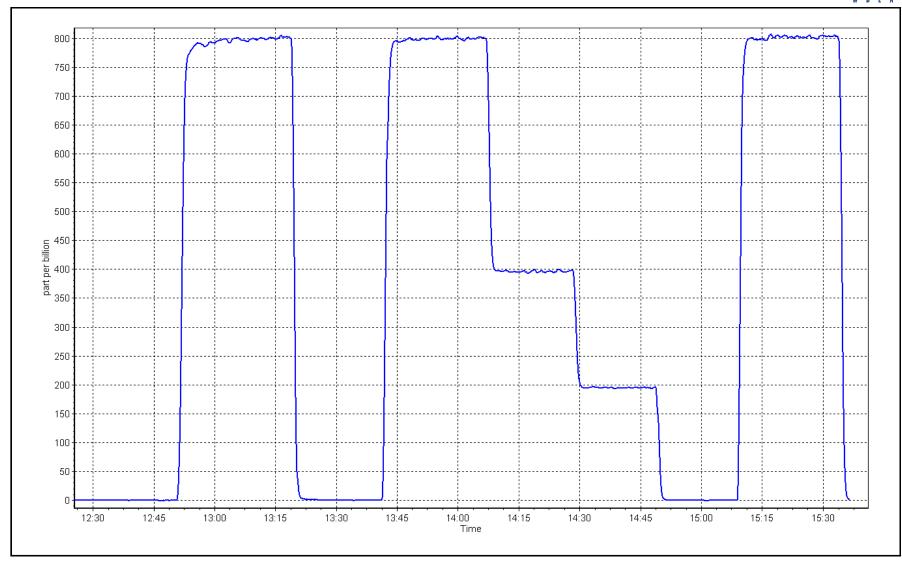
SO2 Calibration Plot

Date:

January 3, 2024

Location: Ells River







TRS Calibration Report

Version-11-2021

Station Information

Station Name: Ells River

Calibration Date: January 18, 2024

Start time (MST): 10:40 Reason: Routine

Station number: AMS30

> Last Cal Date: December 15, 2023

End time (MST): 15:31

Calibration Standards

Cal Gas Concentration: November 15, 2026 4.99 ppm Cal Gas Exp Date:

Cal Gas Cylinder #: CC505806

Rem Gas Exp Date: February 9, 2024 Removed Cal Gas Conc: 5.08 ppm

Removed Gas Cyl #: EY0002443 Diff between cyl: 2.3% 3061 Calibrator Make/Model: API T700 Serial Number: 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

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> Calibration slope: 1.000065 1.005472 Backgd or Offset: 2.05 1.57 0.020811 -0.120388 Calibration intercept: Coeff or Slope: 1.100 1.072

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	80.3	0.996
as found 2nd point					
as found 3rd point					
new cylinder response	4920	80.2	80.0	82.3	0.972

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4920	80.2	80.0	80.4	0.995
second point	4960	40.1	40.0	40.0	1.000
third point	4980	20.0	20.0	20.0	0.998
as left zero	5000	0.0	0.0	0.4	
as left span	4920	80.2	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.2	800.4	-0.1	
Date of last scrubber chang	ge:	N/A		Ave Corr Factor	0.998
- 44					

Date of last scrubber change:	N/A	Ave Corr Factor 0.998	
Date of last converter efficiency test:	N/A	efficiency	

Baseline Corr As found: 80.3 Prev response: 79.99 *% change: 0.4% Baseline Corr 2nd AF pt: NA AF Slope: NA AF Intercept: NA AF Correlation: Baseline Corr 3rd AF pt: NA NA * = > +/-5% change initiates investigation

Change inlet filters and H2S cylinder after as founds. SOx scrubber check done after calibrator Notes: zero, passed. Adjusted zero and span.

Calibration Performed By: Jan Castro



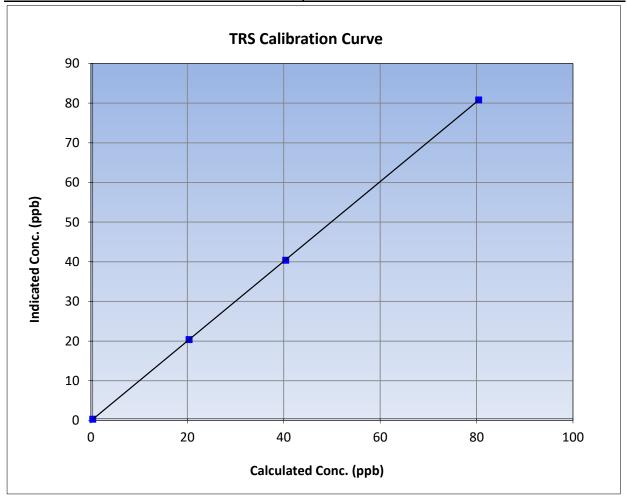
TRS Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 18, 2024 **Previous Calibration:** December 15, 2023 Station Name: Ells River Station Number: AMS30 Start Time (MST): 10:40 End Time (MST): 15:31 Analyzer make: Thermo 43i TLE Analyzer serial #: 1410661331

Calibration Data								
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.0	-0.1		Correlation Coefficient	0.999995	≥0.995			
80.0	80.4	0.9955	Correlation Coefficient	0.555555	20.333			
40.0	40.0	1.0005	Slope	1.005472	0.90 - 1.10			
20.0	20.0	0.9980	Slope	1.003472	0.90 - 1.10			
			- Intercept	-0.120388	+/-3			

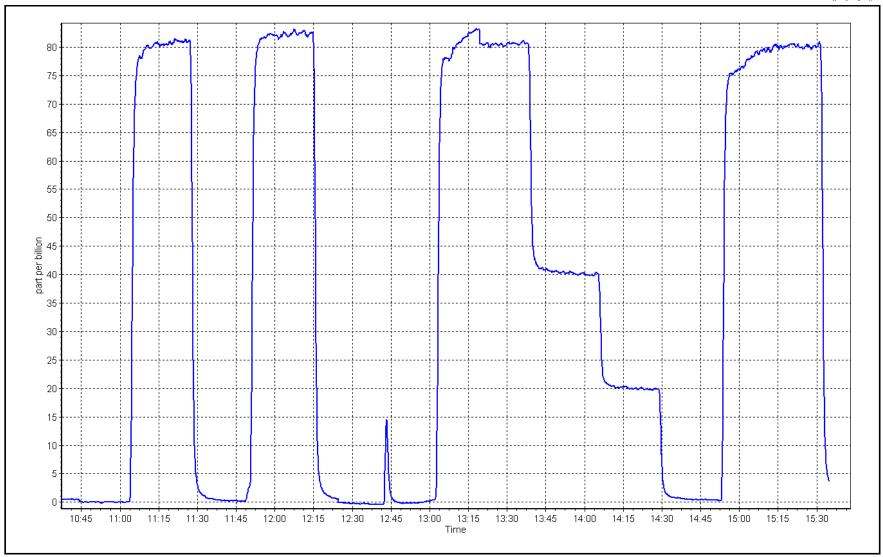




Date: January 18, 2024

Location: Ells River







THC / CH₄ / NMHC Calibration Report

Version-01-2020

Station Information

Ells River Station Name:

Calibration Date: January 3, 2024

Start time (MST): 12:27 Reason: Routine Station number: AMS 30

Last Cal Date: December 1, 2023

End time (MST): 15:33

Calibration Standards

Gas Cert Reference: Cal Gas Expiry Date: December 29, 2028 CC494126 CH4 Cal Gas Conc. 499.7 ppm

C3H8 Cal Gas Conc. 209.2 ppm

Removed Gas Cert:

Removed CH4 Conc. 499.7 ppm 209.2 ppm

Removed C3H8 Conc.

Diff between cyl (CH_4):

Calibrator Model: **API T700** ZAG make/model: **API T701H** CH4 Equiv Conc. 1075.0 ppm

Removed Gas Expiry:

CH4 Equiv Conc. 1075.0 ppm

Diff between cyl (THC):

Diff between cyl (NM):

Serial Number: 3061 Serial Number: 358

Analyzer Information

Analyzer make: Thermo 55i

THC Range (ppm): 0 - 20 ppm

NMHC Range (ppm): 0 - 10 ppm

Analyzer serial #: 1181490018

CH4 Range (ppm): 0 - 10 ppm

Start Finish

2.51E-04

NMHC SP Ratio:

Start

Finish 6.00E-05

151854

CH4 SP Ratio: 2.48E-04 5.80E-05 CH4 Retention time: 14.2 NMHC Peak Area: 14.2 157070

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	16.73	1.018
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	17.07	0.997
second point	4960	39.6	8.51	8.49	1.003
third point	4980	19.8	4.26	4.19	1.015
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	17.03	17.05	0.999
			Ave	rage Correction Factor	1.005

Baseline Corr AF: 16.73 Prev response 16.93 -1.2% *% change Baseline Corr 2nd AF: NA AF Slope: AF Intercept:

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



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 <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.11	8.90	1.024
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	9.17	0.994
second point	4960	39.6	4.56	4.58	0.995
third point	4980	19.8	2.28	2.27	1.006
as left zero	5000	0	0.00	0.00	
as left span	4921	79.2	9.11	9.13	0.998
			Avera	ge Correction Factor	0.998
Baseline Corr AF:	8.90	Prev response	9.09	*% change	-2.1%
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		Ind conc (ppm) (Ic)	CF Limit= 0.95-1.0
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i> 5
as found zero	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span		Source gas flow rate	Calc conc (ppm) (Cc)	,,,	
as found zero as found span as found 2nd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point	5000	Source gas flow rate 0.0	Calc conc (ppm) (Cc) 0.00	0.00	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4921	Source gas flow rate 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91	0.00 7.83	1.011
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4921 5000	Source gas flow rate 0.0 79.2 0.0	Calc conc (ppm) (Cc) 0.00 7.91	0.00 7.83	1.011
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4921 5000 4921	0.0 79.2 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91	0.00 7.83 0.00 7.90	1.011
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4921 5000 4921 4960	0.0 79.2 0.0 79.2 0.0 79.2 39.6	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96	0.00 7.83 0.00 7.90 3.91	1.011 1.002 1.012
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 4980	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98	0.00 7.83 0.00 7.90 3.91 1.93	1.011
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	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00	0.00 7.83 0.00 7.90 3.91	1.011 1.002 1.012 1.026
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 0.0	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92	1.011 1.002 1.012 1.026
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	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91	0.00 7.83 0.00 7.90 3.91 1.93 0.00	1.011 1.011 1.002 1.012 1.026
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 4980 5000 4921	0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91 Average	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92 age Correction Factor *% change	1.011 1.002 1.012 1.026 1.000 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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 5000 4921 4960 4980 5000 4921 7.83	0.0 79.2 0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91 Average	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92 age Correction Factor	1.011 1.011 1.002 1.012 1.026 1.000 1.013 -0.1%
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 Baseline Corr AF:	5000 4921 5000 4921 4960 4980 5000 4921 7.83 NA	0.0 79.2 0.0 79.2 39.6 19.8 0.0 79.2 Prev response AF Slope:	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91 Avera 7.84	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92 age Correction Factor *% change AF Intercept:	1.011 1.011 1.002 1.012 1.026 1.000 1.013 -0.1%
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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 5000 4921 4960 4980 5000 4921 7.83 NA	O.0 79.2 O.0 79.2 39.6 19.8 O.0 79.2 Prev response AF Slope: AF Correlation: Calibration	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91 Avera 7.84	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92 age Correction Factor *% change AF Intercept: * = > +/-5% change initiat	1.011 1.011 1.002 1.012 1.026 1.000 1.013 -0.1%
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 Baseline Corr AF: Baseline Corr 2nd AF:	5000 4921 5000 4921 4960 4980 5000 4921 7.83 NA	O.0 79.2 O.0 79.2 39.6 19.8 O.0 79.2 Prev response AF Slope: AF Correlation:	Calc conc (ppm) (Cc) 0.00 7.91 0.00 7.91 3.96 1.98 0.00 7.91 Avera 7.84	0.00 7.83 0.00 7.90 3.91 1.93 0.00 7.92 age Correction Factor *% change AF Intercept:	1.011 1.011 1.002 1.012 1.026 1.000 1.013 -0.1%

Notes: Inlet filter changed after As Founds, adjusted span only.

0.992583

-0.016756

0.999405

-0.019981

Calibration Performed By: Jan Castro

CH4 Cal Slope:

CH4 Cal Offset:

NMHC Cal Slope:

NMHC Cal Offset:

0.999470

-0.026357

1.007395

-0.012583



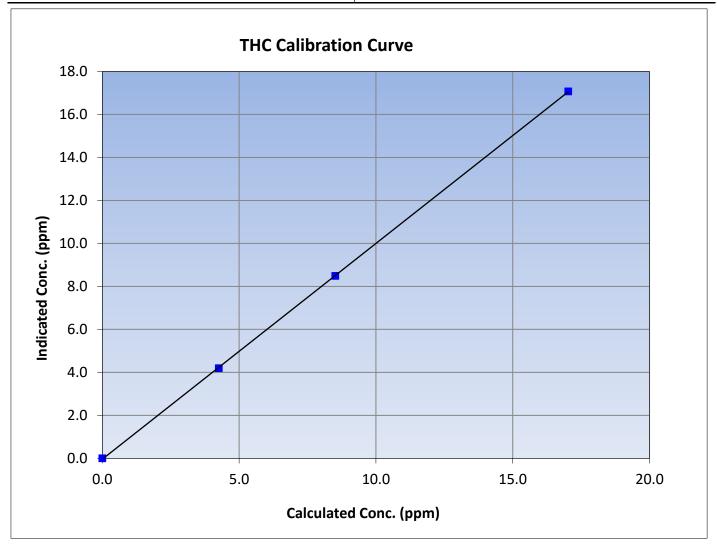
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: January 3, 2024 December 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 12:27 End Time (MST): 15:33 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	0.999975	≥0.995
17.03	17.07	0.9973	Correlation Coefficient	0.555575	20.333
8.51	8.49	1.0028	Slope	1.003892	0.90 - 1.10
4.26	4.19	1.0153	Зюре	1.003892	0.30 - 1.10
			Intercept	-0.039540	+/-0.5





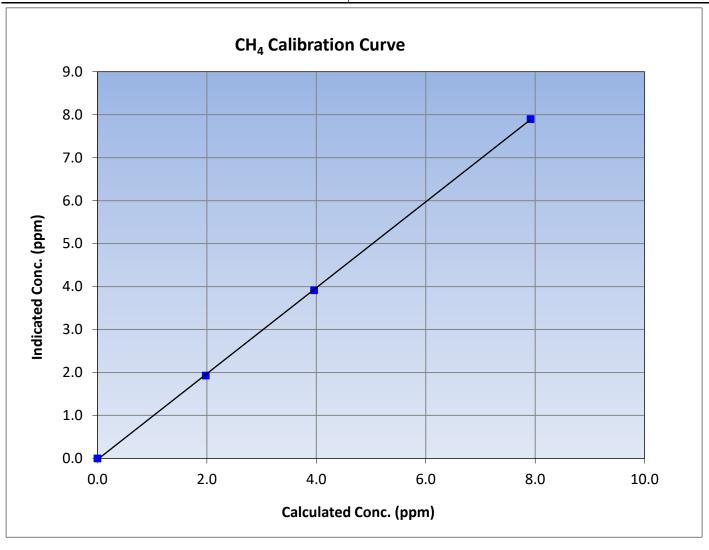
CH₄ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 12:27 End Time (MST): 15:33 Analyzer make: Analyzer serial #: Thermo 55i 1181490018

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999948	≥0.995
7.91	7.90	1.0020	Correlation Coemicient	0.333346	20.999
3.96	3.91	1.0117	Slope	0.999470	0.90 - 1.10
1.98	1.93	1.0264	Slope	0.555470	0.90 - 1.10
			Intercept	-0.026357	+/-0.5





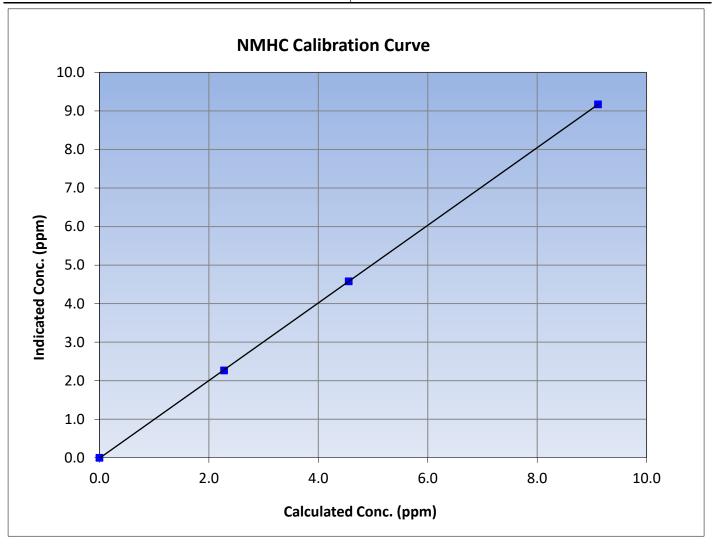
NMHC Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 3, 2024 **Previous Calibration:** December 1, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 12:27 End Time (MST): 15:33 Analyzer make: Analyzer serial #: 1181490018 Thermo 55i

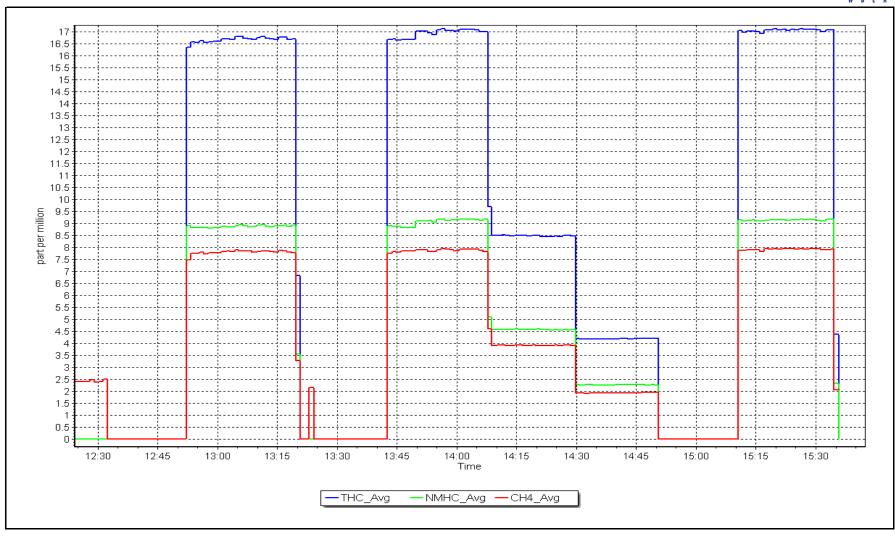
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999990	≥0.995
9.11	9.17	0.9936	Correlation Coefficient	0.999990	20.333
4.56	4.58	0.9951	Clama	1.007395	0.90 - 1.10
2.28	2.27	1.0059	Slope	1.007393	0.90 - 1.10
		·	Intercept	-0.012583	+/-0.5



NMHC Calibration Plot

Date: January 3, 2024 Location: Ells River







NO_X \ NO \ NO₂ Calibration Report

End time (MST): 16:37

Version-04-2020

Station Information

Station Name: Ells River Station number: AMS 30

Calibration Date: January 11, 2024 Last Cal Date: December 18, 2023

Start time (MST): 10:56
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0045703 Cal Gas Expiry Date: May 16, 2031

NOX Cal Gas Conc:60.4ppmNO Cal Gas Conc:60.1ppmRemoved Cylinder #:T2Y1P2RRemoved Gas Exp Date: December 11, 2023Removed Gas NOX Conc:50.83ppmRemoved Gas NO Conc:49.97ppm

NOX gas Diff: -1.0% NO gas Diff: -0.4%

Calibrator Model: API T700 Serial Number: 3061 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>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.153	1.165	NO bkgnd or offset:	14.1	13.6
NOX coeff or slope:	0.992	0.992	NOX bkgnd or offset:	14.1	13.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	189.7	194.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000506	1.002653
NO _x Cal Offset:	-1.440000	-1.638433
NO Cal Slope:	0.998642	1.007289
NO Cal Offset:	-2.440000	-2.359365
NO ₂ Cal Slope:	1.005022	0.981718
NO ₂ Cal Offset:	0.180492	0.452475



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	-0.9	-0.9	0.0		
as found span	4920	80.0	813.3	799.5	13.8	812.0	795.9	16.5	1.0016	1.0045
as found 2nd										
as found 3rd										
new cyl resp	4933	66.6	804.5	800.5	4.0	795.6	793.7	1.8	1.0112	1.0086
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4933	66.6	804.5	800.5	4.0	806.0	805.0	1.2	0.9982	0.9944
second point	4967	33.3	402.3	400.3	2.0	400.3	400.1	0.2	1.0049	1.0004
third point	4983	16.6	200.5	199.5	1.0	198.3	196.1	2.1	1.0112	1.0175
as left zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2		
as left span	4933	66.6	804.5	425.4	379.1	801.0	427.6	373.6	1.0044	0.9949
							Average C	orrection Factor	1.0048	1.0041
Corrected As fo	ound NO _X =	812.9 ppb	NO =	796.8 ppb	* = > +/-59	6 change initiates	nvestigation	*Percent Chang	ge NO _x =	0.1%
Previous Respo	onse NO _X =	812.3 ppb	NO =	796.0 ppb				*Percent Chang	ge NO =	0.1%
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	ord pt NO _X =	NA ppb	NO =	NA ppb	As found	$I \qquad NO r^2$:		NO SI:	NO Int:	
					As found	$I \qquad NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				(GPT Calibration	Data				
O3 Setpo	pint (ppb)	Indicated NO Ref		ated NO Drop entration (ppb)	Calculated NC concentration (pp		dicated NO2 tration (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									
· · · · · · · · · · · · · · · · · · ·	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									

379.1

190.8

102.8

371.8

189.8

100.6

Average Correction Factor

1.0196

1.0052

1.0218

1.0156

Notes: Swapped NO gas cylinder#: T2Y1P2R with cylinder#: DT0045703. Adjusted zero and span.

423.8

612.1

700.1

Calibration Performed By: Braiden Boutilier

1st GPT point (400 ppb O3)

2nd GPT point (200 ppb O3)

3rd GPT point (100 ppb O3)

798.9

798.9

798.9

98.1%

99.5%

97.9%

98.5%



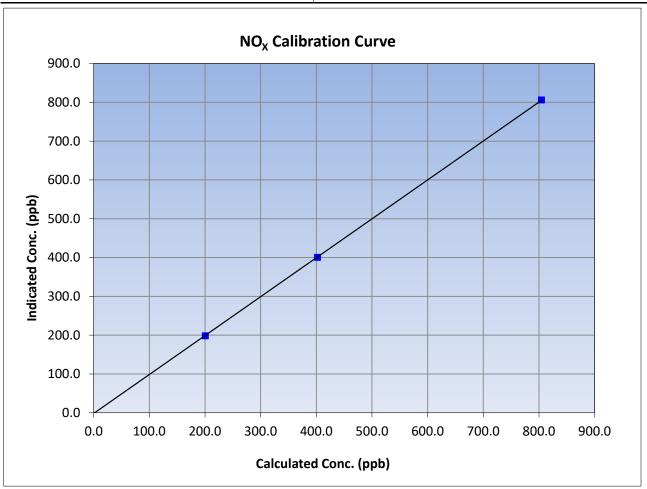
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 18, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:56 End Time (MST): 16:37 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999982	≥0.995
804.5	806.0	0.9982	Correlation Coefficient	0.555562	20.333
402.3	400.3	1.0049	Slope	1.002653	0.90 - 1.10
200.5	198.3	1.0112	Slope	1.002055	0.90 - 1.10
			Intercept	-1.638433	+/-20





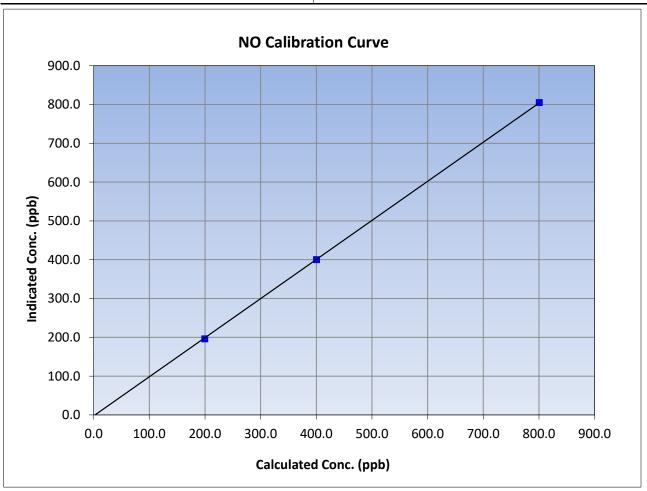
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 18, 2023 Station Name: Ells River Station Number: **AMS 30** 10:56 Start Time (MST): End Time (MST): 16:37 Analyzer make: Thermo 42i Analyzer serial #: 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999963	≥0.995	
800.5	805.0	0.9944	Correlation Coefficient	0.999903	20.555	
400.3	400.1	1.0004	Slope	1.007289	0.90 - 1.10	
199.5	196.1	1.0175	Slope	1.007289	0.90 - 1.10	
			Intercept	-2.359365	+/-20	





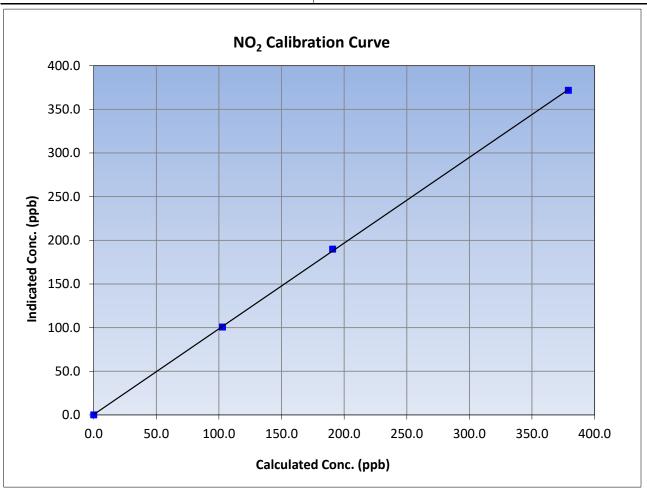
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 11, 2024 Previous Calibration: December 18, 2023 Station Name: Ells River Station Number: **AMS 30** Start Time (MST): 10:56 End Time (MST): 16:37 Analyzer serial #: Analyzer make: Thermo 42i 710321429

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999925	≥0.995
379.1	371.8	1.0196	correlation coefficient	0.333323	20.333
190.8	189.8	1.0052	Slope	0.981718	0.90 - 1.10
102.8	100.6	1.0218	Slope	0.961716	0.90 - 1.10
			Intercept	0.452475	+/-20

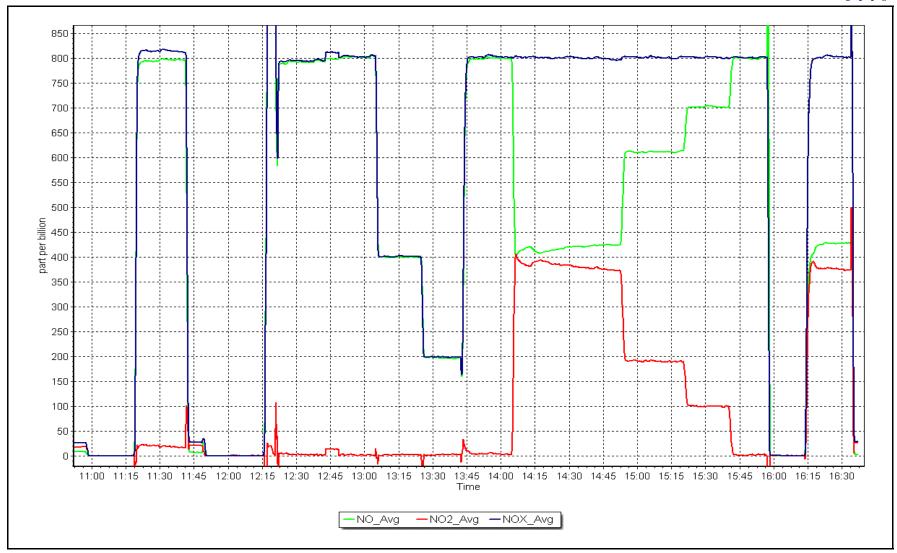


NO_x Calibration Plot

Date: January 11, 2024

Location: Ells River







T640 PM_{2.5} CALIBRATION

Version-01-2023

		Station Information	1			
Station Name:	Ells River		Station number:		10, 2022	
Calibration Date: Start time (MST):	January 22, 2024 10:36		Last Cal Date: End time (MST):		18, 2023	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	875		
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388751		
Temp/RH standard:	Alicat FP-25BT		S/N:	388751		
		Monthly Calibration T	est			
<u>Parameter</u>	As found	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	-22.30	-23.40	-22.30			+/- 2 deg C
P (mmHg)	735.20	736.60	735.20			+/- 10 mmHg
flow (LPM)	5.00	5.00	5.00			+/- 0.25 LPM
Leak Test:	Date of check: _ PM w/o HEPA:	January 22, 2024 5.30	Last Cal Date: PM w/ HEPA:	December		<0.2 ug/m3
Note: this leak check will be			-			10.2 ug/1113
Inlet cleaning :	Inlet Head					
		Quarterly Calibration 1				
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test	9.00	11.00	11.00			10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	5.30	w/ HEPA:	0	.00
Date Optical Cham	ber Cleaned:	January 22,	2024			<0.2 ug/m3
Disposable Filter	r Changed: _	January 22,	, 2024			
		Annual Maintenanc	e			
Date Sample Tub	e Cleaned:	October 27	, 2023			
Date RH/T Senso	-	November 3				
Notes:	Verified flov	v, temperature and pres	sure. Leak check pa	ssed. No adj	ustment ma	ade.
Calibration by:	Jan Castro					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS501 LEISMER

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Leismer

January 16, 2024 Calibration Date:

Start time (MST): 10:02 Routine

Reason:

Station number: AMS501

Last Cal Date:

December 12, 2023

December 29, 2028

End time (MST): 13:10

Calibration Standards

Cal Gas Concentration: 50.52 ppm

Cal Gas Cylinder #: CC274266

Removed Cal Gas Conc:

Removed Gas Cyl #: <u>NA</u>

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

50.52 ppm Rem Gas Exp Date: NA

Diff between cyl:

Cal Gas Exp Date:

Serial Number: 2659 Serial Number: 4427

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1160290011

Analyzer Range 0 - 1000 ppb

Finish Start

1.000572

Backgd or Offset:

Start 19.2

Finish 20.3

Calibration slope: 0.999030 0.981 Calibration intercept: -1.115967 -1.756005 Coeff or Slope: 0.971

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	800.2	790.9	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4921	79.2	800.2	799.2	1.001
second point	4960	39.6	400.2	399.2	1.002
third point	4980	19.8	200.1	196.1	1.020
as left zero	5000	0.0	0.0	-0.3	
as left span	4921	79.2	800.2	800.2	1.000
		_	Averag	ge Correction Factor	1.008

Baseline Corr As found: 790.60 Previous response 798.31 *% change -1.0% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

NA AF Correlation: Baseline Corr 3rd AF pt:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala



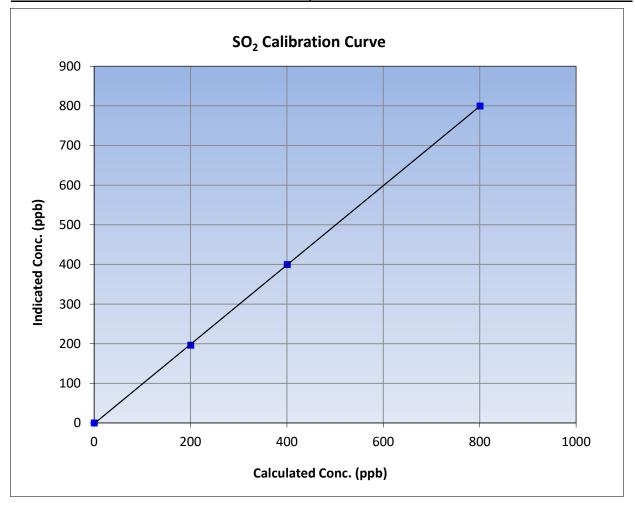
SO₂ Calibration Summary

Version-01-2020

Station Information

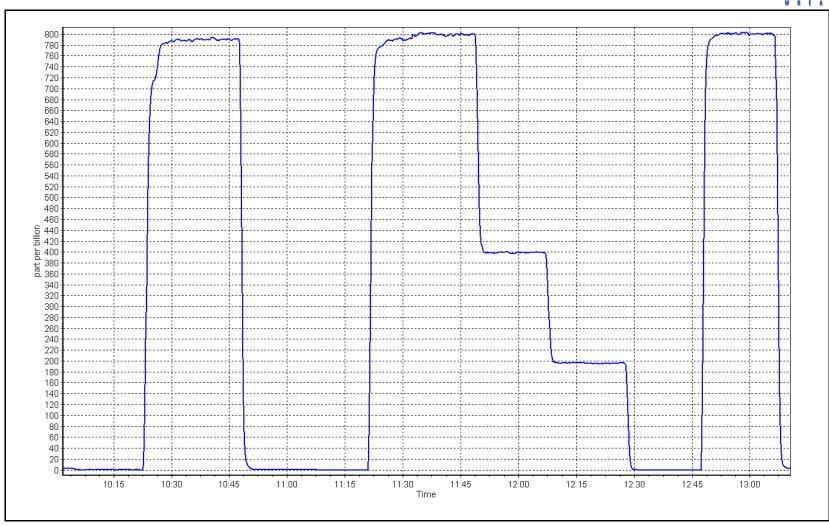
Calibration Date: January 16, 2024 **Previous Calibration:** December 12, 2023 Station Name: Leismer Station Number: AMS501 Start Time (MST): 10:02 End Time (MST): 13:10 Analyzer make: Thermo 43i Analyzer serial #: 1160290011

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	0.999977	≥0.995		
800.2	799.2	1.0013	Correlation coefficient	0.555577	20.993		
400.2	399.2	1.0024	Slope	1.000572	0.90 - 1.10		
200.1	196.1	1.0202	Slope	1.000372	0.90 - 1.10		
			- Intercept	-1.756005	+/-30		



Date: January 16, 2024 Location: Leismer







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Leismer

Calibration Date: January 23, 2024

9:43 Start time (MST): Reason: Routine Station number: AMS501

Last Cal Date: December 12, 2023

End time (MST): 13:48

Calibration Standards

Cal Gas Concentration: 5.14 ppm

Cal Gas Cylinder #: CC511843

Removed Cal Gas Conc: 5.14 Removed Gas Cyl #: NA

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

Cal Gas Exp Date: September 16, 2024

Rem Gas Exp Date: NA Diff between cyl:

Serial Number: 2659 Serial Number: 4427

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020

ppm

Global G150 Converter serial #: 2022-218 Converter make:

0 - 100 ppb Analyzer Range

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

Start <u>Finish</u> 0.995716 0.999147 Backgd or Offset: 3.57 Calibration slope: 3.47 0.001539 Calibration intercept: -0.078455 Coeff or Slope: 1.128 1.105

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	77.8	80.0	77.5	1.031
as found 2nd point	4961	38.9	40.0	38.9	1.025
as found 3rd point	4981	19.4	19.9	19.3	1.028
new cylinder response					

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.1	
high point	4922	77.8	80.0	79.9	1.001
second point	4961	38.9	40.0	40.1	0.997
third point	4981	19.4	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.2	
as left span	4922	77.8	80.0	79.9	1.001
SO2 Scrubber Check	4921	79.2	792.0	0.0	
Date of last scrubber cha	ange:	24-Feb-23		Ave Corr Factor	1.004
Date of last converter ef	ficiency test:	December 1, 2022			efficiency

Baseline Corr As found: 77.6 79.56 -2.5% Prev response: *% change: -0.038970 Baseline Corr 2nd AF pt: 39.0 AF Slope: 0.970286 AF Intercept: Baseline Corr 3rd AF pt: 0.999992 19.4 AF Correlation:

Changed inlet filter after as founds. Scrubber test done after calibrator zero. Adjusted span only. Notes:

Calibration Performed By: Sean Bala * = > +/-5% change initiates investigation



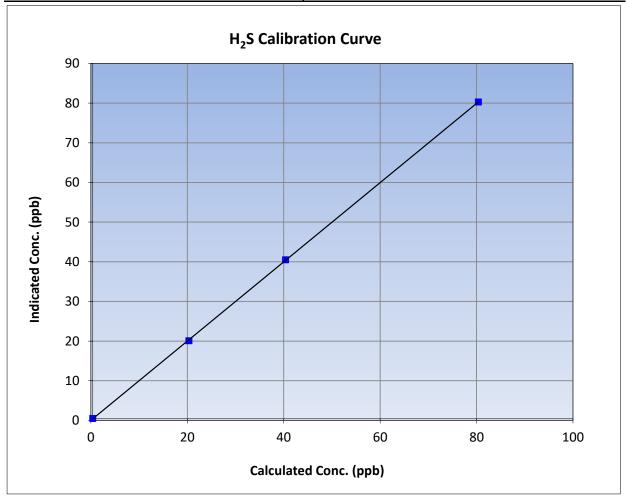
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 23, 2024 **Previous Calibration:** December 12, 2023 Station Name: Station Number: AMS501 Leismer Start Time (MST): 9:43 End Time (MST): 13:48 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1180540020

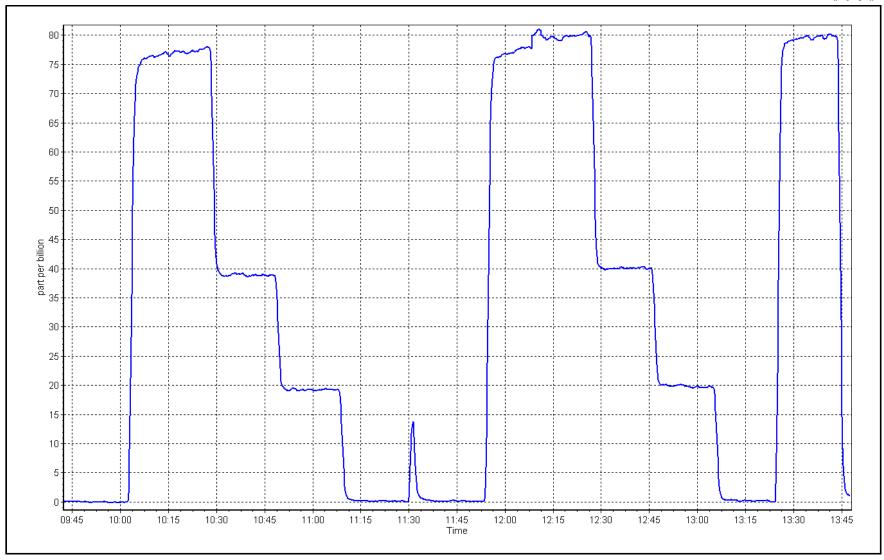
Calibration Data							
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)			Statistical Evalua	ation	<u>Limits</u>		
0.0	0.1		Correlation Coefficient	0.999977	≥0.995		
80.0	79.9	1.0010	Correlation Coefficient	0.333311	20.993		
40.0	40.1	0.9973	Slope	0.999147	0.90 - 1.10		
19.9	19.7	1.0123	Slope	0.333147	0.90 - 1.10		
			- Intercept	0.001539	+/-3		



Date: January 23, 2024

Location: Leismer







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Leismer

Calibration Date: January 24, 2024

Start time (MST): 9:41 Reason: Removal Station number: AMS501

Last Cal Date: December 13, 2023

End time (MST): 14:15

Calibration Standards

October 30, 2024 NO Gas Cylinder #: T26811M Cal Gas Expiry Date: NOX Cal Gas Conc: NO Cal Gas Conc: 47.46 ppm ppm Removed Cylinder #: NA Removed Gas Exp Date: NA Removed Gas NOX Conc: Removed Gas NO Conc: 47.46 ppm 47.39 ppm

NOX gas Diff:

Calibrator Model: API T700 ZAG make/model: API 701

NO gas Diff:

Serial Number: 2659 Serial Number: 4427

Analyzer Information

Analyzer make: Thermo 42i Analyzer serial #: 1218153356

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.238	1.186	NO bkgnd or offset:	3.7	3.5
NOX coeff or slope:	0.990	0.991	NOX bkgnd or offset:	3.6	3.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	166.2	166.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001988	1.001018
NO _x Cal Offset:	-4.067947	-1.427986
NO Cal Slope:	1.004511	1.002011
NO Cal Offset:	-4.907940	-2.907962
NO ₂ Cal Slope:	0.99993	1.000174
NO ₂ Cal Offset:	0.065389	0.184957



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/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	0.6	-0.1	0.7		
as found span	4916	84.4	801.1	799.9	1.2	839.5	836.1	3.7	0.9542	0.9567
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.0	0.4		
high point	4916	84.4	801.1	799.9	1.2	801.2	799.8	1.5	0.9998	1.0001
second point	4958	42.2	400.5	400.0	0.6	399.1	397.1	2.0	1.0036	1.0072
third point	4979	21.1	200.3	200.0	0.3	196.9	194.1	2.8	1.0172	1.0303
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4916	84.4	801.1	412.8	388.3	797.1	412.1	384.9	1.0050	1.0016
							Average C	orrection Factor	1.0069	1.0125
Corrected As fo	ound NO _X =	838.9 ppb	NO =	836.2 ppb	* = > +/-5%	% change initiates i	investigation	*Percent Chang	ge NO _X =	4.8%
Previous Respo	onse NO _X =	798.6 ppb	NO =	798.6 ppb				*Percent Chang	ge NO =	4.5%
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	$100 \text{ NO } \text{r}^2$:		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	
				G	GPT Calibration I	Data				
O3 Setpo	oint (ppb)	Indicated NO Refere concentration (pp		cated NO Drop entration (ppb)	Calculated NC concentration (ppl		dicated NO2 stration (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	int (400 ppb NO2)									
as found GPT poi	int (200 ppb NO2)									
as found GPT poi	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	796.6		409.5	388.3		388.6	0.9992		100.1%
2nd GPT point	nt (200 ppb O3)	796.6		612.2	185.6		185.8	0.9988		100.1%
3rd GPT point	t (100 ppb O3)	796.6		706.1	91.7		91.6	1.0009		99.9%
						Average Co	rrection Factor	0.9996	õ	100.0%

Notes:

Changed inlet filter after as founds. Adjusted span. 3rd point was triggered after high point to check linearity.

Calibration Performed By:

Sean Bala



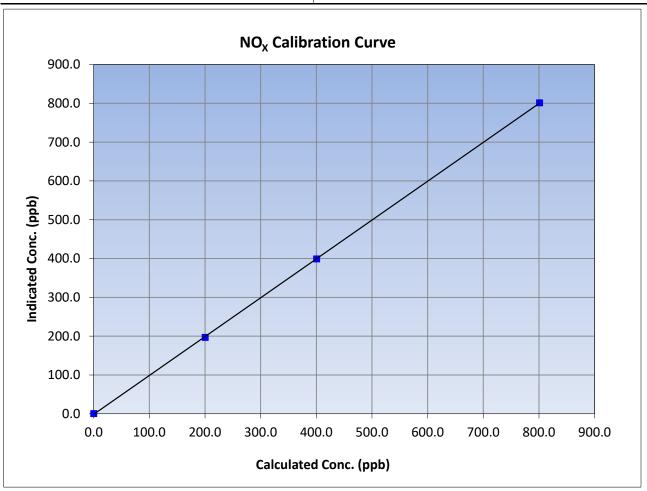
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 24, 2024 Previous Calibration: December 13, 2023 Station Name: Leismer Station Number: AMS501 Start Time (MST): 9:41 End Time (MST): 14:15 Analyzer serial #: Analyzer make: Thermo 42i 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999975	≥0.995
801.1	801.2	0.9998	Correlation Coefficient	0.333373	20.993
400.5	399.1	1.0036	Slope	1.001018	0.90 - 1.10
200.3	196.9	1.0172	Slope	1.001016	0.90 - 1.10
			Intercept	-1.427986	+/-20





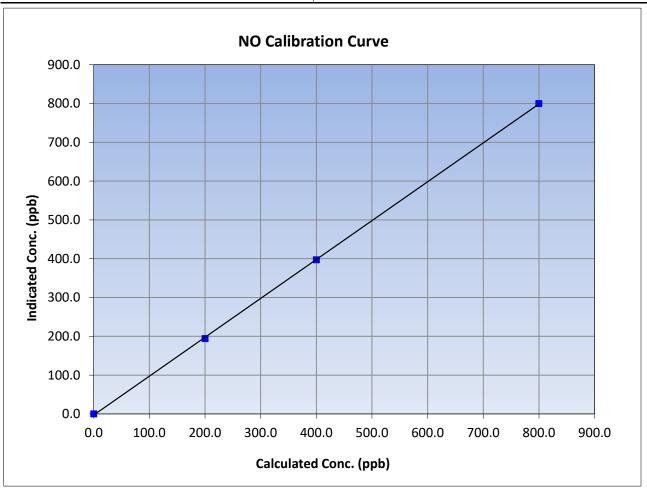
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 24, 2024 Previous Calibration: December 13, 2023 Station Name: Leismer Station Number: AMS501 Start Time (MST): 9:41 End Time (MST): 14:15 Analyzer make: Thermo 42i Analyzer serial #: 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999938	≥0.995
799.9	799.8	1.0001	Correlation Coefficient	0.55555	20.333
400.0	397.1	1.0072	Slope	1.002011	0.90 - 1.10
200.0	194.1	1.0303	Slope	1.002011	0.90 - 1.10
			Intercept	-2.907962	+/-20





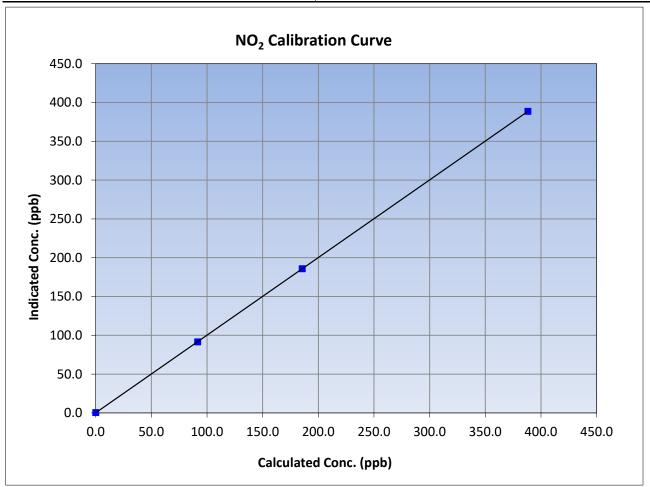
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 24, 2024 Previous Calibration: December 13, 2023 Station Name: Leismer Station Number: AMS501 Start Time (MST): 9:41 End Time (MST): 14:15 Analyzer make: Thermo 42i Analyzer serial #: 1218153356

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999998	≥0.995
388.3	388.6	0.9992	Correlation Coefficient	0.999998	20.333
185.6	185.8	0.9988	Slope	1.000174	0.90 - 1.10
91.7	91.6	1.0009	Зюре	1.000174	0.90 - 1.10
			Intercept	0.184957	+/-20



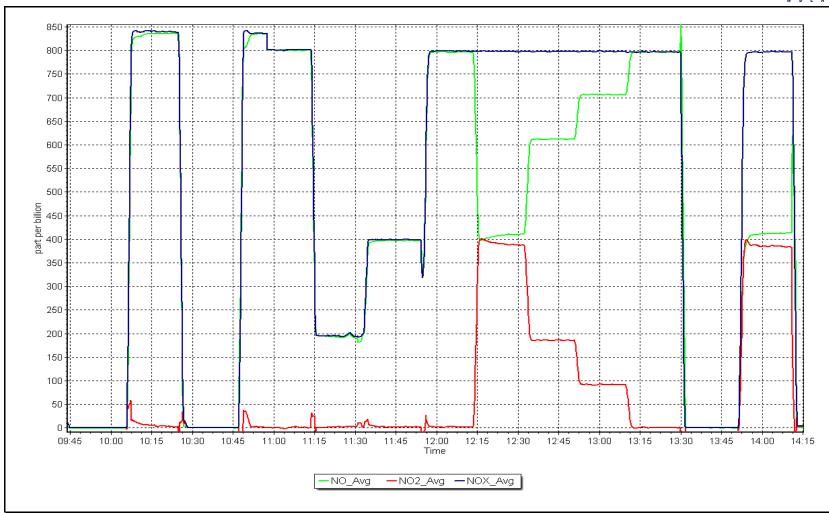
NO_x Calibration Plot

Date: Janu

January 24, 2024

Location: Leismer







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS505 SAWBONES BAY

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Station Information

Station Name: Sawbones Bay

Calibration Date: January 11, 2024

Start time (MST): 8:21
Reason: Routine

Station number: AMS505

Last Cal Date: December 6, 2023

End time (MST): 11:12

Calibration Standards

Cal Gas Concentration: 51.4 ppm Cal Gas Exp Date: February 15, 2029

Cal Gas Cylinder #: EY0000672

Removed Cal Gas Conc: 51.40 ppm Rem Gas Exp Date: February 15, 2029

Removed Gas Cyl #: EY0000672 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: 1.000723 1.001437 Backgd or Offset: 20.5 20.5 0.994 Calibration intercept: -0.792239 -0.892107 Coeff or Slope: 0.994

SO₂ Calibration Data

Set Point	Dilution air flow rate	Source gas flow rate	Calculated		Correction factor (Cc/Ic
	(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	4922	77.8	799.8	802.8	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	
high point	4922	77.8	799.8	799.8	1.000
second point	4961	38.9	399.9	401.1	0.997
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	800.9	0.999
			Averag	ge Correction Factor	1.003
				#o/ I	0 = 0 /

Baseline Corr As found: 803.30 Previous response 799.60 *% change 0.5% Baseline Corr 2nd AF pt: NA AF Slope: AF Intercept:

Baseline Corr 3rd AF pt: NA AF Correlation:

Notes: Changed inlet filter. No adjustment made.

Calibration Performed By: Sean Bala

* = > +/-5% change initiates investigation



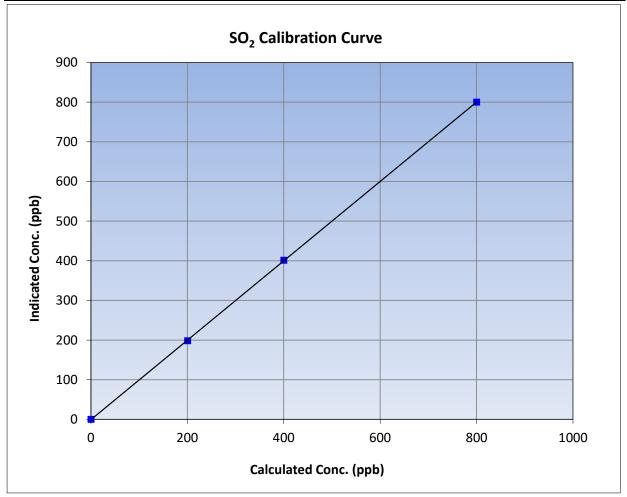
SO₂ Calibration Summary

Version-01-2020

Station Information

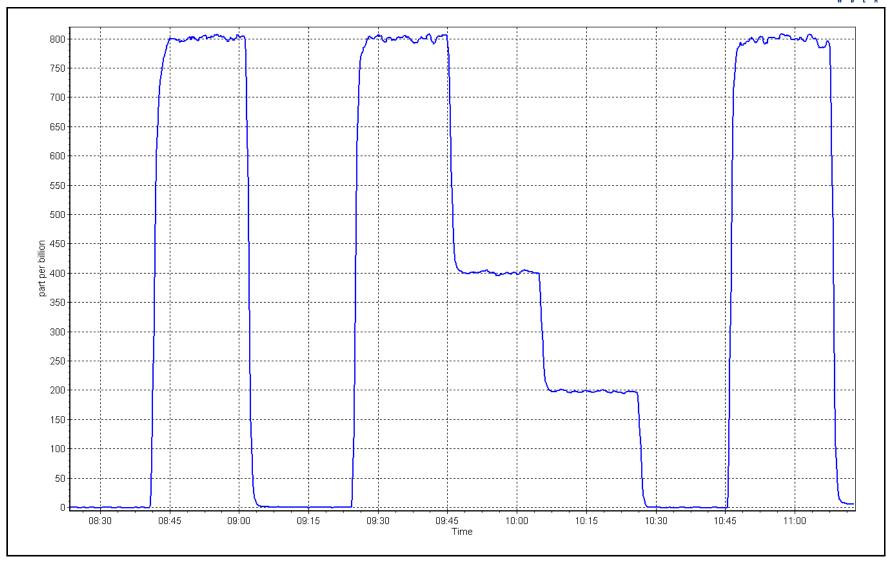
Calibration Date: January 11, 2024 **Previous Calibration:** December 6, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 8:21 End Time (MST): 11:12 Analyzer make: Thermo 43i Analyzer serial #: 0710321323

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	0.999981	≥0.995		
799.8	799.8	1.0000	Correlation Coefficient	0.555501	20.333		
399.9	401.1	0.9970	Slope	1.001437	0.90 - 1.10		
200.4	197.9	1.0128	Зюре	1.001437	0.90 - 1.10		
			- Intercept	-0.892107	+/-30		



SO2 Calibration Plot Date: January 11, 2024 Location: Sawbones Bay





W B E A

Wood Buffalo Environmental Association

H₂S Calibration Report

Station number:

AMS505

NA

15:59

Version-11-2021

Station Information

Station Name: Sawbones Bay Calibration Date: January 8, 2024

Start time (MST): 13:45 Reason: Install 8, 2024 Last Cal Date: End time (MST):

Calibration Standards

Cal Gas Concentration: 5.15 ppm Cal Gas Exp Date: February 5, 2024

Cal Gas Cylinder #: CC517397

Removed Cal Gas Conc: 5.15 ppm Rem Gas Exp Date: NA Removed Gas Cyl #: NA Diff between cyl:

Calibrator Make/Model: Teledybe API T700 Serial Number: 5112 ZAG Make/Model: Teledybe API T701 Serial Number: 690

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 12113311965
Converter make: Global 150 Converter serial #: 2022-224

Analyzer Range 0 - 100 ppb

StartFinishStartFinishCalibration slope:NA1.006361Backgd or Offset:NA1.01

Calibration intercept: NA 1.006361 Backgo of Offset: NA 1.01

Calibration intercept: NA -0.218059 Coeff or Slope: NA 1.119

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

(sccm)	Source gas flow rate (sccm)	concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	(Cc/Ic) Limit = 0.95-1.05
5000	0.0	0.0	-0.1	
4922	77.7	80.0	80.4	0.995
4961	38.8	40.0	39.9	1.002
4981	19.4	20.0	19.8	1.009
5000	0.0	0.0	0.0	
4922	77.7	80.0	79.9	1.002
4922	77.8	778.0	0.0	
	5000 4922 4961 4981 5000 4922	(sccm) (sccm) 5000 0.0 4922 77.7 4961 38.8 4981 19.4 5000 0.0 4922 77.7	(sccm) (sccm) concentration (ppb) (Cc) 5000 0.0 0.0 4922 77.7 80.0 4961 38.8 40.0 4981 19.4 20.0 5000 0.0 0.0 4922 77.7 80.0	(sccm) (sccm) concentration (ppb) (CC) concentration (ppb) (Ic) 5000 0.0 0.0 -0.1 4922 77.7 80.0 80.4 4961 38.8 40.0 39.9 4981 19.4 20.0 19.8 5000 0.0 0.0 0.0 4922 77.7 80.0 79.9

Date of last scrubber change:Ave Corr Factor1.002Date of last converter efficiency test:efficiency

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

* = > +/-5% change initiates investigation

Notes: Install Calibration. Adjusted span.

Calibration Performed By: Sean Bala



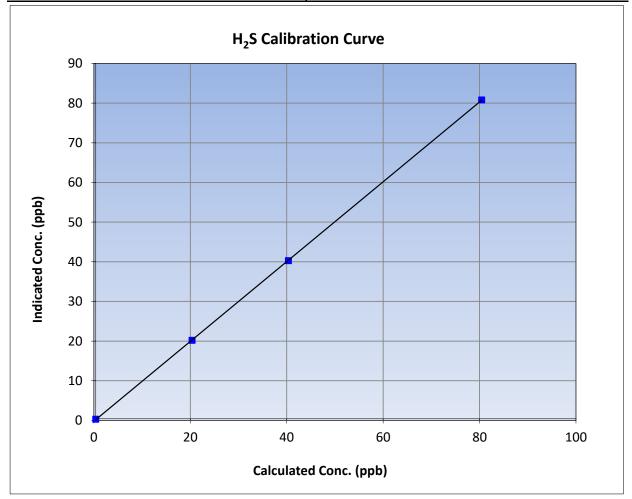
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 8, 2024 **Previous Calibration:** NA Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 13:45 End Time (MST): 15:59 Analyzer make: Thermo 43iQ Analyzer serial #: 12113311965

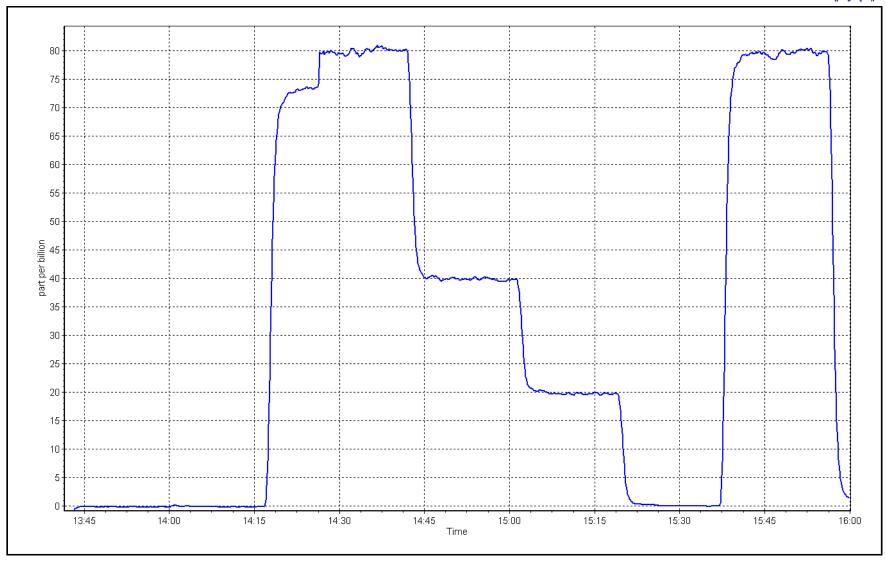
Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	-0.1		Correlation Coefficient	0.999989	≥0.995				
80.0	80.4	0.9955	Correlation Coefficient	0.555565	20.333				
40.0	39.9	1.0016	Slope	1.006361	0.90 - 1.10				
20.0	19.8	1.0091	Slope	1.000301	0.90 - 1.10				
			- Intercept	-0.218059	+/-3				



Date: January 8, 2024

Location: Sawbones Bay







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Sawbones Bay

Calibration Date: January 10, 2024

Start time (MST): 10:27 Reason: Routine Station number: AMS505

Last Cal Date: December 7, 2023

End time (MST): 14:44

NO gas Diff:

Calibration Standards

NO Gas Cylinder #: T1FY3PK Cal Gas Expiry Date: March 14, 2025

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

Removed Cylinder #: T1FY3PK Removed Gas Exp Date: March 14, 2025

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

NOX gas Diff:

Calibrator Model: API T700 Serial Number: 5112 ZAG make/model: API T701H Serial Number: 690

Analyzer Information

Analyzer make: API T200 Analyzer serial #: 4260

NOX Range (ppb): 0 - 1000 ppb

Start Finish <u>Start</u> **Finish** NO coeff or slope: 1.069 1.062 NO bkgnd or offset: 0.4 0.4 NOX coeff or slope: 1.060 NOX bkgnd or offset: 1.065 1.3 1.3 NO2 coeff or slope: NA NA Reaction cell Press: 7.5 7.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.003180	1.001378
NO _x Cal Offset:	-1.290916	-1.910345
NO Cal Slope:	1.004108	1.000734
NO Cal Offset:	-1.590759	-2.109999
NO ₂ Cal Slope:	0.997701	0.999561
NO ₂ Cal Offset:	-0.376391	0.319413



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/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	-0.4		
as found span	4917	83.4	799.6	799.6	0.0	804.3	803.7	0.6	0.9941	0.9949
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3		
high point	4917	83.4	799.6	799.6	0.0	799.4	799.0	0.3	1.0002	1.0007
second point	4958	41.7	399.8	399.8	0.0	398.1	397.2	0.9	1.0044	1.0067
third point	4979	20.9	200.4	200.4	0.0	197.0	196.3	0.7	1.0172	1.0209
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4		
as left span	4916	83.4	799.7	334.7	465.0	791.9	331.8	460.1	1.0099	1.0088
							Average C	orrection Factor	1.0073	1.0094
Corrected As for	und NO _X =	805.0 ppb	NO =	803.9 ppb	* = > +/-59	6 change initiates i	nvestigation	*Percent Chan	ge NO _X =	0.5%
Previous Respor	nse NO _X =	800.8 ppb	NO =	801.3 ppb				*Percent Chan	ge NO =	0.3%
Baseline Corr 2r	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3r	d pt NO _x =	NA ppb	NO =	NA ppb	As found	$1 NO r^2$:		NO SI:	NO Int:	
					As found	2		NO2 SI:	NO ₂ Int:	
				G	PT Calibration	Data				
O3 Setpoi	int (ppb)	Indicated NO Ref		cated NO Drop entration (ppb)	Calculated NC concentration (pp		dicated NO2 tration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit =	0.95-1.05	rter Efficiency n Limit = 96-104%
as found 0	GPT zero									
as found GPT poin	nt (400 ppb NO2)									
as found GPT poin	nt (200 ppb NO2)									
as found GPT poin	nt (100 ppb NO2)									
1st GPT point ((400 ppb O3)	794.4		329.4	465.0		464.8	1.000	4 1	100.0%
2nd GPT point	(200 ppb O3)	794.4		546.5	247.9		248.2	0.998	8	100.1%
3rd GPT point ((100 ppb O3)	794.4		647.2	147.2		148.3	0.992	6	100.7%

Notes:

Changed inlet filter after as founds. Adjusted span.

Average Correction Factor

Calibration Performed By:

Sean Bala

100.3%

0.9973



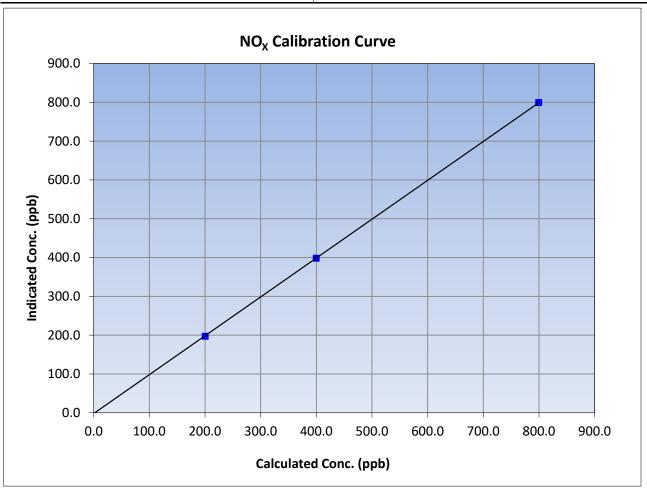
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 10:27 End Time (MST): 14:44 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	-0.4		Correlation Coefficient	0.999983	≥0.995
799.6	799.4	1.0002	Correlation Coefficient	0.555565	20.333
399.8	398.1	1.0044	Slope	1.001378	0.90 - 1.10
200.4	197.0	1.0172	Slope	1.001576	0.90 - 1.10
			Intercept	-1.910345	+/-20





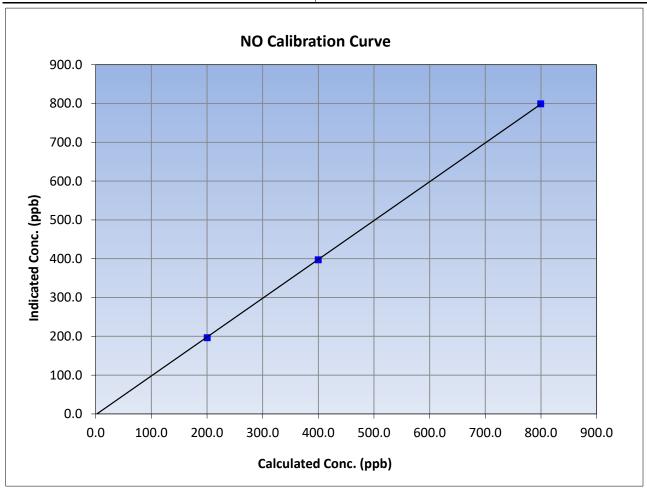
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 10:27 End Time (MST): 14:44 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	0.999971	≥0.995
799.6	799.0	1.0007	Correlation Coefficient	0.555571	20.333
399.8	397.2	1.0067	Slope	1.000734	0.90 - 1.10
200.4	196.3	1.0209	Slope	1.000734	0.90 - 1.10
			Intercept	-2.109999	+/-20





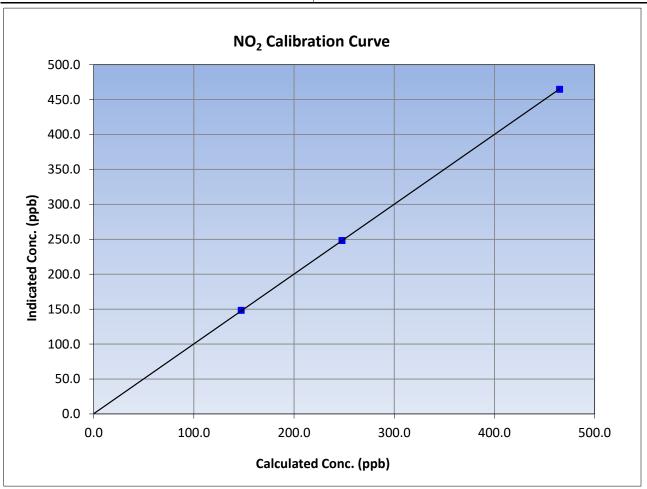
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 10, 2024 Previous Calibration: December 7, 2023 Station Name: Sawbones Bay Station Number: AMS505 Start Time (MST): 10:27 End Time (MST): 14:44 Analyzer serial #: Analyzer make: **API T200** 4260

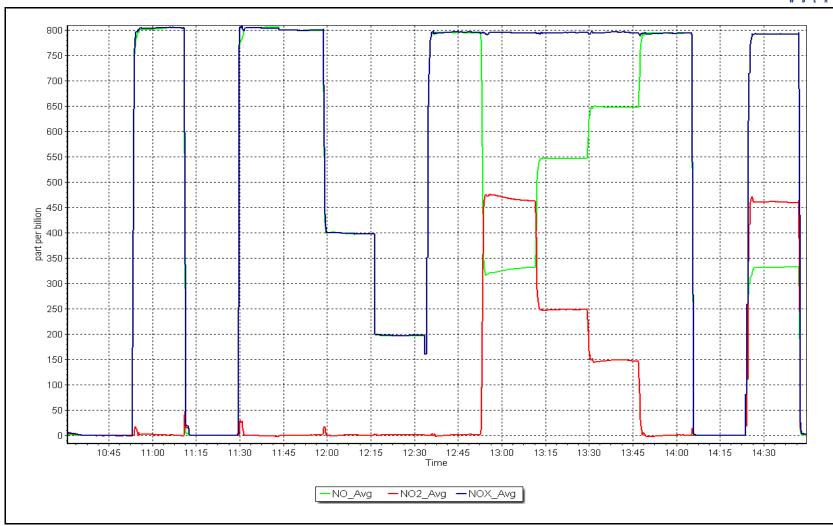
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999989	≥0.995
465.0	464.8	1.0004	Correlation Coefficient	0.555565	20.333
247.9	248.2	0.9988	Slope	0.999561	0.90 - 1.10
147.2	148.3	0.9926	Slope	0.999301	0.90 - 1.10
			Intercept	0.319413	+/-20



NO_x Calibration Plot

Date: January 10, 2024 Location: Sawbones Bay







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS507 KIRBY SOUTH

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

Version-01-2020

Finish

Station Information

Station Name: Kirby South

Calibration Date: January 16, 2024

Start time (MST): 12:24

Reason: Maintenance

Station number: AMS 507

Last Cal Date: December 24, 2023

End time (MST): 15:03

Calibration Standards

Cal Gas Concentration: 49.18

Cal Gas Cylinder #: CC303554

Removed Cal Gas Conc: 49.18
Removed Gas Cyl #: NA

Calibrator Make/Model: API T700 ZAG Make/Model: API T701H ppm Cal Gas Exp Date: February 23, 2025

ppm Rem Gas Exp Date: NA

Diff between cyl:

Serial Number: 3804 Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Finish

Analyzer Range 0 - 1000 ppb

<u>Start</u>

Calibration slope: 1.016010 Calibration intercept: -0.008833

Notes:

<u>Start</u>

Backgd or Offset: 20.2 20.3 Coeff or Slope: 1.146 1.146

Average Correction Factor

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	0.8	
as found span	4919	81.3	799.6	811.0	0.986
as found 2nd point	4959	40.7	400.3	403.6	0.992
as found 3rd point	4980	20.3	199.7	203.3	0.982
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					

Baseline Corr As found:	810.20	Previous response	812.41	*% change	-0.3%
Baseline Corr 2nd AF pt:	402.80	AF Slope:	1.012737	AF Intercept:	0.311630
Baseline Corr 3rd AF pt:	202.50	AF Correlation:	0.999982		

* = > +/-5% change initiates investigation

MPAFs done, swapped out UV lamp. Instrument will be left flagged overnight and will be calibrated Jan 17.

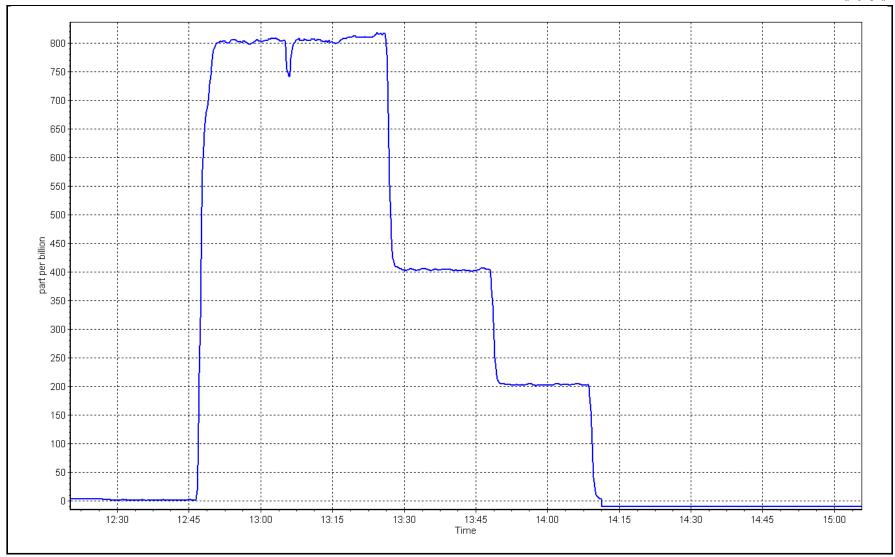
Calibration Performed By: Braiden Boutilier

SO2 Calibration Plot

Date: January 16, 2024

Location: Kirby South







SO₂ Calibration Report

Version-01-2020

Station Information

Kirby South Station Name: January 17, 2024 Calibration Date:

Start time (MST): Reason:

12:32

Routine

Station number: AMS 507

January 16, 2024 Last Cal Date:

16:52 End time (MST):

Calibration Standards

Cal Gas Concentration: 49.18

Cal Gas Cylinder #: CC303554

Removed Cal Gas Conc: 49.18 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 ppm Diff between cyl:

Serial Number: 3804

Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Analyzer Range 0 - 1000 ppb

Finish Start

Calibration slope: 1.016010 Calibration intercept: -0.008833

Baseline Corr 3rd AF pt:

1.005405

Backgd or Offset:

0.999982

Start 20.2

Finish 24.6 1.100

-1.048100 Coeff or Slope: 1.146

SO₂ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
	(SCCIII)	(SCCIII)	concentration (ppb) (cc)	(ppb) (ic)	LIIIII = 0.95-1.05
as found zero	5000	0.0	0.0	0.8	
as found span	4919	81.3	799.6	811.0	0.986
as found 2nd point	4959	40.7	400.3	403.6	0.992
as found 3rd point	4980	20.3	199.7	203.3	0.982
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	
high point	4919	81.3	799.6	804.0	0.995
second point	4959	40.7	400.3	398.9	1.004
third point	4980	20.3	199.7	200.4	0.996
as left zero	5000	0.0	0.0	-0.2	
as left span	4919	81.3	799.6	796.6	1.004
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	810.20	Previous response	812.41	*% change	-0.3%
Baseline Corr 2nd AF pt:	402.80	AF Slope	: 1.012737	AF Intercept:	0.311630

Notes: As founds done Jan 16 during maintenance. Adjusted zero and span.

AF Correlation:

Calibration Performed By: **Braiden Boutilier**

202.50

* = > +/-5% change initiates investigation



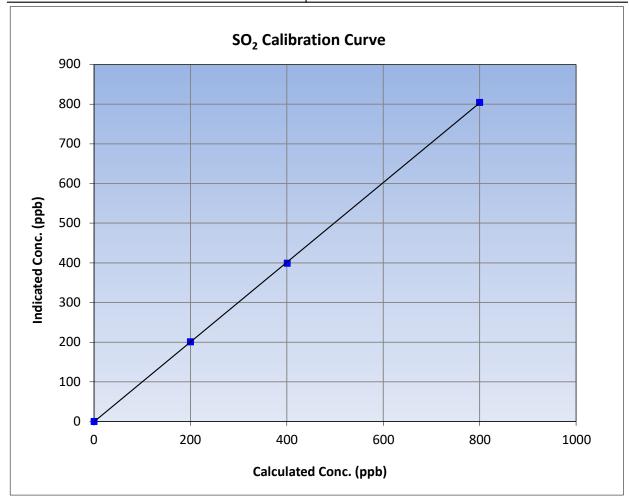
SO₂ Calibration Summary

Version-01-2020

Station Information

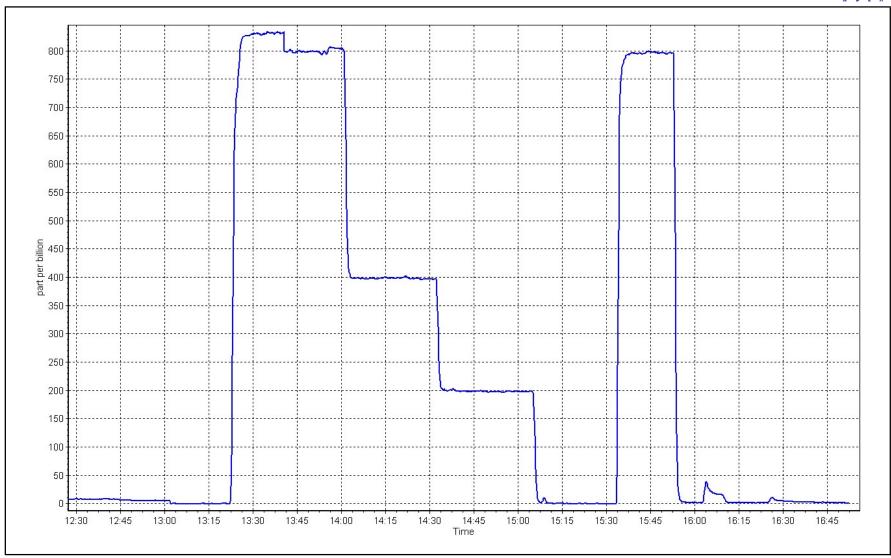
Calibration Date: January 17, 2024 **Previous Calibration:** January 16, 2024 Station Name: Kirby South AMS 507 Station Number: Start Time (MST): 12:32 End Time (MST): 16:52 Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Calibration Data									
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.0	-0.3		Correlation Coefficient	0.999975	≥0.995				
799.6	804.0	0.9946	Correlation Coefficient	0.999975	20.995				
400.3	398.9	1.0036	Clana	1.005405	0.90 - 1.10				
199.7	200.4	0.9963	Slope	1.005405	0.90 - 1.10				
			Intercept	-1.048100	+/-30				



SO2 Calibration Plot Date: January 17, 2024 Location: Kirby South







H₂S Calibration Report

Station number:

Version-11-2021

Station Information

Station Name: Kirby South

Calibration Date: January 17, 2024

Start time (MST): 12:29
Reason: Routine

y 17, 2024 Last Cal Date:

Last Cal Date: December 7, 2023

AMS507

End time (MST): 19:05

Calibration Standards

Cal Gas Concentration: 5.05 ppm Cal Gas Exp Date: November 15, 2026

ppm

Cal Gas Cylinder #: DT0019762

Removed Cal Gas Conc: 5.167
Removed Gas Cyl #: CC517378
Calibrator Make/Model: API T750
ZAG Make/Model: API T751H

Rem Gas Exp Date: NA

Diff between cyl: 2.4% Serial Number: 281 Serial Number: 321

Analyzer Information

Analyzer make: Thermo 43i TLE Analyzer serial #: 1150840012
Converter make: Global Converter serial #: 2022-197

Analyzer Range 0 - 100 ppb

Finish <u>Finish</u> <u>Start</u> <u>Start</u> 0.997813 Backgd or Offset: Calibration slope: 1.002178 1.81 1.74 Calibration intercept: -0.081174 0.179050 Coeff or Slope: 1.052 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	0.0	
as found span	4923	77.4	80.0	79.6	1.005
as found 2nd point	4961	38.8	40.1	39.9	1.005
as found 3rd point	4981	19.3	19.9	20.2	0.987
new cylinder response	4921	79.2	80.0	81.6	0.980

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	79.2	80.0	80.1	0.999
second point	4960	39.6	40.0	39.8	1.005
third point	4980	19.8	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.1	
as left span	4921	79.2	80.0	78.7	1.016
SO2 Scrubber Check	4919	80.0	800.2	0.1	
Date of last scrubber chang	ge:	25-Jul-23		Ave Corr Factor	0.996
Date of last converter efficiency test: efficiency					

Baseline Corr As found:	79.6	Prev response:	80.07	*% change:	-0.6%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.993743	AF Intercept:	0.139102
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999975	* = > +/-5% change initiates	investigation

Changed cyl#: CC517378, with cyl#: DT0019762. Ran SOx scrubber check after cal zero. Adjusted

span.

Calibration Performed By: Braiden Boutilier

Notes:



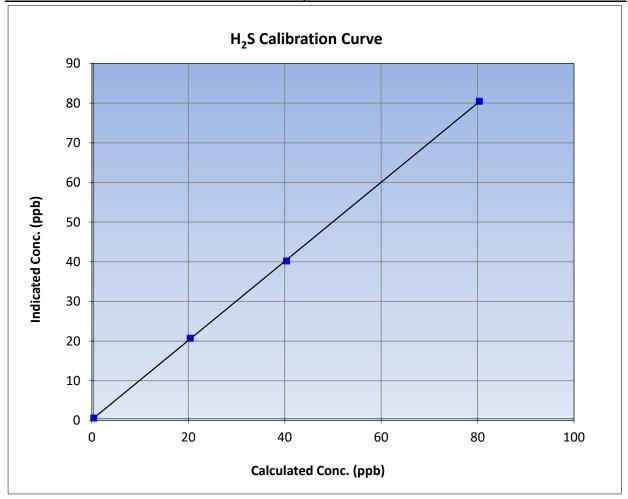
H₂S Calibration Summary

Version-11-2021

Station Information

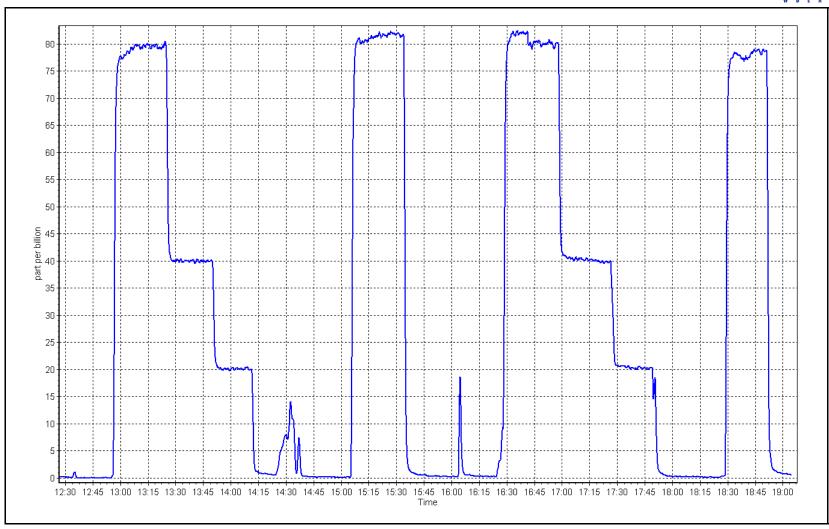
Calibration Date: January 17, 2024 **Previous Calibration:** December 7, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 12:29 End Time (MST): 19:05 Thermo 43i-TLE Analyzer make: Analyzer serial #: 1150840012

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	0.999965	≥0.995				
80.0	80.1	0.9987	Correlation Coefficient	0.999905	20.993				
40.0	39.8	1.0050	Slope	0.997813	0.90 - 1.10				
20.0	20.3	0.9852	Slope	0.557615	0.90 - 1.10				
			- Intercept	0.179050	+/-3				



Date: January 17, 2024 Location: Kirby South







CH4 Cal Gas Conc.

Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name: Kirby South

January 16, 2024 Calibration Date:

12:24 Start time (MST):

As Found Reason:

Station number: AMS507

> December 7, 2023 Last Cal Date:

End time (MST):

15:03

Calibration Standards

CC303554 Gas Cert Reference: Cal Gas Expiry Date: March 23, 2025

CH4 Equiv Conc. 1061.7 ppm

1061.7

ppm

ppm C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA

Removed Gas Expiry: NA Removed CH4 Conc. 496.6 CH4 Equiv Conc. ppm

Removed C3H8 Conc. 205.5 Diff between cyl: ppm

496.6

3804 Calibrator Make/Model: **API T700** Serial Number: ZAG Make/Model: **API T701H** Serial Number: 880

Analyzer Information

Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

Start Finish

Finish <u>Start</u> Background: 1.001294 2.86 2.86

Calibration slope: Coefficient: Calibration intercept: -0.045008 3.753 3.753

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	0.17	
as found span	4919	81.3	17.26	17.40	0.992
as found 2nd point	4959	40.7	8.64	8.68	0.996
as found 3rd point	4980	20.3	4.31	4.35	0.992
new cylinder response					
calibrator zero					
high point					
second point					_
third point					
as left zero					
as left span					

			Ave	erage Correction Factor	
Baseline Corr As found:	17.23	Previous response	17.24	*% change	-0.1%
Baseline Corr 2nd AF pt:	8.51	AF Slope:	0.999776	AF Intercept:	0.097209
Baseline Corr 3rd AF pt:	4.18	AF Correlation:	0.999912		
				* = > +/-5% change initiates	investigation

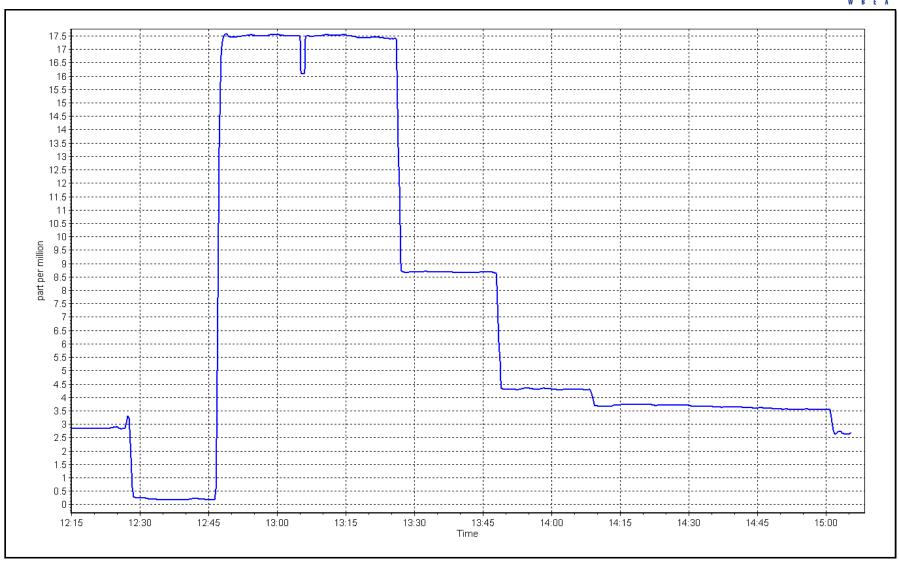
MPAF's done with SO2 maintenance. Calibration will be performed Jan 17.

Calibration Performed By: **Braiden Boutilier**

Notes:

THC Calibration Plot Date: January 16, 2024 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: January 17, 2024

Start time (MST): 12:24 Reason: Routine Station number: AMS507

Last Cal Date: January 16, 2024

End time (MST): 16:52

Calibration Standards

Gas Cert Reference: CC303554 Cal Gas Expiry Date: March 23, 2025

496.6 ppm CH4 Equiv Conc. 1061.7 ppm

C3H8 Cal Gas Conc. 205.5 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 496.6 ppm CH4 Equiv Conc. 1061.7 ppm

Removed C3H8 Conc. 205.5 ppm Diff between cyl:

Calibrator Make/Model: API T700 Serial Number: 3804 ZAG Make/Model: API T701H Serial Number: 880

Analyzer Information

Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

Start Finish Finish <u>Start</u> Calibration slope: Background: 1.001294 0.993376 2.86 2.86 0.069808 Coefficient: Calibration intercept: -0.045008 3.753 3.753

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	0.17	
as found span	4919	81.3	17.26	17.40	0.992
as found 2nd point	4959	40.7	8.64	8.68	0.996
as found 3rd point	4980	20.3	4.31	4.35	0.992
new cylinder response					
calibrator zero	5000	0.0	0.00	0.06	
high point	4919	81.3	17.26	17.22	1.002
second point	4959	40.7	8.64	8.64	1.000
third point	4980	20.3	4.31	4.38	0.985
as left zero	5000	0.0	0.00	0.10	
as left span	4919	81.3	17.26	17.35	0.995
			Avera	ge Correction Factor	0.996
Baseline Corr As found:	17.23	Previous response	17.24	*% change	-0.1%
Baseline Corr 2nd AF pt:	8.51	AF Slope:	0.999776	AF Intercept:	0.097209
Baseline Corr 3rd AF pt:	4.18	AF Correlation:	0.999912		
				* = > +/-5% change initia	ates investigation

Notes: MPAF's done Jan 16 for SO2 maintenance. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier



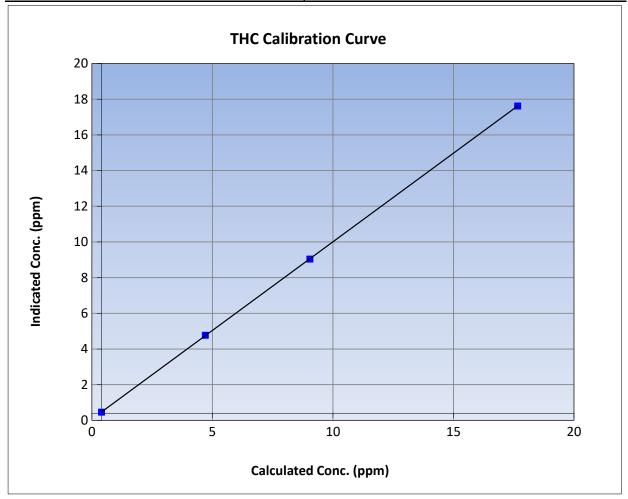
THC Calibration Summary

Version-01-2020

Station Information

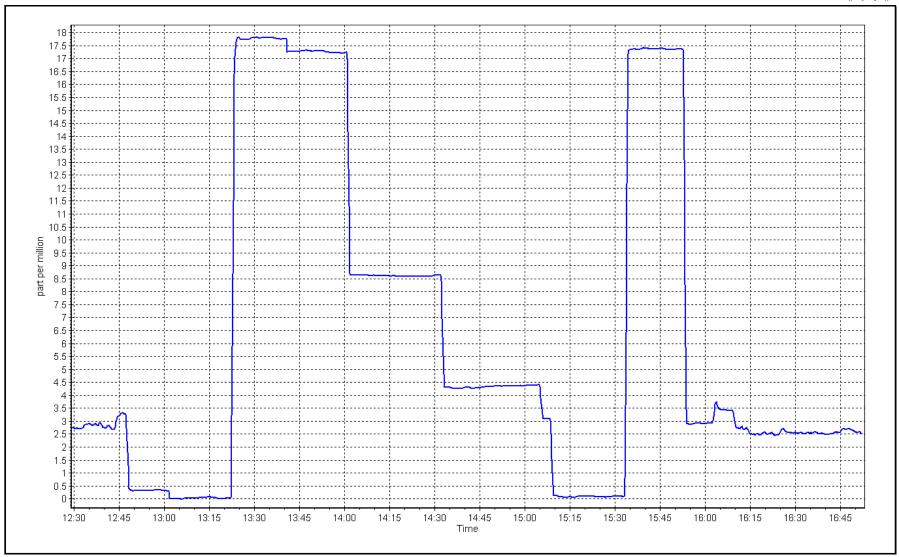
Previous Calibration: Calibration Date: January 17, 2024 January 16, 2024 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 12:24 End Time (MST): 16:52 Analyzer make: Thermo 51i Analyzer serial #: 1182340005

Calibration Data									
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>				
0.00	0.06		Correlation Coefficient	0.999994	≥0.995				
17.26	17.22	1.0025	Correlation Coefficient	0.333334	20.995				
8.64	8.64	1.0003	Slope	0.993376	0.90 - 1.10				
4.31	4.38	0.9852	Slope	0.333370	0.90 - 1.10				
			- Intercept	0.069808	+/-1.5				



THC Calibration Plot Date: January 17, 2024 Location: Kirby South







NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station Name: Kirby South Station number: AMS507

Calibration Date: January 18, 2024 Last Cal Date: December 6, 2023

Start time (MST): 8:51 End time (MST): 14:24 Routine Reason:

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** Calibrator Model:

Serial Number: 3804 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: 1.397 1.397 NO bkgnd or offset: 1.7 1.7 NOX coeff or slope: 0.995 0.995 NOX bkgnd or offset: 1.8 1.8 NO2 coeff or slope: 1.000 1.000 Reaction cell Press: 202.87 209.21

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002591	1.003862
NO _x Cal Offset:	-4.472891	-4.492458
NO Cal Slope:	1.001411	1.005411
NO Cal Offset:	-4.934867	-5.173949
NO ₂ Cal Slope:	0.999171	0.997888
NO ₂ Cal Offset:	0.864517	0.693913



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dil	ution Calibratio	on Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated 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	-0.7	-0.6	0.0		
as found span	4919	81.0	800.1	794.1	6.0	803.0	797.7	5.3	0.9964	0.9955
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0		
high point	4919	81.0	800.1	794.1	6.0	801.0	796.0	5.1	0.9989	0.9976
second point	4960	40.5	400.0	397.0	3.0	394.4	390.6	3.9	1.0142	1.0164
third point	4980	20.2	199.5	198.0	1.5	192.0	189.7	2.3	1.0392	1.0439
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.4	-0.1		
as left span	4919	81.0	800.1	413.9	386.2	792.8	408.9	383.9	1.0092	1.0123
							Average C	Correction Factor	1.0175	1.0193
Corrected As fo	ound NO _X =	803.7 ppb	NO =	= 798.3 ppb	* = > +/-5	% change initia	ates investigation	*Percent Chan	ge NO _x =	0.7%
Previous Respo	nse NO _X =	797.7 ppb	NO =	= 790.3 ppb				*Percent Chan	ge NO =	1.0%
Baseline Corr 2	nd pt $NO_X =$	NA ppb	NO =	= NA ppb	As foun	id NO _x	₍ r ² :	Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _X =	NA ppb	NO =	= NA ppb	As foun	id NO	r ² :	NO SI:	NO Int:	
					As foun	nd NO ₂	₁ r ² :	NO2 SI:	NO ₂ Int:	
				e	GPT Calibration	Data				
O3 Setpo	int (ppb)	Indicated NO Refer		licated NO Drop centration (ppb)	Calculated No concentration (pp		Indicated NO2 ncentration (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 poin	nt (400 ppb NO2)									
as found GPT poin	nt (200 ppb NO2)									
as found GPT poin	nt (100 ppb NO2)									
1st GPT point	(400 ppb O3)	791.4	·	411.2	386.2		386.1	1.0002	2	100.0%
2nd GPT point	(200 ppb O3)	791.4		623.5	173.9		173.5	1.0023	3	99.8%
3rd GPT point	(100 ppb O3)	791.4		714.8	82.6		84.5	0.9774	4	102.3%
						Average	Correction Factor	r 0.9933	3	100.7%

Notes:

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

Calibration Performed By:

Braiden Boutilier



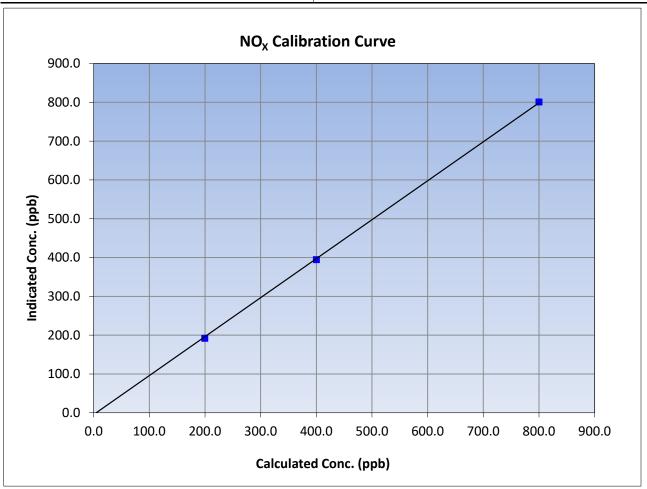
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 6, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:51 End Time (MST): 14:24 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	-0.3		Correlation Coefficient	0.999874	≥0.995
800.1	801.0	0.9989	Correlation Coefficient	0.555074	20.555
400.0	394.4	1.0142	Slope	1.003862	0.90 - 1.10
199.5	192.0	1.0392	Slope	1.005662	0.90 - 1.10
			Intercept	-4.492458	+/-20





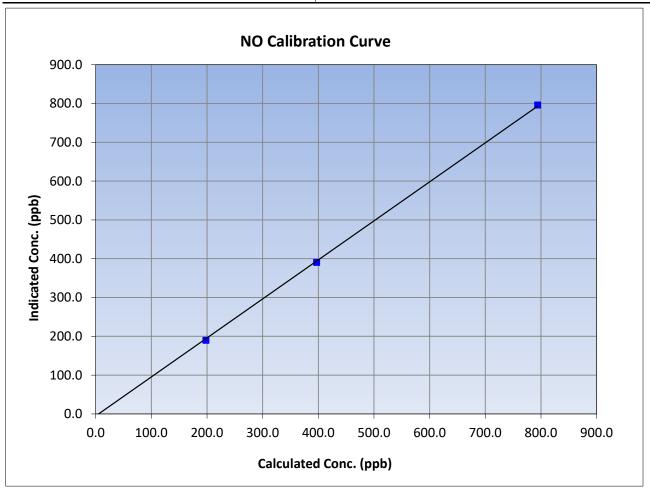
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 6, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:51 End Time (MST): 14:24 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	-0.3		Correlation Coefficient	0.999826	≥0.995	
794.1	796.0	0.9976	Correlation Coefficient	0.999620	20.333	
397.0	390.6	1.0164	Slope	1.005411	0.90 - 1.10	
198.0	189.7	1.0439	Slope	1.005411	0.90 - 1.10	
			Intercept	-5.173949	+/-20	





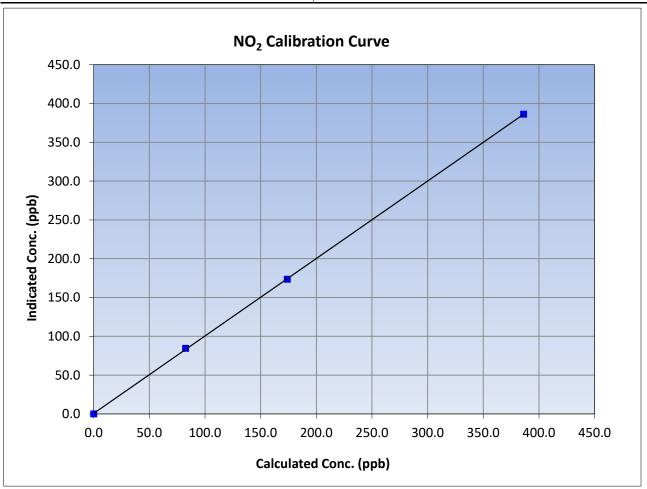
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 18, 2024 Previous Calibration: December 6, 2023 Station Name: Kirby South Station Number: AMS507 Start Time (MST): 8:51 End Time (MST): 14:24 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	0.999965	≥0.995	
386.2	386.1	1.0002	Correlation Coefficient	0.555505	20.993	
173.9	173.5	1.0023	Slope	0.997888	0.90 - 1.10	
82.6	84.5	0.9774	Slope	0.997000	0.90 - 1.10	
			Intercept	0.693913	+/-20	

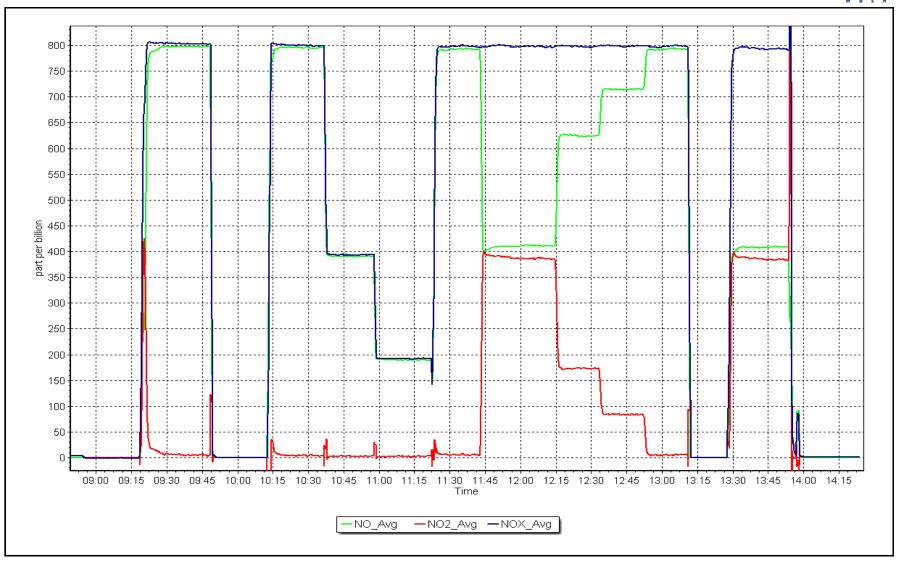


NO_x Calibration Plot

Date: January 18, 2024

Location: Kirby South







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS511 BLACKGOLD

JANUARY 2024

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

February 29, 2024



SO₂ Calibration Report

AMS511

Version-01-2020

Station Information

Blackgold Station number: Station Name:

January 17, 2024 December 14, 2023 Calibration Date: Last Cal Date:

Start time (MST): 12:22 End time (MST): 15:33

Routine Reason:

Calibration Standards

Cal Gas Concentration: 50.06 ppm Cal Gas Exp Date: January 5, 2029

Cal Gas Cylinder #: CC147416

Removed Cal Gas Conc: 50.06 ppm Rem Gas Exp Date: NA Diff between cyl: Removed Gas Cyl #: NA

Calibrator Make/Model: Teledyne API T700 Serial Number: 5258 ZAG Make/Model: Teledyne API 701 Serial Number: 138

Analyzer Information

Analyzer make: Thermo scientific Analyzer serial #: 1160290014

Analyzer Range 0 - 1000 ppb

Finish Finish Start Start Calibration slope: 1.002260 1.000172 Backgd or Offset: 35.4 36.5

1.228 Calibration intercept: 0.830491 2.710765 Coeff or Slope: 1.187

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 1.6			
as found span	4926	79.9	799.0	774.7	1.031	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.0	2.0		
high point	4926	79.9	799.0	801.4	0.997	
second point	4968	40.0	399.8	403.3	0.991	
third point	4987	20.0	200.0	203.2	0.984	
as left zero	5000	0.0	0.0	1.9		
as left span	4926	80.0	800.0	801.8	0.998	
			Averag	ge Correction Factor	0.991	
Baseline Corr As found:	773.10	Previous response	801.65	*% change	-3.7%	

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

Baseline Corr 3rd AF pt: NA AF Correlation:

* = > +/-5% change initiates investigation

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

Calibration Performed By: Mohammed Kashif



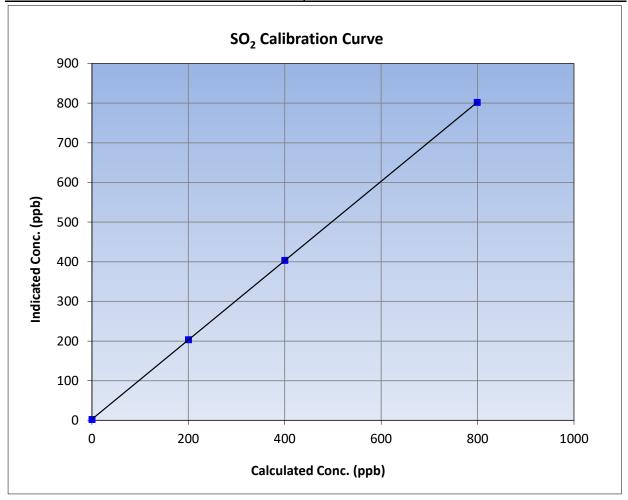
SO₂ Calibration Summary

Version-01-2020

Station Information

Calibration Date: January 17, 2024 **Previous Calibration:** December 14, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 12:22 End Time (MST): 15:33 Analyzer make: Thermo scientific Analyzer serial #: 1160290014

Calibration Data										
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	2.0		Correlation Coefficient	0.999996	≥0.995					
799.0	801.4	0.9970	Correlation Coefficient	0.555550	20.993					
399.8	403.3	0.9914	Slope	1.000172	0.90 - 1.10					
200.0	203.2	0.9841	Slope	1.000172	0.90 - 1.10					
			- Intercept	2.710765	+/-30					



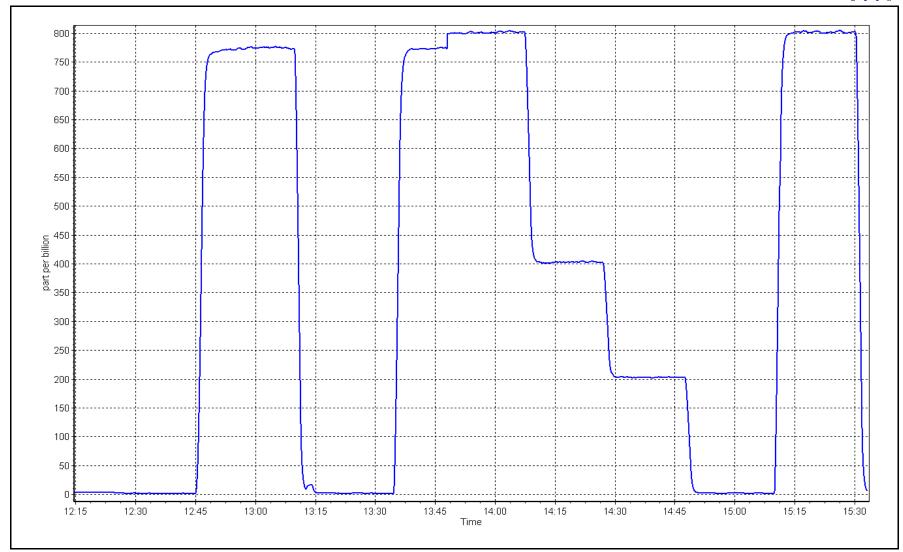
SO2 Calibration Plot

Date:

January 17, 2024

Location: Blackgold







H₂S Calibration Report

Version-11-2021

Station Information

Station Name: Blackgold

Calibration Date: January 25, 2024

Start time (MST): 11:19

Reason: Routine Station number: AMS511

> Last Cal Date: December 13, 2023

End time (MST): 15:16

Calibration Standards

Cal Gas Exp Date: January 3, 2026 Cal Gas Concentration: 5.139 ppm

Cal Gas Cylinder #: CC511397

Removed Cal Gas Conc: Rem Gas Exp Date: NA 5.139 ppm Removed Gas Cyl #: Diff between cyl: NA

Calibrator Make/Model: API T700 Serial Number: 2445 ZAG Make/Model: **API T701** Serial Number: 138

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090

Global G150 Converter serial #: 2022-227 Converter make:

0 - 100 ppb Analyzer Range

<u>Start</u> **Finish** <u>Finish</u> <u>Start</u> 0.977047 Backgd or Offset: Calibration slope: 0.982906 3.41 3.39 Calibration intercept: 0.001152 0.181198 Coeff or Slope: 1.159 1.159

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	77.8	80.0	78.4	1.021
as found 2nd point	4961	38.9	40.0	39.3	1.020
as found 3rd point	4981	19.5	20.0	19.9	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	0.2	
high point	4922	77.8	80.0	78.3	1.021
second point	4961	38.9	40.0	39.3	1.017
third point	4981	19.5	20.0	19.7	1.017
as left zero	5000	0.0	0.0	0.2	
as left span	4922	77.9	80.0	77.9	1.027
SO2 Scrubber Check	4920	80.0	800.0	0.1	
Date of last scrubber chan	ge:			Ave Corr Factor	1.019
Data of last convertor offic	ionautosti				officion ou

Date of last scrubber change:	Ave Corr Factor	1.019
Date of last converter efficiency test:		efficiency

Baseline Corr As found: 78.3 Prev response: 78.60 *% change: -0.4% Baseline Corr 2nd AF pt: 39.2 AF Slope: 0.978479 AF Intercept: 0.181087 Baseline Corr 3rd AF pt: AF Correlation: 0.999994 19.8 * = > +/-5% change initiates investigation

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



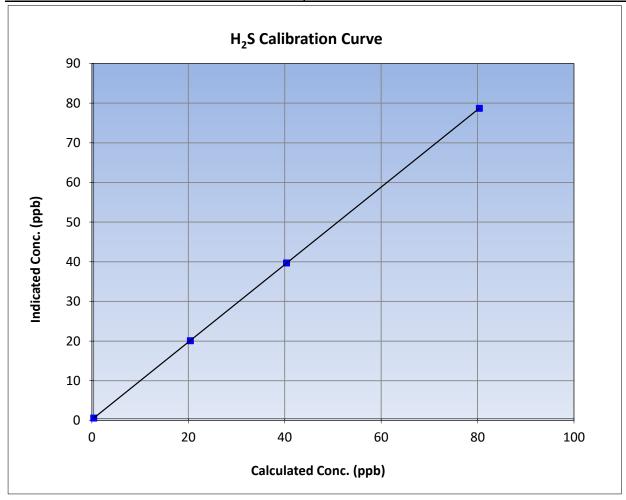
H₂S Calibration Summary

Version-11-2021

Station Information

Calibration Date: January 25, 2024 **Previous Calibration:** December 13, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 11:19 End Time (MST): 15:16 Analyzer make: Thermo 43i-TLE Analyzer serial #: 1336160090

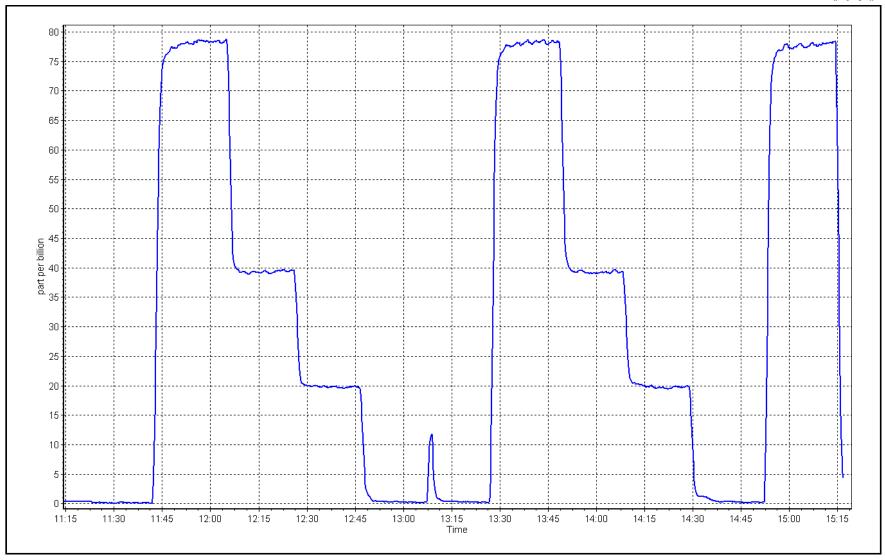
Calibration Data										
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.0	0.2		Correlation Coefficient	0.999998	≥0.995					
80.0	78.3	1.0213	Correlation Coefficient	0.555556	20.993					
40.0	39.3	1.0174	Slope	0.977047	0.90 - 1.10					
20.0	19.7	1.0173	Slope	0.377047	0.90 - 1.10					
			- Intercept	0.181198	+/-3					



Date: January 25, 2024

Location: Blackgold







THC Calibration Report

Version-01-2020

Station Information

Blackgold Station Name:

January 17, 2024 Calibration Date:

Start time (MST): 12:22

Routine Reason:

Station number: AMS511

> December 14, 2023 Last Cal Date:

End time (MST): 15:33

Calibration Standards

CC147416 Gas Cert Reference: Cal Gas Expiry Date: January 5, 2029

CH4 Cal Gas Conc. 498.90 CH4 Equiv Conc. 1070.90 ppm ppm

C3H8 Cal Gas Conc. 208.00 ppm

Removed Gas Cert: NA Removed Gas Expiry: NA

Removed CH4 Conc. 498.90 CH4 Equiv Conc. 1070.90 ppm ppm

Removed C3H8 Conc. Diff between cyl: 208.00 ppm

5258 Calibrator Make/Model: Teledyne API T700 Serial Number: ZAG Make/Model: Teledyne API 701 Serial Number: 138

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1317958295

Analyzer Range: 0 - 20 ppm

Start Finish Finish <u>Start</u> Background: Calibration slope: 0.994672 0.996004 0.90 0.89 0.019633 -0.004347 Coefficient: Calibration intercept: 0.575 0.567

THC Calibration Data

Set Point	Dilution air flow rate (sccm)			Correction factor (Cc/Ic) Limit = 0.95-1.05	
as found zero	5000	0.0	0.00	0.05	
as found span	4920	79.9	17.11	17.35	0.986
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.07	
high point	4920	79.9	17.11	17.09	1.001
second point	4960	40.0	8.57	8.45	1.014
third point	4980	20.0	4.28	4.22	1.016
as left zero	5000	0.0	0.00	0.08	
as left span	4926	80.0	17.11	17.16	0.997
			Av	erage Correction Factor	1.010
Baseline Corr As found:	17.30	Previous response	17.04	*% change	1.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

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

Mohammed Kashif Calibration Performed By:

* = > +/-5% change initiates investigation



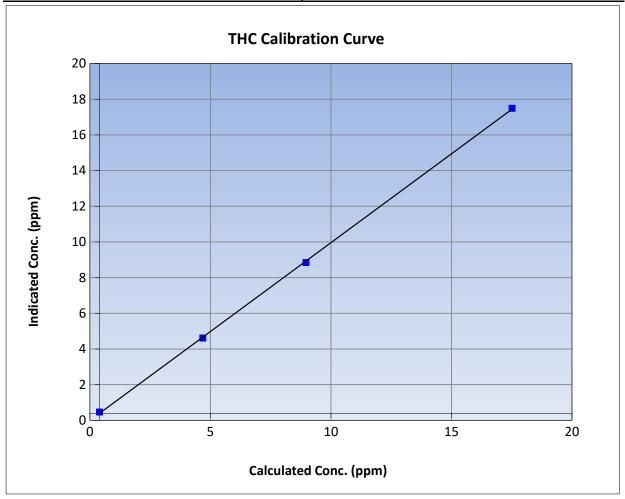
THC Calibration Summary

Version-01-2020

Station Information

Previous Calibration: Calibration Date: January 17, 2024 December 14, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 12:22 End Time (MST): 15:33 Analyzer make: Thermo 51i-LT Analyzer serial #: 1317958295

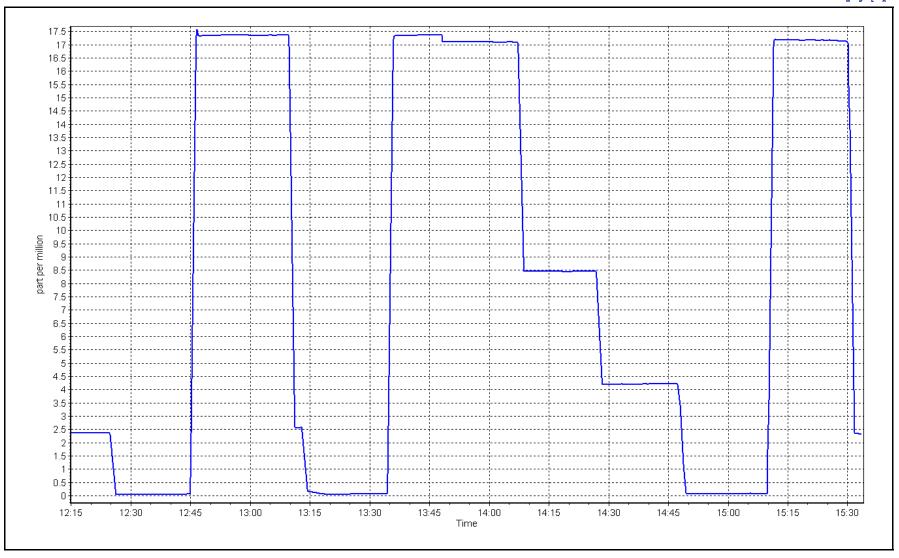
Calibration Data										
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>					
0.00	0.07	0.07 Correlation Coefficie		0.999893	≥0.995					
17.11	17.09	1.0012	Correlation Coefficient	0.555655	20.995					
8.57	8.45	1.0143	Slope	0.996004	0.90 - 1.10					
4.28	4.22	1.0156	Slope	0.990004	0.90 - 1.10					
			- Intercept	-0.004347	+/-1.5					



THC Calibration Plot Date: January 17, 2024

Location: Blackgold







NO_X \ NO \ NO₂ Calibration Report

End time (MST): 16:14

Version-04-2020

Station Information

Station Name: Blackgold Station number: AMS511

Calibration Date: January 9, 2024 Last Cal Date: December 22, 2023

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

Calibration Standards

NO Gas Cylinder #: T0F8P52 Cal Gas Expiry Date: August 16, 2026

NOX Cal Gas Conc: 47.43 ppm NO Cal Gas Conc: 47.43 ppm

Removed Cylinder #: NA Removed Gas Exp Date: NA

Removed Gas NOX Conc: 47.43 ppm Removed Gas NO Conc: 47.43 ppm

NOX gas Diff: NO gas Diff:

Calibrator Model: Teledyne API T700 Serial Number: 2445 ZAG make/model: Teledyne API T701 Serial Number: 138

Analyzer Information

Analyzer make: Teledyne API T200 Analyzer serial #: 7029

NOX Range (ppb): 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.041	1.041	NO bkgnd or offset:	0.2	0.2
NOX coeff or slope:	1.038	1.038	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.2	4.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.012843	1.002964
NO _x Cal Offset:	0.247028	-1.992779
NO Cal Slope:	1.011487	1.002150
NO Cal Offset:	-0.052956	-2.932730
NO ₂ Cal Slope:	0.998436	1.004437
NO ₂ Cal Offset:	1.931124	1.342612



NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

				Dile	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0		
as found span	4916	84.4	800.6	800.6	0.0	792.4	789.6	2.8	1.0103	1.0139
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4916	84.4	800.6	800.6	0.0	802.0	801.0	1.1	0.9982	0.9994
second point	4958	42.2	400.3	400.3	0.0	398.2	396.1	2.1	1.0053	1.0106
third point	4979	21.1	200.2	200.2	0.0	197.1	195.3	1.7	1.0155	1.0249
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4916	84.4	800.6	429.3	371.3	798.0	433.6	364.4	1.0032	0.9900
							Average C	orrection Factor	1.0063	1.0116
Corrected As fo	ound NO _X =	792.7 ppb	NO =	= 789.9 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chan	ge NO _x =	-2.3%
Previous Respo	onse NO _X =	811.1 ppb	NO =	= 809.7 ppb				*Percent Chan	ge NO =	-2.5%
Baseline Corr 2	and pt $NO_X =$	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _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 Setpo	pint (ppb)	Indicated NO Ref		icated NO Drop centration (ppb)	Calculated No concentration (pp		dicated NO2 stration (ppb) (Ic)	NO2 Correction fa Calibration Limit = As Found Limit = 0	0.95-1.05	rter Efficiency n Limit = 96-104%
as found	GPT zero									
as found GPT po	int (400 ppb NO2)									
as found GPT po	int (200 ppb NO2)									
as found GPT po	int (100 ppb NO2)									
1st GPT point	t (400 ppb O3)	797.0		425.7	371.3		373.5	0.994	1 :	100.6%
2nd GPT poin	t (200 ppb O3)	797.0		620.2	176.8		180.1	0.981	7	101.9%
3rd GPT poin	t (100 ppb O3)	797.0		707.4	89.6		92.3	0.970	7	103.0%

Notes:

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

Average Correction Factor

0.9822

Calibration Performed By: Mohammed Kashif

101.8%



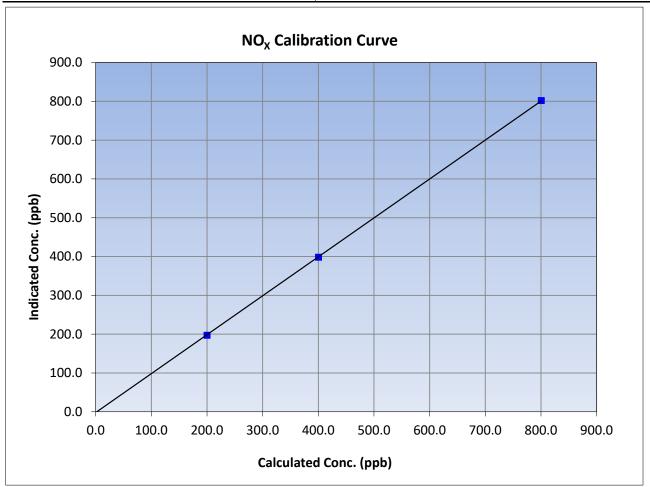
NO_x Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 22, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 11:11 End Time (MST): 16:14 Analyzer serial #: Analyzer make: Teledyne API T200 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999974	≥0.995
800.6	802.0	0.9982	Correlation Coefficient	0.555574	20.993
400.3	398.2	1.0053	Slope	1.002964	0.90 - 1.10
200.2	197.1	1.0155	Slope	1.002904	0.90 - 1.10
			Intercept	-1.992779	+/-20





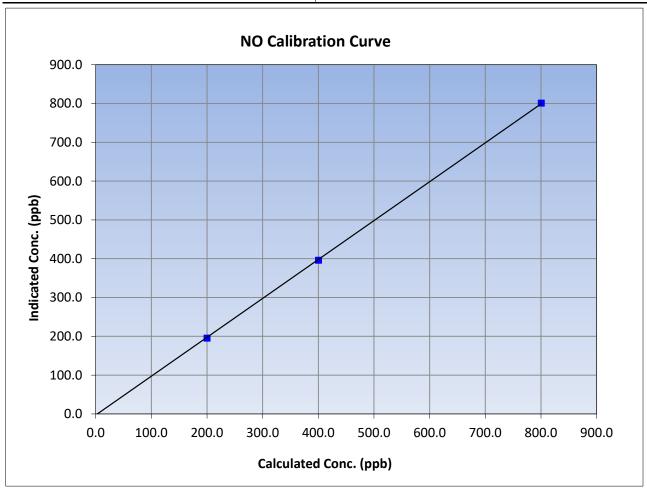
NO Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 22, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 11:11 End Time (MST): 16:14 Analyzer make: Teledyne API T200 Analyzer serial #: 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999941	≥0.995
800.6	801.0	0.9994			
400.3	396.1	1.0106	Slope	1.002150	0.90 - 1.10
200.2	195.3	1.0249			
			Intercept	-2.932730	+/-20





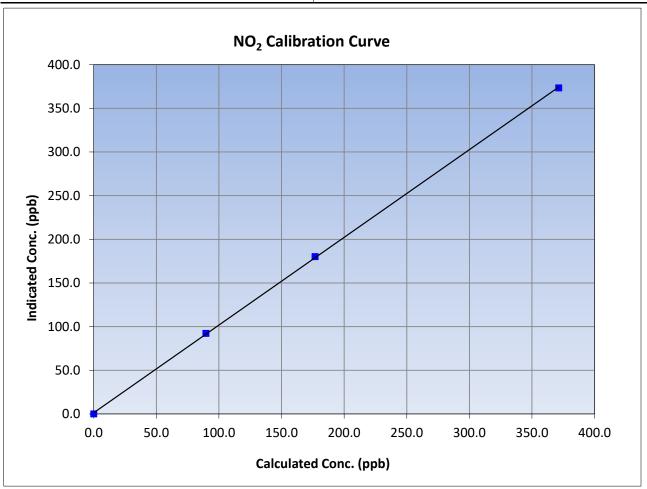
NO₂ Calibration Summary

Version-04-2020

Station Information

Calibration Date: January 9, 2024 Previous Calibration: December 22, 2023 Station Name: Blackgold Station Number: AMS511 Start Time (MST): 11:11 End Time (MST): 16:14 Analyzer serial #: Analyzer make: Teledyne API T200 7029

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999938	≥0.995
371.3	373.5	0.9941			
176.8	180.1	0.9817	Slope	1.004437	0.90 - 1.10
89.6	92.3	0.9707			
			Intercept	1.342612	+/-20

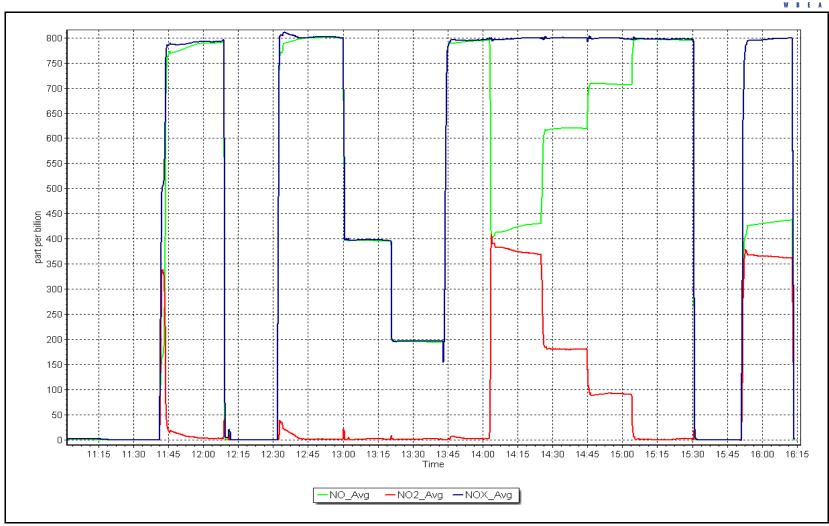


NO_x Calibration Plot

Date: January 9, 2024

Location: Blackgold







End of Report