



**WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION**

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Wood Buffalo Environmental Association

SEPTEMBER 2024 MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING

October 31, 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 SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 9, 2024 Last Cal Date: August 16, 2024
Start time (MST): 9:38 End time (MST): 13:36
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.21 ppm Cal Gas Exp Date: March 10, 2031
Cal Gas Cylinder #: CC418809
Removed Cal Gas Conc: 49.21 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 3565
Zero Air Gen Model: Teledyne API T701 Serial Number: 4766

Analyzer Information

Analyzer make: Thermo 43i Serial Number: JC1501301448
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001379	1.003278	Backgd or Offset:	20.4	20.7
Calibration intercept:	0.046988	-0.293098	Coeff or Slope:	0.875	0.875

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4918	81.3	800.3	801.4	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	801.2	Previous response	801.4	*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4918	81.3	800.3	803.1	0.996
Mid point	4959	40.7	400.6	400.6	1.000
Low point	4979	20.3	199.8	200.2	0.998
As left zero	5000	0.0	0.0	0.4	----
As left span	4918	81.3	800.3	803.5	0.996
Average Correction Factor:					0.998

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

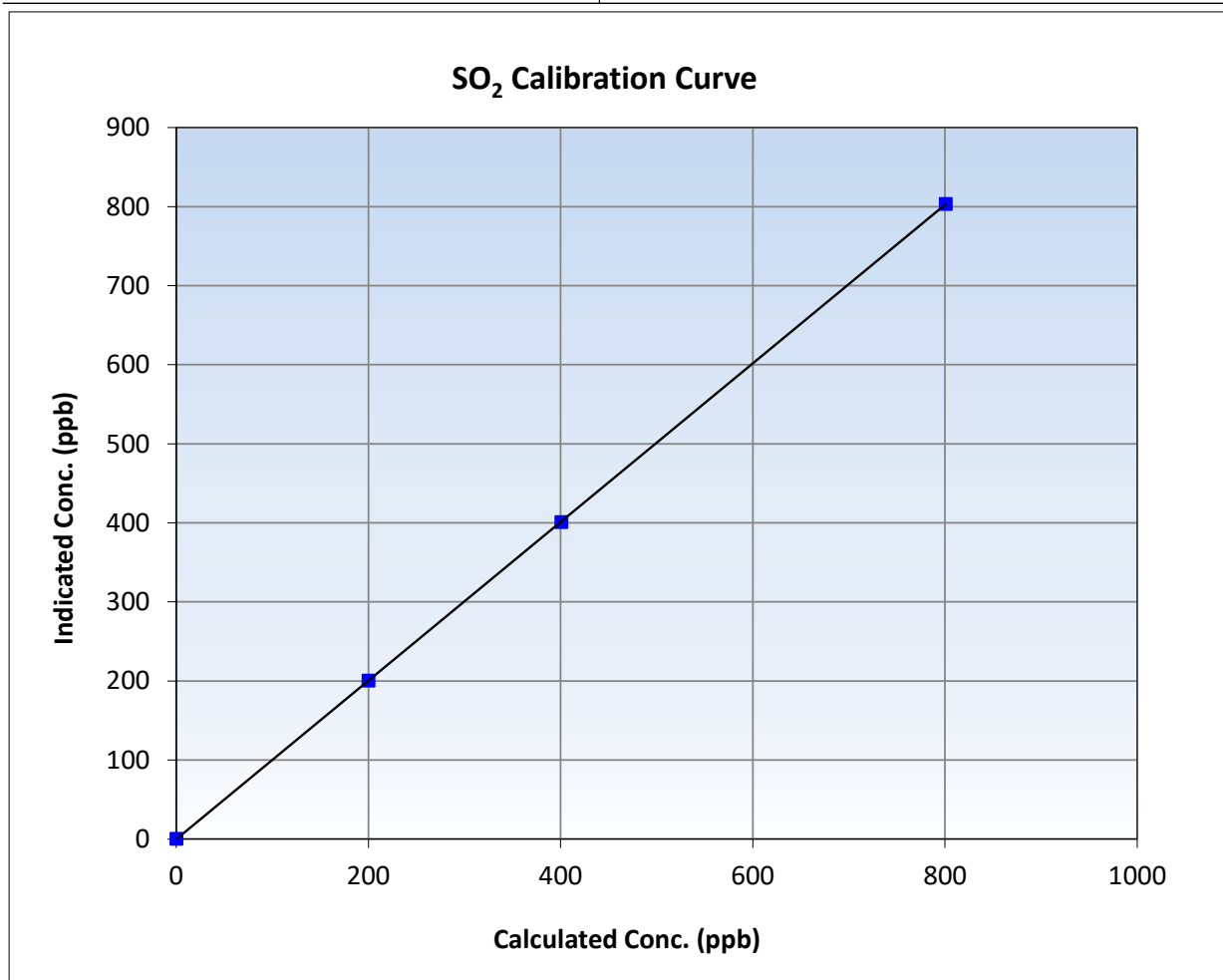
SO₂ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 16, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:38	End Time (MST):	13:36
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301448

Calibration Data

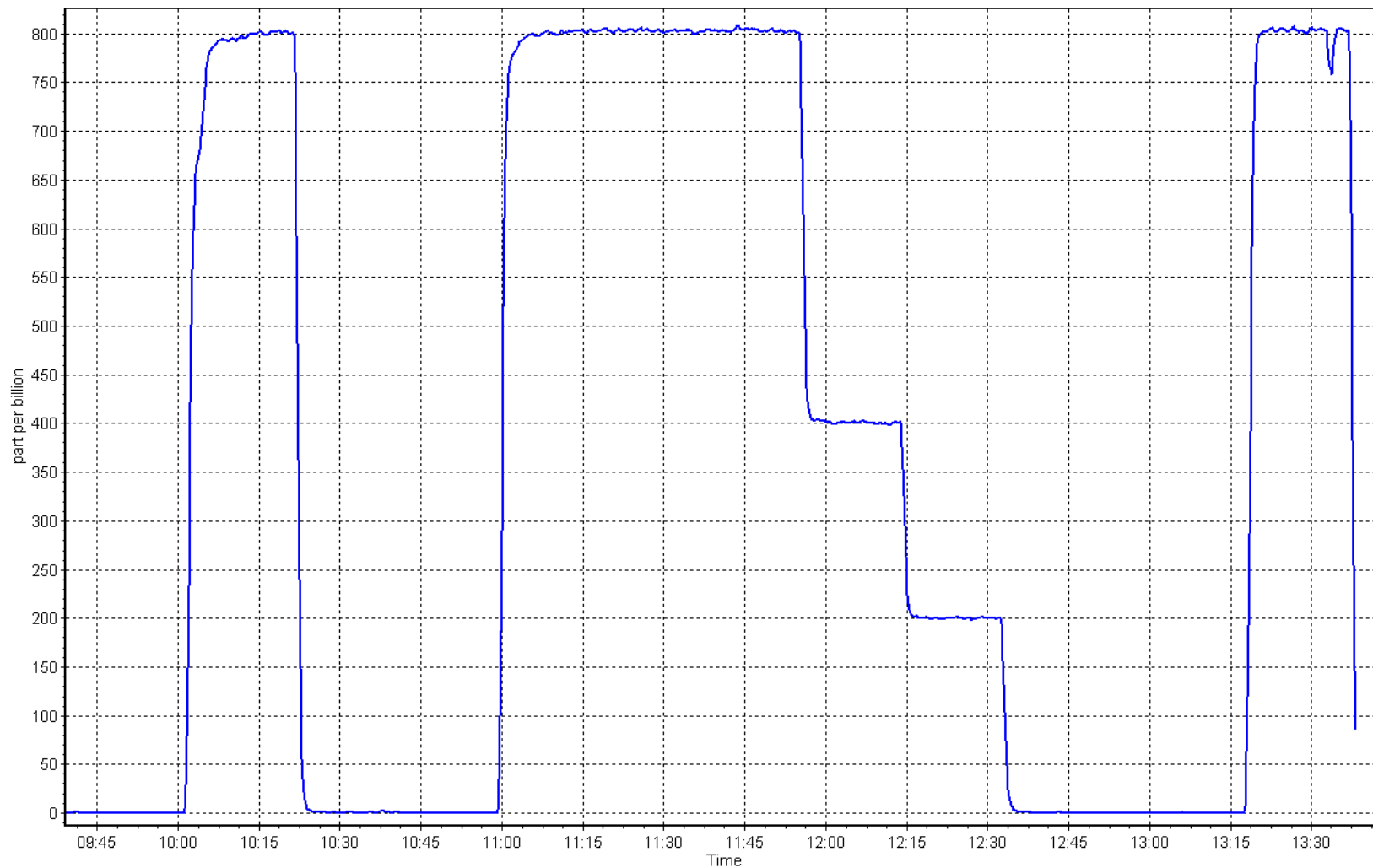
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999996	≥0.995
800.3	803.1	0.9965	Slope	1.003278	0.90 - 1.10
400.6	400.6	1.0000	Intercept	-0.293098	+/-30
199.8	200.2	0.9981			



SO2 Calibration Plot

Date: September 9, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 23, 2024 Last Cal Date: August 21, 2024
Start time (MST): 8:56 End time (MST): 13:24
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.10 ppm Cal Gas Exp Date: September 16, 2024
Cal Gas Cylinder #: CC511749
Removed Cal Gas Conc: 5.10 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3565
ZAG Make/Model: Teledyne API T701 Serial Number: 4766

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153461
Converter make: CD Nova Converter serial #: 470
Analyzer Range: 0 - 100 ppb Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002132	1.002704	Backgd or Offset:	2.54	2.53
Calibration intercept:	0.060001	0.139999	Coeff or Slope:	0.891	0.881

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4921	78.4	80.0	79.6	1.005
As found Mid point	4960	39.2	40.0	40.1	0.997
As found Low point	4980	19.6	20.0	20.1	0.995
New cylinder response					
Baseline Corr As found:	79.6	Prev response:	80.21	*% change:	-0.8%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.994844	AF Intercept:	0.139998
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999981	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4921	78.4	80.0	80.3	0.996
Mid point	4960	39.2	40.0	40.3	0.992
Low point	4980	19.6	20.0	20.2	0.990
As left zero	5000	0.0	0.0	0.2	----
As left span	4921	78.4	80.0	80.1	0.998
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:	December 17, 2021			Ave Corr Factor	0.993
Date of last converter efficiency test:					

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

Calibration Performed By: Rene Chamberland



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TRS Calibration Summary

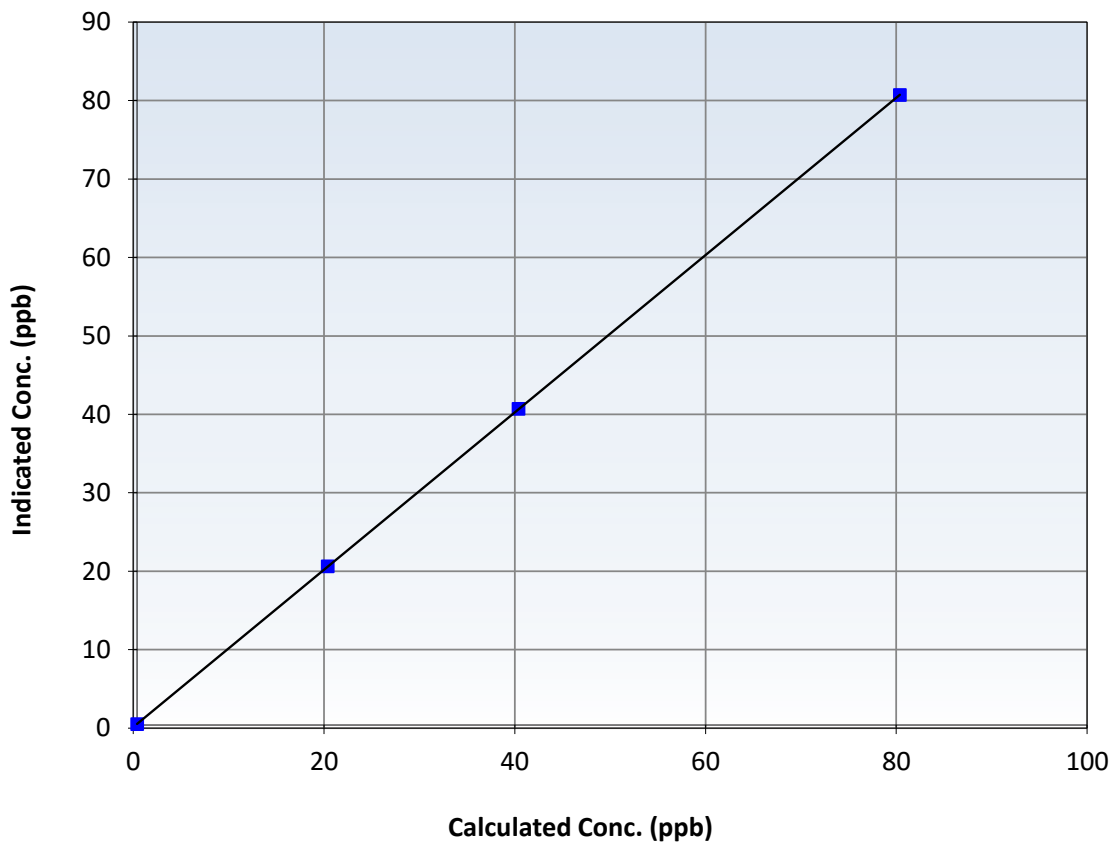
Station Information

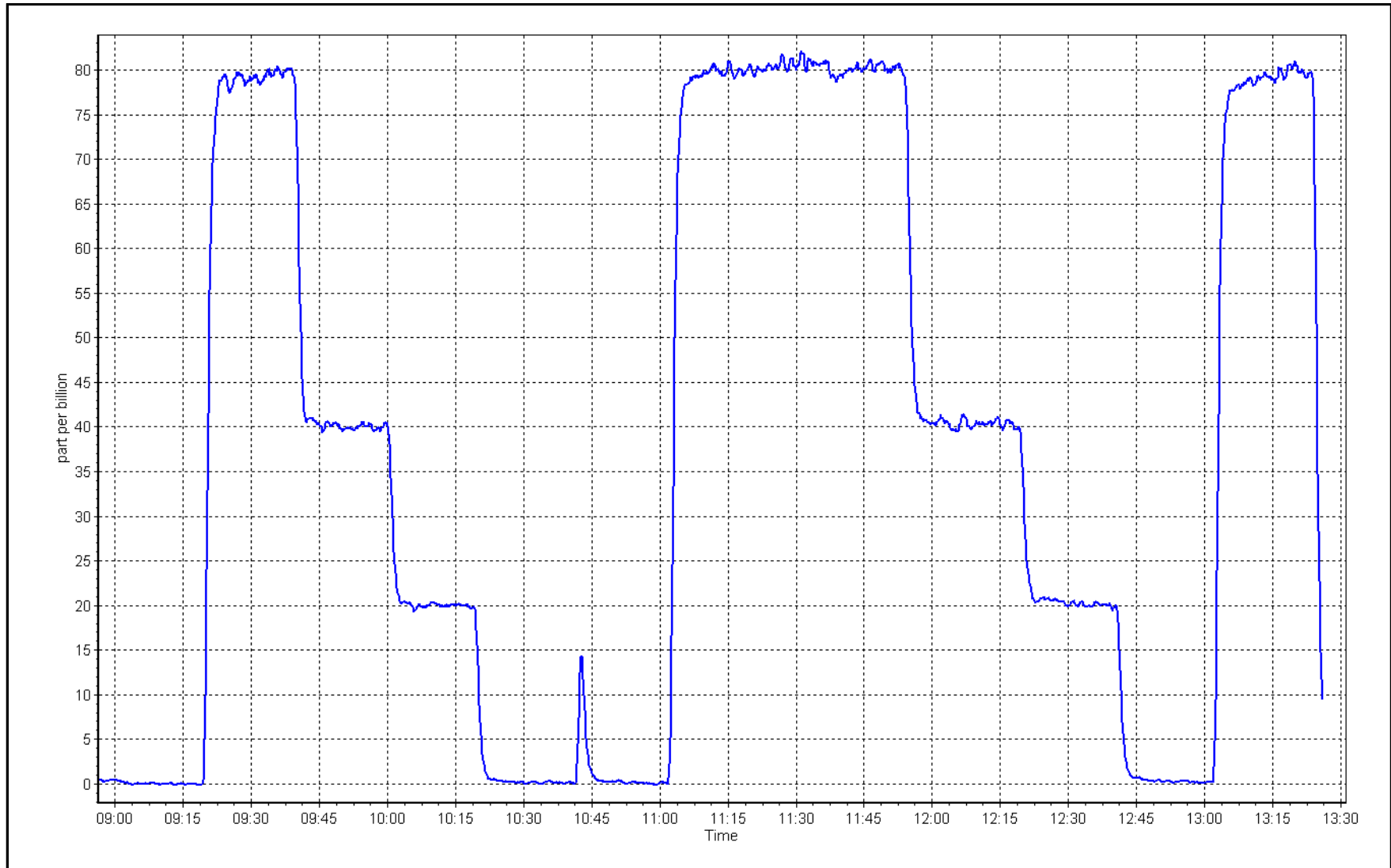
Calibration Date:	September 23, 2024	Previous Calibration:	August 21, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	8:56	End Time (MST):	13:24
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

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	0.999998	≥ 0.995
80.0	80.3	0.9960	Slope	1.002704	$0.90 - 1.10$
40.0	40.3	0.9923	Intercept	0.139999	± 3
20.0	20.2	0.9898			

TRS Calibration Curve







Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 23, 2024 Last Cal Date: August 21, 2024
Start time (MST): 8:56 End time (MST): 13:24
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.10 ppm Cal Gas Exp Date: September 16, 2024
Cal Gas Cylinder #: CC511749
Removed Cal Gas Conc: 5.10 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3565
ZAG Make/Model: Teledyne API T701 Serial Number: 4766

Analyzer Information

Analyzer make: Thermo 43iQ-TL Analyzer serial #: 1200326167
Converter make: CD Nova Converter serial #: 2022-221
Analyzer Range: 0 - 100 ppb Converter Temp: 350 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998479	1.002767	Backgd or Offset:	1.54	1.54
Calibration intercept:	-0.083187	0.116793	Coeff or Slope:	0.945	0.964

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4922	78.4	80.0	79.1	1.011
As found Mid point	4960	39.2	40.0	39.6	1.010
As found Low point	4980	19.6	20.0	19.7	1.015
New cylinder response					
Baseline Corr As found:	79.1	Prev response:	79.76	*% change:	-0.8%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.989618	AF Intercept:	-0.023168
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999998	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4922	78.4	80.0	80.3	0.996
Mid point	4960	39.2	40.0	40.2	0.995
Low point	4980	19.6	20.0	20.2	0.990
As left zero	5000	0.0	0.0	0.3	----
As left span	4922	78.4	80.0	79.1	1.011
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:	January 25, 2024			Ave Corr Factor	0.993
Date of last converter efficiency test:					

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

H₂S Calibration Summary

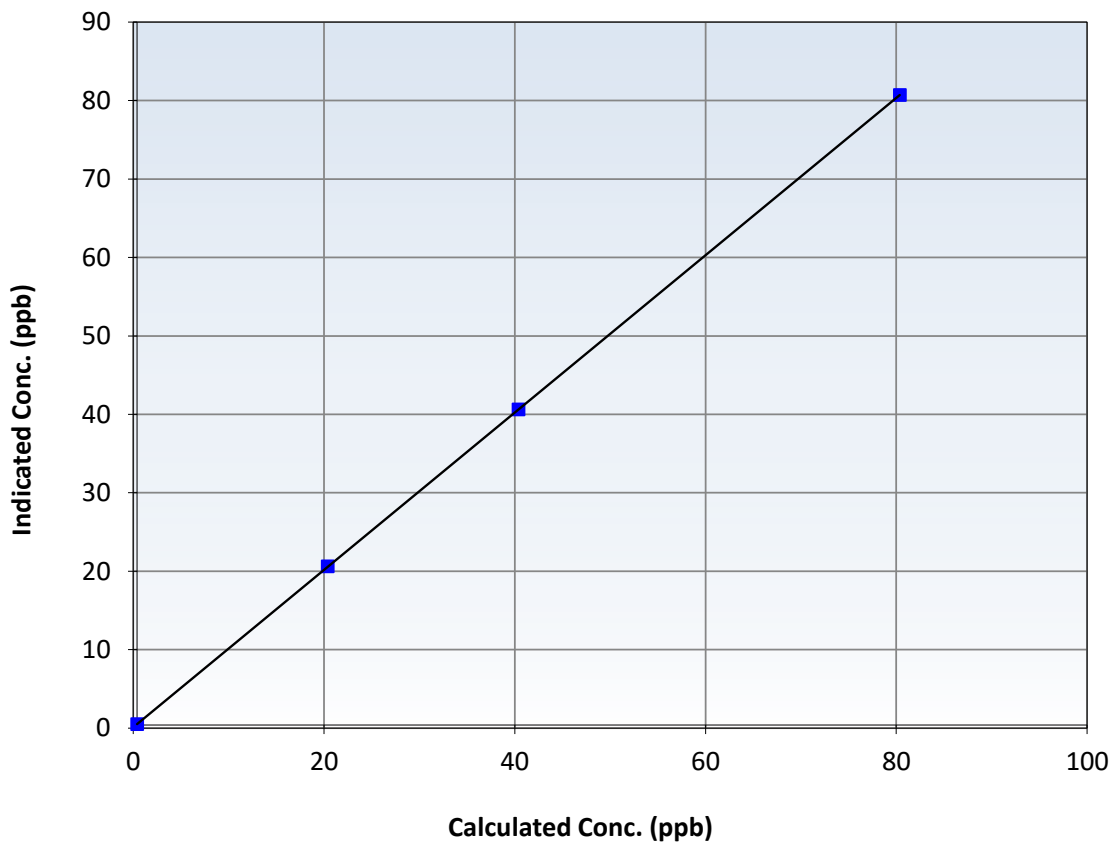
Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	August 21, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	8:56	End Time (MST):	13:24
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1200326167

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	0.999999		≥0.995
80.0	80.3	0.9958	Slope	1.002767		0.90 - 1.10
40.0	40.2	0.9948	Intercept	0.116793		+/-3
20.0	20.2	0.9898				

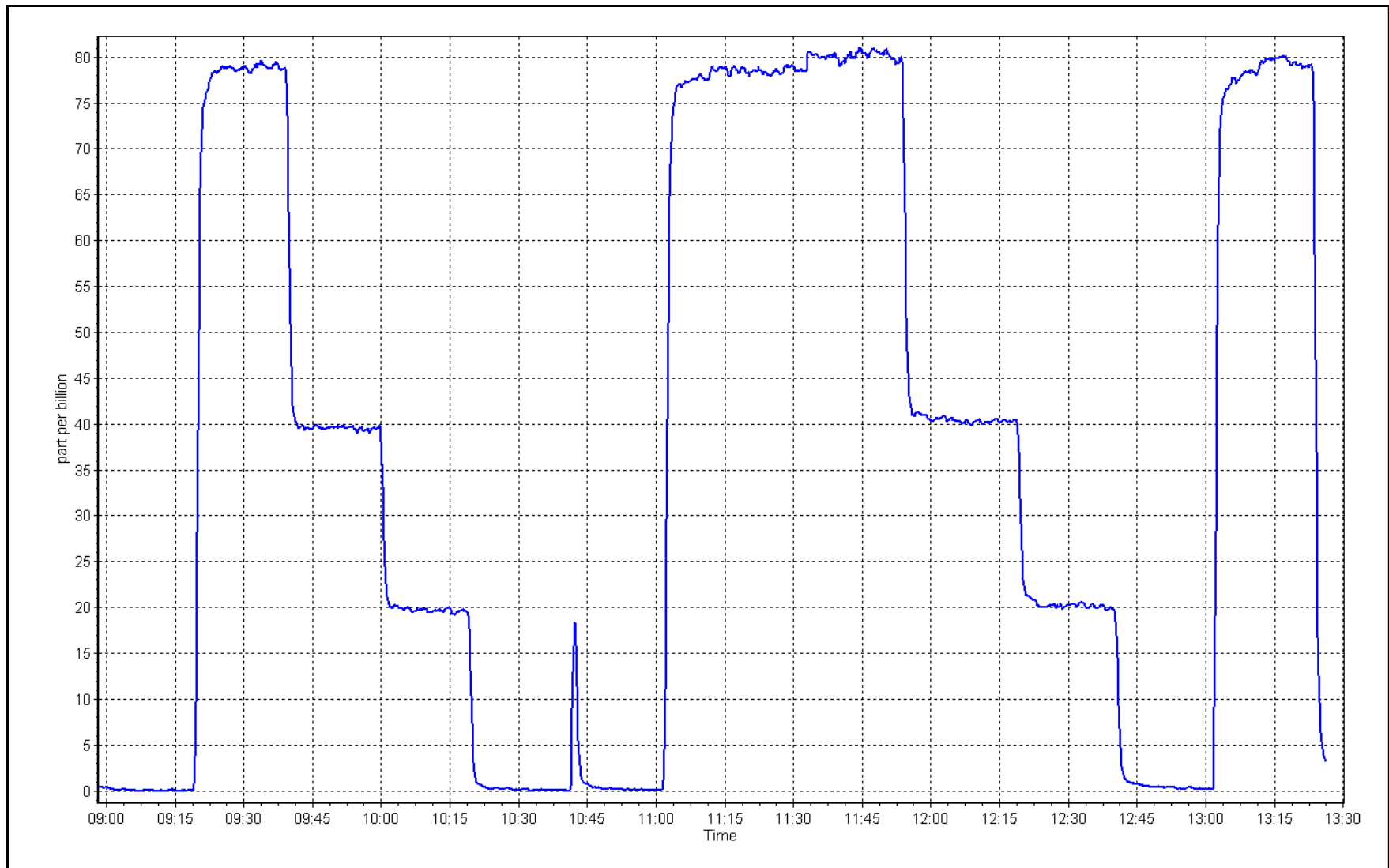
H₂S Calibration Curve



H₂S Calibration Plot

Date: September 23, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
 Calibration Date: September 9, 2024 Last Cal Date: August 16, 2024
 Start time (MST): 9:38 End time (MST): 13:33
 Reason: Routine

Calibration Standards

Gas Cert Reference: CC418809 Cal Gas Expiry Date: March 10, 2031
 CH₄ Cal Gas Conc. 497.2 ppm CH₄ Equiv Conc. 1061.8 ppm
 C₃H₈ Cal Gas Conc. 205.3 ppm
 Removed Gas Cert: NA Removed Gas Expiry: NA
 Removed CH₄ Conc. 497.2 ppm CH₄ Equiv Conc. 1061.8 ppm
 Removed C₃H₈ Conc. 205.3 ppm Diff between cyl (THC):
 Diff between cyl (CH₄): Diff between cyl (NM):
 Calibrator Model: Teledyne API T700 Serial Number: 3565
 Zero Air Gen model: Teledyne API T701 Serial Number: 4766

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1180320040
 THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	4.46E-04	4.44E-04	NMHC SP Ratio:	7.98E-05
CH ₄ Retention time:	16.7	16.7	NMHC Peak Area:	115154
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	17.27	17.26	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.26	Prev response	17.30	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	17.27	17.21	1.003
Mid point	4959	40.7	8.64	8.49	1.018
Low point	4979	20.3	4.31	4.23	1.020
As left zero	5000	0.0	0.00	0.19	----
As left span	4918	81.3	17.27	17.16	1.006
Average Correction Factor					1.014

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4918	81.3	9.18	9.16	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.16	Prev response	9.17	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4918	81.3	9.18	9.13	1.006
Mid point	4959	40.7	4.60	4.55	1.010
Low point	4979	20.3	2.29	2.28	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	9.18	9.11	1.008
Average Correction Factor					1.006

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4918	81.3	8.09	8.11	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.11	Prev response	8.12	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4918	81.3	8.09	8.08	1.001
Mid point	4959	40.7	4.05	3.94	1.028
Low point	4979	20.3	2.02	1.94	1.040
As left zero	5000	0.0	0.00	0.19	----
As left span	4918	81.3	8.09	8.05	1.004
Average Correction Factor					1.023

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.999637	0.997236
THC Cal Offset:	0.035581	-0.054031
CH ₄ Cal Slope:	1.000599	1.001136
CH ₄ Cal Offset:	0.033887	-0.052513
NMHC Cal Slope:	0.998839	0.993789
NMHC Cal Offset:	0.002492	-0.001718

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

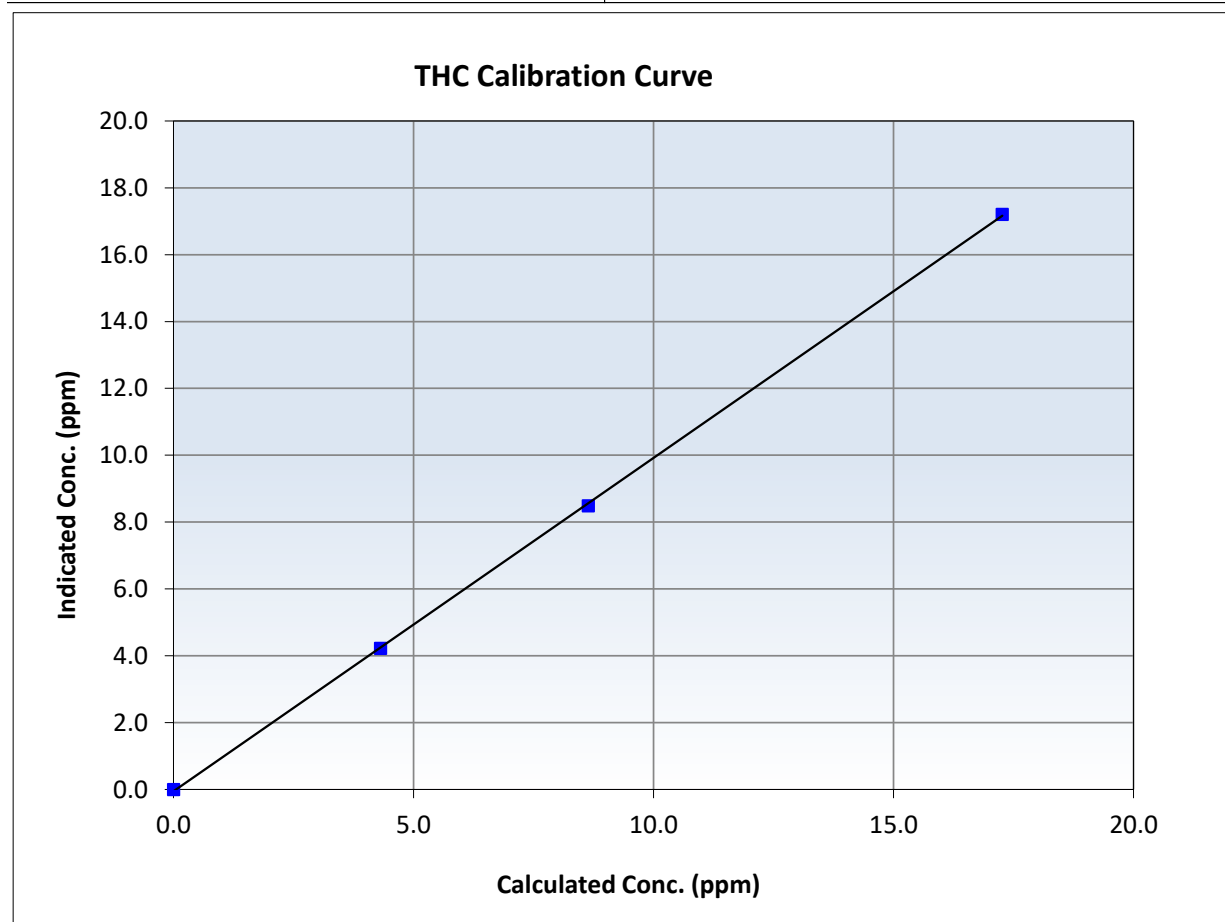
THC Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 16, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:38	End Time (MST):	13:33
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999931	≥ 0.995
17.27	17.21	1.0034	Slope	0.997236	$0.90 - 1.10$
8.64	8.49	1.0183	Intercept	-0.054031	± 0.5
4.31	4.23	1.0205			





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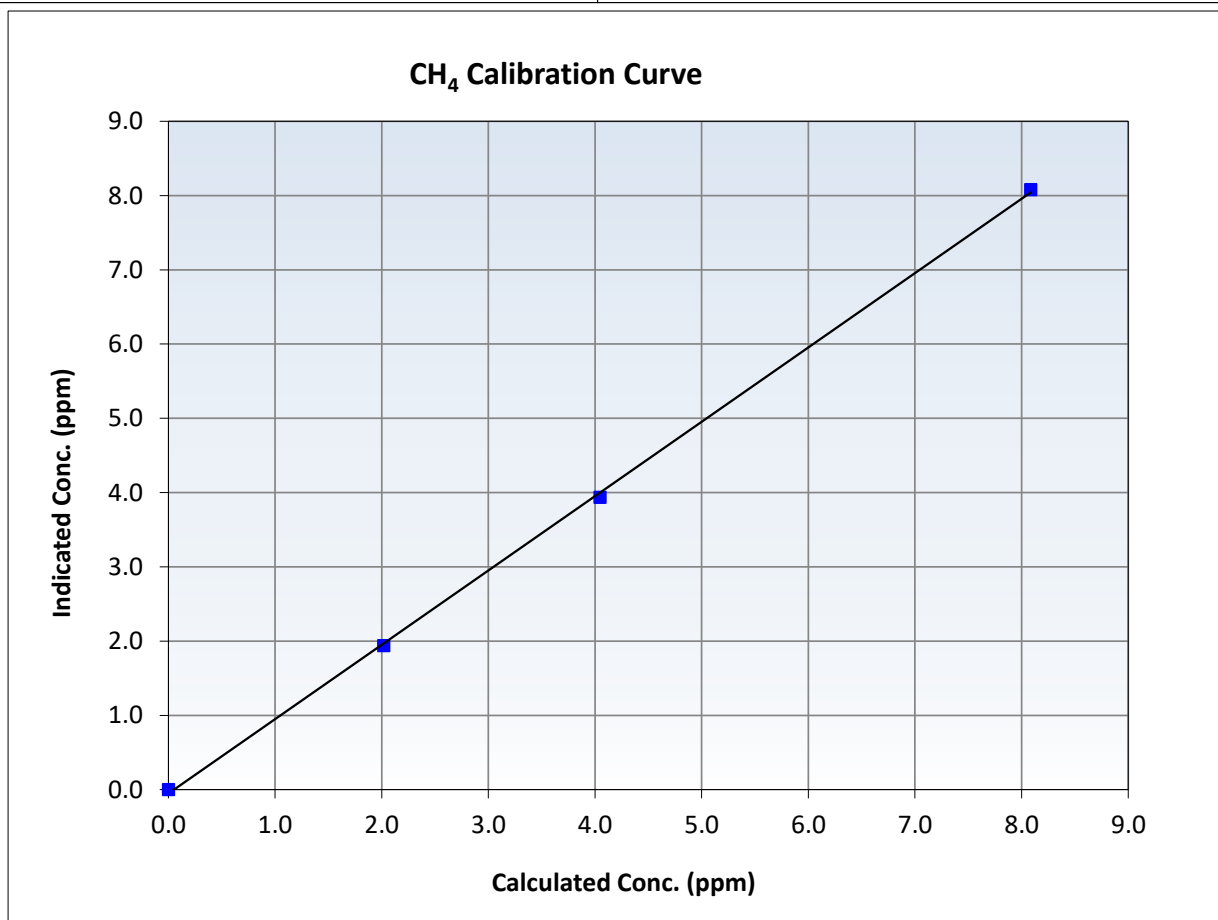
CH₄ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 16, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:38	End Time (MST):	13:33
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999747	≥ 0.995
8.09	8.08	1.0006	Slope	1.001136	$0.90 - 1.10$
4.05	3.94	1.0283	Intercept	-0.052513	± 0.5
2.02	1.94	1.0401			





Wood Buffalo Environmental Association

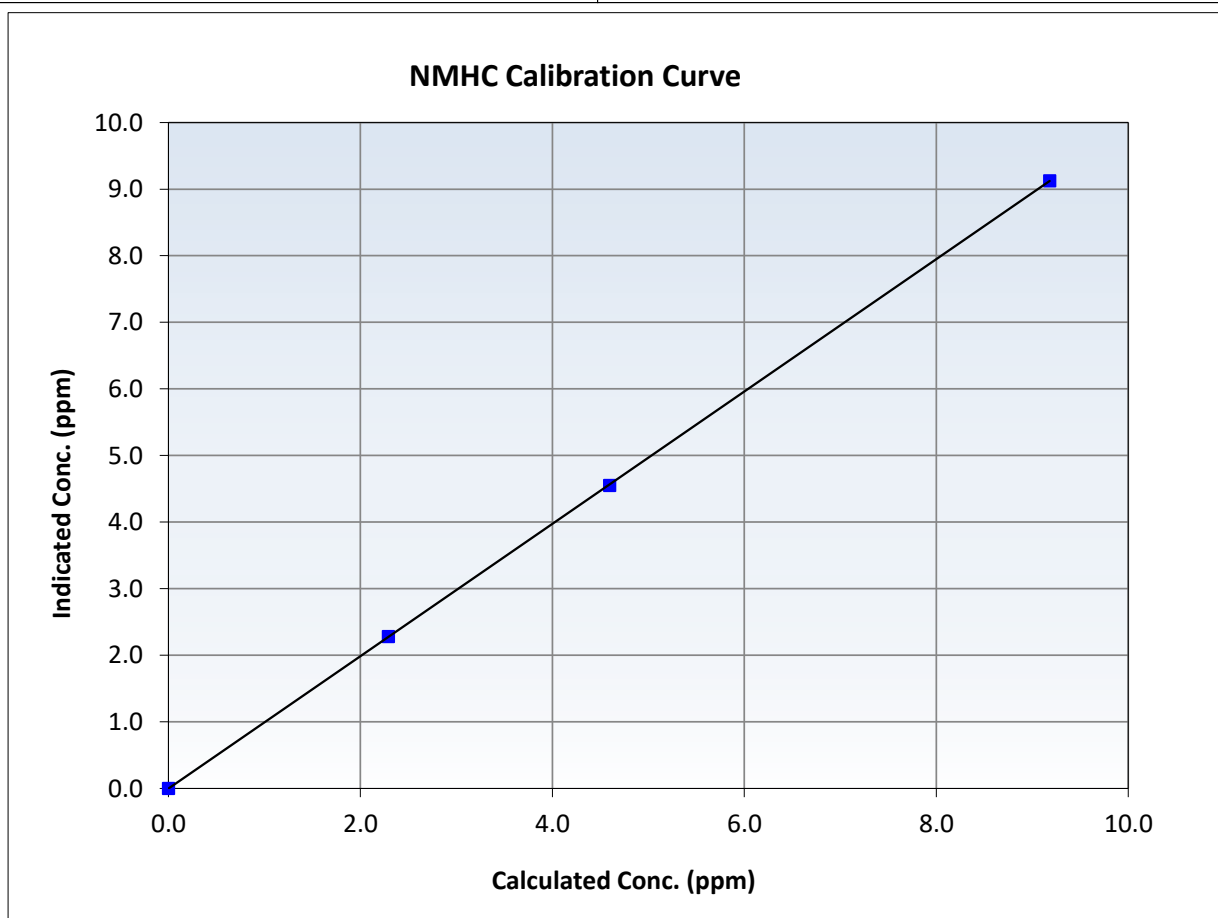
NMHC Calibration Summary

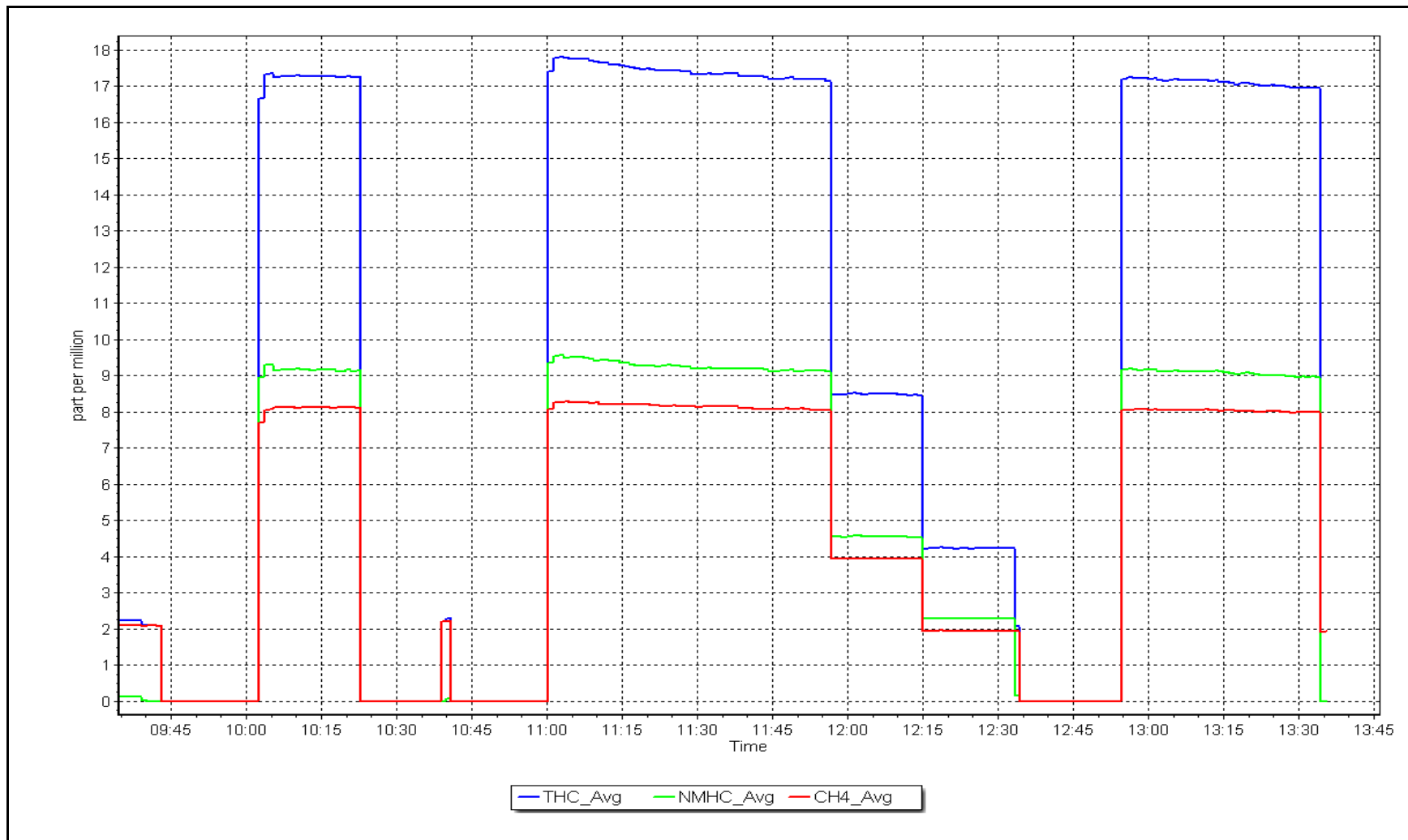
Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 16, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:38	End Time (MST):	13:33
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999993	<i>≥0.995</i>
9.18	9.13	1.0058	Slope	0.993789	<i>0.90 - 1.10</i>
4.60	4.55	1.0099	Intercept	-0.001718	<i>+/-0.5</i>
2.29	2.28	1.0037			







Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay
Station number: AMS 01
Calibration Date: September 13, 2024
Last Cal Date: August 14, 2024
Start time (MST): 10:22
End time (MST): 14:45
Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC335700
NOX Cal Gas Conc: 59.40 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 59.40 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701
Cal Gas Expiry Date: September 1, 2032
NO Cal Gas Conc: 59.20 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 59.20 ppm
NO gas Diff:
Serial Number: 3565
Serial Number: 4766

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.8	0.2	----	----
AF High point	4932	67.6	803.1	800.4	2.7	792.6	785.6	7.1	1.0125	1.0178
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 802.6 ppb	NO = 800.2 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = -1.2%
Baseline Corr 1st pt	NO _x = 793.2 ppb	NO = 786.4 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -1.8%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb	As found	NO _x r ² :	Nx SI:	Nx Int:
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb	As found	NO r ² :	NO SI:	NO Int:
			As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 7117

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.133	1.141	NO bkgnd or offset:	-1.5	-1.5
NOX coeff or slope:	1.132	1.142	NOX bkgnd or offset:	-1.2	-1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.4	6.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000339	1.001221
NO _x Cal Offset:	-0.720000	-0.880000
NO Cal Slope:	1.002105	1.002205
NO Cal Offset:	-1.880000	-2.240000
NO ₂ Cal Slope:	0.998451	0.999541
NO ₂ Cal Offset:	0.397796	0.879608

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) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.4	0.0	----	----
High point	4932	67.6	803.1	800.4	2.7	803.4	800.9	2.6	0.9996	0.9994
Mid point	4966	33.8	401.5	400.2	1.4	401.1	397.7	3.3	1.0011	1.0063
Low point	4983	16.9	200.8	200.1	0.7	199.4	196.6	2.8	1.0069	1.0178
As left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
As left span	4932	67.6	803.1	391.1	412.0	797.9	391.1	406.8	1.0065	1.0000
Average Correction Factor									1.0025	1.0078

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) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	798.2	390.0	410.9	411.3	0.9990	100.1%
Mid GPT point	798.2	593.7	207.2	208.0	0.9962	100.4%
Low GPT point	798.2	698.7	102.2	104.2	0.9808	102.0%
Average Correction Factor					0.9920	100.8%

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

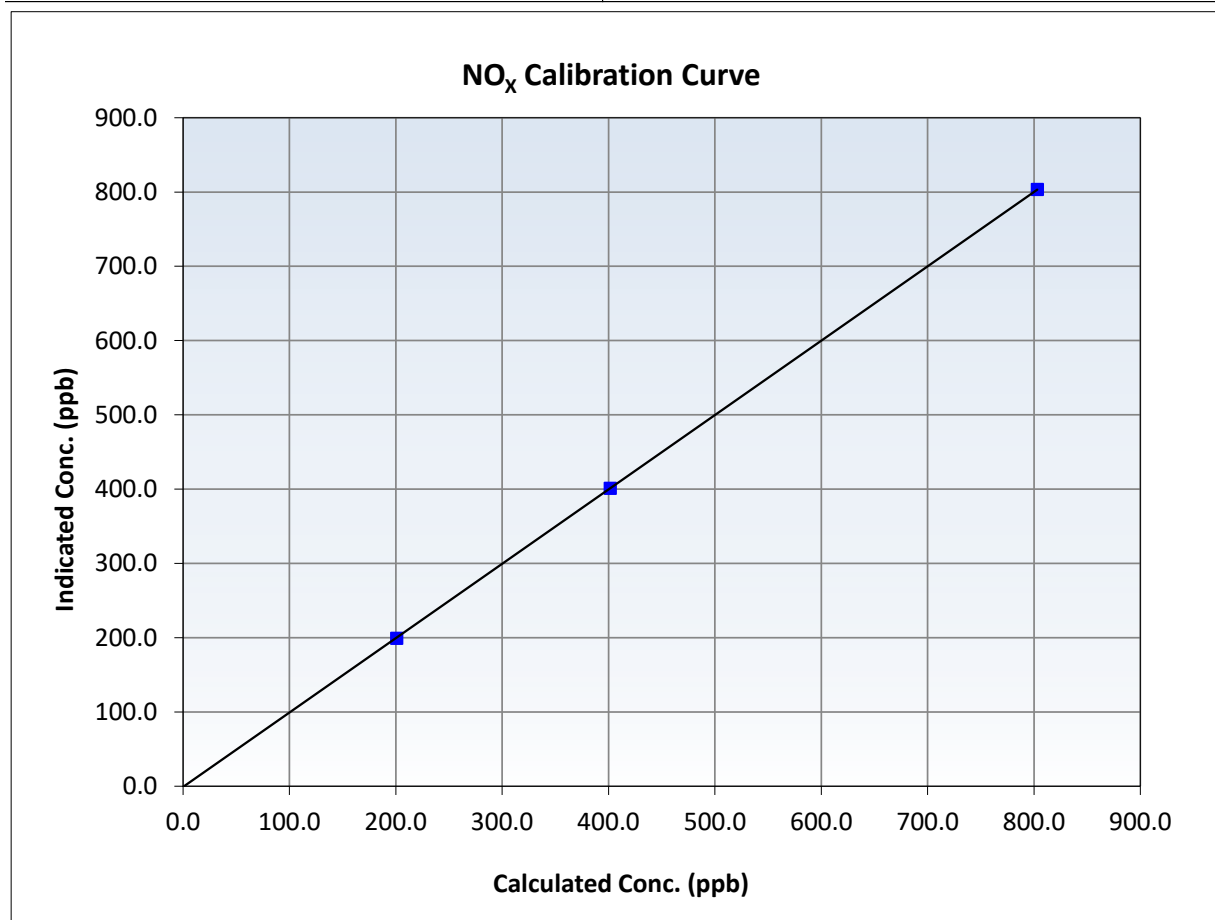
NO_x Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:22	End Time (MST):	14:45
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

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	0.999997	≥0.995
803.1	803.4	0.9996	Slope	1.001221	0.90 - 1.10
401.5	401.1	1.0011	Intercept	-0.880000	+/-20
200.8	199.4	1.0069			





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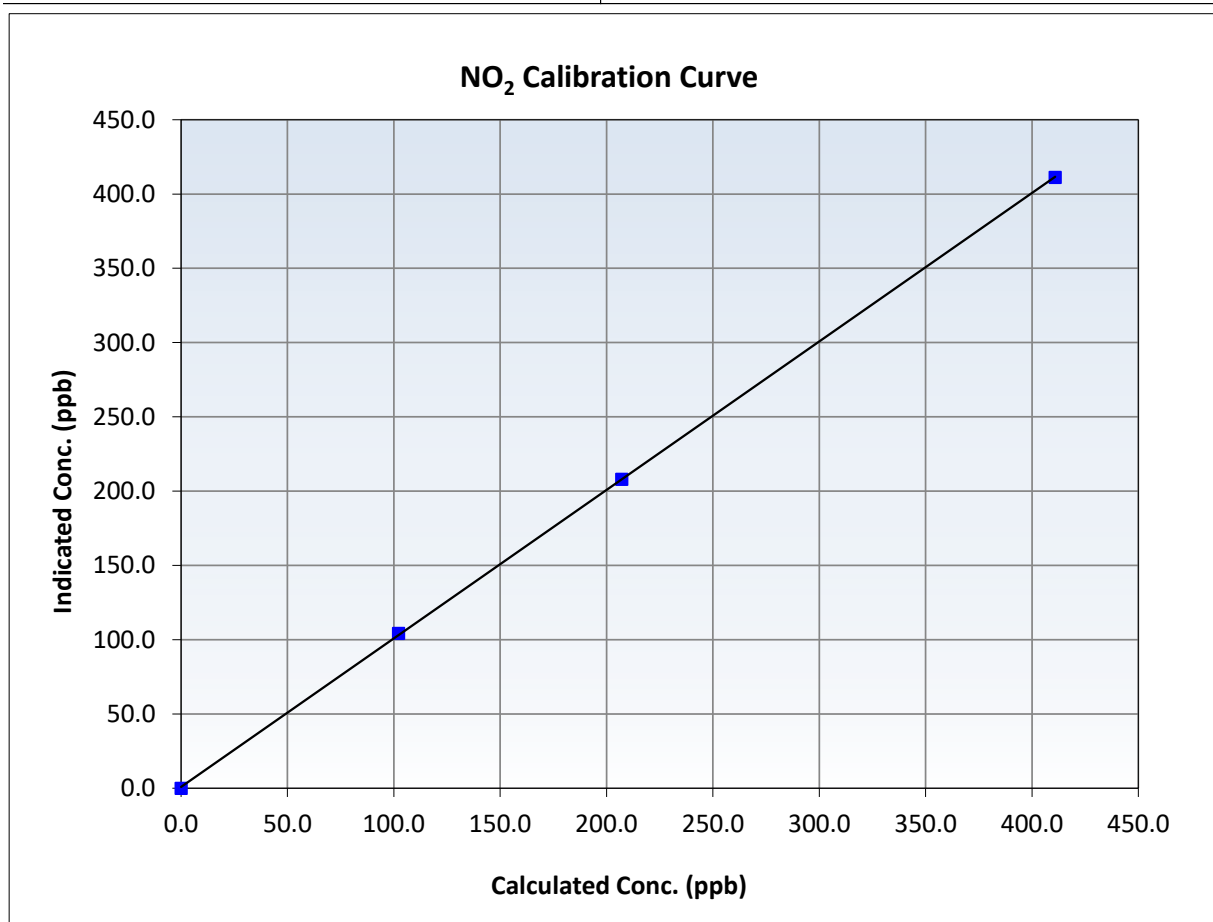
NO₂ Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:22	End Time (MST):	14:45
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999976	≥0.995
410.9	411.3	0.9990	Slope	0.999541	0.90 - 1.10
207.2	208.0	0.9962	Intercept	0.879608	+/-20
102.2	104.2	0.9808			





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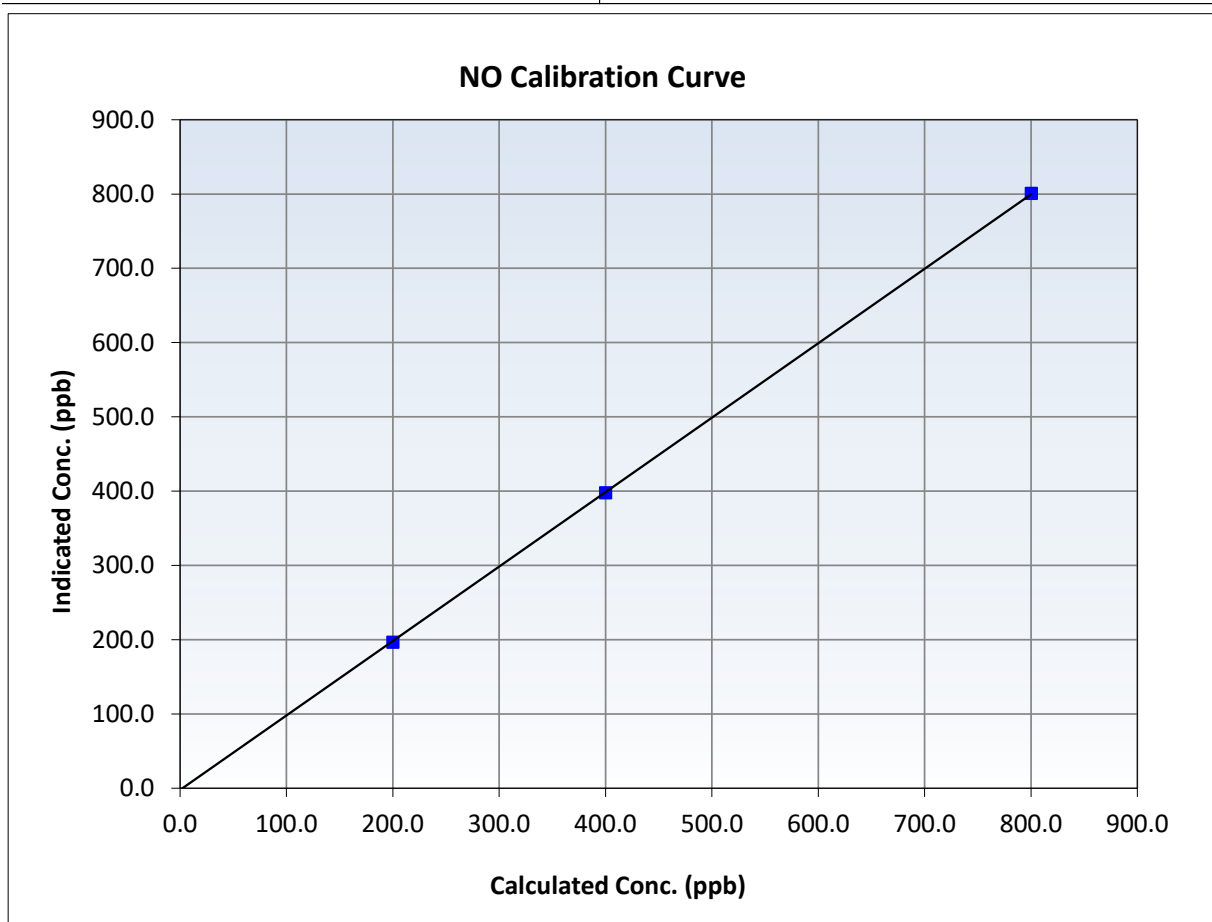
NO Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:22	End Time (MST):	14:45
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

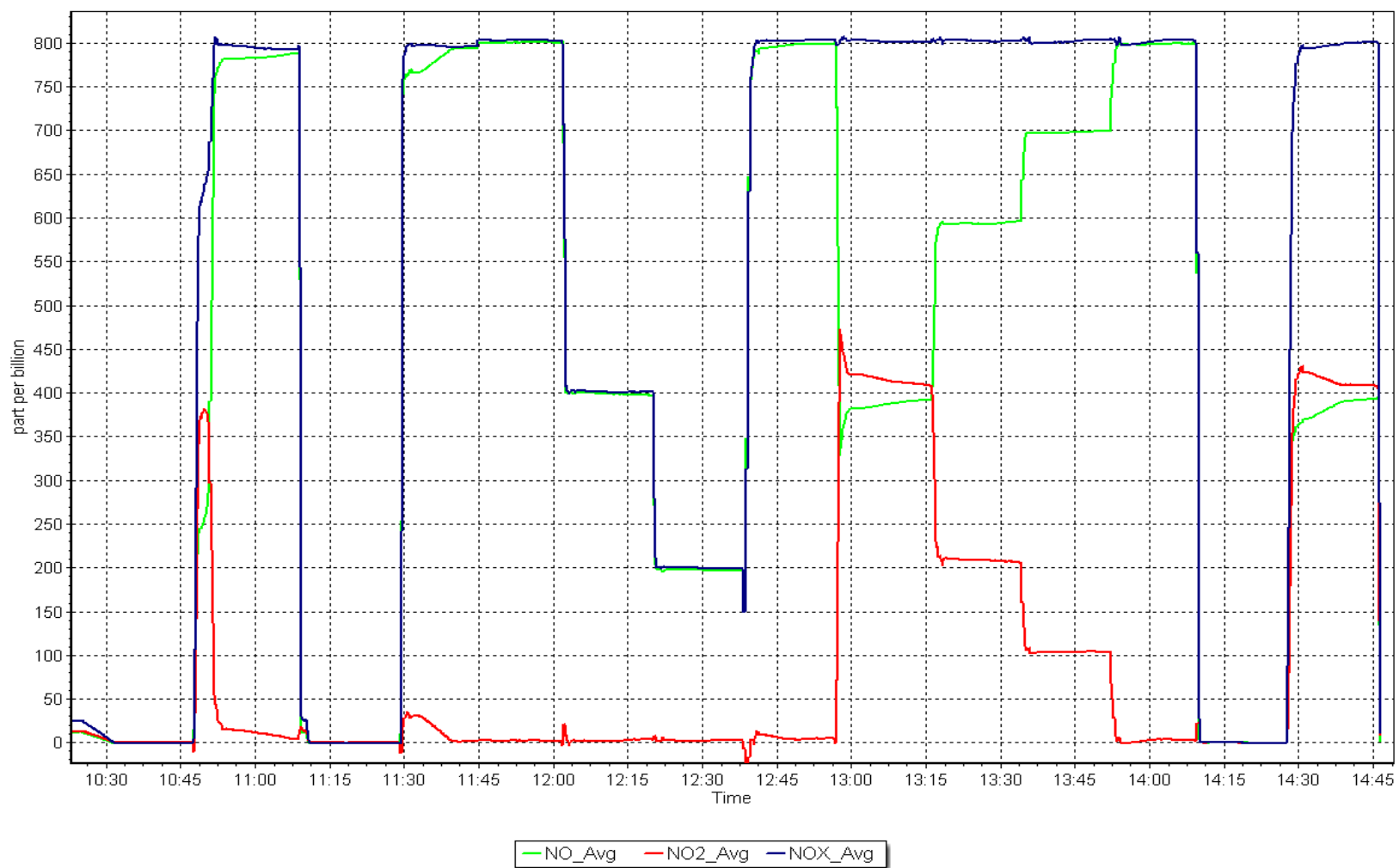
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.4	----	Correlation Coefficient	0.999976	≥ 0.995
800.4	800.9	0.9994	Slope	1.002205	$0.90 - 1.10$
400.2	397.7	1.0063	Intercept	-2.240000	± 20
200.1	196.6	1.0178			



NO_x Calibration Plot

Date: September 13, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 10, 2024 Last Cal Date: August 1, 2024
Start time (MST): 10:23 End time (MST): 13:08
Reason: Routine

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: Teledyne API T700 Serial Number: 3565
ZAG Make/Model: Teledyne API T701 Serial Number: 4766

Analyzer Information

Analyzer make: Teledyne API T400 Analyzer serial #: 1107
Analyzer Range: 0 - 500 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002771	0.999657	Backgd or Offset:	4.2	4.2
Calibration intercept:	-0.560000	0.460000	Coeff or Slope:	1.007	1.007

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	5000	863.1	400.0	400.8	0.998
As found Mid point					
As found Low point					
Baseline Corr As found:	400.9	Previous response	400.5	*% 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	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	5000	863.1	400.0	400.2	1.000
Mid point	5000	744.0	200.0	200.5	0.998
Low point	5000	651.7	100.0	100.7	0.993
As left zero	5000	0.0	0.0	0.3	----
As left span	5000	863.1	400.0	403.2	0.992
Average Correction Factor					0.997

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

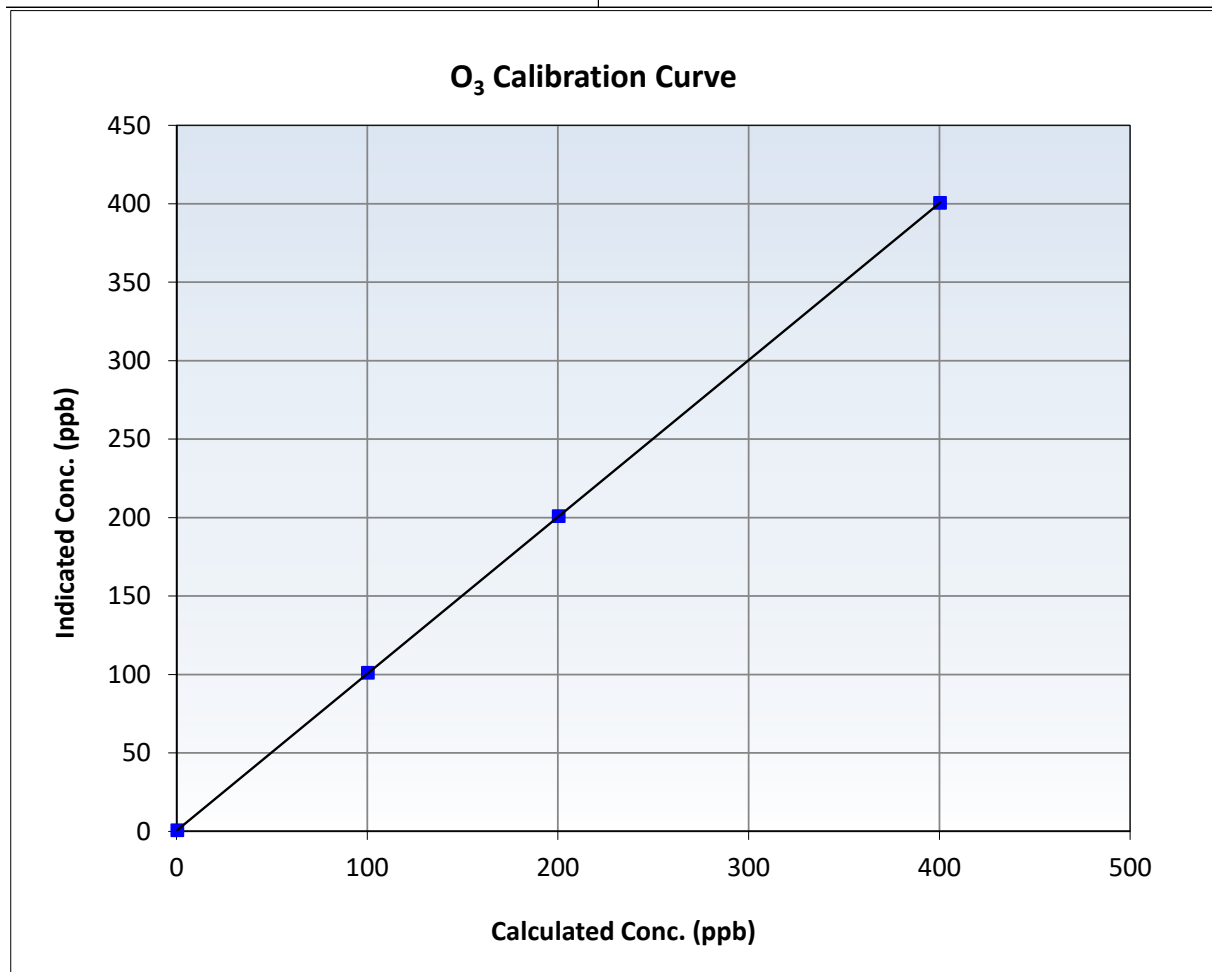
O₃ Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 1, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:23	End Time (MST):	13:08
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107

Calibration Data

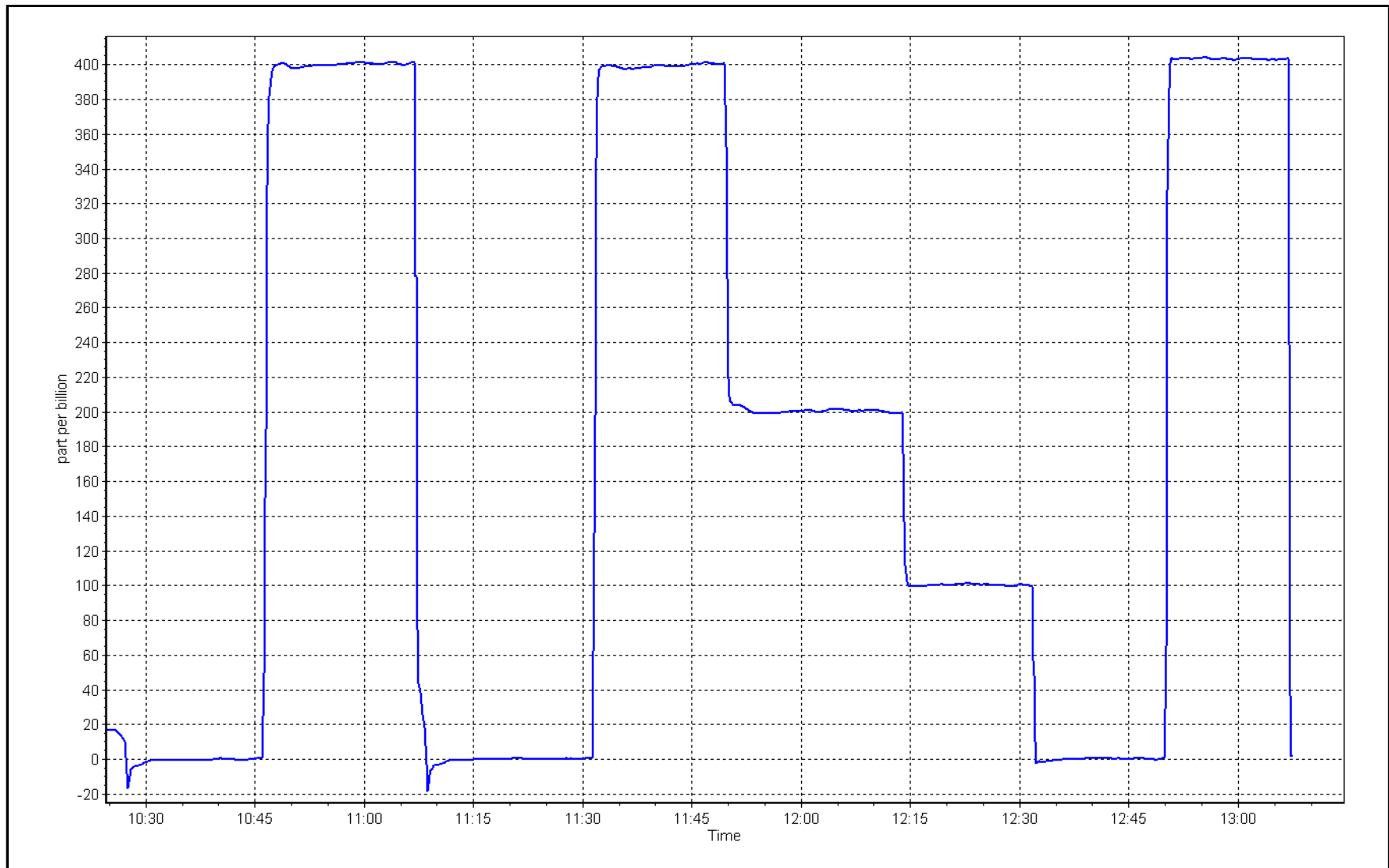
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999998	≥0.995
400.0	400.2	0.9995	Slope	0.999657	0.90 - 1.10
200.0	200.5	0.9975	Intercept	0.460000	+/- 5
100.0	100.7	0.9930			



O₃ Calibration Plot

Date: September 10, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Fort McKay - Bertha Ganter Station number: AMS 01
Calibration Date: September 23, 2024 Last Cal Date: August 21, 2024
Start time (MST): 9:55 End time (MST): 11:15

Analyzer Make: Teledyne API T640 S/N: 322
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388752
Temp/RH standard: Alicat FP-25BT S/N: 388752

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.9	14.0	14.9	☐	+/- 2 °C
P (mmHg)	728.6	730.74	728.6	☐	+/- 10 mmHg
Flow (LPM)	5.07	4.956	5.07	☐	+/- 0.25 LPM
PW% (pump)	39		39	☐	>80%
Zero Verification	PM w/o HEPA:	7.5	PM w/ HEPA:	0.0	<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: June 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	10.9 +/- 0.5

Date Optical Chamber Cleaned: July 11, 2024
Date Disposable Filter Changed: July 11, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: _____
Date RH/T Sensor Cleaned: _____

Notes: Flow, temperature, and pressure were verified. Leak checks passed.

Calibration by: Rene Chamberland



Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 16, 2024 Last Cal Date: August 2, 2024
Start time (MST): 10:27 End time (MST): 13:20
Reason: Routine

Calibration Standards

Cal Gas Concentration: 3,040 ppm Cal Gas Exp Date: December 1, 2028
Cal Gas Cylinder #: ALM042207
Removed Cal Gas Conc: 3,040 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3565
ZAG Make/Model: Teledyne API T701 Serial Number: 4890

Analyzer Information

Analyzer make: Teledyne API T300 Analyzer serial #: 3520
Analyzer Range: 0 - 50 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998382	0.998382	Backgd or Offset:	-0.014	-0.014
Calibration intercept:	0.123830	0.123830	Coeff or Slope:	0.993	0.993

CO 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4933	66.7	40.6	40.7	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	40.66	Prev response:	40.61	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4933	66.7	40.6	40.7	0.998
Mid point	4966	33.3	20.2	20.8	0.975
Low point	4983	16.7	10.2	10.3	0.988
As left zero	5000	0.0	0.0	0.0	----
As left span	2960	40.0	40.5	40.2	1.008
Average Correction Factor					0.987

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

CO Calibration Summary

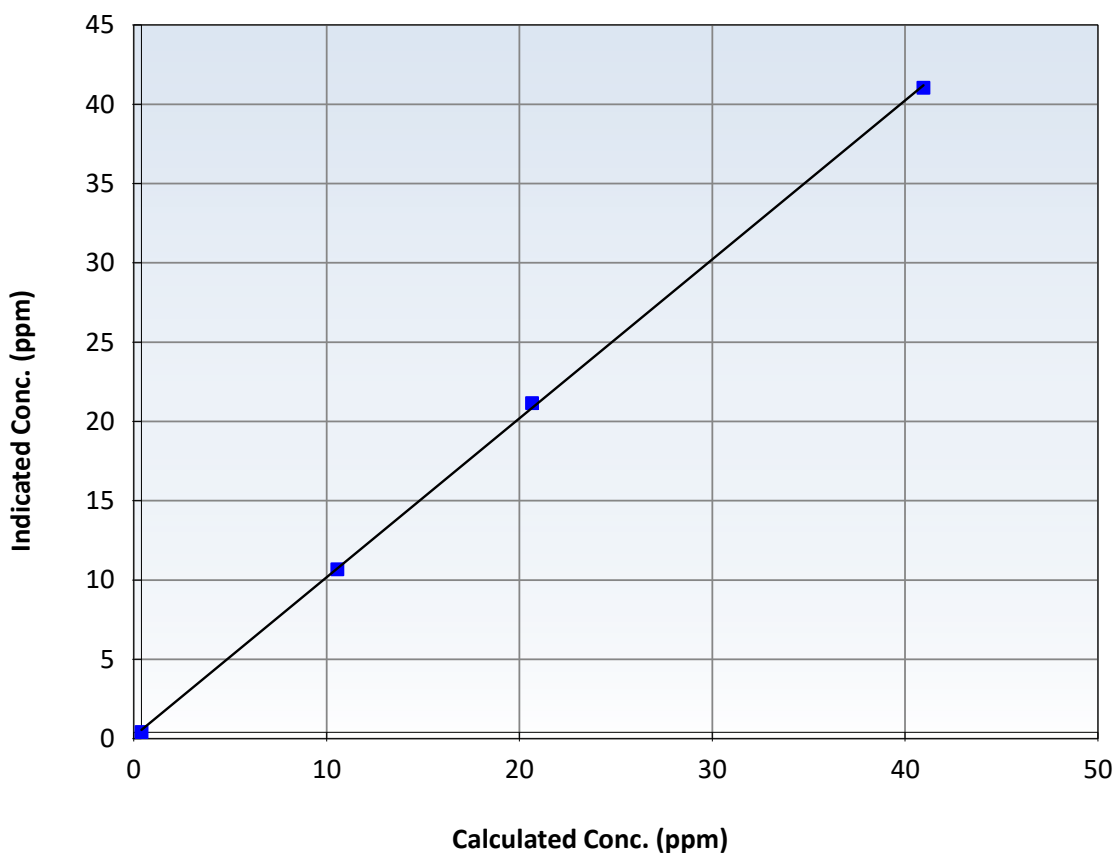
Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 2, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:27	End Time (MST):	13:20
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	0.0	----	Correlation Coefficient	0.999848	≥ 0.995
40.6	40.7	0.9977	Slope	1.002157	$0.90 - 1.10$
20.2	20.8	0.9754	Intercept	0.151869	± 1.5
10.2	10.3	0.9878			

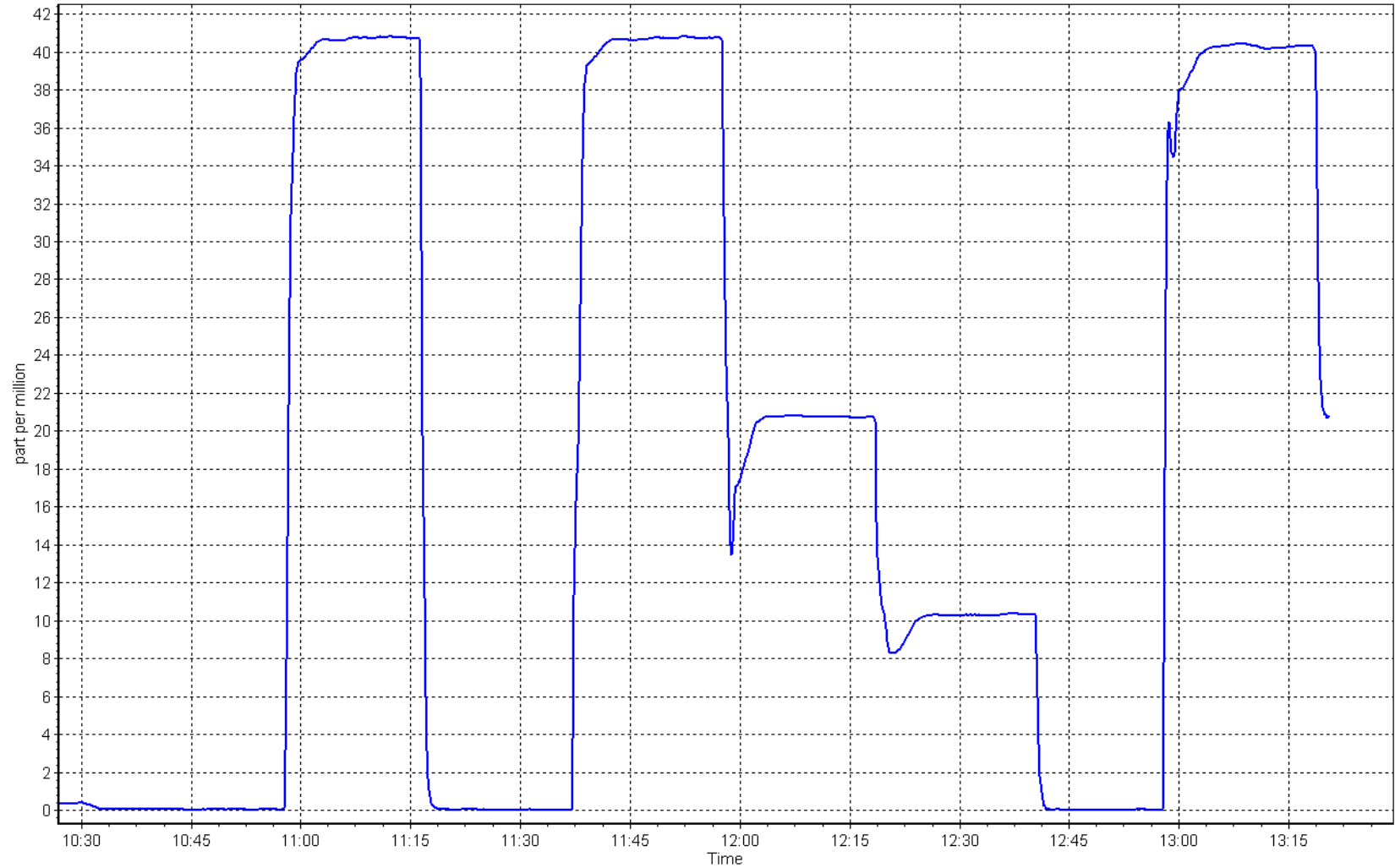
CO Calibration Curve



CO Calibration Plot

Date: September 16, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

CO₂ Calibration Report

Station Information

Station Name: Bertha Ganter-Fort McKay Station number: AMS 01
Calibration Date: September 24, 2024 Last Cal Date: August 15, 2024
Start time (MST): 10:21 End time (MST): 13:57
Reason: Routine

Calibration Standards

Cal Gas Concentration: 60,200 ppm Cal Gas Exp Date: December 1, 2028
Cal Gas Cylinder #: ALM042207
Removed Cal Gas Conc: 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 Scientific Serial Number: 7220900034

Analyzer Information

Analyzer make: Teledyne API 360 Analyzer serial #: 442
Analyzer Range: 0 - 2,000 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997625	0.998614	Backgd or Offset:	0.002	0.002
Calibration intercept:	0.060000	0.940000	Coeff or Slope:	0.906	0.906

CO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	3000	0.0	0.0	0.3	----
As found High Point	2920	80.0	1605.3	1614.1	0.995
As found Mid Point					
As found Low Point					
New cylinder response					
Baseline Corr As found:	1613.8	Prev response:	1601.6	*% change:	0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	3000	0.0	0.0	0.5	----
High point	2920	80.0	1605.3	1605.1	1.000
Mid point	2960	40.0	802.7	798.9	1.005
Low point	2980	20.0	401.3	404.7	0.992
As left zero	3000	0.0	0.0	-2.9	----
As left span	2960	40.0	802.7	784.6	1.023

Average Correction Factor **0.999**

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

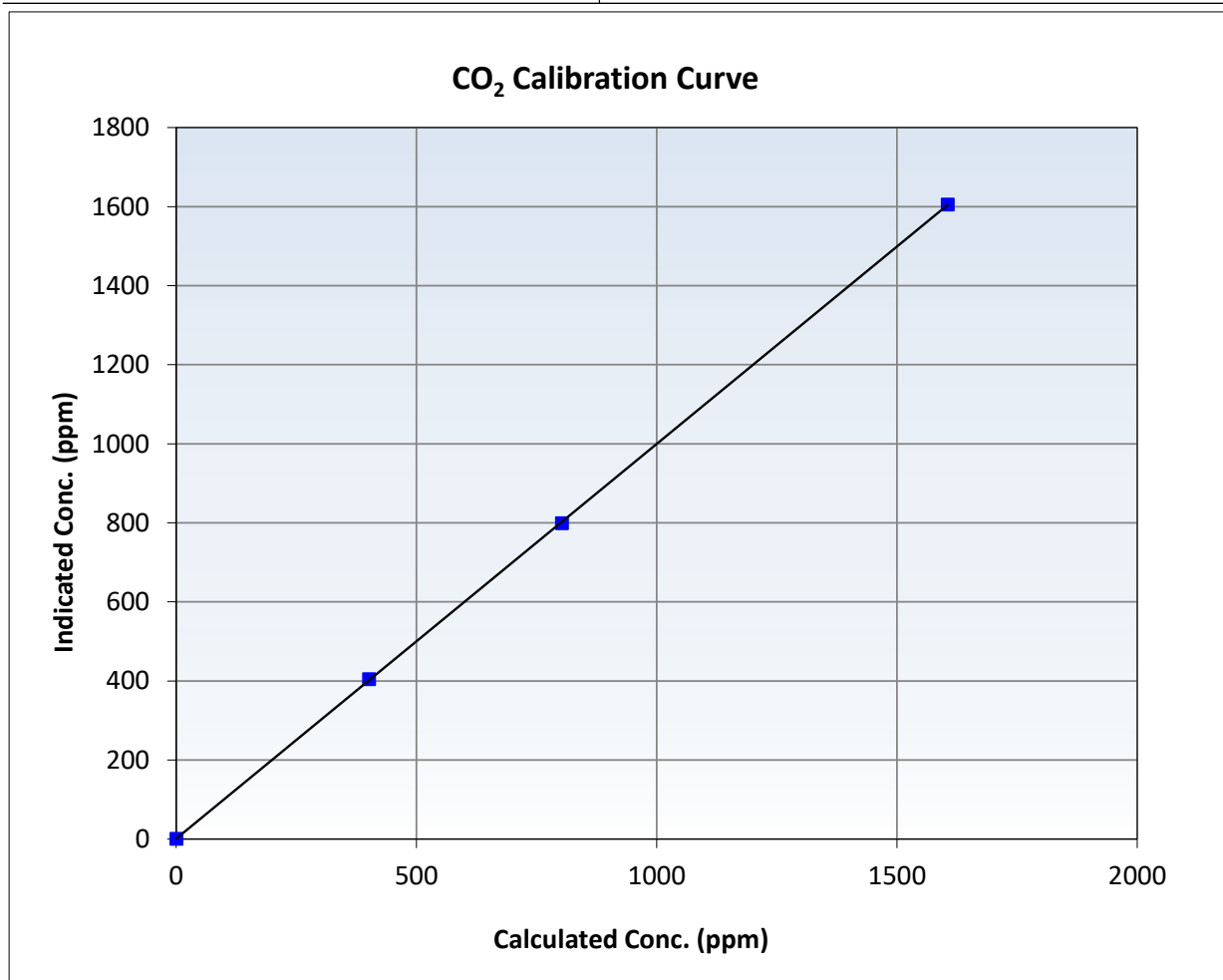
CO₂ Calibration Summary

Station Information

Calibration Date	September 24, 2024	Previous Calibration	August 15, 2024
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS 01
Start Time (MST)	10:21	End Time (MST)	13:57
Analyzer make	Teledyne API 360	Analyzer serial #	442

Calibration Data

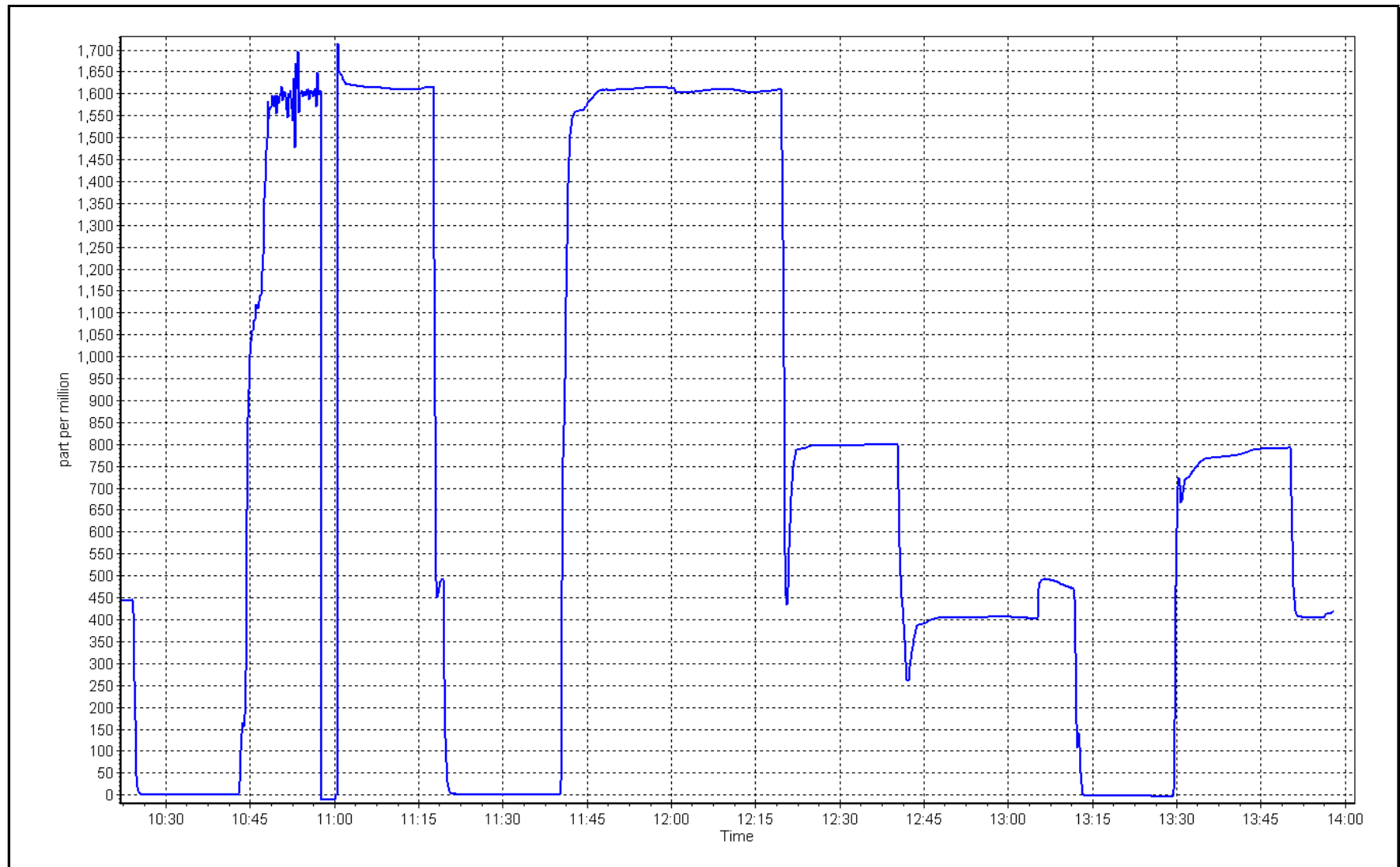
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5	----	Correlation Coefficient	0.999984	≥0.995
1605.3	1605.1	1.0001	Slope	0.998614	0.90 - 1.10
802.7	798.9	1.0047	Intercept	0.9	+/-20
401.3	404.7	0.9917			



CO₂ Calibration Plot

Date: September 24, 2024

Location: Bertha Ganter-Fort McKay





Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
NOX Cal Date:	September 11, 2024	Last Cal Date:	August 19, 2024
Start time (MST):	9:59	End time (MST):	14:28
NH3 Cal Date:	September 12, 2024	Last Cal Date:	August 20, 2024
Start time (MST):	10:15	End time (MST):	14:15
Reason:	Routine		

Calibration Standards

NOX Cal Gas Conc:	59.40	ppm	NO Gas Cylinder #:	CC335700
NO Cal Gas Conc:	59.20	ppm	NO Cal Gas Expiry:	September 1, 2032
Removed NOX Conc:	59.40	ppm	Removed Cylinder #:	NA
Removed NO Conc:	59.20	ppm	Removed cyl Expiry:	NA
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	76.58	ppm	NH3 Gas Cylinder #:	CC743587
			NH3 Cal Gas Expiry:	August 22, 2024
Removed NH3 Conc:	76.58	ppm	Removed Cylinder #:	NA
NH3 gas Diff:			Removed cyl Expiry:	NA
Calibrator Model:	API T700		Serial Number:	3565
ZAG make/model:	API T701		Serial Number:	4766

Analyzer Information

Analyzer model:	API T201	Analyzer serial #:	475
Converter model:	API T501	Converter serial #:	824
NH3 Range (ppb):	0 - 2000 ppb	Reaction cell Press:	6.50
NOX Range (ppb):	0 - 1000 ppb	Sample Flow:	501

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.879	0.867	Nt coefficient:	0.891	0.881
NOX coefficient:	0.882	0.870	NO bkgrnd:	-0.9	-0.9
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.3	-0.3
NH3 coefficient:	0.946	0.946	Nt bkgrnd:	1.2	1.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002559	0.999229
NO _x Cal Offset:	-2.500000	-1.780000
NO Cal Slope:	1.001962	1.000277
NO Cal Offset:	-2.380000	-2.240000
NO ₂ Cal Slope:	0.994569	0.991887
NO ₂ Cal Offset:	-0.424421	-1.241288
NH3 Cal Slope:	1.000377	0.998711
NH3 Cal Offset:	3.738556	0.661904
Nt Cal Slope:	1.003642	1.001845
Nt Cal Offset:	3.471953	0.628996



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

NO_x / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NO _x Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>	Baseline corr NO Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.8	-0.8	----	----
As found span	4932	67.6	803.1	800.4	803.1	810.4	800.6	813.1	0.9910	0.9997
AF GPT span	4932	67.6	803.1	-----	803.1	797.6	-----	799.9	1.0069	-----

new NO cyl rp

Baseline Corr As Fd Nt = 813.9 ppb NO_x = 811.0 ppb NO = 801.4 ppb

Previous Response Nt = 809.49 ppb NO_x = 802.6 ppb NO = 799.6 ppb

****NO_x Δ (NO to GPT response) = -1.6%**

*** = > +/-2% difference initiates investigation**

***Percent Change Nt_(NO) = 0.5%**

***Percent Change NO_x = 1.0%**

***Percent Change NO = 0.2%**

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

NO_x / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.6	----	----
High point	4932	67.6	803.1	800.4	803.1	802.0	799.5	802.7	1.0014	1.0011
Mid point	4966	33.8	401.5	400.2	401.5	397.0	396.8	399.3	1.0114	1.0085
Low point	4983	16.9	200.8	200.1	200.8	198.5	195.9	198.8	1.0114	1.0214
Average Correction Factor									1.0081	1.0104

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Calibration zero	----	----	0.0	-0.2	----	----
High GPT point (400 ppb O3)	797.4	394.6	405.5	401.5	1.0100	99.0%
Mid GPT point (200 ppb O3)	797.4	590.5	209.6	206.2	1.0165	98.4%
Low GPT point (100 ppb O3)	797.4	694.5	105.6	102.4	1.0313	97.0%
Average Correction Factor					1.0193	98.1%



Wood Buffalo Environmental Association NH₃ - N_T Calibration Report

NH₃ As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Baseline corr Nt Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.5	0.0	----	----
AF High point	3418	82.2	1798.5	----	1798.5	1801.5	----	1796.0	0.998	1.001
AF Mid point							----			
AF Low point							----			
new NH3 cyl rp										
Baseline Corr As Fd	Nt =	1801.9 ppb	NH3 =	1796.0 ppb					*Percent Change	Nt _(NH3) = -0.4%
Previous Response	Nt =	1808.6 ppb	NH3 =	1803.0 ppb					*Percent Change	NH3 = -0.4%

* = > +/-5% change initiates investigation

NH₃ Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Nt Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.3	-0.3	----	----
High point	3418	82.2	1798.5	----	1798.5	1801.5	----	1796.0	0.998	1.001
Mid point	3454	45.7	1000.0	----	1000.0	1003.8	----	1000.7	0.996	0.999
Low point	3477	22.8	498.9	----	498.9	501.3	----	499.4	0.995	0.999
Average Correction Factor									0.9966	0.9999

NH3 Previous Converter Efficiency = 90.8 %
NH3 Current Converter Efficiency = 90.8 %

Notes:

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

Calibration Performed By:

Rene Chamberland



Wood Buffalo Environmental Association

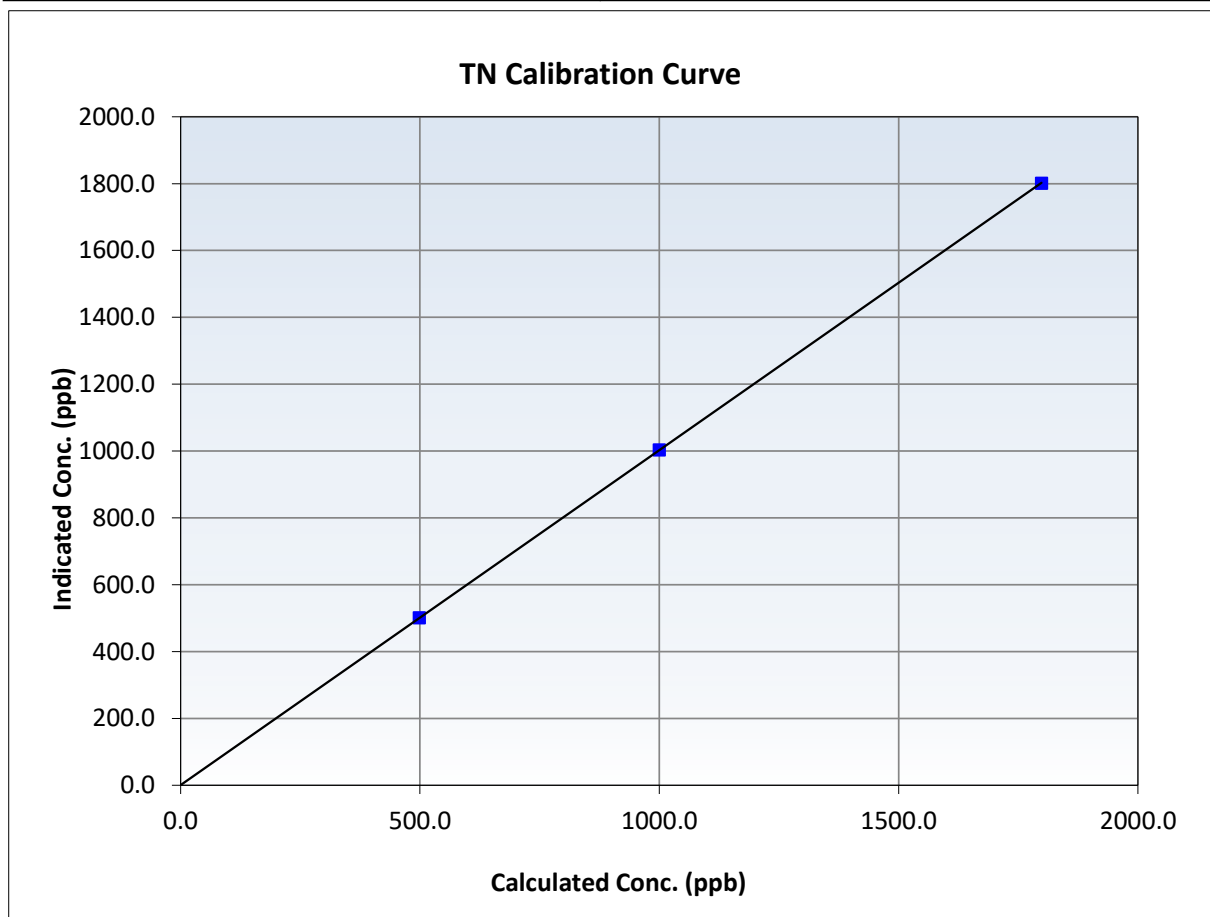
Nt Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:59	End Time (MST):	14:28
Analyzer make:	API T201	Analyzer serial #:	475

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	0.999997	≥ 0.995
1798.5	1801.5	0.9984	Slope	1.001845	$0.90 - 1.10$
1000.0	1003.8	0.9962	Intercept	0.628996	± 20
498.9	501.3	0.9951			





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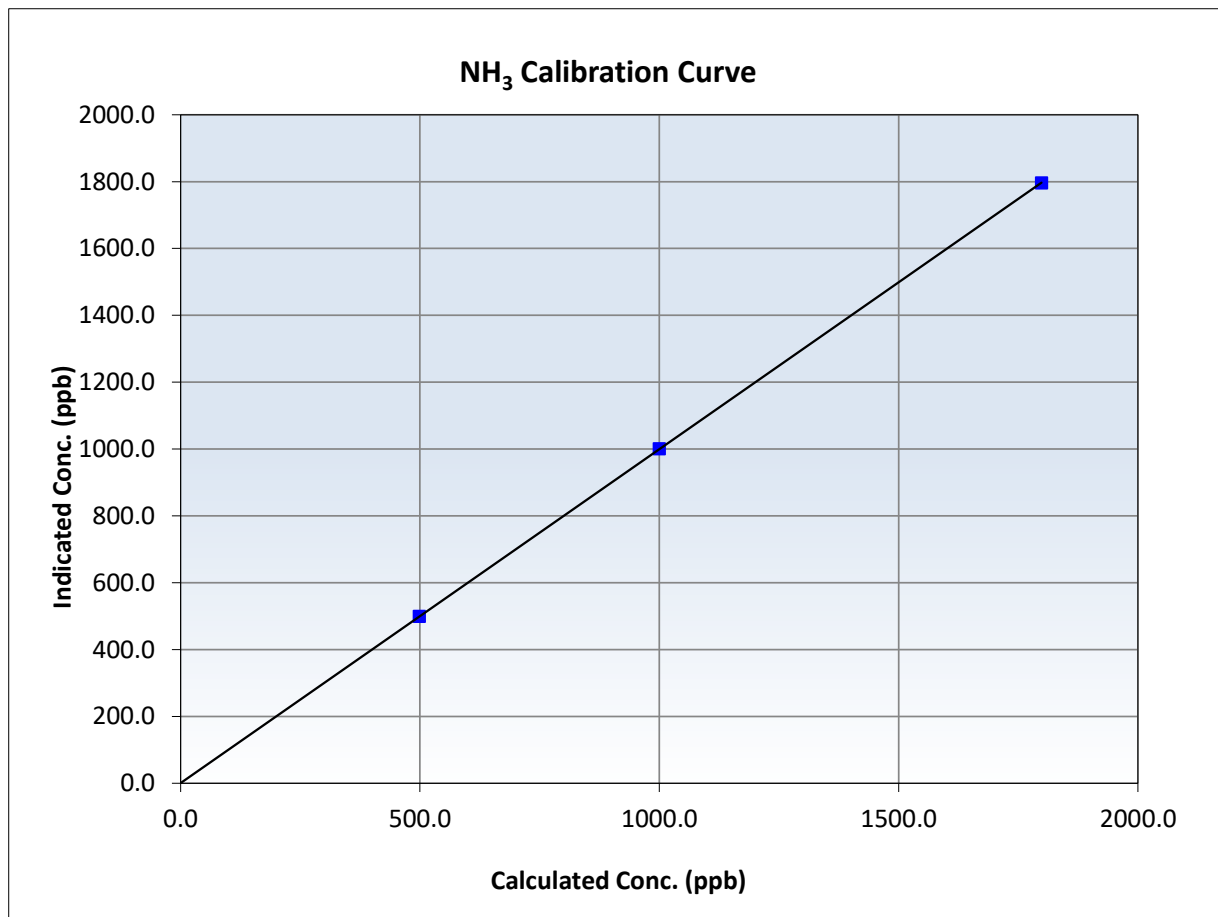
NH₃ Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:59	End Time (MST):	14:28
Analyzer make:	API T201	Analyzer serial #:	475

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	0.999998	≥ 0.995
1798.5	1796.0	1.0014	Slope	0.998711	$0.90 - 1.10$
1000.0	1000.7	0.9993	Intercept	0.661904	± 20
498.9	499.4	0.9989			





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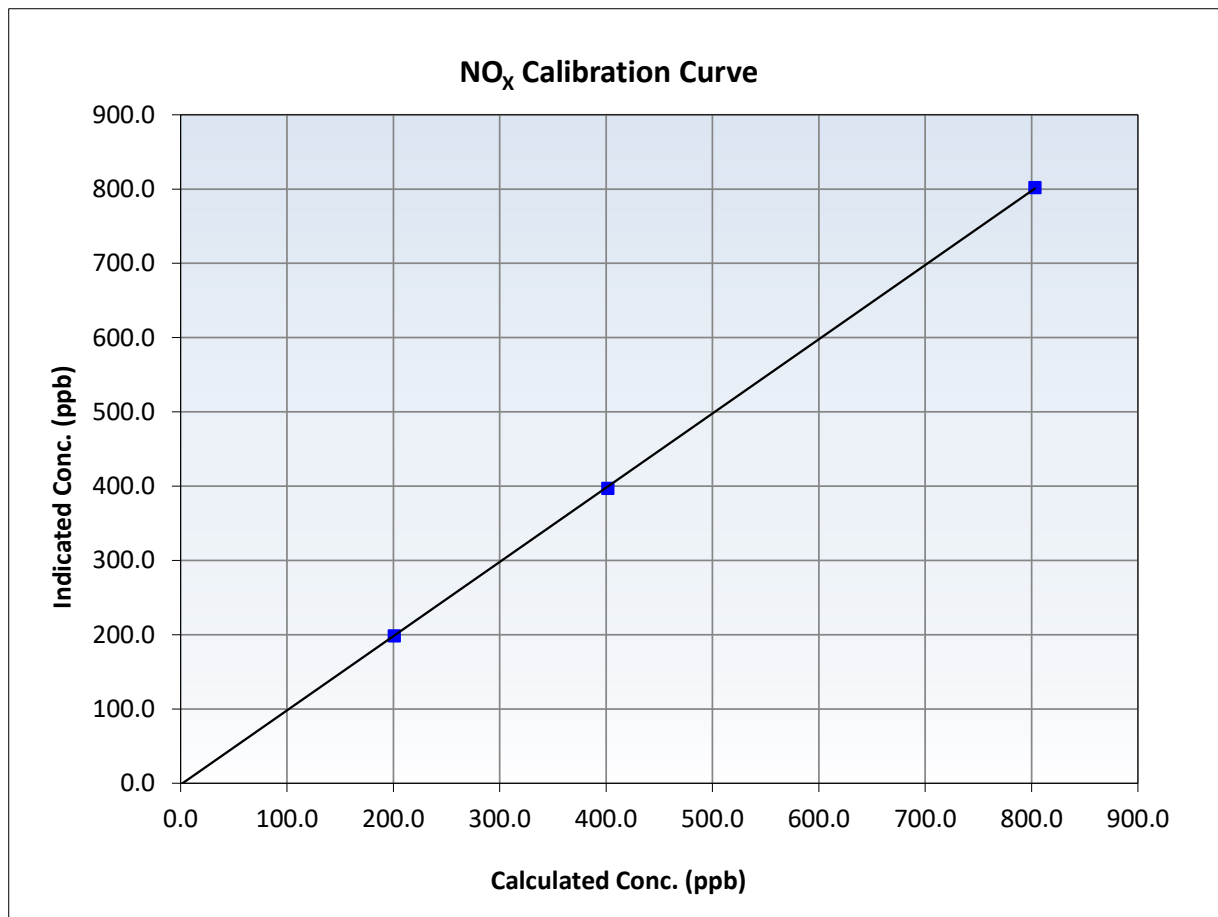
NO_x Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:59	End Time (MST):	14:28
Analyzer make:	API T201	Analyzer serial #:	475

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	0.999971	≥0.995
803.1	802.0	1.0014	Slope	0.999229	0.90 - 1.10
401.5	397.0	1.0114	Intercept	-1.780000	+/-20
200.8	198.5	1.0114			





Wood Buffalo Environmental Association

NO Calibration Summary

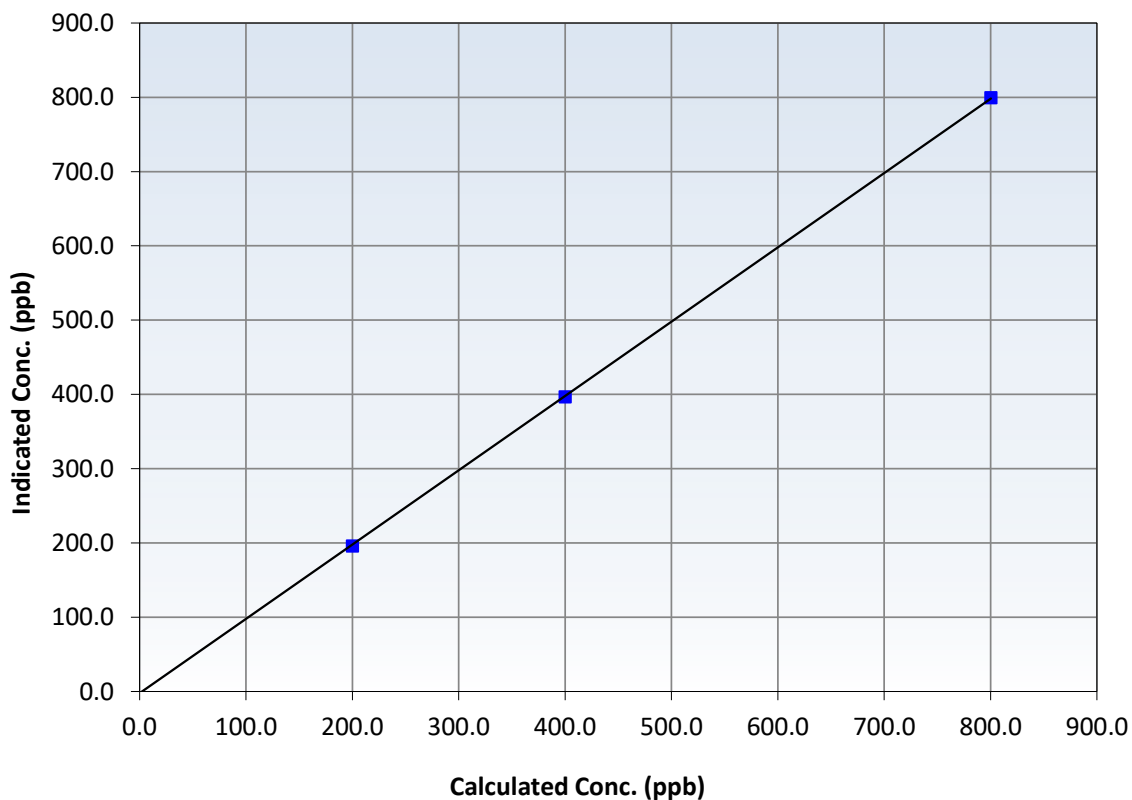
Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:59	End Time (MST):	14:28
Analyzer make:	API T201	Analyzer serial #:	475

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	0.999967	≥ 0.995
800.4	799.5	1.0011	Slope	1.000277	0.90 - 1.10
400.2	396.8	1.0085	Intercept	-2.240000	+/-20
200.1	195.9	1.0214			

NO Calibration Curve





Wood Buffalo Environmental Association

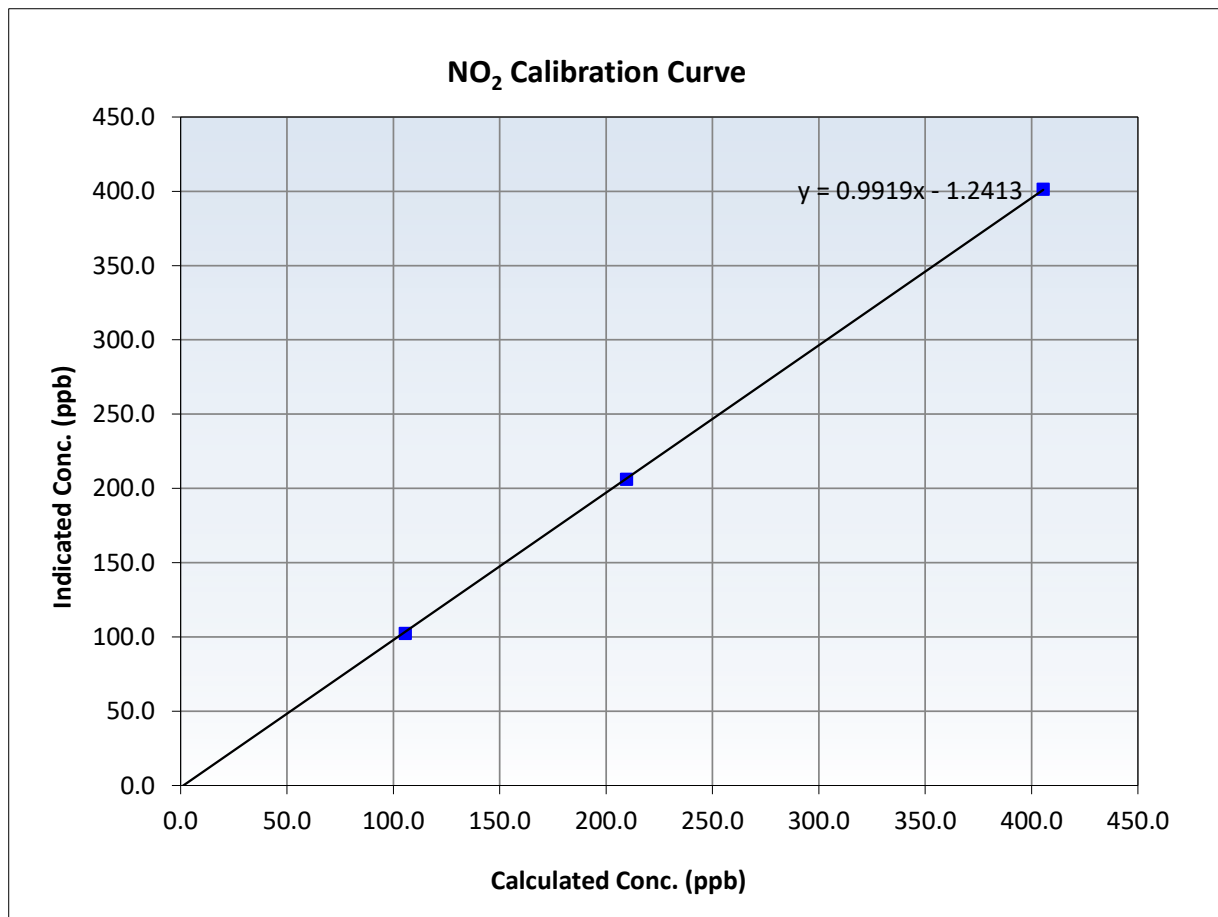
NO₂ Calibration Summary

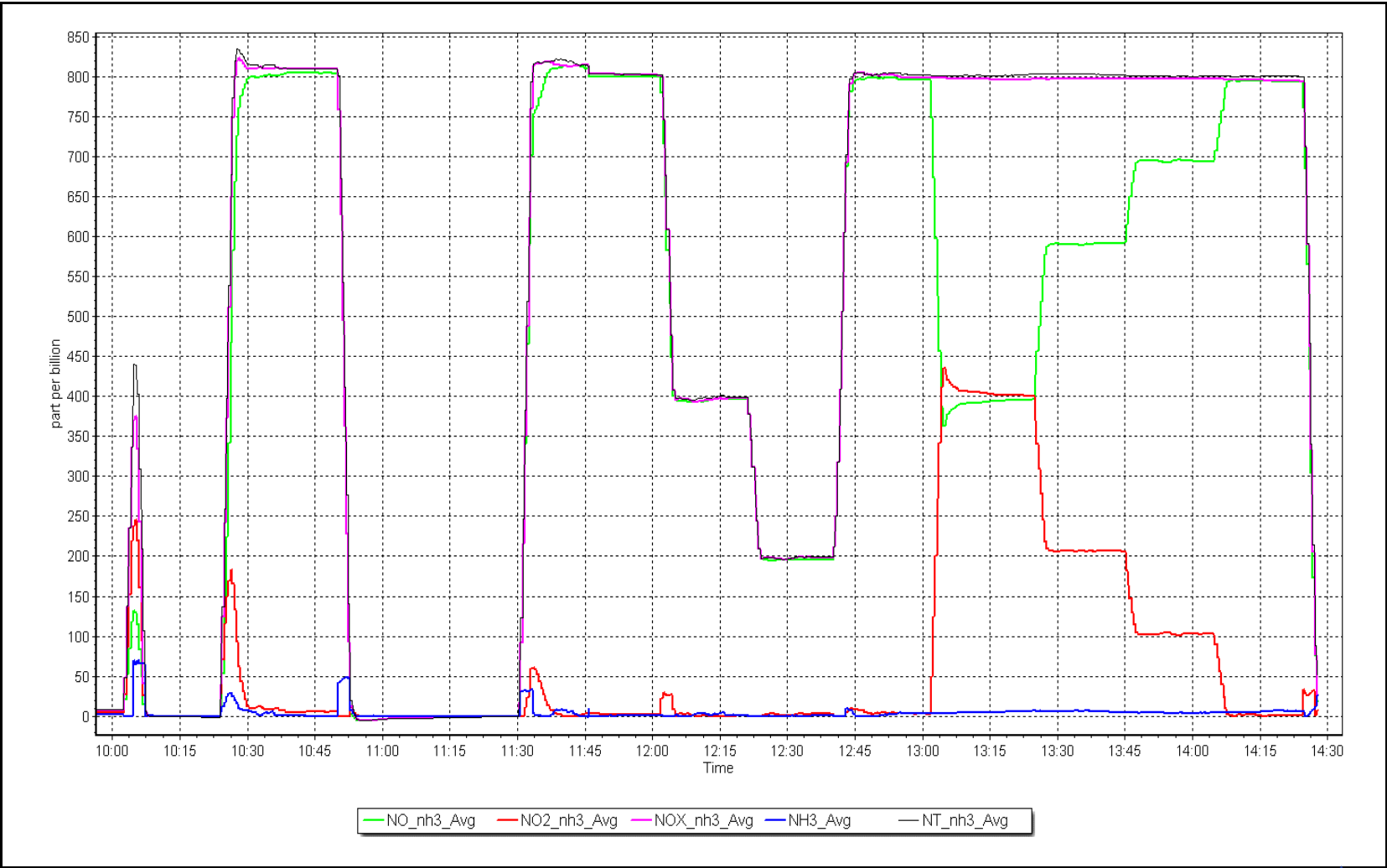
Station Information

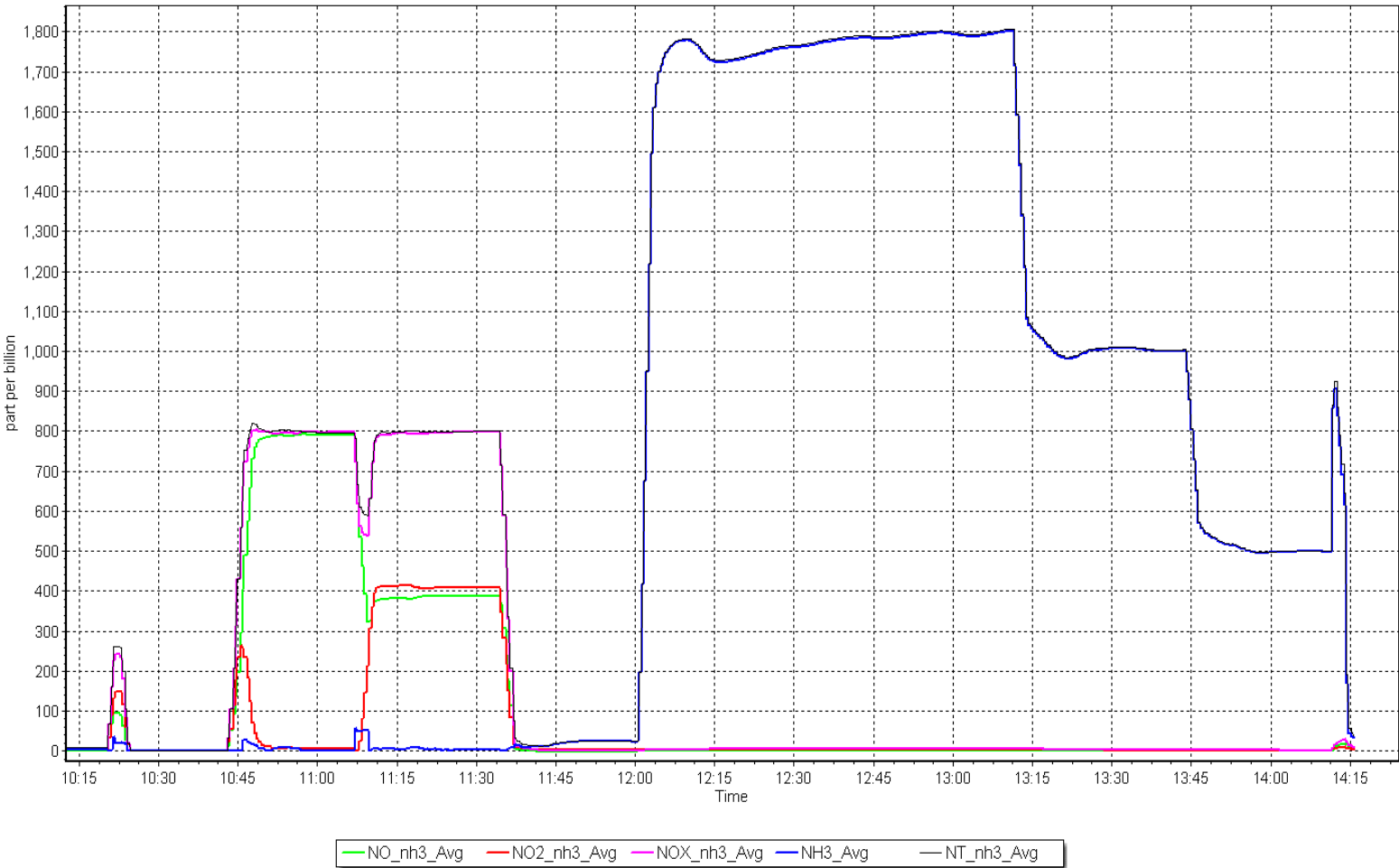
Calibration Date:	September 11, 2024	Previous Calibration:	August 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:59	End Time (MST):	14:28
Analyzer make:	API T201	Analyzer serial #:	475

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	0.999968	≥ 0.995
405.5	401.5	1.0100	Slope	0.991887	0.90 - 1.10
209.6	206.2	1.0165	Intercept	-1.241288	+/-20
105.6	102.4	1.0313			









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS02 MILDRED LAKE SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Mildred Lake Station number: AMS 02
Calibration Date: September 5, 2024 Last Cal Date: August 13, 2024
Start time (MST): 10:20 End time (MST): 14:30
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.98 ppm Cal Gas Exp Date: August 12, 2024
Cal Gas Cylinder #: CC501209
Removed Cal Gas Conc: 49.98 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 1185
Zero Air Gen Model: Teledyne API T701 Serial Number: 4891

Analyzer Information

Analyzer make: Thermo 43i Serial Number: JC1404901075
Analyzer Range: 0-1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002239	0.999787	Backgd or Offset:	18.7	18.9
Calibration intercept:	-0.784588	-0.425107	Coeff or Slope:	0.778	0.759

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.5	----
As found High point	4920	80.2	801.6	824.0	0.973
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	823.5	Previous response	802.7	*% change	2.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4920	80.2	801.6	801.0	1.001
Mid point	4960	40.1	400.8	400.6	1.001
Low point	4980	20.0	199.9	199.1	1.004
As left zero	5000	0.0	0.0	-0.2	----
As left span	4920	80.2	801.6	801.0	1.001
Average Correction Factor:					1.002

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

Calibration Performed By: Braiden Boutillier



Wood Buffalo Environmental Association

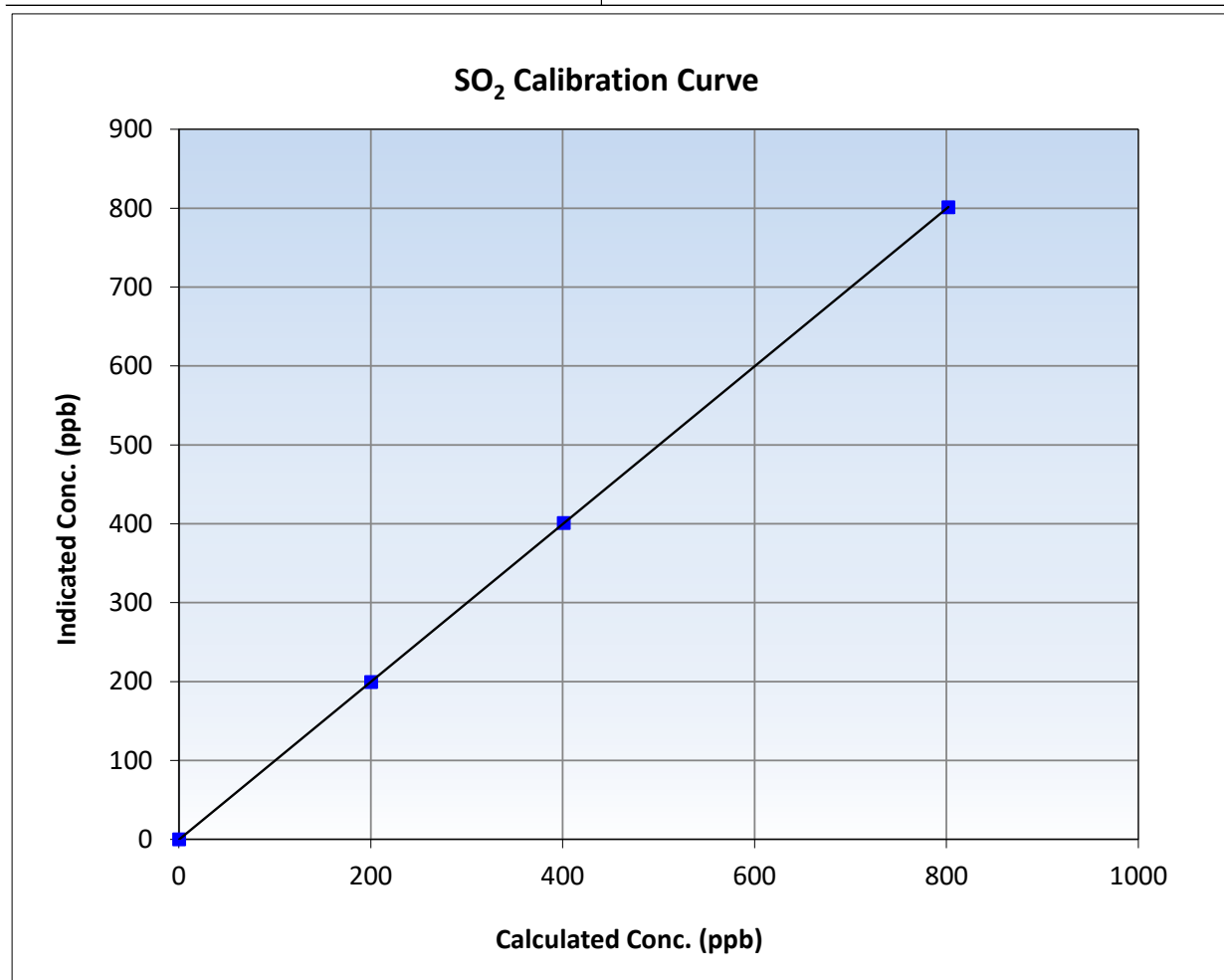
SO₂ Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:20	End Time (MST):	14:30
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

Calibration Data

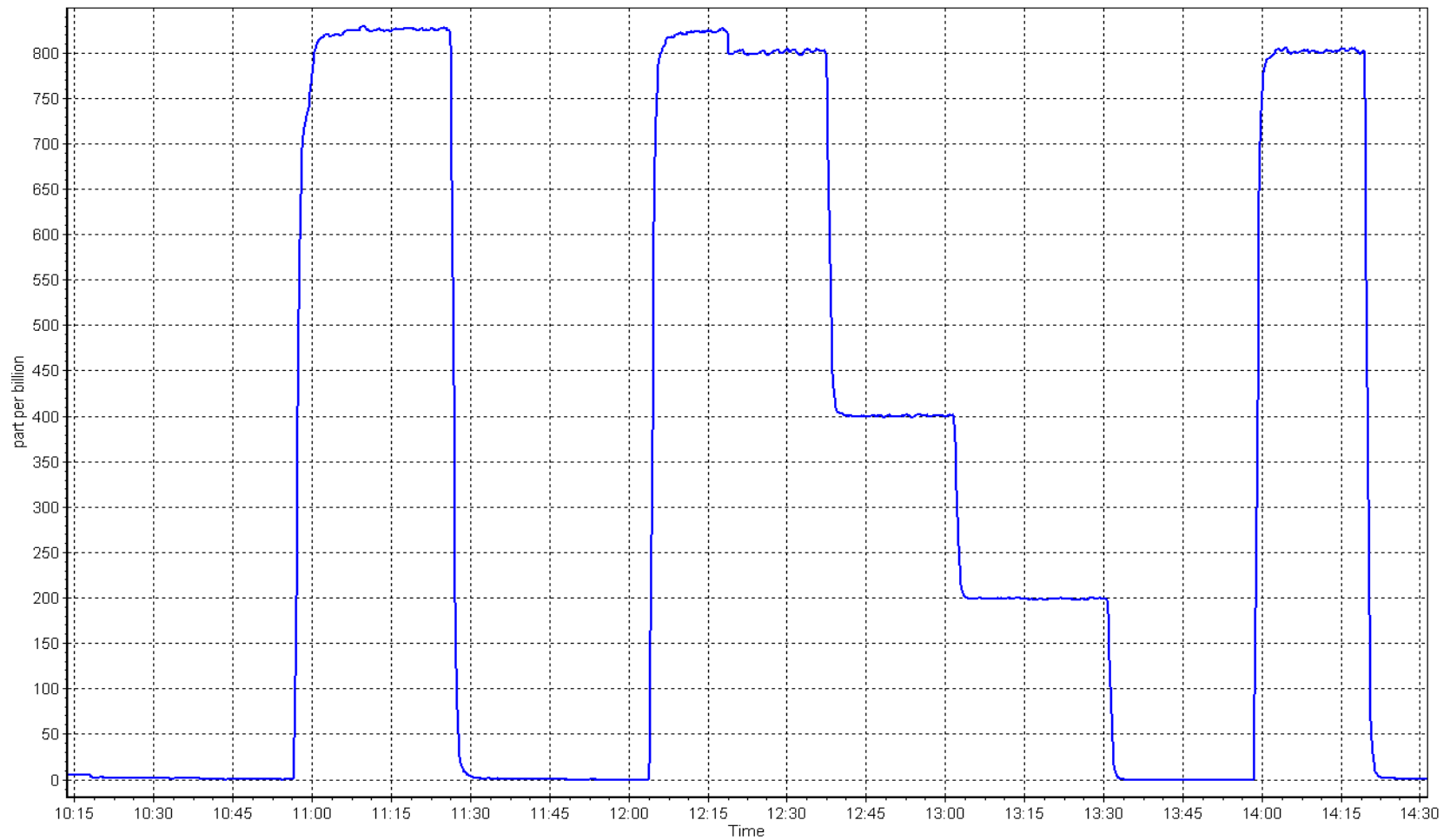
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3	----	Correlation Coefficient	0.999999	≥0.995
801.6	801.0	1.0008	Slope	0.999787	0.90 - 1.10
400.8	400.6	1.0006	Intercept	-0.425107	+/-30
199.9	199.1	1.0041			



SO2 Calibration Plot

Date: September 5, 2024

Location: Mildred Lake





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Mildred Lake
Calibration Date: September 18, 2024
Start time (MST): 9:39
Reason: Routine

Station number: AMS 02
Last Cal Date: August 26, 2024
End time (MST): 14:46

Calibration Standards

Cal Gas Concentration: 5.29 ppm
Cal Gas Cylinder #: CC345191
Removed Cal Gas Conc: 5.29 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: January 4, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 1185
Serial Number: 4891

Analyzer Information

Analyzer make: Thermo 43iQTL
Converter make: Global G150
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 12333331546
Converter serial #: 2023-267
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002822	0.997964	Backgd or Offset:	1.17	1.17
Calibration intercept:	-0.019199	0.000799	Coeff or Slope:	1.007	1.007

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4924	75.6	80.0	79.2	1.013
As found Mid point	4962	37.8	40.0	39.9	1.007
As found Low point	4981	18.9	20.0	19.4	1.041
New cylinder response					
Baseline Corr As found:	79.0	Prev response:	80.20	*% change:	-1.5%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.990249	AF Intercept:	0.020791
Baseline Corr 3rd AF pt:	19.2	AF Correlation:	0.999916	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4924	75.6	80.0	79.8	1.002
Mid point	4962	37.8	40.0	40.0	1.000
Low point	4981	18.9	20.0	19.9	1.005
As left zero	5000	0.0	0.0	0.0	----
As left span	4924	75.6	80.0	80.1	0.999
SO2 Scrubber Check	4920	80.2	802.0	0.1	----
Date of last scrubber change:		July 16, 2024		Ave Corr Factor	1.002
Date of last converter efficiency test:		NA			

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

H2S Calibration Summary

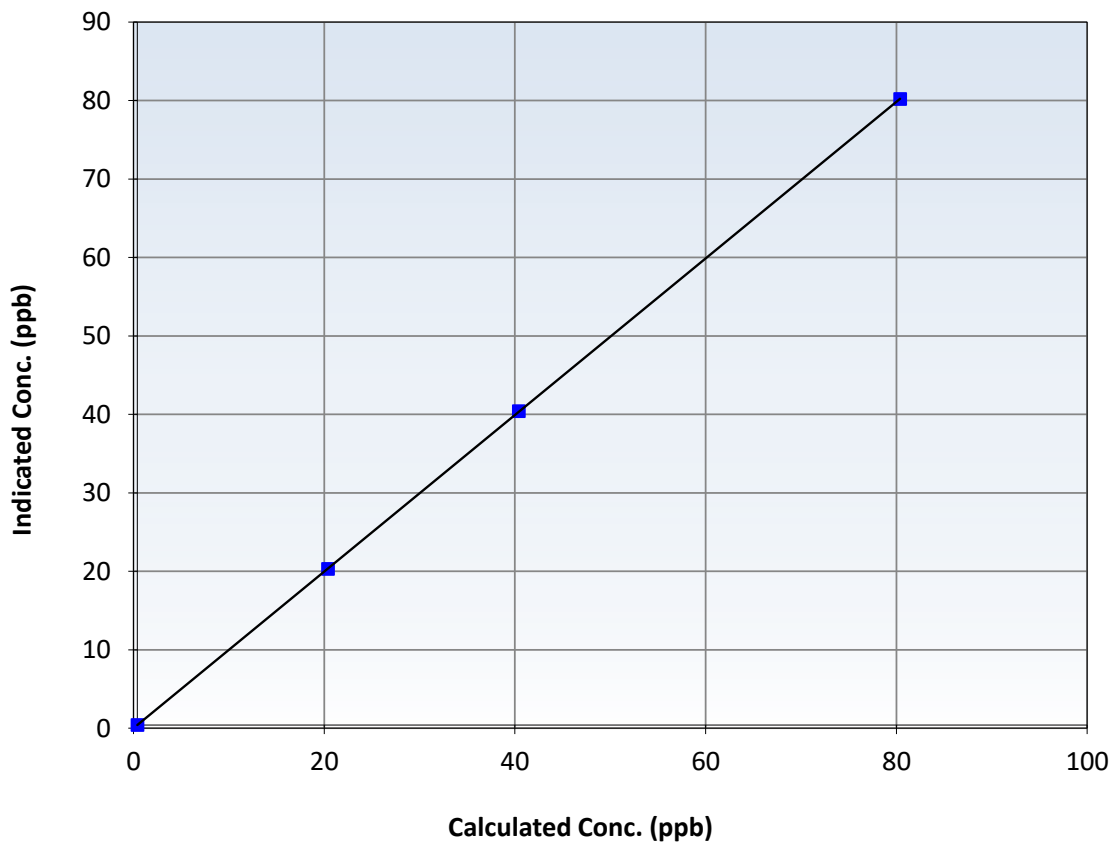
Station Information

Calibration Date:	July 5, 2024	Previous Calibration:	June 24, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:39	End Time (MST):	14:46
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331546

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999997		≥ 0.995
80.0	79.8	1.0024	Slope	0.997964		$0.90 - 1.10$
40.0	40.0	0.9998	Intercept	0.000799		± 3
20.0	19.9	1.0049				

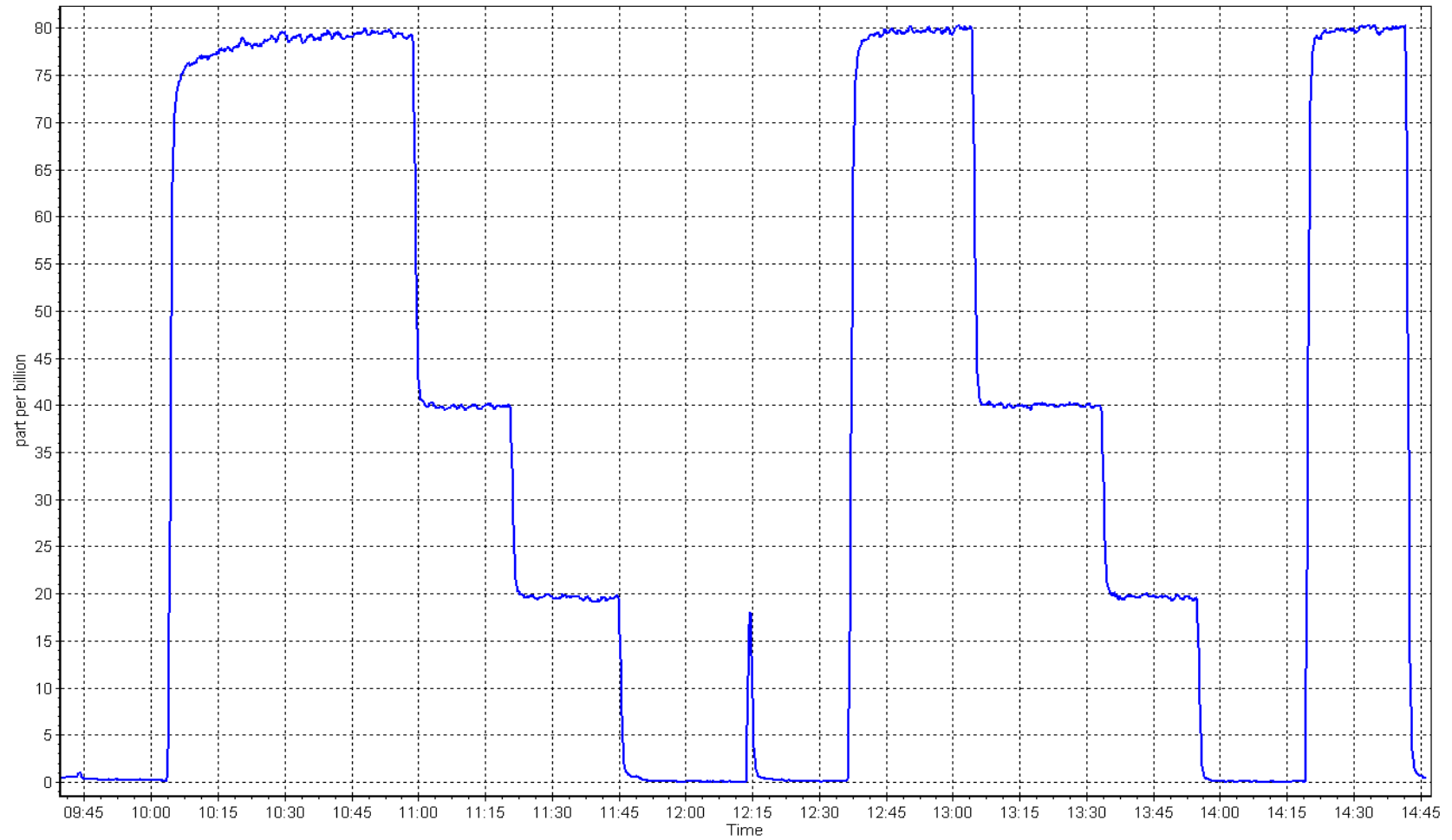
H₂S Calibration Curve



H2S Calibration Plot

Date: September 18, 2024

Location: Mildred Lake





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mildred Lake
Calibration Date: September 5, 2024
Start time (MST): 10:20
Reason: Routine

Station number: AMS 02
Last Cal Date: August 14, 2024
End time (MST): 14:30

Calibration Standards

Gas Cert Reference:	CC501209	Cal Gas Expiry Date:	August 12, 2024
CH ₄ Cal Gas Conc.	500.2 ppm	CH ₄ Equiv Conc.	1048.6 ppm
C ₃ H ₈ Cal Gas Conc.	199.4 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH ₄ Conc.	500.2 ppm	CH ₄ Equiv Conc.	1048.6 ppm
Removed C ₃ H ₈ Conc.	199.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	1185
Zero Air Gen model:	Teledyne API T701	Serial Number:	4891

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1170050131
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.48E-04	2.49E-04	NMHC SP Ratio:	6.23E-05
CH ₄ Retention time:	14.0	14.0	NMHC Peak Area:	141348
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	17.01	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.01	Prev response	16.89	*% change	0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	80.2	16.82	16.87	0.997
Mid point	4960	40.1	8.41	8.41	1.000
Low point	4980	20.0	4.19	4.22	0.993
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	17.02	0.988
Average Correction Factor					0.997

Notes:

Changed sample inlet filter after as founds. Adjusted span.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	8.80	9.00	0.977
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.00	Prev response	8.88	*% change	1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.80	8.83	0.996
Mid point	4960	40.1	4.40	4.41	0.998
Low point	4980	20.0	2.19	2.22	0.988
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.99	0.978
Average Correction Factor					0.994

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	8.02	8.00	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.00	Prev response	8.02	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.02	8.04	0.998
Mid point	4960	40.1	4.01	4.01	1.001
Low point	4980	20.0	2.00	2.01	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.02	8.03	0.999
Average Correction Factor					0.999

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.004808	1.002593
THC Cal Offset:	-0.005486	0.001312
CH ₄ Cal Slope:	0.999728	1.001949
CH ₄ Cal Offset:	-0.001849	-0.002642
NMHC Cal Slope:	1.009495	1.003167
NMHC Cal Offset:	-0.002838	0.004754

Calibration Performed By: Braiden Boutillier



Wood Buffalo Environmental Association

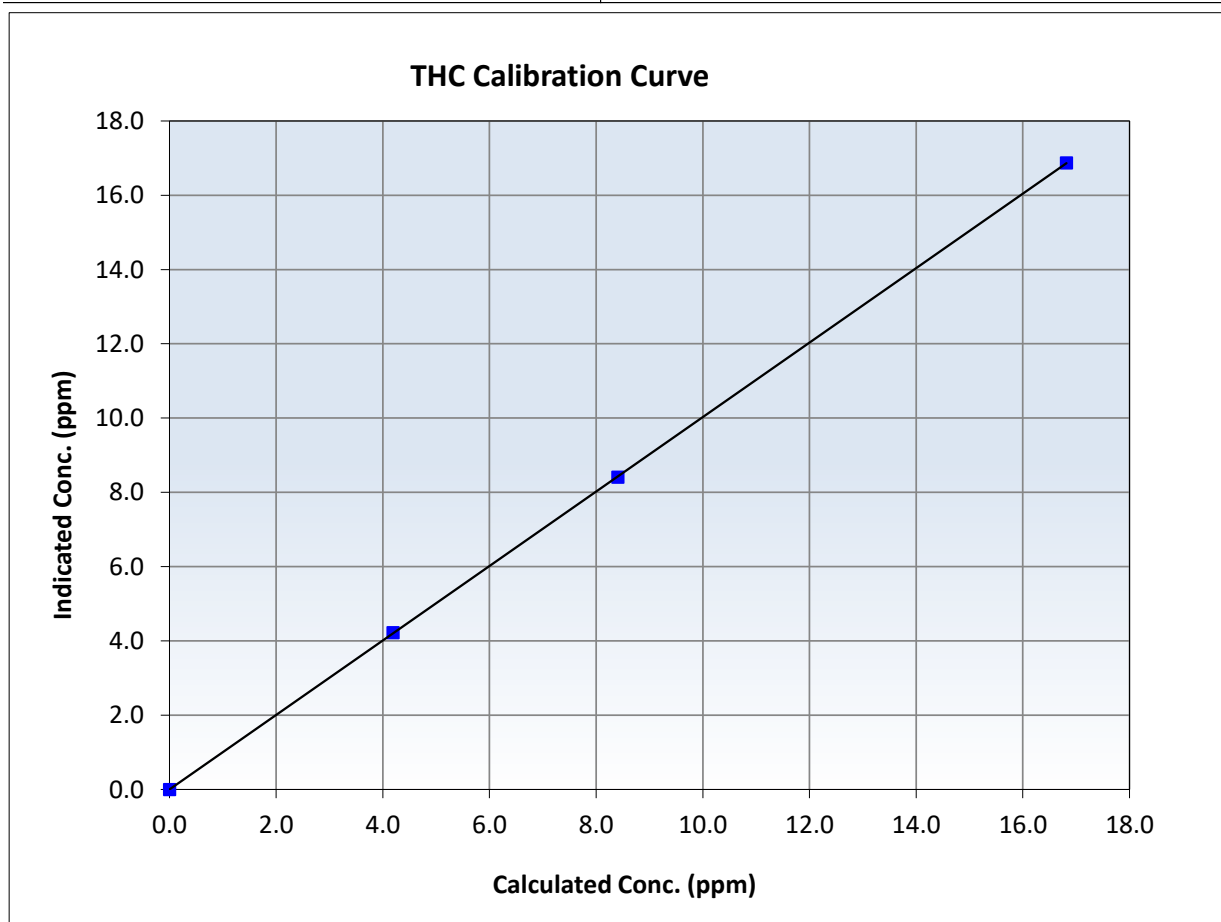
THC Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 14, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:20	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999995	≥ 0.995
16.82	16.87	0.9969	Slope	1.002593	$0.90 - 1.10$
8.41	8.41	0.9999	Intercept	0.001312	± 0.5
4.19	4.22	0.9932			





Wood Buffalo Environmental Association

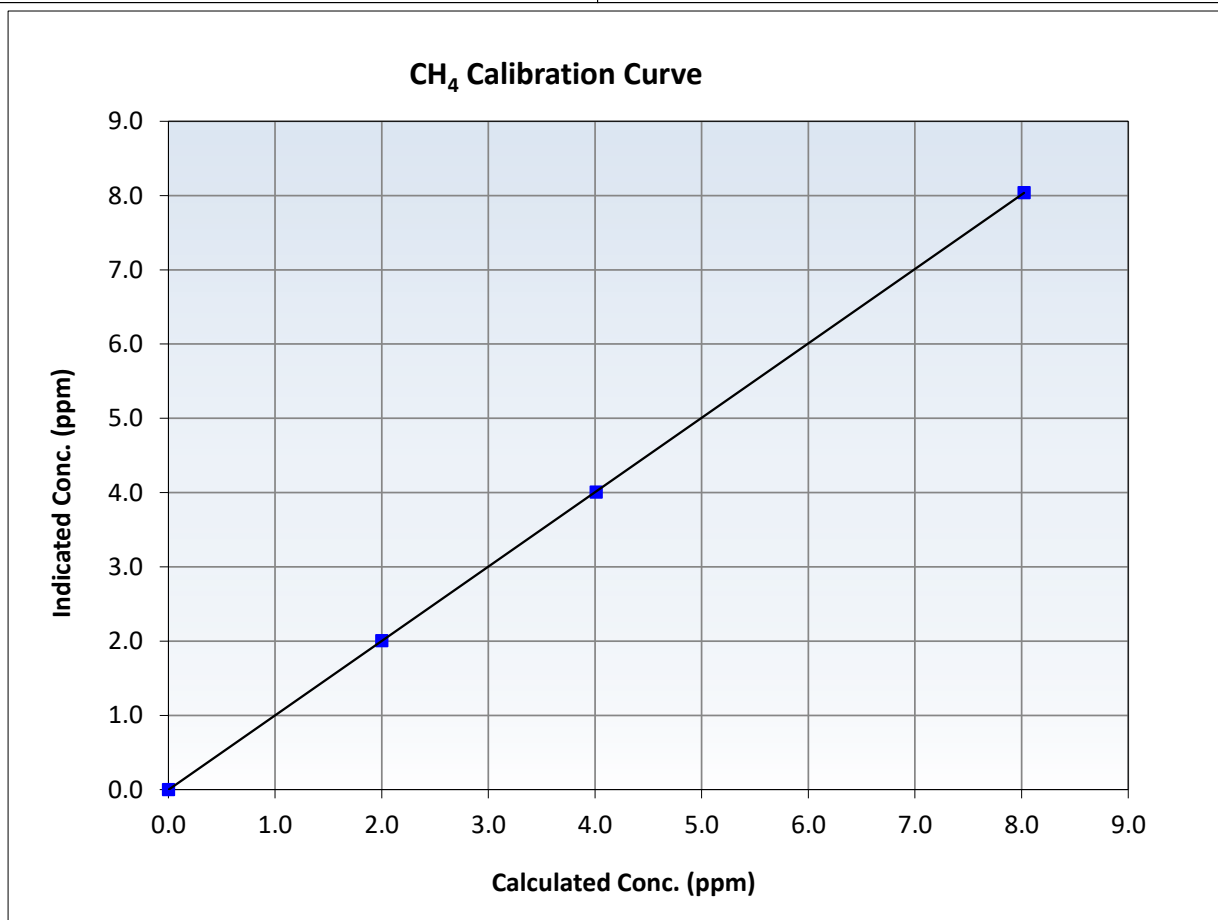
CH₄ Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 14, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:20	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999996	<i>≥0.995</i>
8.02	8.04	0.9979	Slope	1.001949	<i>0.90 - 1.10</i>
4.01	4.01	1.0011	Intercept	-0.002642	<i>+/-0.5</i>
2.00	2.01	0.9979			





Wood Buffalo Environmental Association

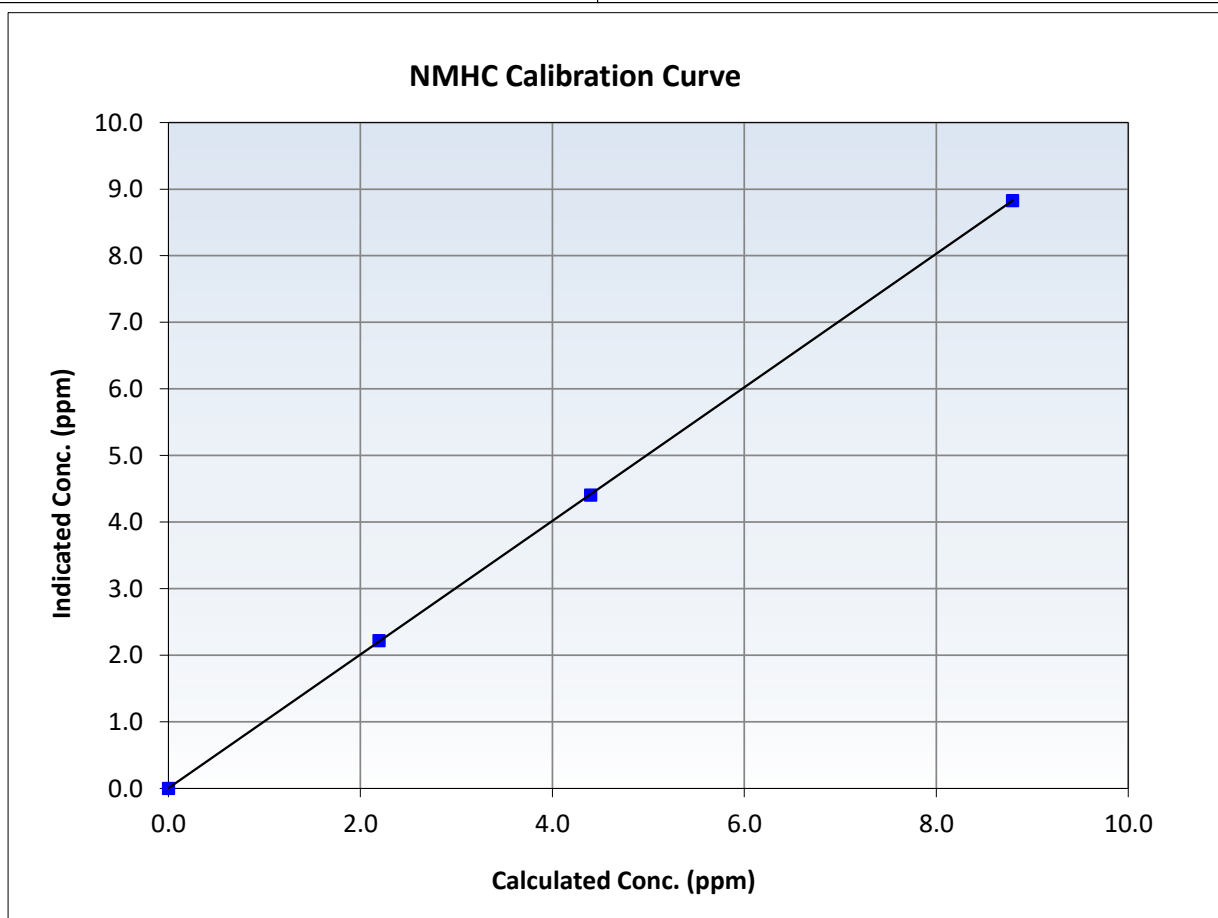
NMHC Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 14, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:20	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

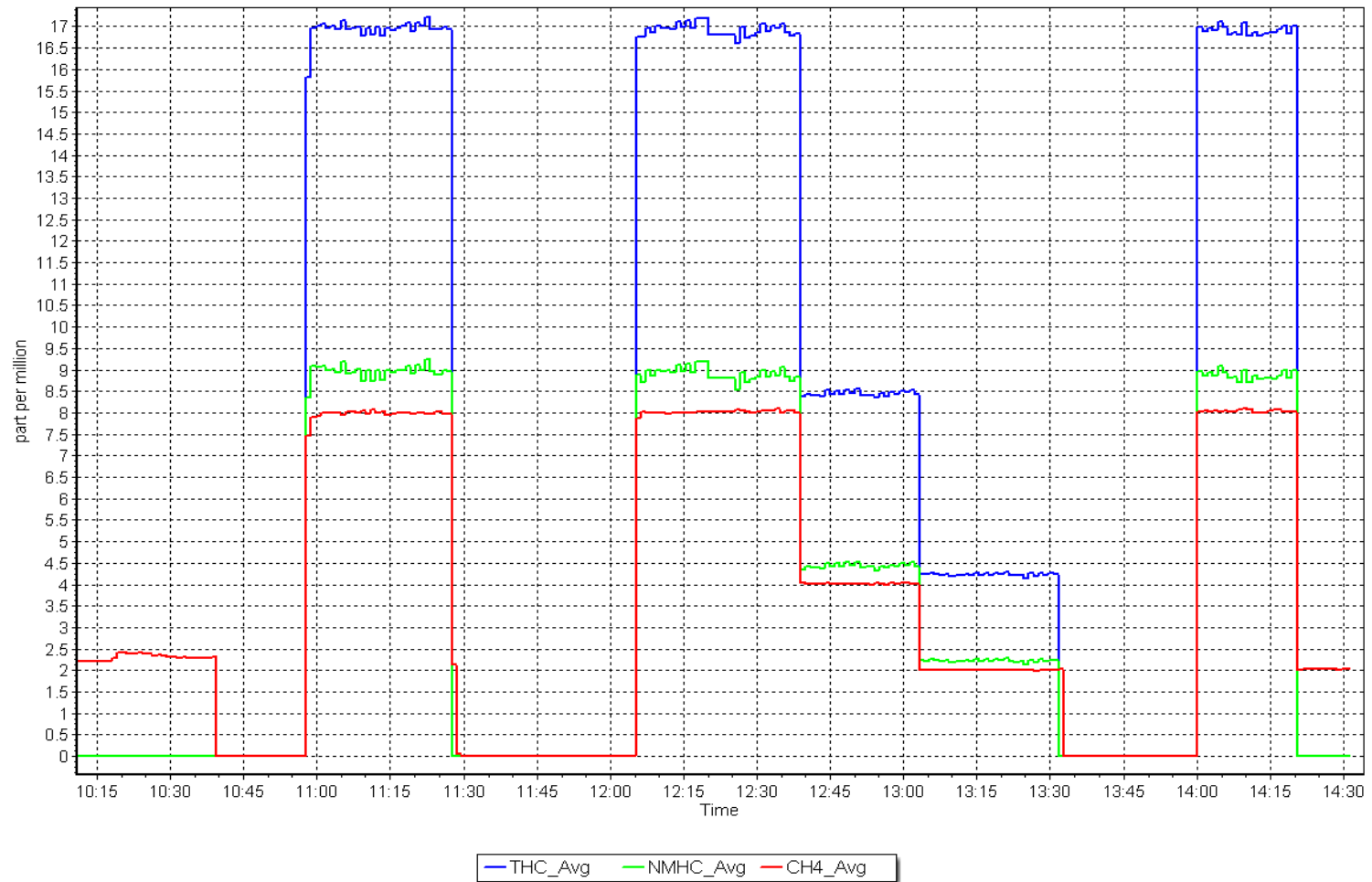
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999992	<i>≥0.995</i>
8.80	8.83	0.9961	Slope	1.003167	<i>0.90 - 1.10</i>
4.40	4.41	0.9983	Intercept	0.004754	<i>+/-0.5</i>
2.19	2.22	0.9885			



NMHC Calibration Plot

Date: September 5, 2024

Location: Mildred Lake





Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Mildred Lake Station Number: AMS 02
Calibration Date: September 5, 2024 Prev Cal Date: August 30, 2023
Start Time (MST): 13:24 End Time (MST): 14:18
Tower Height (m): 10.0 Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: E5130
WS Calibrator: MetOne 053 Serial Number: CA 05231

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error <i>Limit = +/- 1.5%</i>
0	0.0	0.0	---
200	20.2	20.3	0.4%
400	39.4	39.4	0.1%
600	58.6	58.6	0.0%
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		0.999564	$0.90 - 1.10$
Calculated intercept		-0.025288	± 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: B1462
As Found Declination (deg east of True North): 14 As Left Declination (deg east of True North): 14
Solar noon time (MST): 11:27 Calc Declination*: 14 Degrees
Deadband calc: -0.3 degrees (*Limit 4 deg*) * - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) <i>Limit = +/- 1.0%</i>
0	0.3	---
90	87.1	-0.8%
180	178.0	-0.6%
270	272.1	0.6%
356	357.6	0.4%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r^2)		0.999916	≥ 0.9995
Calculated slope		0.991388	$0.90 - 1.10$
Calculated intercept		1.719781	± 4

Notes: Verified crossarm aligned with true north. Both sensors were within acceptable limits.

Calibration Performed By: Braiden Boutilier



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Buffalo Viewpoint Station number: AMS 04
Calibration Date: September 10, 2024 Last Cal Date: August 20, 2024
Start time (MST): 6:20 End time (MST): 9:09
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.87 ppm Cal Gas Exp Date: March 10, 2031
Cal Gas Cylinder #: CC446753
Removed Cal Gas Conc: 50.87 ppm Rem Gas Exp Date:
Removed Gas Cyl #: Diff between cyl:
Calibrator Model: API T700 Serial Number: 3808
Zero Air Gen Model: API T701 Serial Number: 362

Analyzer Information

Analyzer make: Thermo 43i Serial Number: JC1327300932
Analyzer Range: 0-1000ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002114	1.001027	Backgd or Offset:	24.6	26.1
Calibration intercept:	1.515391	0.395469	Coeff or Slope:	0.866	0.866

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	1.1	----
As found High point	4921	78.6	799.7	805.8	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	804.7	Previous response	802.9	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.5	----
High point	4921	78.6	799.7	800.6	0.999
Mid point	4961	39.3	399.8	400.8	0.998
Low point	4980	19.6	199.4	201.1	0.992
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	78.6	799.7	805.6	0.993
Average Correction Factor:					0.996

Notes: No maintenance done. Zero adjusted.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

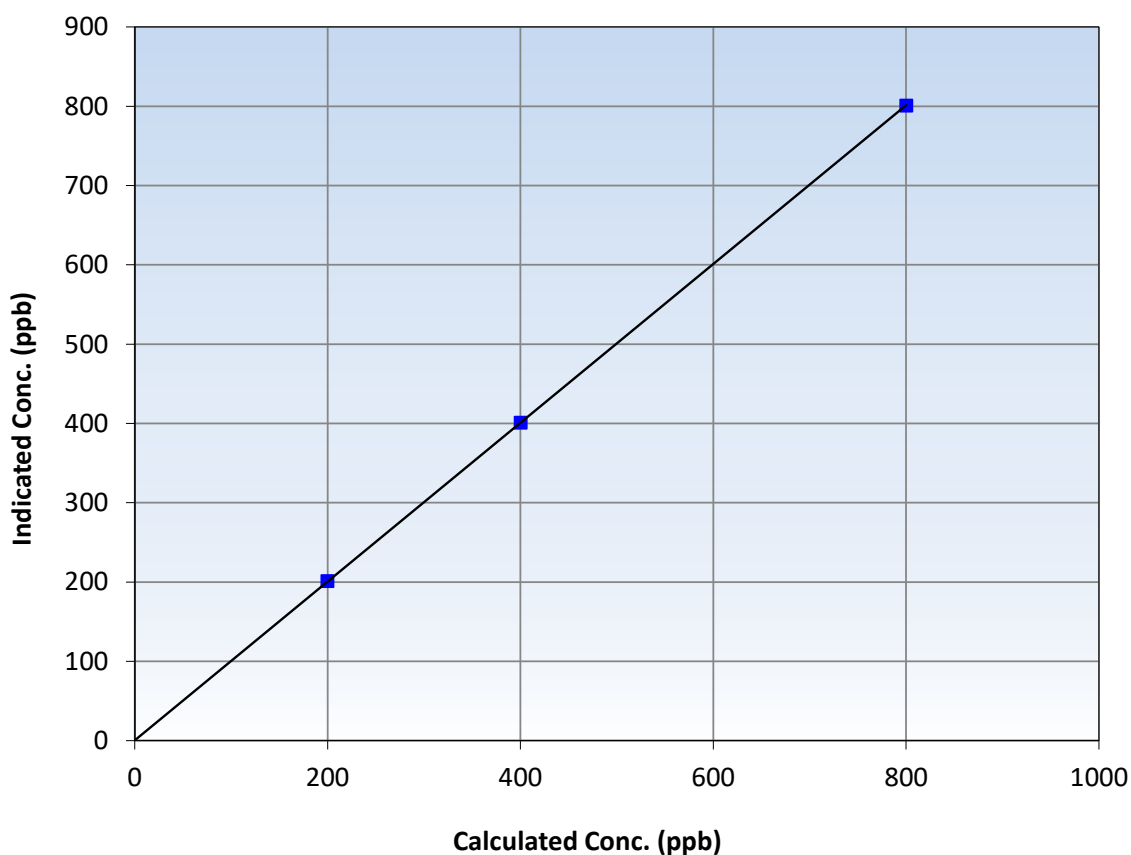
Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 20, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:20	End Time (MST):	9:09
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	-0.5	----	Correlation Coefficient	0.999994	≥0.995
799.7	800.6	0.9989	Slope	1.001027	0.90 - 1.10
399.8	400.8	0.9975	Intercept	0.395469	+/-30
199.4	201.1	0.9917			

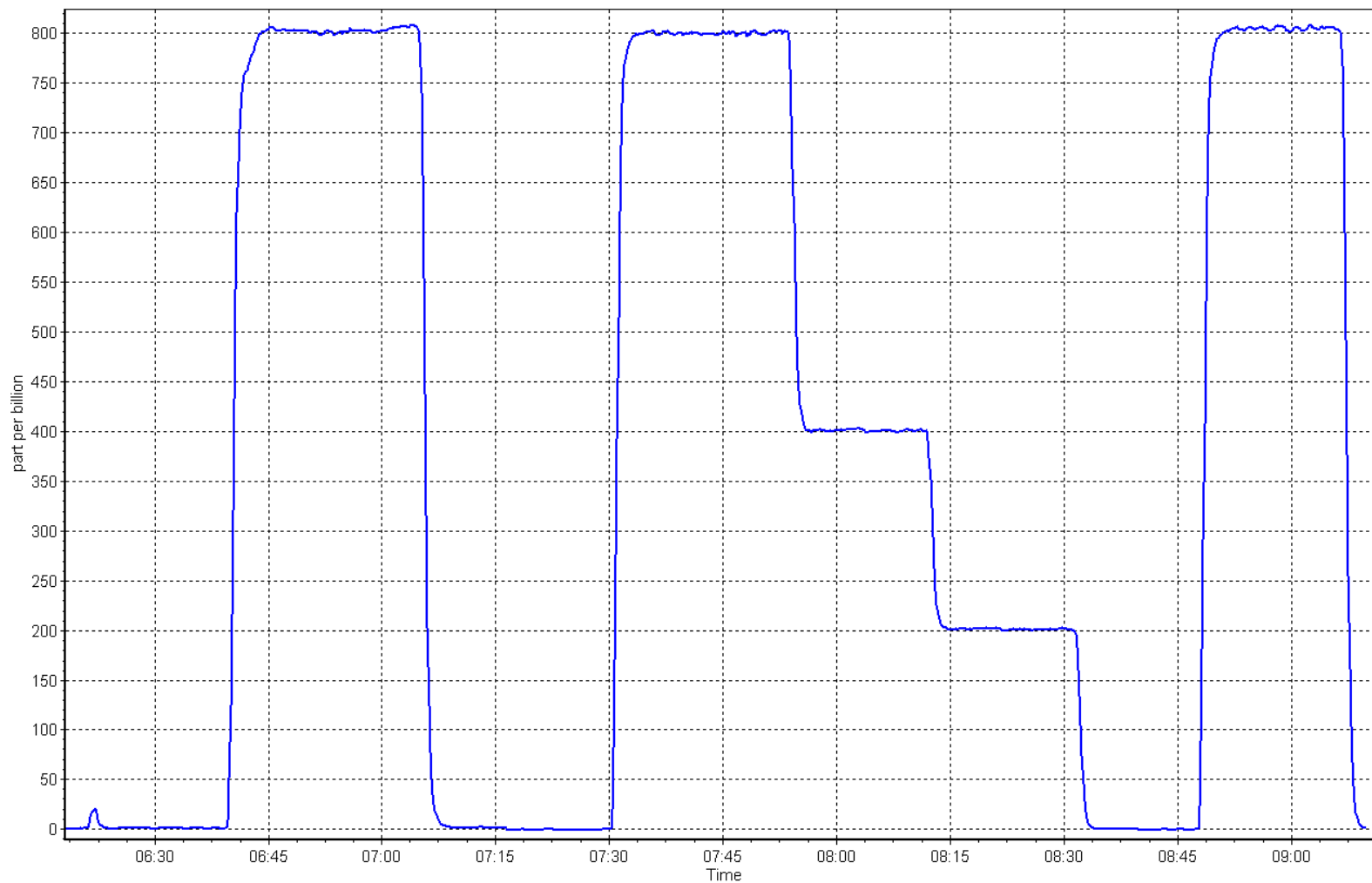
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 10, 2024

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Buffalo Viewpoint
Calibration Date: September 23, 2024
Start time (MST): 9:47
Reason: Routine

Station number: AMS 04
Last Cal Date: August 23, 2024
End time (MST): 14:12

Calibration Standards

Cal Gas Concentration: 5.42 ppm
Cal Gas Cylinder #: CC345266
Removed Cal Gas Conc: 5.42 ppm
Removed Gas Cyl #:
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701H

Cal Gas Exp Date: January 4, 2025
Rem Gas Exp Date:
Diff between cyl:
Serial Number: 3808
Serial Number: 362

Analyzer Information

Analyzer make: Thermo 43i-LTE
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1008841400
Converter serial #: 2022-200
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.984977	0.995222	Backgd or Offset:	1.81	1.92
Calibration intercept:	0.081932	0.022118	Coeff or Slope:	1.092	1.108

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4926	74.1	80.3	79.5	1.013
As found Mid point	4963	37.0	40.1	40.1	1.005
As found Low point	4982	18.5	20.1	19.9	1.018
New cylinder response					
Baseline Corr As found:	79.3	Prev response:	79.20	*% change:	0.1%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.988107	AF Intercept:	0.221990
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999974	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4926	74.1	80.3	79.9	1.005
Mid point	4963	37.0	40.1	40.1	1.000
Low point	4982	18.5	20.1	19.9	1.008
As left zero	5000	0.0	0.0	0.0	----
As left span	4926	74.1	80.3	81.2	0.989
SO2 Scrubber Check	4920	80.0	800.0		----
Date of last scrubber change:		16-May-23		Ave Corr Factor	1.004
Date of last converter efficiency test:					

Notes: Sox scrubber checked after the calibrator zero. Span and zero adjustment performed.

Calibration Performed By: Kelly Baragar



Wood Buffalo Environmental Association

H₂S Calibration Summary

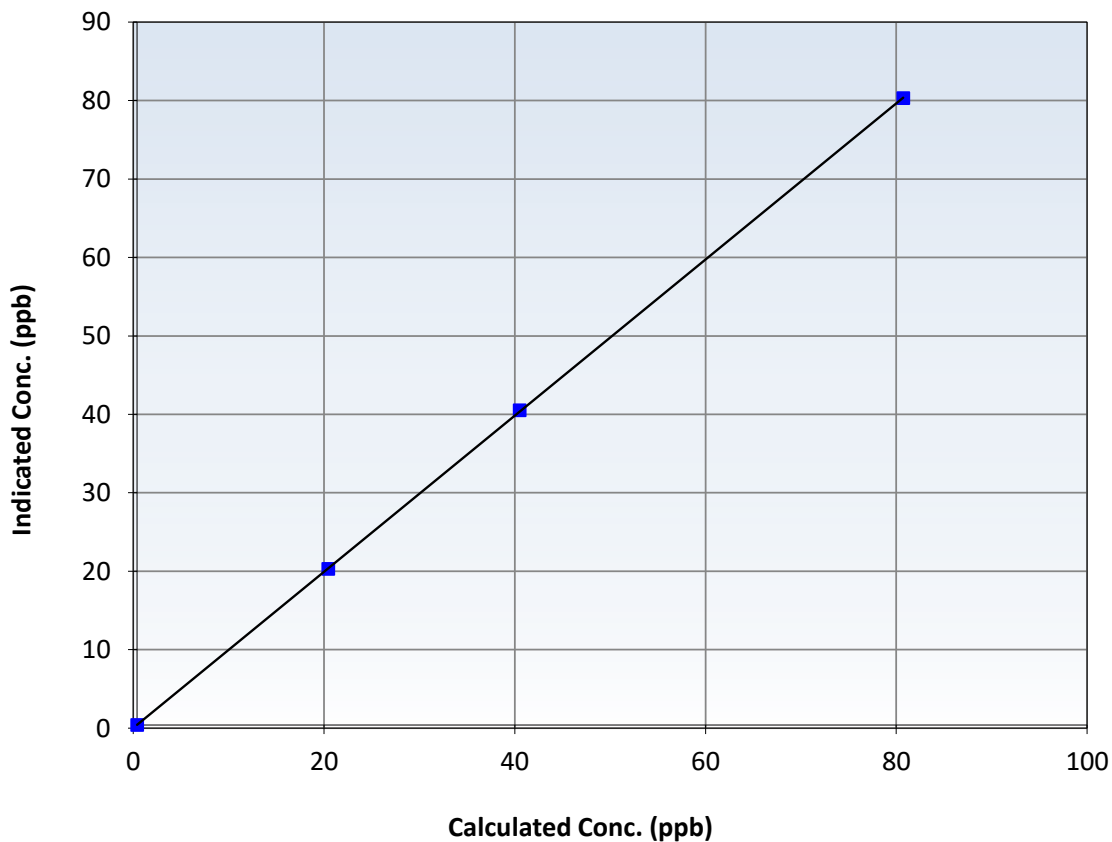
Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	August 23, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	9:47	End Time (MST):	14:12
Analyzer make:	Global	Analyzer serial #:	2022-200

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999990	≥ 0.995
80.3	79.9	1.0053	Slope	0.995222	$0.90 - 1.10$
40.1	40.1	1.0002	Intercept	0.022118	± 3
20.1	19.9	1.0076			

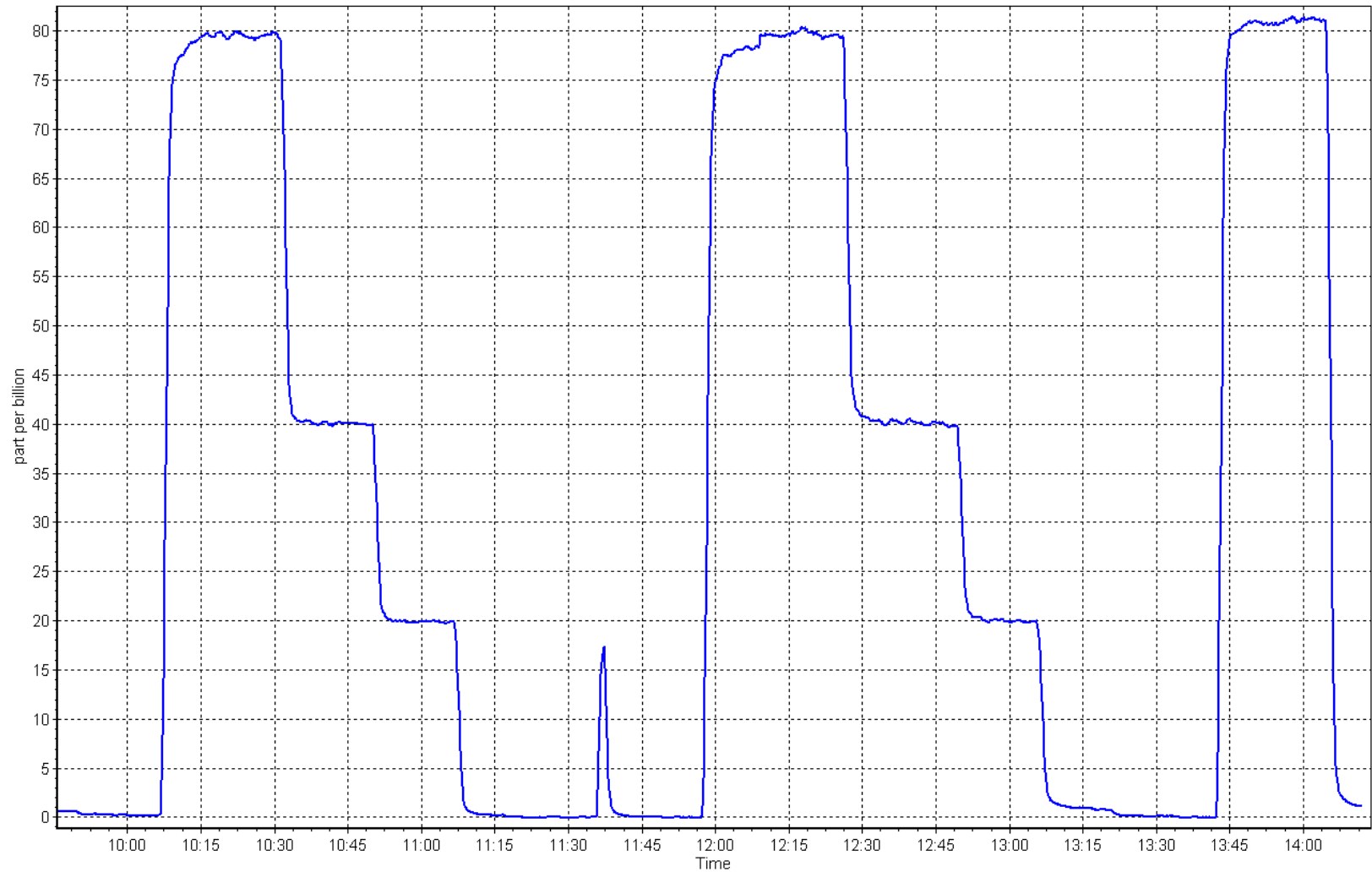
H₂S Calibration Curve



H₂S Calibration Plot

Date: September 23, 2024

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	September 10, 2024	Last Cal Date:	August 20, 2024
Start time (MST):	6:20	End time (MST):	9:09
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC446753	Cal Gas Expiry Date:	March 10, 2031
CH ₄ Cal Gas Conc.	497.2 ppm	CH ₄ Equiv Conc.	1058.2 ppm
C ₃ H ₈ Cal Gas Conc.	204.0 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH ₄ Conc.	497.2 ppm	CH ₄ Equiv Conc.	1058.2 ppm
Removed C ₃ H ₈ Conc.	204.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3808
Zero Air Gen model:	API T701	Serial Number:	362

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594
THC Range:	0 - 20 ppm	NMHC/CH ₄ Range:	0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	4.44E-04	4.44E-04	NMHC SP Ratio:	1.13E-04
CH ₄ Retention time:	13.7	13.7	NMHC Peak Area:	78327
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	16.64	16.60	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.60	Prev response	16.62	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	16.64	16.52	1.007
Mid point	4961	39.3	8.32	8.24	1.009
Low point	4980	19.6	4.15	4.13	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	16.64	16.47	1.010
Average Correction Factor					1.007

Notes: Nitrogen Cylinder Changed. No adjustments done.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	8.82	8.80	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.80	Prev response	8.80	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.76	1.006
Mid point	4961	39.3	4.41	4.38	1.007
Low point	4980	19.6	2.20	2.20	0.999
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	8.82	8.73	1.010
Average Correction Factor					1.004

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.79	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.79	Prev response	7.81	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	7.82	7.76	1.007
Mid point	4961	39.3	3.91	3.86	1.012
Low point	4980	19.6	1.95	1.93	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	7.82	7.74	1.010
Average Correction Factor					1.010

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	0.998340	0.992852
THC Cal Offset:	0.006661	-0.000161
CH ₄ Cal Slope:	0.999844	0.992900
CH ₄ Cal Offset:	-0.005103	-0.006117
NMHC Cal Slope:	0.996865	0.992887
NMHC Cal Offset:	0.011564	0.006157

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

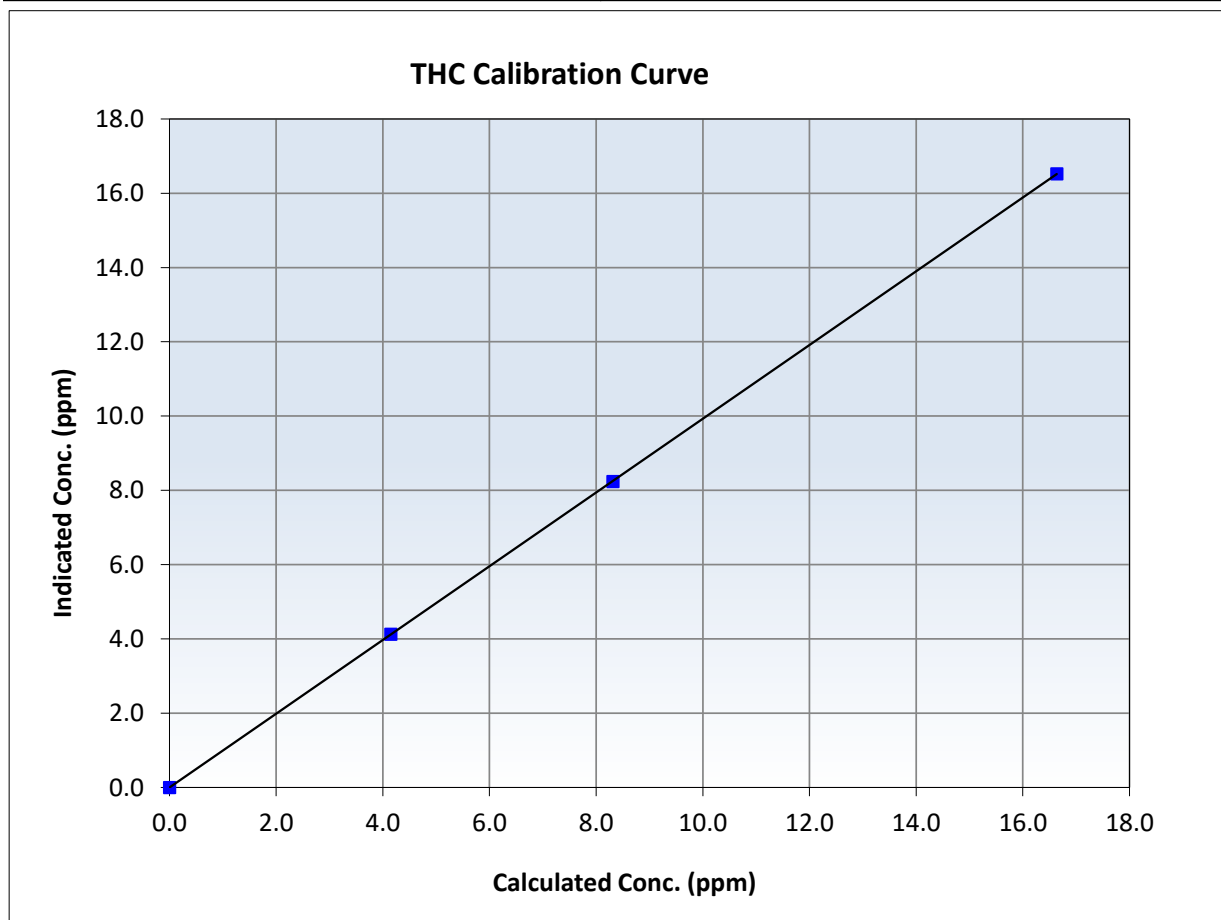
THC Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 20, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:20	End Time (MST):	9:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

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
16.64	16.52	1.0069	Slope	0.992852	$0.90 - 1.10$
8.32	8.24	1.0093	Intercept	-0.000161	± 0.5
4.15	4.13	1.0045			





Wood Buffalo Environmental Association

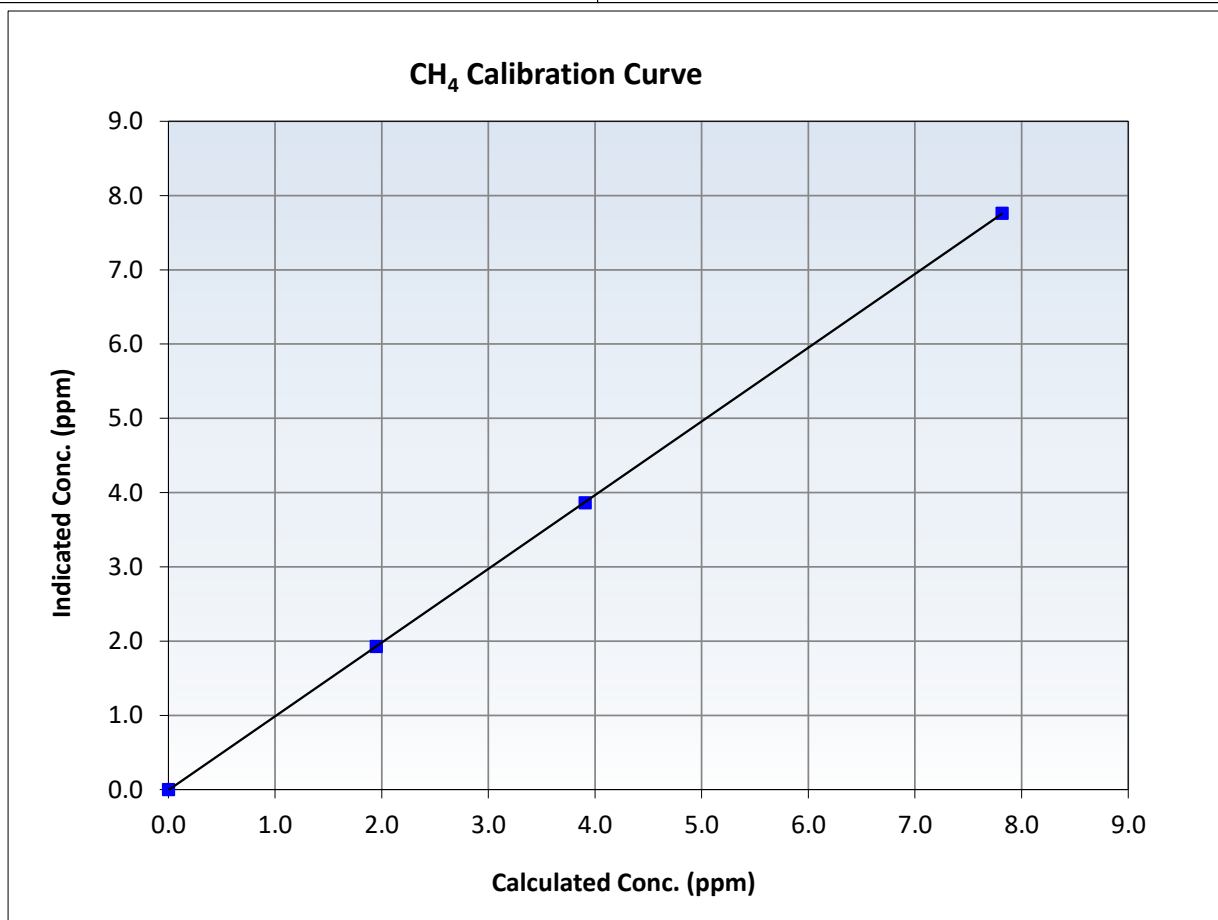
CH₄ Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 20, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:20	End Time (MST):	9:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999993	≥ 0.995
7.82	7.76	1.0072	Slope	0.992900	$0.90 - 1.10$
3.91	3.86	1.0118	Intercept	-0.006117	± 0.5
1.95	1.93	1.0105			





Wood Buffalo Environmental Association

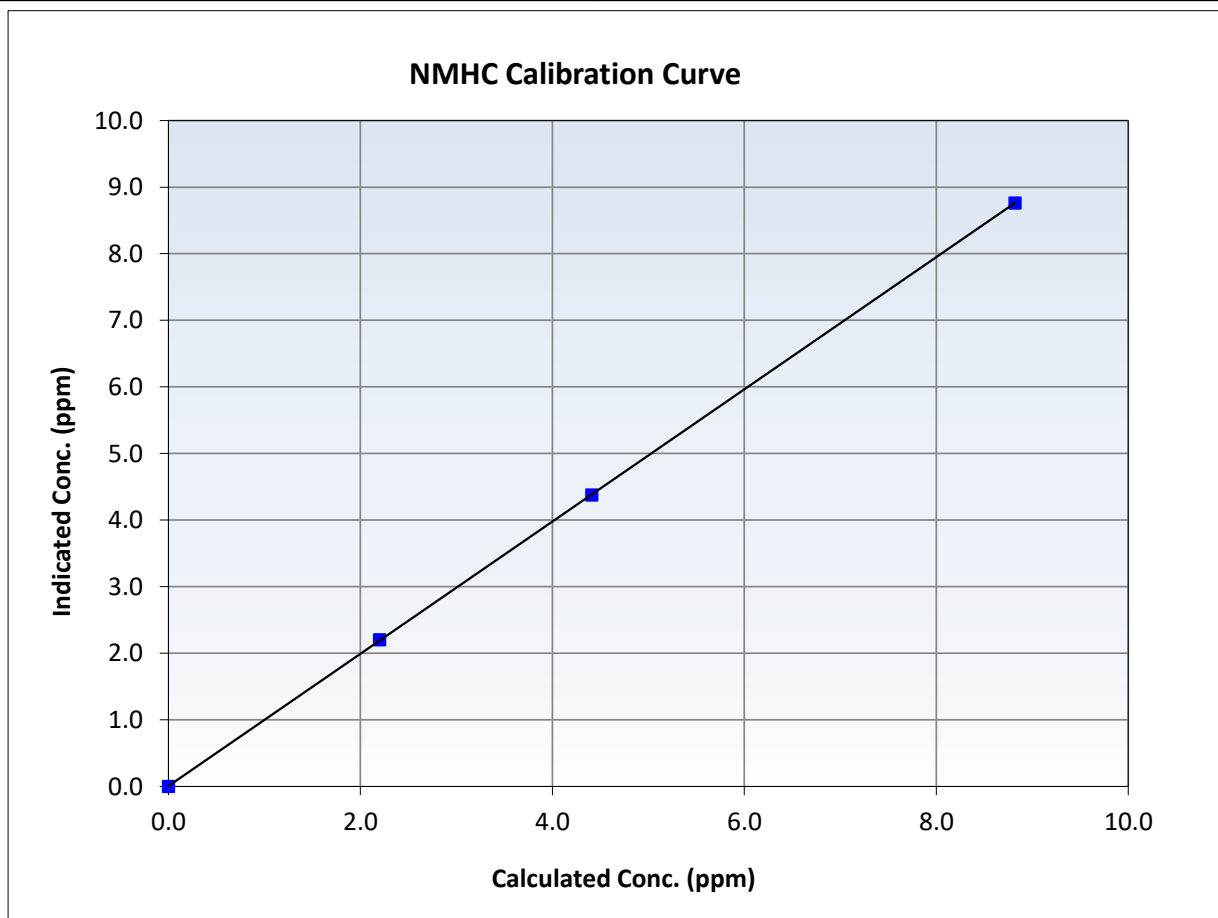
NMHC Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 20, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:20	End Time (MST):	9:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

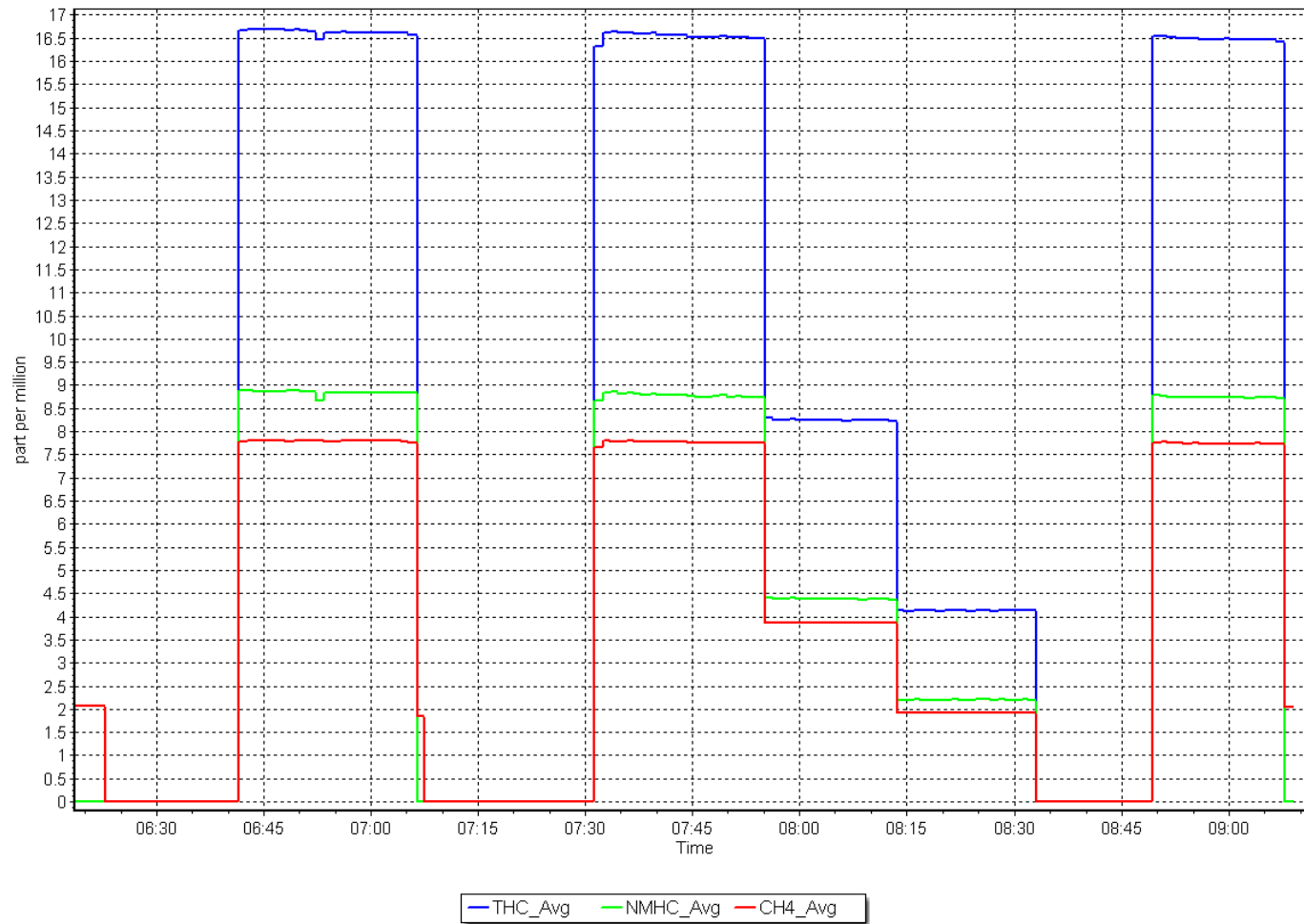
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999995	<i>≥0.995</i>
8.82	8.76	1.0065	Slope	0.992887	<i>0.90 - 1.10</i>
4.41	4.38	1.0071	Intercept	0.006157	<i>+/-0.5</i>
2.20	2.20	0.9988			



NMHC Calibration Plot

Date: September 10, 2024

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Buffalo Viewpoint
Station number: AMS 04
Calibration Date: September 26, 2024
Last Cal Date: August 22, 2024
Start time (MST): 8:56
End time (MST): 14:29
Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC324979
NOX Cal Gas Conc: 48.90 ppm
Removed Cylinder #:
Removed Gas NOX Conc: 48.90 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: APIT701
Cal Gas Expiry Date: November 3, 2032
NO Cal Gas Conc: 48.80 ppm
Removed Gas Exp Date:
Removed Gas NO Conc: 48.80 ppm
NO gas Diff:
Serial Number: 3808
Serial Number: 362

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.6	0.3	----	----
AF High point	4918	81.8	800.0	798.4	1.6	804.0	799.6	4.3	0.9947	0.9978
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 798.6 ppb	NO = 801.9 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = 0.7%
Baseline Corr 1st pt	NO _x = 804.3 ppb	NO = 800.2 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -0.2%
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:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 721

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.246	1.240	NO bkgnd or offset:	0.4	0.4
NOX coeff or slope:	1.228	1.230	NOX bkgnd or offset:	0.5	0.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.4	4.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997279	1.001277
NO _x Cal Offset:	0.766470	0.667599
NO Cal Slope:	1.005407	0.999396
NO Cal Offset:	-0.832853	-0.133984
NO ₂ Cal Slope:	0.981496	0.988052
NO ₂ Cal Offset:	-0.653208	0.825493

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
High point	4918	81.8	800.0	798.4	1.6	801.7	797.8	3.9	0.9979	1.0008
Mid point	4959	40.9	400.0	399.2	0.8	400.7	399.0	1.6	0.9983	1.0005
Low point	4980	20.4	199.5	199.1	0.4	201.5	198.4	3.1	0.9901	1.0035
As left zero	5000	0.0	0.0	1.3	-1.3	0.8	1.3	-0.5	----	----
As left span	4918	81.8	800.0	397.7	800.0	798.6	397.7	400.9	1.0018	1.0000
Average Correction Factor									0.9954	1.0016

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	798.0	397.5	402.1	398.0	1.0104	99.0%
Mid GPT point	798.0	599.0	200.6	198.7	1.0097	99.0%
Low GPT point	798.0	698.5	101.1	102.1	0.9906	101.0%
Average Correction Factor					1.0036	99.7%

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

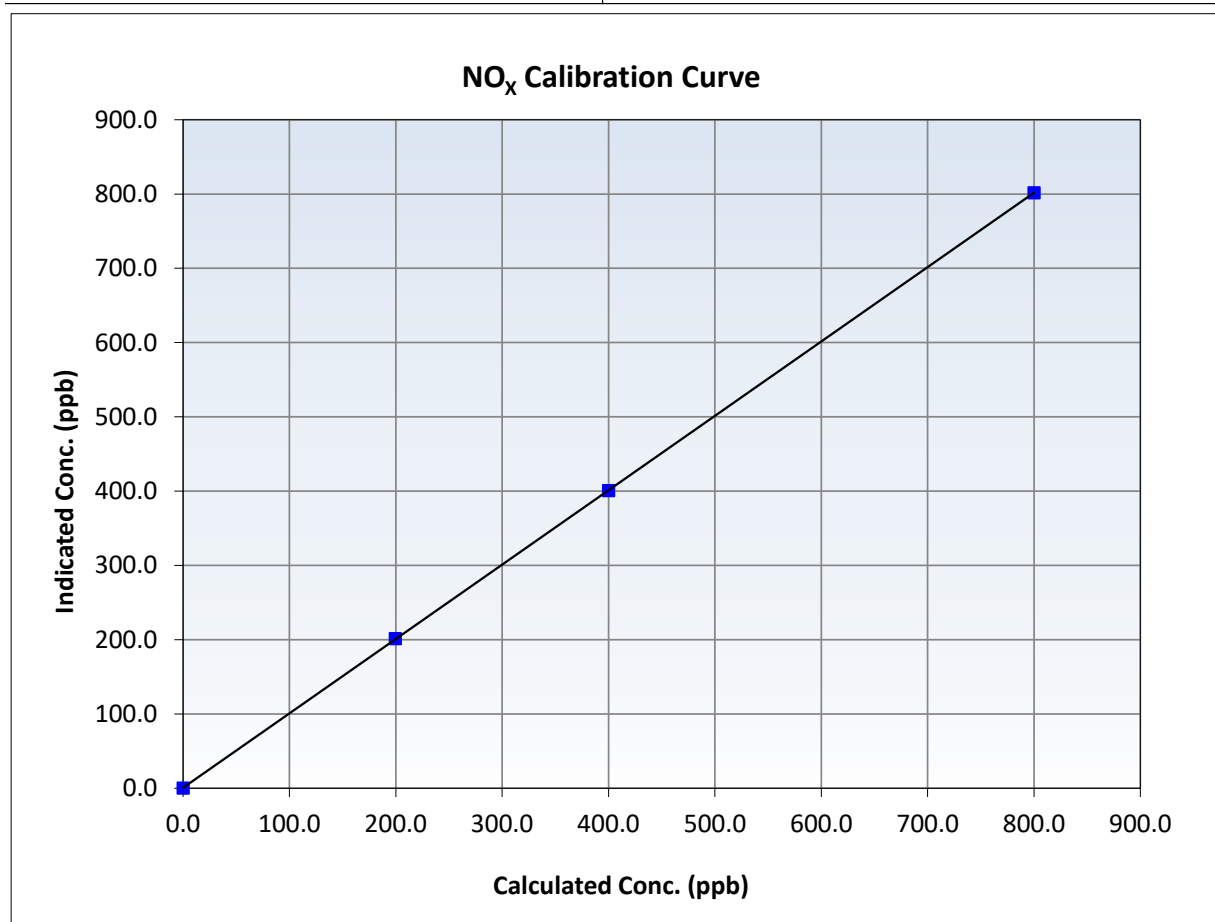
NO_x Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 22, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:56	End Time (MST):	14:29
Analyzer make:	API T200	Analyzer serial #:	721

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	0.999995	≥0.995
800.0	801.7	0.9979	Slope	1.001277	0.90 - 1.10
400.0	400.7	0.9983	Intercept	0.667599	+/-20
199.5	201.5	0.9901			





Wood Buffalo Environmental Association

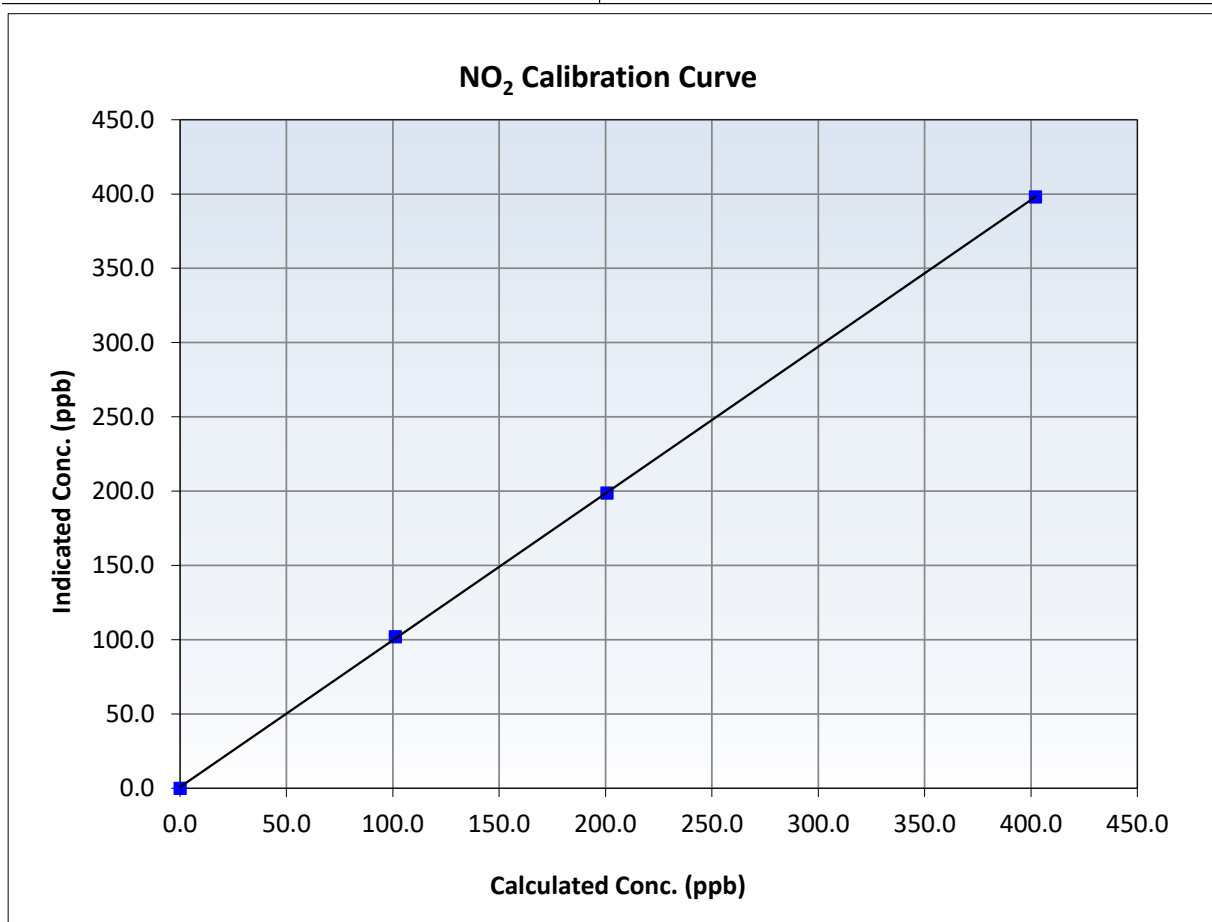
NO₂ Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 22, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:56	End Time (MST):	14:29
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999969	≥ 0.995
402.1	398.0	1.0104	Slope	0.988052	$0.90 - 1.10$
200.6	198.7	1.0097	Intercept	0.825493	± 20
101.1	102.1	0.9906			





Wood Buffalo Environmental Association

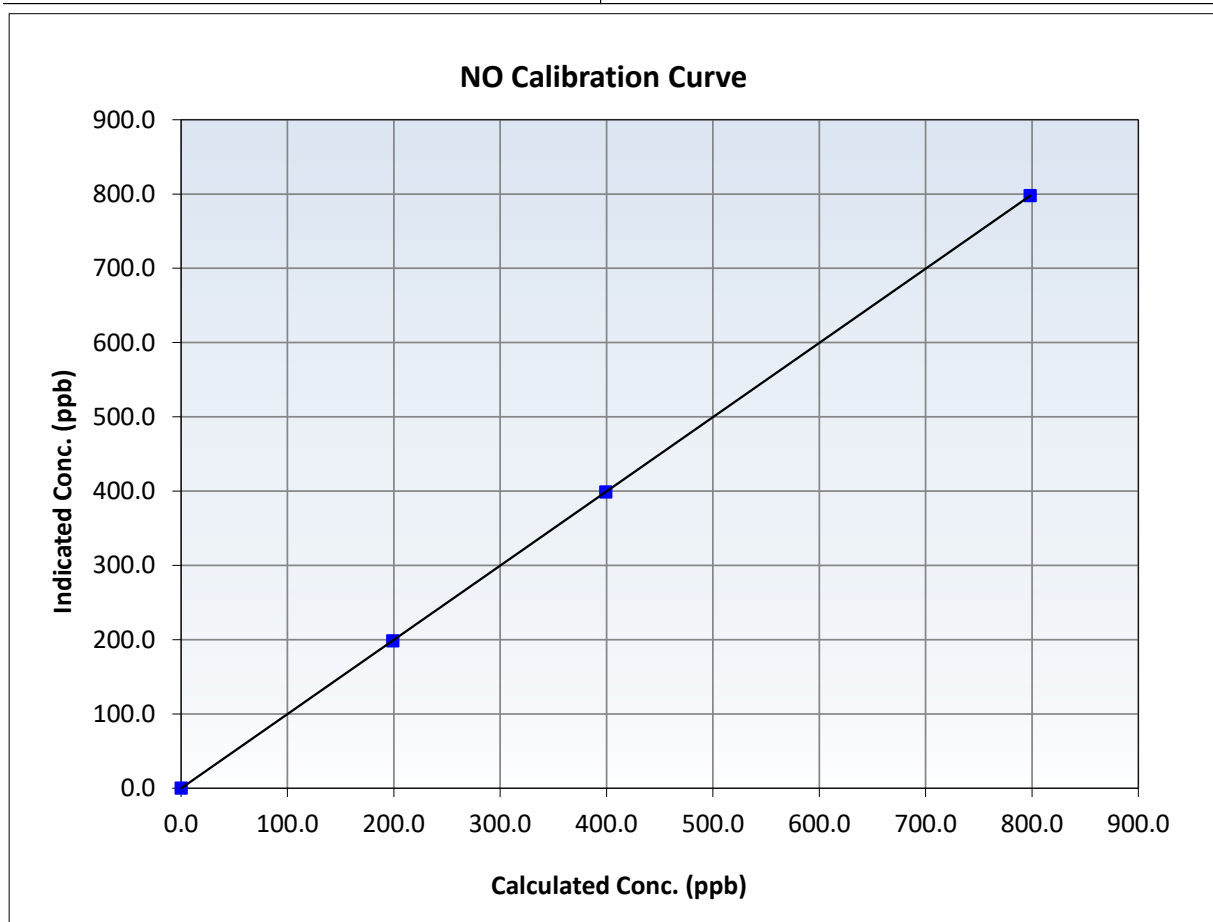
NO Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 22, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:56	End Time (MST):	14:29
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

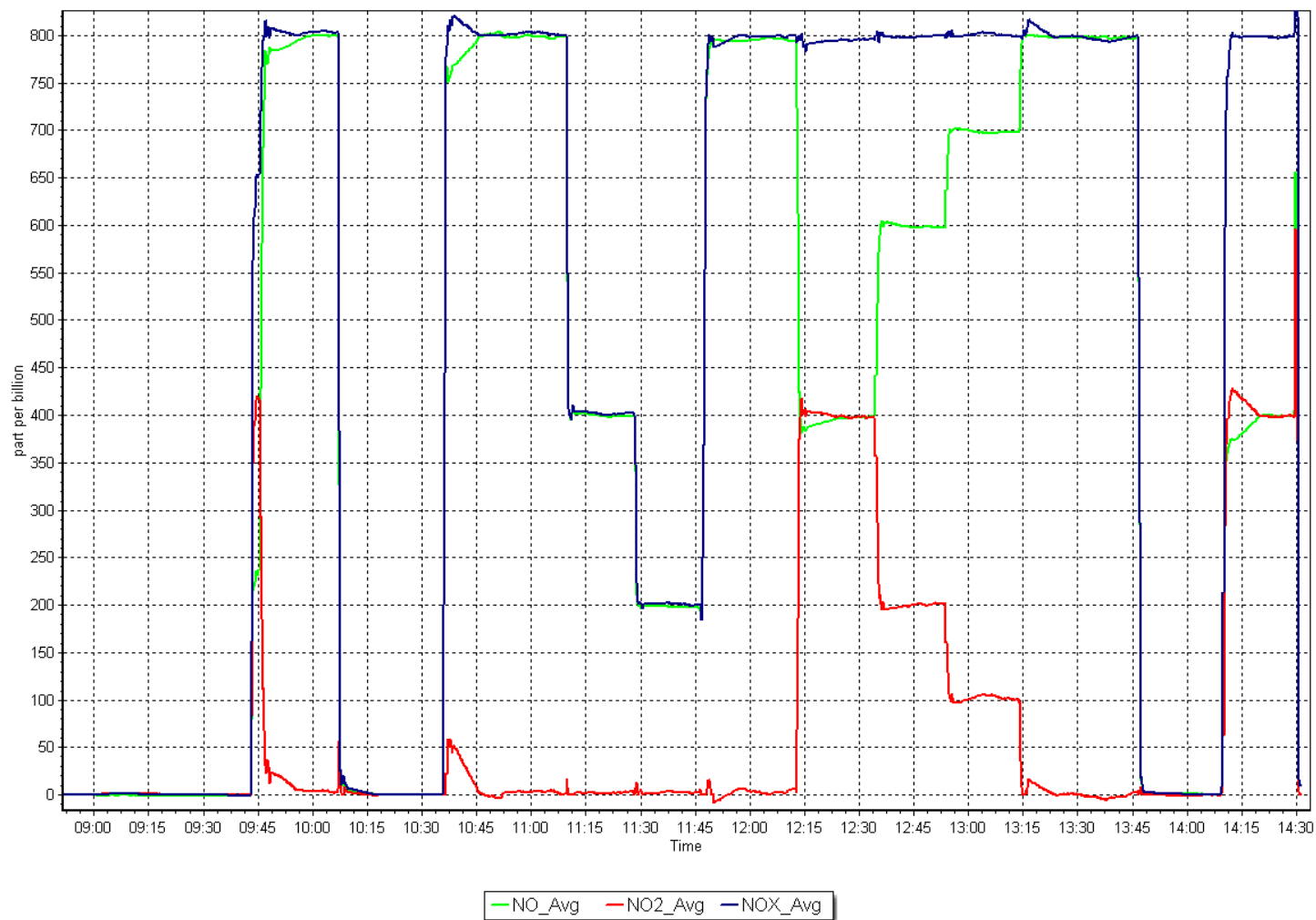
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999999	≥ 0.995
798.4	797.8	1.0008	Slope	0.999396	$0.90 - 1.10$
399.2	399.0	1.0005	Intercept	-0.133984	± 20
199.1	198.4	1.0035			



NO_x Calibration Plot

Date: September 26, 2024

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Buffalo Viewpoint
Calibration Date: September 10, 2024
Start time (MST): 9:07
Reason: Routine

Station number: AMS 04
Last Cal Date: August 19, 2024
End time (MST): 11:30

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: APIP T700
ZAG Make/Model: API T701

Serial Number: 3808
Serial Number: 362

Analyzer Information

Analyzer make: API T400
Analyzer Range: 0 - 500 ppb

Analyzer serial #: 2961

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004171	1.001057	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	0.120000	0.640000	Coeff or Slope:	1.020	1.020

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	5000	1000.2	400.0	399.0	1.003
As found Mid point					
As found Low point					
Baseline Corr As found:	398.9	Previous response	401.8	*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	5000	1001.6	400.0	400.6	0.999
Mid point	5000	826.0	200.0	201.7	0.992
Low point	5000	715.0	100.0	100.9	0.991
As left zero	5000	0.0	0.0	0.0	----
As left span	5000	1003.1	400.0	405.5	0.986
Average Correction Factor					0.994

Notes: No adjustments and maintenance done.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

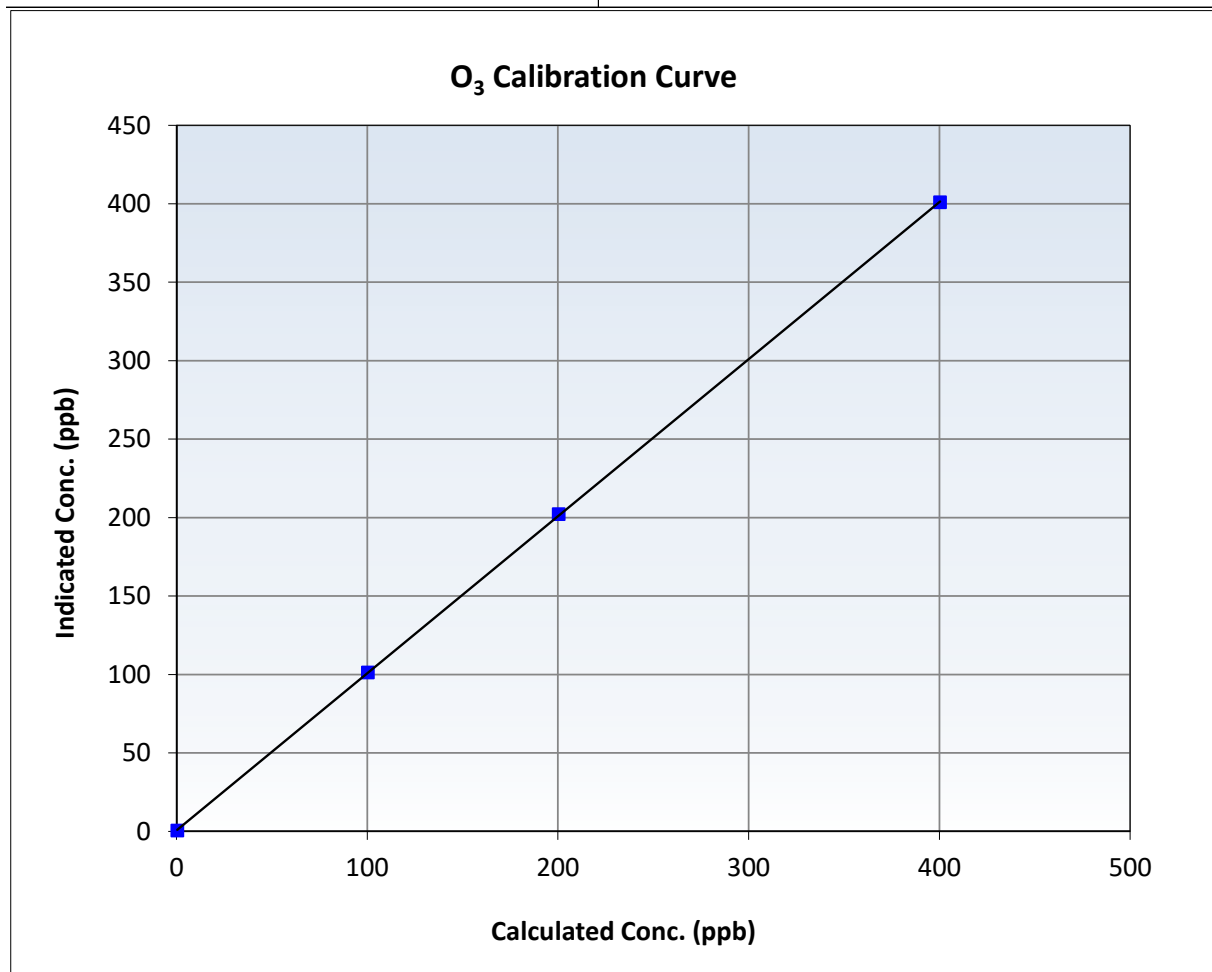
O₃ Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 19, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	9:07	End Time (MST):	11:30
Analyzer make:	API T400	Analyzer serial #:	2961

Calibration Data

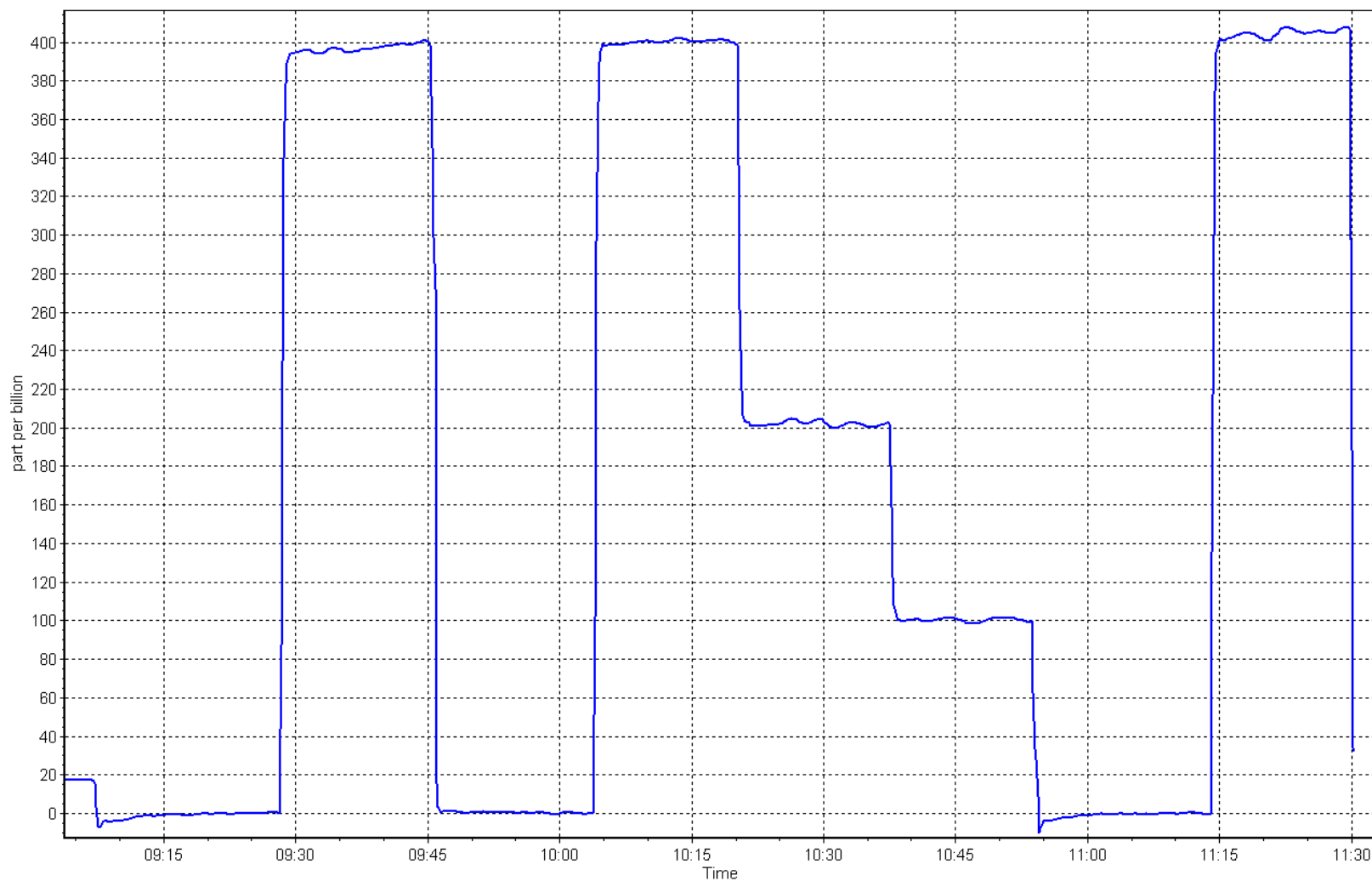
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999986	≥ 0.995
400.0	400.6	0.9985	Slope	1.001057	$0.90 - 1.10$
200.0	201.7	0.9916	Intercept	0.640000	± 5
100.0	100.9	0.9911			



O₃ Calibration Plot

Date: September 10, 2024

Location: Buffalo Viewpoint





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Buffalo Viewpoint Station number: AMS 04
Calibration Date: September 23, 2024 Last Cal Date: August 23, 2024
Start time (MST): 10:25 End time (MST): 12:35

Analyzer Make: API T640 S/N: 321
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388744
Temp/RH standard: Alicat FP-25BT S/N: 388744

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.0	14.8	14.0	☐	+/- 2 °C
P (mmHg)	723.0	725.3	723.0	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.07	5.00	☐	+/- 0.25 LPM
PW% (pump)	38	----	38	☐	>80%
Zero Verification	PM w/o HEPA: 40.1		PM w/ HEPA: 0.0		<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: 6-10-2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.7	11.1	11.1	☐	+/- 0.5

Date Optical Chamber Cleaned: September 23, 2024
Date Disposable Filter Changed: May 30, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: February 27, 2024
Date RH/T Sensor Cleaned: February 27, 2024

No adjustments done. Leak check passed, optics and RH chamber cleaned.

Notes:

Calibration by: Kelly Baragar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS05 MANNIX SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 4, 2024
Start time (MST): 8:50
Reason: Routine

Station number: AMS 05
Last Cal Date: August 2, 2024
End time (MST): 12:44

Calibration Standards

Cal Gas Concentration: 49.84 ppm
Cal Gas Cylinder #: CC408659
Removed Cal Gas Conc: 49.84 ppm
Removed Gas Cyl #: N/A
Calibrator Model: API T700
Zero Air Gen Model: API T701

Cal Gas Exp Date: January 6, 2030
Rem Gas Exp Date: N/A
Diff between cyl:
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 43i
Analyzer Range: 1000 ppb

Serial Number: 1008841399

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004355	1.006471	Backgd or Offset:	10.2	10.0
Calibration intercept:	-0.485683	-1.326424	Coeff or Slope:	0.932	0.926

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	4920	80.3	800.4	800.0	1.001
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	799.9	Previous response	803.4	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	80.3	800.4	805.0	0.994
Mid point	4960	40.1	399.7	400.2	0.999
Low point	4980	20.1	200.4	198.8	1.008
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	80.3	800.4	803.0	0.997
Average Correction Factor:					1.000

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

Calibration Performed By: Braiden Boutillier



Wood Buffalo Environmental Association

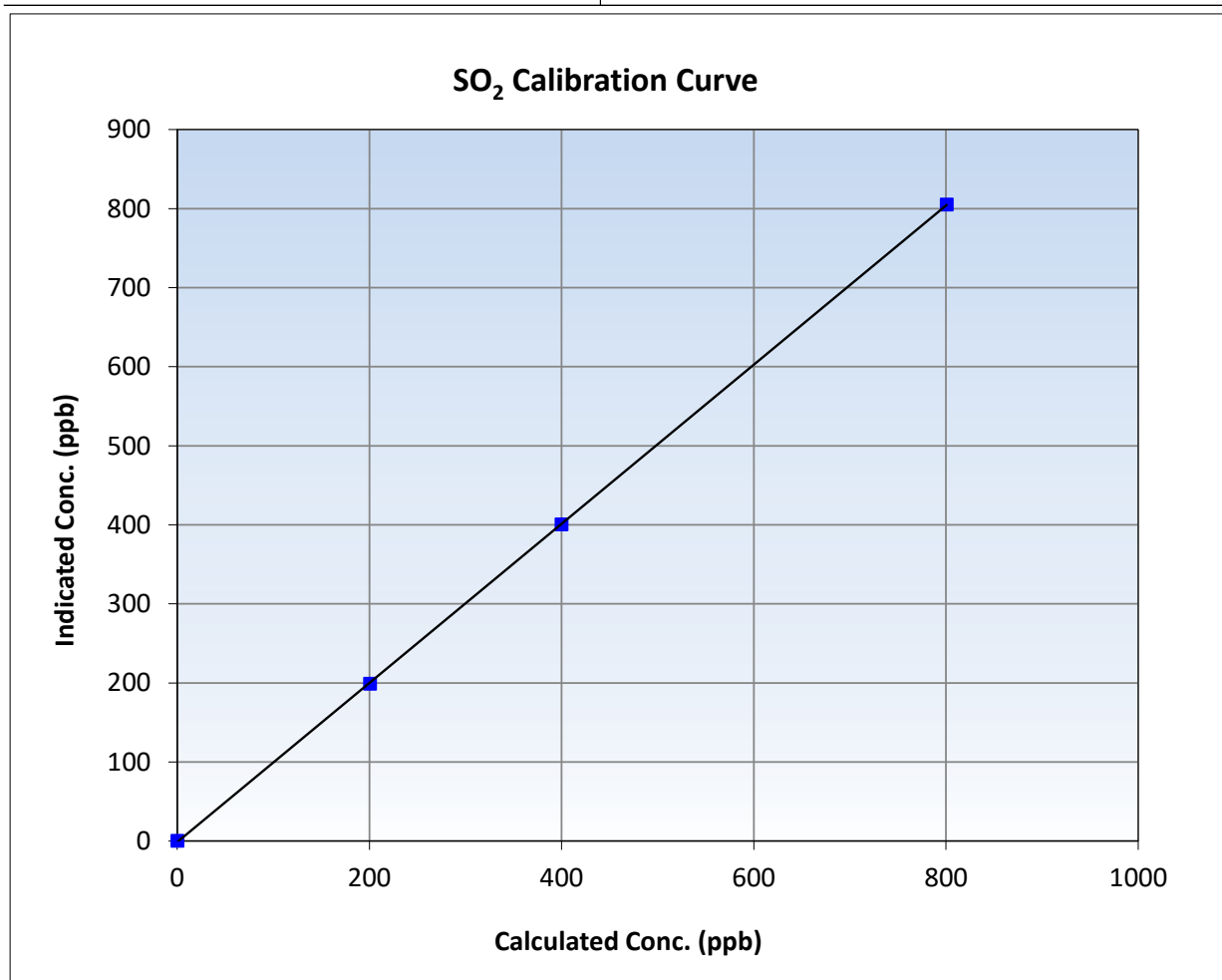
SO₂ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 2, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:50	End Time (MST):	12:44
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

Calibration Data

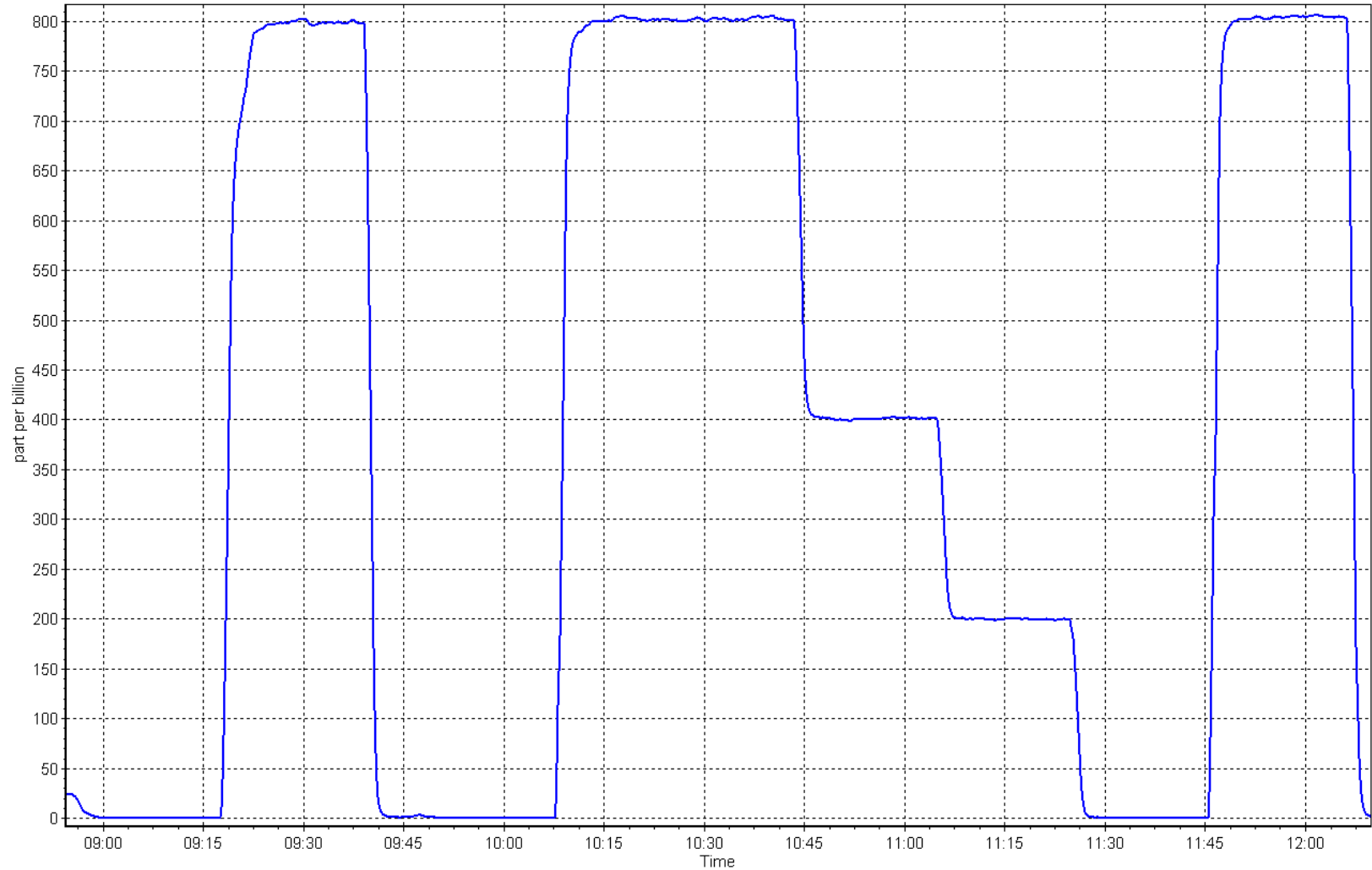
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999984	≥0.995
800.4	805.0	0.9943	Slope	1.006471	0.90 - 1.10
399.7	400.2	0.9988	Intercept	-1.326424	+/-30
200.4	198.8	1.0078			



SO2 Calibration Plot

Date: September 4, 2024

Location: Mannix





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 6, 2024
Start time (MST): 10:05
Reason: Routine

Station number: AMS 05
Last Cal Date: August 7, 2024
End time (MST): 15:05

Calibration Standards

Cal Gas Concentration: 4.96 ppm
Cal Gas Cylinder #: DT0037363
Removed Cal Gas Conc: 4.96 ppm
Removed Gas Cyl #: N/A
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Cal Gas Exp Date: November 15, 2026
Rem Gas Exp Date: N/A
Diff between cyl:
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 43iQ
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1200326169
Converter serial #: 2022-225
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001546	0.989394	Backgd or Offset:	1.22	1.22
Calibration intercept:	-0.097704	0.002555	Coeff or Slope:	1.009	1.009

H₂S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4919	80.6	80.0	79.9	1.000
As found Mid point	4960	40.3	40.0	39.6	1.007
As found Low point	4980	20.2	20.0	19.8	1.007
New cylinder response					
Baseline Corr As found:	80.0	Prev response:	79.99	*% change:	0.0%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	1.000691	AF Intercept:	-0.217767
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999983	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4919	80.6	80.0	79.0	1.012
Mid point	4960	40.3	40.0	39.9	1.002
Low point	4980	20.2	20.0	19.6	1.022
As left zero	5000	0.0	0.0	0.0	----
As left span	4919	80.6	80.0	79.6	1.005
SO2 Scrubber Check	4920	80.3	803.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.012
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

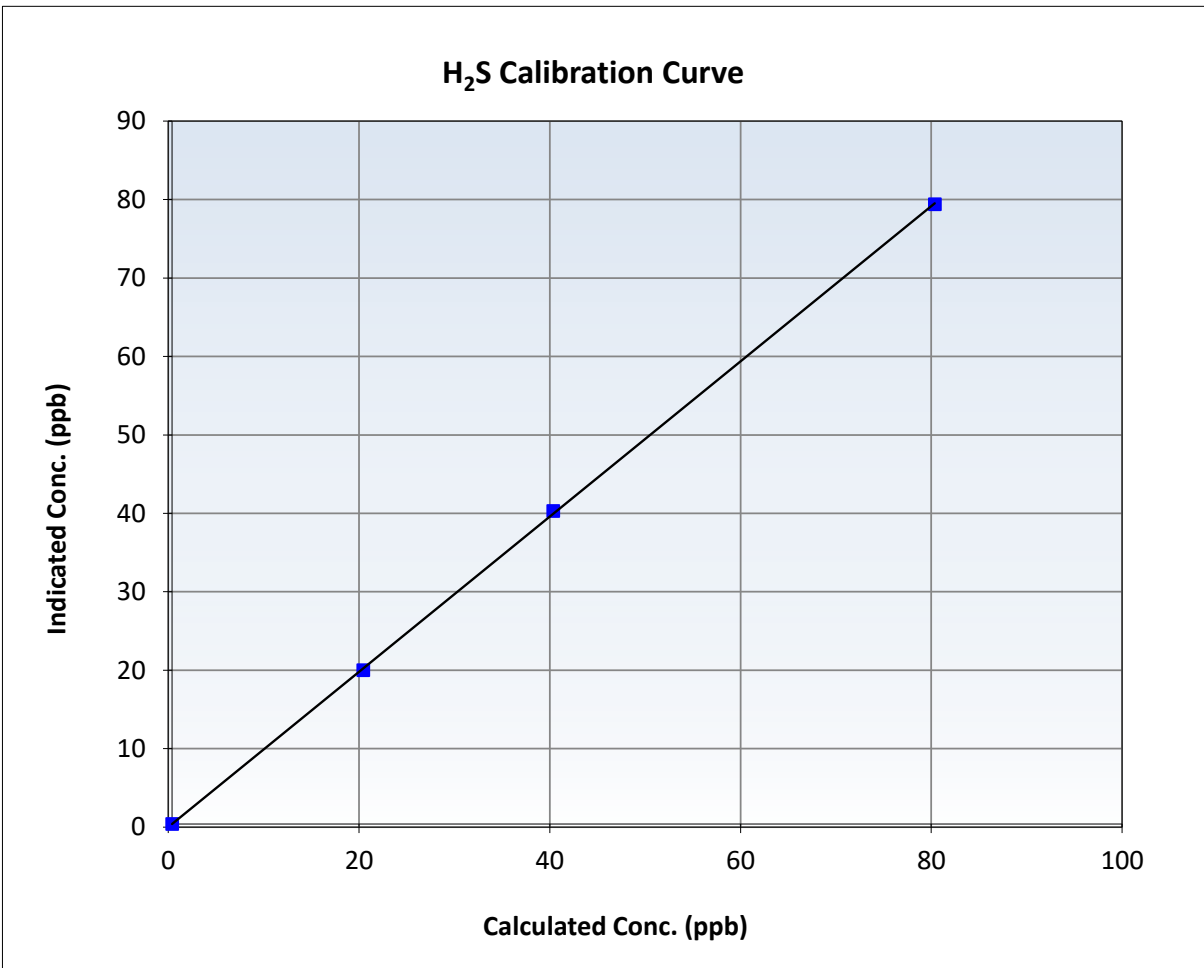
H₂S Calibration Summary

Station Information

Calibration Date:	September 6, 2024	Previous Calibration:	August 7, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	10:05	End Time (MST):	15:05
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1200326169

Calibration Data

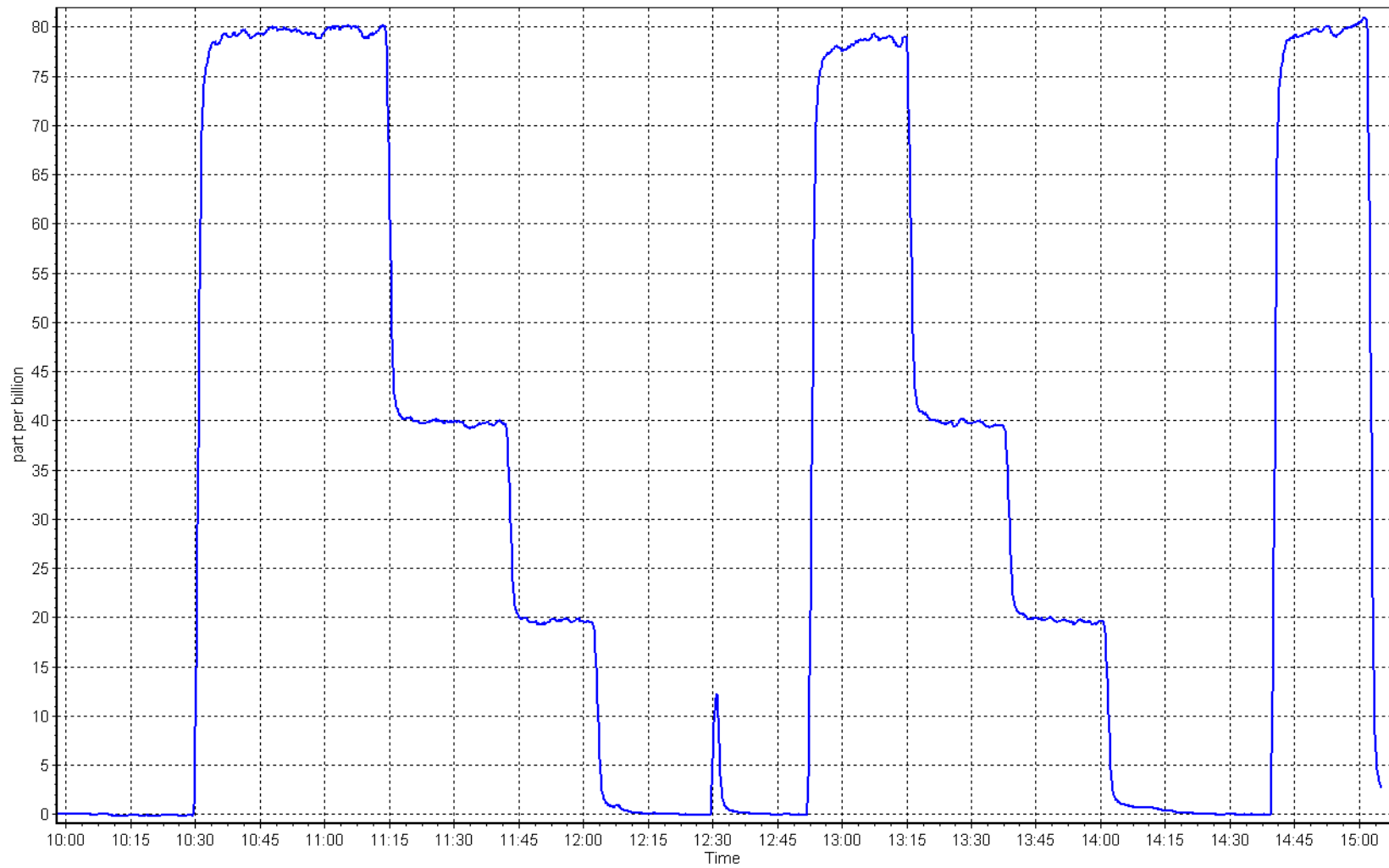
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999946	≥ 0.995
80.0	79.0	1.0122	Slope	0.989394	$0.90 - 1.10$
40.0	39.9	1.0019	Intercept	0.002555	± 3
20.0	19.6	1.0223			



H₂S Calibration Plot

Date: September 6, 2024

Location: Mannix





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 4, 2024
Start time (MST): 8:50
Reason: Routine

Station number: AMS 05
Last Cal Date: August 2, 2024
End time (MST): 12:44

Calibration Standards

Gas Cert Reference: CC408659
CH₄ Cal Gas Conc. 507.2 ppm
C₃H₈ Cal Gas Conc. 200.2 ppm
Removed Gas Cert: N/A
Removed CH₄ Conc. 507.2 ppm
Removed C₃H₈ Conc. 200.2 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 6, 2030
CH₄ Equiv Conc. 1057.8 ppm
Removed Gas Expiry: N/A
CH₄ Equiv Conc. 1057.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1170050130
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.01E-04	3.18E-04	NMHC SP Ratio:	5.64E-05	4.67E-05
CH ₄ Retention time:	15.2	15.6	NMHC Peak Area:	156832	189102
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.01	----
As found High point	4920	80.3	16.99	16.08	1.057
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.07	Prev response	17.01	*% change	-5.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	16.99	1.000
Mid point	4960	40.1	8.48	8.48	1.000
Low point	4980	20.1	4.25	4.19	1.014
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	16.99	16.97	1.001
Average Correction Factor					1.005

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.84	8.63	1.024
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.63	Prev response	8.85	*% change	-2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	8.84	8.84	1.000
Mid point	4960	40.1	4.42	4.41	1.001
Low point	4980	20.1	2.21	2.17	1.019
As left zero	5000	0.0	0.00	0.00	1.001
As left span	4920	80.3	8.84	8.83	1.007
Average Correction Factor					1.007

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.01	Limit = 0.90-1.10
As found High point	4920	80.3	8.15	7.45	1.096
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.43	Prev response	8.16	*% change	-9.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	8.15	8.15	0.999
Mid point	4960	40.1	4.07	4.06	1.001
Low point	4980	20.1	2.04	2.02	1.008
As left zero	5000	0.0	0.00	0.00	1.001
As left span	4920	80.3	8.15	8.14	1.003
Average Correction Factor					1.003

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.002631	1.001365
THC Cal Offset:	-0.016927	-0.024521
CH ₄ Cal Slope:	1.002676	1.001273
CH ₄ Cal Offset:	-0.003461	-0.008463
NMHC Cal Slope:	1.002810	1.001387
NMHC Cal Offset:	-0.014067	-0.017061

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

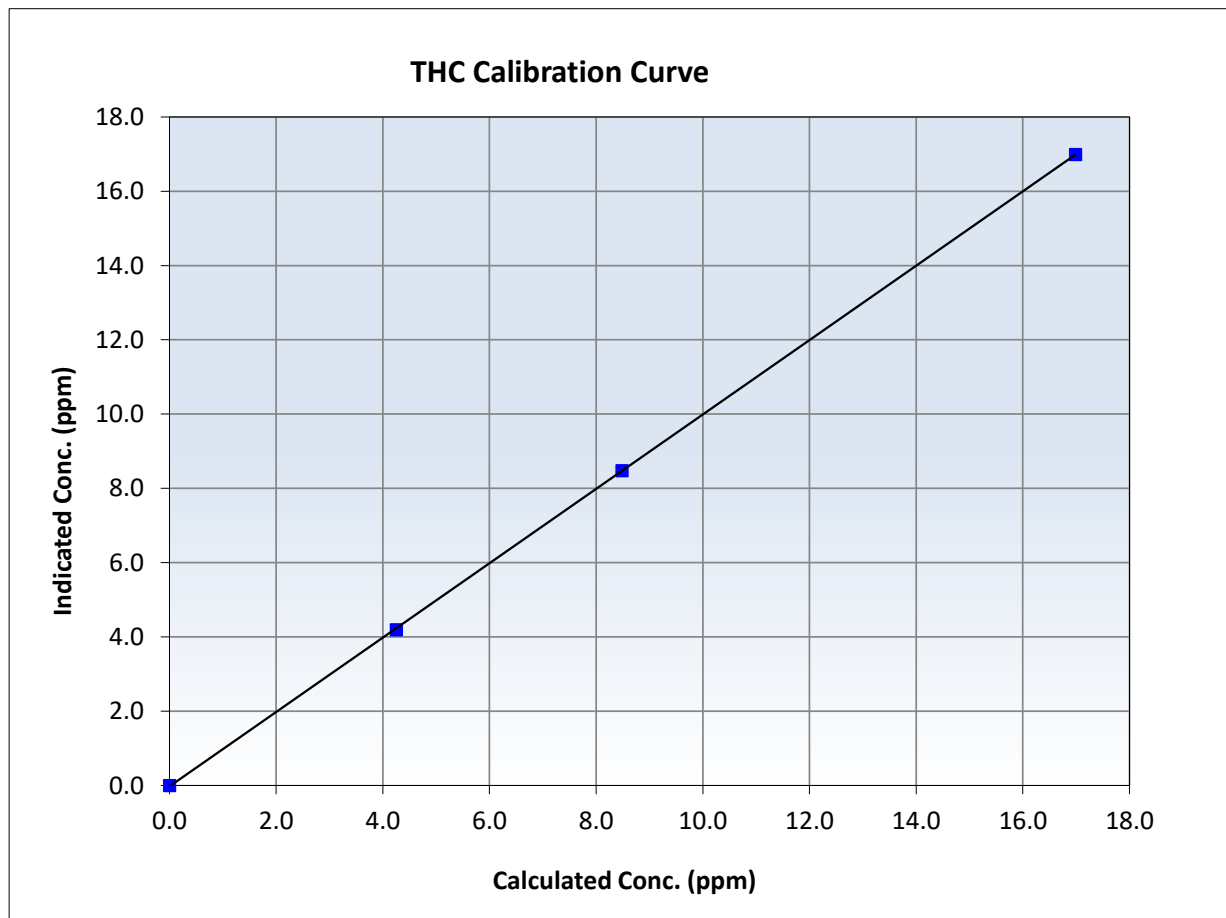
THC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 2, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:50	End Time (MST):	12:44
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999986	<i>≥0.995</i>
16.99	16.99	0.9998	Slope	1.001365	<i>0.90 - 1.10</i>
8.48	8.48	1.0004	Intercept	-0.024521	<i>+/-0.5</i>
4.25	4.19	1.0138			





Wood Buffalo Environmental Association

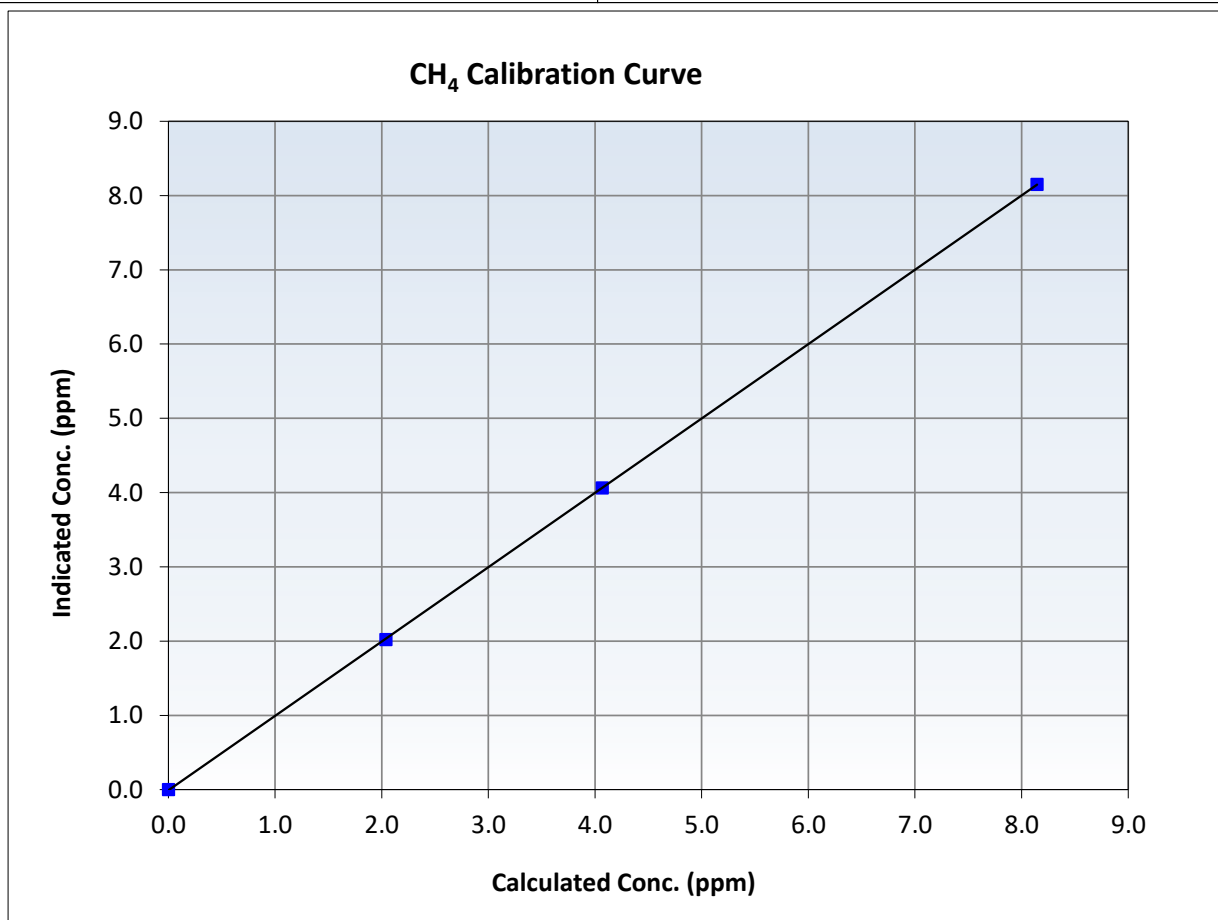
CH₄ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 2, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:50	End Time (MST):	12:44
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999994	<i>≥0.995</i>
8.15	8.15	0.9994	Slope	1.001273	<i>0.90 - 1.10</i>
4.07	4.06	1.0009	Intercept	-0.008463	<i>+/-0.5</i>
2.04	2.02	1.0084			





Wood Buffalo Environmental Association

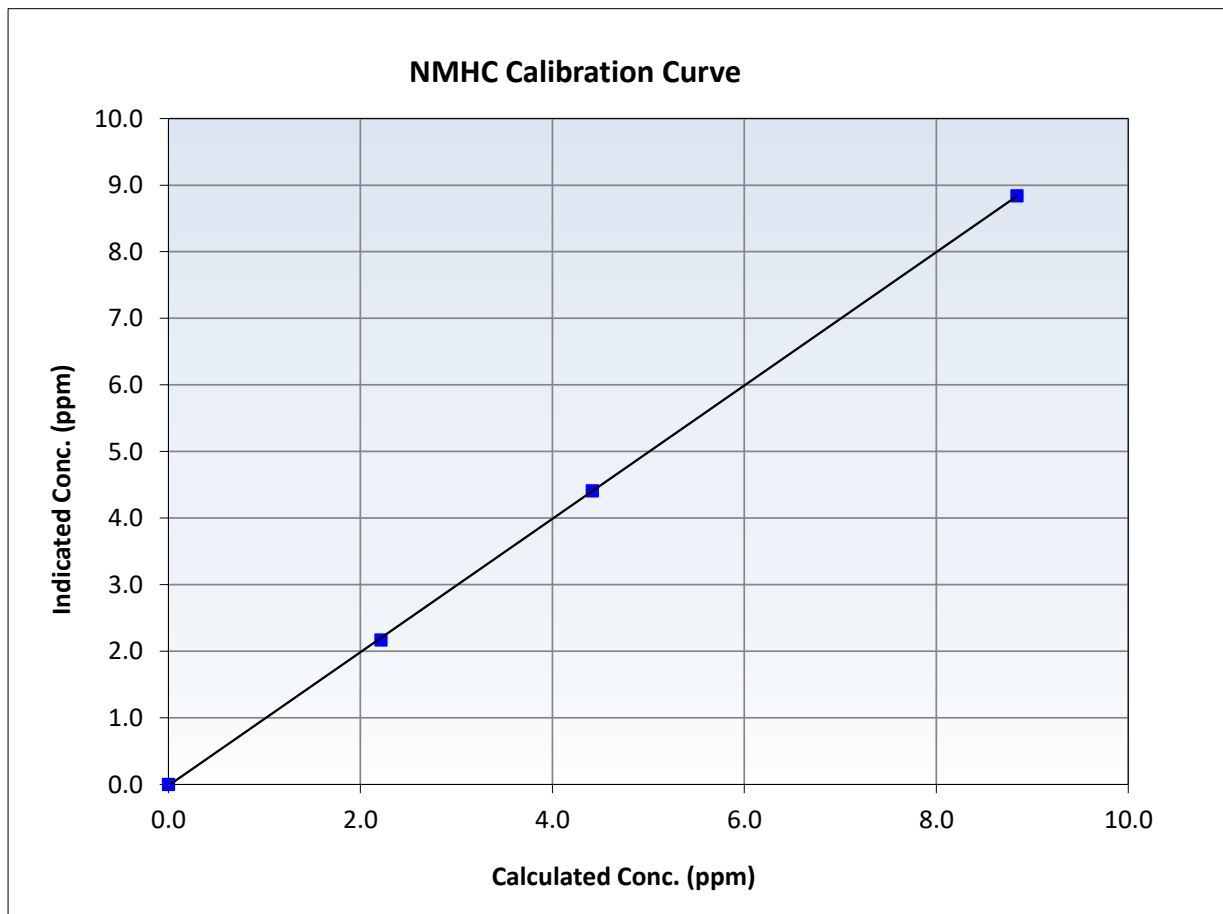
NMHC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 2, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:50	End Time (MST):	12:44
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

Calibration Data

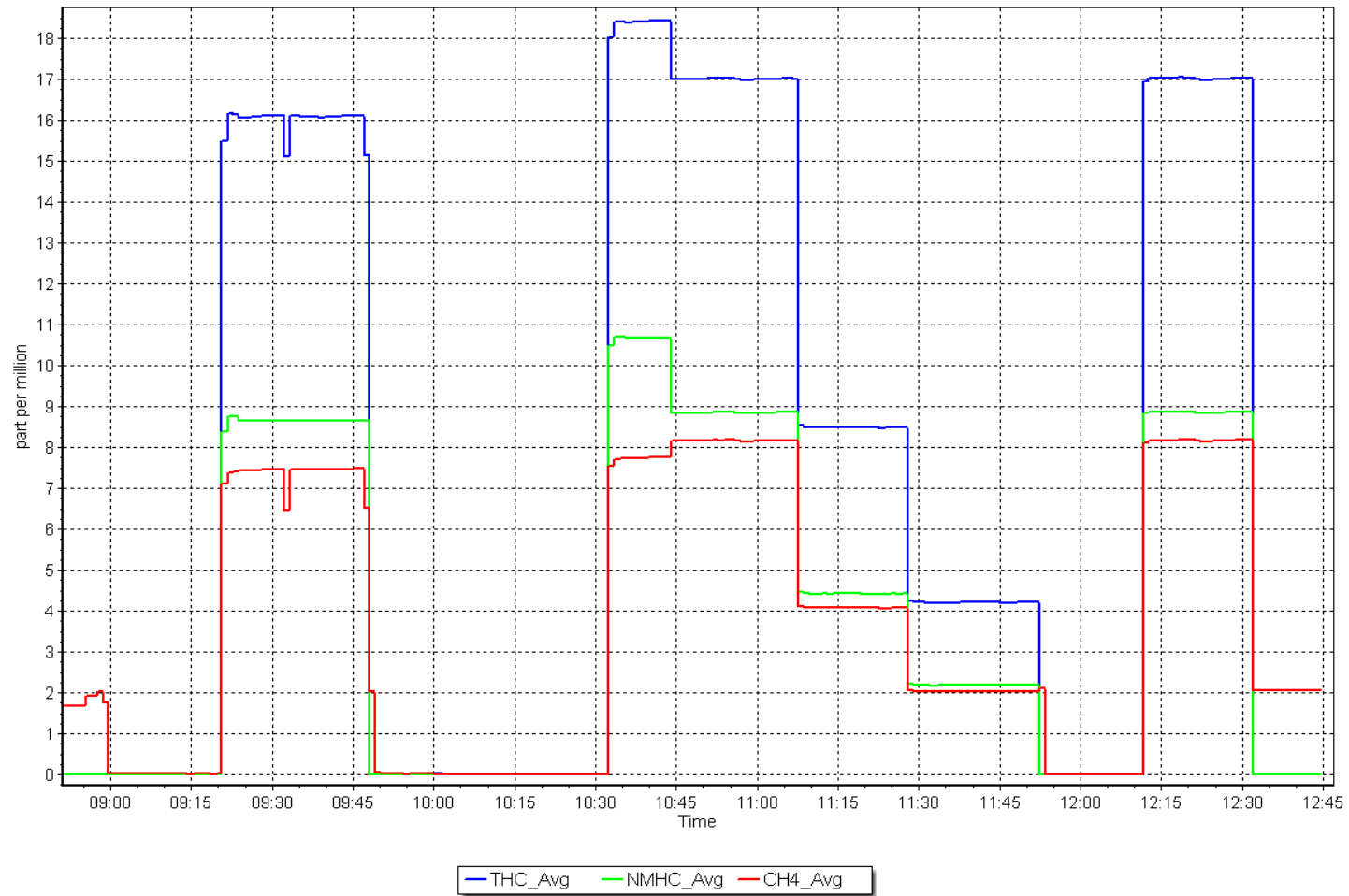
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999975	<i>≥0.995</i>
8.84	8.84	1.0001	Slope	1.001387	<i>0.90 - 1.10</i>
4.42	4.41	1.0010	Intercept	-0.017061	<i>+/-0.5</i>
2.21	2.17	1.0190			



NMHC Calibration Plot

Date: September 4, 2024

Location: Mannix





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 11, 2024
Start time (MST): 8:43
Reason: Removal

Station number: AMS 05
Last Cal Date: September 4, 2024
End time (MST): 10:10

Calibration Standards

Gas Cert Reference: CC408659
CH₄ Cal Gas Conc. 507.2 ppm
C₃H₈ Cal Gas Conc. 200.2 ppm
Removed Gas Cert: N/A
Removed CH₄ Conc. 507.2 ppm
Removed C₃H₈ Conc. 200.2 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 6, 2030
CH₄ Equiv Conc. 1057.8 ppm
Removed Gas Expiry: N/A
CH₄ Equiv Conc. 1057.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1170050130
NMHC/CH₄ Range: 0 - 10 ppm

Start
CH₄ SP Ratio: 3.01E-04
CH₄ Retention time: 15.2
Zero Chromatogram: ON

Finish

Start
NMHC SP Ratio: 5.64E-05
NMHC Peak Area: 156832
Flat Baseline: OFF

Finish

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	16.99	16.38	1.037
As found Mid point	4960	40.1	8.48	8.35	1.016
As found Low point	4980	20.1	4.25	4.14	1.027
New cylinder response					
Baseline Corr AF:	16.38	Prev response	16.99	*% change	-3.7%
Baseline Corr 2nd AF:	8.35	AF Slope:	0.964456	AF Intercept:	0.049728
Baseline Corr 3rd AF:	4.14	AF Correlation:	0.999868	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes:

Removal calibration due to dips.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.84	8.78	1.007
As found Mid point	4960	40.1	4.42	4.39	1.007
As found Low point	4980	20.1	2.21	2.16	1.023
New cylinder response					
Baseline Corr AF:	8.78	Prev response	8.84	*% change	-0.6%
Baseline Corr 2nd AF:	4.39	AF Slope:	0.994884	AF Intercept:	-0.014661
Baseline Corr 3rd AF:	2.16	AF Correlation:	0.999980	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.15	7.59	1.073
As found Mid point	4960	40.1	4.07	3.96	1.026
As found Low point	4980	20.1	2.04	1.98	1.032
New cylinder response					
Baseline Corr AF:	7.59	Prev response	8.15	*% change	-7.3%
Baseline Corr 2nd AF:	3.96	AF Slope:	0.931316	AF Intercept:	0.064790
Baseline Corr 3rd AF:	1.98	AF Correlation:	0.999362	* = > +/-5% change initiates investigation	

CH₄ 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
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Calibration Statistics

	<u>Start</u>	
THC Cal Slope:	1.001365	
THC Cal Offset:	-0.024521	
CH ₄ Cal Slope:	1.001273	
CH ₄ Cal Offset:	-0.008463	
NMHC Cal Slope:	1.001387	
NMHC Cal Offset:	-0.017061	

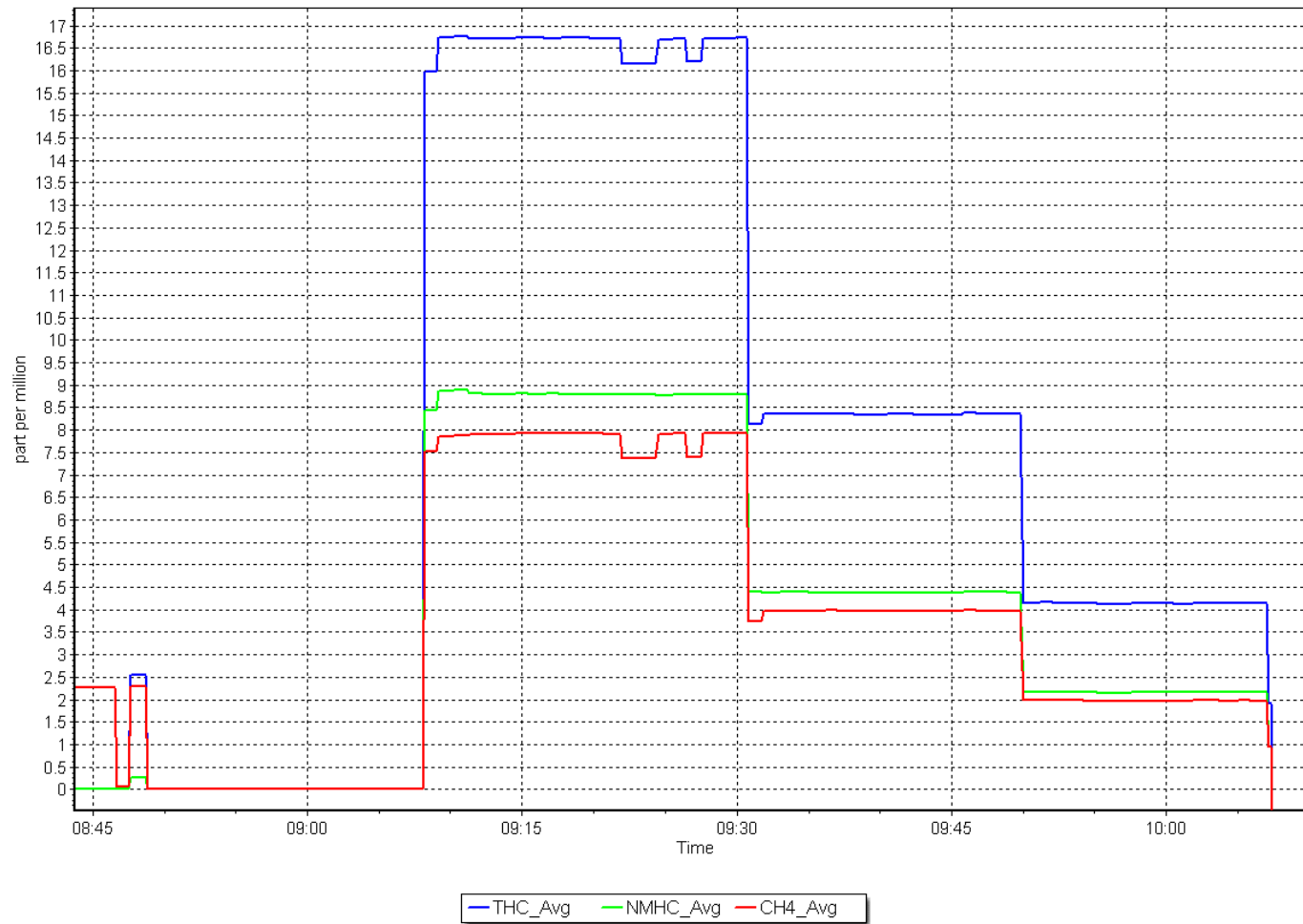
Finish

Calibration Performed By: Sean Bala

NMHC Calibration Plot

Date: September 11, 2024

Location: Mannix





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 11, 2024
Start time (MST): 10:17
Reason: Install

Station number: AMS 05
Last Cal Date: September 4, 2024
End time (MST): 12:54

Calibration Standards

Gas Cert Reference: CC408659
CH₄ Cal Gas Conc. 507.2 ppm
C₃H₈ Cal Gas Conc. 200.2 ppm
Removed Gas Cert: N/A
Removed CH₄ Conc. 507.2 ppm
Removed C₃H₈ Conc. 200.2 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 6, 2030
CH₄ Equiv Conc. 1057.8 ppm
Removed Gas Expiry: N/A
CH₄ Equiv Conc. 1057.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1172750023
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:		3.25E-04	NMHC SP Ratio:	5.40E-05
CH ₄ Retention time:		15.5	NMHC Peak Area:	163844
Zero Chromatogram:		ON	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	17.01	0.999
Mid point	4960	40.1	8.48	8.52	0.996
Low point	4980	20.1	4.25	4.26	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	16.99	16.99	1.000
Average Correction Factor					0.998

Notes: Install calibration. Do zero chromatogram and use zero chromatogram.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.84	8.84	1.000
Mid point	4960	40.1	4.42	4.44	0.994
Low point	4980	20.1	2.21	2.23	0.992
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.84	8.83	1.002
Average Correction Factor					0.995

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ 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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.15	8.16	0.998
Mid point	4960	40.1	4.07	4.07	0.999
Low point	4980	20.1	2.04	2.03	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.15	8.16	0.998
Average Correction Factor					1.000

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:		1.001218
THC Cal Offset:		0.006072
CH ₄ Cal Slope:		1.002662
CH ₄ Cal Offset:		-0.005663
NMHC Cal Slope:		0.999901
NMHC Cal Offset:		0.011936

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

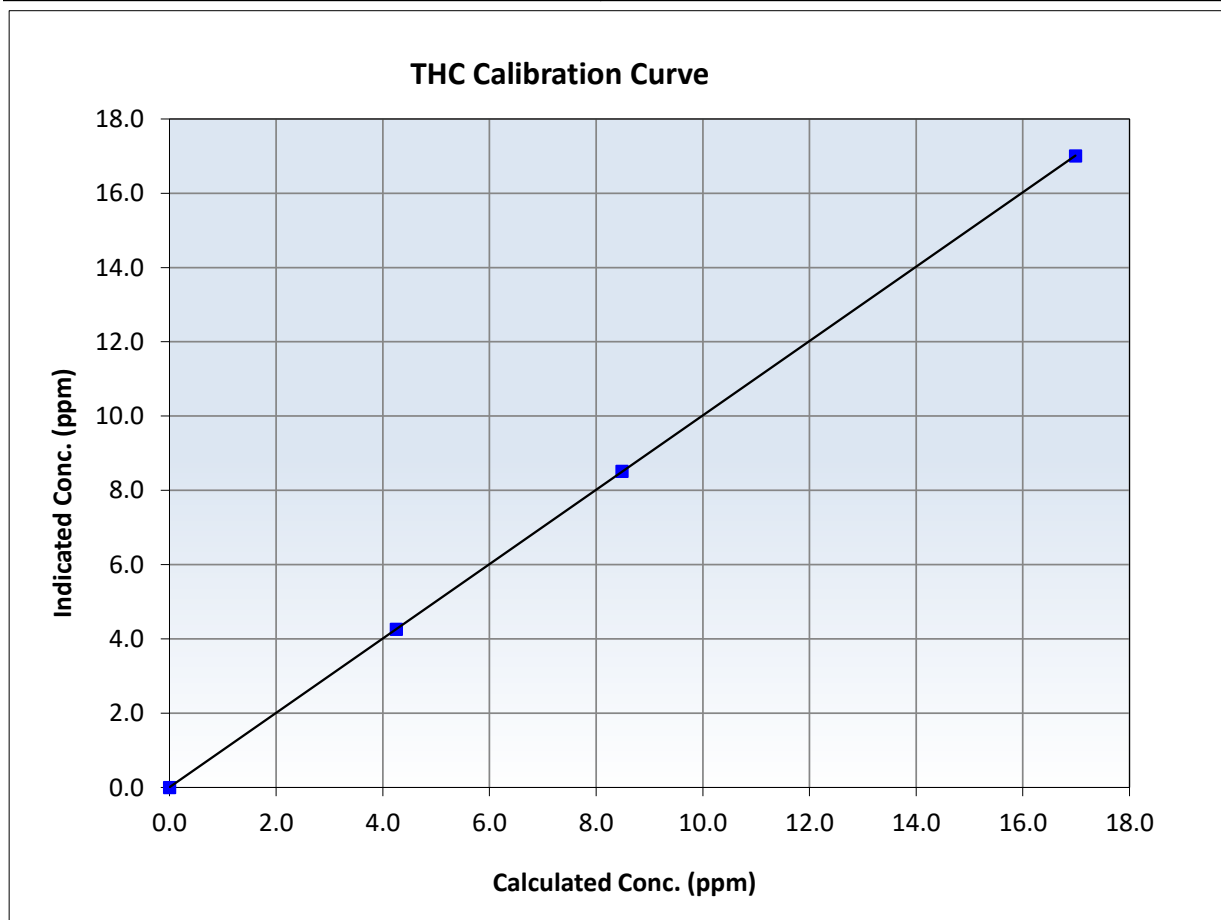
THC Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	September 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	10:17	End Time (MST):	12:54
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999998	≥ 0.995
16.99	17.01	0.9989	Slope	1.001218	$0.90 - 1.10$
8.48	8.52	0.9962	Intercept	0.006072	± 0.5
4.25	4.26	0.9979			





Wood Buffalo Environmental Association

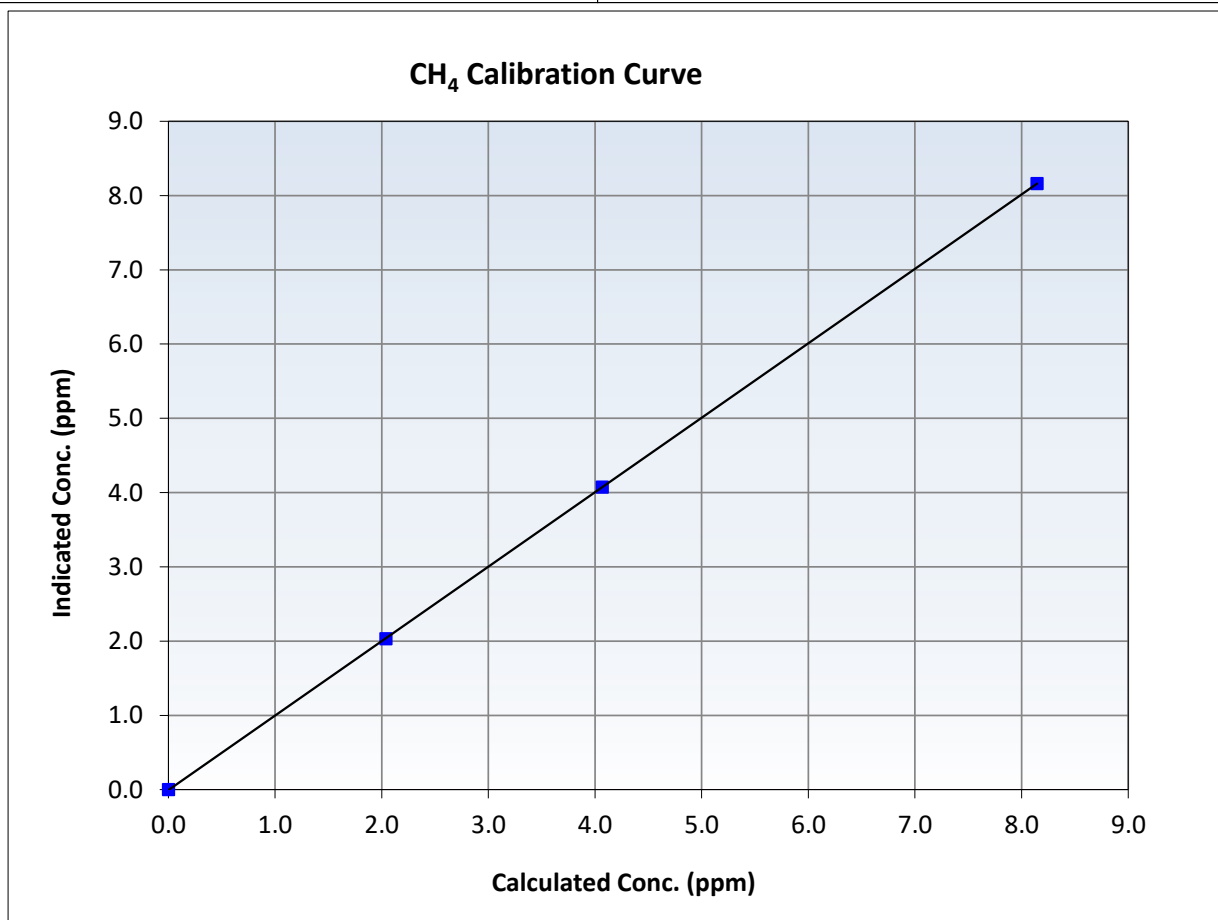
CH₄ Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	September 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	10:17	End Time (MST):	12:54
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999997	≥ 0.995
8.15	8.16	0.9978	Slope	1.002662	0.90 - 1.10
4.07	4.07	0.9987	Intercept	-0.005663	± 0.5
2.04	2.03	1.0039			





Wood Buffalo Environmental Association

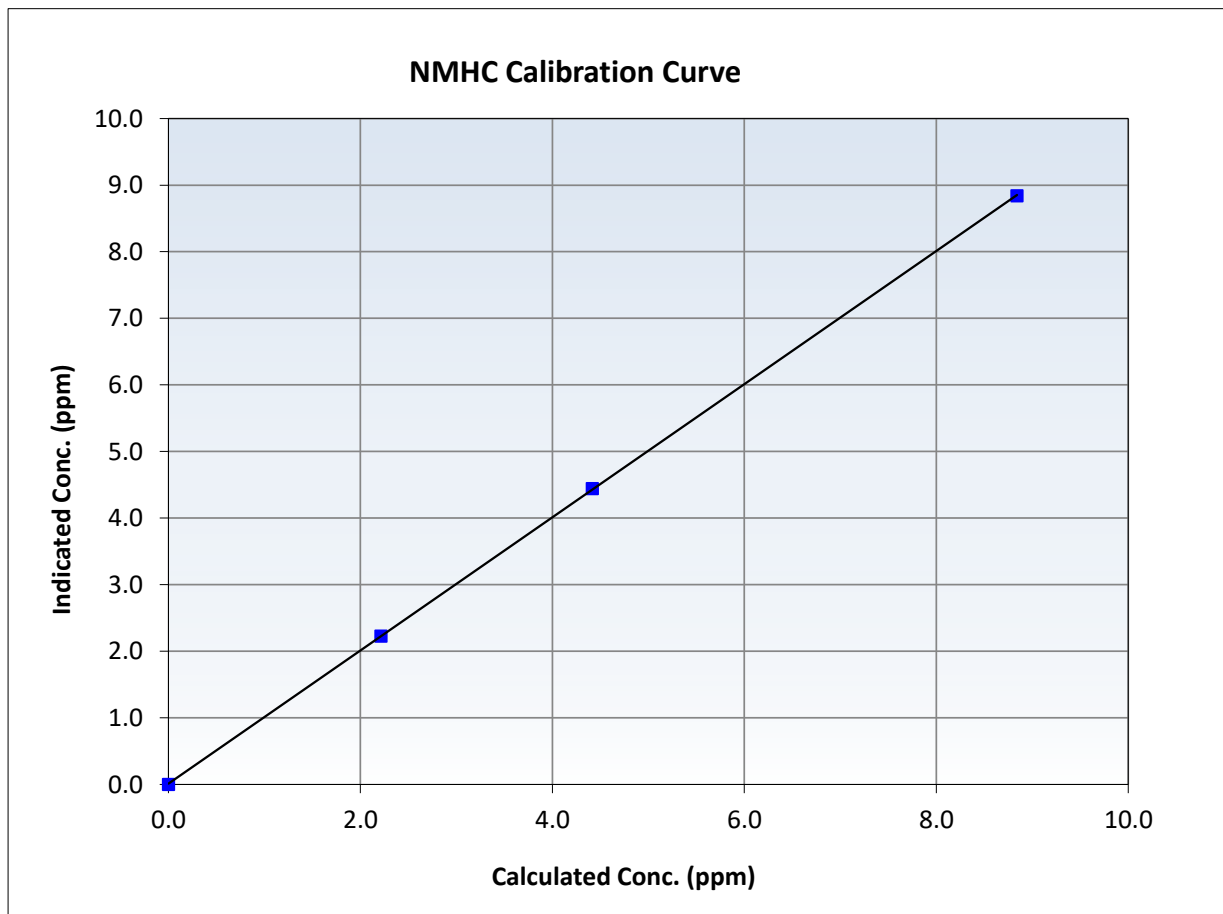
NMHC Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	September 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	10:17	End Time (MST):	12:54
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

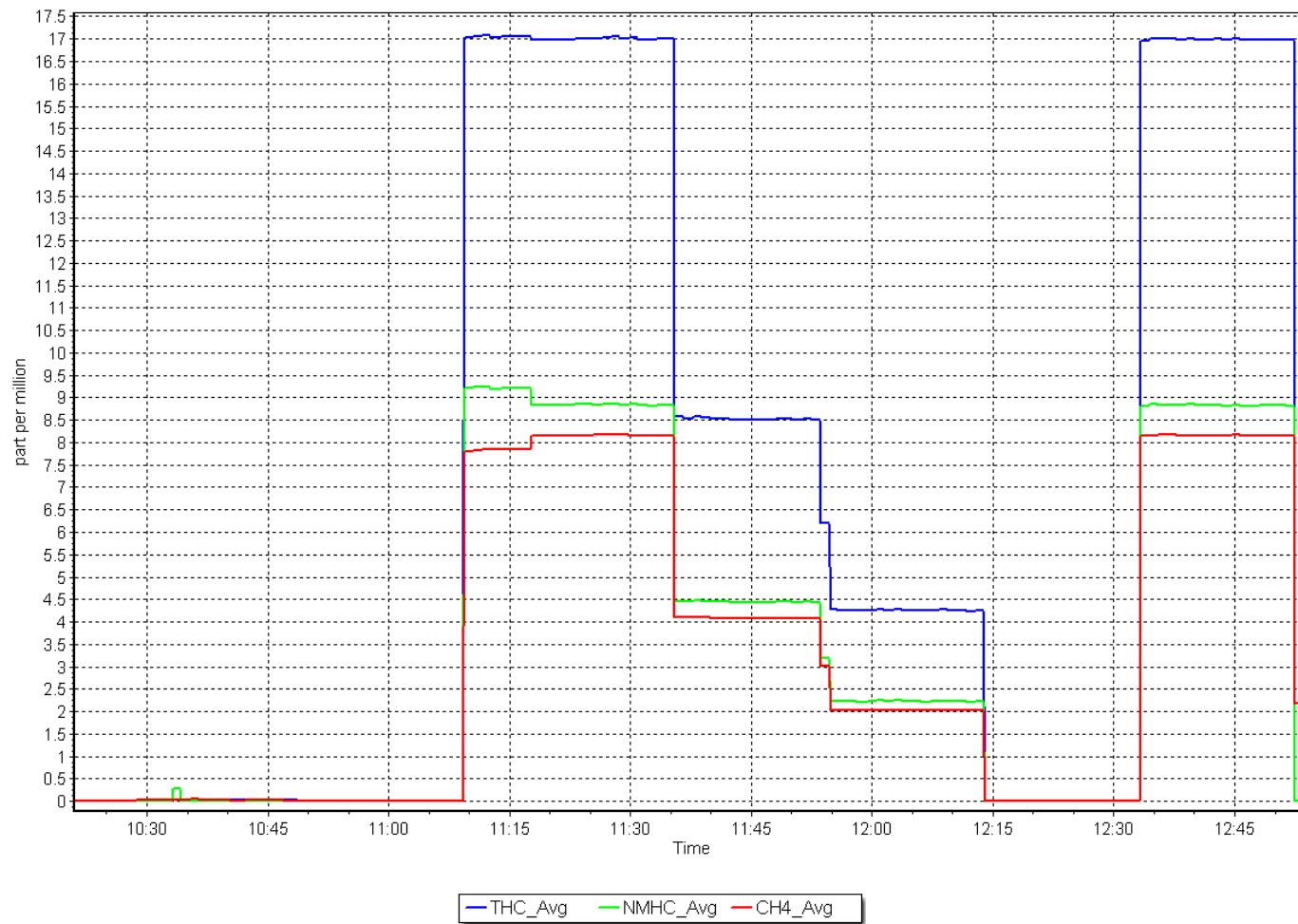
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999988	≥ 0.995
8.84	8.84	0.9998	Slope	0.999901	$0.90 - 1.10$
4.42	4.44	0.9938	Intercept	0.011936	± 0.5
2.21	2.23	0.9925			



NMHC Calibration Plot

Date: September 11, 2024

Location: Mannix





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 13, 2024
Start time (MST): 9:12
Reason: Cylinder Change

Station number: AMS 05
Last Cal Date: September 11, 2024
End time (MST): 12:06

Calibration Standards

Gas Cert Reference: CC408659
CH₄ Cal Gas Conc. 507.2 ppm
C₃H₈ Cal Gas Conc. 200.2 ppm
Removed Gas Cert: N/A
Removed CH₄ Conc. 507.2 ppm
Removed C₃H₈ Conc. 200.2 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 6, 2030
CH₄ Equiv Conc. 1057.8 ppm
Removed Gas Expiry: N/A
CH₄ Equiv Conc. 1057.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1172750023
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.25E-04	NA	NMHC SP Ratio:	5.40E-05	NA
CH ₄ Retention time:	15.5	NA	NMHC Peak Area:	163844	NA
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	16.99	16.89	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.89	Prev response	17.01	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	16.85	1.008
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 1.008

Notes:

Swapped N2 cylinder.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.84	8.77	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.77	Prev response	8.85	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.84	8.74	1.011
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 1.011

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.15	8.12	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.12	Prev response	8.16	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.15	8.10	1.005
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 1.005

Calibration Statistics

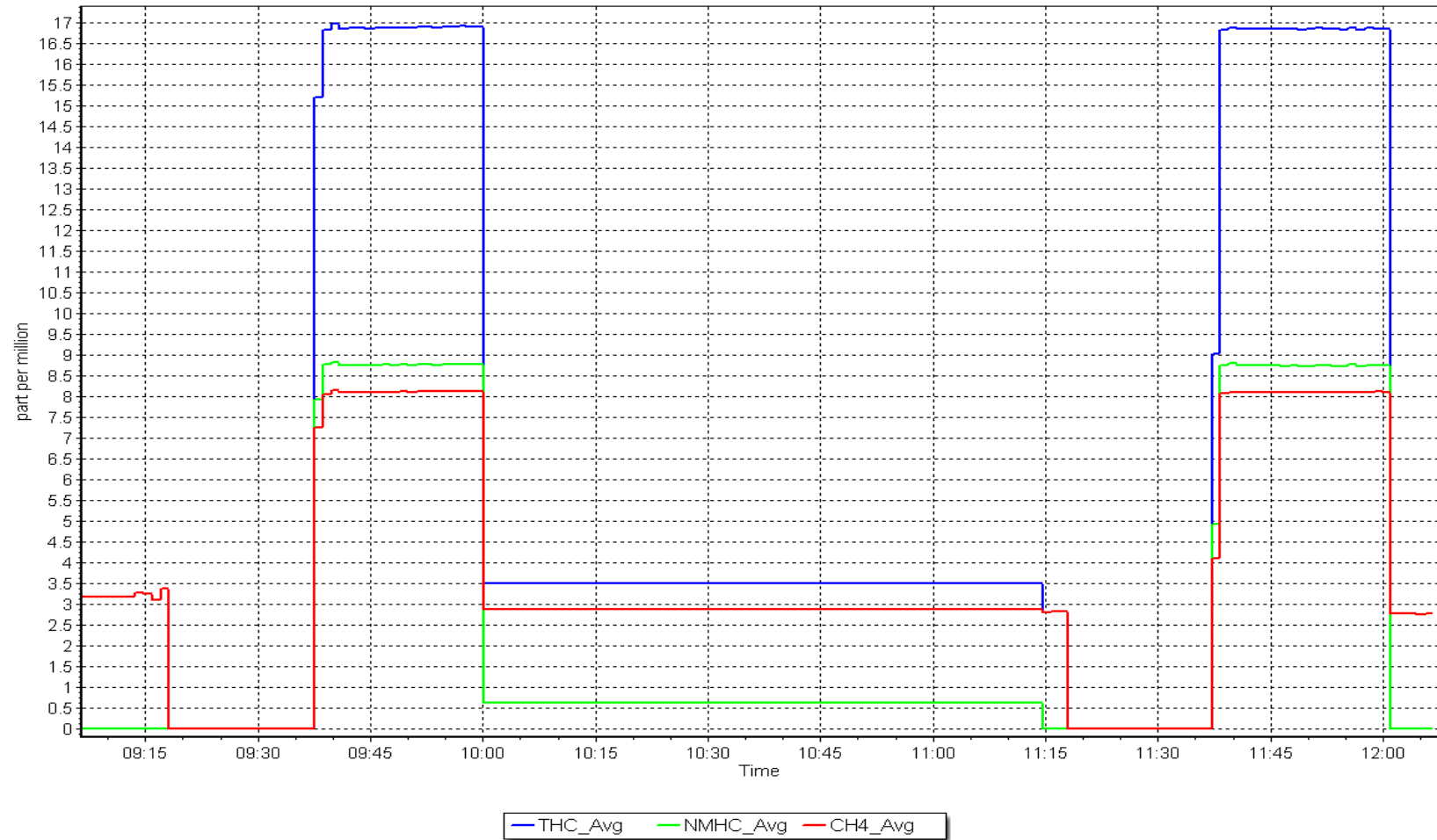
	Start	Finish
THC Cal Slope:	1.001218	NA
THC Cal Offset:	0.006072	NA
CH ₄ Cal Slope:	1.002662	NA
CH ₄ Cal Offset:	-0.005663	NA
NMHC Cal Slope:	0.999901	NA
NMHC Cal Offset:	0.011936	NA

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot

Date: September 13, 2024

Location: Mannix





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Mannix
Calibration Date: September 25, 2024
Start time (MST): 9:20
Reason: Cylinder Change

Station number: AMS 05
Last Cal Date: September 11, 2024
End time (MST): 13:38

Calibration Standards

Gas Cert Reference: CC408659
CH₄ Cal Gas Conc. 507.2 ppm
C₃H₈ Cal Gas Conc. 200.2 ppm
Removed Gas Cert: N/A
Removed CH₄ Conc. 507.2 ppm
Removed C₃H₈ Conc. 200.2 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 6, 2030
CH₄ Equiv Conc. 1057.8 ppm
Removed Gas Expiry: N/A
CH₄ Equiv Conc. 1057.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 5470
Serial Number: 361

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1172750023
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.25E-04	NA	NMHC SP Ratio:	5.40E-05	NA
CH ₄ Retention time:	15.5	NA	NMHC Peak Area:	163844	NA
Zero Chromatogram:	ON		Flat Baseline:	OFF	

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	16.99	16.79	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.79	Prev response	17.01	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	16.84	1.009
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 1.009

Notes:

Changed N2 cylinder.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.84	8.67	1.020
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.67	Prev response	8.85	*% change	-2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.84	8.65	1.023
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 1.023

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.15	8.12	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.12	Prev response	8.16	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.15	8.19	0.994
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 0.994

Calibration Statistics

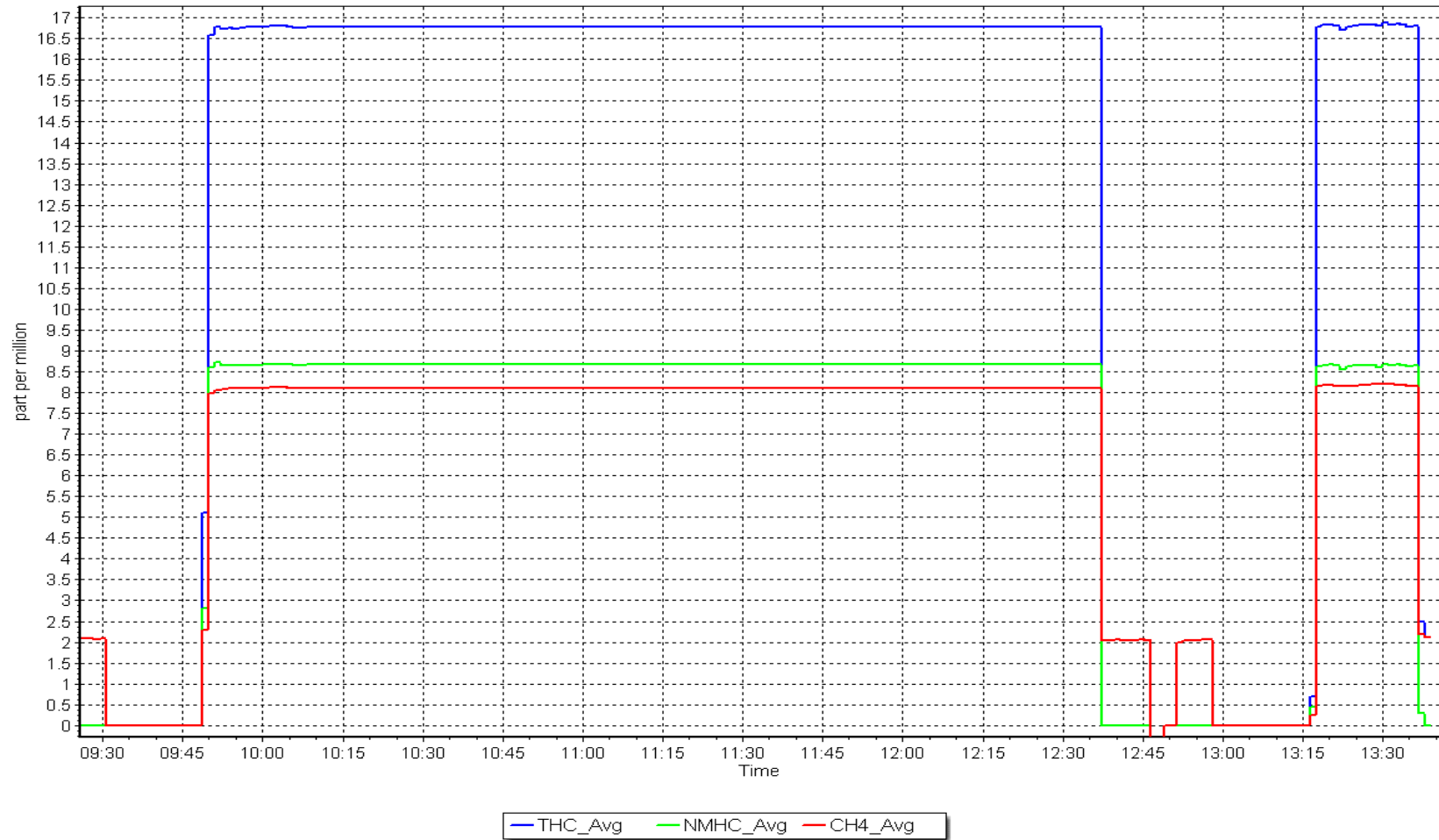
	Start	Finish
THC Cal Slope:	1.001218	NA
THC Cal Offset:	0.006072	NA
CH ₄ Cal Slope:	1.002662	NA
CH ₄ Cal Offset:	-0.005663	NA
NMHC Cal Slope:	0.999901	NA
NMHC Cal Offset:	0.011936	NA

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot

Date: September 25, 2024

Location: Mannix





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06
PATRICIA MCINNES
SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 5, 2024
Start time (MST): 8:34
Reason: Routine

Station number: AMS 06
Last Cal Date: August 13, 2024
End time (MST): 12:04

Calibration Standards

Cal Gas Concentration: 49.78 ppm
Cal Gas Cylinder #: AAL070632
Removed Cal Gas Conc: 49.78 ppm
Removed Gas Cyl #:
Calibrator Model: API T700
Zero Air Gen Model: API T701

Cal Gas Exp Date: September 9, 2024
Rem Gas Exp Date:
Diff between cyl:
Serial Number: 3566
Serial Number: 5608

Analyzer Information

Analyzer make: Thermo 43i
Analyzer Range: 0 - 1000 ppb

Serial Number: 1160290013

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.000634	1.001060	Backgd or Offset:	17.4	17.7
Calibration intercept:	1.999885	0.700654	Coeff or Slope:	0.901	0.901

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4919.7	80.3	799.5	797.8	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.5	Previous response	802.0	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4919.7	80.3	799.5	801.0	0.998
Mid point	4959.8	40.2	400.2	400.6	0.999
Low point	4979.9	20.1	200.1	202.6	0.988
As left zero	5000	0.0	0.0	0.0	----
As left span	4919.7	80.3	799.5	799.9	0.999
Average Correction Factor:					0.995

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

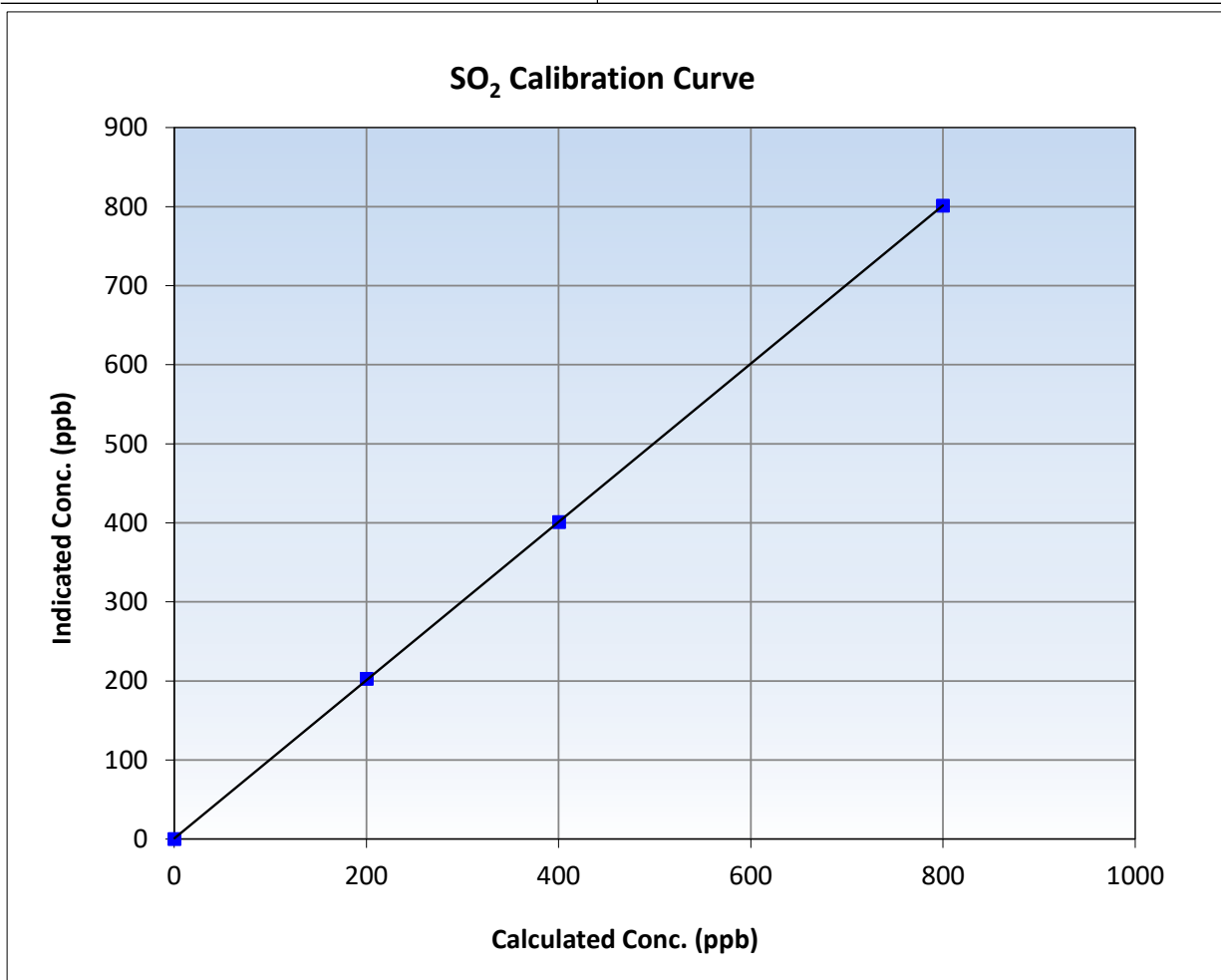
SO₂ Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:34	End Time (MST):	12:04
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

Calibration Data

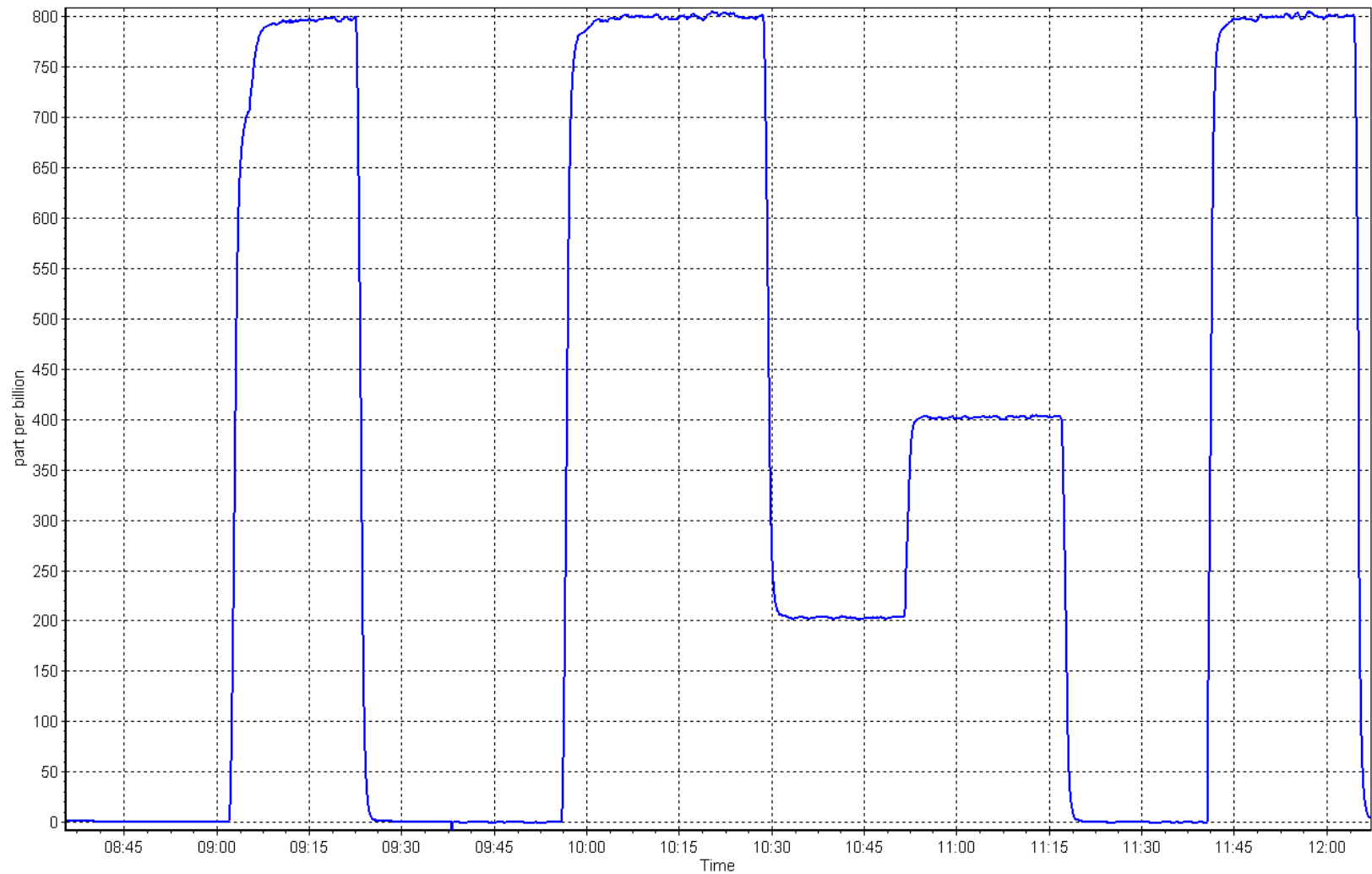
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1	----	Correlation Coefficient	0.999989	≥0.995
799.5	801.0	0.9981	Slope	1.001060	0.90 - 1.10
400.2	400.6	0.9991	Intercept	0.700654	+/-30
200.1	202.6	0.9877			



SO2 Calibration Plot

Date: September 5, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 12, 2024
Start time (MST): 8:26
Reason: Routine

Station number: AMS 06
Last Cal Date: August 14, 2024
End time (MST): 12:59

Calibration Standards

Cal Gas Concentration: 5.328 ppm
Cal Gas Cylinder #: CC506659
Removed Cal Gas Conc: 5.328 ppm
Removed Gas Cyl #: N/A
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Cal Gas Exp Date: February 14, 2025
Rem Gas Exp Date: N/A
Diff between cyl:
Serial Number: 3566
Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 43i TLE
Converter make: CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1218153358
Converter serial #: 517
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002022	0.990454	Backgd or Offset:	1.99	1.99
Calibration intercept:	-0.199533	-0.219616	Coeff or Slope:	1.145	1.145

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	4925	75.1	80.0	81.3	0.986
As found Mid point	4963	37.5	40.0	40.5	0.989
As found Low point	4981	18.8	20.0	19.5	1.033
New cylinder response					
Baseline Corr As found:	81.2	Prev response:	79.99	*% change:	1.5%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.018451	AF Intercept:	-0.299610
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999850	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4925	75.1	80.0	79.1	1.012
Mid point	4963	37.5	40.0	39.5	1.012
Low point	4981	18.8	20.0	19.1	1.049
As left zero	5000	0.0	0.0	0.2	----
As left span	4925	75.1	80.0	78.9	1.014
SO2 Scrubber Check	4920	80.3	803.0	0.1	----
Date of last scrubber change:	December 20, 2021			Ave Corr Factor	1.024
Date of last converter efficiency test:					

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

TRS Calibration Summary

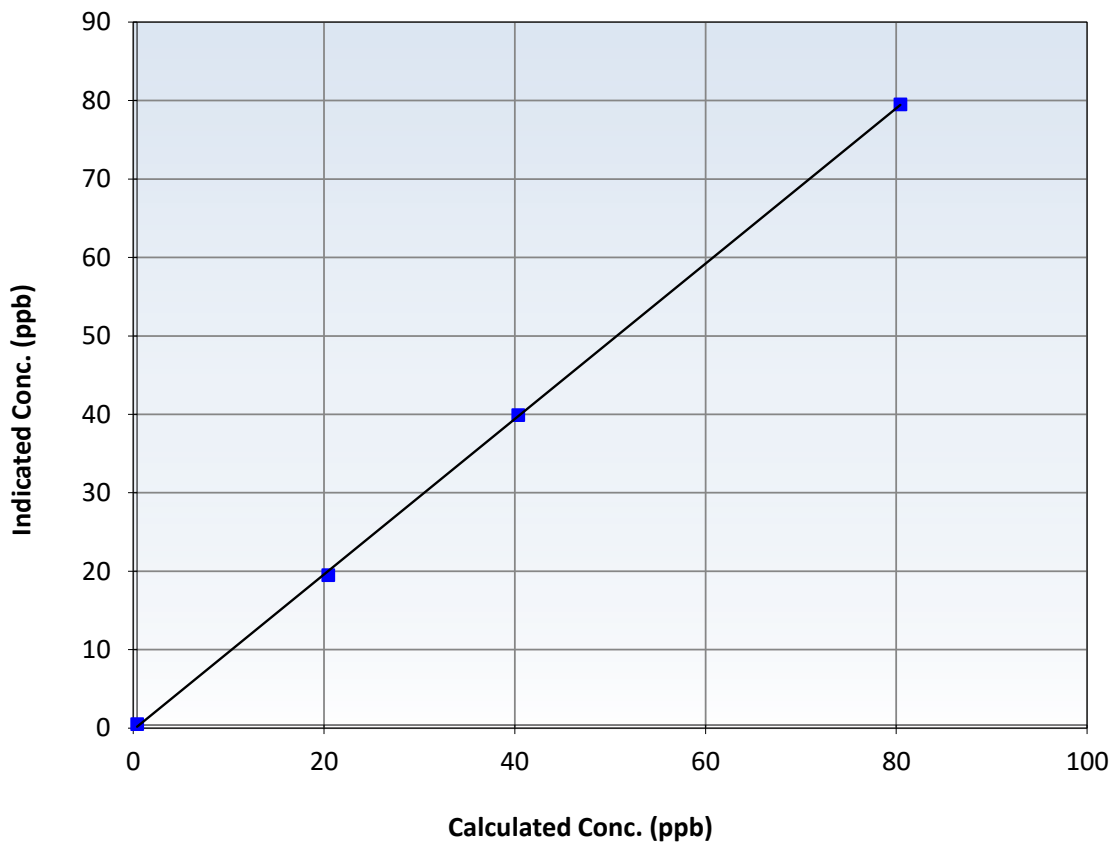
Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 14, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:26	End Time (MST):	12:59
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

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	0.999883		≥ 0.995
80.0	79.1	1.0117	Slope	0.990454		$0.90 - 1.10$
40.0	39.5	1.0115	Intercept	-0.219616		± 3
20.0	19.1	1.0489				

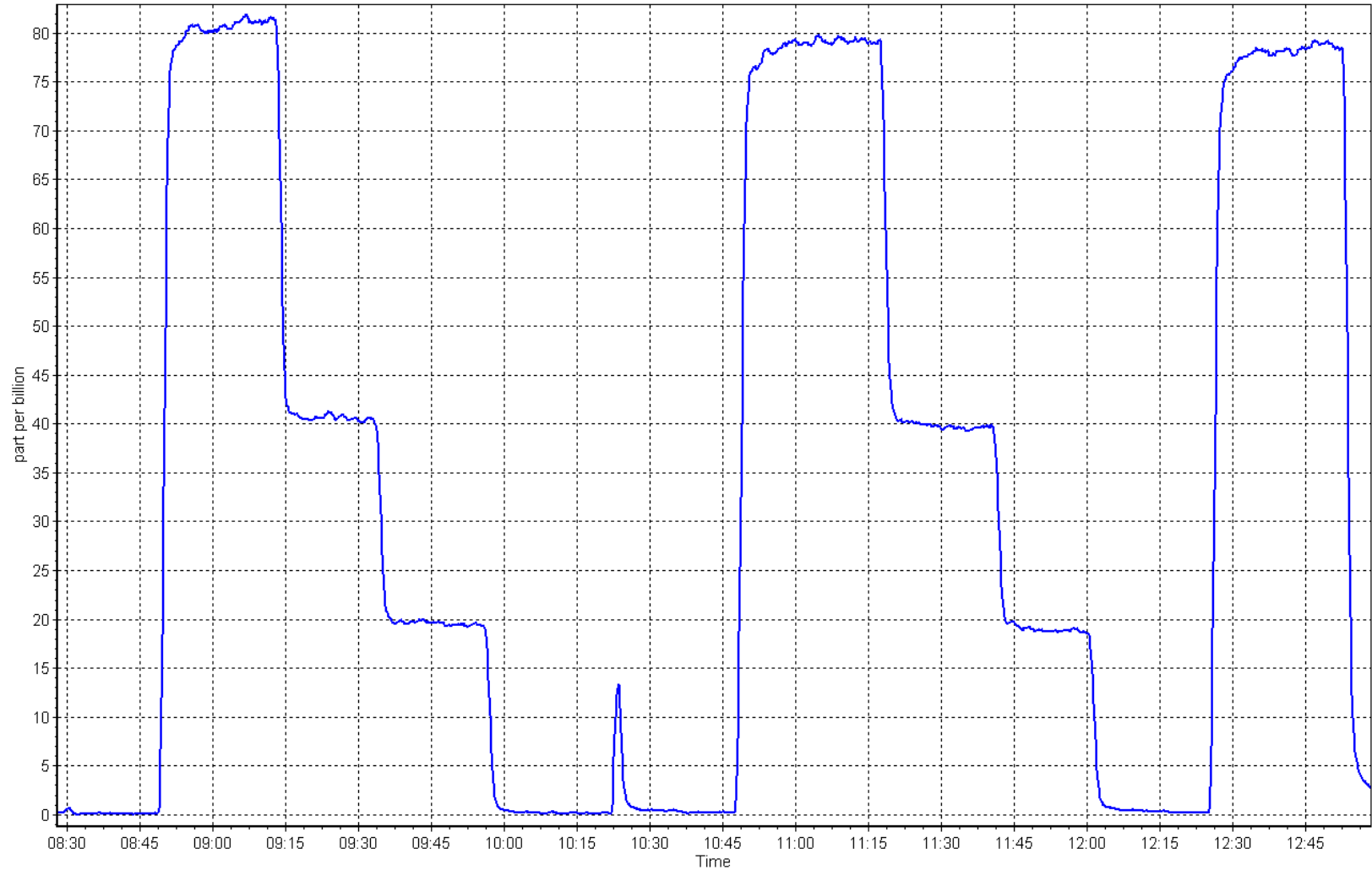
TRS Calibration Curve



TRS Calibration Plot

Date: September 12, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 2, 2024
Start time (MST): 9:34
Reason: Cylinder Change

Station number: AMS 06
Last Cal Date: August 13, 2024
End time (MST): 12:12

Calibration Standards

Gas Cert Reference: AAL070632
CH₄ Cal Gas Conc. 501.6 ppm
C₃H₈ Cal Gas Conc. 205.3 ppm
Removed Gas Cert:
Removed CH₄ Conc. 501.6 ppm
Removed C₃H₈ Conc. 205.3 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: September 9, 2024
CH₄ Equiv Conc. 1066.2 ppm
Removed Gas Expiry:
CH₄ Equiv Conc. 1066.2 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3566
Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1118148495
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.59E-04	2.59E-04	NMHC SP Ratio:	5.22E-05	5.22E-05
CH ₄ Retention time:	15.0	15.0	NMHC Peak Area:	173644	173644
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.17	----
As left span	4920	80.3	17.12	17.13	0.999
Average Correction Factor					

Notes:

Replaced the empty H2 cylinder. Performed as lefts.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
Limit = 0.90-1.10					
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Limit = 0.95-1.05					
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.07	9.08	0.998
Average Correction Factor					

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
Limit = 0.90-1.10					
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ 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					
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.17	----
As left span	4920	80.3	8.06	8.05	1.001
Average Correction Factor					

Calibration Statistics

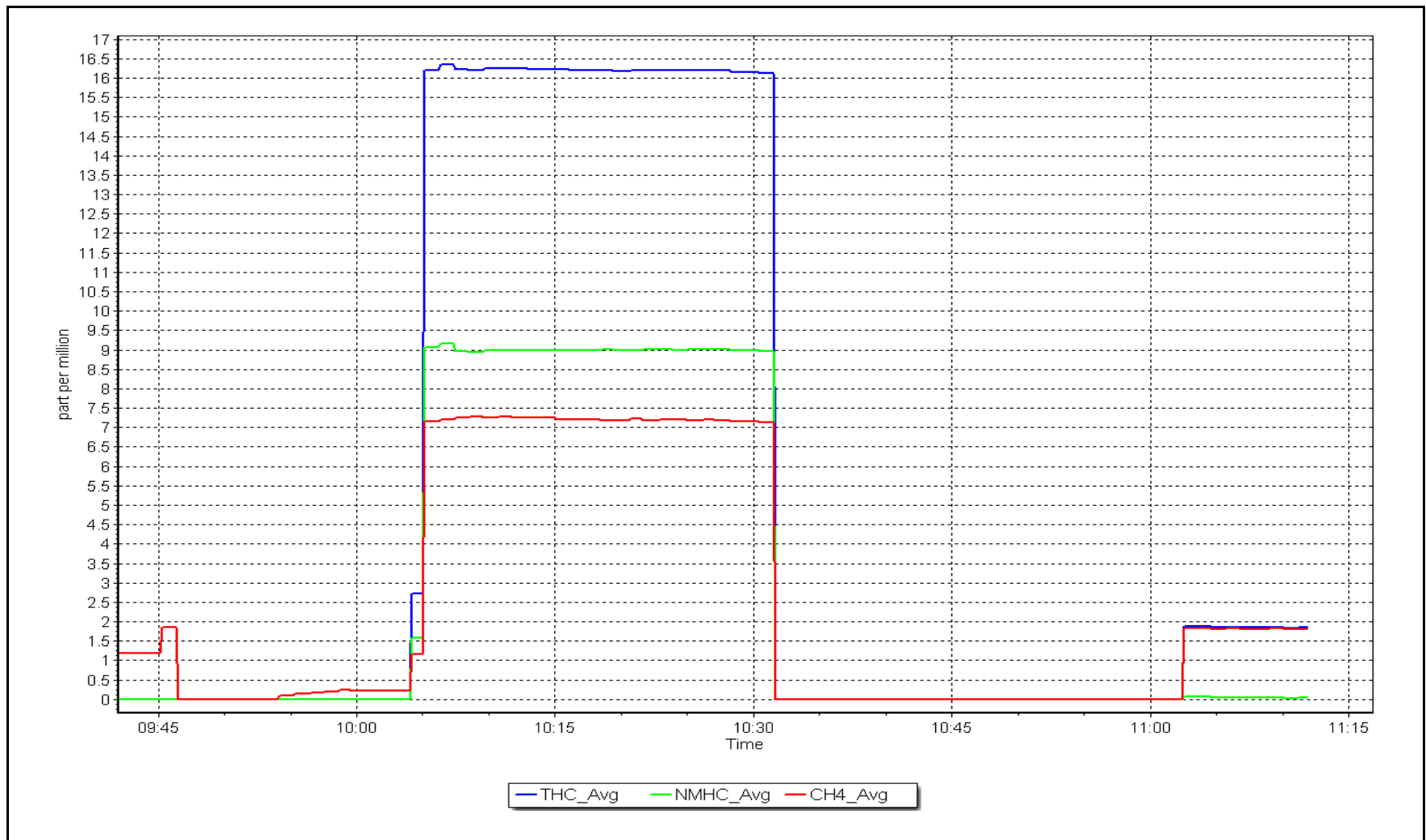
	Start	Finish
THC Cal Slope:	1.000722	
THC Cal Offset:	0.015236	
CH ₄ Cal Slope:	1.001451	
CH ₄ Cal Offset:	0.005437	
NMHC Cal Slope:	0.999722	
NMHC Cal Offset:	0.010199	

Calibration Performed By: Rene Chamberland

NMHC Calibration Plot

Date: September 2, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 5, 2024
Start time (MST): 8:34
Reason: Routine

Station number: AMS 06
Last Cal Date: August 13, 2024
End time (MST): 12:04

Calibration Standards

Gas Cert Reference: AAL070632
CH₄ Cal Gas Conc. 501.6 ppm
C₃H₈ Cal Gas Conc. 205.3 ppm
Removed Gas Cert:
Removed CH₄ Conc. 501.6 ppm
Removed C₃H₈ Conc. 205.3 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: September 9, 2024
CH₄ Equiv Conc. 1066.2 ppm
Removed Gas Expiry:
CH₄ Equiv Conc. 1066.2 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3566
Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1118148495
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.59E-04	2.14E-04	NMHC SP Ratio:	5.22E-05
CH ₄ Retention time:	15.0	14.0	NMHC Peak Area:	173644
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.14	0.999
Mid point	4960	40.2	8.57	8.52	1.006
Low point	4980	20.1	4.29	4.29	1.000
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.12	17.20	0.996
Average Correction Factor					1.002

Notes:

Changed the inlet filter before calibrator zero. Adjusted the span only.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.07	9.07	1.000
Mid point	4960	40.2	4.54	4.54	1.000
Low point	4980	20.1	2.27	2.29	0.990
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.07	9.12	0.994
Average Correction Factor					0.997

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ 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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.06	8.08	0.997
Mid point	4960	40.2	4.03	3.98	1.013
Low point	4980	20.1	2.02	1.99	1.012
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.08	0.997
Average Correction Factor					1.008

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	1.000722	1.000813
THC Cal Offset:	0.015236	-0.014946
CH ₄ Cal Slope:	1.001451	1.002891
CH ₄ Cal Offset:	0.005437	-0.024143
NMHC Cal Slope:	0.999722	0.999458
NMHC Cal Offset:	0.010199	0.007997

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

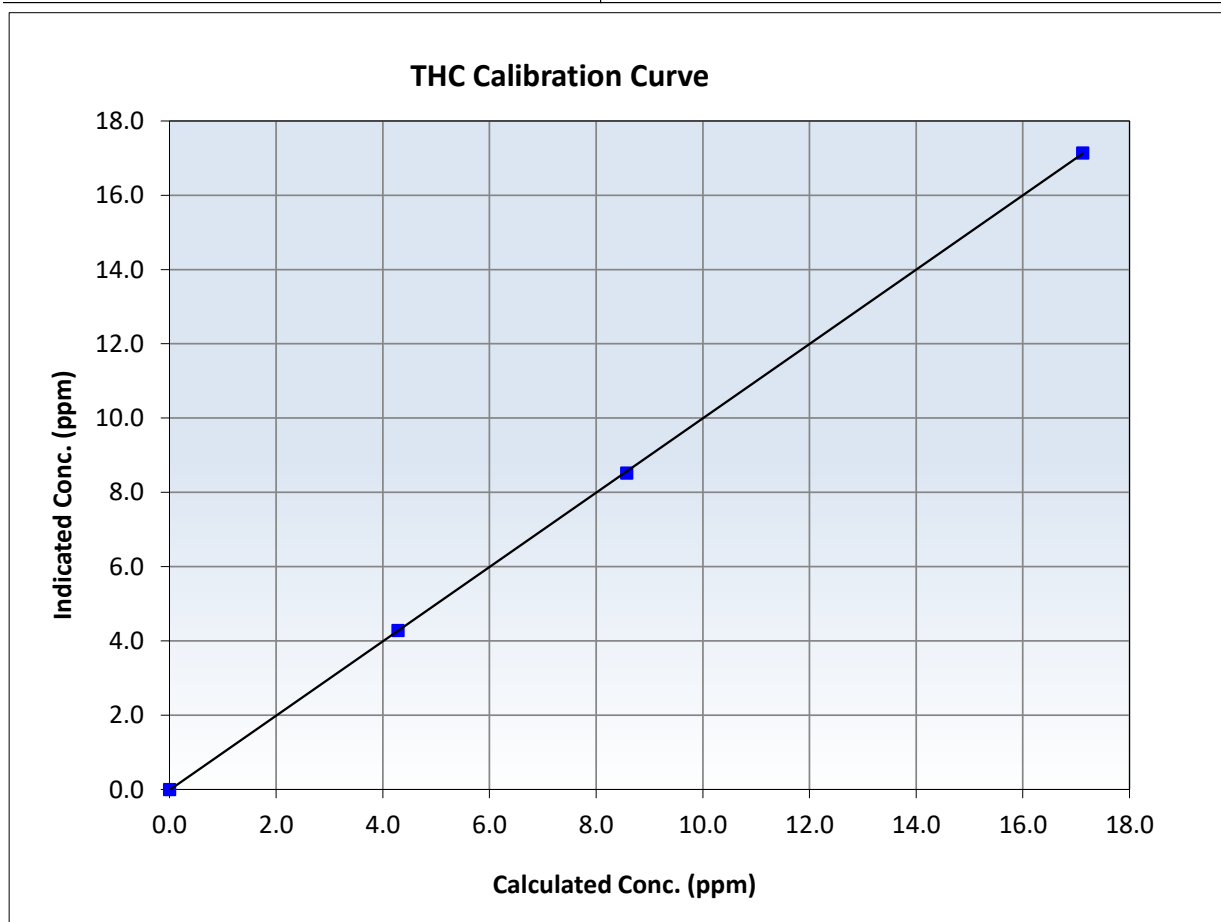
THC Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:34	End Time (MST):	12:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999982	≥ 0.995
17.12	17.14	0.9989	Slope	1.000813	$0.90 - 1.10$
8.57	8.52	1.0063	Intercept	-0.014946	± 0.5
4.29	4.29	1.0002			





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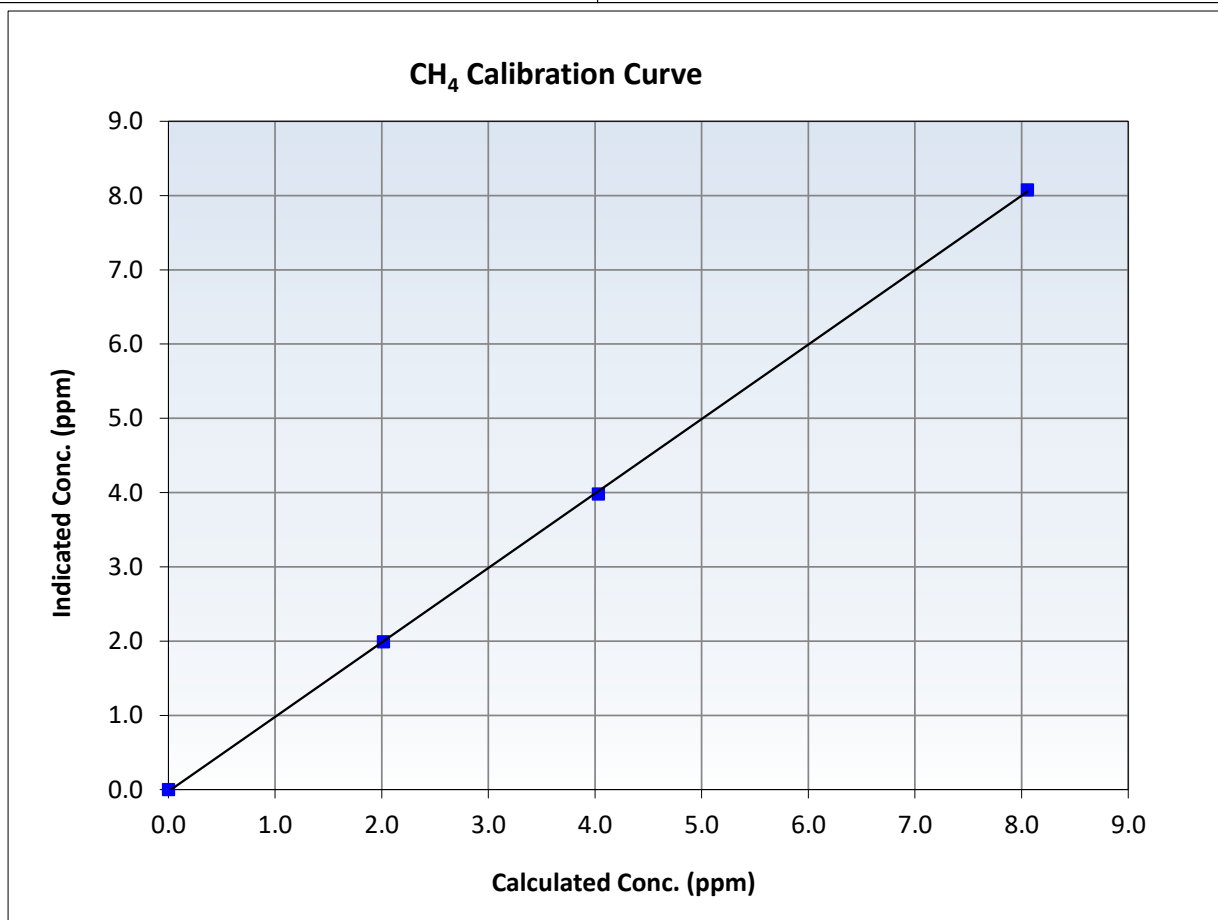
CH₄ Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:34	End Time (MST):	12:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			Limits
0.00	0.00	----	Correlation Coefficient	0.999927		≥0.995
8.06	8.08	0.9975	Slope	1.002891		0.90 - 1.10
4.03	3.98	1.0130	Intercept	-0.024143		+/-0.5
2.02	1.99	1.0122				





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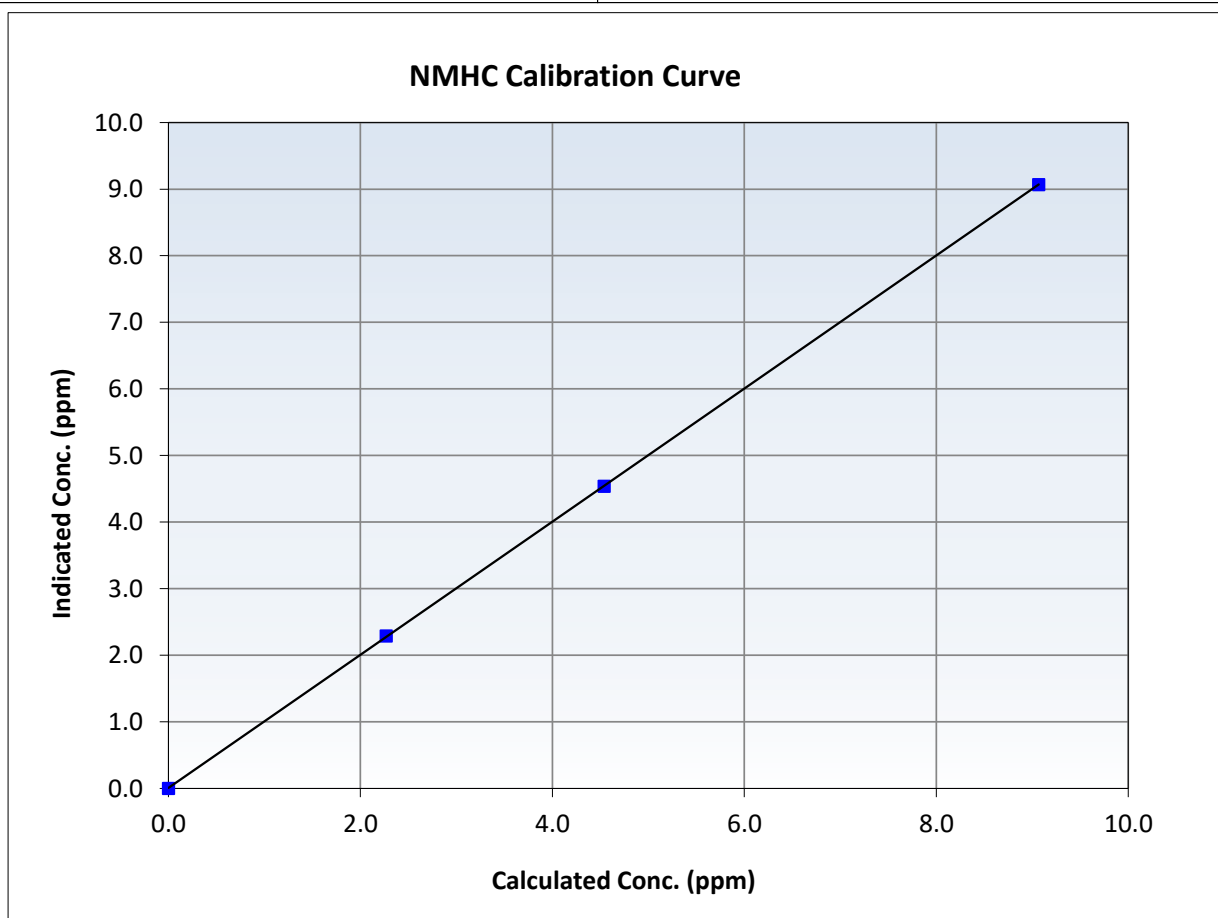
NMHC Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:34	End Time (MST):	12:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

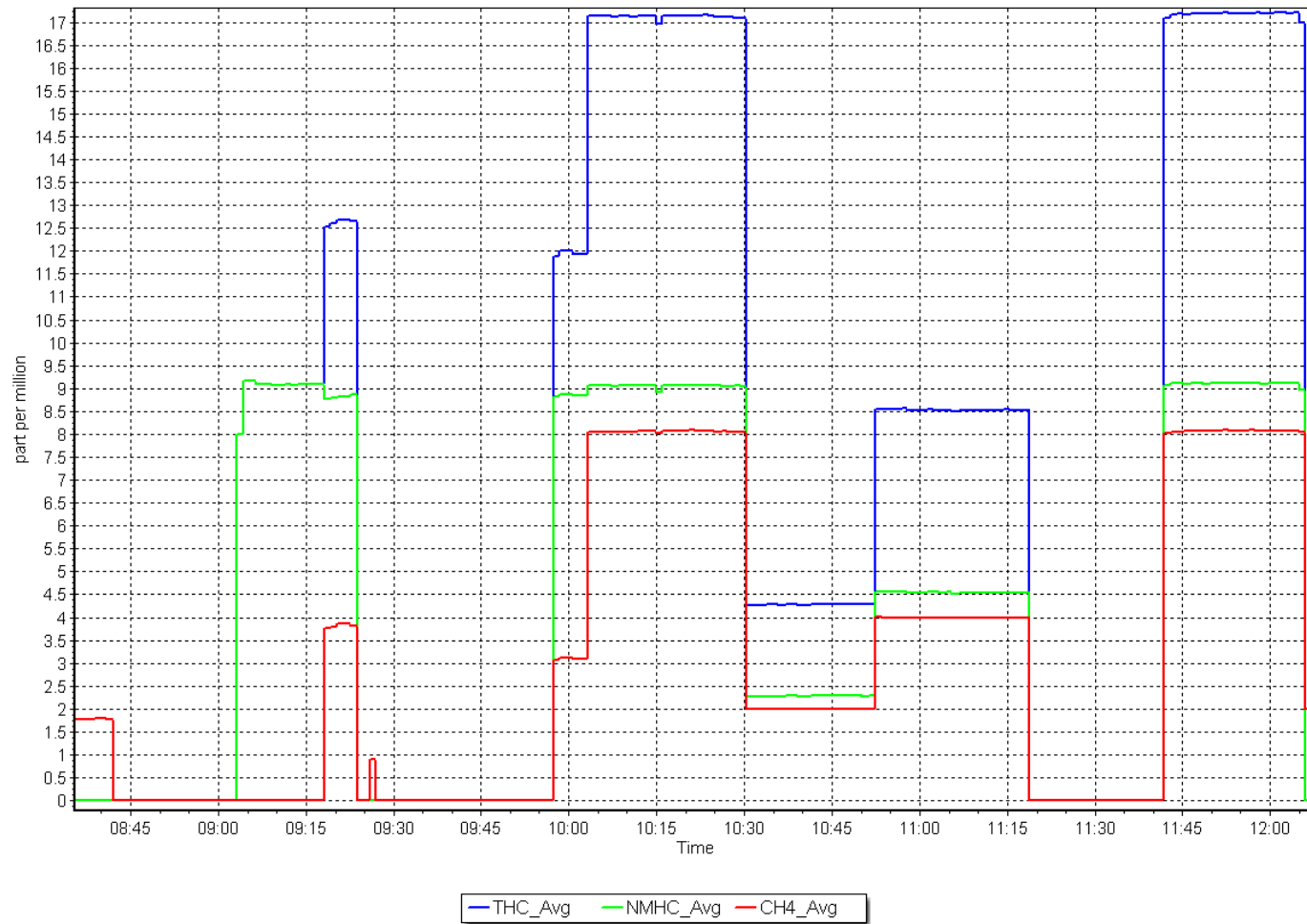
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999992	≥ 0.995
9.07	9.07	0.9997	Slope	0.999458	$0.90 - 1.10$
4.54	4.54	1.0004	Intercept	0.007997	± 0.5
2.27	2.29	0.9902			



NMHC Calibration Plot

Date: September 5, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 15, 2024
Start time (MST): 10:20
Reason: Routine

Station number: AMS 06
Last Cal Date: September 5, 2024
End time (MST): 16:10

Calibration Standards

Gas Cert Reference: AAL070632
CH₄ Cal Gas Conc. 501.6 ppm
C₃H₈ Cal Gas Conc. 205.3 ppm
Removed Gas Cert:
Removed CH₄ Conc. 501.6 ppm
Removed C₃H₈ Conc. 205.3 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: September 9, 2024
CH₄ Equiv Conc. 1066.2 ppm
Removed Gas Expiry:
CH₄ Equiv Conc. 1066.2 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3566
Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1118148495
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH ₄ SP Ratio:	2.14E-04	2.18E-04	NMHC SP Ratio:	5.36E-05	5.40E-05
CH ₄ Retention time:	14.0	14.2	NMHC Peak Area:	169266	168033
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	17.03	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.03	Prev response	17.12	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.13	1.000
Mid point	4960	40.2	8.57	8.57	1.000
Low point	4980	20.1	4.29	4.34	0.988
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.12	17.18	0.997
Average Correction Factor					0.996

Notes: Troubleshooting dips occurring during sampling. Adjusted zero and span.



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THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	9.07	9.09	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.09	Prev response	9.07	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	9.07	9.08	0.999
Mid point	4960	40.2	4.54	4.57	0.994
Low point	4980	20.1	2.27	2.32	0.979
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.07	9.11	0.995
Average Correction Factor					0.991

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.06	7.95	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.95	Prev response	8.05	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	8.06	8.04	1.002
Mid point	4960	40.2	4.03	4.01	1.007
Low point	4980	20.1	2.02	2.02	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.07	0.998
Average Correction Factor					1.002

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.000813	0.999341
THC Cal Offset:	-0.014946	0.019839
CH ₄ Cal Slope:	1.002891	0.997363
CH ₄ Cal Offset:	-0.024143	-0.000147
NMHC Cal Slope:	0.999458	0.999964
NMHC Cal Offset:	0.007997	0.021988

Calibration Performed By: Braiden Boutilier



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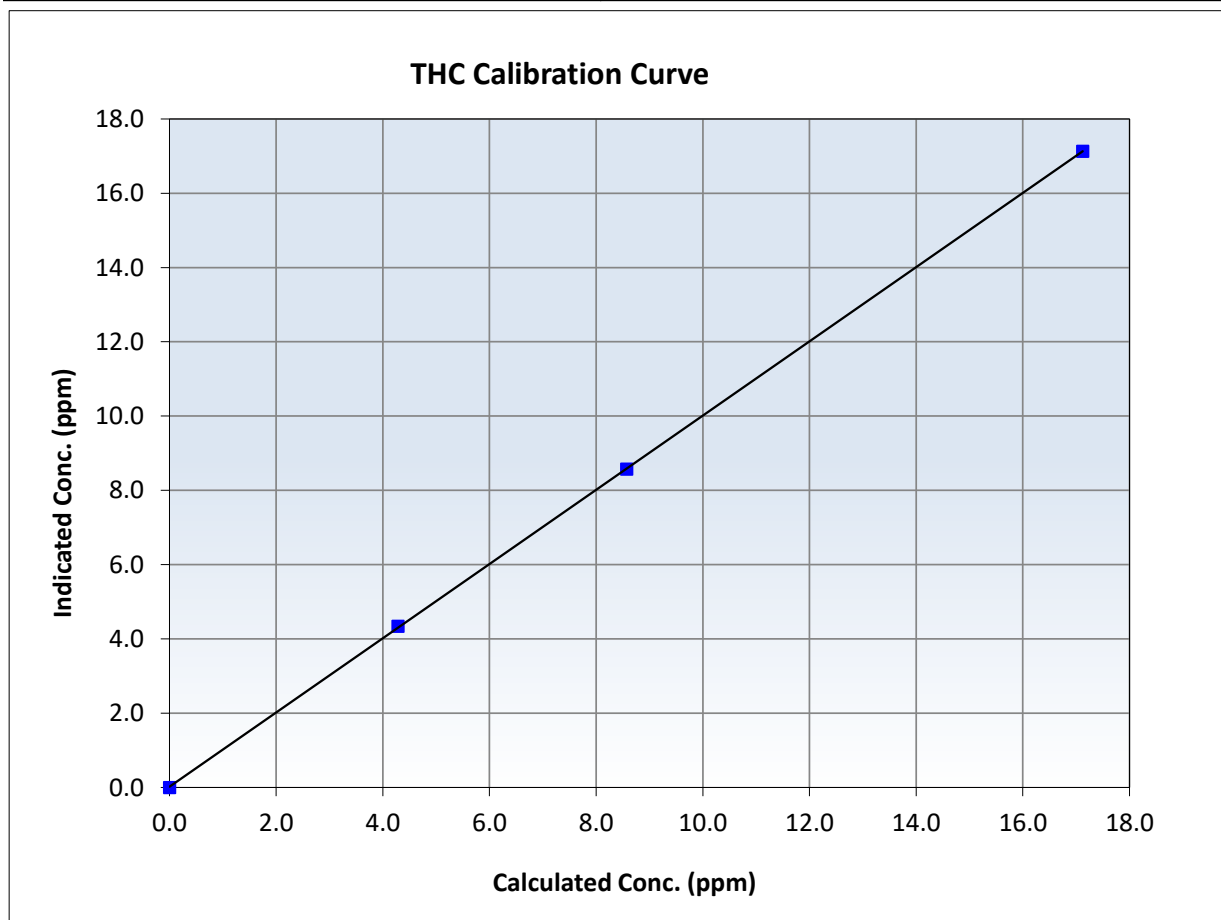
THC Calibration Summary

Station Information

Calibration Date:	September 15, 2024	Previous Calibration:	September 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:20	End Time (MST):	16:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999987	≥ 0.995
17.12	17.13	0.9996	Slope	0.999341	$0.90 - 1.10$
8.57	8.57	1.0002	Intercept	0.019839	± 0.5
4.29	4.34	0.9875			





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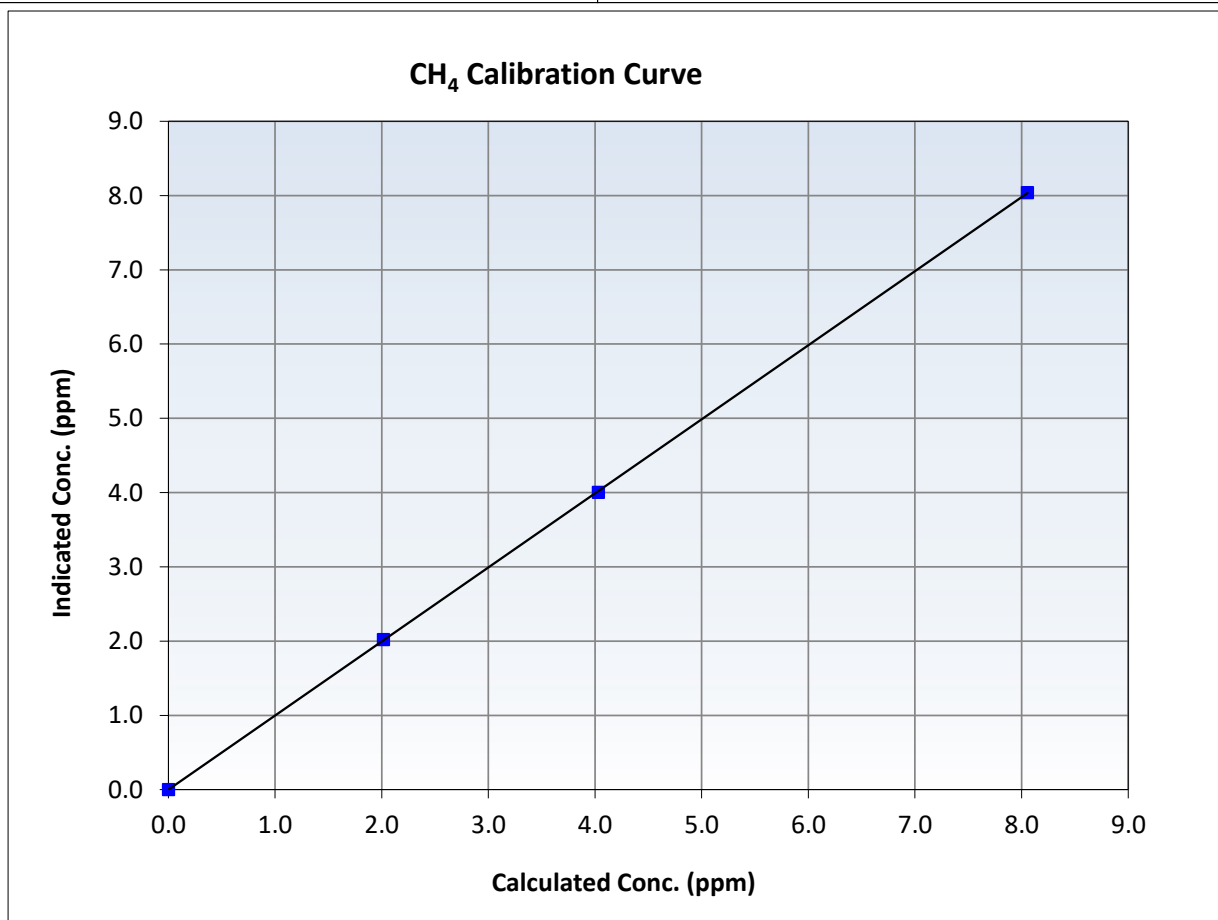
CH₄ Calibration Summary

Station Information

Calibration Date:	September 15, 2024	Previous Calibration:	September 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:20	End Time (MST):	16:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999987	<i>≥0.995</i>
8.06	8.04	1.0020	Slope	0.997363	<i>0.90 - 1.10</i>
4.03	4.01	1.0069	Intercept	-0.000147	<i>+/-0.5</i>
2.02	2.02	0.9972			





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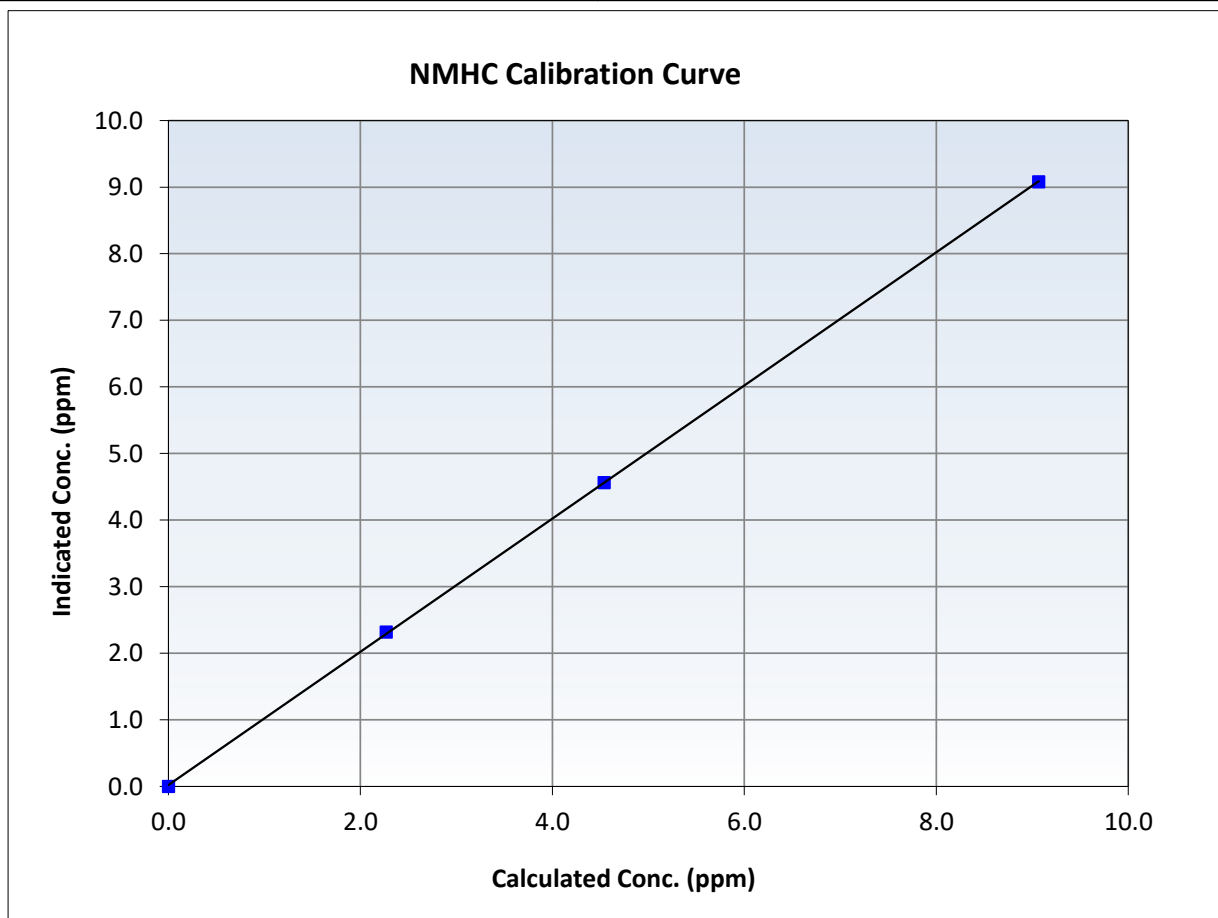
NMHC Calibration Summary

Station Information

Calibration Date:	September 15, 2024	Previous Calibration:	September 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:20	End Time (MST):	16:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

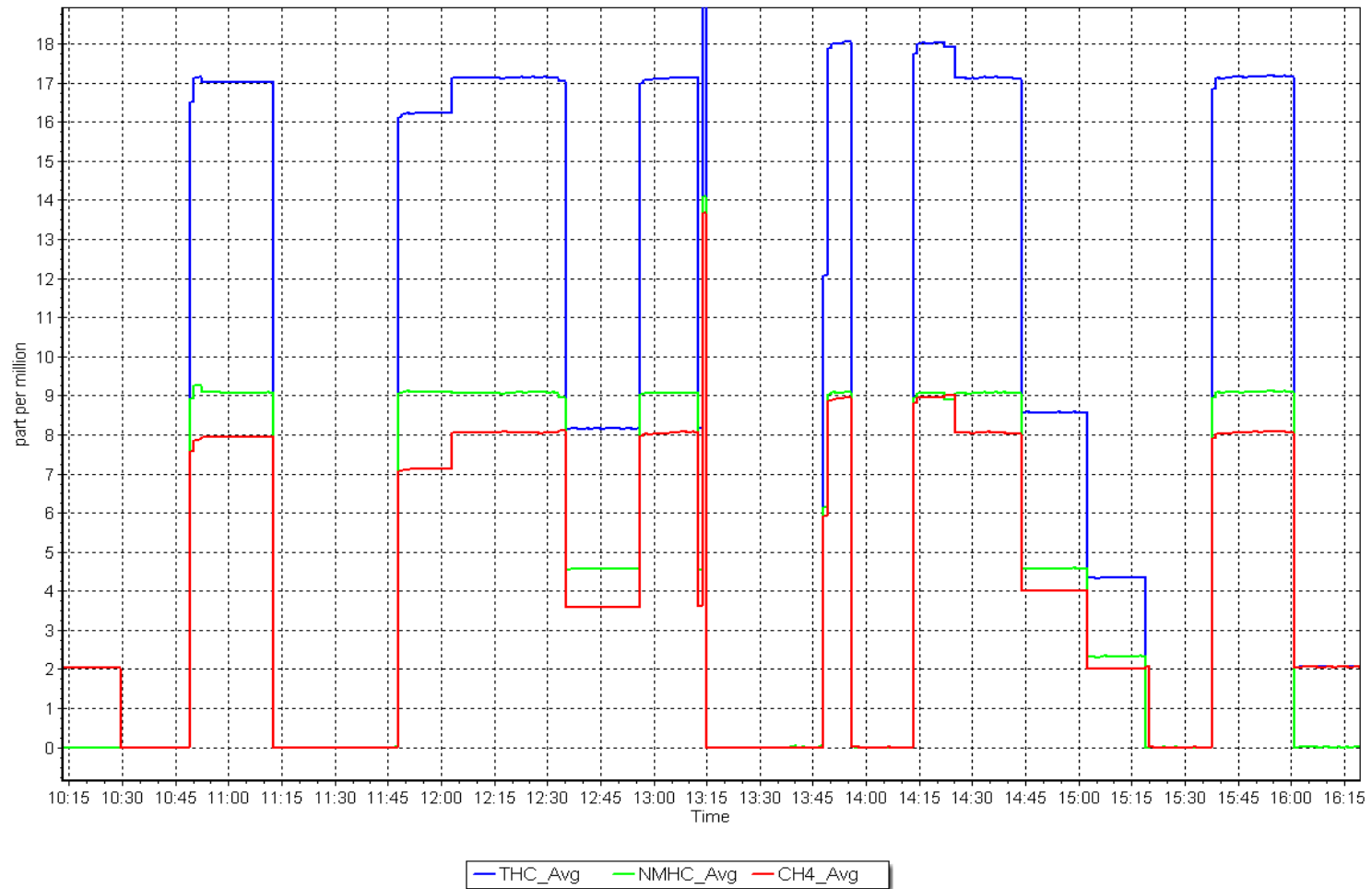
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999971	≥ 0.995
9.07	9.08	0.9986	Slope	0.999964	$0.90 - 1.10$
4.54	4.57	0.9943	Intercept	0.021988	± 0.5
2.27	2.32	0.9791			



NMHC Calibration Plot

Date: September 15, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Patricia McInnes
Station number: AMS 06
Calibration Date: September 16, 2024
Last Cal Date: August 12, 2024
Start time (MST): 8:38
End time (MST): 13:31
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T30YCWN
NOX Cal Gas Conc: 47.94 ppm
Removed Cylinder #: N/A
Removed Gas NOX Conc: 47.94 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701
Cal Gas Expiry Date: April 11, 2025
NO Cal Gas Conc: 46.39 ppm
Removed Gas Exp Date: N/A
Removed Gas NO Conc: 46.39 ppm
NO gas Diff:
Serial Number: 3566
Serial Number: 4602

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.6	0.7	-0.1	----	----
AF High point	4914	86.2	826.5	799.7	26.7	822.0	793.7	28.1	1.0062	1.0085
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 827.2 ppb	NO = 801.2 ppb	* = > +/-5% change initiates investigation			*Percent Change	NO _x = -0.7%			
Baseline Corr 1st pt	NO _x = 821.4 ppb	NO = 793.0 ppb	<u>As Found Statistics</u>			*Percent Change	NO = -1.0%			
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:			

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1172750022

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.827	0.832	NO bkgnd or offset:	3.2	3.7
NOX coeff or slope:	0.987	0.989	NOX bkgnd or offset:	3.8	4.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	153.9	153.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997989	0.998903
NO _x Cal Offset:	2.376160	2.295640
NO Cal Slope:	1.000173	1.000545
NO Cal Offset:	1.282863	0.902692
NO ₂ Cal Slope:	0.999367	1.003618
NO ₂ Cal Offset:	-0.891395	1.282880

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
High point	4914	86.2	826.5	799.7	26.7	826.6	800.5	26.2	0.9998	0.9990
Mid point	4957	43.1	413.2	399.9	13.4	416.3	401.7	14.6	0.9926	0.9955
Low point	4978	21.6	207.1	200.4	6.7	211.7	202.3	9.3	0.9784	0.9907
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4914	86.2	826.5	400.0	426.5	829.9	400.0	429.8	0.9958	1.0000
Average Correction Factor									0.9903	0.9951

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	799.5	398.3	427.9	430.1	0.9949	100.5%
Mid GPT point	799.5	601.5	224.7	227.1	0.9895	101.1%
Low GPT point	799.5	703.3	122.9	126.4	0.9725	102.8%
Average Correction Factor					0.9856	101.5%

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

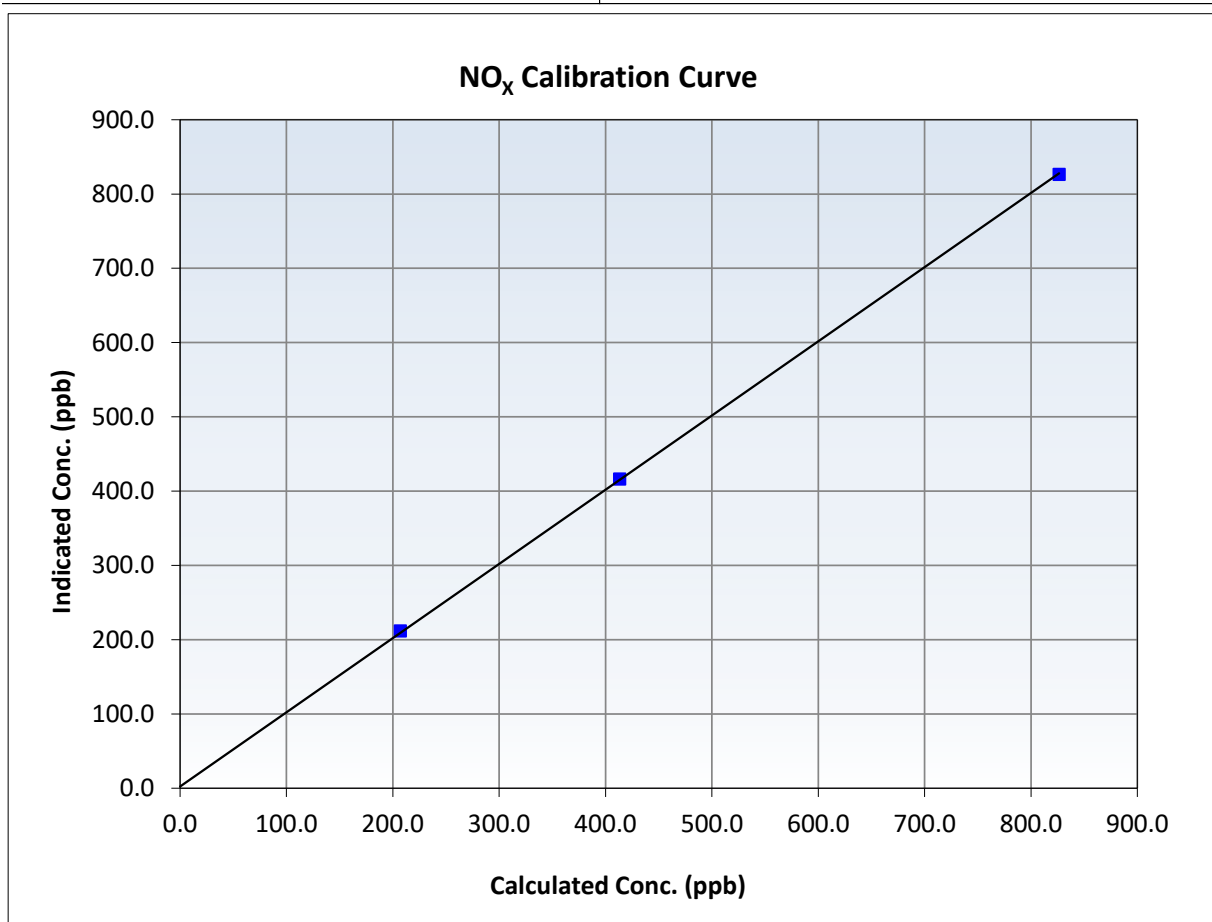
NO_x Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 12, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:38	End Time (MST):	13:31
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

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	0.999958	≥0.995
826.5	826.6	0.9998	Slope	0.998903	0.90 - 1.10
413.2	416.3	0.9926	Intercept	2.295640	+/-20
207.1	211.7	0.9784			





Wood Buffalo Environmental Association

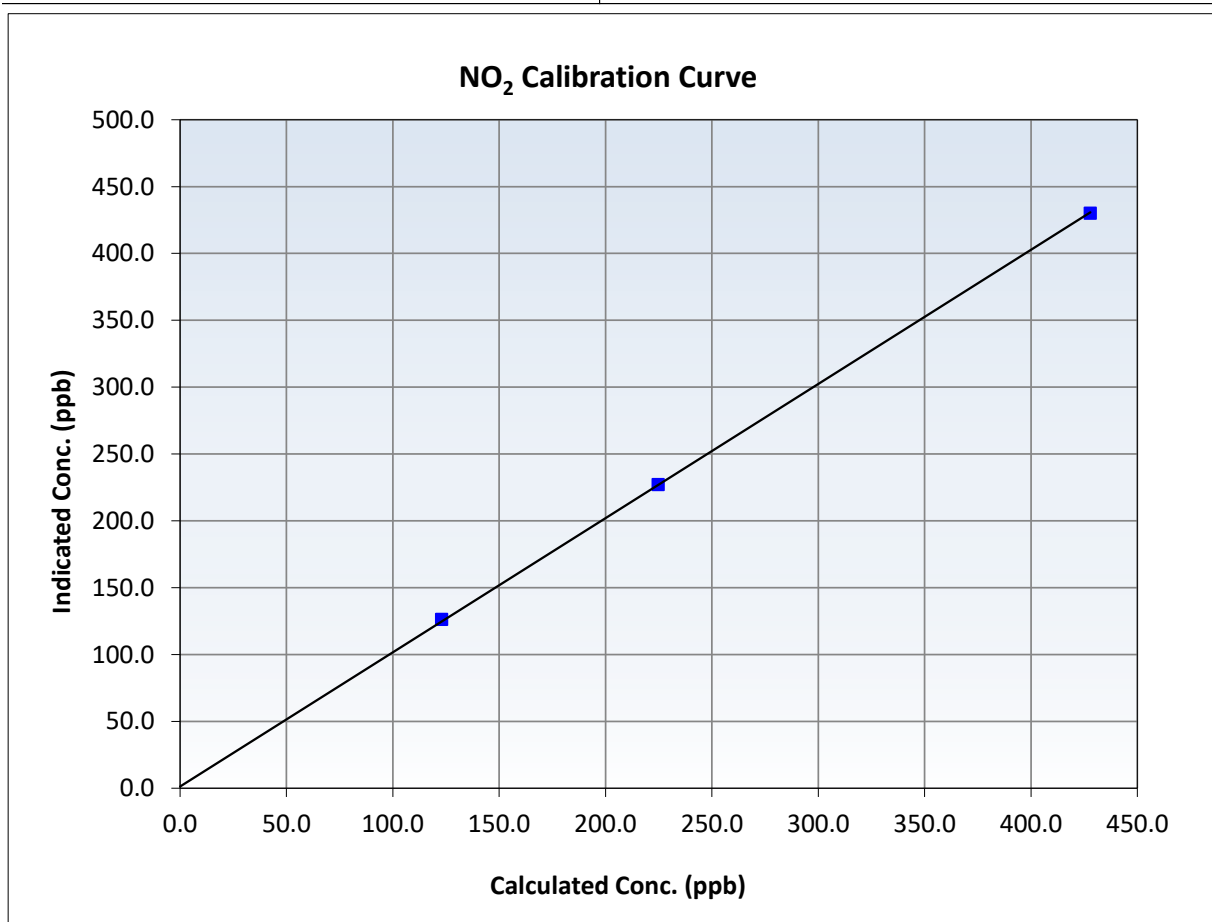
NO₂ Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 12, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:38	End Time (MST):	13:31
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

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	0.999945	≥0.995
427.9	430.1	0.9949	Slope	1.003618	0.90 - 1.10
224.7	227.1	0.9895	Intercept	1.282880	+/-20
122.9	126.4	0.9725			





Wood Buffalo Environmental Association

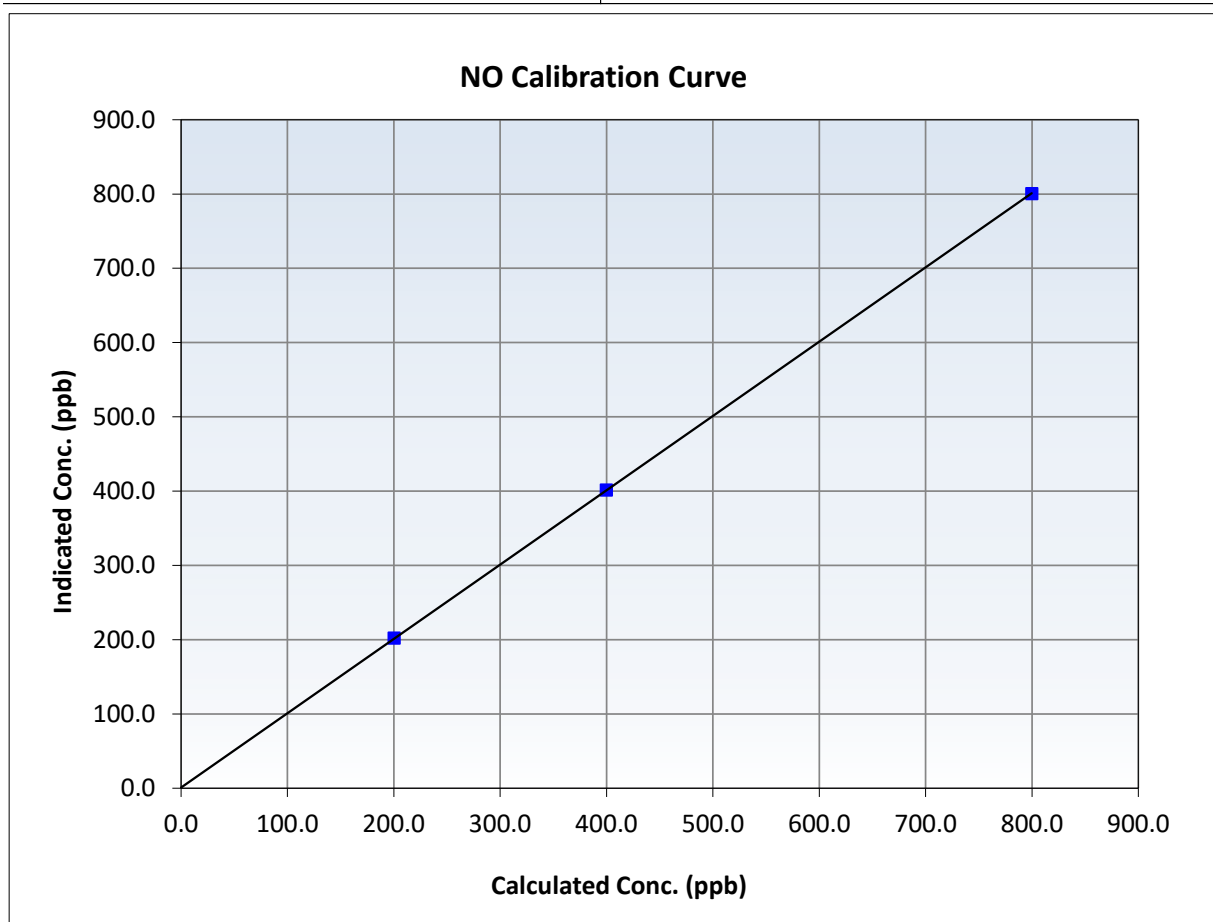
NO Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 12, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:38	End Time (MST):	13:31
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

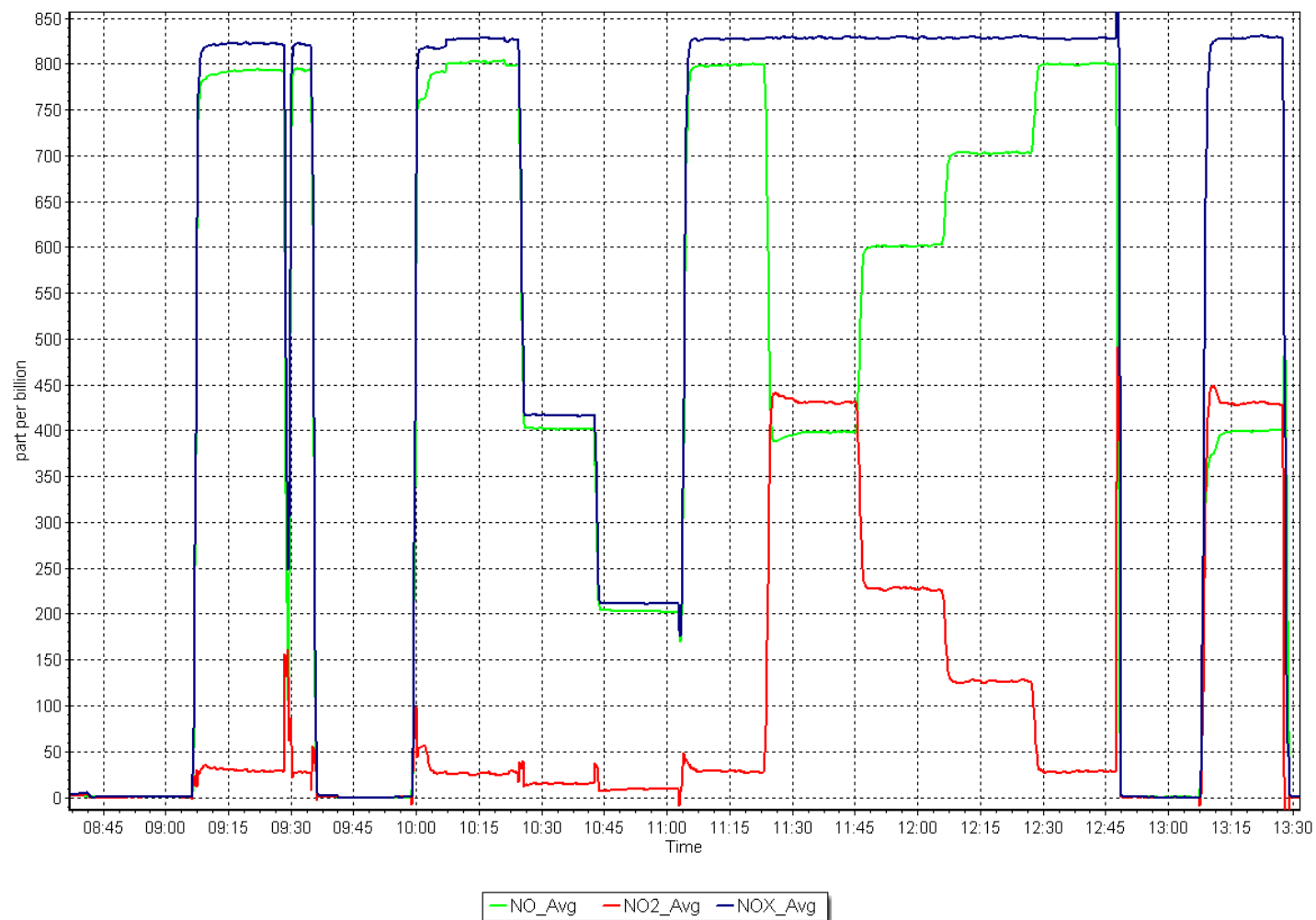
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1	----	Correlation Coefficient	0.999993	≥ 0.995
799.7	800.5	0.9990	Slope	1.000545	$0.90 - 1.10$
399.9	401.7	0.9955	Intercept	0.902692	± 20
200.4	202.3	0.9907			



NO_x Calibration Plot

Date: September 16, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Patricia McInnes
Calibration Date: September 6, 2024
Start time (MST): 8:40
Reason: Routine

Station number: AMS 06
Last Cal Date: August 6, 2024
End time (MST): 12:23

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Serial Number: 3566
Serial Number: 4602

Analyzer Information

Analyzer make: Thermo 49i
Analyzer Range: 0 - 500 ppb

Analyzer serial #: 1300156234

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.006571	1.000143	Backgd or Offset:	-1.1	-0.5
Calibration intercept:	0.100000	0.100000	Coeff or Slope:	1.026	1.020

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	800.0	0.0	0.3	----
As found High point	5000	1027.6	400.0	401.0	0.998
As found Mid point					
As found Low point					
Baseline Corr As found:	400.7	Previous response	402.7	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	800.0	0.0	0.2	----
High point	5000	1022.7	400.0	400.2	1.000
Mid point	5000	817.9	200.0	200.1	1.000
Low point	5000	693.8	100.0	100.0	1.000
As left zero	5000	800.0	0.0	0.2	----
As left span	5000	1025.8	400.0	401.0	0.998
Average Correction Factor					1.000

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

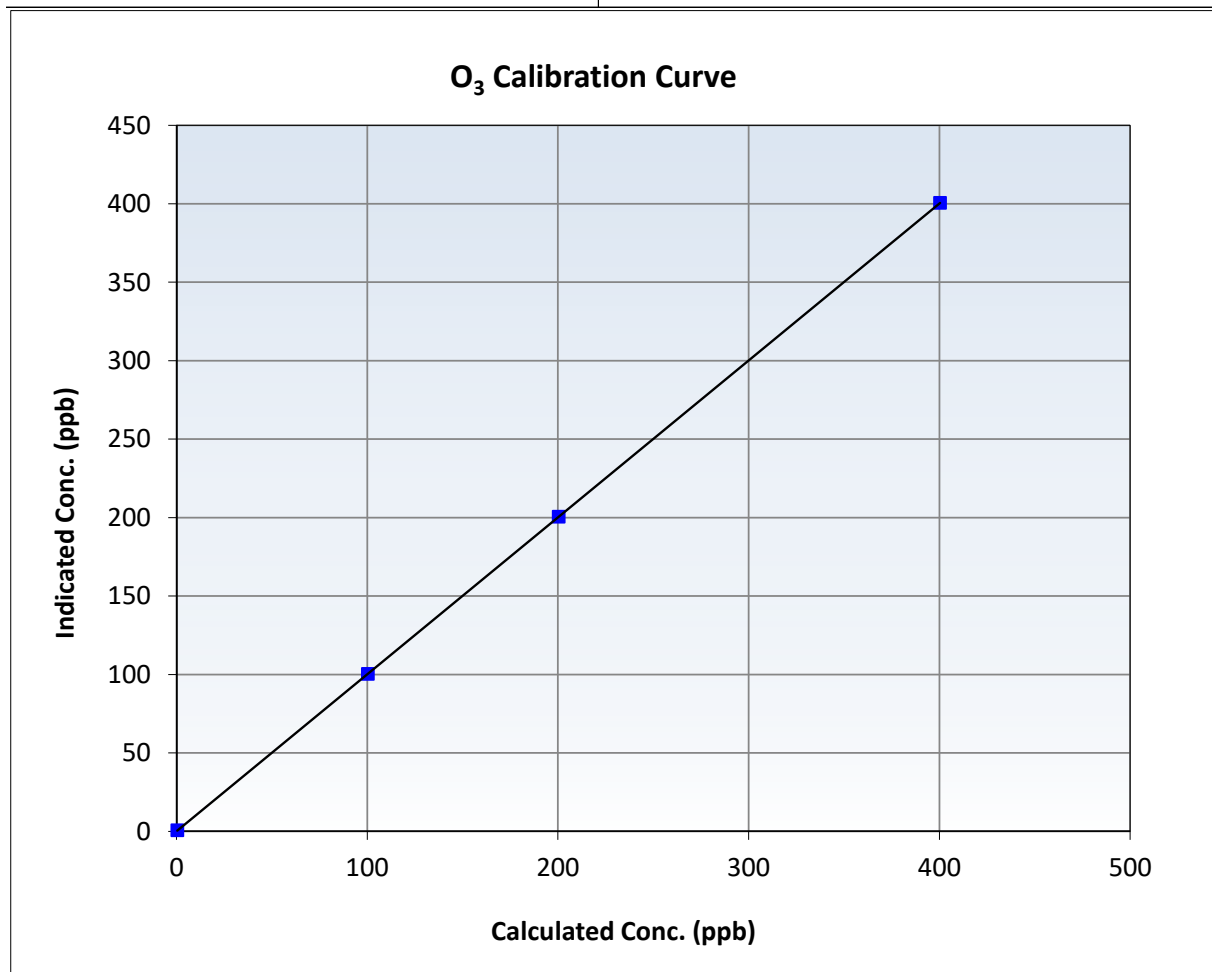
O₃ Calibration Summary

Station Information

Calibration Date:	September 6, 2024	Previous Calibration:	August 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:40	End Time (MST):	12:23
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

Calibration Data

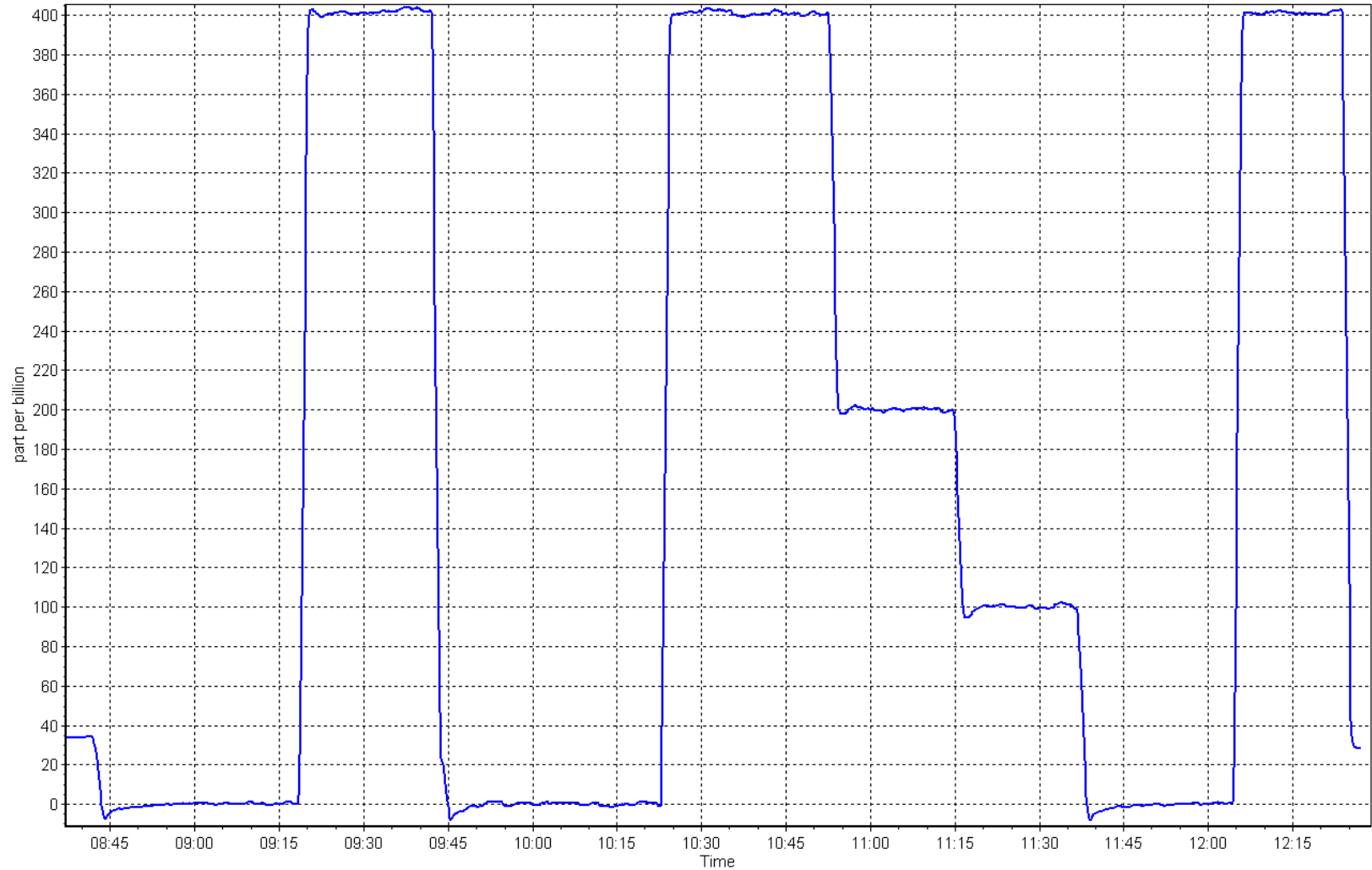
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	1.000000	≥ 0.995
400.0	400.2	0.9995	Slope	1.000143	$0.90 - 1.10$
200.0	200.1	0.9995	Intercept	0.100000	± 5
100.0	100.0	1.0000			



O₃ Calibration Plot

Date: September 6, 2024

Location: Patricia McInnes





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Patricia McInnes Station number: AMS 06
Calibration Date: September 6, 2024 Last Cal Date: August 14, 2024
Start time (MST): 12:29 End time (MST): 13:33

Analyzer Make: API T640 S/N: 766
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388754
Temp/RH standard: Alicat FP-25BT S/N: 388754

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	20.50	20.54	20.50	☐	+/- 2 °C
P (mmHg)	724.40	727.02	724.40	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.12	5.00	☐	+/- 0.25 LPM
PW% (pump)	38	----	38	☐	>80%
Zero Verification	PM w/o HEPA: 14.30		PM w/ HEPA: 0.00		<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

SPAN DUST Refractive Index: 10.9 Expiry Date: 6-10-2024
Lot No.: 100128-050-035

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.10	11.90	11.00	☒	+/- 0.5

Date Optical Chamber Cleaned: September 6, 2024
Date Disposable Filter Changed: September 6, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.00 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: April 13, 2023
Date RH/T Sensor Cleaned: April 13, 2023

Notes: Verified flow, pressure, temperature and pump power. Leak check passed. PMT adjusted.

Calibration by: Jan Castro



Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	September 3, 2024	Last Cal Date:	August 8, 2024
Start time (MST):	9:50	End time (MST):	11:30
NH3 Cal Date:	September 3, 2024	Last Cal Date:	August 8, 2024
Start time (MST):	11:30	End time (MST):	15:00
Reason:	As Found		

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 #:	N/A
Removed NO Conc:	46.39	ppm	Removed cyl Expiry:	N/A
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	76.3	ppm	NH3 Gas Cylinder #:	EB0108520
			NH3 Cal Gas Expiry:	August 22, 2024
Removed NH3 Conc:	76.3	ppm	Removed Cylinder #:	N/A
NH3 gas Diff:			Removed cyl Expiry:	N/A
Calibrator Model:	API T700		Serial Number:	3566
ZAG make/model:	API T701		Serial Number:	4602

Analyzer Information

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

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	0.859	0.859	Nt coefficient:	0.849	0.849
NOX coefficient:	0.856	0.856	NO bkgrnd:	-1.0	-1.0
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.6	-0.6
NH3 coefficient:	0.896	0.896	Nt bkgrnd:	5.0	5.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.993729	
NO _x Cal Offset:	2.017291	
NO Cal Slope:	0.997514	
NO Cal Offset:	0.363561	
NO ₂ Cal Slope:	1.014625	
NO ₂ Cal Offset:	1.555381	
NH3 Cal Slope:	0.986268	
NH3 Cal Offset:	6.470747	
Nt Cal Slope:	0.997858	
Nt Cal Offset:	7.033274	



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

NO_x / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NO _x Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>	Baseline corr NO Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.6	----	----
As found span	4914	86.2	826.5	799.7	826.5	827.0	781.8	826.0	0.9993	1.0229
AF GPT span										
new NO cyl rp										
Baseline Corr As Fd	Nt =	826.6 ppb	NO _x =	827.1 ppb	NO =	781.9 ppb			*Percent Change	Nt _(NO) = -0.6%
Previous Response	Nt =	831.72 ppb	NO _x =	823.3 ppb	NO =	798.1 ppb			*Percent Change	NO _x = 0.5%
**NO _x Δ (NO to GPT response) =									*Percent Change	NO = -2.1%
* = > +/-2% difference initiates investigation									* = > +/-5% change initiates investigation	

NO_x / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero										
High point										
Mid point										
Low point										

Average Correction Factor

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found zero	----	----	0.0	0.0	----	----
Calibration zero						
High GPT point (400 ppb O3)	781.8	437.5	371.0	389.5	0.9526	105.0%
Mid GPT point (200 ppb O3)						
Low GPT point (100 ppb O3)						

Average Correction Factor 0.9526 105.0%



Wood Buffalo Environmental Association NH₃ - N_T Calibration Report

NH₃ As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH ₃ concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH ₃ concentration (ppb) (Ic)	Baseline corr Nt Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>	Baseline corr NH ₃ Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.1	-0.5	----	----
AF High point	3417	82.6	1800.6	0.0	1800.6	1804.9	166.1	1638.7	0.997	1.098
AF Mid point	3454	45.9	1000.5	0.0	1000.5	1007.4	94.5	913.1	0.993	1.095
AF Low point	3477	22.9	499.2	0.0	499.2	513.2	57.3	455.9	0.972	1.094
new NH ₃ cyl rp										
Baseline Corr As Fd	Nt = 1805.5 ppb	NH ₃ = 1639.2 ppb						*Percent Change	Nt _(NH₃) = 0.1%	
Previous Response	Nt = 1803.8 ppb	NH ₃ = 1782.4 ppb		* = > +/-5% change initiates investigation				*Percent Change	NH ₃ = -8.7%	

NH₃ Calibration Data

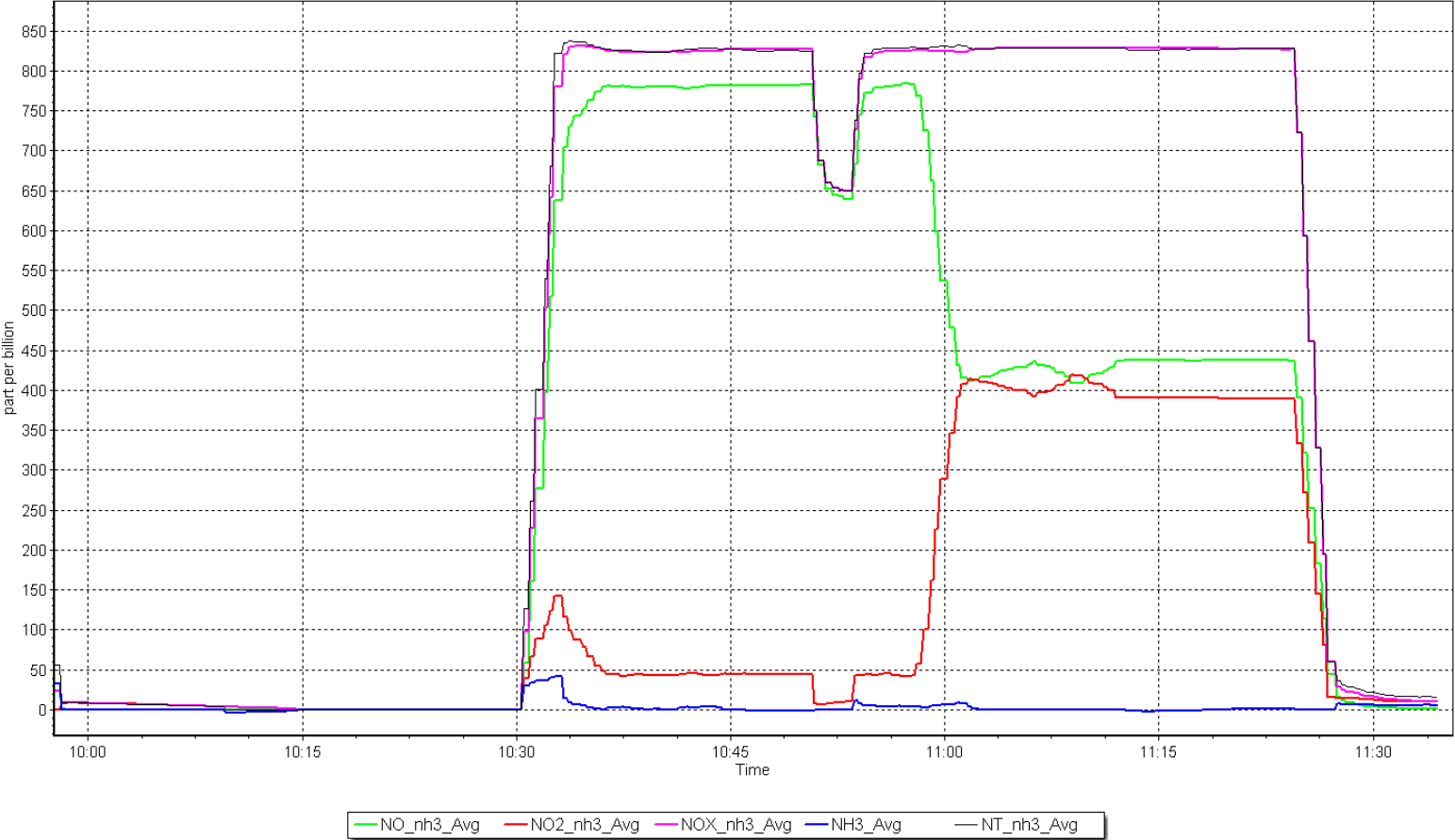
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH ₃ concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH ₃ concentration (ppb) (Ic)	Nt Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH ₃ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero										
High point										
Mid point										
Low point										
Average Correction Factor										
NH ₃ Previous Converter Efficiency =			90.8 %							
NH ₃ Current Converter Efficiency =			90.8 %							

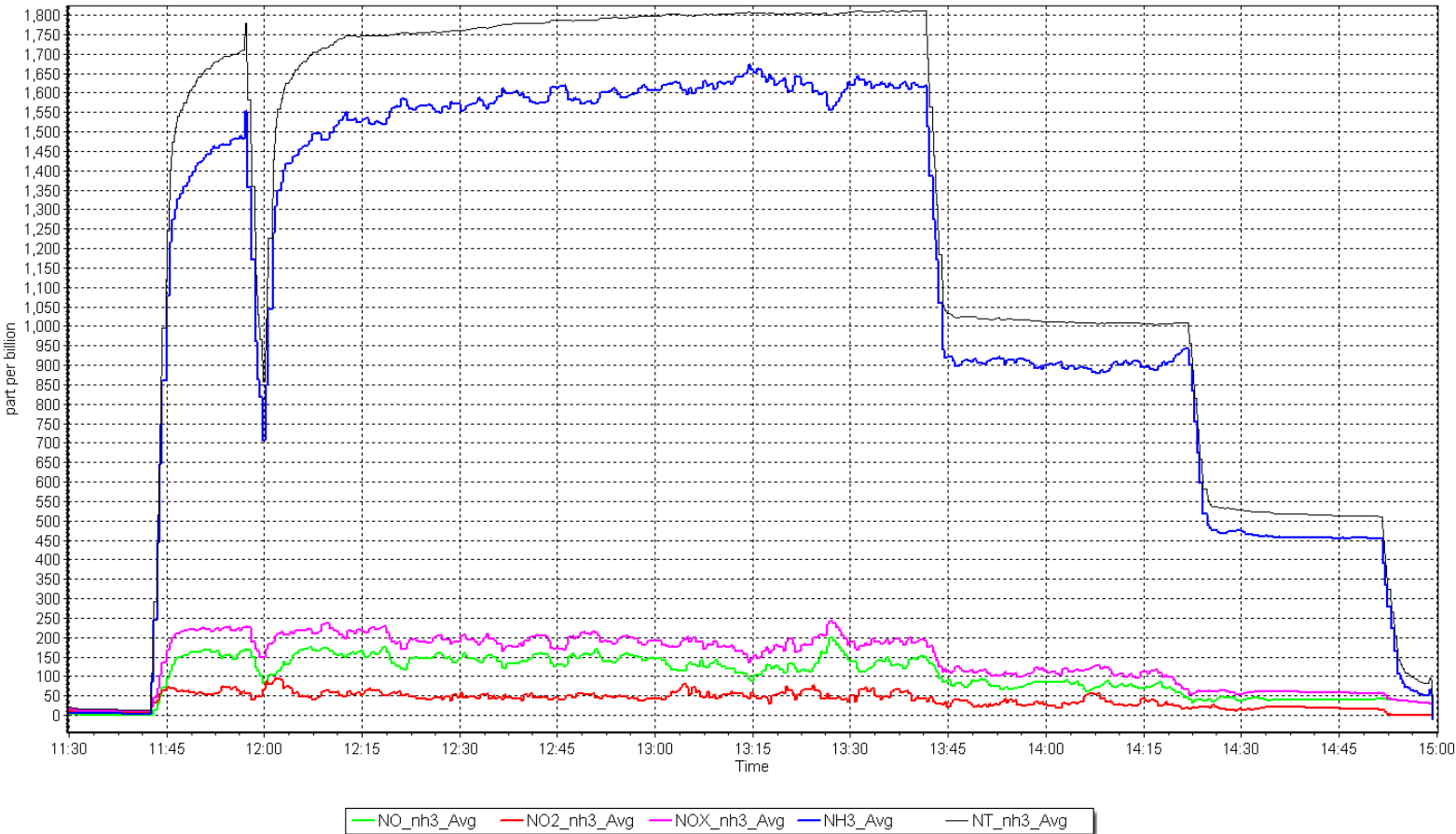
Notes:

As founds performed to replace instrument for maintenance purposes.

Calibration Performed By:

Kelly Baragar







Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	September 4, 2024	Last Cal Date:	NA
Start time (MST):	8:30	End time (MST):	12:25
NH3 Cal Date:	September 4, 2024	Last Cal Date:	NA
Start time (MST):	12:45	End time (MST):	15:55
Reason:	Install		

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 #:	N/A
Removed NO Conc:	46.39	ppm	Removed cyl Expiry:	N/A
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	76.3	ppm	NH3 Gas Cylinder #:	EB0108520
			NH3 Cal Gas Expiry:	August 22, 2024
Removed NH3 Conc:	76.3	ppm	Removed Cylinder #:	N/A
NH3 gas Diff:			Removed cyl Expiry:	N/A
Calibrator Model:	API T700		Serial Number:	3566
ZAG make/model:	API T701		Serial Number:	4602

Analyzer Information

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

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:	NA	0.986	Nt coefficient:	NA	0.977
NOX coefficient:	NA	0.976	NO bkgnd:	NA	-2.1
NO2 coefficient:	NA	1.000	NOX bkgnd:	NA	-2.0
NH3 coefficient:	NA	0.912	Nt bkgnd:	NA	0.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:		0.998032
NO _x Cal Offset:		2.035807
NO Cal Slope:		0.996759
NO Cal Offset:		1.202925
NO ₂ Cal Slope:		0.999656
NO ₂ Cal Offset:		-0.498440
NH3 Cal Slope:		0.980720
NH3 Cal Offset:		7.323200
Nt Cal Slope:		0.984525
Nt Cal Offset:		7.509565



Wood Buffalo Environmental Association

NO_x - NO - NO₂ Calibration Report

NO_x / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NO _x Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>	Baseline corr NO Correction factor (Cc/Ic) <i>Limit = 0.9 - 1.0</i>
As found zero										
As found span										
AF GPT span										
new NO cyl rp										
Baseline Corr As Fd	Nt =	NA ppb	NO _x =	NA ppb	NO =	NA ppb			*Percent Change	Nt _(NO) = NA
Previous Response	Nt =	NA ppb	NO _x =	NA ppb	NO =	NA ppb			*Percent Change	NO _x = NA
**NO _x Δ (NO to GPT response) =									*Percent Change	NO = NA
* = > +/-2% difference initiates investigation									* = > +/-5% change initiates investigation	

NO_x / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero	5000	0.0	0.0	0.0	0.0	0.1	-0.3	0.0	----	----
High point	4914	86.2	826.5	799.7	826.5	826.2	797.8	827.7	1.0003	1.0024
Mid point	4957	43.1	413.2	399.9	413.2	414.5	399.9	415.9	0.9969	0.9999
Low point	4978	21.6	207.1	200.4	207.1	211.3	202.9	211.9	0.9802	0.9878
Average Correction Factor									0.9925	0.9967

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found zero						
Calibration zero	----	----	0.0	0.4	----	----
High GPT point (400 ppb O3)	797.9	393.1	431.5	431.0	1.0012	99.9%
Mid GPT point (200 ppb O3)	797.9	599.8	224.8	225.0	0.9992	100.1%
Low GPT point (100 ppb O3)	797.9	698.7	125.9	123.6	1.0188	98.2%
Average Correction Factor					1.0064	99.4%



Wood Buffalo Environmental Association NH₃ - N_T Calibration Report

NH₃ As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Baseline corr Nt Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) <i>Limit = 0.9 - 1.1</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
AF High point										
AF Mid point										
AF Low point										
new NH3 cyl rp										
Baseline Corr As Fd	Nt =	NA ppb	NH3 =	NA ppb					*Percent Change	Nt _(NH3) = NA
Previous Response	Nt =	NA ppb	NH3 =	NA ppb					*Percent Change	NH3 = NA

* = > +/-5% change initiates investigation

NH₃ Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Nt Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibration zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
High point	3417	82.6	1800.6	0.0	1800.6	1773.0	7.0	1766.0	1.016	1.020
Mid point	3454	45.9	1000.5	0.0	1000.5	1004.0	4.2	1000.0	0.997	1.001
Low point	3477	22.9	499.2	0.0	499.2	502.3	2.2	500.1	0.994	0.998
Average Correction Factor									1.0020	1.0061
NH3 Previous Converter Efficiency =			NA %							
NH3 Current Converter Efficiency =			91.2 %							

Notes: Install calibration. Sample inlet filters changed before NOx calibrator zero. Adjusted zero and span for NOx and TNx. Adjusted span for NH3.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

Nt Calibration Summary

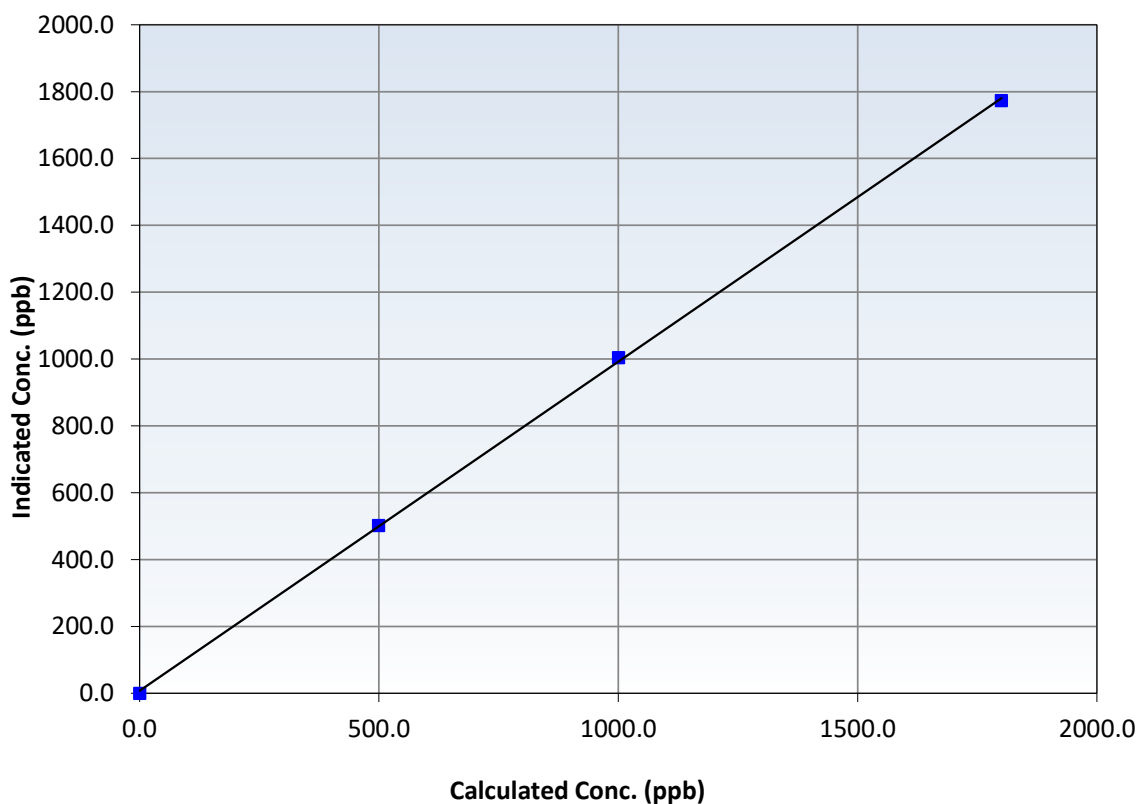
Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	NA
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:30	End Time (MST):	12:25
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999853	≥ 0.995
1800.6	1773.0	1.0156	Slope	0.984525	$0.90 - 1.10$
1000.5	1004.0	0.9965	Intercept	7.509565	± 20
499.2	502.3	0.9938			

TN Calibration Curve





Wood Buffalo Environmental Association

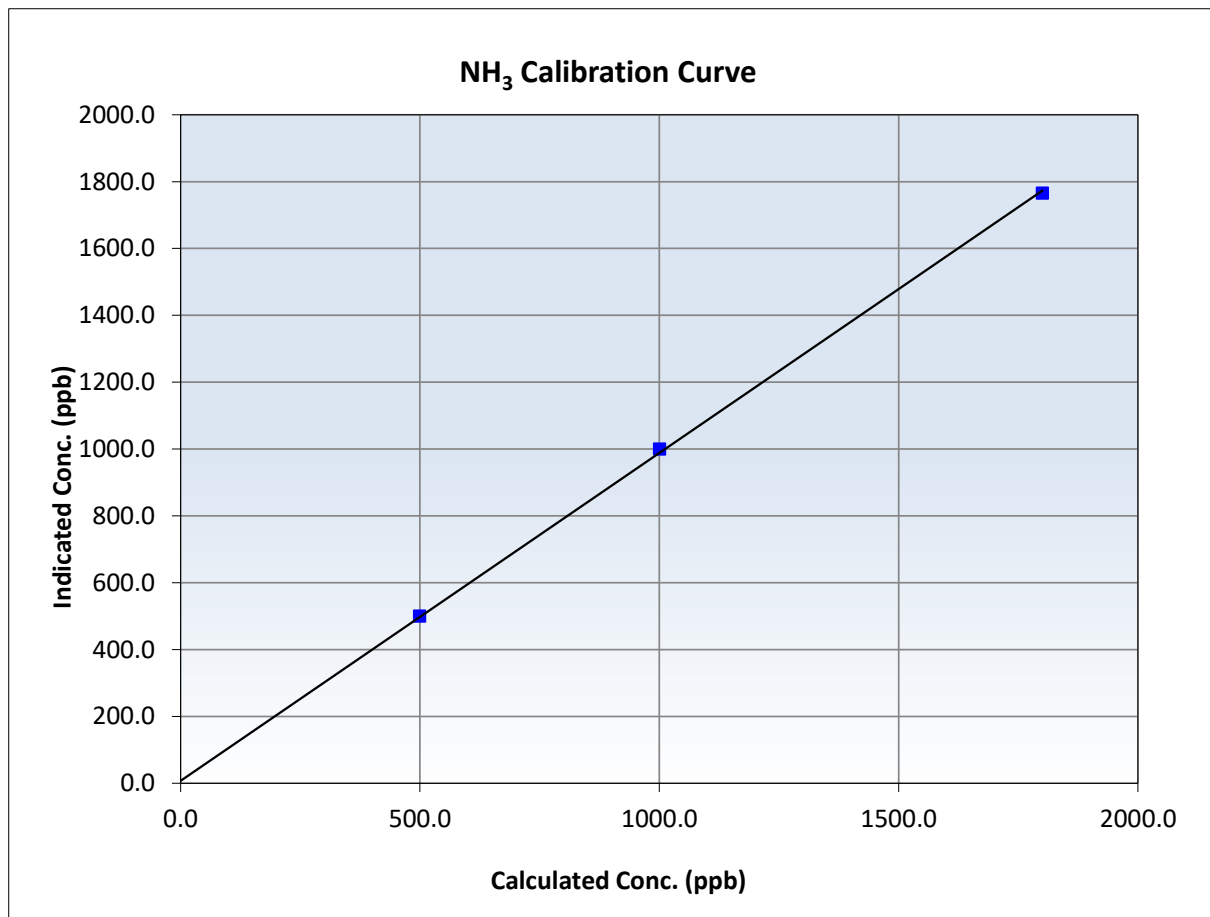
NH₃ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	NA
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:30	End Time (MST):	12:25
Analyzer make:	API T201	Analyzer serial #:	808

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	0.999854	<i>≥0.995</i>
1800.6	1766.0	1.0196	Slope	0.980720	<i>0.90 - 1.10</i>
1000.5	1000.0	1.0005	Intercept	7.323200	<i>+/-20</i>
499.2	500.1	0.9981			





Wood Buffalo Environmental Association

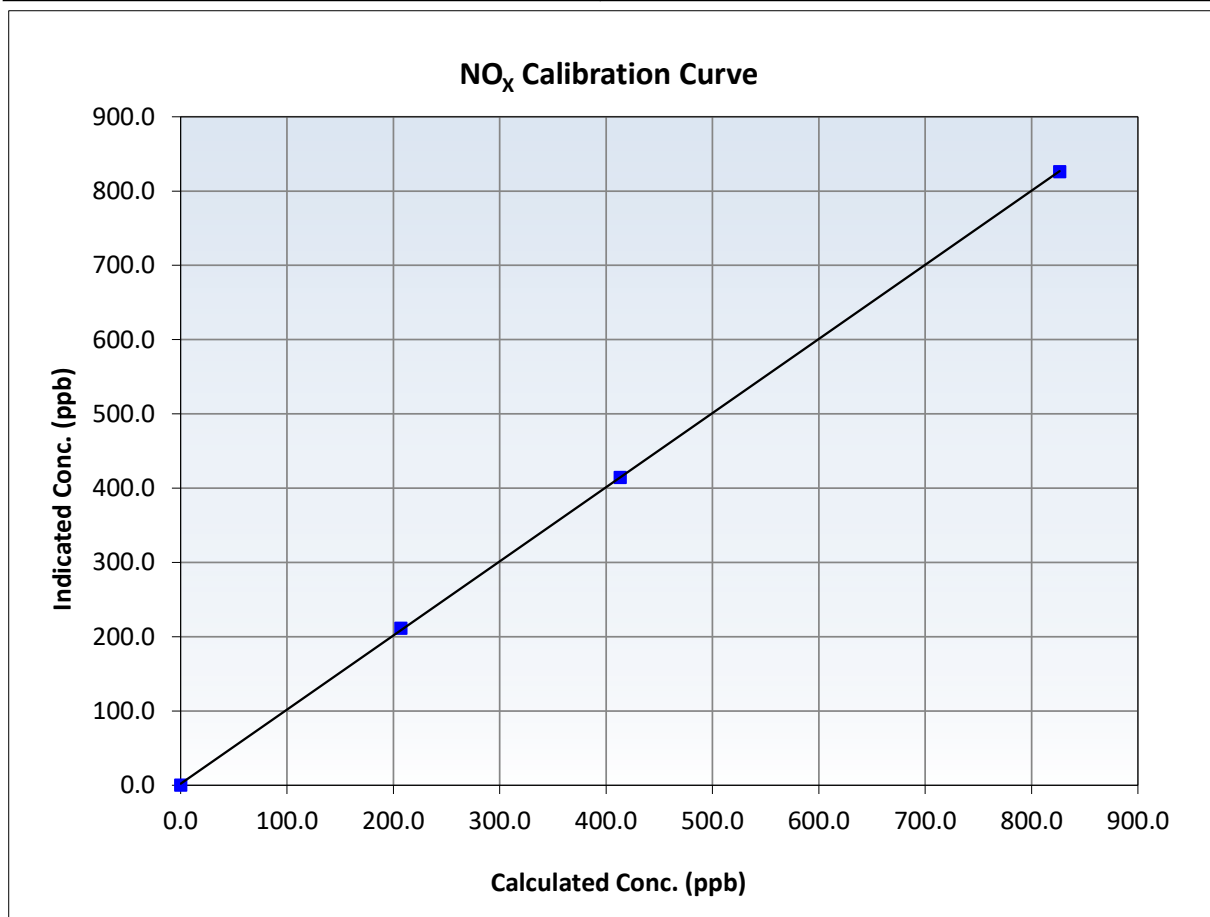
NO_x Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	NA
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:30	End Time (MST):	12:25
Analyzer make:	API T201	Analyzer serial #:	808

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	0.999971	<i>≥0.995</i>
826.5	826.2	1.0003	Slope	0.998032	<i>0.90 - 1.10</i>
413.2	414.5	0.9969	Intercept	2.035807	<i>+/-20</i>
207.1	211.3	0.9802			





Wood Buffalo Environmental Association

NO Calibration Summary

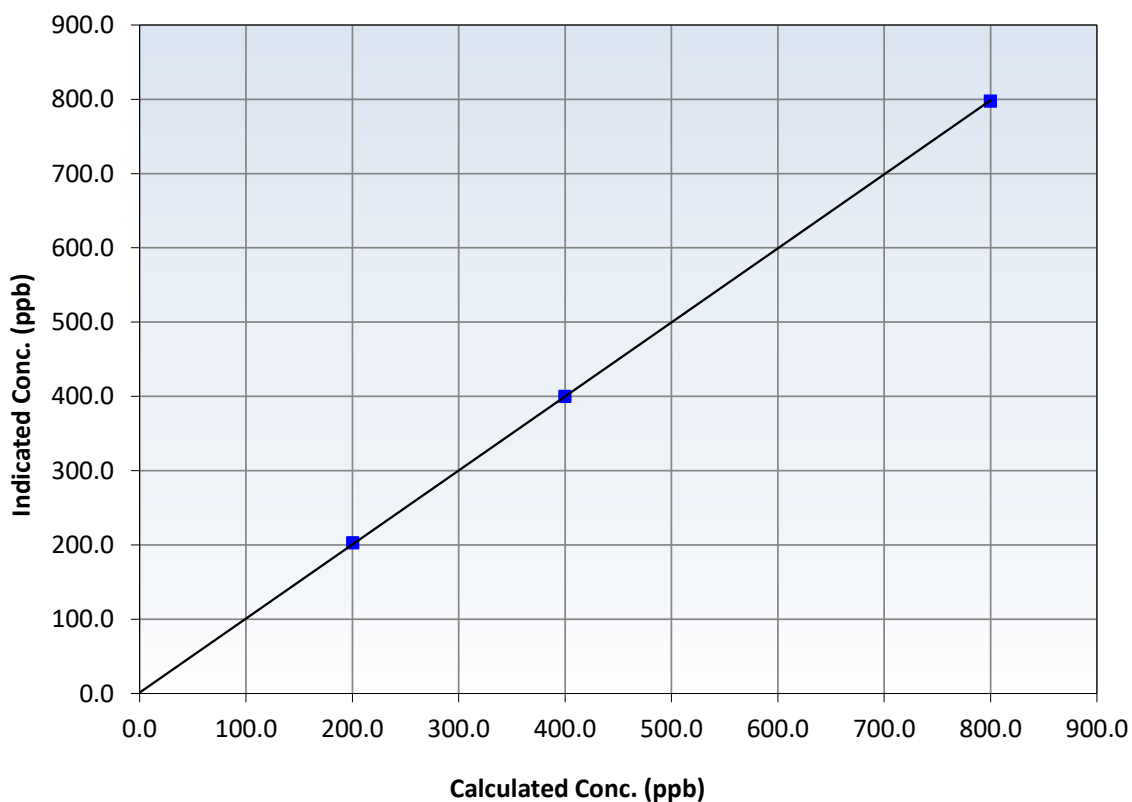
Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	NA
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:30	End Time (MST):	12:25
Analyzer make:	API T201	Analyzer serial #:	808

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	0.999982	≥ 0.995
799.7	797.8	1.0024	Slope	0.996759	0.90 - 1.10
399.9	399.9	0.9999	Intercept	1.202925	+/-20
200.4	202.9	0.9878			

NO Calibration Curve





Wood Buffalo Environmental Association

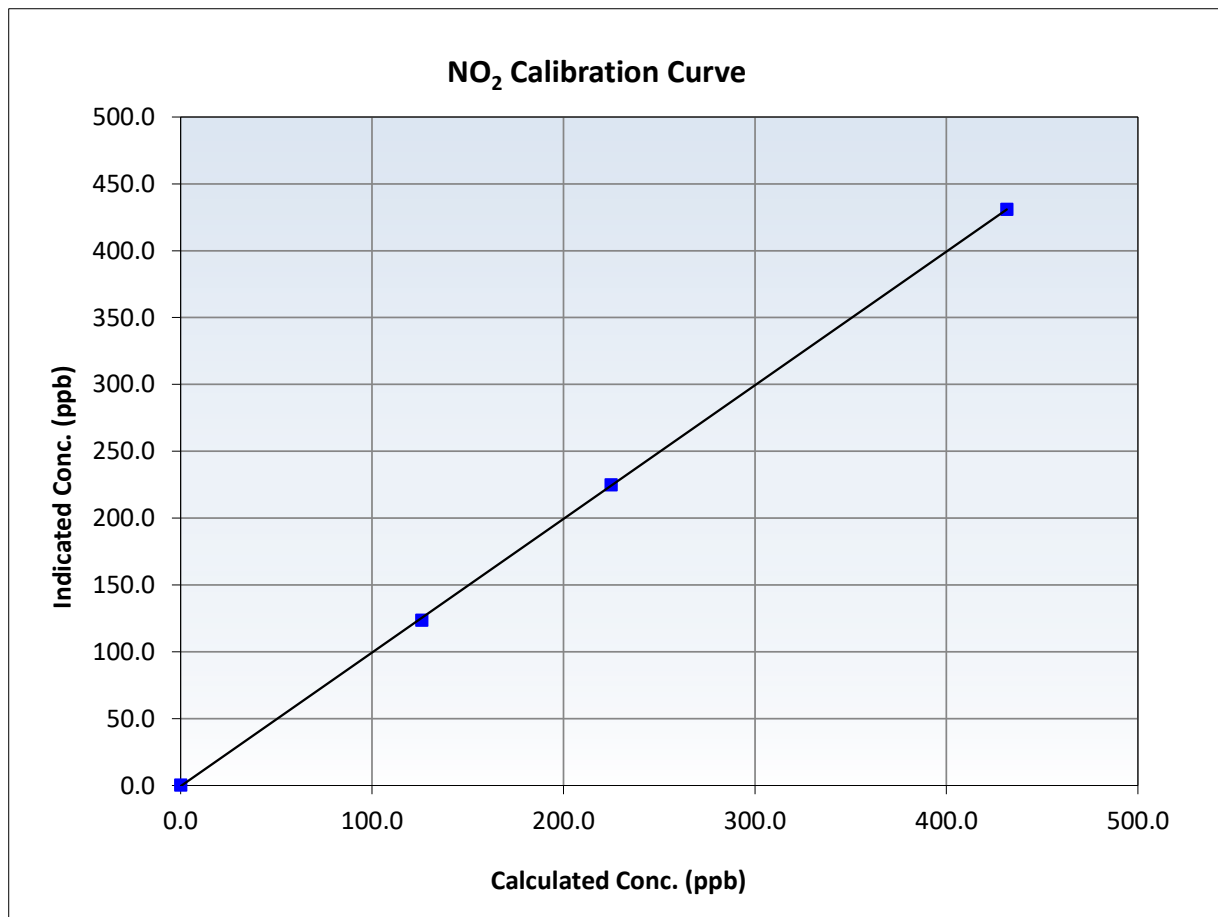
NO₂ Calibration Summary

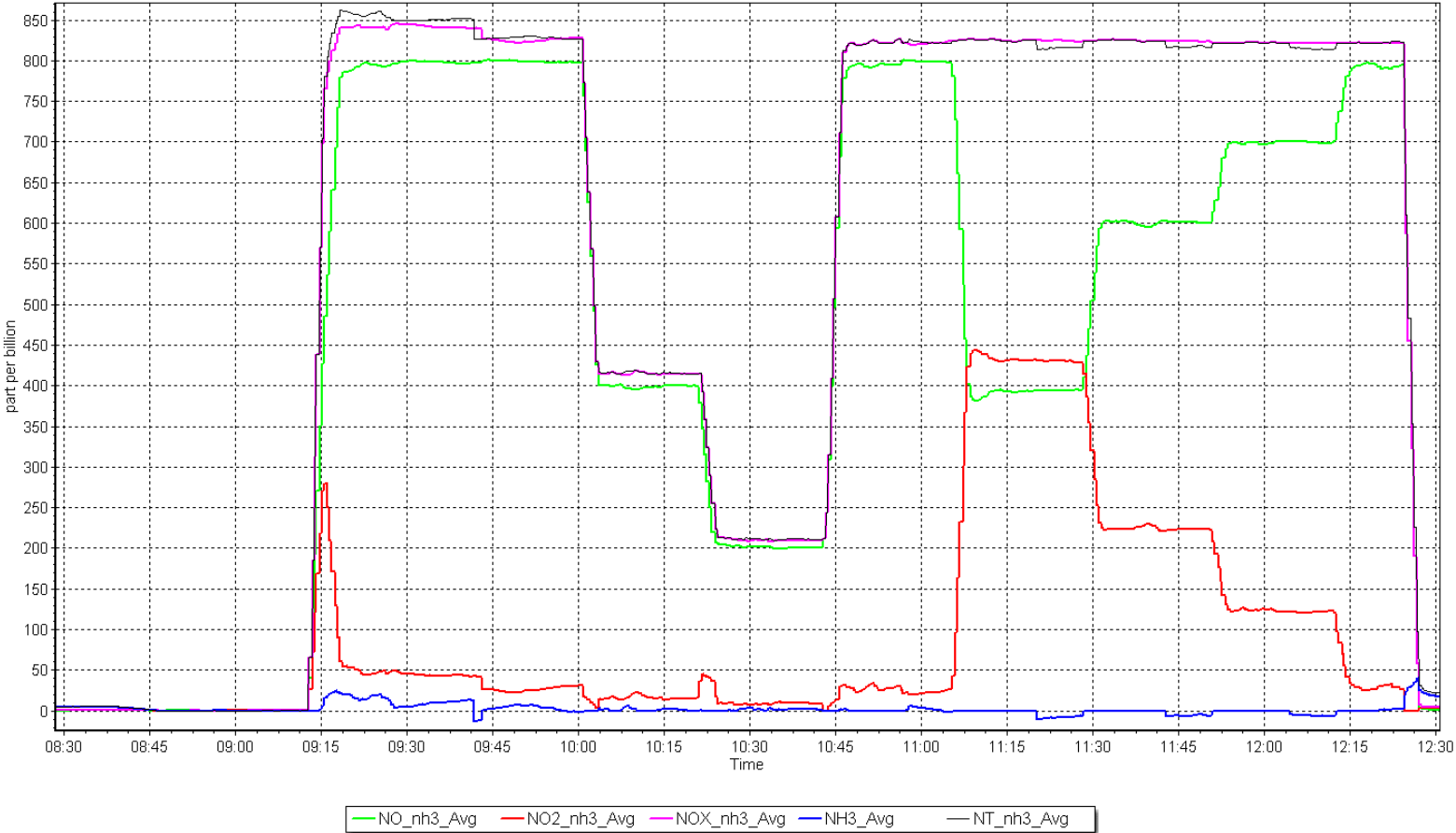
Station Information

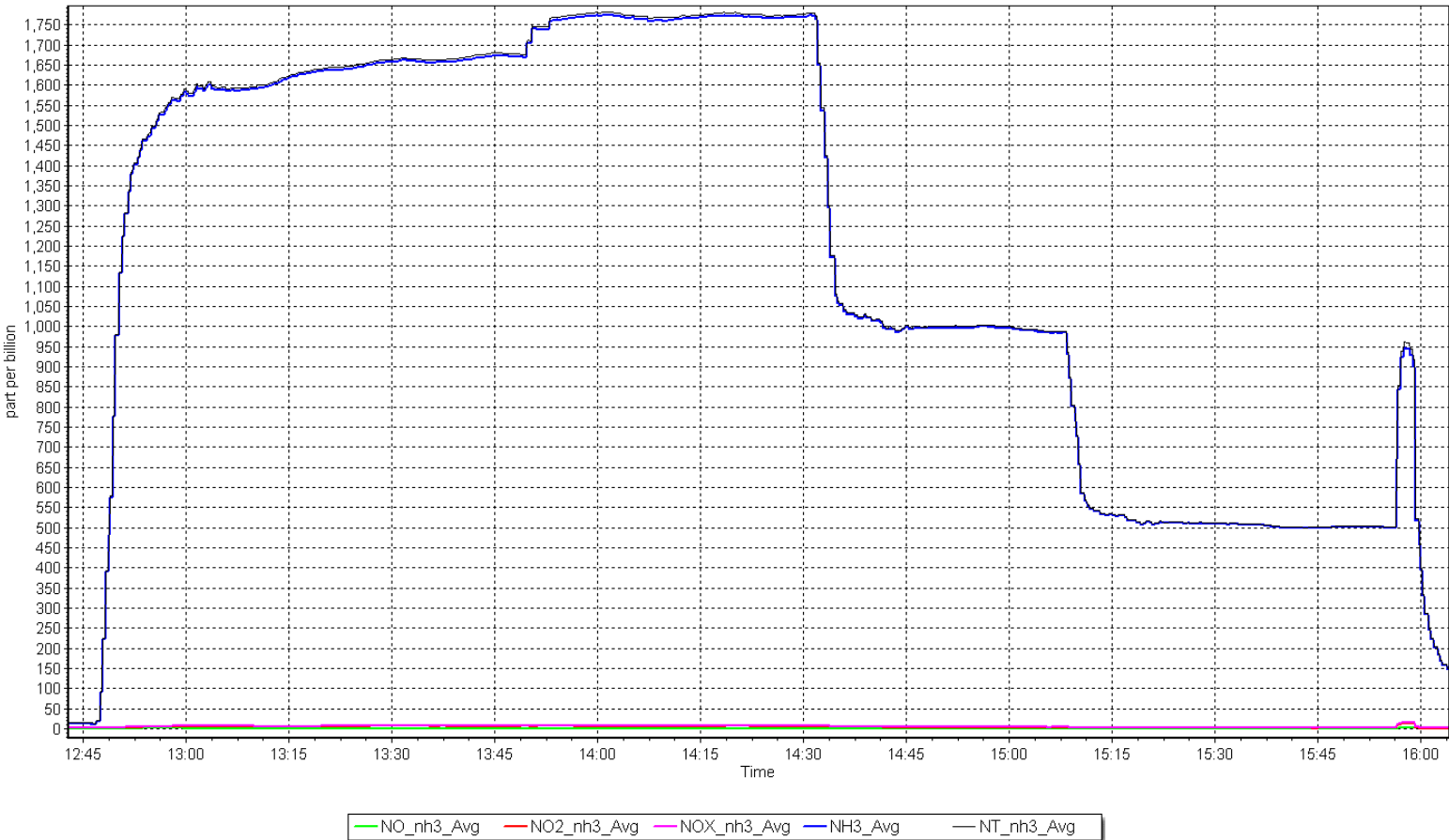
Calibration Date:	September 4, 2024	Previous Calibration:	NA
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:30	End Time (MST):	12:25
Analyzer make:	API T201	Analyzer serial #:	808

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	0.999954	≥ 0.995
431.5	431.0	1.0012	Slope	0.999656	$0.90 - 1.10$
224.8	225.0	0.9992	Intercept	-0.498440	± 20
125.9	123.6	1.0188			









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS07 ATHABASCA VALLEY SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Athabasca Valley Station number: AMS07
Calibration Date: September 4, 2024 Last Cal Date: August 12, 2024
Start time (MST): 10:04 End time (MST): 13:15
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.06 ppm Cal Gas Exp Date: March 10, 2031
Cal Gas Cylinder #: CC320556
Removed Cal Gas Conc: 50.06 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 3805
Zero Air Gen Model: API 701H Serial Number: 198

Analyzer Information

Analyzer make: Thermo 43i-LTE Serial Number: 1507864683
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002351	0.997027	Backgd or Offset:	2.64	2.64
Calibration intercept:	1.223977	1.285471	Coeff or Slope:	0.834	0.834

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	79.8	799.0	793.7	1.007
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.7	Previous response	802.1	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	79.8	799.0	796.5	1.003
Mid point	4960	39.9	399.5	402.7	0.992
Low point	4980	20.0	200.2	200.3	1.000
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.0	797.2	1.002
Average Correction Factor:					0.998

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

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

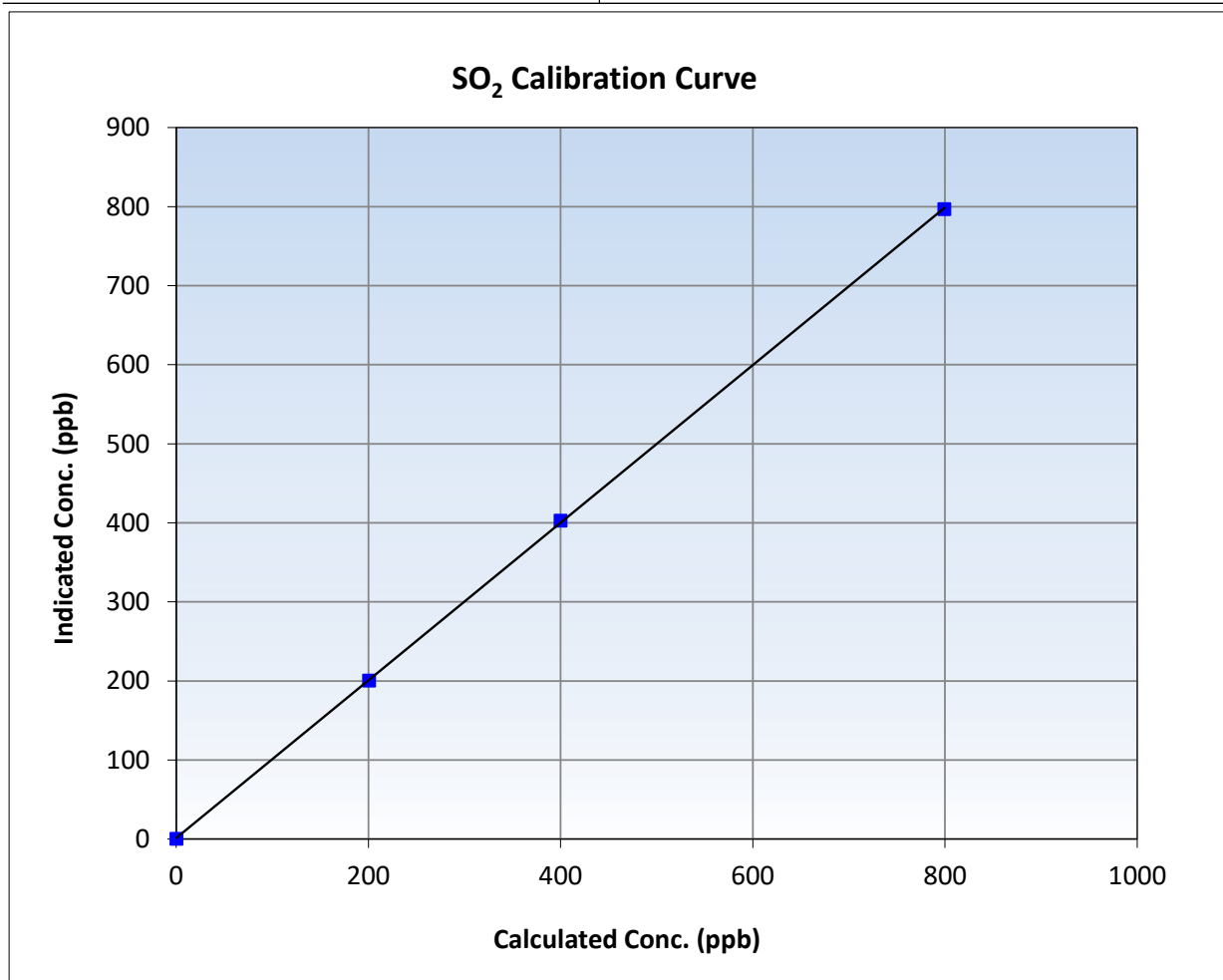
SO₂ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 12, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:04	End Time (MST):	13:15
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

Calibration Data

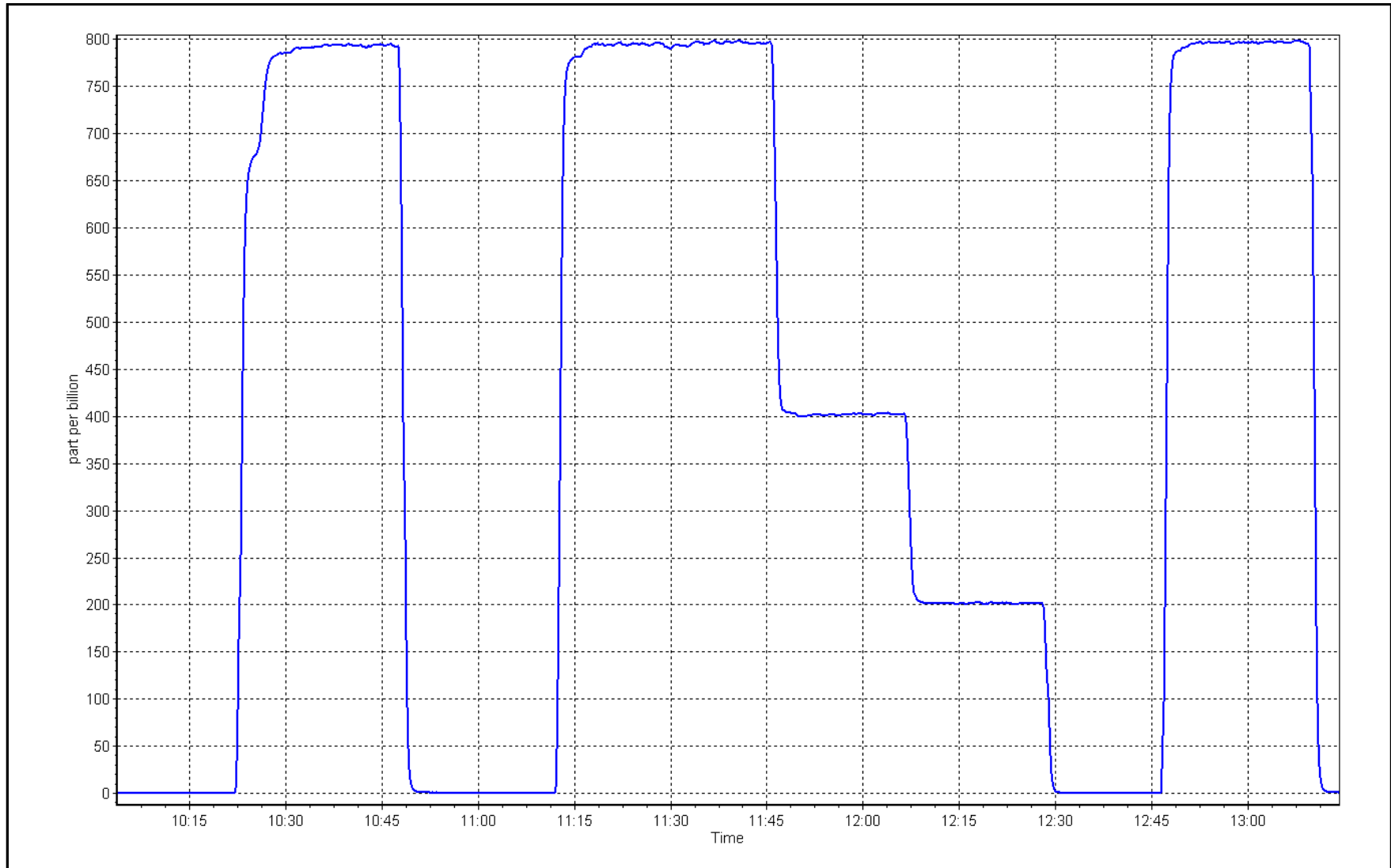
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999962	≥0.995
799.0	796.5	1.0031	Slope	0.997027	0.90 - 1.10
399.5	402.7	0.9920	Intercept	1.285471	+/-30
200.2	200.3	0.9997			



SO2 Calibration Plot

Date: September 4, 2024

Location: Athabasca Valley





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Athabasca Valley Station number: AMS07
Calibration Date: September 20, 2024 Last Cal Date: August 8, 2024
Start time (MST): 9:34 End time (MST): 14:22
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.25 ppm Cal Gas Exp Date: January 3, 2026
Cal Gas Cylinder #: CC504080
Removed Cal Gas Conc: 5.25 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 3805
ZAG Make/Model: API T701H Serial Number: 198

Analyzer Information

Analyzer make: Thermo 43i LTE Analyzer serial #: 1180540018
Converter make: CDN-101 Converter serial #: 551
Analyzer Range: 0 - 100 ppb Converter Temp: 840 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.016069	1.005689	Backgd or Offset:	2.8
Calibration intercept:	-0.202273	-0.242146	Coeff or Slope:	0.944

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4925	75.5	79.3	82.5	0.956
As found Mid point	4962	37.7	39.6	40.9	0.959
As found Low point	4981	18.9	19.8	20.1	0.968
New cylinder response					
Baseline Corr As found:	82.9	Prev response:	80.34	*% change:	3.1%
Baseline Corr 2nd AF pt:	41.3	AF Slope:	1.046787	AF Intercept:	-0.522287
Baseline Corr 3rd AF pt:	20.5	AF Correlation:	0.999989	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4925	75.5	79.3	79.5	0.998
Mid point	4962	37.7	39.6	39.7	0.998
Low point	4981	18.9	19.9	19.6	1.013
As left zero	5000	0.0	0.0	0.1	----
As left span	4925	75.5	79.3	79.3	1.000
SO2 Scrubber Check	4920	79.2	792.1	0.0	----
Date of last scrubber change:	25-Feb-22		Ave Corr Factor		1.003
Date of last converter efficiency test:	April 22, 2022				

Notes: Sample inlet filters changed after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

TRS Calibration Summary

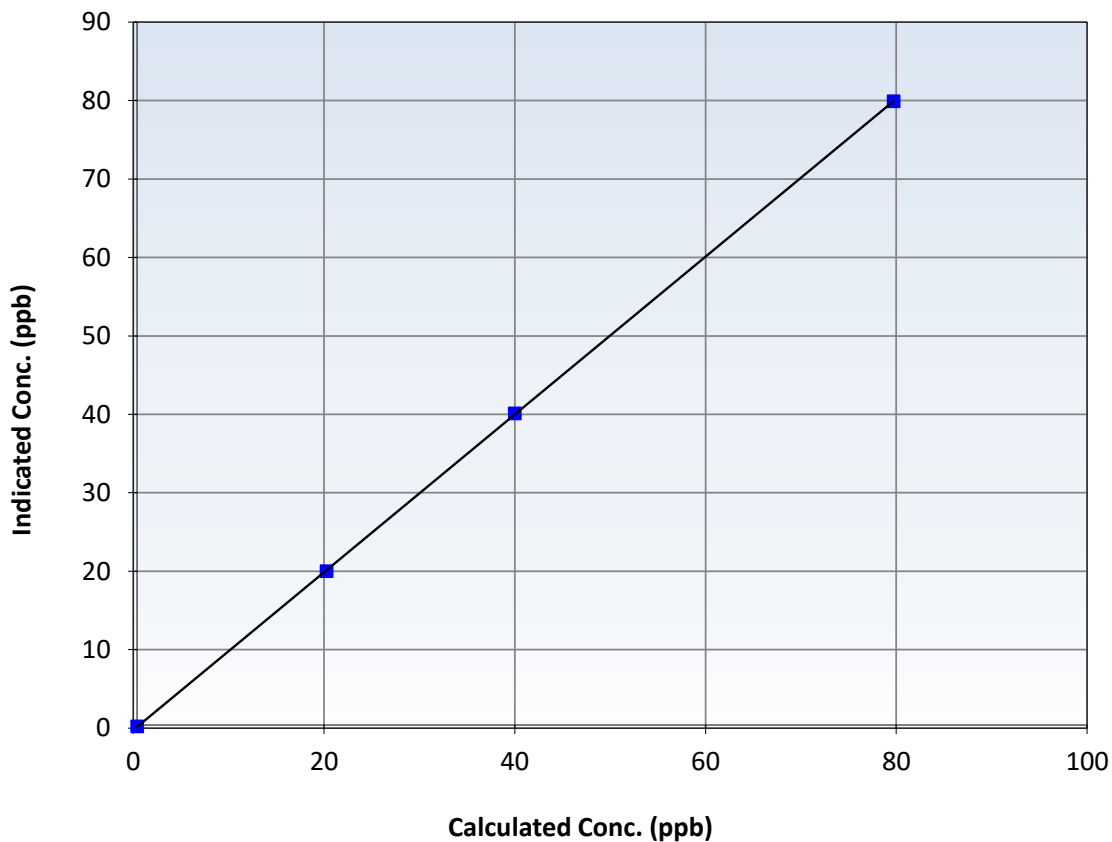
Station Information

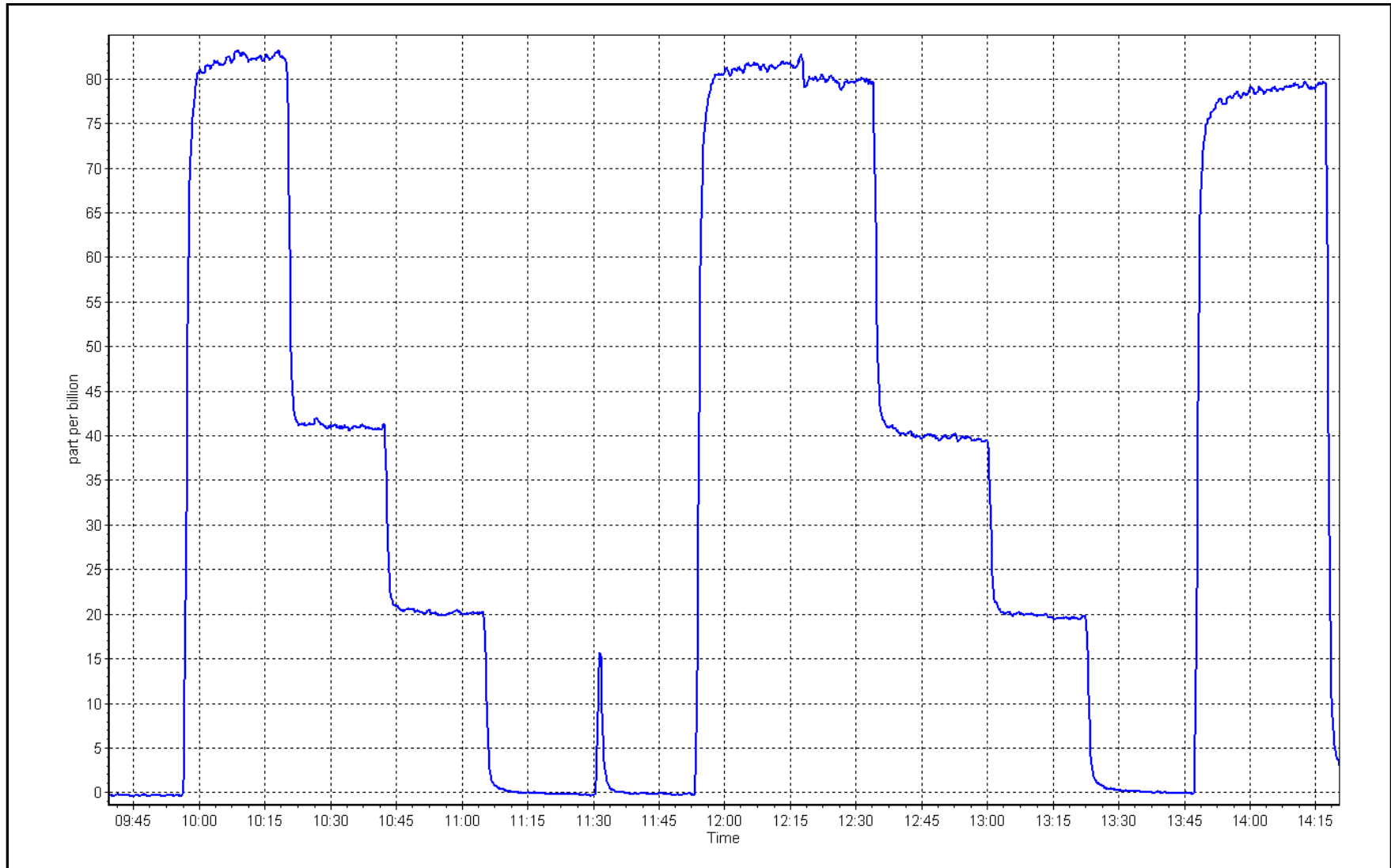
Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	9:34	End Time (MST):	14:22
Analyzer make:	Thermo 43i LTE	Analyzer serial #:	1180540018

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	0.999991		≥ 0.995
79.3	79.5	0.9976	Slope	1.005689		$0.90 - 1.10$
39.6	39.7	0.9977	Intercept	-0.242146		± 3
19.9	19.6	1.0131				

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Athabasca Valley
Calibration Date: September 4, 2024
Start time (MST): 10:04
Reason: Routine

Station number: AMS 07
Last Cal Date: August 12, 2024
End time (MST): 13:15

Calibration Standards

Gas Cert Reference:	CC320556	Cal Gas Expiry Date:	March 10, 2031
CH ₄ Cal Gas Conc.	496.0 ppm	CH ₄ Equiv Conc.	1059.8 ppm
C ₃ H ₈ Cal Gas Conc.	205.0 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH ₄ Conc.	496.0 ppm	CH ₄ Equiv Conc.	1059.8 ppm
Removed C ₃ H ₈ Conc.	205.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	3805
Zero Air Gen model:	Teledyne API T701H	Serial Number:	198

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 12227620777
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.97E-04	2.94E-04	NMHC SP Ratio:	6.80E-05
CH ₄ Retention time:	13.4	13.4	NMHC Peak Area:	132319
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	16.91	17.20	0.984
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.20	Prev response	16.88	*% change	1.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	16.91	16.91	1.000
Mid point	4960	39.9	8.46	8.38	1.009
Low point	4980	20.0	4.24	4.21	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	16.91	16.86	1.003
Average Correction Factor					1.005

Notes:

Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	79.8	9.00	9.13	0.986
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.13	Prev response	8.98	*% change	1.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.00	9.01	0.998
Mid point	4960	39.9	4.50	4.48	1.003
Low point	4980	20.0	2.26	2.26	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.00	8.97	1.003
Average Correction Factor					1.000

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	79.8	7.92	8.07	0.981
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.07	Prev response	7.90	*% change	2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	7.92	7.90	1.002
Mid point	4960	39.9	3.96	3.90	1.016
Low point	4980	20.0	1.98	1.95	1.018
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	7.92	7.89	1.003
Average Correction Factor					1.012

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.998854	1.000003
THC Cal Offset:	-0.018332	-0.026337
CH ₄ Cal Slope:	0.999964	0.998404
CH ₄ Cal Offset:	-0.020533	-0.023129
NMHC Cal Slope:	0.997548	1.001283
NMHC Cal Offset:	0.003001	-0.003208

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

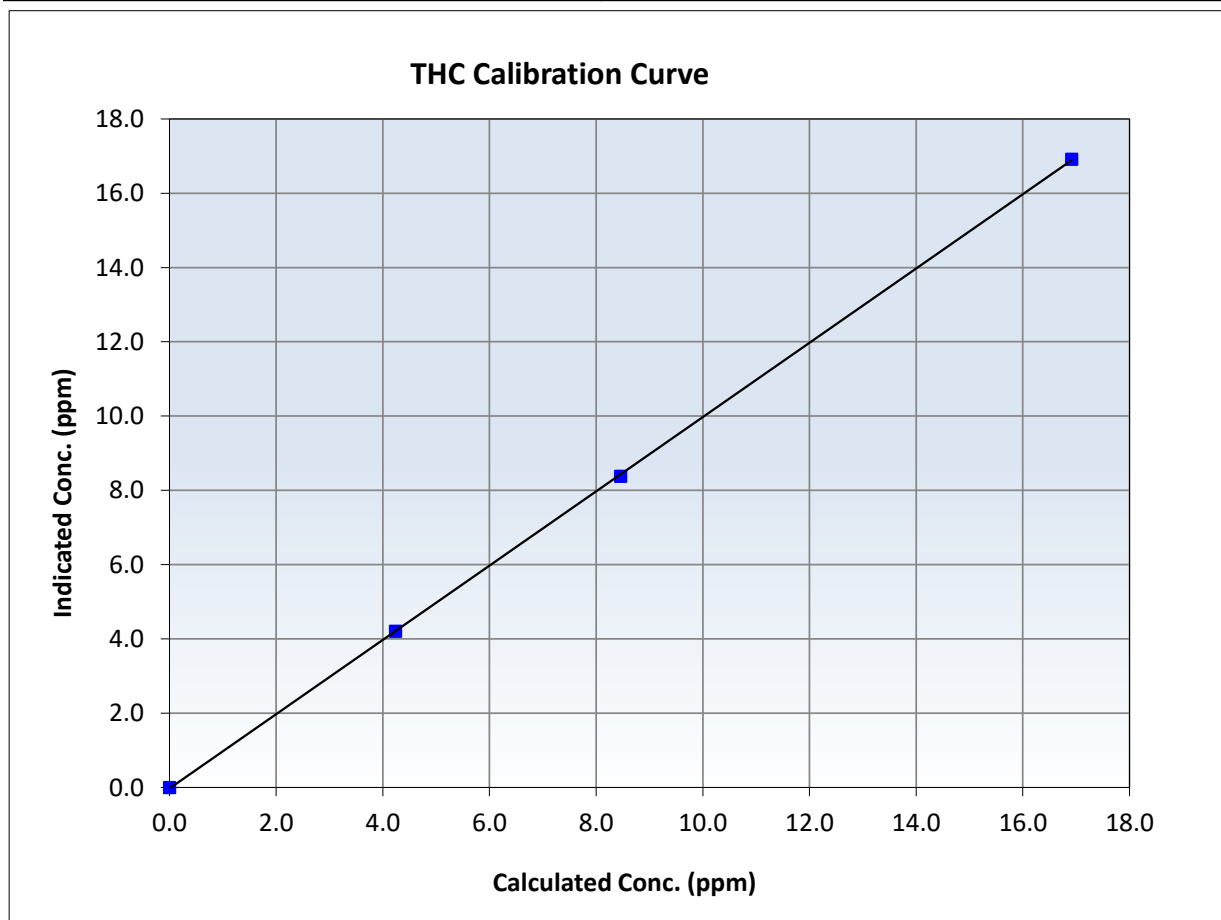
THC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 12, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:04	End Time (MST):	13:15
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999976	≥ 0.995
16.91	16.91	1.0001	Slope	1.000003	$0.90 - 1.10$
8.46	8.38	1.0089	Intercept	-0.026337	± 0.5
4.24	4.21	1.0069			





Wood Buffalo Environmental Association

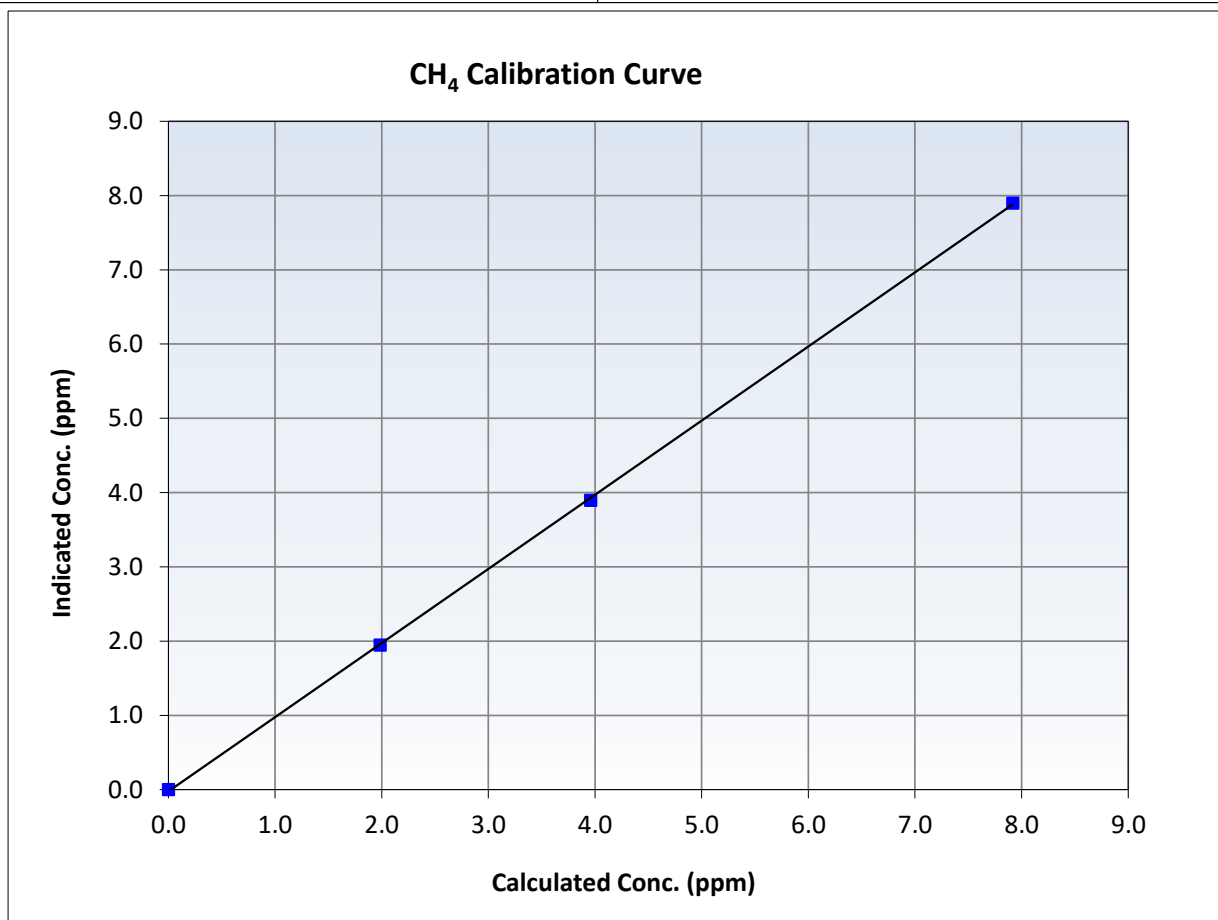
CH₄ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 12, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:04	End Time (MST):	13:15
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999942	≥ 0.995
7.92	7.90	1.0022	Slope	0.998404	$0.90 - 1.10$
3.96	3.90	1.0157	Intercept	-0.023129	± 0.5
1.98	1.95	1.0185			





Wood Buffalo Environmental Association

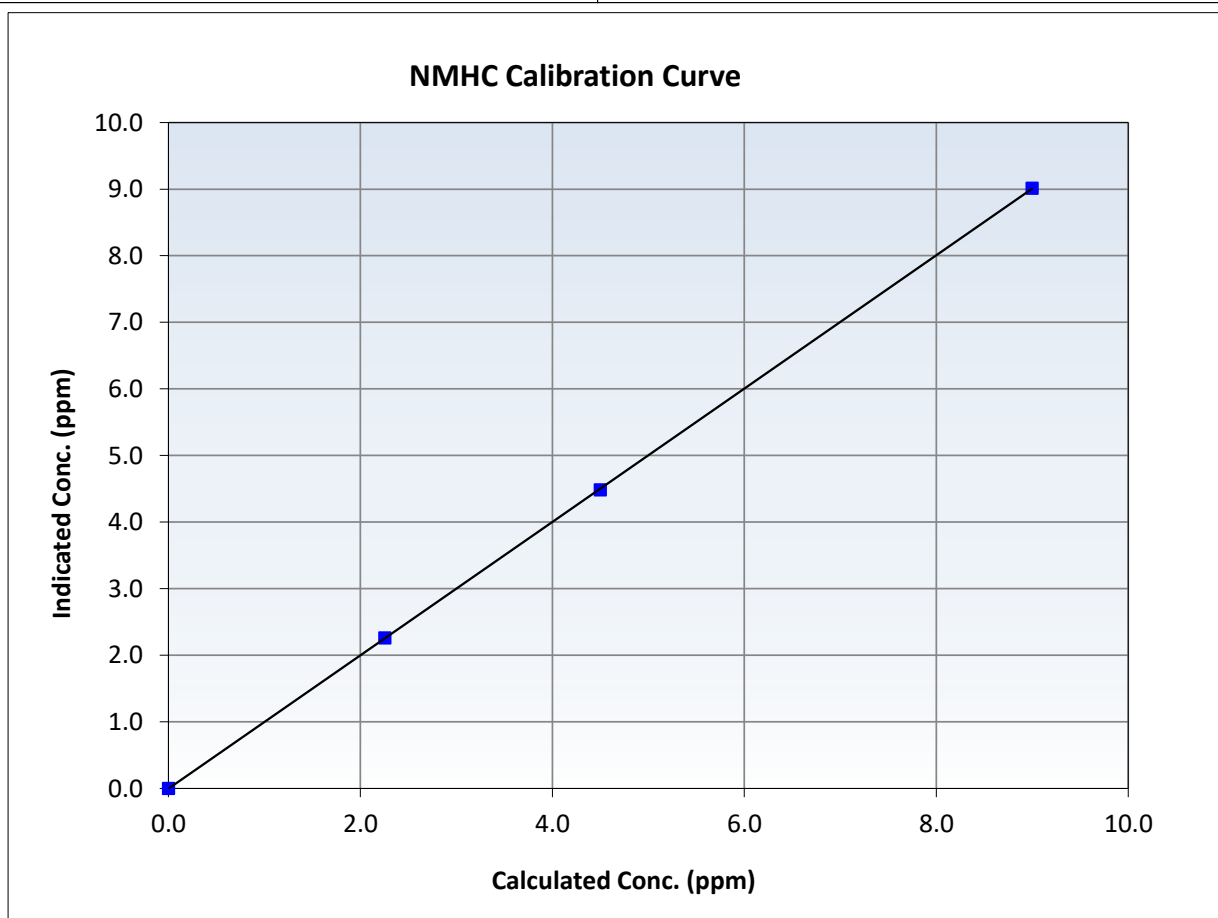
NMHC Calibration Summary

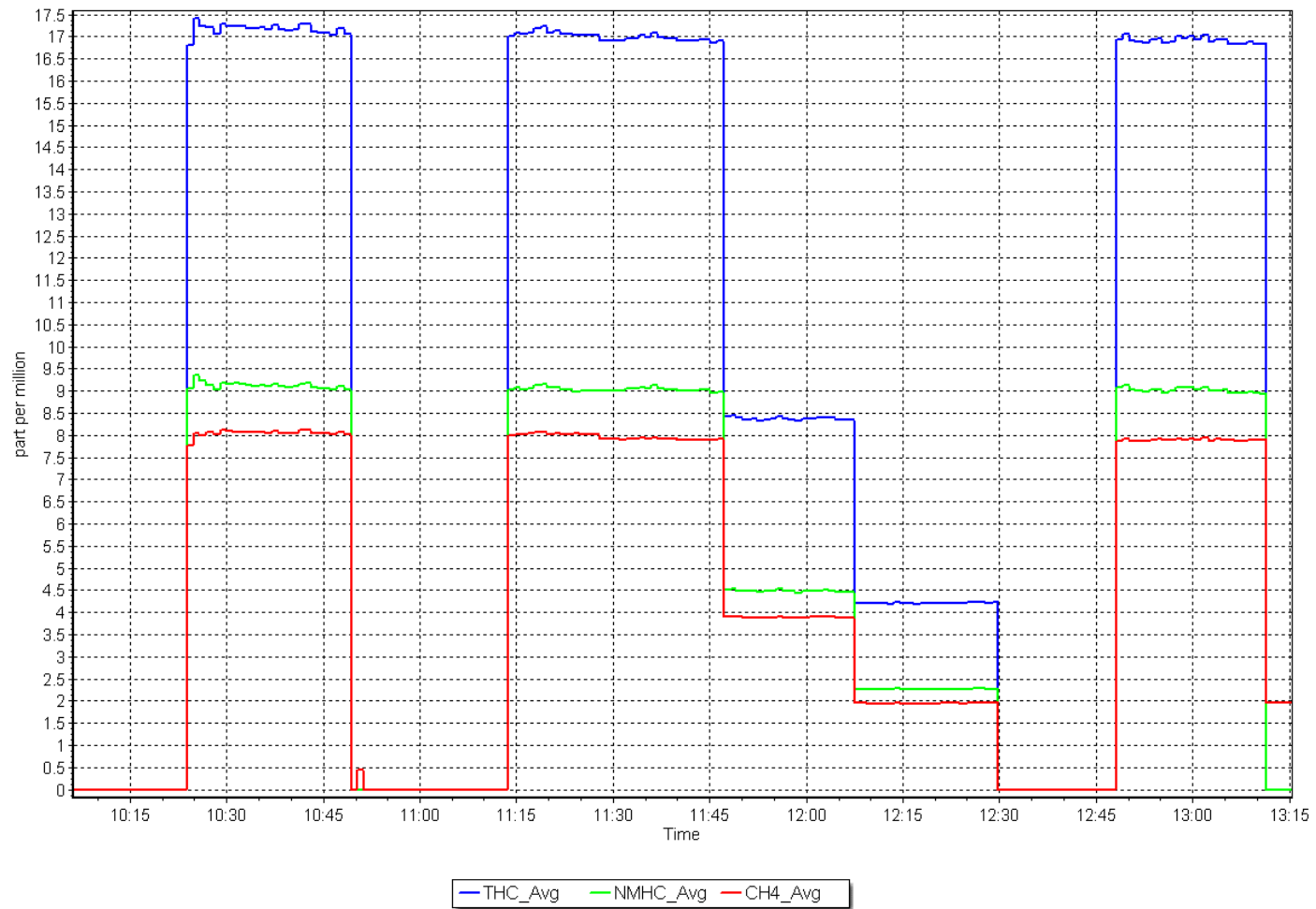
Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 12, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:04	End Time (MST):	13:15
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999991	<i>≥0.995</i>
9.00	9.01	0.9983	Slope	1.001283	<i>0.90 - 1.10</i>
4.50	4.48	1.0033	Intercept	-0.003208	<i>+/-0.5</i>
2.26	2.26	0.9969			







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Athabasca Valley
Calibration Date: September 26, 2024
Start time (MST): 9:44
Reason: Cylinder Change

Station number: AMS 07
Last Cal Date: September 4, 2024
End time (MST): 11:37

Calibration Standards

Gas Cert Reference: CC320556
CH₄ Cal Gas Conc. 496.0 ppm
C₃H₈ Cal Gas Conc. 205.0 ppm
Removed Gas Cert: NA
Removed CH₄ Conc. 496.0 ppm
Removed C₃H₈ Conc. 205.0 ppm
Diff between cyl (CH₄):
Calibrator Model: Teledyne API T700
Zero Air Gen model: Teledyne API T701H

Cal Gas Expiry Date: March 10, 2031
CH₄ Equiv Conc. 1059.8 ppm
Removed Gas Expiry: NA
CH₄ Equiv Conc. 1059.8 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3805
Serial Number: 198

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 12227620777
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.94E-04	2.94E-04	NMHC SP Ratio:	6.86E-05
CH ₄ Retention time:	13.4	13.4	NMHC Peak Area:	131117
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	16.91	16.87	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.87	Prev response	16.89	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	16.91	16.54	1.023
Average Correction Factor					

Notes: Changed out hydrogen cylinder.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.00	8.90	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.90	Prev response	9.01	*% change	-1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero					----
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.00	8.66	1.039
Average Correction Factor					

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	7.92	7.97	0.993
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.97	Prev response	7.88	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero					----
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	7.92	7.87	1.006
Average Correction Factor					

Calibration Statistics

	<u>Start</u>	
THC Cal Slope:	1.000003	
THC Cal Offset:	-0.026337	
CH ₄ Cal Slope:	0.998404	
CH ₄ Cal Offset:	-0.023129	
NMHC Cal Slope:	1.001283	
NMHC Cal Offset:	-0.003208	

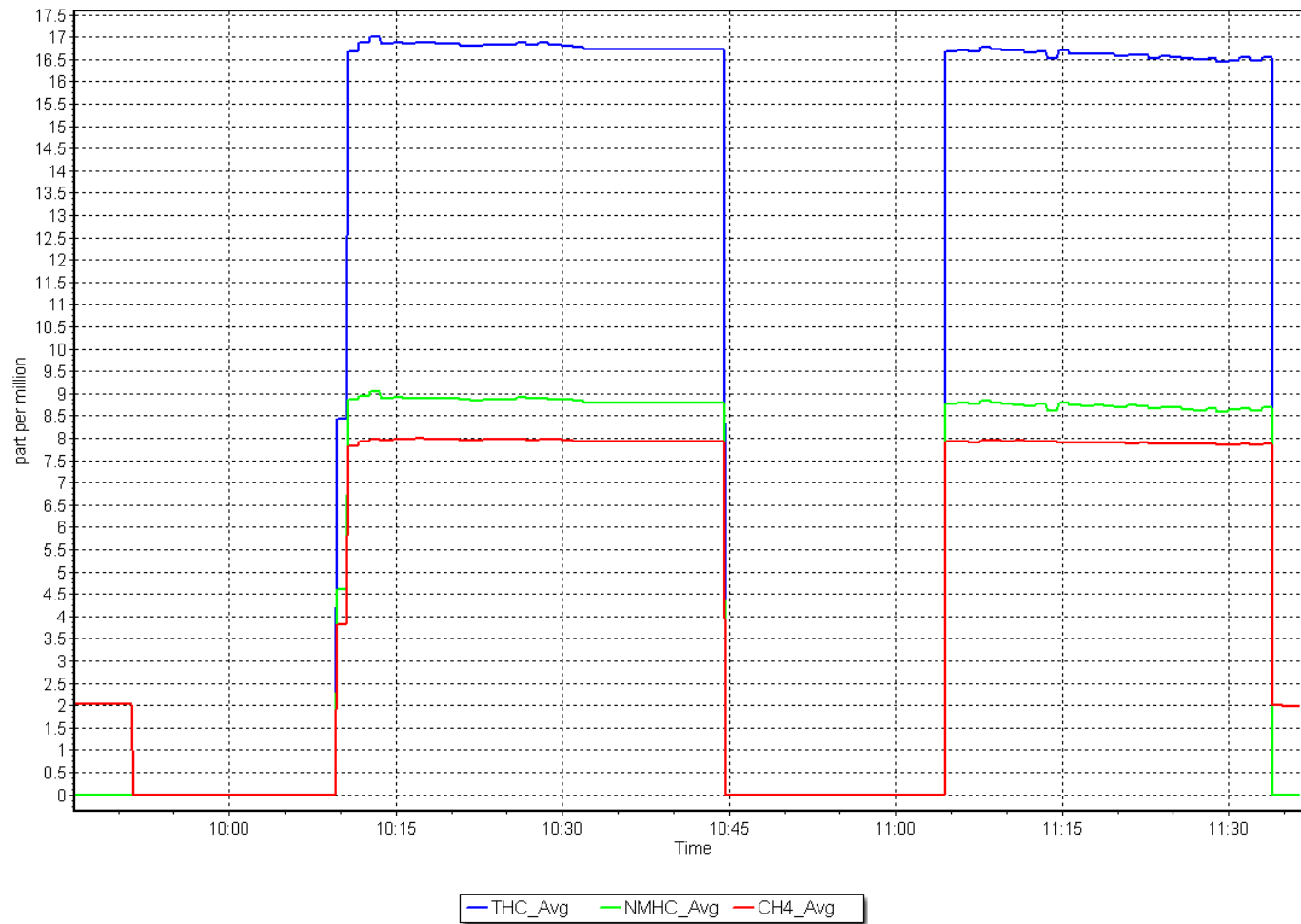
Finish

Calibration Performed By: Braiden Boutilier

NMHC Calibration Plot

Date: September 26, 2024

Location: Athabasca Valley





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Athabasca Valley
Station number: AMS 07
Calibration Date: September 13, 2024
Last Cal Date: August 16, 2024
Start time (MST): 9:10
End time (MST): 14:02
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0033919
NOX Cal Gas Conc: 60.10 ppm
Removed Cylinder #: N/A
Removed Gas NOX Conc: 60.10 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701H
Cal Gas Expiry Date: January 9, 2032
NO Cal Gas Conc: 59.90 ppm
Removed Gas Exp Date: N/A
Removed Gas NO Conc: 59.90 ppm
NO gas Diff:
Serial Number: 3805
Serial Number: 198

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
AF High point	4933	66.8	803.0	800.3	2.7	799.8	790.1	9.6	1.0041	1.0129
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 805.0 ppb	NO = 803.4 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = -0.7%
Baseline Corr 1st pt	NO _x = 799.7 ppb	NO = 790.1 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -1.7%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb	As found	NO _x r ² :	Nx SI:	Nx Int:
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb	As found	NO r ² :	NO SI:	NO Int:
			As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1160120024

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000485	0.995760
NO _x Cal Offset:	1.671914	2.331921
NO Cal Slope:	1.002598	0.995386
NO Cal Offset:	1.051932	1.951956
NO ₂ Cal Slope:	1.008423	1.001904
NO ₂ Cal Offset:	1.195208	0.108741

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.143	1.148	NO bkgnd or offset:	8.1	8.2
NOX coeff or slope:	1.002	1.002	NOX bkgnd or offset:	8.4	8.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	227.7	226.7

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) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
High point	4933	66.8	803.0	800.3	2.7	800.4	797.2	3.2	1.0032	1.0039
Mid point	4966	33.4	401.5	400.2	1.3	404.6	402.6	2.0	0.9924	0.9940
Low point	4983	16.7	200.7	200.1	0.7	203.3	201.9	1.5	0.9874	0.9910
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
As left span	4933	66.8	803.0	397.0	406.0	809.6	397.0	412.6	0.9918	1.0000
Average Correction Factor									0.9943	0.9963

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) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.1	----	----
High GPT point	797.3	397.7	402.3	403.2	0.9977	100.2%
Mid GPT point	797.3	596.8	203.2	203.5	0.9984	100.2%
Low GPT point	797.3	697.1	102.9	103.3	0.9959	100.4%
Average Correction Factor					0.9973	100.3%

Notes:

Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

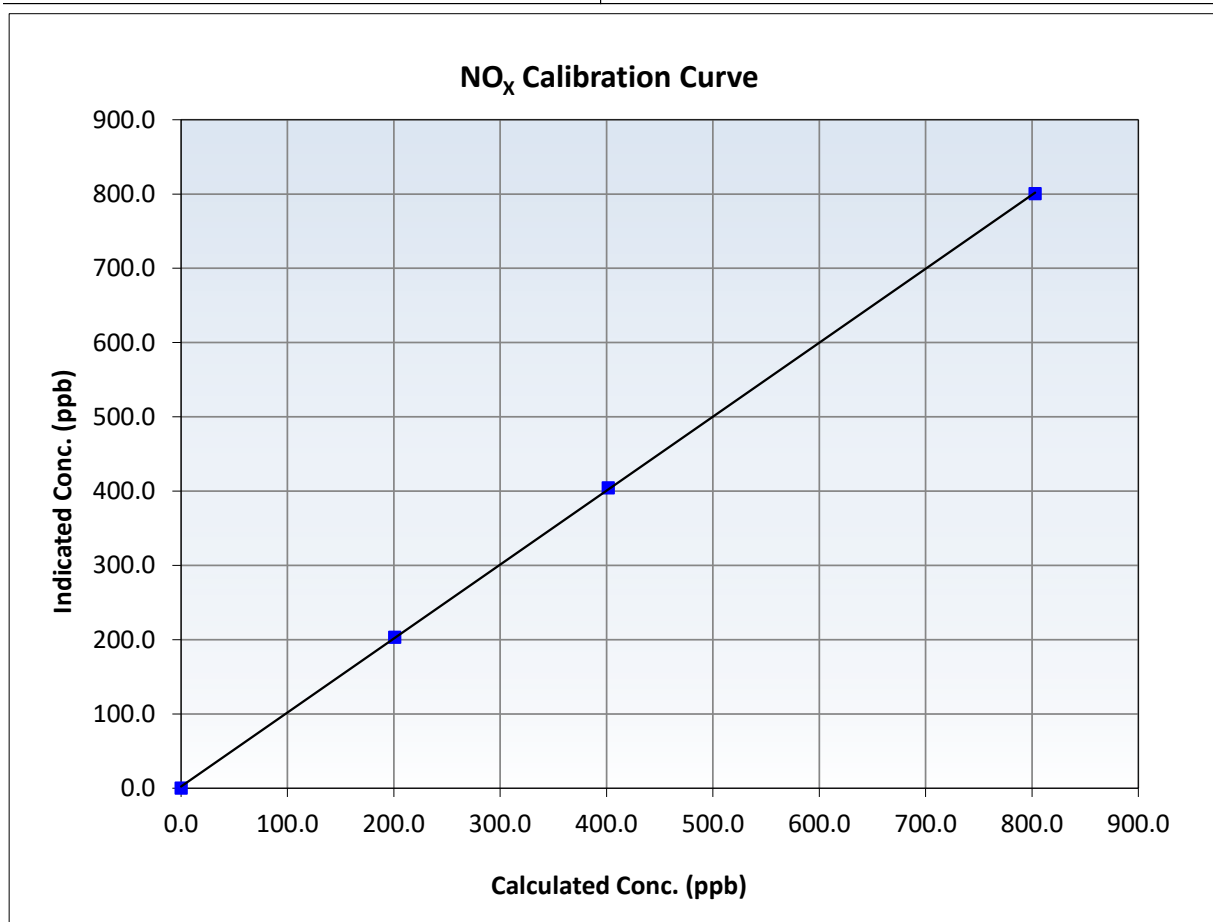
NO_x Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 16, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:10	End Time (MST):	14:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

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	0.999961	≥0.995
803.0	800.4	1.0032	Slope	0.995760	0.90 - 1.10
401.5	404.6	0.9924	Intercept	2.331921	+/-20
200.7	203.3	0.9874			





Wood Buffalo Environmental Association

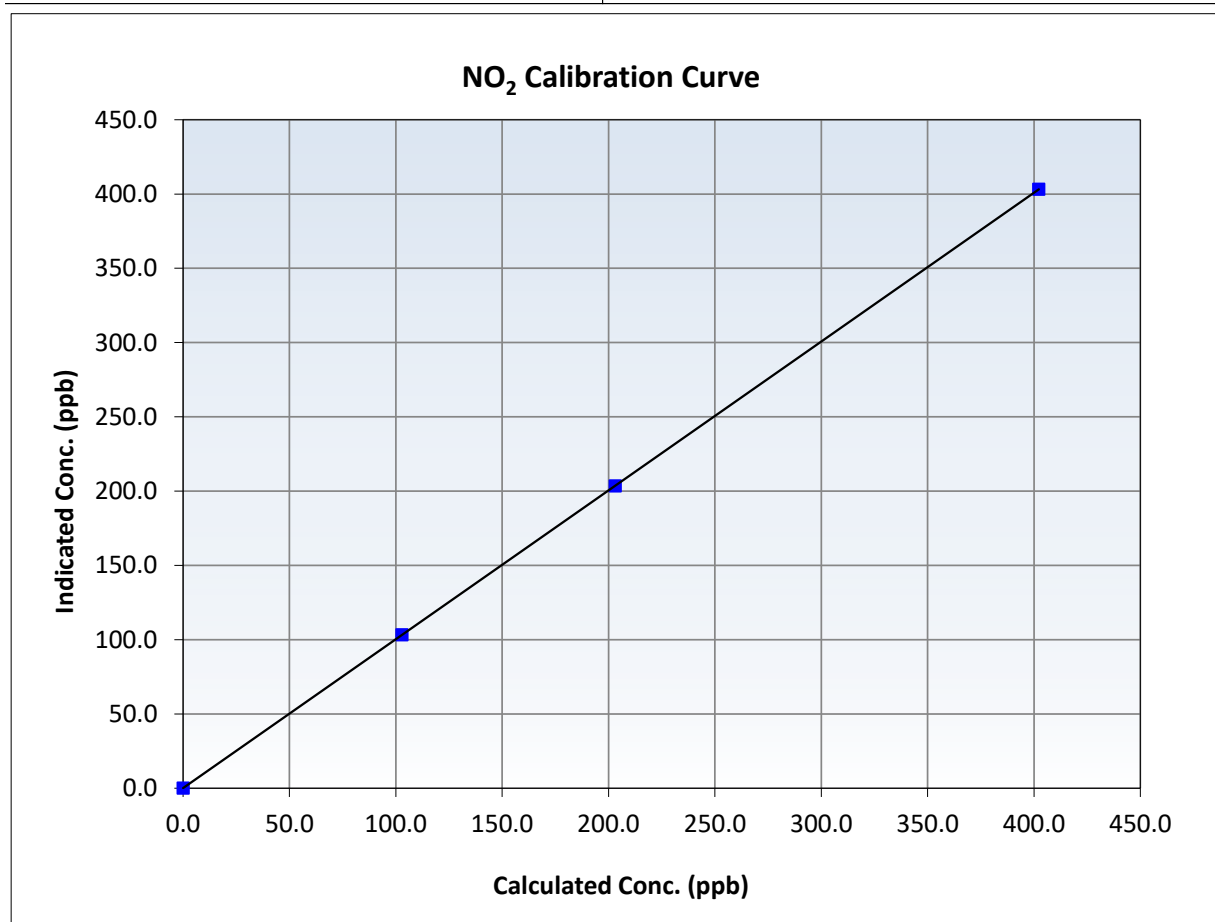
NO₂ Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 16, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:10	End Time (MST):	14:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

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	0.999999	≥0.995
402.3	403.2	0.9977	Slope	1.001904	0.90 - 1.10
203.2	203.5	0.9984	Intercept	0.108741	+/-20
102.9	103.3	0.9959			





Wood Buffalo Environmental Association

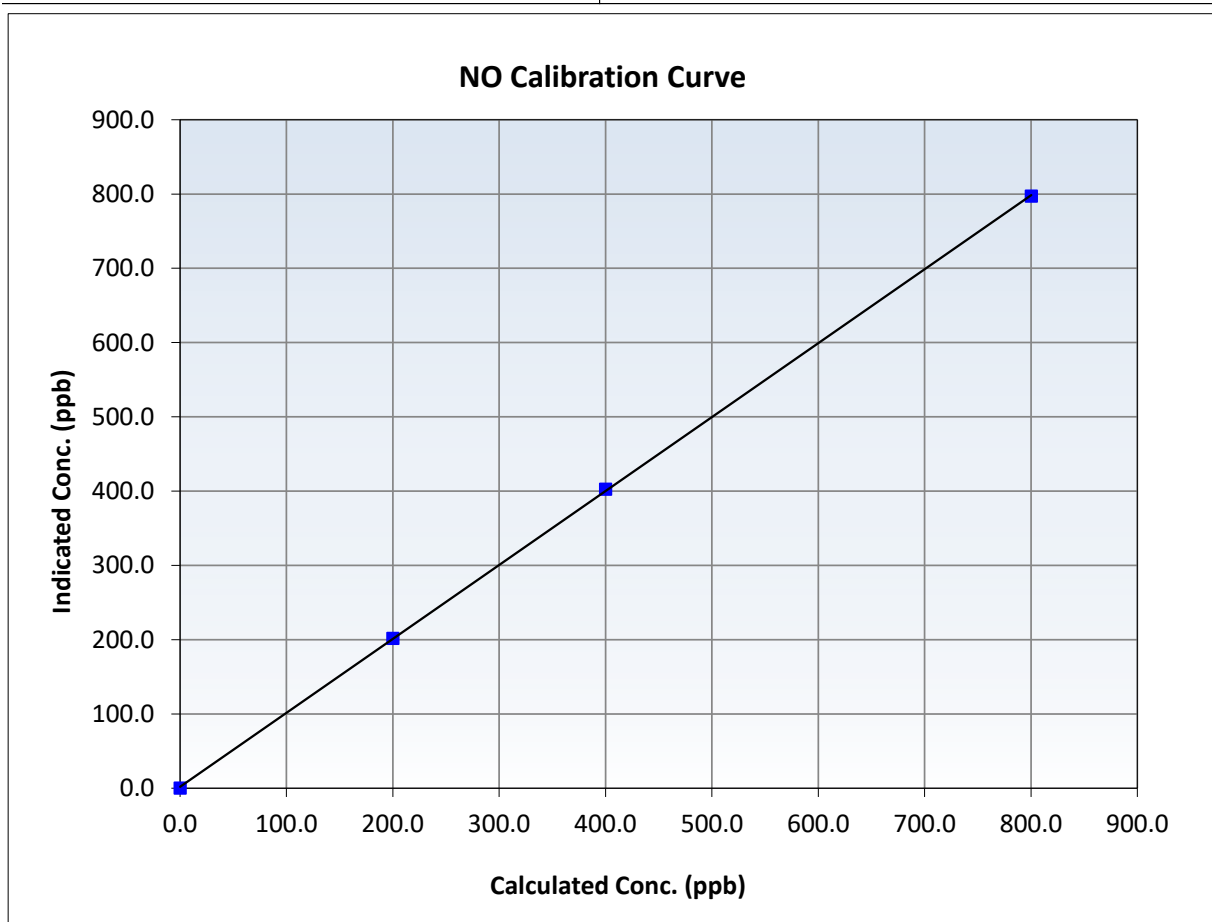
NO Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 16, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:10	End Time (MST):	14:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

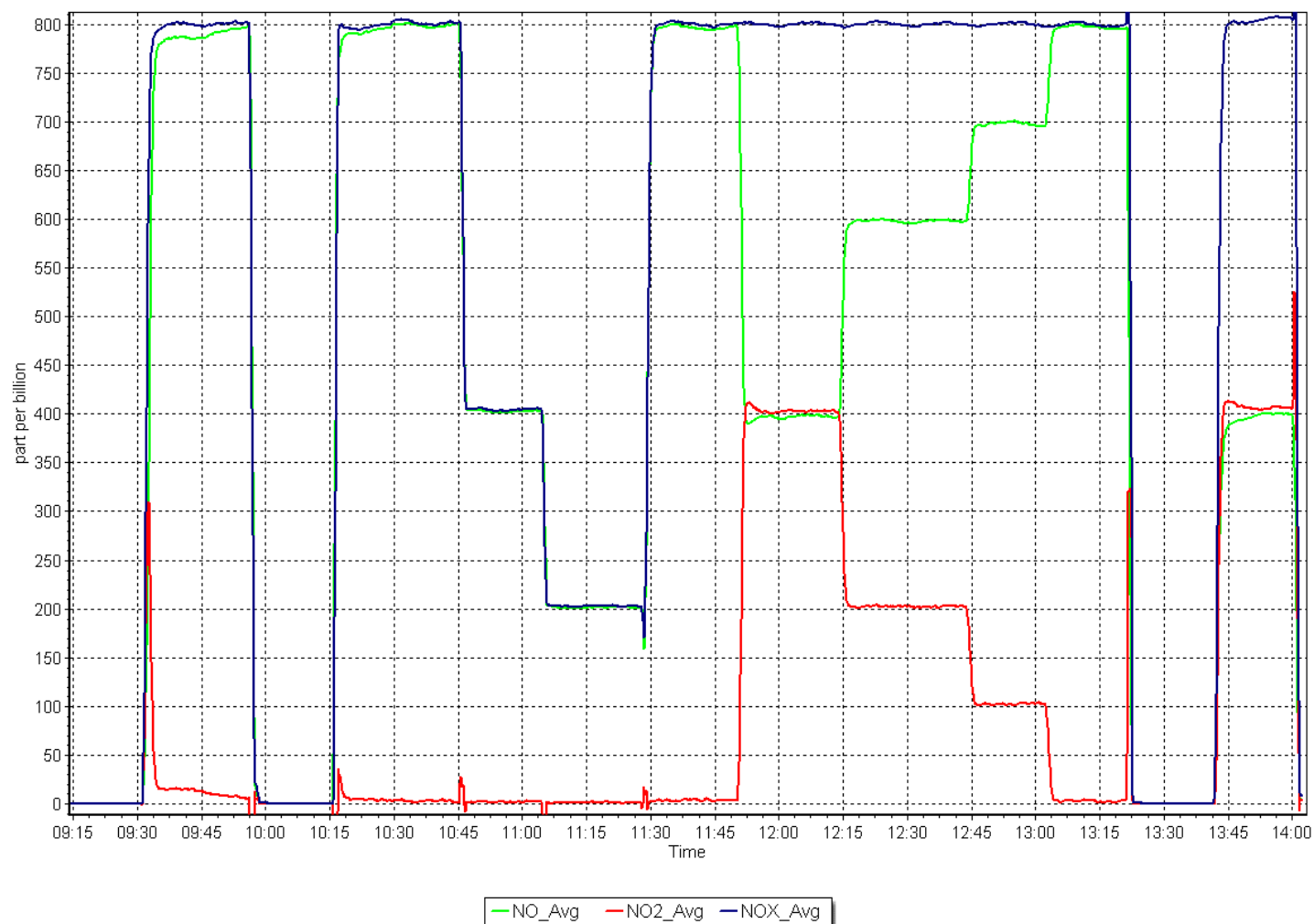
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999969	≥ 0.995
800.3	797.2	1.0039	Slope	0.995386	$0.90 - 1.10$
400.2	402.6	0.9940	Intercept	1.951956	± 20
200.1	201.9	0.9910			



NO_x Calibration Plot

Date: September 13, 2024

Location: Athabasca Valley





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Athabasca Valley Station number: AMS07
Calibration Date: September 9, 2024 Last Cal Date: August 2, 2024
Start time (MST): 10:12 End time (MST): 13:28
Reason: Routine

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: T750 Serial Number: 282
ZAG Make/Model: 751H Serial Number: 321

Analyzer Information

Analyzer make: Thermo 49i Analyzer serial #: 1152220023
Analyzer Range: 0 - 500 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997800	0.998943	Backgd or Offset:	-1.9	-1.9
Calibration intercept:	0.860000	0.760000	Coeff or Slope:	1.531	1.531

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	800.0	0.0	-0.2	----
As found High point	5000	1138.8	400.0	398.1	1.004
As found Mid point					
As found Low point					
Baseline Corr As found:	398.3	Previous response	400.0	*% 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	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	800.0	0.0	0.4	----
High point	5000	1150.6	400.0	400.3	0.999
Mid point	5000	852.0	200.0	200.3	0.999
Low point	5000	722.5	100.0	101.3	0.987
As left zero	5000	400.0	0.0	0.2	----
As left span	5000	1569.7	400.0	401.1	0.997
Average Correction Factor					0.995

Notes: Sample inlet filters changed after as founds. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

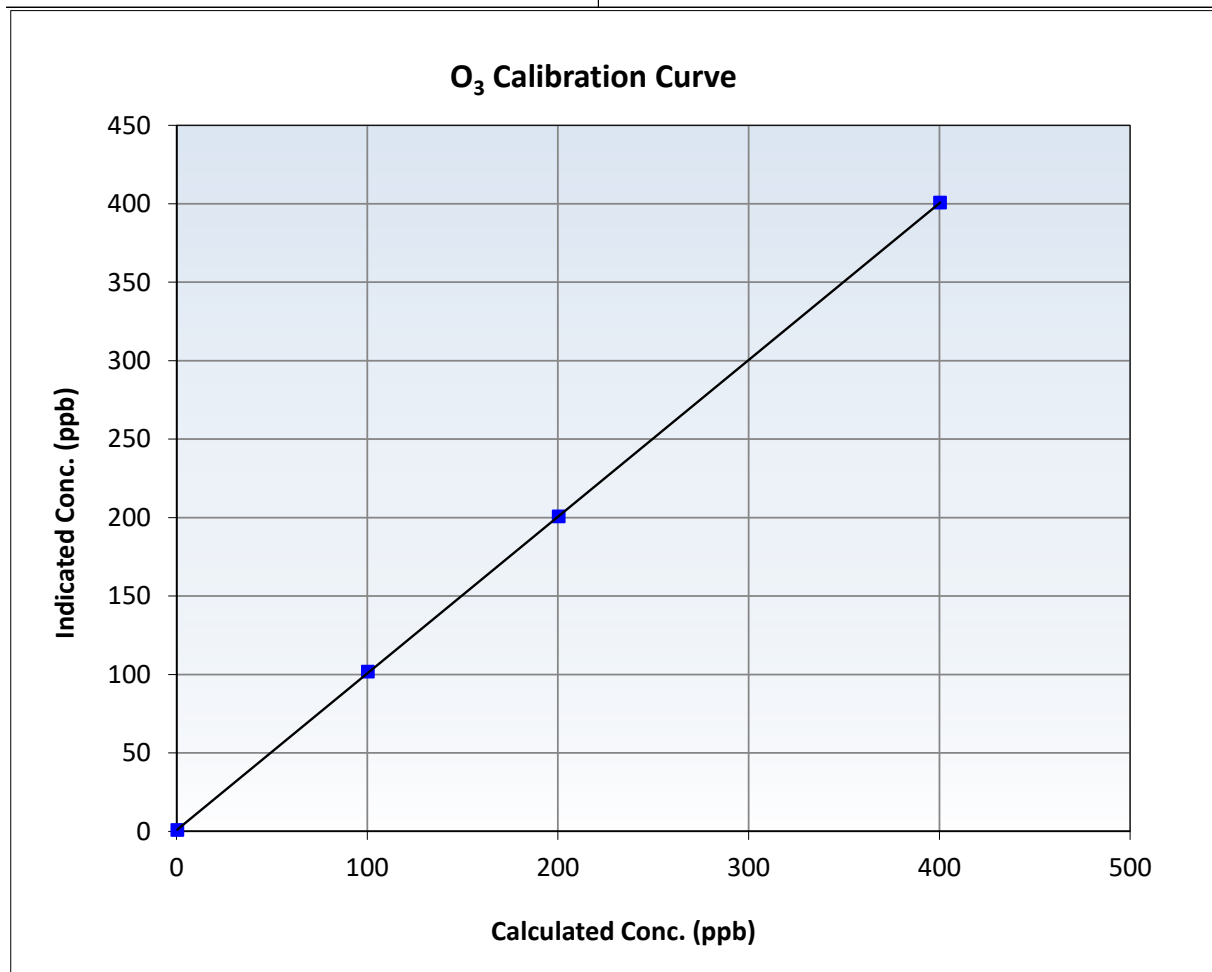
O₃ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 2, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:12	End Time (MST):	13:28
Analyzer make:	Thermo 49i	Analyzer serial #:	1152220023

Calibration Data

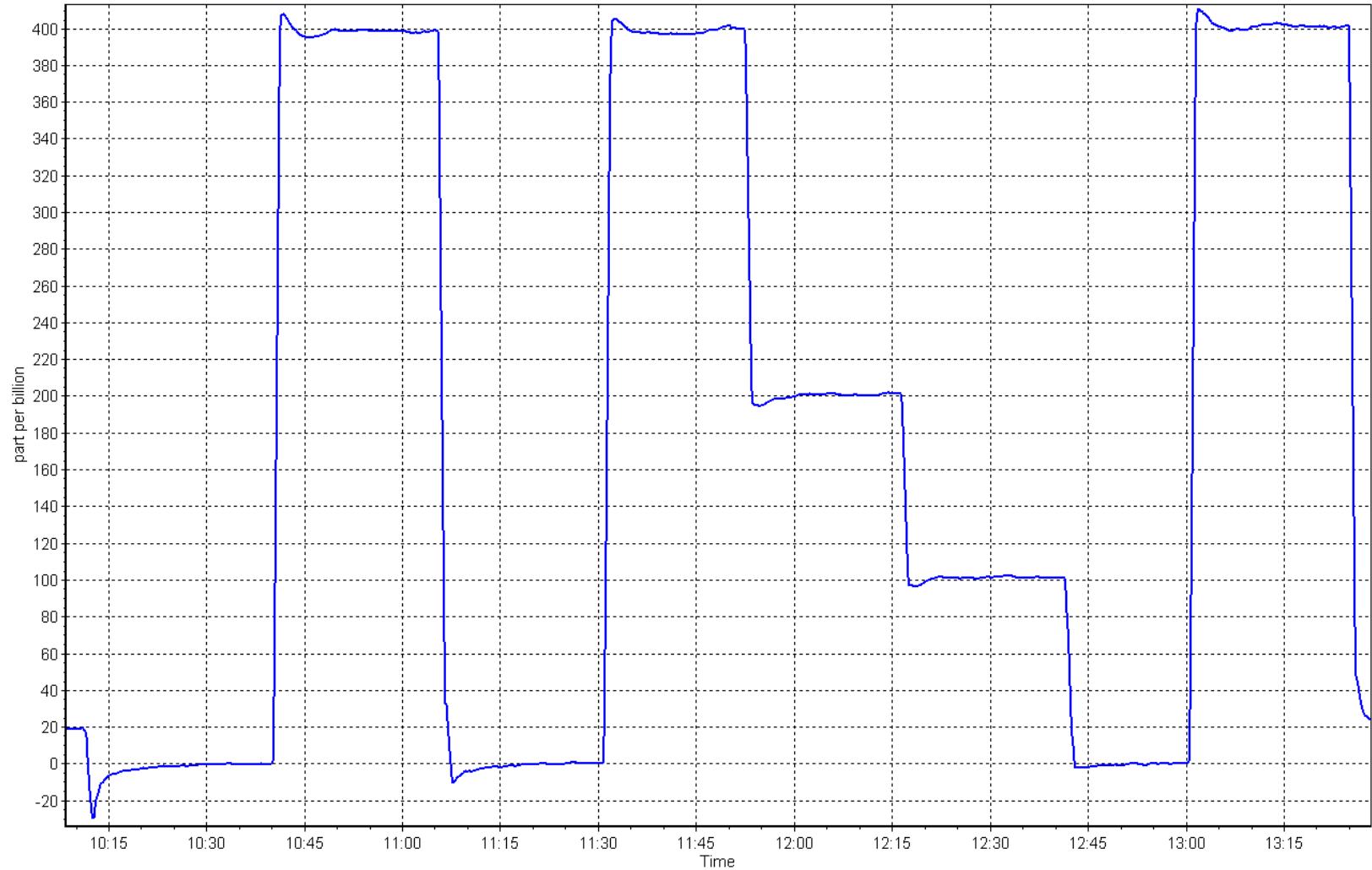
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4	----	Correlation Coefficient	0.999993	≥ 0.995
400.0	400.3	0.9993	Slope	0.998943	$0.90 - 1.10$
200.0	200.3	0.9985	Intercept	0.760000	± 5
100.0	101.3	0.9872			



O₃ Calibration Plot

Date: September 9, 2024

Location: Athabasca Valley





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Athabasca Valley Station number: AMS 07
Calibration Date: September 20, 2024 Last Cal Date: August 16, 2024
Start time (MST): 13:10 End time (MST): 14:06
Analyzer Make: API T640 S/N: 645
Particulate Fraction: PM2.5
Flow Meter Make/Model: Alicat FP-25BT S/N: 388749
Temp/RH standard: Alicat FP-25BT S/N: 388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.6	14.1	14.6	☐	+/- 2 °C
P (mmHg)	734.8	732.6	734.8	☐	+/- 10 mmHg
Flow (LPM)	4.97	4.96	4.97	☐	+/- 0.25 LPM
PW% (pump)	36	----	35	☐	>80%
Zero Verification	PM w/o HEPA: 14.1		PM w/ HEPA: 0.0		<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: October 6, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	N/A	N/A	N/A	☐	+/- 0.5

Date Optical Chamber Cleaned: July 8, 2024
Date Disposable Filter Changed: August 16, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: July 8, 2024
Date RH/T Sensor Cleaned: July 8, 2024

Notes: Flow, temp and pressure. Leak check passed.

Calibration by: Aswin Sasi Kumar



Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name: Athabasca Valley Station number: AMS 07
Calibration Date: September 6, 2024 Last Cal Date: August 9, 2024
Start time (MST): 10:25 End time (MST): 13:45
Reason: Routine

Calibration Standards

Cal Gas Concentration: 2,953 ppm Cal Gas Exp Date: September 30, 2029
Cal Gas Cylinder #: T1TWKRN
Removed Cal Gas Conc: 2,953 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 3805
ZAG Make/Model: API 700H Serial Number: 198

Analyzer Information

Analyzer make: Thermo 48i-TLE Analyzer serial #: 1408761381
Analyzer Range: 0 - 50 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996157	0.999837	Backgd or Offset:	5.027	5.027
Calibration intercept:	0.107962	0.146010	Coeff or Slope:	1.069	1.069

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4932	67.8	40.0	40.1	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	39.95	Prev response:	40.00	*% change:	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4932	67.8	40.0	40.1	0.998
Mid point	4966	33.9	20.0	20.3	0.987
Low point	4983	16.9	10.0	10.2	0.980
As left zero	5000	0.0	0.0	0.0	----
As left span	4932	67.8	40.0	40.1	0.999
Average Correction Factor					0.988

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

CO Calibration Summary

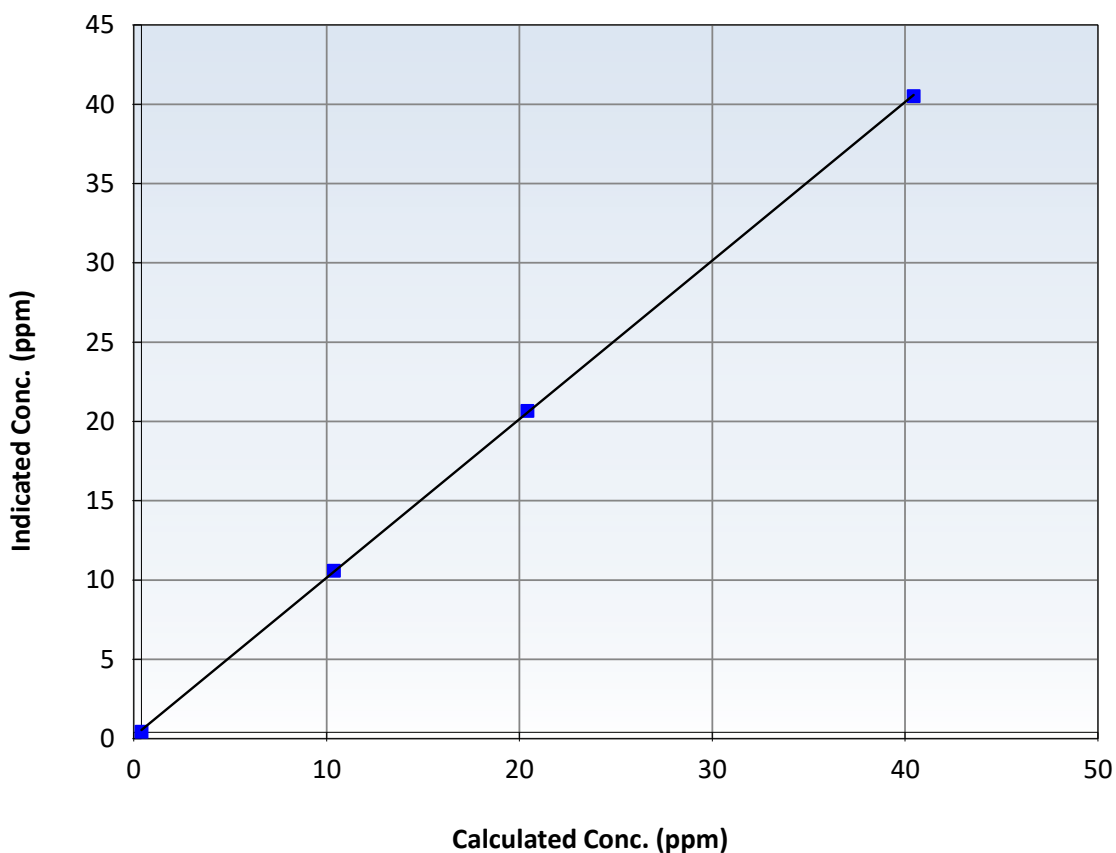
Station Information

Calibration Date:	September 6, 2024	Previous Calibration:	August 9, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:25	End Time (MST):	13:45
Analyzer make:	Thermo 48i-TLE	Analyzer serial #:	1408761381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999961	≥ 0.995
40.0	40.1	0.9984	Slope	0.999837	$0.90 - 1.10$
20.0	20.3	0.9873	Intercept	0.146010	± 1.5
10.0	10.2	0.9795			

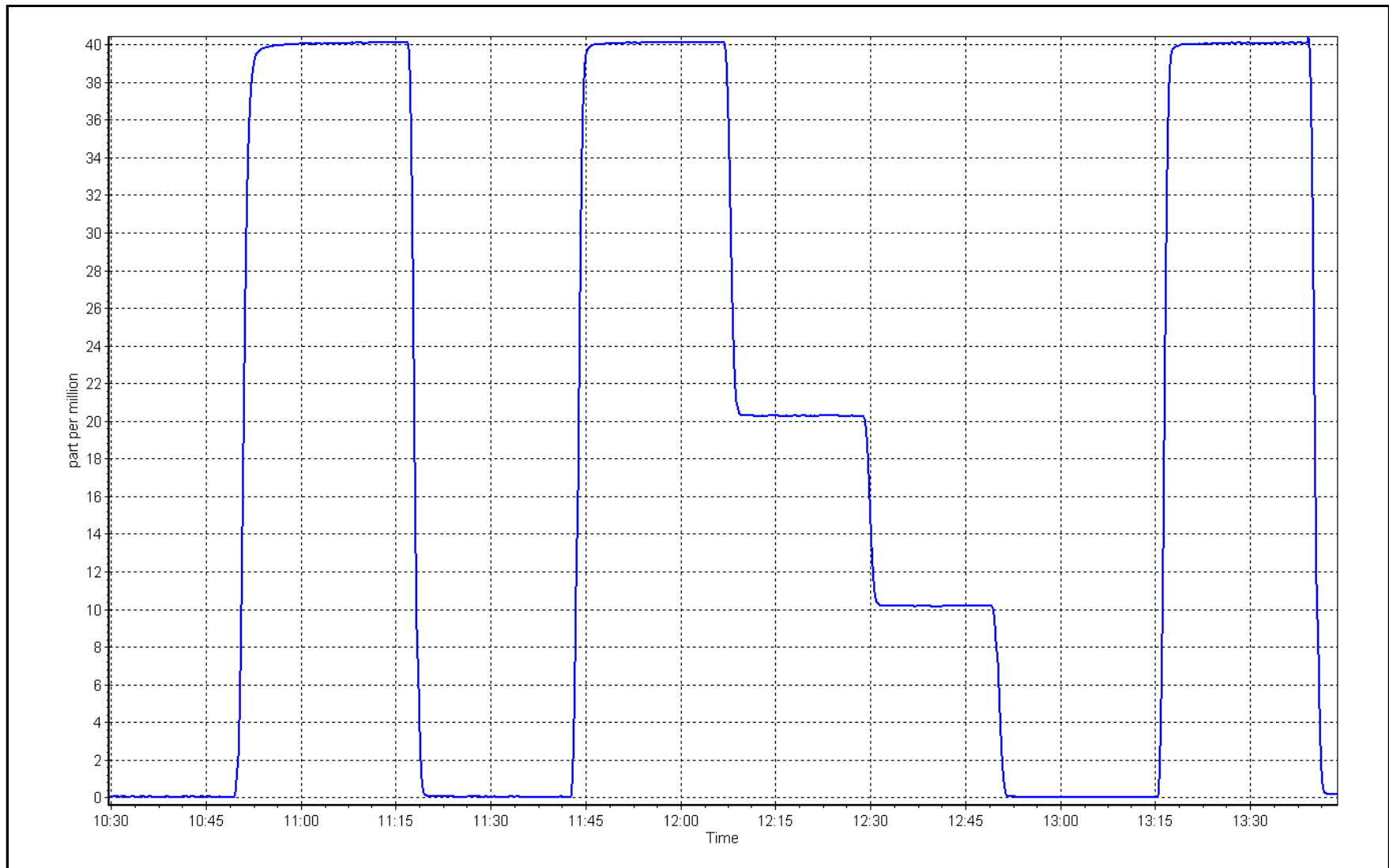
CO Calibration Curve



CO Calibration Plot

Date: September 6, 2024

Location: Athabasca Valley





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS08 FORT CHIPEWYAN SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Fort Chipewyan Station number: AMS08
Calibration Date: September 2, 2024 Last Cal Date: August 12, 2024
Start time (MST): 11:59 End time (MST): 14:32
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.84 ppm Cal Gas Exp Date: January 6, 2030
Cal Gas Cylinder #: CC196697
Removed Cal Gas Conc: 49.84 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 3252
Zero Air Gen Model: Teledyne API T701 Serial Number: 135

Analyzer Information

Analyzer make: Thermo 43i-TLE Serial Number: 1136451241
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995579	1.000817	Backgd or Offset:	1.8	1.8
Calibration intercept:	1.915867	1.055474	Coeff or Slope:	0.959	0.959

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4920	80.3	800.4	801.5	1.001
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	799.6	Previous response	804.1	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4920	80.3	800.4	801.9	0.998
Mid point	4960	40.2	400.7	401.3	0.998
Low point	4980	20.1	200.4	203.9	0.983
As left zero	5000	0.0	0.0	-0.3	----
As left span	4920	80.3	800.4	801.2	0.999
Average Correction Factor:					0.993

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

Calibration Performed By: Matthew Courtoreille



Wood Buffalo Environmental Association

SO₂ Calibration Summary

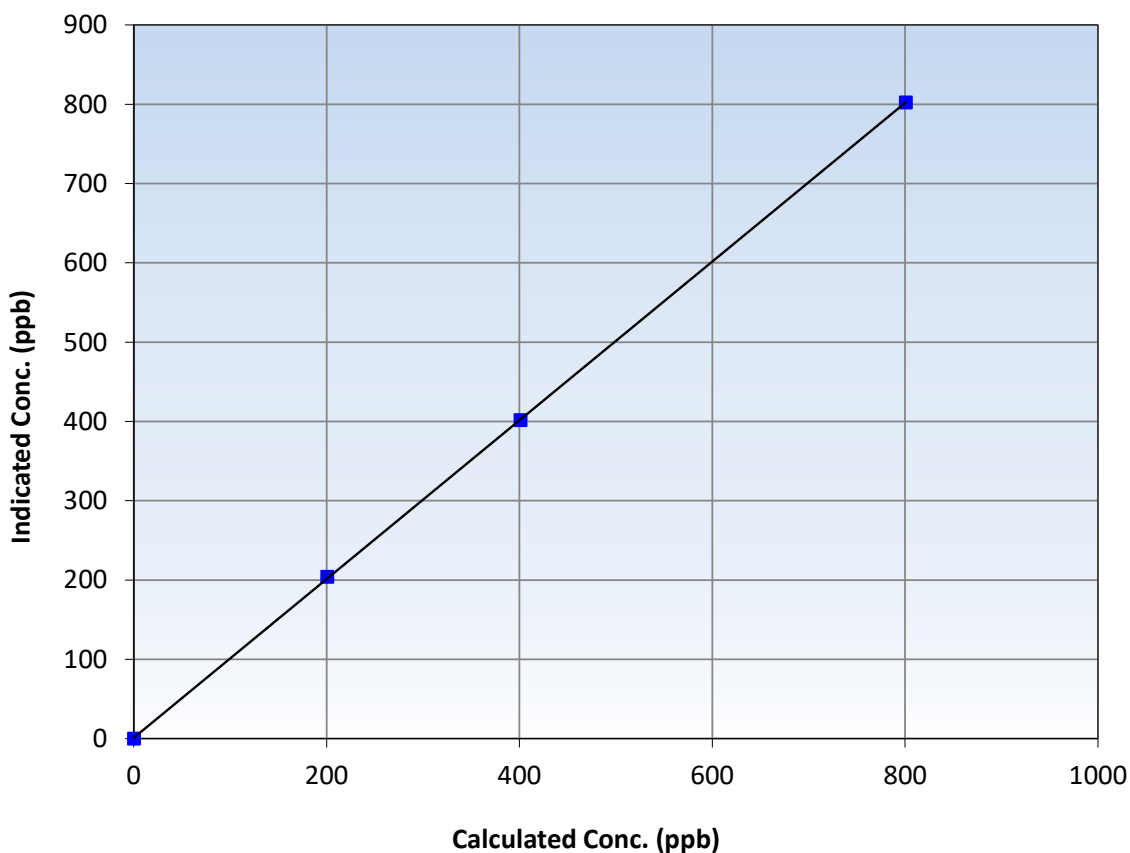
Station Information

Calibration Date:	September 2, 2024	Previous Calibration:	August 12, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	11:59	End Time (MST):	14:32
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

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	0.999977	≥0.995
800.4	801.9	0.9981	Slope	1.000817	0.90 - 1.10
400.7	401.3	0.9985	Intercept	1.055474	+/-30
200.4	203.9	0.9826			

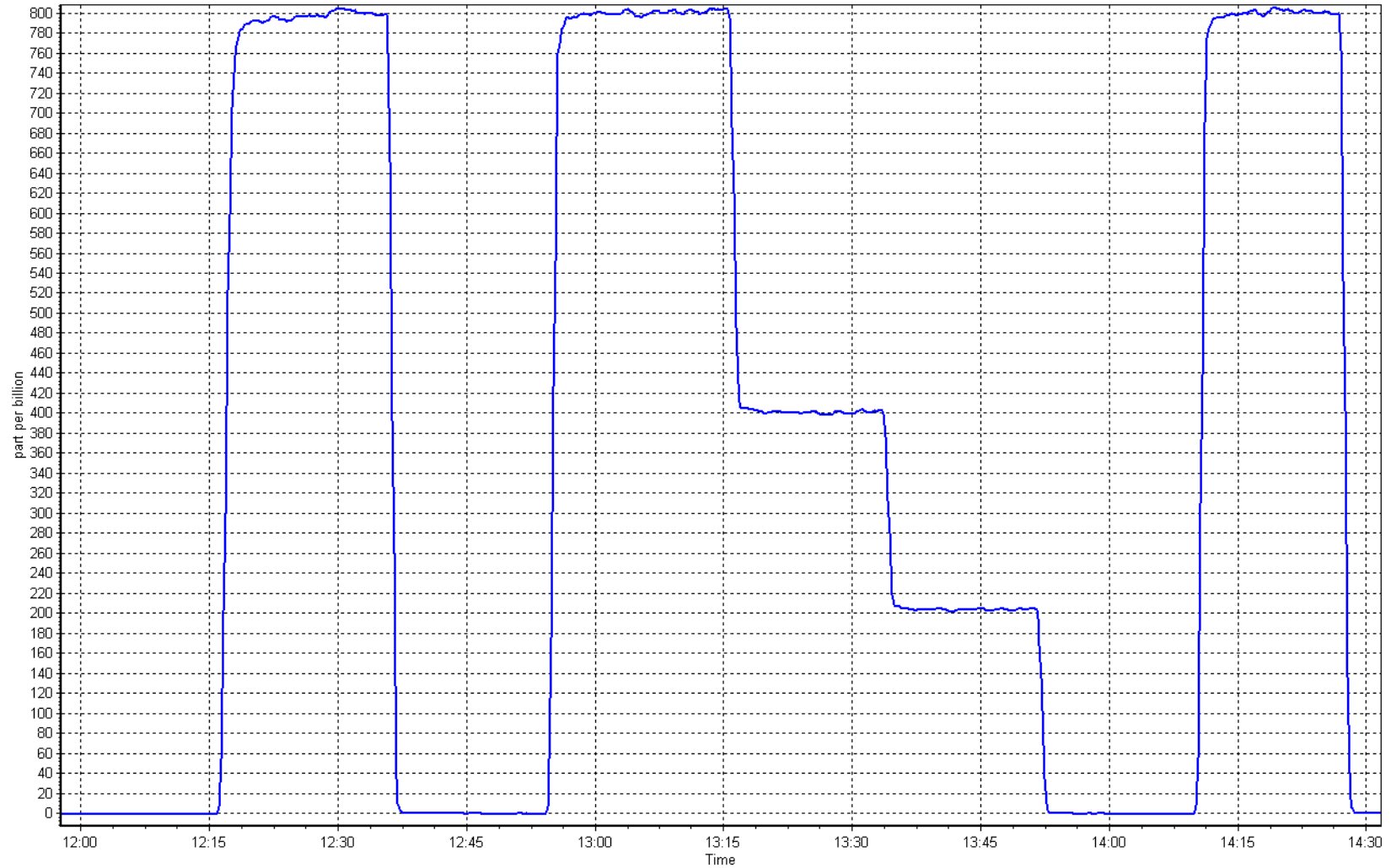
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 2, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Fort Chipewyan Station number: AMS 08
Calibration Date: September 17, 2024 Last Cal Date: August 13, 2024
Start time (MST): 15:39 End time (MST): 20:17
Reason: Routine

Calibration Standards

Cal Gas Concentration: 4.97 ppm Cal Gas Exp Date: February 9, 2024
Cal Gas Cylinder #: EY0002276
Removed Cal Gas Conc: 4.97 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 43iQ-TL Analyzer serial #: 1203169744
Converter make: CDN-101 Converter serial #: 14639
Analyzer Range: 0 - 100 ppb Converter Temp: 833 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992136	0.997712	Backgd or Offset:	1.5	1.5
Calibration intercept:	0.238818	0.118758	Coeff or Slope:	0.762	0.762

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.5	80.0	79.9	1.000
As found Mid point	4960	40.2	40.0	40.0	0.996
As found Low point	4980	20.1	20.0	20.1	0.989
New cylinder response					
Baseline Corr As found:	80.0	Prev response:	79.62	*% change:	0.5%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.999140	AF Intercept:	0.018799
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999990	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.5	80.0	79.9	1.001
Mid point	4960	40.2	40.0	40.0	0.999
Low point	4980	20.1	20.0	20.2	0.989
As left zero	5000	0.0	0.0	0.1	----
As left span	4920	80.5	80.0	79.9	1.001
SO2 Scrubber Check	4919.7	80.3	803.0	0.0	----
Date of last scrubber change:		March 7, 2022		Ave Corr Factor	0.996
Date of last converter efficiency test:		March 15, 2022		100.7% efficiency	

Notes: Changed inlet filter after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. No adjustment made.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

TRS Calibration Summary

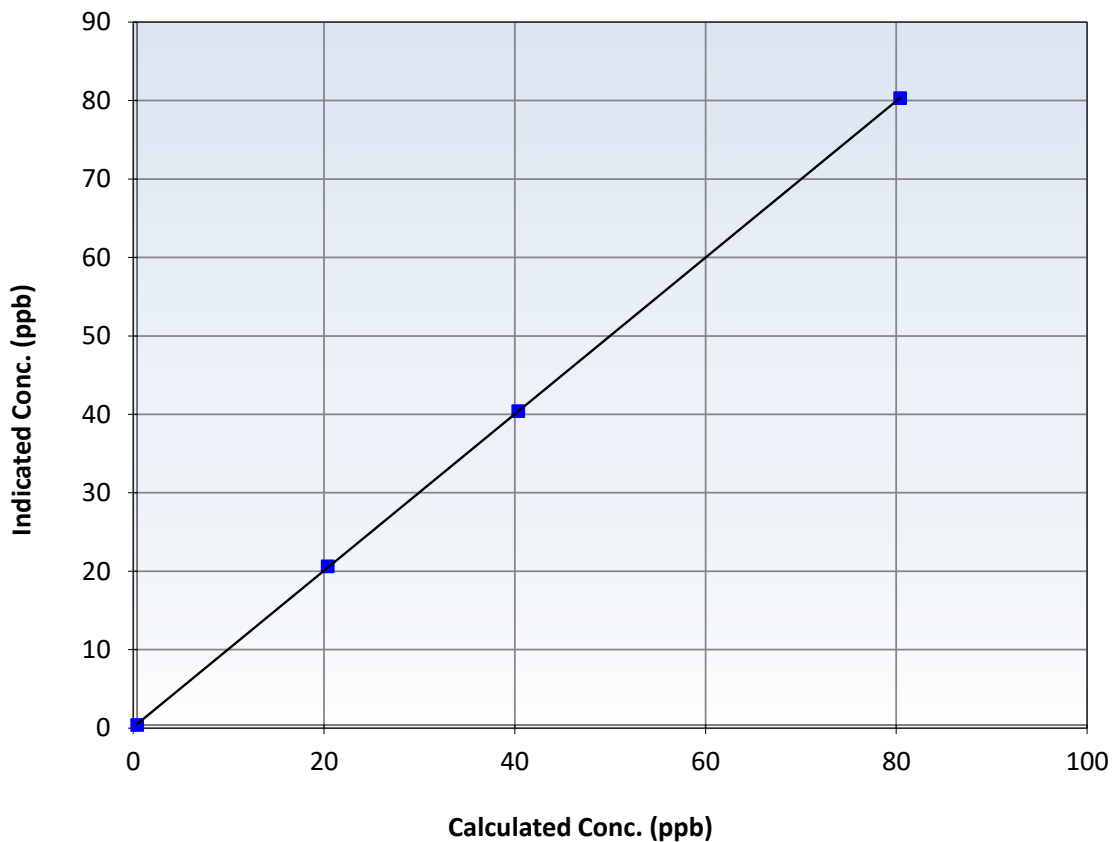
Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 13, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	15:39	End Time (MST):	20:17
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999989	≥ 0.995
80.0	79.9	1.0014	Slope	0.997712	$0.90 - 1.10$
40.0	40.0	0.9989	Intercept	0.118758	± 3
20.0	20.2	0.9891			

TRS Calibration Curve



TRS Calibration Plot

Date: September 17, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Fort Chipewyan
Station number: AMS 08
Calibration Date: September 17, 2024
Last Cal Date: August 19, 2024
Start time (MST): 10:13
End time (MST): 15:29
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DTO046831
NOX Cal Gas Conc: 60.20 ppm
Removed Cylinder #: DT0046831
Removed Gas NOX Conc: 60.20 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701H
Cal Gas Expiry Date: January 9, 2032
NO Cal Gas Conc: 60.00 ppm
Removed Gas Exp Date: January 9, 2032
Removed Gas NO Conc: 60.00 ppm
NO gas Diff:
Serial Number: 3252
Serial Number: 135

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
AF High point	4933	66.7	803.1	800.4	2.7	815.7	798.2	17.4	0.9846	1.0029
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 811.3 ppb	NO = 803.1 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = 0.5%
Baseline Corr 1st pt	NO _x = 815.7 ppb	NO = 798.1 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -0.6%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb	As found	NO _x r ² :	Nx SI:	Nx Int:
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb	As found	NO r ² :	NO SI:	NO Int:
			As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 4460

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.245	1.228	NO bkgnd or offset:	0.0	0.0
NOX coeff or slope:	1.239	1.225	NOX bkgnd or offset:	0.1	0.1
NO2 coeff or slope:	2.100	2.100	Reaction cell Press:	-1.7	2.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.009371	0.998472
NO _x Cal Offset:	0.635012	1.713845
NO Cal Slope:	1.003384	0.998210
NO Cal Offset:	-0.065746	0.595824
NO ₂ Cal Slope:	1.010606	0.991813
NO ₂ Cal Offset:	1.430889	2.007418

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
High point	4933	66.7	803.1	800.4	2.7	803.0	798.7	4.4	1.0001	1.0022
Mid point	4967	33.3	400.9	399.6	1.3	402.1	401.5	0.6	0.9970	0.9952
Low point	4983	16.7	201.1	200.4	0.7	204.7	200.2	4.5	0.9823	1.0010
As left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
As left span	4933	66.7	803.1	398.5	404.6	798.9	398.5	400.4	1.0053	1.0000
Average Correction Factor									0.9931	0.9995

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.1	----	----
High GPT point	797.8	390.9	409.6	407.5	1.0051	99.5%
Mid GPT point	797.8	600.1	200.4	201.0	0.9969	100.3%
Low GPT point	797.8	697.8	102.7	106.2	0.9667	103.4%
Average Correction Factor					0.9896	101.1%

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

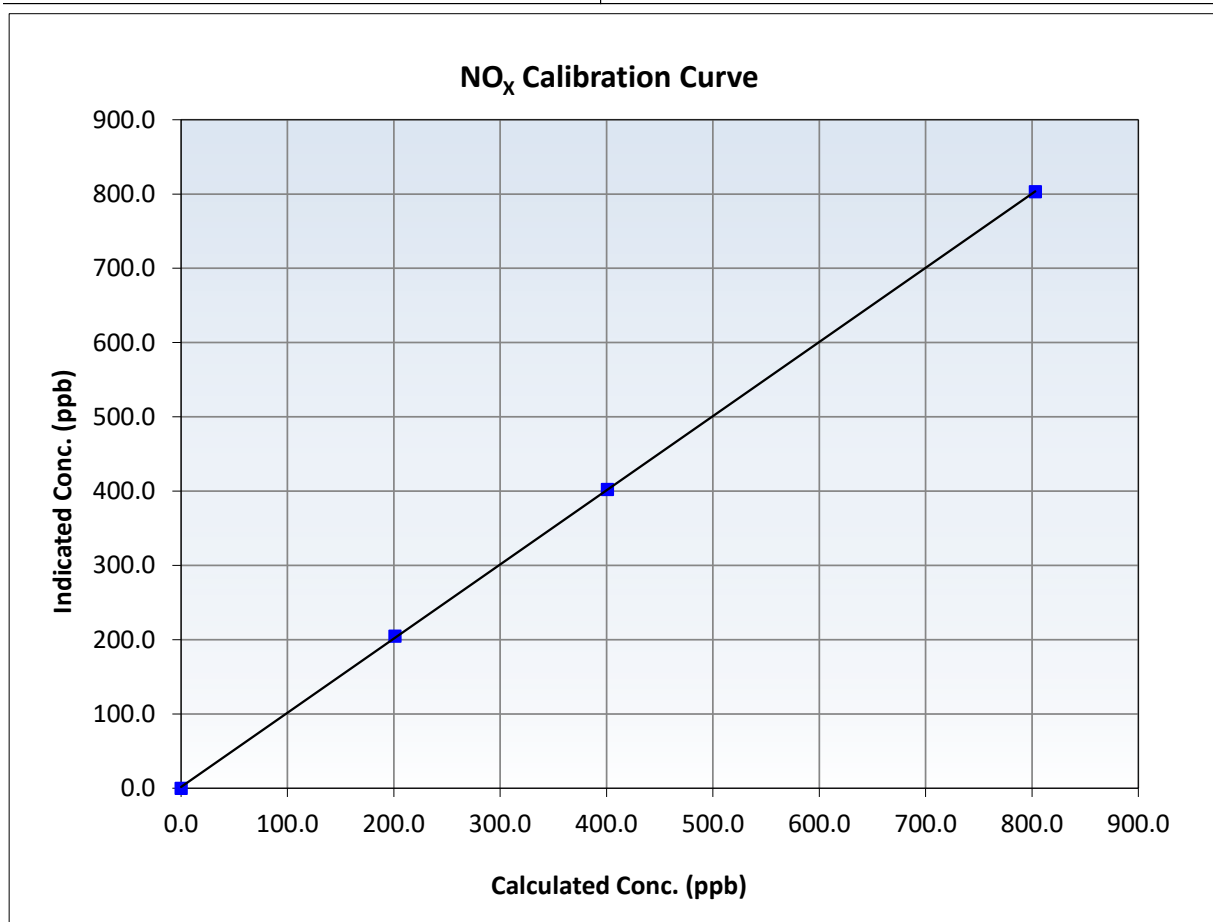
NO_x Calibration Summary

Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 19, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	10:13	End Time (MST):	15:29
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999976	≥0.995
803.1	803.0	1.0001	Slope	0.998472	0.90 - 1.10
400.9	402.1	0.9970	Intercept	1.713845	+/-20
201.1	204.7	0.9823			





Wood Buffalo Environmental Association

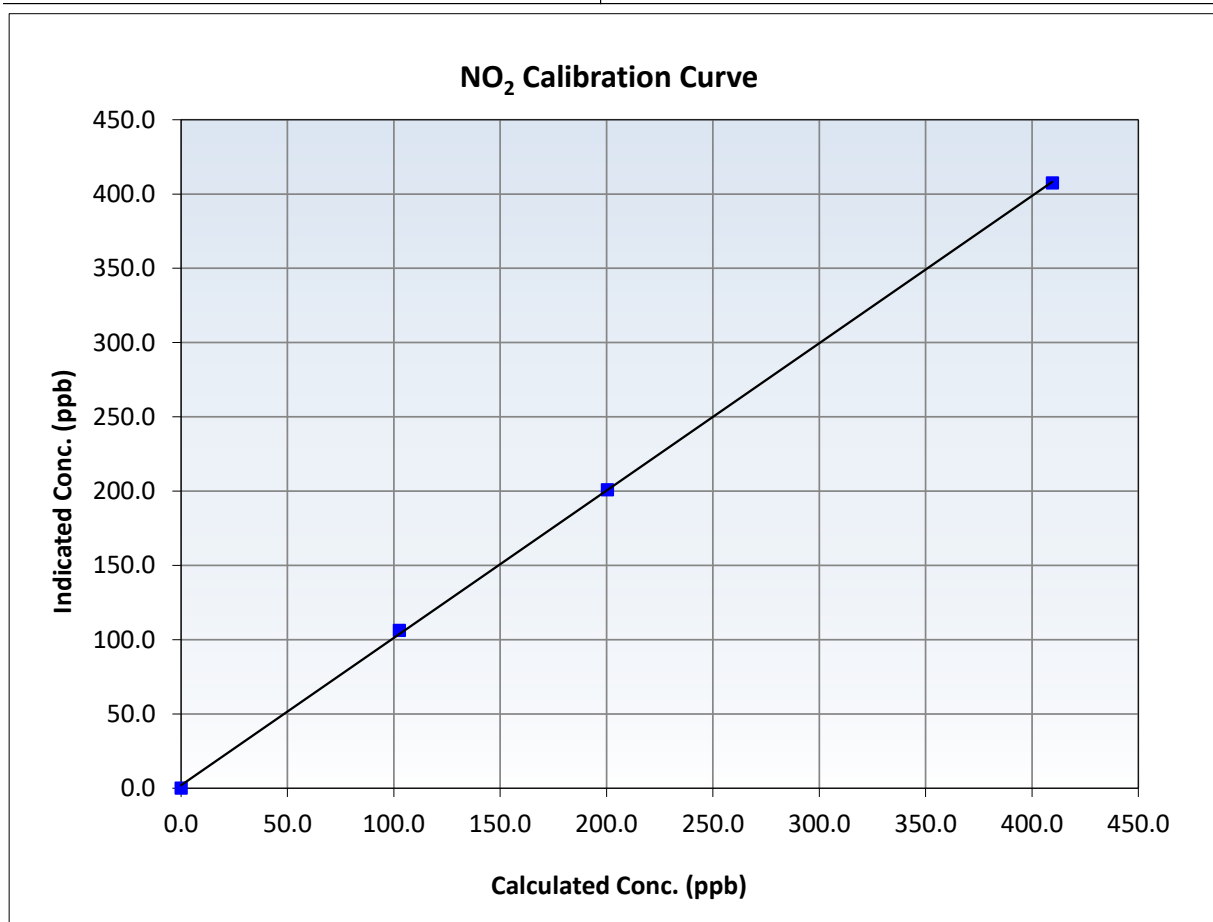
NO₂ Calibration Summary

Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 19, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	10:13	End Time (MST):	15:29
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

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	0.999891	≥ 0.995
409.6	407.5	1.0051	Slope	0.991813	$0.90 - 1.10$
200.4	201.0	0.9969	Intercept	2.007418	± 20
102.7	106.2	0.9667			





Wood Buffalo Environmental Association

NO Calibration Summary

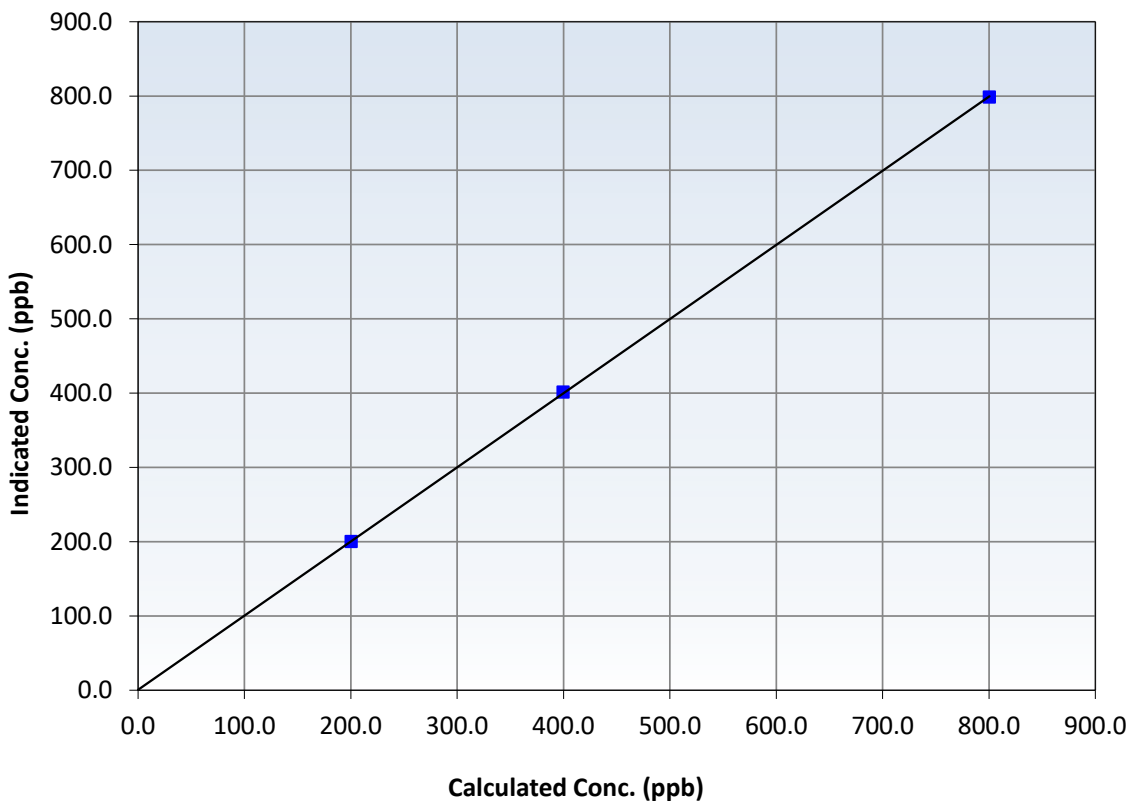
Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 19, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	10:13	End Time (MST):	15:29
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

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	0.999984	≥ 0.995
800.4	798.7	1.0022	Slope	0.998210	$0.90 - 1.10$
399.6	401.5	0.9952	Intercept	0.595824	± 20
200.4	200.2	1.0010			

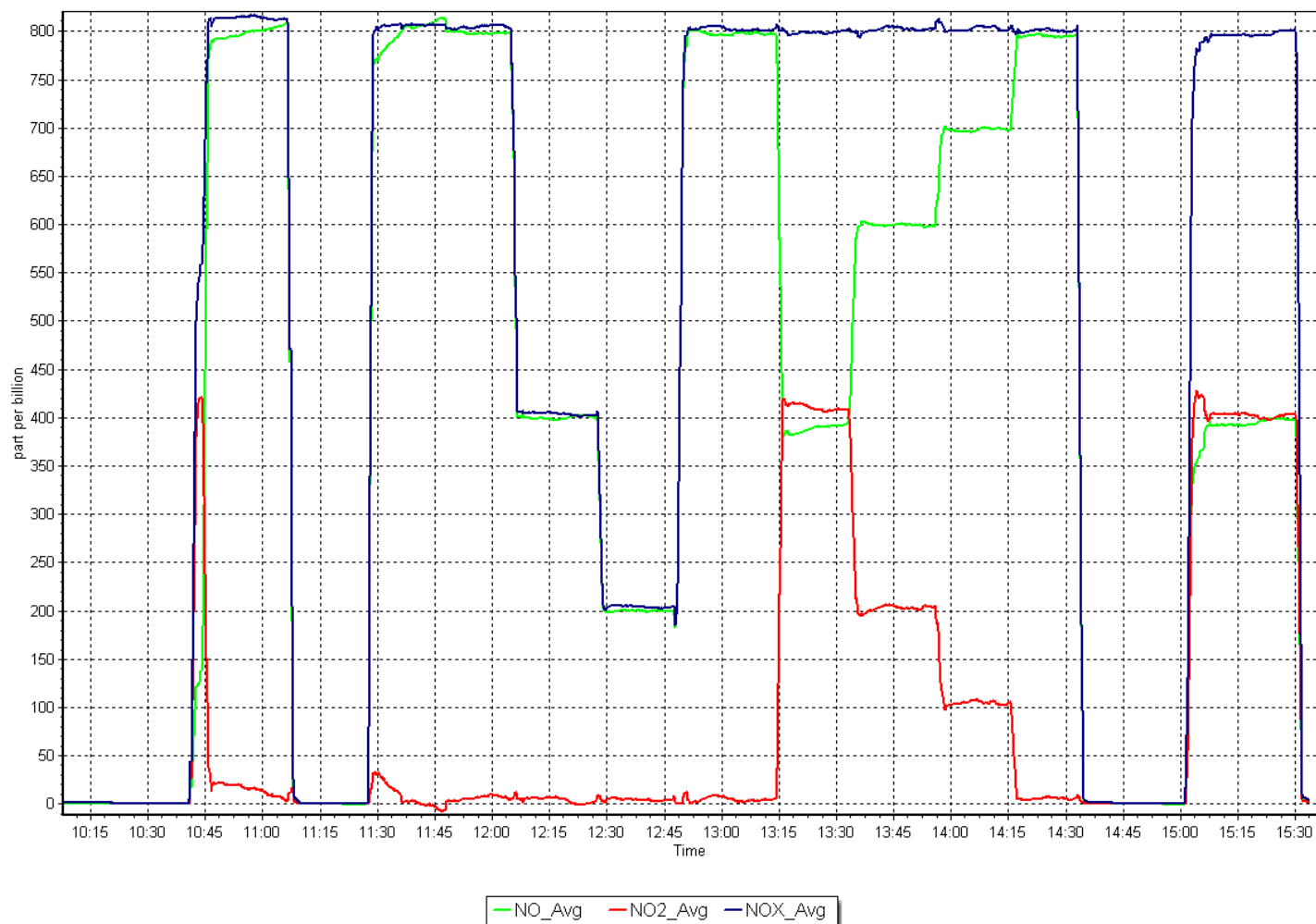
NO Calibration Curve



NO_x Calibration Plot

Date: September 17, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Fort Chipewyan
Calibration Date: September 2, 2024
Start time (MST): 9:21
Reason: Routine

Station number: AMS 08
Last Cal Date: August 12, 2024
End time (MST): 11:54

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701

Serial Number: 3252
Serial Number: 135

Analyzer Information

Analyzer make: Teledyne API T400
Analyzer Range: 0 - 500 ppb

Analyzer serial #: 3872

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997600	0.996200	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	0.320000	-0.160000	Coeff or Slope:	1.016	1.016

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted
					Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	5000	913.0	400.0	398.1	1.005
As found Mid point					
As found Low point					
Baseline Corr As found:	398.0	Previous response	399.4	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.5	----
High point	5000	914.7	400.0	398.5	1.004
Mid point	5000	786.4	200.0	199.2	1.004
Low point	5000	701.3	100.0	98.5	1.015
As left zero	5000	0.0	0.0	0.1	----
As left span	5000	963.3	400.0	400.9	0.998
Average Correction Factor					1.008

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

Calibration Performed By: Matthew Courtoreille



Wood Buffalo Environmental Association

O₃ Calibration Summary

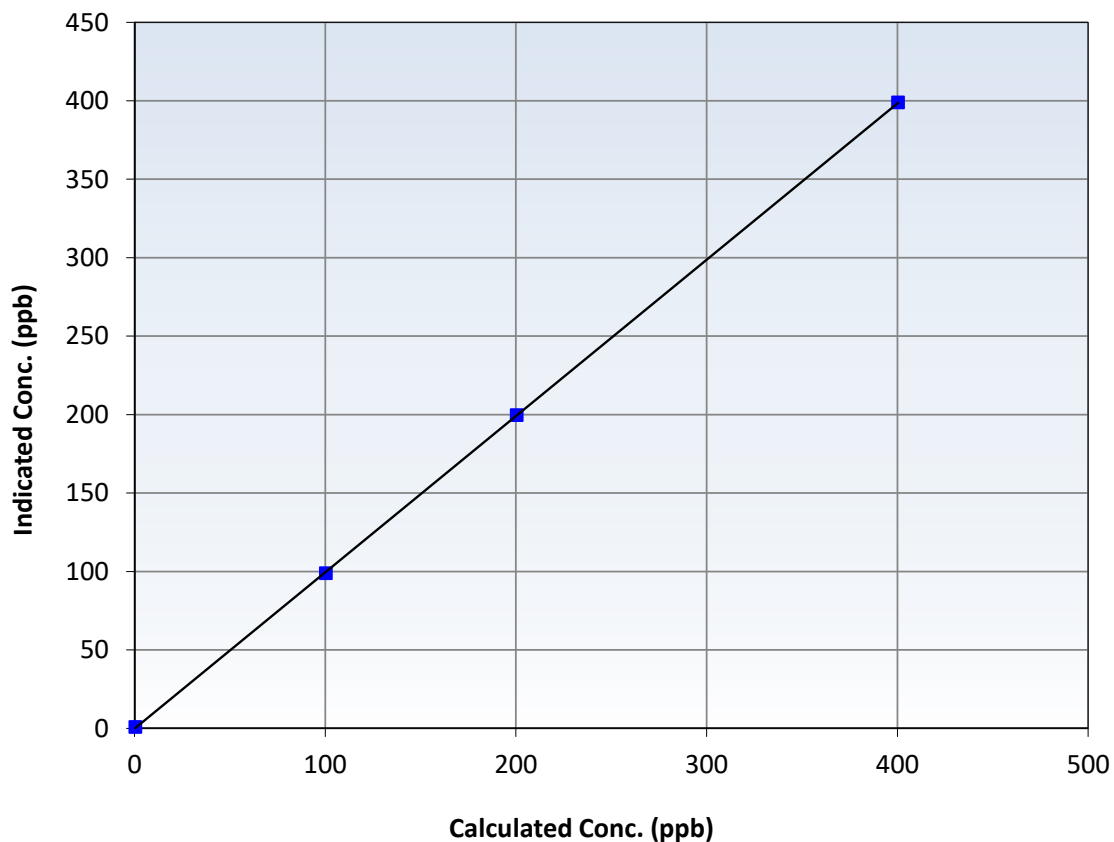
Station Information

Calibration Date:	September 2, 2024	Previous Calibration:	August 12, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	9:21	End Time (MST):	11:54
Analyzer make:	Teledyne API T400	Analyzer serial #:	3872

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5	----	Correlation Coefficient	0.999984	≥0.995
400.0	398.5	1.0038	Slope	0.996200	0.90 - 1.10
200.0	199.2	1.0040	Intercept	-0.160000	+/- 5
100.0	98.5	1.0152			

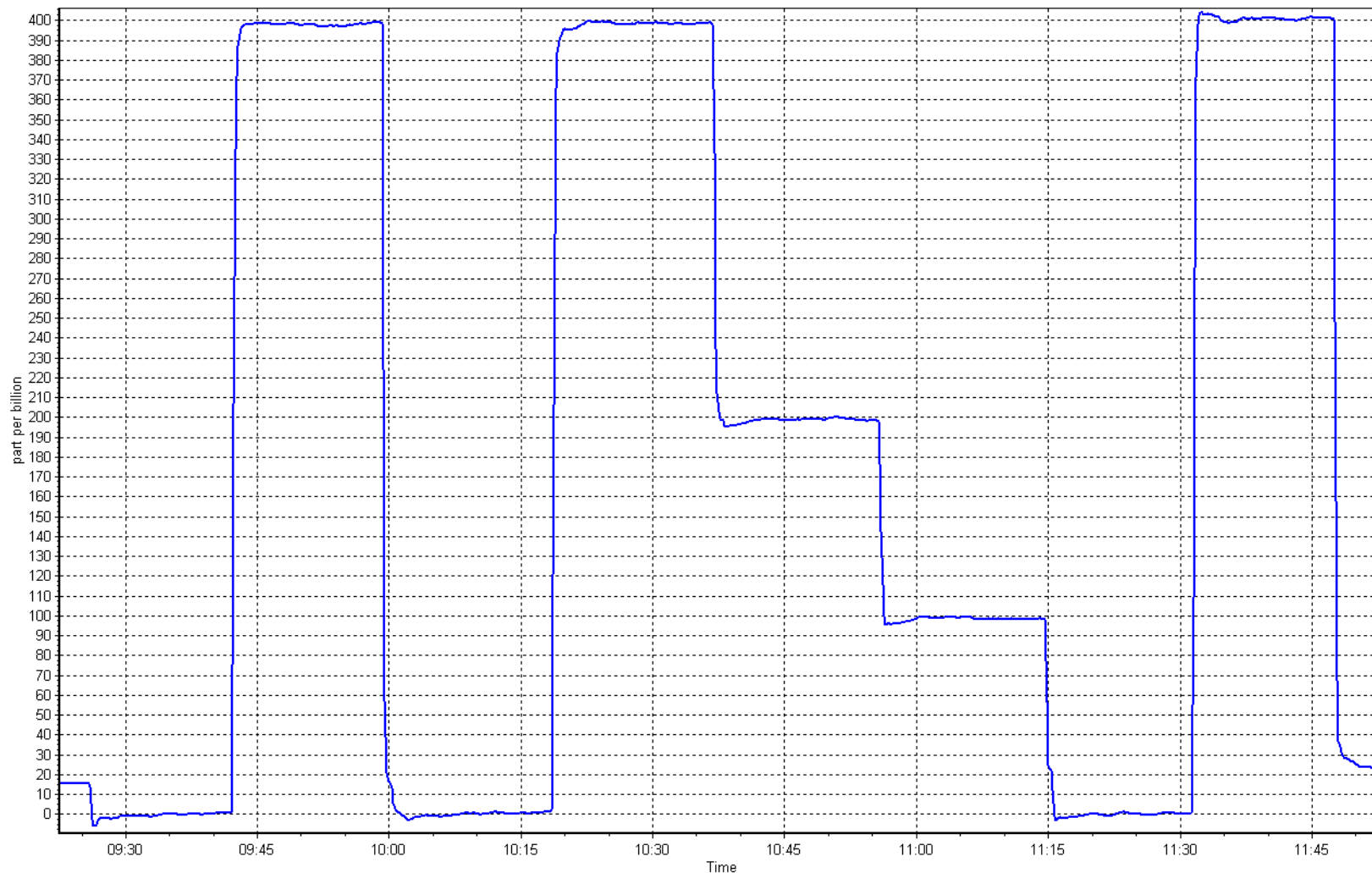
O₃ Calibration Curve



O₃ Calibration Plot

Date: September 2, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Fort Chipewyan Station number: AMS 08
Calibration Date: September 18, 2024 Last Cal Date: August 29, 2024
Start time (MST): 7:22 End time (MST): 8:57

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: Alicat FP-25BT S/N: 388747

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	12.90	12.65	12.90	☐	+/- 2 °C
P (mmHg)	729.10	731.35	729.10	☐	+/- 10 mmHg
Flow (LPM)	4.94	4.98	4.94	☐	+/- 0.25 LPM
PW% (pump)	66%		41%	☒	>80%
Zero Verification	PM w/o HEPA: 8.60		PM w/ HEPA: 0.00		<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

SPAN DUST Refractive Index: 10.90 Expiry Date: 10-Jun-24
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	9.00	8.80	10.80	☒	+/- 0.5

Date Optical Chamber Cleaned: September 18, 2024

Date Disposable Filter Changed: September 18, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.00 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 29, 2024

Date RH/T Sensor Cleaned: August 29, 2024

Notes:

Verified flow, pressure, temperature and pump power. 1st Leak check passed. Pump changed. PMT adjusted. 2nd leak check passed.

Calibration by: Jan Castro



Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name: Fort Chipewyan Station number: AMS 08
Calibration Date: September 18, 2024 Last Cal Date: August 15, 2024
Start time (MST): 5:37 End time (MST): 8:34
Reason: Routine

Calibration Standards

Cal Gas Concentration: 3,030 ppm Cal Gas Exp Date: December 1, 2028
Cal Gas Cylinder #: ALM014846
Removed Cal Gas Conc: 3,030 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3252
ZAG Make/Model: Teledyne API T701H Serial Number: 135

Analyzer Information

Analyzer make: Teledyne API T300 Analyzer serial #: 3505
Analyzer Range: 0 - 50 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.993690	0.997708	Backgd or Offset:	-0.015	0
Calibration intercept:	0.142917	0.106888	Coeff or Slope:	1.006	1.009

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4934	66.7	40.4	40.3	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	40.32	Prev response:	40.30	*% change:	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4934	66.7	40.4	40.4	1.001
Mid point	4966.7	33.3	20.2	20.3	0.993
Low point	4983.3	16.7	10.1	10.3	0.983
As left zero	5000	0.0	0.0	0.0	----
As left span	2960	40.0	40.4	40.3	1.003
Average Correction Factor					0.992

Notes: Changed inlet filter after as found. Adjusted zero only.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

CO Calibration Summary

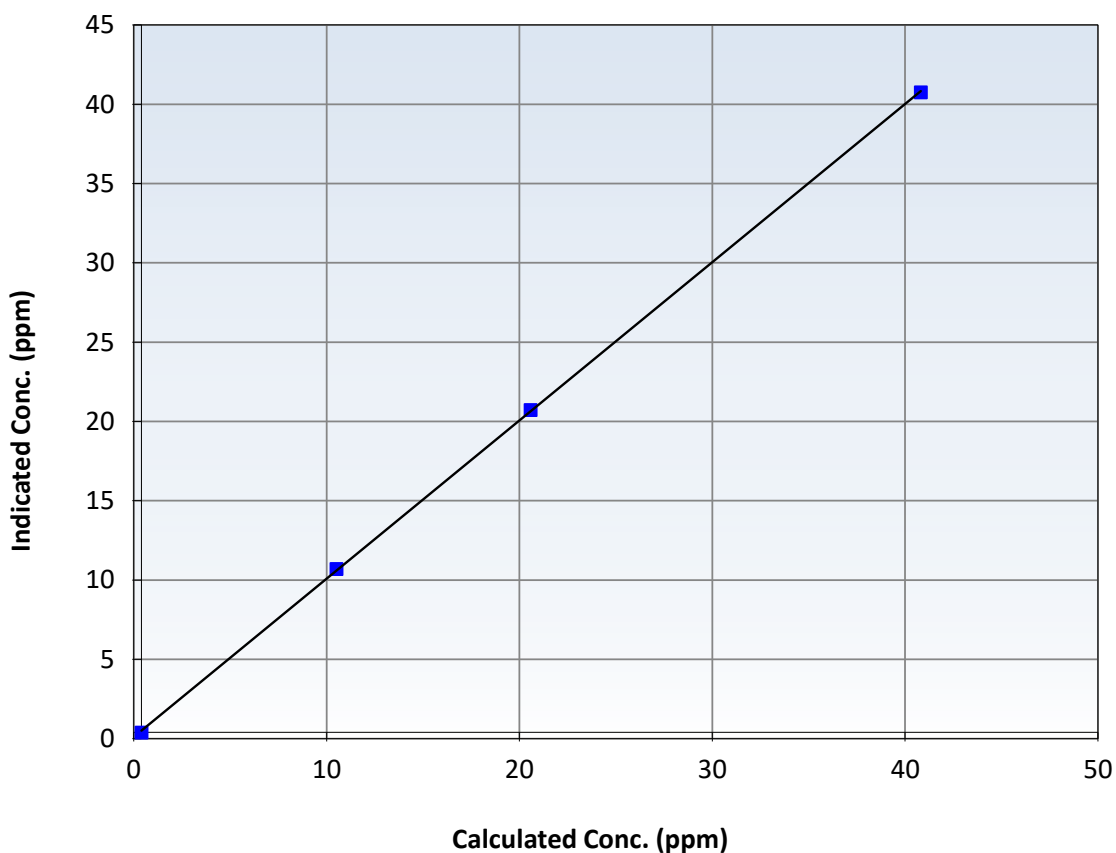
Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 15, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	5:37	End Time (MST):	8:34
Analyzer make:	Teledyne API T300	Analyzer serial #:	3505

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999960	≥ 0.995
40.4	40.4	1.0014	Slope	0.997708	$0.90 - 1.10$
20.2	20.3	0.9926	Intercept	0.106888	± 1.5
10.1	10.3	0.9825			

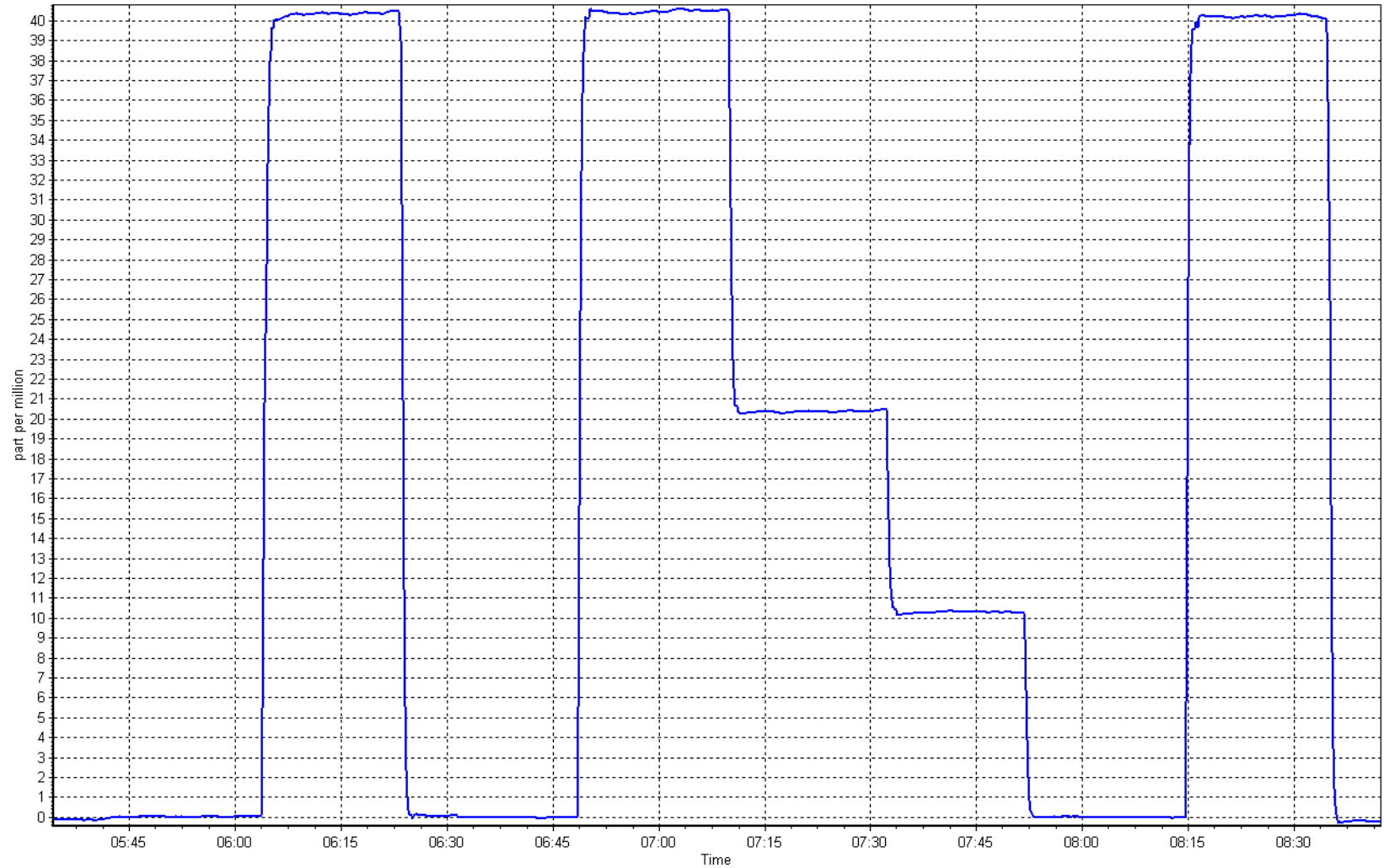
CO Calibration Curve



CO Calibration Plot

Date: September 18, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

CO₂ Calibration Report

Station Information

Station Name: Fort Chipewyan Station number: AMS 08
Calibration Date: September 23, 2024 Last Cal Date: August 13, 2024
Start time (MST): 11:54 End time (MST): 15:17
Reason: Routine

Calibration Standards

Cal Gas Concentration: 60,220 ppm Cal Gas Exp Date: December 1, 2028
Cal Gas Cylinder #: ALM014846
Removed Cal Gas Conc: 60,220 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 3252
N2 Gen Make/Model: Peak Scientific Serial Number: 135

Analyzer Information

Analyzer make: Teledyne API T360 Analyzer serial #: 289
Analyzer Range: 0 - 2,000 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002958	1.000382	Backgd or Offset:	-0.011	-0.016
Calibration intercept:	-4.620000	-7.160000	Coeff or Slope:	1.033	1.034

CO₂ 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	3000	0.0	0.0	0.0	----
As found High Point	2920	80.0	1605.9	1623.1	0.989
As found Mid Point					
As found Low Point					
New cylinder response					
Baseline Corr As found:	1623.1	Prev response:	1606.0	*% change:	1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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
Calibrator zero	3000	0.0	0.0	-0.2	----
High point	2920	80.0	1605.9	1606.9	0.999
Mid point	2960	40.0	802.9	780.3	1.029
Low point	2980	20.0	401.5	395.7	1.015
As left zero	3000	0.0	0.0	-0.4	----
As left span	2960	40.0	802.9	776.9	1.034

Average Correction Factor 1.014

Notes: Changed inlet filter after as found, Adjustments made to Zero and high point span.

Calibration Performed By: Matthew Courtoreille



Wood Buffalo Environmental Association

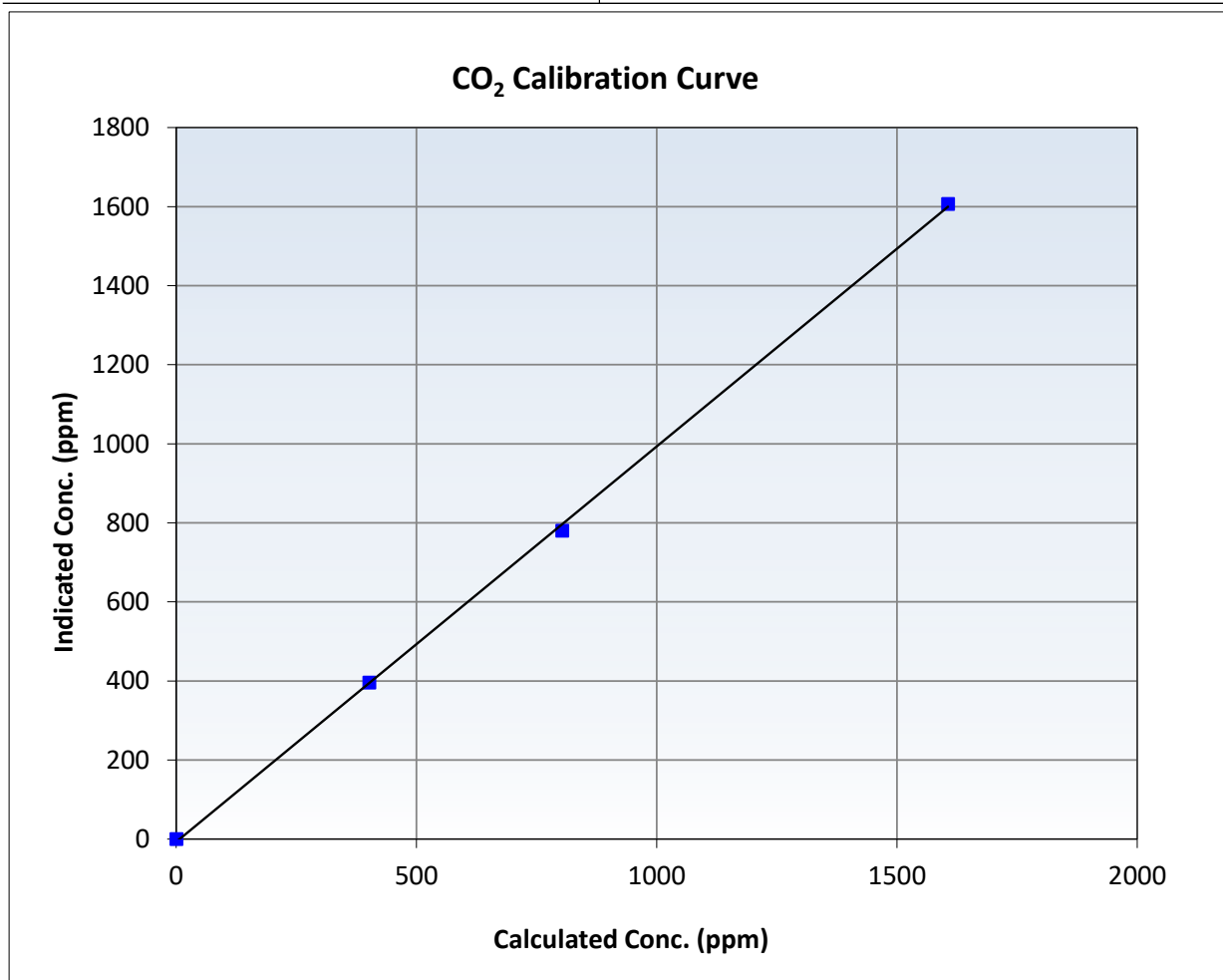
CO₂ Calibration Summary

Station Information

Calibration Date	September 23, 2024	Previous Calibration	August 13, 2024
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	11:54	End Time (MST)	15:17
Analyzer make	Teledyne API T360	Analyzer serial #	289

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999748	≥0.995
1605.9	1606.9	0.9994	Slope	1.000382	0.90 - 1.10
802.9	780.3	1.0290	Intercept	-7.2	+/-20
401.5	395.7	1.0146			



CO₂ Calibration Plot

Date: September 23, 2024

Location: Fort Chipewyan





Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Fort McKay - Bertha Ganter Station Number: AMS 01
Calibration Date: September 17, 2024 Prev Cal Date: June 29, 2022
Start Time (MST): 13:52 End Time (MST): 16:23
Tower Height (m): 10.0 Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: P22394
WS Calibrator: MetOne 053 Serial Number: CA 05230

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error <i>Limit = +/- 1.5%</i>
0	0.0	0.0	---
200	20.2	20.3	0.7%
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	0.999997	≥ 0.9995
Calculated slope	0.998873	1.000482	$0.90 - 1.10$
Calculated intercept	-0.027395	-0.053275	± 2

Wind Direction Information

Sensor make/model: Met One 020C-1 Serial Number: E4853
As Found Declination (deg east of True North): 5 As Left Declination (deg east of True North): 14
Solar noon time (MST): 22:29 Calc Declination*: 13.65 Degrees
Deadband calc: 2.8 degrees (*Limit 4 deg*) * - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) <i>Limit = +/- 1.0%</i>
0	0.9	---
90	88.5	-0.4%
180	177.8	-0.6%
270	271.5	0.4%
358	355.1	-0.8%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r^2)	0.999915	0.999919	≥ 0.9995
Calculated slope	0.990857	1.004968	$0.90 - 1.10$
Calculated intercept	-0.704563	-0.048077	± 4

Notes: Bearings still good. Confirmed true north using a compass.

Calibration Performed By: Jan Castro



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09 BARGE LANDING SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Barge Landing Station number: AMS 09
Calibration Date: September 4, 2024 Last Cal Date: August 16, 2024
Start time (MST): 9:27 End time (MST): 12:45
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.96 ppm Cal Gas Exp Date: January 5, 2025
Cal Gas Cylinder #: CC151285
Removed Cal Gas Conc: 49.96 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 3812
Zero Air Gen Model: APIT701 Serial Number: 4888

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1118148498
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.996559	1.003488	Backgd or Offset:	10.1	10.2
Calibration intercept:	0.206495	0.028097	Coeff or Slope:	0.958	0.971

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	4919	80.2	801.5	790.0	1.015
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	789.9	Previous response	798.9	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.4	----
High point	4919	80.2	801.5	805.0	0.996
Mid point	4960	40.1	400.7	400.4	1.001
Low point	4980	20.0	199.8	201.2	0.993
As left zero	5000	0.0	0.0	0.3	----
As left span	4919	80.2	801.5	805.9	0.995
Average Correction Factor:					0.997

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

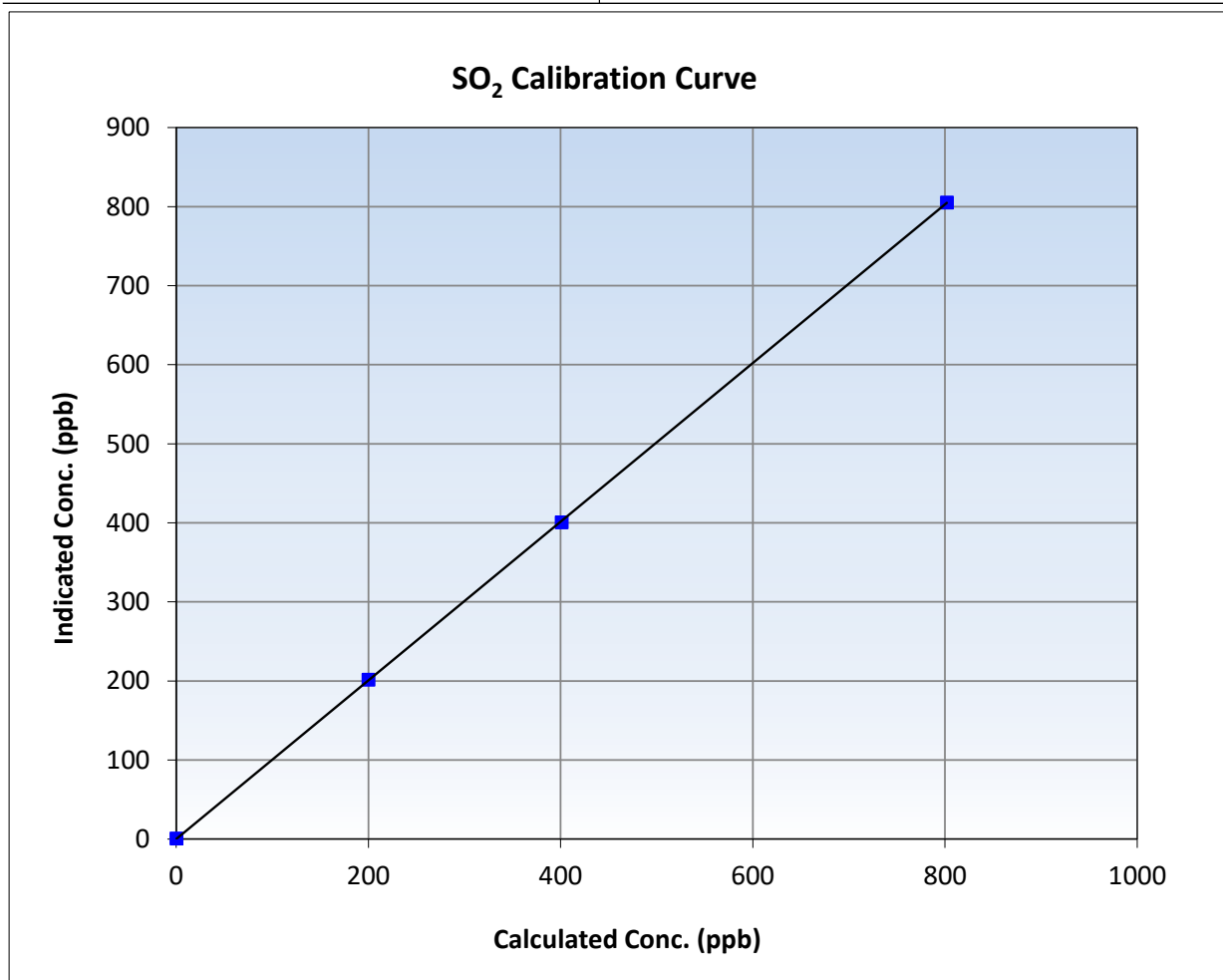
SO₂ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 16, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:45
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

Calibration Data

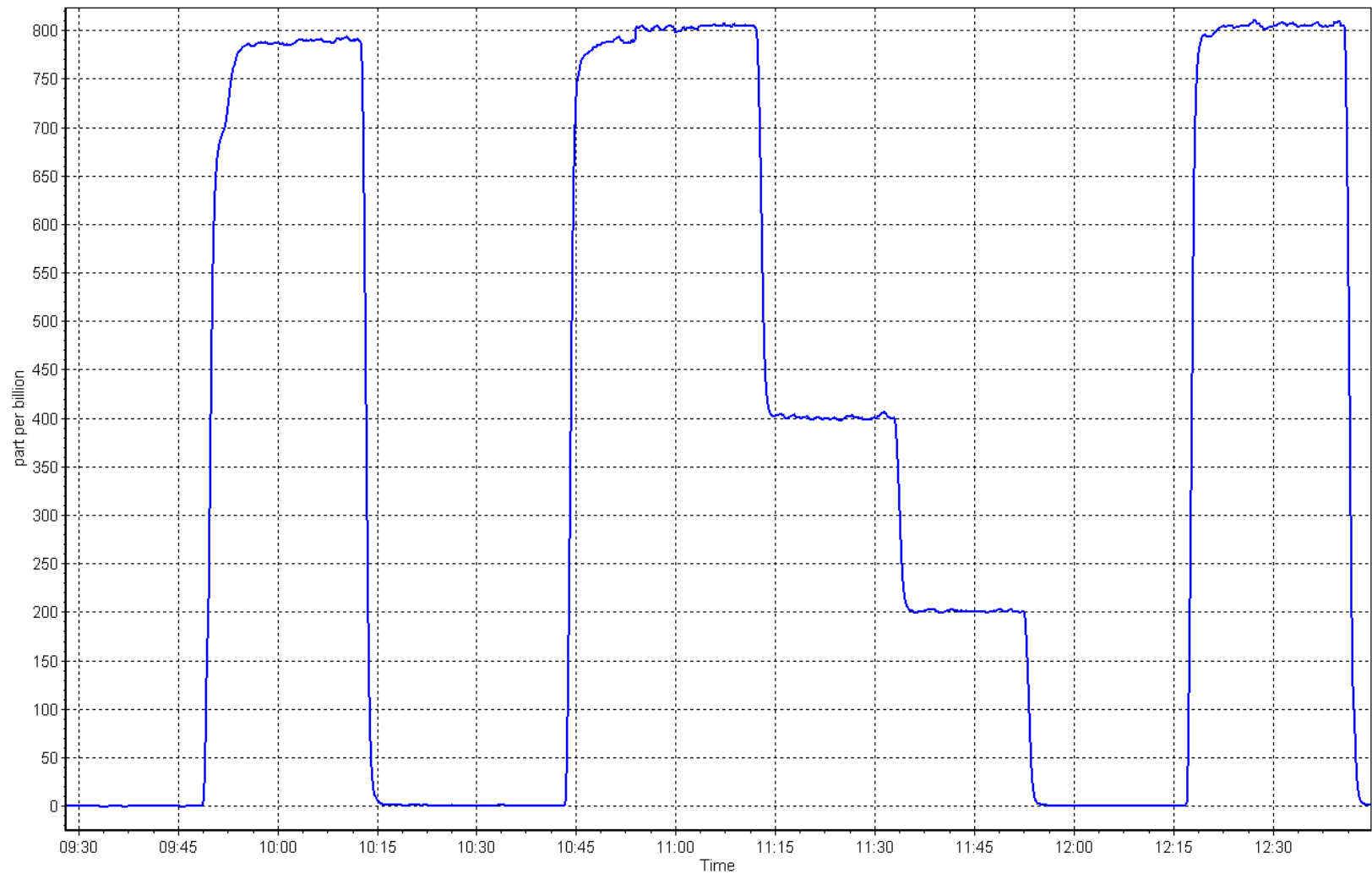
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4	----	Correlation Coefficient	0.999989	≥0.995
801.5	805.0	0.9956	Slope	1.003488	0.90 - 1.10
400.7	400.4	1.0007	Intercept	0.028097	+/-30
199.8	201.2	0.9932			



SO2 Calibration Plot

Date: September 4, 2024

Location: Barge Landing





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Barge Landing
Calibration Date: September 3, 2024
Start time (MST): 9:35
Reason: Routine

Station number: AMS 09
Last Cal Date: August 8, 2024
End time (MST): 13:39

Calibration Standards

Cal Gas Concentration: 5.17 ppm
Cal Gas Cylinder #: CC511415
Removed Cal Gas Conc: 5.17 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Cal Gas Exp Date: August 22, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 3812
Serial Number: 4888

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1331259320
Converter serial #: 519
Converter Temp: 830 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.015681	1.010398	Backgd or Offset:	2.970	2.970
Calibration intercept:	0.119698	0.079627	Coeff or Slope:	1.215	1.215

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4923	77.4	80.0	80.3	0.996
As found Mid point	4961	38.7	40.0	40.4	0.988
As found Low point	4981	19.3	20.0	20.0	0.993
New cylinder response					
Baseline Corr As found:	80.4	Prev response:	81.42	*% change:	-1.3%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.004690	AF Intercept:	-0.020535
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999983	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4923	77.4	80.0	80.9	0.989
Mid point	4961	38.7	40.0	40.6	0.986
Low point	4981	19.3	20.0	20.3	0.983
As left zero	5000	0.0	0.0	0.1	----
As left span	4923	77.4	80.0	81.4	0.983
SO2 Scrubber Check	4920	80.2	802.0	-0.1	----
Date of last scrubber change:				Ave Corr Factor	0.986
Date of last converter efficiency test:					

Notes: Sample inlet filter changed after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. No adjustment.

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

TRS Calibration Summary

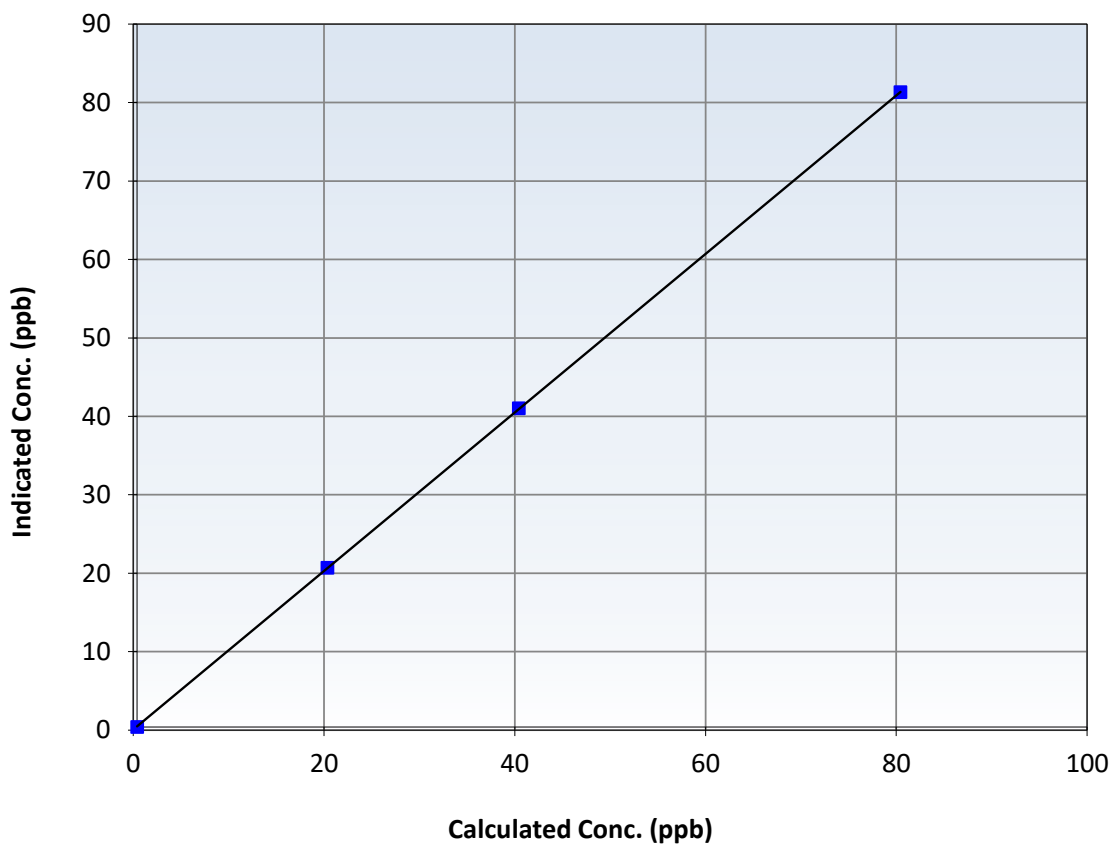
Station Information

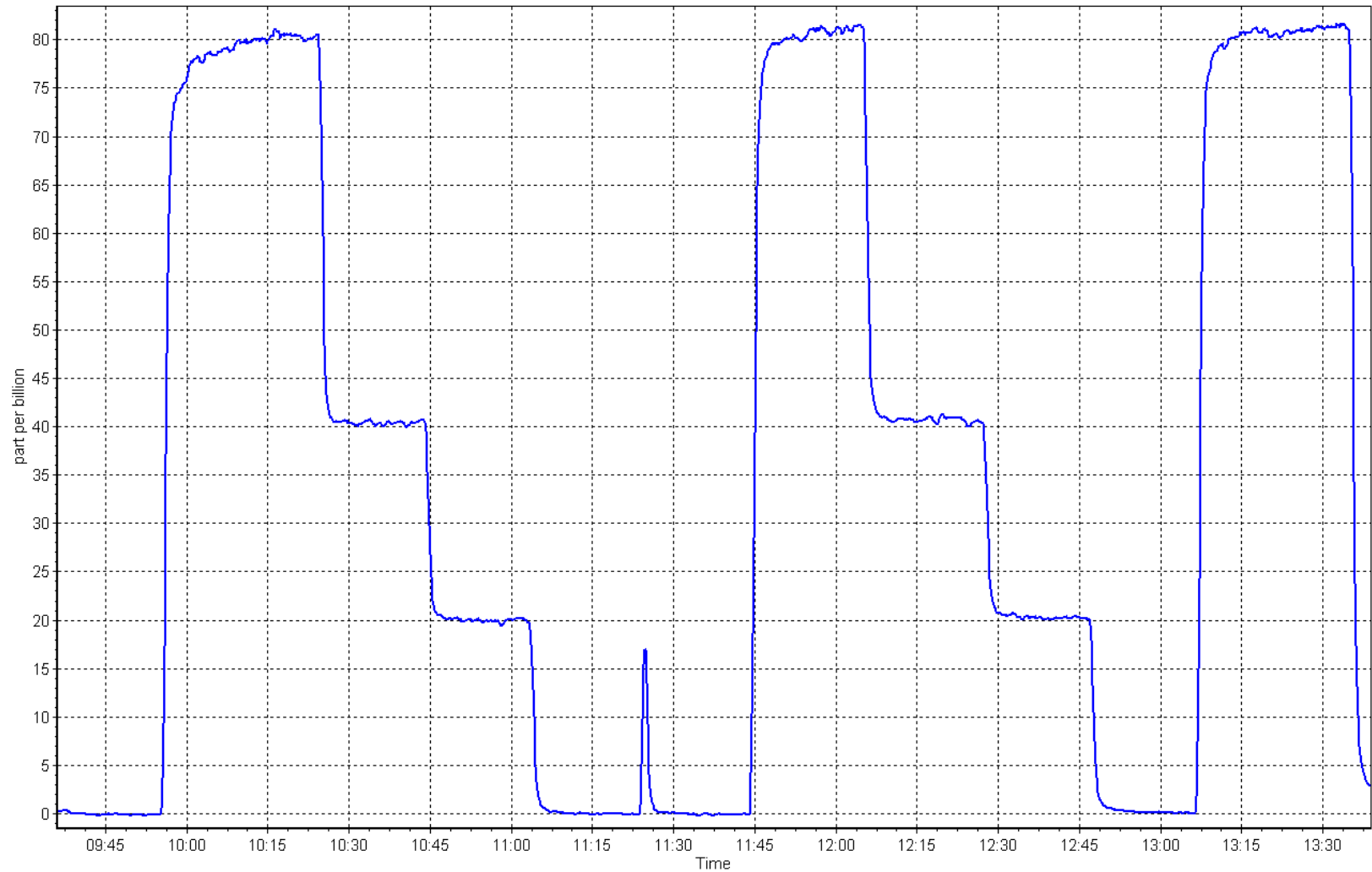
Calibration Date:	September 3, 2024	Previous Calibration:	August 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:35	End Time (MST):	13:39
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999995		≥ 0.995
80.0	80.9	0.9894	Slope	1.010398		$0.90 - 1.10$
40.0	40.6	0.9859	Intercept	0.079627		± 3
20.0	20.3	0.9832				

H₂S/TRS Calibration Curve







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Barge Landing
Calibration Date: September 4, 2024
Start time (MST): 9:27
Reason: Routine

Station number: AMS 09
Last Cal Date: August 16, 2024
End time (MST): 12:45

Calibration Standards

Gas Cert Reference:	CC151285	Cal Gas Expiry Date:	January 5, 2025
CH ₄ Cal Gas Conc.	497.6 ppm	CH ₄ Equiv Conc.	1067.1 ppm
C ₃ H ₈ Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH ₄ Conc.	497.6 ppm	CH ₄ Equiv Conc.	1067.1 ppm
Removed C ₃ H ₈ Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3812
Zero Air Gen model:	APIT701	Serial Number:	4888

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1180320038
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.31E-04	2.32E-04	NMHC SP Ratio:	5.67E-05
CH ₄ Retention time:	14.0	14.0	NMHC Peak Area:	161086
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	17.33	0.988
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.33	Prev response	17.11	*% change	1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.13	0.999
Mid point	4960	40.1	8.56	8.58	0.997
Low point	4980	20.0	4.27	4.30	0.993
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.12	1.000
Average Correction Factor					0.996

Notes:

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4919	80.2	9.14	9.34	0.978
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.34	Prev response	9.14	*% change	2.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	9.14	9.16	0.997
Mid point	4960	40.1	4.57	4.59	0.995
Low point	4980	20.0	2.28	2.30	0.991
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.15	0.999
Average Correction Factor					0.995

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4919	80.2	7.98	7.99	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.99	Prev response	7.98	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	7.97	1.002
Mid point	4960	40.1	3.99	3.99	0.999
Low point	4980	20.0	1.99	2.00	0.994
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	7.97	1.001
Average Correction Factor					0.998

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.998126	1.000229
THC Cal Offset:	0.024256	0.015260
CH ₄ Cal Slope:	0.998861	0.997902
CH ₄ Cal Offset:	0.005263	0.007862
NMHC Cal Slope:	0.997709	1.002388
NMHC Cal Offset:	0.019593	0.007399

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

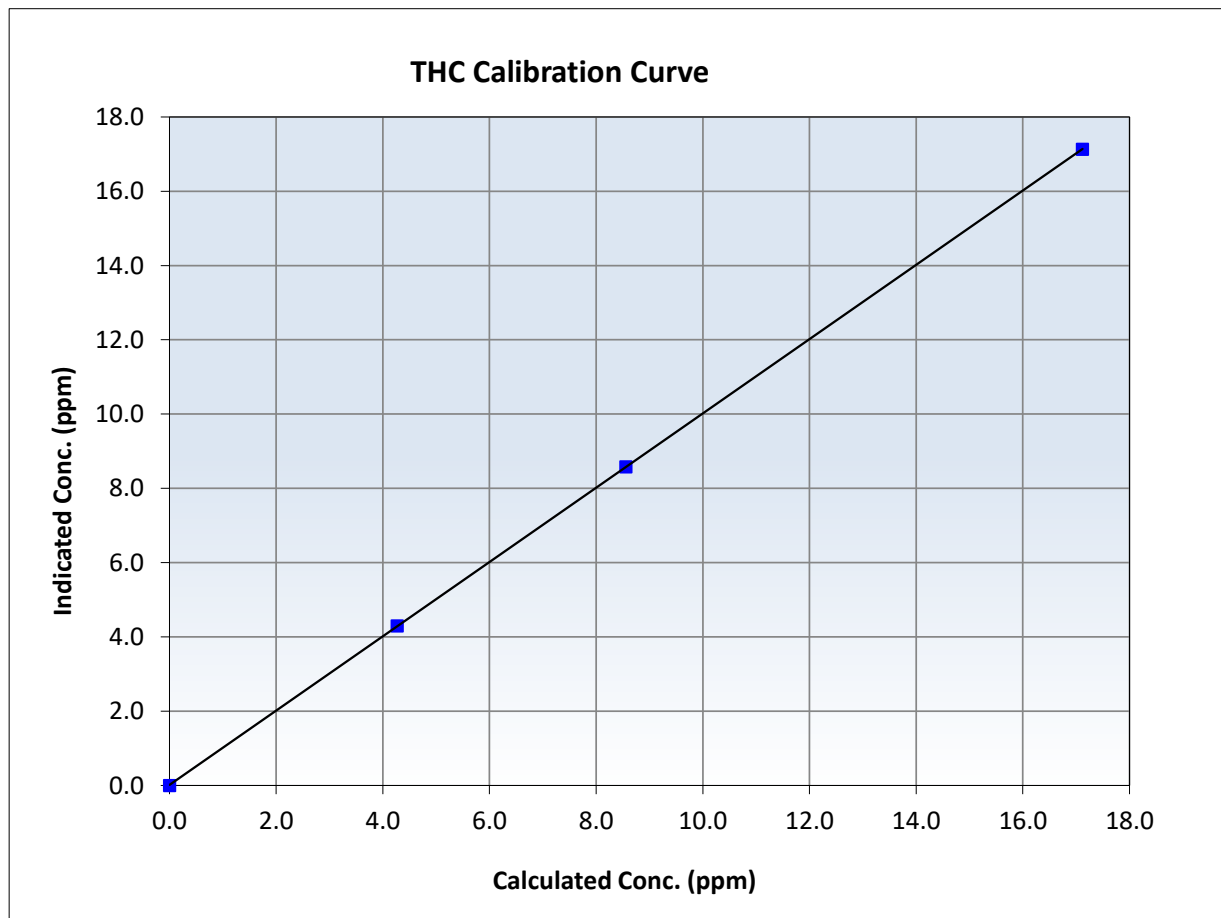
THC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 16, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999996	≥ 0.995
17.12	17.13	0.9993	Slope	1.000229	$0.90 - 1.10$
8.56	8.58	0.9971	Intercept	0.015260	± 0.5
4.27	4.30	0.9927			





Wood Buffalo Environmental Association

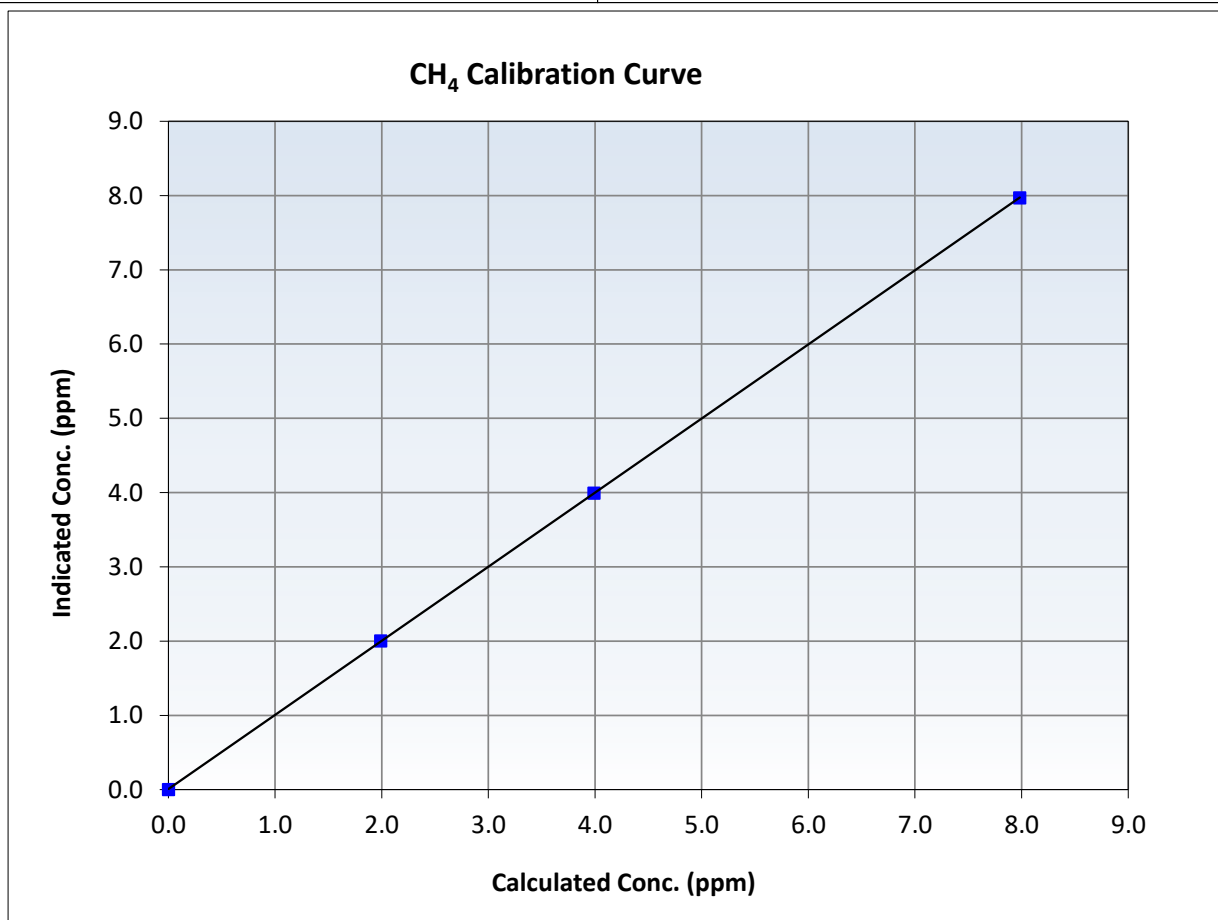
CH₄ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 16, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999996	≥ 0.995
7.98	7.97	1.0016	Slope	0.997902	$0.90 - 1.10$
3.99	3.99	0.9992	Intercept	0.007862	± 0.5
1.99	2.00	0.9942			





Wood Buffalo Environmental Association

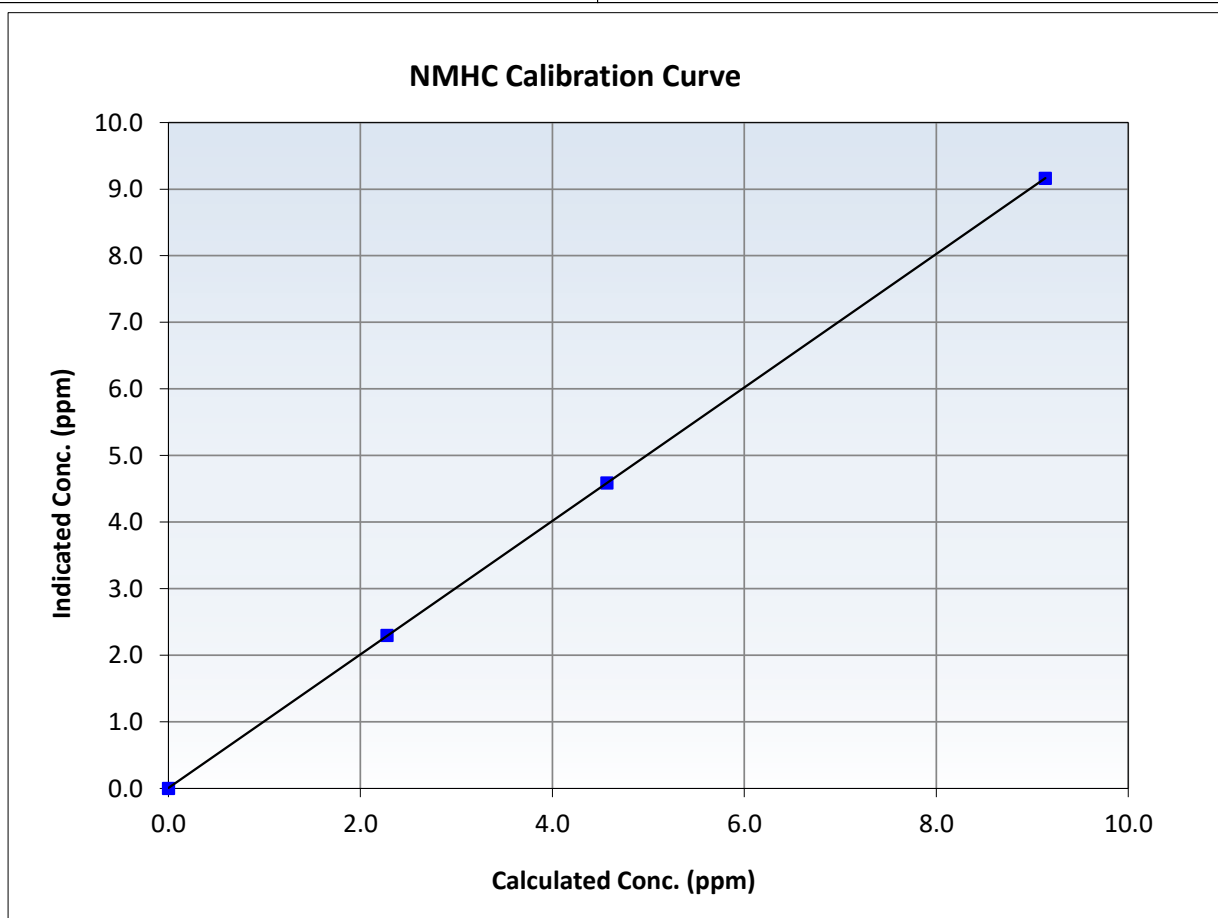
NMHC Calibration Summary

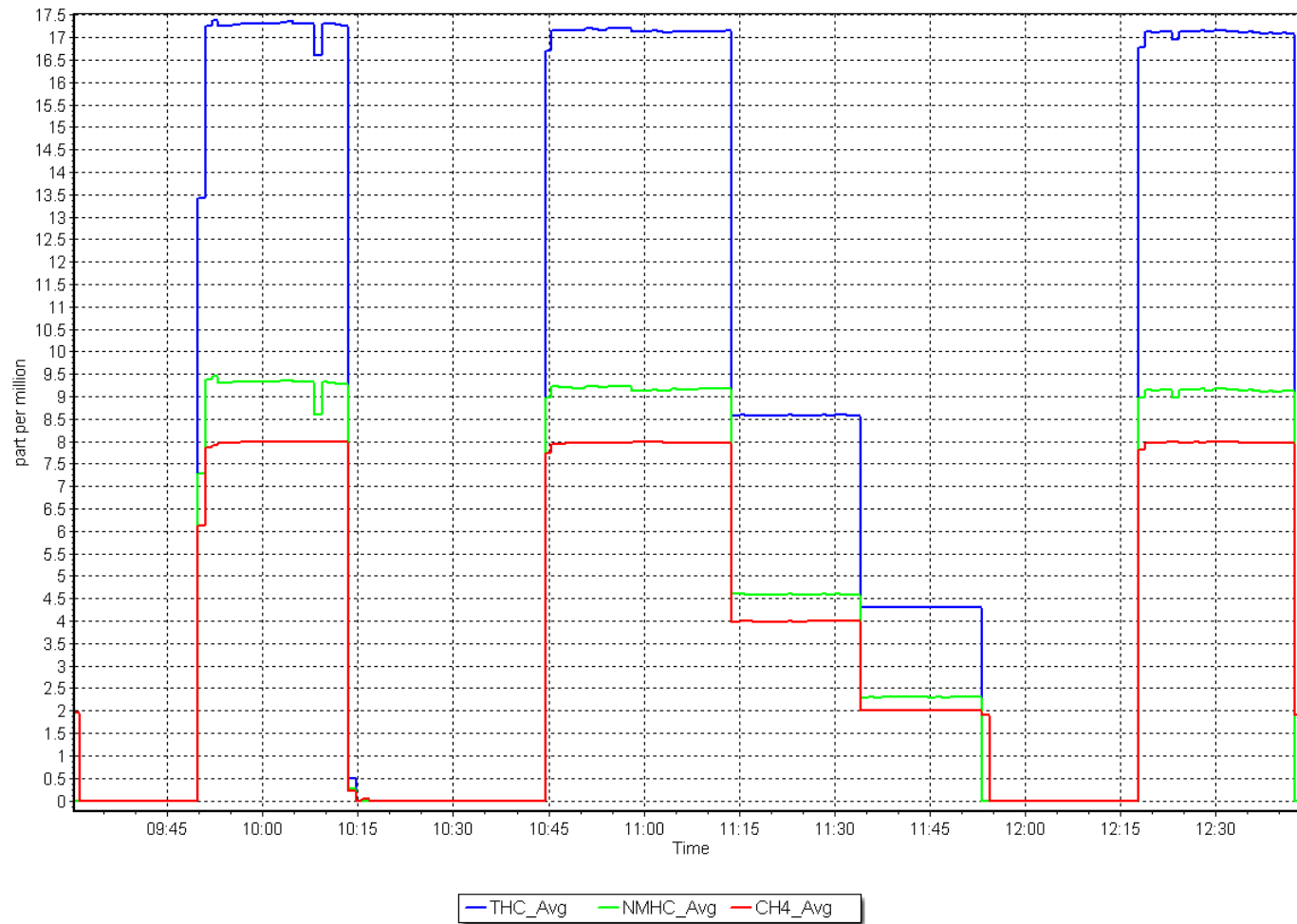
Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 16, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999997	<i>≥0.995</i>
9.14	9.16	0.9972	Slope	1.002388	<i>0.90 - 1.10</i>
4.57	4.59	0.9951	Intercept	0.007399	<i>+/-0.5</i>
2.28	2.30	0.9913			







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Barge Landing
Calibration Date: September 27, 2024
Start time (MST): 11:58
Reason: Cylinder Change

Station number: AMS 09
Last Cal Date: September 4, 2024
End time (MST): 13:29

Calibration Standards

Gas Cert Reference: CC151285
CH₄ Cal Gas Conc. 497.6 ppm
C₃H₈ Cal Gas Conc. 207.1 ppm
Removed Gas Cert: NA
Removed CH₄ Conc. 497.6 ppm
Removed C₃H₈ Conc. 207.1 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: APIT701

Cal Gas Expiry Date: January 5, 2025
CH₄ Equiv Conc. 1067.1 ppm
Removed Gas Expiry:
CH₄ Equiv Conc. 1067.1 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3812
Serial Number: 4888

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1180320038
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.32E-04	2.32E-04	NMHC SP Ratio:	5.61E-05
CH ₄ Retention time:	14.0	14.0	NMHC Peak Area:	163061
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	17.14	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.14	Prev response	17.14	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.41	0.983
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 0.983

Notes: N2 cylinder changed out.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4919	80.2	9.14	9.18	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.18	Prev response	9.17	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	9.14	9.39	0.973
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 0.973

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4919	80.2	7.98	7.96	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.96	Prev response	7.97	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ 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
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	8.02	0.995
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor 0.995

Calibration Statistics

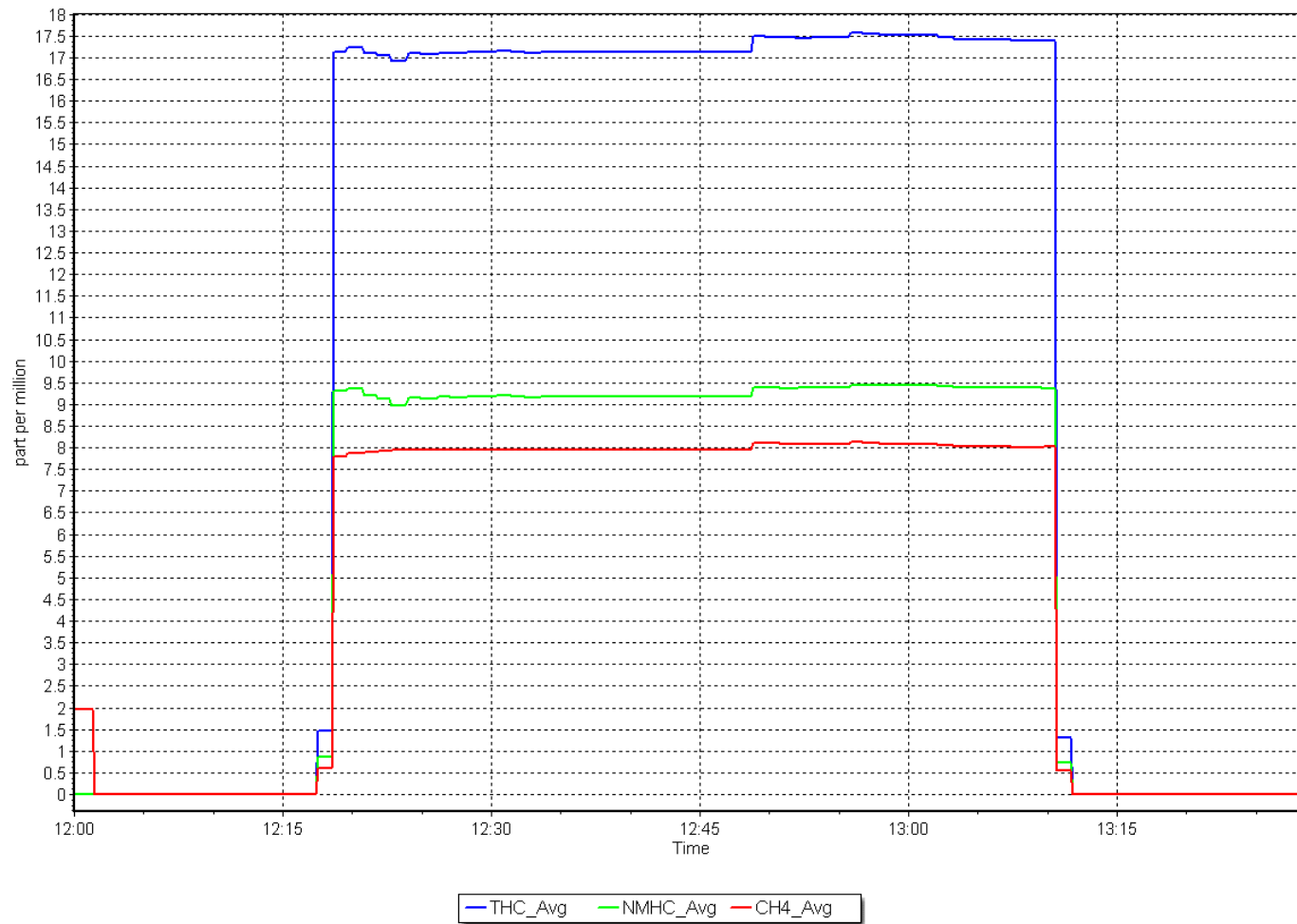
	Start	Finish
THC Cal Slope:	1.000229	1.016798
THC Cal Offset:	0.015260	0.000000
CH ₄ Cal Slope:	0.997902	1.004662
CH ₄ Cal Offset:	0.007862	0.000000
NMHC Cal Slope:	1.002388	1.027620
NMHC Cal Offset:	0.007399	0.000000

Calibration Performed By: Sean Bala

NMHC Calibration Plot

Date: September 27, 2024

Location: Barge Landing





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Barge Landing
Station number: AMS 09
Calibration Date: September 17, 2024
Last Cal Date: August 22, 2024
Start time (MST): 8:31
End time (MST): 13:03
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T2Y1KDH
NOX Cal Gas Conc: 47.38 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 47.38 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: Api T701
Cal Gas Expiry Date: November 17, 2026
NO Cal Gas Conc: 46.94 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 46.94 ppm
NO gas Diff:
Serial Number: 3812
Serial Number: 4888

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.1	----	----
AF High point	4915	85.3	808.3	800.7	7.5	806.5	795.4	11.0	1.0018	1.0066
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 808.8 ppb	NO = 800.3 ppb				* = > +/-5% change initiates investigation		*Percent Change	NO _x = -0.2%	
Baseline Corr 1st pt	NO _x = 806.8 ppb	NO = 795.5 ppb				<u>As Found Statistics</u>		*Percent Change	NO = -0.6%	
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:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1426262593

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.102	1.107	NO bkgnd or offset:	10.0	10.1
NOX coeff or slope:	1.000	1.000	NOX bkgnd or offset:	10.3	10.4
NO2 coeff or slope:	0.998	0.996	Reaction cell Press:	179.5	178.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999629	0.996772
NO _x Cal Offset:	0.858423	0.818039
NO Cal Slope:	0.999895	0.998025
NO Cal Offset:	-0.403675	-0.323937
NO ₂ Cal Slope:	1.001780	0.999413
NO ₂ Cal Offset:	0.346555	-0.725562

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
High point	4915	85.3	808.3	800.7	7.5	806.0	799.0	6.9	1.0028	1.0022
Mid point	4957	42.6	403.7	400.0	3.7	403.7	398.7	5.0	1.0000	1.0032
Low point	4979	21.3	201.8	200.0	1.9	202.9	198.9	4.0	0.9947	1.0053
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
As left span	4915	85.3	808.3	414.7	393.6	804.2	414.7	389.4	1.0050	1.0000
Average Correction Factor									0.9992	1.0035

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	796.4	408.6	395.3	394.5	1.0020	99.8%
Mid GPT point	796.4	599.1	204.8	204.2	1.0030	99.7%
Low GPT point	796.4	696.6	107.3	105.5	1.0171	98.3%
Average Correction Factor					1.0074	99.3%

Notes:

Changed inlet filter after as founds. Span adjusted.

Calibration Performed By:

Sean Bala



Wood Buffalo Environmental Association

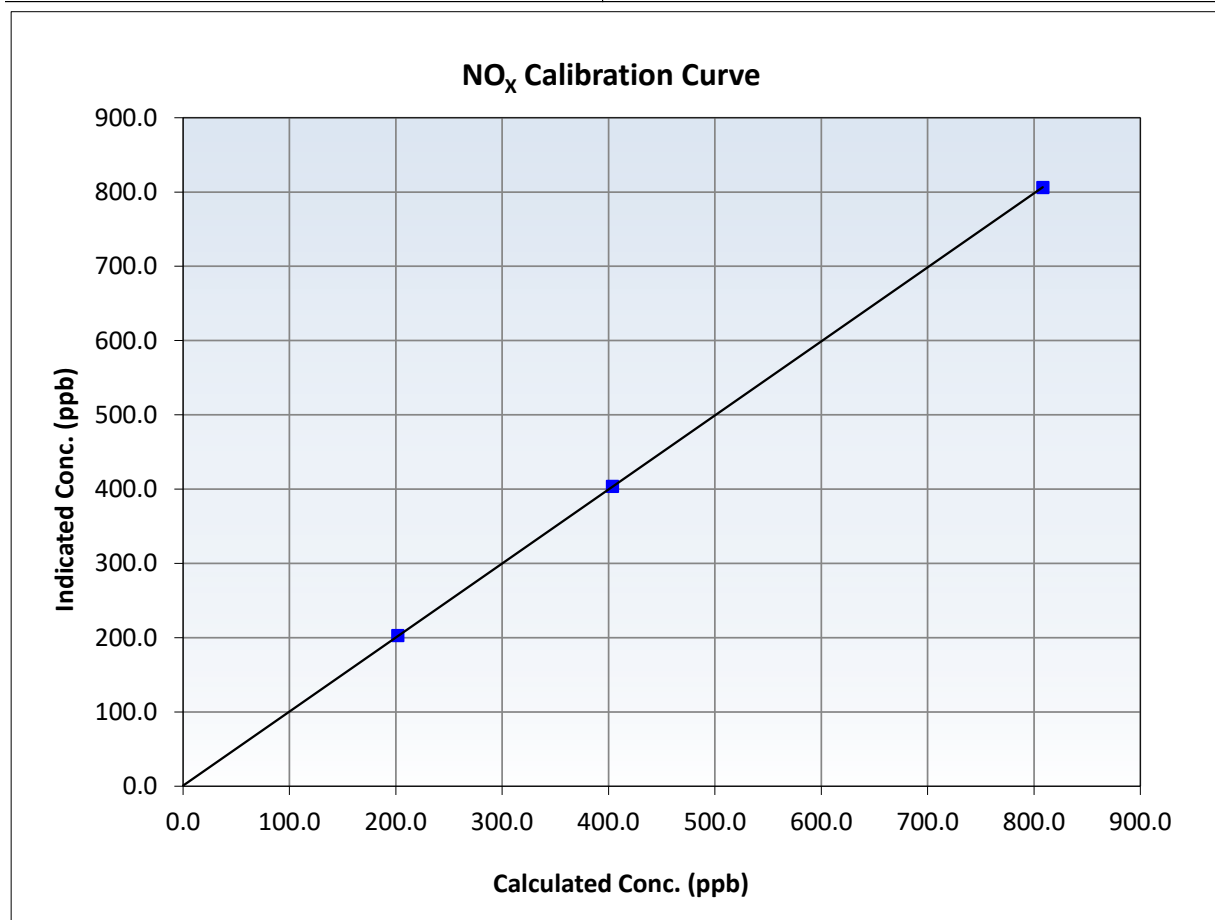
NO_x Calibration Summary

Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:31	End Time (MST):	13:03
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

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	0.999994	≥0.995
808.3	806.0	1.0028	Slope	0.996772	0.90 - 1.10
403.7	403.7	1.0000	Intercept	0.818039	+/-20
201.8	202.9	0.9947			





Wood Buffalo Environmental Association

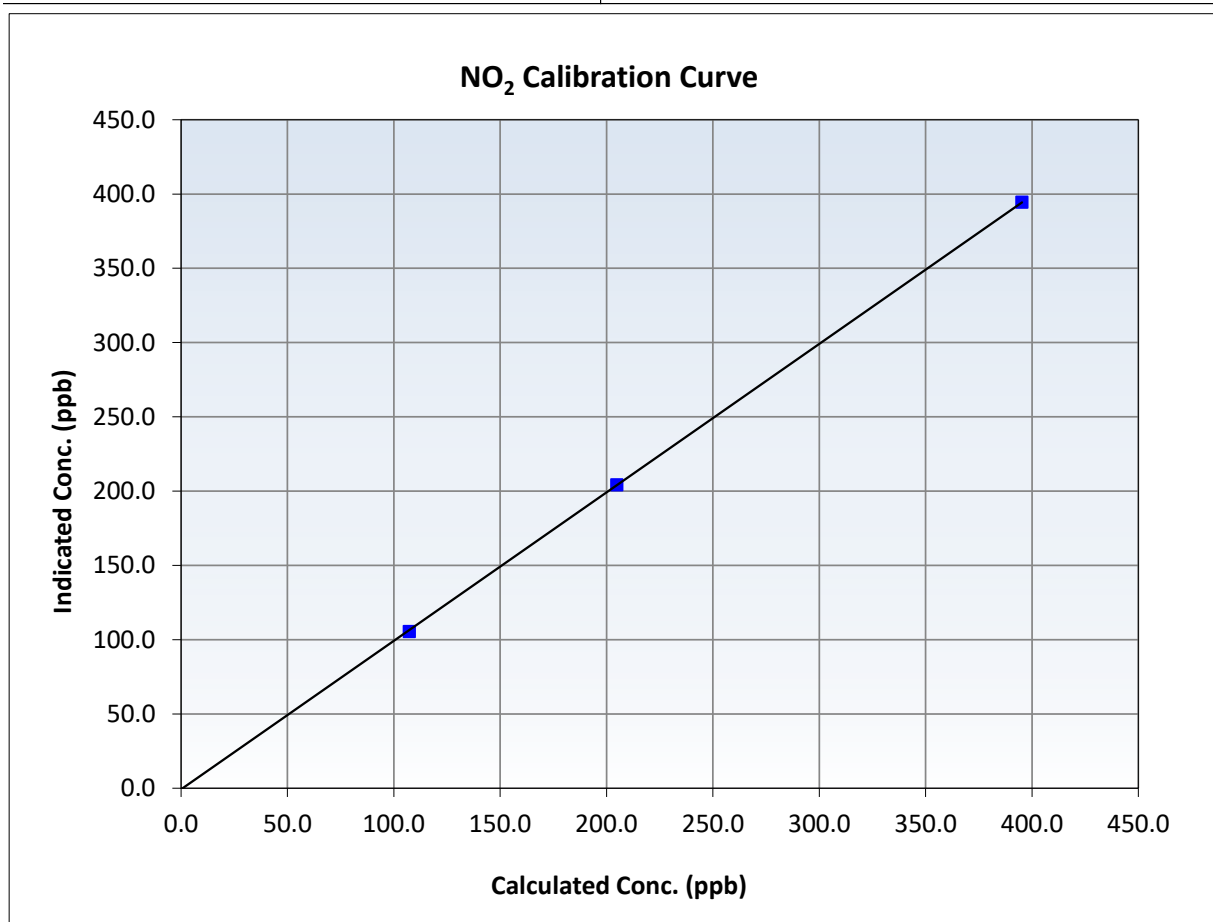
NO₂ Calibration Summary

Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:31	End Time (MST):	13:03
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

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	0.999982	≥0.995
395.3	394.5	1.0020	Slope	0.999413	0.90 - 1.10
204.8	204.2	1.0030	Intercept	-0.725562	+/-20
107.3	105.5	1.0171			





Wood Buffalo Environmental Association

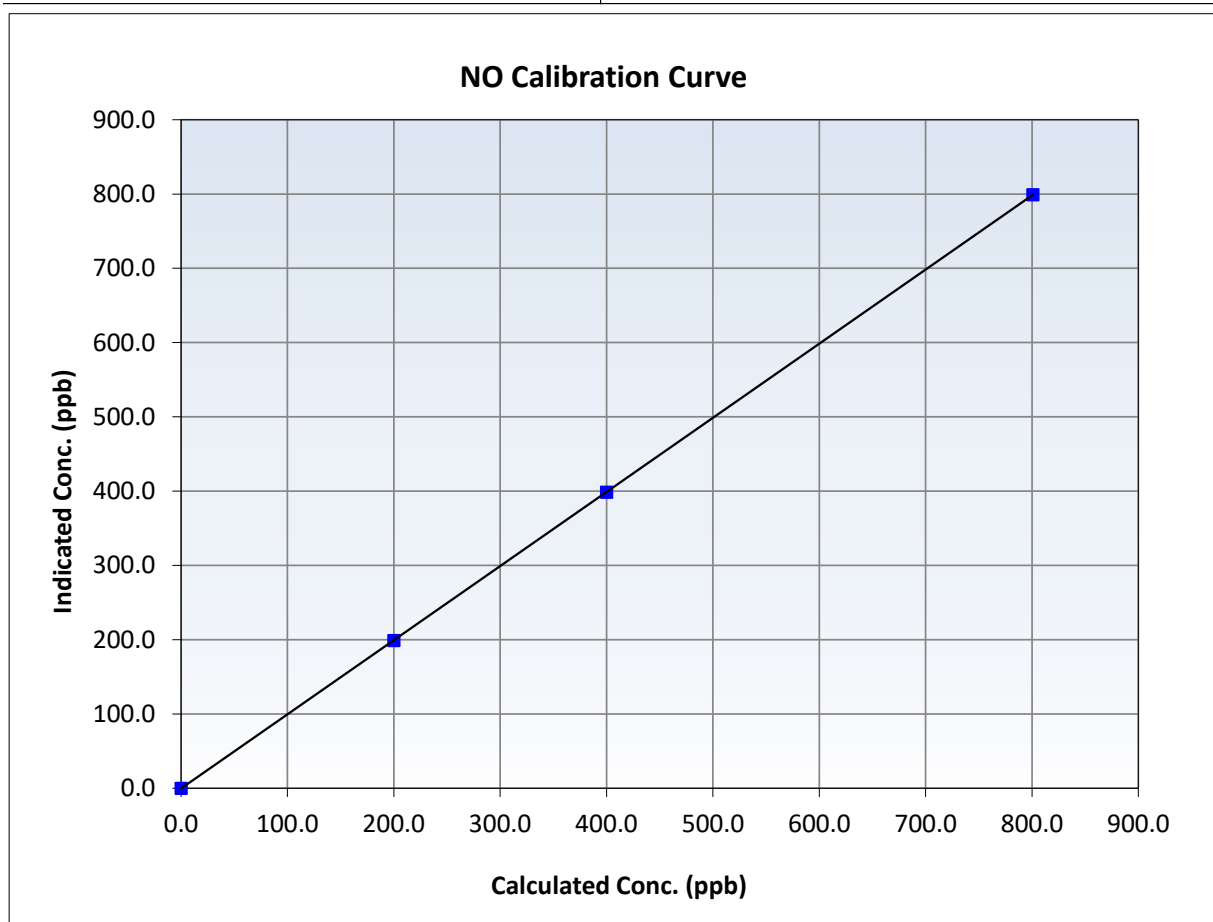
NO Calibration Summary

Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:31	End Time (MST):	13:03
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

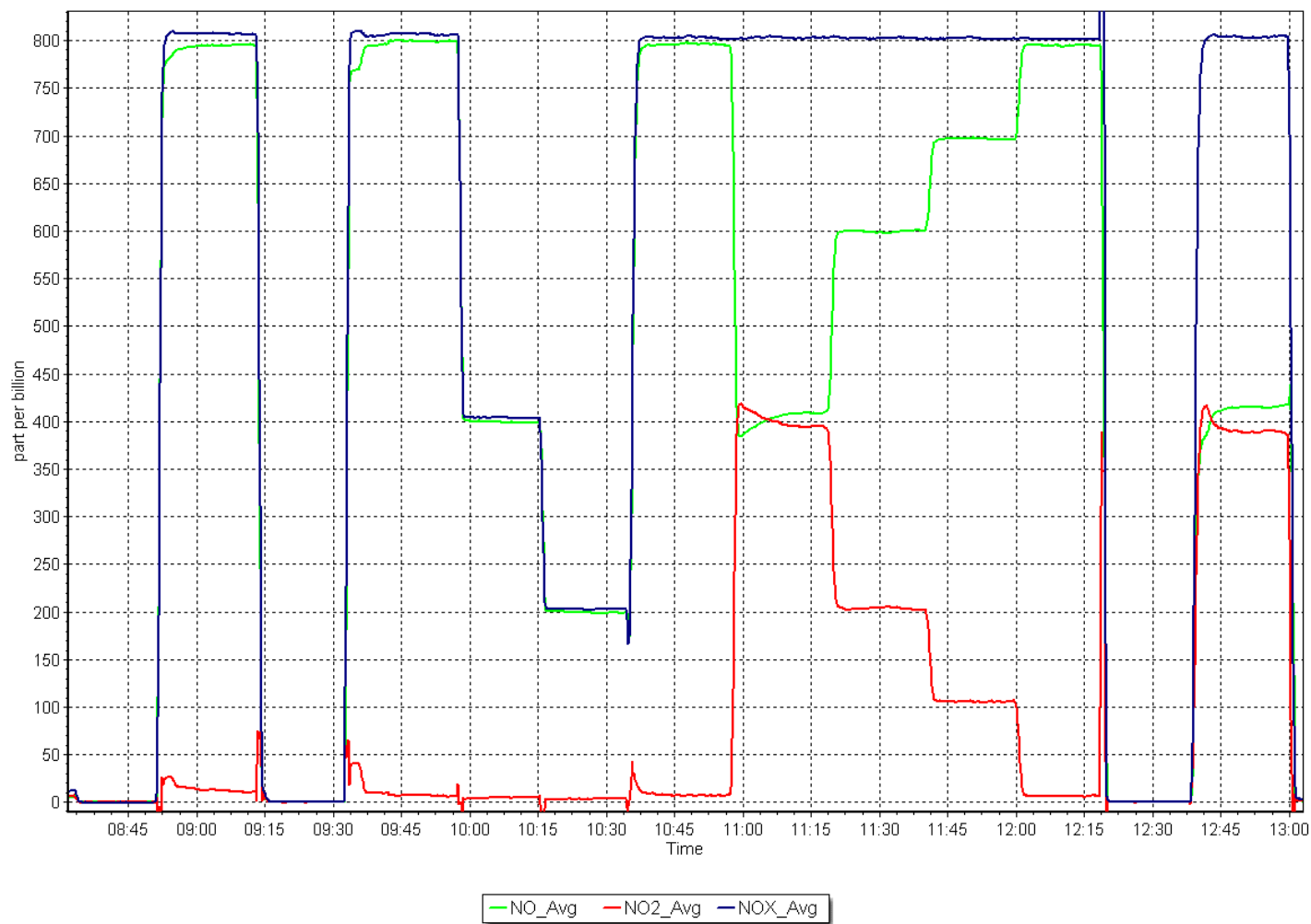
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999999	≥ 0.995
800.7	799.0	1.0022	Slope	0.998025	$0.90 - 1.10$
400.0	398.7	1.0032	Intercept	-0.323937	± 20
200.0	198.9	1.0053			



NO_x Calibration Plot

Date: September 17, 2024

Location: Barge Landing





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Barge Landing Station number: AMS 09
Calibration Date: September 17, 2024 Last Cal Date: August 22, 2024
Start time (MST): 9:08 End time (MST): 9:28

Analyzer Make: API T640 S/N: 844
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388746
Temp/RH standard: Alicat FP-25BT S/N: 388746

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	13.30	13.00	13.30	☐	+/- 2 °C
P (mmHg)	722.20	729.60	722.20	☐	+/- 10 mmHg
Flow (LPM)	4.98	4.90	4.98	☐	+/- 0.25 LPM
PW% (pump)	35	----	35	☐	>80%
Zero Verification	PM w/o HEPA: 9.20		PM w/ HEPA: 0.00		<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

SPAN DUST Refractive Index: 10.9 Expiry Date: June 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: July 8, 2024
Date Disposable Filter Changed: July 8, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 23, 2023
Date RH/T Sensor Cleaned: August 23, 2023

Notes: No adjustment made. Leak check passed.

Calibration by: Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11 LOWER CAMP SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Lower Camp Station number: AMS 11
Calibration Date: September 20, 2024 Last Cal Date: August 8, 2024
Start time (MST): 10:52 End time (MST): 15:10
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.25 ppm Cal Gas Exp Date: February 23, 2025
Cal Gas Cylinder #: CC2216
Removed Cal Gas Conc: 49.25 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 3807
Zero Air Gen Model: Teledyne API T701 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 100841398
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.007672	1.000782	Backgd or Offset:	15.7	15.8
Calibration intercept:	-1.250459	-0.886348	Coeff or Slope:	0.977	0.977

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4932	81.4	799.6	795.9	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	796.0	Previous response	804.5	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.4	----
High point	4932	81.4	799.6	800.1	0.999
Mid point	4959	40.7	400.9	399.5	1.004
Low point	4981	20.4	200.9	199.0	1.009
As left zero	5000	0.0	0.0	0.2	----
As left span	4932	81.4	799.6	802.6	0.996
Average Correction Factor:					1.004

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

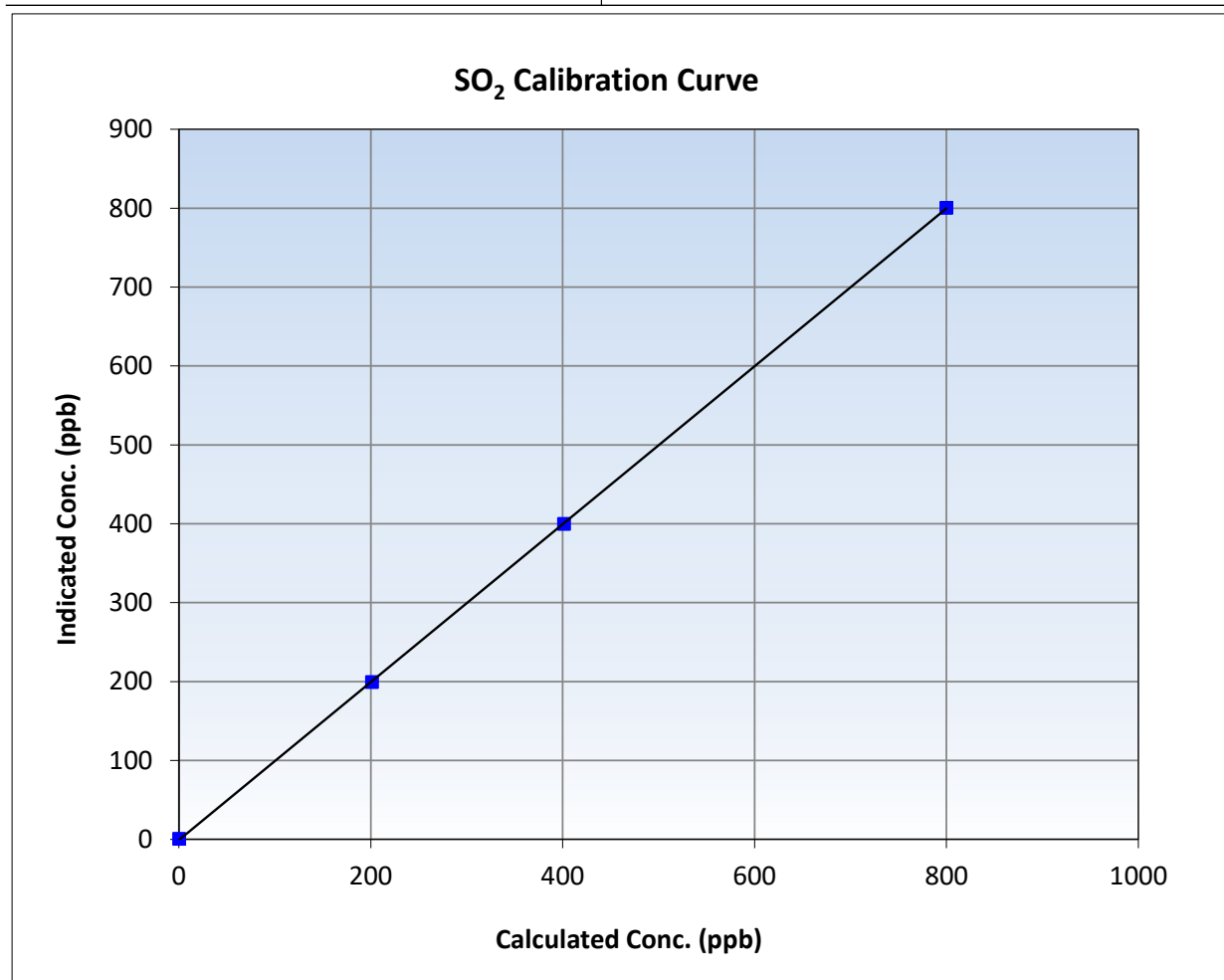
SO₂ Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:52	End Time (MST):	15:10
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

Calibration Data

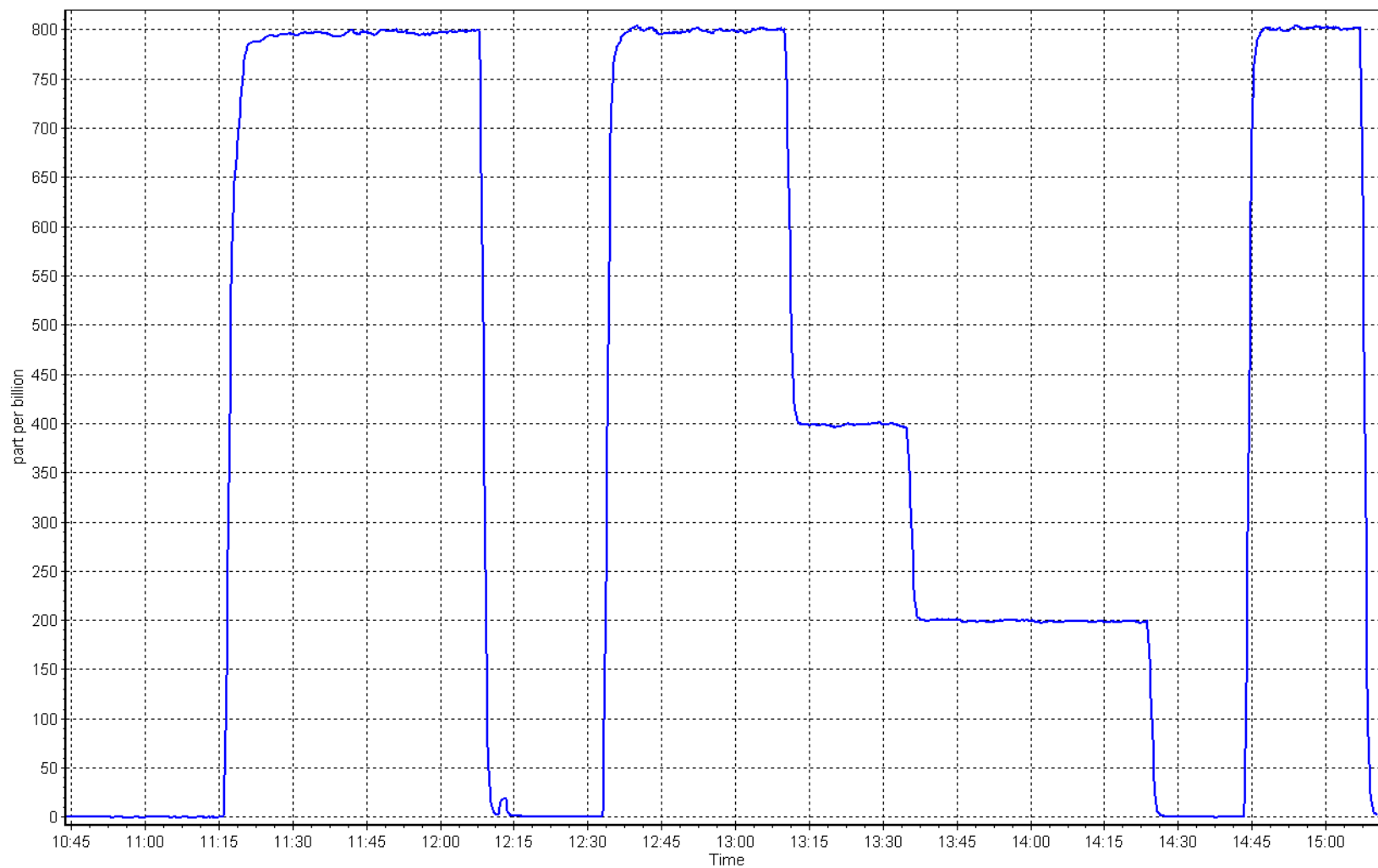
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4	----	Correlation Coefficient	0.999988	≥0.995
799.6	800.1	0.9994	Slope	1.000782	0.90 - 1.10
400.9	399.5	1.0036	Intercept	-0.886348	+/-30
200.9	199.0	1.0095			



SO2 Calibration Plot

Date: September 20, 2024

Location: Lower Camp





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Lower Camp Station number: AMS 11
Calibration Date: September 24, 2024 Last Cal Date: August 26, 2024
Start time (MST): 9:55 End time (MST): 14:46
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.43 ppm Cal Gas Exp Date: January 4, 2025
Cal Gas Cylinder #: CC501097
Removed Cal Gas Conc: 5.43 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 3807
ZAG Make/Model: API T701H Serial Number: 196

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1203169745
Converter make: Global G150 Converter serial #: 2022-223
Analyzer Range: 0 - 100 ppb Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.010484	0.994593	Backgd or Offset:	2.5
Calibration intercept:	-0.085568	-0.304091	Coeff or Slope:	0.817

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	4926	73.6	79.9	79.3	1.009
As found Mid point	4963	36.8	40.0	39.7	1.009
As found Low point	4982	18.6	20.2	19.8	1.025
New cylinder response					
Baseline Corr As found:	79.2	Prev response:	80.67	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.992301	AF Intercept:	-0.023824
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999981	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4926	73.6	79.9	79.2	1.009
Mid point	4963	36.8	40.0	39.5	1.012
Low point	4982	18.6	20.2	19.6	1.030
As left zero	5000	0.0	0.0	-0.2	----
As left span	4926	73.6	79.9	78.9	1.013
SO2 Scrubber Check	4935	81.5	812.3	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.017
Date of last converter efficiency test:					

Notes: Changed sample inlet filter and DMC pressure and flow board after as founds, this may have caused a drift in the slope. Ran scrubber check after calibrator zero and it passed. Adjusted zero only.

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

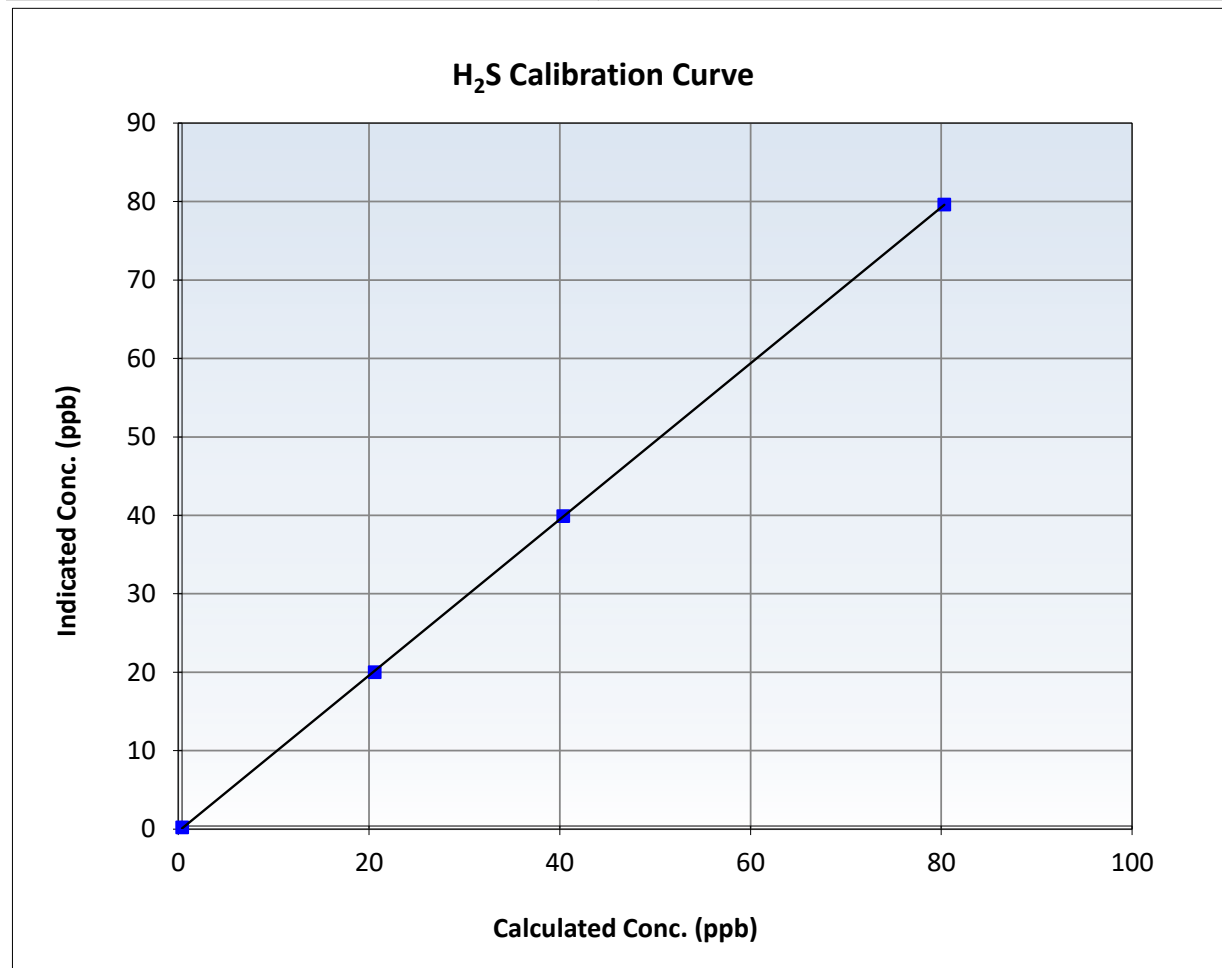
H₂S Calibration Summary

Station Information

Calibration Date:	September 24, 2024	Previous Calibration:	August 26, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	9:55	End Time (MST):	14:46
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1203169745

Calibration Data

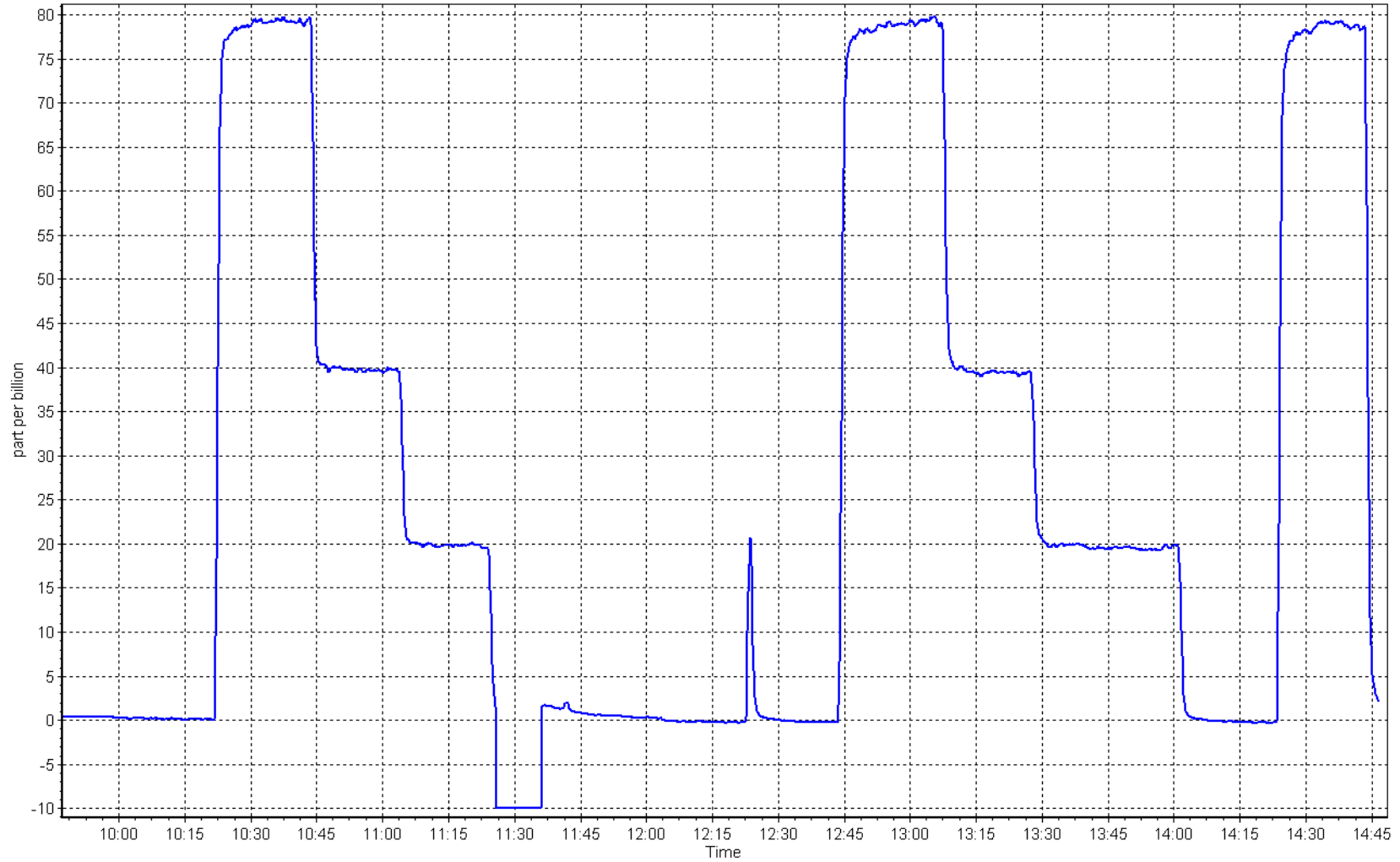
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999986	≥0.995
79.9	79.2	1.0091	Slope	0.994593	0.90 - 1.10
40.0	39.5	1.0116	Intercept	-0.304091	+/-3
20.2	19.6	1.0303			



H₂S Calibration Plot

Date: September 24, 2024

Location: Lower Camp





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Lower Camp Station number: AMS 11
Calibration Date: September 20, 2024 Last Cal Date: August 8, 2024
Start time (MST): 10:52 End time (MST): 15:10
Reason: Routine

Calibration Standards

Gas Cert Reference: CC2216 Cal Gas Expiry Date: February 23, 2025
CH₄ Cal Gas Conc. 502.0 ppm CH₄ Equiv Conc. 1067.1 ppm
C₃H₈ Cal Gas Conc. 205.5 ppm
Removed Gas Cert: NA Removed Gas Expiry: NA
Removed CH₄ Conc. 502.0 ppm CH₄ Equiv Conc. 1067.1 ppm
Removed C₃H₈ Conc. 205.5 ppm Diff between cyl (THC):
Diff between cyl (CH₄): Diff between cyl (NM):
Calibrator Model: API T700 Serial Number: 3807
Zero Air Gen model: API T701 Serial Number: 196

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1505164381
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH ₄ SP Ratio:	2.62E-04	2.68E-04	NMHC SP Ratio:	4.58E-05	4.69E-05
CH ₄ Retention time:	15.0	15.0	NMHC Peak Area:	200025	195399
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	17.33	16.97	1.021
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.97	Prev response	17.29	*% change	-1.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	17.33	17.33	1.000
Mid point	4959	40.7	8.69	8.64	1.006
Low point	4981	20.4	4.35	4.30	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	17.33	17.42	0.994
Average Correction Factor					1.006

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4932	81.4	9.18	8.98	1.022
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.98	Prev response	9.15	*% change	-2.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4932	81.4	9.18	9.18	1.000
Mid point	4959	40.7	4.60	4.58	1.005
Low point	4981	20.4	2.31	2.28	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	9.18	9.25	0.992
Average Correction Factor					1.005

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4932	81.4	8.15	7.99	1.020
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.99	Prev response	8.13	*% change	-1.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4932	81.4	8.15	8.15	1.000
Mid point	4959	40.7	4.09	4.06	1.006
Low point	4981	20.4	2.05	2.02	1.014
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	8.15	8.18	0.997
Average Correction Factor					1.007

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.999989	1.000560
THC Cal Offset:	-0.039901	-0.028731
CH ₄ Cal Slope:	0.999930	1.000719
CH ₄ Cal Offset:	-0.021958	-0.015775
NMHC Cal Slope:	0.999370	1.000443
NMHC Cal Offset:	-0.016741	-0.012558

Calibration Performed By:

Mohammed Kashif



Wood Buffalo Environmental Association

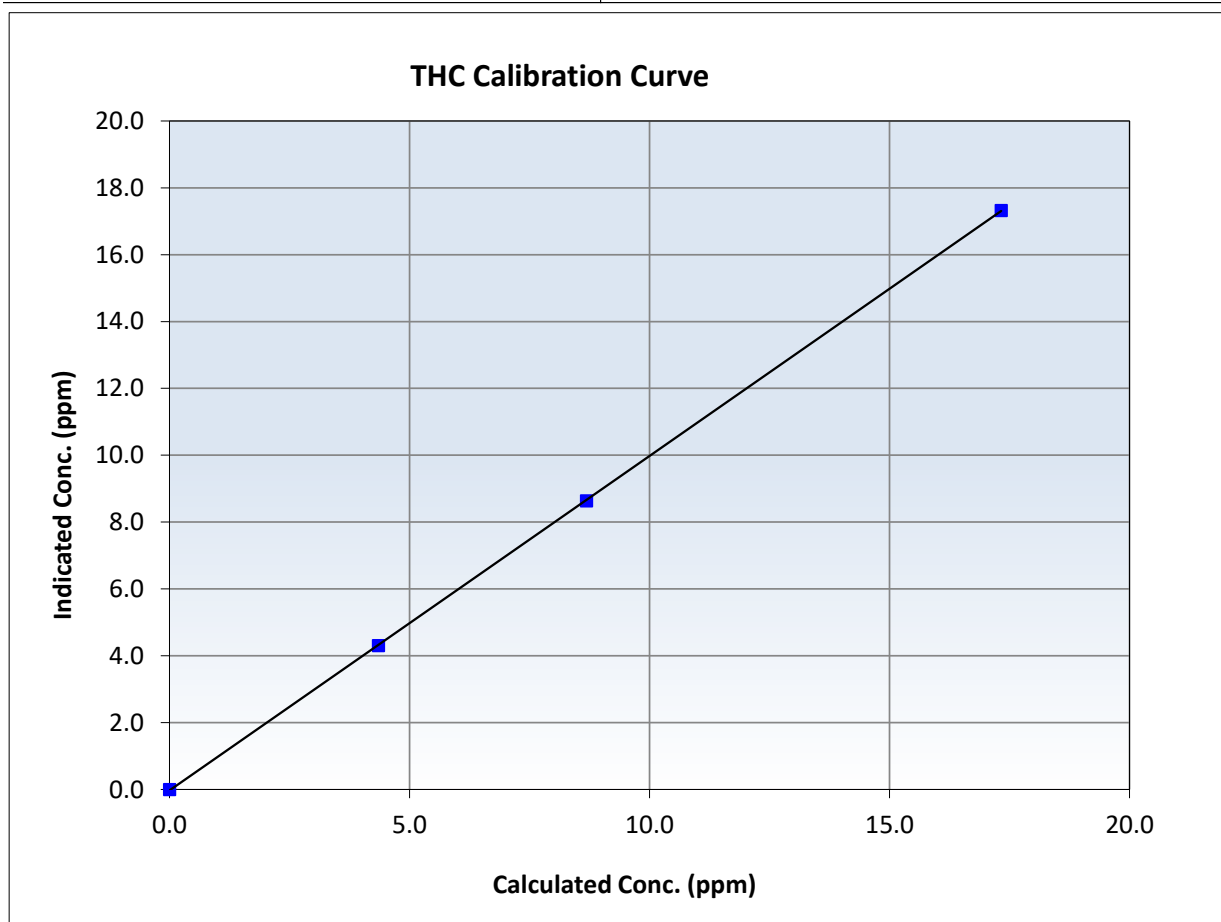
THC Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:52	End Time (MST):	15:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999987	≥ 0.995
17.33	17.33	1.0001	Slope	1.000560	$0.90 - 1.10$
8.69	8.64	1.0055	Intercept	-0.028731	± 0.5
4.35	4.30	1.0113			





Wood Buffalo Environmental Association

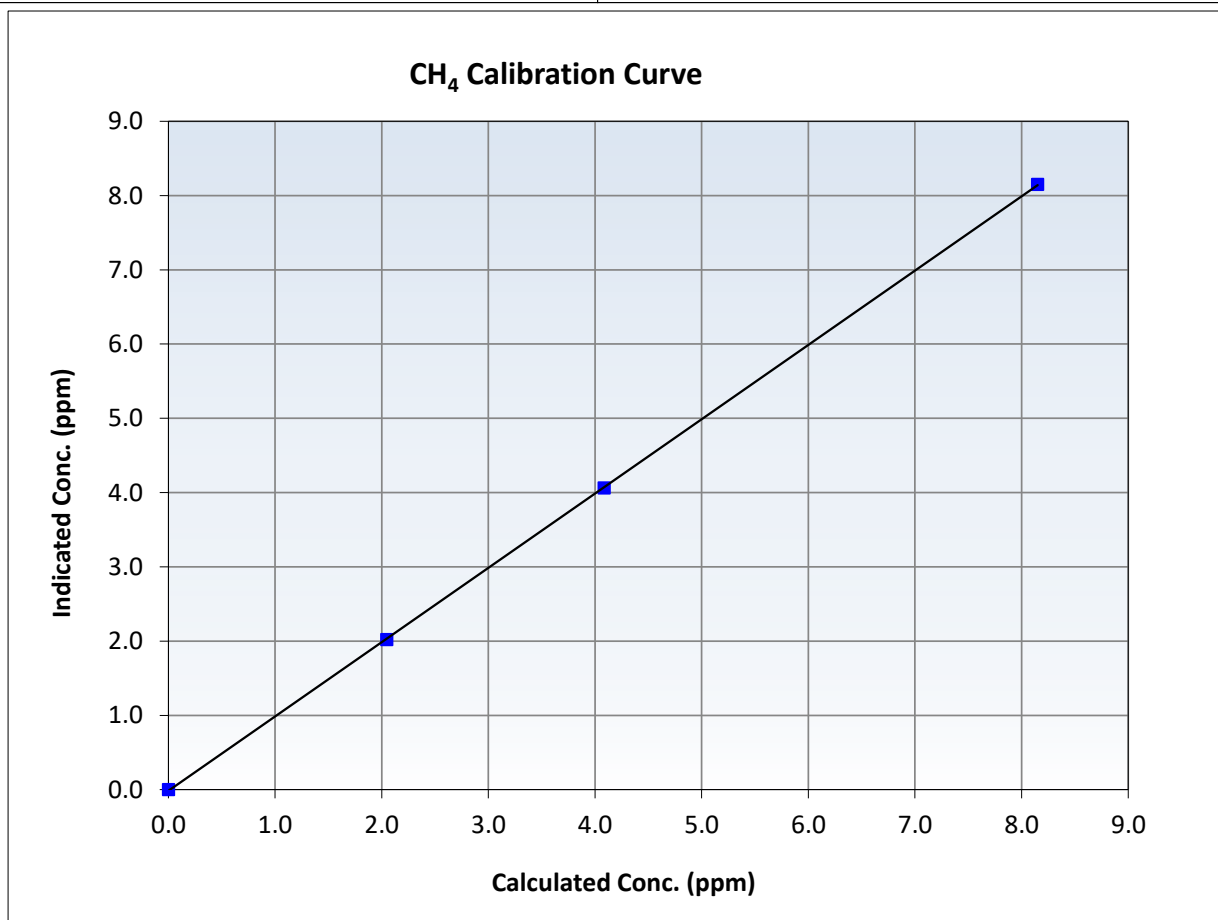
CH₄ Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:52	End Time (MST):	15:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999982	≥ 0.995
8.15	8.15	1.0001	Slope	1.000719	$0.90 - 1.10$
4.09	4.06	1.0060	Intercept	-0.015775	± 0.5
2.05	2.02	1.0137			





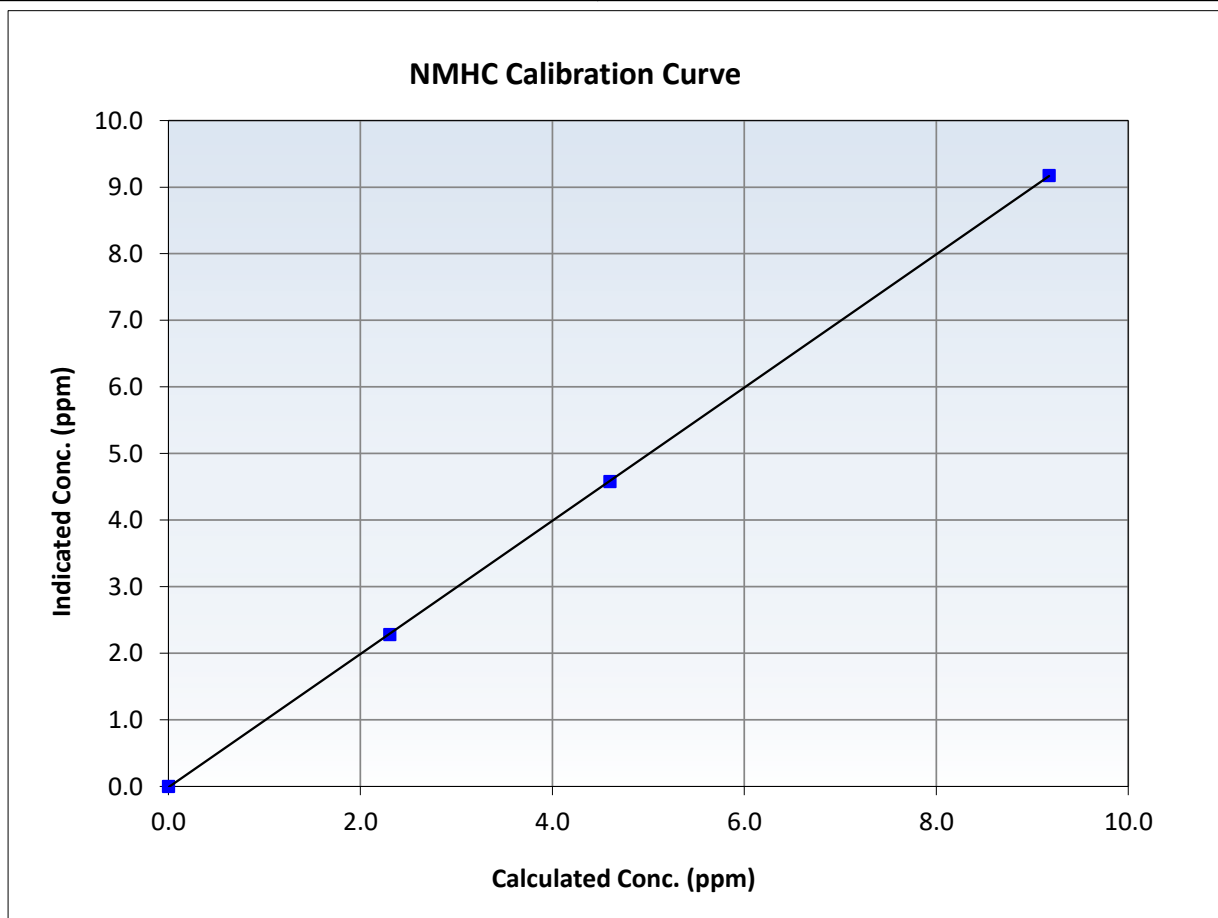
Wood Buffalo Environmental Association NMHC Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:52	End Time (MST):	15:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

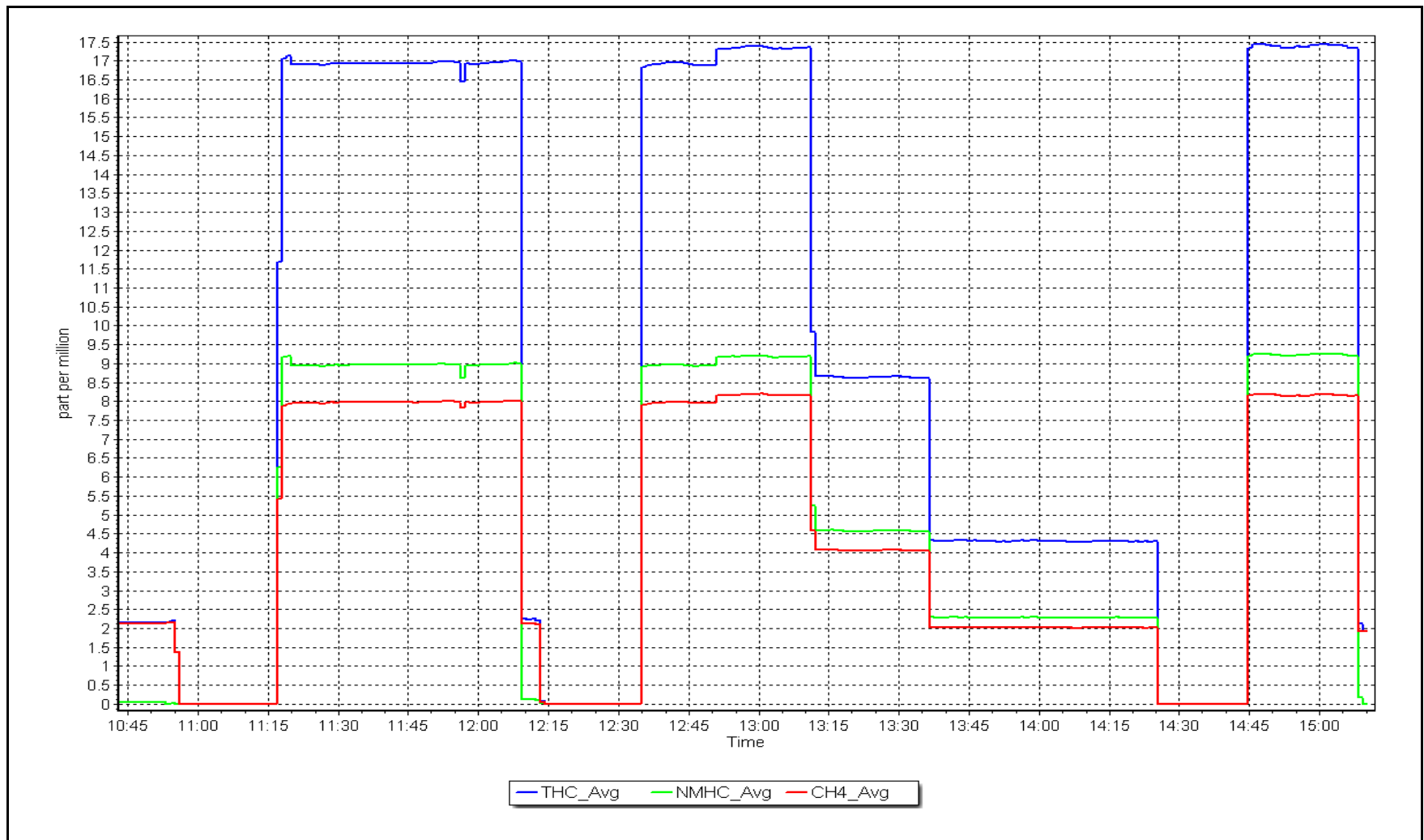
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999991	<i>≥0.995</i>
9.18	9.18	1.0001	Slope	1.000443	<i>0.90 - 1.10</i>
4.60	4.58	1.0047	Intercept	-0.012558	<i>+/-0.5</i>
2.31	2.28	1.0092			



NMHC Calibration Plot

Date: July 18, 2024

Location: Lower Camp





Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Lower Camp	Station Number:	AMS 11
Calibration Date:	September 24, 2024	Prev Cal Date:	July 21, 2023
Start Time (MST):	13:01	End Time (MST):	14:45
Tower Height (m):	10.0	Reason:	Routine

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	N11710
WS Calibrator:	MetOne 053	Serial Number:	CA05231

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error <i>Limit = +/- 1.5%</i>
0	0.0	0.0	---
200	20.2	20.2	0.2%
400	39.4	39.4	0.1%
600	58.6	58.7	0.2%
800	77.8	77.7	-0.1%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r^2)	0.999998	0.999997	≥ 0.9995
Calculated slope	0.998863	1.000125	$0.90 - 1.10$
Calculated intercept	0.064097	-0.035284	± 2

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	N12035
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):	13:17	Calc Declination*:	13.54 Degrees
Deadband calc:	1.8 degrees (<i>Limit 4 deg</i>)	* - calculated declination as per NOAA website	

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) <i>Limit = +/- 1.0%</i>
0	0.1	---
90	91.4	0.4%
180	180.3	0.1%
270	272.8	0.8%
353	355.4	0.7%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r^2)	0.999918	0.999987	≥ 0.9995
Calculated slope	0.998903	0.993333	$0.90 - 1.10$
Calculated intercept	-0.302646	-0.195681	± 4

Notes: WS/WD calibration. Cross arm was aligned using solar noon after calibration.

Calibration Performed By: Mohammed Kashif



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Fort McKay South
Calibration Date: September 13, 2024
Start time (MST): 9:02
Reason: Routine

Station number: AMS 13
Last Cal Date: August 23, 2024
End time (MST): 12:09

Calibration Standards

Cal Gas Concentration: 50.55 ppm
Cal Gas Cylinder #: CC260812
Removed Cal Gas Conc: 50.55 ppm
Removed Gas Cyl #: NA
Calibrator Model: API T700
Zero Air Gen Model: API T701

Cal Gas Exp Date: December 29, 2028
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 2448
Serial Number: 1117

Analyzer Information

Analyzer make: API T100
Analyzer Range: 0 - 1000 ppb

Serial Number: 599

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004100	1.006803	Backgd or Offset:	99.5	99.5
Calibration intercept:	-2.578257	-2.898574	Coeff or Slope:	0.697	0.697

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.6	----
As found High point	4921	79.1	799.7	800.6	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	801.2	Previous response	800.4	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.5	----
High point	4921	79.1	799.7	803.5	0.995
Mid point	4961	39.5	399.3	397.7	1.004
Low point	4980	19.8	200.2	196.4	1.019
As left zero	5000	0.0	0.0	-0.3	----
As left span	4921	79.1	799.7	802.1	0.997
Average Correction Factor:					1.006

Notes: Sample inlet filters changed after as founds. No adjustment made.

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

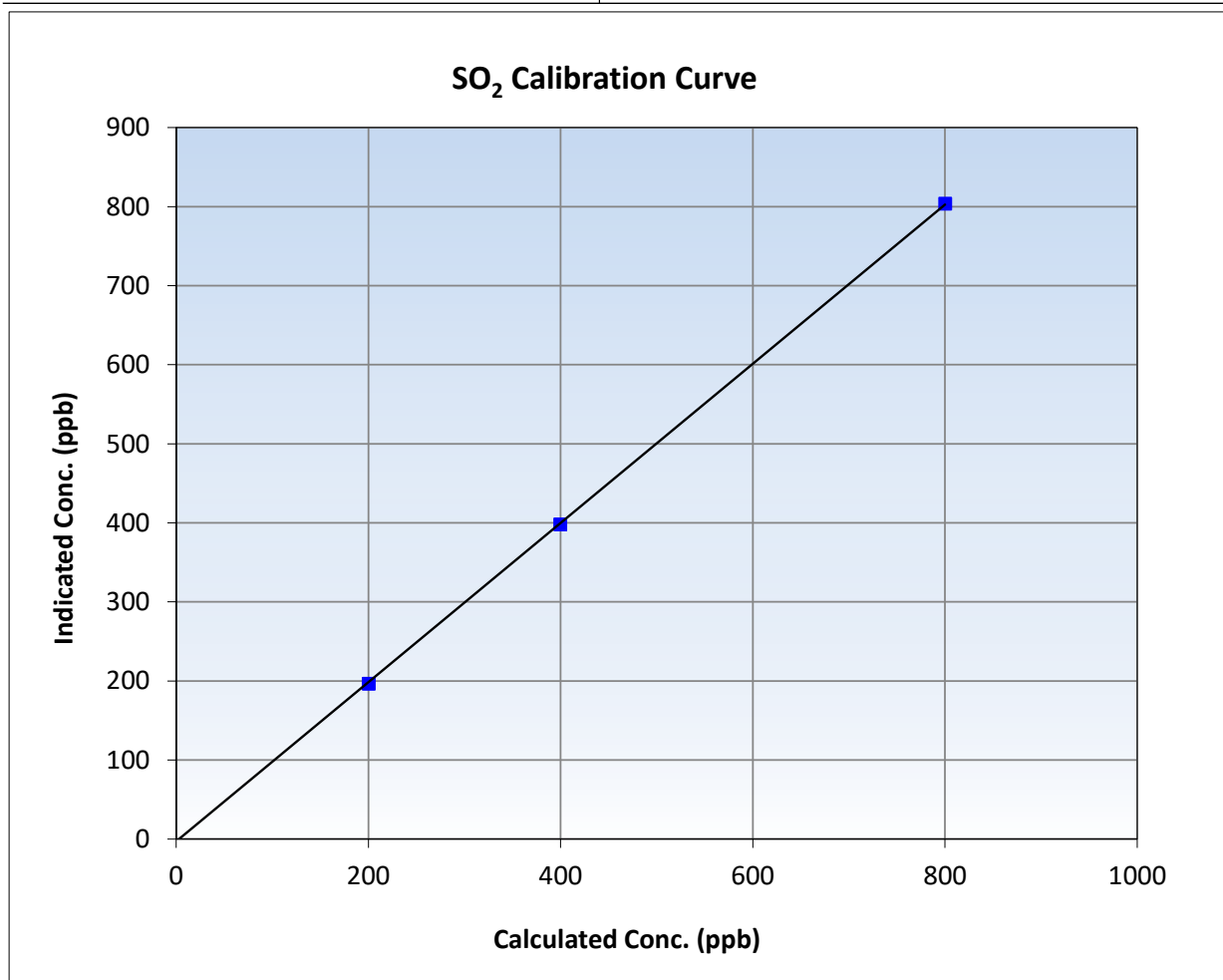
SO₂ Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 23, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:02	End Time (MST):	12:09
Analyzer make:	API T100	Analyzer serial #:	599

Calibration Data

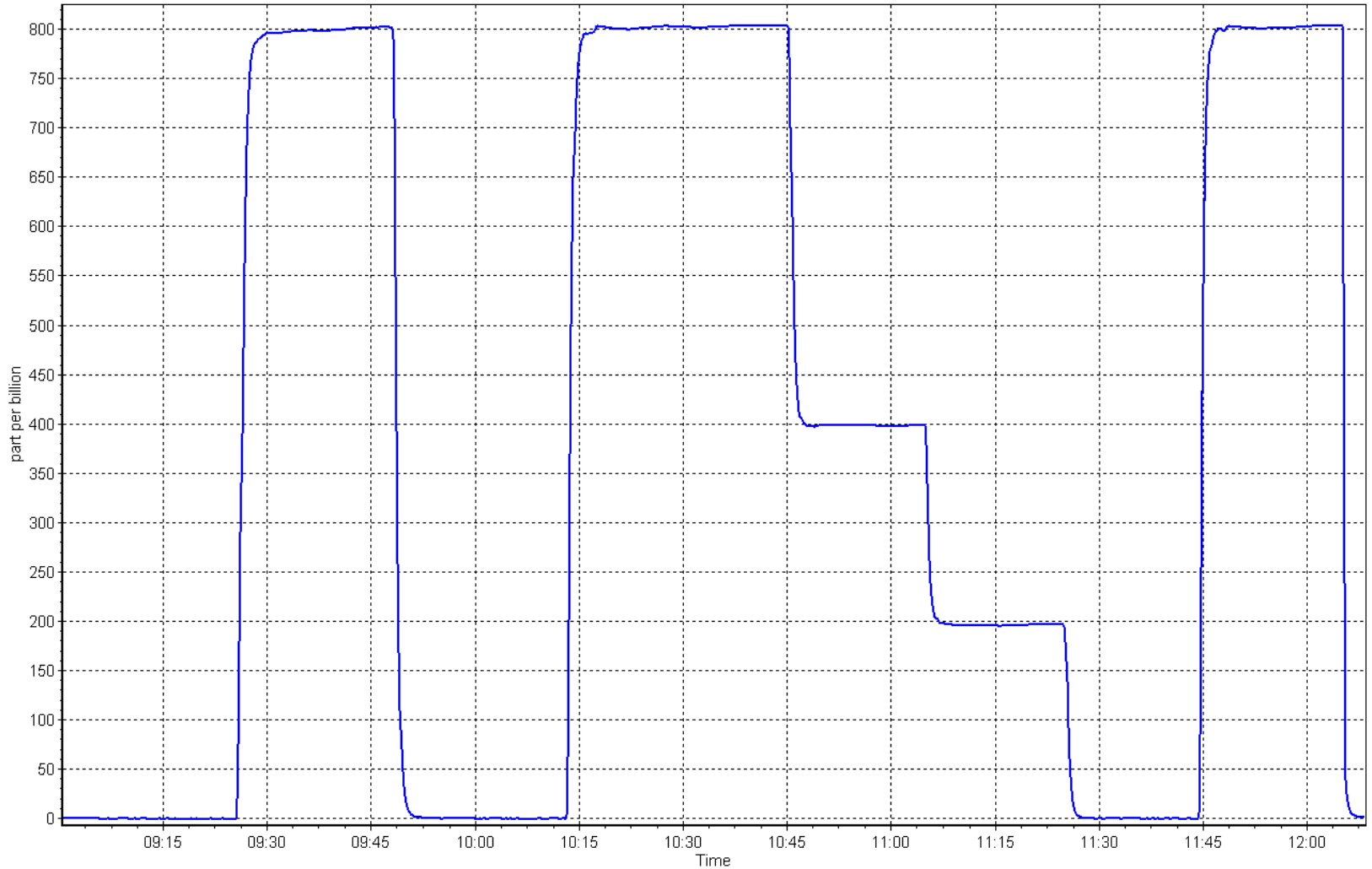
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.5	----	Correlation Coefficient	0.999959	≥0.995
799.7	803.5	0.9953	Slope	1.006803	0.90 - 1.10
399.3	397.7	1.0040	Intercept	-2.898574	+/-30
200.2	196.4	1.0193			



SO2 Calibration Plot

Date: September 13, 2024

Location: Fort McKay South





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Fort McKay South
Calibration Date: September 5, 2024
Start time (MST): 9:05
Reason: Routine

Station number: AMS 13
Last Cal Date: August 12, 2024
End time (MST): 13:19

Calibration Standards

Cal Gas Concentration: 5.34 ppm
Cal Gas Cylinder #: CC500241
Removed Cal Gas Conc: 5.34 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Cal Gas Exp Date: January 1, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 2448
Serial Number: 1117

Analyzer Information

Analyzer make: Thermo 43i TLE
Converter make: CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1180540017
Converter serial #: 521
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.007595	1.002916	Backgd or Offset:	3.69	3.69
Calibration intercept:	-0.362245	-0.322246	Coeff or Slope:	1.13	1.13

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4925	75.5	80.6	80.6	0.999
As found Mid point	4962	37.7	40.3	40.1	1.002
As found Low point	4981	18.9	20.2	19.6	1.025
New cylinder response					
Baseline Corr As found:	80.7	Prev response:	80.88	*% change:	-0.2%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	1.002914	AF Intercept:	-0.322153
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999956	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4925	75.5	80.6	80.7	0.999
Mid point	4962	37.7	40.3	39.9	1.009
Low point	4981	18.9	20.2	19.6	1.030
As left zero	5000	0.0	0.0	0.0	----
As left span	4925	75.5	80.6	78.8	1.023
SO2 Scrubber Check	4921	79.1	791.0	0.0	----
Date of last scrubber change:		20-Jan-20		Ave Corr Factor	1.013
Date of last converter efficiency test:					

Notes: Changed inlet filter after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. No adjustment.

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

TRS Calibration Summary

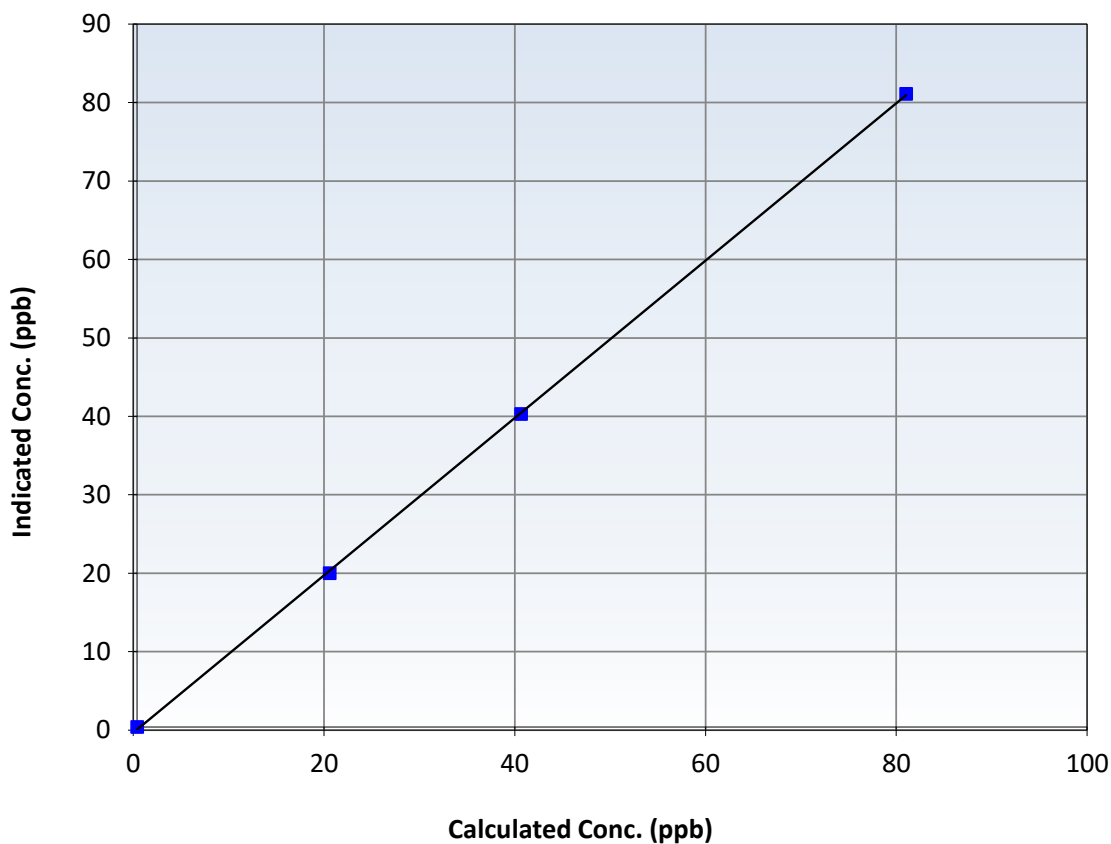
Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 12, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:05	End Time (MST):	13:19
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999927		≥ 0.995
80.6	80.7	0.9991	Slope	1.002916		$0.90 - 1.10$
40.3	39.9	1.0092	Intercept	-0.322246		± 3
20.2	19.6	1.0299				

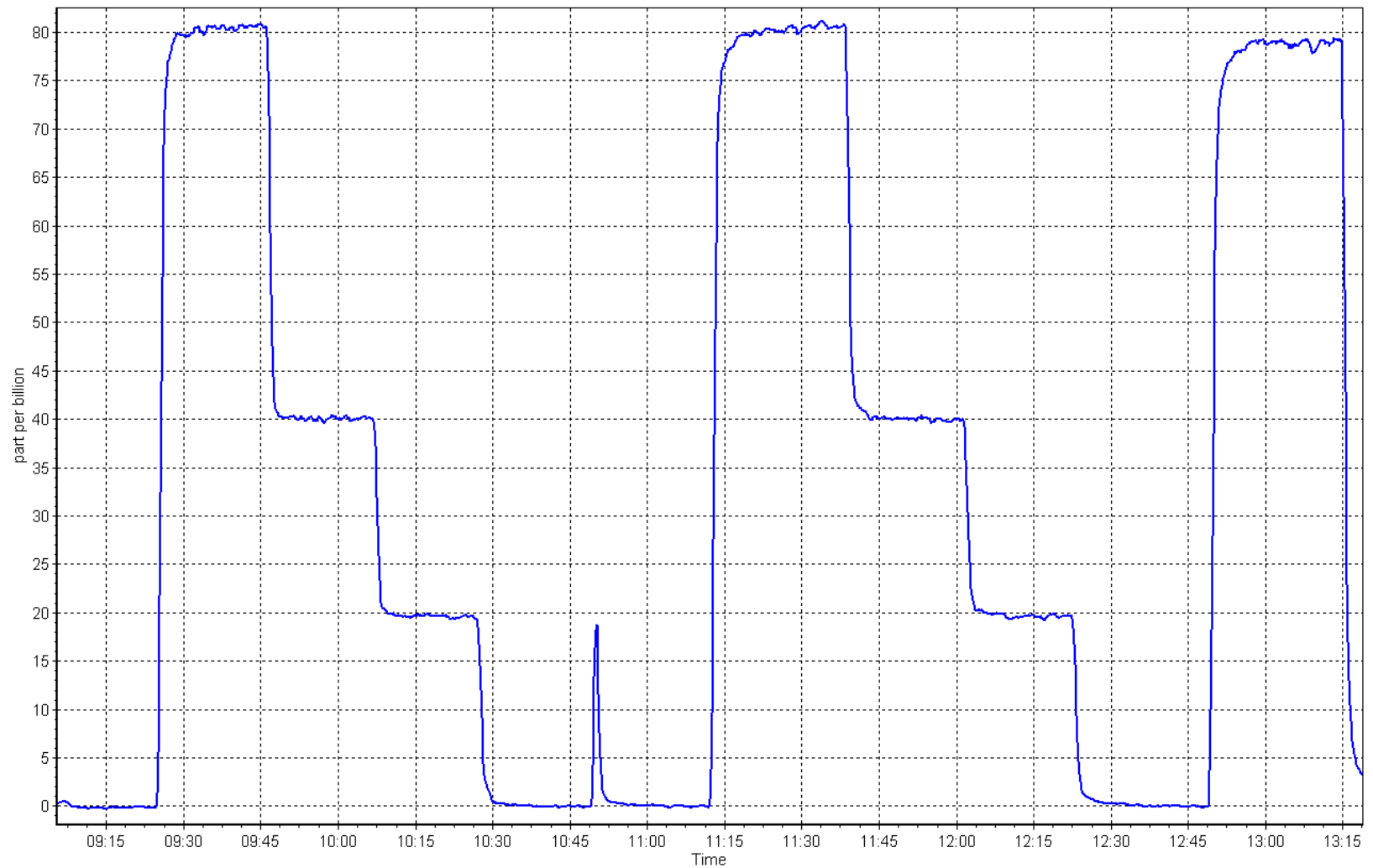
TRS Calibration Curve



TRS Calibration Plot

Date: September 5, 2024

Location: Fort McKay South





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	September 13, 2024	Last Cal Date:	August 23, 2024
Start time (MST):	9:02	End time (MST):	12:09
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC2608112	Cal Gas Expiry Date:	
CH ₄ Cal Gas Conc.	503.6 ppm	CH ₄ Equiv Conc.	1077.5 ppm
C ₃ H ₈ Cal Gas Conc.	208.7 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH ₄ Conc.	503.6 ppm	CH ₄ Equiv Conc.	1077.5 ppm
Removed C ₃ H ₈ Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	2448
Zero Air Gen model:	API T701	Serial Number:	1117

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776
THC Range:	0 - 20 ppm	NMHC/CH ₄ Range:	0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.10E-04	3.15E-04	NMHC SP Ratio:	7.15E-05
CH ₄ Retention time:	14.80	14.80	NMHC Peak Area:	126990
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	17.05	16.53	1.031
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.53	Prev response	17.04	*% change	-3.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	17.05	17.04	1.001
Mid point	4961	39.5	8.51	8.48	1.004
Low point	4980	19.8	4.27	4.20	1.017
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	17.05	17.16	0.993
Average Correction Factor					1.007

Notes:

Adjusted span only.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4921	79.1	9.08	8.66	1.048
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.66	Prev response	9.08	*% change	-4.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4921	79.1	9.08	9.06	1.002
Mid point	4961	39.5	4.53	4.53	1.001
Low point	4980	19.8	2.27	2.24	1.015
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.18	0.990
Average Correction Factor					1.006

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4921	79.1	7.97	7.87	1.013
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.87	Prev response	7.96	*% change	-1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4921	79.1	7.97	7.97	0.999
Mid point	4961	39.5	3.98	3.95	1.007
Low point	4980	19.8	1.99	1.96	1.020
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	7.98	0.998
Average Correction Factor					1.009

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.001011	1.000629
THC Cal Offset:	-0.025755	-0.033157
CH ₄ Cal Slope:	1.001777	1.001806
CH ₄ Cal Offset:	-0.022985	-0.021586
NMHC Cal Slope:	1.000351	0.999357
NMHC Cal Offset:	-0.002569	-0.011372

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

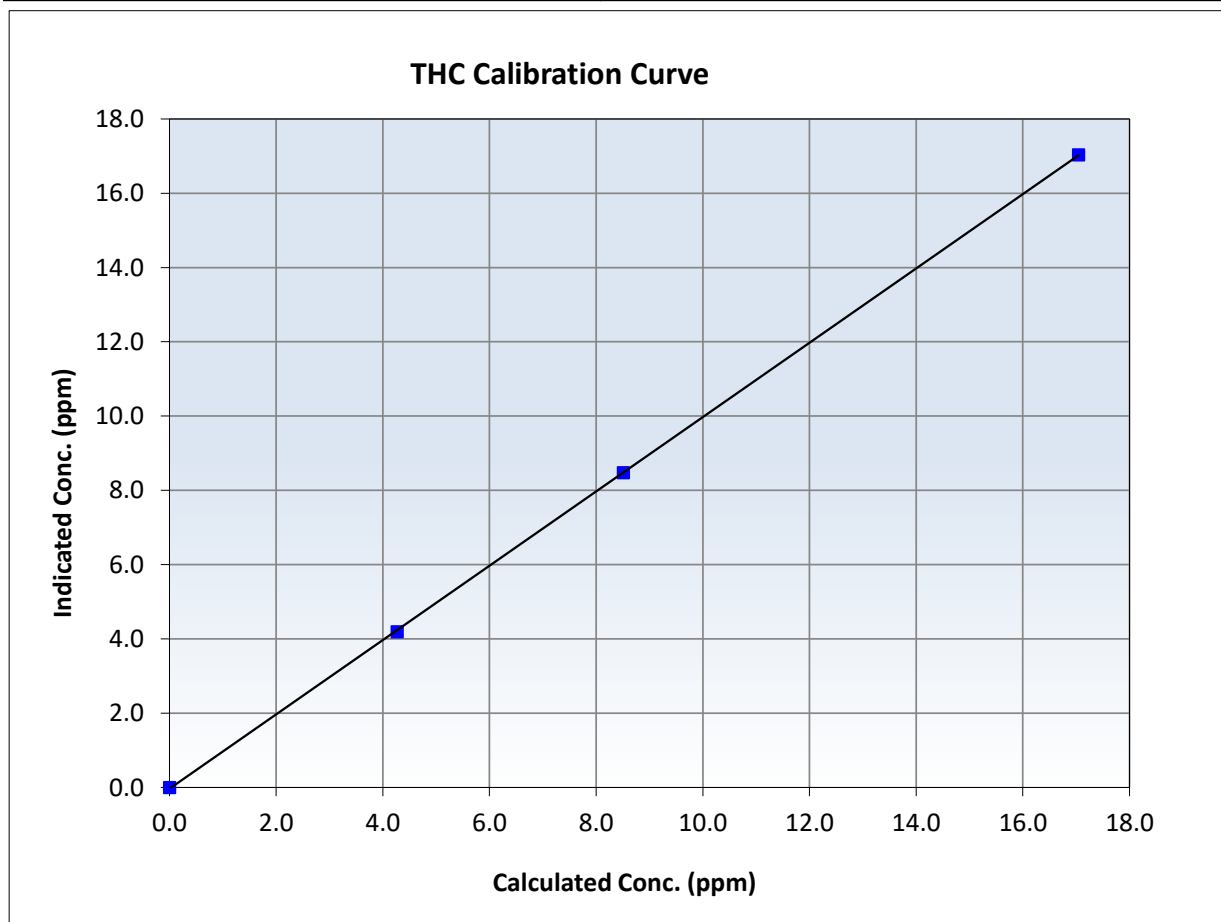
THC Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 23, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:02	End Time (MST):	12:09
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999981	≥ 0.995
17.05	17.04	1.0006	Slope	1.000629	$0.90 - 1.10$
8.51	8.48	1.0037	Intercept	-0.033157	± 0.5
4.27	4.20	1.0172			





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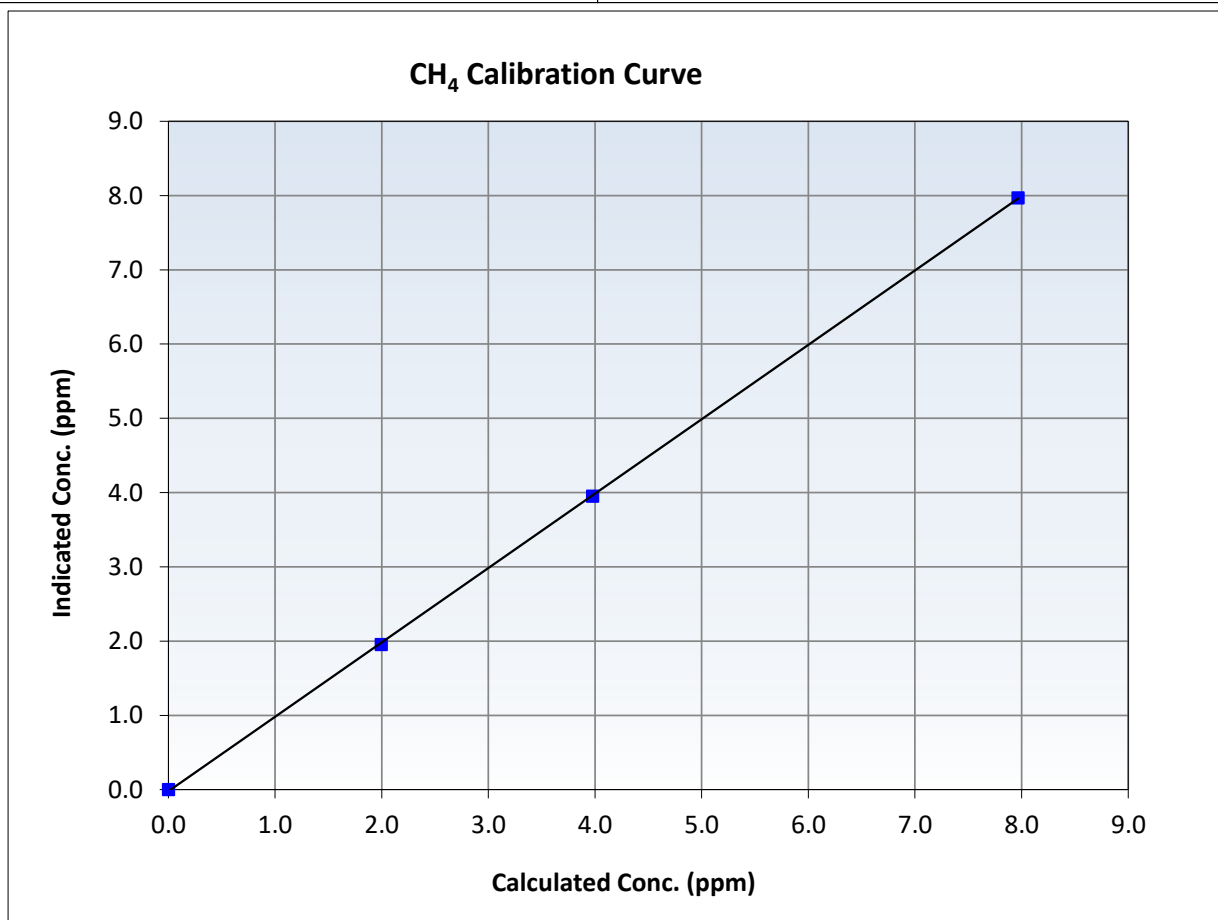
CH₄ Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 23, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:02	End Time (MST):	12:09
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999966	≥ 0.995
7.97	7.97	0.9995	Slope	1.001806	$0.90 - 1.10$
3.98	3.95	1.0068	Intercept	-0.021586	± 0.5
1.99	1.96	1.0196			





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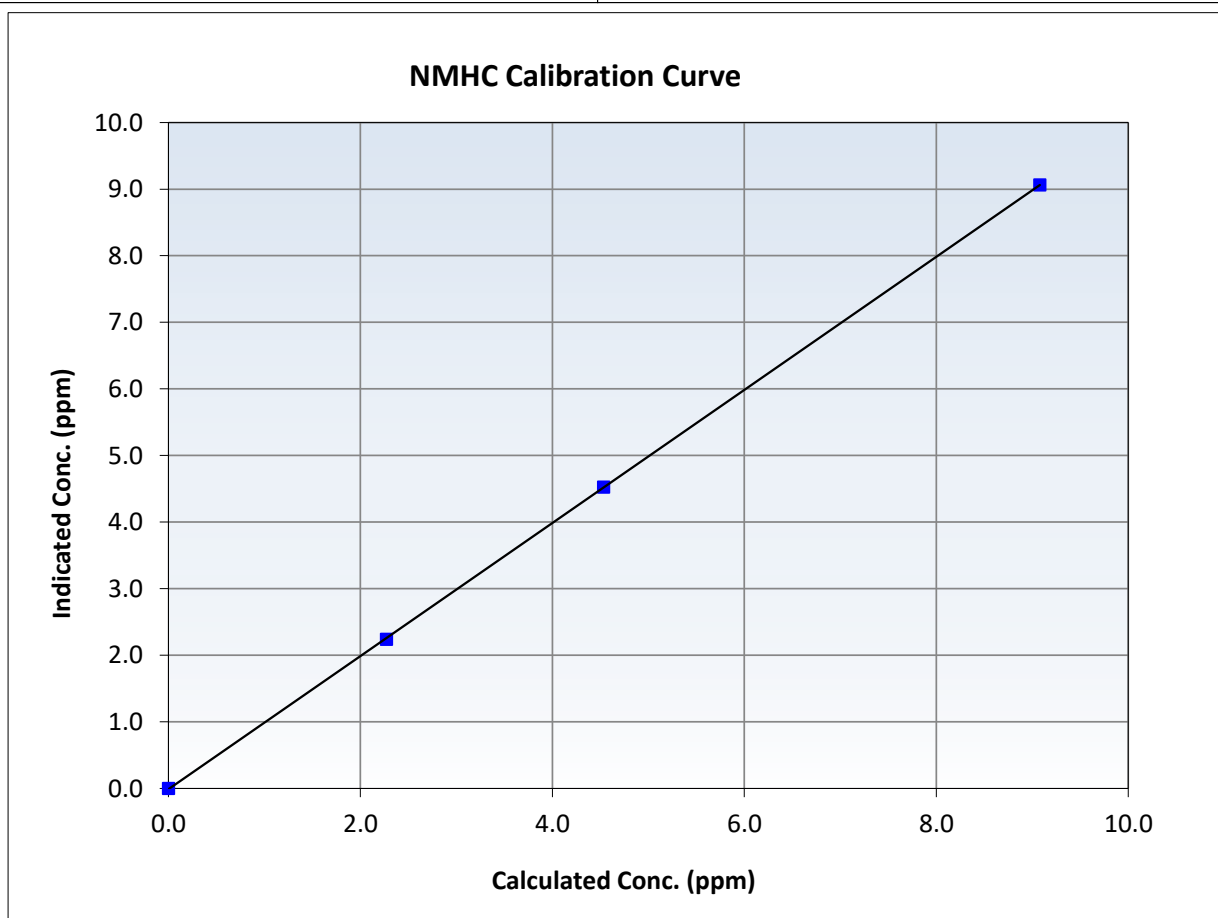
NMHC Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 23, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:02	End Time (MST):	12:09
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

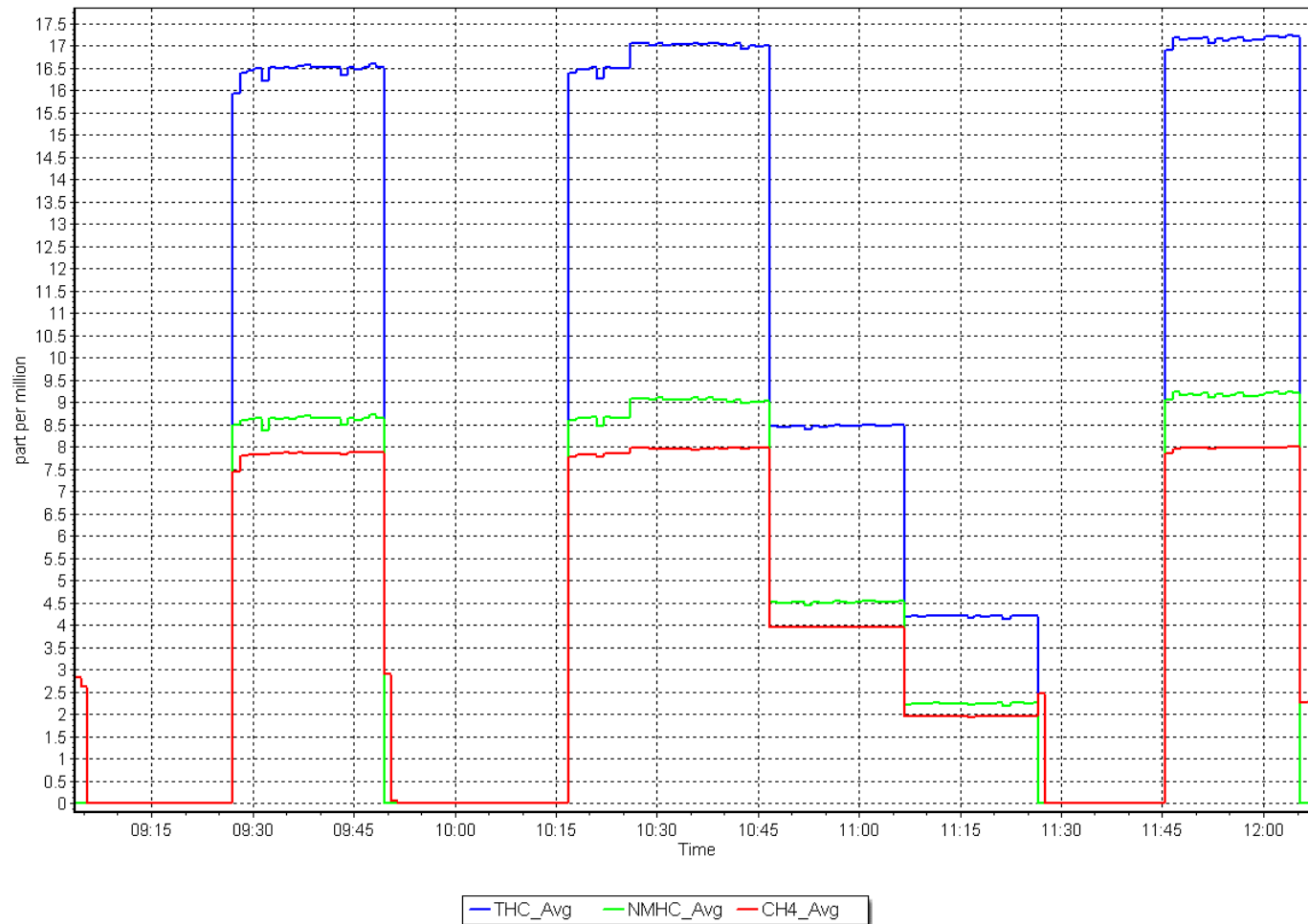
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999986	<i>≥0.995</i>
9.08	9.06	1.0018	Slope	0.999357	<i>0.90 - 1.10</i>
4.53	4.53	1.0012	Intercept	-0.011372	<i>+/-0.5</i>
2.27	2.24	1.0151			



NMHC Calibration Plot

Date: September 13, 2024

Location: Fort McKay South





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Fort McKay South
Station number: AMS 13
Calibration Date: September 20, 2024
Last Cal Date: August 9, 2024
Start time (MST): 9:10
End time (MST): 13:20
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T2UP1RP
NOX Cal Gas Conc: 48.25 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 48.25 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: APIT701
Cal Gas Expiry Date: November 17, 2026
NO Cal Gas Conc: 47.88 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 47.88 ppm
NO gas Diff:
Serial Number: 2448
Serial Number: 1117

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
AF High point	4917	83.5	805.7	799.5	6.2	808.7	799.8	8.9	0.9964	0.9998
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 805.3 ppb	NO = 798.8 ppb				* = > +/-5% change initiates investigation		*Percent Change	NO _x = 0.4%	
Baseline Corr 1st pt	NO _x = 808.6 ppb	NO = 799.7 ppb				<u>As Found Statistics</u>		*Percent Change	NO = 0.1%	
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:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1410661329

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.148	1.148	NO bkgnd or offset:	10.2	10.2
NOX coeff or slope:	1.004	1.004	NOX bkgnd or offset:	10.4	10.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	162.3	160.5

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001959	1.001179
NO _x Cal Offset:	-1.933462	-1.833158
NO Cal Slope:	1.002654	1.001281
NO Cal Offset:	-2.791549	-2.611239
NO ₂ Cal Slope:	1.000265	0.999115
NO ₂ Cal Offset:	-0.308710	-0.716977

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.0	----	----
High point	4917	83.5	805.7	799.5	6.2	805.8	799.2	6.5	0.9999	1.0004
Mid point	4958	41.8	403.4	400.3	3.1	401.1	397.1	4.0	1.0057	1.0080
Low point	4979	20.9	201.7	200.1	1.5	198.0	194.9	3.2	1.0186	1.0269
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4917	83.5	805.7	379.1	426.6	808.1	379.1	429.0	0.9970	1.0000
Average Correction Factor									1.0081	1.0118

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	796.2	376.9	425.5	424.6	1.0021	99.8%
Mid GPT point	796.2	586.4	216.0	215.2	1.0036	99.6%
Low GPT point	796.2	689.8	112.6	110.7	1.0170	98.3%
Average Correction Factor					1.0076	99.3%

Notes:

Changed inlet filter after as founds. No adjustment made.

Calibration Performed By:

Sean Bala



Wood Buffalo Environmental Association

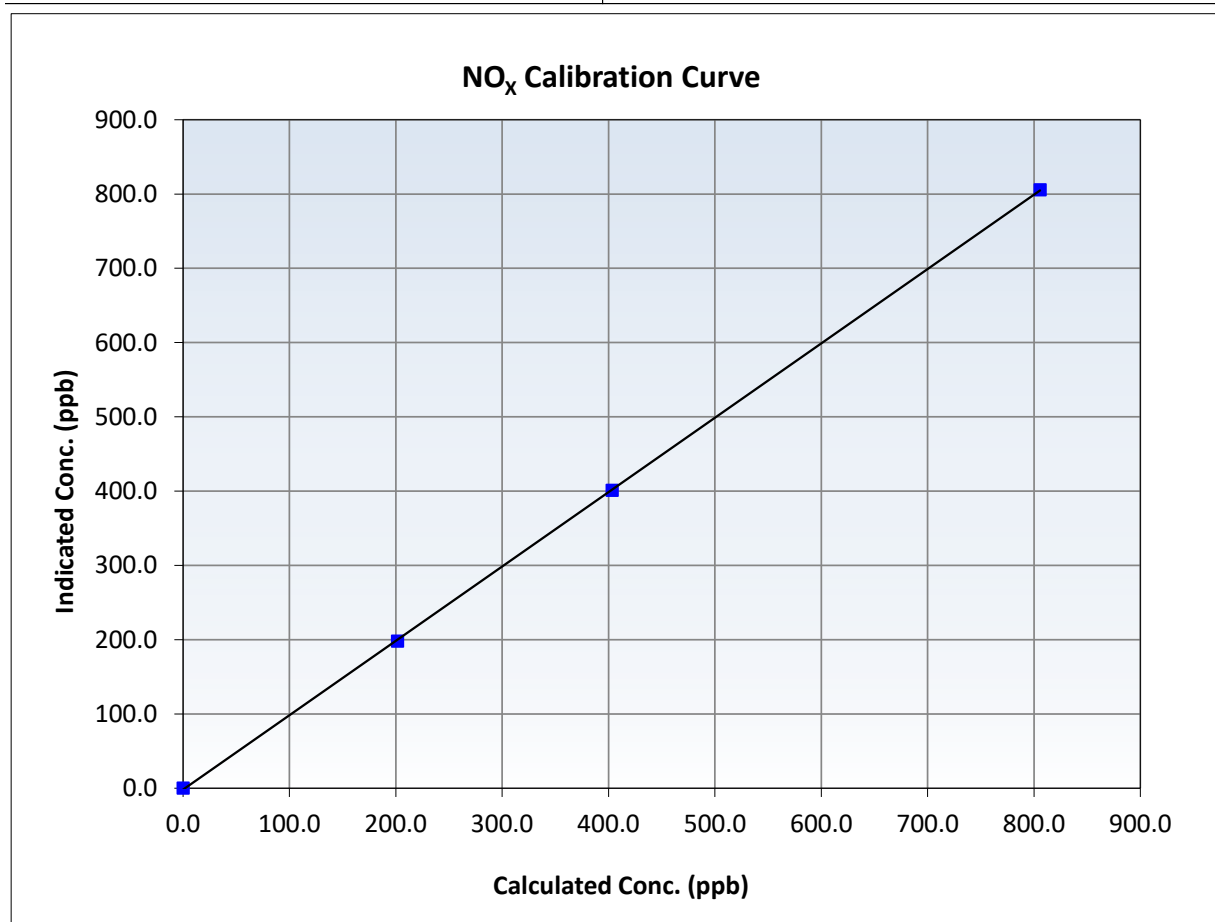
NO_x Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:10	End Time (MST):	13:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

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	0.999971	≥0.995
805.7	805.8	0.9999	Slope	1.001179	0.90 - 1.10
403.4	401.1	1.0057	Intercept	-1.833158	+/-20
201.7	198.0	1.0186			





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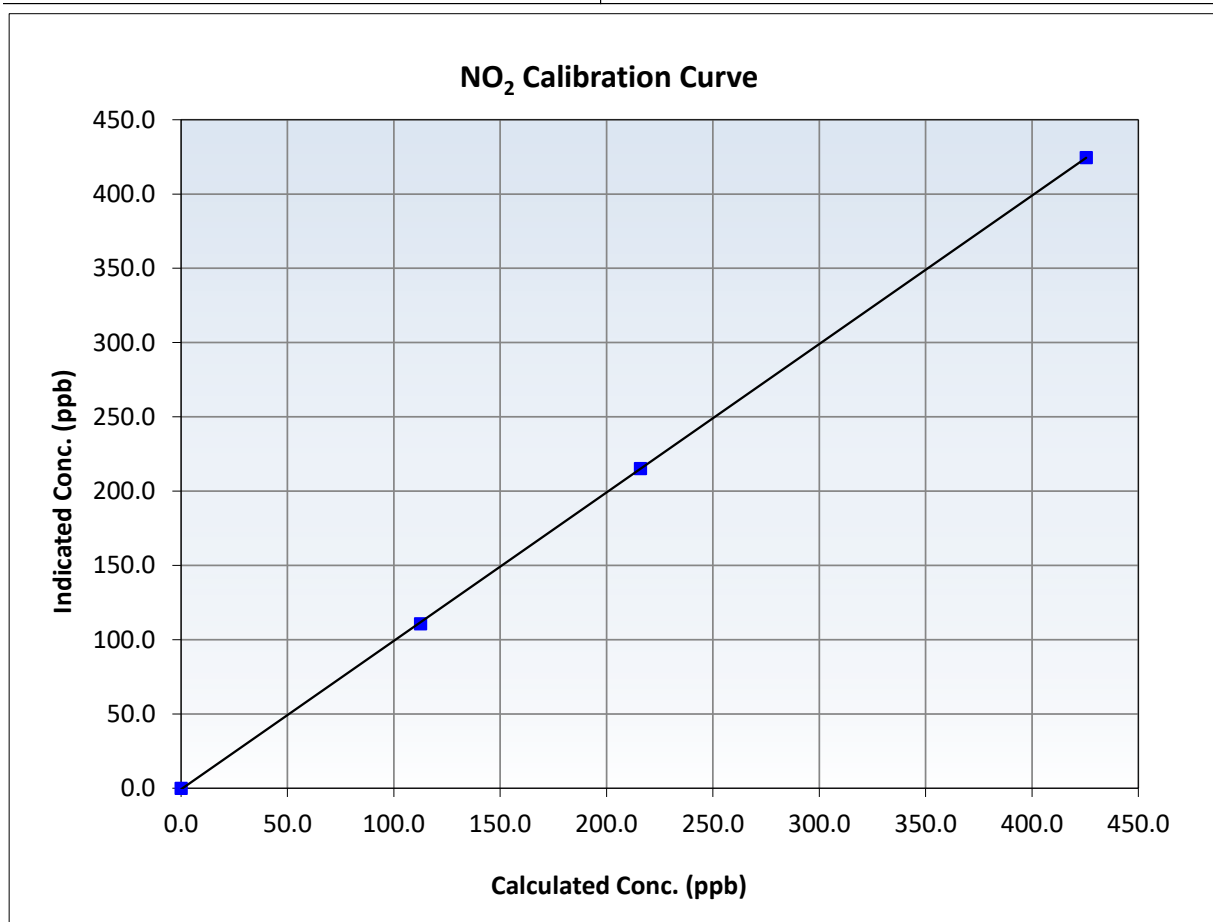
NO₂ Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:10	End Time (MST):	13:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999983	≥0.995
425.5	424.6	1.0021	Slope	0.999115	0.90 - 1.10
216.0	215.2	1.0036	Intercept	-0.716977	+/-20
112.6	110.7	1.0170			





Wood Buffalo Environmental Association

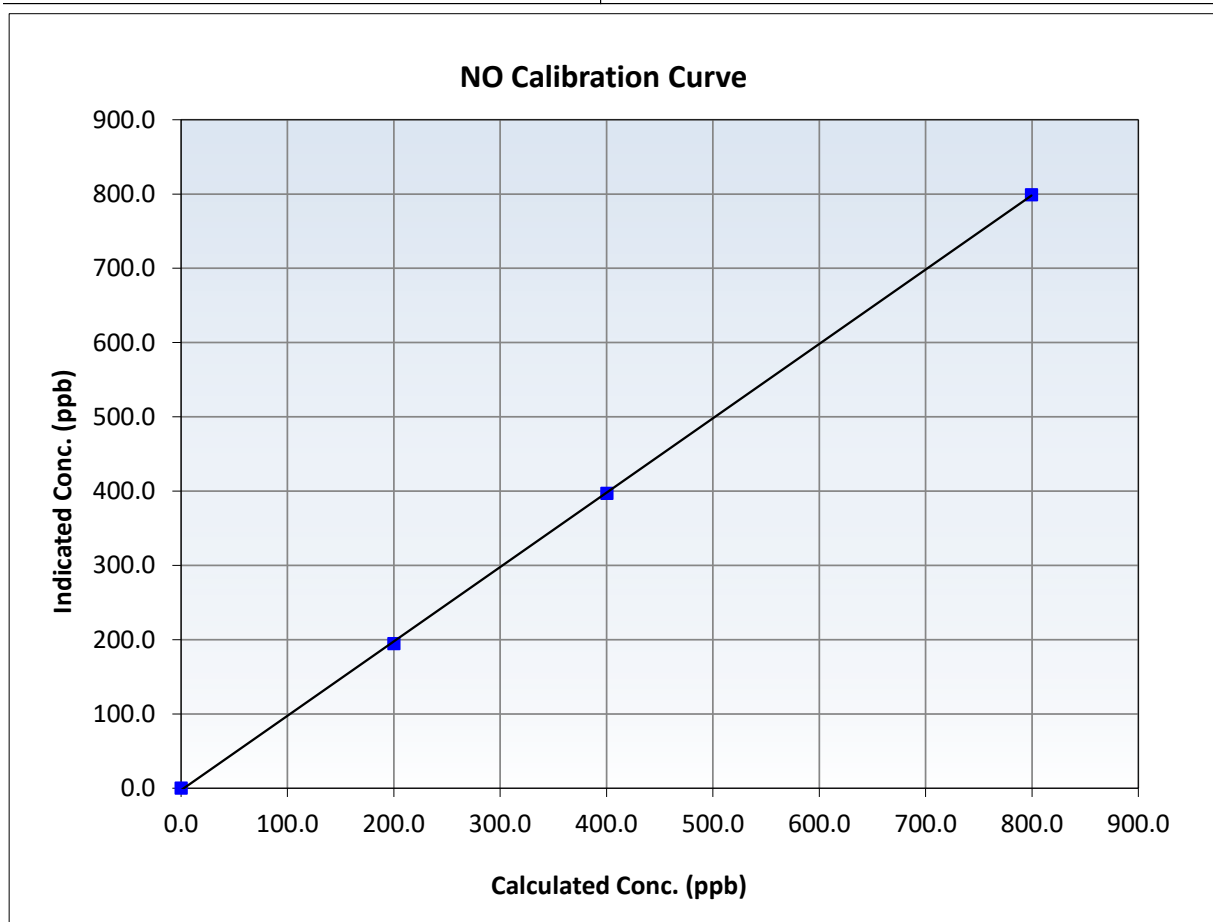
NO Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:10	End Time (MST):	13:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

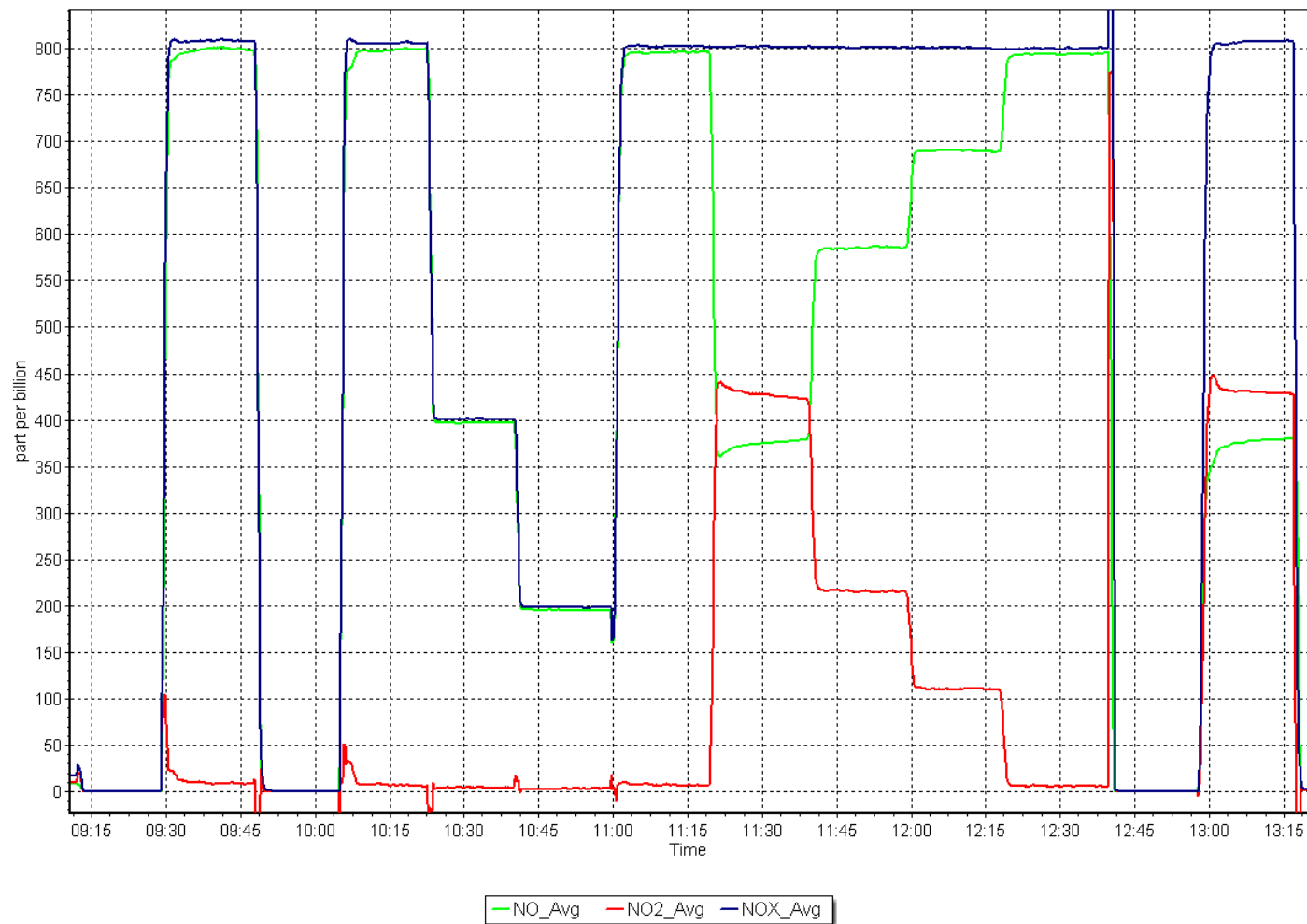
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999947	≥ 0.995
799.5	799.2	1.0004	Slope	1.001281	$0.90 - 1.10$
400.3	397.1	1.0080	Intercept	-2.611239	± 20
200.1	194.9	1.0269			



NO_x Calibration Plot

Date: September 20, 2024

Location: Fort McKay South





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Fort McKay South Station number: AMS 13
Calibration Date: September 10, 2024 Last Cal Date: August 7, 2024
Start time (MST): 8:55 End time (MST): 12:22
Reason: Routine

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 serial #: 3871
Analyzer Range: 0 - 500 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997571	1.002943	Backgd or Offset:	2.7	2.7
Calibration intercept:	0.900000	0.860000	Coeff or Slope:	0.973	0.973

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted
					Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.6	----
As found High point	5000	997.5	400.0	401.1	0.996
As found Mid point					
As found Low point					
Baseline Corr As found:	401.7	Previous response	399.9	*% 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	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	5000	996.1	400.0	401.5	0.996
Mid point	5000	850.2	200.0	202.3	0.989
Low point	5000	745.9	100.0	101.6	0.984
As left zero	5000	0.0	0.0	0.1	----
As left span	5000	996.1	400.0	403.0	0.993
Average Correction Factor					0.990

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

O₃ Calibration Summary

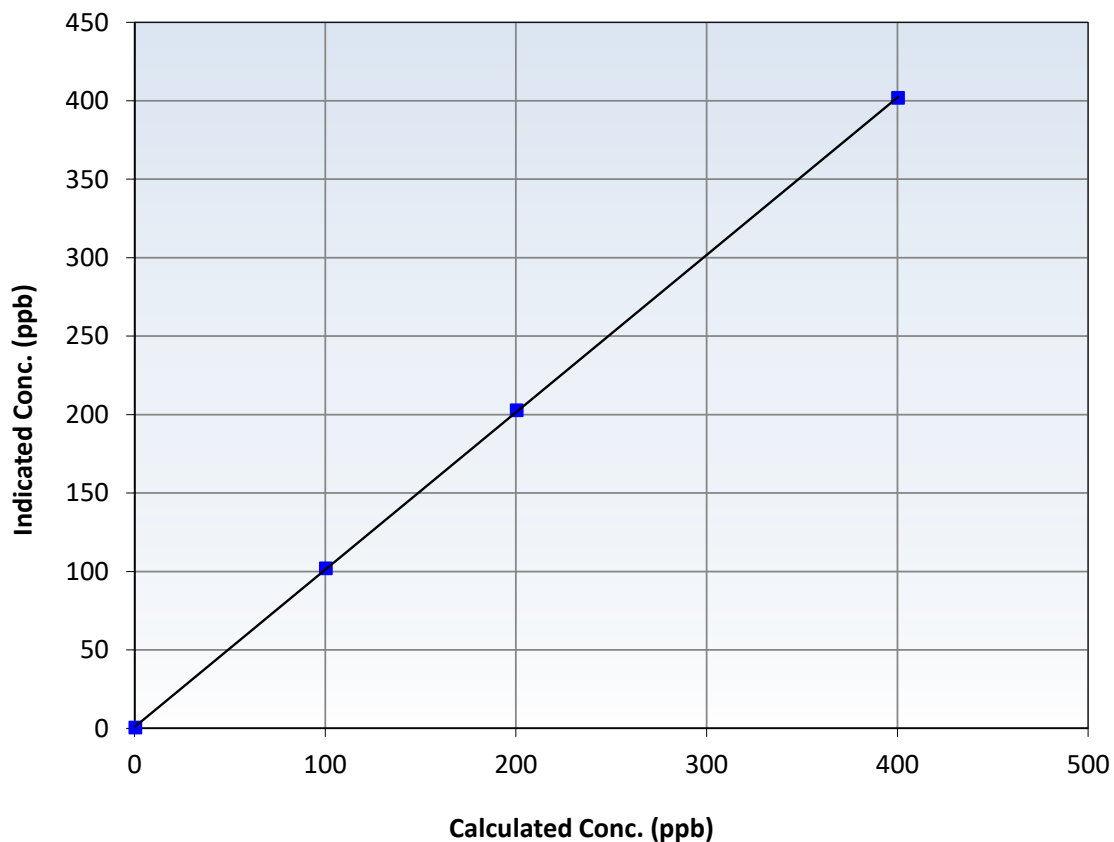
Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 7, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:55	End Time (MST):	12:22
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	0.1	----	Correlation Coefficient	0.999980	≥ 0.995
400.0	401.5	0.9963	Slope	1.002943	$0.90 - 1.10$
200.0	202.3	0.9886	Intercept	0.860000	± 5
100.0	101.6	0.9843			

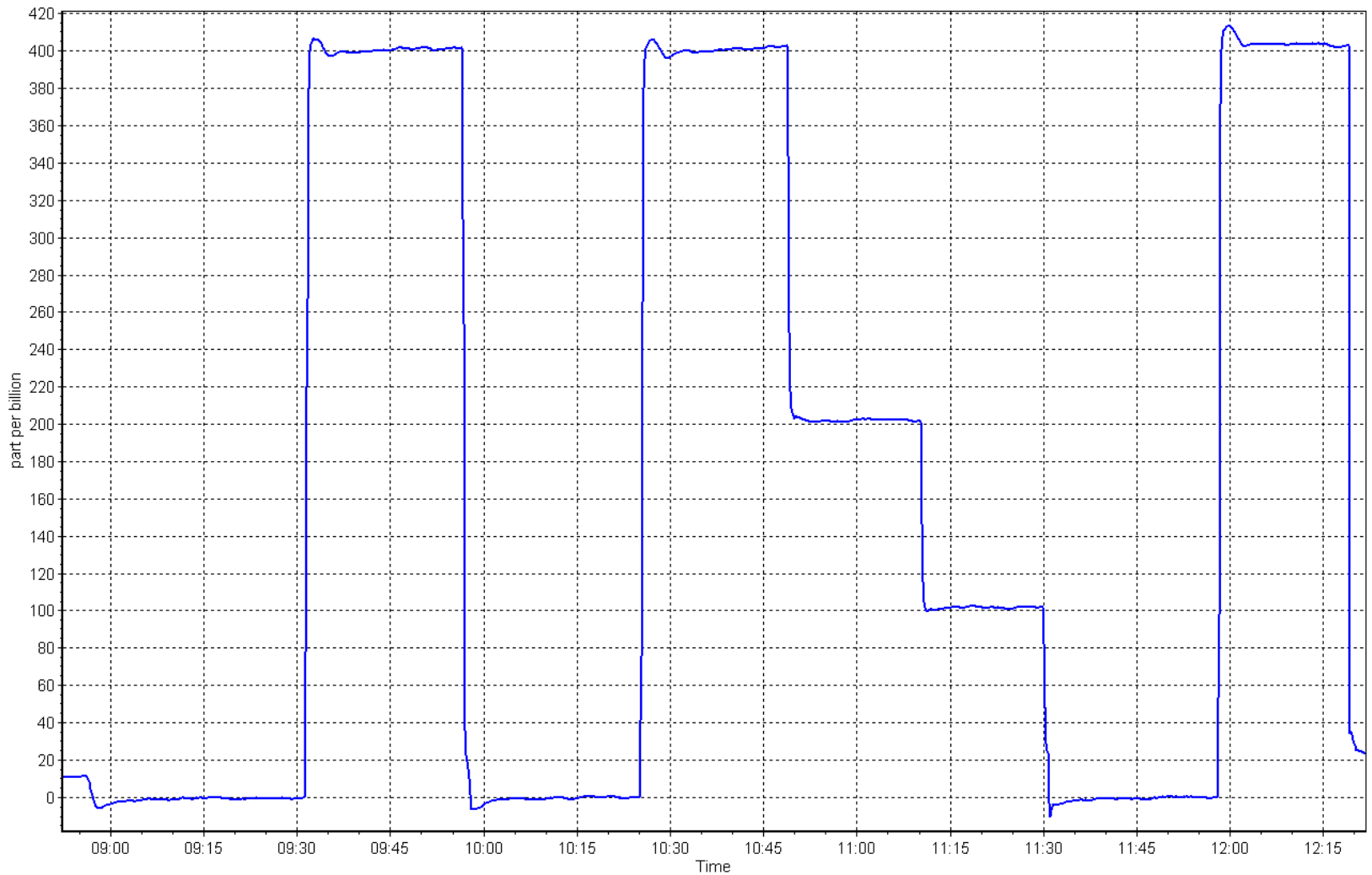
O₃ Calibration Curve



O₃ Calibration Plot

Date: September 10, 2024

Location: Fort McKay South





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Fort McKay South Station number: AMS 13
Calibration Date: September 20, 2024 Last Cal Date: August 23, 2024
Start time (MST): 9:41 End time (MST): 10:06

Analyzer Make: API T640 S/N: 1335
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388746
Temp/RH standard: Alicat FP-25BT S/N: 388746

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	13.10	13.43	13.10	☐	+/- 2 °C
P (mmHg)	729.60	730.90	729.60	☐	+/- 10 mmHg
Flow (LPM)	4.98	4.96	4.98	☐	+/- 0.25 LPM
PW% (pump)	41	----	41	☐	>80%
Zero Verification	PM w/o HEPA: _____	9.3	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 maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: June 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: July 12, 2024
Date Disposable Filter Changed: July 12, 2024

Post- maintenance Zero Verification: PM w/ HEPA: _____ <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: June 29, 2023
Date RH/T Sensor Cleaned: June 29, 2023

Notes: No adjustment made. Leak check passed.

Calibration by: Sean Bala



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

**AMS14
ANZAC
SEPTEMBER 2024**

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Anzac Station number: AMS 14
Calibration Date: September 3, 2024 Last Cal Date: August 21, 2024
Start time (MST): 9:55 End time (MST): 13:21
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.95 ppm Cal Gas Exp Date: January 5, 2025
Cal Gas Cylinder #: CC279389
Removed Cal Gas Conc: 49.95 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 3060
Zero Air Gen Model: API T701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 0710321322
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.015682	1.016425	Backgd or Offset:	25.0	25.0
Calibration intercept:	-3.090024	-3.150365	Coeff or Slope:	1.043	1.043

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.9	----
As found High point	4938	80.3	799.3	808.7	0.987
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	809.6	Previous response	808.7	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	4938	80.3	799.3	810.9	0.986
Mid point	4979	40.2	400.1	401.3	0.997
Low point	4998	20.2	201.1	199.0	1.010
As left zero	5000	0.0	0.0	-0.8	----
As left span	4938	80.3	799.3	813.6	0.982
Average Correction Factor:					0.998

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

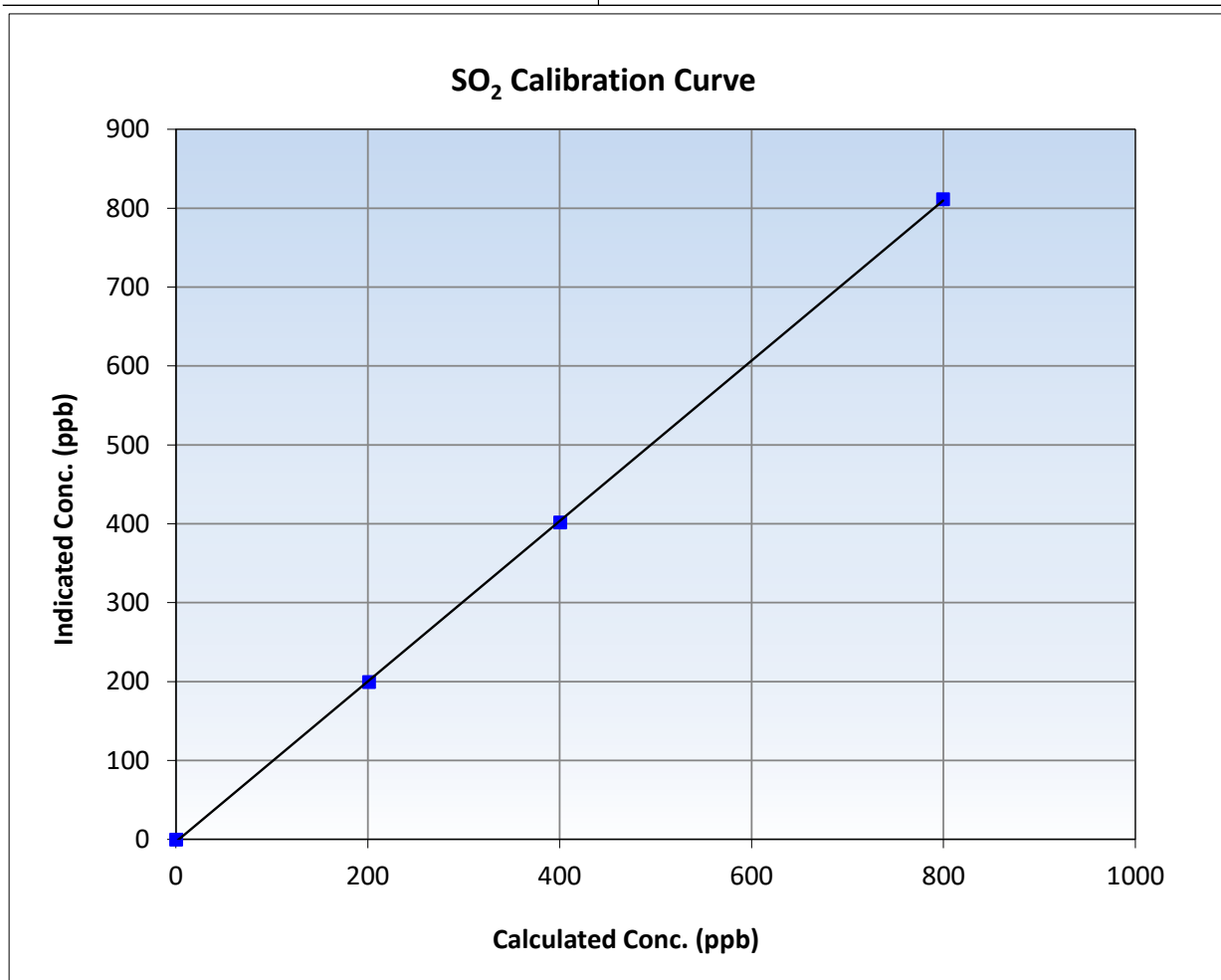
SO₂ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 21, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:55	End Time (MST):	13:21
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

Calibration Data

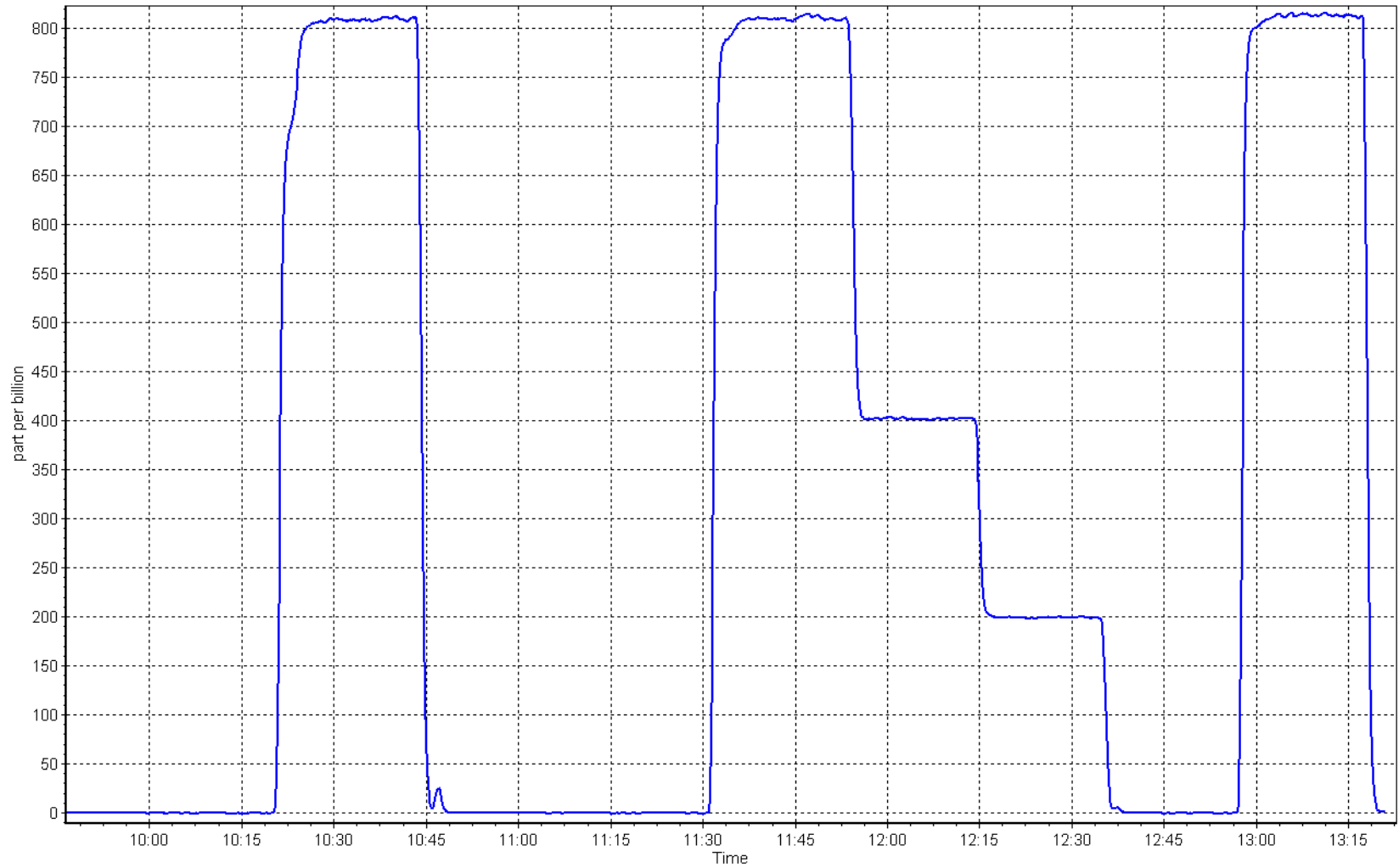
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	-0.4	----	Correlation Coefficient	0.999945		≥0.995
799.3	810.9	0.9857	Slope	1.016425		0.90 - 1.10
400.1	401.3	0.9969	Intercept	-3.150365		+/-30
201.1	199.0	1.0104				



SO2 Calibration Plot

Date: September 3, 2024

Location: Anzac





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Anzac
Calibration Date: September 17, 2024
Start time (MST): 9:32
Reason: Routine

Station number: AMS 14
Last Cal Date: August 15, 2024
End time (MST): 14:15

Calibration Standards

Cal Gas Concentration: 5.15 ppm
Cal Gas Cylinder #: CC510379
Removed Cal Gas Conc: 5.15 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API 701H

Cal Gas Exp Date: January 3, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 3060
Serial Number: 357

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: CD Nova CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1218153582
Converter serial #: 503
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.017458	1.026893	Backgd or Offset:	2.4
Calibration intercept:	-0.165446	-0.145472	Coeff or Slope:	1.018

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4938	77.9	80.0	82.3	0.969
As found Mid point	4973	38.9	40.0	40.9	0.973
As found Low point	4997	19.5	20.0	20.4	0.972
New cylinder response					
Baseline Corr As found:	82.5	Prev response:	81.21	*% change:	1.6%
Baseline Corr 2nd AF pt:	41.1	AF Slope:	1.031499	AF Intercept:	-0.245604
Baseline Corr 3rd AF pt:	20.6	AF Correlation:	0.999997	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4938	77.9	80.0	81.9	0.976
Mid point	4973	38.9	40.0	41.1	0.972
Low point	4997	19.5	20.0	20.2	0.991
As left zero	5000	0.0	0.0	0.1	----
As left span	4938	77.9	80.0	80.0	0.999
SO2 Scrubber Check	4936	80.3	800.4	-0.1	----
Date of last scrubber change:				Ave Corr Factor	0.980
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

TRS Calibration Summary

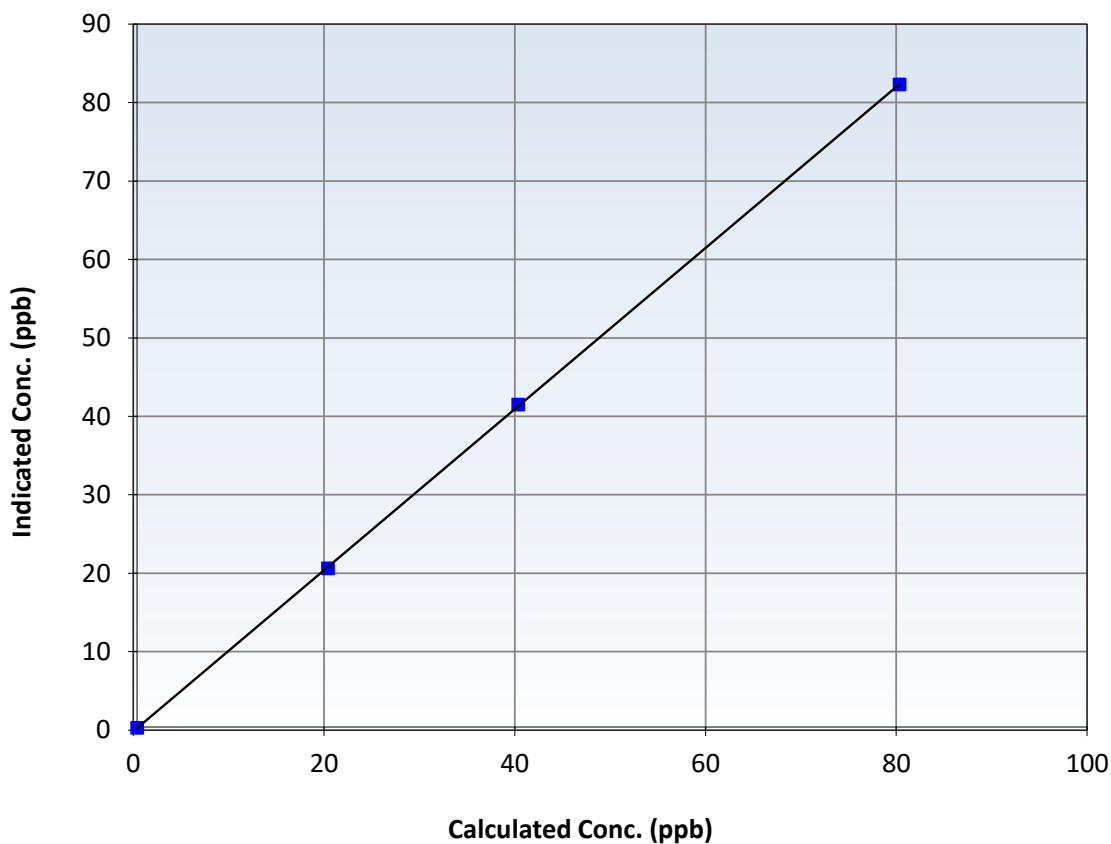
Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 15, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:32	End Time (MST):	14:15
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153582

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	0.999975		≥ 0.995
80.0	81.9	0.9762	Slope	1.026893		$0.90 - 1.10$
40.0	41.1	0.9722	Intercept	-0.145472		± 3
20.0	20.2	0.9907				

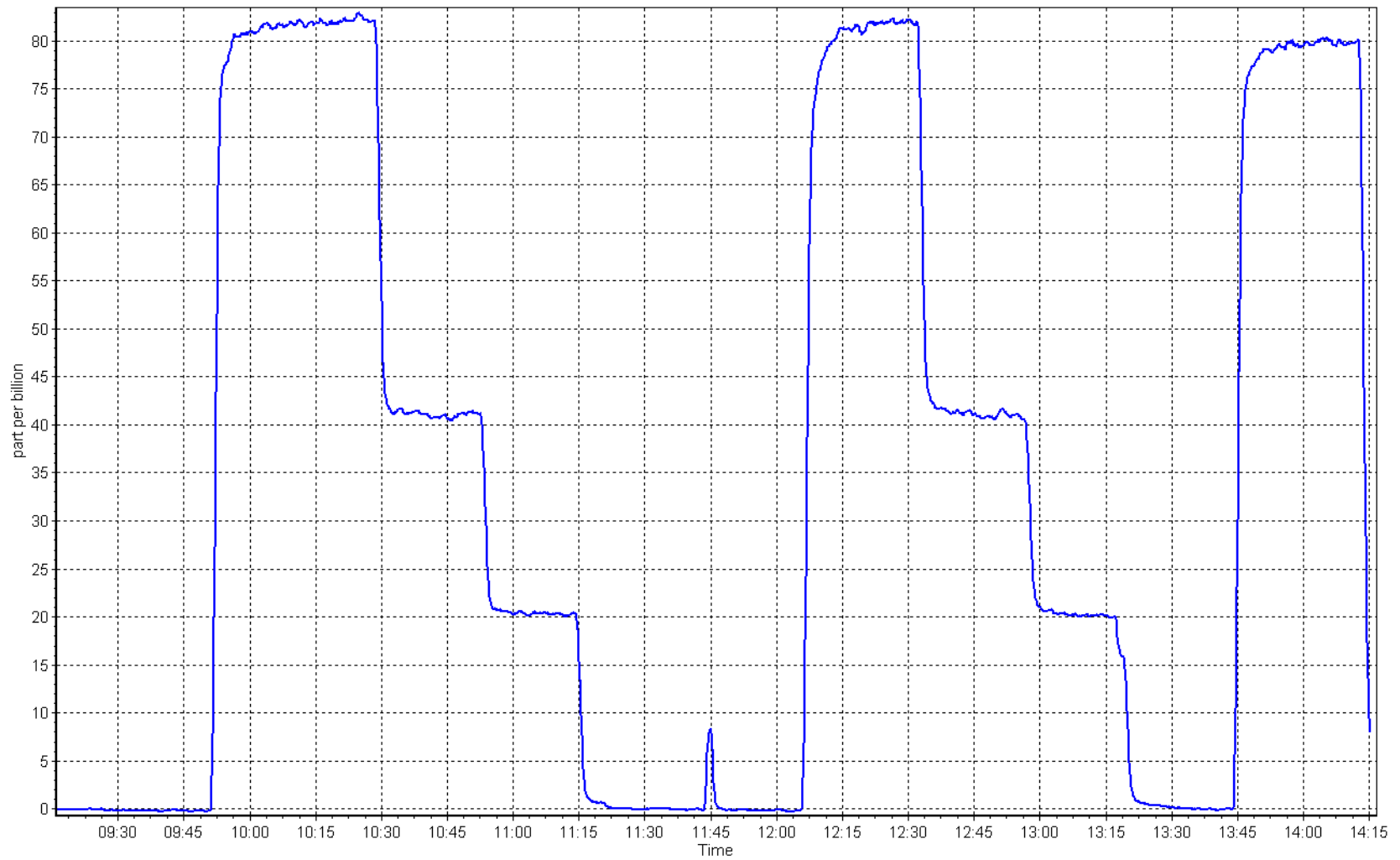
TRS Calibration Curve



TRS Calibration Plot

Date: September 17, 2024

Location: Anzac





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Anzac
Calibration Date: September 3, 2024
Start time (MST): 9:55
Reason: Routine

Station number: AMS 14
Last Cal Date: August 26, 2024
End time (MST): 13:21

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH ₄ Cal Gas Conc.	499.3 ppm	CH ₄ Equiv Conc.	1068.8 ppm
C ₃ H ₈ Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH ₄ Conc.	499.3 ppm	CH ₄ Equiv Conc.	1068.8 ppm
Removed C ₃ H ₈ Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3060
Zero Air Gen model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1118148494
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.87E-04	3.87E-04	NMHC SP Ratio:	4.44E-05	4.44E-05
CH ₄ Retention time:	14.20	14.20	NMHC Peak Area:	205559	205559
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.14	17.16	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.16	Prev response	17.13	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.14	17.12	1.001
Mid point	4960	40.1	8.57	8.51	1.007
Low point	4980	20.0	4.28	4.25	1.006
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.14	17.16	0.999
Average Correction Factor					1.005

Notes: Sample inlet filter and H₂ cylinder were changed after as founds. No adjustments made.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.13	9.16	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.16	Prev response	9.12	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.13	9.12	1.002
Mid point	4960	40.1	4.57	4.54	1.007
Low point	4980	20.0	2.28	2.26	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.13	9.14	0.999
Average Correction Factor					1.005

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.01	8.00	1.001
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.00	Prev response	8.01	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.01	8.00	1.001
Mid point	4960	40.1	4.00	3.98	1.007
Low point	4980	20.0	2.00	1.99	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.01	8.01	0.999
Average Correction Factor					1.005

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	1.000665	0.998752
THC Cal Offset:	-0.022828	-0.018233
CH ₄ Cal Slope:	1.002258	0.998676
CH ₄ Cal Offset:	-0.015649	-0.007853
NMHC Cal Slope:	0.999281	0.998605
NMHC Cal Offset:	-0.006979	-0.009781

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

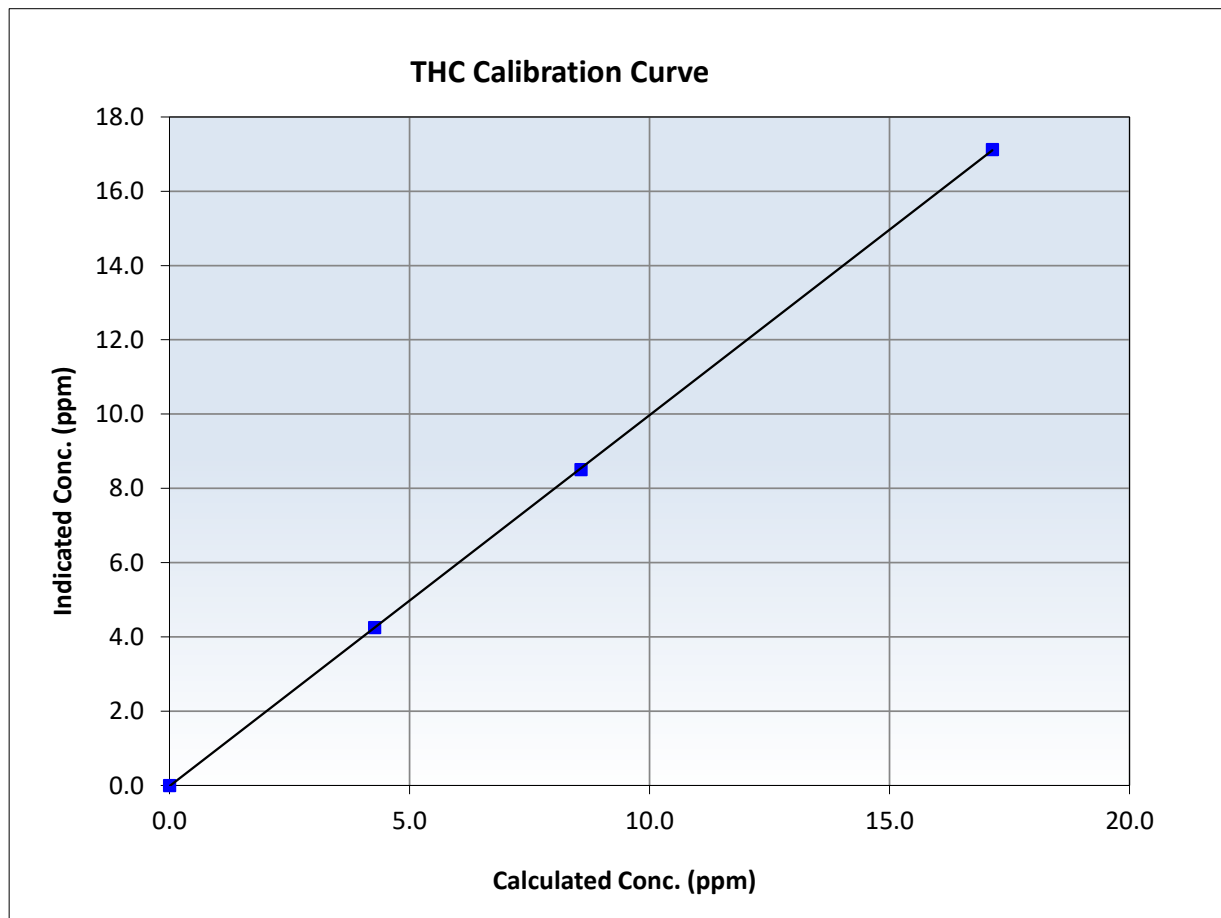
THC Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 26, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:55	End Time (MST):	13:21
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999989	≥ 0.995
17.14	17.12	1.0013	Slope	0.998752	$0.90 - 1.10$
8.57	8.51	1.0074	Intercept	-0.018233	± 0.5
4.28	4.25	1.0060			





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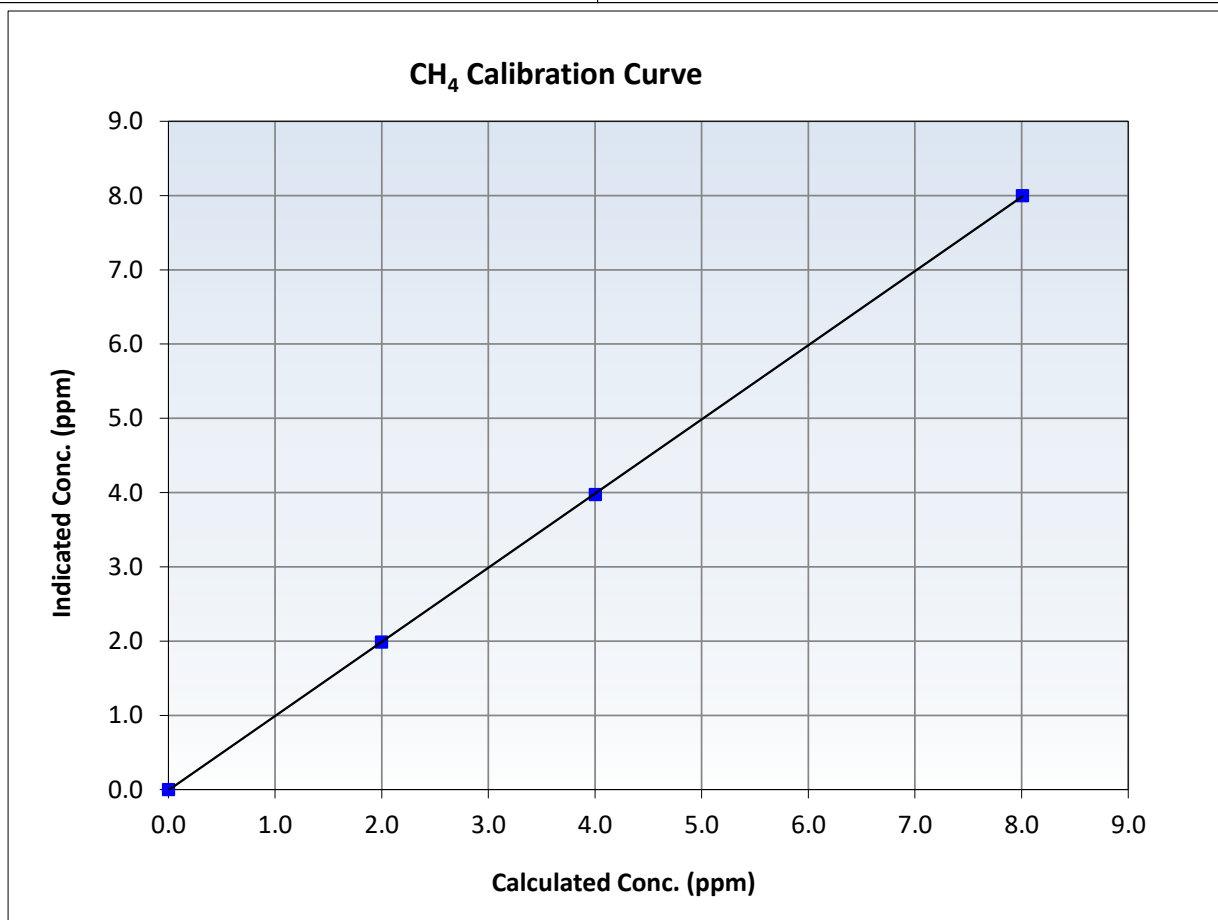
CH₄ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 26, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:55	End Time (MST):	13:21
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999989	<i>≥0.995</i>
8.01	8.00	1.0013	Slope	0.998676	<i>0.90 - 1.10</i>
4.00	3.98	1.0074	Intercept	-0.007853	<i>+/-0.5</i>
2.00	1.99	1.0051			





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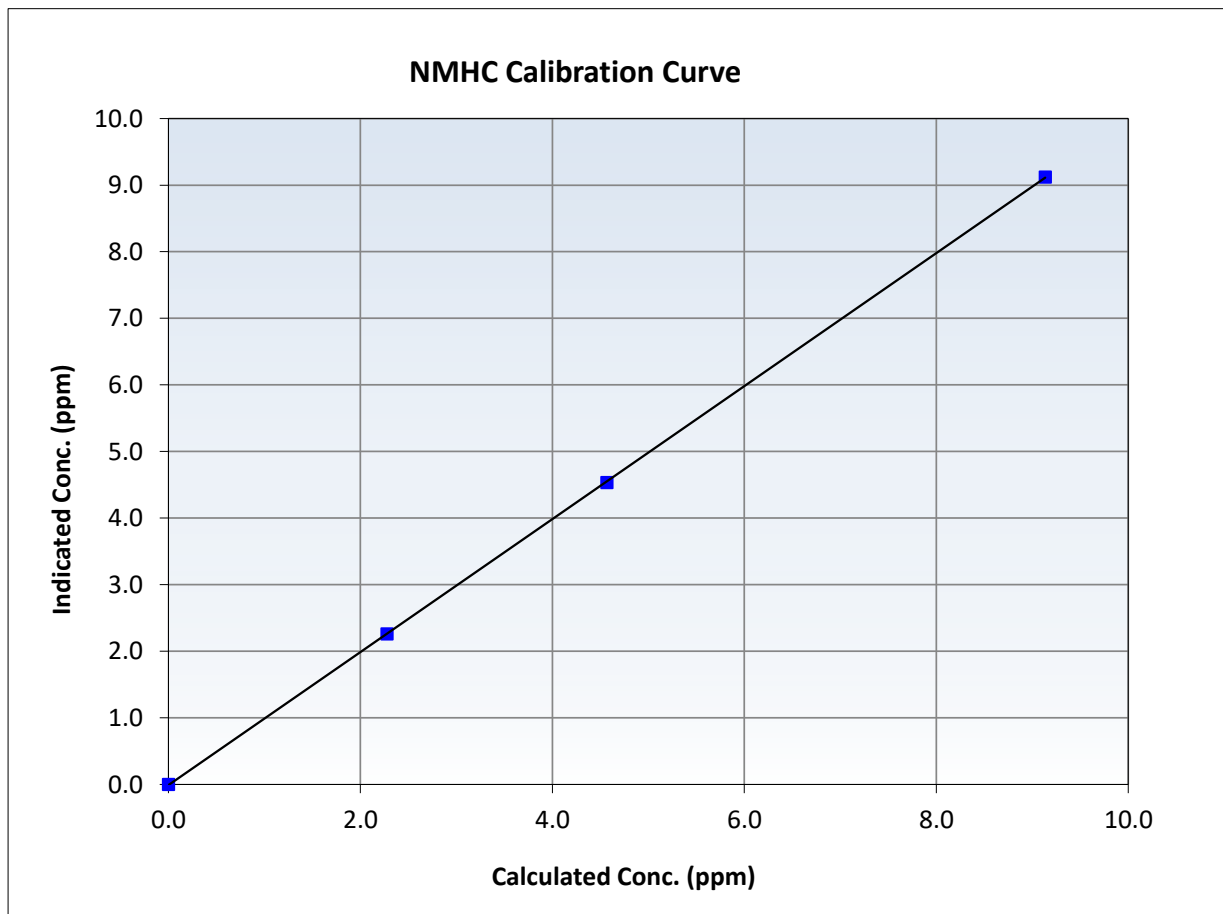
NMHC Calibration Summary

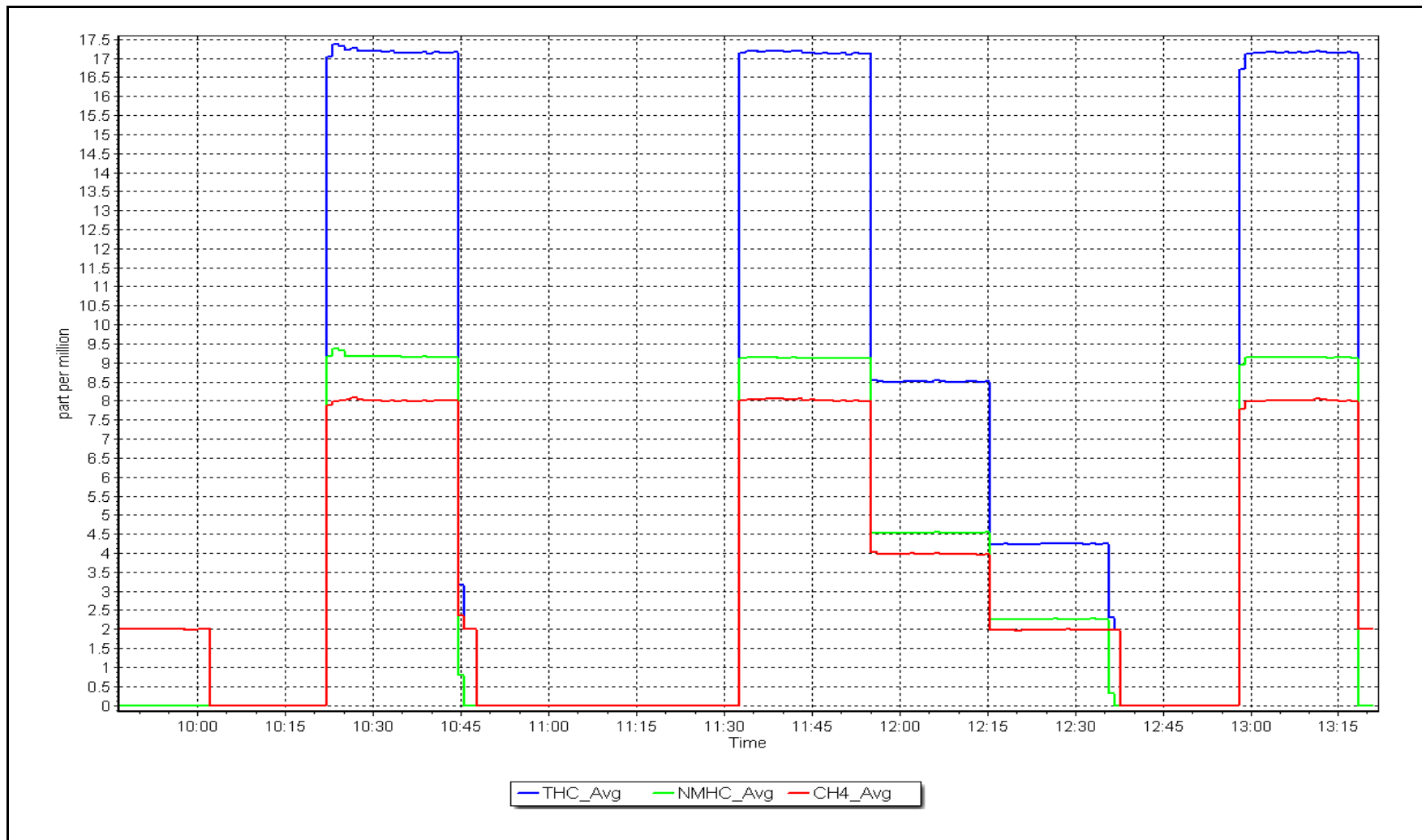
Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 26, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:55	End Time (MST):	13:21
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999990	<i>≥0.995</i>
9.13	9.12	1.0015	Slope	0.998605	<i>0.90 - 1.10</i>
4.57	4.54	1.0072	Intercept	-0.009781	<i>+/-0.5</i>
2.28	2.26	1.0067			







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Anzac Station number: AMS 14
Calibration Date: September 21, 2024 Last Cal Date: September 3, 2024
Start time (MST): 13:56 End time (MST): 17:29
Reason: Maintenance

Calibration Standards

Gas Cert Reference: CC279389 Cal Gas Expiry Date: January 5, 2025
CH₄ Cal Gas Conc. 499.3 ppm CH₄ Equiv Conc. 1068.8 ppm
C₃H₈ Cal Gas Conc. 207.1 ppm
Removed Gas Cert: NA Removed Gas Expiry: NA
Removed CH₄ Conc. 499.3 ppm CH₄ Equiv Conc. 1068.8 ppm
Removed C₃H₈ Conc. 207.1 ppm Diff between cyl (THC):
Diff between cyl (CH₄): Diff between cyl (NM):
Calibrator Model: API T700 Serial Number: 3060
Zero Air Gen model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1118148494
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	3.87E-04	4.10E-04	NMHC SP Ratio:	4.44E-05	4.51E-05
CH ₄ Retention time:	14.20	14.40	NMHC Peak Area:	205559	202367
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.14	16.58	1.034
As found Mid point	4960	40.1	8.57	8.23	1.042
As found Low point	4980	20.0	4.28	4.09	1.046
New cylinder response					
Baseline Corr AF:	16.58	Prev response	17.10	*% change	-3.2%
Baseline Corr 2nd AF:	8.23	AF Slope:	0.967713	AF Intercept:	-0.030771
Baseline Corr 3rd AF:	4.09	AF Correlation:	0.999980	* => +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero))
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.14	17.16	0.999
Mid point	4960	40.1	8.57	8.52	1.006
Low point	4980	20.0	4.28	4.24	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.14	17.21	0.996
Average Correction Factor					1.004

Notes: Upon investigation, no alarms were detected. The diagnostics were consistent with previous calibration results; there were no discrepancies in the chromatograms compared to the last calibration. It is suspected that these issues may have arisen due to unstable station temperatures during the night. Adjusted span only.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	9.13	9.02	1.013
As found Mid point	4960	40.1	4.57	4.49	1.018
As found Low point	4980	20.0	2.28	2.23	1.021
New cylinder response					
Baseline Corr AF:	9.02	Prev response	9.11	*% change	-1.0%
Baseline Corr 2nd AF:	4.49	AF Slope:	0.987998	AF Intercept:	-0.012406
Baseline Corr 3rd AF:	2.23	AF Correlation:	0.999988	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.2	9.13	9.14	0.999
Mid point	4960	40.1	4.57	4.55	1.005
Low point	4980	20.0	2.28	2.27	1.006
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.13	9.17	0.996
Average Correction Factor					1.003

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	8.01	7.56	1.060
As found Mid point	4960	40.1	4.00	3.75	1.069
As found Low point	4980	20.0	2.00	1.86	1.075
New cylinder response					
Baseline Corr AF:	7.56	Prev response	7.99	*% change	-5.7%
Baseline Corr 2nd AF:	3.75	AF Slope:	0.944333	AF Intercept:	-0.017765
Baseline Corr 3rd AF:	1.86	AF Correlation:	0.999970	* = > +/-5% change initiates investigation	

CH₄ 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)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.2	8.01	8.02	0.999
Mid point	4960	40.1	4.00	3.98	1.007
Low point	4980	20.0	2.00	1.98	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.01	8.04	0.996
Average Correction Factor					1.005

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.998752	1.001432
THC Cal Offset:	-0.018233	-0.026827
CH ₄ Cal Slope:	0.998676	1.001517
CH ₄ Cal Offset:	-0.007853	-0.015051
NMHC Cal Slope:	0.998605	1.001132
NMHC Cal Offset:	-0.009781	-0.011376

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

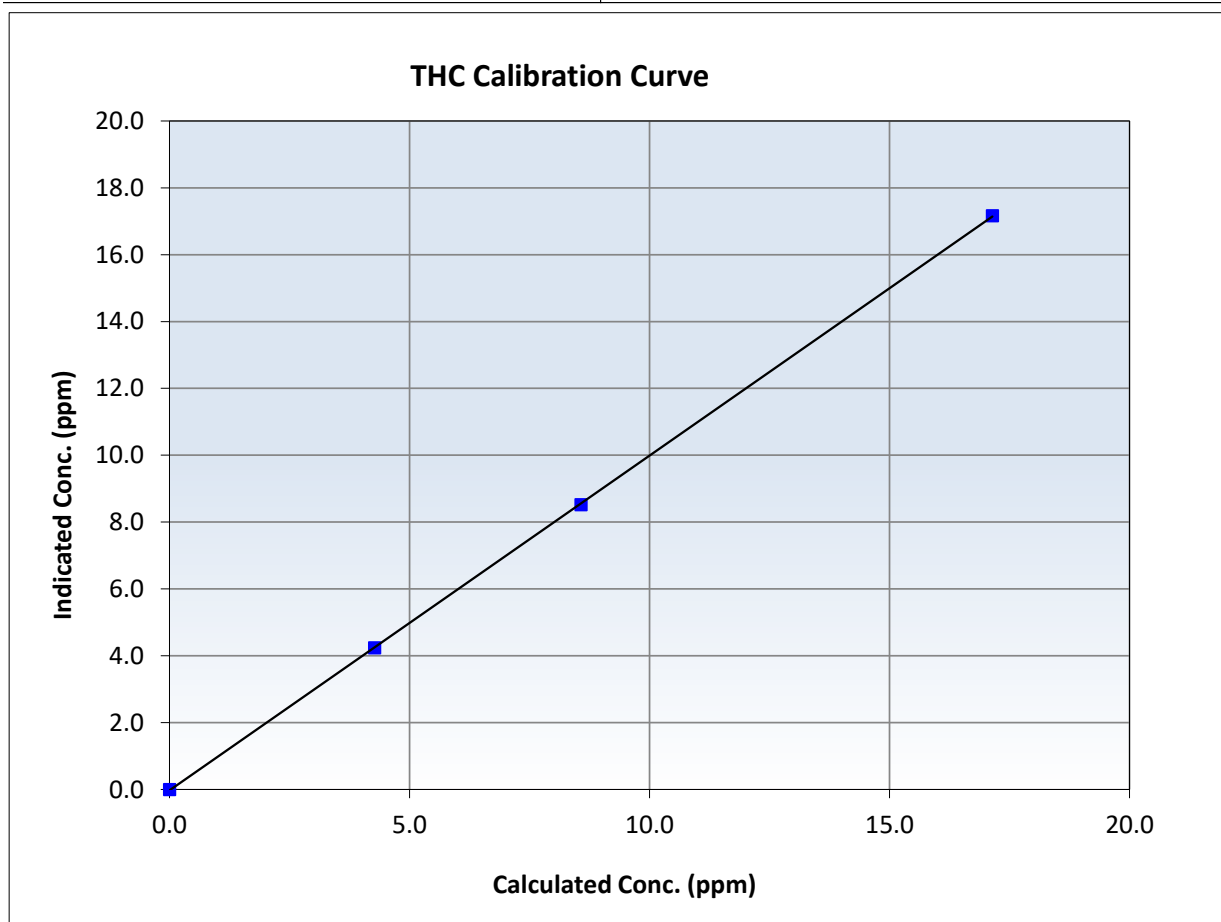
THC Calibration Summary

Station Information

Calibration Date:	September 21, 2024	Previous Calibration:	September 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	13:56	End Time (MST):	17:29
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999984	<i>≥0.995</i>
17.14	17.16	0.9989	Slope	1.001432	<i>0.90 - 1.10</i>
8.57	8.52	1.0060	Intercept	-0.026827	<i>+/-0.5</i>
4.28	4.24	1.0076			





Wood Buffalo Environmental Association

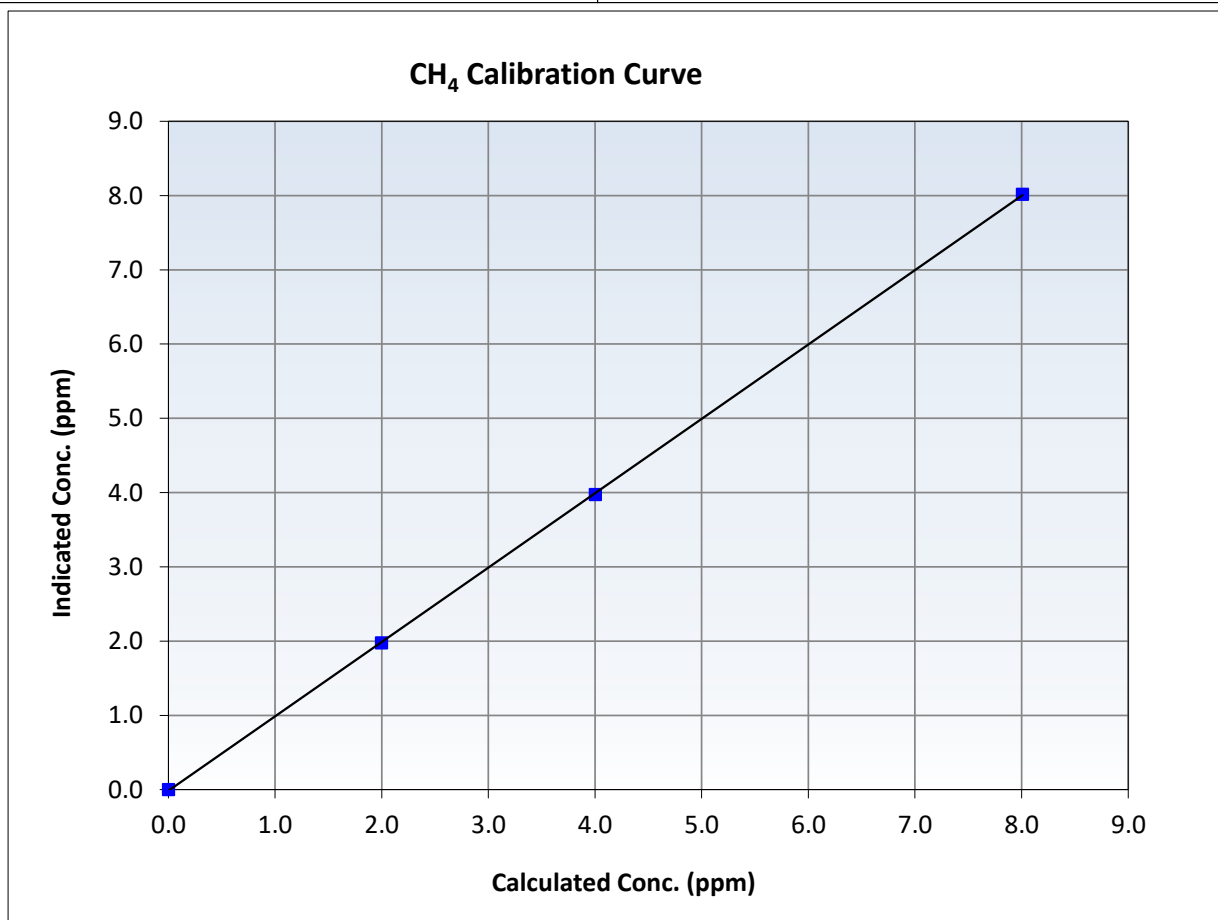
CH₄ Calibration Summary

Station Information

Calibration Date:	September 21, 2024	Previous Calibration:	September 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	13:56	End Time (MST):	17:29
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999978	≥ 0.995
8.01	8.02	0.9989	Slope	1.001517	$0.90 - 1.10$
4.00	3.98	1.0071	Intercept	-0.015051	± 0.5
2.00	1.98	1.0097			





Wood Buffalo Environmental Association

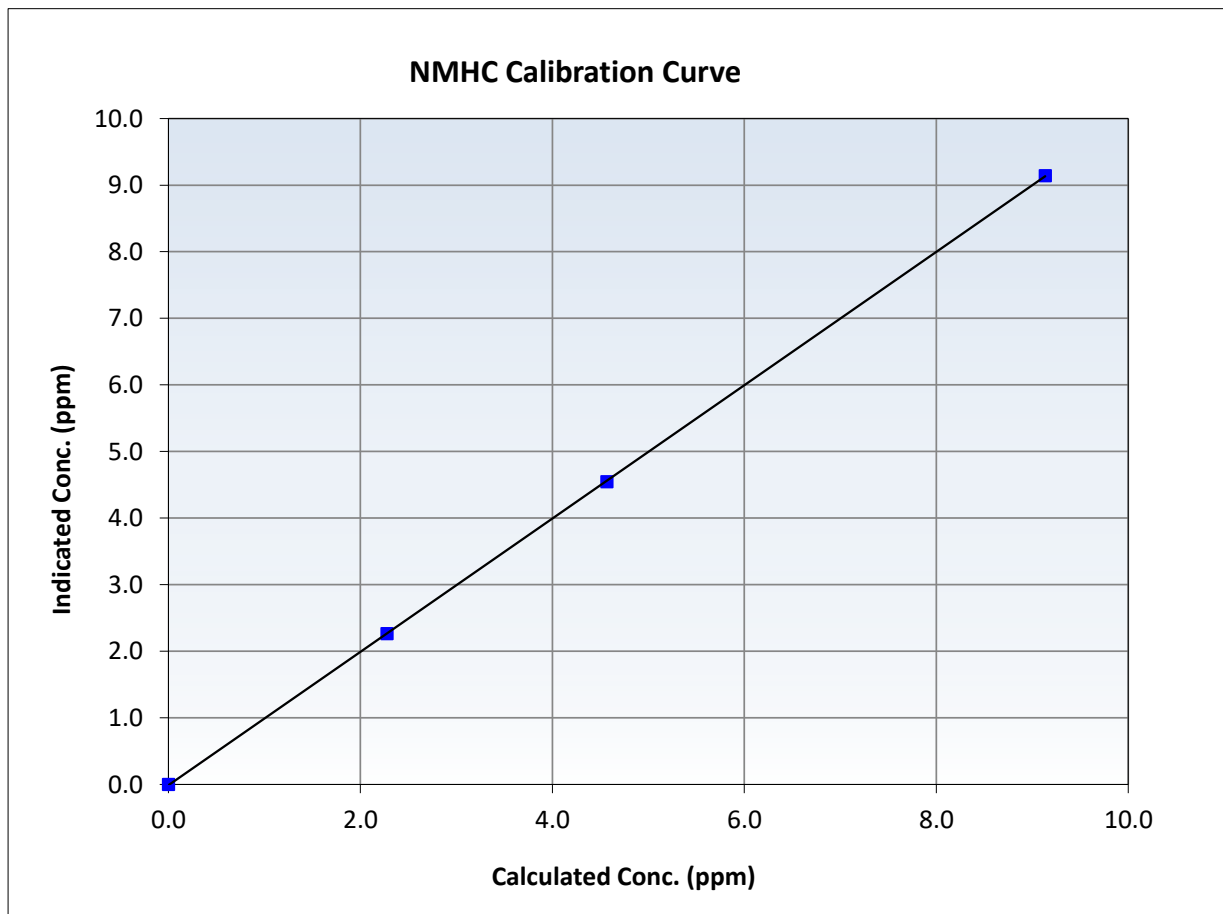
NMHC Calibration Summary

Station Information

Calibration Date:	September 21, 2024	Previous Calibration:	September 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	13:56	End Time (MST):	17:29
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

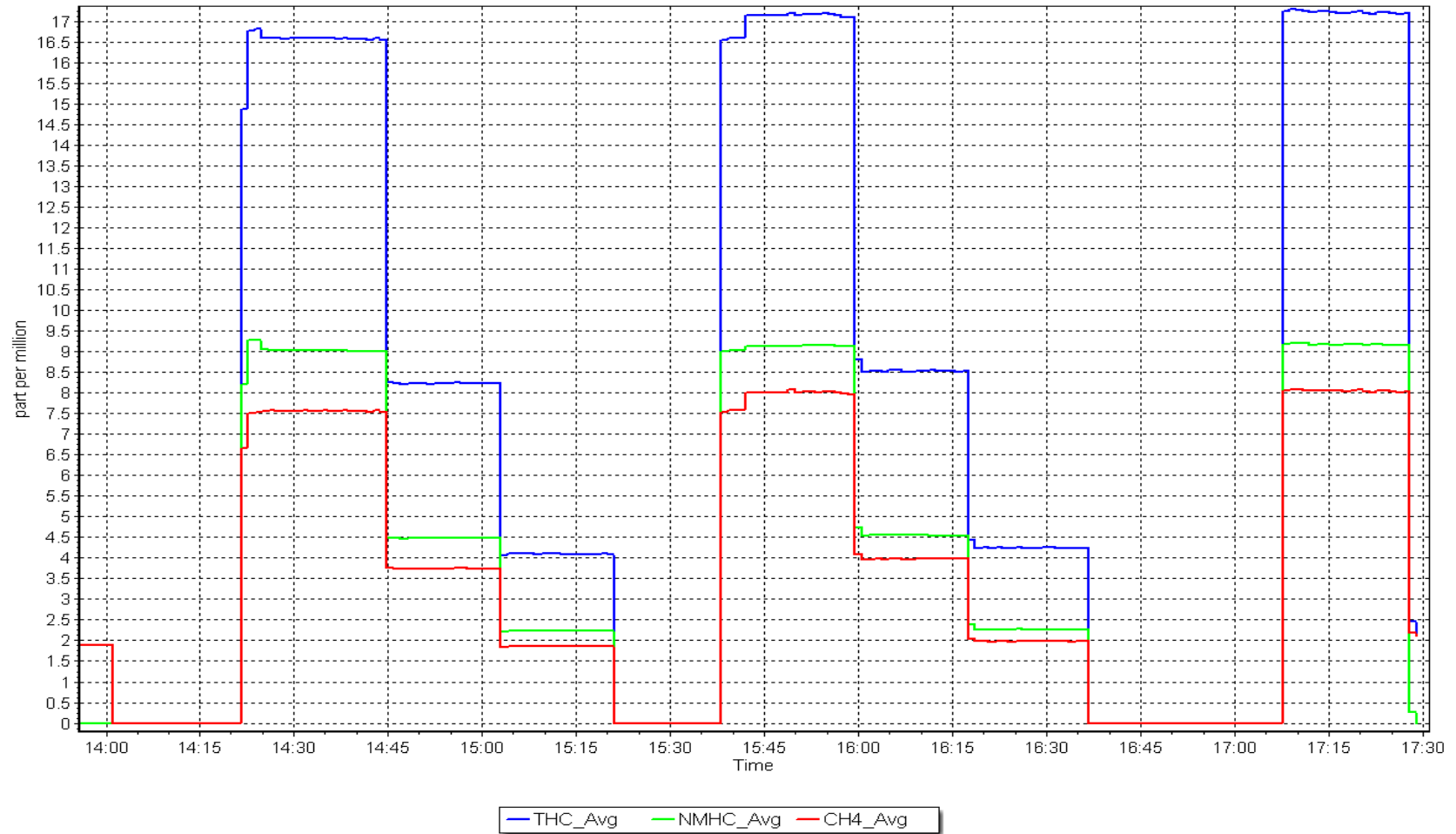
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999989	<i>≥0.995</i>
9.13	9.14	0.9991	Slope	1.001132	<i>0.90 - 1.10</i>
4.57	4.55	1.0050	Intercept	-0.011376	<i>+/-0.5</i>
2.28	2.27	1.0058			



NMHC Calibration Plot

Date: September 21, 2024

Location: Anzac





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Anzac Station number: AMS 14
Calibration Date: September 27, 2024 Last Cal Date: September 21, 2024
Start time (MST): 8:20 End time (MST): 9:50
Reason: Cylinder Change

Calibration Standards

Gas Cert Reference: CC279389 Cal Gas Expiry Date: January 5, 2025
CH₄ Cal Gas Conc. 499.3 ppm CH₄ Equiv Conc. 1068.8 ppm
C₃H₈ Cal Gas Conc. 207.1 ppm
Removed Gas Cert: NA Removed Gas Expiry: NA
Removed CH₄ Conc. 499.3 ppm CH₄ Equiv Conc. 1068.8 ppm
Removed C₃H₈ Conc. 207.1 ppm
Diff between cyl (THC):
Diff between cyl (CH₄):
Calibrator Model: API T700 Serial Number: 3060
Zero Air Gen model: API 701H Serial Number: 357

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1118148494
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	4.10E-04	4.10E-04	NMHC SP Ratio:	4.51E-05	4.51E-05
CH ₄ Retention time:	14.40	14.40	NMHC Peak Area:	202367	202367
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.14	17.49	0.980
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.49	Prev response	17.14	*% change	2.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.14	17.42	0.984
Average Correction Factor					

Notes: Replaced N₂ carrier gas, captured as founds and as lefts.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.13	9.19	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.19	Prev response	9.13	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero					----
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.13	9.16	0.998
Average Correction Factor					

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.01	8.29	0.966
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.29	Prev response	8.01	*% change	3.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero					----
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.01	8.27	0.968
Average Correction Factor					

Calibration Statistics

	<u>Start</u>	
THC Cal Slope:	1.001432	
THC Cal Offset:	-0.026827	
CH ₄ Cal Slope:	1.001517	
CH ₄ Cal Offset:	-0.015051	
NMHC Cal Slope:	1.001132	
NMHC Cal Offset:	-0.011376	

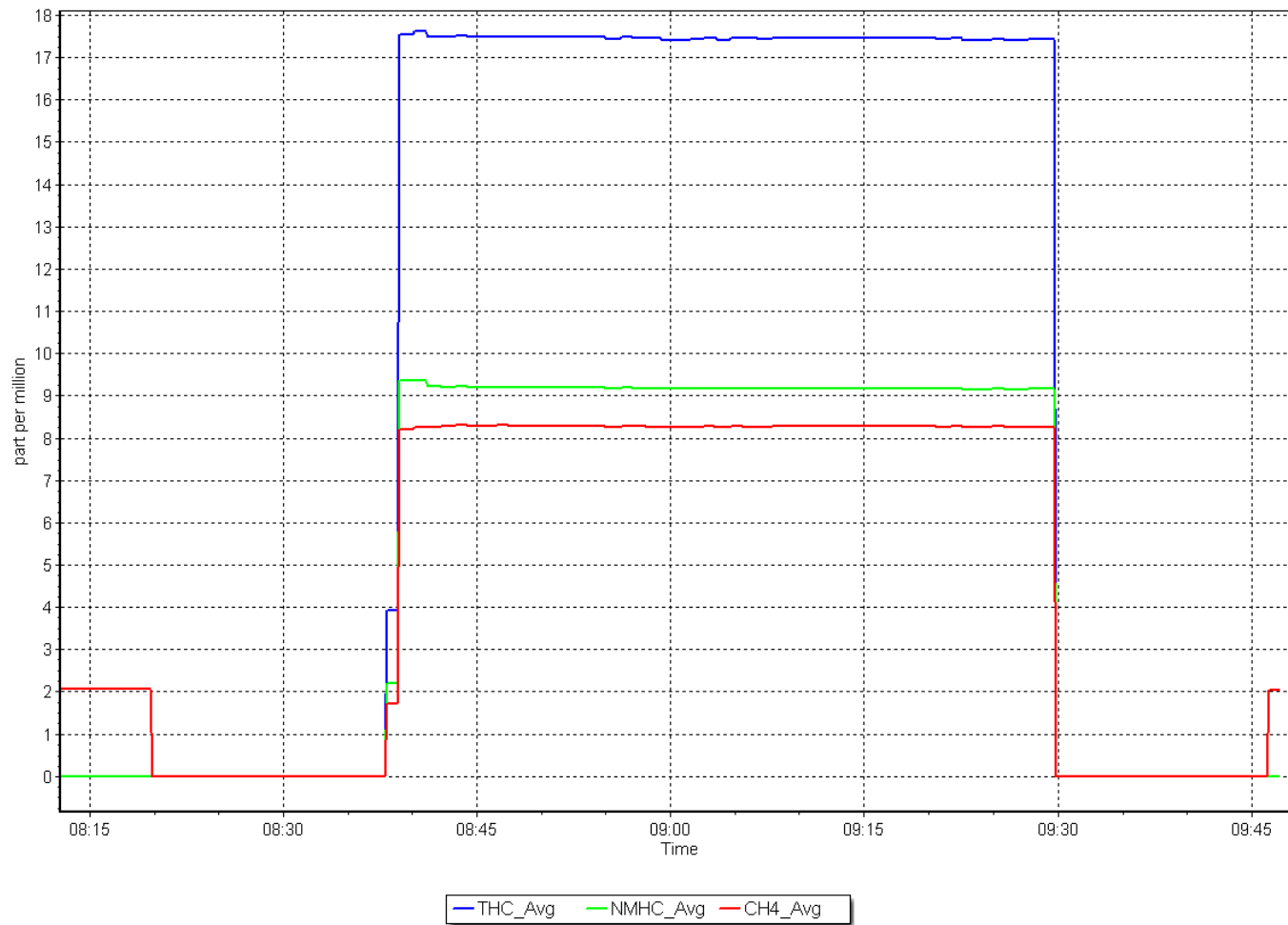
Finish

Calibration Performed By: Kelly Baragar

NMHC Calibration Plot

Date: September 27, 2024

Location: Anzac





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Anzac
Station number: AMS 14
Calibration Date: September 12, 2024
Last Cal Date: August 29, 2024
Start time (MST): 9:47
End time (MST): 14:54
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0037092
NOX Cal Gas Conc: 60.7 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 60.70 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T700H
Cal Gas Expiry Date: May 16, 2031
NO Cal Gas Conc: 60.40 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 60.40 ppm
NO gas Diff:
Serial Number: 3060
Serial Number: 357

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
AF High point	4934	66.3	804.8	800.9	4.0	809.2	803.0	6.1	0.9946	0.9972
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 806.6 ppb	NO = 803.5 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = 0.3%
Baseline Corr 1st pt	NO _x = 809.2 ppb	NO = 803.1 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -0.1%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb	As found	NO _x r ² :	Nx SI:	Nx Int:
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb	As found	NO r ² :	NO SI:	NO Int:
			As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1152430008

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.003184	1.002642
NO _x Cal Offset:	-0.751364	-0.610820
NO Cal Slope:	1.006164	1.005463
NO Cal Offset:	-2.249820	-2.029391
NO ₂ Cal Slope:	0.992110	0.994626
NO ₂ Cal Offset:	-0.863192	-1.000823

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.424	1.424	NO bkgnd or offset:	3.9	3.9
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.9	3.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	156.3	156.0

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.2	----	----
High point	4934	66.3	804.8	800.9	4.0	806.6	803.9	2.8	0.9978	0.9962
Mid point	4985	33.2	401.6	399.6	2.0	402.1	399.8	2.3	0.9987	0.9995
Low point	5004	16.7	201.9	200.9	1.0	200.7	197.1	3.6	1.0060	1.0193
As left zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.3	----	----
As left span	4934	66.3	804.8	415.2	389.6	807.0	415.2	391.8	0.9973	1.0000
Average Correction Factor									1.0008	1.0050

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.2	----	----
High GPT point	804.0	412.5	395.5	393.0	1.0063	99.4%
Mid GPT point	804.0	611.1	196.9	194.1	1.0143	98.6%
Low GPT point	804.0	706.3	101.7	99.0	1.0270	97.4%
Average Correction Factor					1.0159	98.4%

Notes:

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

Calibration Performed By:

Mohammed Kashif



Wood Buffalo Environmental Association

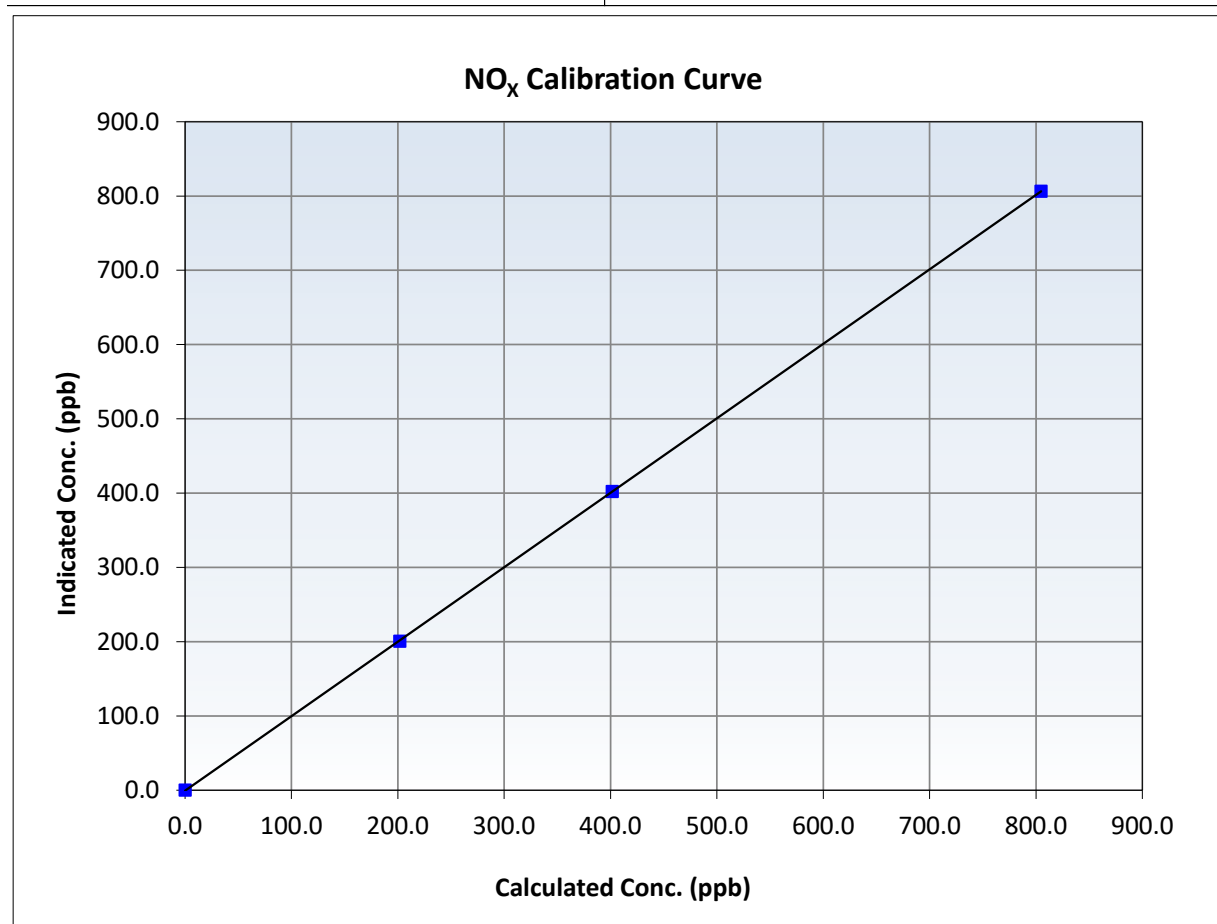
NO_x Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:47	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999994	≥0.995
804.8	806.6	0.9978	Slope	1.002642	0.90 - 1.10
401.6	402.1	0.9987	Intercept	-0.610820	+/-20
201.9	200.7	1.0060			





Wood Buffalo Environmental Association

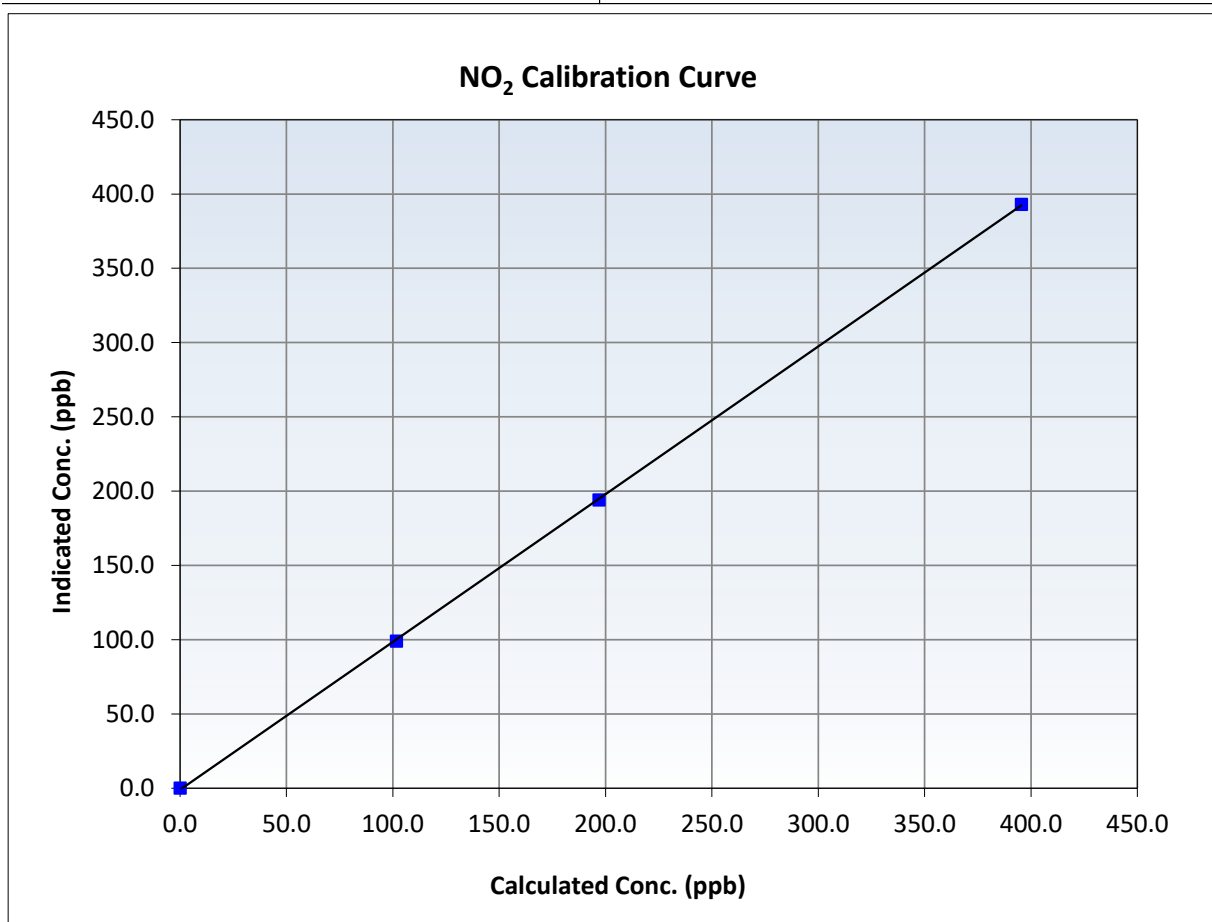
NO₂ Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:47	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

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	0.999957	≥0.995
395.5	393.0	1.0063	Slope	0.994626	0.90 - 1.10
196.9	194.1	1.0143	Intercept	-1.000823	+/-20
101.7	99.0	1.0270			





Wood Buffalo Environmental Association

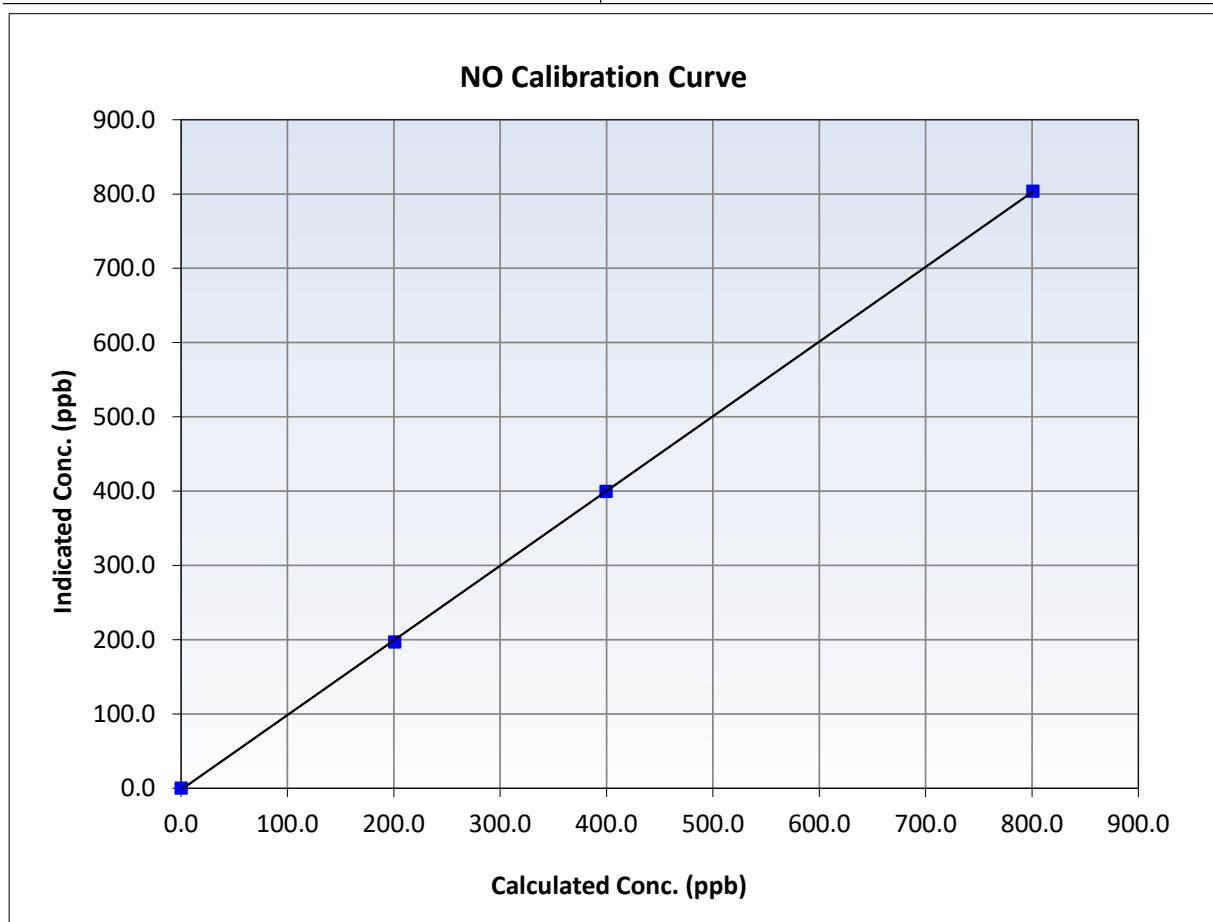
NO Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:47	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

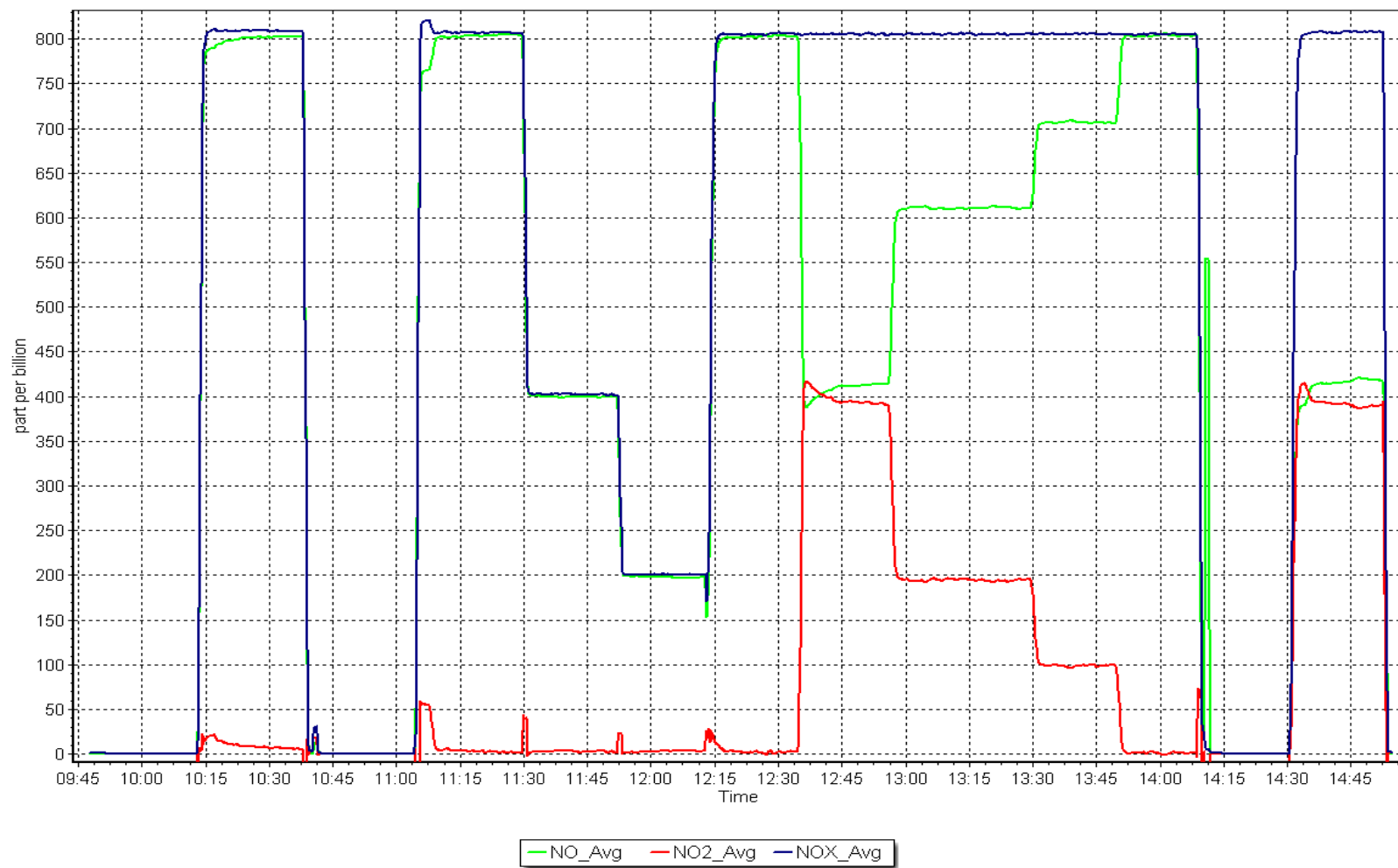
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999963	≥ 0.995
800.9	803.9	0.9962	Slope	1.005463	$0.90 - 1.10$
399.6	399.8	0.9995	Intercept	-2.029391	± 20
200.9	197.1	1.0193			



NO_x Calibration Plot

Date: September 12, 2024

Location: Anzac





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Anzac
Calibration Date: September 16, 2024
Start time (MST): 9:47
Reason: Routine

Station number: AMS 14
Last Cal Date: August 7, 2024
End time (MST): 13:16

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 Range: 0 - 500 ppb

Analyzer serial #: 1426262595

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995029	0.995829	Backgd or Offset:	1.9	2.0
Calibration intercept:	0.820000	0.980000	Coeff or Slope:	1.617	1.667

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	1.0	----
As found High point	5000	918.8	400.0	388.9	1.031
As found Mid point					
As found Low point					
Baseline Corr As found:	387.9	Previous response	398.8	*% change	-2.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	5000	918.8	400.0	398.4	1.004
Mid point	5000	803.8	200.0	202.0	0.990
Low point	5000	709.8	100.0	100.5	0.995
As left zero	5000	0.0	0.0	0.6	----
As left span	5000	918.8	400.0	407.3	0.982
Average Correction Factor					0.996

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

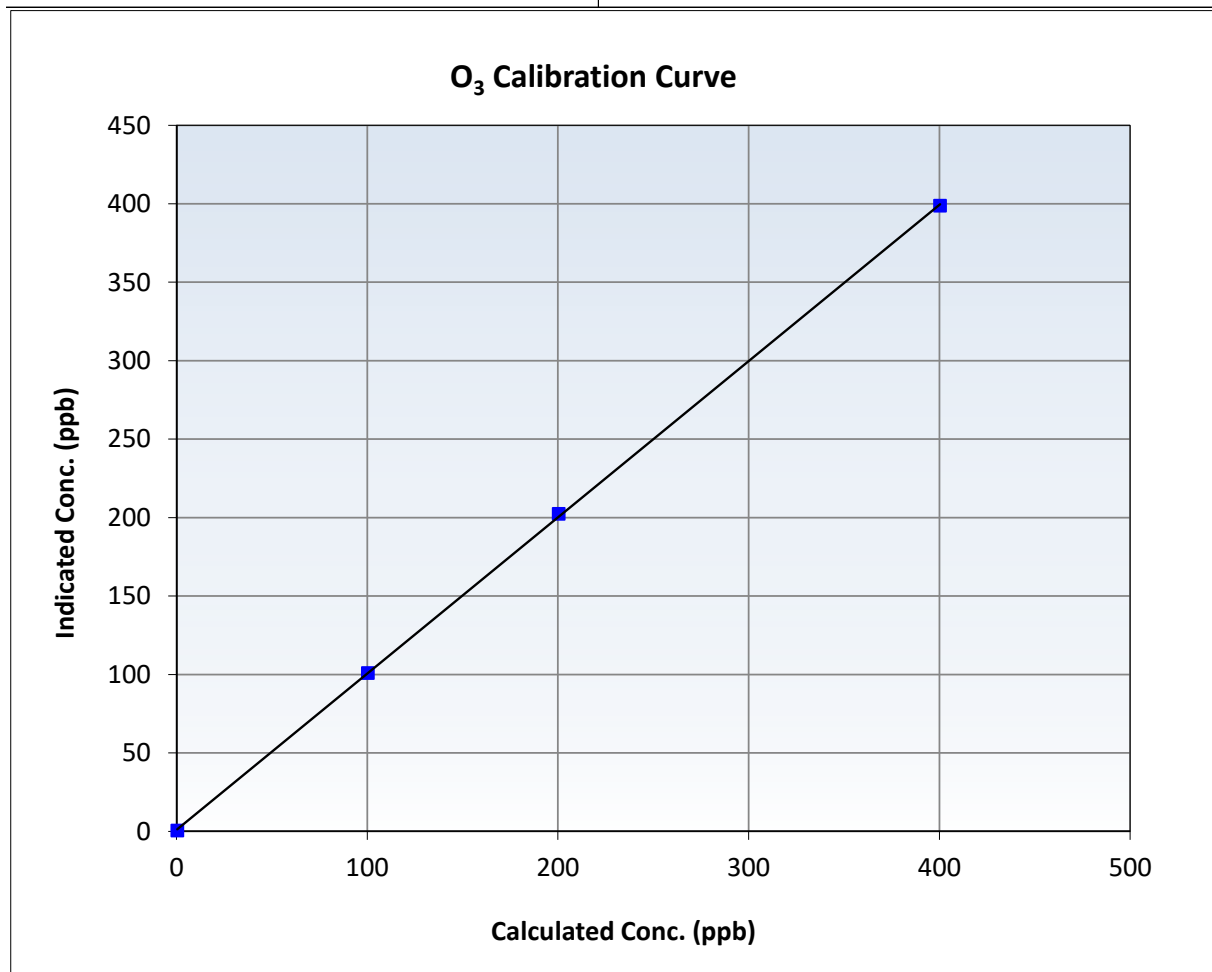
O₃ Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:47	End Time (MST):	13:16
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

Calibration Data

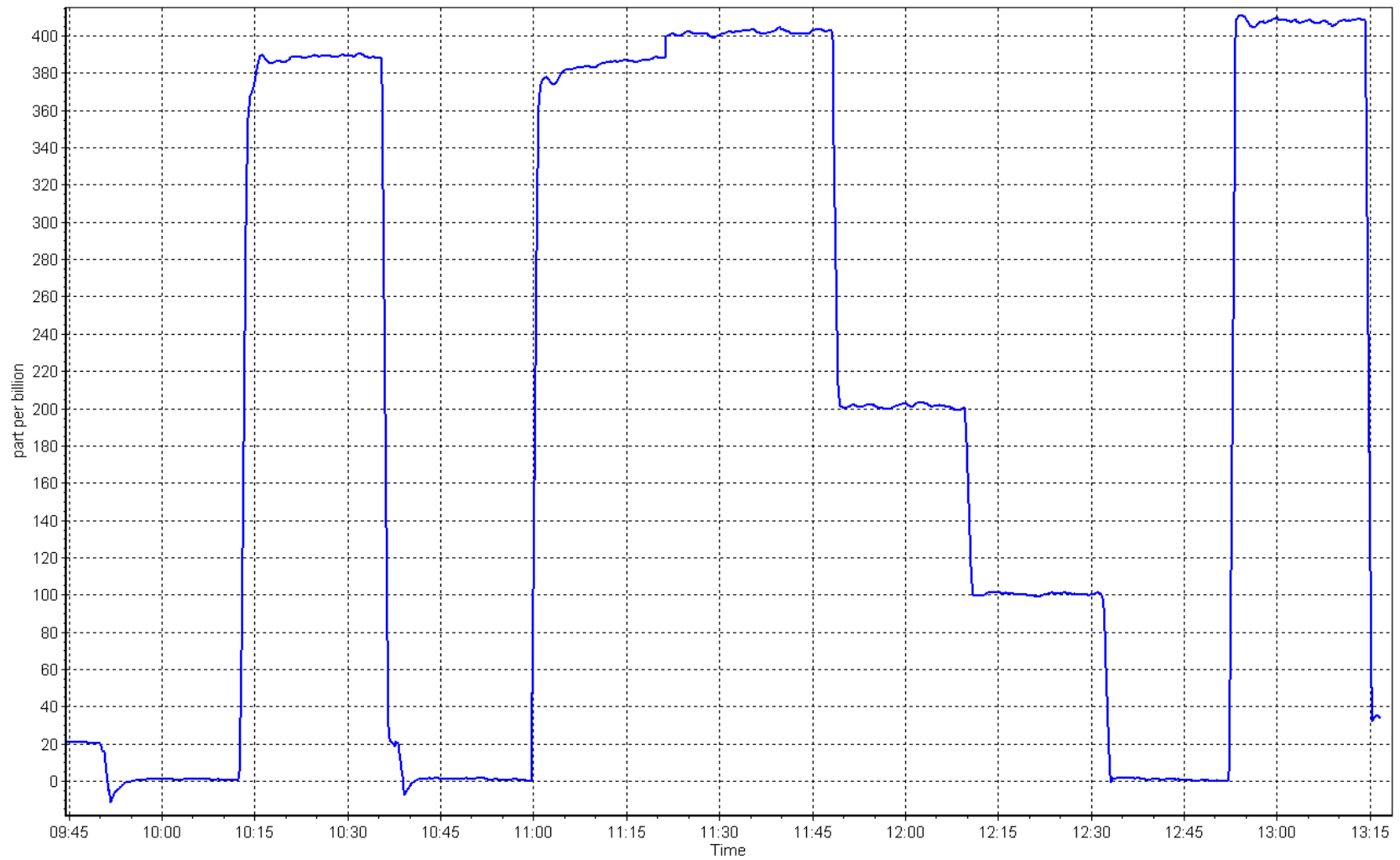
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999942	≥0.995
400.0	398.4	1.0040	Slope	0.995829	0.90 - 1.10
200.0	202.0	0.9901	Intercept	0.980000	+/- 5
100.0	100.5	0.9950			



O₃ Calibration Plot

Date: September 16, 2024

Location: Anzac





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Anzac
Calibration Date: September 23, 2024
Start time (MST): 11:06
Station number: AMS 14
Last Cal Date: August 29, 2024
End time (MST): 11:24
Analyzer Make: AP T640
S/N: 825
Particulate Fraction: PM2.5
Flow Meter Make/Model: Alicat FP-25BT
S/N: 388749
Temp/RH standard: Alicat FP-25BT
S/N: 388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	15.5	14.11	15.5	☐	+/- 2 °C
P (mmHg)	710.1	711.04	710.1	☐	+/- 10 mmHg
Flow (LPM)	4.99	4.913	4.99	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>80%
Zero Verification	PM w/o HEPA: _____	5.3	PM w/ HEPA: _____	0.0	<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: _____ Expiry Date: _____
Lot No.: _____

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: _____ August 29, 2024
Date Disposable Filter Changed: _____ August 29, 2024

Post- maintenance Zero Verification: PM w/ HEPA: _____ <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: _____ August 29, 2024
Date RH/T Sensor Cleaned: _____ August 29, 2024

Notes: No adjustments made. Leak check passed. Head cleaned.

Calibration by: Mohammed Kashif



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

**AMS17
WAPASU
SEPTEMBER 2024**

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Wapasu Station number: AMS17
Calibration Date: September 5, 2024 Last Cal Date: August 13, 2024
Start time (MST): 10:00 End time (MST): 12:59
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 Model: API T700 Serial Number: 2449
Zero Air Gen Model: API 701H Serial Number: 359

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1218153459
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004339	1.003569	Backgd or Offset:	13.3	13.3
Calibration intercept:	-1.599110	-1.579875	Coeff or Slope:	1.098	1.098

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.1	----
As found High point	4921	79.4	800.0	795.5	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	795.4	Previous response	801.8	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.6	----
High point	4921	79.4	800.0	802.1	0.997
Mid point	4960	39.7	400.0	399.5	1.001
Low point	4980	19.8	199.5	196.0	1.018
As left zero	5000	0.0	0.0	0.3	----
As left span	4920	79.4	800.1	803.9	0.995
Average Correction Factor:					1.006

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

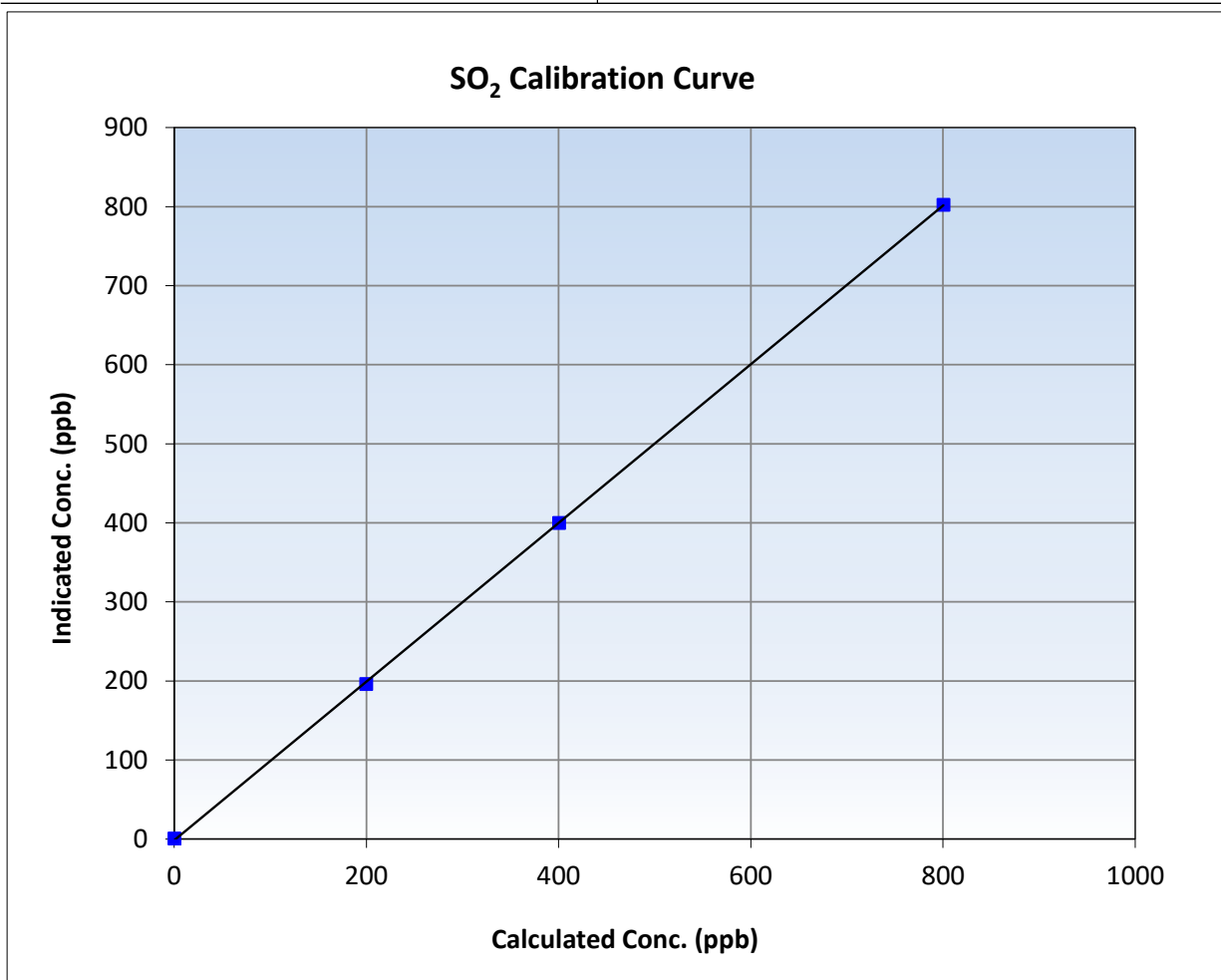
SO₂ Calibration Summary

Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:00	End Time (MST):	12:59
Analyzer make:	Thermo 43i	Analyzer serial #:	1218153459

Calibration Data

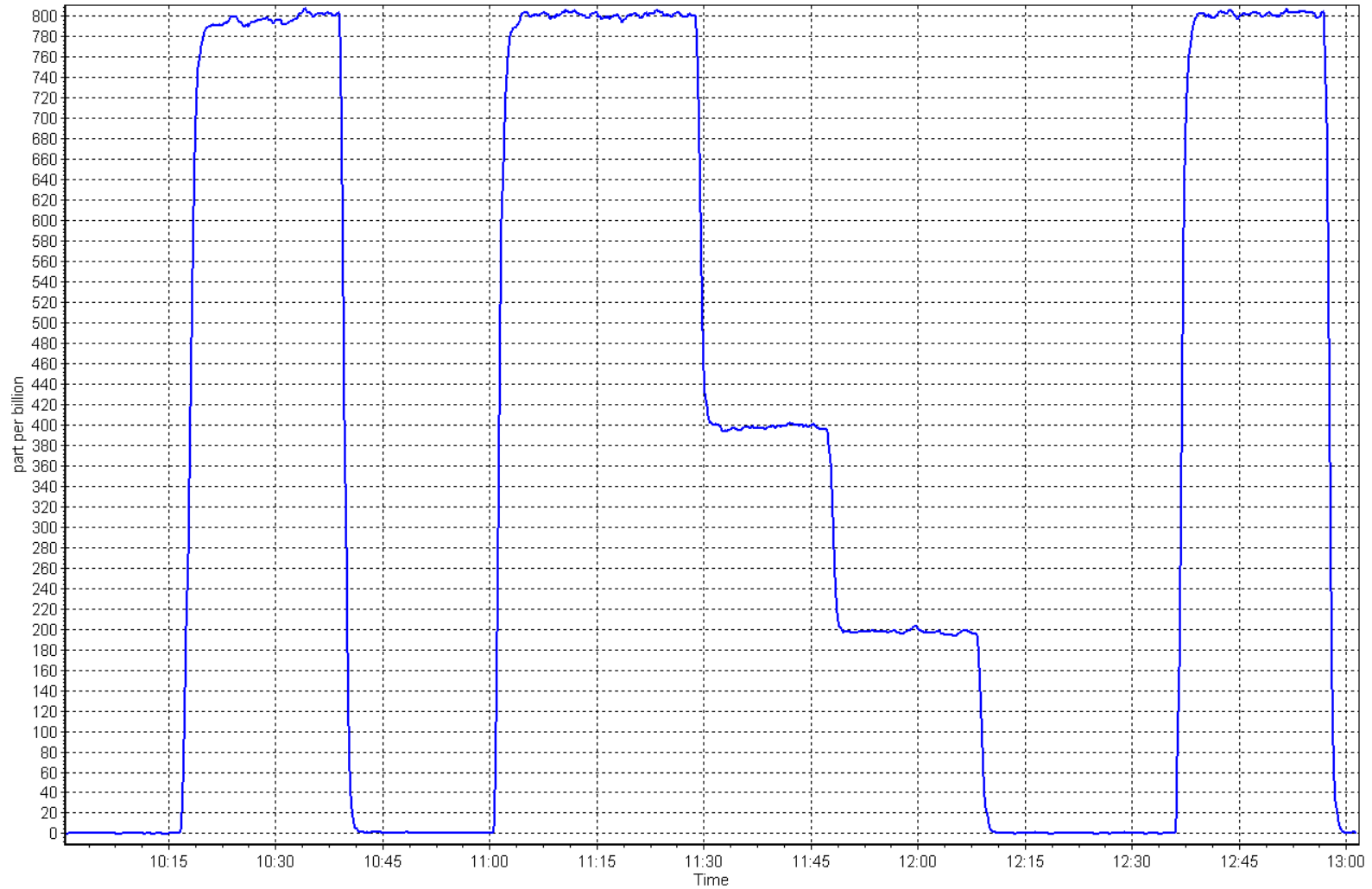
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.6	----	Correlation Coefficient	0.999964	≥0.995
800.0	802.1	0.9973	Slope	1.003569	0.90 - 1.10
400.0	399.5	1.0014	Intercept	-1.579875	+/-30
199.5	196.0	1.0179			



SO2 Calibration Plot

Date: September 5, 2024

Location: Wapasu





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Wapasu
Calibration Date: September 12, 2024
Start time (MST): 10:08
Reason: Routine

Station number: AMS 17
Last Cal Date: August 7, 2024
End time (MST): 14:25

Calibration Standards

Cal Gas Concentration: 5.08 ppm
Cal Gas Cylinder #: CC511852
Removed Cal Gas Conc: 5.08 ppm
Removed Gas Cyl #: N/A
Calibrator Make/Model: API T700
ZAG Make/Model: API T701H

Cal Gas Exp Date: September 16, 2024
Rem Gas Exp Date: N/A
Diff between cyl:
Serial Number: 2449
Serial Number: 359

Analyzer Information

Analyzer make: Thermo 450i
Converter make: CD Nova
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1218153583
Converter serial #: N/A
Converter Temp: degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.987997	1.002283	Backgd or Offset:	13.2	13.2
Calibration intercept:	-0.279234	-0.479222	Coeff or Slope:	1.116	1.116

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4921	78.8	80.0	81.7	0.974
As found Mid point	4961	39.4	40.0	40.8	0.971
As found Low point	4980	19.7	20.0	19.9	0.985
New cylinder response					
Baseline Corr As found:	82.1	Prev response:	78.76	*% change:	4.1%
Baseline Corr 2nd AF pt:	41.2	AF Slope:	1.027425	AF Intercept:	-0.459169
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999981	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4921	78.8	80.0	80.0	1.000
Mid point	4961	39.4	40.0	39.1	1.023
Low point	4980	19.7	20.0	19.4	1.031
As left zero	5000	0.0	0.0	0.1	----
As left span	4921	78.8	80.0	76.8	1.042
SO2 Scrubber Check	4921	79.4	793.9	0.1	----
Date of last scrubber change:		N/A		Ave Corr Factor	1.018
Date of last converter efficiency test:		N/A			

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

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

H₂S Calibration Summary

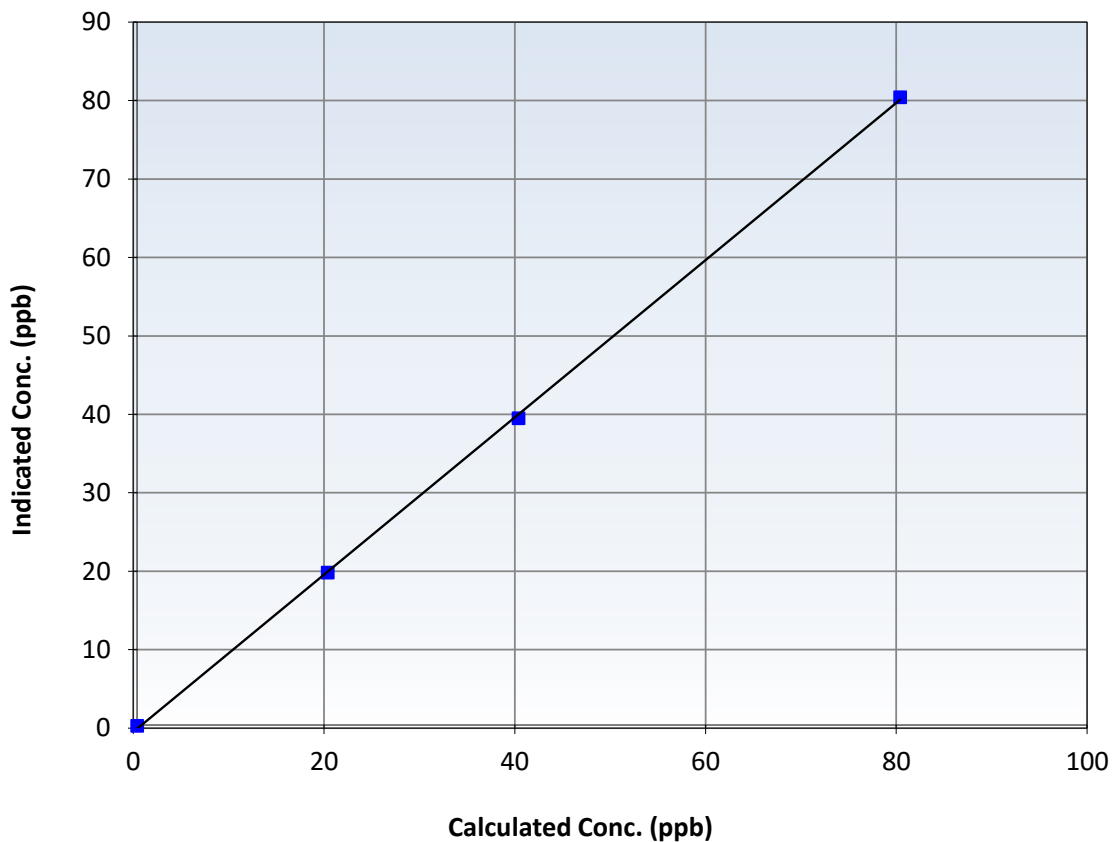
Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 7, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:08	End Time (MST):	14:25
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	-0.1	----	Correlation Coefficient	0.999853		≥ 0.995
80.0	80.0	1.0000	Slope	1.002283		$0.90 - 1.10$
40.0	39.1	1.0229	Intercept	-0.479222		± 3
20.0	19.4	1.0310				

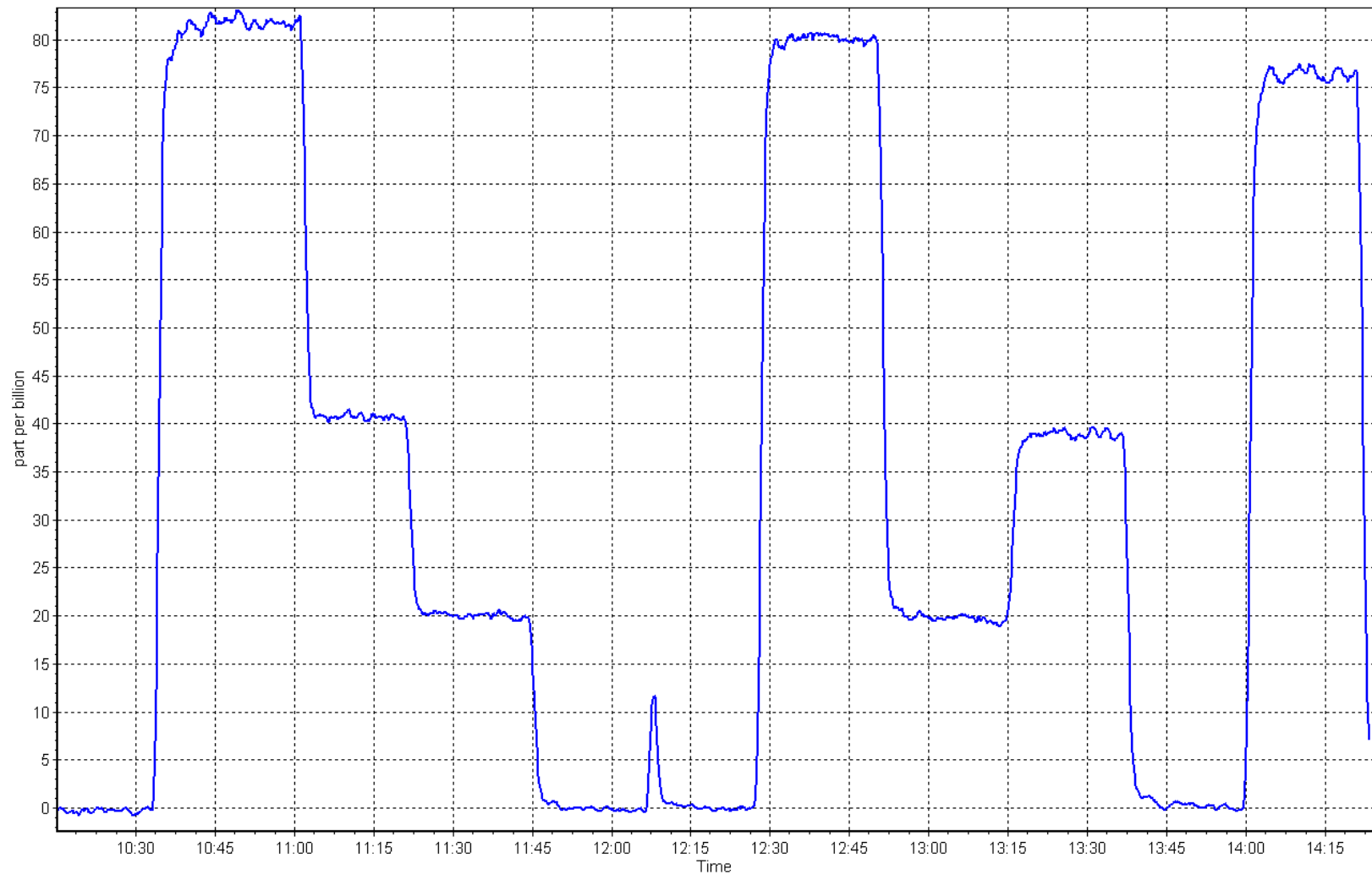
H₂S Calibration Curve



H₂S Calibration Plot

Date: September 12, 2024

Location: Wapasu





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name: Wapasu Station number: AMS17
Calibration Date: September 5, 2024 Last Cal Date: August 13, 2024
Start time (MST): 10:00 End time (MST): 12:59
Reason: Routine

Calibration Standards

Gas Cert Reference: ALM066507 Cal Gas Expiry Date:
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:
Removed CH4 Conc. 503.5 ppm CH4 Equiv Conc. 1076.3 ppm
Removed C3H8 Conc. 208.3 ppm
Calibrator Make/Model: API T700 Serial Number: 2449
ZAG Make/Model: API 701H Serial Number: 359

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1218153352
Analyzer Range: 0 - 20 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995954	0.988287	Background:	3.390	3.280
Calibration intercept:	-0.027161	0.045400	Coefficient:	4.596	4.444

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.05	----
As found High point	4921	79.4	17.09	17.62	0.973
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.57	Previous response	16.99	*% change	3.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.11	----
High point	4921	79.4	17.09	16.98	1.007
Mid point	4960	39.7	8.55	8.43	1.014
Low point	4980	19.8	4.26	4.22	1.011
As left zero	5000	0.0	0.00	0.03	----
As left span	4921	79.4	17.09	16.99	1.006
Average Correction Factor					1.010

Notes:

Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

THC Calibration Summary

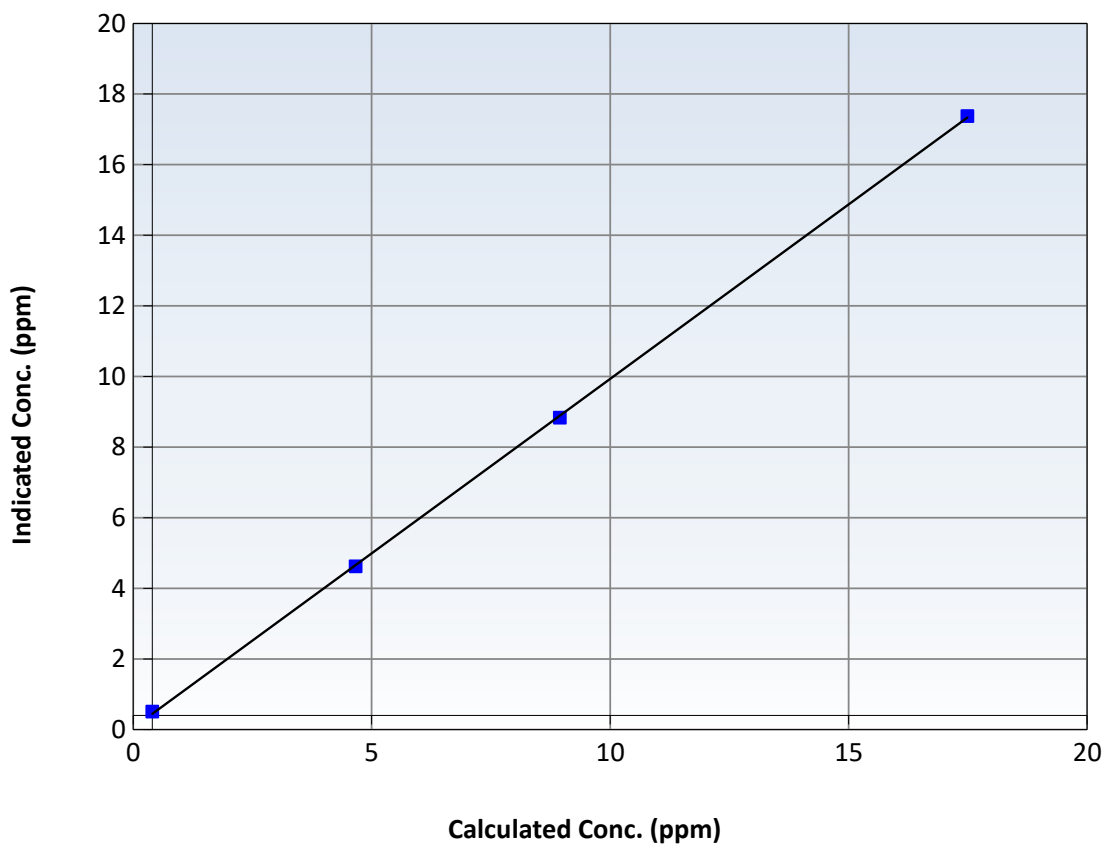
Station Information

Calibration Date:	September 5, 2024	Previous Calibration:	August 13, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:00	End Time (MST):	12:59
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.11	----	Correlation Coefficient	0.999927	≥ 0.995
17.09	16.98	1.0066	Slope	0.988287	$0.90 - 1.10$
8.55	8.43	1.0141	Intercept	0.045400	± 1.5
4.26	4.22	1.0108			

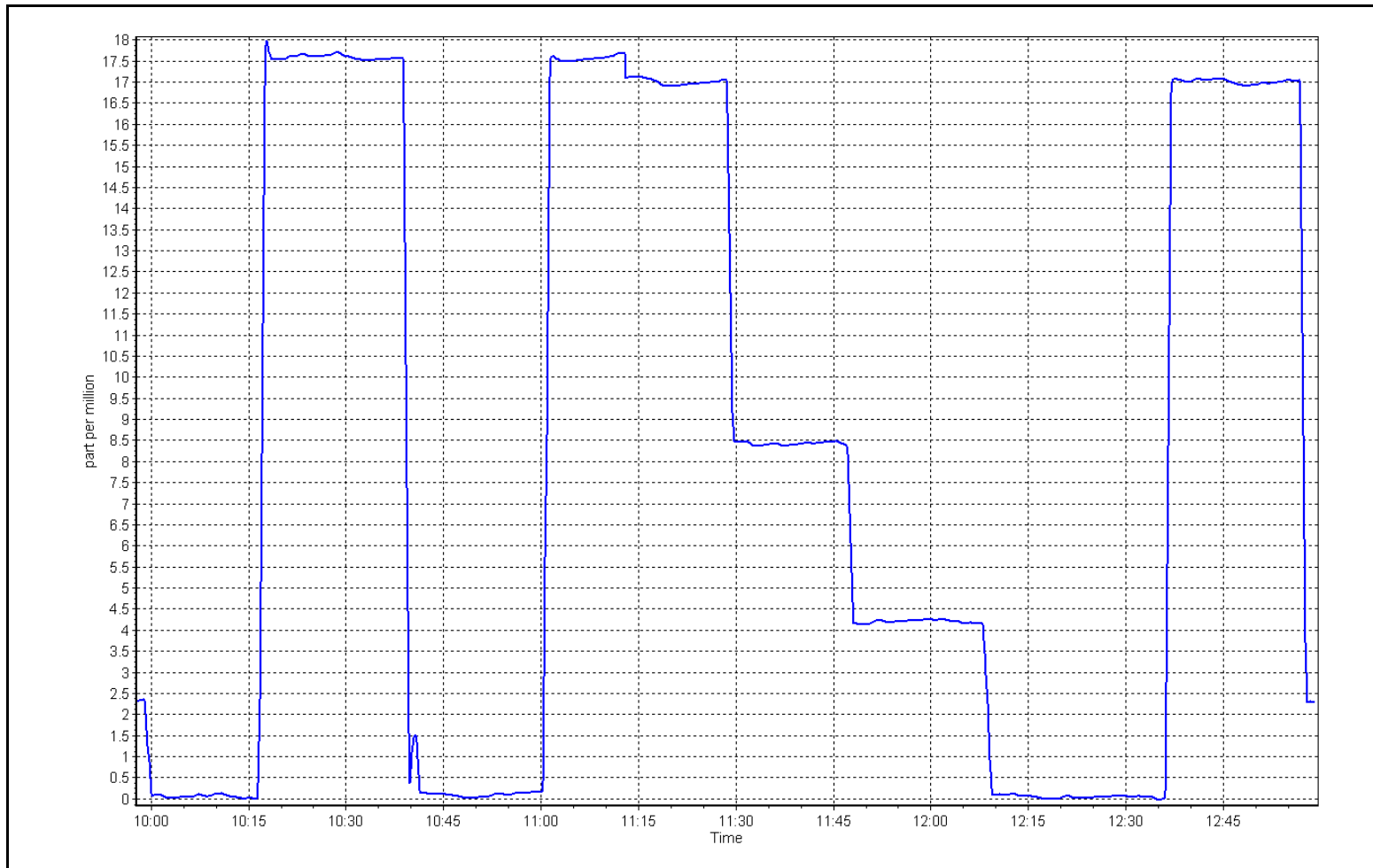
THC Calibration Curve



THC Calibration Plot

Date: September 5, 2024

Location: Wapasu





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Wapasu
Station number: AMS 17
Calibration Date: September 16, 2024
Last Cal Date: August 21, 2024
Start time (MST): 10:30
End time (MST): 14:57
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T375YK8
NOX Cal Gas Conc: 49.11 ppm
Removed Cylinder #: T375YK8
Removed Gas NOX Conc: 49.11 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701H
Cal Gas Expiry Date: April 13, 2025
NO Cal Gas Conc: 48.07 ppm
Removed Gas Exp Date: N/A
Removed Gas NO Conc: 48.07 ppm
NO gas Diff:
Serial Number: 2449
Serial Number: 359

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.3	----	----
AF High point	4917	83.2	817.2	799.9	17.3	822.0	803.7	18.3	0.9935	0.9950
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 817.2 ppb	NO = 799.7 ppb	* = > +/-5% change initiates investigation			*Percent Change	NO _x = 0.7%			
Baseline Corr 1st pt	NO _x = 822.5 ppb	NO = 803.9 ppb	<u>As Found Statistics</u>			*Percent Change	NO = 0.5%			
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:			

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo Scientific 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1218153460

Instrument Settings

	<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.098	1.094
NOX coeff or slope:	0.994	0.994
NO2 coeff or slope:	1.000	1.000

	<u>Start</u>	<u>Finish</u>
NO bkgnd or offset:	3.8	3.8
NOX bkgnd or offset:	4.2	4.2
Reaction cell Press:	244.5	240.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001103	1.000361
NO _x Cal Offset:	-0.940000	-1.000000
NO Cal Slope:	1.001444	0.999072
NO Cal Offset:	-1.380000	-1.500000
NO ₂ Cal Slope:	1.002275	0.999691
NO ₂ Cal Offset:	-0.076322	-0.046296

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) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.3	----	----
High point	4917	83.2	817.2	799.9	17.3	817.0	798.4	18.2	1.0002	1.0019
Mid point	4958	41.6	408.6	399.9	8.7	406.9	397.2	9.6	1.0042	1.0069
Low point	4979	20.8	204.3	200.0	4.3	203.0	197.0	6.0	1.0064	1.0151
As left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.3	----	----
As left span	4917	83.2	817.2	399.3	417.9	818.0	399.3	418.8	0.9990	1.0000
Average Correction Factor									1.0036	1.0079

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) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.3	----	----
High GPT point	798.0	396.4	418.9	418.5	1.0010	99.9%
Mid GPT point	798.0	600.5	214.8	215.1	0.9986	100.1%
Low GPT point	798.0	700.3	115.0	115.0	1.0000	100.0%
Average Correction Factor					0.9999	100.0%

Notes:

Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

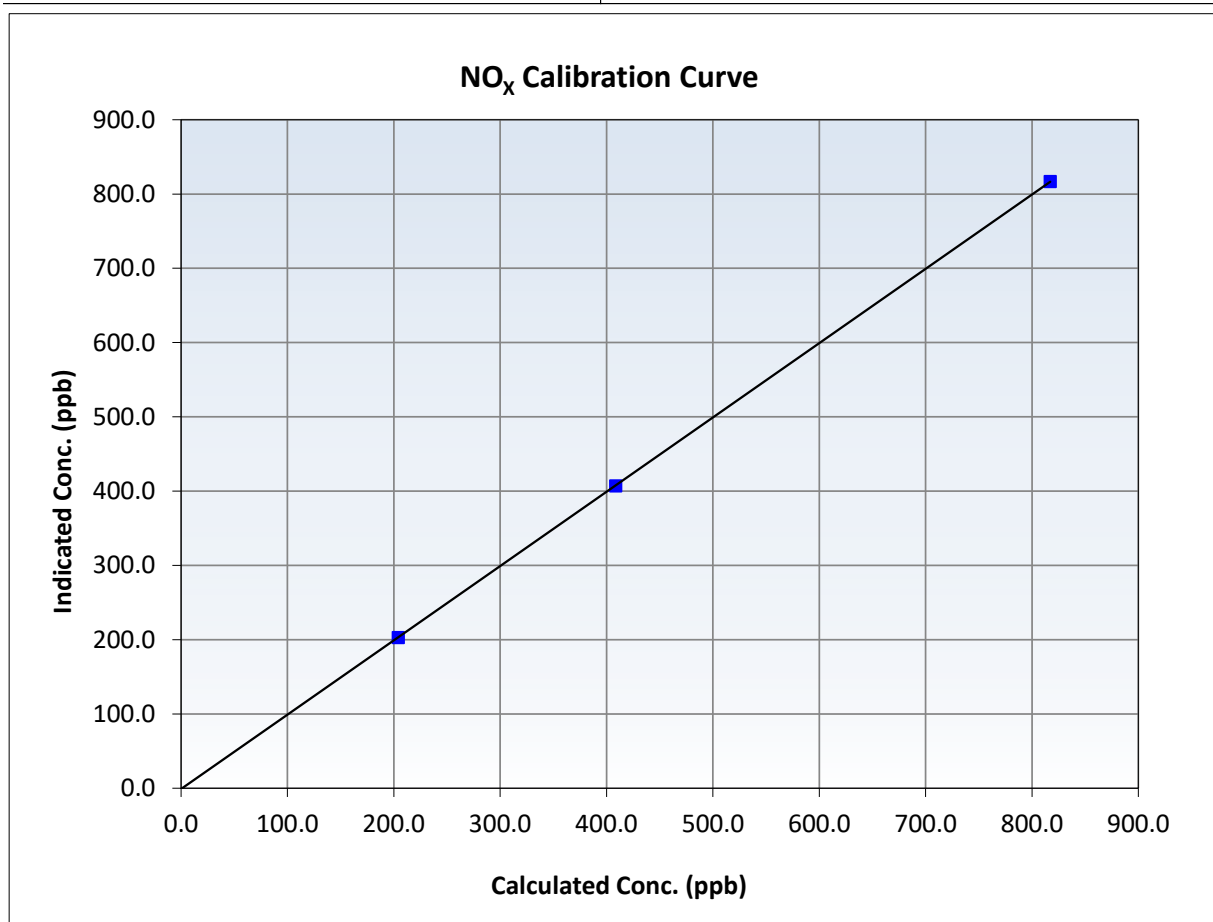
NO_x Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 21, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:30	End Time (MST):	14:57
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

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	0.999996	≥0.995
817.2	817.0	1.0002	Slope	1.000361	0.90 - 1.10
408.6	406.9	1.0042	Intercept	-1.000000	+/-20
204.3	203.0	1.0064			





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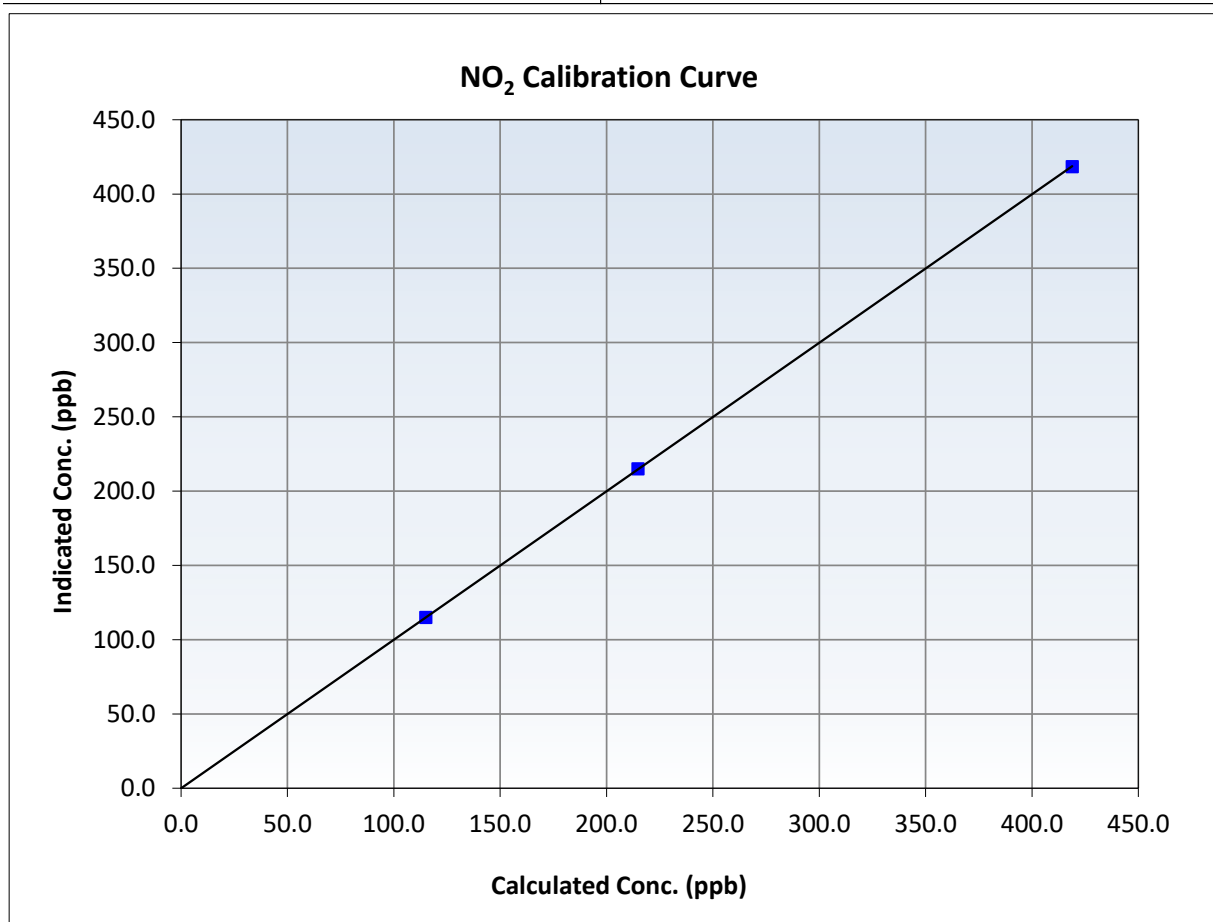
NO₂ Calibration Summary

Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 21, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:30	End Time (MST):	14:57
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

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	0.999997	≥0.995
418.9	418.5	1.0010	Slope	0.999691	0.90 - 1.10
214.8	215.1	0.9986	Intercept	-0.046296	+/-20
115.0	115.0	1.0000			





Wood Buffalo Environmental Association

NO Calibration Summary

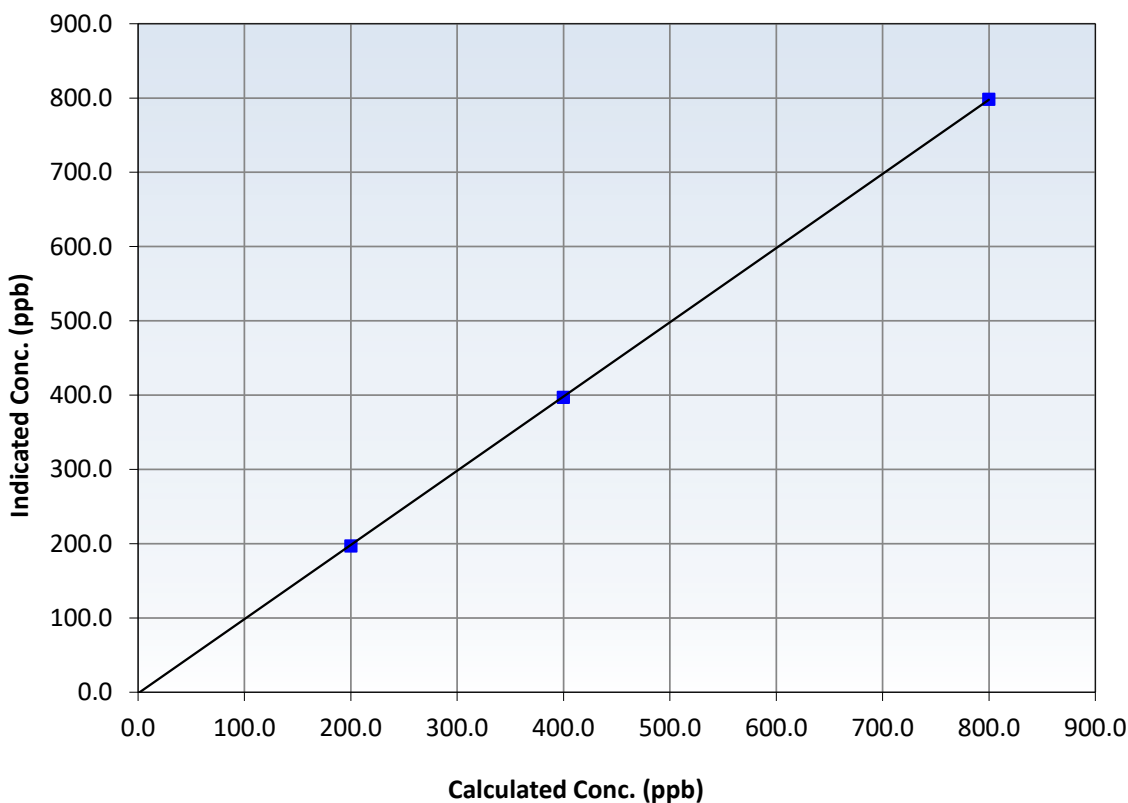
Station Information

Calibration Date:	September 16, 2024	Previous Calibration:	August 21, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:30	End Time (MST):	14:57
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

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	0.999986	≥ 0.995
799.9	798.4	1.0019	Slope	0.999072	$0.90 - 1.10$
399.9	397.2	1.0069	Intercept	-1.500000	± 20
200.0	197.0	1.0151			

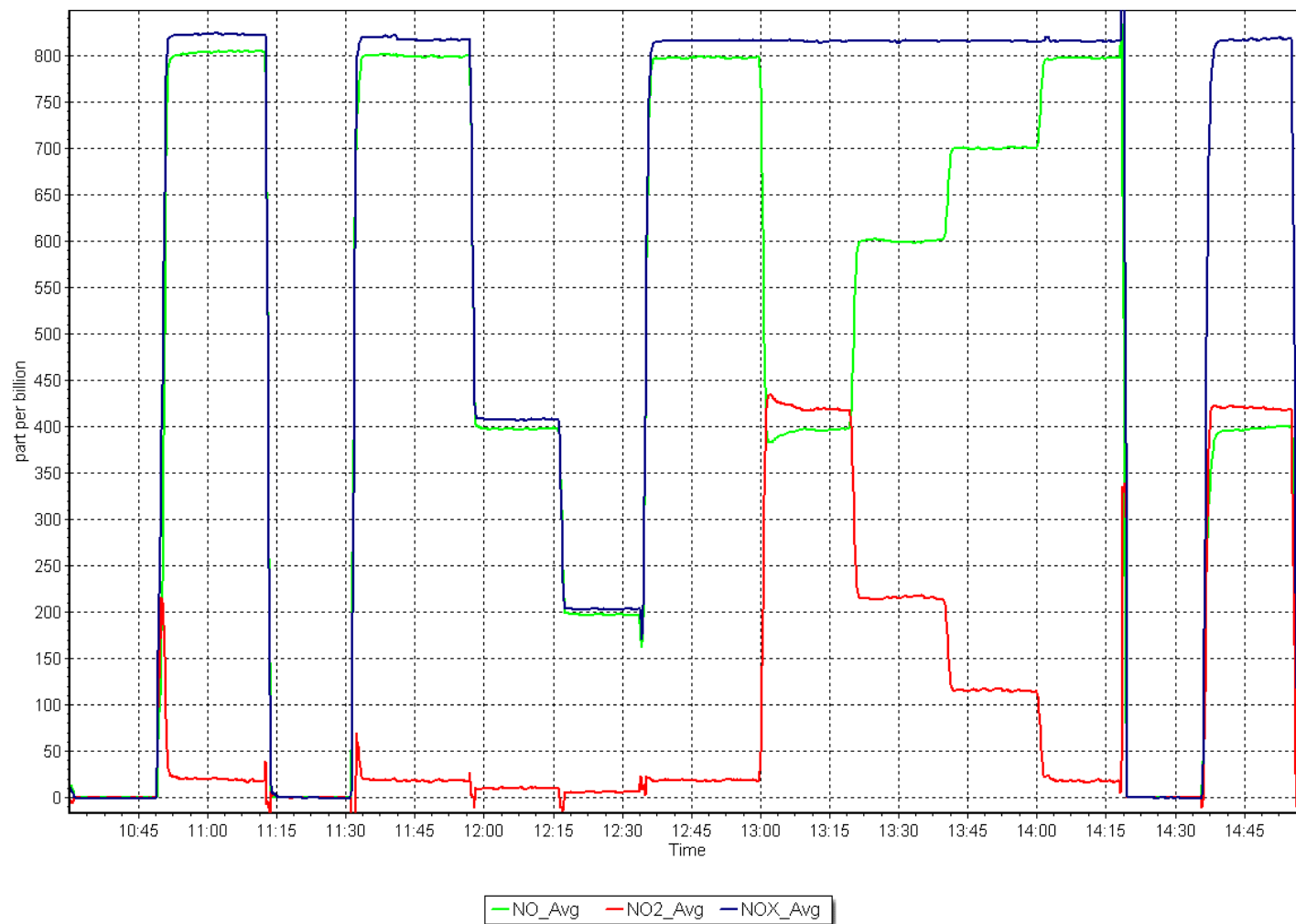
NO Calibration Curve



NO_x Calibration Plot

Date: September 16, 2024

Location: Wapasu





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Wapasu
Calibration Date: September 11, 2024
Start time (MST): 9:53
Reason: Routine
Station number: AMS17
Last Cal Date: August 6, 2024
End time (MST): 13:11

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 Range: 0 - 500 ppb
Analyzer serial #: 7045

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004514	1.002200	Backgd or Offset:	-0.8	-0.8
Calibration intercept:	-0.640000	0.740000	Coeff or Slope:	1.015	1.015

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	5000	1077.3	400.0	400.8	0.998
As found Mid point					
As found Low point					
Baseline Corr As found:	400.8	Previous response	401.2	*% 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	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.8	----
High point	5000	1077.3	400.0	401.6	0.996
Mid point	5000	900.3	200.0	201.3	0.994
Low point	5000	789.5	100.0	100.8	0.992
As left zero	5000	0.0	0.0	1.1	----
As left span	5000	1077.3	400.0	405.2	0.987
Average Correction Factor					0.994

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

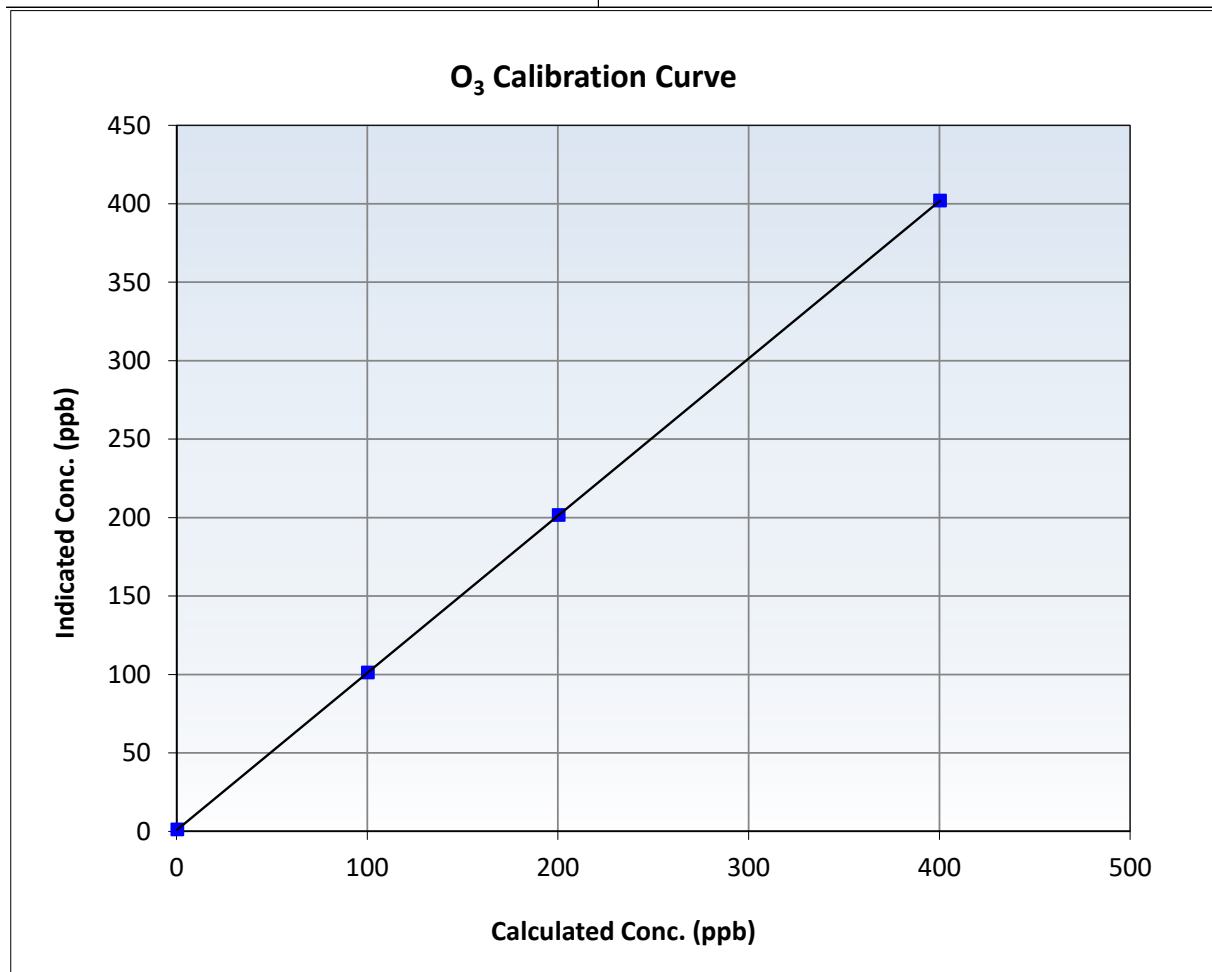
O₃ Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 6, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	9:53	End Time (MST):	13:11
Analyzer make:	API T400	Analyzer serial #:	7045

Calibration Data

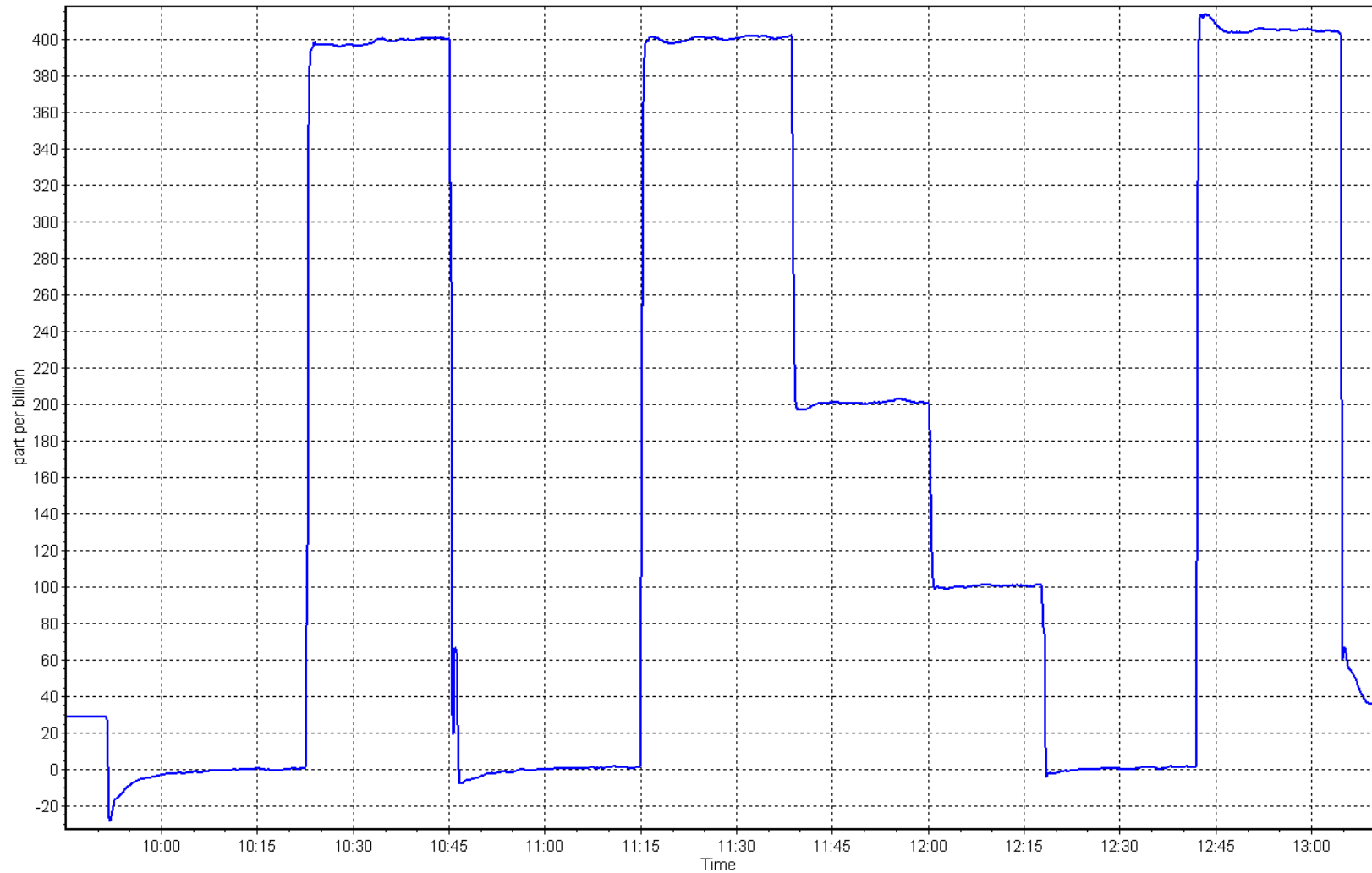
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.8	----	Correlation Coefficient	0.999999	≥ 0.995
400.0	401.6	0.9960	Slope	1.002200	$0.90 - 1.10$
200.0	201.3	0.9935	Intercept	0.740000	± 5
100.0	100.8	0.9921			



O₃ Calibration Plot

Date: September 11, 2024

Location: Wapasu





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Wapasu Station number: AMS 17
Calibration Date: September 16, 2024 Last Cal Date: August 21, 2024
Start time (MST): 13:39 End time (MST): 14:41

Analyzer Make: Teledyne API T640 S/N: 1183
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388749
Temp/RH standard: Alicat FP-25BT S/N: 388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	18.7	18.4	18.7	☐	+/- 2 °C
P (mmHg)	707.3	709.4	707.3	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.97	5.00	☐	+/- 0.25 LPM
PW% (pump)	38	----	38	☐	>80%
Zero Verification	PM w/o HEPA: 2.5		PM w/ HEPA: 0.0		<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: October 6, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: June 24, 2024
Date Disposable Filter Changed: September 16, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: July 23, 2024
Date RH/T Sensor Cleaned: July 23, 2024

Notes:

Temperature, pressure and flow checked. Leak check passed. DFU filter changed out.

Calibration by: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS18 STONY MOUNTAIN SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 18, 2024 Last Cal Date: August 23, 2024
Start time (MST): 10:35 End time (MST): 14:50
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.02 ppm Cal Gas Exp Date: January 12, 2029
Cal Gas Cylinder #: XC026809B
Removed Cal Gas Conc: 49.40 ppm Rem Gas Exp Date: February 23, 2025
Removed Gas Cyl #: CC463851 Diff between cyl: -0.8%
Calibrator Model: Teledyne API T700 Serial Number: 2658
Zero Air Gen Model: Teledyne API 701H Serial Number: 360

Analyzer Information

Analyzer make: Thermo 43i Serial Number: JC1501301453
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001061	0.987719	Backgd or Offset:	23.6	23.3
Calibration intercept:	-0.163272	0.160000	Coeff or Slope:	0.793	0.788

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.5	----
As found High point	4919	81.0	800.3	798.7	1.003
As found Mid point					
As found Low point					
New cylinder response	4920	80.0	800.3	792.2	1.010
Baseline Corr As found:	798.2	Previous response	801.0	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.6	----
High point	4920	80.0	800.3	790.6	1.012
Mid point	4960	40.0	400.2	396.0	1.011
Low point	4980	20.0	200.1	196.8	1.017
As left zero	5000	0.0	0.0	0.6	----
As left span	4919	81.0	810.3	794.7	1.020
Average Correction Factor:					1.013

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

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SO₂ Calibration Summary

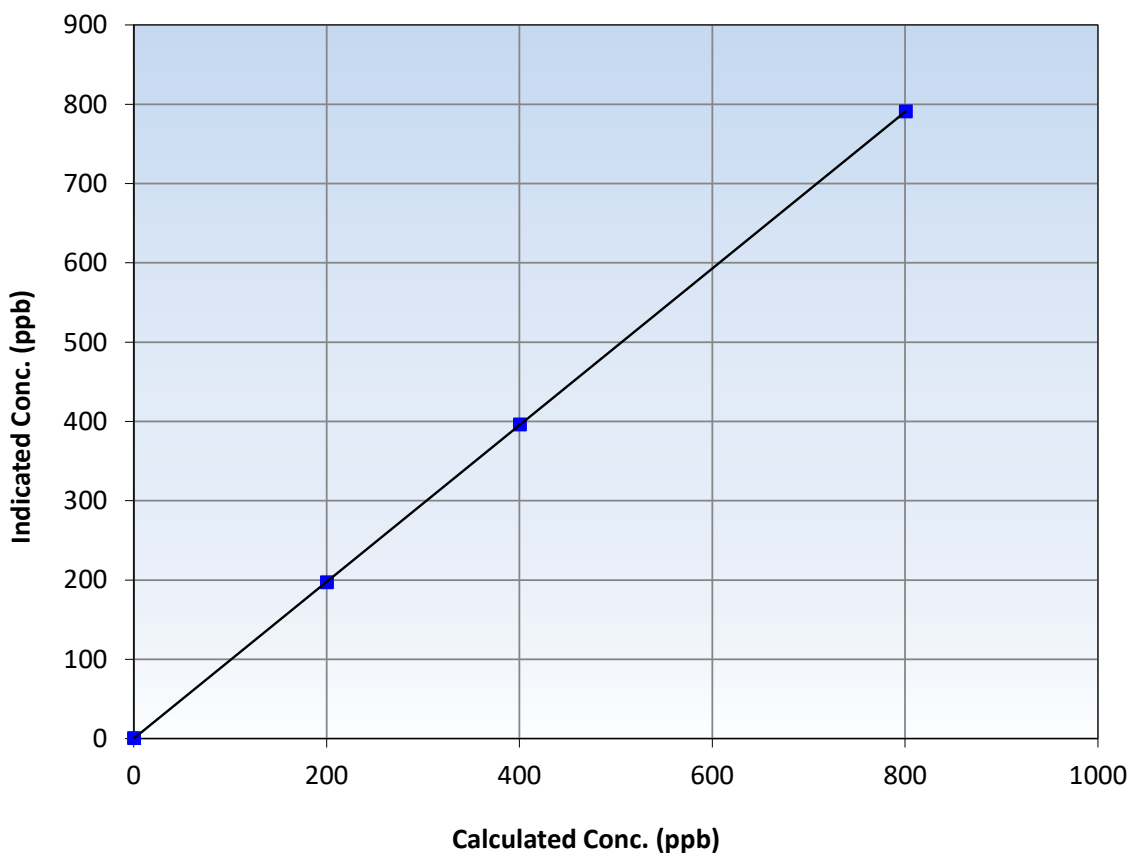
Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:35	End Time (MST):	14:50
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.6	----	Correlation Coefficient	0.999996	≥0.995
800.3	790.6	1.0123	Slope	0.987719	0.90 - 1.10
400.2	396.0	1.0105	Intercept	0.160000	+/-30
200.1	196.8	1.0167			

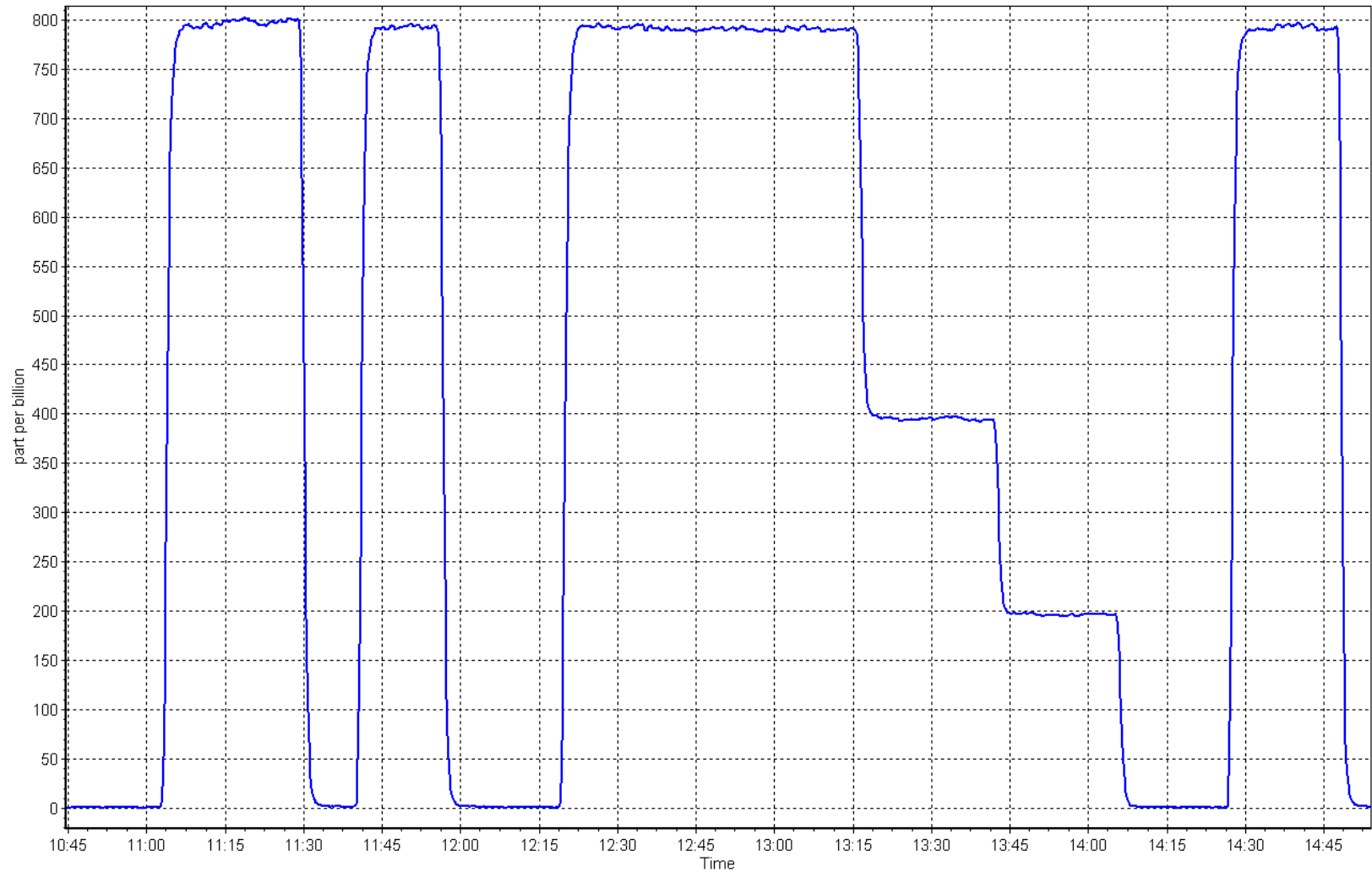
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 18, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS18
Calibration Date: September 24, 2024 Last Cal Date: August 29, 2024
Start time (MST): 10:22 End time (MST): 15:36
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.48 ppm Cal Gas Exp Date: January 4, 2025
Cal Gas Cylinder #: CC500395
Removed Cal Gas Conc: 5.48 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 2658
ZAG Make/Model: Teledyne API T701 Serial Number: 360

Analyzer Information

Analyzer make: Thermo 43i-TLE Analyzer serial #: 1218153359
Converter make: CD Nova CDN-101 Converter serial #: 555
Analyzer Range: 0 - 100 ppb Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.991726	0.999011	Backgd or Offset:	2.8	3.16
Calibration intercept:	0.081152	-0.098893	Coeff or Slope:	1.256	1.256

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4927	73.0	80.0	81.5	0.985
As found Mid point	4964	36.5	40.0	41.4	0.973
As found Low point	4983	18.3	20.0	20.3	1.002
New cylinder response					
Baseline Corr As found:	81.2	Prev response:	79.41	*% change:	2.2%
Baseline Corr 2nd AF pt:	41.1	AF Slope:	1.017300	AF Intercept:	0.260834
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999902	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4927	73.0	80.0	79.8	1.002
Mid point	4964	36.5	40.0	40.0	1.000
Low point	4983	18.3	20.0	19.7	1.018
As left zero	5000	0.0	0.0	0.2	----
As left span	4927	73.0	80.0	79.8	1.002
SO2 Scrubber Check	4923	77.1	771.0	0.0	----
Date of last scrubber change:		17-Dec-21		Ave Corr Factor	1.007
Date of last converter efficiency test:					

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

TRS Calibration Summary

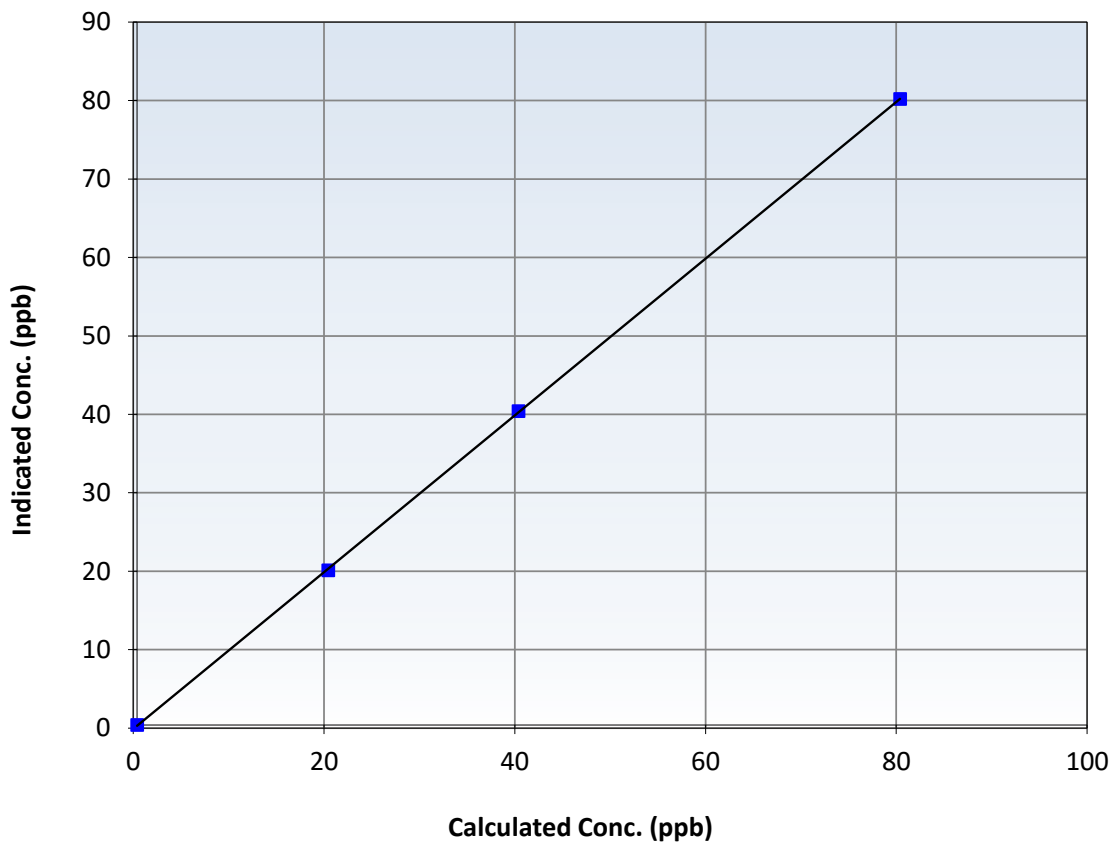
Station Information

Calibration Date:	September 24, 2024	Previous Calibration:	August 29, 2024
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	10:22	End Time (MST):	15:36
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999976		≥ 0.995
80.0	79.8	1.0024	Slope	0.999011		$0.90 - 1.10$
40.0	40.0	0.9998	Intercept	-0.098893		± 3
20.0	19.7	1.0177				

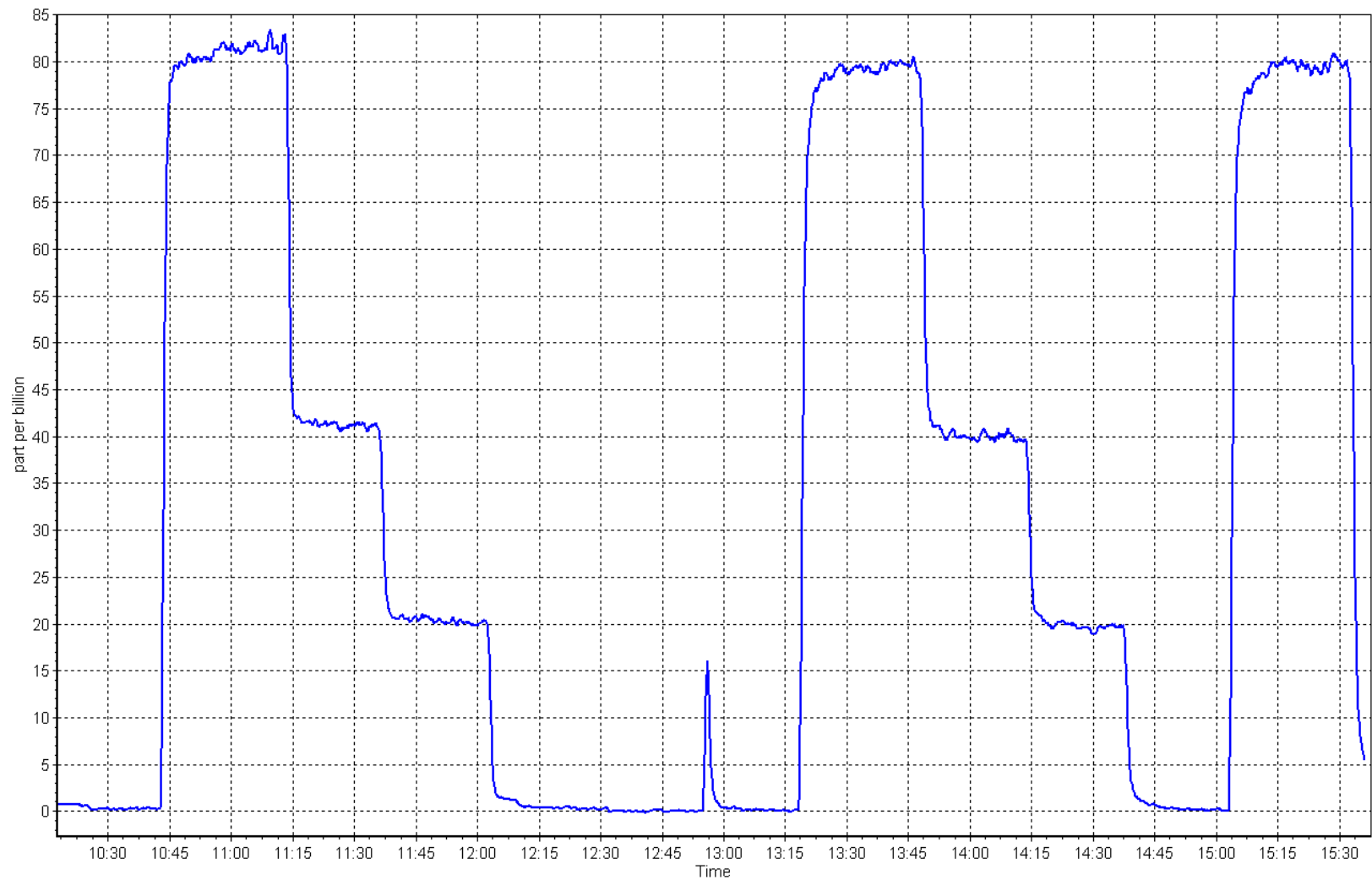
TRS Calibration Curve



TRS Calibration Plot

Date: September 24, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 18, 2024 Last Cal Date: August 29, 2024
Start time (MST): 10:34 End time (MST): 14:50
Reason: Routine

Calibration Standards

Gas Cert Reference: XC026809B 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: CC463851 Removed Gas Expiry: February 23, 2025
Removed CH₄ Conc. 500.8 ppm CH₄ Equiv Conc. 1066.8 ppm
Removed C₃H₈ Conc. 205.8 ppm Diff between cyl (THC): 0.5%
Diff between cyl (CH₄): 0.9% Diff between cyl (NM): 0.2%
Calibrator Model: Teledyne API T750 Serial Number: 282
Zero Air Gen model: Teledyne API T751H Serial Number: 321

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1193585647
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH ₄ SP Ratio:	2.71E-04	2.61E-04	NMHC SP Ratio:	4.11E-05	4.18E-05
CH ₄ Retention time:	16.4	16.2	NMHC Peak Area:	223380	219103
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	81.0	17.28	16.04	1.077
As found Mid point					
As found Low point					
New cylinder response	4920	80.0	17.23	16.06	1.073
Baseline Corr AF:	16.04	Prev response	17.38	*% change	-8.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4920	80.0	17.23	17.26	0.998
Mid point	4960	40.0	8.61	8.69	0.991
Low point	4980	20.0	4.31	4.33	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	17.23	17.30	0.996
Average Correction Factor					0.995

Notes: Dips present during as founds. Calibration gas swapped out. Bumped up carrier gas from 30 psi to 32 psi. Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	81.0	9.17	8.90	1.030
As found Mid point					
As found Low point					
New cylinder response	4920	80.0	9.15	8.90	1.028
Baseline Corr AF:	8.90	Prev response	9.23	*% change	-3.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	9.15	9.19	0.995
Mid point	4960	40.0	4.57	4.62	0.990
Low point	4980	20.0	2.29	2.31	0.990
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	9.15	9.21	0.994
Average Correction Factor					0.992

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	81.0	8.11	7.14	1.137
As found Mid point					
As found Low point					
New cylinder response	4920	80.0	8.08	7.16	1.128
Baseline Corr AF:	7.14	Prev response	8.16	*% change	-14.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4920	80.0	8.08	8.07	1.002
Mid point	4960	40.0	4.04	4.07	0.993
Low point	4980	20.0	2.02	2.02	1.000
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	8.08	8.09	0.999
Average Correction Factor					0.998

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.005177	1.001443
THC Cal Offset:	0.008062	0.025000
CH ₄ Cal Slope:	1.005774	0.997581
CH ₄ Cal Offset:	-0.004589	0.015000
NMHC Cal Slope:	1.005196	1.004929
NMHC Cal Offset:	0.011452	0.009200

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

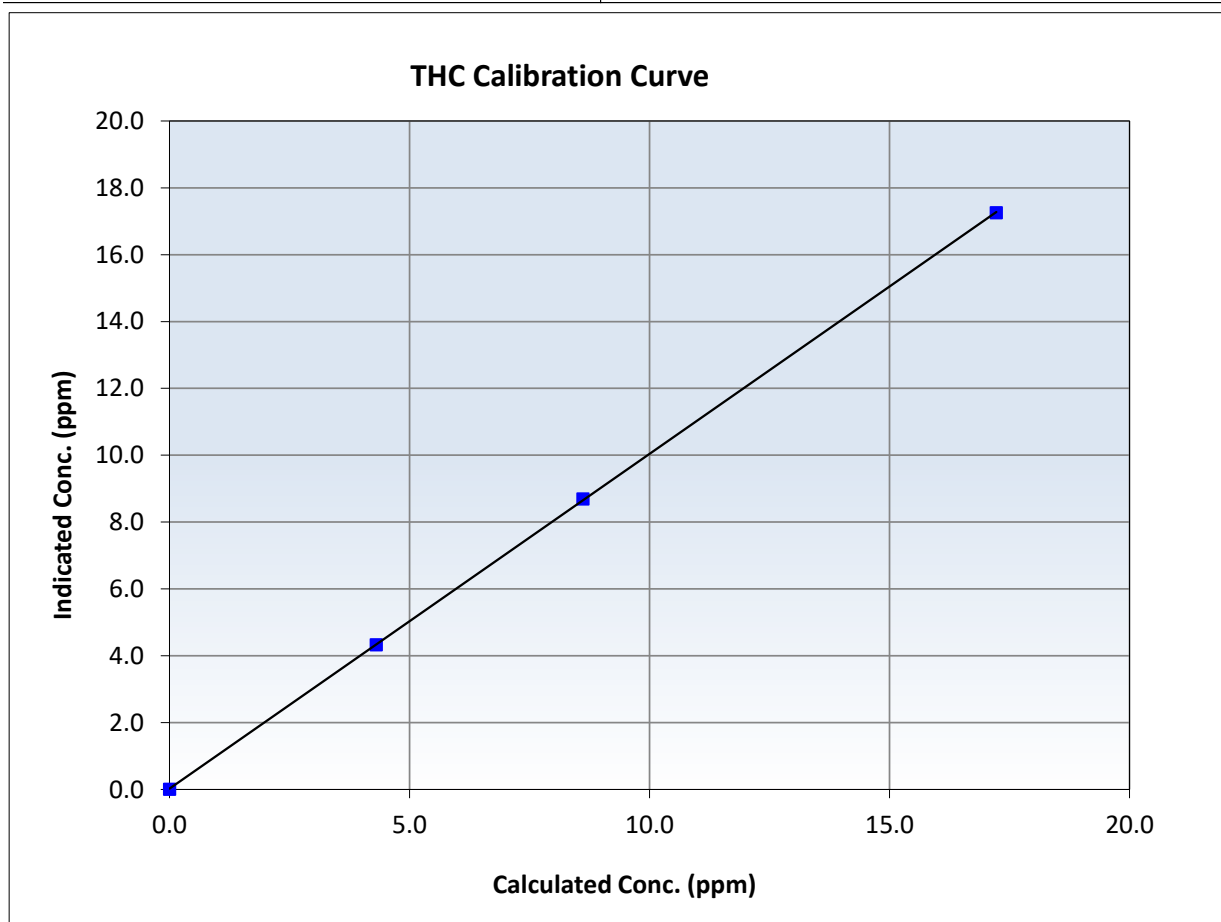
THC Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 29, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:34	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.01	----	Correlation Coefficient	0.999987	≥ 0.995
17.23	17.26	0.9981	Slope	1.001443	$0.90 - 1.10$
8.61	8.69	0.9911	Intercept	0.025000	± 0.5
4.31	4.33	0.9946			





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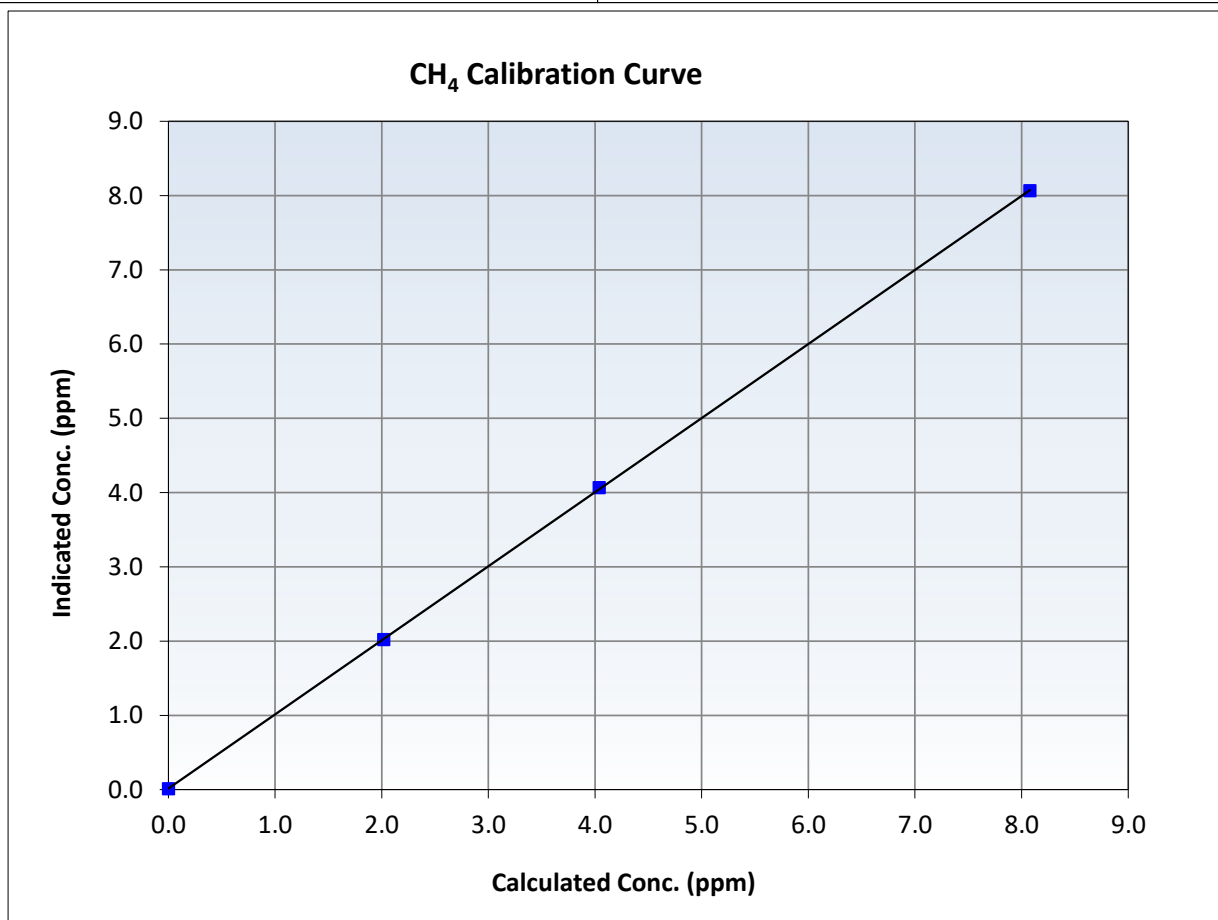
CH₄ Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 29, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:34	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.01	----	Correlation Coefficient	0.999980	<i>≥0.995</i>
8.08	8.07	1.0017	Slope	0.997581	<i>0.90 - 1.10</i>
4.04	4.07	0.9932	Intercept	0.015000	<i>+/-0.5</i>
2.02	2.02	0.9998			





Wood Buffalo Environmental Association

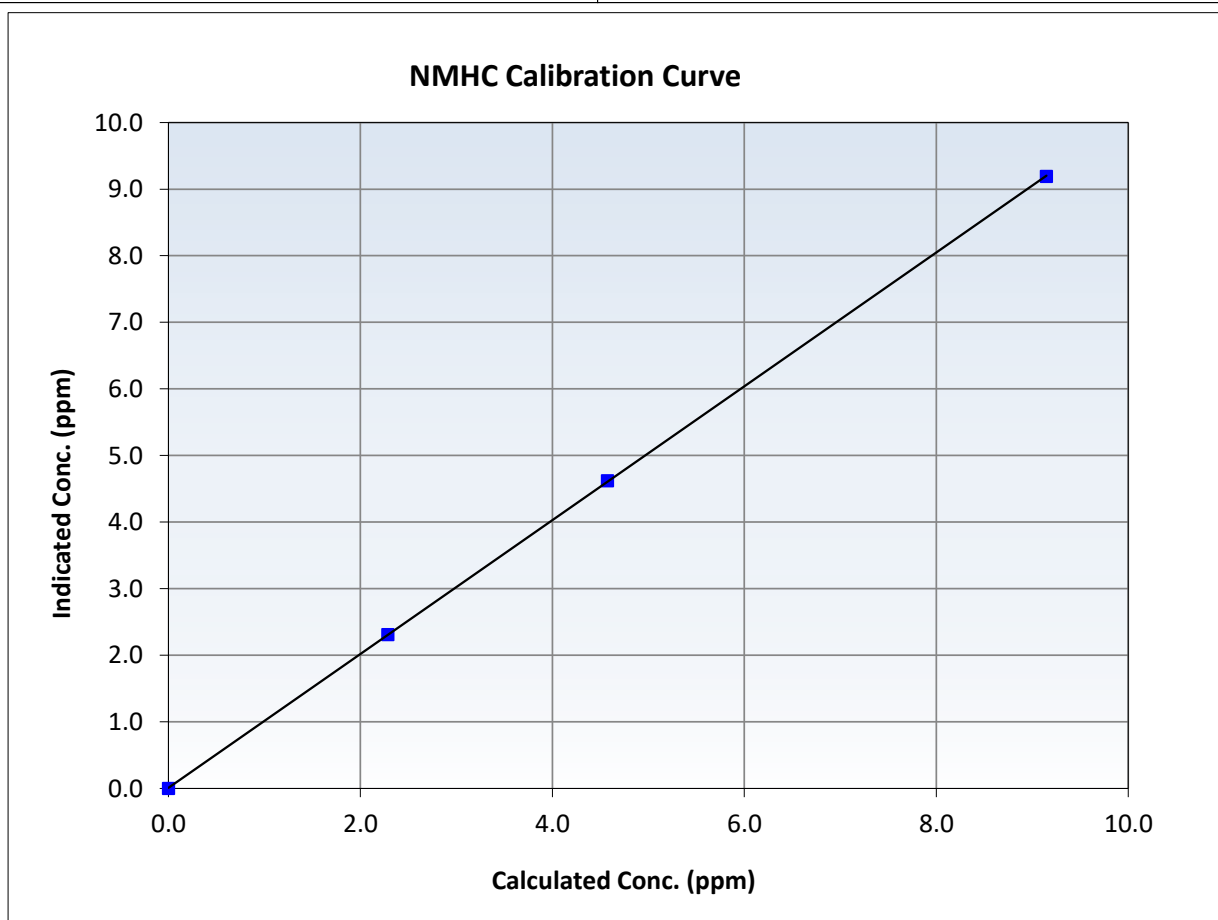
NMHC Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 29, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:34	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

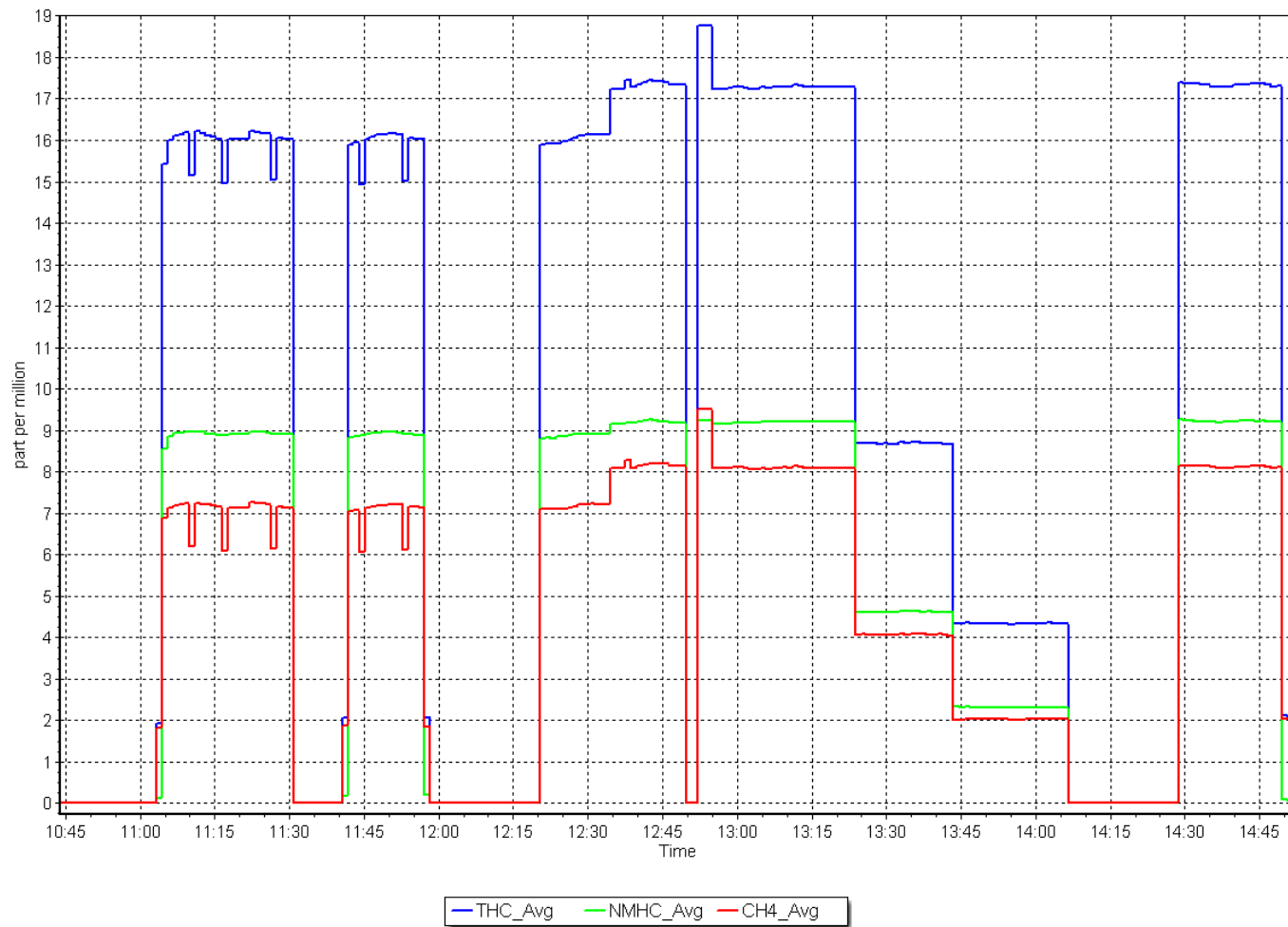
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999992	≥ 0.995
9.15	9.19	0.9950	Slope	1.004929	$0.90 - 1.10$
4.57	4.62	0.9900	Intercept	0.009200	± 0.5
2.29	2.31	0.9900			



NMHC Calibration Plot

Date: September 18, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Stony Mountain
Station number: AMS 18
Calibration Date: September 18, 2024
Last Cal Date: August 28, 2024
Start time (MST): 11:00
End time (MST): N/A
Reason: As Found

Calibration Standards

NO Gas Cylinder #: DT0045516
NO_x Cal Gas Conc: 60.30 ppm
Removed Cylinder #: N/A
Removed Gas NO_x Conc: 60.30 ppm
NO_x gas Diff:
Calibrator Model: Teledyne API T750
ZAG make/model: Teledyne API T751H
Cal Gas Expiry Date: November 17, 2026
NO Cal Gas Conc: 60.10 ppm
Removed Gas Exp Date: N/A
Removed Gas NO Conc: 60.10 ppm
NO gas Diff:
Serial Number: 282
Serial Number: 321

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-10.7	-10.7	0.1	----	----
AF High point	4933	66.6	803.3	800.6	2.7	803.0	806.0	-2.8	0.9872	0.9803
AF Mid point	4967	33.3	401.6	400.2	1.3	398.5	399.0	-0.5	0.9814	0.9769
AF Low point	4983	16.6	200.2	199.5	0.7	194.4	193.7	0.6	0.9762	0.9763
New cyl resp										
Previous Respo 4933	NO _x = 799.8 ppb	NO = 801.1 ppb	* = > +/-5% change initiates investigation			*Percent Change		NO _x = 1.7%		
Baseline Corr 1st pt	NO _x = 813.7 ppb	NO = 816.7 ppb	<u>As Found Statistics</u>			*Percent Change		NO = 1.9%		
Baseline Corr 2nd pt	NO _x = 409.2 ppb	NO = 409.7 ppb	As found NO _x r ² : 0.999985			Nx SI: 1.012362		Nx Int: -9.304		
Baseline Corr 3rd pt	NO _x = 205.1 ppb	NO = 204.4 ppb	As found NO r ² : 0.999996			NO SI: 1.019956		NO Int: -10.083		
			As found NO ₂ r ² : 0.999900			NO ₂ SI: 0.986482		NO ₂ Int: -0.522		

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero	----	----	0.0	0.1	----	----
As found high GPT point	806.0	441.9	366.8	362.3	1.0123	98.8%
As found mid GPT point	806.0	621.2	187.5	182.1	1.0295	97.1%
As found low GPT point	806.0	719.0	89.7	88.6	1.0120	98.8%



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1035

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.927	N/A	NO bkgnd or offset:	-29.8	N/A
NOX coeff or slope:	0.922	N/A	NOX bkgnd or offset:	-29.1	N/A
NO2 coeff or slope:	1.000	N/A	Reaction cell Press:	6.3	N/A

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.995550	
NO _x Cal Offset:	0.151417	
NO Cal Slope:	1.002249	
NO Cal Offset:	-1.308888	
NO ₂ Cal Slope:	0.992734	
NO ₂ Cal Offset:	-1.313154	

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) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
-----------	---------------------------	-----------------------------	---	--	---	--	---------------------------------------	--	---	--

Cal zero
High point
Mid point
Low point
As left zero
As left span

Average Correction Factor

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) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
-------------------	--	---------------------------------------	---	--	---	--

Cal zero
High GPT point
Mid GPT point
Low GPT point

Average Correction Factor

Notes:

As Found done for maintenance.

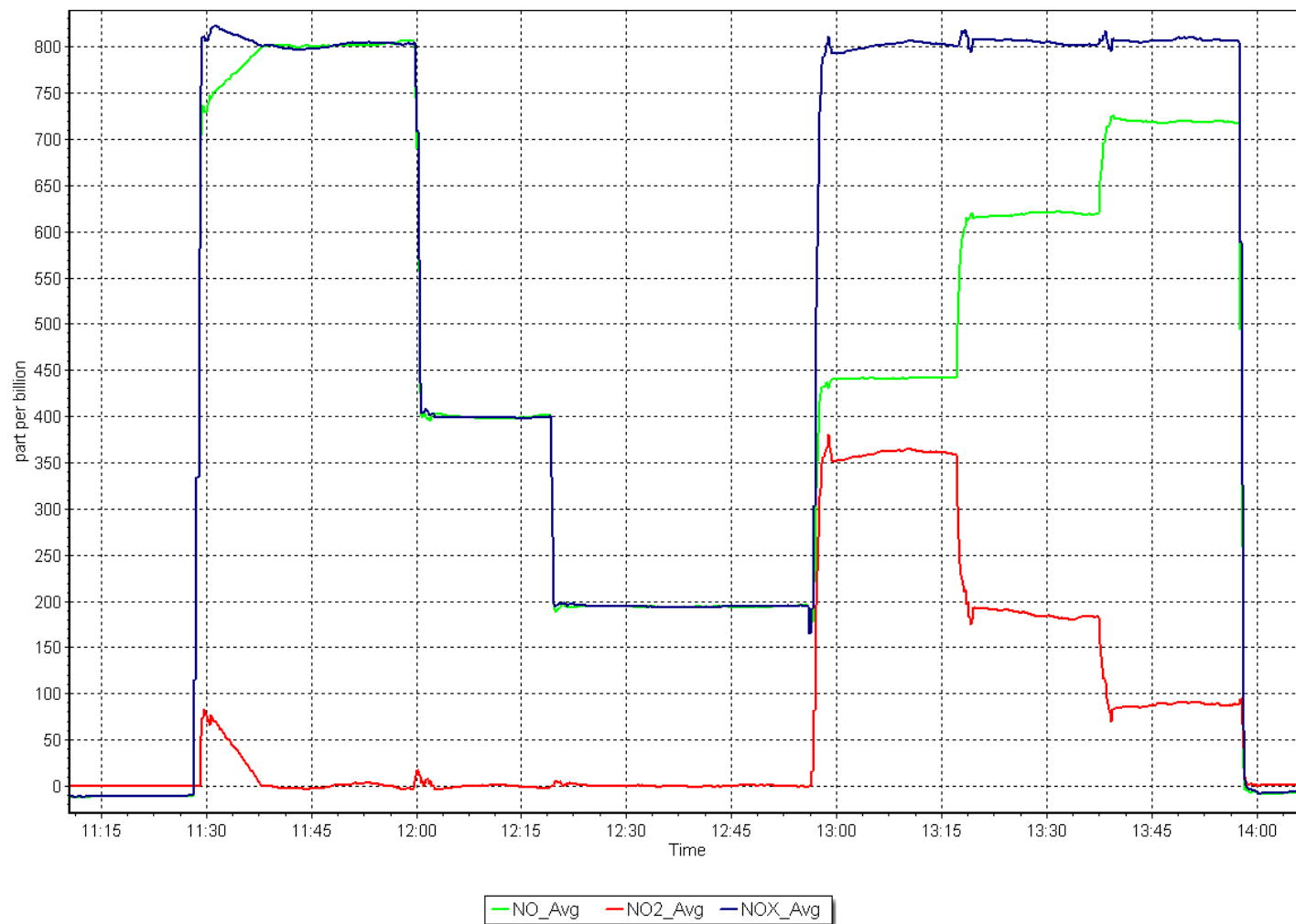
Calibration Performed By:

Aswin Sasi Kumar

NO_x Calibration Plot

Date: September 18, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Stony Mountain
Station number: AMS 18
Calibration Date: September 19, 2024
Last Cal Date: August 28, 2024
Start time (MST): 10:45
End time (MST): 15:12
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0045516
NOX Cal Gas Conc: 60.30 ppm
Removed Cylinder #: N/A
Removed Gas NOX Conc: 60.30 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API 701H
Cal Gas Expiry Date: November 17, 2026
NO Cal Gas Conc: 60.10 ppm
Removed Gas Exp Date: N/A
Removed Gas NO Conc: 60.10 ppm
NO gas Diff:
Serial Number: 2658
Serial Number: 360

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero										
AF High point										
AF Mid point										
AF Low point										
New cyl resp										
Previous Respo 4933	NO _x = NA	ppb	NO = NA	ppb	* = > +/-5% change initiates investigation		*Percent Change		NO _x =	NA
Baseline Corr 1st pt	NO _x = NA	ppb	NO = NA	ppb	<u>As Found Statistics</u>		*Percent Change		NO =	NA
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:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1035

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	N/A	0.932	NO bkgnd or offset:	N/A	-55.2
NOX coeff or slope:	N/A	0.923	NOX bkgnd or offset:	N/A	-54.8
NO2 coeff or slope:	N/A	1.000	Reaction cell Press:	N/A	7.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	N/A	0.995337
NO _x Cal Offset:	N/A	2.651403
NO Cal Slope:	N/A	1.001122
NO Cal Offset:	N/A	1.210855
NO ₂ Cal Slope:	N/A	0.983851
NO ₂ Cal Offset:	N/A	-0.930728

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	2.4	2.4	0.0	----	----
High point	4933	66.6	803.3	800.6	2.7	802.0	803.0	-1.2	1.0016	0.9970
Mid point	4967	33.3	401.6	400.2	1.3	402.6	402.2	0.4	0.9975	0.9951
Low point	4983	16.6	200.2	199.5	0.7	202.1	199.2	2.9	0.9907	1.0017
As left zero	5000	0.0	0.0	0.0	0.0	5.5	5.9	-0.3	----	----
As left span	4933	66.6	803.3	372.6	430.7	801.0	372.6	428.3	1.0028	1.0000
Average Correction Factor									0.9966	0.9980

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	804.9	372.1	435.5	427.9	1.0177	98.3%
Mid GPT point	804.9	602.5	205.1	200.5	1.0228	97.8%
Low GPT point	804.9	700.7	106.9	103.2	1.0355	96.6%
Average Correction Factor					1.0253	97.5%

Notes: As Finds performed on Sept 18. Pump and charcoal pack changed out. Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

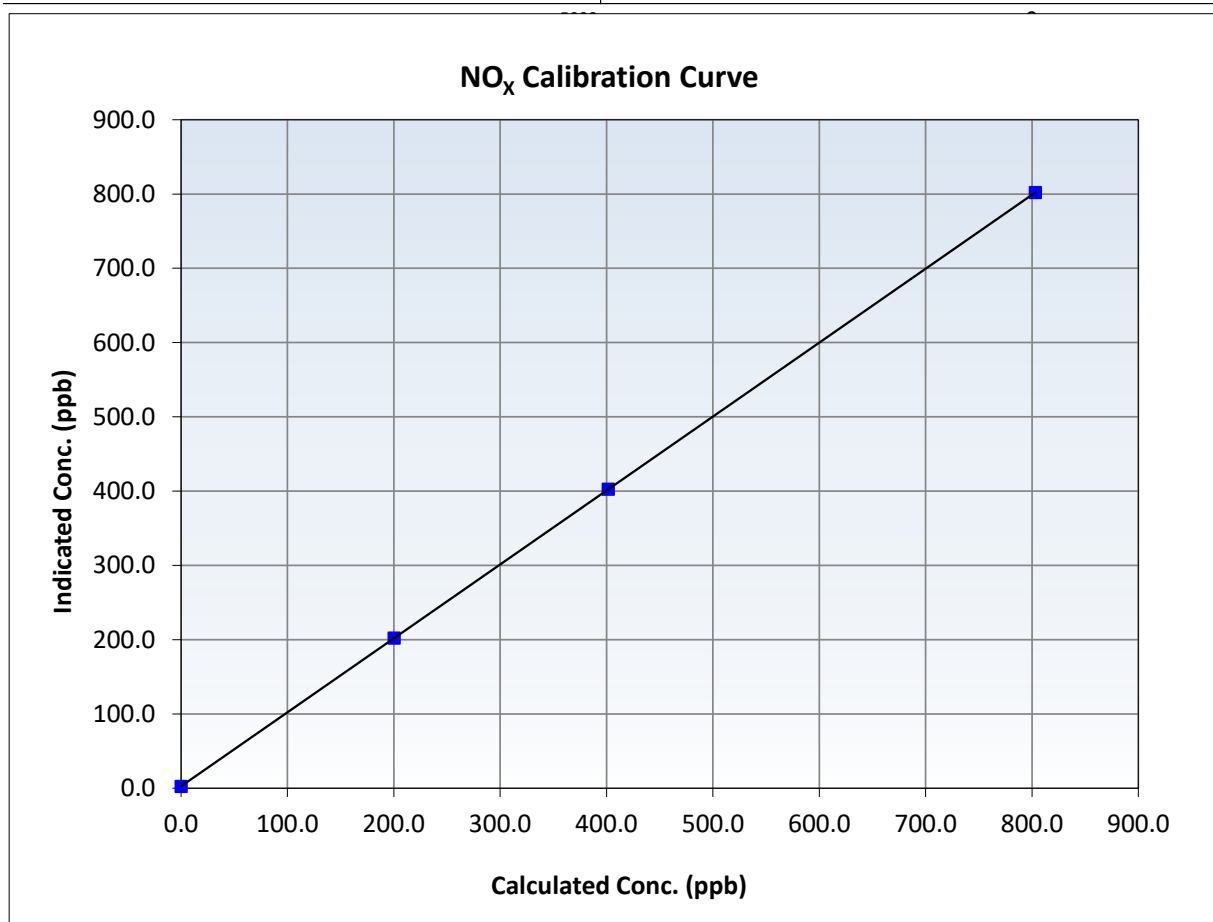
NO_x Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:45	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	2.4	----	Correlation Coefficient	0.999999	≥0.995
803.3	802.0	1.0016	Slope	0.995337	0.90 - 1.10
401.6	402.6	0.9975	Intercept	2.651403	+/-20
200.2	202.1	0.9907			





Wood Buffalo Environmental Association

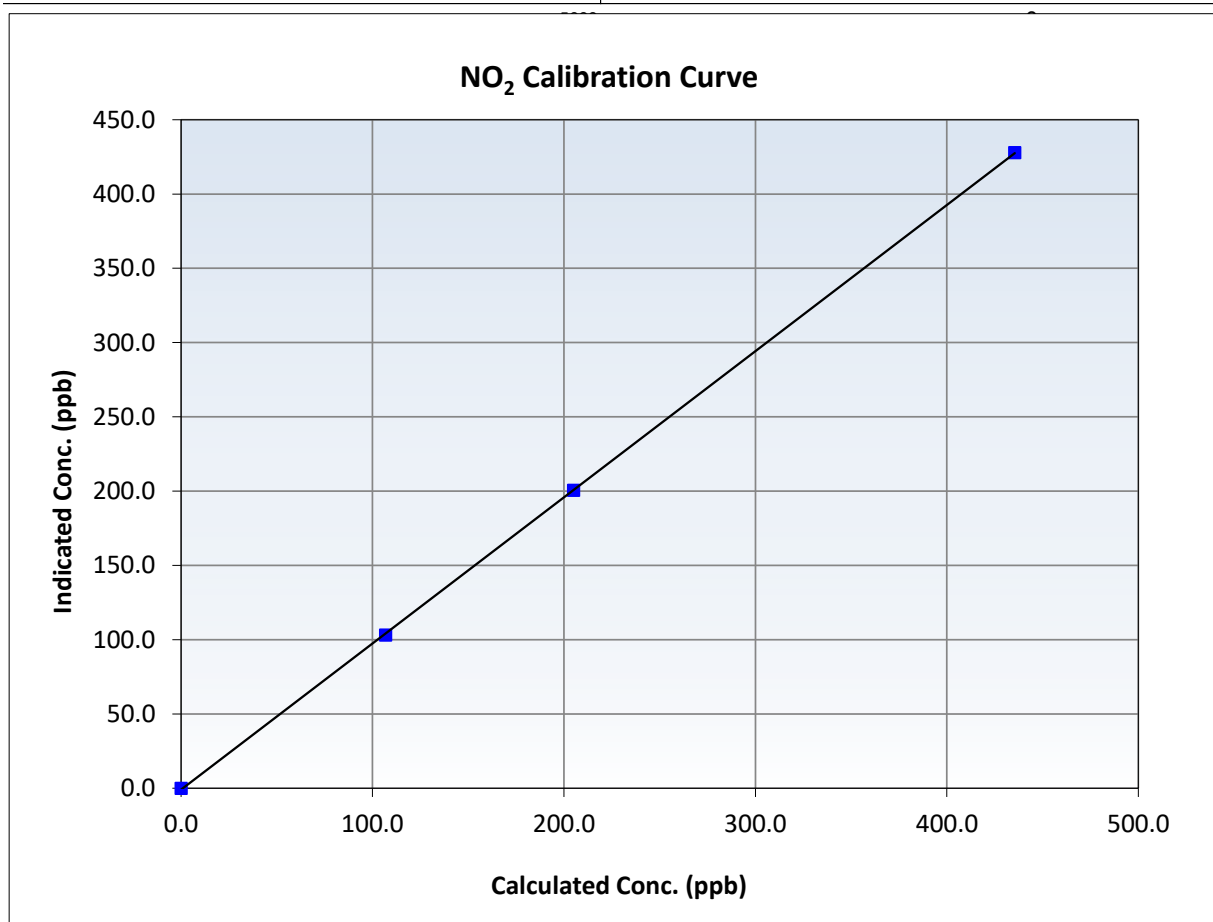
NO₂ Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:45	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999979	≥0.995
435.5	427.9	1.0177	Slope	0.983851	0.90 - 1.10
205.1	200.5	1.0228	Intercept	-0.930728	+/-20
106.9	103.2	1.0355			





Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:45	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

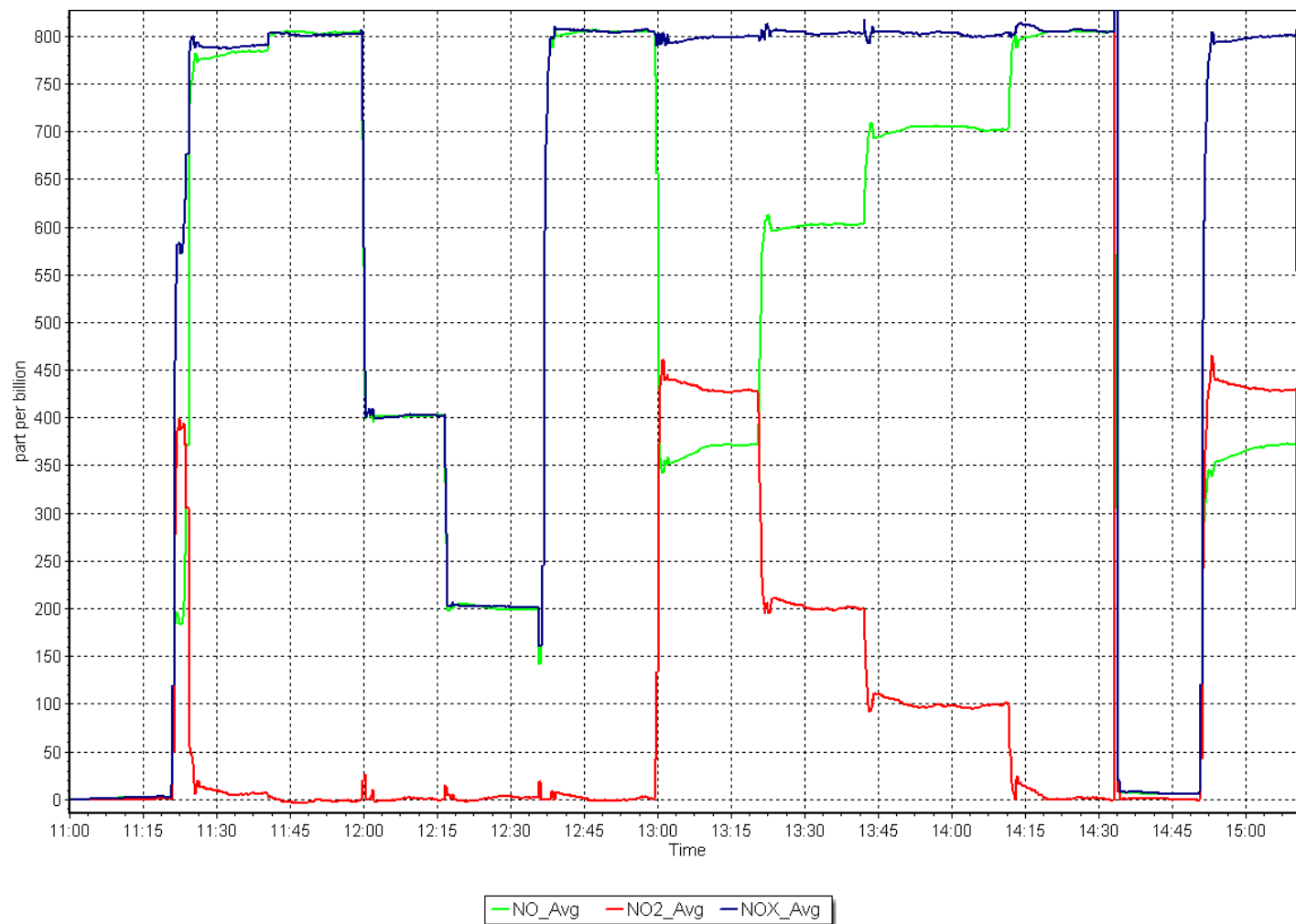
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	2.4	----	Correlation Coefficient	0.999986	≥0.995
800.6	803.0	0.9970	Slope	1.001122	0.90 - 1.10
400.2	402.2	0.9951			
199.5	199.2	1.0017	Intercept	1.210855	+/-20
		5000			0
		4933			66.6



NO_x Calibration Plot

Date: September 19, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 3, 2024 Last Cal Date: August 14, 2024
Start time (MST): 10:45 End time (MST): 14:36
Reason: Routine

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

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004514	1.001714	Backgd or Offset:	0.3	1.1
Calibration intercept:	-0.140000	0.500000	Coeff or Slope:	0.986	0.988

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted
					Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	NA	0.0	0.6	----
As found High point	4888	1138.1	400.0	302.9	1.323
As found Mid point	4888	884.5	200.0	154.9	1.296
As found Low point	4888	741.4	100.0	77.4	1.302
Baseline Corr As found:	302.3	Previous response	401.7	*% change	-32.9%
Baseline Corr 2nd AF pt:	154.3	AF Slope:	0.755600	AF Intercept:	1.720000
Baseline Corr 3rd AF pt:	76.8	AF Correlation:	0.999867	* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	NA	0.0	0.2	----
High point	4888	1138.1	400.0	400.8	0.998
Mid point	4888	884.5	200.0	201.7	0.992
Low point	4888	741.4	100.0	100.5	0.995
As left zero	5000	NA	0.0	0.0	----
As left span	4812	1097.9	400.0	405.4	0.987
Average Correction Factor					0.995

Notes: Pump swapped after as founds. Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

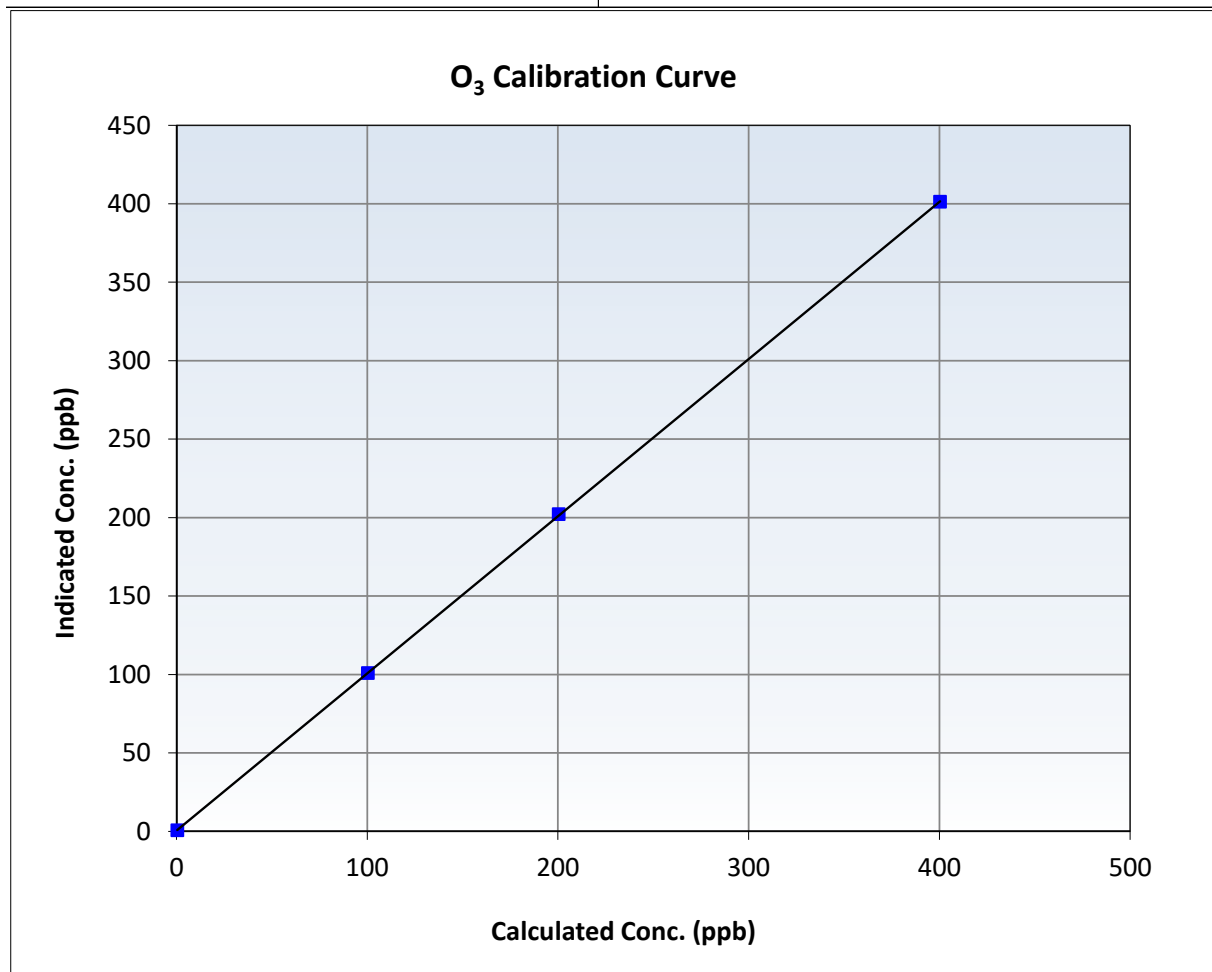
O₃ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 14, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:45	End Time (MST):	14:36
Analyzer make:	API T400	Analyzer serial #:	825

Calibration Data

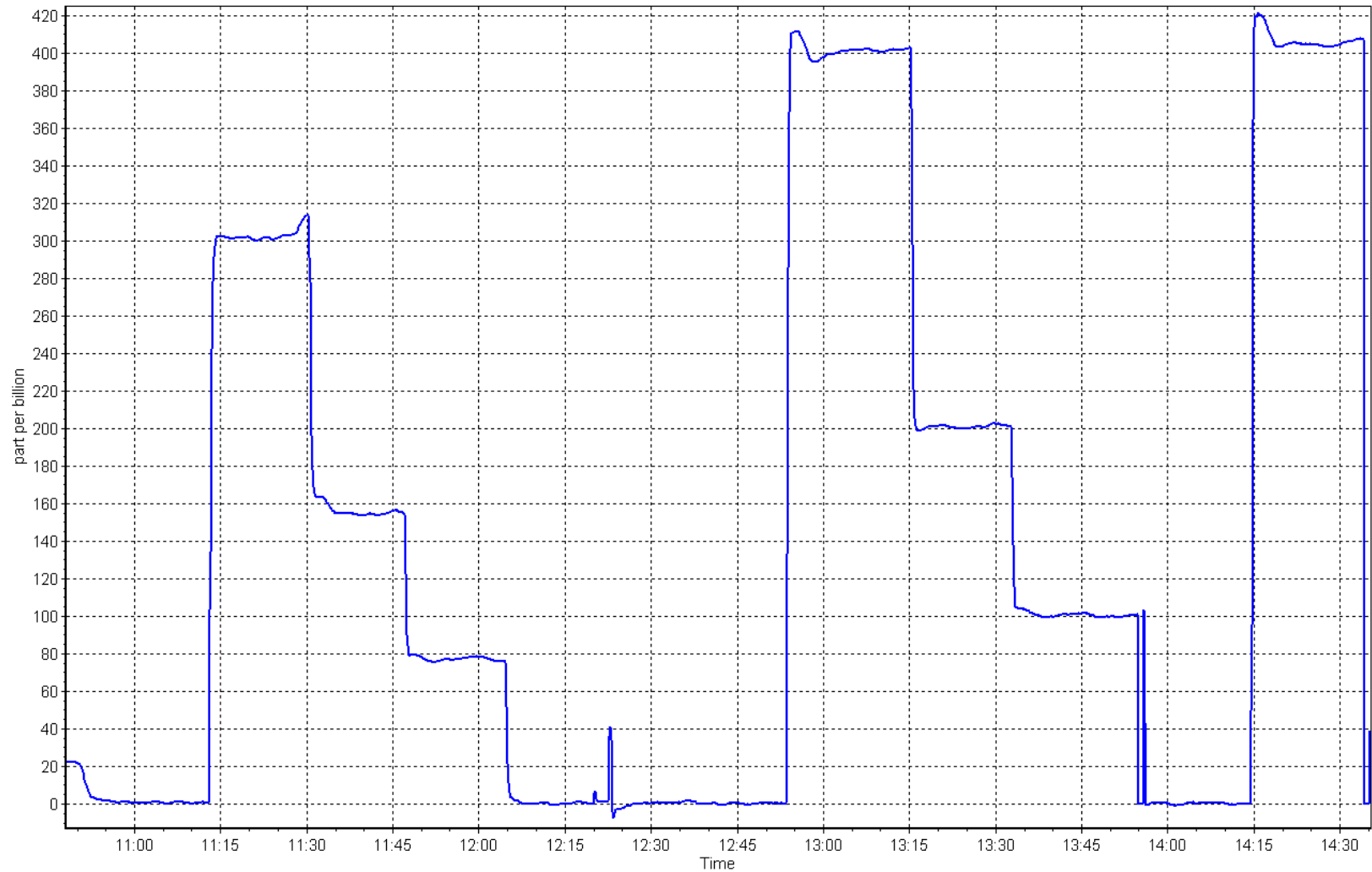
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999989	≥0.995
400.0	400.8	0.9980	Slope	1.001714	0.90 - 1.10
200.0	201.7	0.9916	Intercept	0.500000	+/- 5
100.0	100.5	0.9950			



O₃ Calibration Plot

Date: September 3, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 24, 2024 Last Cal Date: August 29, 2024
Start time (MST): 11:47 End time (MST): 12:58

Analyzer Make: API T640 S/N: 324
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388750
Temp/RH standard: Alicat FP-25BT S/N: 388750

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	20.1	19.96	20.1	☐	+/- 2 °C
P (mmHg)	694.2	694.13	694.2	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.112	5.01	☐	+/- 0.25 LPM
PW% (pump)	37	----	37	☐	>80%
Zero Verification	PM w/o HEPA: 1.0		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 maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: October 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.9	11.1	11.1	☒	+/- 0.5

Date Optical Chamber Cleaned: September 24, 2024
Date Disposable Filter Changed: September 24, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: July 4, 2024
Date RH/T Sensor Cleaned: July 4, 2024

Notes: Flow, temp and pressure checked. Quarterly maintenance completed. Adjusted PMT peak.

Calibration by: Braiden Boutilier



Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 20, 2024 Last Cal Date: August 26, 2024
Start time (MST): 11:10 End time (MST): 13:55
Reason: Routine

Calibration Standards

Cal Gas Concentration: 3,080 ppm Cal Gas Exp Date: November 4, 2028
Cal Gas Cylinder #: EB0065608
Removed Cal Gas Conc: 3,080 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 2658
ZAG Make/Model: Teledyne API T701H Serial Number: 355

Analyzer Information

Analyzer make: Teledyne API T300 Analyzer serial #: 3504
Analyzer Range: 0 - 50 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.991203	1.002360	Backgd or Offset:	-0.011	-0.011
Calibration intercept:	0.319818	0.071803	Coeff or Slope:	0.894	0.909

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) Limit = 0.90-1.10
As found zero	5000	0.0	0.0	0.2	----
As found High point	4933	66.7	41.1	40.6	1.018
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	40.36	Prev response:	41.05	*% change:	-1.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4933	66.7	41.1	41.2	0.998
Mid point	4966	33.3	20.5	20.8	0.984
Low point	4983	16.7	10.3	10.3	0.996
As left zero	5000	0.0	0.0	0.0	----
As left span	4933	66.7	41.1	41.2	0.997
Average Correction Factor					0.993

Notes: Zero and span adjusted instrument.

Calibration Performed By: Kelly Baragar



Wood Buffalo Environmental Association

CO Calibration Summary

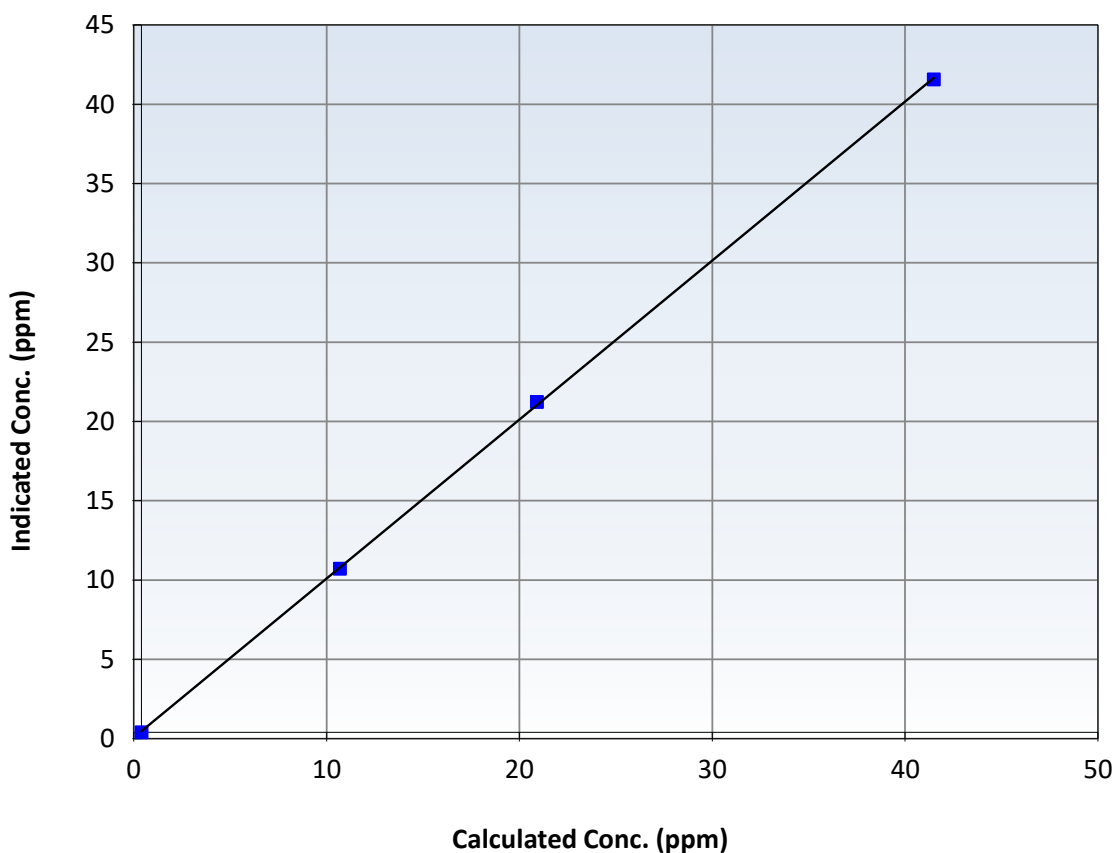
Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 26, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:10	End Time (MST):	13:55
Analyzer make:	Teledyne API T300	Analyzer serial #:	3504

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999939	≥ 0.995
41.1	41.2	0.9980	Slope	1.002360	$0.90 - 1.10$
20.5	20.8	0.9844	Intercept	0.071803	± 1.5
10.3	10.3	0.9959			

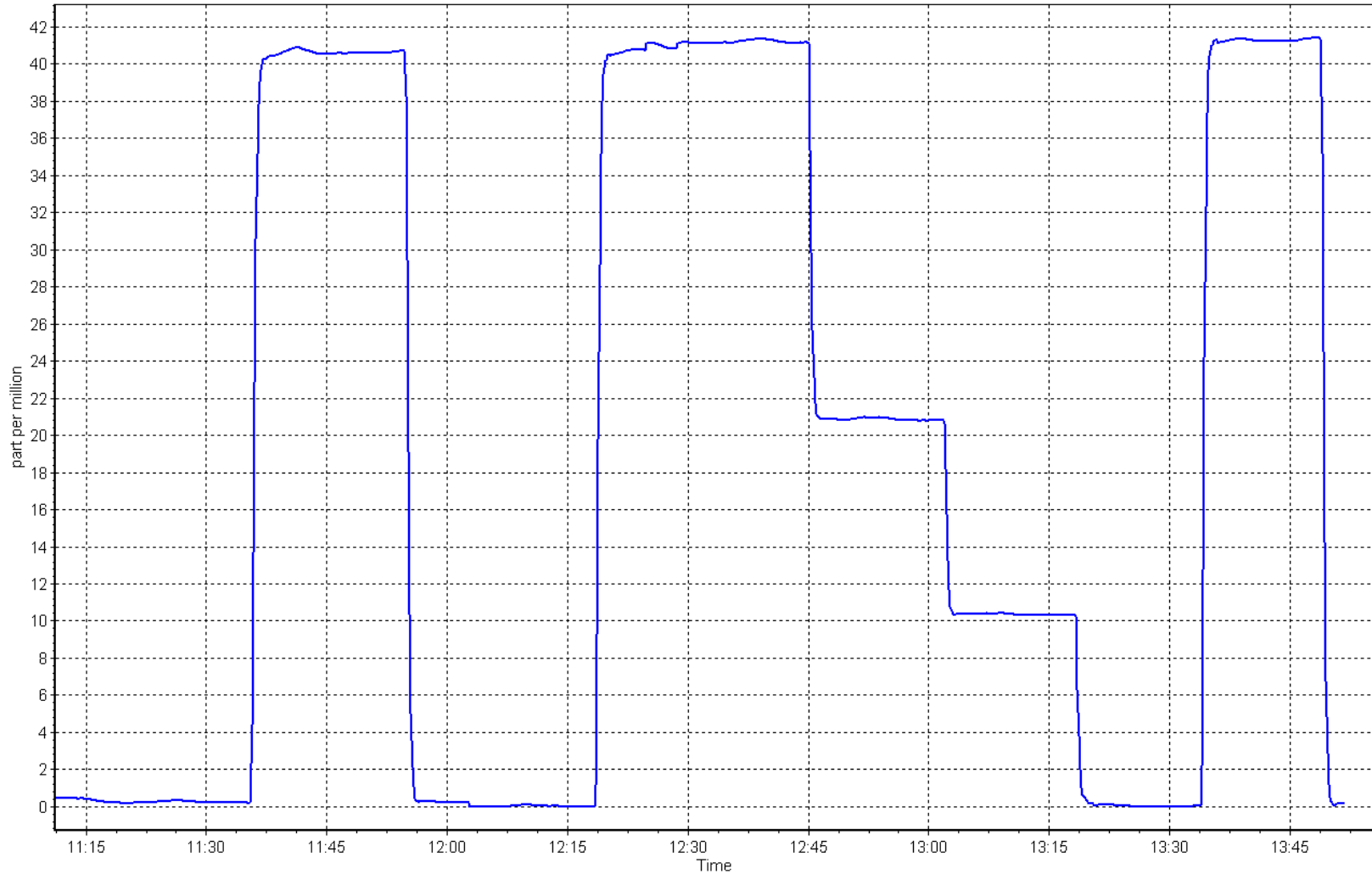
CO Calibration Curve



CO Calibration Plot

Date: September 20, 2024

Location: Stony Mountain





Wood Buffalo Environmental Association

CO₂ Calibration Report

Station Information

Station Name: Stony Mountain Station number: AMS 18
Calibration Date: September 10, 2024 Last Cal Date: August 15, 2024
Start time (MST): 10:15 End time (MST): 13:15
Reason: Routine

Calibration Standards

Cal Gas Concentration: 59,100 ppm Cal Gas Exp Date: November 4, 2028
Cal Gas Cylinder #: EB0065608
Removed Cal Gas Conc: 59,100 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 2658
N2 Gen Make/Model: Peak Scientific Serial Number: 771048317

Analyzer Information

Analyzer make: API T360 Analyzer serial #: 489
Analyzer Range: 0 - 2,000 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998891	0.997752	Backgd or Offset:	-0.068	-0.068
Calibration intercept:	-4.860000	-4.100000	Coeff or Slope:	0.961	0.961

CO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	3000	0.0	0.0	-0.7	----
As found High Point	2920	80.0	1576.0	1573.6	1.001
As found Mid Point					
As found Low Point					
New cylinder response					
Baseline Corr As found:	1574.3	Prev response:	1569.4	*% change:	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	3000	0.0	0.0	-0.3	----
High point	2920	80.0	1576.0	1572.0	1.003
Mid point	2960	40.0	788.0	775.0	1.017
Low point	2980	20.0	394.0	388.7	1.014
As left zero	3000	0.0	0.0	-0.7	----
As left span	2930	80.0	1570.8	1577.1	0.996
Average Correction Factor					1.011

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

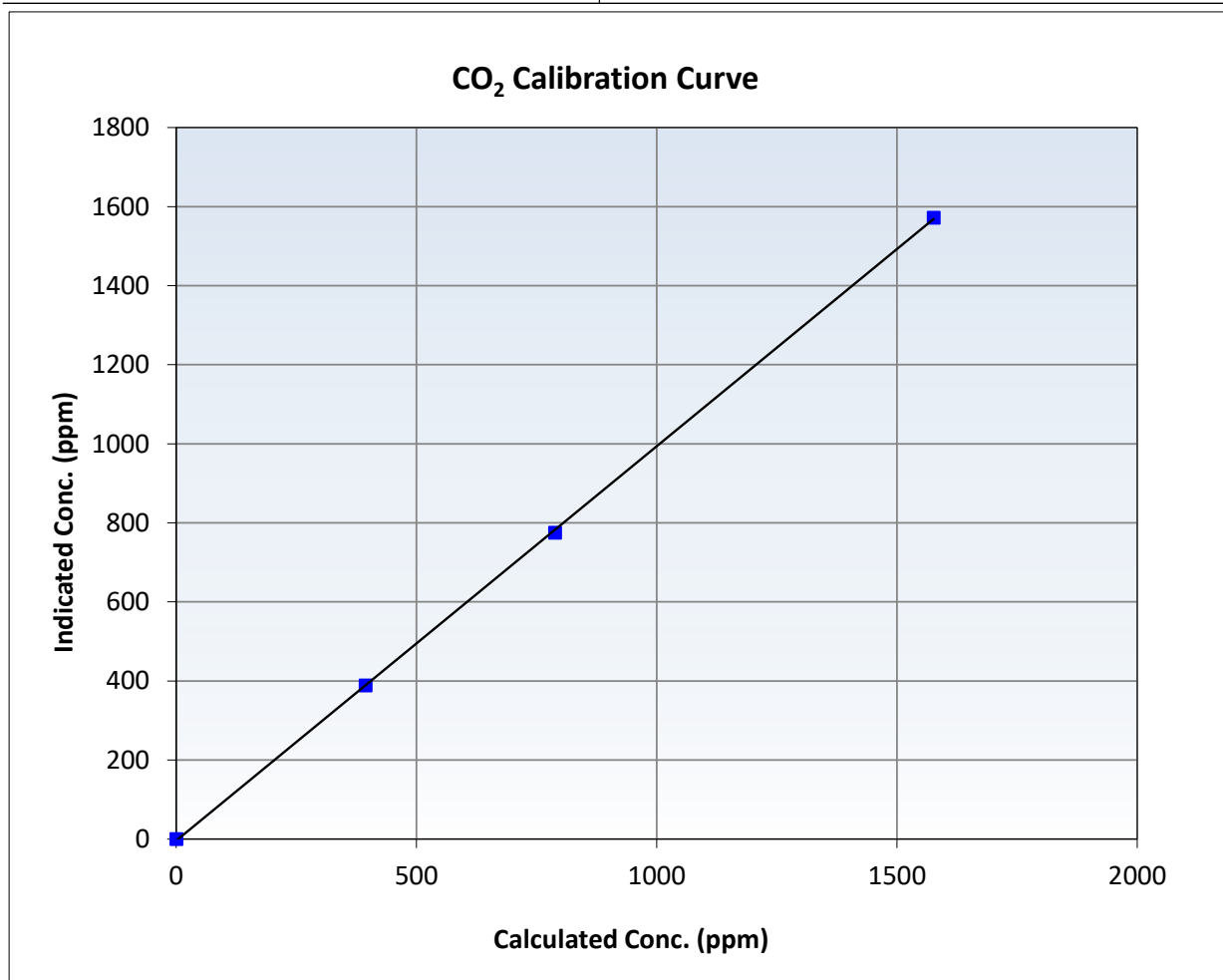
CO₂ Calibration Summary

Station Information

Calibration Date	September 10, 2024	Previous Calibration	August 15, 2024
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:15	End Time (MST)	13:15
Analyzer make	API T360	Analyzer serial #	489

Calibration Data

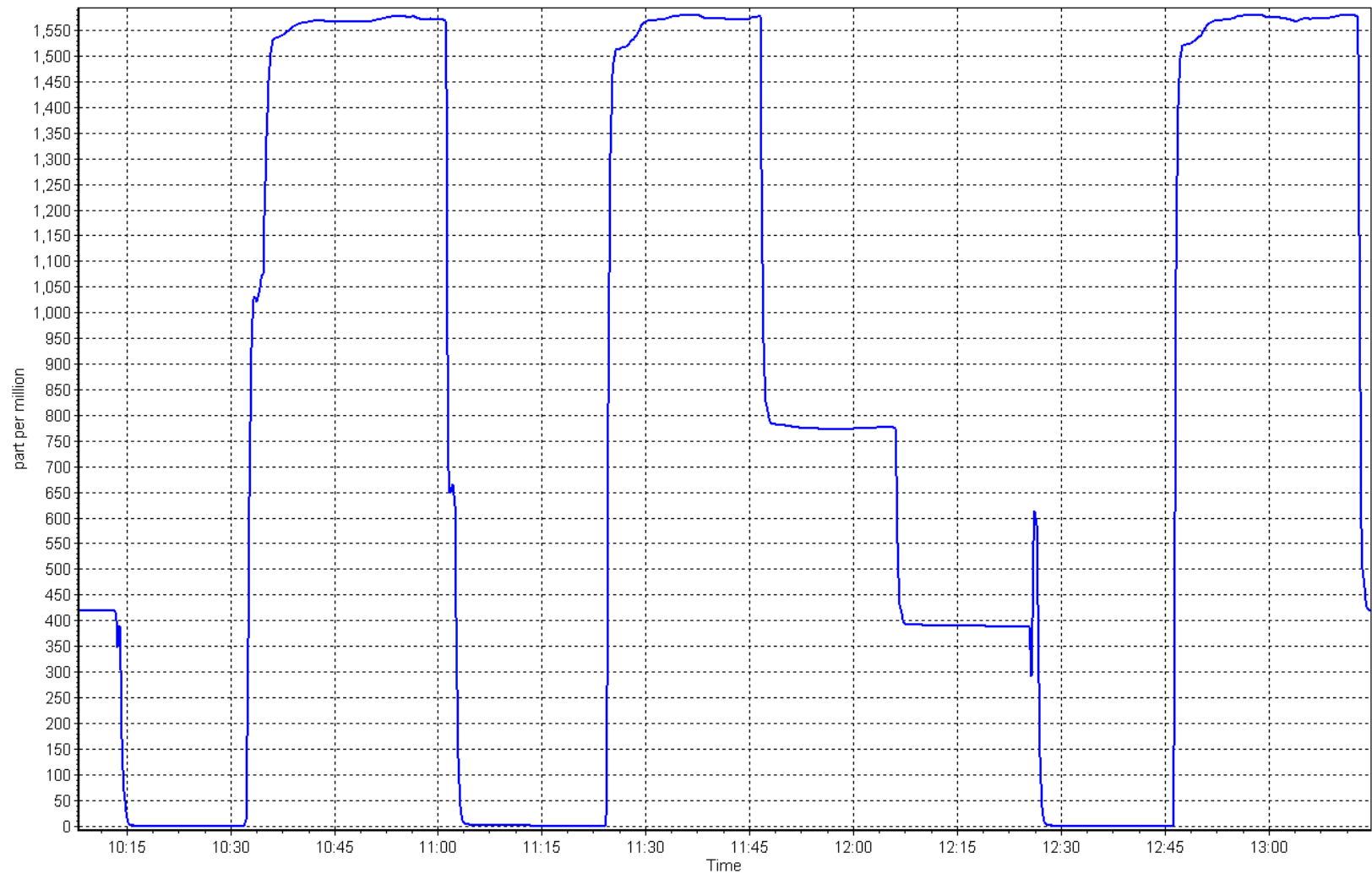
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3	----	Correlation Coefficient	0.999942	≥0.995
1576.0	1572.0	1.0025	Slope	0.997752	0.90 - 1.10
788.0	775.0	1.0168	Intercept	-4.1	+/-20
394.0	388.7	1.0136			



CO₂ Calibration Plot

Date: September 10, 2024

Location: Stony Mountain





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19 FIREBAG SEPTEMBER 2024

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

October 31, 2024





Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Firebag Station number: AMS 19
Calibration Date: September 10, 2024 Last Cal Date: August 21, 2024
Start time (MST): 9:47 End time (MST): 13:09
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.29 ppm Cal Gas Exp Date: February 23, 2025
Cal Gas Cylinder #: CC716618
Removed Cal Gas Conc: 49.29 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 1607
Zero Air Gen Model: Teledyne API T701H Serial Number: 201

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1410661308
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002534	1.002452	Backgd or Offset:	10.6	10.6
Calibration intercept:	-0.221679	1.057039	Coeff or Slope:	1.000	1.000

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	4999	0.0	0.0	0.0	----
As found High point	4919	81.1	799.5	801.0	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	801.0	Previous response	801.3	*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	4999	0.0	0.0	0.4	----
High point	4919	81.1	799.5	802.0	0.997
Mid point	4959	40.6	400.3	403.1	0.993
Low point	4980	20.3	200.1	202.0	0.991
As left zero	4999	0.0	0.0	0.3	----
As left span	4919	81.1	799.5	802.0	0.997
Average Correction Factor:					0.993

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

Calibration Performed By: Braiden Boutillier



Wood Buffalo Environmental Association

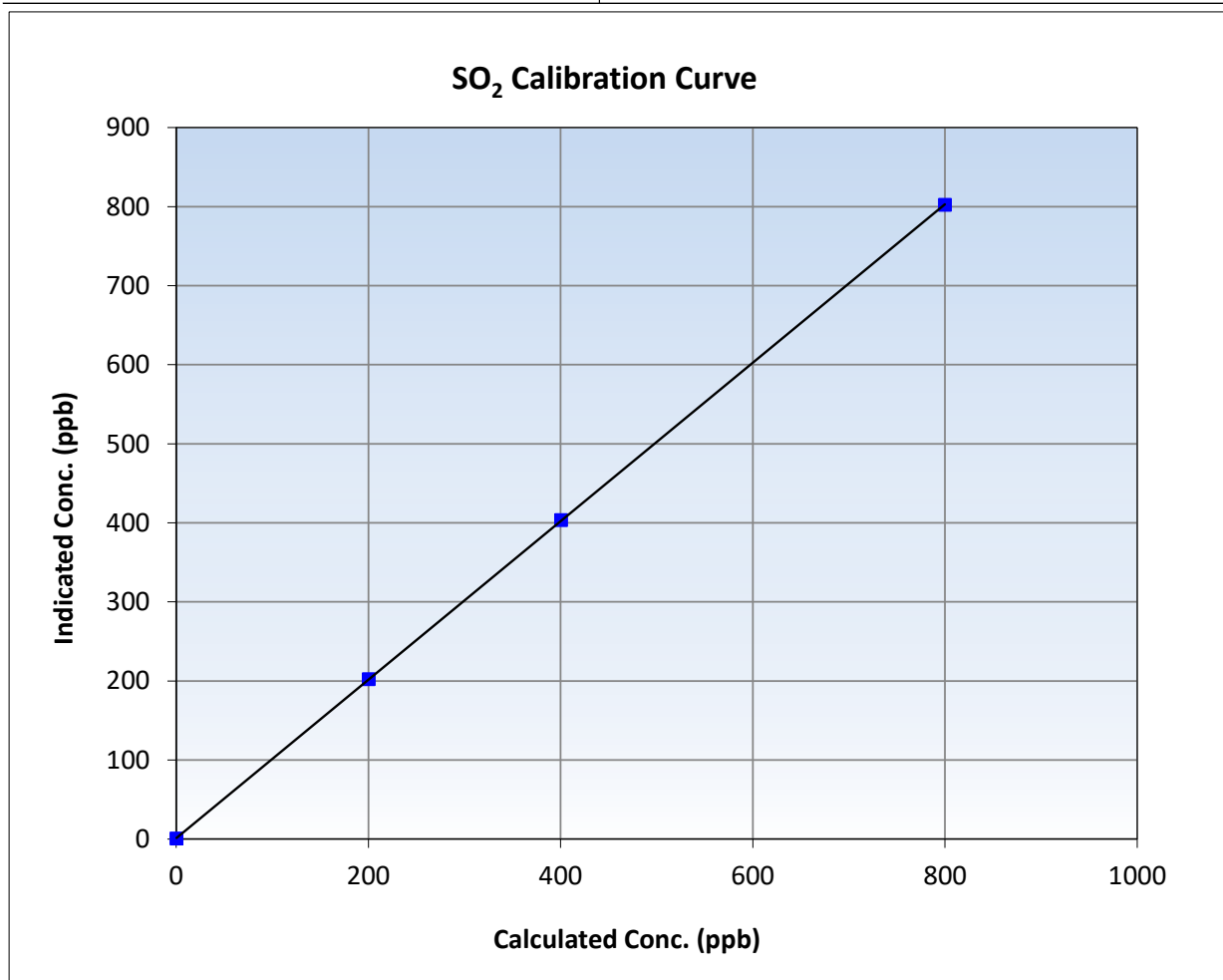
SO₂ Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 21, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	9:47	End Time (MST):	13:09
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

Calibration Data

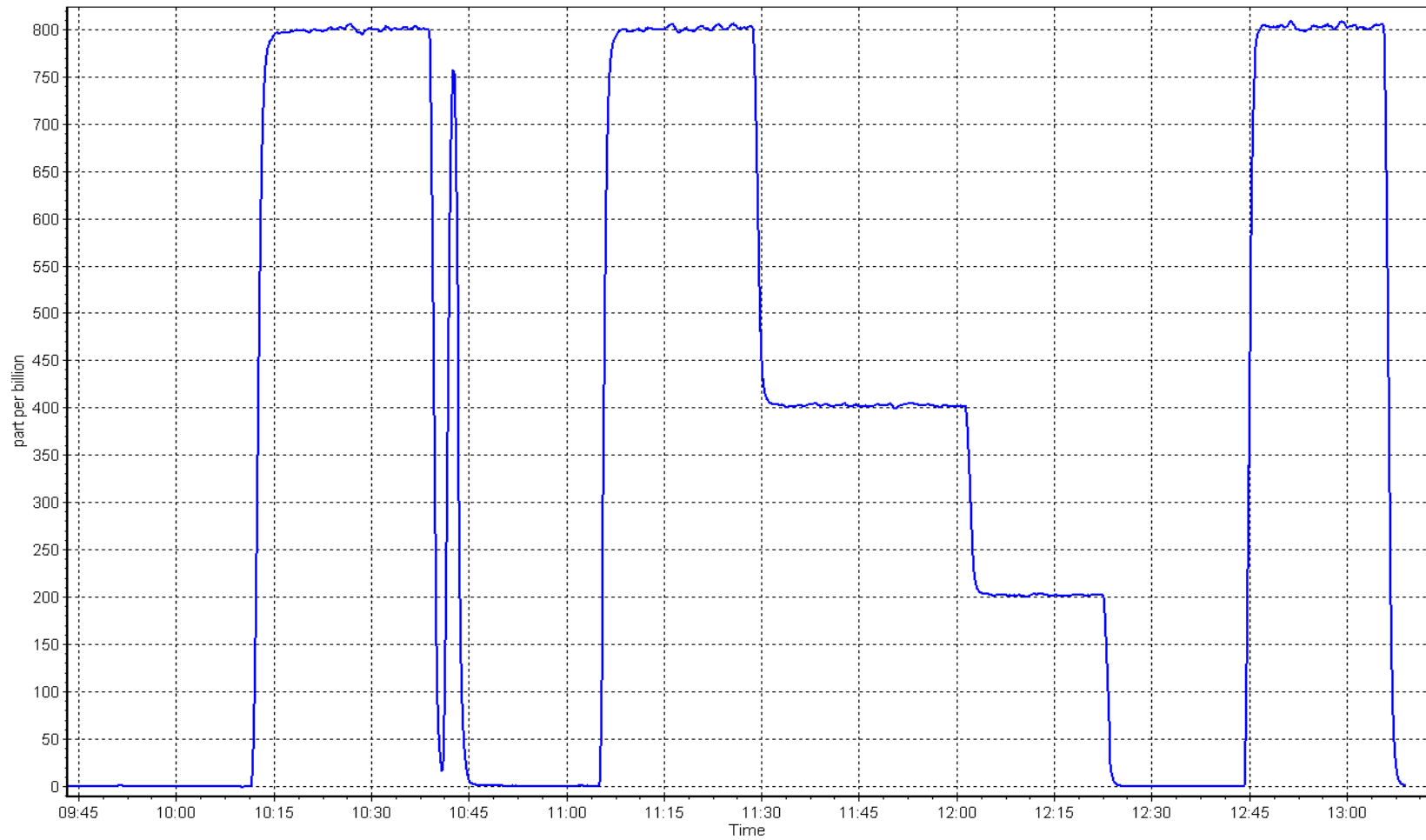
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4	----	Correlation Coefficient	0.999996	≥0.995
799.5	802.0	0.9968	Slope	1.002452	0.90 - 1.10
400.3	403.1	0.9930	Intercept	1.057039	+/-30
200.1	202.0	0.9906			



SO2 Calibration Plot

Date: September 10, 2024

Location: Firebag





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Firebag
Calibration Date: September 20, 2024
Start time (MST): 10:09
Reason: Routine

Station number: AMS 19
Last Cal Date: August 29, 2024
End time (MST): 15:16

Calibration Standards

Cal Gas Concentration: 5.29 ppm
Cal Gas Cylinder #: DT0010492
Removed Cal Gas Conc: 5.29 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: March 19, 2027
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 1607
Serial Number: 201

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1151680032
Converter serial #: 2022-222
Converter Temp: 350 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999904	1.006334	Backgd or Offset:	2.79
Calibration intercept:	-0.040000	-0.240000	Coeff or Slope:	1.190

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4924	75.6	80.0	80.7	0.989
As found Mid point	4962	37.8	40.0	40.6	0.980
As found Low point	4981	18.9	20.0	20.3	0.975
New cylinder response					
Baseline Corr As found:	80.9	Prev response:	79.94	*% change:	1.2%
Baseline Corr 2nd AF pt:	40.8	AF Slope:	1.010763	AF Intercept:	-0.020000
Baseline Corr 3rd AF pt:	20.5	AF Correlation:	0.999972	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4924	75.6	80.0	80.3	0.996
Mid point	4962	37.8	40.0	39.9	1.002
Low point	4981	18.9	20.0	19.9	1.005
As left zero	5000	0.0	0.0	0.0	----
As left span	4924	75.6	80.0	79.0	1.012
SO2 Scrubber Check	4922	78.3	783.0	0.1	----
Date of last scrubber change:		18-Jan-23		Ave Corr Factor	1.001
Date of last converter efficiency test:		n/a			

Notes: Changed sample inlet filter after as founds. Adjusted span twice which cancelled and remained at the initial span coefficient.

Calibration Performed By: Braiden Boutillier



Wood Buffalo Environmental Association

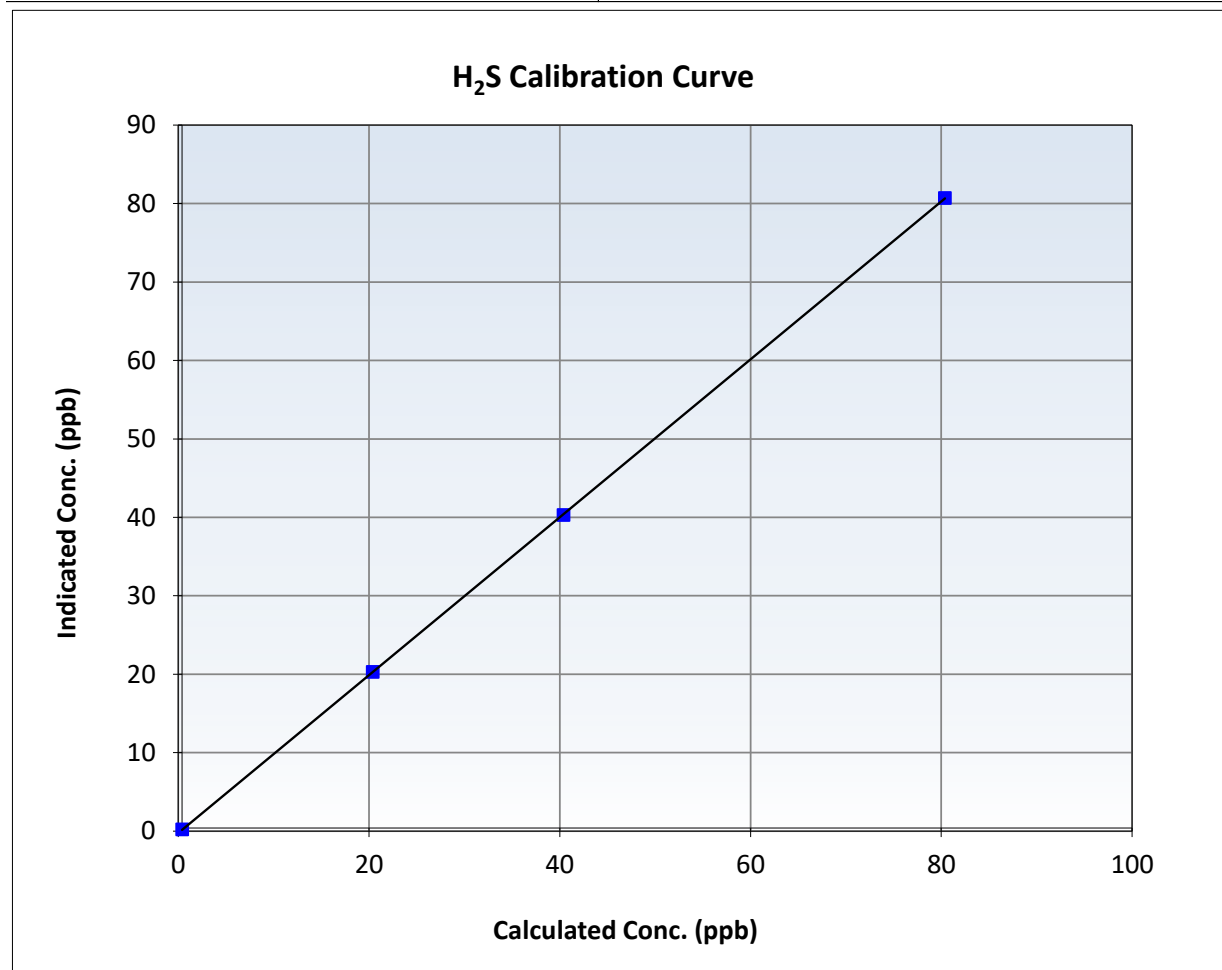
H2S Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 29, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:09	End Time (MST):	15:16
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680032

Calibration Data

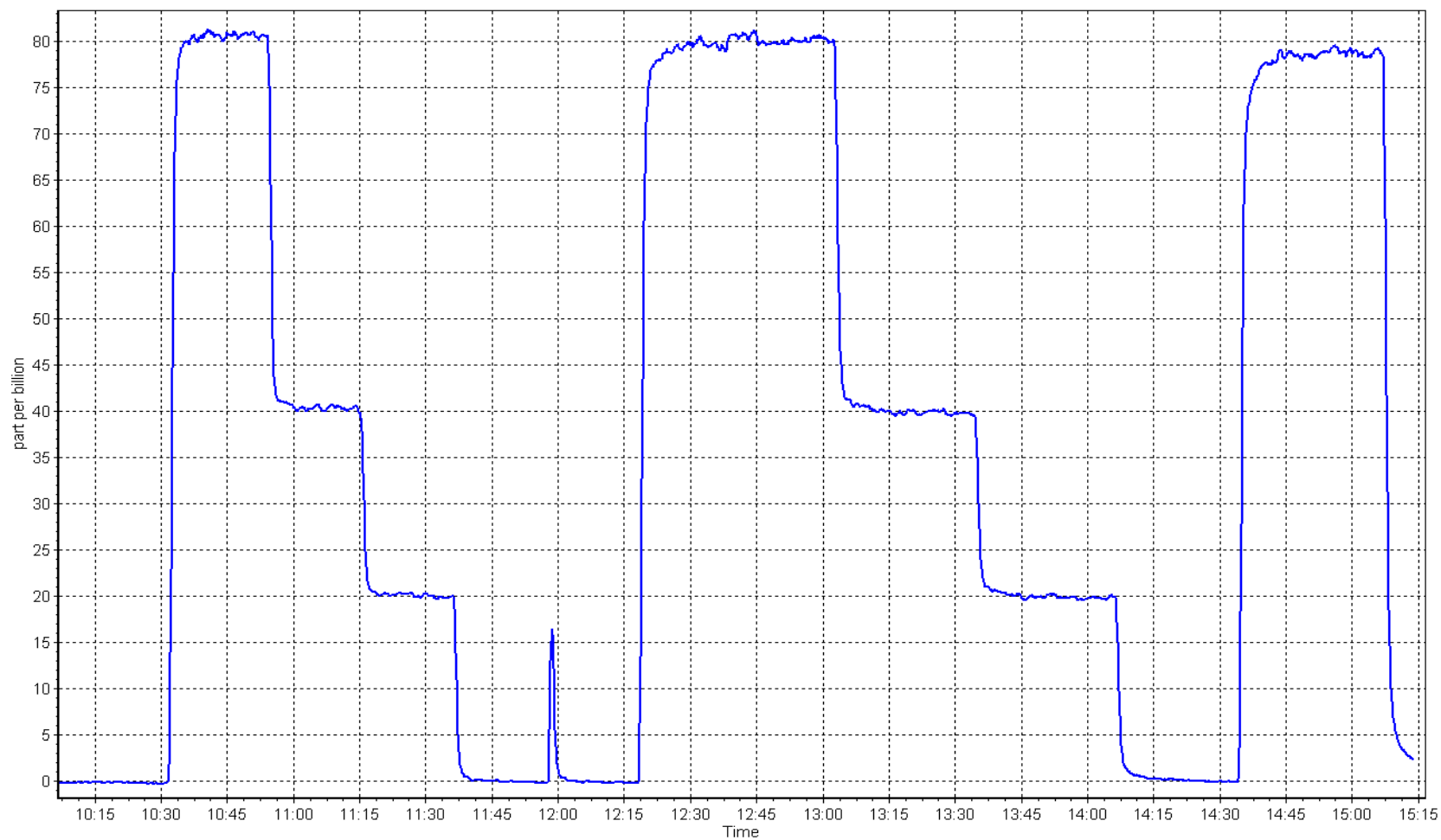
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999996	≥ 0.995
80.0	80.3	0.9961	Slope	1.006334	$0.90 - 1.10$
40.0	39.9	1.0023	Intercept	-0.240000	± 3
20.0	19.9	1.0048			



H2S Calibration Plot

Date: September 20, 2024

Location: Firebag





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name: Firebag Station number: AMS 19
Calibration Date: September 10, 2024 Last Cal Date: August 21, 2024
Start time (MST): 9:47 End time (MST): 13:09
Reason: Routine

Calibration Standards

Gas Cert Reference: CC716618 Cal Gas Expiry Date: February 23, 2025
CH4 Cal Gas Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm
C3H8 Cal Gas Conc. 205.9 ppm
Removed Gas Cert: Removed Gas Expiry:
Removed CH4 Conc. 500.7 ppm CH4 Equiv Conc. 1066.9 ppm
Removed C3H8 Conc. 205.9 ppm Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 1607
ZAG Make/Model: Teledyne API T701H Serial Number: 201

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089
Analyzer Range: 0 - 20 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995715	0.997445	Background:	2.07	2.07
Calibration intercept:	-0.045726	0.014665	Coefficient:	3.835	3.835

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	4999	0.0	0.00	0.01	----
As found High point	4919	81.1	17.31	17.39	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.39	Previous response	17.19	*% change	1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	4999	0.0	0.00	0.04	----
High point	4919	81.1	17.31	17.30	1.000
Mid point	4959	40.6	8.66	8.61	1.006
Low point	4980	20.3	4.33	4.33	1.000
As left zero	5000	0.0	0.00	0.01	----
As left span	4919	81.1	17.31	17.35	0.997
Average Correction Factor					1.002

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

THC Calibration Summary

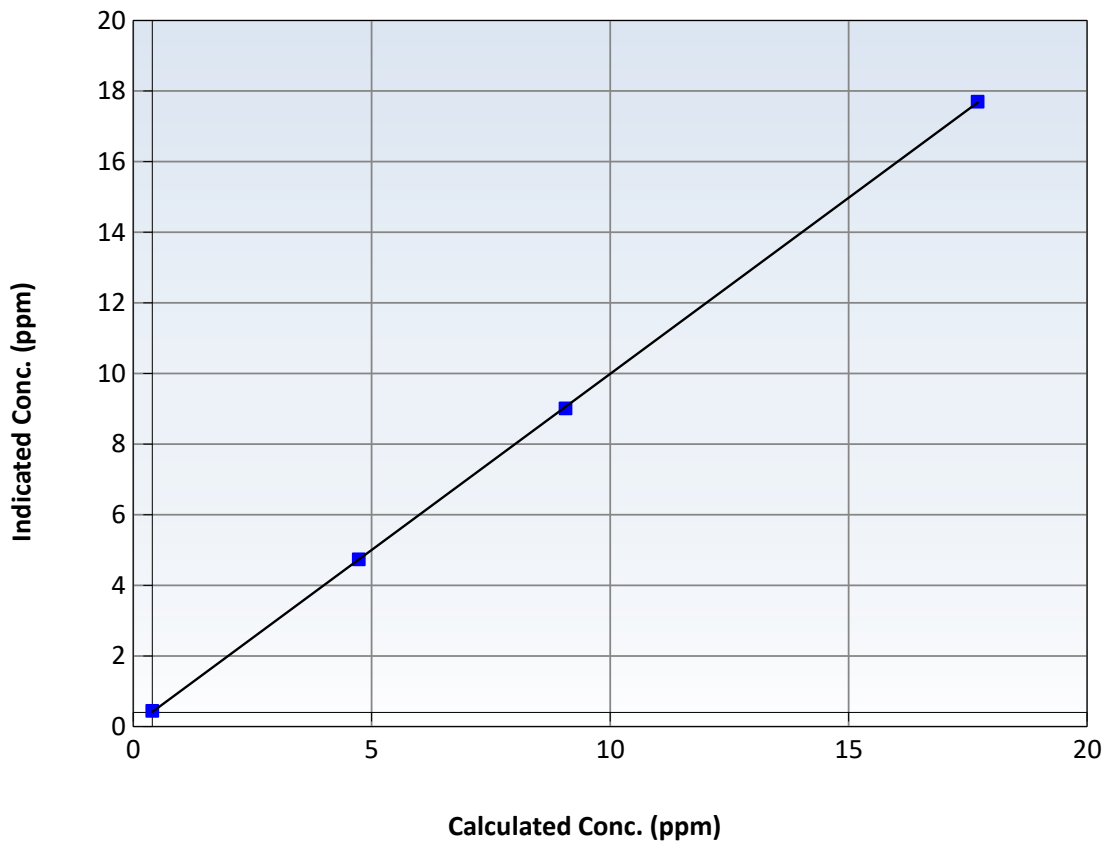
Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 21, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	9:47	End Time (MST):	13:09
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>Limits</u>
0.00	0.04	----	Correlation Coefficient	0.999979	≥ 0.995
17.31	17.30	1.0003	Slope	0.997445	$0.90 - 1.10$
8.66	8.61	1.0063	Intercept	0.014665	± 1.5
4.33	4.33	1.0001			

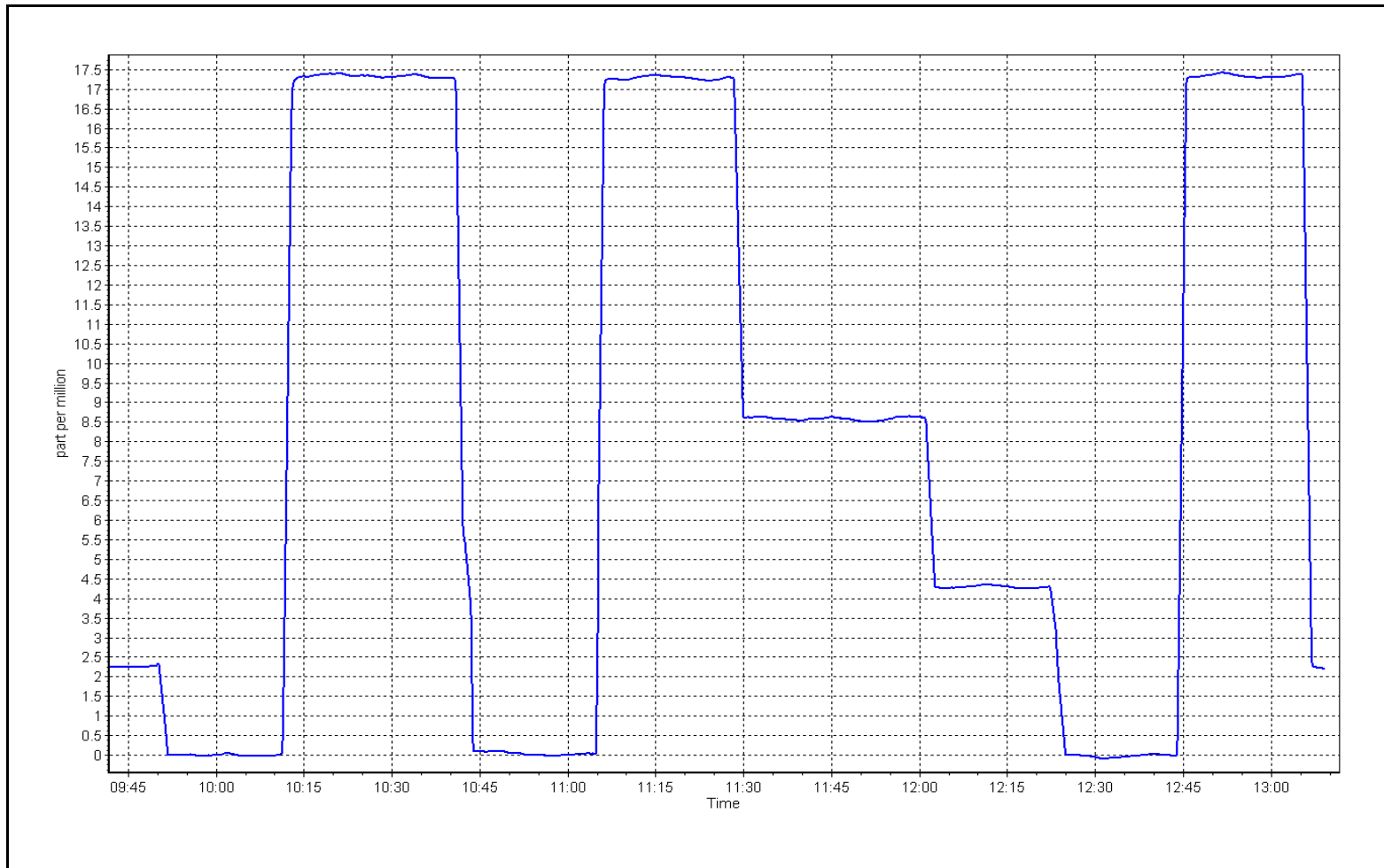
THC Calibration Curve



THC Calibration Plot

Date: September 10, 2024

Location: Firebag





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Firebag
Station number: AMS 19
Calibration Date: September 9, 2024
Last Cal Date: August 22, 2024
Start time (MST): 9:45
End time (MST): 14:36
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0044018
NOX Cal Gas Conc: 48.90 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 48.90 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701H
Cal Gas Expiry Date: November 3, 2031
NO Cal Gas Conc: 48.70 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 48.70 ppm
NO gas Diff:
Serial Number: 1607
Serial Number: 201

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
AF High point	4918	82.1	802.9	799.7	3.3	798.0	795.3	2.7	1.0062	1.0053
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 802.7 ppb	NO = 800.6 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO _x = -0.6%
Baseline Corr 1st pt	NO _x = 798.0 ppb	NO = 795.4 ppb	<u>As Found Statistics</u>	*Percent Change	NO = -0.7%
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:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1410661309

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.919	0.919	NO bkgnd or offset:	4.6	4.6
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	4.6	4.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	164.2	162.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.997733	0.994331
NO _x Cal Offset:	1.599965	1.320201
NO Cal Slope:	1.000088	0.997343
NO Cal Offset:	0.859701	0.420117
NO ₂ Cal Slope:	0.998153	1.000553
NO ₂ Cal Offset:	-0.470622	-0.531676

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
High point	4918	82.1	802.9	799.7	3.3	799.2	797.8	1.4	1.0047	1.0023
Mid point	4959	41.1	402.0	400.3	1.6	401.3	399.7	1.7	1.0016	1.0015
Low point	4980	20.5	200.5	199.7	0.8	202.1	200.1	2.0	0.9920	0.9979
As left zero	5000	0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
As left span	4918	82.1	802.9	413.9	389.0	801.0	413.9	387.0	1.0024	1.0000
Average Correction Factor									0.9995	1.0006

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.1	----	----
High GPT point	795.4	412.8	385.9	385.8	1.0002	100.0%
Mid GPT point	795.4	604.3	194.4	193.9	1.0025	99.8%
Low GPT point	795.4	700.9	97.8	96.5	1.0133	98.7%
Average Correction Factor					1.0053	99.5%

Notes:

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

Calibration Performed By:

Braiden Boutilier



Wood Buffalo Environmental Association

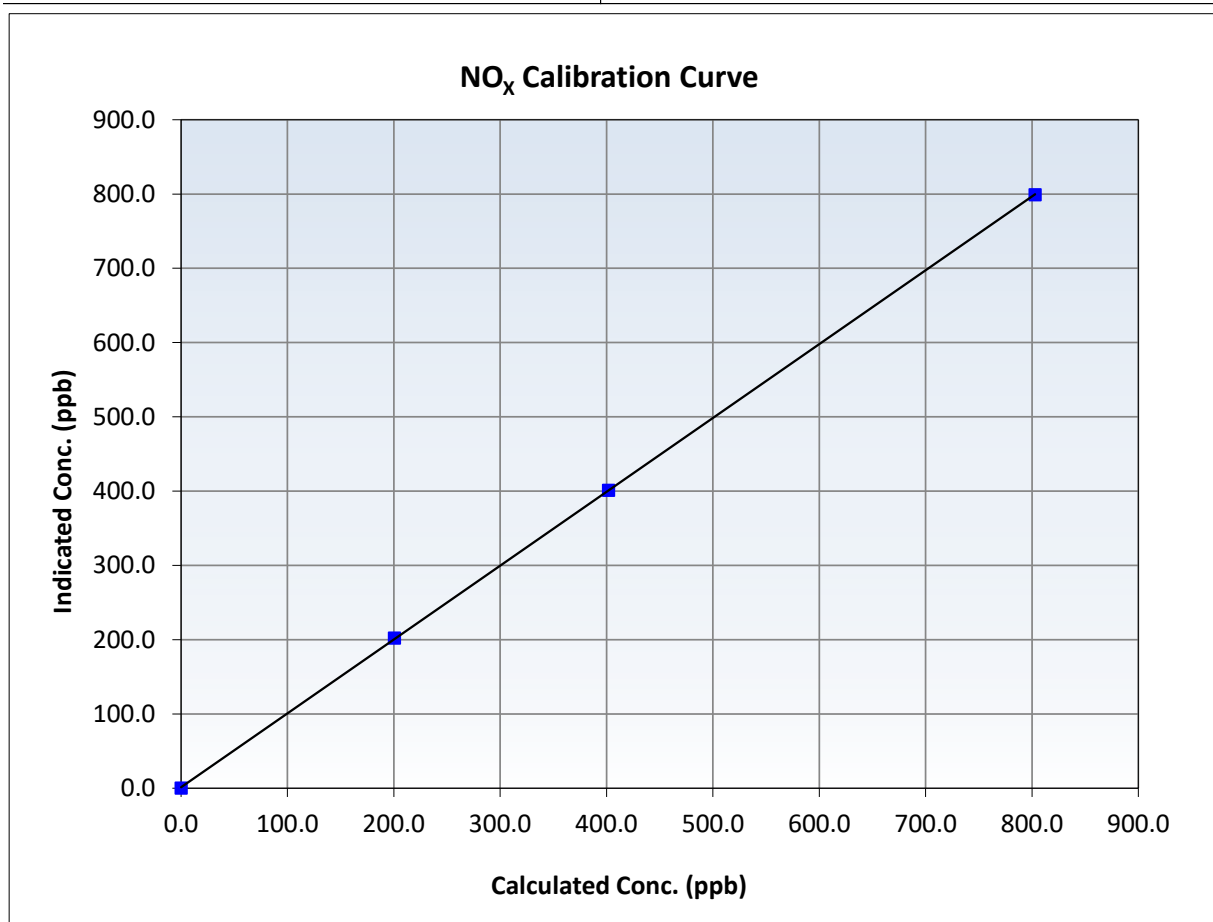
NO_x Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 22, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	9:45	End Time (MST):	14:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

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	0.999989	≥0.995
802.9	799.2	1.0047	Slope	0.994331	0.90 - 1.10
402.0	401.3	1.0016	Intercept	1.320201	+/-20
200.5	202.1	0.9920			





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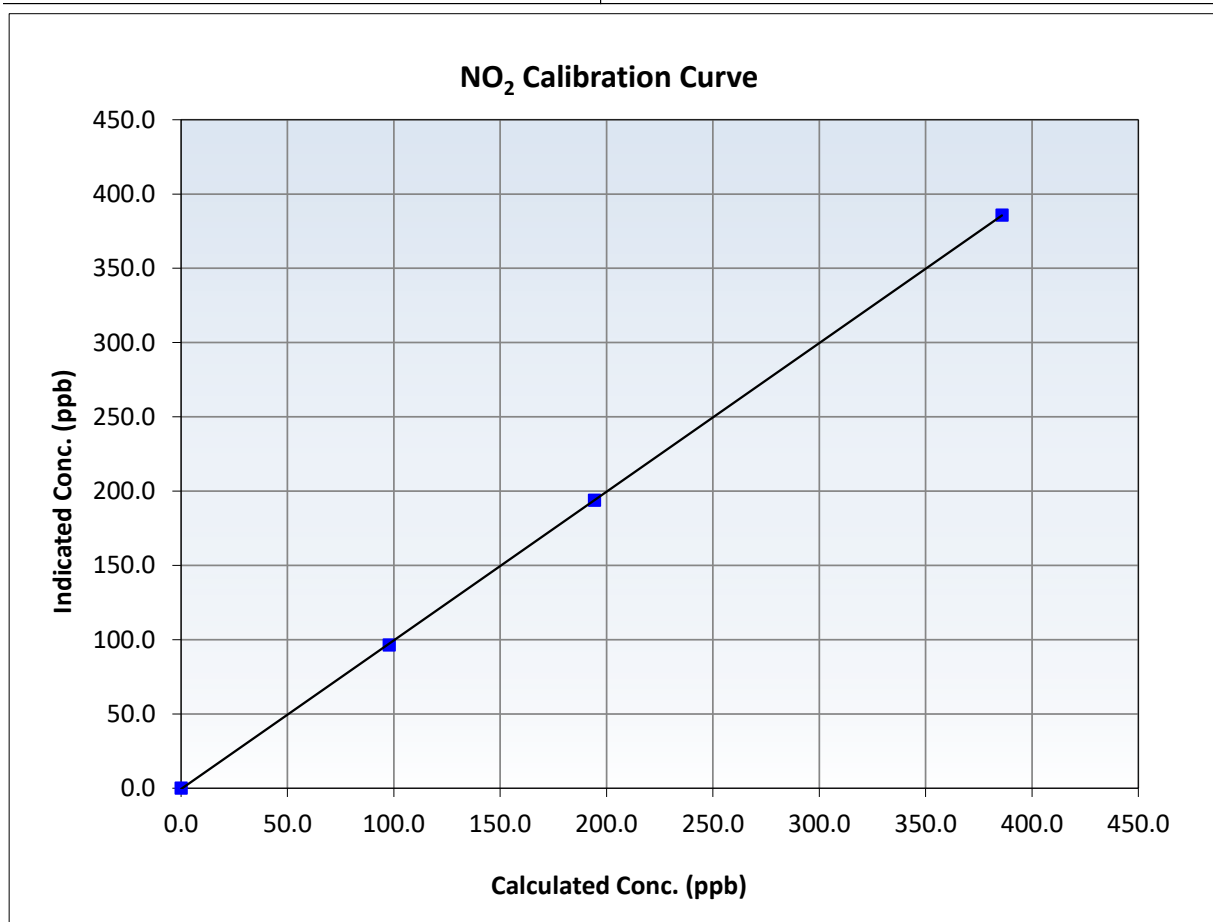
NO₂ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 22, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	9:45	End Time (MST):	14:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

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	0.999986	≥0.995
385.9	385.8	1.0002	Slope	1.000553	0.90 - 1.10
194.4	193.9	1.0025	Intercept	-0.531676	+/-20
97.8	96.5	1.0133			





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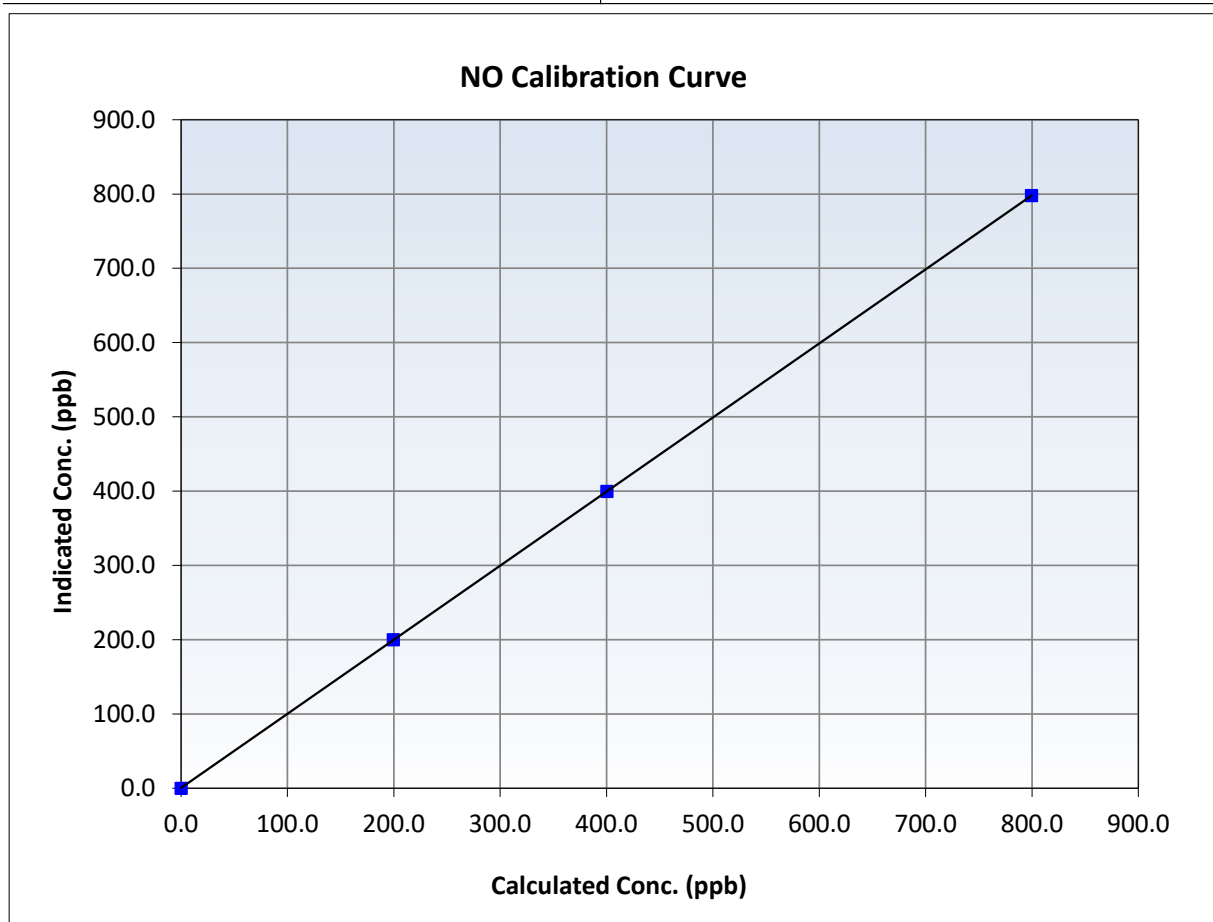
NO Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 22, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	9:45	End Time (MST):	14:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

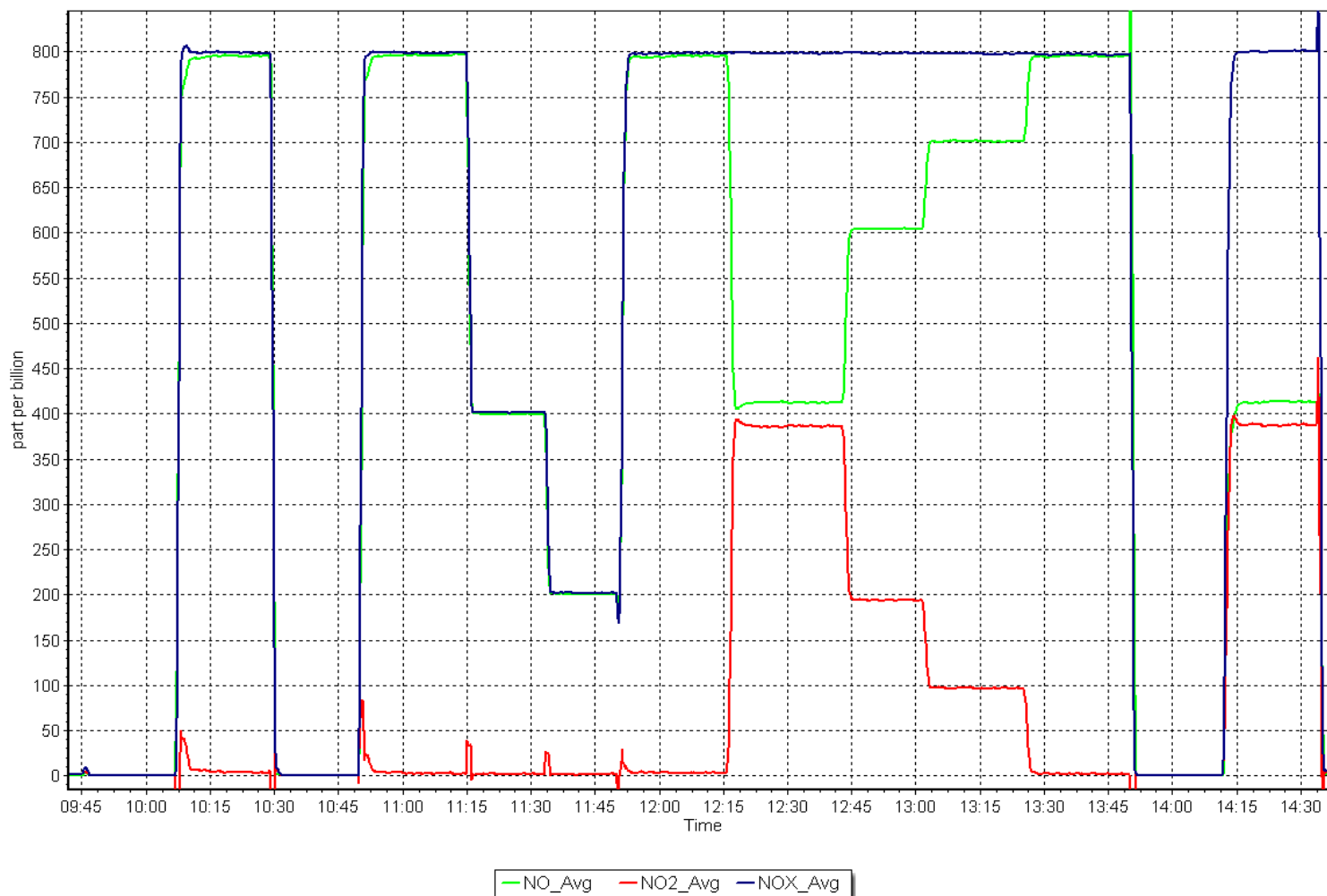
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999999	≥ 0.995
799.7	797.8	1.0023	Slope	0.997343	$0.90 - 1.10$
400.3	399.7	1.0015	Intercept	0.420117	± 20
199.7	200.1	0.9979			



NO_x Calibration Plot

Date: September 9, 2024

Location: Firebag





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20 MACKAY RIVER SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: MacKay River Station number: AMS 20
Calibration Date: September 13, 2024 Last Cal Date: August 12, 2024
Start time (MST): 6:43 End time (MST): 9:17
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.22 ppm Cal Gas Exp Date: February 23, 2025
Cal Gas Cylinder #: CC30686
Removed Cal Gas Conc: 49.22 ppm Rem Gas Exp Date:
Removed Gas Cyl #: Diff between cyl:
Calibrator Model: API T700 Serial Number: 1220
Zero Air Gen Model: API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1501301450
Analyzer Range: 0-1000ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995324	1.006460	Backgd or Offset:	18.5	18.5
Calibration intercept:	3.771262	3.071466	Coeff or Slope:	0.930	0.930

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4919	81.3	800.3	804.2	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	803.9	Previous response	800.3	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4919	81.3	800.3	807.7	0.991
Mid point	4959	40.7	400.7	406.0	0.987
Low point	4980	20.3	199.8	208.1	0.960
As left zero	5000	0.0	0.0	0.3	----
As left span	4919	81.3	800.3	805.3	0.994
Average Correction Factor:					0.979

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

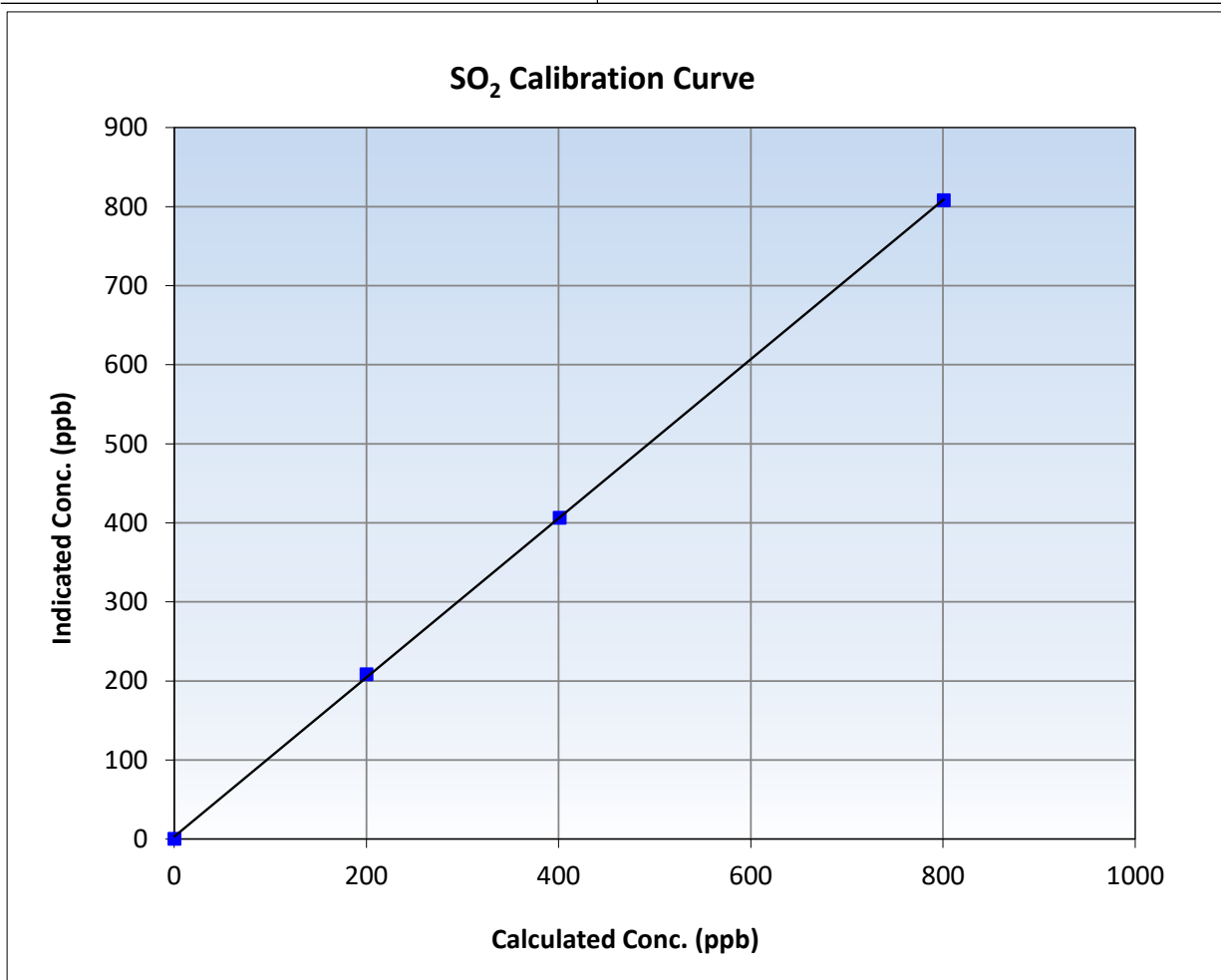
SO₂ Calibration Summary

Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 12, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:43	End Time (MST):	9:17
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

Calibration Data

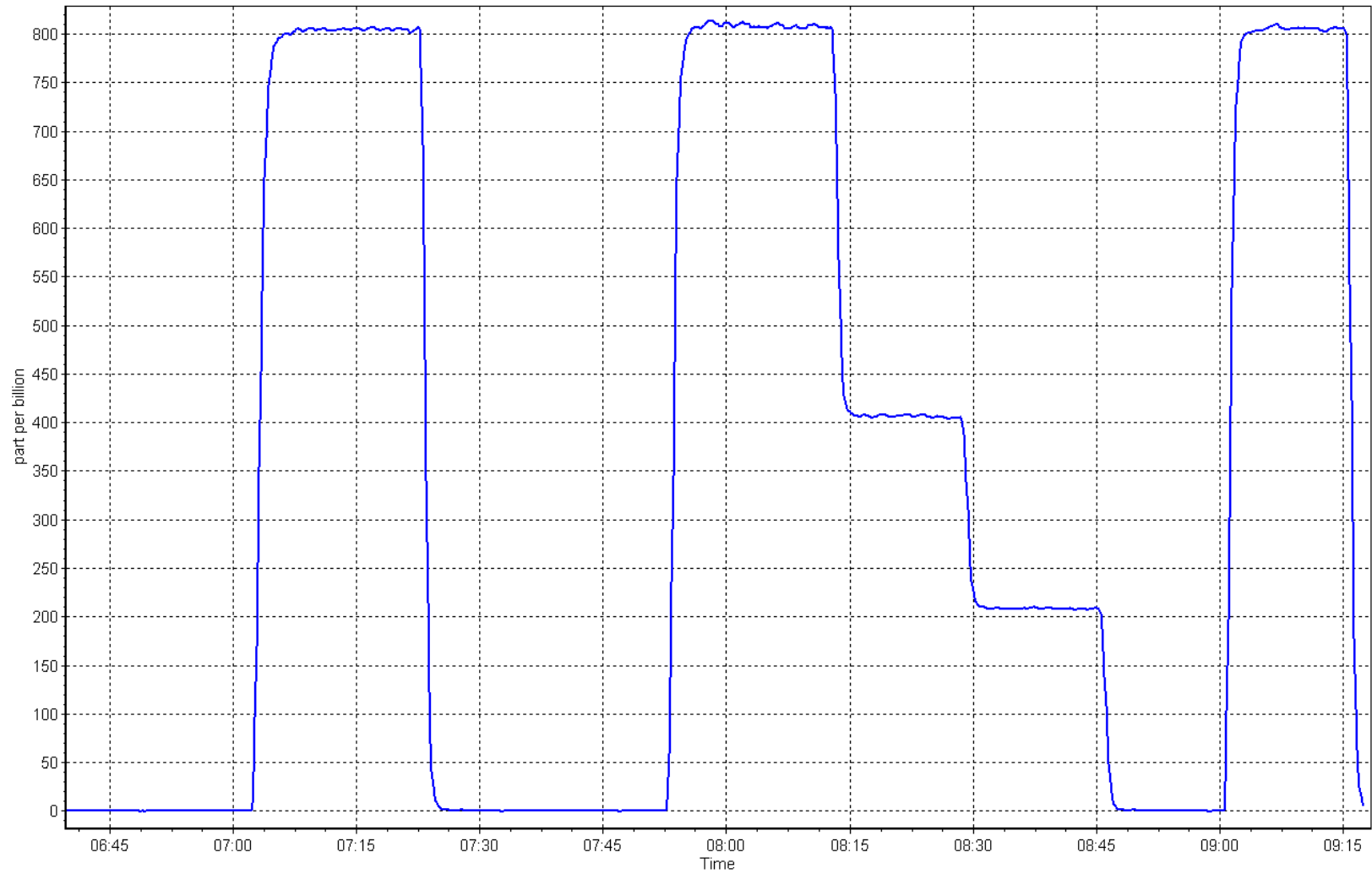
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3	----	Correlation Coefficient	0.999933	≥0.995
800.3	807.7	0.9908	Slope	1.006460	0.90 - 1.10
400.7	406.0	0.9869	Intercept	3.071466	+/-30
199.8	208.1	0.9602			



SO2 Calibration Plot

Date: September 13, 2024

Location: MacKay River





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: MacKay River
Calibration Date: September 11, 2024
Start time (MST): 6:40
Reason: Routine

Station number: AMS 20
Last Cal Date: August 6, 2024
End time (MST): 10:53

Calibration Standards

Cal Gas Concentration: 5.12 ppm
Cal Gas Cylinder #: CC515997
Removed Cal Gas Conc: 5.12 ppm
Removed Gas Cyl #:
Calibrator Make/Model: API T700
ZAG Make/Model: API 701

Cal Gas Exp Date: January 3, 2026
Rem Gas Exp Date:
Diff between cyl:
Serial Number: 1220
Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 43i TLE
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1236656117
Converter serial #: 2022-226
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.986447	0.986589	Backgd or Offset:	3.43	3.43
Calibration intercept:	0.479260	0.599295	Coeff or Slope:	1.051	1.051

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4922	78.1	80.0	80.7	0.991
As found Mid point	4961	39.0	39.9	40.9	0.976
As found Low point	4980	19.5	20.0	20.8	0.960
New cylinder response					
Baseline Corr As found:	80.7	Prev response:	79.37	*% change:	1.7%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.007166	AF Intercept:	0.379722
Baseline Corr 3rd AF pt:	20.8	AF Correlation:	0.999893	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4922	78.1	80.0	79.3	1.008
Mid point	4961	39.0	39.9	40.2	0.993
Low point	4980	19.5	20.0	20.7	0.965
As left zero	5000	0.0	0.0	0.3	----
As left span	4922	78.1	80.0	78.4	1.020
SO2 Scrubber Check	4982	81.3	802.8	-0.1	----
Date of last scrubber change:	25-May-23		Ave Corr Factor		0.989
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

H₂S Calibration Summary

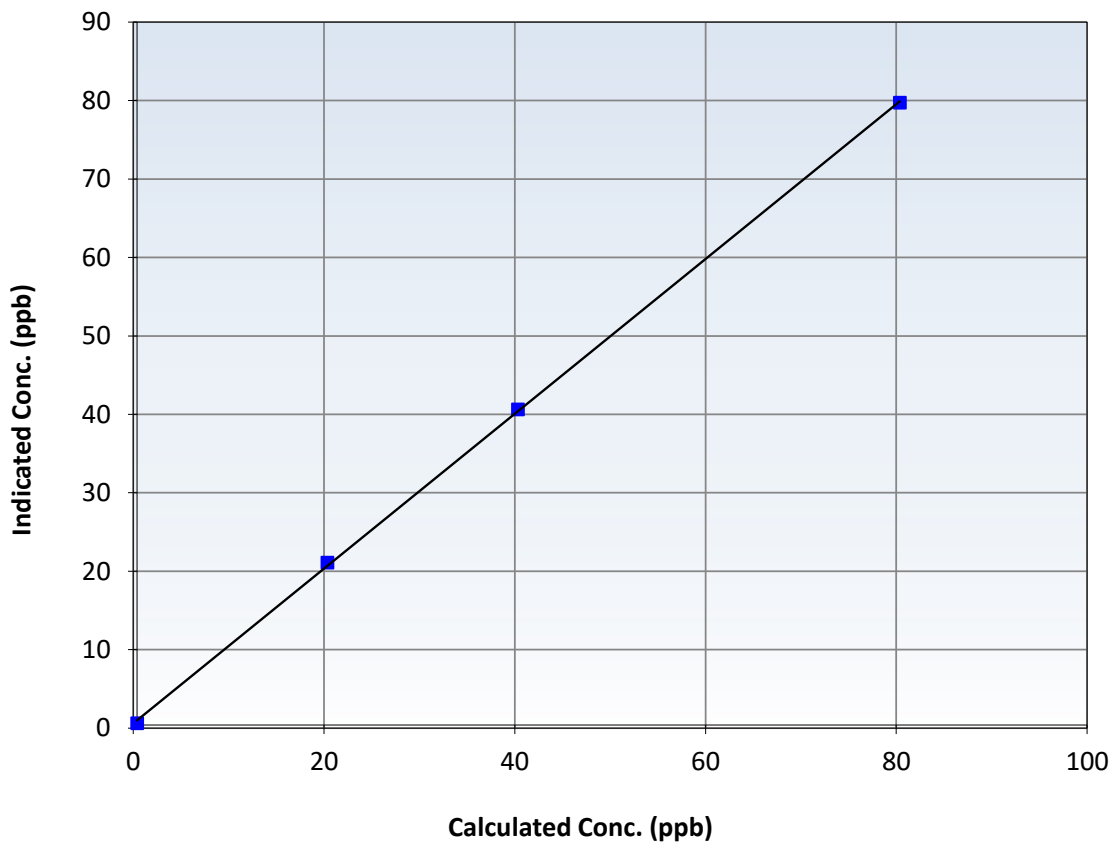
Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 6, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:40	End Time (MST):	10:53
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1236656117

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	0.999883	≥ 0.995
80.0	79.3	1.0085	Slope	0.986589	$0.90 - 1.10$
39.9	40.2	0.9934	Intercept	0.599295	± 3
20.0	20.7	0.9647			

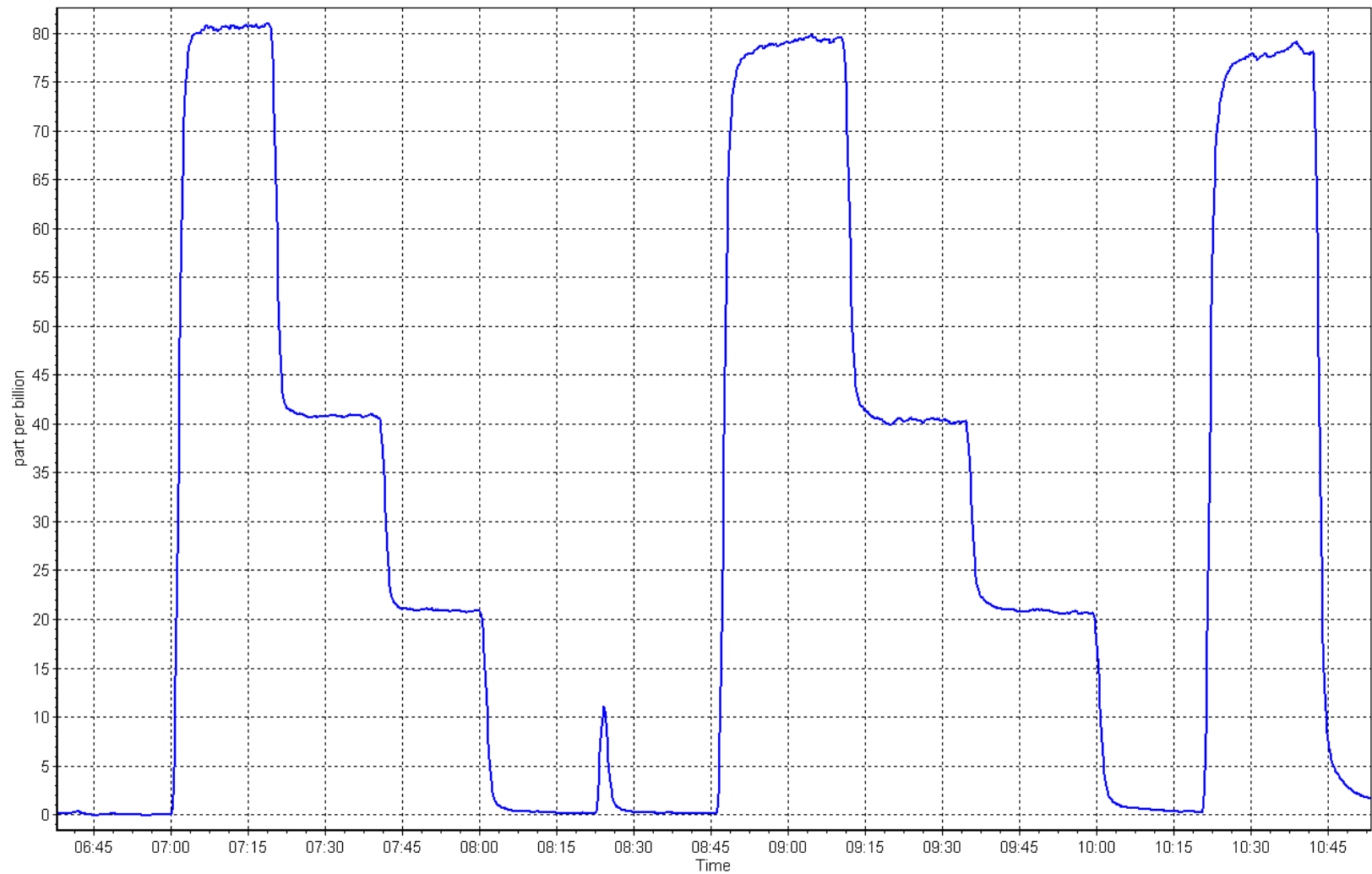
H₂S Calibration Curve



H₂S Calibration Plot

Date: September 11, 2024

Location: MacKay River





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name: MacKay River Station number: AMS 20
Calibration Gas Date: September 13, 2024 Last Cal Date: August 12, 2024
Start time (MST): 6:42 End time (MST): 9:17
Reason: Routine

Calibration Standards

Gas Cert Reference: CC306868 Cal Gas Expiry Date: February 23, 2024
CH4 Cal Gas Conc. 499.4 ppm CH4 Equiv Conc. 1066.5 ppm
C3H8 Cal Gas Conc. 206.2 ppm
Removed Gas Cert: Removed Gas Expiry:
Removed CH4 Conc. 499.4 ppm CH4 Equiv Conc. 1066.5 ppm
Removed C3H8 Conc. 206.2 ppm Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 1220
ZAG Make/Model: API 701 Serial Number: 4522

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1501663727
Analyzer Range: 0 - 20 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995938	0.989360	Background:	3.090	3.300
Calibration intercept:	0.069221	0.065387	Coefficient:	5.361	5.210

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.20	----
As found High point	4919	81.3	17.34	18.03	0.973
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.83	Previous response	17.34	*% change	2.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.09	----
High point	4919	81.3	17.34	17.23	1.006
Mid point	4959	40.7	8.68	8.65	1.003
Low point	4980	20.3	4.33	4.32	1.003
As left zero	5000	0.0	0.00	-0.24	----
As left span	4919	81.3	17.34	17.22	1.007
Average Correction Factor					1.004

Notes: Hydrogen cylinder change. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC Calibration Summary

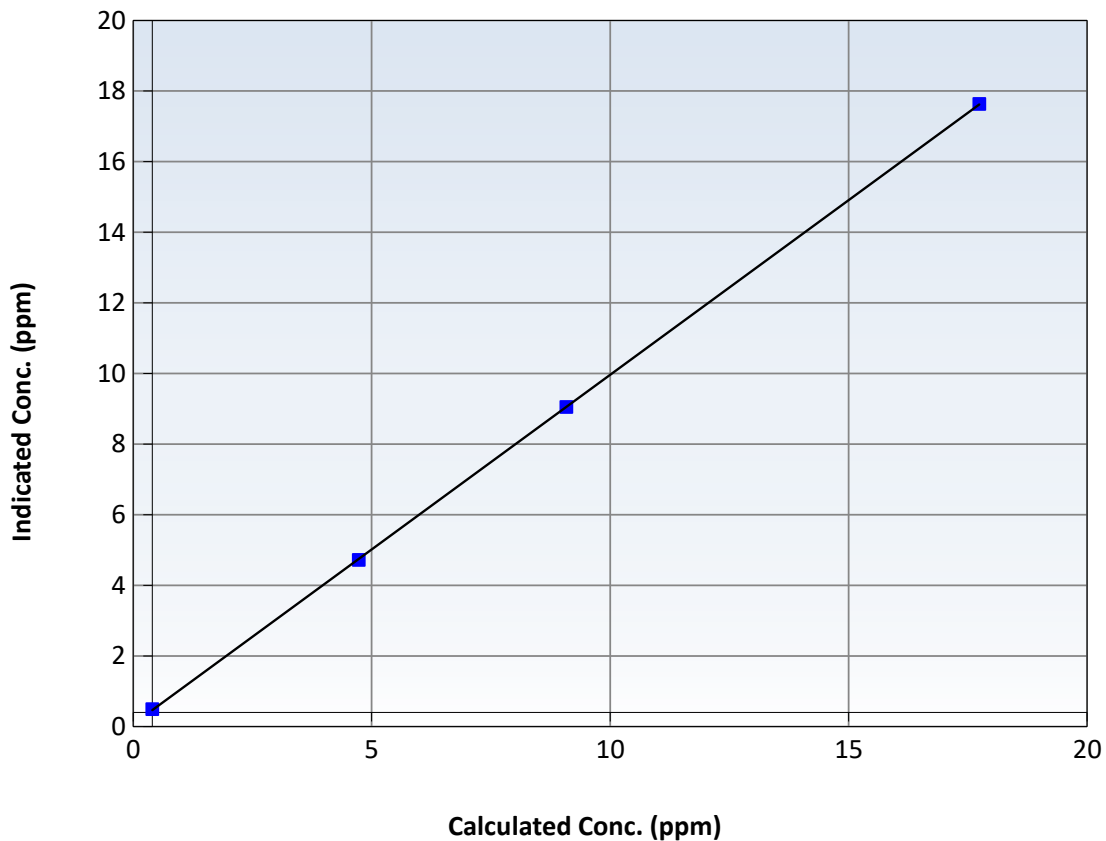
Station Information

Calibration Date:	September 13, 2024	Previous Calibration:	August 12, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:42	End Time (MST):	9:17
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.09	----	Correlation Coefficient	0.999988	≥ 0.995
17.34	17.23	1.0064	Slope	0.989360	$0.90 - 1.10$
8.68	8.65	1.0034	Intercept	0.065387	± 1.5
4.33	4.32	1.0034			

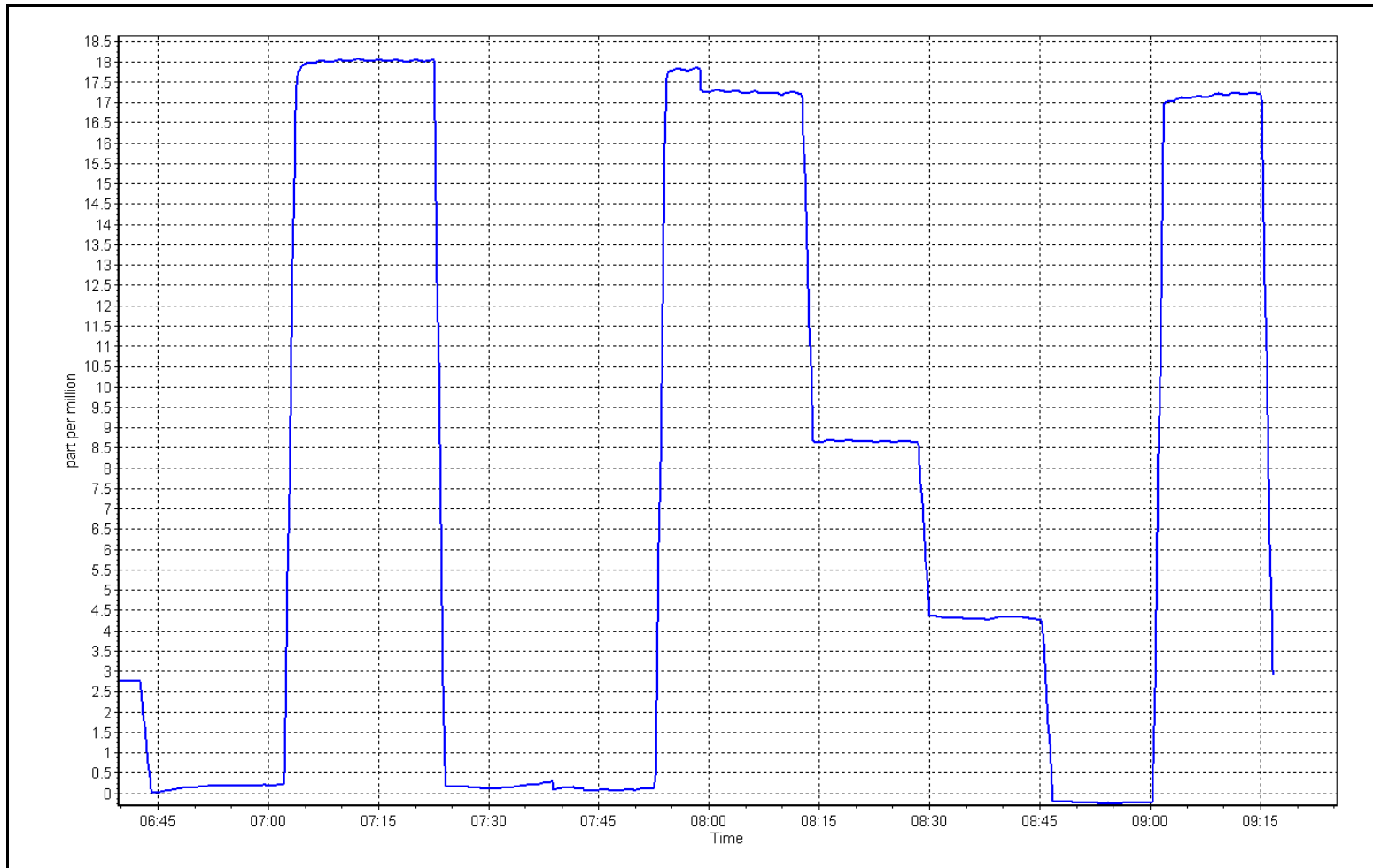
THC Calibration Curve



THC Calibration Plot

Date: September 13, 2024

Location: MacKay River





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: MacKay River
Station number: AMS 20
Calibration Date: September 9, 2024
Last Cal Date: August 7, 2024
Start time (MST): 6:35
End time (MST): 10:50
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T376265
NOX Cal Gas Conc: 49.19 ppm
Removed Cylinder #:
Removed Gas NOX Conc: 49.19 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701
Cal Gas Expiry Date: April 13, 2025
NO Cal Gas Conc: 48.04 ppm
Removed Gas Exp Date:
Removed Gas NO Conc: 48.04 ppm
NO gas Diff:
Serial Number: 1220
Serial Number: 4522

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
AF High point	4917	83.3	819.5	800.3	19.2	808.7	787.9	20.8	1.0133	1.0159
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 814.0 ppb	NO = 793.3 ppb	* = > +/-5% change initiates investigation			*Percent Change	NO _x = -0.7%			
Baseline Corr 1st pt	NO _x = 808.7 ppb	NO = 787.8 ppb	<u>As Found Statistics</u>			*Percent Change	NO = -0.7%			
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:			

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1505164379

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.997	1.013	NO bkgnd or offset:	2.8	2.8
NOX coeff or slope:	0.994	0.993	NOX bkgnd or offset:	3.0	3.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	159.4	159.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.987887	0.997788
NO _x Cal Offset:	4.502536	4.602226
NO Cal Slope:	0.986935	0.997472
NO Cal Offset:	3.442955	3.702631
NO ₂ Cal Slope:	1.003095	1.000948
NO ₂ Cal Offset:	-0.004612	-0.433255

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
High point	4917	83.3	819.5	800.3	19.2	820.2	800.4	19.8	0.9991	0.9999
Mid point	4958	41.7	410.3	400.7	9.6	415.6	404.6	11.0	0.9872	0.9903
Low point	4979	20.8	204.6	199.9	4.8	213.7	206.9	6.8	0.9576	0.9659
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
As left span	4917	83.3	819.5	441.9	377.6	819.7	441.9	377.8	0.9997	1.0000
Average Correction Factor									0.9813	0.9854

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	798.4	441.6	376.0	376.0	0.9999	100.0%
Mid GPT point	798.4	612.9	204.7	204.5	1.0008	99.9%
Low GPT point	798.4	702.5	115.1	114.2	1.0075	99.3%
Average Correction Factor					1.0027	99.7%

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

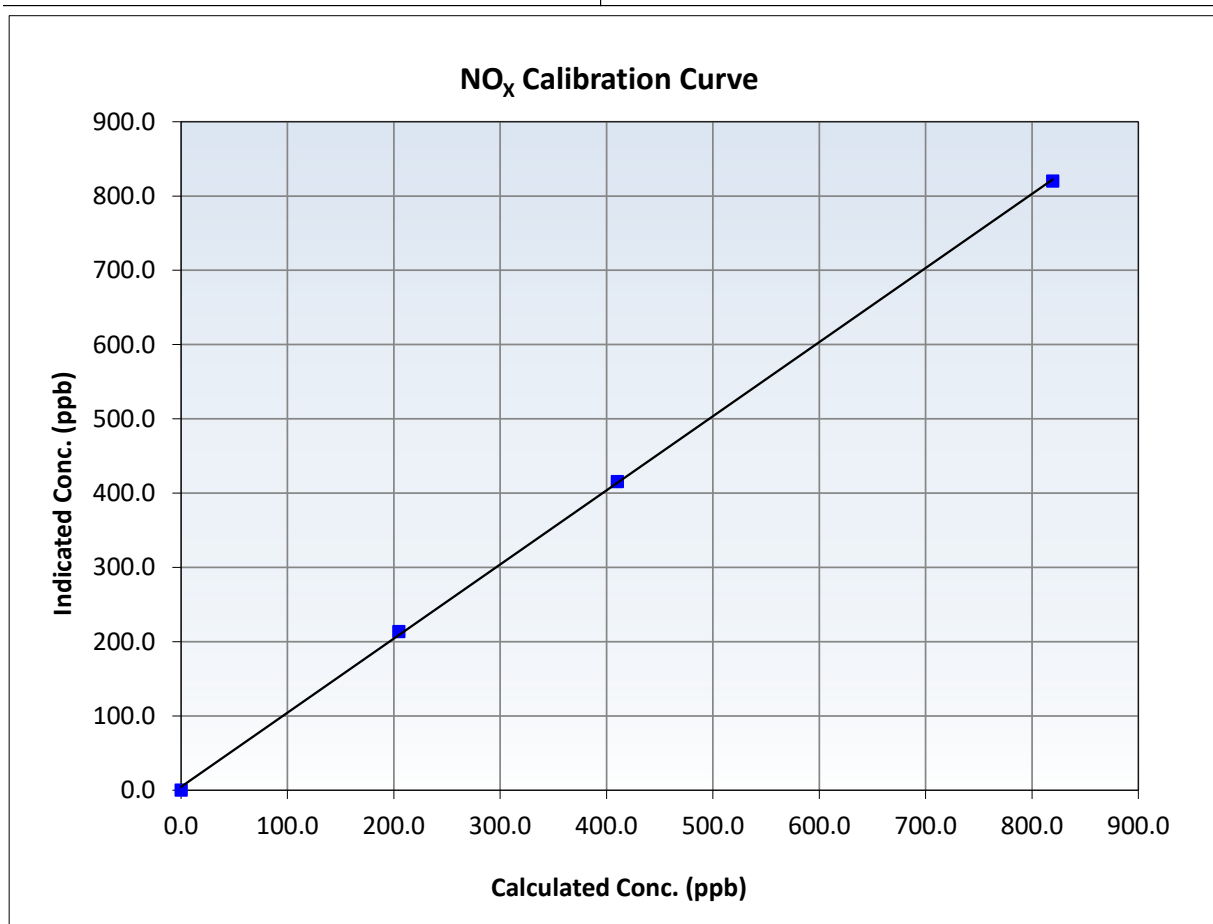
NO_x Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 7, 2024
Station Name:	Mackay River	Station Number:	AMS 20
Start Time (MST):	6:35	End Time (MST):	10:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

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	0.999860	≥0.995
819.5	820.2	0.9991	Slope	0.997788	0.90 - 1.10
410.3	415.6	0.9872	Intercept	4.602226	+/-20
204.6	213.7	0.9576			





Wood Buffalo Environmental Association

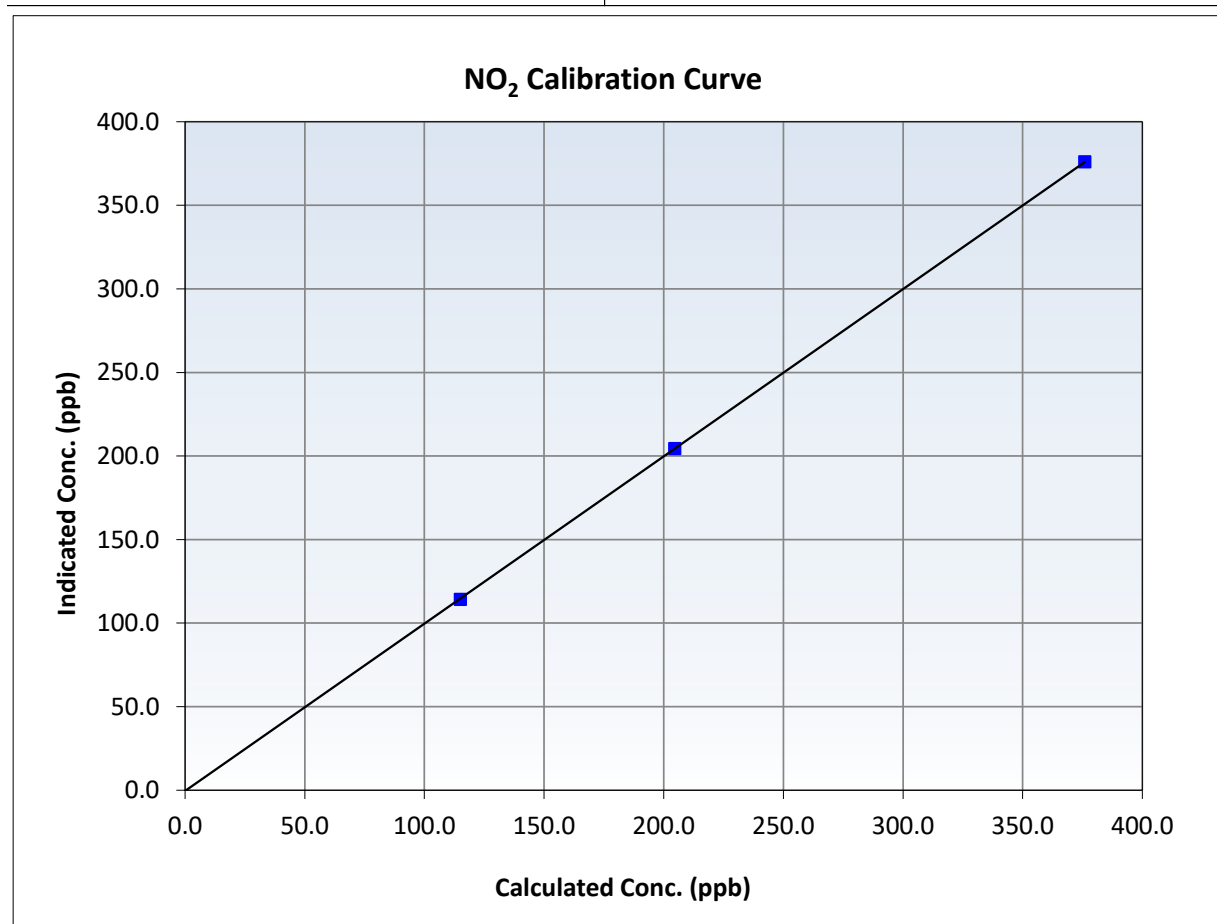
NO₂ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 7, 2024
Station Name:	Mackay River	Station Number:	AMS 20
Start Time (MST):	6:35	End Time (MST):	10:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

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	0.999994	≥ 0.995
376.0	376.0	0.9999	Slope	1.000948	$0.90 - 1.10$
204.7	204.5	1.0008	Intercept	-0.433255	± 20
115.1	114.2	1.0075			





Wood Buffalo Environmental Association

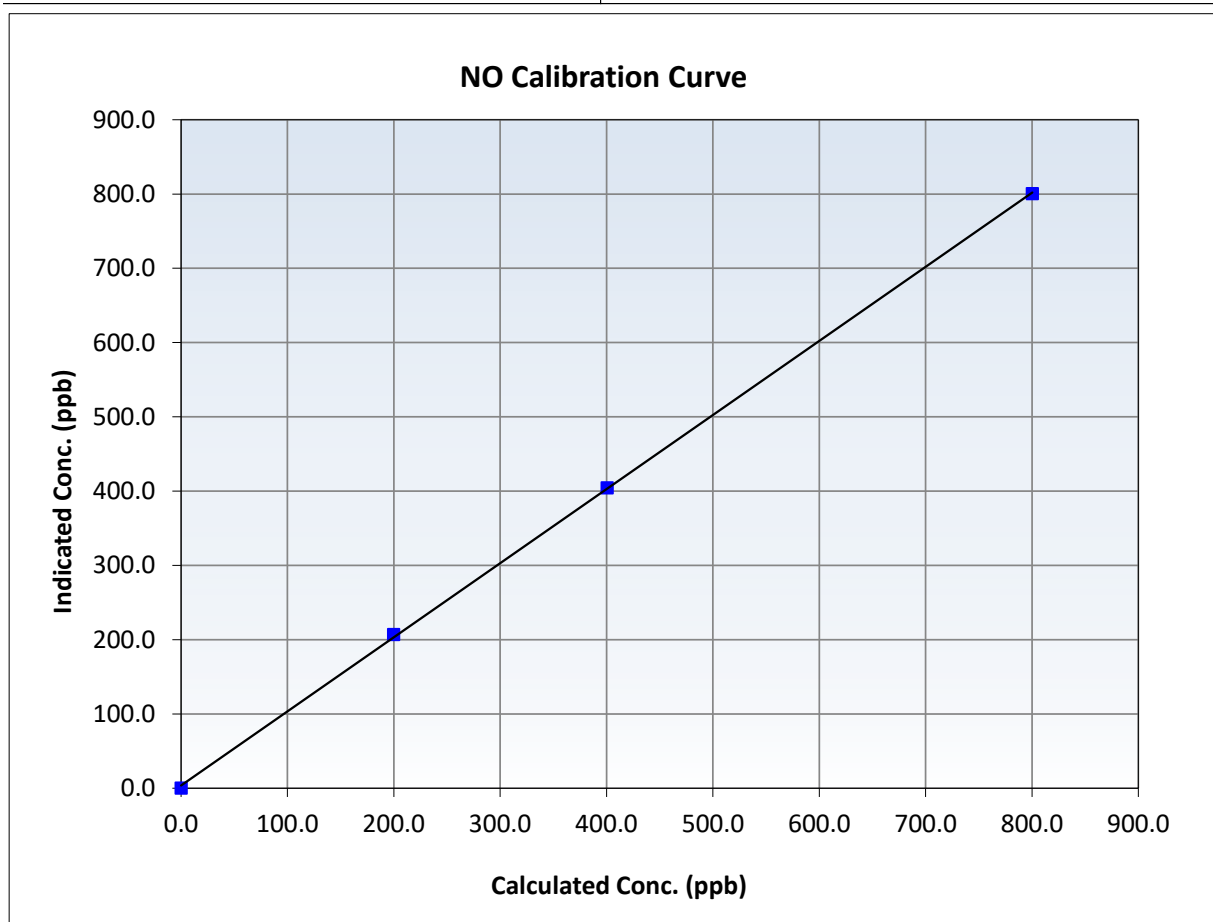
NO Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 7, 2024
Station Name:	Mackay River	Station Number:	AMS 20
Start Time (MST):	6:35	End Time (MST):	10:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

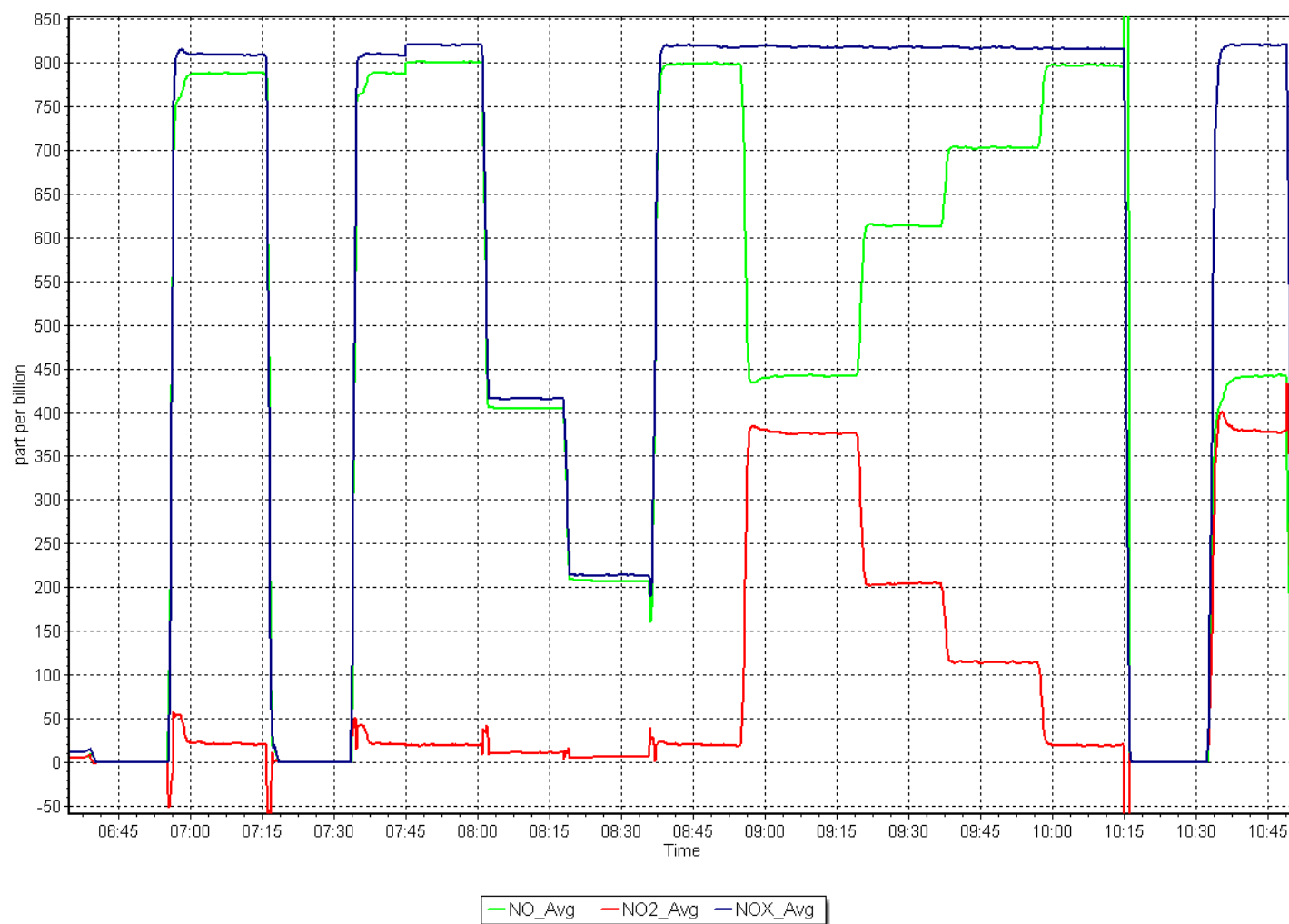
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999911	≥ 0.995
800.3	800.4	0.9999	Slope	0.997472	$0.90 - 1.10$
400.7	404.6	0.9903	Intercept	3.702631	± 20
199.9	206.9	0.9659			



NO_x Calibration Plot

Date: September 9, 2024

Location: MacKay River





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

**AMS21
CONKLIN
SEPTEMBER 2024**

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Conklin
Calibration Date: September 9, 2024
Start time (MST): 10:39
Reason: Routine

Station number: AMS 21
Last Cal Date: August 1, 2024
End time (MST): 14:13

Calibration Standards

Cal Gas Concentration: 49.93 ppm
Cal Gas Cylinder #: CC259455
Removed Cal Gas Conc: 49.93 ppm
Removed Gas Cyl #: NA
Calibrator Model: Teledyne API T700
Zero Air Gen Model: Teledyne API T701

Cal Gas Exp Date: January 5, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 5252
Serial Number: 953

Analyzer Information

Analyzer make: Thermo 43i
Analyzer Range: 0 - 1000 ppb

Serial Number: 1428701363

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999945	0.999945	Backgd or Offset:	28.3	27.5
Calibration intercept:	-0.404202	-0.304200	Coeff or Slope:	0.871	0.861

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.6	----
As found High point	4920	80.2	800.8	809.1	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	809.7	Previous response	800.4	*% change	1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4920	80.2	800.8	800.7	1.000
Mid point	4960	40.1	400.4	399.6	1.002
Low point	4980	20.0	200.1	200.0	1.001
As left zero	5005	0.0	0.0	-0.2	----
As left span	4920	80.2	800.8	801.0	1.000
Average Correction Factor:					1.001

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

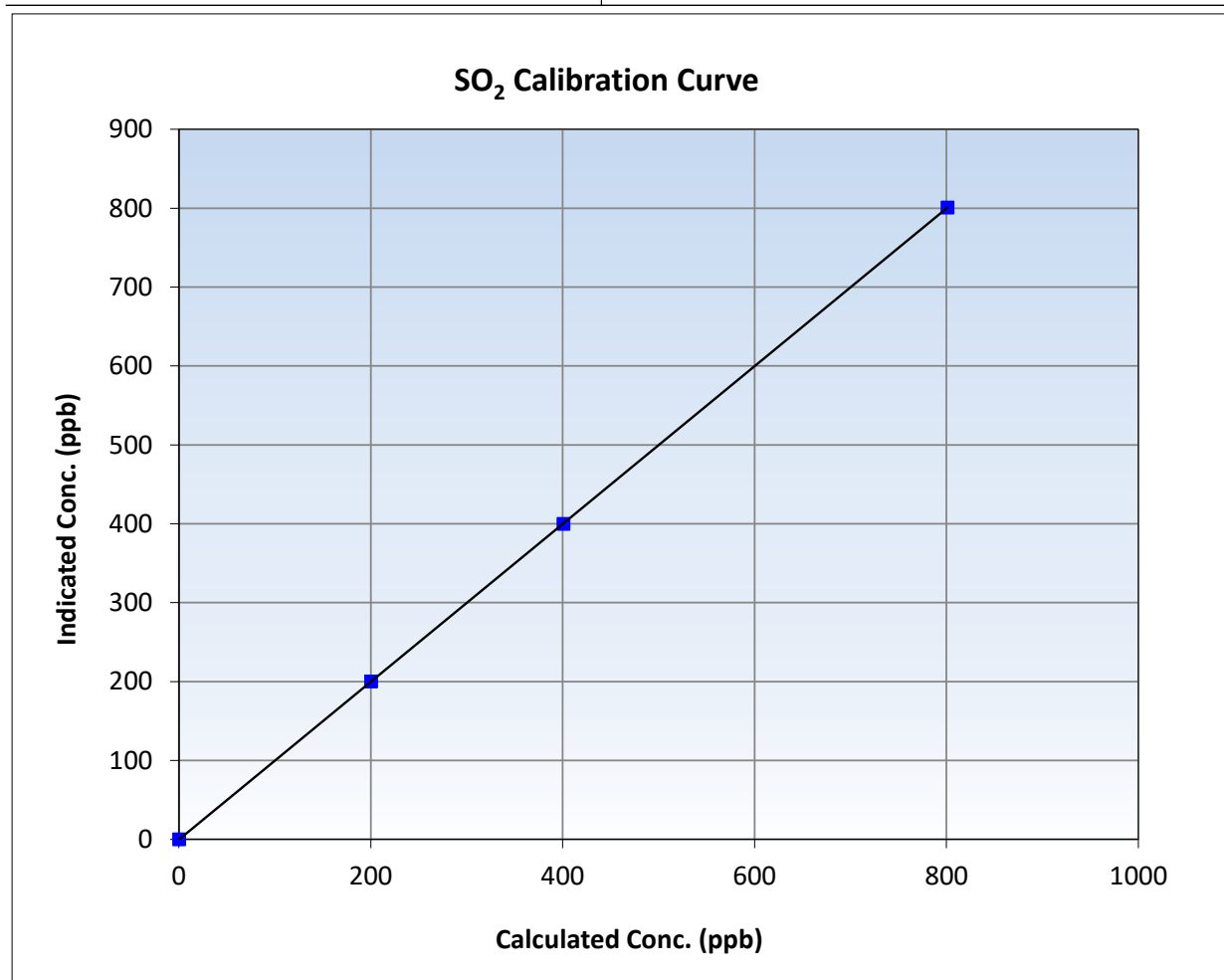
SO₂ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 1, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:39	End Time (MST):	14:13
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363

Calibration Data

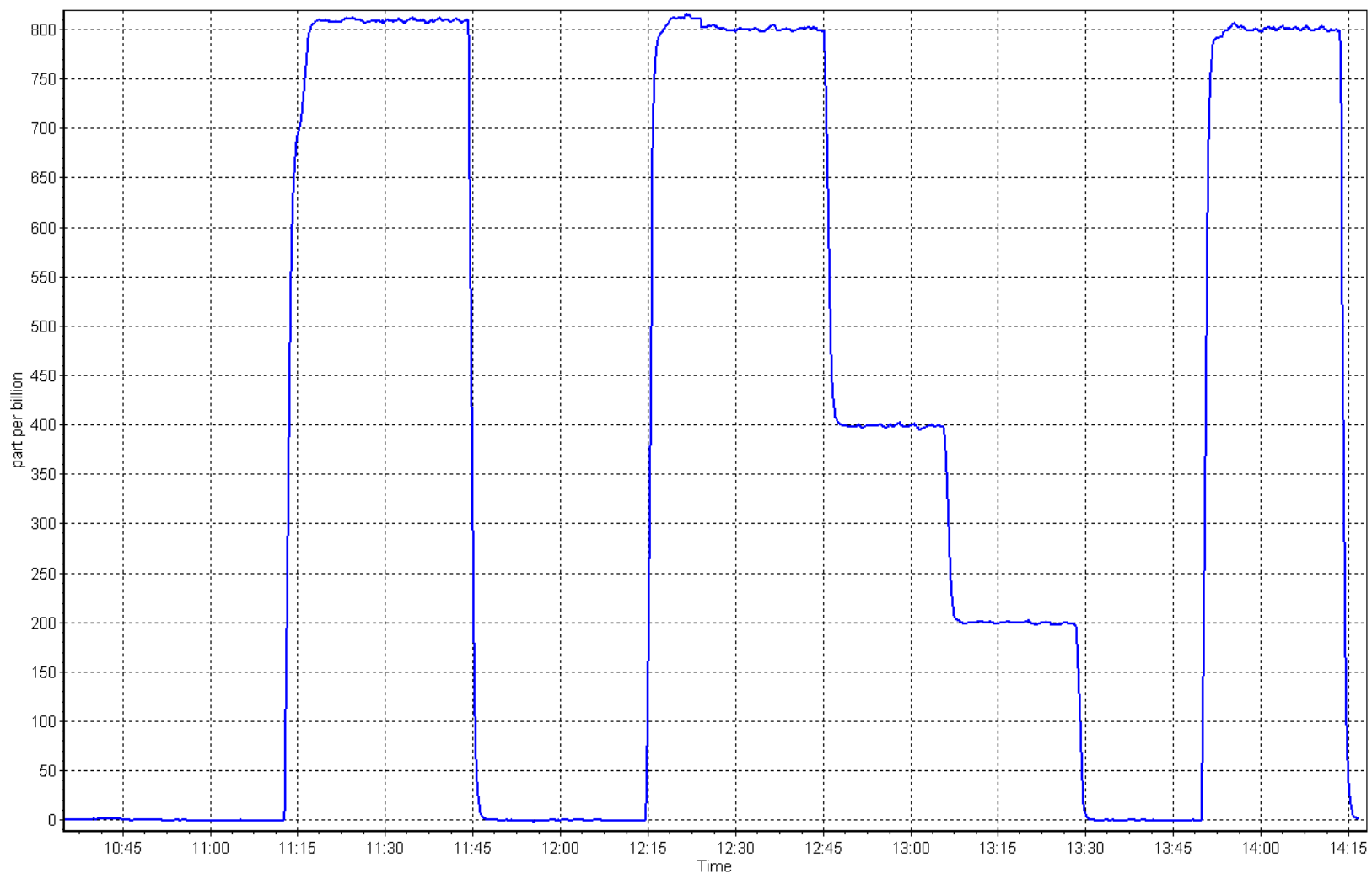
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999999	≥0.995
800.8	800.7	1.0002	Slope	0.999945	0.90 - 1.10
400.4	399.6	1.0021	Intercept	-0.304200	+/-30
200.1	200.0	1.0006			



SO2 Calibration Plot

Date: September 9, 2024

Location: Conklin





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Conklin
Calibration Date: September 12, 2024
Start time (MST): 9:30
Reason: Routine

Station number: AMS 21
Last Cal Date: August 21, 2024
End time (MST): 13:47

Calibration Standards

Cal Gas Concentration: 5.00 ppm
Cal Gas Cylinder #: CC501204
Removed Cal Gas Conc: 5.00 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne T700
ZAG Make/Model: Teledyne T701

Cal Gas Exp Date: January 3, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 5252
Serial Number: 953

Analyzer Information

Analyzer make: Thermo 43i-QTL
Converter make: CD-Nova 101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 12228021058
Converter serial #: 565
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001714	1.008143	Backgd or Offset:	2.3	2.4
Calibration intercept:	-0.260000	-0.260000	Coeff or Slope:	1.456	1.489

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	80.0	80.0	78.8	1.015
As found Mid point	4960	40.0	40.0	39.3	1.018
As found Low point	4980	20.0	20.0	19.4	1.031
New cylinder response					
Baseline Corr As found:	78.8	Prev response:	79.88	*% change:	-1.4%
Baseline Corr 2nd AF pt:	39.3	AF Slope:	0.986143	AF Intercept:	-0.140000
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999984	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4920	80.0	80.0	80.5	0.994
Mid point	4960	40.0	40.0	40.1	0.998
Low point	4980	20.0	20.0	19.4	1.031
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	80.0	80.0	80.6	0.993
SO2 Scrubber Check	4920	80.2	802.0	0.1	----
Date of last scrubber change:	July 9, 2024		Ave Corr Factor		1.007
Date of last converter efficiency test:					

Notes: Sample inlet filters was changed after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. Adjusted span only.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

TRS Calibration Summary

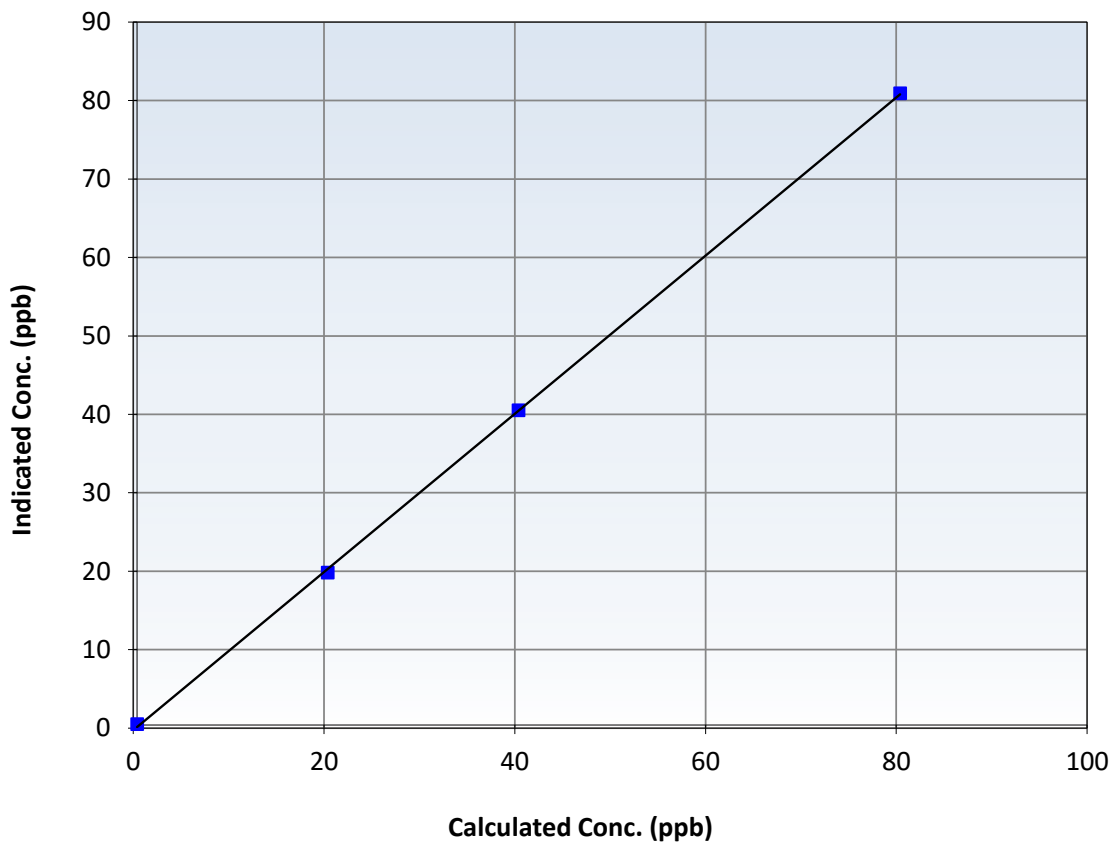
Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 21, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:30	End Time (MST):	13:47
Analyzer make:	Thermo 43i-QTL	Analyzer serial #:	12228021058

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	0.999889		≥ 0.995
80.0	80.5	0.9938	Slope	1.008143		$0.90 - 1.10$
40.0	40.1	0.9975	Intercept	-0.260000		± 3
20.0	19.4	1.0309				

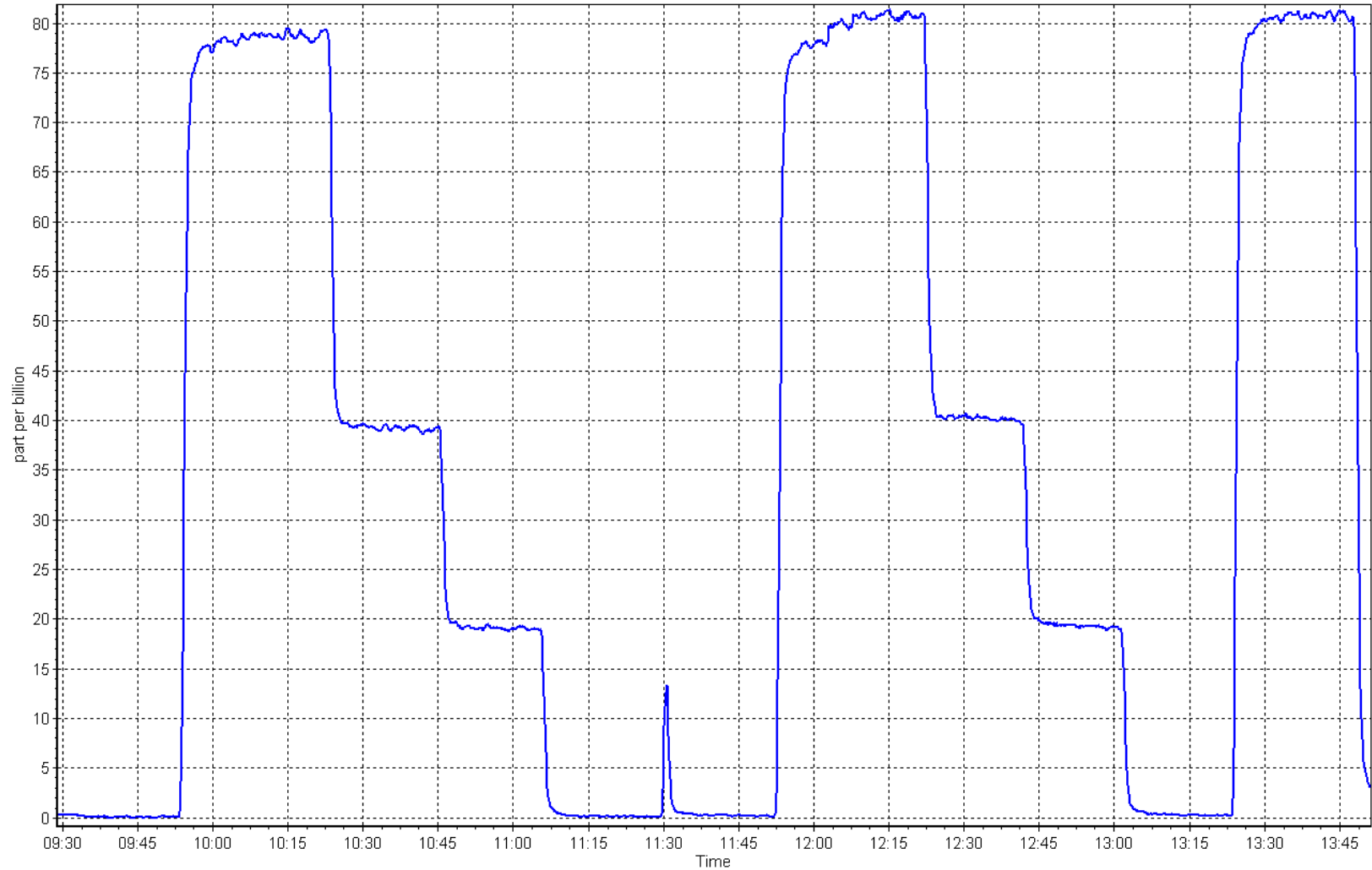
TRS Calibration Curve



TRS Calibration Plot

Date: September 12, 2024

Location: Conklin





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Conklin
 Calibration Date: September 9, 2024
 Start time (MST): 10:39
 Reason: Routine

Station number: AMS 21
 Last Cal Date: August 20, 2024
 End time (MST): 14:13

Calibration Standards

Gas Cert Reference:	CC259455	Cal Gas Expiry Date:	January 5, 2025
CH ₄ Cal Gas Conc.	497.9 ppm	CH ₄ Equiv Conc.	1067.7 ppm
C ₃ H ₈ Cal Gas Conc.	207.2 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH ₄ Conc.	497.9 ppm	CH ₄ Equiv Conc.	1067.7 ppm
Removed C ₃ H ₈ Conc.	207.2 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	5252
Zero Air Gen model:	Teledyne API T701	Serial Number:	953

Analyzer Information

Analyzer make: Thermo 55i
 THC Range: 0 - 20 ppm

Analyzer serial #: 1331259521
 NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.53E-04	2.69E-04	NMHC SP Ratio:	5.13E-05
CH ₄ Retention time:	14.2	14.0	NMHC Peak Area:	178280
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF
				5.48E-05
				166844
				OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.13	16.07	1.066
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.07	Prev response	16.98	*% change	-5.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.13	17.07	1.003
Mid point	4960	40.1	8.56	8.44	1.015
Low point	4980	20.0	4.28	4.20	1.020
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.11	1.001
Average Correction Factor					1.013

Notes:

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	9.14	8.57	1.066
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.57	Prev response	9.07	*% change	-5.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.14	9.11	1.003
Mid point	4960	40.1	4.57	4.54	1.007
Low point	4980	20.0	2.28	2.28	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.14	1.000
Average Correction Factor					1.004

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.2	7.99	7.50	1.064
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.50	Prev response	7.92	*% change	-5.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	7.99	7.96	1.003
Mid point	4960	40.1	3.99	3.90	1.024
Low point	4980	20.0	2.00	1.92	1.042
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	7.98	1.001
Average Correction Factor					1.023

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.993962	0.997505
THC Cal Offset:	-0.038840	-0.047639
CH ₄ Cal Slope:	0.995201	0.999008
CH ₄ Cal Offset:	-0.028646	-0.046446
NMHC Cal Slope:	0.993103	0.996430
NMHC Cal Offset:	-0.010594	-0.002392

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

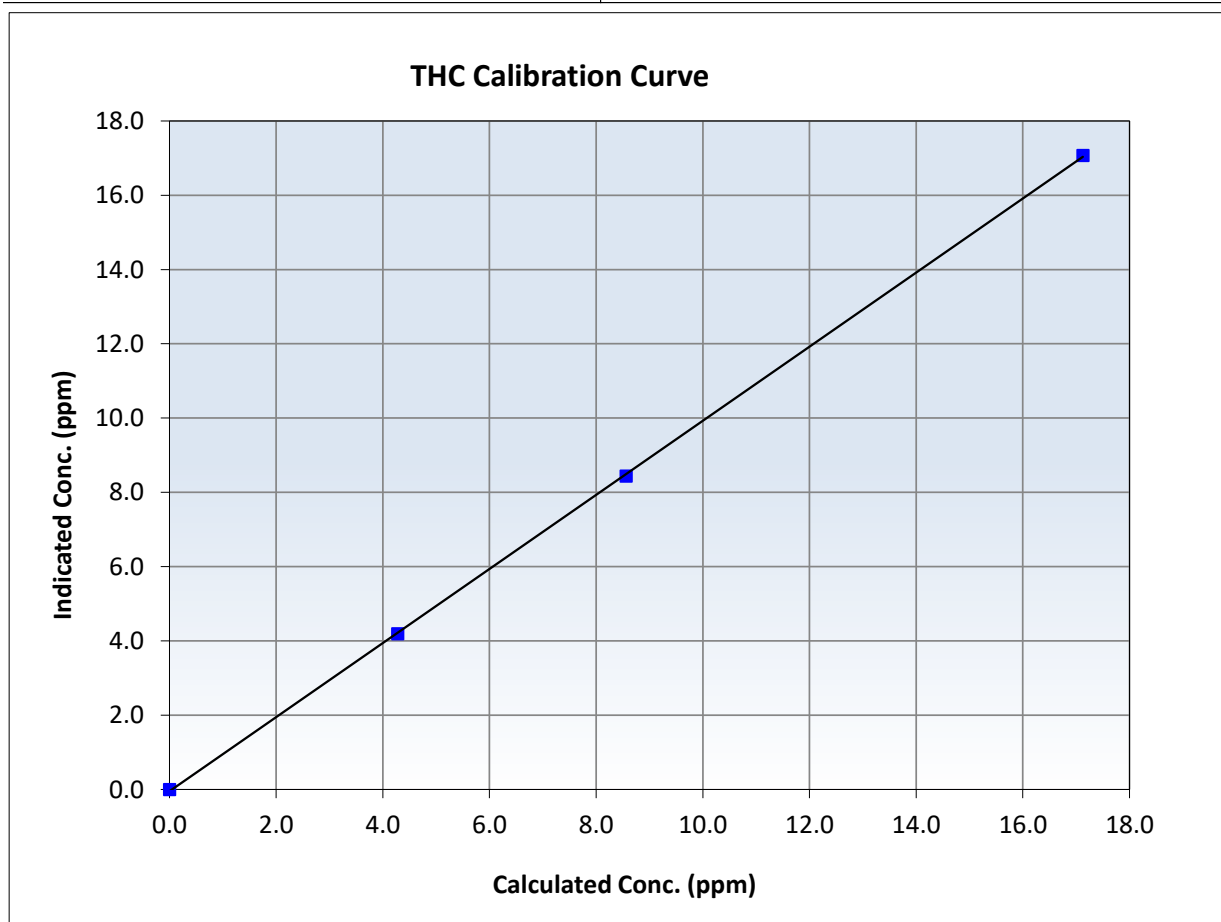
THC Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:39	End Time (MST):	14:13
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			Limits
0.00	0.00	----	Correlation Coefficient	0.999953		≥ 0.995
17.13	17.07	1.0032	Slope	0.997505		0.90 - 1.10
8.56	8.44	1.0150	Intercept	-0.047639		± 0.5
4.28	4.20	1.0199				





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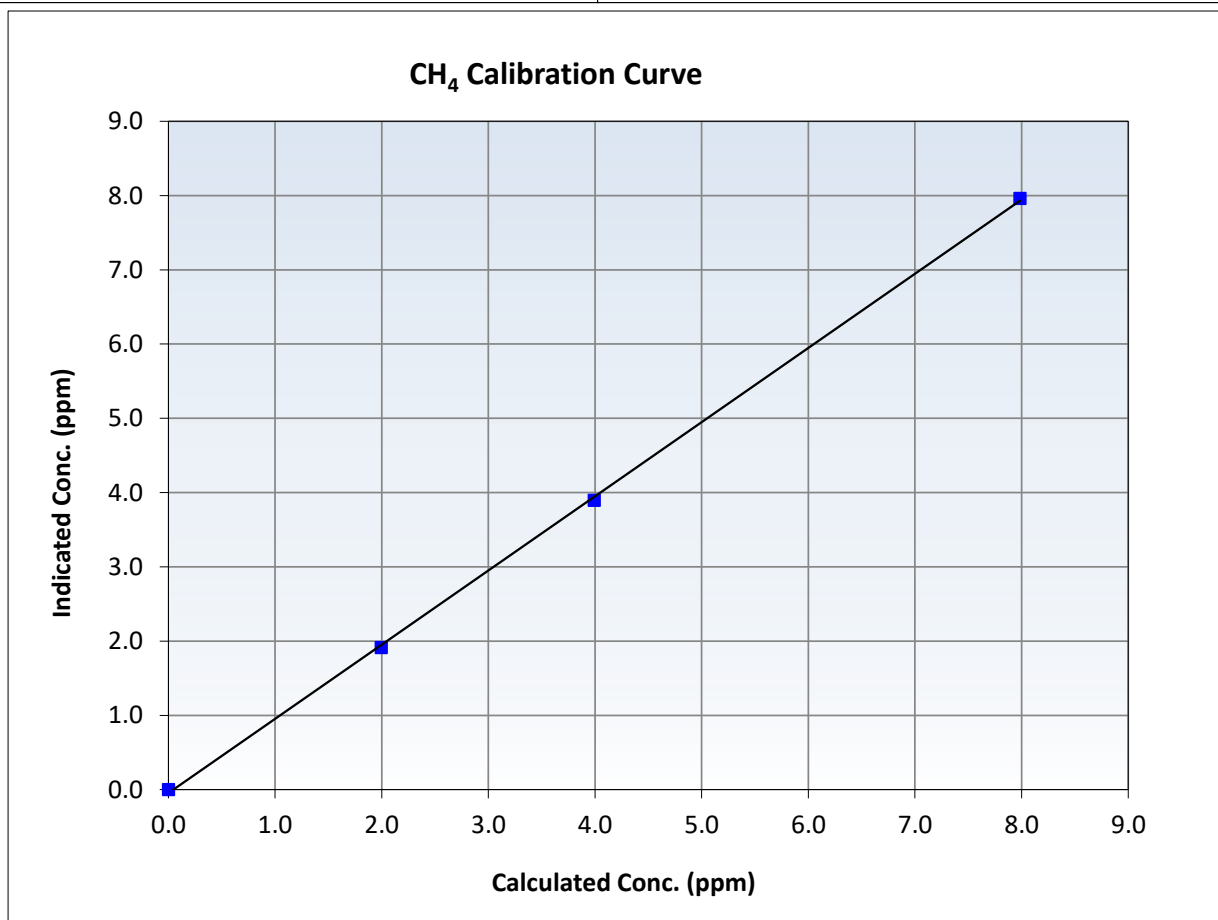
CH₄ Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:39	End Time (MST):	14:13
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999825	≥ 0.995
7.99	7.96	1.0030	Slope	0.999008	$0.90 - 1.10$
3.99	3.90	1.0244	Intercept	-0.046446	± 0.5
2.00	1.92	1.0421			





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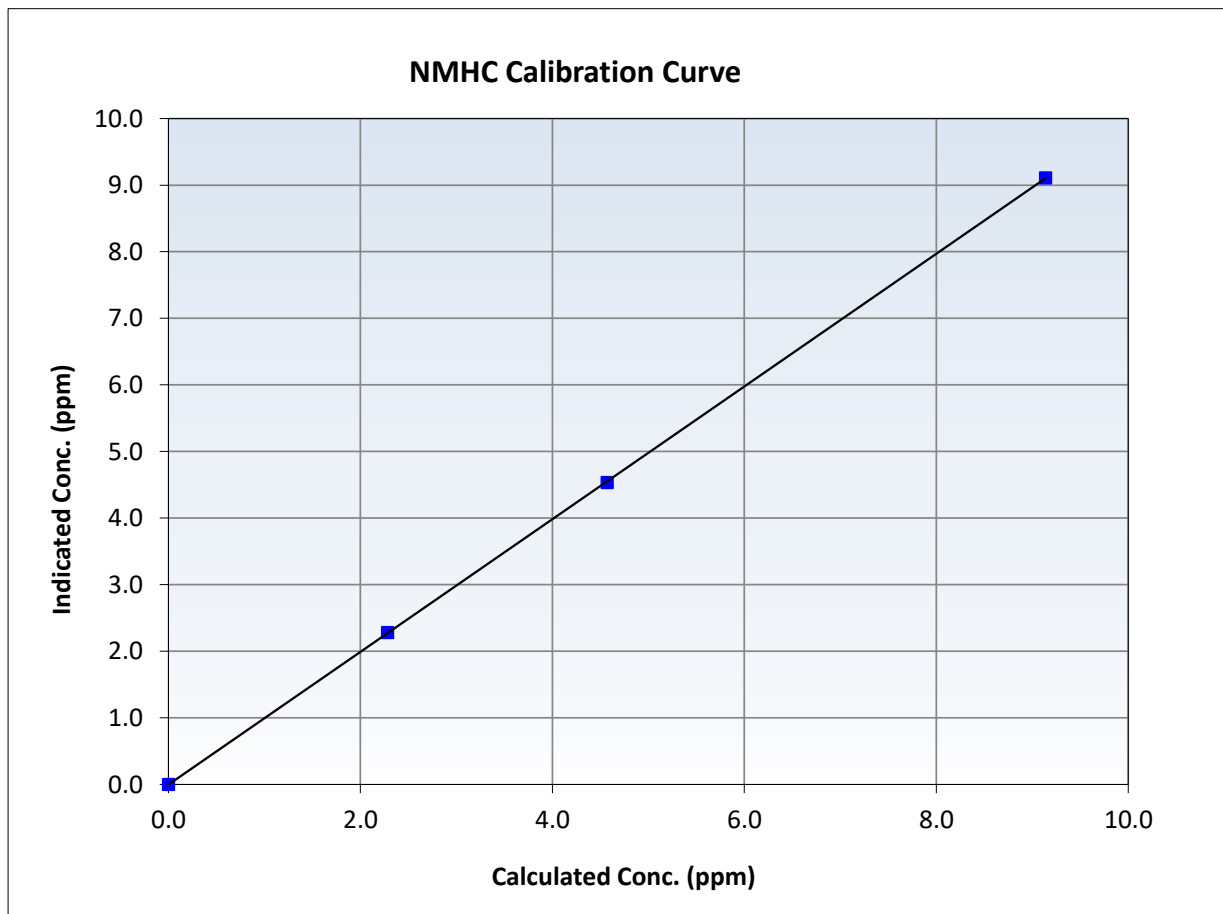
NMHC Calibration Summary

Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:39	End Time (MST):	14:13
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

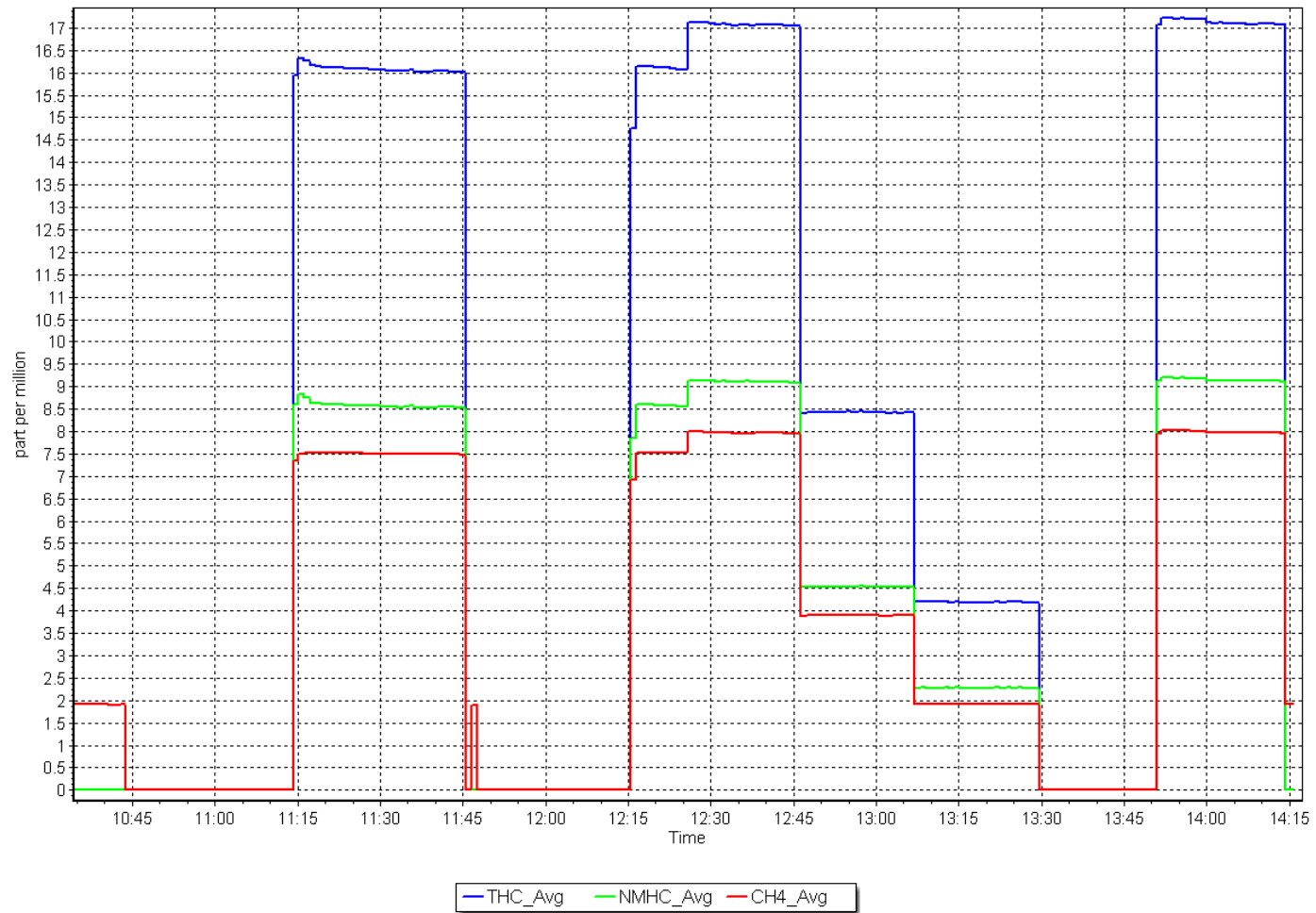
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999993	<i>≥0.995</i>
9.14	9.11	1.0032	Slope	0.996430	<i>0.90 - 1.10</i>
4.57	4.54	1.0074	Intercept	-0.002392	<i>+/-0.5</i>
2.28	2.28	1.0016			



NMHC Calibration Plot

Date: September 9, 2024

Location: Conklin





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Conklin
Station number: AMS 21
Calibration Date: September 19, 2024
Last Cal Date: August 28, 2024
Start time (MST): 9:13
End time (MST): 14:20
Reason: Routine

Calibration Standards

NO Gas Cylinder #: SA18828
NOX Cal Gas Conc: 48.90 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 48.90 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701H
Cal Gas Expiry Date: November 3, 2031
NO Cal Gas Conc: 48.80 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 48.80 ppm
NO gas Diff:
Serial Number: 5252
Serial Number: 953

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
AF High point	4918	82.0	802.0	800.3	1.6	816.4	812.4	4.1	0.9824	0.9853
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 803.1 ppb	NO = 801.0 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO _x = 1.6%
Baseline Corr 1st pt	NO _x = 816.3 ppb	NO = 812.3 ppb		*Percent Change	NO = 1.4%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb			
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb			

As Found Statistics

As found	NO _x r ² :	Nx SI:	Nx Int:
As found	NO r ² :	NO SI:	NO Int:
As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1501663731

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.019	1.003	NO bkgnd or offset:	9.5	9.4
NOX coeff or slope:	0.998	0.998	NOX bkgnd or offset:	9.6	9.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	148.5	147.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999143	0.997547
NO _x Cal Offset:	1.848037	1.508015
NO Cal Slope:	1.000291	0.997421
NO Cal Offset:	0.488003	0.467984
NO ₂ Cal Slope:	1.000736	1.002044
NO ₂ Cal Offset:	0.069057	0.101487

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.1	----	----
High point	4918	82.0	802.0	800.3	1.6	800.6	798.5	2.2	1.0017	1.0023
Mid point	4959	41.0	401.0	400.2	0.8	402.9	400.0	2.9	0.9952	1.0004
Low point	4980	20.5	200.5	200.1	0.4	202.3	200.1	2.3	0.9910	0.9998
As left zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.1	----	----
As left span	4918	82.0	802.0	414.8	387.2	798.8	414.8	384.0	1.0040	1.0000
Average Correction Factor									0.9960	1.0008

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.1	----	----
High GPT point	794.4	411.7	384.3	385.1	0.9980	100.2%
Mid GPT point	794.4	600.6	195.4	196.3	0.9956	100.4%
Low GPT point	794.4	703.7	92.3	92.4	0.9994	100.1%
Average Correction Factor					0.9977	100.2%

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

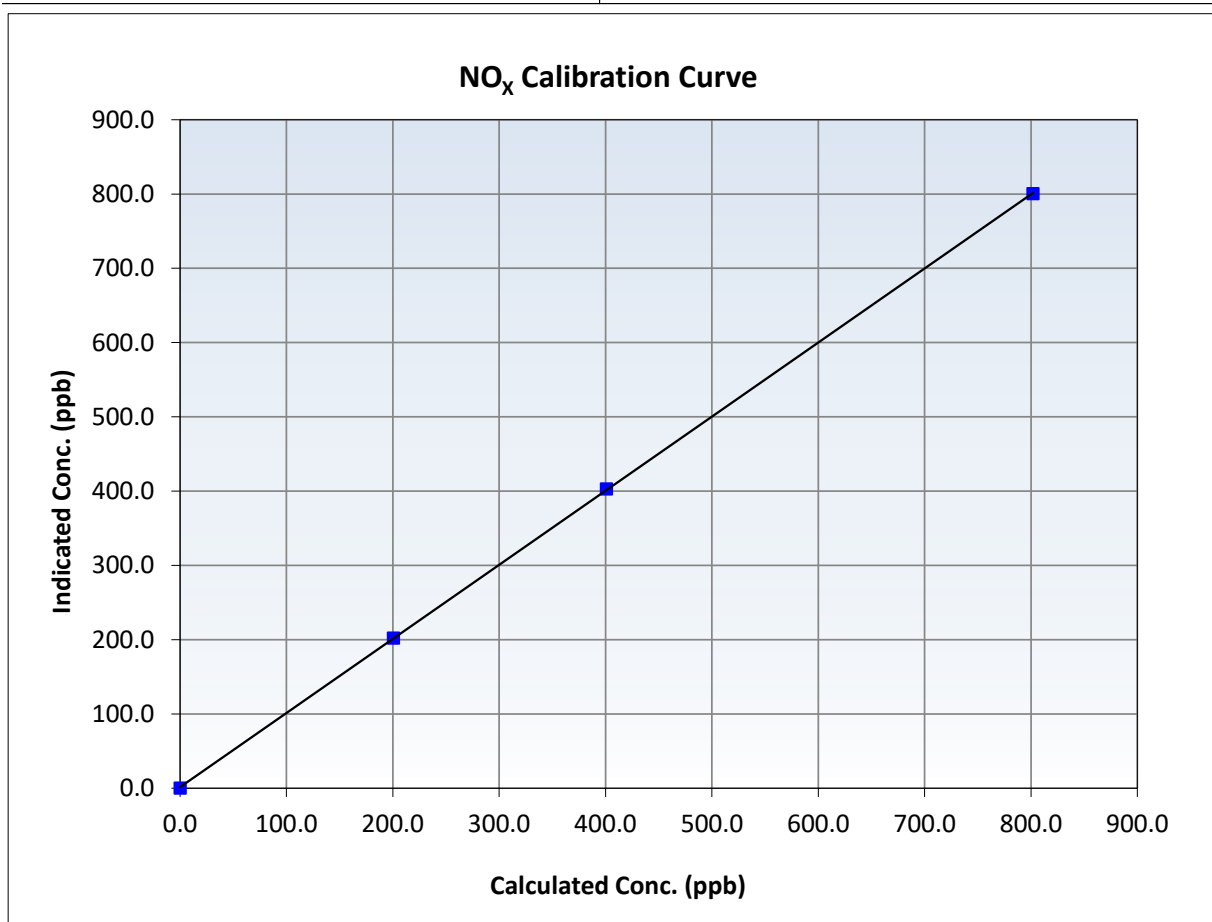
NO_x Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:13	End Time (MST):	14:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

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	0.999985	≥0.995
802.0	800.6	1.0017	Slope	0.997547	0.90 - 1.10
401.0	402.9	0.9952	Intercept	1.508015	+/-20
200.5	202.3	0.9910			





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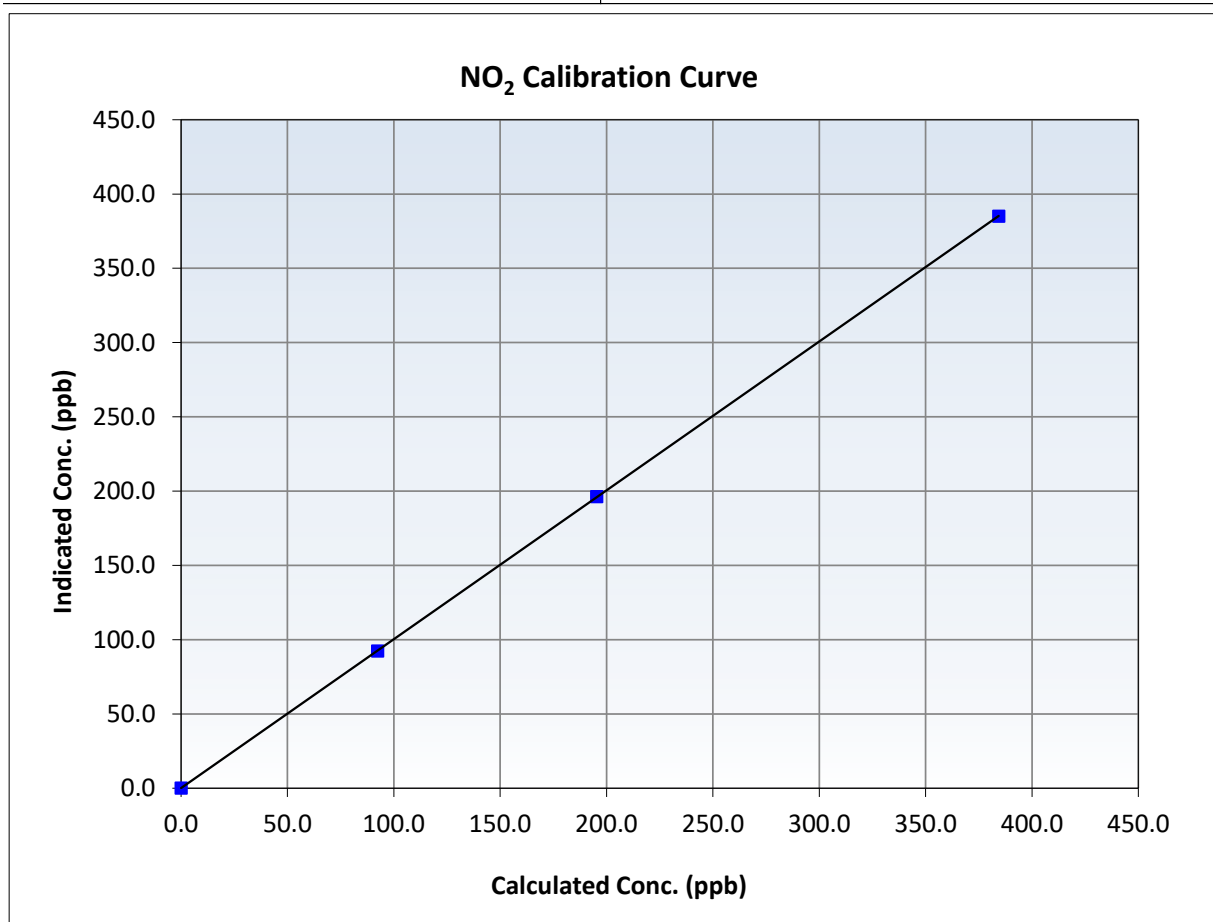
NO₂ Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:13	End Time (MST):	14:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

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	0.999998	≥ 0.995
384.3	385.1	0.9980	Slope	1.002044	$0.90 - 1.10$
195.4	196.3	0.9956	Intercept	0.101487	± 20
92.3	92.4	0.9994			





Wood Buffalo Environmental Association

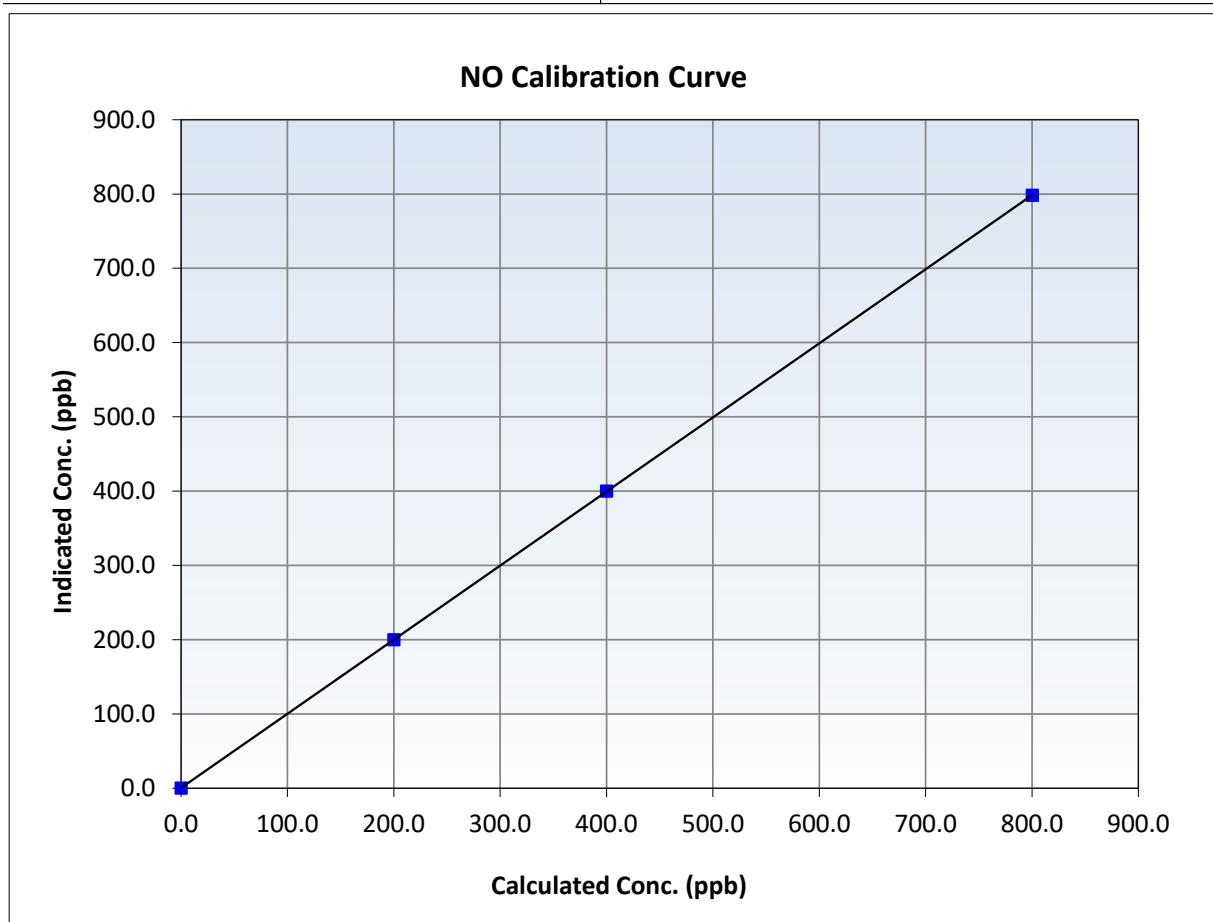
NO Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 28, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:13	End Time (MST):	14:20
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

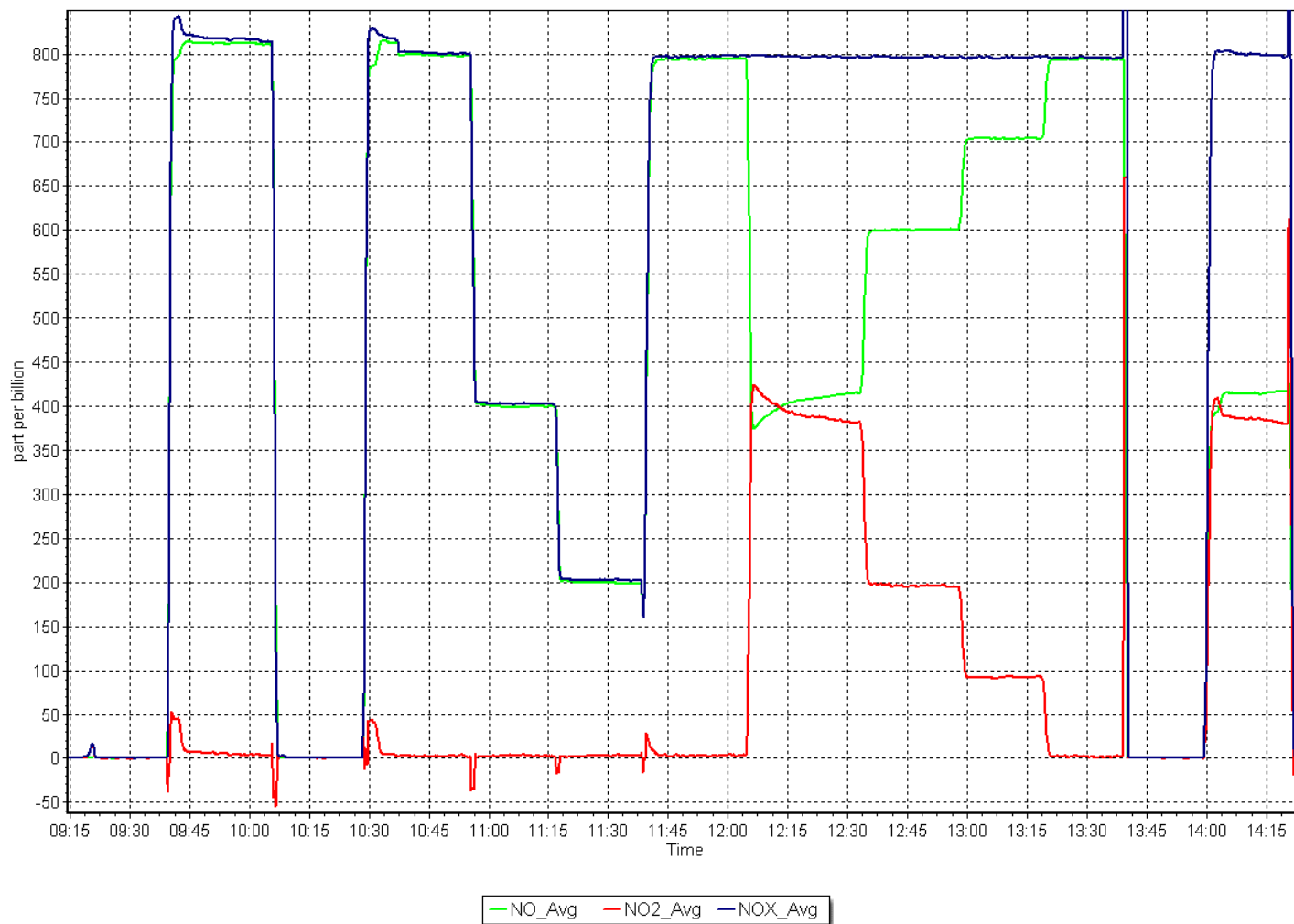
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999999	≥ 0.995
800.3	798.5	1.0023	Slope	0.997421	$0.90 - 1.10$
400.2	400.0	1.0004	Intercept	0.467984	± 20
200.1	200.1	0.9998			



NO_x Calibration Plot

Date: September 19, 2024

Location: Conklin





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Conklin
Calibration Date: September 11, 2024
Start time (MST): 10:18
Reason: Removal
Station number: AMS 21
Last Cal Date: August 8, 2024
End time (MST): 12:47

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API 701
Serial Number: 5252
Serial Number: 953

Analyzer Information

Analyzer make: Thermo 49i
Analyzer Range: 0 - 500 ppb
Analyzer serial #: 1501663734

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001714	NA	Backgd or Offset:	-1.7
Calibration intercept:	-1.800000	NA	Coeff or Slope:	1.033

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted
					Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	800.0	0.0	0.1	----
As found High point	5000	908.4	400.0	400.4	0.999
As found Mid point	5000	812.3	200.0	198.2	1.010
As found Low point	5000	714.4	100.0	95.5	1.048
Baseline Corr As found:	400.3	Previous response	398.9	*% change	0.4%
Baseline Corr 2nd AF pt:	198.1	AF Slope:	1.004171	AF Intercept:	-2.180000
Baseline Corr 3rd AF pt:	95.4	AF Correlation:	0.999844	* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic- AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes: Removal Calibrations done to do further maintenance in the shop.

Calibration Performed By: Jan Castro

O₃ Calibration Plot

Date: September 11, 2024

Location: Conklin





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Conklin
Calibration Date: September 11, 2024
Start time (MST): 13:03
Reason: Install

Station number: AMS 21
Last Cal Date: NA
End time (MST): 15:46

Calibration Standards

O₃ generation mode: Photometer
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API 701

Serial Number: 5252
Serial Number: 953

Analyzer Information

Analyzer make: Thermo 49i
Analyzer Range: 0 - 500 ppb

Analyzer serial #: 1300156233

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	NA	1.004486	Backgd or Offset:	NA	-2.5
Calibration intercept:	NA	-1.060000	Coeff or Slope:	NA	1.029

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
Baseline Corr As found:	NA	Previous response	NA	*% change	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	800.0	0.0	0.5	----
High point	5000	927.7	400.0	401.3	0.997
Mid point	5000	820.3	200.0	199.7	1.002
Low point	5000	722.4	100.0	97.4	1.027
As left zero	5000	800.0	0.0	1.0	----
As left span	5000	925.9	400.0	404.7	0.988
Average Correction Factor					1.008

Notes: Install calibrations. Sample inlet filter and pump was changed before calibrator zero. Adjusted zero and span.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

O₃ Calibration Summary

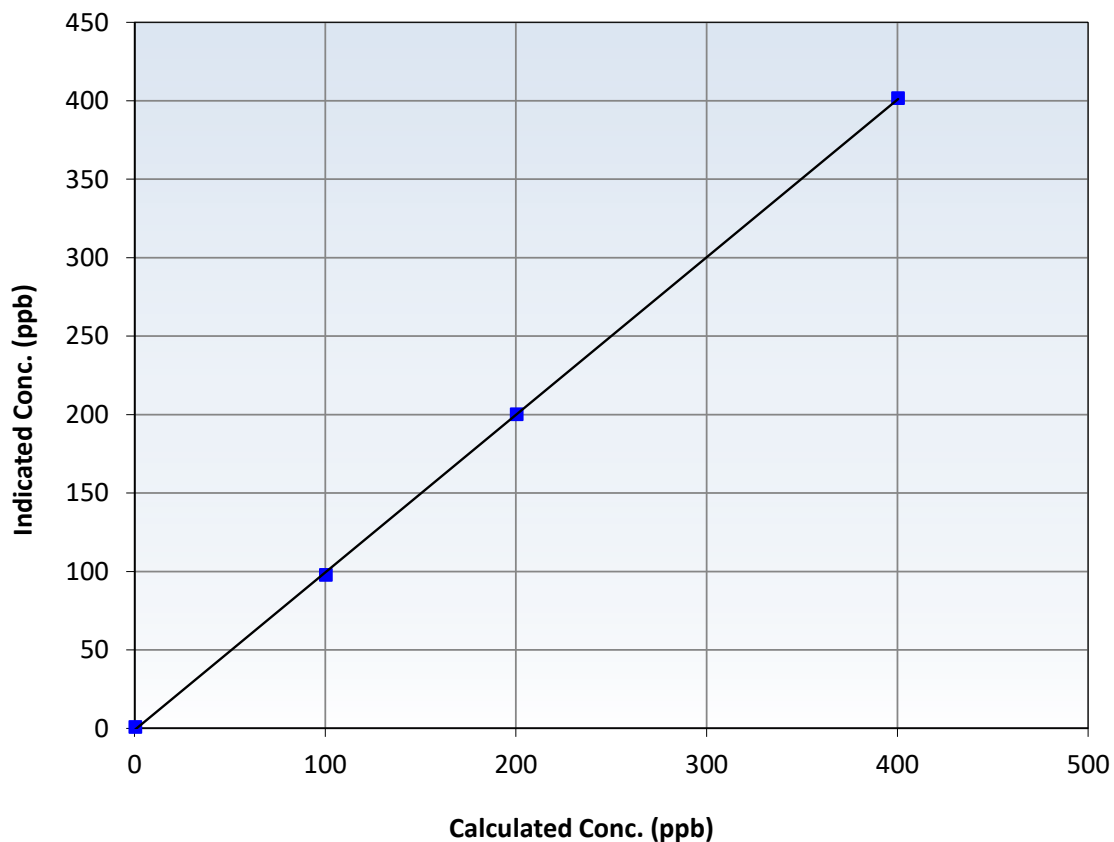
Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	13:03	End Time (MST):	15:46
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156233

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5	----	Correlation Coefficient	0.999924	≥ 0.995
400.0	401.3	0.9968	Slope	1.004486	$0.90 - 1.10$
200.0	199.7	1.0015	Intercept	-1.060000	± 5
100.0	97.4	1.0267			

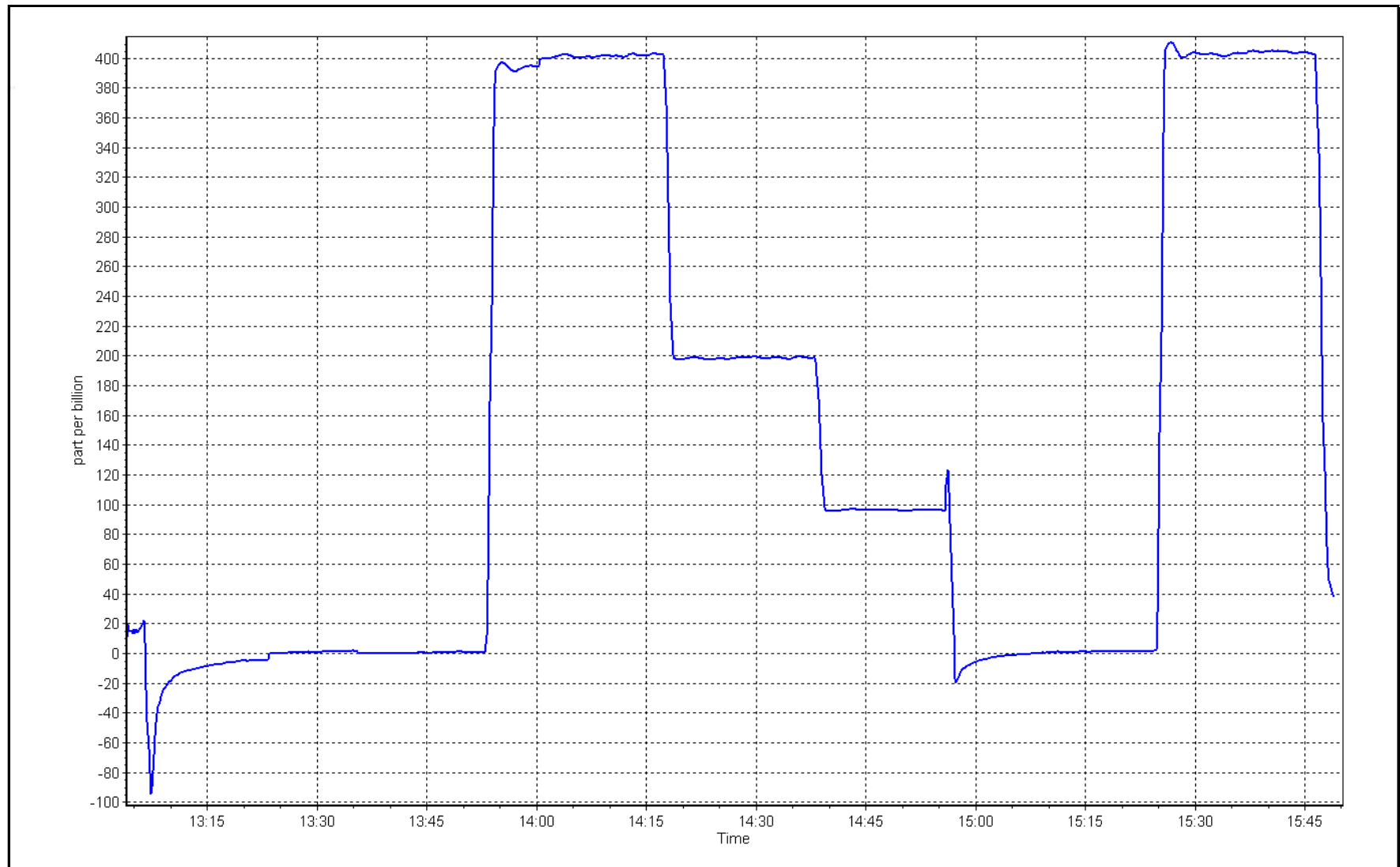
O₃ Calibration Curve



O₃ Calibration Plot

Date: September 11, 2024

Location: Conklin





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Conklin
Calibration Date: September 11, 2024
Start time (MST): 11:45
Station number: AMS 21
Last Cal Date: August 9, 2024
End time (MST): 12:45
Analyzer Make: API T640
Particulate Fraction: PM2.5
S/N: 326
Flow Meter Make/Model: Alicat FP-25BT
Temp/RH standard: Alicat FP-25BT
S/N: 388754
S/N: 388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	19.30	19.90	19.30	☐	+/- 2 °C
P (mmHg)	707.70	710.18	707.70	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.10	5.00	☐	+/- 0.25 LPM
PW% (pump)	38	----	38	☐	>80%
Zero Verification	PM w/o HEPA: 8.40		PM w/ HEPA: 0.00		<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

SPAN DUST Refractive Index: 10.90 Expiry Date: September 29, 2024
Lot No.: 100128-050-040

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	10.10	10.10	10.70	☒	+/- 0.5

Date Optical Chamber Cleaned: September 11, 2024
Date Disposable Filter Changed: September 11, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.00 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 9, 2024
Date RH/T Sensor Cleaned: August 9, 2024

Notes:

Verified flow, pressure, temperature and pump power. Leak check passed. Disposable filter changed. PMT adjusted.

Calibration by: Jan Castro



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name: Conklin Station Number: AMS 21
Calibration Date: September 19, 2024 Prev Cal Date: May 17, 2024
Start Time (MST): 10:25 End Time (MST): 13:25
Tower Height (m): 10.0 Reason: Routine

Wind Speed Information

Sensor make/model: Met One 010C-1 Serial Number: J4337
WS Calibrator: MetOne 053-120 Serial Number: CA05230

Shaft RPM	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	0.999998	≥ 0.9995
Calculated slope	0.998853	0.999062	<i>0.90 - 1.10</i>
Calculated intercept	-0.027978	0.033729	<i>+/- 2</i>

Wind Direction Information

Sensor make/model: Met One 020D Serial Number: D14062
As Found Declination (deg east of True North): 15.9 As Left Declination (deg east of True North): 13
Solar noon time (MST): 13:18 Calc Declination*: 13.1 Degrees
Deadband calc: -2.1 degrees (*Limit 4 deg*)
* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) <i>Limit = +/- 1.0%</i>
0	0.3	---
90	87.5	-0.7%
180	178.9	-0.3%
270	272.4	0.7%
357	359.4	0.7%

	<u>Start</u>	<u>Finish</u>	<u>Limits</u>
Correl Coeff (r^2)	0.999980	0.999937	≥ 0.9995
Calculated slope	0.994697	0.989874	<i>0.90 - 1.10</i>
Calculated intercept	1.427878	1.525550	<i>+/- 4</i>

Notes: Bearings still good. Confirmed declination with a compass. Replaced sensor wire with 30m as previous wire is short.

Calibration Performed By: Jan Castro



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

**AMS22
JANVIER
SEPTEMBER 2024**

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Janvier Station number: AMS 22
Calibration Date: September 25, 2024 Last Cal Date: August 12, 2024
Start time (MST): 9:40 End time (MST): 12:45
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.11 ppm Cal Gas Exp Date: January 18, 2029
Cal Gas Cylinder #: CC281519
Removed Cal Gas Conc: 50.11 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 3806
Zero Air Gen Model: Teledyne API T701 Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1152430006
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998506	1.000850	Backgd or Offset:	23.6	25.4
Calibration intercept:	1.244452	0.023969	Coeff or Slope:	0.995	1.004

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4920	79.8	799.8	792.2	1.010
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	792.0	Previous response	799.8	*% change	-1.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.7	----
High point	4920	79.8	799.8	800.0	1.000
Mid point	4960	39.9	399.9	401.0	0.997
Low point	4980	20.0	200.4	201.1	0.997
As left zero	5000	0.0	0.0	-0.4	----
As left span	4920	79.8	799.8	799.9	1.000
Average Correction Factor:					0.998

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

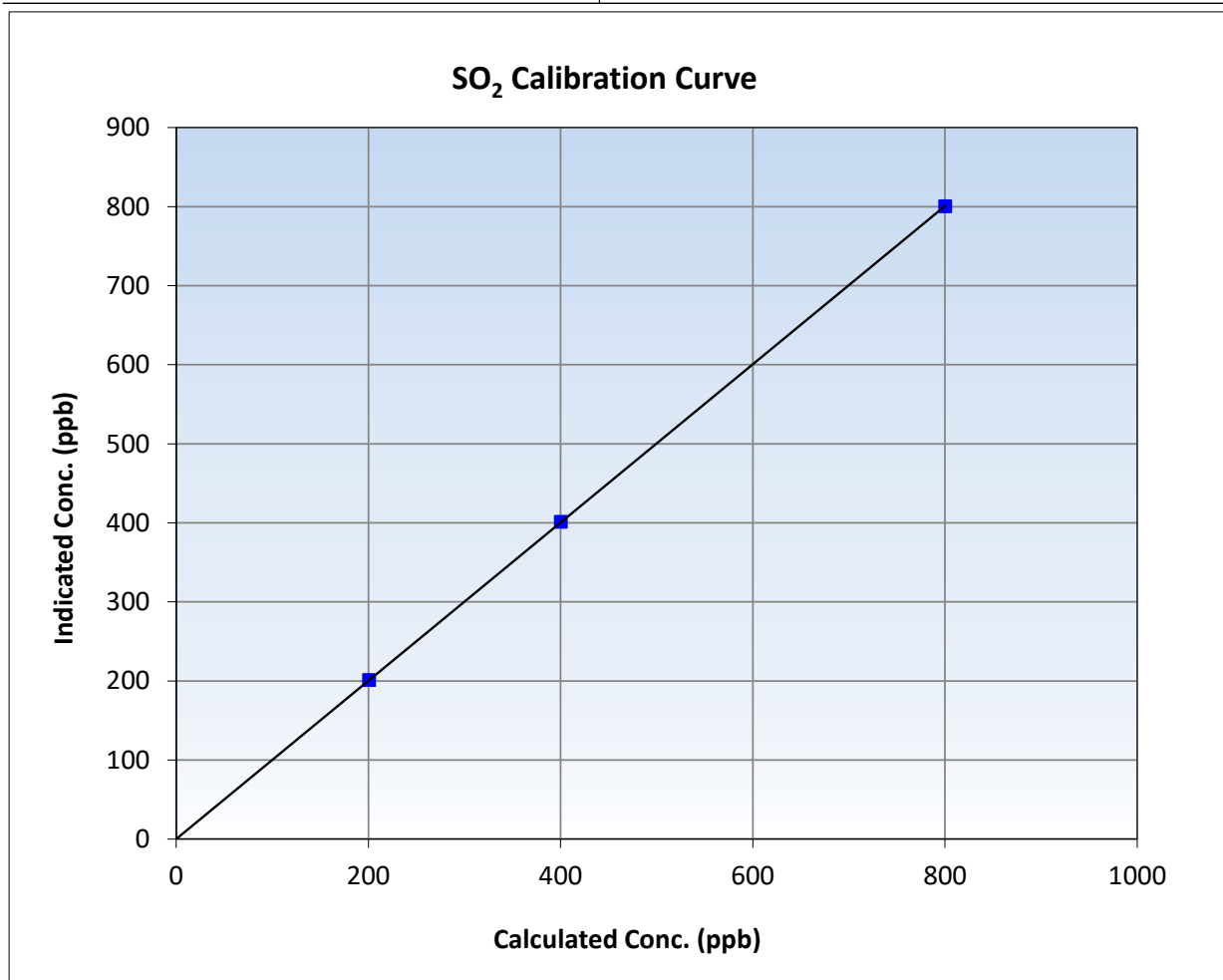
SO₂ Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:40	End Time (MST):	12:45
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

Calibration Data

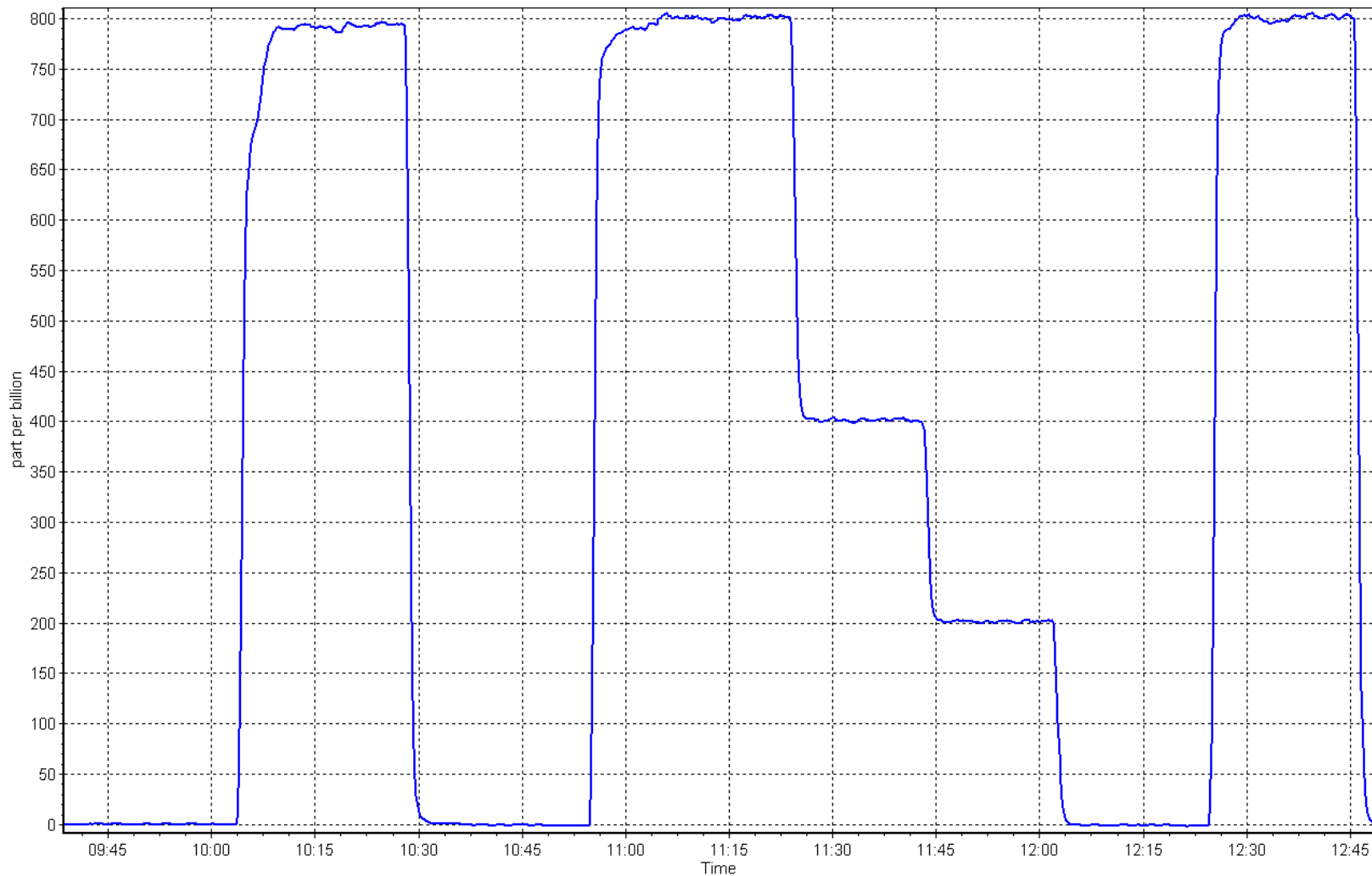
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.7	----	Correlation Coefficient	0.999996	≥0.995
799.8	800.0	0.9997	Slope	1.000850	0.90 - 1.10
399.9	401.0	0.9972	Intercept	0.023969	+/-30
200.4	201.1	0.9967			



SO2 Calibration Plot

Date: September 25, 2024

Location: Janvier





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Janvier
Calibration Date: September 26, 2024
Start time (MST): 11:00
Reason: Routine

Station number: AMS 22
Last Cal Date: August 26, 2024
End time (MST): 15:41

Calibration Standards

Cal Gas Concentration: 5.02 ppm
Cal Gas Cylinder #: CC424047
Removed Cal Gas Conc: 5.02 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: November 15, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 3806
Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1151680031
Converter serial #: 620
Converter Temp: 850 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998094	0.999096	Backgd or Offset:	3.18	3.23
Calibration intercept:	0.300595	0.140534	Coeff or Slope:	1.134	1.153

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	79.7	80.0	79.2	1.010
As found Mid point	4960	39.8	40.0	40.1	0.997
As found Low point	4980	19.9	20.0	20.0	0.999
New cylinder response					
Baseline Corr As found:	79.2	Prev response:	80.17	*% change:	-1.2%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.989522	AF Intercept:	0.200535
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999941	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4920	79.7	80.0	80.1	0.999
Mid point	4960	39.8	40.0	40.0	0.999
Low point	4980	19.9	20.0	20.2	0.989
As left zero	5000	0.0	0.0	0.4	----
As left span	4920	79.7	80.0	78.4	1.021
SO2 Scrubber Check	4920	79.8	798.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.996
Date of last converter efficiency test:					

Notes: Changed the inlet filter after as founds. Scrubber test performed after zero point, no issues.
Adjusted span only.

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

TRS Calibration Summary

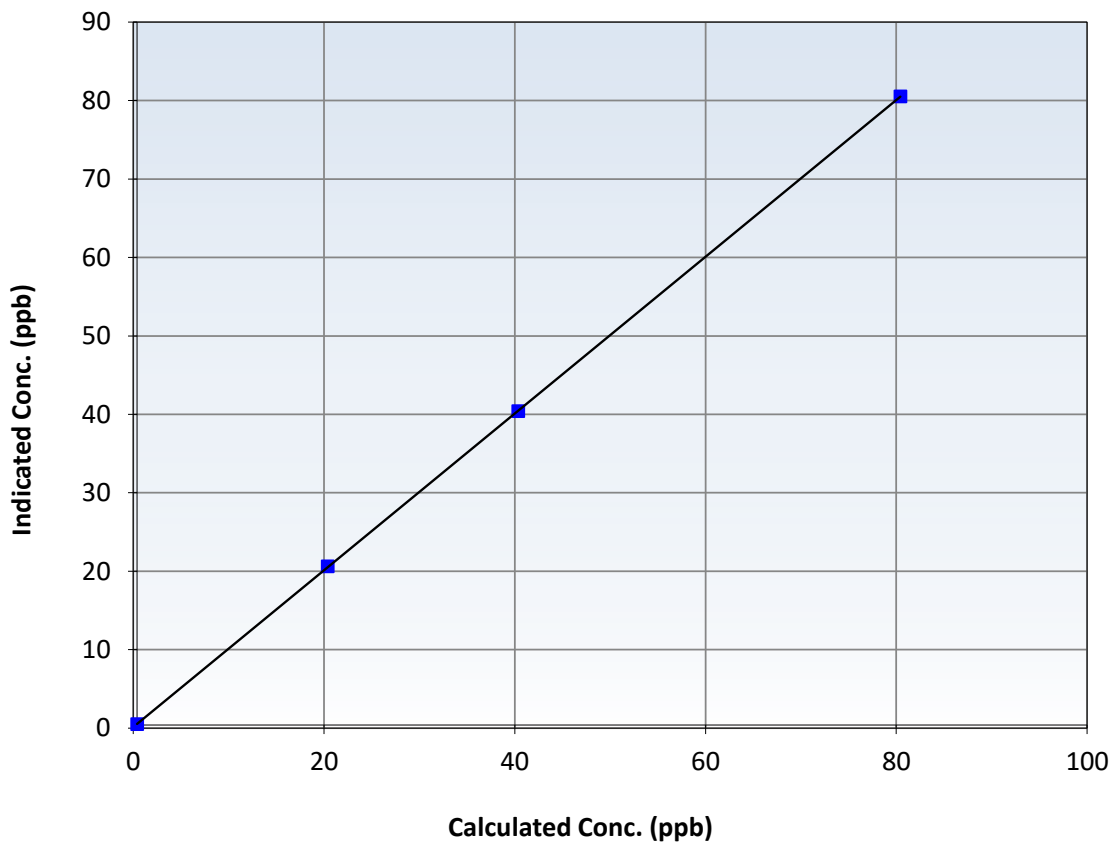
Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 26, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:00	End Time (MST):	15:41
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999996		≥ 0.995
80.0	80.1	0.9990	Slope	0.999096		$0.90 - 1.10$
40.0	40.0	0.9990	Intercept	0.140534		± 3
20.0	20.2	0.9891				

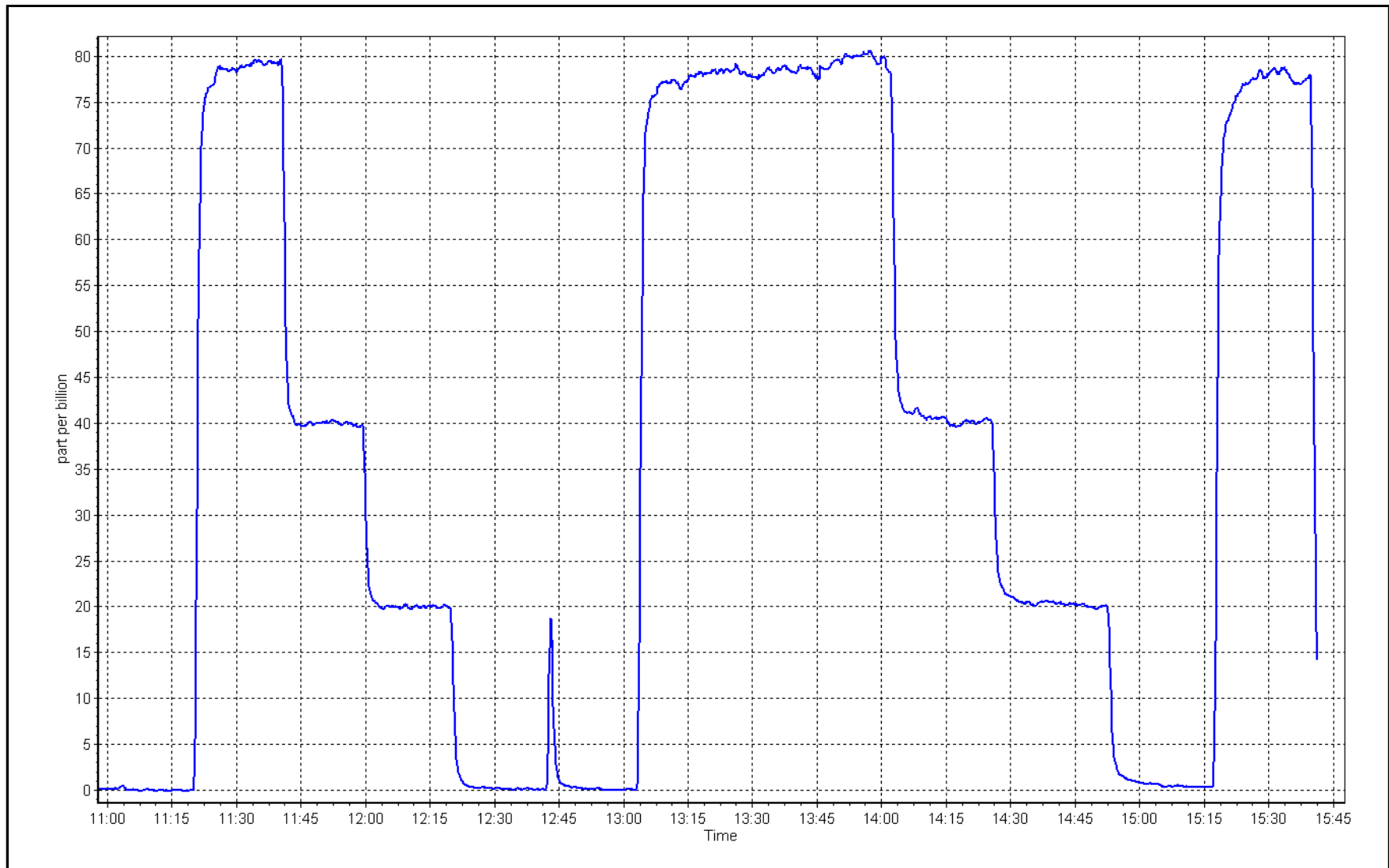
TRS Calibration Curve



TRS Calibration Plot

Date: September 26, 2024

Location: Janvier





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Janvier
Calibration Date: September 25, 2024
Start time (MST): 9:40
Reason: Routine

Station number: AMS 22
Last Cal Date: August 12, 2024
End time (MST): 12:45

Calibration Standards

Gas Cert Reference: CC281519
CH₄ Cal Gas Conc. 502.8 ppm
C₃H₈ Cal Gas Conc. 208.4 ppm
Removed Gas Cert: NA
Removed CH₄ Conc. 502.8 ppm
Removed C₃H₈ Conc. 208.4 ppm
Diff between cyl (CH₄):
Calibrator Model: Teledyne API 700
Zero Air Gen model: Teledyne API 701

Cal Gas Expiry Date: January 18, 2029
CH₄ Equiv Conc. 1075.9 ppm
Removed Gas Expiry: NA
CH₄ Equiv Conc. 1075.9 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 3806
Serial Number: 4890

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1317958219
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.45E-04	2.47E-04	NMHC SP Ratio:	5.76E-05
CH ₄ Retention time:	11.6	11.6	NMHC Peak Area:	158834
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	17.17	16.95	1.013
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.95	Prev response	17.14	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	17.17	17.14	1.002
Mid point	4960	39.9	8.59	8.54	1.005
Low point	4980	20.0	4.30	4.27	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	17.17	17.11	1.004
Average Correction Factor					1.005

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



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.15	8.97	1.019
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.97	Prev response	9.12	*% change	-1.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.15	9.13	1.002
Mid point	4960	39.9	4.57	4.57	1.002
Low point	4980	20.0	2.29	2.29	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.15	9.10	1.005
Average Correction Factor					1.002

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	8.03	7.98	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.98	Prev response	8.02	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	8.03	8.01	1.002
Mid point	4960	39.9	4.01	3.97	1.010
Low point	4980	20.0	2.01	1.98	1.015
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	8.03	8.00	1.003
Average Correction Factor					1.009

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	0.999863	0.998458
THC Cal Offset:	-0.029595	-0.016789
CH ₄ Cal Slope:	1.002478	0.998903
CH ₄ Cal Offset:	-0.023362	-0.016556
NMHC Cal Slope:	0.997668	0.998068
NMHC Cal Offset:	-0.006633	-0.000233

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

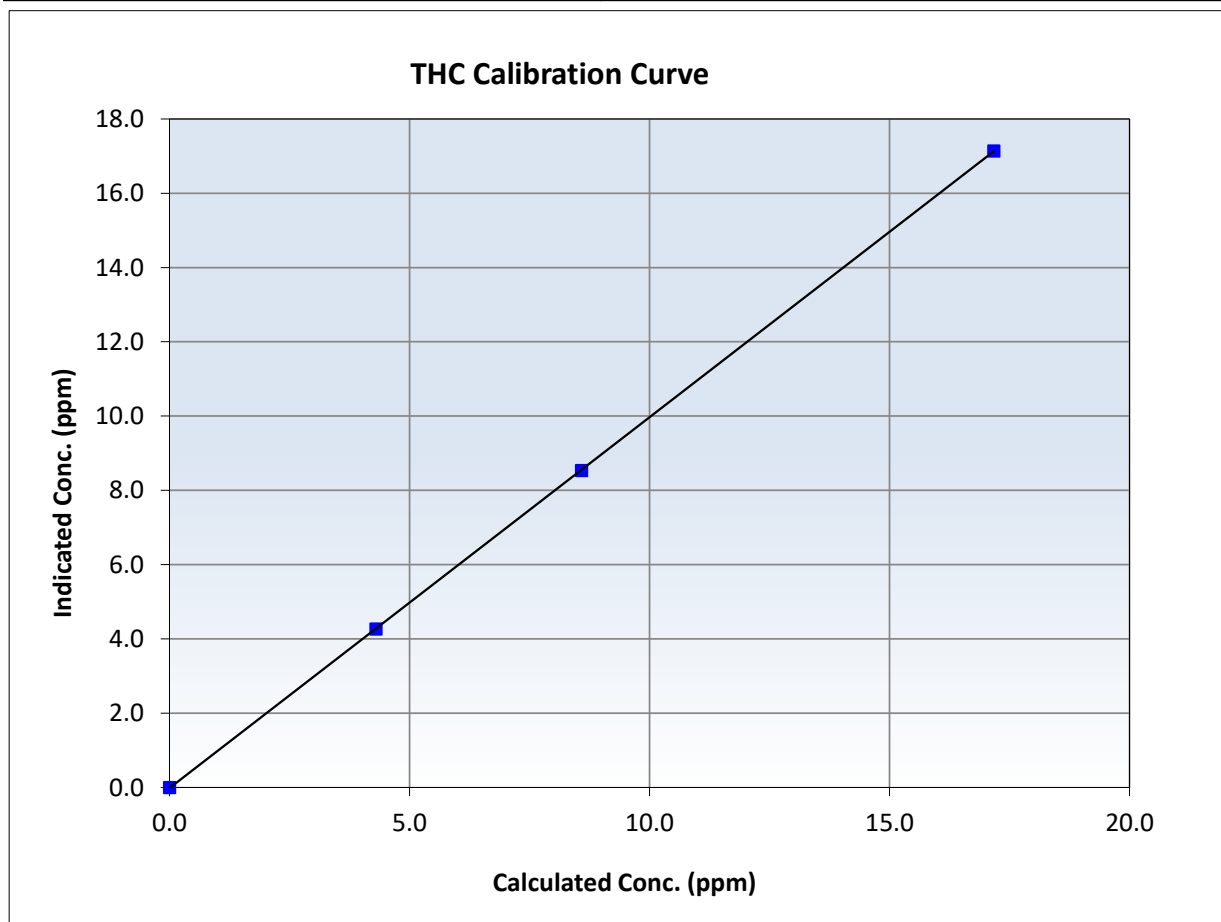
THC Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:40	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			Limits
0.00	0.00	----	Correlation Coefficient	0.999995		≥ 0.995
17.17	17.14	1.0019	Slope	0.998458		0.90 - 1.10
8.59	8.54	1.0055	Intercept	-0.016789		± 0.5
4.30	4.27	1.0081				





Wood Buffalo Environmental Association

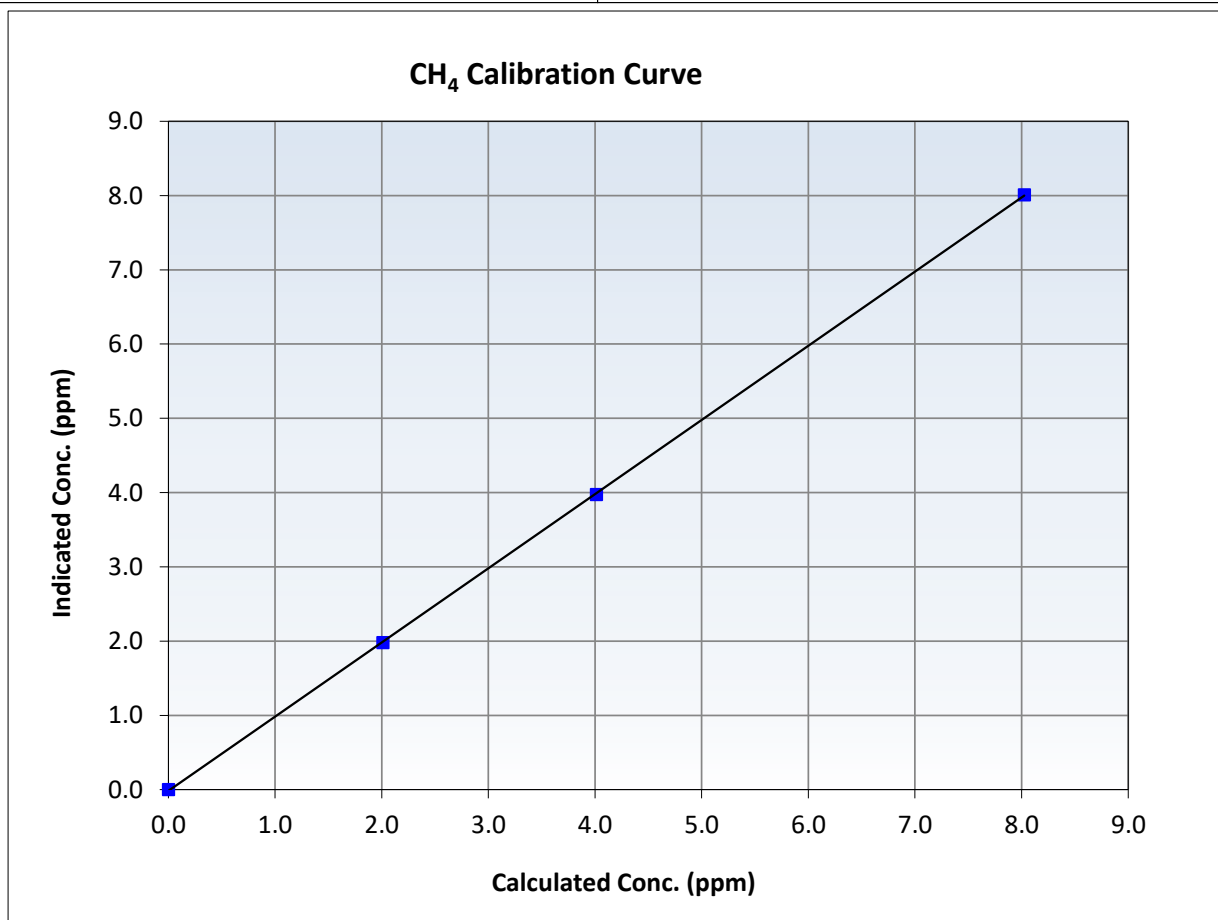
CH₄ Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:40	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999977	≥ 0.995
8.03	8.01	1.0017	Slope	0.998903	$0.90 - 1.10$
4.01	3.97	1.0097	Intercept	-0.016556	± 0.5
2.01	1.98	1.0147			





Wood Buffalo Environmental Association

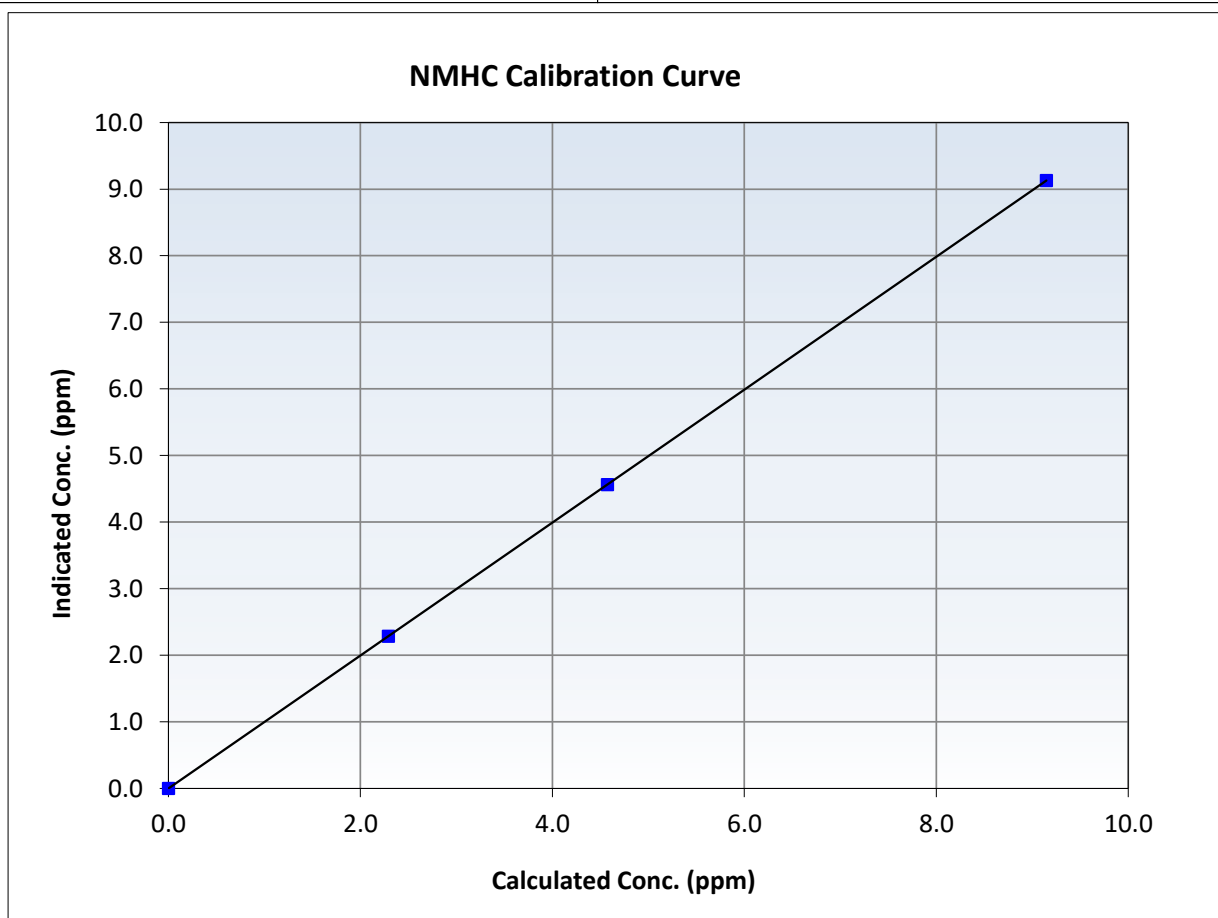
NMHC Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:40	End Time (MST):	12:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

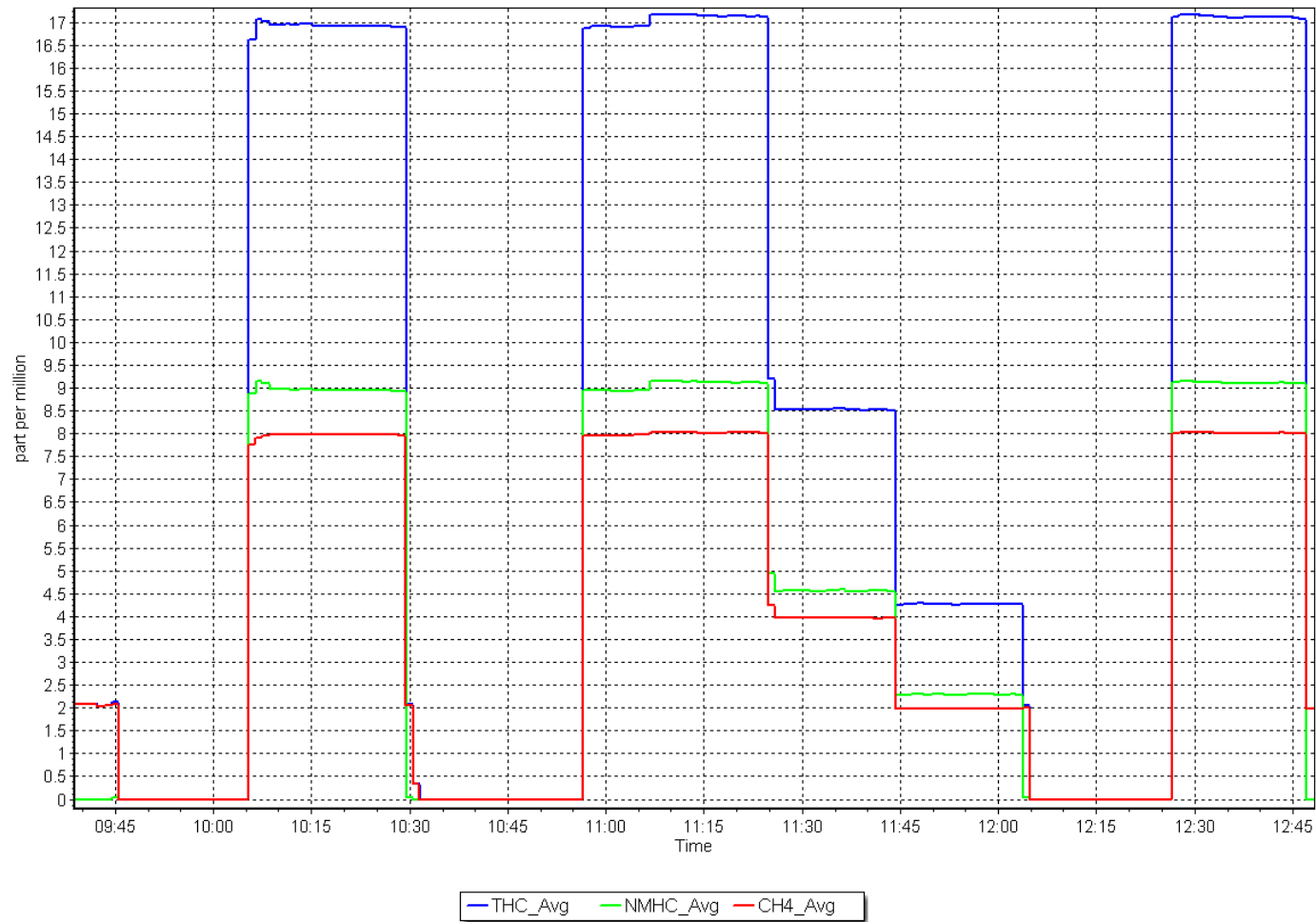
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			Limits
0.00	0.00	----	Correlation Coefficient	1.000000		≥ 0.995
9.15	9.13	1.0020	Slope	0.998068		0.90 - 1.10
4.57	4.57	1.0018	Intercept	-0.000233		± 0.5
2.29	2.29	1.0024				



NMHC Calibration Plot

Date: September 25, 2024

Location: Janvier





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 833

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.880	0.880	NO bkgnd or offset:	-0.7	-0.7
NOX coeff or slope:	0.879	0.879	NOX bkgnd or offset:	0.5	0.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	7.8	7.8

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001178	1.000736
NO _x Cal Offset:	1.604169	1.384212
NO Cal Slope:	0.999360	0.998132
NO Cal Offset:	0.083933	0.563984
NO ₂ Cal Slope:	1.005437	1.006805
NO ₂ Cal Offset:	0.993298	0.388240

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) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
High point	4918	82.0	802.0	800.3	1.6	803.0	799.2	3.9	0.9987	1.0014
Mid point	4960	41.0	400.9	400.1	0.8	404.2	400.1	4.0	0.9918	0.9999
Low point	4980	20.5	200.5	200.1	0.4	202.5	200.6	1.9	0.9900	0.9973
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.3	----	----
As left span	4918	82.0	802.0	395.0	407.0	798.7	395.0	403.8	1.0041	1.0000
Average Correction Factor									0.9935	0.9996

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) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	795.4	395.2	401.8	404.6	0.9932	100.7%
Mid GPT point	795.4	602.5	194.5	197.0	0.9875	101.3%
Low GPT point	795.4	698.8	98.2	99.3	0.9893	101.1%
Average Correction Factor					0.9900	101.0%

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

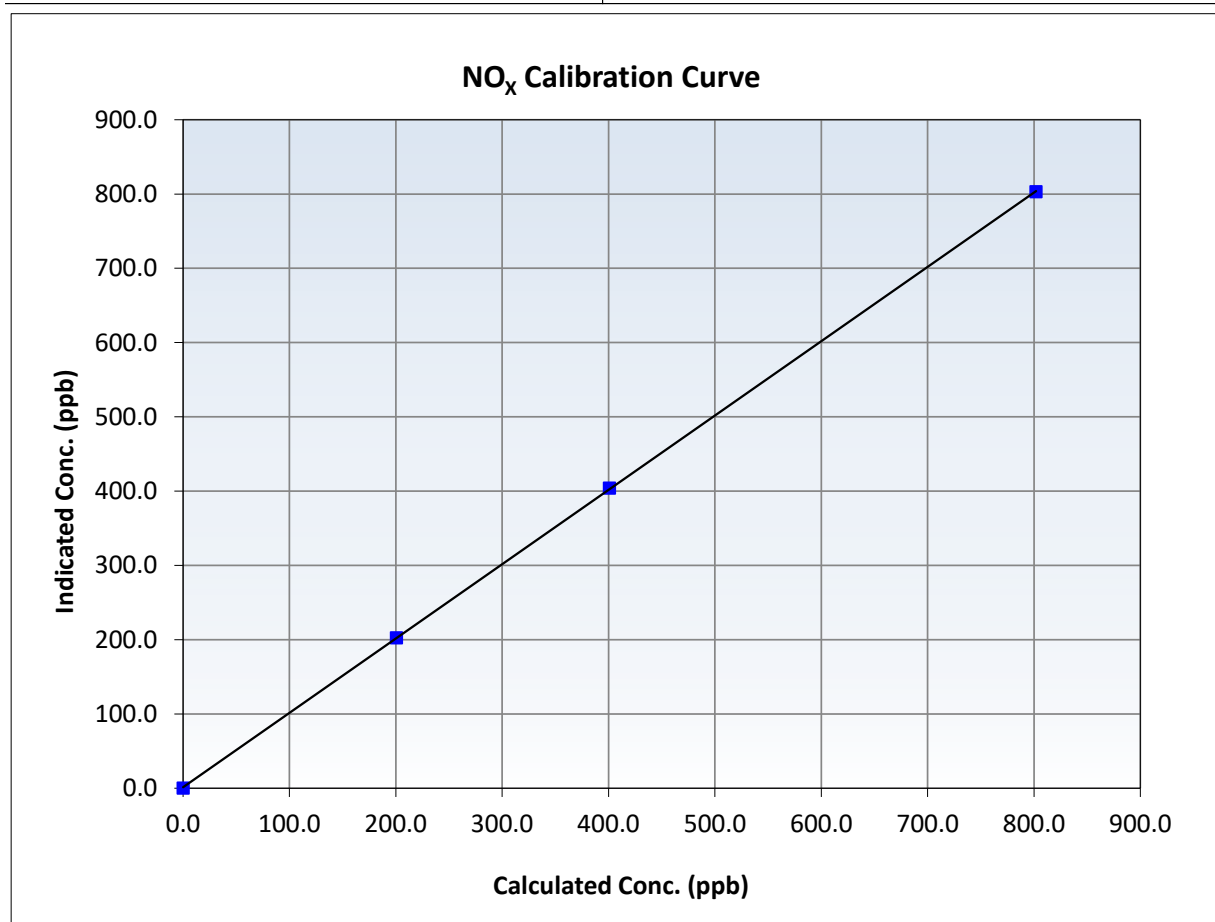
NO_x Calibration Summary

Station Information

Calibration Date:	September 27, 2024	Previous Calibration:	August 30, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:00	End Time (MST):	15:23
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

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	0.999985	≥0.995
802.0	803.0	0.9987	Slope	1.000736	0.90 - 1.10
400.9	404.2	0.9918	Intercept	1.384212	+/-20
200.5	202.5	0.9900			





Wood Buffalo Environmental Association

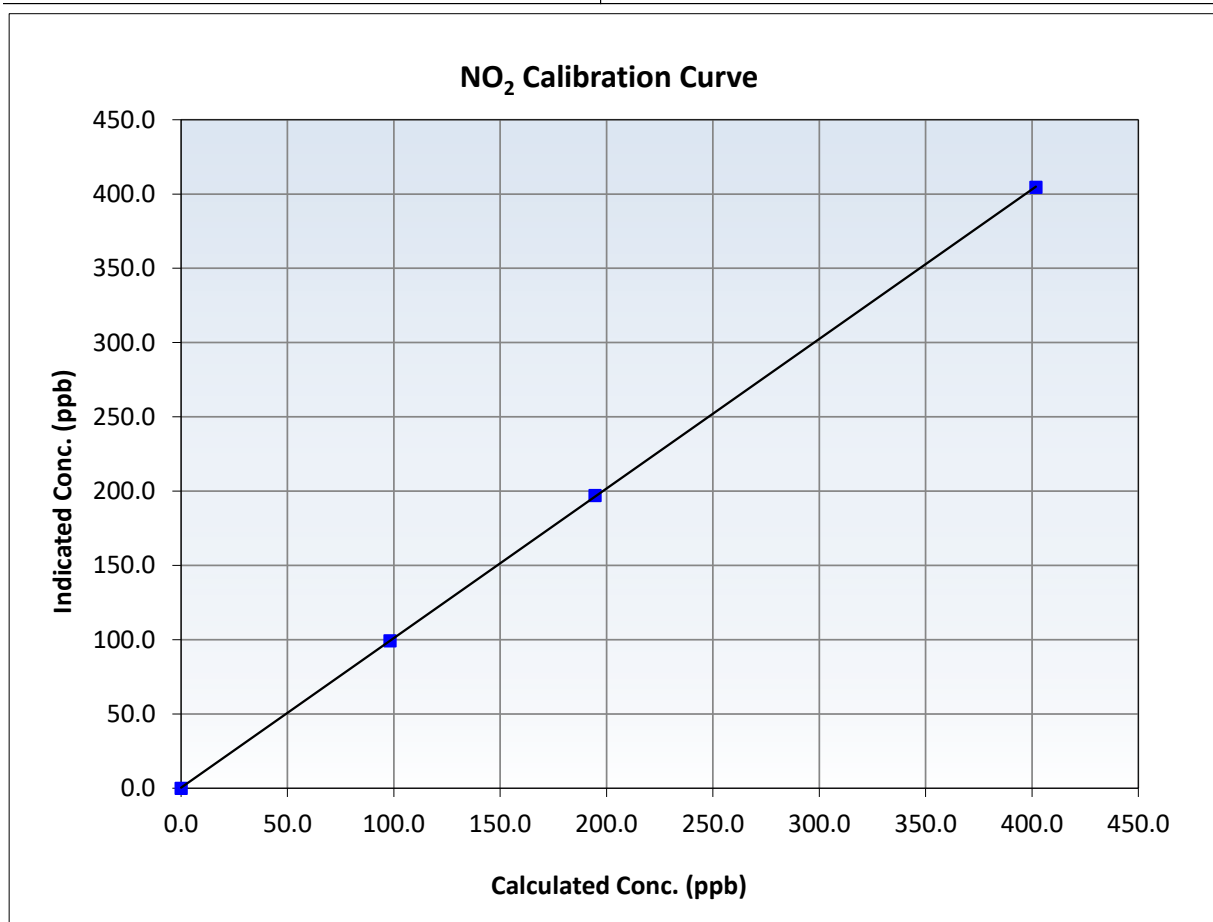
NO₂ Calibration Summary

Station Information

Calibration Date:	September 27, 2024	Previous Calibration:	August 30, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:00	End Time (MST):	15:23
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999991	≥0.995
401.8	404.6	0.9932	Slope	1.006805	0.90 - 1.10
194.5	197.0	0.9875	Intercept	0.388240	+/-20
98.2	99.3	0.9893			





Wood Buffalo Environmental Association

NO Calibration Summary

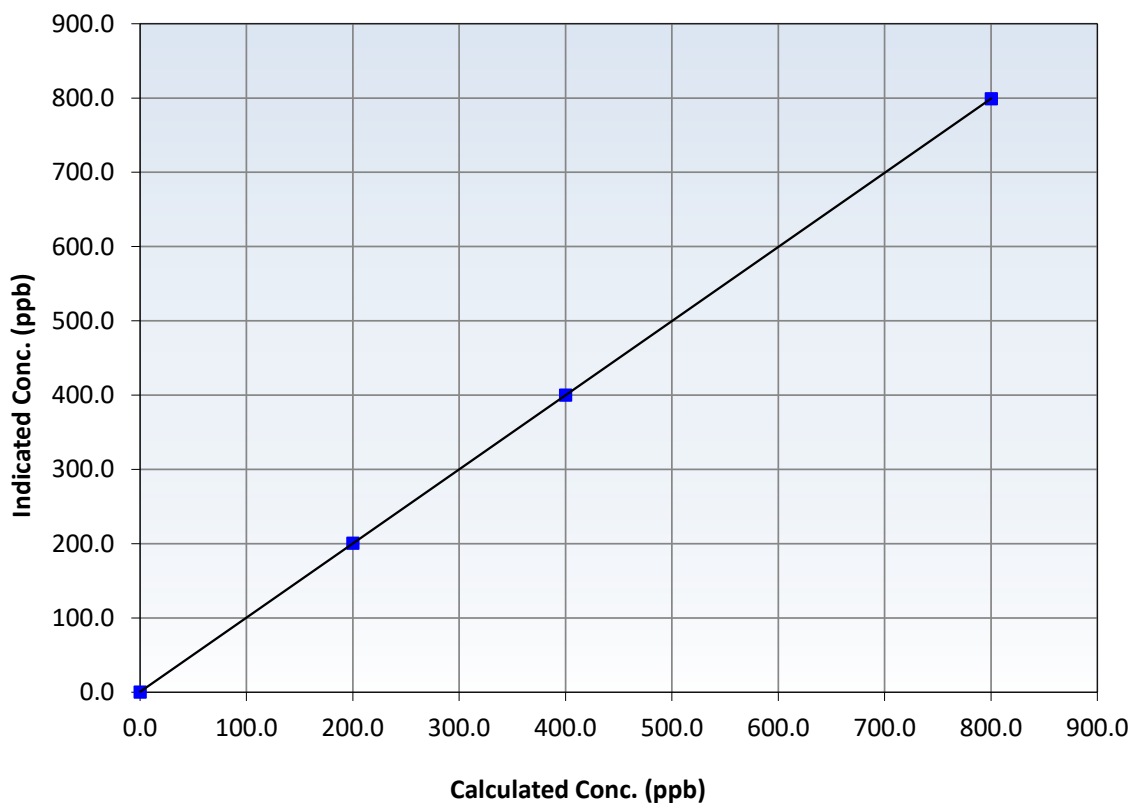
Station Information

Calibration Date:	September 27, 2024	Previous Calibration:	August 30, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:00	End Time (MST):	15:23
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.2	----	Correlation Coefficient	0.999999	≥ 0.995
800.3	799.2	1.0014	Slope	0.998132	$0.90 - 1.10$
400.1	400.1	0.9999	Intercept	0.563984	± 20
200.1	200.6	0.9973			

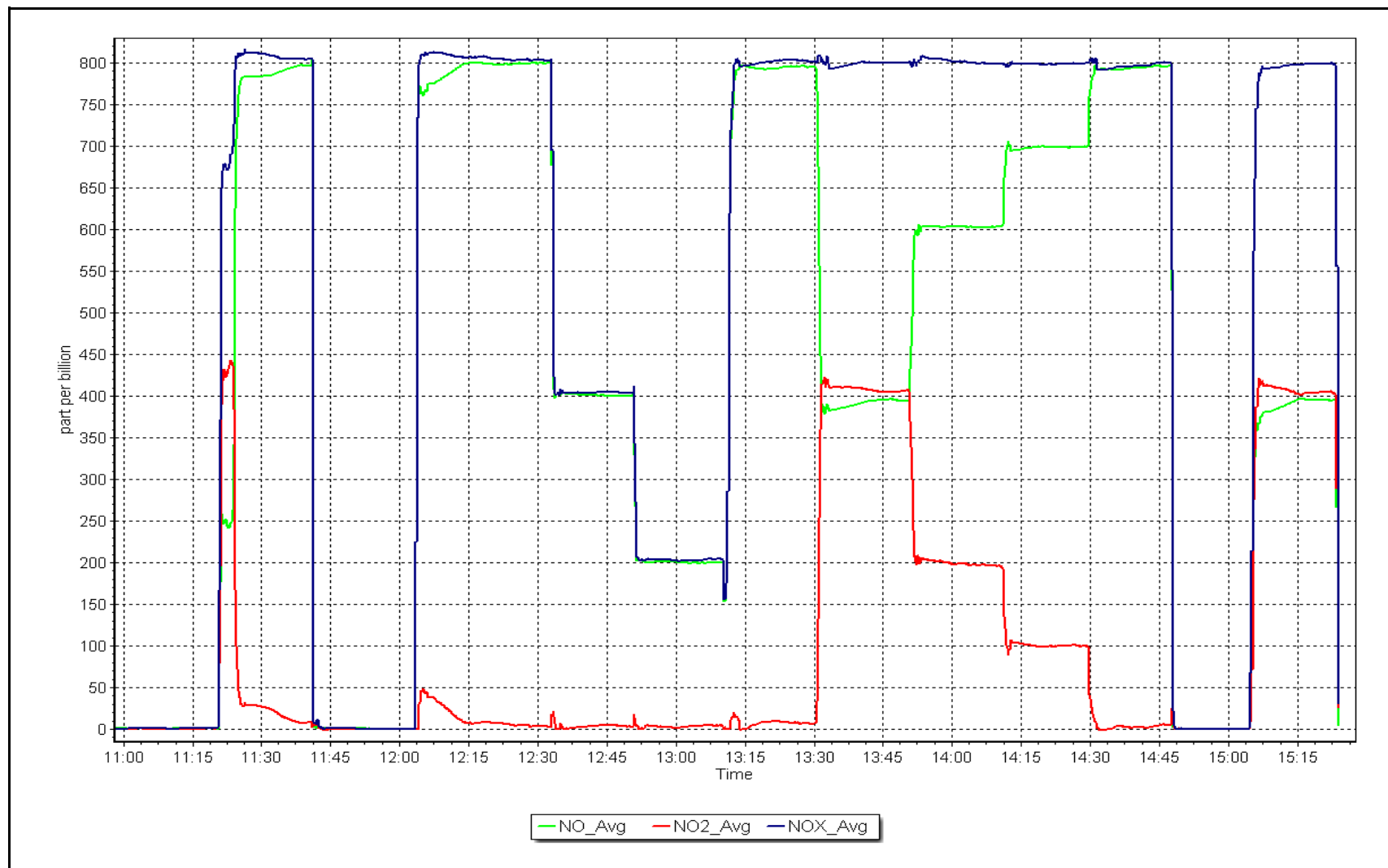
NO Calibration Curve



NO_x Calibration Plot

Date: September 27, 2024

Location: Janvier





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Station Name: Janvier Station number: AMS 22
Calibration Date: September 3, 2024 Last Cal Date: August 23, 2024
Start time (MST): 10:55 End time (MST): 13:24
Reason: Routine

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 serial #: 7046
Analyzer Range: 0 - 500 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002200	1.003114	Backgd or Offset:	2.1	2.1
Calibration intercept:	0.040000	0.080000	Coeff or Slope:	1.027	1.027

O₃ As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	800.0	0.0	-2.3	----
As found High point	5000	916.2	400.0	400.9	0.992
As found Mid point					
As found Low point					
Baseline Corr As found:	403.2	Previous response	400.9	*% change	0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O₃ Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	800.0	0.0	-0.6	----
High point	5000	916.2	400.0	400.8	0.998
Mid point	5000	763.7	200.0	201.6	0.992
Low point	5000	656.1	100.0	100.7	0.993
As left zero	5000	800.0	0.0	0.0	----
As left span	5000	916.2	400.0	403.2	0.992
Average Correction Factor					0.994

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

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

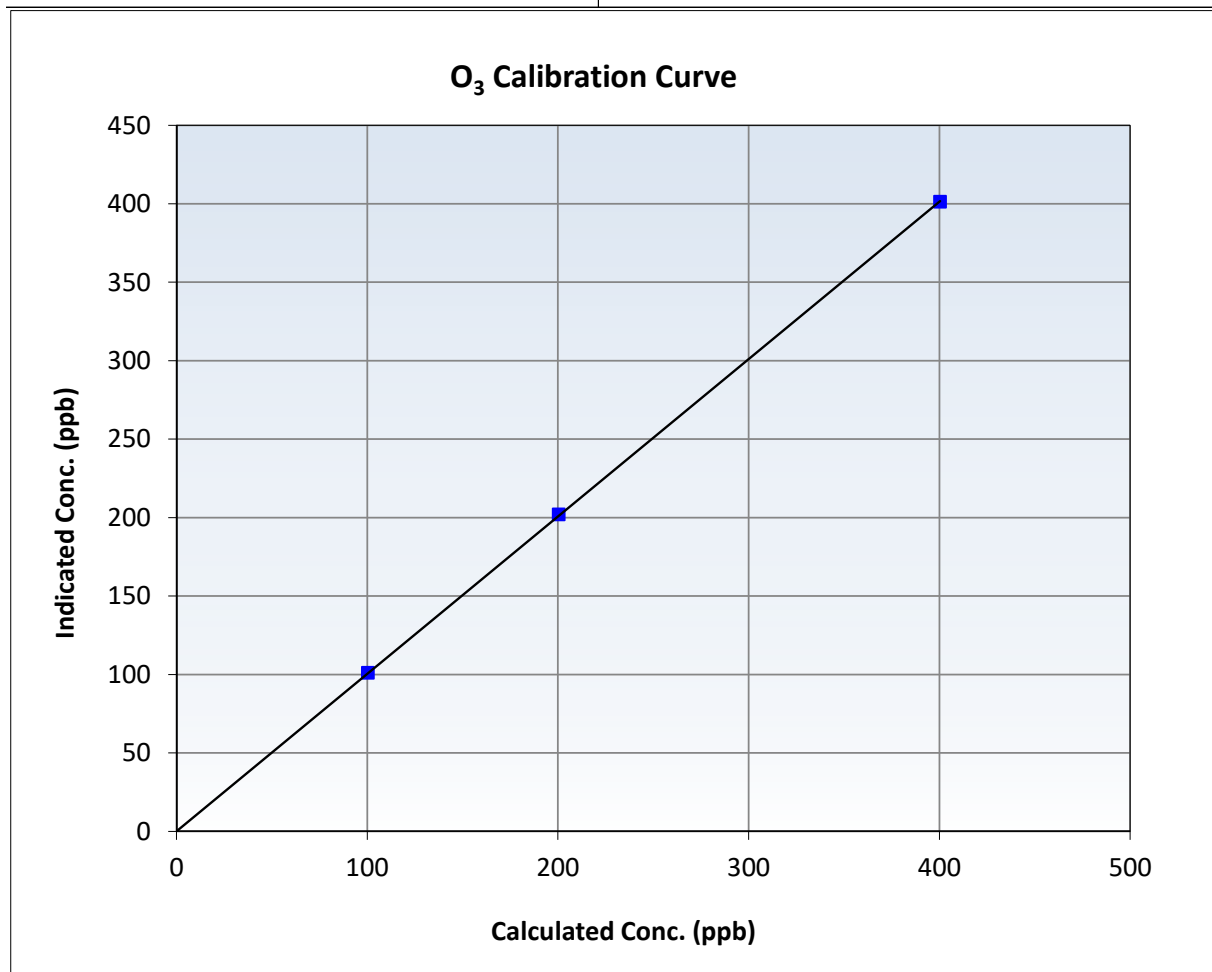
O₃ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 23, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:55	End Time (MST):	13:24
Analyzer make:	Teledyne API T400	Analyzer serial #:	7046

Calibration Data

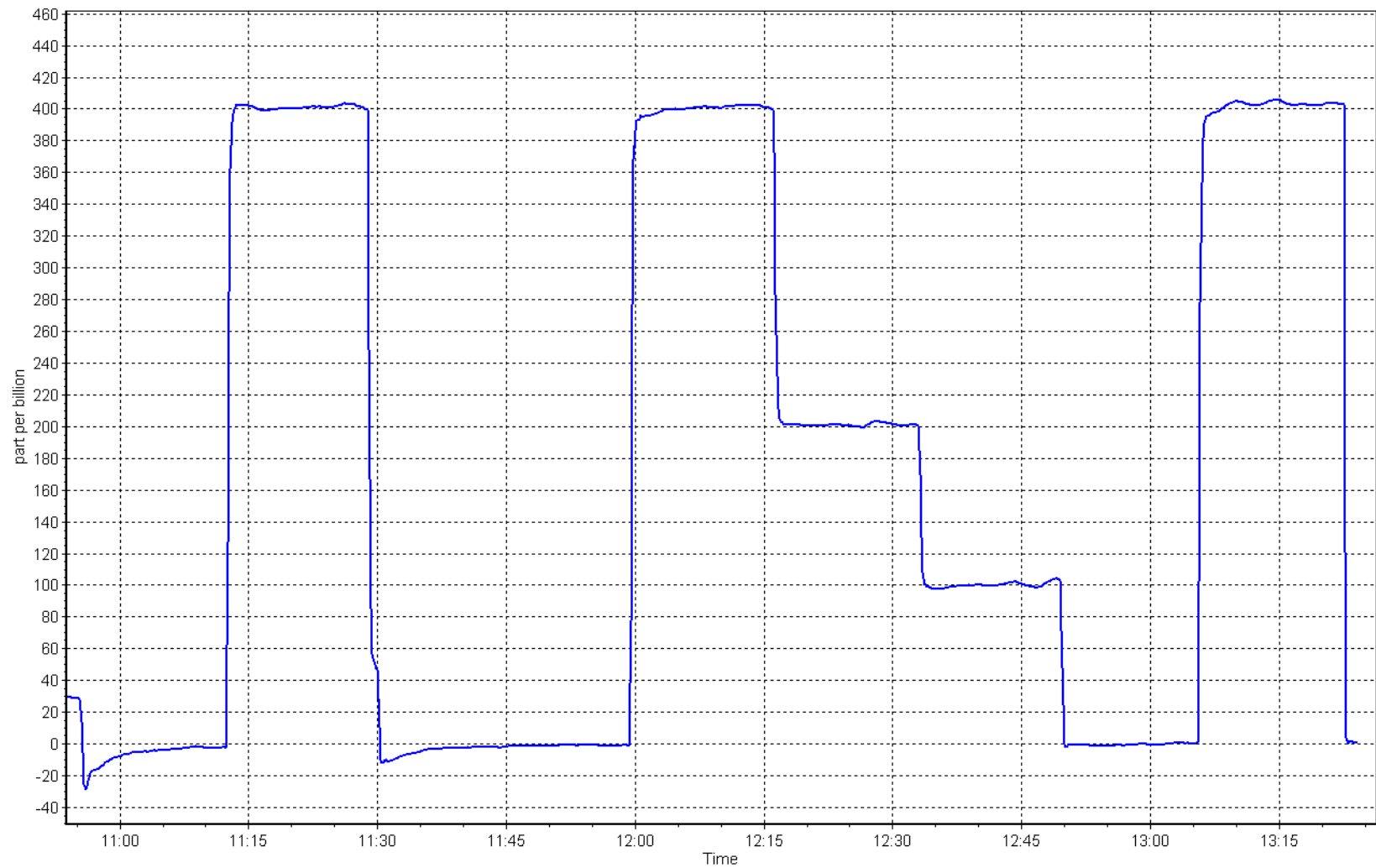
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.6	----	Correlation Coefficient	0.999981	≥ 0.995
400.0	400.8	0.9980	Slope	1.003114	$0.90 - 1.10$
200.0	201.6	0.9921	Intercept	0.080000	± 5
100.0	100.7	0.9930			



O₃ Calibration Plot

Date: September 3, 2024

Location: Janvier





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Janvier Station number: AMS 22
Calibration Date: September 26, 2024 Last Cal Date: August 30, 2024
Start time (MST): 12:45 End time (MST): 13:32

Analyzer Make: Teledyne API T640 S/N: 325
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388752
Temp/RH standard: Alicat FP-25BT S/N: 388752

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.3	13.61	14.3	☐	+/- 2 °C
P (mmHg)	708.2	709.18	708.2	☐	+/- 10 mmHg
Flow (LPM)	5.05	4.999	5.05	☐	+/- 0.25 LPM
PW% (pump)	36	----	36	☐	>80%
Zero Verification	PM w/o HEPA: 6.7		PM w/ HEPA: 0.0		<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: June 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	10.9 +/- 0.5

Date Optical Chamber Cleaned: July 26, 2024
Date Disposable Filter Changed: July 26, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: July 26, 2023
Date RH/T Sensor Cleaned: April 18, 2024

Notes: Verified flow, temperature, and pressure. Leak check passed.

Calibration by: Rene Chamberland



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS23 FORT HILLS SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Fort Hills Station number: AMS 23
Calibration Date: September 4, 2024 Last Cal Date: August 9, 2024
Start time (MST): 9:08 End time (MST): 11:34
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.76 ppm Cal Gas Exp Date: January 5, 2025
Cal Gas Cylinder #: CC281425
Removed Cal Gas Conc: 49.76 ppm Rem Gas Exp Date:
Removed Gas Cyl #: Diff between cyl:
Calibrator Model: API T700 Serial Number: 451
Zero Air Gen Model: API T701 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1160290012
Analyzer Range: 0-1000ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.005085	1.004241	Backgd or Offset:	18.4	18.4
Calibration intercept:	-0.724696	-0.604468	Coeff or Slope:	1.046	1.046

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4920	80.3	799.1	802.7	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.9	Previous response	802.4	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	80.3	799.1	802.1	0.996
Mid point	4960	40.2	400.1	401.3	0.997
Low point	4980	20.1	200.0	199.1	1.005
As left zero	5000	0.0	0.0	0.1	----
As left span	4920	80.3	799.1	804.0	0.994
Average Correction Factor:					0.999

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

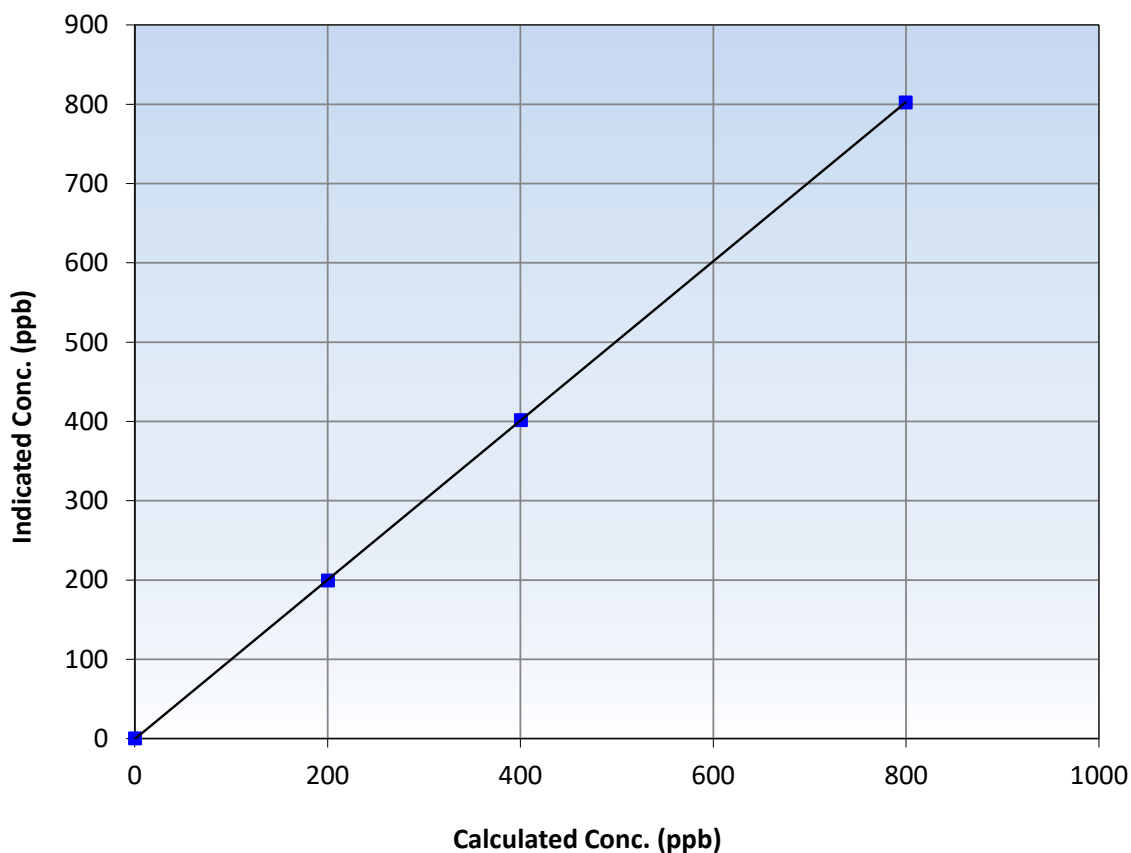
Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 9, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:08	End Time (MST):	11:34
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	0.999994	≥0.995
799.1	802.1	0.9963	Slope	1.004241	0.90 - 1.10
400.1	401.3	0.9969	Intercept	-0.604468	+/-30
200.0	199.1	1.0047			

SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 4, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Fort Hills
Calibration Date: September 16, 2024
Start time (MST): 7:14
Reason: Routine

Station number: AMS 23
Last Cal Date: August 14, 2024
End time (MST): 11:29

Calibration Standards

Cal Gas Concentration: 5.20 ppm
Cal Gas Cylinder #: CC517372
Removed Cal Gas Conc: 5.20 ppm
Removed Gas Cyl #:
Calibrator Make/Model: API T700
ZAG Make/Model: API T701

Cal Gas Exp Date: February 5, 2024
Rem Gas Exp Date:
Diff between cyl:
Serial Number: 451
Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 43i TLE
Converter make: CDN-101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1300156232
Converter serial #: 594
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.007916	1.007633	Backgd or Offset:	2.09
Calibration intercept:	-0.198028	-0.438126	Coeff or Slope:	1.211

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4923	77.0	80.1	79.7	1.005
As found Mid point	4962	38.5	40.0	39.9	1.003
As found Low point	4981	19.2	20.0	19.3	1.035
New cylinder response					
Baseline Corr As found:	79.7	Prev response:	80.52	*% change:	-1.0%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.997788	AF Intercept:	-0.218335
Baseline Corr 3rd AF pt:	19.3	AF Correlation:	0.999931	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4923	77.0	80.1	80.5	0.995
Mid point	4962	38.5	40.0	39.6	1.011
Low point	4981	19.2	20.0	19.3	1.035
As left zero	5000	0.0	0.0	0.2	----
As left span	4923	77.0	80.1	82.9	0.966
SO2 Scrubber Check	4920	80.3	803.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.013
Date of last converter efficiency test:		March 13, 2024		102.7% efficiency	

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

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

TRS Calibration Summary

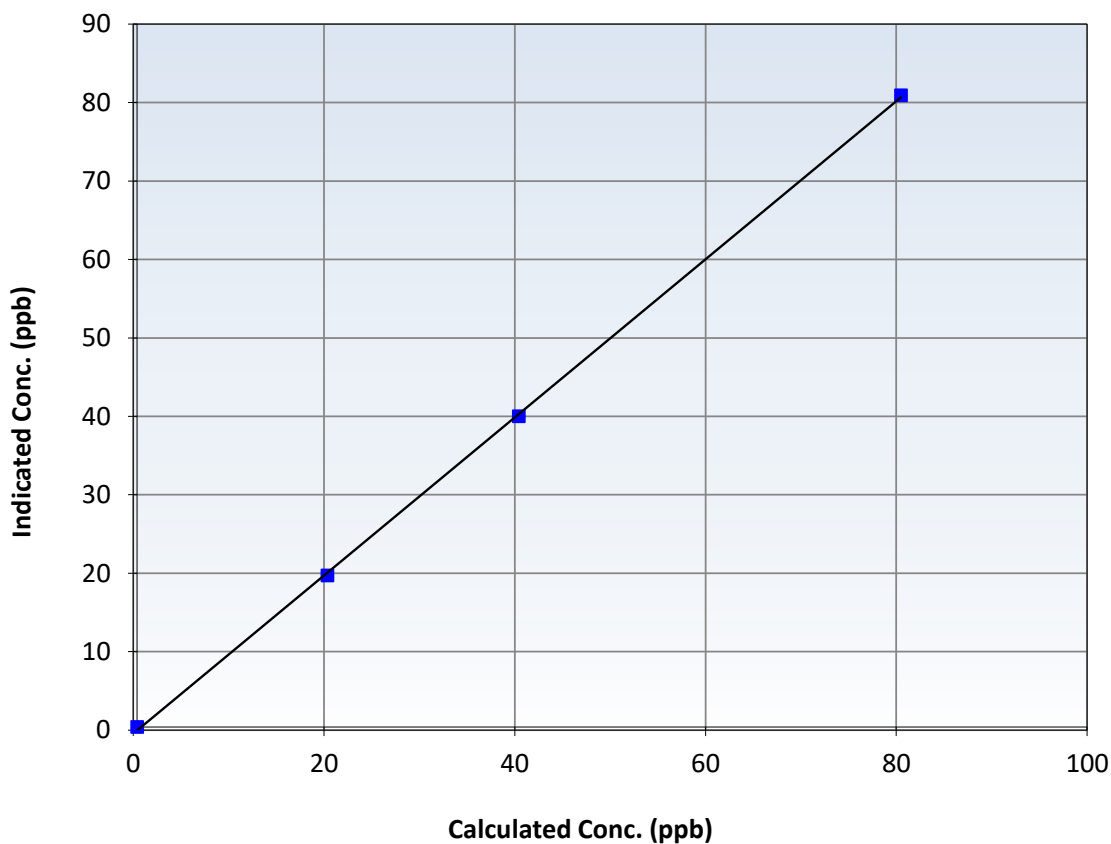
Station Information

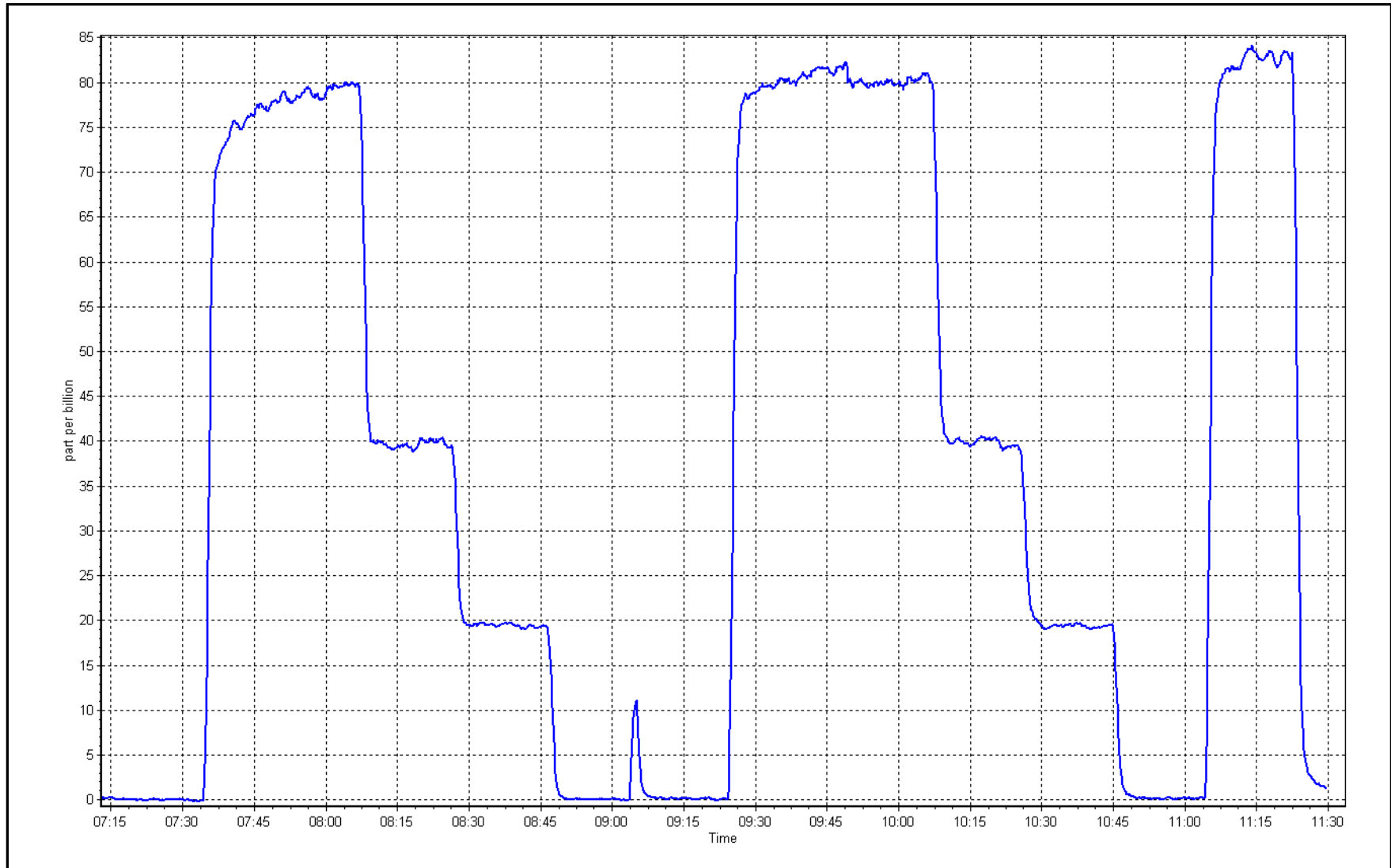
Calibration Date:	September 16, 2024	Previous Calibration:	August 14, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:14	End Time (MST):	11:29
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999862		≥ 0.995
80.1	80.5	0.9948	Slope	1.007633		$0.90 - 1.10$
40.0	39.6	1.0110	Intercept	-0.438126		± 3
20.0	19.3	1.0346				

TRS Calibration Curve







Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Fort Hills
Calibration Date: September 4, 2024
Start time (MST): 6:35
Reason: Routine

Station number: AMS 23
Last Cal Date: August 14, 2024
End time (MST): 9:12

Calibration Standards

Gas Cert Reference:	CC281425	Cal Gas Expiry Date:	January 5, 2025
CH ₄ Cal Gas Conc.	500.2 ppm	CH ₄ Equiv Conc.	1070.6 ppm
C ₃ H ₈ Cal Gas Conc.	207.4 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH ₄ Conc.	500.2 ppm	CH ₄ Equiv Conc.	1070.6 ppm
Removed C ₃ H ₈ Conc.	207.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH ₄):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	451
Zero Air Gen model:	API T701	Serial Number:	5611

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1331259520
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:	2.50E-04	2.59E-04	NMHC SP Ratio:	5.56E-05
CH ₄ Retention time:	13.6	14.0	NMHC Peak Area:	164649
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	16.77	1.025
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.77	Prev response	17.08	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.15	1.002
Mid point	4960	40.2	8.61	8.59	1.002
Low point	4980	20.1	4.30	4.27	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.16	1.002
Average Correction Factor					1.004

Notes: CH₄ peak has shifted slightly. Pressures and temperatures the same as last calibration. Zero and Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	9.16	9.27	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.27	Prev response	9.15	*% change	1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.16	9.15	1.001
Mid point	4960	40.2	4.59	4.57	1.002
Low point	4980	20.1	2.29	2.28	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.15	1.001
Average Correction Factor					1.004

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.03	7.50	1.071
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.50	Prev response	7.92	*% change	-5.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.03	8.01	1.003
Mid point	4960	40.2	4.02	4.01	1.002
Low point	4980	20.1	2.01	1.99	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.01	1.003
Average Correction Factor					1.005

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.994200	0.998110
THC Cal Offset:	-0.015956	-0.009376
CH ₄ Cal Slope:	0.987341	0.997173
CH ₄ Cal Offset:	-0.007223	-0.003044
NMHC Cal Slope:	1.000004	0.999143
NMHC Cal Offset:	-0.008133	-0.006932

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

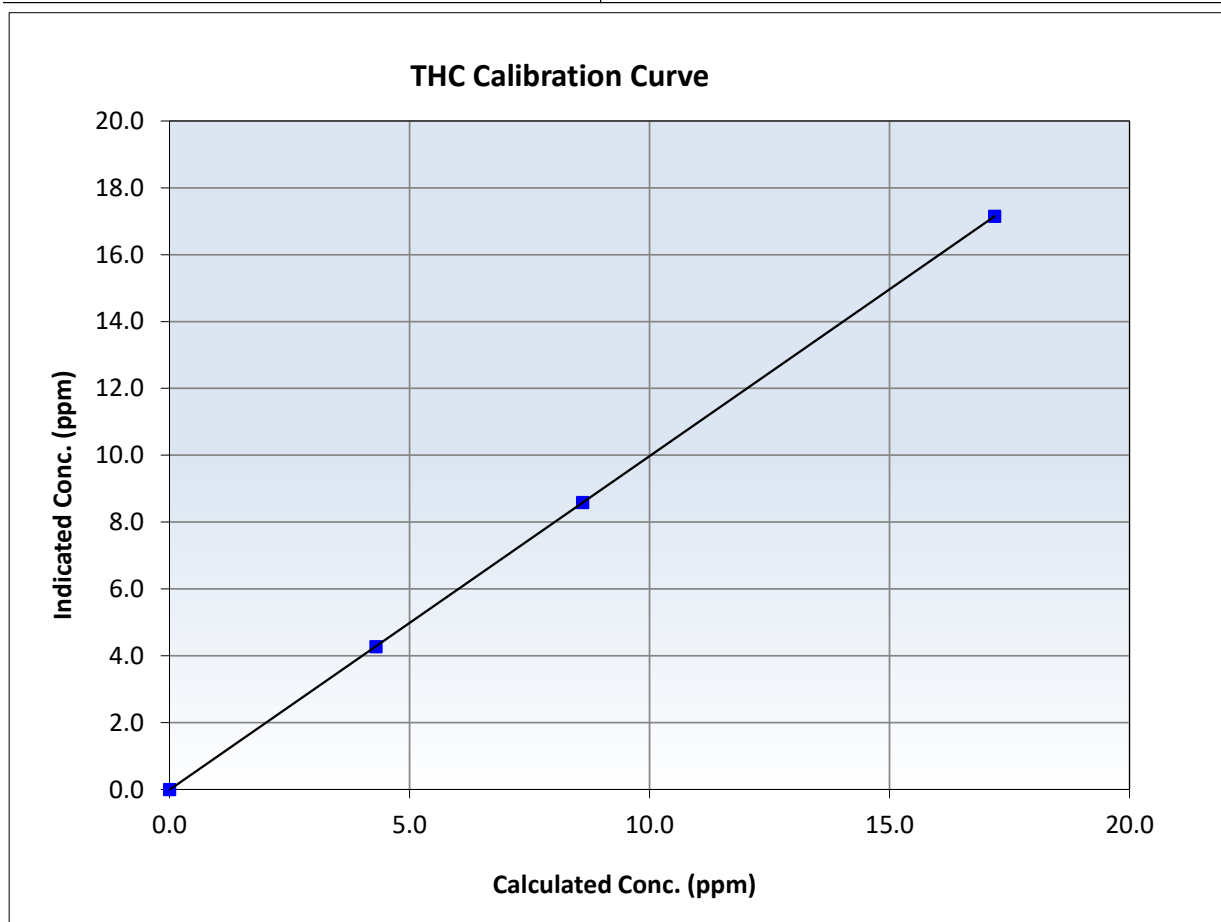
THC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 14, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:35	End Time (MST):	9:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999997	≥ 0.995
17.19	17.15	1.0024	Slope	0.998110	$0.90 - 1.10$
8.61	8.59	1.0022	Intercept	-0.009376	± 0.5
4.30	4.27	1.0081			





Wood Buffalo Environmental Association

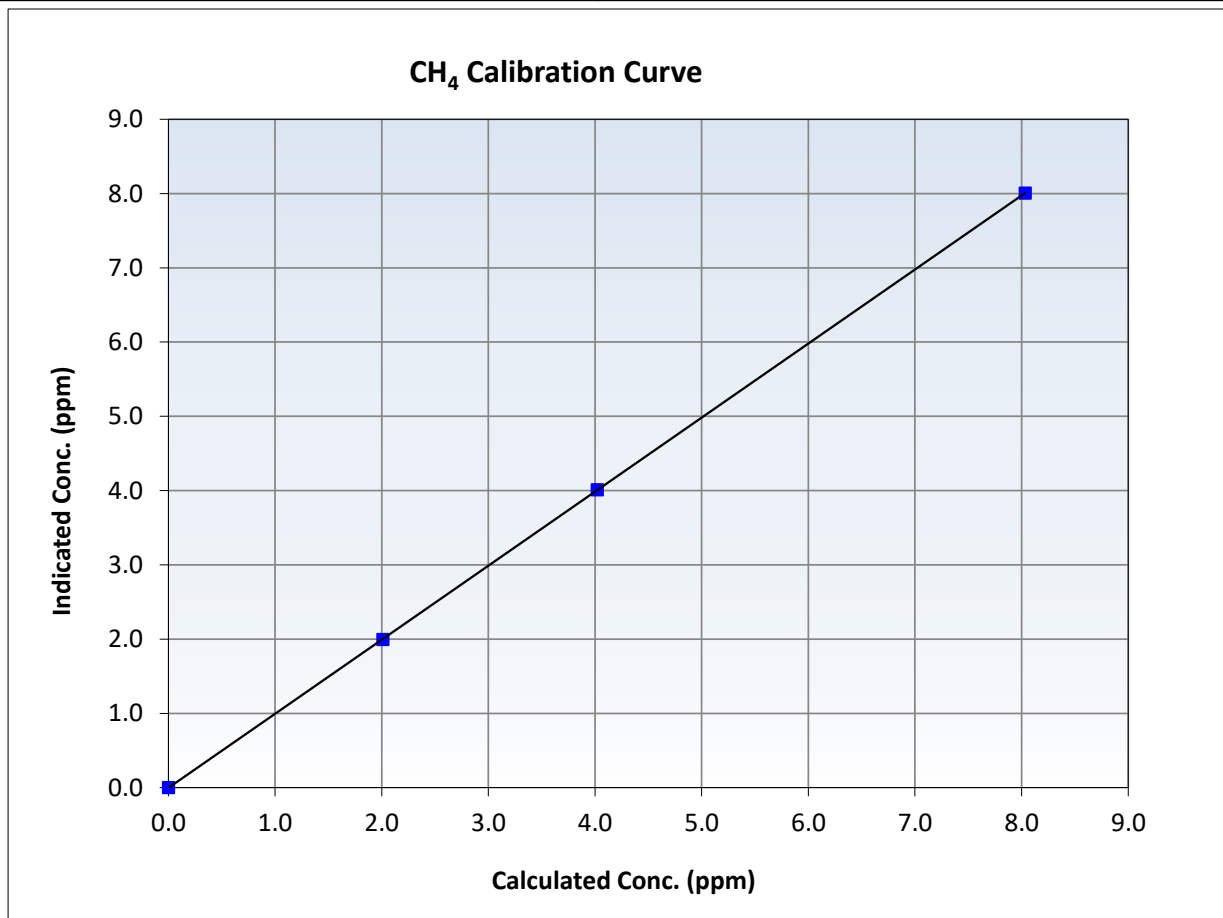
CH₄ Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 14, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:35	End Time (MST):	9:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999997	<i>≥0.995</i>
8.03	8.01	1.0033	Slope	0.997173	<i>0.90 - 1.10</i>
4.02	4.01	1.0021	Intercept	-0.003044	<i>+/-0.5</i>
2.01	1.99	1.0084			





Wood Buffalo Environmental Association

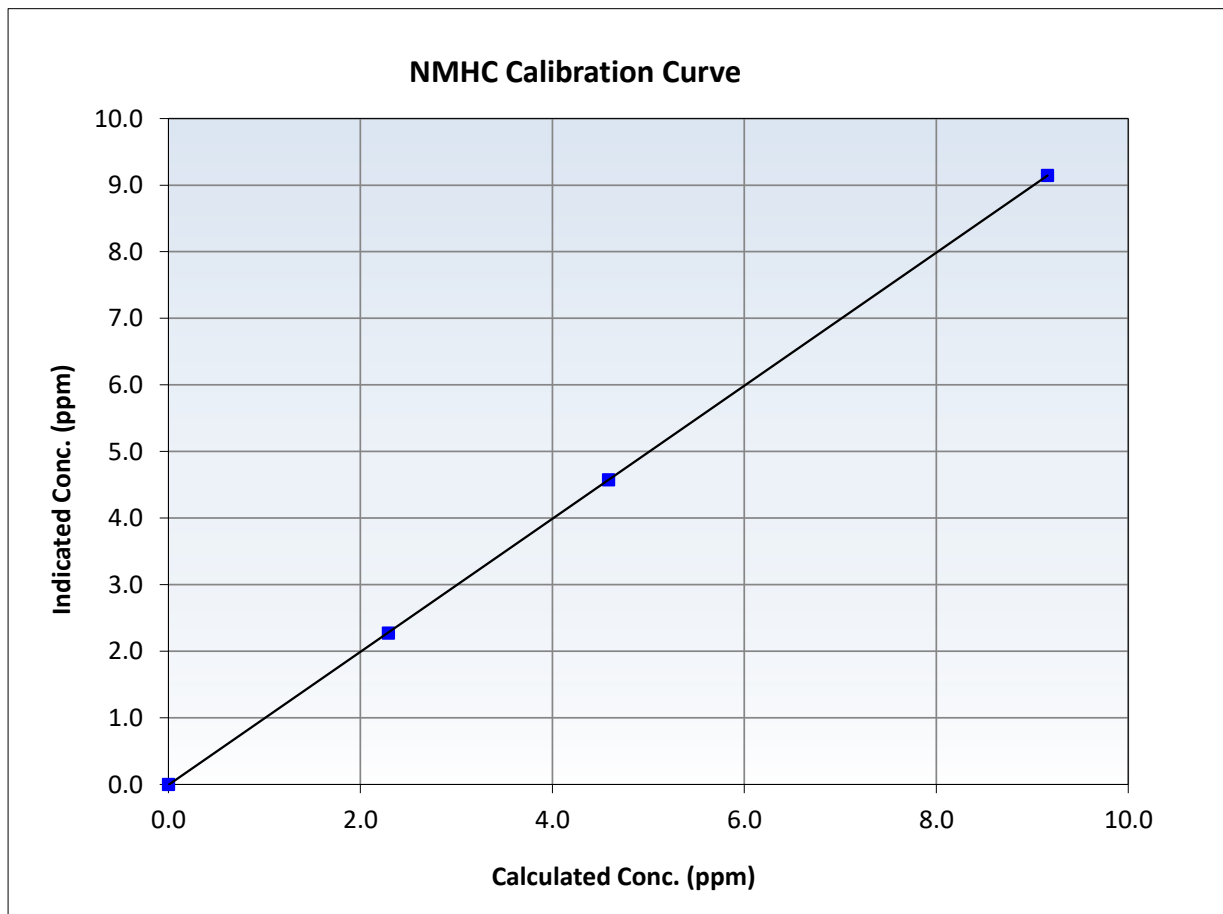
NMHC Calibration Summary

Station Information

Calibration Date:	September 4, 2024	Previous Calibration:	August 14, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:35	End Time (MST):	9:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

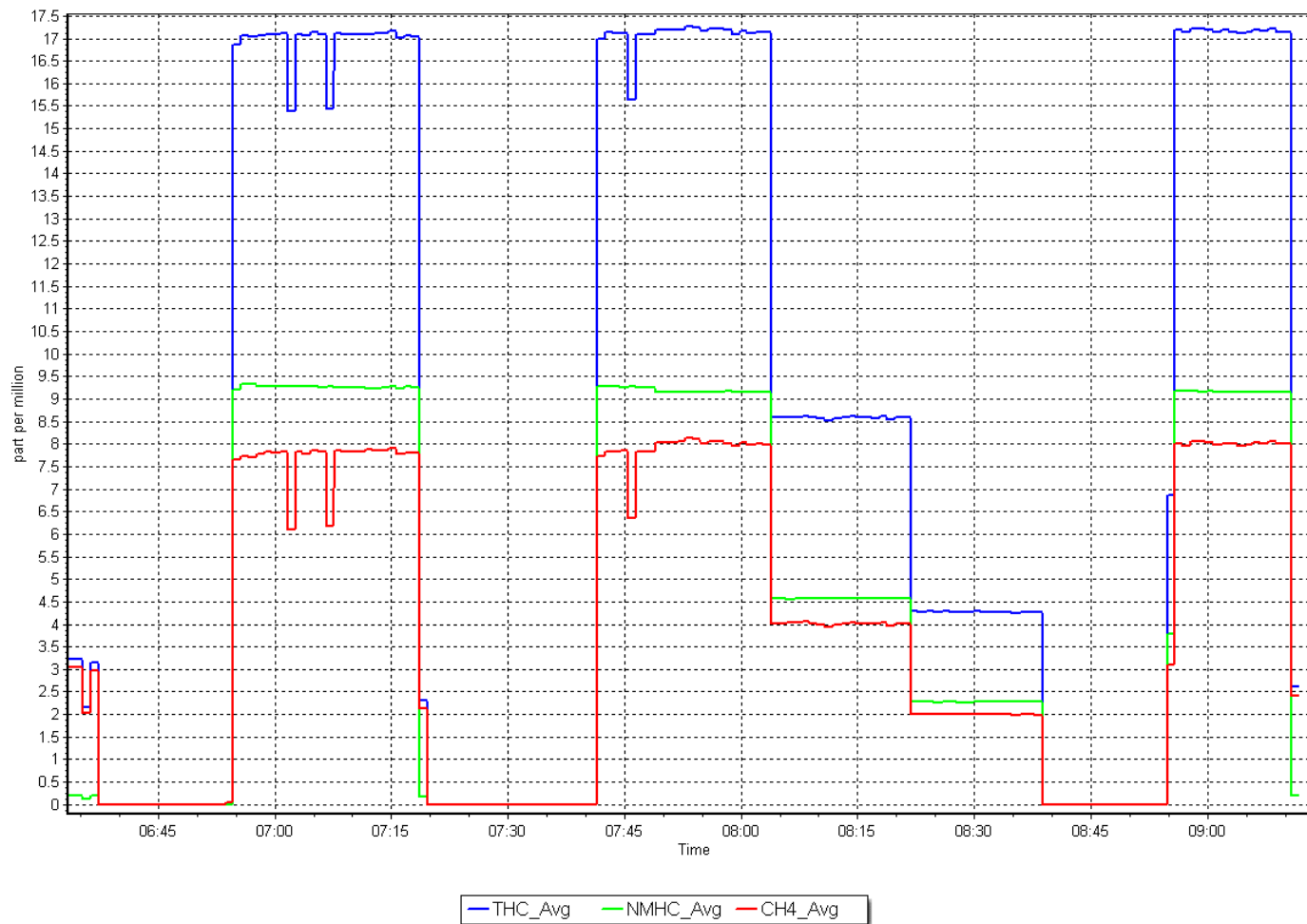
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999997	<i>≥0.995</i>
9.16	9.15	1.0013	Slope	0.999143	<i>0.90 - 1.10</i>
4.59	4.57	1.0025	Intercept	-0.006932	<i>+/-0.5</i>
2.29	2.28	1.0078			



NMHC Calibration Plot

Date: September 4, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Fort Hills Station number: AMS 23
 Calibration Date: September 18, 2024 Last Cal Date: September 4, 2024
 Start time (MST): 6:05 End time (MST): 8:19
 Reason: Maintenance CH4 channel dipping

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025
 CH4 Cal Gas Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
 C3H8 Cal Gas Conc. 207.4 ppm
 Removed Gas Cert: Removed Gas Expiry:
 Removed CH4 Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
 Removed C3H8 Conc. 207.4 ppm Diff between cyl (THC):
 Diff between cyl (CH₄): Diff between cyl (NM):
 Calibrator Model: API T700 Serial Number: 451
 Zero Air Gen model: API T701 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259520
 THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.59E-04	2.79E-04	NMHC SP Ratio:	5.51E-05
CH4 Retention time:	14.0	14.4	NMHC Peak Area:	166390
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	16.46	1.045
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.46	Prev response	17.15	*% change	-4.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.21	0.999
Mid point	4960	40.2	8.61	8.63	0.997
Low point	4980	20.1	4.30	4.28	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.19	1.000
Average Correction Factor					1.000

Notes: RT has moved on the CH₄ channel. Pressures and temperatures the same as last calibration. Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	9.16	9.07	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.07	Prev response	9.14	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	9.16	9.14	1.002
Mid point	4960	40.2	4.59	4.57	1.004
Low point	4980	20.1	2.29	2.26	1.014
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.14	1.002
Average Correction Factor					1.006

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.03	7.39	1.087
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.39	Prev response	8.01	*% change	-8.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	8.03	8.07	0.996
Mid point	4960	40.2	4.02	4.07	0.989
Low point	4980	20.1	2.01	2.02	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.04	0.999
Average Correction Factor					0.994

Calibration Statistics

	Start	Finish
THC Cal Slope:	0.998110	1.001780
THC Cal Offset:	-0.009376	-0.007997
CH ₄ Cal Slope:	0.997173	1.004915
CH ₄ Cal Offset:	-0.003044	0.004733
NMHC Cal Slope:	0.999143	0.998993
NMHC Cal Offset:	-0.006932	-0.012330

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

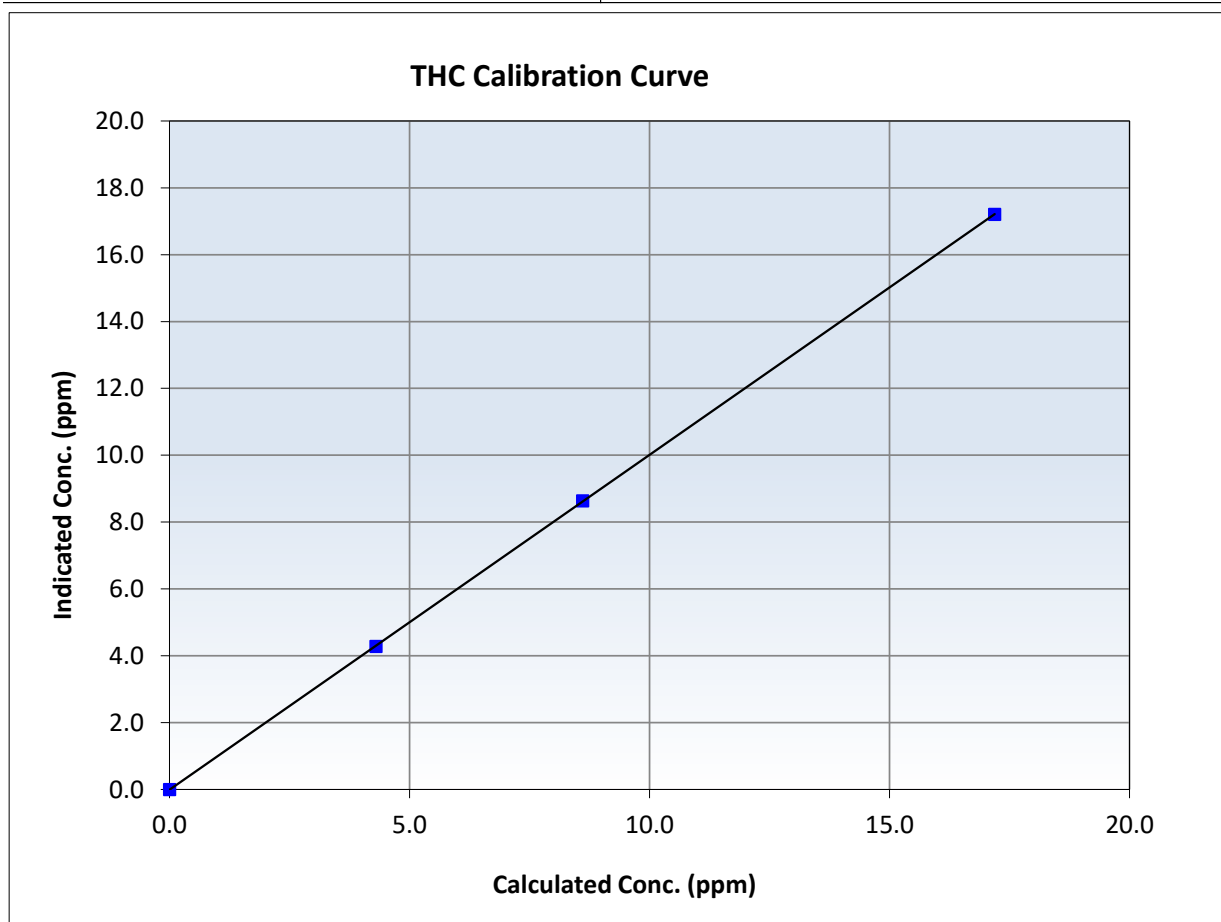
THC Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	September 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:05	End Time (MST):	8:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999994	≥ 0.995
17.19	17.21	0.9989	Slope	1.001780	$0.90 - 1.10$
8.61	8.63	0.9970	Intercept	-0.007997	± 0.5
4.30	4.28	1.0055			





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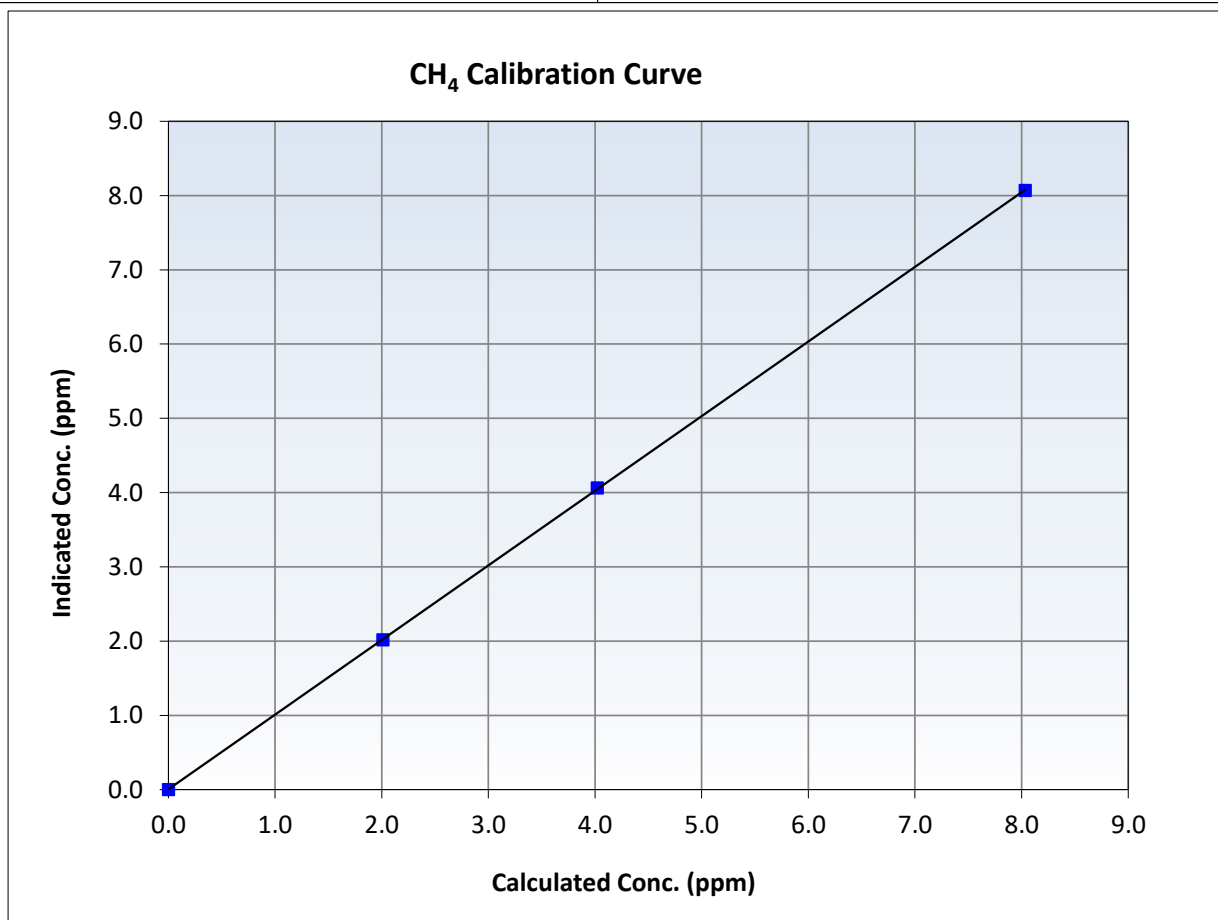
CH₄ Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	September 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:05	End Time (MST):	8:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999986	≥ 0.995
8.03	8.07	0.9955	Slope	1.004915	$0.90 - 1.10$
4.02	4.07	0.9893	Intercept	0.004733	± 0.5
2.01	2.02	0.9959			





Wood Buffalo Environmental Association

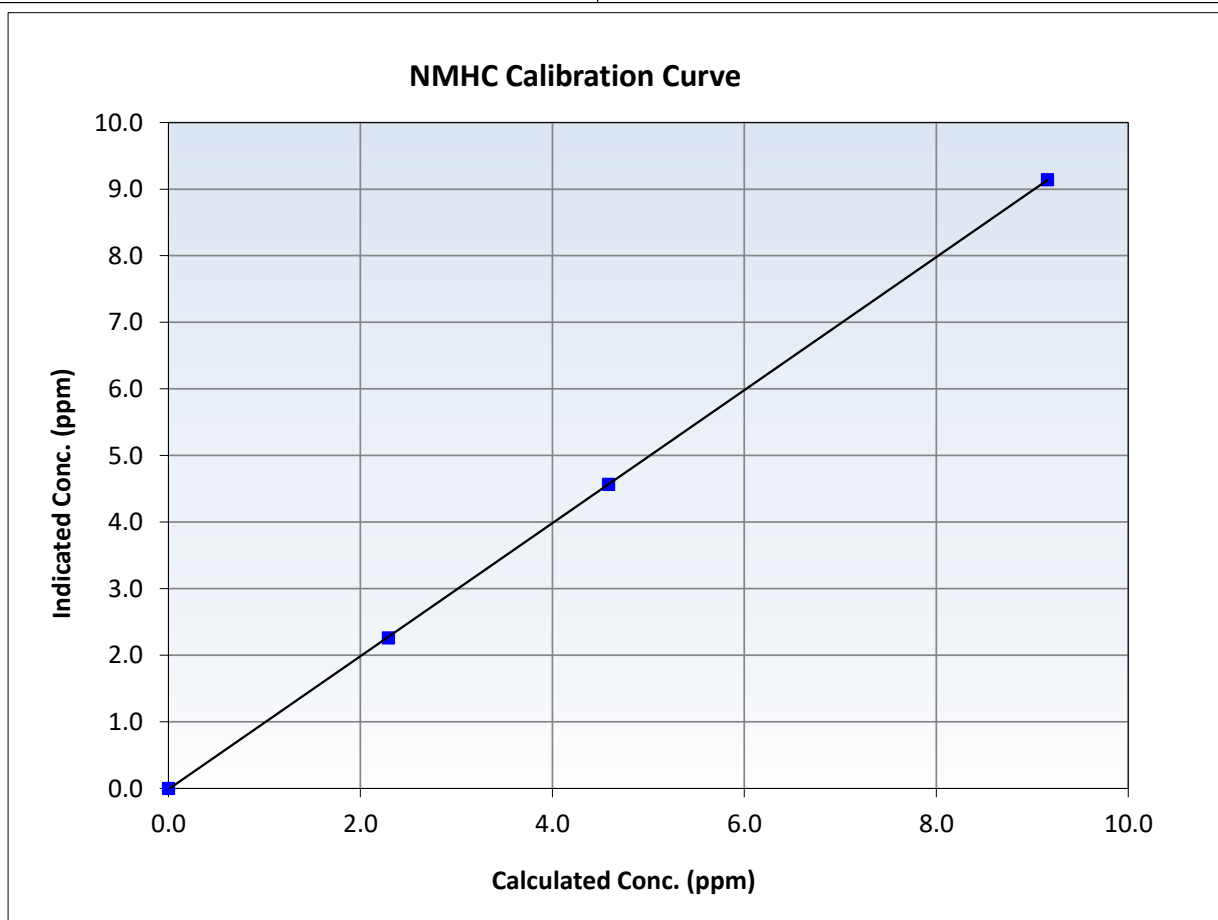
NMHC Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	September 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:05	End Time (MST):	8:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

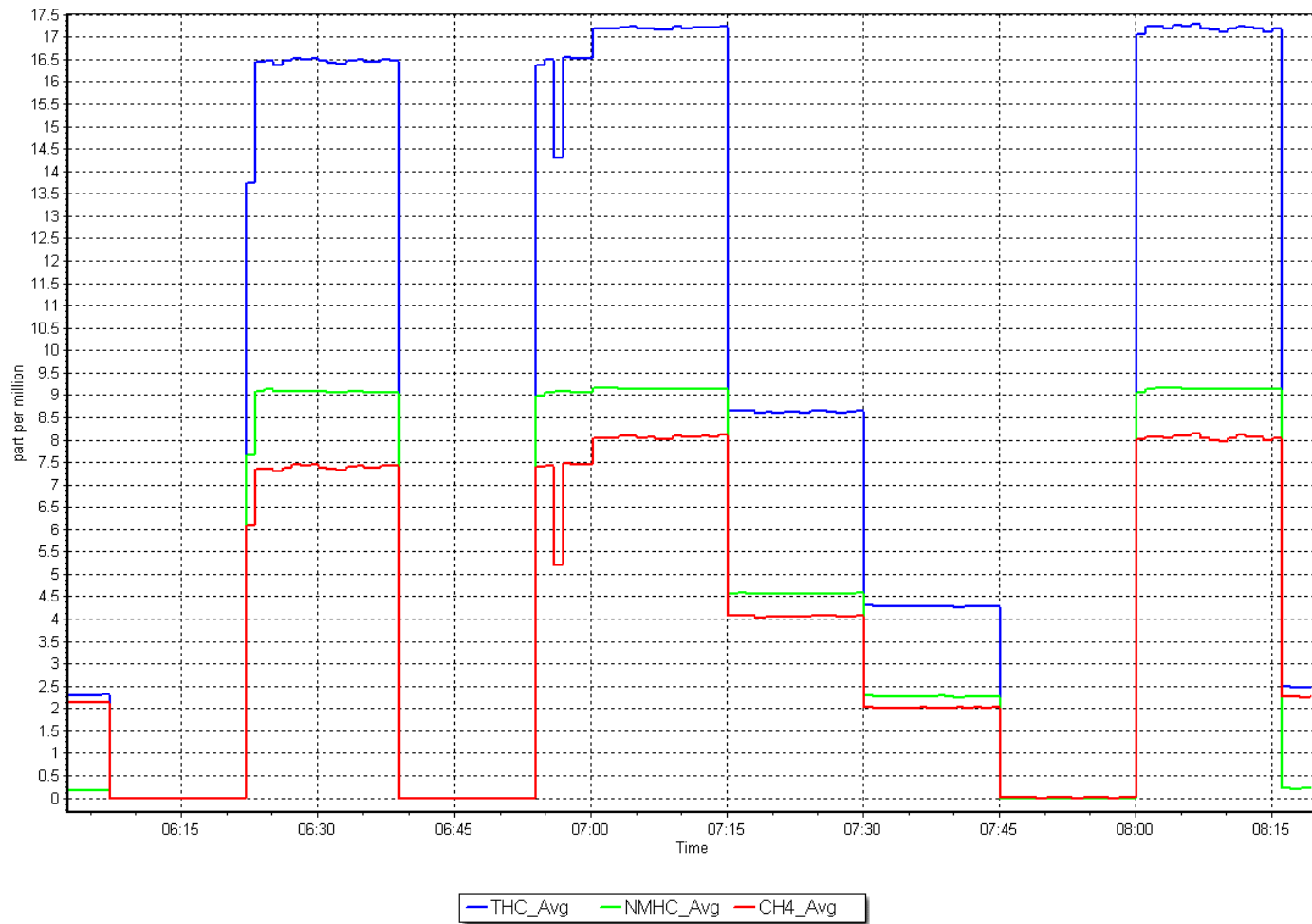
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999991	<i>≥0.995</i>
9.16	9.14	1.0019	Slope	0.998993	<i>0.90 - 1.10</i>
4.59	4.57	1.0038	Intercept	-0.012330	<i>+/-0.5</i>
2.29	2.26	1.0136			



NMHC Calibration Plot

Date: September 18, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Fort Hills Station number: AMS 23
Calibration Date: September 22, 2024 Last Cal Date: September 18, 2024
Start time (MST): 9:55 End time (MST): 14:58
Reason: Maintenance CH4 channel dipping

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025
CH4 Cal Gas Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
C3H8 Cal Gas Conc. 207.4 ppm
Removed Gas Cert: Removed Gas Expiry:
Removed CH4 Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
Removed C3H8 Conc. 207.4 ppm Diff between cyl (THC):
Diff between cyl (CH₄): Diff between cyl (NM):
Calibrator Model: API T700 Serial Number: 451
Zero Air Gen model: API T701 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259520
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	2.79E-04	3.05E-04	NMHC SP Ratio:	5.56E-05	5.59E-05
CH4 Retention time:	14.4	14.8	NMHC Peak Area:	164734	163965
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	16.56	1.039
As found Mid point	4960	40.2	8.61	8.31	1.036
As found Low point	4980	20.1	4.30	4.13	1.042
New cylinder response					
Baseline Corr AF:	16.55	Prev response	17.21	*% change	-4.0%
Baseline Corr 2nd AF:	8.30	AF Slope:	0.963256	AF Intercept:	0.000171
Baseline Corr 3rd AF:	4.13	AF Correlation:	0.999997	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.29	0.994
Mid point	4960	40.2	8.61	8.66	0.994
Low point	4980	20.1	4.30	4.35	0.989
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.28	0.995

Average Correction Factor **0.992**

Notes: Upon investigation, no alarms were detected. The diagnostics were consistent with previous calibration results; there were no discrepancies in the chromatograms compared to the last calibration. Adjusted zero and span.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
					<i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.16	9.10	1.006
As found Mid point	4960	40.2	4.59	4.55	1.008
As found Low point	4980	20.1	2.29	2.27	1.010
New cylinder response					
Baseline Corr AF:	9.10	Prev response	9.14	*% change	-0.4%
Baseline Corr 2nd AF:	4.55	AF Slope:	0.994015	AF Intercept:	-0.005120
Baseline Corr 3rd AF:	2.27	AF Correlation:	0.999999	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
					<i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.16	9.15	1.001
Mid point	4960	40.2	4.59	4.58	1.000
Low point	4980	20.1	2.29	2.30	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.16	1.000
Average Correction Factor					0.999

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFZero))
					<i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.03	7.45	1.078
As found Mid point	4960	40.2	4.02	3.76	1.072
As found Low point	4980	20.1	2.01	1.86	1.080
New cylinder response					
Baseline Corr AF:	7.45	Prev response	8.08	*% change	-8.4%
Baseline Corr 2nd AF:	3.75	AF Slope:	0.927912	AF Intercept:	0.005492
Baseline Corr 3rd AF:	1.86	AF Correlation:	0.999986	* = > +/-5% change initiates investigation	

CH₄ 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)
					<i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.03	8.14	0.986
Mid point	4960	40.2	4.02	4.08	0.987
Low point	4980	20.1	2.01	2.05	0.980
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.12	0.990
Average Correction Factor					0.984

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:	1.001780	1.005230
THC Cal Offset:	-0.007997	0.012789
CH ₄ Cal Slope:	1.004915	1.013080
CH ₄ Cal Offset:	0.004733	0.005524
NMHC Cal Slope:	0.998993	0.998221
NMHC Cal Offset:	-0.012330	0.006266

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

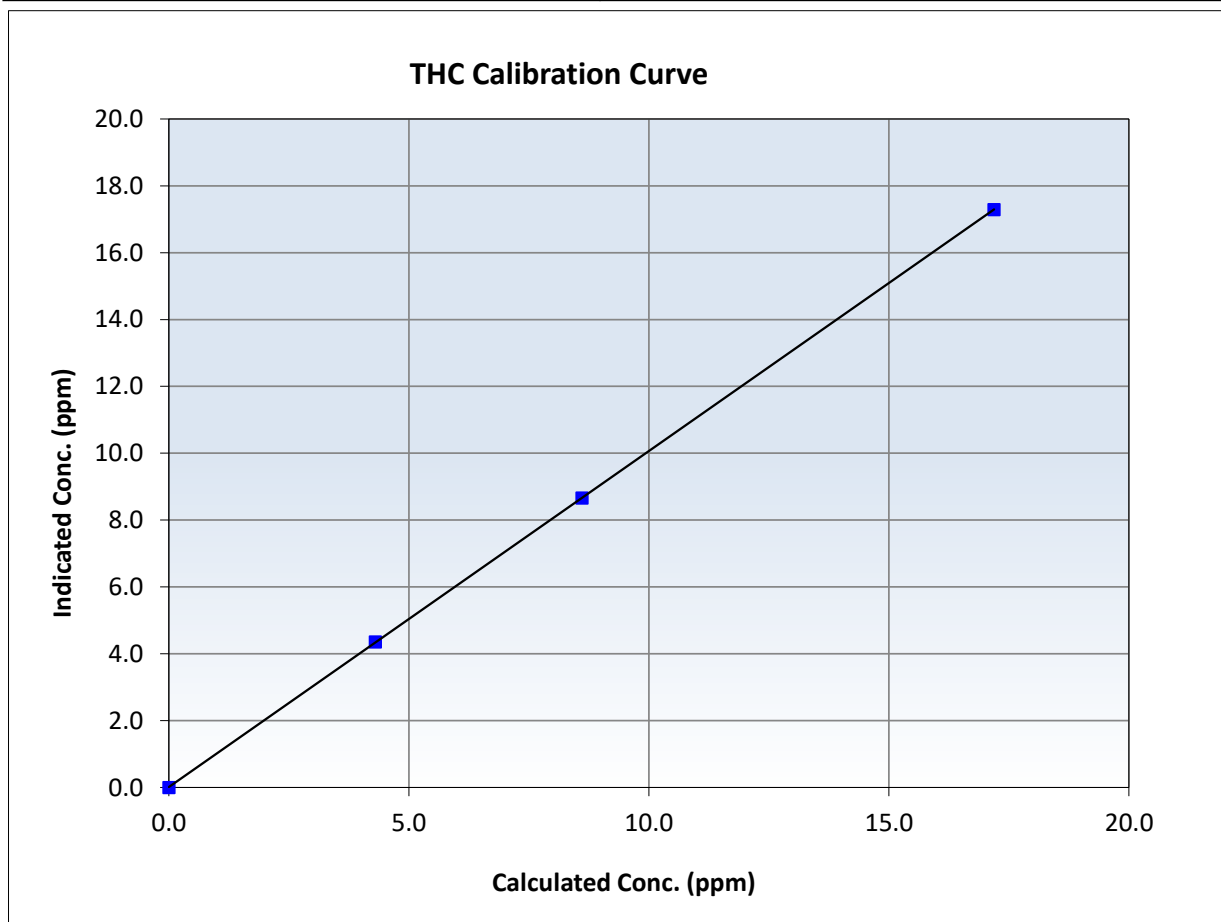
THC Calibration Summary

Station Information

Calibration Date:	September 22, 2024	Previous Calibration:	September 18, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:55	End Time (MST):	14:58
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999998	<i>≥0.995</i>
17.19	17.29	0.9942	Slope	1.005230	<i>0.90 - 1.10</i>
8.61	8.66	0.9935	Intercept	0.012789	<i>+/-0.5</i>
4.30	4.35	0.9886			





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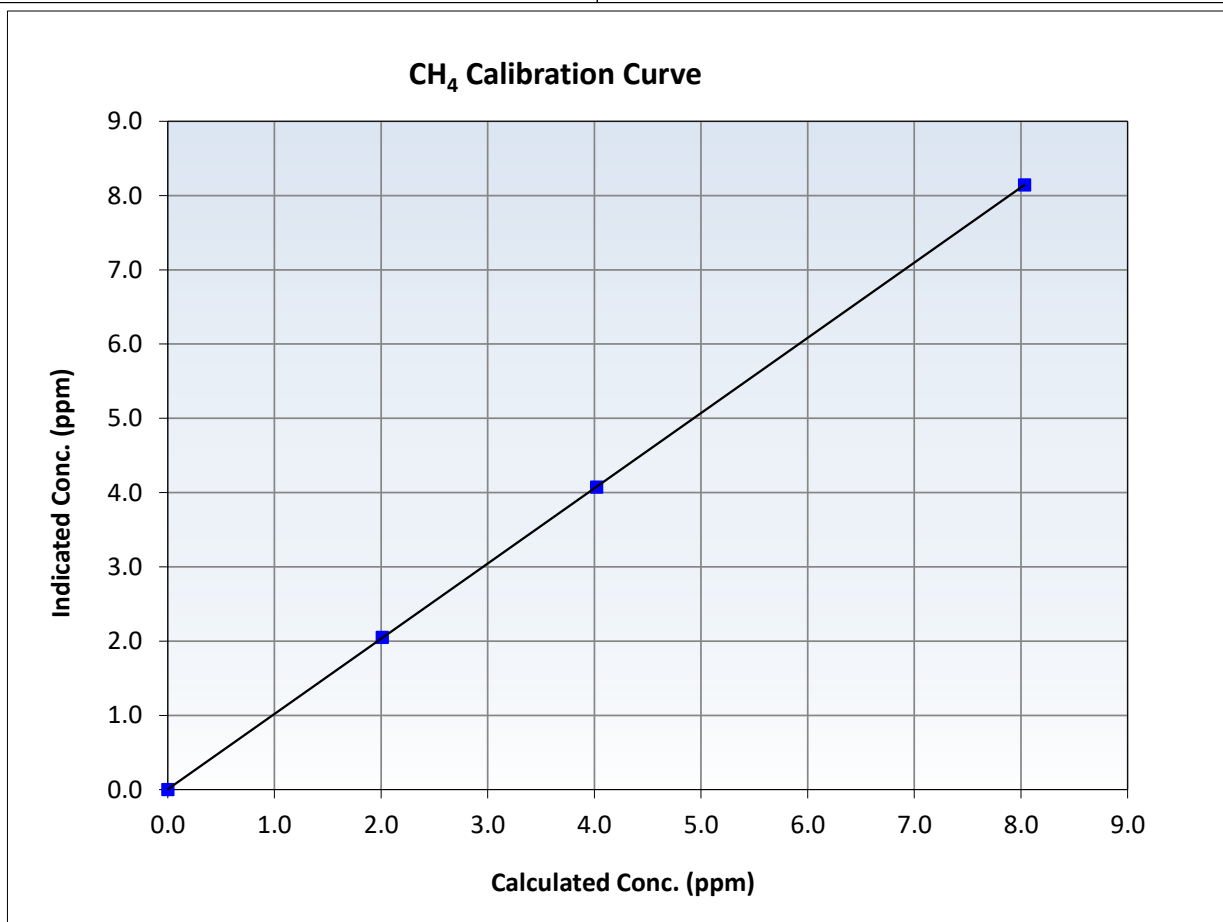
CH₄ Calibration Summary

Station Information

Calibration Date:	September 22, 2024	Previous Calibration:	September 18, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:55	End Time (MST):	14:58
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999997	≥0.995
8.03	8.14	0.9865	Slope	1.013080	0.90 - 1.10
4.02	4.08	0.9866	Intercept	0.005524	+/-0.5
2.01	2.05	0.9804			





Wood Buffalo Environmental Association

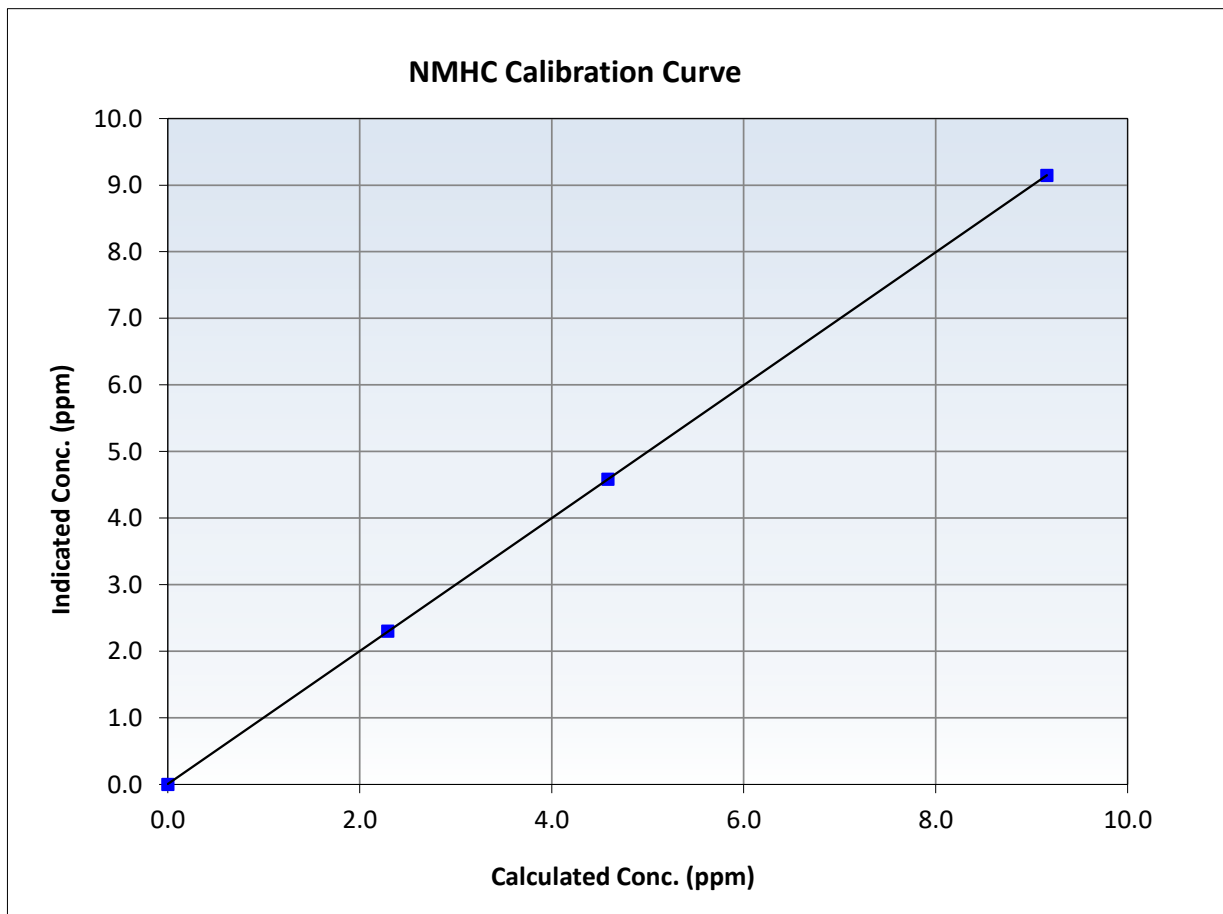
NMHC Calibration Summary

Station Information

Calibration Date:	September 22, 2024	Previous Calibration:	September 18, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:55	End Time (MST):	14:58
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

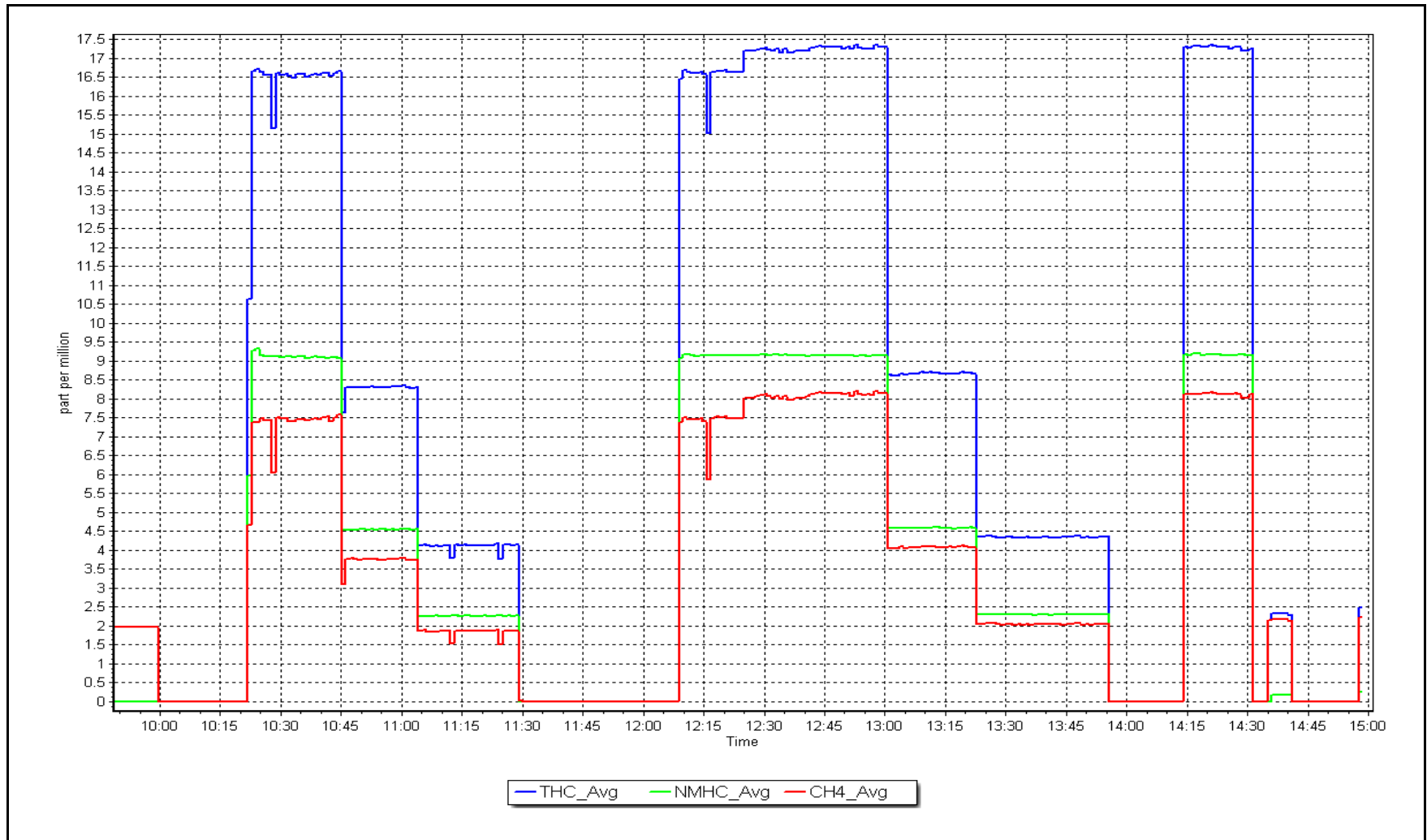
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999998	≥ 0.995
9.16	9.15	1.0013	Slope	0.998221	$0.90 - 1.10$
4.59	4.58	1.0003	Intercept	0.006266	± 0.5
2.29	2.30	0.9956			



NMHC Calibration Plot

Date: September 22, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Fort Hills Station number: AMS 23
Calibration Date: September 23, 2024 Last Cal Date: September 22, 2024
Start time (MST): 9:20 End time (MST): 13:05
Reason: Maintenance CH4 channel dipping

Calibration Standards

Gas Cert Reference: CC281425 Cal Gas Expiry Date: January 5, 2025
CH4 Cal Gas Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
C3H8 Cal Gas Conc. 207.4 ppm
Removed Gas Cert: Removed Gas Expiry:
Removed CH4 Conc. 500.2 ppm CH4 Equiv Conc. 1070.6 ppm
Removed C3H8 Conc. 207.4 ppm Diff between cyl (THC):
Diff between cyl (CH₄): Diff between cyl (NM):
Calibrator Model: API T700 Serial Number: 451
Zero Air Gen model: API T701 Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1331259520
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	3.05E-04	2.74E-04	NMHC SP Ratio:	5.59E-05	5.68E-05
CH4 Retention time:	14.8	14.6	NMHC Peak Area:	163965	161208
Zero Chromatogram:	ON	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	17.18	1.001
As found Mid point	4960	40.2	8.61	8.63	0.998
As found Low point	4980	20.1	4.30	4.29	1.002
New cylinder response					
Baseline Corr AF:	17.18	Prev response	17.29	*% change	-0.7%
Baseline Corr 2nd AF:	8.63	AF Slope:	0.999374	AF Intercept:	0.003610
Baseline Corr 3rd AF:	4.29	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.28	0.995
Mid point	4960	40.2	8.61	8.70	0.989
Low 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	17.33	0.992
Average Correction Factor					0.992

Notes: Carrier run pressure increased after as founds. Adjusted window timing. Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	9.16	9.15	1.001
As found Mid point	4960	40.2	4.59	4.58	1.001
As found Low point	4980	20.1	2.29	2.28	1.005
New cylinder response					
Baseline Corr AF:	9.15	Prev response	9.15	*% change	0.0%
Baseline Corr 2nd AF:	4.58	AF Slope:	0.999431	AF Intercept:	-0.003335
Baseline Corr 3rd AF:	2.28	AF Correlation:	0.999999	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	9.16	9.18	0.998
Mid point	4960	40.2	4.59	4.61	0.996
Low point	4980	20.1	2.29	2.31	0.993
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.21	0.995
Average Correction Factor					0.995

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4920	80.3	8.03	8.03	1.001
As found Mid point	4960	40.2	4.02	4.05	0.994
As found Low point	4980	20.1	2.01	2.01	0.999
New cylinder response					
Baseline Corr AF:	8.03	Prev response	8.14	*% change	-1.4%
Baseline Corr 2nd AF:	4.04	AF Slope:	0.999537	AF Intercept:	0.007144
Baseline Corr 3rd AF:	2.01	AF Correlation:	0.999987	* = > +/-5% change initiates investigation	

CH₄ 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)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4920	80.3	8.03	8.10	0.992
Mid point	4960	40.2	4.02	4.10	0.982
Low point	4980	20.1	2.01	2.03	0.992
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.13	0.988
Average Correction Factor					0.988

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.005230	1.004886
THC Cal Offset:	0.012789	0.016376
CH ₄ Cal Slope:	1.013080	1.009071
CH ₄ Cal Offset:	0.005524	0.008120
NMHC Cal Slope:	0.998221	1.001603
NMHC Cal Offset:	0.006266	0.007455

Calibration Performed By: Devin Russell



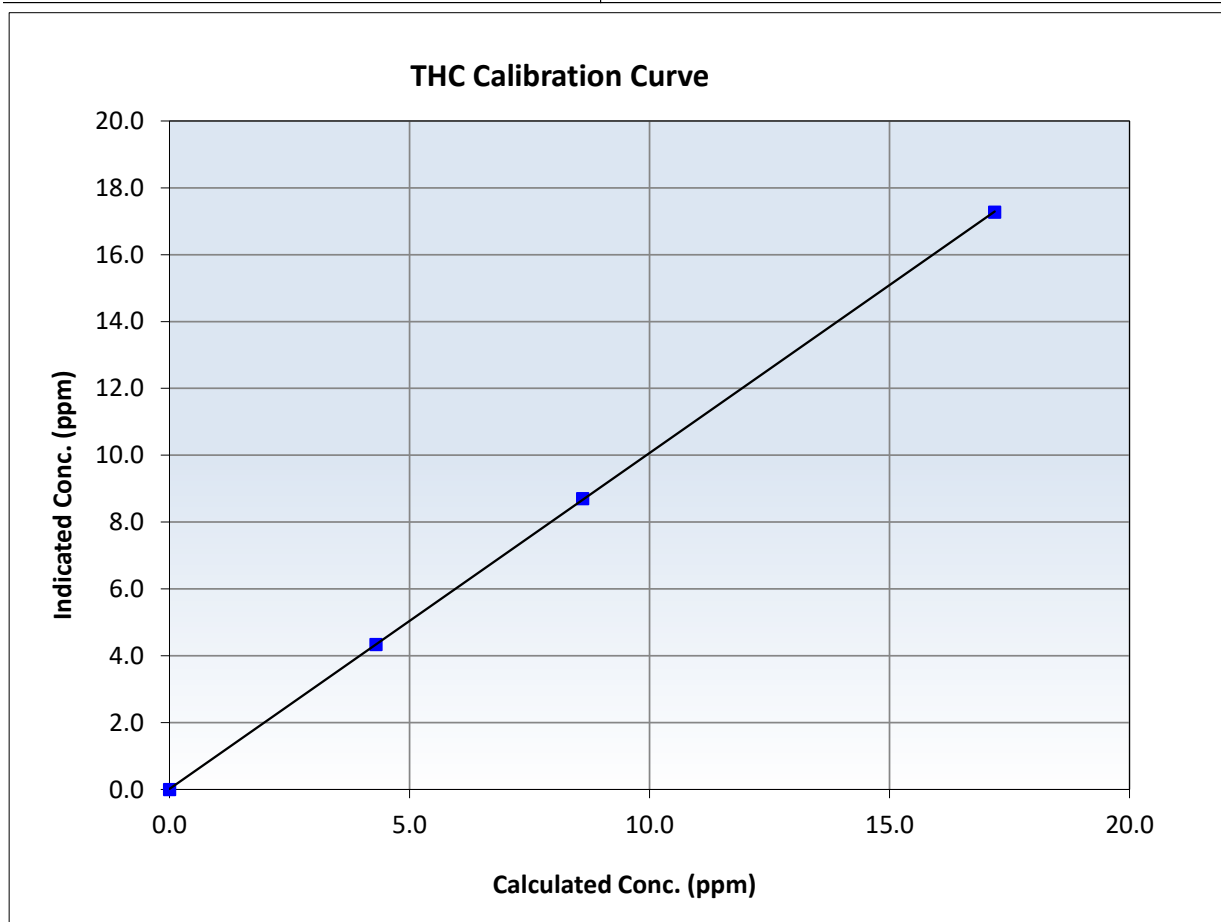
Wood Buffalo Environmental Association THC Calibration Summary

Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	September 22, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:20	End Time (MST):	13:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999989	≥ 0.995
17.19	17.28	0.9952	Slope	1.004886	$0.90 - 1.10$
8.61	8.70	0.9892	Intercept	0.016376	± 0.5
4.30	4.34	0.9918			





Wood Buffalo Environmental Association

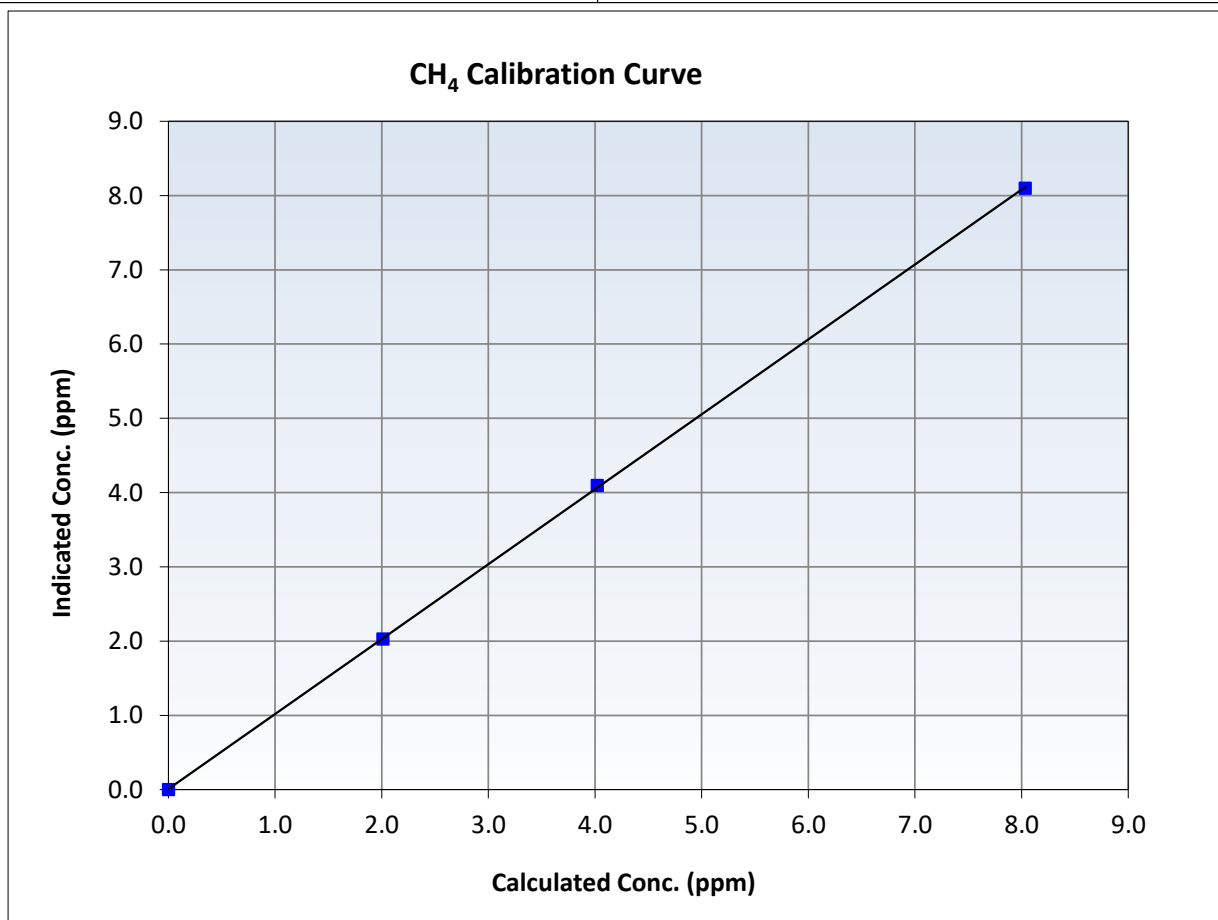
CH₄ Calibration Summary

Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	September 22, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:20	End Time (MST):	13:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999966	≥ 0.995
8.03	8.10	0.9916	Slope	1.009071	$0.90 - 1.10$
4.02	4.10	0.9818	Intercept	0.008120	± 0.5
2.01	2.03	0.9915			





Wood Buffalo Environmental Association

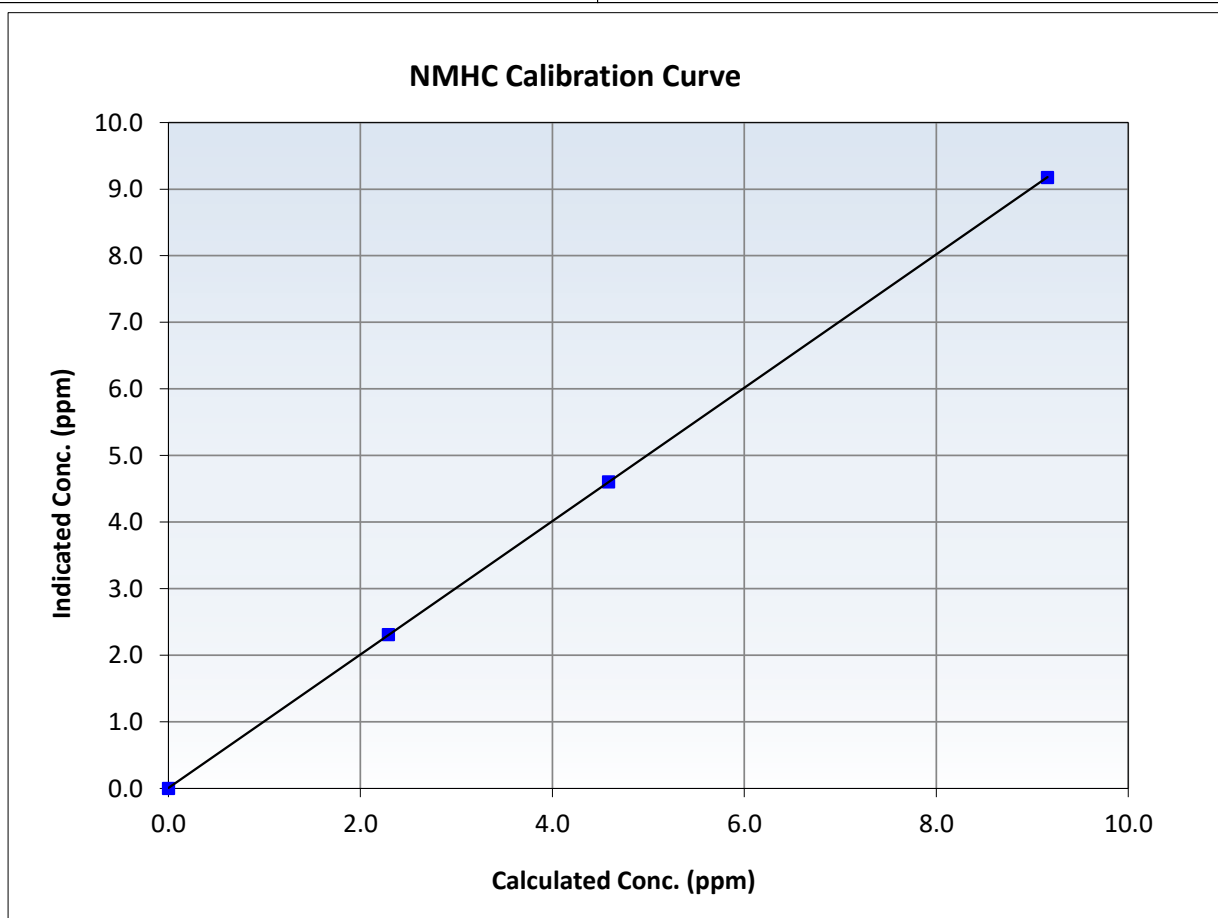
NMHC Calibration Summary

Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	September 22, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	9:20	End Time (MST):	13:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

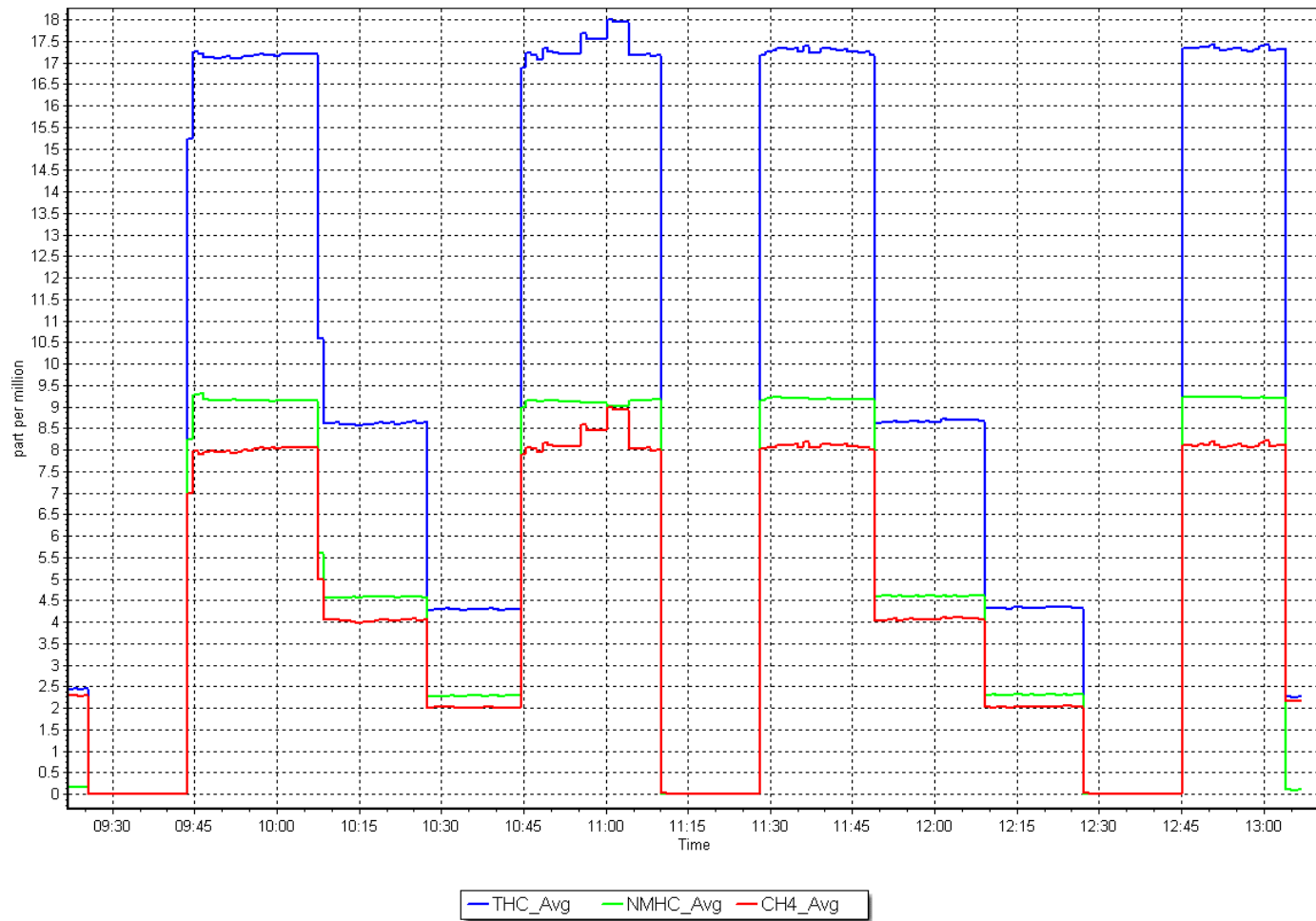
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999997	<i>≥0.995</i>
9.16	9.18	0.9981	Slope	1.001603	<i>0.90 - 1.10</i>
4.59	4.61	0.9955	Intercept	0.007455	<i>+/-0.5</i>
2.29	2.31	0.9925			



NMHC Calibration Plot

Date: September 23, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Fort Hills
Calibration Date: September 25, 2024
Start time (MST): 11:12
Reason: Install

Station number: AMS 23
Last Cal Date: September 23, 2024
End time (MST): 14:43

Calibration Standards

Gas Cert Reference: CC281425
CH₄ Cal Gas Conc. 500.2 ppm
C₃H₈ Cal Gas Conc. 207.4 ppm
Removed Gas Cert: 500.2 ppm
Removed CH₄ Conc. 207.4 ppm
Removed C₃H₈ Conc. 207.4 ppm
Diff between cyl (CH₄):
Calibrator Model: API T700
Zero Air Gen model: API T701

Cal Gas Expiry Date: January 5, 2025
CH₄ Equiv Conc. 1070.6 ppm
Removed Gas Expiry: 1070.6 ppm
CH₄ Equiv Conc. 1070.6 ppm
Diff between cyl (THC):
Diff between cyl (NM):
Serial Number: 451
Serial Number: 5611

Analyzer Information

Analyzer make: Thermo 55i
THC Range: 0 - 20 ppm

Analyzer serial #: 1152430012
NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
CH ₄ SP Ratio:		2.02E-04	NMHC SP Ratio:	6.60E-05
CH ₄ Retention time:		12.2	NMHC Peak Area:	138802
Zero Chromatogram:		OFF	Flat Baseline:	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.26	0.996
Mid point	4960	40.2	8.61	8.73	0.986
Low point	4980	20.1	4.30	4.41	0.977
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.22	0.998
Average Correction Factor					0.986

Notes: Analyzer being replaced, performing install calibration. Span adjusted.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.16	9.19	0.997
Mid point	4960	40.2	4.59	4.70	0.976
Low point	4980	20.1	2.29	2.41	0.953
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.20	0.996
Average Correction Factor					0.975

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ 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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.03	8.07	0.995
Mid point	4960	40.2	4.02	4.04	0.996
Low point	4980	20.1	2.01	2.00	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.02	1.001
Average Correction Factor					0.999

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope:		1.002954
THC Cal Offset:		0.052168
CH ₄ Cal Slope:		1.005950
CH ₄ Cal Offset:		-0.009658
NMHC Cal Slope:		1.000339
NMHC Cal Offset:		0.062026

Calibration Performed By: Rene Chamberland



Wood Buffalo Environmental Association

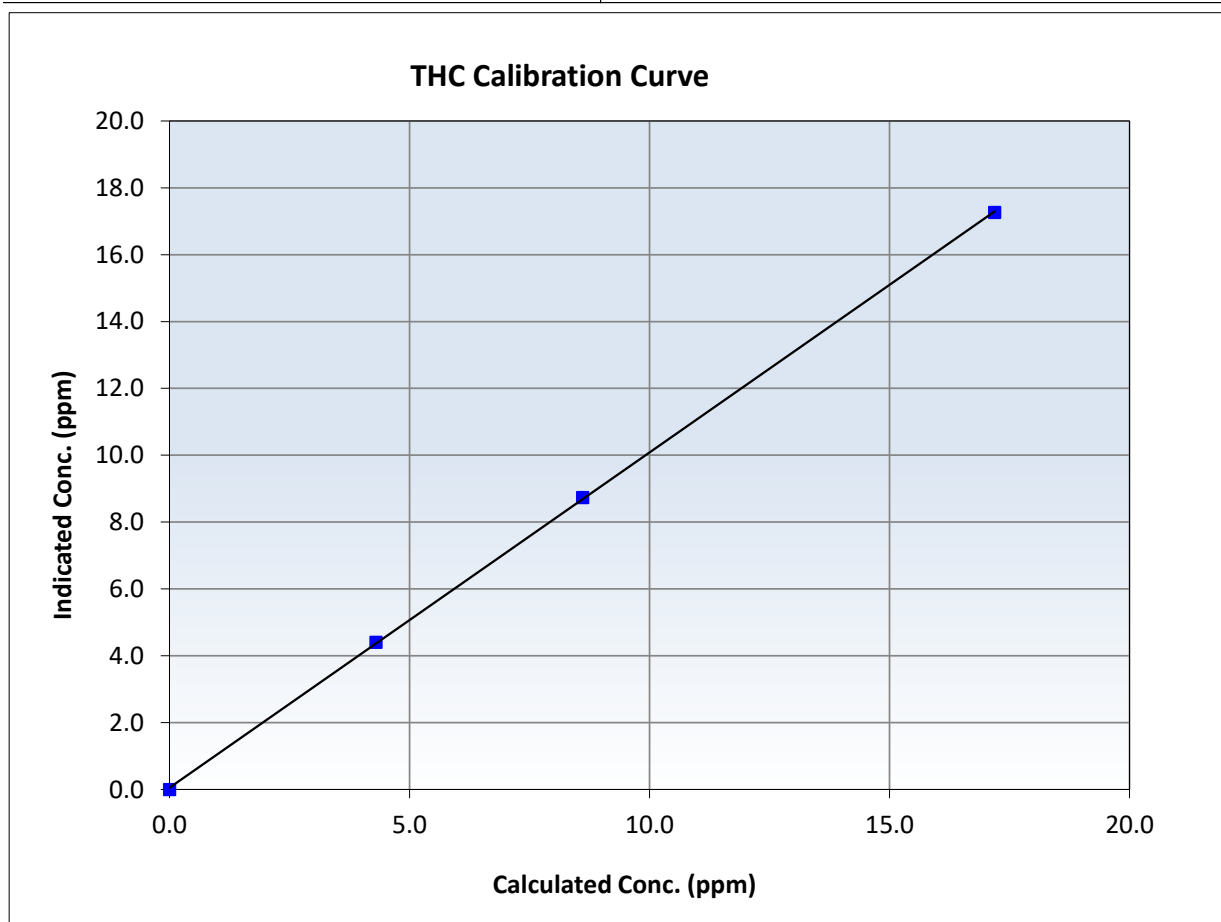
THC Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 23, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	11:12	End Time (MST):	14:43
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999954	≥ 0.995
17.19	17.26	0.9959	Slope	1.002954	$0.90 - 1.10$
8.61	8.73	0.9858	Intercept	0.052168	± 0.5
4.30	4.41	0.9765			





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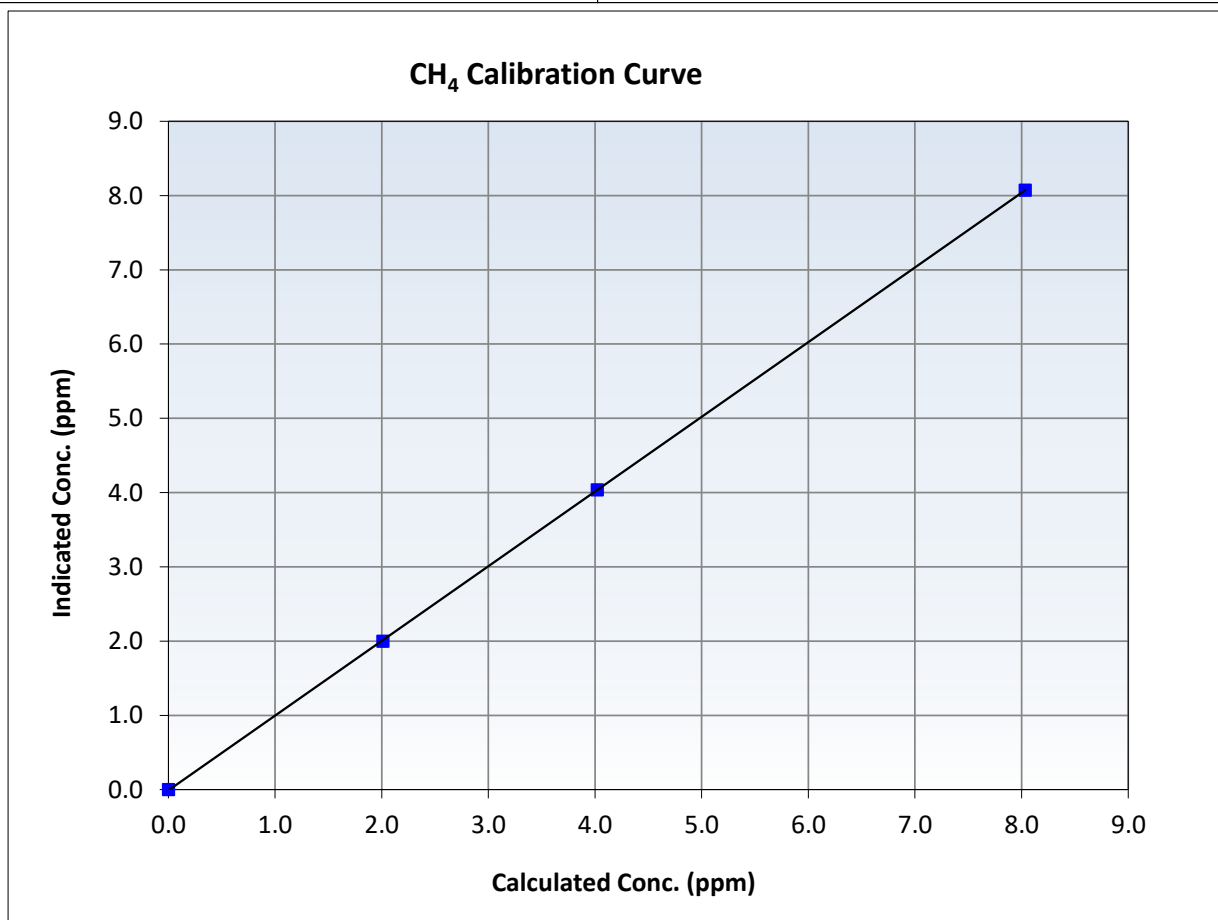
CH₄ Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 23, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	11:12	End Time (MST):	14:43
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999992	≥ 0.995
8.03	8.07	0.9949	Slope	1.005950	0.90 - 1.10
4.02	4.04	0.9964	Intercept	-0.009658	± 0.5
2.01	2.00	1.0054			





Wood Buffalo Environmental Association

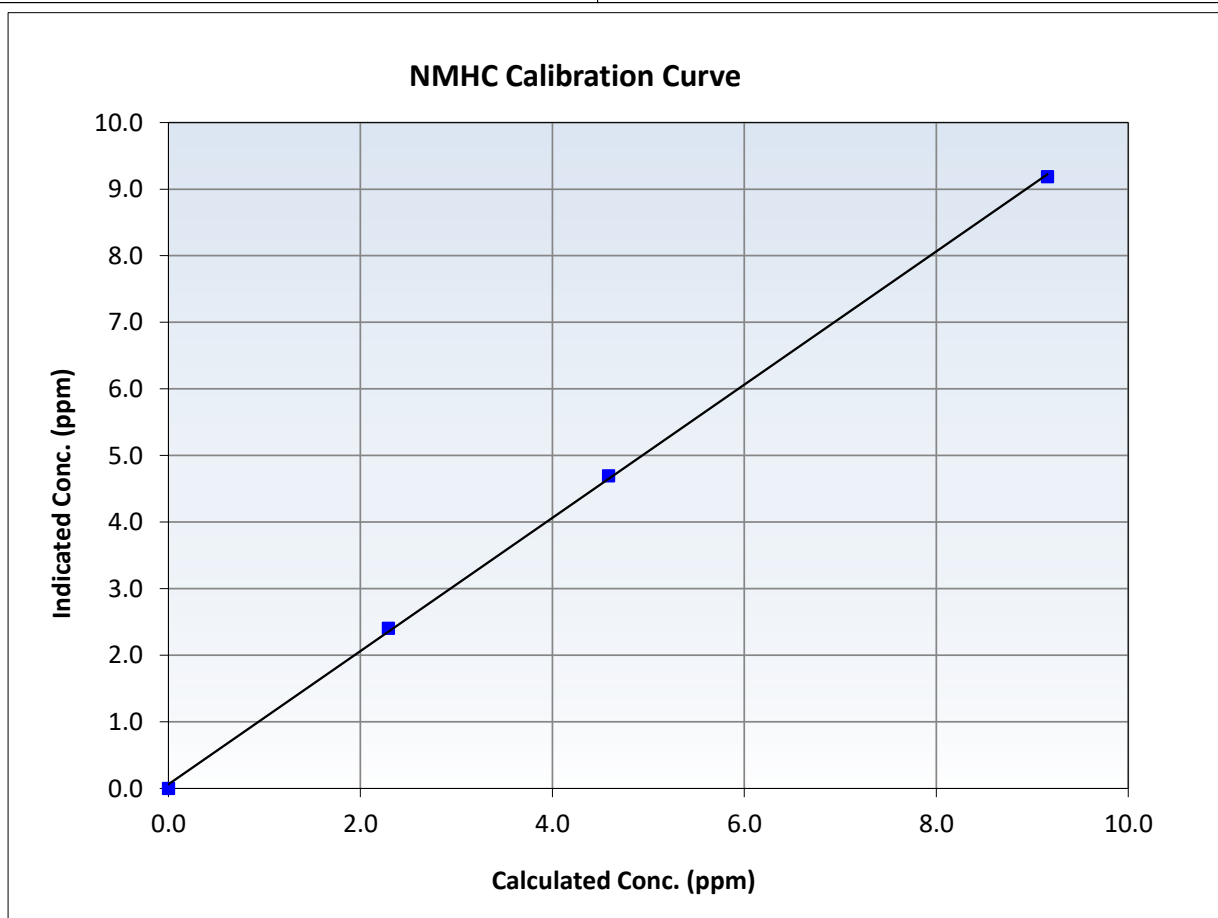
NMHC Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 23, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	11:12	End Time (MST):	14:43
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

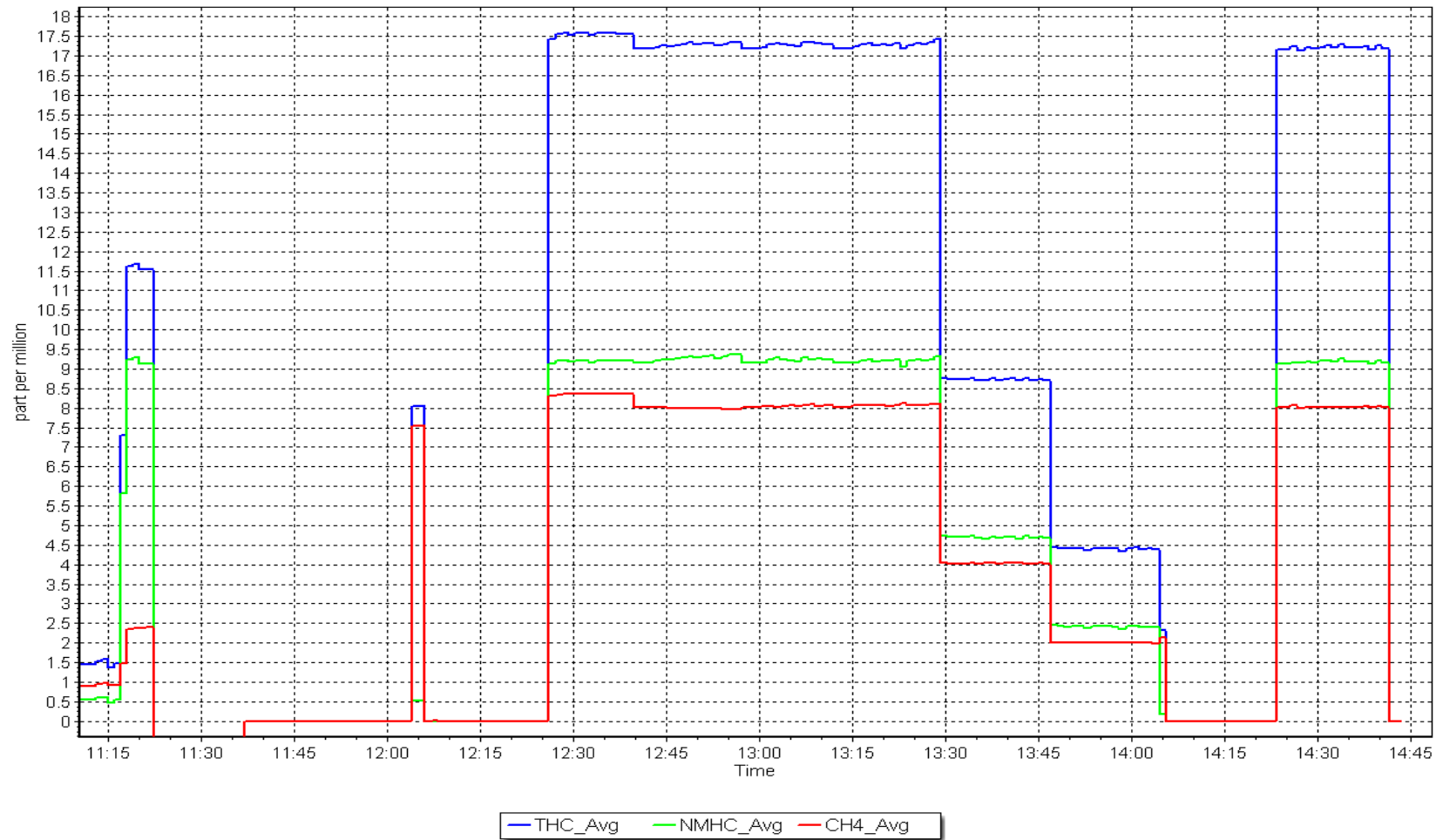
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999782	<i>≥0.995</i>
9.16	9.19	0.9969	Slope	1.000339	<i>0.90 - 1.10</i>
4.59	4.70	0.9765	Intercept	0.062026	<i>+/-0.5</i>
2.29	2.41	0.9525			



NMHC Calibration Plot

Date: September 25, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Fort Hills
Station number: AMS 23
Calibration Date: September 12, 2024
Last Cal Date: August 13, 2024
Start time (MST): 6:30
End time (MST): 11:08
Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC358149
NOX Cal Gas Conc: 60.30 ppm
Removed Cylinder #:
Removed Gas NOX Conc: 60.30 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701
Cal Gas Expiry Date: January 5, 1932
NO Cal Gas Conc: 60.10 ppm
Removed Gas Exp Date:
Removed Gas NO Conc: 60.10 ppm
NO gas Diff:
Serial Number: 451
Serial Number: 5611

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.4	-0.3	----	----
AF High point	4934	66.3	799.5	796.9	2.7	777.1	772.6	4.6	1.0279	1.0309
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 798.9 ppb	NO = 797.0 ppb				* = > +/-5% change initiates investigation		*Percent Change	NO _x = -2.7%	
Baseline Corr 1st pt	NO _x = 777.8 ppb	NO = 773.0 ppb				<u>As Found Statistics</u>		*Percent Change	NO = -3.1%	
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:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1152430007

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.216	1.253	NO bkgnd or offset:	3.8	3.8
NOX coeff or slope:	0.992	0.993	NOX bkgnd or offset:	4.3	4.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	185.0	185.0

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999813	1.000913
NO _x Cal Offset:	-0.513906	-0.474201
NO Cal Slope:	1.002434	1.002621
NO Cal Offset:	-1.792787	-2.032832
NO ₂ Cal Slope:	0.998755	1.002789
NO ₂ Cal Offset:	-1.443570	0.174230

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
High point	4934	66.3	799.5	796.9	2.7	799.8	797.7	2.1	0.9997	0.9990
Mid point	4967	33.2	400.4	399.0	1.3	400.5	397.6	2.9	0.9997	1.0036
Low point	4983	16.6	200.2	199.5	0.7	199.4	195.9	3.5	1.0041	1.0186
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
As left span	4934	66.3	799.5	399.9	399.6	799.4	399.9	399.6	1.0002	1.0000
Average Correction Factor									1.0011	1.0071

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	793.5	399.6	396.6	397.6	0.9974	100.3%
Mid GPT point	793.5	596.3	199.9	201.1	0.9938	100.6%
Low GPT point	793.5	694.2	102.0	102.3	0.9966	100.3%
Average Correction Factor					0.9959	100.4%

Notes: No Maintenance done. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

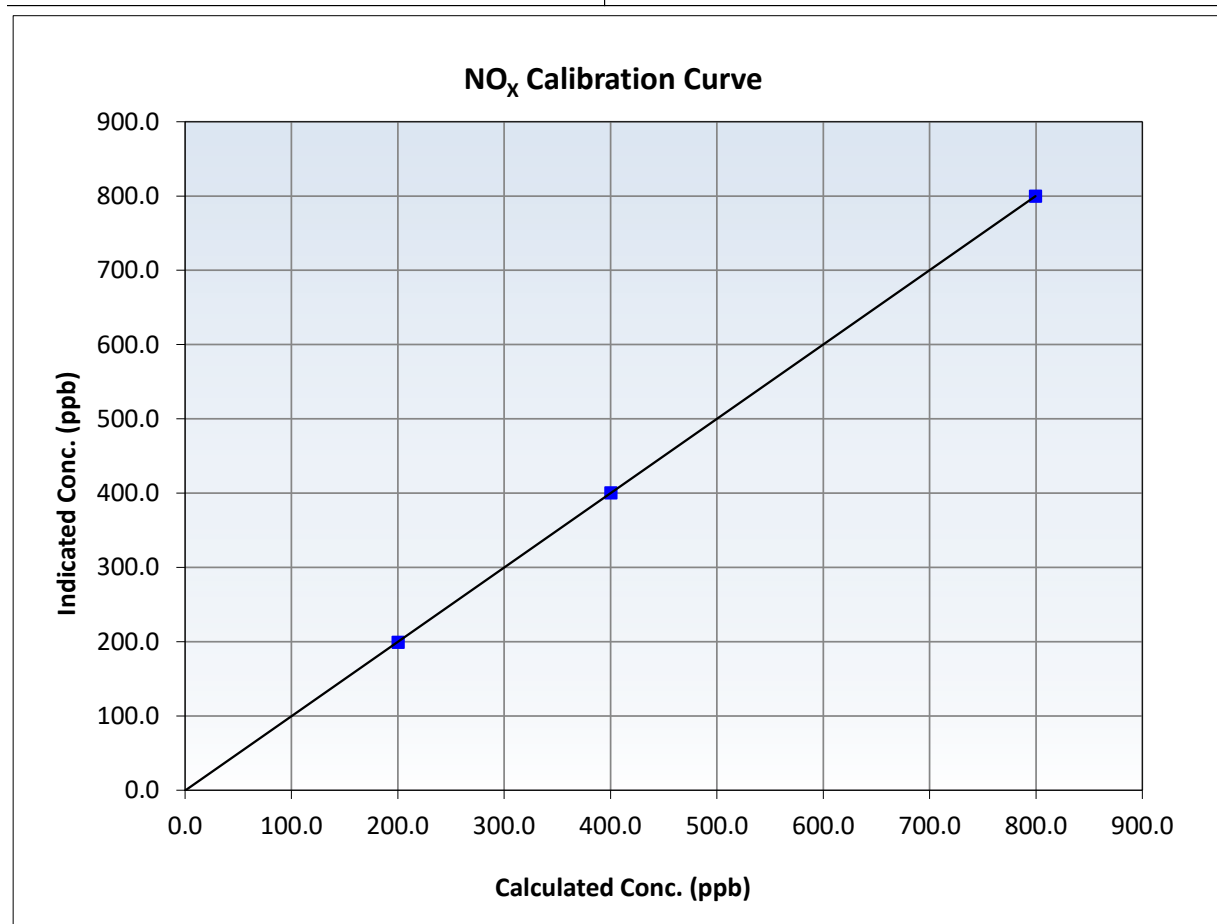
NO_x Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 13, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:30	End Time (MST):	11:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

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	0.999999	≥0.995
799.5	799.8	0.9997	Slope	1.000913	0.90 - 1.10
400.4	400.5	0.9997	Intercept	-0.474201	+/-20
200.2	199.4	1.0041			





Wood Buffalo Environmental Association

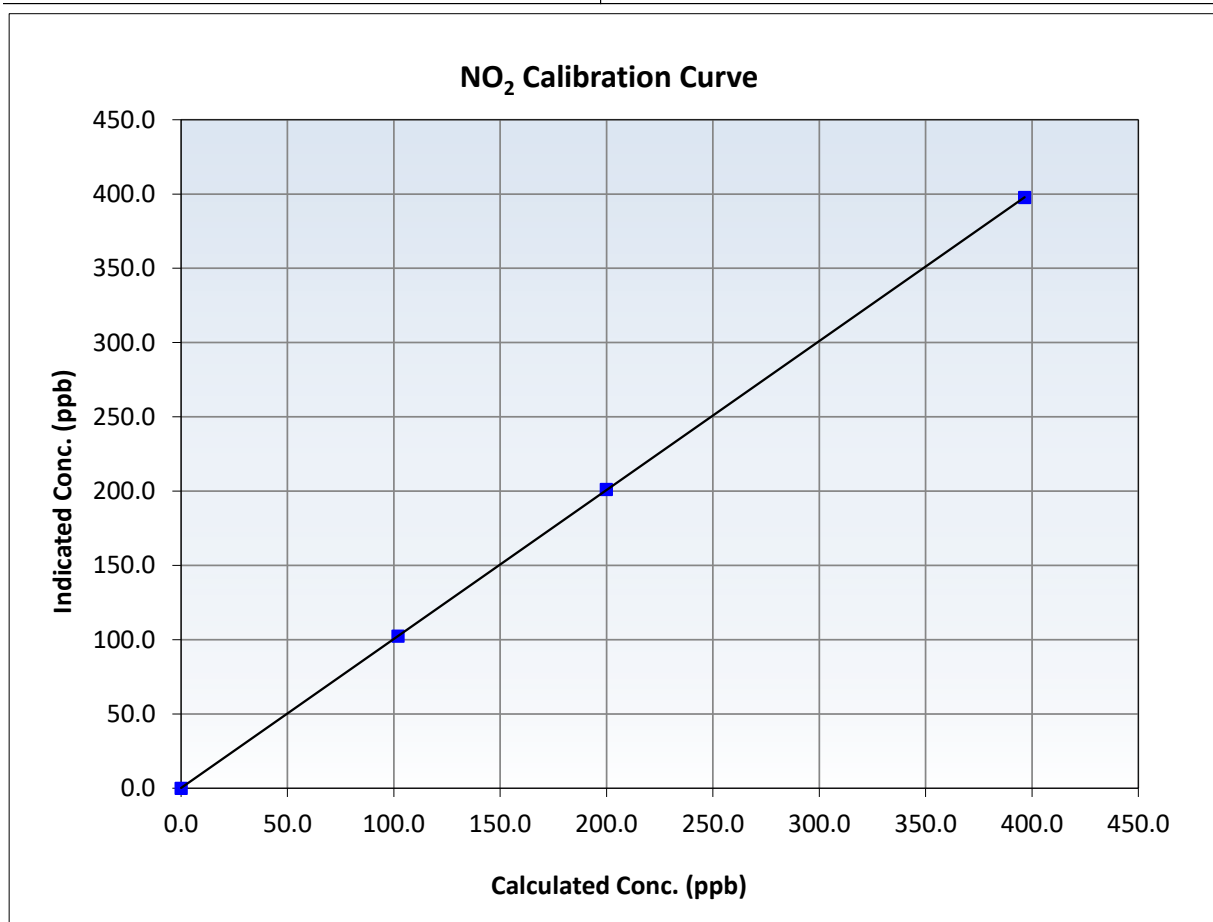
NO₂ Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 13, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:30	End Time (MST):	11:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999996	≥0.995
396.6	397.6	0.9974	Slope	1.002789	0.90 - 1.10
199.9	201.1	0.9938	Intercept	0.174230	+/-20
102.0	102.3	0.9966			





Wood Buffalo Environmental Association

NO Calibration Summary

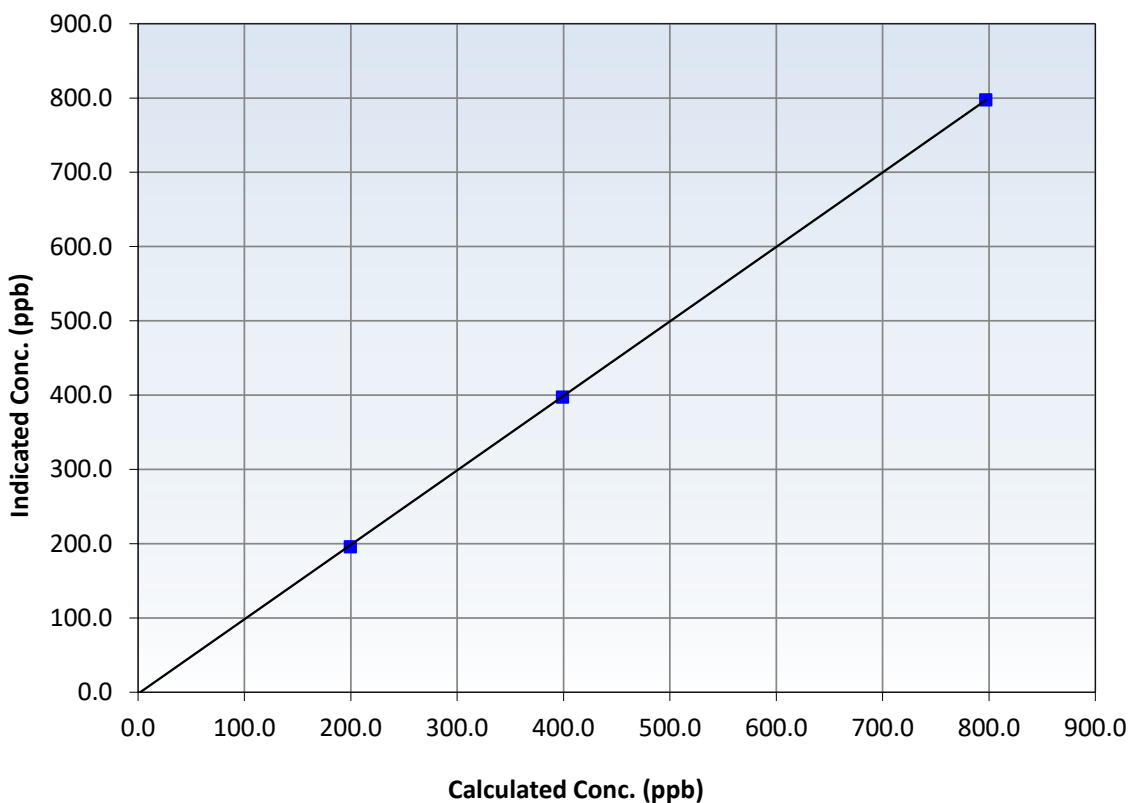
Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 13, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:30	End Time (MST):	11:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

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	0.999975	≥ 0.995
796.9	797.7	0.9990	Slope	1.002621	$0.90 - 1.10$
399.0	397.6	1.0036	Intercept	-2.032832	± 20
199.5	195.9	1.0186			

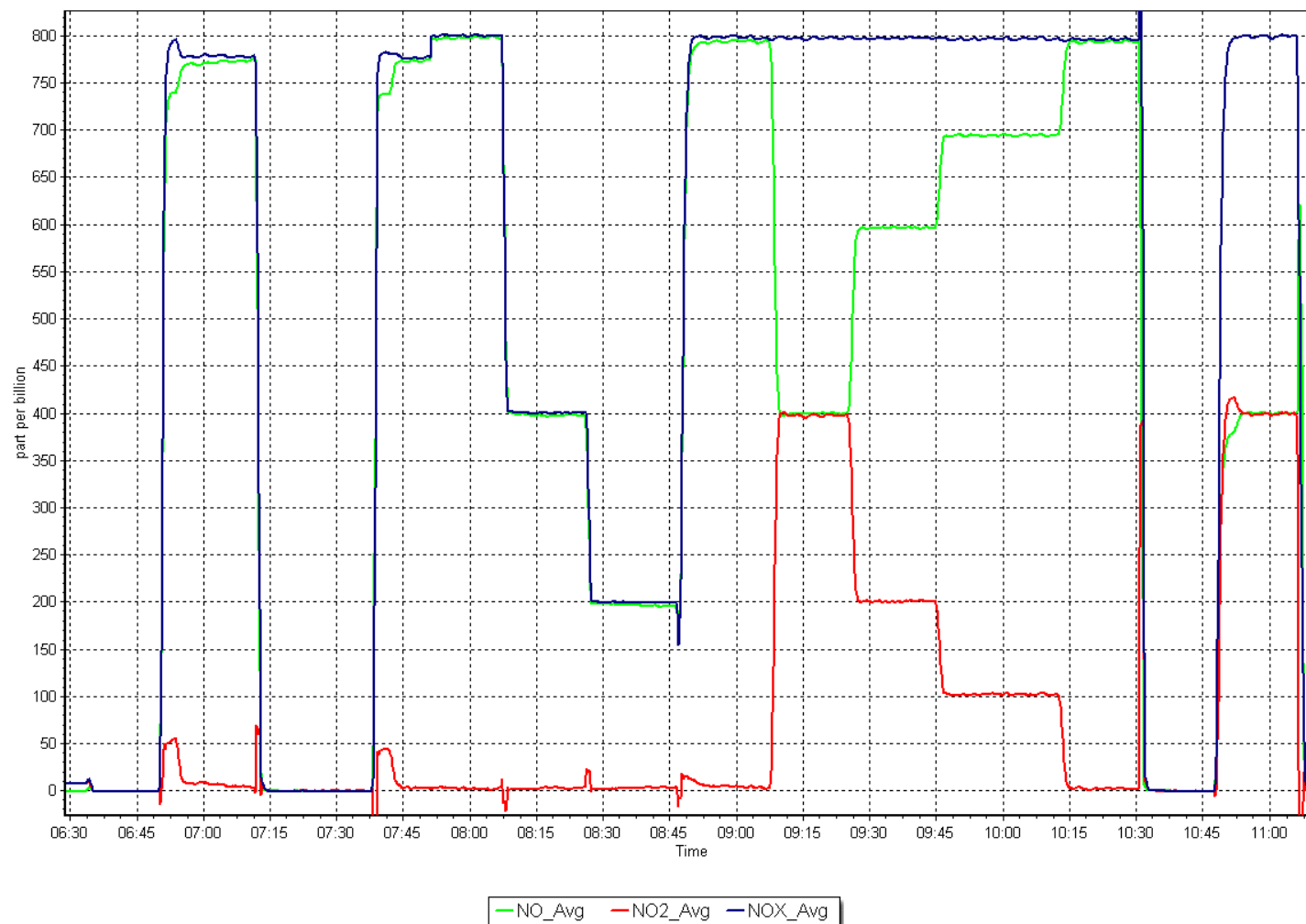
NO Calibration Curve



NO_x Calibration Plot

Date: September 12, 2024

Location: Fort Hills





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Fort Hills Station number: AMS 23
Calibration Date: September 4, 2024 Last Cal Date: August 14, 2024
Start time (MST): 9:19 End time (MST): 9:38

Analyzer Make: API T640 S/N: 1546
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388744
Temp/RH standard: Alicat FP-25BT S/N: 388744

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.2	14.7	14.2	☐	+/- 2 °C
P (mmHg)	741	740.8	741	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.95	5.00	☐	+/- 0.25 LPM
PW% (pump)	42	----	42	☐	>80%
Zero Verification	PM w/o HEPA: _____	6.0	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 maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: 10-Jun-24
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	9.9		9.9	☐	+/- 0.5

Date Optical Chamber Cleaned: August 14, 2024
Date Disposable Filter Changed: August 14, 2024

Post- maintenance Zero Verification: PM w/ HEPA: _____ <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: October 17, 2023
Date RH/T Sensor Cleaned: October 17, 2023

Notes: Removed to Sample Temp and Sample RH Warning.

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Fort Hills Station number: AMS 23
Calibration Date: September 4, 2024 Last Cal Date:
Start time (MST): 9:40 End time (MST): 10:11

Analyzer Make: API T640 S/N: 320
Particulate Fraction: PM2.5

Flow Meter Make/Model: Alicat FP-25BT S/N: 388744
Temp/RH standard: Alicat FP-25BT S/N: 388744

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	14.6	14.7	14.6	☐	+/- 2 °C
P (mmHg)	741.7	740.8	741.7	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.05	5.00	☐	+/- 0.25 LPM
PW% (pump)	39	----	39	☐	>80%
Zero Verification	PM w/o HEPA: _____	4.6	PM w/ HEPA: _____	0.0	<0.2 ug/m3

Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check

PM Inlet observation : Inlet Head Clean ☒ Alignment Factor On : ☒

Quarterly Calibration Test

SPAN DUST Refractive Index: 10.9 Expiry Date: 10-Jun-24
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	12.6	10.6	10.6	☒	+/- 0.5

Date Optical Chamber Cleaned: September 4, 2024
Date Disposable Filter Changed: September 4, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: October 17, 2023
Date RH/T Sensor Cleaned: October 17, 2023

Notes: Installed due to other T640 not working properly. PMT adjusted. Leak check passed.

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Waskow ohci Pimatisiwin Station number: AMS 25
Calibration Date: September 19, 2024 Last Cal Date: August 22, 2024
Start time (MST): 5:55 End time (MST): 9:08
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.01 ppm Cal Gas Exp Date: April 20, 2022
Cal Gas Cylinder #: D750950
Removed Cal Gas Conc: 50.01 ppm Rem Gas Exp Date:
Removed Gas Cyl #: Diff between cyl:
Calibrator Model: API T700 Serial Number: 747
Zero Air Gen Model: API T701 Serial Number: 4765

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1118148497
Analyzer Range: 0-1000ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992216	1.002542	Backgd or Offset:	10.1	10.1
Calibration intercept:	0.880000	0.140000	Coeff or Slope:	1.019	1.032

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.0	800.2	789.7	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	789.4	Previous response	794.8	*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.4	----
High point	4920	80.0	800.2	802.3	0.997
Mid point	4960	40.0	400.1	401.6	0.996
Low point	4980	20.0	200.0	200.1	1.000
As left zero	5000	0.0	0.0	0.8	----
As left span	4920	80.0	800.2	797.3	1.004
Average Correction Factor:					0.998

Notes: No maintenance done. Span adjusted. After Mid point the purge and zero button was accidentally used on the calibrator before the third point was put in.

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

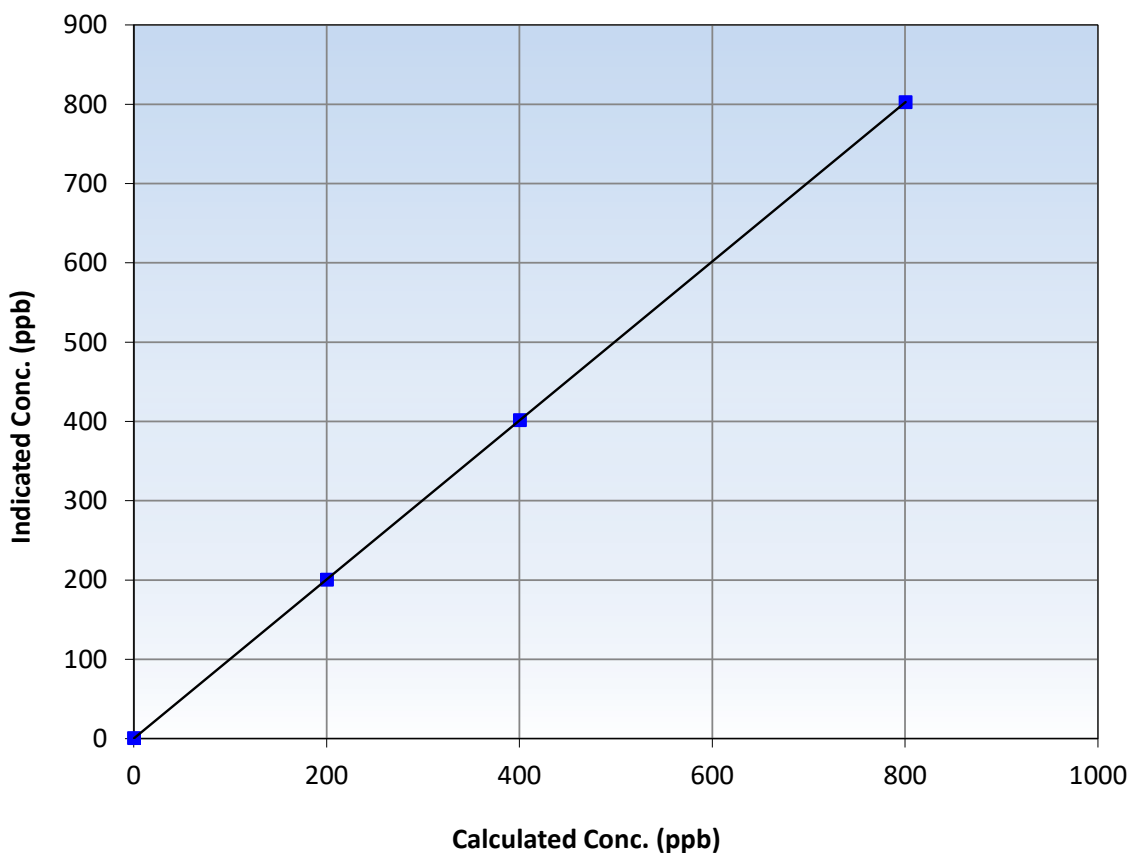
Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 22, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	5:55	End Time (MST):	9:08
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4	----	Correlation Coefficient	0.999998	≥0.995
800.2	802.3	0.9973	Slope	1.002542	0.90 - 1.10
400.1	401.6	0.9962	Intercept	0.140000	+/-30
200.0	200.1	0.9997			

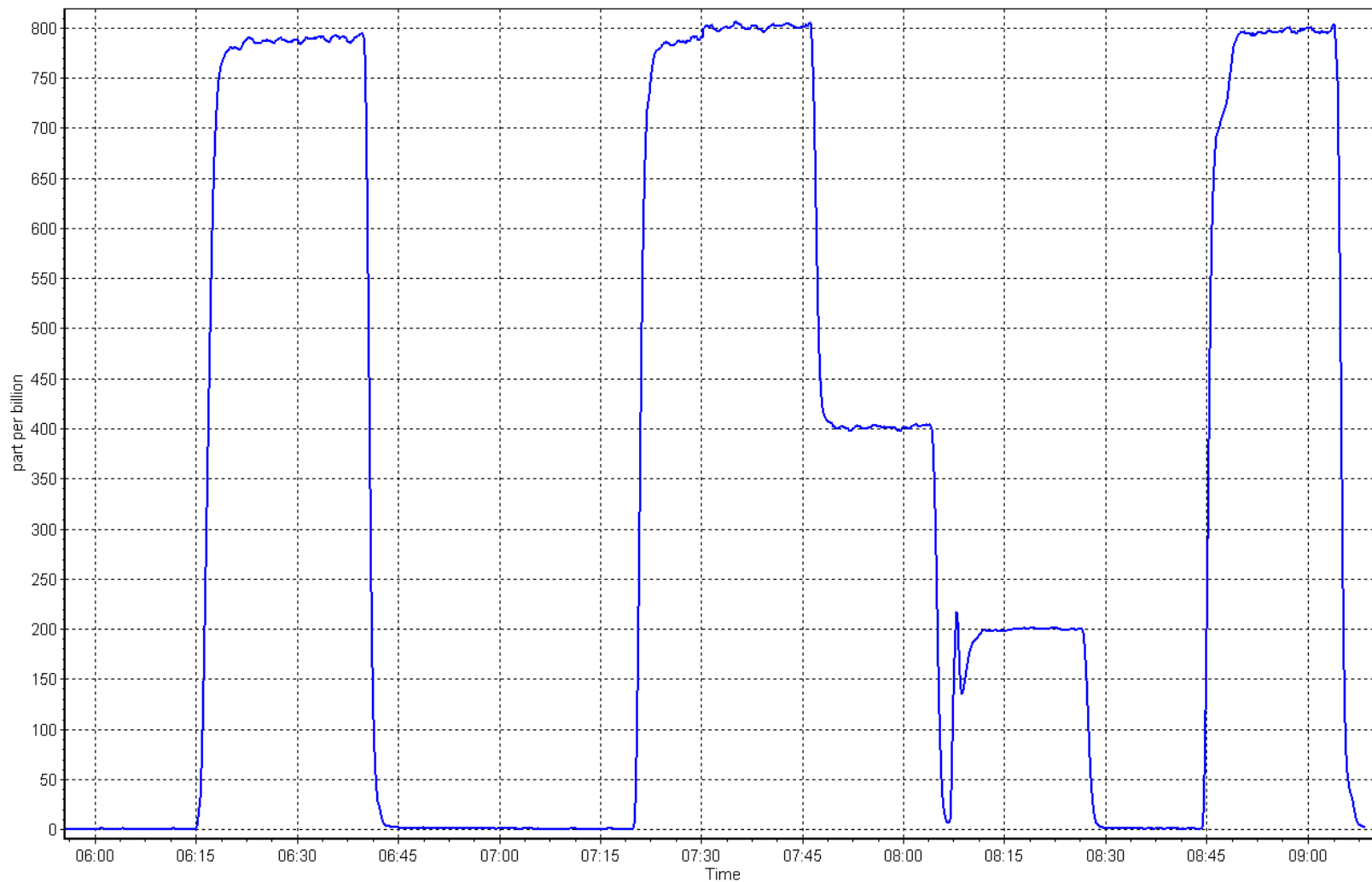
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 19, 2024

Location: Waskow ohci Pimatisiwin





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Waskow ohci Pimatisiwin Station number: AMS 25
Calibration Date: September 3, 2024 Last Cal Date: August 16, 2024
Start time (MST): 6:30 End time (MST): 11:25
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:
Removed Gas Cyl #: Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 747
ZAG Make/Model: API T701 Serial Number: 261

Analyzer Information

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1170050146
Converter make: Global G-150 Converter serial #: 2022-219
Analyzer Range: 0 - 100 ppb Converter Temp: 350 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.005174	1.014659	Backgd or Offset:	3.1
Calibration intercept:	0.480000	0.400000	Coeff or Slope:	1.088

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.0	79.5	81.3	0.982
As found Mid point	4960	40.0	39.8	40.9	0.979
As found Low point	4980	20.0	19.9	20.4	0.989
New cylinder response					
Baseline Corr As found:	81.0	Prev response:	80.41	*% change:	0.7%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.019402	AF Intercept:	0.260000
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999992	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4920	80.0	79.5	81.1	0.981
Mid point	4960	40.0	39.8	40.8	0.975
Low point	4980	20.0	19.9	20.4	0.975
As left zero	5000	0.0	0.0	0.5	----
As left span	4912	88.3	800.0	814.0	0.983
SO2 Scrubber Check	4921	79.2	800.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.977
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

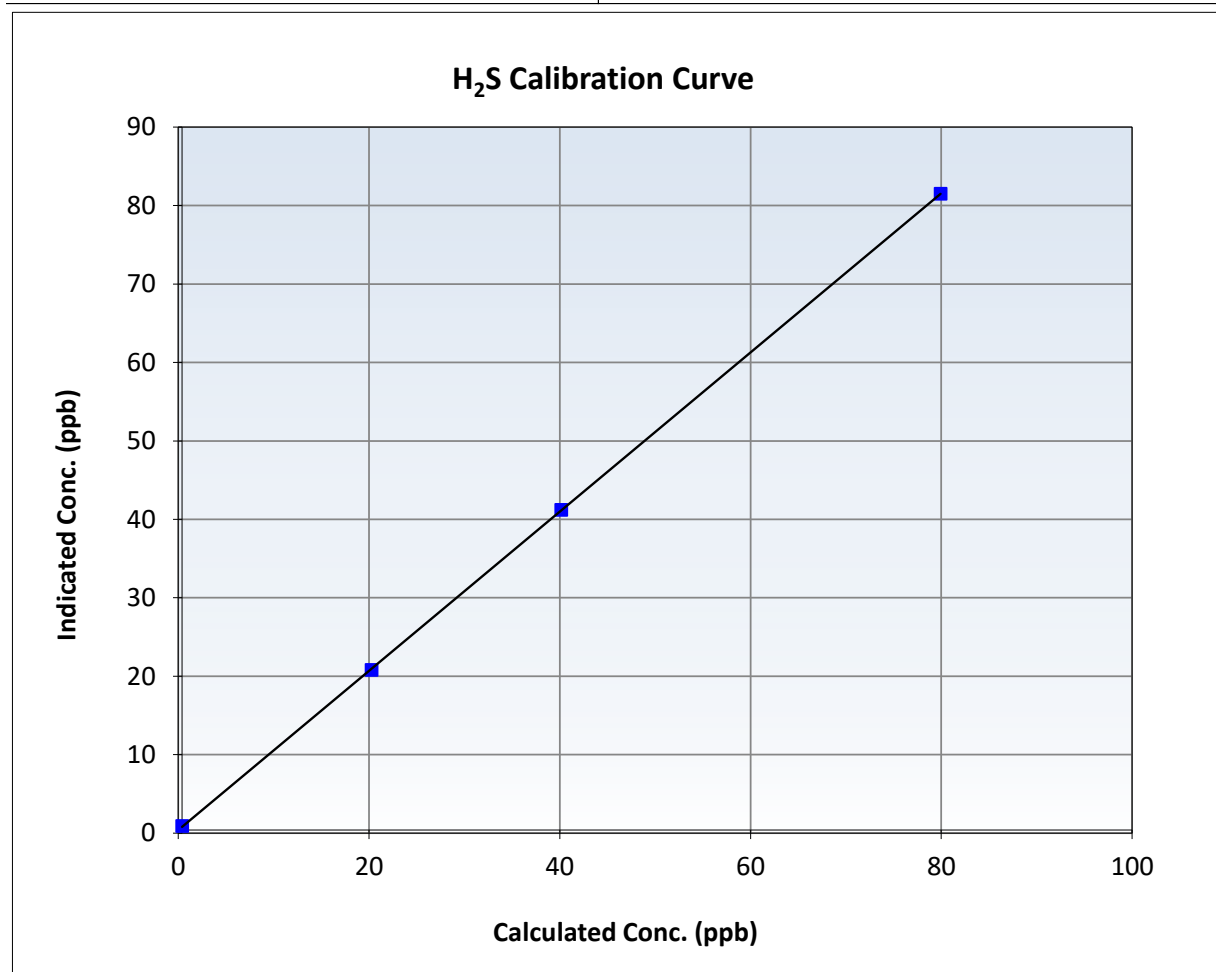
H₂S Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 16, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	6:30	End Time (MST):	11:25
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146

Calibration Data

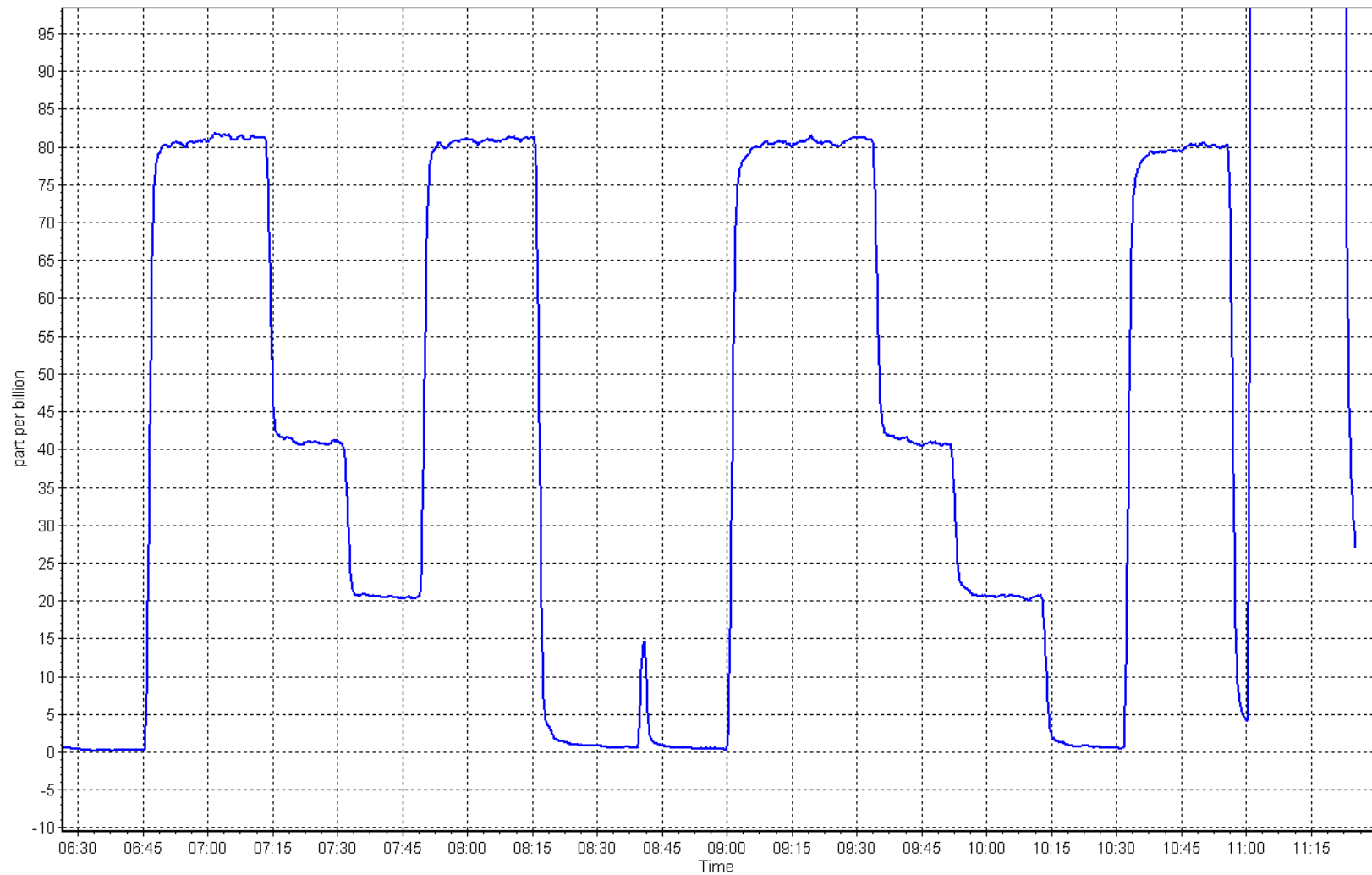
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5	----	Correlation Coefficient	0.999988	≥ 0.995
79.5	81.1	0.9805	Slope	1.014659	$0.90 - 1.10$
39.8	40.8	0.9745	Intercept	0.400000	± 3
19.9	20.4	0.9745			



H₂S Calibration Plot

Date: September 3, 2024

Location: Waskow ohci Pimatisiwin





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS26 CHRISTINA LAKE SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Christina Lake Station number: AMS 26
Calibration Date: September 24, 2024 Last Cal Date: August 13, 2024
Start time (MST): 9:56 End time (MST): 13:48
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.62 ppm Cal Gas Exp Date: March 10, 2031
Cal Gas Cylinder #: EB0008522
Removed Cal Gas Conc: 50.62 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 5258
Zero Air Gen Model: API T701H Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1152430005
Analyzer Range: 0- 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001367	1.000997	Backgd or Offset:	27.5	28.0
Calibration intercept:	-1.152984	-0.673305	Coeff or Slope:	0.950	0.962

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.3	----
As found High point	4921	79.0	799.8	800.0	0.999
As found Mid point	4960	39.5	399.9	399.9	0.999
As found Low point	4980	19.8	200.5	198.5	1.008
New cylinder response					
Baseline Corr As found:	800.3	Previous response	799.7	*% change	0.1%
Baseline Corr 2nd AF pt:	400.2	AF Slope:	1.001397	AF Intercept:	-1.013369
Baseline Corr 3rd AF pt:	198.8	AF Correlation:	0.999994	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.0	799.8	800.0	1.000
Mid point	4960	39.5	399.9	400.1	1.000
Low point	4980	19.8	200.5	198.8	1.008
As left zero	5000	0.0	0.0	0.0	----
As left span	4921	79.0	799.8	799.8	1.000
Average Correction Factor:					1.003

Notes: Sample inlet filter and pump was changed after multipoint as founds. Adjusted span only.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

SO₂ Calibration Summary

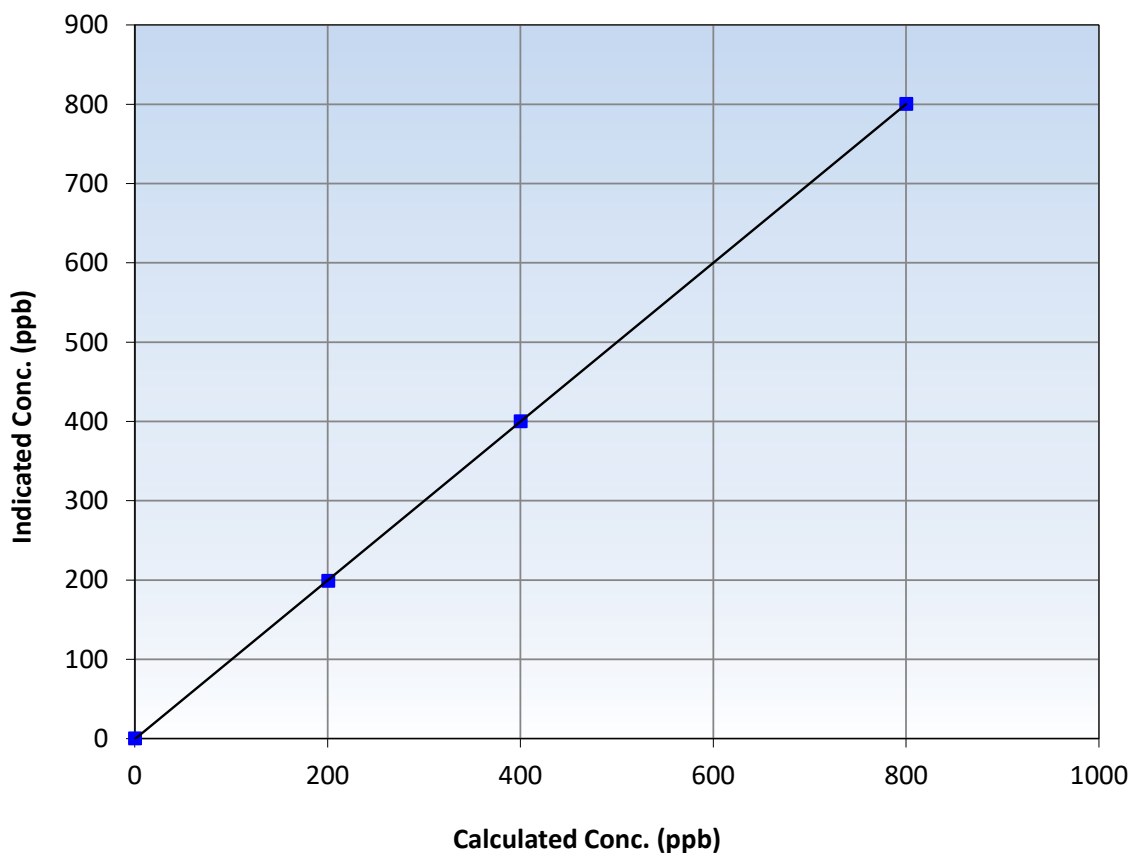
Station Information

Calibration Date:	September 24, 2024	Previous Calibration:	August 13, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:56	End Time (MST):	13:48
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430005

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999994	≥0.995
799.8	800.0	0.9997	Slope	1.000997	0.90 - 1.10
399.9	400.1	0.9996	Intercept	-0.673305	+/-30
200.5	198.8	1.0084			

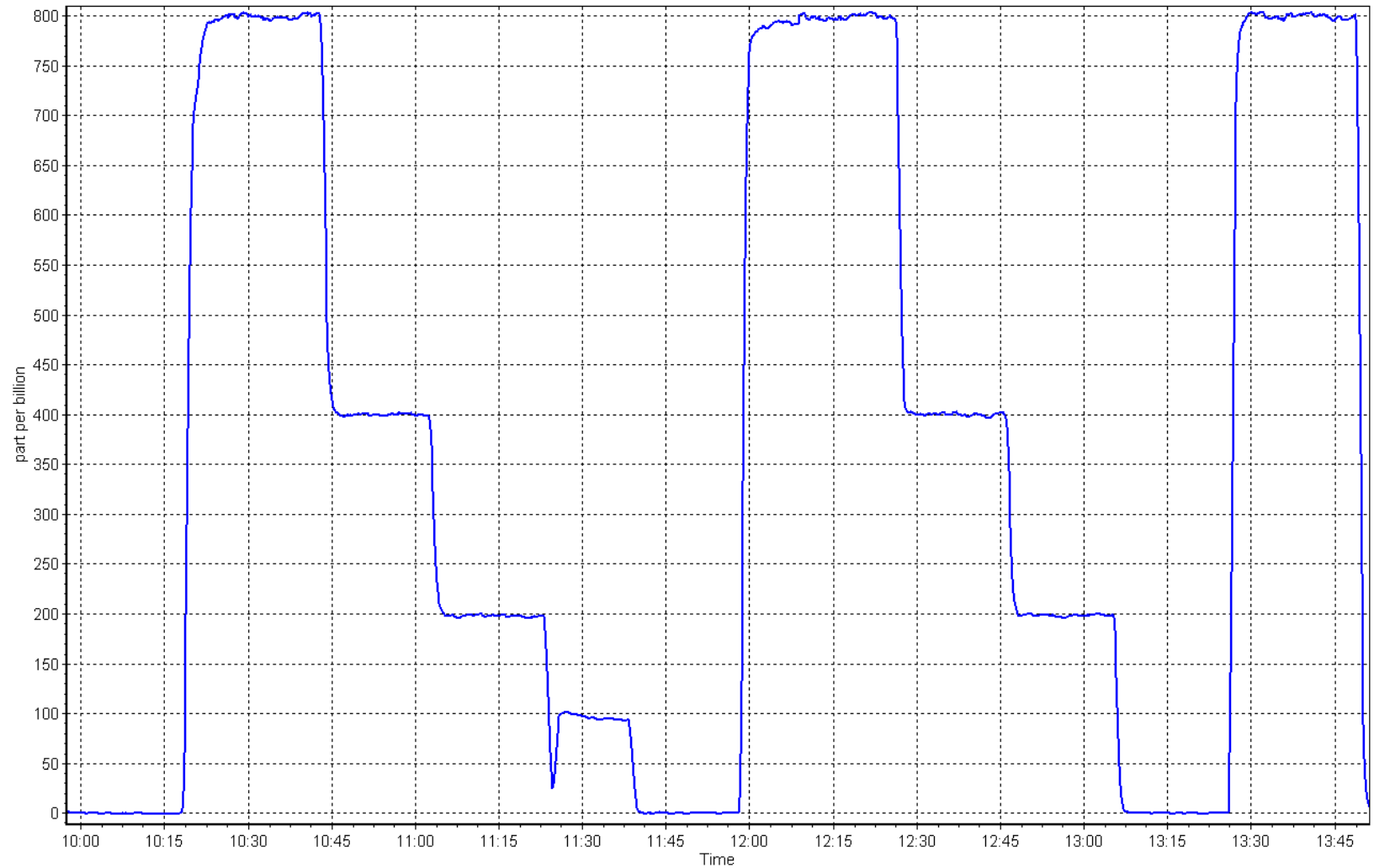
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 24, 2024

Location: Christina Lake





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Christina Lake
Calibration Date: September 23, 2024
Start time (MST): 10:15
Reason: Routine

Station number: AMS 26
Last Cal Date: August 22, 2024
End time (MST): 14:10

Calibration Standards

Cal Gas Concentration: 5.05 ppm
Cal Gas Cylinder #: DT0014831
Removed Cal Gas Conc: 5.05 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne T700
ZAG Make/Model: Teledyne T701H

Cal Gas Exp Date: November 15, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 5258
Serial Number: 832

Analyzer Information

Analyzer make: Thermo 43iQTL
Converter make: Global 150
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 12333331547
Converter serial #: 2022-196
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002855	1.006712	Backgd or Offset:	1.3	1.3
Calibration intercept:	-0.121604	-0.081615	Coeff or Slope:	1.047	1.063

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4921	79.2	80.0	78.5	1.016
As found Mid point	4960	39.6	40.0	39.3	1.013
As found Low point	4980	19.8	20.0	19.6	1.010
New cylinder response					
Baseline Corr As found:	78.7	Prev response:	80.10	*% change:	-1.8%
Baseline Corr 2nd AF pt:	39.5	AF Slope:	0.983566	AF Intercept:	-0.121578
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4921	79.2	80.0	80.4	0.995
Mid point	4960	39.6	40.0	40.3	0.993
Low point	4980	19.8	20.0	20.0	1.000
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	80.5	0.994
SO2 Scrubber Check	4920	80.2	802.0	0.0	----
Date of last scrubber change:	11-Apr-24		Ave Corr Factor		0.996
Date of last converter efficiency test:					

Notes: Changed sample inlet filter after multipoint as founds. Scrubber check done after calibrator zero and passed. Adjusted span only.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

H2S Calibration Summary

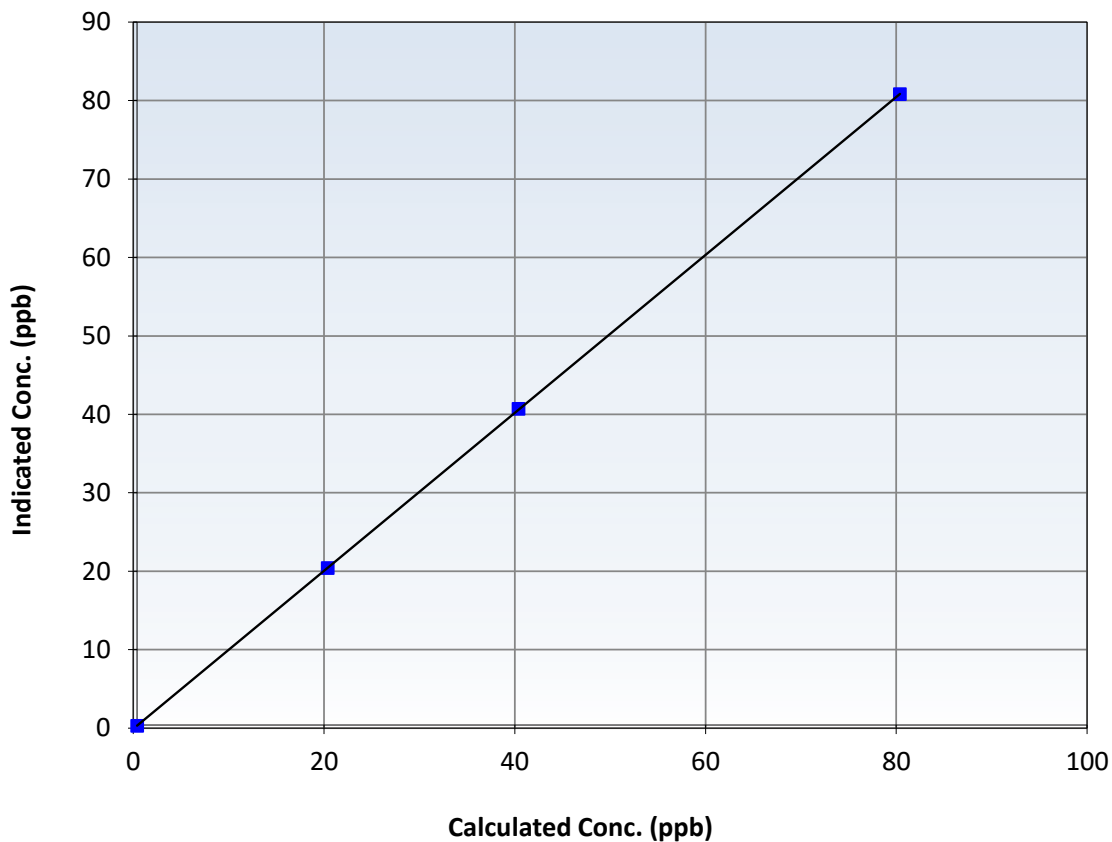
Station Information

Calibration Date:	September 23, 2024	Previous Calibration:	August 22, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	10:15	End Time (MST):	14:10
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331547

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	0.999995		≥ 0.995
80.0	80.4	0.9949	Slope	1.006712		$0.90 - 1.10$
40.0	40.3	0.9925	Intercept	-0.081615		± 3
20.0	20.0	0.9999				

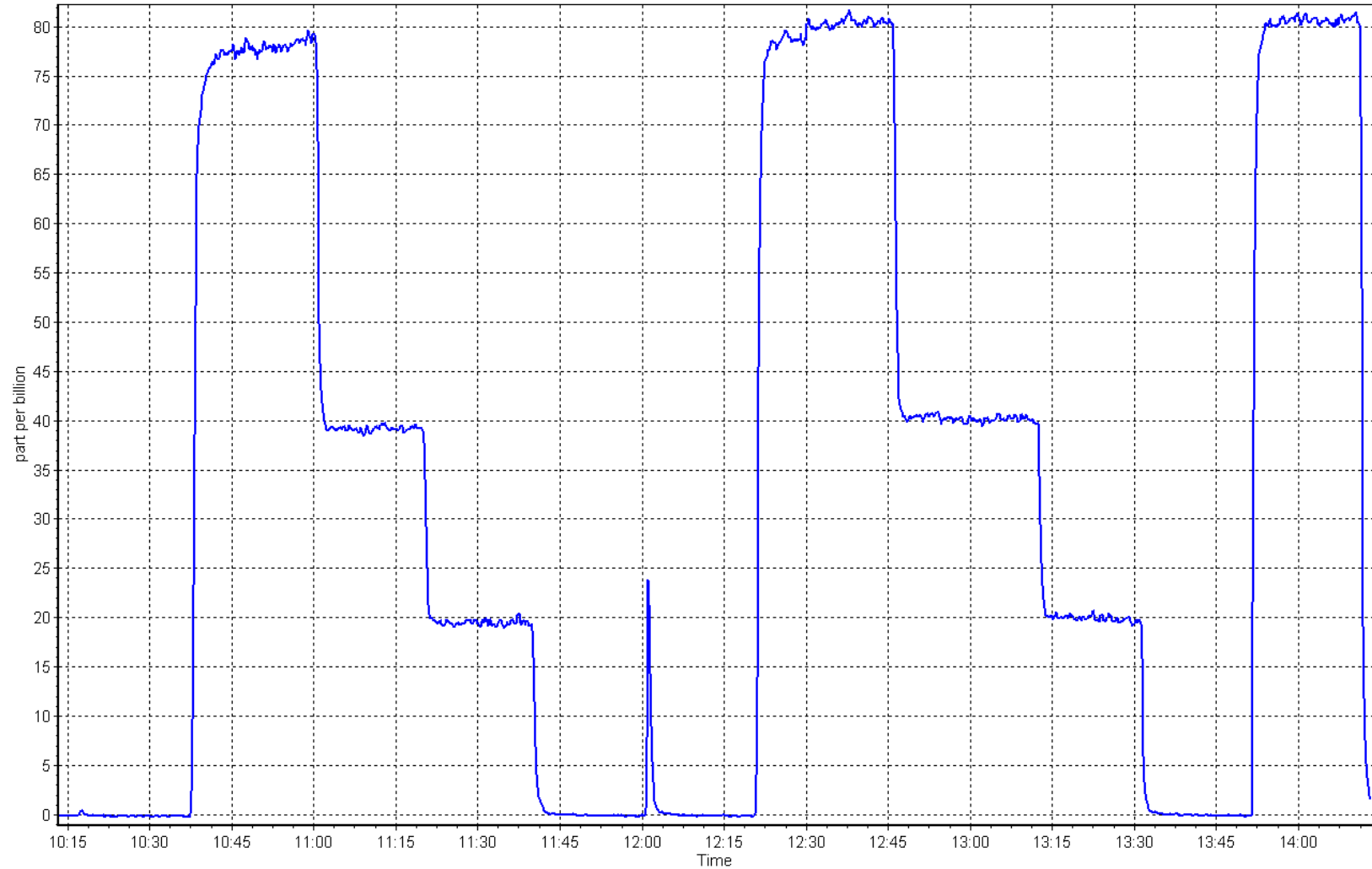
H₂S Calibration Curve



H2S Calibration Plot

Date: September 23, 2024

Location: Christina Lake





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Christina Lake
Station number: AMS 26
Calibration Date: September 10, 2024
Last Cal Date: August 15, 2024
Start time (MST): 9:28
End time (MST): 14:05
Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC755290
NOX Cal Gas Conc: 48.90 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 48.90 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701H
Cal Gas Expiry Date: January 3, 2031
NO Cal Gas Conc: 48.70 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 48.70 ppm
NO gas Diff:
Serial Number: 5258
Serial Number: 832

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
AF High point	4918	82.1	802.9	799.6	3.3	807.9	804.0	3.8	0.9936	0.9945
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 801.6 ppb	NO = 800.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO _x = 0.8%
Baseline Corr 1st pt	NO _x = 808.1 ppb	NO = 804.1 ppb		*Percent Change	NO = 0.5%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb			
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb			

As Found Statistics

As found	NO _x r ² :	Nx SI:	Nx Int:
As found	NO r ² :	NO SI:	NO Int:
As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1173480006

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.346	1.335	NO bkgnd or offset:	2.6	2.6
NOX coeff or slope:	0.989	0.991	NOX bkgnd or offset:	2.7	2.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	163.1	161.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999557	0.999143
NO _x Cal Offset:	-0.989731	-0.469414
NO Cal Slope:	1.002203	1.000231
NO Cal Offset:	-1.329451	-1.189233
NO ₂ Cal Slope:	0.997821	1.002041
NO ₂ Cal Offset:	-0.899231	-0.072219

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4918	82.1	802.9	799.6	3.3	802.1	799.4	2.8	1.0010	1.0003
Mid point	4959	41.1	401.9	400.3	1.6	400.6	398.1	2.4	1.0034	1.0055
Low point	4979	20.5	200.5	199.7	0.8	199.6	197.7	2.0	1.0046	1.0101
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
As left span	4918	82.1	802.9	370.7	432.2	796.1	370.7	425.4	1.0086	1.0000
Average Correction Factor									1.0030	1.0053

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	791.1	362.6	431.8	432.6	0.9981	100.2%
Mid GPT point	791.1	580.2	214.2	214.6	0.9981	100.2%
Low GPT point	791.1	687.3	107.1	107.1	0.9998	100.0%
Average Correction Factor					0.9987	100.1%

Notes: Sample inlet filters was changed after as founds. Adjusted span only. Used 2nd NO reference point because of drift.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

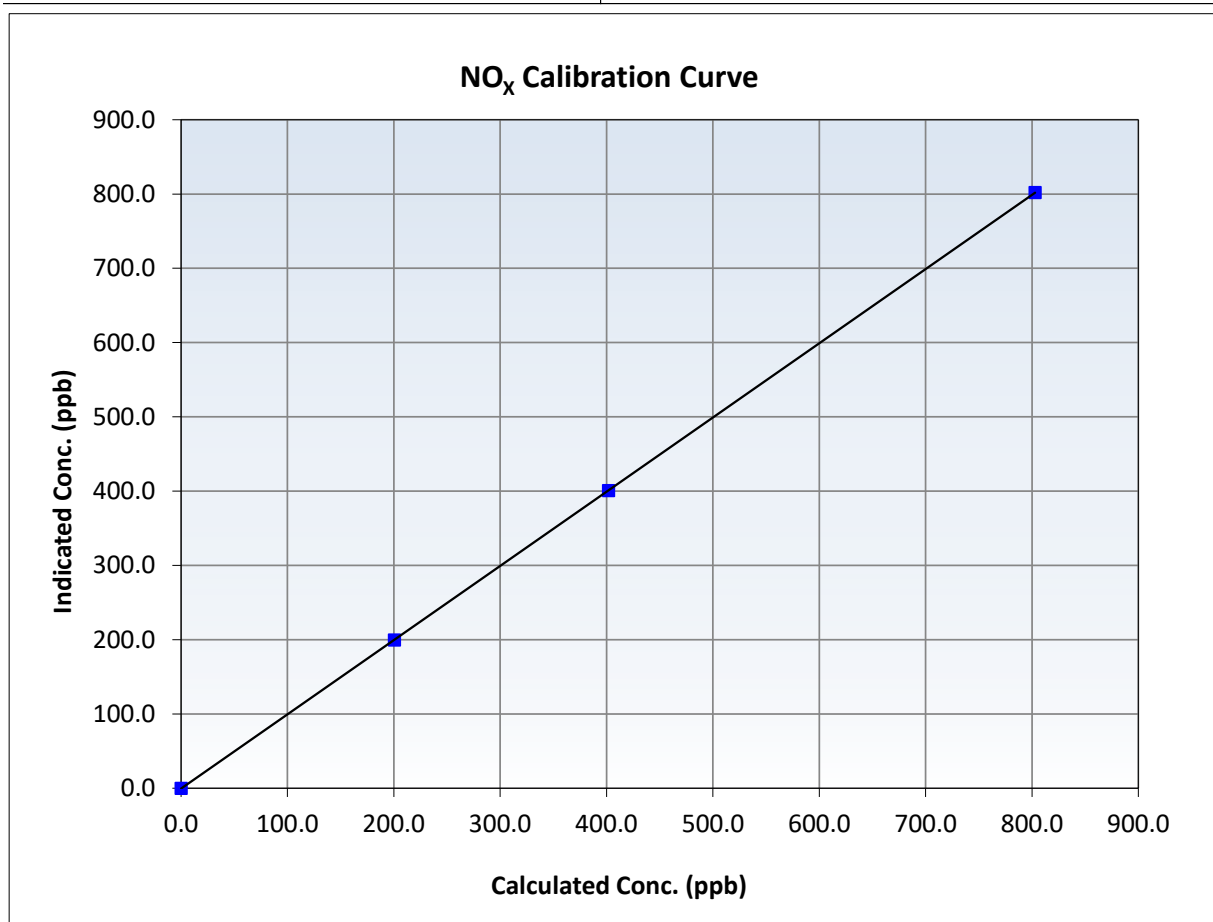
NO_x Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 15, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:28	End Time (MST):	14:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999998	≥0.995
802.9	802.1	1.0010	Slope	0.999143	0.90 - 1.10
401.9	400.6	1.0034	Intercept	-0.469414	+/-20
200.5	199.6	1.0046			





Wood Buffalo Environmental Association

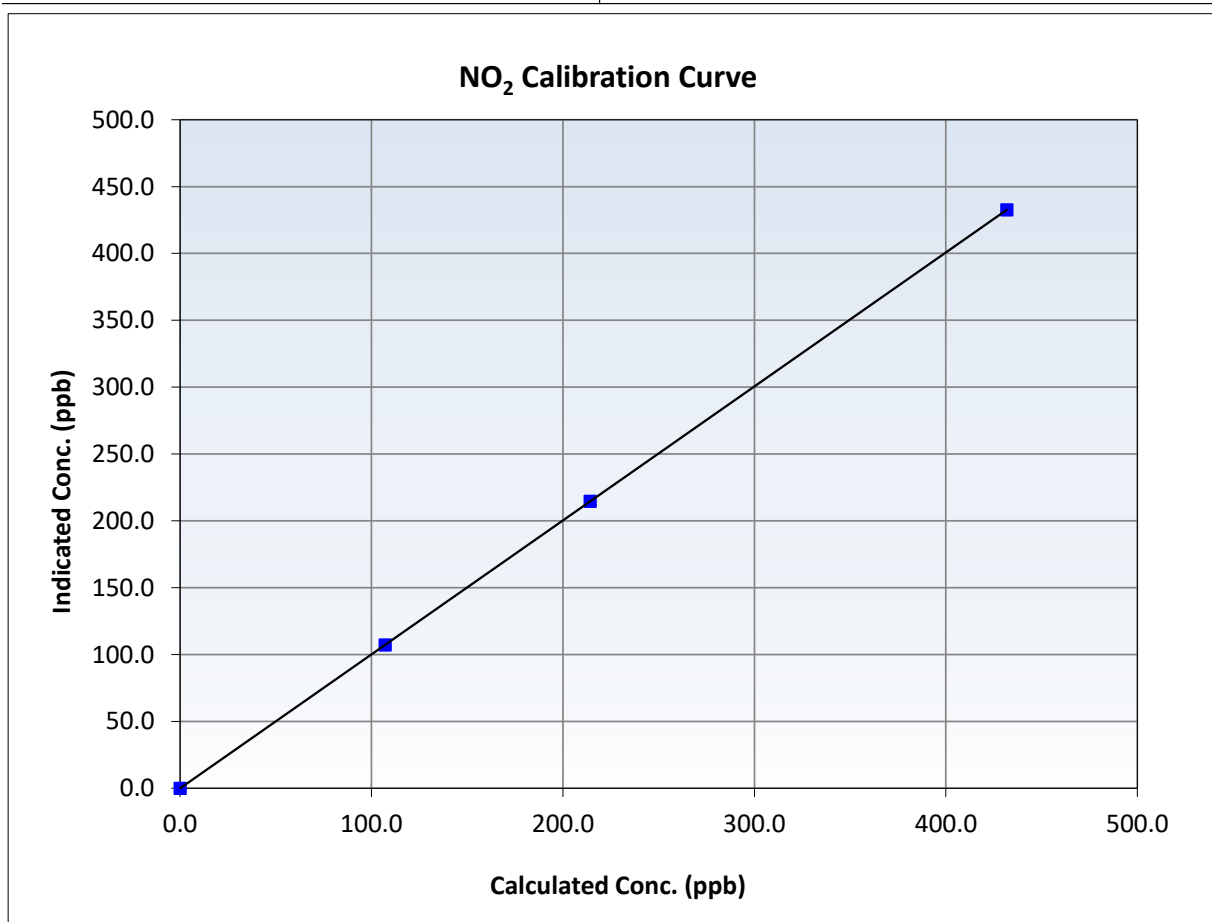
NO₂ Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 15, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:28	End Time (MST):	14:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	1.000000	≥0.995
431.8	432.6	0.9981	Slope	1.002041	0.90 - 1.10
214.2	214.6	0.9981	Intercept	-0.072219	+/-20
107.1	107.1	0.9998			





Wood Buffalo Environmental Association

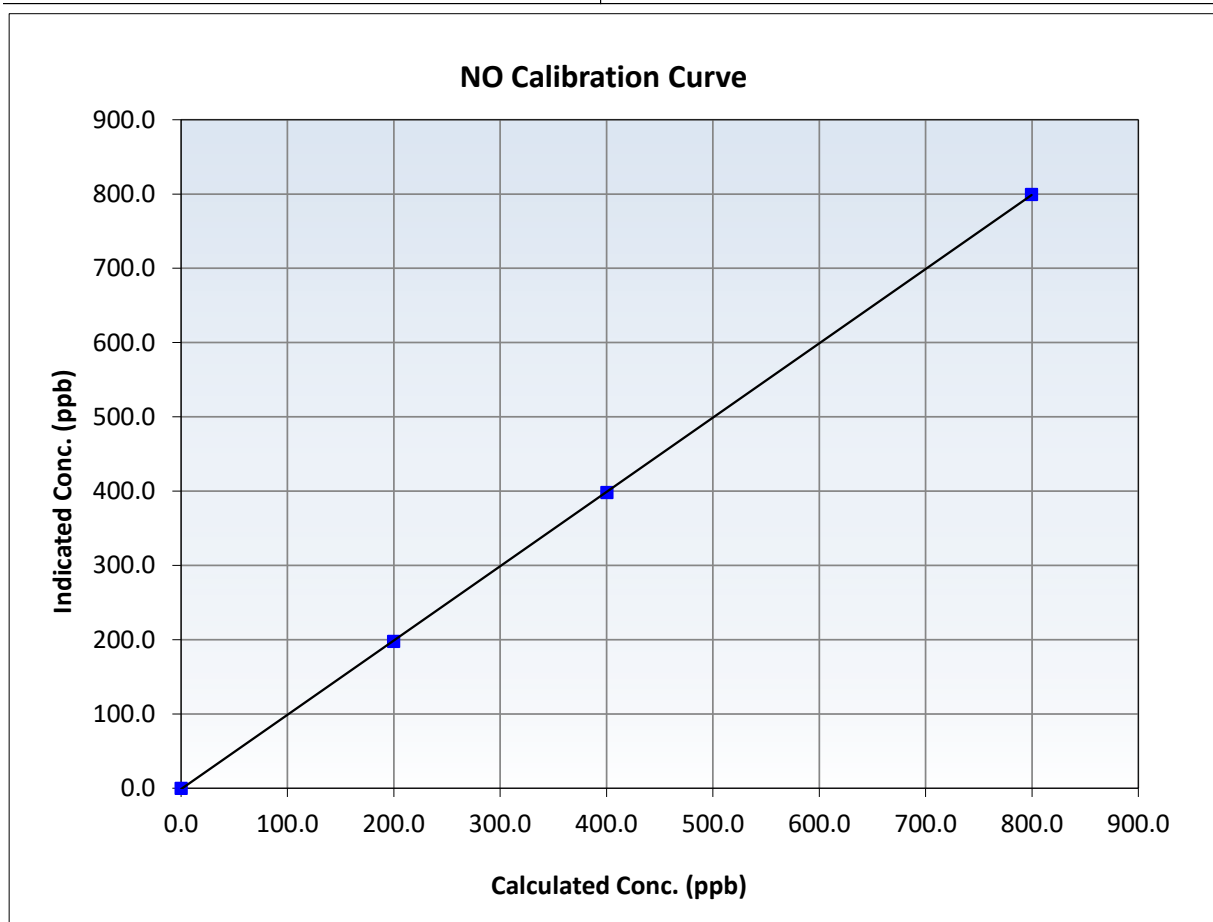
NO Calibration Summary

Station Information

Calibration Date:	September 10, 2024	Previous Calibration:	August 15, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:28	End Time (MST):	14:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

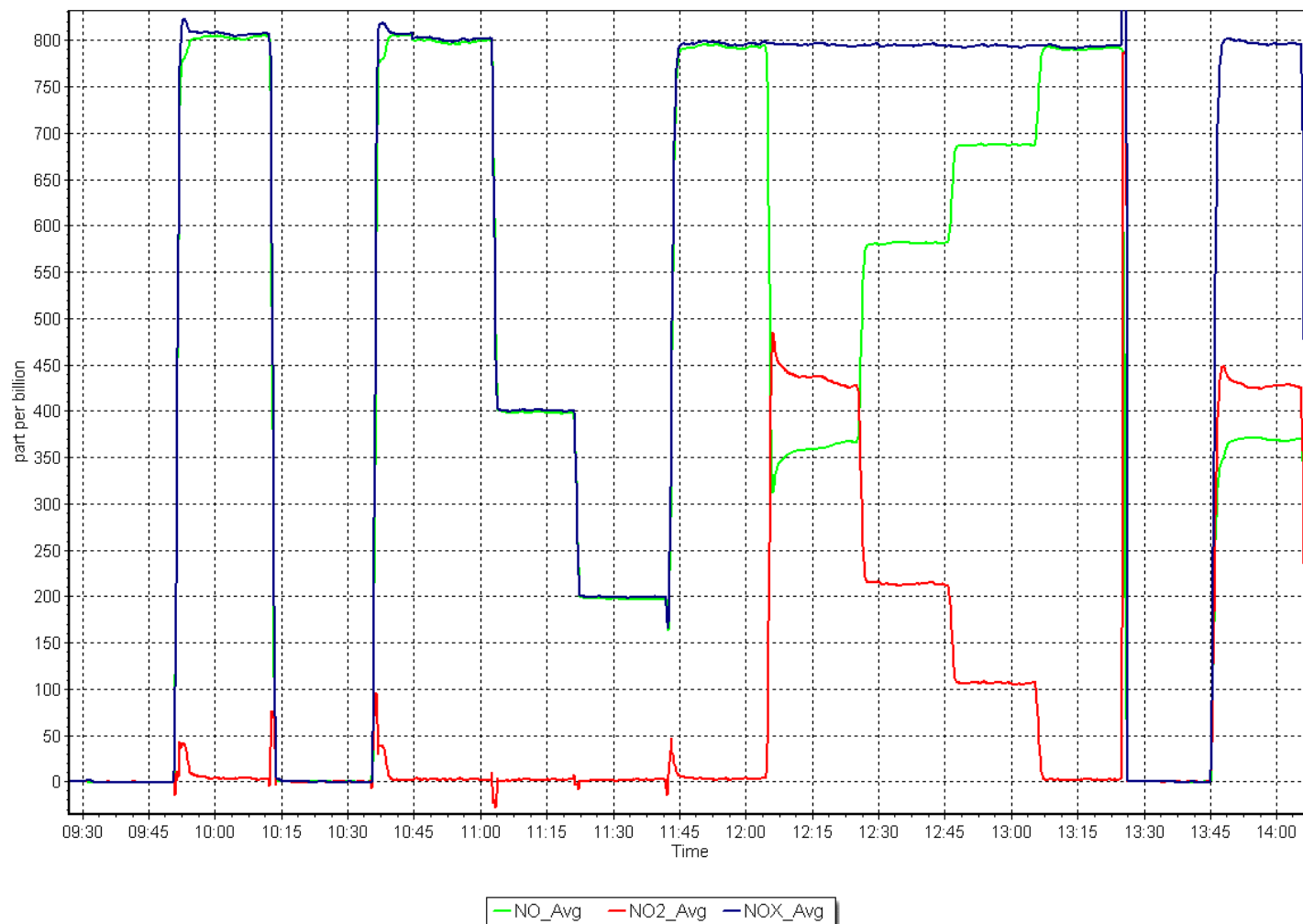
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999989	≥ 0.995
799.6	799.4	1.0003	Slope	1.000231	$0.90 - 1.10$
400.3	398.1	1.0055	Intercept	-1.189233	± 20
199.7	197.7	1.0101			



NO_x Calibration Plot

Date: September 10, 2024

Location: Christina Lake





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27
JACKFISH 2/3
SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Jackfish 2/3 Station number: AMS 27
Calibration Date: September 11, 2024 Last Cal Date: August 20, 2024
Start time (MST): 10:19 End time (MST): 13:52
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.58 ppm Cal Gas Exp Date: December 29, 2028
Cal Gas Cylinder #: SG9133974BAL
Removed Cal Gas Conc: 50.58 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 3811
Zero Air Gen Model: API 701 Serial Number: 268

Analyzer Information

Analyzer make: Thermo 43iQ-TL Serial Number: 12124313138
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.020918	1.005137	Backgd or Offset:	8.2
Calibration intercept:	-0.585414	-1.885089	Coeff or Slope:	0.927

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.2	----
As found High point	4919	79.1	800.5	801.6	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	801.4	Previous response	816.6	*% change	-1.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4919	79.1	800.5	803.0	0.997
Mid point	4960	39.5	399.6	400.6	0.998
Low point	4979	19.8	200.3	196.7	1.019
As left zero	5000	0.0	0.0	0.2	----
As left span	4921	79.1	800.2	807.8	0.991
Average Correction Factor:					1.004

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

SO₂ Calibration Summary

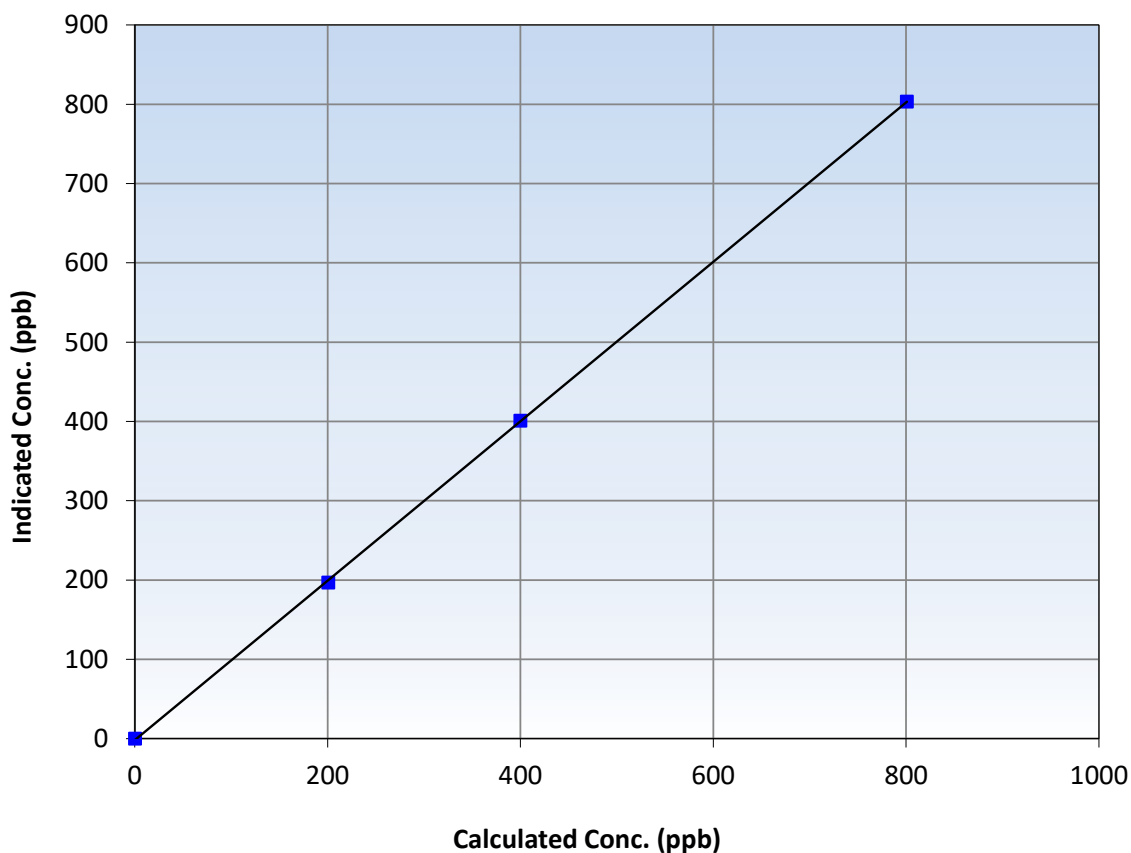
Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 20, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	10:19	End Time (MST):	13:52
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	12124313138

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999968	≥0.995
800.5	803.0	0.9969	Slope	1.005137	0.90 - 1.10
399.6	400.6	0.9976	Intercept	-1.885089	+/-30
200.3	196.7	1.0185			

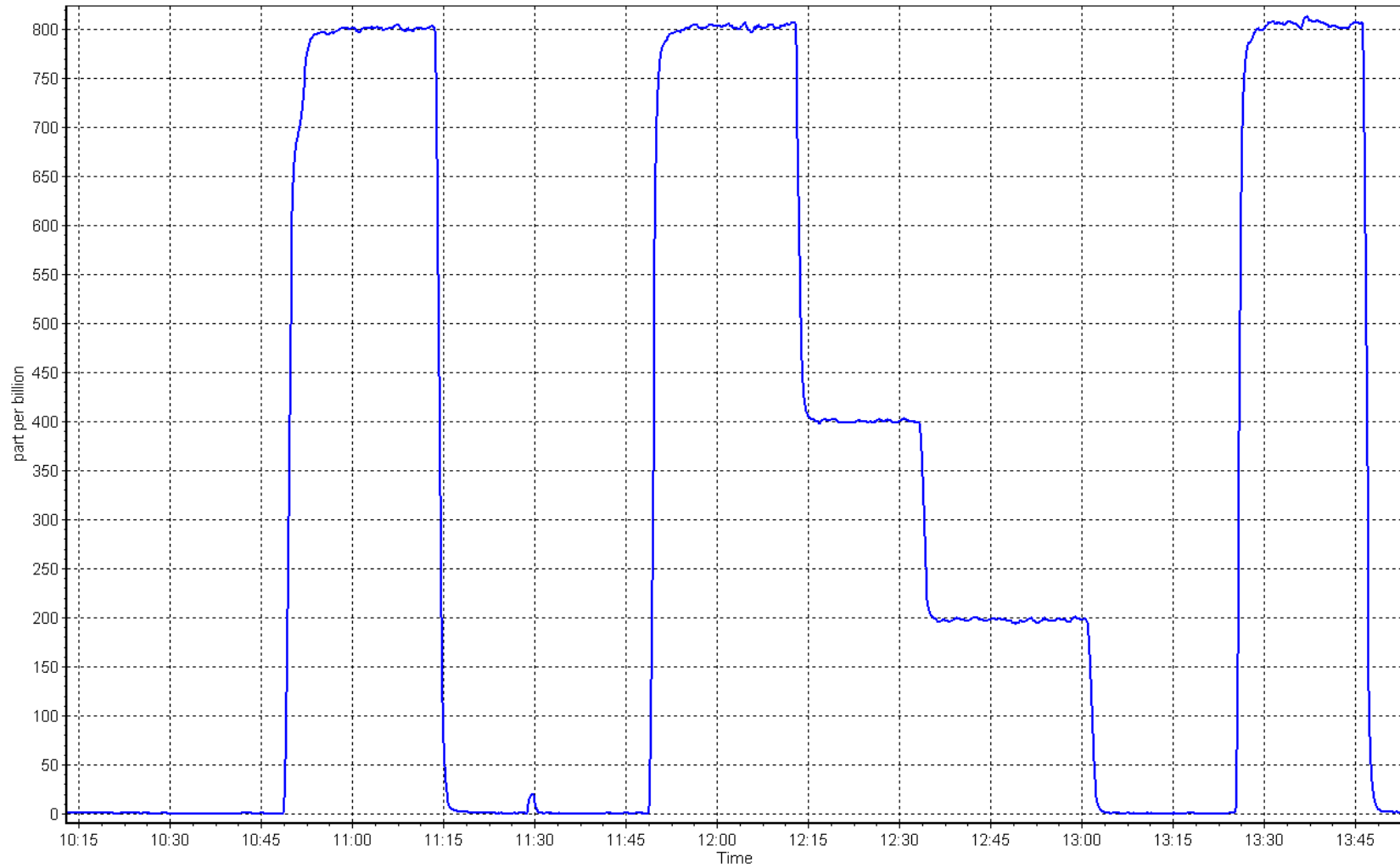
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 11, 2024

Location: Jackfish 2/3





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Jackfish 2/3
Calibration Date: September 18, 2024
Start time (MST): 9:53
Reason: Routine

Station number: AMS 27
Last Cal Date: August 20, 2024
End time (MST): 14:34

Calibration Standards

Cal Gas Concentration: 5.41 ppm
Cal Gas Cylinder #: CC345023
Removed Cal Gas Conc: 5.41 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API 701

Cal Gas Exp Date: January 4, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 3811
Serial Number: 268

Analyzer Information

Analyzer make: API T101
Converter make: NA
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 621
Converter serial #: NA
Converter Temp: 316 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.008895	1.019581	Backgd or Offset: 36.5	36.5
Calibration intercept:	0.082281	0.082683	Coeff or Slope: 0.830	0.830

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.3	----
As found High point	4926	74.1	80.2	84.1	0.957
As found Mid point	4963	37.0	40.0	41.7	0.967
As found Low point	4982	18.5	20.0	20.5	0.991
New cylinder response					
Baseline Corr As found:	83.8	Prev response:	80.97	*% change:	3.4%
Baseline Corr 2nd AF pt:	41.4	AF Slope:	1.047670	AF Intercept:	-0.077026
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999908	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4926	74.1	80.2	81.7	0.981
Mid point	4963	37.0	40.0	41.3	0.969
Low point	4982	18.5	20.0	20.2	0.991
As left zero	5000	0.0	0.0	0.3	----
As left span	4926	74.1	80.2	81.2	0.987
SO2 Scrubber Check	4921	79.1	791.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.981
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif



Wood Buffalo Environmental Association

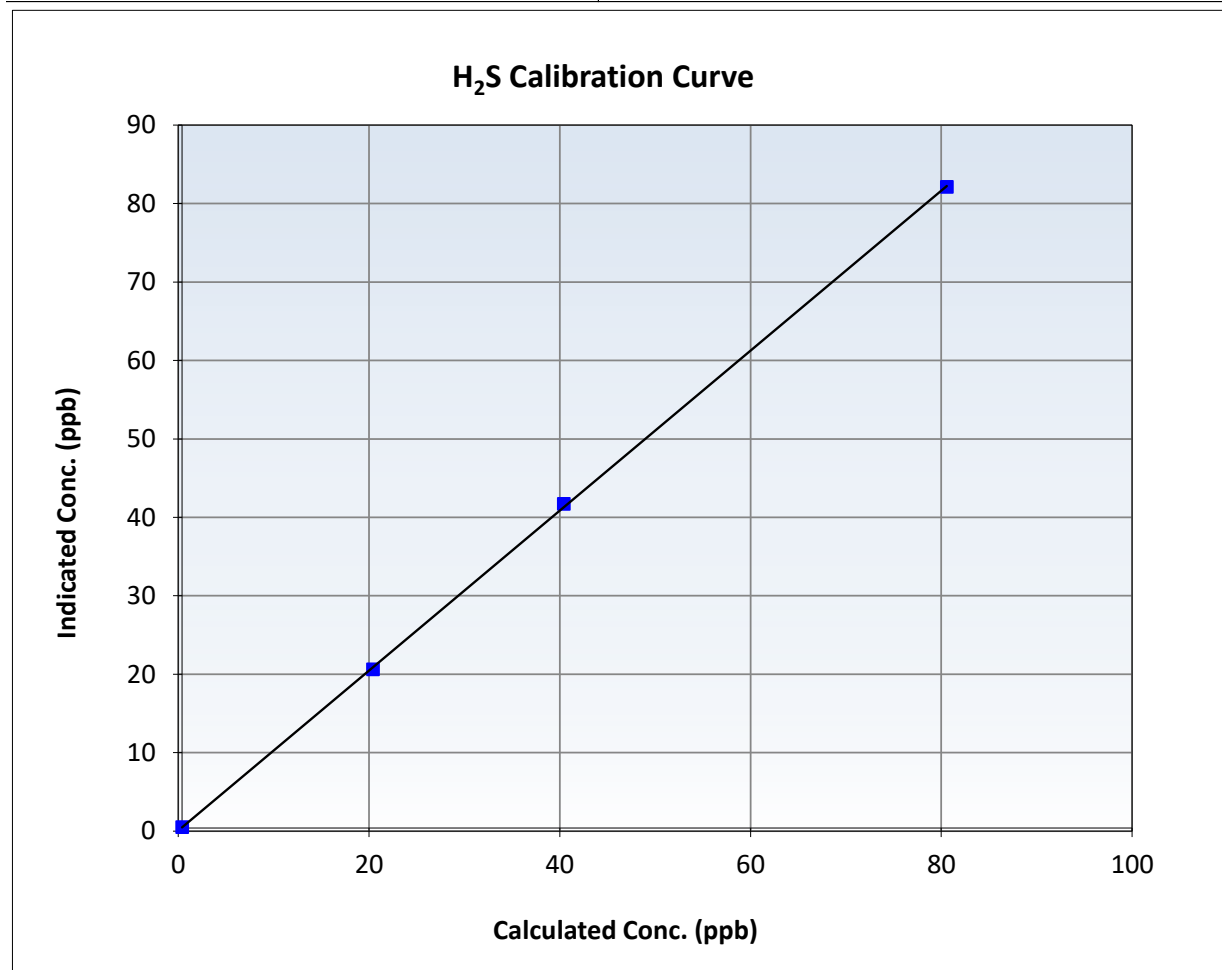
H₂S Calibration Summary

Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 20, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:53	End Time (MST):	14:34
Analyzer make:	API T101	Analyzer serial #:	621

Calibration Data

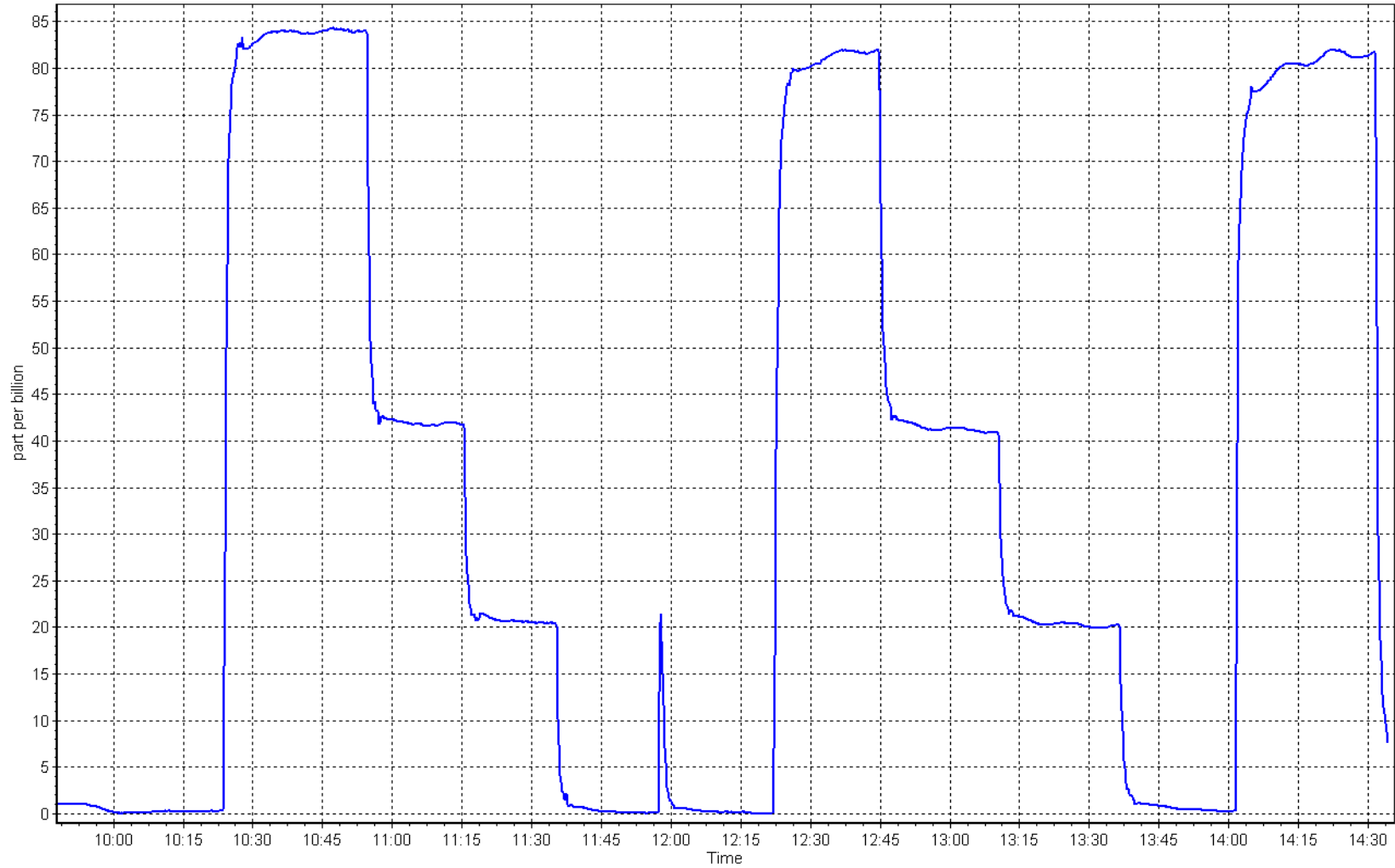
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999929	≥ 0.995
80.2	81.7	0.9813	Slope	1.019581	$0.90 - 1.10$
40.0	41.3	0.9693	Intercept	0.082683	± 3
20.0	20.2	0.9908			



H₂S Calibration Plot

Date: September 18, 2024

Location: Jackfish 2/3





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Jackfish 2/3
Station number: AMS 27
Calibration Date: September 26, 2024
Last Cal Date: August 16, 2024
Start time (MST): 9:57
End time (MST): 15:29
Reason: Routine

Calibration Standards

NO Gas Cylinder #: CC757838
NOX Cal Gas Conc: 60.30 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 60.30 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701
Cal Gas Expiry Date: January 9, 2032
NO Cal Gas Conc: 60.20 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 60.20 ppm
NO gas Diff:
Serial Number: 3811
Serial Number: 268

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.2	-0.2	0.4	----	----
AF High point	4942	66.5	800.6	799.3	1.3	768.8	762.6	6.2	1.0417	1.0479
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 798.3 ppb	NO = 797.9 ppb				* = > +/-5% change initiates investigation		*Percent Change	NO _x = -3.9%	
Baseline Corr 1st pt	NO _x = 768.6 ppb	NO = 762.8 ppb				<u>As Found Statistics</u>		*Percent Change	NO = -4.6%	
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb				As found	NO _x r ² :	Nx SI:	Nx Int:	
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb				As found	NO r ² :	NO SI:	NO Int:	
						As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 722

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.371	1.428	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.355	1.408	NOX bkgnd or offset:	1.5	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.3	3.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999277	0.998423
NO _x Cal Offset:	-1.755381	-2.056065
NO Cal Slope:	1.001407	1.000536
NO Cal Offset:	-2.494780	-2.515188
NO ₂ Cal Slope:	0.978576	0.982695
NO ₂ Cal Offset:	0.366252	0.889680

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	----	----
High point	4942	66.5	800.6	799.3	1.3	797.5	798.3	-0.8	1.0039	1.0013
Mid point	4979	33.3	400.6	399.9	0.7	399.3	397.0	2.2	1.0033	1.0074
Low point	4996	16.6	199.7	199.4	0.3	193.8	193.9	-0.1	1.0304	1.0282
As left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.2	-0.8	----	----
As left span	4942	66.5	800.6	417.5	383.1	793.4	417.5	375.9	1.0091	1.0000
Average Correction Factor									1.0125	1.0123

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	797.6	411.0	387.9	381.6	1.0166	98.4%
Mid GPT point	797.6	612.2	186.7	184.9	1.0099	99.0%
Low GPT point	797.6	706.6	92.3	92.7	0.9960	100.4%
Average Correction Factor					1.0075	99.3%

Notes:

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

Calibration Performed By:

Mohammed Kashif



Wood Buffalo Environmental Association

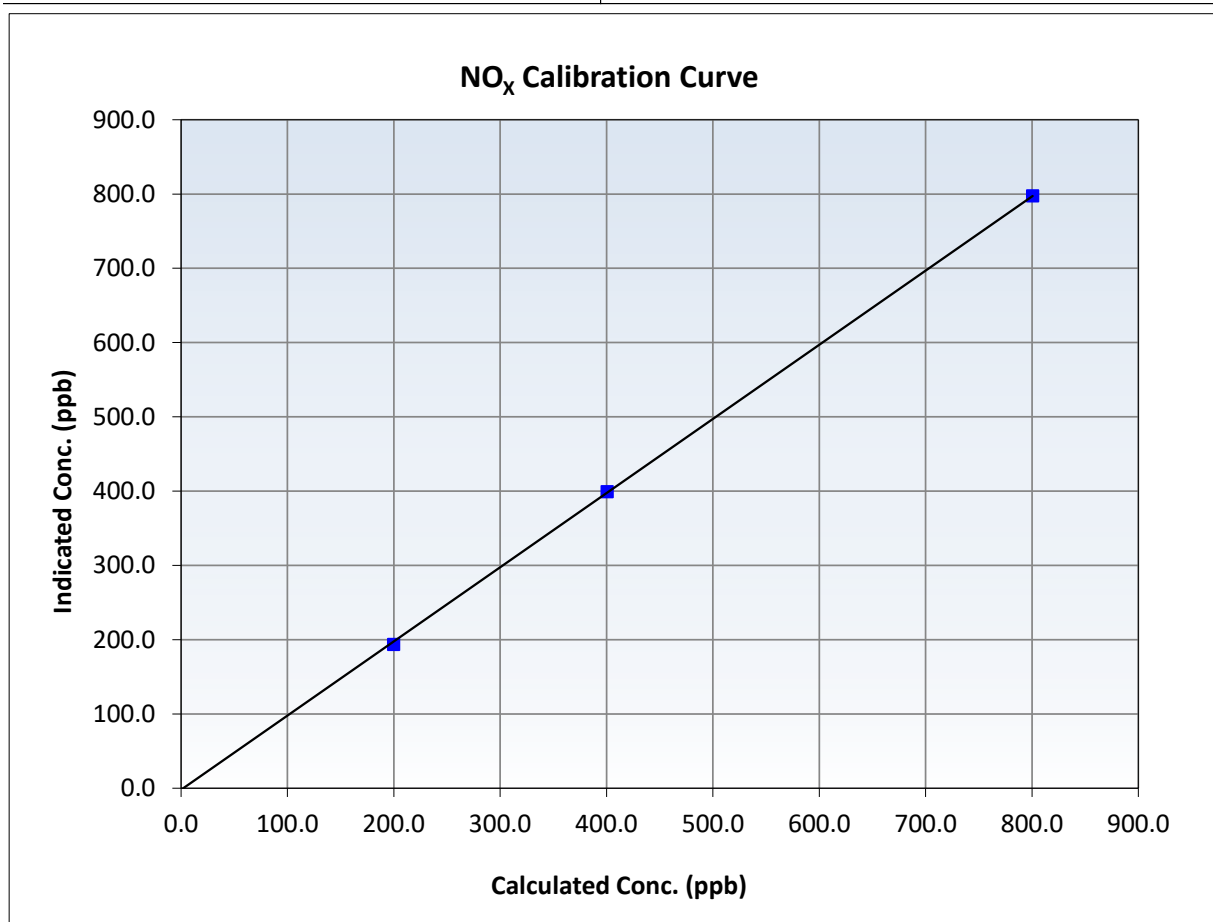
NO_x Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 16, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:57	End Time (MST):	15:29
Analyzer make:	API T200	Analyzer serial #:	722

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	0.999948	≥0.995
800.6	797.5	1.0039	Slope	0.998423	0.90 - 1.10
400.6	399.3	1.0033	Intercept	-2.056065	+/-20
199.7	193.8	1.0304			





Wood Buffalo Environmental Association

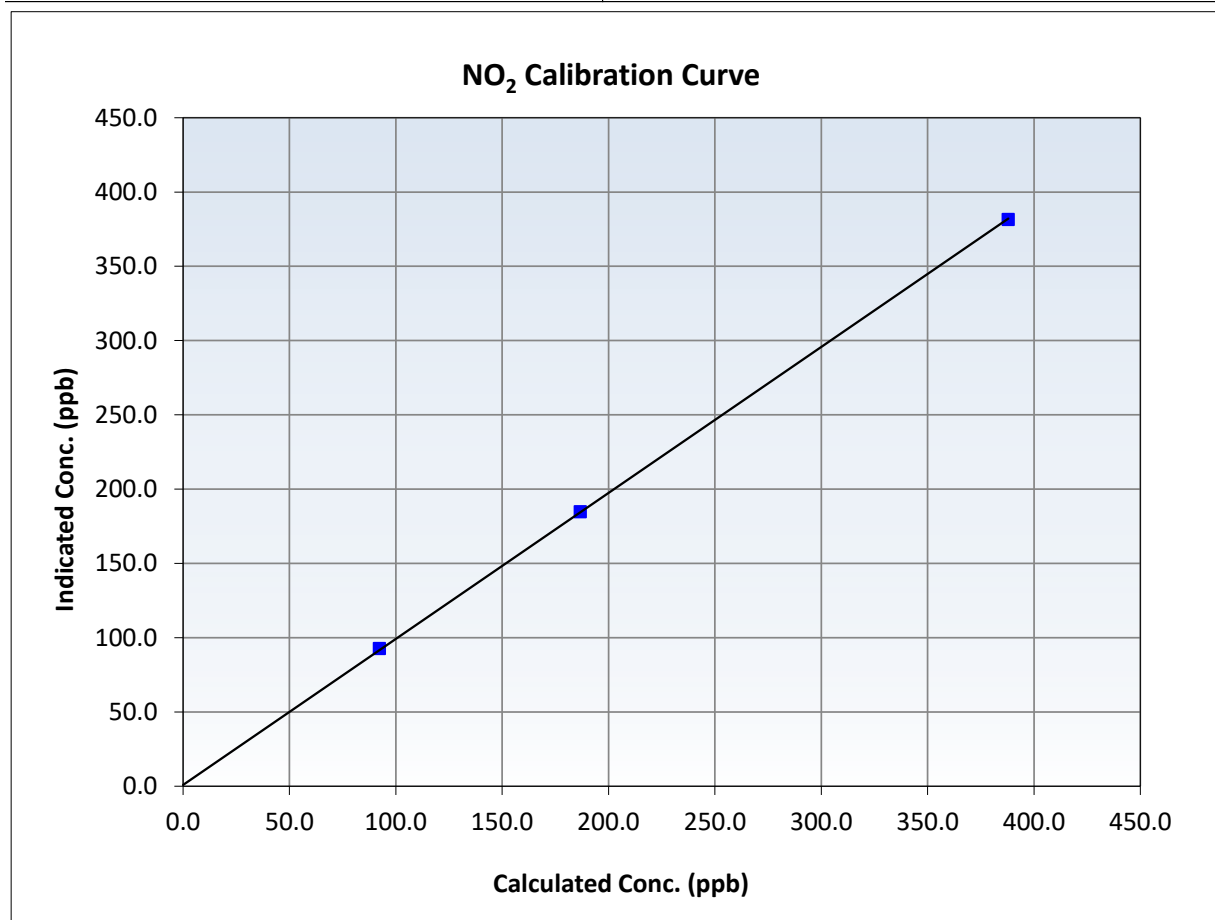
NO₂ Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 16, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:57	End Time (MST):	15:29
Analyzer make:	API T200	Analyzer serial #:	722

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	0.999964	≥0.995
387.9	381.6	1.0166	Slope	0.982695	0.90 - 1.10
186.7	184.9	1.0099	Intercept	0.889680	+/-20
92.3	92.7	0.9960			





Wood Buffalo Environmental Association

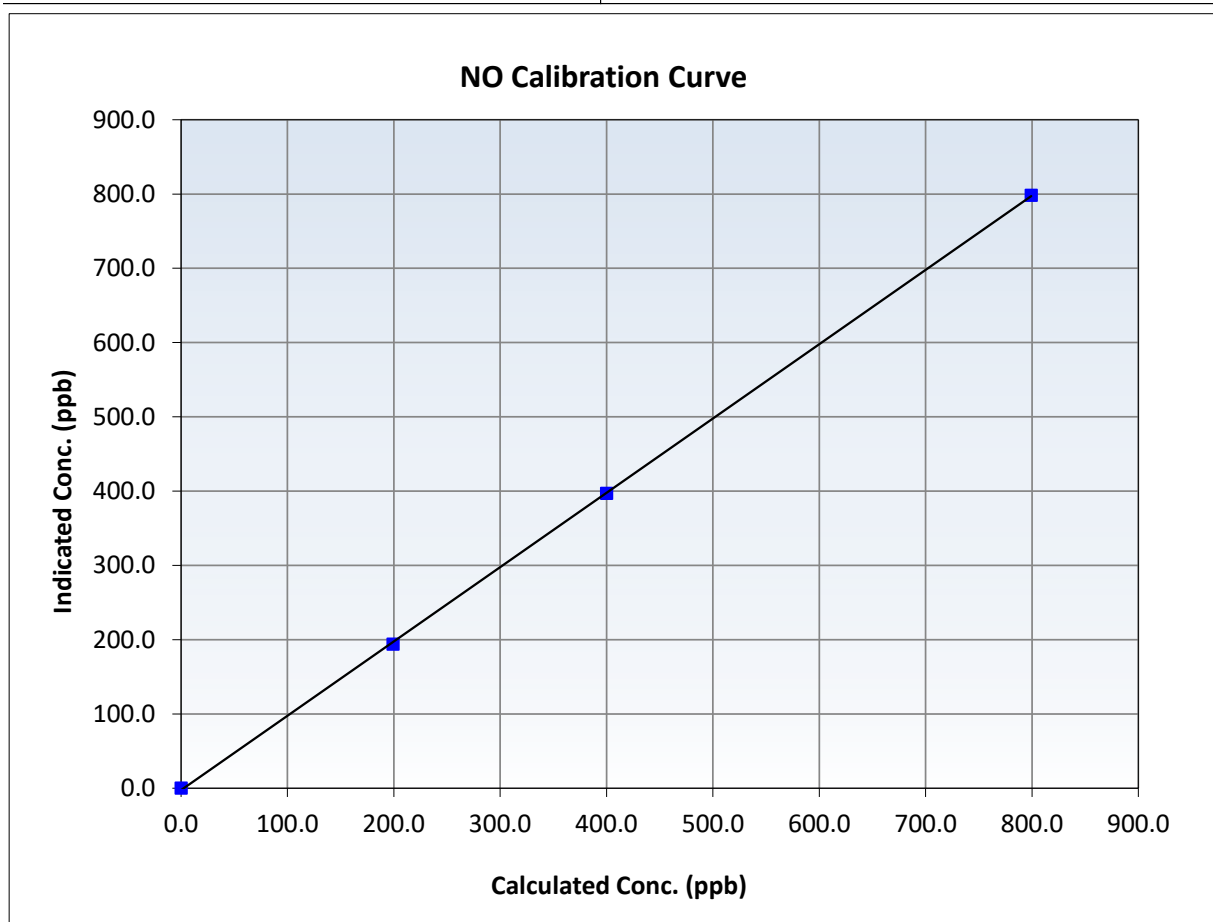
NO Calibration Summary

Station Information

Calibration Date:	September 26, 2024	Previous Calibration:	August 16, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:57	End Time (MST):	15:29
Analyzer make:	API T200	Analyzer serial #:	722

Calibration Data

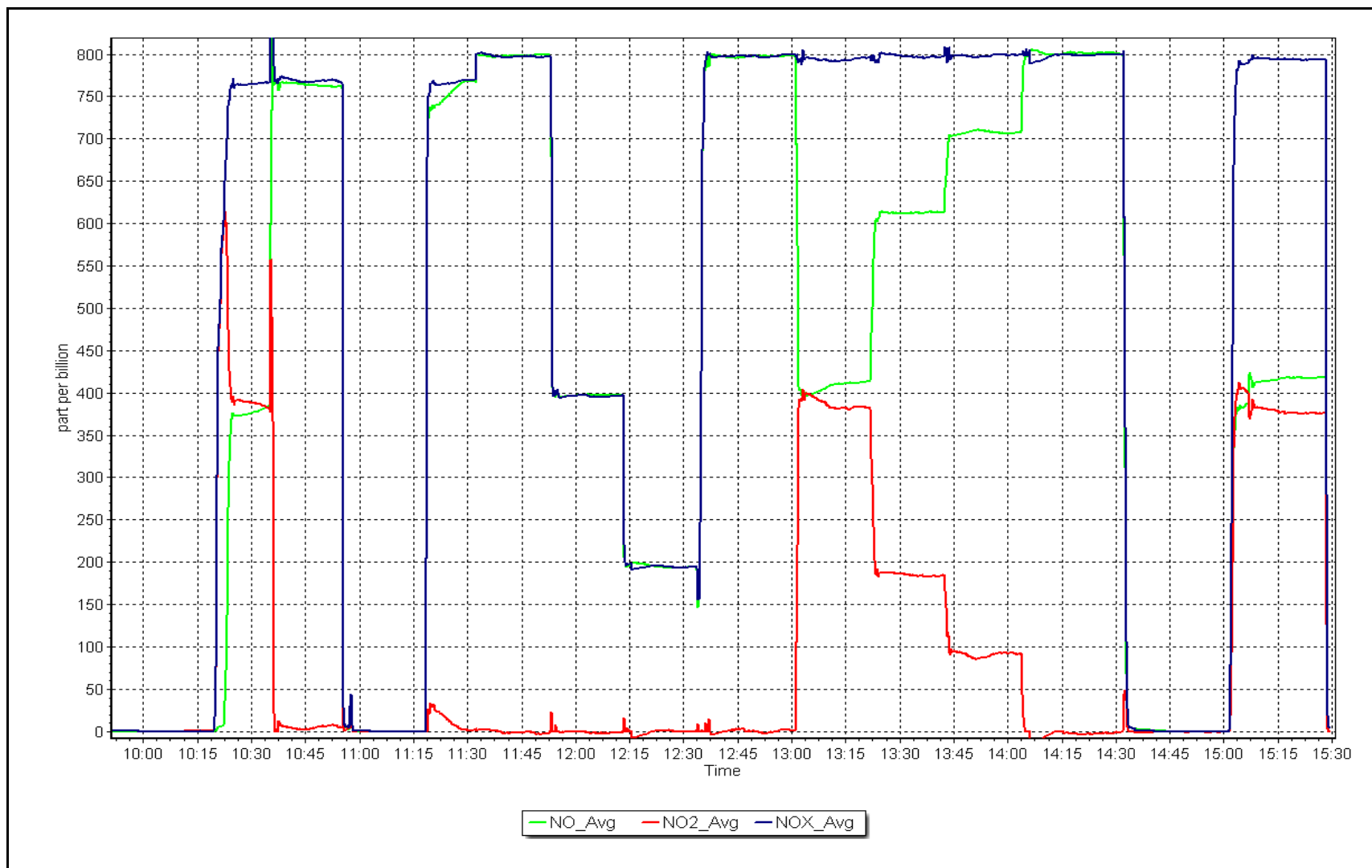
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999949	≥ 0.995
799.3	798.3	1.0013	Slope	1.000536	$0.90 - 1.10$
399.9	397.0	1.0074	Intercept	-2.515188	± 20
199.4	193.9	1.0282			



NO_x Calibration Plot

Date: September 26, 2024

Location: Jackfish 2/3





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

**AMS29
SURMONT 2
SEPTEMBER 2024**

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Surmont 2 Station number: AMS 29
Calibration Date: September 6, 2024 Last Cal Date: August 12, 2024
Start time (MST): 9:45 End time (MST): 13:20
Reason: Routine

Calibration Standards

Cal Gas Concentration: 49.21 ppm Cal Gas Exp Date: February 23, 2025
Cal Gas Cylinder #: CC356008
Removed Cal Gas Conc: 49.21 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 5472
Zero Air Gen Model: Teledyne API T701 Serial Number: 4698

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1170050150
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002616	1.003399	Backgd or Offset: 12.9	12.9
Calibration intercept:	-1.845917	-1.945265	Coeff or Slope: 0.921	0.925

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4919	81.3	800.1	795.2	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	795.4	Previous response	800.4	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4919	81.3	800.1	802.0	0.998
Mid point	4959	40.7	400.6	398.6	1.005
Low point	4979	20.3	199.8	196.9	1.015
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	81.3	800.1	801.0	0.999
Average Correction Factor:					1.006

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

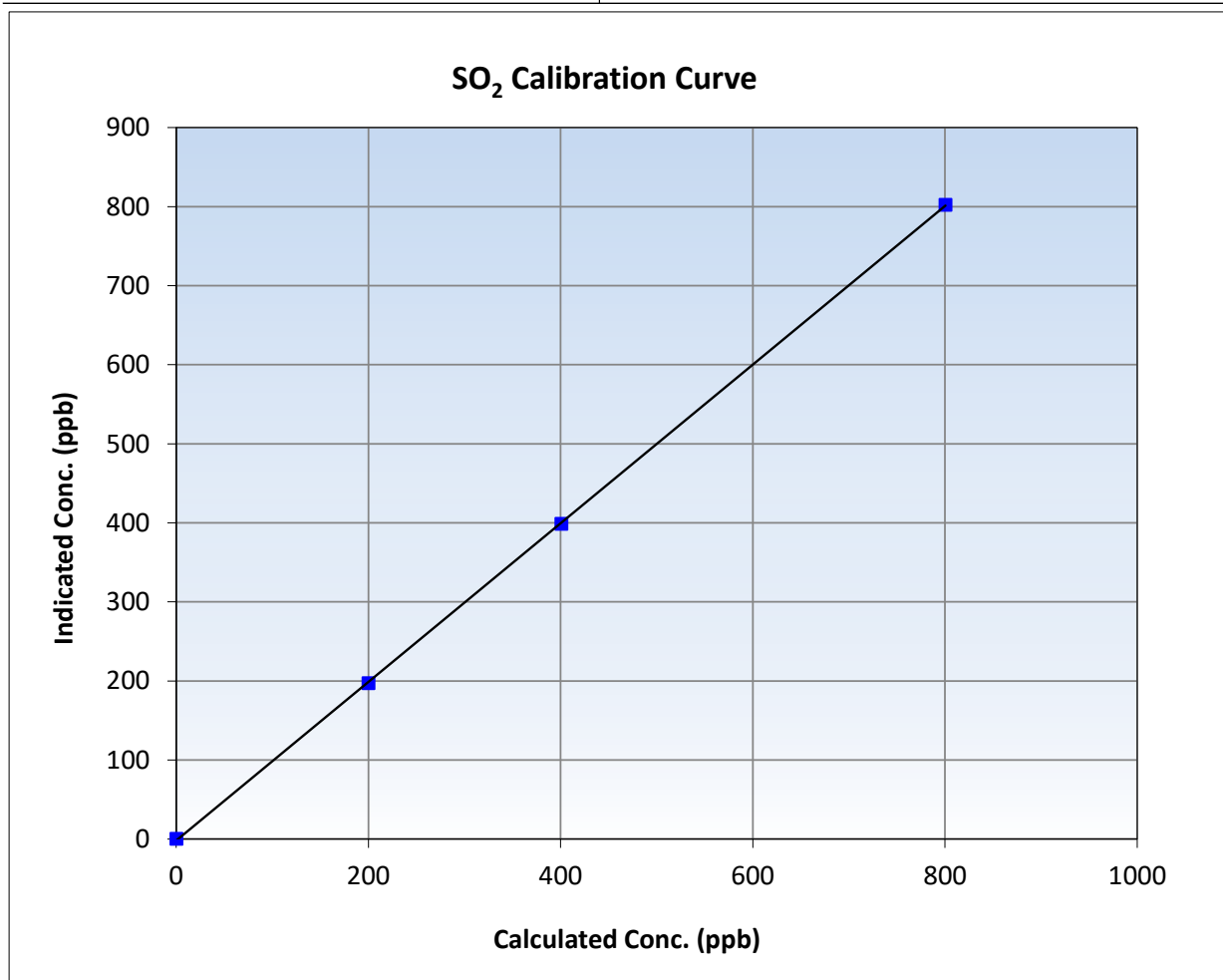
SO₂ Calibration Summary

Station Information

Calibration Date:	September 6, 2024	Previous Calibration:	August 12, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:45	End Time (MST):	13:20
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

Calibration Data

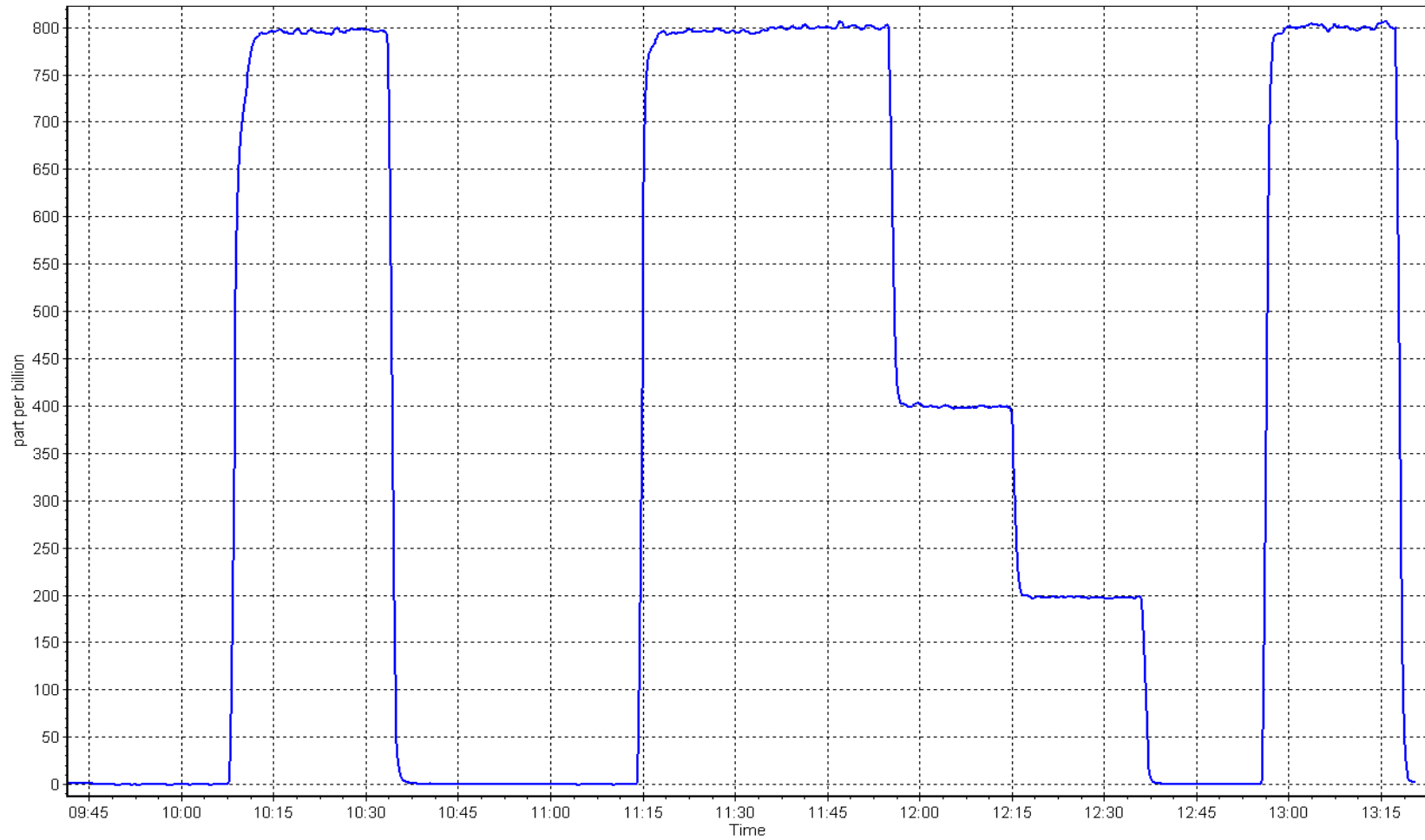
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999972	≥0.995
800.1	802.0	0.9976	Slope	1.003399	0.90 - 1.10
400.6	398.6	1.0050	Intercept	-1.945265	+/-30
199.8	196.9	1.0148			



SO2 Calibration Plot

Date: September 6, 2024

Location: Surmont 2





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Surmont 2
Calibration Date: September 3, 2024
Start time (MST): 10:10
Reason: Routine

Station number: AMS 29
Last Cal Date: August 1, 2024
End time (MST): 15:23

Calibration Standards

Cal Gas Concentration: 5.391 ppm
Cal Gas Cylinder #: CC508338
Removed Cal Gas Conc: 5.391 ppm
Removed Gas Cyl #: CC508338
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701

Cal Gas Exp Date: January 4, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 5472
Serial Number: 4698

Analyzer Information

Analyzer make: Thermo 43iQ-TLE
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1200326170
Converter serial #: 2022-220
Converter Temp: 350.0 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004471	1.002185	Backgd or Offset:	0.88
Calibration intercept:	-0.122865	-0.142761	Coeff or Slope:	1.030

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4926	74.2	80.0	81.5	0.979
As found Mid point	4963	37.2	40.1	40.4	0.988
As found Low point	4982	18.6	20.1	20.1	0.988
New cylinder response					
Baseline Corr As found:	81.7	Prev response:	80.24	*% change:	1.8%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.021468	AF Intercept:	-0.343462
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999976	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4926	74.2	80.0	80.1	0.999
Mid point	4963	37.2	40.1	39.9	1.005
Low point	4982	18.6	20.1	20.0	1.003
As left zero	5000	0.0	0.0	0.1	----
As left span	4926	74.2	80.0	79.4	1.008
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.002
Date of last converter efficiency test:					

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

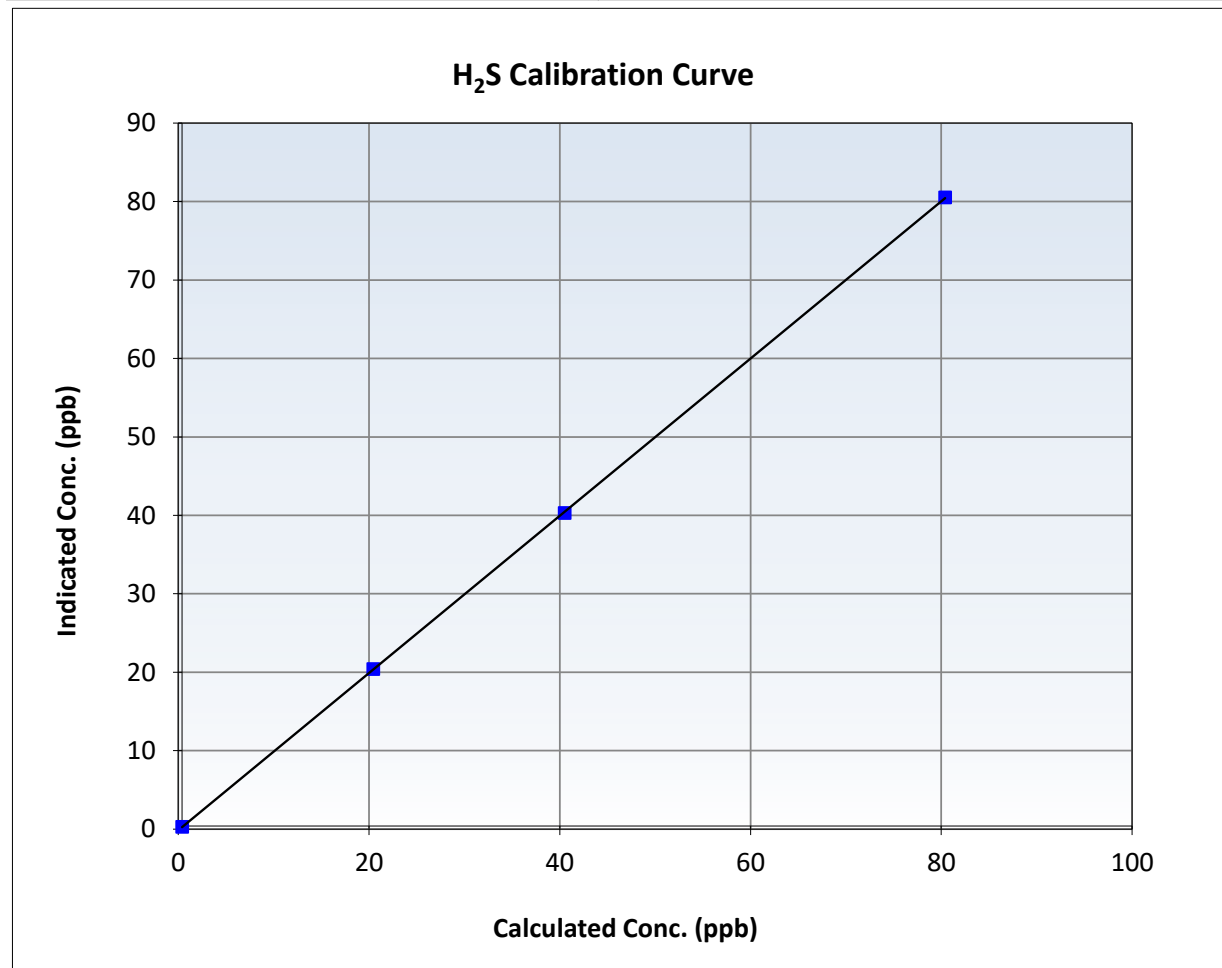
H2S Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 1, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:10	End Time (MST):	15:23
Analyzer make:	Thermo 43iQ-TLE	Analyzer serial #:	1200326170

Calibration Data

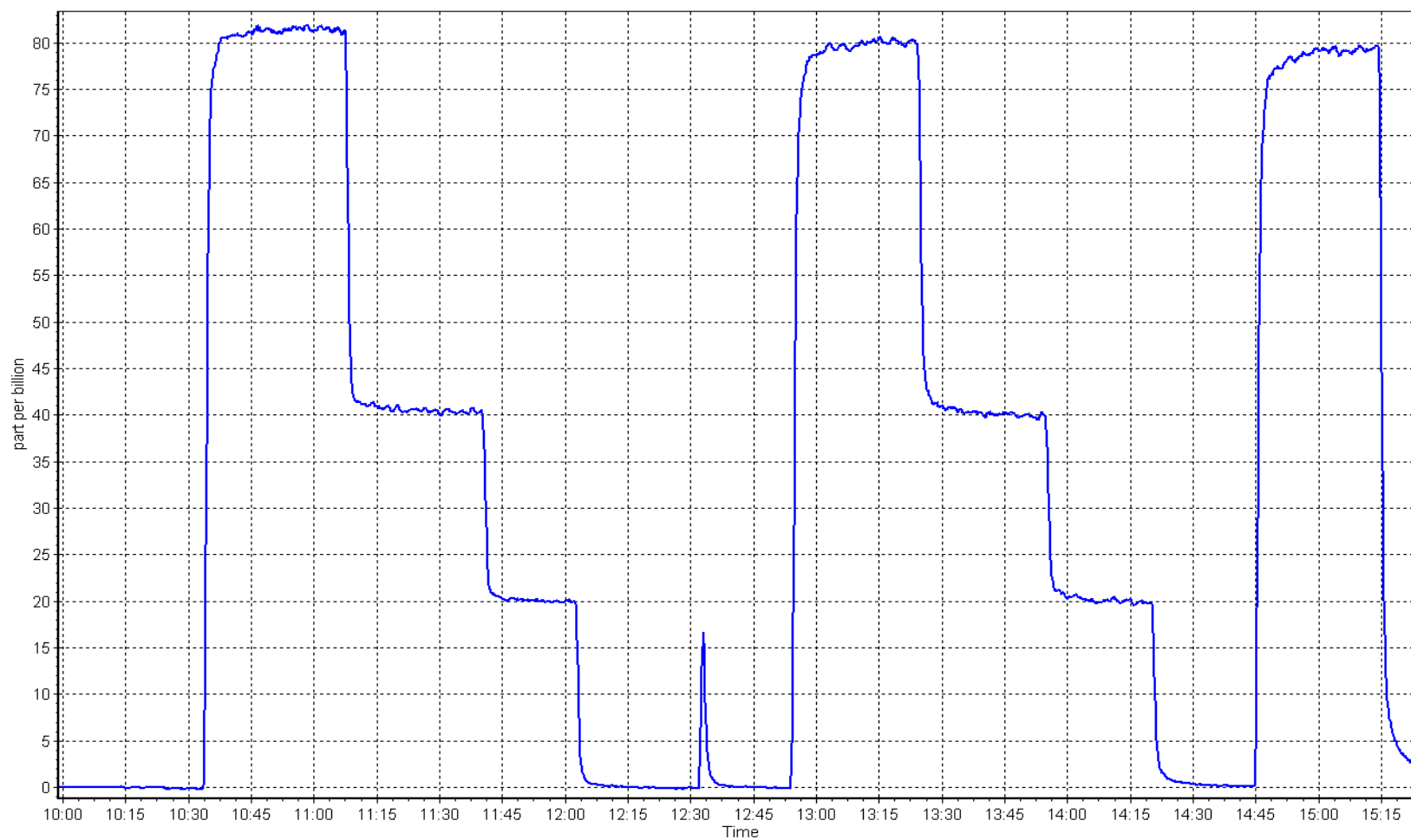
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	-0.1	----	Correlation Coefficient	0.999991		≥ 0.995
80.0	80.1	0.9988	Slope	1.002185		$0.90 - 1.10$
40.1	39.9	1.0052	Intercept	-0.142761		± 3
20.1	20.0	1.0027				



H2S Calibration Plot

Date: September 3, 2024

Location: Surmont 2





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name: Surmont 2 Station number: AMS 29
Calibration Date: September 6, 2024 Last Cal Date: August 12, 2024
Start time (MST): 9:45 End time (MST): 13:20
Reason: Routine

Calibration Standards

Gas Cert Reference: CC356008 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 ppm CH4 Equiv Conc. 1064.7 ppm
Removed C3H8 Conc. 205.7 ppm Diff between cyl:
Calibrator Make/Model: Teledyne API T700 Serial Number: 5472
ZAG Make/Model: Teledyne API T701 Serial Number: 4698

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149
Analyzer Range: 0 - 20 ppm

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.993704	0.998216	Background:	3.66	3.47
Calibration intercept:	-0.037856	0.055734	Coefficient:	3.867	3.856

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	-0.14	----
As found High point	4918	81.3	17.31	17.22	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.36	Previous response	17.17	*% change	1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.08	----
High point	4918	81.3	17.31	17.36	0.997
Mid point	4959	40.6	8.65	8.65	1.000
Low point	4979	20.3	4.32	4.36	0.992
As left zero	5000	0.0	0.00	0.06	----
As left span	4918	81.3	17.31	17.46	0.992
Average Correction Factor					0.996

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

THC Calibration Summary

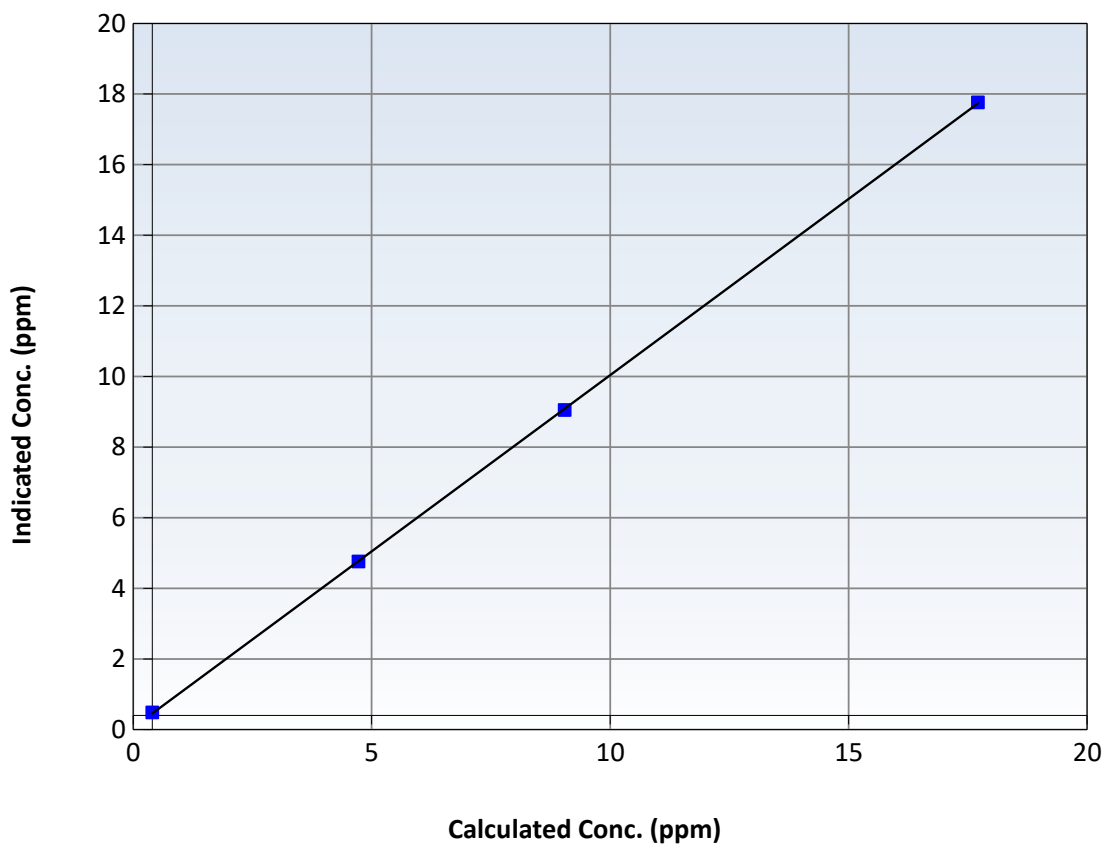
Station Information

Calibration Date:	September 6, 2024	Previous Calibration:	August 12, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:45	End Time (MST):	13:20
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.08	----	Correlation Coefficient	0.999984	≥ 0.995
17.31	17.36	0.9974	Slope	0.998216	$0.90 - 1.10$
8.65	8.65	0.9995	Intercept	0.055734	± 1.5
4.32	4.36	0.9918			

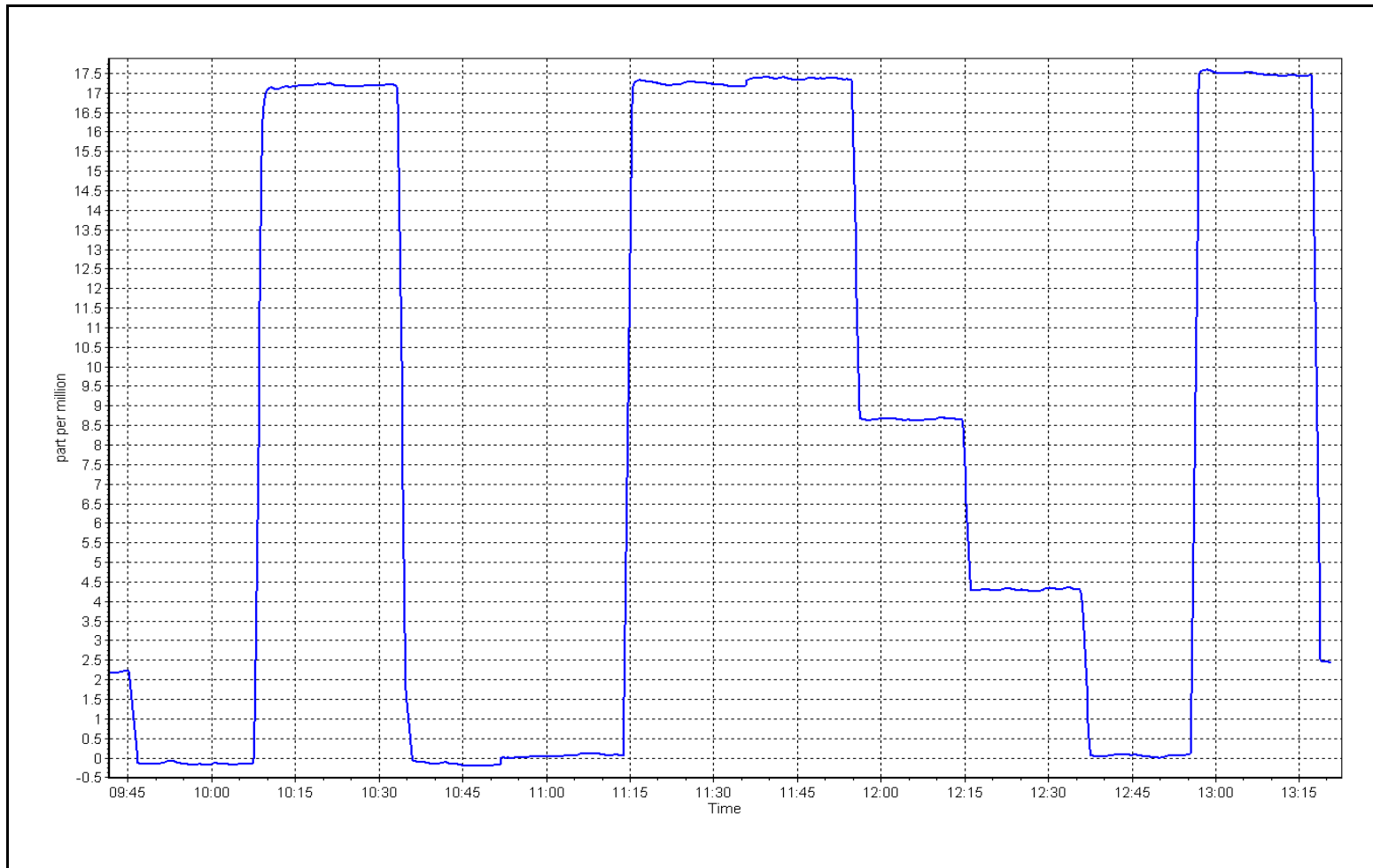
THC Calibration Curve



THC Calibration Plot

Date: September 6, 2024

Location: Surmont 2





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Surmont 2
Station number: AMS 29
Calibration Date: September 19, 2024
Last Cal Date: August 15, 2024
Start time (MST): 9:42
End time (MST): 14:49
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T12YYFE
NOX Cal Gas Conc: 47.46 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 47.46 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701
Cal Gas Expiry Date: October 30, 2024
NO Cal Gas Conc: 47.46 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 47.46 ppm
NO gas Diff:
Serial Number: 5472
Serial Number: 4698

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0	0.0	0.0	0.0	-0.6	-0.2	-0.4	----	----
AF High point	4916	84.3	800.1	800.1	0.0	777.4	775.8	1.5	1.0284	1.0311
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 800.5 ppb	NO = 799.3 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = -2.9%
Baseline Corr 1st pt	NO _x = 778.0 ppb	NO = 776.0 ppb	<u>As Found Statistics</u>		*Percent Change	NO = -3.0%
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:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1170050148

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.002311	0.999522
NO _x Cal Offset:	-1.452672	-0.652076
NO Cal Slope:	1.001338	1.000937
NO Cal Offset:	-1.912077	-1.471932
NO ₂ Cal Slope:	0.992070	1.001153
NO ₂ Cal Offset:	1.638054	-0.322528

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.599	1.646	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.995	0.993	NOX bkgnd or offset:	2.0	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	189.8	192.3

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4916	84.2	799.2	799.2	0.0	797.9	798.6	-0.7	1.0016	1.0007
Mid point	4958	42.1	399.6	399.6	0.0	400.2	399.6	0.6	0.9985	1.0000
Low point	4979	21.1	200.3	200.3	0.0	197.7	196.3	1.4	1.0130	1.0203
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4916	84.2	799.2	408.6	390.6	801.0	408.6	392.1	0.9977	1.0000
Average Correction Factor									1.0044	1.0070

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	794.8	393.0	401.8	402.1	0.9993	100.1%
Mid GPT point	794.8	605.9	188.9	188.6	1.0016	99.8%
Low GPT point	794.8	700.1	94.7	94.2	1.0053	99.5%
Average Correction Factor					1.0021	99.8%

Notes: Changed sample inlet filter after as founds. Adjusted zero and span. Second high NO reference used in GPT calculations.

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

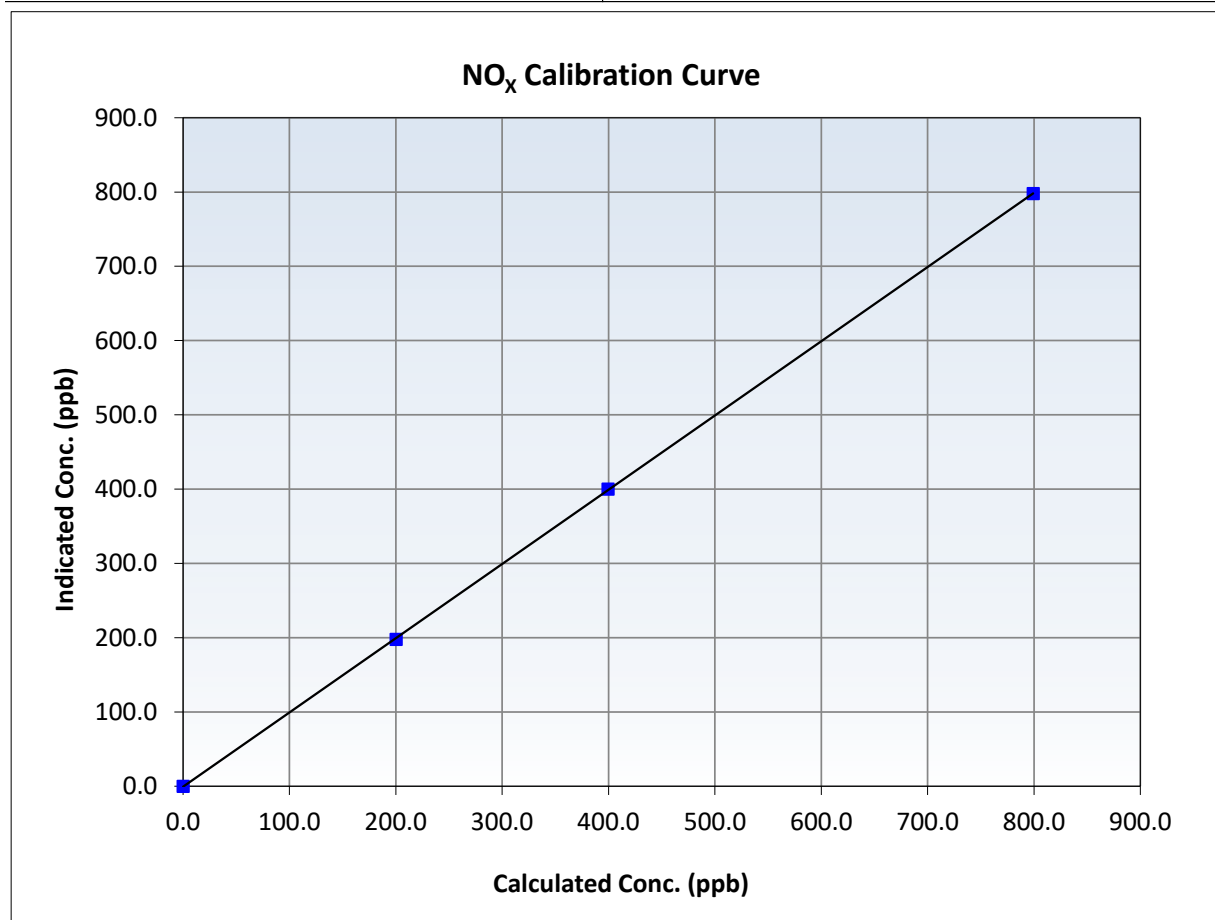
NO_x Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:42	End Time (MST):	14:49
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999983	≥0.995
799.2	797.9	1.0016	Slope	0.999522	0.90 - 1.10
399.6	400.2	0.9985	Intercept	-0.652076	+/-20
200.3	197.7	1.0130			





Wood Buffalo Environmental Association

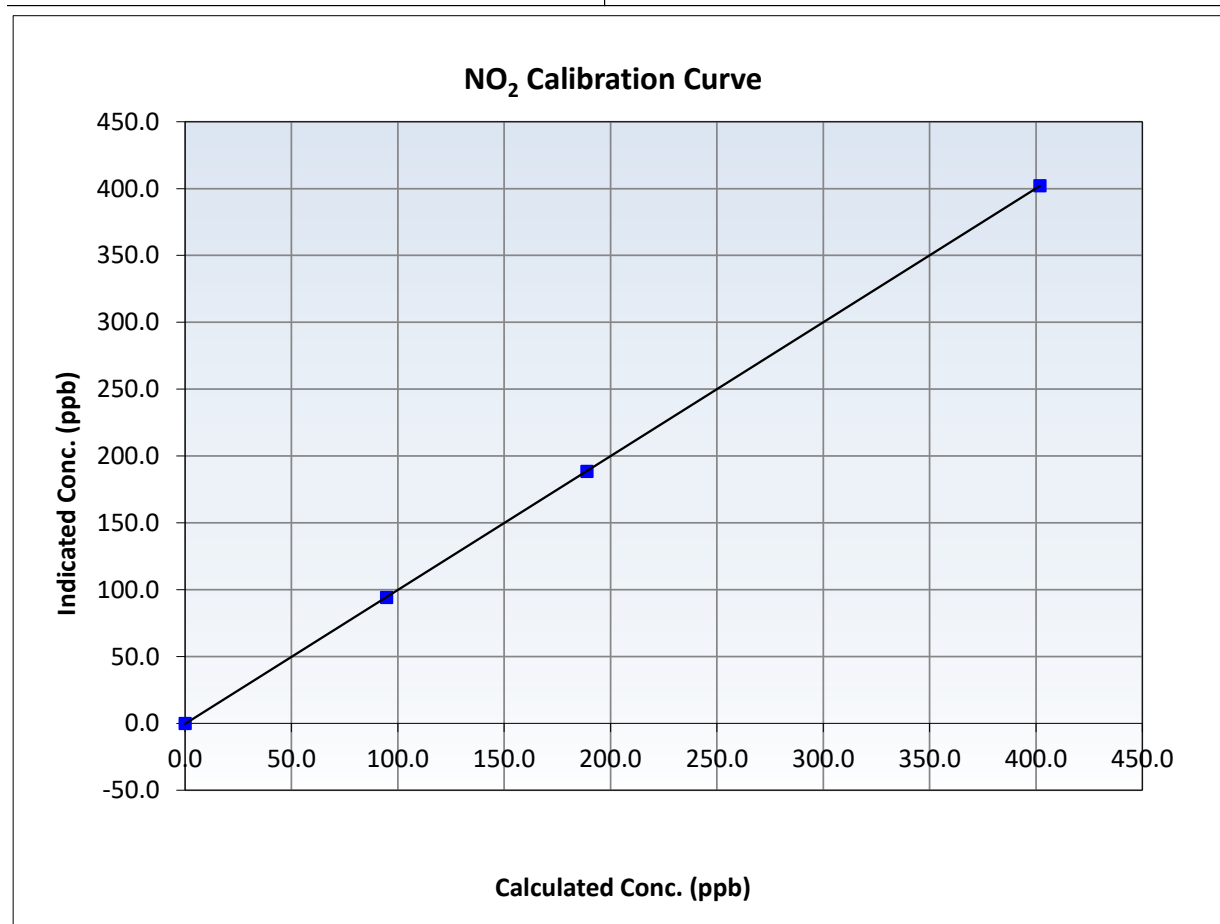
NO₂ Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:42	End Time (MST):	14:49
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999997	≥ 0.995
401.8	402.1	0.9993	Slope	1.001153	$0.90 - 1.10$
188.9	188.6	1.0016	Intercept	-0.322528	± 20
94.7	94.2	1.0053			





Wood Buffalo Environmental Association

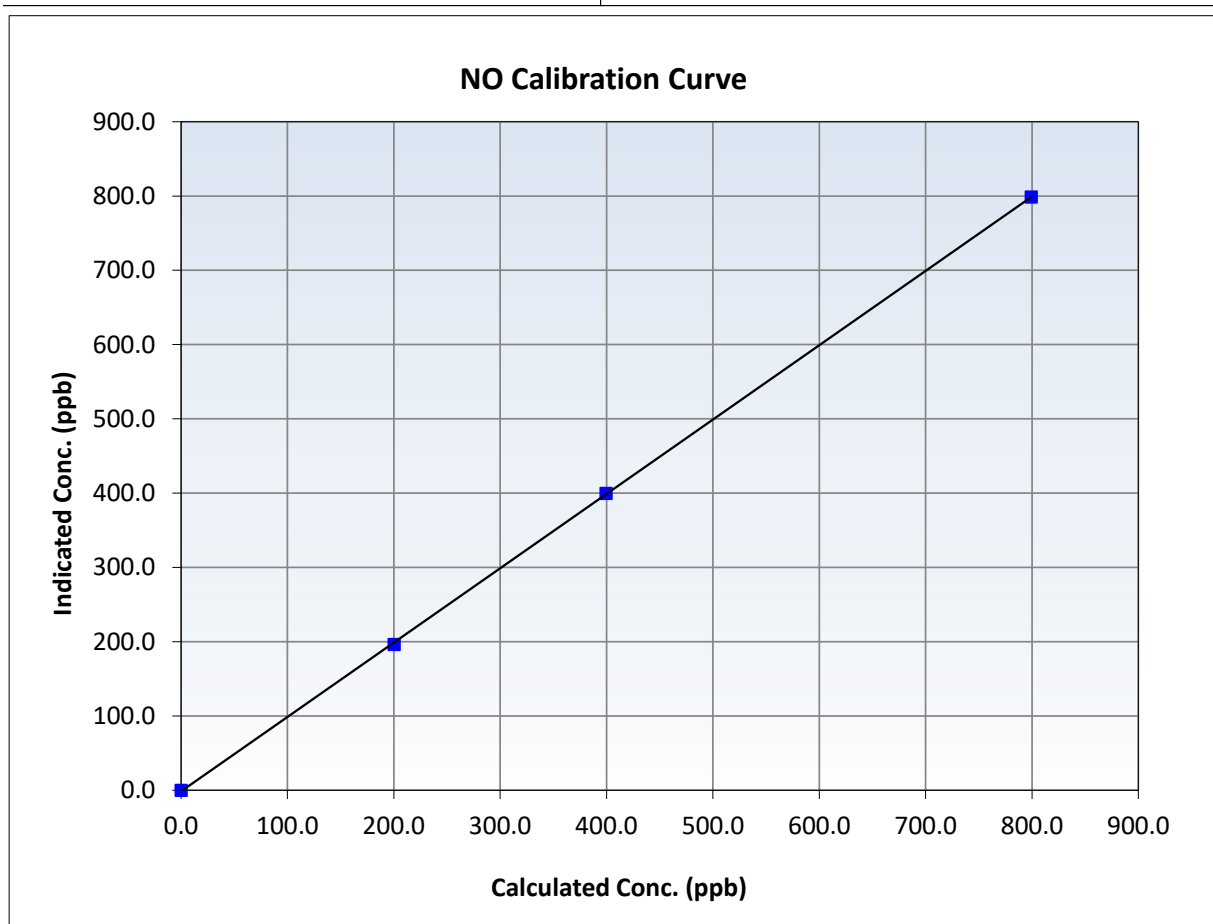
NO Calibration Summary

Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:42	End Time (MST):	14:49
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

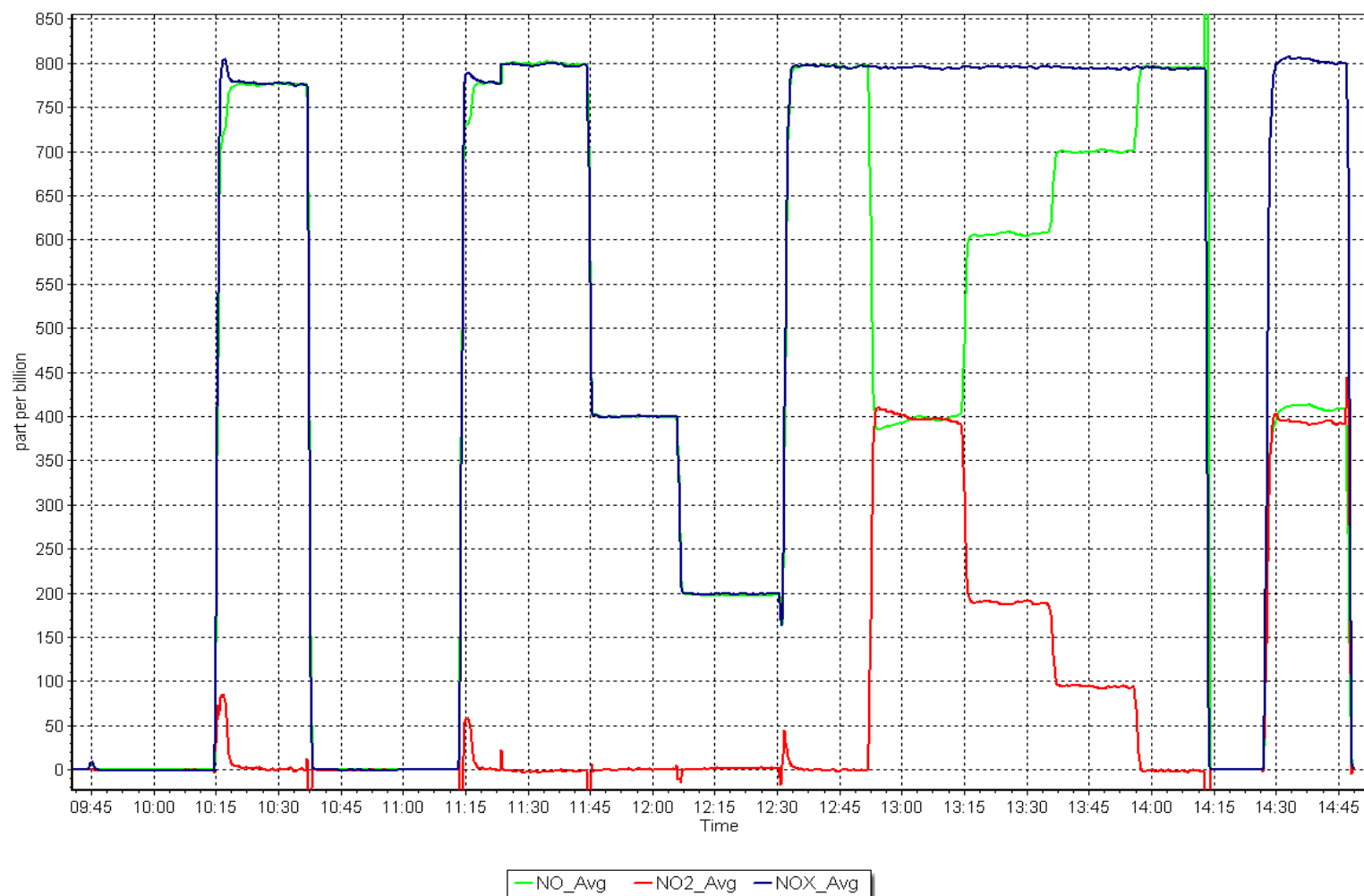
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999970	≥ 0.995
799.2	798.6	1.0007	Slope	1.000937	$0.90 - 1.10$
399.6	399.6	1.0000	Intercept	-1.471932	± 20
200.3	196.3	1.0203			



NO_x Calibration Plot

Date: September 19, 2024

Location: Surmont 2





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Surmont 2 Station number: AMS 29
Calibration Date: September 19, 2024 Last Cal Date: August 15, 2024
Start time (MST): 10:14 End time (MST): 11:30

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 Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	17.1	16.12	17.1	☐	+/- 2 °C
P (mmHg)	703.9	704.94	704.94	☒	+/- 10 mmHg
Flow (LPM)	5.02	5.099	5.02	☐	+/- 0.25 LPM
PW% (pump)	36	----	36	☐	>80%
Zero Verification	PM w/o HEPA: 3.1		PM w/ HEPA: 0.0		<0.2 ug/m3

Note: this leak check will be 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

SPAN DUST Refractive Index: 10.9 Expiry Date: June 10, 2024
Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: July 15, 2024
Date Disposable Filter Changed: July 15, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: October 25, 2023
Date RH/T Sensor Cleaned: October 25, 2023

Notes: Verified pressure, temperature and flow. Leak check passed. Adjusted flow.

Calibration by: Braiden Boutilier



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30 ELLS RIVER SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Ells River Station number: AMS 30
Calibration Date: September 3, 2024 Last Cal Date: August 2, 2024
Start time (MST): 9:53 End time (MST): 13:19
Reason: Routine N2 Cylinder change

Calibration Standards

Cal Gas Concentration: 48.75 ppm Cal Gas Exp Date: March 10, 2031
Cal Gas Cylinder #: CC350110
Removed Cal Gas Conc: 48.75 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: API T700 Serial Number: 3061
Zero Air Gen Model: API T701H Serial Number: 358

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1008841397
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002518	1.002990	Backgd or Offset:	9.6	9.6
Calibration intercept:	-2.132046	-2.372034	Coeff or Slope:	0.985	0.992

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4918	82.0	799.5	793.3	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.3	Previous response	799.4	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4918	82.0	799.5	800.7	0.999
Mid point	4959	41.0	399.8	397.5	1.006
Low point	4980	20.5	199.9	195.5	1.022
As left zero	5000	0.0	0.0	0.2	----
As left span	4918	82.0	799.5	802.2	0.997
Average Correction Factor:					1.009

Notes: Sample inlet filter and N2 cylinder was changed after as founds. Adjusted span only.

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

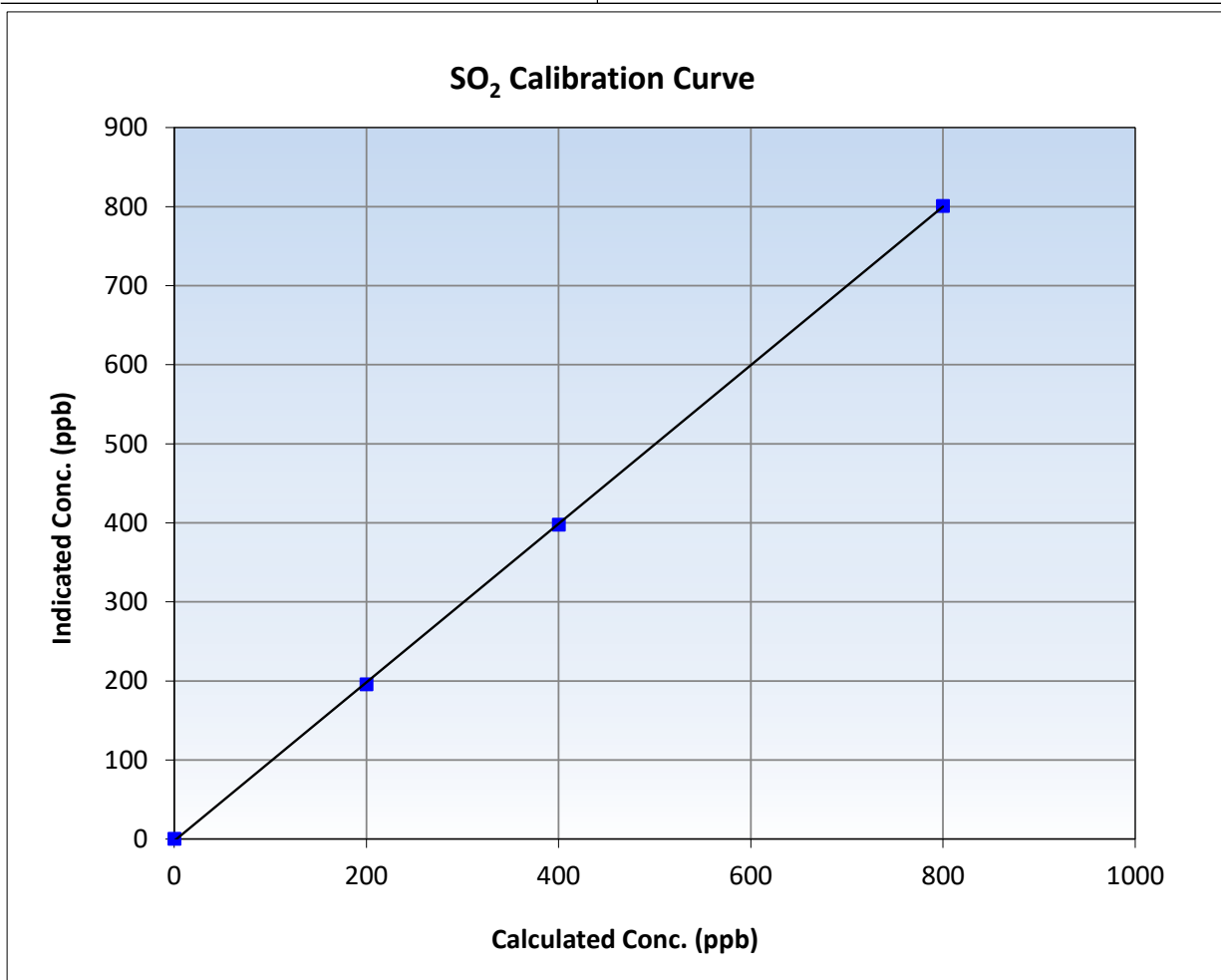
SO₂ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 2, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:53	End Time (MST):	13:19
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397

Calibration Data

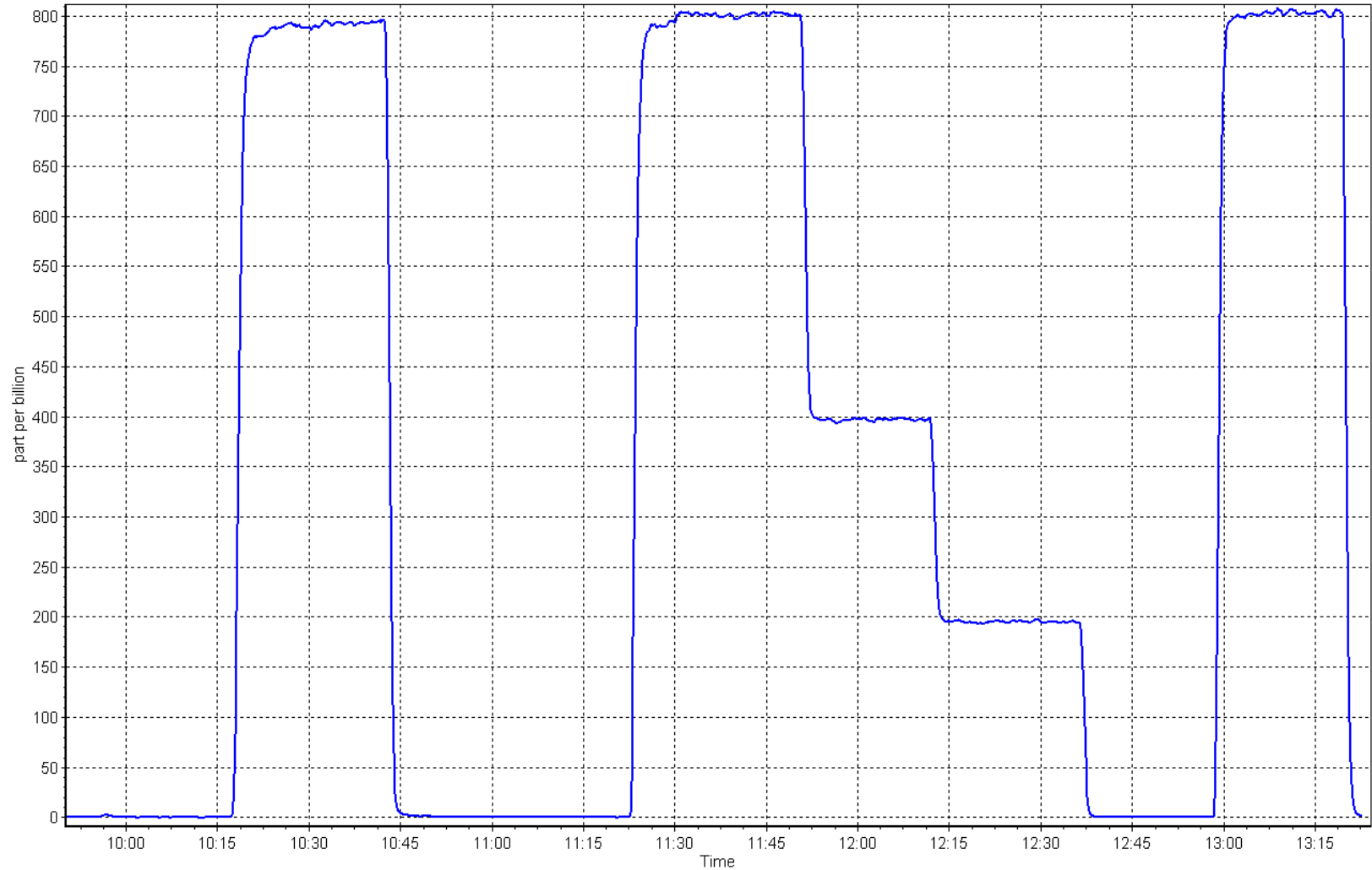
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999956	≥0.995
799.5	800.7	0.9985	Slope	1.002990	0.90 - 1.10
399.8	397.5	1.0057	Intercept	-2.372034	+/-30
199.9	195.5	1.0223			



SO2 Calibration Plot

Date: September 3, 2024

Location: Ells River





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name: Ells River
Calibration Date: September 9, 2024
Start time (MST): 9:05
Reason: Routine

Station number: AMS 30
Last Cal Date: August 12, 2024
End time (MST): 13:17

Calibration Standards

Cal Gas Concentration: 4.99 ppm
Cal Gas Cylinder #: CC505806
Removed Cal Gas Conc: 4.99 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: API T700
ZAG Make/Model: API T701H

Cal Gas Exp Date: November 15, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 3061
Serial Number: 358

Analyzer Information

Analyzer make: Thermo 43i TLE
Converter make: CDN- 101
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1410661331
Converter serial #: 562
Converter Temp: 800 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.006617	1.007332	Backgd or Offset:	1.7	1.7
Calibration intercept:	-0.160455	-0.360497	Coeff or Slope:	1.119	1.119

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	80.0	79.5	1.005
As found Mid point	4960	40.1	40.0	39.8	1.003
As found Low point	4980	20.0	20.0	19.6	1.013
New cylinder response					
Baseline Corr As found:	79.6	Prev response:	80.41	*% change:	-1.0%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.995338	AF Intercept:	-0.140674
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999991	* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4920	80.2	80.0	80.4	0.995
Mid point	4960	40.1	40.0	39.8	1.006
Low point	4980	20.0	20.0	19.5	1.024
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.2	80.0	80.3	0.997
SO2 Scrubber Check	4921	79.2	792.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.008
Date of last converter efficiency test:					

Notes: Change sample inlet filters after multipoint as founds. Sox scrubber check done after calibrator zero and passed. No adjustment made.

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

TRS Calibration Summary

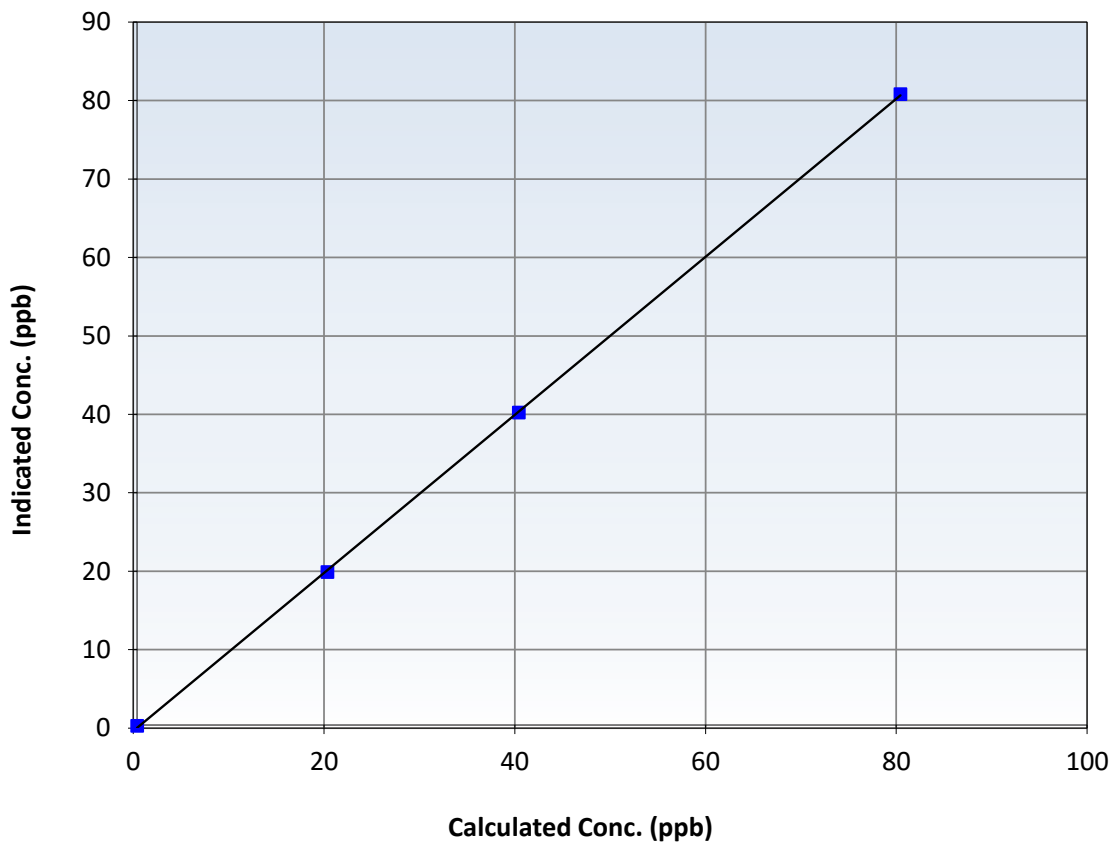
Station Information

Calibration Date:	September 9, 2024	Previous Calibration:	August 12, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:05	End Time (MST):	13:17
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

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	0.999952		≥ 0.995
80.0	80.4	0.9955	Slope	1.007332		$0.90 - 1.10$
40.0	39.8	1.0055	Intercept	-0.360497		± 3
20.0	19.5	1.0236				

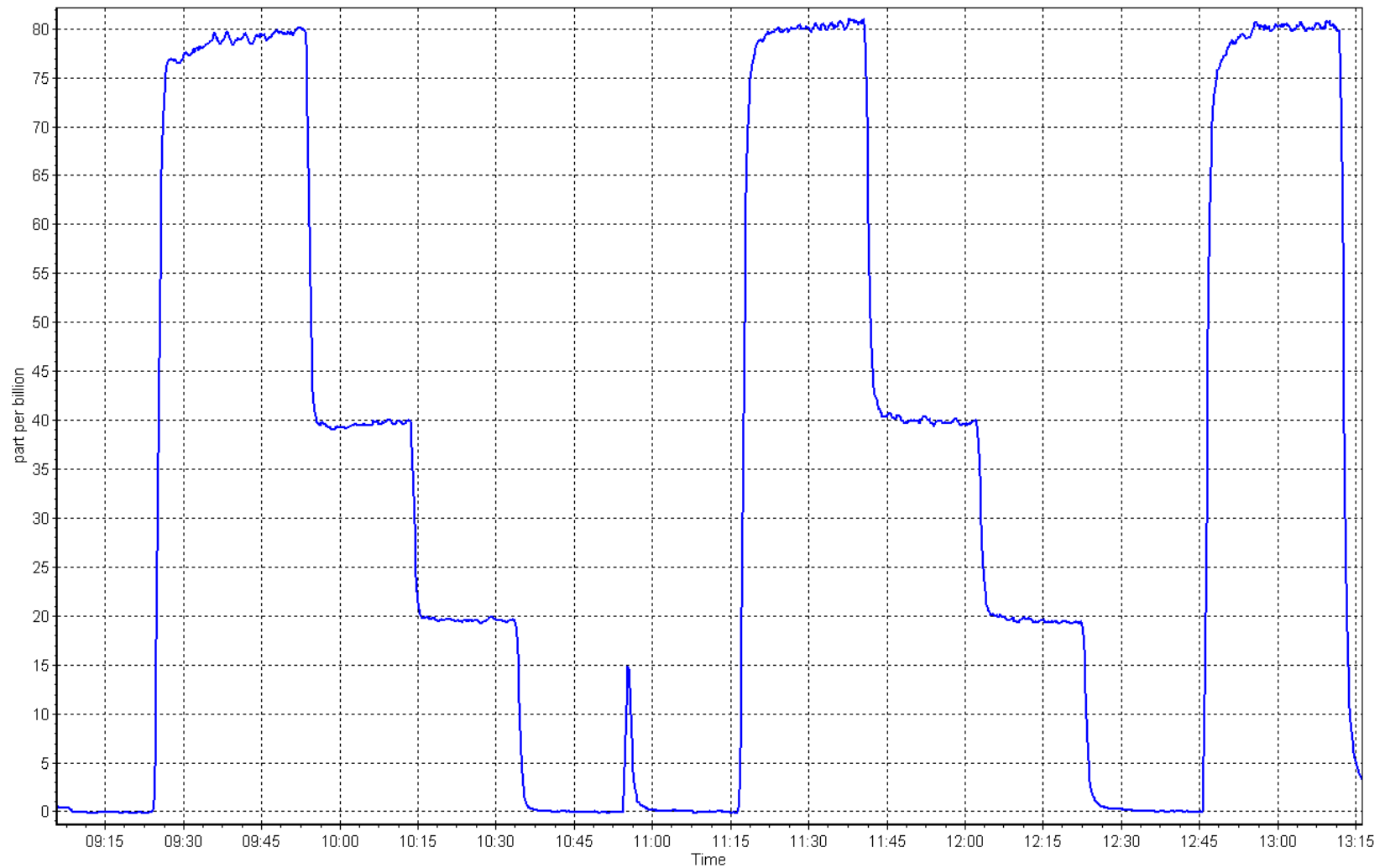
TRS Calibration Curve



TRS Calibration Plot

Date: September 9, 2024

Location: Ells River





Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

Station Information

Station Name: Ells River Station number: AMS 30
Calibration Date: September 3, 2024 Last Cal Date: August 2, 2024
Start time (MST): 9:53 End time (MST): 13:19
Reason: Routine N2 Cylinder change

Calibration Standards

Gas Cert Reference: CC350110 Cal Gas Expiry Date: March 10, 2031
CH₄ Cal Gas Conc. 496.6 ppm CH₄ Equiv Conc. 1066.4 ppm
C₃H₈ Cal Gas Conc. 207.2 ppm
Removed Gas Cert: NA Removed Gas Expiry: NA
Removed CH₄ Conc. 496.6 ppm CH₄ Equiv Conc. 1066.4 ppm
Removed C₃H₈ Conc. 207.2 ppm Diff between cyl (THC):
Diff between cyl (CH₄): Diff between cyl (NM):
Calibrator Model: API T700 Serial Number: 3061
Zero Air Gen model: API T701H Serial Number: 358

Analyzer Information

Analyzer make: Thermo 55i Analyzer serial #: 1152430011
THC Range: 0 - 20 ppm NMHC/CH₄ Range: 0 - 10 ppm

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
CH ₄ SP Ratio:	3.11E-04	3.12E-04	NMHC SP Ratio:	6.04E-05	5.94E-05
CH ₄ Retention time:	17.4	17.6	NMHC Peak Area:	154650	157107
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	82.0	17.49	17.69	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.69	Prev response	17.58	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	82.0	17.49	17.51	0.999
Mid point	4959	41.0	8.74	8.66	1.010
Low point	4980	20.5	4.37	4.29	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	17.49	17.56	0.996
Average Correction Factor					1.009

Notes: Sample inlet filter and N2 cylinder was changed after as founds. Adjusted span only.



Wood Buffalo Environmental Association

THC / CH₄ / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4918	82.0	9.34	9.55	0.979
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.55	Prev response	9.42	*% change	1.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4918	82.0	9.34	9.35	0.999
Mid point	4959	41.0	4.67	4.63	1.010
Low point	4980	20.5	2.34	2.30	1.016
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	9.34	9.42	0.992
Average Correction Factor					1.008

CH₄ As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero))
As found zero	5000	0.0	0.00	0.00	Limit = 0.90-1.10
As found High point	4918	82.0	8.14	8.14	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.14	Prev response	8.16	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH₄ Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
Calibrator zero	5000	0.0	0.00	0.00	Limit = 0.95-1.05
High point	4918	82.0	8.14	8.15	0.999
Mid point	4959	41.0	4.07	4.03	1.009
Low point	4980	20.5	2.04	1.99	1.022
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	8.14	8.15	1.000
Average Correction Factor					1.010

Calibration Statistics

	Start	Finish
THC Cal Slope:	1.007600	1.002067
THC Cal Offset:	-0.038123	-0.052625
CH ₄ Cal Slope:	1.005483	1.002123
CH ₄ Cal Offset:	-0.028141	-0.026119
NMHC Cal Slope:	1.009237	1.001810
NMHC Cal Offset:	-0.009383	-0.025907

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

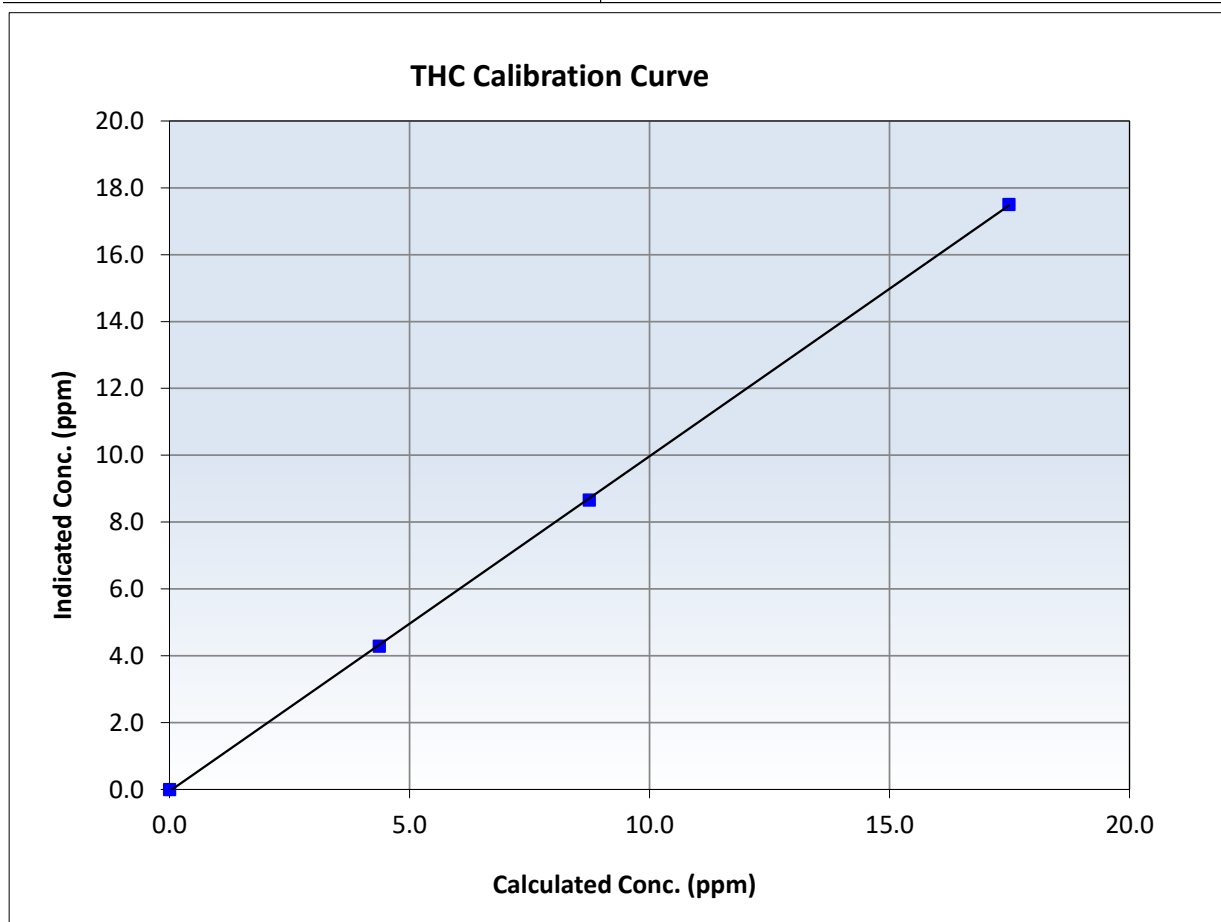
THC Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 2, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:53	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999953	<i>≥0.995</i>
17.49	17.51	0.9990	Slope	1.002067	<i>0.90 - 1.10</i>
8.74	8.66	1.0099	Intercept	-0.052625	<i>+/-0.5</i>
4.37	4.29	1.0186			





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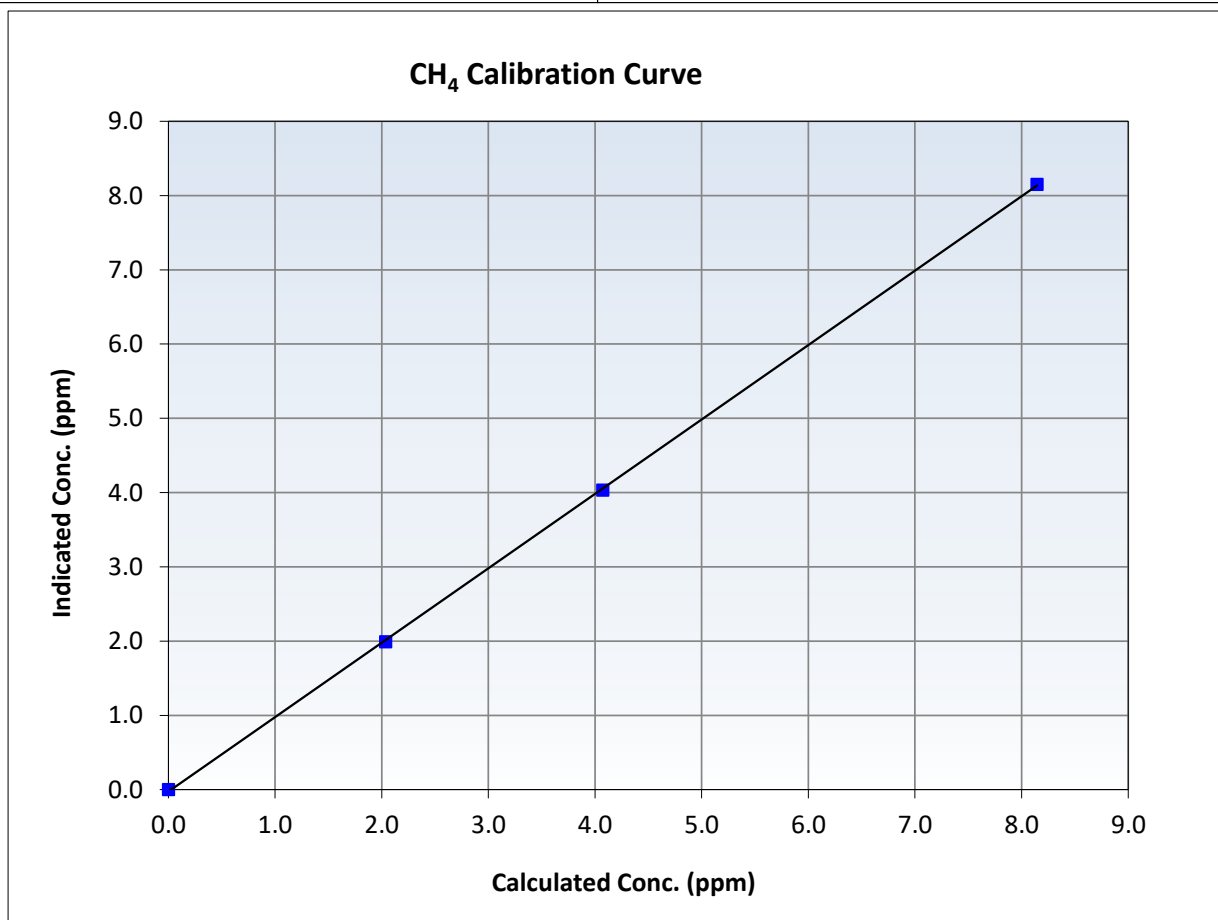
CH₄ Calibration Summary

Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 2, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:53	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<i>Limits</i>
0.00	0.00	----	Correlation Coefficient	0.999951	<i>≥0.995</i>
8.14	8.15	0.9992	Slope	1.002123	<i>0.90 - 1.10</i>
4.07	4.03	1.0094	Intercept	-0.026119	<i>+/-0.5</i>
2.04	1.99	1.0215			





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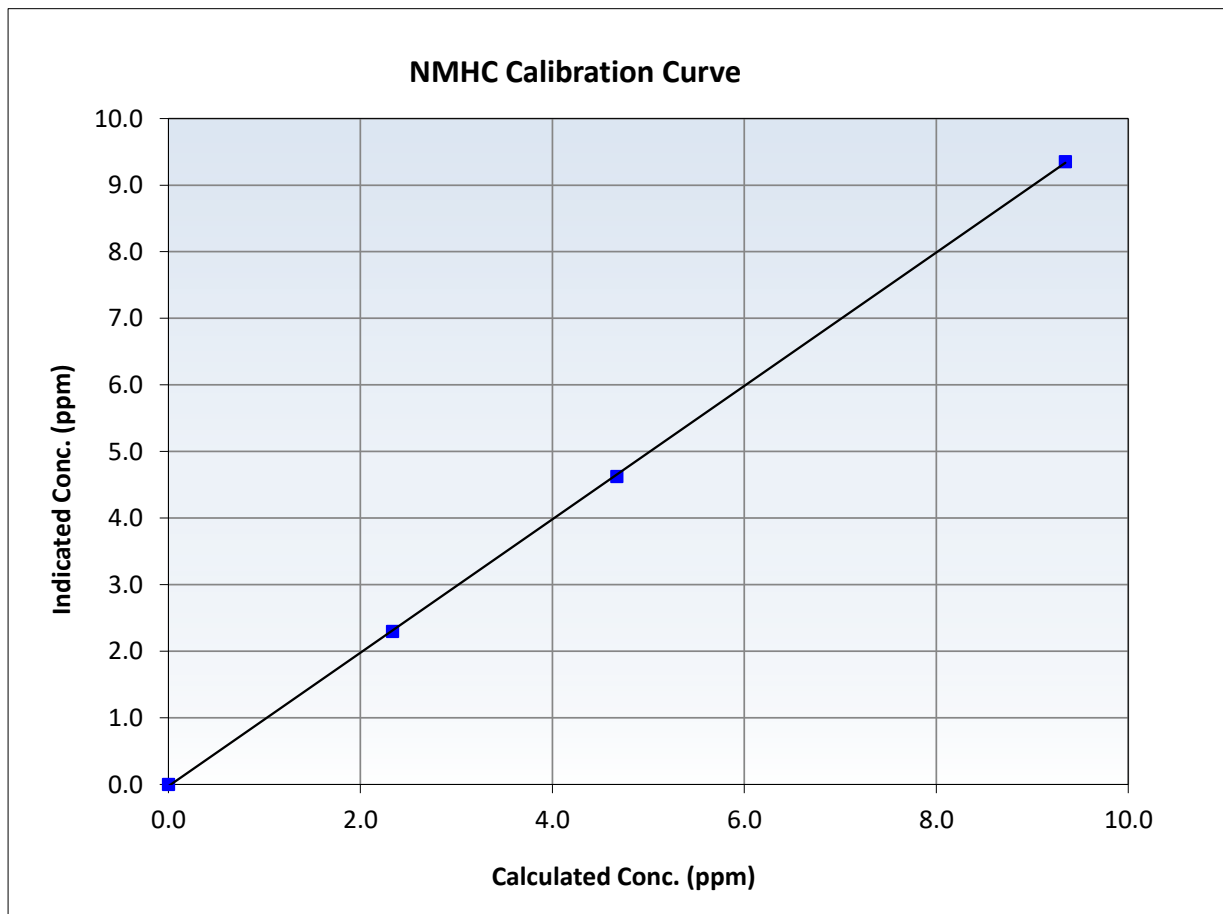
NMHC Calibration Summary

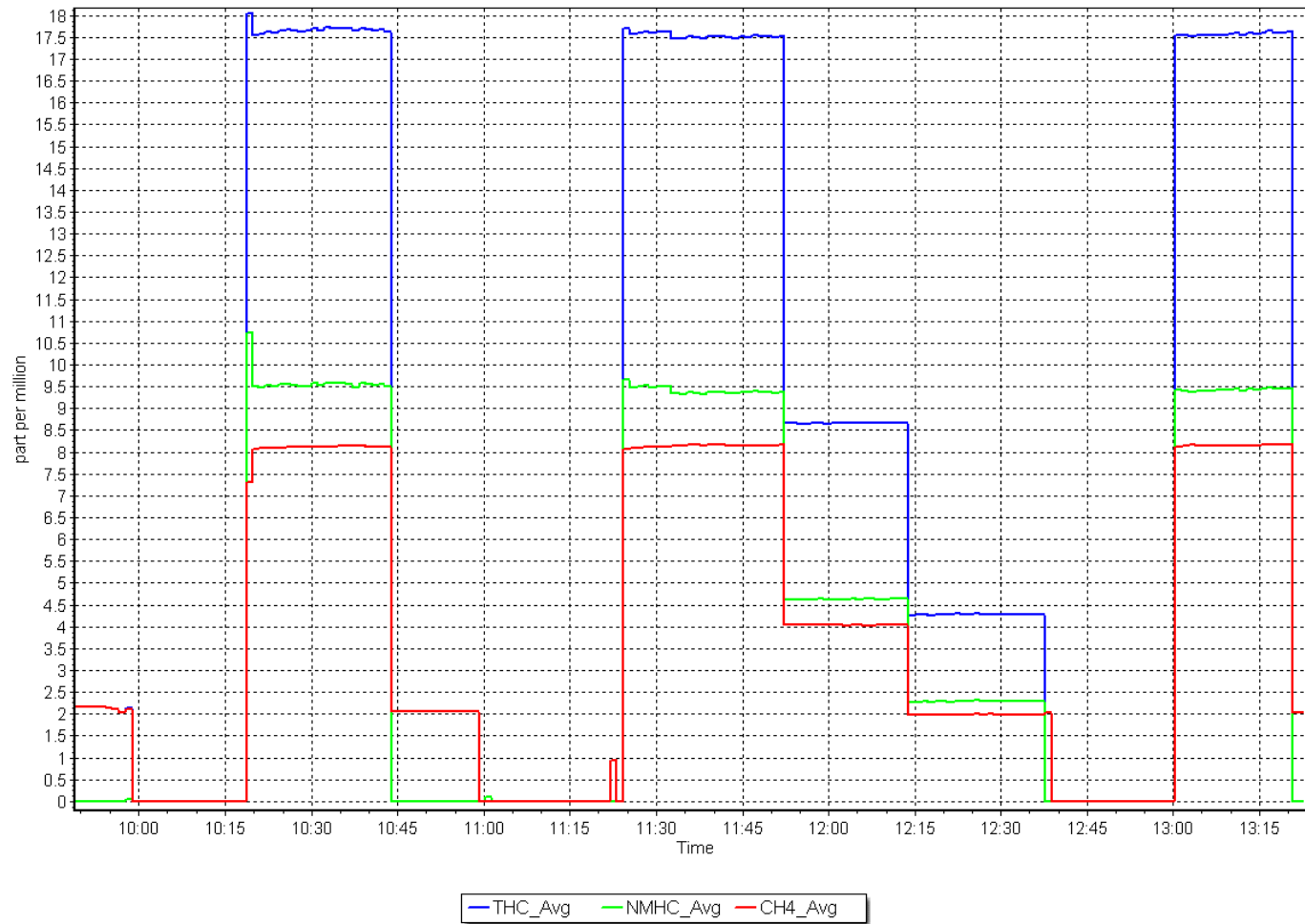
Station Information

Calibration Date:	September 3, 2024	Previous Calibration:	August 2, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:53	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999957	≥ 0.995
9.34	9.35	0.9990	Slope	1.001810	$0.90 - 1.10$
4.67	4.63	1.0100	Intercept	-0.025907	± 0.5
2.34	2.30	1.0161			







Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Ells River
Station number: AMS 30
Calibration Date: September 20, 2024
Last Cal Date: August 14, 2024
Start time (MST): 9:17
End time (MST): 13:51
Reason: Routine

Calibration Standards

NO Gas Cylinder #: DT0027487
NOX Cal Gas Conc: 59.30 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 59.30 ppm
NOX gas Diff:
Calibrator Model: API T700
ZAG make/model: API T701H
Cal Gas Expiry Date: January 9, 2032
NO Cal Gas Conc: 59.10 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 59.10 ppm
NO gas Diff:
Serial Number: 3061
Serial Number: 358

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.3	----	----
AF High point	4932	67.7	803.0	800.3	2.7	815.7	814.0	1.8	0.9838	0.9829
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 800.4 ppb	NO = 800.3 ppb				* = > +/-5% change initiates investigation		*Percent Change	NO _x = 1.9%	
Baseline Corr 1st pt	NO _x = 816.2 ppb	NO = 814.2 ppb				<u>As Found Statistics</u>		*Percent Change	NO = 1.7%	
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb				As found	NO _x r ² :	Nx SI:	Nx Int:	
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb				As found	NO r ² :	NO SI:	NO Int:	
						As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 710321429

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.131	1.115	NO bkgnd or offset:	13.4	13.3
NOX coeff or slope:	0.989	0.994	NOX bkgnd or offset:	13.6	13.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	194.8	192.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.998122	1.002805
NO _x Cal Offset:	-1.038768	-1.457944
NO Cal Slope:	1.002816	1.003673
NO Cal Offset:	-2.199183	-2.299233
NO ₂ Cal Slope:	0.992113	1.000116
NO ₂ Cal Offset:	0.037735	0.247288

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.2	----	----
High point	4932	67.7	803.0	800.3	2.7	804.3	802.0	2.4	0.9983	0.9978
Mid point	4966	33.8	400.9	399.5	1.4	400.3	397.9	2.4	1.0015	1.0041
Low point	4983	16.9	200.4	199.8	0.7	197.9	195.4	2.5	1.0128	1.0223
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.3	----	----
As left span	4932	67.7	803.0	387.5	415.5	806.4	387.5	418.8	0.9957	1.0000
Average Correction Factor									1.0042	1.0081

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	799.5	384.9	417.3	417.3	1.0000	100.0%
Mid GPT point	799.5	588.8	213.4	214.1	0.9968	100.3%
Low GPT point	799.5	689.8	112.4	113.0	0.9948	100.5%
Average Correction Factor					0.9972	100.3%

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

Calibration Performed By: Jan Castro



Wood Buffalo Environmental Association

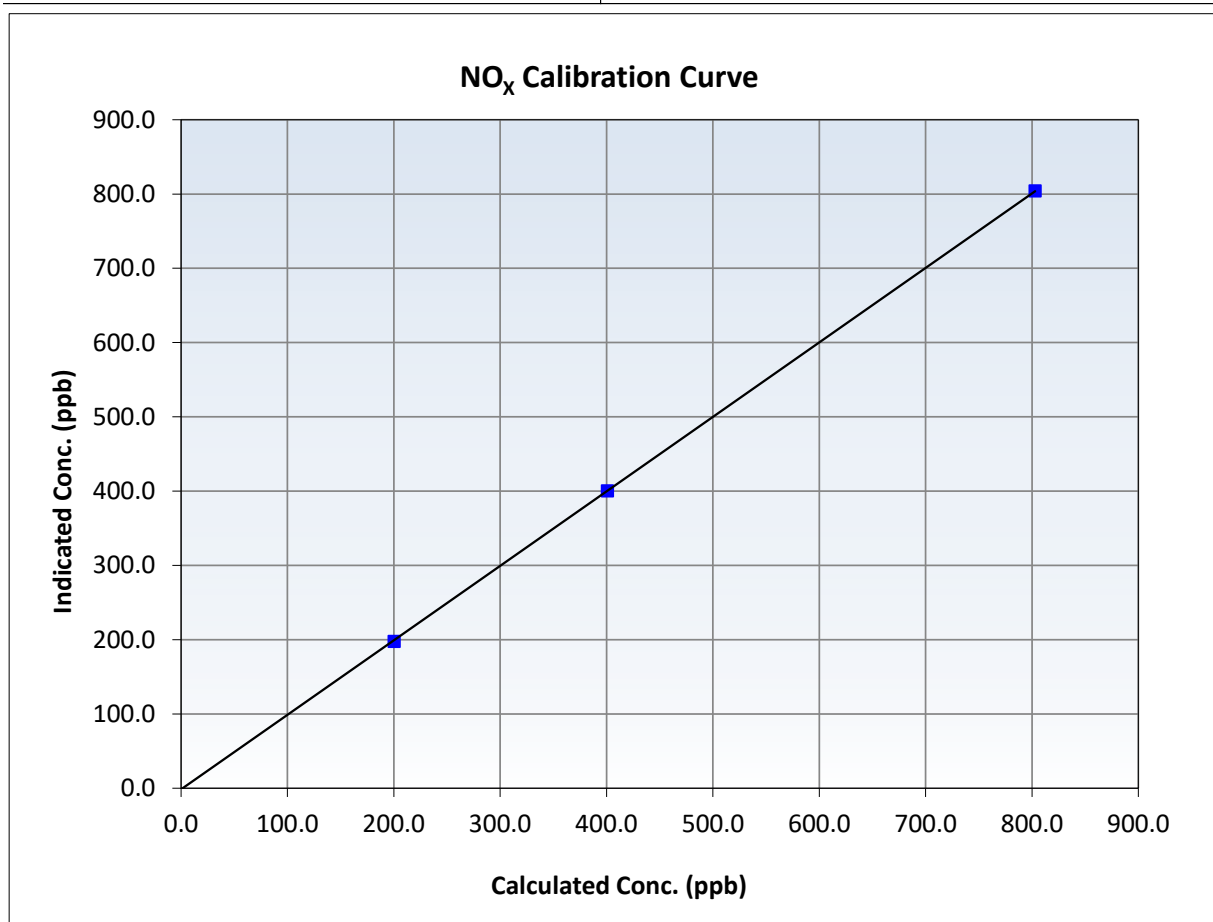
NO_x Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 14, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:17	End Time (MST):	13:51
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

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	0.999986	≥0.995
803.0	804.3	0.9983	Slope	1.002805	0.90 - 1.10
400.9	400.3	1.0015	Intercept	-1.457944	+/-20
200.4	197.9	1.0128			





Wood Buffalo Environmental Association

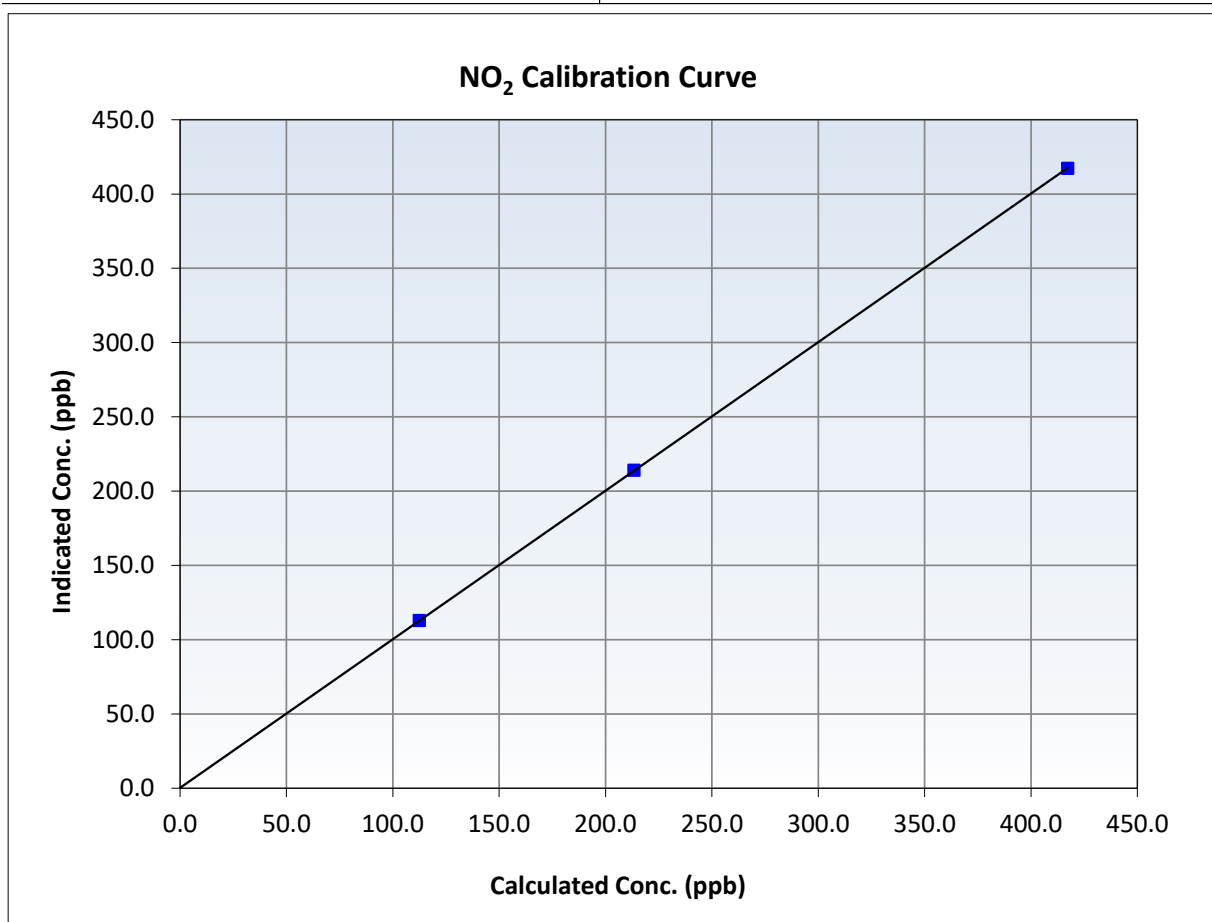
NO₂ Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 14, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:17	End Time (MST):	13:51
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.2	----	Correlation Coefficient	0.999994	≥0.995
417.3	417.3	1.0000	Slope	1.000116	0.90 - 1.10
213.4	214.1	0.9968	Intercept	0.247288	+/-20
112.4	113.0	0.9948			





Wood Buffalo Environmental Association

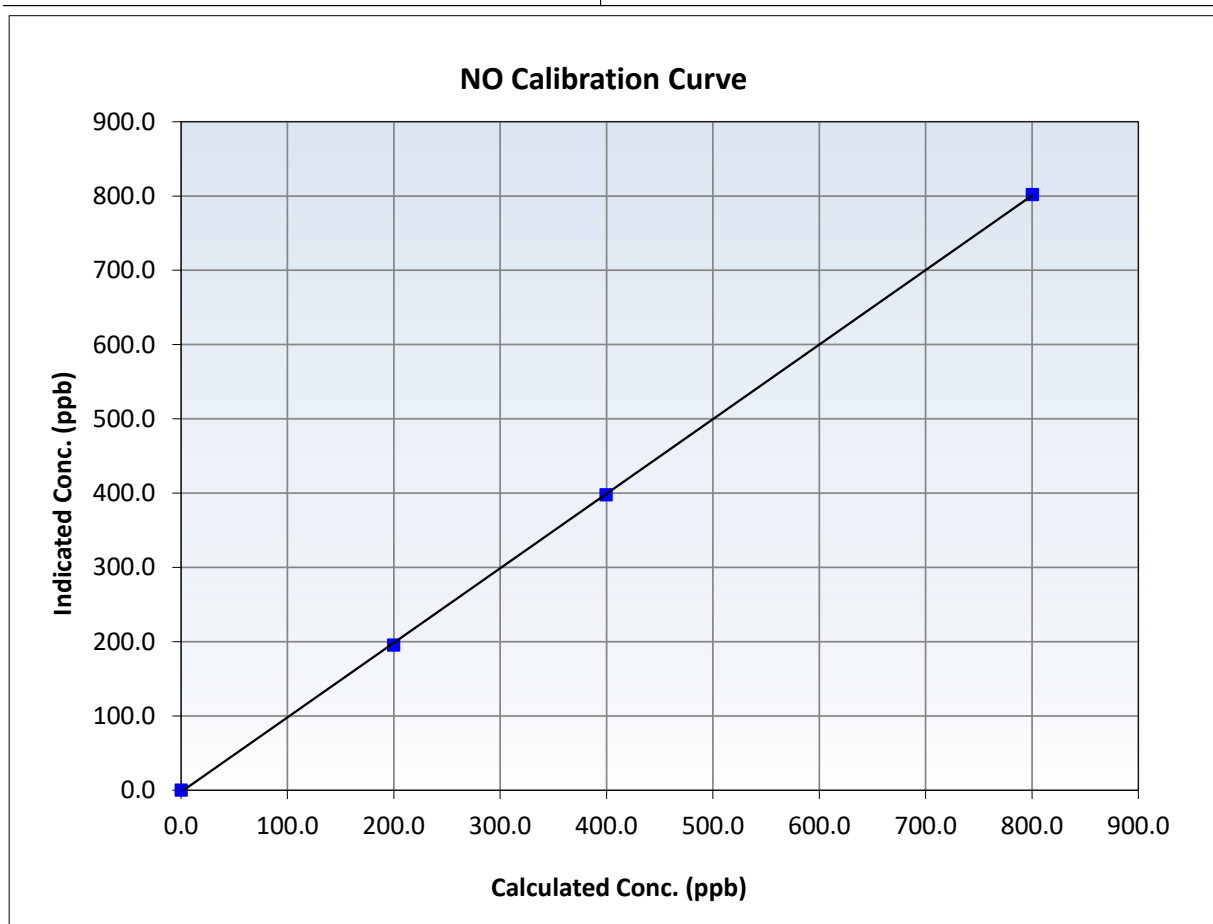
NO Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 14, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:17	End Time (MST):	13:51
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

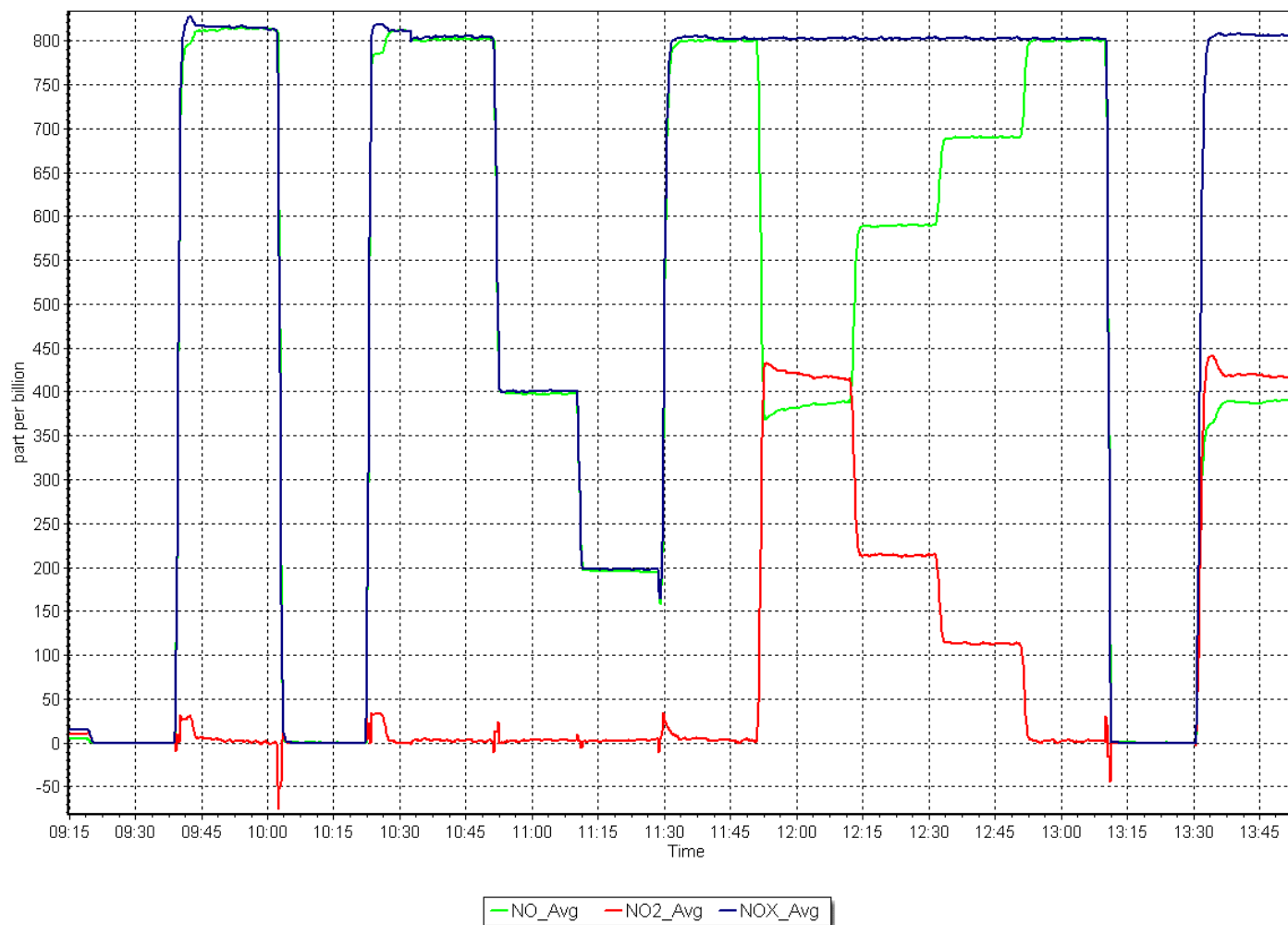
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.2	----	Correlation Coefficient	0.999955	≥ 0.995
800.3	802.0	0.9978	Slope	1.003673	$0.90 - 1.10$
399.5	397.9	1.0041	Intercept	-2.299233	± 20
199.8	195.4	1.0223			



NO_x Calibration Plot

Date: September 20, 2024

Location: Ells River





Wood Buffalo Environmental Association

T640 PM_{2.5} CALIBRATION

Version-01-2024

Station Information

Station Name: Ells River Station number: AMS 30
Calibration Date: September 20, 2024 Last Cal Date: August 14, 2024
Start time (MST): 11:34 End time (MST): 11:57

Analyzer Make: API T640 S/N: 875
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 Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	15.10	14.58	15.10	☐	+/- 2 °C
P (mmHg)	727.10	728.96	727.10	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.07	5.01	☐	+/- 0.25 LPM
PW% (pump)	38	----	38	☐	>80%
Zero Verification	PM w/o HEPA: 7.60		PM w/ HEPA: 0.00		<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

SPAN DUST Refractive Index: 10.90 Expiry Date: September 29, 2024
Lot No.: 100128-050-040

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test				☐	+/- 0.5

Date Optical Chamber Cleaned: August 14, 2024
Date Disposable Filter Changed: August 14, 2024

Post- maintenance Zero Verification: PM w/ HEPA: <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: October 27, 2023
Date RH/T Sensor Cleaned: February 23, 2024

Notes: Verified flow, temperature, pump power and pressure No adjustment made. Leak check passed.

Calibration by: Jan Castro



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS506
JACKFISH 1
SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Jackfish 1 Station number: AMS 506
Calibration Date: September 19, 2024 Last Cal Date: August 14, 2024
Start time (MST): 8:36 End time (MST): 11:42
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.52 ppm Cal Gas Exp Date: December 29, 2028
Cal Gas Cylinder #: CC274266
Removed Cal Gas Conc: 50.52 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 2659
Zero Air Gen Model: Teledyne API T701 Serial Number: 4427

Analyzer Information

Analyzer make: Thermo 43i Serial Number: 1160290011
Analyzer Range: 0-1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002486	1.002986	Backgd or Offset:	19.0	20.0
Calibration intercept:	0.123917	-0.576059	Coeff or Slope:	0.970	0.970

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.5	----
As found High point	4921	79.2	800.2	799.6	1.001
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	799.1	Previous response	802.3	*% 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	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4921	79.2	800.2	802.0	0.998
Mid point	4960	39.6	400.2	401.1	0.998
Low point	4980	19.8	200.1	199.5	1.003
As left zero	5000	0.0	0.0	-0.3	----
As left span	4921	79.2	800.2	799.6	1.001
Average Correction Factor:					0.999

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

SO₂ Calibration Summary

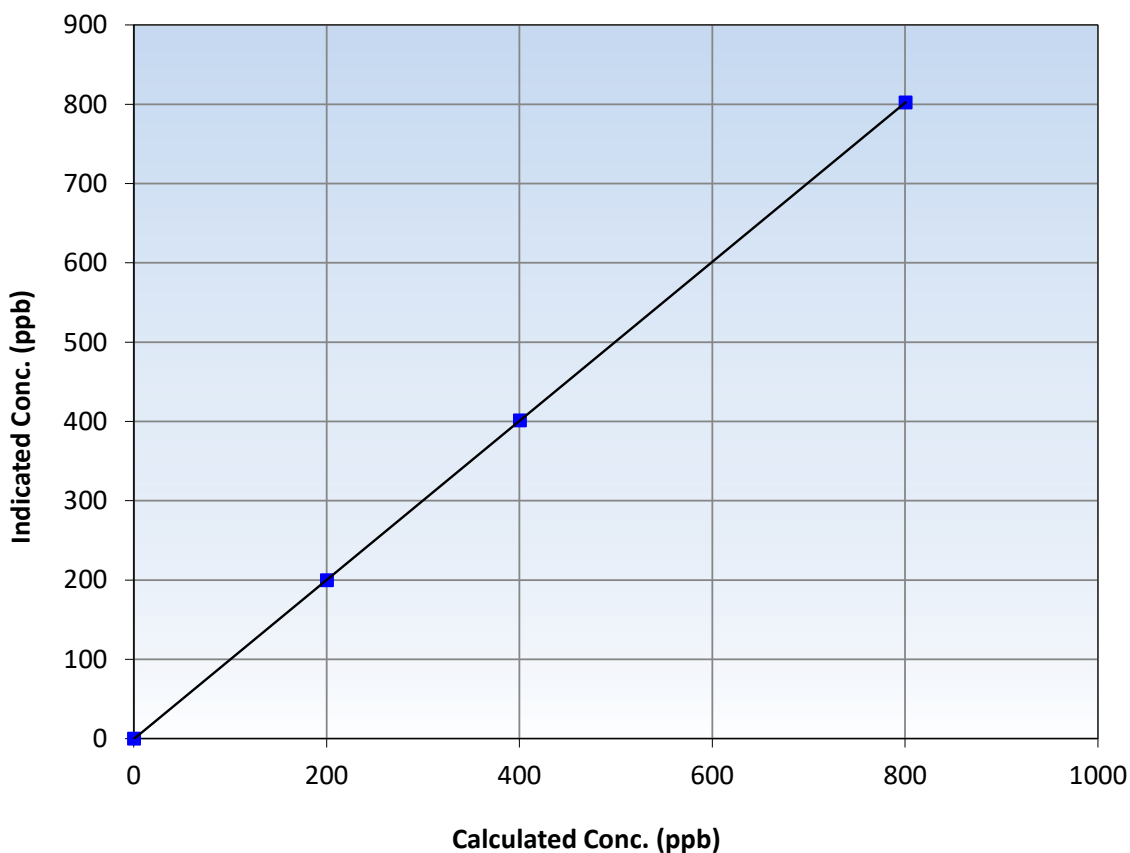
Station Information

Calibration Date:	September 19, 2024	Previous Calibration:	August 14, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	8:36	End Time (MST):	11:42
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290011

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	0.999998		≥0.995
800.2	802.0	0.9978	Slope	1.002986		0.90 - 1.10
400.2	401.1	0.9976	Intercept	-0.576059		+/-30
200.1	199.5	1.0028				

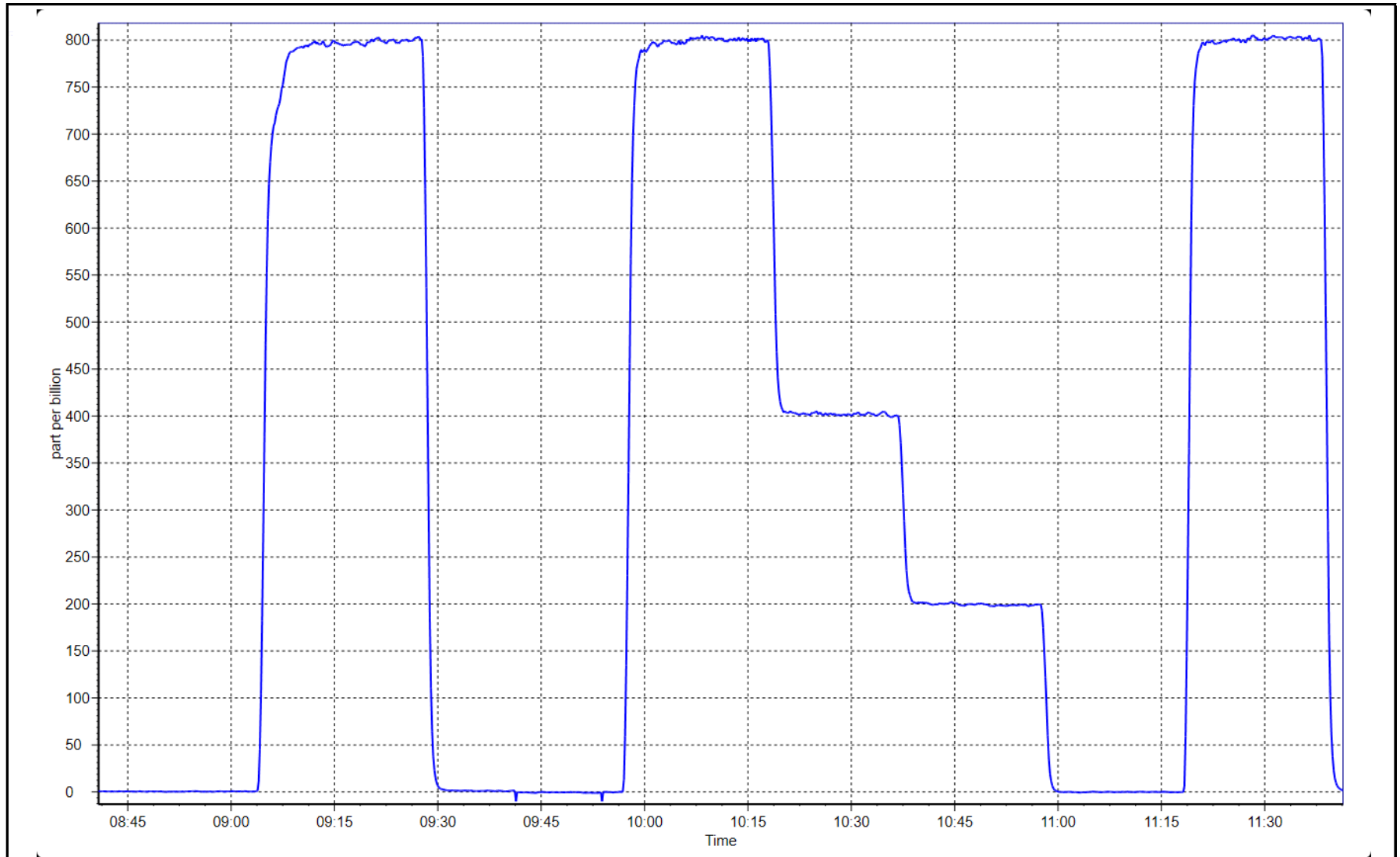
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 19, 2024

Location: Jackfish 1





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Jackfish 1
Calibration Date: September 18, 2024
Start time (MST): 8:53
Reason: Routine

Station number: AMS 506
Last Cal Date: August 13, 2024
End time (MST): 12:57

Calibration Standards

Cal Gas Concentration: 5.14 ppm
Cal Gas Cylinder #: CC511843
Removed Cal Gas Conc: 5.14 ppm
Removed Gas Cyl #: NA
Calibrator Make/Model: Teledyne 750
ZAG Make/Model: Teledyne 751H

Cal Gas Exp Date: September 16, 2024
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 282
Serial Number: 321

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: Global G150
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1180540020
Converter serial #: 2022-218
Converter Temp: 325.0 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001429	0.992715	Backgd or Offset:	3.48
Calibration intercept:	-0.278286	-0.198477	Coeff or Slope:	1.103

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.3	----
As found High point	4922	77.8	80.0	79.0	1.009
As found Mid point	4961	38.9	40.0	39.5	1.005
As found Low point	4981	19.4	19.9	19.5	1.007
New cylinder response					
Baseline Corr As found:	79.3	Prev response:	79.82	*% change:	-0.7%
Baseline Corr 2nd AF pt:	39.8	AF Slope:	0.991572	AF Intercept:	-0.258512
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4922	77.8	80.0	79.1	1.011
Mid point	4961	38.9	40.0	39.7	1.007
Low point	4981	19.4	19.9	19.6	1.017
As left zero	5000	0.0	0.0	-0.3	----
As left span	4922	77.8	80.0	79.5	1.006
SO2 Scrubber Check	4921	79.2	800.2	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.012
Date of last converter efficiency test:					

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

Calibration Performed By: Sean Bala



Wood Buffalo Environmental Association

H2S Calibration Summary

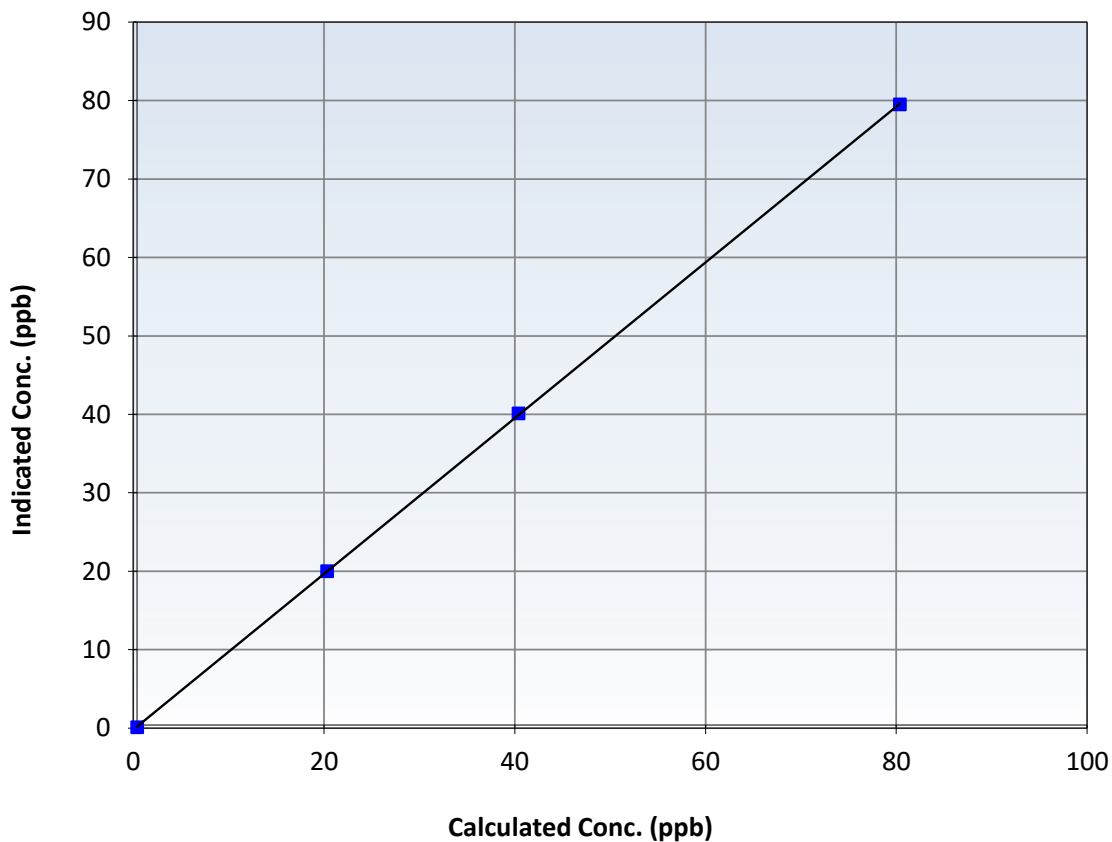
Station Information

Calibration Date:	September 18, 2024	Previous Calibration:	August 13, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	8:53	End Time (MST):	12:57
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540020

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3	----	Correlation Coefficient	0.999983	≥ 0.995
80.0	79.1	1.0111	Slope	0.992715	$0.90 - 1.10$
40.0	39.7	1.0073	Intercept	-0.198477	± 3
19.9	19.6	1.0174			

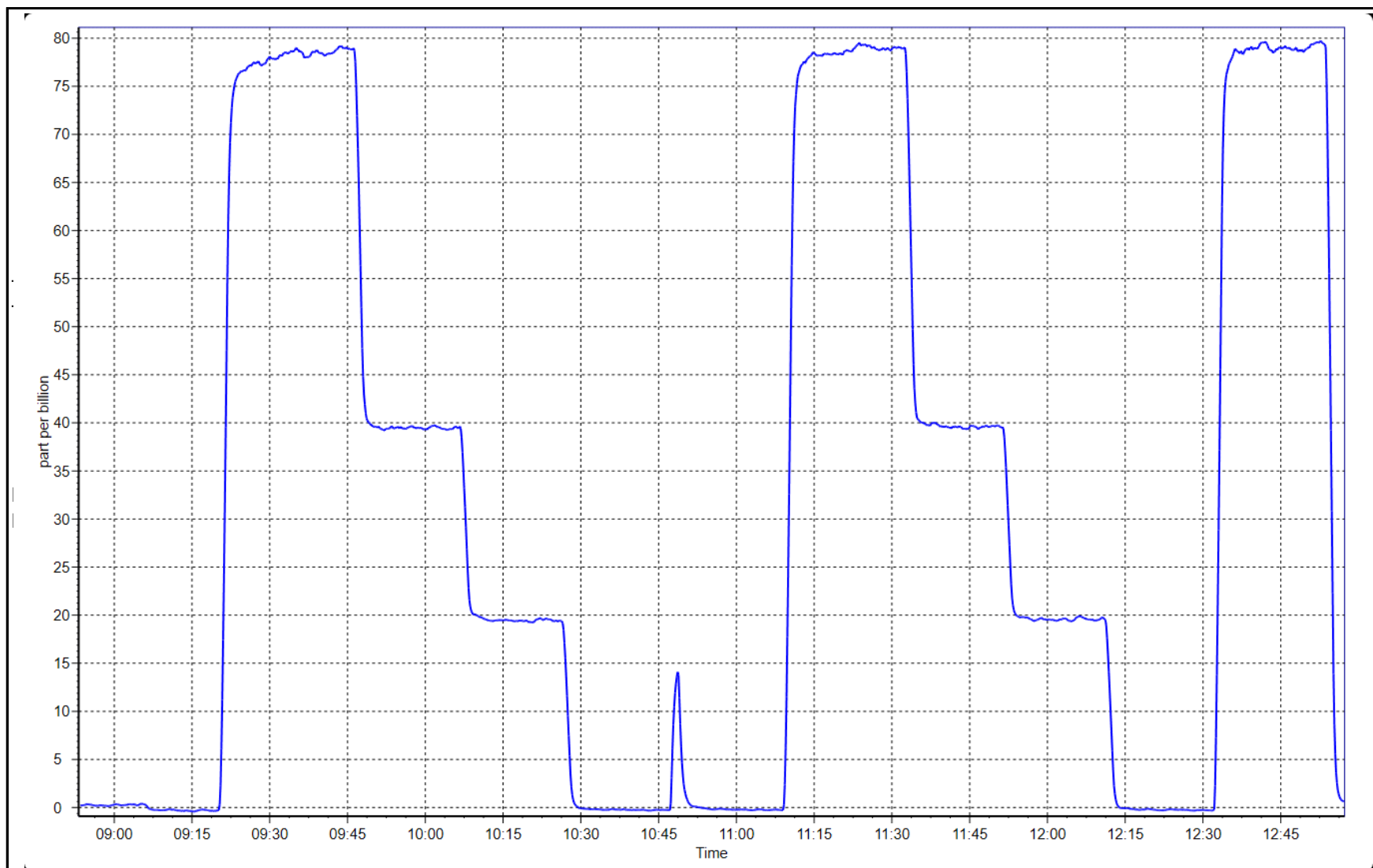
H₂S Calibration Curve



H2S Calibration Plot

Date: September 18, 2024

Location: Jackfish 1



0



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Jackfish 1
Station number: AMS 506
Calibration Date: September 24, 2024
Last Cal Date: August 21, 2024
Start time (MST): 8:21
End time (MST): 11:10
Reason: As Found

Calibration Standards

NO Gas Cylinder #: T26811M
NOX Cal Gas Conc: 47.46 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 47.46 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T750
ZAG make/model: Teledyne API T751H
Cal Gas Expiry Date: October 30, 2024
NO Cal Gas Conc: 47.39 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 47.39 ppm
NO gas Diff:
Serial Number: 282
Serial Number: 321

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.2	----	----
AF High point	4916	84.4	801.1	799.9	1.2	817.0	813.0	3.9	0.9806	0.9839
AF Mid point	4958	42.2	400.5	400.0	0.6	404.7	400.6	4.1	0.9900	0.9984
AF Low point	4979	21.1	200.3	200.0	0.3	197.3	194.2	3.1	1.0156	1.0298
New cyl resp										
Previous Response	NO _x = 801.5 ppb	NO = 798.9 ppb	* = > +/-5% change initiates investigation				*Percent Change		NO _x = 1.9%	
Baseline Corr 1st pt	NO _x = 816.9 ppb	NO = 813.0 ppb	<u>As Found Statistics</u>				*Percent Change		NO = 1.7%	
Baseline Corr 2nd pt	NO _x = 404.6 ppb	NO = 400.6 ppb	As found NO _x r ² : 0.999911				Nx SI: 1.022233		Nx Int: -3.488	
Baseline Corr 3rd pt	NO _x = 197.2 ppb	NO = 194.2 ppb	As found NO r ² : 0.999841				NO SI: 1.019442		NO Int: -4.808	
			As found NO ₂ r ² : 0.999988				NO ₂ SI: 1.004063		NO ₂ Int: 0.862	

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero	----	----	0.0	0.2	----	----
As found high GPT point	810.0	406.0	405.2	407.4	0.9946	100.5%
As found mid GPT point	810.0	620.0	191.2	193.1	0.9901	101.0%
As found low GPT point	810.0	716.2	95.0	96.9	0.9802	102.0%



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1218153356

Instrument Settings

	<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.275	
NOX coeff or slope:	0.989	
NO2 coeff or slope:	1.000	

	<u>Start</u>	<u>Finish</u>
NO bkgnd or offset:	3.7	
NOX bkgnd or offset:	3.6	
Reaction cell Press:	168.9	

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004514	
NO _x Cal Offset:	-3.127986	
NO Cal Slope:	1.004483	
NO Cal Offset:	-4.547947	
NO ₂ Cal Slope:	1.000791	
NO ₂ Cal Offset:	-0.274265	

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
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Cal zero
High point
Mid point
Low point
As left zero
As left span

Average Correction Factor

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
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Cal zero
High GPT point
Mid GPT point
Low GPT point

Average Correction Factor

Notes:

Changed capillaries and o-rings. Will continue calibration tomorrow.

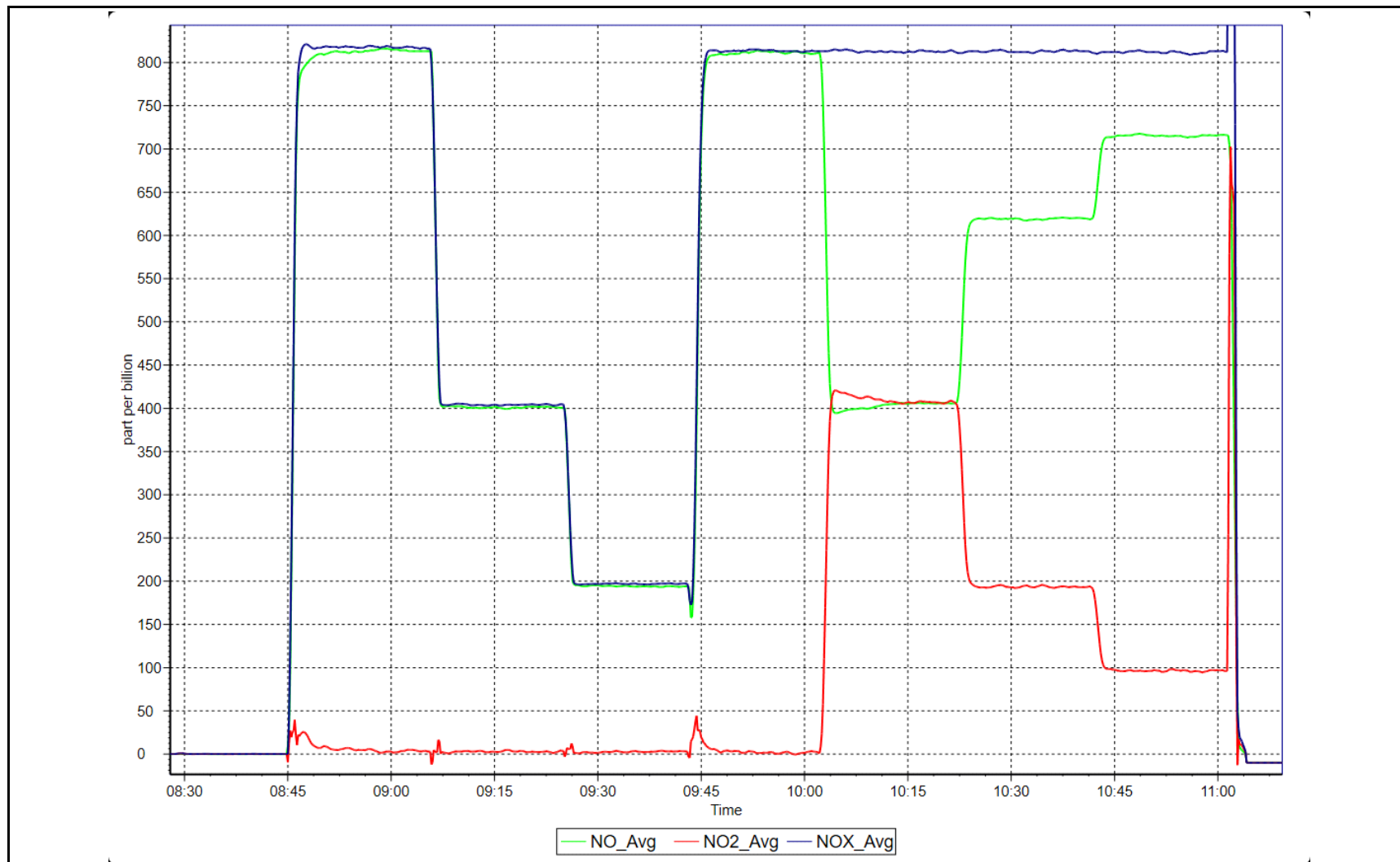
Calibration Performed By:

Sean Bala

NO_x Calibration Plot

Date: September 24, 2024

Location: Jackfish 1





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Jackfish 1
Station number: AMS 506
Calibration Date: September 25, 2024
Last Cal Date: September 24, 2024
Start time (MST): 8:26
End time (MST): 12:26
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T26811M
NOX Cal Gas Conc: 47.46 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 47.46 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T750
ZAG make/model: Teledyne API T751H
Cal Gas Expiry Date: October 30, 2024
NO Cal Gas Conc: 47.39 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 47.39 ppm
NO gas Diff:
Serial Number: 282
Serial Number: 321

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
-----------	------------------------------	--------------------------------	---	--	---	--	---	--	--	---

As found zero
AF High point
AF Mid point
AF Low point
New cyl resp

Previous Response	NO _x = NA	ppb	NO = NA	ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = NA
Baseline Corr 1st pt	NO _x = NA	ppb	NO = NA	ppb	<u>As Found Statistics</u>		*Percent Change	NO = NA
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:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
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As Found GPT zero
As found high GPT point
As found mid GPT point
As found low GPT point



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1218153356

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.275	1.726	NO bkgnd or offset:	3.7	5.3
NOX coeff or slope:	0.989	0.989	NOX bkgnd or offset:	3.6	6.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	168.9	167.4

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.004514	0.999207
NO _x Cal Offset:	-3.127986	-0.368015
NO Cal Slope:	1.004483	0.998897
NO Cal Offset:	-4.547947	-1.267980
NO ₂ Cal Slope:	1.000791	1.003530
NO ₂ Cal Offset:	-0.274265	0.120234

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
High point	4916	84.4	801.1	799.9	1.2	799.5	797.7	1.7	1.0020	1.0027
Mid point	4958	42.2	400.5	400.0	0.6	401.8	399.6	2.2	0.9969	1.0009
Low point	4979	21.1	200.3	200.0	0.3	198.1	195.9	2.2	1.0110	1.0208
As left zero	5000	0.0	0.0	0.0	0.0	0.6	0.0	0.7	----	----
As left span	4916	84.4	801.1	413.3	387.8	811.0	413.3	397.4	0.9877	1.0000
Average Correction Factor									1.0033	1.0082

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	798.7	407.5	392.4	394.0	0.9959	100.4%
Mid GPT point	798.7	611.8	188.1	188.3	0.9988	100.1%
Low GPT point	798.7	707.7	92.2	93.3	0.9880	101.2%
Average Correction Factor					0.9942	100.6%

Notes:

Adjusted zero and span.

Calibration Performed By:

Sean Bala



Wood Buffalo Environmental Association

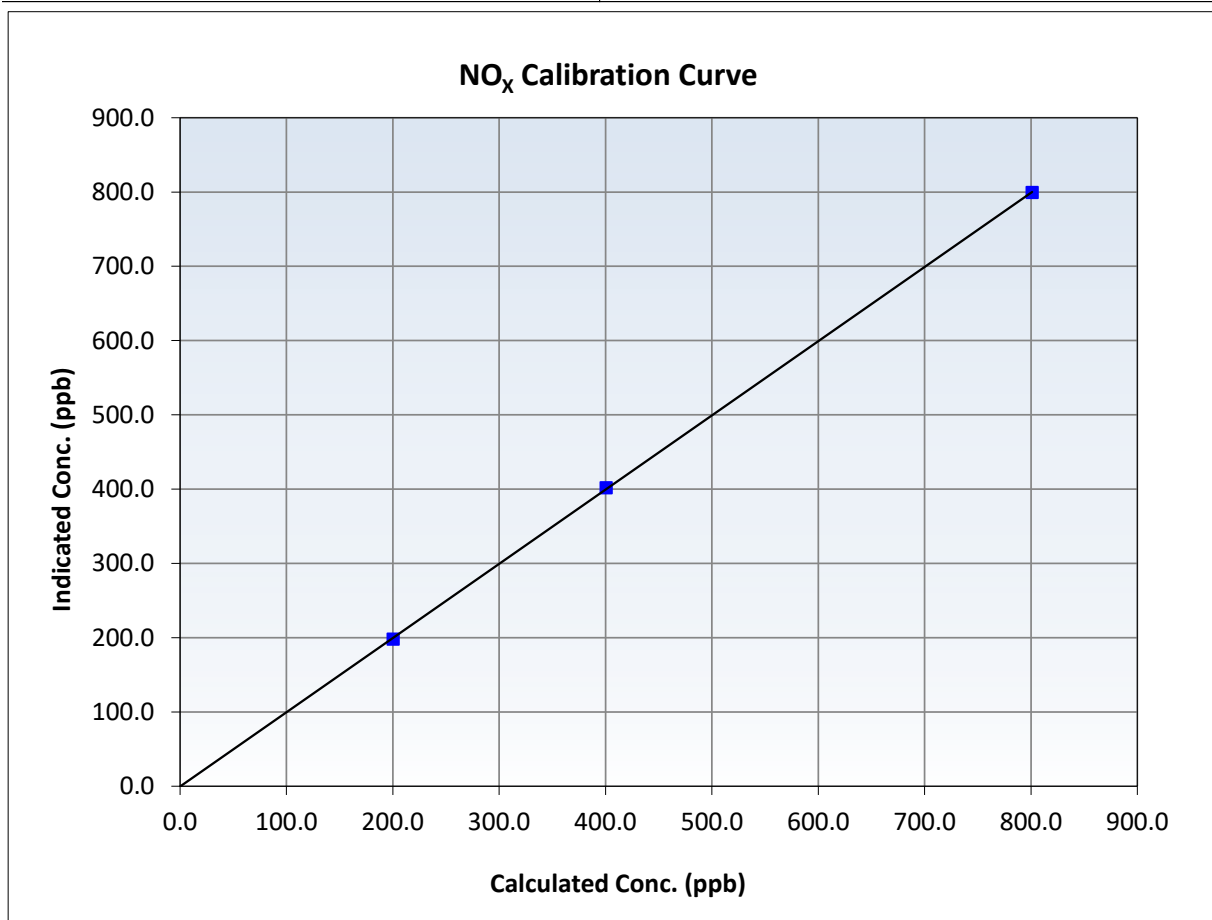
NO_x Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 24, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	8:26	End Time (MST):	12:26
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

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	0.999980	≥ 0.995
801.1	799.5	1.0020	Slope	0.999207	$0.90 - 1.10$
400.5	401.8	0.9969	Intercept	-0.368015	± 20
200.3	198.1	1.0110			





Wood Buffalo Environmental Association

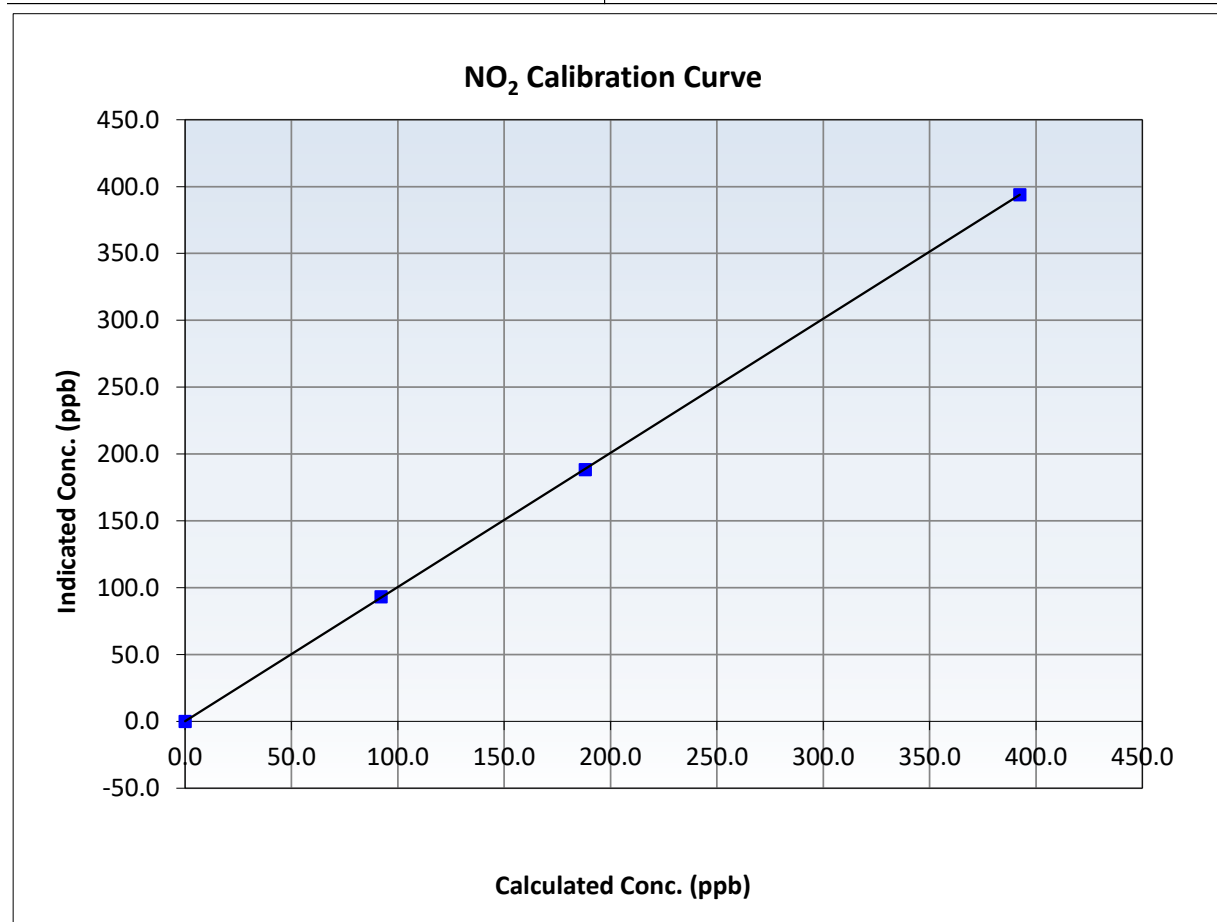
NO₂ Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 24, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	8:26	End Time (MST):	12:26
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

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	0.999990	≥ 0.995
392.4	394.0	0.9959	Slope	1.003530	$0.90 - 1.10$
188.1	188.3	0.9988	Intercept	0.120234	± 20
92.2	93.3	0.9880			





Wood Buffalo Environmental Association

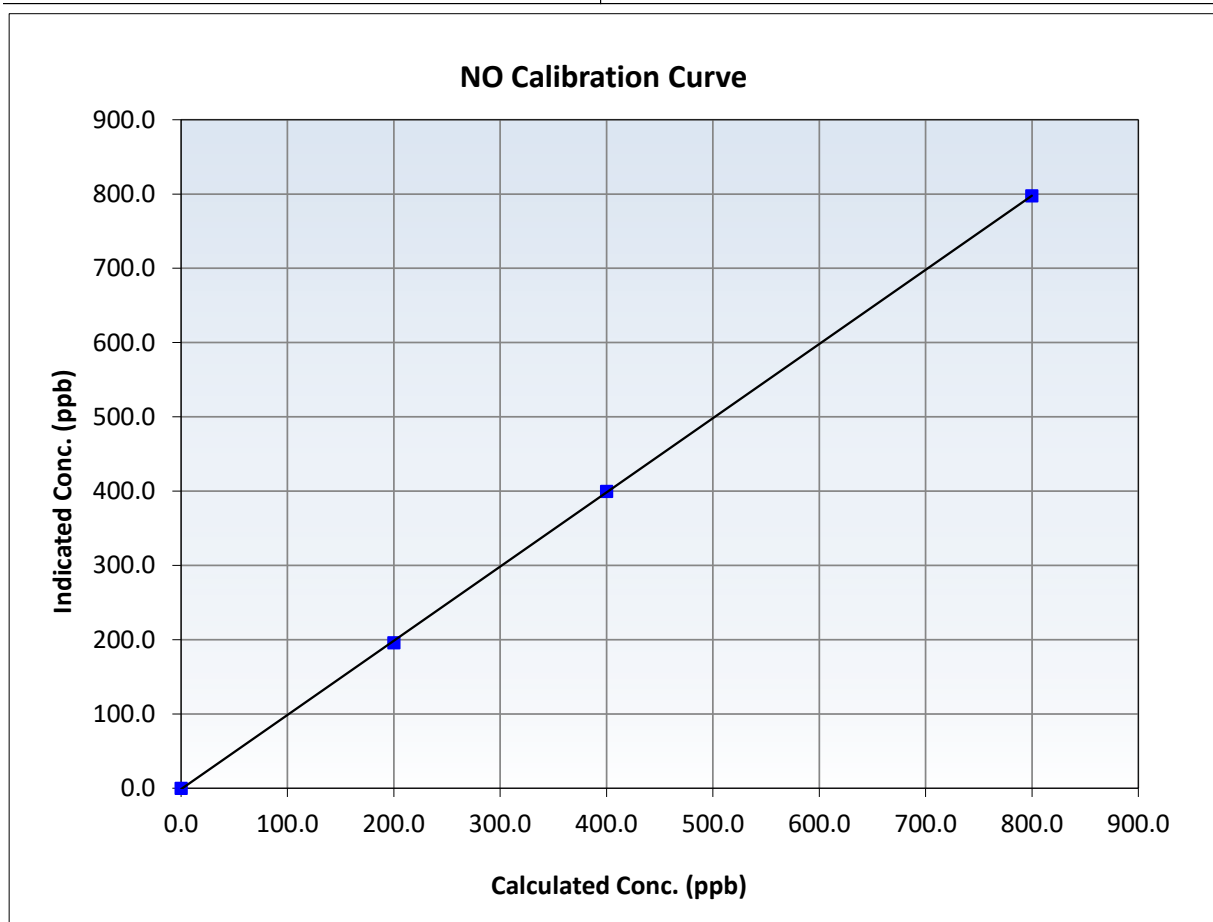
NO Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	September 24, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	8:26	End Time (MST):	12:26
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

Calibration Data

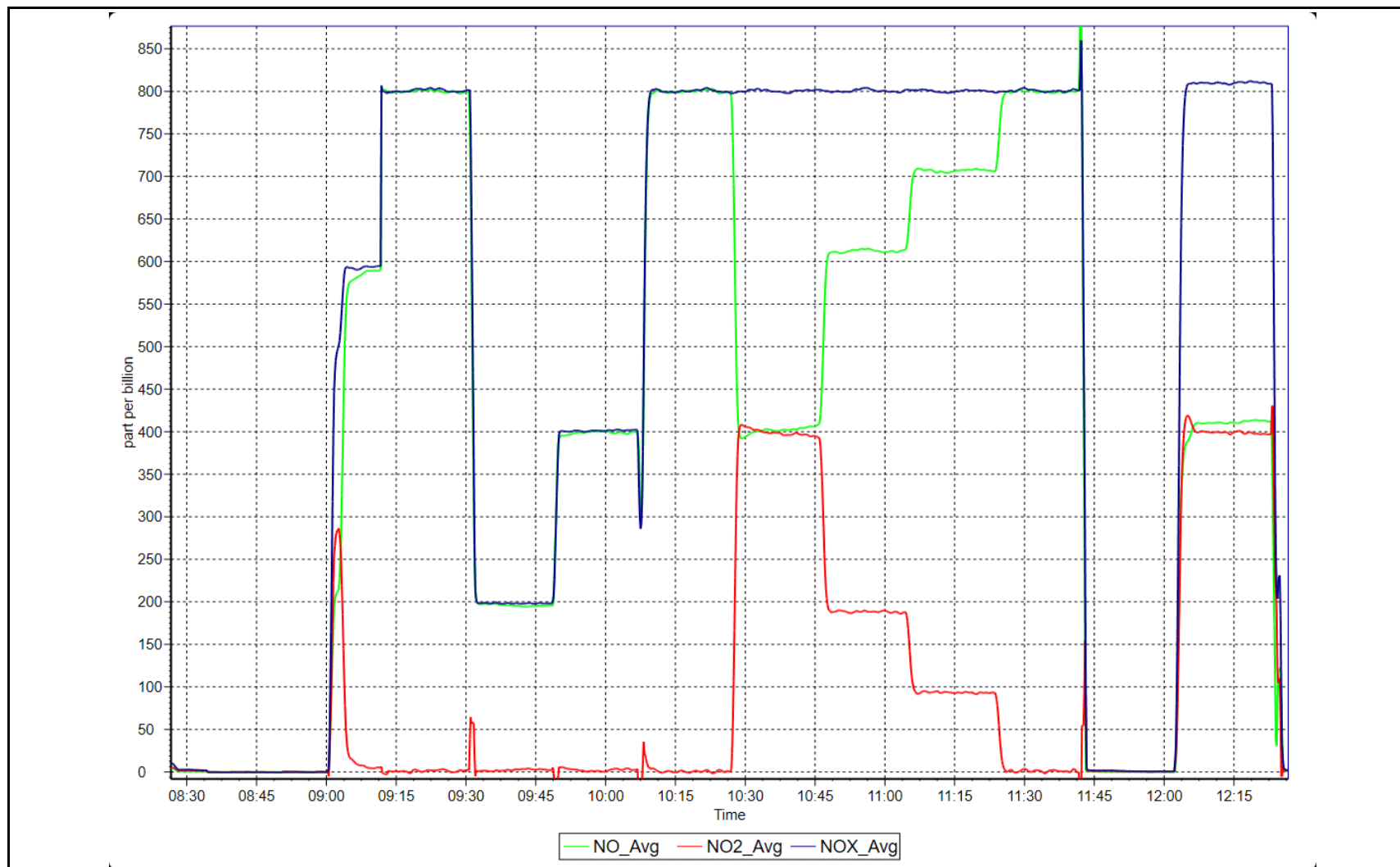
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999971	≥ 0.995
799.9	797.7	1.0027	Slope	0.998897	0.90 - 1.10
400.0	399.6	1.0009	Intercept	-1.267980	+/-20
200.0	195.9	1.0208			



NO_x Calibration Plot

Date: September 25, 2024

Location: Jackfish 1





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS508
KIRBY NORTH
SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Kirby North
Calibration Date: September 12, 2024
Start time (MST): 7:43
Reason: Routine

Station number: AMS 508
Last Cal Date: August 7, 2024
End time (MST): 11:36

Calibration Standards

Cal Gas Concentration: 49.18 ppm
Cal Gas Cylinder #: CC303554
Removed Cal Gas Conc: 49.18 ppm
Removed Gas Cyl #: NA
Calibrator Model: Teledyne API T700
Zero Air Gen Model: Teledyne API T701H

Cal Gas Exp Date: February 23, 2025
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 5240
Serial Number: 880

Analyzer Information

Analyzer make: Thermo 43iQ
Analyzer Range: 0 - 1000 ppb

Serial Number: 1182340007

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.004050	1.001819	Backgd or Offset:	25.1	25.9
Calibration intercept:	-0.648854	0.531649	Coeff or Slope:	1.039	1.058

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.0	----
As found High point	4919	81.3	799.6	799.8	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	799.8	Previous response	802.2	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4919	81.3	799.6	802.0	0.997
Mid point	4959	40.7	400.3	400.0	1.001
Low point	4980	20.3	199.7	202.2	0.987
As left zero	5000	0.0	0.0	0.0	----
As left span	4919	81.3	799.6	802.0	0.997
Average Correction Factor:					0.995

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

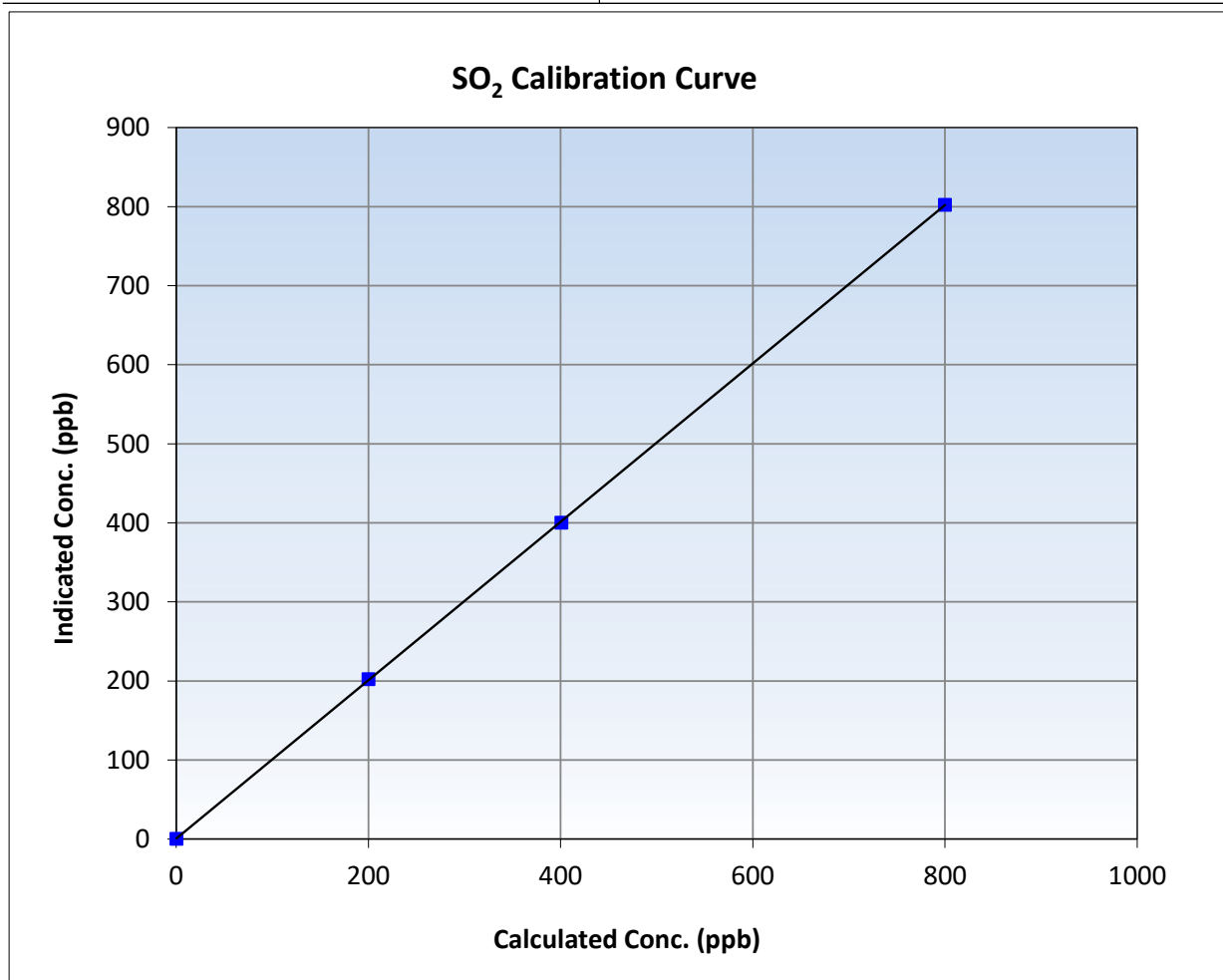
SO₂ Calibration Summary

Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 7, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	7:43	End Time (MST):	11:36
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007

Calibration Data

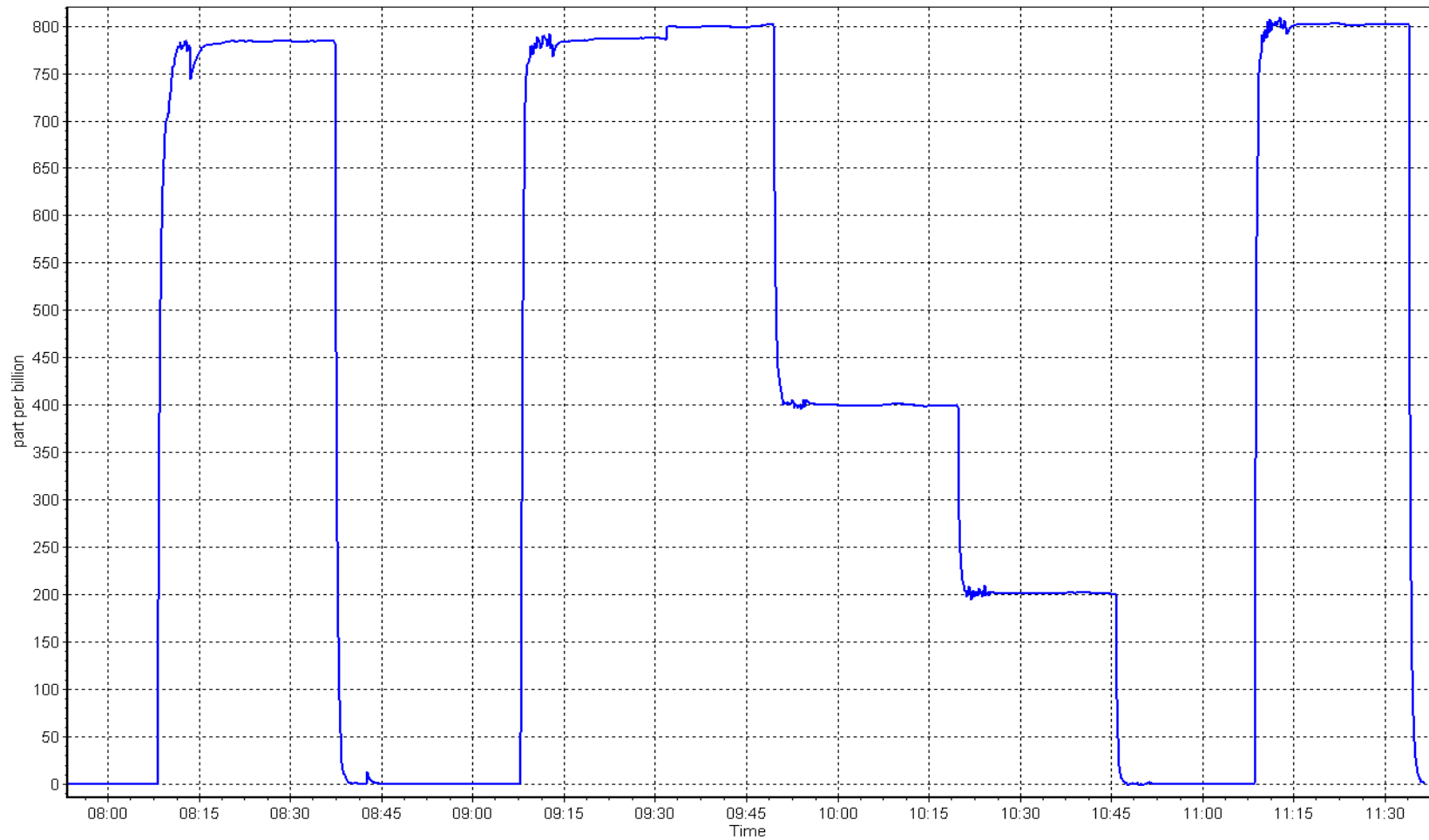
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	0.999984	≥0.995
799.6	802.0	0.9970	Slope	1.001819	0.90 - 1.10
400.3	400.0	1.0009	Intercept	0.531649	+/-30
199.7	202.2	0.9874			



SO2 Calibration Plot

Date: September 12, 2024

Location: Kirby North





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name: Kirby North
Calibration Date: September 11, 2024
Start time (MST): 11:50
Reason: Routine

Station number: AMS 508
Last Cal Date: August 8, 2024
End time (MST): 17:15

Calibration Standards

Cal Gas Concentration: 5.05 ppm
Cal Gas Cylinder #: DT0019762
Removed Cal Gas Conc: 5.05 ppm
Removed Gas Cyl #: n/a
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701H

Cal Gas Exp Date: November 15, 2026
Rem Gas Exp Date: NA
Diff between cyl:
Serial Number: 880
Serial Number: 5240

Analyzer Information

Analyzer make: Thermo 43i-TLE
Converter make: Global
Analyzer Range: 0 - 100 ppb

Analyzer serial #: 1150840012
Converter serial #: 2022-197
Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002385	1.005385	Backgd or Offset:	1.72	1.74
Calibration intercept:	0.119033	-0.160963	Coeff or Slope:	1.030	1.036

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4921	79.2	80.0	80.7	0.989
As found Mid point	4960	39.6	40.0	40.2	0.990
As found Low point	4980	19.8	20.0	19.6	1.010
New cylinder response					
Baseline Corr As found:	80.9	Prev response:	80.30	*% change:	0.7%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.013100	AF Intercept:	-0.380972
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999968	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4921	79.2	80.0	80.3	0.996
Mid point	4960	39.6	40.0	40.0	1.000
Low point	4980	19.8	20.0	19.9	1.005
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	79.5	1.006
SO2 Scrubber Check	4919	80.0	800.2	0.0	----
Date of last scrubber change:		July 25, 2023		Ave Corr Factor	1.000
Date of last converter efficiency test:		n/a			

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

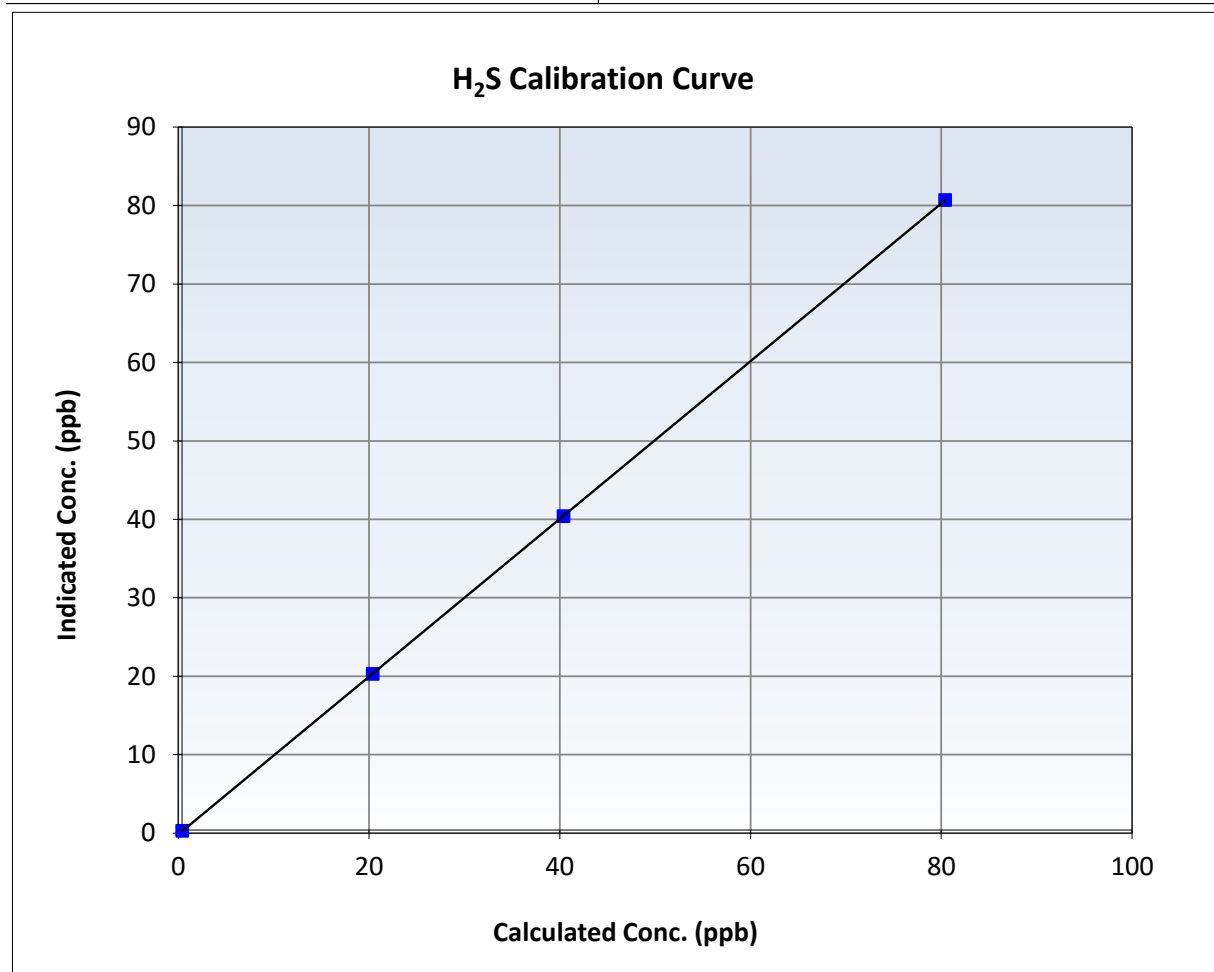
H2S Calibration Summary

Station Information

Calibration Date:	September 11, 2024	Previous Calibration:	August 8, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	11:50	End Time (MST):	17:15
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

Calibration Data

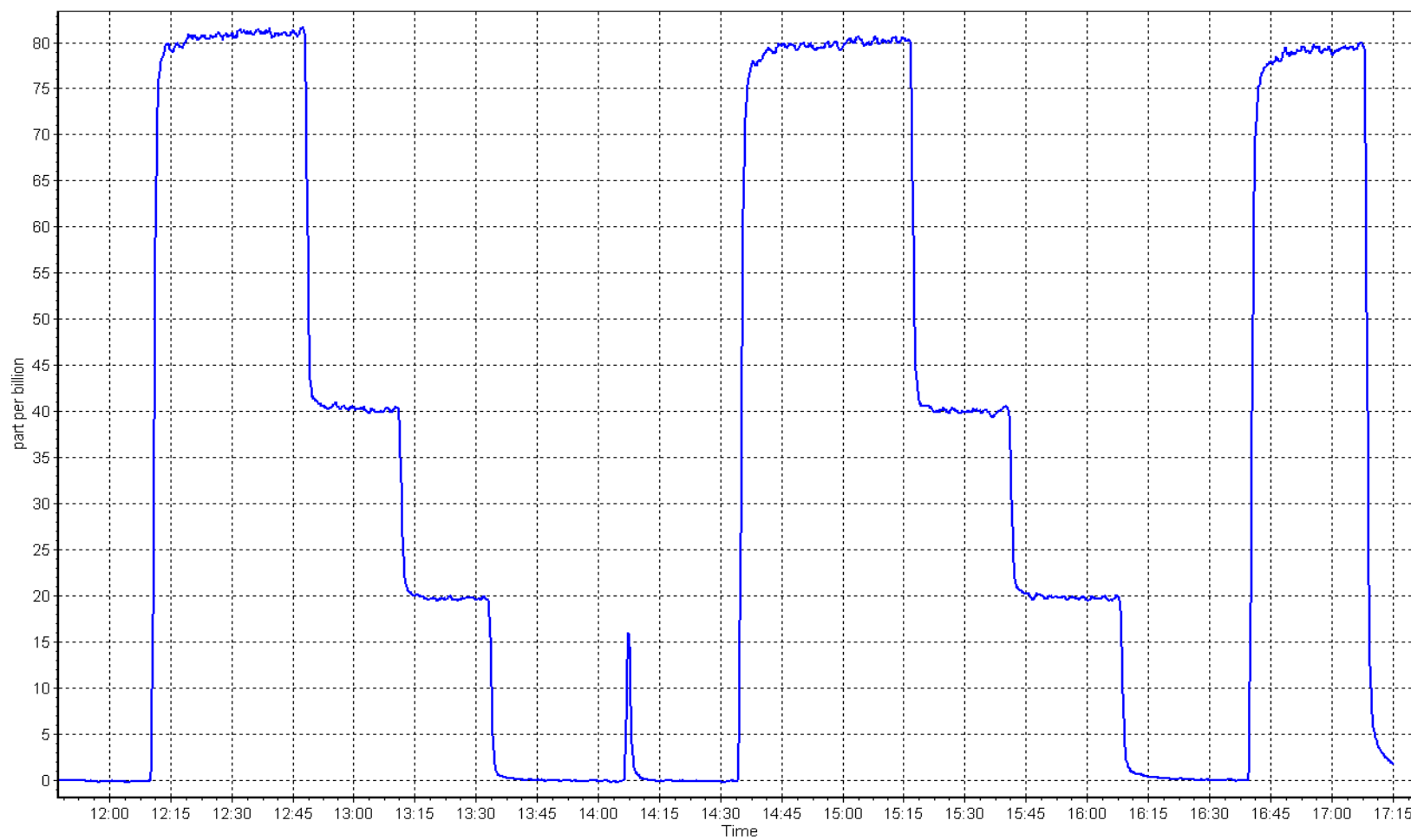
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.1	----	Correlation Coefficient	0.999997	≥ 0.995
80.0	80.3	0.9962	Slope	1.005385	$0.90 - 1.10$
40.0	40.0	1.0000	Intercept	-0.160963	± 3
20.0	19.9	1.0050			



H2S Calibration Plot

Date: September 11, 2024

Location: Kirby North





Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name: Kirby North
Calibration Date: September 12, 2024
Start time (MST): 7:43
Reason: Routine

Station number: AMS 508
Last Cal Date: August 7, 2024
End time (MST): 11:36

Calibration Standards

Gas Cert Reference: CC303554
CH4 Cal Gas Conc. 496.6 ppm
C3H8 Cal Gas Conc. 205.5 ppm
Removed Gas Cert: NA
Removed CH4 Conc. 496.6 ppm
Removed C3H8 Conc. 205.5 ppm
Calibrator Make/Model: Teledyne API T700
ZAG Make/Model: Teledyne API T701H

Cal Gas Expiry Date: March 23, 2025
CH4 Equiv Conc. 1061.7 ppm
Removed Gas Expiry: NA
CH4 Equiv Conc. 1061.7 ppm
Diff between cyl:
Serial Number: 5204
Serial Number: 880

Analyzer Information

Analyzer make: Thermo 51i-LT
Analyzer Range: 0 - 20 ppm

Analyzer serial #: 1182340005

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.006182	0.991845	Background:	2.06	2.06
Calibration intercept:	-0.082490	0.001310	Coefficient:	3.663	3.663

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.00	-0.08	----
As found High point	4919	81.3	17.26	17.12	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.20	Previous response	17.29	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.00	0.02	
High point	4919	81.3	17.26	17.14	1.007
Mid point	4959	40.7	8.64	8.54	1.012
Low point	4980	20.3	4.31	4.28	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.3	17.26	17.18	1.005
Average Correction Factor					1.009

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

Calibration Performed By: Braiden Boutilier



Wood Buffalo Environmental Association

THC Calibration Summary

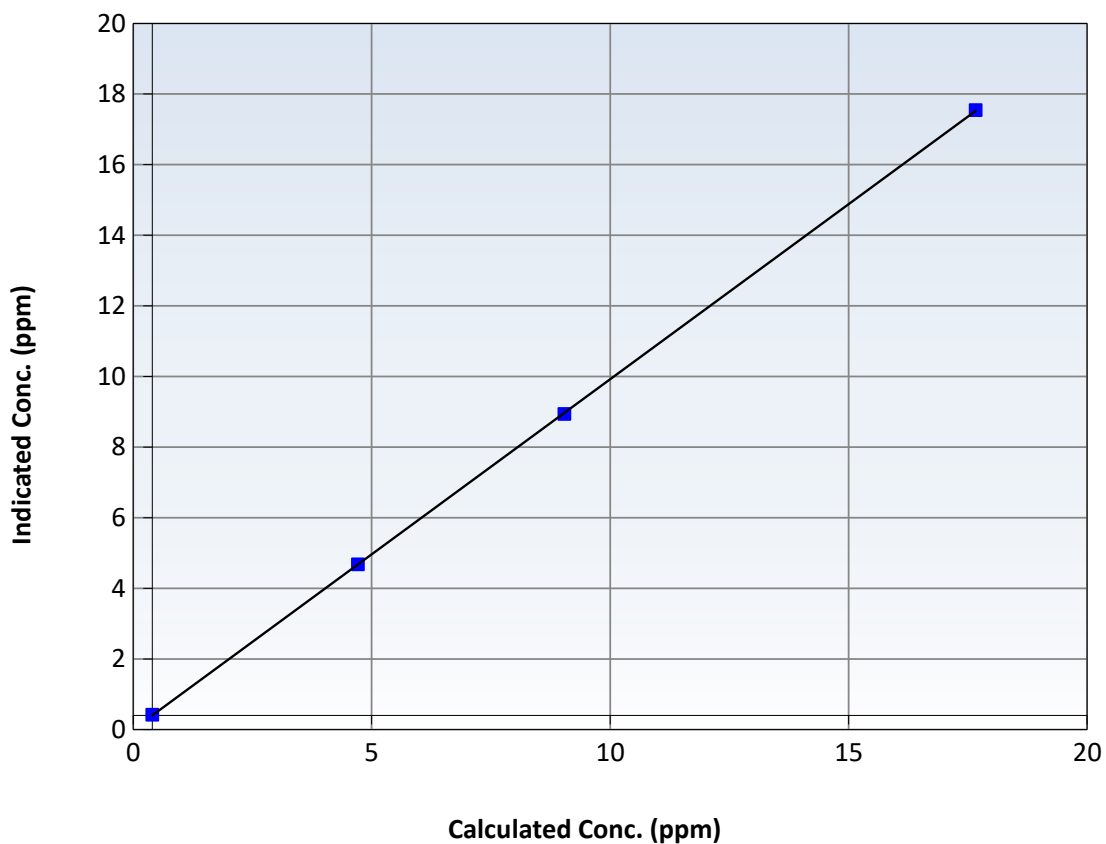
Station Information

Calibration Date:	September 12, 2024	Previous Calibration:	August 7, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	7:43	End Time (MST):	11:36
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1182340005

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.02	----	Correlation Coefficient	0.999989	≥ 0.995
17.26	17.14	1.0072	Slope	0.991845	$0.90 - 1.10$
8.64	8.54	1.0121	Intercept	0.001310	± 1.5
4.31	4.28	1.0079			

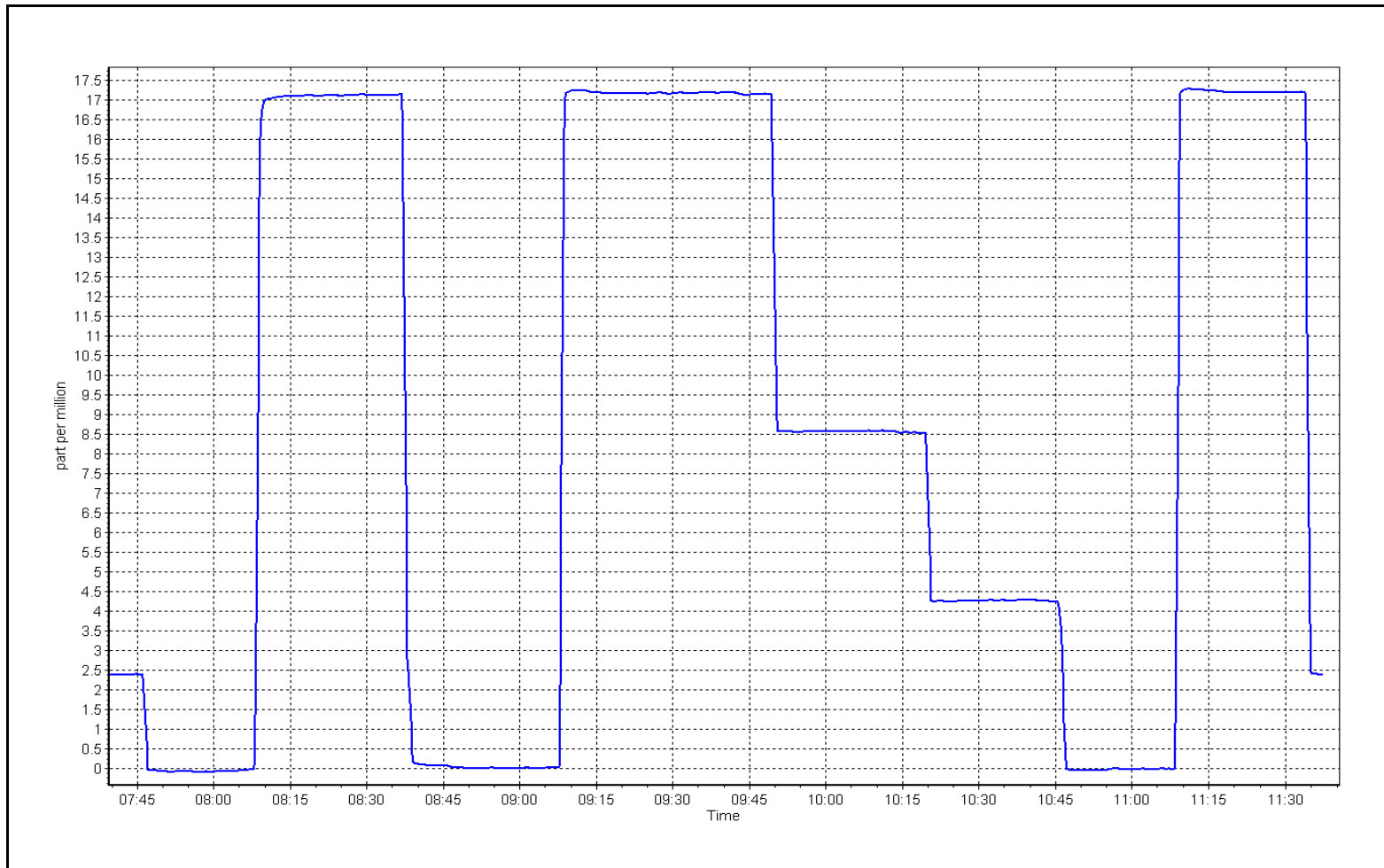
THC Calibration Curve



THC Calibration Plot

Date: September 12, 2024

Location: Kirby North





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Kirby North
Station number: AMS 508
Calibration Date: September 25, 2024
Last Cal Date: August 9, 2024
Start time (MST): 10:10
End time (MST): 15:45
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T34ULGL
NOX Cal Gas Conc: 49.39 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 49.39 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701H
Cal Gas Expiry Date: March 8, 2025
NO Cal Gas Conc: 49.02 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 49.02 ppm
NO gas Diff:
Serial Number: 5240
Serial Number: 880

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO _x Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
AF High point	4918	81.6	806.1	800.1	6.0	846.0	845.0	1.8	0.9531	0.9471
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO _x = 802.5 ppb	NO = 800.9 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO _x = 5.1%
Baseline Corr 1st pt	NO _x = 845.8 ppb	NO = 844.8 ppb	<u>As Found Statistics</u>		*Percent Change	NO = 5.2%
Baseline Corr 2nd pt	NO _x = NA ppb	NO = NA ppb	As found	NO _x r ² :	Nx SI:	Nx Int:
Baseline Corr 3rd pt	NO _x = NA ppb	NO = NA ppb	As found	NO r ² :	NO SI:	NO Int:
			As found	NO ₂ r ² :	NO ₂ SI:	NO ₂ Int:

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	Baseline Adjusted NO ₂ Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 1118148496

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	0.810	0.730	NO bkgnd or offset:	8.4	7.6
NOX coeff or slope:	0.993	0.995	NOX bkgnd or offset:	8.3	7.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	149.8	144.7

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999201	1.001980
NO _x Cal Offset:	-3.004011	-4.584035
NO Cal Slope:	1.006500	1.002130
NO Cal Offset:	-4.344071	-5.164177
NO ₂ Cal Slope:	0.993865	0.994080
NO ₂ Cal Offset:	-1.090314	0.208416

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
High point	4918	81.6	806.1	800.1	6.0	806.0	799.8	6.3	1.0001	1.0003
Mid point	4959	40.8	403.0	400.0	3.0	395.5	391.6	3.8	1.0191	1.0215
Low point	4980	20.4	201.5	200.0	1.5	193.3	190.7	2.7	1.0424	1.0487
As left zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
As left span	4918	81.6	806.1	394.5	411.6	802.0	394.5	407.0	1.0051	1.0000
Average Correction Factor									1.0205	1.0235

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	795.6	398.3	403.3	400.8	1.0063	99.4%
Mid GPT point	795.6	596.6	205.0	204.9	1.0007	99.9%
Low GPT point	795.6	692.1	109.5	108.8	1.0068	99.3%
Average Correction Factor					1.0046	99.5%

Notes:

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:

Braiden Boutilier



Wood Buffalo Environmental Association

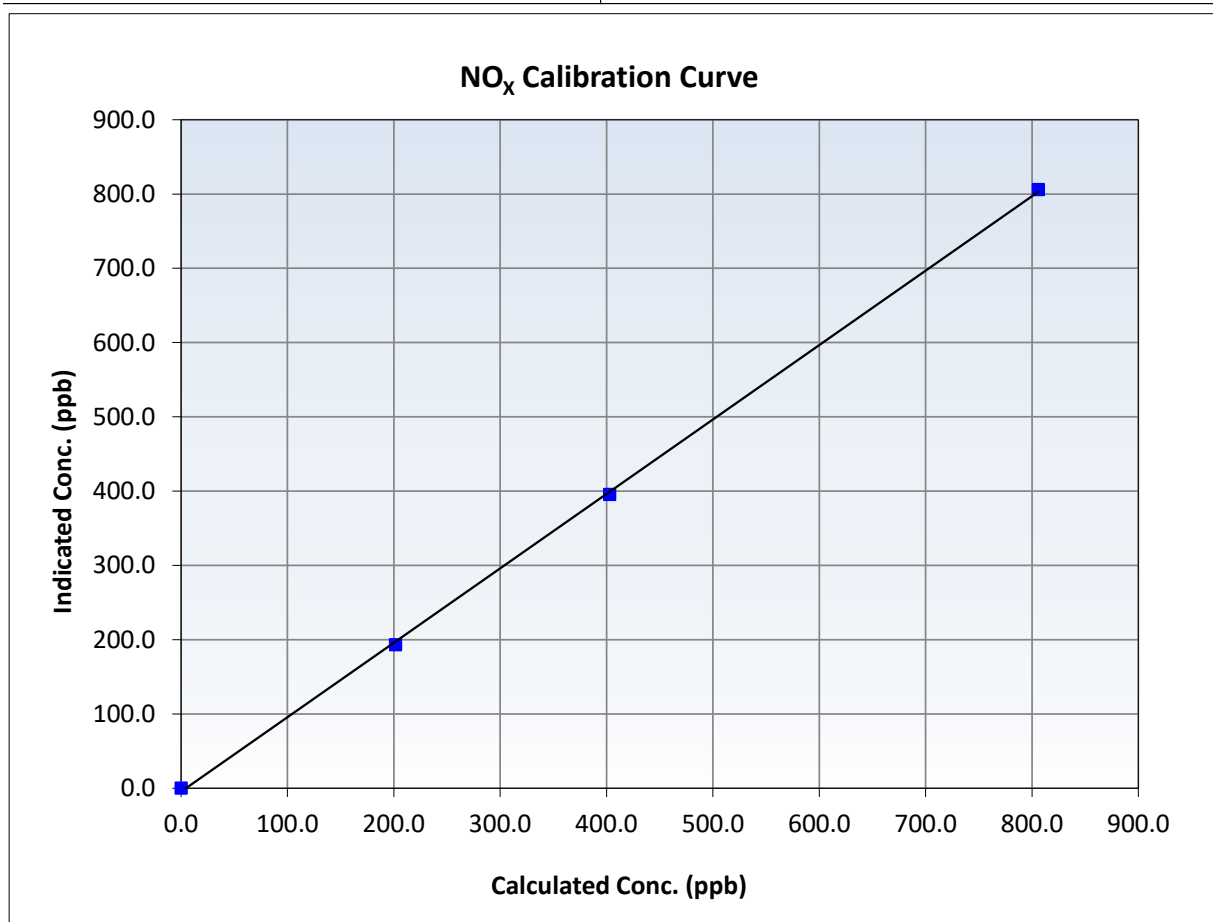
NO_x Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 9, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:10	End Time (MST):	15:45
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

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	0.999825	≥0.995
806.1	806.0	1.0001	Slope	1.001980	0.90 - 1.10
403.0	395.5	1.0191	Intercept	-4.584035	+/-20
201.5	193.3	1.0424			





Wood Buffalo Environmental Association

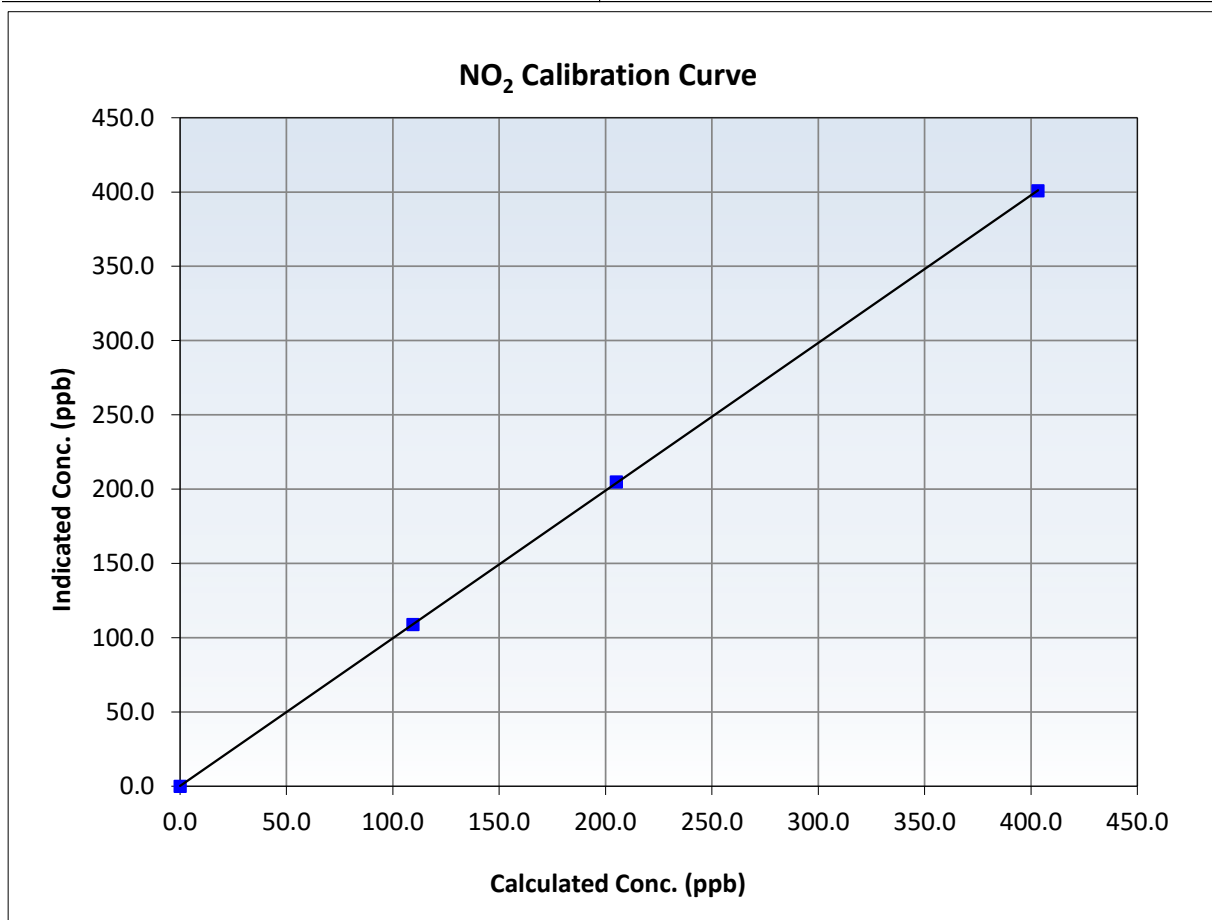
NO₂ Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 9, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:10	End Time (MST):	15:45
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999988	≥0.995
403.3	400.8	1.0063	Slope	0.994080	0.90 - 1.10
205.0	204.9	1.0007	Intercept	0.208416	+/-20
109.5	108.8	1.0068			





Wood Buffalo Environmental Association

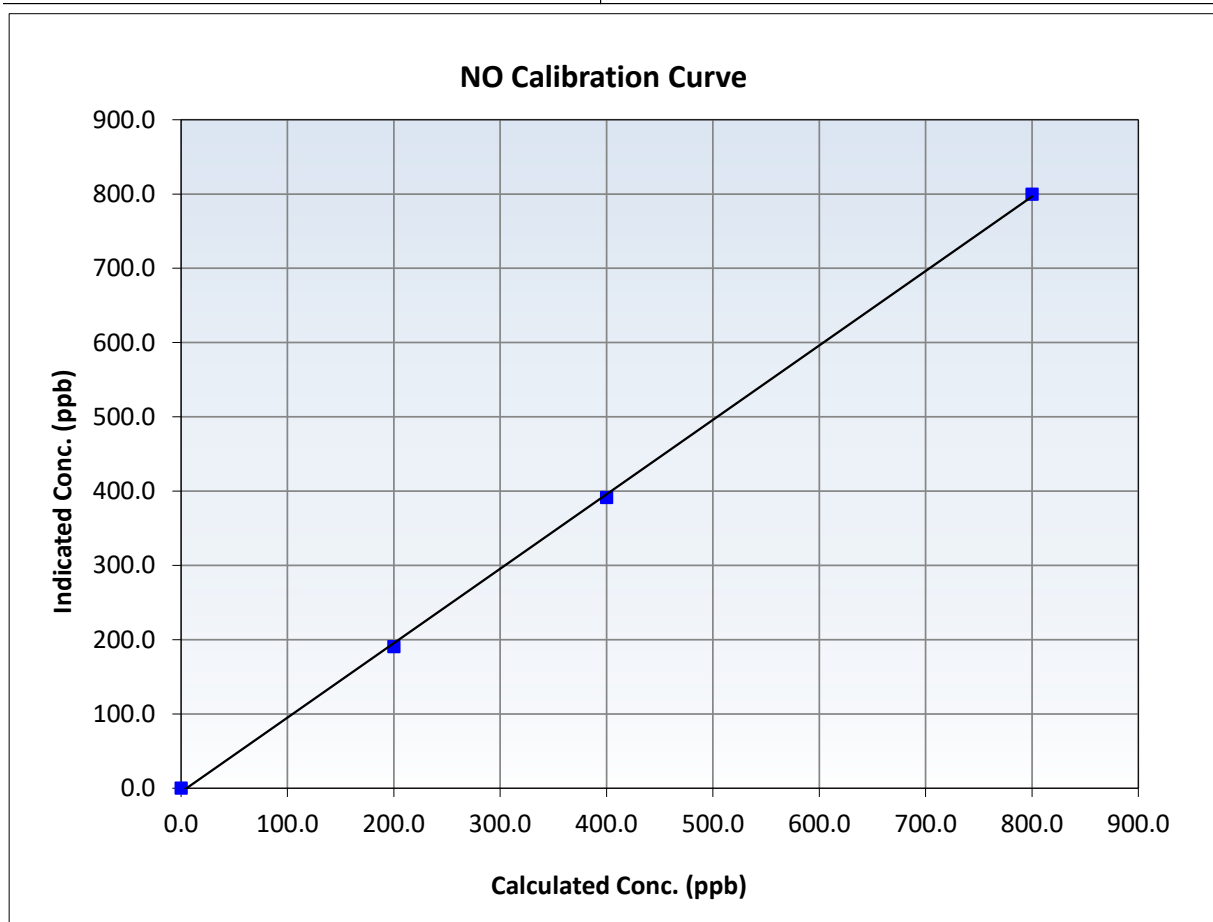
NO Calibration Summary

Station Information

Calibration Date:	September 25, 2024	Previous Calibration:	August 9, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:10	End Time (MST):	15:45
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

Calibration Data

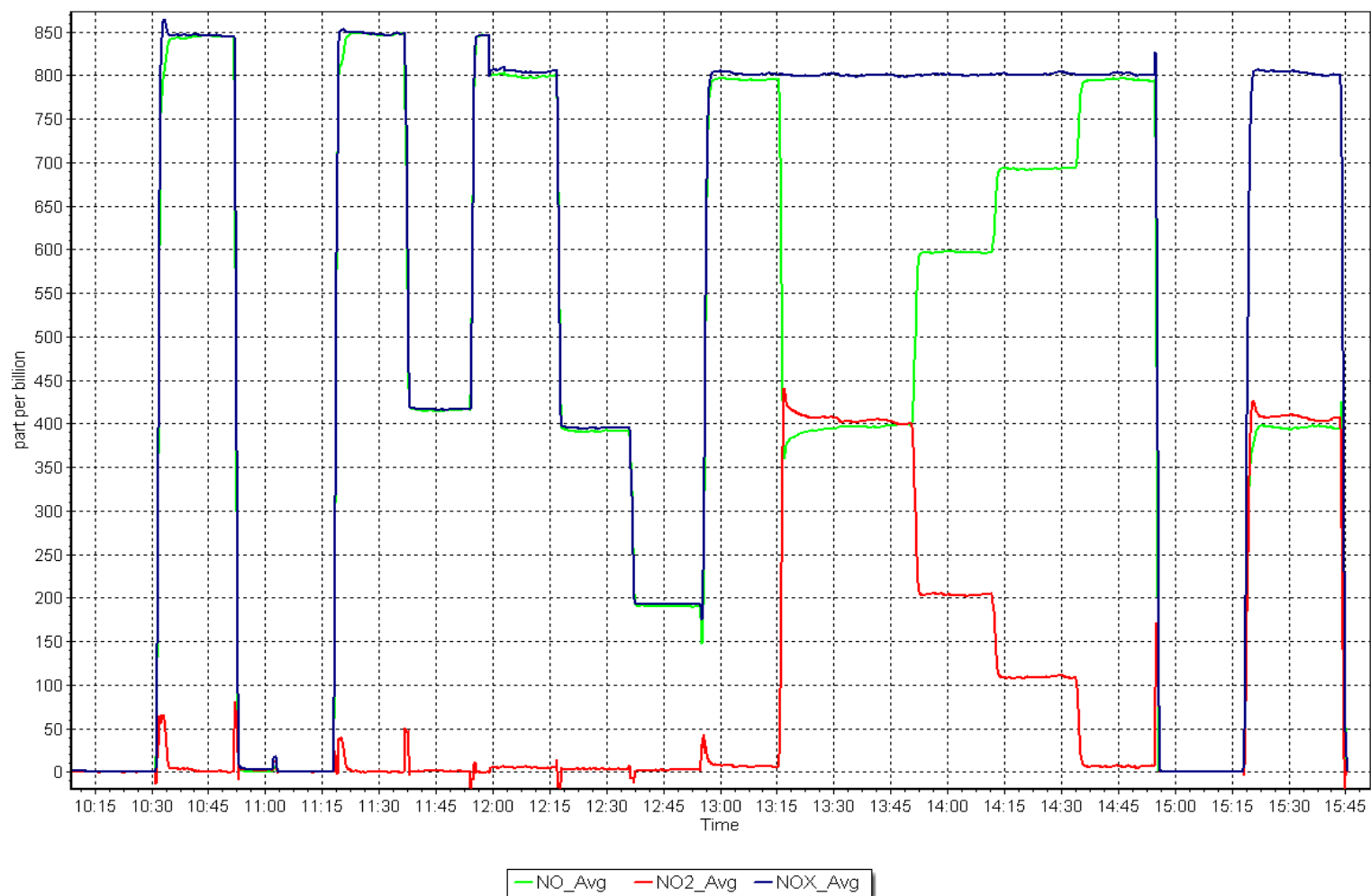
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3	----	Correlation Coefficient	0.999779	≥ 0.995
800.1	799.8	1.0003	Slope	1.002130	$0.90 - 1.10$
400.0	391.6	1.0215	Intercept	-5.164177	± 20
200.0	190.7	1.0487			



NO_x Calibration Plot

Date: September 25, 2024

Location: Kirby North





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS512 HANGINGSTONE EXPANSION SEPTEMBER 2024

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

October 31, 2024



Wood Buffalo Environmental Association

SO₂ Calibration Report

Station Information

Station Name: Hangingstone Expansion Station number: AMS 512
Calibration Date: September 17, 2024 Last Cal Date: August 15, 2024
Start time (MST): 9:50 End time (MST): 12:20
Reason: Routine

Calibration Standards

Cal Gas Concentration: 50.06 ppm Cal Gas Exp Date: January 5, 2029
Cal Gas Cylinder #: CC147416
Removed Cal Gas Conc: 50.06 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Model: Teledyne API T700 Serial Number: 2445
Zero Air Gen Model: Teledyne API 701 Serial Number: 138

Analyzer Information

Analyzer make: Thermo scientific Serial Number: 1173410001
Analyzer Range: 0 - 1000 ppb

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998180	1.004332	Backgd or Offset:	12.8	13.1
Calibration intercept:	-1.222879	-1.523569	Coeff or Slope:	1.129	1.151

SO₂ 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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	0.4	----
As found High point	4920	79.8	799.0	785.6	1.018
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	785.2	Previous response	796.3	*% change	-1.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4920	79.8	799.0	802.3	0.996
Mid point	4960	39.9	399.5	397.6	1.005
Low point	4987	20.0	200.0	198.0	1.010
As left zero	5000	0.0	0.0	0.6	----
As left span	4920	79.8	799.0	800.3	0.998
Average Correction Factor:					1.004

Notes: No maintenance done. Span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SO₂ Calibration Summary

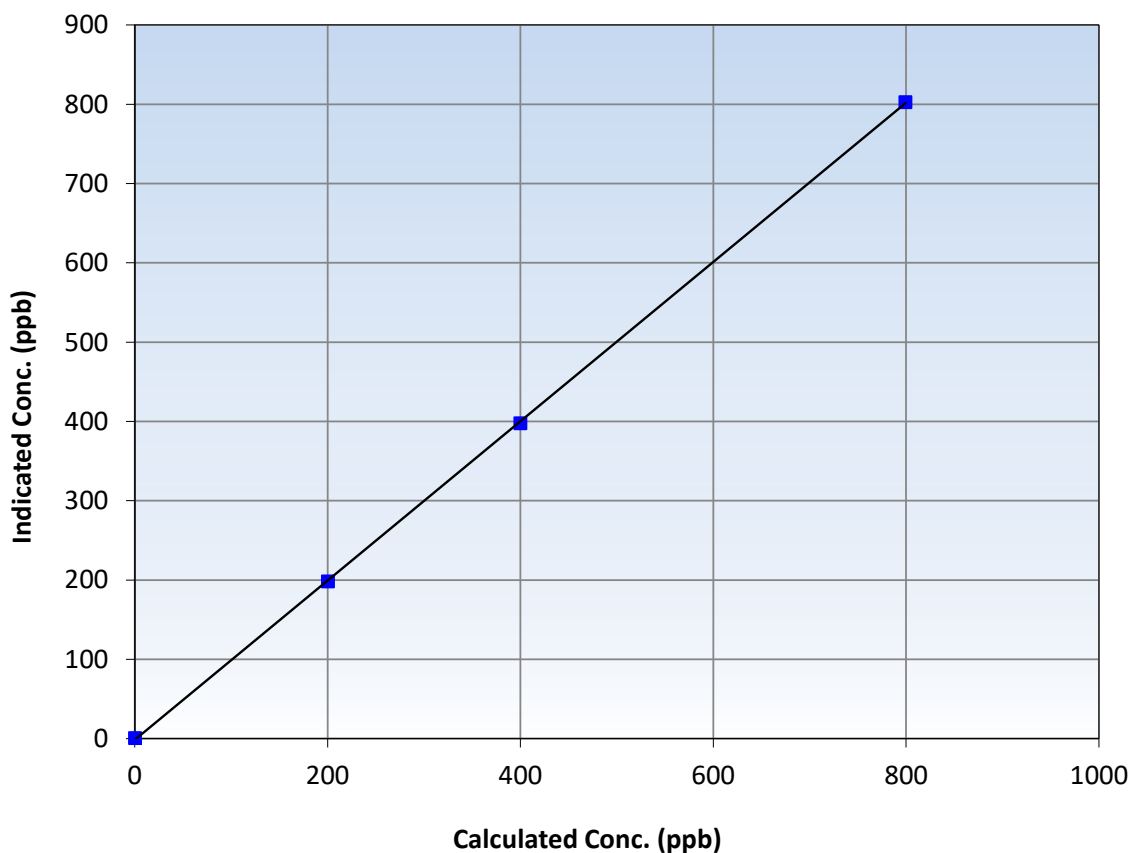
Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 15, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	9:50	End Time (MST):	12:20
Analyzer make:	Thermo scientific	Analyzer serial #:	1173410001

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.5	----	Correlation Coefficient	0.999966	≥0.995
799.0	802.3	0.9959	Slope	1.004332	0.90 - 1.10
399.5	397.6	1.0047	Intercept	-1.523569	+/-30
200.0	198.0	1.0099			

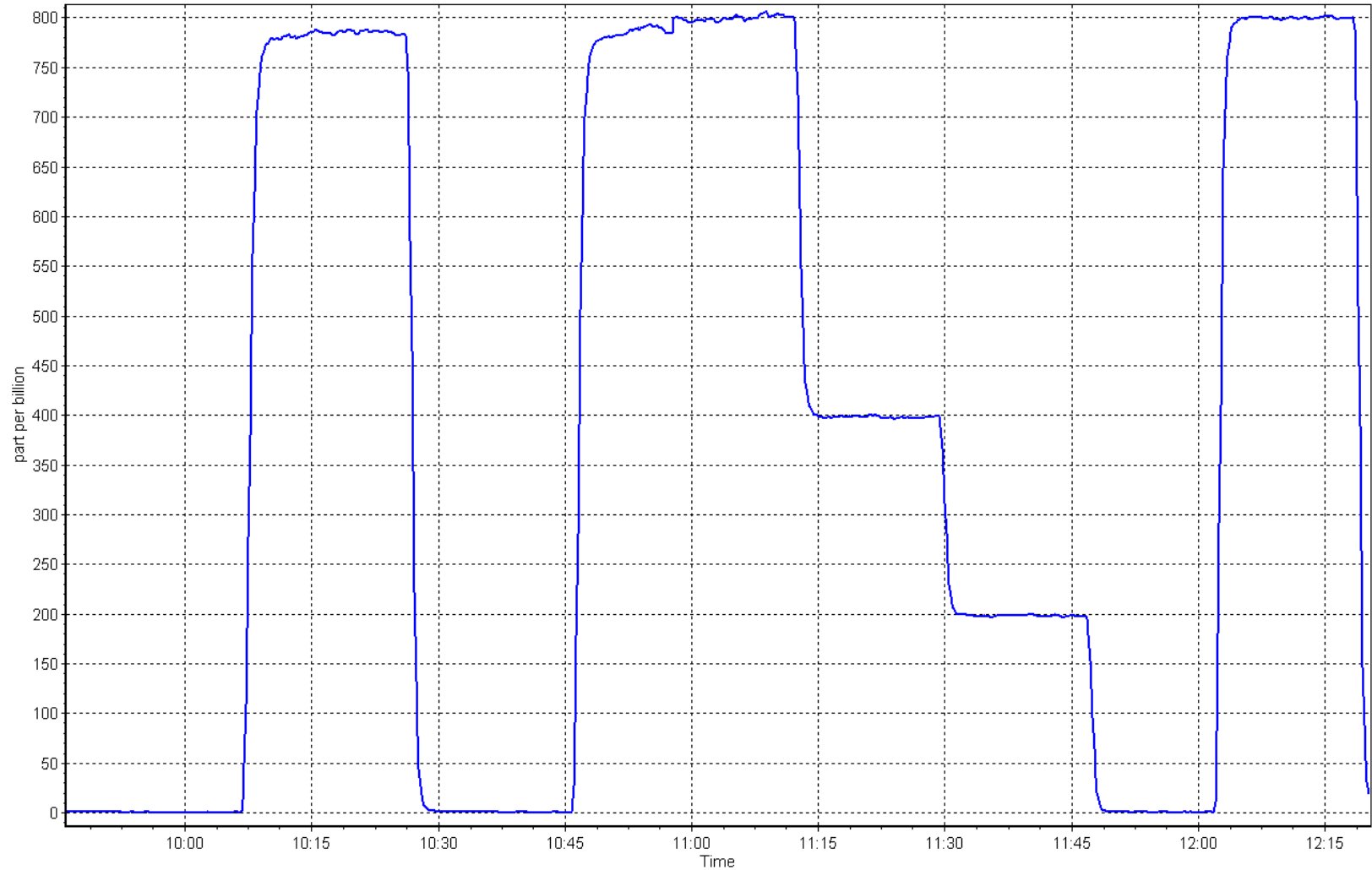
SO₂ Calibration Curve



SO2 Calibration Plot

Date: September 17, 2024

Location: Hangingstone Expansion





Wood Buffalo Environmental Association

H₂S Calibration Report

Station Information

Station Name: Hangingstone Expansion Station number: AMS 512
Calibration Date: September 17, 2024 Last Cal Date: August 15, 2024
Start time (MST): 6:10 End time (MST): 9:56
Reason: Routine

Calibration Standards

Cal Gas Concentration: 5.139 ppm Cal Gas Exp Date: January 3, 2026
Cal Gas Cylinder #: CC511397
Removed Cal Gas Conc: 5.139 ppm Rem Gas Exp Date: NA
Removed Gas Cyl #: NA Diff between cyl:
Calibrator Make/Model: API T700 Serial Number: 2445
ZAG Make/Model: API T701 Serial Number: 138

Analyzer Information

Analyzer make: Thermo 43i-LTE Analyzer serial #: 1336160090
Converter make: Global G150 Converter serial #: 2022-227
Analyzer Range: 0 - 100 ppb Converter Temp: 325 degC

	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Calibration slope:	0.986337	0.981334	Backgd or Offset:	3.43
Calibration intercept:	-0.118940	-0.018842	Coeff or Slope:	1.156

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)) <i>Limit = 0.90-1.10</i>
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4922	77.8	80.0	79.3	1.006
As found Mid point	4961	38.9	40.0	39.6	1.005
As found Low point	4981	19.5	20.0	19.5	1.017
New cylinder response					
Baseline Corr As found:	79.5	Prev response:	78.75	*% change:	0.9%
Baseline Corr 2nd AF pt:	39.8	AF Slope:	0.995200	AF Intercept:	-0.279101
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999988	* = > +/-5% change initiates investigation	

H₂S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4922	77.8	80.0	78.4	1.020
Mid point	4961	38.9	40.0	39.4	1.015
Low point	4981	19.5	20.0	19.5	1.028
As left zero	5000	0.0	0.0	0.1	----
As left span	4922	77.8	80.0	78.0	1.025
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.021
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

H₂S Calibration Summary

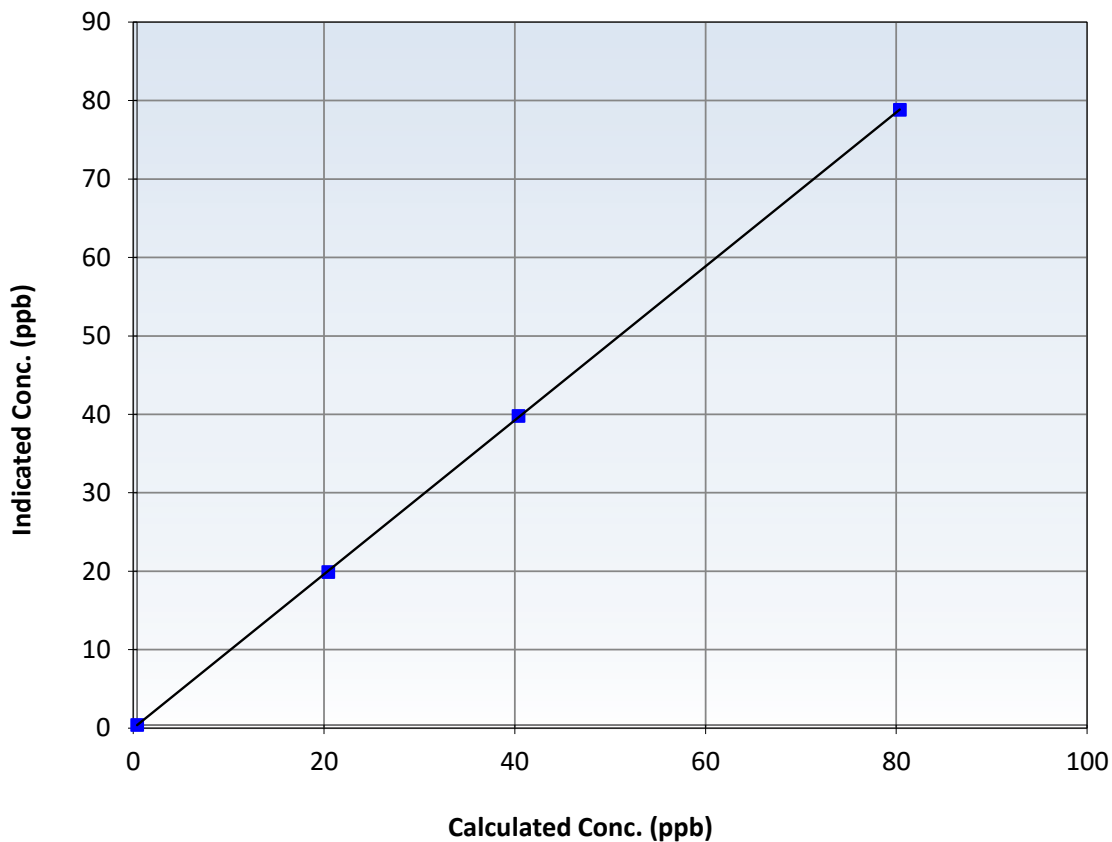
Station Information

Calibration Date:	September 17, 2024	Previous Calibration:	August 15, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	6:10	End Time (MST):	9:56
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation			<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999983		≥0.995
80.0	78.4	1.0200	Slope	0.981334		0.90 - 1.10
40.0	39.4	1.0148	Intercept	-0.018842		+/-3
20.0	19.5	1.0277				

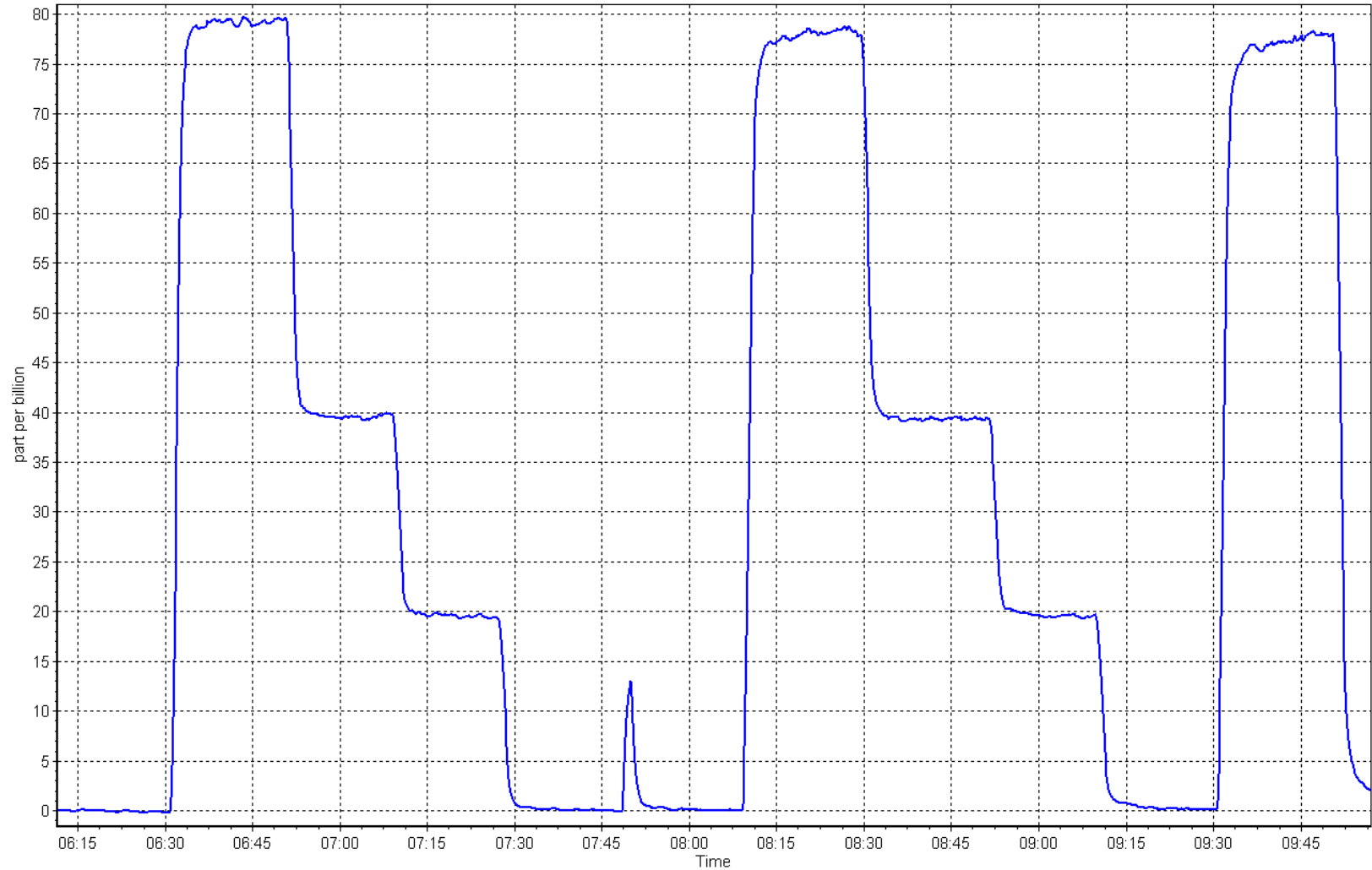
H₂S Calibration Curve



H₂S Calibration Plot

Date: September 17, 2024

Location: Hangingstone Expansion





Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Station Information

Station Name: Green Fire
Station number: AMS 512
Calibration Date: September 20, 2024
Last Cal Date: August 8, 2024
Start time (MST): 5:55
End time (MST): 9:49
Reason: Routine

Calibration Standards

NO Gas Cylinder #: T0F8P52
NOX Cal Gas Conc: 47.43 ppm
Removed Cylinder #: NA
Removed Gas NOX Conc: 47.43 ppm
NOX gas Diff:
Calibrator Model: Teledyne API T700
ZAG make/model: Teledyne API T701
Cal Gas Expiry Date: August 16, 2026
NO Cal Gas Conc: 47.43 ppm
Removed Gas Exp Date: NA
Removed Gas NO Conc: 47.43 ppm
NO gas Diff:
Serial Number: 2445
Serial Number: 138

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
AF High point	4916	84.4	800.6	800.6	0.0	806.5	803.8	2.5	0.9926	0.9958
AF Mid point										
AF Low point										
New cyl resp										
Previous Response	NO _x = 800.1 ppb	NO = 798.6 ppb	* = > +/-5% change initiates investigation			*Percent Change	NO _x = 0.8%			
Baseline Corr 1st pt	NO _x = 806.5 ppb	NO = 803.9 ppb	<u>As Found Statistics</u>			*Percent Change	NO = 0.7%			
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:			

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90 - 1.10</i>	Converter Efficiency <i>Limit = 96-104%</i>
As Found GPT zero						
As found high GPT point						
As found mid GPT point						
As found low GPT point						



Wood Buffalo Environmental Association

NO_x \ NO \ NO₂ Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200
NOX Range (ppb): 0 - 1000 ppb

Serial Number: 7029

Instrument Settings

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.075	1.075	NO bkgnd or offset:	0.2	0.2
NOX coeff or slope:	1.074	1.074	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.6	4.6

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001223	1.011873
NO _x Cal Offset:	-1.432793	-0.812938
NO Cal Slope:	0.999824	1.010916
NO Cal Offset:	-1.792763	-1.752900
NO ₂ Cal Slope:	1.002242	1.005437
NO ₂ Cal Offset:	-0.356996	1.472643

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO _x concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO _x concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO ₂ concentration (ppb) (Ic)	NO _x Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	----	----
High point	4916	84.4	800.6	800.6	0.0	809.6	808.3	1.1	0.9888	0.9904
Mid point	4958	42.2	400.3	400.3	0.0	404.0	402.3	1.7	0.9909	0.9951
Low point	4979	21.1	200.2	200.2	0.0	200.8	198.8	2.0	0.9968	1.0068
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
As left span	4916	84.4	800.6	405.5	395.1	803.4	405.5	398.0	0.9965	1.0000
Average Correction Factor									0.9922	0.9974

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO ₂ concentration (ppb) (Cc)	Indicated NO ₂ concentration (ppb) (Ic)	NO ₂ Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
Cal zero	----	----	0.0	0.0	----	----
High GPT point	805.7	407.9	397.8	400.6	0.9930	100.7%
Mid GPT point	805.7	616.0	189.7	193.4	0.9809	102.0%
Low GPT point	805.7	710.9	94.8	97.9	0.9683	103.3%
Average Correction Factor					0.9807	102.0%

Notes:

No maintenance or adjustments done.

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

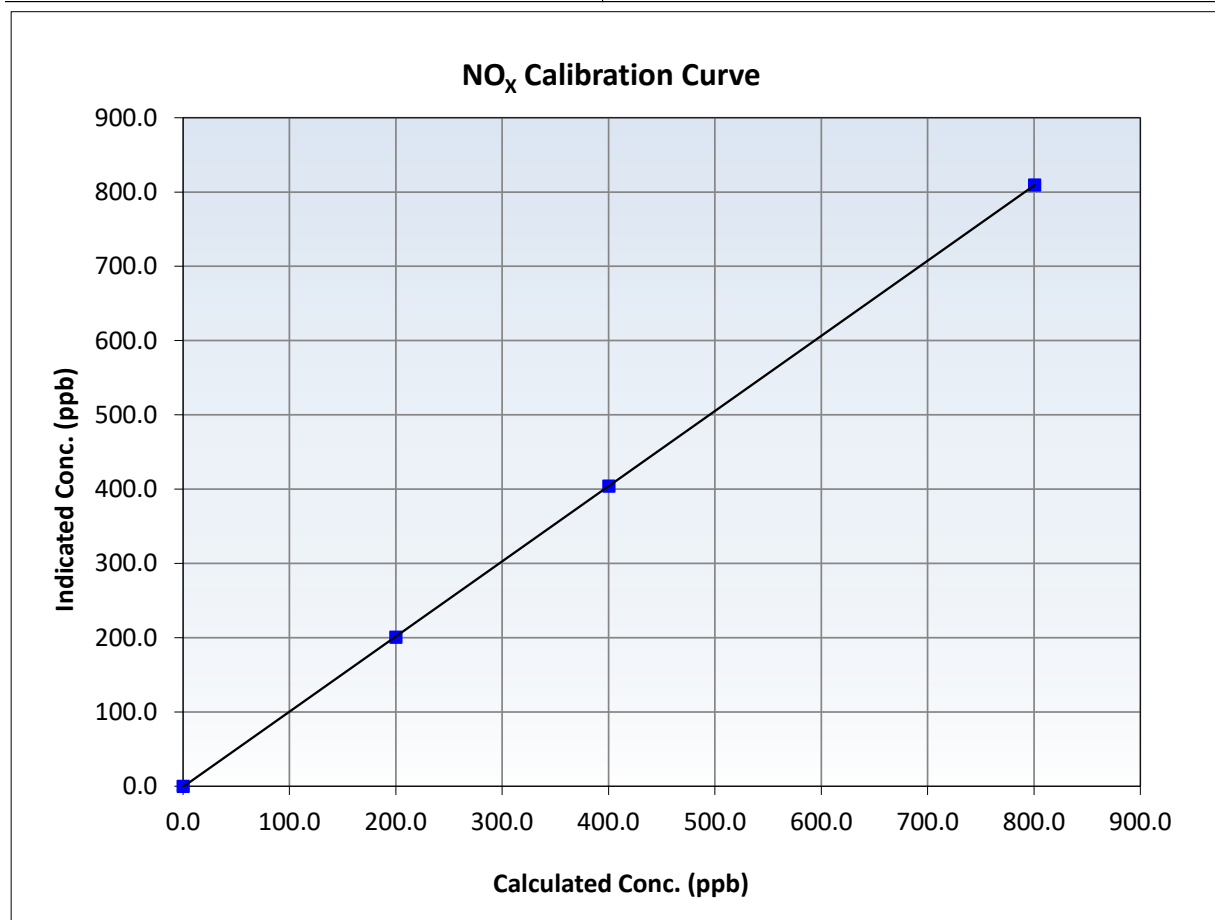
NO_x Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Green Fire	Station Number:	AMS 512
Start Time (MST):	5:55	End Time (MST):	9:49
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999995	≥0.995
800.6	809.6	0.9888	Slope	1.011873	0.90 - 1.10
400.3	404.0	0.9909	Intercept	-0.812938	+/-20
200.2	200.8	0.9968			





Wood Buffalo Environmental Association

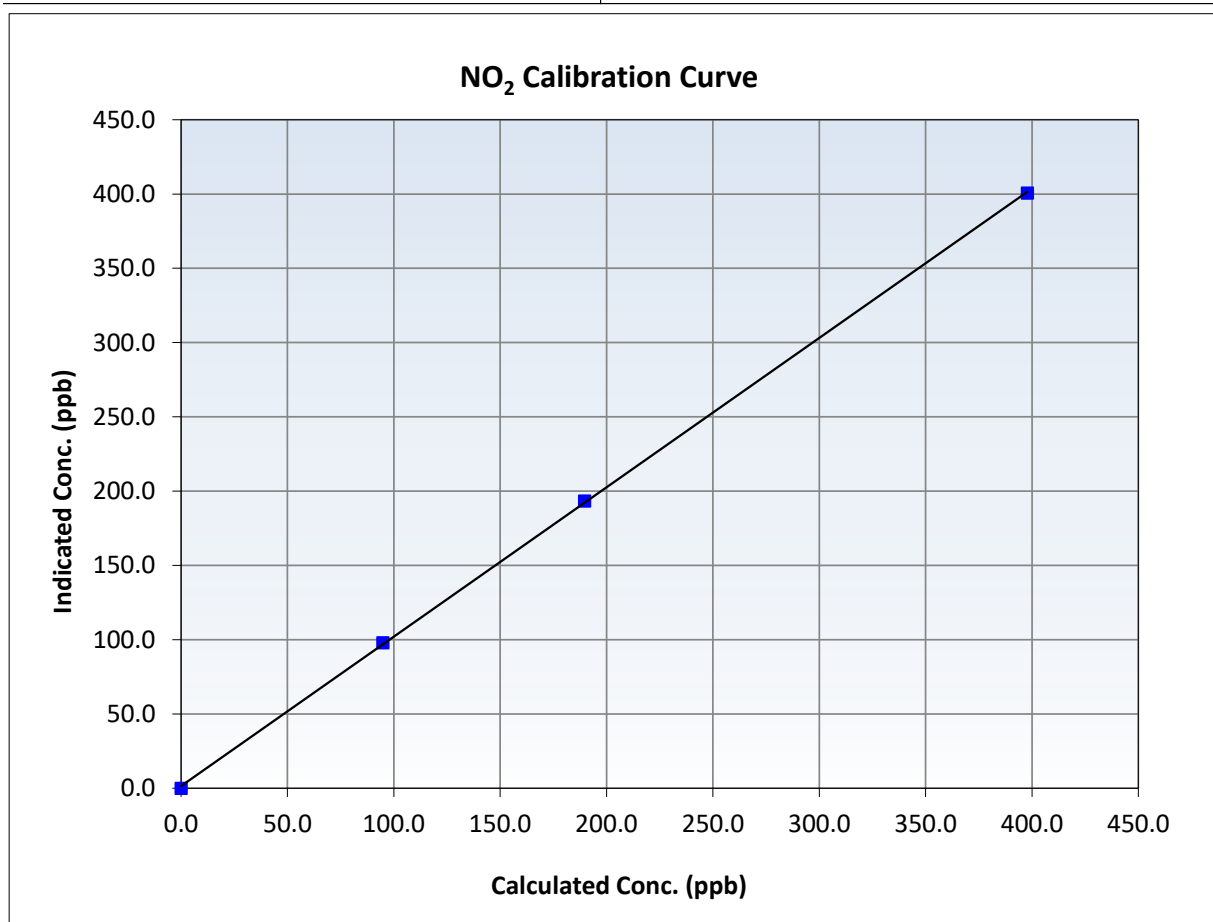
NO₂ Calibration Summary

Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Green Fire	Station Number:	AMS 512
Start Time (MST):	5:55	End Time (MST):	9:49
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	0.999937	≥ 0.995
397.8	400.6	0.9930	Slope	1.005437	$0.90 - 1.10$
189.7	193.4	0.9809	Intercept	1.472643	± 20
94.8	97.9	0.9683			





Wood Buffalo Environmental Association

NO Calibration Summary

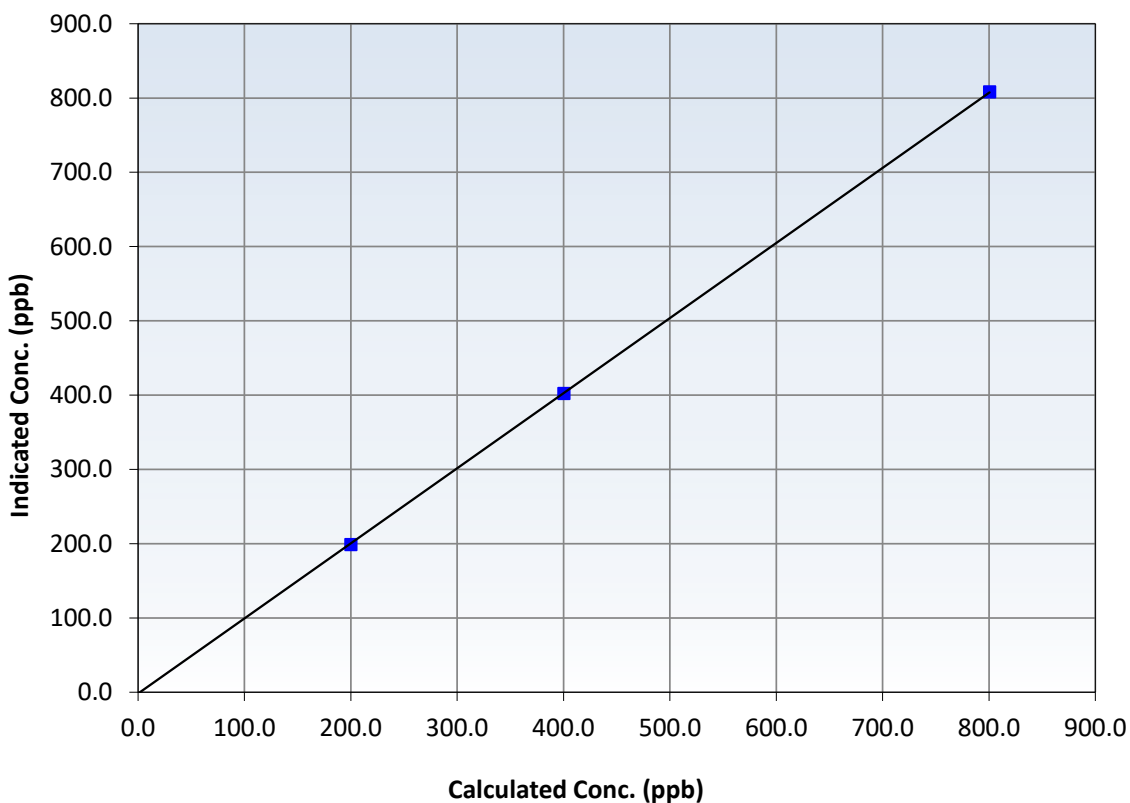
Station Information

Calibration Date:	September 20, 2024	Previous Calibration:	August 8, 2024
Station Name:	Green Fire	Station Number:	AMS 512
Start Time (MST):	5:55	End Time (MST):	9:49
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

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	0.999981	≥ 0.995
800.6	808.3	0.9904	Slope	1.010916	$0.90 - 1.10$
400.3	402.3	0.9951	Intercept	-1.752900	± 20
200.2	198.8	1.0068			

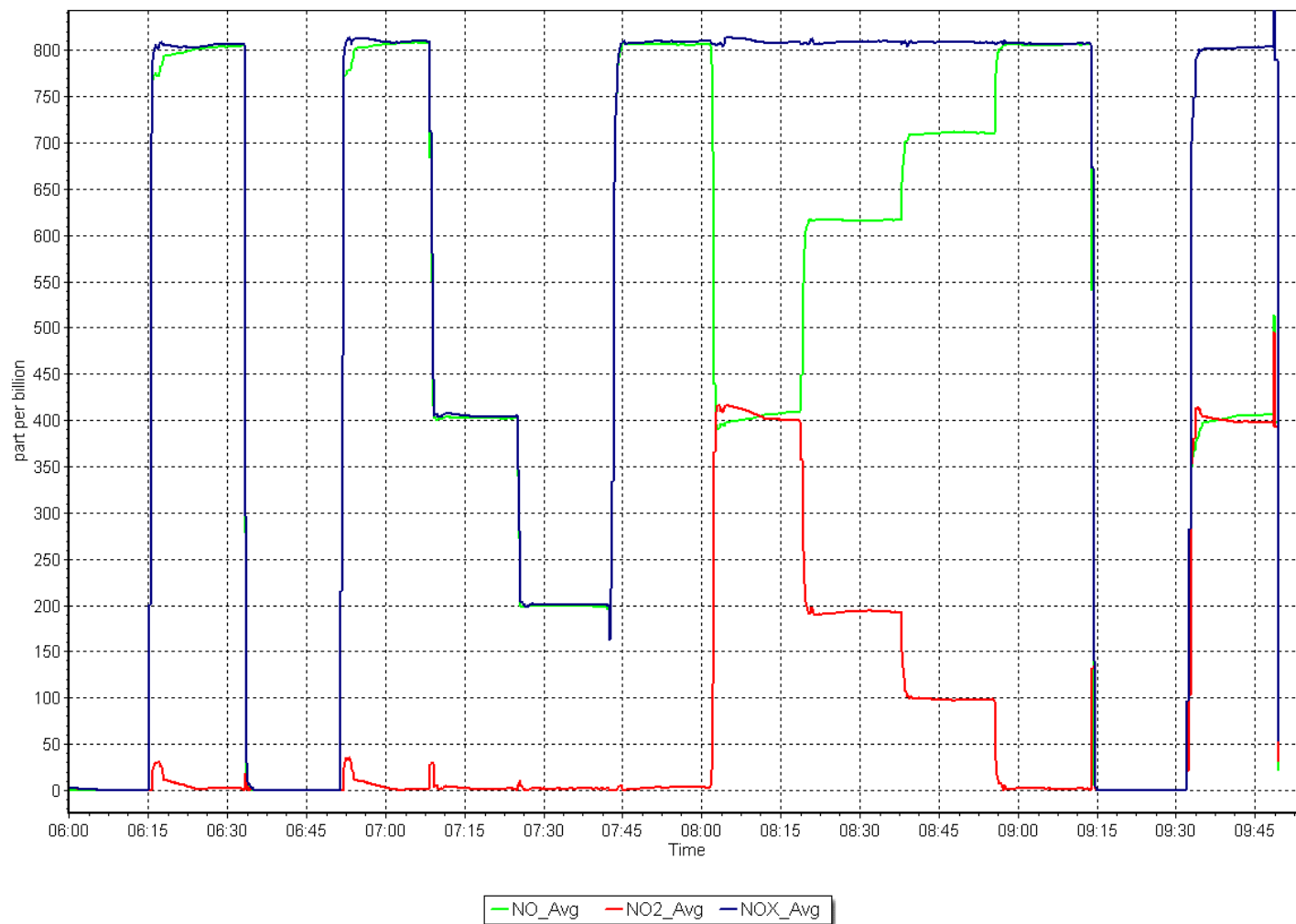
NO Calibration Curve



NO_x Calibration Plot

Date: September 20, 2024

Location: Green Fire





End of Report