WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION

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Wood Buffalo Environmental Association

MAY 2024

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING

June 28, 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
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 16, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	9:22	End time (MST):	12:35
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:	4890

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	JC1501301448	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001305	1.000564	Backgd or Offset:	20.8	20.7
Calibration intercept:	-0.794719	-1.035075	Coeff or Slope:	0.892	0.881

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	1.0	----
As found High point	4918	81.3	800.3	808.6	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	807.6	Previous response	800.5	*% change	0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4918	81.3	800.3	800.6	1.000
Mid point	4959	40.7	400.6	398.3	1.006
Low point	4979	20.3	199.8	198.2	1.008
As left zero	5000	0.0	0.0	0.4	----
As left span	4918	81.3	800.3	800.2	1.000
				Average Correction Factor:	1.005

Notes: Calibrating remotely. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

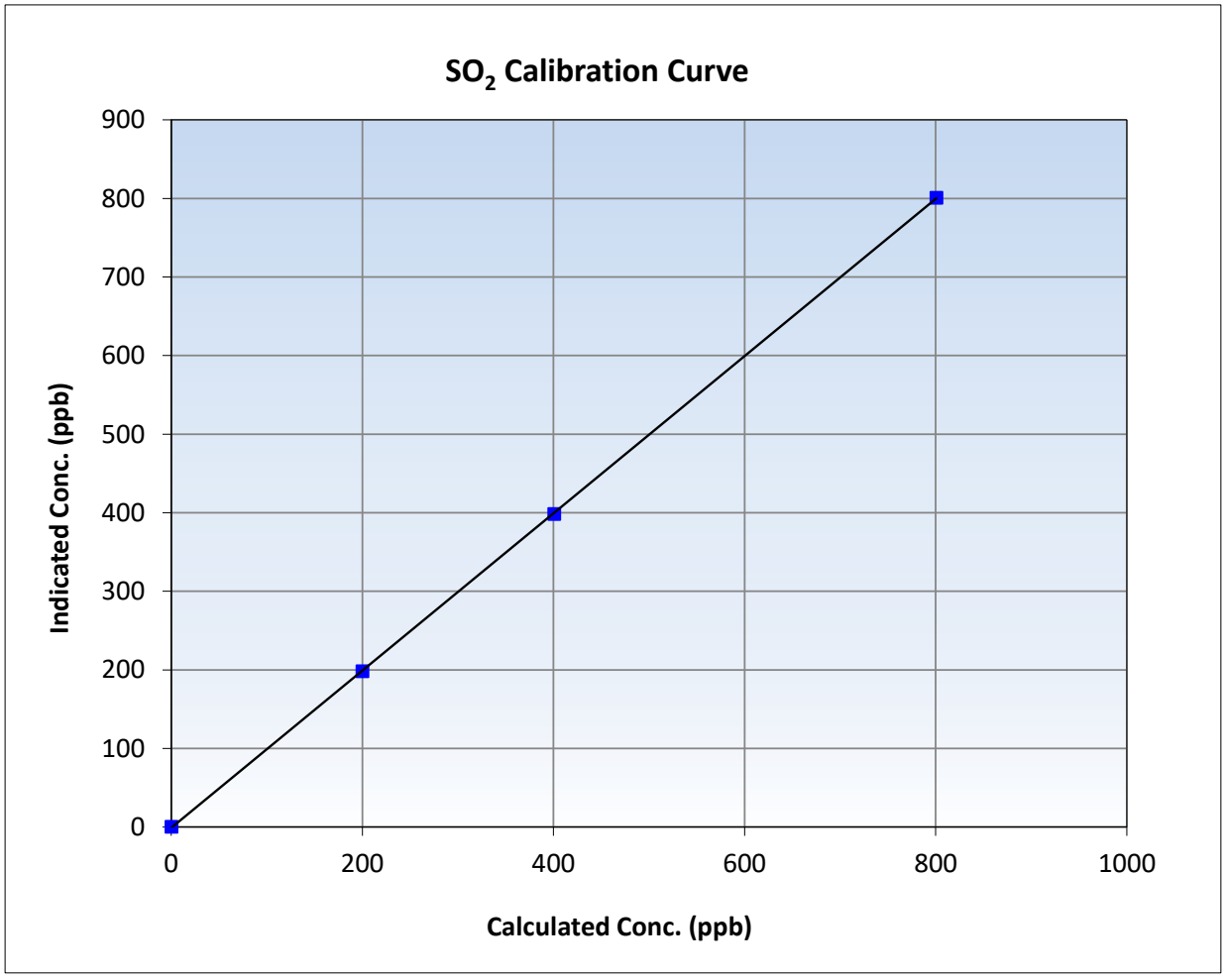
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 3, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:22	End Time (MST):	12:35
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301448

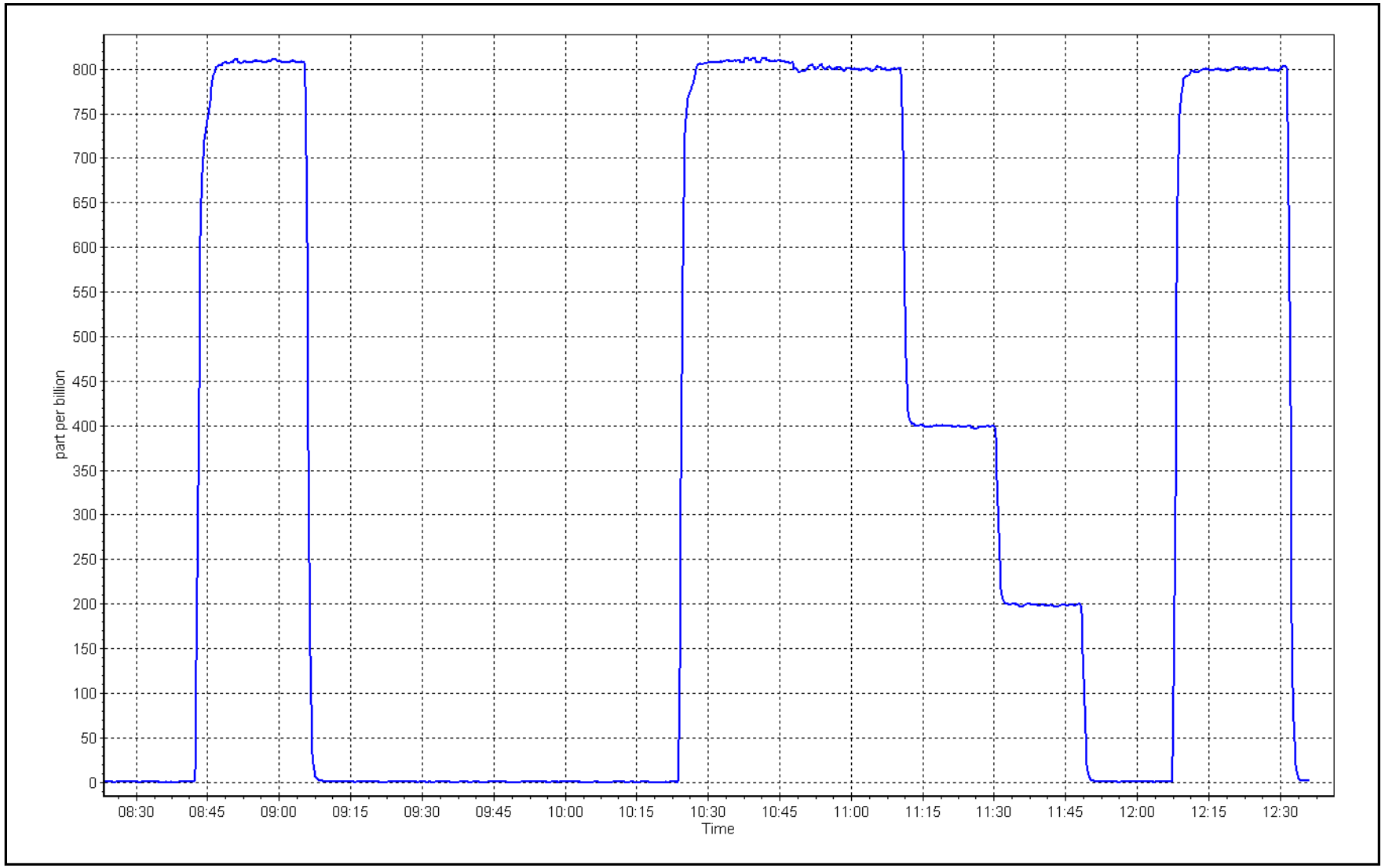
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.3	800.6	0.9996
400.6	398.3	1.0058
199.8	198.2	1.0082

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	1.000564	*0.90 - 1.10*
Intercept	-1.035075	*+/-30*



SO2 Calibration Plot Date: May 16, 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:	May 13, 2024	Last Cal Date:	April 9, 2024
Start time (MST):	10:27	End time (MST):	15:00
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:	4890

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001846	0.996559	Backgd or Offset:	2.42	2.39
Calibration intercept:	0.119998	0.179997	Coeff or Slope:	0.918	0.903

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4921	78.4	80.0	79.8	1.003
As found Mid point	4960	39.2	40.0	40.2	0.997
As found Low point	4980	19.6	20.0	20.2	0.995
New cylinder response					

Baseline Corr As found:	79.7	Prev response:	80.25	*% change:	-0.7%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.996130	AF Intercept:	0.219998
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999986	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4921	78.4	80.0	79.8	1.002
Mid point	4960	39.2	40.0	40.2	0.995
Low point	4980	19.6	20.0	20.1	0.995
As left zero	5000	0.0	0.0	0.3	----
As left span	4921	78.4	80.0	79.6	1.005
SO2 Scrubber Check	4919	81.3	813.0	0.0	----

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	0.997
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

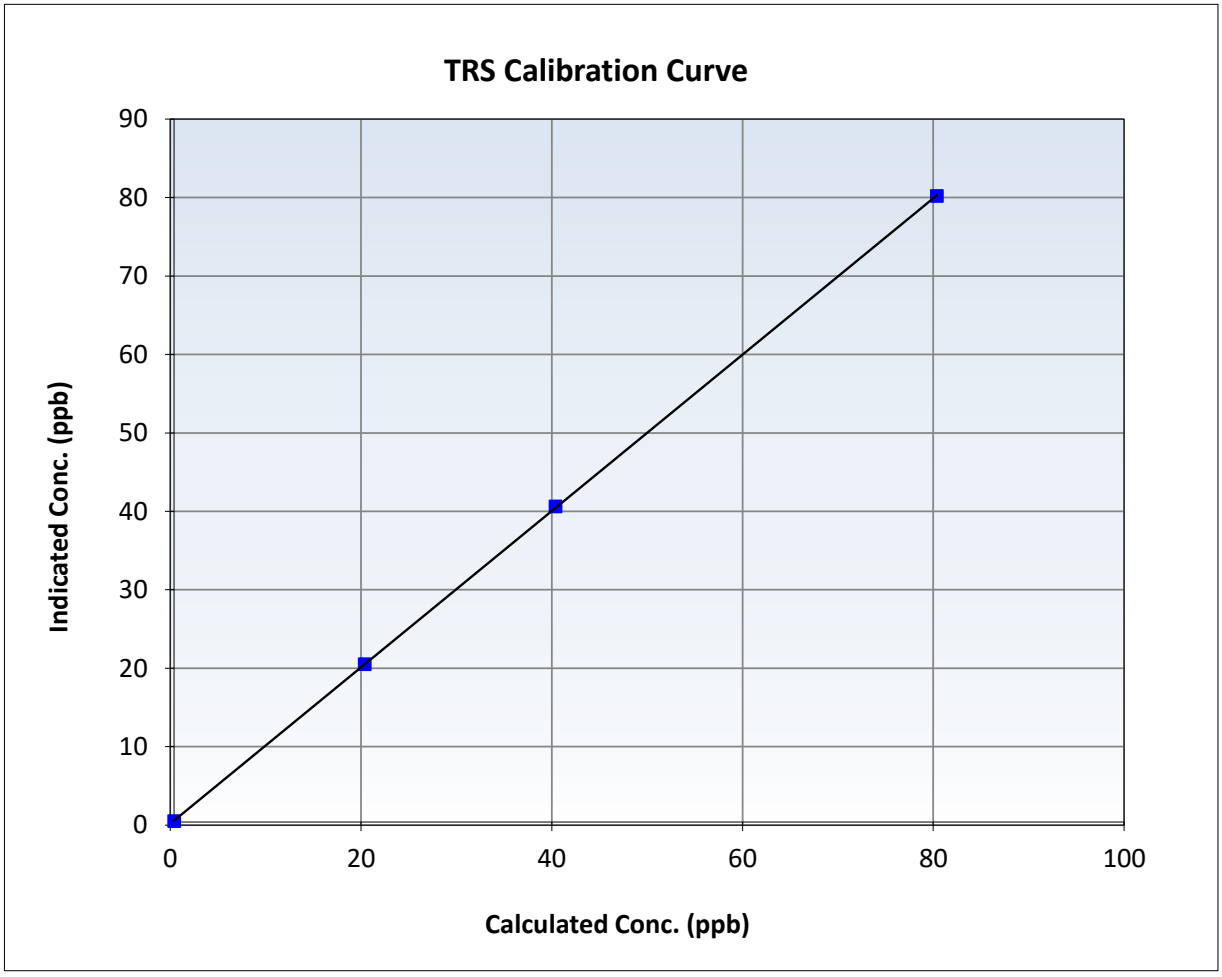
TRS Calibration Summary

Station Information

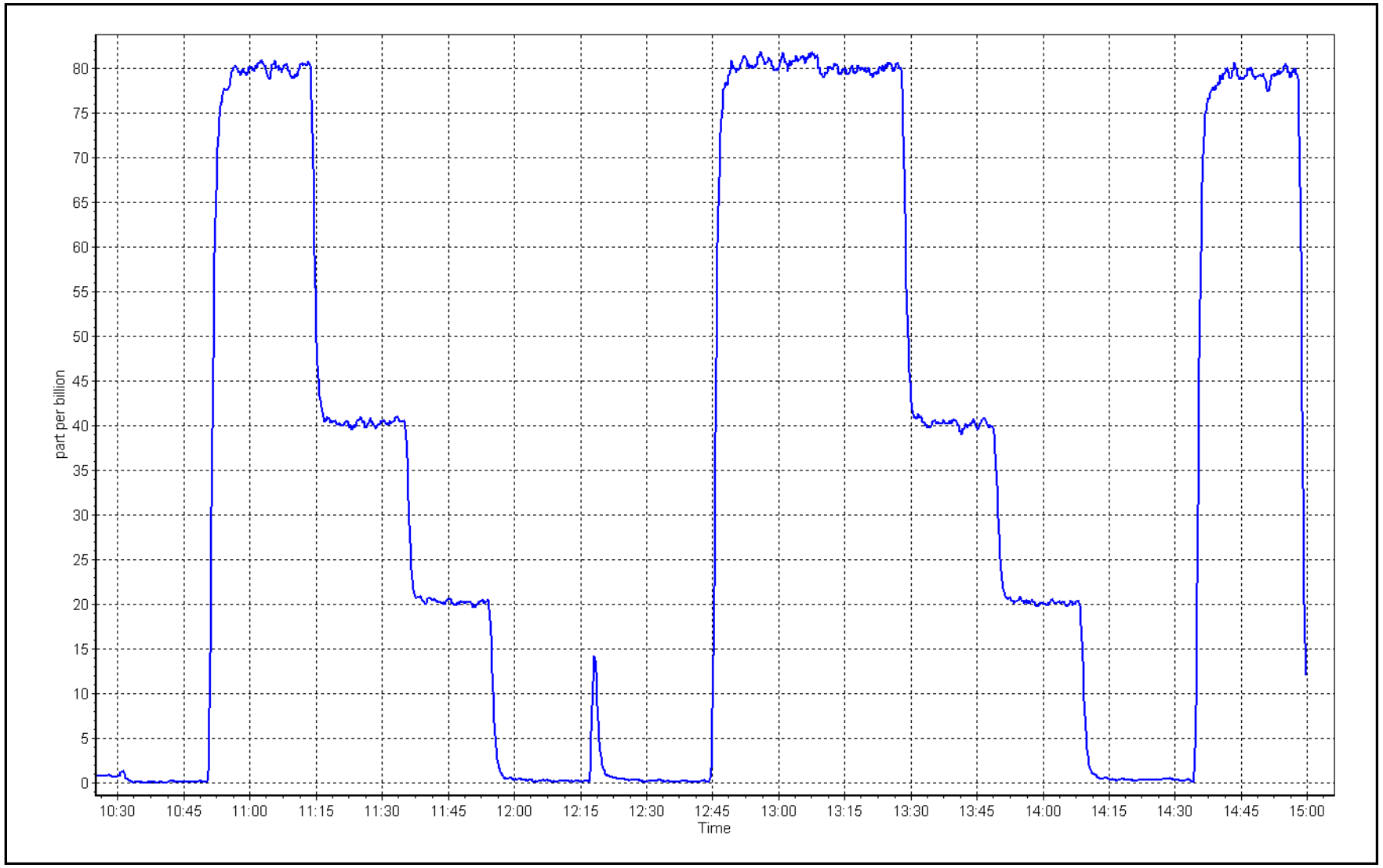
Calibration Date:	May 13, 2024	Previous Calibration:	April 9, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:27	End Time (MST):	15:00
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999988	*≥0.995*
80.0	79.8	1.0022	Slope	0.996559	*0.90 - 1.10*
40.0	40.2	0.9948			
20.0	20.1	0.9947	Intercept	0.179997	*+/-3*



TRS Calibration Plot Date: May 13, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 13, 2024	Last Cal Date:	April 9, 2024
Start time (MST):	10:27	End time (MST):	15:00
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:	4890

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

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002768	1.002910	Backgd or Offset:	2.03	2.01
Calibration intercept:	0.016774	-0.063214	Coeff or Slope:	0.985	0.974

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4922	78.4	80.0	80.8	0.987
As found Mid point	4960	39.2	40.0	40.6	0.980
As found Low point	4980	19.6	20.0	19.9	0.995
New cylinder response					

Baseline Corr As found:	81.0	Prev response:	80.20	*% change:	1.0%
Baseline Corr 2nd AF pt:	40.8	AF Slope:	1.014059	AF Intercept:	-0.203262
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999972	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4922	78.4	80.0	80.1	0.998
Mid point	4960	39.2	40.0	40.1	0.997
Low point	4980	19.6	20.0	20.0	1.000
As left zero	5000	0.0	0.0	0.0	----
As left span	4922	78.4	80.0	79.9	1.001
SO2 Scrubber Check	4919	81.3	813.0	0.1	----
Date of last scrubber change:		January 25, 2024		Ave Corr Factor	0.998
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

H_2S Calibration Summary

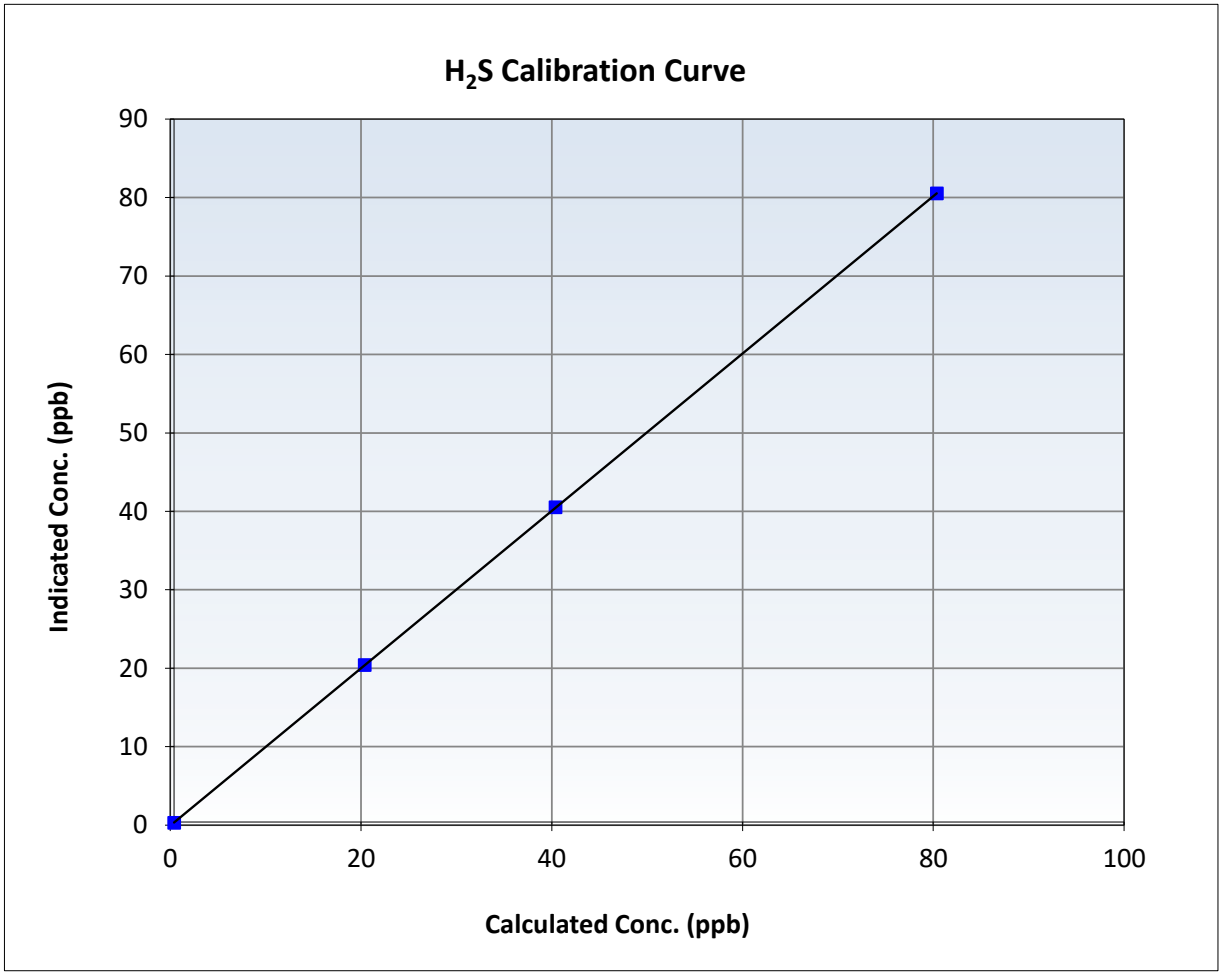
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 9, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:27	End Time (MST):	15:00
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1200326167

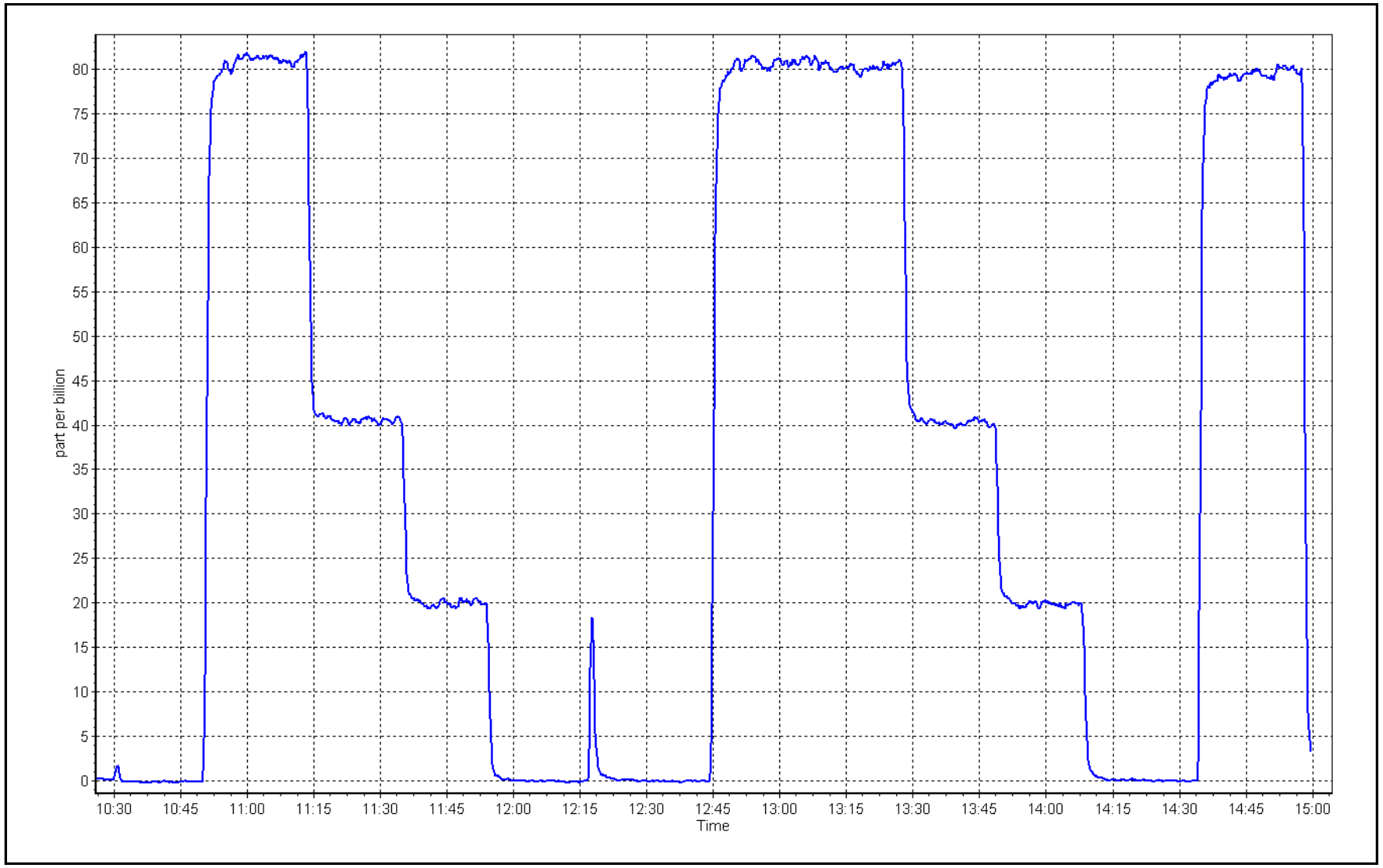
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	80.1	0.9983
40.0	40.1	0.9973
20.0	20.0	0.9997

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.002910	*0.90 - 1.10*
Intercept	-0.063214	*+/-3*



H_2S Calibration Plot Date: May 13, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 16, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	9:22	End time (MST):	12:35
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 (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
Zero Air Gen model:	Teledyne API T701		Serial Number:	4890	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320040	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	4.31E-04	4.36E-04	NMHC SP Ratio:	7.53E-05	7.78E-05
CH4 Retention time:	16.7	16.7	NMHC Peak Area:	122095	118187
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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	17.27	16.83	1.026
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.83	Prev response	17.25	*% change	-2.5%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	17.27	17.24	1.002
Mid point	4959	40.7	8.64	8.49	1.019
Low point	4979	20.3	4.31	4.21	1.023
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	17.27	17.09	1.010
				Average Correction Factor	1.015

Notes: Calibrating remotely. N2 cylinder was changed after as founds. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	9.18	8.88	1.034
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.88	Prev response	9.21	*% 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	9.18	9.18	1.000
Mid point	4959	40.7	4.60	4.54	1.012
Low point	4979	20.3	2.29	2.28	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	9.18	9.05	1.014
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	8.09	7.95	1.018
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.95	Prev response	8.05	*% change	-1.3%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	8.09	8.06	1.003
Mid point	4959	40.7	4.05	3.94	1.026
Low point	4979	20.3	2.02	1.93	1.046
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	8.09	8.04	1.005
				Average Correction Factor	1.025

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.001141	0.999301
THC Cal Offset:	-0.034037	-0.065629
CH4 Cal Slope:	1.000742	0.998751
CH4 Cal Offset:	-0.042118	-0.050322
NMHC Cal Slope:	1.001953	0.999822
NMHC Cal Offset:	0.007481	-0.015708

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

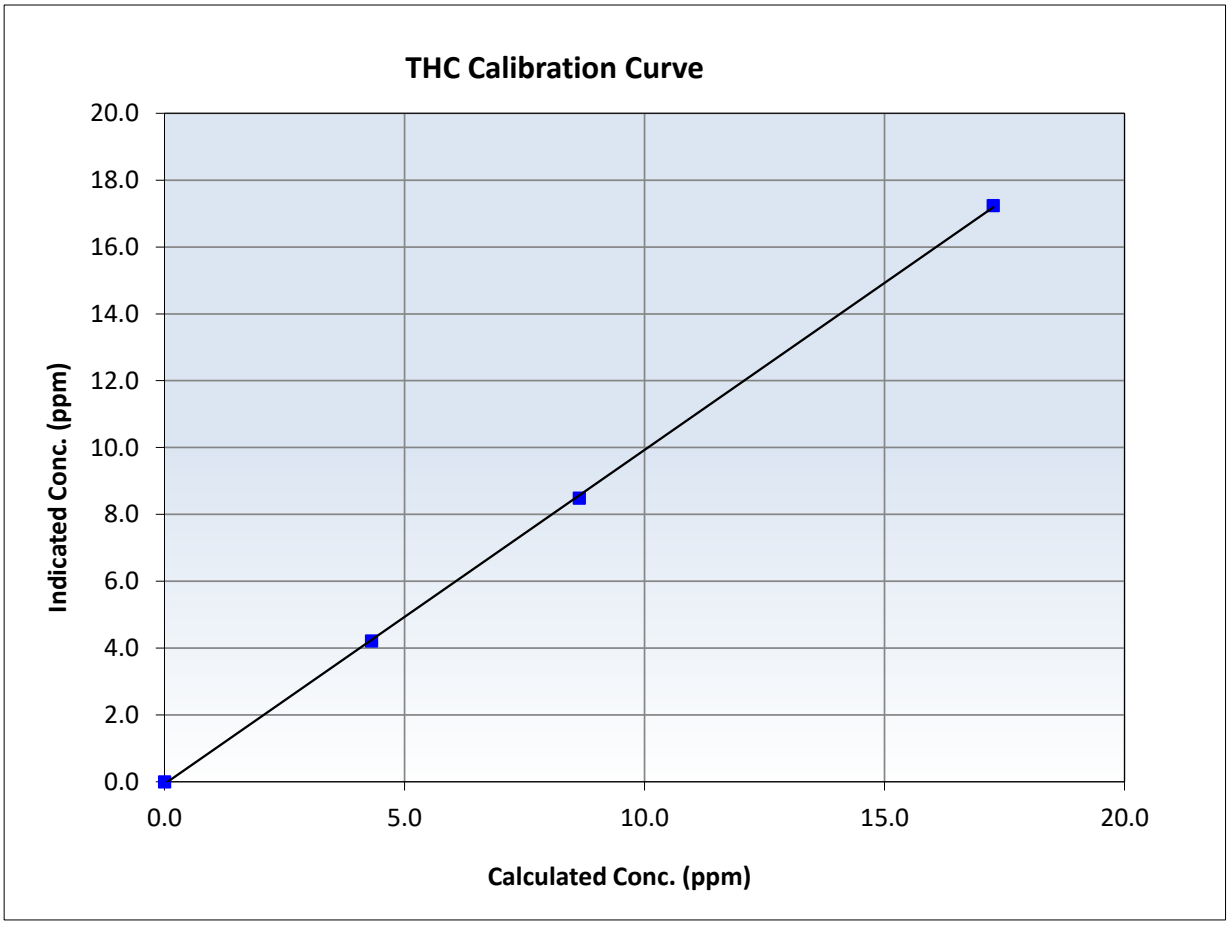
THC Calibration Summary

Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 3, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:22	End Time (MST):	12:35
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	0.999906	≥0.995
17.27	17.24	1.0016	Slope	0.999301	0.90 - 1.10
8.64	8.49	1.0187	Intercept	-0.065629	+/-0.5
4.31	4.21	1.0234			



Wood Buffalo Environmental Association

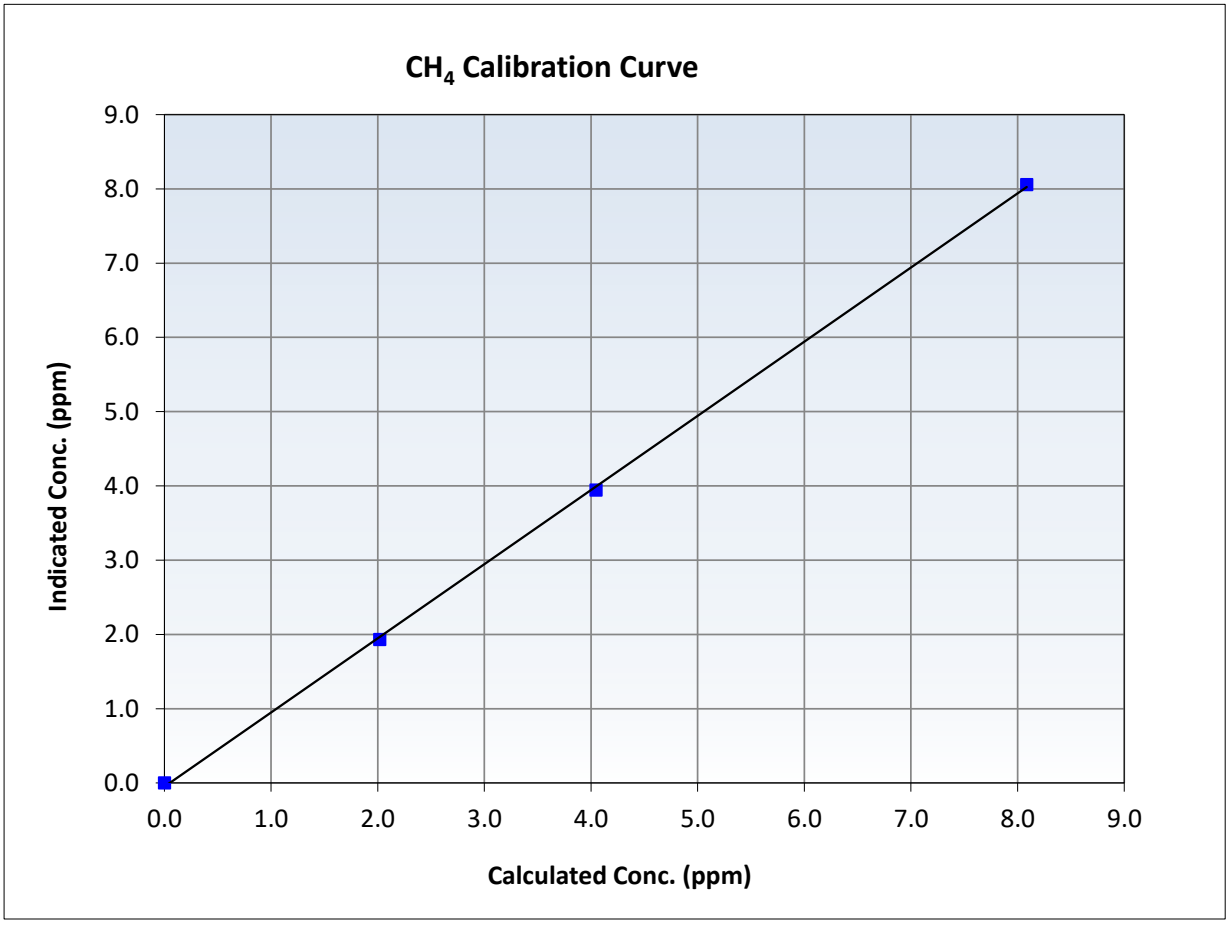
CH_4 Calibration Summary

Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 3, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:22	End Time (MST):	12:35
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	0.999800	*≥0.995*
8.09	8.06	1.0034	Slope	0.998751	*0.90 - 1.10*
4.05	3.94	1.0262			
2.02	1.93	1.0455	Intercept	-0.050322	*+/-0.5*



Wood Buffalo Environmental Association

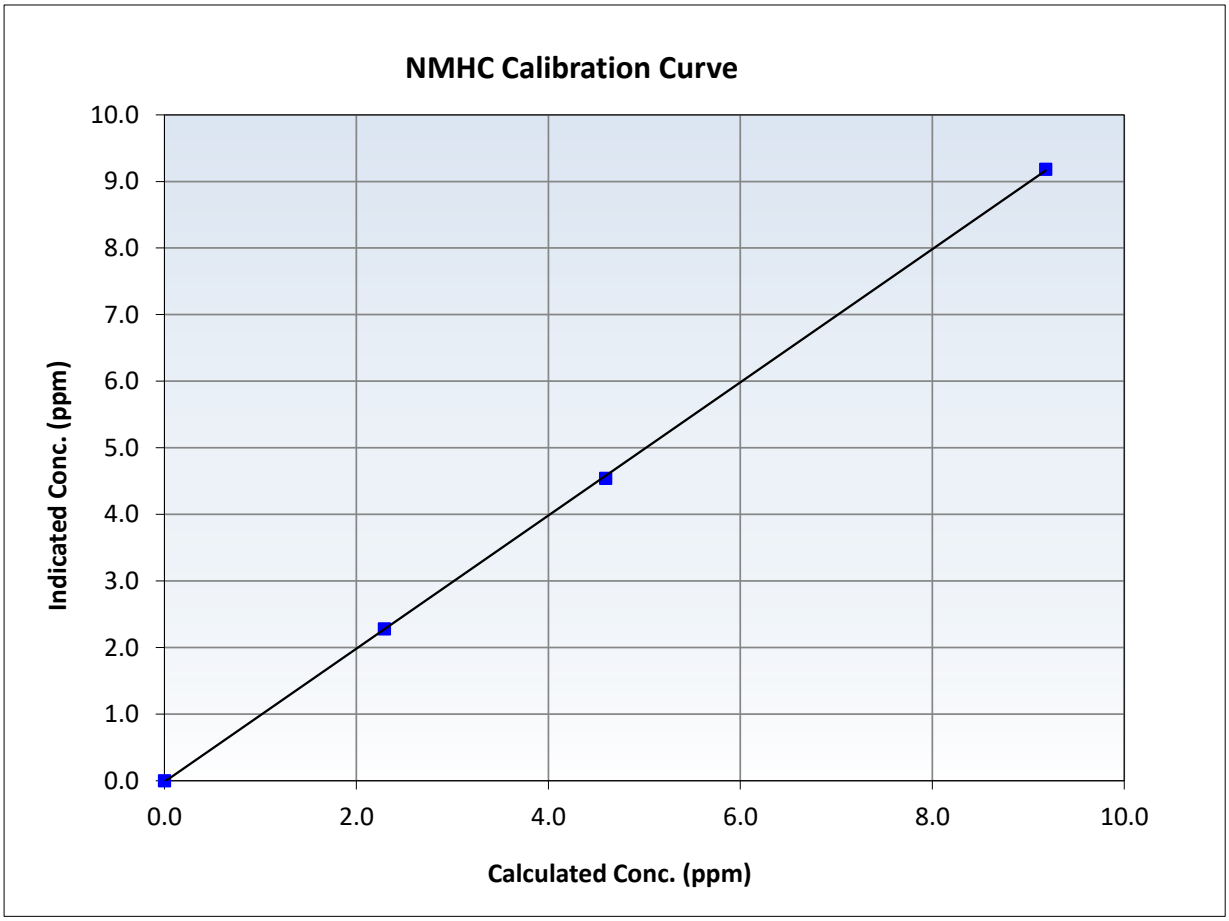
NMHC Calibration Summary

Station Information

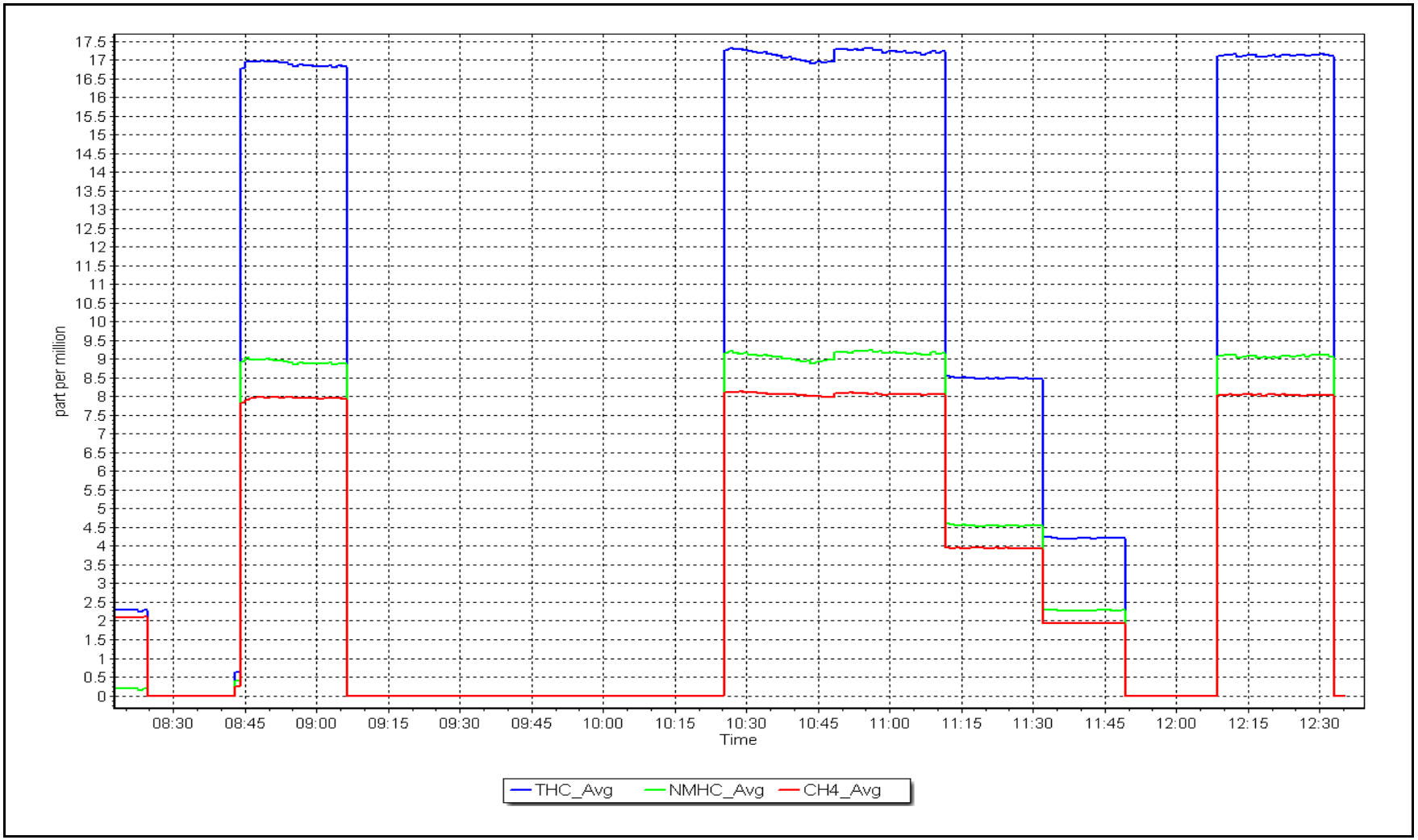
Calibration Date:	May 16, 2024	Previous Calibration:	April 3, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:22	End Time (MST):	12:35
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999955	*≥0.995*
9.18	9.18	0.9999	Slope	0.999822	*0.90 - 1.10*
4.60	4.54	1.0121	Intercept	-0.015708	*+/-0.5*
2.29	2.28	1.0050			



NMHC Calibration Plot Date: May 16, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay
Station number:	AMS 01
Calibration Date:	May 8, 2024
Last Cal Date:	April 8, 2024
Start time (MST):	10:11
End time (MST):	13:06
Reason:	Removal

Calibration Standards

NO Gas Cylinder #:	CC335700	Cal Gas Expiry Date:	September 1, 2032
NOX Cal Gas Conc:	59.40 ppm	NO Cal Gas Conc:	59.20 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	59.40 ppm	Removed Gas NO Conc:	59.20 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3565
ZAG make/model:	Teledyne API T701	Serial Number:	4890

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	26.4	26.4	0.0	----	----
AF High point	4932	67.6	803.1	800.4	2.7	820.8	811.2	9.6	1.0109	1.0199
AF Mid point	4966	33.8	401.5	400.2	1.4	422.7	417.4	5.3	1.0132	1.0235
AF Low point	4983	16.9	200.8	200.1	0.7	224.6	220.7	3.9	1.0130	1.0298
New cyl resp										

Previous Response	NO_X = 802.8 ppb	NO = 799.3 ppb
Baseline Corr 1st pt	NO_X = 794.4 ppb	NO = 784.8 ppb
Baseline Corr 2nd pt	NO_X = 396.3 ppb	NO = 391.0 ppb
Baseline Corr 3rd pt	NO_X = 198.2 ppb	NO = 194.3 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -1.1%

*Percent Change NO = -1.9%

As Found Statistics

As found	NO_X r^2: 0.999998	Nx Sl: 0.989224	Nx Int: 26.060
As found	NO r^2: 0.999992	NO Sl: 0.981143	NO Int: 25.360
As found	NO_2 r^2: 0.999850	NO2 Sl: 0.998389	NO_2 Int: 2.327

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
As Found GPT zero	----	----	0.0	0.0	----	----
As found high GPT point	807.6	406.5	403.8	404.5	0.9983	100.2%
As found mid GPT point	807.6	614.6	195.7	198.5	0.9859	101.4%
As found low GPT point	807.6	714.2	96.1	100.8	0.9534	104.9%

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
Serial Number: 1218153357
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.522		NO bkgnd or offset:	7.5	
NOX coeff or slope:	0.997		NOX bkgnd or offset:	7.6	
NO2 coeff or slope:	1.000		Reaction cell Press:	201.3	

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.999129	
NO_X Cal Offset:	0.380000	
NO Cal Slope:	0.999991	
NO Cal Offset:	-1.040000	
NO_2 Cal Slope:	0.995614	
NO_2 Cal Offset:	1.058457	

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero										
High point										
Mid point										
Low point										
As left zero										
As left span										
								Average Correction Factor		

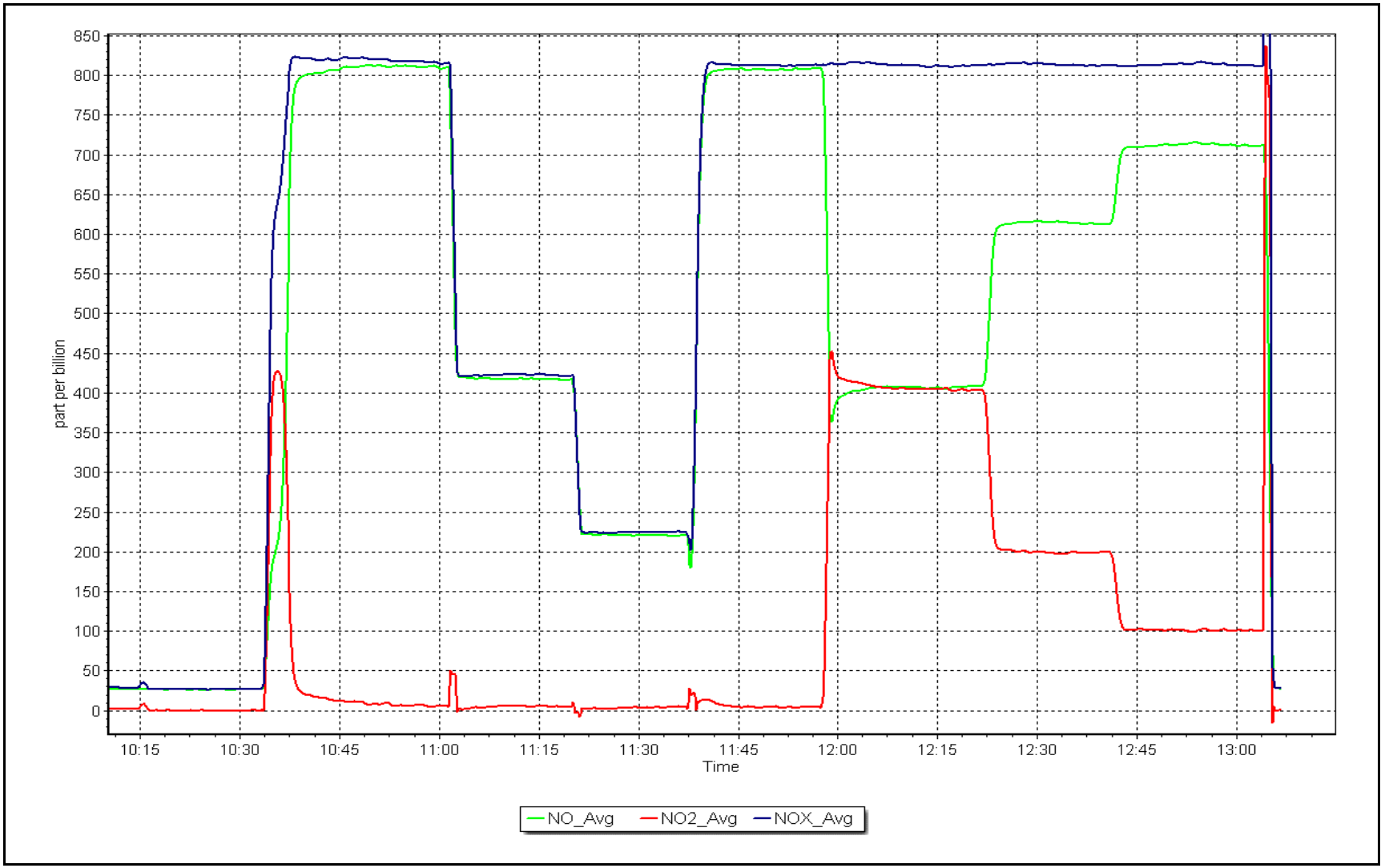
GPT Calibration Data

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero						
High GPT point						
Mid GPT point						
Low GPT point						
				Average Correction Factor		

Notes: PMT cooler failed. Removing the instrument.

Calibration Performed By: Rene Chamberland

NO_X Calibration Plot Date: May 8, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay
Station number:	AMS 01
Calibration Date:	May 9, 2024
Last Cal Date:	NA
Start time (MST):	10:15
End time (MST):	14:54
Reason:	Install

Calibration Standards

NO Gas Cylinder #:	CC335700	Cal Gas Expiry Date:	September 1, 2032
NOX Cal Gas Conc:	59.40 ppm	NO Cal Gas Conc:	59.20 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	59.40 ppm	Removed Gas NO Conc:	59.20 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3565
ZAG make/model:	Teledyne API T701	Serial Number:	4890

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
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	As Found Statistics	*Percent Change	NO =	NA
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO r^2:	NO Sl:	NO Int:	
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 7117

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:		1.106	NO bkgnd or offset:		-0.5
NOX coeff or slope:		1.103	NOX bkgnd or offset:		-0.4
NO2 coeff or slope:		1.000	Reaction cell Press:		6.0

Calibration Statistics

	Start	Finish
NO_X Cal Slope:		1.000652
NO_X Cal Offset:		-2.280000
NO Cal Slope:		1.000563
NO Cal Offset:		-2.540000
NO_2 Cal Slope:		0.998079
NO_2 Cal Offset:		-0.755680

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
High point	4932	67.6	803.1	800.4	2.7	802.8	799.9	2.9	1.0004	1.0006
Mid point	4966	33.8	401.5	400.2	1.4	397.5	395.7	1.8	1.0102	1.0114
Low point	4983	16.9	200.8	200.1	0.7	196.8	195.6	1.2	1.0202	1.0230
As left zero	5000	0.0	0.0	0.0	0.0	0.4	0.5	-0.1	----	----
As left span	4932	67.6	803.1	390.3	412.8	794.6	390.3	404.3	1.0107	1.0000
							Average Correction Factor		1.0102	1.0116

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	795.4	386.7	411.4	410.2	1.0029	99.7%
Mid GPT point	795.4	591.3	206.8	205.4	1.0068	99.3%
Low GPT point	795.4	693.2	104.9	103.1	1.0175	98.3%
				Average Correction Factor	1.0091	99.1%

Notes: Installing a new instrument. Changed the inlet filter. Adjusted both zero and span.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

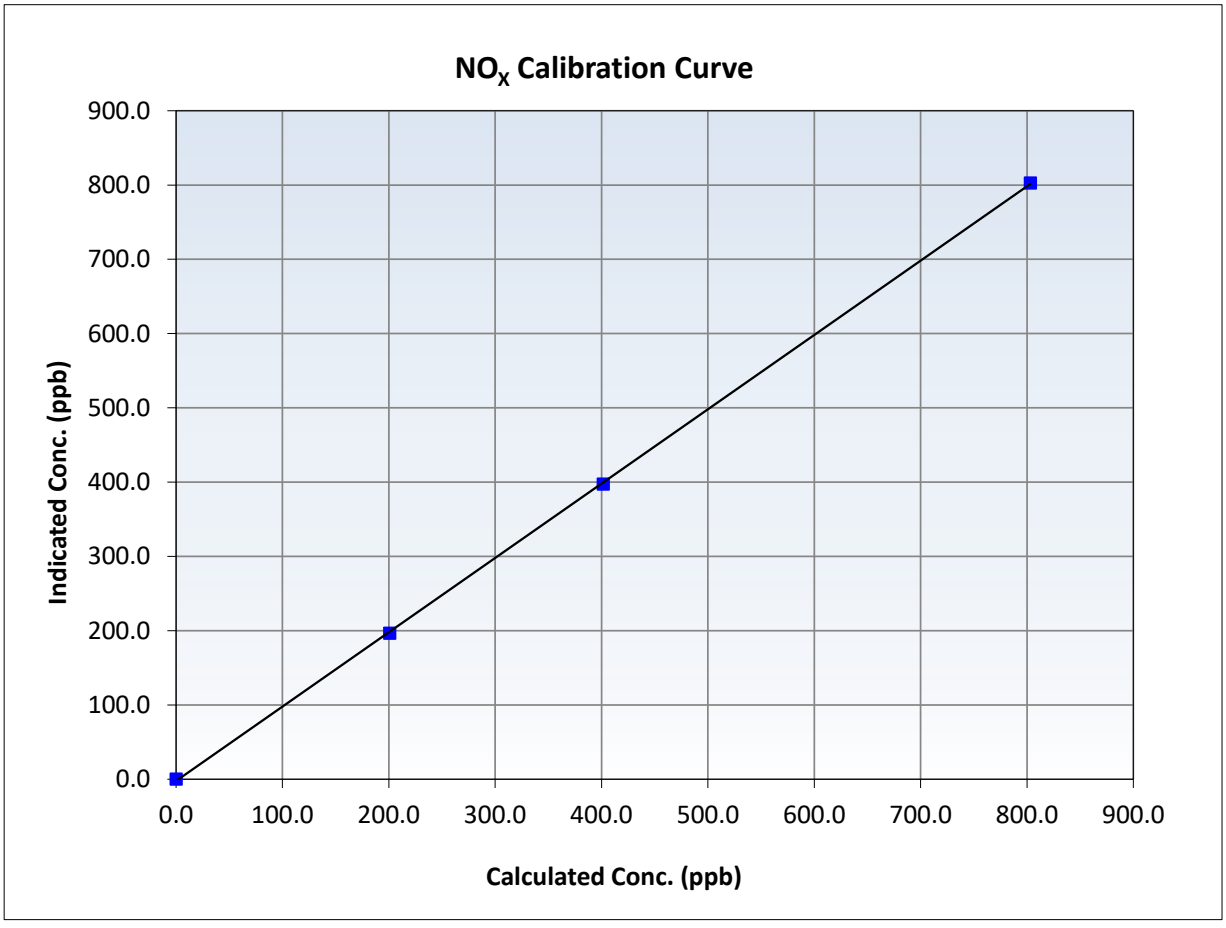
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	NA
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:15	End Time (MST):	14:54
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
803.1	802.8	1.0004
401.5	397.5	1.0102
200.8	196.8	1.0202

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999957	*≥0.995*
Slope	1.000652	*0.90 - 1.10*
Intercept	-2.280000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

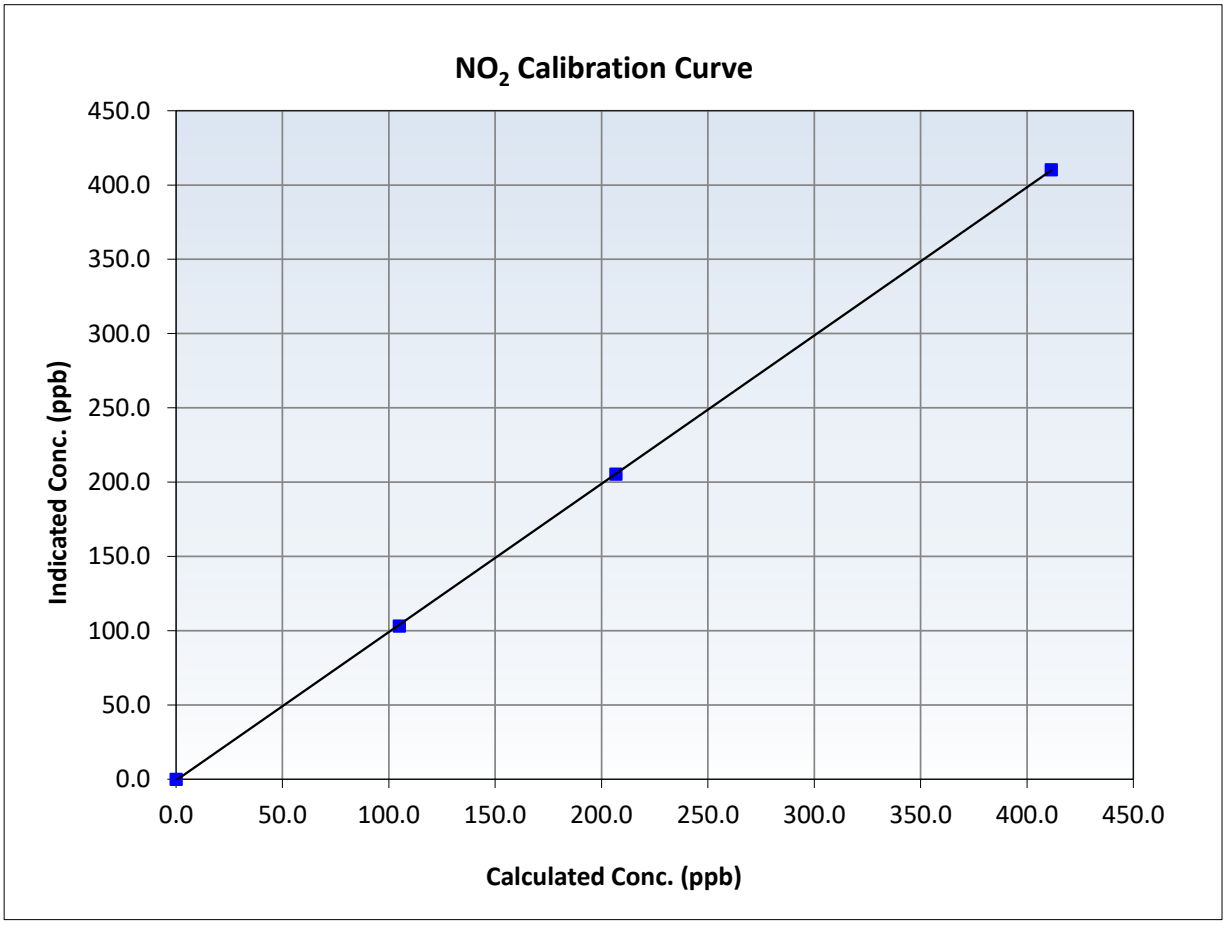
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	NA
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:15	End Time (MST):	14:54
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
411.4	410.2	1.0029
206.8	205.4	1.0068
104.9	103.1	1.0175

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	0.998079	*0.90 - 1.10*
Intercept	-0.755680	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

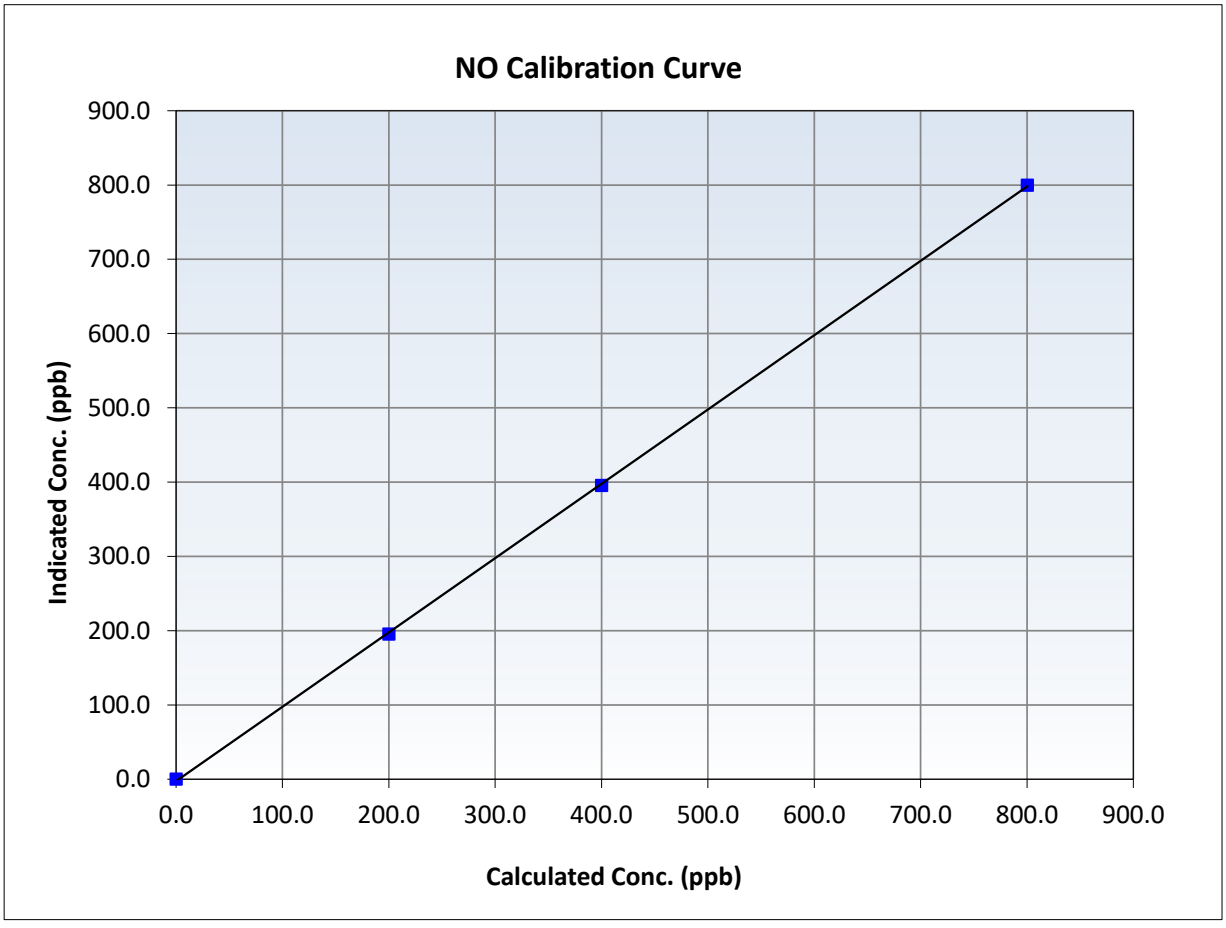
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	NA
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:15	End Time (MST):	14:54
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

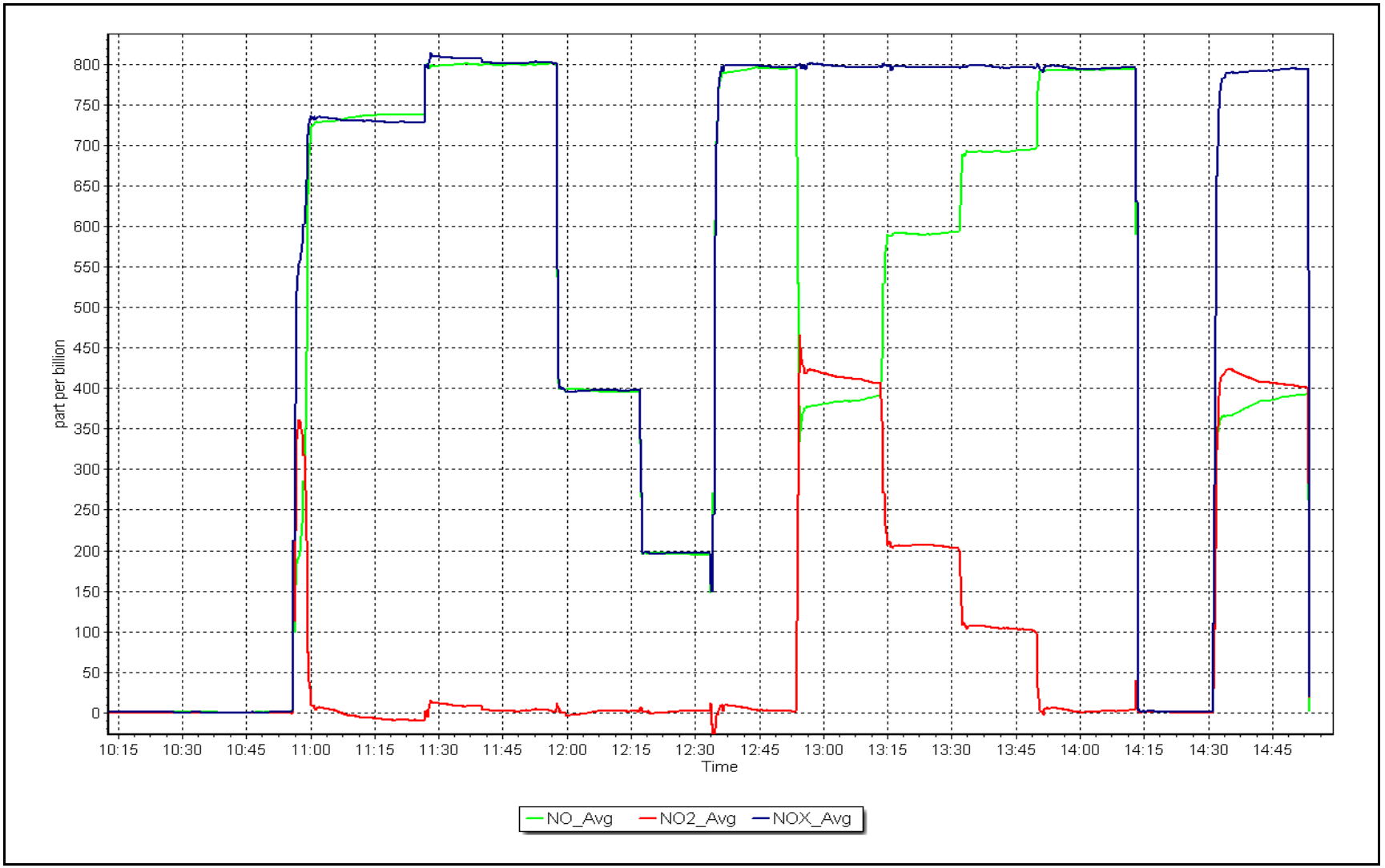
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.4	799.9	1.0006
400.2	395.7	1.0114
200.1	195.6	1.0230

Statistical Evaluation		Limits
Correlation Coefficient	0.999947	≥0.995
Slope	1.000563	0.90 - 1.10
Intercept	-2.540000	+/-20



NO_X Calibration Plot Date: May 9, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 1, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	9:48	End time (MST):	12:50
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:	4890

Analyzer Information

Analyzer make:	Teledyne API T400		Analyzer serial #:	1107	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998829	1.000114	Backgd or Offset:	4.6	4.6
Calibration intercept:	0.180000	0.080000	Coeff or Slope:	1.027	1.017

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.3	----
As found High point	5000	863.1	400.0	405.6	0.985
As found Mid point					
As found Low point					
Baseline Corr As found:	405.9	Previous response	399.7	*% change	1.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	5000	863.1	400.0	399.8	1.001
Mid point	5000	742.5	200.0	200.7	0.997
Low point	5000	651.7	100.0	100.2	0.998
As left zero	5000	0.0	0.0	-0.1	----
As left span	5000	863.1	400.0	402.3	0.994
				Average Correction Factor	0.998

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

O_3 Calibration Summary

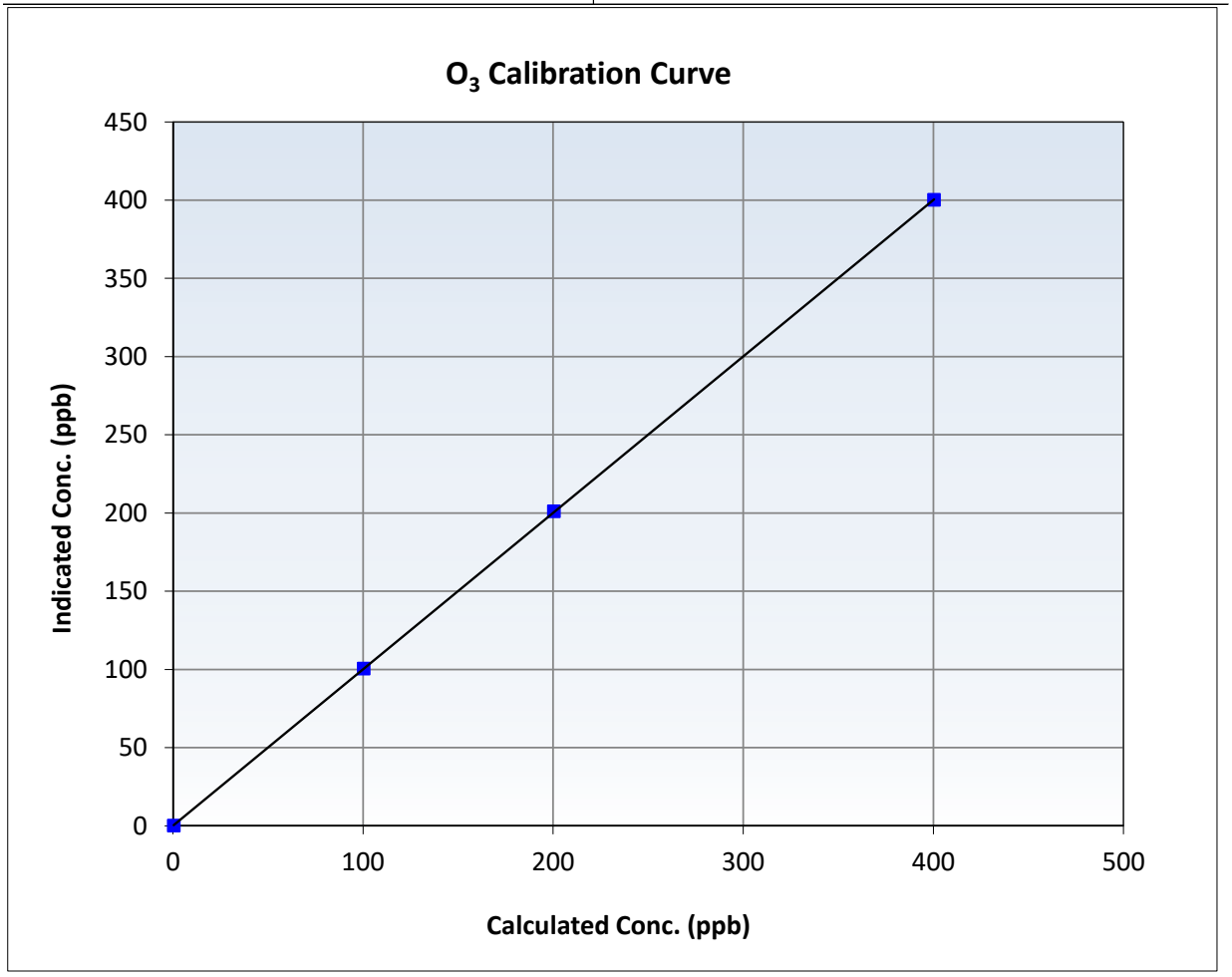
Station Information

Calibration Date:	May 1, 2024	Previous Calibration:	April 2, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:48	End Time (MST):	12:50
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107

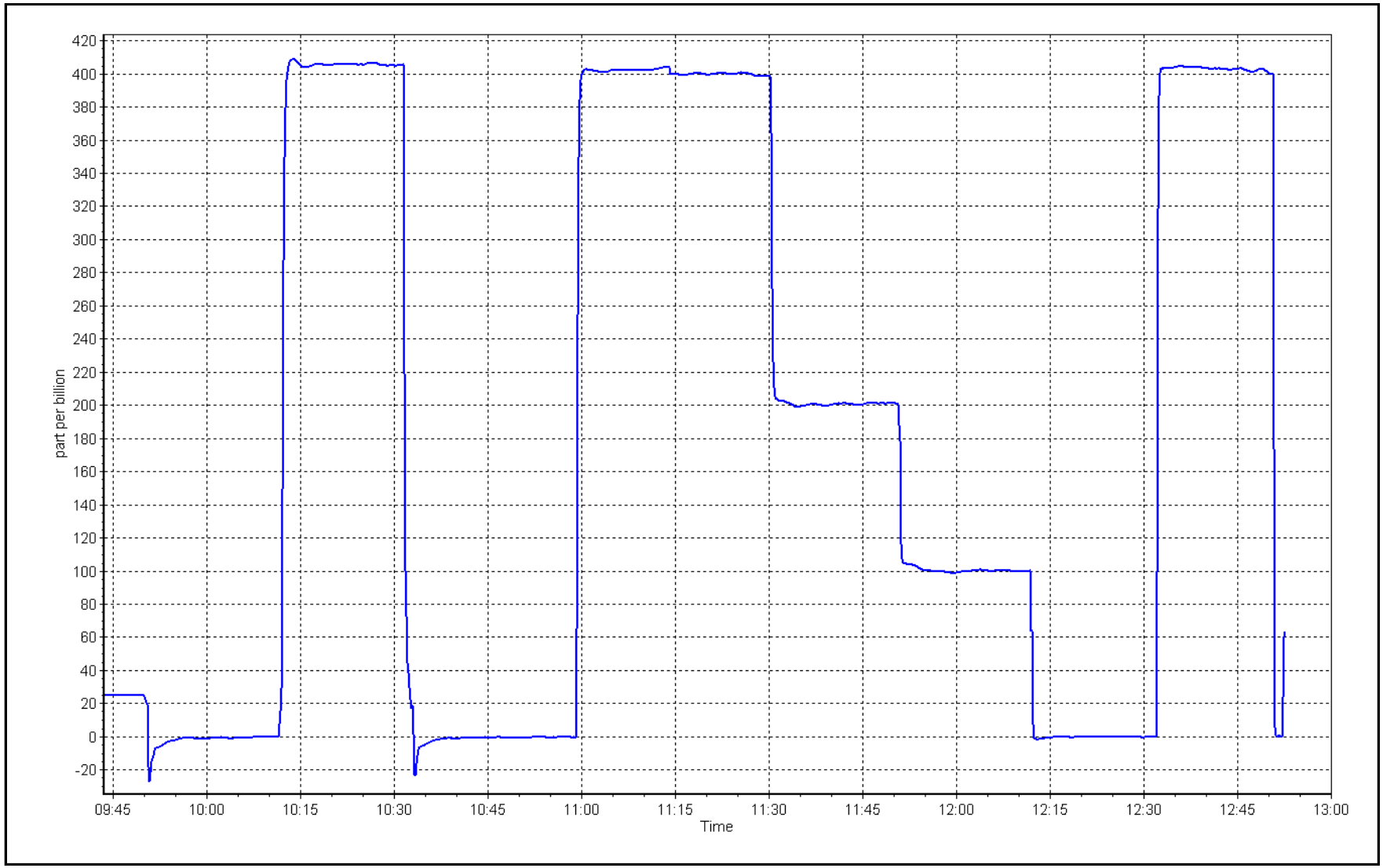
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
400.0	399.8	1.0005
200.0	200.7	0.9965
100.0	100.2	0.9980

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.000114	*0.90 - 1.10*
Intercept	0.080000	*+/- 5*



O_3 Calibration Plot Date: May 1, 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:	May 19, 2024	Last Cal Date:	N/A
Start time (MST):	14:45	End time (MST):	14:58
Analyzer Make:	Teledyne API T640	S/N:	216
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388748
Temp/RH standard:	Alicat FP-25BT	S/N:	388748

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	10.1	9.0	10.1	☐	+/- 2 °C
P (mmHg)	733	735.46	733	☐	+/- 10 mmHg
Flow (LPM)	4.96	5.03	4.96	☐	+/- 0.25 LPM
PW% (pump)	70	-----	70	☐	>80%
Zero Verification	PM w/o HEPA:	1.4	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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	11.0	N/A	11.0	☐	10.9 +/- 0.5

Date Optical Chamber Cleaned: N/A

Date Disposable Filter Changed: N/A

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: September 14, 2023

Date RH/T Sensor Cleaned: April 11, 2024

Notes: Installing new instrument, previous instrument had water damage. Flow, pressure and temp checked. Leak check passed. PMT check done. No adjustments needed.

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 10, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	10:07	End time (MST):	13:50
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000946	1.002580	Backgd or Offset:	-0.013	-0.013
Calibration intercept:	0.155852	0.111862	Coeff or Slope:	0.991	0.990

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	0.1	----
As found High point	4933	66.7	40.6	40.8	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.76	Prev response:	40.75	*% 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4933	66.7	40.6	40.6	0.998
Mid point	4966	33.3	20.2	20.7	0.978
Low point	4983	16.7	10.2	10.2	0.993
As left zero	5000	0.0	0.0	0.0	----
As left span	2960	40.0	40.5	40.1	1.010
				Average Correction Factor	0.989

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Summary

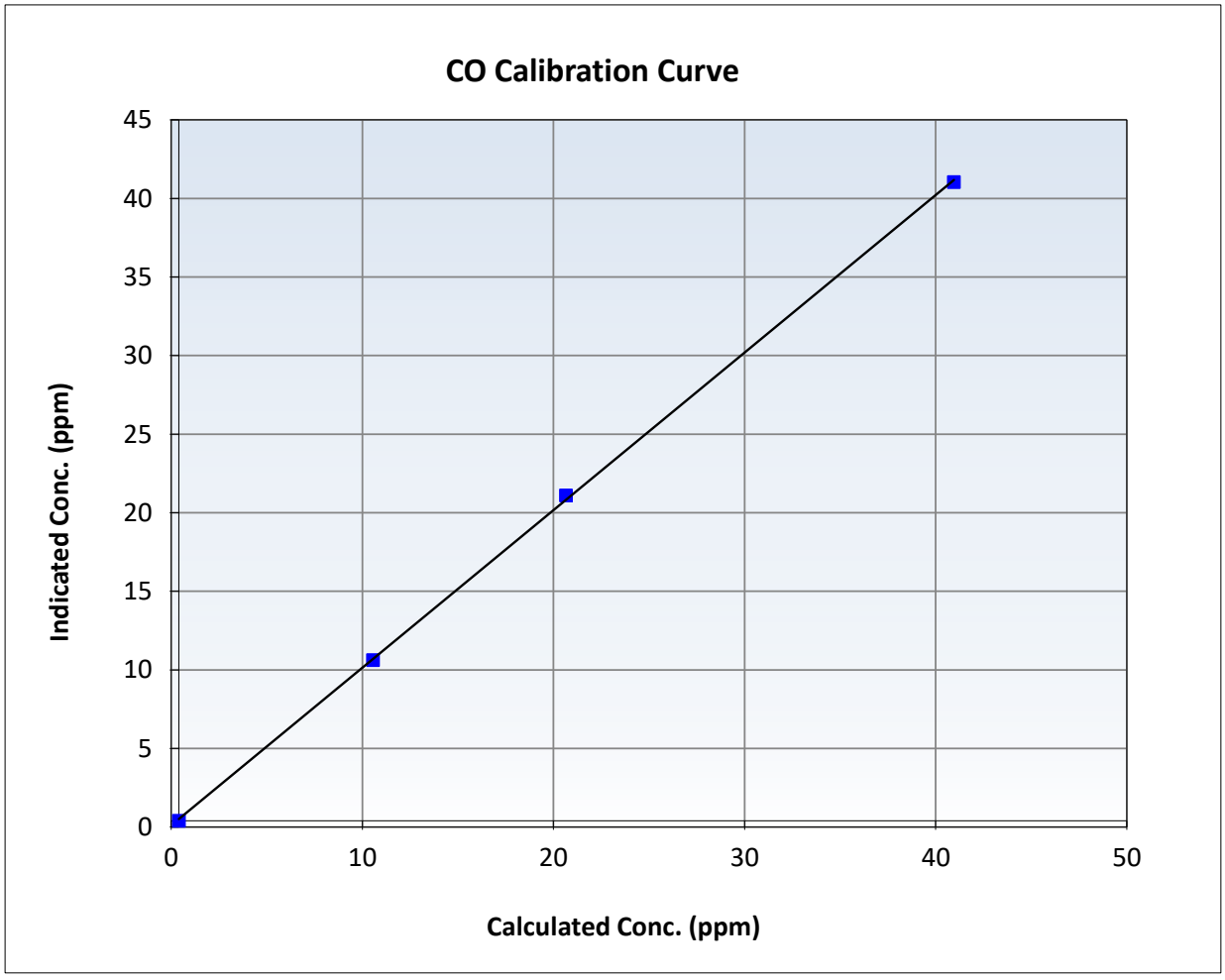
Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	April 10, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:07	End Time (MST):	13:50
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

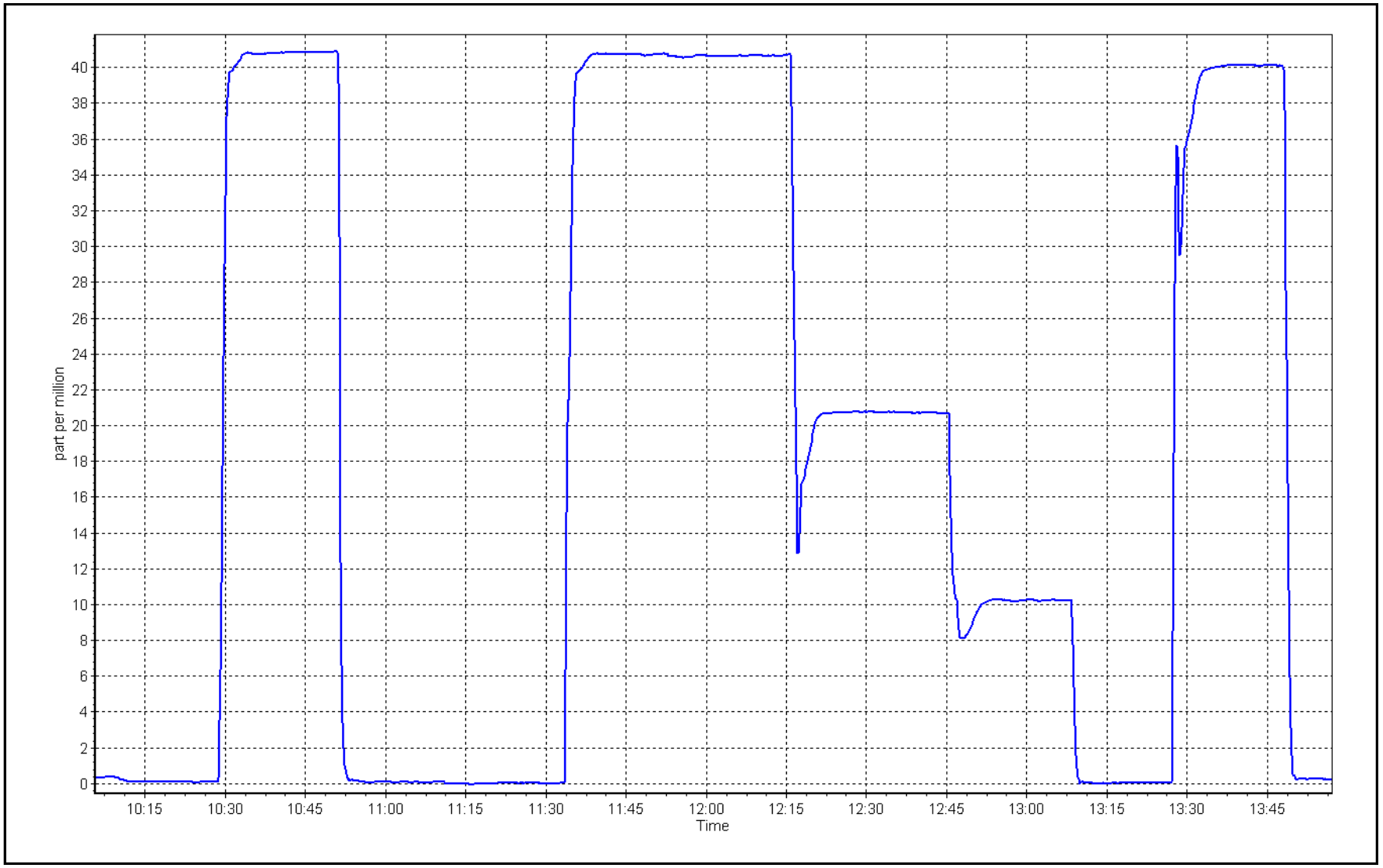
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.6	40.6	0.9979
20.2	20.7	0.9778
10.2	10.2	0.9926

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999867	*≥0.995*
Slope	1.002580	*0.90 - 1.10*
Intercept	0.111862	*+/-1.5*



CO Calibration Plot Date: May 10, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	May 15, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	8:55	End time (MST):	11:57
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001476	1.001149	Backgd or Offset:	0.045	0.045
Calibration intercept:	-5.720000	-6.240000	Coeff or Slope:	0.876	0.876

CO_2 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	-0.2	----
As found High Point	2920	80.0	1605.3	1601.0	1.003
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1601.2	Prev response:	1602.0	*% 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_2 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	1605.3	1604.4	1.001
Mid point	2960	40.0	802.7	793.4	1.012
Low point	2980	20.0	401.3	389.6	1.030
As left zero	3000	0.0	0.0	0.1	----
As left span	2960	40.0	802.7	784.4	1.023
				Average Correction Factor	1.014

Notes: Calibrating remotely. No adjustments made.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO_2 Calibration Summary

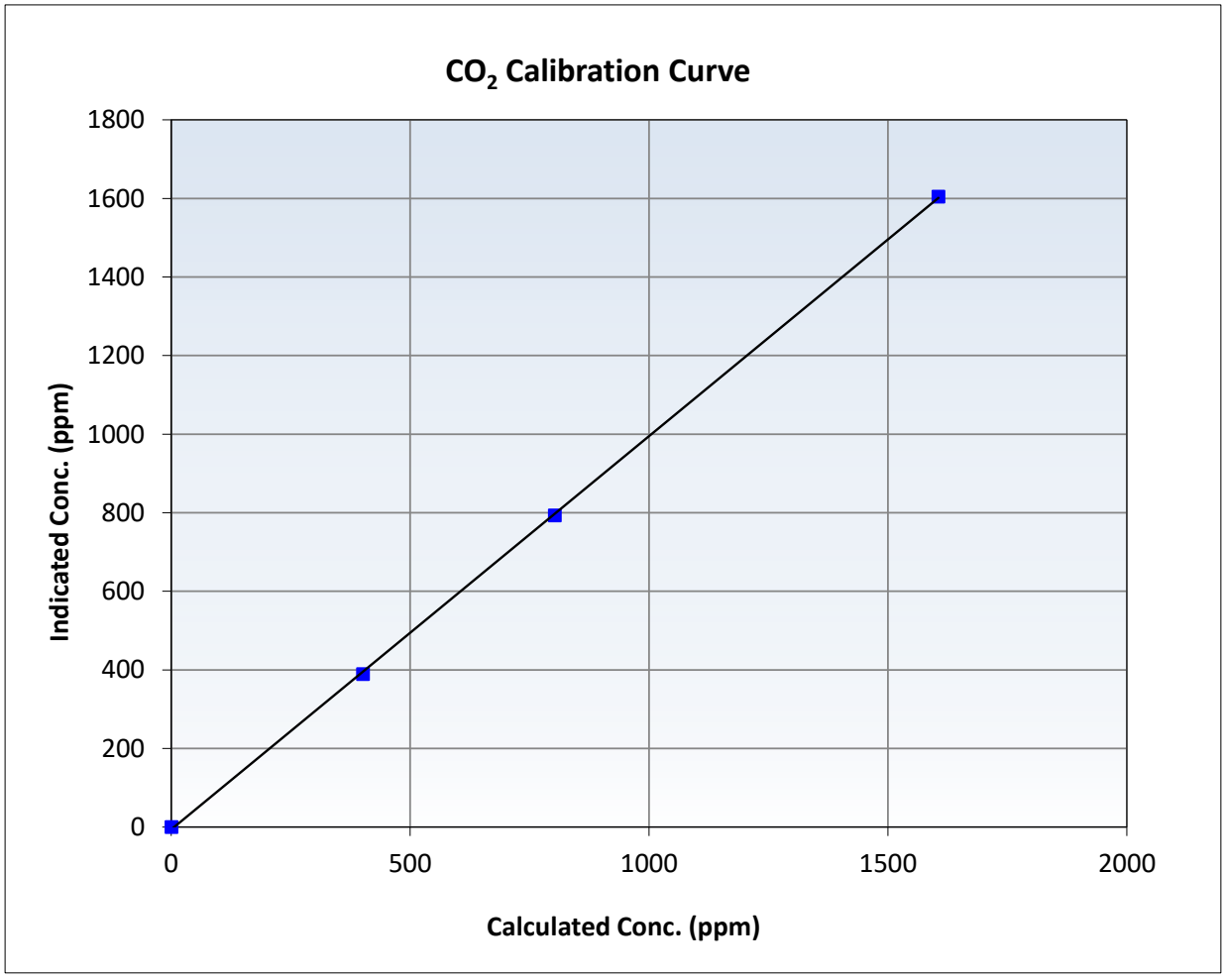
Station Information

Calibration Date	May 15, 2024	Previous Calibration	April 4, 2024
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS 01
Start Time (MST)	8:55	End Time (MST)	11:57
Analyzer make	Teledyne API 360	Analyzer serial #	442

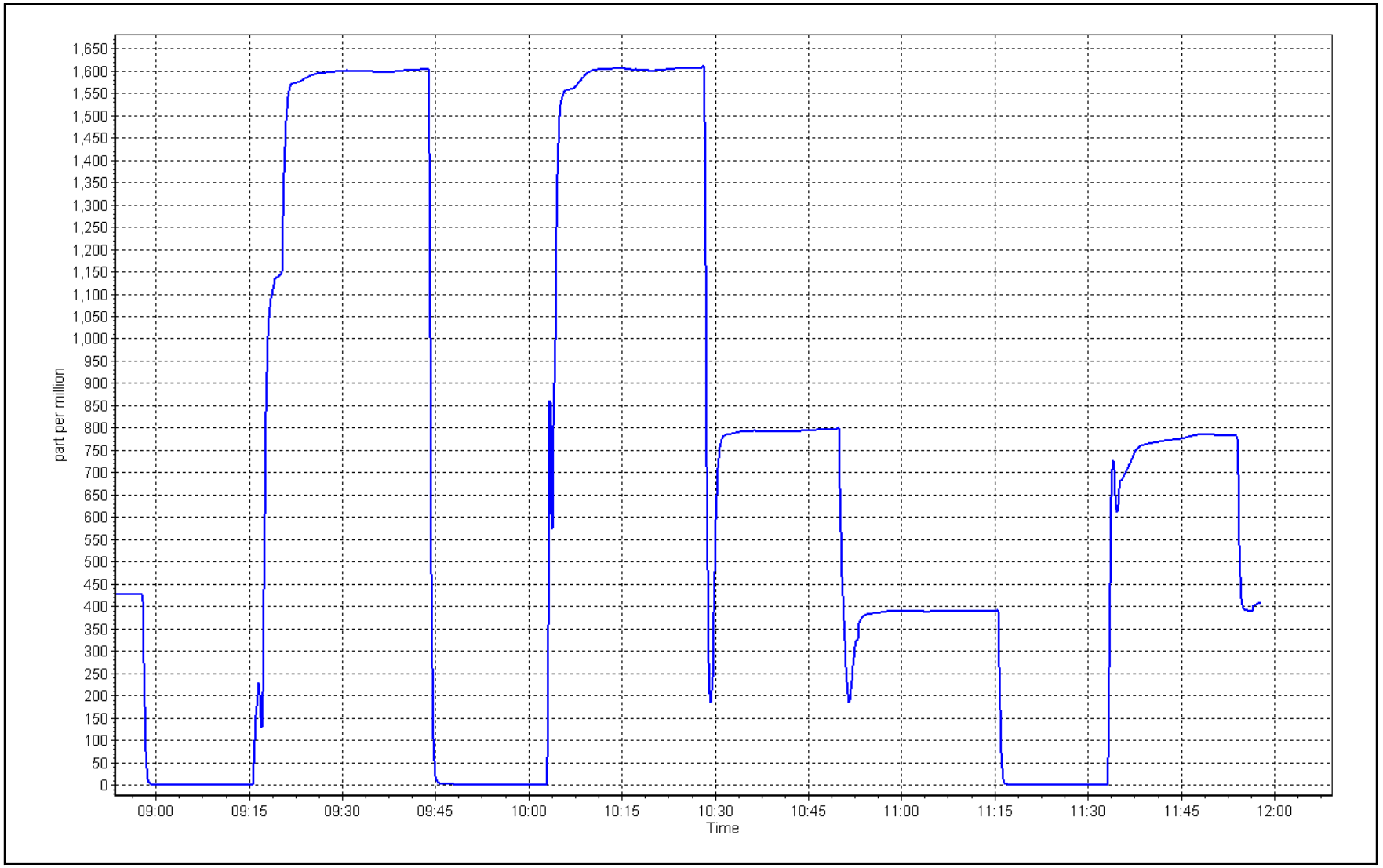
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
1605.3	1604.4	1.0006
802.7	793.4	1.0117
401.3	389.6	1.0301

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999926	*≥0.995*
Slope	1.001149	*0.90 - 1.10*
Intercept	-6.2	*+/-20*



CO_2 Calibration Plot Date: May 15, 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:	May 21, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	9:17	End time (MST):	14:30
NH3 Cal Date:	May 22, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	10:12	End time (MST):	14:08
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:	4890

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:	7.70	
NOX Range (ppb):	0 - 1000 ppb		Sample Flow:	510	
	Start	***Finish***		***Start***	***Finish***
NO coefficient:	0.952	0.907	Nt coefficient:	0.962	0.922
NOX coefficient:	0.959	0.913	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

	Start	***Finish***
NO_X Cal Slope:	1.000623	0.999115
NO_X Cal Offset:	-2.120000	-2.240000
NO Cal Slope:	0.997950	0.998449
NO Cal Offset:	-2.600000	-2.700000
NO_2 Cal Slope:	1.001154	1.000883
NO_2 Cal Offset:	0.886739	-0.637947
NH3 Cal Slope:	0.997027	0.997495
NH3 Cal Offset:	2.325094	1.189973
Nt Cal Slope:	1.000070	1.000452
Nt Cal Offset:	2.166761	1.101631

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

NOx / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NOx Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*	Baseline corr NO Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*
As found zero	5000	0.0	0.0	0.0	0.0	0.8	0.8	0.8	----	----
As found span	4932	67.6	803.1	800.4	803.1	845.1	834.0	837.8	0.9503	0.9597
AF GPT span	4932	67.6	803.1	-----	803.1	801.0	-----	803.0	1.0026	-----
new NO cyl rp										

Baseline Corr As Fd	Nt =	837	ppb	NO_X =	844.3	ppb	NO =	833.2	ppb
Previous Response	Nt =	805.31	ppb	NO_X =	801.5	ppb	NO =	796.1	ppb

**NO_X Δ (NO to GPT response) = -5.2%

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

*Percent Change $Nt_{(NO)}$ = 3.8%

*Percent Change NO_X = 5.1%

*Percent Change NO = 4.4%

* = > +/-5% change initiates investigation

NOx / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.5	----	----
High point	4932	67.6	803.1	800.4	803.1	801.4	798.2	801.7	1.0021	1.0027
Mid point	4966	33.8	401.5	400.2	401.5	397.1	394.3	398.8	1.0112	1.0149
Low point	4983	16.9	200.8	200.1	200.8	197.0	195.2	198.2	1.0191	1.0251
								Average Correction Factor	1.0108	1.0143

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
As Found zero	----	----	0.0	0.0	----	----
Calibration zero	----	----	0.0	-0.3	----	----
High GPT point (400 ppb O3)	795.3	385.2	412.8	412.4	1.0010	99.9%
Mid GPT point (200 ppb O3)	795.3	591.9	206.1	206.4	0.9986	100.1%
Low GPT point (100 ppb O3)	795.3	692.7	105.3	103.8	1.0145	98.6%
				Average Correction Factor	1.0047	99.5%

Wood Buffalo Environmental Association
NH_3 - 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)) *Limit = 0.9 - 1.1*	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*
As found zero	5000	0.0	0.0	0.0	0.0	-1.0	-1.0	0.0	----	----
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 * = > +/-5% change initiates investigation *Percent Change NH3 = NA

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) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.2	----	----
High point	3418	82.2	1798.5	0.0	1798.5	1798.2	5.2	1793.1	1.000	1.003
Mid point	3454	45.7	1000.0	0.0	1000.0	1005.8	2.7	1002.8	0.994	0.997
Low point	3477	22.8	498.9	0.0	498.9	499.8	1.5	498.2	0.998	1.001
								Average Correction Factor	0.9975	1.0005

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

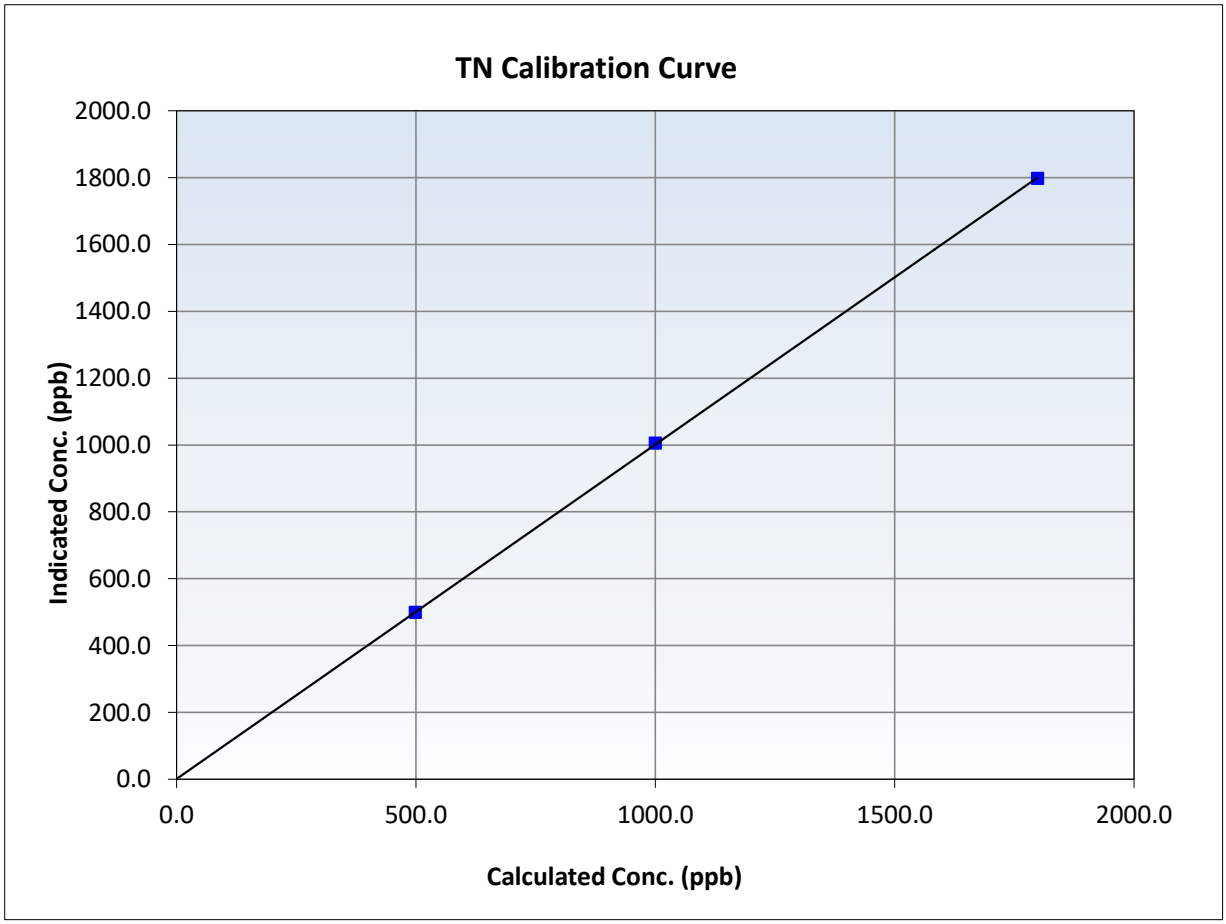
Nt Calibration Summary

Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 11, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:17	End Time (MST):	14:30
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.5	----	Correlation Coefficient	0.999985	*≥0.995*
1798.5	1798.2	1.0002	Slope	1.000452	*0.90 - 1.10*
1000.0	1005.8	0.9942	Intercept	1.101631	*+/-20*
498.9	499.8	0.9981			



Wood Buffalo Environmental Association

NH_3 Calibration Summary

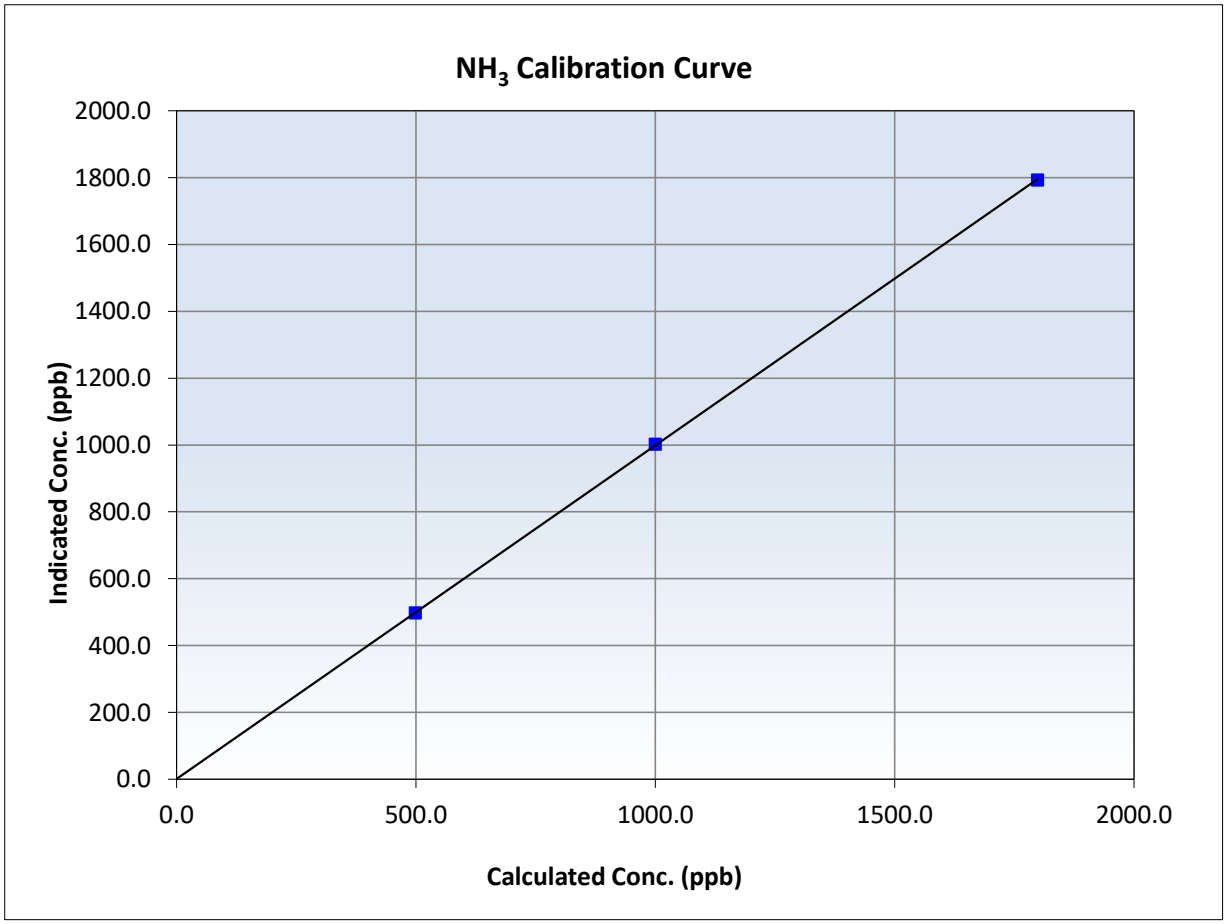
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 11, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:17	End Time (MST):	14:30
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
1798.5	1793.1	1.0030
1000.0	1002.8	0.9972
498.9	498.2	1.0013

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.997495	*0.90 - 1.10*
Intercept	1.189973	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

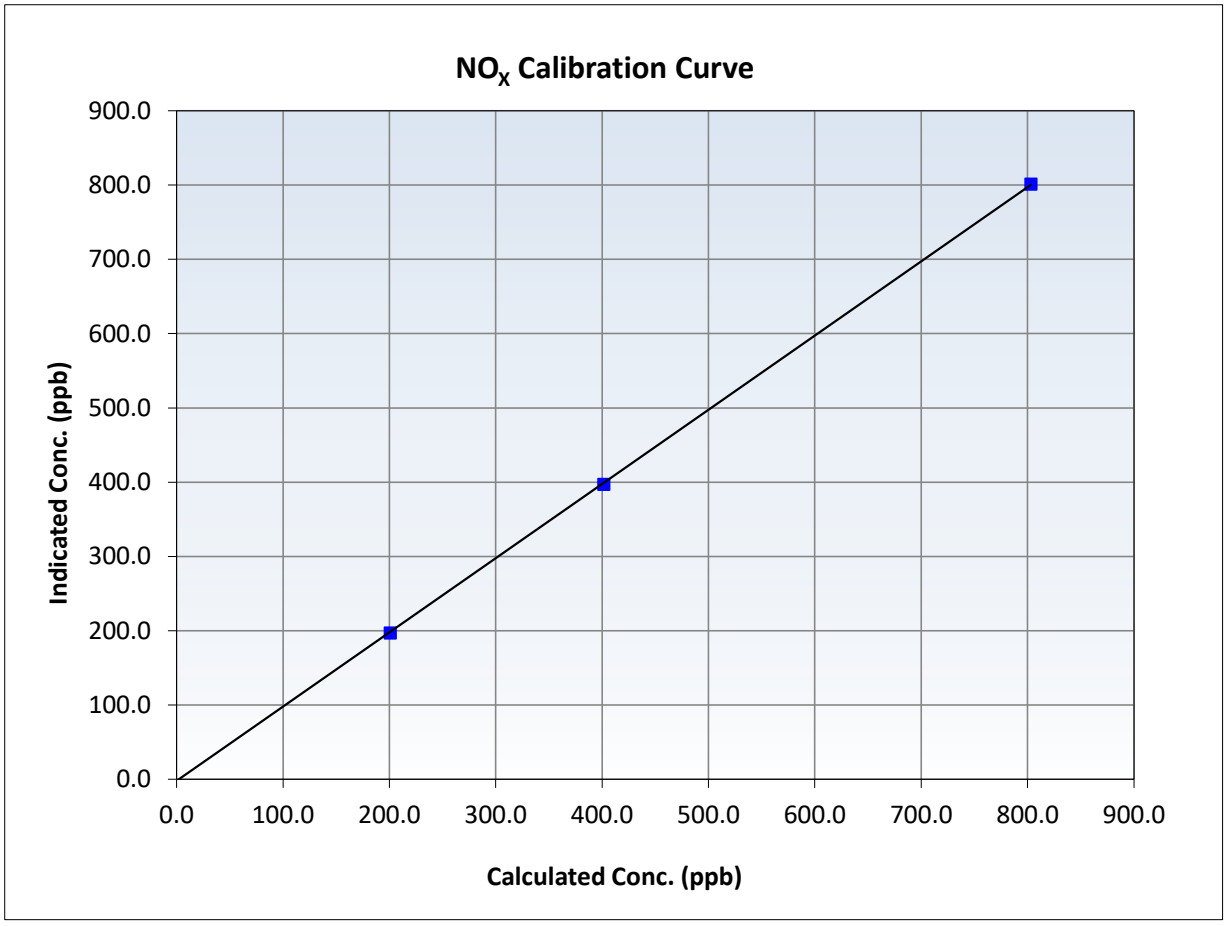
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:17	End Time (MST):	14:30
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
803.1	801.4	1.0021
401.5	397.1	1.0112
200.8	197.0	1.0191

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999970	*≥0.995*
Slope	0.999115	*0.90 - 1.10*
Intercept	-2.240000	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

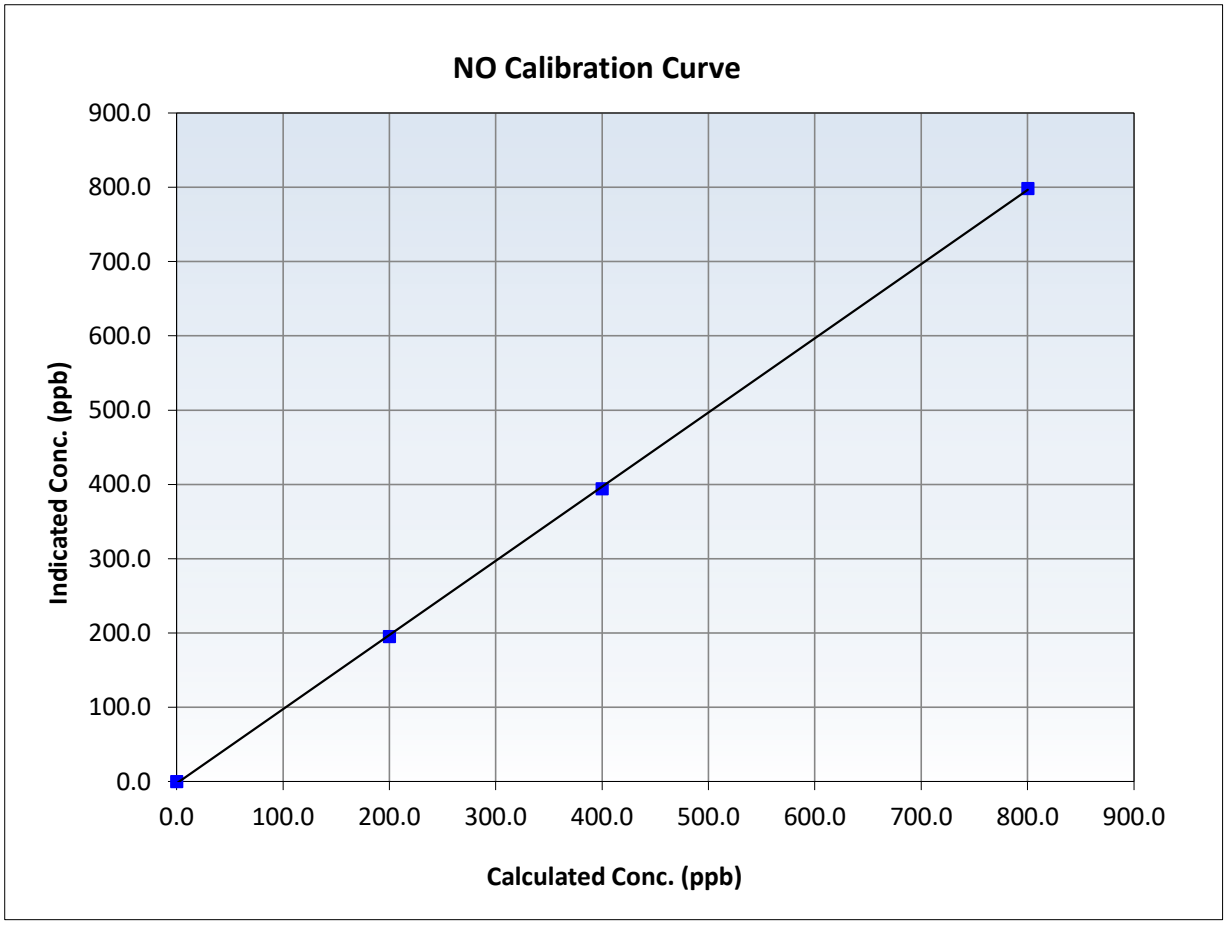
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:17	End Time (MST):	14:30
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.4	798.2	1.0027
400.2	394.3	1.0149
200.1	195.2	1.0251

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999941	*≥0.995*
Slope	0.998449	*0.90 - 1.10*
Intercept	-2.700000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

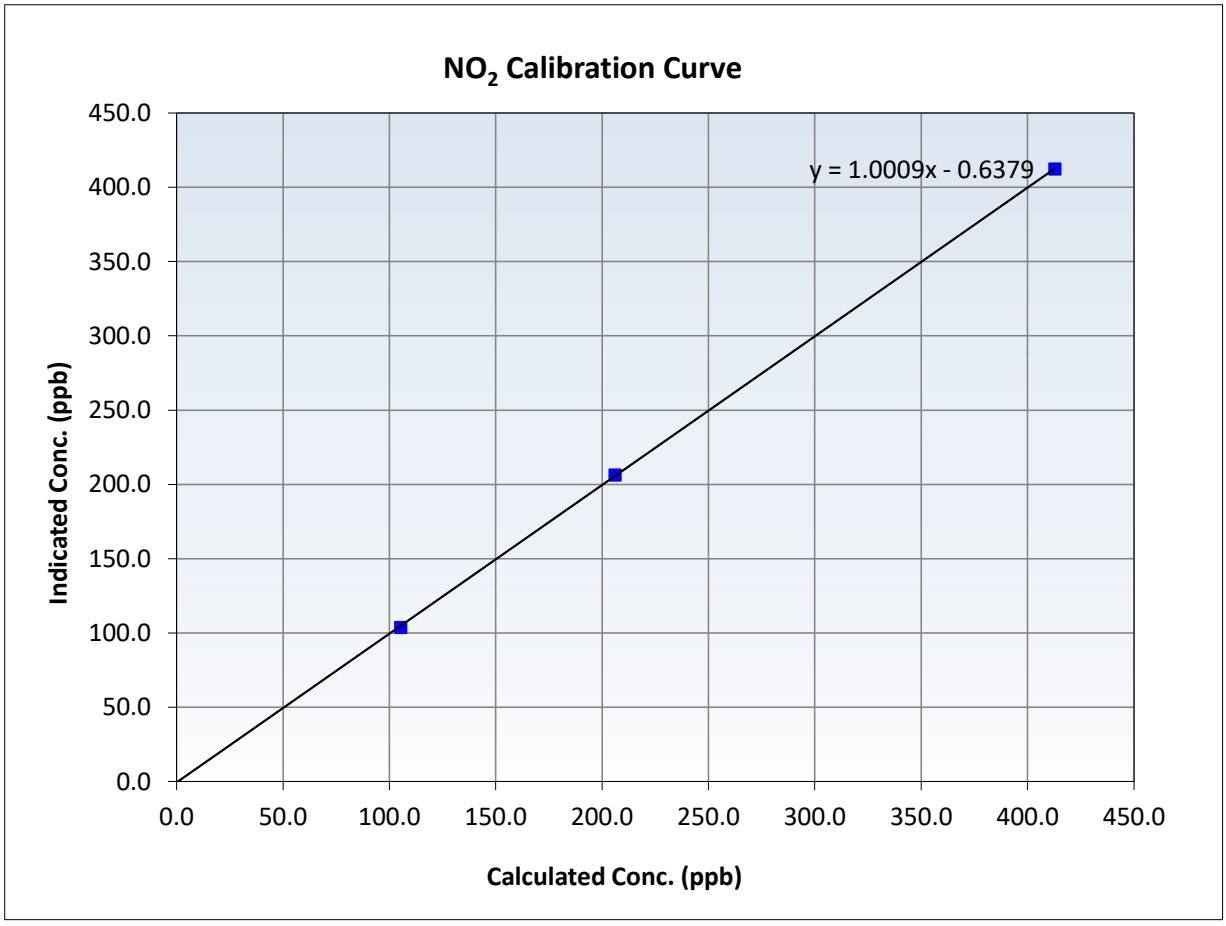
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:17	End Time (MST):	14:30
Analyzer make:	API T201	Analyzer serial #:	475

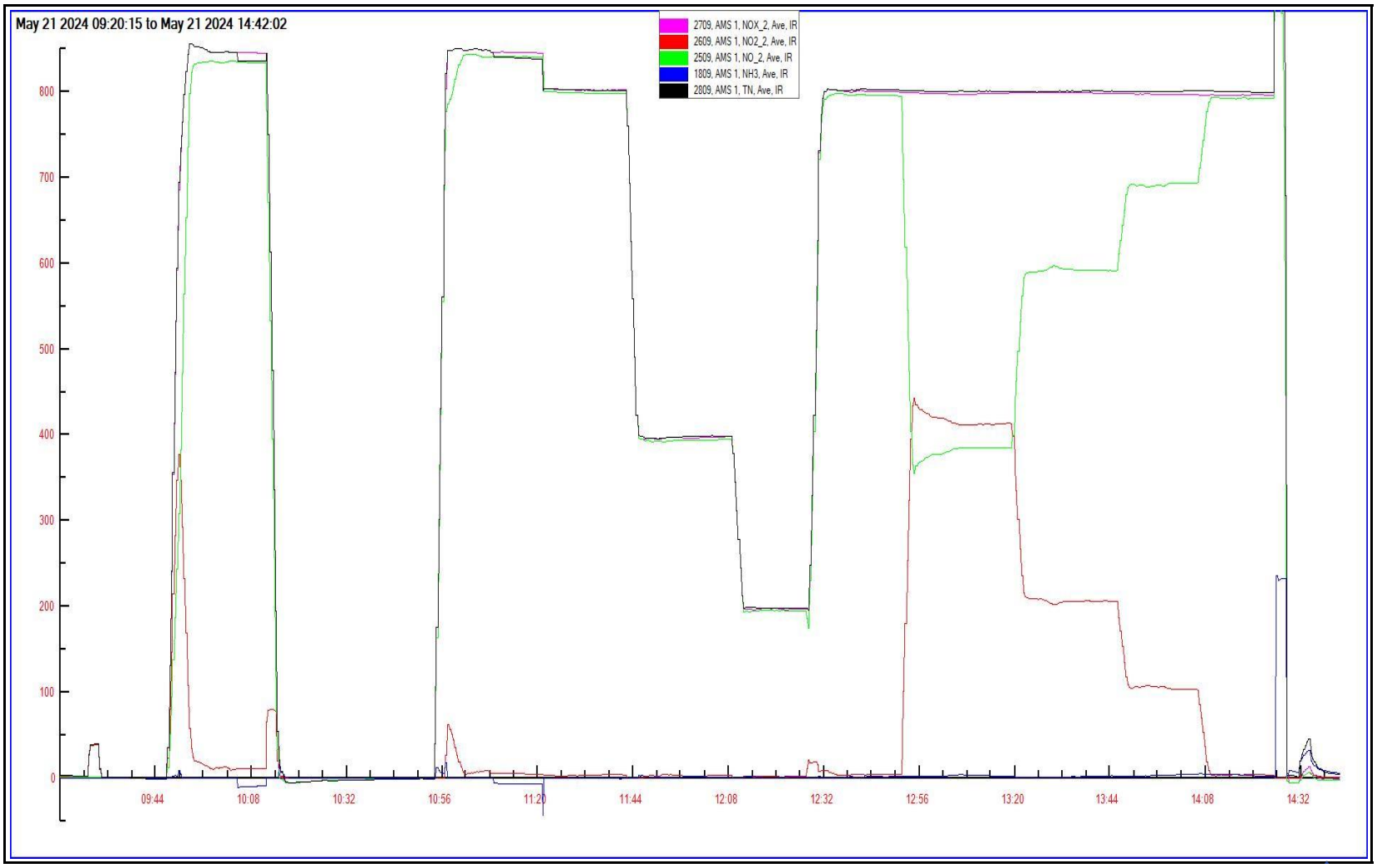
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
412.8	412.4	1.0010
206.1	206.4	0.9986
105.3	103.8	1.0145

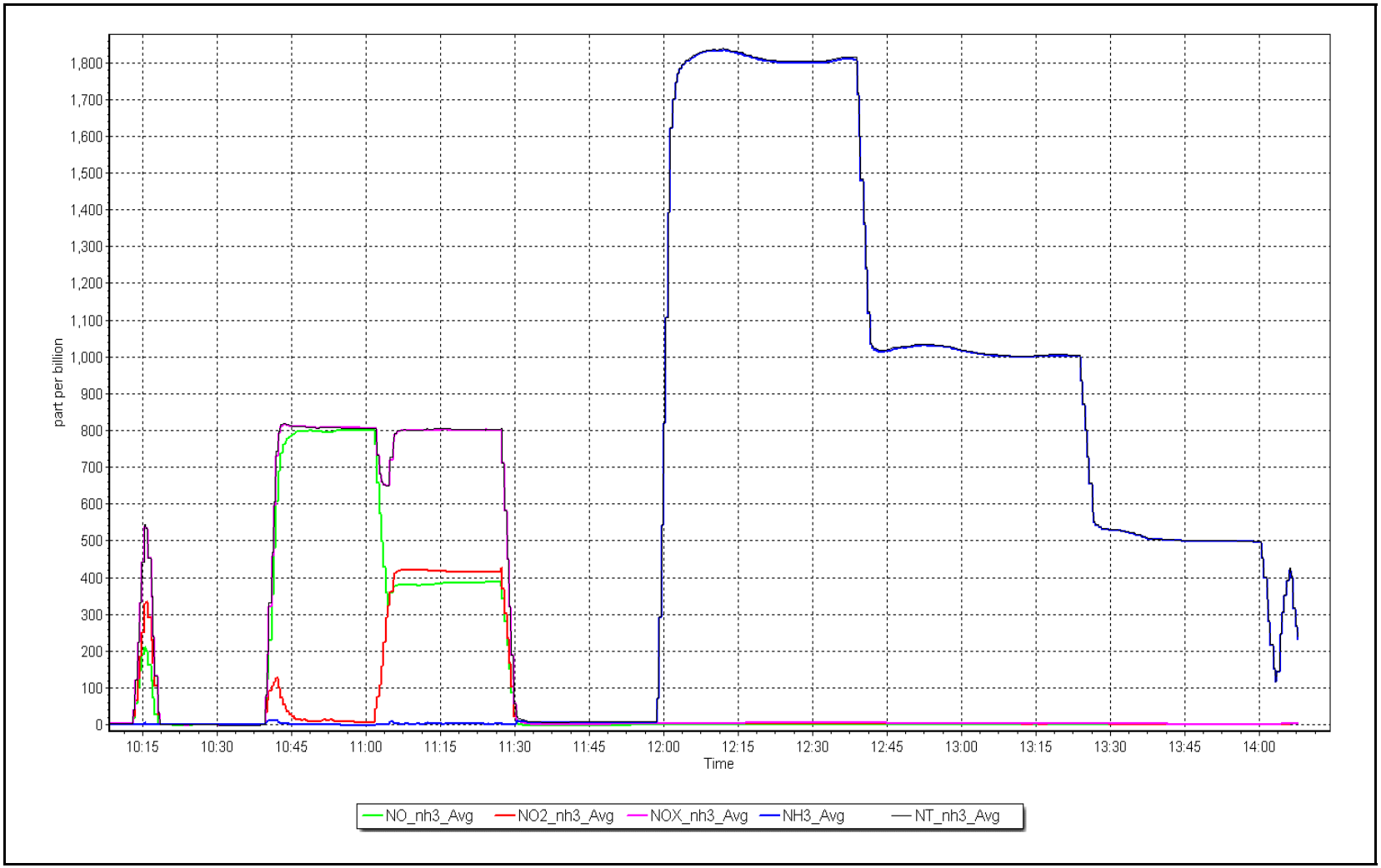
Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	1.000883	*0.90 - 1.10*
Intercept	-0.637947	*+/-20*



NO_X Calibration Plot Date: May 21, 2024 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: May 22, 2024 Location: Bertha Ganter-Fort McKay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS02
MILDRED LAKE
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	May 3, 2024	Last Cal Date:	April 5, 2024
Start time (MST):	9:41	End time (MST):	12:43
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.993915	1.009337	Backgd or Offset:	18.7	18.7
Calibration intercept:	-0.766439	-0.823191	Coeff or Slope:	0.787	0.787

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	801.6	797.7	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.8	Previous response	796.0	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4920	80.2	801.6	808.8	0.991
Mid point	4960	40.1	400.8	402.9	0.995
Low point	4980	20.0	199.9	200.7	0.996
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.2	801.6	803.2	0.998
				Average Correction Factor:	0.994

Notes: Changed sample inlet filter after As Founds. No adjustments made.

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

SO_2 Calibration Summary

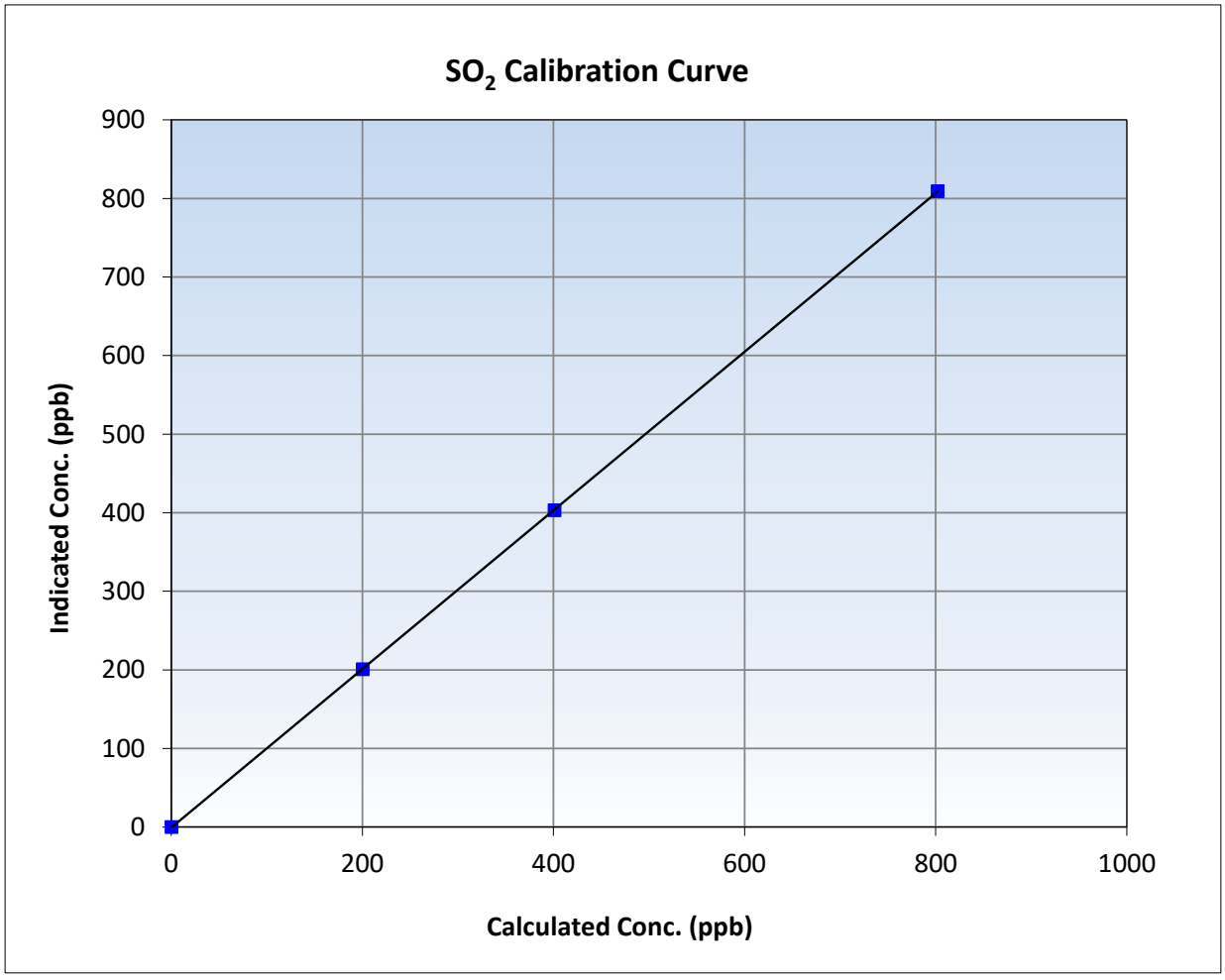
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 5, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:41	End Time (MST):	12:43
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

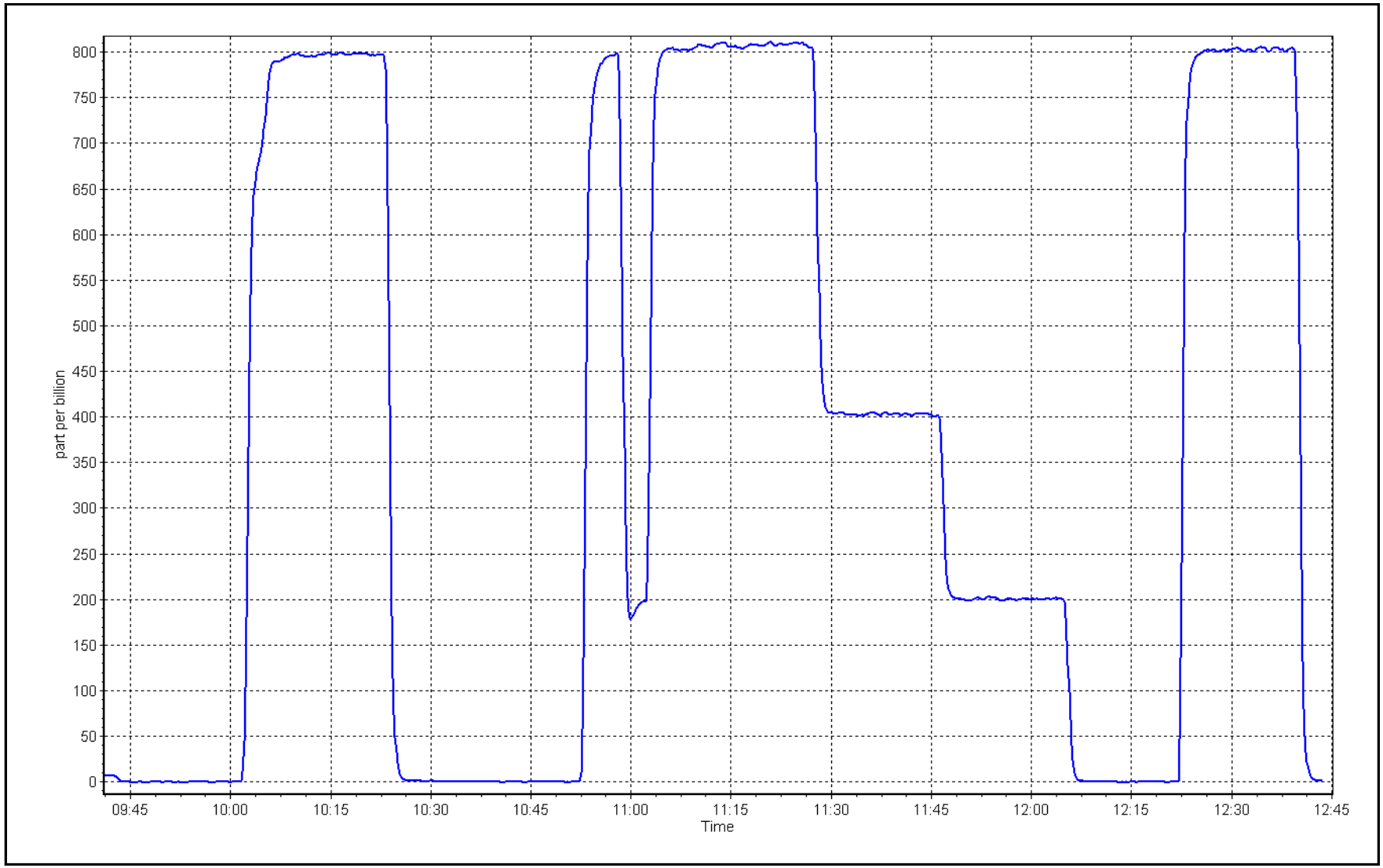
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
801.6	808.8	0.9912
400.8	402.9	0.9949
199.9	200.7	0.9961

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.009337	*0.90 - 1.10*
Intercept	-0.823191	*+/-30*



SO2 Calibration Plot Date: May 3, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	May 28, 2024	Last Cal Date:	April 23, 2024
Start time (MST):	9:20	End time (MST):	14:01
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.29	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC345191			
Removed Cal Gas Conc:	5.29	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1185
ZAG Make/Model:	Teledyne API T701		Serial Number:	4891

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12113311966
Converter make:	Global G150		Converter serial #:	2022-198
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.008965	1.005108	Backgd or Offset:	1.95	1.93
Calibration intercept:	-0.259192	-0.199197	Coeff or Slope:	0.731	0.722

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4924	75.6	80.0	81.1	0.986
As found Mid point	4962	37.8	40.0	40.6	0.985
As found Low point	4981	18.9	20.0	20.1	0.995
New cylinder response					

Baseline Corr As found:	81.1	Prev response:	80.45	*% change:	0.8%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.014680	AF Intercept:	-0.059189
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999993	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4924	75.6	80.0	80.2	0.997
Mid point	4962	37.8	40.0	40.1	0.997
Low point	4981	18.9	20.0	19.7	1.015
As left zero	5000	0.0	0.0	-0.1	----
As left span	4924	75.6	80.0	79.8	1.002
SO2 Scrubber Check	4920	80.2	802.0	-0.1	----

Date of last scrubber change:	September 20, 2023	Ave Corr Factor	1.003
Date of last converter efficiency test:	April 23, 2024	107.1%	efficiency

Notes: Changed inlet filter after MPAFs. Adjusted span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

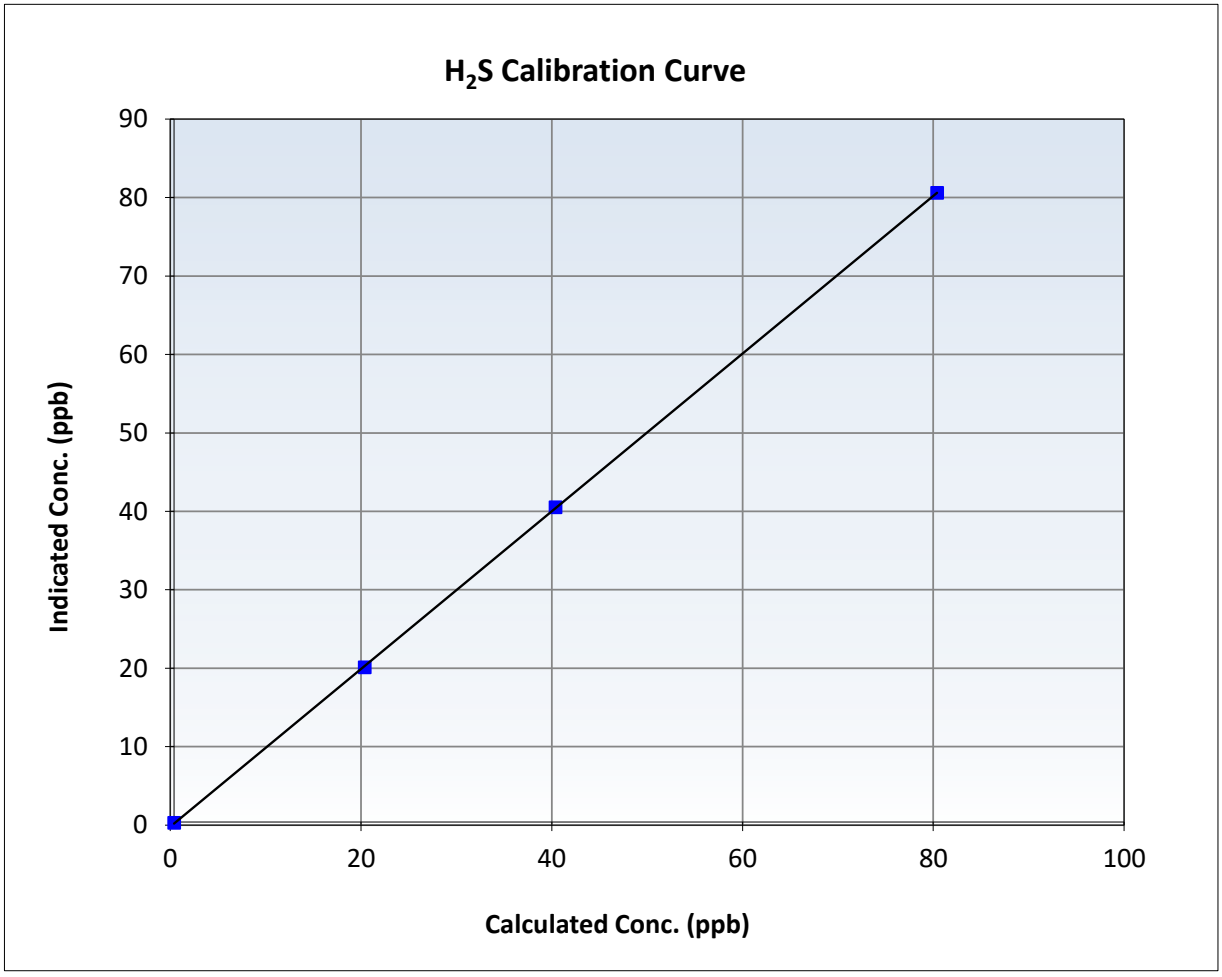
H2S Calibration Summary

Station Information

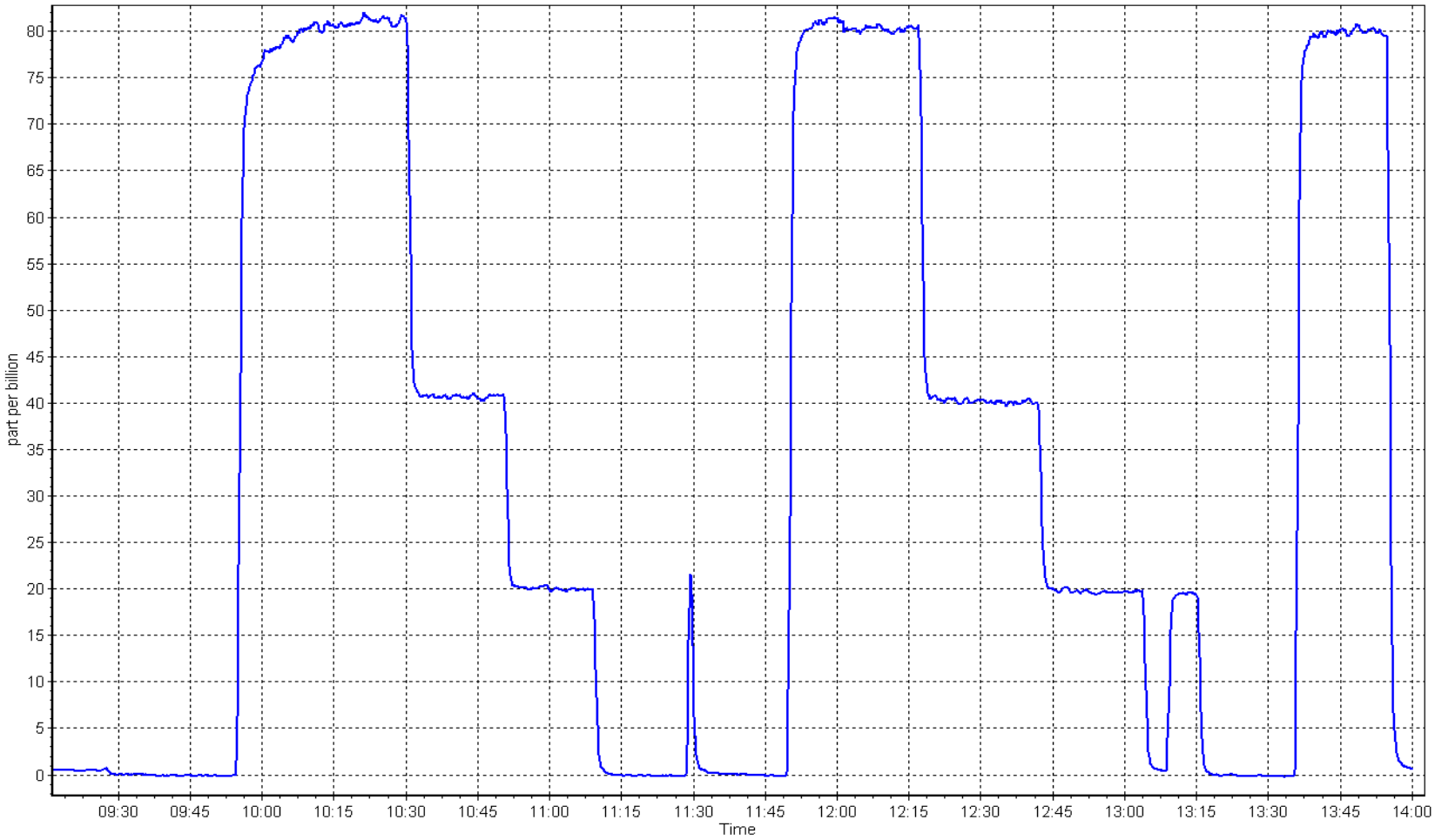
Calibration Date:	May 28, 2024	Previous Calibration:	April 23, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:20	End Time (MST):	14:01
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12113311966

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999983	*≥0.995*
80.0	80.2	0.9974	Slope	1.005108	*0.90 - 1.10*
40.0	40.1	0.9974			
20.0	19.7	1.0151	Intercept	-0.199197	*+/-3*



H2S Calibration Plot Date: May 28, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	May 3, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	9:41	End time (MST):	12:41
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC501209	Cal Gas Expiry Date:	August 12, 2024
CH4 Cal Gas Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
C3H8 Cal Gas Conc.	199.4 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
Removed C3H8 Conc.	199.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	1185
Zero Air Gen model:	Teledyne API T701	Serial Number:	4891

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.08E-04	3.19E-04	NMHC SP Ratio:	6.25E-05	6.29E-05
CH4 Retention time:	17.6	17.8	NMHC Peak Area:	140693	139909
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	16.62	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.62	Prev response	16.83	*% 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)) *Limit = 0.95-1.05*
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	8.46	0.994
Low point	4980	20.0	4.19	4.22	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	16.89	0.996
				Average Correction Factor	0.995

Notes: Filter changed after As Founds. Minor adjustment to span. Station temp lowered 3 degrees for better analyzer operation.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.80	8.80	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.80	Prev response	8.82	*% 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.80	8.81	0.998
Mid point	4960	40.1	4.40	4.44	0.990
Low point	4980	20.0	2.19	2.22	0.989
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.84	0.995
				Average Correction Factor	0.993

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.02	7.82	1.026
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.82	Prev response	8.02	*% change	-2.6%
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	80.2	8.02	8.06	0.995
Mid point	4960	40.1	4.01	4.02	0.997
Low point	4980	20.0	2.00	2.00	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.02	8.05	0.997
				Average Correction Factor	0.998

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001093	1.003097
THC Cal Offset:	-0.005909	0.008106
CH4 Cal Slope:	1.000042	1.005411
CH4 Cal Offset:	-0.007450	-0.007040
NMHC Cal Slope:	1.002130	1.001362
NMHC Cal Offset:	0.001741	0.014946

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

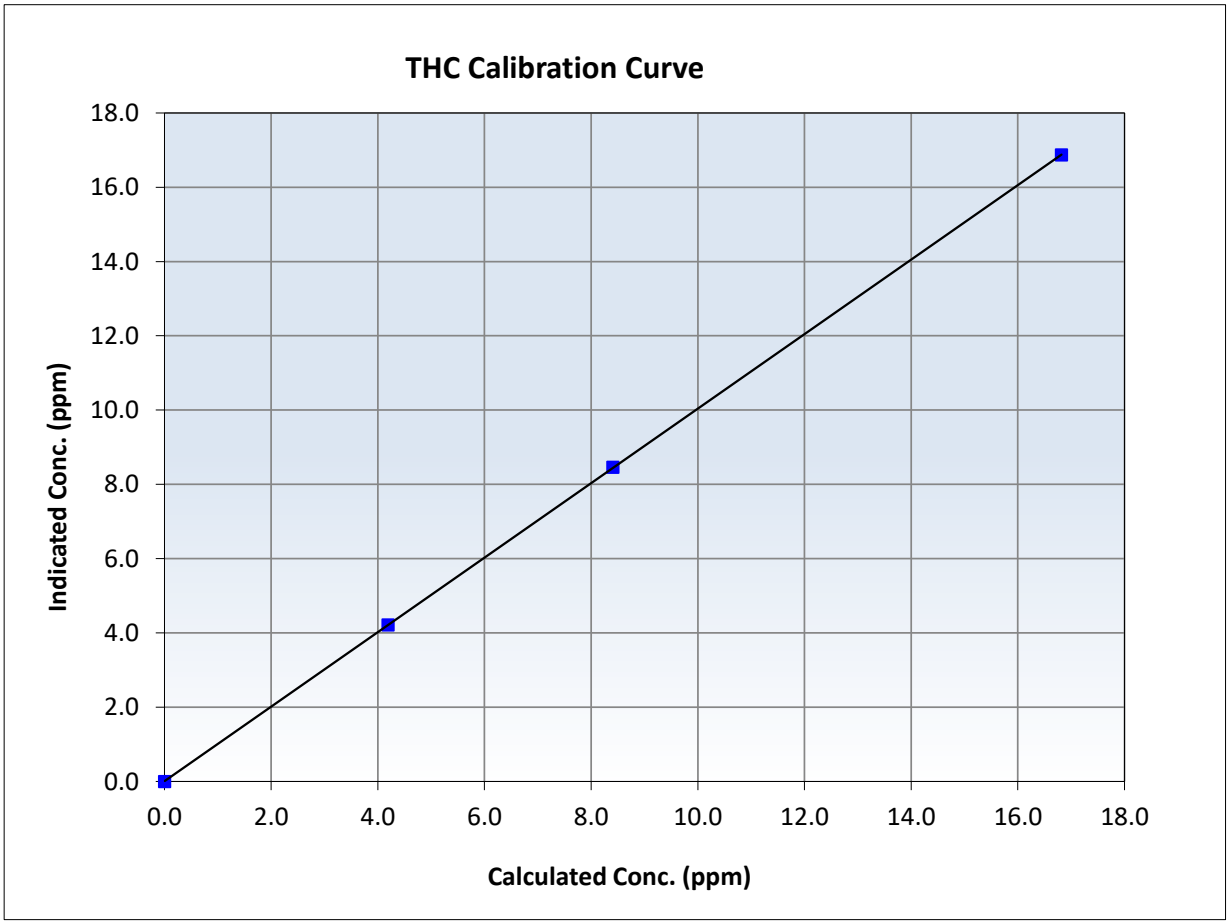
THC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:41	End Time (MST):	12:41
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

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
16.82	16.87	0.9969	Slope	1.003097	0.90 - 1.10
8.41	8.46	0.9940	Intercept	0.008106	+/-0.5
4.19	4.22	0.9951			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

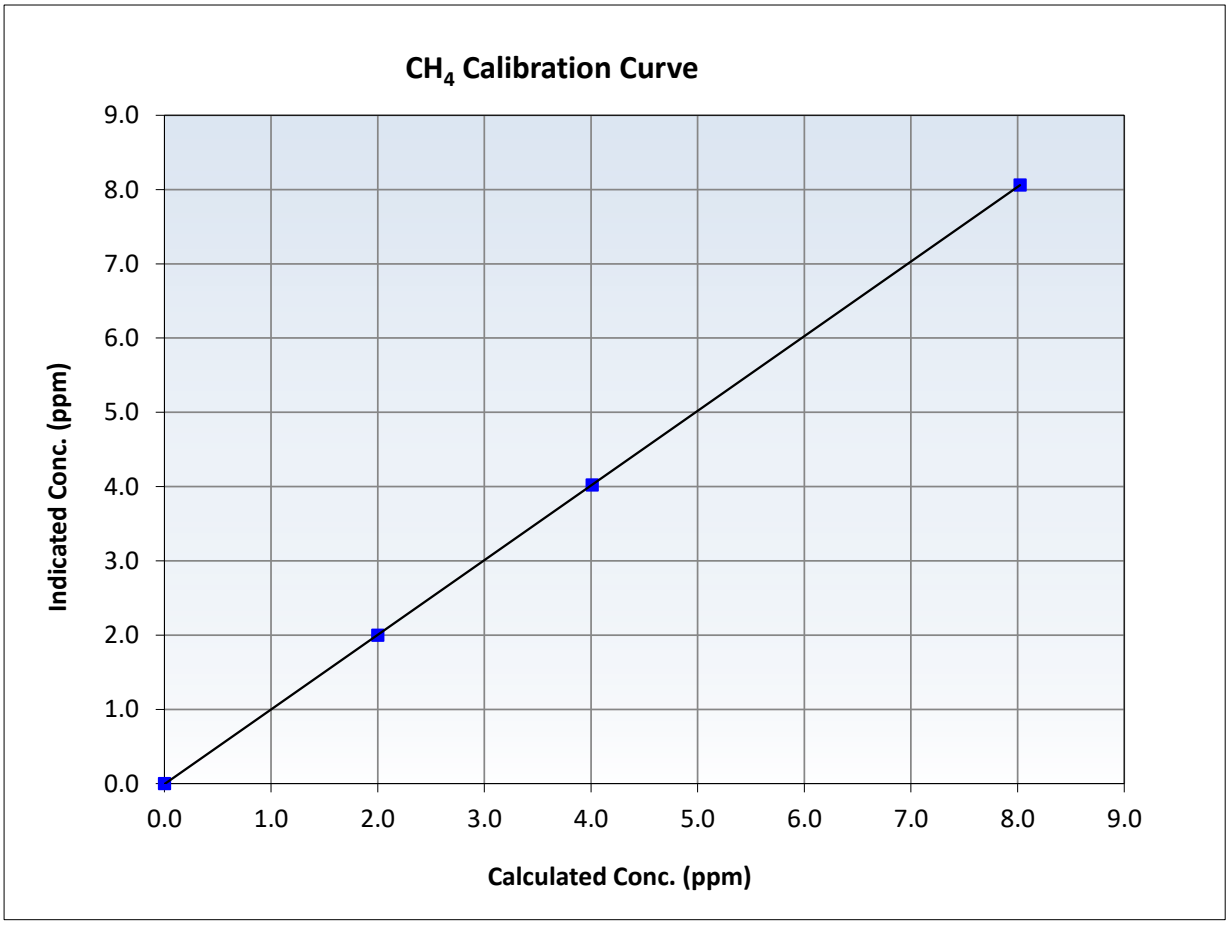
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:41	End Time (MST):	12:41
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.02	8.06	0.9950
4.01	4.02	0.9974
2.00	2.00	1.0014

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.005411	*0.90 - 1.10*
Intercept	-0.007040	*+/-0.5*



Wood Buffalo Environmental Association

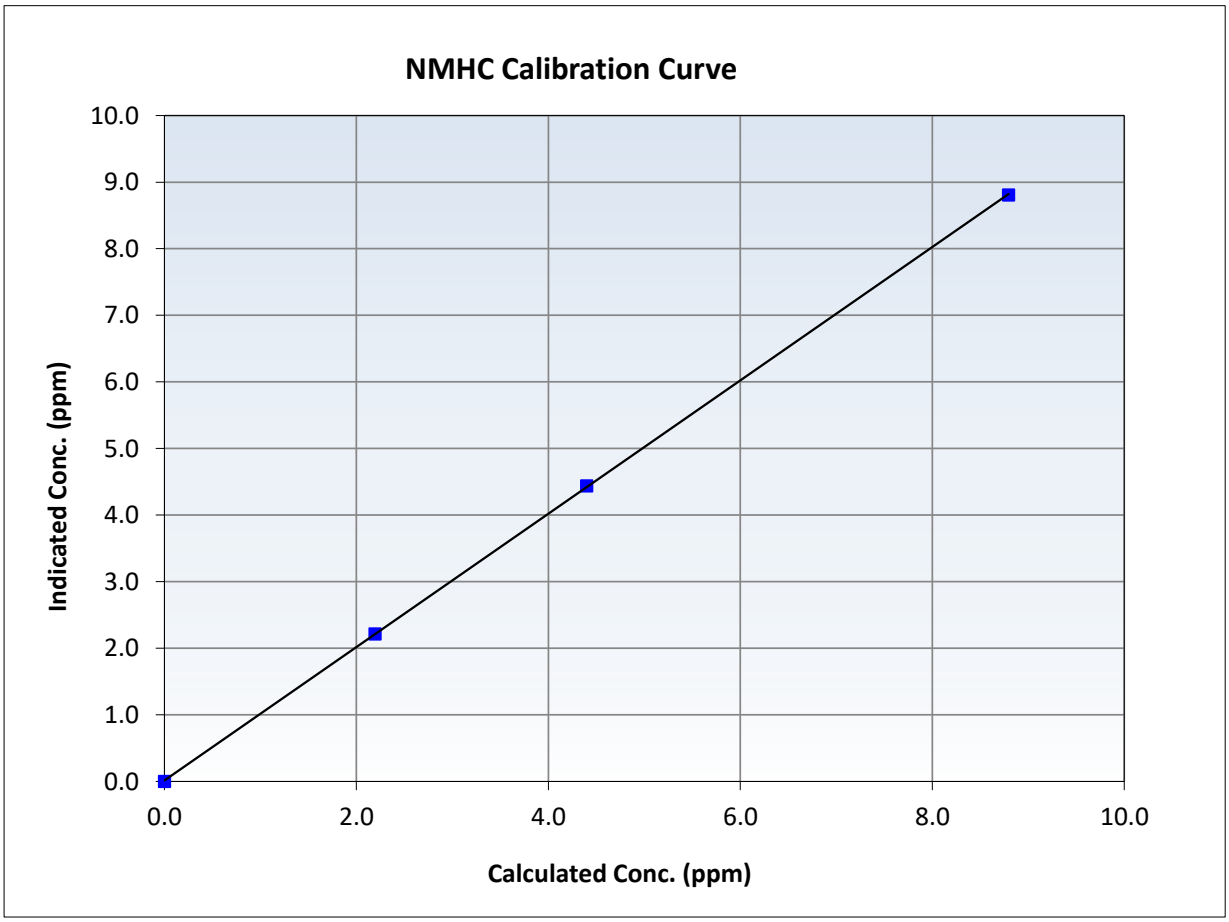
NMHC Calibration Summary

Station Information

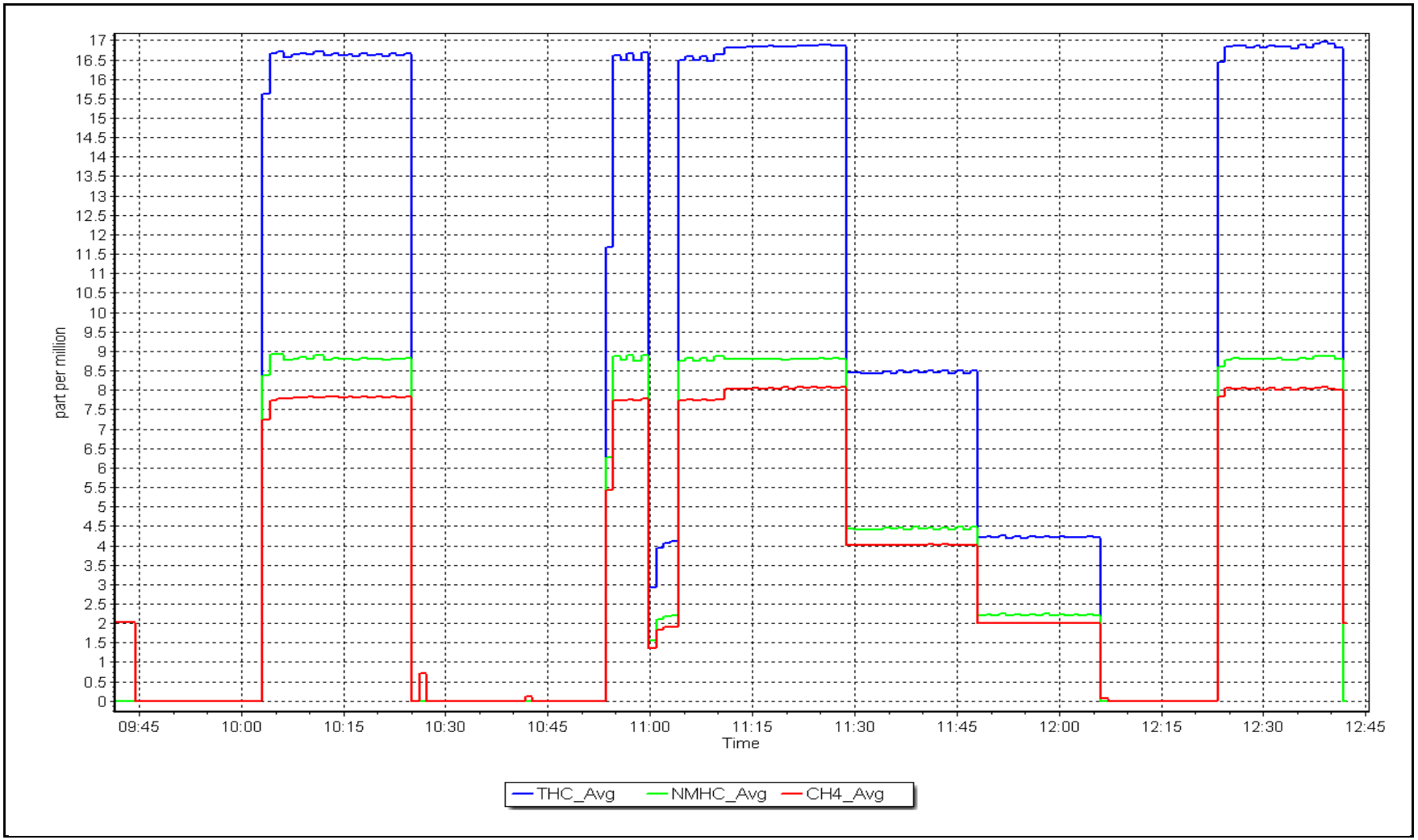
Calibration Date:	May 3, 2024	Previous Calibration:	April 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:41	End Time (MST):	12:41
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999980	≥0.995
8.80	8.81	0.9983	Slope	1.001362	0.90 - 1.10
4.40	4.44	0.9905	Intercept	0.014946	+/-0.5
2.19	2.22	0.9894			



NMHC Calibration Plot Date: May 3, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	May 10, 2024	Last Cal Date:	May 3, 2024
Start time (MST):	9:35	End time (MST):	14:07
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC501209	Cal Gas Expiry Date:	August 12, 2024
CH4 Cal Gas Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
C3H8 Cal Gas Conc.	199.4 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
Removed C3H8 Conc.	199.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	1185
Zero Air Gen model:	Teledyne API T701	Serial Number:	4891

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.19E-04	3.19E-04	NMHC SP Ratio:	6.29E-05	6.25E-05
CH4 Retention time:	17.8	18.0	NMHC Peak Area:	139909	140773
Zero Chromatogram:	OFF	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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	16.74	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.74	Prev response	16.88	*% change	-0.8%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	80.2	16.82	16.70	1.007
Mid point	4960	40.1	8.41	8.42	0.999
Low point	4980	20.0	4.19	4.17	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	16.85	0.998
				Average Correction Factor	1.004

Notes: Ran new zero chromatogram, and turned on "use zero chromatogram" setting. Adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.80	8.73	1.007
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.73	Prev response	8.82	*% change	-1.1%
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	80.2	8.80	8.70	1.011
Mid point	4960	40.1	4.40	4.42	0.994
Low point	4980	20.0	2.19	2.19	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.82	0.997
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.02	8.01	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.01	Prev response	8.06	*% change	-0.6%
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	80.2	8.02	8.00	1.003
Mid point	4960	40.1	4.01	4.00	1.004
Low point	4980	20.0	2.00	1.98	1.012
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.02	8.02	1.000
				Average Correction Factor	1.006

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.003097	0.993409
THC Cal Offset:	0.008106	0.014859
CH4 Cal Slope:	1.005411	0.997693
CH4 Cal Offset:	-0.007040	-0.007457
NMHC Cal Slope:	1.001362	0.989385
NMHC Cal Offset:	0.014946	0.022516

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

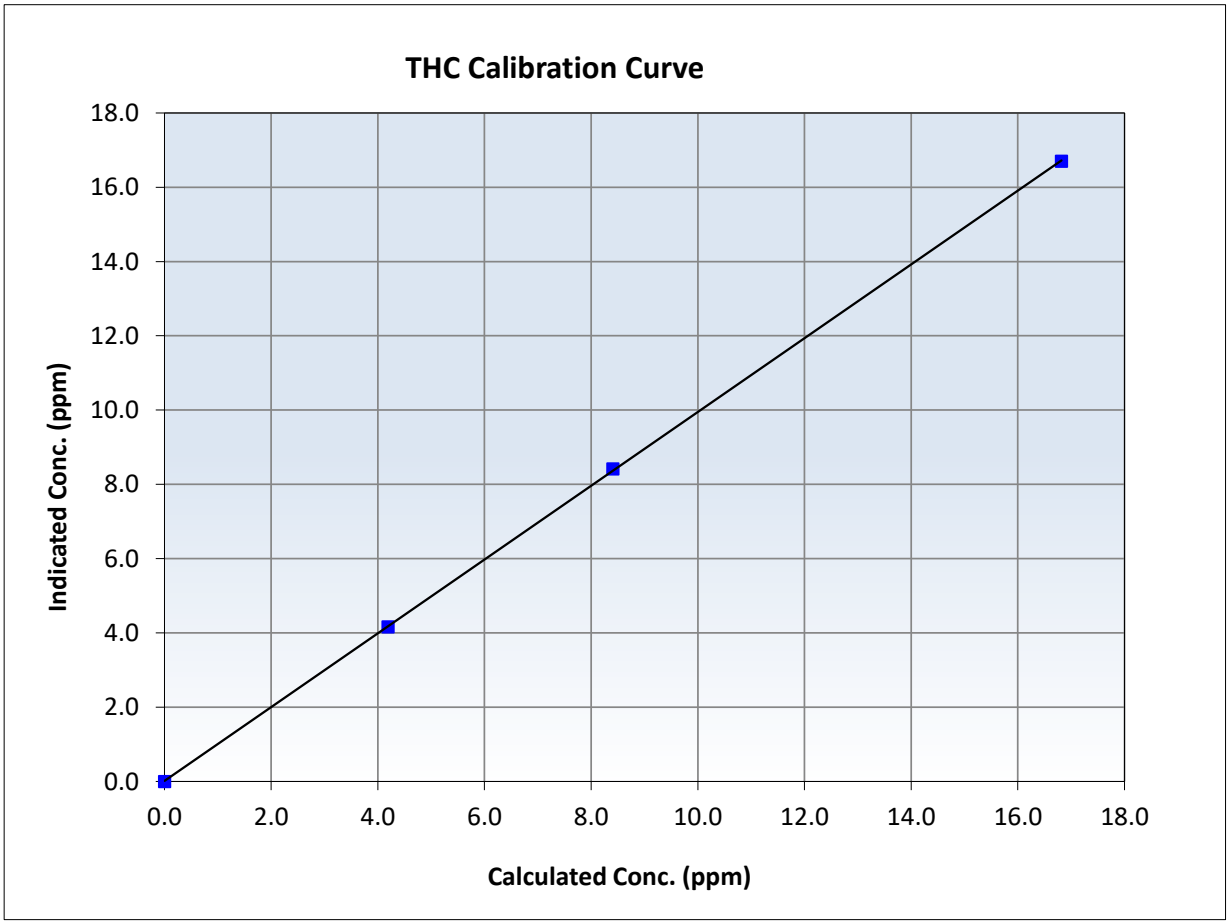
THC Calibration Summary

Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	May 3, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:35	End Time (MST):	14:07
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

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
16.82	16.70	1.0071	Slope	0.993409	0.90 - 1.10
8.41	8.42	0.9987	Intercept	0.014859	+/-0.5
4.19	4.17	1.0065			



Wood Buffalo Environmental Association

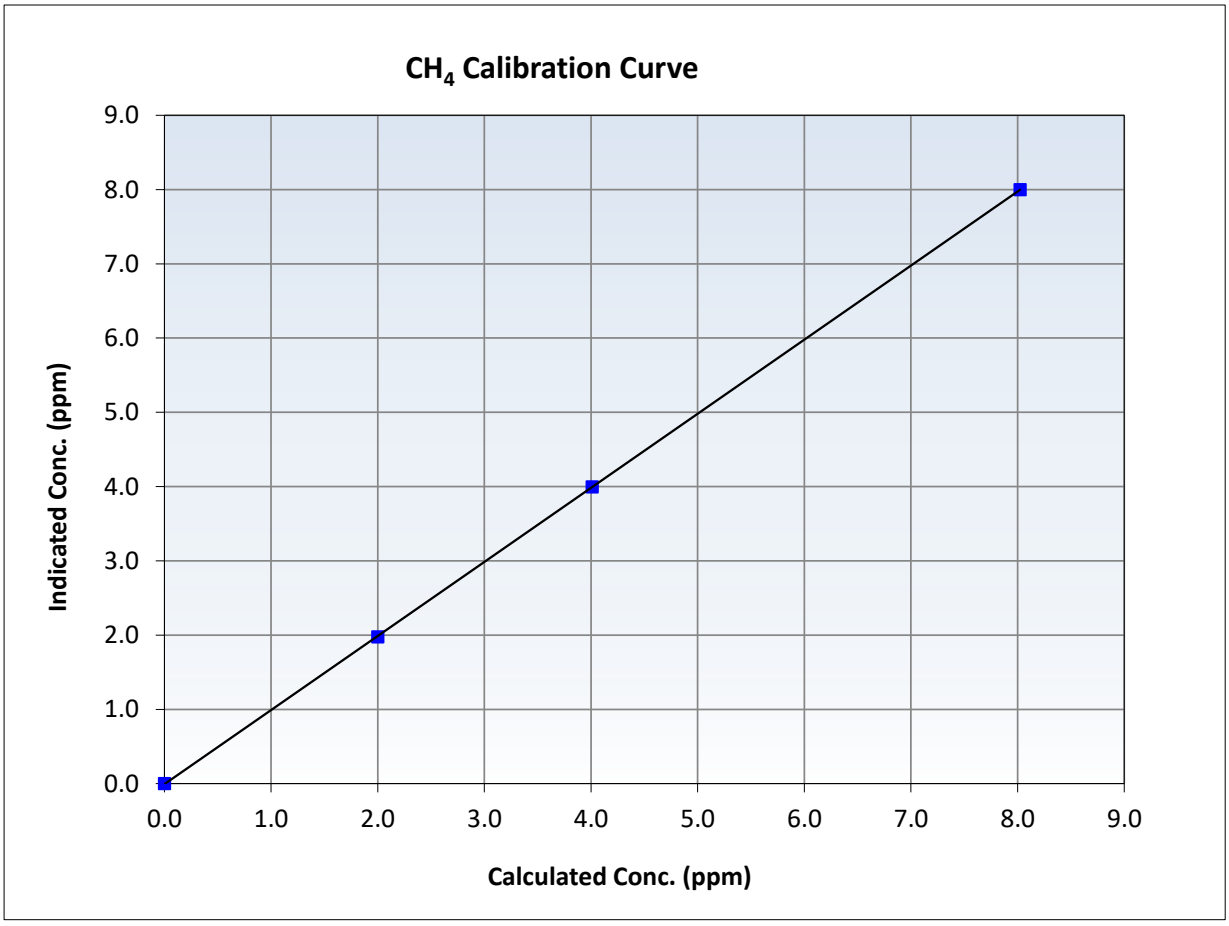
CH_4 Calibration Summary

Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	May 3, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:35	End Time (MST):	14:07
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

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
8.02	8.00	1.0030	Slope	0.997693	0.90 - 1.10
4.01	4.00	1.0039			
2.00	1.98	1.0115	Intercept	-0.007457	+/-0.5



Wood Buffalo Environmental Association

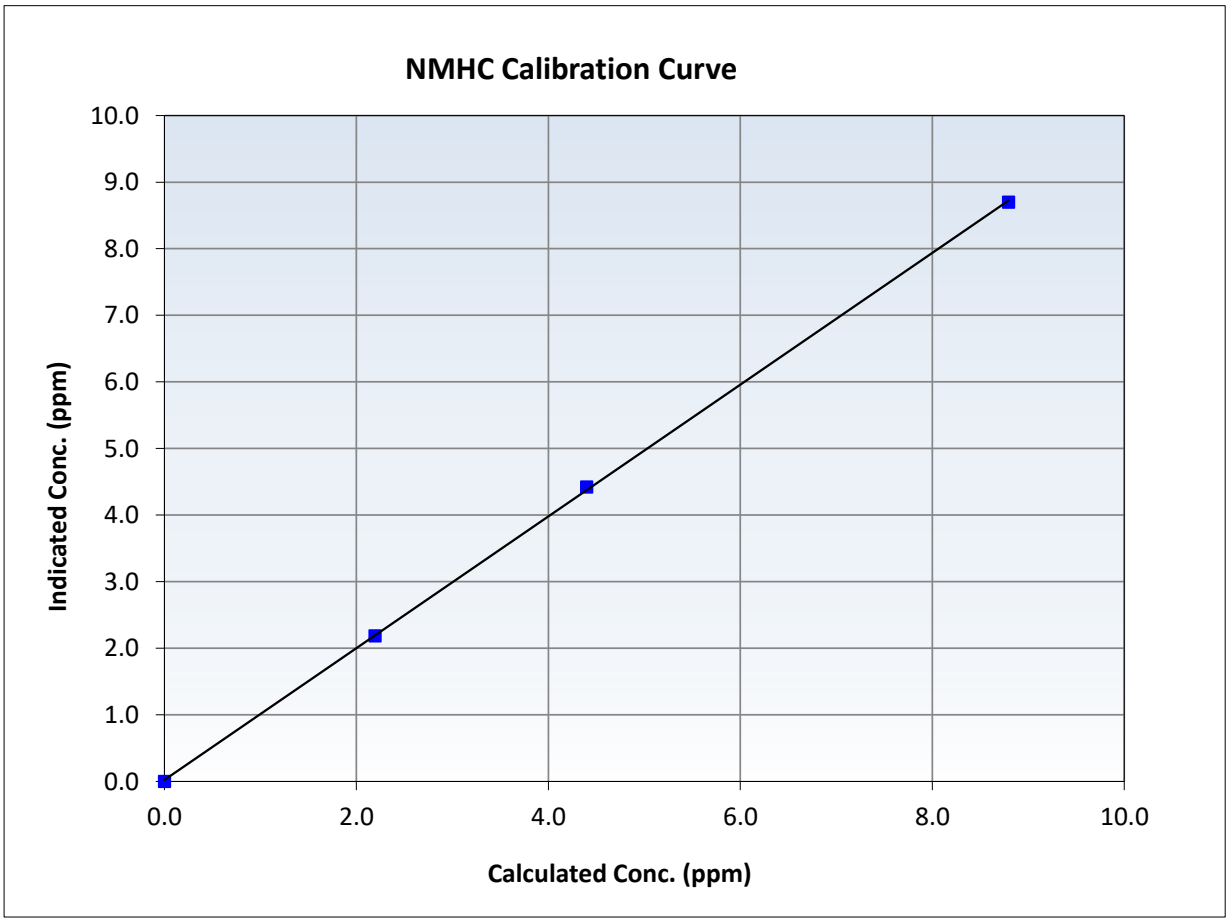
NMHC Calibration Summary

Station Information

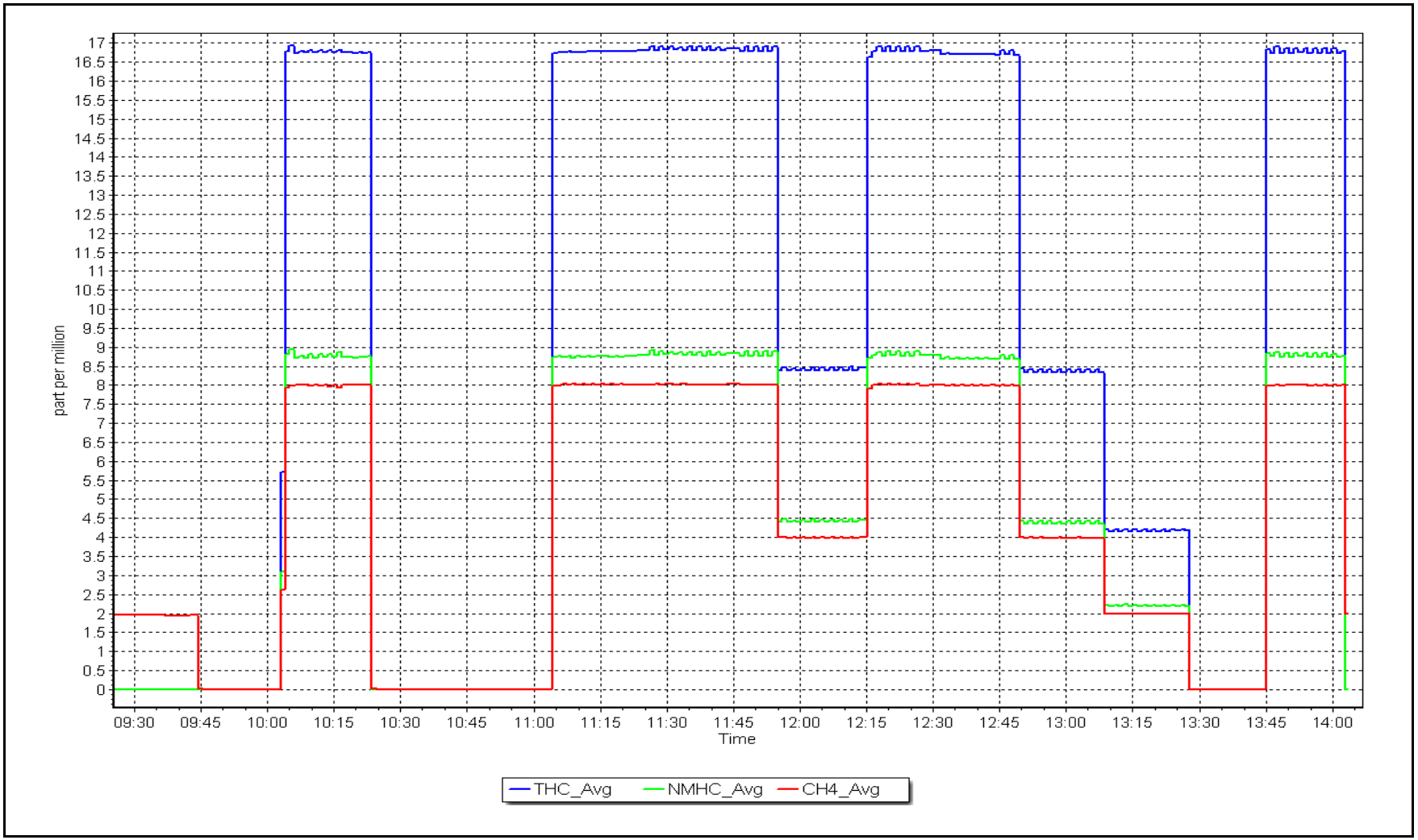
Calibration Date:	May 10, 2024	Previous Calibration:	May 3, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:35	End Time (MST):	14:07
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999912	≥0.995
8.80	8.70	1.0109	Slope	0.989385	0.90 - 1.10
4.40	4.42	0.9941	Intercept	0.022516	+/-0.5
2.19	2.19	1.0020			



NMHC Calibration Plot Date: May 10, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	May 30, 2024	Last Cal Date:	May 10, 2024
Start time (MST):	9:42	End time (MST):	13:19
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:	CC501209	Cal Gas Expiry Date:	August 12, 2024
CH4 Cal Gas Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
C3H8 Cal Gas Conc.	199.4 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	500.2 ppm	CH4 Equiv Conc.	1048.6 ppm
Removed C3H8 Conc.	199.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	1185
Zero Air Gen model:	Teledyne API T701	Serial Number:	4891

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.19E-04	3.27E-04	NMHC SP Ratio:	6.25E-05	6.13E-05
CH4 Retention time:	18.0	18.2	NMHC Peak Area:	140773	143550
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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	16.34	1.029
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.34	Prev response	16.72	*% change	-2.3%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	80.2	16.82	16.82	1.000
Mid point	4960	40.1	8.41	8.36	1.006
Low point	4980	20.0	4.19	4.19	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	16.71	1.006
				Average Correction Factor	1.002

Notes: Swapped nitrogen cylinder. Ran new zero chromatogram and adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.80	8.54	1.030
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.54	Prev response	8.72	*% 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	4920	80.2	8.80	8.87	0.992
Mid point	4960	40.1	4.40	4.38	1.005
Low point	4980	20.0	2.19	2.21	0.992
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.74	1.006
				Average Correction Factor	0.996

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.02	7.80	1.029
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.80	Prev response	8.00	*% change	-2.5%
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	8.02	7.95	1.010
Mid point	4960	40.1	4.01	3.99	1.006
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	8.02	7.98	1.006
				Average Correction Factor	1.009

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.993409	0.999848
THC Cal Offset:	0.014859	-0.011503
CH4 Cal Slope:	0.997693	0.990500
CH4 Cal Offset:	-0.007457	0.002532
NMHC Cal Slope:	0.989385	1.007805
NMHC Cal Offset:	0.022516	-0.012836

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

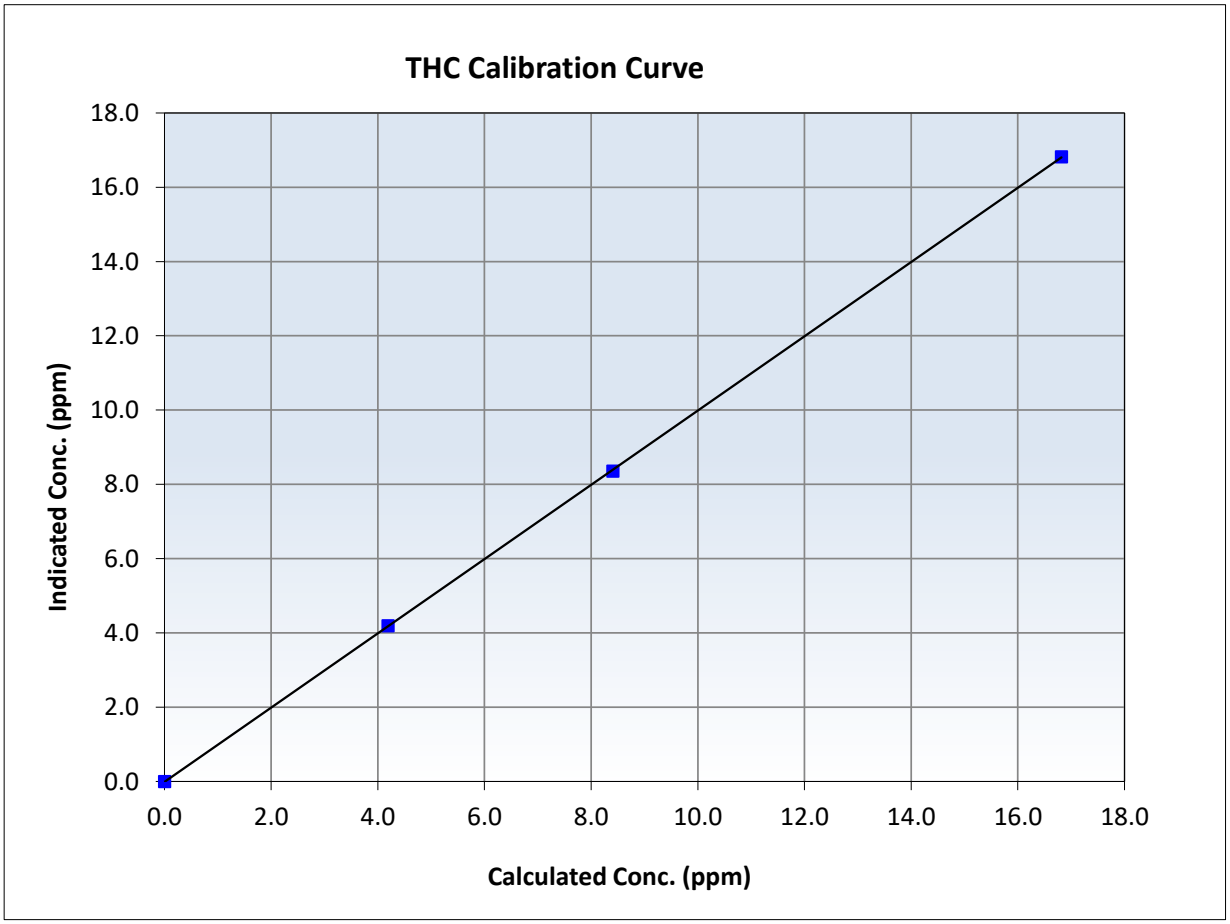
THC Calibration Summary

Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	May 10, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:42	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

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
16.82	16.82	0.9999	Slope	0.999848	0.90 - 1.10
8.41	8.36	1.0059	Intercept	-0.011503	+/-0.5
4.19	4.19	1.0008			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

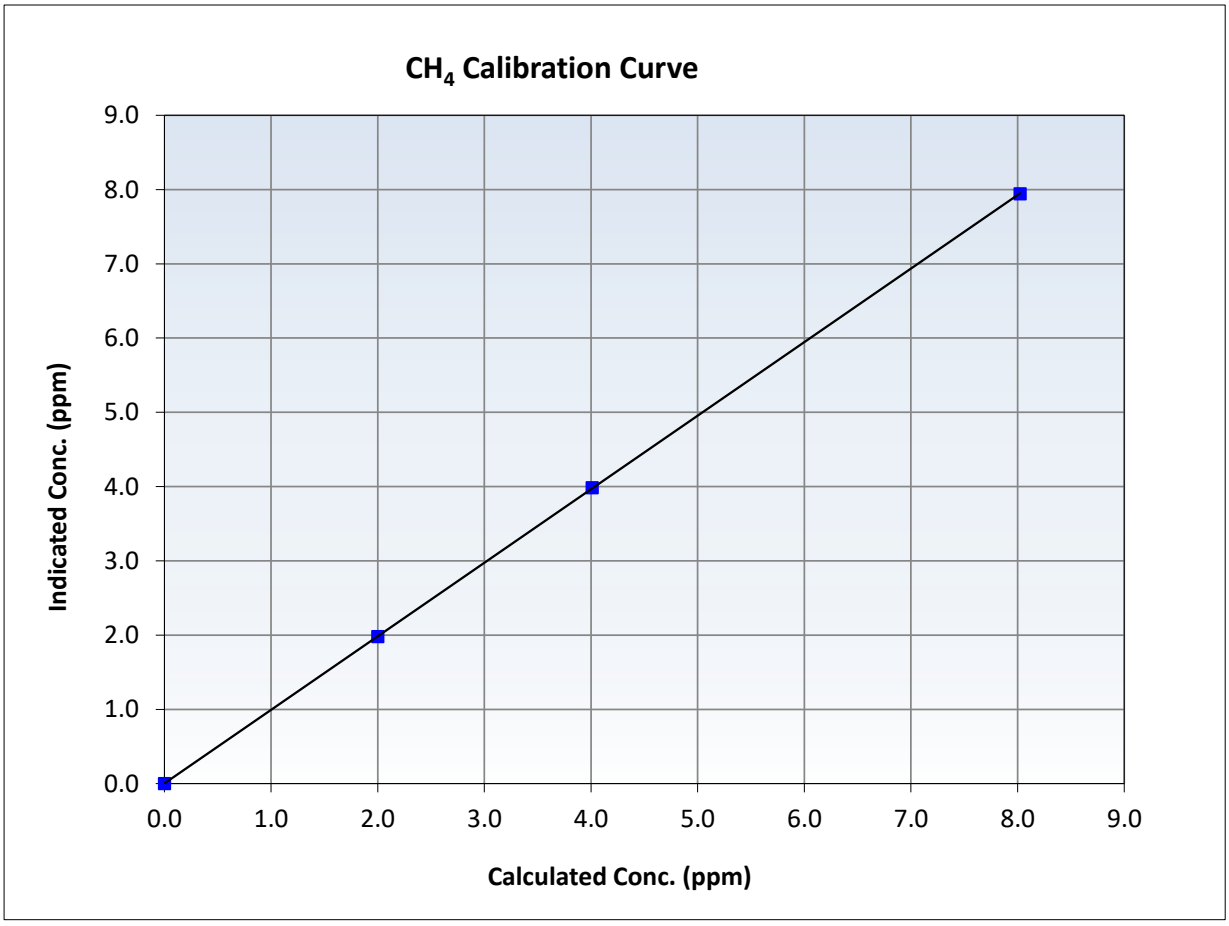
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	May 10, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:42	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.02	7.95	1.0098
4.01	3.99	1.0064
2.00	1.98	1.0100

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.990500	*0.90 - 1.10*
Intercept	0.002532	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

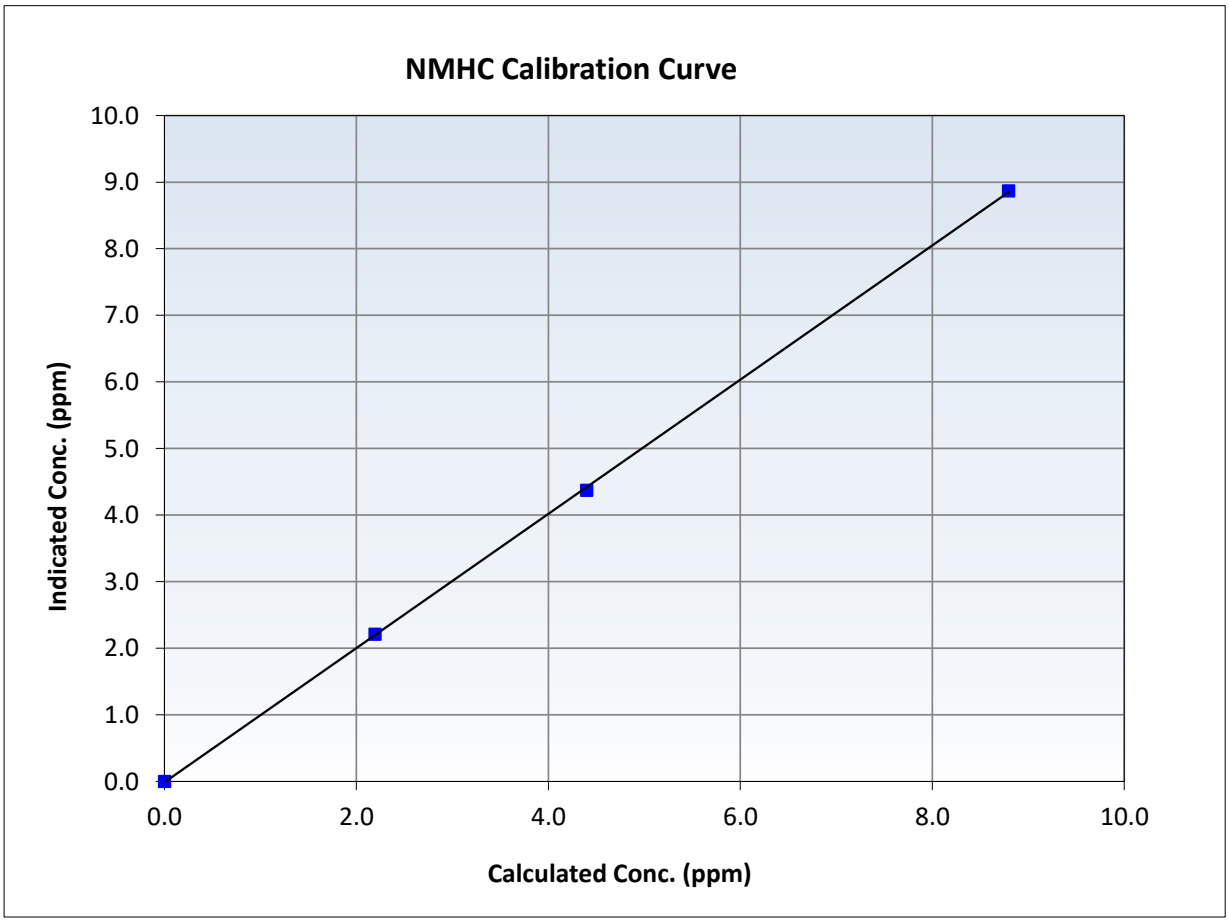
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	May 10, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	9:42	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

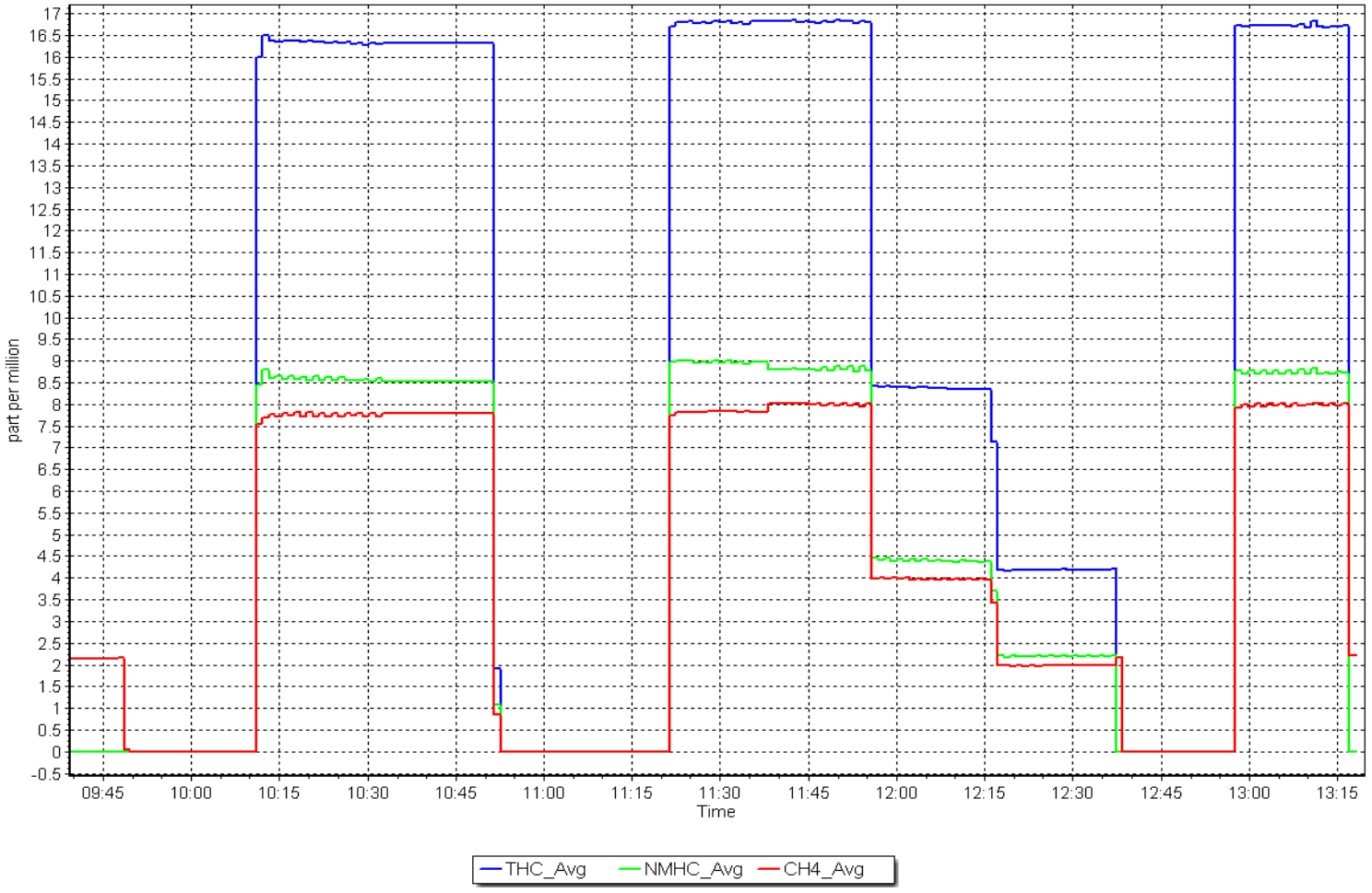
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.80	8.87	0.9916
4.40	4.38	1.0052
2.19	2.21	0.9925

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999939	*≥0.995*
Slope	1.007805	*0.90 - 1.10*
Intercept	-0.012836	*+/-0.5*



NMHC Calibration Plot Date: May 30, 2024 Location: Mildred Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS04
BUFFALO VIEWPOINT
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	May 30, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	7:20	End time (MST):	10:11
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006888	1.001458	Backgd or Offset:	25.1	25.0
Calibration intercept:	0.395801	0.594841	Coeff or Slope:	0.880	0.873

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4921	78.6	799.7	807.0	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	806.7	Previous response	805.6	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4921	78.6	799.7	801.2	0.998
Mid point	4961	39.3	399.8	401.8	0.995
Low point	4980	19.6	199.4	199.9	0.998
As left zero	5000	0.0	0.0	0.2	----
As left span	4921	78.6	799.7	801.1	0.998
				Average Correction Factor:	0.997

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

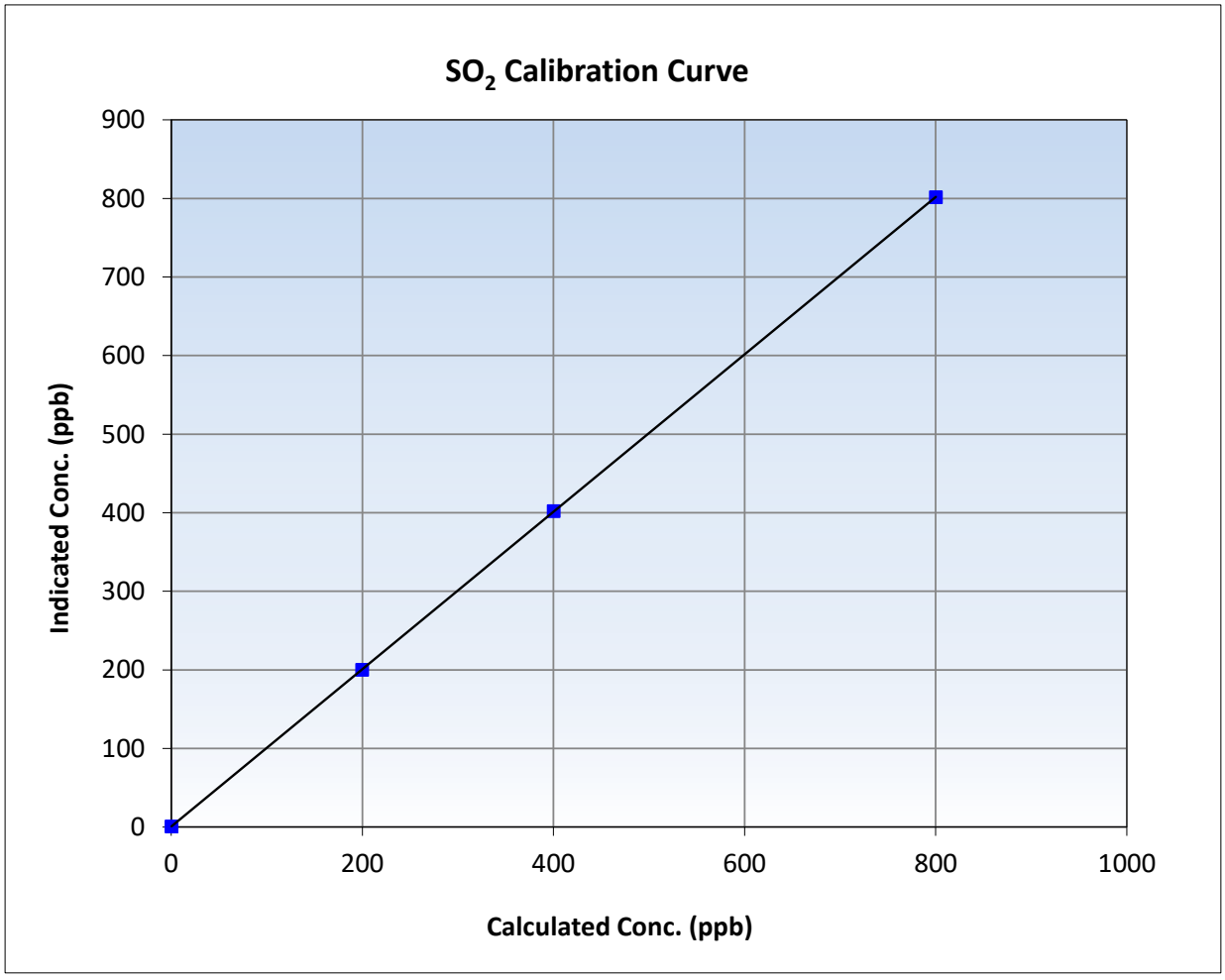
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:20	End Time (MST):	10:11
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932

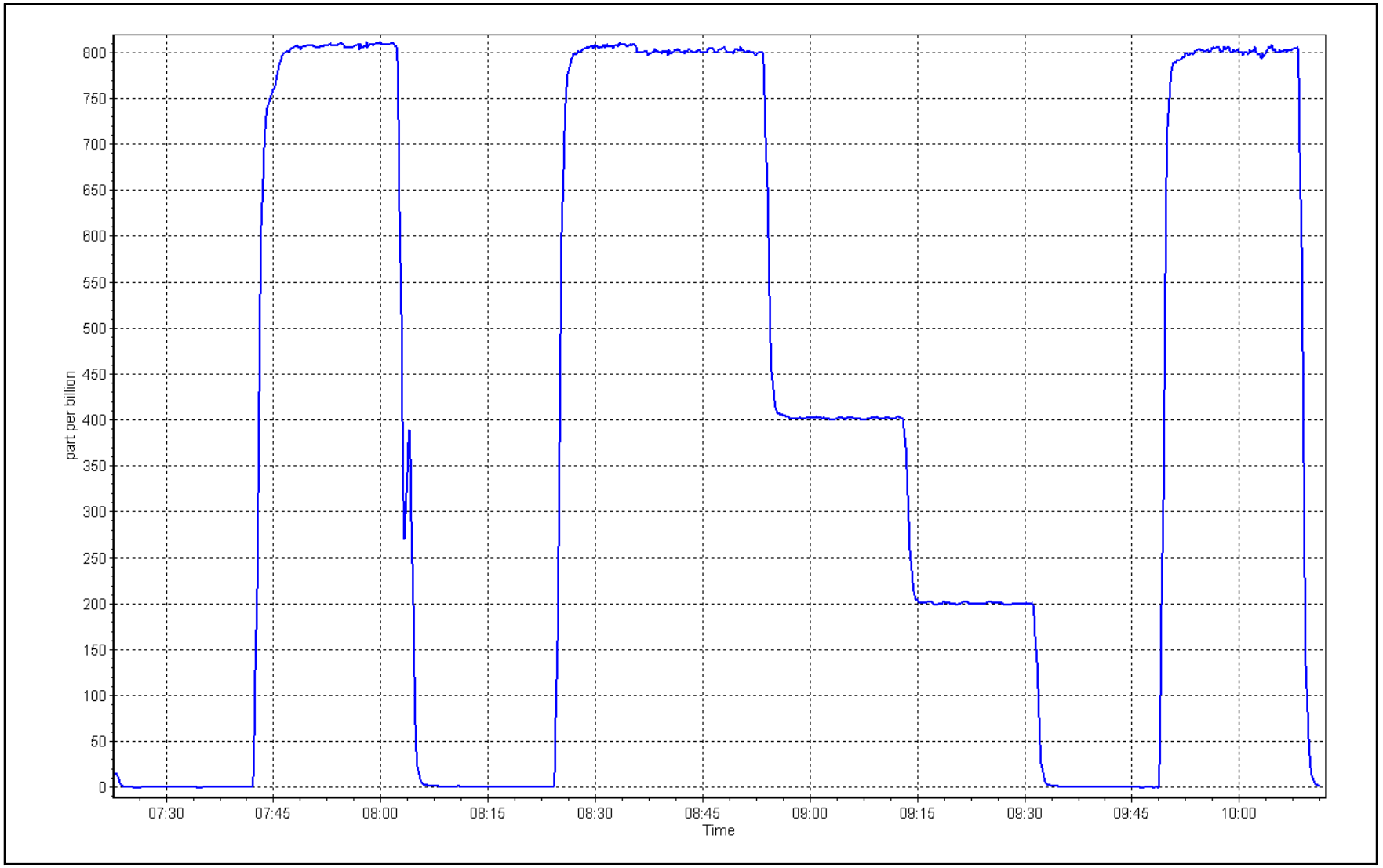
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
799.7	801.2	0.9982
399.8	401.8	0.9951
199.4	199.9	0.9976

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.001458	*0.90 - 1.10*
Intercept	0.594841	*+/-30*



SO2 Calibration Plot Date: May 30, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	May 13, 2024	Last Cal Date:	April 5, 2024
Start time (MST):	7:50	End time (MST):	11:48
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.42	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC345266			
Removed Cal Gas Conc:	5.42	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3808
ZAG Make/Model:	API T701H		Serial Number:	362

Analyzer Information

Analyzer make:	Thermo 43i-LTE		Analyzer serial #:	1008841400
Converter make:	Global		Converter serial #:	2022-200
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.997925	0.996076	Backgd or Offset:	1.09	1.07
Calibration intercept:	0.102175	0.042122	Coeff or Slope:	1.130	1.123

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4926	74.1	80.3	81.7	0.984
As found Mid point	4963	37.0	40.1	40.8	0.985
As found Low point	4982	18.5	20.1	20.0	1.008
New cylinder response					

Baseline Corr As found:	81.6	Prev response:	80.26	*% change:	1.6%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	1.017847	AF Intercept:	-0.097494
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999961	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4926	74.1	80.3	80.0	1.004
Mid point	4963	37.0	40.1	40.2	0.998
Low point	4982	18.5	20.1	19.8	1.013
As left zero	5000	0.0	0.0	0.1	----
As left span	4926	74.1	80.3	79.5	1.010
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:		16-May-23		Ave Corr Factor	1.005
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

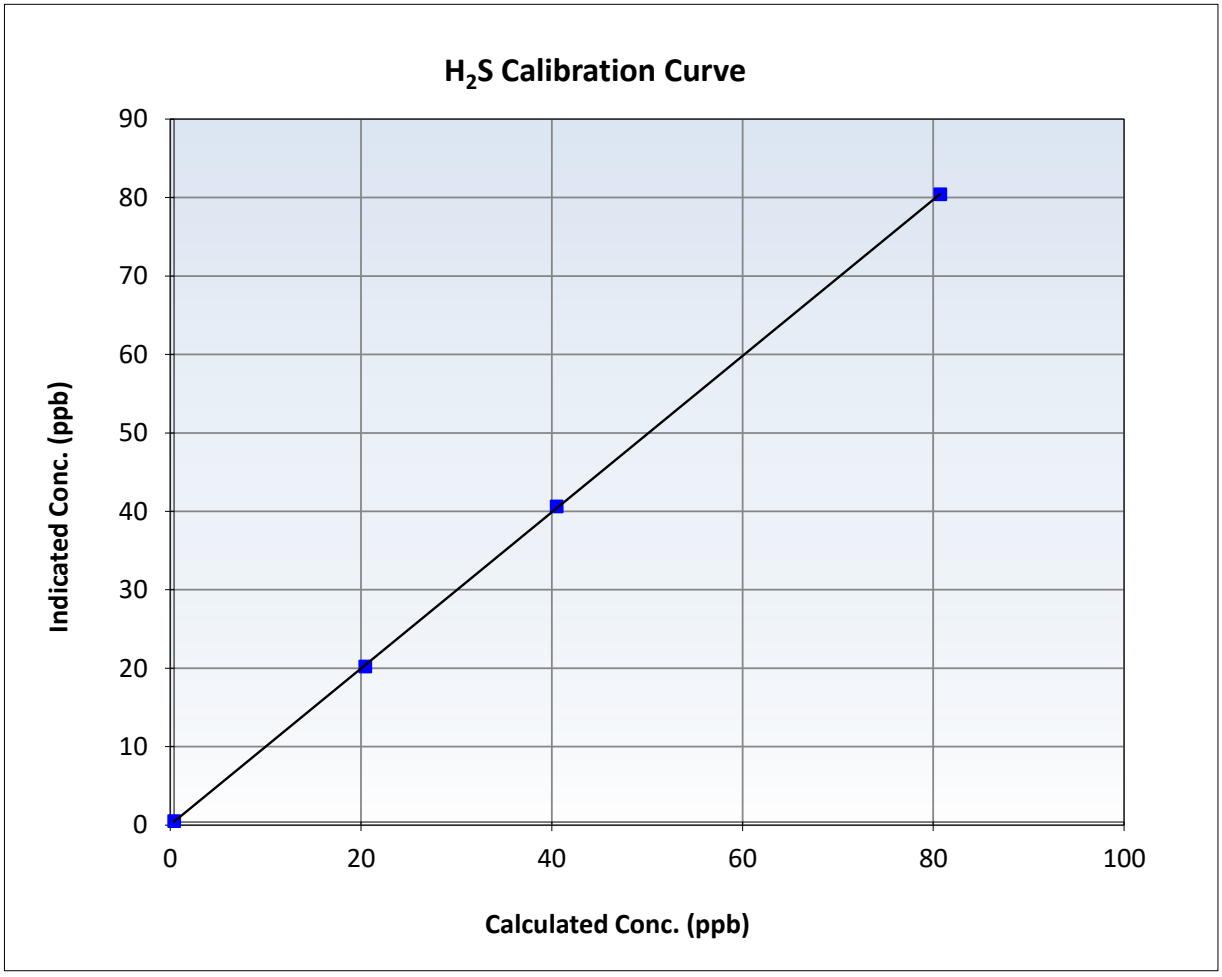
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 5, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:50	End Time (MST):	11:48
Analyzer make:	Global	Analyzer serial #:	2022-200

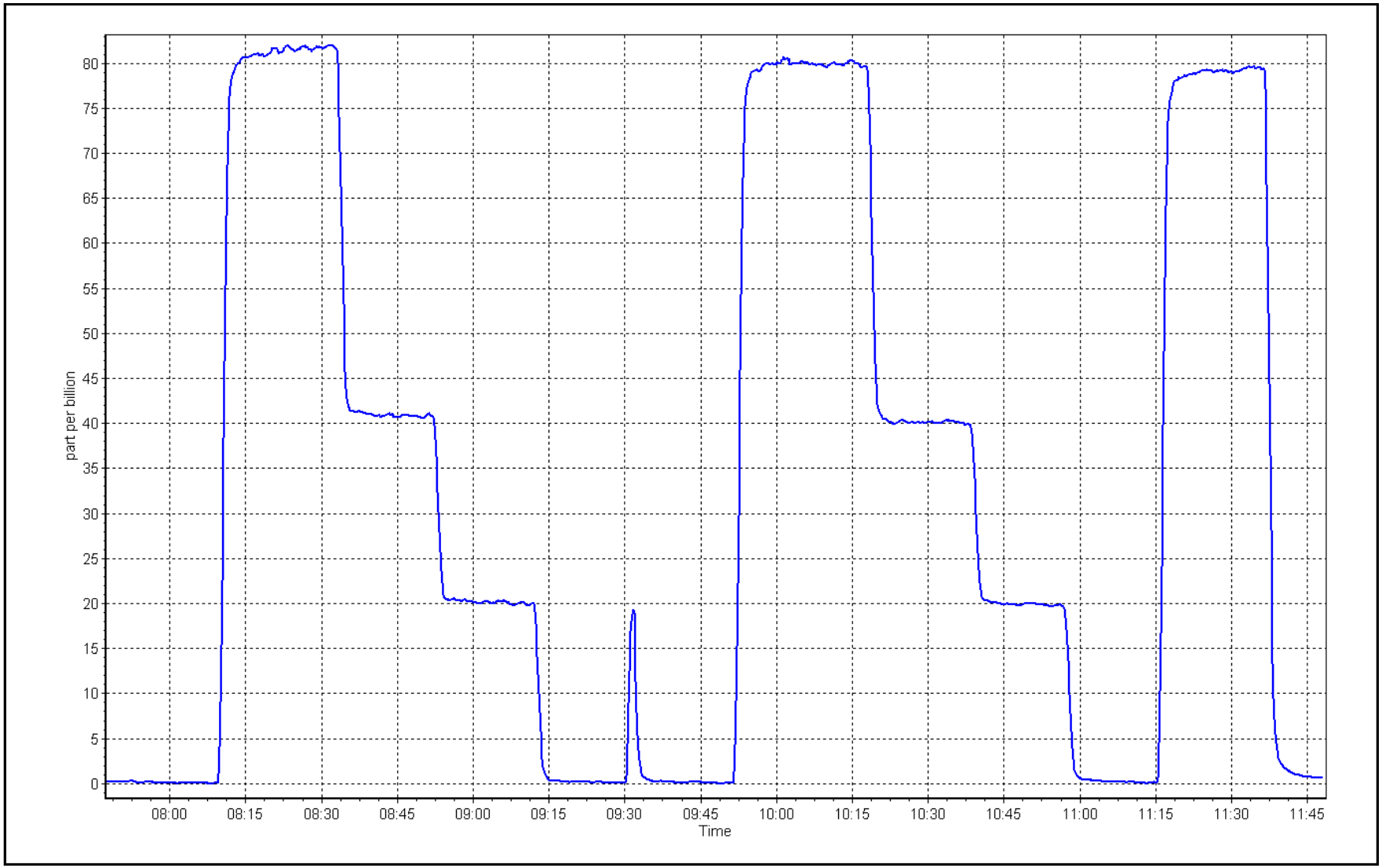
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.3	80.0	1.0040
40.1	40.2	0.9977
20.1	19.8	1.0127

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.996076	*0.90 - 1.10*
Intercept	0.042122	*+/-3*



H_2S Calibration Plot Date: May 13, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	May 14, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	7:20	End time (MST):	8:22
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	CC446753	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH4 Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
Removed C3H8 Conc.	204.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (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/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.22E-04	4.22E-04	NMHC SP Ratio:	1.07E-04	1.07E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	82687	82687
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	16.64	16.61	1.001
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.61	Prev response	16.60	*% 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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	16.64	16.50	1.009
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.009

Notes: Hydrogen Cylinder Changed.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.73	1.010
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.010

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.81	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.81	Prev response	7.80	*% 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

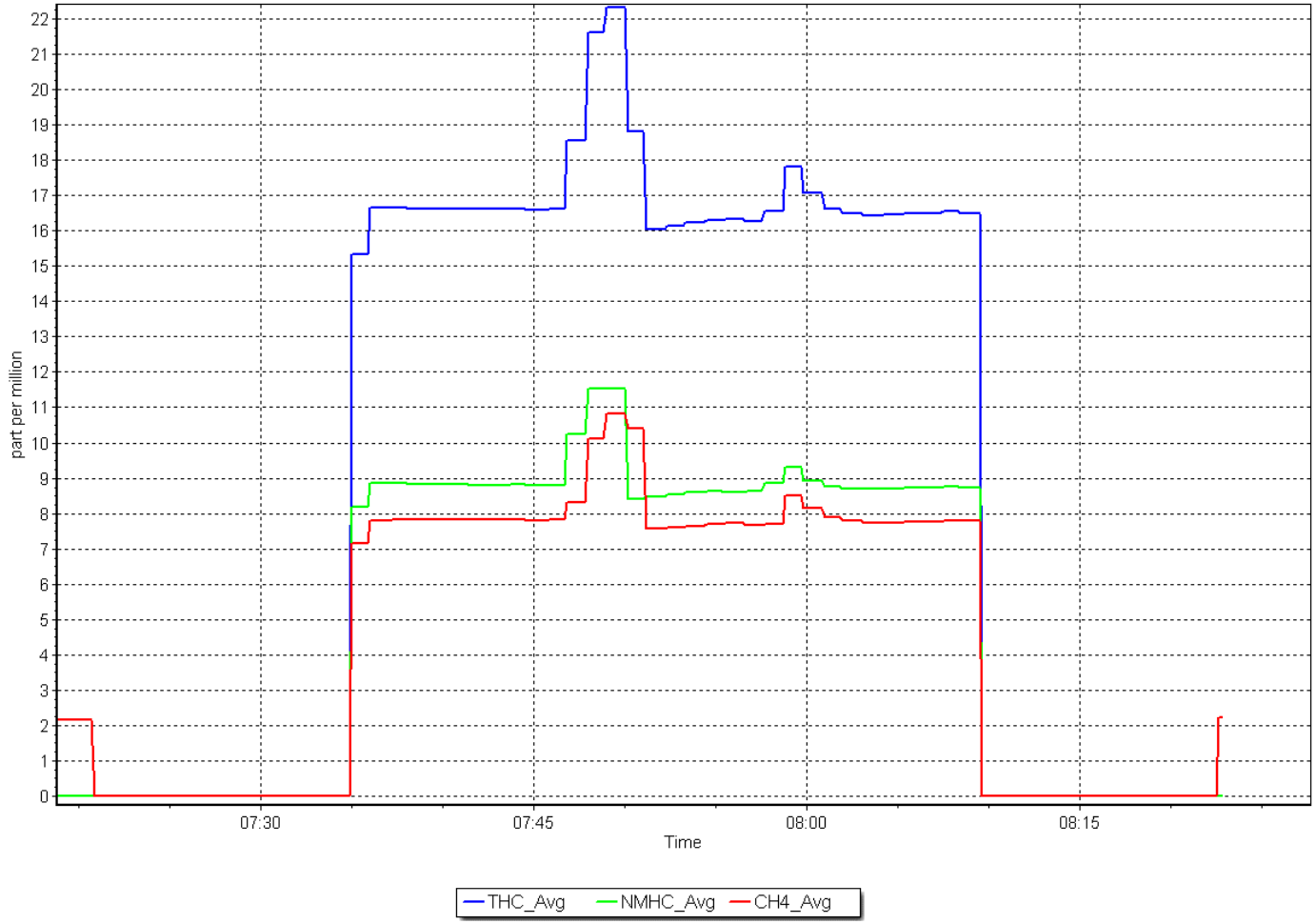
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	7.82	7.77	1.006
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.006

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.997908	0.991571
THC Cal Offset:	0.002057	0.000000
CH4 Cal Slope:	0.998894	0.993781
CH4 Cal Offset:	-0.004105	0.000000
NMHC Cal Slope:	0.997215	0.989725
NMHC Cal Offset:	0.005963	0.000000

Calibration Performed By: Melissa Lemay

NMHC Calibration Plot Date: May 14, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	May 30, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	7:20	End time (MST):	10:10
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC446753	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH4 Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
Removed C3H8 Conc.	204.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (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/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.22E-04	4.24E-04	NMHC SP Ratio:	1.07E-04	1.07E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	82687	82267
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	16.64	16.67	0.998
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.67	Prev response	16.60	*% change	0.4%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	16.64	16.61	1.001
Mid point	4961	39.3	8.32	8.31	1.001
Low point	4980	19.6	4.15	4.16	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	16.64	16.58	1.003
				Average Correction Factor	1.000

Notes: No maintenance done. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	8.82	8.86	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.86	Prev response	8.80	*% change	0.7%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.81	1.001
Mid point	4961	39.3	4.41	4.42	0.998
Low point	4980	19.6	2.20	2.22	0.991
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	8.82	8.79	1.003
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.80	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.80	Prev response	7.80	*% change	0.0%
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	4921	78.6	7.82	7.80	1.002
Mid point	4961	39.3	3.91	3.89	1.004
Low point	4980	19.6	1.95	1.94	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	7.82	7.79	1.003
				Average Correction Factor	1.004

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.997908	0.998333
THC Cal Offset:	0.002057	0.007463
CH4 Cal Slope:	0.998894	0.998558
CH4 Cal Offset:	-0.004105	-0.004706
NMHC Cal Slope:	0.997215	0.997874
NMHC Cal Offset:	0.005963	0.012169

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

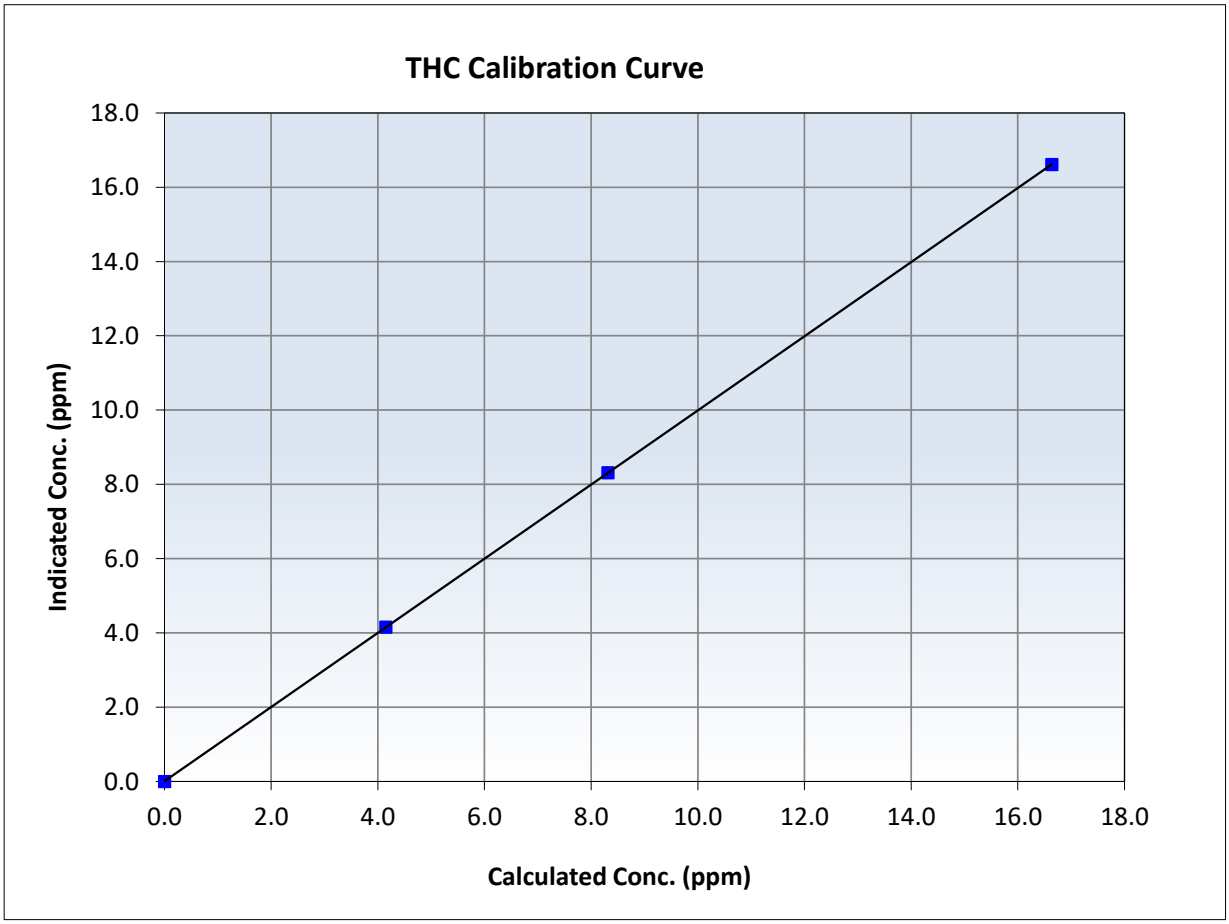
THC Calibration Summary

Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:20	End Time (MST):	10:10
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	0.999999	≥0.995
16.64	16.61	1.0014	Slope	0.998333	0.90 - 1.10
8.32	8.31	1.0006	Intercept	0.007463	+/-0.5
4.15	4.16	0.9977			



Wood Buffalo Environmental Association

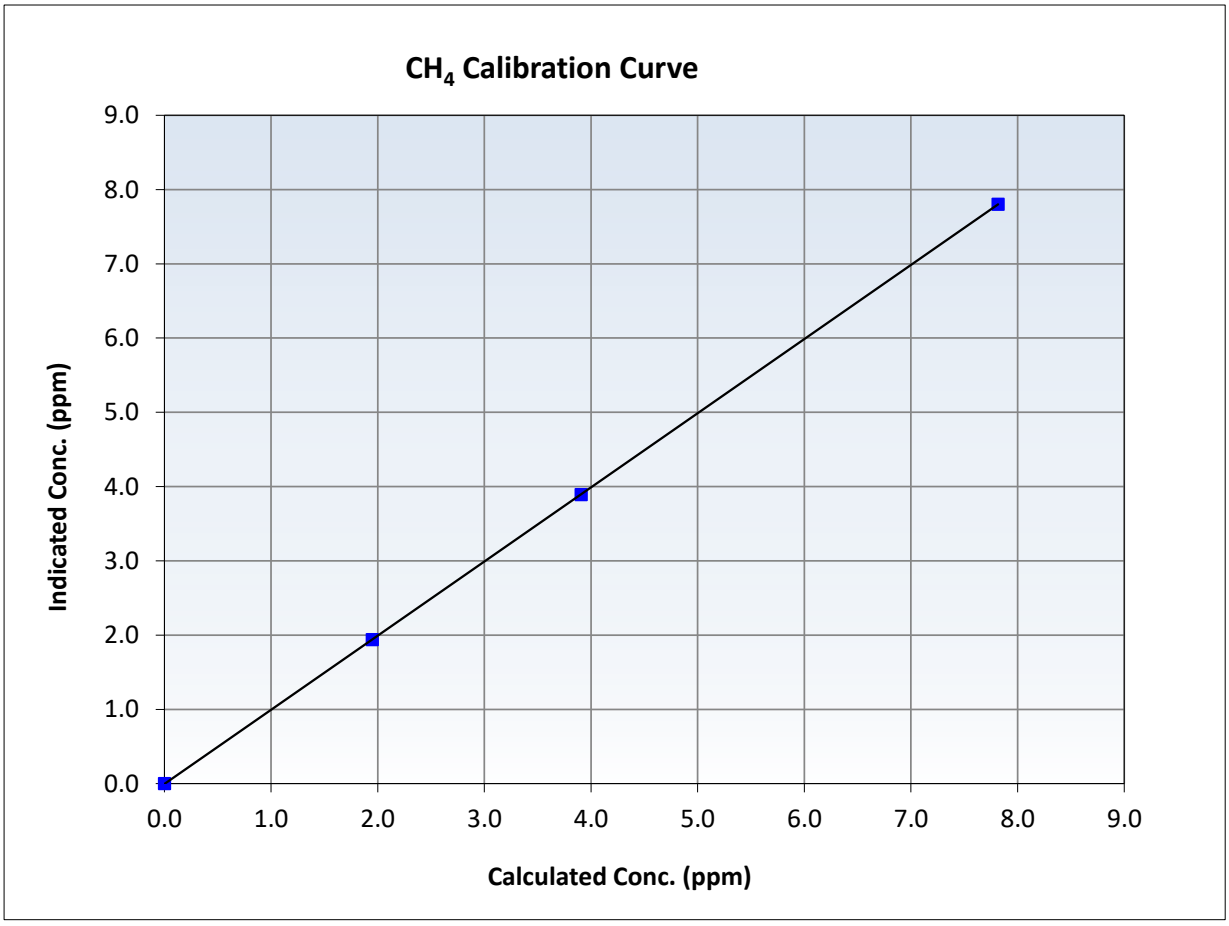
CH_4 Calibration Summary

Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:20	End Time (MST):	10:10
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	0.999998	≥0.995
7.82	7.80	1.0016	Slope	0.998558	0.90 - 1.10
3.91	3.89	1.0040			
1.95	1.94	1.0053	Intercept	-0.004706	+/-0.5



Wood Buffalo Environmental Association

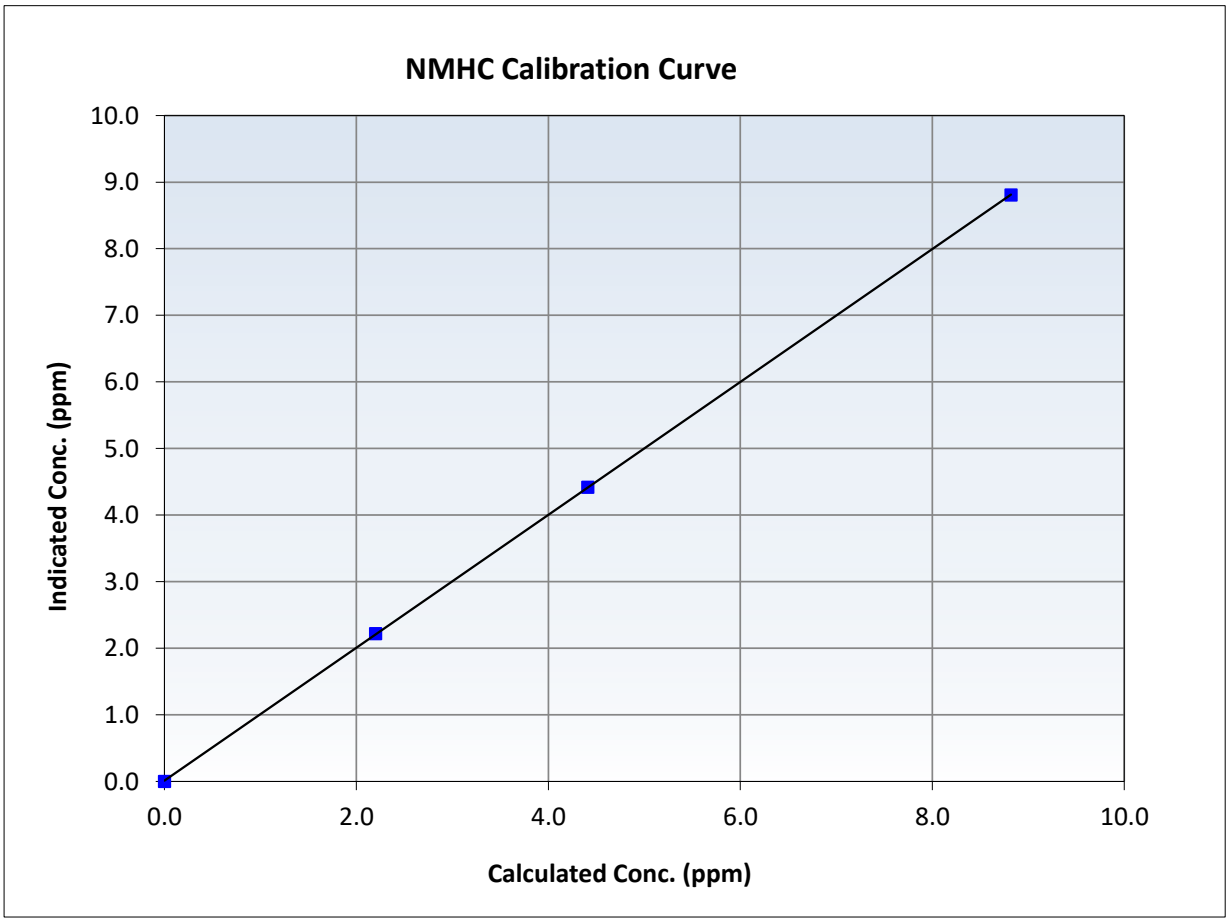
NMHC Calibration Summary

Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:20	End Time (MST):	10:10
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	0.999991	≥0.995
8.82	8.81	1.0014	Slope	0.997874	0.90 - 1.10
4.41	4.42	0.9980	Intercept	0.012169	+/-0.5
2.20	2.22	0.9911			



NMHC Calibration Plot Date: May 30, 2024 Location: Buffalo Viewpoint

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint
Station number:	AMS 04
Calibration Date:	May 2, 2024
Last Cal Date:	April 2, 2024
Start time (MST):	5:50
End time (MST):	10:55
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC324979	Cal Gas Expiry Date:	November 3, 2032
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.80 ppm
Removed Cylinder #:		Removed Gas Exp Date:	
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.80 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3808
ZAG make/model:	APIT701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
AF High point	4918	81.8	800.0	798.4	1.6	792.2	790.5	1.7	1.0100	1.0102
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	802.8 ppb	NO =	800.0 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -1.4%
Baseline Corr 1st pt	NO_X =	792.1 ppb	NO =	790.3 ppb	As Found Statistics	*Percent Change	NO = -1.2%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: API T200 Serial Number: 721

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.189	1.187	NO bkgnd or offset:	-0.6	-0.6
NOX coeff or slope:	1.177	1.199	NOX bkgnd or offset:	-0.3	-0.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.4	4.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.003822	0.996881
NO_X Cal Offset:	-0.272631	0.805902
NO Cal Slope:	1.002903	0.998766
NO Cal Offset:	-0.733480	0.385887
NO_2 Cal Slope:	0.996313	0.984467
NO_2 Cal Offset:	-1.280139	1.356482

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.6	0.7	-0.1	----	----
High point	4918	81.8	800.0	798.4	1.6	797.9	797.9	0.0	1.0027	1.0006
Mid point	4959	40.9	400.0	399.2	0.8	400.7	399.1	1.6	0.9983	1.0002
Low point	4980	20.4	199.5	199.1	0.4	199.2	198.8	0.4	1.0015	1.0014
As left zero	5000	0.0	0.0	0.8	-0.8	0.7	0.8	-0.1	----	----
As left span	4918	81.8	800.0	400.1	800.0	792.5	400.1	392.3	1.0095	1.0000
							Average Correction Factor		1.0008	1.0008

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	795.7	400.0	397.3	391.6	1.0146	98.6%
Mid GPT point	795.7	599.3	198.0	197.6	1.0022	99.8%
Low GPT point	795.7	695.2	102.1	103.0	0.9916	100.8%
				Average Correction Factor	1.0028	99.7%

Notes: Span adjusted. Due to drifting during the GPT the 2nd NO ref point used.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

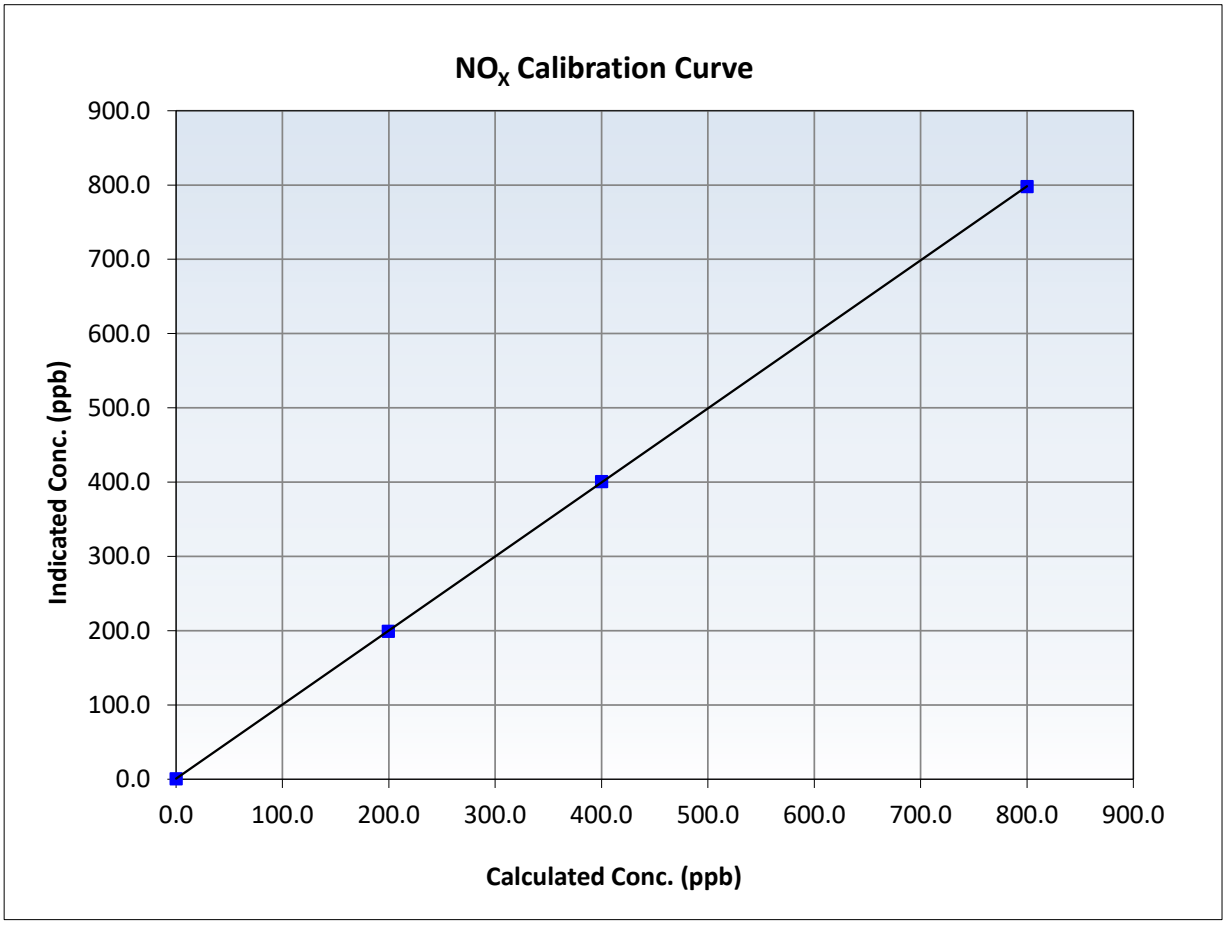
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 2, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	5:50	End Time (MST):	10:55
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
800.0	797.9	1.0027
400.0	400.7	0.9983
199.5	199.2	1.0015

Statistical Evaluation		Limits
Correlation Coefficient	0.999995	≥0.995
Slope	0.996881	0.90 - 1.10
Intercept	0.805902	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

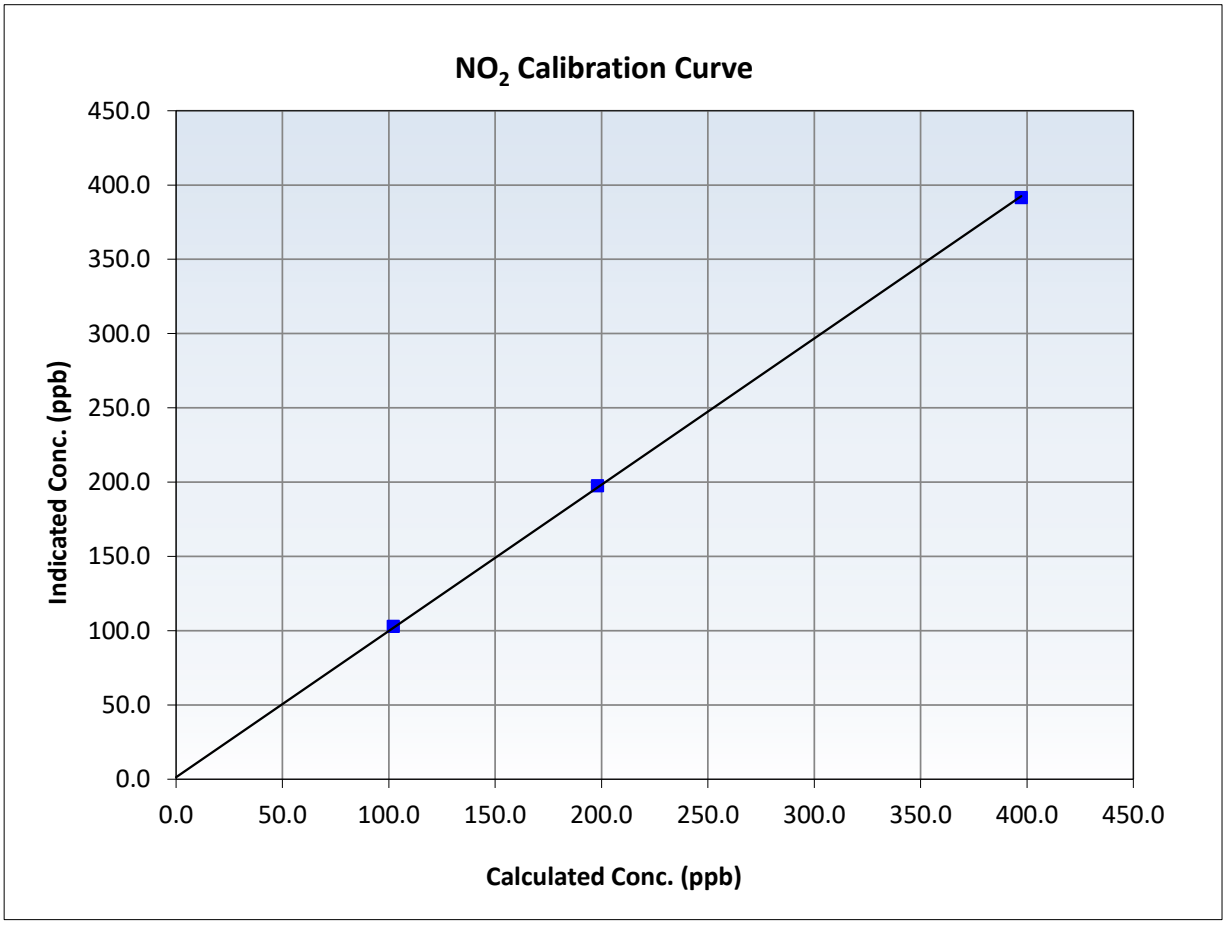
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 2, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	5:50	End Time (MST):	10:55
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
397.3	391.6	1.0146
198.0	197.6	1.0022
102.1	103.0	0.9916

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999930	*≥0.995*
Slope	0.984467	*0.90 - 1.10*
Intercept	1.356482	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

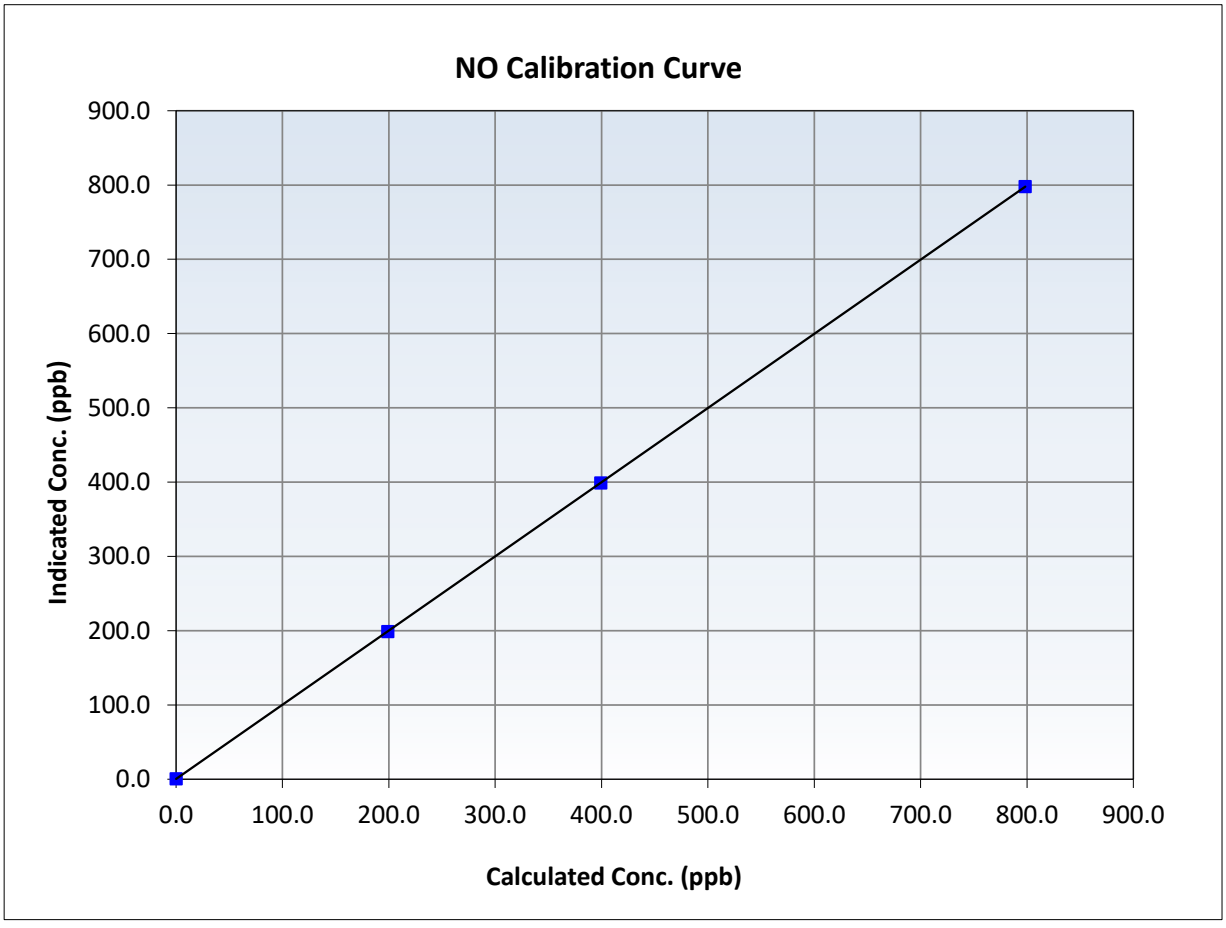
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 2, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	5:50	End Time (MST):	10:55
Analyzer make:	API T200	Analyzer serial #:	721

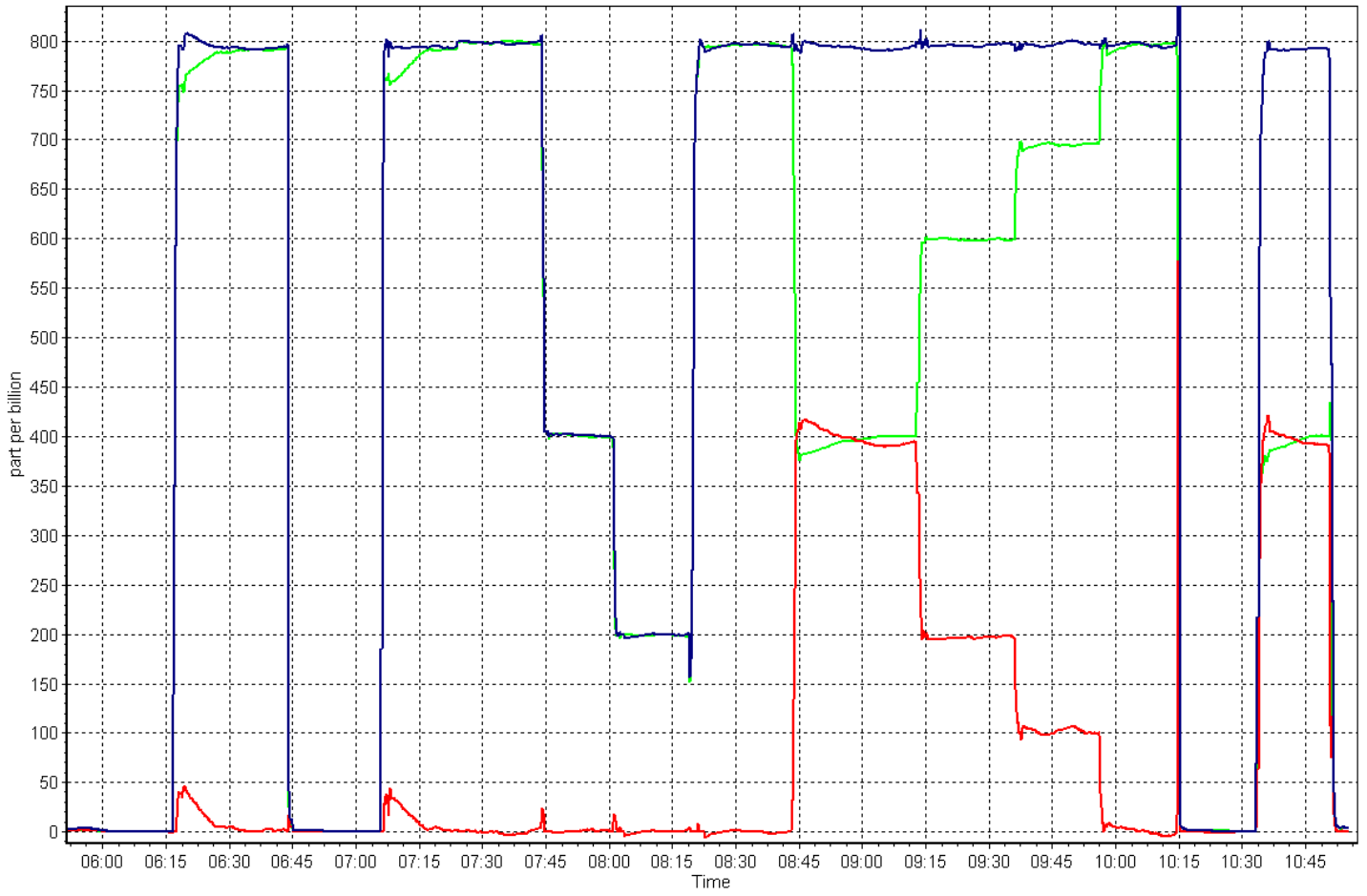
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.7	----
798.4	797.9	1.0006
399.2	399.1	1.0002
199.1	198.8	1.0014

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.998766	0.90 - 1.10
Intercept	0.385887	+/-20



NO_X Calibration Plot Date: May 2, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	May 10, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	8:35	End time (MST):	11:14
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	APIP T700	Serial Number:	3808
ZAG Make/Model:	API T701	Serial Number:	362

Analyzer Information

Analyzer make:	API T400		Analyzer serial #:	2961	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003629	1.002543	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	0.540000	0.780000	Coeff or Slope:	1.011	1.011

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	5000	995.6	400.0	400.1	0.999
As found Mid point					
As found Low point					
Baseline Corr As found:	400.5	Previous response	402.0	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	5000	998.1	400.0	401.6	0.996
Mid point	5000	822.5	200.0	201.4	0.993
Low point	5000	712.4	100.0	101.6	0.984
As left zero	5000	0.0	0.0	0.1	----
As left span	5000	997.1	400.0	402.9	0.993
				Average Correction Factor	0.991

Notes: No adjustments and maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

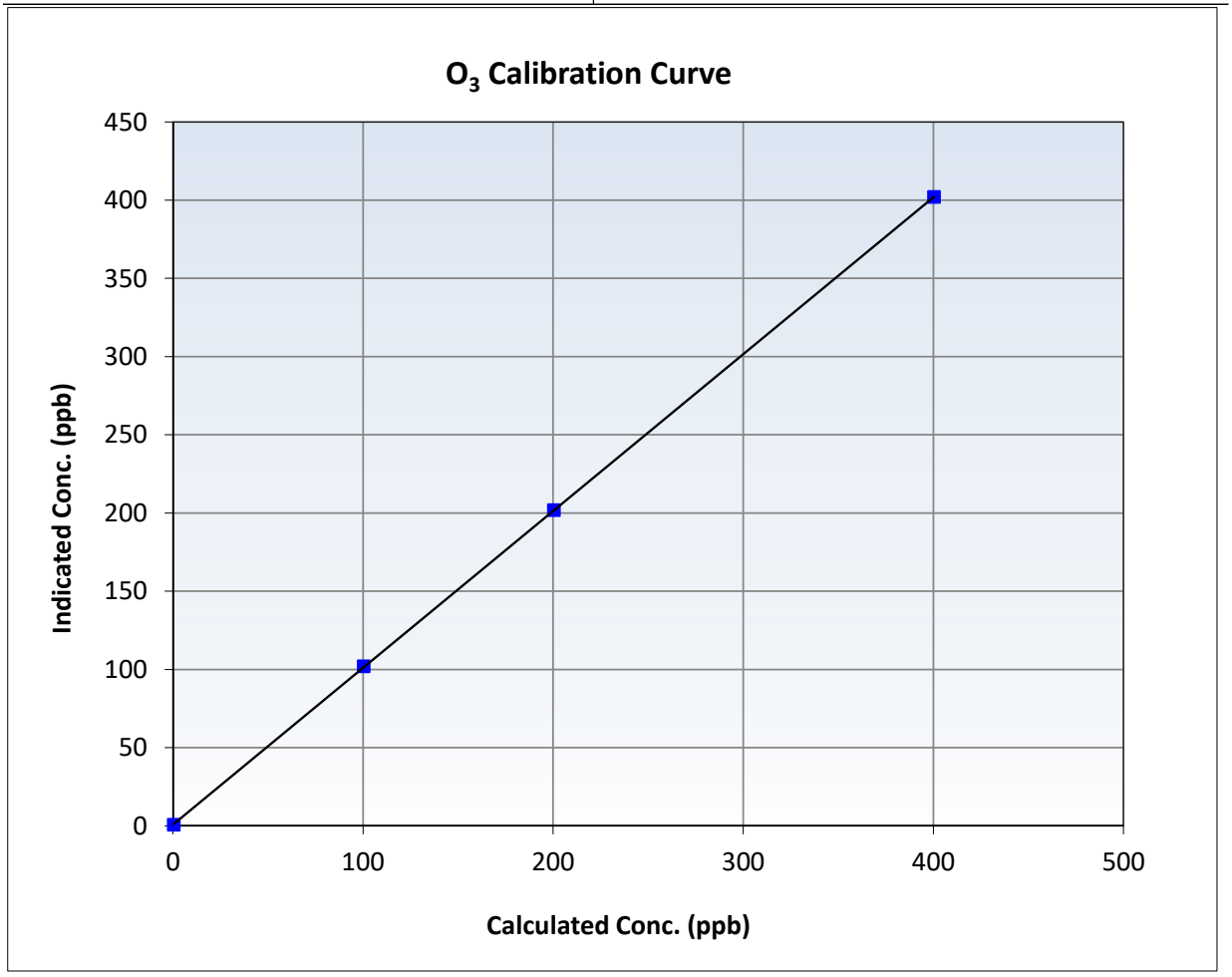
O_3 Calibration Summary

Station Information

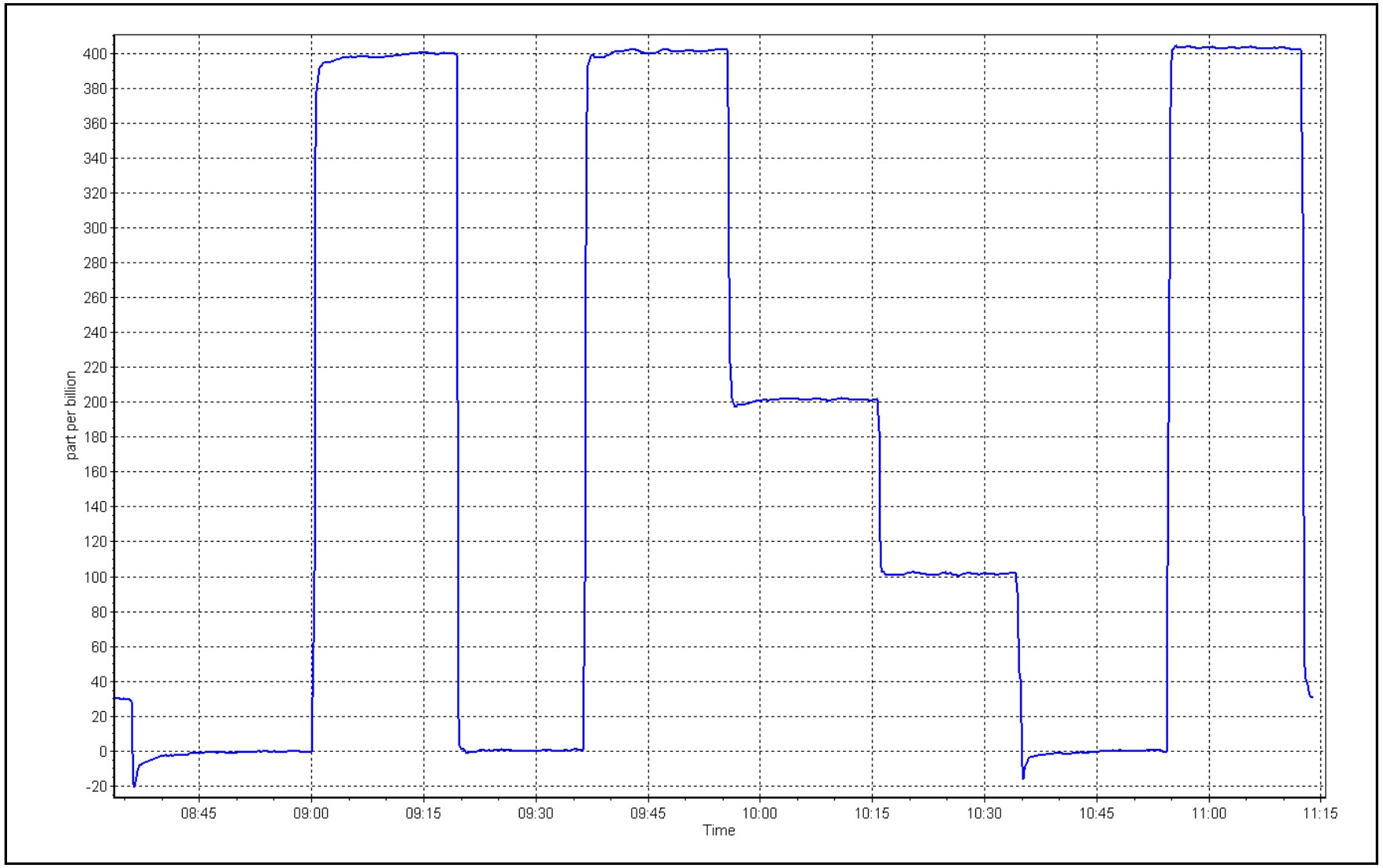
Calibration Date:	May 10, 2024	Previous Calibration:	April 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:35	End Time (MST):	11:14
Analyzer make:	API T400	Analyzer serial #:	2961

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.3	----	Correlation Coefficient	0.999993	≥0.995
400.0	401.6	0.9960	Slope	1.002543	0.90 - 1.10
200.0	201.4	0.9930			
100.0	101.6	0.9843	Intercept	0.780000	+/- 5



O_3 Calibration Plot Date: May 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:	April 24, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	6:17	End time (MST):	7:20
Analyzer Make:	API T640	S/N:	321
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	1451
Temp/RH standard:	Alicat FP-25BT	S/N:	1451

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	10.1	9.8	10.1	☐	+/- 2 °C
P (mmHg)	719.4	721.5	719.4	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.15	5.00	☑	+/- 0.25 LPM
PW% (pump)	37	-----	42	☐	>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: 6-10-2024 — Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	11.9	12.2	10.9	☑	+/- 0.5

Date Optical Chamber Cleaned: May 30, 2024

Date Disposable Filter Changed: May 30, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: February 27, 2024

Date RH/T Sensor Cleaned: February 27, 2024

Notes: Flow and PMT adjusted. Leak check passed.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS05
MANNIX
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 21, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	9:06	End time (MST):	10:28
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	50.02	ppm	Cal Gas Exp Date:	January 12, 2029
Cal Gas Cylinder #:	XC026809B			
Removed Cal Gas Conc:	50.02	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	621
Zero Air Gen Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1008841399	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999943		Backgd or Offset:	9.6	9.6
Calibration intercept:	0.380000		Coeff or Slope:	0.944	0.944

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4920	80.0	800.3	803.9	0.996
As found Mid point	4960	40.0	400.2	399.2	1.003
As found Low point	4980	20.0	200.1	199.6	1.003
New cylinder response					
Baseline Corr As found:	803.8	Previous response	800.7	*% change	0.4%
Baseline Corr 2nd AF pt:	399.1	AF Slope:	1.004570	AF Intercept:	-1.040000
Baseline Corr 3rd AF pt:	199.5	AF Correlation:	0.999985	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

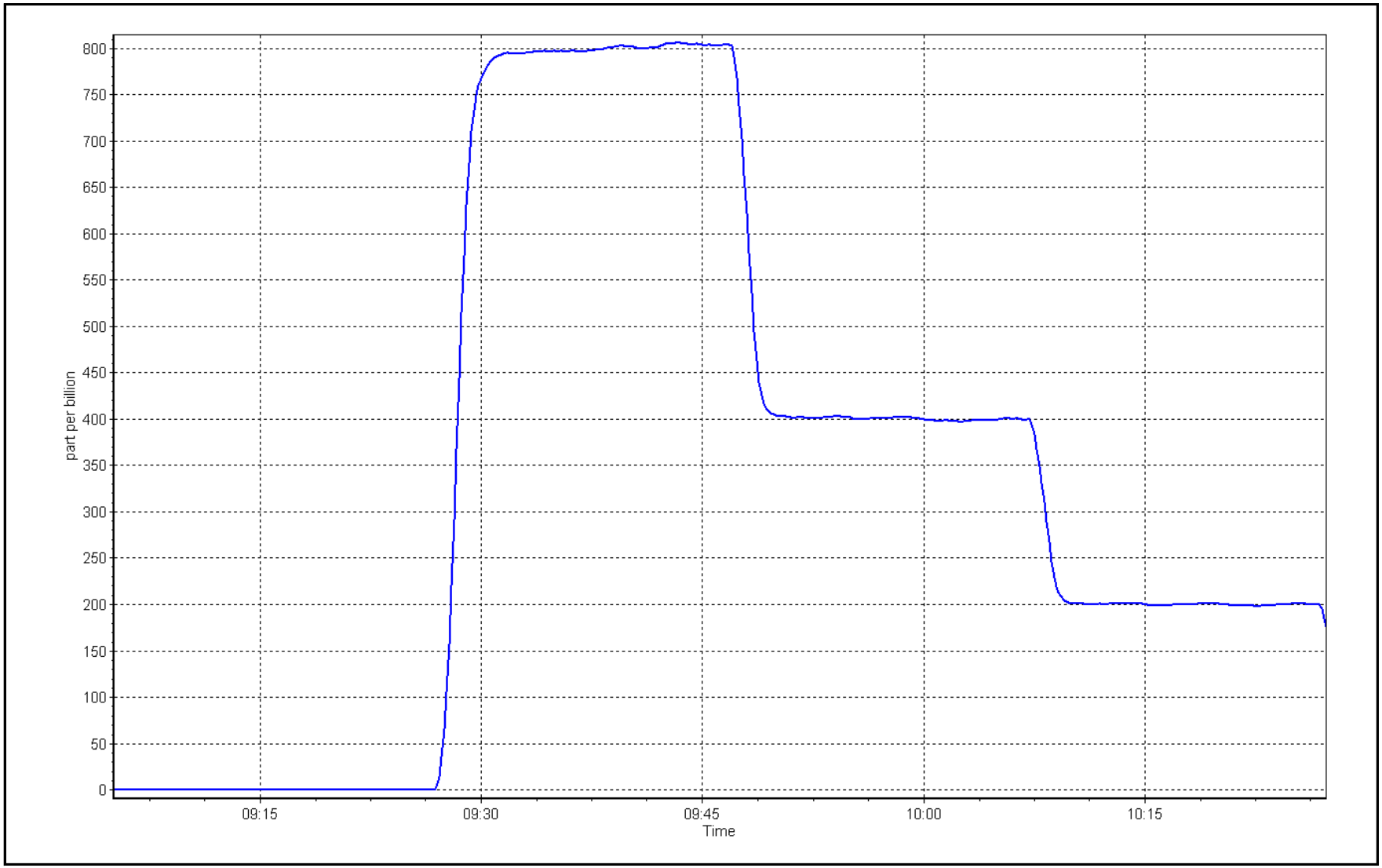
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor:

Notes: Removal calibration for station replacement.

Calibration Performed By: Max Farrell

SO2 Calibration Plot Date: May 21, 2024 Location: Mannix



Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 25, 2024	Last Cal Date:	N/A
Start time (MST):	7:41	End time (MST):	10:00
Reason:	Install		

Calibration Standards

Cal Gas Concentration:	49.84	ppm	Cal Gas Exp Date:	January 6, 2030	
Cal Gas Cylinder #:	CC408659				
Removed Cal Gas Conc:	49.84	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A		Diff between cyl:		
Calibrator Model:	API T700		Serial Number:	5470	
Zero Air Gen Model:	API T701		Serial Number:	361	

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1008841399	
Analyzer Range:	1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:		0.999272	Backgd or Offset:		9.7
Calibration intercept:		-0.306089	Coeff or Slope:		0.932

SO_2 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					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					
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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	1.0	----
High point	4920	80.3	800.4	800.0	1.000
Mid point	4960	40.1	399.7	398.9	1.002
Low point	4980	20.1	200.4	198.3	1.010
As left zero	5000	0.0	0.0	0.6	----
As left span	4920	80.3	800.4	802.3	0.998
				Average Correction Factor:	1.004

Notes: Changed the inlet filter before installation. Adjusted the span only.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

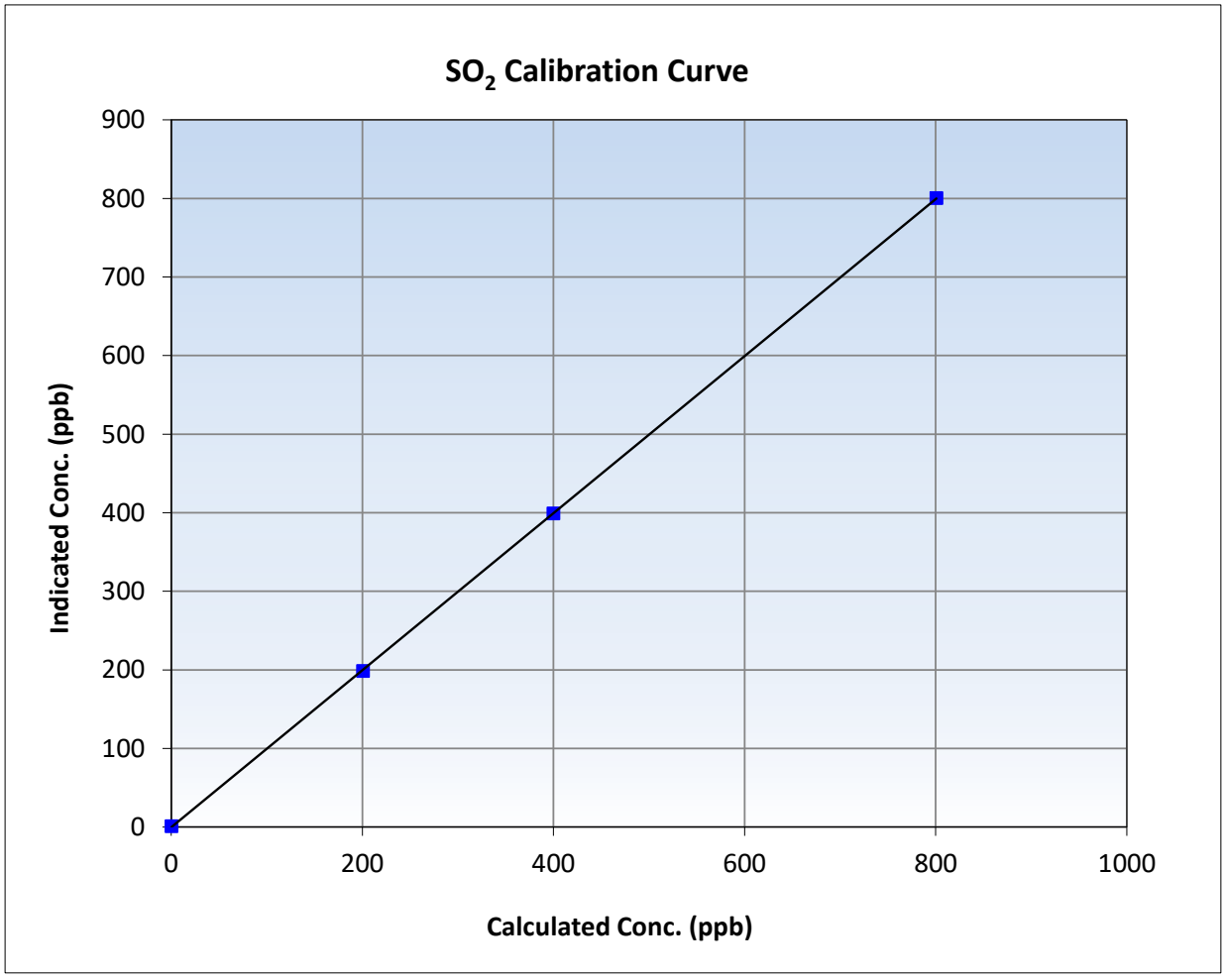
Station Information

Calibration Date:	May 25, 2024	Previous Calibration:	N/A
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	7:41	End Time (MST):	10:00
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

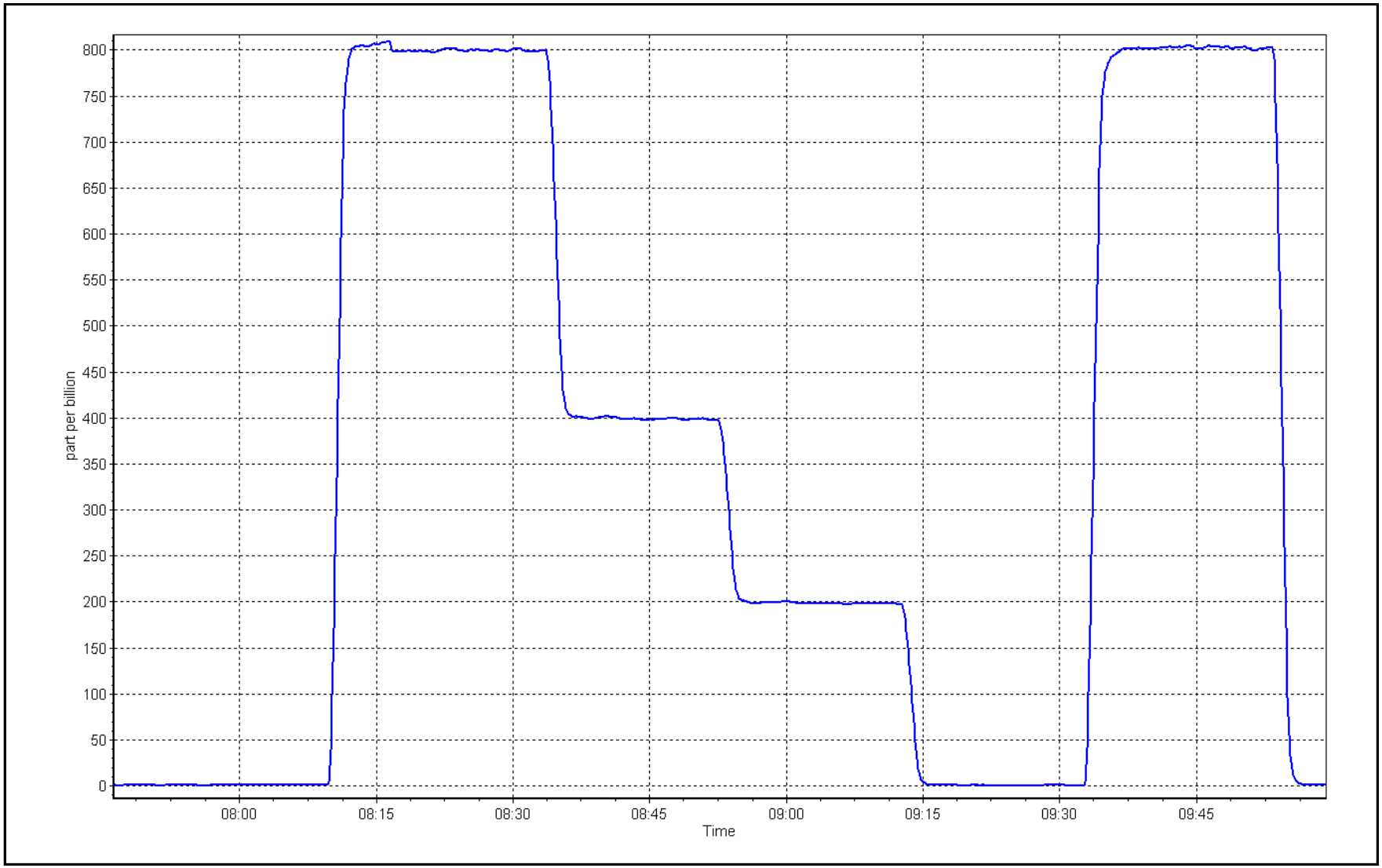
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.0	----
800.4	800.0	1.0005
399.7	398.9	1.0020
200.4	198.3	1.0104

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.999272	*0.90 - 1.10*
Intercept	-0.306089	*+/-30*



SO2 Calibration Plot Date: May 25, 2024 Location: Mannix



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 21, 2024	Last Cal Date:	April 19, 2024
Start time (MST):	10:33	End time (MST):	13:45
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	4.96	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0037363			
Removed Cal Gas Conc:	4.96	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	1845
ZAG Make/Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	1200326169	
Converter make:	Global		Converter serial #:	2022225	
Analyzer Range	0 - 100 ppb		Converter Temp:	350	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.995684		Backgd or Offset:	1.23	1.23
Calibration intercept:	-0.017567		Coeff or Slope:	0.978	0.978

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4919	80.6	80.0	80.7	0.991
As found Mid point	4960	40.3	40.0	40.5	0.987
As found Low point	4980	20.2	20.0	19.9	1.007
New cylinder response					

Baseline Corr As found:	80.7	Prev response:	79.60	*% change:	1.4%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.010837	AF Intercept:	-0.097821
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999969	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					
SO2 Scrubber Check	4920	80.0	800.0		----

Date of last scrubber change:

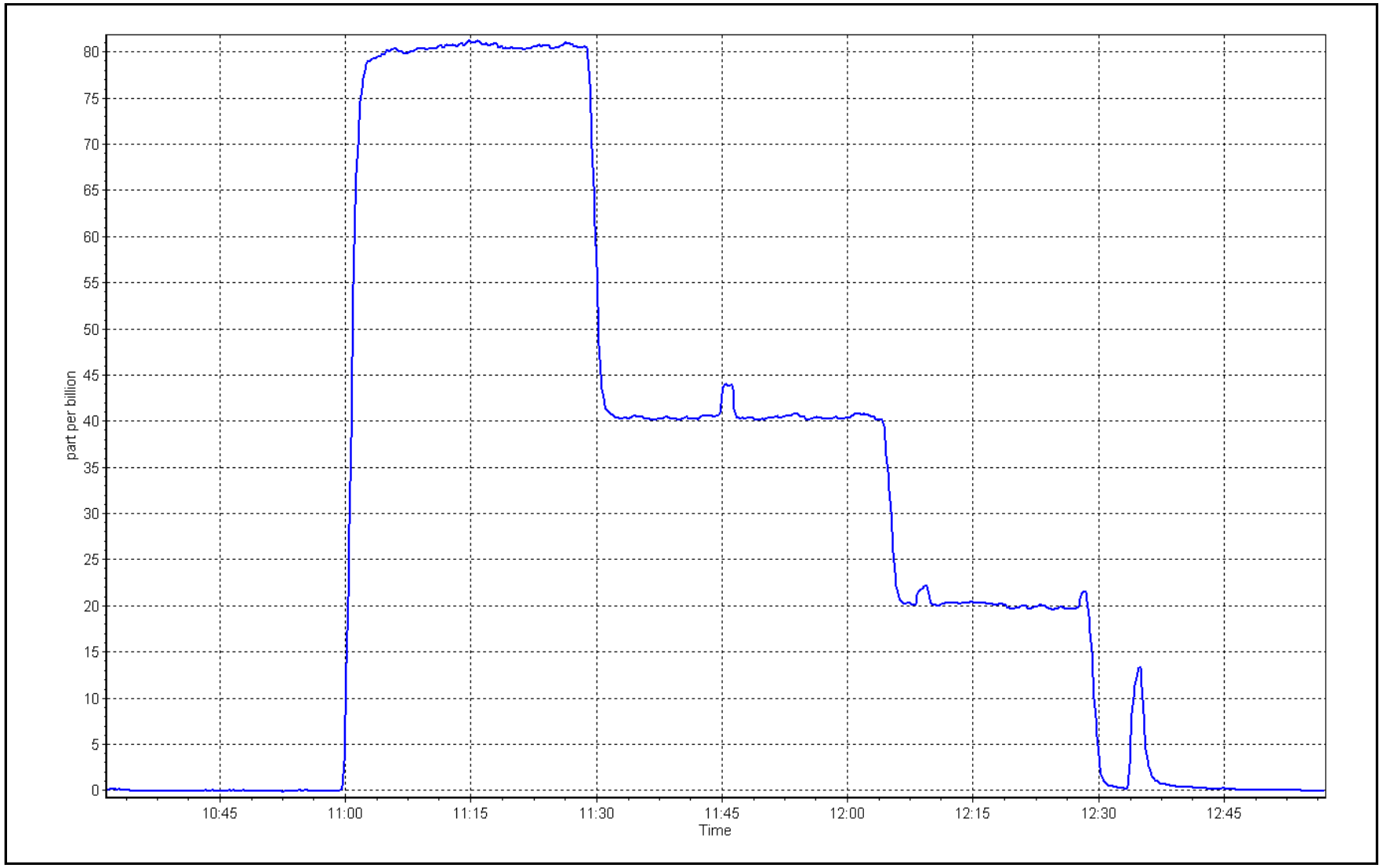
Ave Corr Factor

Date of last converter efficiency test:

Notes: Removal calibration for station replacement. Completed the SO2 scrubber check after the third as found point.

Calibration Performed By: Max Farrell

H_2S Calibration Plot Date: May 21, 2024 Location: Mannix



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 24, 2024	Last Cal Date:	N/A
Start time (MST):	11:06	End time (MST):	15:11
Reason:	Install		

Calibration Standards

Cal Gas Concentration:	4.96	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0037363			
Removed Cal Gas Conc:	4.96	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	5470
ZAG Make/Model:	API T701		Serial Number:	361

Analyzer Information

Analyzer make:	Thermo 43iQ		Analyzer serial #:	1200326169
Converter make:	Global		Converter serial #:	2022-225
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:		1.001686	Backgd or Offset:		1.2
Calibration intercept:		-0.377602	Coeff or Slope:		1.009

H_2S 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					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4919	80.6	80.0	79.8	1.002
Mid point	4960	40.3	40.0	39.7	1.007
Low point	4980	20.2	20.0	19.3	1.038
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	80.6	80.0	81.5	0.981
SO2 Scrubber Check	4920	80.3	803.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.016
Date of last converter efficiency test:					

Notes: Changed the inlet filter. Completed SO2 scrubber check after calibrator zero. Turned off the pressure compensation to stop the random spikes. Adjusted the span. As left span spiked due to low pressure from zero air, increased the zero air pressure to fix the span.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

H_2S Calibration Summary

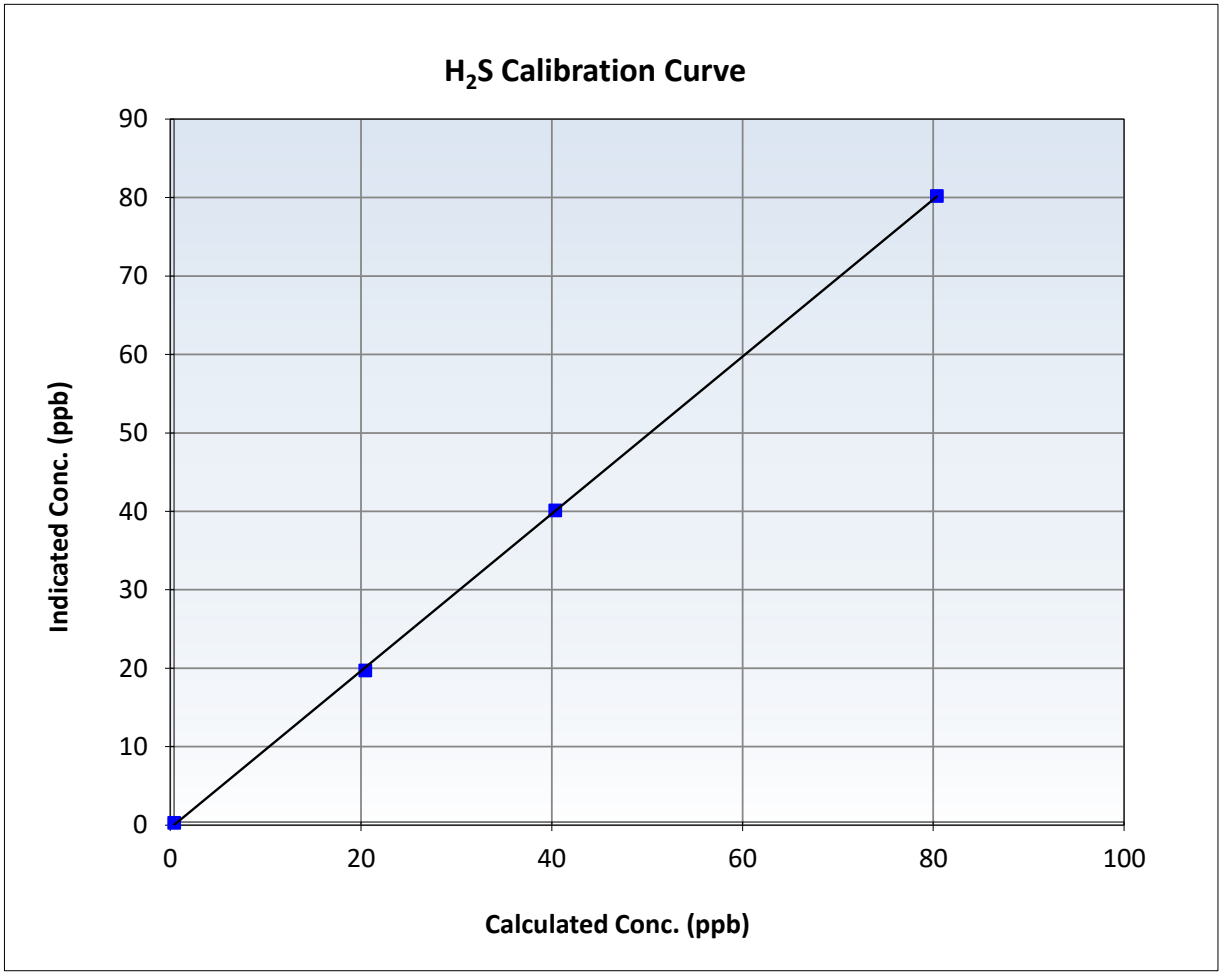
Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	N/A
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	11:06	End Time (MST):	15:11
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1200326169

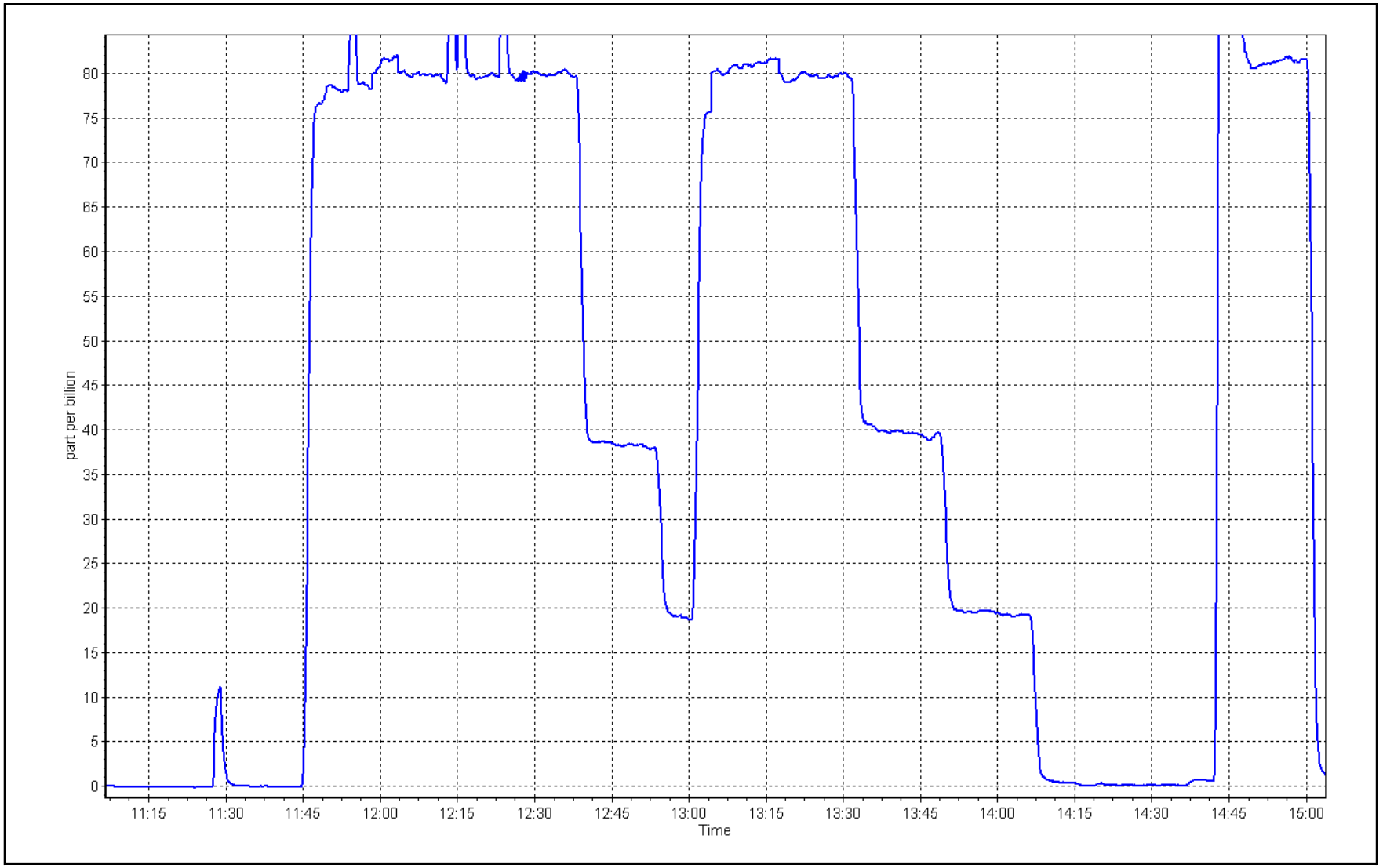
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	79.8	1.0020
40.0	39.7	1.0069
20.0	19.3	1.0382

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999932	*≥0.995*
Slope	1.001686	*0.90 - 1.10*
Intercept	-0.377602	*+/-3*



H_2S Calibration Plot Date: May 24, 2024 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 7, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	9:00	End time (MST):	13:30
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	XCO268098		Cal Gas Expiry Date:		
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
Removed C3H8 Conc.	207.9	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	621	
Zero Air Gen model:	API T701		Serial Number:	5613	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1170050130	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.73E-04	2.52E-04	NMHC SP Ratio:	5.89E-05	5.35E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	155276	170930
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	17.23	17.15	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.15	Prev response	17.21	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	17.23	17.20	1.002
Mid point	4960	40.0	8.61	8.58	1.003
Low point	4980	20.0	4.31	4.27	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	17.23	16.97	1.015
				Average Correction Factor	1.004

Notes: Changed the inlet filter after as founds. Readings became very unstable after as founds, possibly an issue with the actuator. Adjusted the span only. See docit note for more info.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	9.15	9.05	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.05	Prev response	9.13	*% 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	80.0	9.15	9.10	1.005
Mid point	4960	40.0	4.57	4.54	1.007
Low point	4980	20.0	2.29	2.27	1.008
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	9.15	8.94	1.023
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	8.08	8.11	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.11	Prev response	8.08	*% change	0.3%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	8.08	8.10	0.998
Mid point	4960	40.0	4.04	4.04	1.000
Low point	4980	20.0	2.02	2.01	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	8.08	8.03	1.006
				Average Correction Factor	1.001

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999340	0.998663
THC Cal Offset:	-0.004400	-0.012800
CH4 Cal Slope:	1.001641	1.003084
CH4 Cal Offset:	-0.007600	-0.009200
NMHC Cal Slope:	0.997707	0.995196
NMHC Cal Offset:	0.002600	-0.004600

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

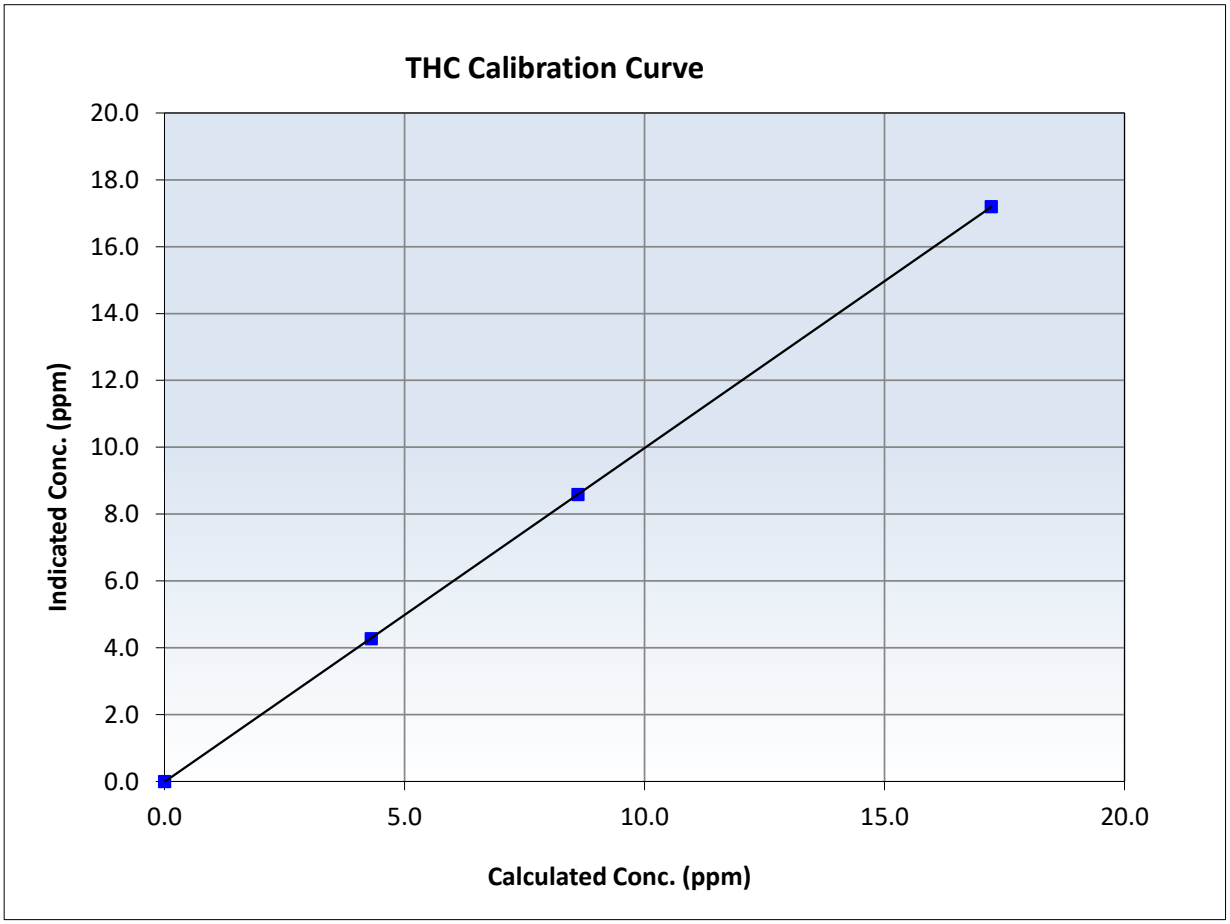
THC Calibration Summary

Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:00	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

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*
17.23	17.20	1.0017	Slope	0.998663	*0.90 - 1.10*
8.61	8.58	1.0034			
4.31	4.27	1.0076	Intercept	-0.012800	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

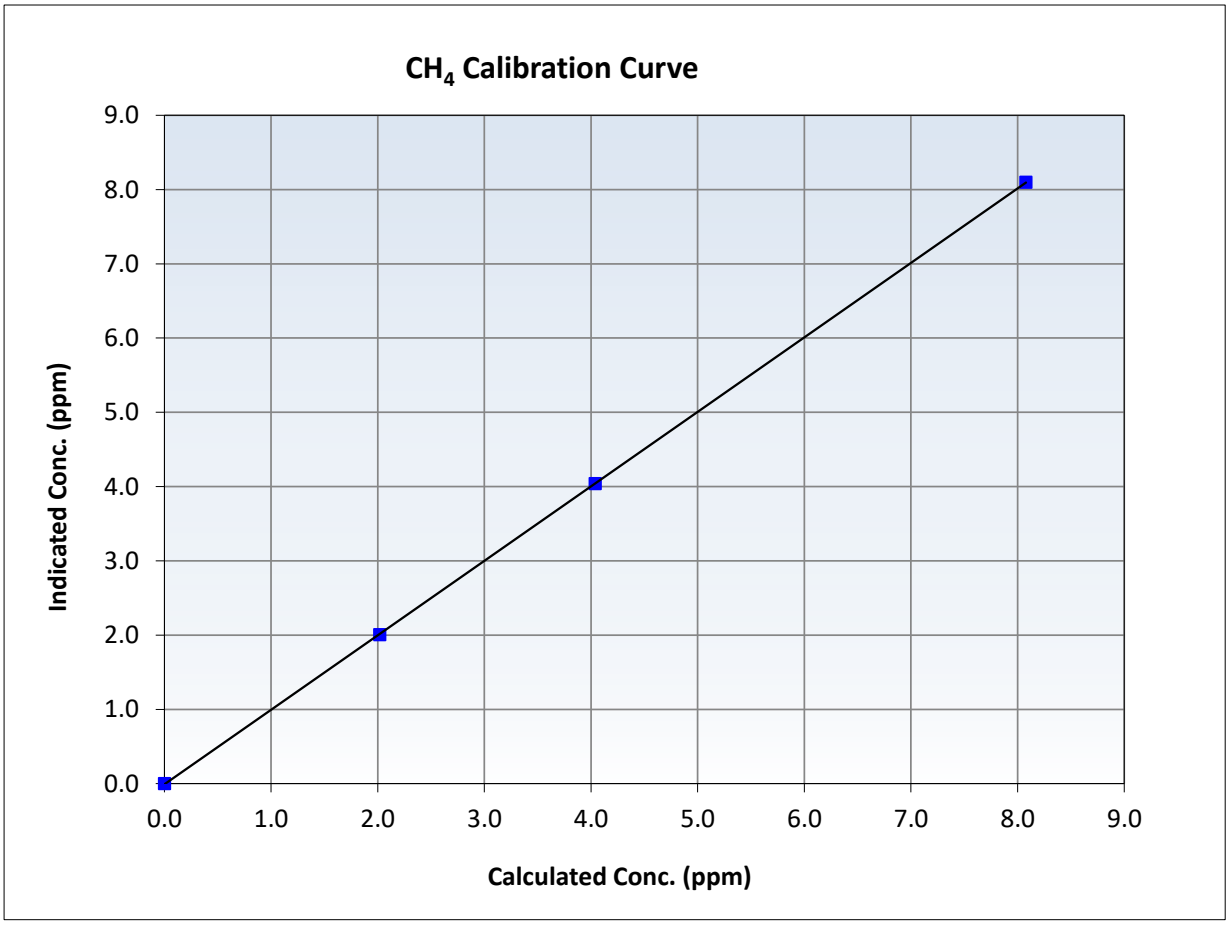
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:00	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.08	8.10	0.9976
4.04	4.04	0.9998
2.02	2.01	1.0068

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.003084	*0.90 - 1.10*
Intercept	-0.009200	*+/-0.5*



Wood Buffalo Environmental Association

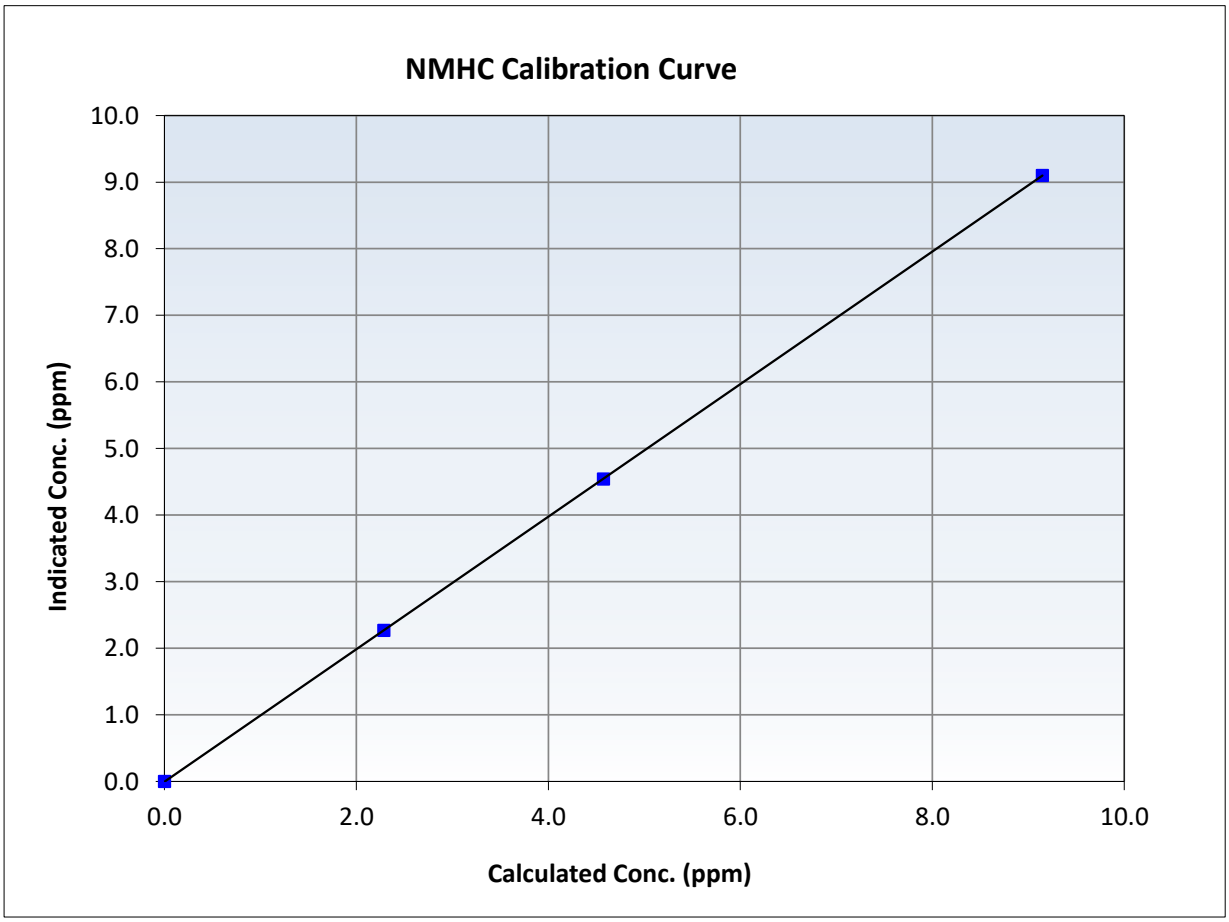
NMHC Calibration Summary

Station Information

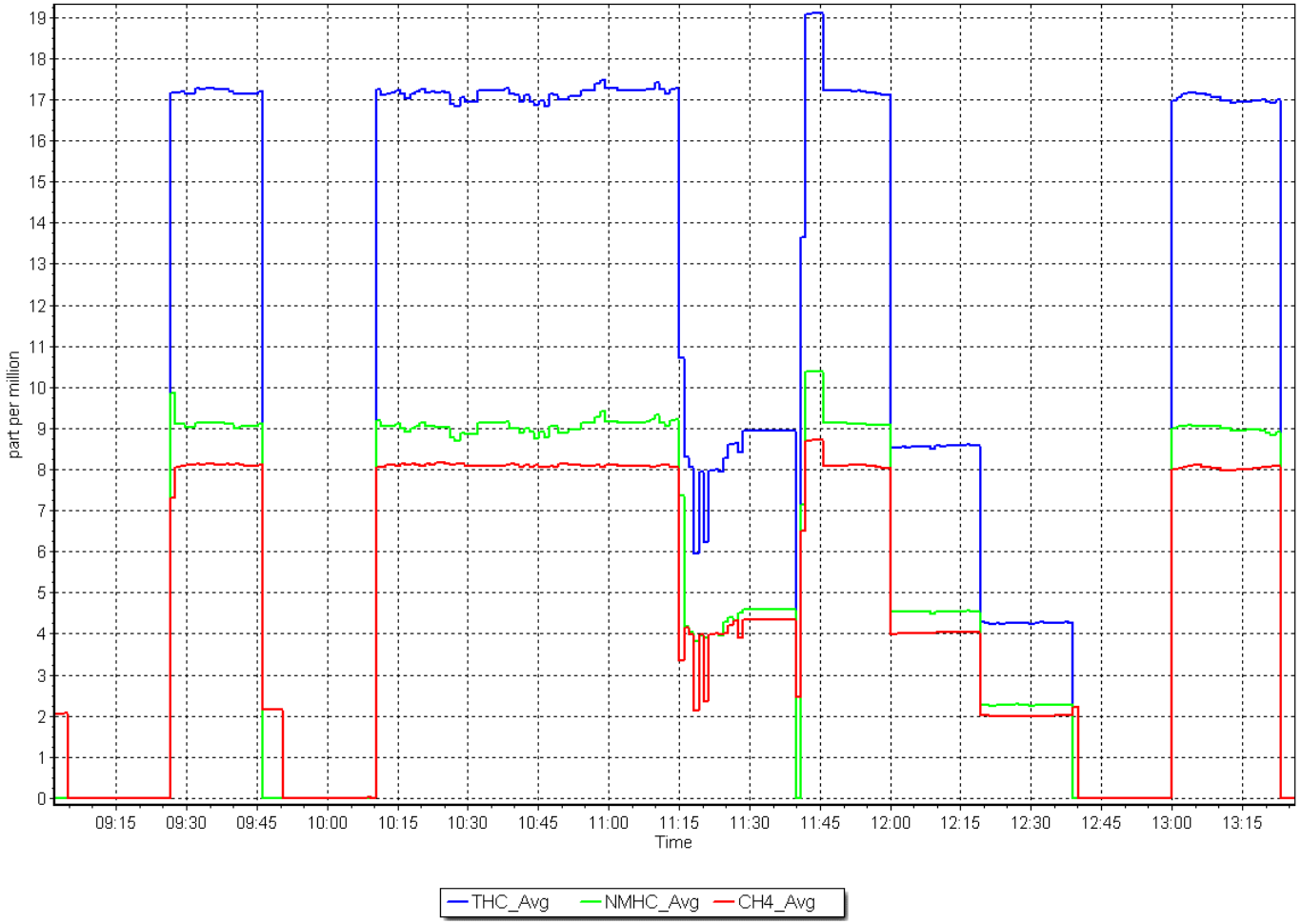
Calibration Date:	May 7, 2024	Previous Calibration:	April 4, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:00	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.15	9.10	1.0050	Slope	0.995196	0.90 - 1.10
4.57	4.54	1.0068			
2.29	2.27	1.0083	Intercept	-0.004600	+/-0.5



NMHC Calibration Plot Date: May 7, 2024 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 16, 2024	Last Cal Date:	May 7, 2024
Start time (MST):	9:33	End time (MST):	11:21
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	XCO268098		Cal Gas Expiry Date:		
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
Removed C3H8 Conc.	207.9	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	621	
Zero Air Gen model:	API T701		Serial Number:	5613	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1170050130	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.52E-04	2.52E-04	NMHC SP Ratio:	5.35E-05	5.35E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	170930	170930
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	17.23	17.25	0.998
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.25	Prev response	17.19	*% change	0.4%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	17.23	17.18	1.003
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.003

Notes: Changed N2 cylinder only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	9.15	9.25	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.25	Prev response	9.10	*% 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	80.0	9.15	9.19	0.996
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.996

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	8.08	8.00	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.00	Prev response	8.09	*% 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

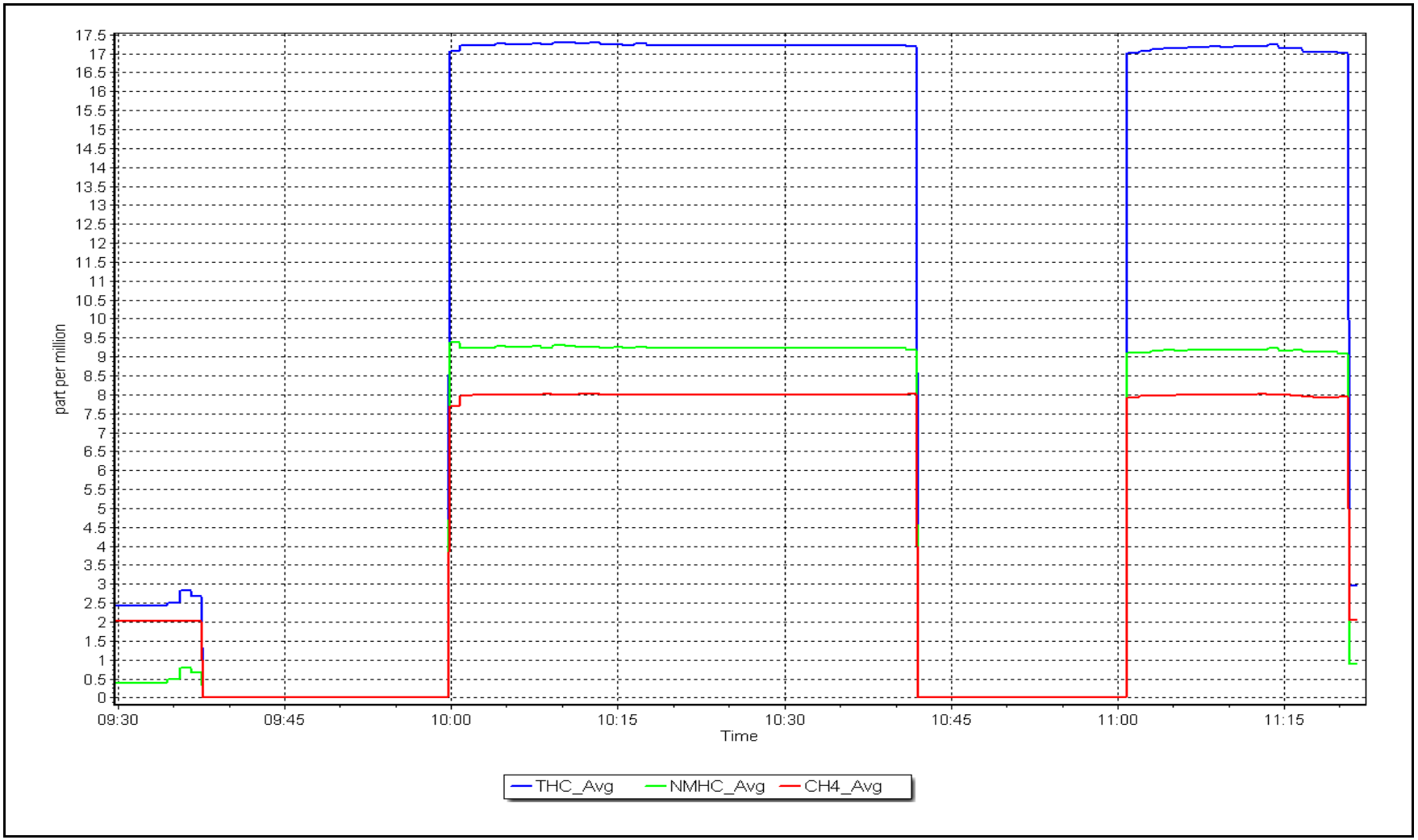
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	8.08	7.99	1.011
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.011

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.998663	0.997214
THC Cal Offset:	-0.012800	0.000000
CH4 Cal Slope:	1.003084	0.989305
CH4 Cal Offset:	-0.009200	0.000000
NMHC Cal Slope:	0.995196	1.004307
NMHC Cal Offset:	-0.004600	0.000000

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot Date: May 16, 2024 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 21, 2024	Last Cal Date:	May 7, 2024
Start time (MST):	9:06	End time (MST):	10:27
Reason:	Removal		

Calibration Standards

Gas Cert Reference:	XCO268098		Cal Gas Expiry Date:		
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
Removed C3H8 Conc.	207.9	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	621	
Zero Air Gen model:	API T701		Serial Number:	5613	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1170050130	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.52E-04	2.52E-04	NMHC SP Ratio:	5.35E-05	5.35E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	170930	170930
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	17.23	17.13	1.005
As found Mid point	4960	40.0	8.61	8.54	1.009
As found Low point	4980	20.0	4.31	4.28	1.006
New cylinder response					
Baseline Corr AF:	17.13	Prev response	17.19	*% change	-0.3%
Baseline Corr 2nd AF:	8.54	AF Slope:	0.994444	AF Intercept:	-0.006000
Baseline Corr 3rd AF:	4.28	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)) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes: Removal calibration for station replacement.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	9.15	9.20	0.994
As found Mid point	4960	40.0	4.57	4.59	0.996
As found Low point	4980	20.0	2.29	2.30	0.993
New cylinder response					
Baseline Corr AF:	9.20	Prev response	9.10	*% change	1.1%
Baseline Corr 2nd AF:	4.59	AF Slope:	1.005953	AF Intercept:	-0.000400
Baseline Corr 3rd AF:	2.30	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) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	8.08	7.93	1.019
As found Mid point	4960	40.0	4.04	3.95	1.024
As found Low point	4980	20.0	2.02	1.98	1.021
New cylinder response					
Baseline Corr AF:	7.93	Prev response	8.09	*% change	-2.1%
Baseline Corr 2nd AF:	3.95	AF Slope:	0.981425	AF Intercept:	-0.005400
Baseline Corr 3rd AF:	1.98	AF Correlation:	0.999993	* = > +/-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

	Start	***Finish***
THC Cal Slope:	0.998663	
THC Cal Offset:	-0.012800	
CH4 Cal Slope:	1.003084	
CH4 Cal Offset:	-0.009200	
NMHC Cal Slope:	0.995196	
NMHC Cal Offset:	-0.004600	

Calibration Performed By: Max Farrell

NMHC Calibration Plot Date: May 21, 2024 Location: Mannix

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	May 25, 2024	Last Cal Date:	N/A
Start time (MST):	7:41	End time (MST):	10:00
Reason:	Install		

Calibration Standards

Gas Cert Reference:	CC408659	Cal Gas Expiry Date:	January 6, 2030
CH4 Cal Gas Conc.	507.2 ppm	CH4 Equiv Conc.	1057.8 ppm
C3H8 Cal Gas Conc.	200.2 ppm		
Removed Gas Cert:	N/A	Removed Gas Expiry:	N/A
Removed CH4 Conc.	507.2 ppm	CH4 Equiv Conc.	1057.8 ppm
Removed C3H8 Conc.	200.2 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	5470
Zero Air Gen model:	API T701	Serial Number:	361

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:		2.8E-04	NMHC SP Ratio:		5.39E-05
CH4 Retention time:		14.6	NMHC Peak Area:		164047
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)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	16.93	1.003
Mid point	4960	40.1	8.48	8.44	1.005
Low point	4980	20.1	4.25	4.21	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	16.99	16.95	1.002
				Average Correction Factor	1.006

Notes: Changed the inlet filter before the install. Adjusted the span only.

Wood Buffalo Environmental Association

THC / CH_4 / 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	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.84	8.77	1.008
Mid point	4960	40.1	4.42	4.37	1.009
Low point	4980	20.1	2.21	2.18	1.015
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.84	8.78	1.007
				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)) *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	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	1.000
Low point	4980	20.1	2.04	2.03	1.006
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.15	8.17	0.997
				Average Correction Factor	1.001

Calibration Statistics

	Start	*Finish*
THC Cal Slope:		0.997154
THC Cal Offset:		-0.014732
CH4 Cal Slope:		1.002564
CH4 Cal Offset:		-0.008063
NMHC Cal Slope:		0.992300
NMHC Cal Offset:		-0.006668

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

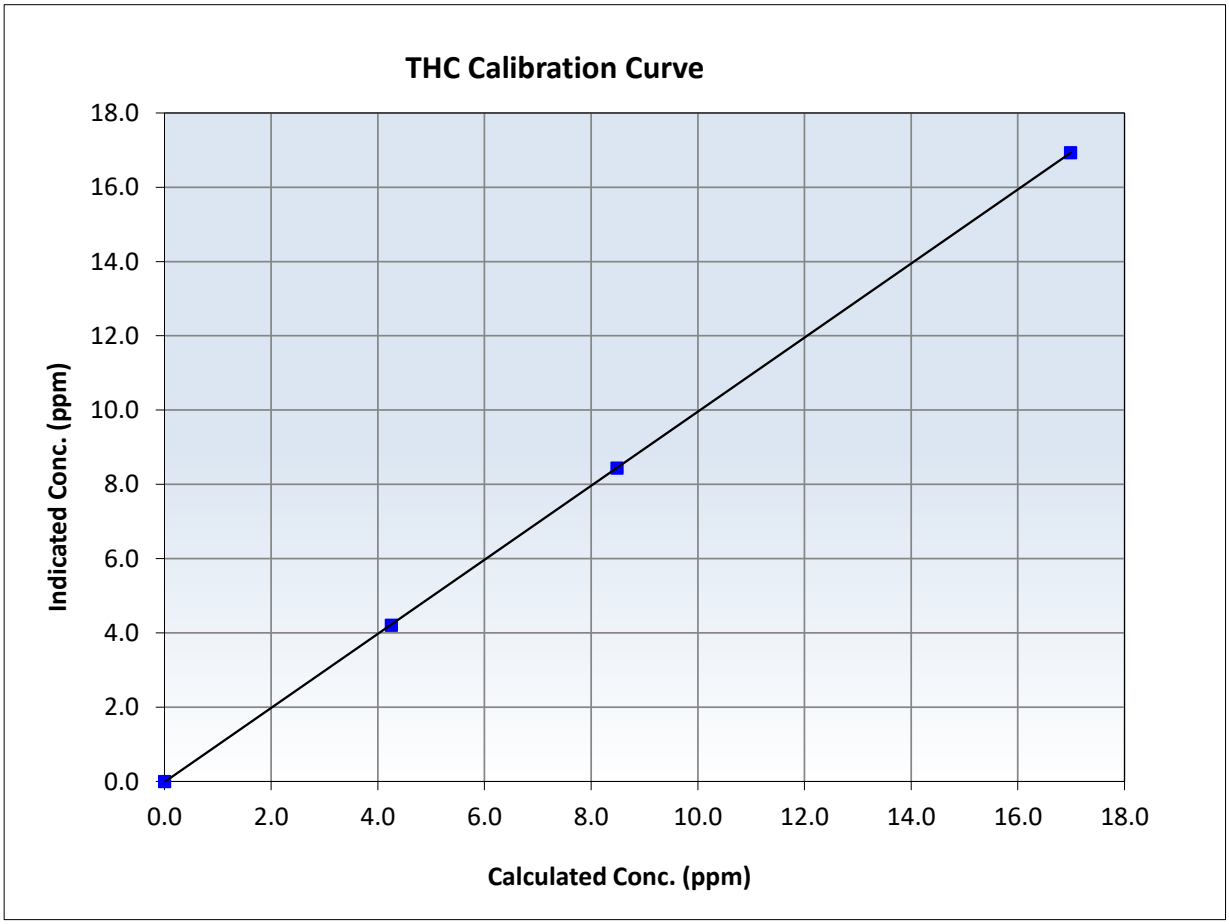
THC Calibration Summary

Station Information

Calibration Date:	May 25, 2024	Previous Calibration:	N/A
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	7:41	End Time (MST):	10:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

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
16.99	16.93	1.0034	Slope	0.997154	0.90 - 1.10
8.48	8.44	1.0049	Intercept	-0.014732	+/-0.5
4.25	4.21	1.0107			



Wood Buffalo Environmental Association

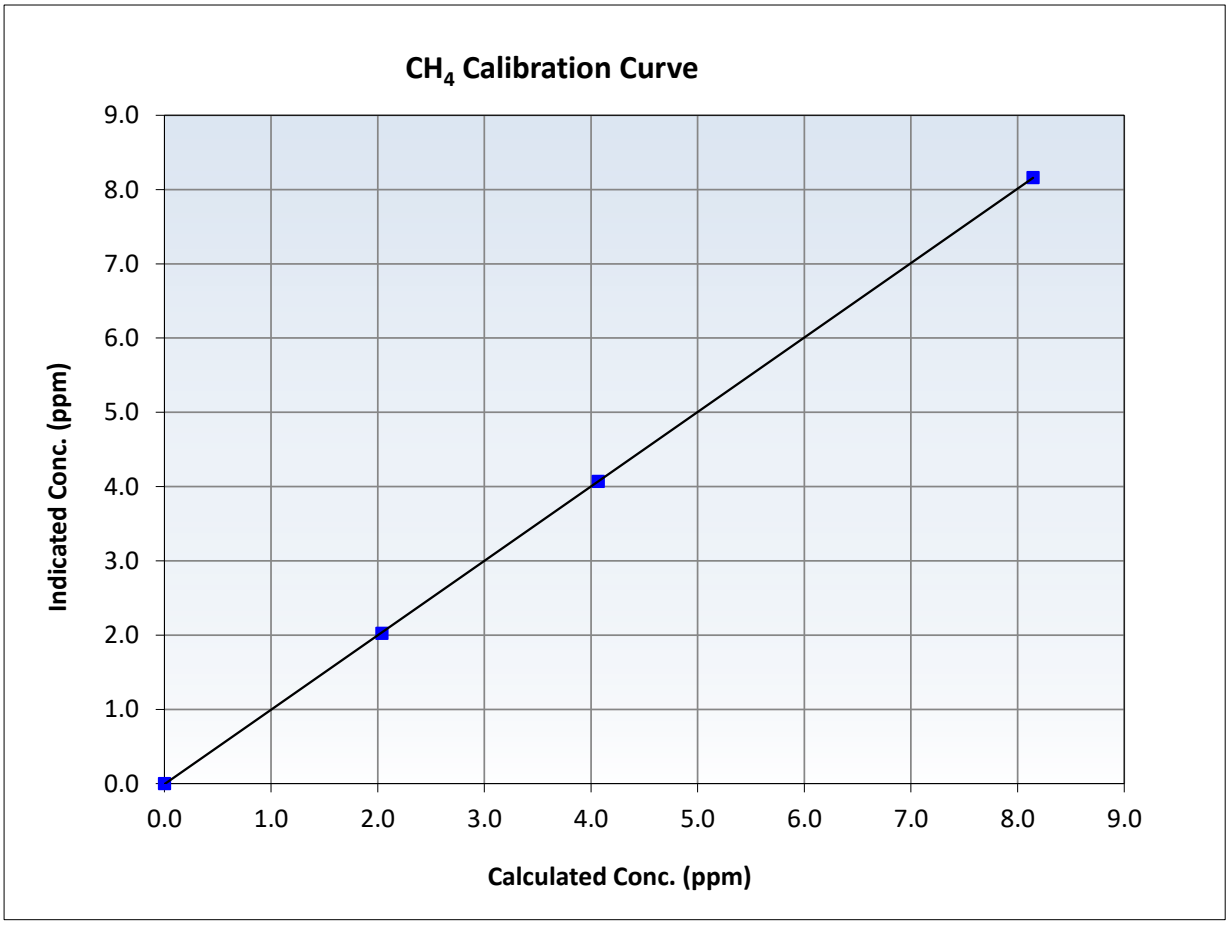
CH_4 Calibration Summary

Station Information

Calibration Date:	May 25, 2024	Previous Calibration:	N/A
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	7:41	End Time (MST):	10:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

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
8.15	8.16	0.9981	Slope	1.002564	0.90 - 1.10
4.07	4.07	0.9997	Intercept	-0.008063	+/-0.5
2.04	2.03	1.0064			



Wood Buffalo Environmental Association

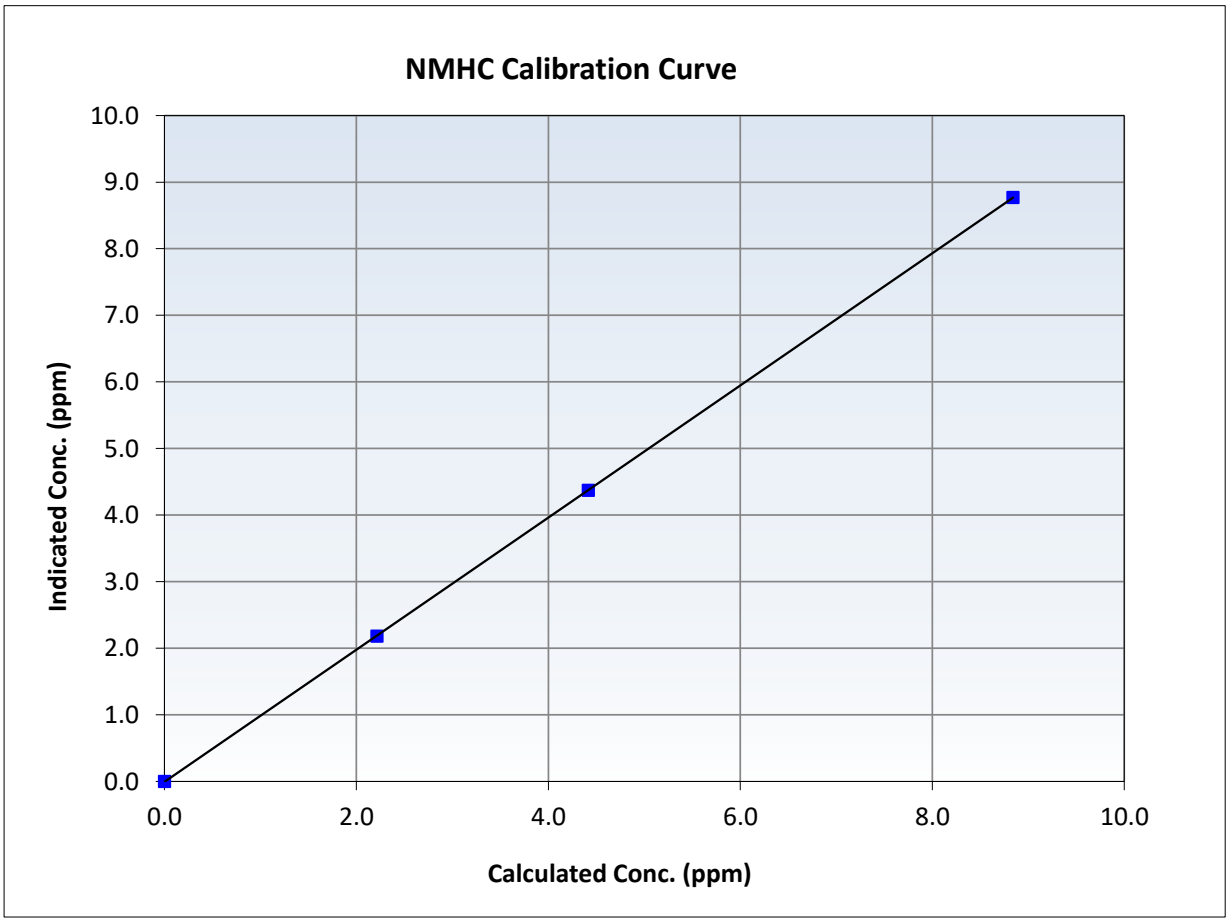
NMHC Calibration Summary

Station Information

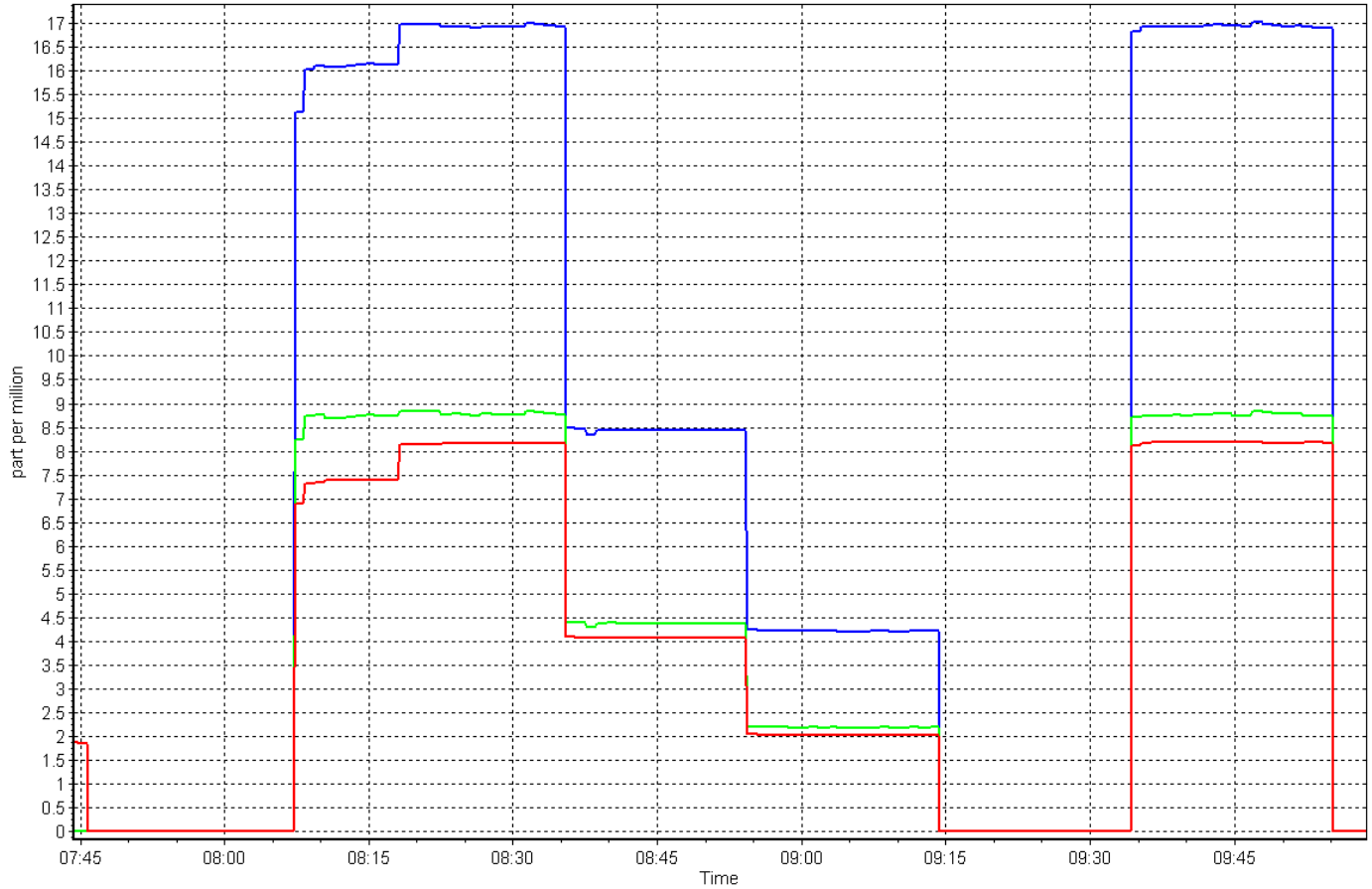
Calibration Date:	May 25, 2024	Previous Calibration:	N/A
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	7:41	End Time (MST):	10:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050130

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
8.84	8.77	1.0082	Slope	0.992300	0.90 - 1.10
4.42	4.37	1.0094			
2.21	2.18	1.0147	Intercept	-0.006668	+/-0.5



NMHC Calibration Plot Date: May 25, 2024 Location: Mannix



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06
PATRICIA MCINNES
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 3, 2024	Last Cal Date:	April 23, 2024
Start time (MST):	10:17	End time (MST):	13:50
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.78	ppm	Cal Gas Exp Date:	September 9, 2024
Cal Gas Cylinder #:	AAL070632			
Removed Cal Gas Conc:	49.78	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	3566
Zero Air Gen Model:	API T701		Serial Number:	5608

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1160290013	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004978	1.005521	Backgd or Offset:	17.7	17.7
Calibration intercept:	1.779365	1.439462	Coeff or Slope:	0.922	0.922

SO_2 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	4919.7	80.3	799.5	802.4	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.2	Previous response	805.2	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4919.7	80.3	799.5	805.0	0.993
Mid point	4959.8	40.2	400.2	403.7	0.991
Low point	4979.9	20.1	200.1	204.3	0.980
As left zero	5000	0.0	0.0	0.4	----
As left span	4919.7	80.3	799.5	805.3	0.993
				Average Correction Factor:	0.988

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

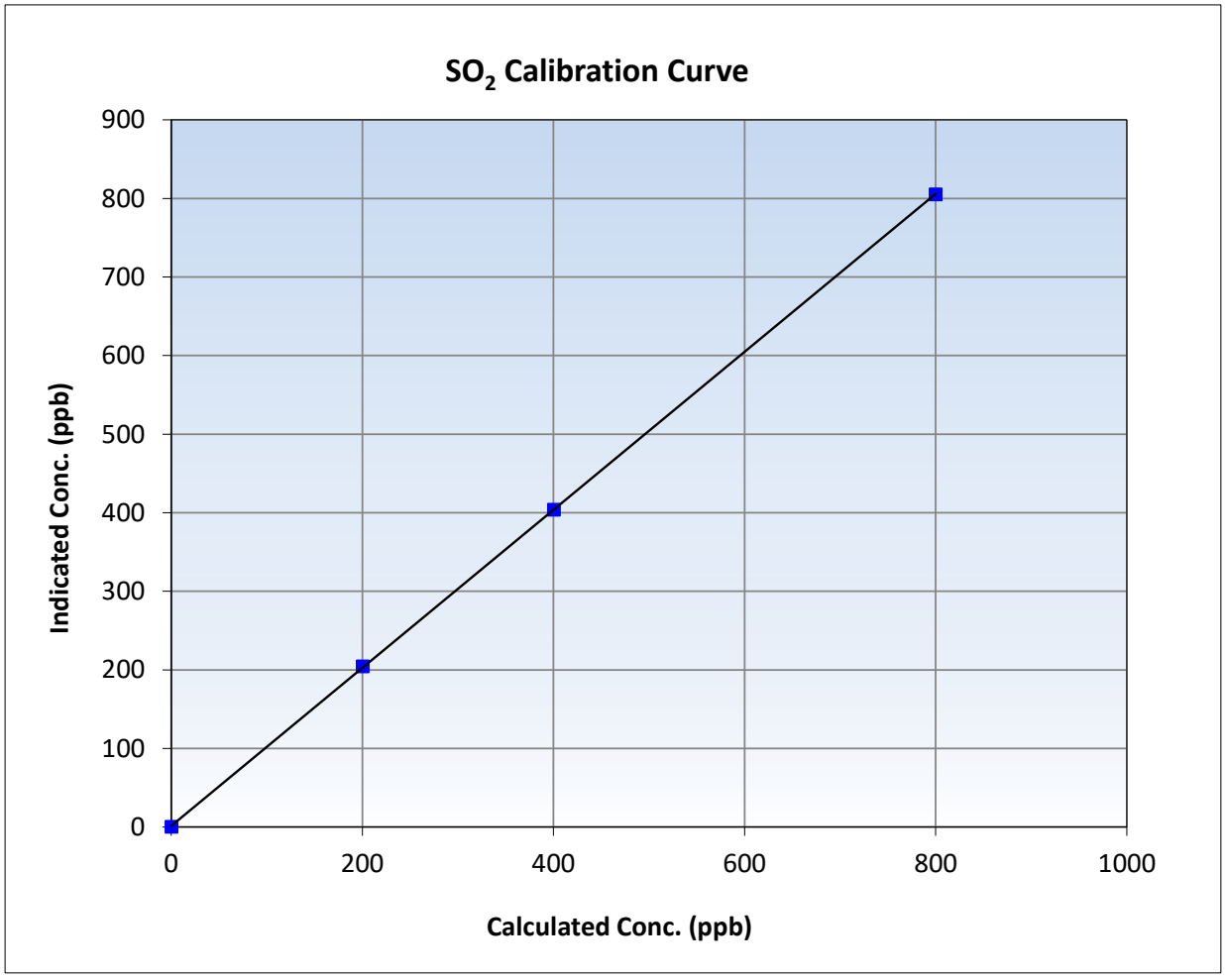
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:17	End Time (MST):	13:50
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

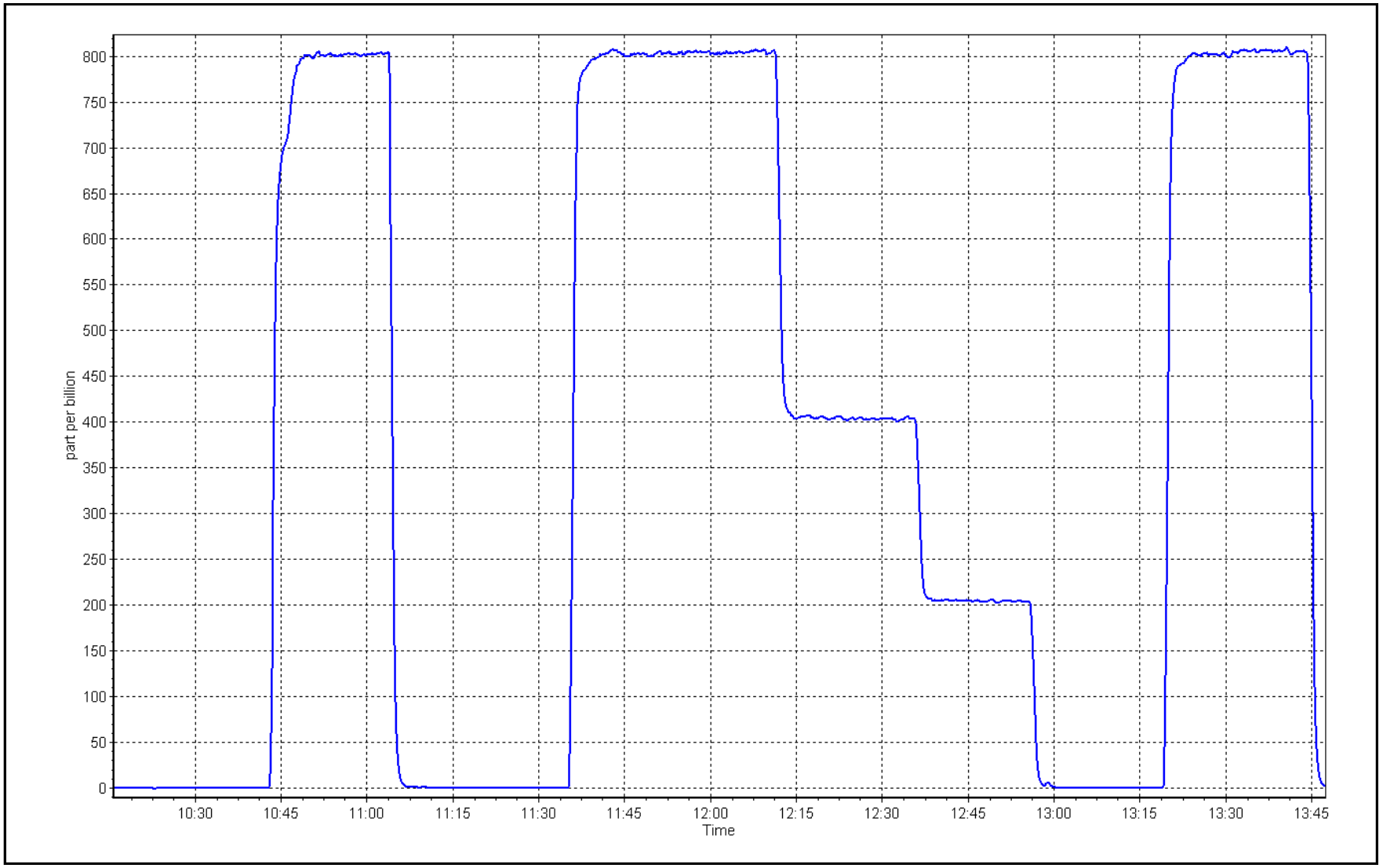
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.5	805.0	0.9931
400.2	403.7	0.9914
200.1	204.3	0.9795

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	1.005521	*0.90 - 1.10*
Intercept	1.439462	*+/-30*



SO2 Calibration Plot Date: May 3, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 10, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	8:21 AM	End time (MST):	12:30
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.328	ppm	Cal Gas Exp Date:	February 14, 2025
Cal Gas Cylinder #:	CC506659			
Removed Cal Gas Conc:	5.328	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3566
ZAG Make/Model:	API T701		Serial Number:	4602

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1218153358
Converter make:	CDN-101		Converter serial #:	517
Analyzer Range	0 - 100 ppb		Converter Temp:	825 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.996746	1.000456	Backgd or Offset:	1.98	1.98
Calibration intercept:	0.460147	0.180275	Coeff or Slope:	1.170	1.170

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4925	75.1	80.0	79.9	1.003
As found Mid point	4963	37.5	40.0	40.0	1.001
As found Low point	4981	18.8	20.0	20.2	0.997
New cylinder response					

Baseline Corr As found:	79.8	Prev response:	80.22	*% change:	-0.5%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.996746	AF Intercept:	0.160146
Baseline Corr 3rd AF pt:	20.1	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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4925	75.1	80.0	80.2	0.998
Mid point	4963	37.5	40.0	40.3	0.991
Low point	4981	18.8	20.0	20.1	0.997
As left zero	5000	0.0	0.0	0.2	----
As left span	4925	75.1	80.0	79.2	1.010
SO2 Scrubber Check	4920	80.3	803.0	0.0	----

Date of last scrubber change:	December 20, 2021	Ave Corr Factor	0.995
Date of last converter efficiency test:			

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

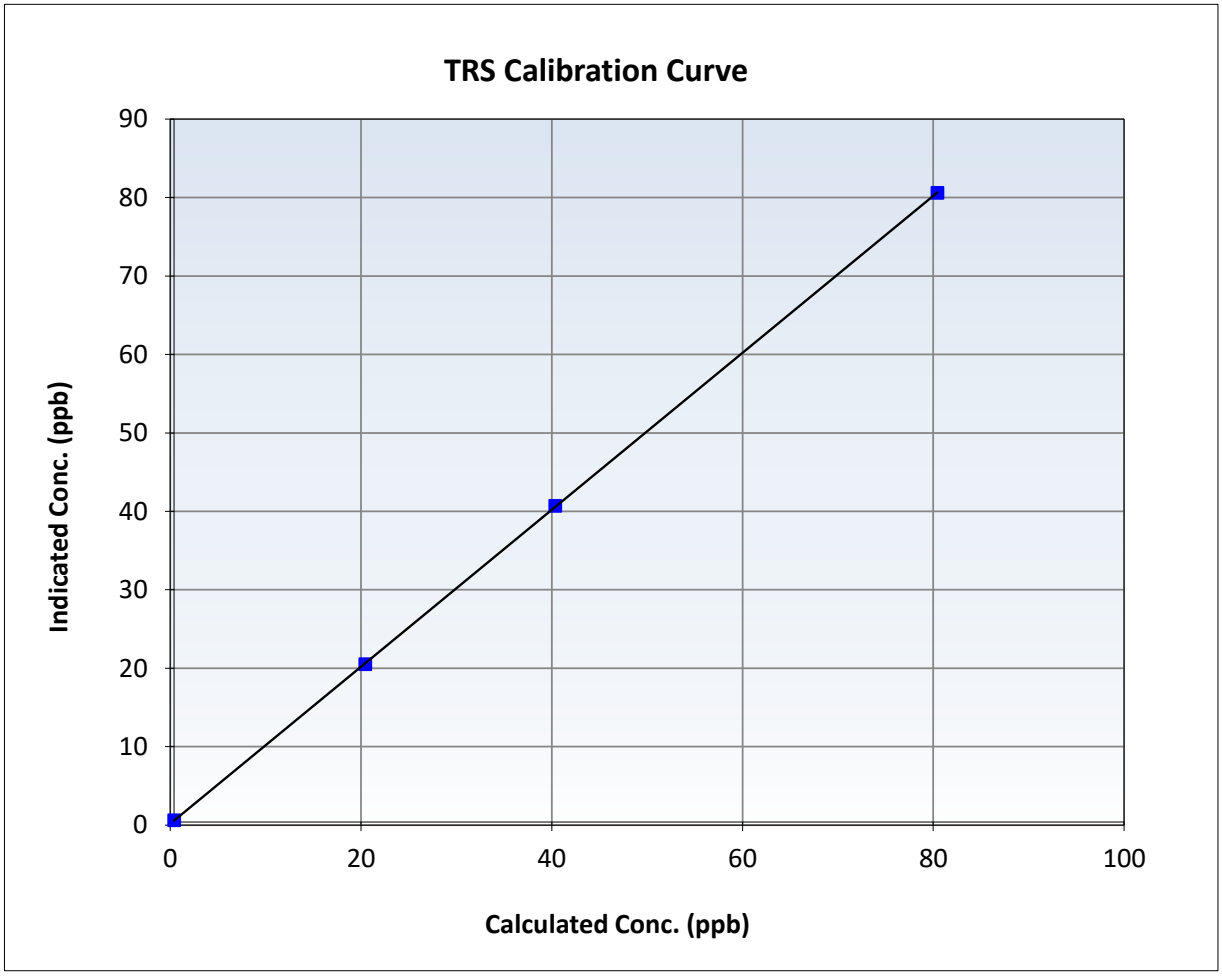
TRS Calibration Summary

Station Information

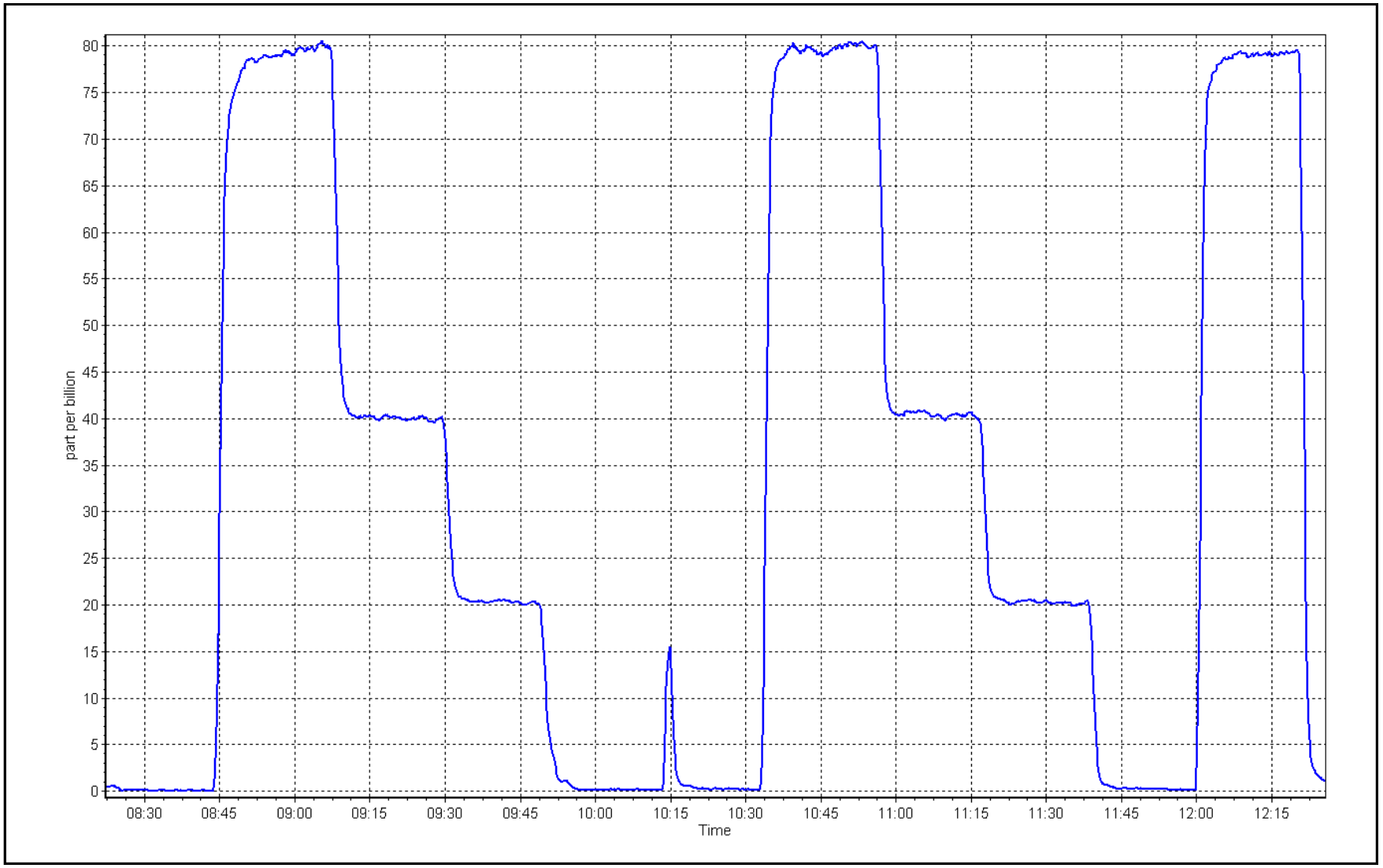
Calibration Date:	May 10, 2024	Previous Calibration:	April 18, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:21	End Time (MST):	12:30
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999989	*≥0.995*
80.0	80.2	0.9978	Slope	1.000456	*0.90 - 1.10*
40.0	40.3	0.9915			
20.0	20.1	0.9967	Intercept	0.180275	*+/-3*



TRS Calibration Plot Date: May 10, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 11, 2024	Last Cal Date:	May 10, 2024
Start time (MST):	8:50	End time (MST):	11:32
Reason:	Maintenance		

Calibration Standards

Cal Gas Concentration:	5.328	ppm	Cal Gas Exp Date:	February 14, 2025
Cal Gas Cylinder #:	CC506659			
Removed Cal Gas Conc:	5.328	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3566
ZAG Make/Model:	API T701		Serial Number:	4602

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1218153358
Converter make:	CDN-101		Converter serial #:	621
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000456	0.995746	Backgd or Offset:	1.98	1.92
Calibration intercept:	0.180275	0.220146	Coeff or Slope:	1.170	1.115

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4925	75.1	80.0	79.9	1.002
Mid point	4963	37.5	40.0	40.0	0.999
Low point	4981	18.8	20.0	20.2	0.992
As left zero	5000	0.0	0.0	0.2	----
As left span	4925	75.1	80.0	78.3	1.022
SO2 Scrubber Check	4920	80.3	803.0		----
Date of last scrubber change:		December 20, 2021		Ave Corr Factor	0.997
Date of last converter efficiency test:					

Notes: Swapping out the converter. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

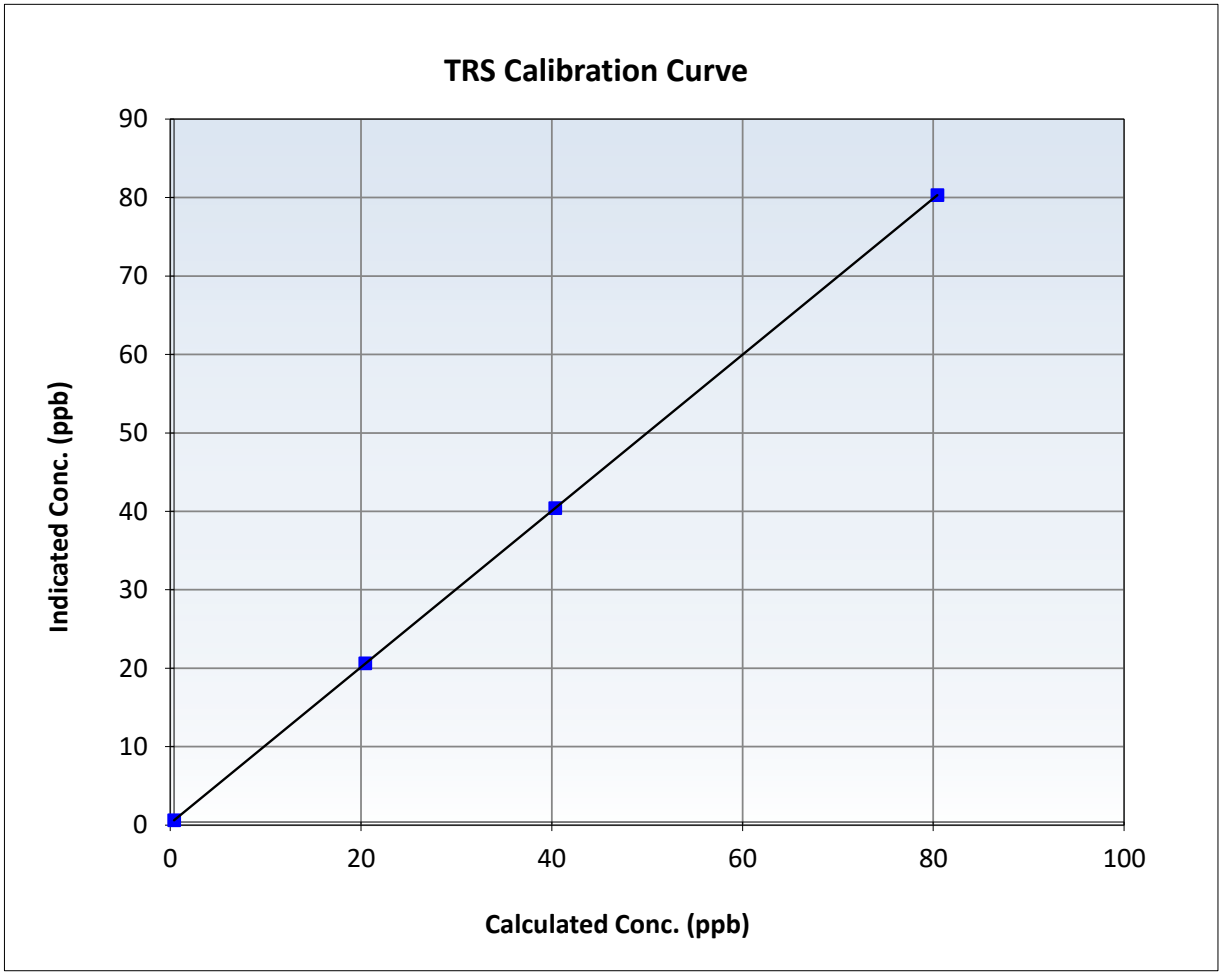
TRS Calibration Summary

Station Information

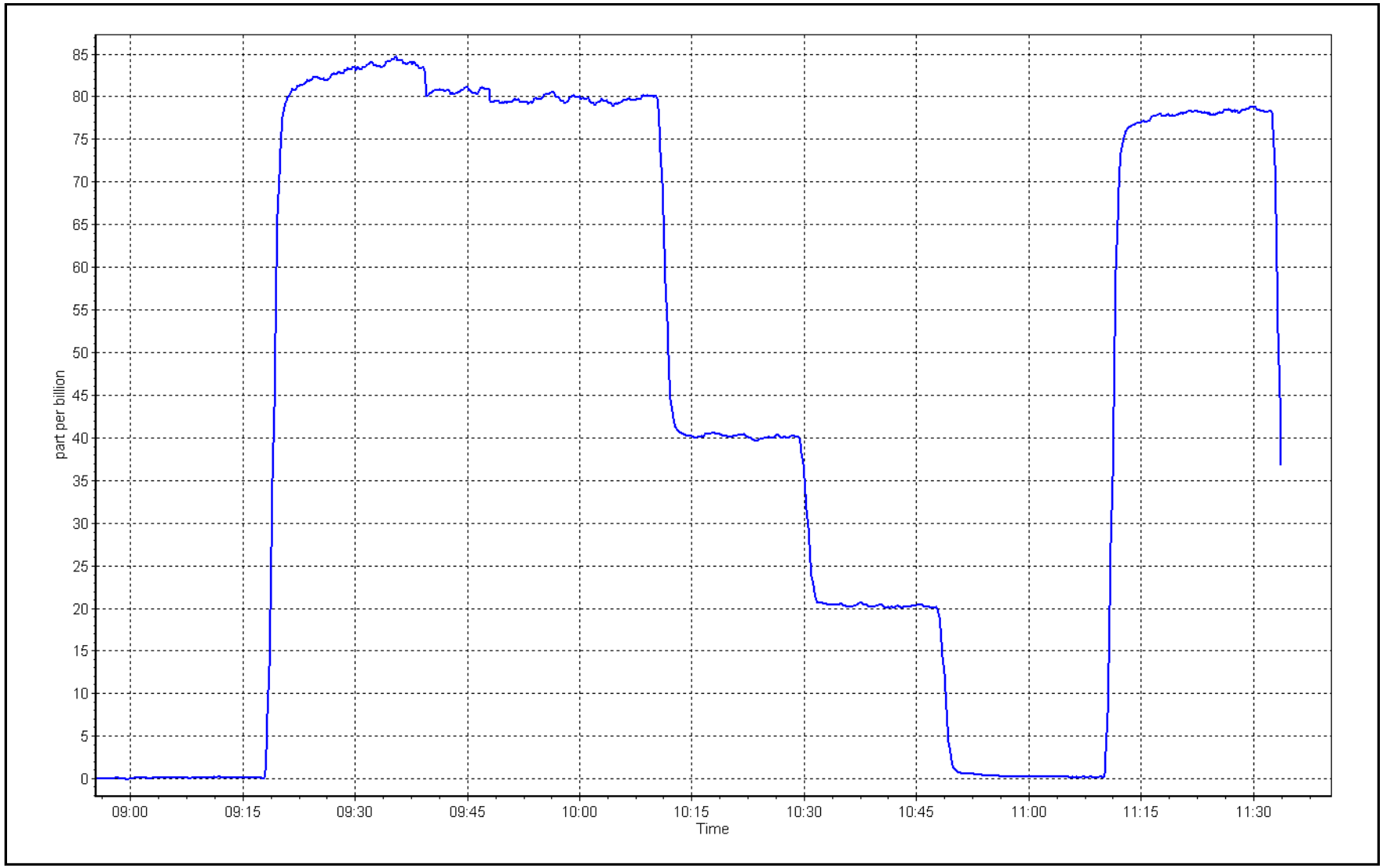
Calibration Date:	May 11, 2024	Previous Calibration:	May 10, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:50	End Time (MST):	11:32
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	1.000000	*≥0.995*
80.0	79.9	1.0016	Slope	0.995746	*0.90 - 1.10*
40.0	40.0	0.9989			
20.0	20.2	0.9918	Intercept	0.220146	*+/-3*



TRS Calibration Plot Date: May 11, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 3, 2024	Last Cal Date:	April 23, 2024
Start time (MST):	10:17 AM	End time (MST):	13:50
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	AAL070632		Cal Gas Expiry Date:	September 9, 2024	
CH4 Cal Gas Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
C3H8 Cal Gas Conc.	205.3	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3566	
Zero Air Gen model:	API T701		Serial Number:	4602	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148495	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.26E-04	2.26E-04	NMHC SP Ratio:	4.92E-05	4.85E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	184279	186903
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	17.16	0.998
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.15	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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.10	1.001
Mid point	4960	40.2	8.57	8.56	1.001
Low point	4980	20.1	4.29	4.34	0.988
As left zero	5000	0.0	0.00	0.01	----
As left span	4920	80.3	17.12	17.04	1.005
				Average Correction Factor	0.997

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.07	9.15	0.992
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.14	Prev response	9.10	*% change	0.4%
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	80.3	9.07	9.05	1.002
Mid point	4960	40.2	4.54	4.55	0.997
Low point	4980	20.1	2.27	2.31	0.981
As left zero	5000	0.0	0.00	0.01	----
As left span	4920	80.3	9.07	9.00	1.008
				Average Correction Factor	0.993

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919.7	80.3	8.06	8.01	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.01	Prev response	8.04	*% change	-0.4%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.06	8.05	1.001
Mid point	4960	40.2	4.03	4.01	1.006
Low point	4980	20.1	2.02	2.02	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.03	1.003
				Average Correction Factor	1.001

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999948	0.997419
THC Cal Offset:	0.023034	0.024244
CH4 Cal Slope:	0.998696	0.998370
CH4 Cal Offset:	-0.002350	0.000050
NMHC Cal Slope:	1.001388	0.996687
NMHC Cal Offset:	0.024584	0.023994

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

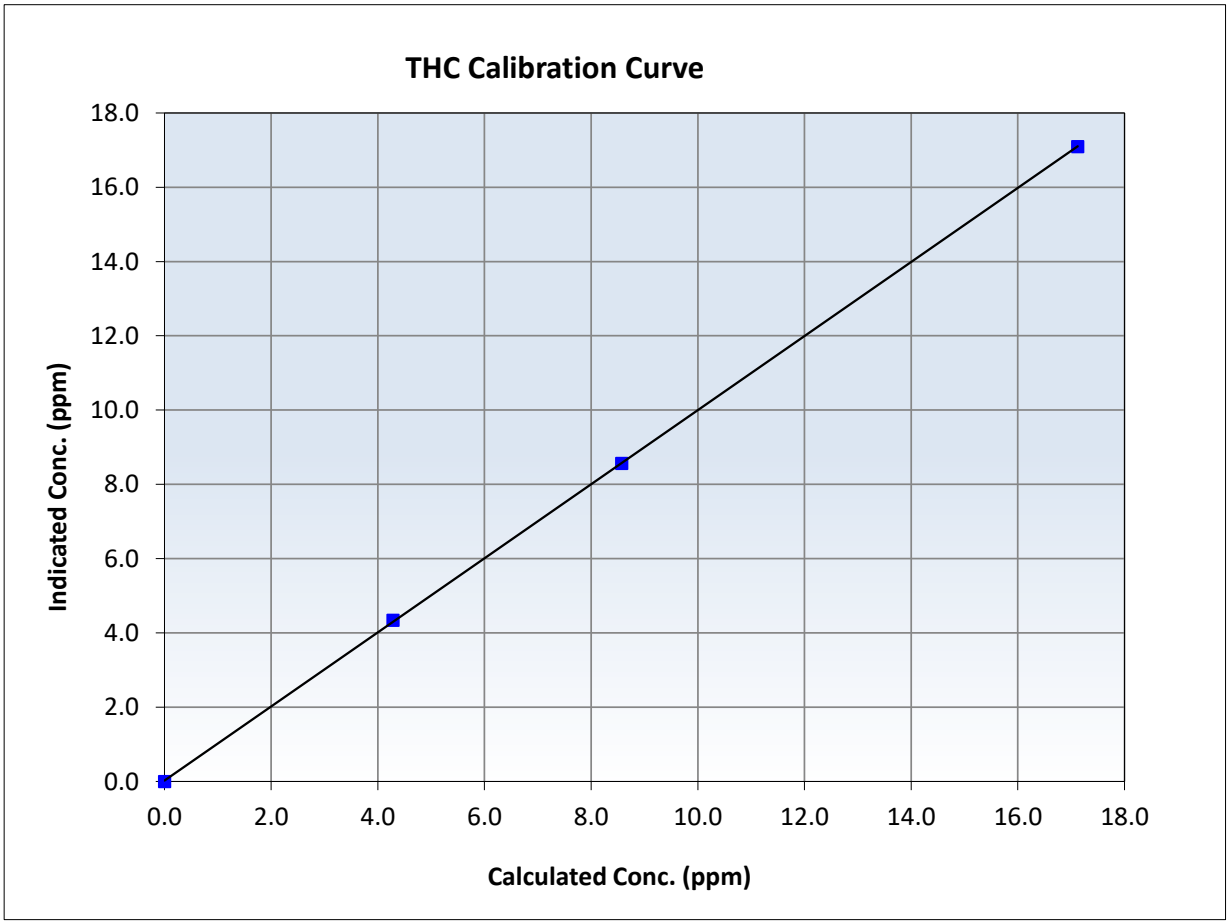
THC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:17	End Time (MST):	13:50
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	0.999986	≥0.995
17.12	17.10	1.0014	Slope	0.997419	0.90 - 1.10
8.57	8.56	1.0009	Intercept	0.024244	+/-0.5
4.29	4.34	0.9880			



Wood Buffalo Environmental Association

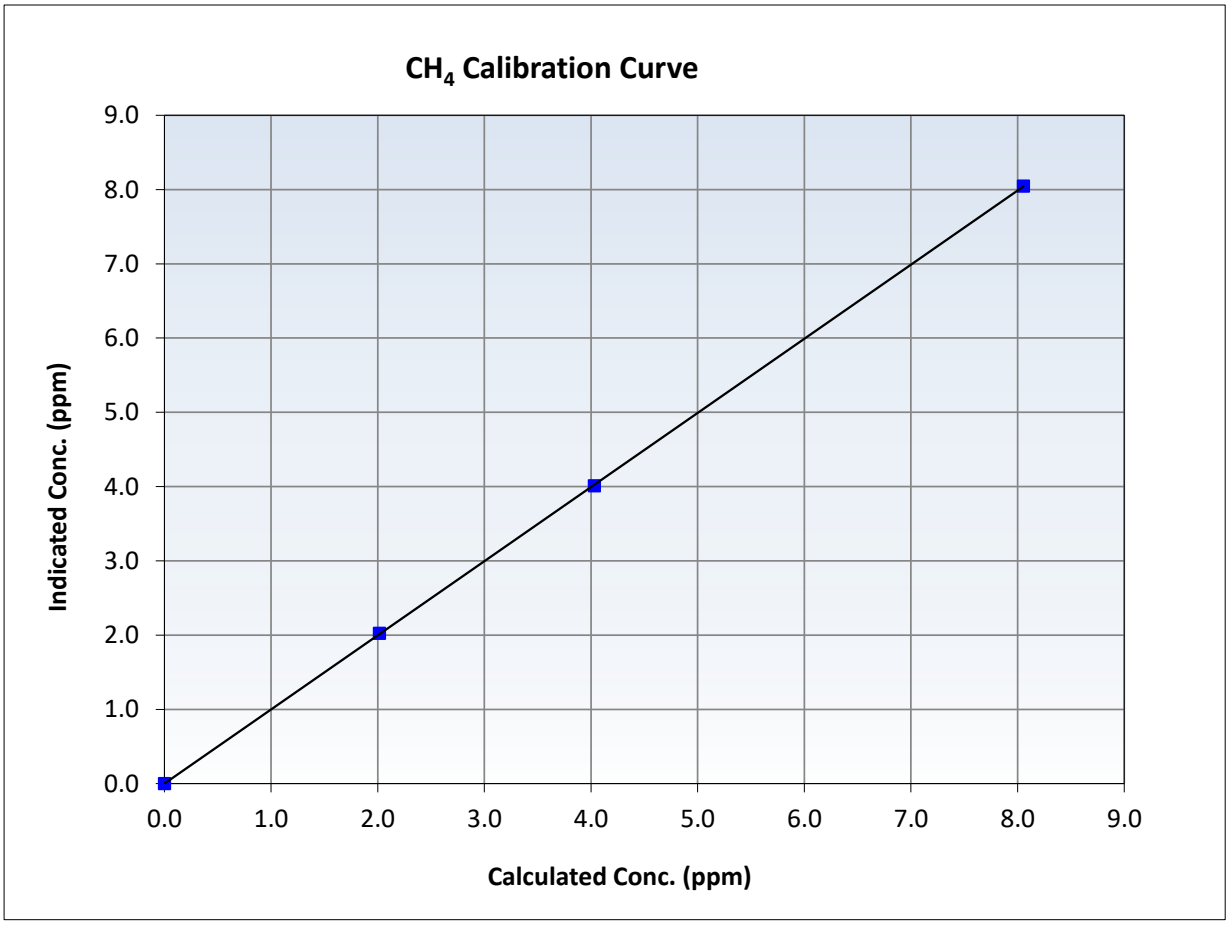
CH_4 Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:17	End Time (MST):	13:50
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	0.999988	≥0.995
8.06	8.05	1.0010	Slope	0.998370	0.90 - 1.10
4.03	4.01	1.0057	Intercept	0.000050	+/-0.5
2.02	2.02	0.9962			



Wood Buffalo Environmental Association

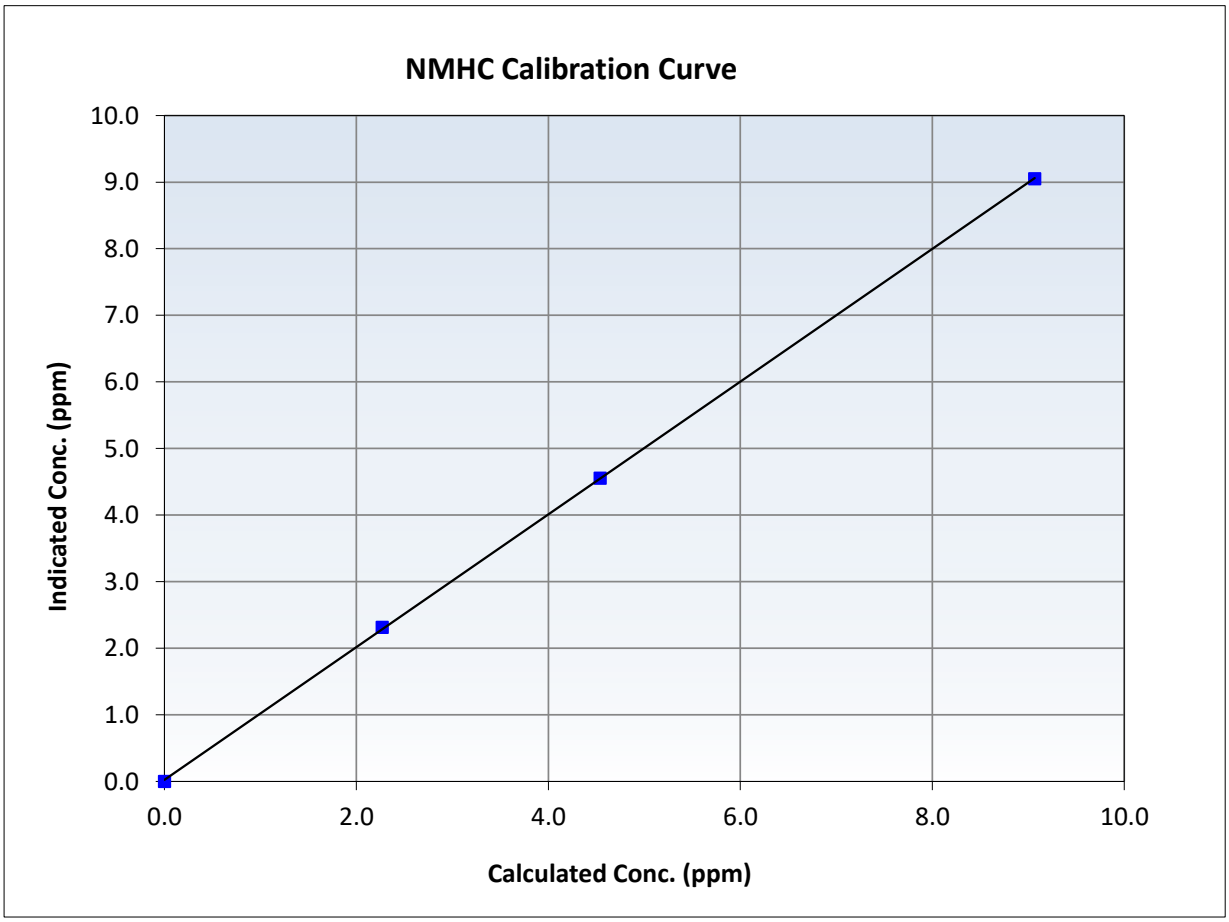
NMHC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:17	End Time (MST):	13:50
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	0.999967	*≥0.995*
9.07	9.05	1.0018	Slope	0.996687	*0.90 - 1.10*
4.54	4.55	0.9967	Intercept	0.023994	*+/-0.5*
2.27	2.31	0.9808			



NMHC Calibration Plot Date: May 3, 2024 Location: Patricia McInnes

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Patricia McInnes
Station number:	AMS 06
Calibration Date:	May 8, 2024
Last Cal Date:	April 10, 2024
Start time (MST):	9:45 AM
End time (MST):	14:27
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.3	0.5	-0.2	----	----
AF High point	4914	86.2	826.5	799.7	26.7	826.1	797.4	28.7	1.0008	1.0036
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 827.2 ppb	NO = 801.9 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.2%
Baseline Corr 1st pt	NO_X = 825.8 ppb	NO = 796.9 ppb	As Found Statistics	*Percent Change	NO = -0.6%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found NO r^2:	NO Sl:	NO Int:
			As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1172750022

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.836	0.836	NO bkgnd or offset:	3.3	3.3
NOX coeff or slope:	0.987	0.987	NOX bkgnd or offset:	3.9	3.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	155.4	155.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.997990	0.997948
NO_X Cal Offset:	2.376066	2.316043
NO Cal Slope:	1.000731	0.999015
NO Cal Offset:	1.562605	1.163165
NO_2 Cal Slope:	1.000336	0.999537
NO_2 Cal Offset:	-0.255207	0.049129

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.3	0.4	-0.1	----	----
High point	4914	86.2	826.5	799.7	26.7	826.1	799.6	26.6	1.0004	1.0002
Mid point	4957	43.1	413.2	399.9	13.4	415.6	401.4	14.3	0.9943	0.9962
Low point	4978	21.6	207.1	200.4	6.7	211.1	201.9	9.1	0.9811	0.9927
As left zero	5000	0.0	0.0	0.0	0.0	0.5	0.6	-0.1	----	----
As left span	4914	86.2	826.5	398.9	427.6	826.8	398.9	427.8	0.9996	1.0000
							Average Correction Factor		0.9920	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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	798.2	397.7	427.2	427.0	1.0005	99.9%
Mid GPT point	798.2	599.5	225.4	225.4	1.0001	100.0%
Low GPT point	798.2	701.0	123.9	124.1	0.9986	100.1%
				Average Correction Factor	0.9997	100.0%

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

NO_X Calibration Summary

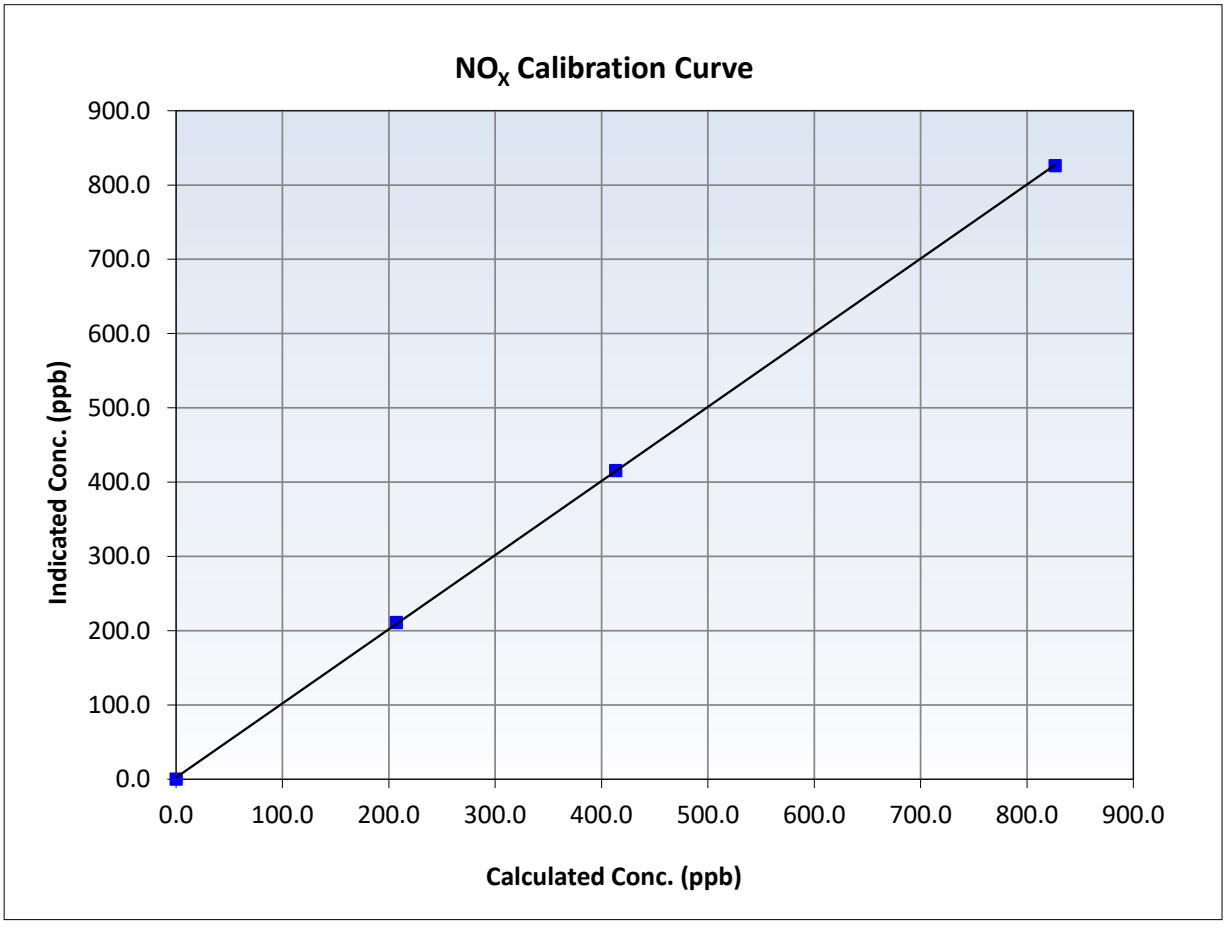
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 10, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:45	End Time (MST):	14:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
826.5	826.1	1.0004
413.2	415.6	0.9943
207.1	211.1	0.9811

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.997948	*0.90 - 1.10*
Intercept	2.316043	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

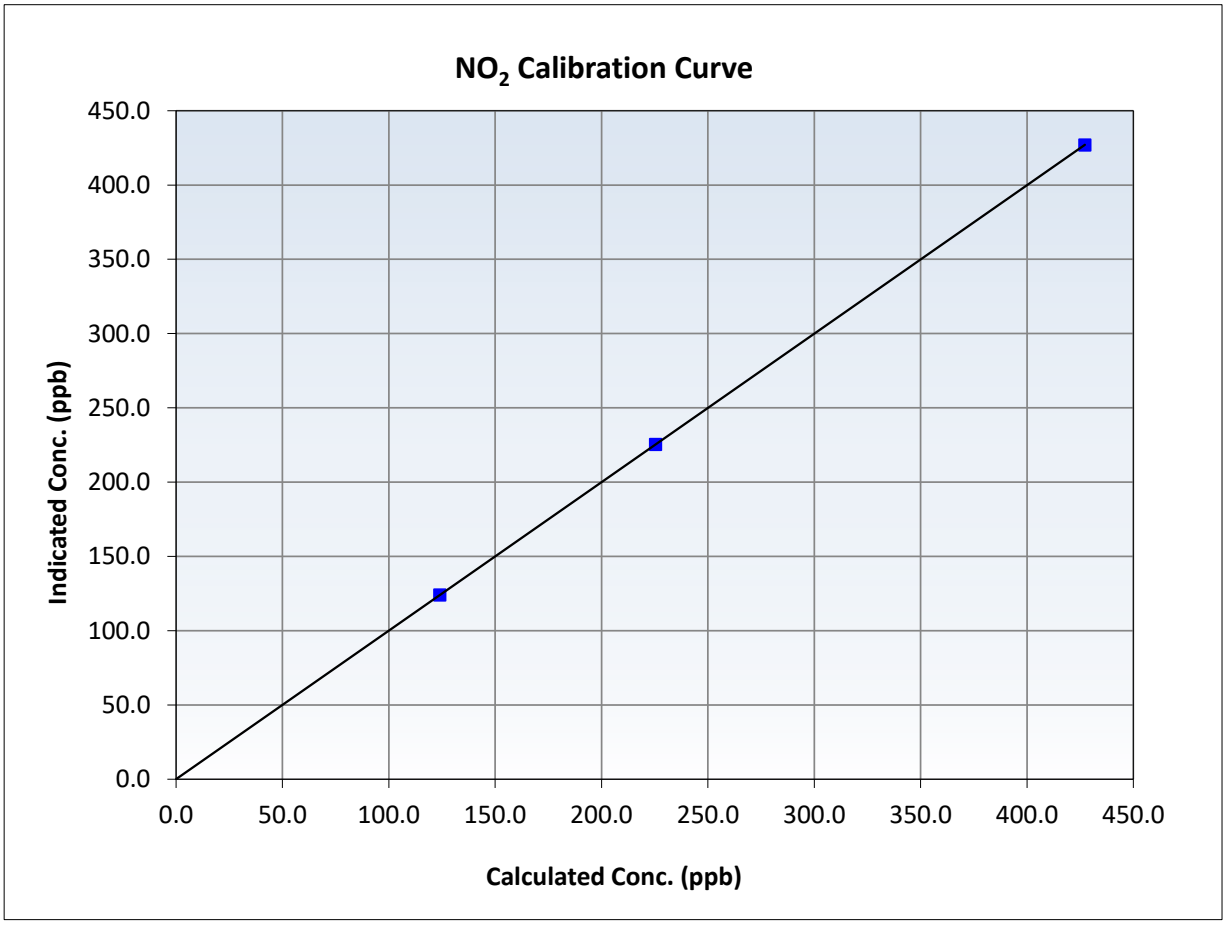
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 10, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:45	End Time (MST):	14:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
427.2	427.0	1.0005
225.4	225.4	1.0001
123.9	124.1	0.9986

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.999537	0.90 - 1.10
Intercept	0.049129	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

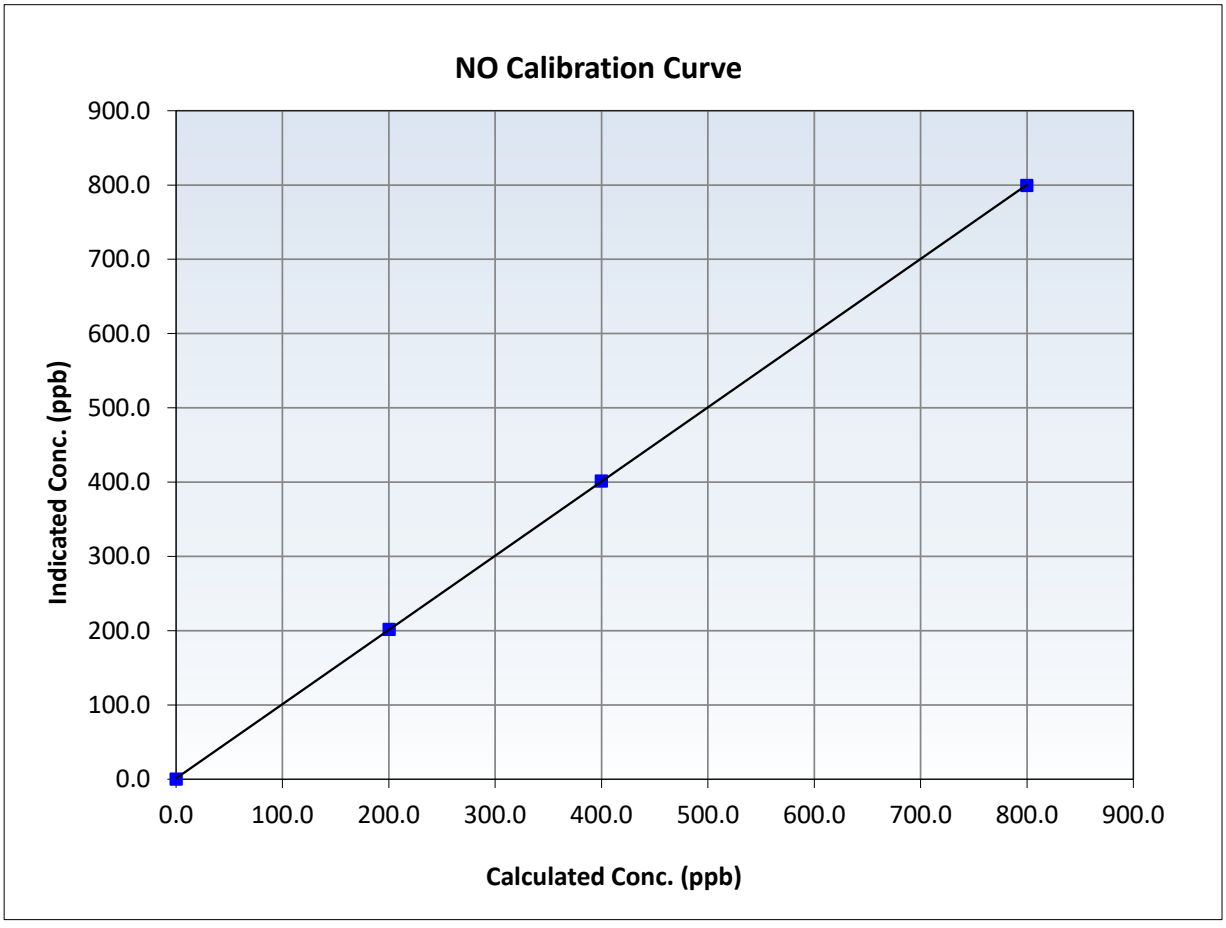
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 10, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:45	End Time (MST):	14:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

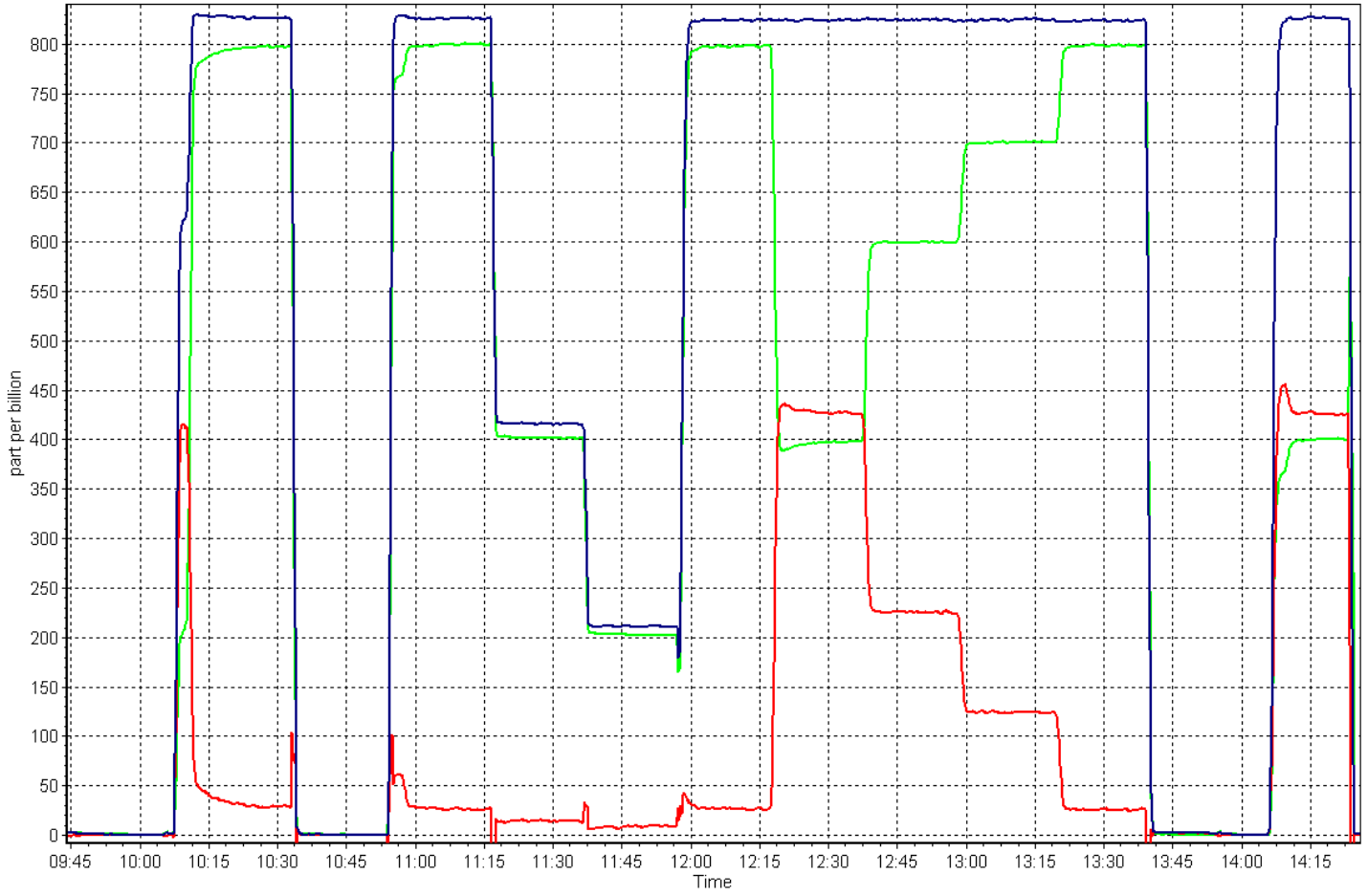
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
799.7	799.6	1.0002
399.9	401.4	0.9962
200.4	201.9	0.9927

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.999015	*0.90 - 1.10*
Intercept	1.163165	*+/-20*



NO_X Calibration Plot Date: May 8, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 6, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	10:06	End time (MST):	13:20
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	3566
ZAG Make/Model:	API T701	Serial Number:	4602

Analyzer Information

Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234
Analyzer Range	0 - 500 ppb		

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.006514	1.003343	Backgd or Offset:	-0.2	-0.2
Calibration intercept:	-0.840000	-0.060000	Coeff or Slope:	1.026	1.026

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	-0.2	----
As found High point	5000	1303.0	400.0	401.6	0.996
As found Mid point					
As found Low point					
Baseline Corr As found:	401.8	Previous response	401.8	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.1	----
High point	5000	1303.0	400.0	401.3	0.997
Mid point	5000	966.5	200.0	200.7	0.997
Low point	5000	794.3	100.0	100.0	1.000
As left zero	5000	800.0	0.0	0.1	----
As left span	5000	1303.0	400.0	403.8	0.991
				Average Correction Factor	0.998

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

O_3 Calibration Summary

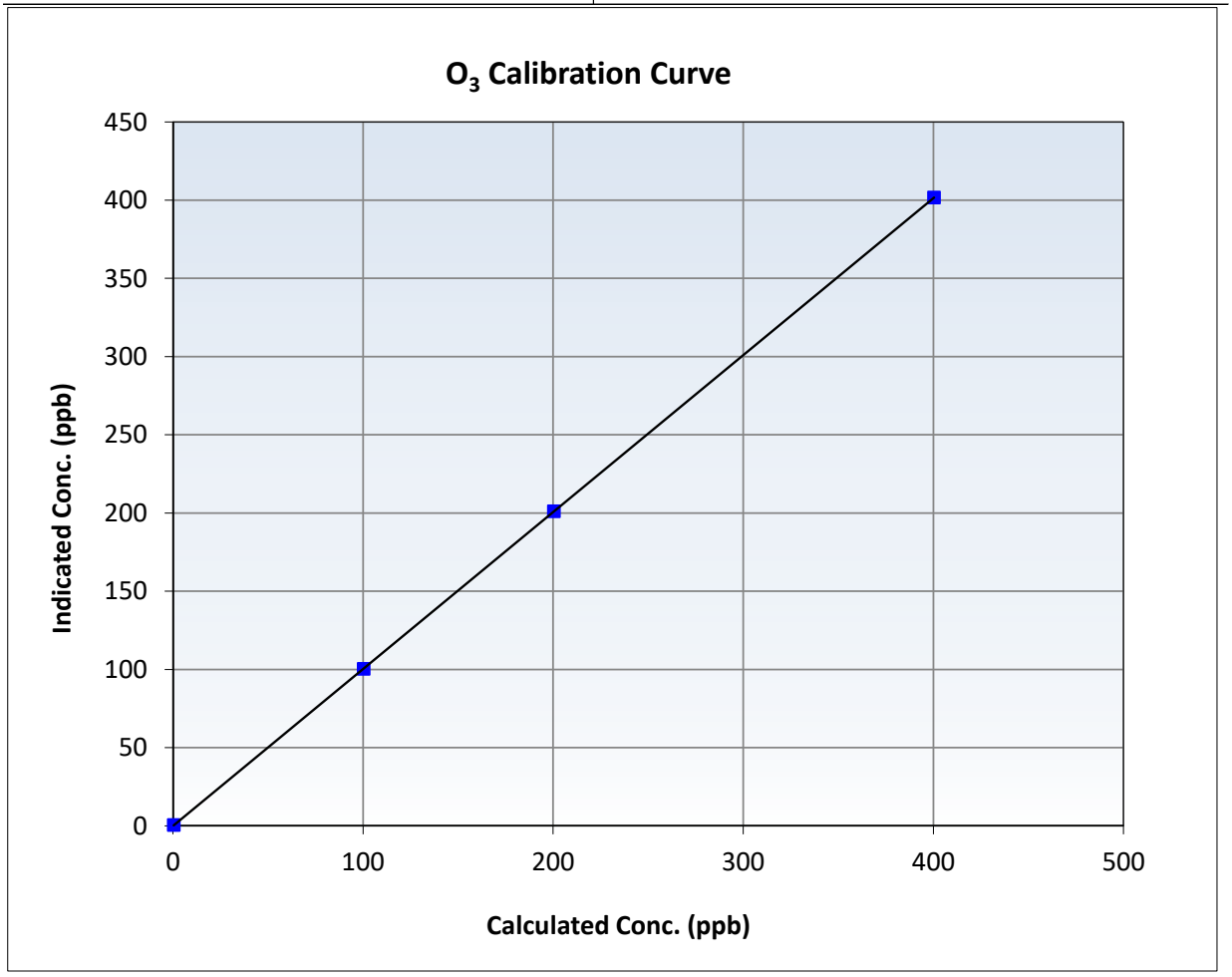
Station Information

Calibration Date:	May 6, 2024	Previous Calibration:	April 12, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:06	End Time (MST):	13:20
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

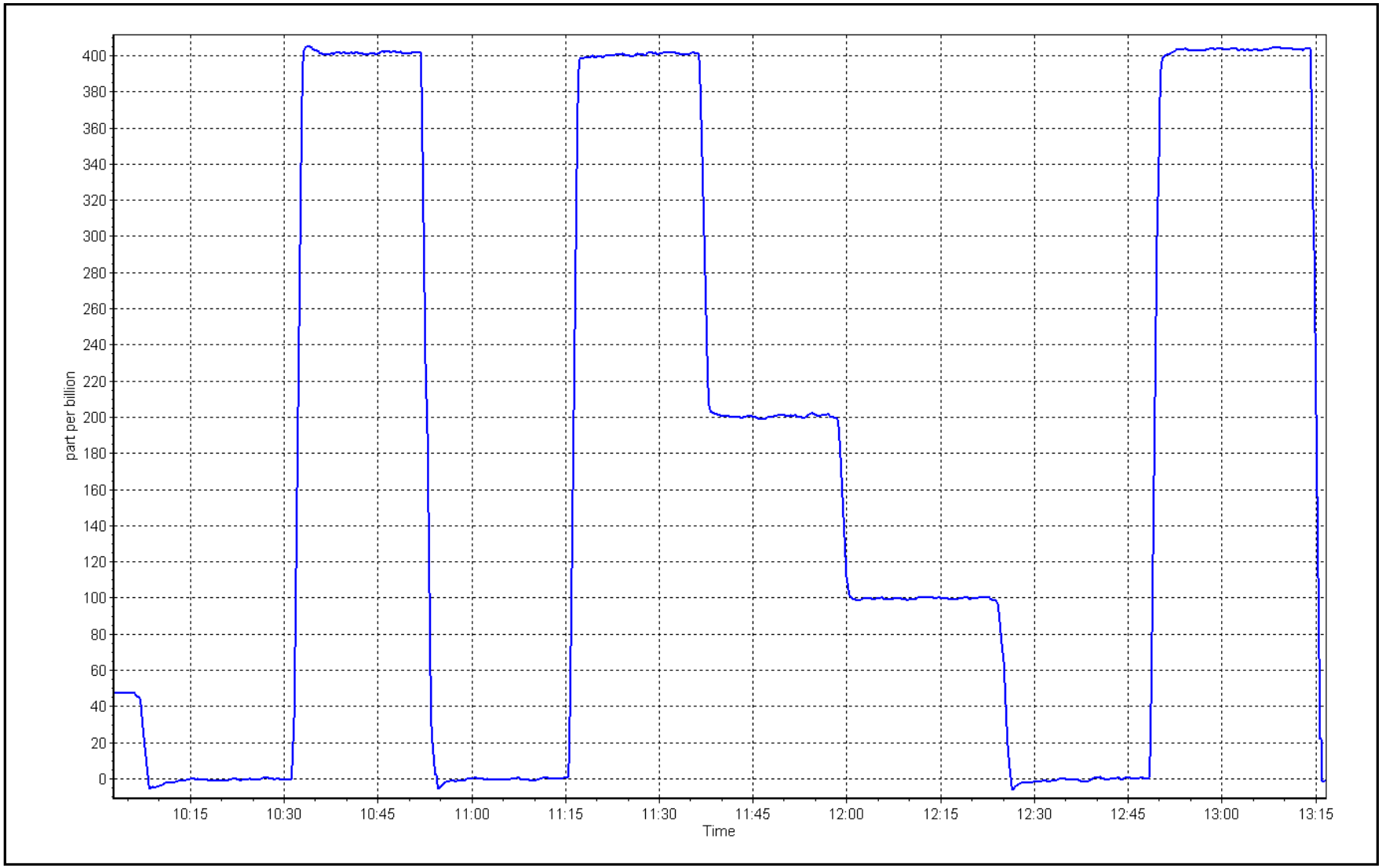
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
400.0	401.3	0.9968
200.0	200.7	0.9965
100.0	100.0	1.0000

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.003343	*0.90 - 1.10*
Intercept	-0.060000	*+/- 5*



O_3 Calibration Plot Date: May 6, 2024 Location: Patricia McInnes



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T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	May 23, 2024	Last Cal Date:	April 22, 2024
Start time (MST):	8:42	End time (MST):	9:13
Analyzer Make:	API T640	S/N:	766
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388755
Temp/RH standard:	Alicat FP-25BT	S/N:	388755

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	8.8	8.4	8.8	☐	+/- 2 °C
P (mmHg)	726.8	728.3	726.8	☐	+/- 10 mmHg
Flow (LPM)	5.04	5.14	5.04	☐	+/- 0.25 LPM
PW% (pump)	40	-----	40	☐	>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: 11-23-2023 — Lot No.: 100128-050-035

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

Date Optical Chamber Cleaned: March 22, 2024

Date Disposable Filter Changed: May 23, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: April 13, 2023

Date RH/T Sensor Cleaned: April 13, 2023

Notes: Quarterly calibrations completed in March. Leak check passed, no adjustments made.

Calibration by: Max Farrell

Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	
NOX Cal Date:	May 14, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	8:12	End time (MST):	12:30
NH3 Cal Date:	May 15, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	13:49	End time (MST):	16:00
Reason:	Routine		

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

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	0.854	0.854	Nt coefficient:	0.849	0.849
NOX coefficient:	0.848	0.848	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

	Start	*Finish*
NO_X Cal Slope:	0.993922	0.993729
NO_X Cal Offset:	1.997132	1.117125
NO Cal Slope:	0.997329	0.994355
NO Cal Offset:	0.703361	0.744064
NO_2 Cal Slope:	0.997014	1.000404
NO_2 Cal Offset:	-0.514270	-0.068951
NH3 Cal Slope:	0.990318	1.000753
NH3 Cal Offset:	4.179726	0.220004
Nt Cal Slope:	0.997067	1.006983
Nt Cal Offset:	5.735735	1.679101

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

NOx / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NOx Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*	Baseline corr NO Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-2.0	----	----
As found span	4914	86.2	826.5	799.7	826.5	822.0	792.7	822.0	1.0054	1.0089
AF GPT span										
new NO cyl rp										

Baseline Corr As Fd Nt = 824 ppb NO_X = 822.0 ppb NO = 792.5 ppb

Previous Response Nt = 829.76 ppb NO_X = 823.4 ppb NO = 798.3 ppb

**NO_X Δ (NO to GPT response) =

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

*Percent Change $Nt_{(NO)}$ = -0.7%

*Percent Change NO_X = -0.2%

*Percent Change NO = -0.7%

* = > +/-5% change initiates investigation

NOx / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	0.4	0.4	-1.0	----	----
High point	4914	86.2	826.5	799.7	826.5	822.5	795.9	821.0	1.0048	1.0048
Mid point	4957	43.1	413.2	399.9	413.2	410.7	398.2	409.6	1.0062	1.0042
Low point	4978	21.6	207.1	200.4	207.1	208.6	200.6	208.2	0.9929	0.9991
								Average Correction Factor	1.0013	1.0027

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
As Found zero	----	----	0.0	-0.2	----	----
Calibration zero	----	----	0.0	0.0	----	----
High GPT point (400 ppb O3)	792.8	392.0	427.5	427.7	0.9996	100.0%
Mid GPT point (200 ppb O3)	792.8	595.2	224.3	224.2	1.0005	99.9%
Low GPT point (100 ppb O3)	792.8	696.6	122.9	122.9	1.0002	100.0%
				Average Correction Factor	1.0001	100.0%

Wood Buffalo Environmental Association
NH_3 - 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)) *Limit = 0.9 - 1.1*	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*
As found zero	5000	0.0	0.0	0.0	0.0	-2.0	0.0	-2.1	----	----
AF High point	3417	82.6	1800.6	0.0	1800.6	1813.6	11.9	1801.6	0.992	0.998
AF Mid point										
AF Low point										
new NH3 cyl rp										

Baseline Corr As Fd Nt = 1815.6 ppb NH3 = 1803.7 ppb *Percent Change $Nt_{(NH3)}$ = 0.8%

Previous Response Nt = 1801.1 ppb NH3 = 1787.4 ppb * = > +/-5% change initiates investigation *Percent Change NH3 = 0.9%

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) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	-1.0	0.4	-1.4	----	----
High point	3417	82.6	1800.6	0.0	1800.6	1813.6	11.9	1801.6	0.993	0.999
Mid point	3454	45.9	1000.5	0.0	1000.5	1009.9	8.4	1001.5	0.991	0.999
Low point	3477	22.9	499.2	0.0	499.2	507.6	5.5	502.0	0.983	0.994
								Average Correction Factor	0.9890	0.9976

NH3 Previous Converter Efficiency = 90.8 %

NH3 Current Converter Efficiency = 90.8 %

Notes: Changed the inlet filter after as founds. No adjustments made. NH3 portion of the calibration completed remotely on the 15th due to forest fire evacuation.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

Nt Calibration Summary

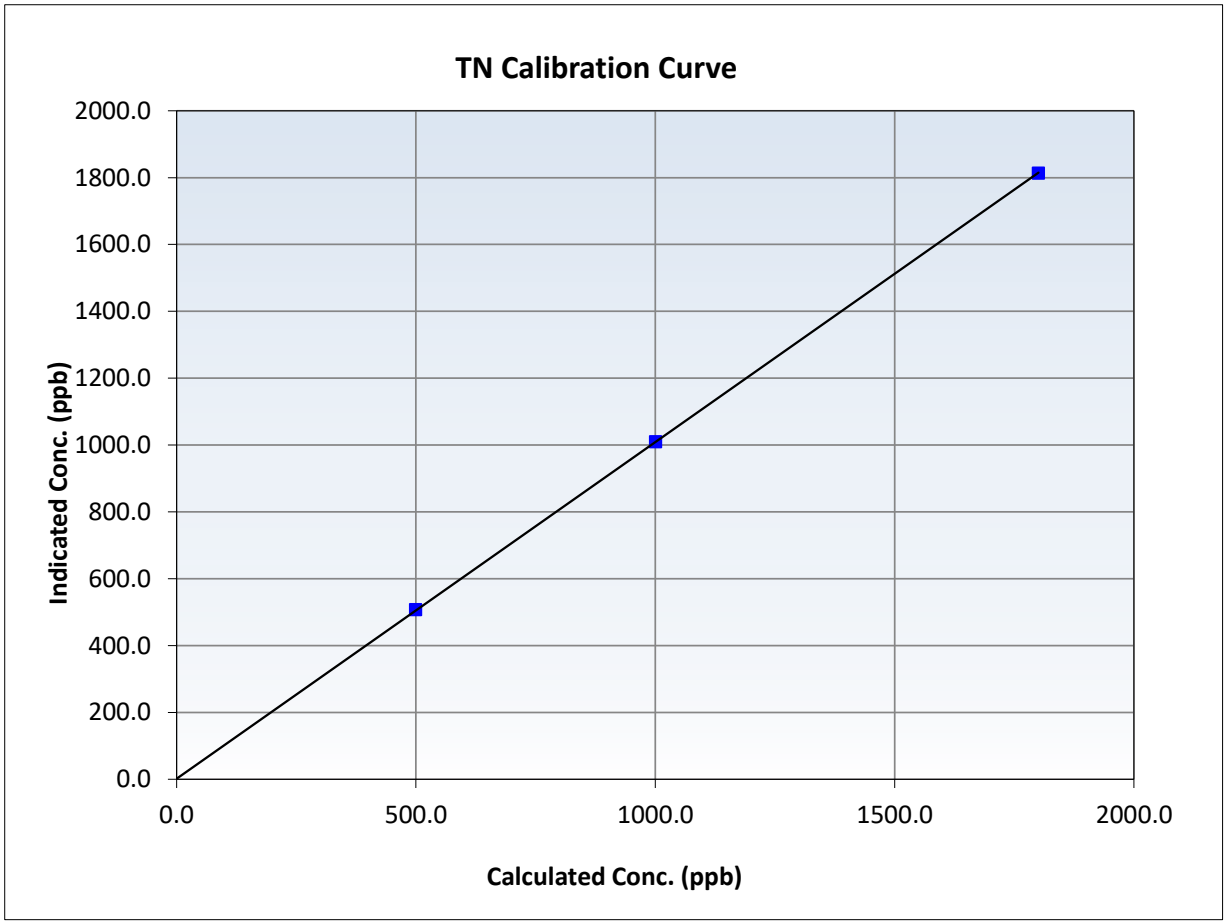
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 11, 2024
Station Name:	Patricia McInnes	Station Number:	
Start Time (MST):	8:12	End Time (MST):	12:30
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-1.0	----
1800.6	1813.6	0.9929
1000.5	1009.9	0.9907
499.2	507.6	0.9834

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	1.006983	*0.90 - 1.10*
Intercept	1.679101	*+/-20*



Wood Buffalo Environmental Association

NH_3 Calibration Summary

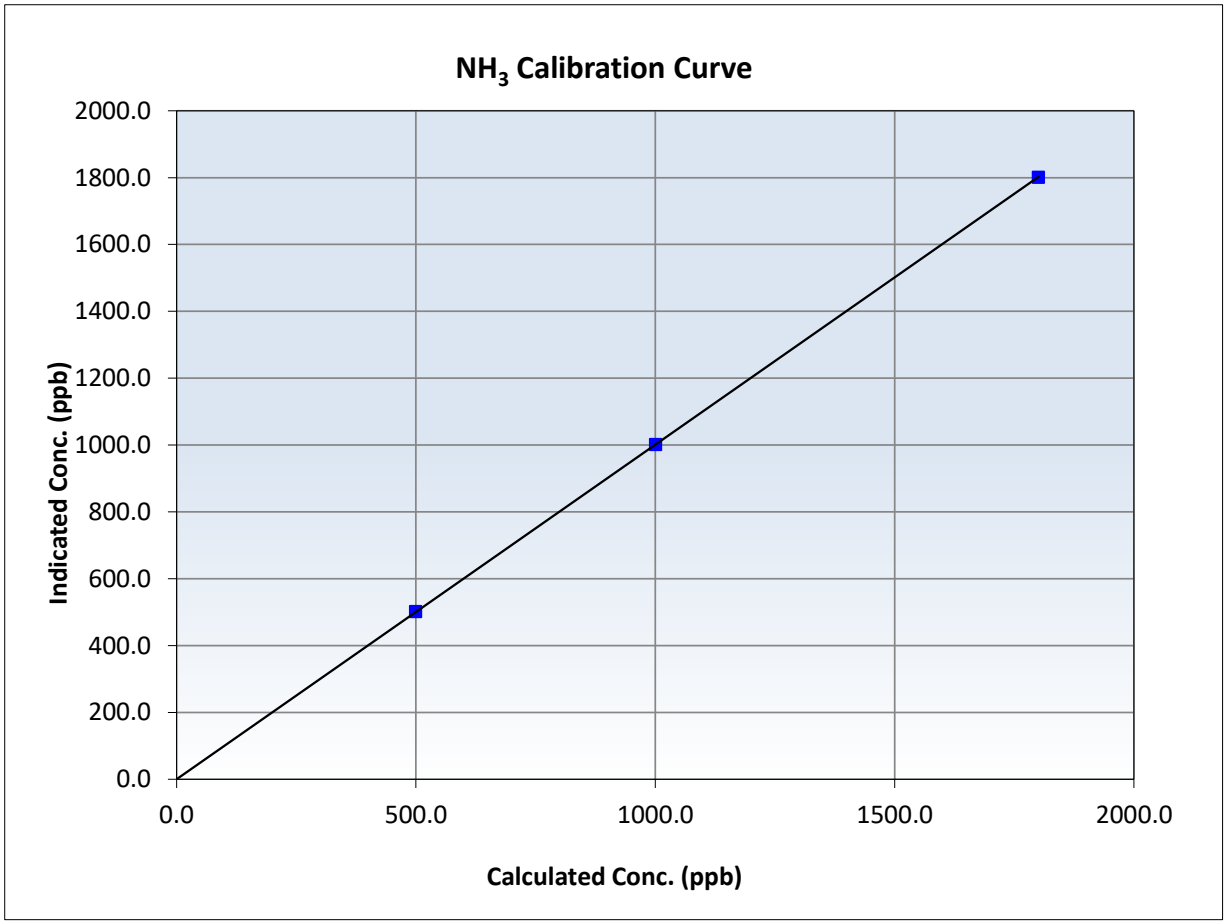
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 11, 2024
Station Name:	Patricia McInnes	Station Number:	
Start Time (MST):	8:12	End Time (MST):	12:30
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-1.4	----
1800.6	1801.6	0.9995
1000.5	1001.5	0.9990
499.2	502.0	0.9944

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.000753	*0.90 - 1.10*
Intercept	0.220004	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

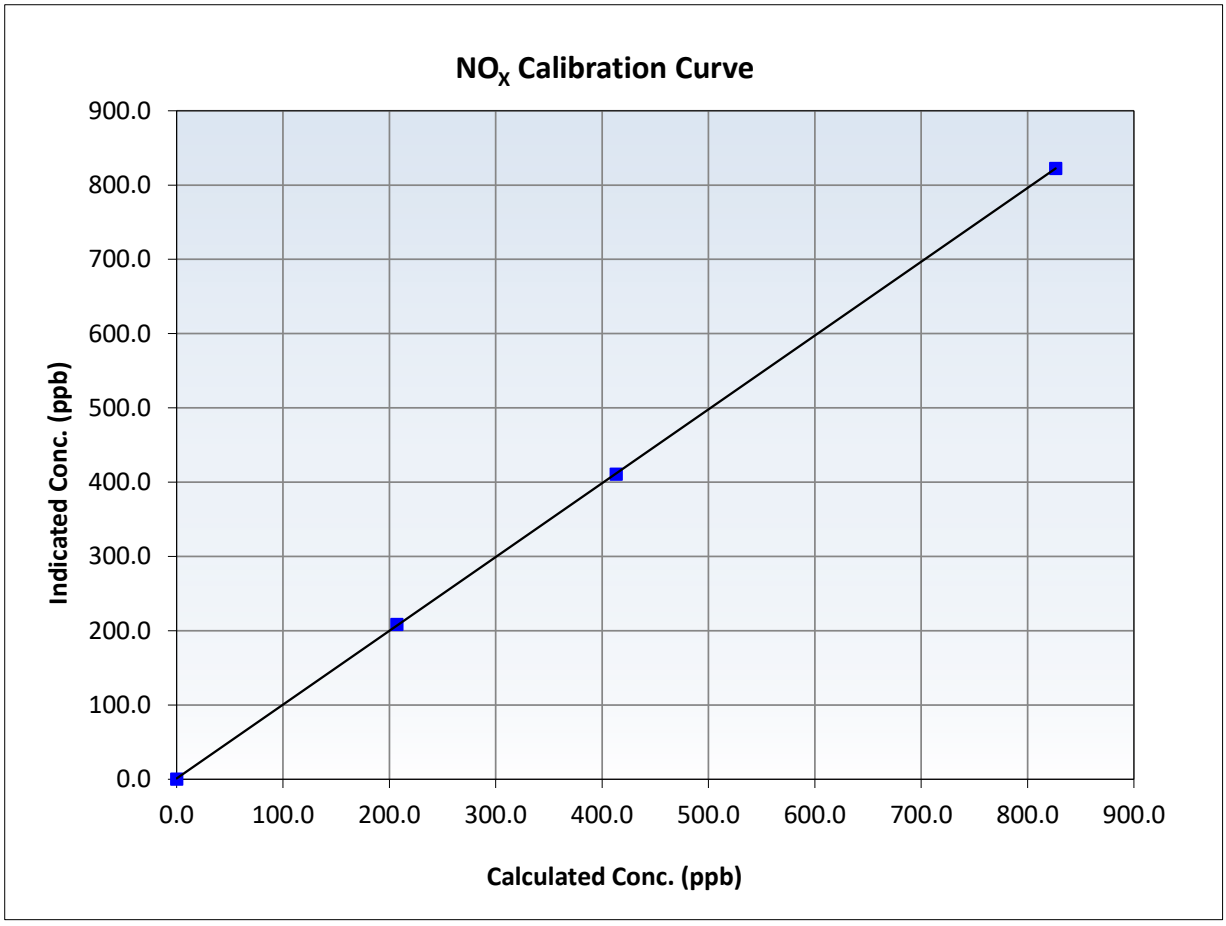
Station Information

Calibration Date:	May 14, 2024	Previous Calibration:	April 11, 2024
Station Name:	Patricia McInnes	Station Number:	
Start Time (MST):	8:12	End Time (MST):	12:30
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
826.5	822.5	1.0048
413.2	410.7	1.0062
207.1	208.6	0.9929

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	0.993729	*0.90 - 1.10*
Intercept	1.117125	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

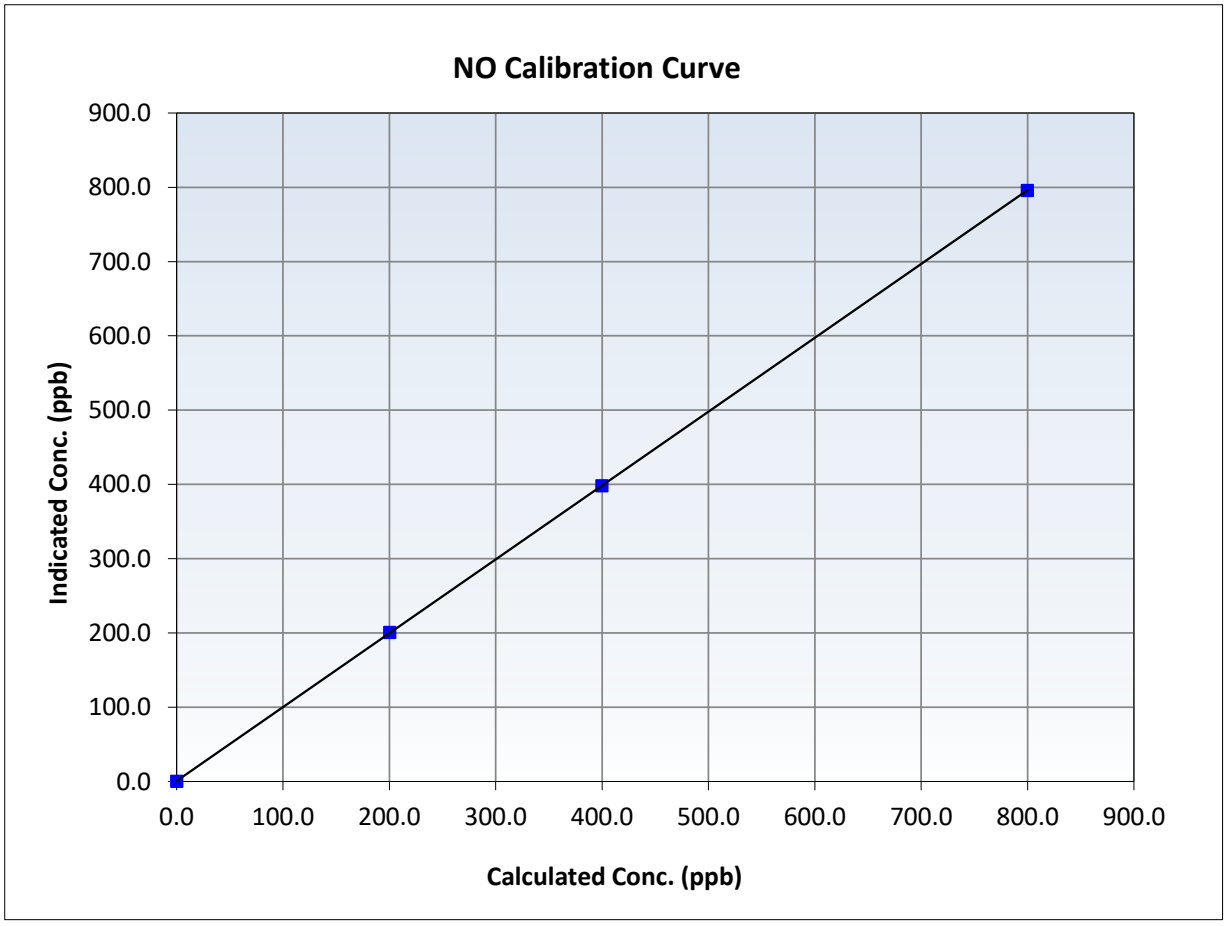
Station Information

Calibration Date:	May 14, 2024	Previous Calibration:	April 11, 2024
Station Name:	Patricia McInnes	Station Number:	
Start Time (MST):	8:12	End Time (MST):	12:30
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
799.7	795.9	1.0048
399.9	398.2	1.0042
200.4	200.6	0.9991

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.994355	*0.90 - 1.10*
Intercept	0.744064	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

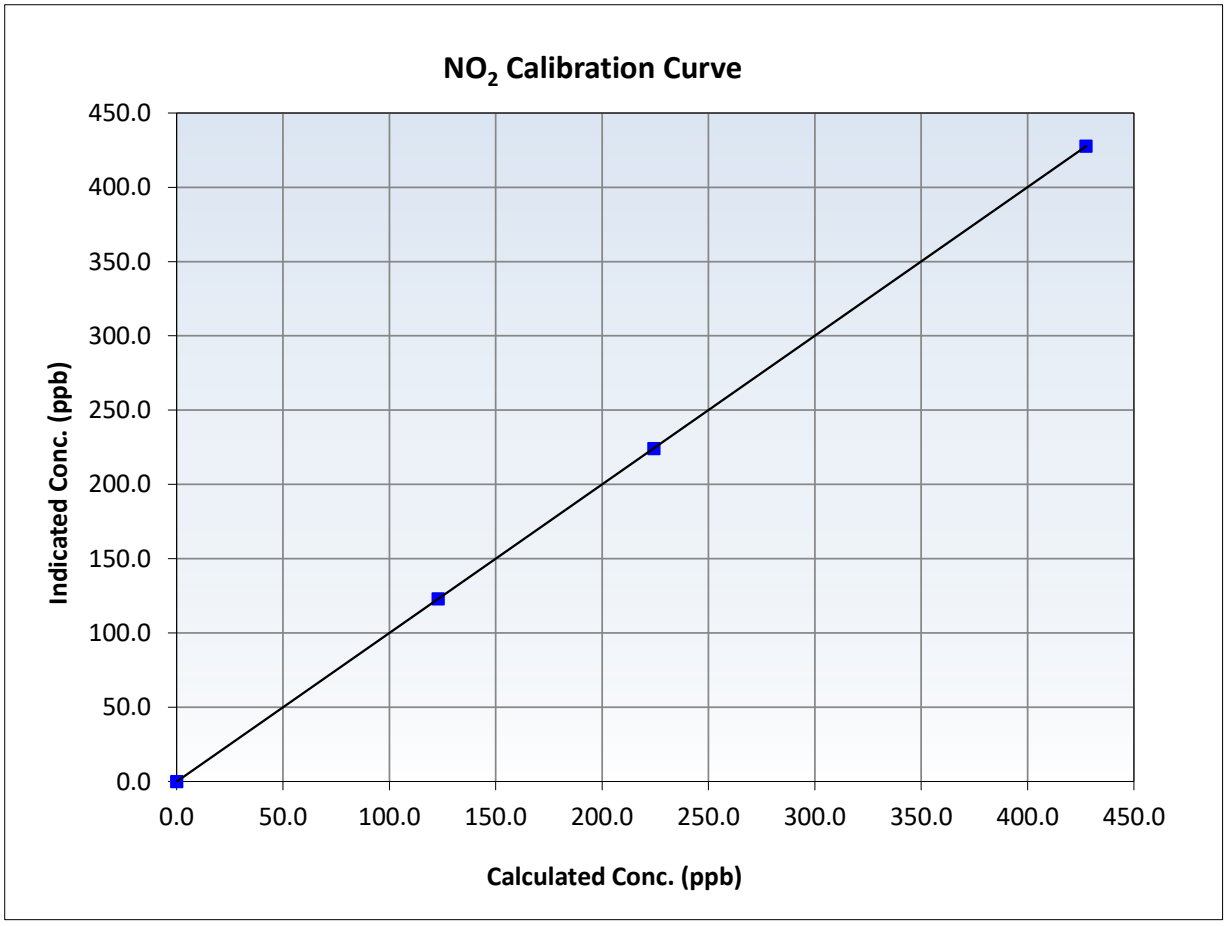
Station Information

Calibration Date:	May 14, 2024	Previous Calibration:	April 11, 2024
Station Name:	Patricia McInnes	Station Number:	
Start Time (MST):	8:12	End Time (MST):	12:30
Analyzer make:	API T201	Analyzer serial #:	808

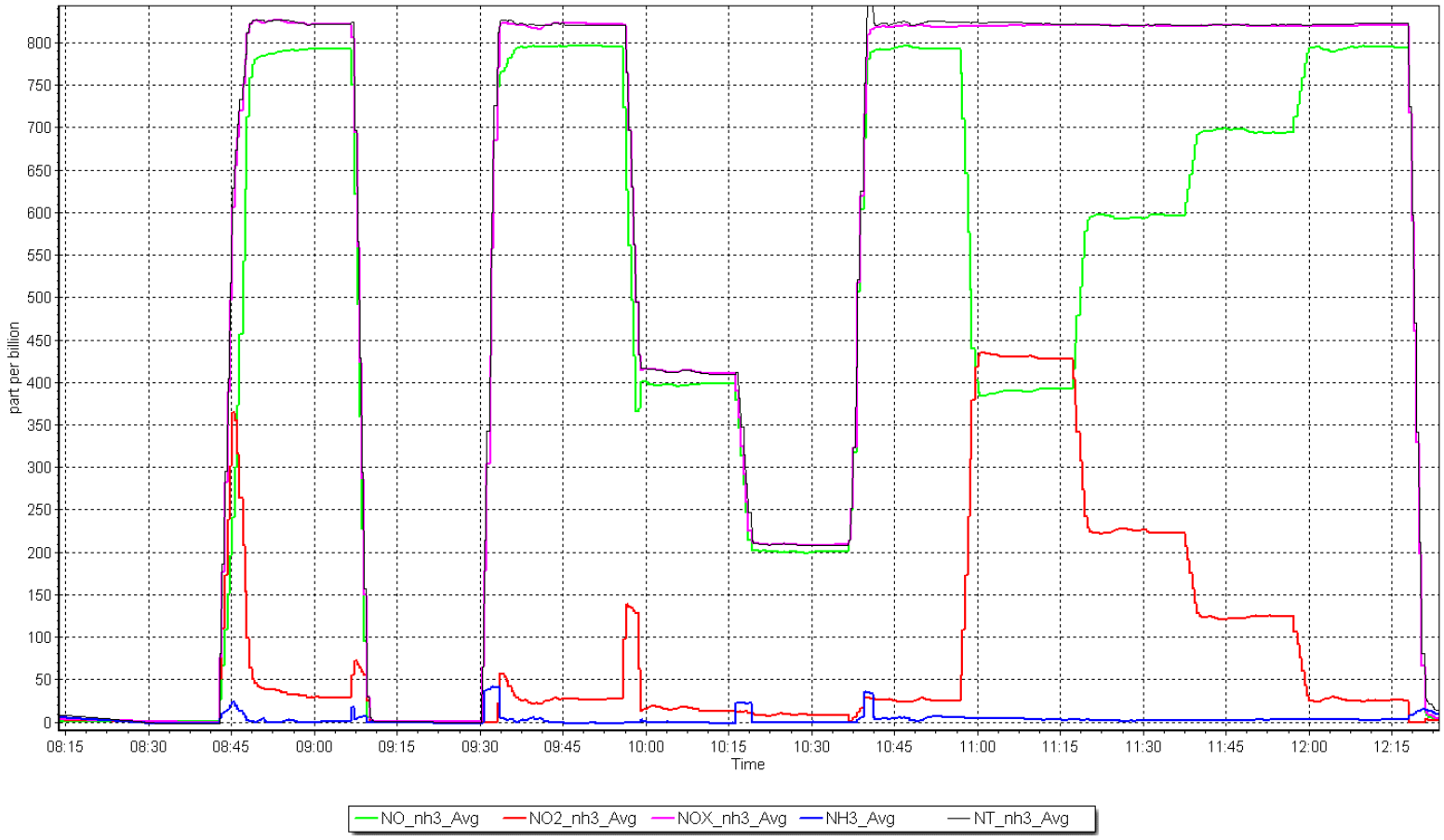
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
427.5	427.7	0.9996
224.3	224.2	1.0005
122.9	122.9	1.0002

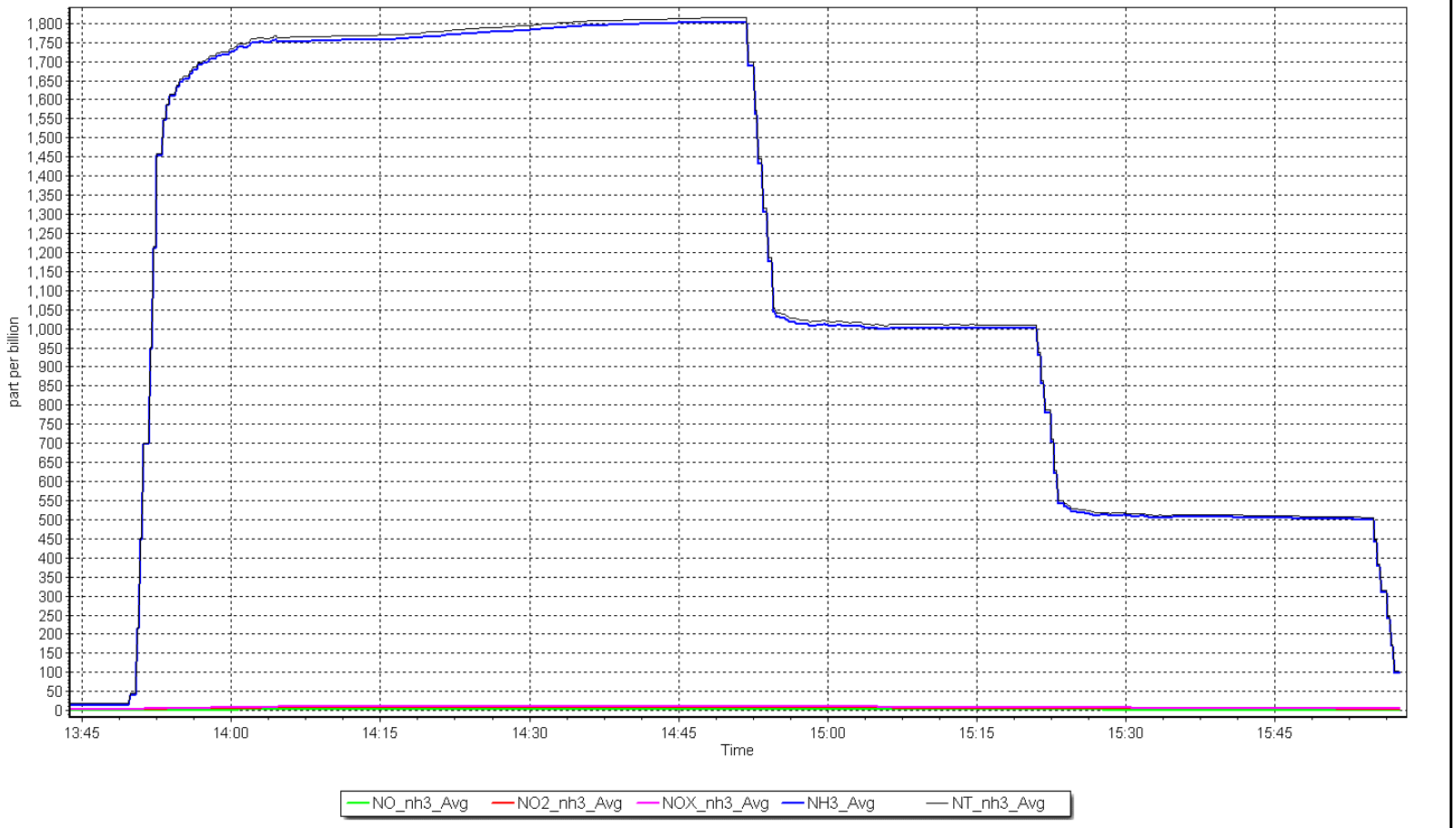
Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.000404	*0.90 - 1.10*
Intercept	-0.068951	*+/-20*



NO_X Calibration Plot Date: May 14, 2024 Location: Patricia McInnes



NH_3 Calibration Plot Date: May 15, 2024 Location: Patricia McInnes



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS07
ATHABASCA VALLEY
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	May 3, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	10:05	End time (MST):	14:56
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000104	1.002151	Backgd or Offset:	2.6	2.6
Calibration intercept:	1.984432	2.043866	Coeff or Slope:	0.845	0.845

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	79.8	799.0	800.0	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	800.0	Previous response	801.1	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4920	79.8	799.0	801.3	0.997
Mid point	4960	39.9	399.5	405.0	0.986
Low point	4980	20.0	200.2	203.3	0.985
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.0	801.5	0.997
				Average Correction Factor:	0.989

Notes: No adjustments made.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

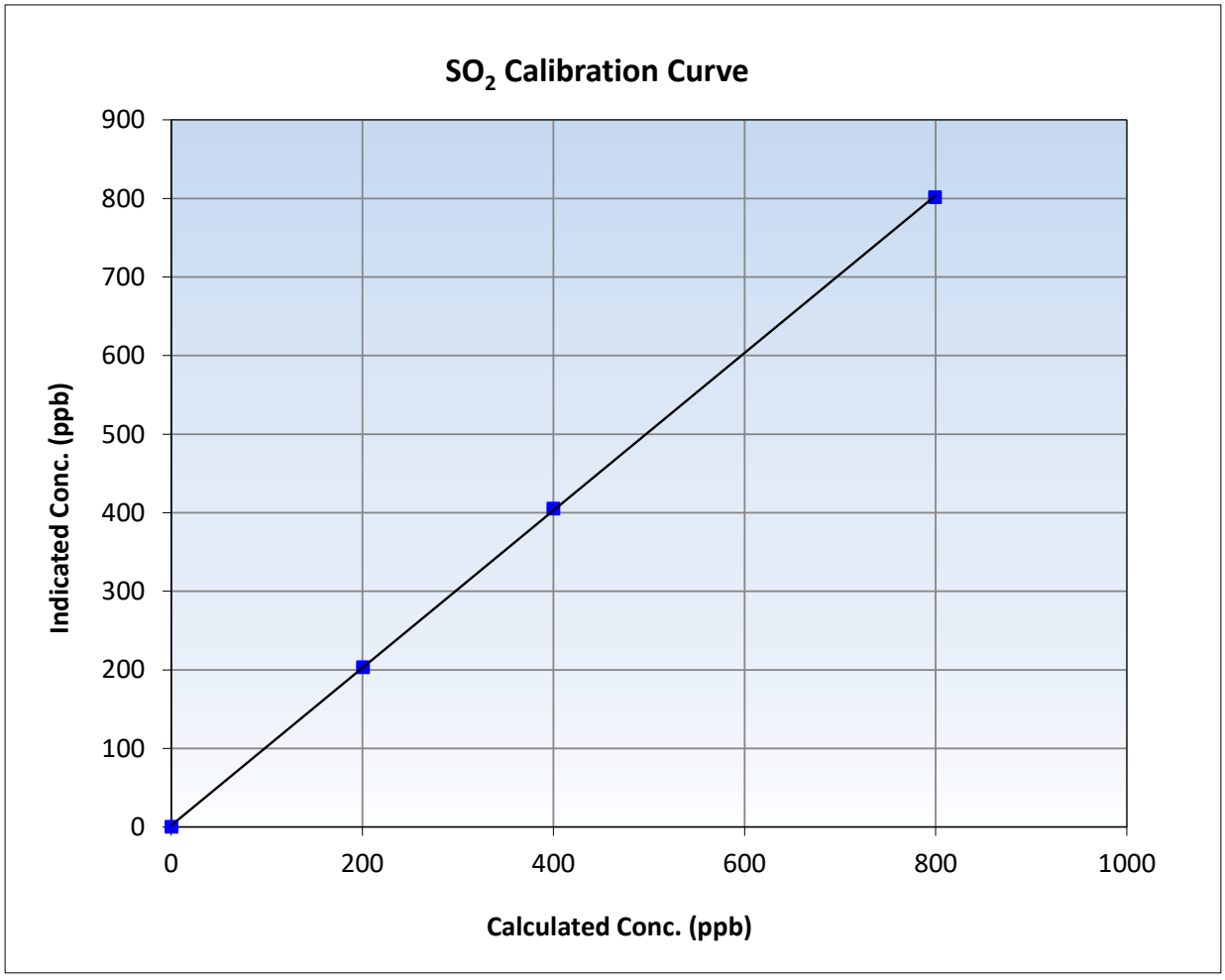
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 10, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:05	End Time (MST):	14:56
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

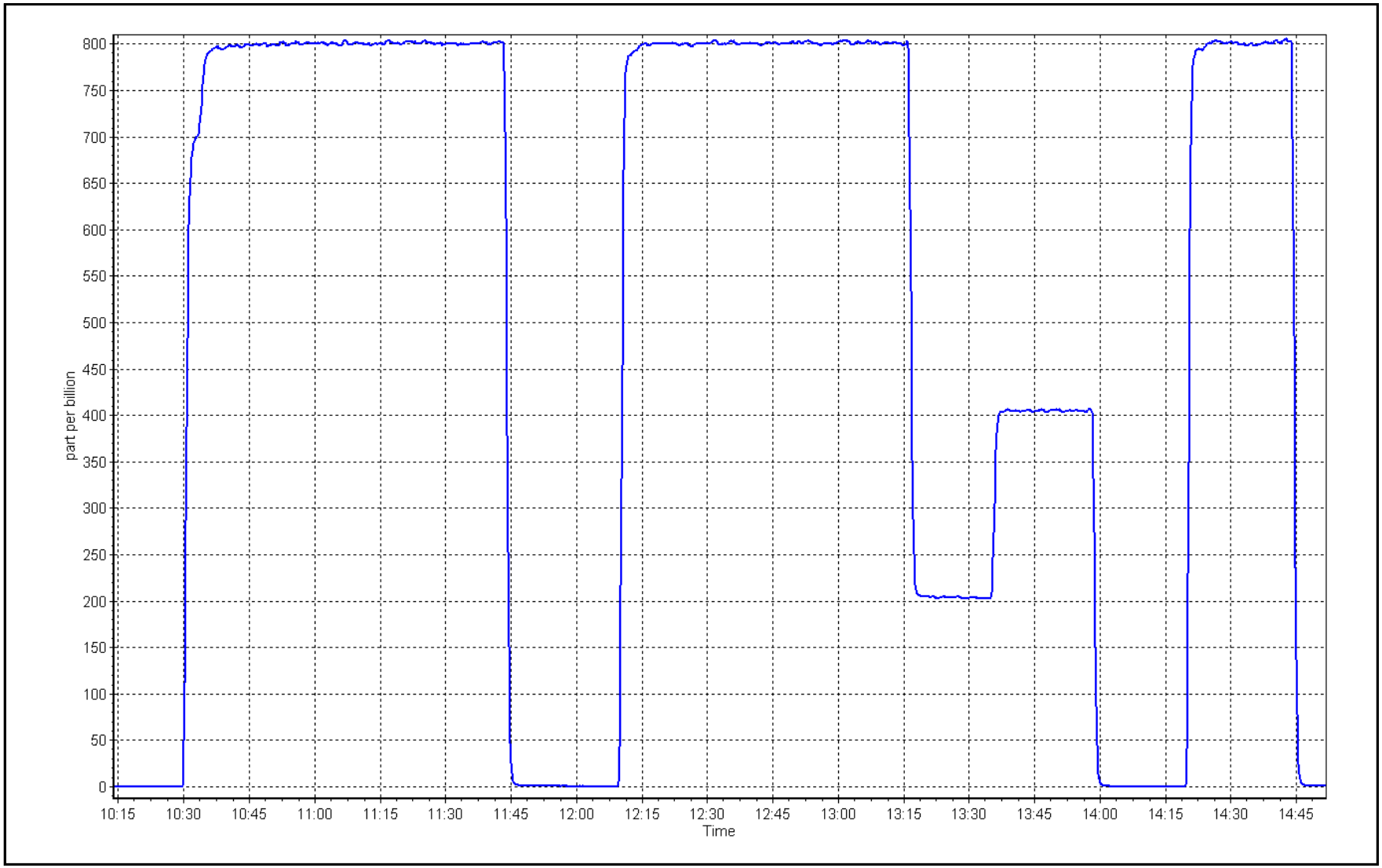
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.0	801.3	0.9971
399.5	405.0	0.9864
200.2	203.3	0.9849

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999965	*≥0.995*
Slope	1.002151	*0.90 - 1.10*
Intercept	2.043866	*+/-30*



SO2 Calibration Plot Date: May 3, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	May 29, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	8:29	End time (MST):	13:13
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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.013471	1.012031	Backgd or Offset:	2.4	2.4
Calibration intercept:	0.037852	-0.062173	Coeff or Slope:	0.901	0.901

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4925	75.5	79.3	80.4	0.985
As found Mid point	4962	37.7	39.6	40.2	0.982
As found Low point	4981	18.9	19.8	19.9	0.992
New cylinder response					

Baseline Corr As found:	80.5	Prev response:	80.37	*% change:	0.2%
Baseline Corr 2nd AF pt:	40.3	AF Slope:	1.016358	AF Intercept:	-0.142169
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999992	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4925	75.5	79.3	80.2	0.989
Mid point	4962	37.7	39.6	40.1	0.988
Low point	4981	18.9	19.9	19.9	0.998
As left zero	5000	0.0	0.0	0.0	----
As left span	4925	75.5	79.3	80.1	0.990
SO2 Scrubber Check	4920	79.2	792.1	0.1	----
Date of last scrubber change:		25-Feb-22		Ave Corr Factor	0.992
Date of last converter efficiency test:		April 22, 2022			

Notes: No adjustments needed.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

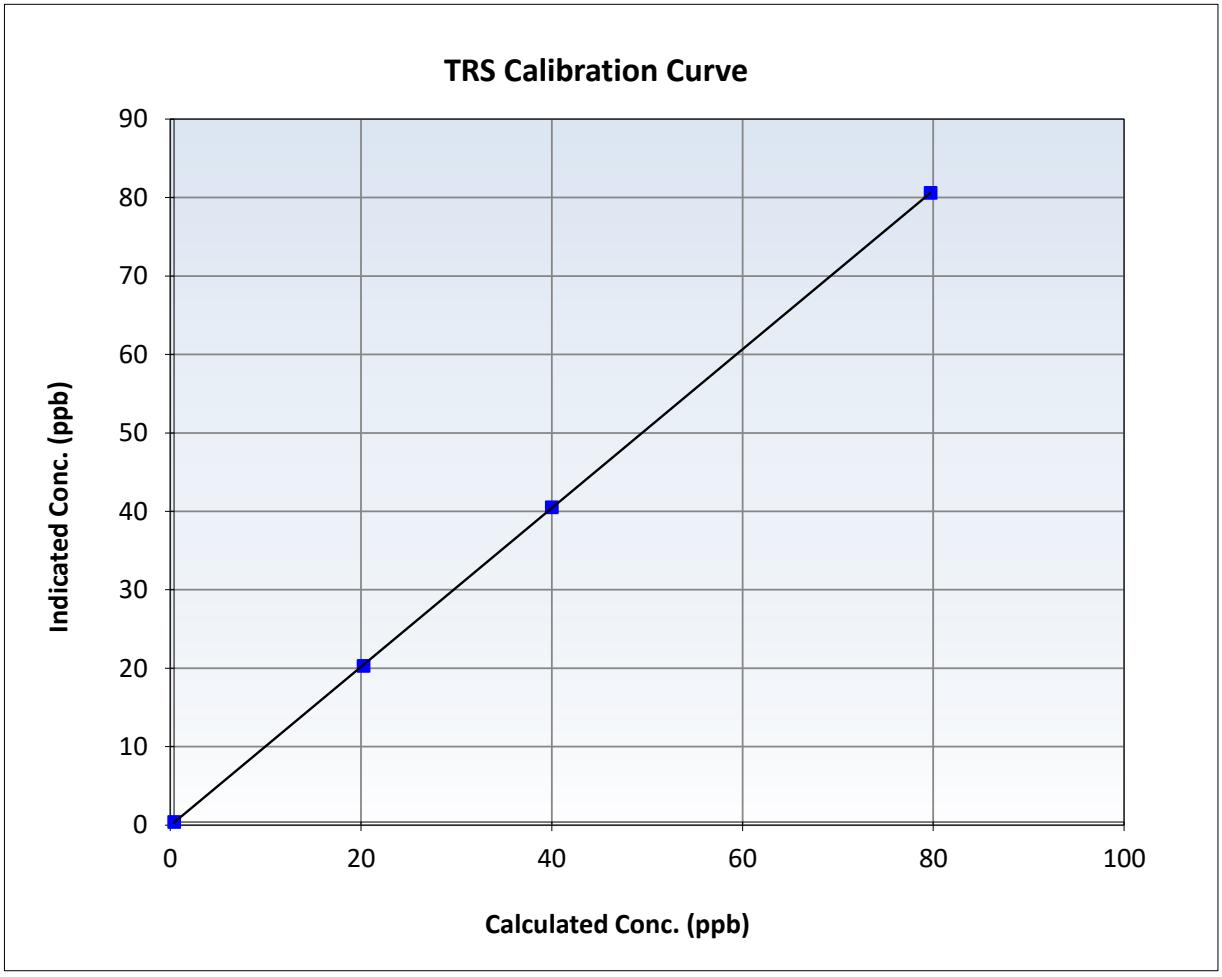
TRS Calibration Summary

Station Information

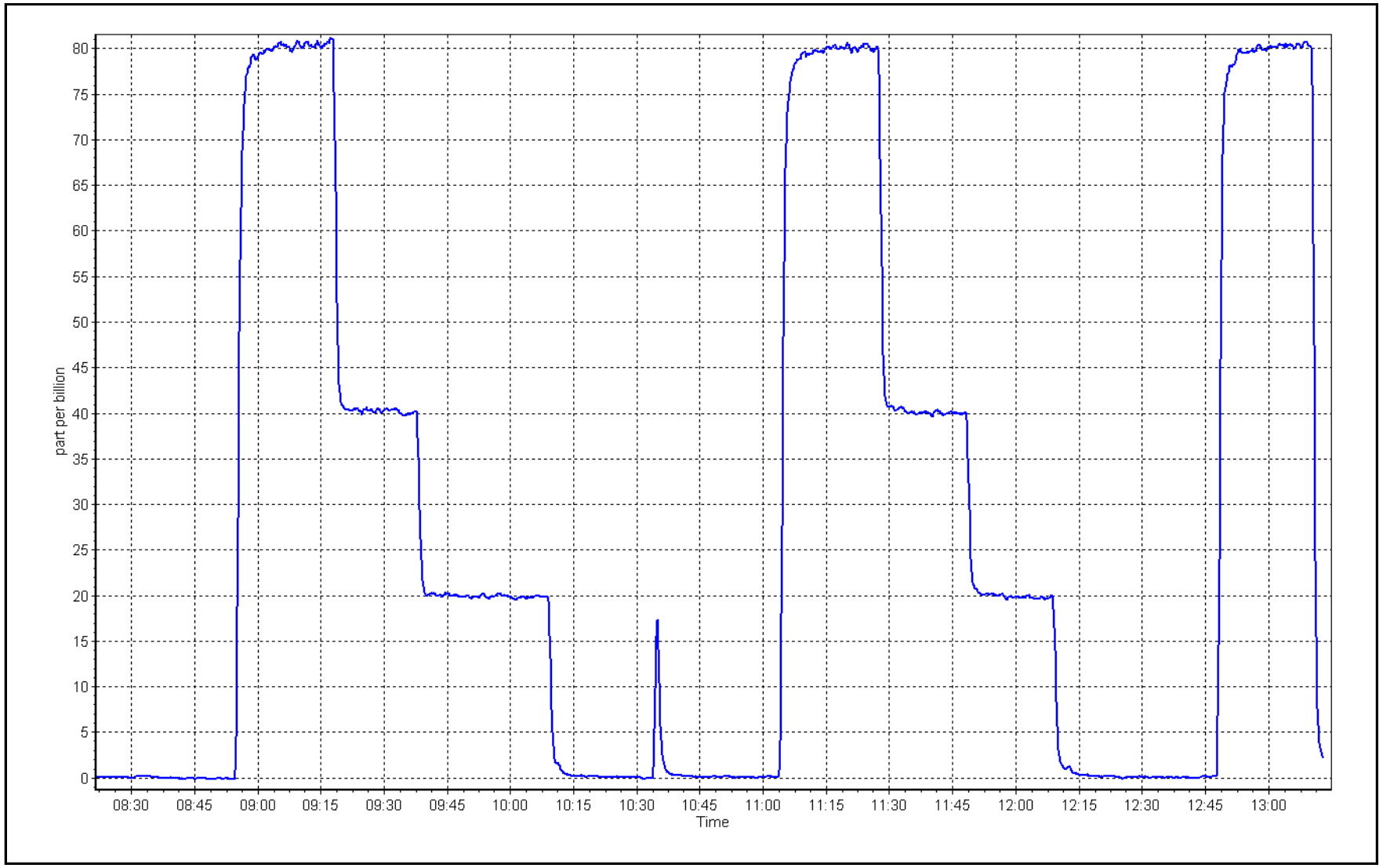
Calibration Date:	May 29, 2024	Previous Calibration:	April 15, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	8:29	End Time (MST):	13:13
Analyzer make:	Thermo 43i LTE	Analyzer serial #:	1180540018

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999992	*≥0.995*
79.3	80.2	0.9889	Slope	1.012031	*0.90 - 1.10*
39.6	40.1	0.9878			
19.9	19.9	0.9978	Intercept	-0.062173	*+/-3*



TRS Calibration Plot Date: May 29, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	May 3, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	10:05	End time (MST):	14:56
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC320556	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
Removed C3H8 Conc.	205.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (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	Analyzer serial #:	12227620777
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.60E-05	2.64E-04	NMHC SP Ratio:	5.34E-05	5.50E-05
CH4 Retention time:	13.4	13.4	NMHC Peak Area:	168530	163554
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	16.91	16.53	1.023
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.53	Prev response	16.88	*% change	-2.1%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	16.91	16.92	1.000
Mid point	4960	39.9	8.46	8.43	1.003
Low point	4980	20.0	4.24	4.20	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	16.91	16.88	1.002
				Average Correction Factor	1.004

Notes: Nitrogen cylinder changed out. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.00	8.79	1.023
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.79	Prev response	8.97	*% 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.00	9.03	0.997
Mid point	4960	39.9	4.50	4.52	0.996
Low point	4980	20.0	2.26	2.25	1.003
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.00	9.03	0.996
				Average Correction Factor	0.998

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	7.92	7.74	1.023
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.74	Prev response	7.91	*% change	-2.2%
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	79.8	7.92	7.90	1.002
Mid point	4960	39.9	3.96	3.91	1.011
Low point	4980	20.0	1.98	1.95	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	7.92	7.85	1.008
				Average Correction Factor	1.011

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.997119	1.001164
THC Cal Offset:	0.013262	-0.023931
CH4 Cal Slope:	0.999590	0.998822
CH4 Cal Offset:	-0.002739	-0.020327
NMHC Cal Slope:	0.995046	1.003694
NMHC Cal Offset:	0.016600	-0.004204

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

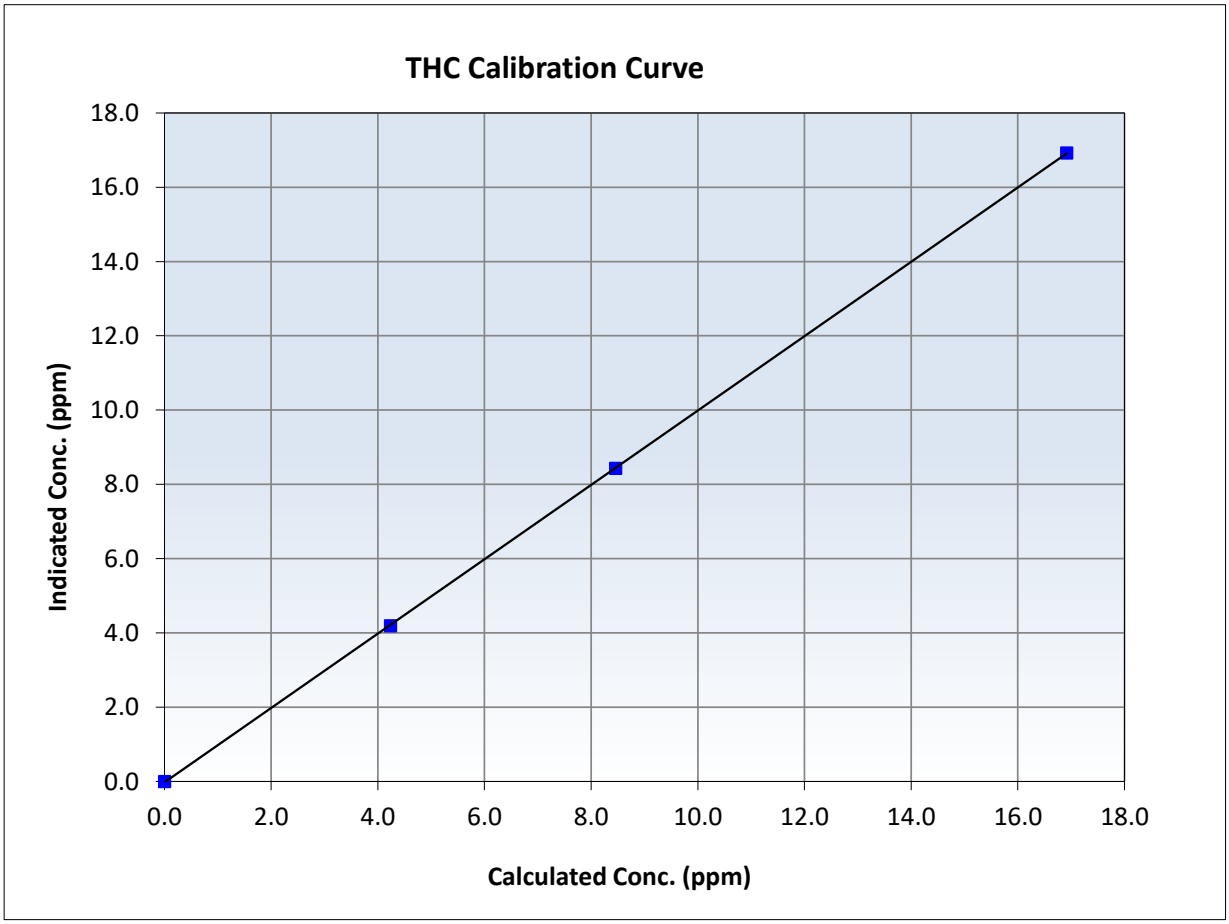
THC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 10, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:05	End Time (MST):	14:56
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999991	≥0.995
16.91	16.92	0.9995	Slope	1.001164	0.90 - 1.10
8.46	8.43	1.0031	Intercept	-0.023931	+/-0.5
4.24	4.20	1.0102			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

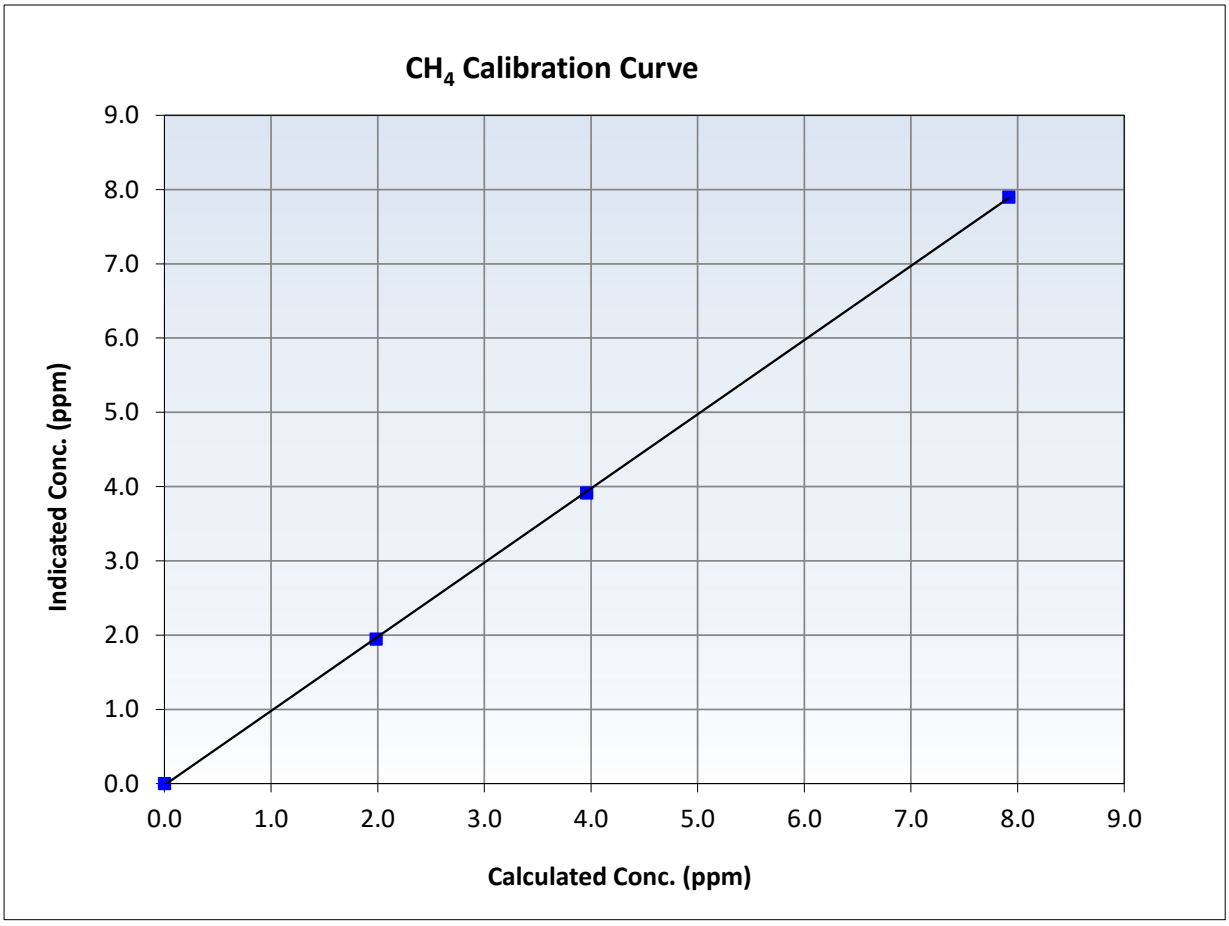
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 10, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:05	End Time (MST):	14:56
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
7.92	7.90	1.0021
3.96	3.91	1.0113
1.98	1.95	1.0190

Statistical Evaluation		Limits
Correlation Coefficient	0.999966	≥0.995
Slope	0.998822	0.90 - 1.10
Intercept	-0.020327	+/-0.5



Wood Buffalo Environmental Association

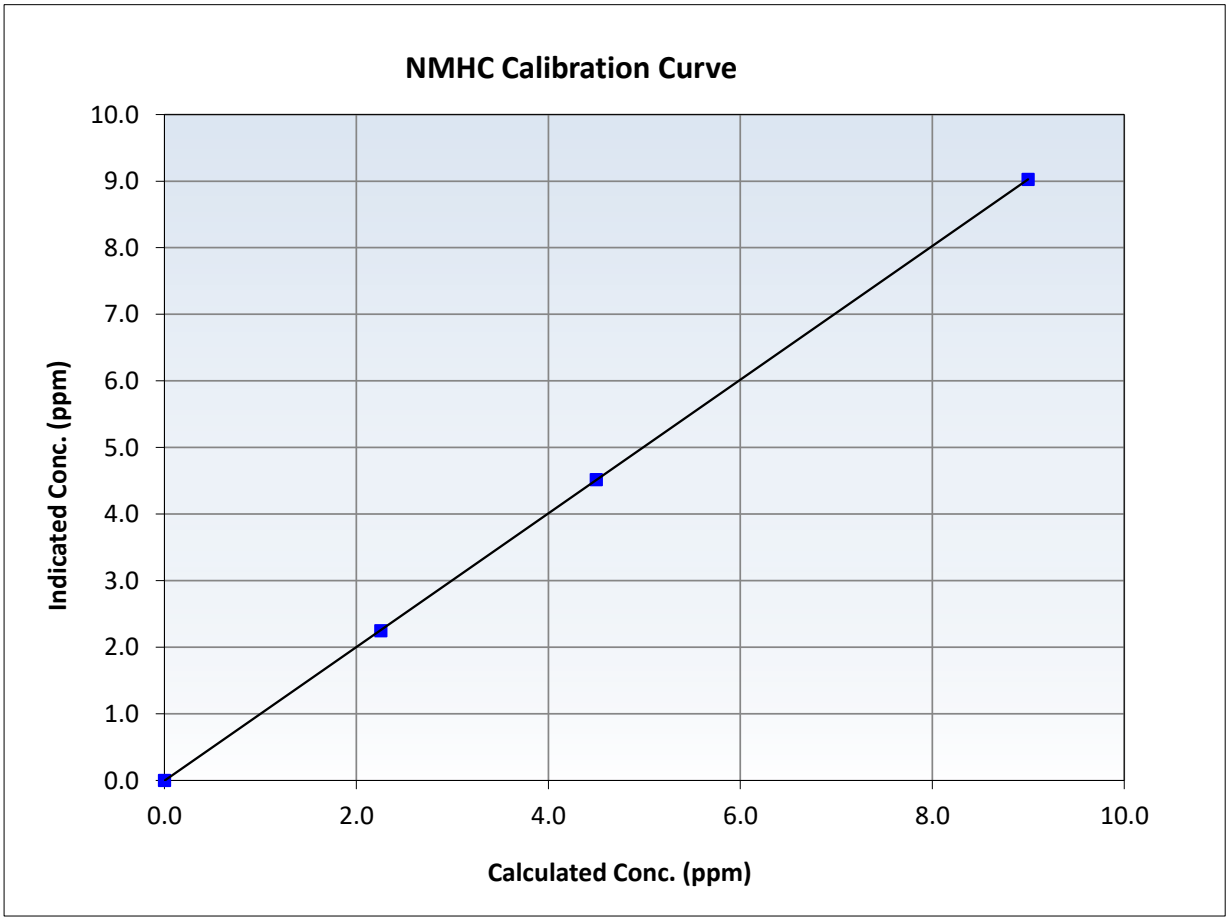
NMHC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 10, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:05	End Time (MST):	14:56
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

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
9.00	9.03	0.9969	Slope	1.003694	0.90 - 1.10
4.50	4.52	0.9958			
2.26	2.25	1.0027	Intercept	-0.004204	+/-0.5



NMHC Calibration Plot Date: May 3, 2024 Location: Athabasca Valley

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley
Station number:	AMS 07
Calibration Date:	May 24, 2024
Last Cal Date:	April 9, 2024
Start time (MST):	9:20
End time (MST):	14:25
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
AF High point	4933	66.8	803.0	800.3	2.7	803.7	795.6	7.9	0.9991	1.0058
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	802.9 ppb	NO =	799.9 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 0.1%
Baseline Corr 1st pt	NO_X =	803.7 ppb	NO =	795.7 ppb	As Found Statistics	*Percent Change	NO = -0.5%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1160120024

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.077	1.107	NO bkgnd or offset:	7.6	7.8
NOX coeff or slope:	1.003	1.001	NOX bkgnd or offset:	7.8	8.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	212.0	216.6

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.997568	0.998991
NO_X Cal Offset:	1.871922	2.071875
NO Cal Slope:	0.997614	1.000699
NO Cal Offset:	1.471946	1.891889
NO_2 Cal Slope:	1.006328	1.002535
NO_2 Cal Offset:	1.745224	1.346655

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
High point	4933	66.8	803.0	800.3	2.7	802.5	801.1	1.3	1.0006	0.9990
Mid point	4966	33.4	401.5	400.2	1.3	406.3	405.5	0.7	0.9882	0.9869
Low point	4983	16.7	200.7	200.1	0.7	203.3	202.4	0.9	0.9874	0.9885
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4933	66.8	803.0	393.8	409.2	804.0	393.8	410.2	0.9987	1.0000
								Average Correction Factor	0.9921	0.9915

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	798.8	397.0	404.5	406.2	0.9957	100.4%
Mid GPT point	798.8	599.2	202.3	204.6	0.9886	101.2%
Low GPT point	798.8	699.3	102.2	105.4	0.9694	103.2%
				Average Correction Factor	0.9846	101.6%

Notes: Span adjusted slightly.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

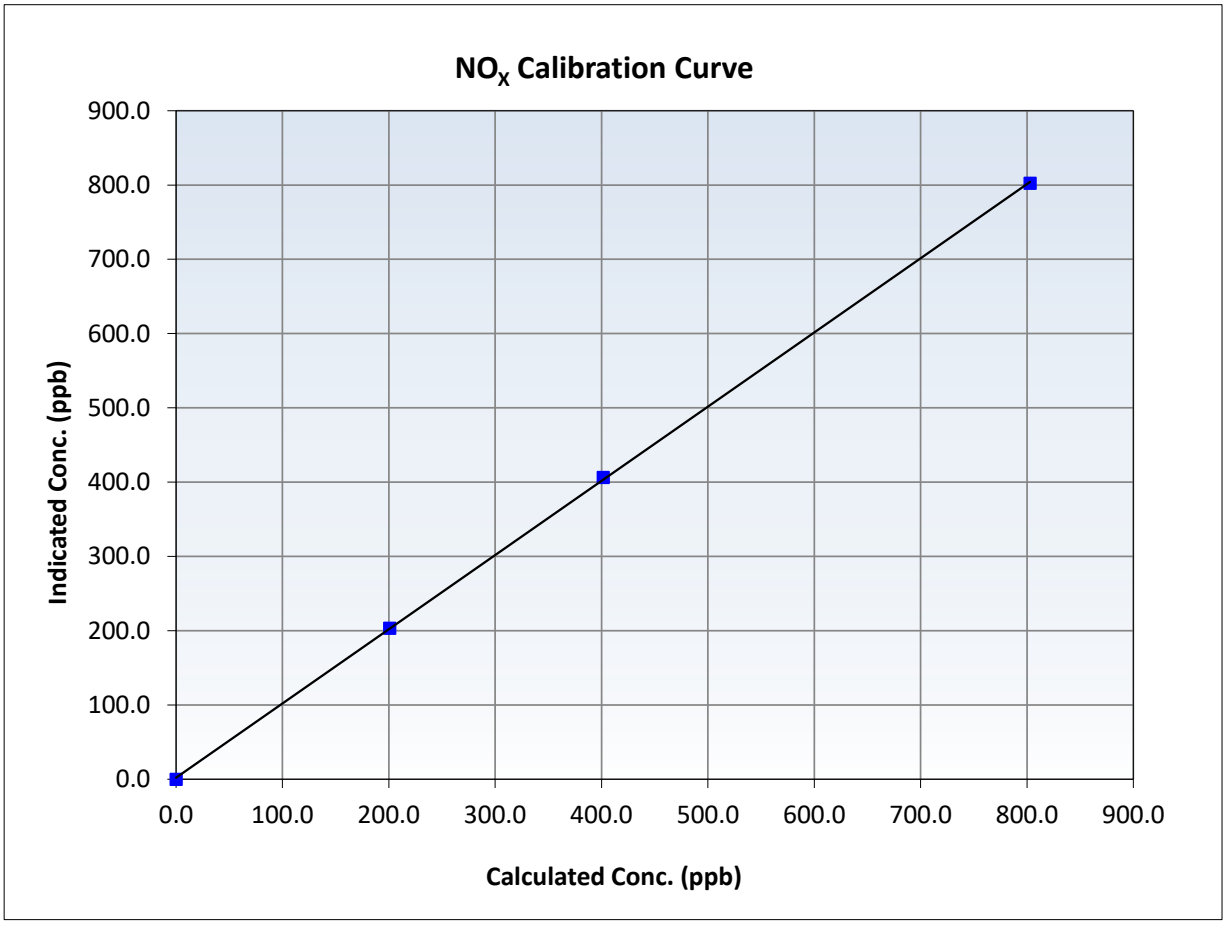
Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	April 9, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:20	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
803.0	802.5	1.0006
401.5	406.3	0.9882
200.7	203.3	0.9874

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999950	*≥0.995*
Slope	0.998991	*0.90 - 1.10*
Intercept	2.071875	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

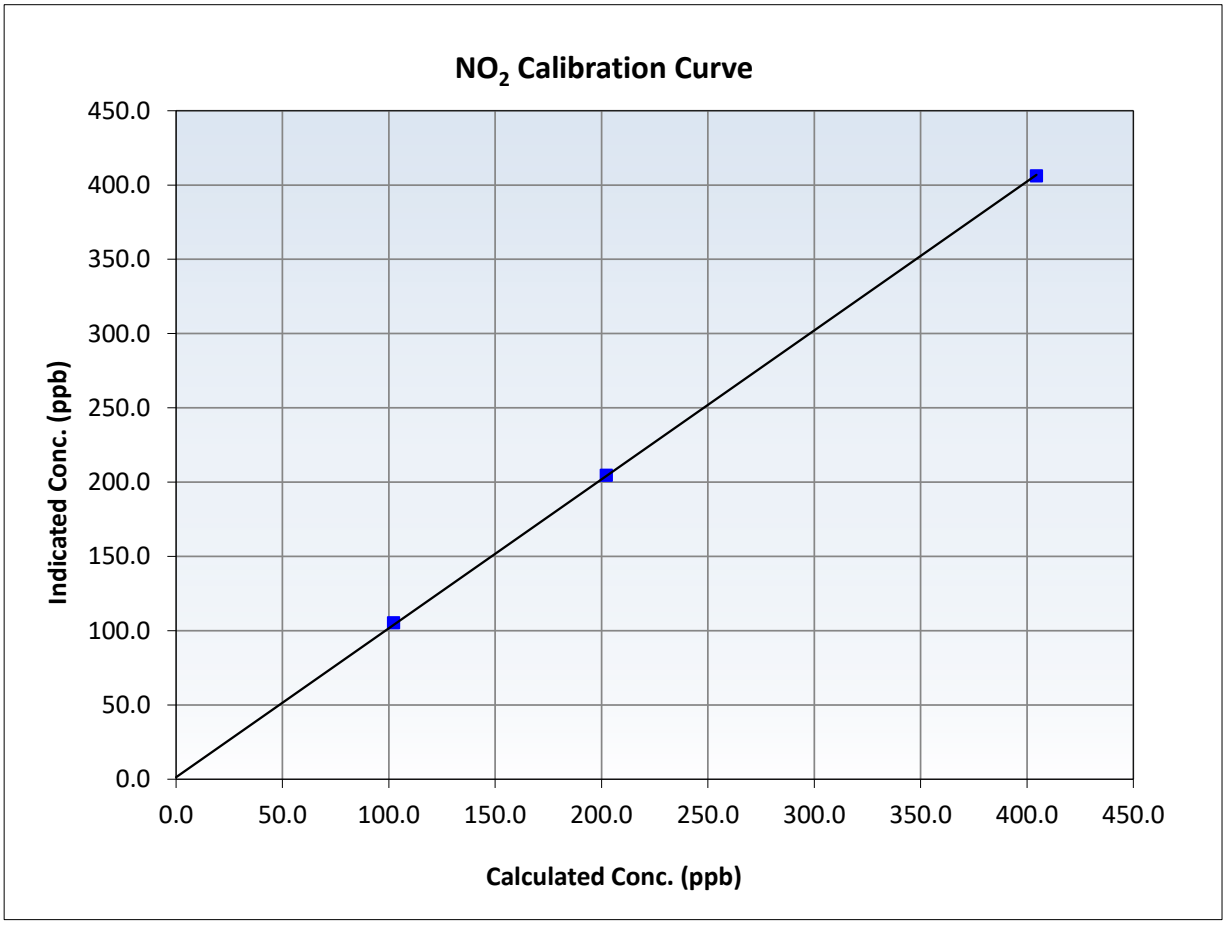
Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	April 9, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:20	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
404.5	406.2	0.9957
202.3	204.6	0.9886
102.2	105.4	0.9694

Statistical Evaluation		Limits
Correlation Coefficient	0.999940	≥0.995
Slope	1.002535	0.90 - 1.10
Intercept	1.346655	+/-20



Wood Buffalo Environmental Association

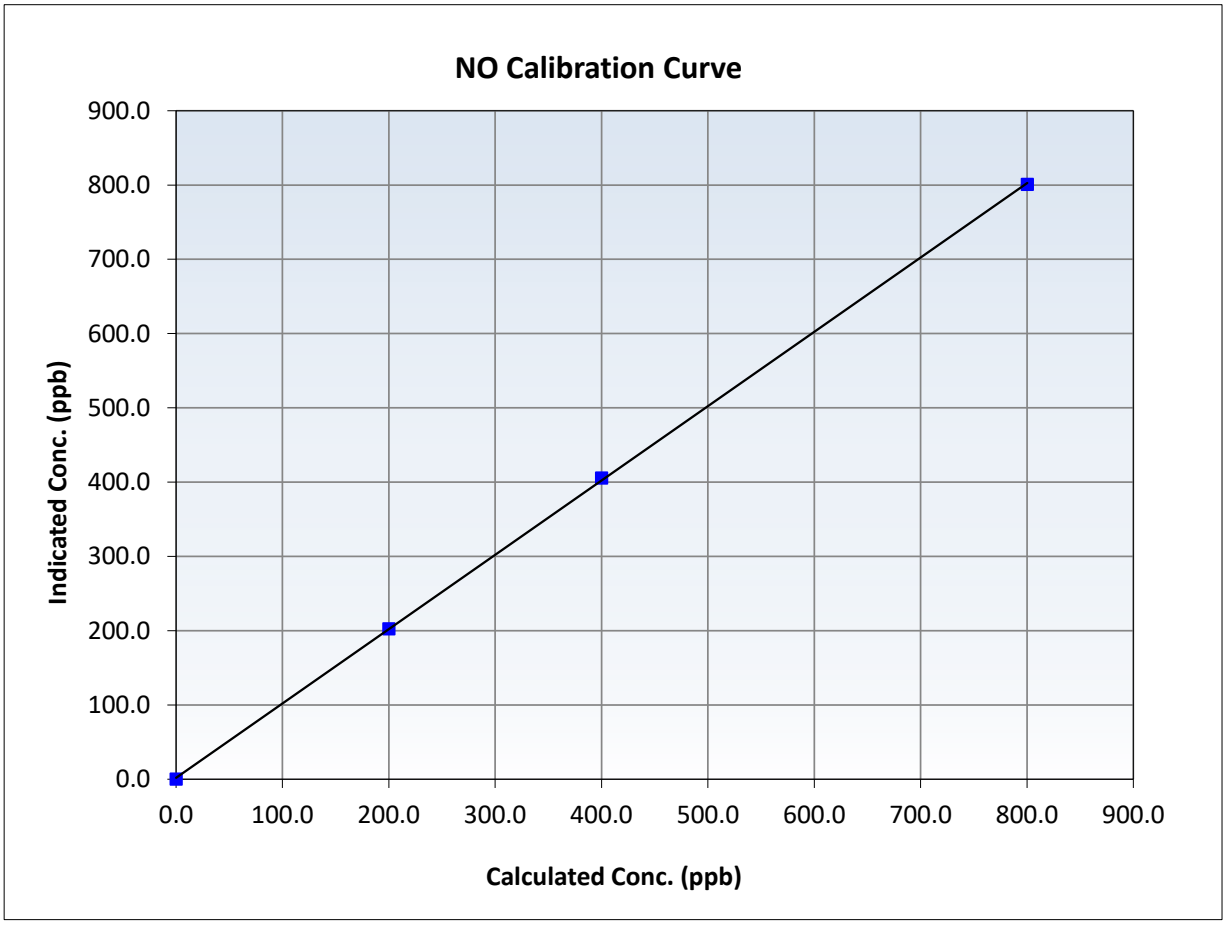
NO Calibration Summary

Station Information

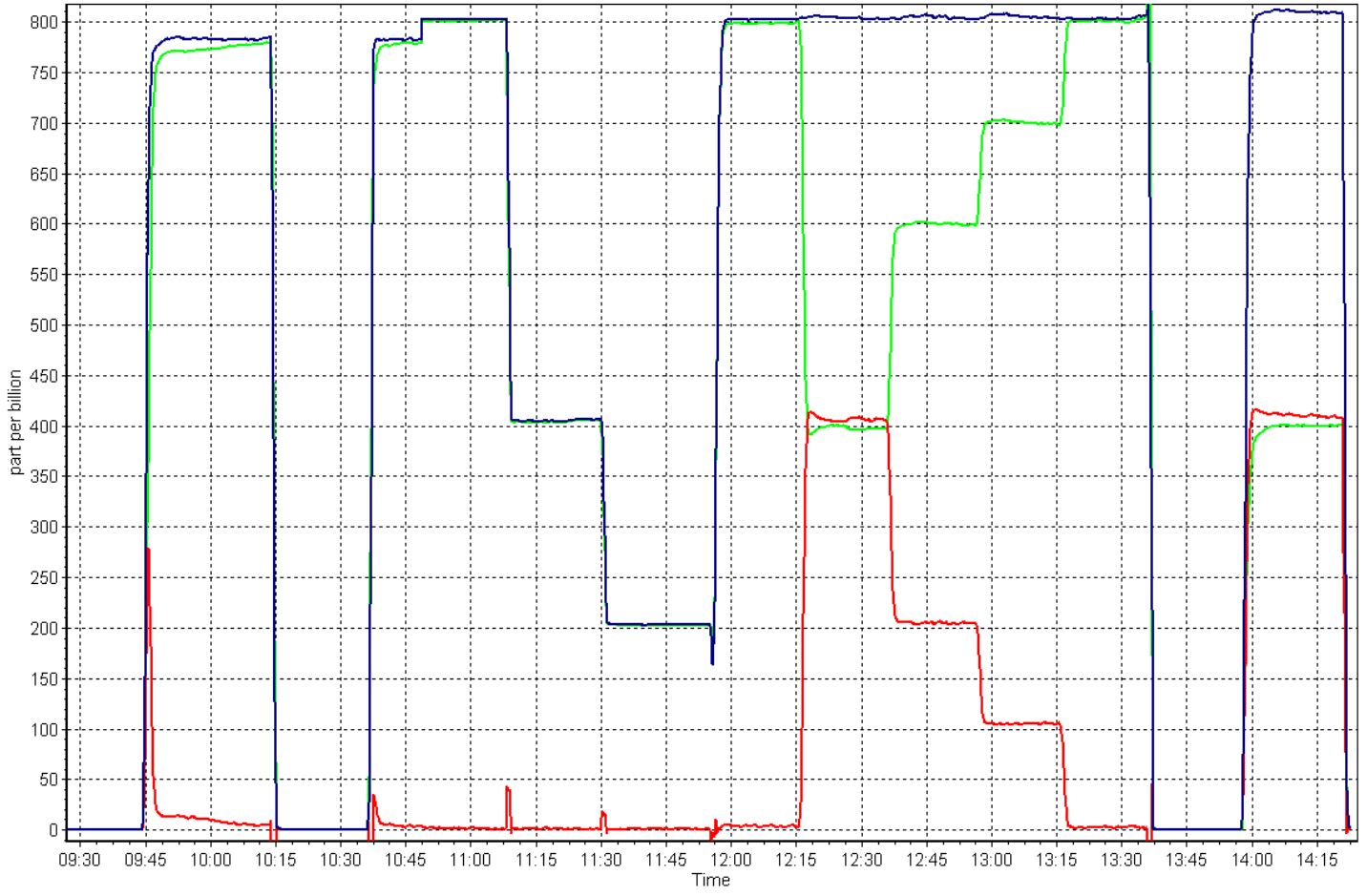
Calibration Date:	May 24, 2024	Previous Calibration:	April 9, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:20	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999955	≥0.995
800.3	801.1	0.9990	Slope	1.000699	0.90 - 1.10
400.2	405.5	0.9869	Intercept	1.891889	+/-20
200.1	202.4	0.9885			



NO_X Calibration Plot Date: May 24, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	May 6, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	11:00	End time (MST):	N/A
Reason:	As Found		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	T700	Serial Number:	3805
ZAG Make/Model:	T701H	Serial Number:	198

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999857	N/A	Backgd or Offset:	-1.6	N/A
Calibration intercept:	0.500000	N/A	Coeff or Slope:	1.549	N/A

O_3 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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-2.2	----
As found High point	5000	1523.6	400.0	398.4	0.999
As found Mid point	5000	1088.1	200.0	199.5	0.992
As found Low point	5000	880.5	100.0	100.1	0.978
Baseline Corr As found:	400.6	Previous response	400.4	*% change	0.0%
Baseline Corr 2nd AF pt:	201.7	AF Slope:	1.000057	AF Intercept:	-1.060000
Baseline Corr 3rd AF pt:	102.3	AF Correlation:	0.999963	* = > +/-5% change initiates investigation	

O_3 Calibration Data

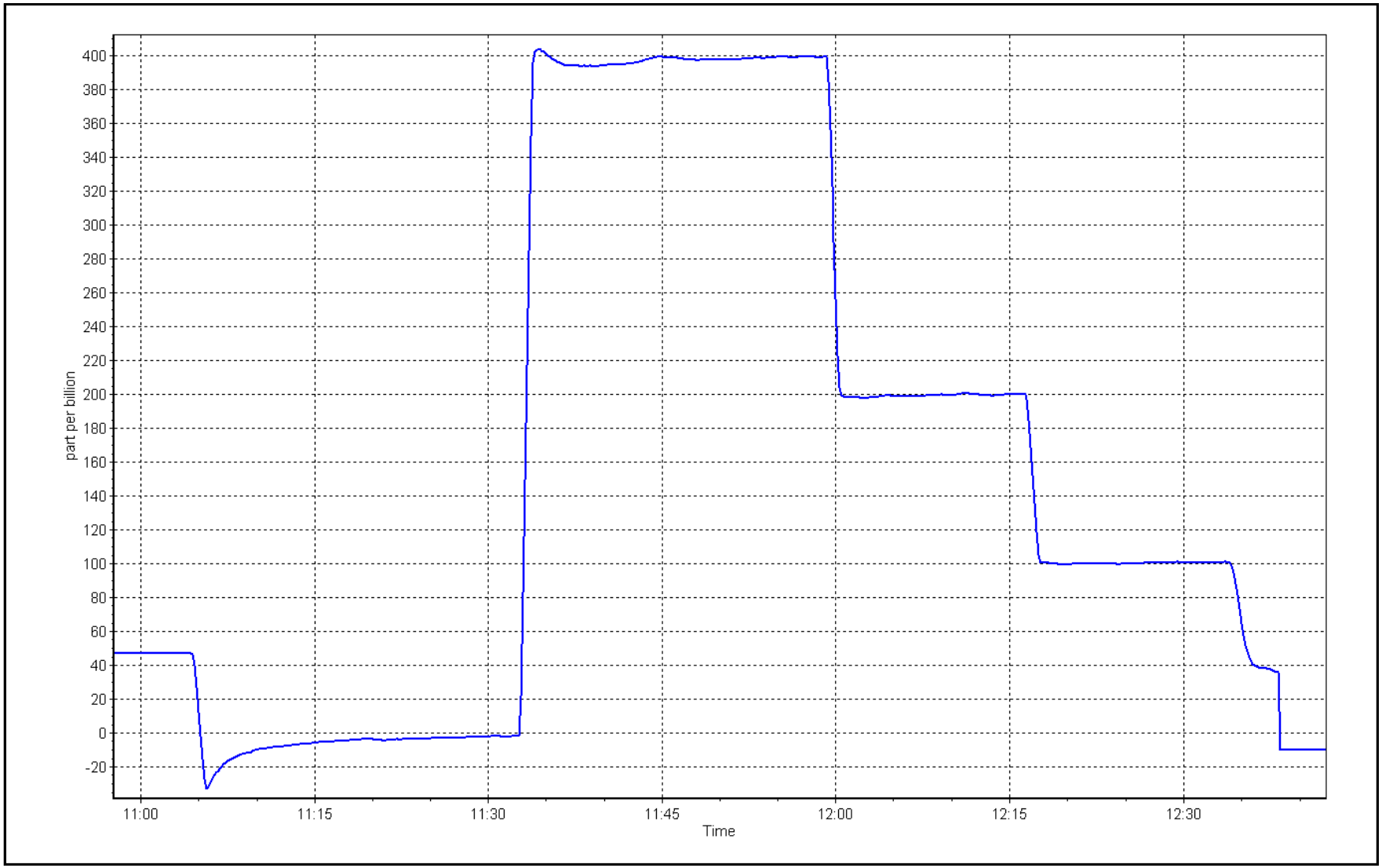
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes: As founds done before maintance.

Calibration Performed By: Aswin Sasi Kumar

O_3 Calibration Plot Date: May 6, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	May 7, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	9:30	End time (MST):	12:22
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	T700	Serial Number:	3805
ZAG Make/Model:	T701H	Serial Number:	198

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	N/A	1.001400	Backgd or Offset:	N/A	-1.7
Calibration intercept:	N/A	0.980000	Coeff or Slope:	N/A	1.549

O_3 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) *Limit = 0.90-1.10*
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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.6	----
High point	5000	1523.6	400.0	401.4	0.997
Mid point	5000	1088.1	200.0	201.3	0.994
Low point	5000	880.5	100.0	101.6	0.984
As left zero	5000	0.0	0.0	0.2	----
As left span	5000	1522.4	400.0	402.0	0.995
				Average Correction Factor	0.991

Notes: Reaction cells cleaned, "blue can" replaced, windows and gaskets swapped after multipoint as founds May 6, 2024. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

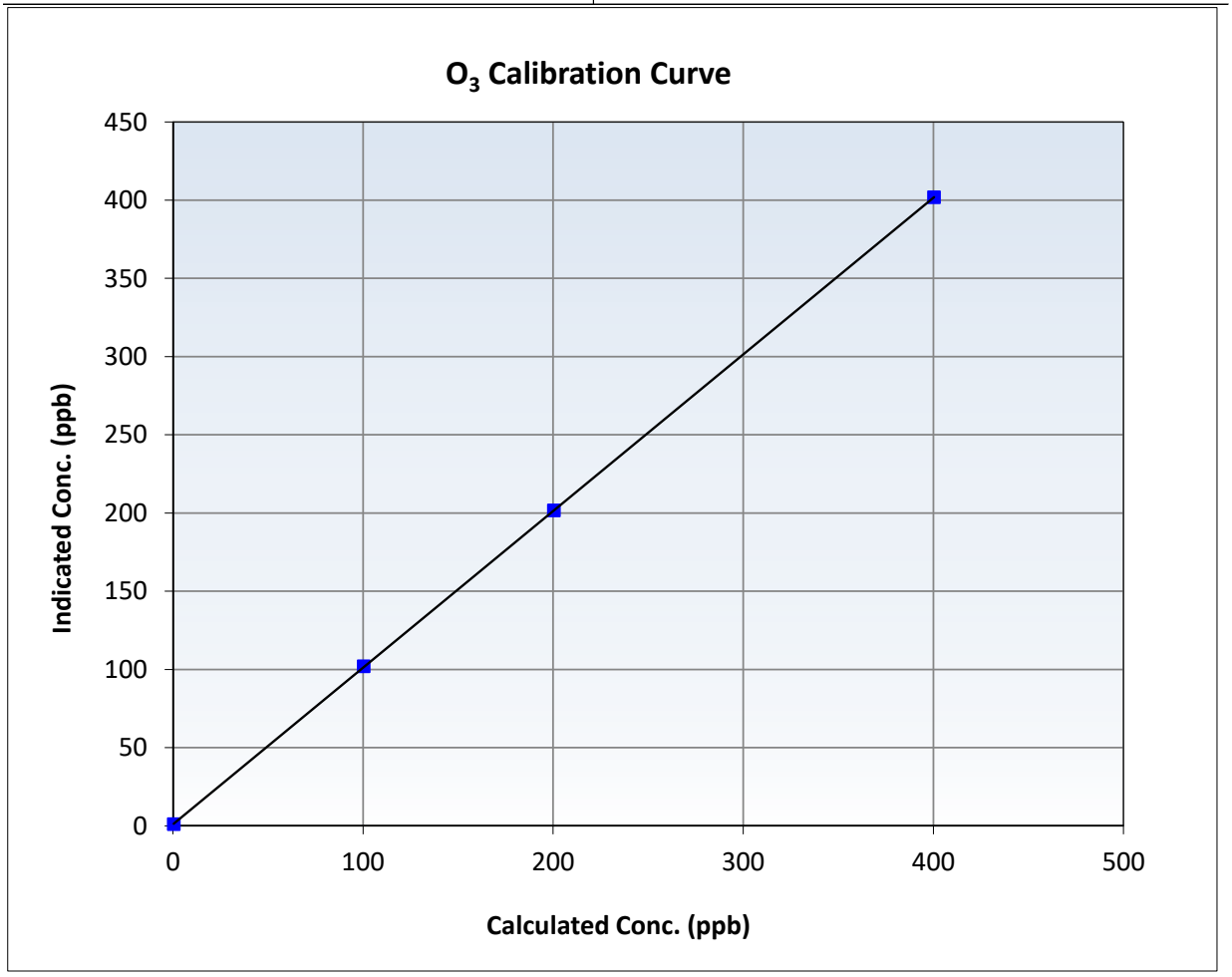
O_3 Calibration Summary

Station Information

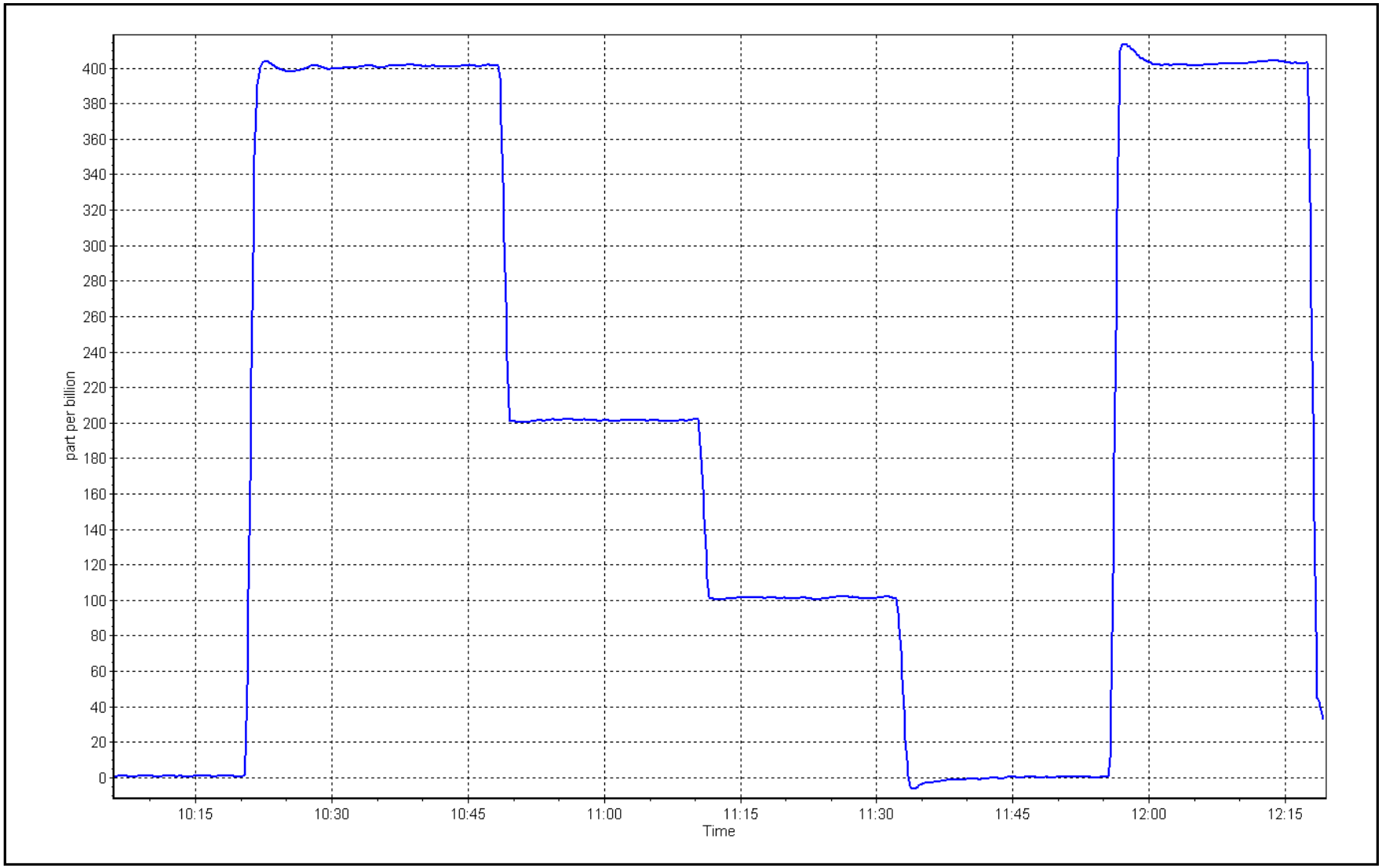
Calibration Date:	May 7, 2024	Previous Calibration:	April 12, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	9:30	End Time (MST):	12:22
Analyzer make:	Thermo 49i	Analyzer serial #:	1152220023

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.6	----	Correlation Coefficient	0.999995	*≥0.995*
400.0	401.4	0.9965	Slope	1.001400	*0.90 - 1.10*
200.0	201.3	0.9935			
100.0	101.6	0.9843	Intercept	0.980000	*+/- 5*



O_3 Calibration Plot Date: May 7, 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:	May 29, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	12:14	End time (MST):	13:01
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 (^{o}C)	16	15.59	16	☐	+/- 2 ^{o}C
P (mmHg)	728.6	727.06	728.6	☐	+/- 10 mmHg
Flow (LPM)	4.99	4.984	4.99	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>80%
Zero Verification	PM w/o HEPA:	12.4	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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: February 27, 2024

Date Disposable Filter Changed: February 27, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: December 5, 2022

Date RH/T Sensor Cleaned: December 5, 2022

Notes: No adjustments needed.

Calibration by: Mohammed Kashif

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	May 2, 2024	Last Cal Date:	April 22, 2024
Start time (MST):	11:20	End time (MST):	15:00
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3,000	ppm	Cal Gas Exp Date:	December 12, 2026
Cal Gas Cylinder #:	LL66942			
Removed Cal Gas Conc:	3,000	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3805
ZAG Make/Model:	API 700H		Serial Number:	198

Analyzer Information

Analyzer make:	Thermo 48i-TLE		Analyzer serial #:	1408761381	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.990260	0.998628	Backgd or Offset:	4.819	4.831
Calibration intercept:	0.092551	0.118562	Coeff or Slope:	1.087	1.095

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	40.0	39.7	1.013
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	39.51	Prev response:	39.73	*% 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	

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	40.0	40.0	1.000
Mid point	4967	33.3	20.0	20.2	0.989
Low point	4983	16.7	10.0	10.2	0.987
As left zero	5000	0.0	0.0	0.0	----
As left span	4933	66.7	40.0	40.0	1.001
				Average Correction Factor	0.992

Notes: Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

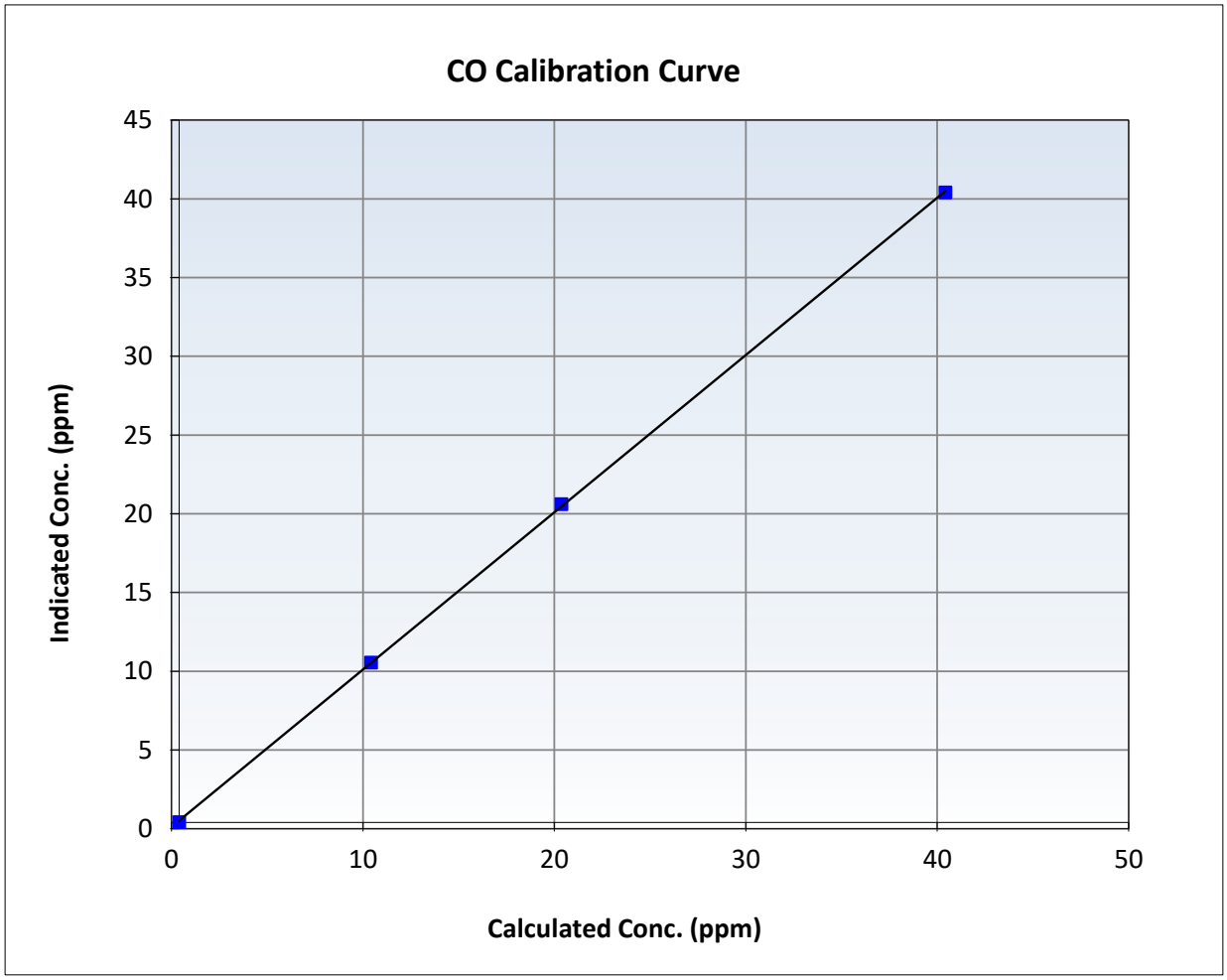
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 22, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	11:20	End Time (MST):	15:00
Analyzer make:	Thermo 48i-TLE	Analyzer serial #:	1408761381

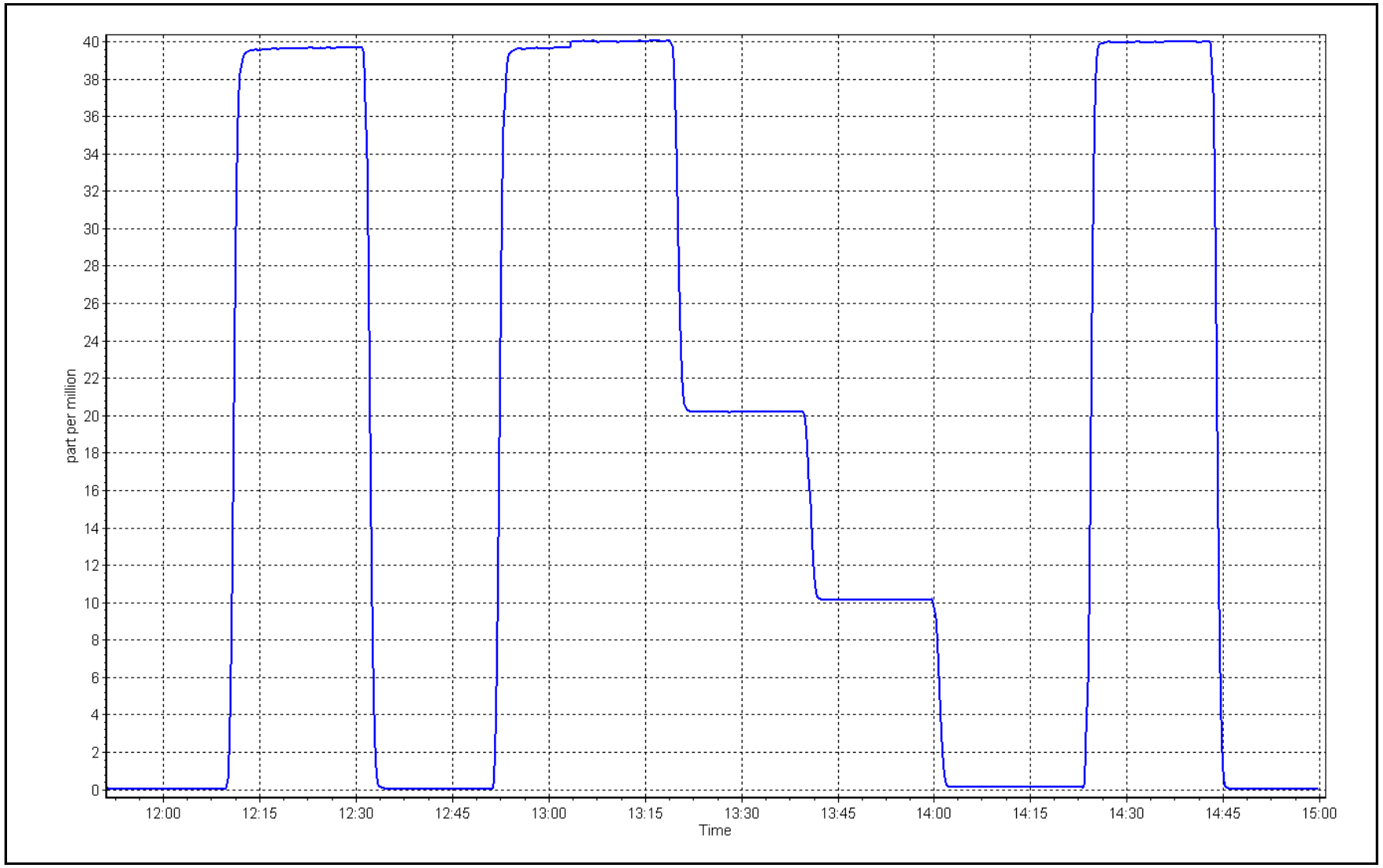
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.0	40.0	1.0003
20.0	20.2	0.9886
10.0	10.2	0.9873

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	0.998628	*0.90 - 1.10*
Intercept	0.118562	*+/-1.5*



CO Calibration Plot Date: May 2, 2024 Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS08
FORT CHIPEWYAN
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	May 14, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	12:29	End time (MST):	15:19
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999602	0.997919	Backgd or Offset:	1.8	1.8
Calibration intercept:	0.656198	1.195944	Coeff or Slope:	0.989	0.976

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4920	80.3	800.4	809.4	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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4920	80.3	800.4	799.6	1.001
Mid point	4960	40.2	400.7	400.6	1.000
Low point	4980	20.1	200.4	203.3	0.986
As left zero	5000	0.0	0.0	-0.3	----
As left span	4920	80.3	800.4	800.1	1.000
				Average Correction Factor:	0.996

Notes: Changed out inlet filter after as founds. adjustments made to span high point.

Calibration Performed By: Matthew Courtoreille, brett g, jeremy c.

Wood Buffalo Environmental Association

SO_2 Calibration Summary

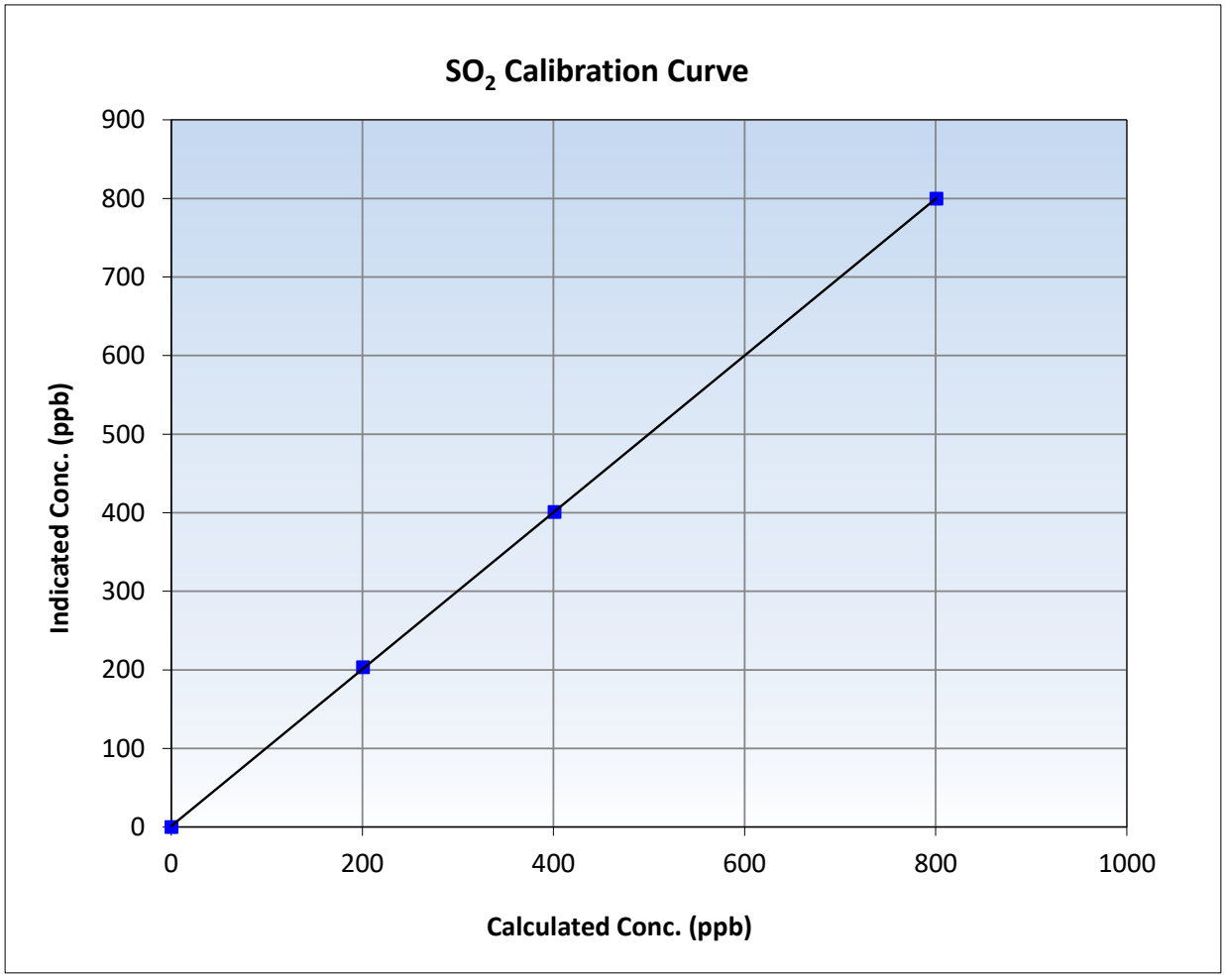
Station Information

Calibration Date:	May 14, 2024	Previous Calibration:	April 17, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	12:29	End Time (MST):	15:19
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

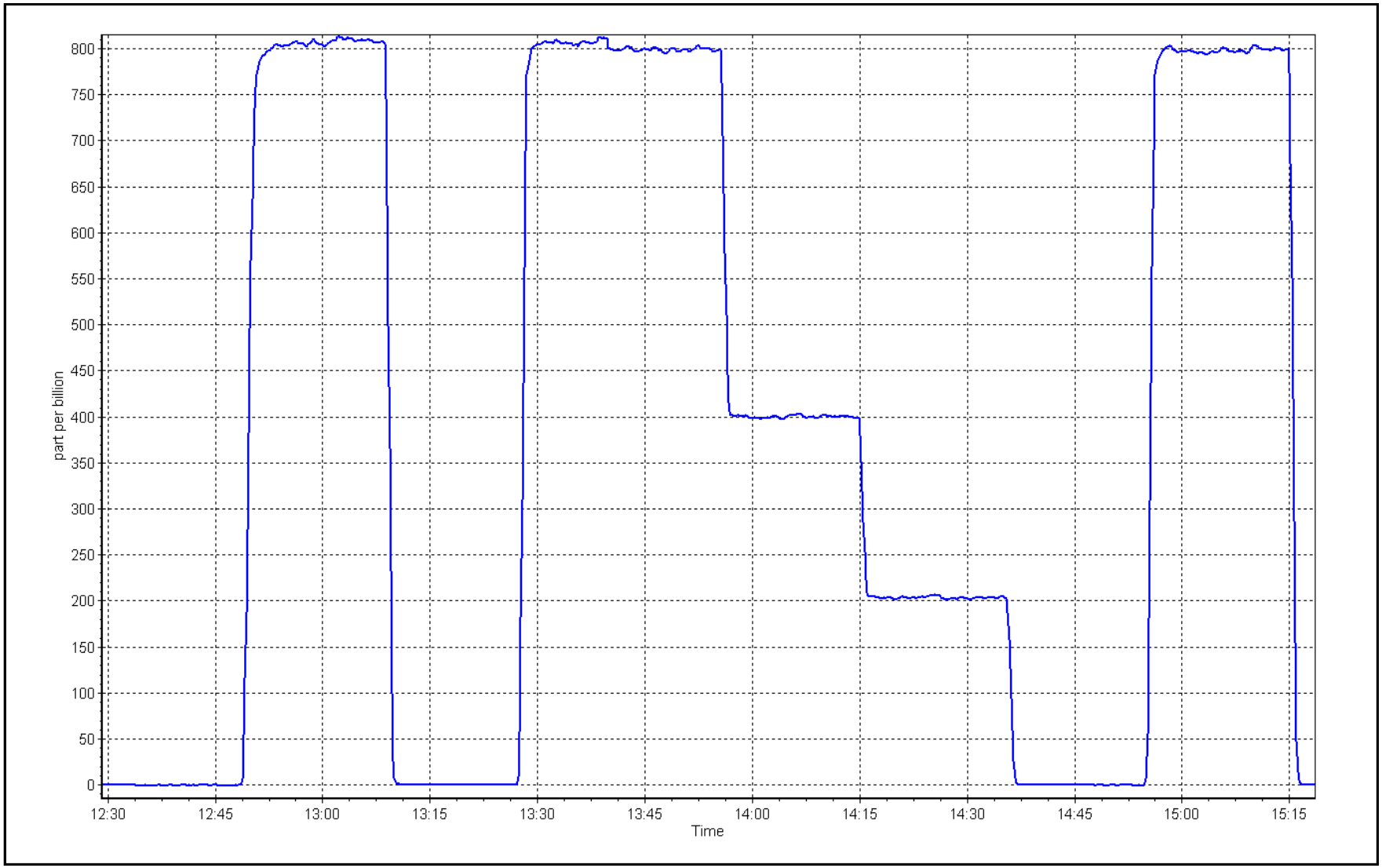
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
800.4	799.6	1.0010
400.7	400.6	1.0002
200.4	203.3	0.9855

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999980	*≥0.995*
Slope	0.997919	*0.90 - 1.10*
Intercept	1.195944	*+/-30*



SO2 Calibration Plot Date: May 14, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	May 27, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	9:20	End time (MST):	12:51
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:	834 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.007424	0.998848	Backgd or Offset:	1.0	1.0
Calibration intercept:	0.578976	0.879017	Coeff or Slope:	0.754	0.754

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.5	----
As found High point	4920	80.5	80.0	81.0	0.994
As found Mid point	4960	40.2	40.0	41.1	0.984
As found Low point	4980	20.1	20.0	20.8	0.984
New cylinder response					

Baseline Corr As found:	80.5	Prev response:	81.18	*% change:	-0.8%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.005851	AF Intercept:	0.658998
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999969	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4920	80.5	80.0	80.5	0.994
Mid point	4960	40.2	40.0	41.3	0.967
Low point	4980	20.1	20.0	21.0	0.951
As left zero	5000	0.0	0.0	0.6	----
As left span	4920	80.5	80.0		
SO2 Scrubber Check	4919.7	80.3	803.0	0.0	----

Date of last scrubber change:	7-Mar-22	Ave Corr Factor	0.971
Date of last converter efficiency test:	March 15, 2022	100.7%	efficiency

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

Calibration Performed By: Morgan Voyageur, Sabian Voyageur

Wood Buffalo Environmental Association

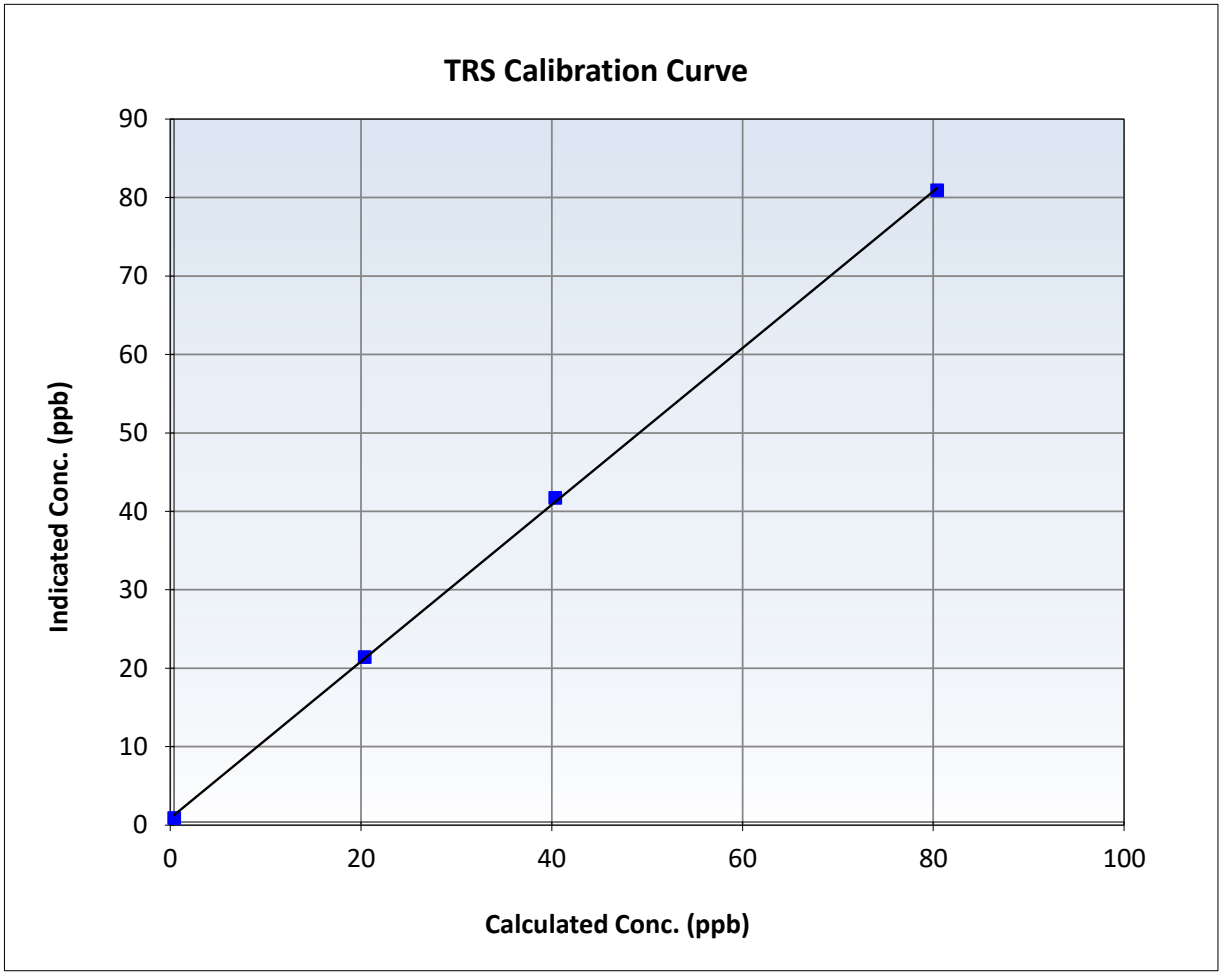
TRS Calibration Summary

Station Information

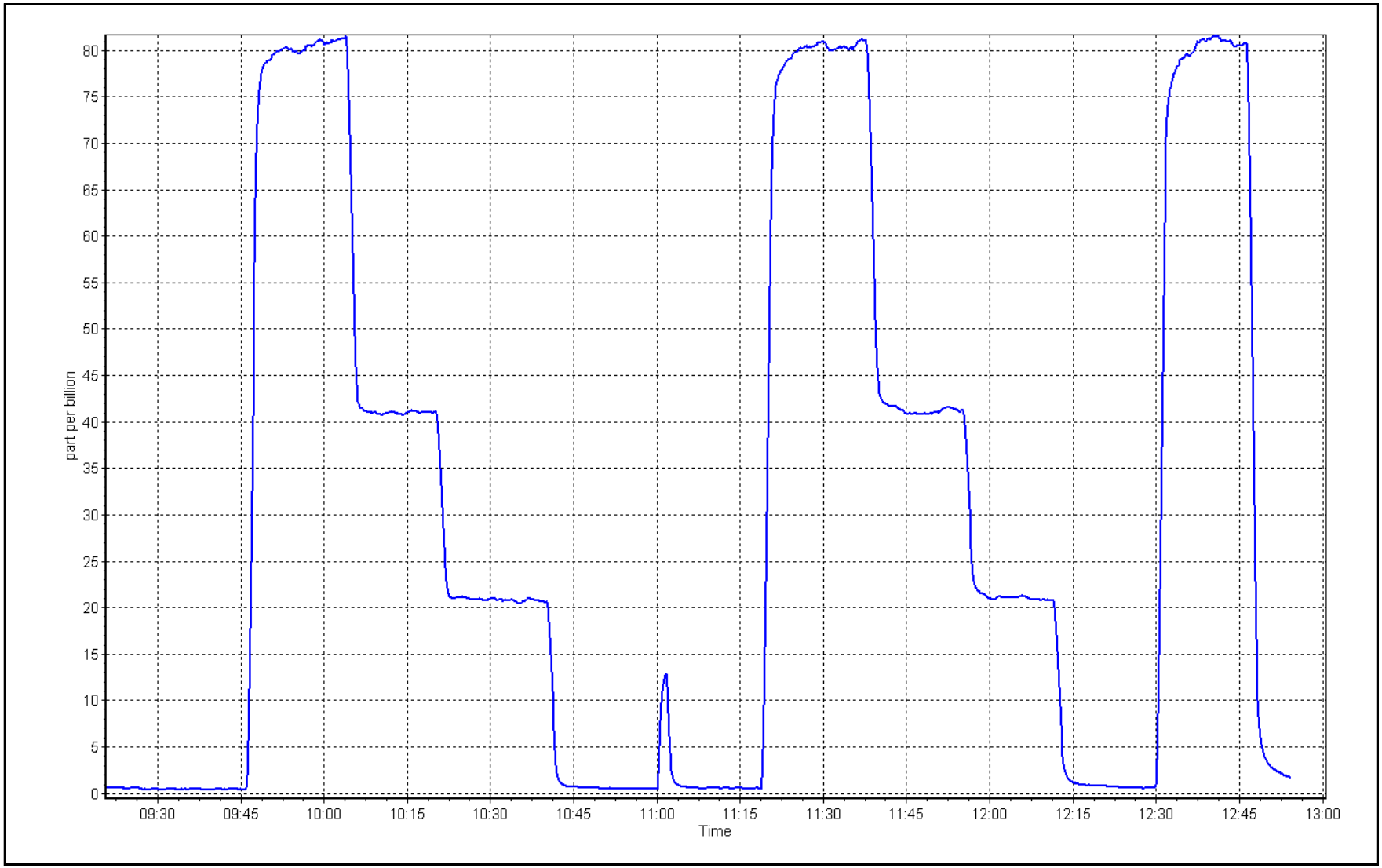
Calibration Date:	May 27, 2024	Previous Calibration:	April 18, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	9:20	End Time (MST):	12:51
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.5	----	Correlation Coefficient	0.999852	*≥0.995*
80.0	80.5	0.9939	Slope	0.998848	*0.90 - 1.10*
40.0	41.3	0.9675			
20.0	21.0	0.9514	Intercept	0.879017	*+/-3*



TRS Calibration Plot Date: May 27, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan
Station number:	AMS 08
Calibration Date:	May 30, 2024
Last Cal Date:	April 18, 2024
Start time (MST):	7:55
End time (MST):	12:06
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DTOO46831	Cal Gas Expiry Date:	January 9,2032
NOX Cal Gas Conc:	60.20 ppm	NO Cal Gas Conc:	60.00 ppm
Removed Cylinder #:	DT0046831	Removed Gas Exp Date:	January 9,2032
Removed Gas NOX Conc:	60.20 ppm	Removed Gas NO Conc:	60.00 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3252
ZAG make/model:	Teledyne API T701H	Serial Number:	135

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	1.4	1.4	0.0	----	----
AF High point	4933	66.7	803.1	800.4	2.7	804.1	798.8	5.2	1.0005	1.0038
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 805.4 ppb	NO = 797.1 ppb
Baseline Corr 1st pt	NO_X = 802.7 ppb	NO = 797.4 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.3%

*Percent Change NO = 0.0%

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: API T200 Serial Number: 4460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.231	1.231	NO bkgnd or offset:	2.5	2.5
NOX coeff or slope:	1.229	1.229	NOX bkgnd or offset:	2.2	2.2
NO2 coeff or slope:	1.000	2.100	Reaction cell Press:	-1.8	-1.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000160	1.000873
NO_X Cal Offset:	2.195593	3.095431
NO Cal Slope:	0.992944	0.997458
NO Cal Offset:	2.314346	2.334079
NO_2 Cal Slope:	0.997333	1.006095
NO_2 Cal Offset:	1.324008	0.117234

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	1.8	1.8	0.0	----	----
High point	4933	66.7	803.1	800.4	2.7	805.9	800.6	5.0	0.9965	0.9998
Mid point	4967	33.3	400.9	399.6	1.3	406.1	400.8	5.3	0.9872	0.9969
Low point	4983	16.7	201.1	200.4	0.7	204.9	203.0	1.9	0.9813	0.9872
As left zero	5000	0.0	0.0	0.0	0.0	1.6	1.7	-0.2	----	----
As left span	4933	66.7	803.1	395.9	407.2	802.0	395.9	406.1	1.0014	1.0000
							Average Correction Factor		0.9884	0.9946

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	802.1	397.6	407.2	409.9	0.9933	100.7%
Mid GPT point	802.1	602.7	202.1	202.9	0.9959	100.4%
Low GPT point	802.1	704.2	100.6	101.8	0.9879	101.2%
				Average Correction Factor	0.9924	100.8%

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

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

NO_X Calibration Summary

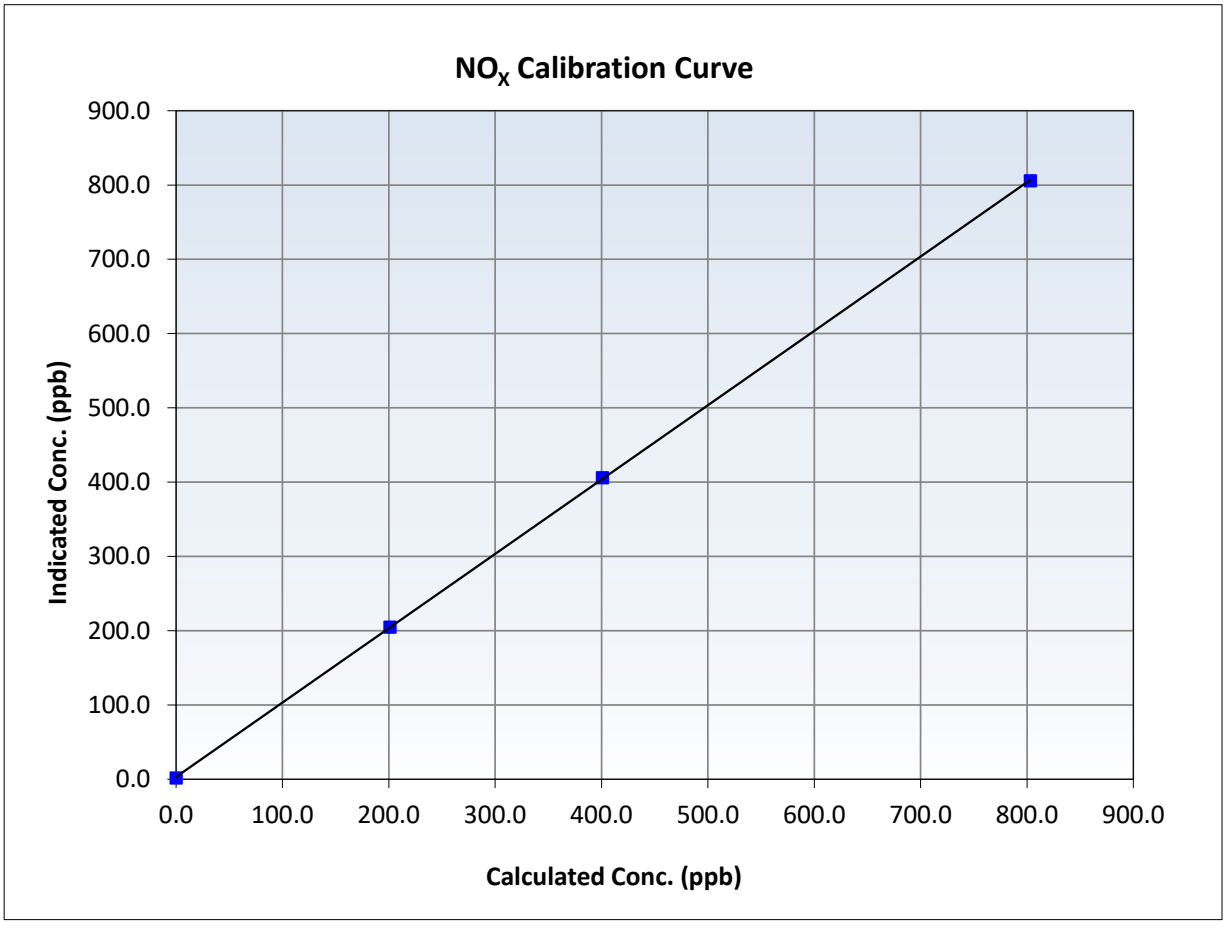
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 18, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	7:55	End Time (MST):	12:06
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.8	----
803.1	805.9	0.9965
400.9	406.1	0.9872
201.1	204.9	0.9813

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	1.000873	*0.90 - 1.10*
Intercept	3.095431	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

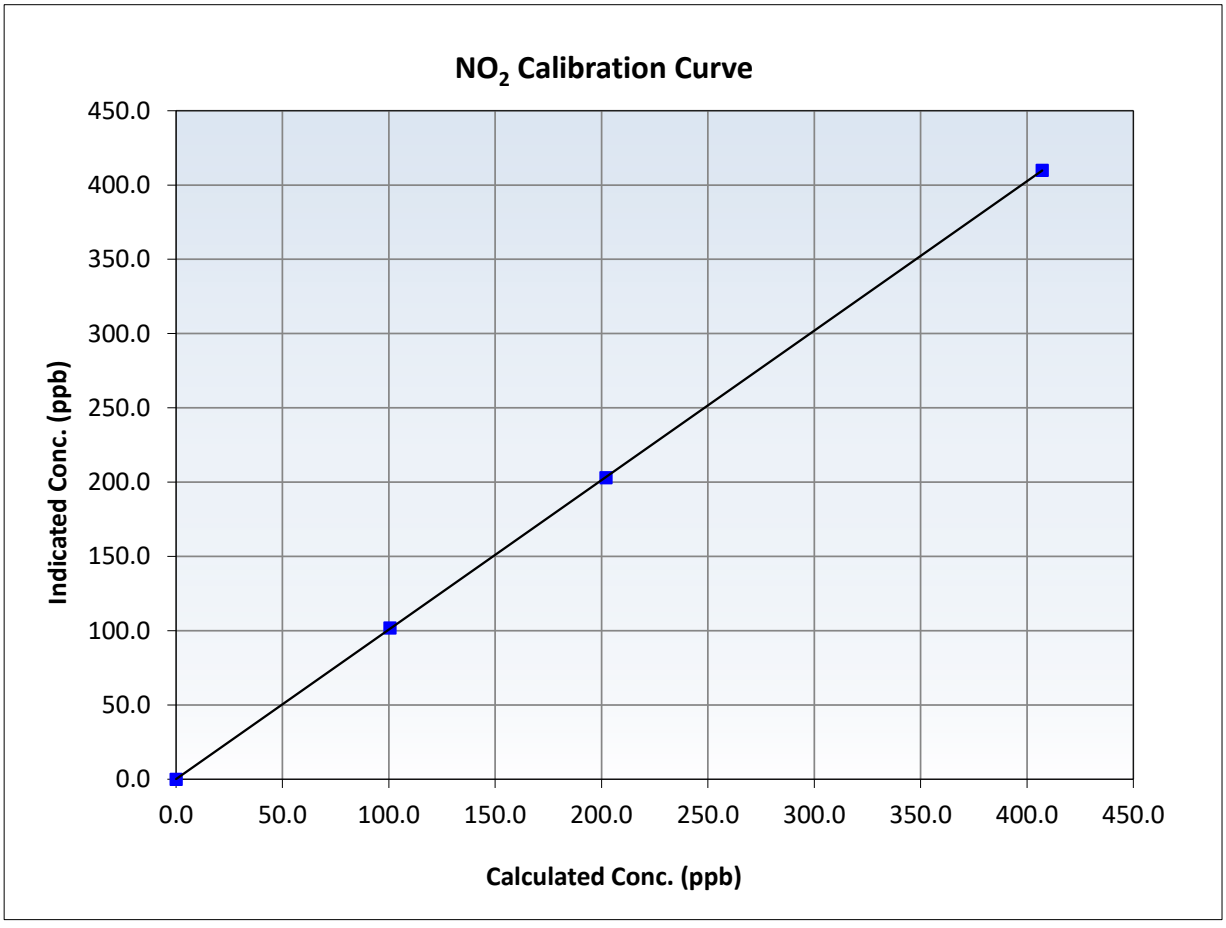
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 18, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	7:55	End Time (MST):	12:06
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
407.2	409.9	0.9933
202.1	202.9	0.9959
100.6	101.8	0.9879

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.006095	*0.90 - 1.10*
Intercept	0.117234	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

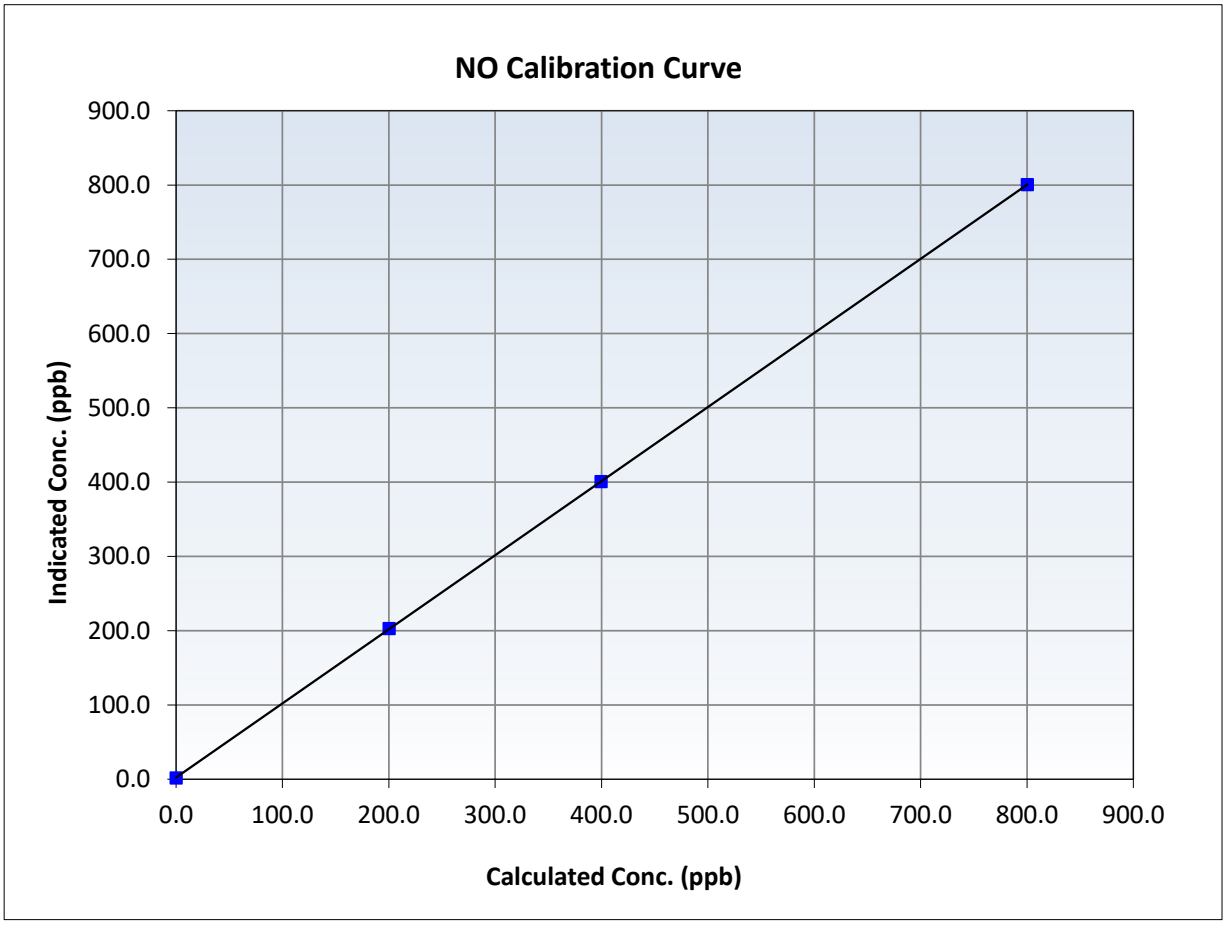
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 18, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	7:55	End Time (MST):	12:06
Analyzer make:	API T200	Analyzer serial #:	4460

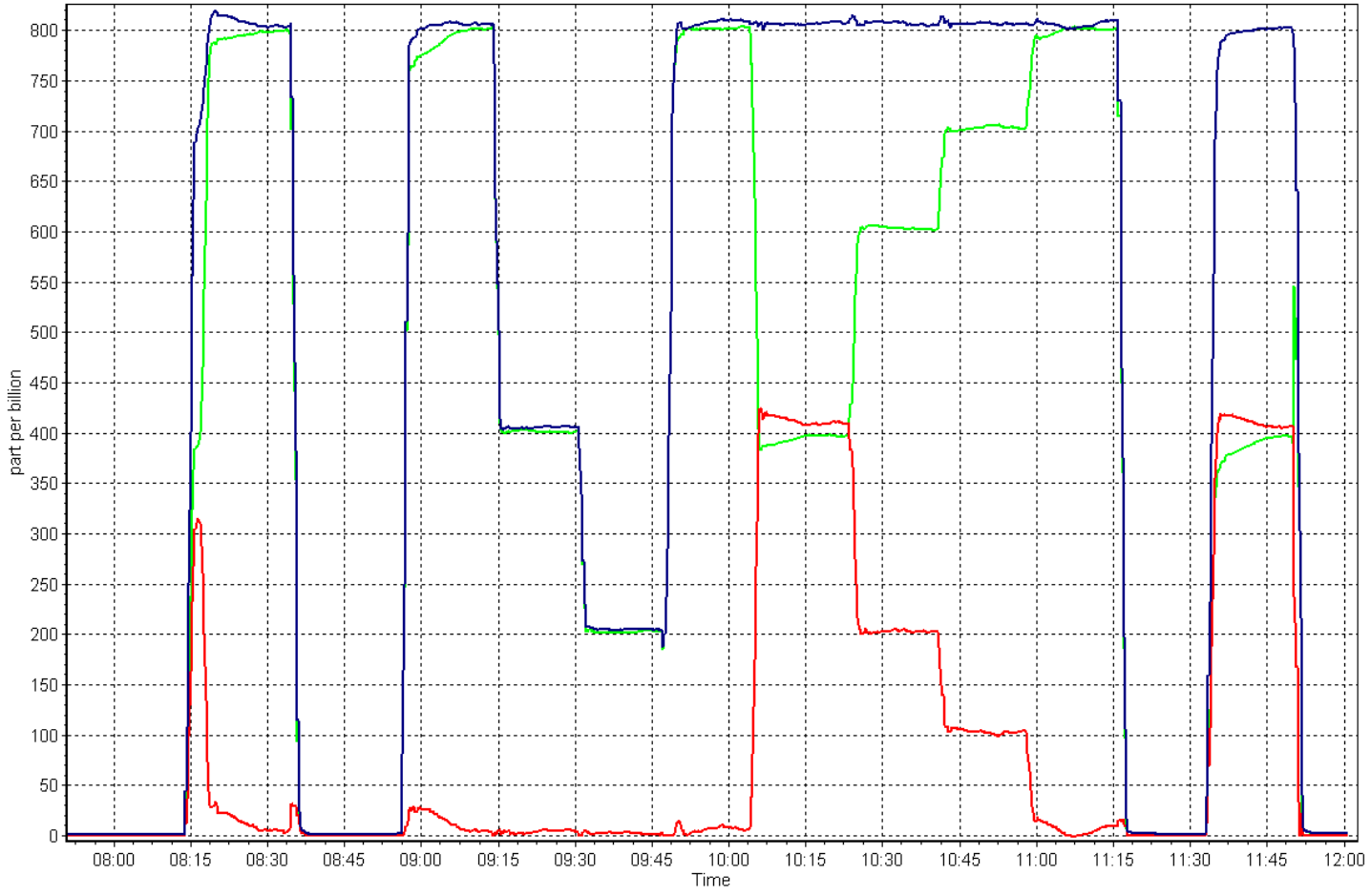
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.8	----
800.4	800.6	0.9998
399.6	400.8	0.9969
200.4	203.0	0.9872

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.997458	*0.90 - 1.10*
Intercept	2.334079	*+/-20*



NO_X Calibration Plot Date: May 30, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	May 10, 2024	Last Cal Date:	April 16, 2024
Start time (MST):	9:07	End time (MST):	11:53
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3252
ZAG Make/Model:	Teledyne API T701	Serial Number:	135

Analyzer Information

Analyzer make:	Teledyne API T400		Analyzer serial #:	3872	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999086	0.999829	Backgd or Offset:	-1.9	-1.9
Calibration intercept:	0.160000	-0.520000	Coeff or Slope:	1.019	1.011

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.4	----
As found High point	5000	913.0	400.0	403.0	0.994
As found Mid point					
As found Low point					
Baseline Corr As found:	402.6	Previous response	399.8	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.8	----
High point	5000	914.7	400.0	399.9	1.000
Mid point	5000	786.4	200.0	199.3	1.004
Low point	5000	701.3	100.0	97.8	1.022
As left zero	5000	0.0	0.0	-0.1	----
As left span	5000	963.3	400.0	401.9	0.995
				Average Correction Factor	1.009

Notes: Changed out inlet filter after as found. Made calibration zero run longer. Adjusted span high point.

Calibration Performed By: Matthew C

Wood Buffalo Environmental Association

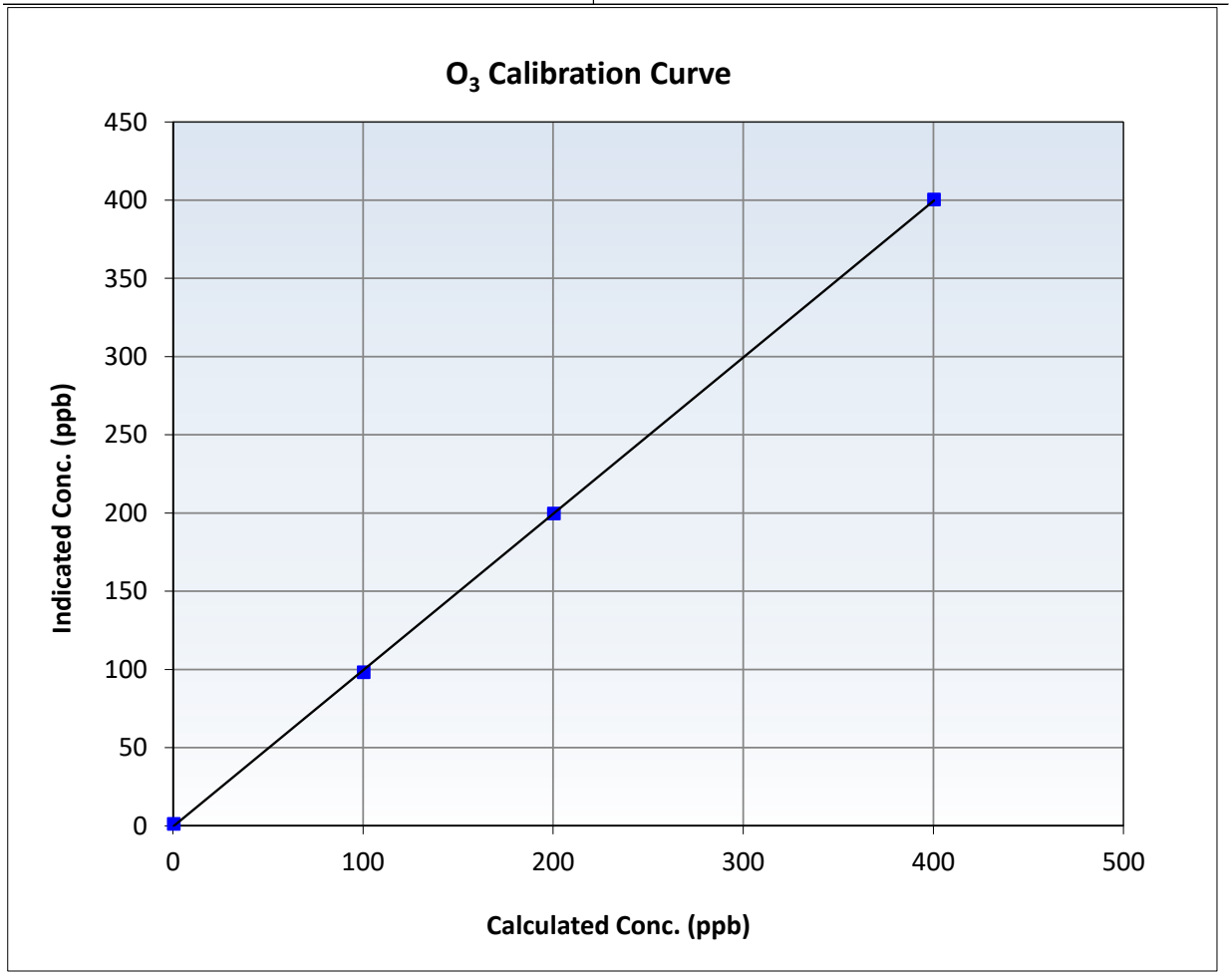
O_3 Calibration Summary

Station Information

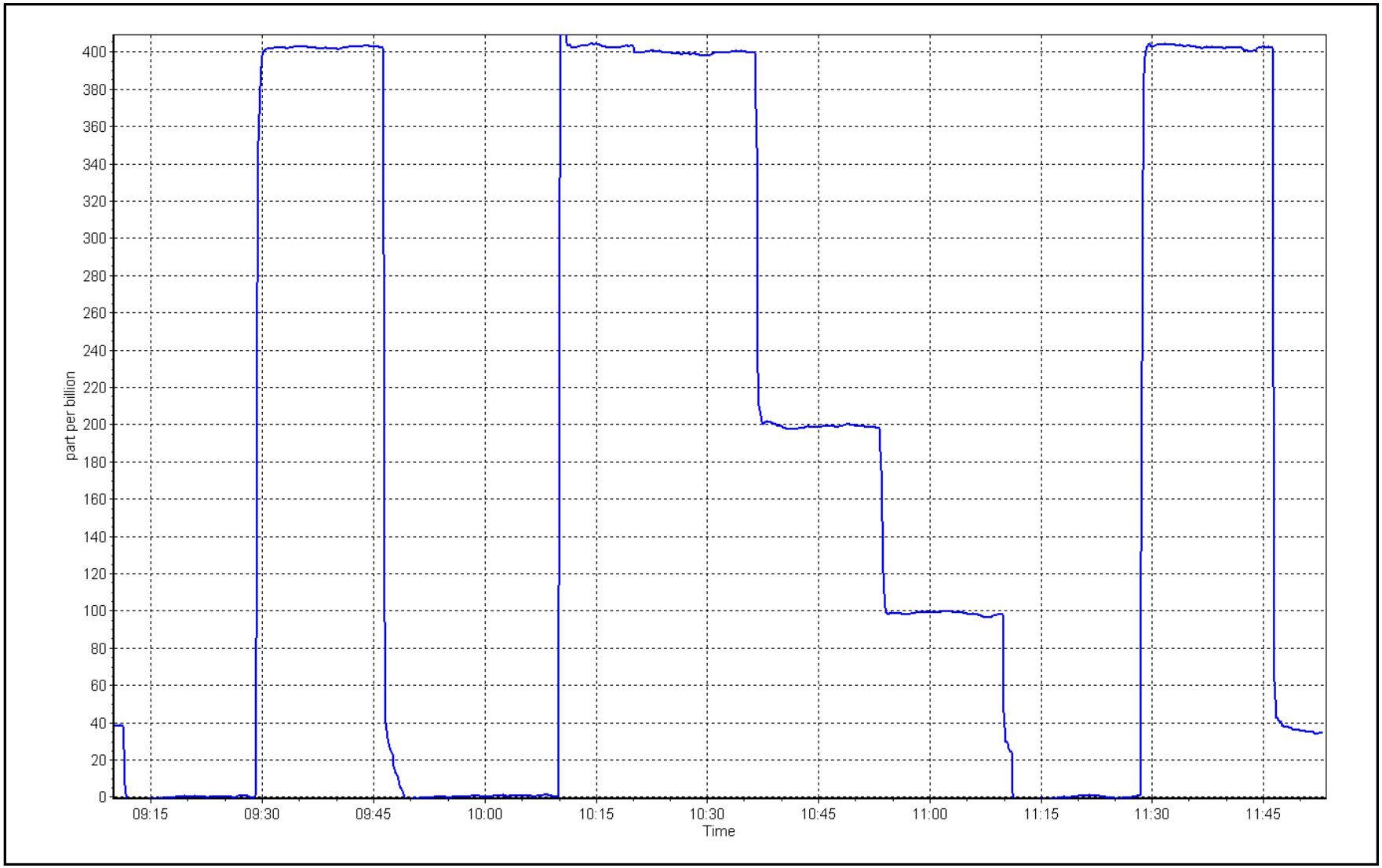
Calibration Date:	May 10, 2024	Previous Calibration:	April 16, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	9:07	End Time (MST):	11:53
Analyzer make:	Teledyne API T400	Analyzer serial #:	3872

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.8	----	Correlation Coefficient	0.999945	≥0.995
400.0	399.9	1.0003	Slope	0.999829	0.90 - 1.10
200.0	199.3	1.0035			
100.0	97.8	1.0225	Intercept	-0.520000	+/- 5



O_3 Calibration Plot Date: May 10, 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:	May 30, 2024	Last Cal Date:	April 29, 2024
Start time (MST):	10:05	End time (MST):	11:19
Analyzer Make:	Teledyne API T640	S/N:	319
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	10.70	11.12	10.70	☐	+/- 2 °C
P (mmHg)	727.10	729.51	727.10	☐	+/- 10 mmHg
Flow (LPM)	4.99	4.98	4.99	☐	+/- 0.25 LPM
PW% (pump)	38%			☐	>80%
Zero Verification	PM w/o HEPA:	6.60	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	9.91	0.00	10.80	☐	+/- 0.5

Date Optical Chamber Cleaned: May 30, 2024

Date Disposable Filter Changed: May 30, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: July 25, 2023

Date RH/T Sensor Cleaned: July 25, 2023

Notes: No adjustments needed.

Calibration by: Morgan Voyageur

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	May 13, 2024	Last Cal Date:	April 29, 2024
Start time (MST):	13:11	End time (MST):	15:59
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003563	0.994765	Backgd or Offset:	-0.015	-0.015
Calibration intercept:	0.210880	0.218907	Coeff or Slope:	1.007	1.003

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	0.1	----
As found High point	4934	66.7	40.4	40.8	0.994
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.67	Prev response:	40.77	*% 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	

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	0.1	----
High point	4934	66.7	40.4	40.3	1.002
Mid point	4966.7	33.3	20.2	20.4	0.989
Low point	4983.3	16.7	10.1	10.4	0.975
As left zero	5000	0.0	0.0	0.1	----
As left span	2960	40.0	40.4	40.2	1.005
				Average Correction Factor	0.989

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

Calibration Performed By: Matt c, jermey c, brett g.

Wood Buffalo Environmental Association

CO Calibration Summary

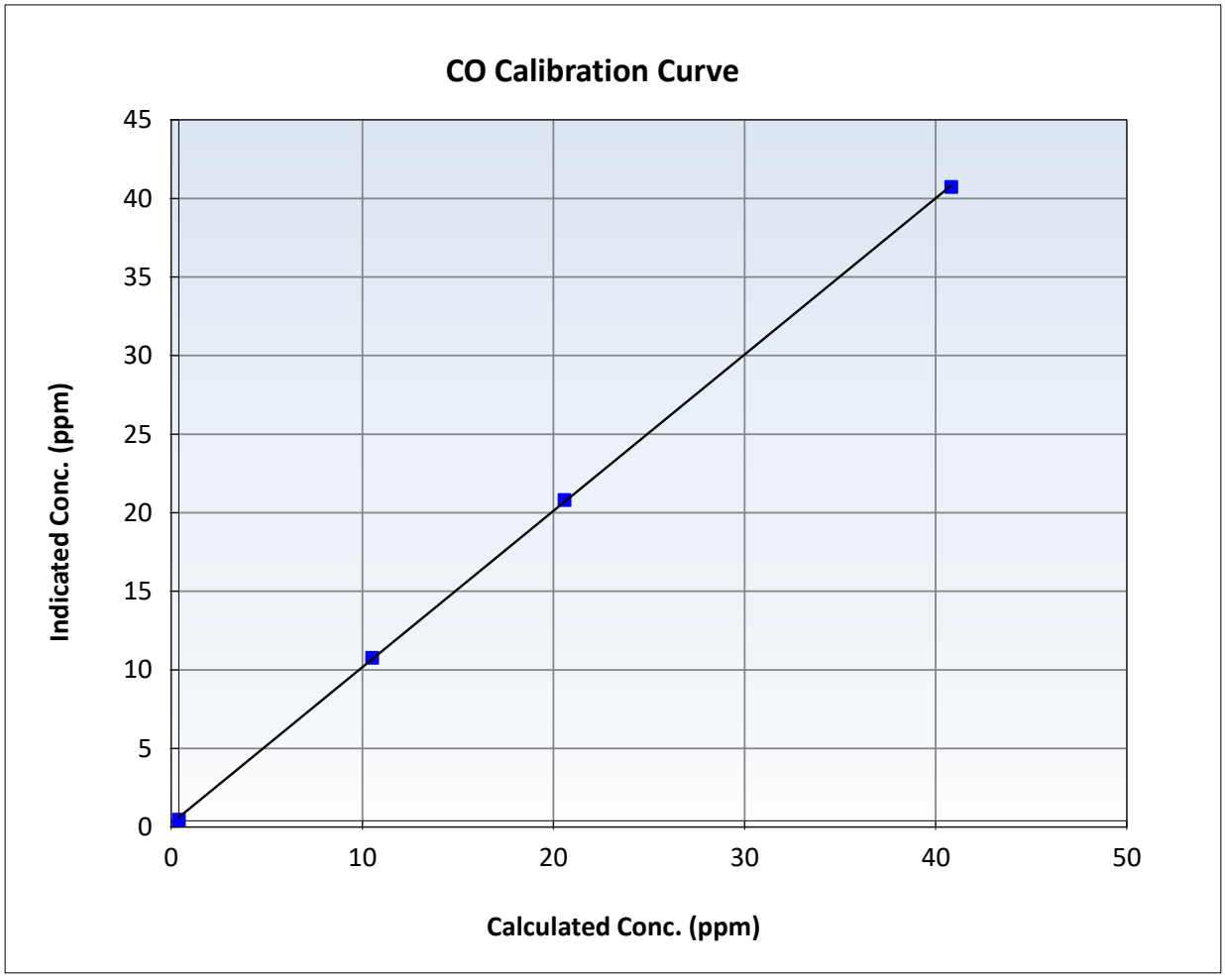
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 29, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	13:11	End Time (MST):	15:59
Analyzer make:	Teledyne API T300	Analyzer serial #:	3505

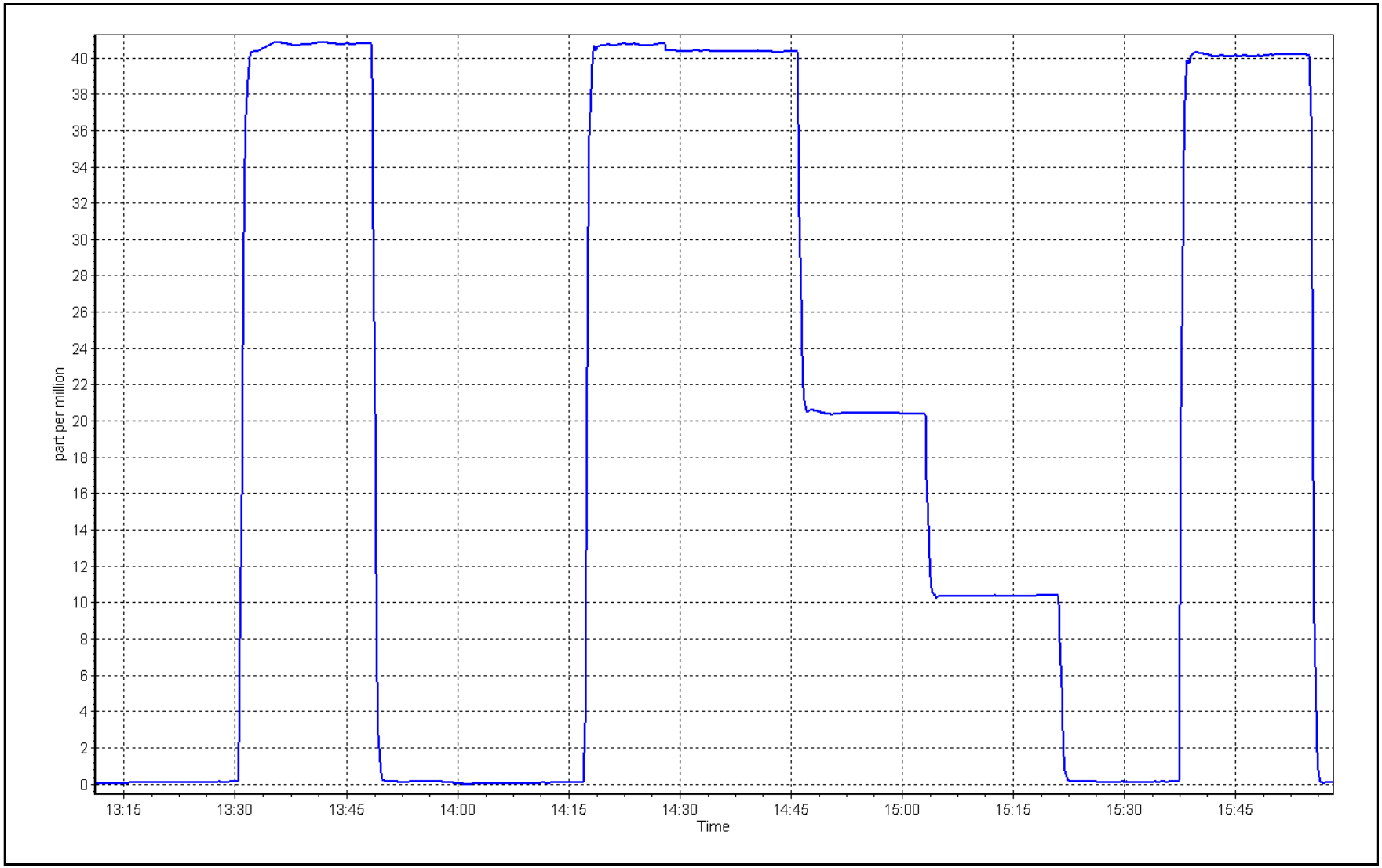
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
40.4	40.3	1.0018
20.2	20.4	0.9887
10.1	10.4	0.9750

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999948	*≥0.995*
Slope	0.994765	*0.90 - 1.10*
Intercept	0.218907	*+/-1.5*



CO Calibration Plot Date: May 13, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	May 16, 2024	Last Cal Date:	April 16, 2024
Start time (MST):	7:20	End time (MST):	11:51
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003378	1.000610	Backgd or Offset:	-0.063	-0.011
Calibration intercept:	-4.540000	-5.520000	Coeff or Slope:	1.087	1.033

CO_2 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	-5.0	----
As found High Point	2920	80.0	1605.9	1621.0	0.988
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1626.0	Prev response:	1606.8	*% change:	1.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO_2 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	-0.3	----
High point	2920	80.0	1605.9	1608.4	0.998
Mid point	2960	40.0	802.9	781.9	1.027
Low point	2980	20.0	401.5	399.9	1.004
As left zero	3000	0.0	0.0	-0.5	----
As left span	2960	40.0	802.9	781.7	1.027
				Average Correction Factor	1.010

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

Calibration Performed By: Matthew c, brett g, jeremy c.

Wood Buffalo Environmental Association

CO_2 Calibration Summary

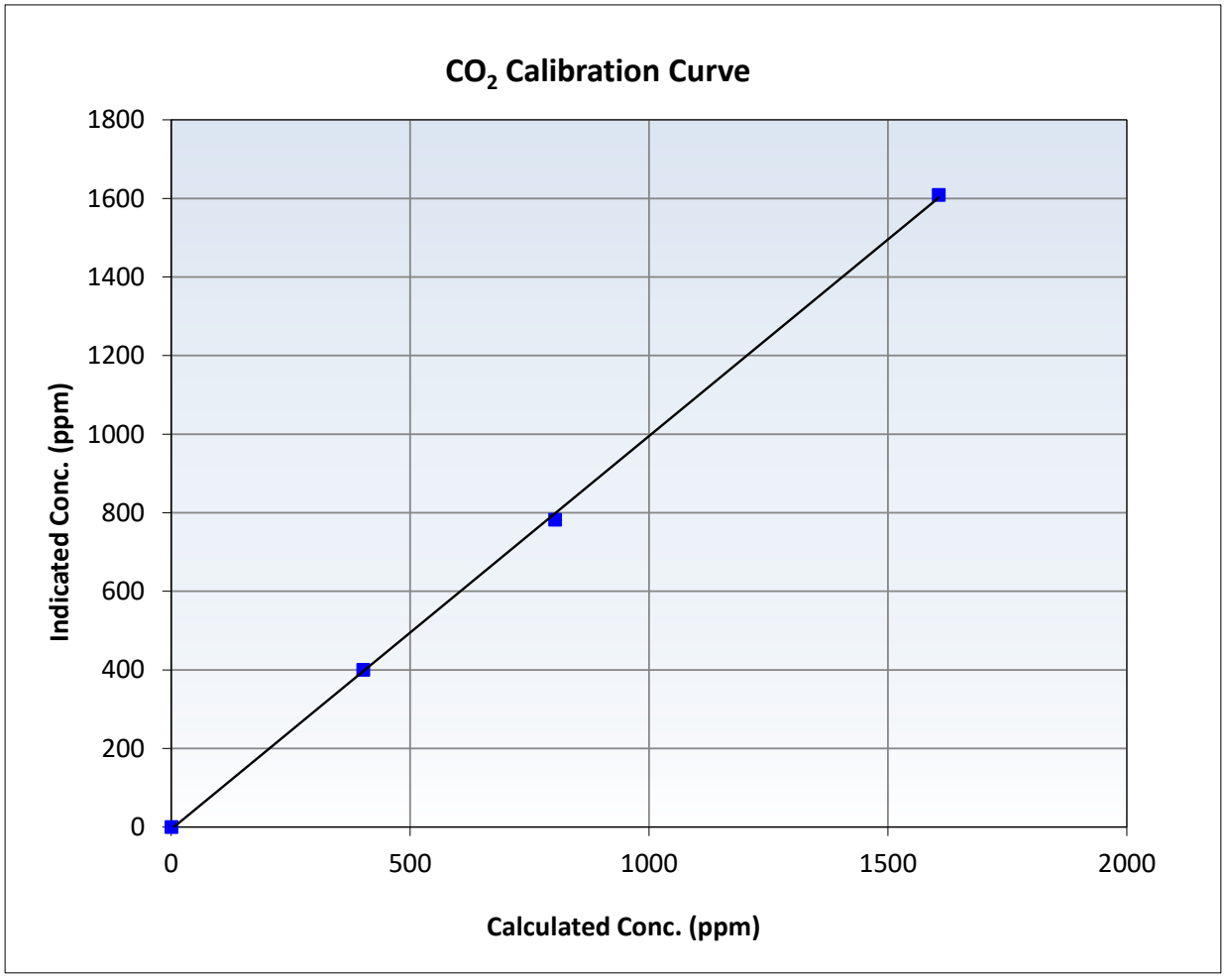
Station Information

Calibration Date	May 16, 2024	Previous Calibration	April 16, 2024
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	7:20	End Time (MST)	11:51
Analyzer make	Teledyne API T360	Analyzer serial #	289

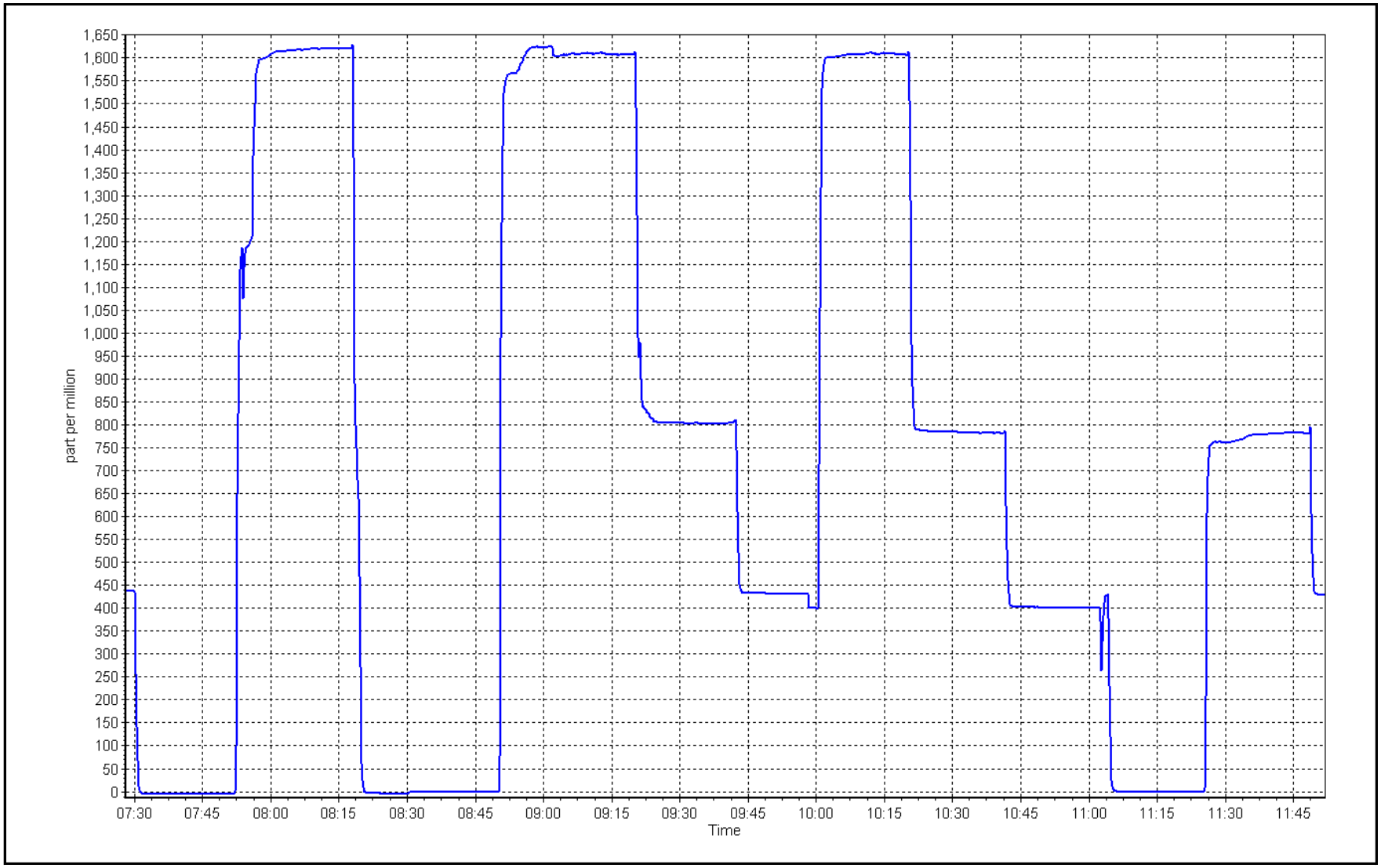
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
1605.9	1608.4	0.9984
802.9	781.9	1.0269
401.5	399.9	1.0039

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999754	*≥0.995*
Slope	1.000610	*0.90 - 1.10*
Intercept	-5.5	*+/-20*



CO_2 Calibration Plot Date: May 16, 2024 Location: Fort Chipewyan



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09
BARGE LANDING
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 13, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	10:01	End time (MST):	13:51
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997204	0.996431	Backgd or Offset:	10.1	10.3
Calibration intercept:	0.710524	0.426529	Coeff or Slope:	0.956	0.968

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4919	80.2	801.5	798.1	1.005
As found Mid point	4960	40.1	400.7	398.5	1.006
As found Low point	4980	20.0	199.8	198.5	1.008
New cylinder response					
Baseline Corr As found:	797.8	Previous response	800.0	*% change	-0.3%
Baseline Corr 2nd AF pt:	398.2	AF Slope:	0.995620	AF Intercept:	-0.114112
Baseline Corr 3rd AF pt:	198.2	AF Correlation:	0.999999	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4919	80.2	801.5	799.2	1.003
Mid point	4960	40.1	400.7	399.1	1.004
Low point	4980	20.0	199.8	200.1	0.999
As left zero	5000	0.0	0.0	0.5	----
As left span	4919	80.2	801.5	800.2	1.002
				Average Correction Factor:	1.002

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

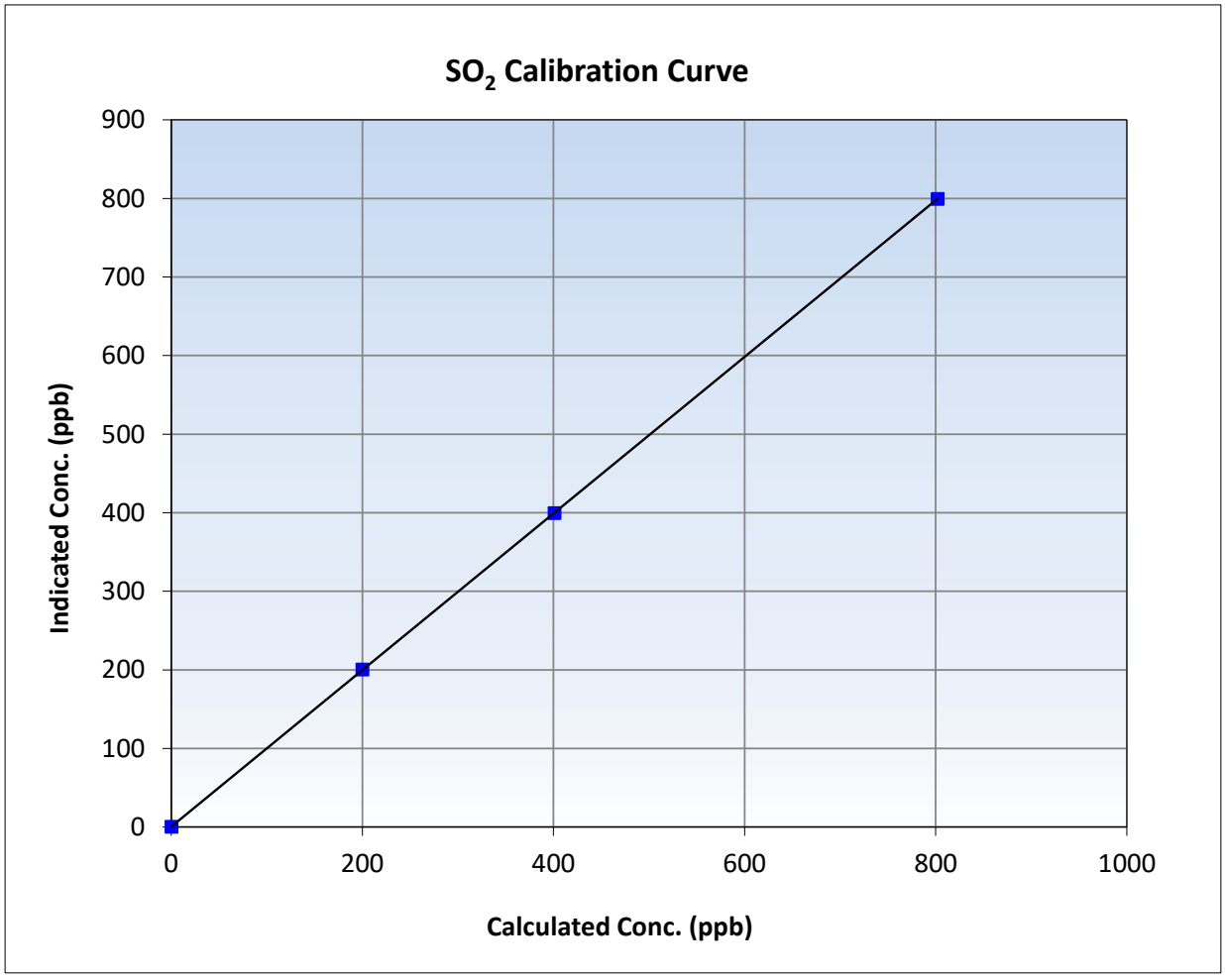
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 2, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	10:01	End Time (MST):	13:51
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

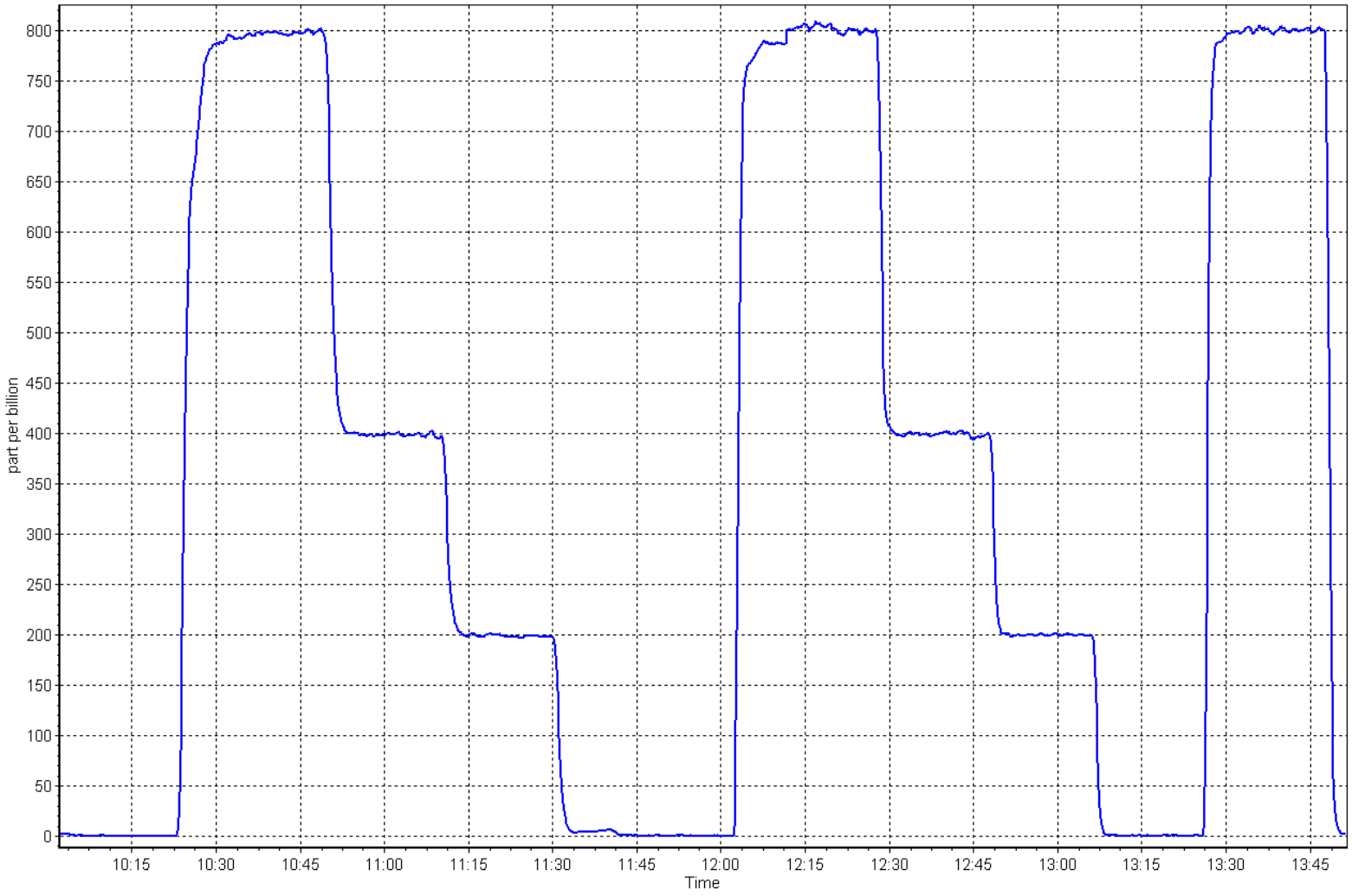
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
801.5	799.2	1.0029
400.7	399.1	1.0039
199.8	200.1	0.9987

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	0.996431	*0.90 - 1.10*
Intercept	0.426529	*+/-30*



SO2 Calibration Plot Date: May 13, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 14, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	8:48	End time (MST):	11:00
Reason:	As Found		

Calibration Standards

Cal Gas Concentration:	5.17	ppm	Cal Gas Exp Date:	August 22, 2026
Cal Gas Cylinder #:	CC511415			
Removed Cal Gas Conc:	5.17	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3812
ZAG Make/Model:	API T701		Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1331259320
Converter make:	CDN-101		Converter serial #:	519
Analyzer Range	0 - 100 ppb		Converter Temp:	830 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.990985		Backgd or Offset:	2.830	2.830
Calibration intercept:	0.059198		Coeff or Slope:	1.170	1.170

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4923	77.4	80.0	78.3	1.022
As found Mid point	4961	38.7	40.0	39.2	1.021
As found Low point	4981	19.3	20.0	19.5	1.024
New cylinder response					

Baseline Corr As found:	78.3	Prev response:	79.38	*% change:	-1.4%
Baseline Corr 2nd AF pt:	39.2	AF Slope:	0.978423	AF Intercept:	-0.001033
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999999	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point					
Mid point					
Low point					
As left zero					
As left span					
SO2 Scrubber Check					

Date of last scrubber change:

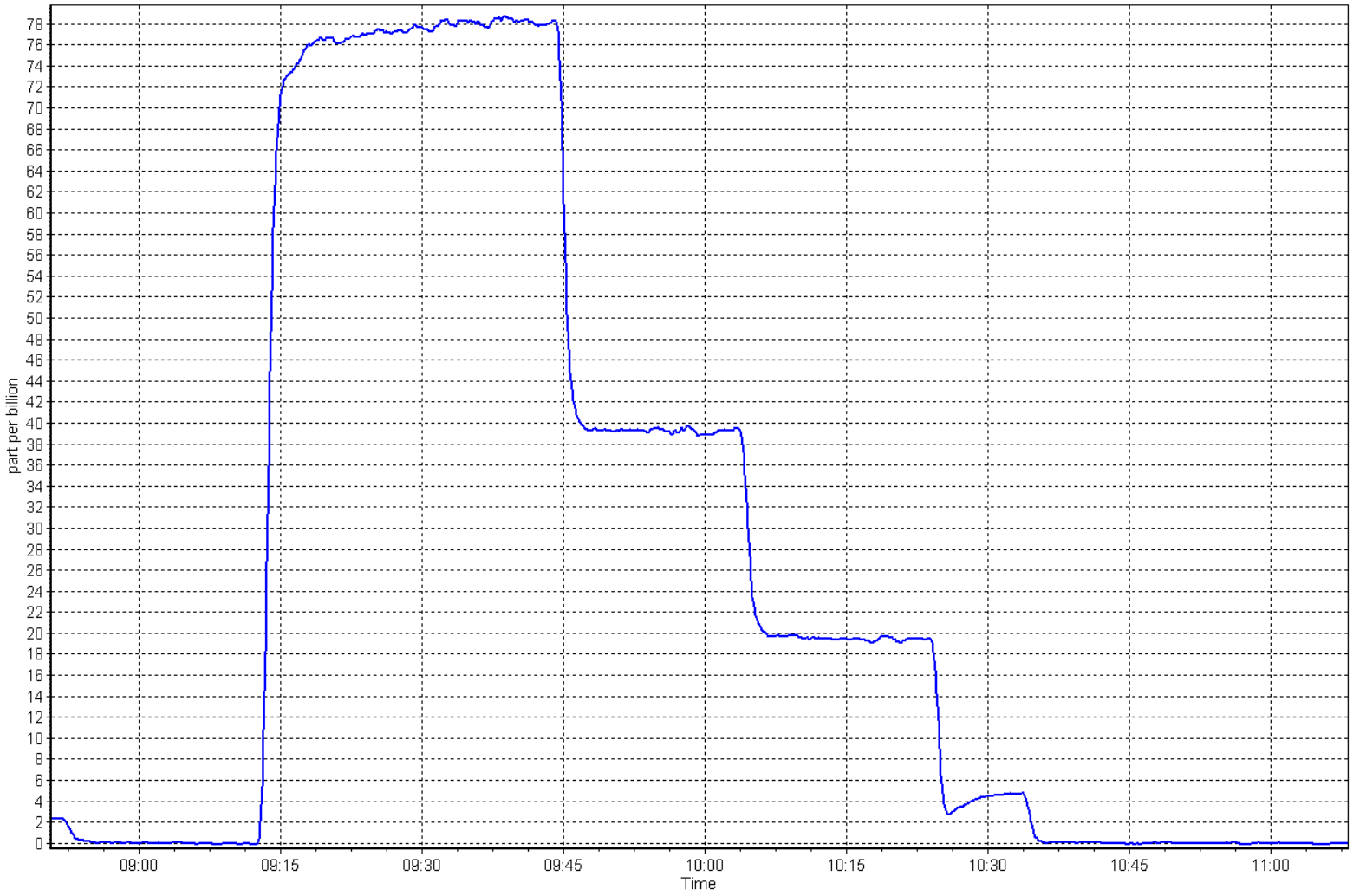
Ave Corr Factor

Date of last converter efficiency test:

Notes: Changed inlet filter after as founds. Pump was changed due to low flow.

Calibration Performed By: Sean Bala

TRS Calibration Plot Date: May 14, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 15, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	6:45	End time (MST):	9:29
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.17	ppm	Cal Gas Exp Date:	August 22, 2026
Cal Gas Cylinder #:	CC511415			
Removed Cal Gas Conc:	5.17	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3812
ZAG Make/Model:	API T701		Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1331259320
Converter make:	CDN-101		Converter serial #:	519
Analyzer Range	0 - 100 ppb		Converter Temp:	830 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.990985	0.968001	Backgd or Offset:	2.830	2.830
Calibration intercept:	0.059198	0.038801	Coeff or Slope:	1.170	1.170

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4923	77.4	80.0	77.5	1.033
Mid point	4961	38.7	40.0	38.8	1.032
Low point	4981	19.3	20.0	19.4	1.029
As left zero	5000	0.0	0.0	0.0	----
As left span	4923	77.4	80.0	77.4	1.034
SO2 Scrubber Check	4920	80.2	802.0	-0.1	----
Date of last scrubber change:				Ave Corr Factor	1.031
Date of last converter efficiency test:					

Notes: No as founds as it was done yesterday. Filter was changed yesterday as well. No adjustment made.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

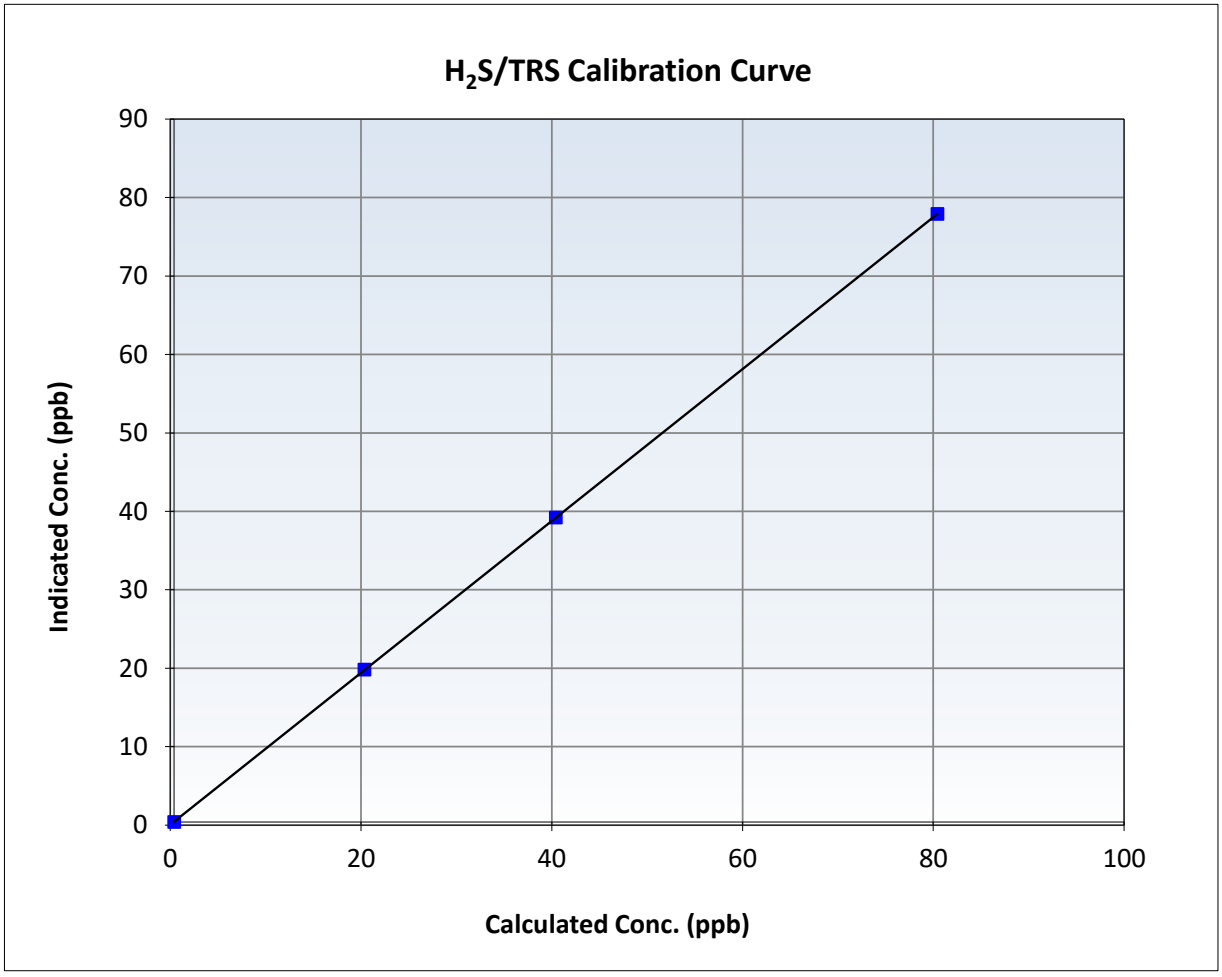
TRS Calibration Summary

Station Information

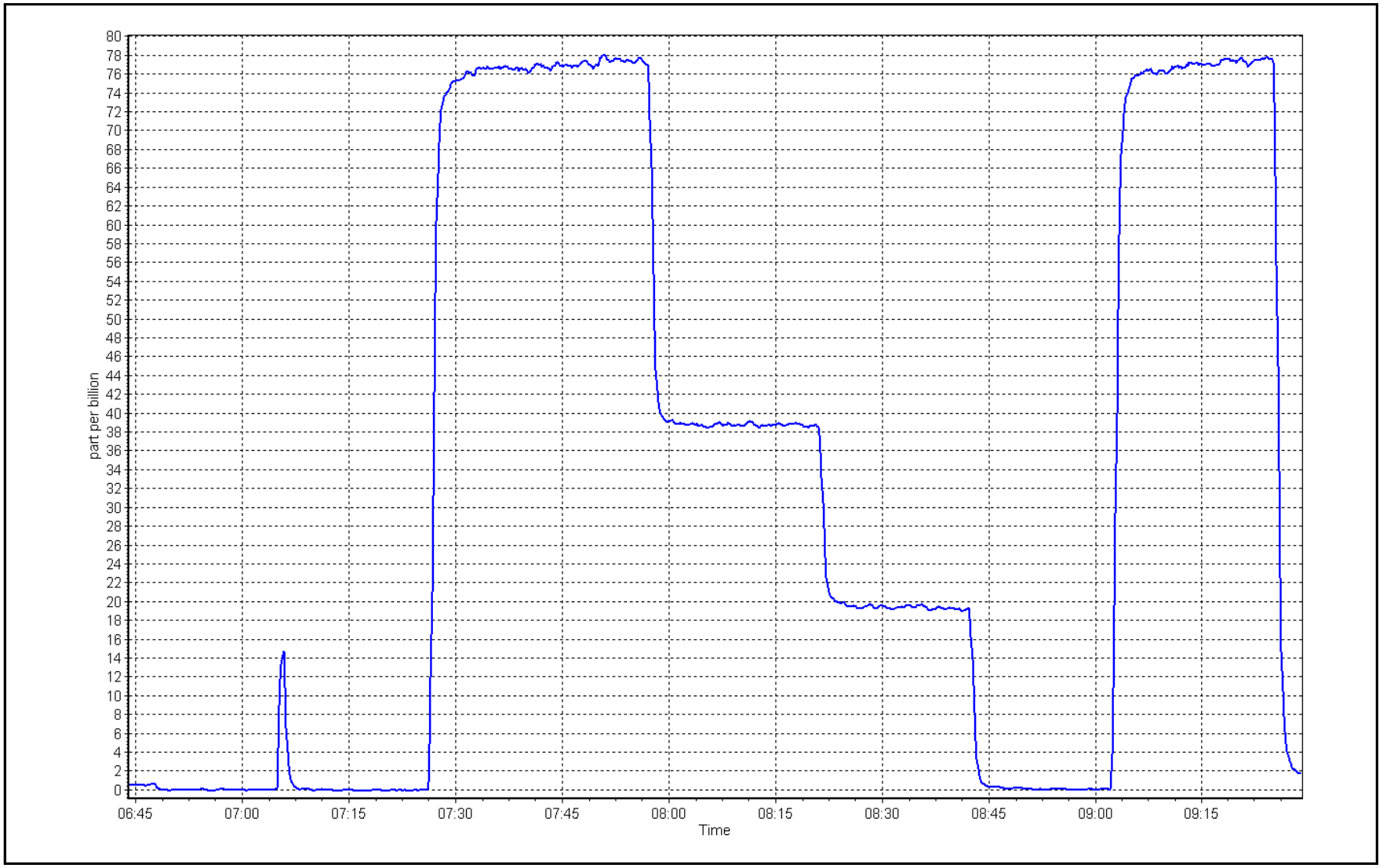
Calibration Date:	May 15, 2024	Previous Calibration:	April 3, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	6:45	End Time (MST):	9:29
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999999	*≥0.995*
80.0	77.5	1.0328	Slope	0.968001	*0.90 - 1.10*
40.0	38.8	1.0316			
20.0	19.4	1.0288	Intercept	0.038801	*+/-3*



TRS Calibration Plot Date: May 15, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 8, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	8:48	End time (MST):	12:47
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:	CC151285	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3812
Zero Air Gen model:	APIT701	Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.60E-04	2.96E-04	NMHC SP Ratio:	4.50E-05	5.00E-05
CH4 Retention time:	15.20	16.00	NMHC Peak Area:	205331	182732
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	12.37	1.384
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	12.37	Prev response	17.14	*% change	-38.5%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.20	0.995
Mid point	4960	40.1	8.56	8.63	0.992
Low point	4980	20.0	4.27	4.29	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.38	0.985
				Average Correction Factor	0.994

Notes: Changed inlet filter after as founds. Chromatogram shifted. Possible cause was the N2 cylinder pressure was around 70 psi. Adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	9.14	8.17	1.119
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.17	Prev response	9.16	*% change	-12.1%
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	9.17	0.996
Mid point	4960	40.1	4.57	4.60	0.994
Low point	4980	20.0	2.28	2.29	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.26	0.987
				Average Correction Factor	0.996

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	7.98	4.21	1.898
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	4.21	Prev response	7.98	*% change	-89.8%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	8.03	0.994
Mid point	4960	40.1	3.99	4.03	0.990
Low point	4980	20.0	1.99	2.00	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	8.12	0.983
				Average Correction Factor	0.993

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.000957	1.005116
THC Cal Offset:	0.000059	0.003673
CH4 Cal Slope:	0.999506	1.006735
CH4 Cal Offset:	0.000263	0.002275
NMHC Cal Slope:	1.001926	1.004065
NMHC Cal Offset:	0.000995	0.001198

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

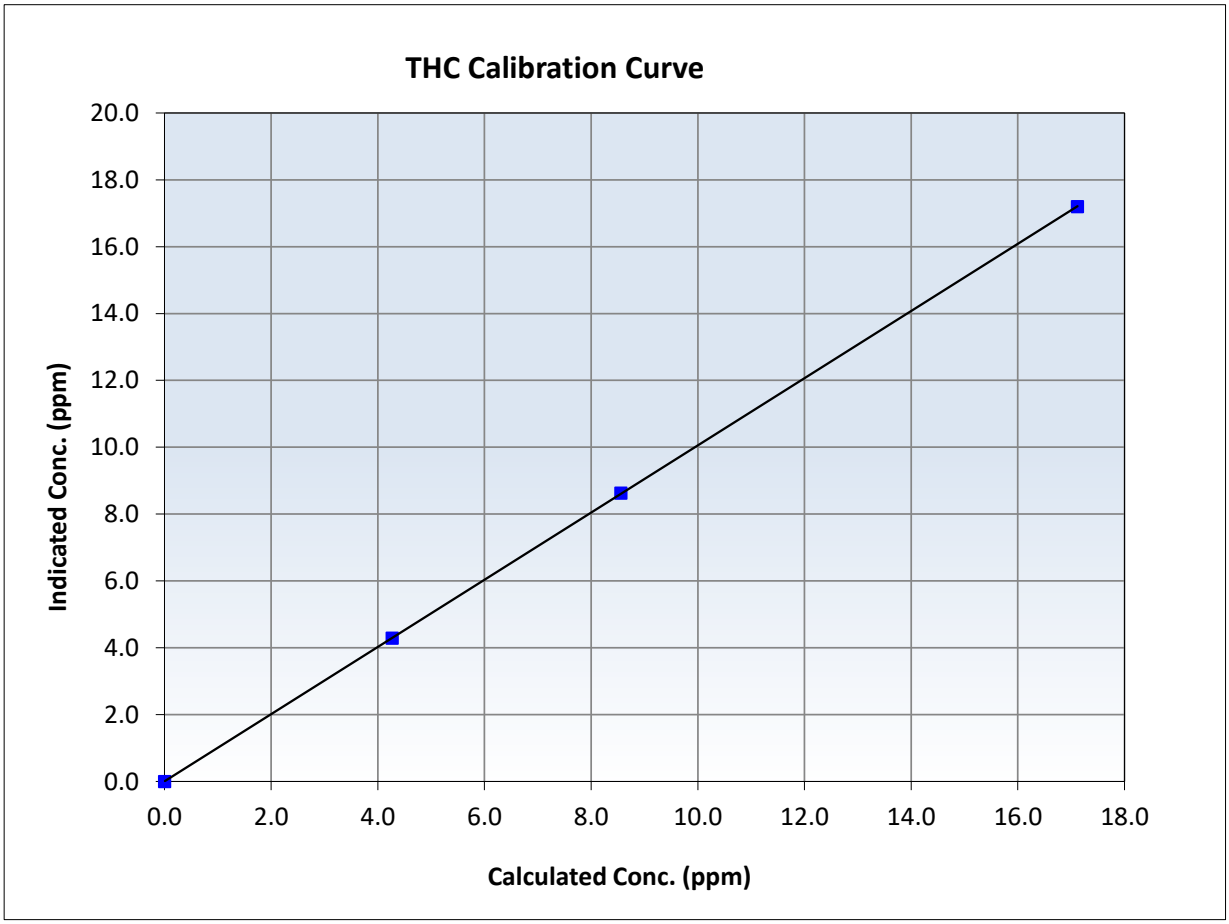
THC Calibration Summary

Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:48	End Time (MST):	12:47
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	0.999997	≥0.995
17.12	17.20	0.9951	Slope	1.005116	0.90 - 1.10
8.56	8.63	0.9923	Intercept	0.003673	+/-0.5
4.27	4.29	0.9959			



Wood Buffalo Environmental Association

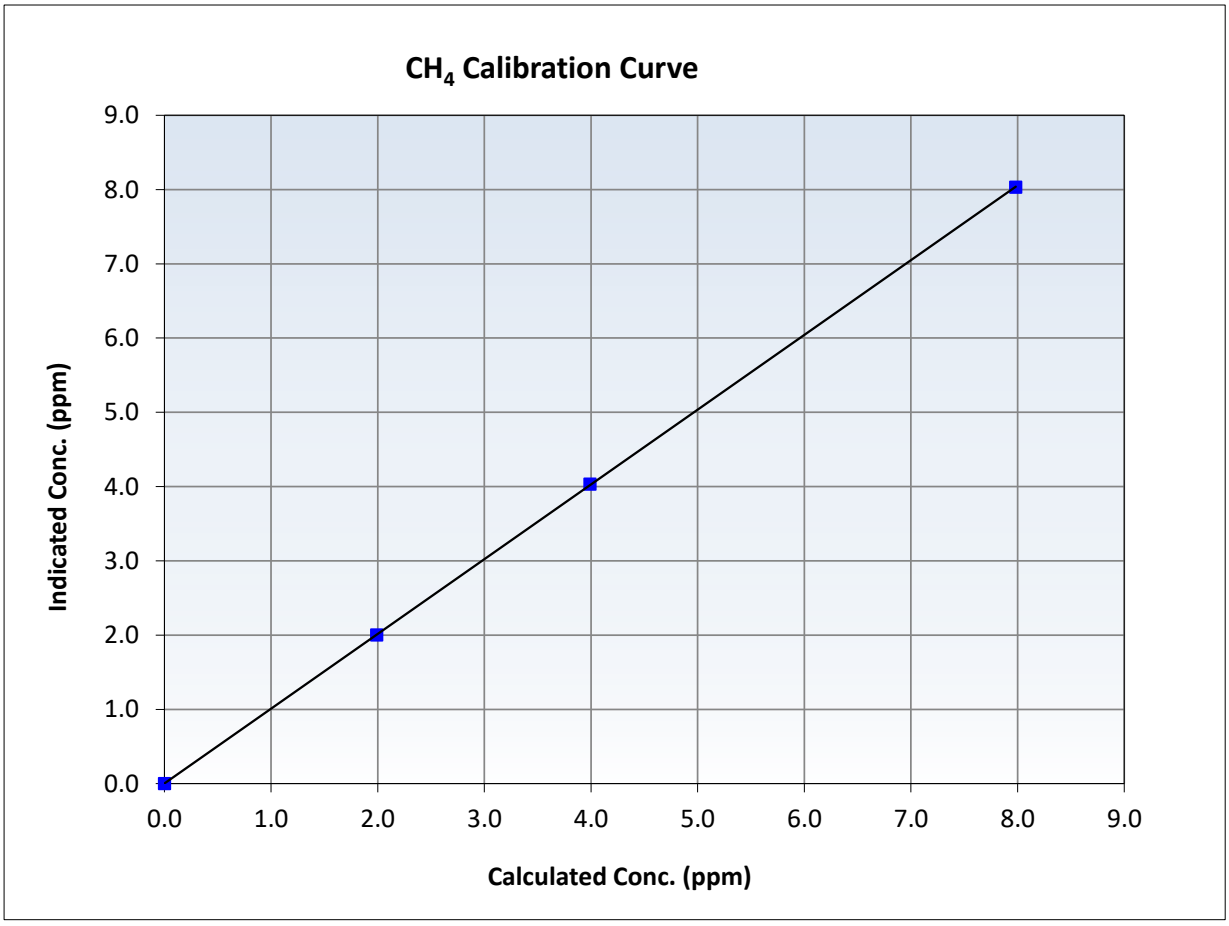
CH_4 Calibration Summary

Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:48	End Time (MST):	12:47
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	0.999994	≥0.995
7.98	8.03	0.9936	Slope	1.006735	0.90 - 1.10
3.99	4.03	0.9898			
1.99	2.00	0.9947	Intercept	0.002275	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

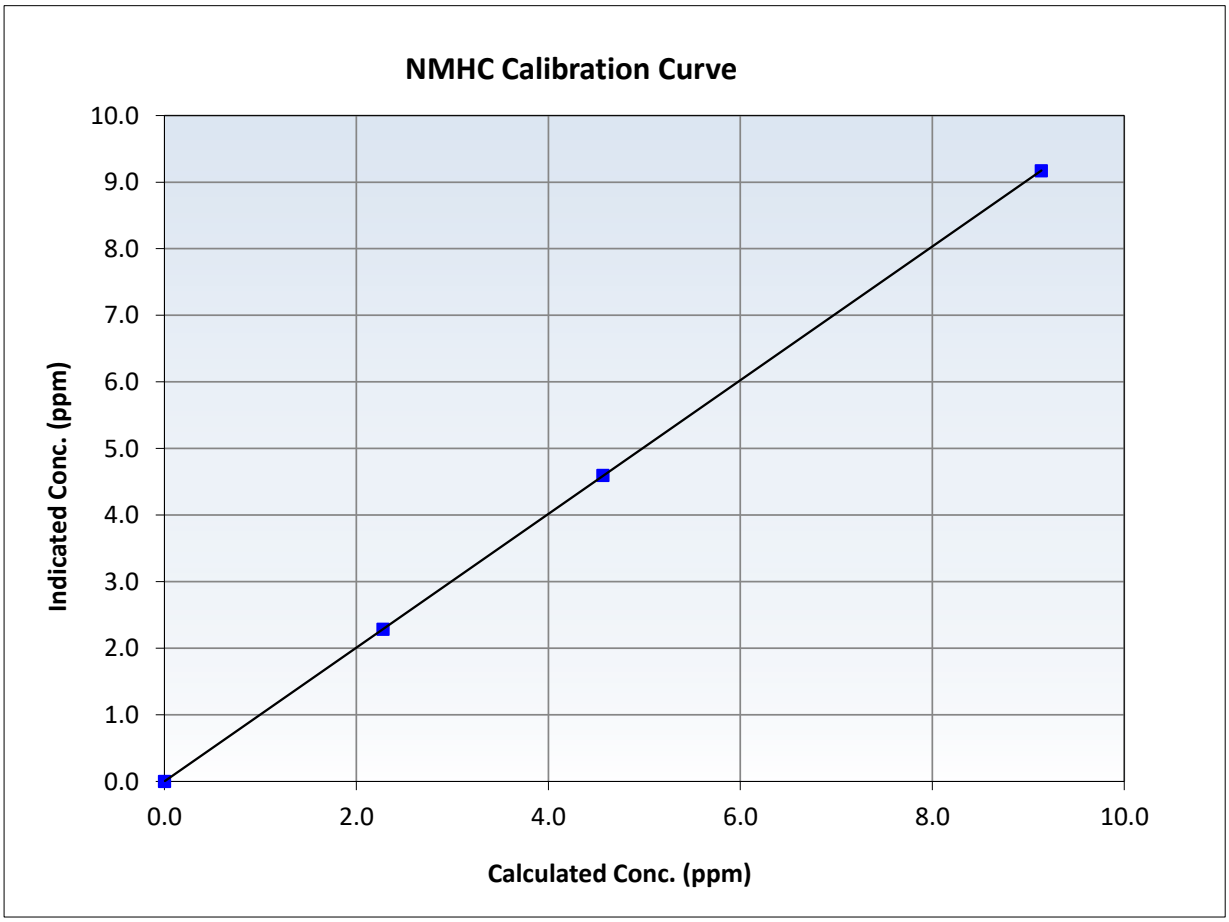
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:48	End Time (MST):	12:47
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

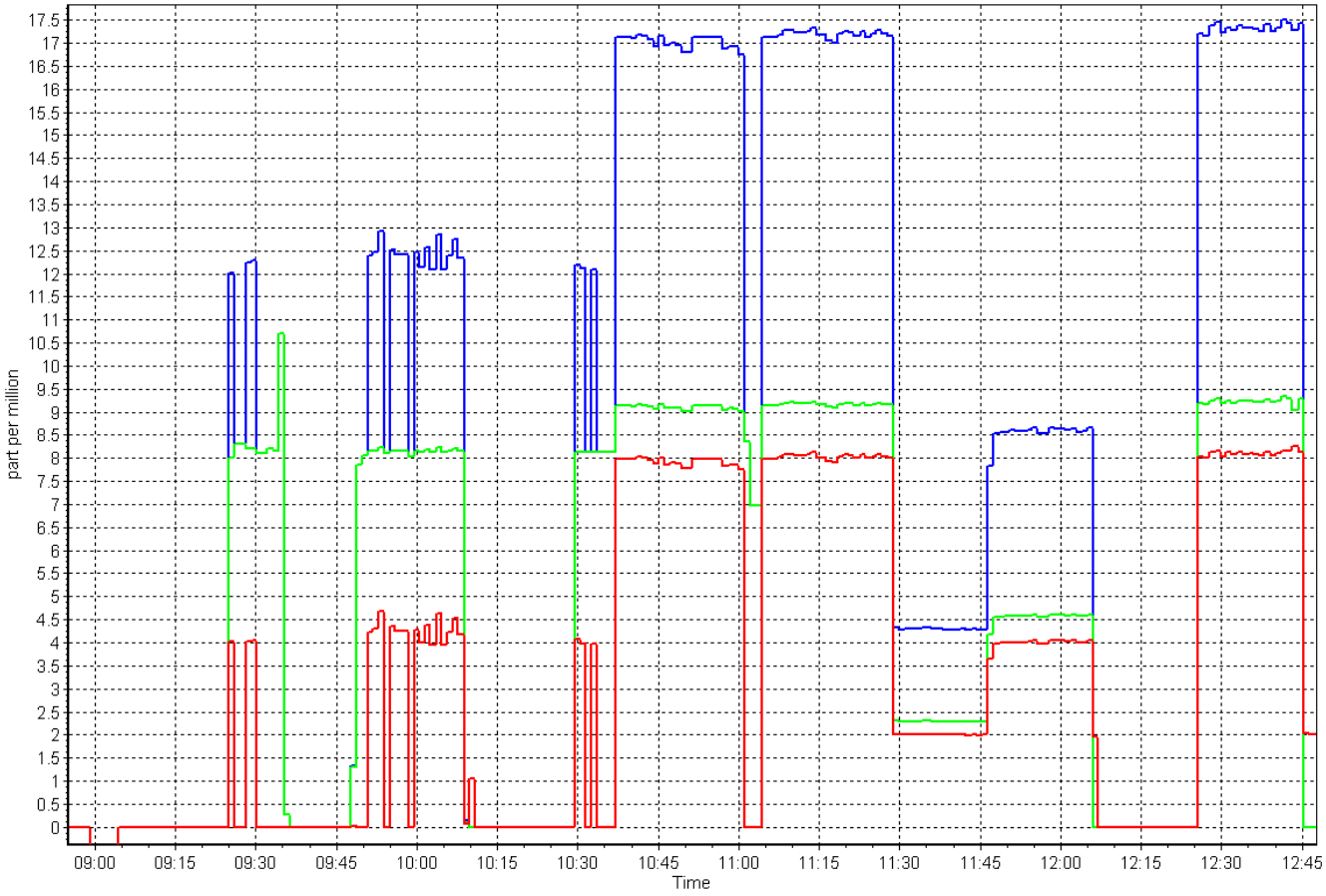
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.14	9.17	0.9961
4.57	4.60	0.9940
2.28	2.29	0.9970

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.004065	*0.90 - 1.10*
Intercept	0.001198	*+/-0.5*



NMHC Calibration Plot Date: May 8, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 9, 2024	Last Cal Date:	May 8, 2024
Start time (MST):	9:27	End time (MST):	12:28
Reason:	Maintenance	low response during daily zero and span	

Calibration Standards

Gas Cert Reference:	CC151285	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3812
Zero Air Gen model:	APIT701	Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.96E-04	2.62E-04	NMHC SP Ratio:	5.00E-05	4.46E-05
CH4 Retention time:	16.00	15.00	NMHC Peak Area:	182732	204877
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	14.72	1.163
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	14.72	Prev response	17.21	*% change	-17.0%
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)) *Limit = 0.95-1.05*
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	8.53	1.004
Low point	4980	20.0	4.27	4.26	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.03	1.005
				Average Correction Factor	1.001

Notes: Noticed there's a leak from zero air line to the analyzer. Replaced the line. Adjusted the span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	9.14	10.24	0.893
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	10.24	Prev response	9.17	*% change	10.4%
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	4919	80.2	9.14	9.15	0.999
Mid point	4960	40.1	4.57	4.56	1.003
Low point	4980	20.0	2.28	2.28	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.10	1.005
				Average Correction Factor	1.001

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	7.98	4.48	1.781
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	4.48	Prev response	8.04	*% change	-79.4%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	7.98	1.000
Mid point	4960	40.1	3.99	3.97	1.005
Low point	4980	20.0	1.99	1.99	1.000
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	7.94	1.006
				Average Correction Factor	1.002

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.005116	1.000391
THC Cal Offset:	0.003673	-0.009947
CH4 Cal Slope:	1.006735	0.999763
CH4 Cal Offset:	0.002275	-0.004138
NMHC Cal Slope:	1.004065	1.001251
NMHC Cal Offset:	0.001198	-0.005809

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

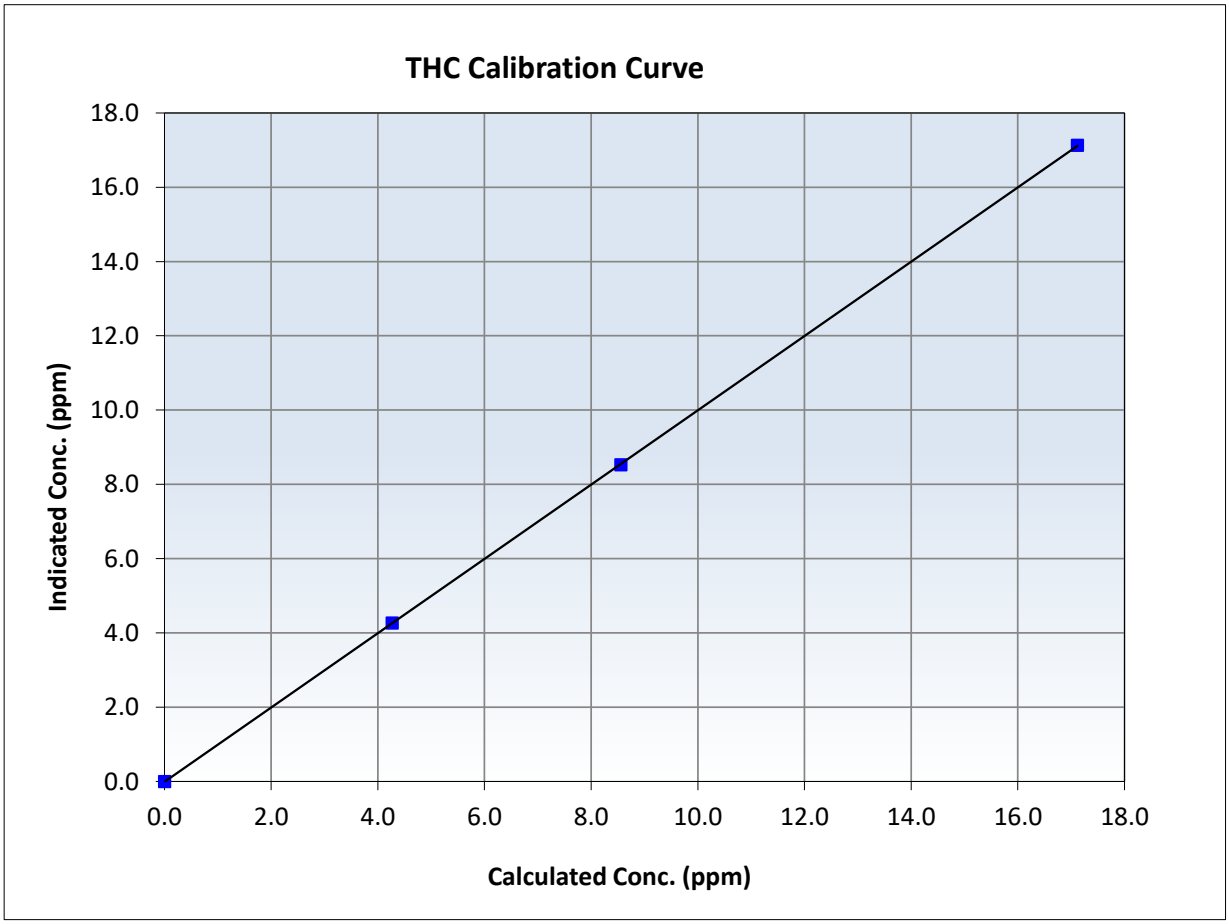
THC Calibration Summary

Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:28
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	0.999994	≥0.995
17.12	17.13	0.9995	Slope	1.000391	0.90 - 1.10
8.56	8.53	1.0038	Intercept	-0.009947	+/-0.5
4.27	4.26	1.0011			



Wood Buffalo Environmental Association

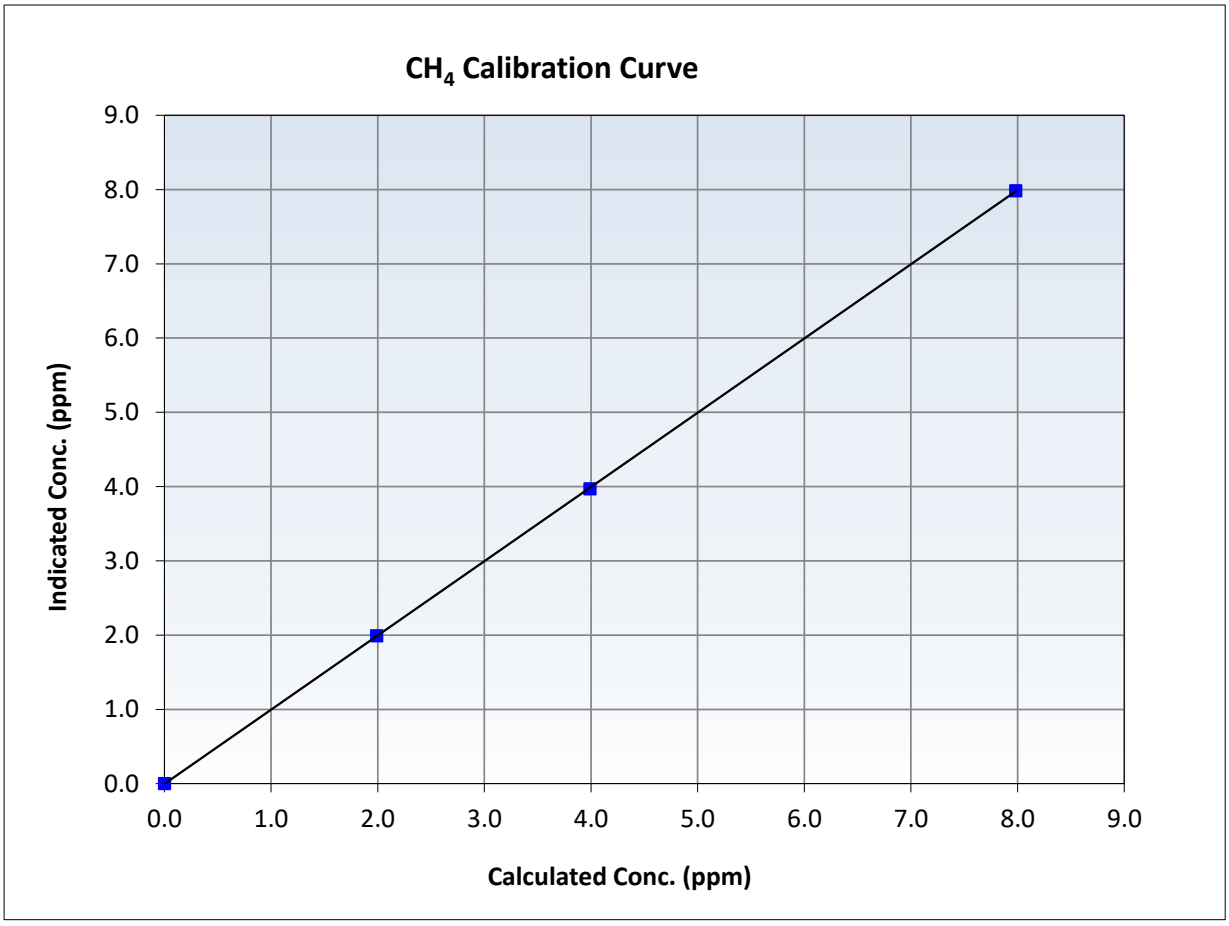
CH_4 Calibration Summary

Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:28
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	0.999992	≥0.995
7.98	7.98	1.0000	Slope	0.999763	0.90 - 1.10
3.99	3.97	1.0050			
1.99	1.99	1.0002	Intercept	-0.004138	+/-0.5



Wood Buffalo Environmental Association

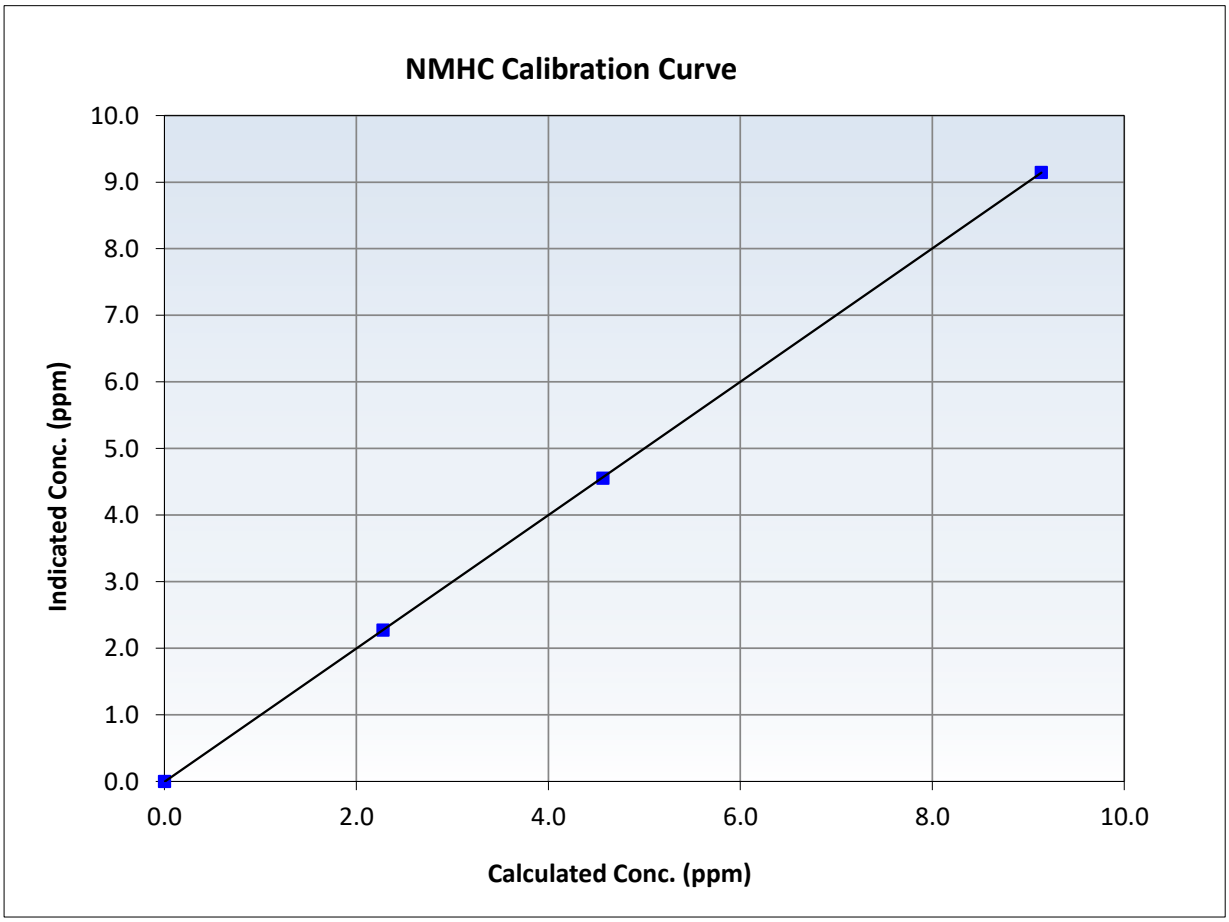
NMHC Calibration Summary

Station Information

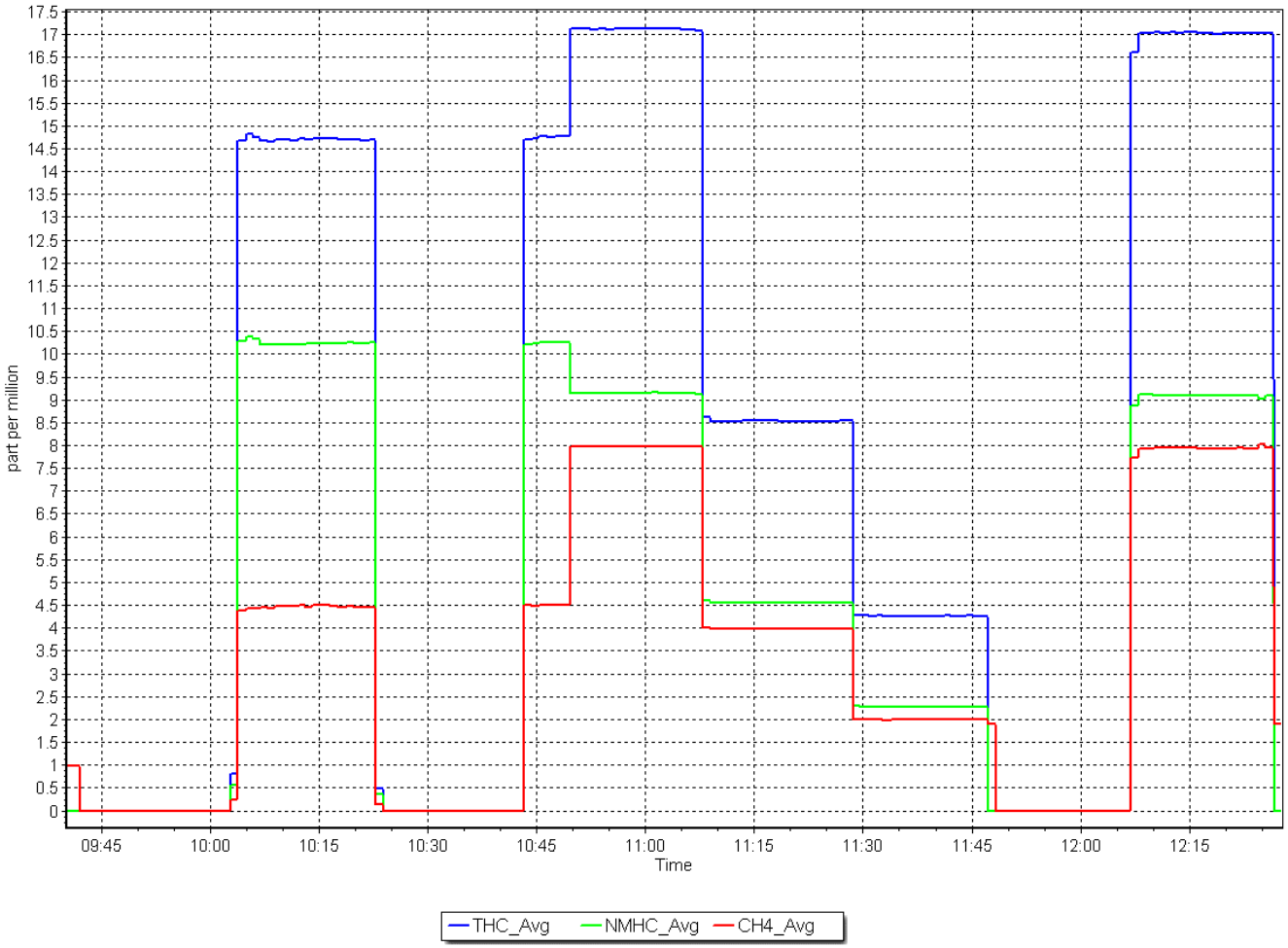
Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:27	End Time (MST):	12:28
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999996	≥0.995
9.14	9.15	0.9988	Slope	1.001251	0.90 - 1.10
4.57	4.56	1.0025			
2.28	2.28	1.0014	Intercept	-0.005809	+/-0.5



NMHC Calibration Plot Date: May 9, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 10, 2024	Last Cal Date:	NA
Start time (MST):	9:51	End time (MST):	12:05
Reason:	Install		

Calibration Standards

Gas Cert Reference:	CC151285	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3812
Zero Air Gen model:	APIT701	Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	NA	2.40E-04	NMHC SP Ratio:	NA	6.02E-05
CH4 Retention time:	NA	14.20	NMHC Peak Area:	NA	151938
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.17	0.997
Mid point	4960	40.1	8.56	8.61	0.994
Low point	4980	20.0	4.27	4.36	0.980
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.57	0.975
				Average Correction Factor	0.990

Notes: Install calibrations. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / 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	5000	0.0	0.00	0.00	----
High point	4919	80.2	9.14	9.19	0.994
Mid point	4960	40.1	4.57	4.64	0.984
Low point	4980	20.0	2.28	2.37	0.960
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.58	0.954
				Average Correction Factor	0.980

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	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	7.98	1.000
Mid point	4960	40.1	3.99	3.97	1.005
Low point	4980	20.0	1.99	1.98	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	7.98	1.000
				Average Correction Factor	1.003

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	NA	1.001789
THC Cal Offset:	NA	0.035083
CH4 Cal Slope:	NA	0.999950
CH4 Cal Offset:	NA	-0.006540
NMHC Cal Slope:	NA	1.003133
NMHC Cal Offset:	NA	0.042422

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

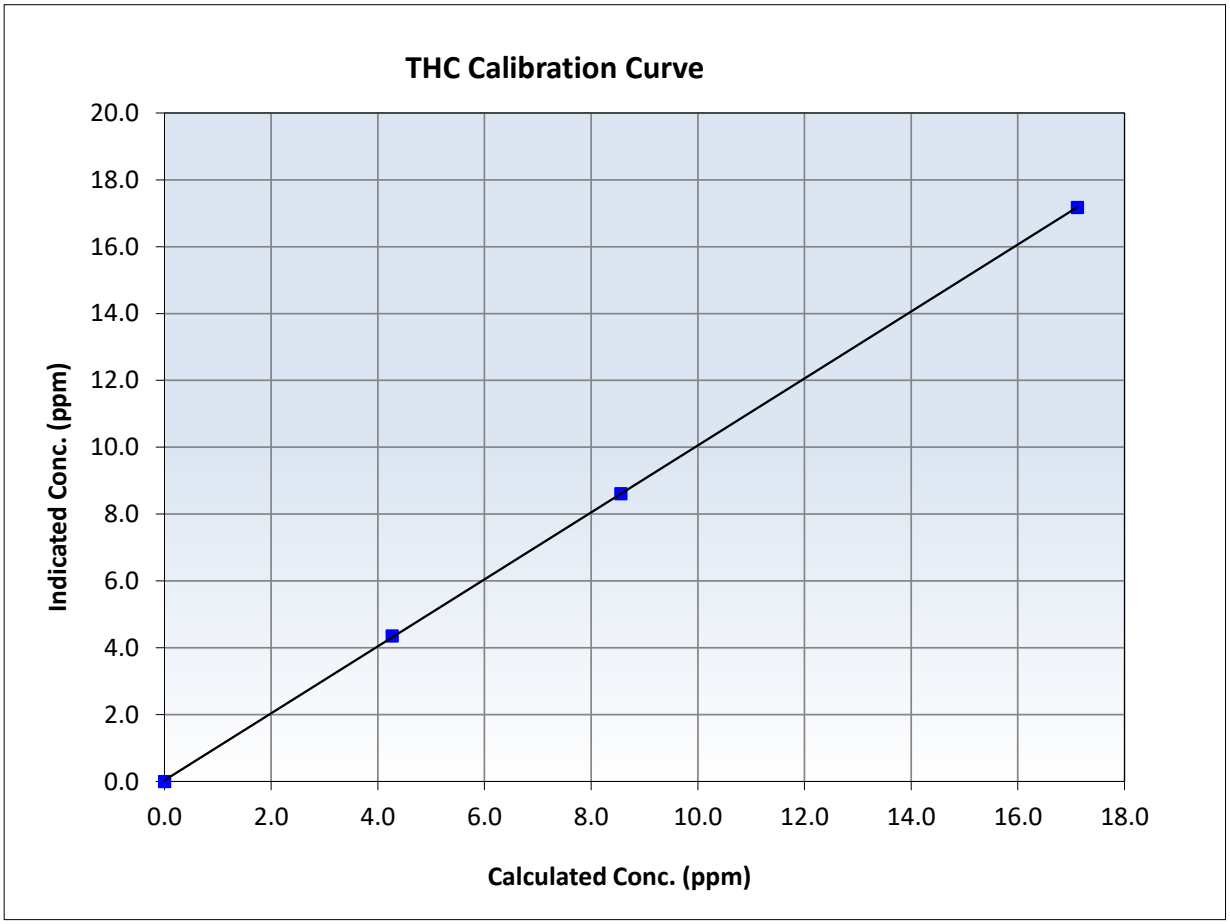
THC Calibration Summary

Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	NA
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	12:05
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	0.999979	≥0.995
17.12	17.17	0.9969	Slope	1.001789	0.90 - 1.10
8.56	8.61	0.9936	Intercept	0.035083	+/-0.5
4.27	4.36	0.9801			



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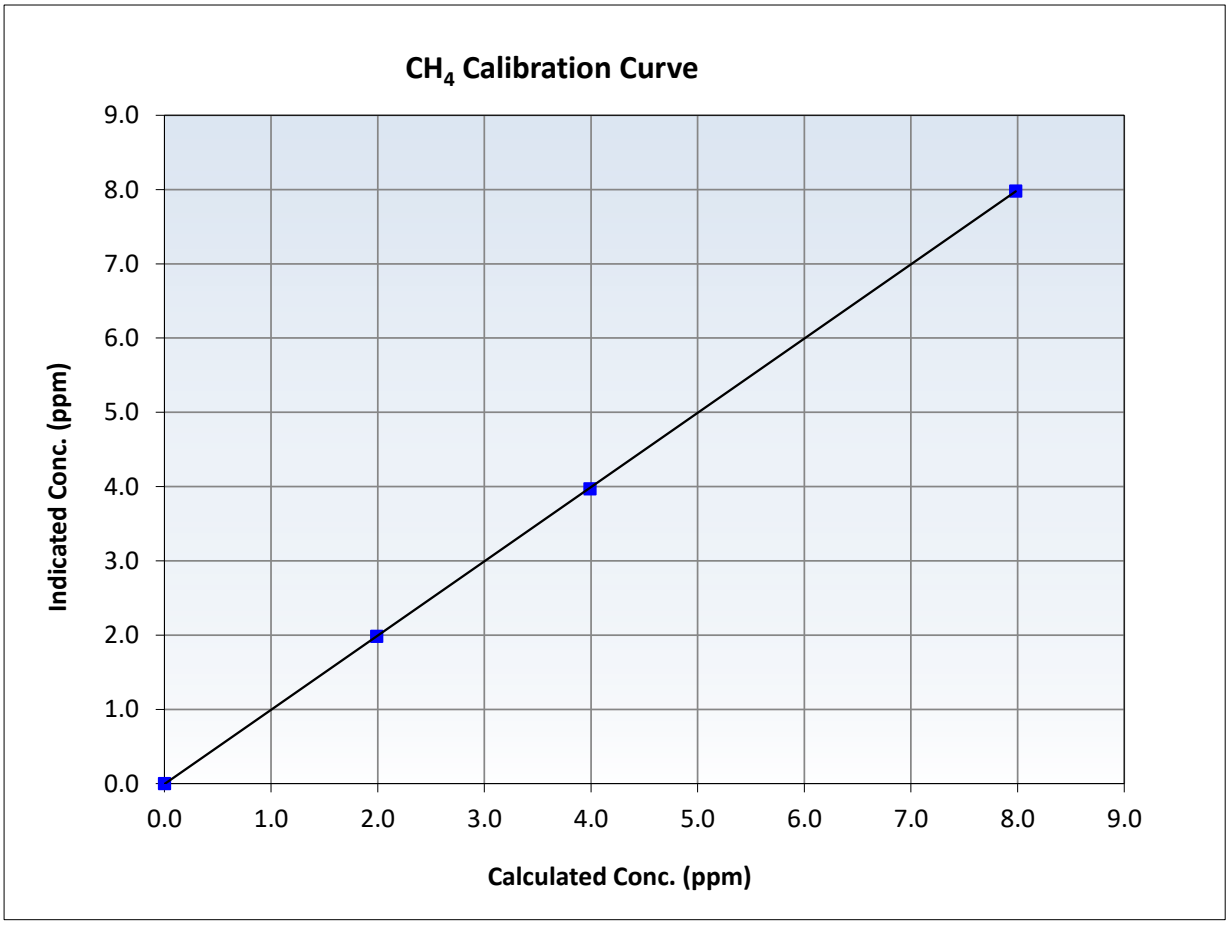
CH_4 Calibration Summary

Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	NA
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	12:05
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	0.999994	≥0.995
7.98	7.98	1.0001	Slope	0.999950	0.90 - 1.10
3.99	3.97	1.0047			
1.99	1.98	1.0037	Intercept	-0.006540	+/-0.5



Wood Buffalo Environmental Association

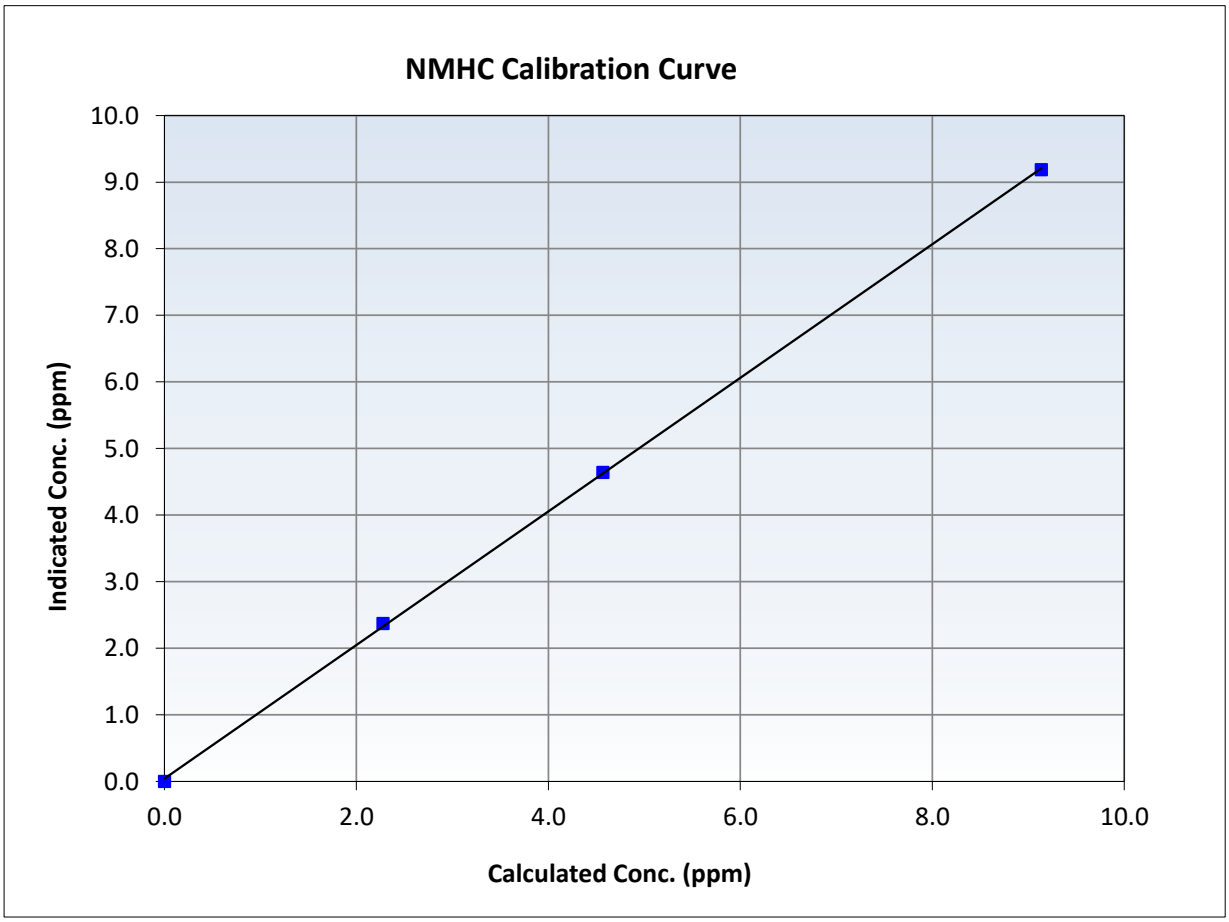
NMHC Calibration Summary

Station Information

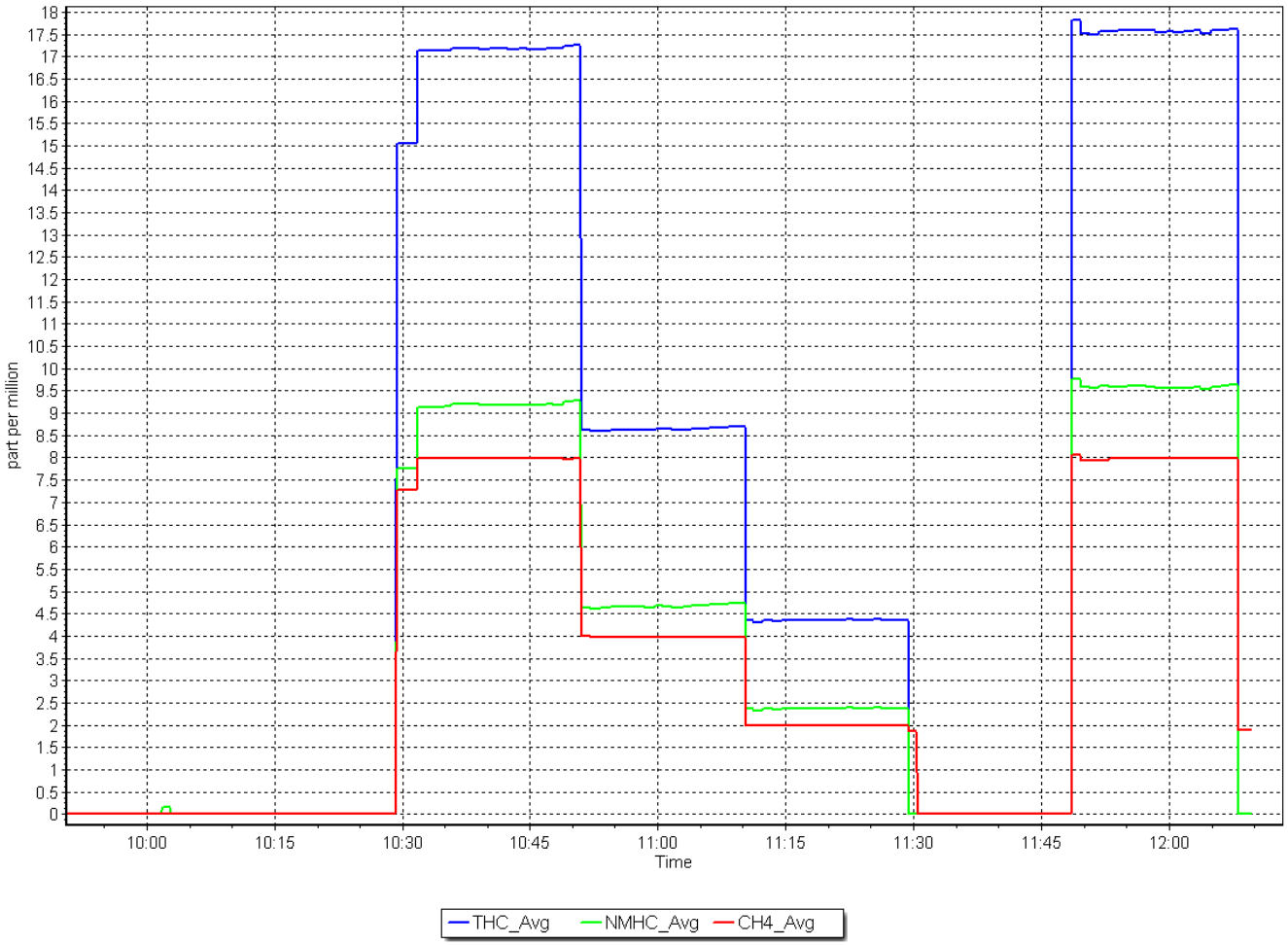
Calibration Date:	May 10, 2024	Previous Calibration:	NA
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	12:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999902	≥0.995
9.14	9.19	0.9944	Slope	1.003133	0.90 - 1.10
4.57	4.64	0.9842	Intercept	0.042422	+/-0.5
2.28	2.37	0.9600			



NMHC Calibration Plot Date: May 10, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	May 31, 2024	Last Cal Date:	May 10, 2024
Start time (MST):	8:05	End time (MST):	11:05
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	CC151285	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	497.6 ppm	CH4 Equiv Conc.	1067.1 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3812
Zero Air Gen model:	APIT701	Serial Number:	4888

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.40E-04	2.36E-04	NMHC SP Ratio:	6.02E-05	5.67E-05
CH4 Retention time:	14.20	13.80	NMHC Peak Area:	151938	161257
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	17.68	0.968
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.68	Prev response	17.19	*% change	2.8%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.08	1.003
Mid point	4959	40.1	8.56	8.53	1.003
Low point	4980	20.0	4.27	4.29	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.08	1.002
				Average Correction Factor	1.001

Notes: Nitrogen Cylinder Changed. Spans dipping after nitrogen change. Chromatograms show Span had a slight move. Full calibration done.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	9.14	9.62	0.950
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.62	Prev response	9.21	*% change	4.3%
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	9.08	1.007
Mid point	4959	40.1	4.57	4.55	1.004
Low point	4980	20.0	2.28	2.29	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.13	1.001
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	7.98	8.06	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.06	Prev response	7.98	*% change	1.0%
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	8.00	0.998
Mid point	4959	40.1	3.99	3.98	1.003
Low point	4980	20.0	1.99	2.00	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	7.95	1.004
				Average Correction Factor	0.999

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001789	0.996814
THC Cal Offset:	0.035083	0.009905
CH4 Cal Slope:	0.999950	1.001770
CH4 Cal Offset:	-0.006540	-0.003091
NMHC Cal Slope:	1.003133	0.992658
NMHC Cal Offset:	0.042422	0.012796

Calibration Performed By: Melissa Lemay and Jan Castro

Wood Buffalo Environmental Association

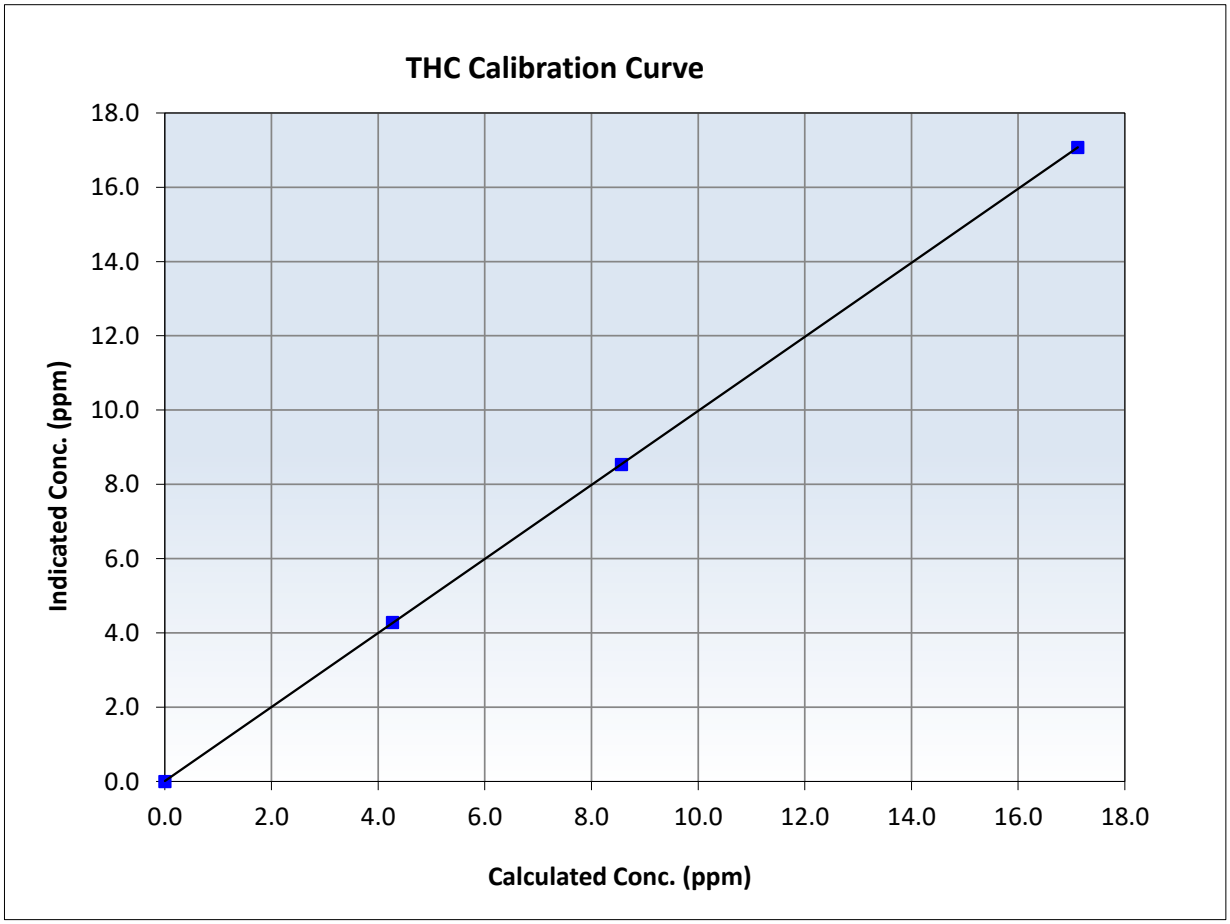
THC Calibration Summary

Station Information

Calibration Date:	May 31, 2024	Previous Calibration:	May 10, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:05	End Time (MST):	11:05
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
17.12	17.08	1.0026	Slope	0.996814	0.90 - 1.10
8.56	8.53	1.0033	Intercept	0.009905	+/-0.5
4.27	4.29	0.9961			



Wood Buffalo Environmental Association

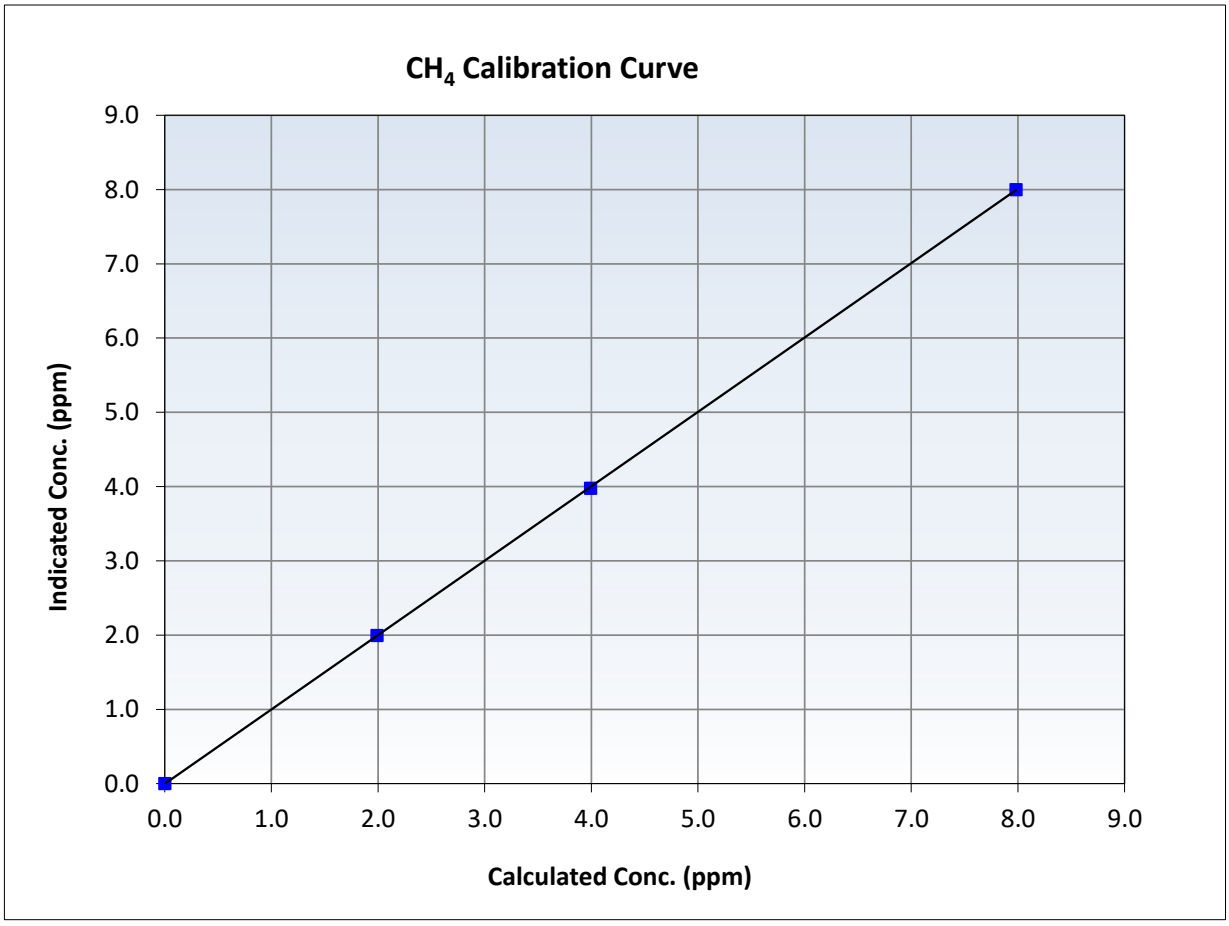
CH_4 Calibration Summary

Station Information

Calibration Date:	May 31, 2024	Previous Calibration:	May 10, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:05	End Time (MST):	11:05
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	0.999991	≥0.995
7.98	8.00	0.9978	Slope	1.001770	0.90 - 1.10
3.99	3.98	1.0029			
1.99	2.00	0.9967	Intercept	-0.003091	+/-0.5



Wood Buffalo Environmental Association

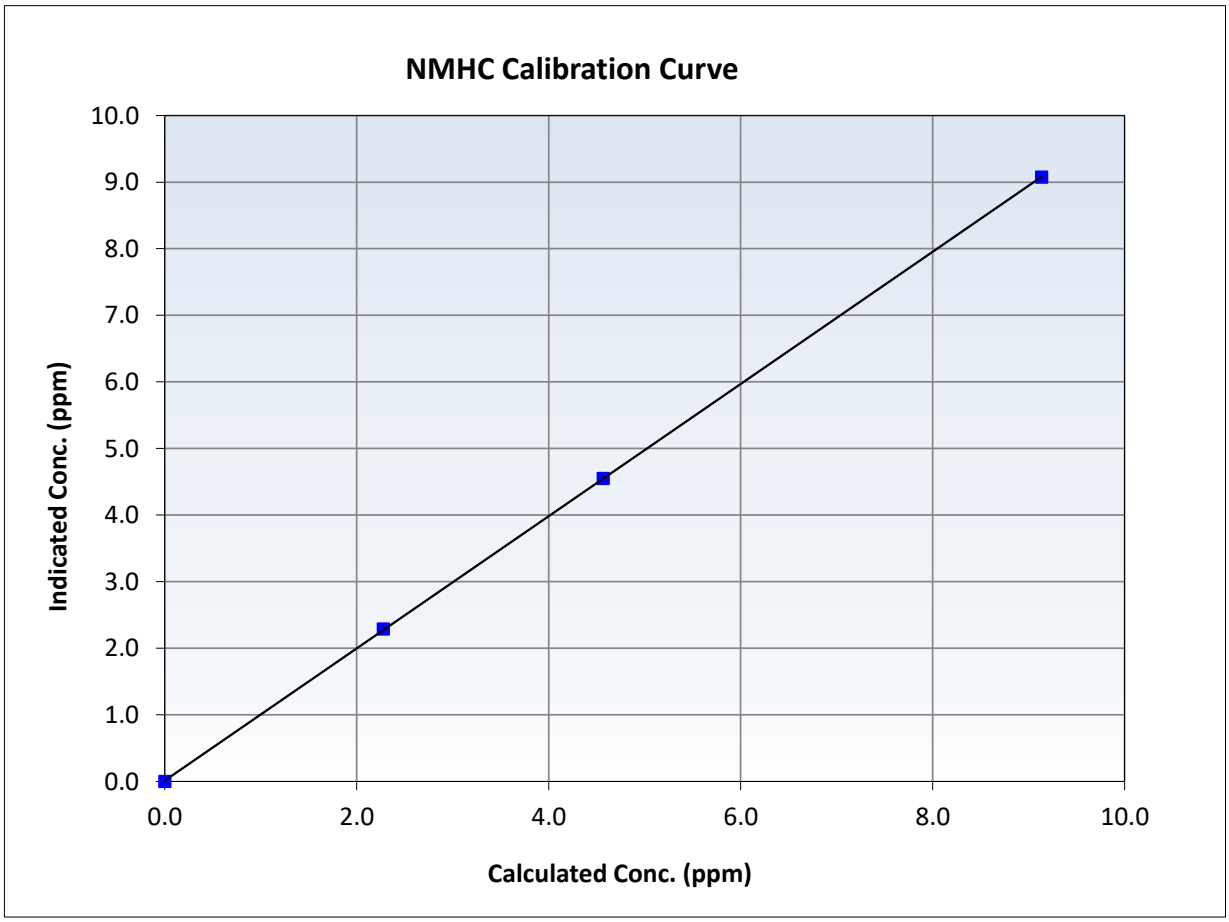
NMHC Calibration Summary

Station Information

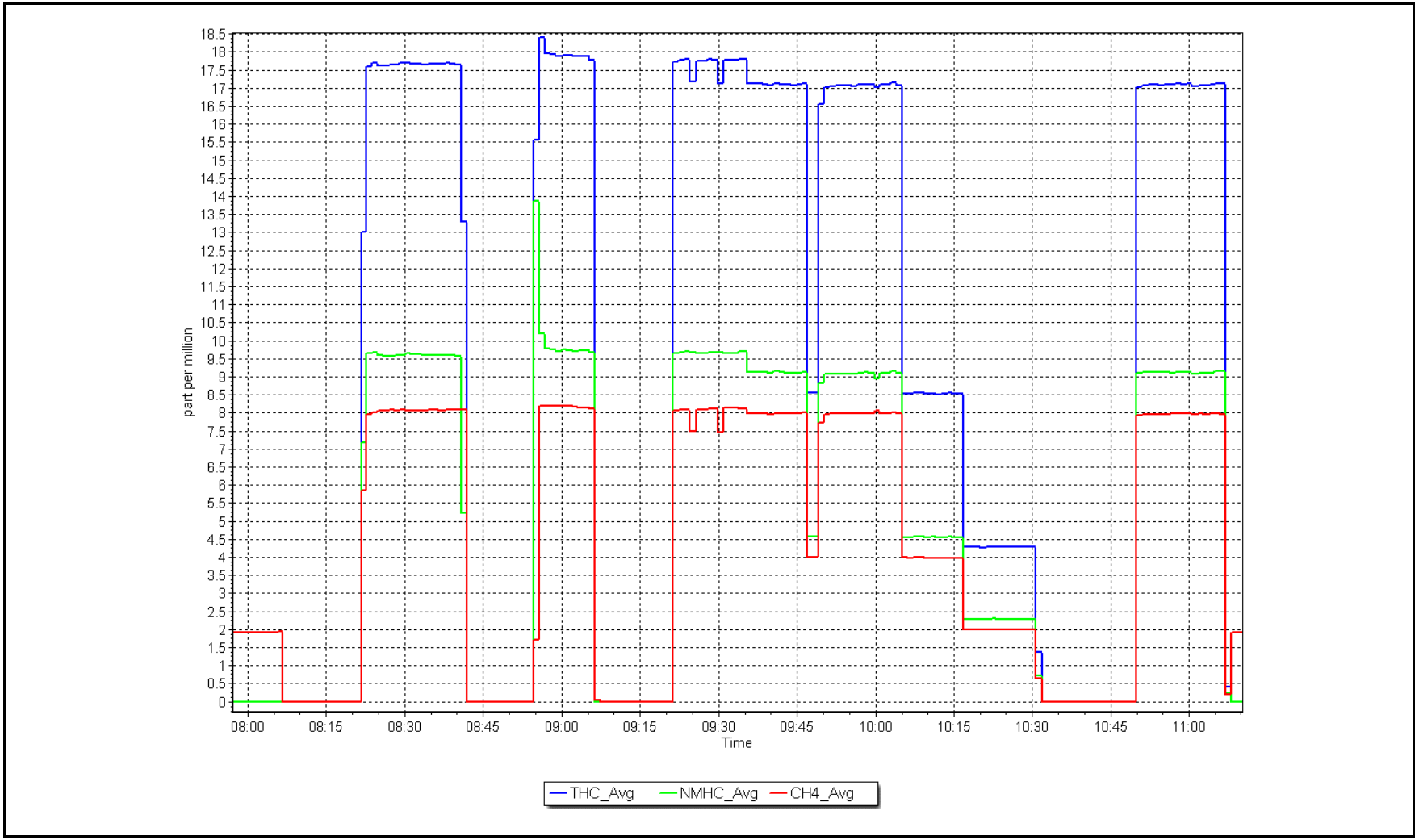
Calibration Date:	May 31, 2024	Previous Calibration:	May 10, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:05	End Time (MST):	11:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999991	≥0.995
9.14	9.08	1.0066	Slope	0.992658	0.90 - 1.10
4.57	4.55	1.0038			
2.28	2.29	0.9952	Intercept	0.012796	+/-0.5



NMHC Calibration Plot Date: May 31, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Barge Landing
Station number:	AMS 09
Calibration Date:	May 21, 2024
Last Cal Date:	April 18, 2024
Start time (MST):	9:21
End time (MST):	13:44
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T2Y1KDH	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	47.38 ppm	NO Cal Gas Conc:	46.94 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	47.38 ppm	Removed Gas NO Conc:	46.94 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3812
ZAG make/model:	Api T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	----	----
AF High point	4915	85.3	808.3	800.7	7.5	796.8	785.6	11.3	1.0139	1.0192
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 808.1 ppb	NO = 798.9 ppb
Baseline Corr 1st pt	NO_X = 797.2 ppb	NO = 785.7 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

*Percent Change	NO_X = -1.4%
*Percent Change	NO = -1.7%

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1426262593

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.101	1.119	NO bkgnd or offset:	10.1	10.2
NOX coeff or slope:	0.998	0.998	NOX bkgnd or offset:	10.4	10.6
NO2 coeff or slope:	1.000	0.998	Reaction cell Press:	182.2	177.1

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.999233	0.999445
NO_X Cal Offset:	0.498364	0.698545
NO Cal Slope:	0.998482	0.998311
NO Cal Offset:	-0.583944	-0.423947
NO_2 Cal Slope:	1.006238	1.005694
NO_2 Cal Offset:	0.877238	0.635782

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
High point	4915	85.3	808.3	800.7	7.5	808.0	799.2	8.8	1.0003	1.0019
Mid point	4957	42.6	403.7	400.0	3.7	404.8	398.6	6.1	0.9973	1.0034
Low point	4979	21.3	201.8	200.0	1.9	203.2	198.8	4.3	0.9932	1.0058
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1	----	----
As left span	4915	85.3	808.3	418.5	389.8	807.4	418.5	389.0	1.0011	1.0000
								Average Correction Factor	0.9970	1.0037

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	796.5	416.3	387.7	390.0	0.9941	100.6%
Mid GPT point	796.5	603.5	200.5	203.0	0.9877	101.2%
Low GPT point	796.5	700.4	103.6	105.5	0.9820	101.8%
				Average Correction Factor	0.9880	101.2%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

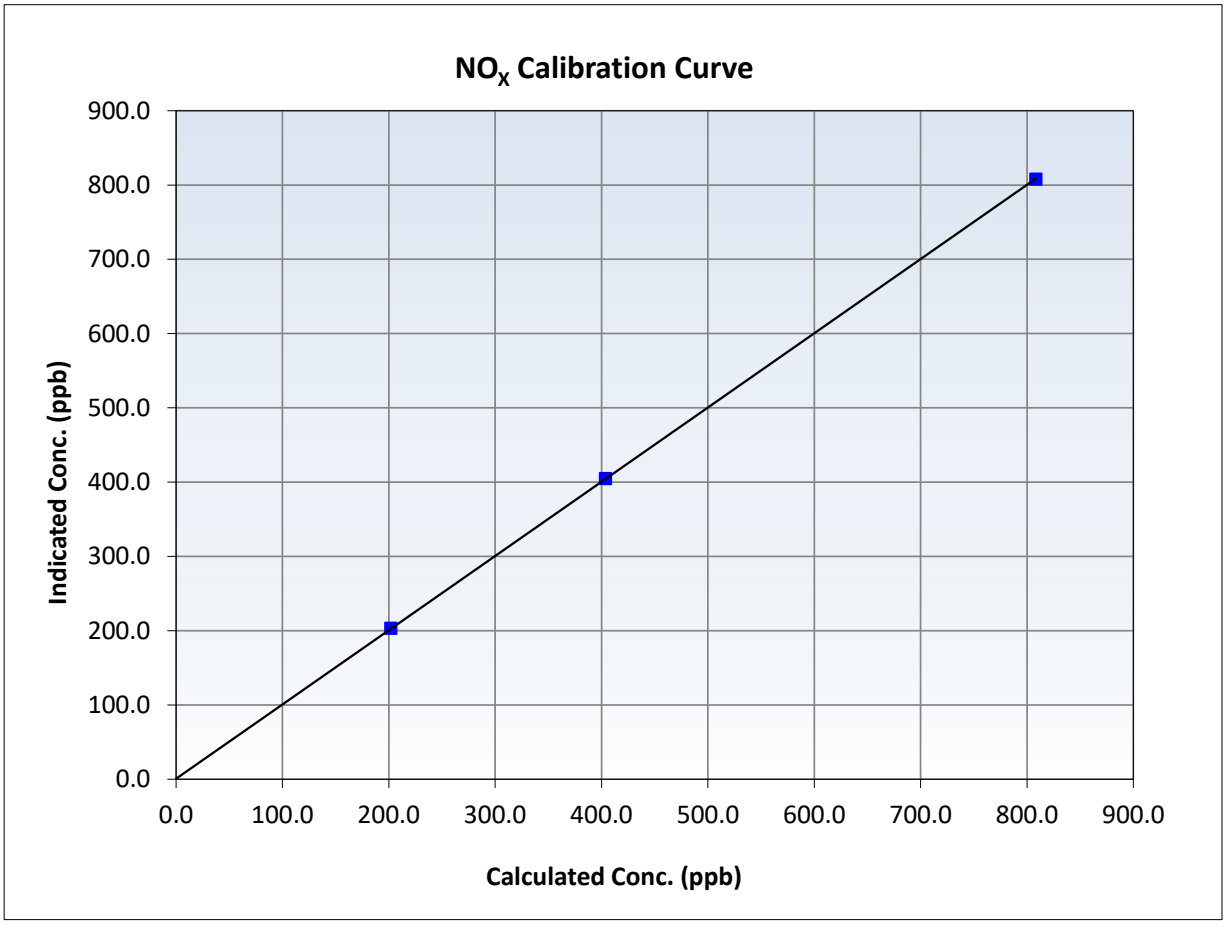
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 18, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:21	End Time (MST):	13:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
808.3	808.0	1.0003
403.7	404.8	0.9973
201.8	203.2	0.9932

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	0.999445	*0.90 - 1.10*
Intercept	0.698545	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

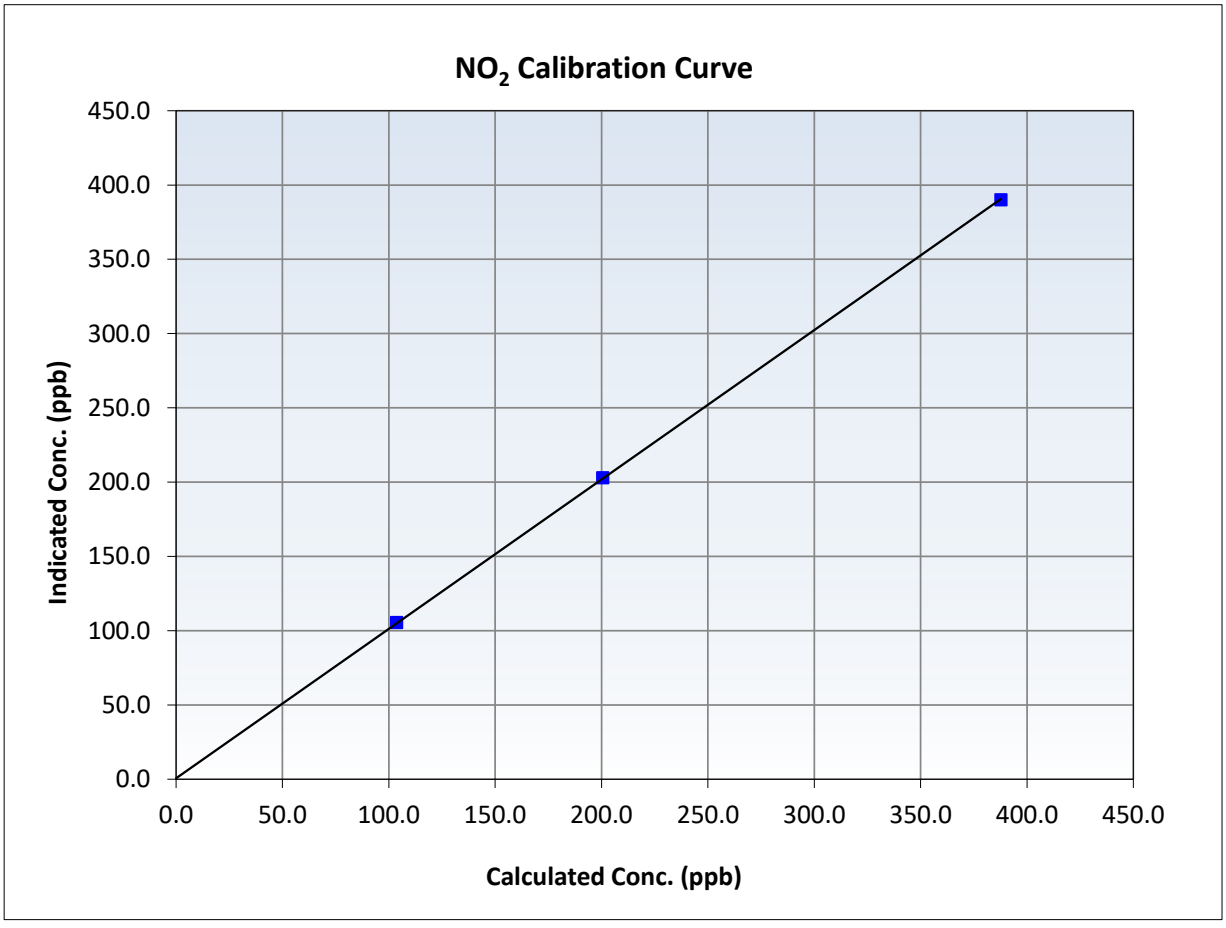
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 18, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:21	End Time (MST):	13:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
387.7	390.0	0.9941
200.5	203.0	0.9877
103.6	105.5	0.9820

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	1.005694	*0.90 - 1.10*
Intercept	0.635782	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

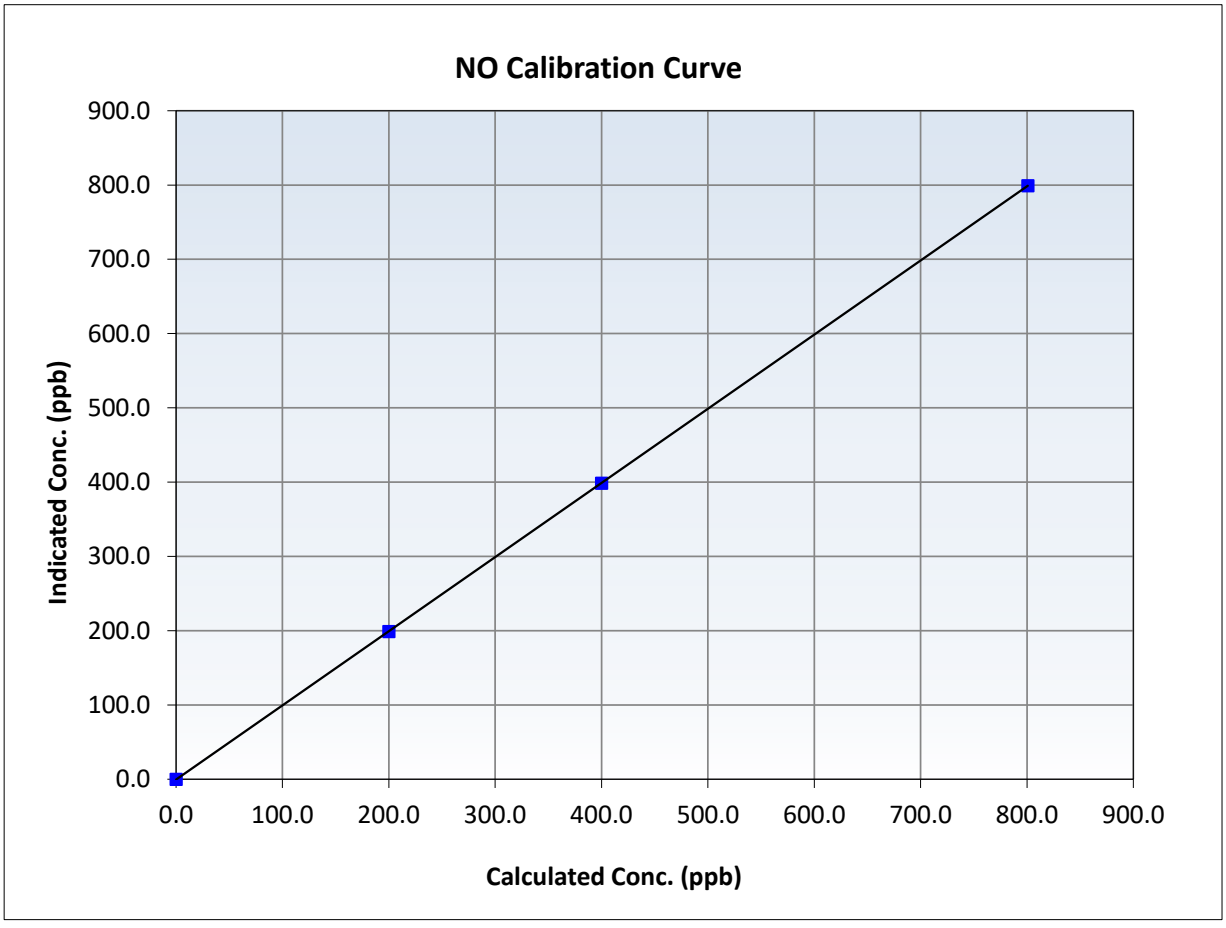
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 18, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:21	End Time (MST):	13:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

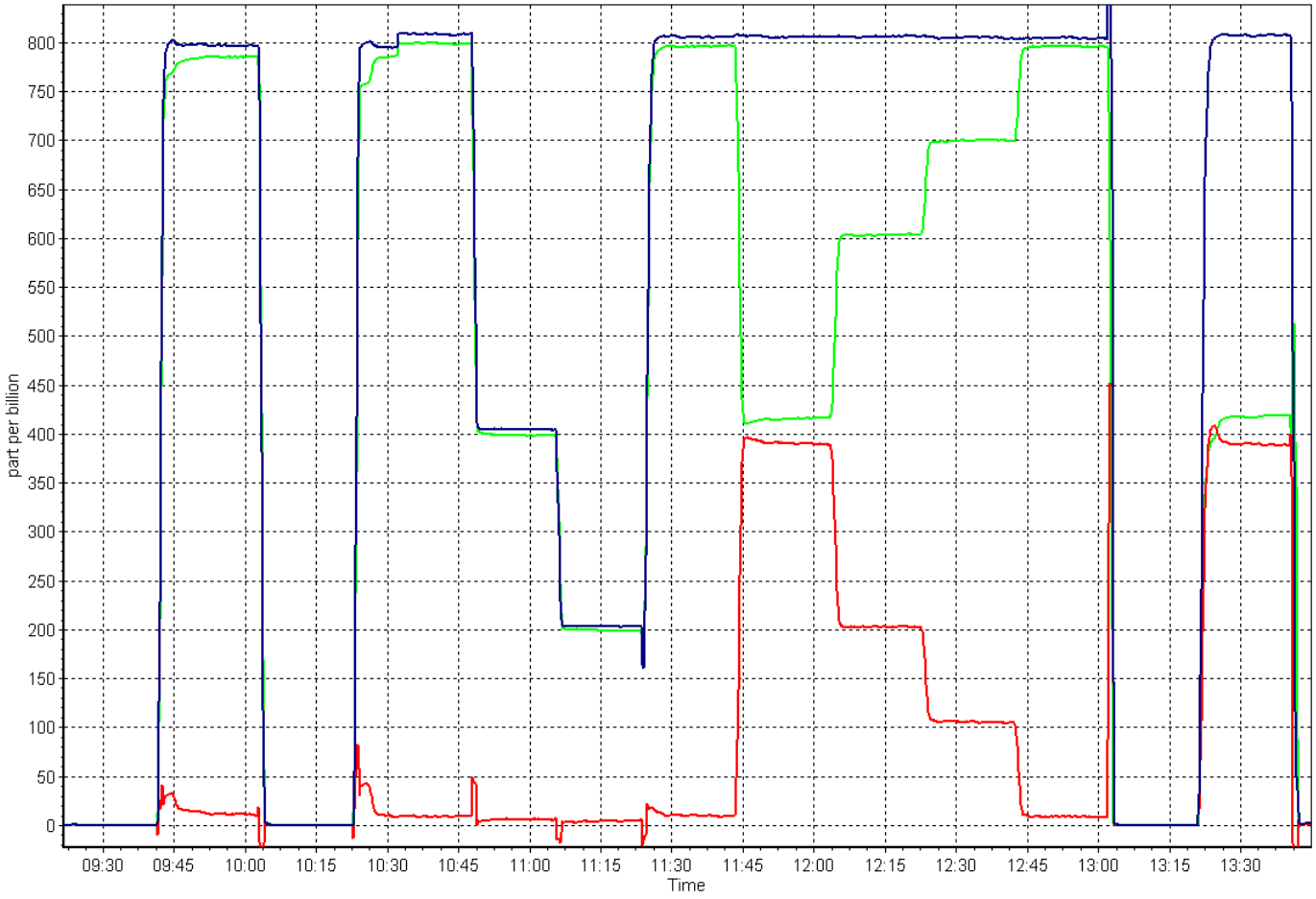
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.7	799.2	1.0019
400.0	398.6	1.0034
200.0	198.8	1.0058

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.998311	0.90 - 1.10
Intercept	-0.423947	+/-20



NO_X Calibration Plot Date: May 21, 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:	May 21, 2024	Last Cal Date:	April 13, 2024
Start time (MST):	10:55	End time (MST):	11:52
Analyzer Make:	API T640	S/N:	844
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)	11.3	10.9	10.0	☐	+/- 2 °C
P (mmHg)	726.0	734.0	719.4	☐	+/- 10 mmHg
Flow (LPM)	4.97	4.88	4.97	☐	+/- 0.25 LPM
PW% (pump)	35	-----	36	☐	>80%
Zero Verification	PM w/o HEPA:	2.6	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: June 10, 2024 — Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	8.0	11.2	11.0	☑	+/- 0.5

Date Optical Chamber Cleaned: May 21, 2024

Date Disposable Filter Changed: May 21, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 23, 2023

Date RH/T Sensor Cleaned: August 23, 2023

Notes: Inlet head looks good. No adjustments. Leak check passed.

Calibration by: Sean Bala

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11
LOWER CAMP
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	May 24, 2024	Last Cal Date:	April 24, 2024
Start time (MST):	10:16	End time (MST):	13:32
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.988759	0.998178	Backgd or Offset:	14.7	16.7
Calibration intercept:	-0.098992	-1.624170	Coeff or Slope:	1.034	1.034

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	1.4	----
As found High point	4932	81.4	799.6	794.7	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.3	Previous response	790.6	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4932	81.4	799.6	797.7	1.002
Mid point	4959	40.7	400.9	396.5	1.011
Low point	4981	20.4	200.9	198.5	1.012
As left zero	5000	0.0	0.0	-0.2	----
As left span	4932	81.4	799.6	800.4	0.999
				Average Correction Factor:	1.009

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

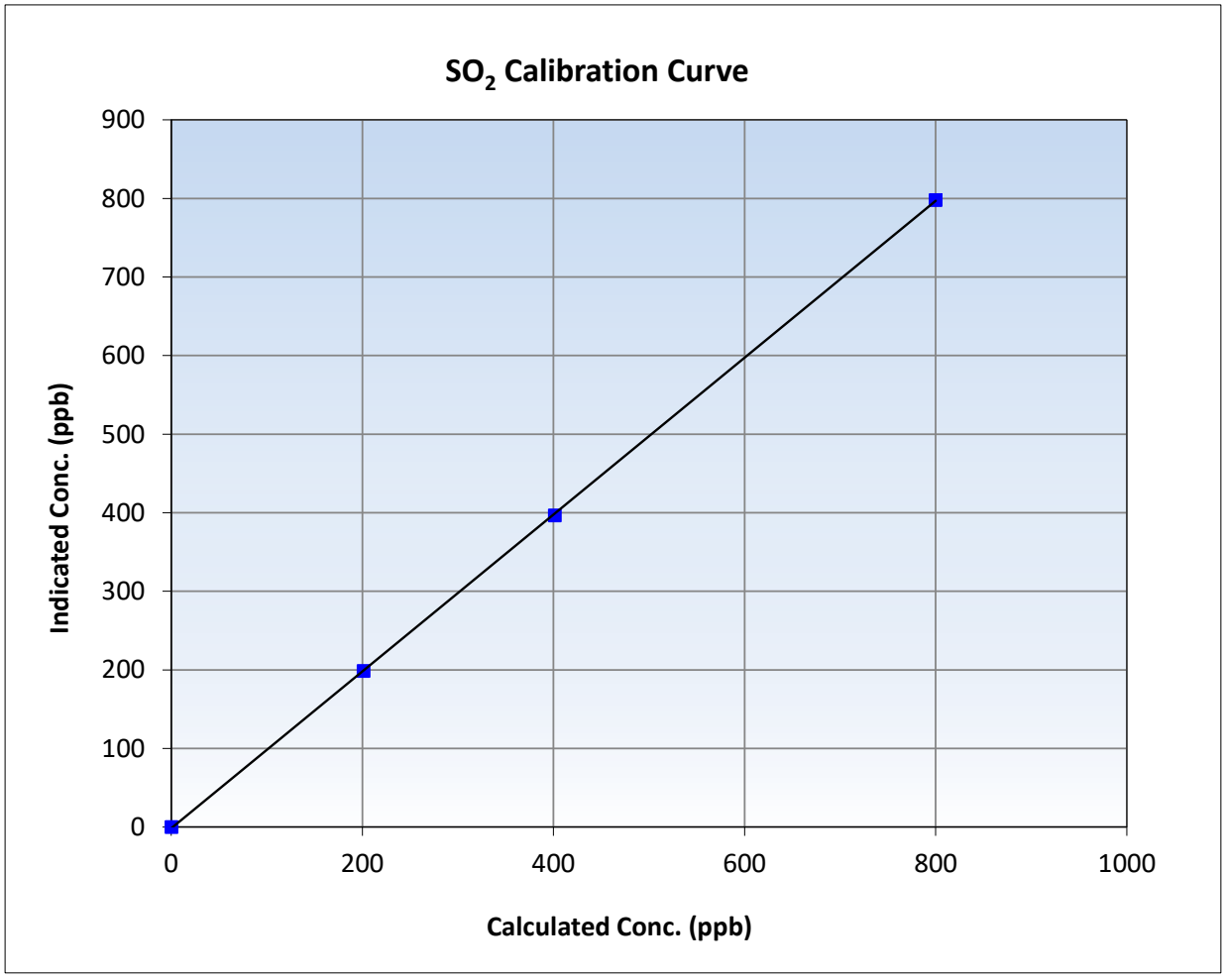
Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	April 24, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:16	End Time (MST):	13:32
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

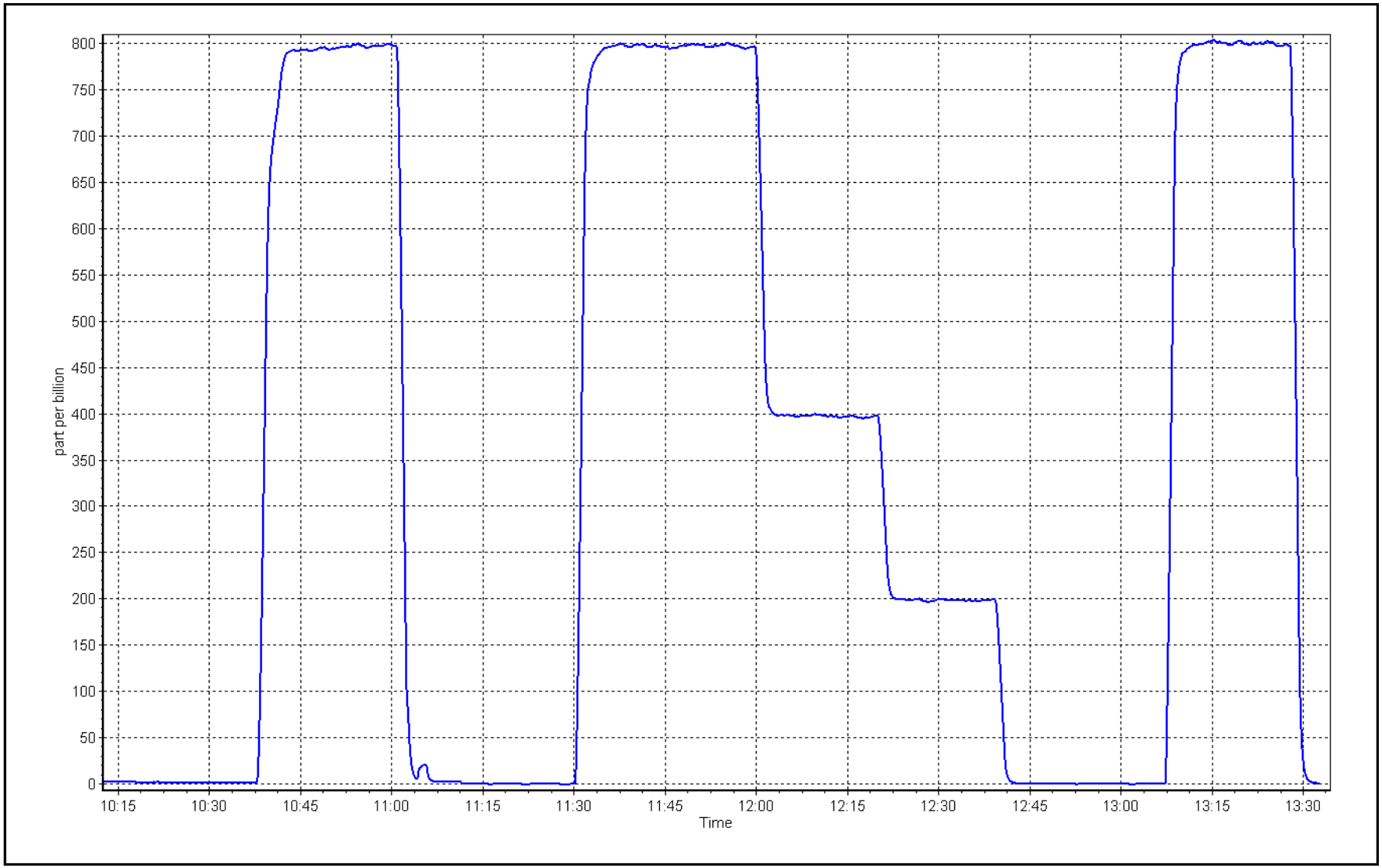
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
799.6	797.7	1.0024
400.9	396.5	1.0111
200.9	198.5	1.0120

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.998178	*0.90 - 1.10*
Intercept	-1.624170	*+/-30*



SO2 Calibration Plot Date: May 24, 2024 Location: Lower Camp



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	May 23, 2024	Last Cal Date:	April 23, 2024
Start time (MST):	9:48	End time (MST):	13:54
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
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.990021	1.005616	Backgd or Offset:	2.5	2.5
Calibration intercept:	0.156017	-0.165109	Coeff or Slope:	0.817	0.817

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4926	73.6	79.9	80.3	0.994
As found Mid point	4963	36.8	40.0	39.5	1.009
As found Low point	4982	18.6	20.2	20.0	1.005
New cylinder response					
Baseline Corr As found:	80.4	Prev response:	79.28	*% change:	1.4%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	1.006054	AF Intercept:	-0.305434
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999932	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4926	73.6	79.9	80.2	0.997
Mid point	4963	36.8	40.0	40.1	0.996
Low point	4982	18.6	20.2	20.0	1.010
As left zero	5000	0.0	0.0	0.0	----
As left span	4926	73.6	79.9	79.8	1.002
SO2 Scrubber Check	4935	81.5	812.3	0.2	----
Date of last scrubber change:				Ave Corr Factor	1.001
Date of last converter efficiency test:					

Notes: Changed sample inlet filter after as founds. No adjustments made. Ran scrubber check after calibrator zero and it passed.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

H_2S Calibration Summary

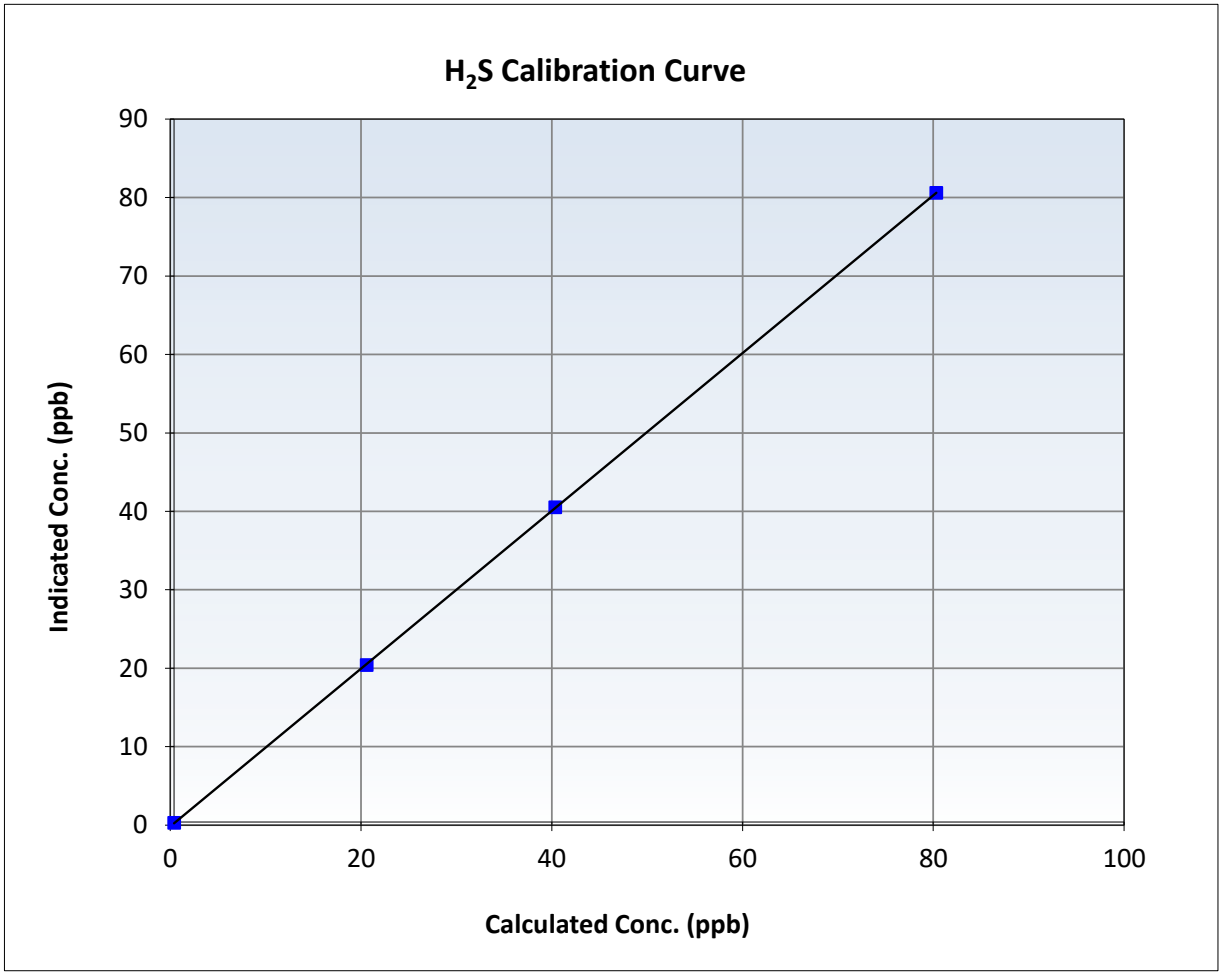
Station Information

Calibration Date:	May 23, 2024	Previous Calibration:	April 23, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	9:48	End Time (MST):	13:54
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1203169745

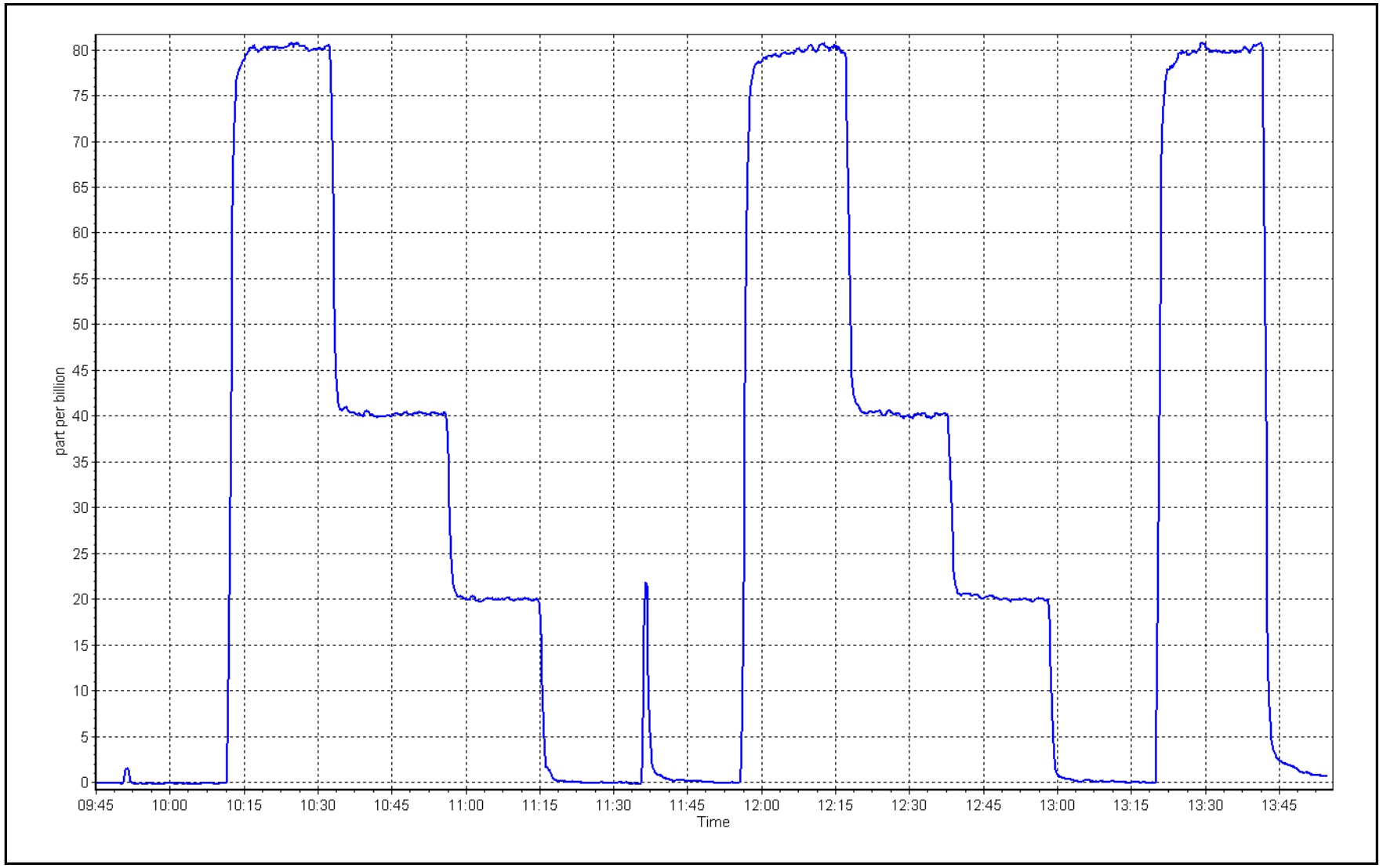
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
79.9	80.2	0.9965
40.0	40.1	0.9965
20.2	20.0	1.0097

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	1.005616	*0.90 - 1.10*
Intercept	-0.165109	*+/-3*



H_2S Calibration Plot Date: May 23, 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:	May 24, 2024	Last Cal Date:	April 24, 2024
Start time (MST):	10:16	End time (MST):	13:32
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 (CH_4):		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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.75E-04	2.75E-04	NMHC SP Ratio:	4.90E-05	4.90E-05
CH4 Retention time:	14.8	14.8	NMHC Peak Area:	187273	187273
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	17.33	17.50	0.990
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.50	Prev response	17.28	*% 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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	17.33	17.50	0.990
Mid point	4959	40.7	8.69	8.68	1.000
Low point	4981	20.4	4.35	4.32	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	17.33	17.59	0.985
				Average Correction Factor	0.999

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	9.18	9.30	0.987
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.30	Prev response	9.15	*% change	1.7%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	9.18	9.29	0.988
Mid point	4959	40.7	4.60	4.62	0.996
Low point	4981	20.4	2.31	2.30	1.003
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	9.18	9.34	0.982
				Average Correction Factor	0.996

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	8.15	8.20	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.20	Prev response	8.13	*% change	0.8%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	8.15	8.21	0.993
Mid point	4959	40.7	4.09	4.07	1.005
Low point	4981	20.4	2.05	2.02	1.012
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	8.15	8.25	0.988
				Average Correction Factor	1.003

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.998938	1.010841
THC Cal Offset:	-0.023918	-0.047031
CH4 Cal Slope:	0.999584	1.008203
CH4 Cal Offset:	-0.013970	-0.025003
NMHC Cal Slope:	0.997916	1.013246
NMHC Cal Offset:	-0.009146	-0.022029

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

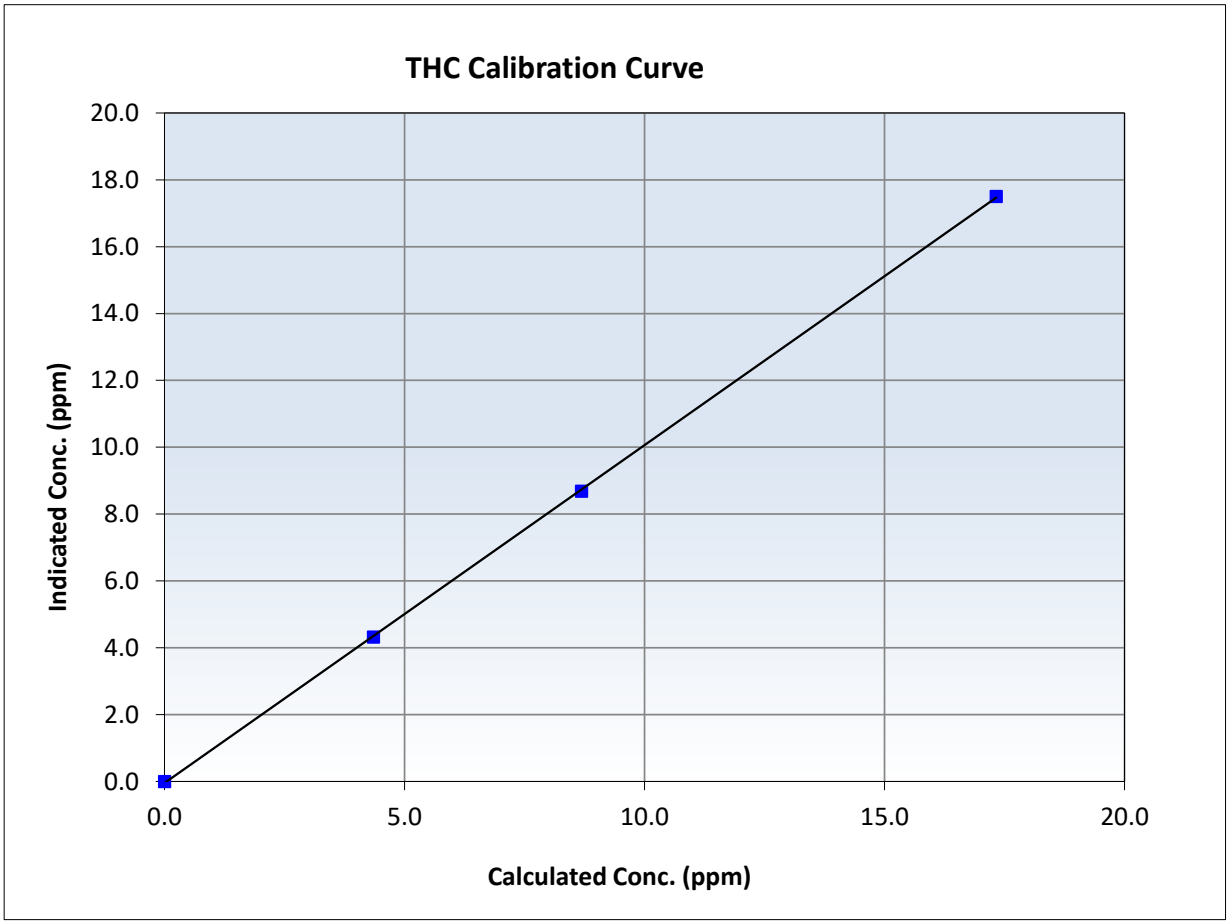
THC Calibration Summary

Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	April 24, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:16	End Time (MST):	13:32
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	0.999960	≥0.995
17.33	17.50	0.9901	Slope	1.010841	0.90 - 1.10
8.69	8.68	1.0005			
4.35	4.32	1.0066	Intercept	-0.047031	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

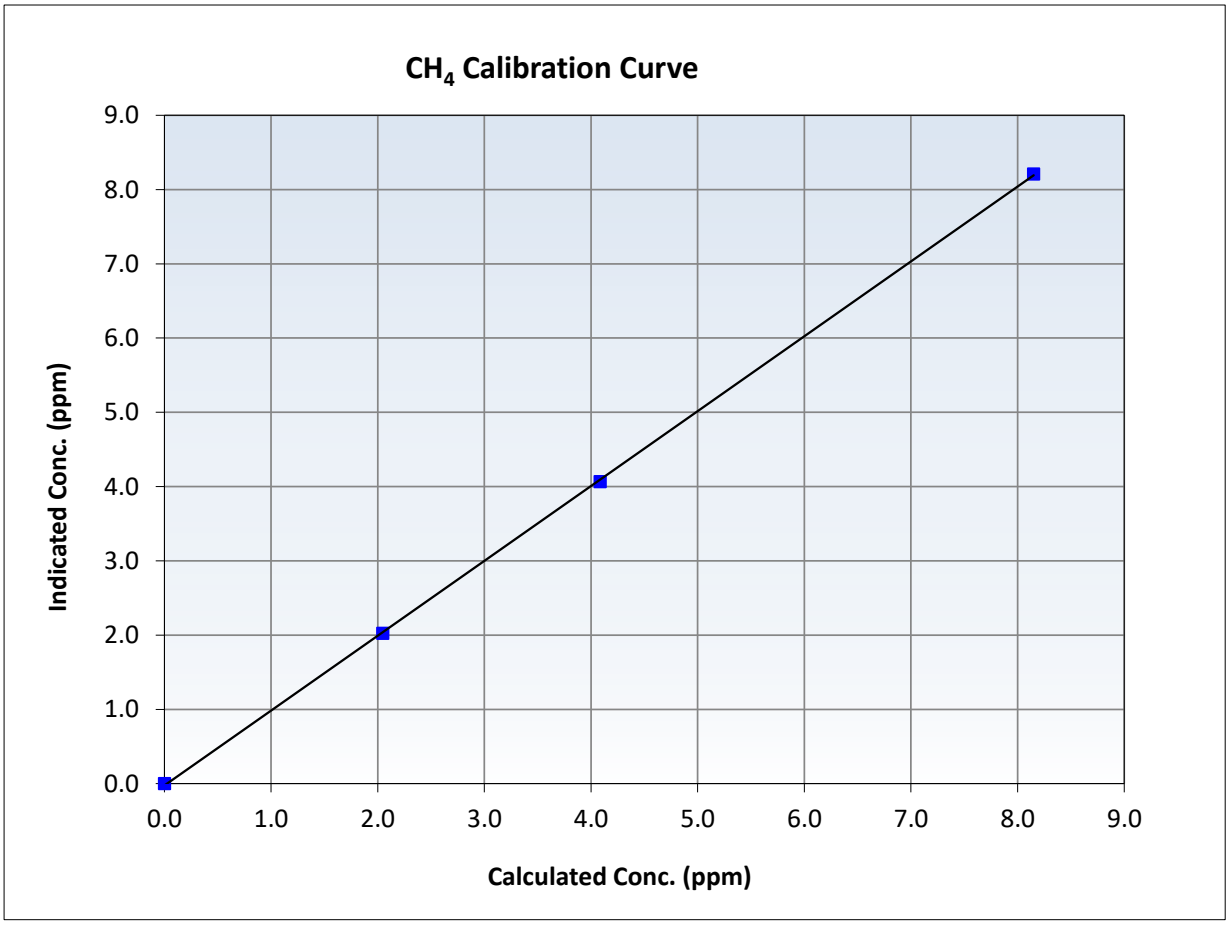
Station Information

Calibration Date:	May 24, 2024	Previous Calibration:	April 24, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:16	End Time (MST):	13:32
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.15	8.21	0.9928
4.09	4.07	1.0046
2.05	2.02	1.0117

Statistical Evaluation		Limits
Correlation Coefficient	0.999949	≥0.995
Slope	1.008203	0.90 - 1.10
Intercept	-0.025003	+/-0.5



Wood Buffalo Environmental Association

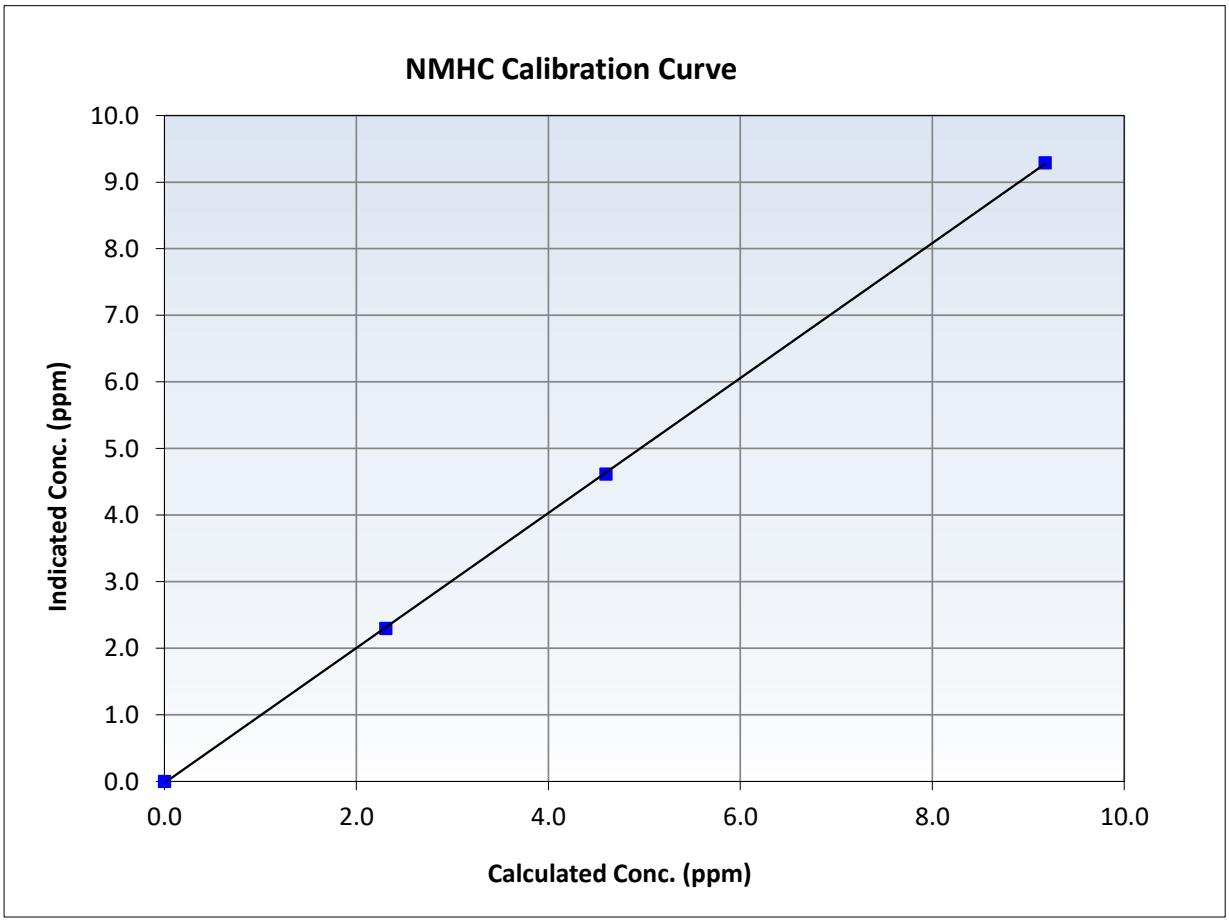
NMHC Calibration Summary

Station Information

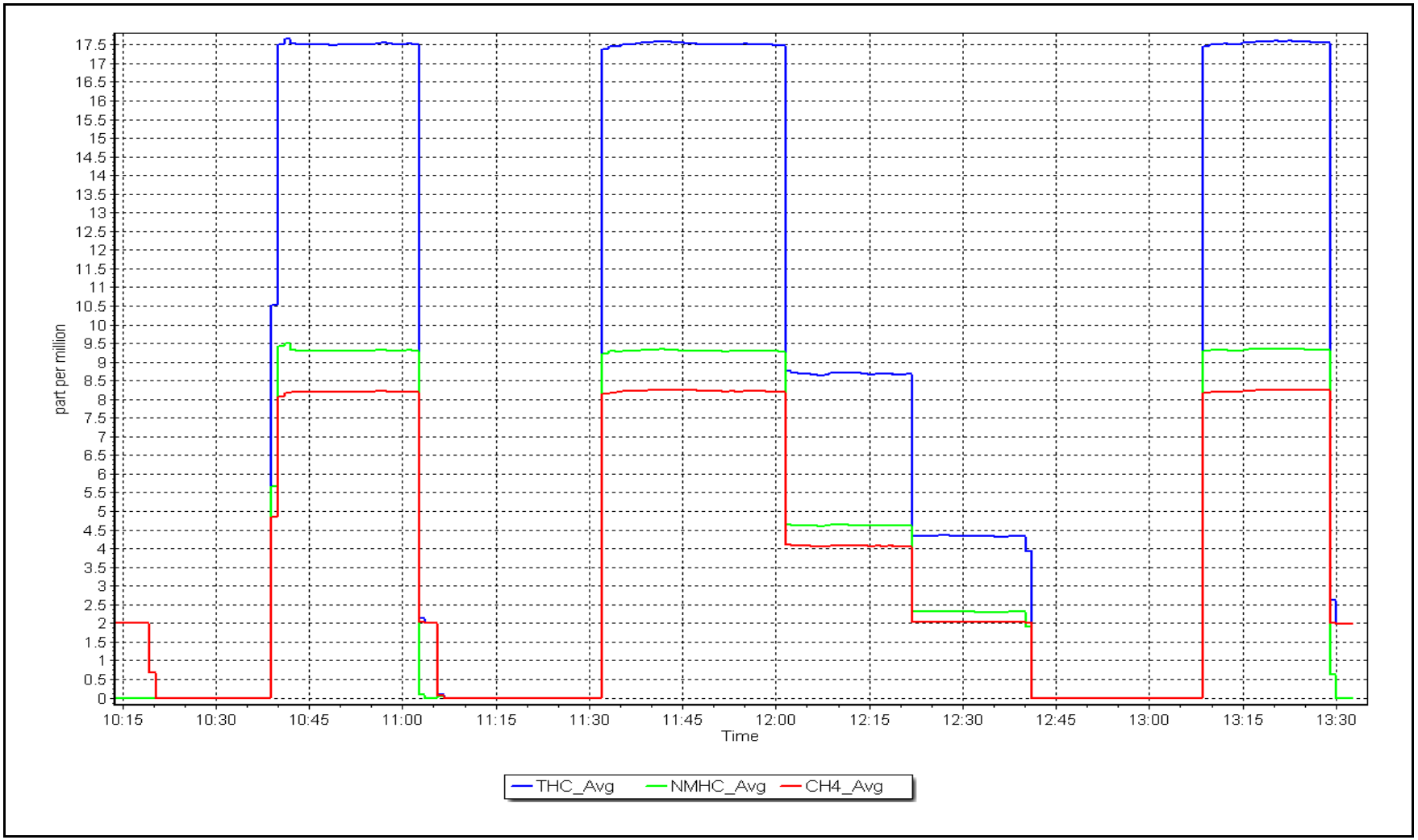
Calibration Date:	May 24, 2024	Previous Calibration:	April 24, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:16	End Time (MST):	13:32
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999970	*≥0.995*
9.18	9.29	0.9877	Slope	1.013246	*0.90 - 1.10*
4.60	4.62	0.9964	Intercept	-0.022029	*+/-0.5*
2.31	2.30	1.0026			



NMHC Calibration Plot Date: May 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:	May 31, 2024	Last Cal Date:	May 24, 2024
Start time (MST):	10:53	End time (MST):	12:43
Reason:	Cylinder Change		

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 (CH_4):		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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.75E-04	2.75E-04	NMHC SP Ratio:	4.90E-05	4.90E-05
CH4 Retention time:	14.8	14.8	NMHC Peak Area:	187273	187273
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	17.33	17.45	0.993
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.45	Prev response	17.47	*% 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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	17.33	17.46	0.992
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 0.992

Notes: Changed Hydrogen cylinder.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	9.18	9.25	0.992
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.25	Prev response	9.28	*% change	-0.3%
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	4932	81.4	9.18	9.27	0.990
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.990

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	8.15	8.20	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.20	Prev response	8.19	*% 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

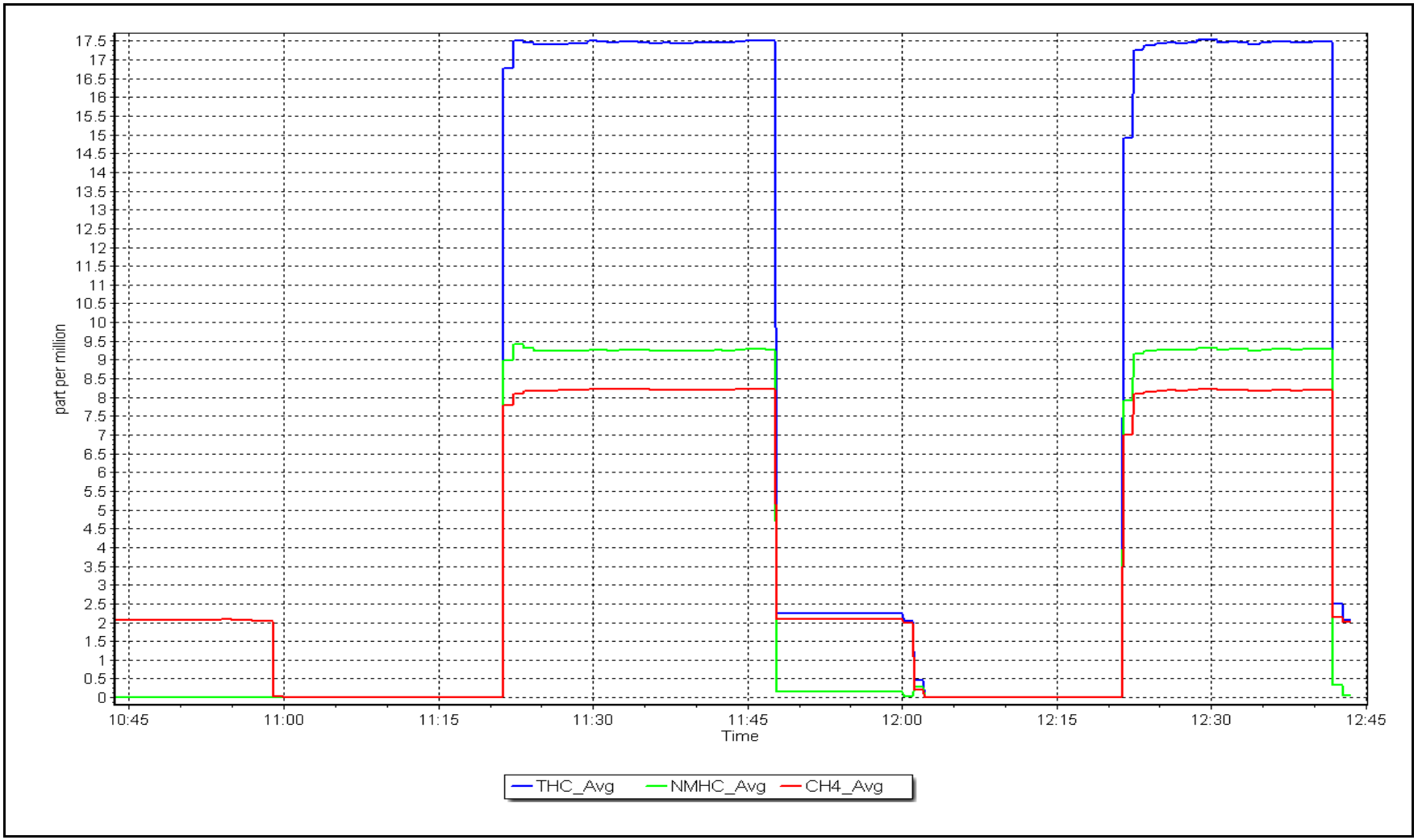
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	8.15	8.19	0.996
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.996

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.010841	1.007713
THC Cal Offset:	-0.047031	0.000000
CH4 Cal Slope:	1.008203	1.004452
CH4 Cal Offset:	-0.025003	0.000000
NMHC Cal Slope:	1.013246	1.010610
NMHC Cal Offset:	-0.022029	0.000000

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot Date: May 31, 2024 Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS13
FORT MCKAY SOUTH
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	May 17, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	10:57	End time (MST):	13:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.55	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC260812			
Removed Cal Gas Conc:	50.55	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	2448
Zero Air Gen Model:	API T701		Serial Number:	1117

Analyzer Information

Analyzer make:	API T100		Serial Number:	599	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004442	1.008015	Backgd or Offset:	90.0	90.0
Calibration intercept:	-2.497906	-1.197668	Coeff or Slope:	0.711	0.711

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	1.1	----
As found High point	4921	79.1	799.7	805.7	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	804.6	Previous response	800.7	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	1.1	----
High point	4921	79.1	799.7	805.7	0.993
Mid point	4961	39.5	399.3	401.2	0.995
Low point	4980	19.8	200.2	197.6	1.013
As left zero	5000	0.0	0.0	1.3	----
As left span	4921	79.1	799.7	809.4	0.988
				Average Correction Factor:	1.000

Notes: Remote calibrations. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

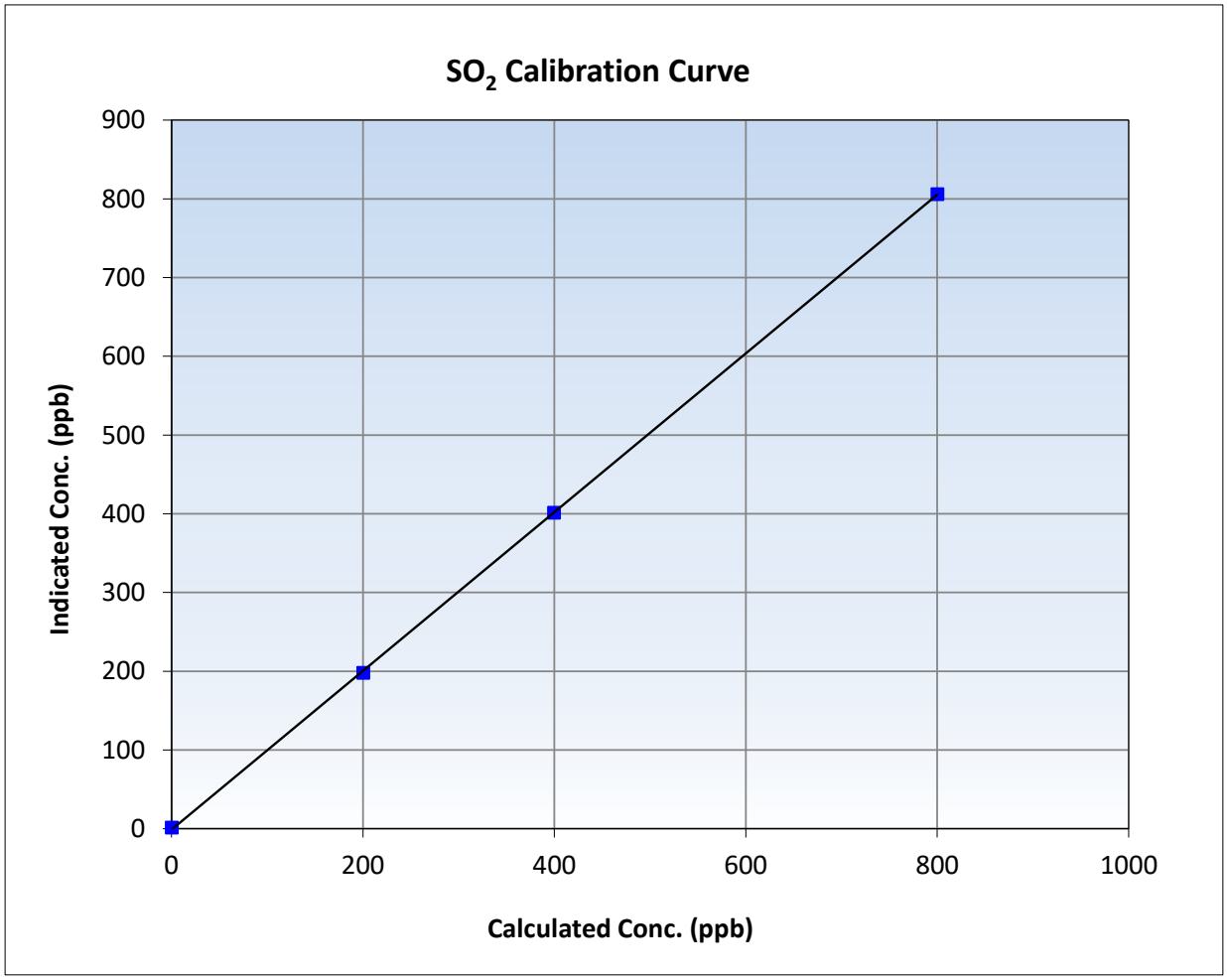
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:57	End Time (MST):	13:05
Analyzer make:	API T100	Analyzer serial #:	599

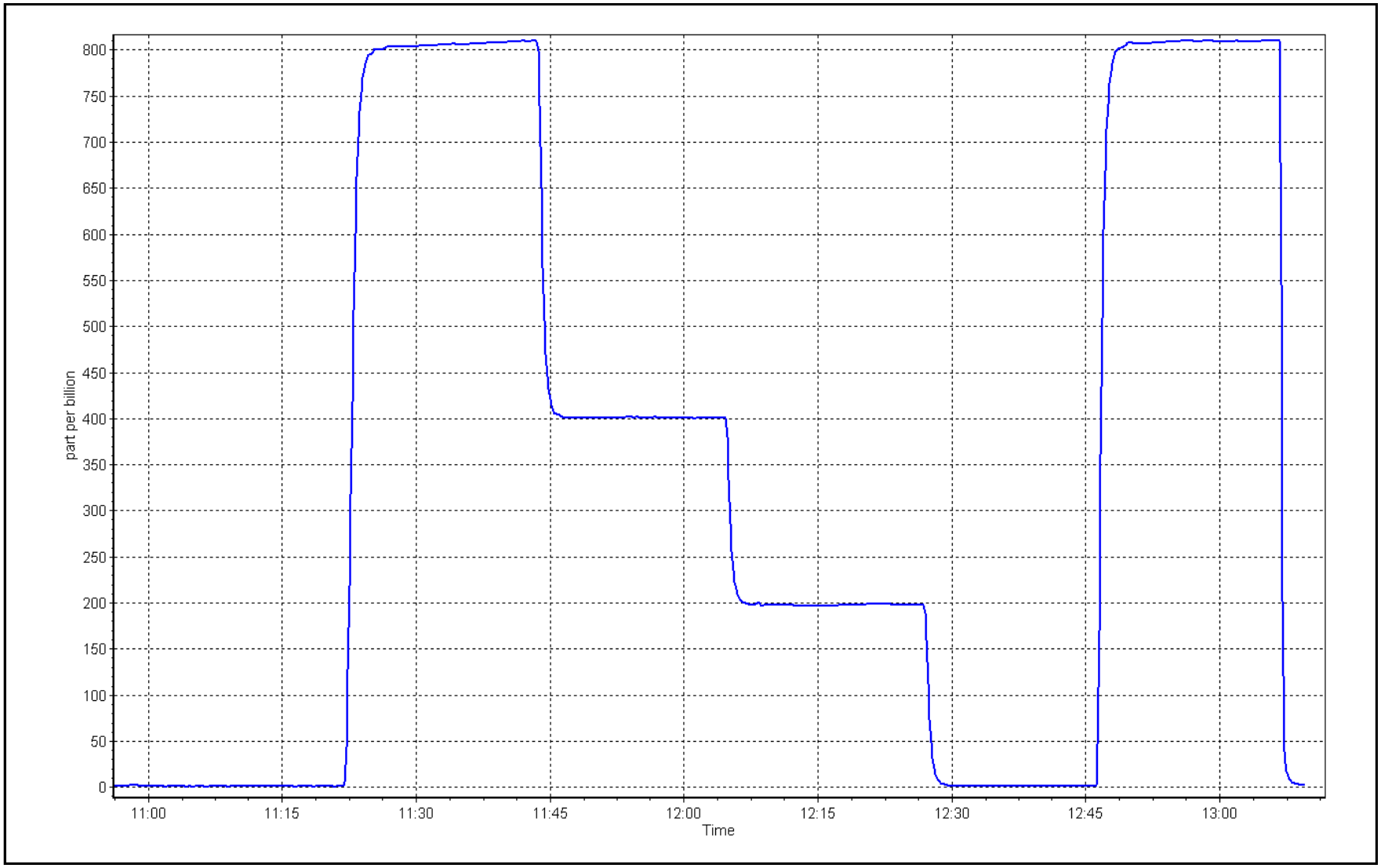
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.1	----
799.7	805.7	0.9925
399.3	401.2	0.9953
200.2	197.6	1.0131

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999958	*≥0.995*
Slope	1.008015	*0.90 - 1.10*
Intercept	-1.197668	*+/-30*



SO2 Calibration Plot Date: May 17, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	May 2, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	8:59	End time (MST):	12:53
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.34	ppm	Cal Gas Exp Date:	January 1, 2025
Cal Gas Cylinder #:	CC500241			
Removed Cal Gas Conc:	5.34	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2448
ZAG Make/Model:	API T701		Serial Number:	1117

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1180540017
Converter make:	CDN-101		Converter serial #:	521
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.010145	1.000504	Backgd or Offset:	4.1	3.7
Calibration intercept:	-0.602184	-0.262173	Coeff or Slope:	1.143	1.131

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.5	----
As found High point	4925	75.5	80.6	81.2	0.987
As found Mid point	4962	37.7	40.3	40.0	0.994
As found Low point	4981	18.9	20.2	19.3	1.019
New cylinder response					

Baseline Corr As found:	81.7	Prev response:	80.84	*% change:	1.1%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.015674	AF Intercept:	-0.822218
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999926	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4925	75.5	80.6	80.5	1.002
Mid point	4962	37.7	40.3	40.0	1.007
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	79.4	1.015
SO2 Scrubber Check	4921	79.1	791.0	0.1	----

Date of last scrubber change:	20-Jan-20	Ave Corr Factor	1.013
Date of last converter efficiency test:			

Notes: Changed inlet filter after as founds. Srubber checked after as left zero. Adjusted zero and span.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

TRS Calibration Summary

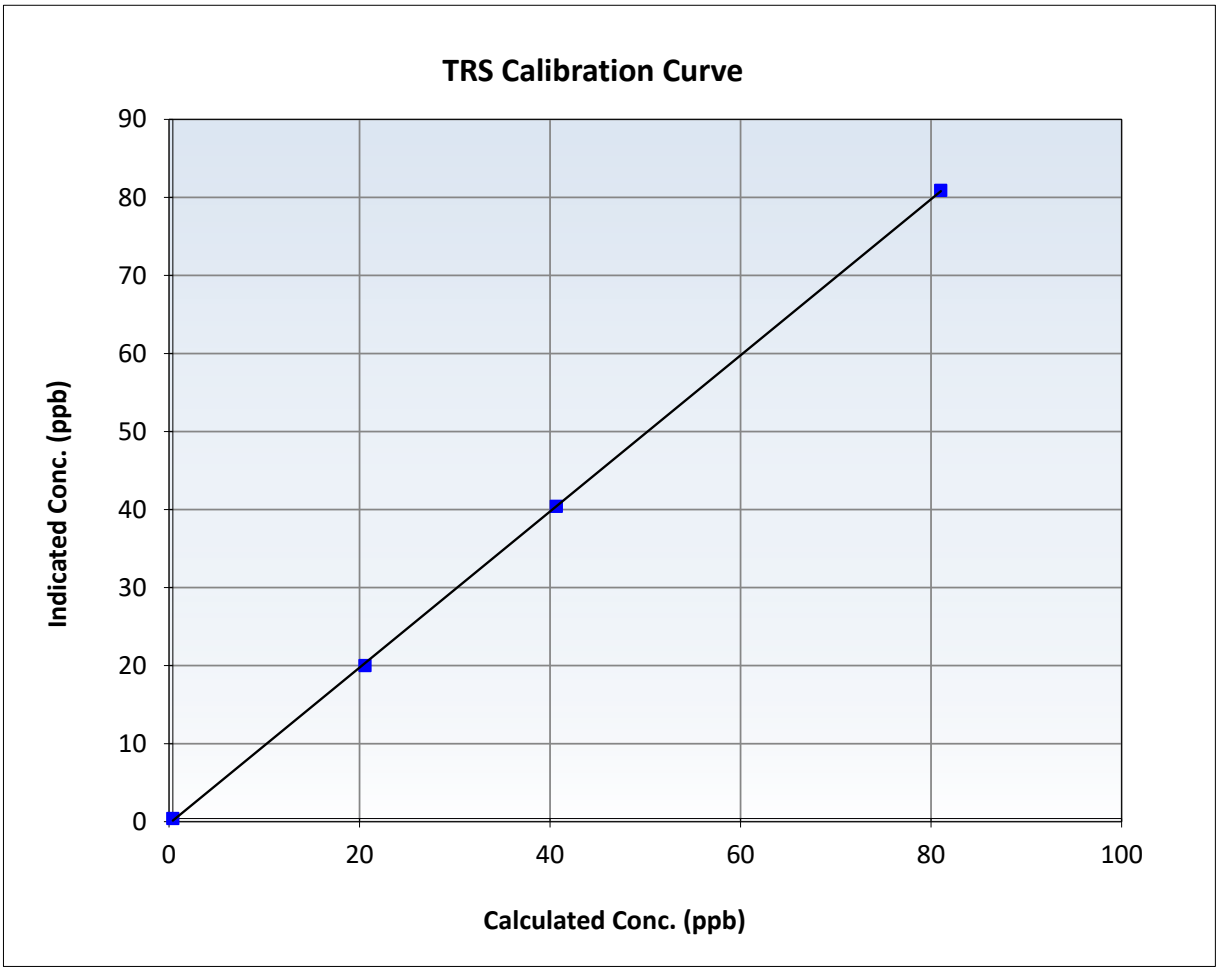
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 10, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:59	End Time (MST):	12:53
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017

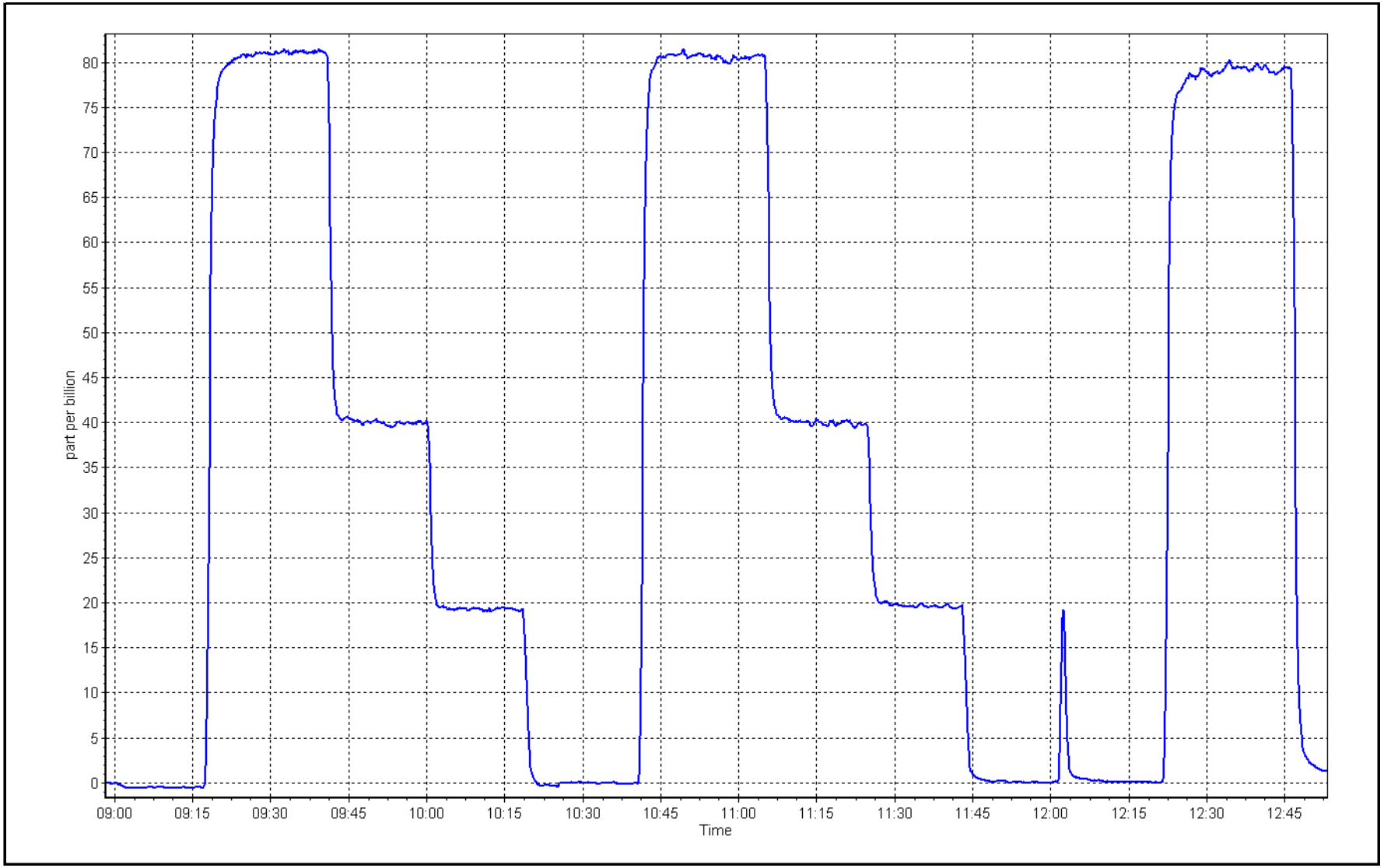
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.6	80.5	1.0016
40.3	40.0	1.0067
20.2	19.6	1.0299

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999947	*≥0.995*
Slope	1.000504	*0.90 - 1.10*
Intercept	-0.262173	*+/-3*



TRS Calibration Plot Date: May 2, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	May 17, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	10:57	End time (MST):	13:05
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC2608112	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
C3H8 Cal Gas Conc.	208.7 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
Removed C3H8 Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (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 #:	1172750023
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.05E-04	3.05E-04	NMHC SP Ratio:	5.21E-05	5.21E-05
CH4 Retention time:	15.40	15.40	NMHC Peak Area:	174169	174169
Zero Chromatogram:	ON	ON	Flat Baseline:	ON	ON

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.01	----
As found High point	4921	79.1	17.05	17.05	1.000
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.04	Prev response	17.06	*% 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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4921	79.1	17.05	17.05	1.000
Mid point	4961	39.5	8.51	8.53	0.998
Low point	4980	19.8	4.27	4.27	1.000
As left zero	5000	0.0	0.00	0.04	----
As left span	4921	79.1	17.05	17.09	0.997
				Average Correction Factor	0.999

Notes: Remote calibrations. No adjustment made.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	9.08	9.00	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.00	Prev response	9.10	*% change	-1.1%
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	4921	79.1	9.08	9.00	1.008
Mid point	4961	39.5	4.53	4.52	1.003
Low point	4980	19.8	2.27	2.27	0.999
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.01	1.008
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.01	----
As found High point	4921	79.1	7.97	8.06	0.990
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.05	Prev response	7.96	*% 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4921	79.1	7.97	8.06	0.989
Mid point	4961	39.5	3.98	4.01	0.992
Low point	4980	19.8	1.99	2.00	1.000
As left zero	5000	0.0	0.00	0.04	----
As left span	4921	79.1	7.97	8.09	0.985
				Average Correction Factor	0.993

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.002927	1.000019
THC Cal Offset:	-0.034543	0.008642
CH4 Cal Slope:	1.002287	1.011045
CH4 Cal Offset:	-0.026764	-0.005782
NMHC Cal Slope:	1.003450	0.991238
NMHC Cal Offset:	-0.007378	0.012622

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

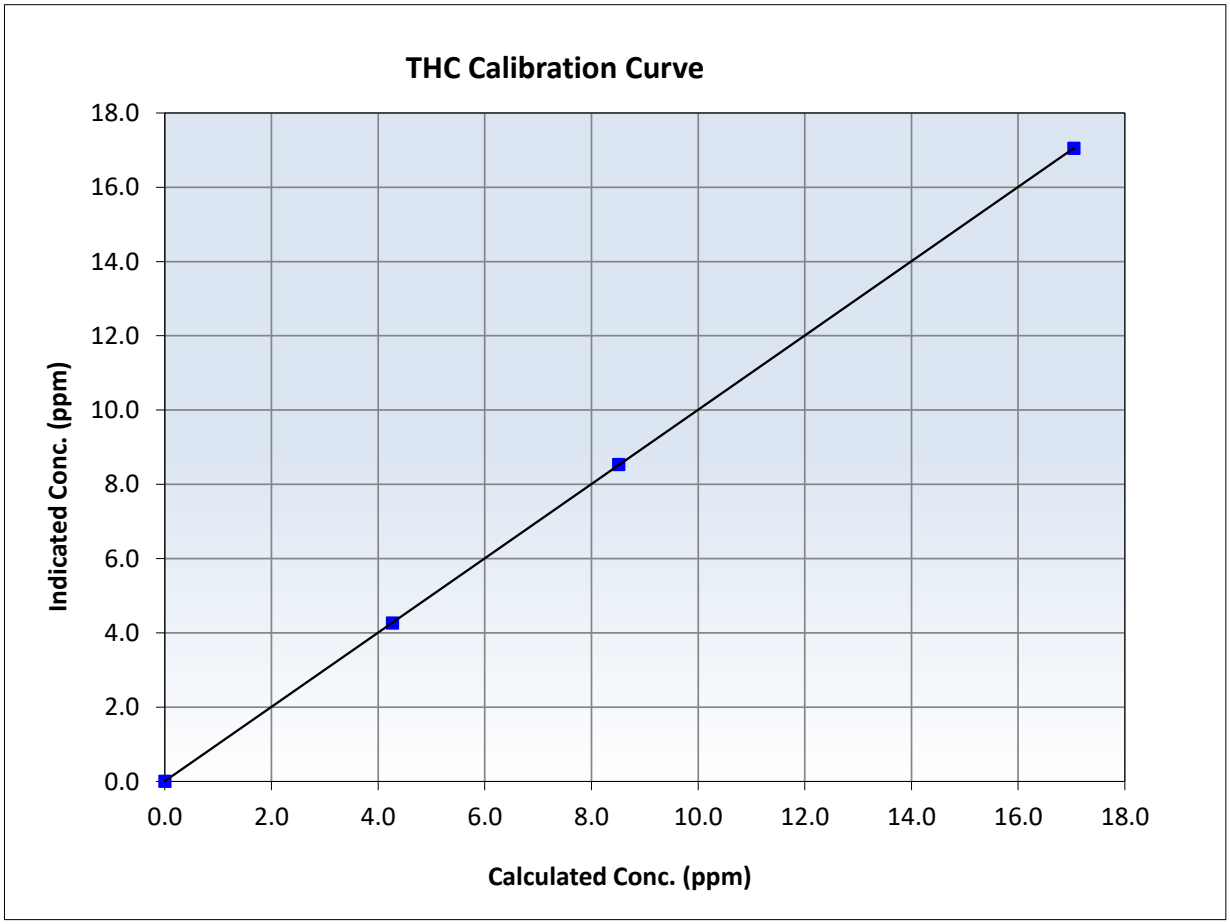
THC Calibration Summary

Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:57	End Time (MST):	13:05
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	0.01	----	Correlation Coefficient	0.999999	≥0.995
17.05	17.05	0.9997	Slope	1.000019	0.90 - 1.10
8.51	8.53	0.9976			
4.27	4.27	0.9996	Intercept	0.008642	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

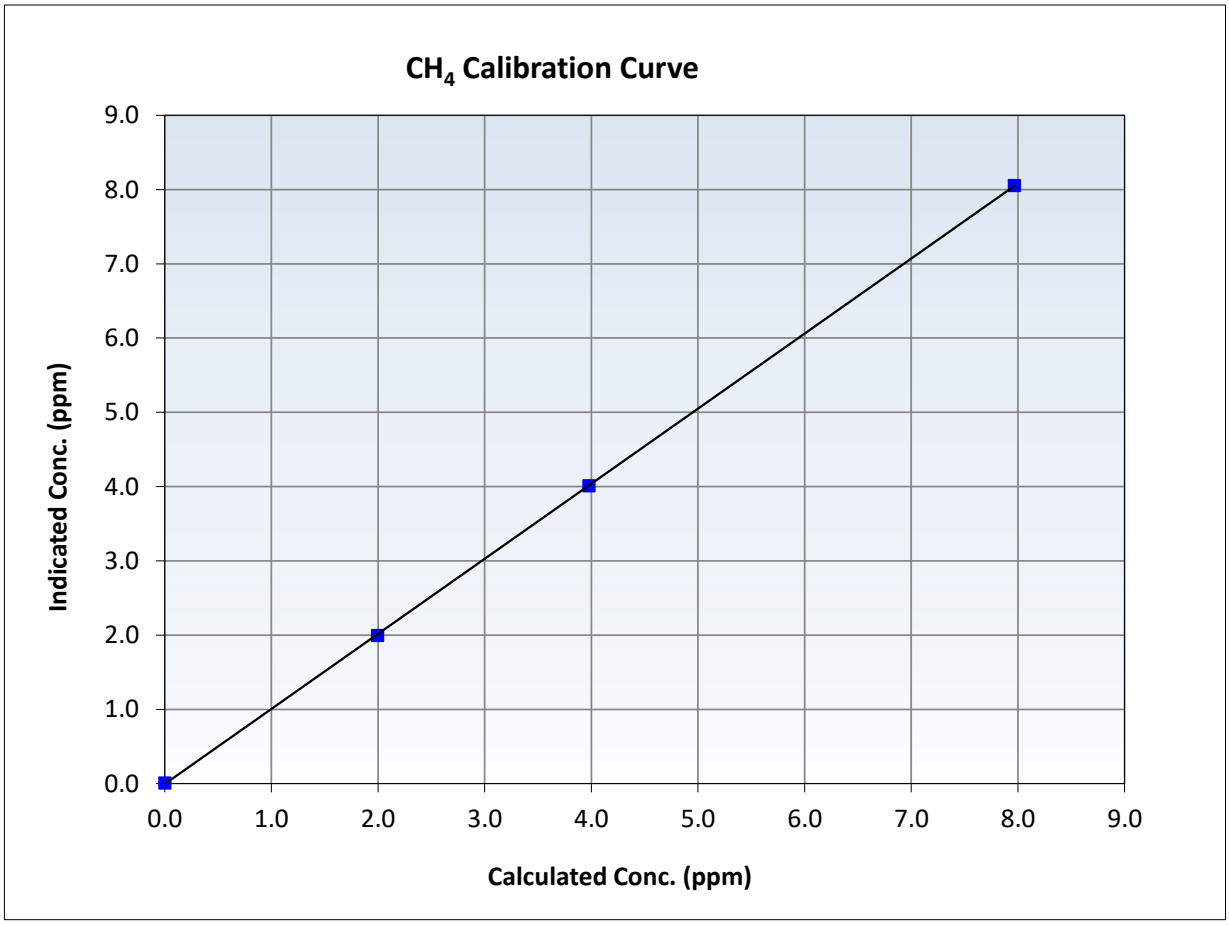
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:57	End Time (MST):	13:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.01	----
7.97	8.06	0.9890
3.98	4.01	0.9915
1.99	2.00	0.9997

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.011045	*0.90 - 1.10*
Intercept	-0.005782	*+/-0.5*



Wood Buffalo Environmental Association

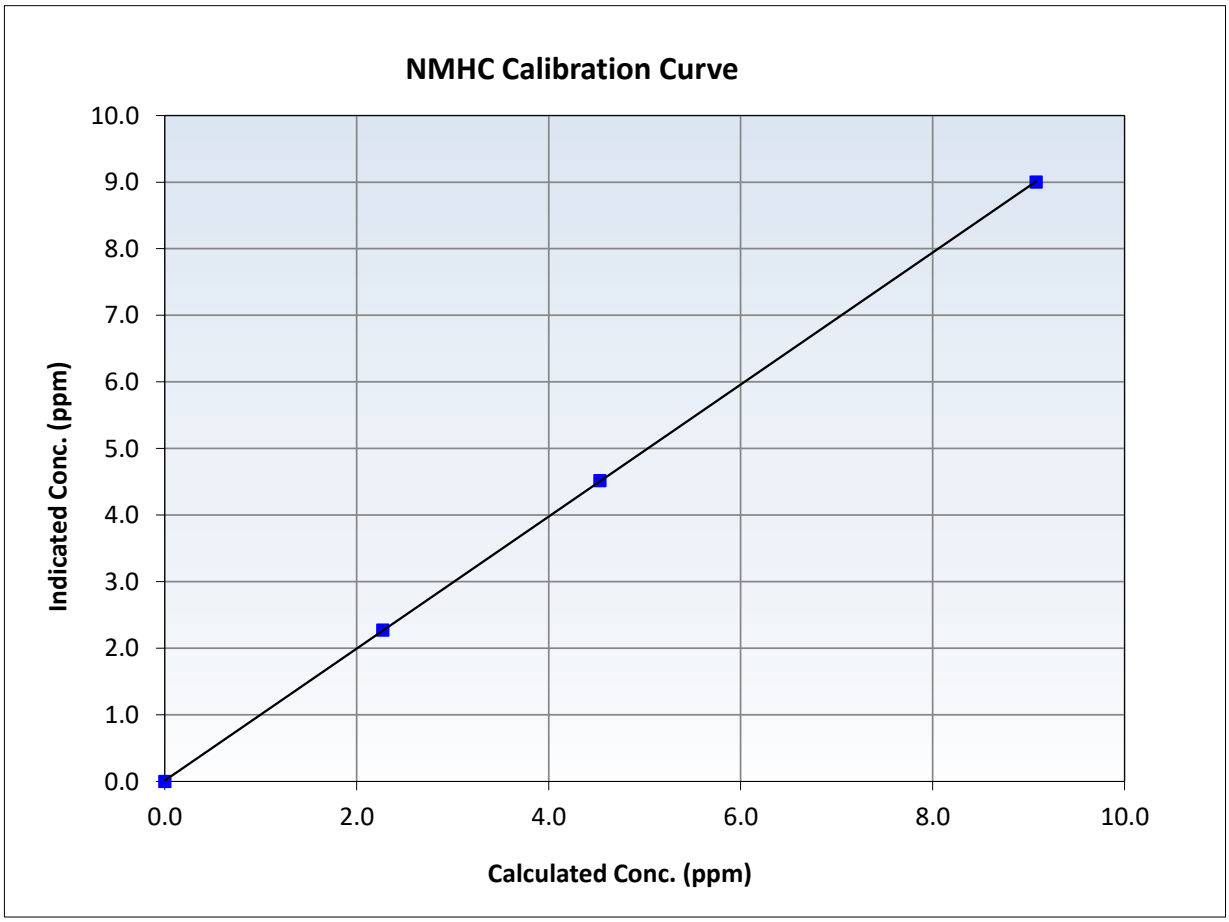
NMHC Calibration Summary

Station Information

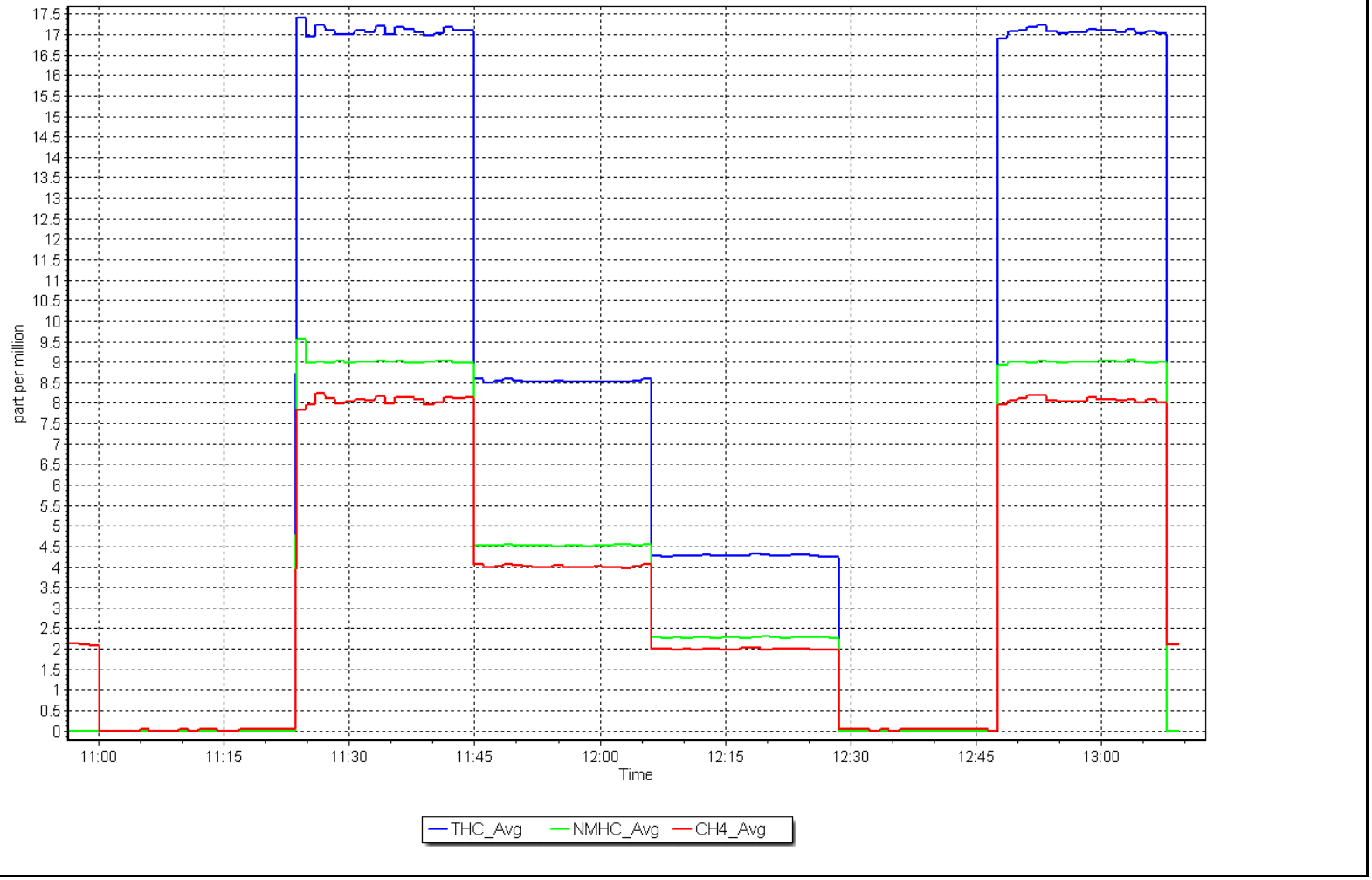
Calibration Date:	May 17, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:57	End Time (MST):	13:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999990	*≥0.995*
9.08	9.00	1.0084	Slope	0.991238	*0.90 - 1.10*
4.53	4.52	1.0032			
2.27	2.27	0.9995	Intercept	0.012622	*+/-0.5*



NMHC Calibration Plot Date: May 17, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort McKay South
Station number:	AMS 13
Calibration Date:	May 7, 2024
Last Cal Date:	April 16, 2024
Start time (MST):	9:40
End time (MST):	13:55
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T2UP1RP	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	48.25 ppm	NO Cal Gas Conc:	47.88 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.25 ppm	Removed Gas NO Conc:	47.88 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	2448
ZAG make/model:	APIT701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
AF High point	4917	83.5	805.7	799.5	6.2	805.8	798.3	7.5	0.9999	1.0015
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	804.7 ppb	NO =	799.7 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 0.1%
Baseline Corr 1st pt	NO_X =	805.8 ppb	NO =	798.3 ppb	As Found Statistics	*Percent Change	NO = -0.2%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1410661329

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.140	1.140	NO bkgnd or offset:	10.2	10.2
NOX coeff or slope:	1.002	1.002	NOX bkgnd or offset:	10.3	10.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	163.5	157.3

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000782	0.998924
NO_X Cal Offset:	-1.593202	-1.312891
NO Cal Slope:	1.003482	1.000524
NO Cal Offset:	-2.631535	-2.371115
NO_2 Cal Slope:	1.001146	0.996093
NO_2 Cal Offset:	-0.447686	-0.942456

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
High point	4917	83.5	805.7	799.5	6.2	804.3	798.8	5.4	1.0017	1.0009
Mid point	4958	41.8	403.4	400.3	3.1	400.9	397.1	3.8	1.0062	1.0080
Low point	4979	20.9	201.7	200.1	1.5	198.5	195.0	3.5	1.0161	1.0264
As left zero	5000	0.0	0.0	0.0	0.0	0.5	0.4	0.1	----	----
As left span	4917	83.5	805.7	379.9	425.8	808.9	379.9	429.0	0.9960	1.0000
								Average Correction Factor	1.0080	1.0118

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	797.9	376.9	427.2	425.0	1.0051	99.5%
Mid GPT point	797.9	585.2	218.9	216.8	1.0096	99.1%
Low GPT point	797.9	691.2	112.9	110.4	1.0224	97.8%
				Average Correction Factor	1.0124	98.8%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

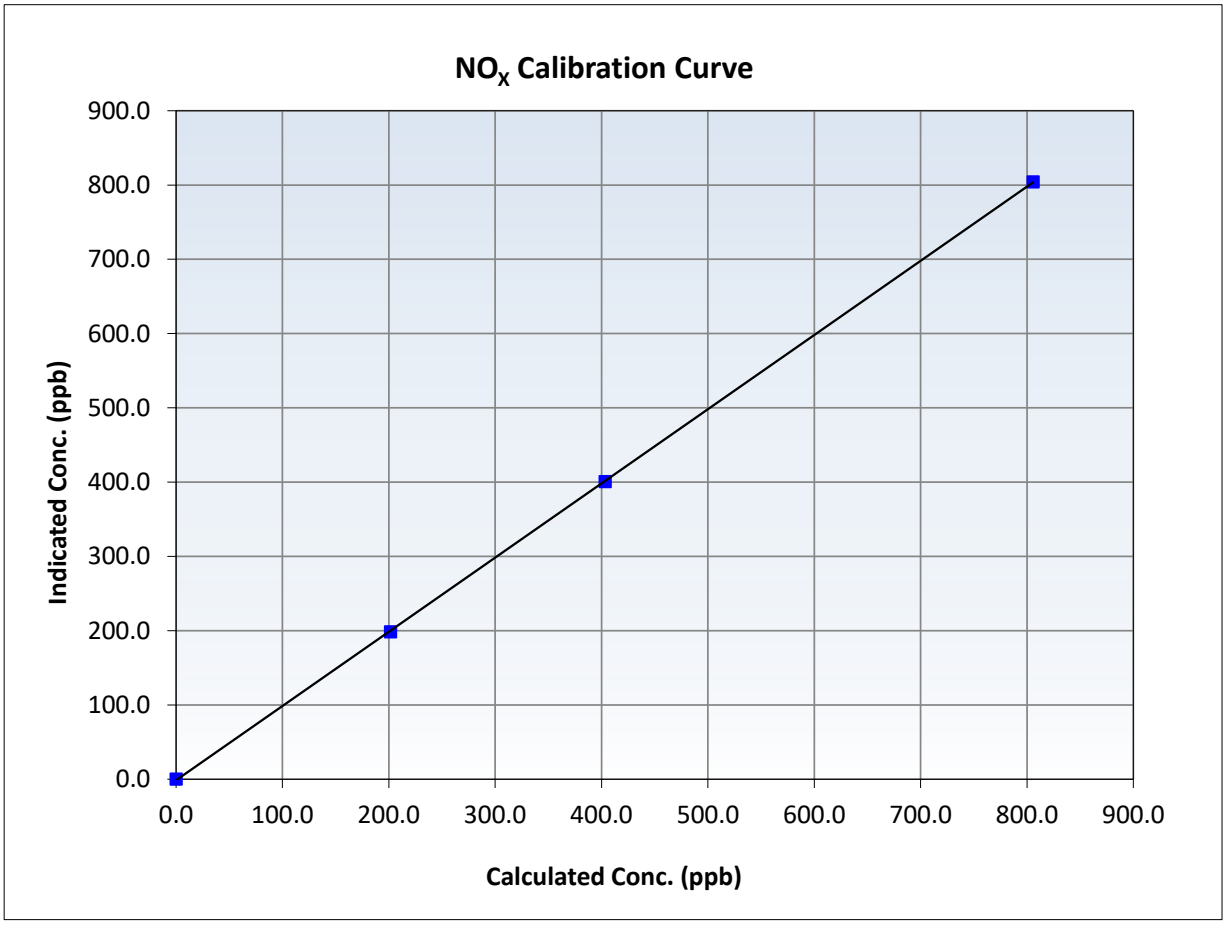
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 16, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:40	End Time (MST):	13:55
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
805.7	804.3	1.0017
403.4	400.9	1.0062
201.7	198.5	1.0161

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999982	*≥0.995*
Slope	0.998924	*0.90 - 1.10*
Intercept	-1.312891	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

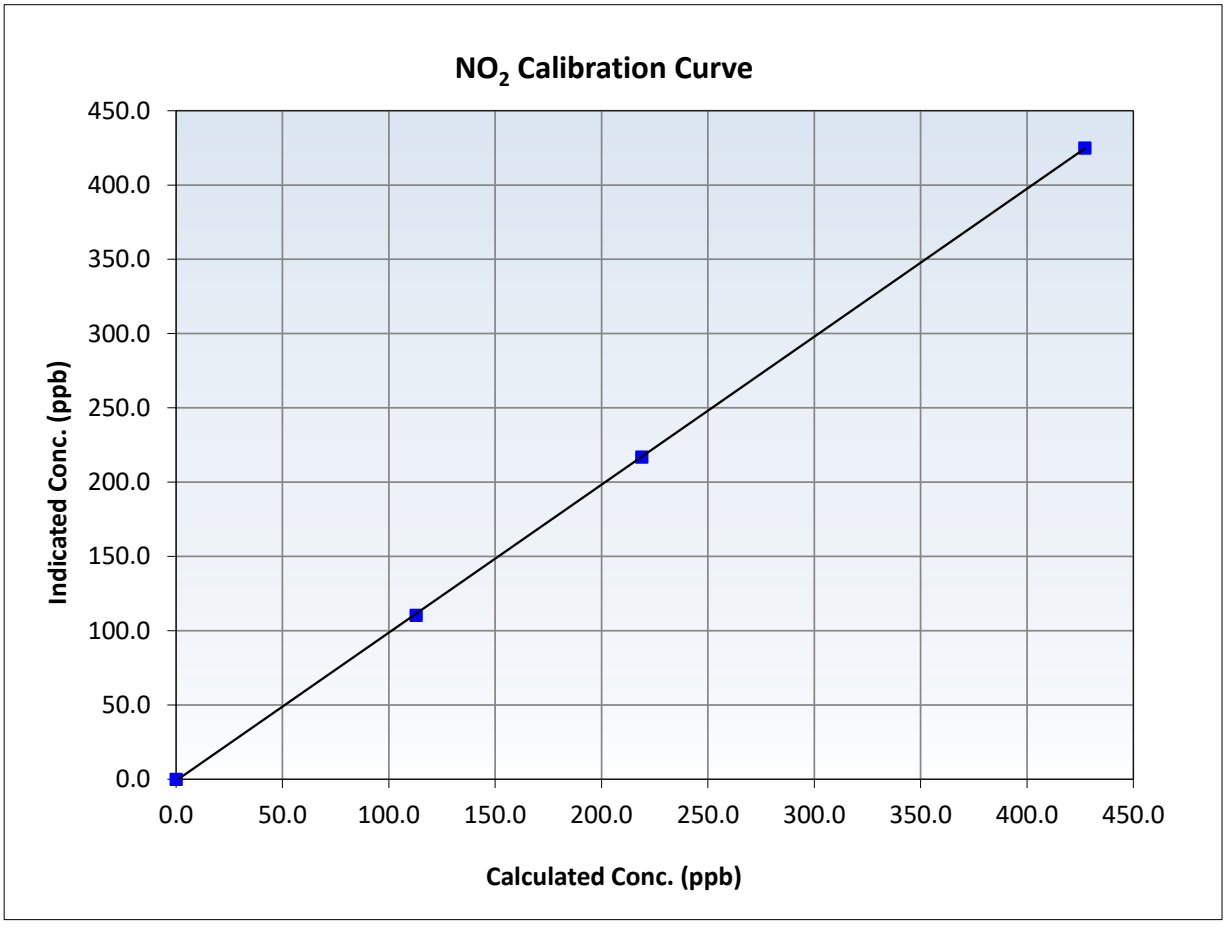
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 16, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:40	End Time (MST):	13:55
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
427.2	425.0	1.0051
218.9	216.8	1.0096
112.9	110.4	1.0224

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	0.996093	*0.90 - 1.10*
Intercept	-0.942456	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

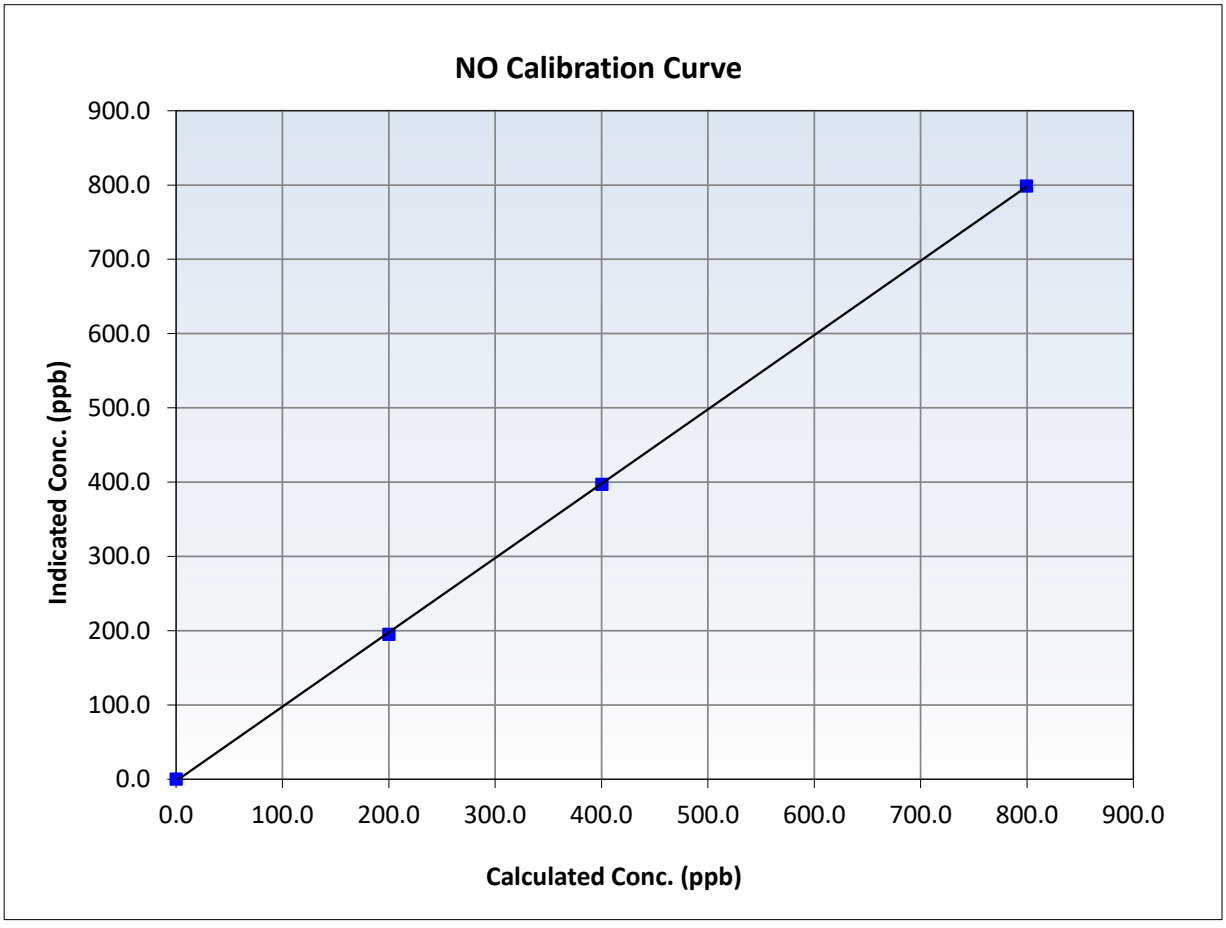
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 16, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:40	End Time (MST):	13:55
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

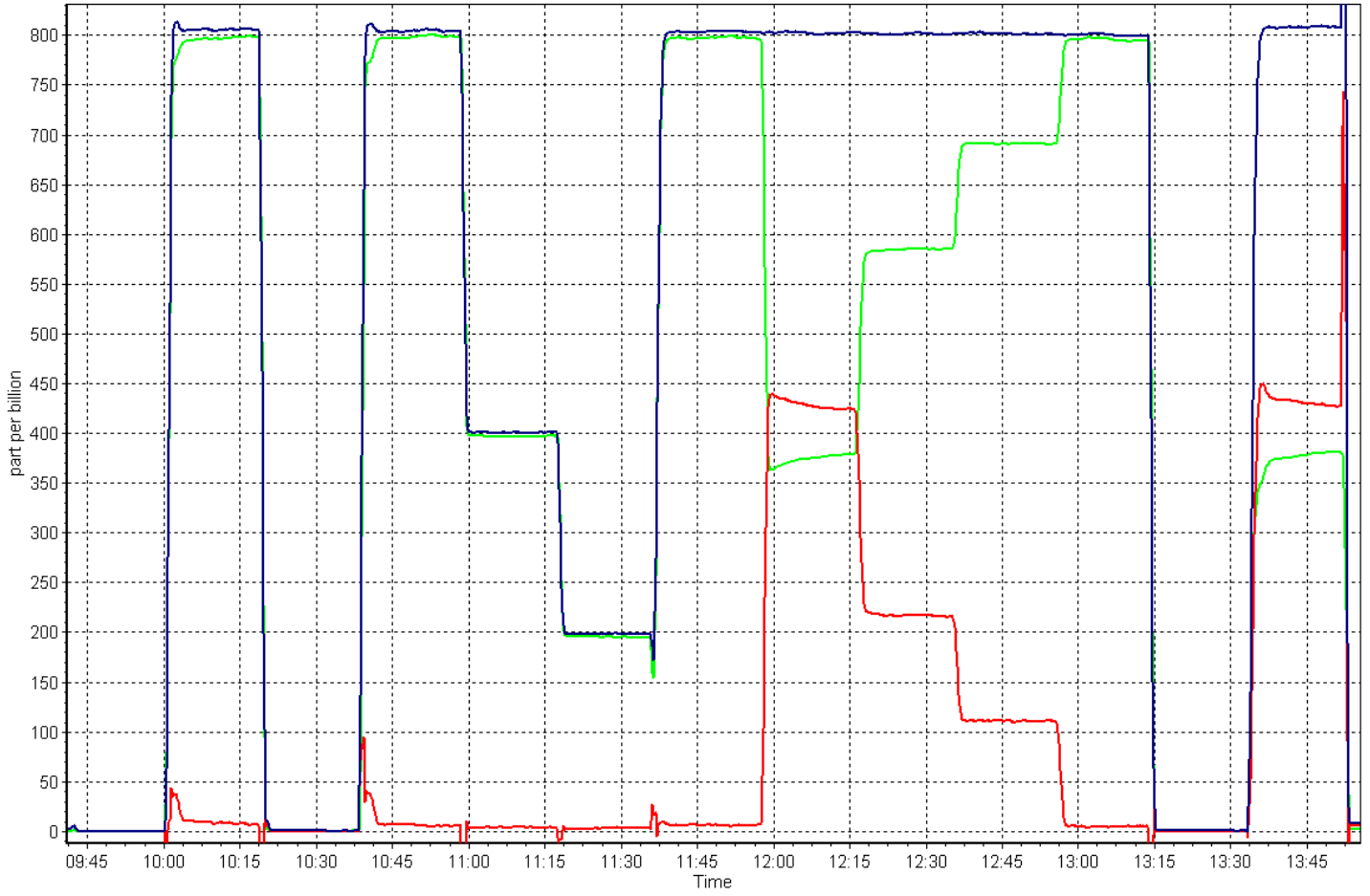
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.5	798.8	1.0009
400.3	397.1	1.0080
200.1	195.0	1.0264

Statistical Evaluation		Limits
Correlation Coefficient	0.999949	≥0.995
Slope	1.000524	0.90 - 1.10
Intercept	-2.371115	+/-20



NO_X Calibration Plot Date: May 7, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	May 6, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	10:22	End time (MST):	13:29
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001029	0.999914	Backgd or Offset:	2.7	2.7
Calibration intercept:	1.320000	1.540000	Coeff or Slope:	0.973	0.973

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	5000	994.5	400.0	401.9	0.996
As found Mid point					
As found Low point					
Baseline Corr As found:	401.8	Previous response	401.7	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.6	----
High point	5000	995.4	400.0	401.0	0.998
Mid point	5000	849.9	200.0	202.1	0.990
Low point	5000	746.6	100.0	102.4	0.977
As left zero	5000	0.0	0.0	0.6	----
As left span	5000	995.4	400.0	402.1	0.995
				Average Correction Factor	0.988

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

O_3 Calibration Summary

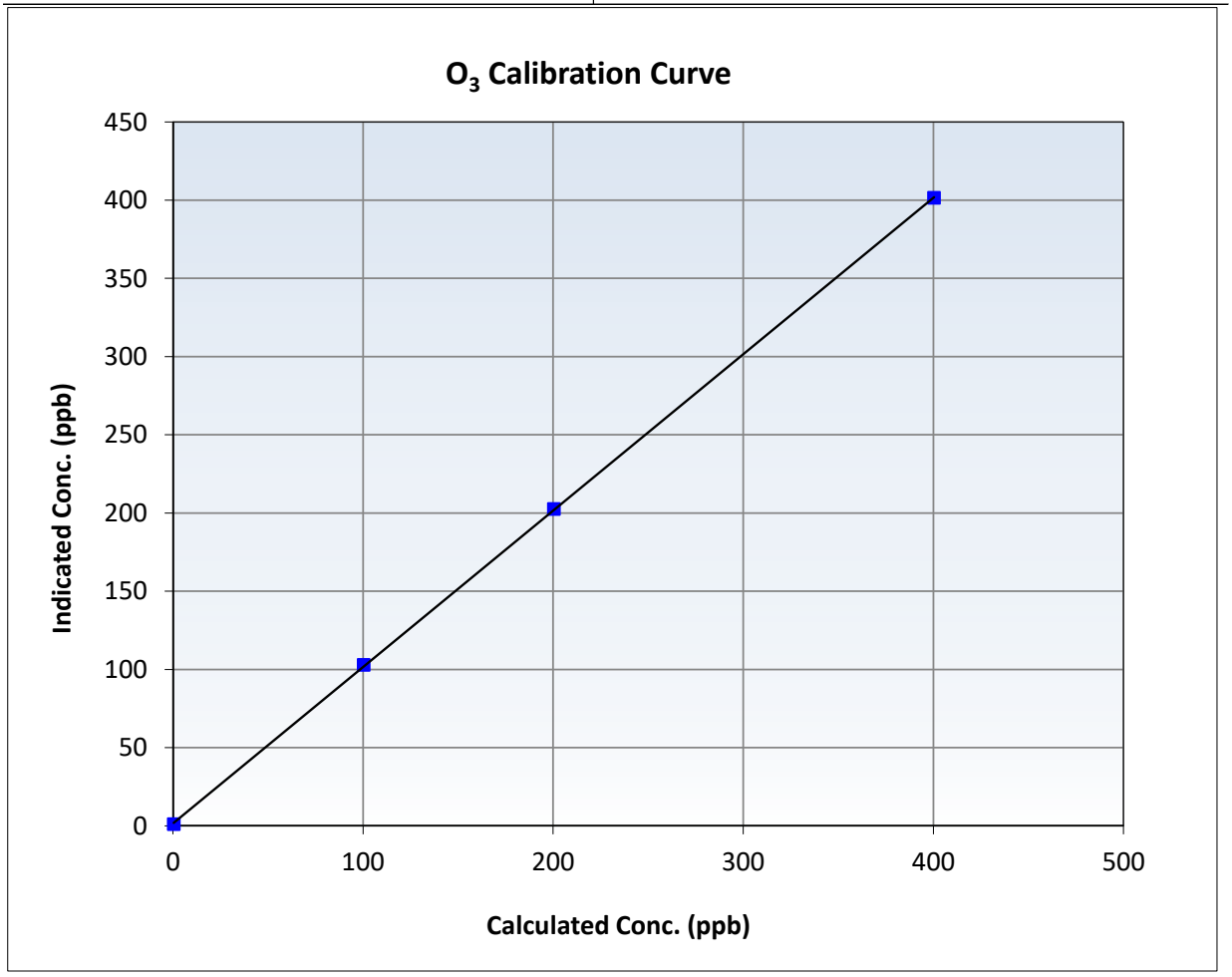
Station Information

Calibration Date:	May 6, 2024	Previous Calibration:	April 15, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:22	End Time (MST):	13:29
Analyzer make:	Teledyne API T400	Analyzer serial #:	3871

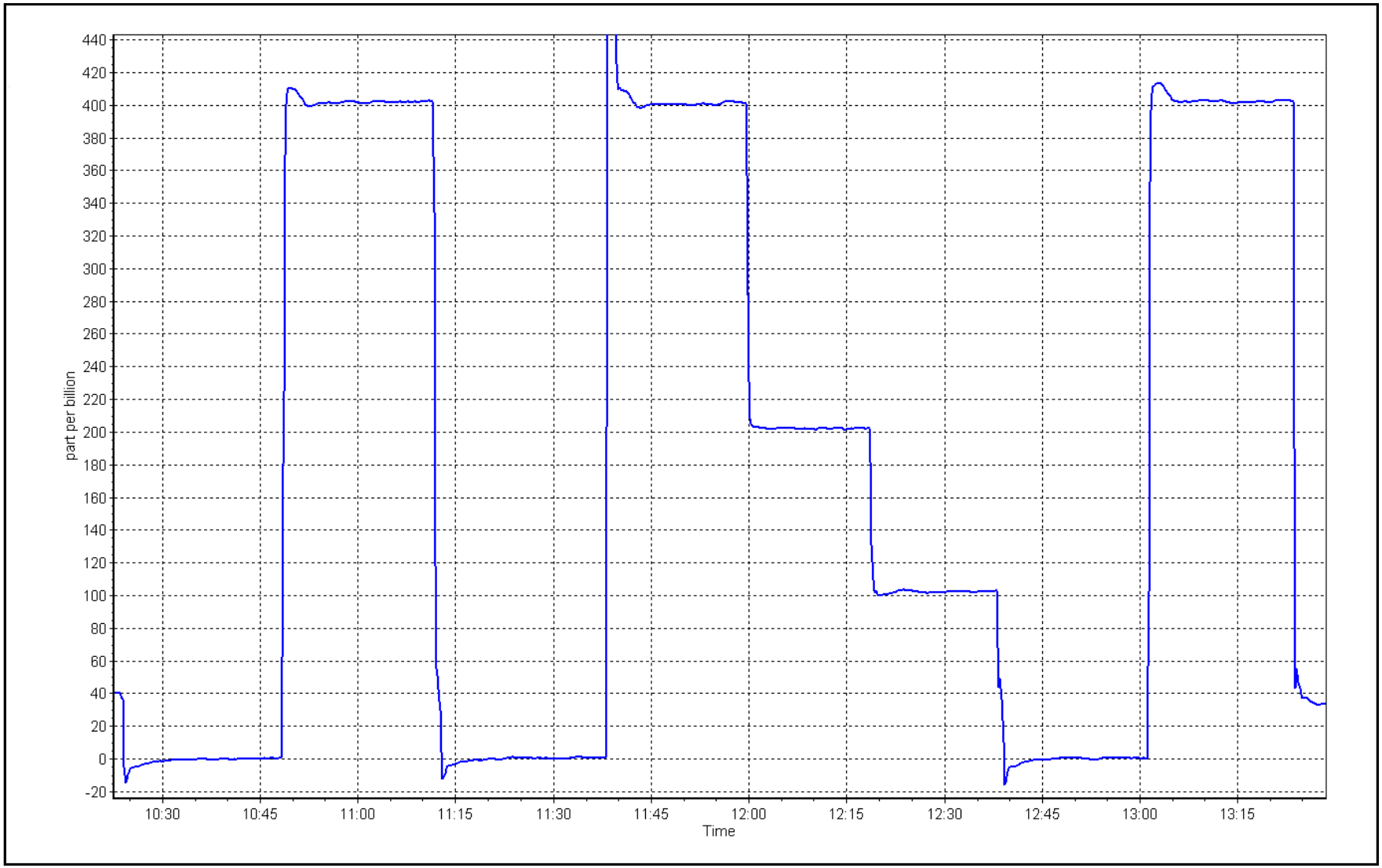
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
400.0	401.0	0.9975
200.0	202.1	0.9896
100.0	102.4	0.9766

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	0.999914	*0.90 - 1.10*
Intercept	1.540000	*+/- 5*



O_3 Calibration Plot Date: May 6, 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:	May 22, 2024	Last Cal Date:	April 19, 2024
Start time (MST):	9:05	End time (MST):	9:22
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)	9.30	8.91	9.30	☐	+/- 2 °C
P (mmHg)	735.50	737.70	735.50	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.93	5.00	☐	+/- 0.25 LPM
PW% (pump)	45	-----	45	☐	>80%
Zero Verification	PM w/o HEPA:	2.7	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				☐	+/- 0.5

Date Optical Chamber Cleaned: April 19, 2024

Date Disposable Filter Changed: April 19, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: June 29, 2023

Date RH/T Sensor Cleaned: June 29, 2023

Notes: No adjustments made. Leak check passed. Filter is still clean.

Calibration by: Sean Bala

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS14
ANZAC
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 3, 2024	Last Cal Date:	April 16, 2024
Start time (MST):	9:04	End time (MST):	14:04
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009311	1.019487	Backgd or Offset:	24.6	24.8
Calibration intercept:	-4.184570	-2.972409	Coeff or Slope:	1.043	1.043

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4938	80.3	799.3	809.3	0.987
As found Mid point	4979	40.2	400.1	400.2	0.999
As found Low point	4998	20.2	201.1	198.2	1.014
New cylinder response					
Baseline Corr As found:	809.4	Previous response	802.5	*% change	0.8%
Baseline Corr 2nd AF pt:	400.3	AF Slope:	1.014249	AF Intercept:	-3.188607
Baseline Corr 3rd AF pt:	198.3	AF Correlation:	0.999930	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4938	80.3	799.3	813.6	0.982
Mid point	4979	40.2	400.1	402.4	0.994
Low point	4998	20.2	201.1	200.1	1.005
As left zero	5000	0.0	0.0	0.2	----
As left span	4938	80.3	799.3	813.8	0.982
				Average Correction Factor:	0.994

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

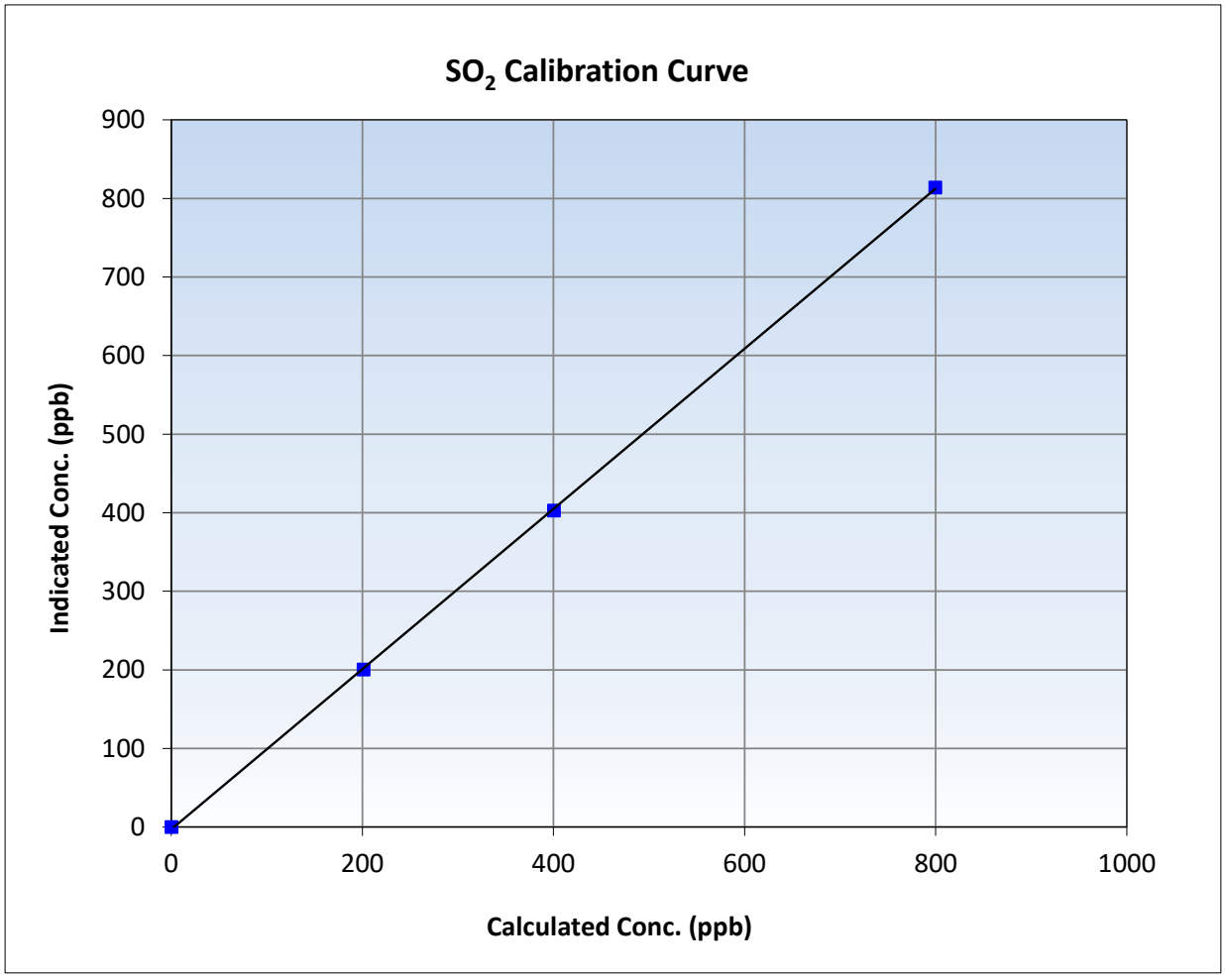
Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	April 16, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:04	End Time (MST):	14:04
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

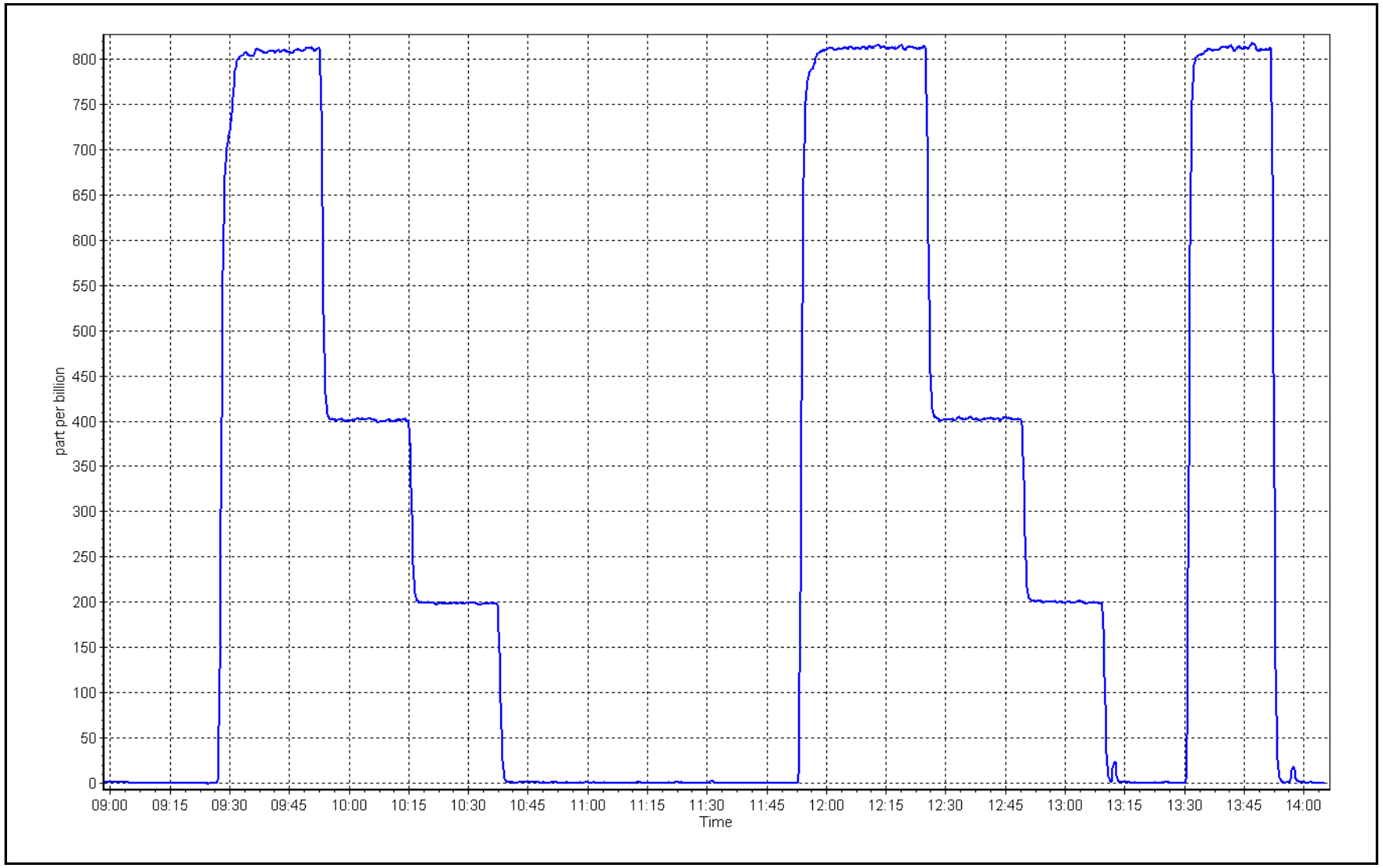
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
799.3	813.6	0.9824
400.1	402.4	0.9942
201.1	200.1	1.0048

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999945	*≥0.995*
Slope	1.019487	*0.90 - 1.10*
Intercept	-2.972409	*+/-30*



SO2 Calibration Plot Date: May 3, 2024 Location: Anzac



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 9, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	9:22	End time (MST):	14:02
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.15	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC510379			
Removed Cal Gas Conc:	5.15	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3060
ZAG Make/Model:	API 701H		Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153582	
Converter make:	CD Nova CDN-101		Converter serial #:	503	
Analyzer Range	0 - 100 ppb		Converter Temp:	800	degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.015603	1.003735	Backgd or Offset:	2.3	2.3
Calibration intercept:	-0.225550	-0.185416	Coeff or Slope:	0.984	0.984

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4938	77.9	80.0	80.5	0.992
As found Mid point	4973	38.9	40.0	40.4	0.987
As found Low point	4997	19.5	20.0	20.0	0.996
New cylinder response					

Baseline Corr As found:	80.6	Prev response:	81.01	*% change:	-0.5%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.008346	AF Intercept:	-0.085404
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999987	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4938	77.9	80.0	80.1	0.998
Mid point	4973	38.9	40.0	39.9	1.001
Low point	4997	19.5	20.0	19.8	1.011
As left zero	5000	0.0	0.0	0.1	----
As left span	4938	77.9	80.0	78.4	1.020
SO2 Scrubber Check	4936	80.3	800.4	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.003
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

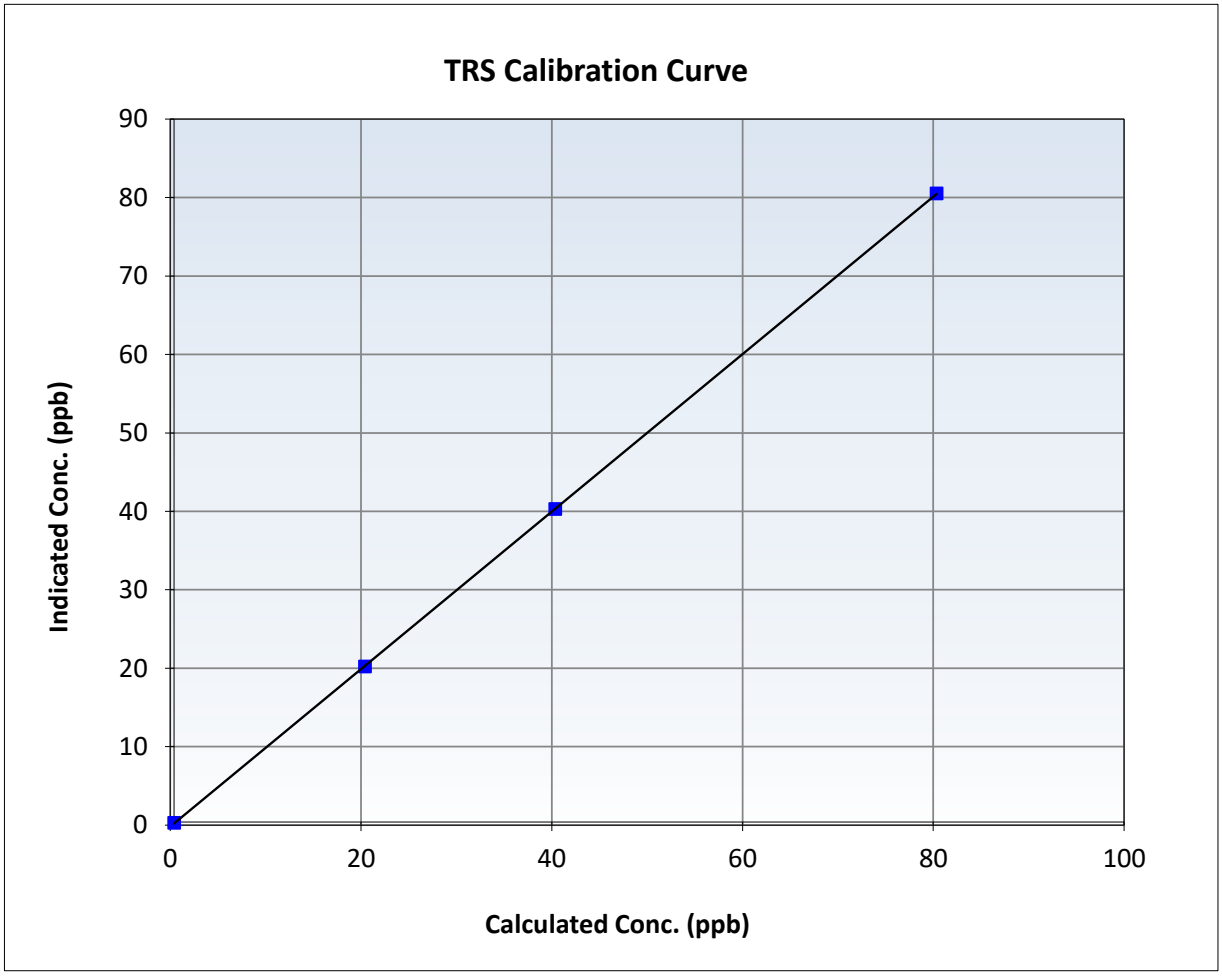
TRS Calibration Summary

Station Information

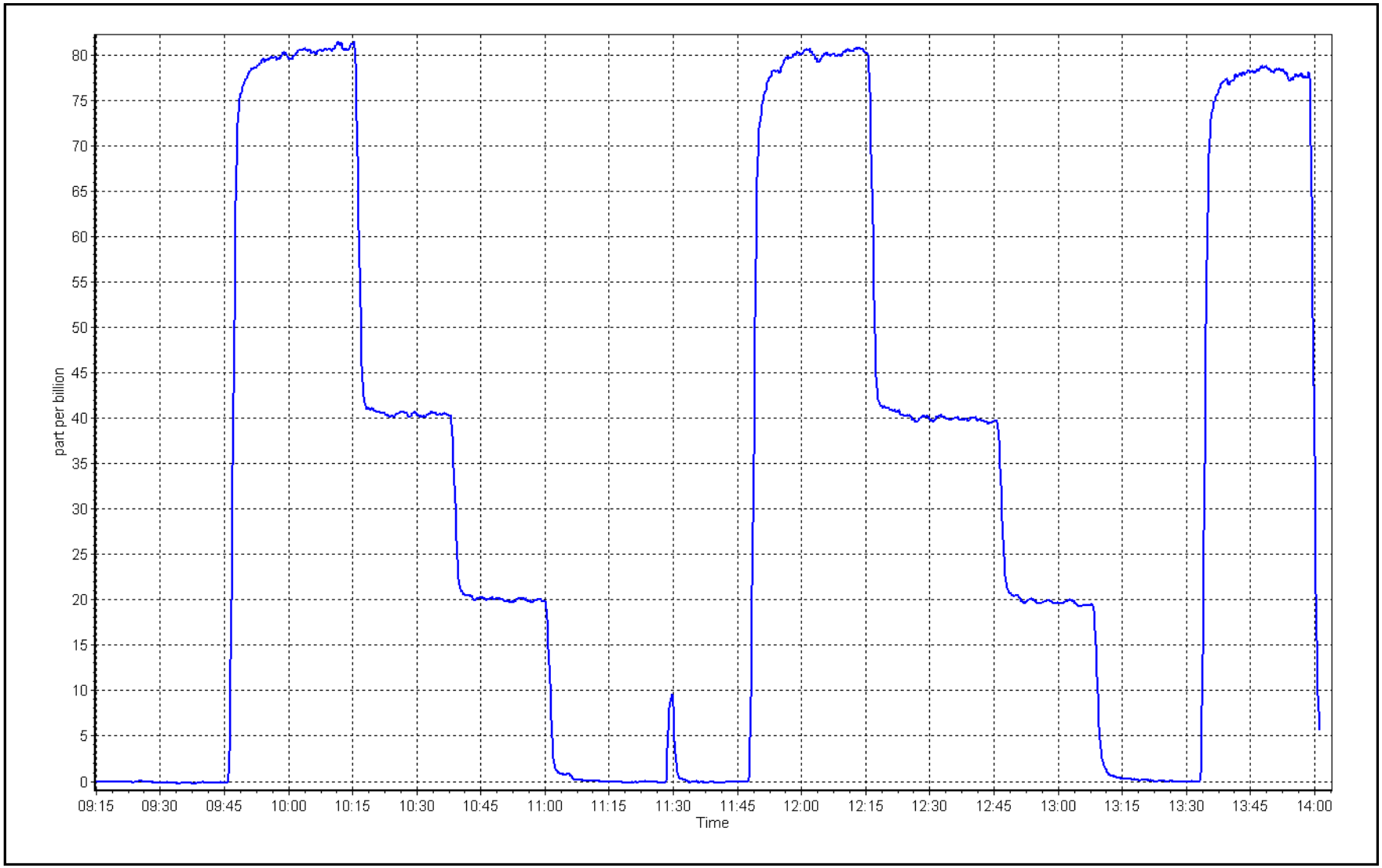
Calibration Date:	May 9, 2024	Previous Calibration:	April 11, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:22	End Time (MST):	14:02
Analyzer make:	CD Nova CDN-101	Analyzer serial #:	503

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999995	*≥0.995*
80.0	80.1	0.9981	Slope	1.003735	*0.90 - 1.10*
40.0	39.9	1.0014			
20.0	19.8	1.0107	Intercept	-0.185416	*+/-3*



TRS Calibration Plot Date: May 9, 2024 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 3, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	9:04	End time (MST):	10:47
Reason:	Removal		

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3060
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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.25E-04	NA	NMHC SP Ratio:	4.11E-05	NA
CH4 Retention time:	13.30	NA	NMHC Peak Area:	221451	NA
Zero Chromatogram:	OFF		Flat Baseline:	OFF	

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4938	80.3	17.10	16.24	1.053
As found Mid point	4979	40.2	8.56	8.05	1.063
As found Low point	4998	20.2	4.30	3.99	1.078
New cylinder response					
Baseline Corr AF:	16.24	Prev response	16.71	*% change	-2.9%
Baseline Corr 2nd AF:	8.05	AF Slope:	0.951160	AF Intercept:	-0.053021
Baseline Corr 3rd AF:	3.99	AF Correlation:	0.999950	* = > +/-5% change initiates investigation	

THC Calibration Data

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

Average Correction Factor

Notes: Removal calibration. Conducted investigation and found no alarms; diagnostics closely resembled previous calibration; Chromatograms appeared normal. Observations revealed a drop in air pressure (air and actuator lines (T- Connection) on the back of analyzer from ZAG) post backflush mode, decreasing to approximately 18 psi from the normal 24 psi. This decline is resulting in reduced flame count and flame temperature, though neither reaches zero. Suspecting an internal issue, to be resolved at the repair shop.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4938	80.3	9.11	8.50	1.072
As found Mid point	4979	40.2	4.56	4.23	1.079
As found Low point	4998	20.2	2.29	2.11	1.085
New cylinder response					
Baseline Corr AF:	8.50	Prev response	8.87	*% change	-4.4%
Baseline Corr 2nd AF:	4.23	AF Slope:	0.933538	AF Intercept:	-0.016001
Baseline Corr 3rd AF:	2.11	AF Correlation:	0.999982	* = > +/-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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4938	80.3	7.99	7.74	1.032
As found Mid point	4979	40.2	4.00	3.83	1.045
As found Low point	4998	20.2	2.01	1.88	1.070
New cylinder response					
Baseline Corr AF:	7.74	Prev response	7.83	*% change	-1.2%
Baseline Corr 2nd AF:	3.83	AF Slope:	0.971146	AF Intercept:	-0.037620
Baseline Corr 3rd AF:	1.88	AF Correlation:	0.999892	* = > +/-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					

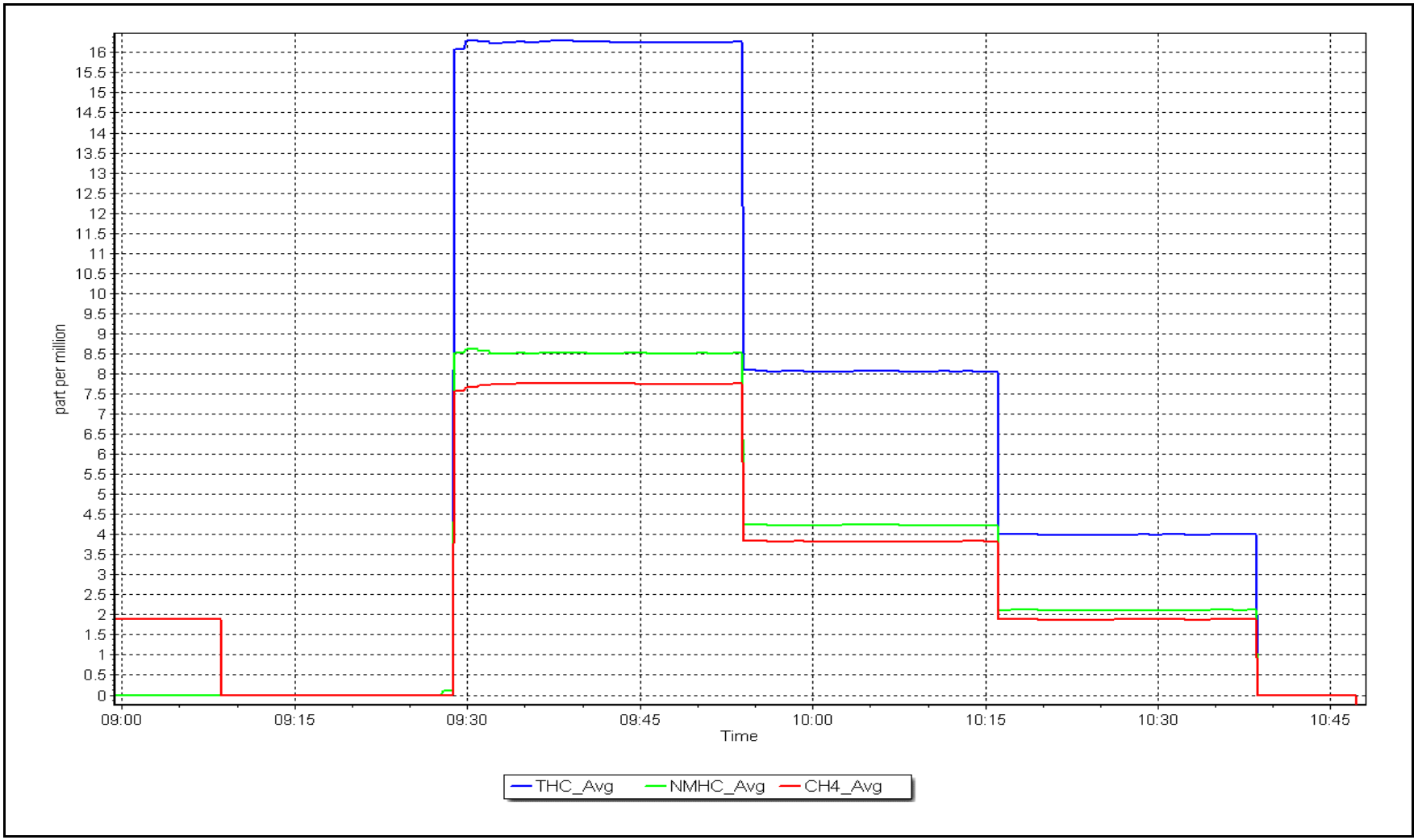
Average Correction Factor

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.980408	NA
THC Cal Offset:	-0.060379	NA
CH4 Cal Slope:	0.984987	NA
CH4 Cal Offset:	-0.035307	NA
NMHC Cal Slope:	0.976268	NA
NMHC Cal Offset:	-0.025072	NA

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot Date: May 3, 2024 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 3, 2024	Last Cal Date:	NA
Start time (MST):	11:30	End time (MST):	14:04
Reason:	Install		

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3060
Zero Air Gen model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	NA	2.63E-04	NMHC SP Ratio:	NA	5.37E-05
CH4 Retention time:	NA	14.90	NMHC Peak Area:	NA	169773
Zero Chromatogram:		OFF	Flat Baseline:		OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4938	80.3	17.10	17.04	1.004
Mid point	4979	40.2	8.56	8.36	1.024
Low point	4998	20.2	4.30	4.13	1.041
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	17.10	16.94	1.010
				Average Correction Factor	1.023

Notes: Replaced the sample inlet filter and Nitrogen cylinder, then conducted the installation. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / 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	5000	0.0	0.00	0.00	----
High point	4938	80.3	9.11	9.08	1.003
Mid point	4979	40.2	4.56	4.47	1.020
Low point	4998	20.2	2.29	2.21	1.035
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	9.11	9.02	1.010
				Average Correction Factor	1.020

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	5000	0.0	0.00	0.00	----
High point	4938	80.3	7.99	7.96	1.004
Mid point	4979	40.2	4.00	3.89	1.028
Low point	4998	20.2	2.01	1.92	1.048
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	7.99	7.91	1.010
				Average Correction Factor	1.026

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	NA	0.998493
THC Cal Offset:	NA	-0.096363
CH4 Cal Slope:	NA	0.998448
CH4 Cal Offset:	NA	-0.052166
NMHC Cal Slope:	NA	0.998382
NMHC Cal Offset:	NA	-0.043597

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

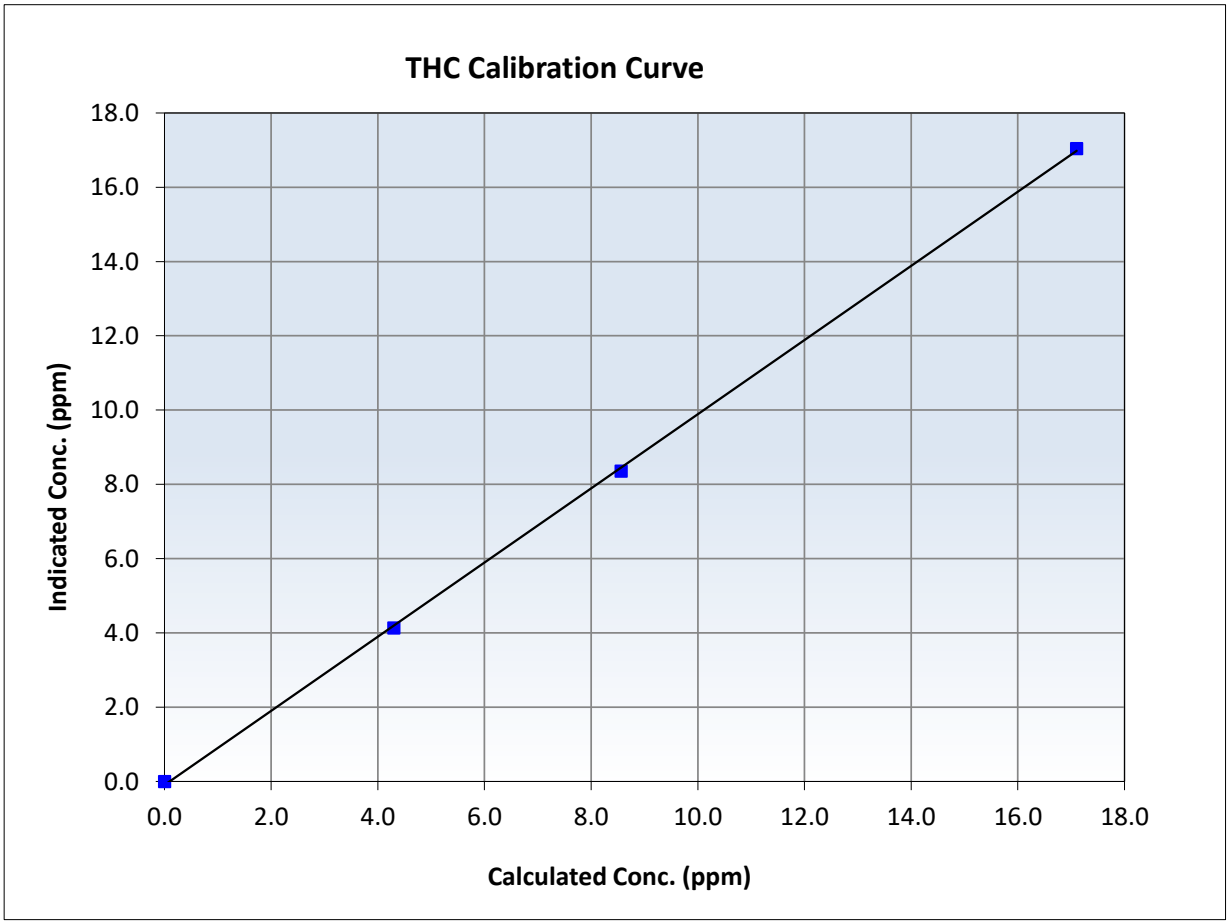
THC Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	NA
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:30	End Time (MST):	14:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999837	≥0.995
17.10	17.04	1.0035	Slope	0.998493	0.90 - 1.10
8.56	8.36	1.0239	Intercept	-0.096363	+/-0.5
4.30	4.13	1.0415			



Wood Buffalo Environmental Association

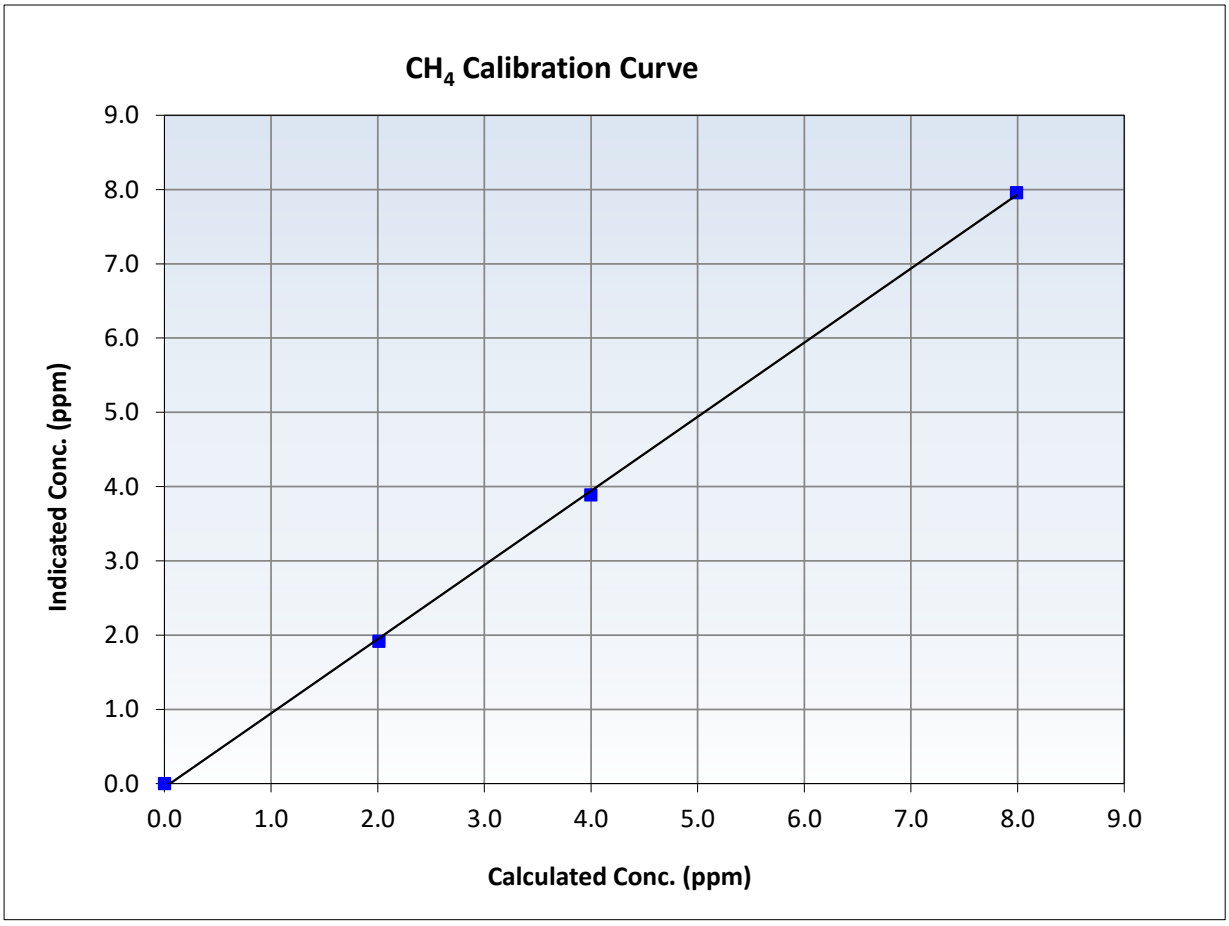
CH_4 Calibration Summary

Station Information

Calibration Date:	May 3, 2024	Previous Calibration:	NA
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:30	End Time (MST):	14:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999779	≥0.995
7.99	7.96	1.0038	Slope	0.998448	0.90 - 1.10
4.00	3.89	1.0278			
2.01	1.92	1.0479	Intercept	-0.052166	+/-0.5



Wood Buffalo Environmental Association

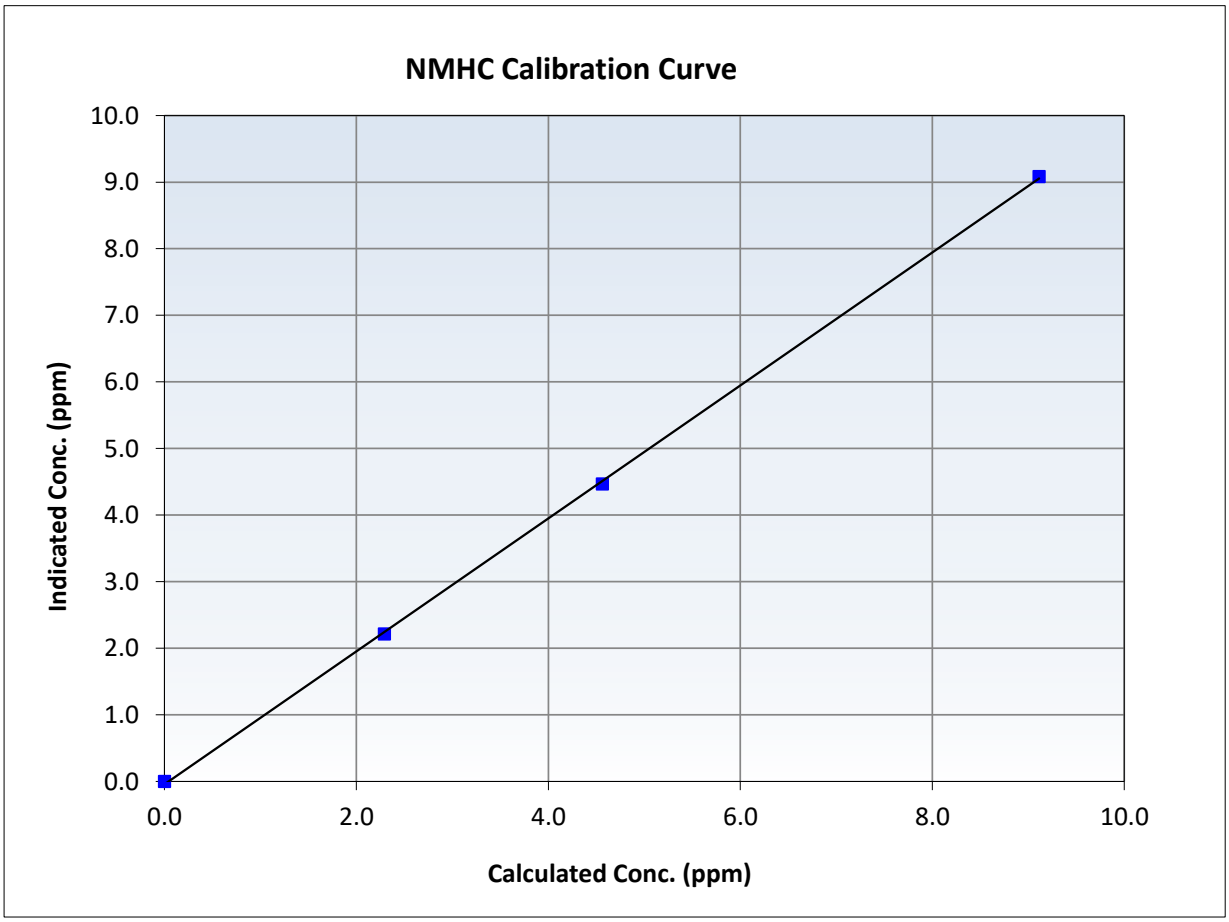
NMHC Calibration Summary

Station Information

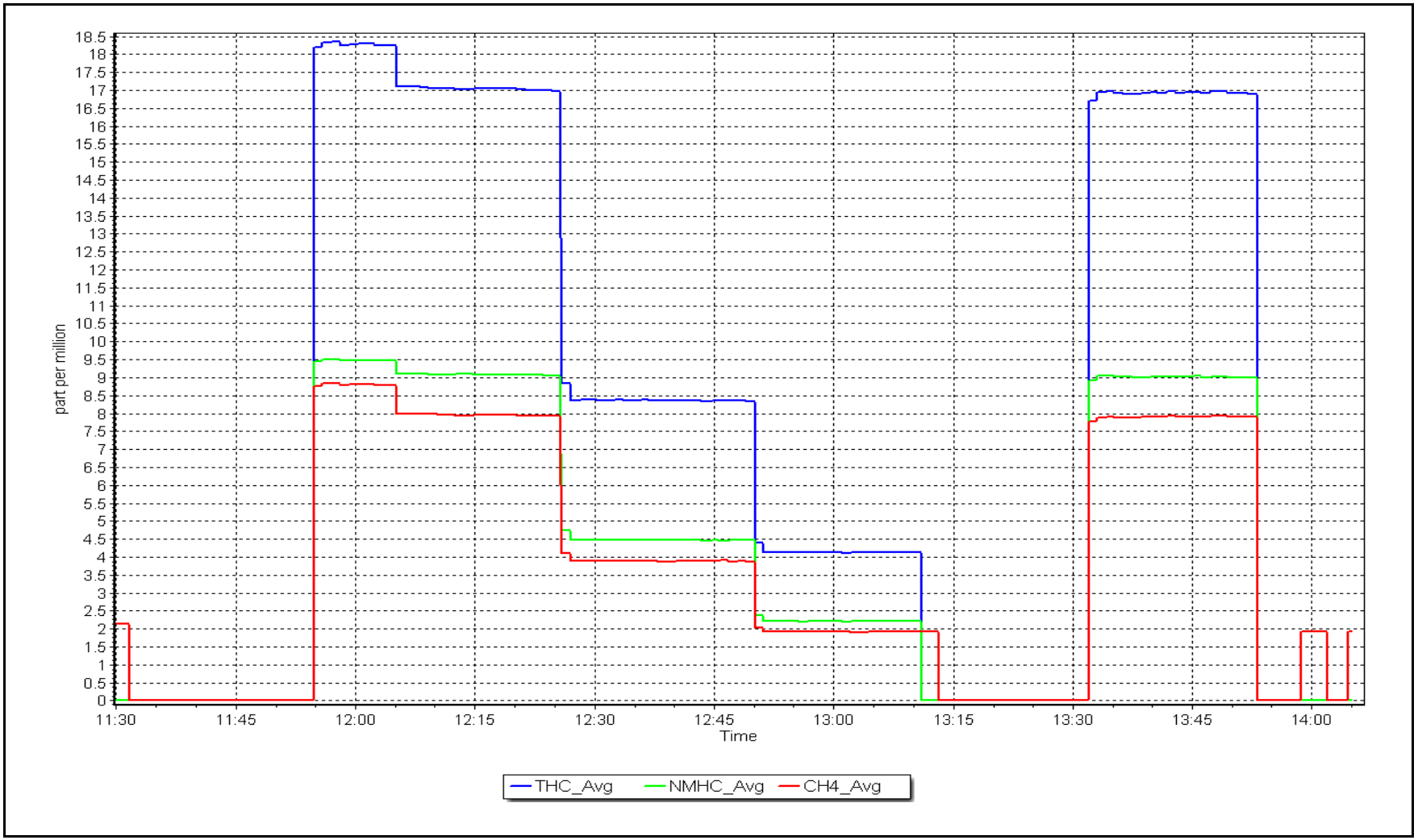
Calibration Date:	May 3, 2024	Previous Calibration:	NA
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:30	End Time (MST):	14:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999883	≥0.995
9.11	9.08	1.0033	Slope	0.998382	0.90 - 1.10
4.56	4.47	1.0205			
2.29	2.21	1.0355	Intercept	-0.043597	+/-0.5



NMHC Calibration Plot Date: May 3, 2024 Location: Anzac



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Anzac
Station number:	AMS 14
Calibration Date:	May 7, 2024
Last Cal Date:	April 3, 2024
Start time (MST):	9:20
End time (MST):	14:12
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0037092		Cal Gas Expiry Date:	May 16, 2031	
NOX Cal Gas Conc:	60.7	ppm	NO Cal Gas Conc:	60.40	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	60.70	ppm	Removed Gas NO Conc:	60.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3060	
ZAG make/model:	Teledyne API T700H		Serial Number:	357	

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
AF High point	4934	66.3	804.8	800.9	4.0	799.5	796.3	3.1	1.0067	1.0056
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	798.1 ppb	NO =	797.9 ppb		
Baseline Corr 1st pt	NO_X =	799.5 ppb	NO =	796.4 ppb		
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb		
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb		

* = > +/-5% change initiates investigation

*Percent Change	NO_X =	0.2%	
*Percent Change	NO =	-0.2%	

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1152430008

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.411	1.411	NO bkgnd or offset:	3.8	3.8
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.5	3.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	158.8	158.8

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.992088	0.992016
NO_X Cal Offset:	-0.369777	-0.569604
NO Cal Slope:	0.998384	0.997285
NO Cal Offset:	-1.649243	-2.189386
NO_2 Cal Slope:	0.993217	0.995331
NO_2 Cal Offset:	-1.136094	-1.206129

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.1	----	----
High point	4934	66.3	804.8	800.9	4.0	798.0	797.4	0.5	1.0086	1.0043
Mid point	4985	33.2	401.6	399.6	2.0	398.0	395.7	2.3	1.0090	1.0099
Low point	5004	16.7	201.9	200.9	1.0	198.7	195.8	2.8	1.0161	1.0261
As left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
As left span	4934	66.3	804.8	406.8	398.0	799.9	406.8	393.3	1.0062	1.0000
								Average Correction Factor	1.0112	1.0134

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	796.1	402.3	397.8	395.4	1.0060	99.4%
Mid GPT point	796.1	595.7	204.4	201.6	1.0138	98.6%
Low GPT point	796.1	693.5	106.6	103.5	1.0297	97.1%
				Average Correction Factor	1.0165	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

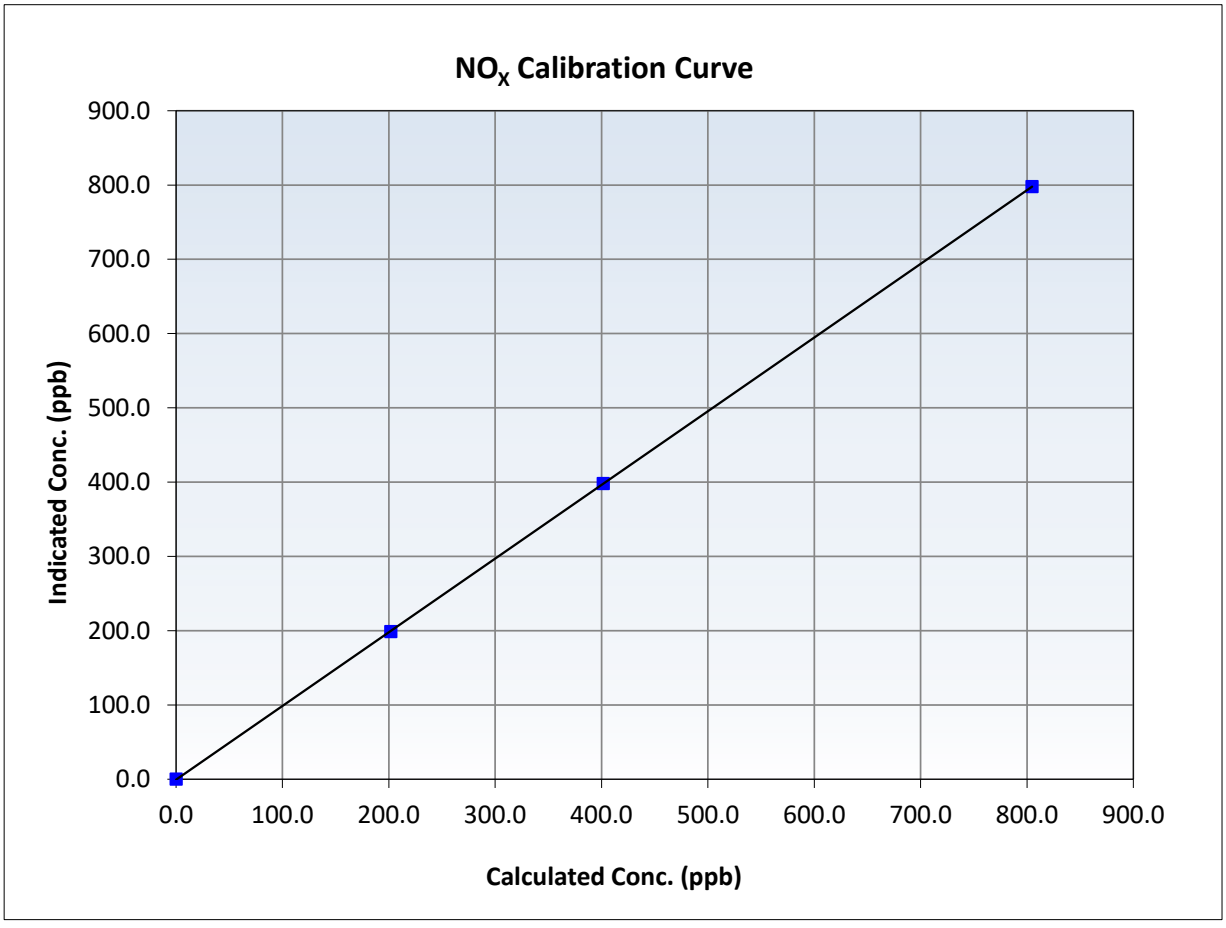
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:20	End Time (MST):	14:12
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
804.8	798.0	1.0086
401.6	398.0	1.0090
201.9	198.7	1.0161

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.992016	*0.90 - 1.10*
Intercept	-0.569604	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

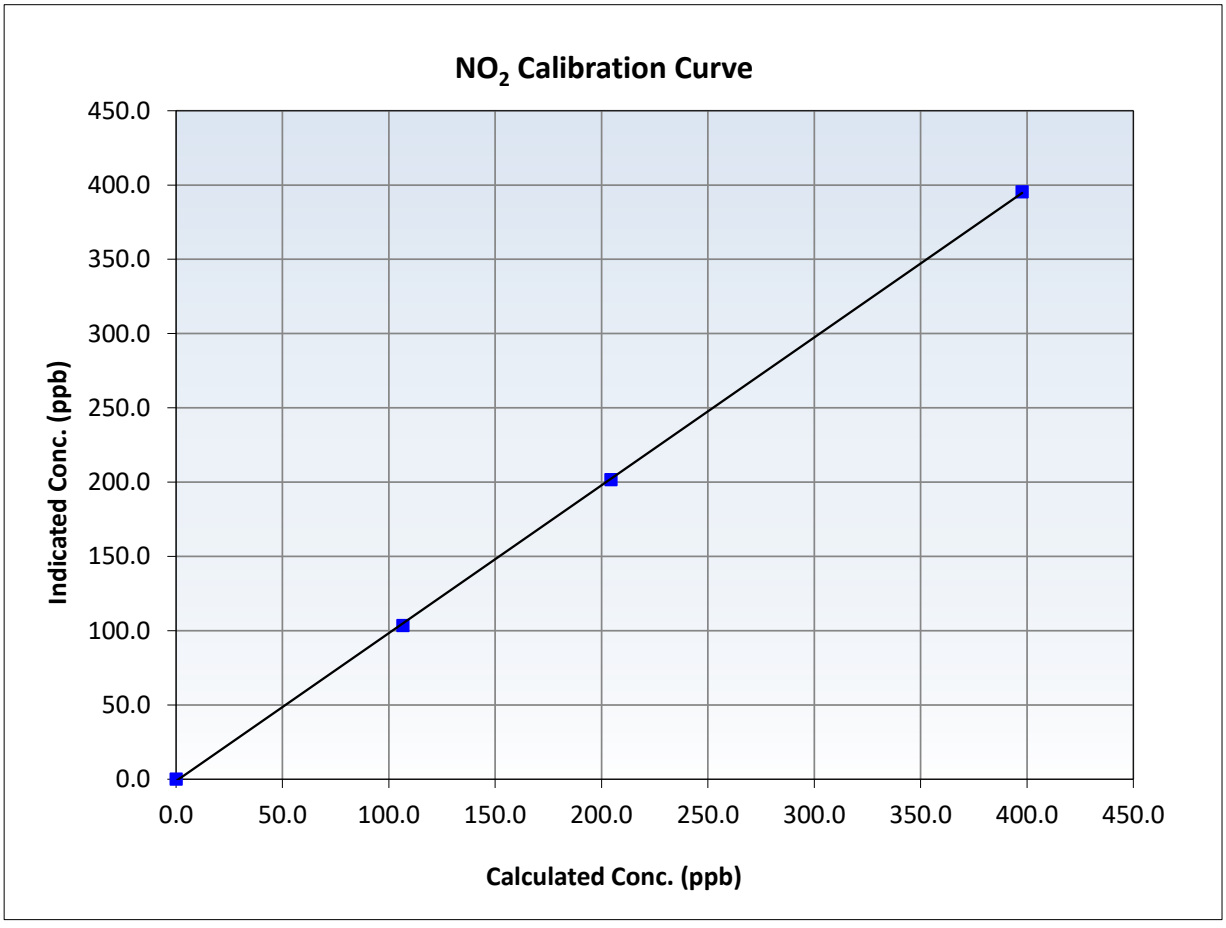
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:20	End Time (MST):	14:12
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
397.8	395.4	1.0060
204.4	201.6	1.0138
106.6	103.5	1.0297

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999948	*≥0.995*
Slope	0.995331	*0.90 - 1.10*
Intercept	-1.206129	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

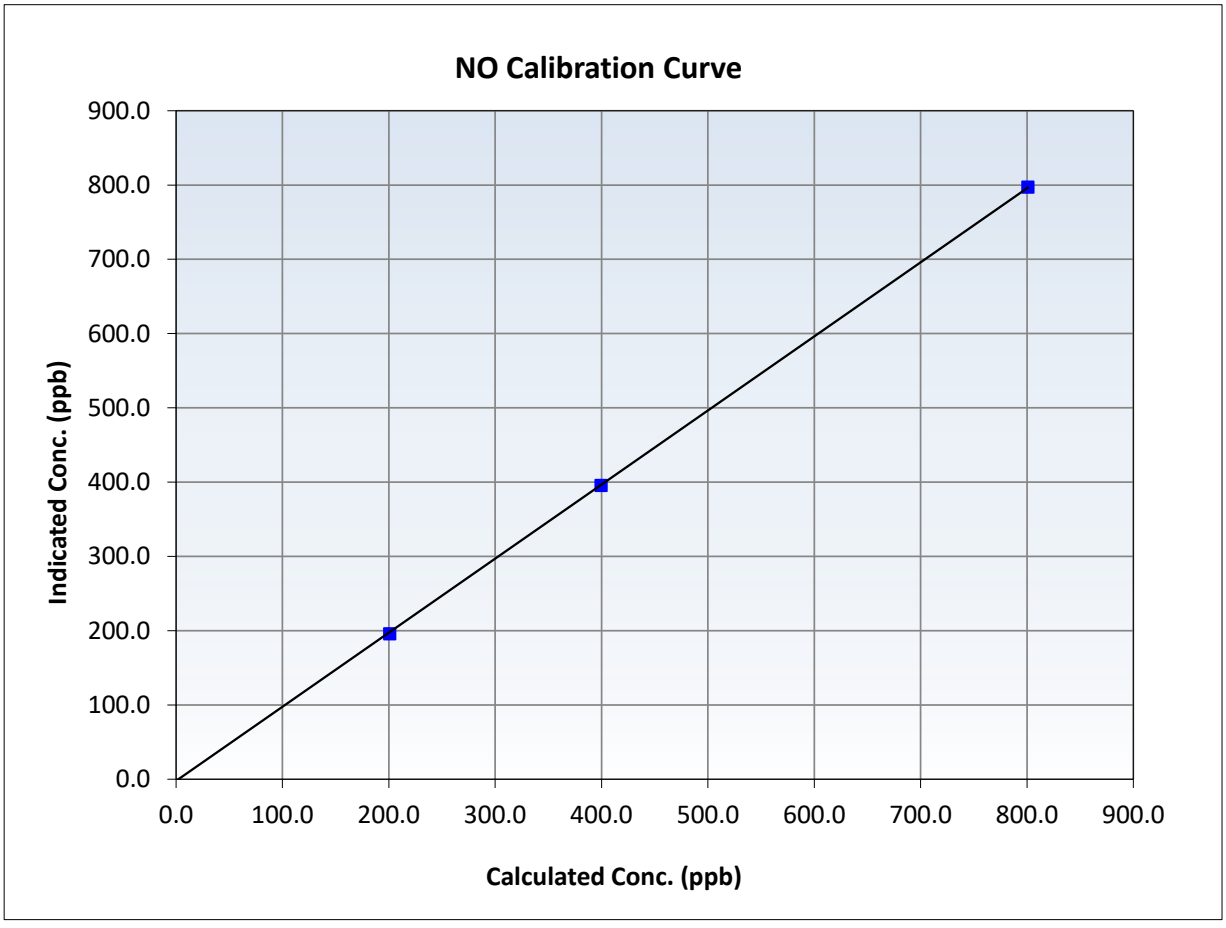
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 3, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:20	End Time (MST):	14:12
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

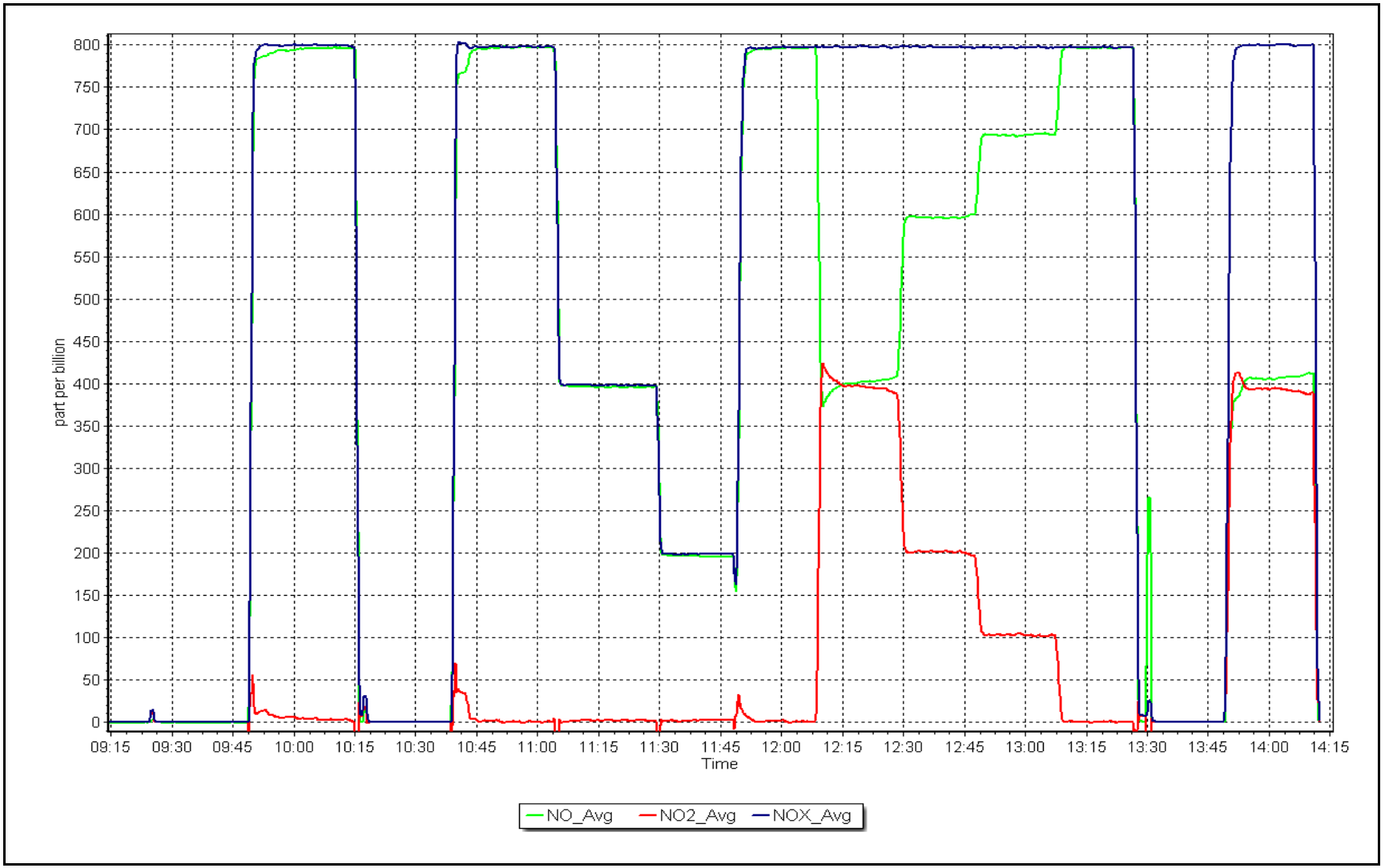
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
800.9	797.4	1.0043
399.6	395.7	1.0099
200.9	195.8	1.0261

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	0.997285	*0.90 - 1.10*
Intercept	-2.189386	*+/-20*



NO_X Calibration Plot Date: May 7, 2024 Location: Anzac



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 6, 2024	Last Cal Date:	April 9, 2024
Start time (MST):	10:24	End time (MST):	13:32
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	3060
ZAG Make/Model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595
Analyzer Range	0 - 500 ppb		

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.997086	0.996257	Backgd or Offset:	1.4	1.4
Calibration intercept:	2.260000	3.380000	Coeff or Slope:	1.594	1.594

O_3 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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.9	----
As found High point	5000	918.8	400.0	401.6	0.998
As found Mid point					
As found Low point					
Baseline Corr As found:	400.7	Previous response	401.1	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.7	----
High point	5000	918.8	400.0	400.3	0.999
Mid point	5000	803.8	200.0	204.7	0.977
Low point	5000	709.8	100.0	105.2	0.951
As left zero	5000	0.0	0.0	1.0	----
As left span	5000	918.8	400.0	402.3	0.994
				Average Correction Factor	0.976

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

O_3 Calibration Summary

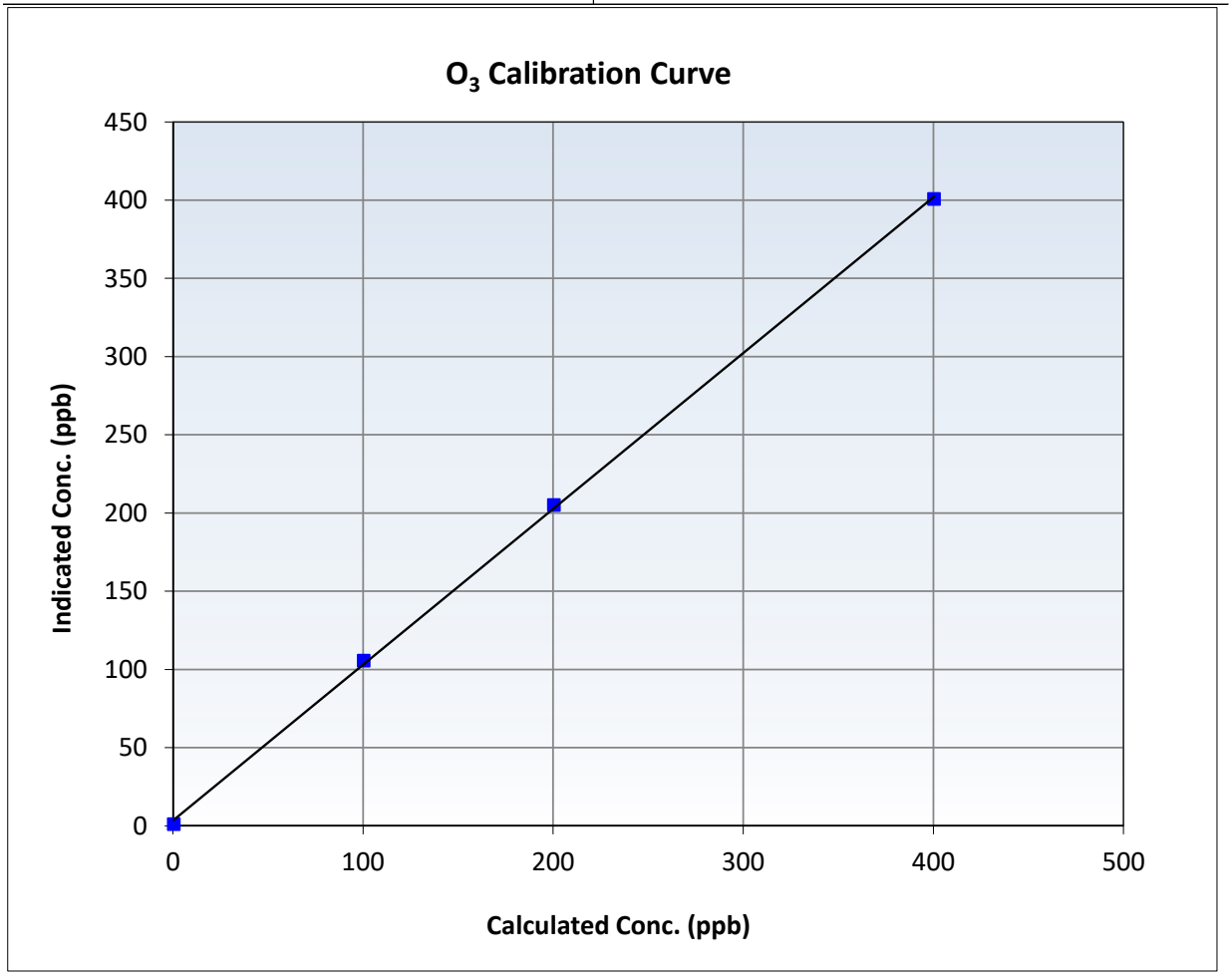
Station Information

Calibration Date:	May 6, 2024	Previous Calibration:	April 9, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:24	End Time (MST):	13:32
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

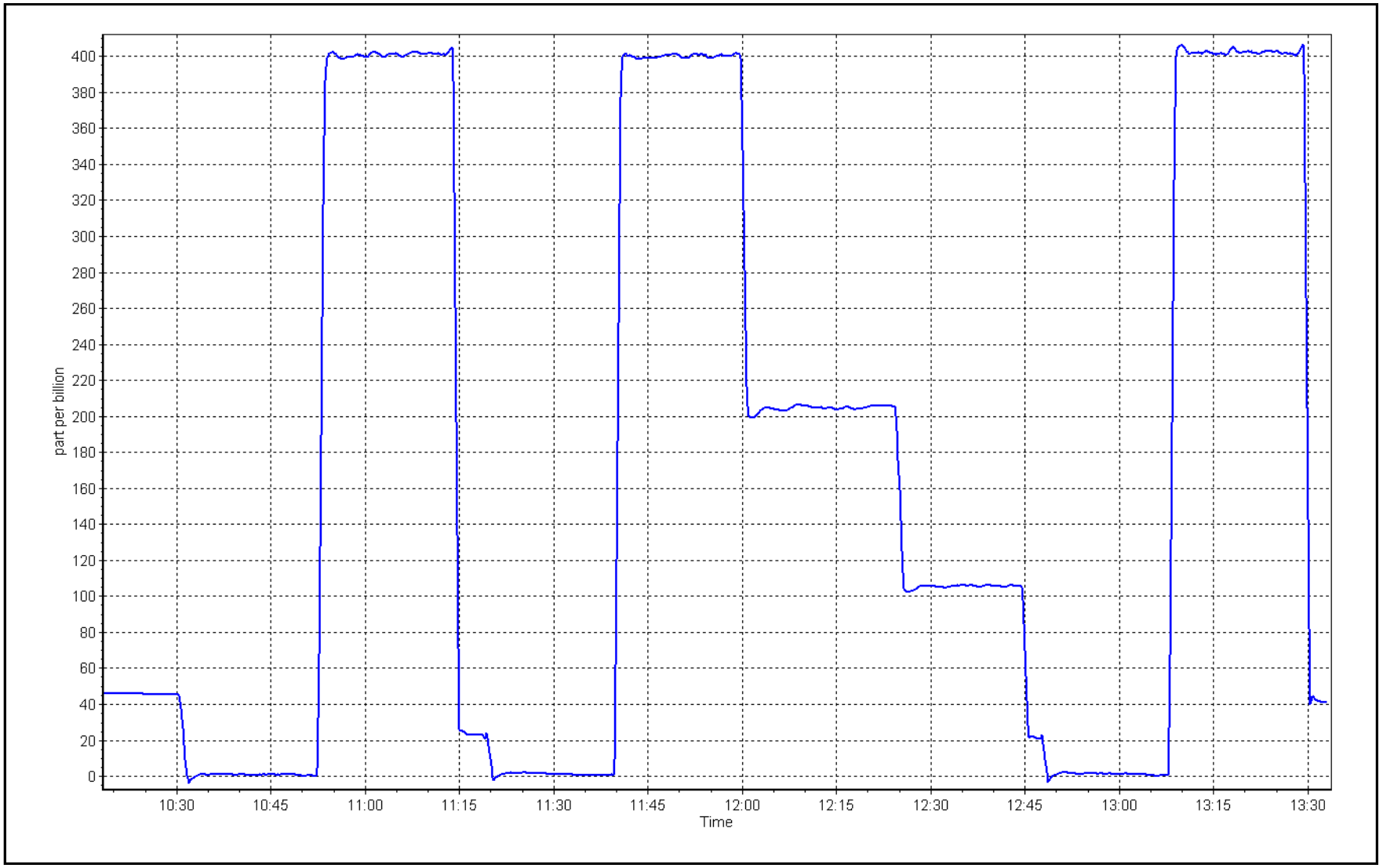
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.7	----
400.0	400.3	0.9993
200.0	204.7	0.9770
100.0	105.2	0.9506

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999784	*≥0.995*
Slope	0.996257	*0.90 - 1.10*
Intercept	3.380000	*+/- 5*



O_3 Calibration Plot Date: May 6, 2024 Location: Anzac



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	May 10, 2024	Last Cal Date:	April 30, 2024
Start time (MST):	10:31	End time (MST):	11:45
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)	21.9	21.57	21.9	☐	+/- 2 °C
P (mmHg)	711.6	712.48	711.6	☐	+/- 10 mmHg
Flow (LPM)	5.01	4.98	5.01	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>80%
Zero Verification	PM w/o HEPA:	3.5	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: December 15, 2024 — Lot No.: 100128-050-040

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	10.8	11.0	10.9	☑	+/- 0.5

Date Optical Chamber Cleaned: May 10, 2024

Date Disposable Filter Changed: May 10, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: July 6, 2023

Date RH/T Sensor Cleaned: July 6, 2023

Notes: Performed quarterly calibration test. Leak check passed. Head cleaned.

Calibration by: Mohammed Kashif

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS17
WAPASU
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	May 16, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	10:50	End time (MST):	14:02
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998796	0.997012	Backgd or Offset:	13.3	13.3
Calibration intercept:	-1.859943	-2.260549	Coeff or Slope:	1.098	1.098

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4921	79.4	800.0	793.0	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.1	Previous response	797.1	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.4	800.0	796.7	1.004
Mid point	4960	39.7	400.0	394.7	1.014
Low point	4980	19.8	199.5	194.9	1.024
As left zero	5000	0.0	0.0	-0.1	----
As left span	4920	79.4	800.1	796.0	1.005
				Average Correction Factor:	1.014

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

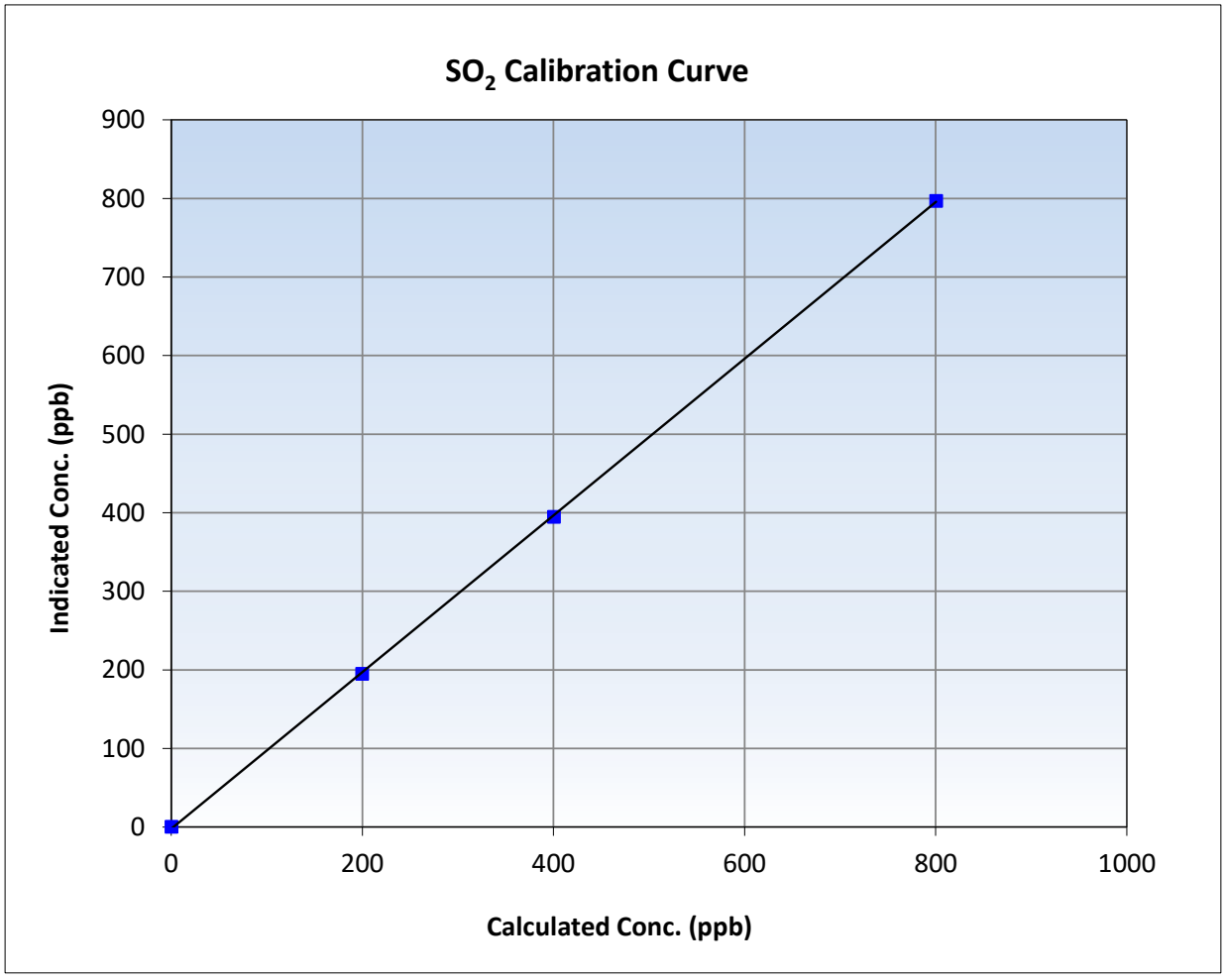
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 2, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:50	End Time (MST):	14:02
Analyzer make:	Thermo 43i	Analyzer serial #:	1218153459

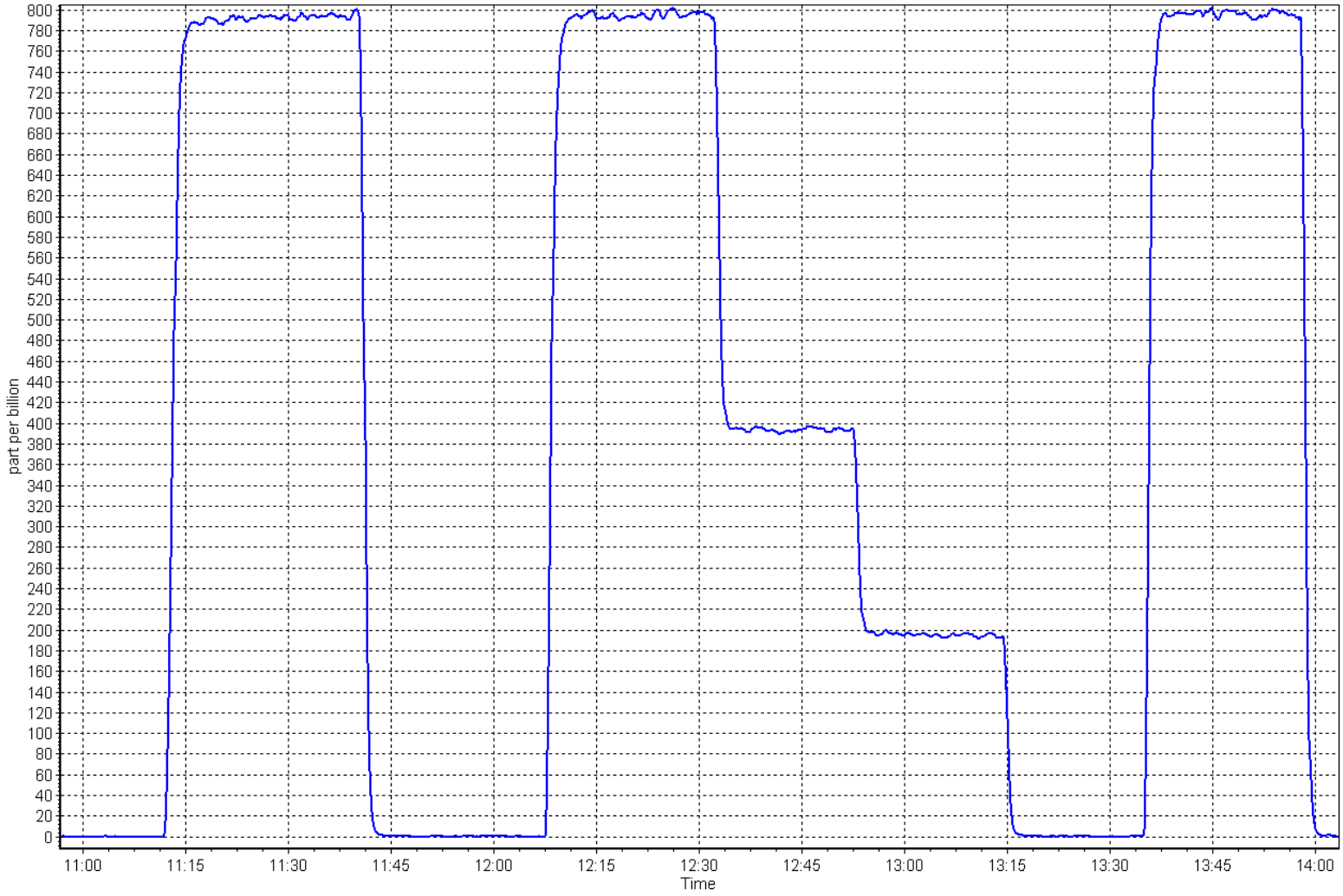
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.0	796.7	1.0041
400.0	394.7	1.0135
199.5	194.9	1.0237

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	0.997012	*0.90 - 1.10*
Intercept	-2.260549	*+/-30*



SO2 Calibration Plot Date: May 16, 2024 Location: Wapasu



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	May 22, 2024	Last Cal Date:	April 8, 2024
Start time (MST):	9:49	End time (MST):	15:00
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.08	ppm	Cal Gas Exp Date:	September 16, 2024
Cal Gas Cylinder #:	CC511852			
Removed Cal Gas Conc:	5.08	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2449
ZAG Make/Model:	API T701H		Serial Number:	359

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	1218153583	
Converter make:	CD Nova		Converter serial #:	N/A	
Analyzer Range	0 - 100 ppb		Converter Temp:		degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.992711	1.010854	Backgd or Offset:	11.8	11.8
Calibration intercept:	-0.119219	-0.579198	Coeff or Slope:	1.096	1.096

H_2S 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	4921	78.8	80.0	79.2	1.013
As found Mid point	4961	39.4	40.0	39.6	1.015
As found Low point	4980	19.7	20.0	19.8	1.020
New cylinder response					

Baseline Corr As found:	79.0	Prev response:	79.30	*% change:	-0.4%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.987997	AF Intercept:	0.120789
Baseline Corr 3rd AF pt:	19.6	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	4921	78.8	80.0	80.4	0.995
Mid point	4961	39.4	40.0	39.7	1.007
Low point	4980	19.7	20.0	19.5	1.026
As left zero	5000	0.0	0.0	-0.4	----
As left span	4921	78.8	80.0	79.7	1.004
SO2 Scrubber Check	4921	79.4	793.9	-0.1	----
Date of last scrubber change:		N/A		Ave Corr Factor	1.009
Date of last converter efficiency test:		N/A			

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

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

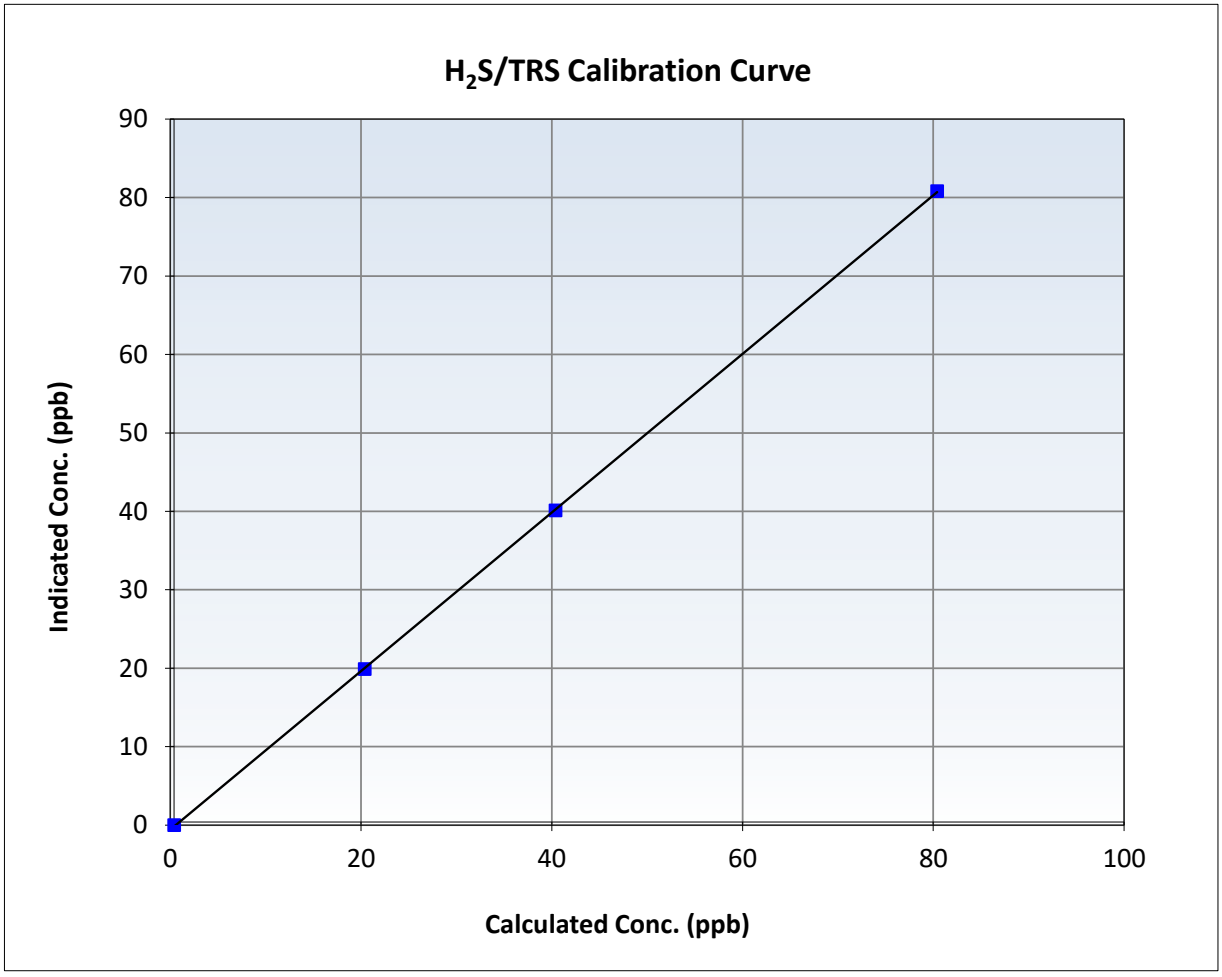
H_2S/TRS Calibration Summary

Station Information

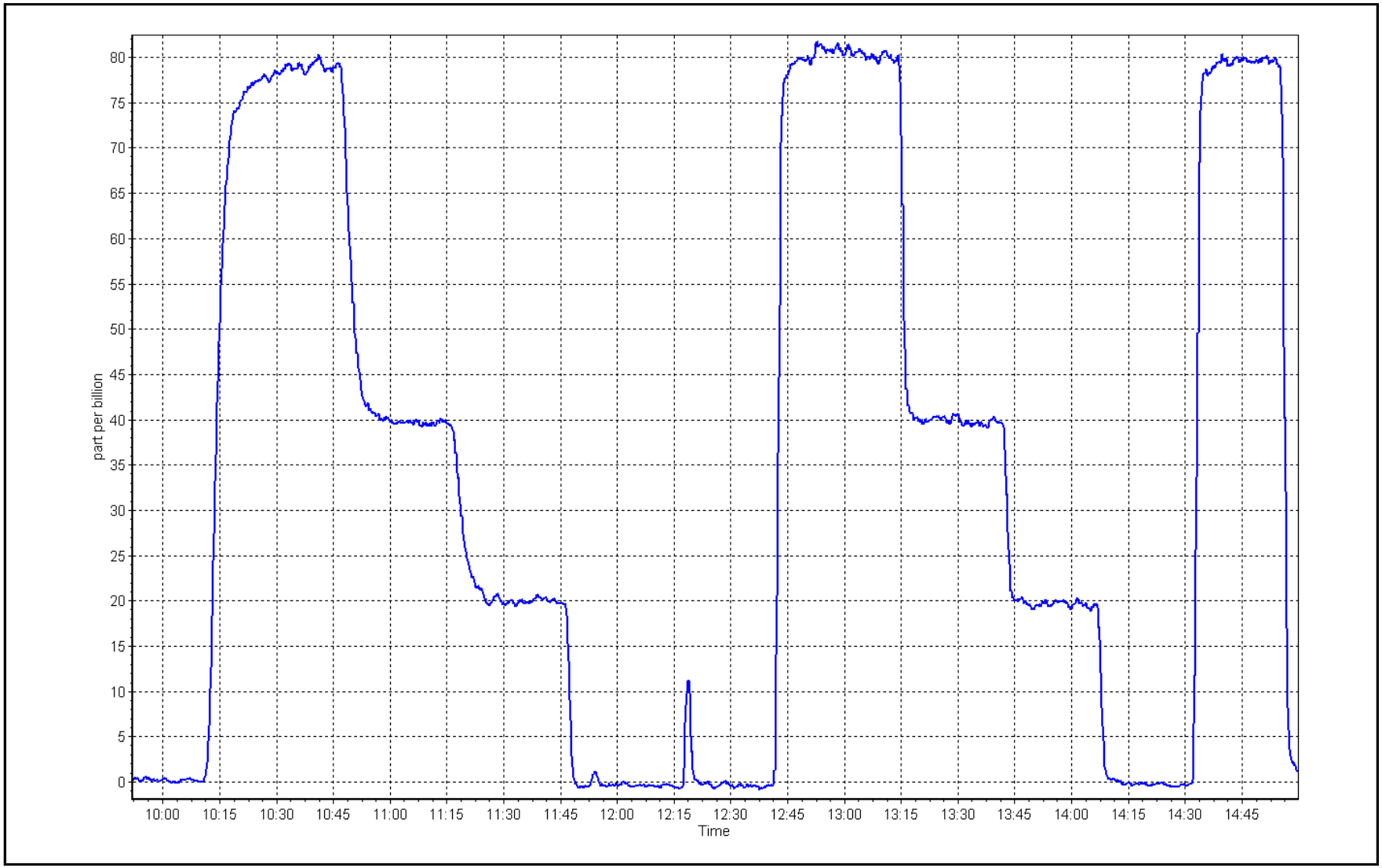
Calibration Date:	May 22, 2024	Previous Calibration:	April 8, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	9:49	End Time (MST):	15:00
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.4	----	Correlation Coefficient	0.999976	*≥0.995*
80.0	80.4	0.9950	Slope	1.010854	*0.90 - 1.10*
40.0	39.7	1.0074			
20.0	19.5	1.0257	Intercept	-0.579198	*+/-3*



H_2S Calibration Plot Date: May 22, 2024 Location: Wapasu



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	May 16, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	10:50	End time (MST):	14:02
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	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	2449	
ZAG Make/Model:	API 701H		Serial Number:	359	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1218153352	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.990526	0.999180	Background:	3.020	3.020
Calibration intercept:	0.030412	0.018473	Coefficient:	4.390	4.390

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.05	----
As found High point	4921	79.4	17.09	17.01	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	16.96	Previous response	16.96	*% 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	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4921	79.4	17.09	17.10	0.999
Mid point	4960	39.7	8.55	8.53	1.002
Low point	4980	19.8	4.26	4.31	0.990
As left zero	5000	0.0	0.00	0.20	----
As left span	4921	79.4	17.09	17.18	0.995
				Average Correction Factor	0.997

Notes: H2 cylinder swapped out after as founds. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

THC Calibration Summary

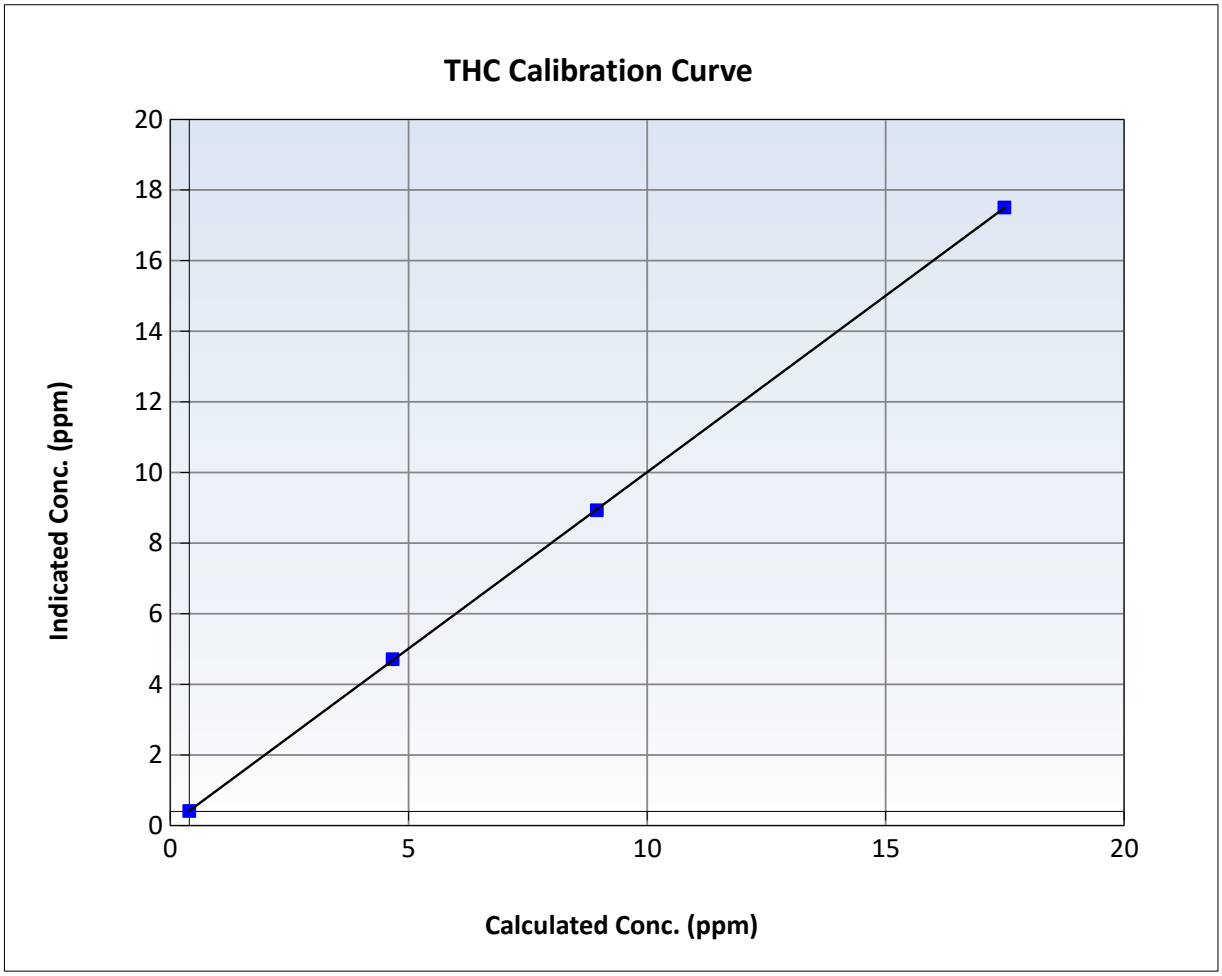
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 2, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:50	End Time (MST):	14:02
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

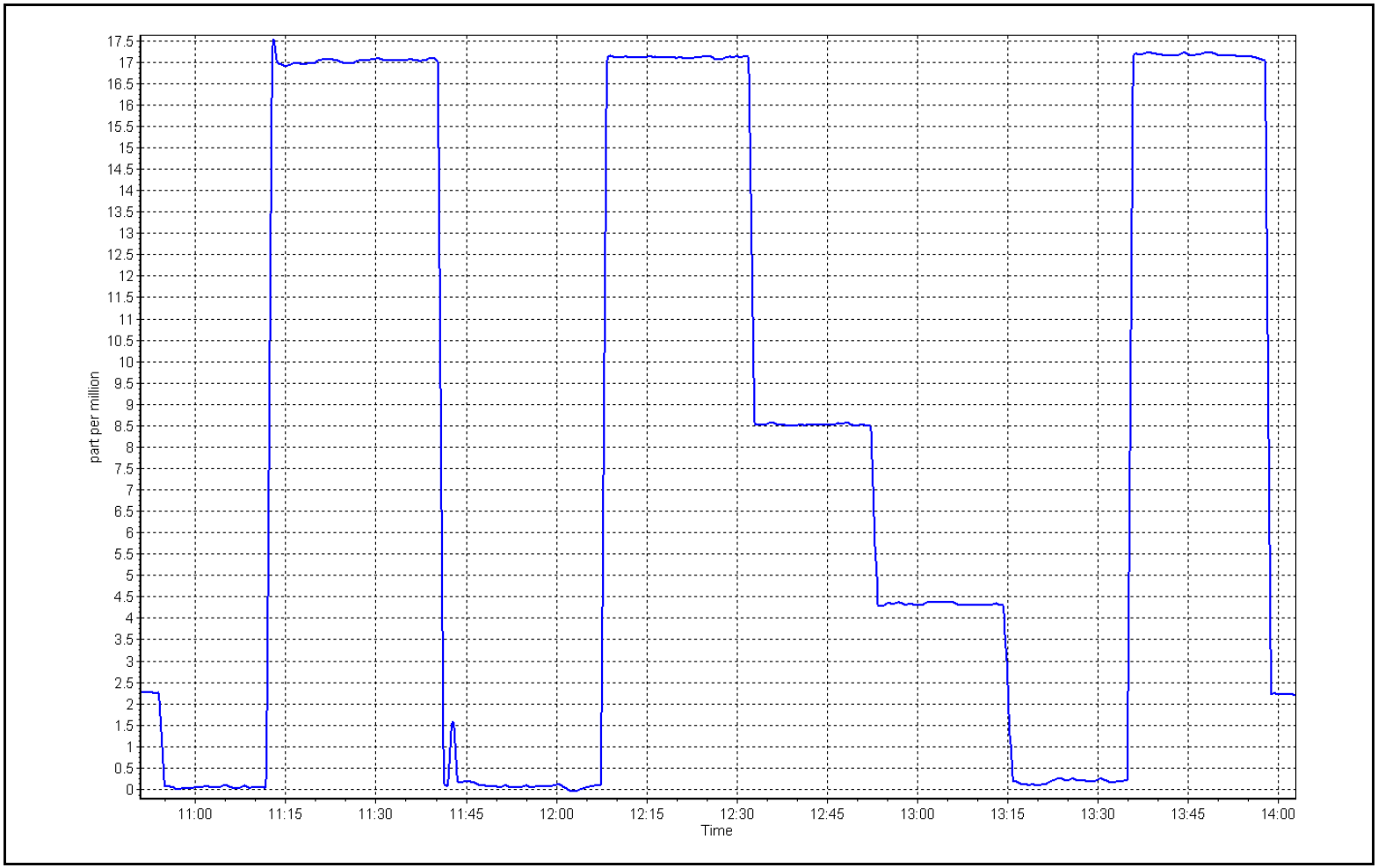
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.01	----
17.09	17.10	0.9993
8.55	8.53	1.0022
4.26	4.31	0.9899

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	0.999180	*0.90 - 1.10*
Intercept	0.018473	*+/-1.5*



THC Calibration Plot Date: May 16, 2024 Location: Wapasu



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Wapasu
Station number:	AMS 17
Calibration Date:	May 17, 2024
Last Cal Date:	April 18, 2024
Start time (MST):	7:04
End time (MST):	12:28
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T375YK8	Cal Gas Expiry Date:	April 13, 2025
NOX Cal Gas Conc:	49.11 ppm	NO Cal Gas Conc:	48.07 ppm
Removed Cylinder #:	T375YK8	Removed Gas Exp Date:	N/A
Removed Gas NOX Conc:	49.11 ppm	Removed Gas NO Conc:	48.07 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	2449
ZAG make/model:	API T701H	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.3	-0.3	----	----
AF High point	4917	83.2	817.2	799.9	17.3	820.5	803.4	17.0	0.9952	0.9953
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 816.3 ppb	NO = 798.9 ppb
Baseline Corr 1st pt	NO_X = 821.1 ppb	NO = 803.7 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

*Percent Change	NO_X =	0.6%	
*Percent Change	NO =	0.6%	

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo Scientific 42i

Serial Number: 1218153460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.100	1.100	NO bkgnd or offset:	3.8	3.8
NOX coeff or slope:	0.992	0.992	NOX bkgnd or offset:	4.2	4.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	261.0	261.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999550	1.004026
NO_X Cal Offset:	-0.560000	-1.060000
NO Cal Slope:	1.000573	1.005288
NO Cal Offset:	-1.400000	-1.300000
NO_2 Cal Slope:	0.995649	0.997935
NO_2 Cal Offset:	-0.696163	-0.116856

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	----	----
High point	4917	83.2	817.2	799.9	17.3	819.8	803.4	16.5	0.9968	0.9956
Mid point	4958	41.6	408.6	399.9	8.7	408.7	400.2	8.5	0.9997	0.9994
Low point	4979	20.8	204.3	200.0	4.3	203.5	198.5	4.9	1.0039	1.0074
As left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	----	----
As left span	4917	83.2	817.2	397.7	419.5	819.1	397.7	421.6	0.9977	1.0000
							Average Correction Factor		1.0002	1.0008

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.3	----	----
High GPT point	802.3	399.2	420.4	419.3	1.0026	99.7%
Mid GPT point	802.3	603.5	216.1	215.7	1.0019	99.8%
Low GPT point	802.3	705.9	113.7	113.5	1.0018	99.8%
				Average Correction Factor	1.0021	99.8%

Notes: Remote calibration. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

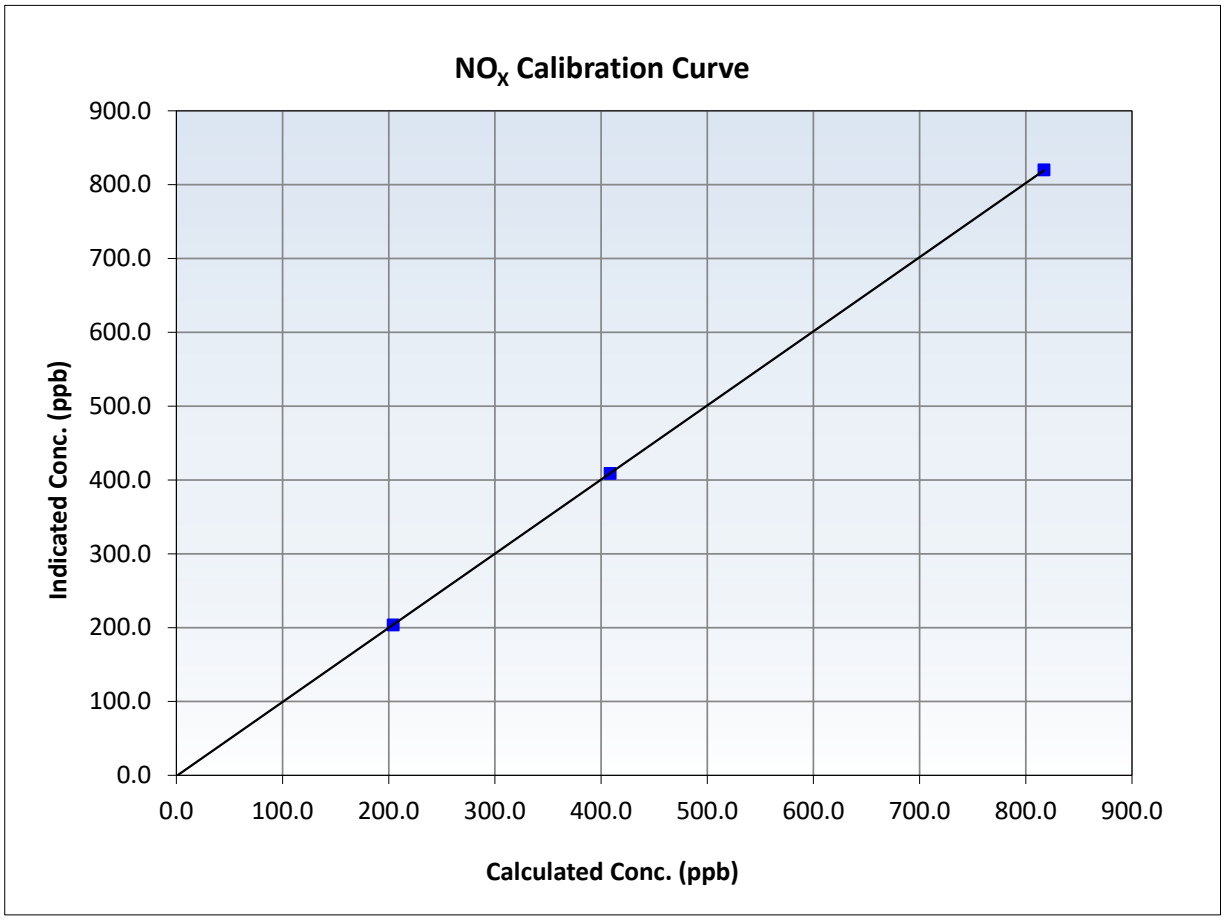
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	7:04	End Time (MST):	12:28
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
817.2	819.8	0.9968
408.6	408.7	0.9997
204.3	203.5	1.0039

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.004026	*0.90 - 1.10*
Intercept	-1.060000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

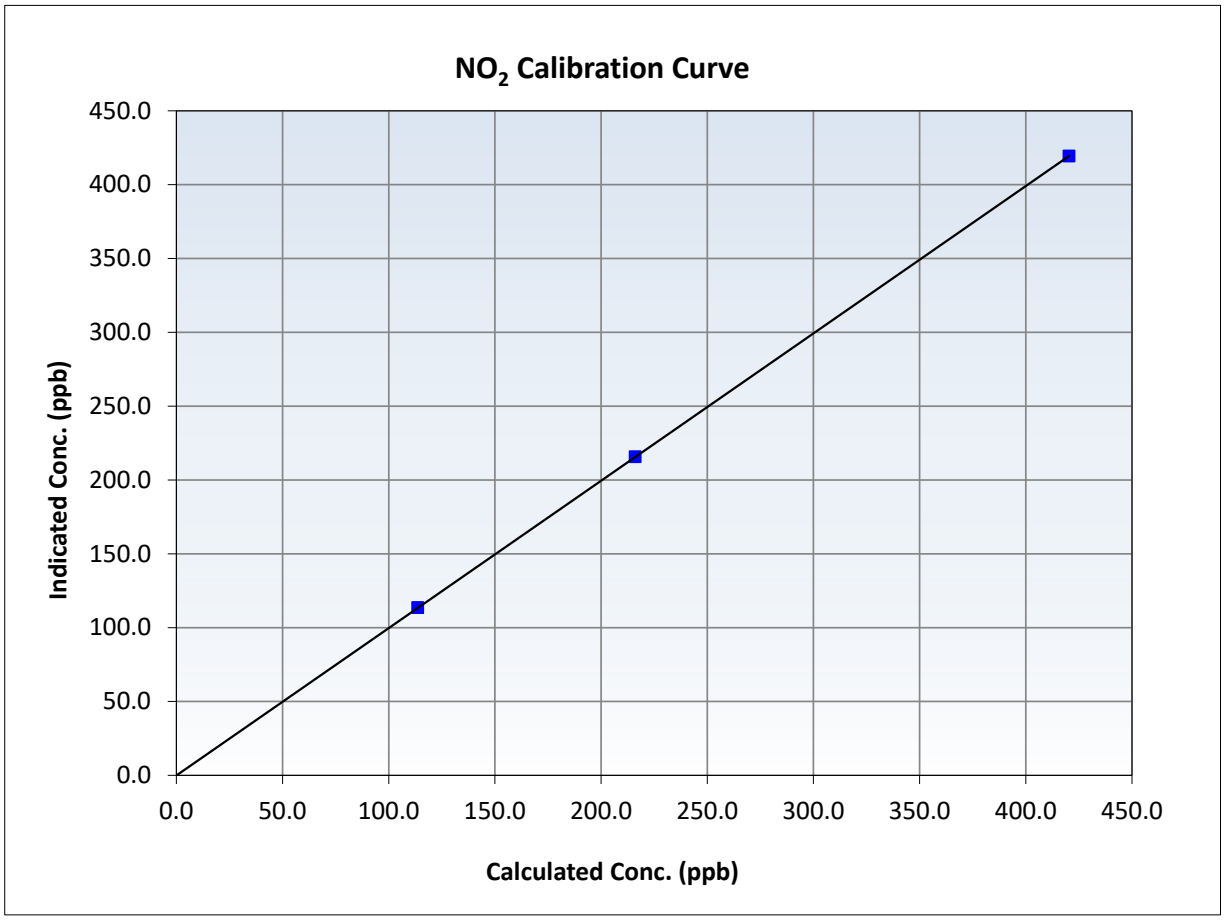
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	7:04	End Time (MST):	12:28
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
420.4	419.3	1.0026
216.1	215.7	1.0019
113.7	113.5	1.0018

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.997935	*0.90 - 1.10*
Intercept	-0.116856	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

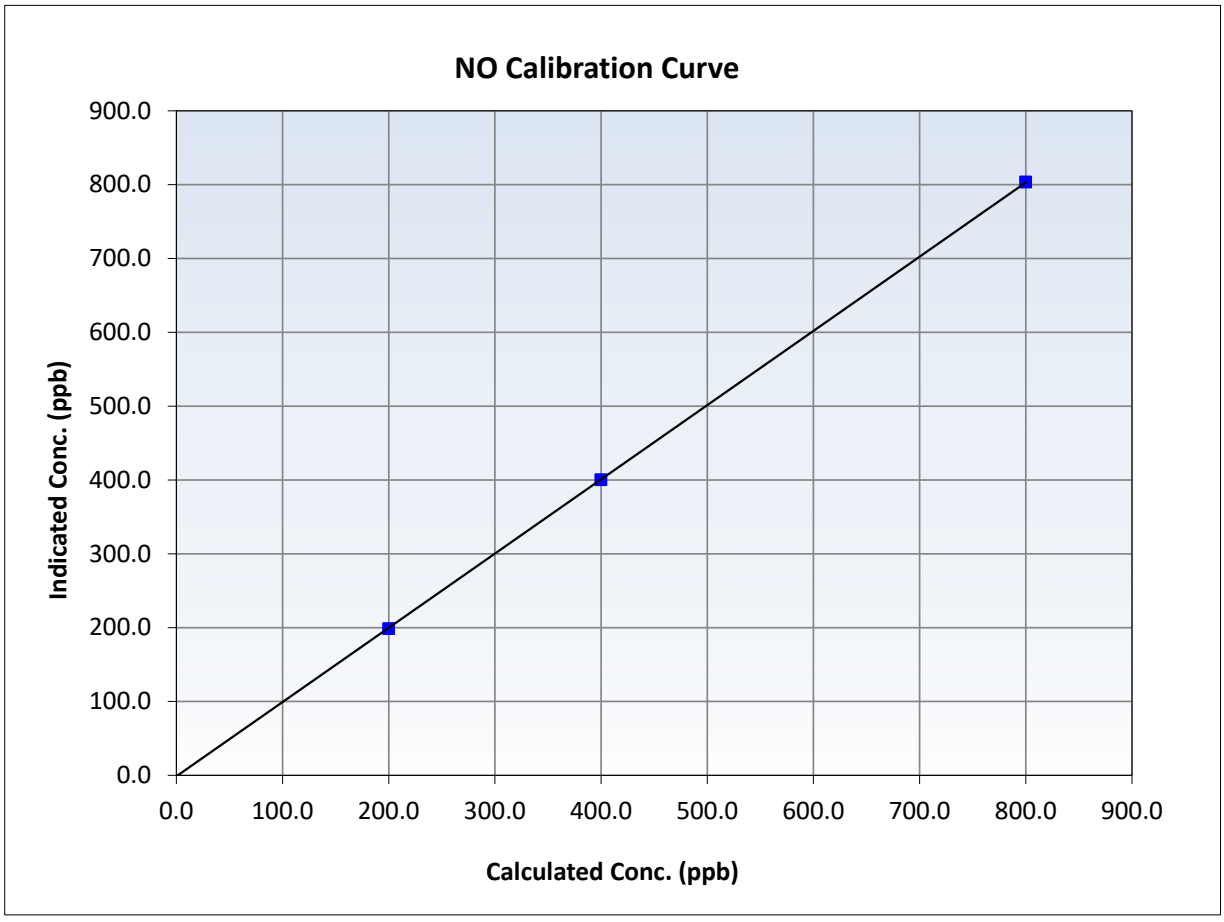
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	7:04	End Time (MST):	12:28
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

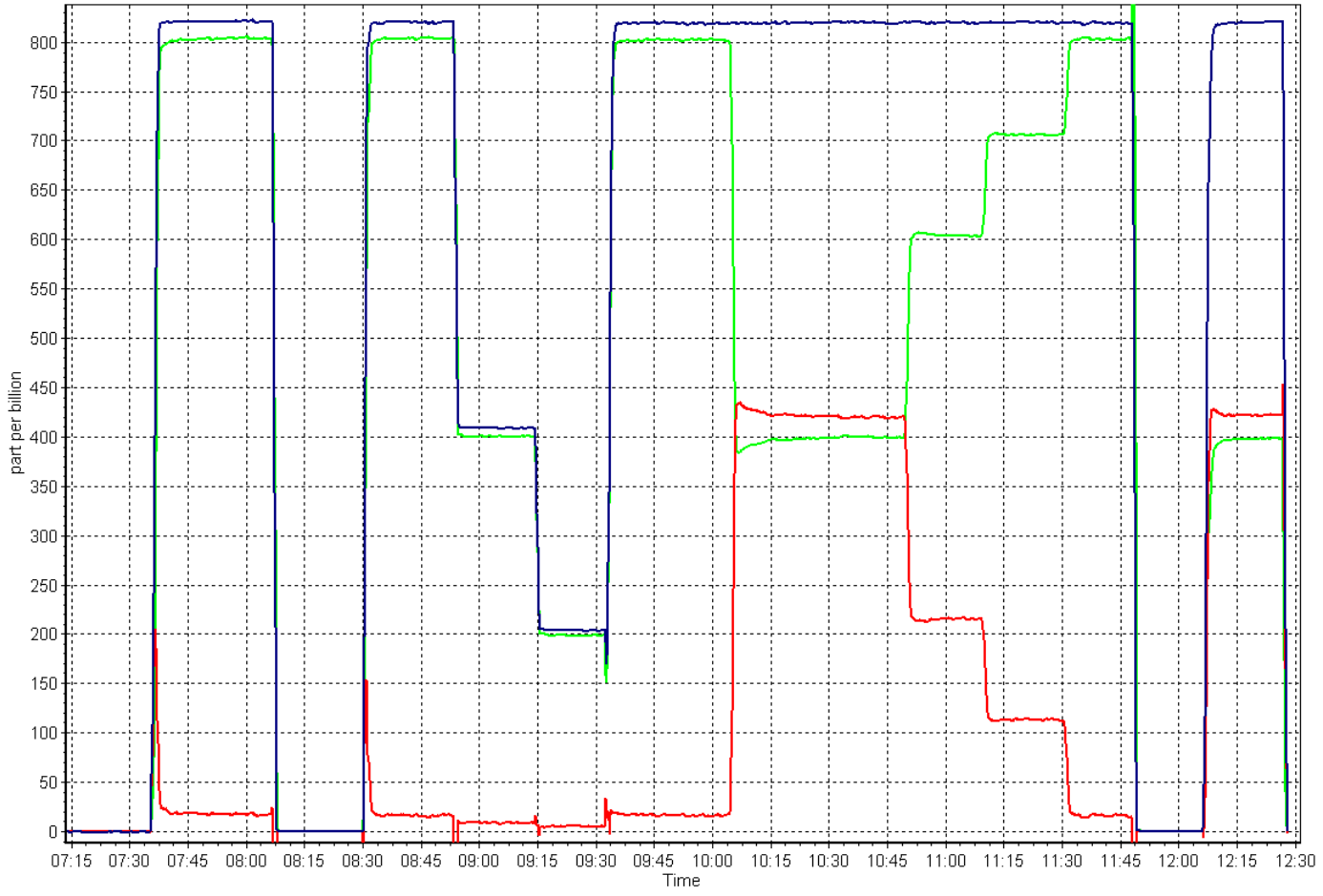
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.9	803.4	0.9956
399.9	400.2	0.9994
200.0	198.5	1.0074

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	1.005288	*0.90 - 1.10*
Intercept	-1.300000	*+/-20*



NO_X Calibration Plot Date: May 17, 2024 Location: Wapasu



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	May 10, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	9:55	End time (MST):	13:14
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	2449
ZAG Make/Model:	API T701H	Serial Number:	359

Analyzer Information

Analyzer make:	API T400		Analyzer serial #:	3870	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000714	1.012486	Backgd or Offset:	-1.8	-1.8
Calibration intercept:	-0.600000	-0.860000	Coeff or Slope:	1.013	1.013

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.2	----
As found High point	5000	1077.3	400.0	403.0	0.993
As found Mid point					
As found Low point					
Baseline Corr As found:	402.8	Previous response	399.7	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	5000	1077.3	400.0	404.8	0.988
Mid point	5000	900.3	200.0	200.6	0.997
Low point	5000	789.5	100.0	99.8	1.002
As left zero	5000	0.0	0.0	0.8	----
As left span	5000	1077.3	400.0	404.0	0.990
				Average Correction Factor	0.996

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

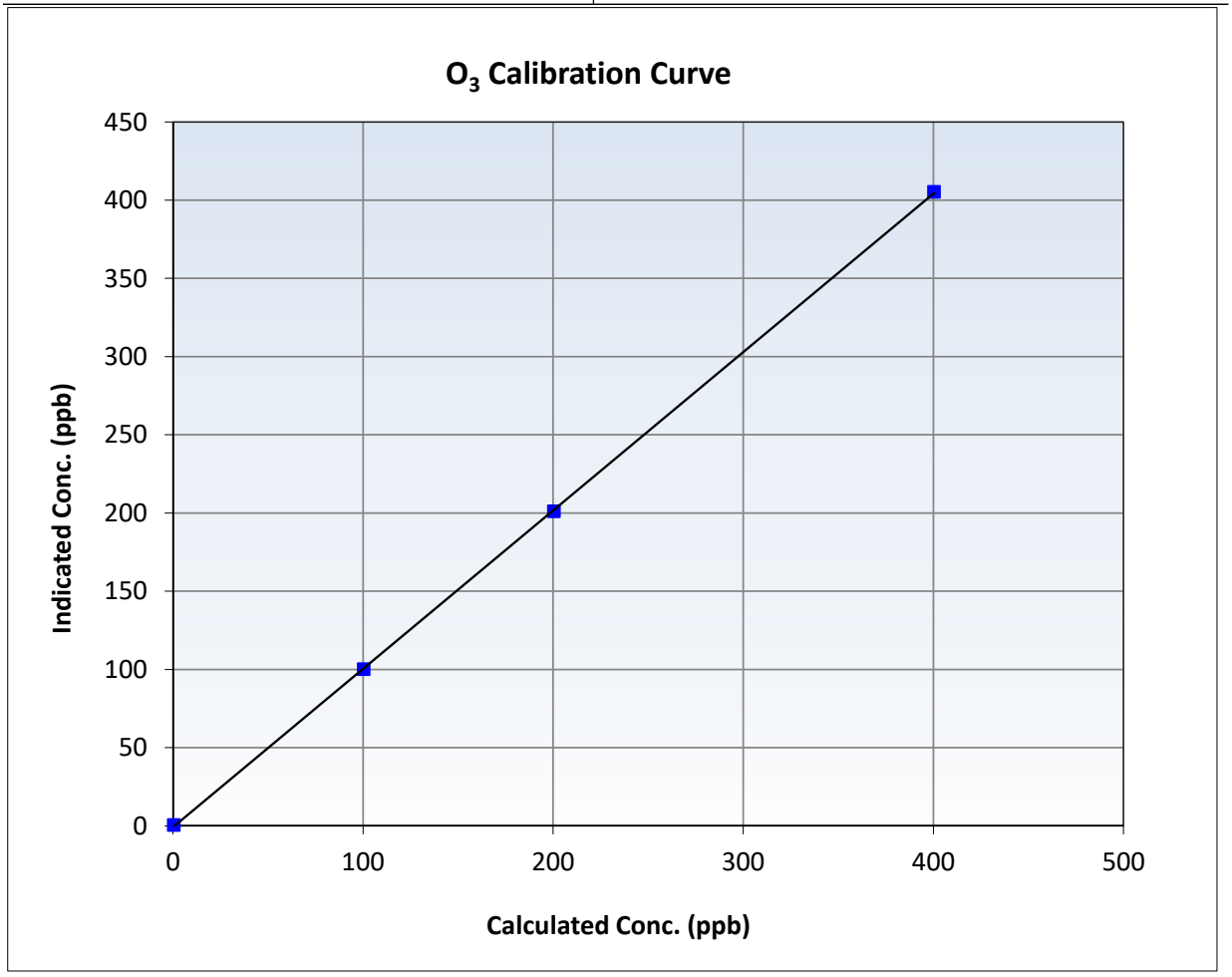
Station Information

Calibration Date:	May 10, 2024	Previous Calibration:	April 4, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	9:55	End Time (MST):	13:14
Analyzer make:	API T400	Analyzer serial #:	3870

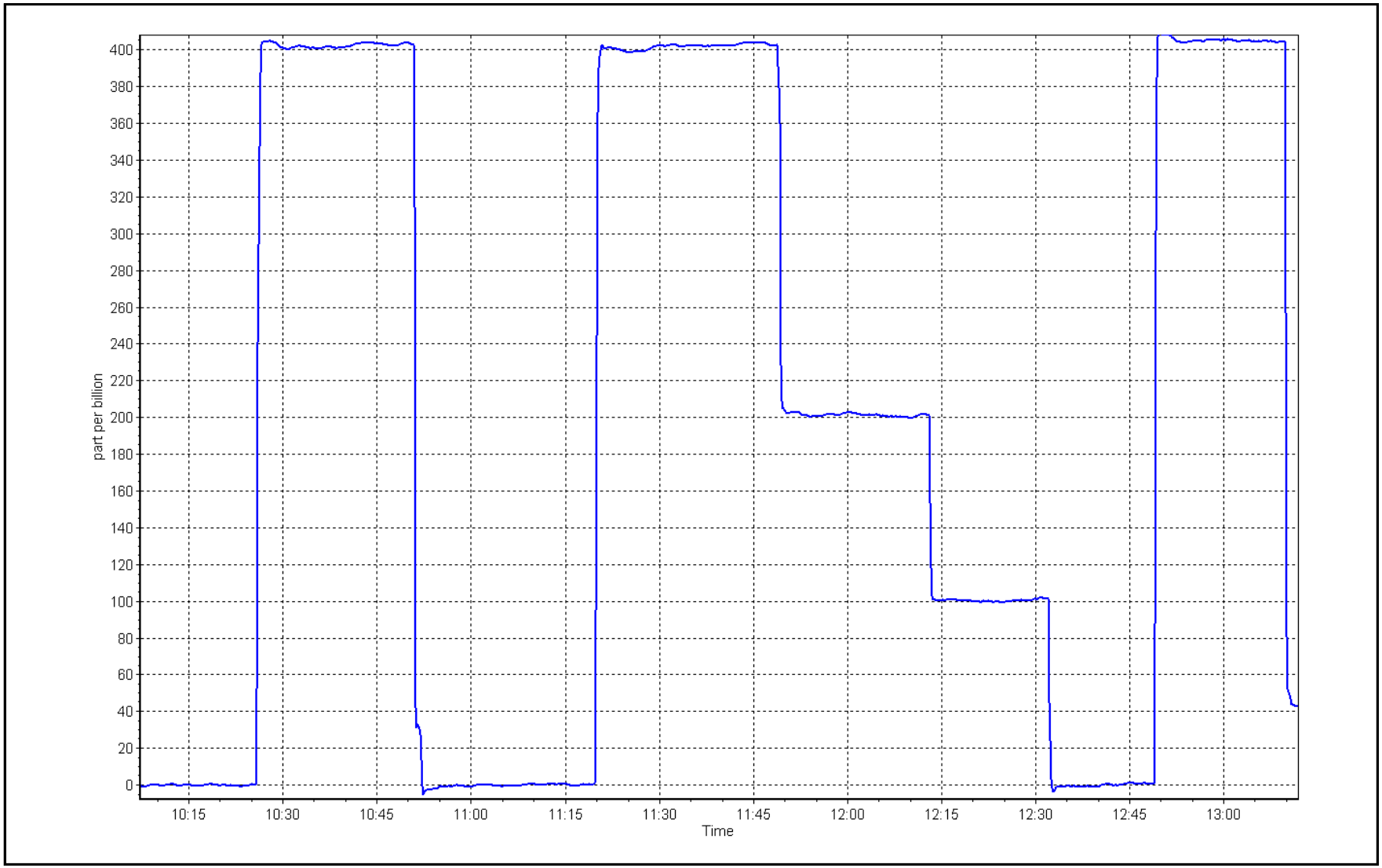
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
400.0	404.8	0.9881
200.0	200.6	0.9970
100.0	99.8	1.0020

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999969	*≥0.995*
Slope	1.012486	*0.90 - 1.10*
Intercept	-0.860000	*+/- 5*



O_3 Calibration Plot Date: May 10, 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:	May 22, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	14:16	End time (MST):	14:55
Analyzer Make:	Teledyne API T640	S/N:	1183
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388753
Temp/RH standard:	Alicat FP-25BT	S/N:	388753

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	10.5	10.0	10.5	☐	+/- 2 °C
P (mmHg)	715	713.2	715	☐	+/- 10 mmHg
Flow (LPM)	4.99	5.05	4.99	☐	+/- 0.25 LPM
PW% (pump)	41	-----	41	☐	>80%
Zero Verification	PM w/o HEPA:	2.2	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: February 13, 2024

Date Disposable Filter Changed: February 13, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: _____

Date RH/T Sensor Cleaned: _____

Notes: Temp. pressure and flow checked. Leak check passed.

Calibration by: Aswin Sasi Kumar

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS18
STONY MOUNTAIN
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 8, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	10:15	End time (MST):	15:42
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.40	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC463851			
Removed Cal Gas Conc:	49.40	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002389	1.005230	Backgd or Offset:	22.9	23.4
Calibration intercept:	0.496756	0.277512	Coeff or Slope:	0.800	0.800

SO_2 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	0.6	----
As found High point	4919	81.0	800.3	807.1	0.992
As found Mid point	4959	40.5	400.2	403.3	0.994
As found Low point	4979	20.2	199.6	199.9	1.002
New cylinder response					
Baseline Corr As found:	806.5	Previous response	802.7	*% change	0.5%
Baseline Corr 2nd AF pt:	402.7	AF Slope:	1.008486	AF Intercept:	-0.262204
Baseline Corr 3rd AF pt:	199.3	AF Correlation:	0.999994	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.8	----
High point	4919	81.0	800.3	805.0	0.994
Mid point	4959	40.5	400.2	402.3	0.995
Low point	4979	20.2	199.6	200.4	0.996
As left zero	5000	0.0	0.0	1.1	----
As left span	4919	81.0	800.3	802.6	0.997
				Average Correction Factor:	0.995

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

Version 03-2024
CALS_341

Wood Buffalo Environmental Association

SO_2 Calibration Summary

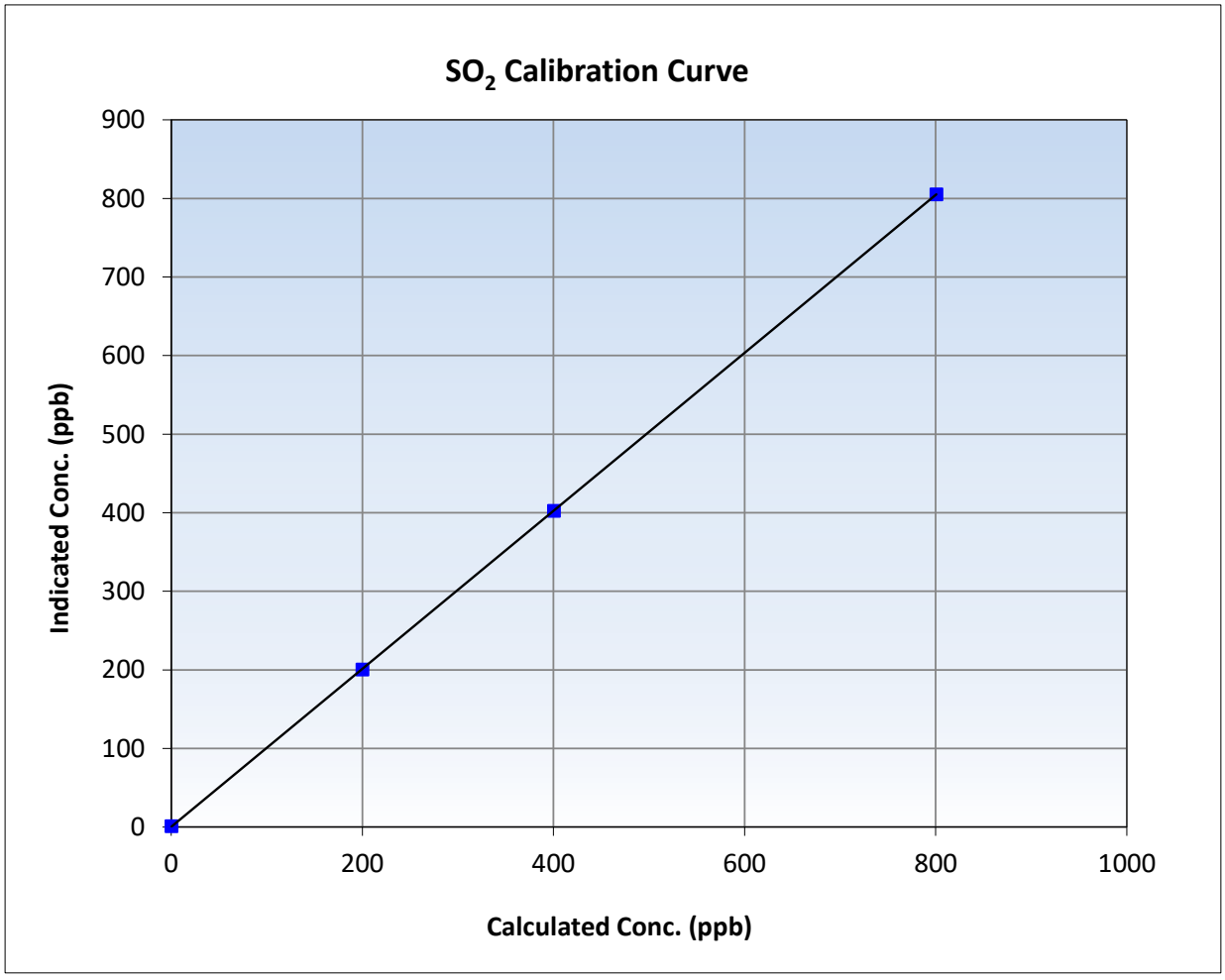
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 3, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:15	End Time (MST):	15:42
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453

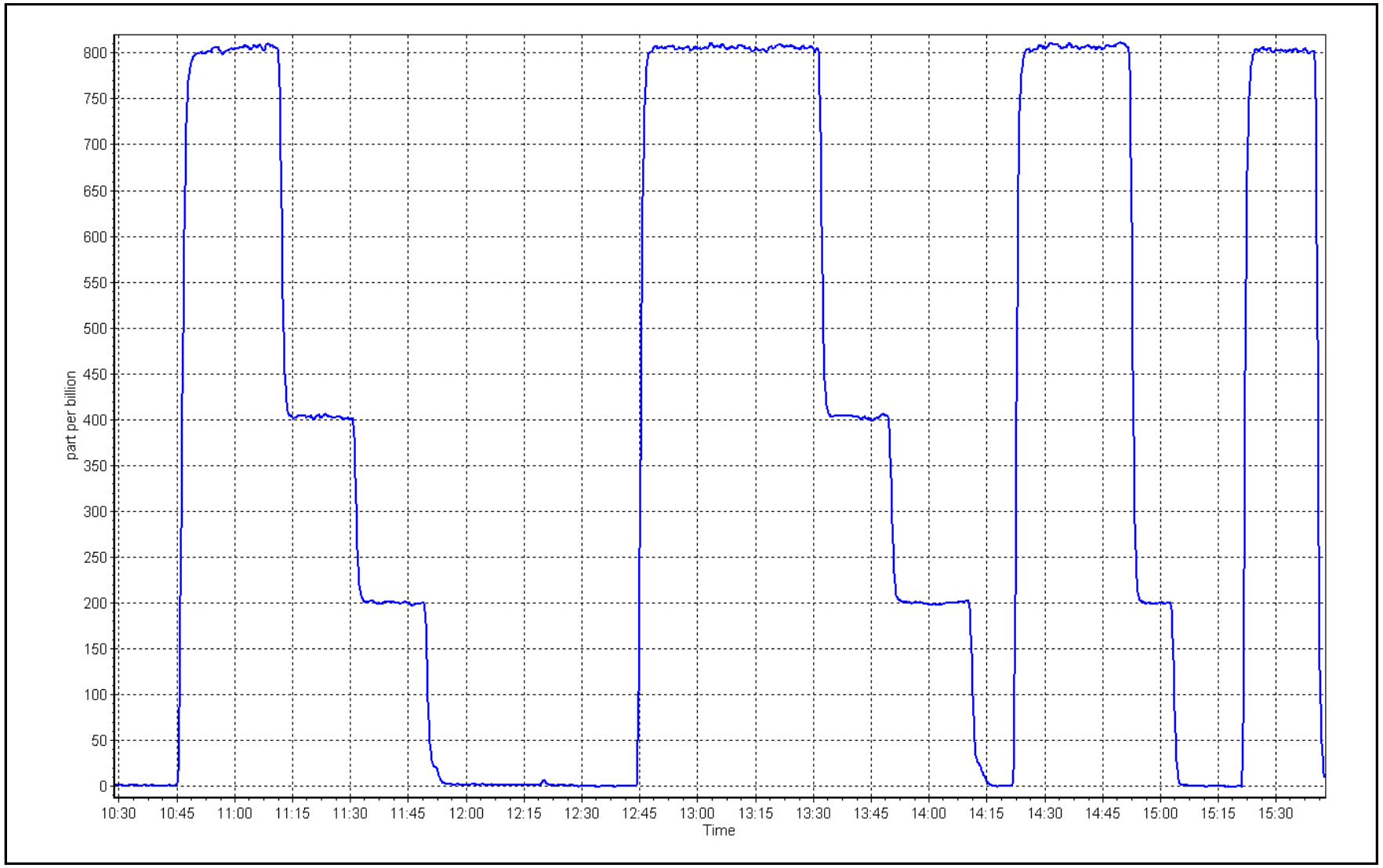
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.8	----
800.3	805.0	0.9941
400.2	402.3	0.9947
199.6	200.4	0.9960

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.005230	*0.90 - 1.10*
Intercept	0.277512	*+/-30*



SO2 Calibration Plot Date: May 8, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS18
Calibration Date:	May 28, 2024	Last Cal Date:	April 24, 2024
Start time (MST):	10:15	End time (MST):	15:05
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:	799 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.993725	0.996870	Backgd or Offset:	2.6	2.6
Calibration intercept:	0.261187	0.301076	Coeff or Slope:	1.137	1.167

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.2	----
As found High point	4927	73.0	80.0	79.6	1.007
As found Mid point	4964	36.5	40.0	39.9	1.007
As found Low point	4983	18.3	20.0	20.1	1.007
New cylinder response					

Baseline Corr As found:	79.4	Prev response:	79.75	*% change:	-0.4%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.992584	AF Intercept:	0.201110
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	1.000000	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4927	73.0	80.0	80.0	1.000
Mid point	4964	36.5	40.0	40.3	0.992
Low point	4983	18.3	20.0	20.2	0.992
As left zero	5000	0.0	0.0	0.5	----
As left span	4927	73.0	80.0	78.2	1.023
SO2 Scrubber Check	4923	77.1	771.0	0.0	----
Date of last scrubber change:		17-Dec-21		Ave Corr Factor	0.995
Date of last converter efficiency test:					

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

H_2S/TRS Calibration Summary

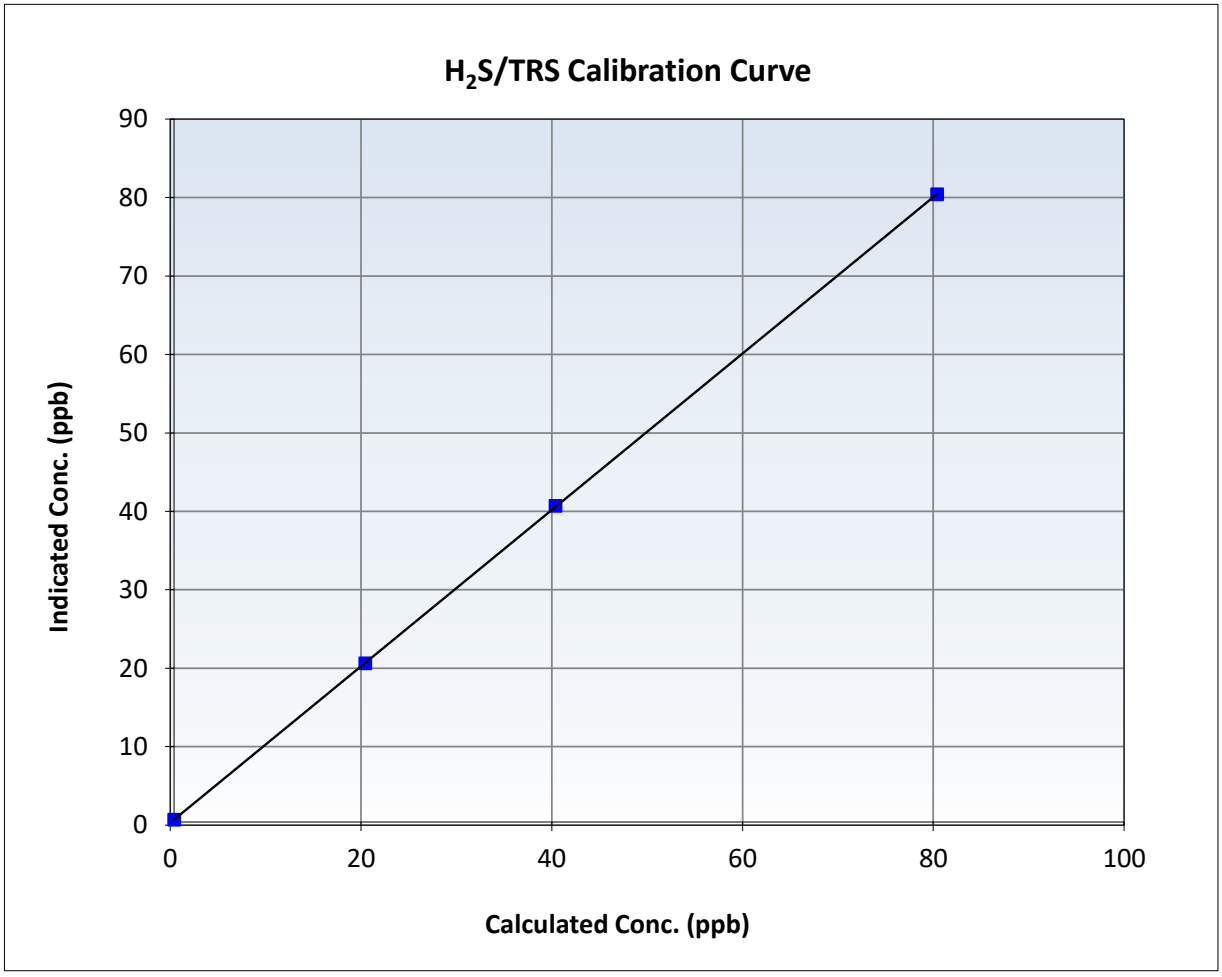
Station Information

Calibration Date:	May 28, 2024	Previous Calibration:	April 24, 2024
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	10:15	End Time (MST):	15:05
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359

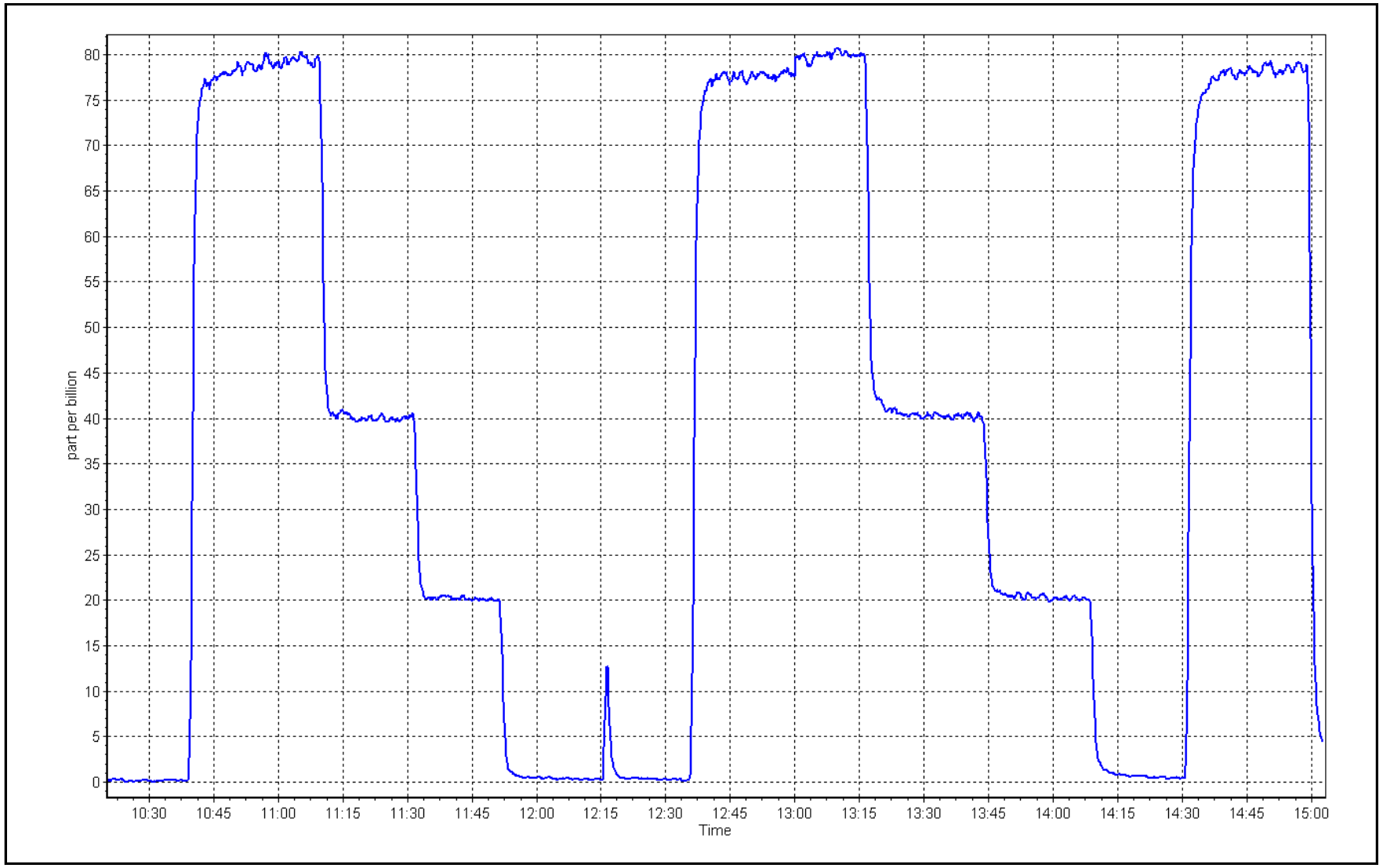
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.0	0.9999
40.0	40.3	0.9924
20.0	20.2	0.9925

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	0.996870	*0.90 - 1.10*
Intercept	0.301076	*+/-3*



H_2S/TRS Calibration Plot Date: May 28, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 9, 2024	Last Cal Date:	May 8, 2024
Start time (MST):	10:30	End time (MST):	14:30
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:	CC463851	Cal Gas Expiry Date:	February 23, 2025
CH4 Cal Gas Conc.	500.8 ppm	CH4 Equiv Conc.	1066.8 ppm
C3H8 Cal Gas Conc.	205.8 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	500.8 ppm	CH4 Equiv Conc.	1066.8 ppm
Removed C3H8 Conc.	205.8 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	2658
Zero Air Gen model:	Teledyne API T701H	Serial Number:	360

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.23E-04	2.96E-04	NMHC SP Ratio:	5.94E-05	4.35E-05
CH4 Retention time:	16.4	16.4	NMHC Peak Area:	154457	210670
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)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	81.0	17.28	17.26	1.002
Mid point	4959	40.5	8.64	8.67	0.997
Low point	4979	20.2	4.31	4.33	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.0	17.28	17.27	1.001
				Average Correction Factor	0.998

Notes: Resolved linearity issue, reset all parameters of instrument before calibration.

Wood Buffalo Environmental Association

THC / CH_4 / 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	5000	0.0	0.00	0.00	----
High point	4919	81.0	9.17	9.17	1.000
Mid point	4959	40.5	4.58	4.61	0.994
Low point	4979	20.2	2.29	2.32	0.985
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.0	9.17	9.19	0.997
				Average Correction Factor	0.993

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	5000	0.0	0.00	0.00	----
High point	4919	81.0	8.11	8.09	1.003
Mid point	4959	40.5	4.06	4.06	1.000
Low point	4979	20.2	2.02	2.00	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.0	8.11	8.07	1.005
				Average Correction Factor	1.004

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999037	0.998336
THC Cal Offset:	0.068218	0.017013
CH4 Cal Slope:	0.994973	0.997807
CH4 Cal Offset:	0.061988	-0.002818
NMHC Cal Slope:	1.002583	0.999129
NMHC Cal Offset:	0.006430	0.019031

Calibration Performed By: Kelly Baragar

Wood Buffalo Environmental Association

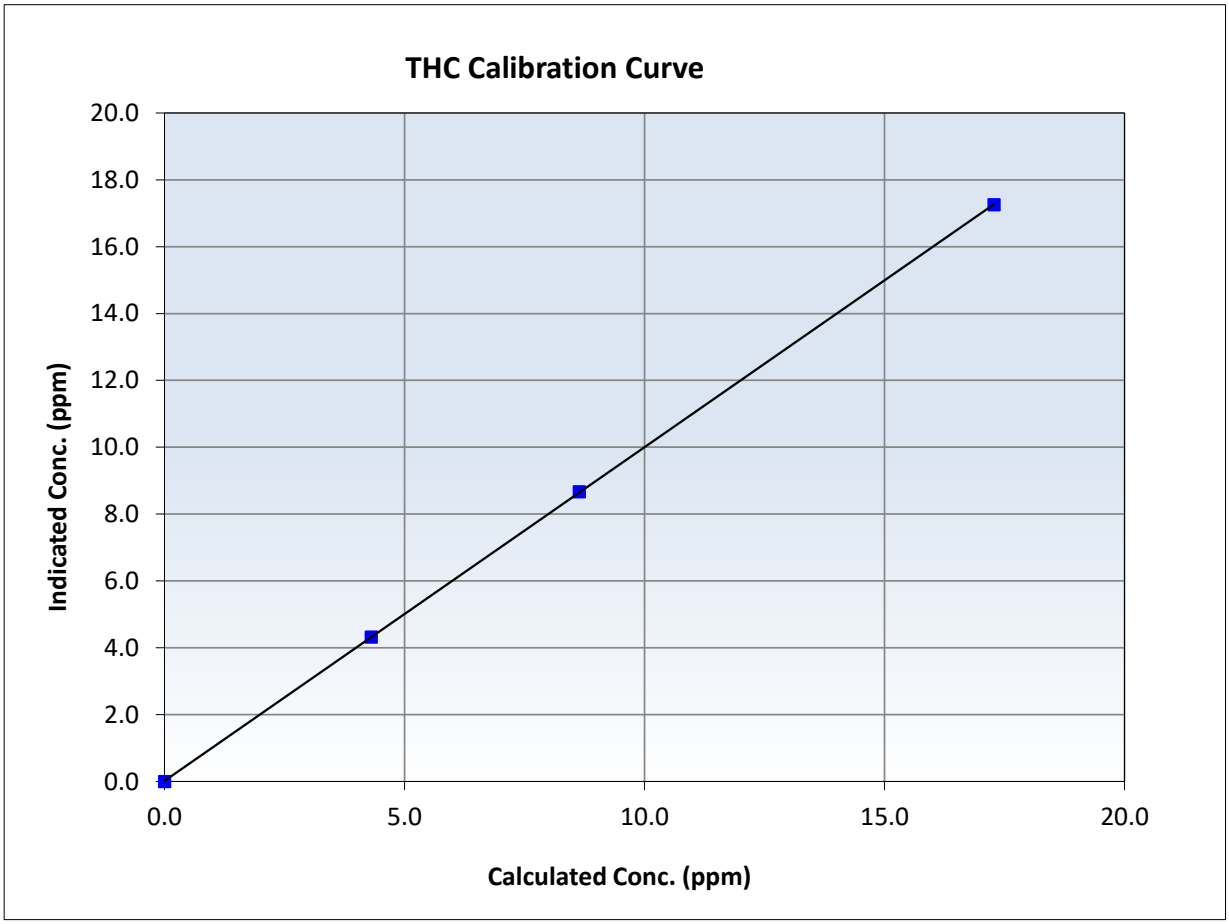
THC Calibration Summary

Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:30	End Time (MST):	14:30
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
17.28	17.26	1.0015	Slope	0.998336	0.90 - 1.10
8.64	8.67	0.9966	Intercept	0.017013	+/-0.5
4.31	4.33	0.9966			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

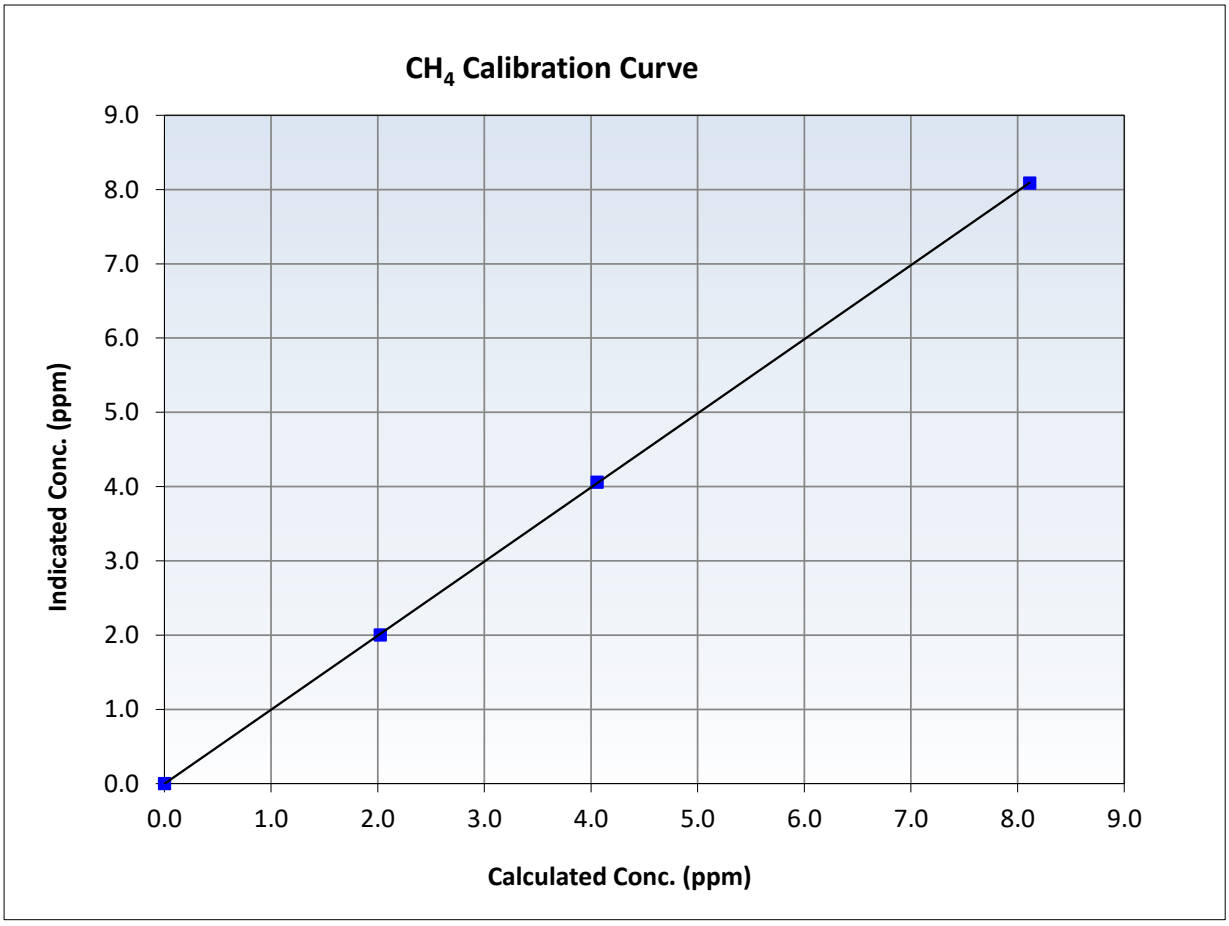
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:30	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.11	8.09	1.0030
4.06	4.06	0.9997
2.02	2.00	1.0098

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	0.997807	*0.90 - 1.10*
Intercept	-0.002818	*+/-0.5*



Wood Buffalo Environmental Association

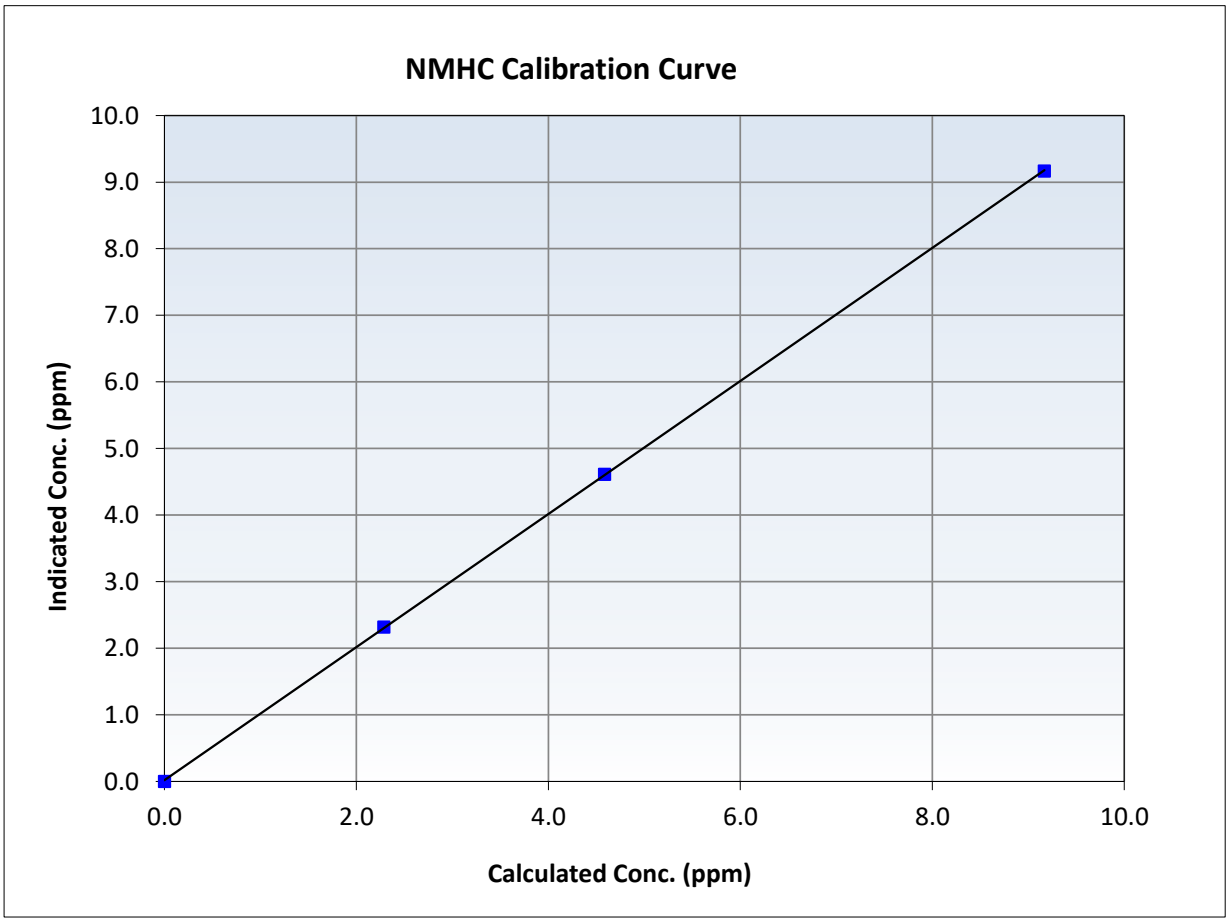
NMHC Calibration Summary

Station Information

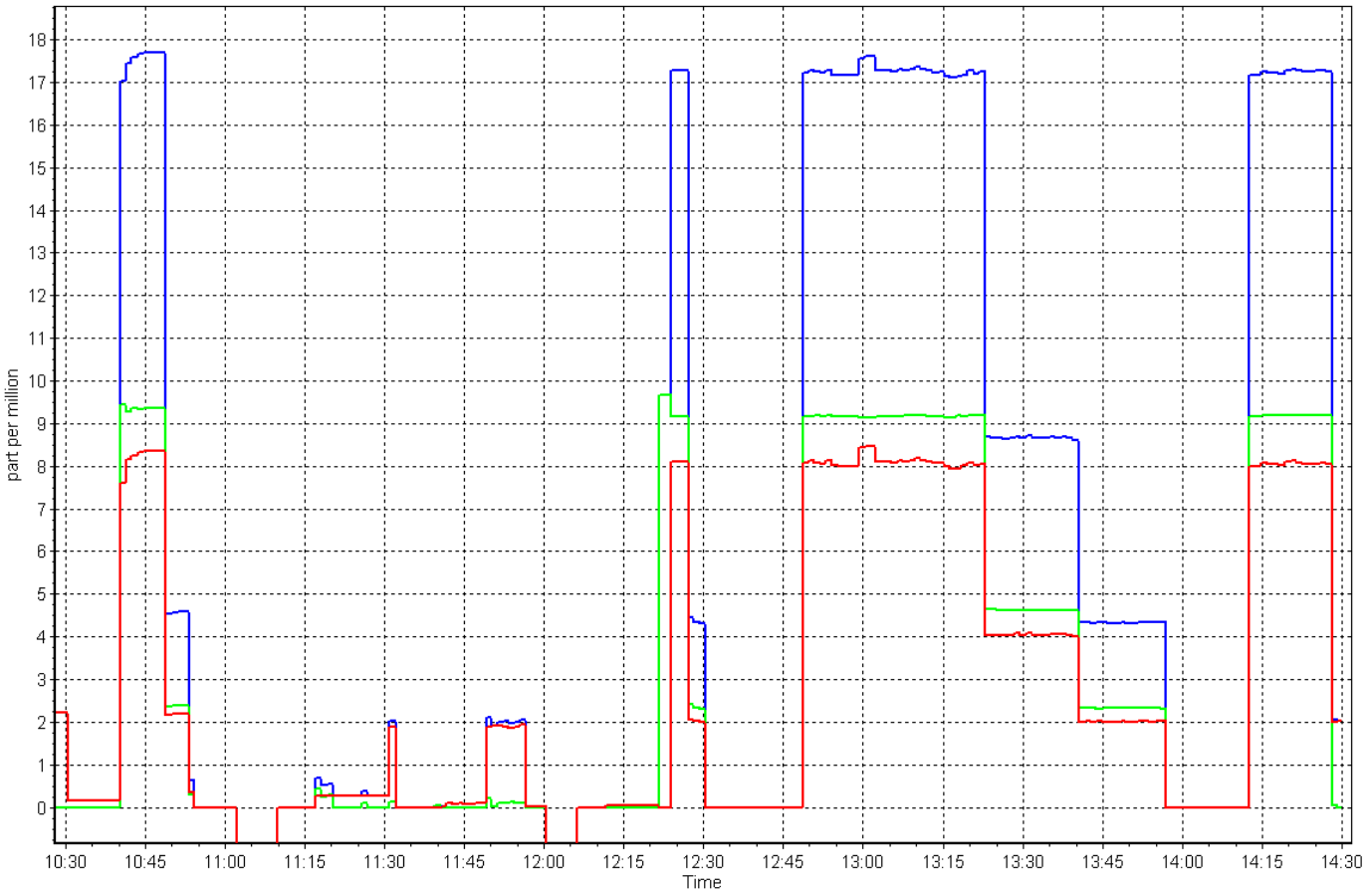
Calibration Date:	May 9, 2024	Previous Calibration:	May 8, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:30	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999980	≥0.995
9.17	9.17	0.9999	Slope	0.999129	0.90 - 1.10
4.58	4.61	0.9941	Intercept	0.019031	+/-0.5
2.29	2.32	0.9853			



NMHC Calibration Plot Date: May 9, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Stony Mountain
Station number:	AMS 18
Calibration Date:	May 15, 2024
Last Cal Date:	April 23, 2024
Start time (MST):	8:23
End time (MST):	13:08
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T26DHGA	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	48.28 ppm	NO Cal Gas Conc:	47.58 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.28 ppm	Removed Gas NO Conc:	47.58 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	2658
ZAG make/model:	Teledyne API T701	Serial Number:	13779

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
AF High point	4916	84.0	811.1	799.3	11.8	801.3	789.7	11.6	1.0121	1.0120
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 813.6 ppb	NO = 802.3 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -1.5%
Baseline Corr 1st pt	NO_X = 801.4 ppb	NO = 789.9 ppb	As Found Statistics	*Percent Change	NO = -1.6%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found NO r^2:	NO Sl:	NO Int:
			As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i

Serial Number: 1336160088

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.119	1.119	NO bkgnd or offset:	3.1	3.1
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	3.1	3.1
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	256.4	256.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.003895	0.985690
NO_X Cal Offset:	-0.640000	-1.180000
NO Cal Slope:	1.005239	0.986466
NO Cal Offset:	-1.220000	-1.380000
NO_2 Cal Slope:	1.001293	1.001655
NO_2 Cal Offset:	-0.223061	-0.094534

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4916	84.0	811.1	799.3	11.8	798.6	787.6	11.1	1.0157	1.0149
Mid point	4958	42.0	405.6	399.7	5.9	398.9	392.9	6.0	1.0167	1.0172
Low point	4979	21.0	202.8	199.8	2.9	196.9	193.9	3.0	1.0298	1.0306
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4916	84.0	811.1	344.5	466.6	798.8	344.5	454.4	1.0154	1.0000
							Average Correction Factor		1.0207	1.0209

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	787.0	346.7	452.1	452.6	0.9988	100.1%
Mid GPT point	787.0	580.7	218.1	218.8	0.9966	100.3%
Low GPT point	787.0	684.7	114.1	113.7	1.0032	99.7%
				Average Correction Factor	0.9995	100.0%

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

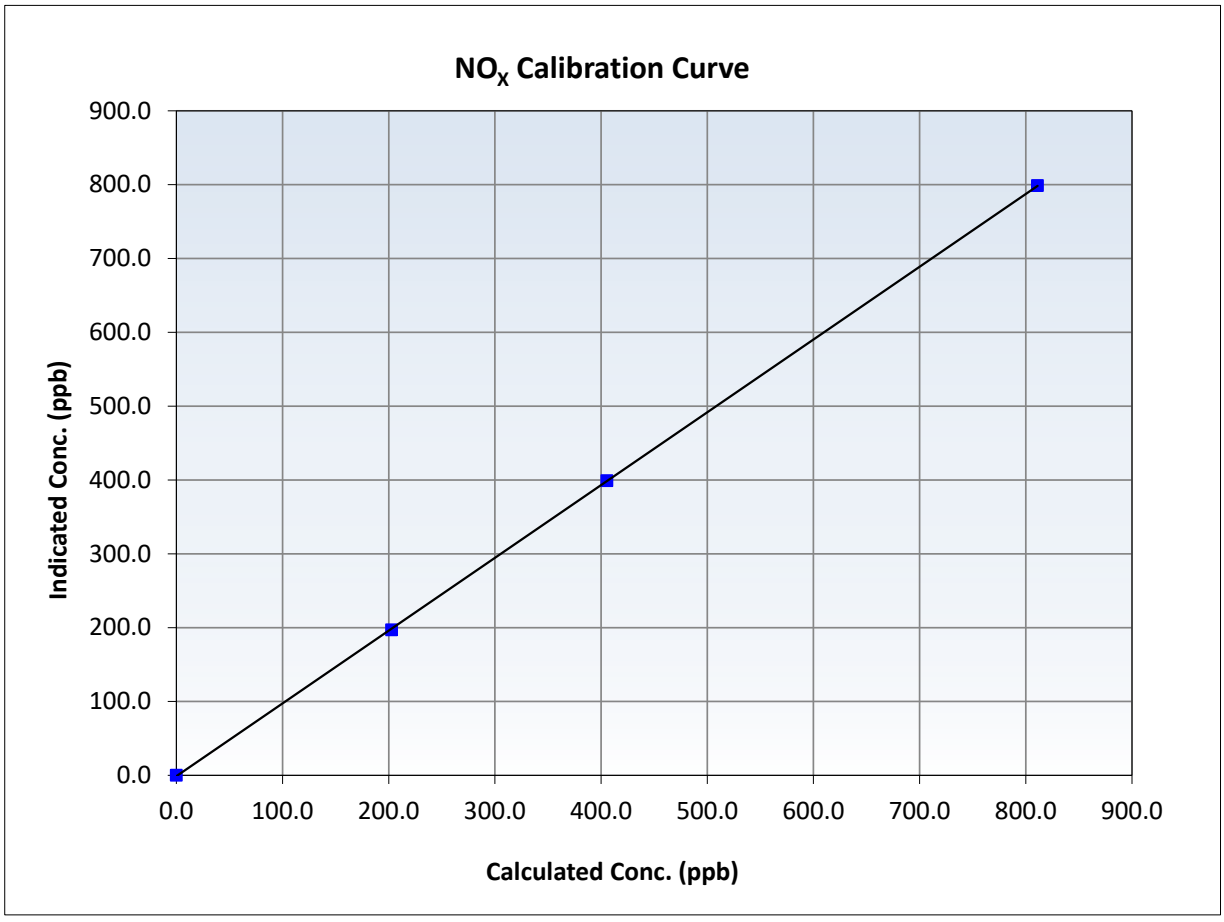
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	8:23	End Time (MST):	13:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
811.1	798.6	1.0157
405.6	398.9	1.0167
202.8	196.9	1.0298

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	0.985690	*0.90 - 1.10*
Intercept	-1.180000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

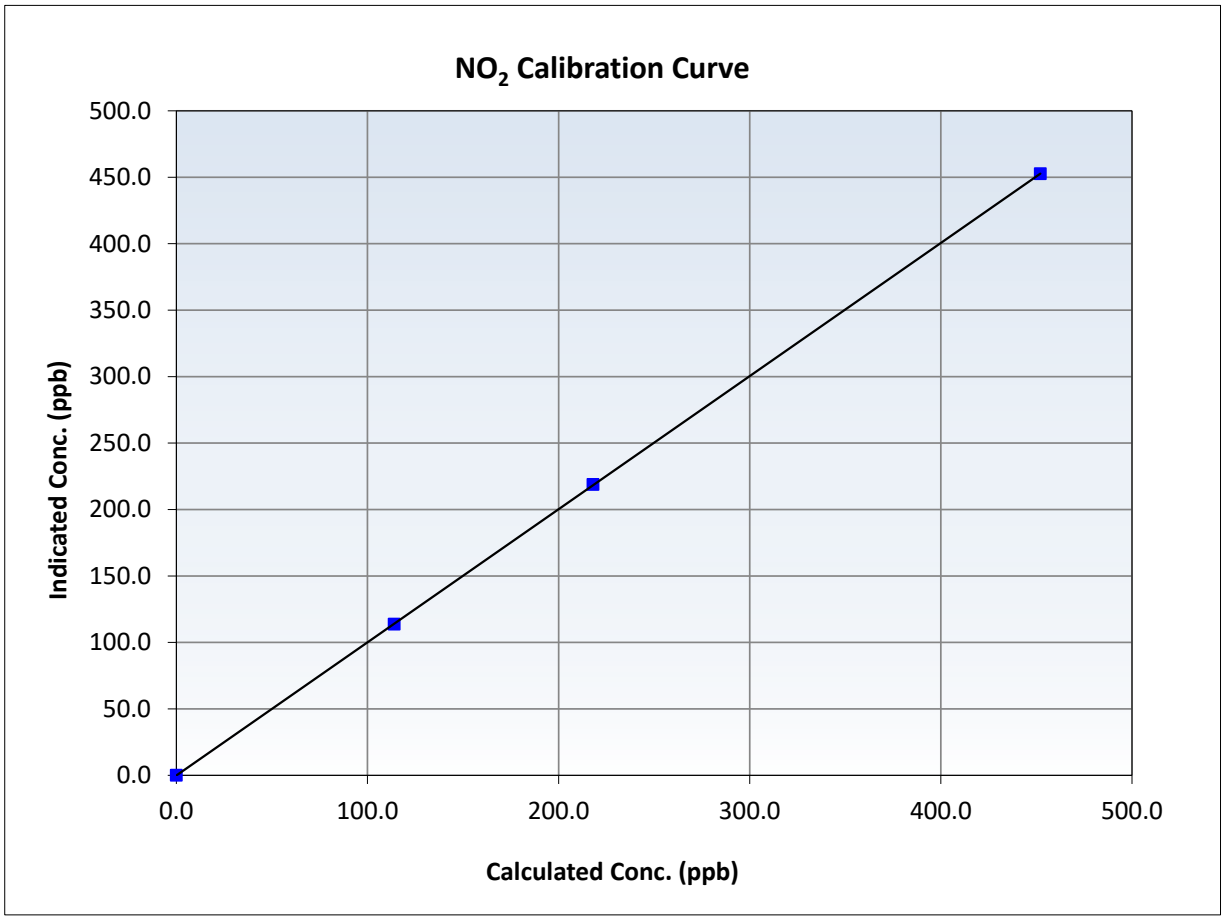
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	8:23	End Time (MST):	13:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
452.1	452.6	0.9988
218.1	218.8	0.9966
114.1	113.7	1.0032

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.001655	*0.90 - 1.10*
Intercept	-0.094534	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

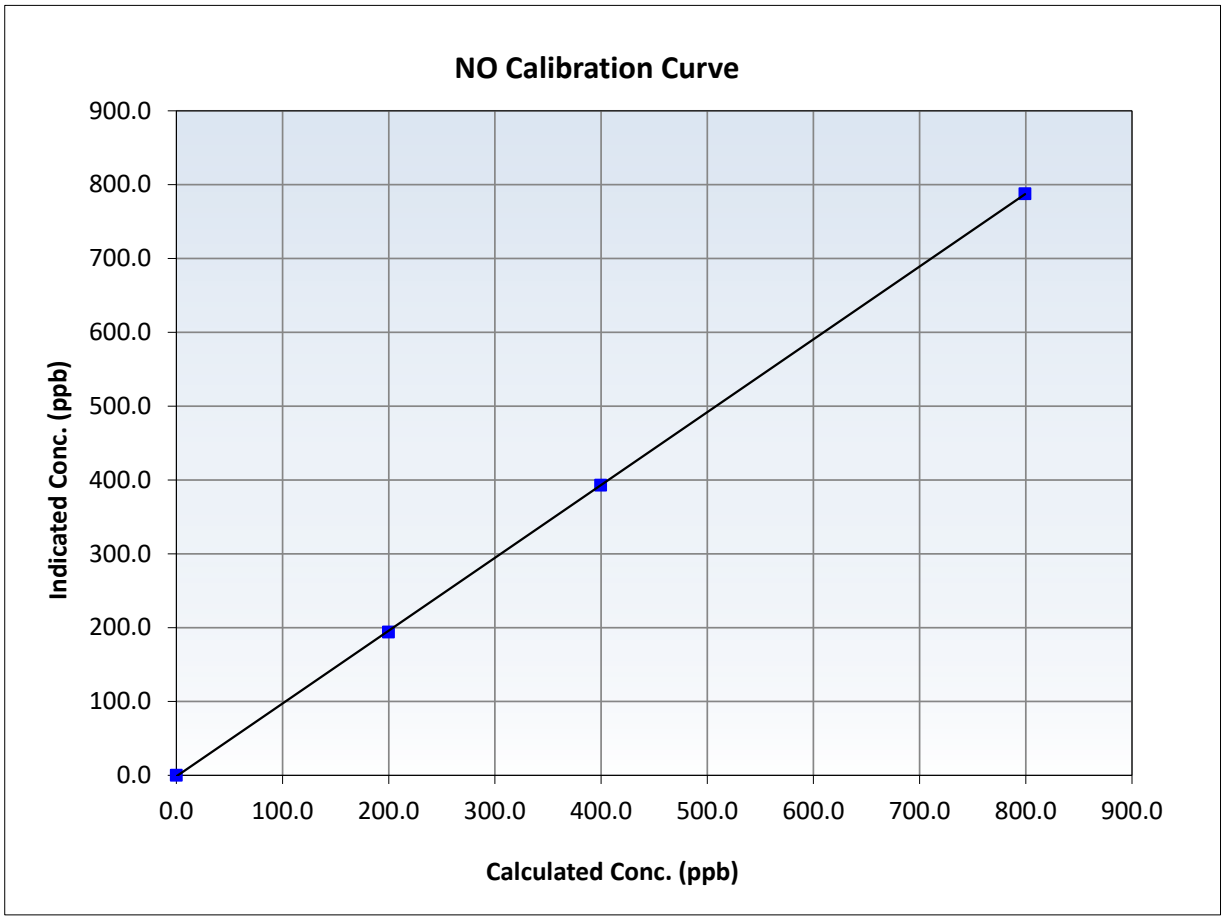
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	8:23	End Time (MST):	13:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

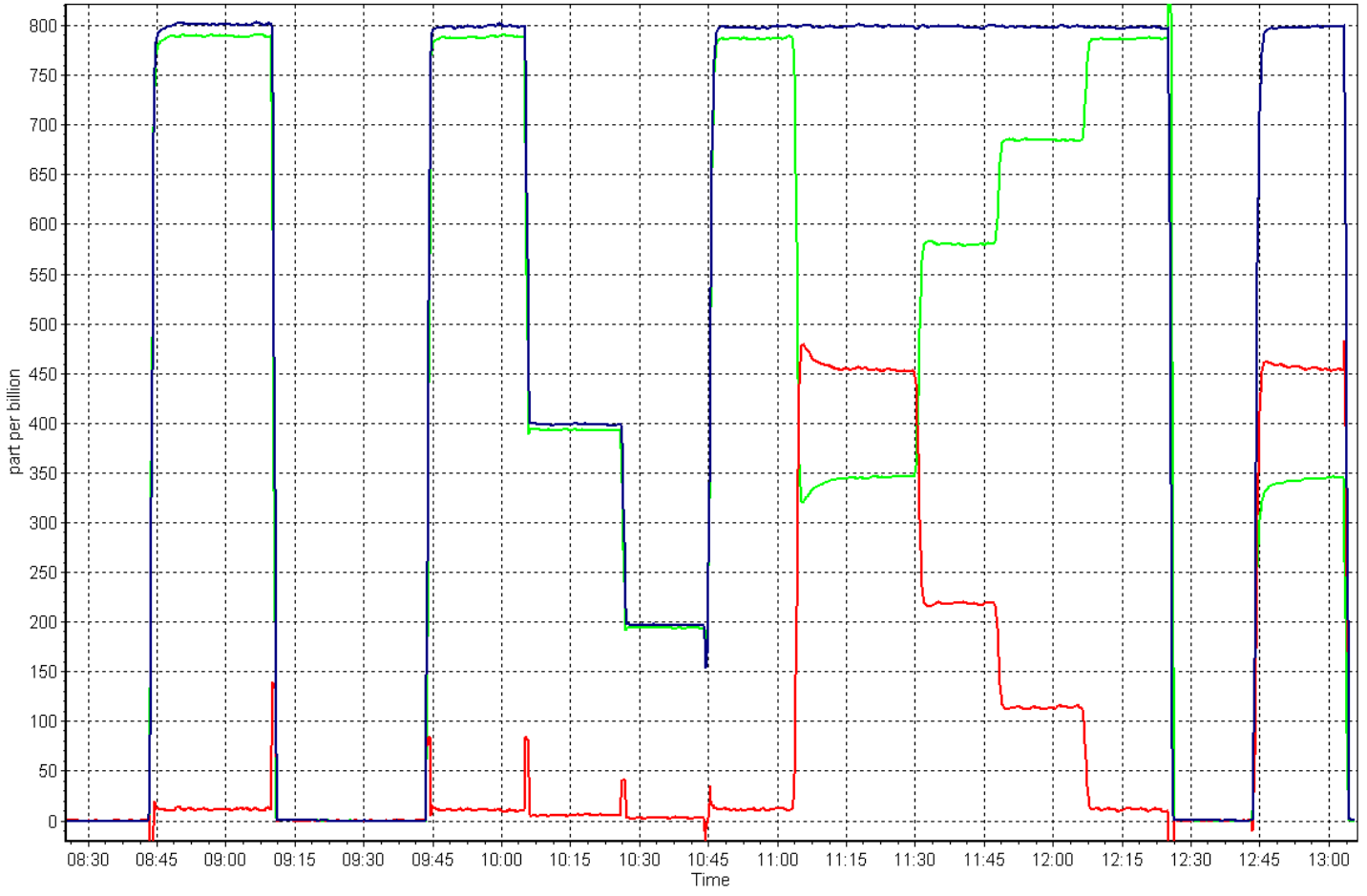
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.3	787.6	1.0149
399.7	392.9	1.0172
199.8	193.9	1.0306

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	0.986466	*0.90 - 1.10*
Intercept	-1.380000	*+/-20*



NO_X Calibration Plot Date: May 15, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 21, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	10:50	End time (MST):	14:42
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000029	1.000800	Backgd or Offset:	0.3	0.3
Calibration intercept:	-0.180000	-0.240000	Coeff or Slope:	0.982	0.966

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	NA	0.0	-0.3	----
As found High point	4804	1141.9	400.0	407.6	0.981
As found Mid point					
As found Low point					
Baseline Corr As found:	407.9	Previous response	399.8	*% change	2.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	NA	0.0	-0.1	----
High point	4888	1138.1	400.0	400.1	1.000
Mid point	4888	884.5	200.0	200.0	1.000
Low point	4888	741.4	100.0	99.6	1.004
As left zero	5000	NA	0.0	0.1	----
As left span	4812	1097.9	400.0	402.3	0.994
				Average Correction Factor	1.001

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

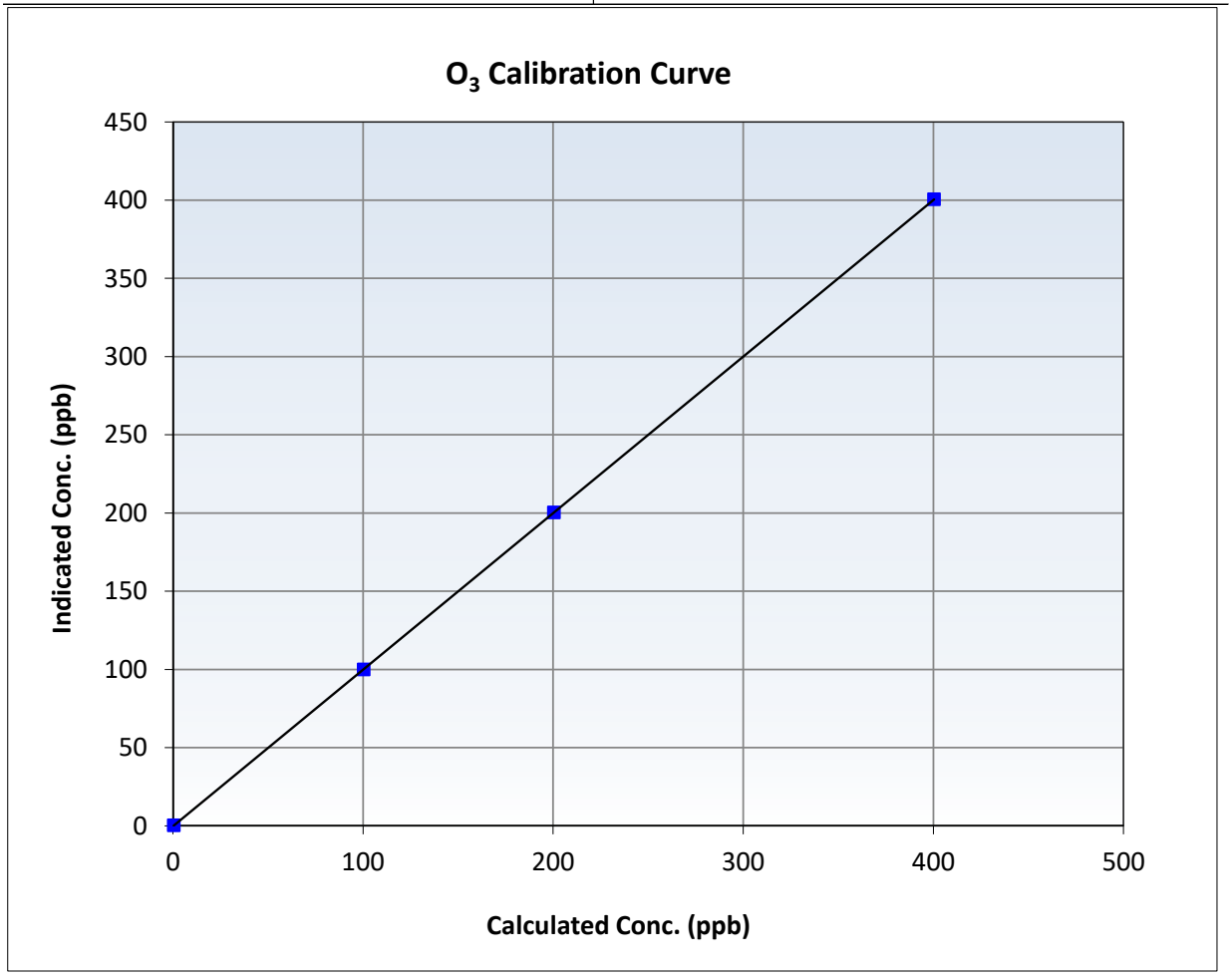
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:50	End Time (MST):	14:42
Analyzer make:	API T400	Analyzer serial #:	825

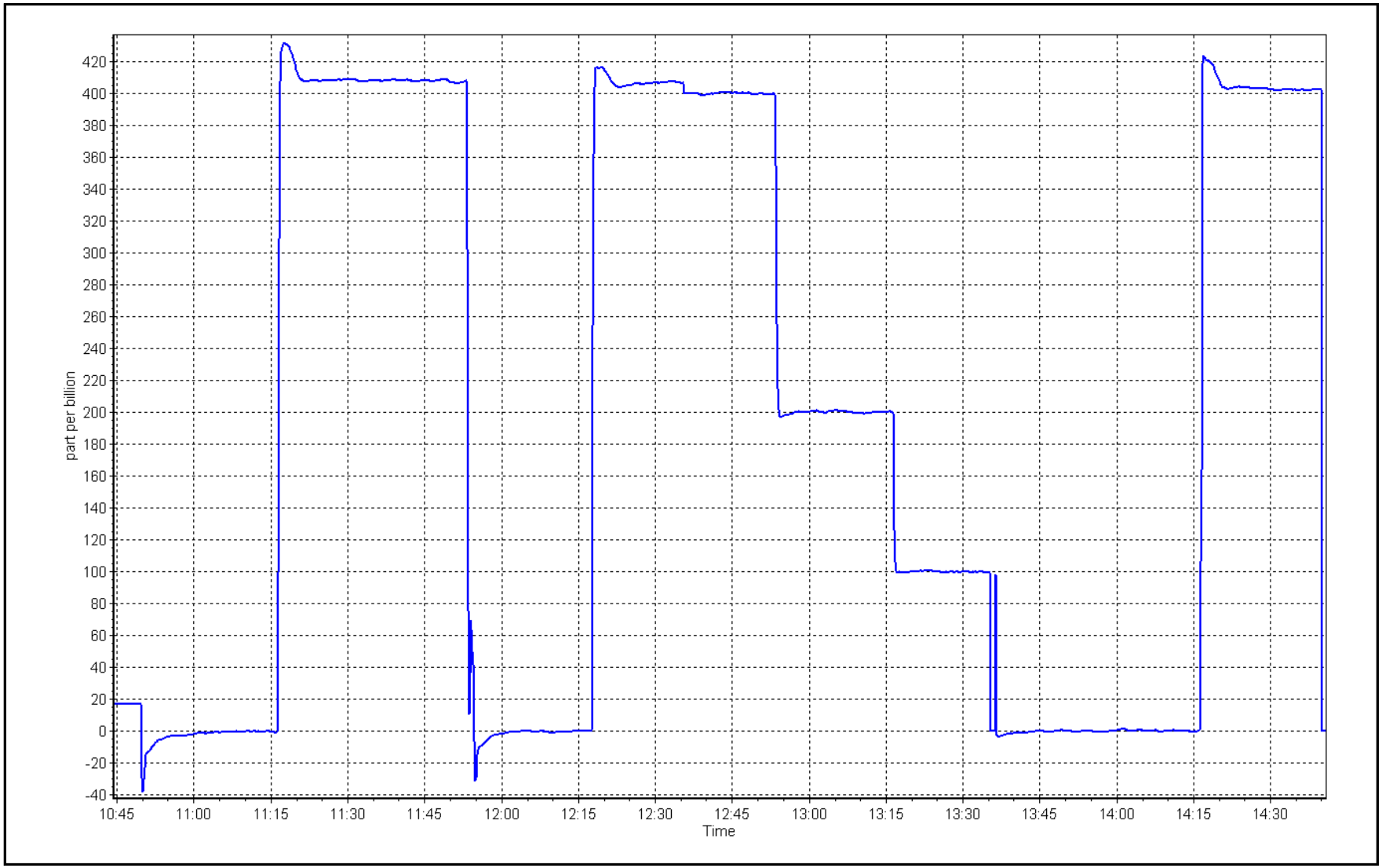
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
400.0	400.1	0.9998
200.0	200.0	1.0000
100.0	99.6	1.0040

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.000800	*0.90 - 1.10*
Intercept	-0.240000	*+/- 5*



O_3 Calibration Plot Date: May 21, 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:	May 16, 2024	Last Cal Date:	April 26, 2024
Start time (MST):	11:10	End time (MST):	12:20
Analyzer Make:	API T640	S/N:	1162
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388755
Temp/RH standard:	Alicat FP-25BT	S/N:	388755

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	12.6	12.15	12.6	☐	+/- 2 °C
P (mmHg)	692.2	691.75	692.2	☐	+/- 10 mmHg
Flow (LPM)	5.02	5.04	5.02	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>80%
Zero Verification	PM w/o HEPA:	20.0	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		10.9	☐	+/- 0.5

Date Optical Chamber Cleaned: May 16, 2024

Date Disposable Filter Changed: February 21, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

Notes: Instrument reading zero. Flow, pressure and temp checked, no issues. No response from PMT. Reset instrument and readings came back. All checks completed again. No issues. PMT check good. Leak check passed.

Calibration by: Devin Russell

Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 21, 2024	Last Cal Date:	May 16, 2024
Start time (MST):	13:55	End time (MST):	14:27
Analyzer Make:	API T640	S/N:	1162
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388748
Temp/RH standard:	Alicat FP-25BT	S/N:	388748

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	10.4	9.44	10.4	☐	+/- 2 °C
P (mmHg)	698.9	698.91	698.9	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.05	5.01	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>80%
Zero Verification	PM w/o HEPA:	3.0	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		10.9	☐	+/- 0.5

Date Optical Chamber Cleaned: May 16, 2024

Date Disposable Filter Changed: February 21, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

Notes: Flow, temp and pressure checked. Heated stack replaced. Leak check passed and PMT checked.

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 29, 2024	Last Cal Date:	N/A
Start time (MST):	12:40	End time (MST):	13:45
Analyzer Make:	API T640	S/N:	766
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388748
Temp/RH standard:	Alicat FP-25BT	S/N:	388748

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	16.3	16.24	16.3	☐	+/- 2 ^{o}C
P (mmHg)	691.2	692.99	691.2	☐	+/- 10 mmHg
Flow (LPM)	4.97	5.09	4.97	☐	+/- 0.25 LPM
PW% (pump)	37	-----	37	☐	>80%

Zero Verification — PM w/o HEPA: 3.2 — 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	N/A		N/A	☐	+/- 0.5

Date Optical Chamber Cleaned: N/A

Date Disposable Filter Changed: N/A

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

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

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 31, 2024	Last Cal Date:	May 29, 2024
Start time (MST):	11:05	End time (MST):	12:16
Analyzer Make:	API T640	S/N:	324
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388748
Temp/RH standard:	Alicat FP-25BT	S/N:	388748

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	10.2	9.7	10.2	☐	+/- 2 °C
P (mmHg)	693.8	692.2	693.8	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.02	4.98	☐	+/- 0.25 LPM
PW% (pump)	37	-----	37	☐	>80%
Zero Verification	PM w/o HEPA:	8.2	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	11.0		11.0	☐	+/- 0.5

Date Optical Chamber Cleaned: N/A

Date Disposable Filter Changed: N/A

Post- maintenance Zero Verification: PM w/ HEPA: 0.0 <0.2 ug/m3

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

Notes: Flow, temp and pressure checked. PMT checked and leak check passed.

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 1, 2024	Last Cal Date:	April 5, 2024
Start time (MST):	9:15	End time (MST):	12:30
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:	API T300		Analyzer serial #:	3504	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006642	0.994403	Backgd or Offset:	-0.010	-0.011
Calibration intercept:	0.249837	0.079799	Coeff or Slope:	0.905	0.902

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	41.5	0.996
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	41.26	Prev response:	41.61	*% change:	-0.9%
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	0.1	----
High point	4933	66.7	41.1	40.9	1.005
Mid point	4966	33.3	20.5	20.7	0.993
Low point	4983	16.7	10.3	10.2	1.006
As left zero	5000	0.0	0.0	0.0	----
As left span	4933	66.7	41.1	40.7	1.010
				Average Correction Factor	1.001

Notes: Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

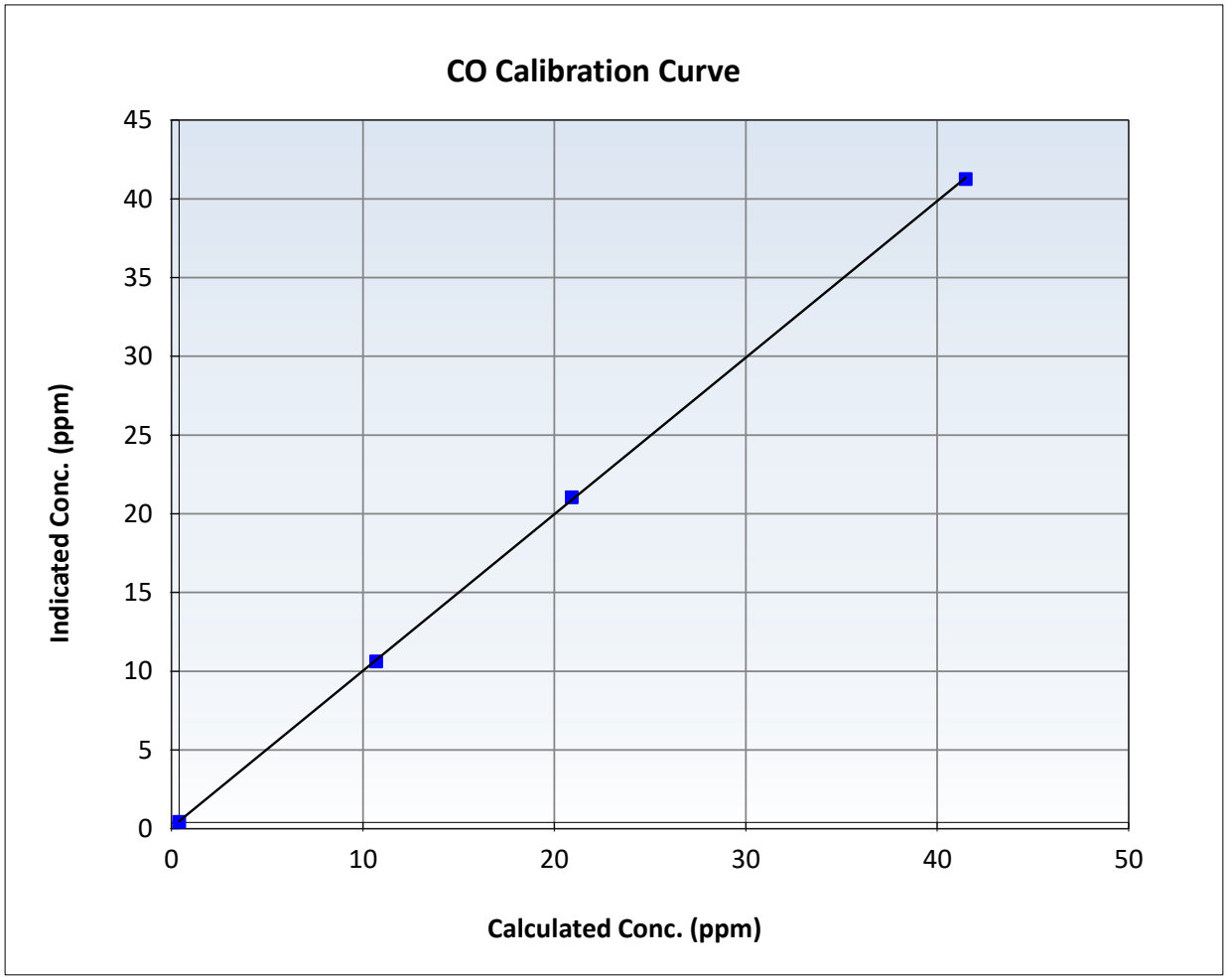
Station Information

Calibration Date:	May 1, 2024	Previous Calibration:	April 5, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	9:15	End Time (MST):	12:30
Analyzer make:	API T300	Analyzer serial #:	3504

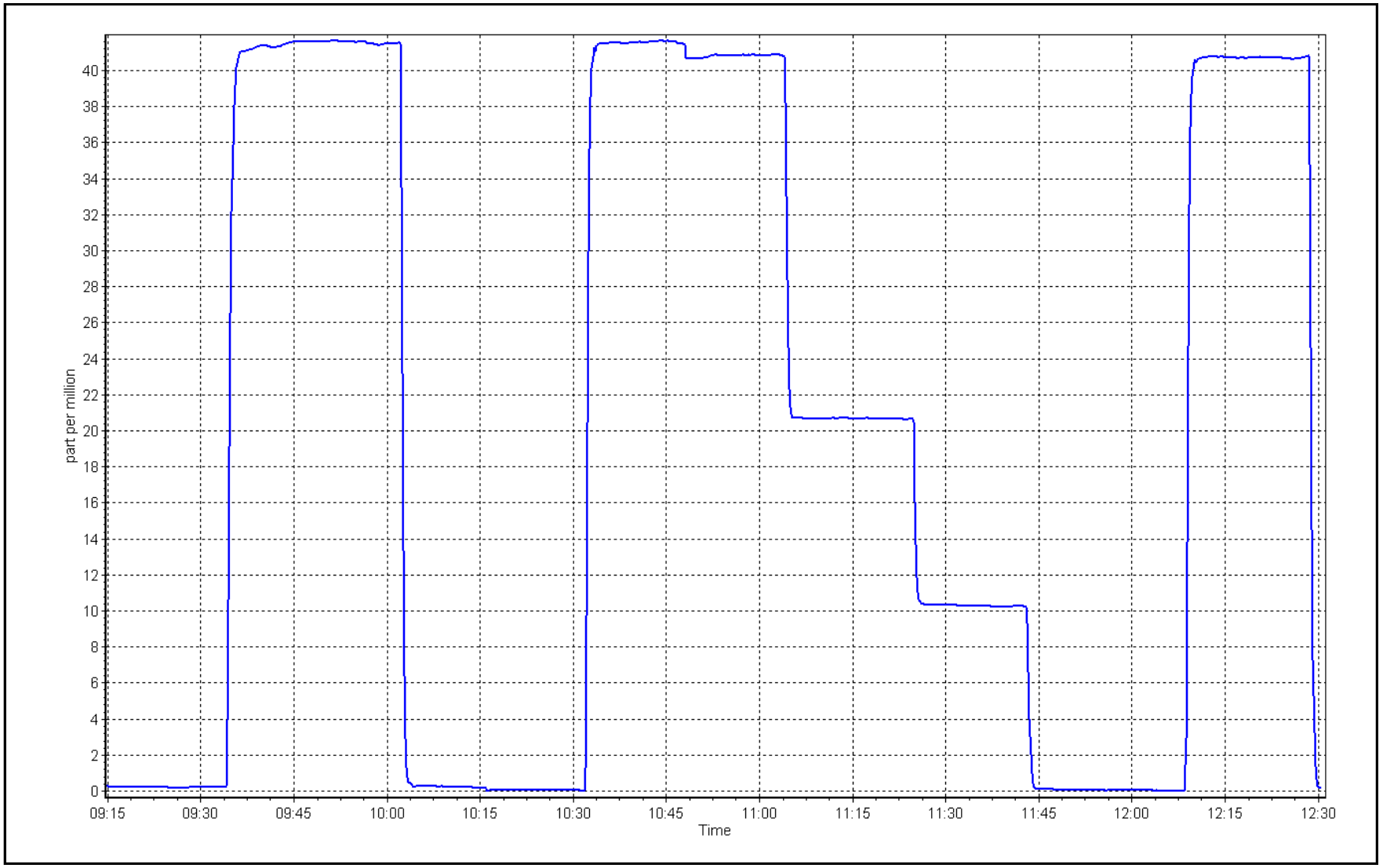
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
41.1	40.9	1.0054
20.5	20.7	0.9930
10.3	10.2	1.0057

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999951	*≥0.995*
Slope	0.994403	*0.90 - 1.10*
Intercept	0.079799	*+/-1.5*



CO Calibration Plot Date: May 1, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	May 23, 2024	Last Cal Date:	April 26, 2024
Start time (MST):	10:44	End time (MST):	14:06
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006157	1.007099	Backgd or Offset:	-0.037	-0.037
Calibration intercept:	-3.120000	-1.320000	Coeff or Slope:	0.939	0.939

CO_2 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	1.0	----
As found High Point	2920	80.0	1576.0	1592.0	0.991
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1591.0	Prev response:	1582.6	*% 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	

CO_2 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	1.0	----
High point	2920	80.0	1576.0	1588.8	0.992
Mid point	2960	40.0	788.0	785.8	1.003
Low point	2980	20.0	394.0	396.7	0.993
As left zero	3000	0.0	0.0	0.7	----
As left span	2930	80.0	1570.8	1586.4	0.990
				Average Correction Factor	0.996

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO_2 Calibration Summary

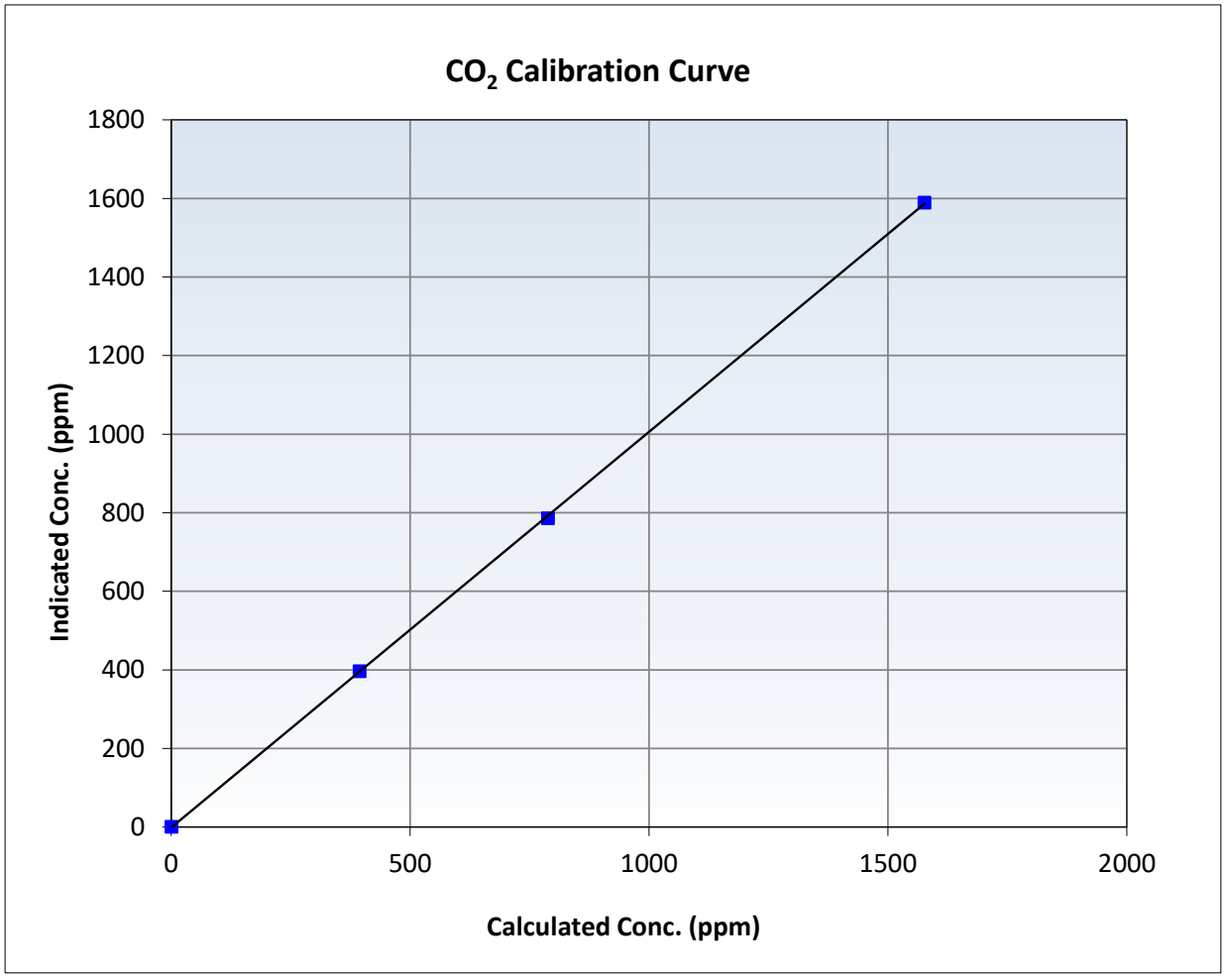
Station Information

Calibration Date	May 23, 2024	Previous Calibration	April 26, 2024
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:44	End Time (MST)	14:06
Analyzer make	API T360	Analyzer serial #	489

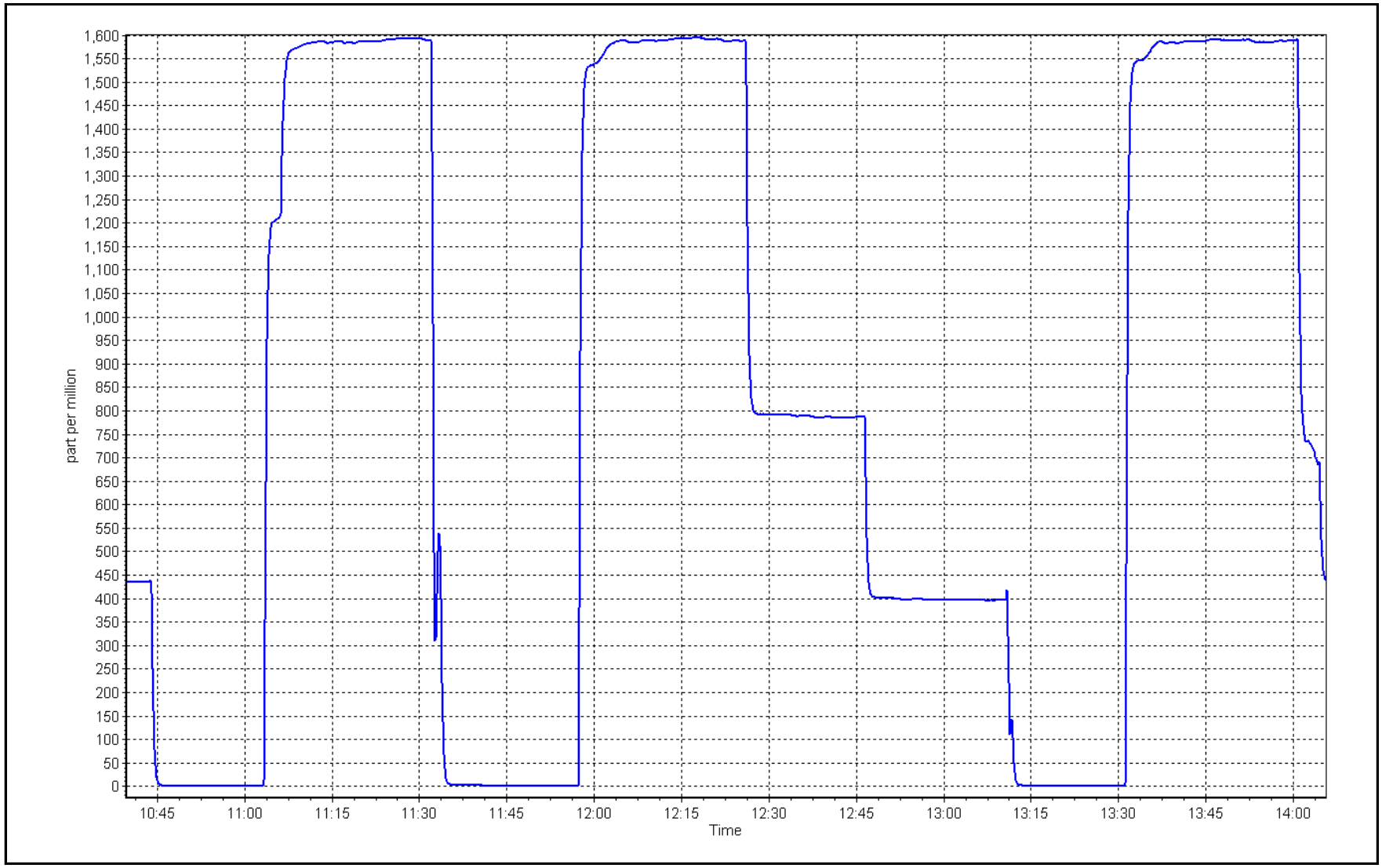
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	1.0	----
1576.0	1588.8	0.9919
788.0	785.8	1.0028
394.0	396.7	0.9932

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999958	*≥0.995*
Slope	1.007099	*0.90 - 1.10*
Intercept	-1.3	*+/-20*



CO_2 Calibration Plot Date: May 23, 2024 Location: Stony Mountain



CALS_371

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19
FIREBAG
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	May 15, 2024	Last Cal Date:	April 22, 2024
Start time (MST):	10:11	End time (MST):	14:18
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996719	0.995775	Backgd or Offset:	10.6	10.6
Calibration intercept:	0.438192	0.818481	Coeff or Slope:	0.991	0.991

SO_2 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	4999	0.0	0.0	0.0	----
As found High point	4919	81.1	799.5	797.3	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.3	Previous response	797.3	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	4999	0.0	0.0	0.0	----
High point	4919	81.1	799.5	796.5	1.004
Mid point	4959	40.6	400.3	399.8	1.001
Low point	4980	20.3	200.1	200.9	0.996
As left zero	4999	0.0	0.0	0.2	----
As left span	4919	81.1	799.5	797.4	1.003
				Average Correction Factor:	1.000

Notes: Calibrated remotely due to evacuation notice. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

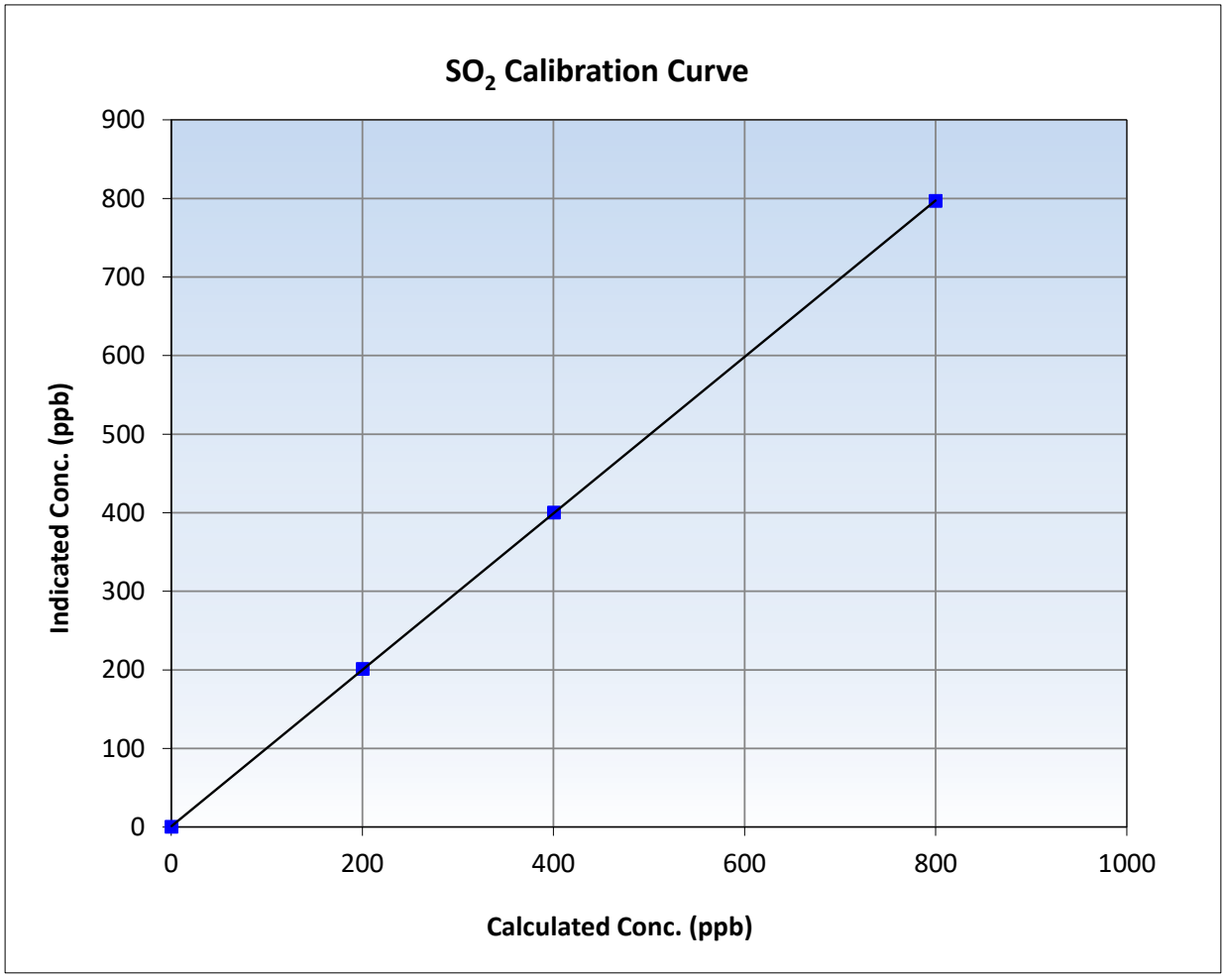
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 22, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:11	End Time (MST):	14:18
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

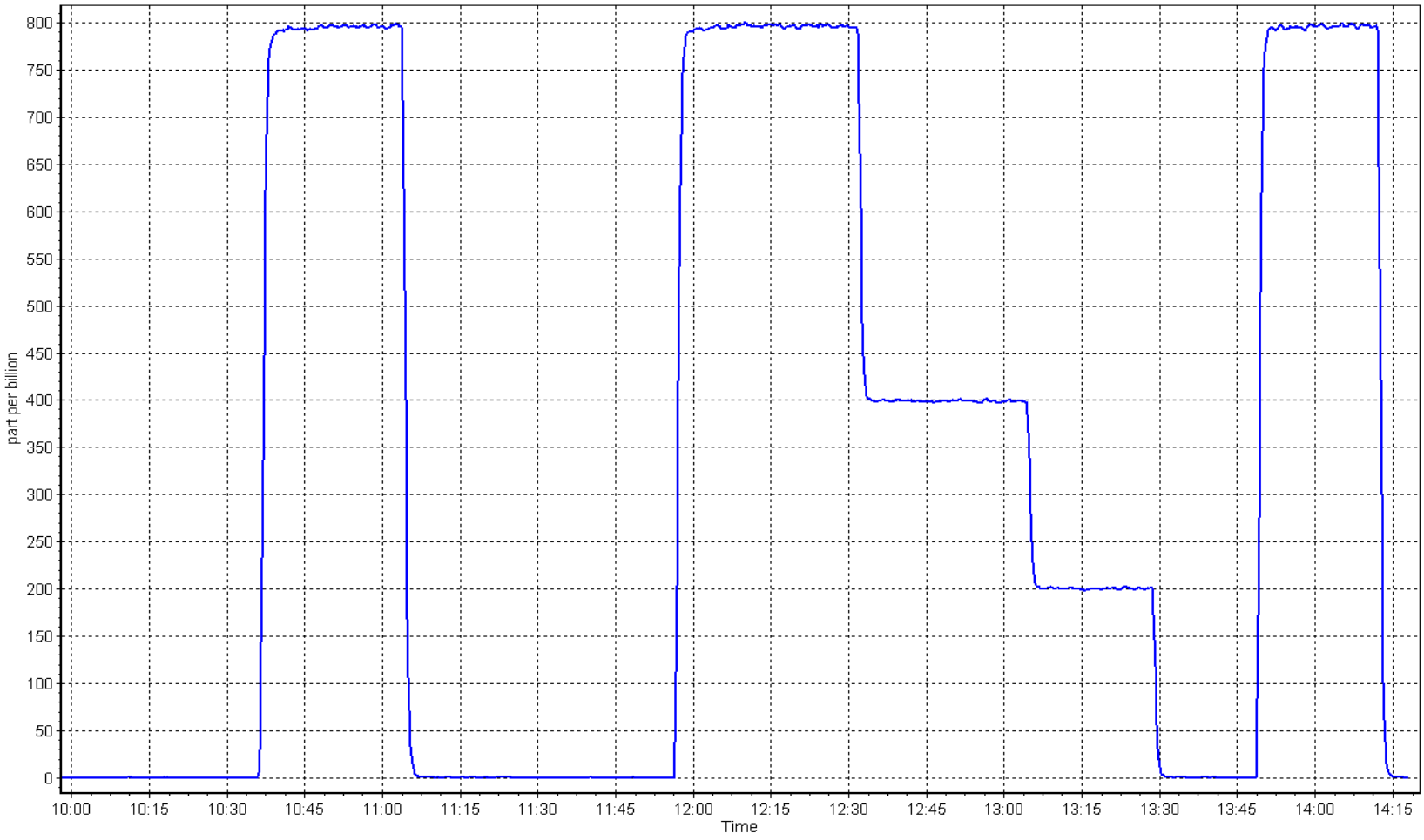
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.5	796.5	1.0037
400.3	399.8	1.0012
200.1	200.9	0.9960

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.995775	*0.90 - 1.10*
Intercept	0.818481	*+/-30*



SO2 Calibration Plot Date: May 15, 2024 Location: Firebag



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	May 16, 2024	Last Cal Date:	April 16, 2024
Start time (MST):	10:51	End time (MST):	16:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.114	ppm	Cal Gas Exp Date:	February 5, 2024
Cal Gas Cylinder #:	CC517427			
Removed Cal Gas Conc:	5.114	ppm	Rem Gas Exp Date:	n/a
Removed Gas Cyl #:	n/a		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1607
ZAG Make/Model:	Teledyne API T701		Serial Number:	201

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1151680032	
Converter make:	Global		Converter serial #:	2022-222	
Analyzer Range	0 - 100 ppb		Converter Temp:	350	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001197	1.002480	Backgd or Offset:	2.72	2.72
Calibration intercept:	0.078370	-0.041548	Coeff or Slope:	1.163	1.163

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4922	78.2	80.0	81.6	0.979
As found Mid point	4961	39.1	40.0	40.7	0.980
As found Low point	4980	19.6	20.0	20.0	0.997
New cylinder response					

Baseline Corr As found:	81.7	Prev response:	80.15	*% change:	1.9%
Baseline Corr 2nd AF pt:	40.8	AF Slope:	1.023060	AF Intercept:	-0.261942
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999975	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4922	78.2	80.0	80.1	0.998
Mid point	4961	39.1	40.0	40.2	0.995
Low point	4980	19.6	20.0	19.9	1.007
As left zero	5000	0.0	0.0	0.0	----
As left span	4922	78.2	80.0	78.8	1.015
SO2 Scrubber Check	4922	78.3	783.0	0.0	----
Date of last scrubber change:		18-Jan-23		Ave Corr Factor	1.000
Date of last converter efficiency test:		n/a			

Notes: Calibrated remotely due to evacuation notice. Scrubber check passed. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

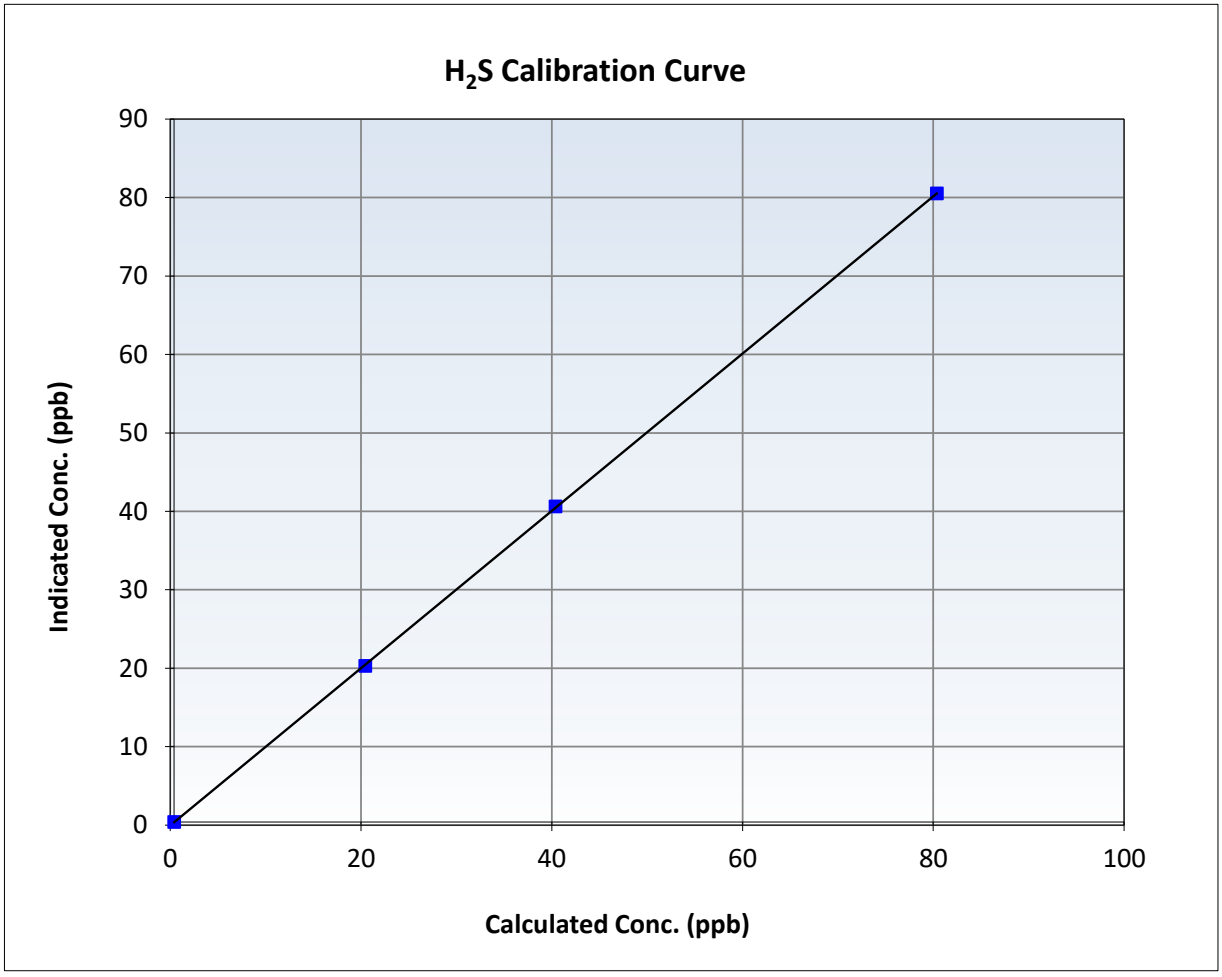
H2S Calibration Summary

Station Information

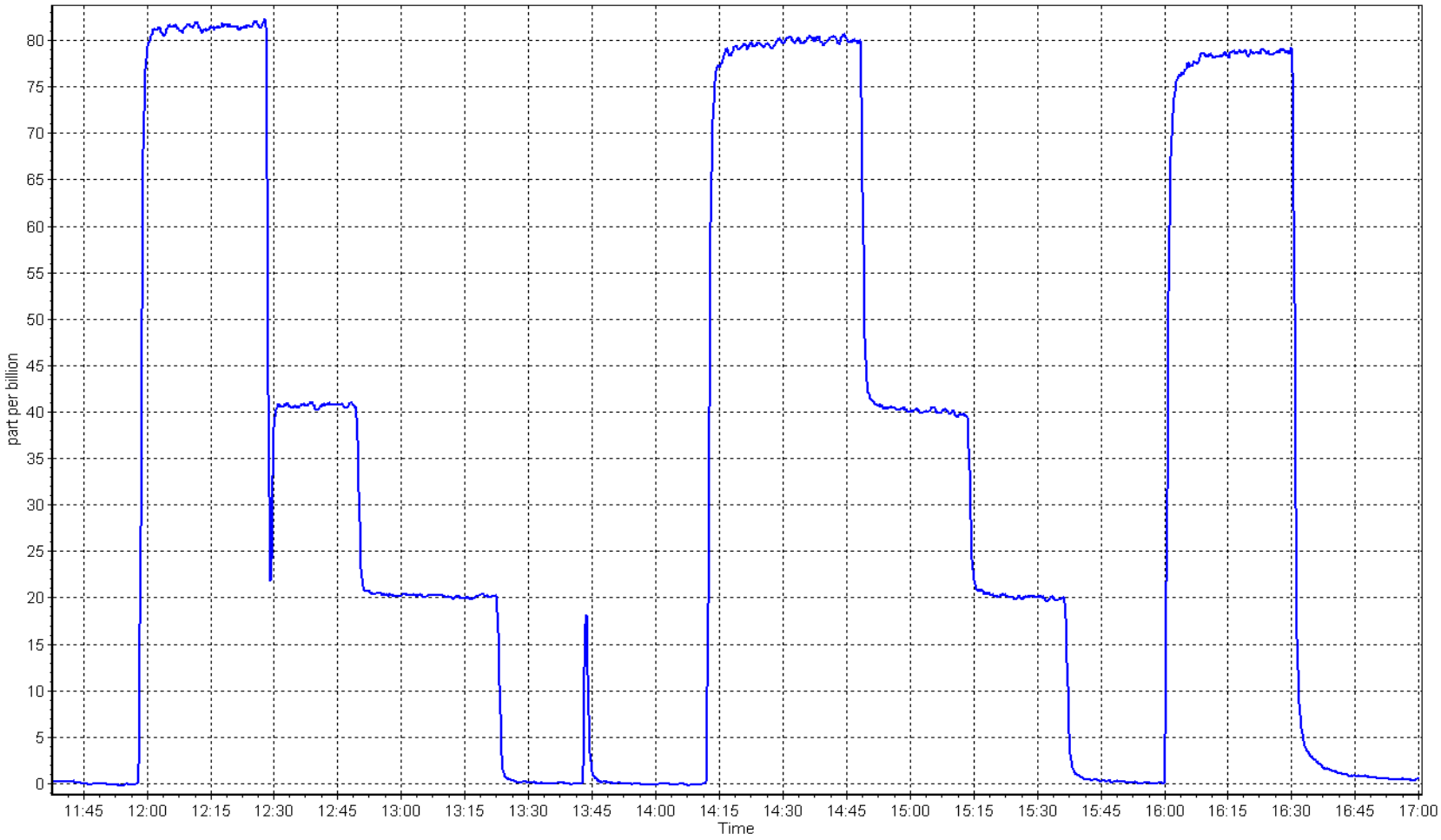
Calibration Date:	May 16, 2024	Previous Calibration:	April 16, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:51	End Time (MST):	16:55
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999986	*≥0.995*
80.0	80.1	0.9985	Slope	1.002480	*0.90 - 1.10*
40.0	40.2	0.9948			
20.0	19.9	1.0075	Intercept	-0.041548	*+/-3*



H2S Calibration Plot Date: May 16, 2024 Location: Firebag



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	May 15, 2024	Last Cal Date:	April 22, 2024
Start time (MST):	10:11	End time (MST):	14:18
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996237	1.003351	Background:	1.99	2.12
Calibration intercept:	0.011064	-0.083575	Coefficient:	3.757	3.766

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	4999	0.0	0.00	0.09	----
As found High point	4919	81.1	17.31	17.43	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.34	Previous response	17.25	*% 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) *Limit = 0.95-1.05*
Calibrator zero	4999	0.0	0.00	-0.08	----
High point	4919	81.1	17.31	17.29	1.001
Mid point	4959	40.6	8.66	8.58	1.010
Low point	4980	20.3	4.33	4.28	1.012
As left zero	5000	0.0	0.00	-0.10	----
As left span	4919	81.1	17.31	17.27	1.002
				Average Correction Factor	1.008

Notes: Calibrated remotely due to evacuation notice. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

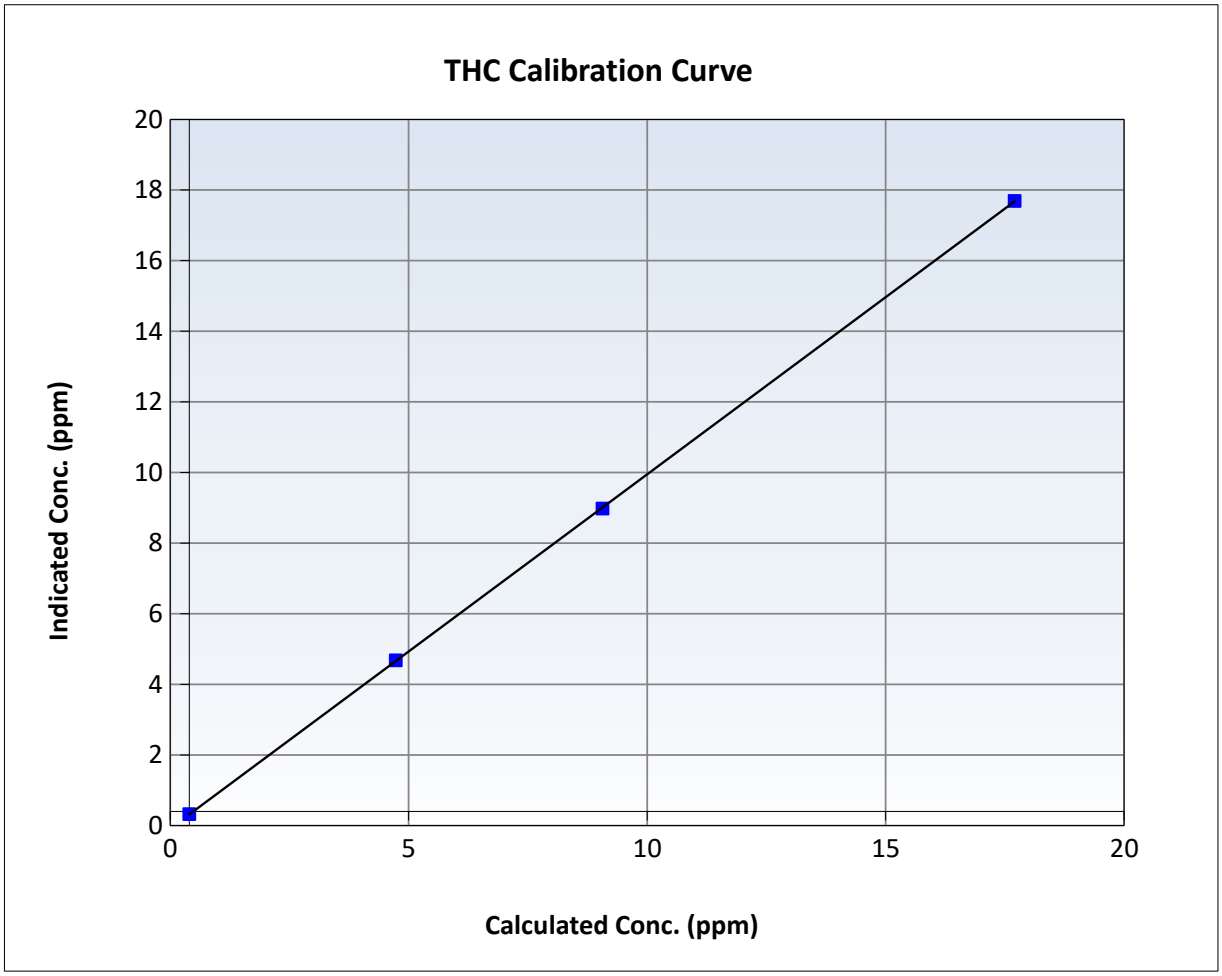
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 22, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:11	End Time (MST):	14:18
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

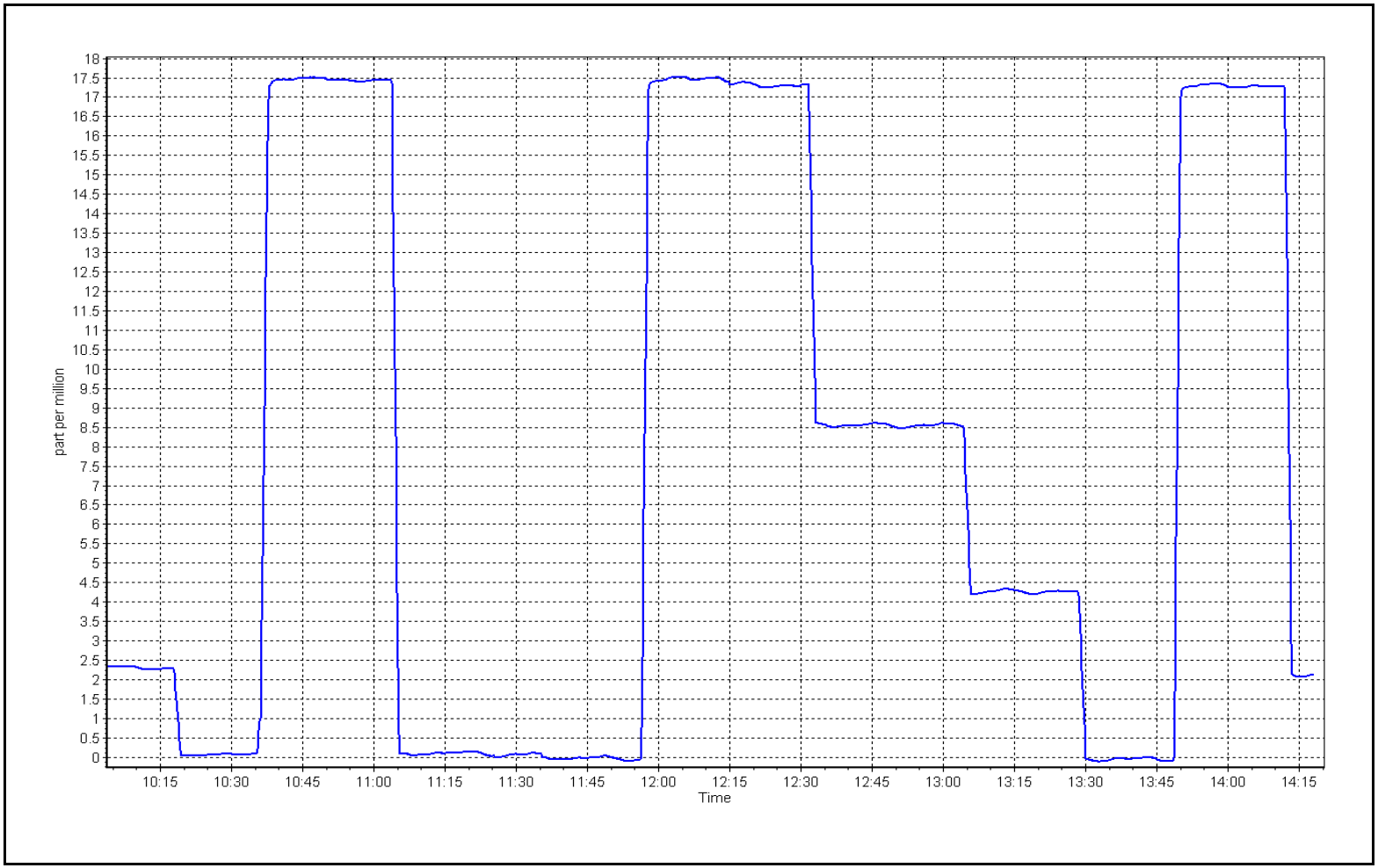
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.08	----
17.31	17.29	1.0009
8.66	8.58	1.0098
4.33	4.28	1.0120

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.003351	*0.90 - 1.10*
Intercept	-0.083575	*+/-1.5*



THC Calibration Plot Date: May 15, 2024 Location: Firebag



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Firebag
Station number:	AMS 19
Calibration Date:	May 23, 2024
Last Cal Date:	April 4, 2024
Start time (MST):	10:17
End time (MST):	14:54
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0044018	Cal Gas Expiry Date:	November 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	1607
ZAG make/model:	Teledyne API T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
AF High point	4918	82.1	802.9	799.7	3.3	861.0	855.0	5.2	0.9326	0.9352
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	803.9 ppb	NO =	801.3 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 6.6%
Baseline Corr 1st pt	NO_X =	861.0 ppb	NO =	855.1 ppb	As Found Statistics	*Percent Change	NO = 6.3%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1410661309

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.990	0.927	NO bkgnd or offset:	5.0	4.6
NOX coeff or slope:	0.995	0.993	NOX bkgnd or offset:	5.0	4.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	177.5	166.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.998971	0.997818
NO_X Cal Offset:	1.739938	1.520105
NO Cal Slope:	1.001345	1.001331
NO Cal Offset:	0.620021	0.699868
NO_2 Cal Slope:	1.000081	0.999250
NO_2 Cal Offset:	0.547188	-0.951936

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4918	82.1	802.9	799.7	3.3	802.0	801.0	1.1	1.0012	0.9983
Mid point	4959	41.1	402.0	400.3	1.6	403.2	402.1	1.1	0.9969	0.9956
Low point	4980	20.5	200.5	199.7	0.8	203.2	201.2	2.0	0.9867	0.9924
As left zero	5000	0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
As left span	4918	82.1	802.9	388.6	414.3	804.0	388.6	415.1	0.9987	1.0000
							Average Correction Factor		0.9949	0.9954

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	799.1	388.3	414.1	413.4	1.0017	99.8%
Mid GPT point	799.1	594.4	208.0	206.1	1.0091	99.1%
Low GPT point	799.1	698.8	103.6	101.8	1.0175	98.3%
				Average Correction Factor	1.0094	99.1%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

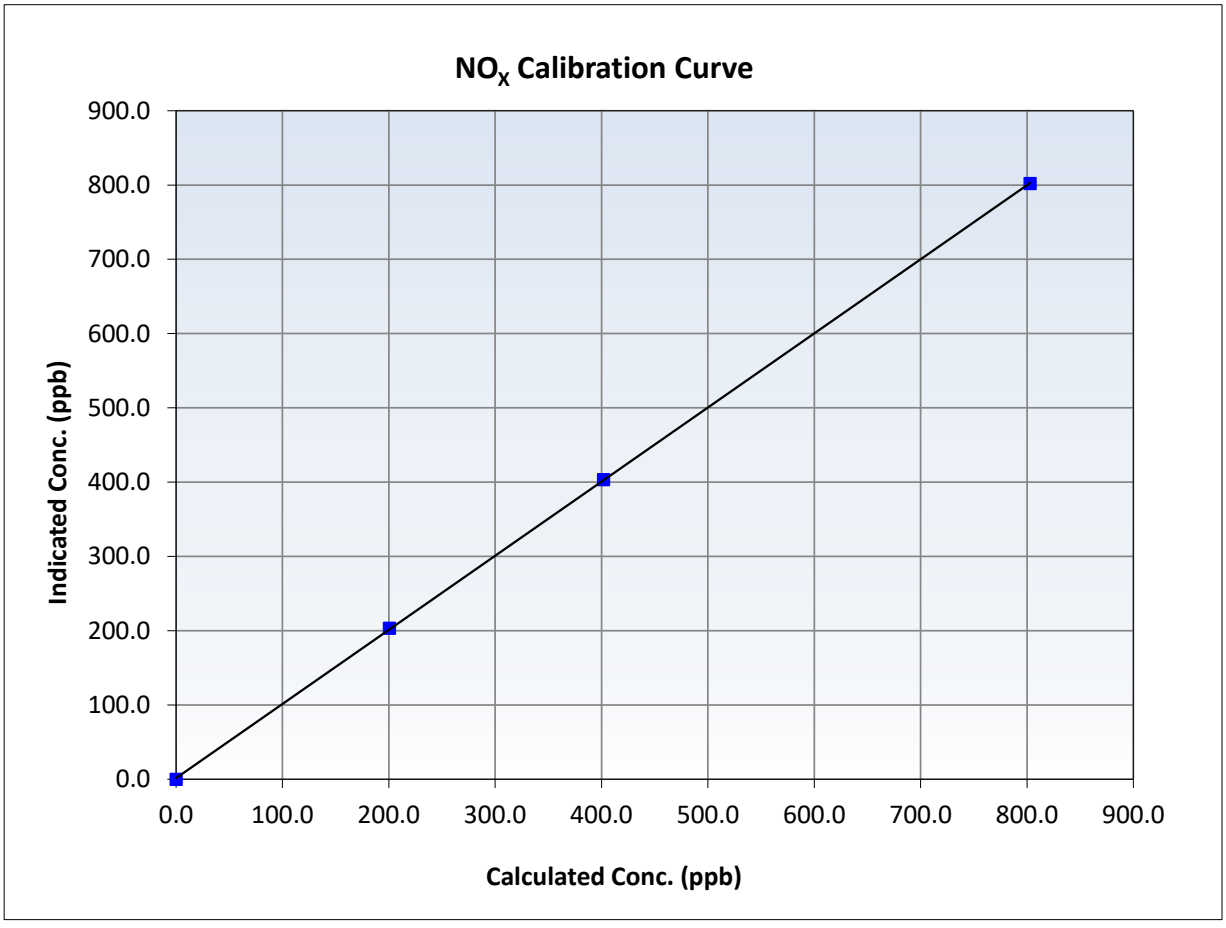
Station Information

Calibration Date:	May 23, 2024	Previous Calibration:	April 4, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:17	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
802.9	802.0	1.0012
402.0	403.2	0.9969
200.5	203.2	0.9867

Statistical Evaluation		Limits
Correlation Coefficient	0.999983	≥0.995
Slope	0.997818	0.90 - 1.10
Intercept	1.520105	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

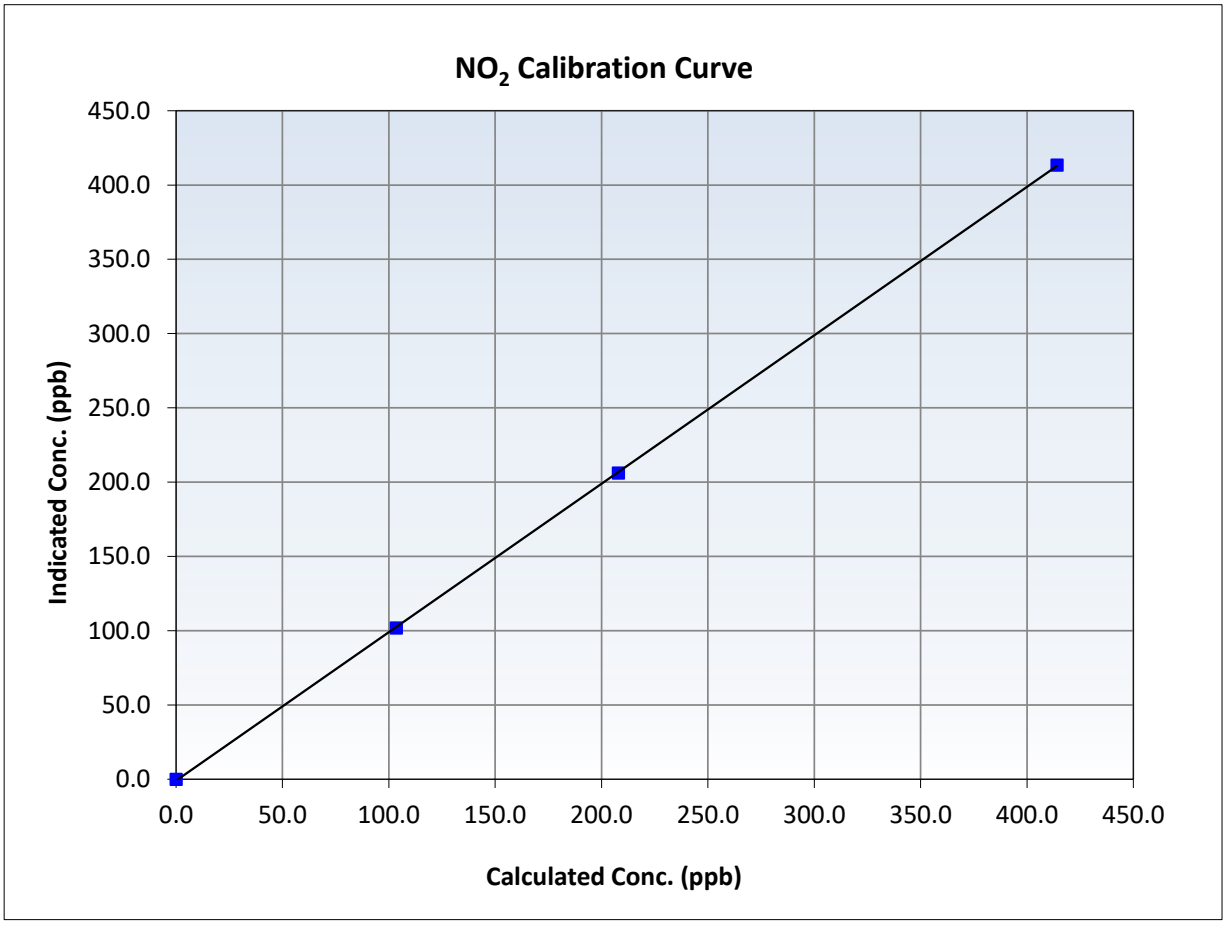
Station Information

Calibration Date:	May 23, 2024	Previous Calibration:	April 4, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:17	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
414.1	413.4	1.0017
208.0	206.1	1.0091
103.6	101.8	1.0175

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999974	*≥0.995*
Slope	0.999250	*0.90 - 1.10*
Intercept	-0.951936	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

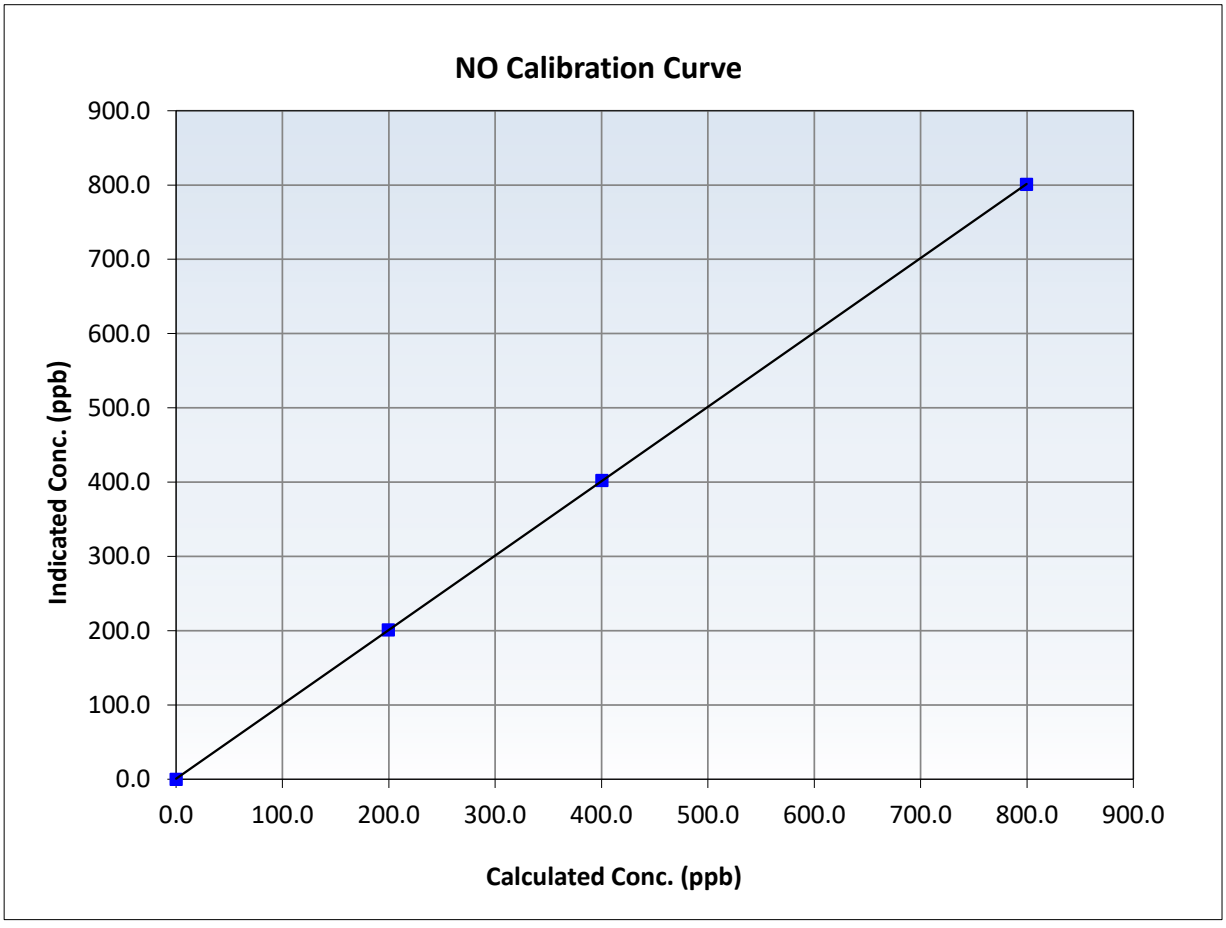
Station Information

Calibration Date:	May 23, 2024	Previous Calibration:	April 4, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:17	End Time (MST):	14:54
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

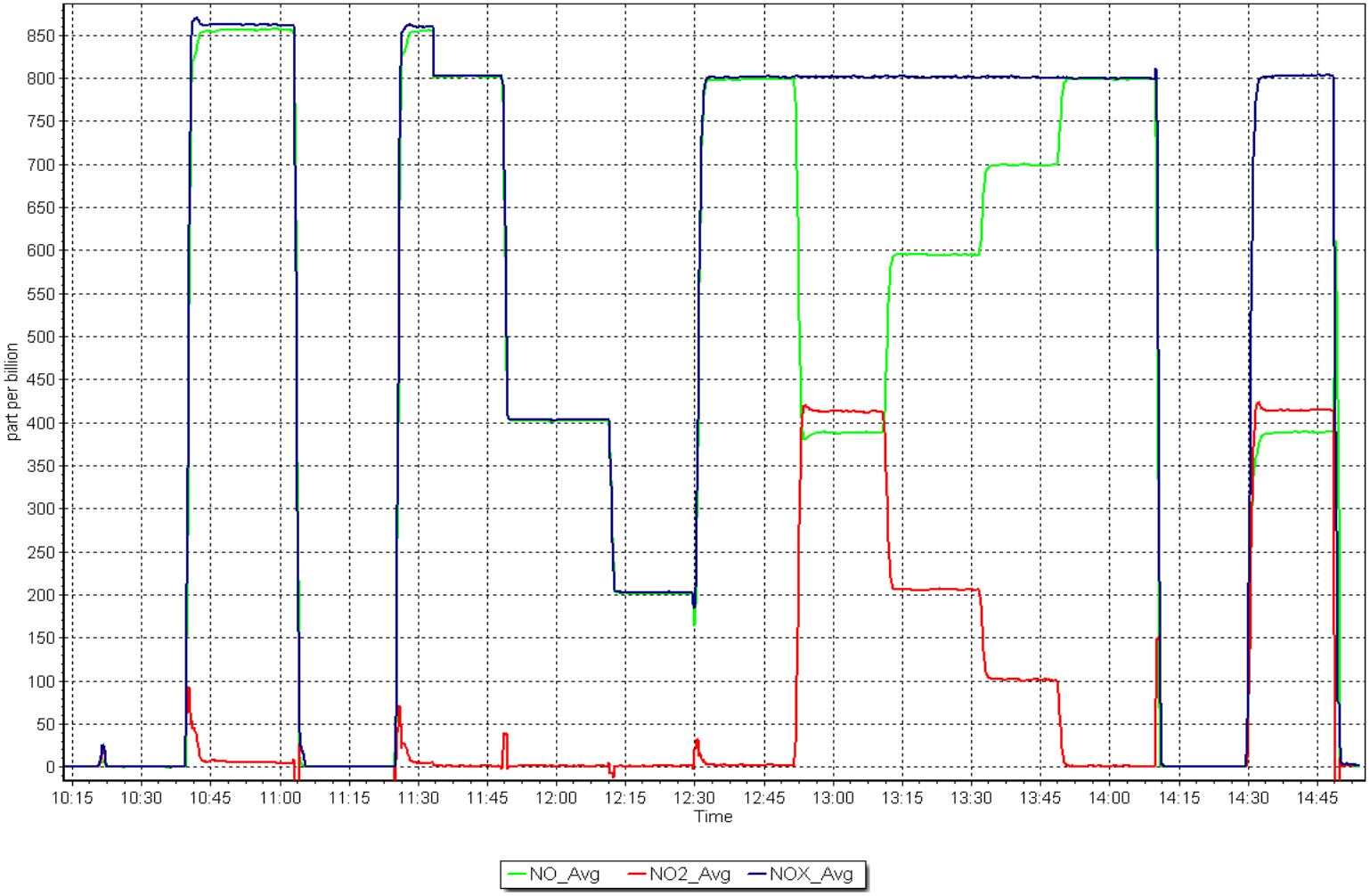
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.7	801.0	0.9983
400.3	402.1	0.9956
199.7	201.2	0.9924

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.001331	*0.90 - 1.10*
Intercept	0.699868	*+/-20*



NO_X Calibration Plot Date: May 23, 2024 Location: Firebag



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20
MACKAY RIVER
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	May 9, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	7:15	End time (MST):	10:02
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.994567	1.003462	Backgd or Offset:	19.3	19.3
Calibration intercept:	3.111267	3.271175	Coeff or Slope:	0.950	0.950

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4919	81.3	800.3	804.4	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	804.1	Previous response	799.0	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.4	----
High point	4919	81.3	800.3	805.3	0.994
Mid point	4959	40.7	400.7	405.5	0.988
Low point	4980	20.3	199.8	207.5	0.963
As left zero	5000	0.0	0.0	0.4	----
As left span	4919	81.3	800.3	806.8	0.992
				Average Correction Factor:	0.982

Notes: No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

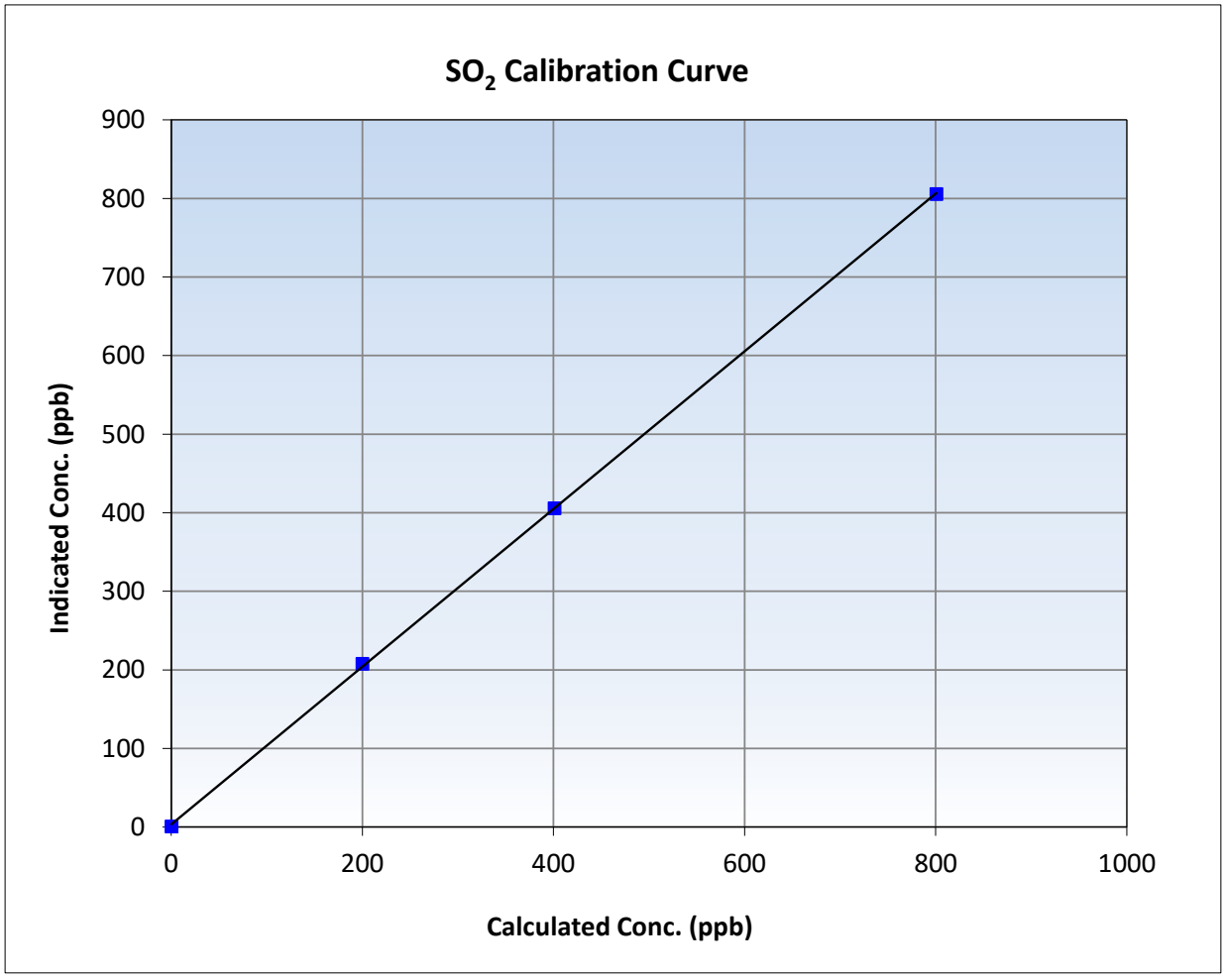
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	April 10, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:15	End Time (MST):	10:02
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

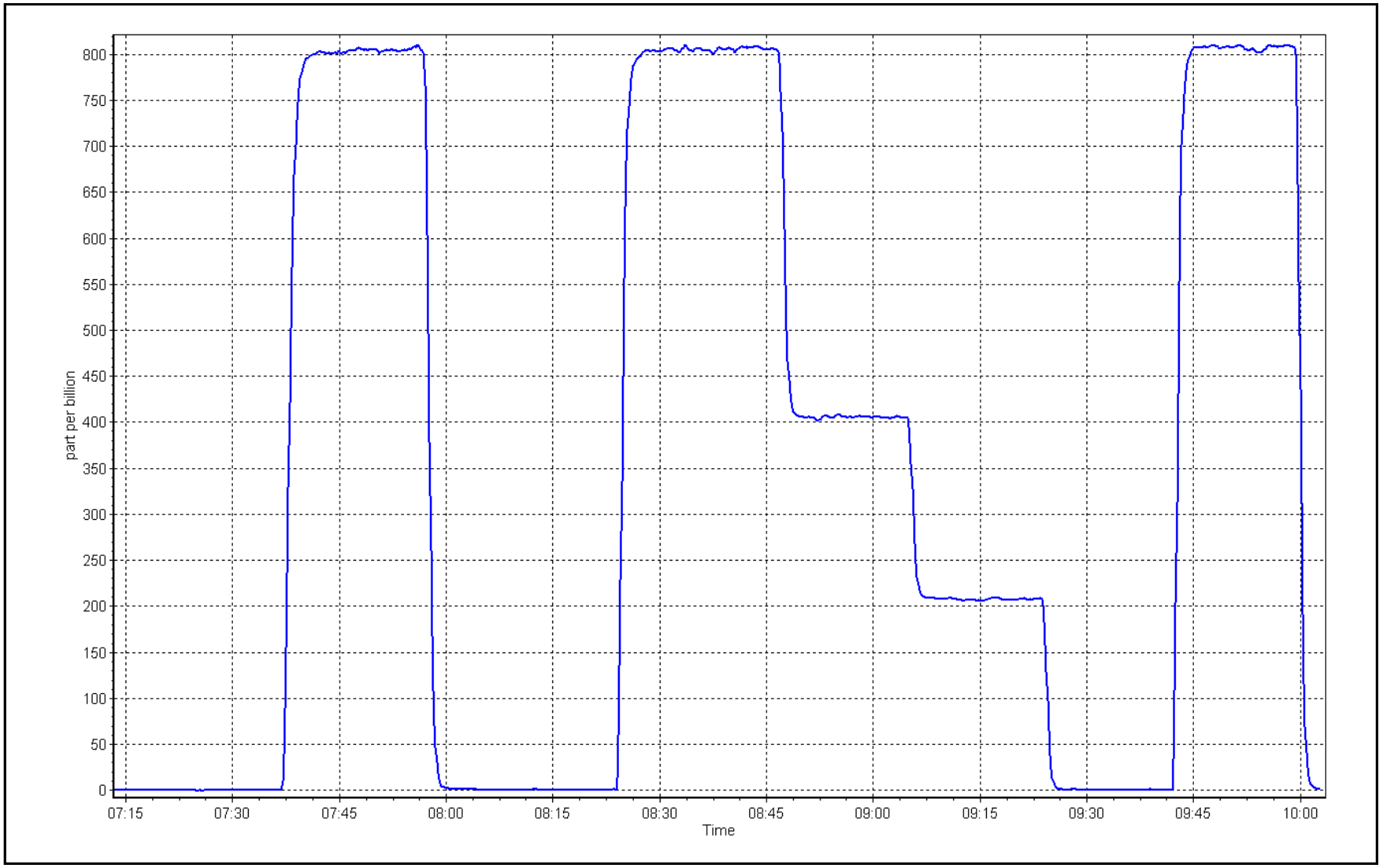
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
800.3	805.3	0.9938
400.7	405.5	0.9881
199.8	207.5	0.9630

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999935	*≥0.995*
Slope	1.003462	*0.90 - 1.10*
Intercept	3.271175	*+/-30*



SO2 Calibration Plot Date: May 9, 2024 Location: MacKay River



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	May 8, 2024	Last Cal Date:	April 9, 2024
Start time (MST):	7:00	End time (MST):	11:57
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.12	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC515997			
Removed Cal Gas Conc:	5.12	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	1220
ZAG Make/Model:	API 701		Serial Number:	4522

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1236656117
Converter make:	Global		Converter serial #:	2022-226
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.984302	0.992309	Backgd or Offset:	3.19	2.99
Calibration intercept:	0.679249	0.699268	Coeff or Slope:	1.113	1.051

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4922	78.1	80.0	79.9	1.002
As found Mid point	4961	39.0	39.9	40.3	0.993
As found Low point	4980	19.5	20.0	20.7	0.969
New cylinder response					

Baseline Corr As found:	79.8	Prev response:	79.40	*% change:	0.5%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	0.995450	AF Intercept:	0.439415
Baseline Corr 3rd AF pt:	20.6	AF Correlation:	0.999915	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.6	----
High point	4922	78.1	80.0	80.0	1.000
Mid point	4961	39.0	39.9	40.4	0.989
Low point	4980	19.5	20.0	20.6	0.969
As left zero	5000	0.0	0.0	0.6	----
As left span	4922	78.1	80.0	79.1	1.011
SO2 Scrubber Check	4982	81.3	802.8	-0.1	----
Date of last scrubber change:		25-May-23		Ave Corr Factor	0.986
Date of last converter efficiency test:					

Notes: Lamp Voltage and intensity have been fluctuating. Lamp and Socket replaced. Sox scrubber checked after the calibrator zero. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

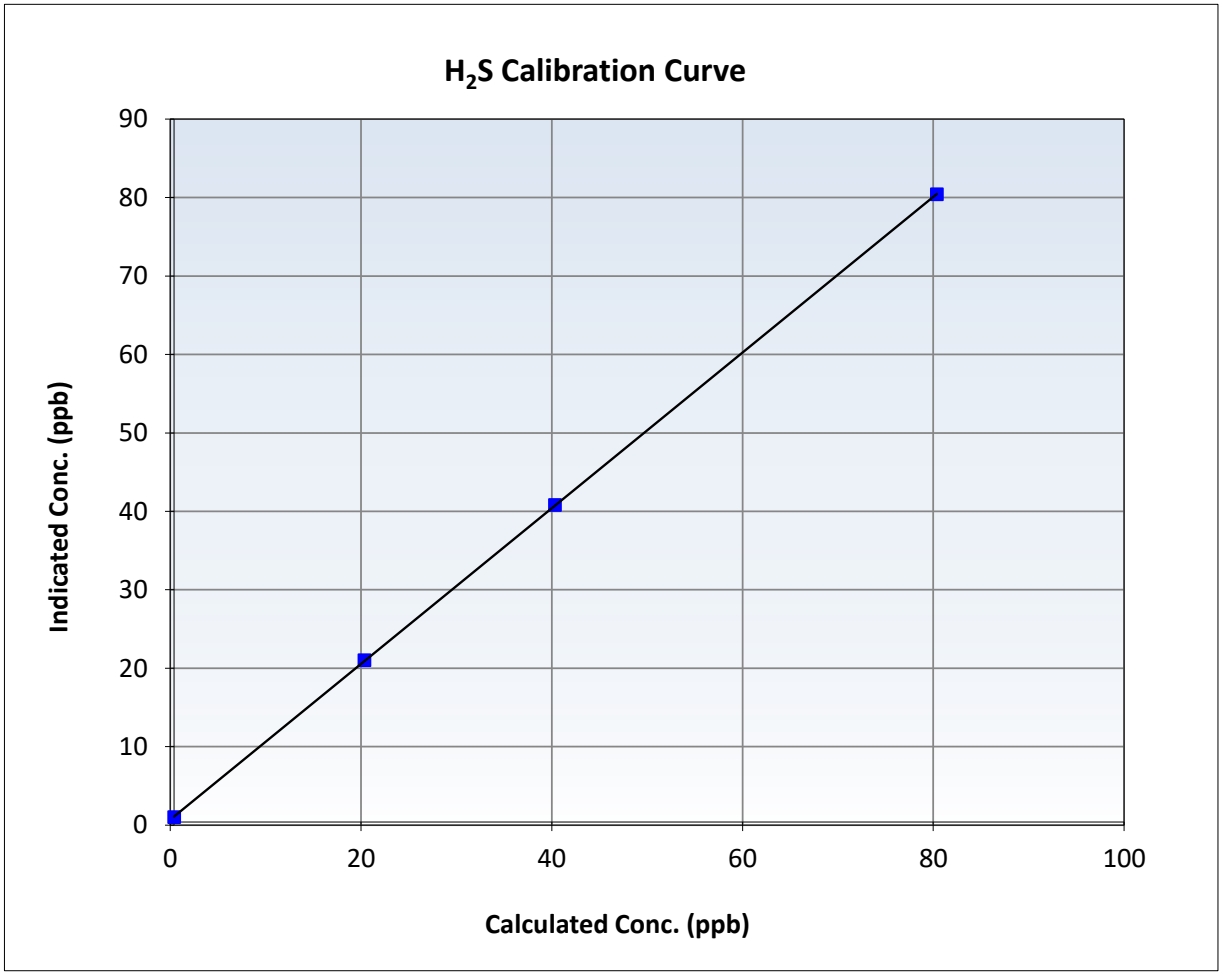
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 9, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:00	End Time (MST):	11:57
Analyzer make:	Global	Analyzer serial #:	2022-226

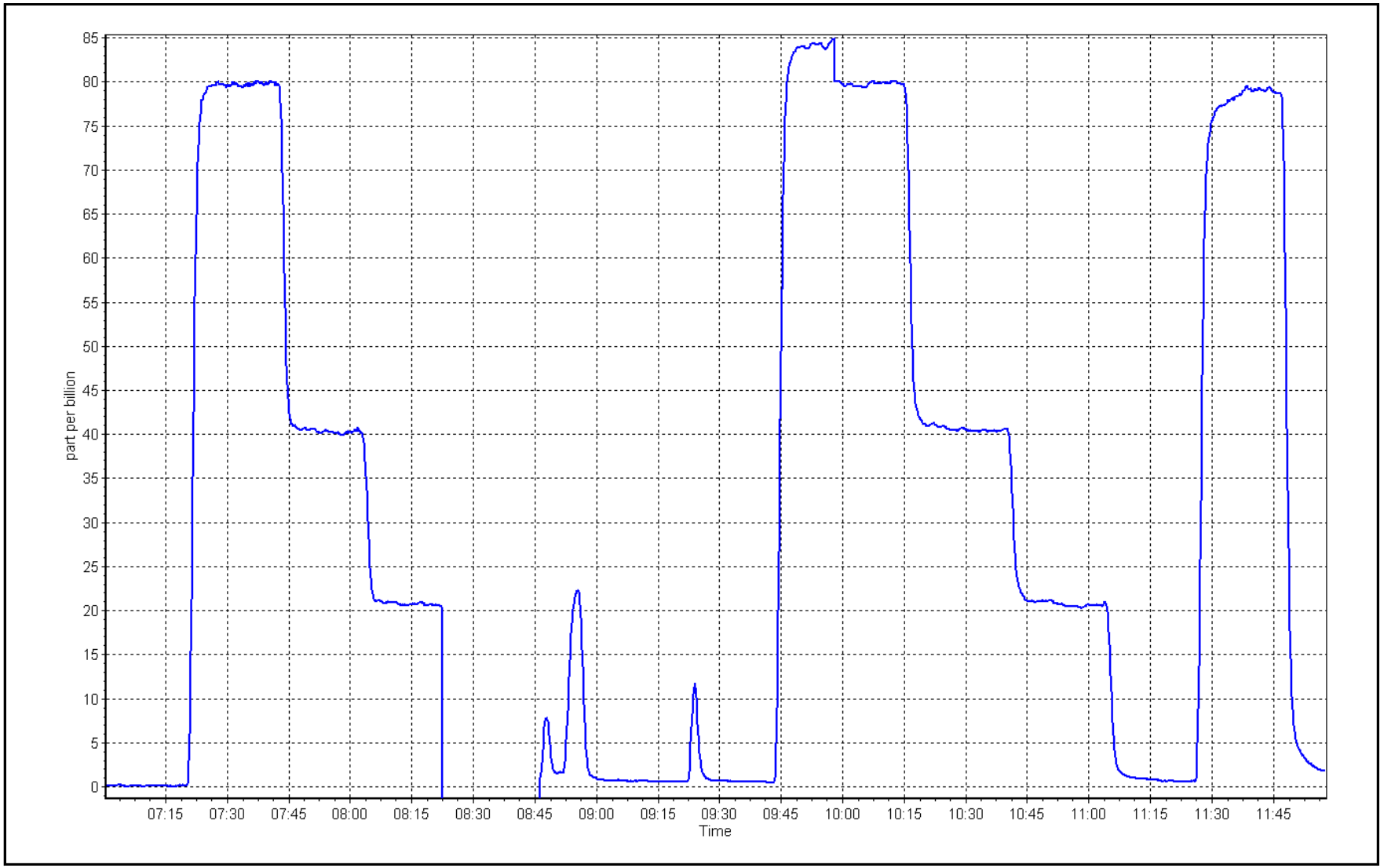
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
80.0	80.0	0.9997
39.9	40.4	0.9885
20.0	20.6	0.9694

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	0.992309	*0.90 - 1.10*
Intercept	0.699268	*+/-3*



H_2S Calibration Plot Date: May 8, 2024 Location: MacKay River



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	May 9, 2024	Last Cal Date:	April 10, 2024
Start time (MST):	7:15	End time (MST):	10:01
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.995490	1.000613	Background:	3.680	3.680
Calibration intercept:	-0.003380	0.009001	Coefficient:	6.124	6.124

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.03	----
As found High point	4919	81.3	17.34	17.48	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.50	Previous response	17.26	*% 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	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.05	----
High point	4919	81.3	17.34	17.34	1.000
Mid point	4959	40.7	8.68	8.71	0.997
Low point	4980	20.3	4.33	4.41	0.983
As left zero	5000	0.0	0.00	-0.10	----
As left span	4919	81.3	17.34	17.40	0.996
				Average Correction Factor	0.993

Notes: Hydrogen Cylinder changed. No adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC Calibration Summary

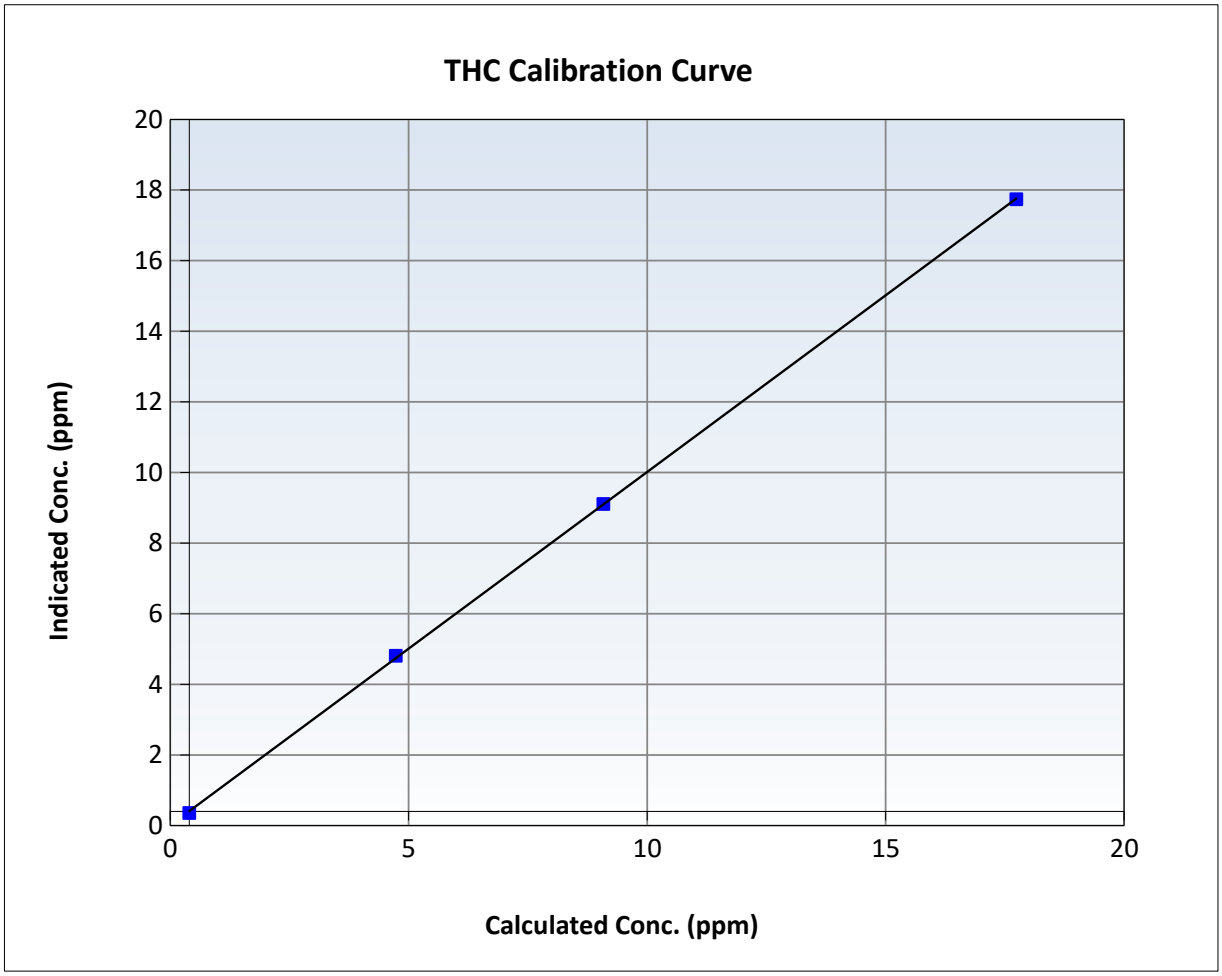
Station Information

Calibration Date:	May 9, 2024	Previous Calibration:	April 10, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:15	End Time (MST):	10:01
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

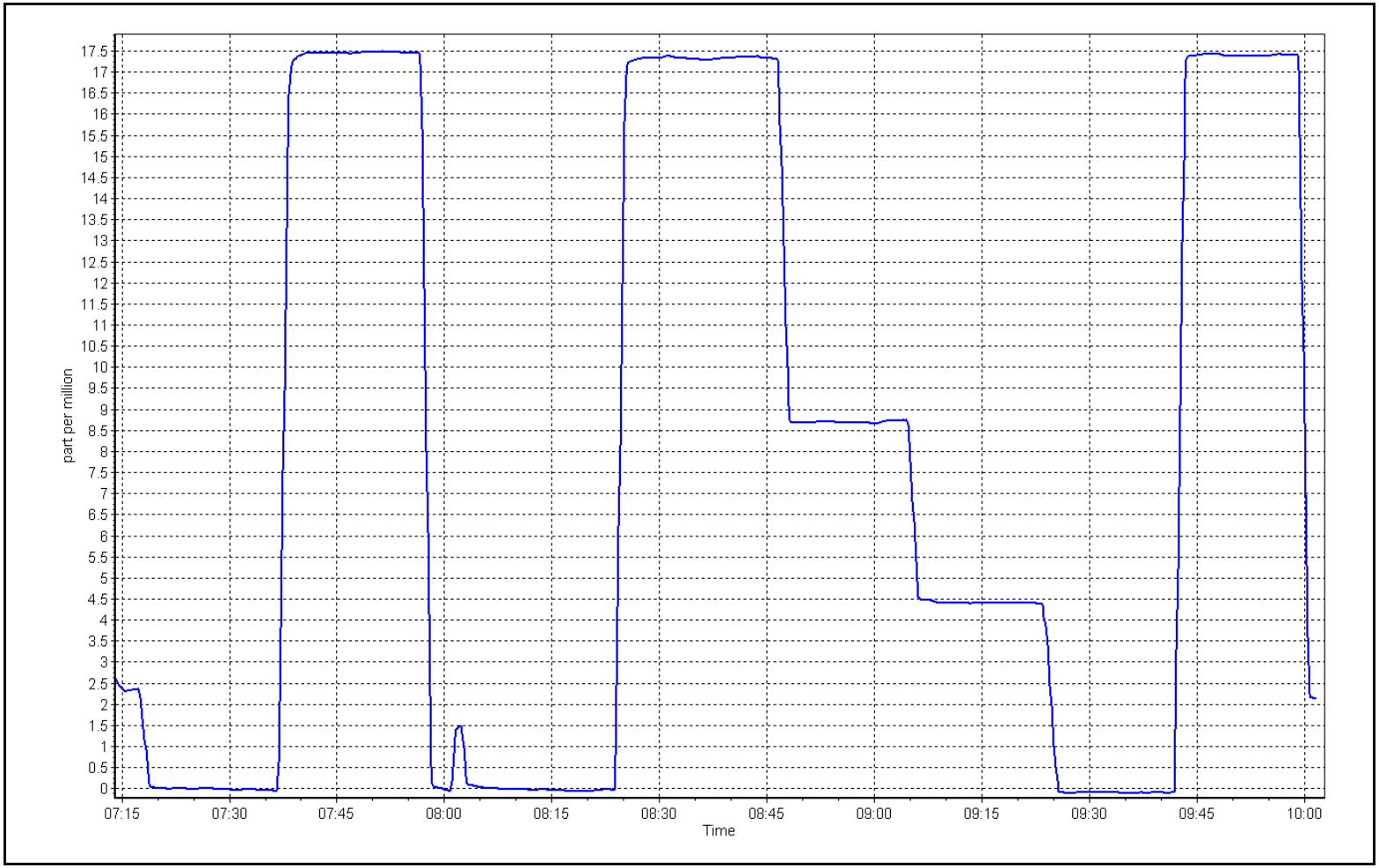
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.05	----
17.34	17.34	1.0001
8.68	8.71	0.9969
4.33	4.41	0.9829

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999954	*≥0.995*
Slope	1.000613	*0.90 - 1.10*
Intercept	0.009001	*+/-1.5*



THC Calibration Plot Date: May 9, 2024 Location: MacKay River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	MacKay River
Station number:	AMS 20
Calibration Date:	May 7, 2024
Last Cal Date:	April 8, 2024
Start time (MST):	7:10
End time (MST):	11:33
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T376265	Cal Gas Expiry Date:	April 13, 2025
NOX Cal Gas Conc:	49.19 ppm	NO Cal Gas Conc:	48.04 ppm
Removed Cylinder #:		Removed Gas Exp Date:	
Removed Gas NOX Conc:	49.19 ppm	Removed Gas NO Conc:	48.04 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	1220
ZAG make/model:	API T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
AF High point	4917	83.3	819.5	800.3	19.2	815.2	794.3	21.0	1.0051	1.0076
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 818.6 ppb	NO = 798.3 ppb
Baseline Corr 1st pt	NO_X = 815.3 ppb	NO = 794.3 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.4%

*Percent Change NO = -0.5%

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1505164379

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.990	0.997	NO bkgnd or offset:	2.8	2.8
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	3.0	3.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	164.2	164.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.994162	0.996087
NO_X Cal Offset:	3.902461	4.362190
NO Cal Slope:	0.993845	0.996287
NO Cal Offset:	2.922811	3.342620
NO_2 Cal Slope:	1.003001	1.002860
NO_2 Cal Offset:	-0.362701	0.059293

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	----	----
High point	4917	83.3	819.5	800.3	19.2	818.6	799.2	19.4	1.0010	1.0014
Mid point	4958	41.7	410.3	400.7	9.6	414.7	403.7	11.0	0.9893	0.9925
Low point	4979	20.8	204.6	199.9	4.8	212.9	206.0	6.9	0.9612	0.9702
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	----	----
As left span	4917	83.3	819.5	440.1	379.4	819.8	440.1	379.6	0.9996	1.0000
							Average Correction Factor		0.9839	0.9880

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	796.8	439.5	376.5	377.5	0.9972	100.3%
Mid GPT point	796.8	611.9	204.1	204.9	0.9959	100.4%
Low GPT point	796.8	701.0	115.0	115.3	0.9970	100.3%
				Average Correction Factor	0.9967	100.3%

Notes: Span adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

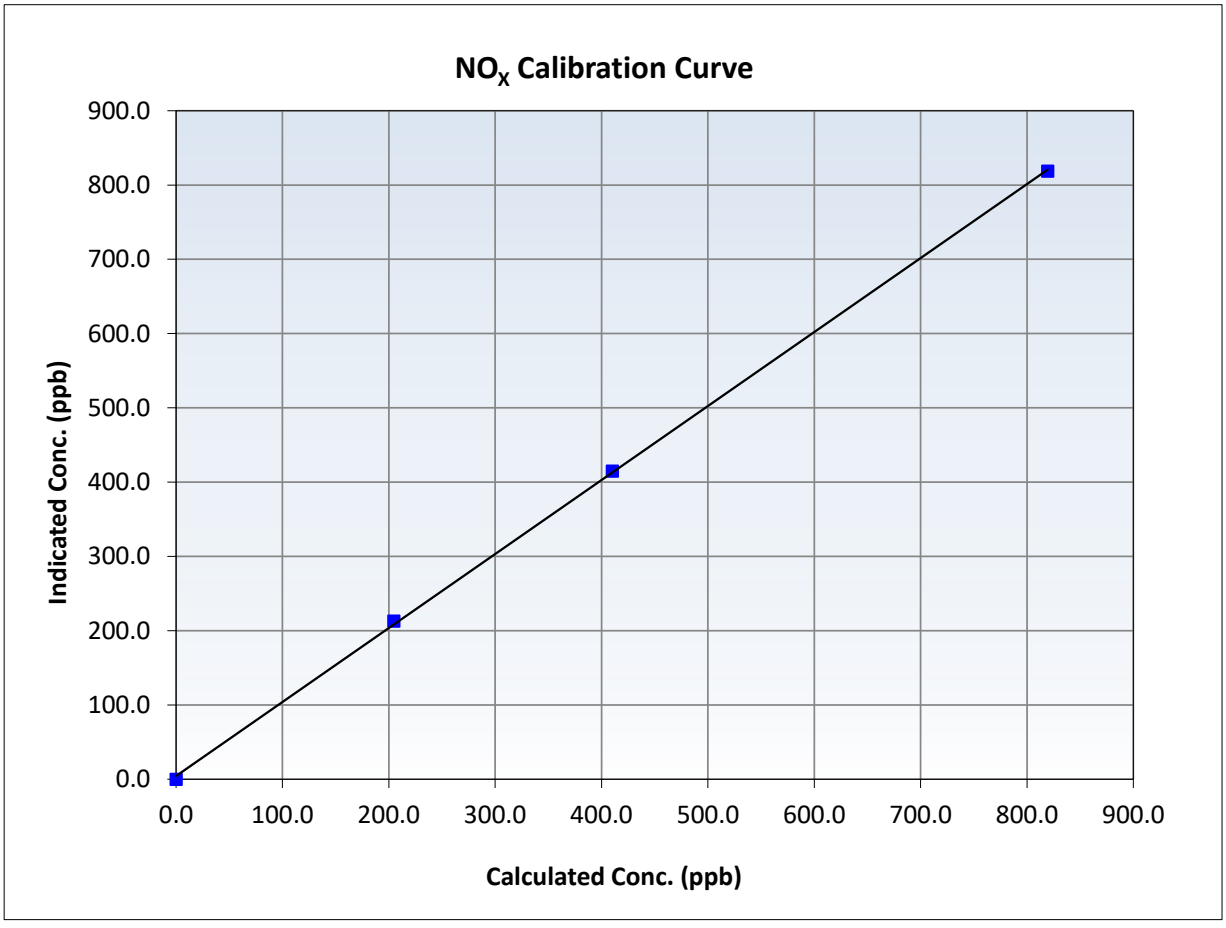
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 8, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:10	End Time (MST):	11:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
819.5	818.6	1.0010
410.3	414.7	0.9893
204.6	212.9	0.9612

Statistical Evaluation		Limits
Correlation Coefficient	0.999868	≥0.995
Slope	0.996087	0.90 - 1.10
Intercept	4.362190	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

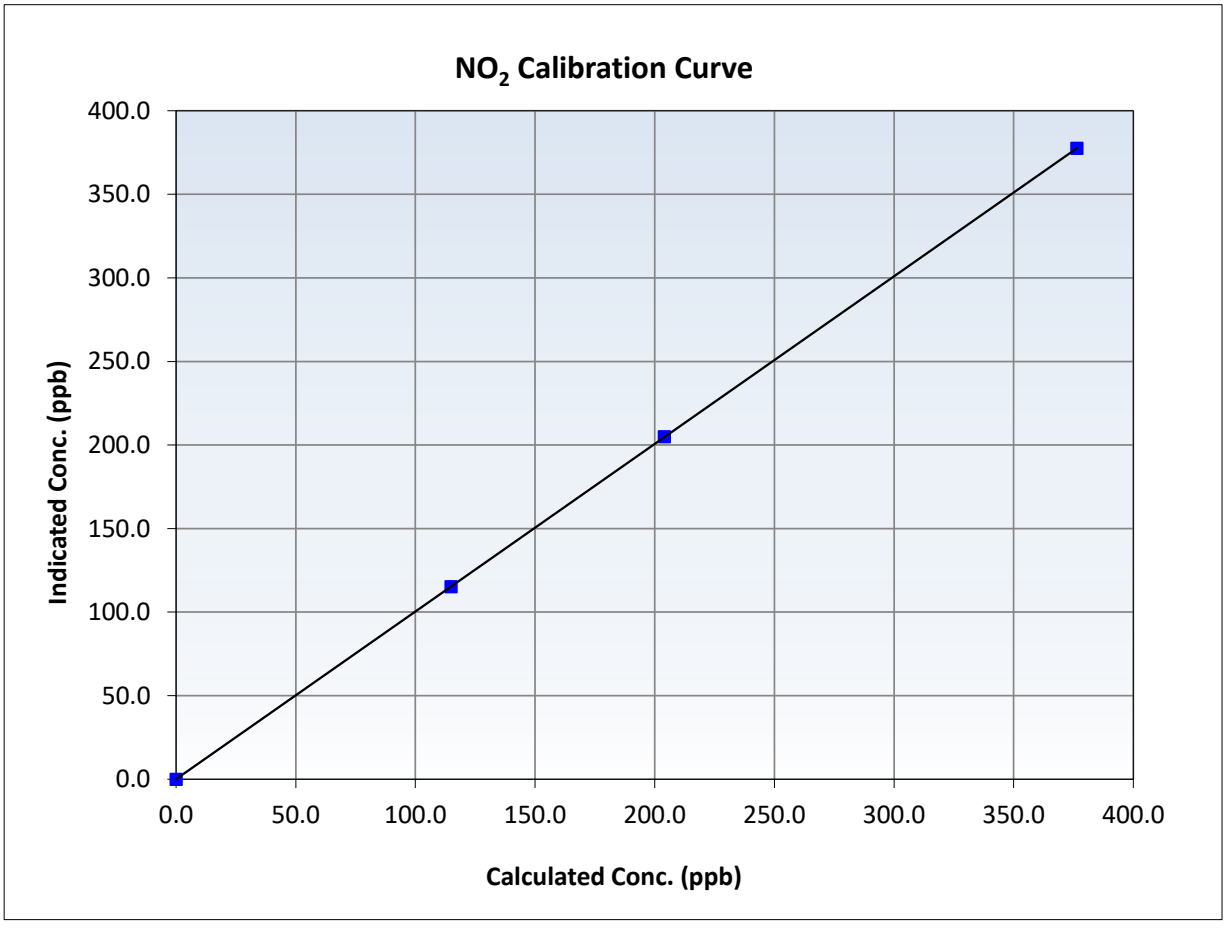
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 8, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:10	End Time (MST):	11:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
376.5	377.5	0.9972
204.1	204.9	0.9959
115.0	115.3	0.9970

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.002860	*0.90 - 1.10*
Intercept	0.059293	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

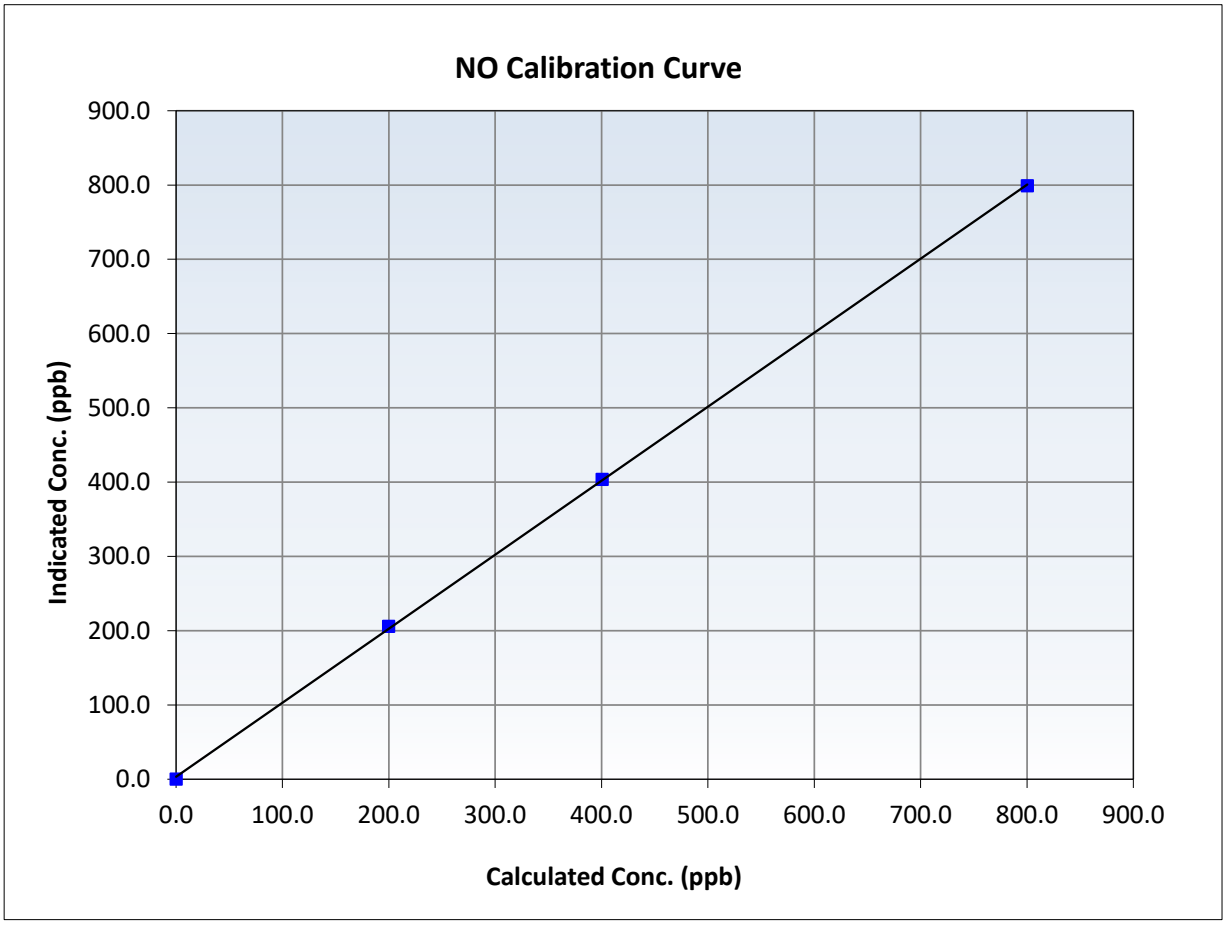
Station Information

Calibration Date:	May 7, 2024	Previous Calibration:	April 8, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:10	End Time (MST):	11:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

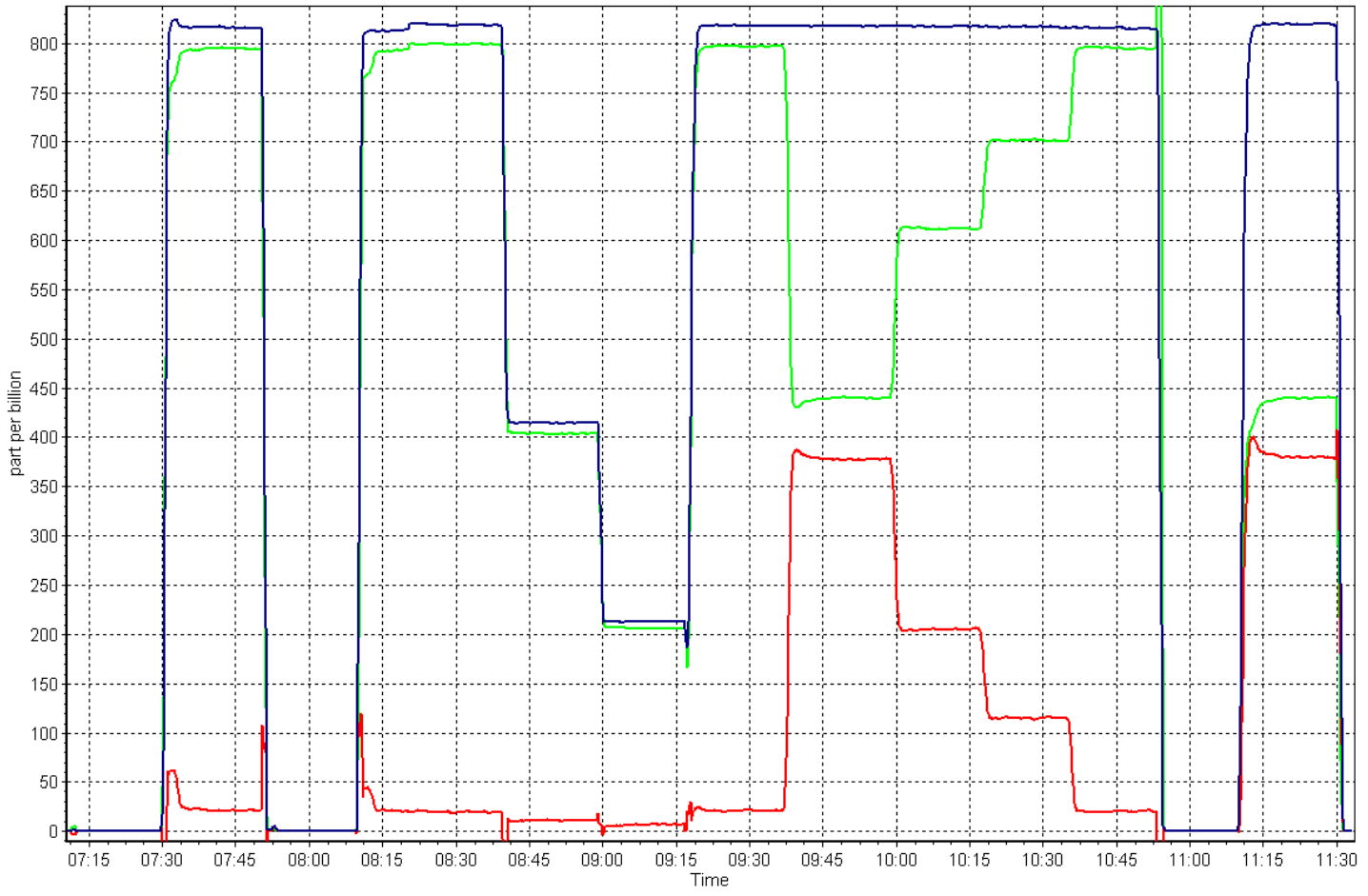
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	799.2	1.0014
400.7	403.7	0.9925
199.9	206.0	0.9702

Statistical Evaluation		Limits
Correlation Coefficient	0.999924	≥0.995
Slope	0.996287	0.90 - 1.10
Intercept	3.342620	+/-20



NO_X Calibration Plot Date: May 7, 2024 Location: MacKay River



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS21
CONKLIN
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 2, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	10:11	End time (MST):	13:15
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.93	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC259455			
Removed Cal Gas Conc:	49.93	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	3810
Zero Air Gen Model:	Teledyne API 701		Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1428701363	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.992525	1.002413	Backgd or Offset:	28.3	28.3
Calibration intercept:	1.395547	2.056037	Coeff or Slope:	0.901	0.901

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.5	----
As found High point	4920	80.2	800.8	802.0	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	801.5	Previous response	796.3	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.6	----
High point	4920	80.2	800.8	804.3	0.996
Mid point	4960	40.1	400.4	403.6	0.992
Low point	4980	20.0	200.1	204.5	0.979
As left zero	5005	0.0	0.0	0.5	----
As left span	4920	80.2	800.8	804.3	0.996
				Average Correction Factor:	0.989

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

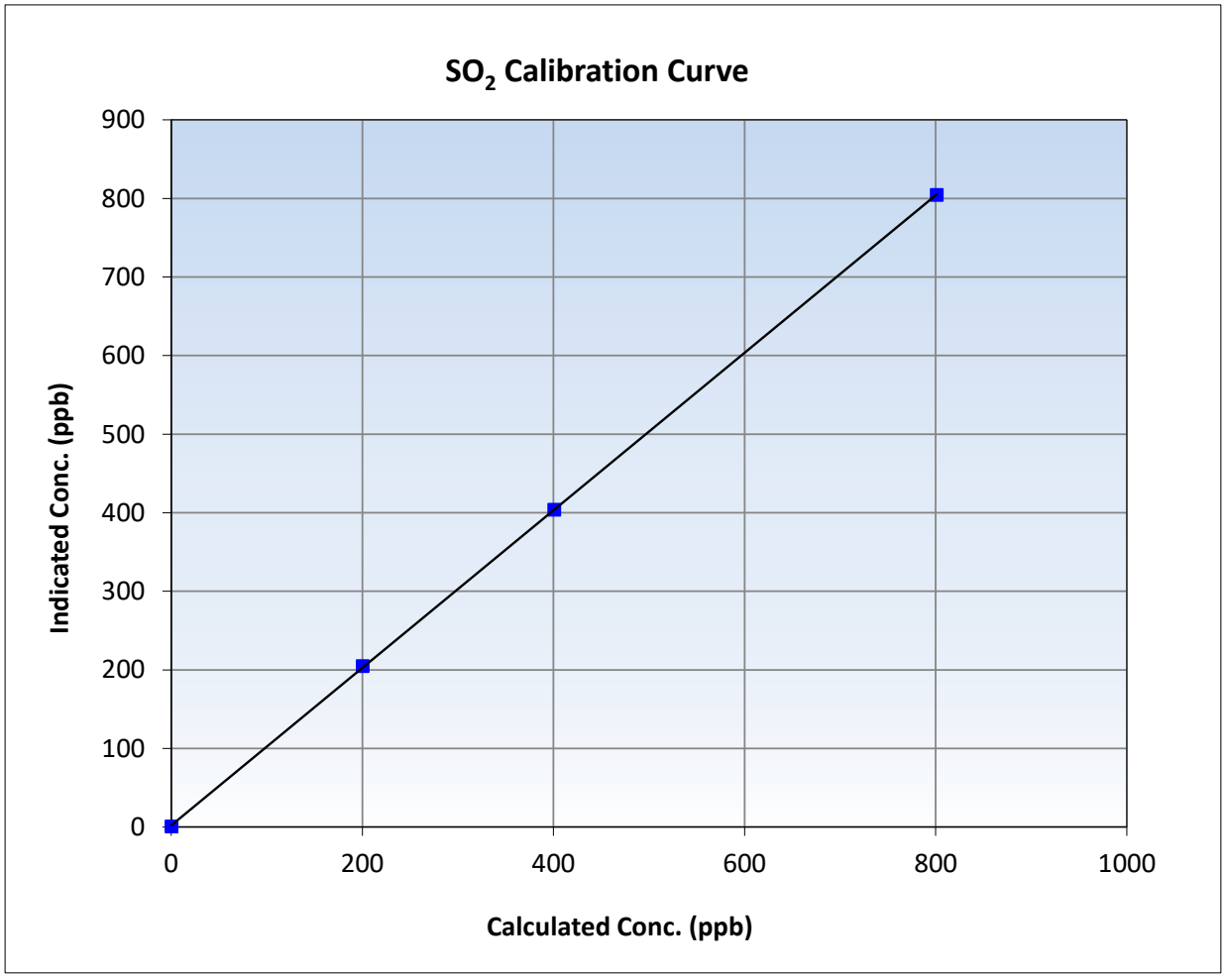
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 3, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:11	End Time (MST):	13:15
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363

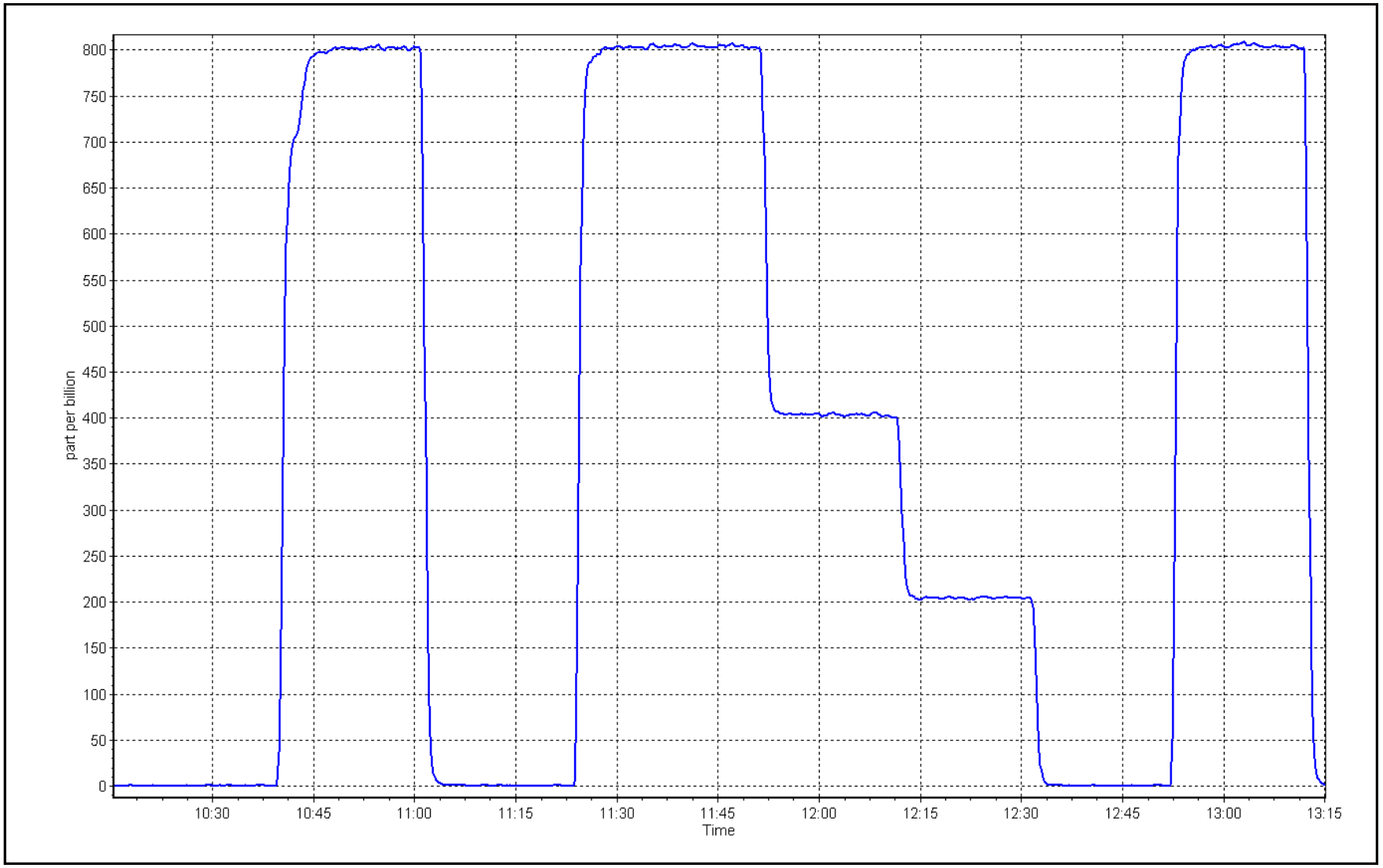
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
800.8	804.3	0.9957
400.4	403.6	0.9921
200.1	204.5	0.9786

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	1.002413	*0.90 - 1.10*
Intercept	2.056037	*+/-30*



SO2 Calibration Plot Date: May 2, 2024 Location: Conklin



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 28, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	9:30	End time (MST):	14:00
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.00	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC501204			
Removed Cal Gas Conc:	5.00	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3810
ZAG Make/Model:	Teledyne API 701H		Serial Number:	691

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1236656116
Converter make:	CD-Nova 101		Converter serial #:	NA
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999714	0.997857	Backgd or Offset:	2.8	2.4
Calibration intercept:	0.060000	0.200000	Coeff or Slope:	0.998	0.923

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.3	----
As found High point	4920	80.0	80.0	84.0	0.949
As found Mid point	4960	40.0	40.0	42.1	0.943
As found Low point	4980	20.0	20.0	21.1	0.935
New cylinder response					

Baseline Corr As found:	84.3	Prev response:	80.04	*% change:	5.1%
Baseline Corr 2nd AF pt:	42.4	AF Slope:	1.052714	AF Intercept:	-0.120000
Baseline Corr 3rd AF pt:	21.4	AF Correlation:	0.999979	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.0	80.0	79.9	1.001
Mid point	4960	40.0	40.0	40.3	0.993
Low point	4980	20.0	20.0	20.3	0.985
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.0	80.0	80.0	1.000
SO2 Scrubber Check	4920	80.2	802.0	0.0	----

Date of last scrubber change:	28-May-24	Ave Corr Factor	0.993
Date of last converter efficiency test:			

Notes: Sample inlet filters and scrubber was changed after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

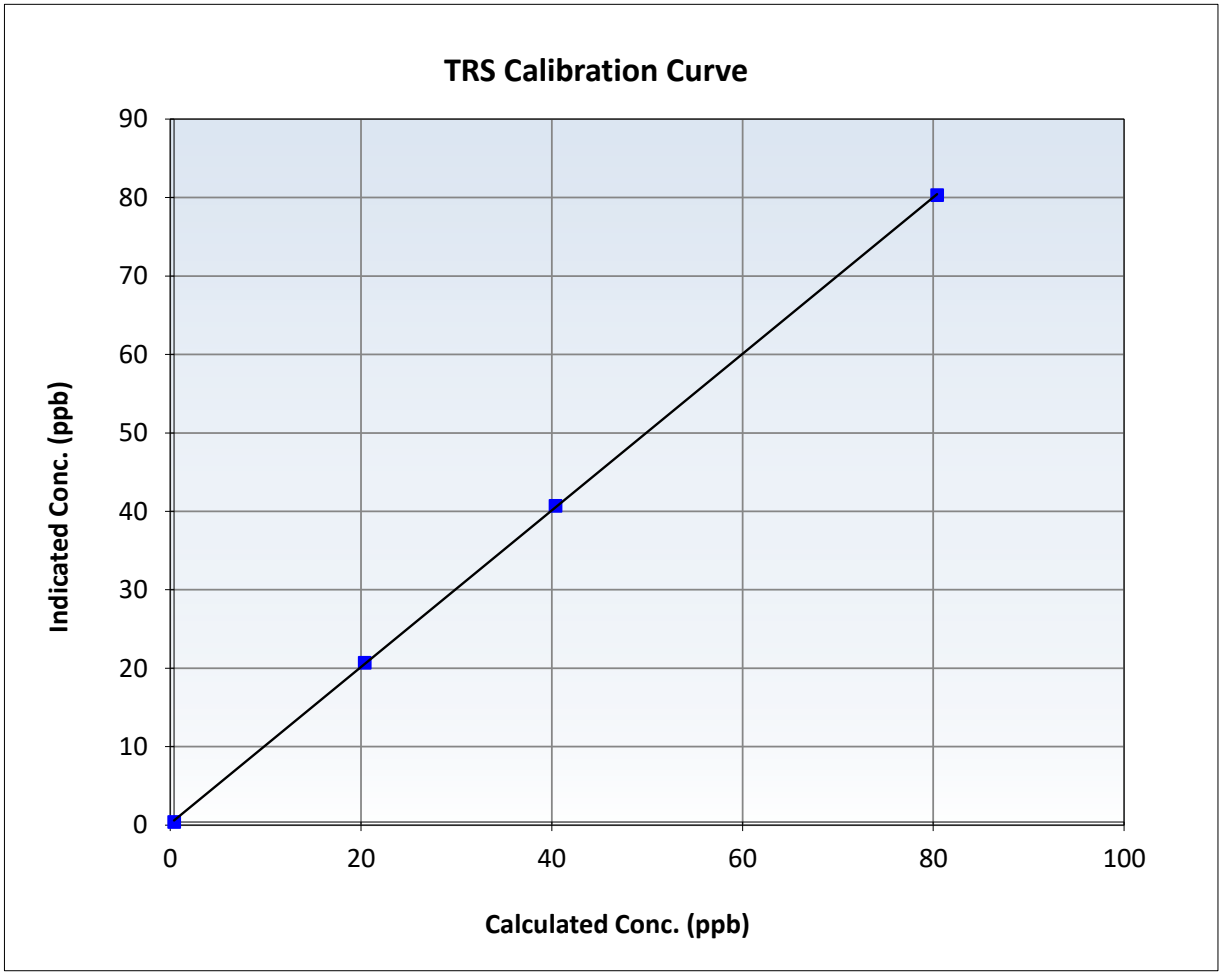
TRS Calibration Summary

Station Information

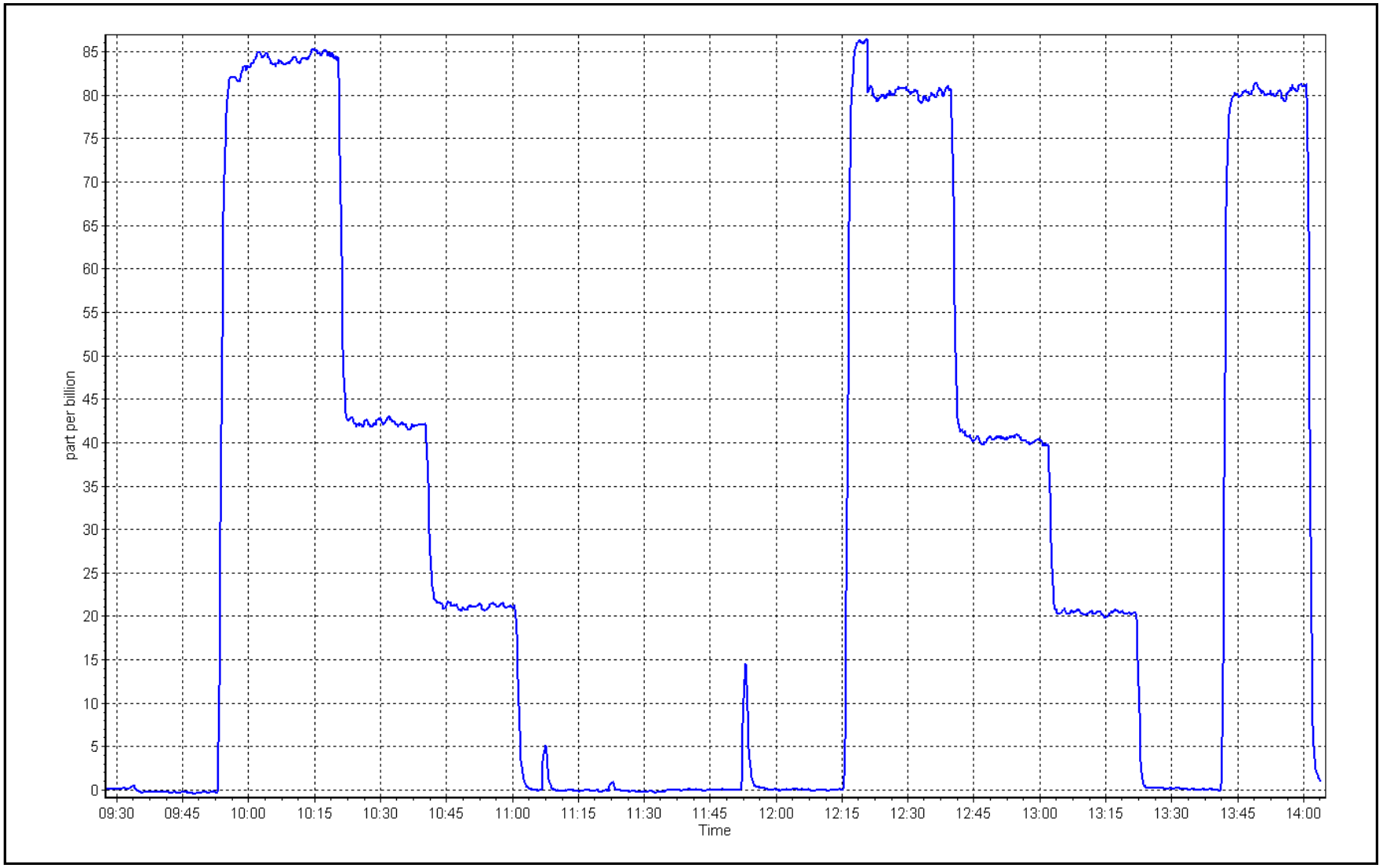
Calibration Date:	May 28, 2024	Previous Calibration:	April 18, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:30	End Time (MST):	14:00
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999968	*≥0.995*
80.0	79.9	1.0013	Slope	0.997857	*0.90 - 1.10*
40.0	40.3	0.9926			
20.0	20.3	0.9852	Intercept	0.200000	*+/-3*



TRS Calibration Plot Date: May 28, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 2, 2024	Last Cal Date:	April 19, 2024
Start time (MST):	10:11	End time (MST):	13:14
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC259455	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	497.9 ppm	CH4 Equiv Conc.	1067.7 ppm
C3H8 Cal Gas Conc.	207.2 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	497.9 ppm	CH4 Equiv Conc.	1067.7 ppm
Removed C3H8 Conc.	207.2 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	3810
Zero Air Gen model:	Teledyne API 701H	Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.48E-04	2.63E-04	NMHC SP Ratio:	4.50E-05	6.48E-05
CH4 Retention time:	15.4	14.4	NMHC Peak Area:	202994	140997
Zero Chromatogram:	ON	ON	Flat Baseline:	ON	ON

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.13	17.93	0.955
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.93	Prev response	17.16	*% change	4.3%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.13	17.15	0.998
Mid point	4960	40.1	8.56	8.59	0.997
Low point	4980	20.0	4.28	4.37	0.979
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.10	1.001
				Average Correction Factor	0.991

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.14	9.89	0.924
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.89	Prev response	9.13	*% change	7.7%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.14	9.13	1.001
Mid point	4960	40.1	4.57	4.58	0.998
Low point	4980	20.0	2.28	2.34	0.976
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.09	1.006
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	7.99	8.04	0.993
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.04	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	7.99	8.02	0.995
Mid point	4960	40.1	3.99	4.01	0.996
Low point	4980	20.0	2.00	2.03	0.981
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	8.01	0.997
				Average Correction Factor	0.991

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999013	0.999907
THC Cal Offset:	0.053566	0.037370
CH4 Cal Slope:	1.000152	1.003372
CH4 Cal Offset:	0.035557	0.011560
NMHC Cal Slope:	0.996817	0.997092
NMHC Cal Offset:	0.019809	0.025211

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

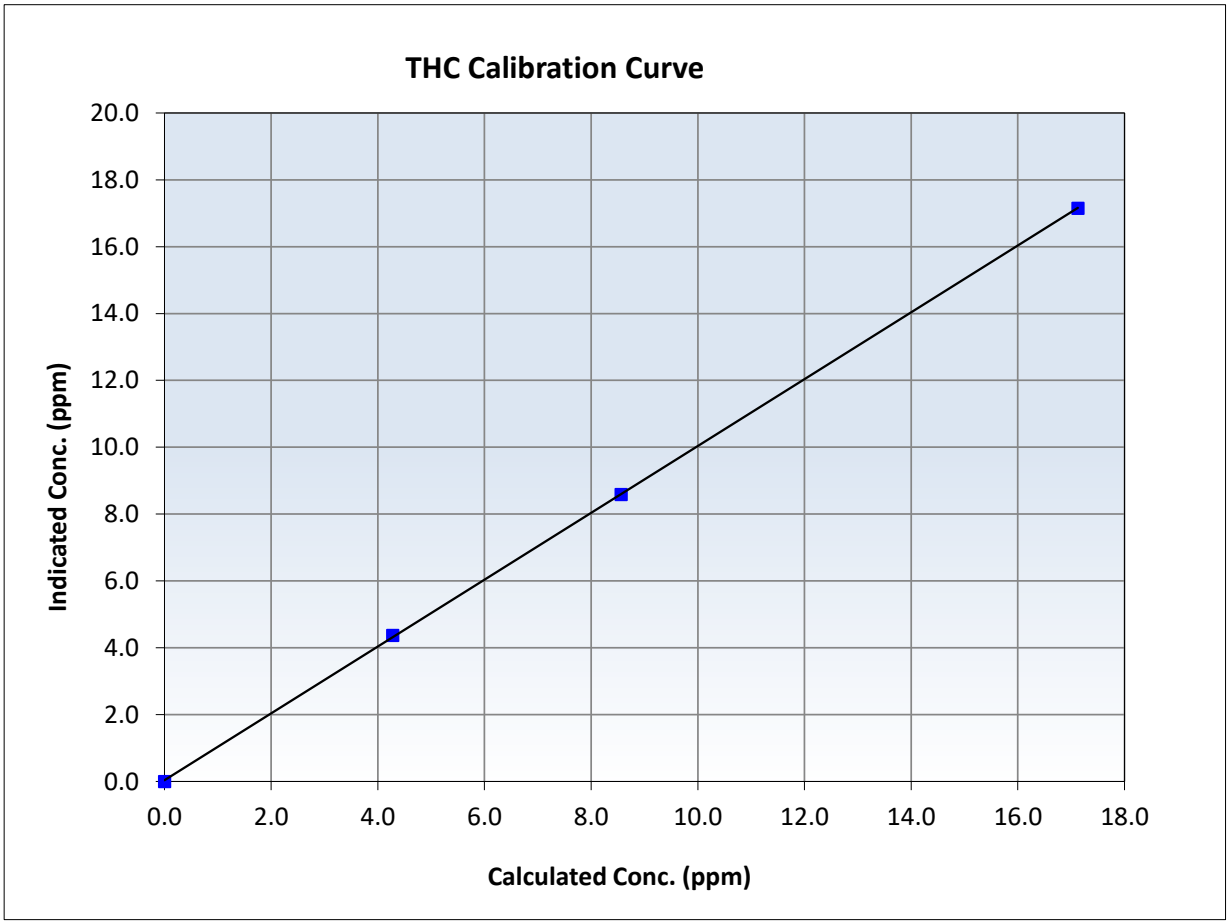
THC Calibration Summary

Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 19, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:11	End Time (MST):	13:14
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	0.999970	≥0.995
17.13	17.15	0.9984	Slope	0.999907	0.90 - 1.10
8.56	8.59	0.9969	Intercept	0.037370	+/-0.5
4.28	4.37	0.9786			



Wood Buffalo Environmental Association

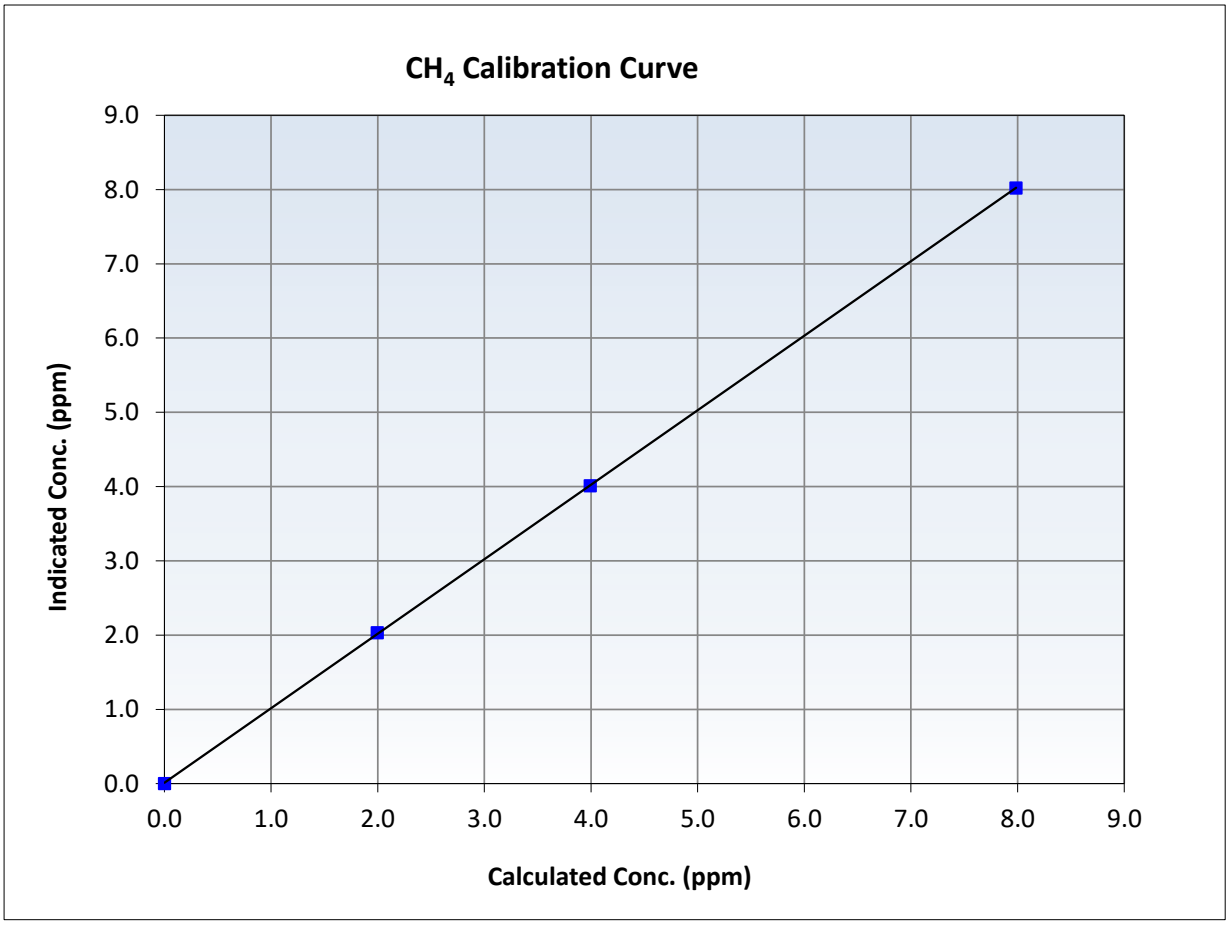
CH_4 Calibration Summary

Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 19, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:11	End Time (MST):	13:14
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	0.999983	*≥0.995*
7.99	8.02	0.9954	Slope	1.003372	*0.90 - 1.10*
3.99	4.01	0.9955	Intercept	0.011560	*+/-0.5*
2.00	2.03	0.9811			



Wood Buffalo Environmental Association

NMHC Calibration Summary

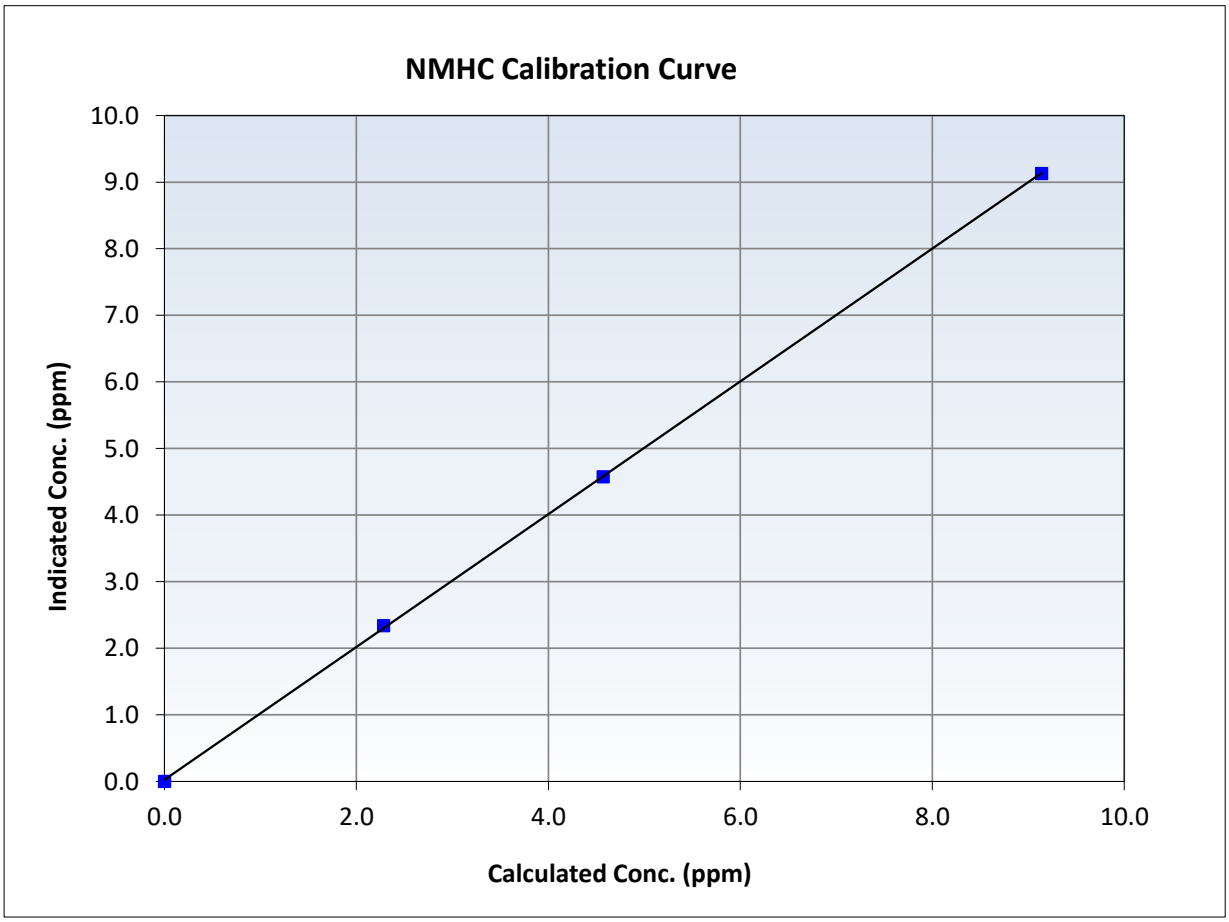
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	April 19, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:11	End Time (MST):	13:14
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

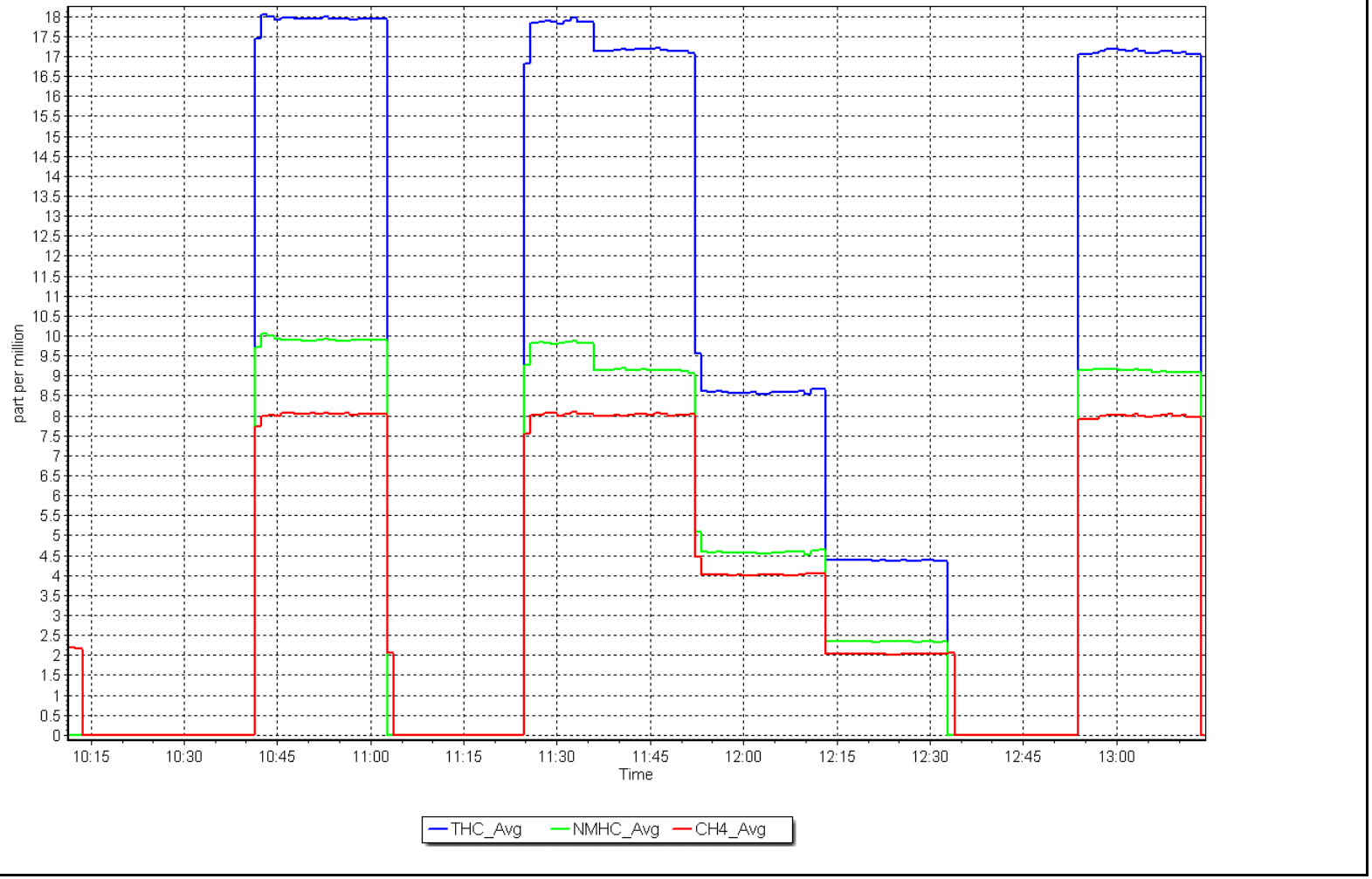
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.14	9.13	1.0009
4.57	4.58	0.9984
2.28	2.34	0.9764

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999955	*≥0.995*
Slope	0.997092	*0.90 - 1.10*
Intercept	0.025211	*+/-0.5*



NMHC Calibration Plot Date: May 2, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 24, 2024	Last Cal Date:	May 2, 2024
Start time (MST):	9:37	End time (MST):	11:24
Reason:	Cylinder Change	Support Gas N2 and H2	

Calibration Standards

Gas Cert Reference:	CC259455	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	497.9 ppm	CH4 Equiv Conc.	1067.7 ppm
C3H8 Cal Gas Conc.	207.2 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	497.9 ppm	CH4 Equiv Conc.	1067.7 ppm
Removed C3H8 Conc.	207.2 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	3810
Zero Air Gen model:	Teledyne API 701H	Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.63E-04	2.63E-04	NMHC SP Ratio:	6.48E-05	6.48E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	140997	140997
Zero Chromatogram:	ON	ON	Flat Baseline:	ON	ON

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.13	17.50	0.979
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.50	Prev response	17.16	*% 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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.13	17.43	0.983
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 0.983

Notes: N2 and H2 cylinder changed after as founds. No adjustment made.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.14	9.48	0.964
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.48	Prev response	9.14	*% change	3.6%
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	80.2	9.14	9.47	0.965
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.965

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	7.99	8.02	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.02	Prev response	8.02	*% 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

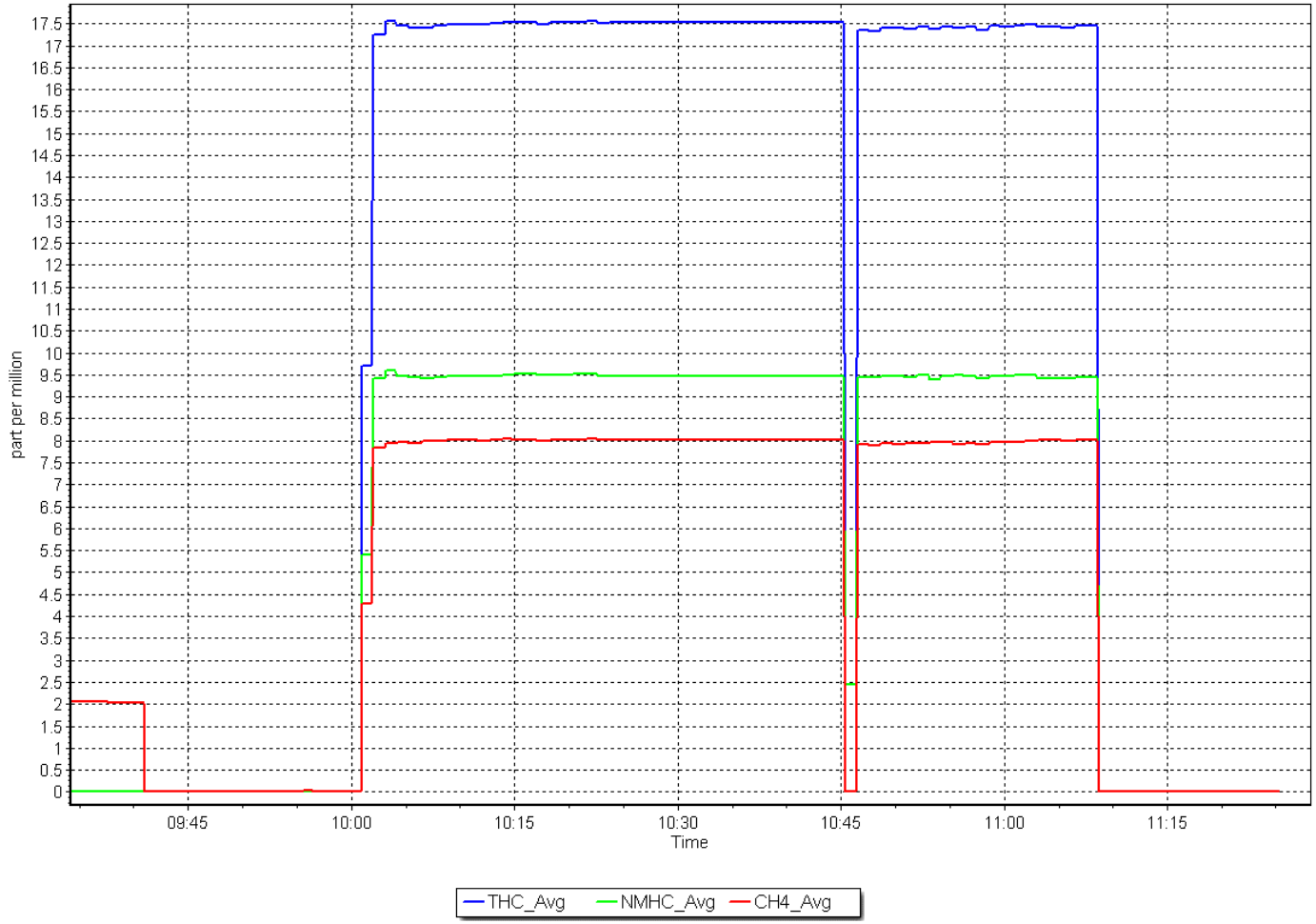
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	7.99	7.96	1.003
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.003

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999907	1.017505
THC Cal Offset:	0.037370	0.000000
CH4 Cal Slope:	1.003372	0.996620
CH4 Cal Offset:	0.011560	0.000000
NMHC Cal Slope:	0.997092	1.035864
NMHC Cal Offset:	0.025211	0.000000

Calibration Performed By: Jan Castro

NMHC Calibration Plot Date: May 24, 2024 Location: Conklin



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Conklin
Station number:	AMS 21
Calibration Date:	May 8, 2024
Last Cal Date:	April 17, 2024
Start time (MST):	8:59
End time (MST):	13:24
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	SA18828	Cal Gas Expiry Date:	November 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.80 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.80 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3810
ZAG make/model:	Teledyne API T701H	Serial Number:	953

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-1.8	-1.7	-0.1	----	----
AF High point	4918	82.0	802.0	800.3	1.6	758.8	749.9	8.8	1.0544	1.0648
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 804.0 ppb	NO = 800.2 ppb
Baseline Corr 1st pt	NO_X = 760.6 ppb	NO = 751.6 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change	NO_X =	-5.7%	
*Percent Change	NO =	-6.5%	

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1501663731

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.098	1.173	NO bkgnd or offset:	12.0	11.5
NOX coeff or slope:	0.999	0.993	NOX bkgnd or offset:	12.2	11.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	157.8	151.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999799	0.998117
NO_X Cal Offset:	2.168069	2.108054
NO Cal Slope:	0.998620	0.999906
NO Cal Offset:	0.948023	1.148032
NO_2 Cal Slope:	1.011507	1.002080
NO_2 Cal Offset:	-1.127282	-1.209969

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	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	801.5	800.8	0.6	1.0006	0.9994
Mid point	4959	41.0	401.0	400.2	0.8	403.2	401.7	1.5	0.9945	0.9962
Low point	4980	20.5	200.5	200.1	0.4	204.7	202.7	2.0	0.9793	0.9870
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
As left span	4918	82.0	802.0	386.6	415.4	803.0	386.6	416.4	0.9987	1.0000
							Average Correction Factor		0.9915	0.9942

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	803.6	383.3	421.9	421.9	1.0001	100.0%
Mid GPT point	803.6	601.1	204.1	203.8	1.0017	99.8%
Low GPT point	803.6	700.6	104.6	101.6	1.0299	97.1%
				Average Correction Factor	1.0106	99.0%

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

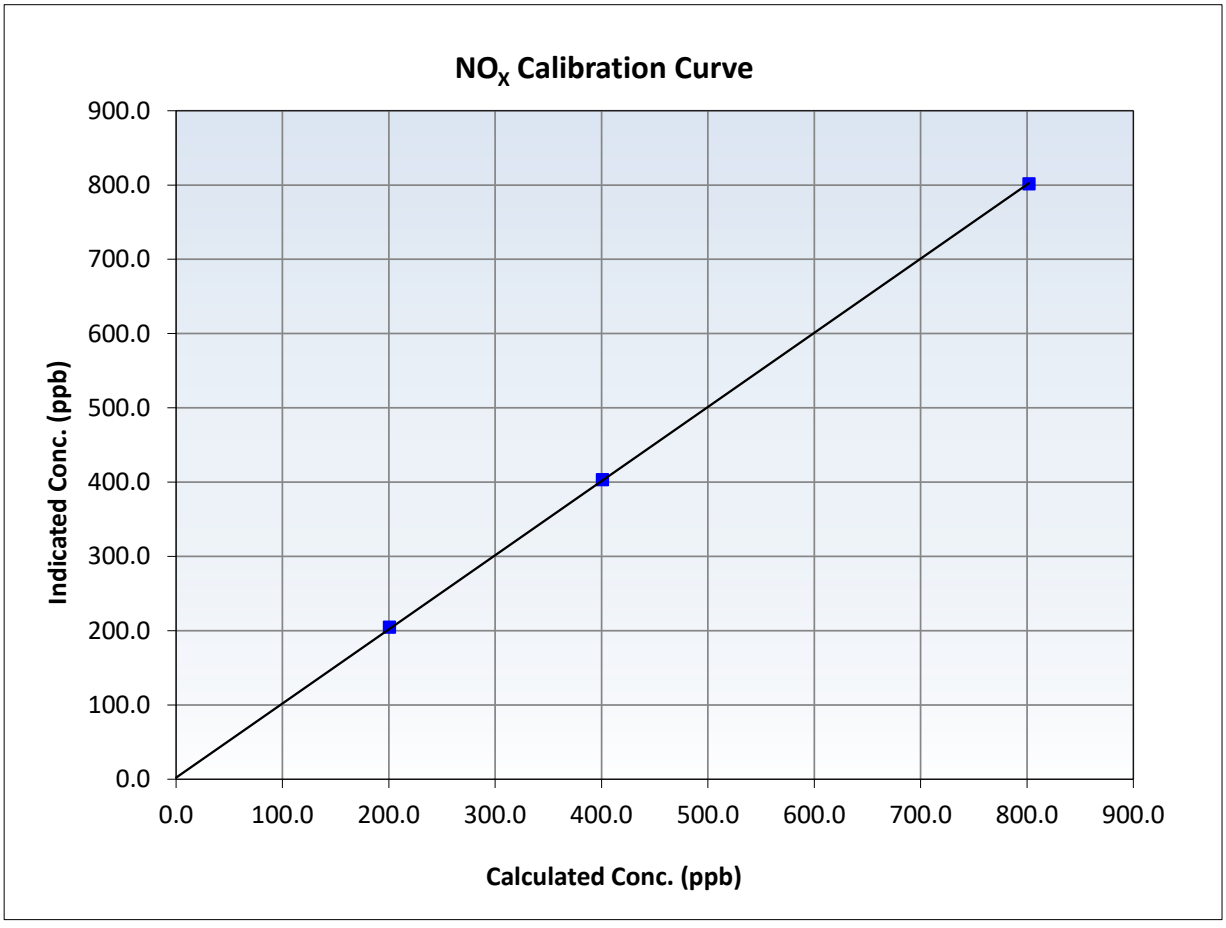
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 17, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	8:59	End Time (MST):	13:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
802.0	801.5	1.0006
401.0	403.2	0.9945
200.5	204.7	0.9793

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999962	*≥0.995*
Slope	0.998117	*0.90 - 1.10*
Intercept	2.108054	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

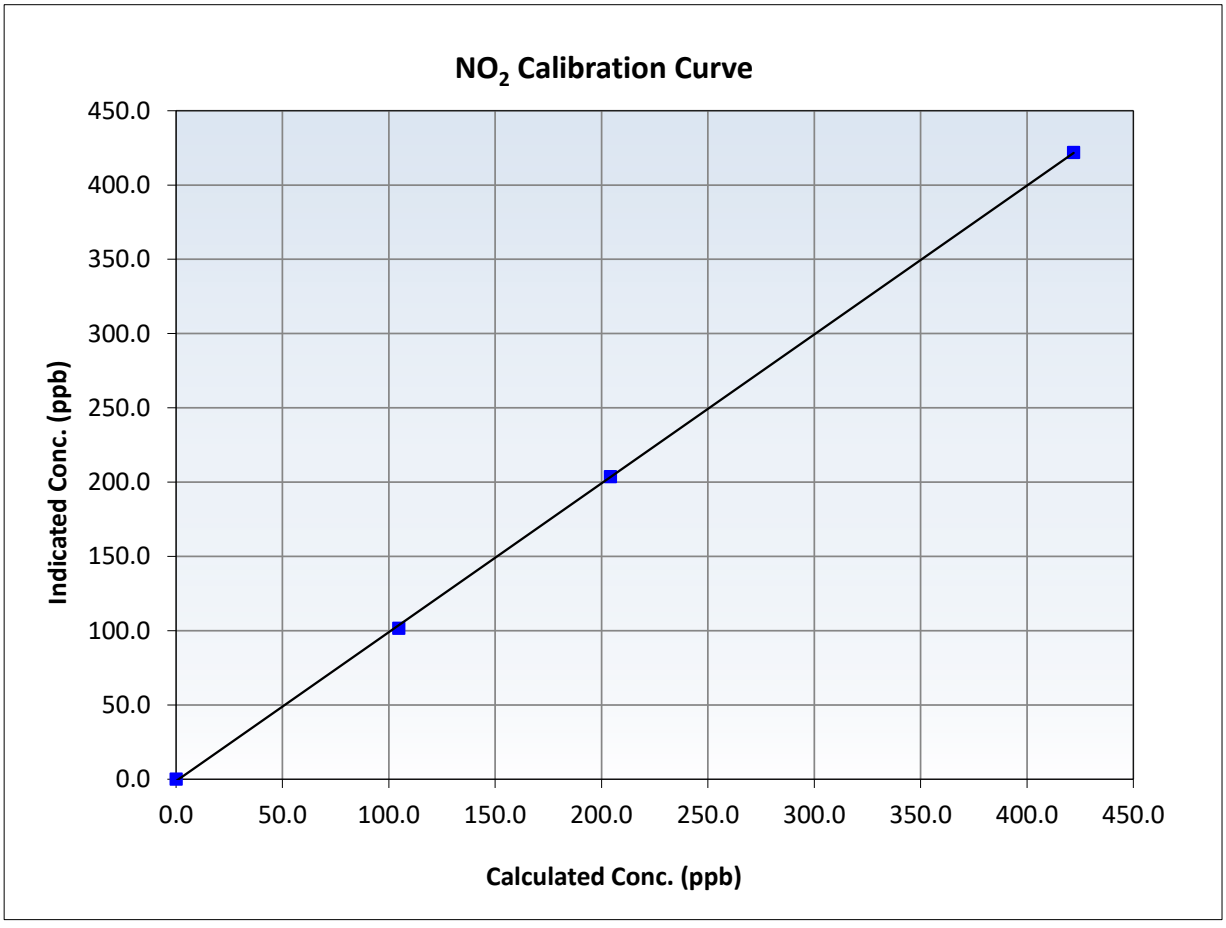
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 17, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	8:59	End Time (MST):	13:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
421.9	421.9	1.0001
204.1	203.8	1.0017
104.6	101.6	1.0299

Statistical Evaluation		Limits
Correlation Coefficient	0.999937	≥0.995
Slope	1.002080	0.90 - 1.10
Intercept	-1.209969	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

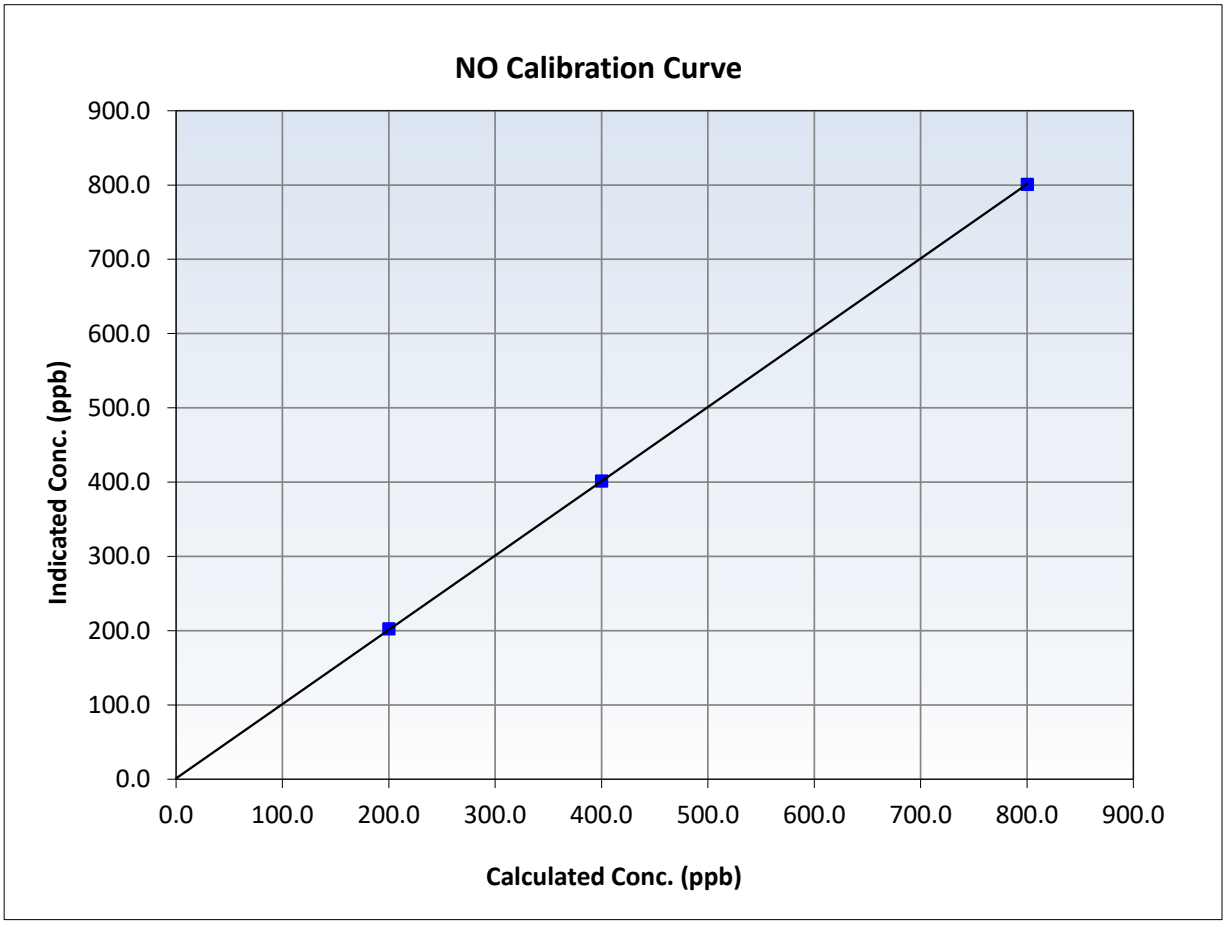
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 17, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	8:59	End Time (MST):	13:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

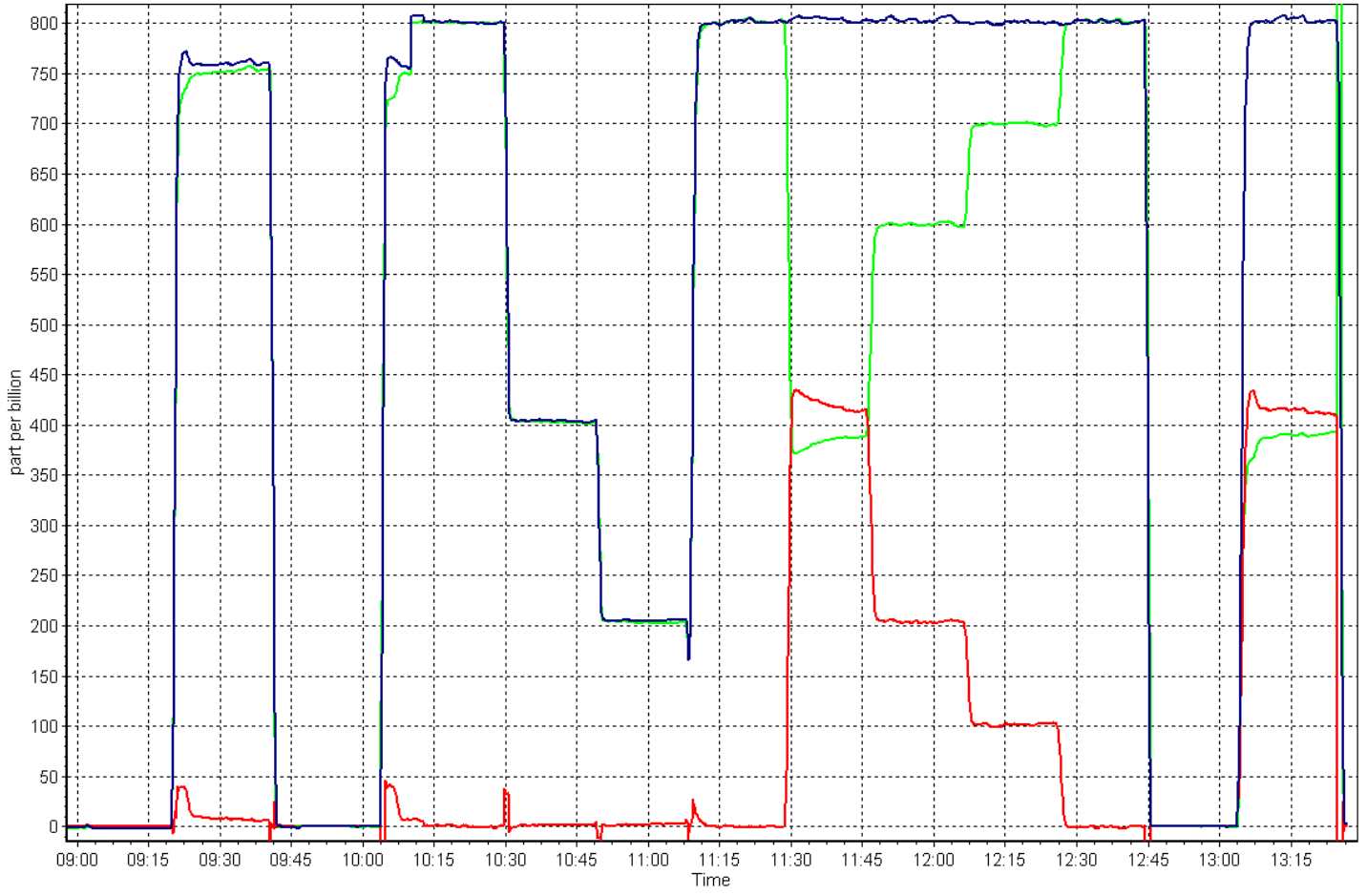
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
800.3	800.8	0.9994
400.2	401.7	0.9962
200.1	202.7	0.9870

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.999906	*0.90 - 1.10*
Intercept	1.148032	*+/-20*



NO_X Calibration Plot Date: May 8, 2024 Location: Conklin



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 17, 2024	Last Cal Date:	April 8, 2024
Start time (MST):	7:35	End time (MST):	10:08
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3810
ZAG Make/Model:	Teledyne API 701H	Serial Number:	691

Analyzer Information

Analyzer make:	Thermo 49i		Analyzer serial #:	1501663734	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999943	0.999857	Backgd or Offset:	-1.1	-1.1
Calibration intercept:	0.060000	0.100000	Coeff or Slope:	0.998	0.998

O_3 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) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	-0.3	----
As found High point	5000	955.4	400.0	399.8	1.000
As found Mid point					
As found Low point					
Baseline Corr As found:	400.1	Previous response	400.0	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	-0.3	----
High point	5000	955.4	400.0	399.8	1.001
Mid point	5000	809.3	200.0	200.4	0.998
Low point	5000	706.5	100.0	100.4	0.996
As left zero	5000	800.0	0.0	0.3	----
As left span	5000	951.8	400.0	401.4	0.997
				Average Correction Factor	0.998

Notes: Remote calibrations. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

O_3 Calibration Summary

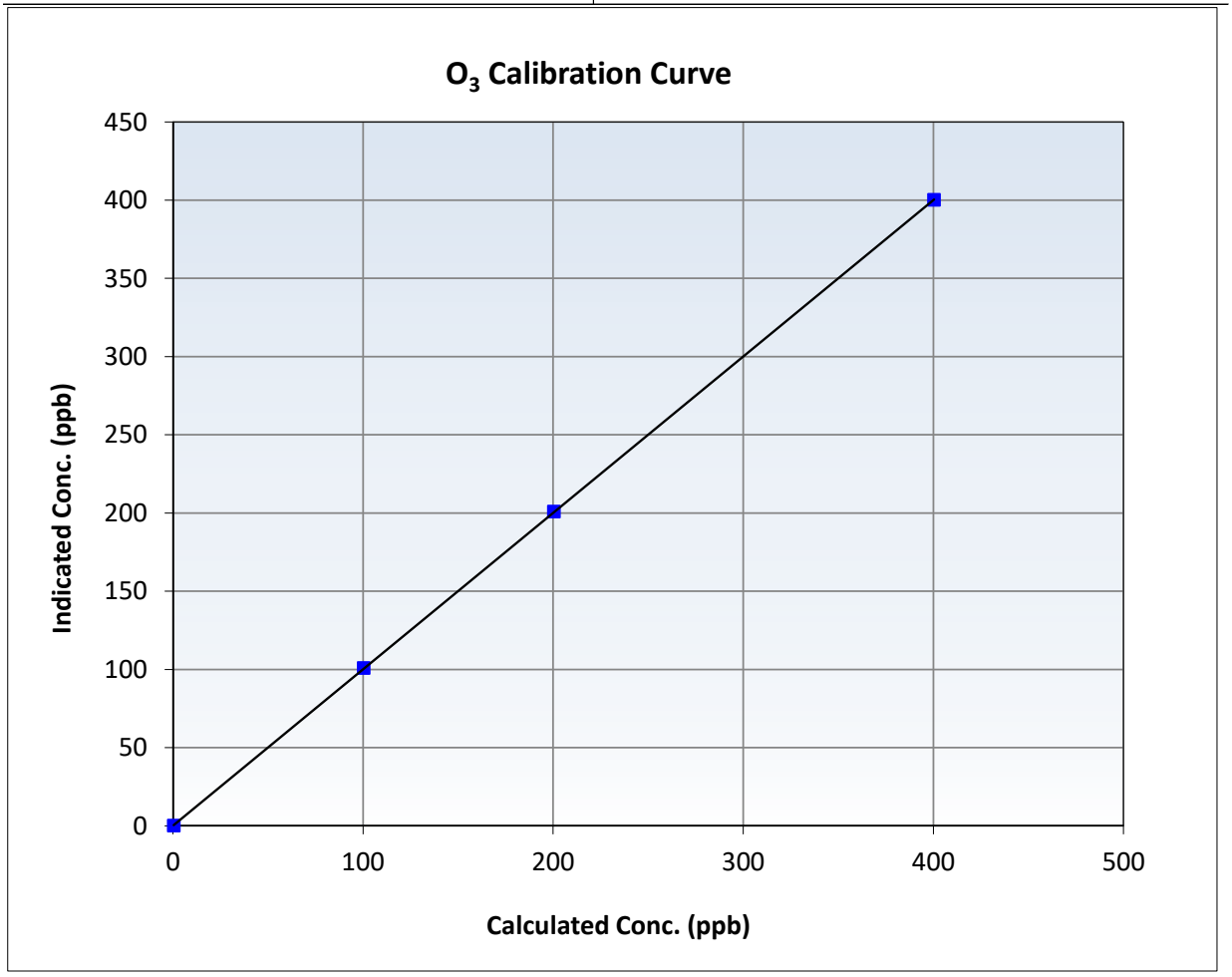
Station Information

Calibration Date:	May 17, 2024	Previous Calibration:	April 8, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	7:35	End Time (MST):	10:08
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734

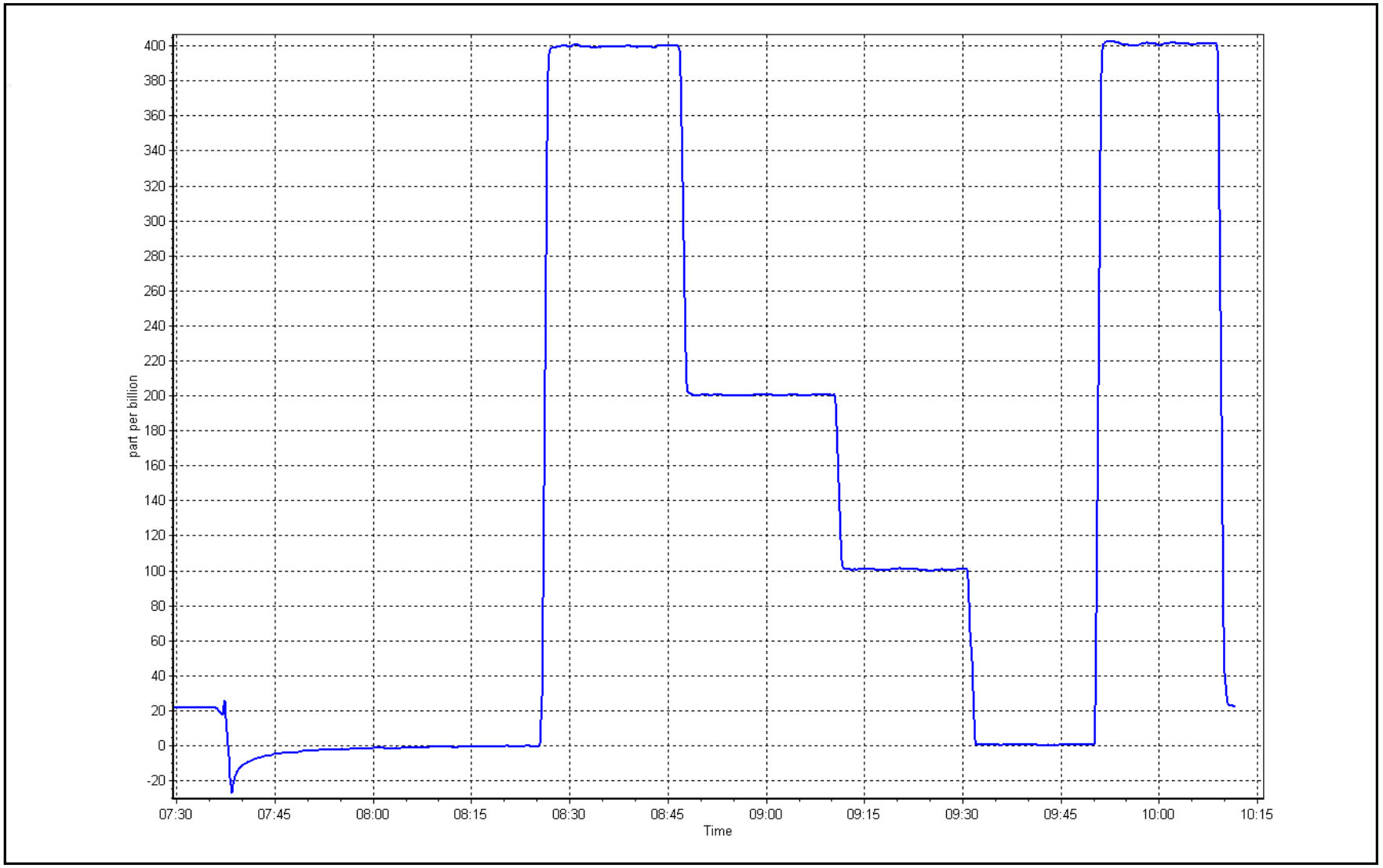
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
400.0	399.8	1.0005
200.0	200.4	0.9980
100.0	100.4	0.9960

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.999857	*0.90 - 1.10*
Intercept	0.100000	*+/- 5*



O_3 Calibration Plot Date: May 17, 2024 Location: Conklin



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	May 28, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	10:34	End time (MST):	11:32
Analyzer Make:	API T640	S/N:	326
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)	20.90	21.9	20.90	☐	+/- 2 °C
P (mmHg)	707.80	709.88	707.80	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.11	5.01	☐	+/- 0.25 LPM
PW% (pump)	37	-----	37	☐	>80%

Zero Verification — PM w/o HEPA: 5.70 — 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	10.90	10.90	☐	+/- 0.5

Date Optical Chamber Cleaned: May 28, 2024

Date Disposable Filter Changed: May 28, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: December 7, 2023

Date RH/T Sensor Cleaned: December 7, 2023

Notes: Verified flow, pressure, temperature and pump power.Disposable filter changed. Leak check passed. No adjustment made.

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:	May 17, 2024	Prev Cal Date:	August 30, 2023
Start Time (MST):	11:30	End Time (MST):	12:40
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:	R10866

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error *Limit = +/- 1.5%*
0	0.0	0.0	---
200	20.2	20.3	0.5%
400	39.4	39.4	0.1%
600	58.6	58.7	0.2%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		0.999999	*≥0.9995*
Calculated slope		0.998853	*0.90 - 1.10*
Calculated intercept		-0.027978	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020D	Serial Number:	D14062
As Found Declination (deg east of True North):	13	As Left Declination (deg east of True North):	13
Solar noon time (MST):	NA	Calc Declination*:	13 Degrees
Deadband calc:	-2.7 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	-0.4	---
90	88.3	-0.5%
180	178.8	-0.3%
270	269.6	-0.1%
358	359.4	0.4%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		0.999980	*≥0.9995*
Calculated slope		0.994697	*0.90 - 1.10*
Calculated intercept		1.427878	*+/- 4*

Notes: Bearings still good. Confirmed declination with a compass. Replaced Wind Direction sensor as previous unit with water damage

Calibration Performed By: Ryan Power

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS22
JANVIER
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	May 28, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	10:36	End time (MST):	14:08
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002236	1.000307	Backgd or Offset:	24.1	23.9
Calibration intercept:	-0.036002	0.464235	Coeff or Slope:	1.013	1.009

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4920	79.8	799.8	802.1	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.0	Previous response	801.5	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	79.8	799.8	800.3	0.999
Mid point	4960	39.9	399.9	400.8	0.998
Low point	4980	20.0	200.4	201.1	0.997
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.8	799.8	1.000
				Average Correction Factor:	0.998

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

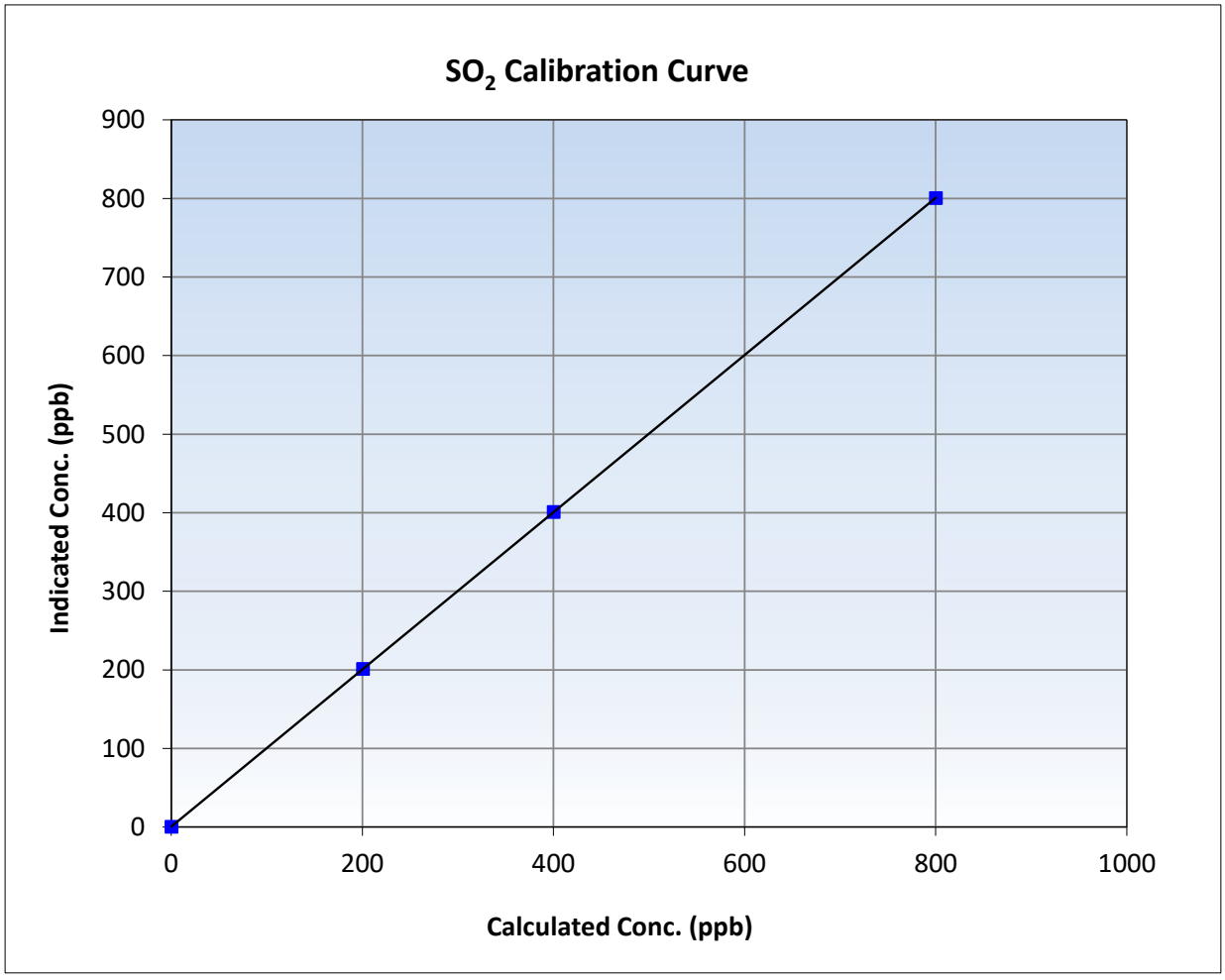
Station Information

Calibration Date:	May 28, 2024	Previous Calibration:	April 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:36	End Time (MST):	14:08
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

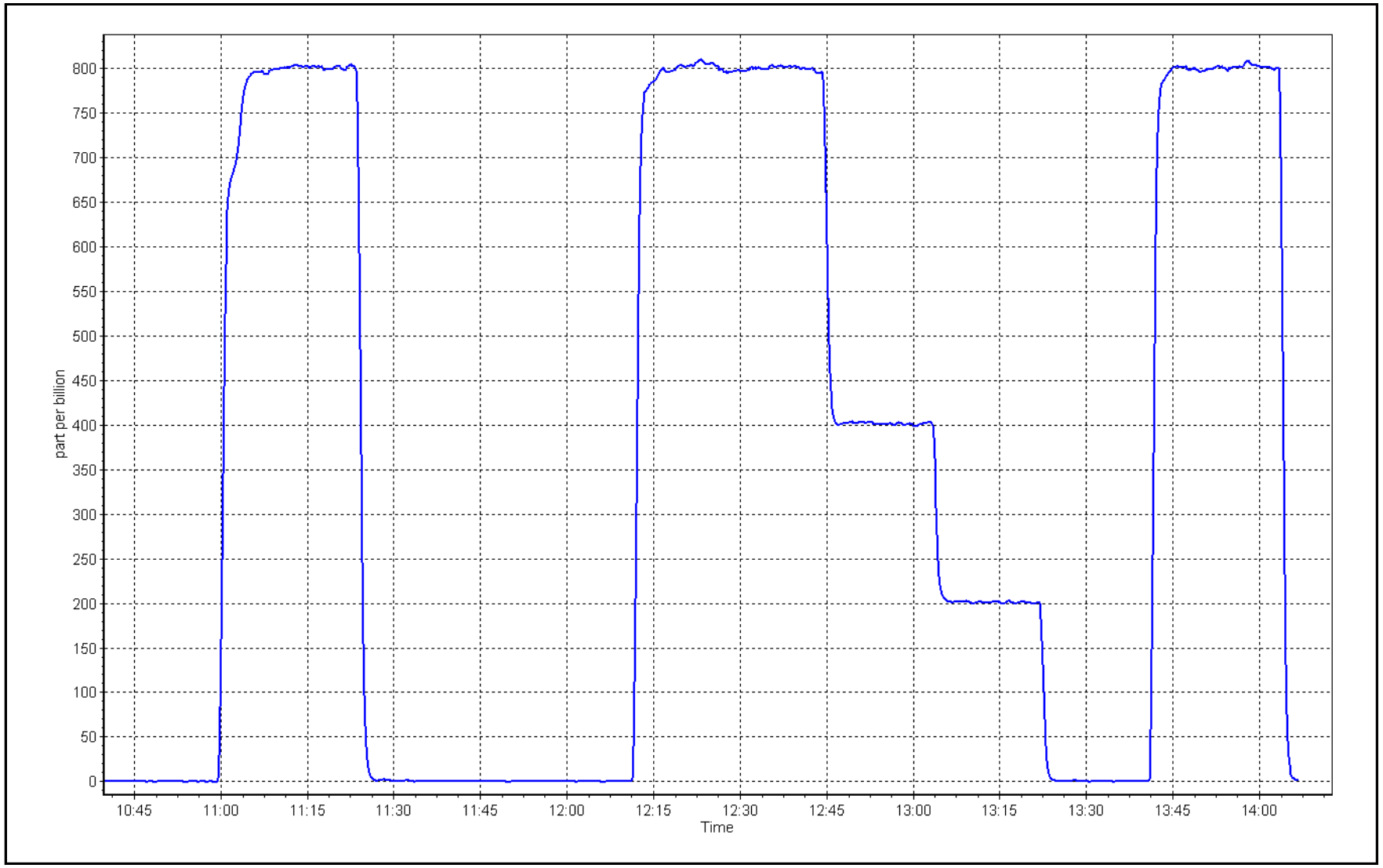
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
799.8	800.3	0.9994
399.9	400.8	0.9977
200.4	201.1	0.9967

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.000307	*0.90 - 1.10*
Intercept	0.464235	*+/-30*



SO2 Calibration Plot Date: May 28, 2024 Location: Janvier



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	May 23, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	10:50	End time (MST):	14:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.02	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	CC424047			
Removed Cal Gas Conc:	5.02	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3806
ZAG Make/Model:	Teledyne API T701		Serial Number:	4890

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1151680031
Converter make:	CDN-101		Converter serial #:	620
Analyzer Range	0 - 100 ppb		Converter Temp:	850 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.995809	0.998806	Backgd or Offset:	3.57	3.52
Calibration intercept:	0.280545	0.100668	Coeff or Slope:	1.188	1.158

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4920	79.7	80.0	82.2	0.971
As found Mid point	4960	39.8	40.0	41.5	0.958
As found Low point	4980	19.9	20.0	20.6	0.961
New cylinder response					

Baseline Corr As found:	82.4	Prev response:	79.97	*% change:	3.0%
Baseline Corr 2nd AF pt:	41.7	AF Slope:	1.029509	AF Intercept:	0.001358
Baseline Corr 3rd AF pt:	20.8	AF Correlation:	0.999945	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4920	79.7	80.0	79.9	1.002
Mid point	4960	39.8	40.0	40.2	0.994
Low point	4980	19.9	20.0	20.2	0.989
As left zero	5000	0.0	0.0	0.1	----
As left span	4920	79.7	80.0	79.7	1.004
SO2 Scrubber Check	4920	79.8	798.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.995
Date of last converter efficiency test:					

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TRS Calibration Summary

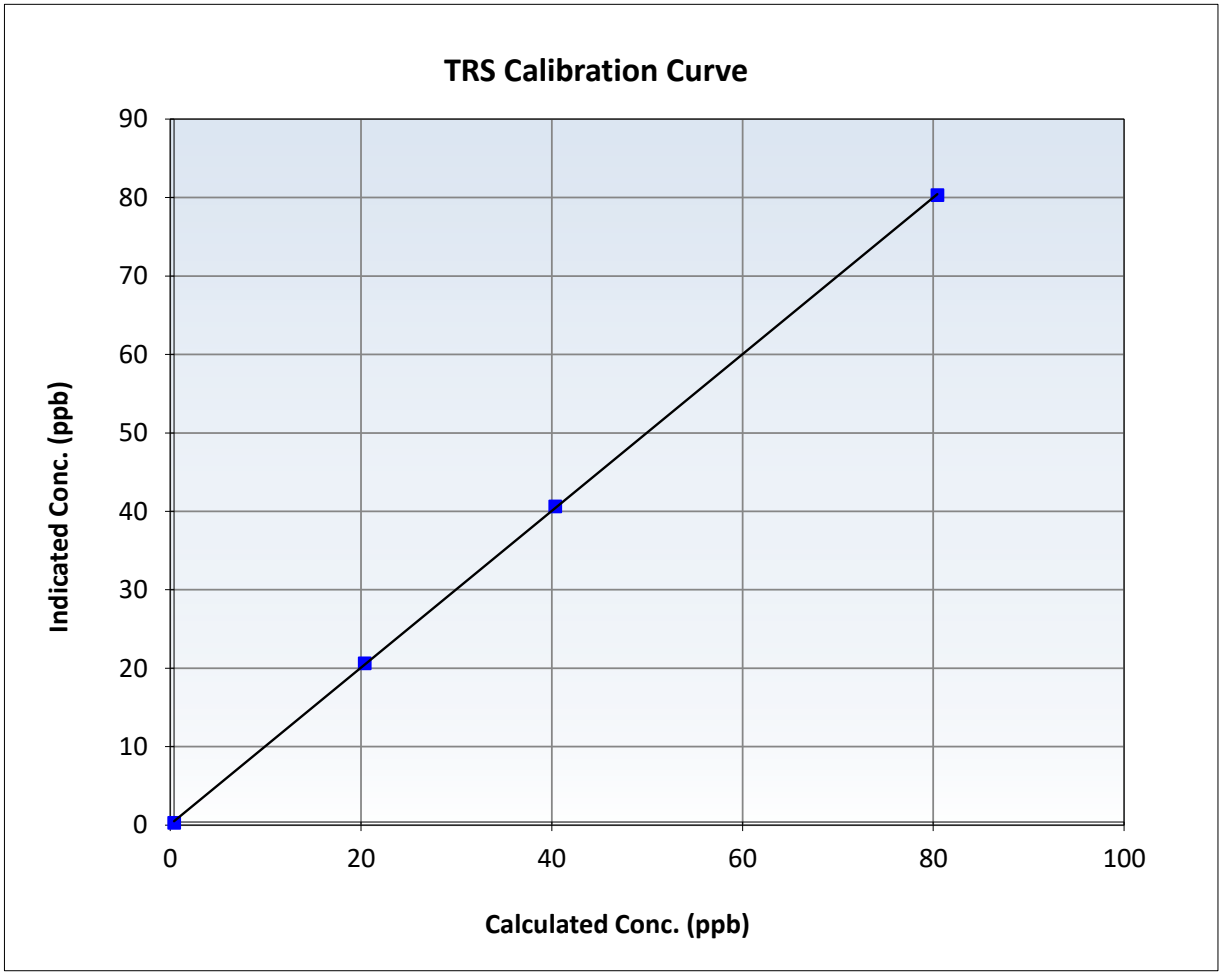
Station Information

Calibration Date:	May 23, 2024	Previous Calibration:	April 18, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:50	End Time (MST):	14:55
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031

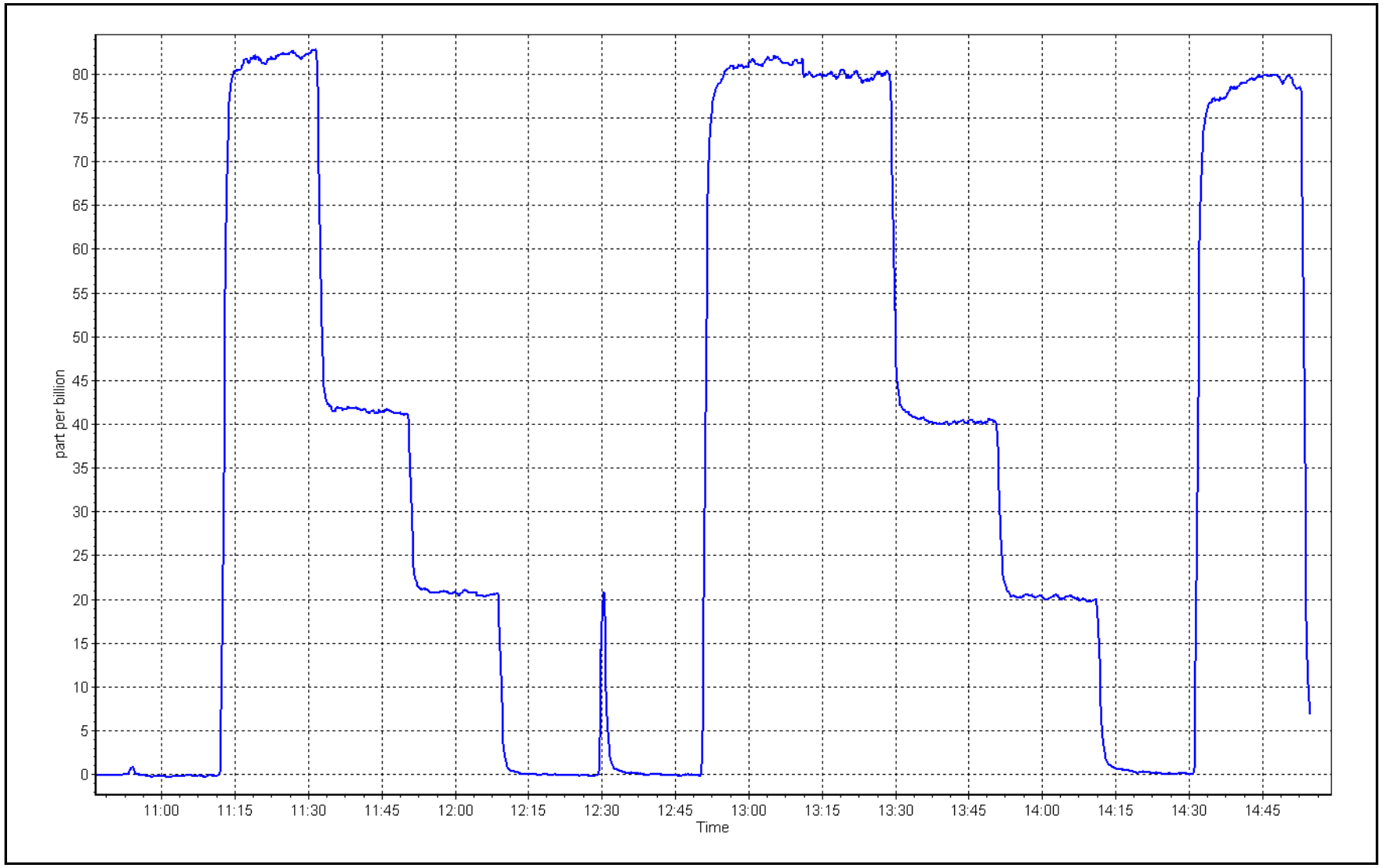
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	79.9	1.0015
40.0	40.2	0.9940
20.0	20.2	0.9891

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	0.998806	*0.90 - 1.10*
Intercept	0.100668	*+/-3*



TRS Calibration Plot Date: May 23, 2024 Location: Janvier



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	May 28, 2024	Last Cal Date:	April 19, 2024
Start time (MST):	10:36	End time (MST):	14:08
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC281519		Cal Gas Expiry Date:	January 18, 2029	
CH4 Cal Gas Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
C3H8 Cal Gas Conc.	208.4	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
Removed C3H8 Conc.	208.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API 700		Serial Number:	3806	
Zero Air Gen model:	Teledyne API 701		Serial Number:	4890	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1317958219	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.41E-04	2.46E-04	NMHC SP Ratio:	5.65E-05	5.74E-05
CH4 Retention time:	11.6	11.6	NMHC Peak Area:	161932	159535
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	17.17	16.81	1.022
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.81	Prev response	17.17	*% change	-2.1%
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)) *Limit = 0.95-1.05*
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	8.52	1.008
Low point	4980	20.0	4.30	4.26	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	17.17	17.05	1.007
				Average Correction Factor	1.007

Notes: Changed the inlet filter and N2/H2 cylinders after as founds. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.15	9.01	1.015
As found Mid point					
As found Low point				2.31	
New cylinder response					
Baseline Corr AF:	9.01	Prev response	9.15	*% change	-1.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	2.31	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	9.15	9.13	1.002
Mid point	4960	39.9	4.57	4.56	1.004
Low point	4980	20.0	2.29	2.28	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.15	9.07	1.008
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	8.03	7.80	1.030
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.80	Prev response	8.02	*% change	-2.9%
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	8.03	8.01	1.002
Mid point	4960	39.9	4.01	3.96	1.012
Low point	4980	20.0	2.01	1.98	1.017
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	8.03	7.98	1.006
				Average Correction Factor	1.010

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.002111	0.998258
THC Cal Offset:	-0.041995	-0.024786
CH4 Cal Slope:	1.002620	0.998675
CH4 Cal Offset:	-0.028359	-0.019755
NMHC Cal Slope:	1.001665	0.998093
NMHC Cal Offset:	-0.013635	-0.004832

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

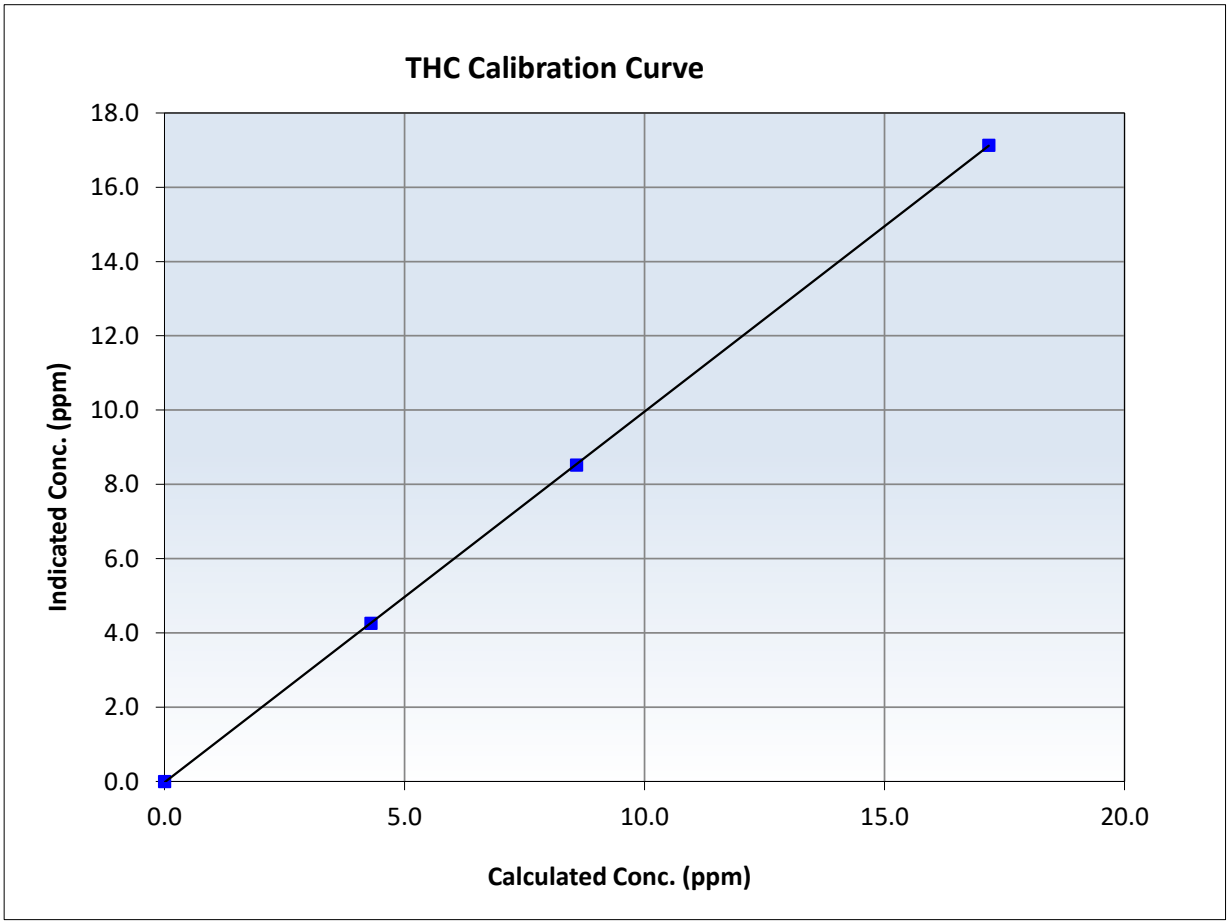
THC Calibration Summary

Station Information

Calibration Date:	May 28, 2024	Previous Calibration:	April 19, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:36	End Time (MST):	14:08
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	0.999988	*≥0.995*
17.17	17.14	1.0022	Slope	0.998258	*0.90 - 1.10*
8.59	8.52	1.0080	Intercept	-0.024786	*+/-0.5*
4.30	4.26	1.0109			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

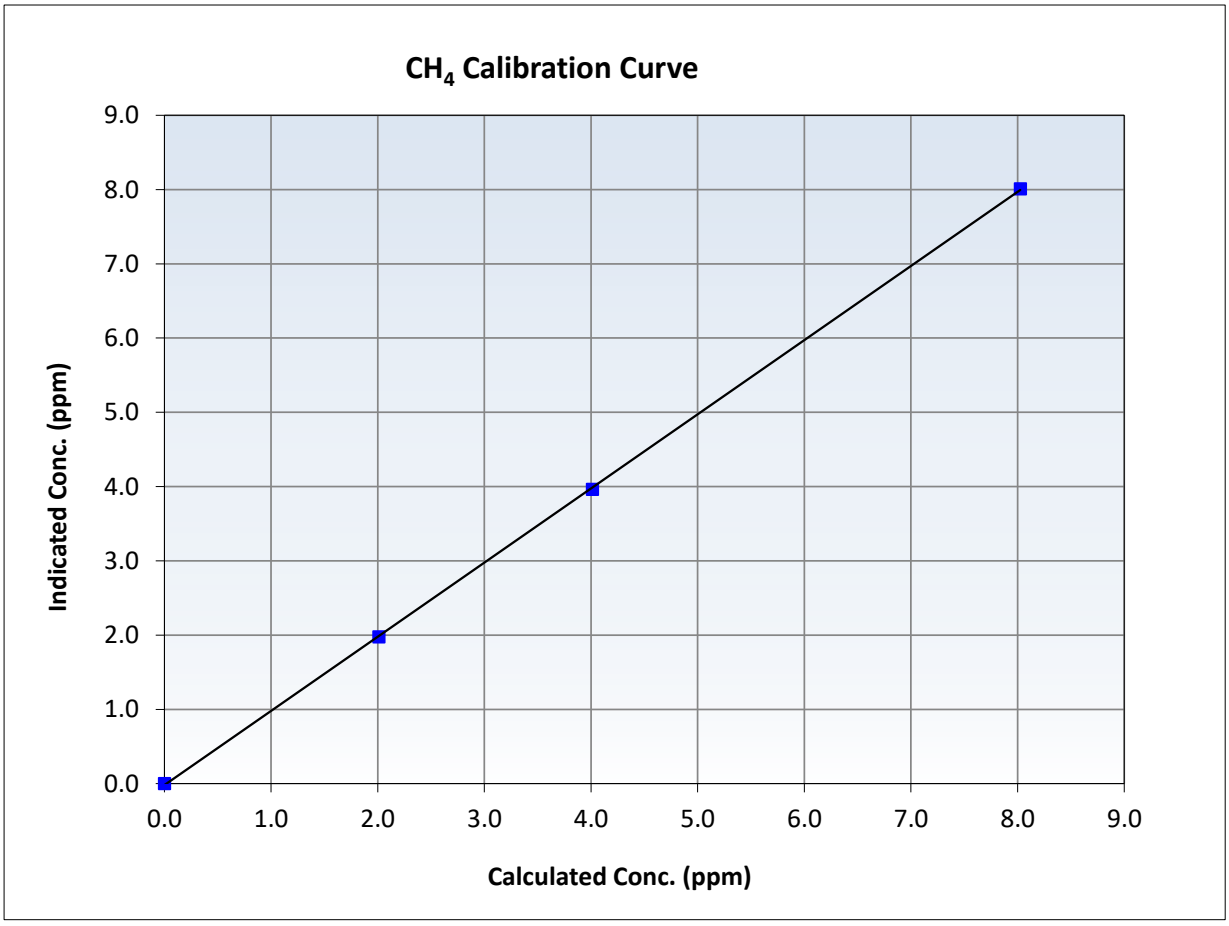
Station Information

Calibration Date:	May 28, 2024	Previous Calibration:	April 19, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:36	End Time (MST):	14:08
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.03	8.01	1.0020
4.01	3.96	1.0122
2.01	1.98	1.0168

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999964	*≥0.995*
Slope	0.998675	*0.90 - 1.10*
Intercept	-0.019755	*+/-0.5*



Wood Buffalo Environmental Association

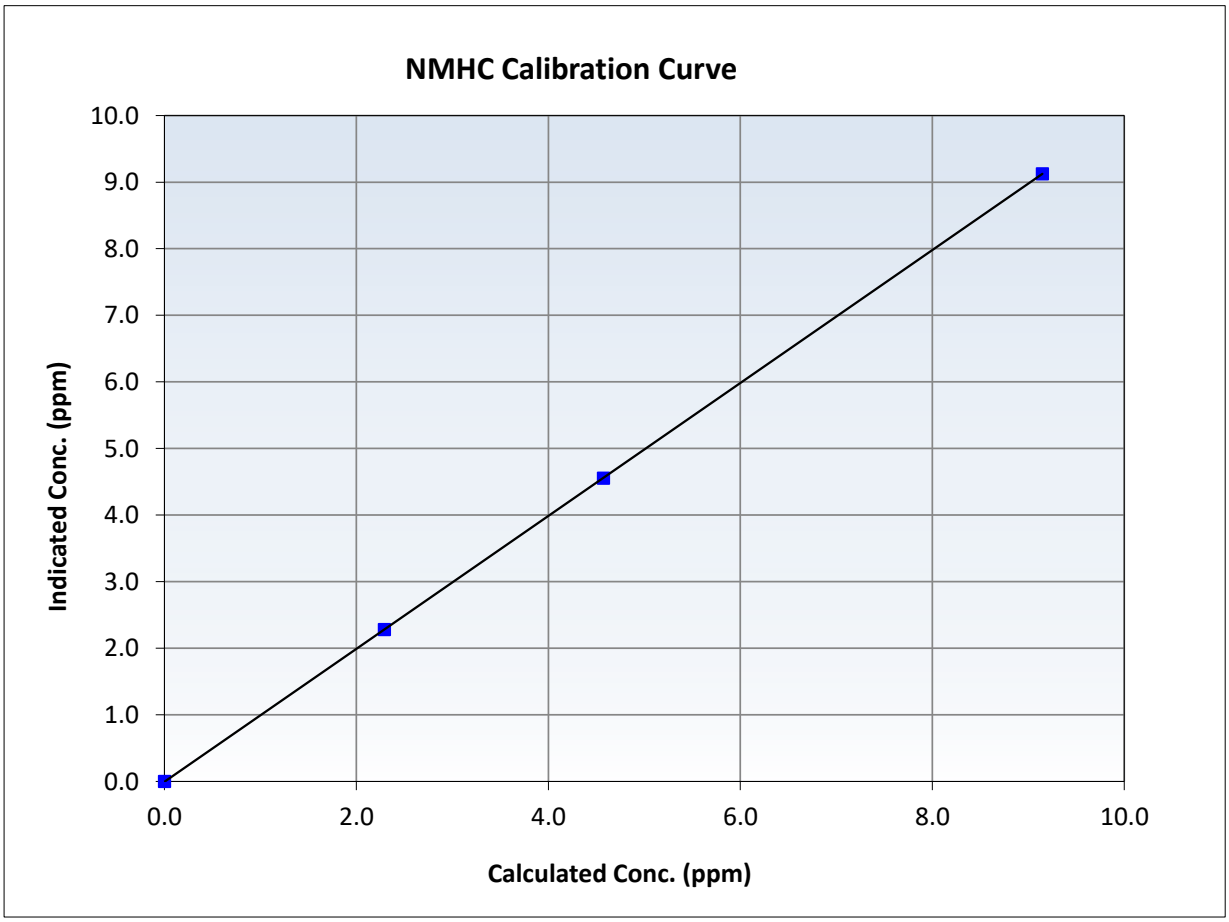
NMHC Calibration Summary

Station Information

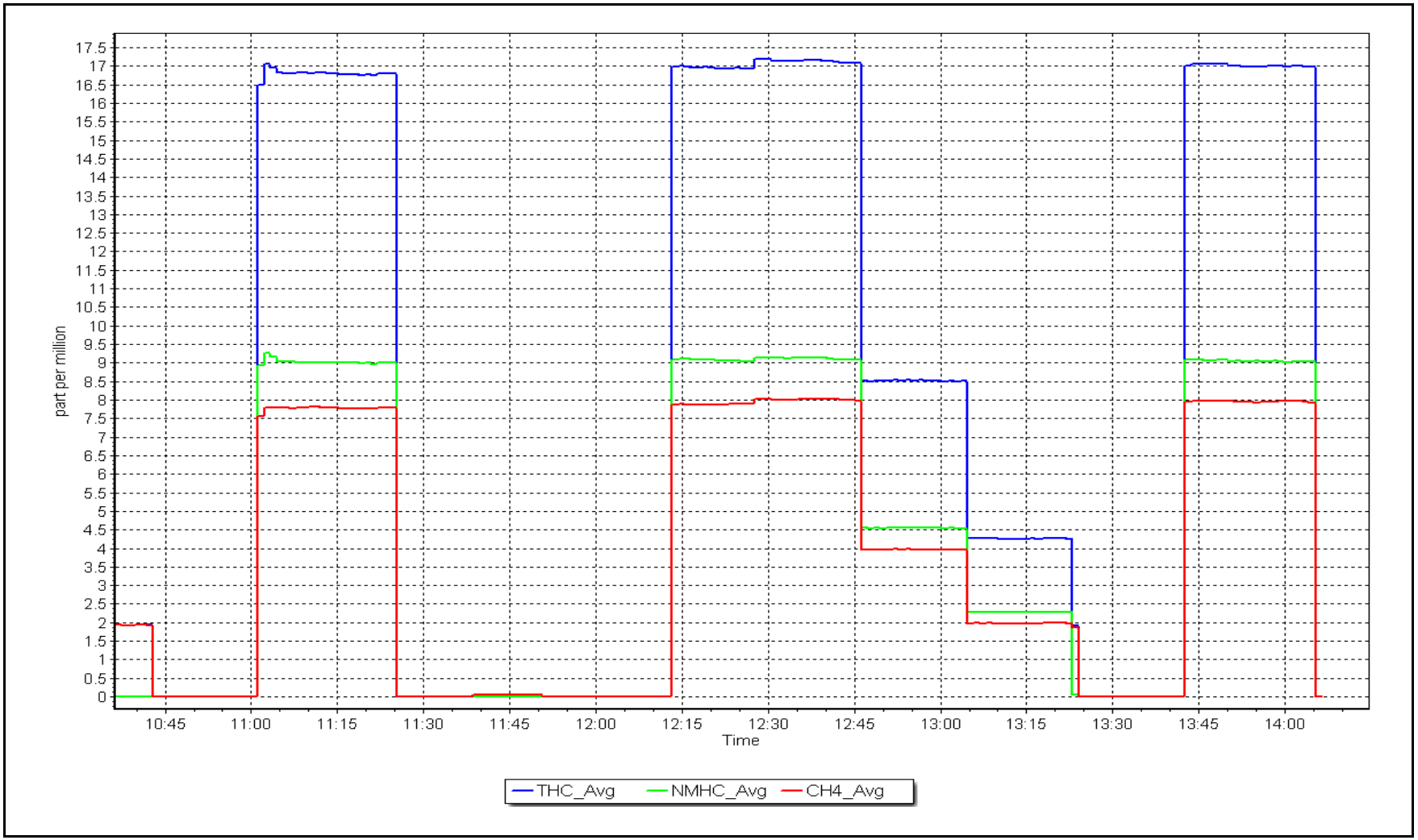
Calibration Date:	May 28, 2024	Previous Calibration:	April 19, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:36	End Time (MST):	14:08
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.15	9.13	1.0021	Slope	0.998093	0.90 - 1.10
4.57	4.56	1.0040			
2.29	2.28	1.0054	Intercept	-0.004832	+/-0.5



NMHC Calibration Plot Date: May 28, 2024 Location: Janvier



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Janvier
Station number:	AMS 22
Calibration Date:	May 27, 2024
Last Cal Date:	April 16, 2024
Start time (MST):	9:55
End time (MST):	14:34
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0047765	Cal Gas Expiry Date:	March 11, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.80 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.80 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3806
ZAG make/model:	Teledyne API T701	Serial Number:	691

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.5	-0.1	0.6	----	----
AF High point	4918	82.0	802.0	800.3	1.6	797.1	783.2	13.9	1.0067	1.0217
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 801.0 ppb	NO = 800.5 ppb
Baseline Corr 1st pt	NO_X = 796.6 ppb	NO = 783.3 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = -0.5%
As found	NO r^2:	*Percent Change	NO = -2.2%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 833

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.846	0.854	NO bkgnd or offset:	-0.7	-0.7
NOX coeff or slope:	0.840	0.846	NOX bkgnd or offset:	0.5	0.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.7	7.1

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.997901	0.995663
NO_X Cal Offset:	0.704052	0.964017
NO Cal Slope:	0.999703	0.999503
NO Cal Offset:	0.464053	-0.016008
NO_2 Cal Slope:	0.997737	1.002632
NO_2 Cal Offset:	-0.534162	0.961073

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.4	0.4	0.1	----	----
High point	4918	82.0	802.0	800.3	1.6	799.0	800.0	-1.1	1.0037	1.0004
Mid point	4960	41.0	400.9	400.1	0.8	400.9	400.0	0.9	1.0000	1.0002
Low point	4980	20.5	200.5	200.1	0.4	200.8	199.3	1.5	0.9984	1.0038
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.3	-0.3	----	----
As left span	4918	82.0	802.0	393.7	408.3	794.9	393.7	401.2	1.0089	1.0000
							Average Correction Factor		1.0007	1.0015

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	791.6	395.6	397.6	399.1	0.9963	100.4%
Mid GPT point	791.6	591.8	201.4	203.7	0.9889	101.1%
Low GPT point	791.6	694.9	98.3	100.2	0.9814	101.9%
				Average Correction Factor	0.9889	101.1%

Notes: Changed the inlet filter after as founds. Adjusted span only. Used the 2nd GPT reference point.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

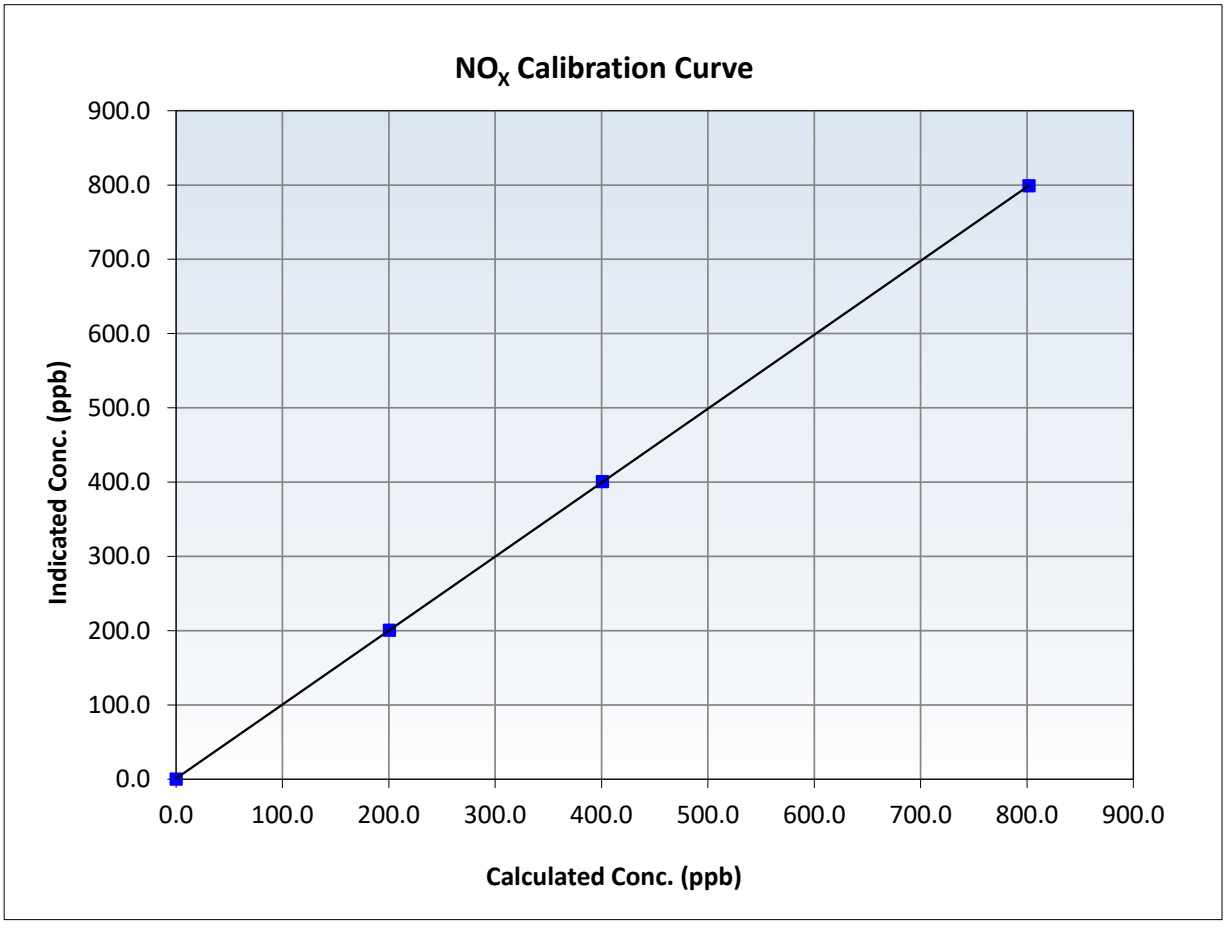
Station Information

Calibration Date:	May 27, 2024	Previous Calibration:	April 16, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:55	End Time (MST):	14:34
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
802.0	799.0	1.0037
400.9	400.9	1.0000
200.5	200.8	0.9984

Statistical Evaluation		Limits
Correlation Coefficient	0.999997	≥0.995
Slope	0.995663	0.90 - 1.10
Intercept	0.964017	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

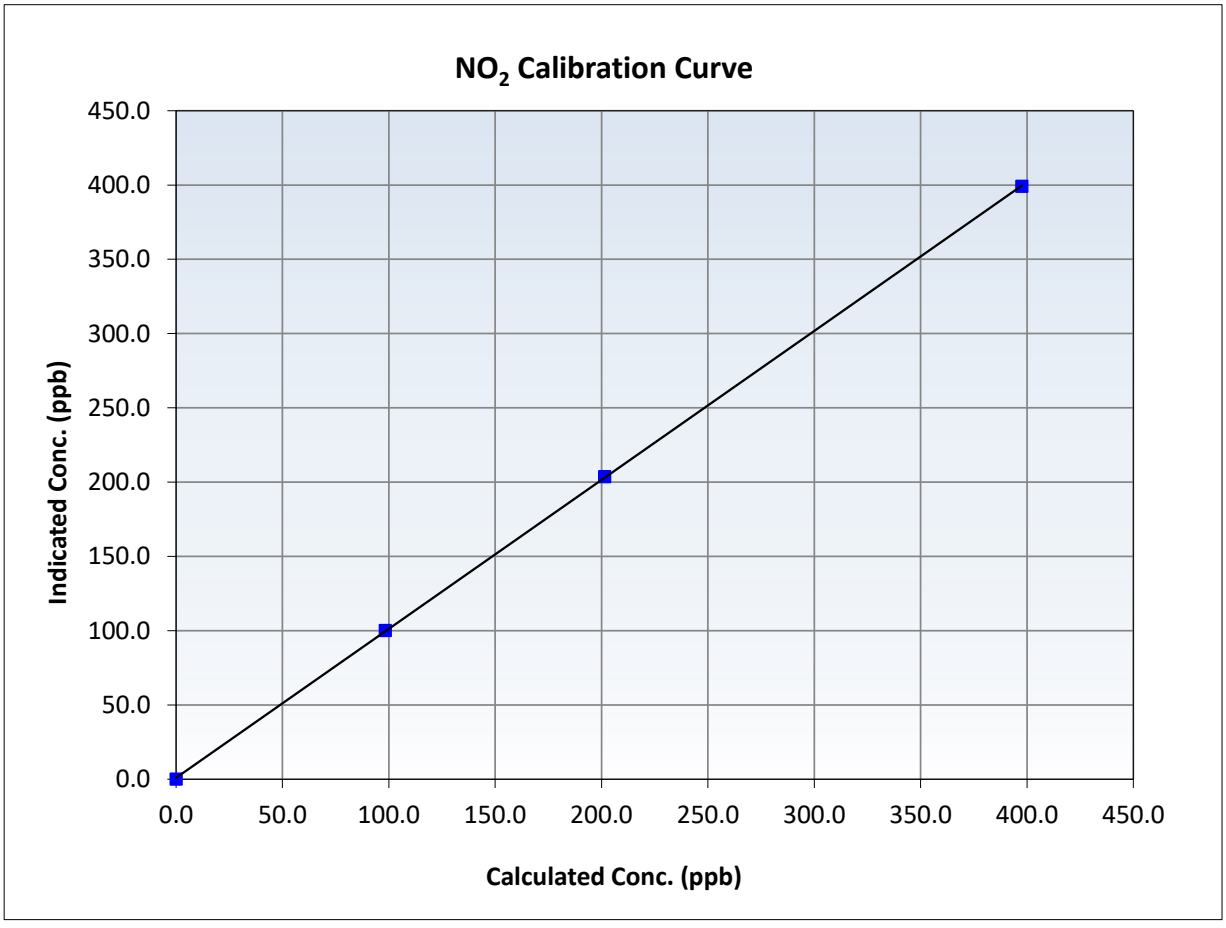
Station Information

Calibration Date:	May 27, 2024	Previous Calibration:	April 16, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:55	End Time (MST):	14:34
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
397.6	399.1	0.9963
201.4	203.7	0.9889
98.3	100.2	0.9814

Statistical Evaluation		Limits
Correlation Coefficient	0.999977	≥0.995
Slope	1.002632	0.90 - 1.10
Intercept	0.961073	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

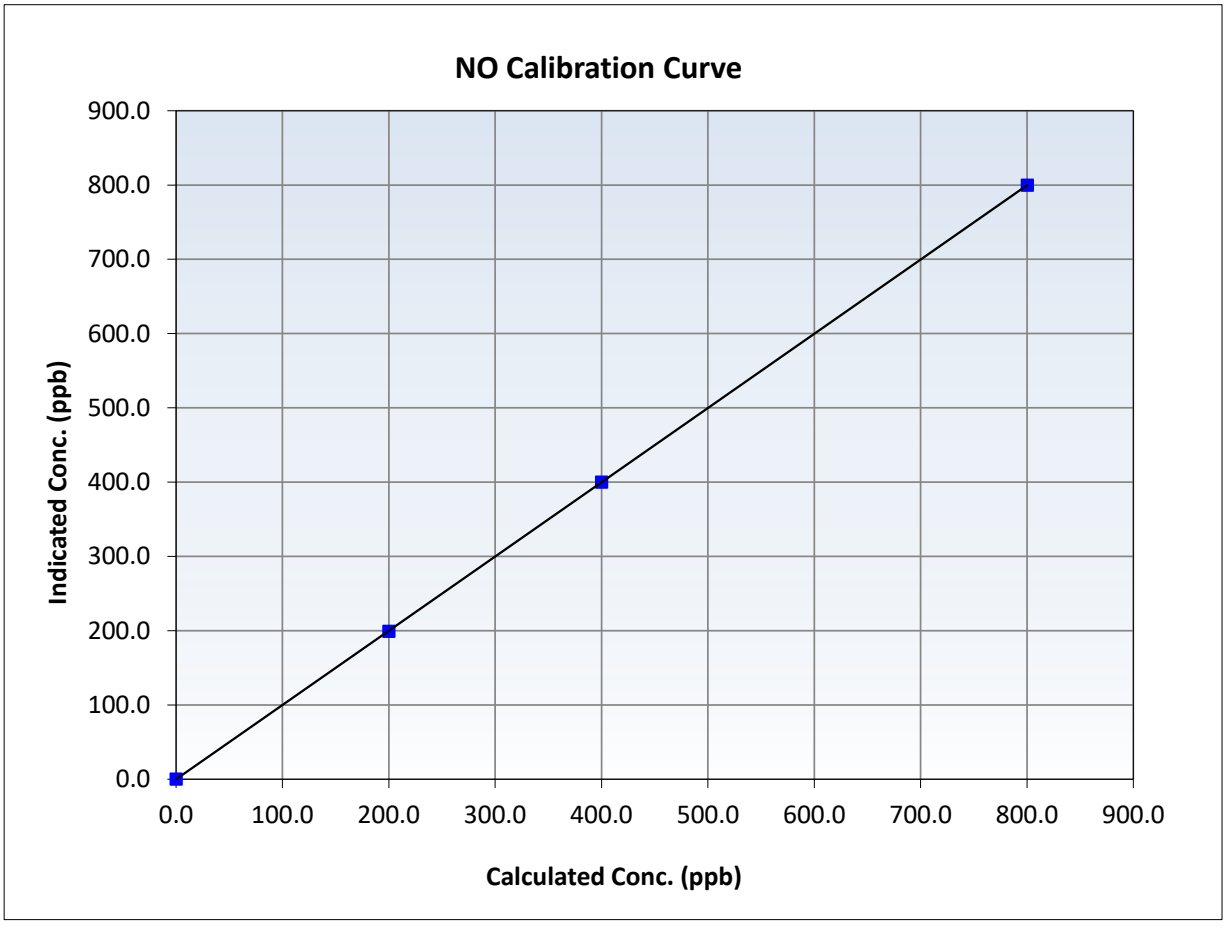
Station Information

Calibration Date:	May 27, 2024	Previous Calibration:	April 16, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:55	End Time (MST):	14:34
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

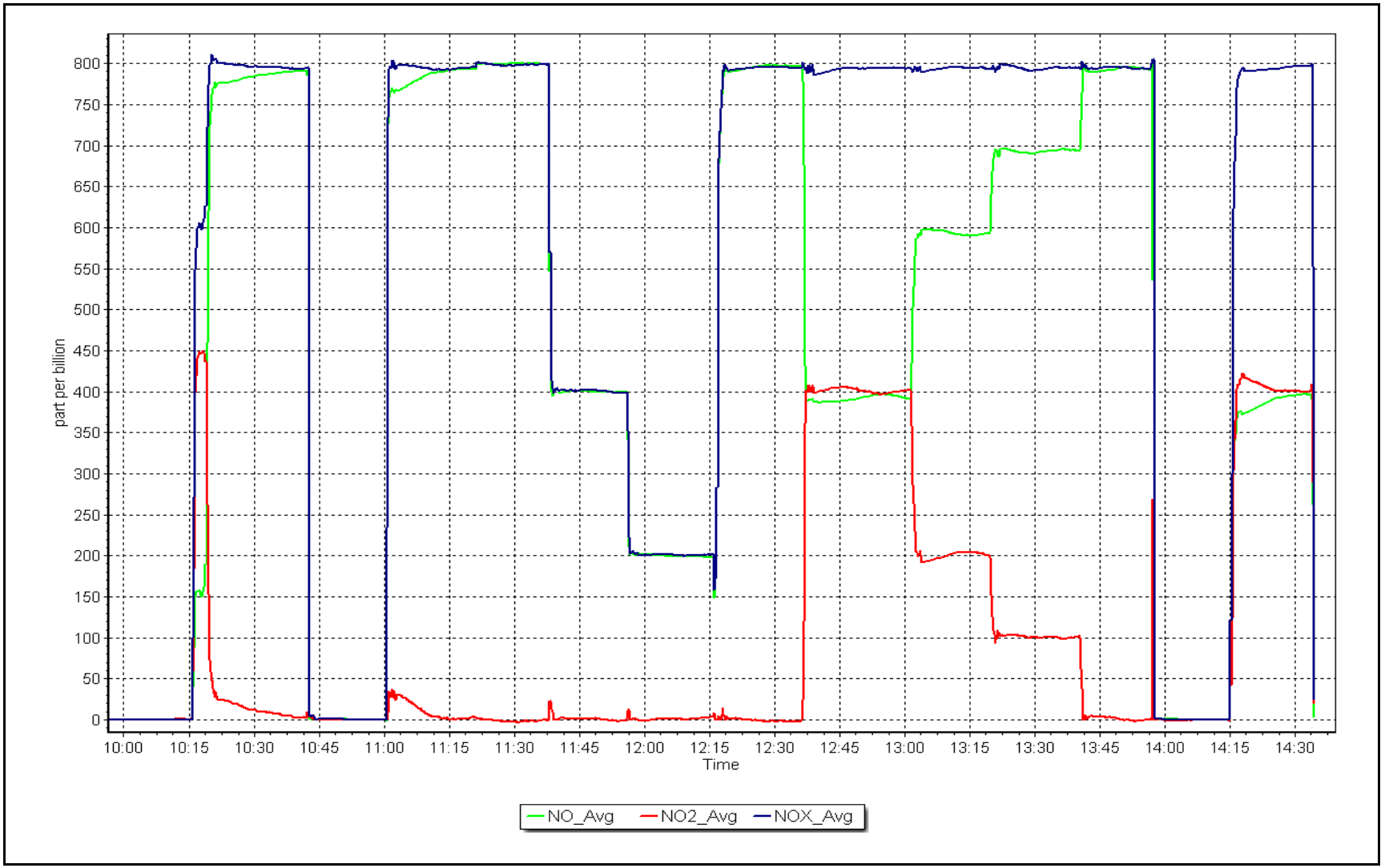
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
800.3	800.0	1.0004
400.1	400.0	1.0002
200.1	199.3	1.0038

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	0.999503	*0.90 - 1.10*
Intercept	-0.016008	*+/-20*



NO_X Calibration Plot Date: May 27, 2024 Location: Janvier



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	May 17, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	9:49	End time (MST):	12:35
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		

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.003571	1.011571	Backgd or Offset:	2.2	2.2
Calibration intercept:	0.300000	0.000000	Coeff or Slope:	1.027	1.027

O_3 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)) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	-1.3	----
As found High point	5000	916.2	400.0	404.5	0.986
As found Mid point					
As found Low point					
Baseline Corr As found:	405.8	Previous response	401.7	*% 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	

O_3 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) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.1	----
High point	5000	916.2	400.0	404.7	0.988
Mid point	5000	763.7	200.0	202.2	0.989
Low point	5000	656.1	100.0	101.1	0.989
As left zero	5000	800.0	0.0	0.5	----
As left span	5000	916.2	400.0	404.2	0.990
				Average Correction Factor	0.989

Notes: Calibrating remotely. No adjustments made.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

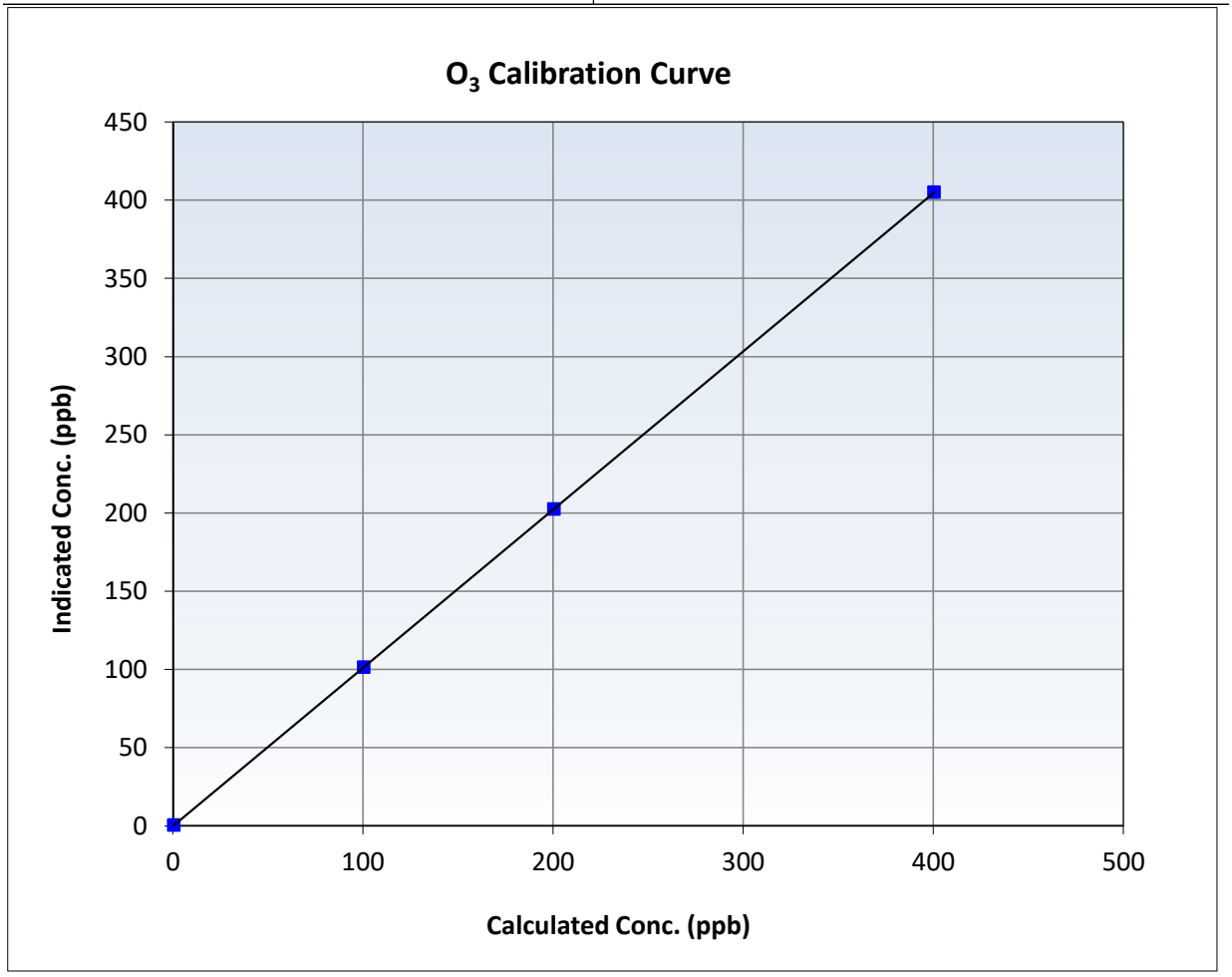
O_3 Calibration Summary

Station Information

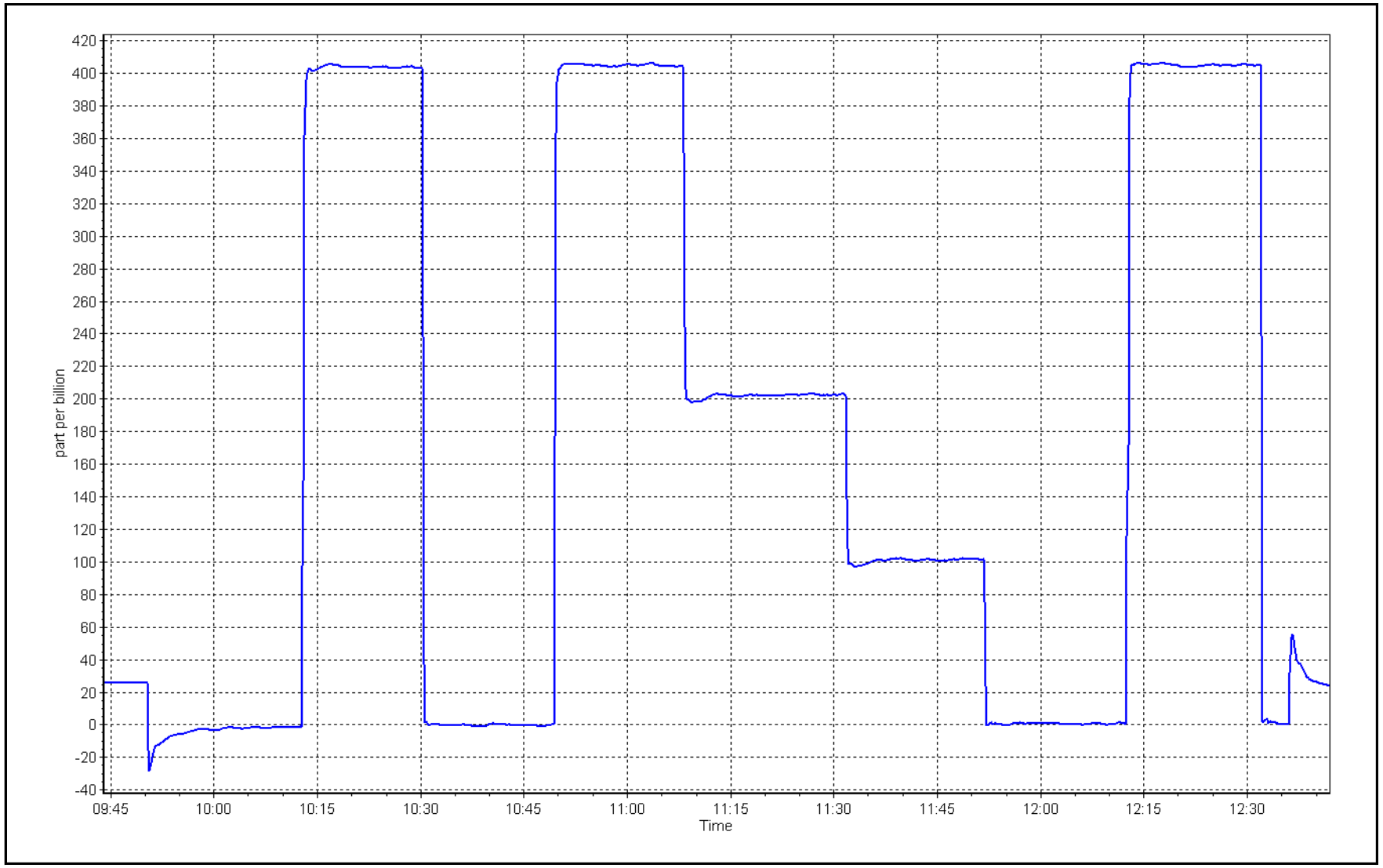
Calibration Date:	May 17, 2024	Previous Calibration:	April 15, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:49	End Time (MST):	12:35
Analyzer make:	Teledyne API T400	Analyzer serial #:	7046

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	1.000000	*≥0.995*
400.0	404.7	0.9884	Slope	1.011571	*0.90 - 1.10*
200.0	202.2	0.9891			
100.0	101.1	0.9891	Intercept	0.000000	*+/- 5*



O_3 Calibration Plot Date: May 17, 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:	May 27, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	11:48	End time (MST):	12:17
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)	20.1	19.43	20.1	☐	+/- 2 °C
P (mmHg)	717.5	718.4	717.5	☐	+/- 10 mmHg
Flow (LPM)	5.04	5.042	5.04	☐	+/- 0.25 LPM
PW% (pump)	35	-----	35	☐	>80%

Zero Verification — PM w/o HEPA: 3.8 — 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: April 18, 2024

Date Disposable Filter Changed: April 18, 2024

Post- maintenance Zero Verification: PM w/ HEPA: _____ <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
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	May 21, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	8:50	End time (MST):	12:16
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009318	1.000622	Backgd or Offset:	18.6	18.4
Calibration intercept:	-1.305054	-1.263478	Coeff or Slope:	1.063	1.046

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.5	----
As found High point	4920	80.3	799.1	813.0	0.982
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	813.5	Previous response	805.2	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	4920	80.3	799.1	798.8	1.000
Mid point	4960	40.2	400.1	398.5	1.004
Low point	4980	20.1	200.0	198.1	1.010
As left zero	5000	0.0	0.0	-0.3	----
As left span	4920	80.3	799.1	800.9	0.998
				Average Correction Factor:	1.005

Notes: Span adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

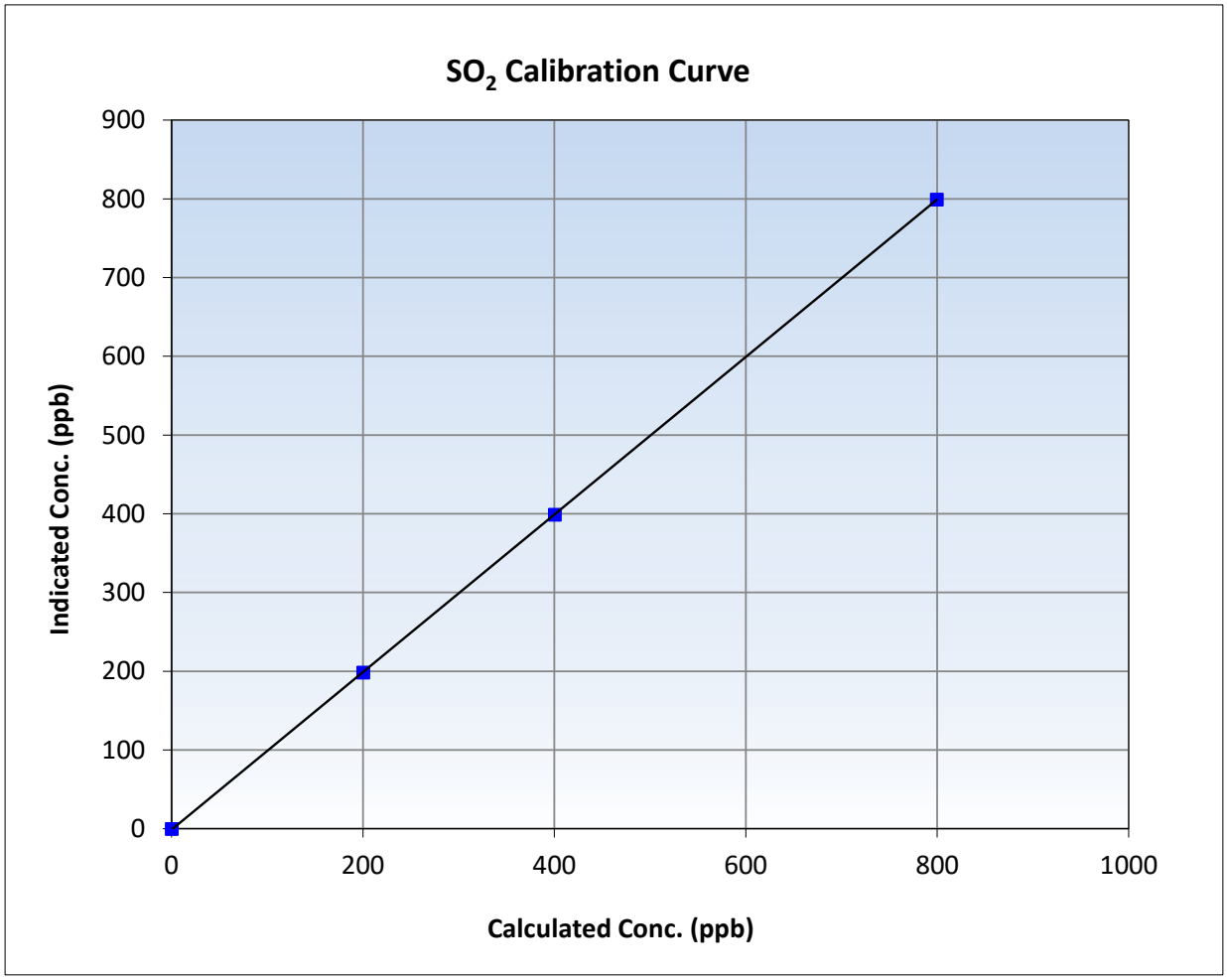
Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:50	End Time (MST):	12:16
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012

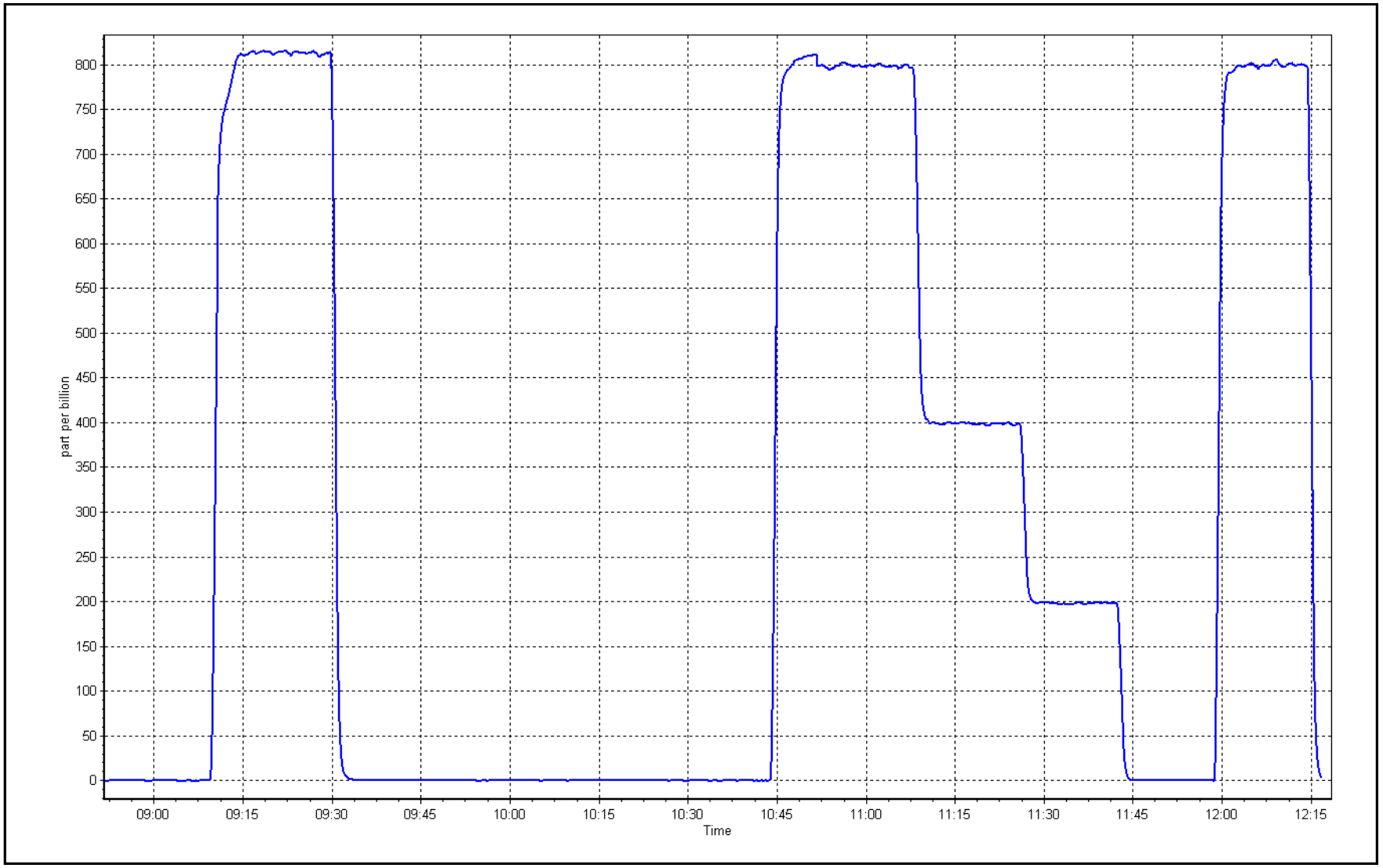
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
799.1	798.8	1.0004
400.1	398.5	1.0039
200.0	198.1	1.0097

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.000622	*0.90 - 1.10*
Intercept	-1.263478	*+/-30*



SO2 Calibration Plot Date: May 21, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	May 1, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	7:05	End time (MST):	11:03
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.20	ppm	Cal Gas Exp Date:	February 5, 2024
Cal Gas Cylinder #:	CC517372			
Removed Cal Gas Conc:	5.20	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	451
ZAG Make/Model:	API T701		Serial Number:	5611

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1300156232
Converter make:	CDN-101		Converter serial #:	594
Analyzer Range	0 - 100 ppb		Converter Temp:	750 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.008213	1.009197	Backgd or Offset:	2.1	2.1
Calibration intercept:	0.074071	0.082105	Coeff or Slope:	1.190	1.190

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4923	77.0	80.1	79.2	1.010
As found Mid point	4962	38.5	40.0	39.5	1.011
As found Low point	4981	19.2	20.0	19.6	1.014
New cylinder response					

Baseline Corr As found:	79.3	Prev response:	80.81	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.990506	AF Intercept:	-0.138309
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999999	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4923	77.0	80.1	80.9	0.990
Mid point	4962	38.5	40.0	40.5	0.989
Low point	4981	19.2	20.0	20.2	0.988
As left zero	5000	0.0	0.0	0.0	----
As left span	4923	77.0	80.1	83.8	0.956
SO2 Scrubber Check	4920	80.3	803.0	-0.1	----

Date of last scrubber change:				Ave Corr Factor	0.989
Date of last converter efficiency test:		March 13, 2024		102.7%	efficiency

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

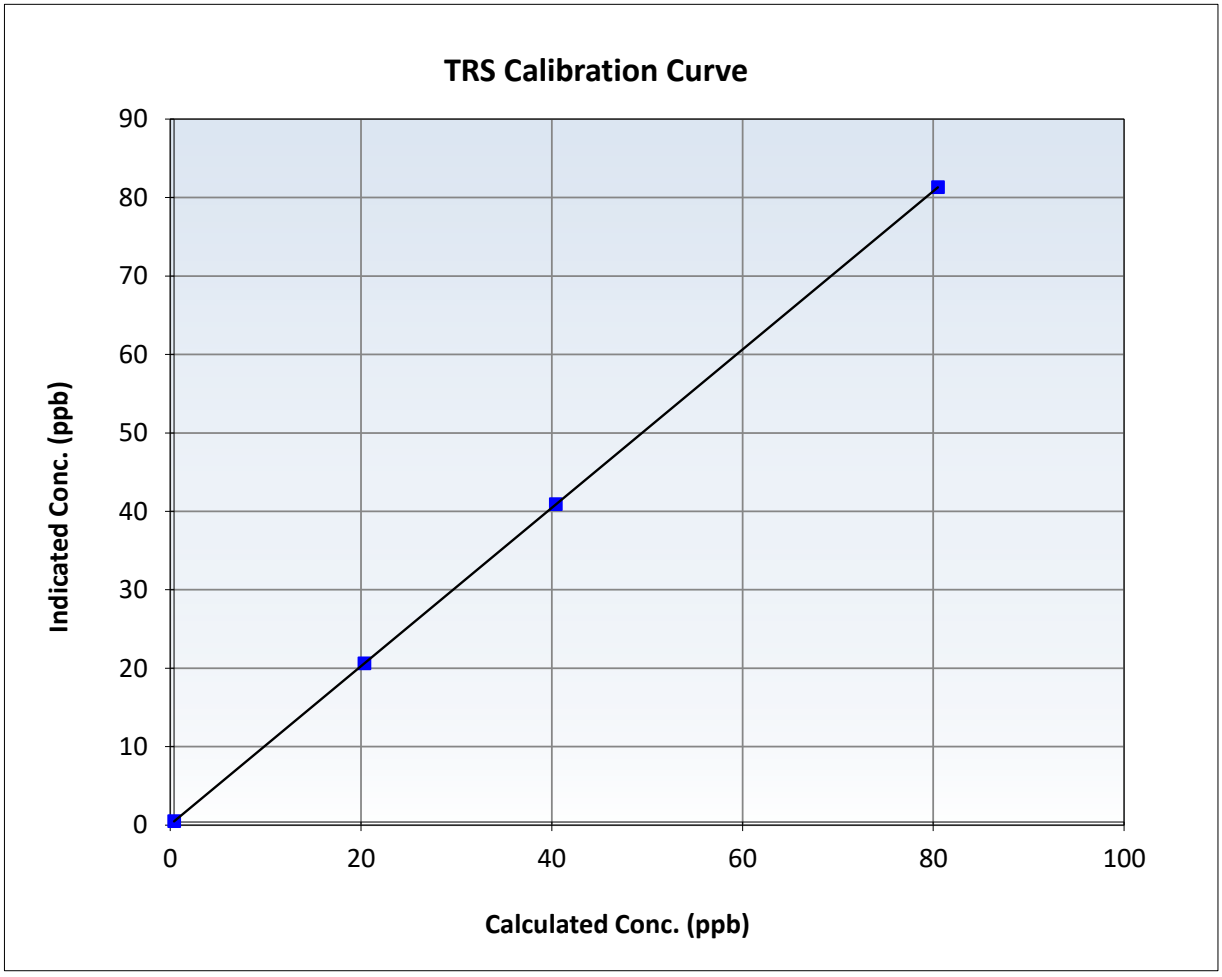
TRS Calibration Summary

Station Information

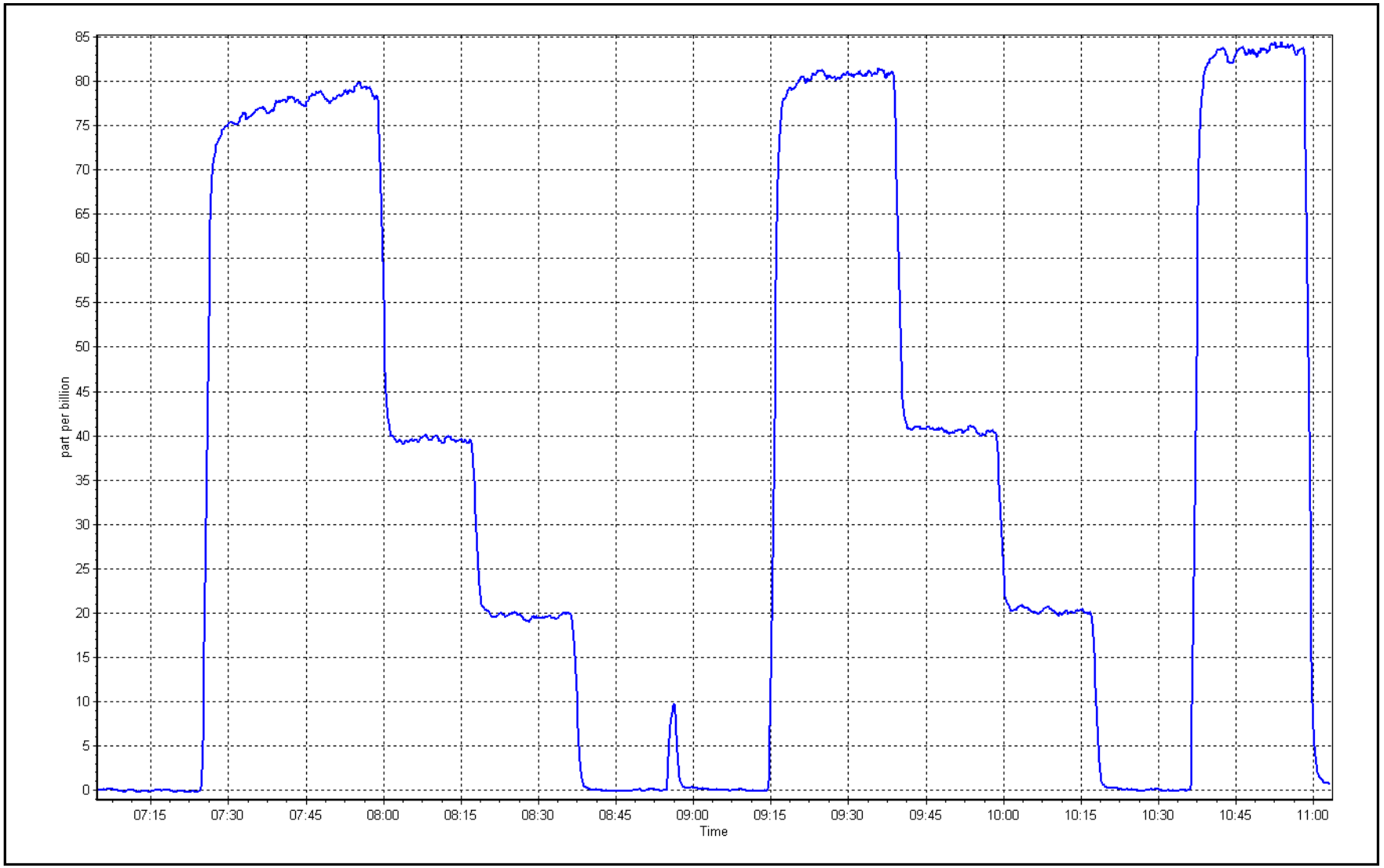
Calibration Date:	May 1, 2024	Previous Calibration:	April 12, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:05	End Time (MST):	11:03
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	1.000000	*≥0.995*
80.1	80.9	0.9899	Slope	1.009197	*0.90 - 1.10*
40.0	40.5	0.9885			
20.0	20.2	0.9885	Intercept	0.082105	*+/-3*



TRS Calibration Plot Date: May 1, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	May 21, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	8:50	End time (MST):	12:16
Reason:	Routine		

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 (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	Analyzer serial #:	1193585648
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.33E-04	2.35E-04	NMHC SP Ratio:	5.01E-05	5.11E-05
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	182937	179091
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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	16.93	1.015
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.93	Prev response	17.21	*% change	-1.7%
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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.23	0.998
Mid point	4960	40.2	8.61	8.64	0.996
Low point	4980	20.1	4.30	4.33	0.994
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.21	0.999
				Average Correction Factor	0.996

Notes: Span adjusted. Had trouble getting the NM zero back down to 0.00pm on calibrator zero. Changed filter holder and filter.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.16	8.97	1.021
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.97	Prev response	9.18	*% change	-2.3%
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	9.19	0.997
Mid point	4960	40.2	4.59	4.65	0.987
Low point	4980	20.1	2.29	2.37	0.968
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	0.984

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.03	7.96	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.96	Prev response	8.04	*% change	-1.0%
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	8.05	0.998
Mid point	4960	40.2	4.02	4.00	1.007
Low point	4980	20.1	2.01	1.96	1.026
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.02	1.002
				Average Correction Factor	1.010

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000451	1.002212
THC Cal Offset:	0.012003	0.008001
CH4 Cal Slope:	1.004637	1.003614
CH4 Cal Offset:	-0.032039	-0.028442
NMHC Cal Slope:	0.997117	1.001457
NMHC Cal Offset:	0.043442	0.036042

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

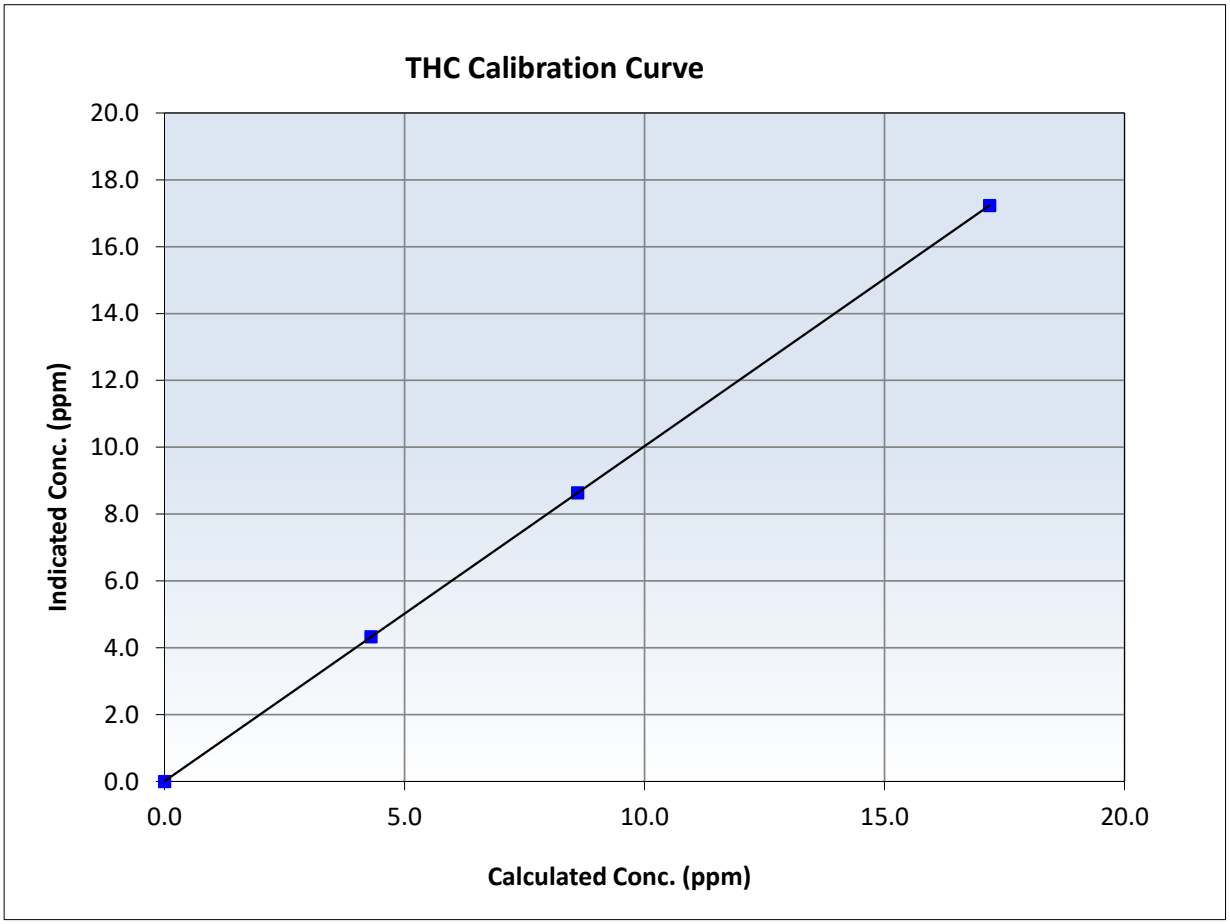
THC Calibration Summary

Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:50	End Time (MST):	12:16
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
17.19	17.23	0.9976	Slope	1.002212	0.90 - 1.10
8.61	8.64	0.9964	Intercept	0.008001	+/-0.5
4.30	4.33	0.9941			



Wood Buffalo Environmental Association

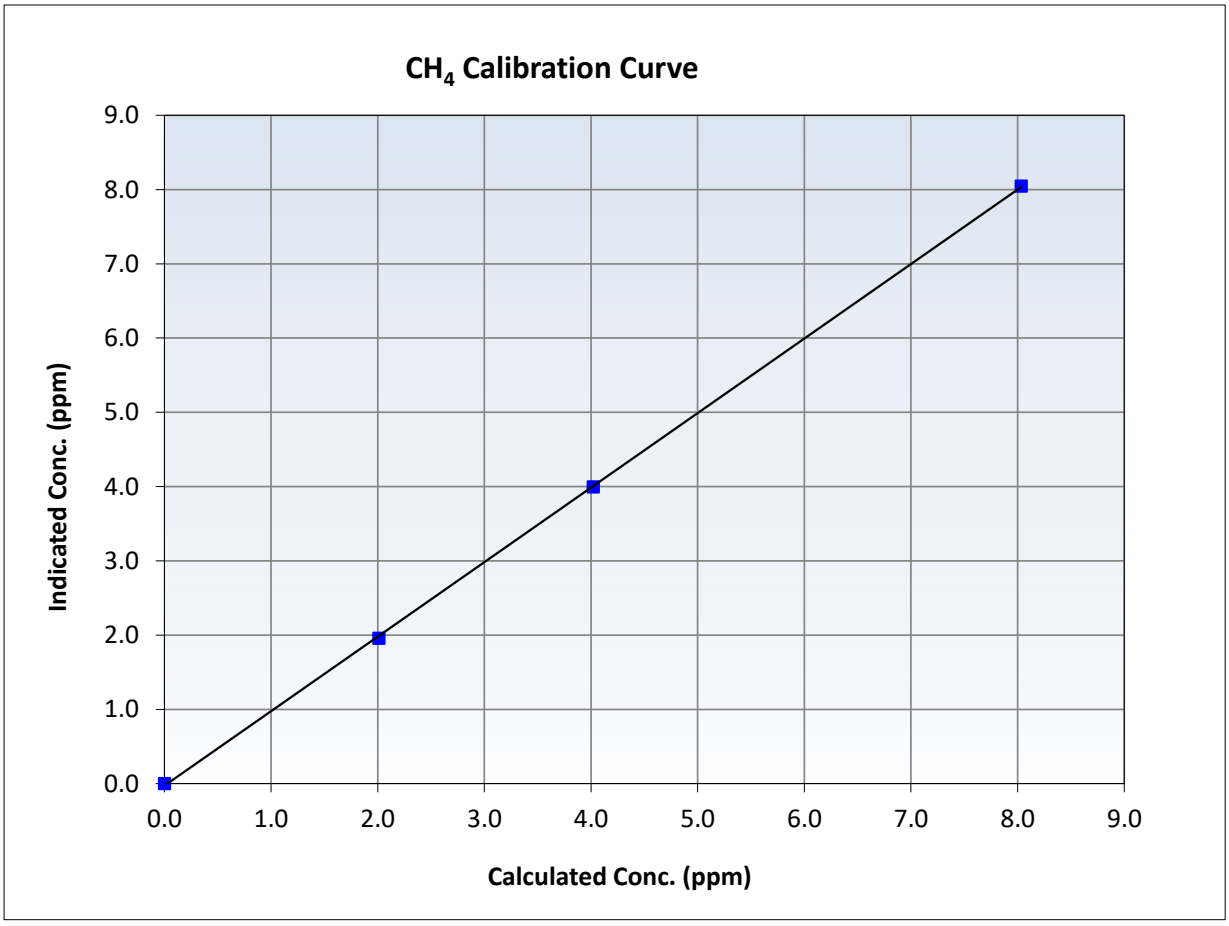
CH_4 Calibration Summary

Station Information

Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:50	End Time (MST):	12:16
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999943	≥0.995
8.03	8.05	0.9982	Slope	1.003614	0.90 - 1.10
4.02	4.00	1.0066			
2.01	1.96	1.0259	Intercept	-0.028442	+/-0.5



Wood Buffalo Environmental Association

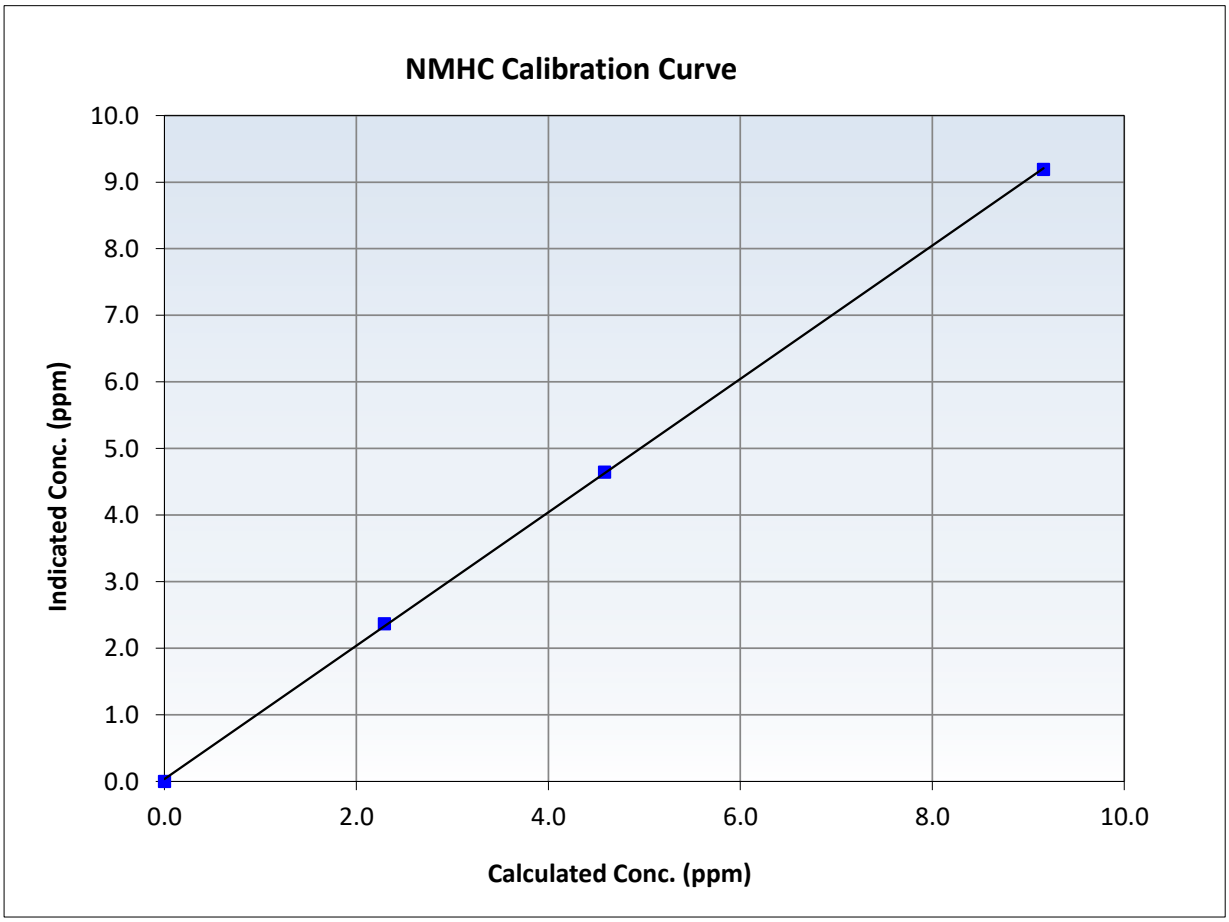
NMHC Calibration Summary

Station Information

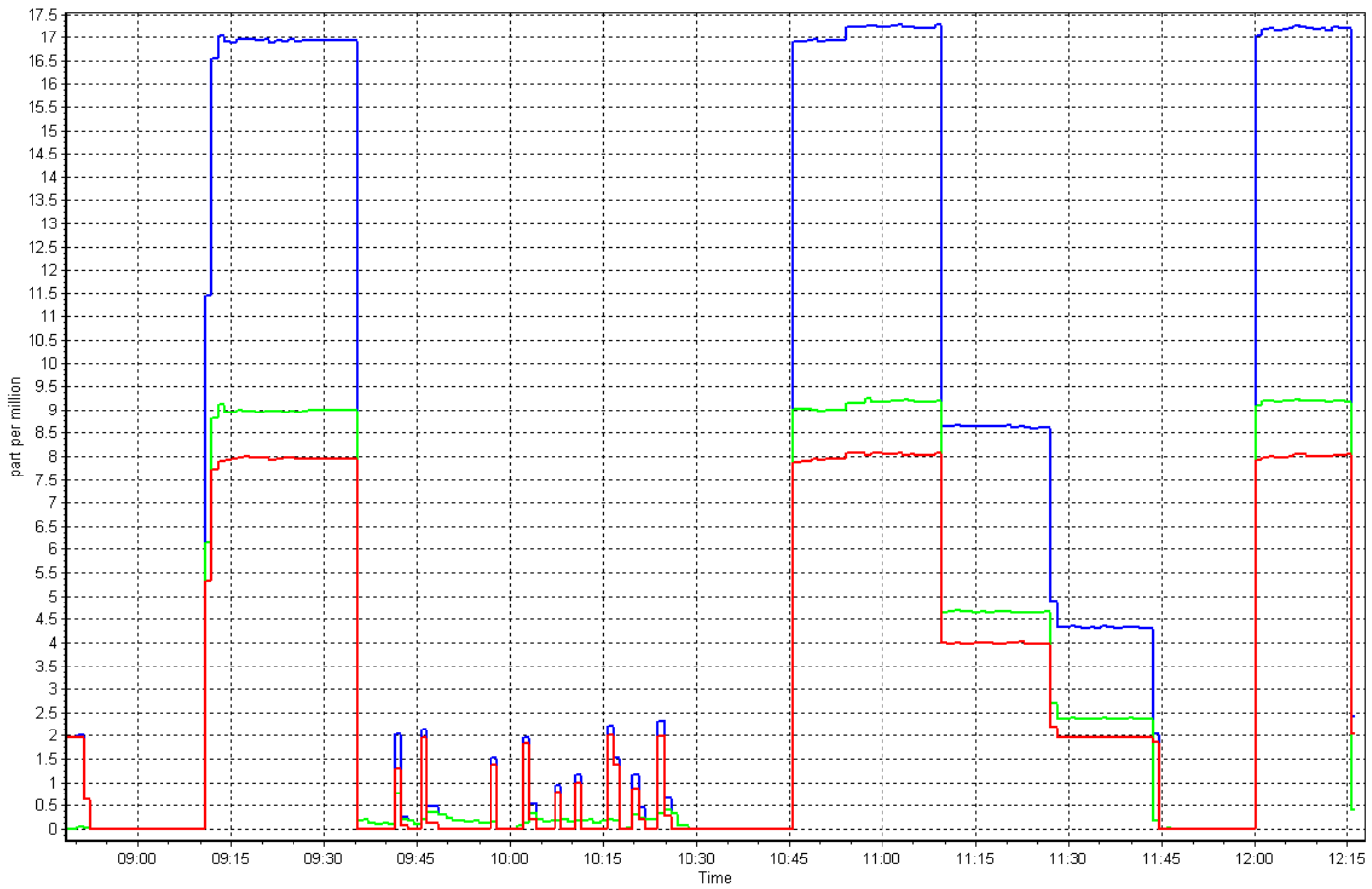
Calibration Date:	May 21, 2024	Previous Calibration:	April 11, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:50	End Time (MST):	12:16
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999929	*≥0.995*
9.16	9.19	0.9965	Slope	1.001457	*0.90 - 1.10*
4.59	4.65	0.9872	Intercept	0.036042	*+/-0.5*
2.29	2.37	0.9678			



NMHC Calibration Plot Date: May 21, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort Hills
Station number:	AMS 23
Calibration Date:	May 22, 2024
Last Cal Date:	April 4, 2024
Start time (MST):	6:50
End time (MST):	11:08
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC358149	Cal Gas Expiry Date:	January 5, 1932
NOX Cal Gas Conc:	60.30 ppm	NO Cal Gas Conc:	60.10 ppm
Removed Cylinder #:		Removed Gas Exp Date:	
Removed Gas NOX Conc:	60.30 ppm	Removed Gas NO Conc:	60.10 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	451
ZAG make/model:	API T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
AF High point	4934	66.3	799.5	796.9	2.7	796.3	789.3	7.1	1.0039	1.0096
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	800.0 ppb	NO =	796.5 ppb			
Baseline Corr 1st pt	NO_X =	796.4 ppb	NO =	789.3 ppb			
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb			
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb			

* = > +/-5% change initiates investigation

*Percent Change	NO_X =	-0.4%	
*Percent Change	NO =	-0.9%	

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1152430007

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.169	1.181	NO bkgnd or offset:	3.2	3.2
NOX coeff or slope:	0.995	0.991	NOX bkgnd or offset:	3.4	3.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	177.7	177.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000499	0.999098
NO_X Cal Offset:	0.045790	-0.213753
NO Cal Slope:	1.001459	1.003237
NO Cal Offset:	-1.552494	-1.772812
NO_2 Cal Slope:	1.003459	0.998852
NO_2 Cal Offset:	-1.071483	-0.832061

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
High point	4934	66.3	799.5	796.9	2.7	798.6	798.6	0.0	1.0012	0.9978
Mid point	4967	33.2	400.4	399.0	1.3	400.0	397.7	2.3	1.0009	1.0034
Low point	4983	16.6	200.2	199.5	0.7	199.4	196.5	2.9	1.0041	1.0155
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	----	----
As left span	4934	66.3	799.5	390.9	408.6	801.4	390.9	410.5	0.9977	1.0000
								Average Correction Factor	1.0021	1.0056

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	795.6	389.5	408.8	407.8	1.0023	99.8%
Mid GPT point	795.6	592.0	206.3	204.9	1.0066	99.3%
Low GPT point	795.6	692.5	105.8	104.0	1.0168	98.3%
				Average Correction Factor	1.0086	99.2%

Notes: Span adjusted. No Maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

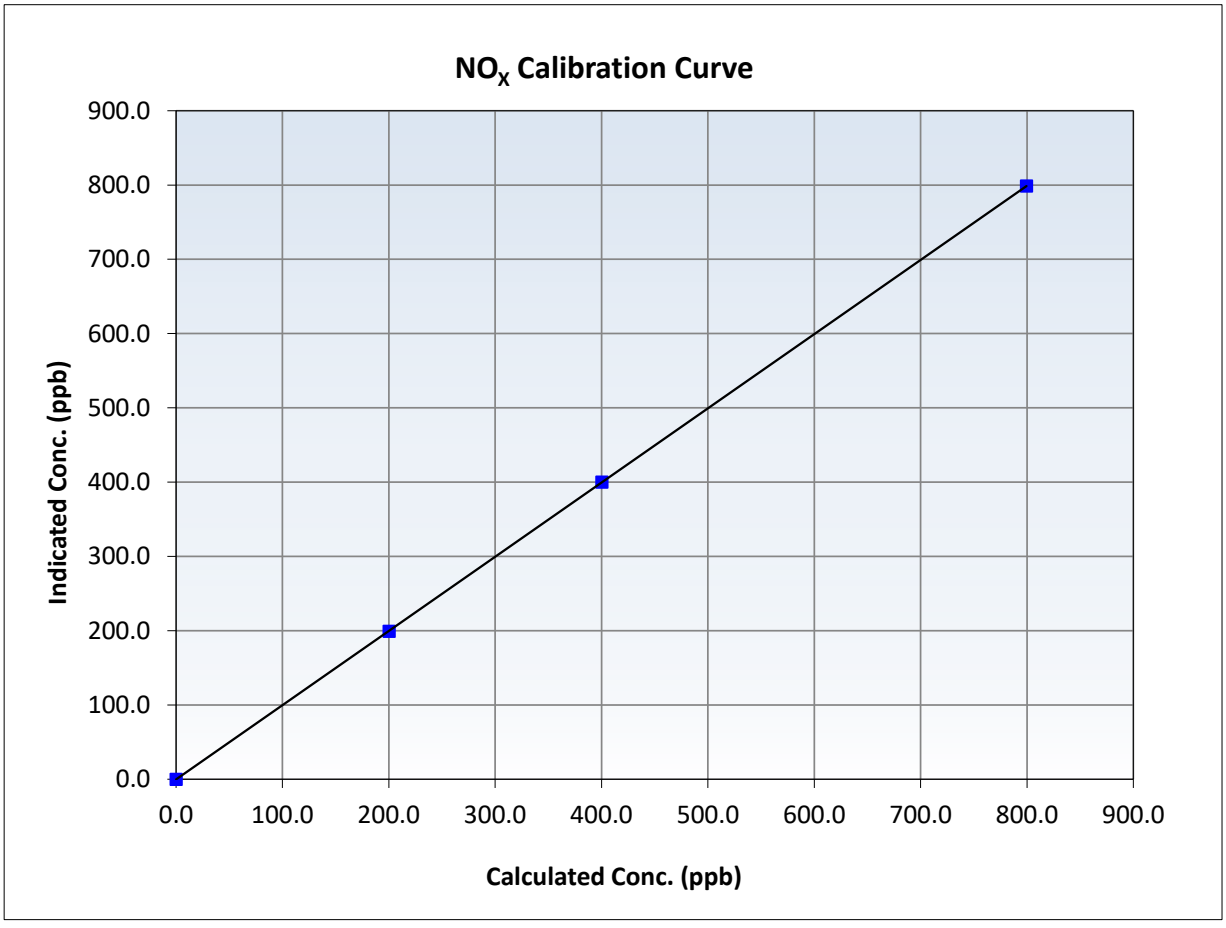
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:50	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)
0.0	0.0	----
799.5	798.6	1.0012
400.4	400.0	1.0009
200.2	199.4	1.0041

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.999098	*0.90 - 1.10*
Intercept	-0.213753	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

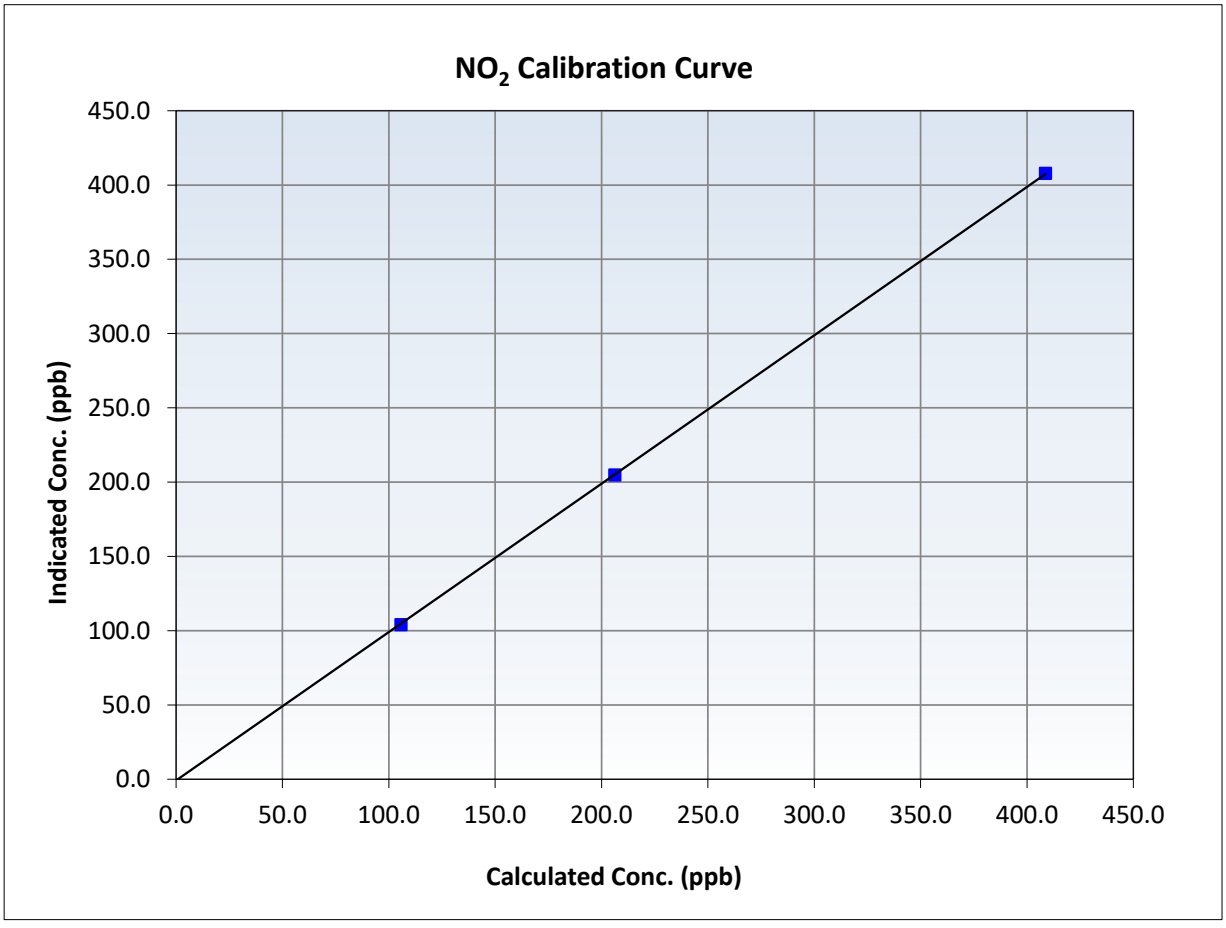
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:50	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)
0.0	-0.1	----
408.8	407.8	1.0023
206.3	204.9	1.0066
105.8	104.0	1.0168

Statistical Evaluation		Limits
Correlation Coefficient	0.999985	≥0.995
Slope	0.998852	0.90 - 1.10
Intercept	-0.832061	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

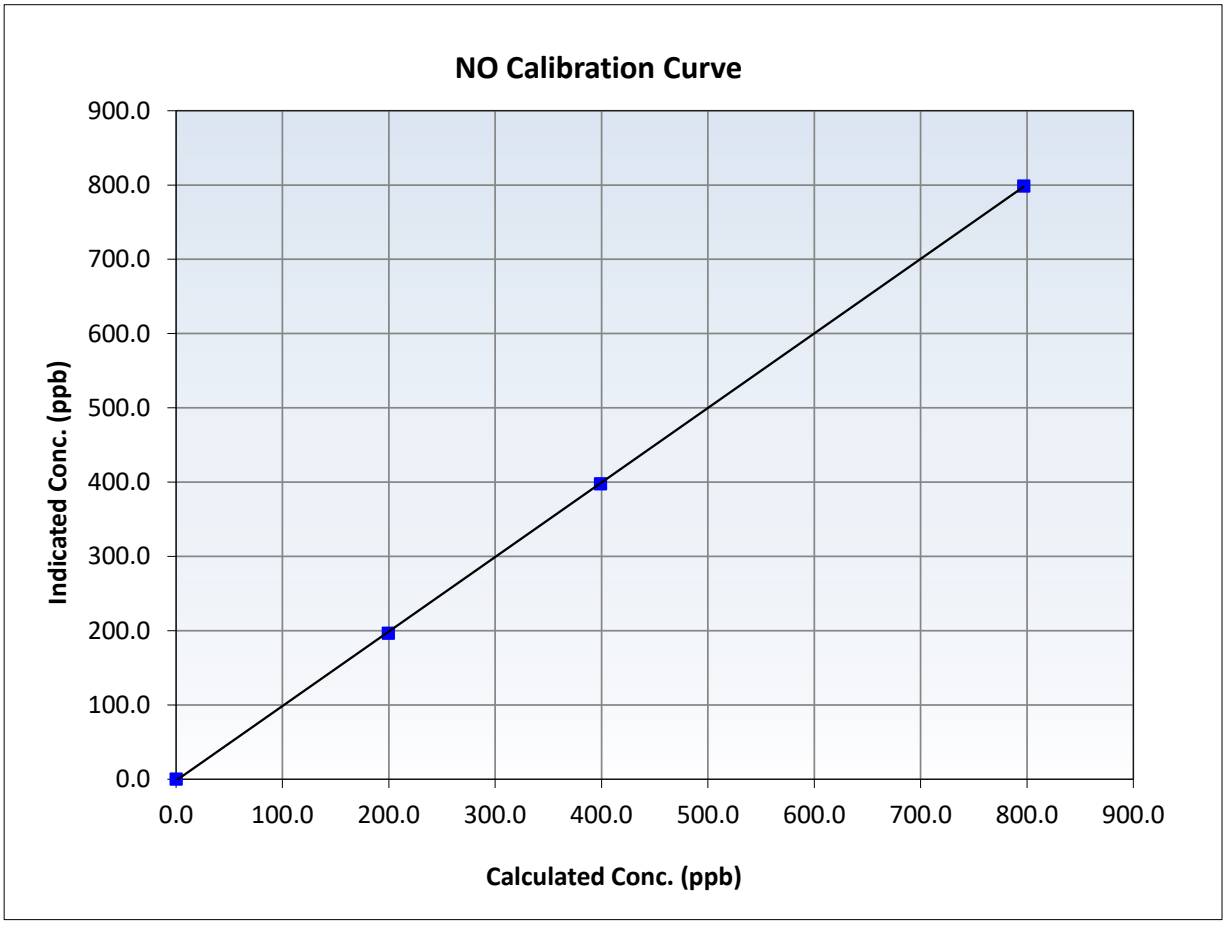
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 4, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:50	End Time (MST):	11:08
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

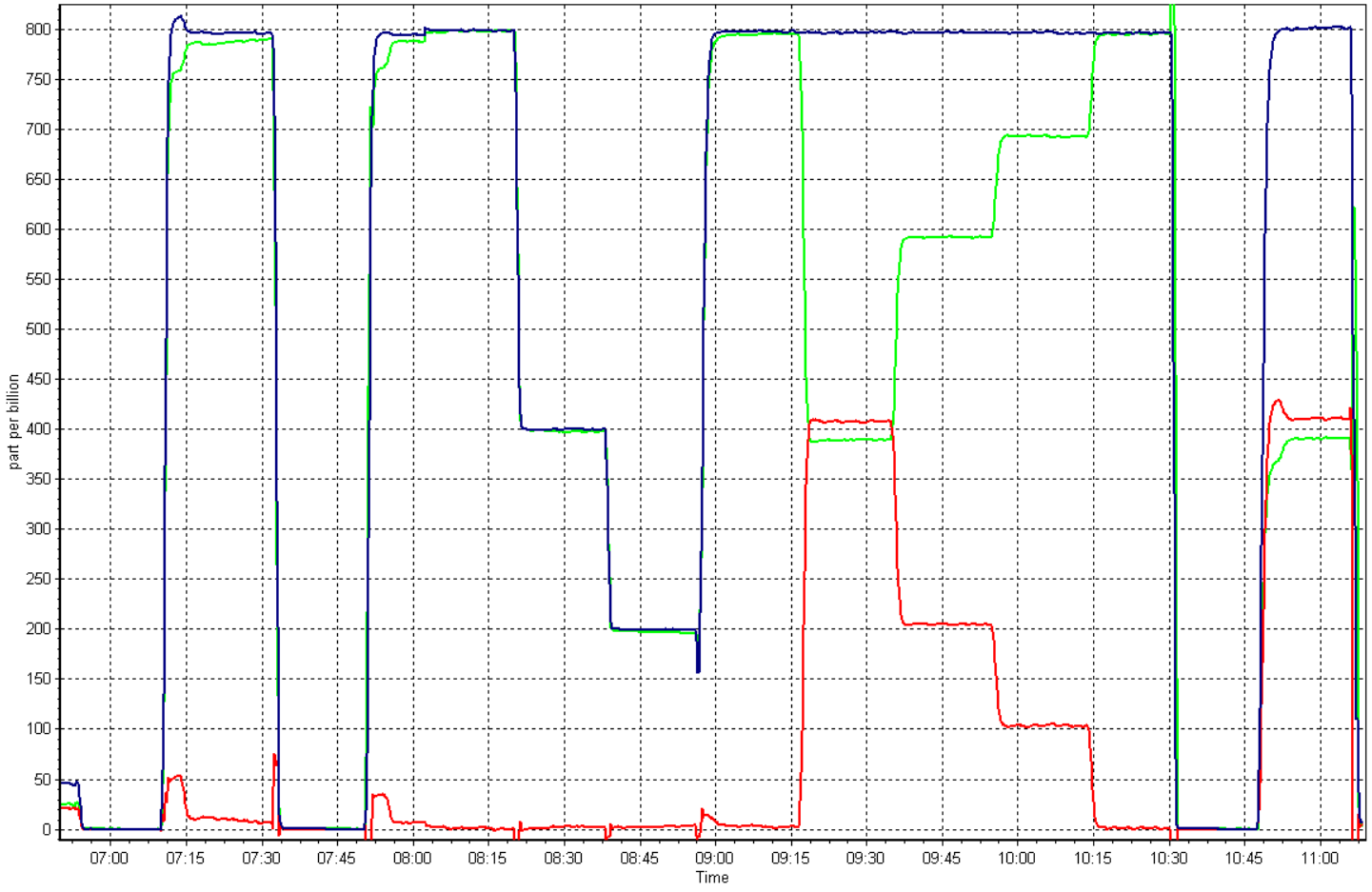
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
796.9	798.6	0.9978
399.0	397.7	1.0034
199.5	196.5	1.0155

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	1.003237	*0.90 - 1.10*
Intercept	-1.772812	*+/-20*



NO_X Calibration Plot Date: May 22, 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:	May 21, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	7:52	End time (MST):	8:47
Analyzer Make:	API T640	S/N:	1546
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388753
Temp/RH standard:	Alicat FP-25BT	S/N:	388753

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	7.9	8.32	7.9	☐	+/- 2 °C
P (mmHg)	734.1	733.1	734.1	☐	+/- 10 mmHg
Flow (LPM)	5.01	4.67	5.02	☑	+/- 0.25 LPM
PW% (pump)	40	-----	42	☐	>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	10	11	11	☐	+/- 0.5

Date Optical Chamber Cleaned: May 21, 2024

Date Disposable Filter Changed: May 21, 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: Flow adjusted after cleaning. Flow after cleaning was 4.78LPM. Leak check passed before and after cleaning. Sample Temp and Sample RH Warning.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25
WASKŌW OHCI PIMÂTISIWIN
MAY 2024

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

June 28, 2024

CALS_474

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	May 29, 2024	Last Cal Date:	April 22, 2024
Start time (MST):	7:44	End time (MST):	10:45
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.70	ppm	Cal Gas Exp Date:	March 10, 2031
Cal Gas Cylinder #:	CC342445			
Removed Cal Gas Conc:	49.70	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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998541	1.002056	Backgd or Offset:	10.8	10.8
Calibration intercept:	-0.052708	-0.332206	Coeff or Slope:	1.048	1.048

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4920	80.5	800.1	820.7	0.974
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	821.1	Previous response	798.9	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	80.5	800.1	801.6	0.998
Mid point	4960	40.2	399.6	400.0	0.999
Low point	4980	20.1	199.8	199.2	1.003
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	80.5	800.1	803.5	0.996
				Average Correction Factor:	1.000

Notes: No maintenance done. Zero and span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

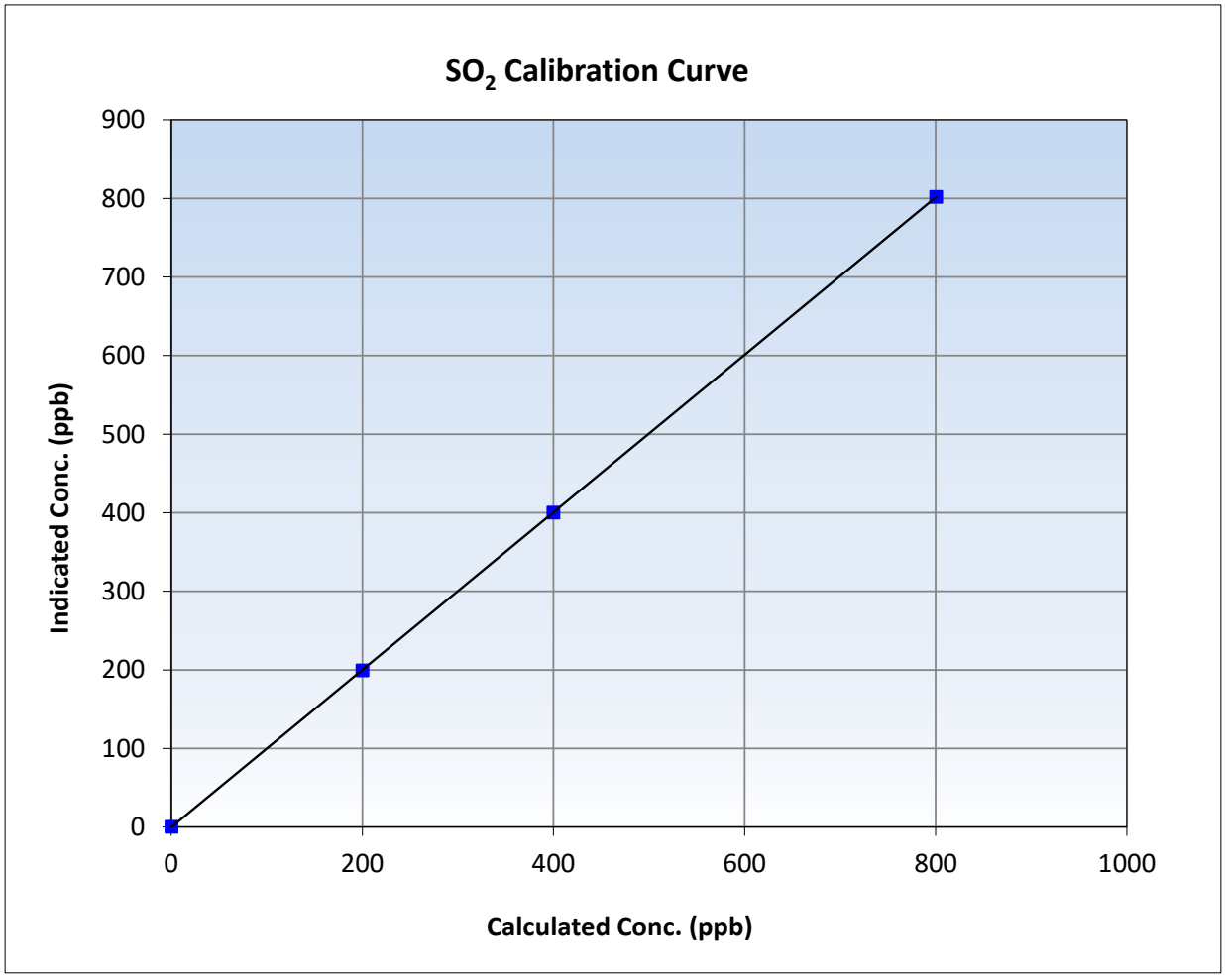
Station Information

Calibration Date:	May 29, 2024	Previous Calibration:	April 22, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	7:44	End Time (MST):	10:45
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

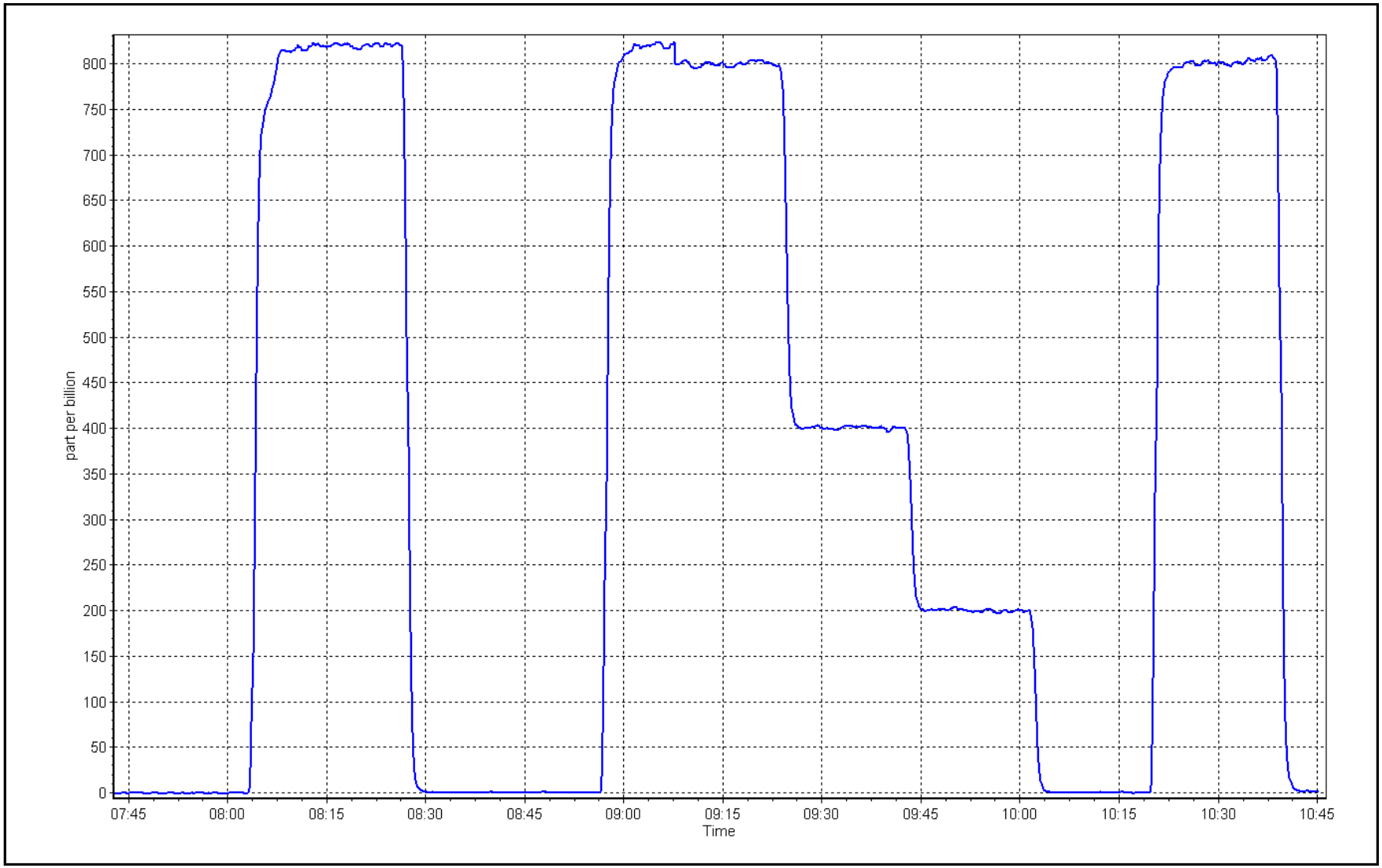
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.1	801.6	0.9981
399.6	400.0	0.9989
199.8	199.2	1.0030

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.002056	*0.90 - 1.10*
Intercept	-0.332206	*+/-30*



SO2 Calibration Plot Date: May 29, 2024 Location: Waskow ohci Pimatisiwin



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	May 28, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	6:50	End time (MST):	12:02
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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001868	1.004168	Backgd or Offset:	3.2	3.1
Calibration intercept:	0.120000	-0.060000	Coeff or Slope:	1.095	1.105

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.0	79.5	78.6	1.010
As found Mid point	4960	40.0	39.8	39.4	1.007
As found Low point	4980	20.0	19.9	19.7	1.004
New cylinder response					

Baseline Corr As found:	78.7	Prev response:	79.79	*% change:	-1.4%
Baseline Corr 2nd AF pt:	39.5	AF Slope:	0.989365	AF Intercept:	-0.020000
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999994	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.0	79.5	79.9	0.995
Mid point	4960	40.0	39.8	39.6	1.004
Low point	4980	20.0	19.9	20.0	0.994
As left zero	5000	0.0	0.0	0.3	----
As left span	4912	88.3	800.0	803.4	0.996
SO2 Scrubber Check	4921	79.2	800.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.998
Date of last converter efficiency test:					

Notes: SOx scrubber checked after the calibrator zero. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

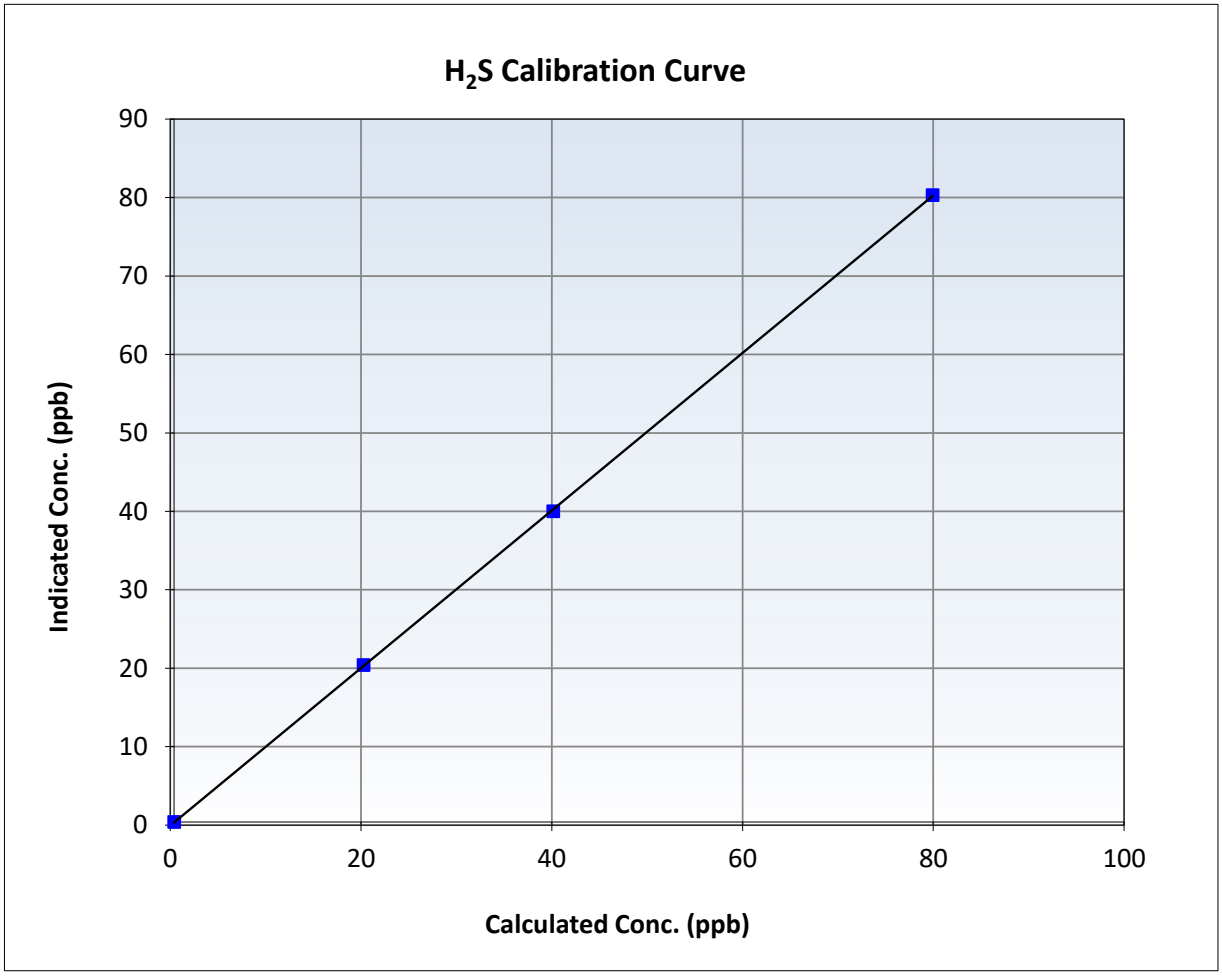
Station Information

Calibration Date:	May 28, 2024	Previous Calibration:	April 17, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	6:50	End Time (MST):	12:02
Analyzer make:	Global G-150	Analyzer serial #:	2022-219

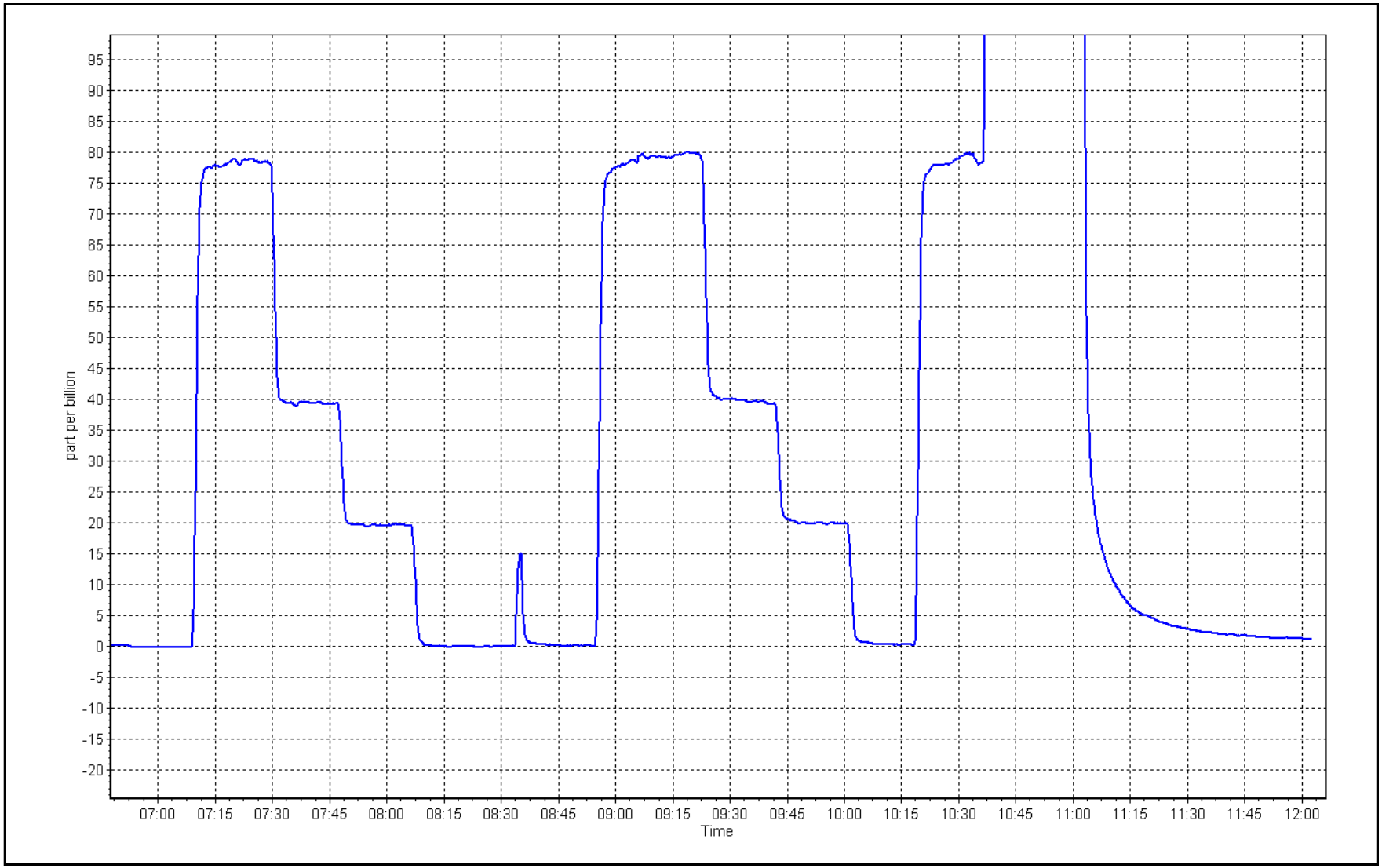
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
79.5	79.9	0.9952
39.8	39.6	1.0040
19.9	20.0	0.9940

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	1.004168	*0.90 - 1.10*
Intercept	-0.060000	*+/-3*



H_2S Calibration Plot Date: May 28, 2024 Location: Waskow ohci Pimatisiwin



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS26
CHRISTINA LAKE
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	May 15, 2024	Last Cal Date:	April 9, 2024
Start time (MST):	11:06	End time (MST):	1:18
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.56	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC362134			
Removed Cal Gas Conc:	49.56	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	281
Zero Air Gen Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1152430005	
Analyzer Range:	0- 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999449	1.012862	Backgd or Offset:	26.5	26.5
Calibration intercept:	0.556005	-1.543821	Coeff or Slope:	0.944	0.944

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4919	80.8	800.9	810.3	0.988
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	810.3	Previous response	801.0	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4919	80.8	800.9	810.3	0.988
Mid point	4960	40.4	400.4	403.7	0.992
Low point	4980	20.2	200.2	199.4	1.004
As left zero	5000	0.0	0.0	0.3	----
As left span	4919	80.8	800.9	810.4	0.988
				Average Correction Factor:	0.995

Notes: Remote calibrations. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

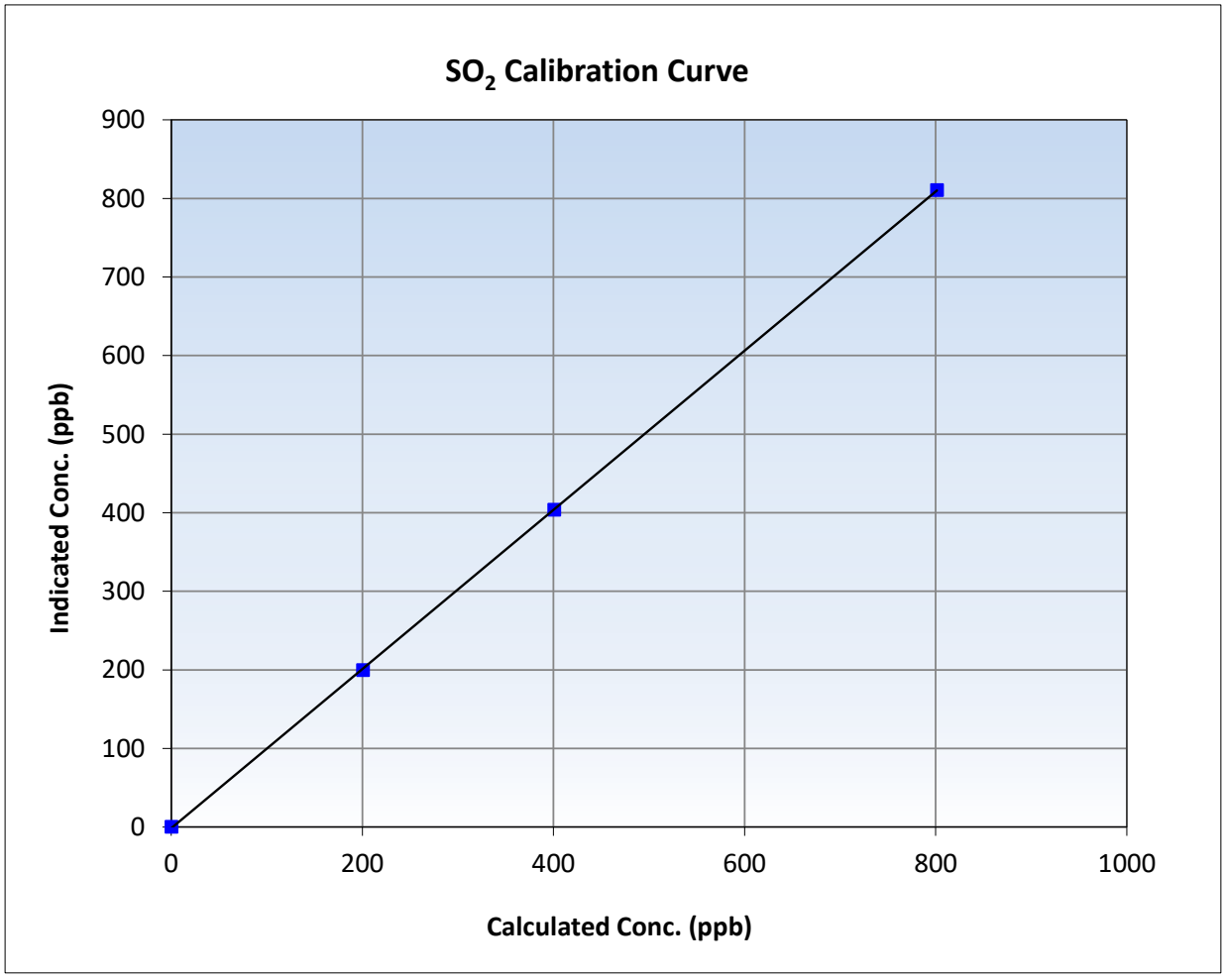
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 9, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	11:06	End Time (MST):	1:18
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430005

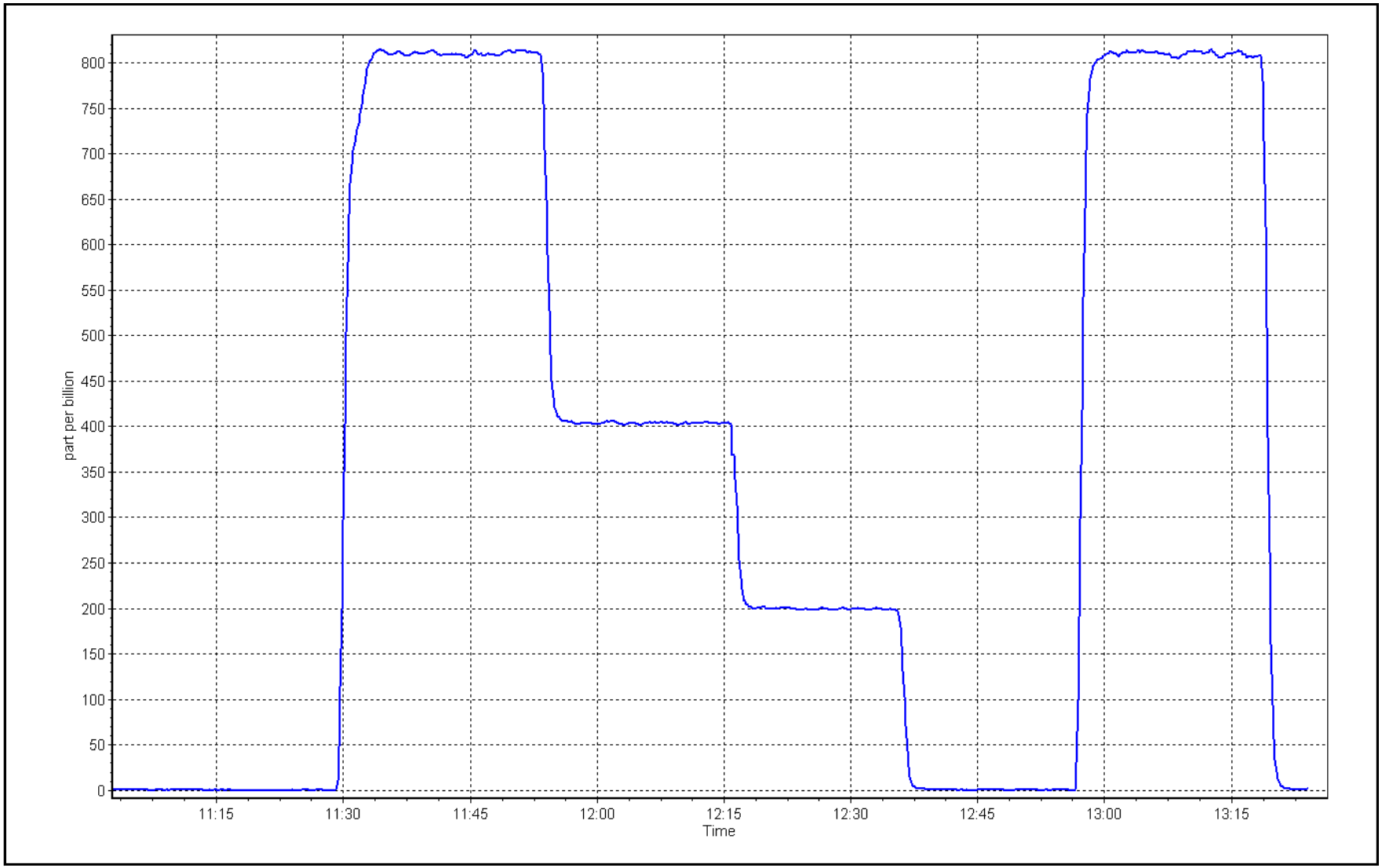
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.9	810.3	0.9884
400.4	403.7	0.9919
200.2	199.4	1.0041

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	1.012862	*0.90 - 1.10*
Intercept	-1.543821	*+/-30*



SO2 Calibration Plot Date: May 15, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	May 23, 2024	Last Cal Date:	April 11, 2024
Start time (MST):	9:40	End time (MST):	13:29
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.05	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0014831			
Removed Cal Gas Conc:	5.05	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	5258
ZAG Make/Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12333331547
Converter make:	Global 150		Converter serial #:	2022-196
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.004141	1.009856	Backgd or Offset:	1.5	1.3
Calibration intercept:	-0.141605	-0.241611	Coeff or Slope:	1.030	1.037

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4921	79.2	80.0	79.0	1.007
As found Mid point	4960	39.6	40.0	38.9	1.018
As found Low point	4980	19.8	20.0	19.0	1.031
New cylinder response					

Baseline Corr As found:	79.4	Prev response:	80.18	*% change:	-1.0%
Baseline Corr 2nd AF pt:	39.3	AF Slope:	0.993996	AF Intercept:	-0.661577
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999949	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4921	79.2	80.0	80.6	0.992
Mid point	4960	39.6	40.0	40.1	0.997
Low point	4980	19.8	20.0	19.8	1.010
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	81.0	0.988
SO2 Scrubber Check	4919	80.8	808.0	-0.1	----
Date of last scrubber change:		11-Apr-24		Ave Corr Factor	1.000
Date of last converter efficiency test:					

Notes: Changed sample inlet filters after multipoint as founds. Scrubber check done after calibrator zero and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

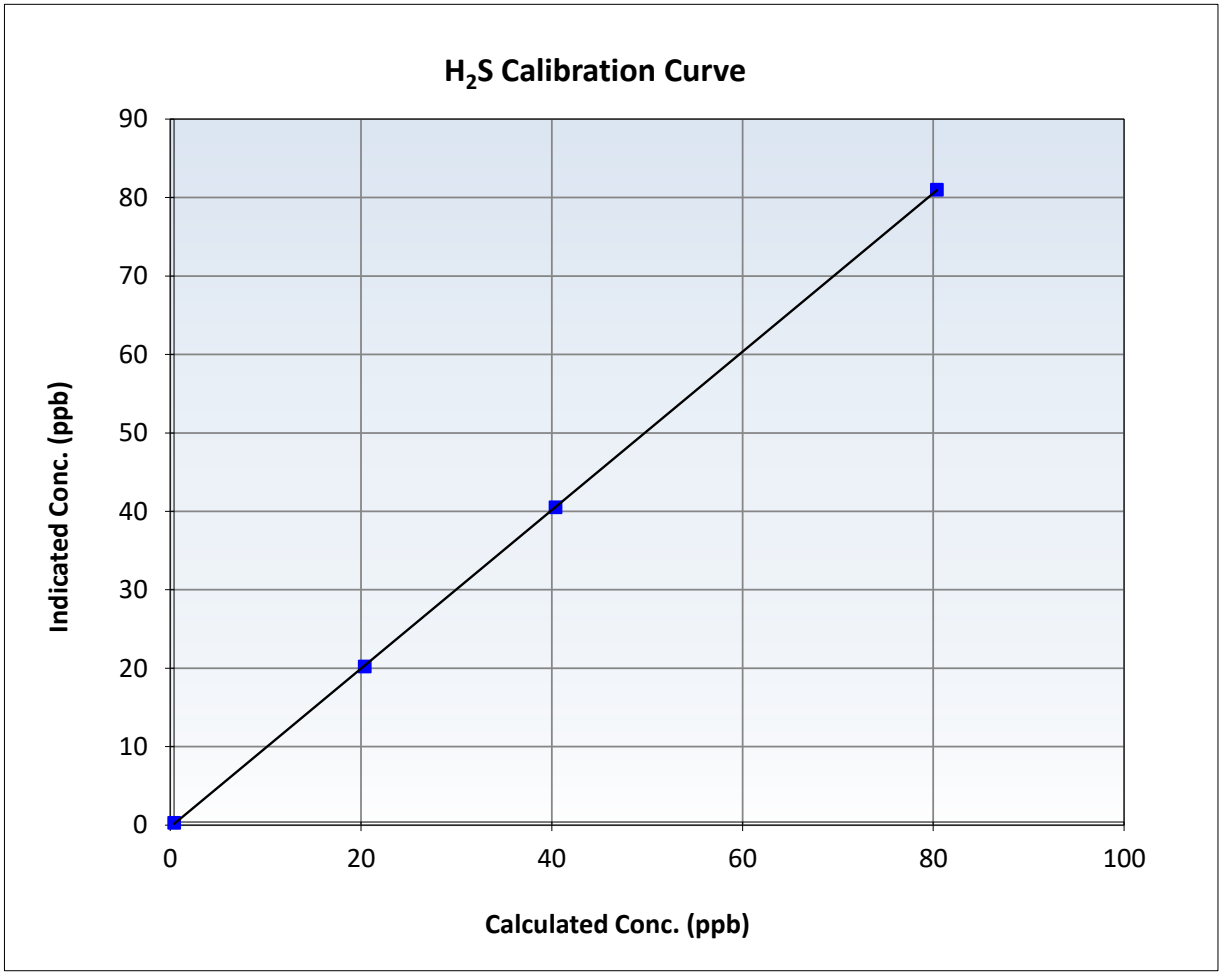
H2S Calibration Summary

Station Information

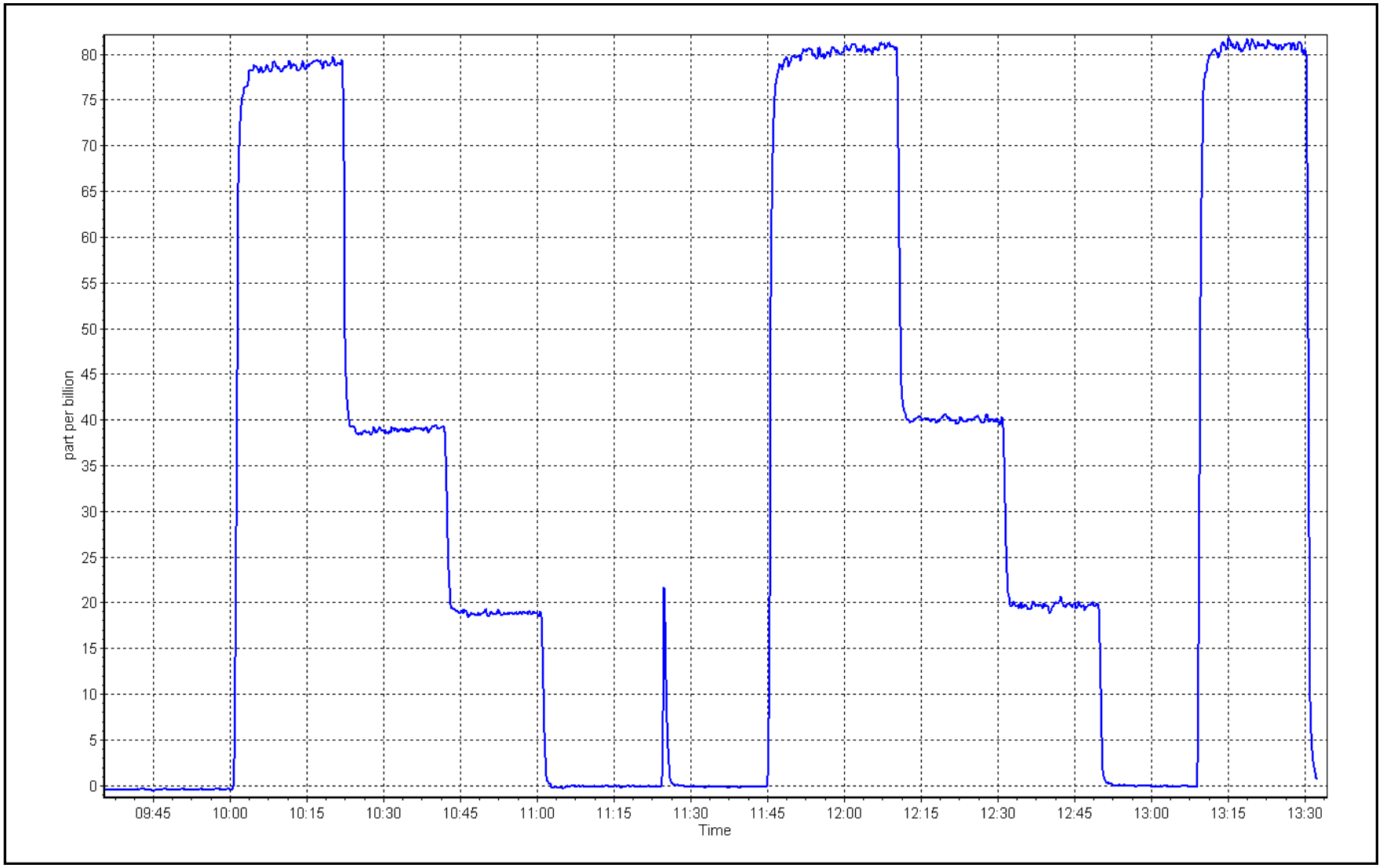
Calibration Date:	May 23, 2024	Previous Calibration:	April 11, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:40	End Time (MST):	13:29
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331547

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999986	*≥0.995*
80.0	80.6	0.9924	Slope	1.009856	*0.90 - 1.10*
40.0	40.1	0.9975			
20.0	19.8	1.0100	Intercept	-0.241611	*+/-3*



H2S Calibration Plot Date: May 23, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Christina Lake
Station number:	AMS 26
Calibration Date:	May 14, 2024
Last Cal Date:	April 23, 2024
Start time (MST):	9:28
End time (MST):	10:25
Reason:	As Found

Calibration Standards

NO Gas Cylinder #:	CC755290	Cal Gas Expiry Date:	January 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3253
ZAG make/model:	API T701H	Serial Number:	832

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1	----	----
AF High point	4918	82.1	802.9	799.6	3.3	819.9	812.6	7.1	0.9791	0.9838
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 801.1 ppb	NO = 796.1 ppb
Baseline Corr 1st pt	NO_X = 820.1 ppb	NO = 812.8 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	Nx Sl:	Nx Int:
As found	NO r^2:	NO Sl:	NO Int:
As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

*Percent Change	NO_X =	2.3%
*Percent Change	NO =	2.1%

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
Serial Number: 1173480006
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.329	NA	NO bkgnd or offset:	2.6	NA
NOX coeff or slope:	0.994	NA	NOX bkgnd or offset:	2.7	NA
NO2 coeff or slope:	1.000	NA	Reaction cell Press:	162.5	NA

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000009	
NO_X Cal Offset:	-1.813460	
NO Cal Slope:	0.998685	
NO Cal Offset:	-2.513223	
NO_2 Cal Slope:	1.022718	
NO_2 Cal Offset:	0.962157	

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero										
High point										
Mid point										
Low point										
As left zero										
As left span										
								Average Correction Factor		

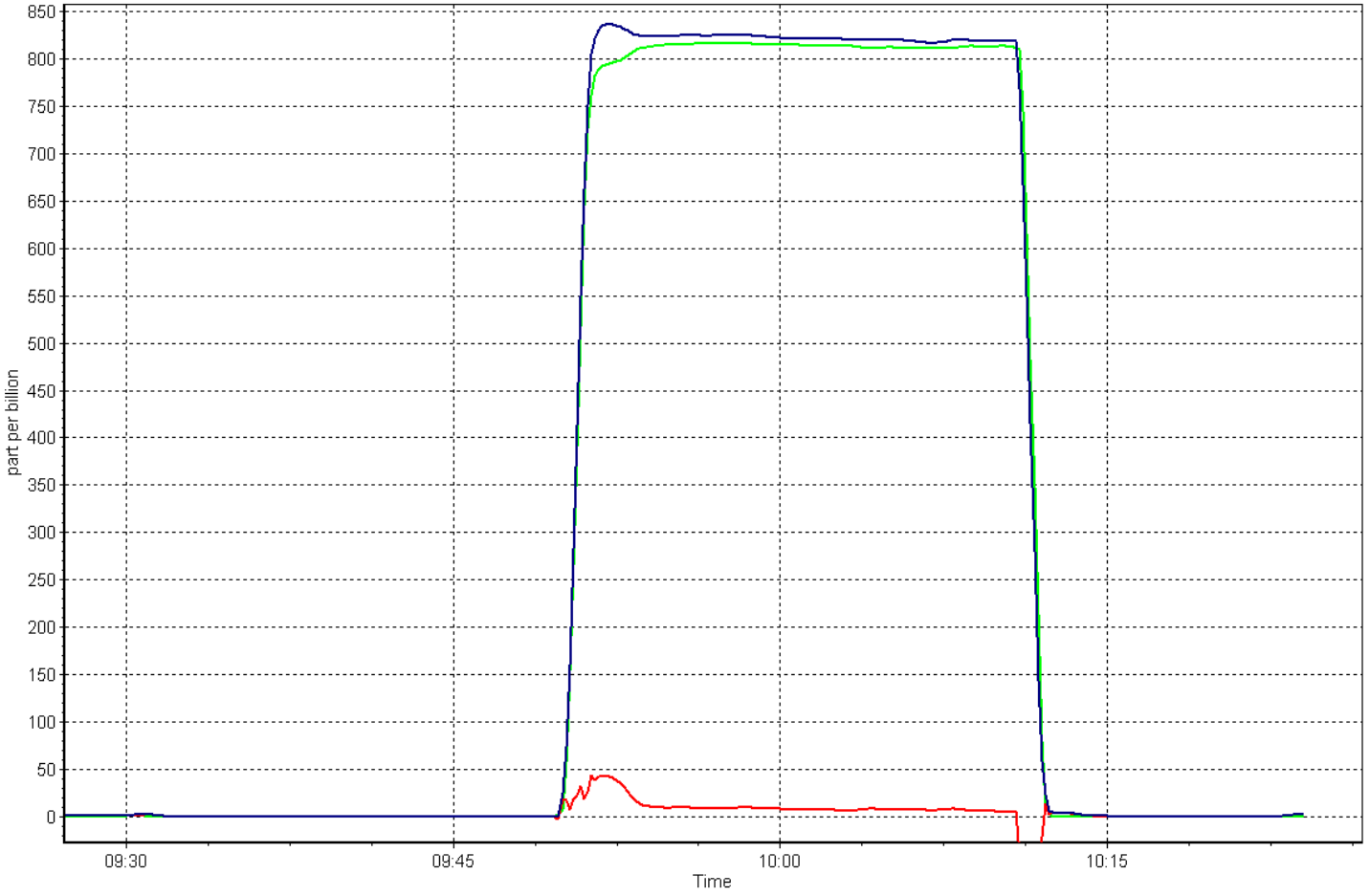
GPT Calibration Data

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero						
High GPT point						
Mid GPT point						
Low GPT point						
				Average Correction Factor		

Notes: Sample inlet filters changed after as founds. Calibrations was aborted due to wildfire concerns.

Calibration Performed By: Jan Castro

NO_X Calibration Plot Date: May 14, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Christina Lake
Station number:	AMS 26
Calibration Date:	May 15, 2024
Last Cal Date:	April 23, 2024
Start time (MST):	6:37
End time (MST):	10:44
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC755290	Cal Gas Expiry Date:	January 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3253
ZAG make/model:	API T701H	Serial Number:	832

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
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	As Found Statistics	*Percent Change	NO =	NA
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO r^2:	NO Sl:	NO Int:	
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1173480006

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	NA	1.329	NO bkgnd or offset:	NA	2.6
NOX coeff or slope:	NA	0.994	NOX bkgnd or offset:	NA	2.7
NO2 coeff or slope:	NA	1.000	Reaction cell Press:	NA	162.5

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	NA	1.005033
NO_X Cal Offset:	NA	-0.853732
NO Cal Slope:	NA	1.003844
NO Cal Offset:	NA	-1.793642
NO_2 Cal Slope:	NA	1.000810
NO_2 Cal Offset:	NA	-1.663798

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
High point	4918	82.1	802.9	799.6	3.3	806.3	801.7	4.6	0.9958	0.9974
Mid point	4959	41.1	401.9	400.3	1.6	403.1	399.3	3.8	0.9971	1.0025
Low point	4980	20.5	200.5	199.7	0.8	199.9	197.0	2.9	1.0029	1.0135
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
As left span	4918	82.1	802.9	385.1	417.8	802.7	385.1	417.4	1.0003	1.0000
							Average Correction Factor		0.9986	1.0045

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	797.0	377.3	423.0	422.4	1.0014	99.9%
Mid GPT point	797.0	587.2	213.1	211.0	1.0099	99.0%
Low GPT point	797.0	691.7	108.6	105.3	1.0312	97.0%
				Average Correction Factor	1.0141	98.6%

Notes: Remote calibrations. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

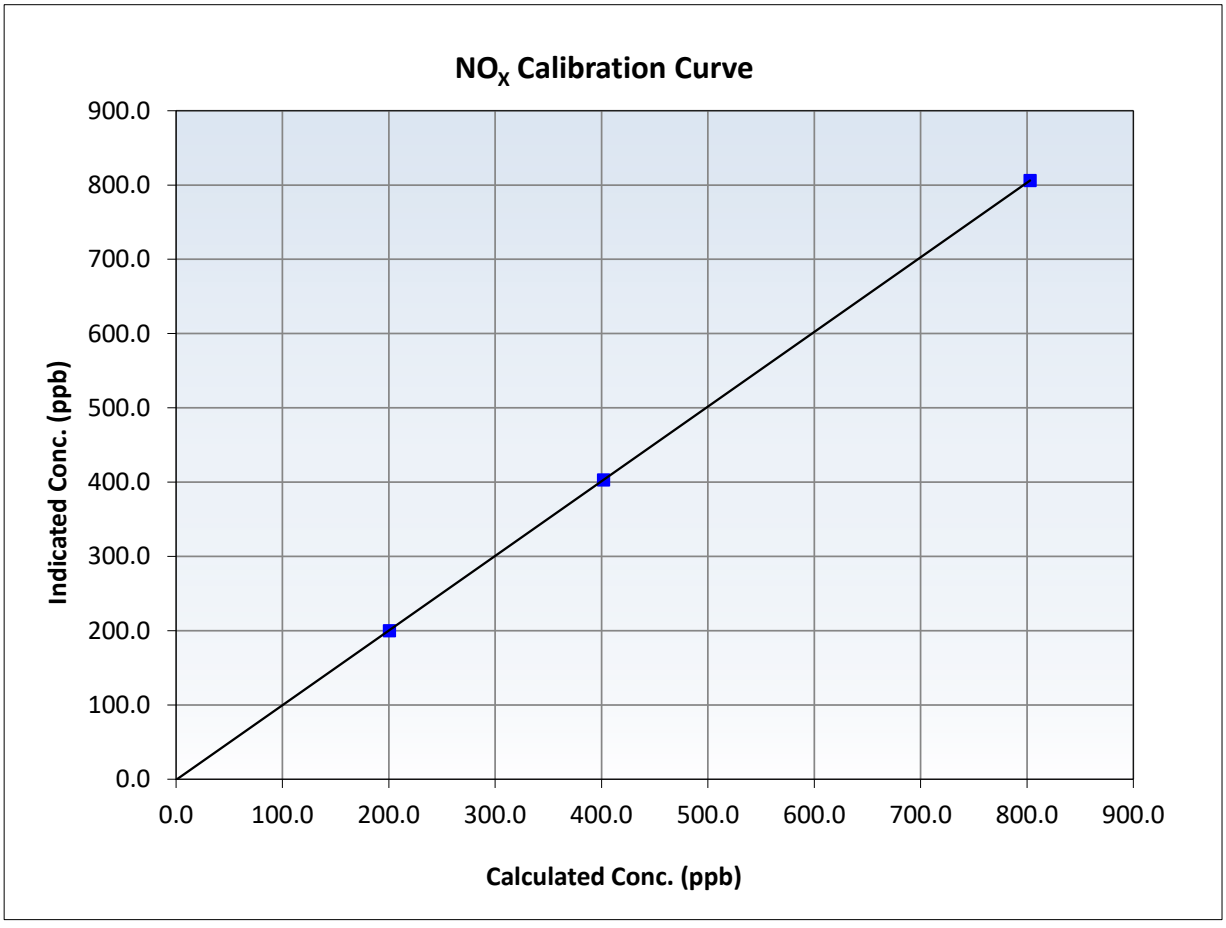
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	6:37	End Time (MST):	10:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
802.9	806.3	0.9958
401.9	403.1	0.9971
200.5	199.9	1.0029

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.005033	*0.90 - 1.10*
Intercept	-0.853732	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

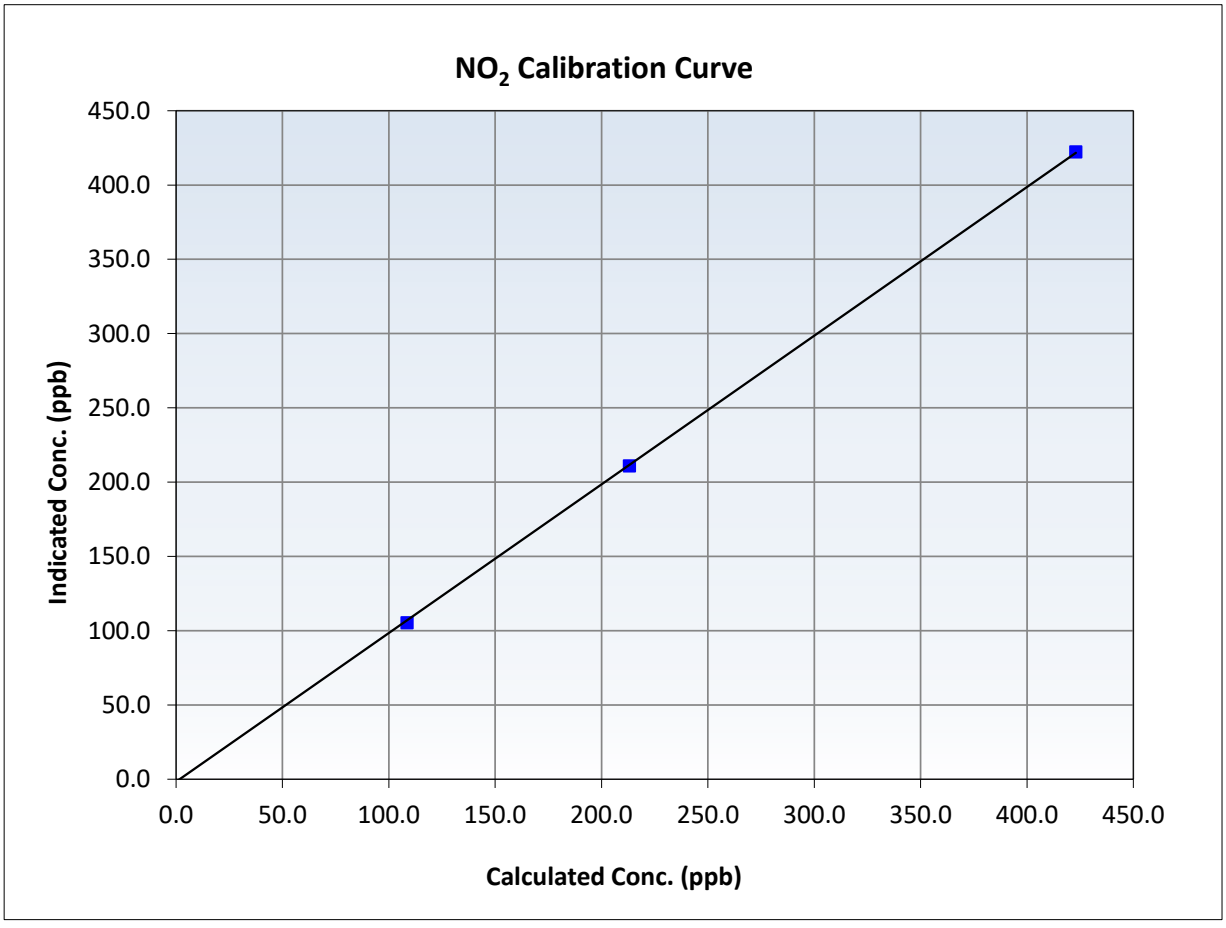
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	6:37	End Time (MST):	10:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
423.0	422.4	1.0014
213.1	211.0	1.0099
108.6	105.3	1.0312

Statistical Evaluation		Limits
Correlation Coefficient	0.999936	≥0.995
Slope	1.000810	0.90 - 1.10
Intercept	-1.663798	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

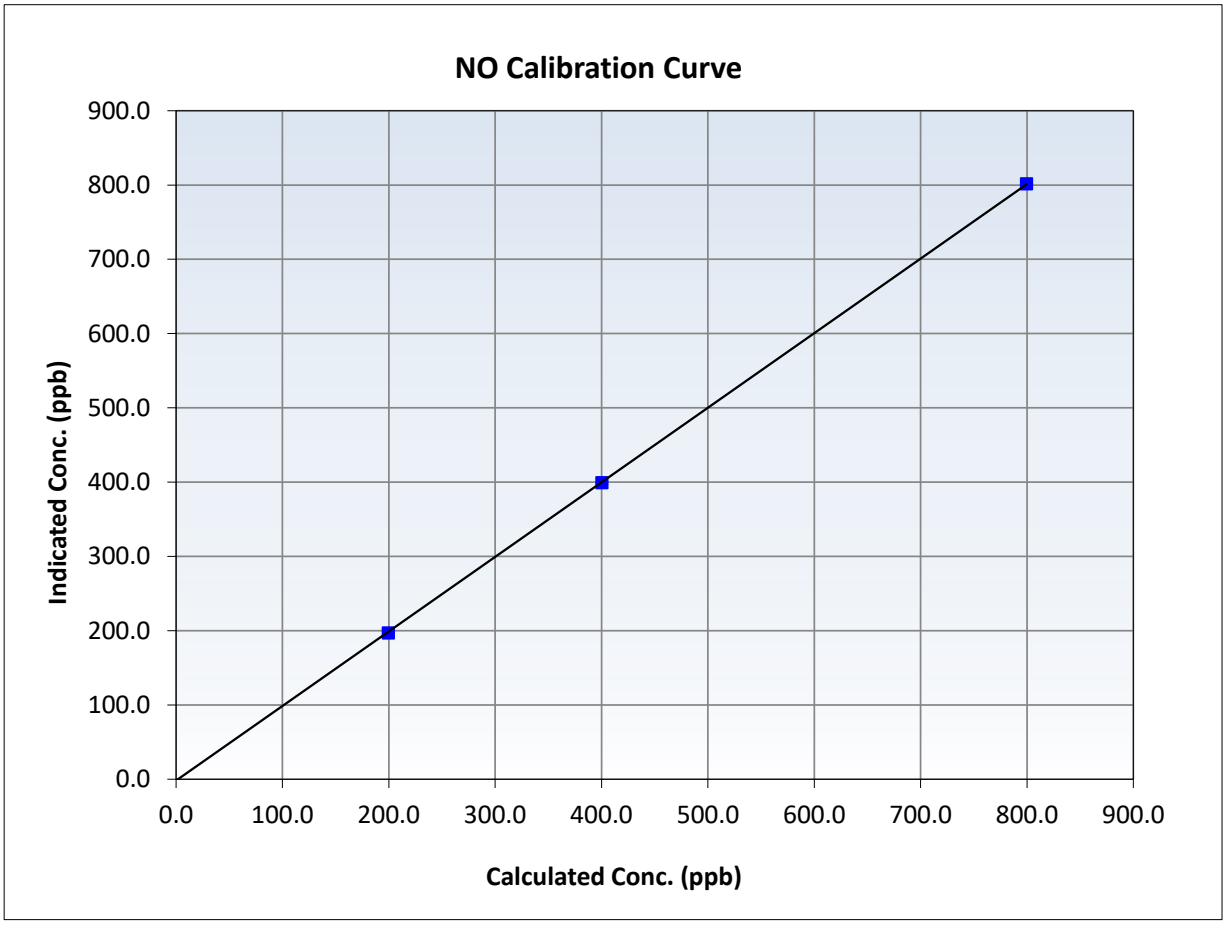
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 23, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	6:37	End Time (MST):	10:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

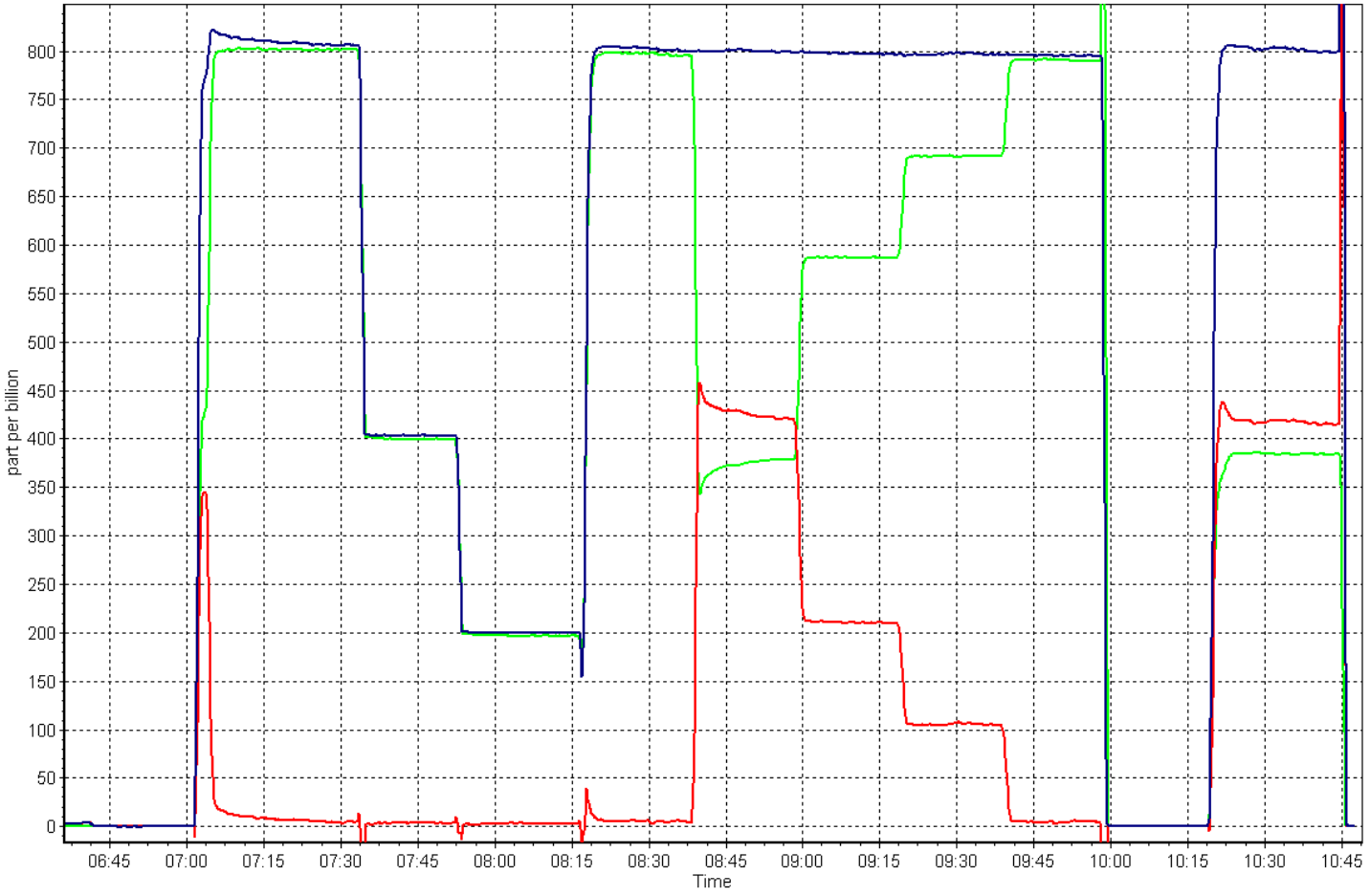
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.6	801.7	0.9974
400.3	399.3	1.0025
199.7	197.0	1.0135

Statistical Evaluation		Limits
Correlation Coefficient	0.999982	≥0.995
Slope	1.003844	0.90 - 1.10
Intercept	-1.793642	+/-20



NO_X Calibration Plot Date: May 15, 2024 Location: Christina Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27
JACKFISH 2/3
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	May 13, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	11:47	End time (MST):	14:46
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999989	1.016707	Backgd or Offset:	8.4	8.5
Calibration intercept:	-1.697880	-2.198983	Coeff or Slope:	0.955	0.955

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4921	79.1	800.2	812.7	0.985
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	812.7	Previous response	798.5	*% change	1.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4921	79.1	800.2	812.8	0.984
Mid point	4961	39.5	399.5	402.0	0.994
Low point	4980	19.8	200.3	199.6	1.004
As left zero	5000	0.0	0.0	0.0	----
As left span	4921	79.1	800.2	816.4	0.980
				Average Correction Factor:	0.994

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

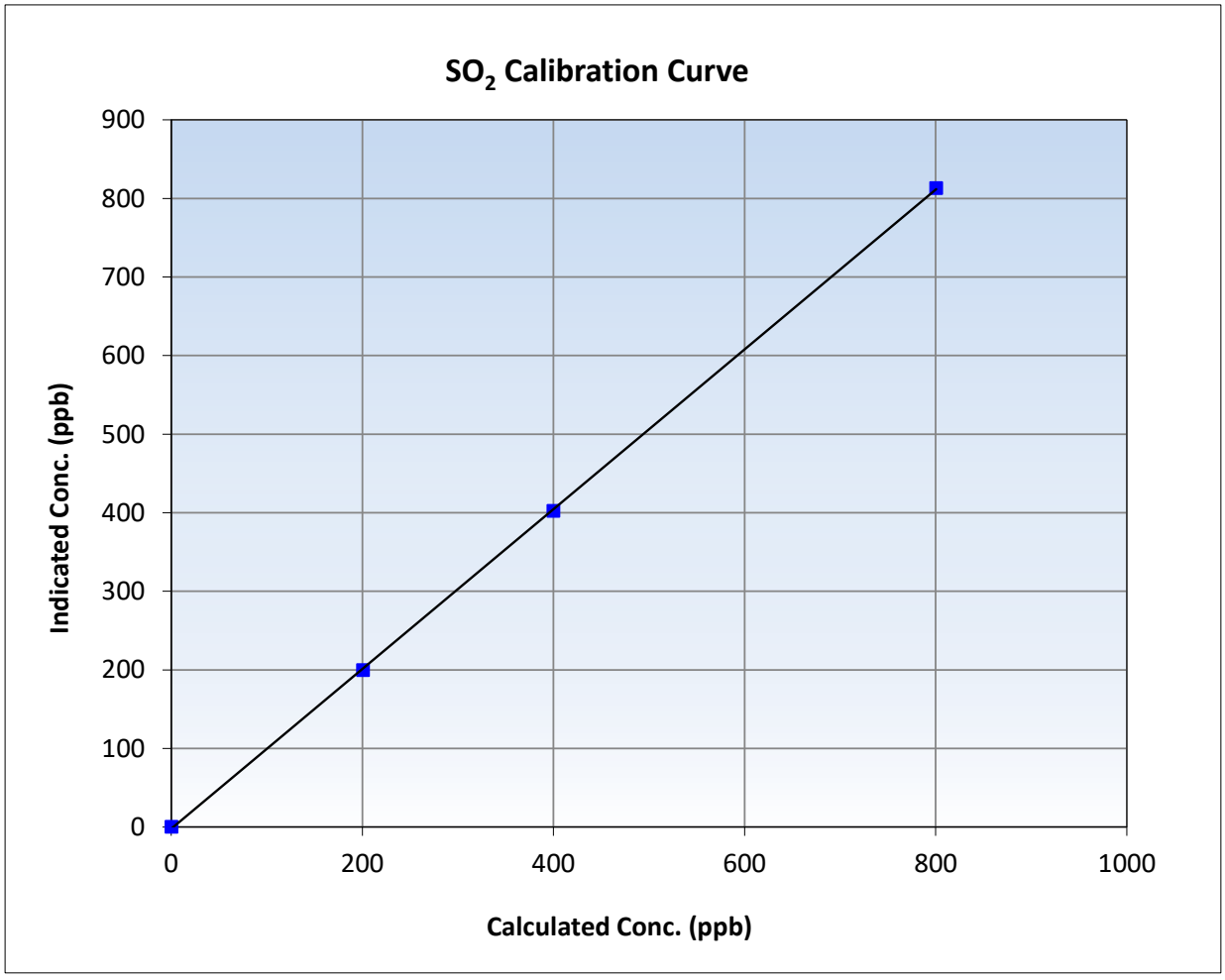
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 15, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:47	End Time (MST):	14:46
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	12124313138

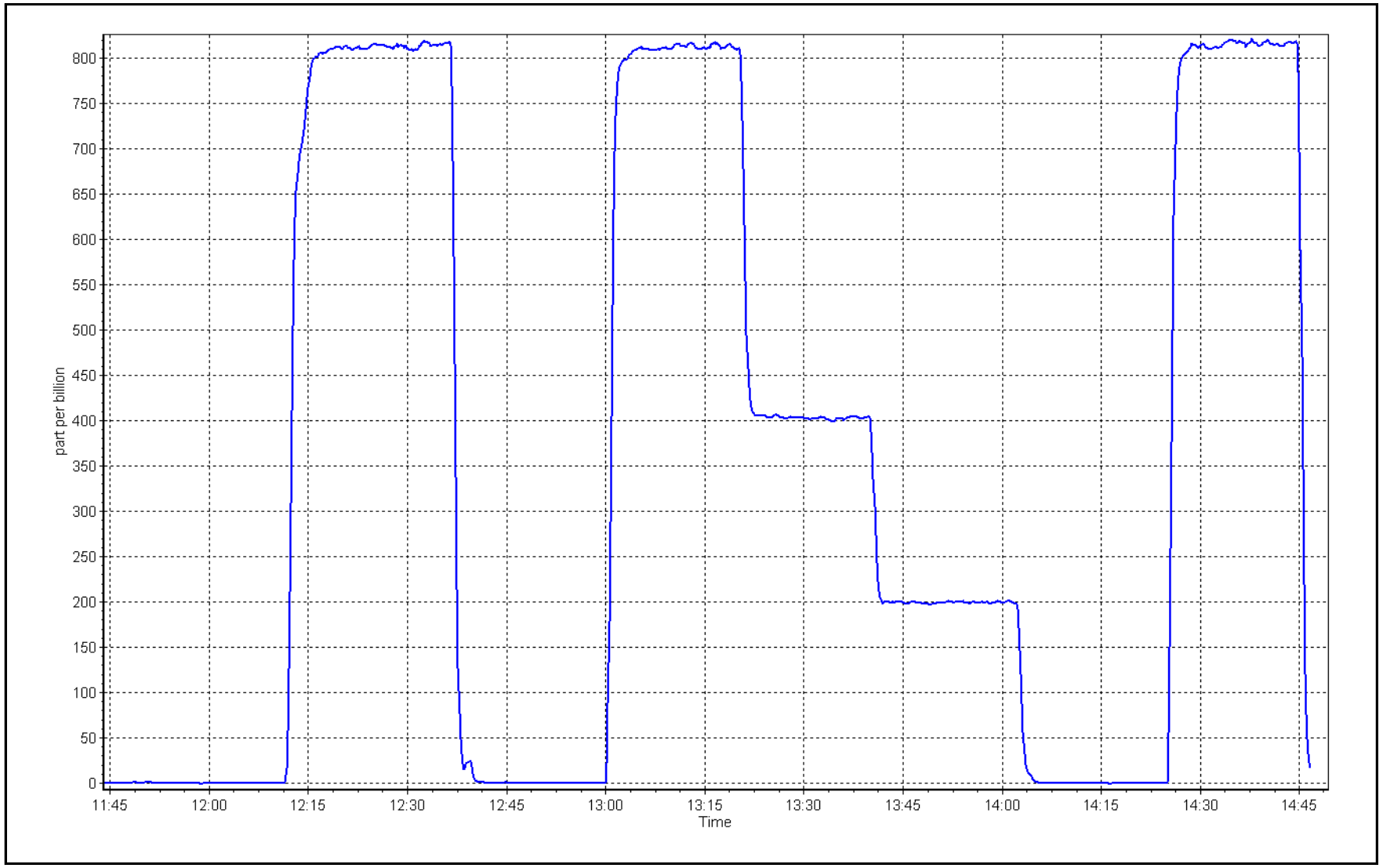
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.2	812.8	0.9844
399.5	402.0	0.9939
200.3	199.6	1.0035

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999957	*≥0.995*
Slope	1.016707	*0.90 - 1.10*
Intercept	-2.198983	*+/-30*



SO2 Calibration Plot Date: May 13, 2024 Location: Jackfish 2/3



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	May 14, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	8:33	End time (MST):	18:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.41	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC345023			
Removed Cal Gas Conc:	5.41	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3811
ZAG Make/Model:	API 701		Serial Number:	268

Analyzer Information

Analyzer make:	API T101		Analyzer serial #:	621	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb		Converter Temp:	316	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.990223	0.981525	Backgd or Offset:	29.9	29.9
Calibration intercept:	-0.338155	0.241749	Coeff or Slope:	0.965	0.965

H_2S 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	4926	74.1	80.2	83.0	0.968
As found Mid point	4963	37.0	40.0	41.4	0.972
As found Low point	4982	18.5	20.0	20.2	1.001
New cylinder response					

Baseline Corr As found:	82.8	Prev response:	79.05	*% change:	4.5%
Baseline Corr 2nd AF pt:	41.2	AF Slope:	1.035409	AF Intercept:	-0.097195
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999926	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4926	74.1	80.2	78.9	1.016
Mid point	4963	37.0	40.0	39.6	1.011
Low point	4982	18.5	20.0	19.9	1.006
As left zero	5000	0.0	0.0	0.0	----
As left span	4926	74.1	80.2	79.6	1.007
SO2 Scrubber Check	4921	79.1	791.0	-0.1	----
Date of last scrubber change:				Ave Corr Factor	1.011
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

H_2S Calibration Summary

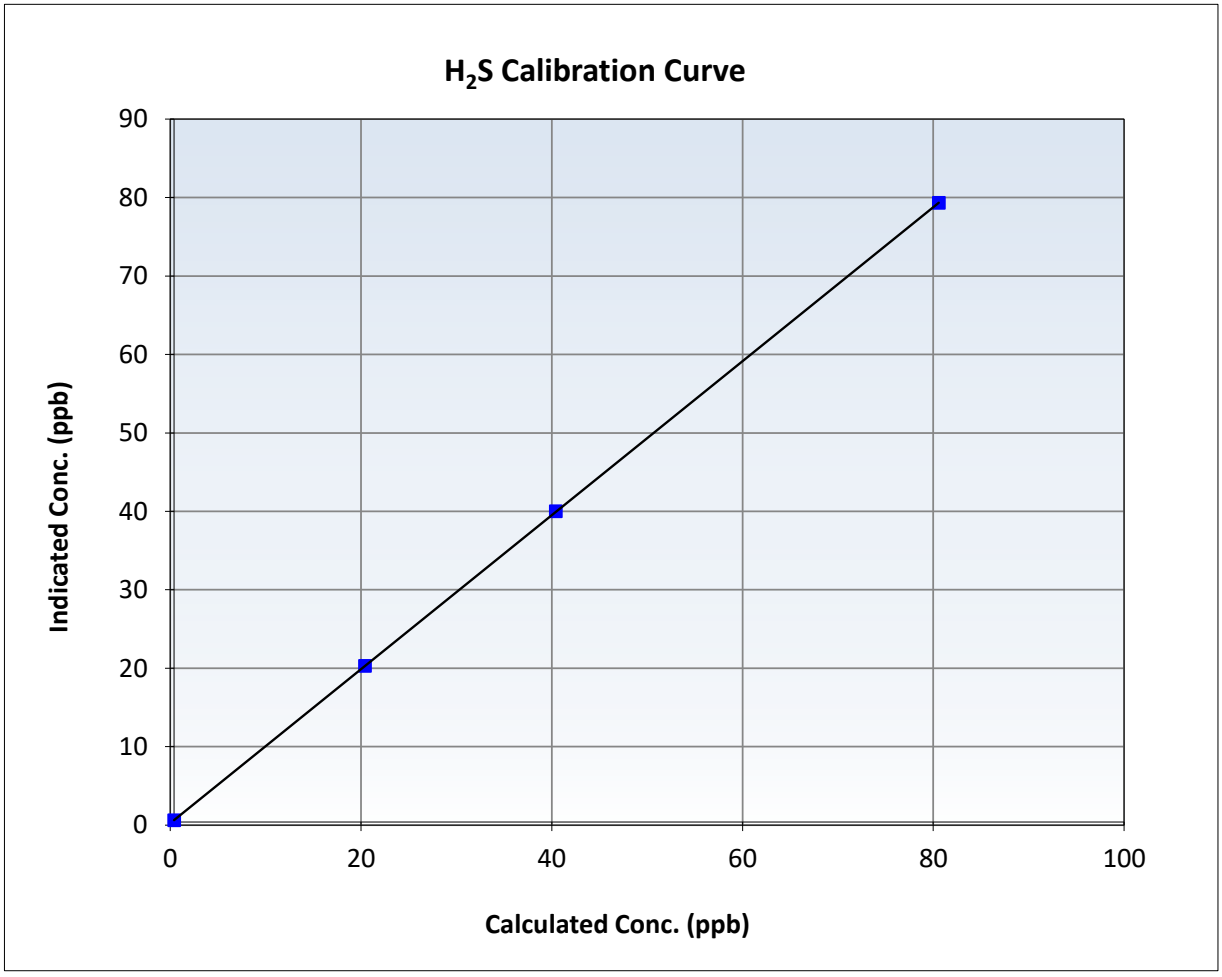
Station Information

Calibration Date:	May 14, 2024	Previous Calibration:	April 17, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	8:33	End Time (MST):	18:55
Analyzer make:	API T101	Analyzer serial #:	621

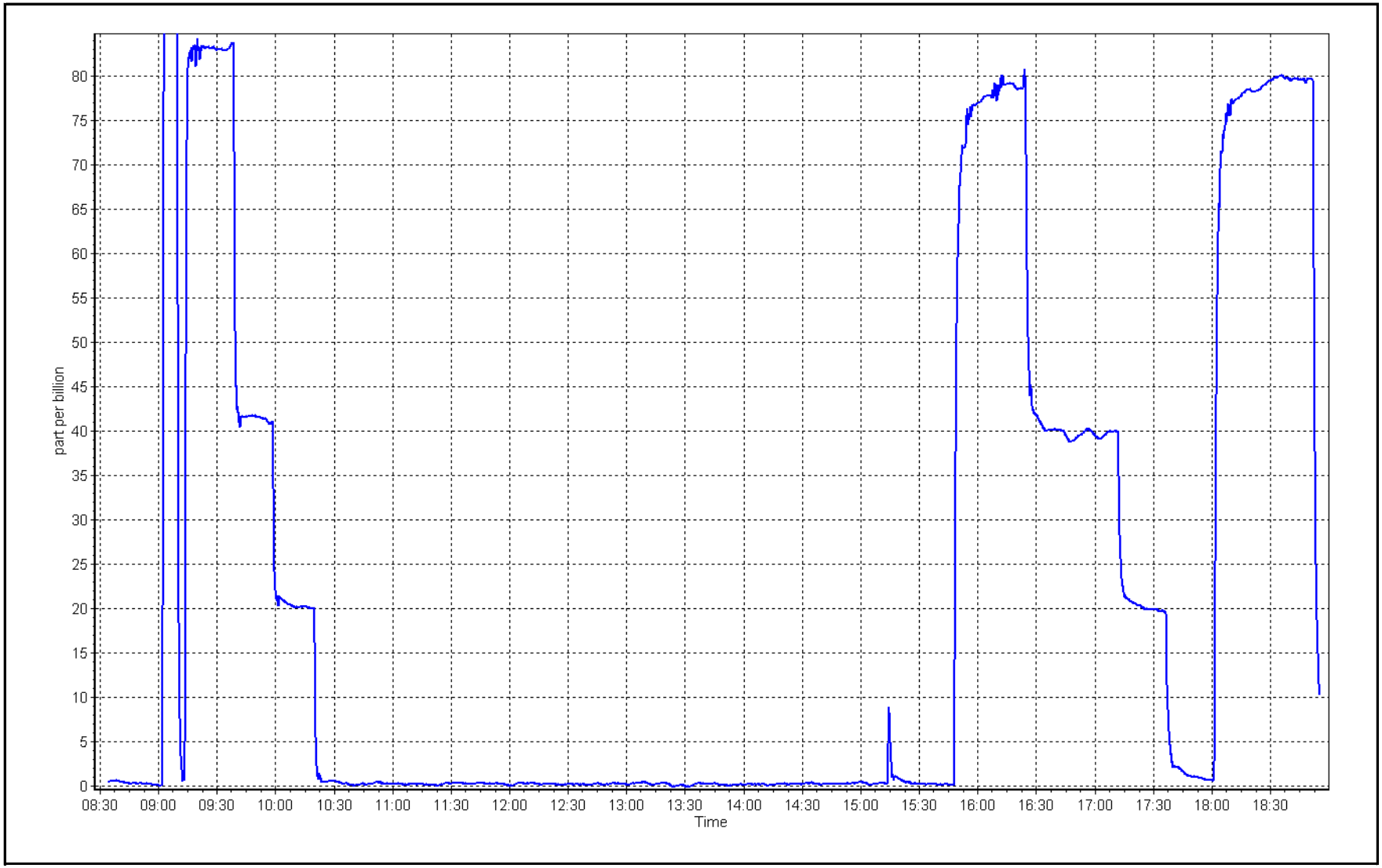
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.2	78.9	1.0162
40.0	39.6	1.0110
20.0	19.9	1.0058

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	0.981525	*0.90 - 1.10*
Intercept	0.241749	*+/-3*



H_2S Calibration Plot Date: May 14, 2024 Location: Jackfish 2/3



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Jackfish 2/3
Station number:	AMS 27
Calibration Date:	May 15, 2024
Last Cal Date:	April 18, 2024
Start time (MST):	9:07
End time (MST):	14:42
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC757838	Cal Gas Expiry Date:	January 9, 2023
NOX Cal Gas Conc:	60.30 ppm	NO Cal Gas Conc:	60.20 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	60.30 ppm	Removed Gas NO Conc:	60.20 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3811
ZAG make/model:	API T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	1.0	-0.5	1.4	----	----
AF High point	4942	66.5	800.6	799.3	1.3	797.0	783.8	13.1	1.0058	1.0191
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	800.5 ppb	NO =	793.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.6%
Baseline Corr 1st pt	NO_X =	796.0 ppb	NO =	784.3 ppb	As Found Statistics	*Percent Change	NO = -1.1%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: API T200 Serial Number: 722

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.271	1.271	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.260	1.260	NOX bkgnd or offset:	1.2	1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.2	3.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.004943	1.003401
NO_X Cal Offset:	-4.114844	-3.974590
NO Cal Slope:	0.996905	0.996415
NO Cal Offset:	-3.695611	-4.574196
NO_2 Cal Slope:	0.980873	1.000868
NO_2 Cal Offset:	1.007817	1.963831

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	1.2	0.3	0.9	----	----
High point	4942	66.5	800.6	799.3	1.3	802.2	795.3	6.9	0.9980	1.0050
Mid point	4979	33.3	400.6	399.9	0.7	394.7	388.5	6.2	1.0150	1.0295
Low point	4996	16.6	199.7	199.4	0.3	191.7	191.2	0.5	1.0417	1.0427
As left zero	5000	0.0	0.0	0.0	0.0	1.5	1.5	0.0	----	----
As left span	4942	66.5	800.6	405.5	395.1	791.9	405.5	386.4	1.0110	1.0000
							Average Correction Factor		1.0182	1.0257

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.9	----	----
High GPT point	789.4	405.4	385.3	387.3	0.9949	100.5%
Mid GPT point	789.4	616.3	174.4	176.6	0.9877	101.2%
Low GPT point	789.4	703.9	86.8	90.2	0.9626	103.9%
				Average Correction Factor	0.9817	101.9%

Notes: No adjustments made.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

NO_X Calibration Summary

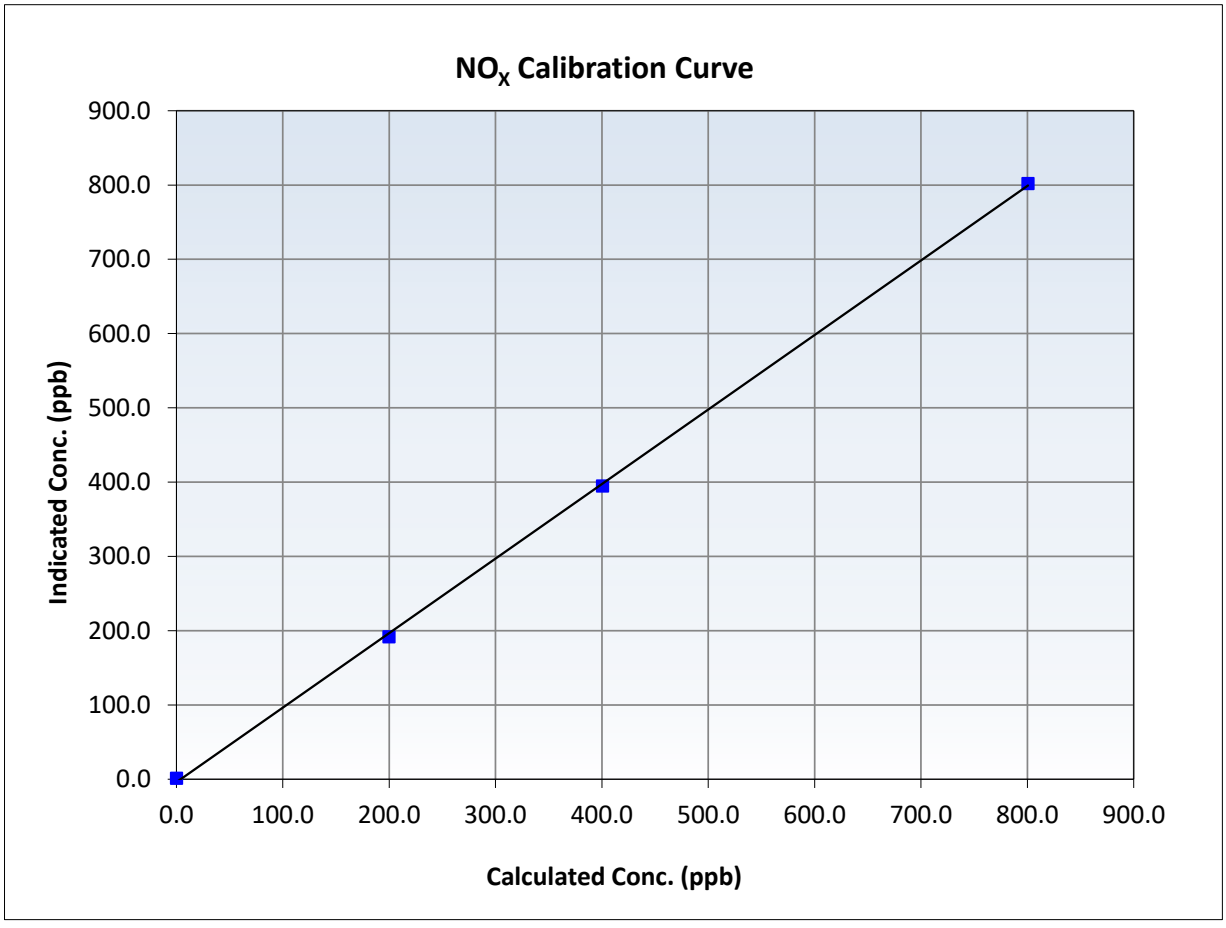
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 18, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:07	End Time (MST):	14:42
Analyzer make:	API T200	Analyzer serial #:	722

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.2	----
800.6	802.2	0.9980
400.6	394.7	1.0150
199.7	191.7	1.0417

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999808	*≥0.995*
Slope	1.003401	*0.90 - 1.10*
Intercept	-3.974590	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

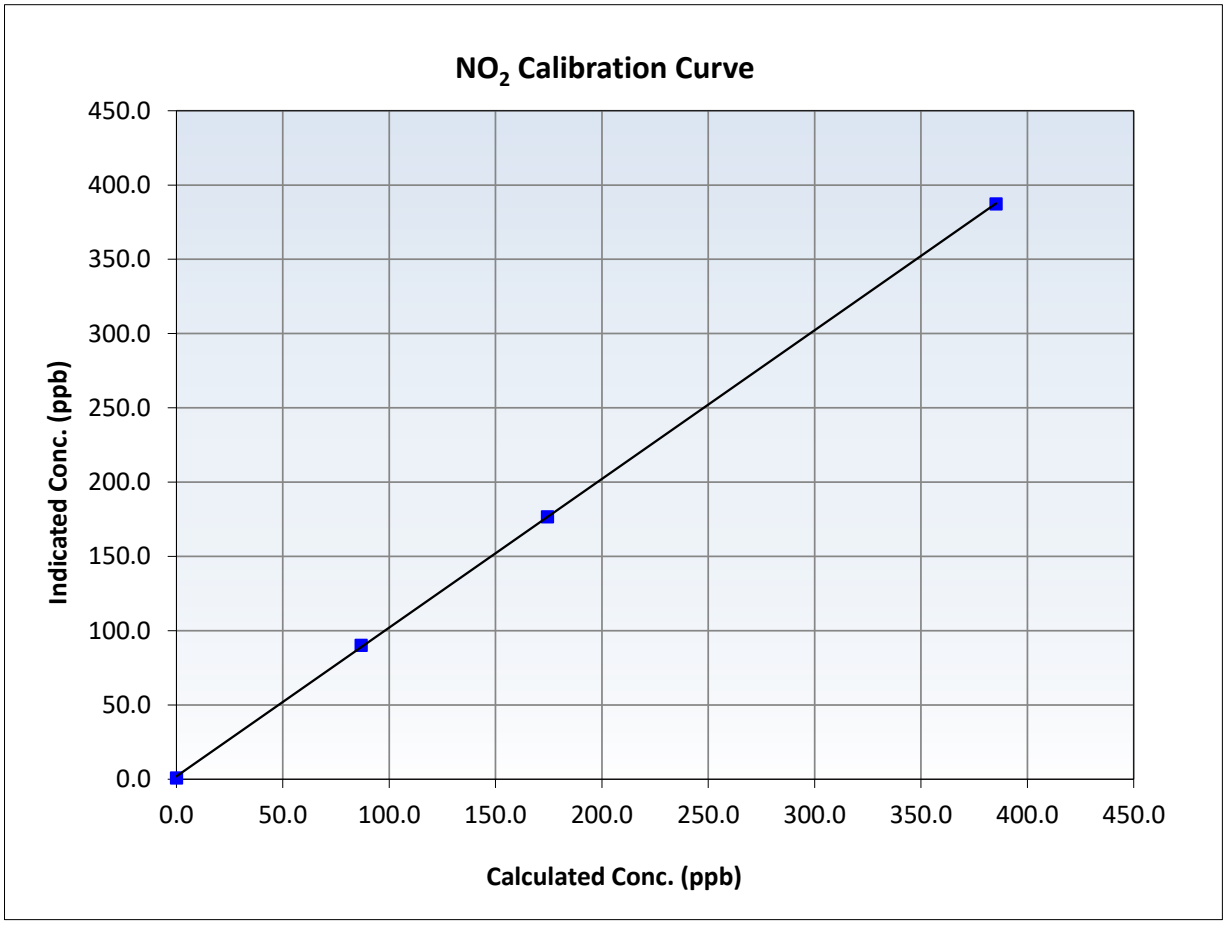
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 18, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:07	End Time (MST):	14:42
Analyzer make:	API T200	Analyzer serial #:	722

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.9	----
385.3	387.3	0.9949
174.4	176.6	0.9877
86.8	90.2	0.9626

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999963	*≥0.995*
Slope	1.000868	*0.90 - 1.10*
Intercept	1.963831	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

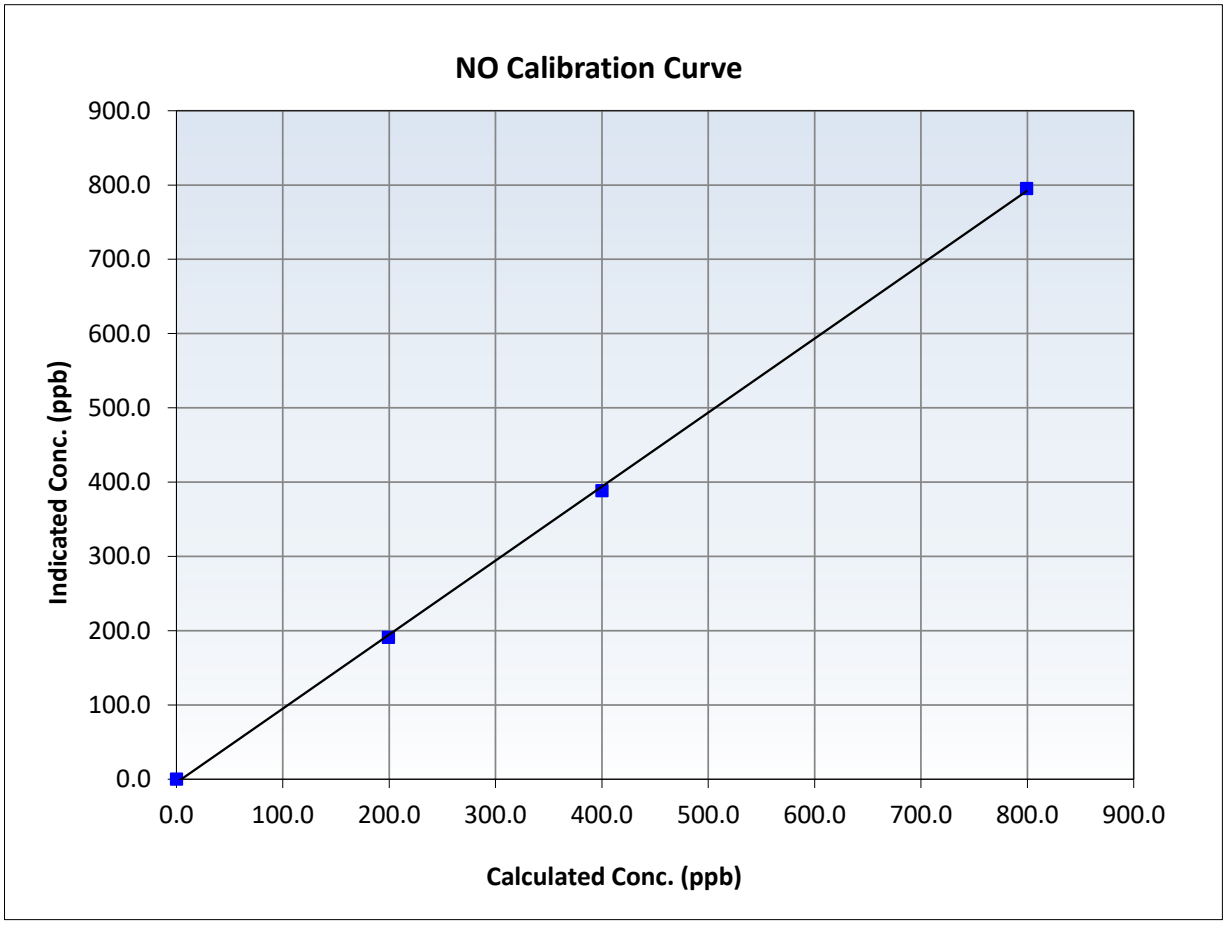
Station Information

Calibration Date:	May 15, 2024	Previous Calibration:	April 18, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	9:07	End Time (MST):	14:42
Analyzer make:	API T200	Analyzer serial #:	722

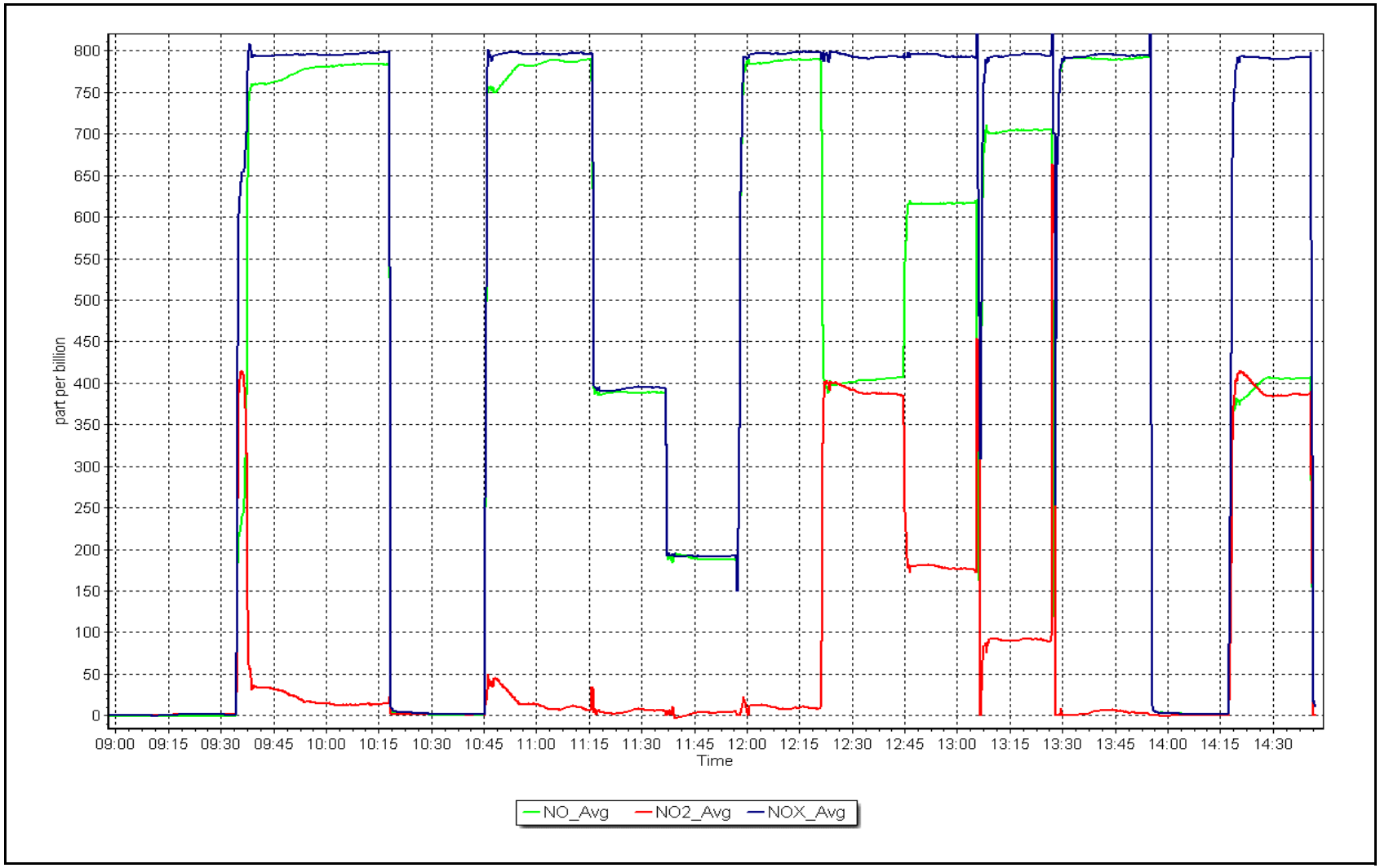
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.3	795.3	1.0050
399.9	388.5	1.0295
199.4	191.2	1.0427

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999788	*≥0.995*
Slope	0.996415	*0.90 - 1.10*
Intercept	-4.574196	*+/-20*



NO_X Calibration Plot Date: May 15, 2024 Location: Jackfish 2/3



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS29
SURMONT 2
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	May 13, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	10:51	End time (MST):	14:32
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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006014	0.997045	Backgd or Offset:	13.0	12.8
Calibration intercept:	-1.785690	-1.145686	Coeff or Slope:	0.939	0.928

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4919	81.3	800.1	804.0	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	804.1	Previous response	803.1	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4919	81.3	800.1	797.1	1.004
Mid point	4959	40.7	400.6	398.0	1.007
Low point	4979	20.3	199.8	196.6	1.016
As left zero	5000	0.0	0.0	0.2	----
As left span	4919	81.3	800.1	797.5	1.003
				Average Correction Factor:	1.009

Notes: Changed filter after as founds. Adjusted span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

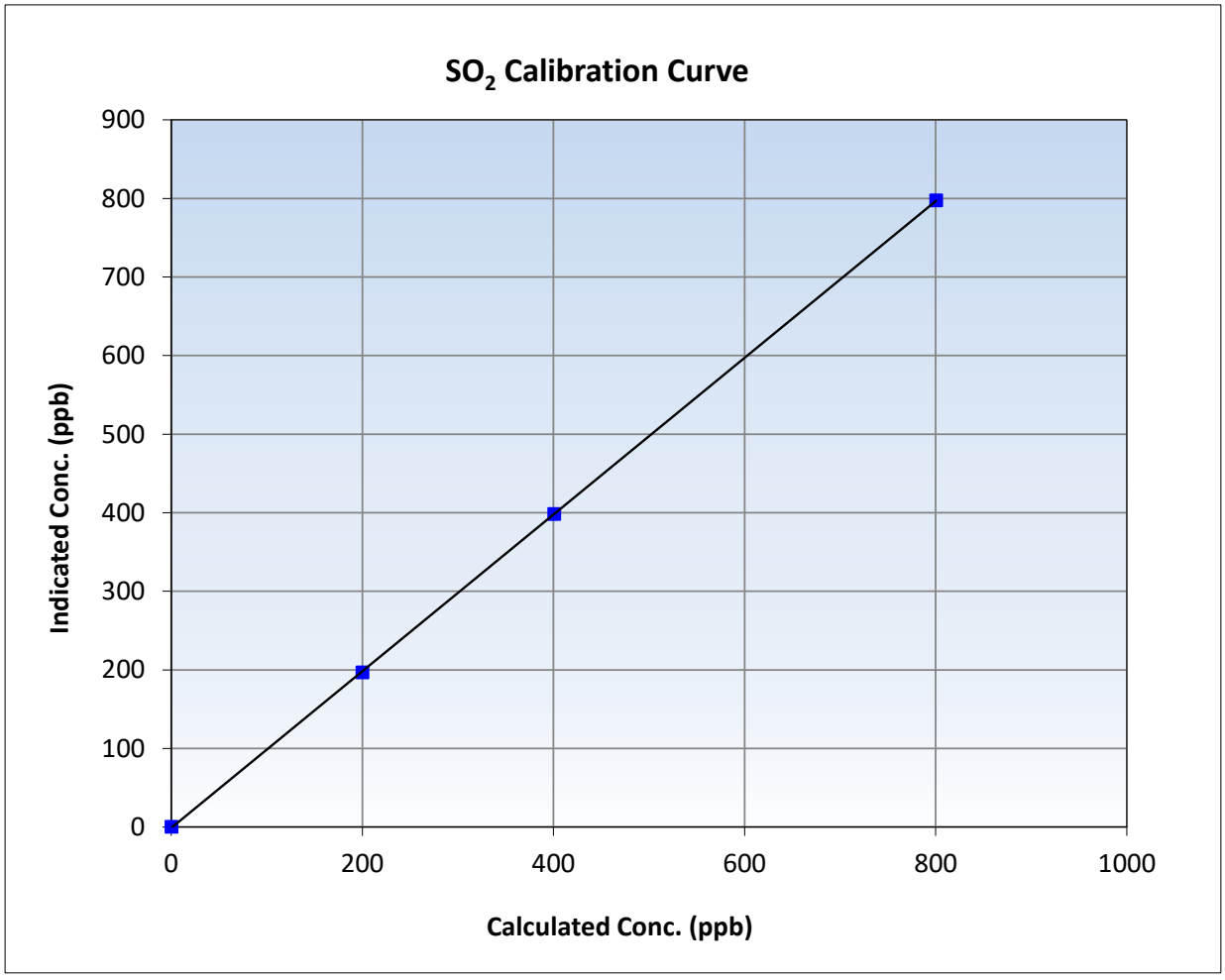
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 12, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:51	End Time (MST):	14:32
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

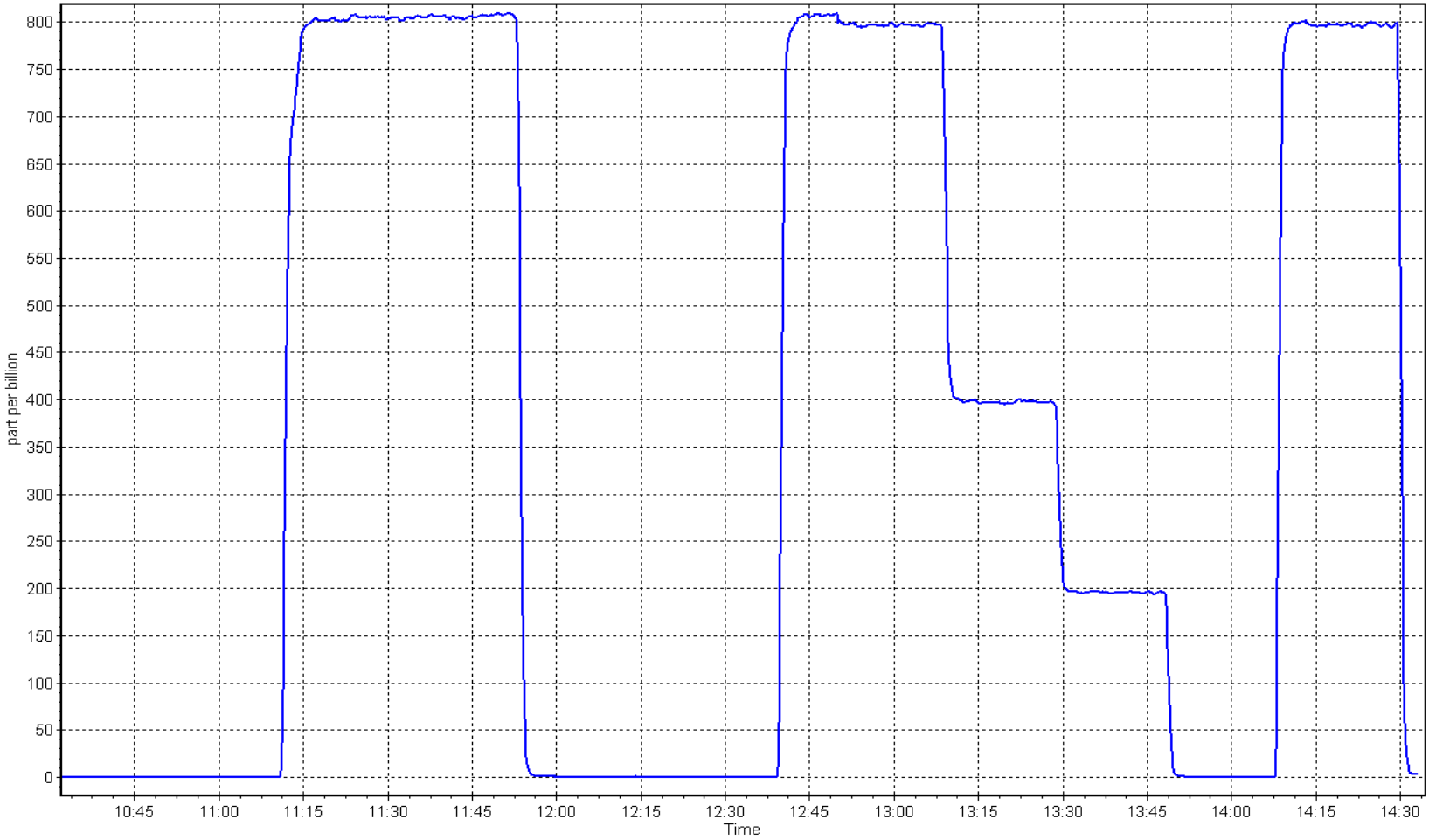
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.1	797.1	1.0038
400.6	398.0	1.0065
199.8	196.6	1.0164

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	0.997045	*0.90 - 1.10*
Intercept	-1.145686	*+/-30*



SO2 Calibration Plot Date: May 13, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	May 9, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	10:07	End time (MST):	14:51
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.391	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC508338			
Removed Cal Gas Conc:	5.391	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	CC508338		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5472
ZAG Make/Model:	Teledyne API T701		Serial Number:	4698

Analyzer Information

Analyzer make:	Thermo 43iQ-TLE		Analyzer serial #:	1200326170
Converter make:	Global		Converter serial #:	2022-220
Analyzer Range	0 - 100 ppb		Converter Temp:	325.0 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.998614	0.998331	Backgd or Offset:	0.90	0.90
Calibration intercept:	-0.142639	-0.082706	Coeff or Slope:	1.050	1.056

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4925.8	74.2	80.0	80.7	0.990
As found Mid point	4962.9	37.2	40.1	40.2	0.995
As found Low point	4981.5	18.6	20.1	19.8	1.008
New cylinder response					

Baseline Corr As found:	80.8	Prev response:	79.75	*% change:	1.3%
Baseline Corr 2nd AF pt:	40.3	AF Slope:	1.011184	AF Intercept:	-0.283103
Baseline Corr 3rd AF pt:	19.9	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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4925.8	74.2	80.0	79.8	1.003
Mid point	4962.9	37.2	40.1	40.0	1.003
Low point	4981.5	18.6	20.1	19.8	1.013
As left zero	5000	0.0	0.0	0.0	----
As left span	4925.8	74.2	80.0	79.2	1.010
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.006
Date of last converter efficiency test:					

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

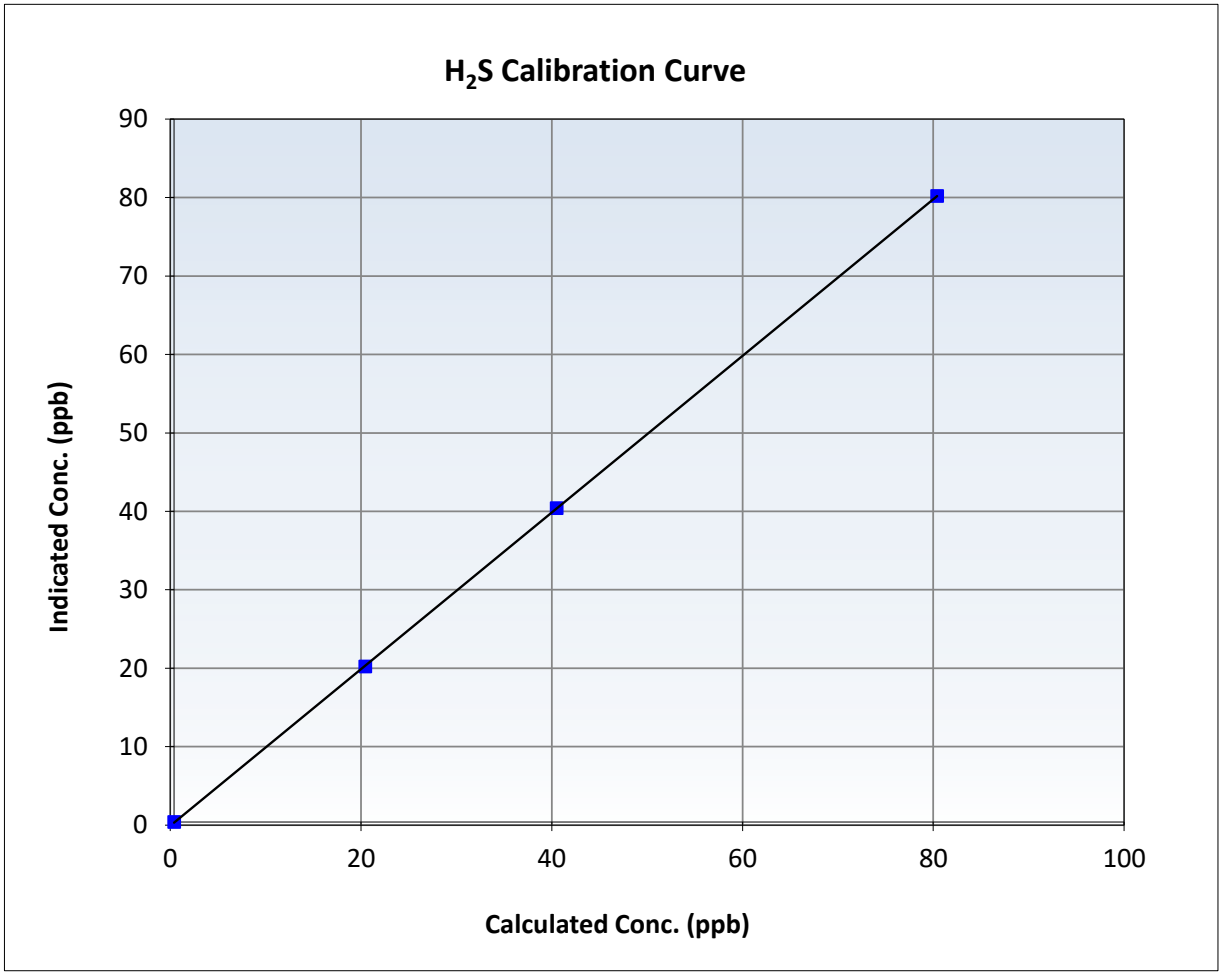
H2S Calibration Summary

Station Information

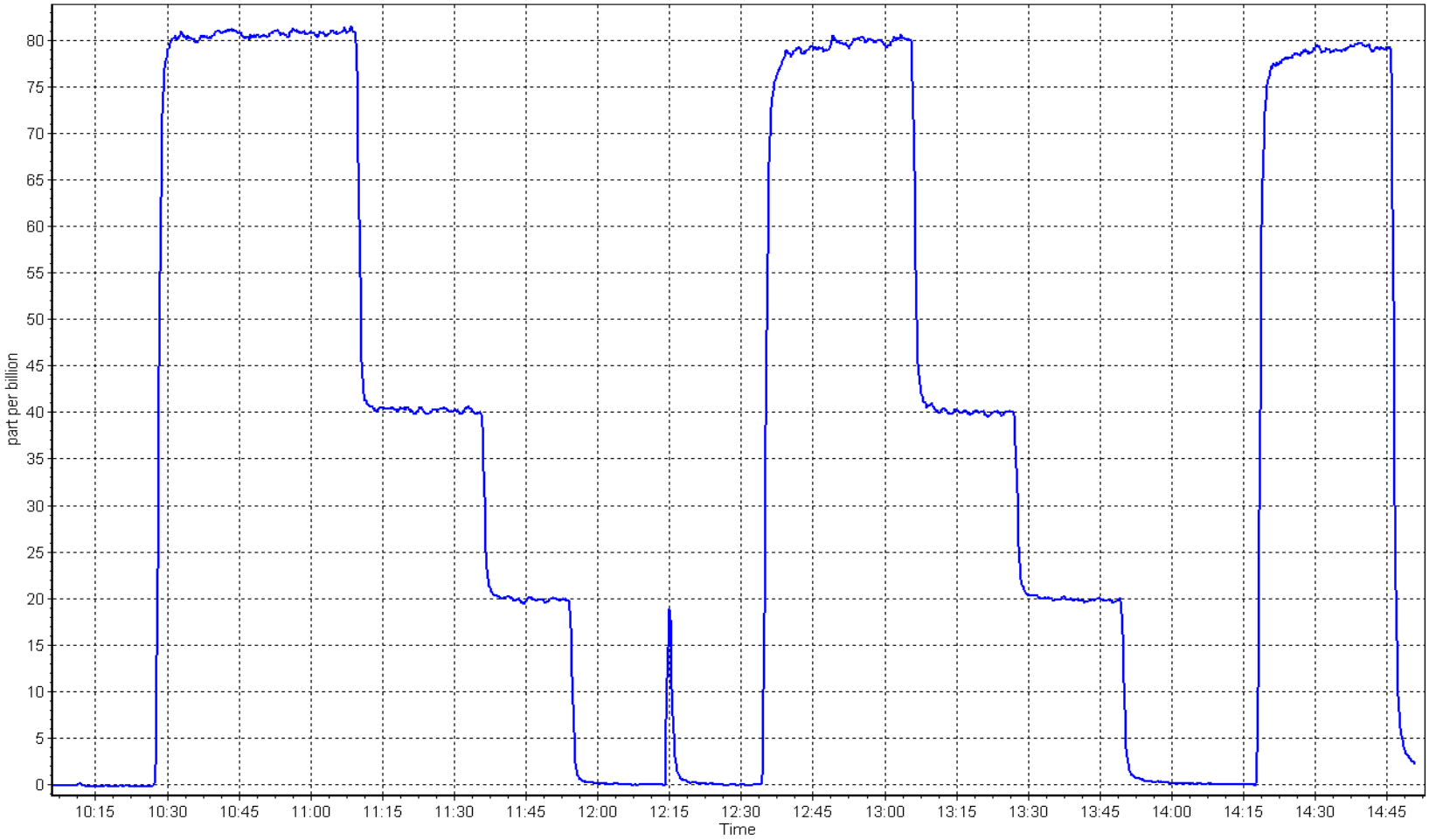
Calibration Date:	May 9, 2024	Previous Calibration:	April 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:07	End Time (MST):	14:51
Analyzer make:	Thermo 43iQ-TLE	Analyzer serial #:	1200326170

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999992	*≥0.995*
80.0	79.8	1.0025	Slope	0.998331	*0.90 - 1.10*
40.1	40.0	1.0027			
20.1	19.8	1.0128	Intercept	-0.082706	*+/-3*



H2S Calibration Plot Date: May 9, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	May 13, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	10:51	End time (MST):	14:32
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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.997593	1.005876	Background:	3.50	3.38
Calibration intercept:	-0.041046	-0.025252	Coefficient:	3.886	3.843

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.04	----
As found High point	4918	81.3	17.31	17.29	0.999
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	17.33	Previous response	17.23	*% 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	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.03	----
High point	4918	81.3	17.31	17.43	0.993
Mid point	4959	40.6	8.65	8.61	1.004
Low point	4979	20.3	4.32	4.29	1.008
As left zero	5000	0.0	0.00	0.08	----
As left span	4918	81.3	17.31	17.40	0.995
				Average Correction Factor	1.002

Notes: Changed filter after as founds. Adjusted zero and span. Changed hydrogen cylinder.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

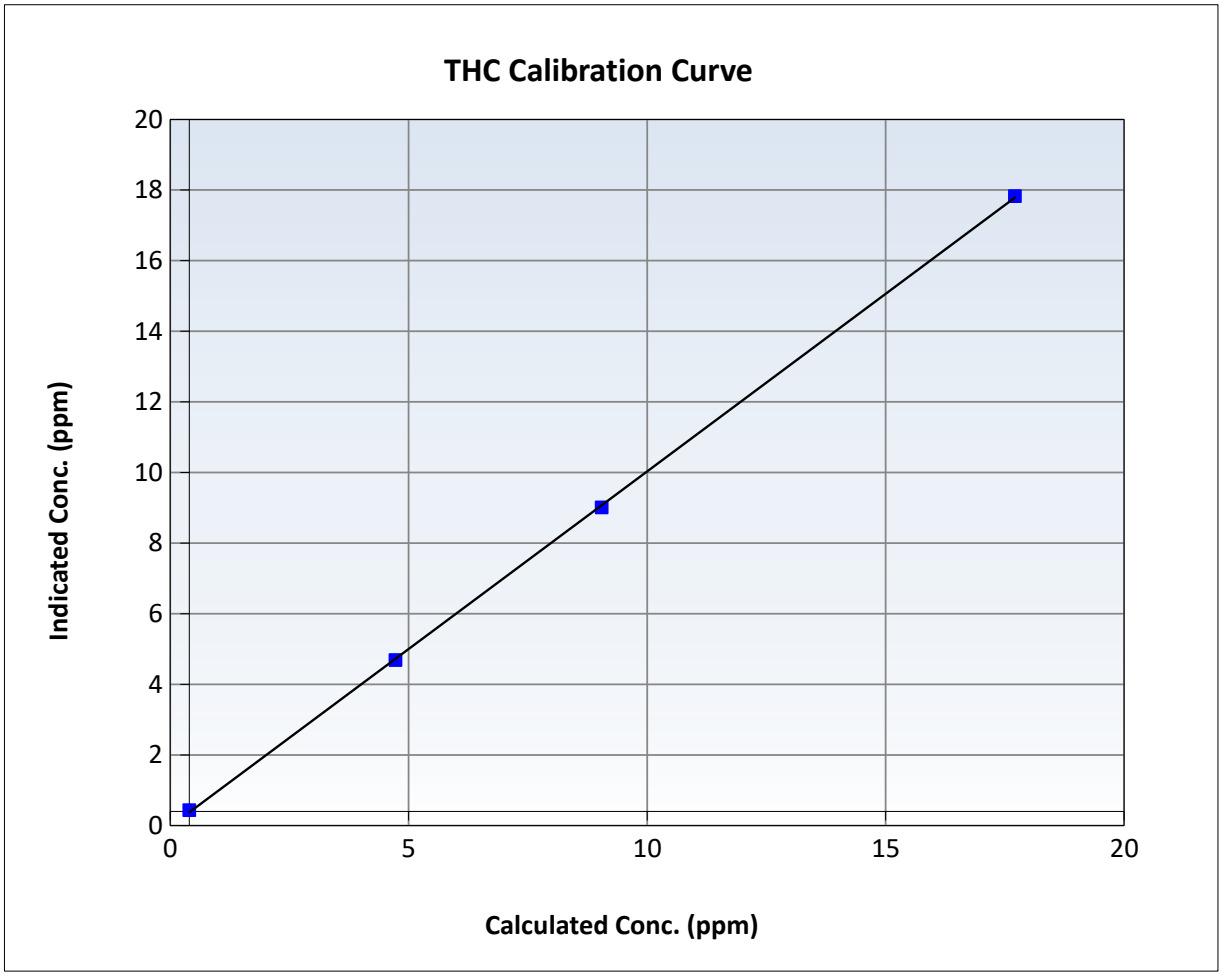
Station Information

Calibration Date:	May 13, 2024	Previous Calibration:	April 12, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:51	End Time (MST):	14:32
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

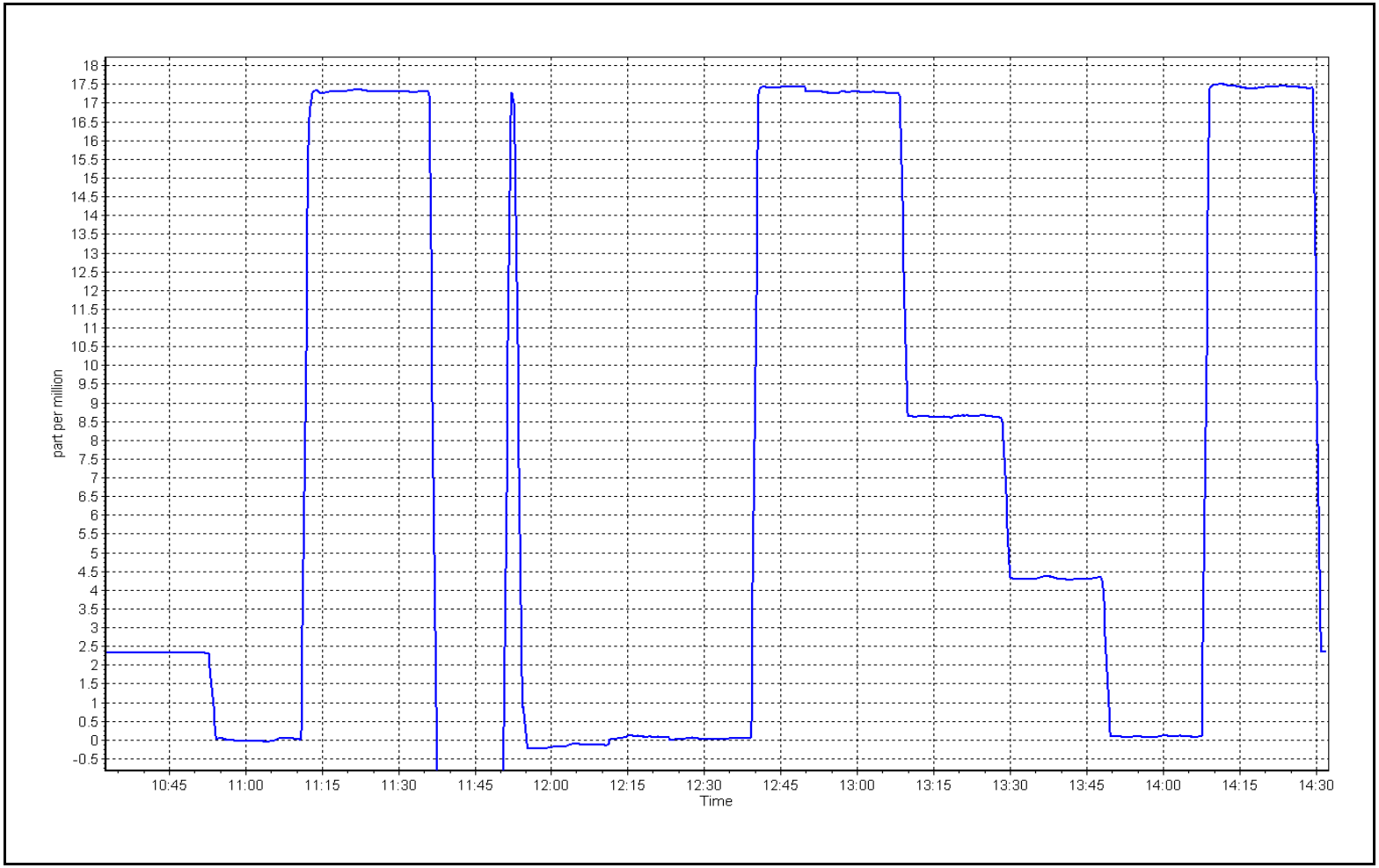
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.03	----
17.31	17.43	0.9933
8.65	8.61	1.0042
4.32	4.29	1.0082

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999941	*≥0.995*
Slope	1.005876	*0.90 - 1.10*
Intercept	-0.025252	*+/-1.5*



THC Calibration Plot Date: May 13, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Surmont 2
Station number:	AMS 29
Calibration Date:	May 8, 2024
Last Cal Date:	April 2, 2024
Start time (MST):	9:41
End time (MST):	14:13
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T12YYFE	Cal Gas Expiry Date:	October 30, 2024
NOX Cal Gas Conc:	47.46 ppm	NO Cal Gas Conc:	47.46 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	47.46 ppm	Removed Gas NO Conc:	47.46 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5472
ZAG make/model:	Teledyne API T701	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
AF High point	4916	84.3	800.1	800.1	0.0	776.5	773.2	3.3	1.0300	1.0344
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	800.2 ppb	NO =	798.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -3.0%
Baseline Corr 1st pt	NO_X =	776.8 ppb	NO =	773.5 ppb	As Found Statistics	*Percent Change	NO = -3.2%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1170050148

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.429	1.474	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.996	0.993	NOX bkgnd or offset:	1.4	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	173.8	177.4

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.001053	1.001124
NO_X Cal Offset:	-0.812441	-1.212303
NO Cal Slope:	1.000036	1.002811
NO Cal Offset:	-1.731680	-1.852292
NO_2 Cal Slope:	1.002282	1.000762
NO_2 Cal Offset:	0.146547	-0.703548

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
High point	4916	84.2	799.2	799.2	0.0	799.0	800.0	-1.2	1.0002	0.9990
Mid point	4958	42.1	399.6	399.6	0.0	399.6	399.4	0.2	1.0000	1.0005
Low point	4979	21.1	200.3	200.3	0.0	197.3	196.3	1.0	1.0151	1.0203
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
As left span	4916	84.2	799.2	799.2	0.0	796.5	400.7	395.8	1.0034	1.9945
							Average Correction Factor		1.0051	1.0066

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	794.5	403.0	391.5	391.3	1.0005	99.9%
Mid GPT point	794.5	605.8	188.7	188.2	1.0027	99.7%
Low GPT point	794.5	699.9	94.6	93.0	1.0172	98.3%
				Average Correction Factor	1.0068	99.3%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

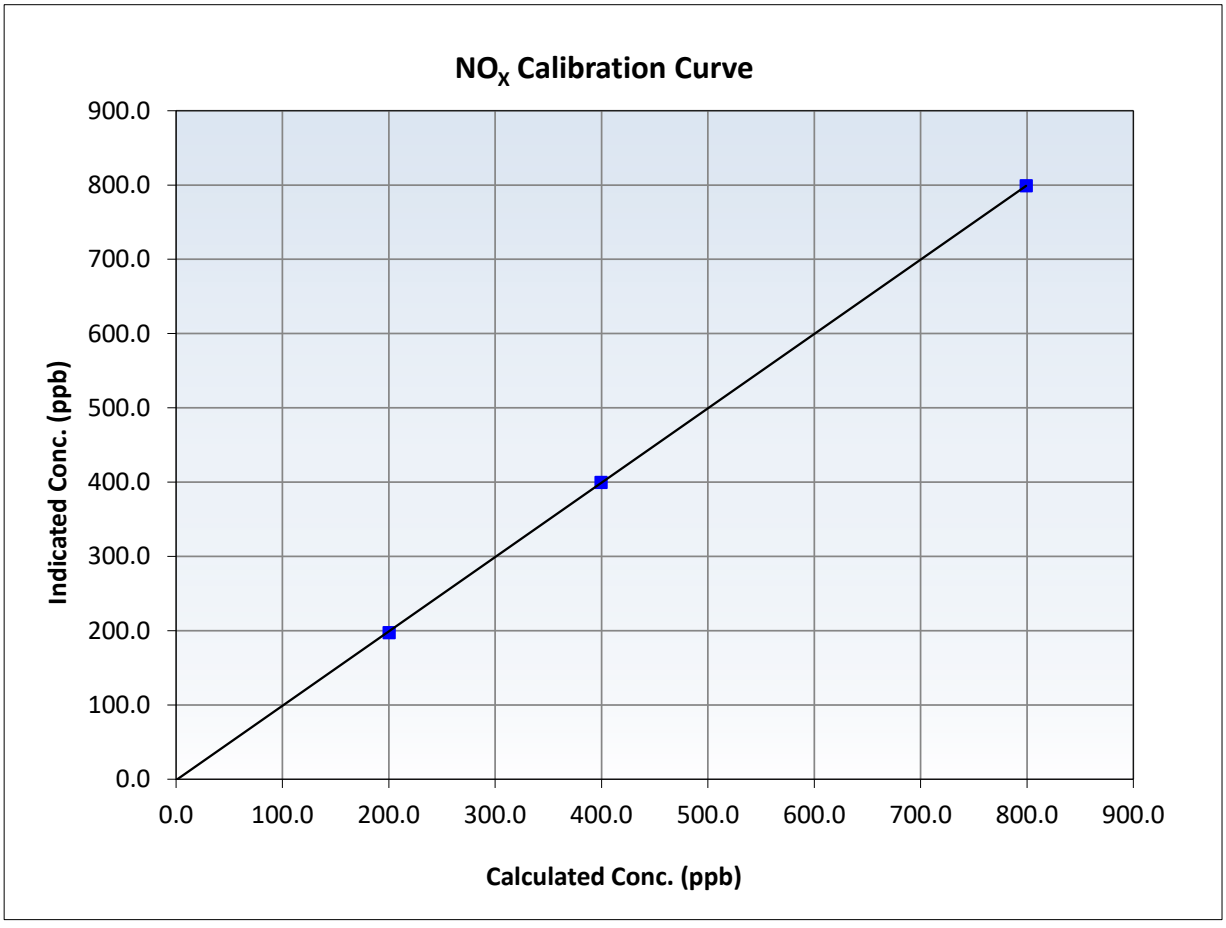
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:41	End Time (MST):	14:13
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.2	799.0	1.0002
399.6	399.6	1.0000
200.3	197.3	1.0151

Statistical Evaluation		Limits
Correlation Coefficient	0.999983	≥0.995
Slope	1.001124	0.90 - 1.10
Intercept	-1.212303	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

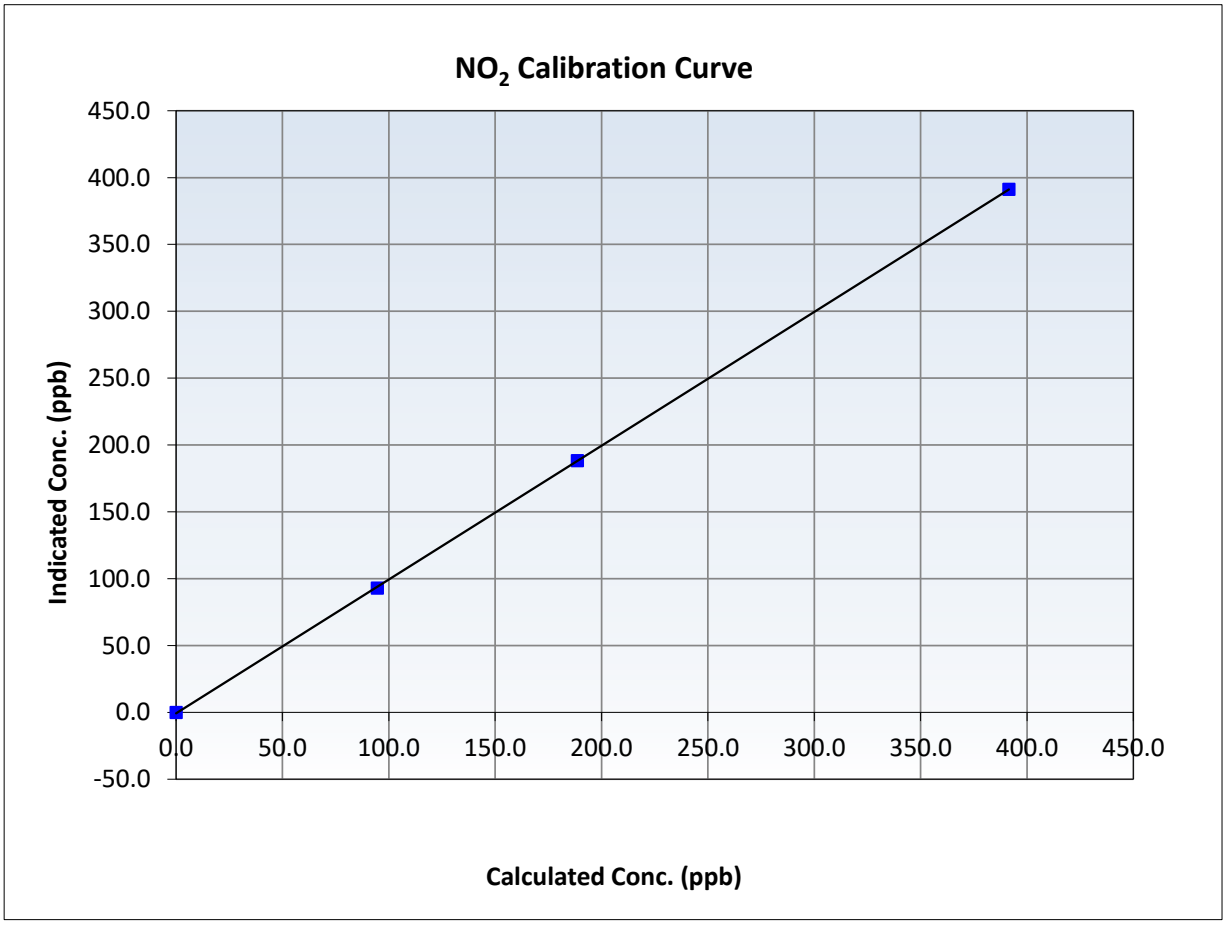
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:41	End Time (MST):	14:13
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
391.5	391.3	1.0005
188.7	188.2	1.0027
94.6	93.0	1.0172

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999982	*≥0.995*
Slope	1.000762	*0.90 - 1.10*
Intercept	-0.703548	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

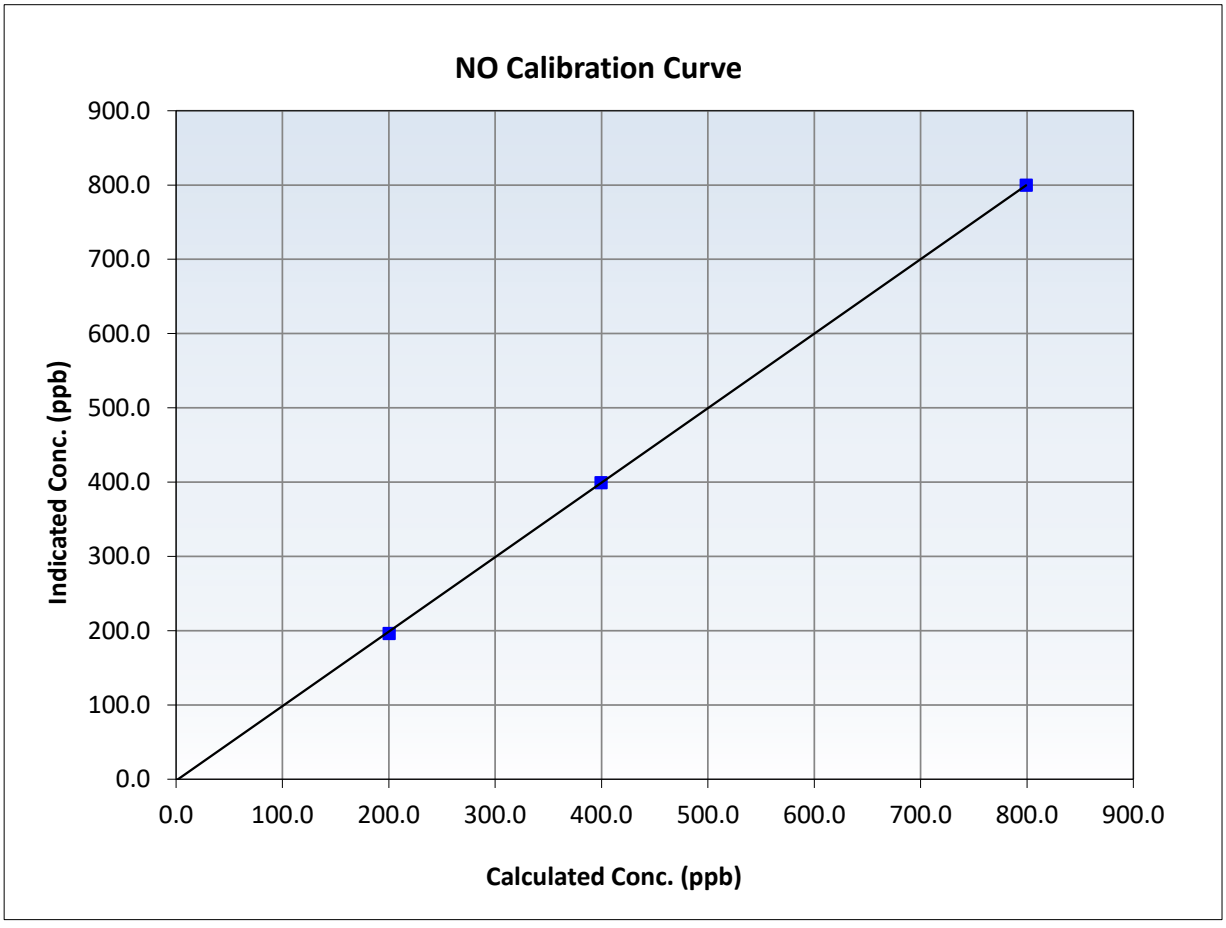
Station Information

Calibration Date:	May 8, 2024	Previous Calibration:	April 2, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:41	End Time (MST):	14:13
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

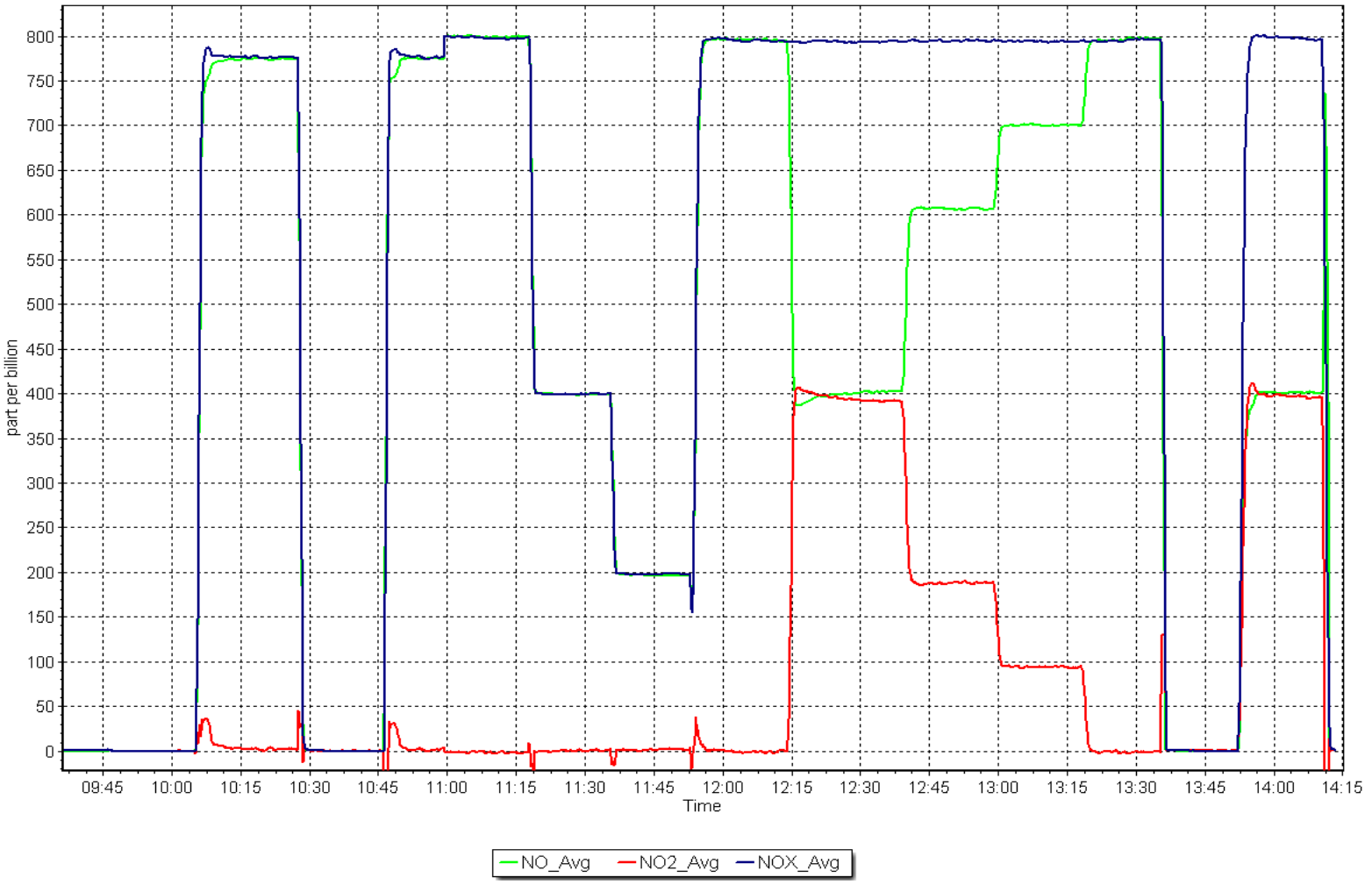
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.2	800.0	0.9990
399.6	399.4	1.0005
200.3	196.3	1.0203

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999969	*≥0.995*
Slope	1.002811	*0.90 - 1.10*
Intercept	-1.852292	*+/-20*



NO_X Calibration Plot Date: May 8, 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:	May 9, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	12:49	End time (MST):	13:16
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)	17.7	18.51	17.7	☐	+/- 2 °C
P (mmHg)	714.4	715.67	714.4	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.111	5.00	☐	+/- 0.25 LPM
PW% (pump)	34	-----	34	☐	>80%
Zero Verification	PM w/o HEPA:	9.7	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				☐	+/- 0.5

Date Optical Chamber Cleaned: April 15, 2024

Date Disposable Filter Changed: April 15, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: Otober 25, 2023

Date RH/T Sensor Cleaned: October 25, 2023

Notes: Verified temperature, pressure and flow. No adjustments made.

Calibration by: Braiden Boutilier

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30
ELLS RIVER
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	May 16, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	9:43	End time (MST):	13:19
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.53	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC494126			
Removed Cal Gas Conc:	50.53	ppm	Rem Gas Exp Date:	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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997233	1.002830	Backgd or Offset:	9.5	9.5
Calibration intercept:	-2.355844	-2.515950	Coeff or Slope:	0.982	0.992

SO_2 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	4921	79.2	800.4	792.8	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.0	Previous response	795.8	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.2	800.4	801.4	0.999
Mid point	4960	39.6	400.2	397.5	1.007
Low point	4980	19.8	200.1	195.7	1.023
As left zero	5000	0.0	0.0	0.0	----
As left span	4921	79.2	800.4	803.1	0.997
				Average Correction Factor:	1.009

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

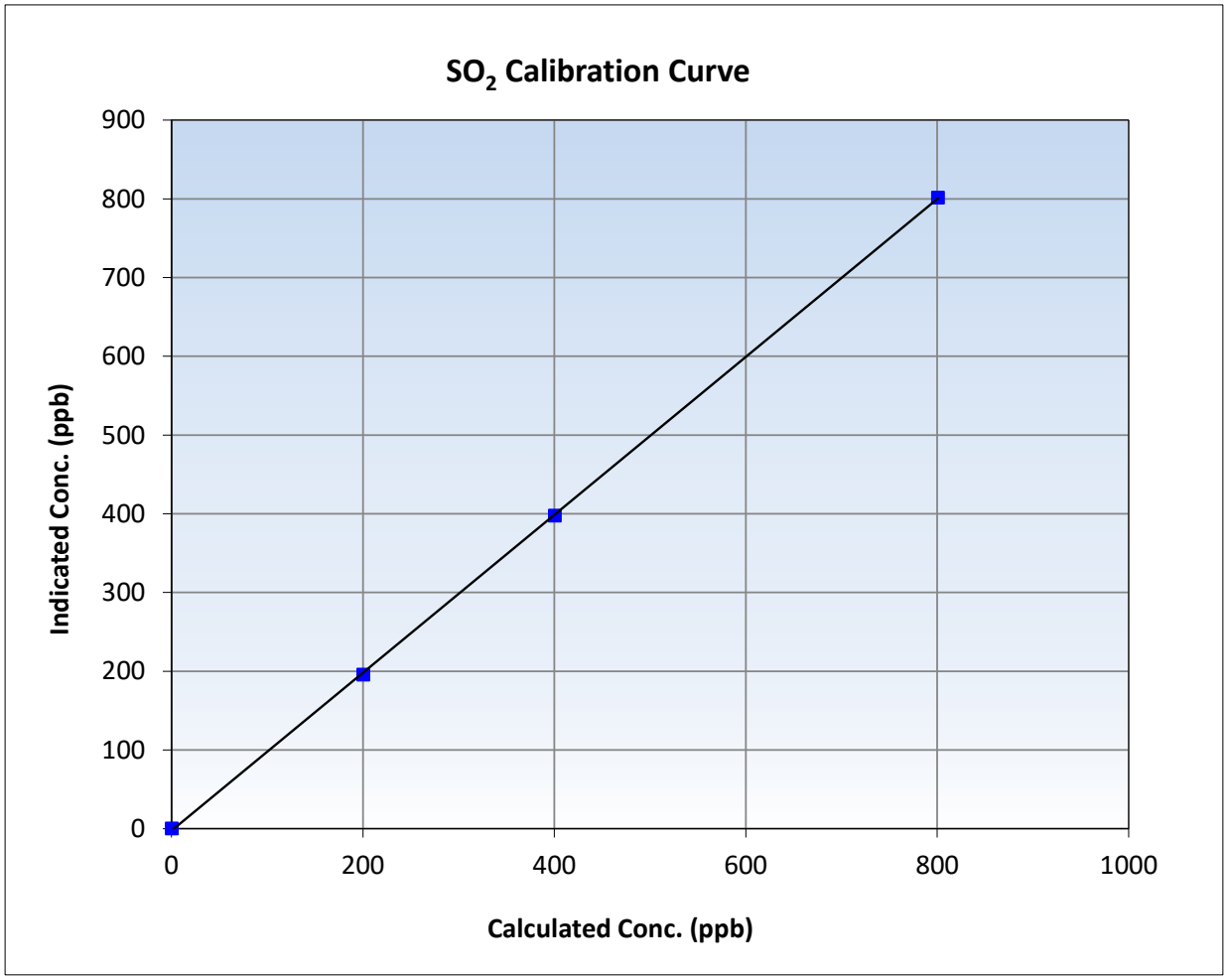
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 4, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:43	End Time (MST):	13:19
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397

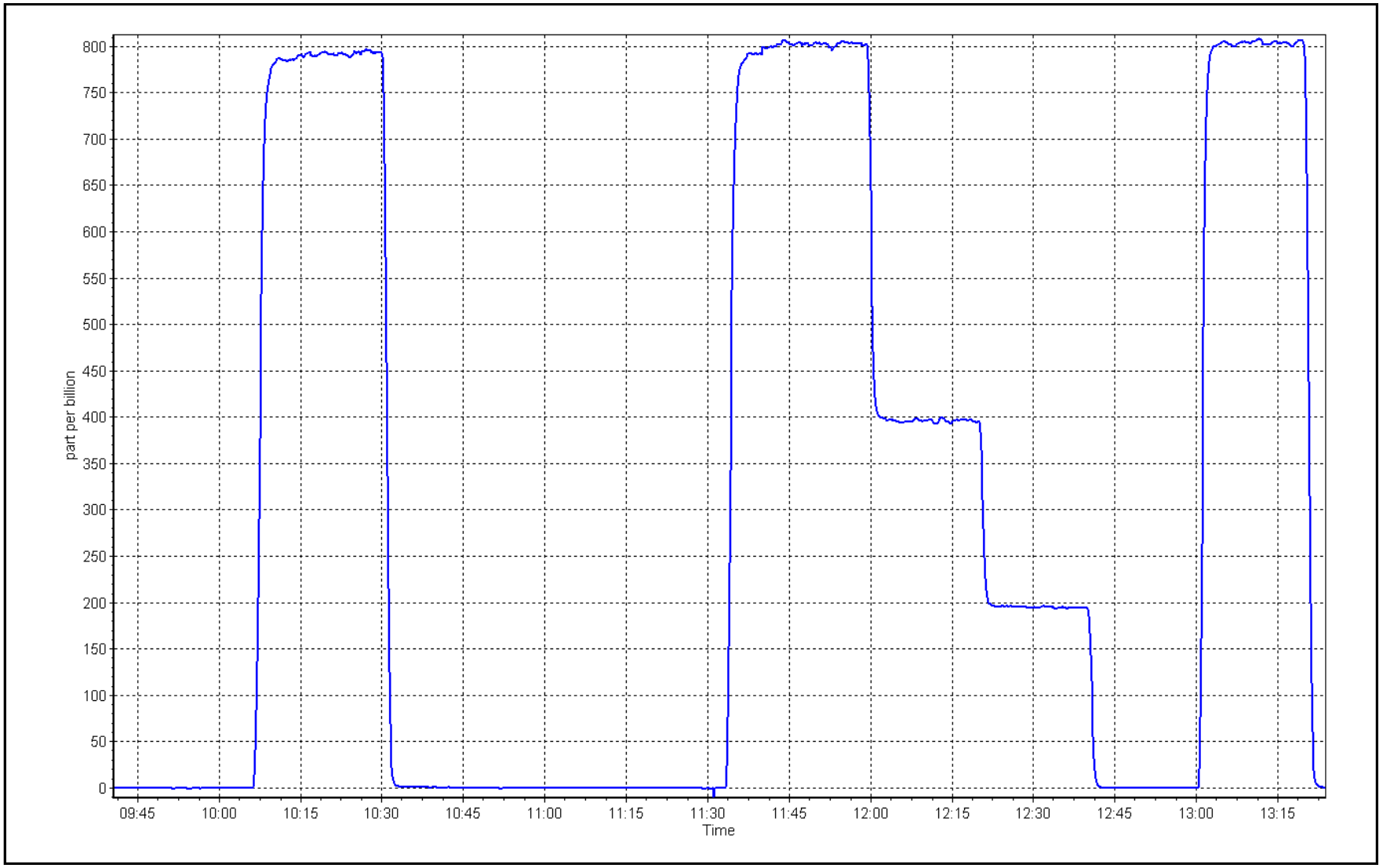
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.4	801.4	0.9987
400.2	397.5	1.0069
200.1	195.7	1.0225

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999955	*≥0.995*
Slope	1.002830	*0.90 - 1.10*
Intercept	-2.515950	*+/-30*



SO2 Calibration Plot Date: May 16, 2024 Location: Ells River



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	May 9, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	9:03	End time (MST):	13:10
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.99	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	CC505806			
Removed Cal Gas Conc:	4.99	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3061
ZAG Make/Model:	API T701H		Serial Number:	358

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1410661331
Converter make:	CDN- 101		Converter serial #:	562
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.005758	1.009186	Backgd or Offset:	1.6	1.7
Calibration intercept:	-0.080404	-0.200410	Coeff or Slope:	1.060	1.082

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	80.0	78.9	1.013
As found Mid point	4960	40.1	40.0	39.2	1.018
As found Low point	4980	20.0	20.0	19.4	1.024
New cylinder response					

Baseline Corr As found:	79.0	Prev response:	80.42	*% change:	-1.8%
Baseline Corr 2nd AF pt:	39.3	AF Slope:	0.987629	AF Intercept:	-0.220806
Baseline Corr 3rd AF pt:	19.5	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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.2	80.0	80.7	0.992
Mid point	4960	40.1	40.0	40.0	1.000
Low point	4980	20.0	20.0	19.8	1.008
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.2	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.2	792.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.000
Date of last converter efficiency test:					

Notes: Change sample inlet filters and pump after multipoint as founds. Sox scrubber check done after calibrator zero and passed. Adjusted span only.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

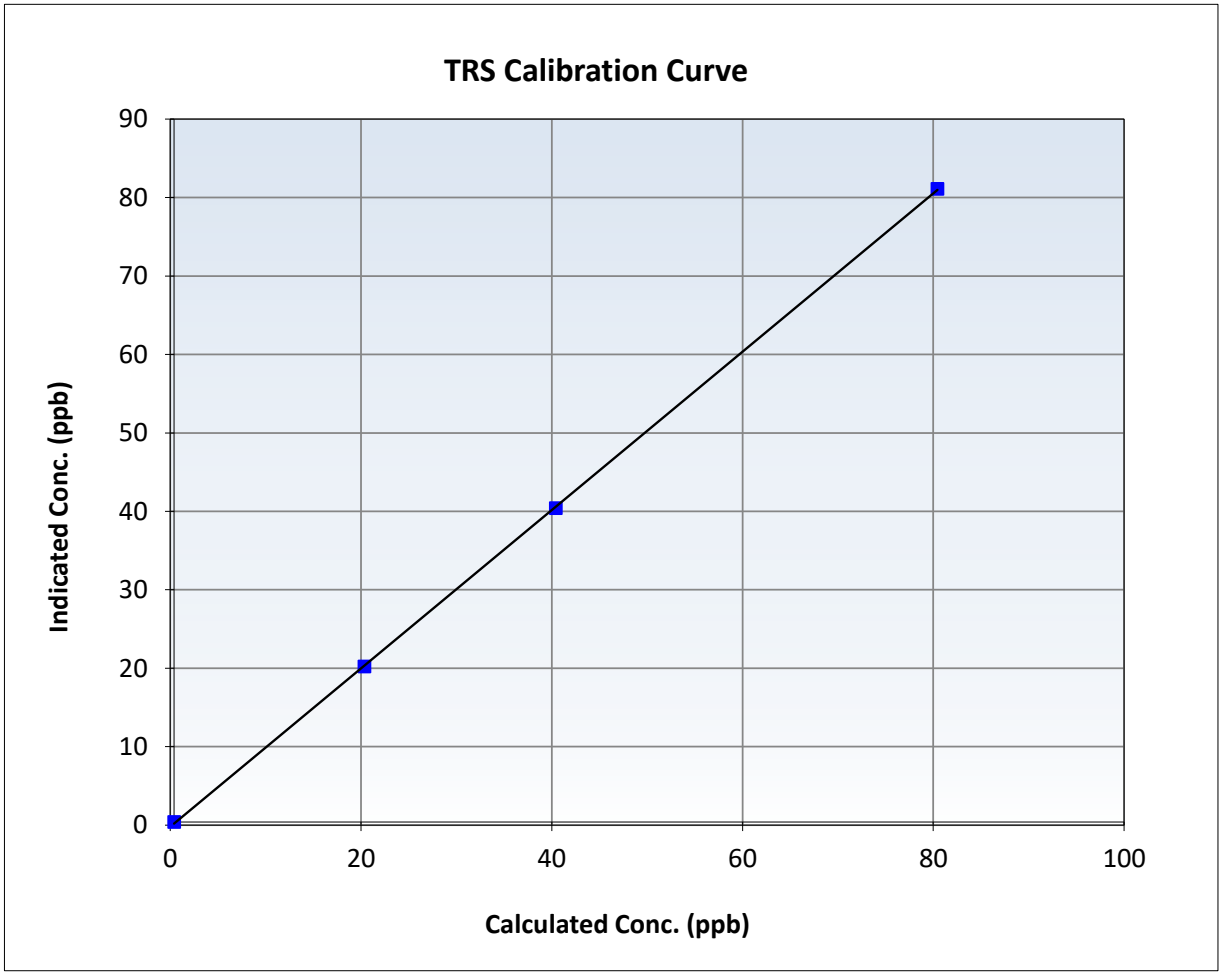
TRS Calibration Summary

Station Information

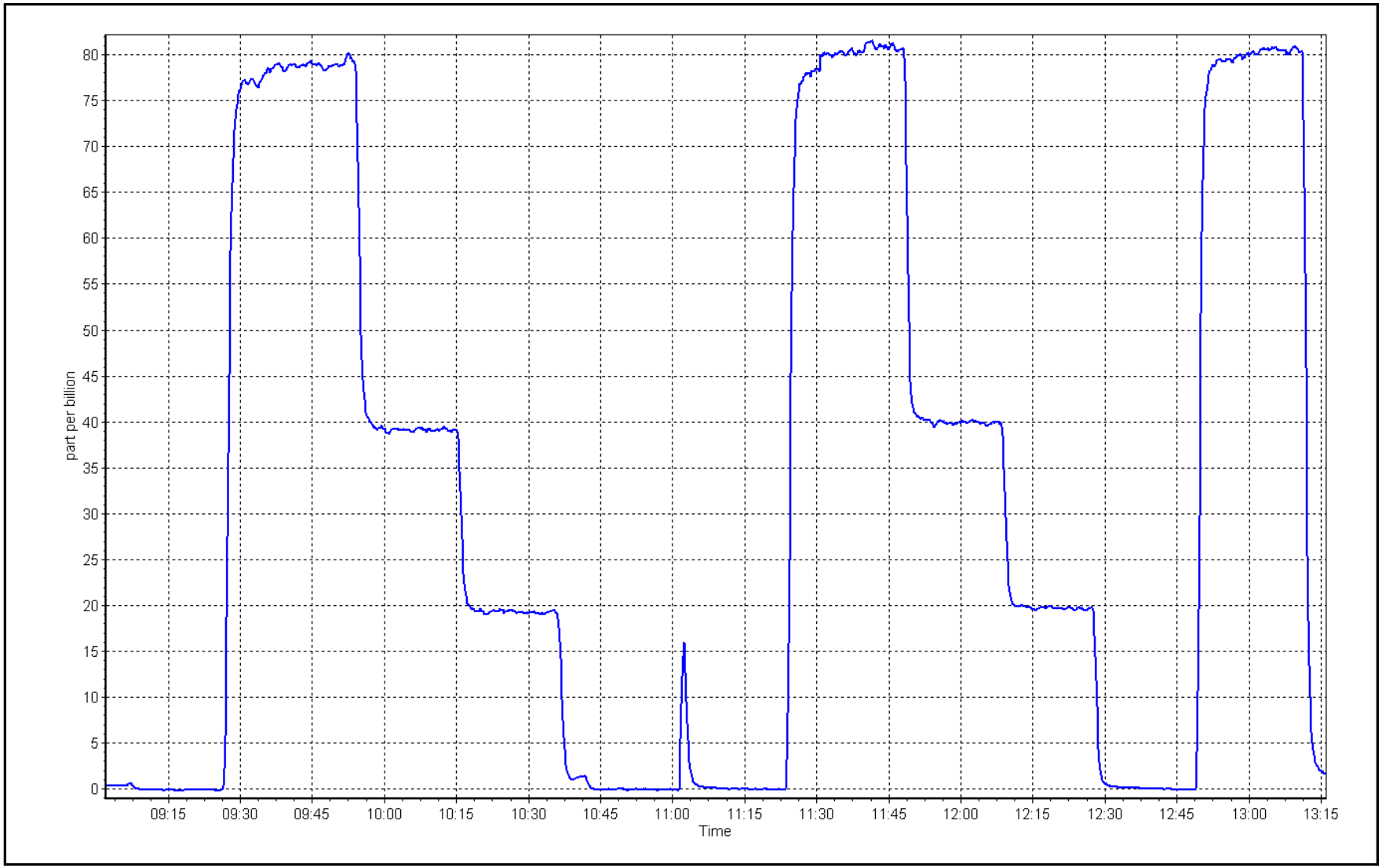
Calibration Date:	May 9, 2024	Previous Calibration:	April 2, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:03	End Time (MST):	13:10
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999969	*≥0.995*
80.0	80.7	0.9918	Slope	1.009186	*0.90 - 1.10*
40.0	40.0	1.0005			
20.0	19.8	1.0081	Intercept	-0.200410	*+/-3*



TRS Calibration Plot Date: May 9, 2024 Location: Ells River



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	May 16, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	9:43	End time (MST):	13:19
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC494126		Cal Gas Expiry Date:	December 29, 2028	
CH4 Cal Gas Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm
C3H8 Cal Gas Conc.	209.2	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm
Removed C3H8 Conc.	209.2	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3061	
Zero Air Gen model:	API T701H		Serial Number:	358	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1152430011	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.07E-04	3.12E-04	NMHC SP Ratio:	6.43E-05	6.31E-05
CH4 Retention time:	17.4	17.4	NMHC Peak Area:	141658	144334
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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.2	17.03	17.05	0.999
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.05	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)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.2	17.03	17.03	1.000
Mid point	4960	39.6	8.51	8.44	1.008
Low point	4980	19.8	4.26	4.19	1.016
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	17.03	17.03	1.000
				Average Correction Factor	1.008

Notes: Sample inlet filters, H2 cylinder, and N2 cylinder was changed after as founds. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.2	9.11	9.25	0.985
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.25	Prev response	9.28	*% change	-0.3%
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	4921	79.2	9.11	9.11	1.000
Mid point	4960	39.6	4.56	4.53	1.006
Low point	4980	19.8	2.28	2.26	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	9.11	9.11	1.000
				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)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.2	7.91	7.79	1.016
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.79	Prev response	7.85	*% change	-0.7%
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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.2	7.91	7.92	0.999
Mid point	4960	39.6	3.96	3.92	1.011
Low point	4980	19.8	1.98	1.93	1.024
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	7.91	7.91	1.000
				Average Correction Factor	1.011

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.008470	1.001295
THC Cal Offset:	-0.047141	-0.042939
CH4 Cal Slope:	0.994402	1.002344
CH4 Cal Offset:	-0.025556	-0.028557
NMHC Cal Slope:	1.020664	1.000672
NMHC Cal Offset:	-0.021985	-0.014781

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

THC Calibration Summary

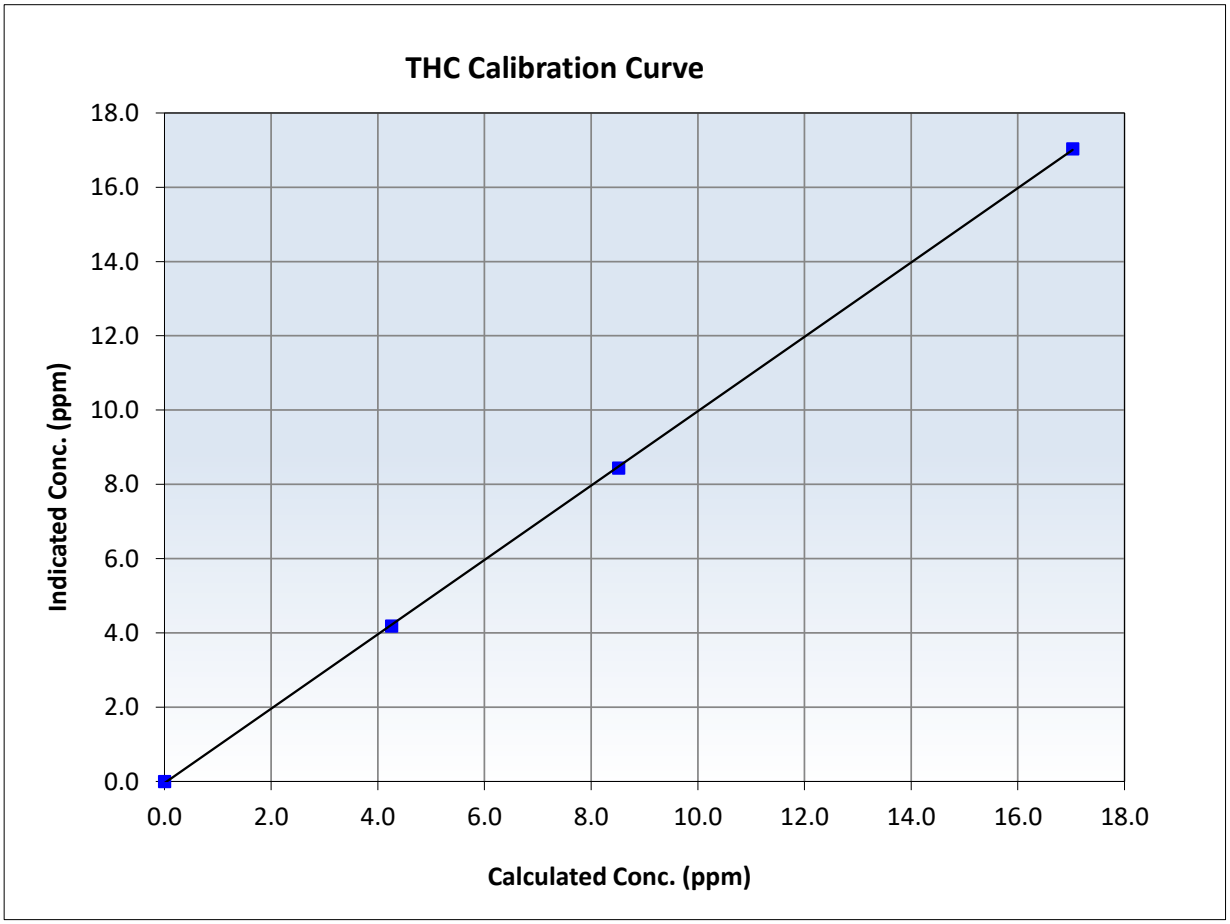
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 4, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:43	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)
0.00	0.00	----
17.03	17.03	0.9996
8.51	8.44	1.0085
4.26	4.19	1.0163

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	1.001295	*0.90 - 1.10*
Intercept	-0.042939	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

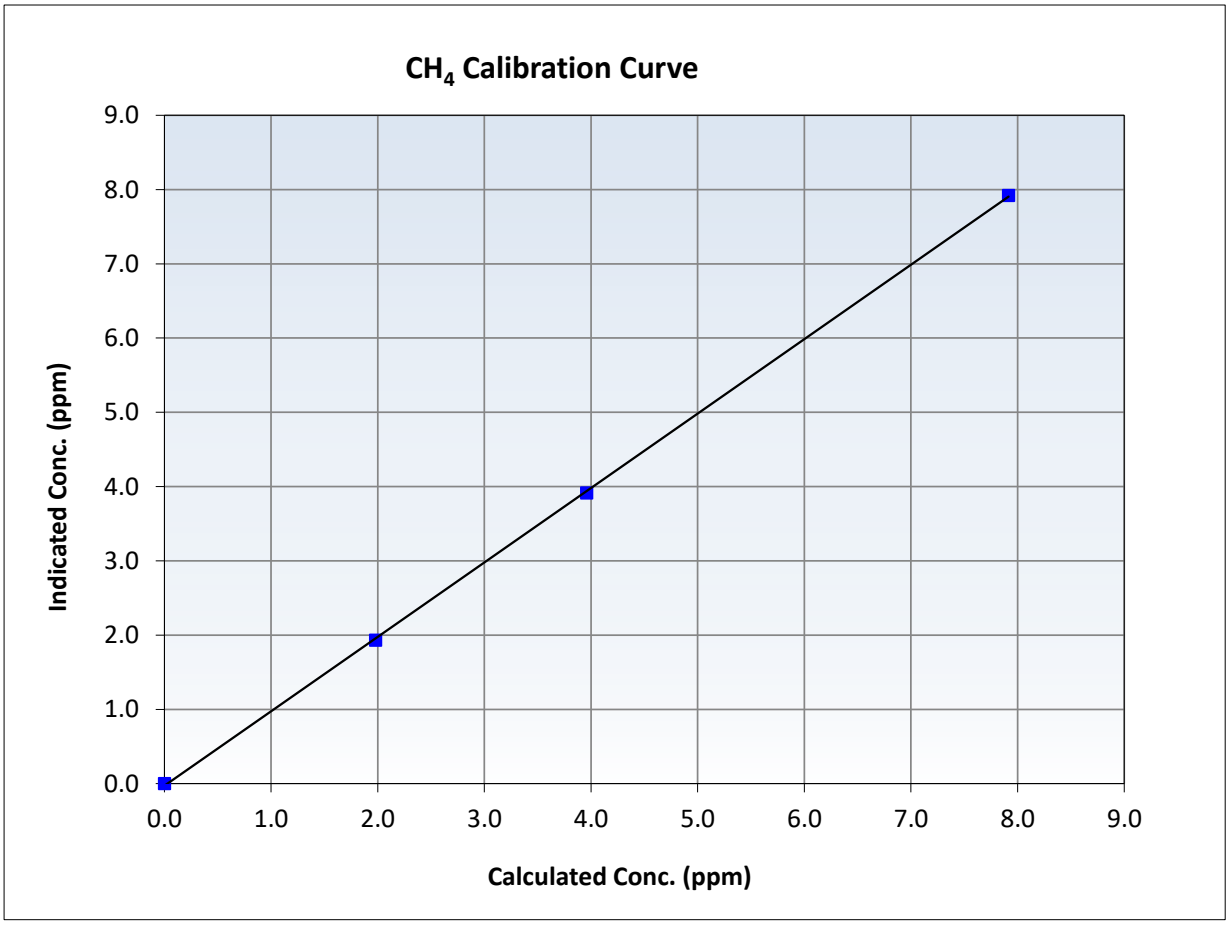
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 4, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:43	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)
0.00	0.00	----
7.91	7.92	0.9991
3.96	3.92	1.0107
1.98	1.93	1.0243

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999938	*≥0.995*
Slope	1.002344	*0.90 - 1.10*
Intercept	-0.028557	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

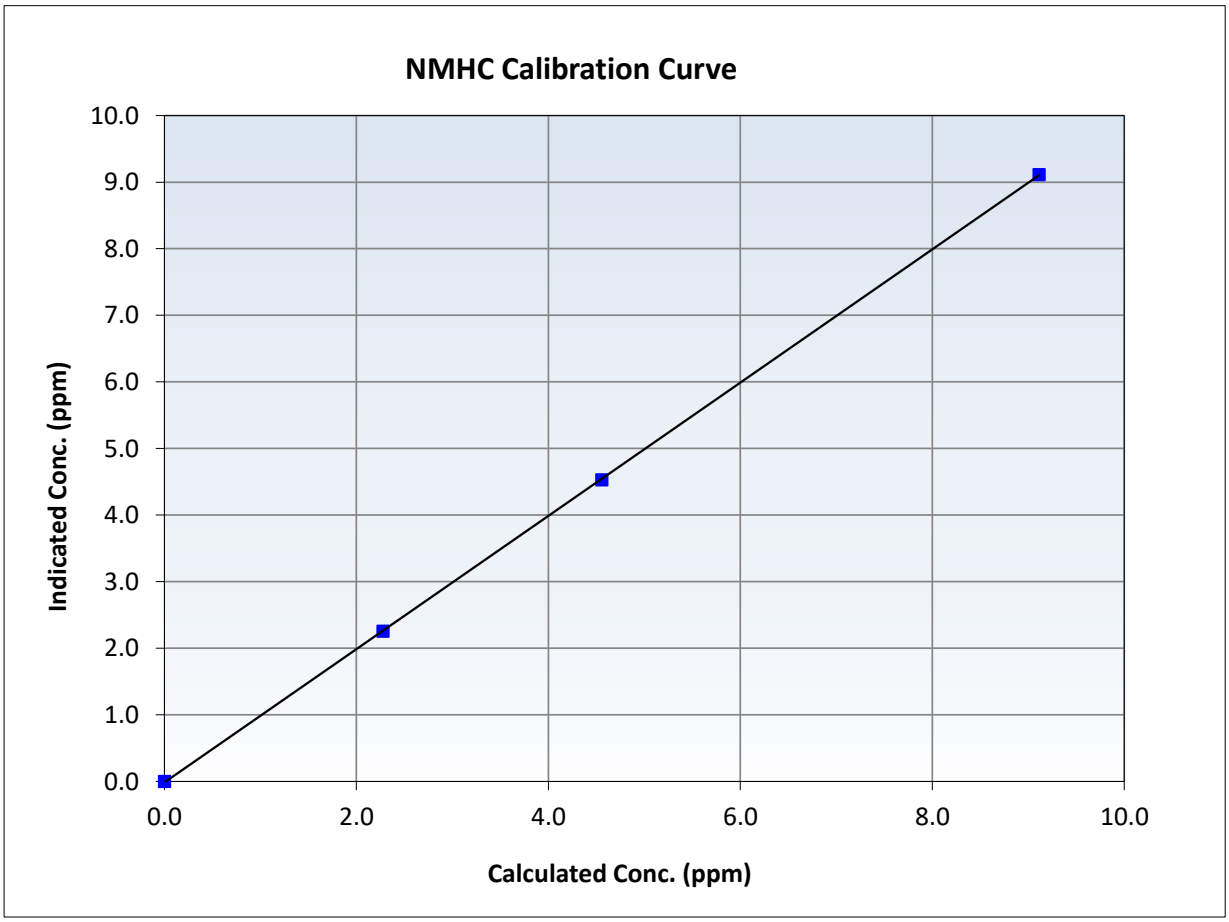
Station Information

Calibration Date:	May 16, 2024	Previous Calibration:	April 4, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:43	End Time (MST):	13:19
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

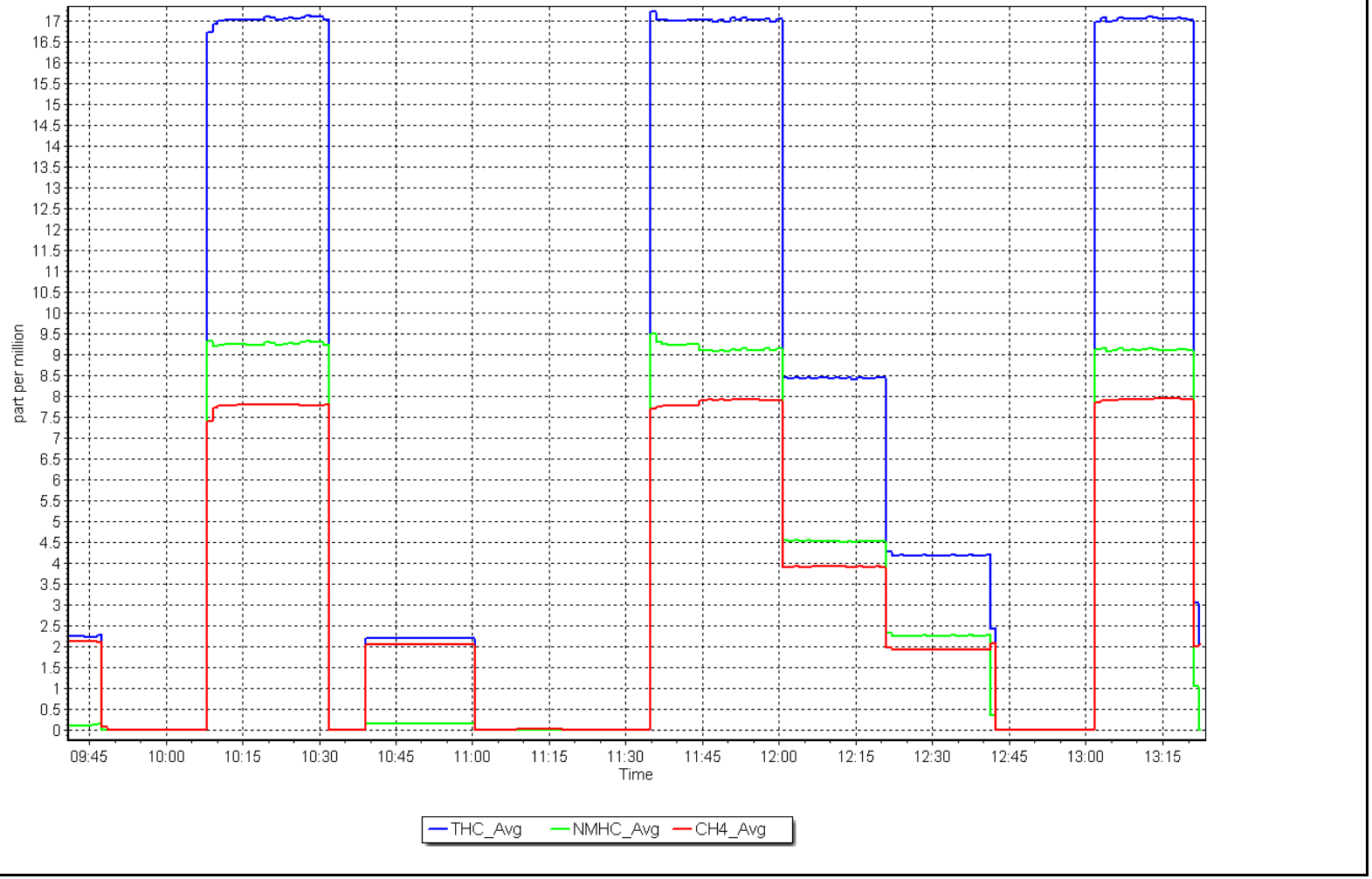
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.11	9.11	0.9998
4.56	4.53	1.0061
2.28	2.26	1.0099

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	1.000672	*0.90 - 1.10*
Intercept	-0.014781	*+/-0.5*



NMHC Calibration Plot Date: May 16, 2024 Location: Ells River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Ells River
Station number:	AMS 30
Calibration Date:	May 22, 2024
Last Cal Date:	April 5, 2024
Start time (MST):	8:00
End time (MST):	12:45
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0027487	Cal Gas Expiry Date:	January 9, 2032
NOX Cal Gas Conc:	59.30 ppm	NO Cal Gas Conc:	59.10 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	59.30 ppm	Removed Gas NO Conc:	59.10 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3061
ZAG make/model:	API T701H	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)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
AF High point	4932	67.7	803.0	800.3	2.7	806.3	801.1	5.3	0.9957	0.9988
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.7 ppb	NO = 798.3 ppb
Baseline Corr 1st pt	NO_X = 806.4 ppb	NO = 801.2 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = 0.8%
As found	NO r^2:	*Percent Change	NO = 0.4%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 710321429

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.195	1.195	NO bkgnd or offset:	14.0	14.0
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	13.9	13.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	193.6	193.6

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.996856	0.999915
NO_X Cal Offset:	-0.719188	-0.918381
NO Cal Slope:	0.999360	1.001445
NO Cal Offset:	-1.439899	-2.419656
NO_2 Cal Slope:	0.994435	0.998908
NO_2 Cal Offset:	0.194273	-0.395536

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
High point	4932	67.7	803.0	800.3	2.7	802.3	800.0	2.2	1.0008	1.0003
Mid point	4966	33.8	400.9	399.5	1.4	400.1	397.2	2.9	1.0020	1.0059
Low point	4983	16.9	200.4	199.8	0.7	197.9	194.6	3.4	1.0128	1.0265
As left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
As left span	4932	67.7	803.0	414.4	388.6	803.7	414.4	389.3	0.9991	1.0000
								Average Correction Factor	1.0052	1.0109

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	798.3	410.2	390.8	390.1	1.0018	99.8%
Mid GPT point	798.3	612.8	188.2	187.8	1.0022	99.8%
Low GPT point	798.3	700.2	100.8	99.5	1.0131	98.7%
				Average Correction Factor	1.0057	99.4%

Notes: Sample inlet filters changed after as founds. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

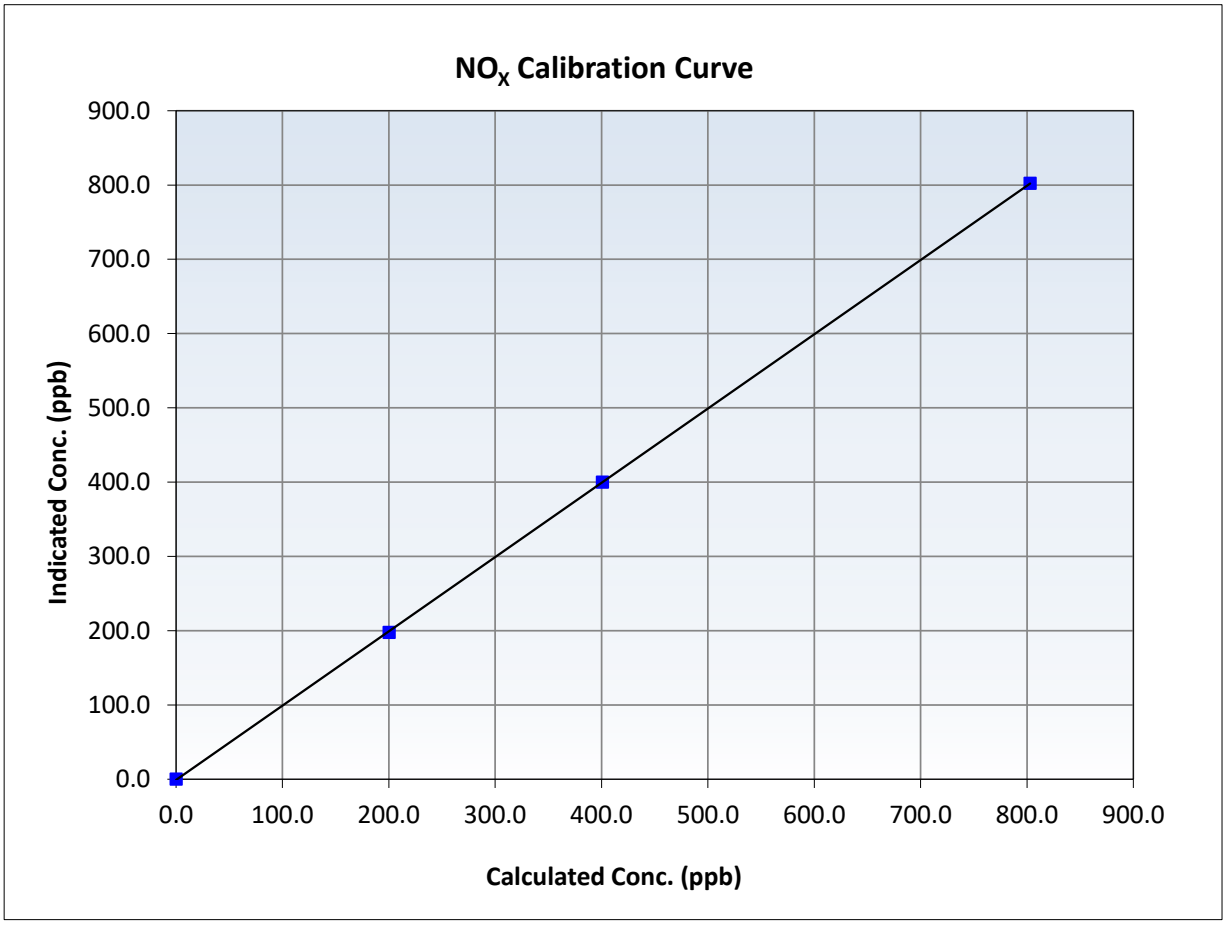
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 5, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:00	End Time (MST):	12:45
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
803.0	802.3	1.0008
400.9	400.1	1.0020
200.4	197.9	1.0128

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	0.999915	*0.90 - 1.10*
Intercept	-0.918381	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

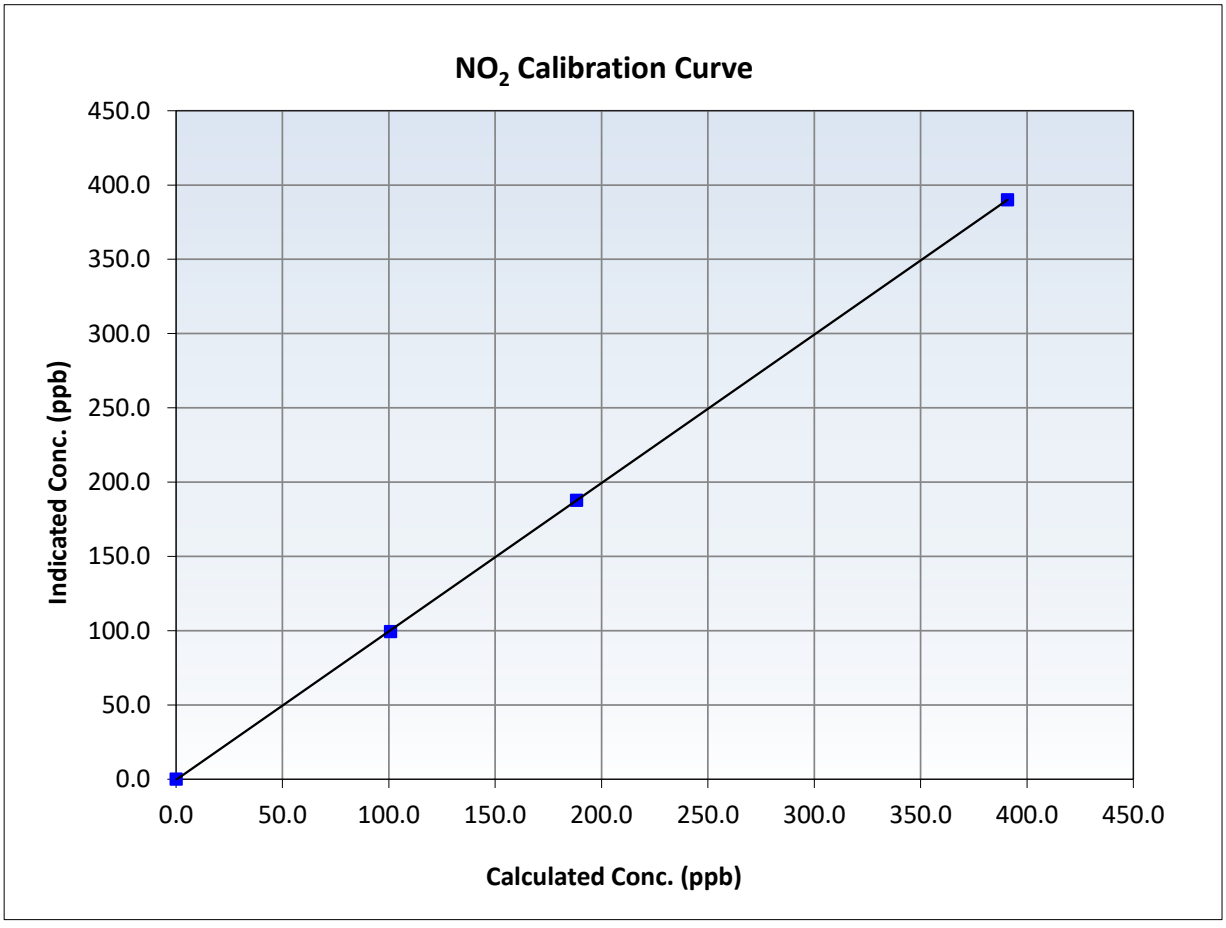
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 5, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:00	End Time (MST):	12:45
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
390.8	390.1	1.0018
188.2	187.8	1.0022
100.8	99.5	1.0131

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	0.998908	*0.90 - 1.10*
Intercept	-0.395536	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

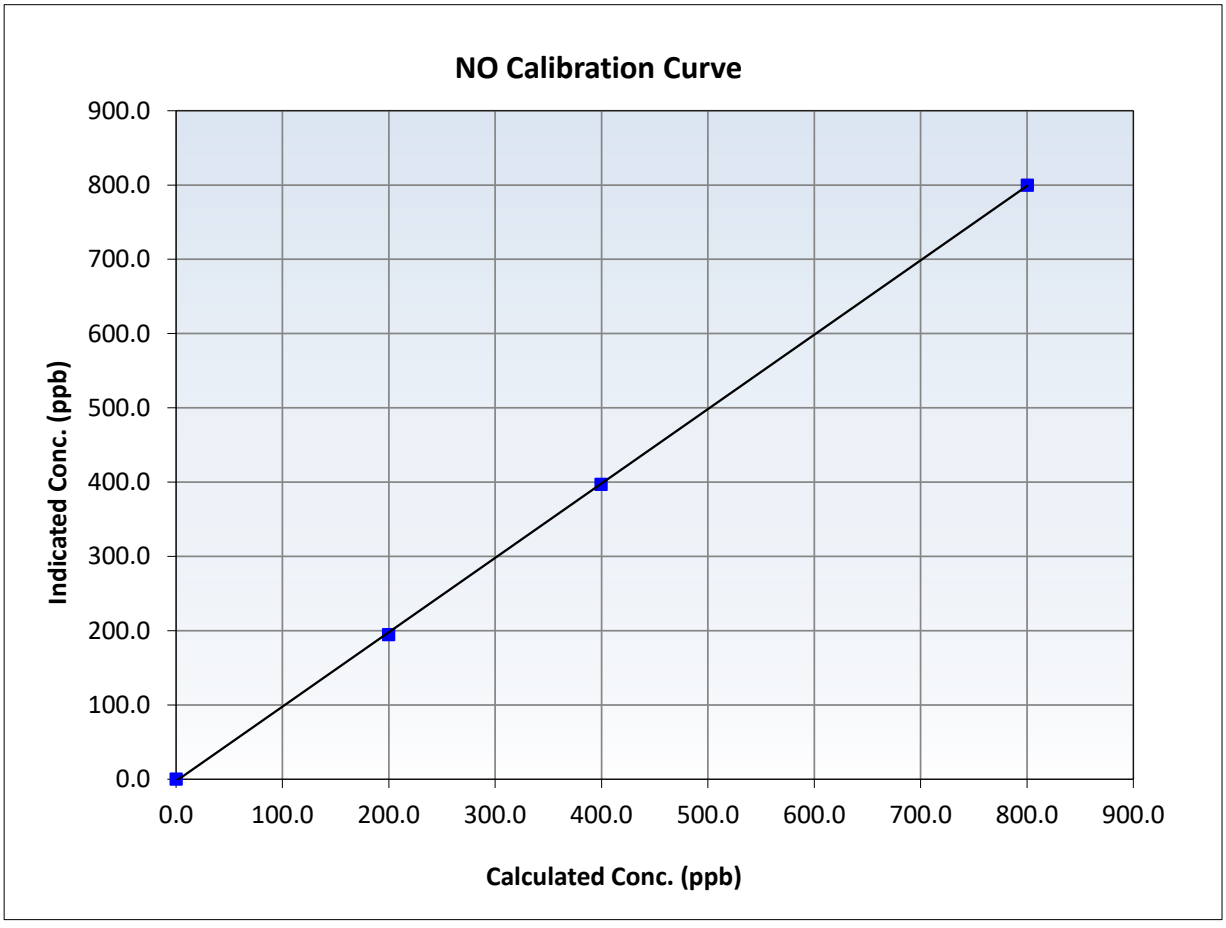
Station Information

Calibration Date:	May 22, 2024	Previous Calibration:	April 5, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:00	End Time (MST):	12:45
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

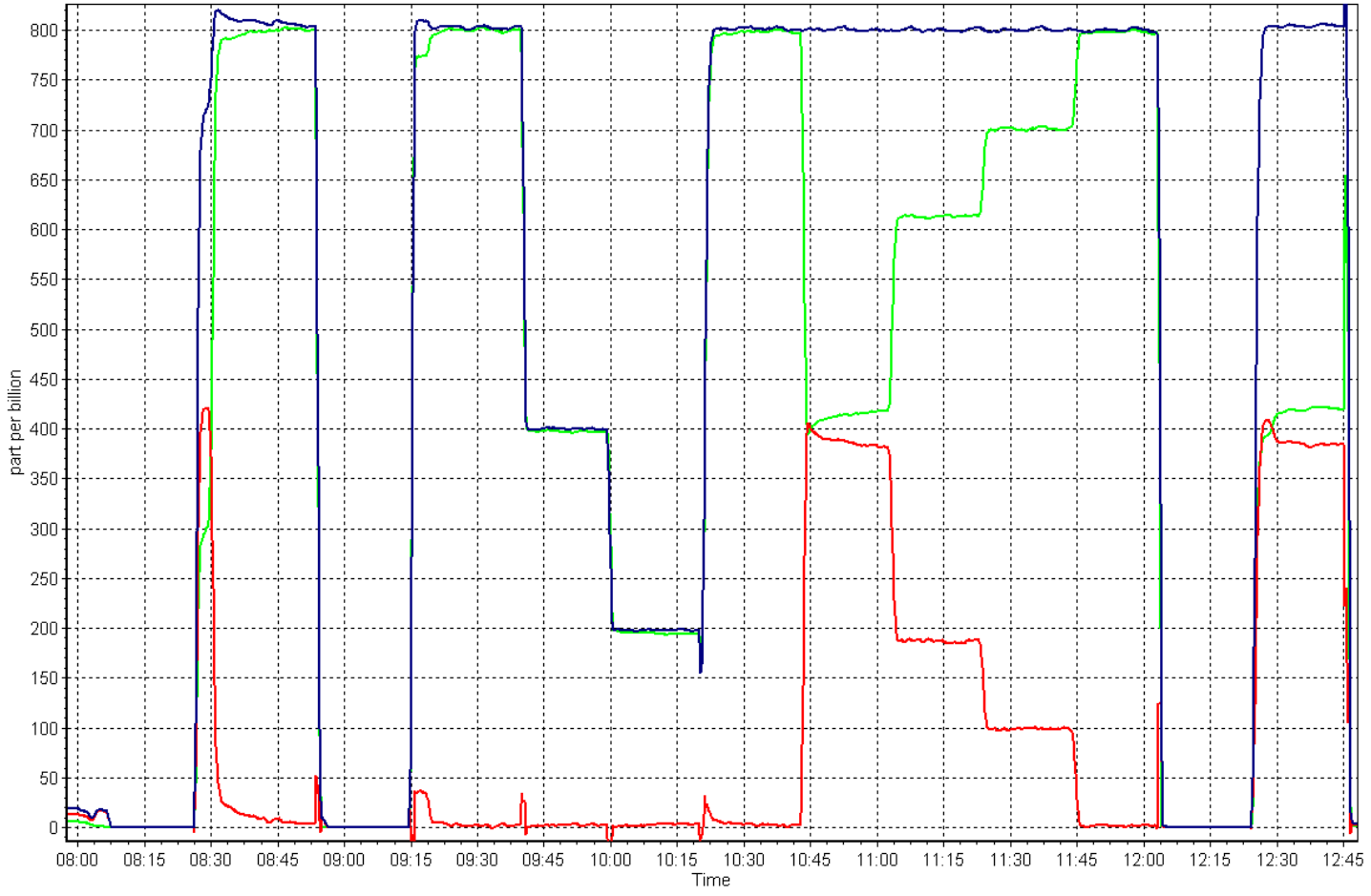
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	800.0	1.0003
399.5	397.2	1.0059
199.8	194.6	1.0265

Statistical Evaluation		Limits
Correlation Coefficient	0.999952	≥0.995
Slope	1.001445	0.90 - 1.10
Intercept	-2.419656	+/-20



NO_X Calibration Plot Date: May 22, 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:	May 21, 2024	Last Cal Date:	April 4, 2024
Start time (MST):	11:34	End time (MST):	12:31
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 (^{o}C)	10.30	9.84	10.30	☐	+/- 2 ^{o}C
P (mmHg)	730.40	732.16	730.40	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.05	4.98	☐	+/- 0.25 LPM
PW% (pump)	39	-----	39	☐	>80%
Zero Verification	PM w/o HEPA:	1.90	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	9.00	12.20	11.20	☑	+/- 0.5

Date Optical Chamber Cleaned: May 21, 2024

Date Disposable Filter Changed: May 21, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.00 <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 and pressure. Disposable filter changed. Leak check passed. No adjustment made.

Calibration by: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS505
SAWBONES BAY
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	May 31, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	10:07	End time (MST):	13:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	51.40	ppm	Cal Gas Exp Date:	February 15, 2029
Cal Gas Cylinder #:	EY0000672			
Removed Cal Gas Conc:	51.40	ppm	Rem Gas Exp Date:	February 15, 2029
Removed Gas Cyl #:	EY0000672		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	5112
Zero Air Gen Model:	Teledyne API T701H		Serial Number:	690

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	710321323	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.008070	1.003853	Backgd or Offset:	20.3	20.8
Calibration intercept:	-1.013890	-1.712657	Coeff or Slope:	1.001	0.995

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4922	77.8	799.8	803.0	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	803.1	Previous response	805.3	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4922	77.8	799.8	802.0	0.997
Mid point	4961	38.9	399.9	399.0	1.002
Low point	4981	19.5	200.4	197.7	1.014
As left zero	5000	0.0	0.0	-0.3	----
As left span	4922	77.8	799.8	803.0	0.996
				Average Correction Factor:	1.004

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

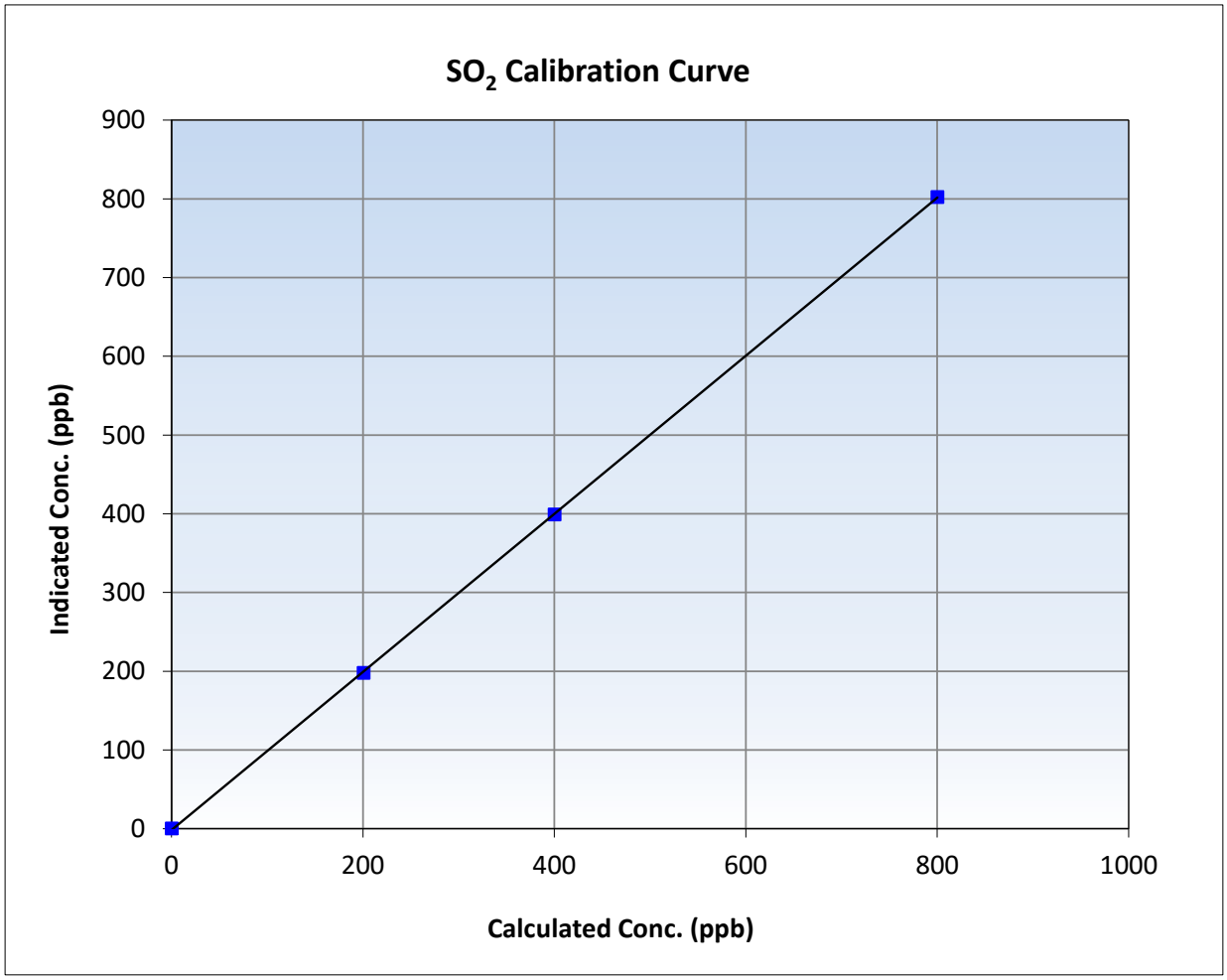
Station Information

Calibration Date:	May 31, 2024	Previous Calibration:	April 17, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	10:07	End Time (MST):	13:05
Analyzer make:	Thermo 43i	Analyzer serial #:	710321323

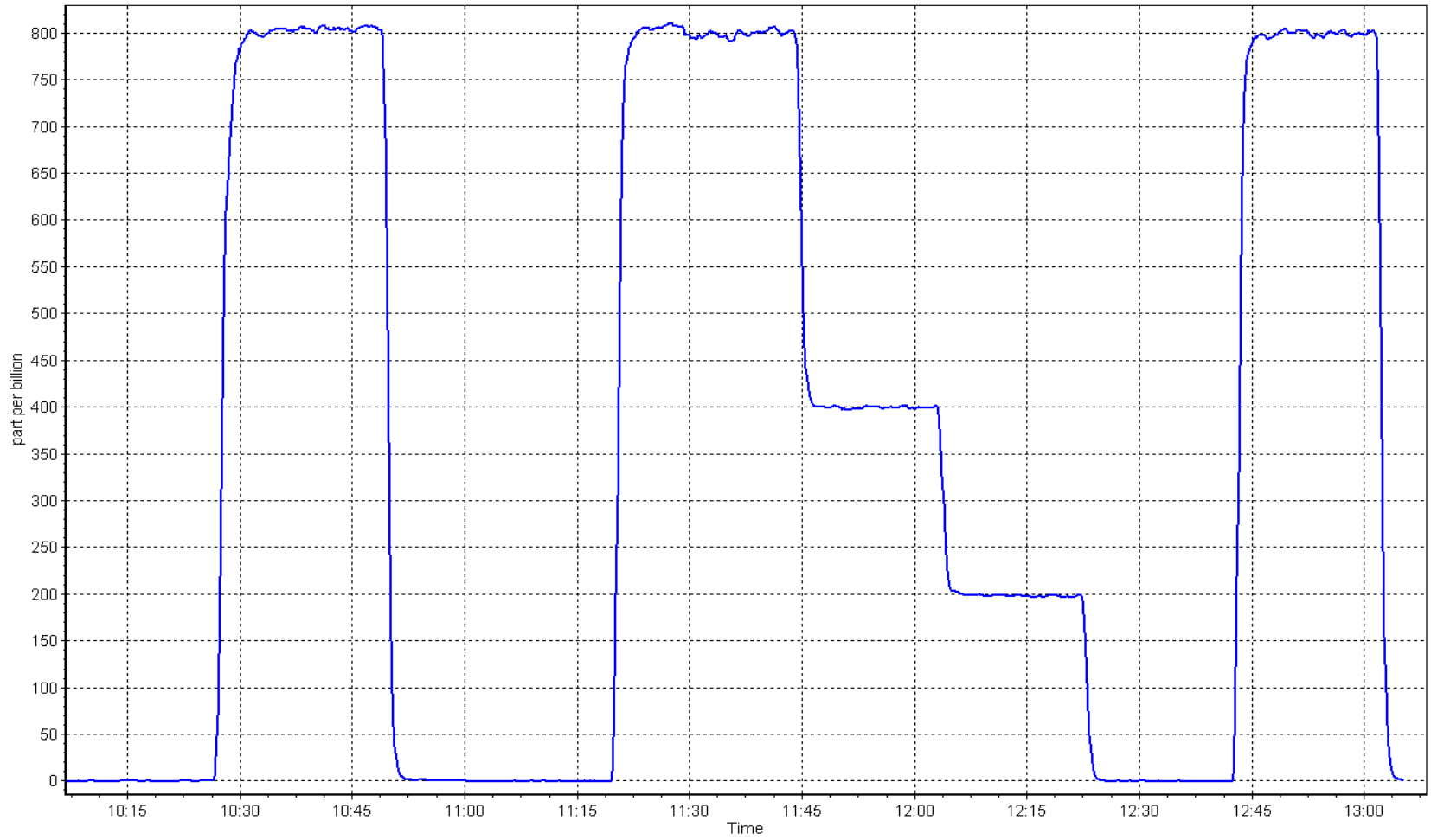
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.8	802.0	0.9973
399.9	399.0	1.0023
200.4	197.7	1.0139

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	1.003853	*0.90 - 1.10*
Intercept	-1.712657	*+/-30*



SO2 Calibration Plot Date: May 31, 2024 Location: Sawbones Bay



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	May 29, 2024	Last Cal Date:	April 24, 2024
Start time (MST):	9:42	End time (MST):	14:45
Reason:	Routine	H2S cylinder changed	

Calibration Standards

Cal Gas Concentration:	5.26	ppm	Cal Gas Exp Date:	March 19, 2027
Cal Gas Cylinder #:	DT0034141			
Removed Cal Gas Conc:	5.15	ppm	Rem Gas Exp Date:	February 5, 2024
Removed Gas Cyl #:	CC517397		Diff between cyl:	-1.4%
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5112
ZAG Make/Model:	Teledyne API T701		Serial Number:	690

Analyzer Information

Analyzer make:	Thermo 43iQ		Analyzer serial #:	12113311965
Converter make:	Global 150		Converter serial #:	2022-224
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998937	0.999743	Backgd or Offset:	0.990	1.450
Calibration intercept:	-0.158258	-0.320000	Coeff or Slope:	1.092	1.105

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4922	77.7	80.0	80.1	0.998
As found Mid point	4961	38.8	40.0	40.0	0.997
As found Low point	4981	19.4	20.0	19.7	1.009
New cylinder response	4924	76.0	80.0	78.9	1.013

Baseline Corr As found:	80.2	Prev response:	79.79	*% change:	0.5%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	1.003075	AF Intercept:	-0.178053
Baseline Corr 3rd AF pt:	19.8	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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4924	76.0	80.0	79.7	1.003
Mid point	4962	38.0	40.0	39.5	1.012
Low point	4981	19.0	20.0	19.6	1.020
As left zero	5000	0.0	0.0	-0.2	----
As left span	4924	76.0	80.0	79.1	1.011
SO2 Scrubber Check	4922	77.8	778.0	-0.2	----
Date of last scrubber change:				Ave Corr Factor	1.012
Date of last converter efficiency test:					

Notes: Changed inlet filter and H2S cylinder after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

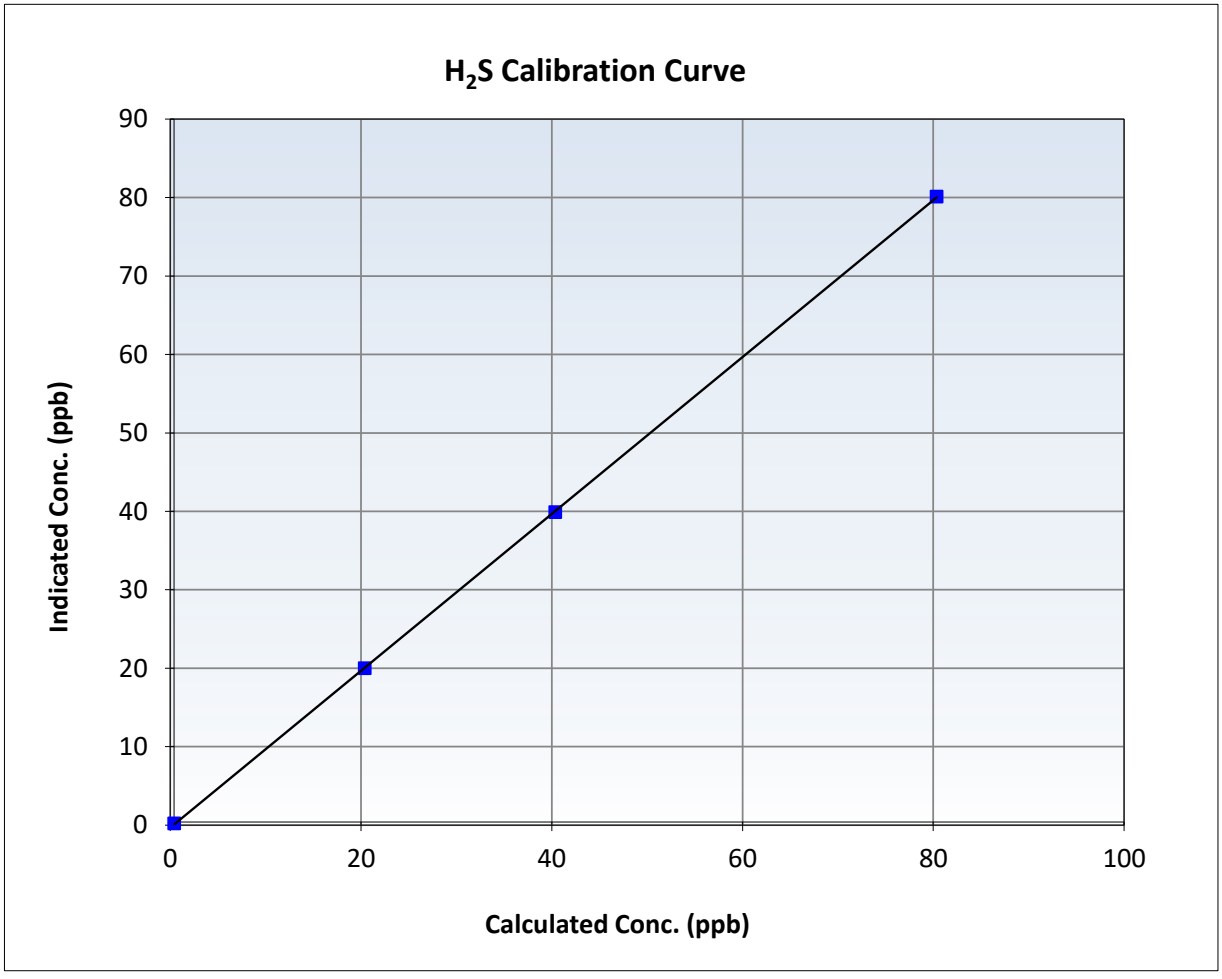
H2S Calibration Summary

Station Information

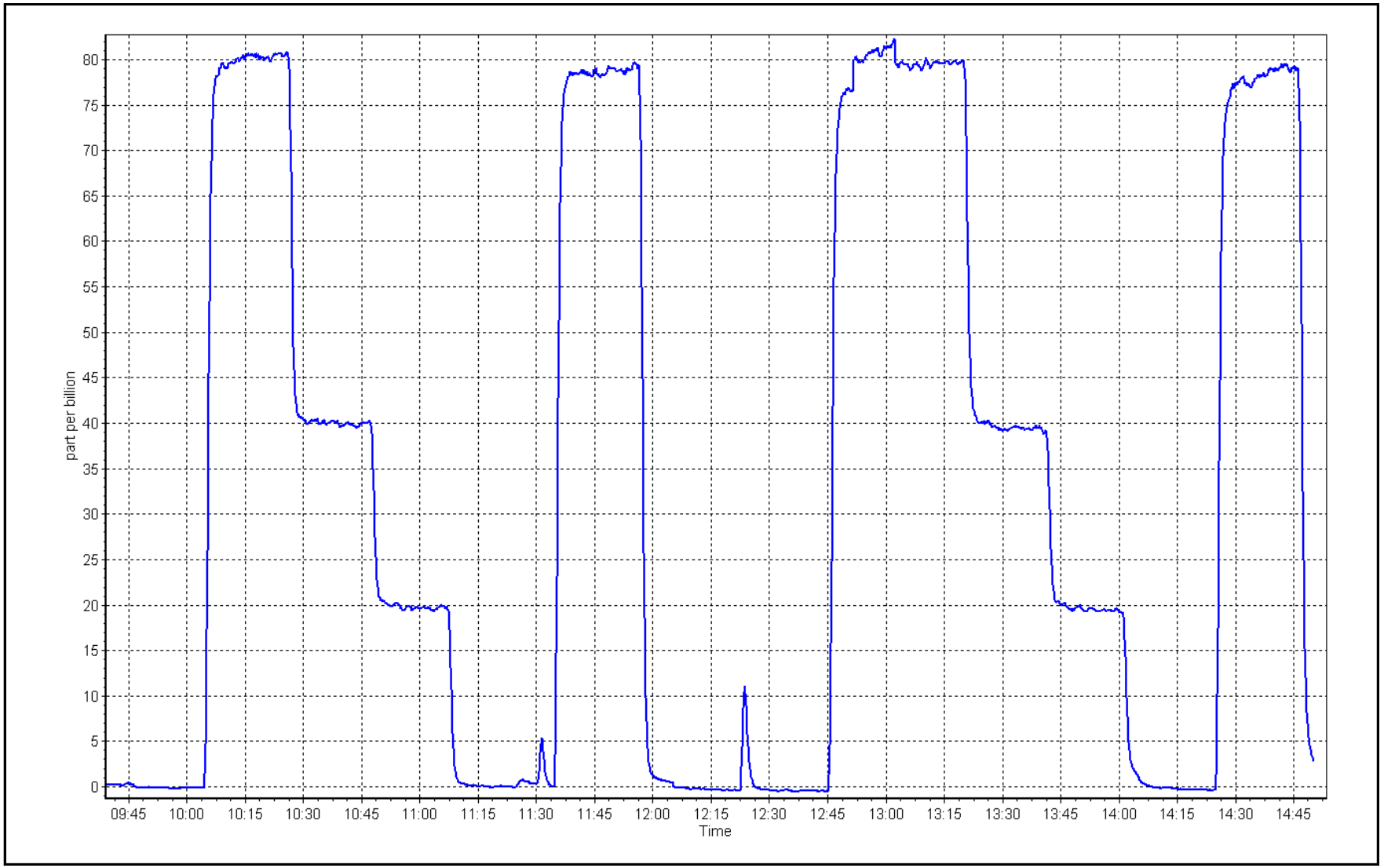
Calibration Date:	May 29, 2024	Previous Calibration:	April 24, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	9:42	End Time (MST):	14:45
Analyzer make:	Thermo 43iQ	Analyzer serial #:	12113311965

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.2	----	Correlation Coefficient	0.999986	*≥0.995*
80.0	79.7	1.0032	Slope	0.999743	*0.90 - 1.10*
40.0	39.5	1.0121			
20.0	19.6	1.0198	Intercept	-0.320000	*+/-3*



H2S Calibration Plot Date: May 29, 2024 Location: Sawbones Bay



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Sawbones Bay
Station number:	AMS 505
Calibration Date:	May 30, 2024
Last Cal Date:	April 11, 2024
Start time (MST):	9:47
End time (MST):	14:09
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T1FY3PK	Cal Gas Expiry Date:	March 14, 2025
NOX Cal Gas Conc:	47.94 ppm	NO Cal Gas Conc:	47.94 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	47.94 ppm	Removed Gas NO Conc:	47.94 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	5112
ZAG make/model:	API T701H	Serial Number:	690

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	1.1	0.0	1.1	----	----
AF High point	4917	83.4	799.6	799.6	0.0	799.9	799.9	0.0	1.0010	0.9996
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	799.6 ppb	NO =	800.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.1%
Baseline Corr 1st pt	NO_X =	798.8 ppb	NO =	799.9 ppb	As Found Statistics	*Percent Change	NO = 0.0%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: API T200 Serial Number: 4260

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.044	1.044	NO bkgnd or offset:	-0.2	-0.2
NOX coeff or slope:	1.039	1.039	NOX bkgnd or offset:	0.7	0.7
NO2 coeff or slope:	NA	NA	Reaction cell Press:	8.1	8.1

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.001007	1.005153
NO_X Cal Offset:	-0.830518	-1.131241
NO Cal Slope:	1.002164	1.006082
NO Cal Offset:	-1.110354	-1.231378
NO_2 Cal Slope:	0.998476	0.996813
NO_2 Cal Offset:	0.748401	-0.401090

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
High point	4917	83.4	799.6	799.6	0.0	803.0	803.8	-0.7	0.9957	0.9947
Mid point	4958	41.7	399.8	399.8	0.0	400.7	400.7	0.0	0.9979	0.9979
Low point	4979	20.9	200.4	200.4	0.0	198.7	198.7	0.0	1.0085	1.0085
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.3	----	----
As left span	4916	83.4	799.7	345.2	454.4	796.7	345.2	451.5	1.0038	1.0000
								Average Correction Factor	1.0007	1.0004

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	799.7	345.4	454.3	452.6	1.0038	99.6%
Mid GPT point	799.7	554.8	244.9	243.7	1.0049	99.5%
Low GPT point	799.7	653.2	146.5	145.2	1.0090	99.1%
				Average Correction Factor	1.0059	99.4%

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

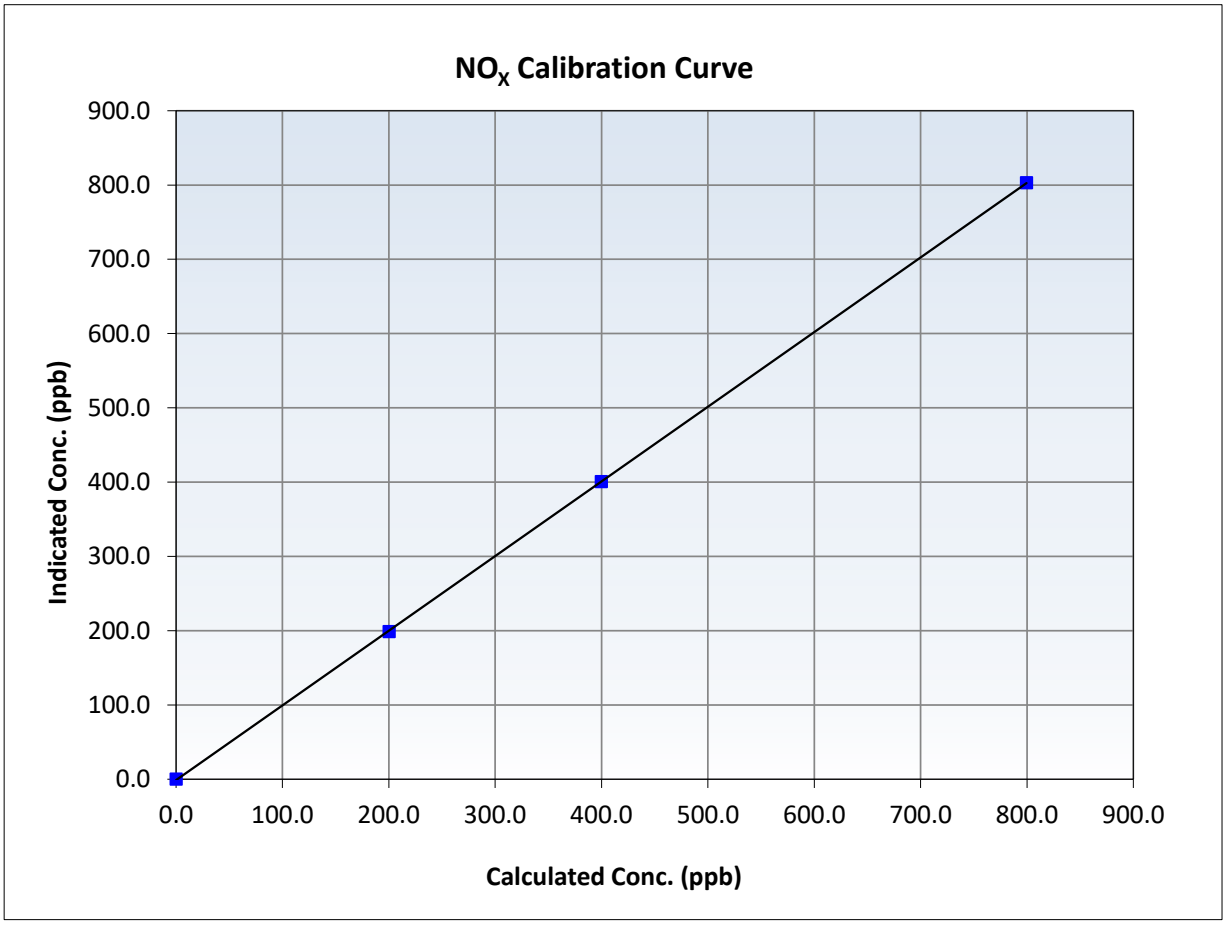
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 11, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	9:47	End Time (MST):	14:09
Analyzer make:	API T200	Analyzer serial #:	4260

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.6	803.0	0.9957
399.8	400.7	0.9979
200.4	198.7	1.0085

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	1.005153	*0.90 - 1.10*
Intercept	-1.131241	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

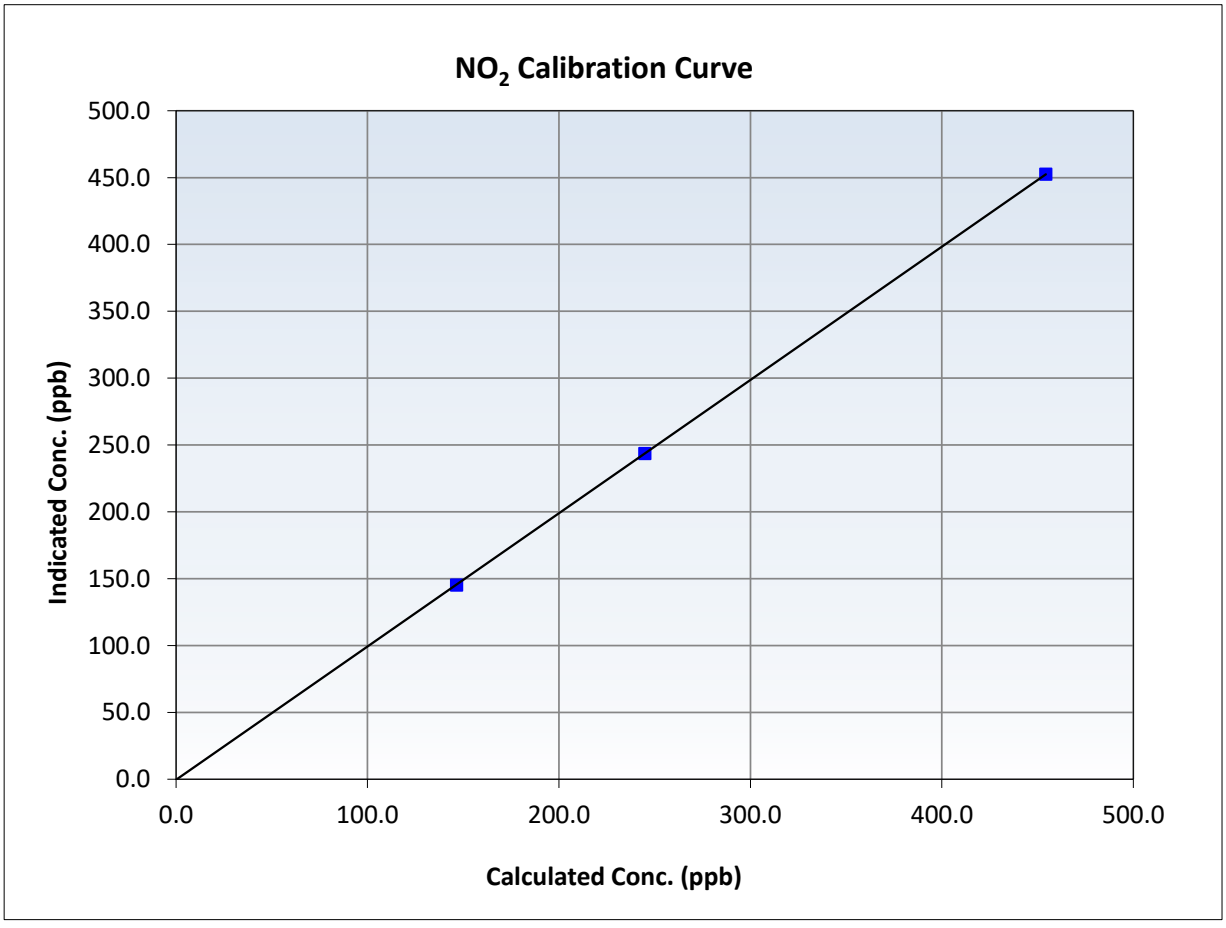
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 11, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	9:47	End Time (MST):	14:09
Analyzer make:	API T200	Analyzer serial #:	4260

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
454.3	452.6	1.0038
244.9	243.7	1.0049
146.5	145.2	1.0090

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.996813	*0.90 - 1.10*
Intercept	-0.401090	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

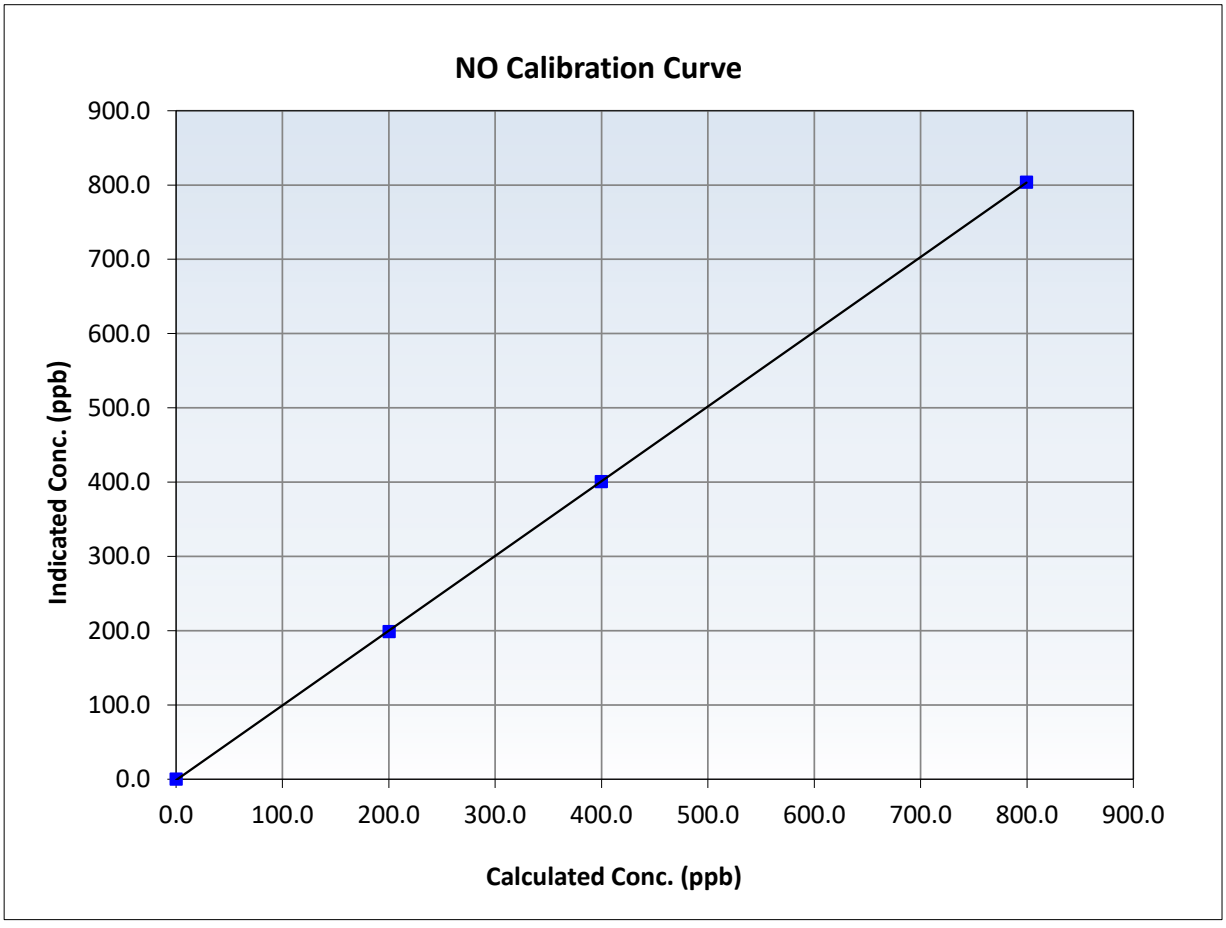
Station Information

Calibration Date:	May 30, 2024	Previous Calibration:	April 11, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	9:47	End Time (MST):	14:09
Analyzer make:	API T200	Analyzer serial #:	4260

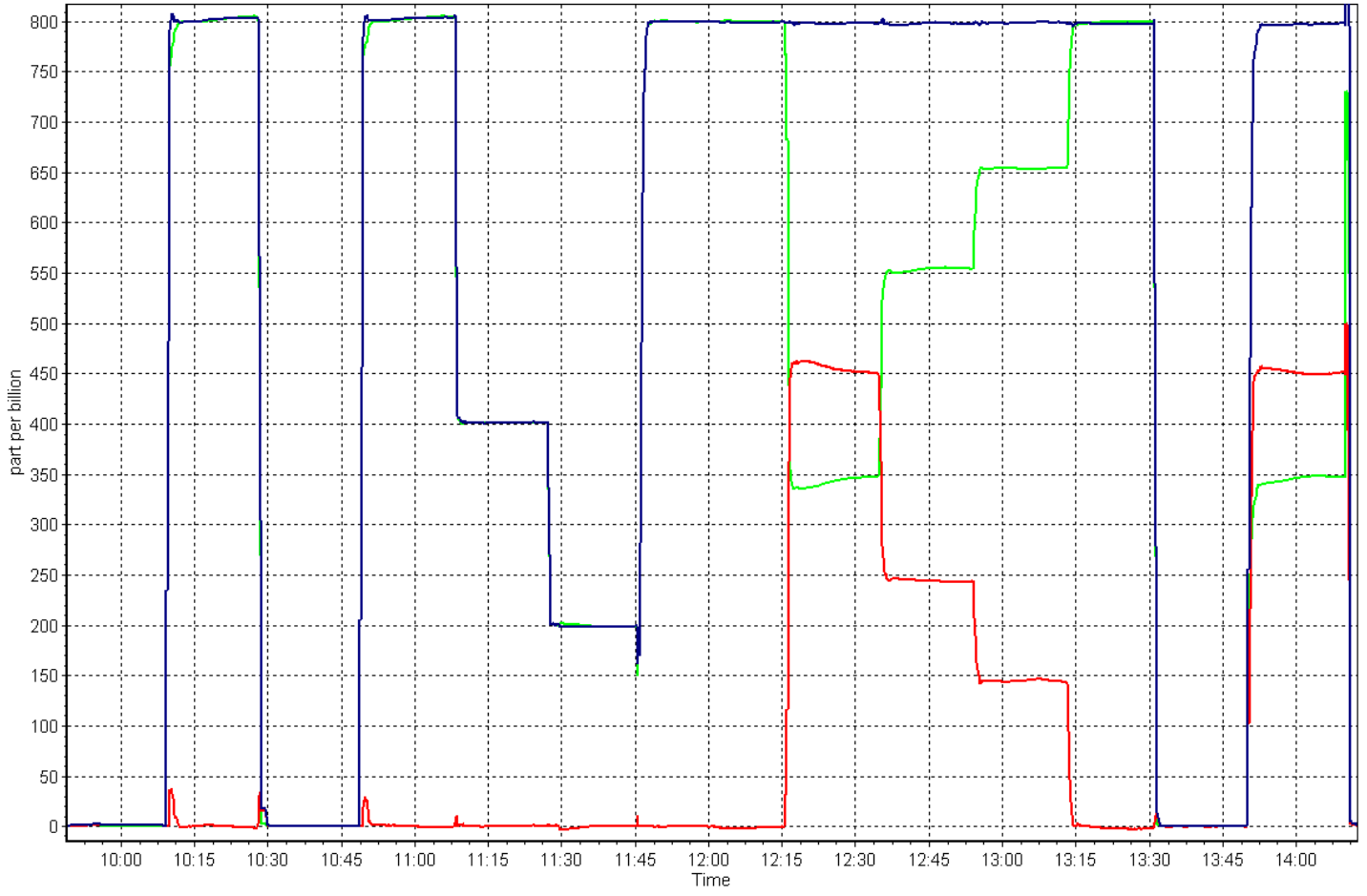
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
799.6	803.8	0.9947
399.8	400.7	0.9979
200.4	198.7	1.0085

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	1.006082	*0.90 - 1.10*
Intercept	-1.231378	*+/-20*



NO_X Calibration Plot Date: May 30, 2024 Location: Sawbones Bay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS507
KIRBY SOUTH
MAY 2024

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

June 28, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	May 1, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	15:30	End time (MST):	17:10
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	49.18	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC303554			
Removed Cal Gas Conc:	49.18	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	3804
Zero Air Gen Model:	Teledyne API T701H		Serial Number:	880

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1173410001	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000467		Backgd or Offset:	25.5	25.7
Calibration intercept:	-1.470231		Coeff or Slope:	0.906	0.906

SO_2 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	4919	81.3	799.6	801.0	0.999
As found Mid point	4959	40.7	400.3	398.5	1.005
As found Low point	4980	20.3	199.7	198.8	1.005
New cylinder response					
Baseline Corr As found:	800.8	Previous response	798.5	*% change	0.3%
Baseline Corr 2nd AF pt:	398.3	AF Slope:	1.001678	AF Intercept:	-0.868812
Baseline Corr 3rd AF pt:	198.6	AF Correlation:	0.999986	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

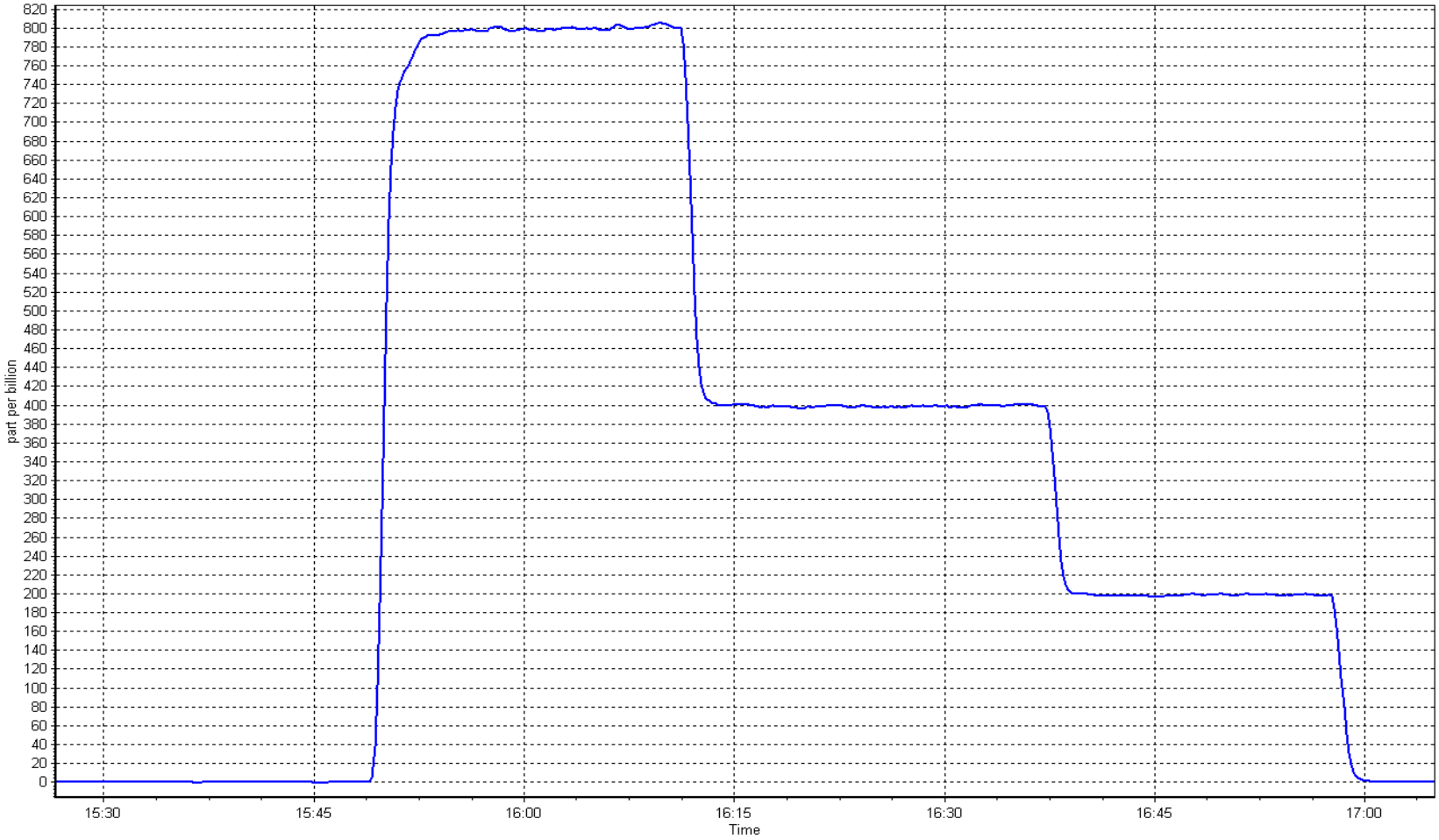
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor:

Notes: Removed due to zero drift. All as found values passed.

Calibration Performed By: Braiden Boutilier

SO2 Calibration Plot Date: May 1, 2024 Location: Kirby South



Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	May 2, 2024	Last Cal Date:	May 1, 2024
Start time (MST):	13:15	End time (MST):	16:15
Reason:	Install		

Calibration Standards

Cal Gas Concentration:	49.18	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC303554			
Removed Cal Gas Conc:	49.18	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	3804
Zero Air Gen Model:	Teledyne API T701H		Serial Number:	880

Analyzer Information

Analyzer make:	Thermo 43iQ		Serial Number:	11823400017	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	NA	1.001378	Backgd or Offset:	NA	24.7
Calibration intercept:	NA	-0.288825	Coeff or Slope:	NA	1.041

SO_2 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					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4919	81.3	799.6	801.0	0.998
Mid point	4959	40.7	400.3	399.3	1.003
Low point	4980	20.3	199.7	200.0	0.998
As left zero	5000	0.0	0.0	-0.1	----
As left span	4919	81.3	799.6	804.0	0.995
				Average Correction Factor:	1.000

Notes: Swapped external pump, adjusted span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

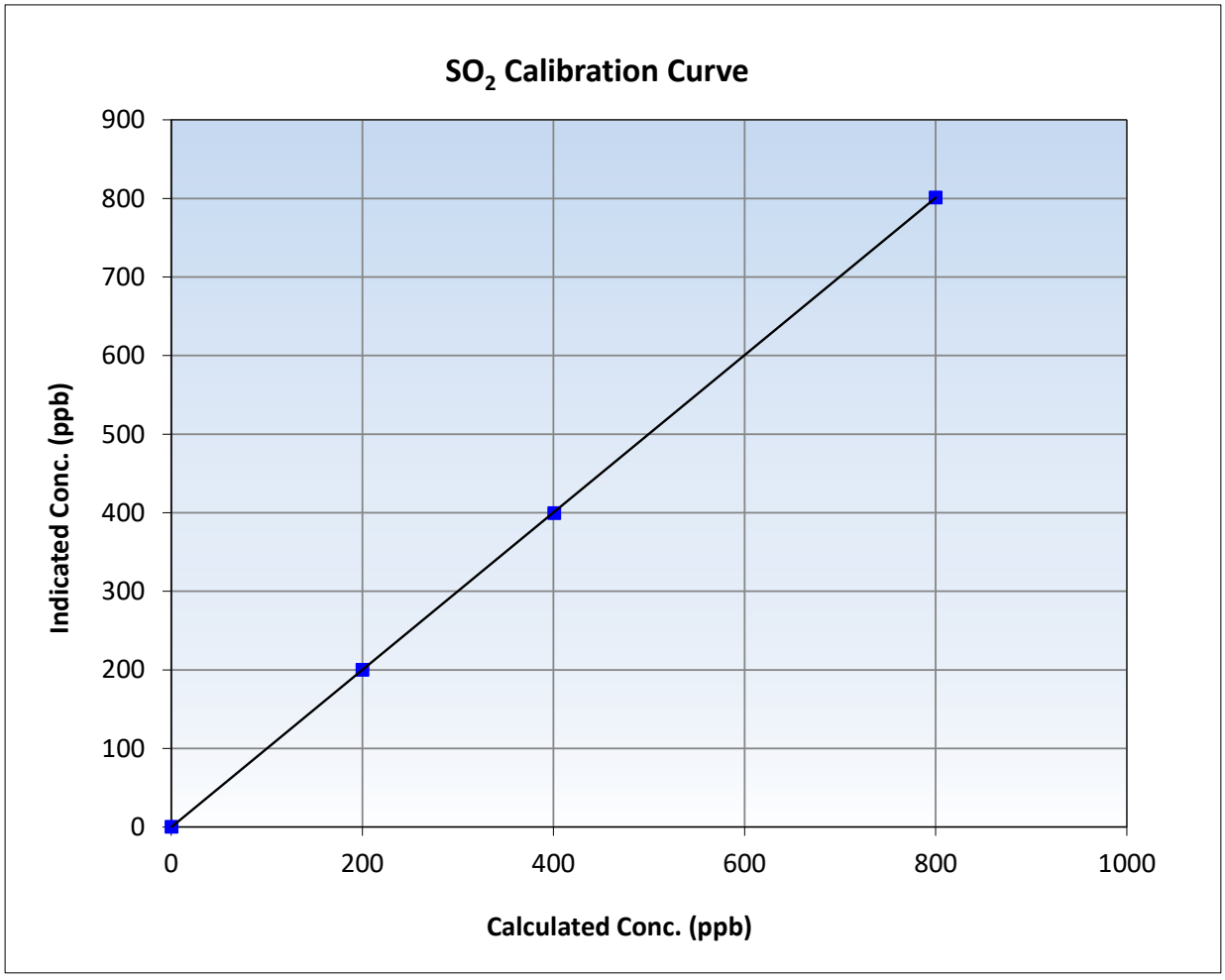
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	May 1, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	13:15	End Time (MST):	16:15
Analyzer make:	Thermo 43iQ	Analyzer serial #:	11823400017

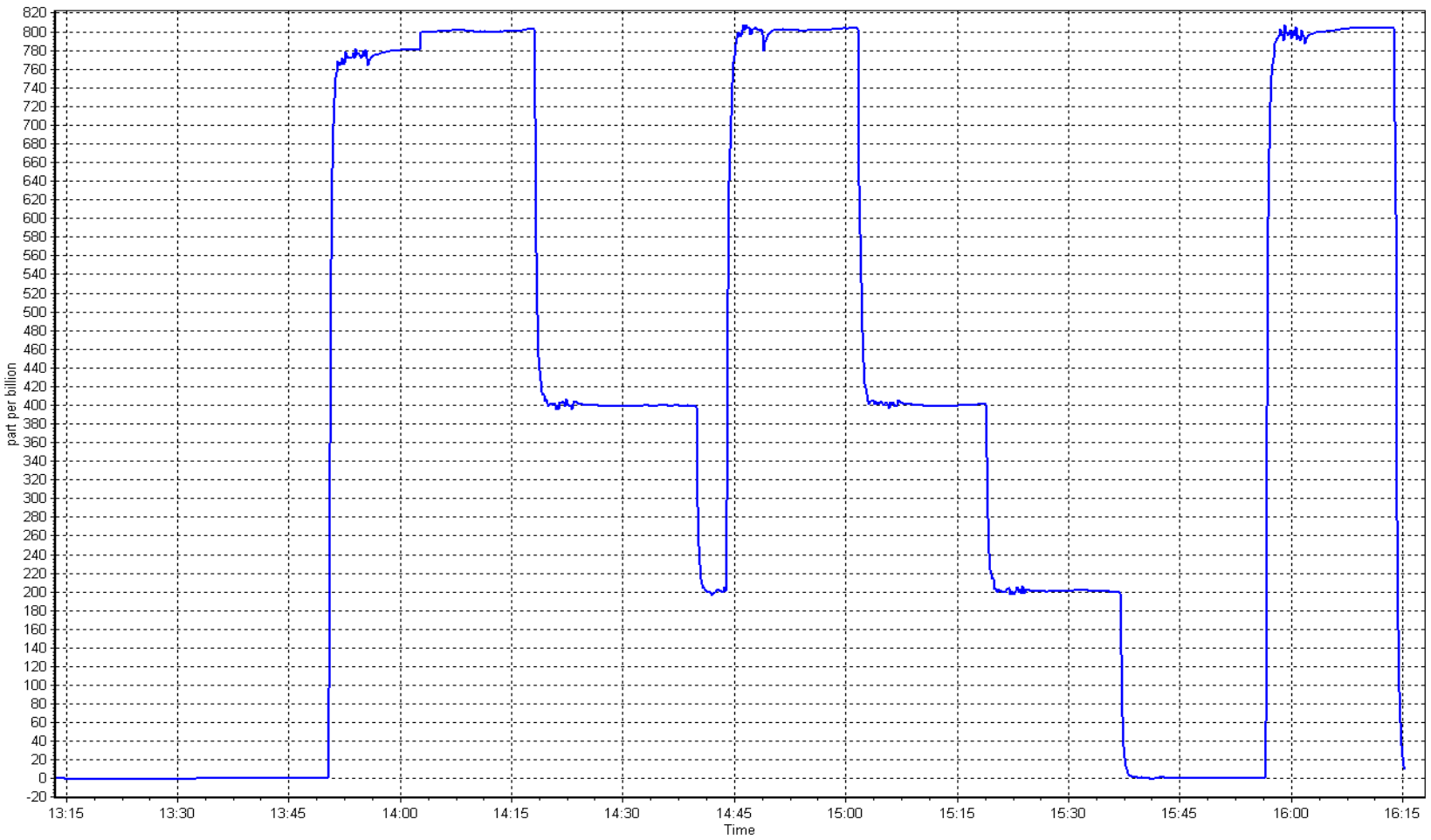
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.6	801.0	0.9983
400.3	399.3	1.0026
199.7	200.0	0.9983

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.001378	*0.90 - 1.10*
Intercept	-0.288825	*+/-30*



SO2 Calibration Plot Date: May 2, 2024 Location: Kirby South



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	May 1, 2024	Last Cal Date:	April 17, 2024
Start time (MST):	11:55	End time (MST):	17:50
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.05	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0019762			
Removed Cal Gas Conc:	5.05	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	n/a		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T750		Serial Number:	281
ZAG Make/Model:	Teledyne API T751H		Serial Number:	322

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb		Converter Temp:	350	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999242	1.002242	Backgd or Offset:	1.72	1.75
Calibration intercept:	-0.020960	0.099034	Coeff or Slope:	1.041	1.041

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4921	79.2	80.0	81.3	0.983
As found Mid point	4960	39.6	40.0	40.8	0.978
As found Low point	4980	19.8	20.0	20.3	0.980
New cylinder response	5000	0.0	0.0		

Baseline Corr As found:	81.4	Prev response:	79.91	*% change:	1.8%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.017672	AF Intercept:	-0.040981
Baseline Corr 3rd AF pt:	20.4	AF Correlation:	0.999993	* = > +/-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) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.2	80.0	80.2	0.997
Mid point	4960	39.6	40.0	40.3	0.993
Low point	4980	19.8	20.0	20.2	0.990
As left zero	5000	0.0	0.0	0.0	----
As left span	4921	79.2	80.0	80.0	1.000
SO2 Scrubber Check	4919	80.0	800.2	0.0	----
Date of last scrubber change:		July 25, 2023		Ave Corr Factor	0.993
Date of last converter efficiency test:		n/a			

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

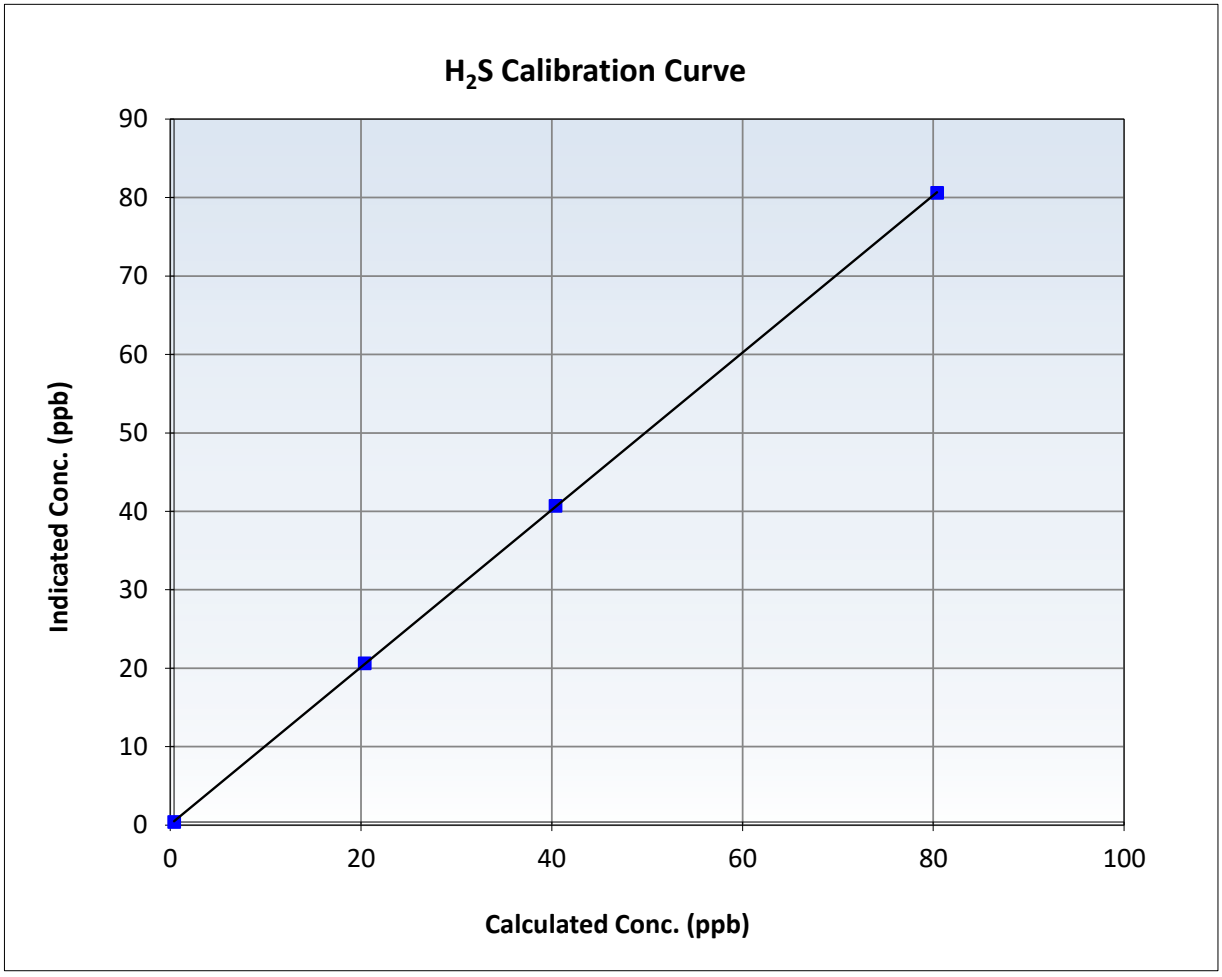
H2S Calibration Summary

Station Information

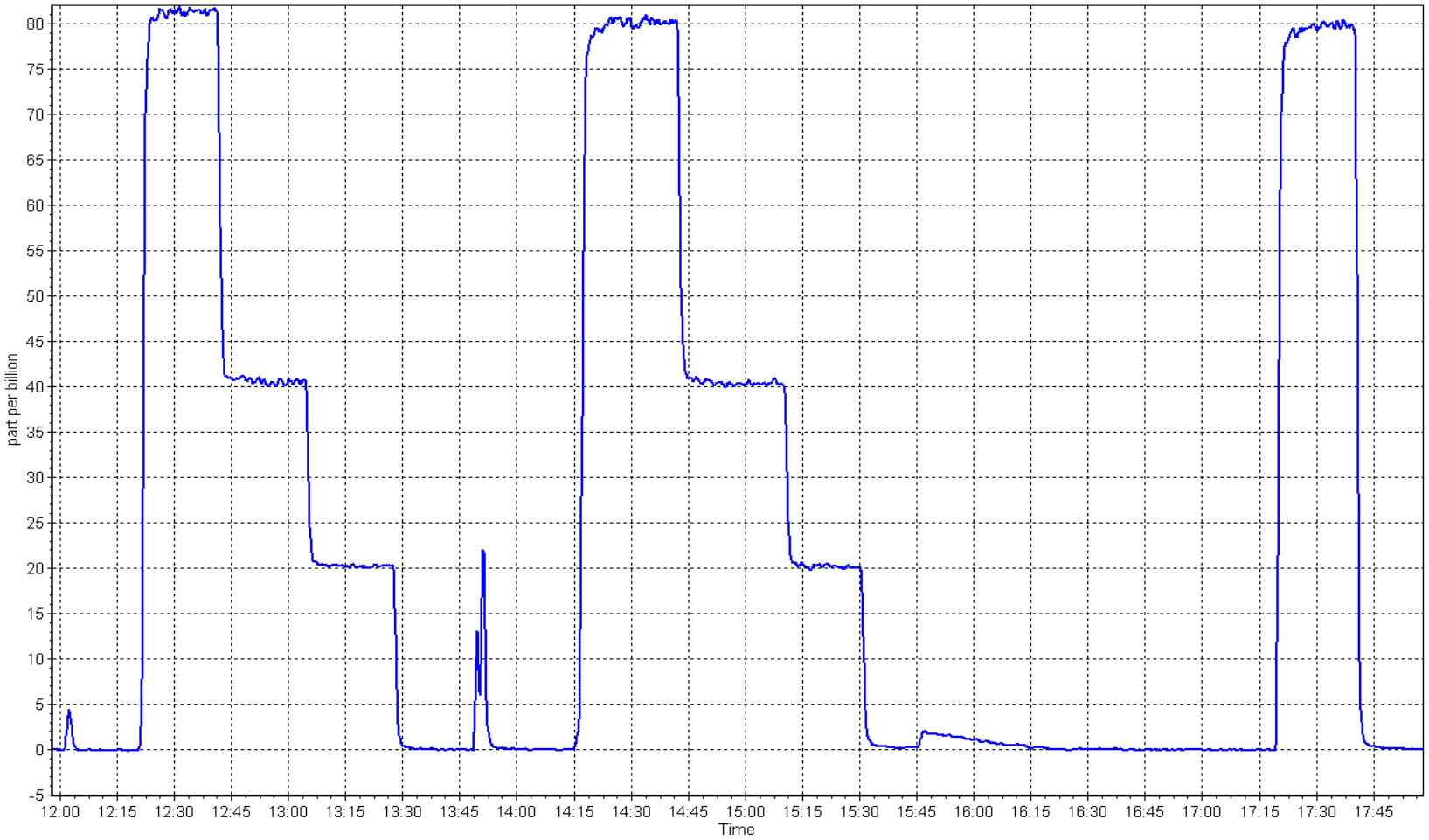
Calibration Date:	May 1, 2024	Previous Calibration:	April 17, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	11:55	End Time (MST):	17:50
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999991	*≥0.995*
80.0	80.2	0.9974	Slope	1.002242	*0.90 - 1.10*
40.0	40.3	0.9925			
20.0	20.2	0.9900	Intercept	0.099034	*+/-3*



H2S Calibration Plot Date: May 1, 2024 Location: Kirby South



CALS_568

Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	May 1, 2024	Last Cal Date:	April 18, 2024
Start time (MST):	15:30	End time (MST):	17:10
Reason:	As Found		

Calibration Standards

Gas Cert Reference:	CC303554		Cal Gas Expiry Date:	March 23, 2025	
CH4 Cal Gas Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3804	
ZAG Make/Model:	Teledyne API T701H		Serial Number:	880	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1182340005	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001763		Background:	2.07	2.07
Calibration intercept:	-0.076111		Coefficient:	3.685	3.685

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.04	----
As found High point	4919	81.3	17.26	17.05	1.010
As found Mid point	4959	40.7	8.64	8.43	1.020
As found Low point	4980	20.3	4.31	4.22	1.010
New cylinder response					
Baseline Corr As found:	17.09	Previous response	17.22	*% change	-0.7%
Baseline Corr 2nd AF pt:	8.47	AF Slope:	0.989698	AF Intercept:	-0.061470
Baseline Corr 3rd AF pt:	4.27	AF Correlation:	0.999967	* = > +/-5% change initiates investigation	

THC Calibration Data

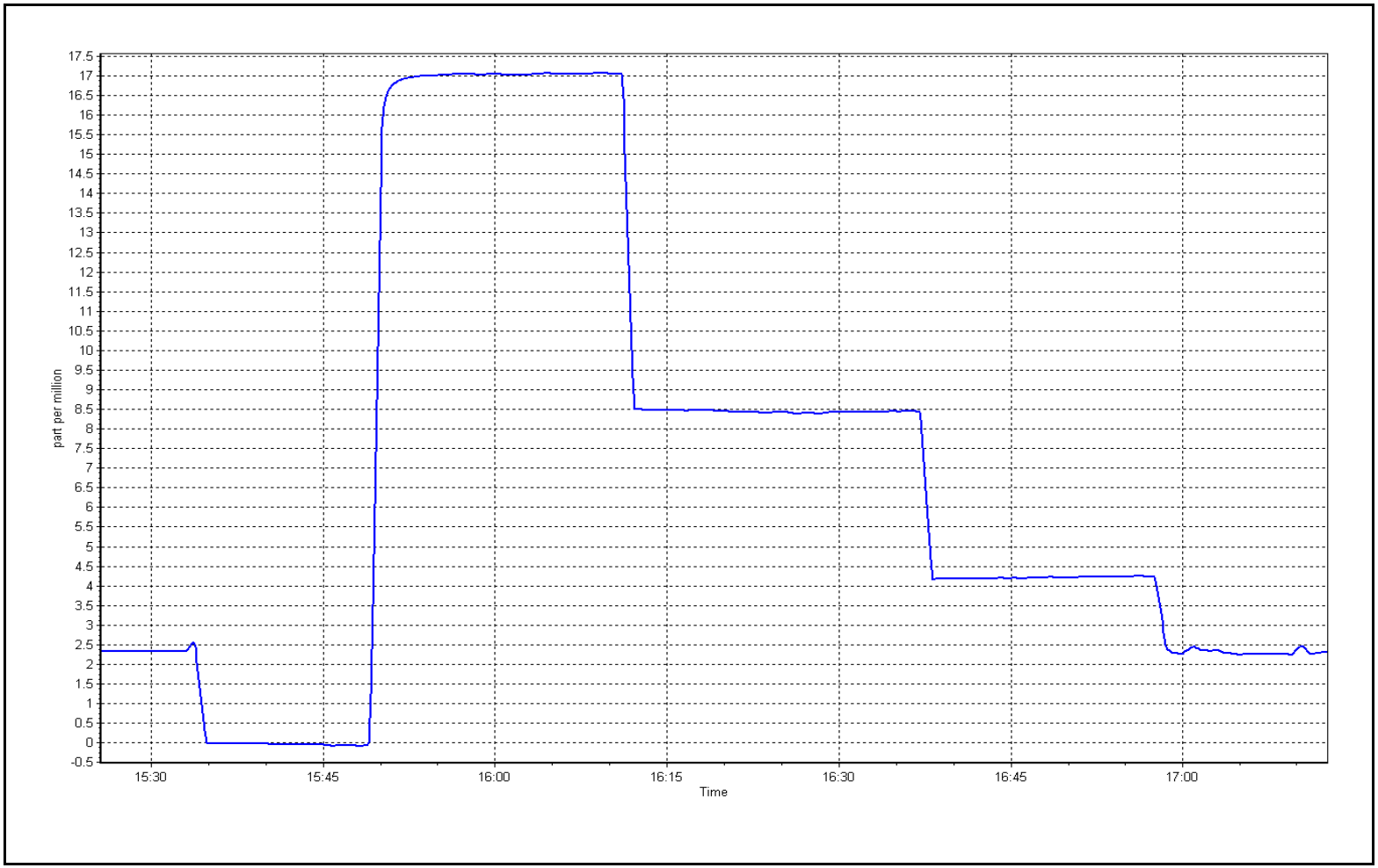
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes: As founds completed with SO2 removal.

Calibration Performed By: Braiden Boutilier

THC Calibration Plot Date: May 1, 2024 Location: Kirby South



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	May 2, 2024	Last Cal Date:	May 1, 2024
Start time (MST):	13:15	End time (MST):	16:15
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC303554		Cal Gas Expiry Date:	March 23, 2025	
CH4 Cal Gas Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3804	
ZAG Make/Model:	Teledyne API T701H		Serial Number:	880	

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001763	1.002250	Background:	2.07	2.09
Calibration intercept:	-0.076111	-0.091288	Coefficient:	3.685	3.726

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					
New cylinder response					

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	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.05	----
High point	4919	81.3	17.26	17.24	1.001
Mid point	4959	40.7	8.64	8.52	1.014
Low point	4980	20.3	4.31	4.21	1.023
As left zero	5000	0.0	0.00	-0.05	----
As left span	4919	81.3	17.26	17.38	0.993
				Average Correction Factor	1.013

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

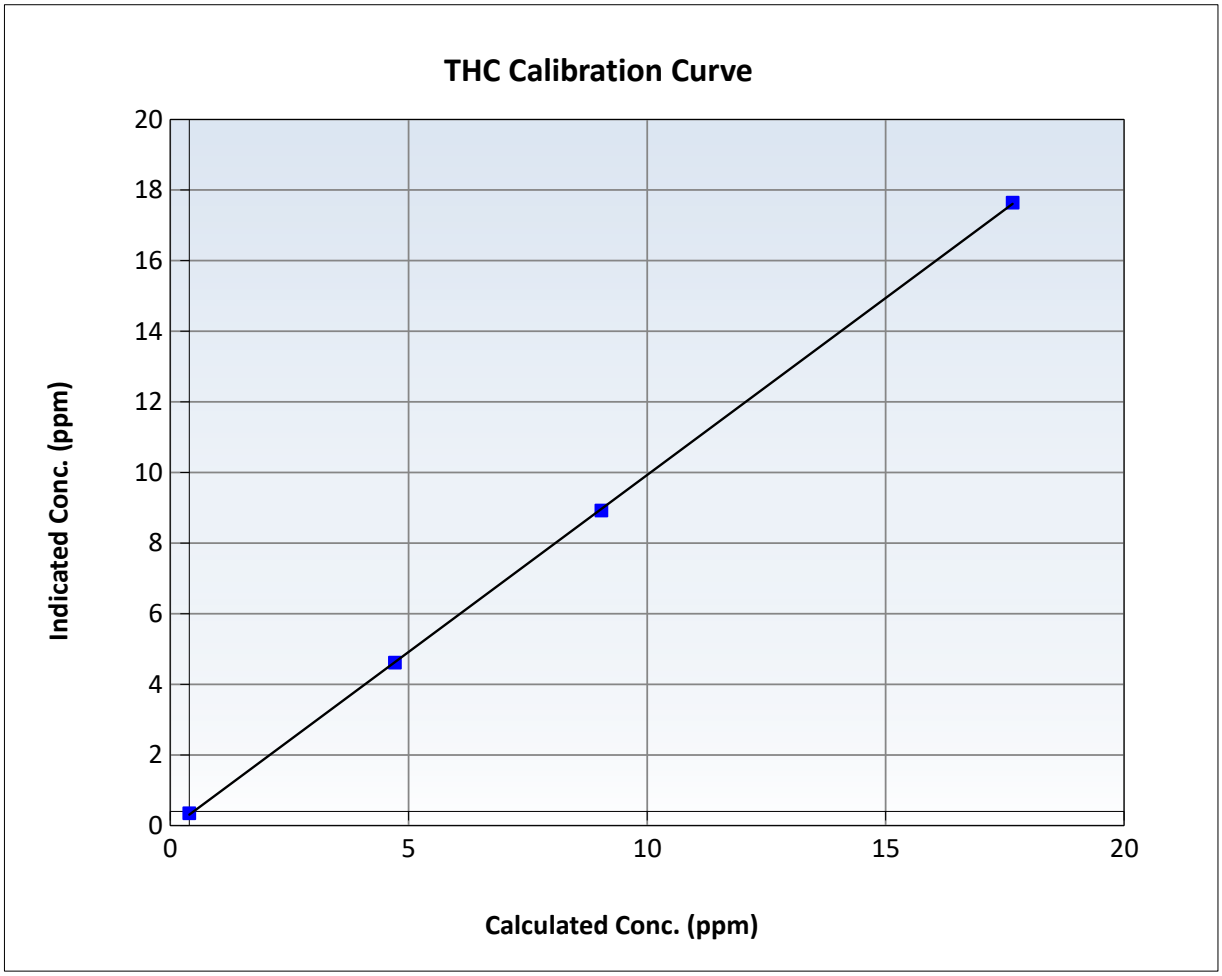
Station Information

Calibration Date:	May 2, 2024	Previous Calibration:	May 1, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	13:15	End Time (MST):	16:15
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1182340005

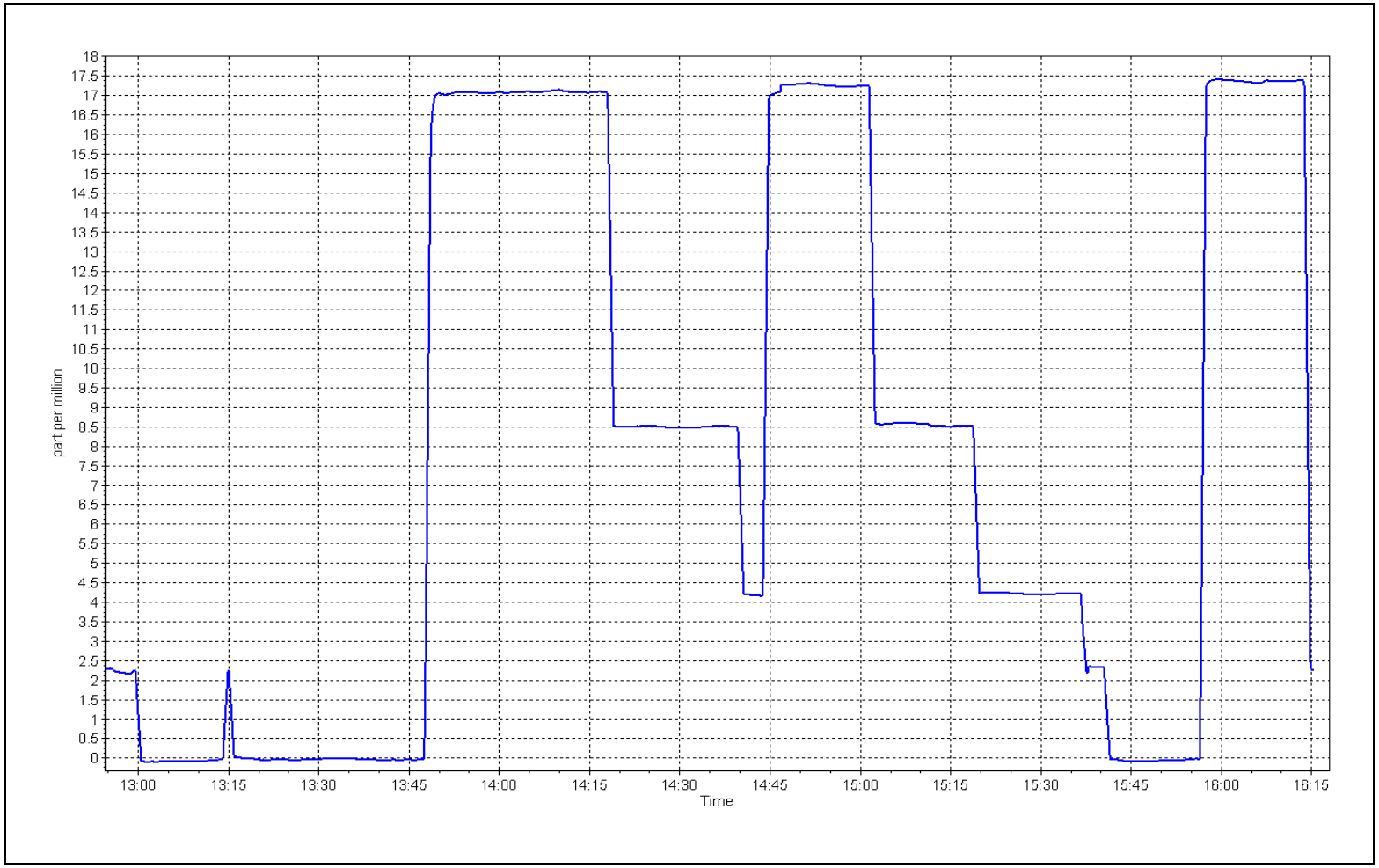
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.05	----
17.26	17.24	1.0013
8.64	8.52	1.0144
4.31	4.21	1.0234

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	1.002250	*0.90 - 1.10*
Intercept	-0.091288	*+/-1.5*



THC Calibration Plot Date: May 2, 2024 Location: Kirby South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Kirby South
Station number:	AMS 507
Calibration Date:	May 1, 2024
Last Cal Date:	April 17, 2024
Start time (MST):	11:46
End time (MST):	14:50
Reason:	Removal

Calibration Standards

NO Gas Cylinder #:	T34ULGL	Cal Gas Expiry Date:	March 8, 2025
NOX Cal Gas Conc:	49.39 ppm	NO Cal Gas Conc:	49.02 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	49.39 ppm	Removed Gas NO Conc:	49.02 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3804
ZAG make/model:	Teledyne API T701	Serial Number:	880

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
AF High point	4919	81.0	800.1	794.1	6.0	806.0	796.1	9.7	0.9926	0.9974
AF Mid point	4960	40.5	400.1	397.1	3.0	394.9	389.0	5.9	1.0128	1.0205
AF Low point	4980	20.2	199.5	198.0	1.5	192.7	189.0	3.7	1.0349	1.0473
New cyl resp										

Previous Response	NO_X = 795.7 ppb	NO = 790.0 ppb
Baseline Corr 1st pt	NO_X = 806.1 ppb	NO = 796.2 ppb
Baseline Corr 2nd pt	NO_X = 395.0 ppb	NO = 389.1 ppb
Baseline Corr 3rd pt	NO_X = 192.8 ppb	NO = 189.1 ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2: 0.999820	*Percent Change	NO_X = 1.3%	
As found	NO r^2: 0.999763	*Percent Change	NO = 0.8%	
As found	NO_2 r^2: 0.999852	Nx Sl: 1.009857	Nx Int: -5.002	
		NO Sl: 1.005408	NO Int: -5.685	
		NO2 Sl: 0.998731	NO_2 Int: -2.008	

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
As Found GPT zero	----	----	0.0	0.0	----	----
As found high GPT point	799.0	405.7	399.3	398.1	1.0030	99.7%
As found mid GPT point	799.0	626.3	178.7	173.9	1.0276	97.3%
As found low GPT point	799.0	713.9	91.1	88.2	1.0328	96.8%

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42iQ
Serial Number: 12400232071
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.057		NO bkgnd or offset:	1.1	
NOX coeff or slope:	0.998		NOX bkgnd or offset:	1.2	
NO2 coeff or slope:	1.000		Reaction cell Press:	197.21	

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000289	
NO_X Cal Offset:	-4.604106	
NO Cal Slope:	1.001623	
NO Cal Offset:	-5.445289	
NO_2 Cal Slope:	0.999497	
NO_2 Cal Offset:	1.161308	

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero										
High point										
Mid point										
Low point										
As left zero										
As left span										
								Average Correction Factor		

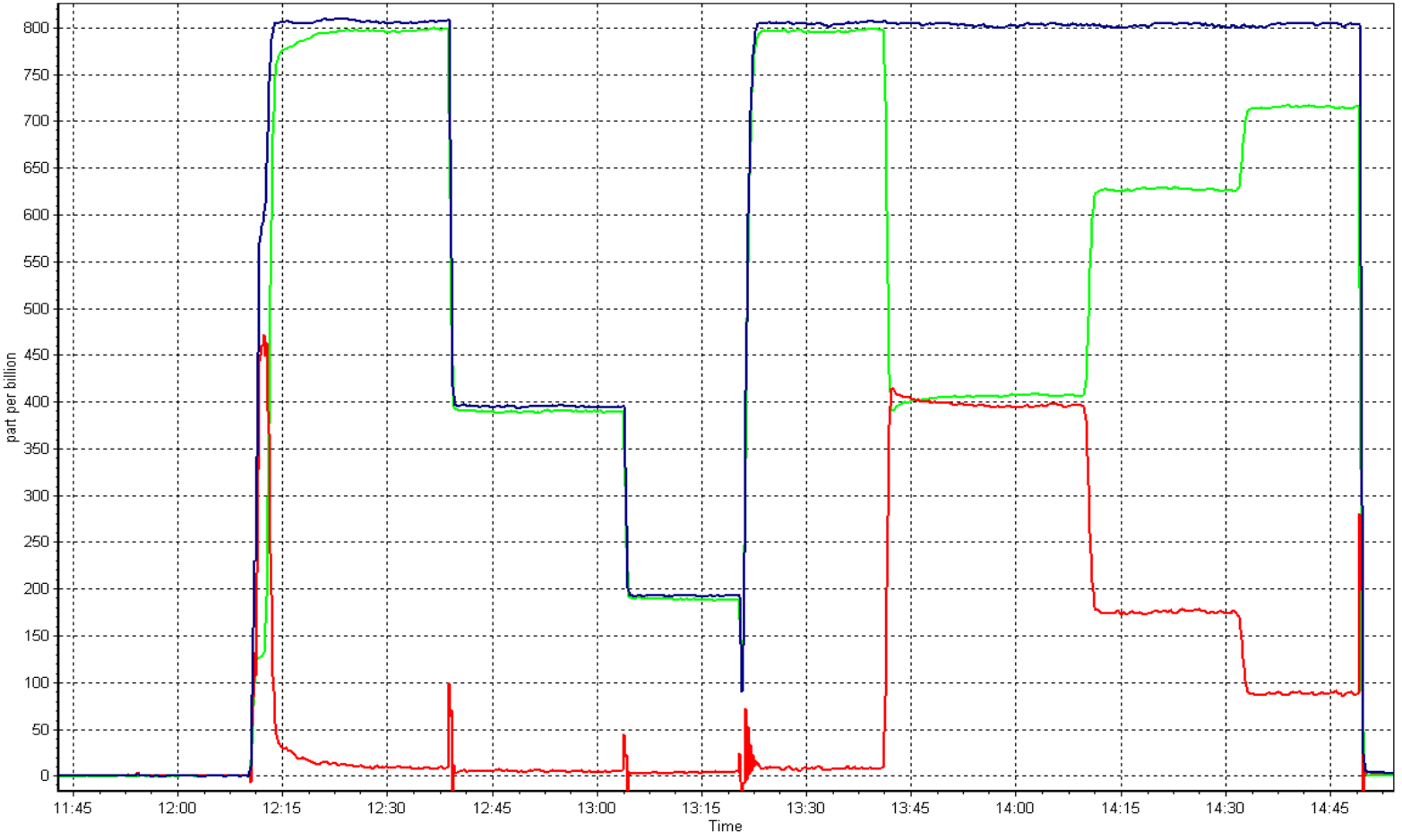
GPT Calibration Data

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero						
High GPT point						
Mid GPT point						
Low GPT point						
				Average Correction Factor		

Notes: Removed due to linearity issues. As found values passed.

Calibration Performed By: Braiden Boutilier

NO_X Calibration Plot Date: May 1, 2024 Location: Kirby South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Kirby South
Station number:	AMS 507
Calibration Date:	May 4, 2024
Last Cal Date:	May 1, 2024
Start time (MST):	8:40
End time (MST):	12:50
Reason:	Install

Calibration Standards

NO Gas Cylinder #:	T34ULGL	Cal Gas Expiry Date:	March 8, 2025
NOX Cal Gas Conc:	49.39 ppm	NO Cal Gas Conc:	49.02 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	49.39 ppm	Removed Gas NO Conc:	49.02 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5240
ZAG make/model:	Teledyne API T701	Serial Number:	880

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
AF High point										
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = NA	ppb	NO = NA	ppb	
Baseline Corr 1st pt	NO_X = NA	ppb	NO = NA	ppb	
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	

* = > +/-5% change initiates investigation

*Percent Change	NO_X =	NA	
*Percent Change	NO =	NA	
Nx Sl:	Nx Int:		
NO Sl:	NO Int:		
NO2 Sl:	NO_2 Int:		

As Found Statistics

As found	NO_X r^2:
As found	NO r^2:
As found	NO_2 r^2:

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)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
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 \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 12400232071

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	NA	0.889	NO bkgnd or offset:	NA	8.7
NOX coeff or slope:	NA	0.997	NOX bkgnd or offset:	NA	8.8
NO2 coeff or slope:	NA	1.000	Reaction cell Press:	NA	149.20

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	NA	1.002136
NO_X Cal Offset:	NA	-4.264015
NO Cal Slope:	NA	1.002087
NO Cal Offset:	NA	-4.324137
NO_2 Cal Slope:	NA	1.002404
NO_2 Cal Offset:	NA	1.422929

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
High point	4918	81.6	806.1	800.1	6.0	806.0	800.0	6.0	1.0001	1.0001
Mid point	4959	40.8	403.0	400.0	3.0	396.7	393.2	3.6	1.0160	1.0173
Low point	4980	20.4	201.5	200.0	1.5	193.8	192.4	1.4	1.0397	1.0394
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
As left span	4918	81.6	806.1	800.1	6.0	809.0	405.3	403.5	0.9964	1.9740
							Average Correction Factor		1.0186	1.0190

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) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	798.2	402.4	401.8	403.3	0.9964	100.4%
Mid GPT point	798.2	604.3	199.9	203.2	0.9840	101.6%
Low GPT point	798.2	702.2	102.0	104.7	0.9746	102.6%
				Average Correction Factor	0.9850	101.5%

Notes: Swapped calibrator due to a leak (removed SN: 3804, installed SN: 5240). Replaced external pump.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

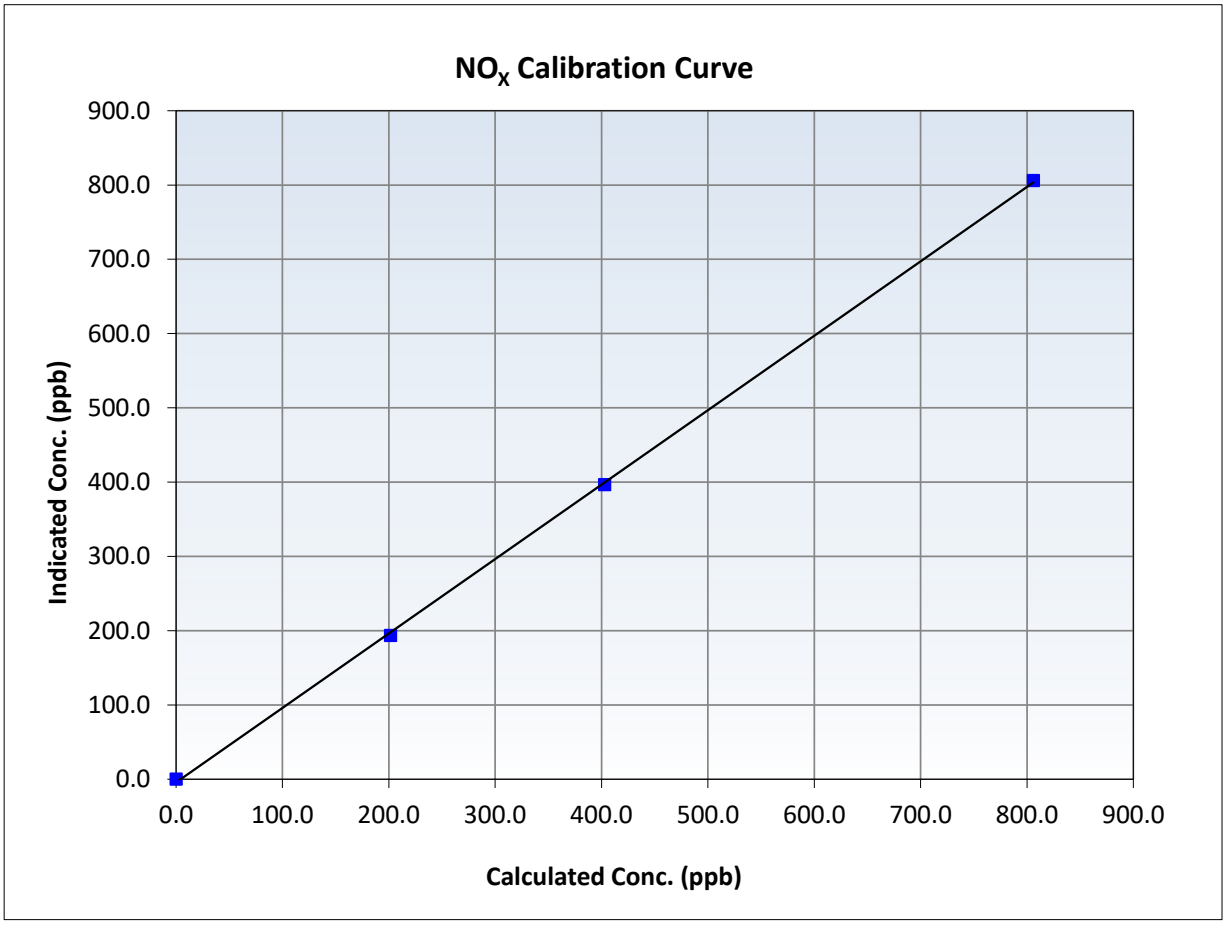
Station Information

Calibration Date:	May 4, 2024	Previous Calibration:	May 1, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	8:40	End Time (MST):	12:50
Analyzer make:	Thermo 42i	Analyzer serial #:	12400232071

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
806.1	806.0	1.0001
403.0	396.7	1.0160
201.5	193.8	1.0397

Statistical Evaluation		Limits
Correlation Coefficient	0.999864	≥0.995
Slope	1.002136	0.90 - 1.10
Intercept	-4.264015	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

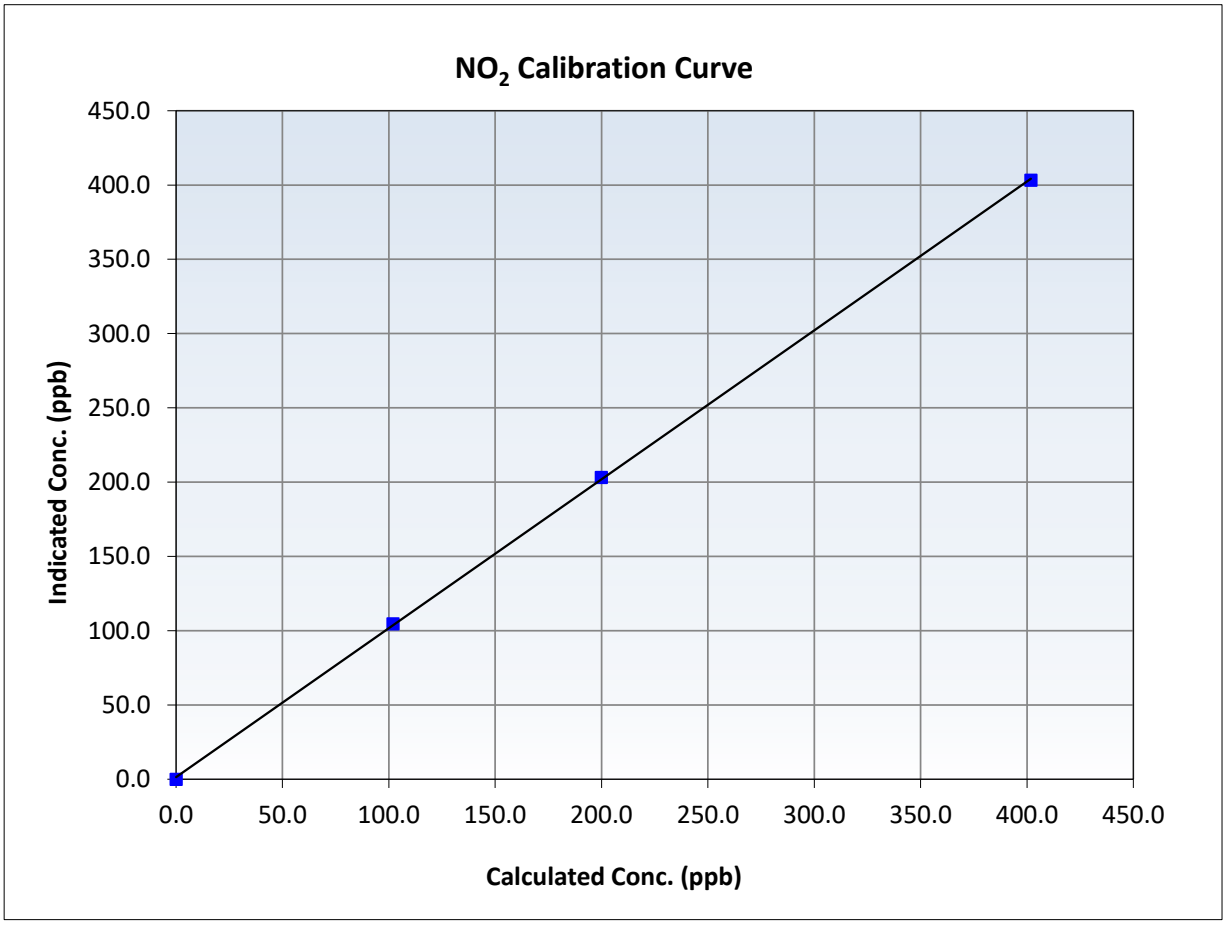
Station Information

Calibration Date:	May 4, 2024	Previous Calibration:	May 1, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	8:40	End Time (MST):	12:50
Analyzer make:	Thermo 42i	Analyzer serial #:	12400232071

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
401.8	403.3	0.9964
199.9	203.2	0.9840
102.0	104.7	0.9746

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999935	*≥0.995*
Slope	1.002404	*0.90 - 1.10*
Intercept	1.422929	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

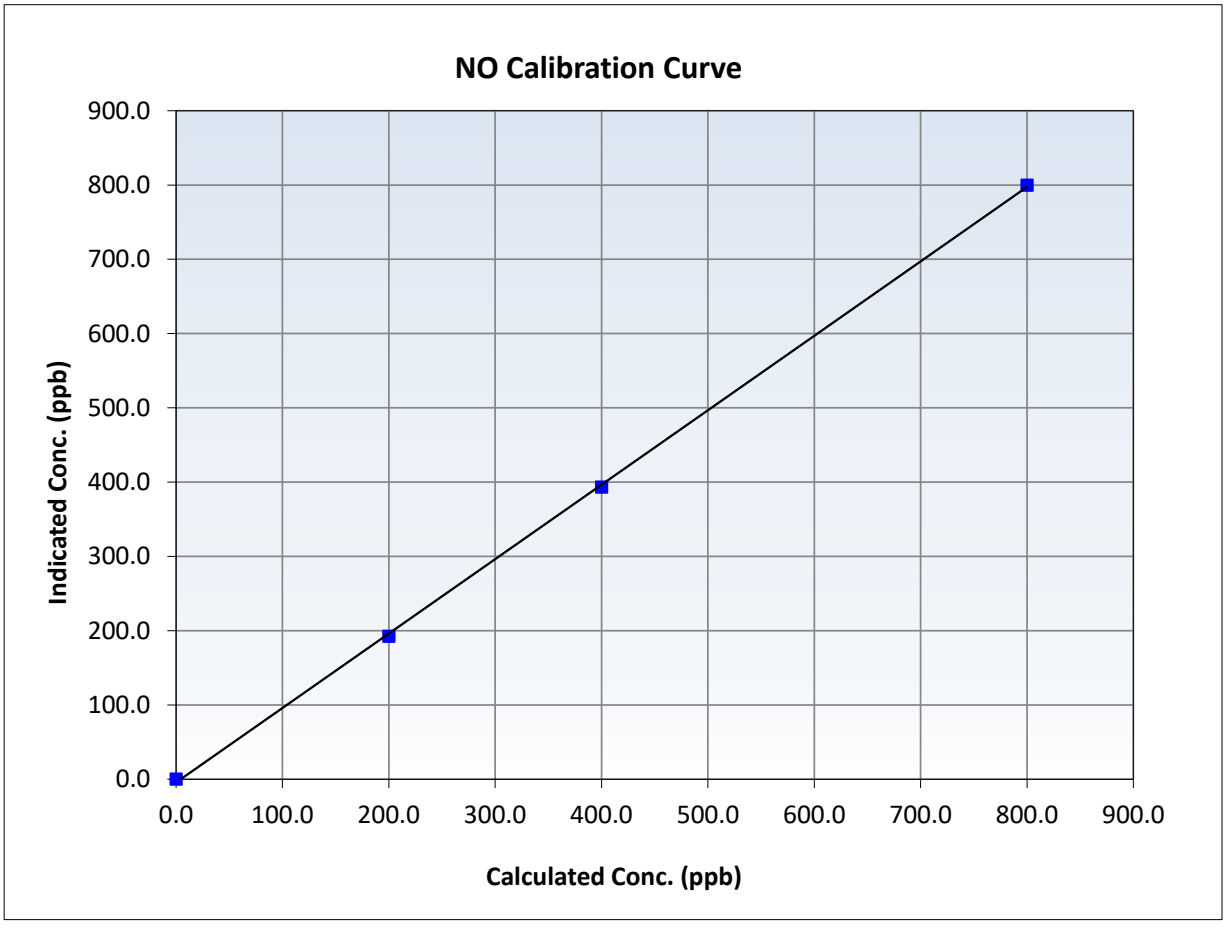
Station Information

Calibration Date:	May 4, 2024	Previous Calibration:	May 1, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	8:40	End Time (MST):	12:50
Analyzer make:	Thermo 42i	Analyzer serial #:	12400232071

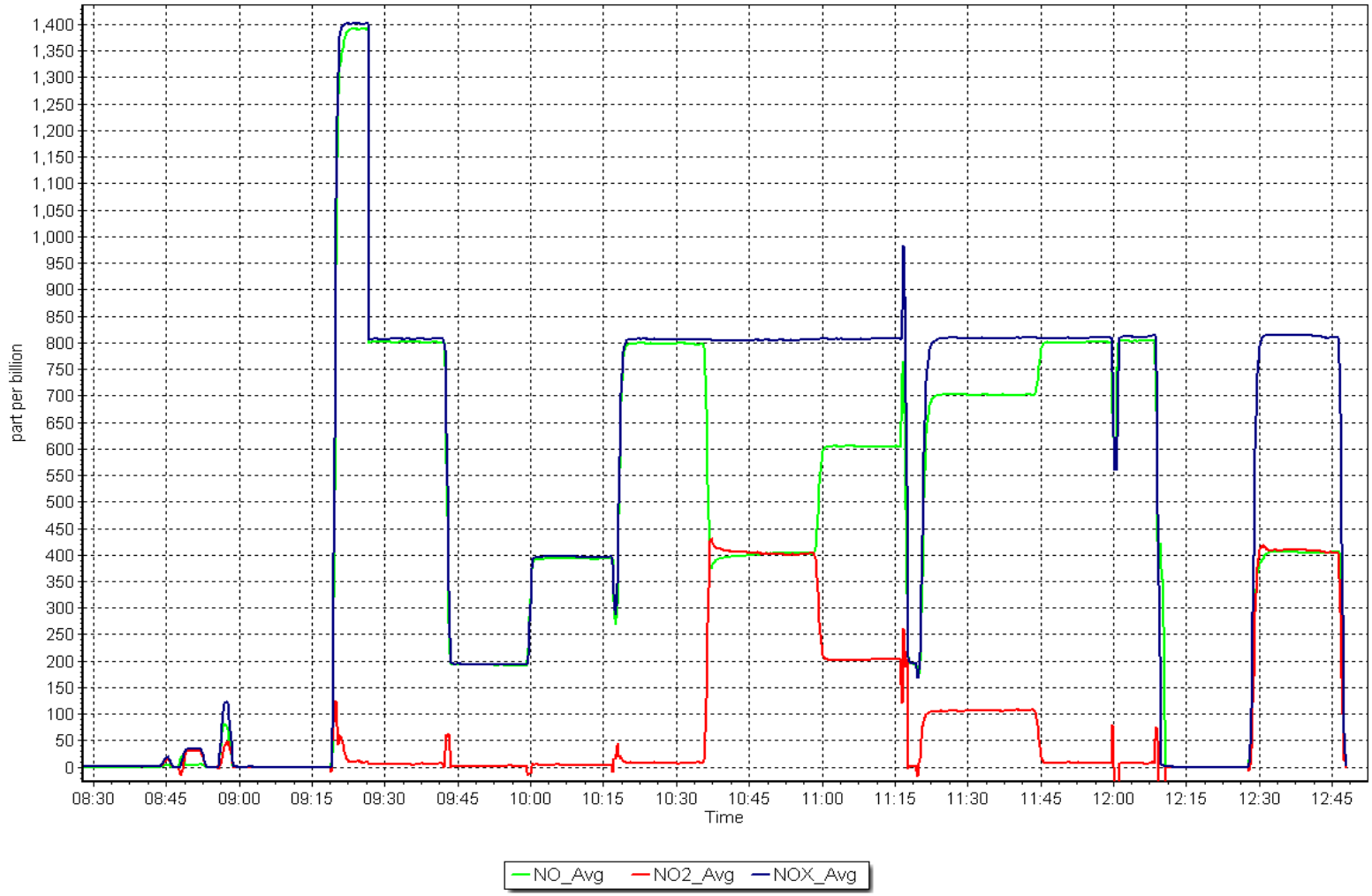
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.1	800.0	1.0001
400.0	393.2	1.0173
200.0	192.4	1.0394

Statistical Evaluation		Limits
Correlation Coefficient	0.999855	≥0.995
Slope	1.002087	0.90 - 1.10
Intercept	-4.324137	+/-20



NO_X Calibration Plot Date: May 4, 2024 Location: Kirby South



End of Report