WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION

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Wood Buffalo Environmental Association

APRIL 2024

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING

March 31, 2024

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS01
BERTHA GANTER - FORT MCKAY
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	April 3, 2024	Last Cal Date:	March 5, 2024
Start time (MST):	9:57	End time (MST):	14:14
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:	0.997052	1.001305	Backgd or Offset:	19.5	20.8
Calibration intercept:	-0.112969	-0.794719	Coeff or Slope:	0.885	0.892

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	802.8	0.998
As found Mid point	4959	40.7	400.6	402.7	0.997
As found Low point	4979	20.3	199.8	199.8	1.005
New cylinder response					
Baseline Corr As found:	801.8	Previous response	797.8	*% change	0.5%
Baseline Corr 2nd AF pt:	401.7	AF Slope:	1.002567	AF Intercept:	0.505908
Baseline Corr 3rd AF pt:	198.8	AF Correlation:	0.999995	* = > +/-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	801.5	0.998
Mid point	4959	40.7	400.6	398.4	1.006
Low point	4979	20.3	199.8	199.2	1.003
As left zero	5000	0.0	0.0	0.2	----
As left span	4918	81.3	800.3	802.3	0.997
				Average Correction Factor:	1.002

Notes: Changed the inlet filter and pump after multi-point as founds. Adjusted both zero and span.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

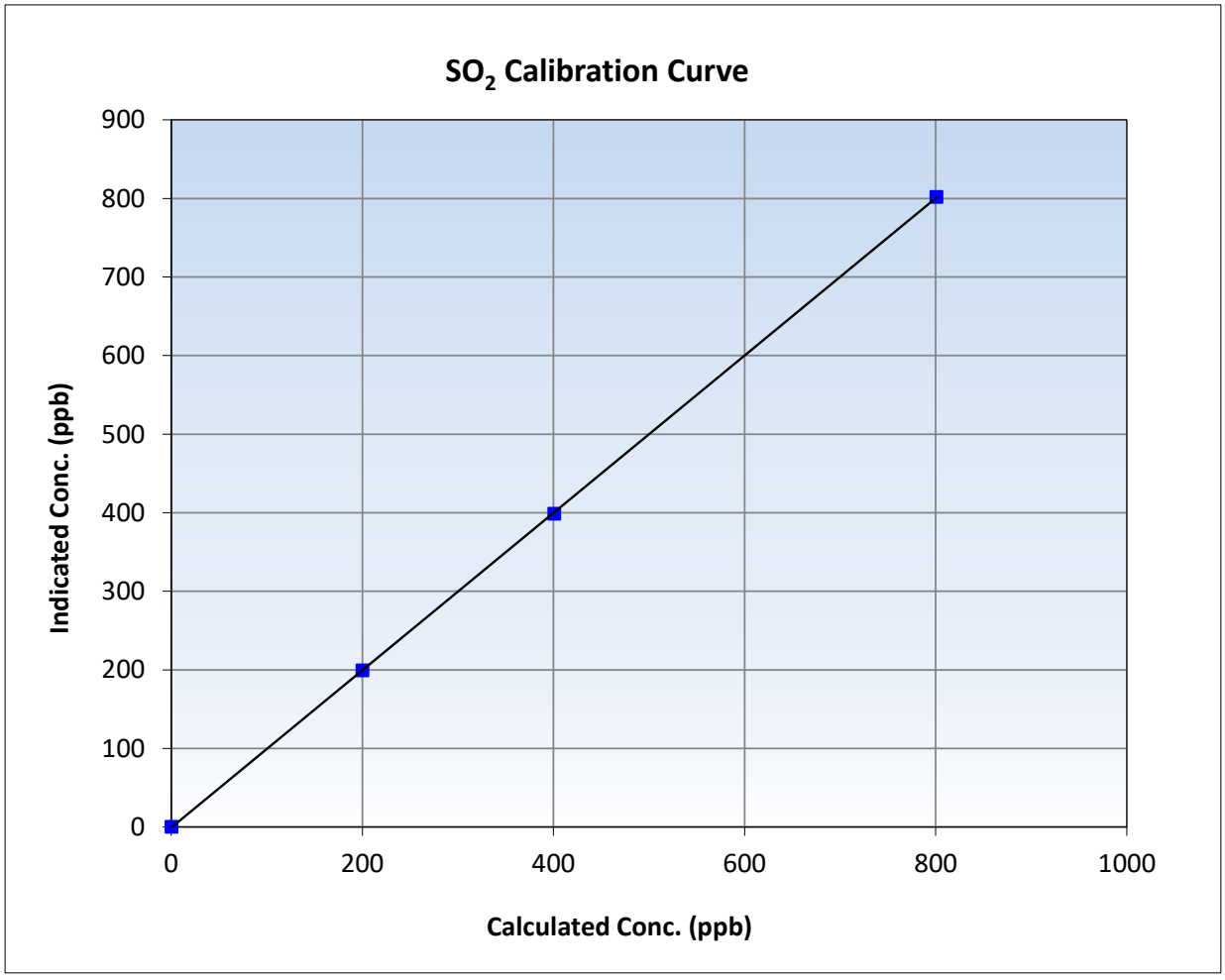
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 5, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:57	End Time (MST):	14:14
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301448

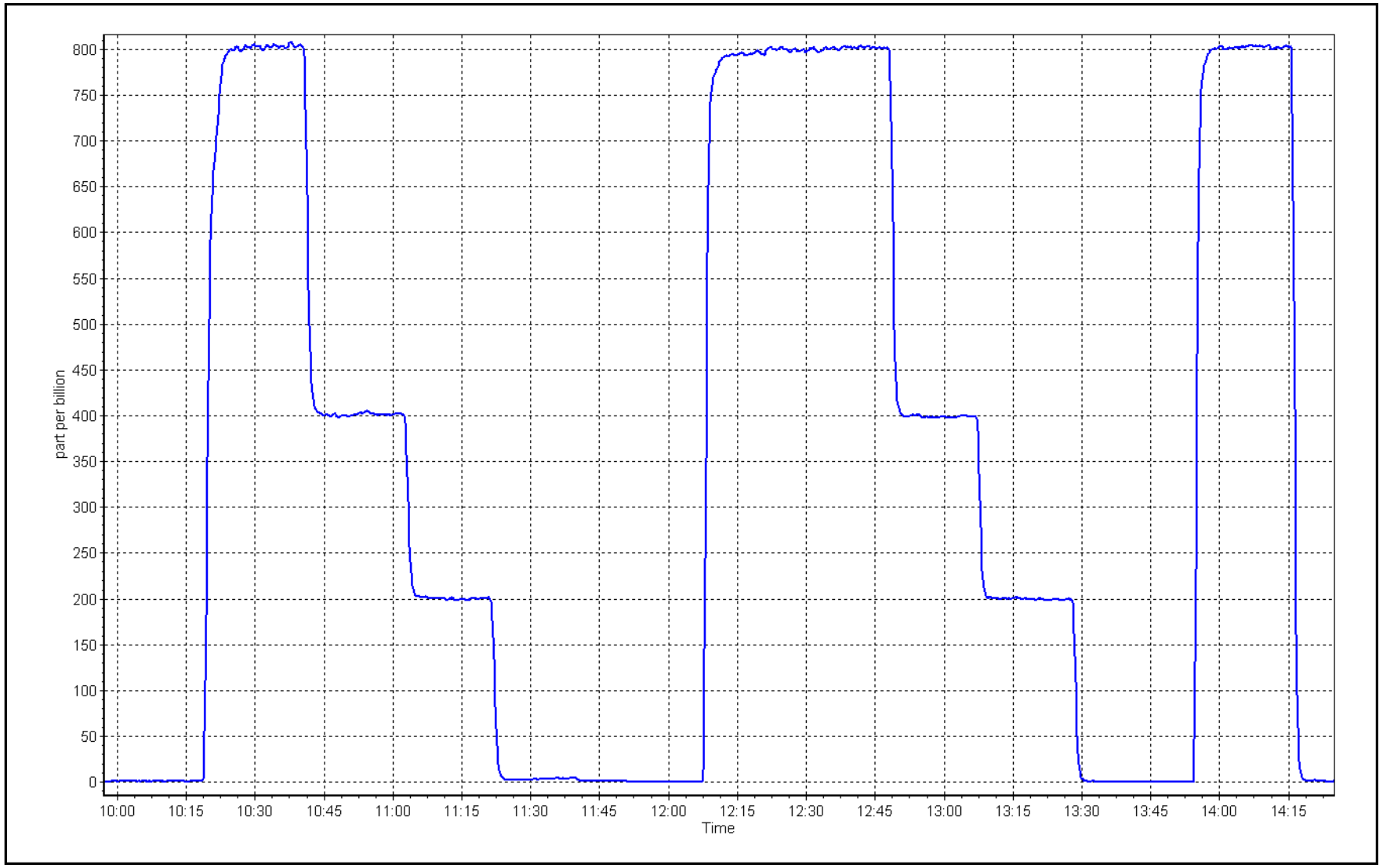
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.3	801.5	0.9985
400.6	398.4	1.0055
199.8	199.2	1.0031

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	1.001305	*0.90 - 1.10*
Intercept	-0.794719	*+/-30*



SO2 Calibration Plot Date: April 3, 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:	April 9, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	10:43	End time (MST):	14:58
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:	1.002936	1.001846	Backgd or Offset:	2.43	2.42
Calibration intercept:	0.199998	0.119998	Coeff or Slope:	0.931	0.918

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	4921	78.4	80.0	80.7	0.991
As found Mid point	4960	39.2	40.0	40.5	0.987
As found Low point	4980	19.6	20.0	20.1	0.995
New cylinder response					

Baseline Corr As found:	80.7	Prev response:	80.41	*% change:	0.4%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.009563	AF Intercept:	-0.000003
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999993	* = > +/-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	80.2	0.997
Mid point	4960	39.2	40.0	40.3	0.992
Low point	4980	19.6	20.0	20.1	0.995
As left zero	5000	5000.0	2550.0	0.3	----
As left span	4921	78.4	80.0	80.3	0.996
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:		December 17, 2021		Ave Corr Factor	0.995
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

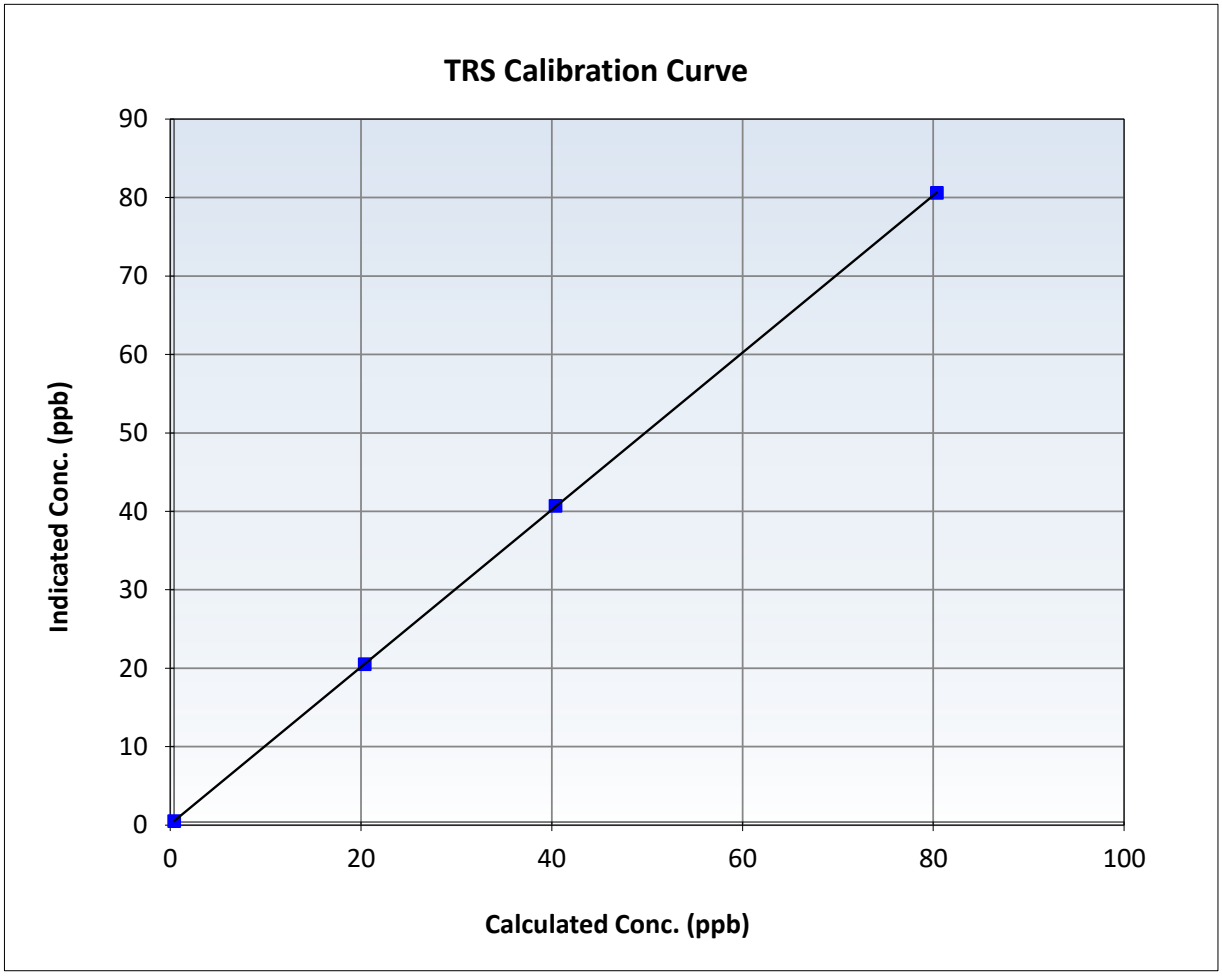
TRS Calibration Summary

Station Information

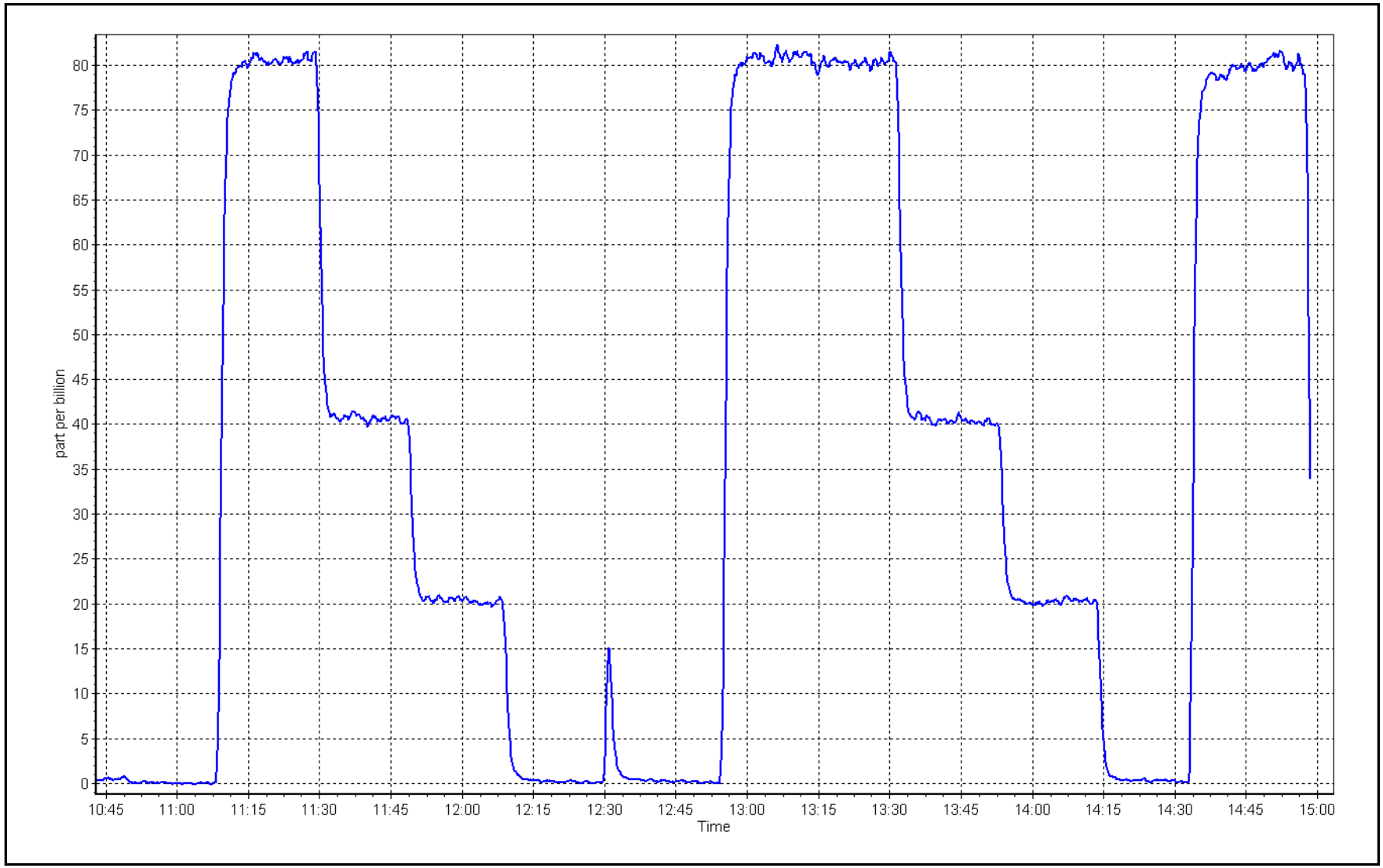
Calibration Date:	April 9, 2024	Previous Calibration:	March 18, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:43	End Time (MST):	14:58
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999995	*≥0.995*
80.0	80.2	0.9972	Slope	1.001846	*0.90 - 1.10*
40.0	40.3	0.9923			
20.0	20.1	0.9947	Intercept	0.119998	*+/-3*



TRS Calibration Plot Date: April 9, 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:	April 9, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	10:43	End time (MST):	14:58
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:	1.005285	1.003053	Backgd or Offset:	2.02	2.03
Calibration intercept:	-0.003216	0.056779	Coeff or Slope:	0.985	0.985

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	78.4	80.0	80.3	0.995
As found Mid point	4960	39.2	40.0	40.1	0.995
As found Low point	4980	19.6	20.0	19.9	1.000
New cylinder response					

Baseline Corr As found:	80.4	Prev response:	80.38	*% change:	0.0%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	1.005911	AF Intercept:	-0.143217
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999998	* = > +/-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	4922	78.4	80.0	80.2	0.997
Mid point	4960	39.2	40.0	40.3	0.992
Low point	4980	19.6	20.0	20.1	0.995
As left zero	5000	0.0	0.0	0.1	----
As left span	4922	78.4	80.0	80.3	0.996
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:		January 25, 2024		Ave Corr Factor	0.995
Date of last converter efficiency test:					

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

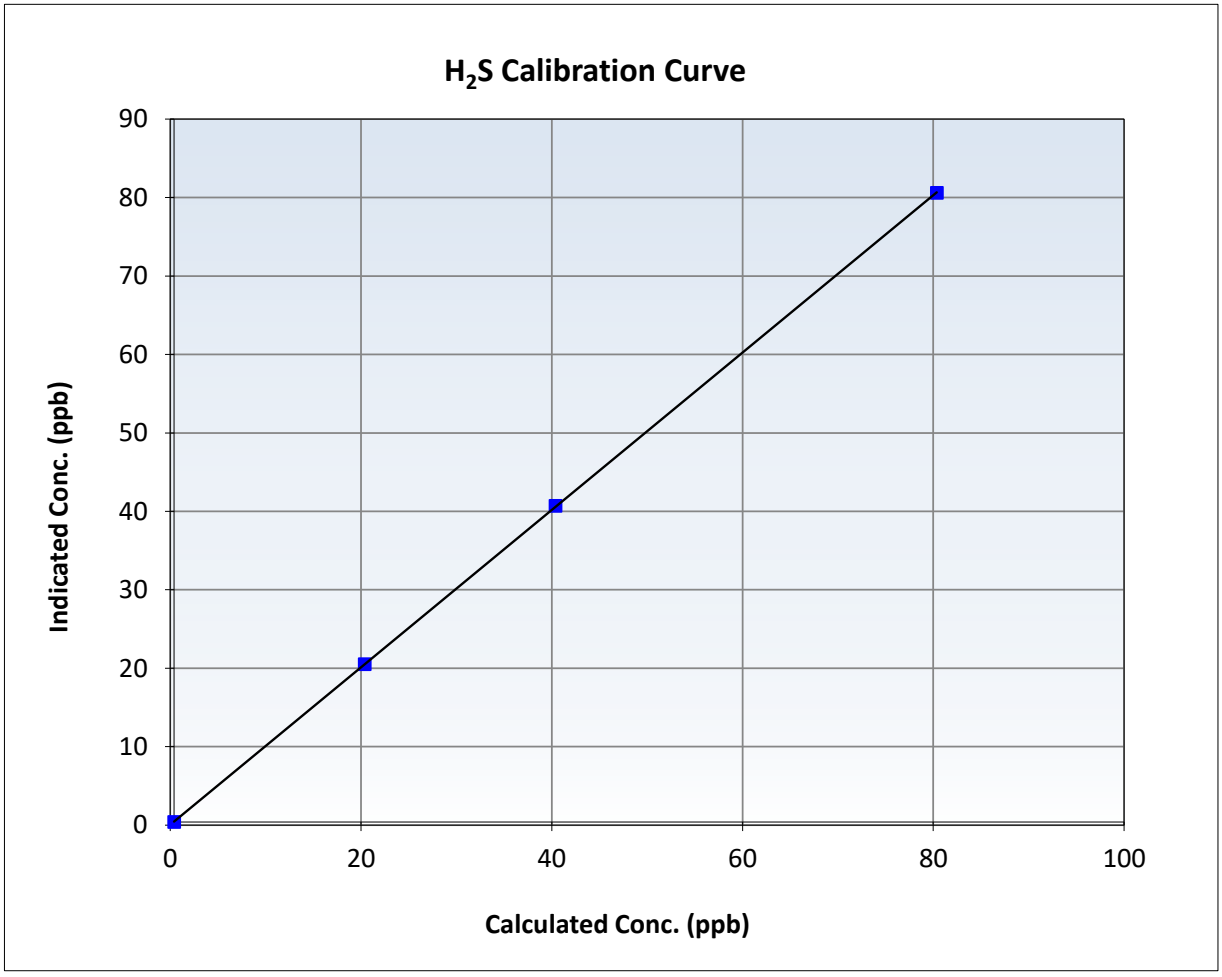
H_2S Calibration Summary

Station Information

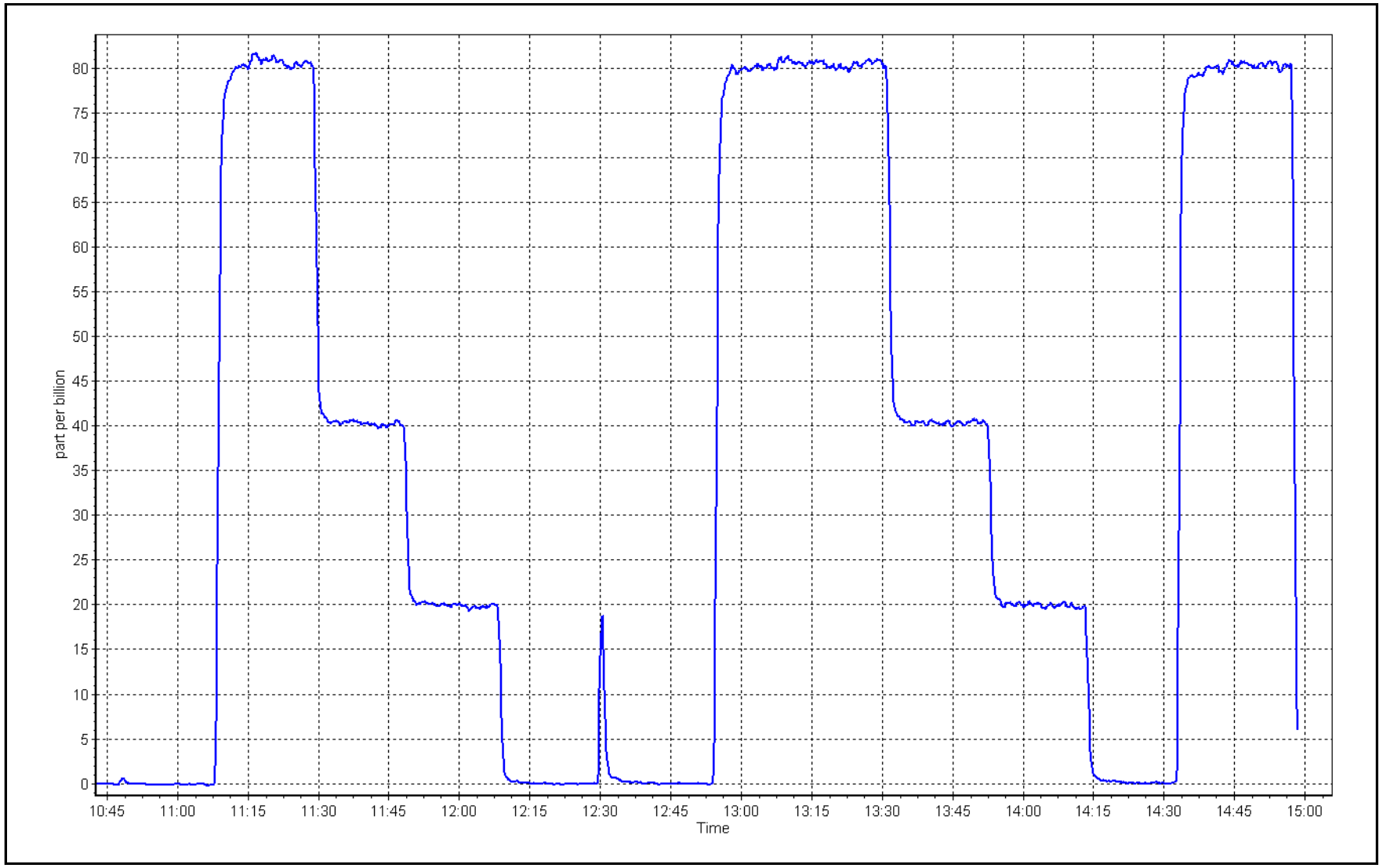
Calibration Date:	April 9, 2024	Previous Calibration:	March 18, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:43	End Time (MST):	14:58
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1200326167

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999993	*≥0.995*
80.0	80.2	0.9970	Slope	1.003053	*0.90 - 1.10*
40.0	40.3	0.9923			
20.0	20.1	0.9947	Intercept	0.056779	*+/-3*



H_2S Calibration Plot Date: April 9, 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:	April 3, 2024	Last Cal Date:	March 5, 2024
Start time (MST):	9:57	End time (MST):	14:14
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:	4.30E-04	4.31E-04	NMHC SP Ratio:	7.20E-05	7.53E-05
CH4 Retention time:	16.7	16.7	NMHC Peak Area:	127593	122095
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	16.90	1.022
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.90	Prev response	17.24	*% change	-2.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	17.27	17.28	0.999
Mid point	4959	40.7	8.64	8.56	1.010
Low point	4979	20.3	4.31	4.28	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	17.27	17.30	0.998
				Average Correction Factor	1.006

Notes: Changed the inlet filter and H2 cylinder 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	8.78	1.046
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.78	Prev response	9.13	*% change	-4.0%
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	4918	81.3	9.18	9.21	0.997
Mid point	4959	40.7	4.60	4.60	0.998
Low point	4979	20.3	2.29	2.32	0.988
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	9.18	9.23	0.995
				Average Correction Factor	0.995

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	8.09	8.12	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.12	Prev response	8.11	*% 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	4918	81.3	8.09	8.08	1.001
Mid point	4959	40.7	4.05	3.96	1.022
Low point	4979	20.3	2.02	1.96	1.033
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	8.09	8.07	1.001
				Average Correction Factor	1.019

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001618	1.001141
THC Cal Offset:	-0.052990	-0.034037
CH4 Cal Slope:	1.008062	1.000742
CH4 Cal Offset:	-0.039196	-0.042118
NMHC Cal Slope:	0.995931	1.001953
NMHC Cal Offset:	-0.013994	0.007481

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

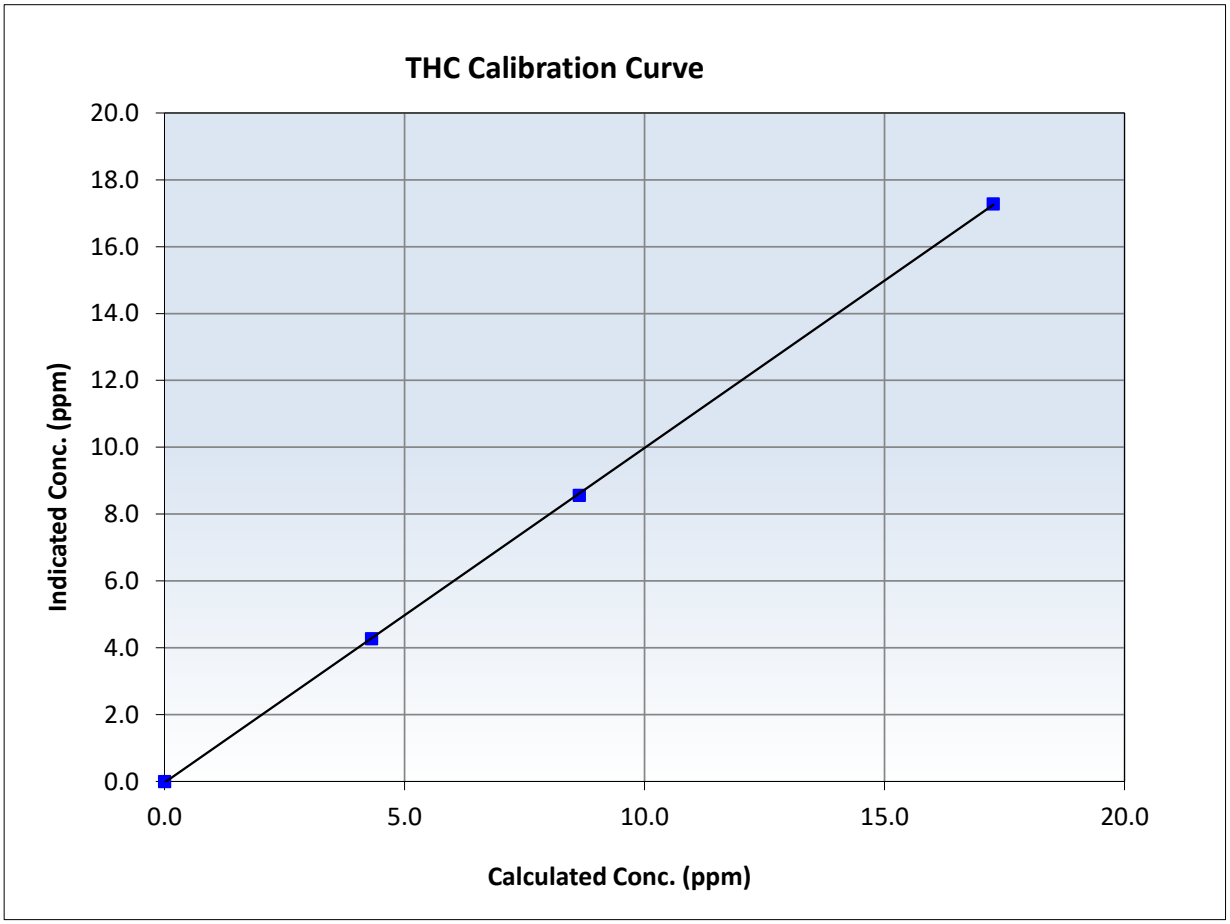
THC Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 5, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:57	End Time (MST):	14:14
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	0.999967	*≥0.995*
17.27	17.28	0.9991	Slope	1.001141	*0.90 - 1.10*
8.64	8.56	1.0095	Intercept	-0.034037	*+/-0.5*
4.31	4.28	1.0085			



Wood Buffalo Environmental Association

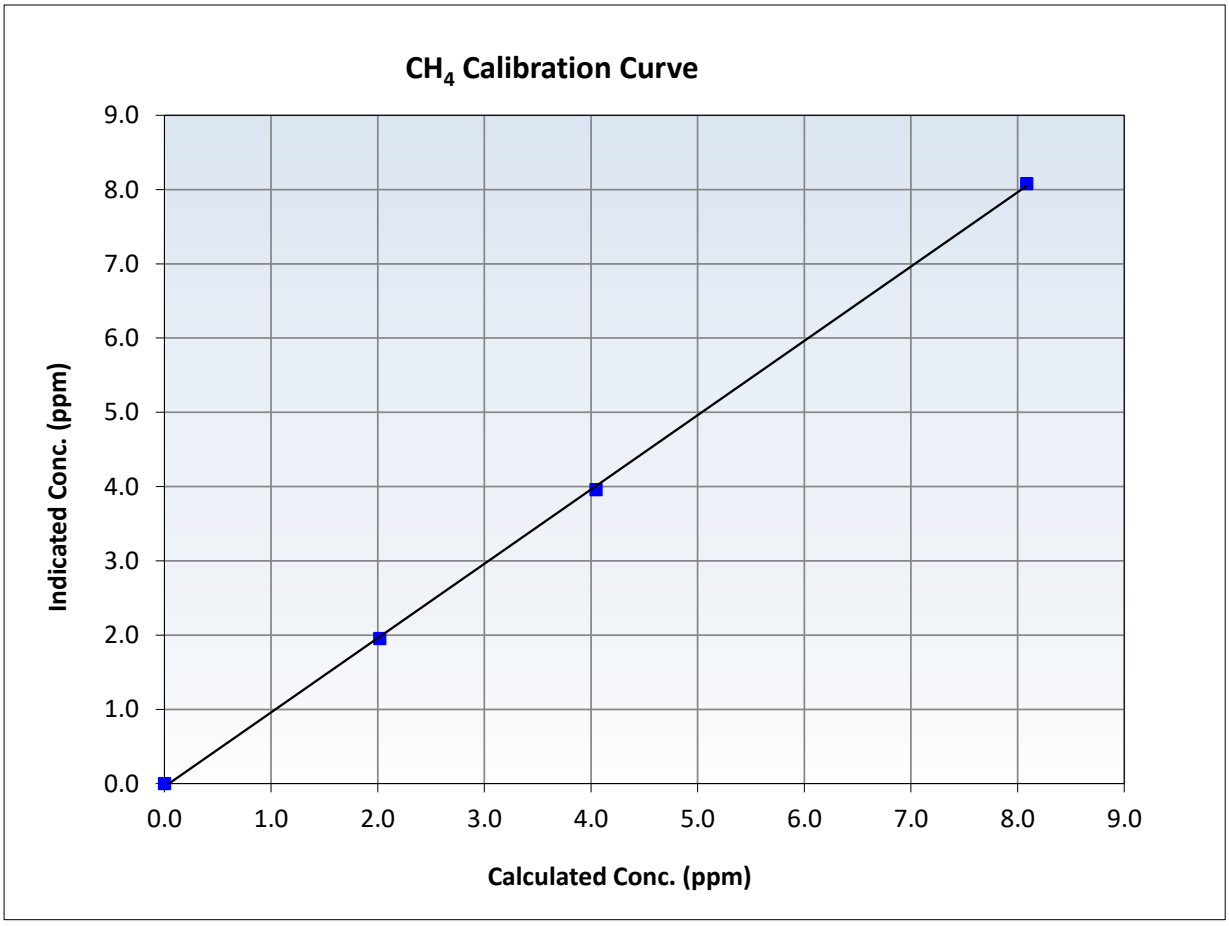
CH_4 Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 5, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:57	End Time (MST):	14:14
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	0.999841	≥0.995
8.09	8.08	1.0007	Slope	1.000742	0.90 - 1.10
4.05	3.96	1.0223			
2.02	1.96	1.0327	Intercept	-0.042118	+/-0.5



Wood Buffalo Environmental Association

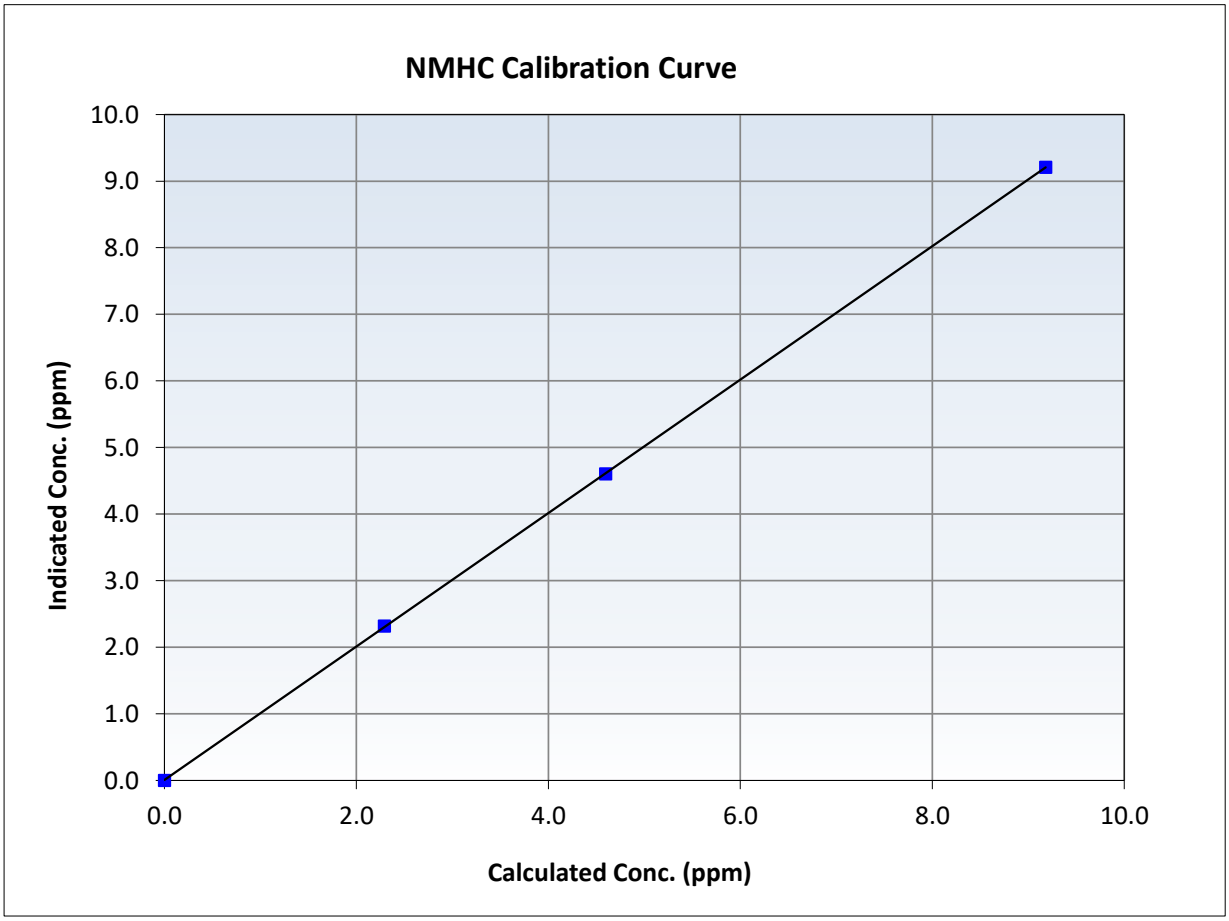
NMHC Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 5, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:57	End Time (MST):	14:14
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	0.999992	≥0.995
9.18	9.21	0.9972	Slope	1.001953	0.90 - 1.10
4.60	4.60	0.9982			
2.29	2.32	0.9881	Intercept	0.007481	+/-0.5



NMHC Calibration Plot Date: April 3, 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:	April 8, 2024
Last Cal Date:	March 14, 2024
Start time (MST):	10:06
End time (MST):	14:41
Reason:	Routine

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	0.3	0.2	0.2	----	----
AF High point	4932	67.6	803.1	800.4	2.7	791.4	783.5	7.9	1.0152	1.0218
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 802.6 ppb	NO = 799.9 ppb
Baseline Corr 1st pt	NO_X = 791.1 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:	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 = -1.5%
*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: 1218153357

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.496	1.522	NO bkgnd or offset:	7.4	7.5
NOX coeff or slope:	0.999	0.997	NOX bkgnd or offset:	7.5	7.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	201.0	201.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999371	0.999129
NO_X Cal Offset:	0.020000	0.380000
NO Cal Slope:	1.000862	0.999991
NO Cal Offset:	-1.220000	-1.040000
NO_2 Cal Slope:	0.995953	0.995614
NO_2 Cal Offset:	0.117298	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	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.2	----	----
High point	4932	67.6	803.1	800.4	2.7	802.6	799.7	2.8	1.0006	1.0009
Mid point	4966	33.8	401.5	400.2	1.4	402.1	399.4	2.7	0.9986	1.0020
Low point	4983	16.9	200.8	200.1	0.7	200.6	197.1	3.5	1.0009	1.0152
As left zero	5000	0.0	0.0	0.0	0.0	0.4	0.1	0.3	----	----
As left span	4932	67.6	803.1	390.6	412.5	802.3	390.6	411.7	1.0010	1.0000
							Average Correction Factor		1.0000	1.0060

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	798.0	389.5	411.2	410.0	1.0029	99.7%
Mid GPT point	798.0	596.6	204.1	204.8	0.9966	100.3%
Low GPT point	798.0	698.7	102.0	103.4	0.9865	101.4%
				Average Correction Factor	0.9953	100.5%

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

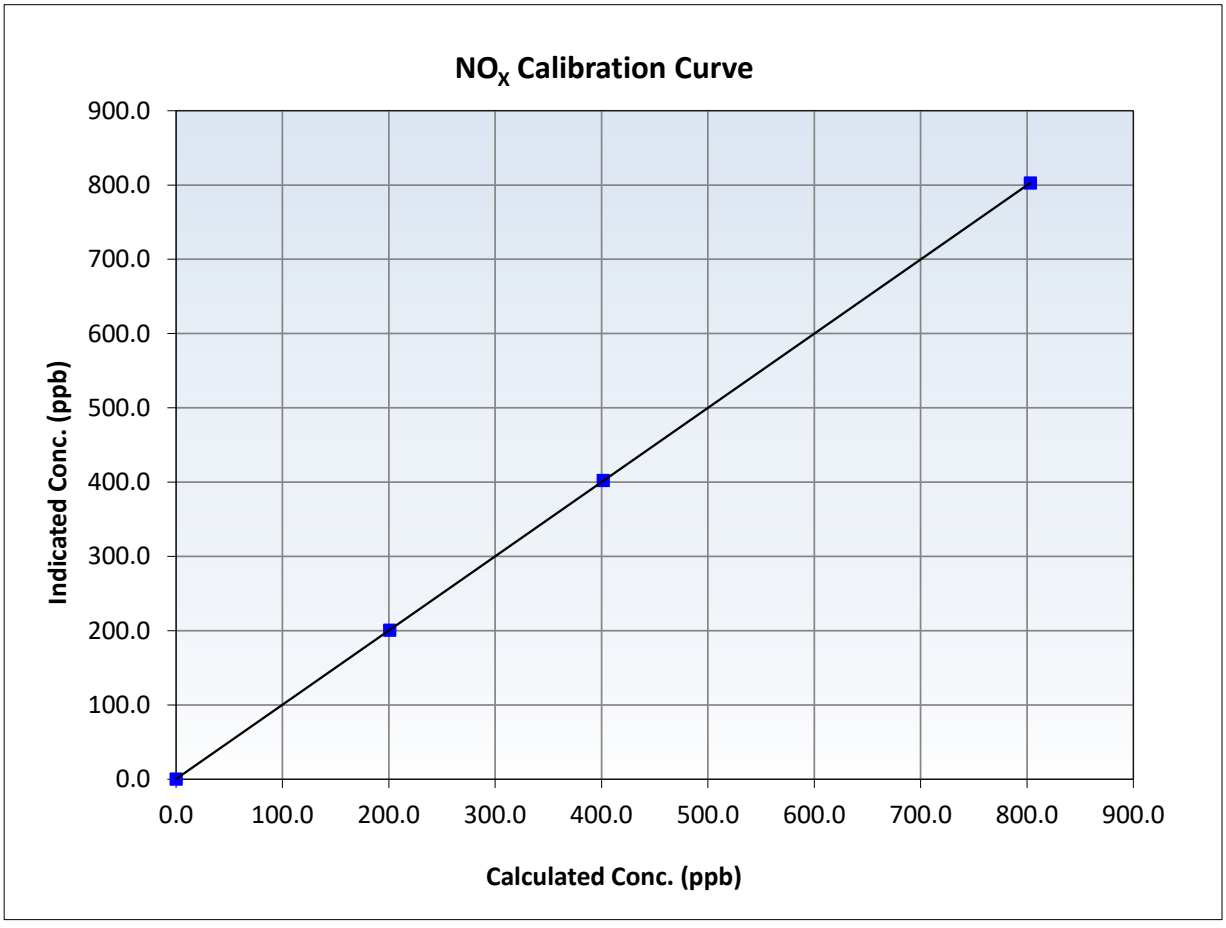
NO_X Calibration Summary

Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:06	End Time (MST):	14:41
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.4	----	Correlation Coefficient	0.999999	≥0.995
803.1	802.6	1.0006	Slope	0.999129	0.90 - 1.10
401.5	402.1	0.9986	Intercept	0.380000	+/-20
200.8	200.6	1.0009			



Wood Buffalo Environmental Association

NO_2 Calibration Summary

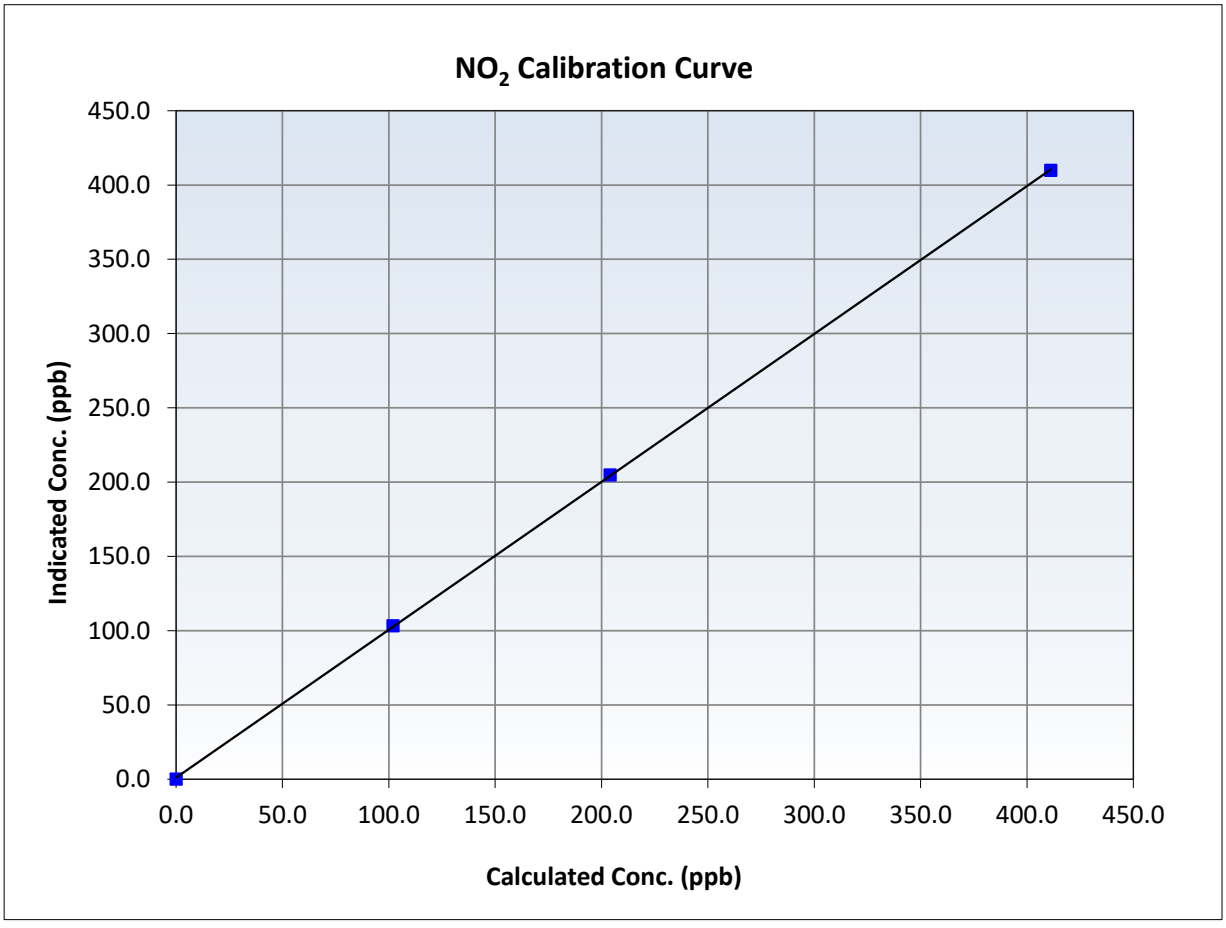
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:06	End Time (MST):	14:41
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
411.2	410.0	1.0029
204.1	204.8	0.9966
102.0	103.4	0.9865

Statistical Evaluation		Limits
Correlation Coefficient	0.999980	≥0.995
Slope	0.995614	0.90 - 1.10
Intercept	1.058457	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

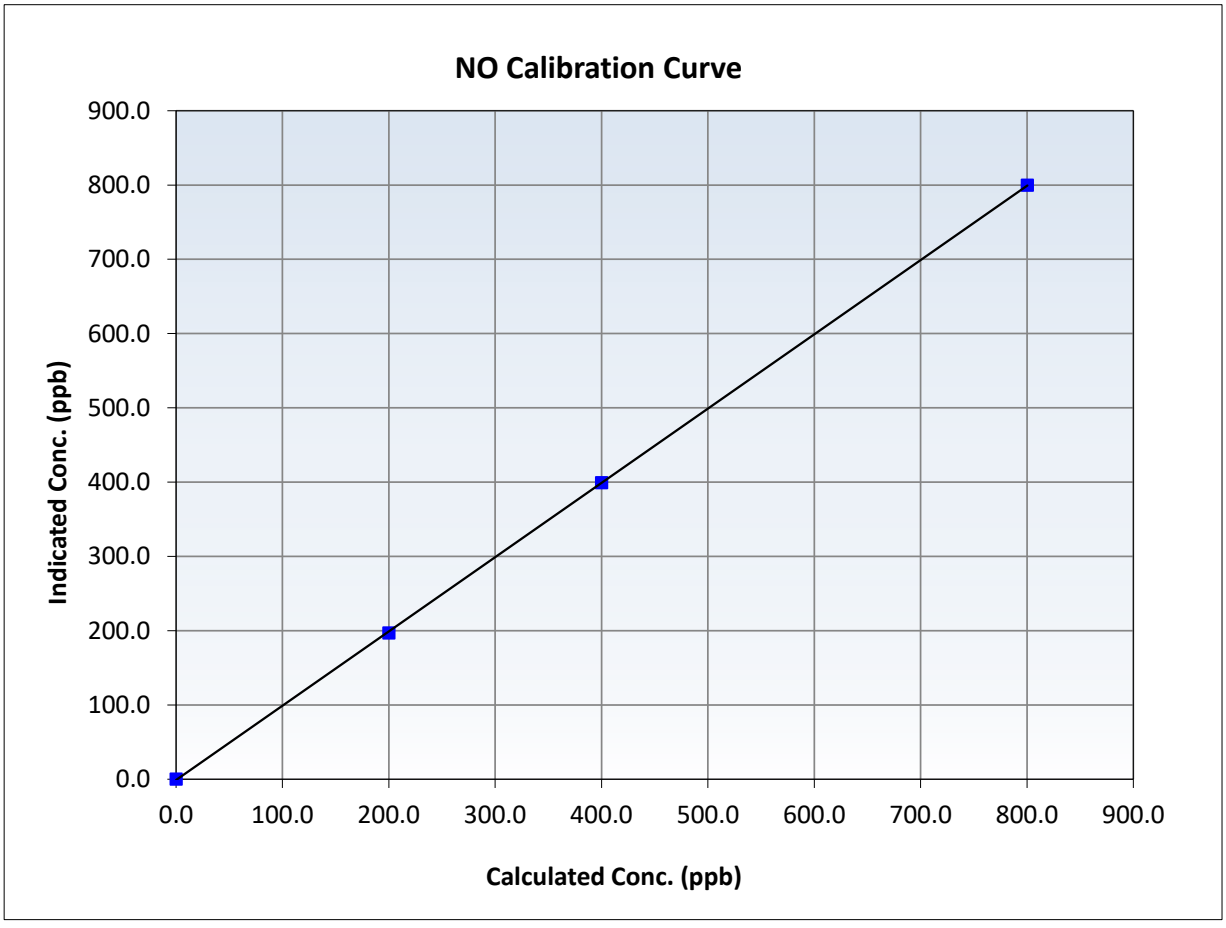
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 14, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:06	End Time (MST):	14:41
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

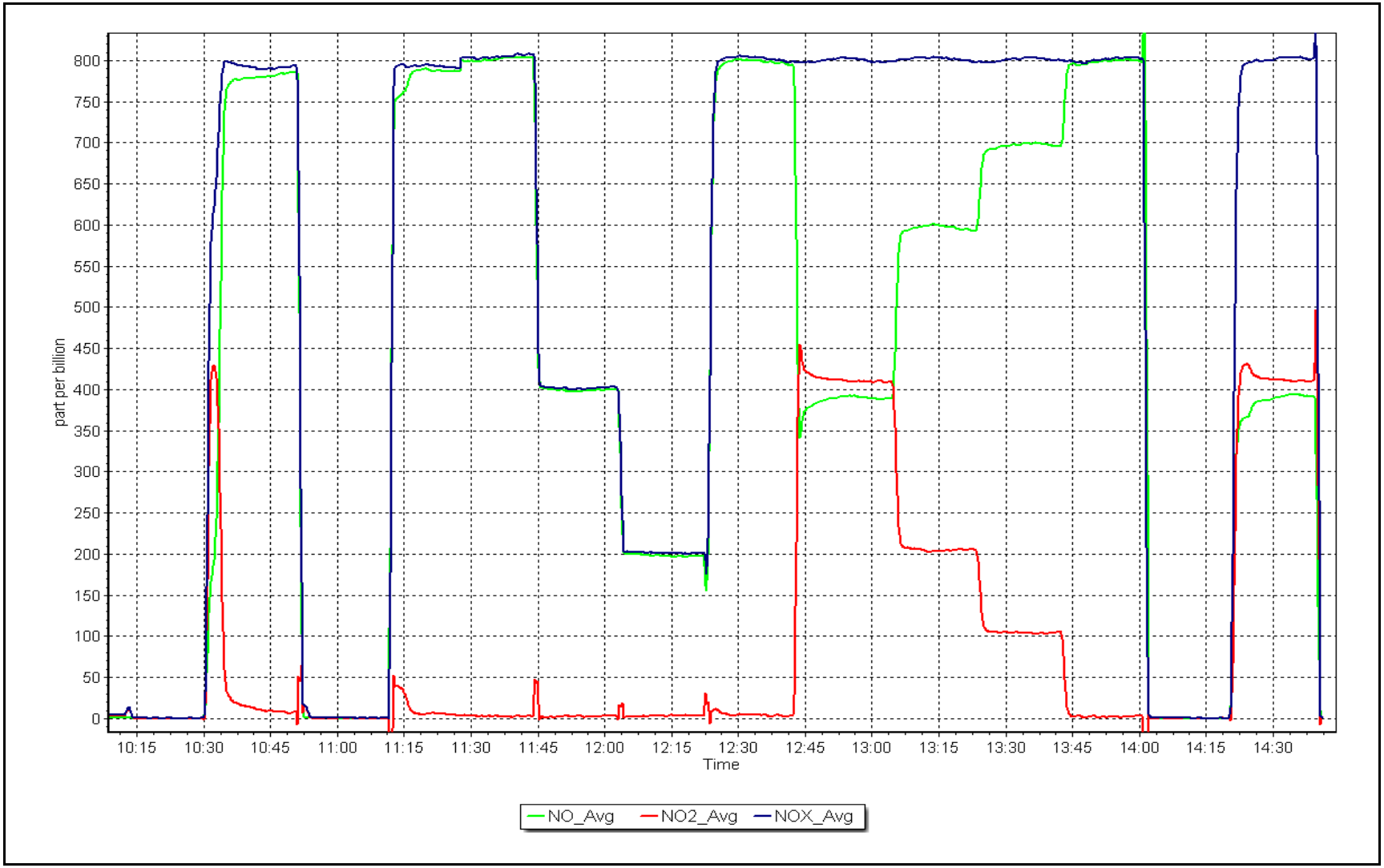
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.4	799.7	1.0009
400.2	399.4	1.0020
200.1	197.1	1.0152

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	0.999991	*0.90 - 1.10*
Intercept	-1.040000	*+/-20*



NO_X Calibration Plot Date: April 8, 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:	April 2, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	9:21	End time (MST):	12:38
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:	1.001057	0.998829	Backgd or Offset:	5.5	4.6
Calibration intercept:	0.640000	0.180000	Coeff or Slope:	1.044	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	0.0	0.0	-1.3	----
As found High point	5000	863.1	400.0	407.4	0.979
As found Mid point					
As found Low point					
Baseline Corr As found:	408.7	Previous response	401.1	*% change	1.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	-0.2	----
High point	5000	863.1	400.0	399.4	1.002
Mid point	5000	742.5	200.0	200.5	0.998
Low point	5000	651.7	100.0	100.2	0.998
As left zero	5000	0.0	0.0	-0.2	----
As left span	5000	863.1	400.0	400.1	1.000
				Average Correction Factor	0.999

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

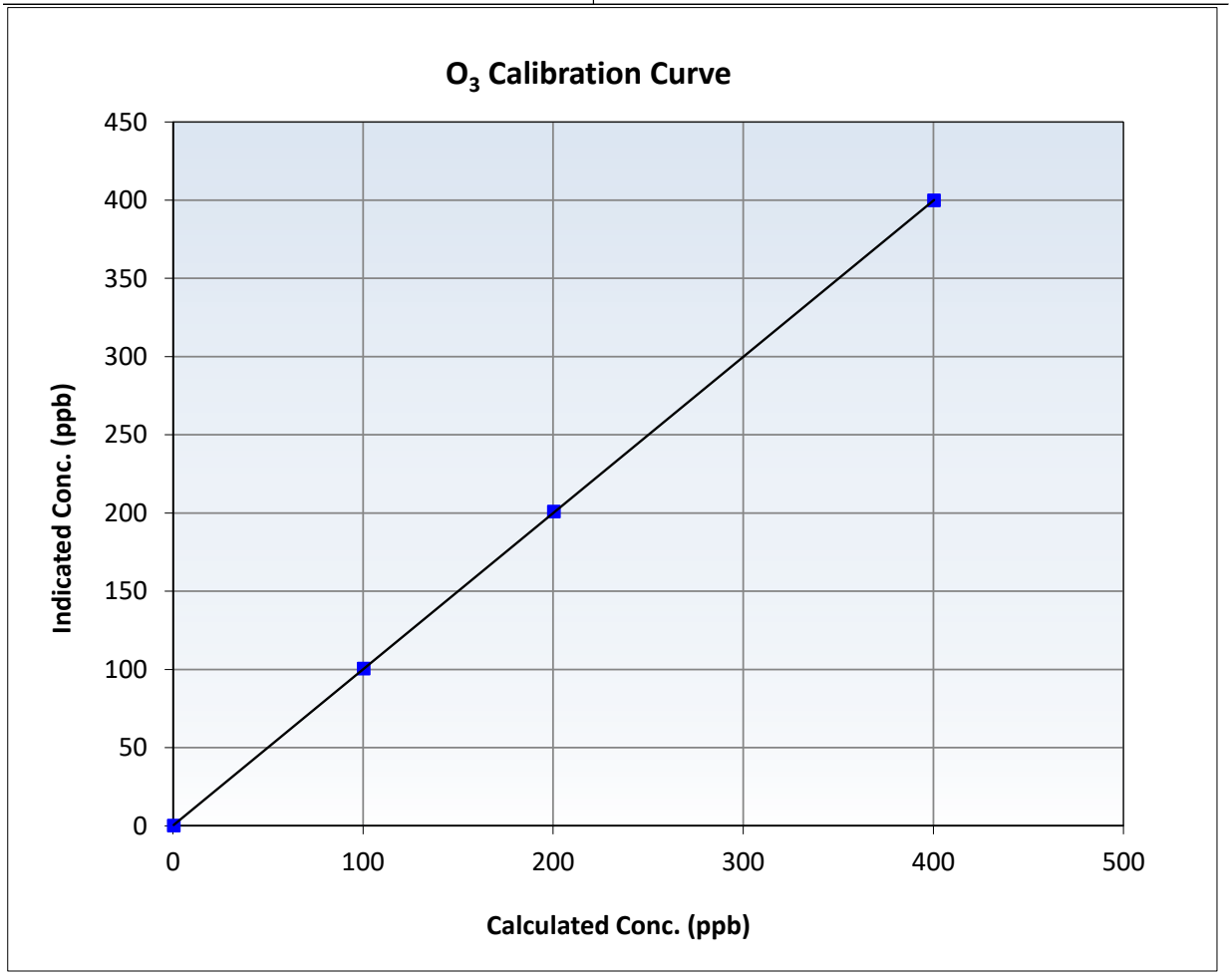
O_3 Calibration Summary

Station Information

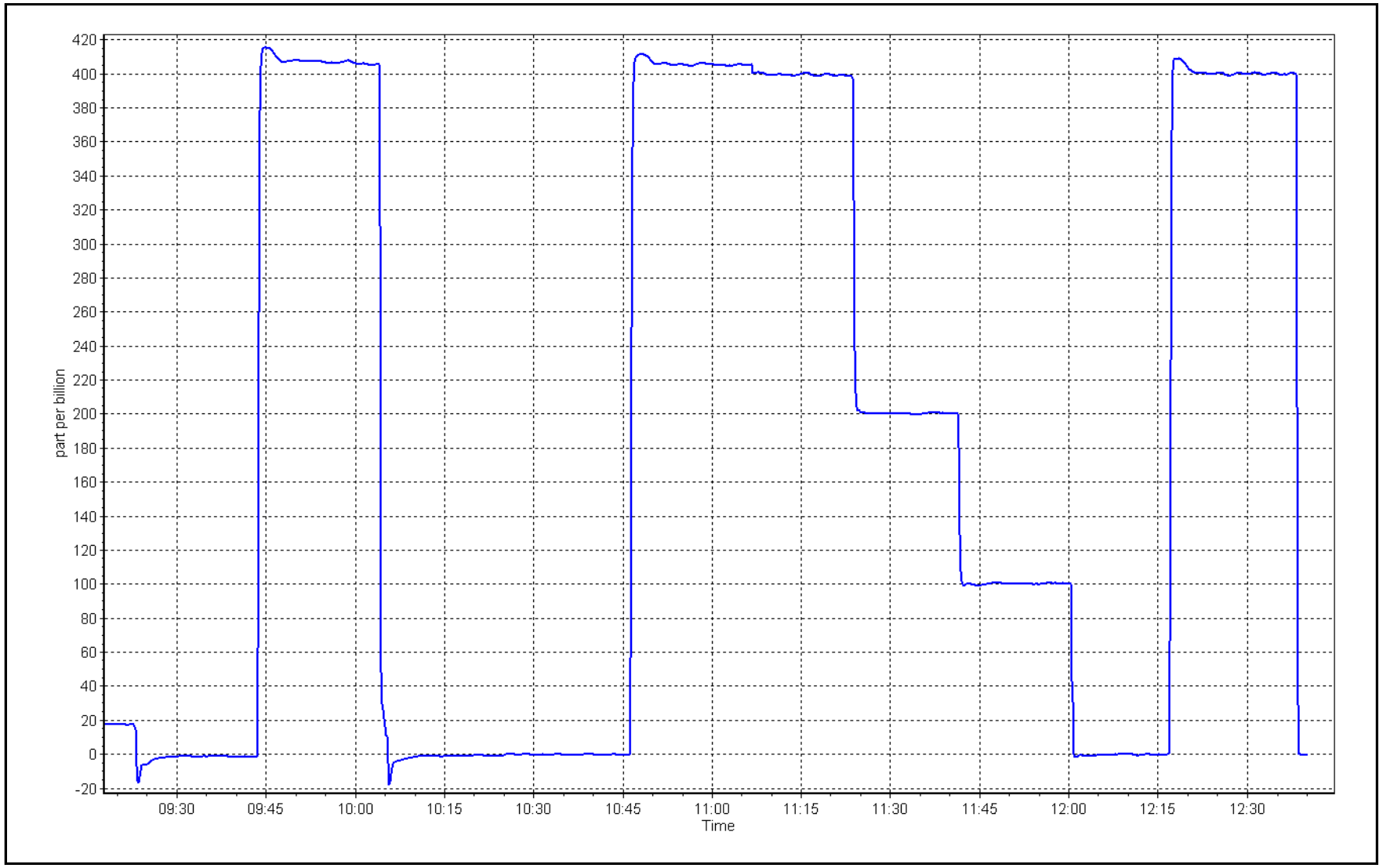
Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	9:21	End Time (MST):	12:38
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.2	----	Correlation Coefficient	0.999993	*≥0.995*
400.0	399.4	1.0015	Slope	0.998829	*0.90 - 1.10*
200.0	200.5	0.9975			
100.0	100.2	0.9980	Intercept	0.180000	*+/- 5*



O_3 Calibration Plot Date: April 2, 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:	April 11, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	12:29	End time (MST):	13:50
Analyzer Make:	Teledyne API T640	S/N:	324
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)	13.9	12.94	13.9	☐	+/- 2 °C
P (mmHg)	736.2	735.46	736.2	☐	+/- 10 mmHg
Flow (LPM)	4.99	5.122	4.99	☐	+/- 0.25 LPM
PW% (pump)	38	-----	38	☐	>80%
Zero Verification	PM w/o HEPA:	7.3	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	8.8	10.9	10.9	☐	10.9 +/- 0.5

Date Optical Chamber Cleaned: April 11, 2024

Date Disposable Filter Changed: April 11, 2024

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: Verified flow, temperature, and pressure. Leak check passed. PMT peak test completed. Disposable filter changed. Optical chamber and RH/T sensor cleaned.

Calibration by: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	April 10, 2024	Last Cal Date:	March 15, 2024
Start time (MST):	10:25	End time (MST):	13:40
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:	1.000382	1.000946	Backgd or Offset:	-0.013	-0.013
Calibration intercept:	0.195846	0.155852	Coeff or Slope:	0.989	0.991

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	0.997
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.66	Prev response:	40.77	*% 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	

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	0.999
Mid point	4966	33.3	20.2	20.7	0.977
Low point	4983	16.7	10.2	10.3	0.987
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	0.988

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

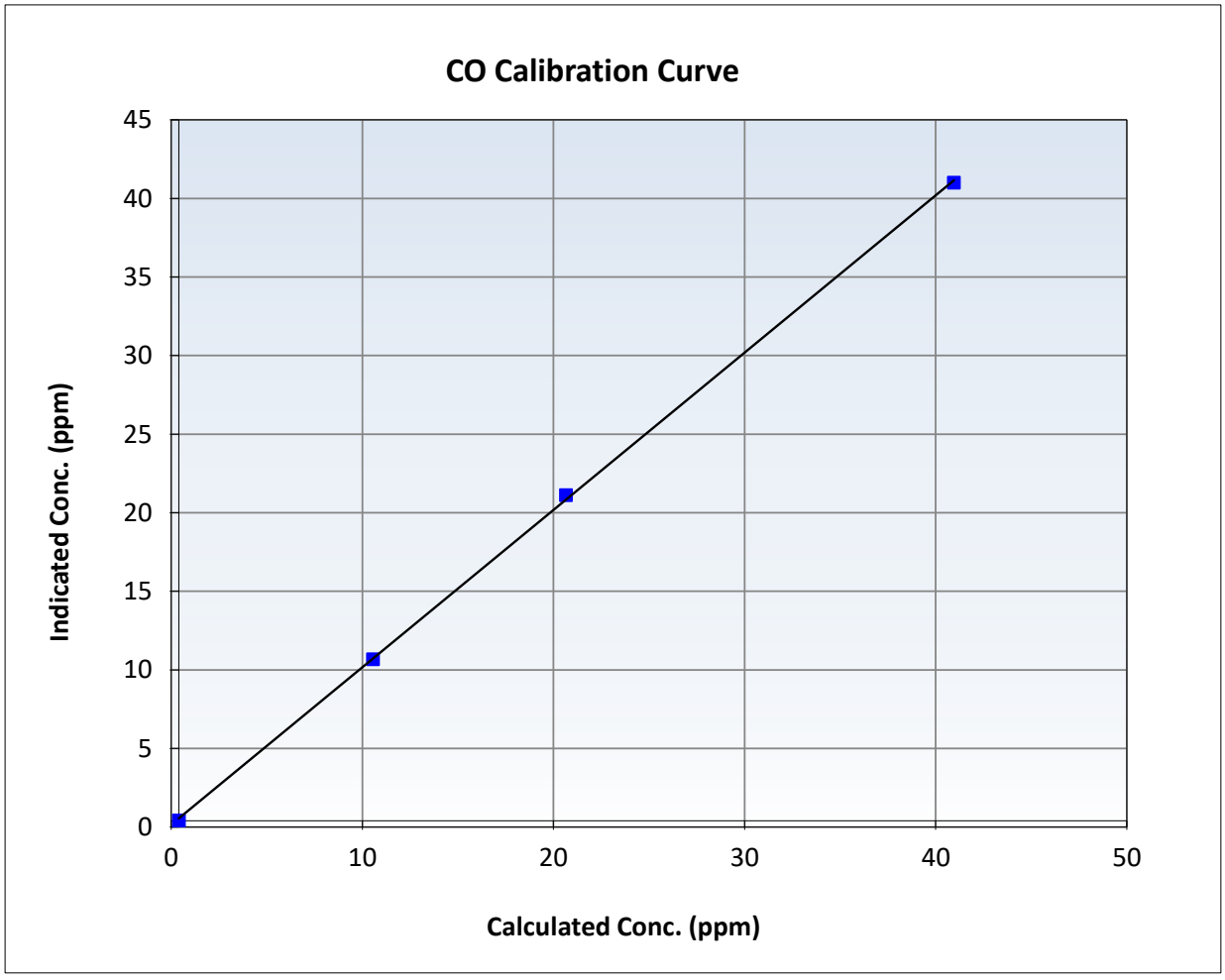
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 15, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:25	End Time (MST):	13:40
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

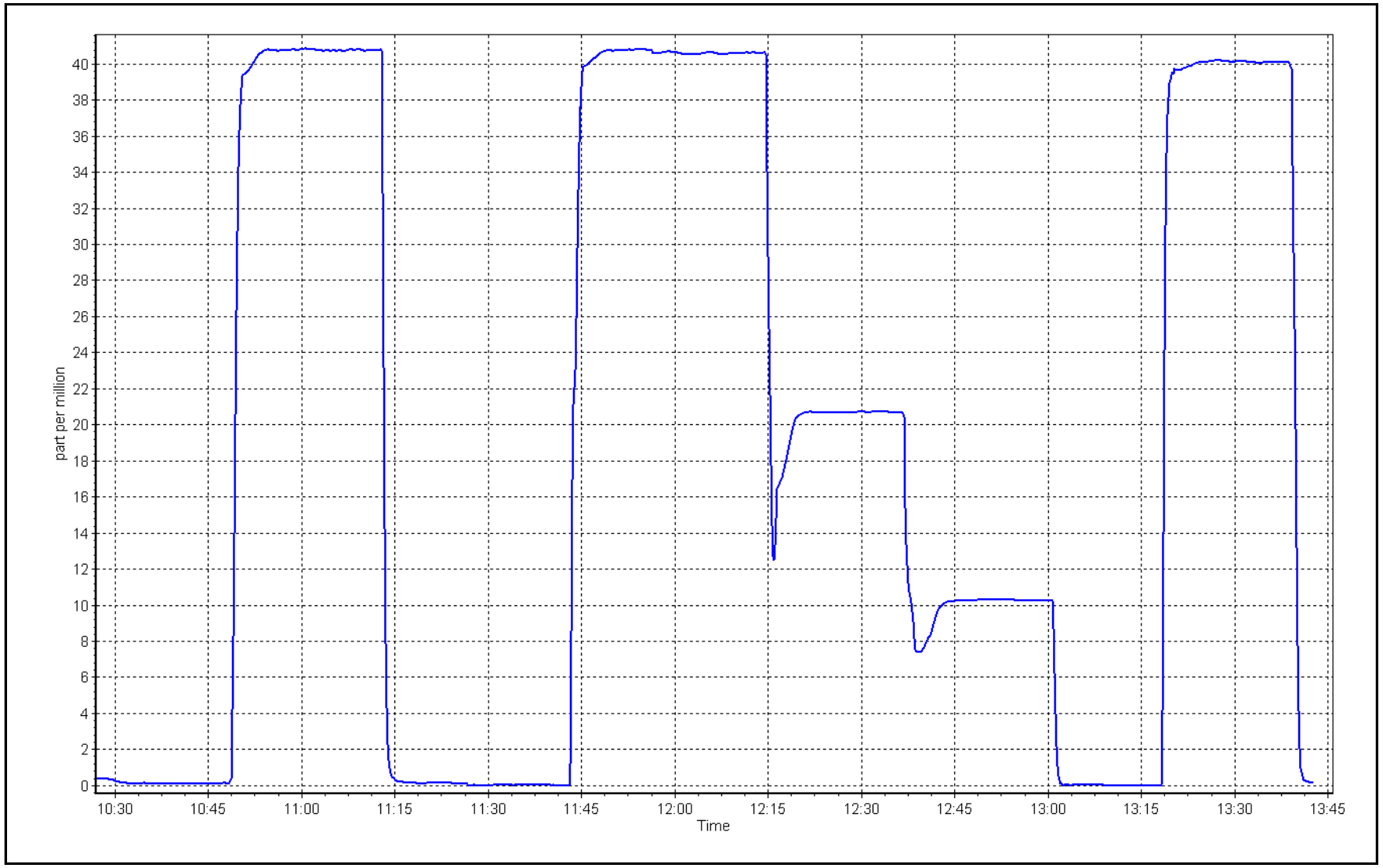
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.6	40.6	0.9987
20.2	20.7	0.9773
10.2	10.3	0.9868

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999863	*≥0.995*
Slope	1.000946	*0.90 - 1.10*
Intercept	0.155852	*+/-1.5*



CO Calibration Plot Date: April 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:	April 4, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	8:44	End time (MST):	11:55
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:	1.000907	1.001476	Backgd or Offset:	0.045	0.045
Calibration intercept:	-6.720000	-5.720000	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	-0.1	----
As found High Point	2920	80.0	1605.3	1594.9	1.006
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1595.0	Prev response:	1600.1	*% 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	

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	1605.1	1.000
Mid point	2960	40.0	802.7	794.7	1.010
Low point	2980	20.0	401.3	390.6	1.027
As left zero	3000	0.0	0.0	0.0	----
As left span	2960	40.0	802.7	778.1	1.032
				Average Correction Factor	1.013

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO_2 Calibration Summary

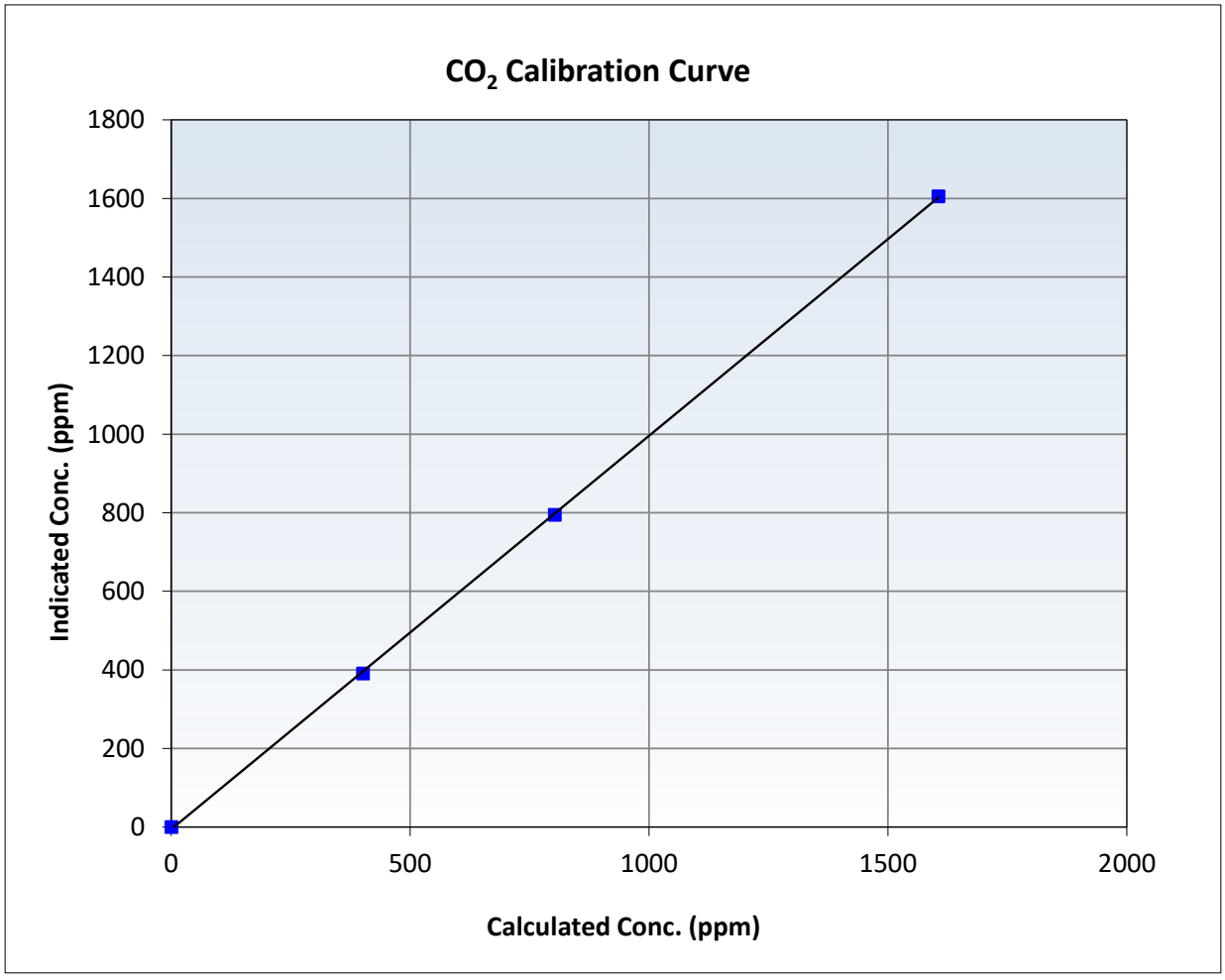
Station Information

Calibration Date	April 4, 2024	Previous Calibration	March 12, 2024
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS 01
Start Time (MST)	8:44	End Time (MST)	11:55
Analyzer make	Teledyne API 360	Analyzer serial #	442

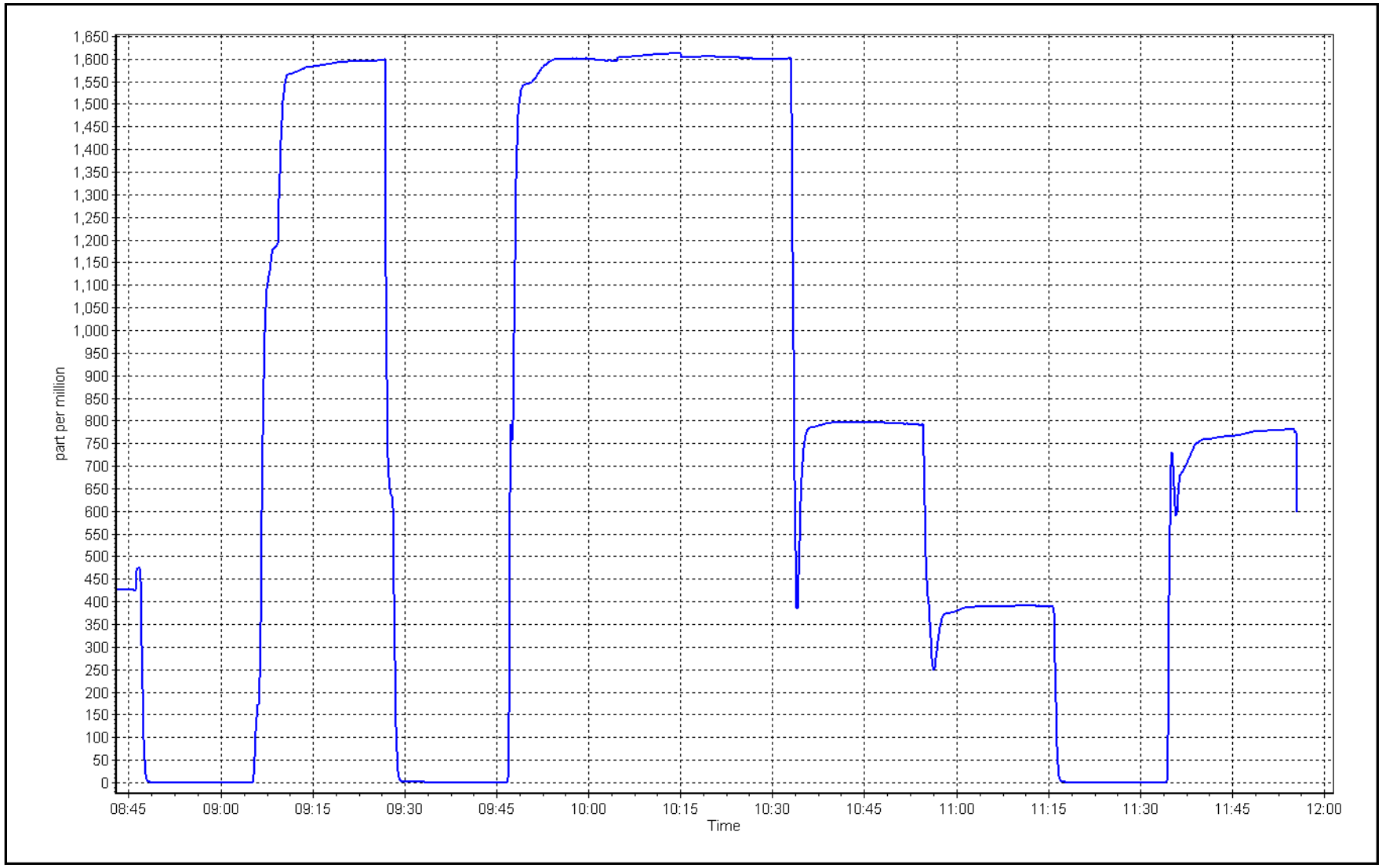
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
1605.3	1605.1	1.0001
802.7	794.7	1.0100
401.3	390.6	1.0275

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999938	*≥0.995*
Slope	1.001476	*0.90 - 1.10*
Intercept	-5.7	*+/-20*



CO_2 Calibration Plot Date: April 4, 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:	April 11, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	10:12	End time (MST):	15:15
NH3 Cal Date:	April 11, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	15:35	End time (MST):	18:00
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:	6.20	
NOX Range (ppb):	0 - 1000 ppb		Sample Flow:	540	
	Start	***Finish***		***Start***	***Finish***
NO coefficient:	0.960	0.952	Nt coefficient:	0.969	0.962
NOX coefficient:	0.966	0.959	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:	1.001292	1.000623
NO_X Cal Offset:	-2.380000	-2.120000
NO Cal Slope:	0.998821	0.997950
NO Cal Offset:	-2.280000	-2.600000
NO_2 Cal Slope:	0.999426	1.001154
NO_2 Cal Offset:	-0.898937	0.886739
NH3 Cal Slope:	1.002078	0.997027
NH3 Cal Offset:	-0.363408	2.325094
Nt Cal Slope:	1.004775	1.000070
Nt Cal Offset:	-0.436983	2.166761

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	-0.4	-0.2	-0.2	----	----
As found span	4932	67.6	803.1	800.4	803.1	813.1	802.3	813.1	0.9877	0.9976
AF GPT span										
new NO cyl rp										

Baseline Corr As Fd Nt = 813.3 ppb NO_X = 813.5 ppb NO = 802.5 ppb *Percent Change $Nt_{(NO)}$ = 0.8%

Previous Response Nt = 806.49 ppb NO_X = 801.7 ppb NO = 797.2 ppb *Percent Change NO_X = 1.4%

**NO_X Δ (NO to GPT response) = *Percent Change NO = 0.7%

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

* = > +/-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	-0.5	-0.3	-0.1	----	----
High point	4932	67.6	803.1	800.4	803.1	803.0	798.1	800.3	1.0001	1.0029
Mid point	4966	33.8	401.5	400.2	401.5	396.7	393.2	397.8	1.0122	1.0178
Low point	4983	16.9	200.8	200.1	200.8	198.6	196.4	199.0	1.0109	1.0188
								Average Correction Factor	1.0078	1.0132

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%*
Calibration zero	----	----	0.0	-0.1	----	----
High GPT point (400 ppb O3)	794.8	384.6	412.9	414.0	0.9974	100.3%
Mid GPT point (200 ppb O3)	794.8	588.2	209.3	210.2	0.9957	100.4%
Low GPT point (100 ppb O3)	794.8	690.6	106.9	109.4	0.9772	102.3%
				Average Correction Factor	0.9901	101.0%

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	-0.2	-0.4	0.2	----	----
AF High point	3418	82.2	1798.5	----	1798.5	1798.2		1793.1	1.000	1.003
AF Mid point							----			
AF Low point							----			
new NH3 cyl rp										

Baseline Corr As Fd Nt = 1798.4 ppb NH3 = 1792.9 ppb *Percent Change $Nt_{(NH3)}$ = -0.5%

Previous Response Nt = 1806.7 ppb NH3 = 1801.9 ppb * = > +/-5% change initiates investigation *Percent Change NH3 = -0.5%

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	-0.1	-0.5	0.4	----	----
High point	3418	82.2	1798.5	----	1798.5	1798.2	----	1793.1	1.000	1.003
Mid point	3454	45.7	1000.0	----	1000.0	1006.8	----	1003.7	0.993	0.996
Low point	3477	22.8	498.9	----	498.9	501.4	----	499.7	0.995	0.998
							Average Correction Factor		0.9961	0.9992

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

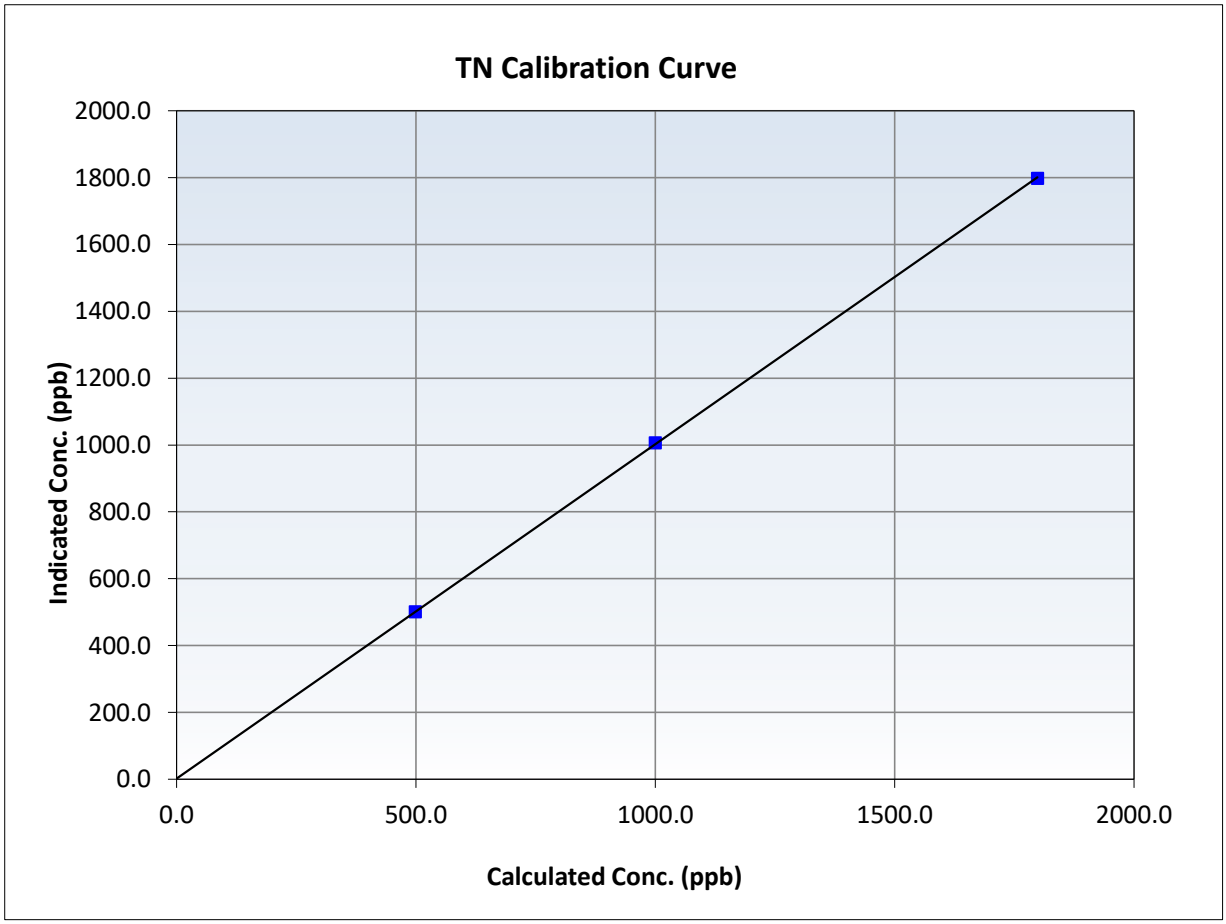
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:12	End Time (MST):	15:15
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
1798.5	1798.2	1.0002
1000.0	1006.8	0.9932
498.9	501.4	0.9949

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999981	*≥0.995*
Slope	1.000070	*0.90 - 1.10*
Intercept	2.166761	*+/-20*



Wood Buffalo Environmental Association

NH_3 Calibration Summary

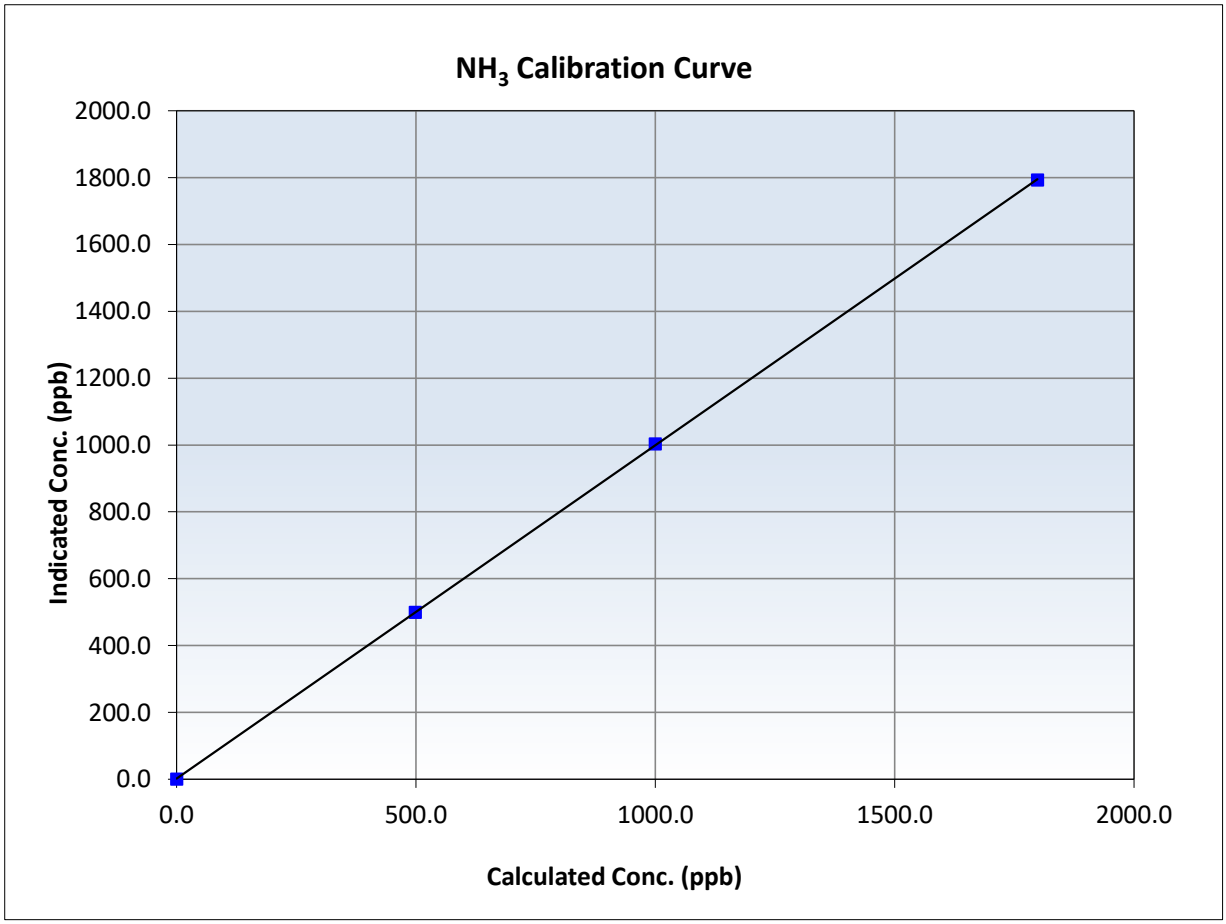
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:12	End Time (MST):	15:15
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
1798.5	1793.1	1.0030
1000.0	1003.7	0.9963
498.9	499.7	0.9983

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	0.997027	*0.90 - 1.10*
Intercept	2.325094	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

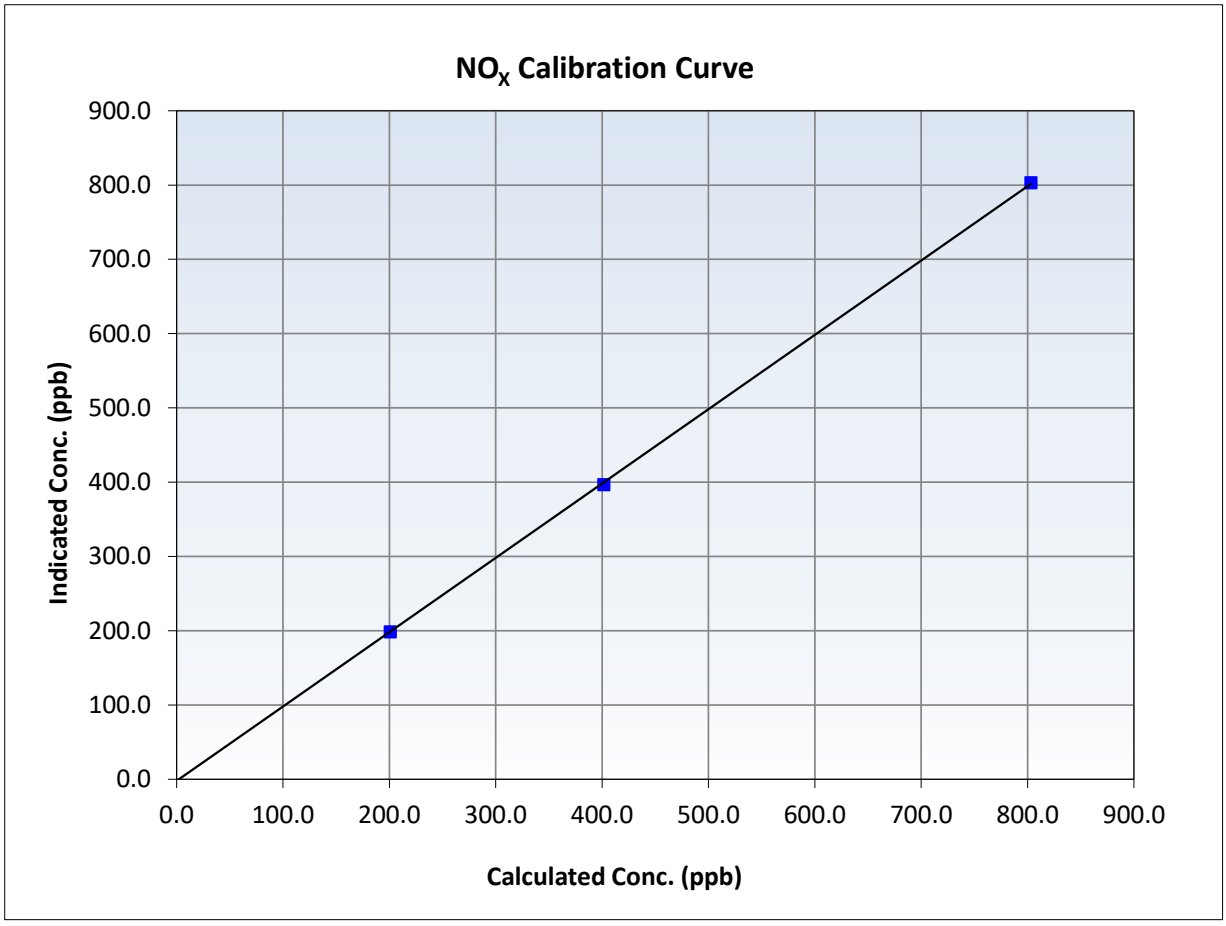
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:12	End Time (MST):	15:15
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.5	----
803.1	803.0	1.0001
401.5	396.7	1.0122
200.8	198.6	1.0109

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	1.000623	*0.90 - 1.10*
Intercept	-2.120000	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

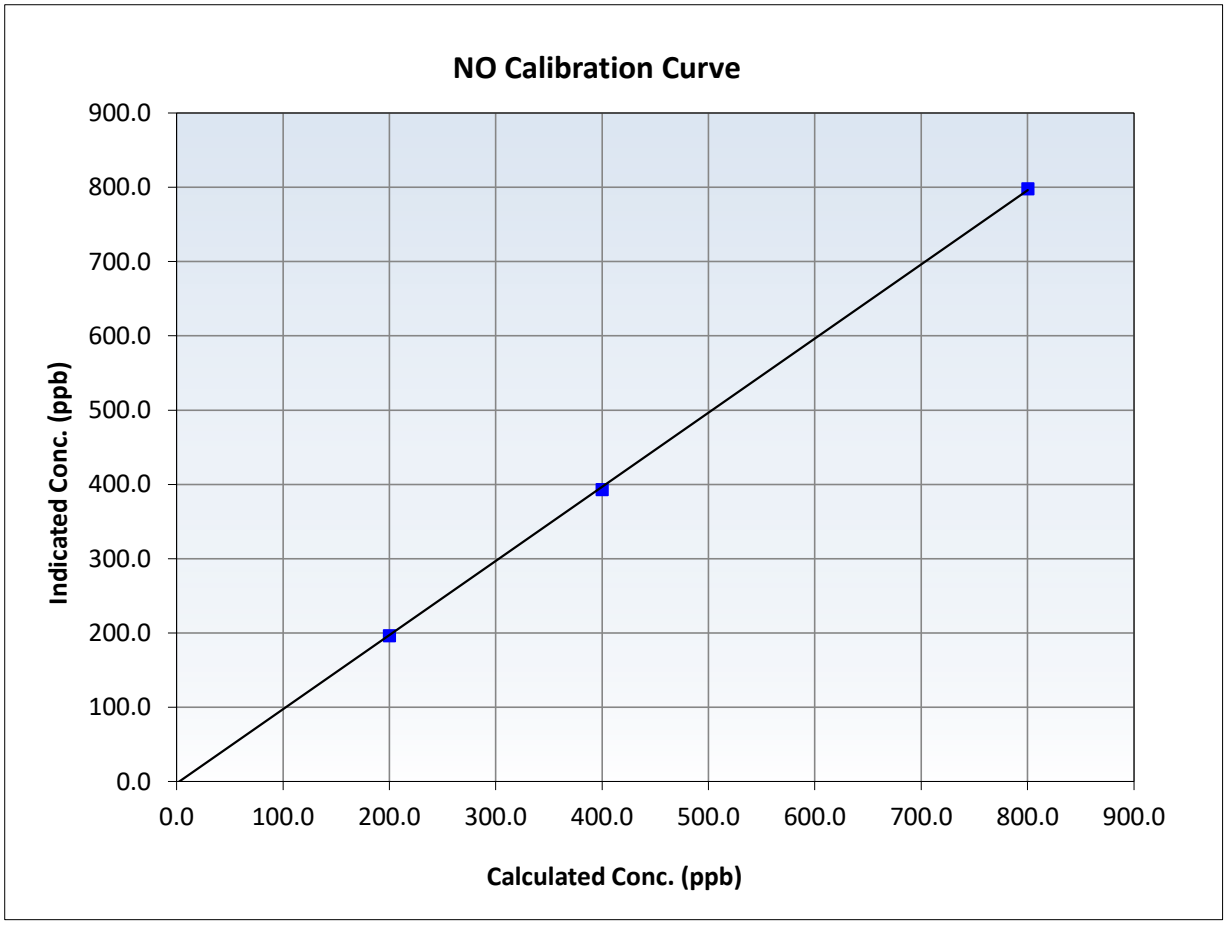
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:12	End Time (MST):	15:15
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	----
800.4	798.1	1.0029
400.2	393.2	1.0178
200.1	196.4	1.0188

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999936	*≥0.995*
Slope	0.997950	*0.90 - 1.10*
Intercept	-2.600000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

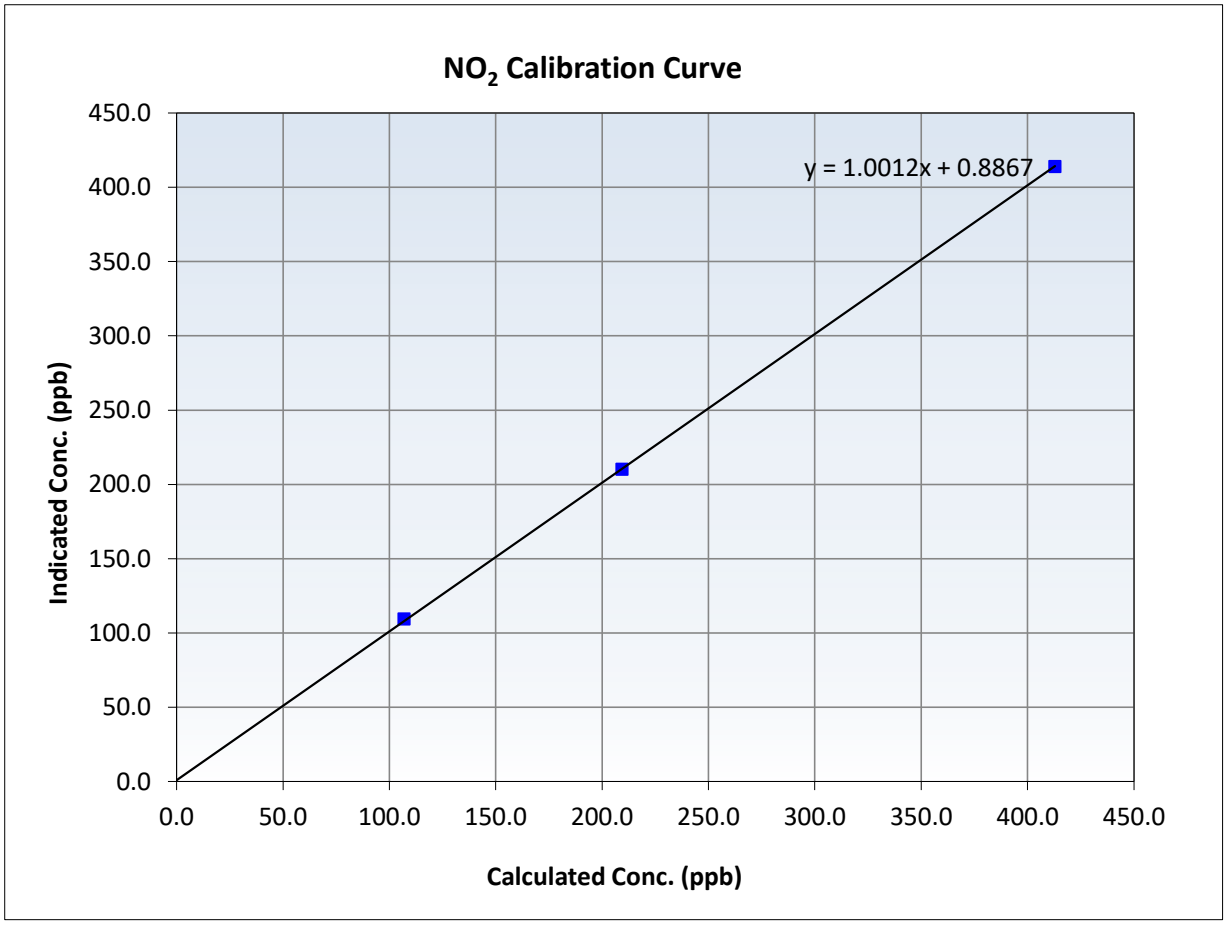
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 19, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:12	End Time (MST):	15:15
Analyzer make:	API T201	Analyzer serial #:	475

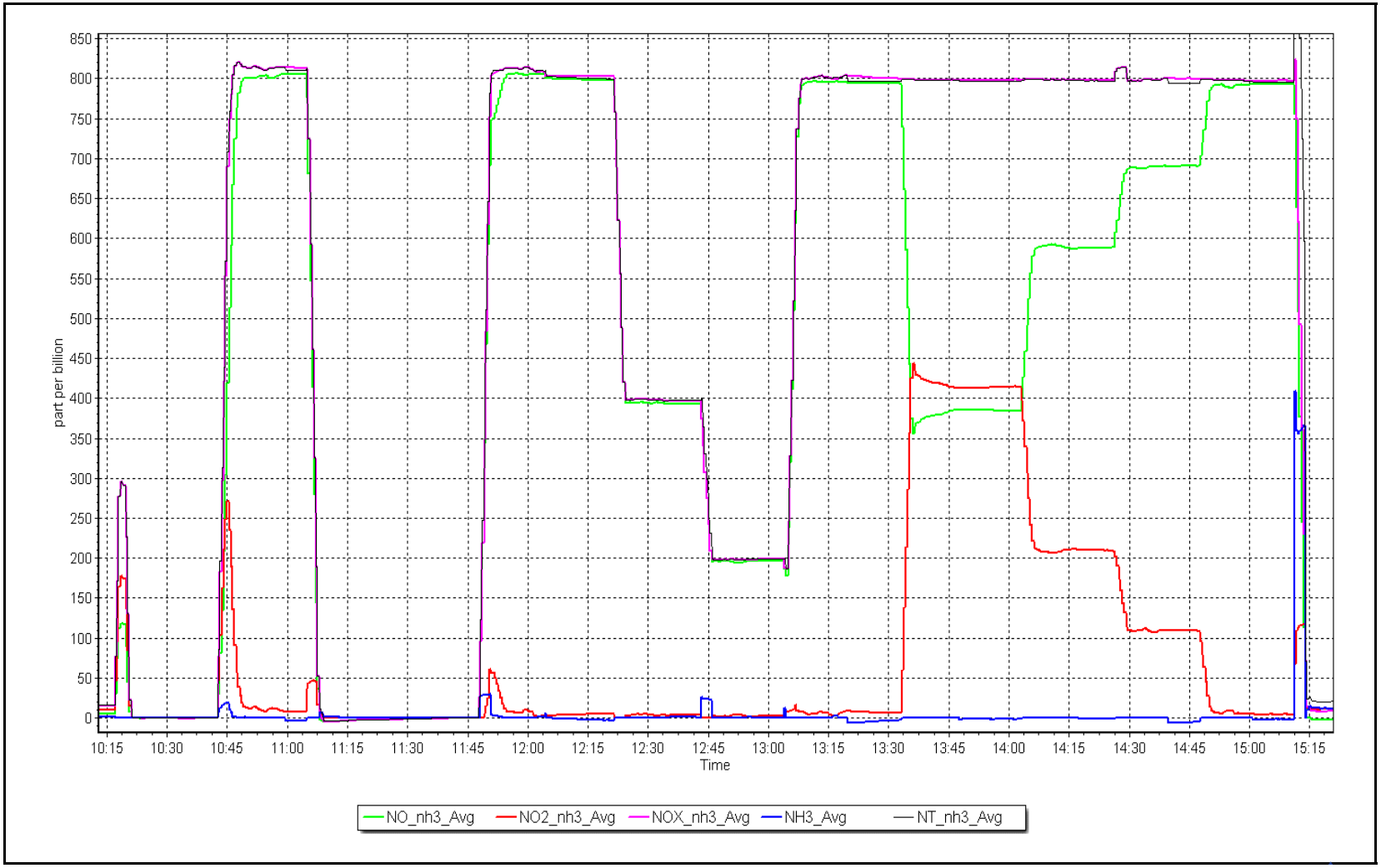
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
412.9	414.0	0.9974
209.3	210.2	0.9957
106.9	109.4	0.9772

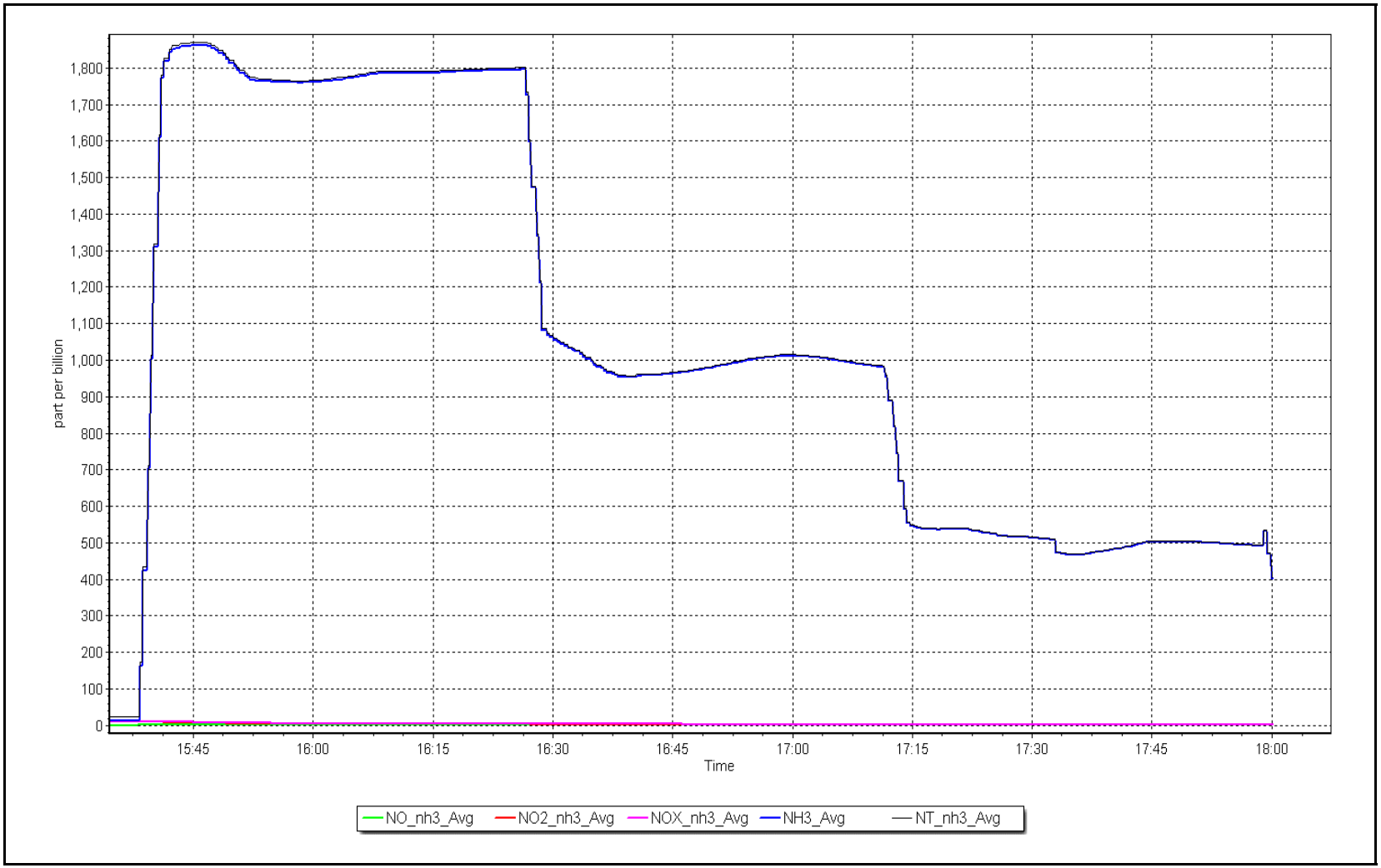
Statistical Evaluation		*Limits*
Correlation Coefficient	0.999964	*≥0.995*
Slope	1.001154	*0.90 - 1.10*
Intercept	0.886739	*+/-20*



NO_X Calibration Plot Date: April 11, 2024 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: April 11, 2024 Location: Bertha Ganter-Fort McKay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS02
MILDRED LAKE
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	April 5, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	10:06	End time (MST):	15:35
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:	1.000614	0.993915	Backgd or Offset:	18.5	18.7
Calibration intercept:	-0.364904	-0.766439	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	797.6	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.5	Previous response	801.8	*% 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	-0.2	----
High point	4920	80.2	801.6	796.2	1.007
Mid point	4960	40.1	400.8	397.6	1.008
Low point	4980	20.0	199.9	197.2	1.014
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.2	801.6	794.9	1.008
				Average Correction Factor:	1.010

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

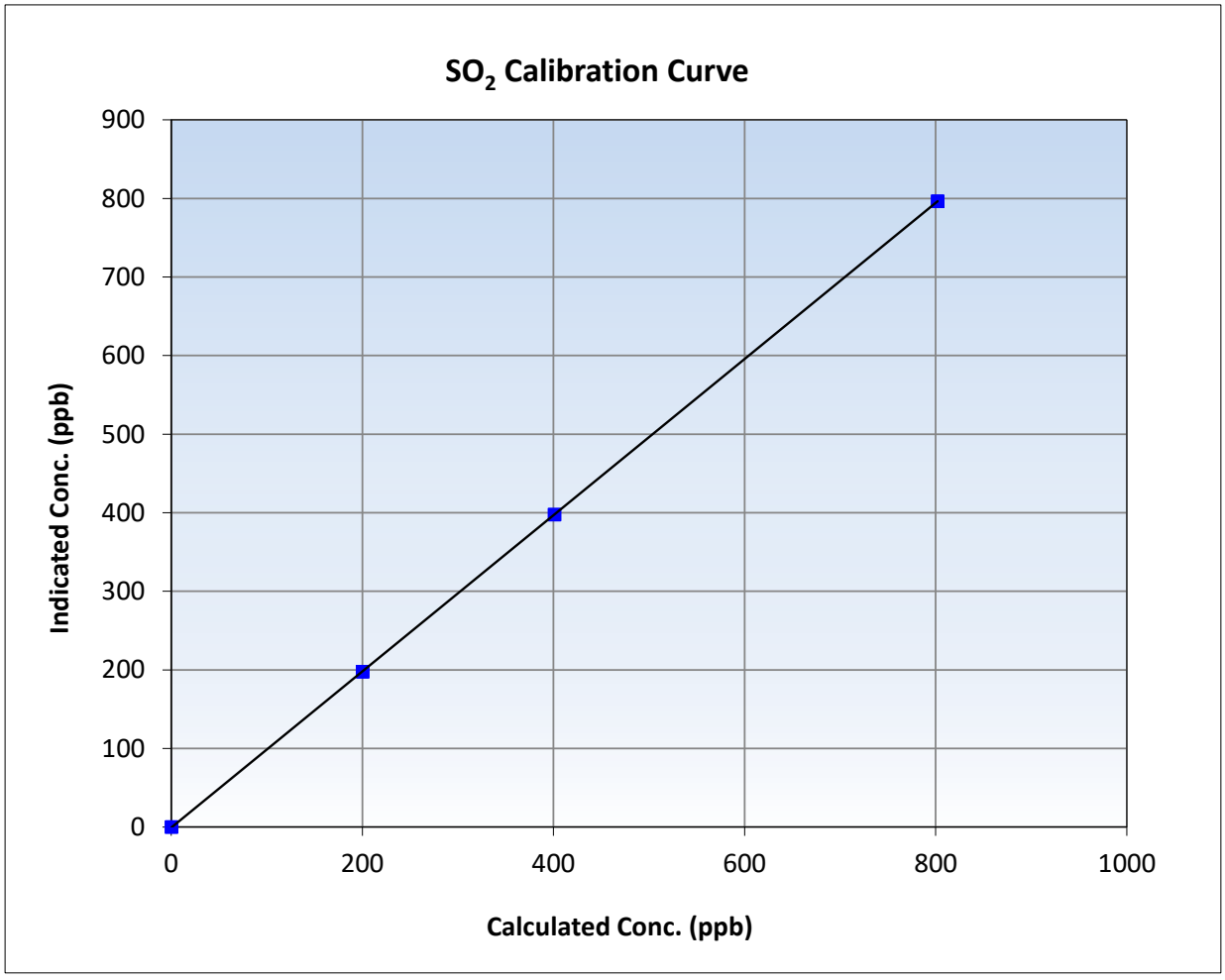
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 19, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:06	End Time (MST):	15:35
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

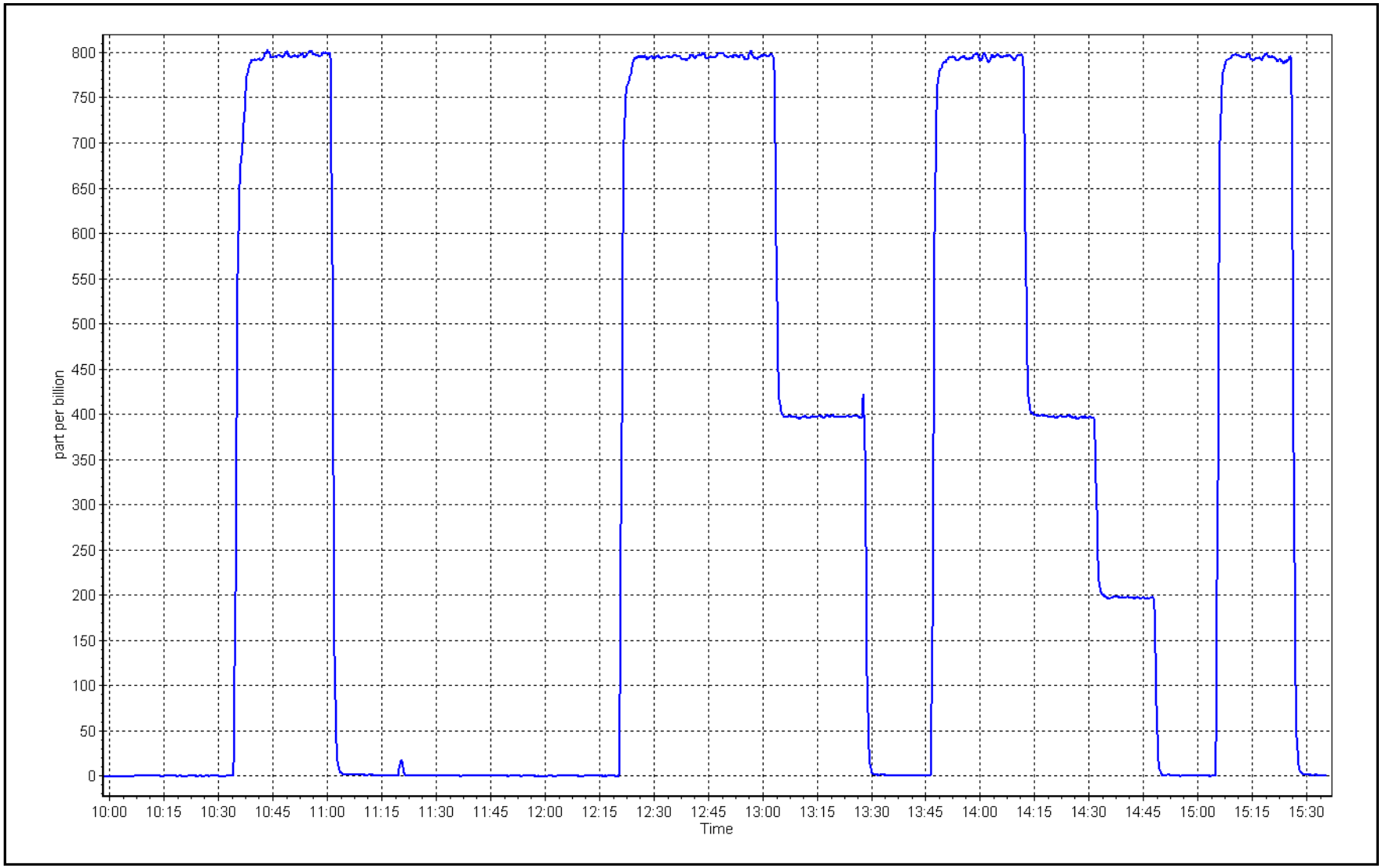
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
801.6	796.2	1.0068
400.8	397.6	1.0081
199.9	197.2	1.0138

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.993915	*0.90 - 1.10*
Intercept	-0.766439	*+/-30*



SO2 Calibration Plot Date: April 5, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	April 23, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	10:11	End time (MST):	16:00
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:	1.000964	1.008965	Backgd or Offset:	1.67	1.95
Calibration intercept:	0.020800	-0.259192	Coeff or Slope:	0.731	0.731

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	81.4	0.983
As found Mid point	4962	37.8	40.0	40.7	0.983
As found Low point	4981	18.9	20.0	19.9	1.005
New cylinder response					

Baseline Corr As found:	81.4	Prev response:	80.09	*% change:	1.6%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	1.019538	AF Intercept:	-0.179186
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999962	* = > +/-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	75.6	80.0	80.4	0.995
Mid point	4962	37.8	40.0	40.3	0.992
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	80.5	0.994
SO2 Scrubber Check	4920	80.2	802.0	0.1	----

Date of last scrubber change:		September 20, 2023		Ave Corr Factor	1.001
Date of last converter efficiency test:		April 23, 2024		107.1%	efficiency

Notes: Changed inlet filter after running the converter efficiency test. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

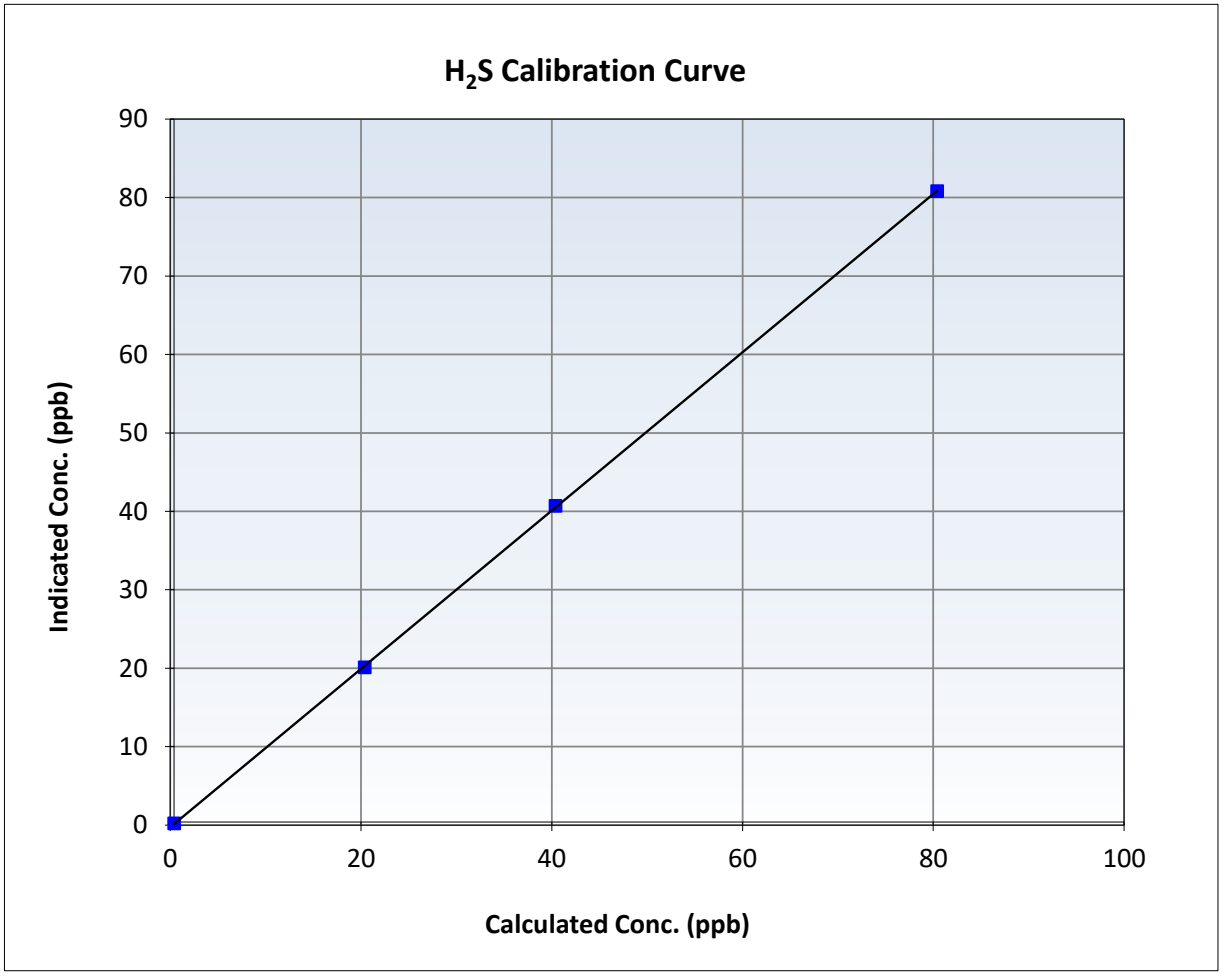
H2S Calibration Summary

Station Information

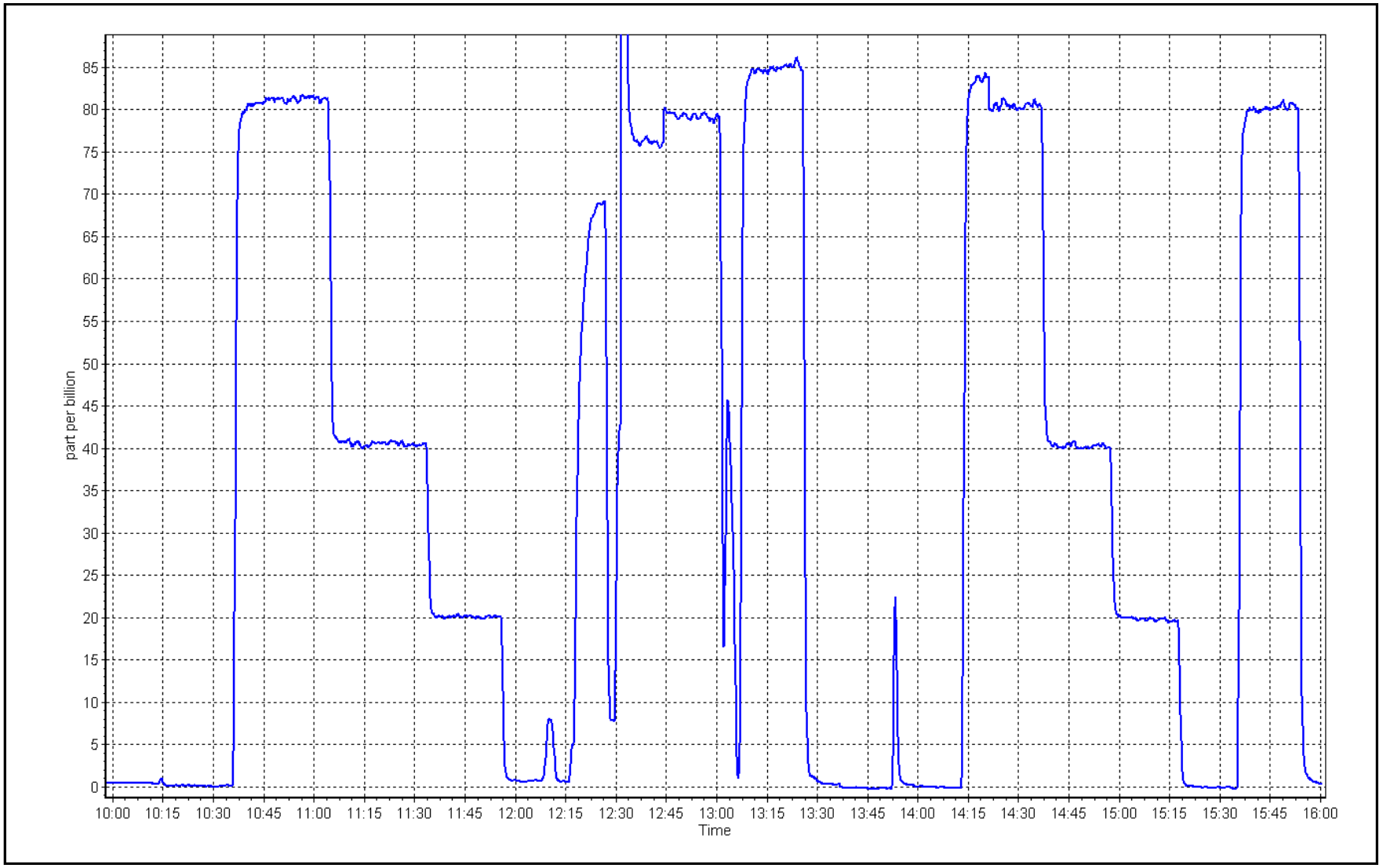
Calibration Date:	April 23, 2024	Previous Calibration:	March 26, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:11	End Time (MST):	16:00
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12113311966

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.2	----	Correlation Coefficient	0.999973	*≥0.995*
80.0	80.4	0.9949	Slope	1.008965	*0.90 - 1.10*
40.0	40.3	0.9924			
20.0	19.7	1.0151	Intercept	-0.259192	*+/-3*



H2S Calibration Plot Date: April 23, 2024 Location: Mildred Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS04
BUFFALO VIEWPOINT
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	April 15, 2024	Last Cal Date:	March 21, 2024
Start time (MST):	8:48	End time (MST):	11:35
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:	1.000873	1.006888	Backgd or Offset:	24.7	25.1
Calibration intercept:	-0.325433	0.395801	Coeff or Slope:	0.867	0.880

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	792.6	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	792.3	Previous response	800.1	*% 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	0.3	----
High point	4921	78.6	799.7	805.1	0.993
Mid point	4961	39.3	399.8	404.5	0.988
Low point	4980	19.6	199.4	200.3	0.996
As left zero	5000	0.0	0.0	0.2	----
As left span	4921	78.6	799.7	804.7	0.994
				Average Correction Factor:	0.992

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

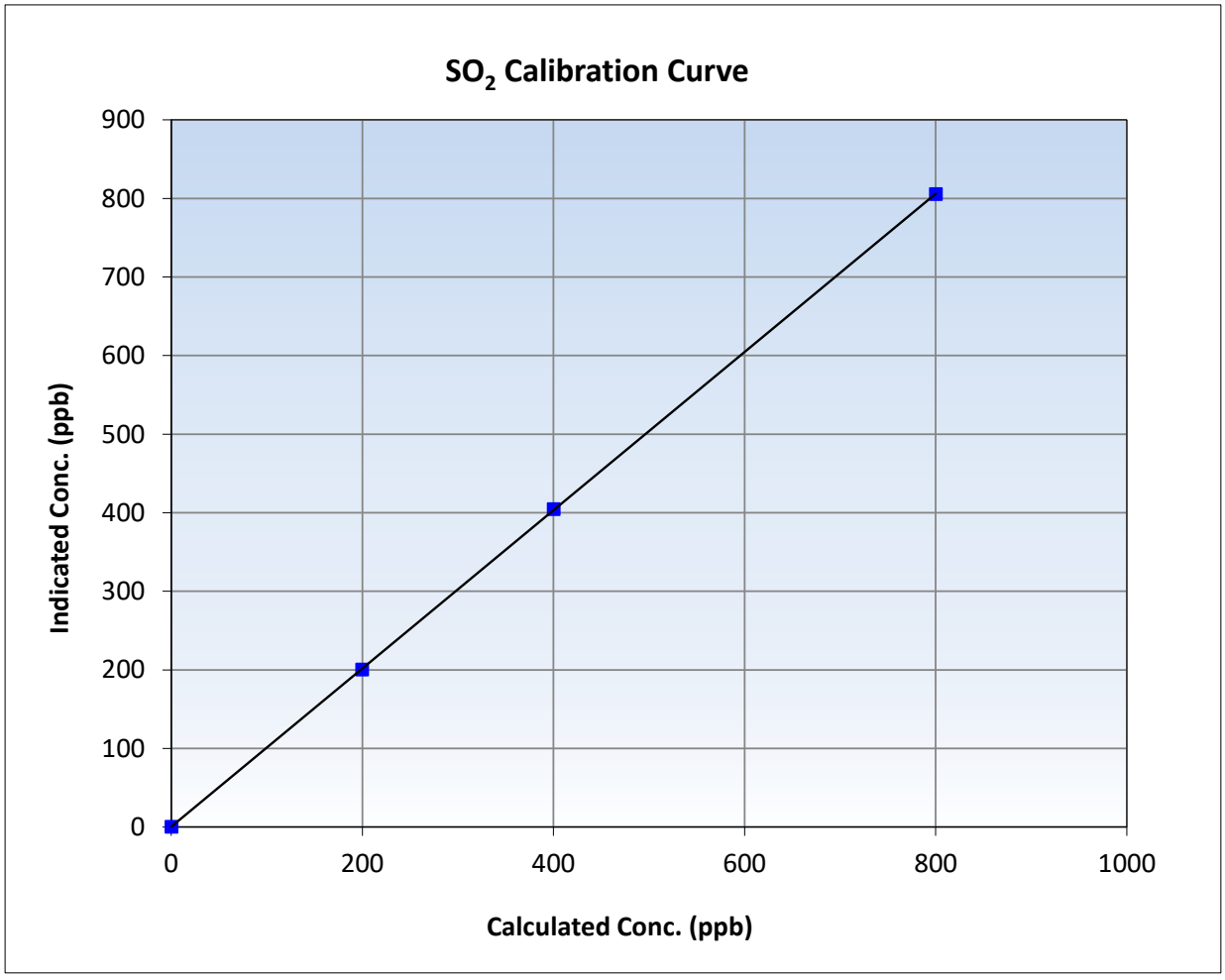
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 21, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:48	End Time (MST):	11:35
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932

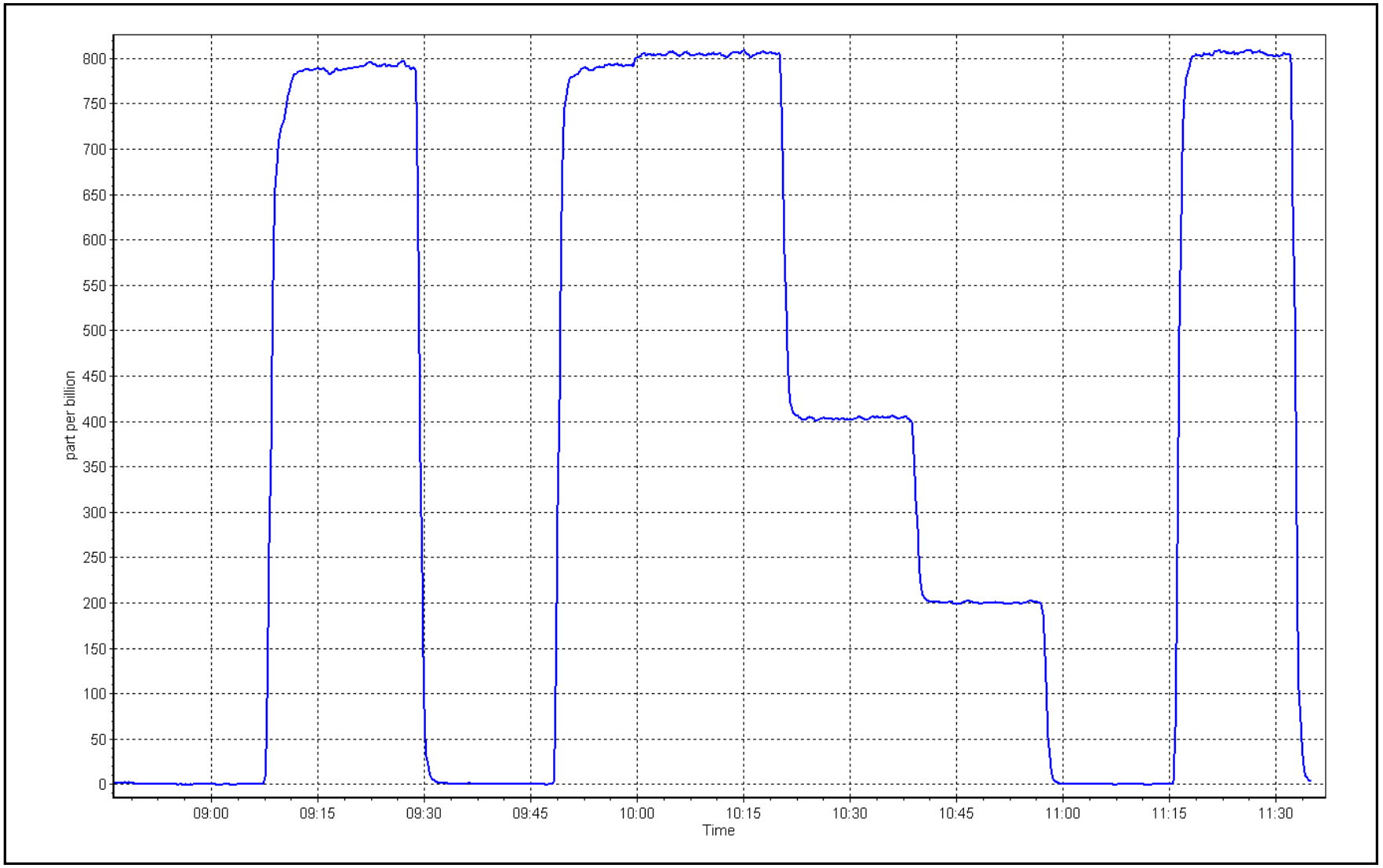
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.7	805.1	0.9933
399.8	404.5	0.9884
199.4	200.3	0.9956

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	1.006888	*0.90 - 1.10*
Intercept	0.395801	*+/-30*



SO2 Calibration Plot Date: April 15, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	April 5, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	6:40	End time (MST):	10:33
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:	0.995649	0.997925	Backgd or Offset:	1.09	1.09
Calibration intercept:	0.182120	0.102175	Coeff or Slope:	1.130	1.130

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	81.4	0.988
As found Mid point	4963	37.0	40.1	40.7	0.988
As found Low point	4982	18.5	20.1	20.1	1.003
New cylinder response					

Baseline Corr As found:	81.3	Prev response:	80.16	*% change:	1.4%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.013436	AF Intercept:	-0.017562
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999983	* = > +/-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	80.2	1.002
Mid point	4963	37.0	40.1	40.3	0.995
Low point	4982	18.5	20.1	20.0	1.003
As left zero	5000	0.0	0.0	0.2	----
As left span	4926	74.1	80.3	79.9	1.005
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:		16-May-23		Ave Corr Factor	1.000
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

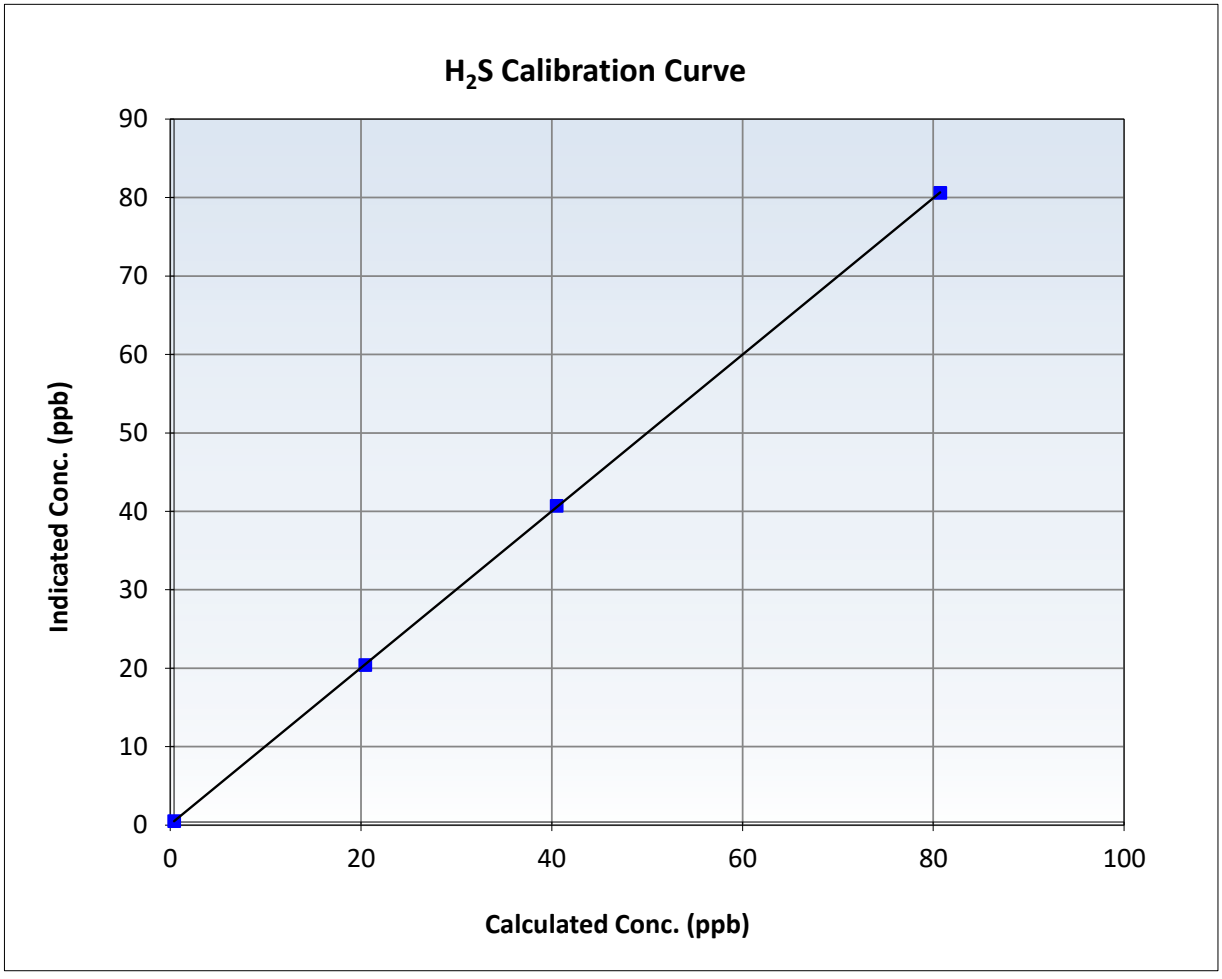
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 20, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:40	End Time (MST):	10:33
Analyzer make:	Global	Analyzer serial #:	2022-200

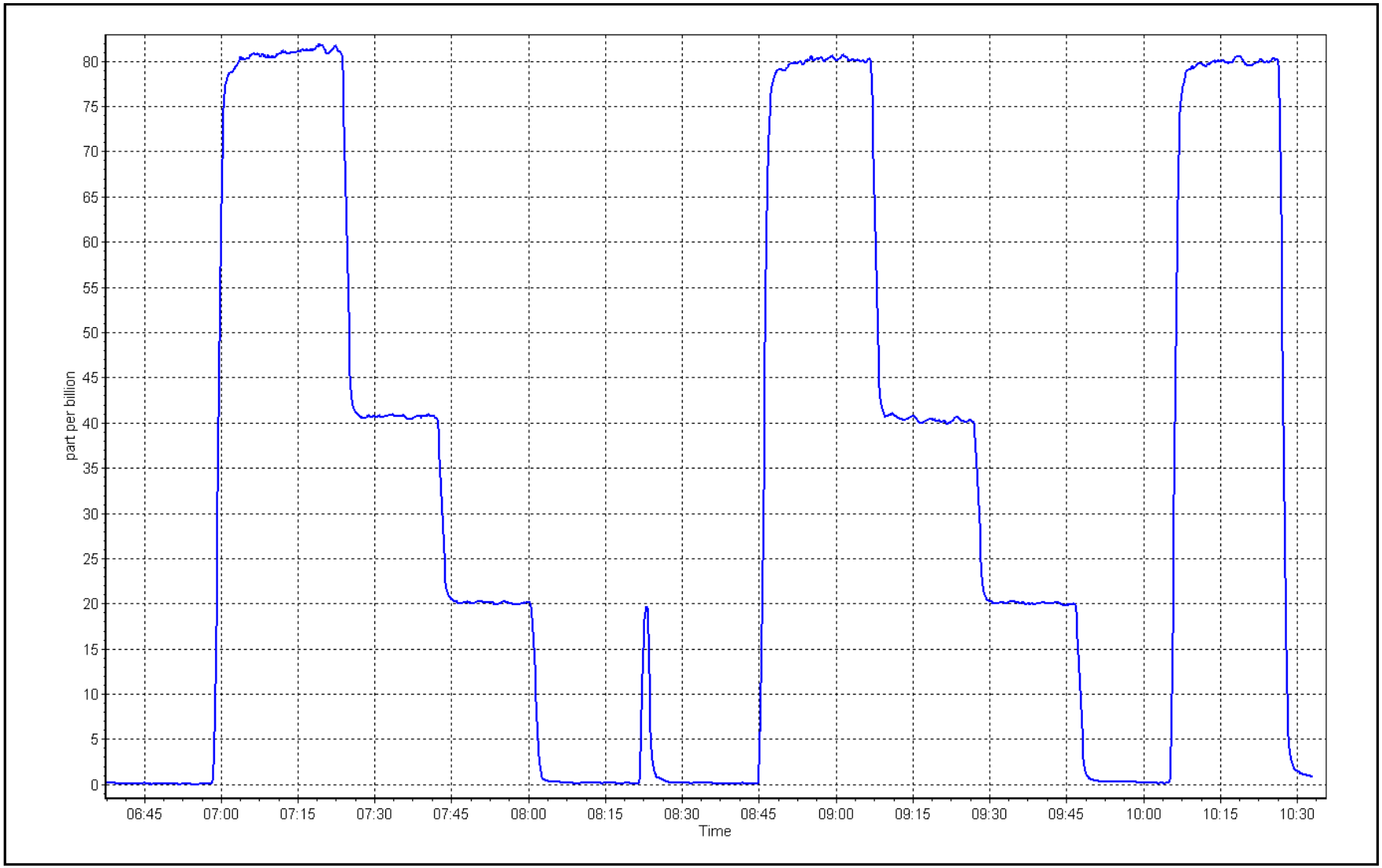
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.3	80.2	1.0015
40.1	40.3	0.9952
20.1	20.0	1.0026

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.997925	*0.90 - 1.10*
Intercept	0.102175	*+/-3*



H_2S Calibration Plot Date: April 5, 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:	April 15, 2024	Last Cal Date:	March 21, 2024
Start time (MST):	8:47	End time (MST):	11:34
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:	4.25E-04	4.22E-04	NMHC SP Ratio:	1.10E-04	1.07E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	80500	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	16.95	0.982
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.95	Prev response	16.65	*% 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	4921	78.6	16.64	16.60	1.002
Mid point	4961	39.3	8.32	8.30	1.002
Low point	4980	19.6	4.15	4.14	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	16.64	16.66	0.999
				Average Correction Factor	1.002

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	9.06	0.973
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.06	Prev response	8.83	*% change	2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.80	1.003
Mid point	4961	39.3	4.41	4.41	1.000
Low point	4980	19.6	2.20	2.20	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	8.82	8.84	0.998
				Average Correction Factor	1.000

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.89	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.89	Prev response	7.82	*% 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	4921	78.6	7.82	7.81	1.001
Mid point	4961	39.3	3.91	3.89	1.004
Low point	4980	19.6	1.95	1.94	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	7.82	7.82	0.999
				Average Correction Factor	1.003

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000586	0.997908
THC Cal Offset:	0.008071	0.002057
CH4 Cal Slope:	1.001043	0.998894
CH4 Cal Offset:	-0.004702	-0.004105
NMHC Cal Slope:	0.999701	0.997215
NMHC Cal Offset:	0.013373	0.005963

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

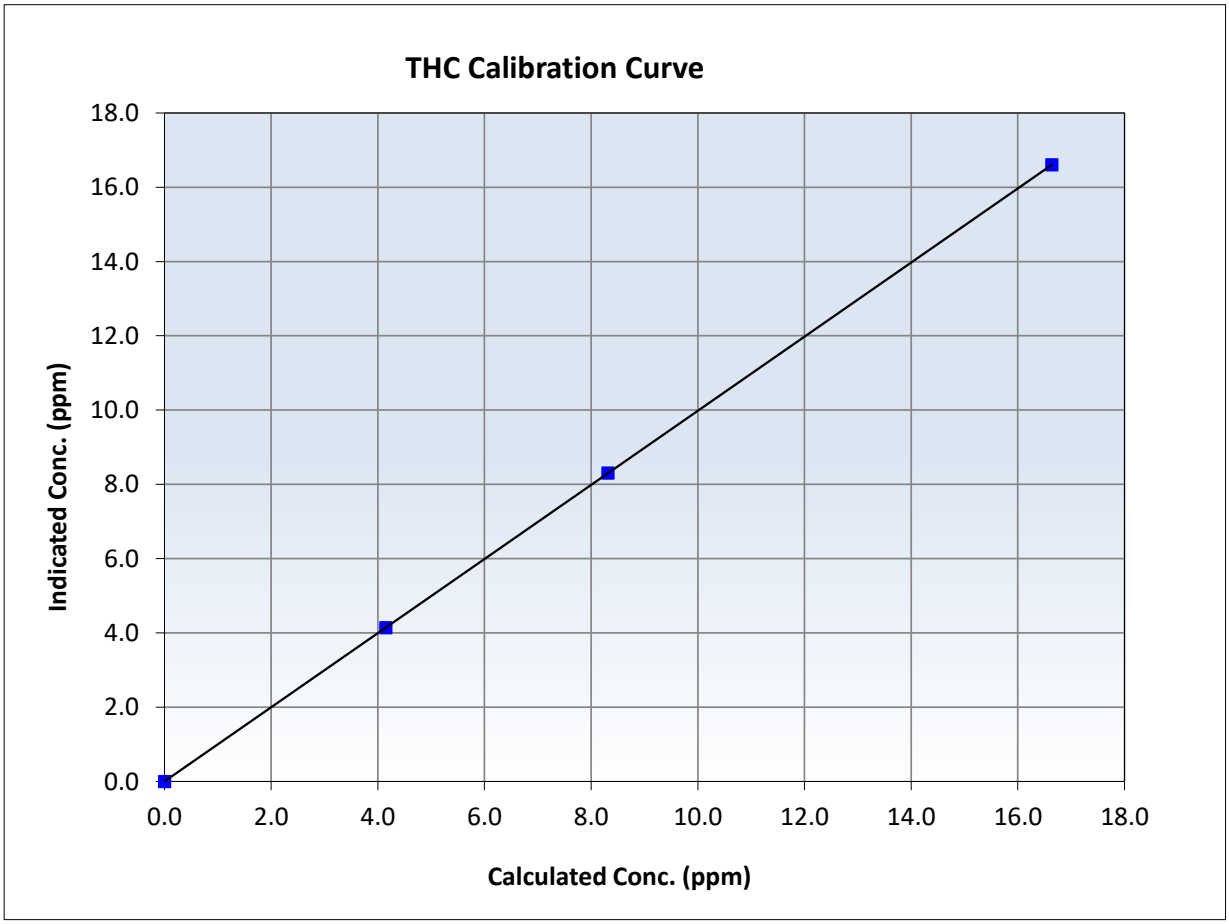
THC Calibration Summary

Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 21, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:47	End Time (MST):	11:34
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	1.000000	*≥0.995*
16.64	16.60	1.0021	Slope	0.997908	*0.90 - 1.10*
8.32	8.30	1.0016			
4.15	4.14	1.0013	Intercept	0.002057	*+/-0.5*



Wood Buffalo Environmental Association

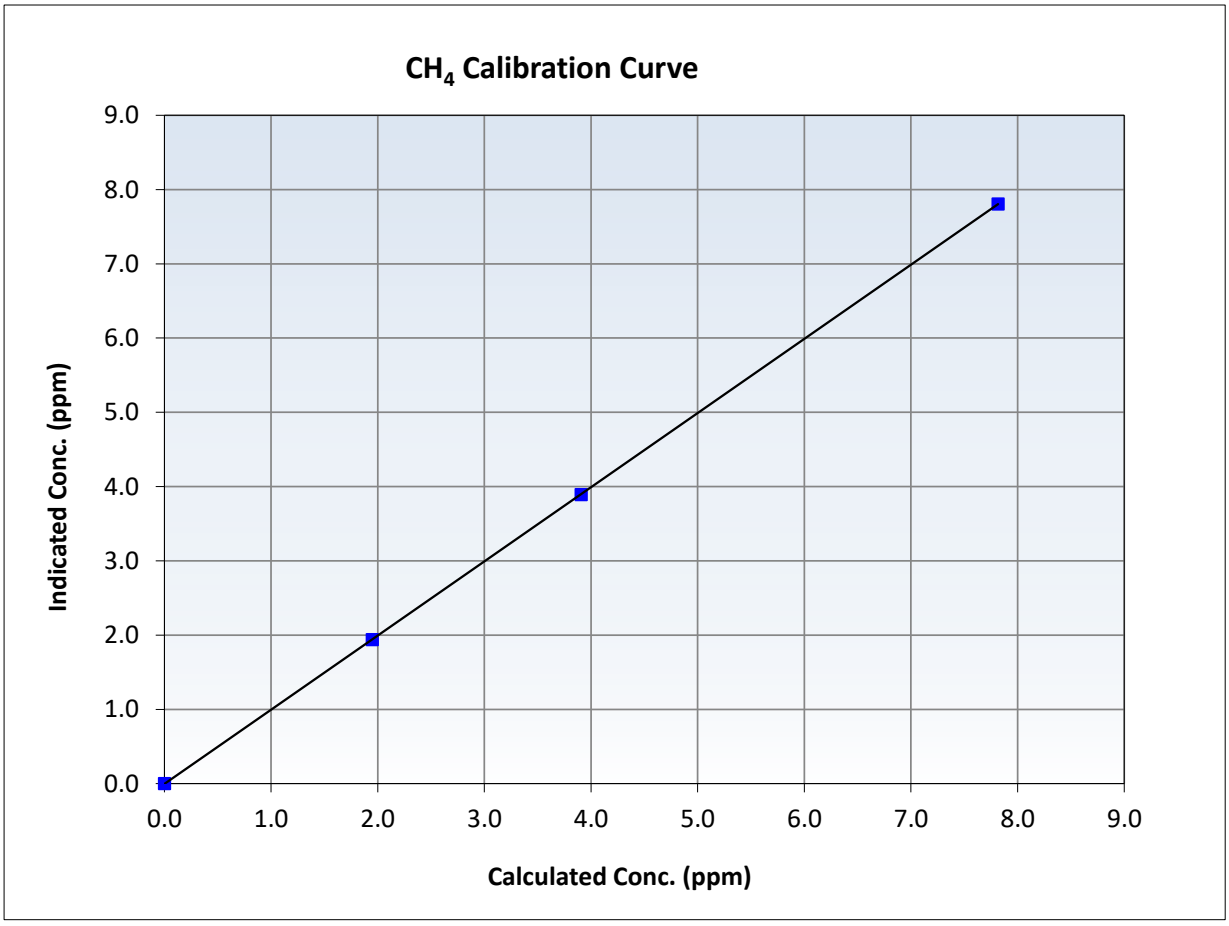
CH_4 Calibration Summary

Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 21, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:47	End Time (MST):	11:34
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	7.81	1.0012	Slope	0.998894	0.90 - 1.10
3.91	3.89	1.0035			
1.95	1.94	1.0042	Intercept	-0.004105	+/-0.5



Wood Buffalo Environmental Association

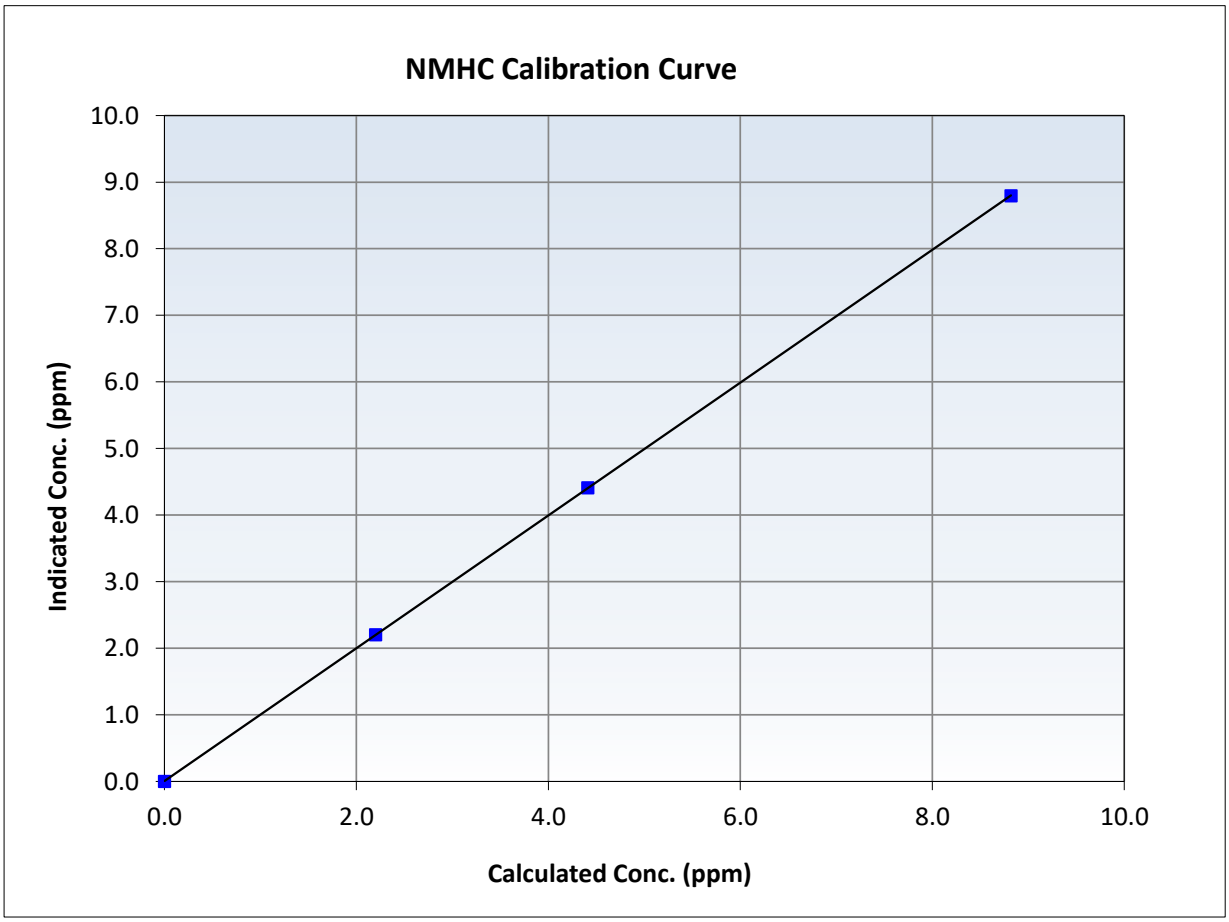
NMHC Calibration Summary

Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 21, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:47	End Time (MST):	11:34
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
8.82	8.80	1.0026	Slope	0.997215	0.90 - 1.10
4.41	4.41	1.0000	Intercept	0.005963	+/-0.5
2.20	2.20	0.9983			



NMHC Calibration Plot Date: April 15, 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:	April 24, 2024	Last Cal Date:	April 15, 2024
Start time (MST):	7:36	End time (MST):	8:59
Reason:	Cylinder Change	Nitrogen 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:	4.25E-04	4.22E-04	NMHC SP Ratio:	1.10E-04	1.07E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	80500	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	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.61	Prev response	16.65	*% change	-0.3%
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	4921	78.6	16.64	16.55	1.005
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.005

Notes: Nitrogen Cylinder Change.

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	8.78	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.78	Prev response	8.83	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.76	1.007
Mid point					
Low point					
As left zero					
As left span					
				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	4921	78.6	7.82	7.82	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.82	Prev response	7.82	*% 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

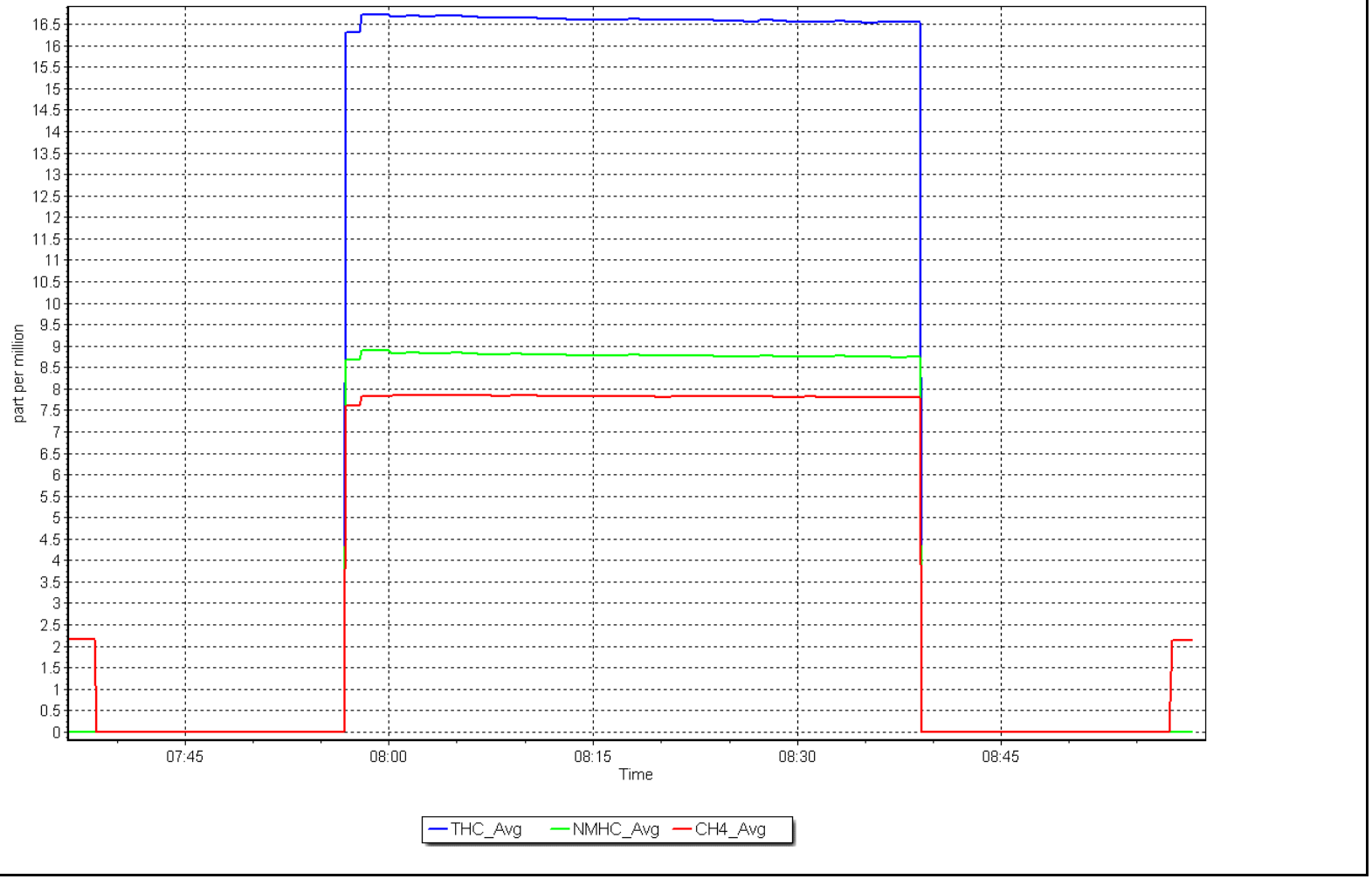
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	7.82	7.80	1.002
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.002

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000586	0.994997
THC Cal Offset:	0.008071	0.000000
CH4 Cal Slope:	1.001043	0.998003
CH4 Cal Offset:	-0.004702	0.000000
NMHC Cal Slope:	0.999701	0.992673
NMHC Cal Offset:	0.013373	0.000000

Calibration Performed By: Melissa Lemay

NMHC Calibration Plot Date: April 24, 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:	April 2, 2024
Last Cal Date:	March 1, 2024
Start time (MST):	6:08
End time (MST):	11:18
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	0.4	0.3	0.1	----	----
AF High point	4918	81.8	800.0	798.4	1.6	784.3	777.1	7.2	1.0206	1.0278
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	796.3 ppb	NO =	791.6 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -1.6%
Baseline Corr 1st pt	NO_X =	783.9 ppb	NO =	776.8 ppb	As Found Statistics	*Percent Change	NO = -1.9%
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:	1.162	1.189	NO bkgnd or offset:	-0.6	-0.6
NOX coeff or slope:	1.154	1.177	NOX bkgnd or offset:	-0.3	-0.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.3	4.3

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.995753	1.003822
NO_X Cal Offset:	-0.374543	-0.272631
NO Cal Slope:	0.993186	1.002903
NO Cal Offset:	-1.315833	-0.733480
NO_2 Cal Slope:	0.998315	0.996313
NO_2 Cal Offset:	1.614021	-1.280139

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	0.5	0.7	-0.2	----	----
High point	4918	81.8	800.0	798.4	1.6	803.4	801.0	2.4	0.9958	0.9968
Mid point	4959	40.9	400.0	399.2	0.8	400.3	398.0	2.2	0.9993	1.0030
Low point	4980	20.4	199.5	199.1	0.4	199.6	198.1	1.5	0.9995	1.0050
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	401.8	800.0	792.6	401.8	390.8	1.0094	1.0000
								Average Correction Factor	0.9982	1.0016

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	796.0	398.7	398.9	396.7	1.0056	99.4%
Mid GPT point	796.0	598.1	199.5	197.1	1.0124	98.8%
Low GPT point	796.0	694.2	103.4	100.6	1.0282	97.3%
				Average Correction Factor	1.0154	98.5%

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

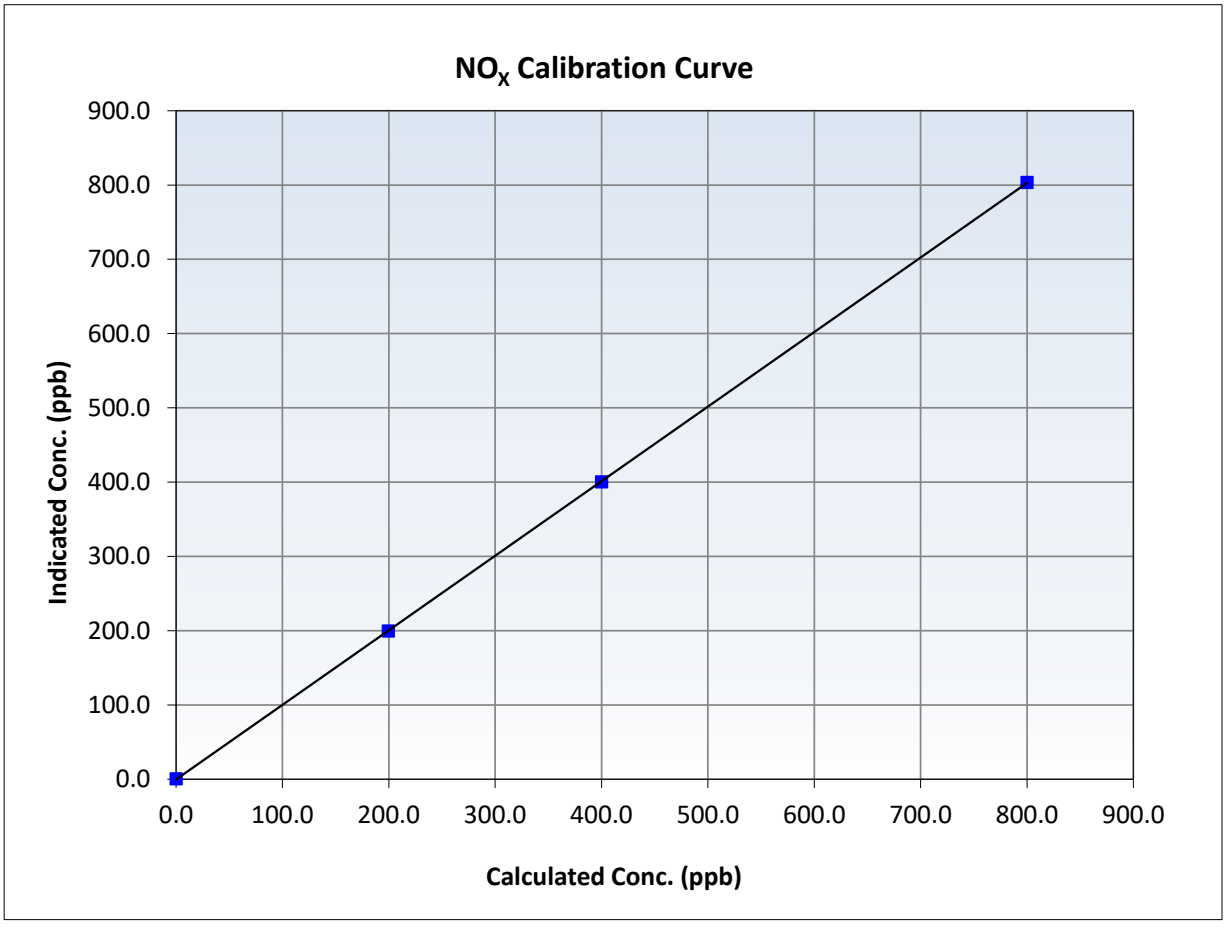
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 1, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:08	End Time (MST):	11:18
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
800.0	803.4	0.9958
400.0	400.3	0.9993
199.5	199.6	0.9995

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.003822	*0.90 - 1.10*
Intercept	-0.272631	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

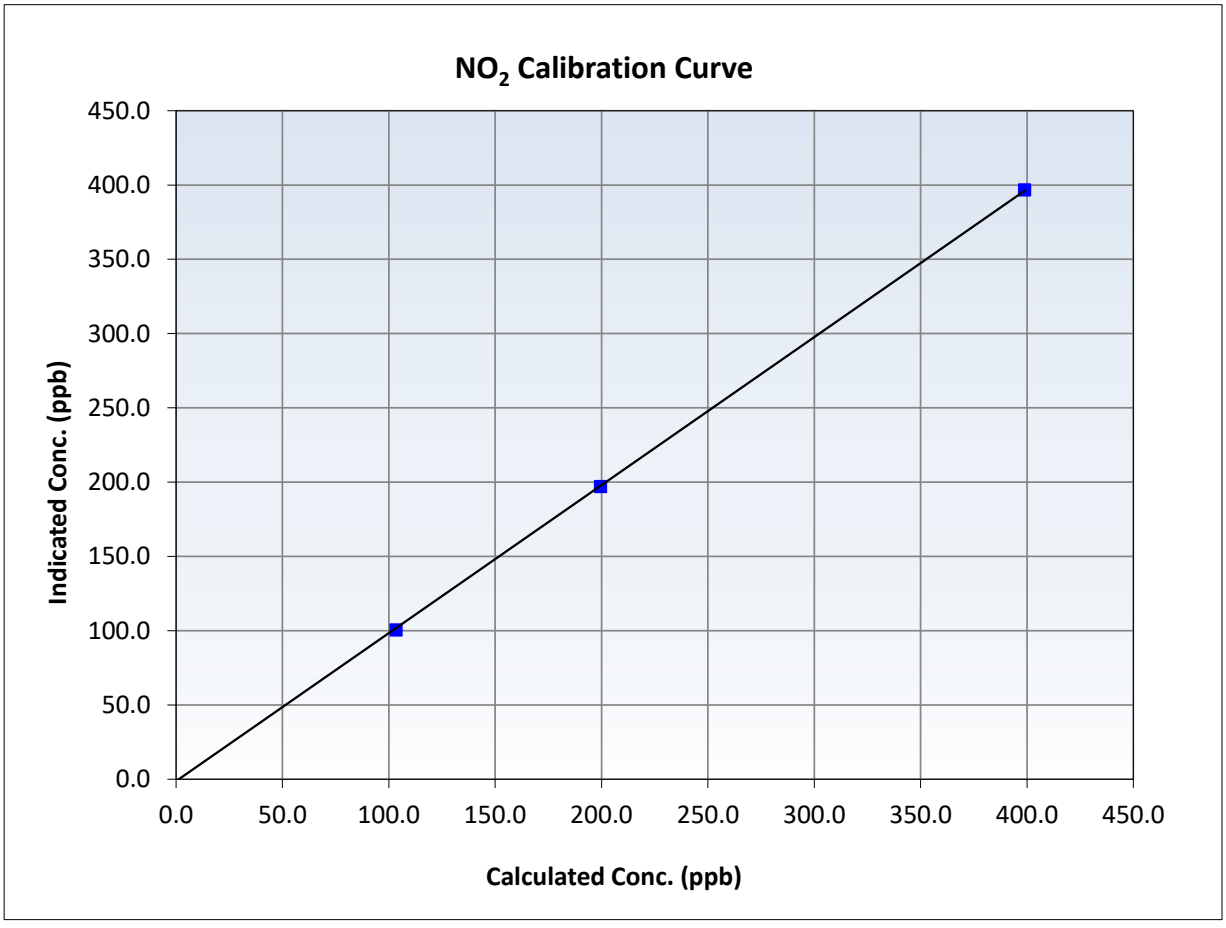
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 1, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:08	End Time (MST):	11:18
Analyzer make:	API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
398.9	396.7	1.0056
199.5	197.1	1.0124
103.4	100.6	1.0282

Statistical Evaluation		Limits
Correlation Coefficient	0.999965	≥0.995
Slope	0.996313	0.90 - 1.10
Intercept	-1.280139	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

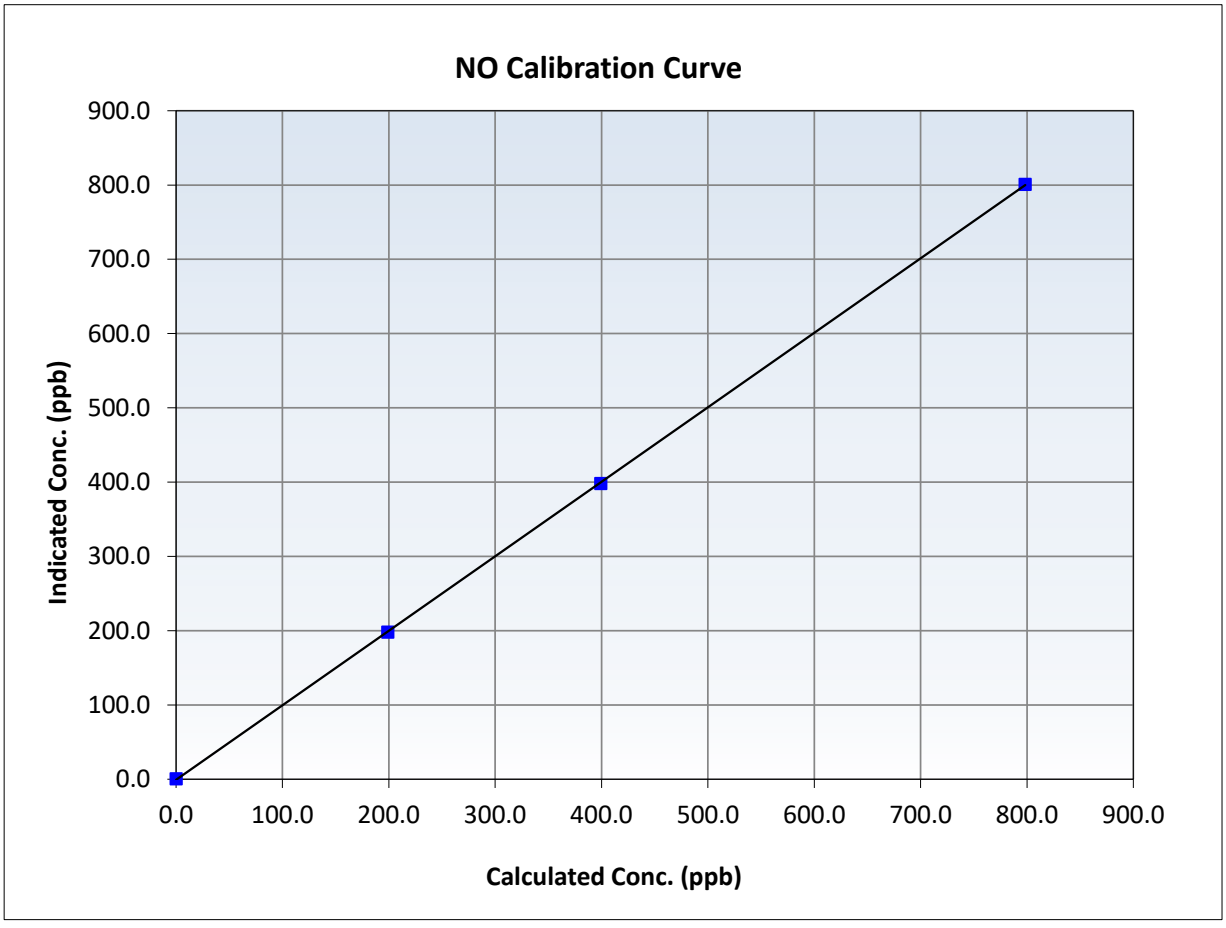
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 1, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:08	End Time (MST):	11:18
Analyzer make:	API T200	Analyzer serial #:	721

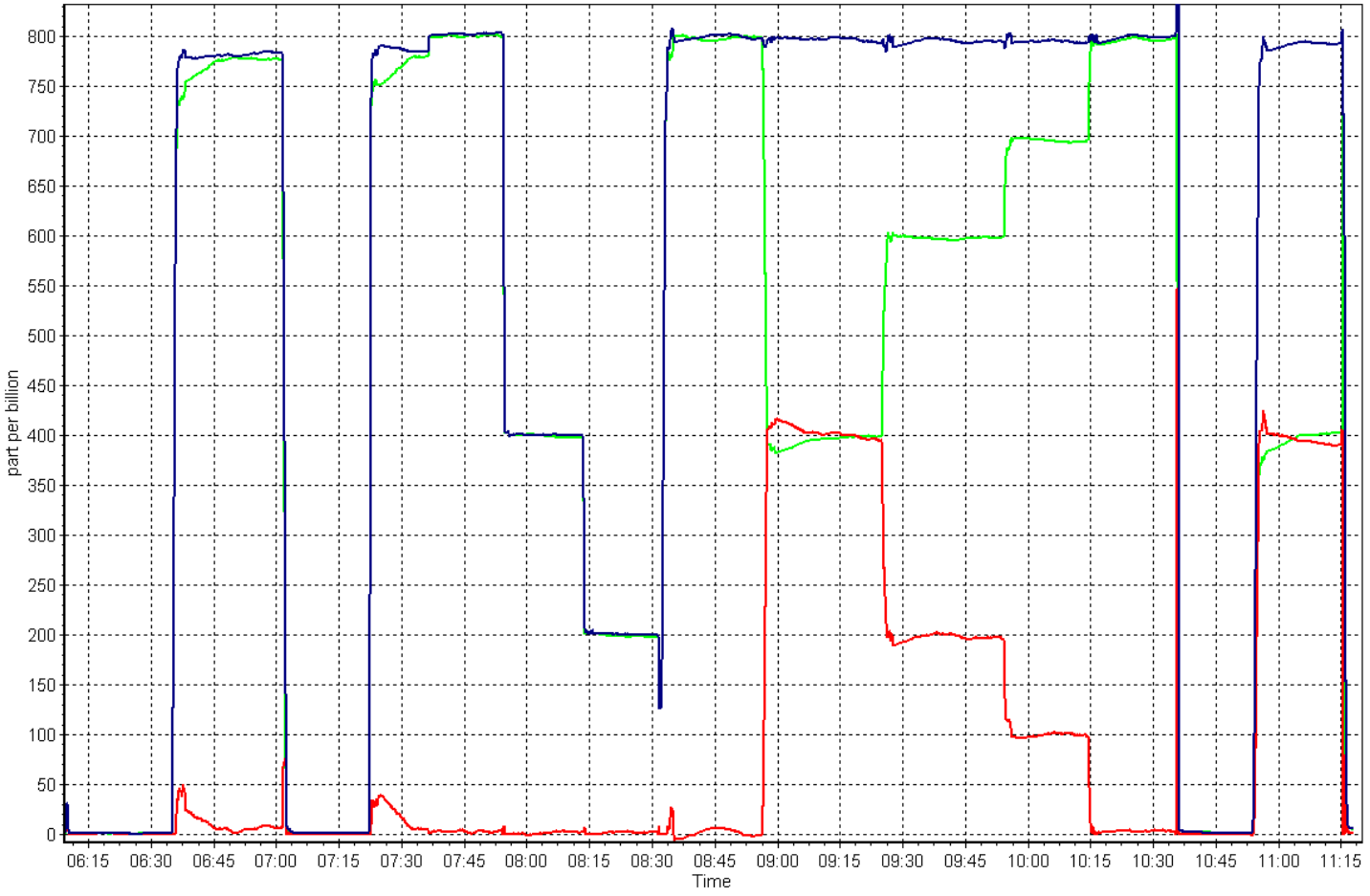
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.7	----
798.4	801.0	0.9968
399.2	398.0	1.0030
199.1	198.1	1.0050

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999982	*≥0.995*
Slope	1.002903	*0.90 - 1.10*
Intercept	-0.733480	*+/-20*



NO_X Calibration Plot Date: April 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:	April 15, 2024	Last Cal Date:	March 15, 2024
Start time (MST):	6:18	End time (MST):	8:48
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:	1.004971	1.003629	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	-0.120000	0.540000	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	995.7	400.0	401.1	0.996
As found Mid point					
As found Low point					
Baseline Corr As found:	401.5	Previous response	401.9	*% 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	0.2	----
High point	5000	995.3	400.0	401.8	0.996
Mid point	5000	820.9	200.0	201.5	0.993
Low point	5000	711.9	100.0	101.2	0.988
As left zero	5000	0.0	0.0	0.0	----
As left span	5000	995.7	400.0	403.5	0.991
				Average Correction Factor	0.992

Notes: No adjustments and maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

O_3 Calibration Summary

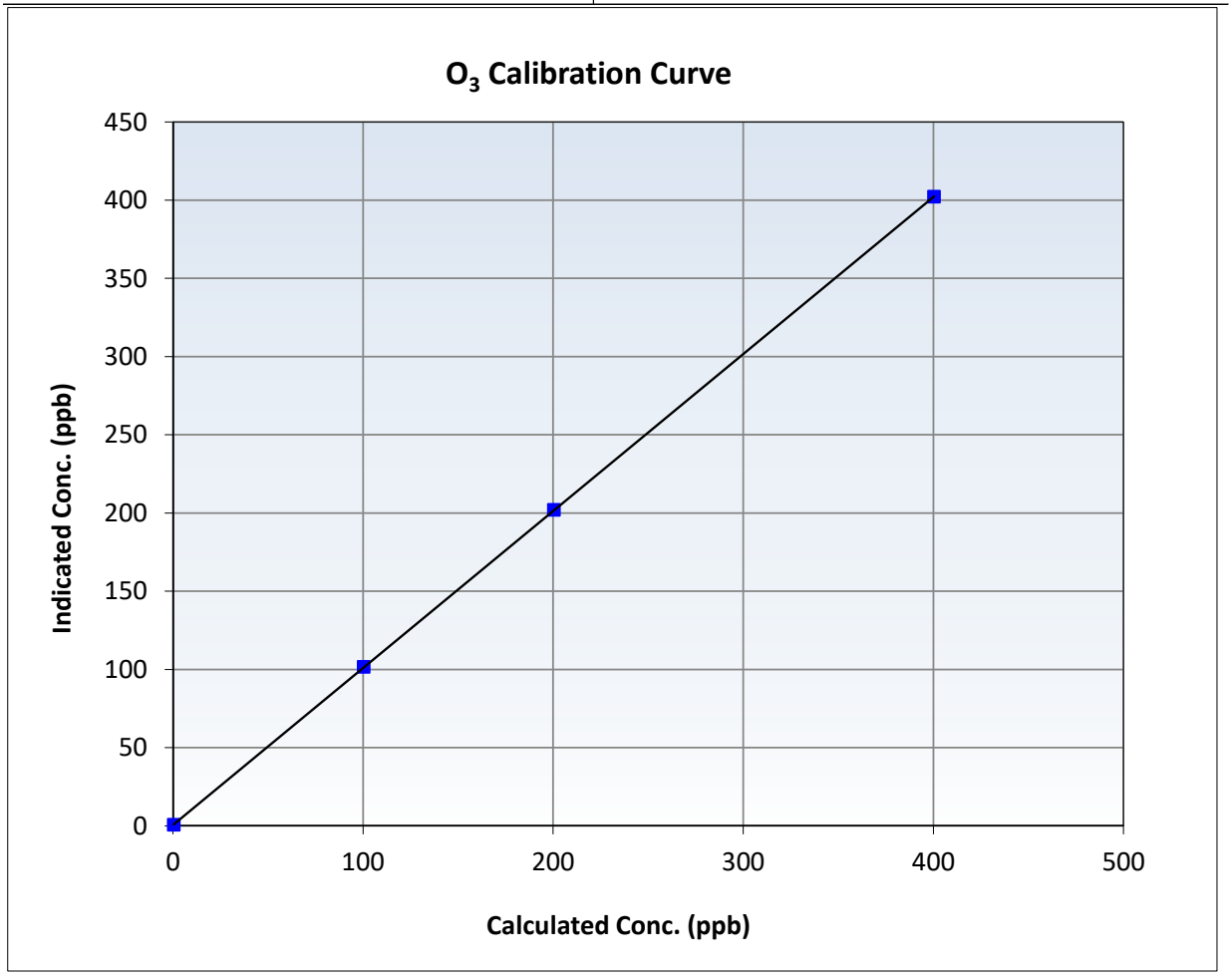
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 15, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:18	End Time (MST):	8:48
Analyzer make:	API T400	Analyzer serial #:	2961

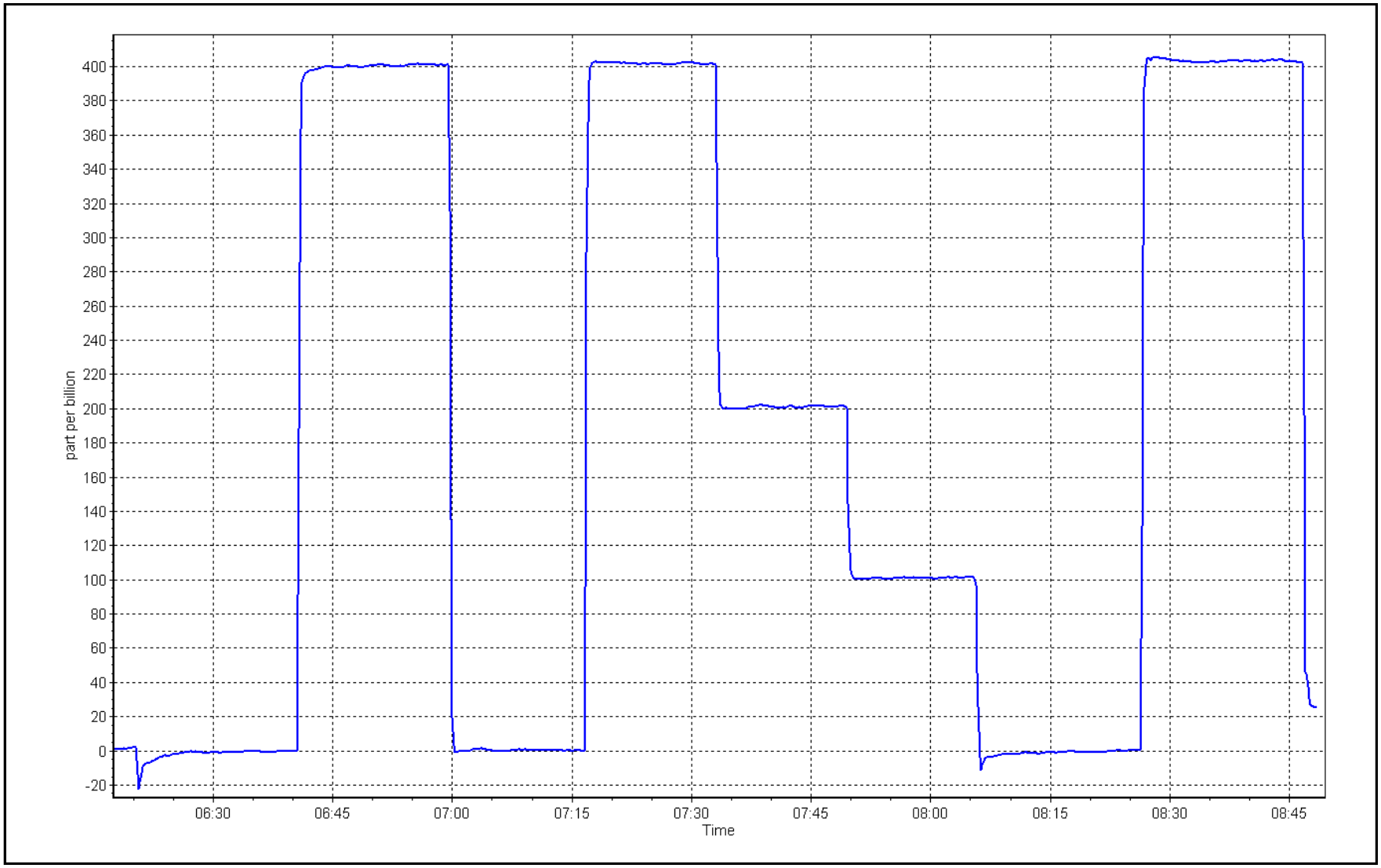
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
400.0	401.8	0.9955
200.0	201.5	0.9926
100.0	101.2	0.9881

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.003629	*0.90 - 1.10*
Intercept	0.540000	*+/- 5*



O_3 Calibration Plot Date: April 15, 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):	6:57	End time (MST):	7:22
Analyzer Make:	API T640	S/N:	321
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388753
Temp/RH standard:	Alicat FP-25BT	S/N:	388753

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	4.6	4.3	4.6	☐	+/- 2 °C
P (mmHg)	727.5	729.4	727.5	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.18	5.00	☐	+/- 0.25 LPM
PW% (pump)	41	-----	41	☐	>80%
Zero Verification	PM w/o HEPA:	15.5	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: 6-10-2024 — Lot No.: 100128-050-042

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

Date Optical Chamber Cleaned: 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: February 27, 2024

Date RH/T Sensor Cleaned: February 27, 2024

Notes: No adjustments done. Leak check passed.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS05
MANNIX
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	April 4, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	8:18	End time (MST):	11:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.02	ppm	Cal Gas Exp Date:	January 12, 2029	
Cal Gas Cylinder #:	XC026809B				
Removed Cal Gas Conc:	50.02	ppm	Rem Gas Exp Date:	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:	1.005098	0.999943	Backgd or Offset:	9.6	9.6
Calibration intercept:	-0.700000	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	0.0	----
As found High point	4920	80.0	800.3	800.9	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	800.9	Previous response	803.7	*% 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	0.1	----
High point	4920	80.0	800.3	800.4	1.000
Mid point	4960	40.0	400.2	401.0	0.998
Low point	4980	20.0	200.1	200.5	0.998
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	80.0	800.3	803.9	0.996
				Average Correction Factor:	0.999

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

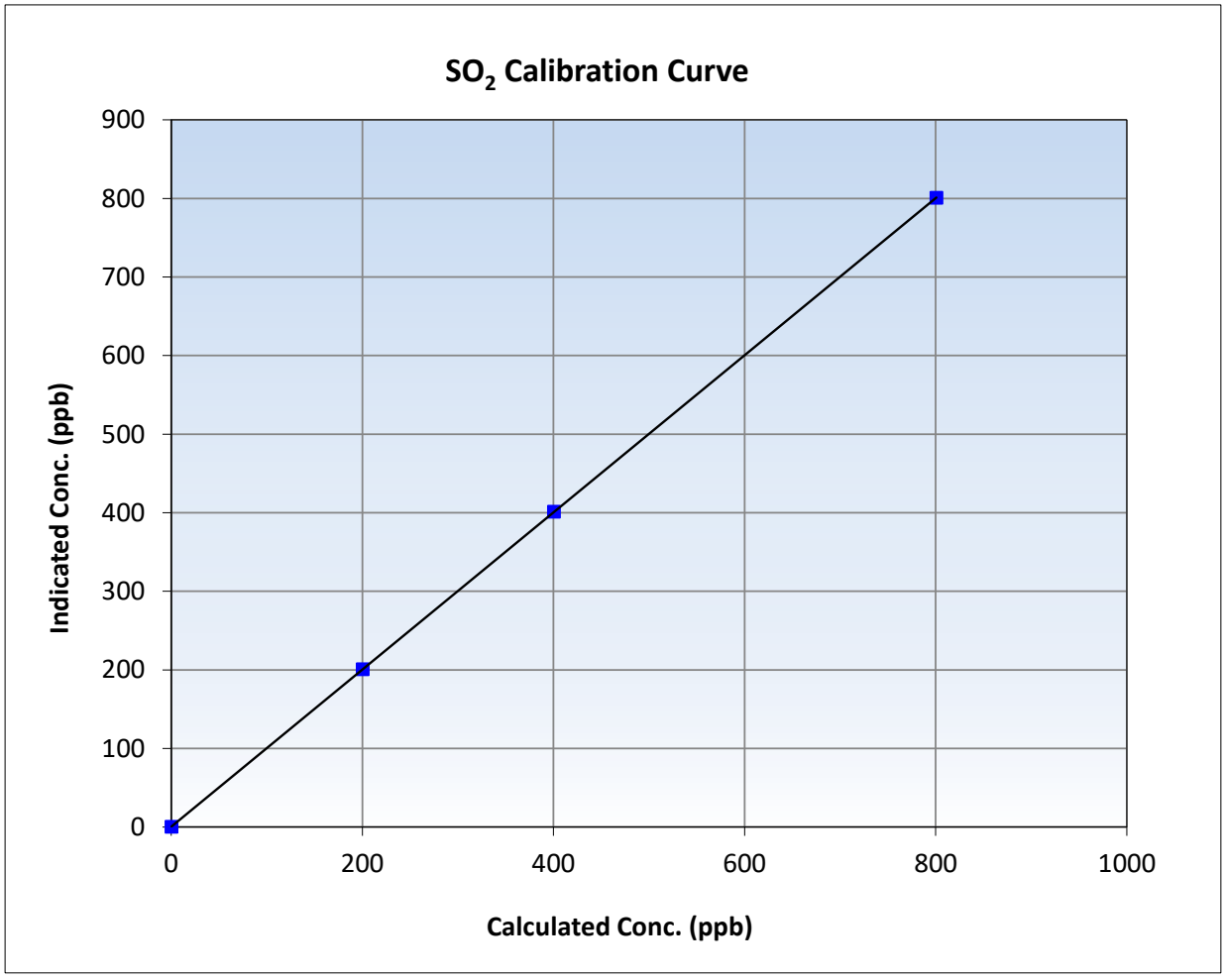
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 20, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:18	End Time (MST):	11:55
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

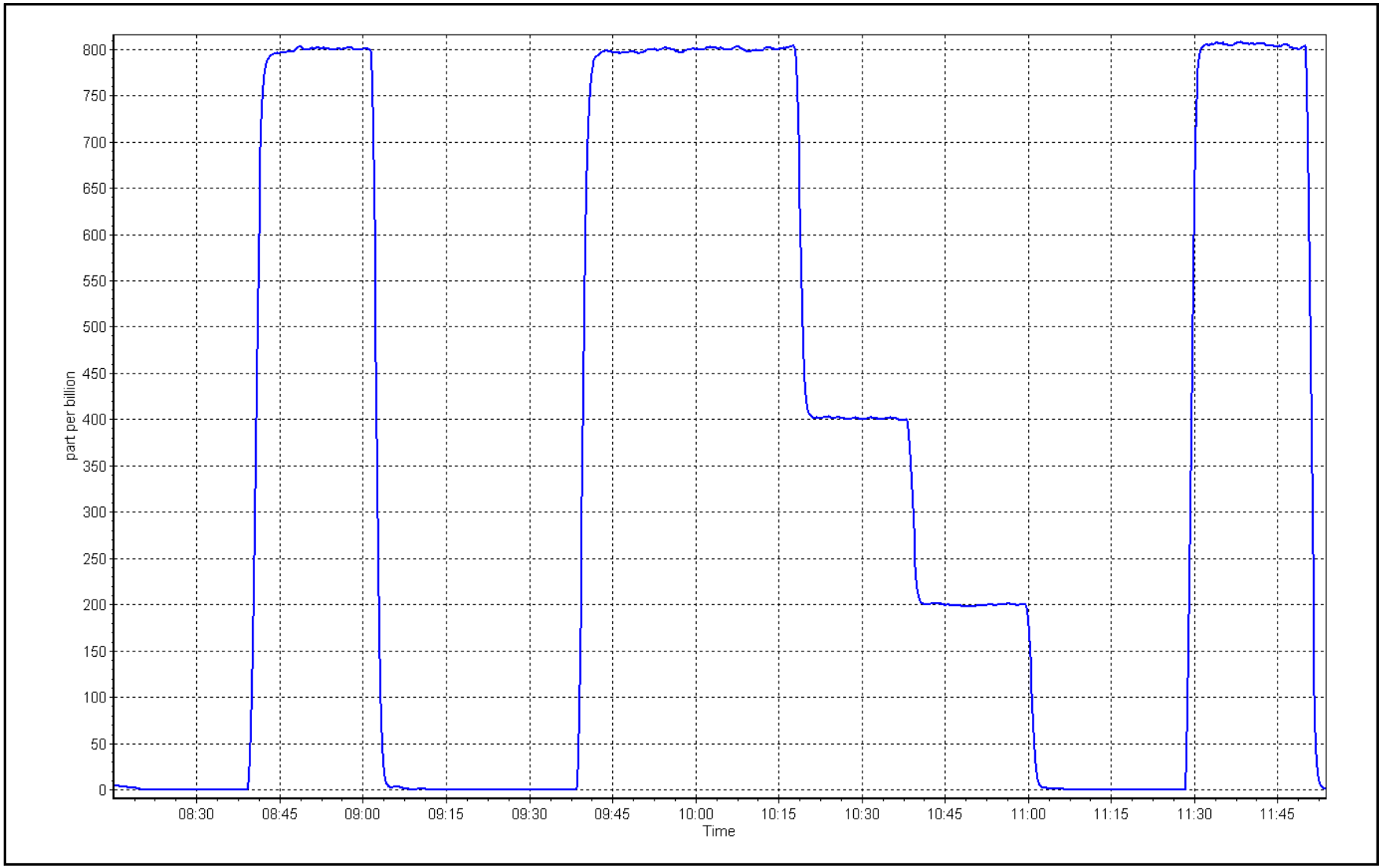
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	800.4	0.9999
400.2	401.0	0.9979
200.1	200.5	0.9979

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.999943	*0.90 - 1.10*
Intercept	0.380000	*+/-30*



SO2 Calibration Plot Date: April 4, 2024 Location: Mannix



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	April 19, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	10:27	End time (MST):	13:45
Reason:	Routine		

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:	0.997116	0.995684	Backgd or Offset:	1.23	1.23
Calibration intercept:	-0.017688	-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	79.5	1.006
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	79.5	Prev response:	79.71	*% change:	-0.3%
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	79.6	1.005
Mid point	4960	40.3	40.0	39.9	1.002
Low point	4980	20.2	20.0	19.7	1.017
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	80.6	80.0	79.6	1.005
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.008
Date of last converter efficiency test:					

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

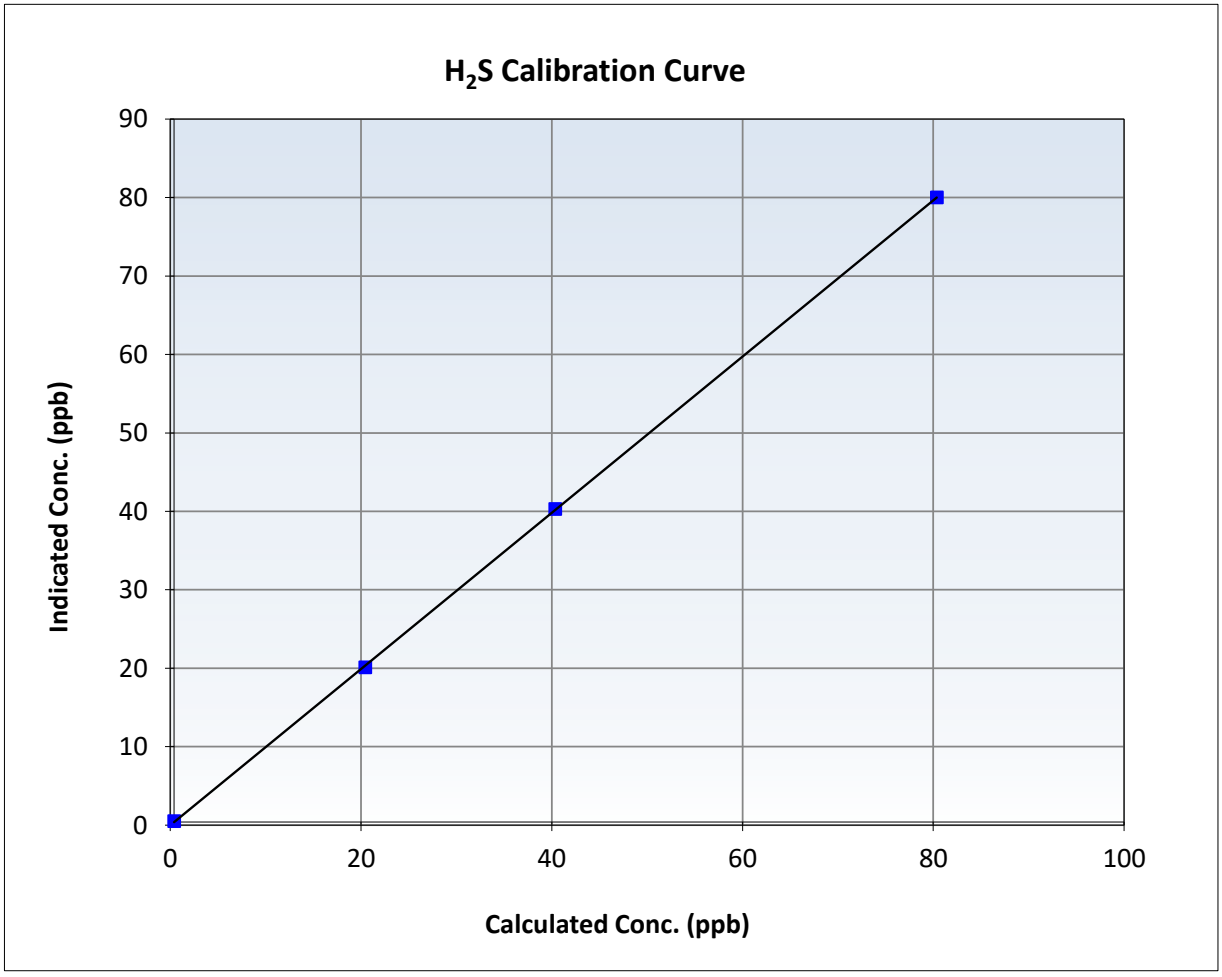
H_2S Calibration Summary

Station Information

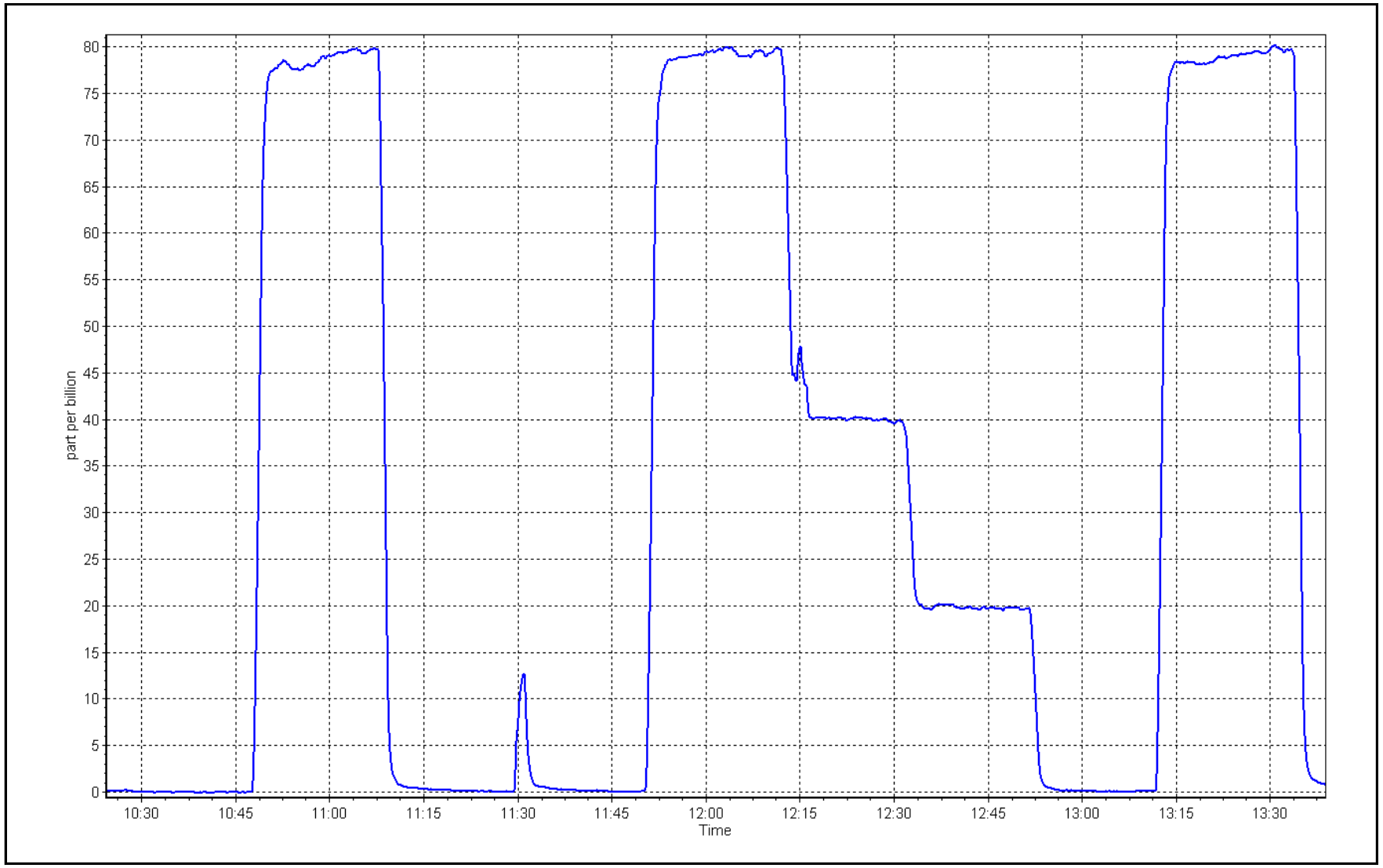
Calibration Date:	April 19, 2024	Previous Calibration:	March 12, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	10:27	End Time (MST):	13:45
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1200326169

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999976	*≥0.995*
80.0	79.6	1.0045	Slope	0.995684	*0.90 - 1.10*
40.0	39.9	1.0019			
20.0	19.7	1.0171	Intercept	-0.017567	*+/-3*



H_2S Calibration Plot Date: April 19, 2024 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	April 4, 2024	Last Cal Date:	March 13, 2024
Start time (MST):	8:18	End time (MST):	11:55
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:	2.76E-04	2.73E-04	NMHC SP Ratio:	5.97E-05	5.89E-05
CH4 Retention time:	14.4	1.44E+01	NMHC Peak Area:	153276	155276
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	17.49	0.985
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.49	Prev response	17.22	*% change	1.5%
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	4920	80.0	17.23	17.21	1.001
Mid point	4960	40.0	8.61	8.61	1.001
Low point	4980	20.0	4.31	4.29	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	17.23	17.27	0.998
				Average Correction Factor	1.002

Notes: Changed the inlet filter and the H2 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	80.0	9.15	9.30	0.984
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.30	Prev response	9.16	*% change	1.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	9.15	9.13	1.002
Mid point	4960	40.0	4.57	4.57	1.000
Low point	4980	20.0	2.29	2.28	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	9.15	9.16	0.998
				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	4920	80.0	8.08	8.19	0.987
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.19	Prev response	8.06	*% change	1.6%
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	80.0	8.08	8.09	0.999
Mid point	4960	40.0	4.04	4.03	1.001
Low point	4980	20.0	2.02	2.01	1.006
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	8.08	8.10	0.997
				Average Correction Factor	1.002

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999917	0.999340
THC Cal Offset:	-0.008000	-0.004400
CH4 Cal Slope:	1.000113	1.001641
CH4 Cal Offset:	-0.024200	-0.007600
NMHC Cal Slope:	0.999769	0.997707
NMHC Cal Offset:	0.016600	0.002600

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

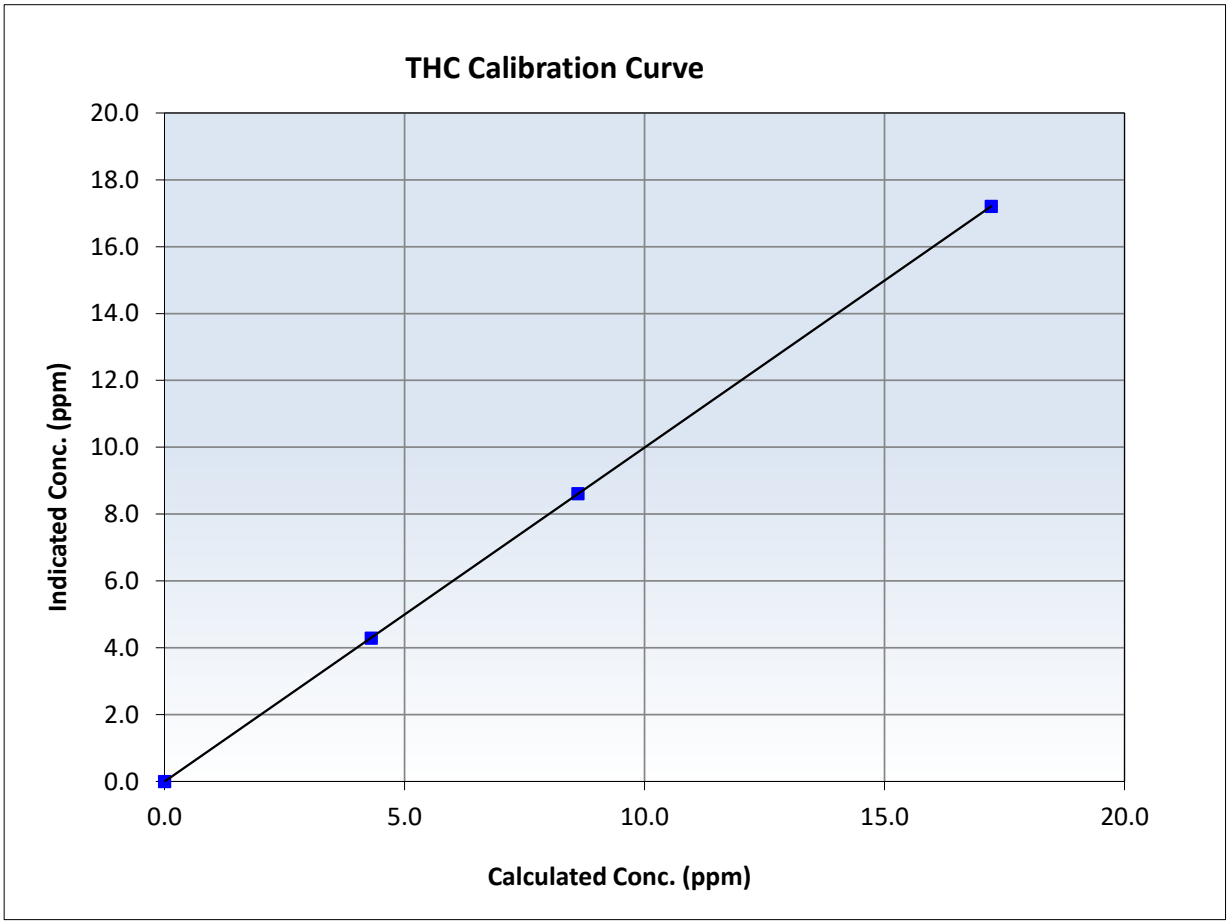
THC Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 13, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:18	End Time (MST):	11:55
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
17.23	17.21	1.0009	Slope	0.999340	0.90 - 1.10
8.61	8.61	1.0006	Intercept	-0.004400	+/-0.5
4.31	4.29	1.0038			



Wood Buffalo Environmental Association

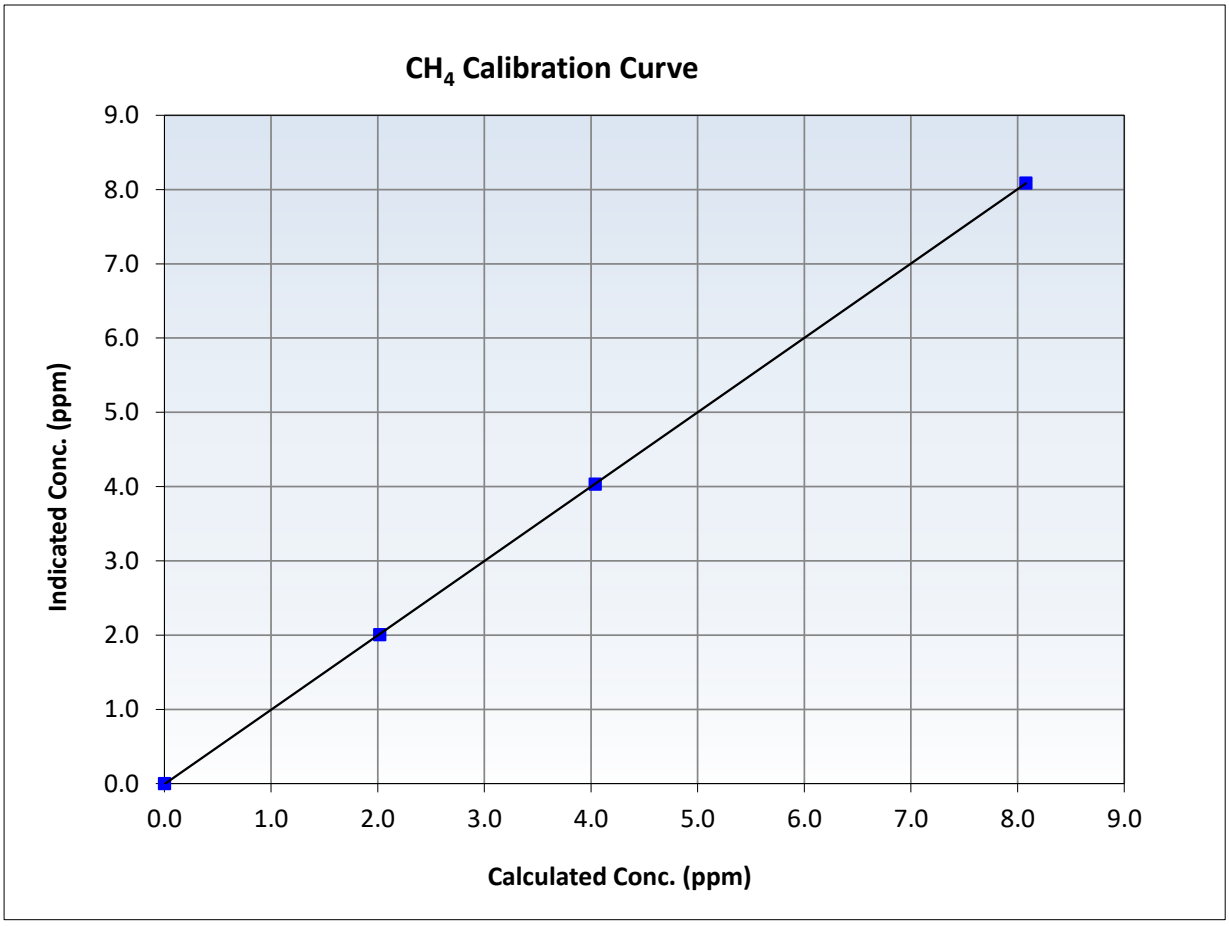
CH_4 Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 13, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:18	End Time (MST):	11:55
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*
8.08	8.09	0.9988	Slope	1.001641	*0.90 - 1.10*
4.04	4.03	1.0013			
2.02	2.01	1.0058	Intercept	-0.007600	*+/-0.5*



Wood Buffalo Environmental Association

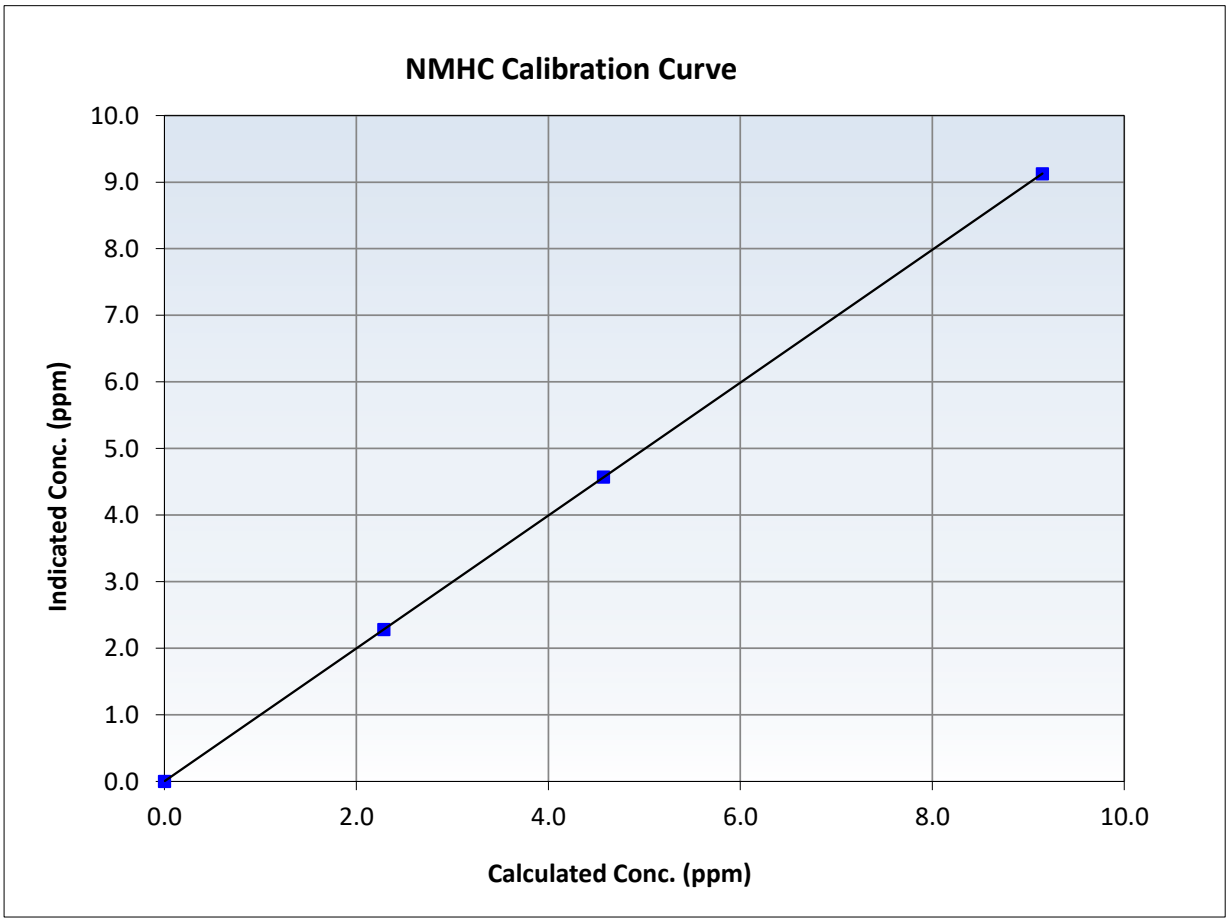
NMHC Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 13, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	8:18	End Time (MST):	11:55
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	0.999998	≥0.995
9.15	9.13	1.0024	Slope	0.997707	0.90 - 1.10
4.57	4.57	1.0002			
2.29	2.28	1.0017	Intercept	0.002600	+/-0.5



NMHC Calibration Plot Date: April 4, 2024 Location: Mannix

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06
PATRICIA MCINNES
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	April 23, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	8:26	End time (MST):	11:45
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:	0.997030	1.004978	Backgd or Offset:	17.7	17.7
Calibration intercept:	1.560821	1.779365	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	0.0	----
As found High point	4919.7	80.3	799.5	800.9	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	800.9	Previous response	798.7	*% 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	0.5	----
High point	4919.7	80.3	799.5	804.7	0.993
Mid point	4959.8	40.2	400.2	404.3	0.990
Low point	4979.9	20.1	200.1	204.4	0.979
As left zero	5000	0.0	0.0	0.3	----
As left span	4919.7	80.3	799.5	805.0	0.993
				Average Correction Factor:	0.987

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

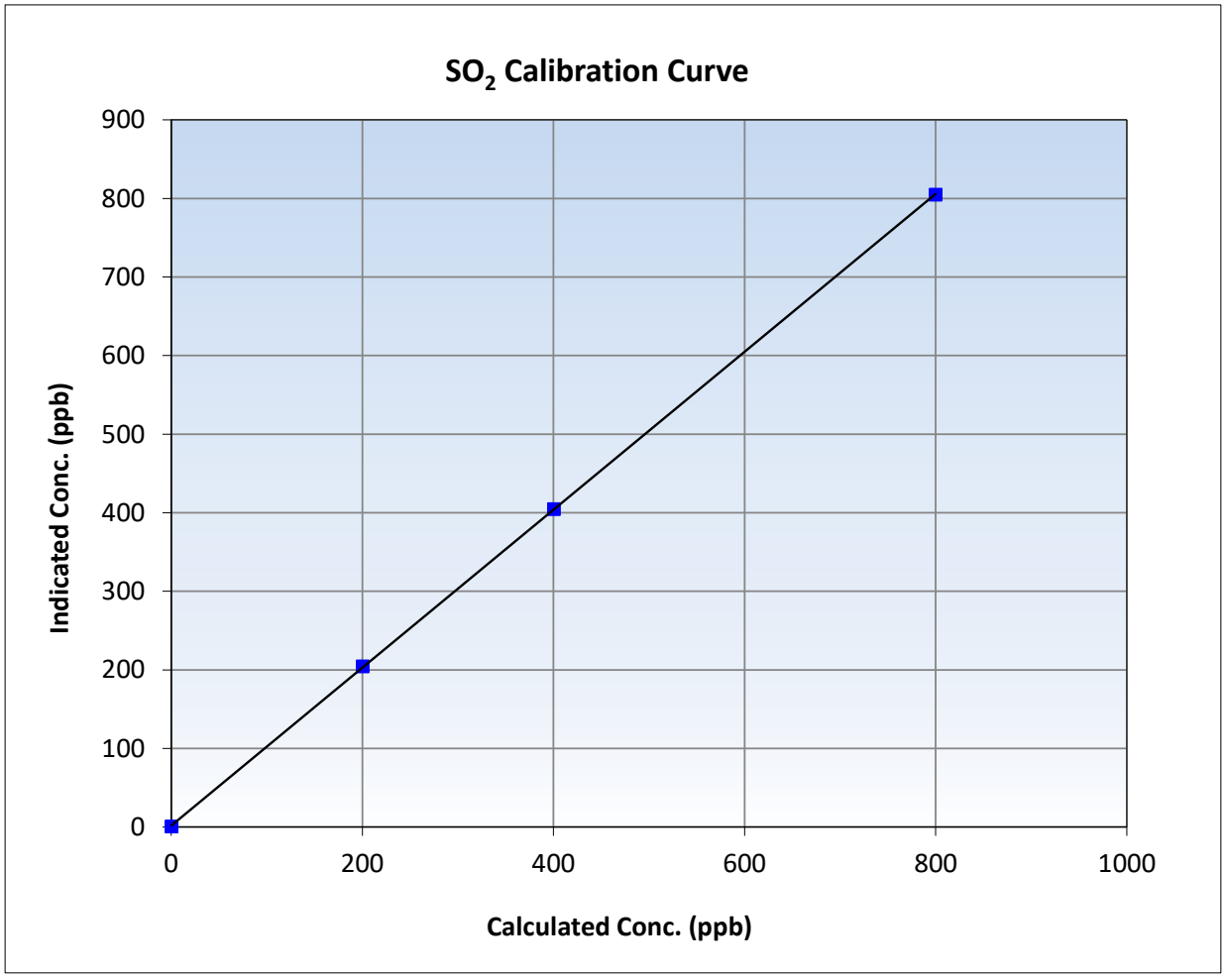
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 7, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	8:26	End Time (MST):	11:45
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

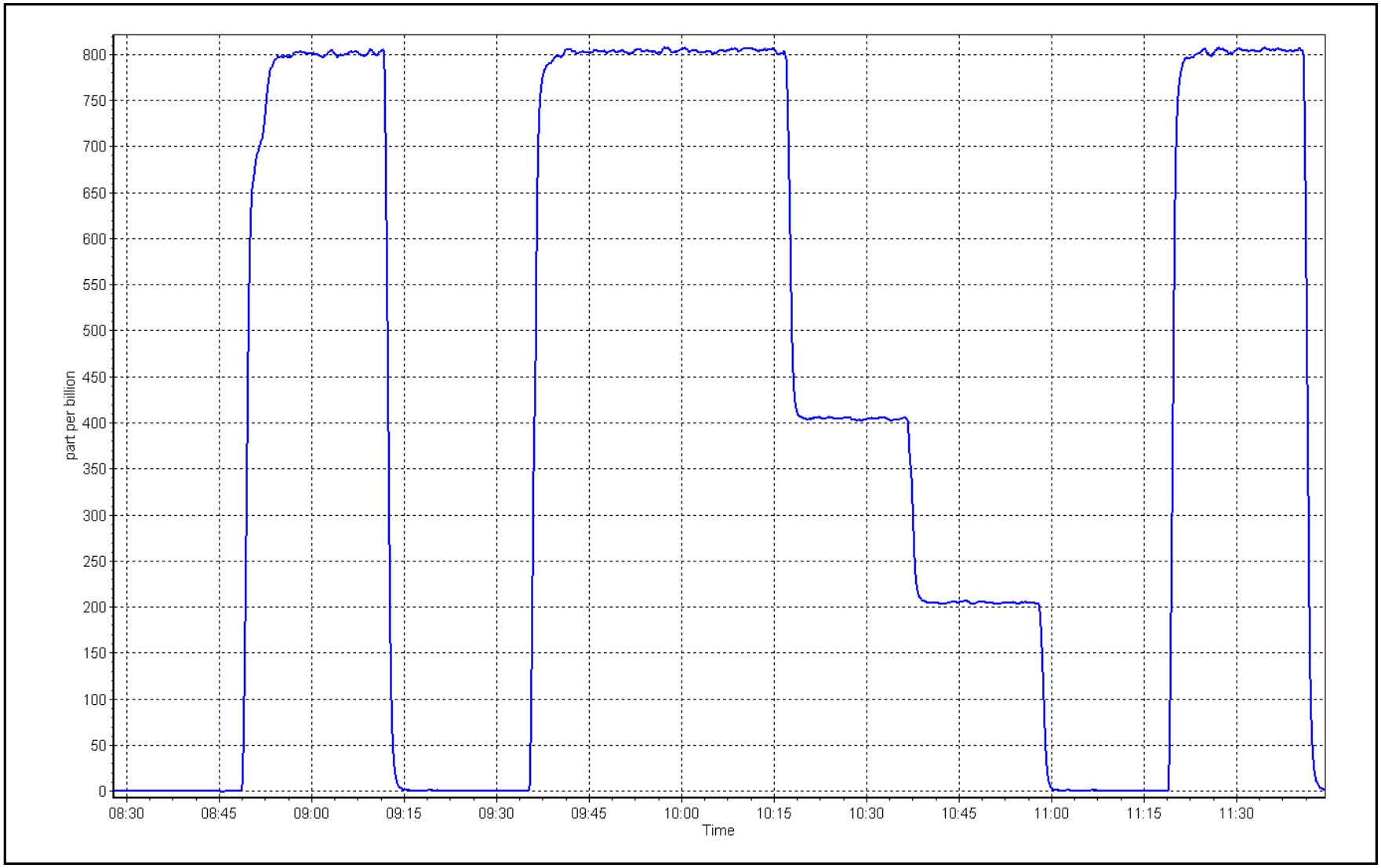
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
799.5	804.7	0.9935
400.2	404.3	0.9899
200.1	204.4	0.9790

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	1.004978	*0.90 - 1.10*
Intercept	1.779365	*+/-30*



SO2 Calibration Plot Date: April 23, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	April 18, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	9:05 AM	End time (MST):	13:30
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:	0.993746	0.996746	Backgd or Offset:	1.95	1.98
Calibration intercept:	0.540147	0.460147	Coeff or Slope:	1.150	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	4925	75.1	80.0	78.2	1.023
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	78.2	Prev response:	80.06	*% change:	-2.4%
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	80.1	0.999
Mid point	4963	37.5	40.0	40.4	0.989
Low point	4981	18.8	20.0	20.7	0.968
As left zero	5000	0.0	0.0	0.9	----
As left span	4925	75.1	80.0	80.9	0.989
SO2 Scrubber Check	4920	80.3	803.0	0.0	----

Date of last scrubber change:	December 20, 2021	Ave Corr Factor	0.985
Date of last converter efficiency test:			

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

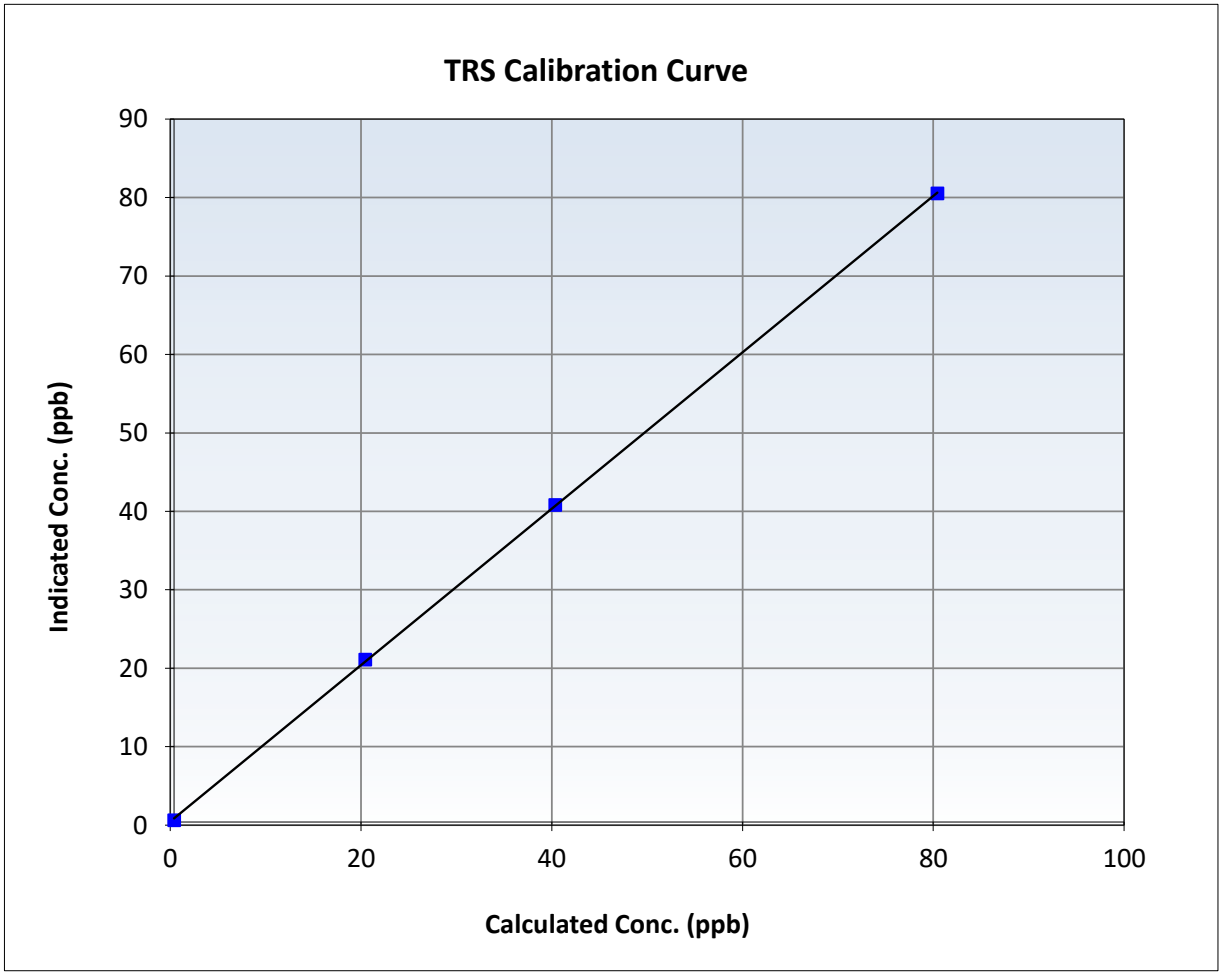
TRS Calibration Summary

Station Information

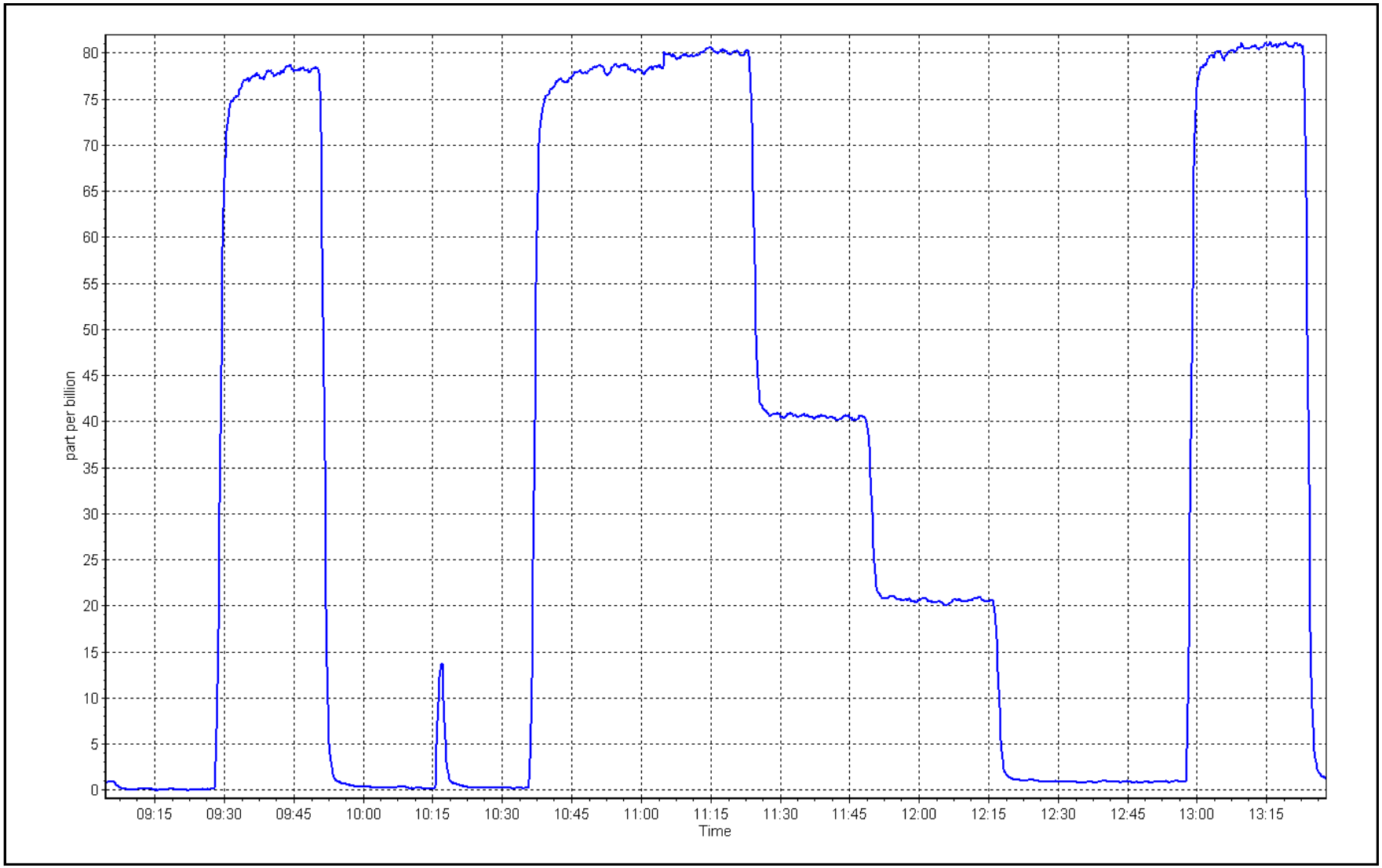
Calibration Date:	April 18, 2024	Previous Calibration:	March 8, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:05	End Time (MST):	13:30
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999951	*≥0.995*
80.0	80.1	0.9991	Slope	0.996746	*0.90 - 1.10*
40.0	40.4	0.9890			
20.0	20.7	0.9678	Intercept	0.460147	*+/-3*



TRS Calibration Plot Date: April 18, 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:	April 22, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	9:43 AM	End time (MST):	11:15
Reason:	As Found		

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:	2.21E-04	2.21E-04	NMHC SP Ratio:	4.84E-05	4.84E-05
CH4 Retention time:	14.2	14.2	NMHC Peak Area:	187266	187266
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	16.78	1.021
As found Mid point	4960	40.2	8.57	8.41	1.019
As found Low point	4980	20.1	4.29	4.27	1.004
New cylinder response					
Baseline Corr AF:	16.78	Prev response	17.12	*% change	-2.1%
Baseline Corr 2nd AF:	8.41	AF Slope:	0.978449	AF Intercept:	0.030920
Baseline Corr 3rd AF:	4.27	AF Correlation:	0.999981	* = > +/-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: Multipoint as founds completed to run a column bakeout. Purpose is to get perfect zero readings during zeros.

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	4919.7	80.3	9.07	8.91	1.018
As found Mid point	4960	40.2	4.54	4.49	1.012
As found Low point	4980	20.1	2.27	2.29	0.990
New cylinder response					
Baseline Corr AF:	8.91	Prev response	9.08	*% change	-1.9%
Baseline Corr 2nd AF:	4.49	AF Slope:	0.980742	AF Intercept:	0.031027
Baseline Corr 3rd AF:	2.29	AF Correlation:	0.999944	* = > +/-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	4919.7	80.3	8.06	7.86	1.025
As found Mid point	4960	40.2	4.03	3.92	1.028
As found Low point	4980	20.1	2.02	1.98	1.021
New cylinder response					
Baseline Corr AF:	7.86	Prev response	8.05	*% change	-2.3%
Baseline Corr 2nd AF:	3.92	AF Slope:	0.975585	AF Intercept:	-0.000106
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					

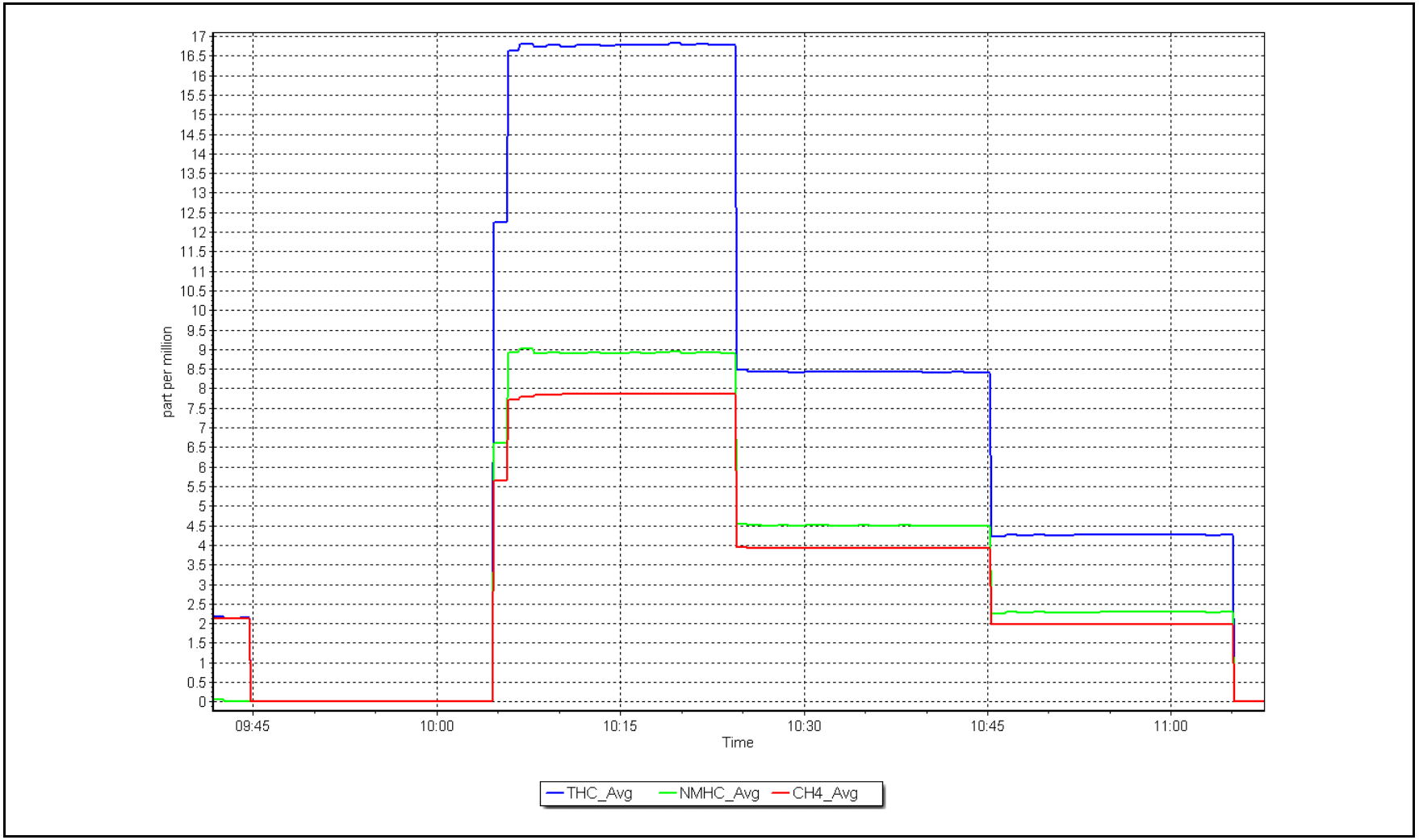
Average Correction Factor

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.998467	
THC Cal Offset:	0.026638	
CH4 Cal Slope:	0.998356	
CH4 Cal Offset:	0.002848	
NMHC Cal Slope:	0.998464	
NMHC Cal Offset:	0.024190	

Calibration Performed By: Max Farrell

NMHC Calibration Plot Date: April 22, 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:	April 23, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	9:15 AM	End time (MST):	11:45
Reason:	Maintenance		

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:	2.21E-04	2.26E-04	NMHC SP Ratio:	4.84E-05	4.92E-05
CH4 Retention time:	14.2	14.4	NMHC Peak Area:	187266	184279
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	4919.7	80.3	17.12	17.14	0.999
Mid point	4960	40.2	8.57	8.58	0.999
Low point	4980	20.1	4.29	4.35	0.986
As left zero	5000	0.0	0.00	0.01	----
As left span	4919.7	80.3	17.12	17.14	0.999
				Average Correction Factor	0.995

Notes: Completed multipoint as founds and ran a column bakeout yesterday. 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	4919.7	80.3	9.07	9.10	0.997
Mid point	4960	40.2	4.54	4.57	0.993
Low point	4980	20.1	2.27	2.33	0.975
As left zero	5000	0.0	0.00	0.01	----
As left span	4919.7	80.3	9.07	9.10	0.997
				Average Correction Factor	0.988

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	4919.7	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	0.999
As left zero	5000	0.0	0.00	0.00	----
As left span	4919.7	80.3	8.06	8.04	1.001
				Average Correction Factor	1.002

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.998467	0.999948
THC Cal Offset:	0.026638	0.023034
CH4 Cal Slope:	0.998356	0.998696
CH4 Cal Offset:	0.002848	-0.002350
NMHC Cal Slope:	0.998464	1.001388
NMHC Cal Offset:	0.024190	0.024584

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

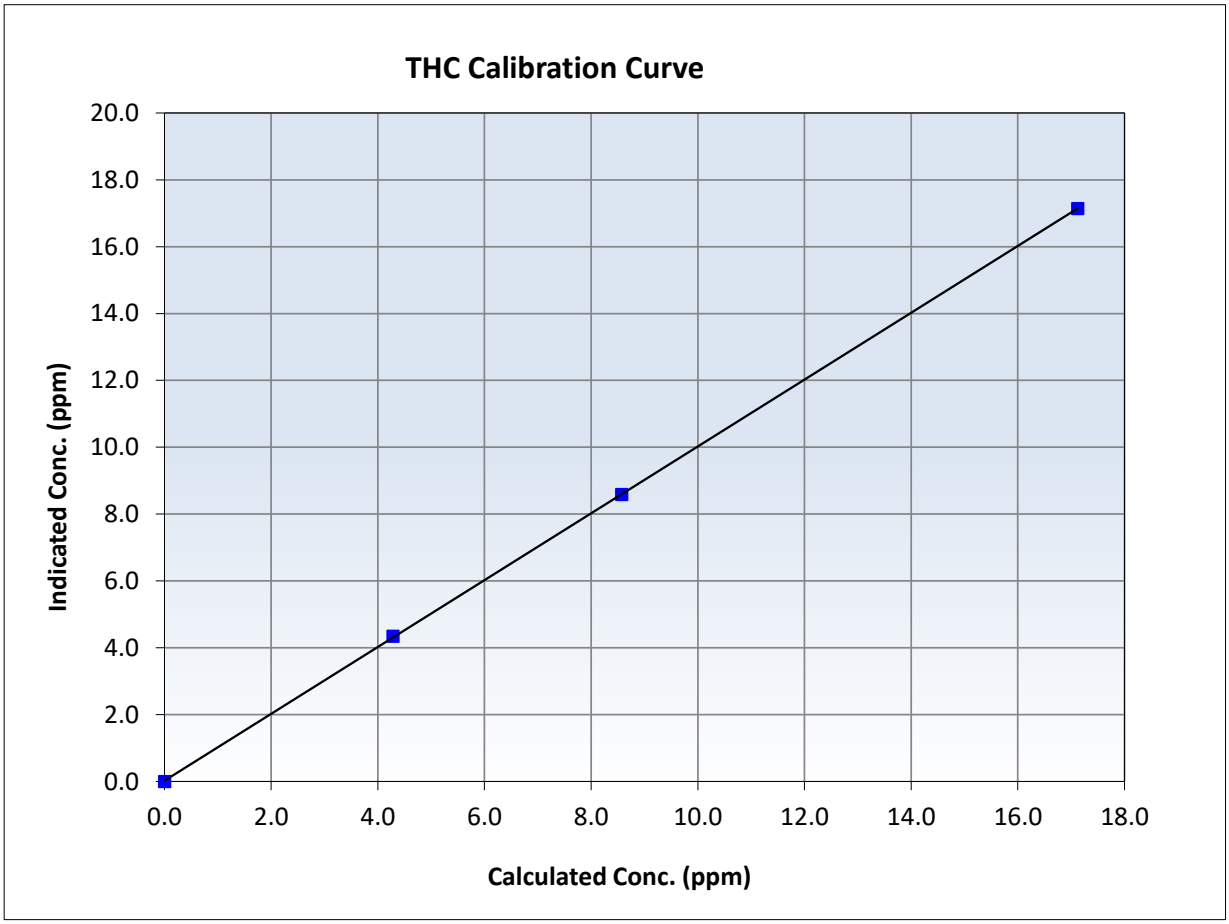
THC Calibration Summary

Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 7, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:15	End Time (MST):	11:45
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	0.999987	≥0.995
17.12	17.14	0.9989	Slope	0.999948	0.90 - 1.10
8.57	8.58	0.9987	Intercept	0.023034	+/-0.5
4.29	4.35	0.9860			



Wood Buffalo Environmental Association

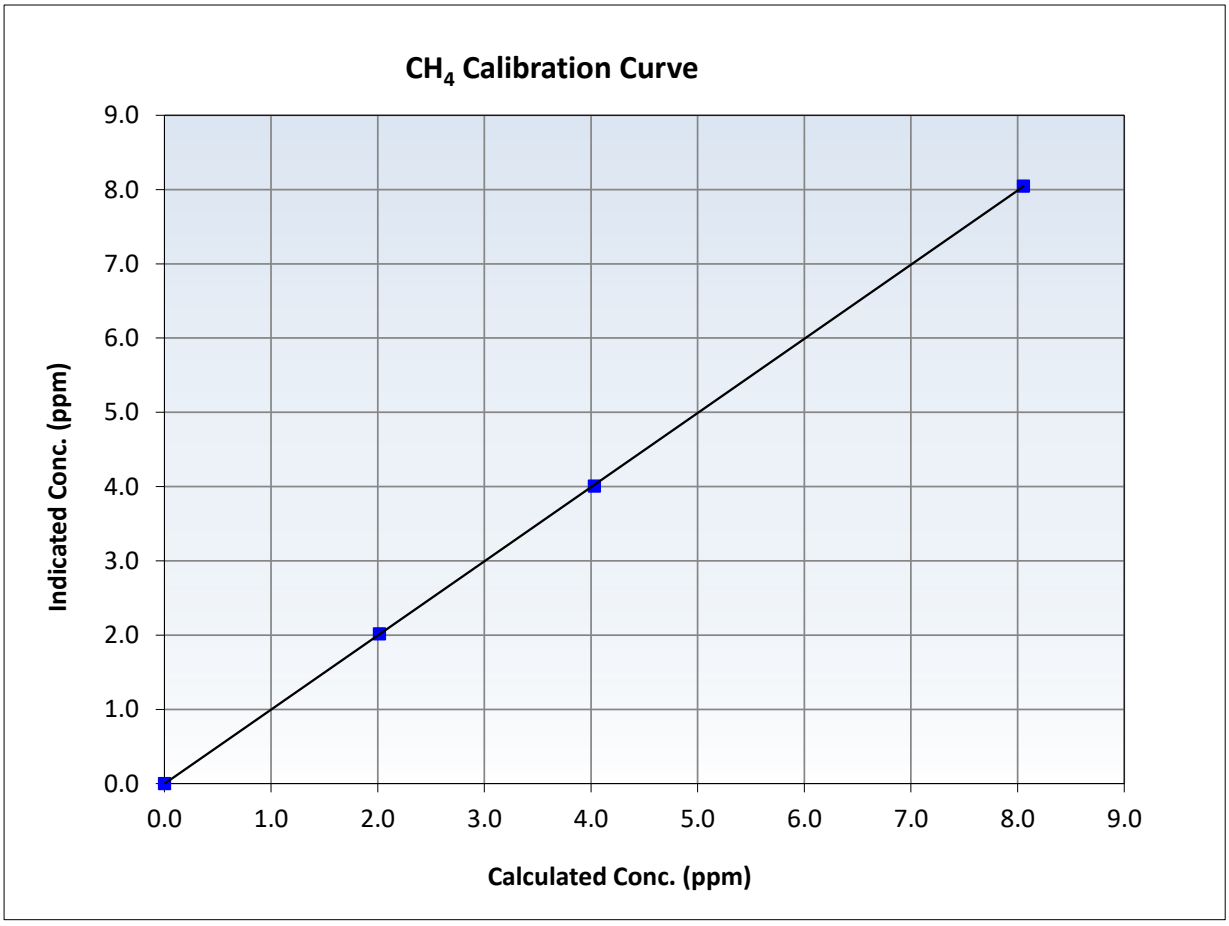
CH_4 Calibration Summary

Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 7, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:15	End Time (MST):	11:45
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	0.999990	≥0.995
8.06	8.05	1.0008	Slope	0.998696	0.90 - 1.10
4.03	4.01	1.0059	Intercept	-0.002350	+/-0.5
2.02	2.02	0.9987			



Wood Buffalo Environmental Association

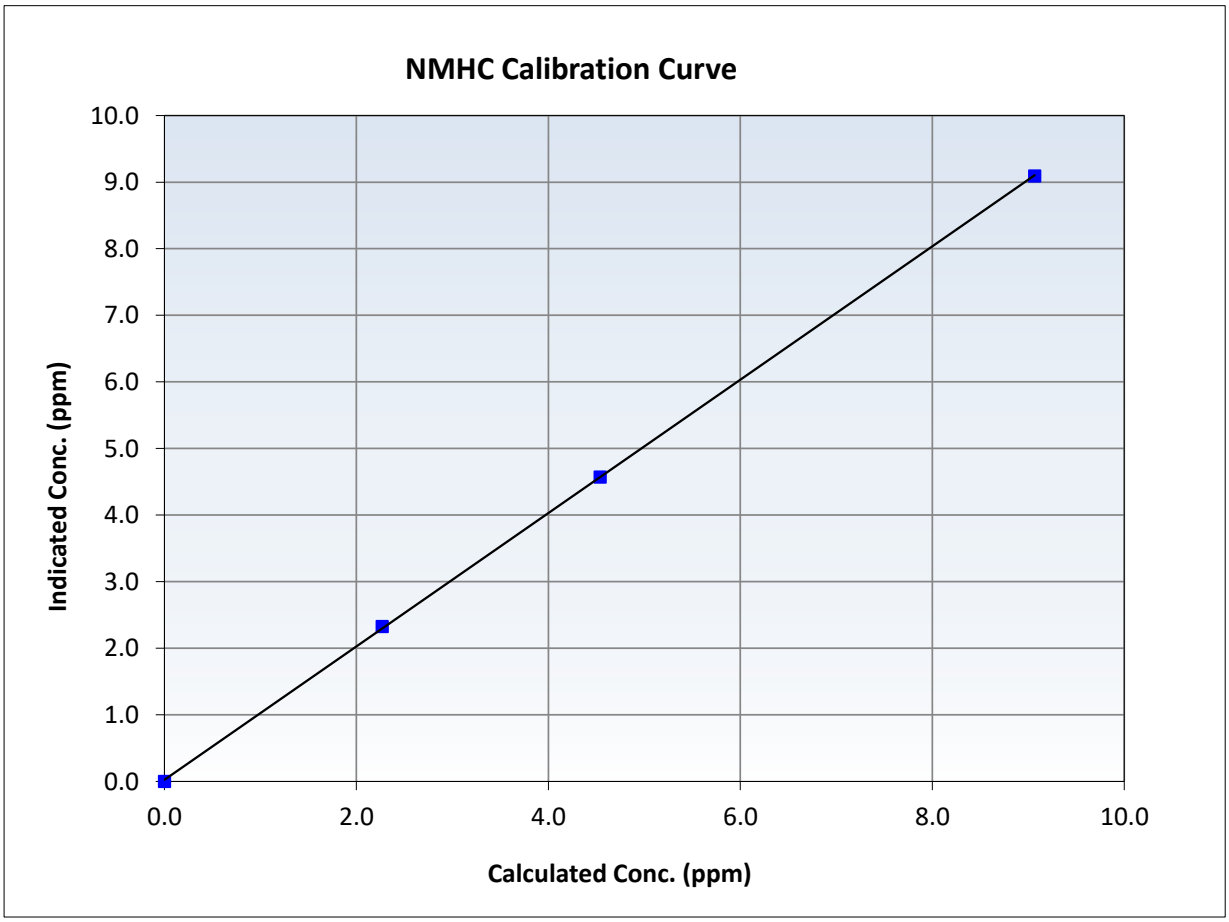
NMHC Calibration Summary

Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 7, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:15	End Time (MST):	11:45
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	0.999964	≥0.995
9.07	9.10	0.9969	Slope	1.001388	0.90 - 1.10
4.54	4.57	0.9926	Intercept	0.024584	+/-0.5
2.27	2.33	0.9749			



NMHC Calibration Plot Date: April 23, 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:	April 10, 2024
Last Cal Date:	March 5, 2024
Start time (MST):	9:26 AM
End time (MST):	14:17
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	-0.1	0.3	-0.4	----	----
AF High point	4914	86.2	826.5	799.7	26.7	817.6	788.7	28.9	1.0107	1.0144
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 830.4 ppb	NO = 803.5 ppb
Baseline Corr 1st pt	NO_X = 817.7 ppb	NO = 788.4 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 = -1.6%	As Found Statistics	
*Percent Change	NO = -1.9%	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: 1172750022

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.825	0.836	NO bkgnd or offset:	3.2	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:	157.2	155.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.002416	0.997990
NO_X Cal Offset:	1.975128	2.376066
NO Cal Slope:	1.003032	1.000731
NO Cal Offset:	1.382192	1.562605
NO_2 Cal Slope:	0.999602	1.000336
NO_2 Cal Offset:	-0.538439	-0.255207

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	0.5	-0.2	----	----
High point	4914	86.2	826.5	799.7	26.7	826.1	801.3	25.0	1.0004	0.9980
Mid point	4957	43.1	413.2	399.9	13.4	415.9	402.4	13.5	0.9936	0.9937
Low point	4978	21.6	207.1	200.4	6.7	211.1	203.1	8.0	0.9811	0.9868
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.4	-0.2	----	----
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		0.9917	0.9929

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	799.3	399.8	426.2	426.5	0.9993	100.1%
Mid GPT point	799.3	605.7	220.3	219.0	1.0060	99.4%
Low GPT point	799.3	704.3	121.7	122.2	0.9961	100.4%
				Average Correction Factor	1.0005	100.0%

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

NO_X Calibration Summary

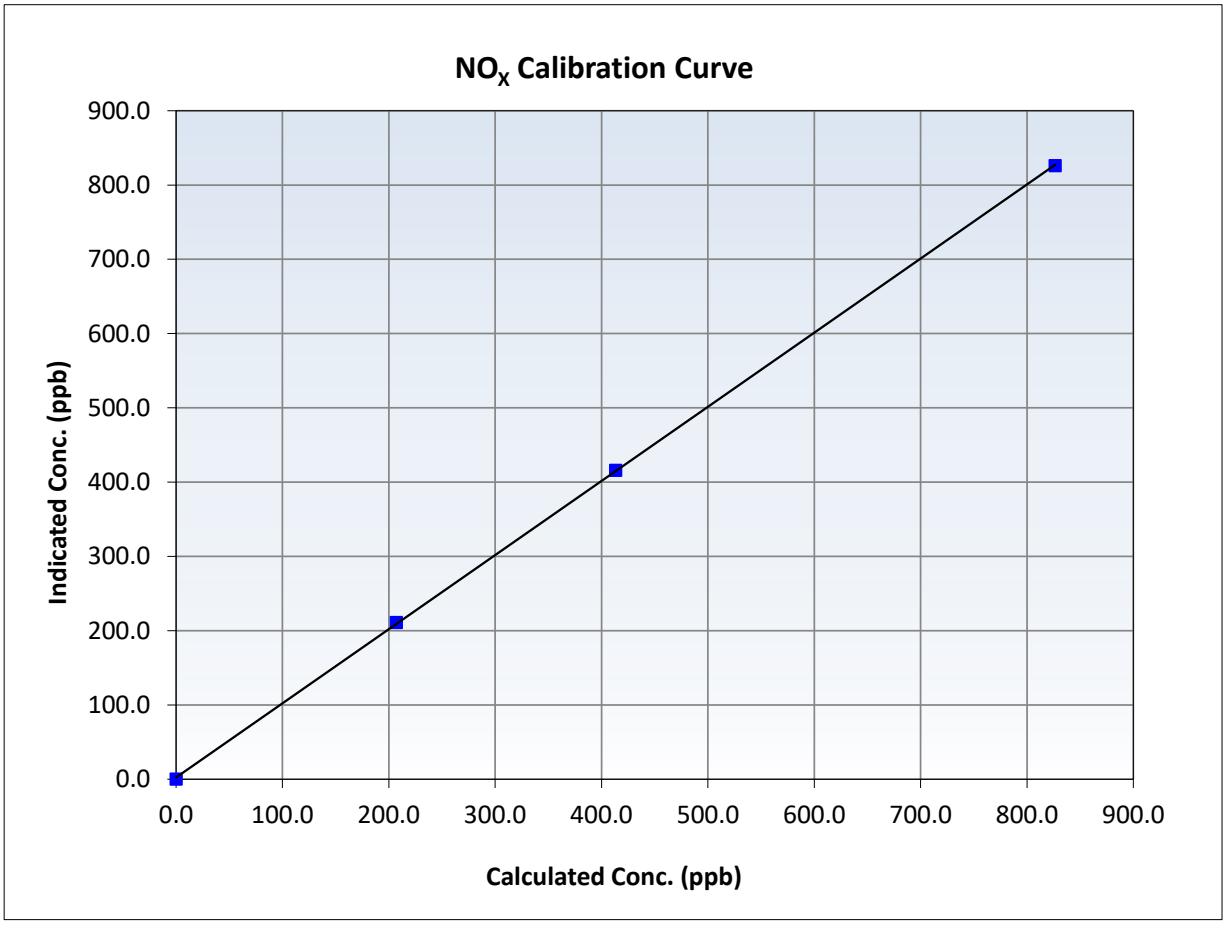
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:26	End Time (MST):	14:17
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	415.9	0.9936
207.1	211.1	0.9811

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	0.997990	*0.90 - 1.10*
Intercept	2.376066	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

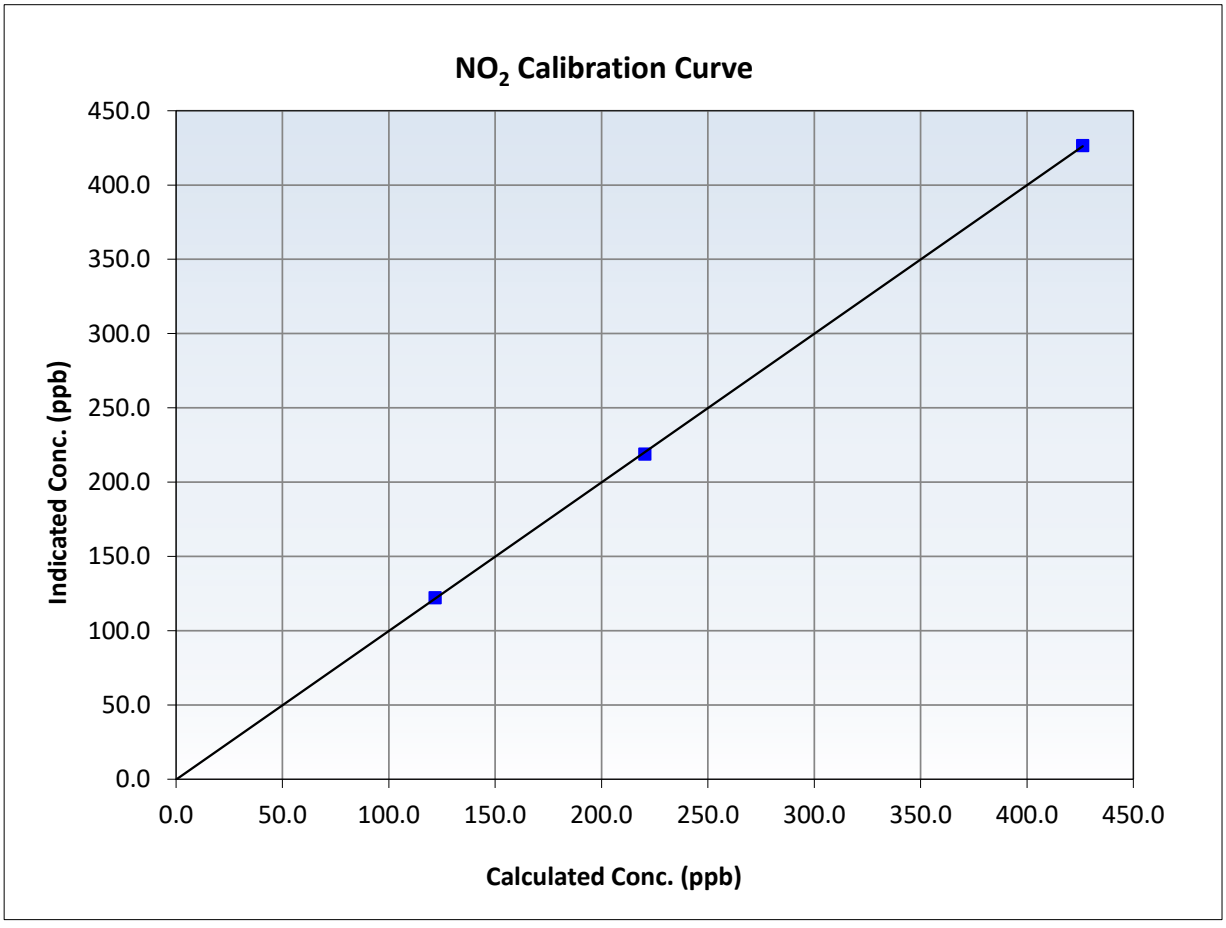
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:26	End Time (MST):	14:17
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
426.2	426.5	0.9993
220.3	219.0	1.0060
121.7	122.2	0.9961

Statistical Evaluation		Limits
Correlation Coefficient	0.999980	≥0.995
Slope	1.000336	0.90 - 1.10
Intercept	-0.255207	+/-20



Wood Buffalo Environmental Association

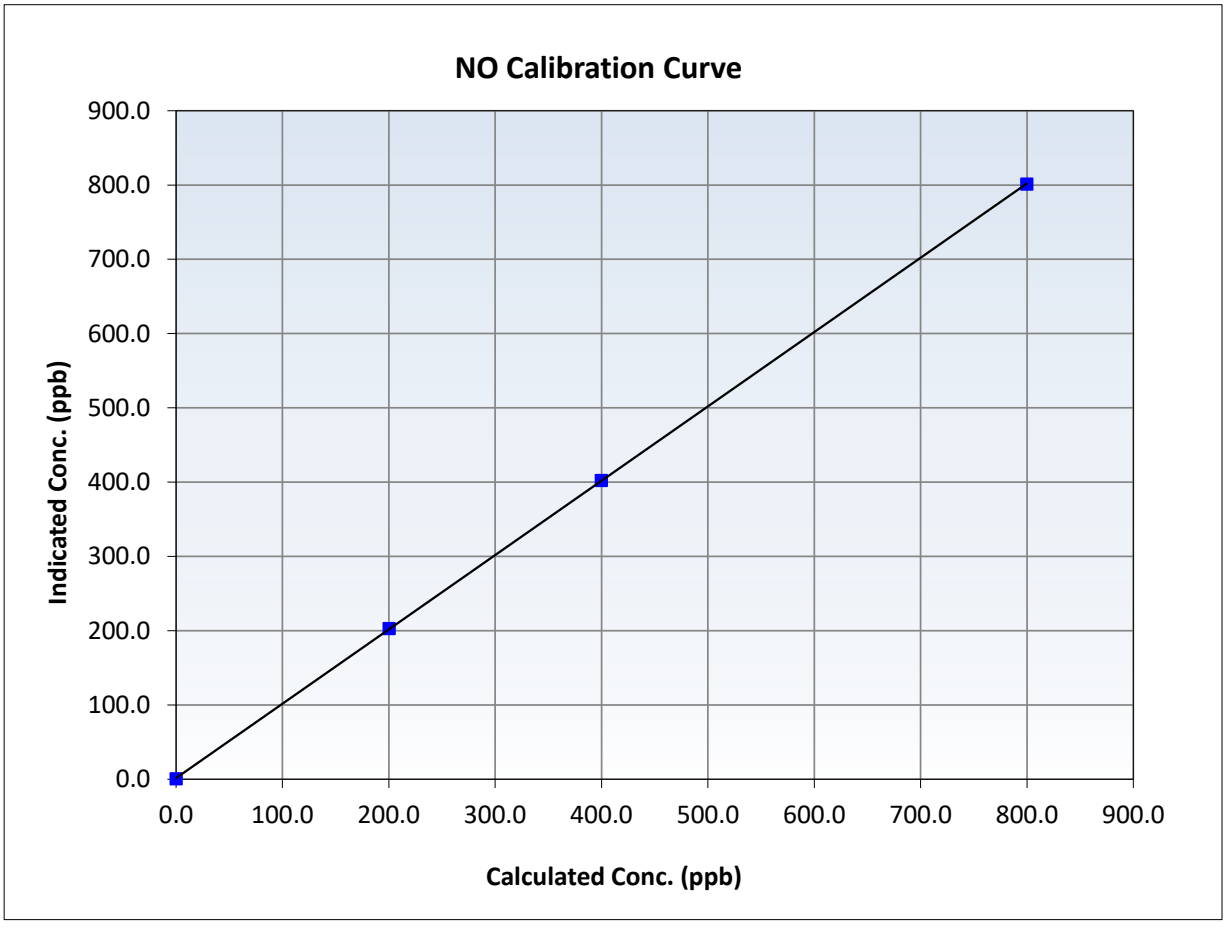
NO Calibration Summary

Station Information

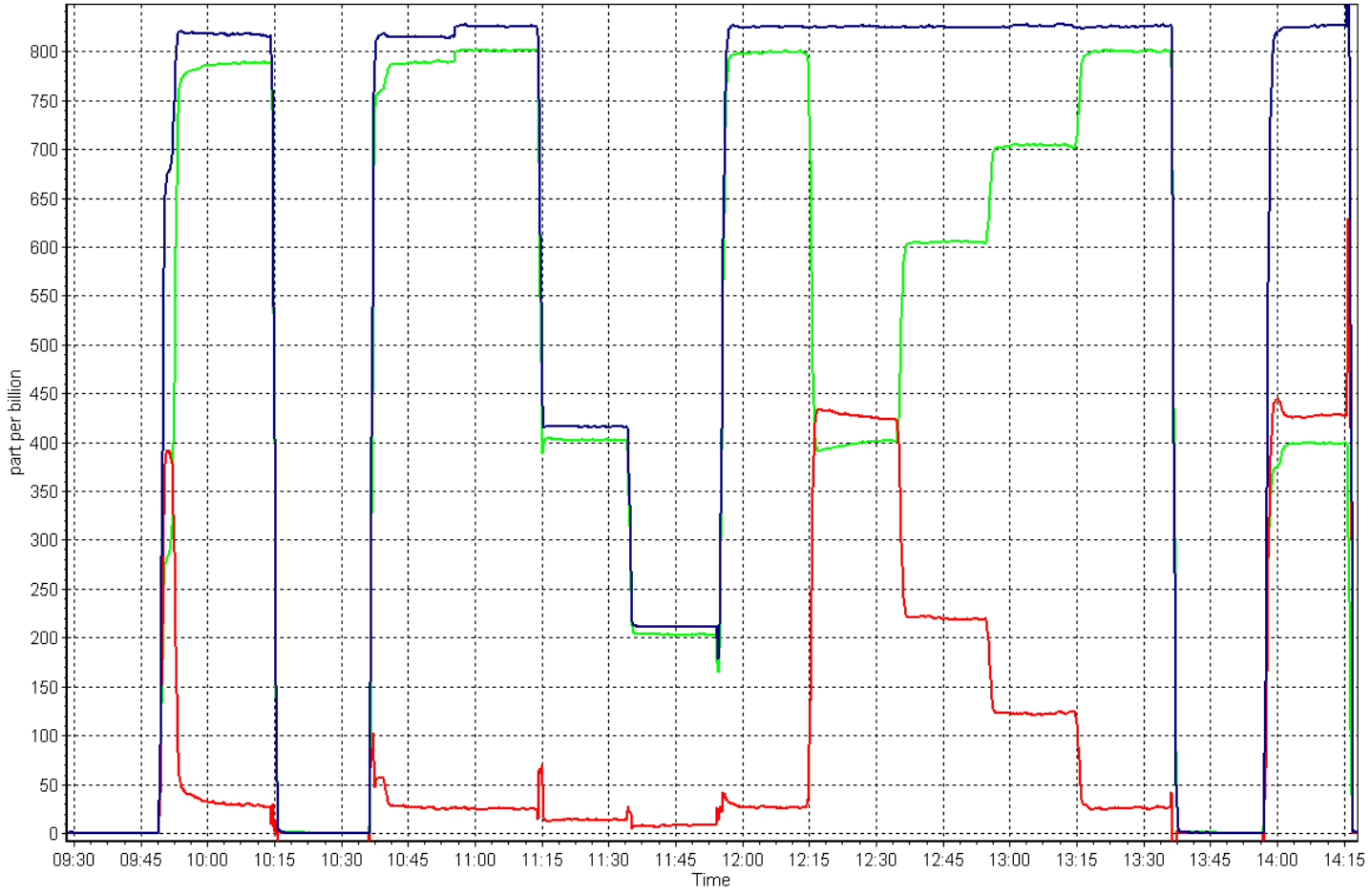
Calibration Date:	April 10, 2024	Previous Calibration:	March 5, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:26	End Time (MST):	14:17
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.5	----	Correlation Coefficient	0.999992	≥0.995
799.7	801.3	0.9980	Slope	1.000731	0.90 - 1.10
399.9	402.4	0.9937	Intercept	1.562605	+/-20
200.4	203.1	0.9868			



NO_X Calibration Plot Date: April 10, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	April 12, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	10:02	End time (MST):	13:00
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:	1.004200	1.006514	Backgd or Offset:	-0.2	-0.2
Calibration intercept:	-0.660000	-0.840000	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	-0.3	----
As found High point	5000	1303.0	400.0	401.2	0.996
As found Mid point					
As found Low point					
Baseline Corr As found:	401.5	Previous response	401.0	*% 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	800.0	0.0	-0.3	----
High point	5000	1303.0	400.0	402.0	0.995
Mid point	5000	966.5	200.0	200.3	0.999
Low point	5000	794.3	100.0	99.2	1.008
As left zero	5000	800.0	0.0	-0.1	----
As left span	5000	1303.0	400.0	402.4	0.994
				Average Correction Factor	1.001

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

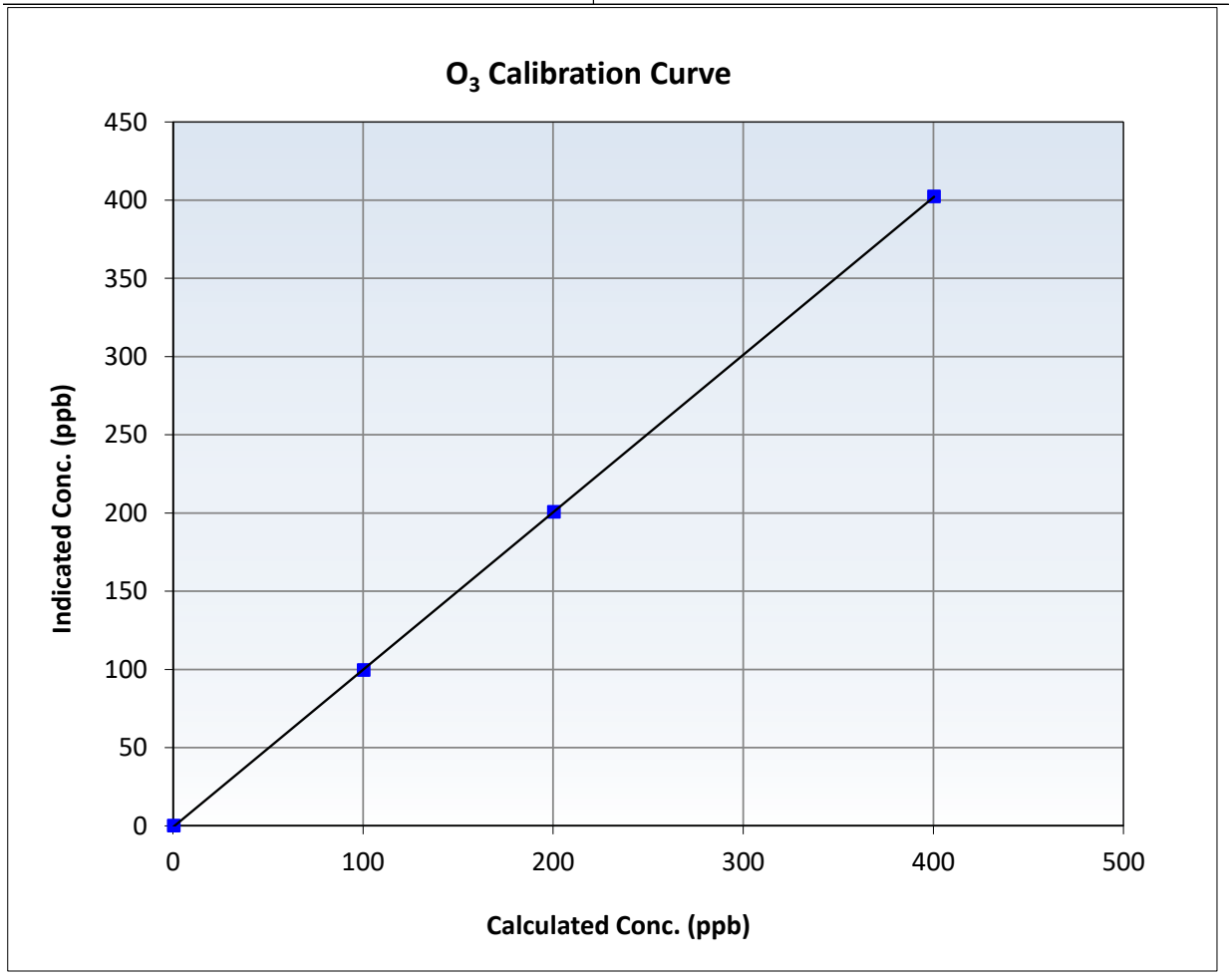
O_3 Calibration Summary

Station Information

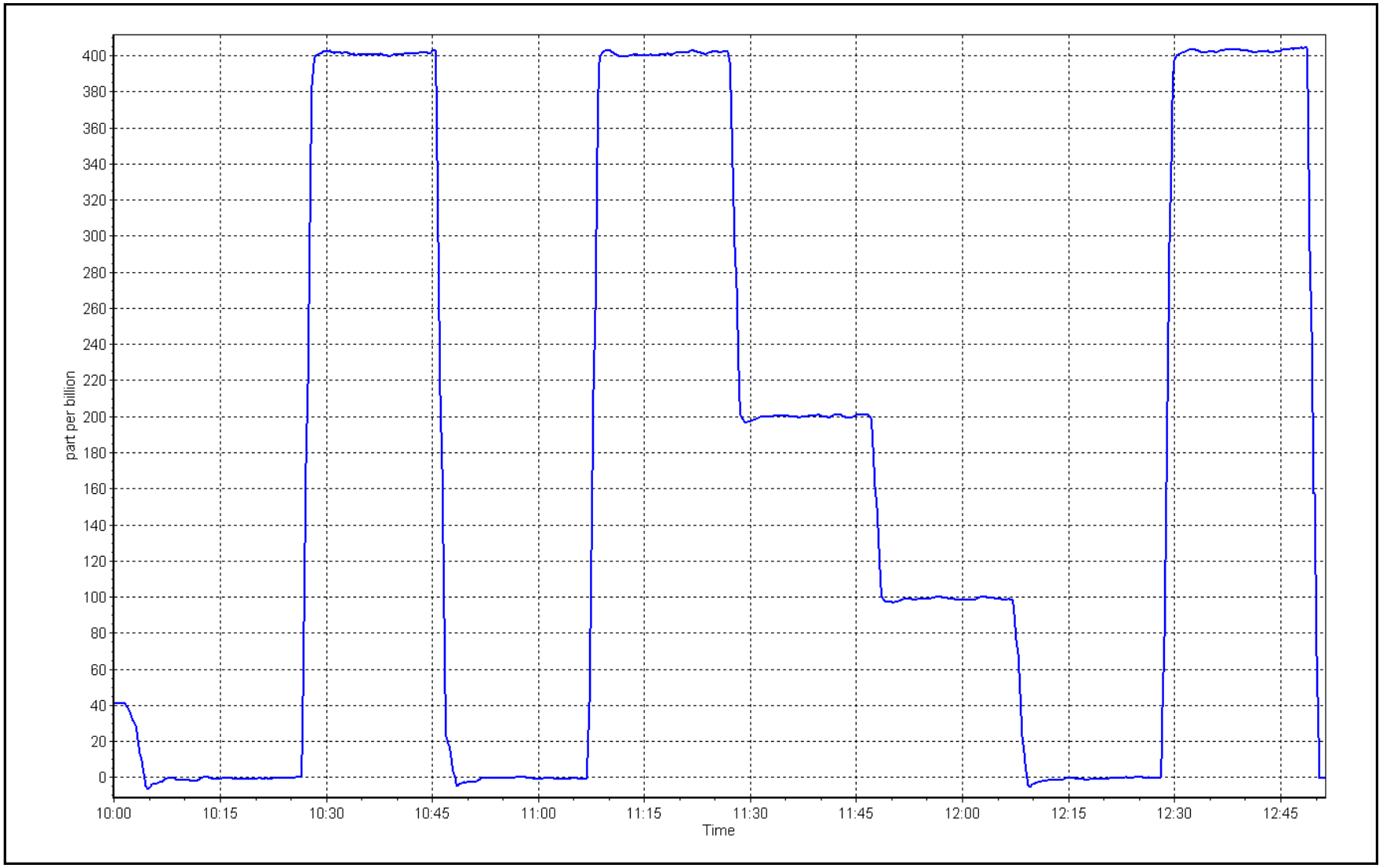
Calibration Date:	April 12, 2024	Previous Calibration:	March 22, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:02	End Time (MST):	13:00
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.3	----	Correlation Coefficient	0.999992	≥0.995
400.0	402.0	0.9950	Slope	1.006514	0.90 - 1.10
200.0	200.3	0.9985			
100.0	99.2	1.0081	Intercept	-0.840000	+/- 5



O_3 Calibration Plot Date: April 12, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	April 22, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	12:56	End time (MST):	13:57
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)	17.8	17.9	17.8	☐	+/- 2 °C
P (mmHg)	720.3	722.7	720.3	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.14	5.01	☐	+/- 0.25 LPM
PW% (pump)	42	-----	42	☐	>80%

Zero Verification — PM w/o HEPA: 12.2 — 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: 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: March 22, 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 last month. 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:	AMS 06
NOX Cal Date:	April 11, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	7:01	End time (MST):	11:11
NH3 Cal Date:	April 11, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	11:20	End time (MST):	13:00
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:	0.992580	0.993922
NO_X Cal Offset:	1.257688	1.997132
NO Cal Slope:	0.996357	0.997329
NO Cal Offset:	-0.056315	0.703361
NO_2 Cal Slope:	1.001744	0.997014
NO_2 Cal Offset:	-0.225723	-0.514270
NH3 Cal Slope:	1.000069	0.990318
NH3 Cal Offset:	3.359353	4.179726
Nt Cal Slope:	1.006770	0.997067
Nt Cal Offset:	4.605099	5.735735

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	0.3	0.3	-1.9	----	----
As found span	4914	86.2	826.5	799.7	826.5	818.0	793.2	821.9	1.0103	1.0082
AF GPT span										
new NO cyl rp										

Baseline Corr As Fd	Nt = 823.8 ppb	NO_X = 817.7 ppb	NO = 792.9 ppb	*Percent Change	$Nt_{(NO)}$ =	-1.6%
Previous Response	Nt = 836.65 ppb	NO_X = 821.6 ppb	NO = 796.8 ppb	*Percent Change	NO_X =	-0.5%
				*Percent Change	NO =	-0.5%

**NO_X Δ (NO to GPT response) =

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

* = > +/-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	0.6	0.3	-0.9	----	----
High point	4914	86.2	826.5	799.7	826.5	822.8	798.3	822.4	1.0044	1.0018
Mid point	4957	43.1	413.2	399.9	413.2	413.2	399.1	415.3	1.0001	1.0019
Low point	4978	21.6	207.1	200.4	207.1	209.4	201.4	209.9	0.9891	0.9951
							Average Correction Factor		0.9979	0.9996

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Calibration zero	----	----	0.0	0.2	----	----
High GPT point (400 ppb O3)	795.0	394.7	427.0	425.7	1.0031	99.7%
Mid GPT point (200 ppb O3)	795.0	601.4	220.3	218.6	1.0079	99.2%
Low GPT point (100 ppb O3)	795.0	696.9	124.8	123.3	1.0123	98.8%
				Average Correction Factor	1.0078	99.2%

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	-1.9	0.3	-2.2	----	----
AF High point	3417	82.6	1800.6	----	1800.6	1795.1		1782.1	1.002	1.009
AF Mid point							----			
AF Low point							----			
new NH3 cyl rp										

Baseline Corr As Fd Nt = 1797.0 ppb NH3 = 1784.3 ppb *Percent Change $Nt_{(NH3)}$ = -1.1%

Previous Response Nt = 1817.4 ppb NH3 = 1804.1 ppb * = > +/-5% change initiates investigation *Percent Change NH3 = -1.1%

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	-0.9	0.6	-1.4	----	----
High point	3417	82.6	1800.6	----	1800.6	1795.1	----	1782.1	1.003	1.010
Mid point	3454	45.9	1000.5	----	1000.5	1012.3	----	1003.2	0.988	0.997
Low point	3477	22.9	499.2	----	499.2	507.1	----	501.2	0.984	0.996
								Average Correction Factor	0.9919	1.0012

NH3 Previous Converter Efficiency = 90.8 %

NH3 Current Converter Efficiency = 90.8 %

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

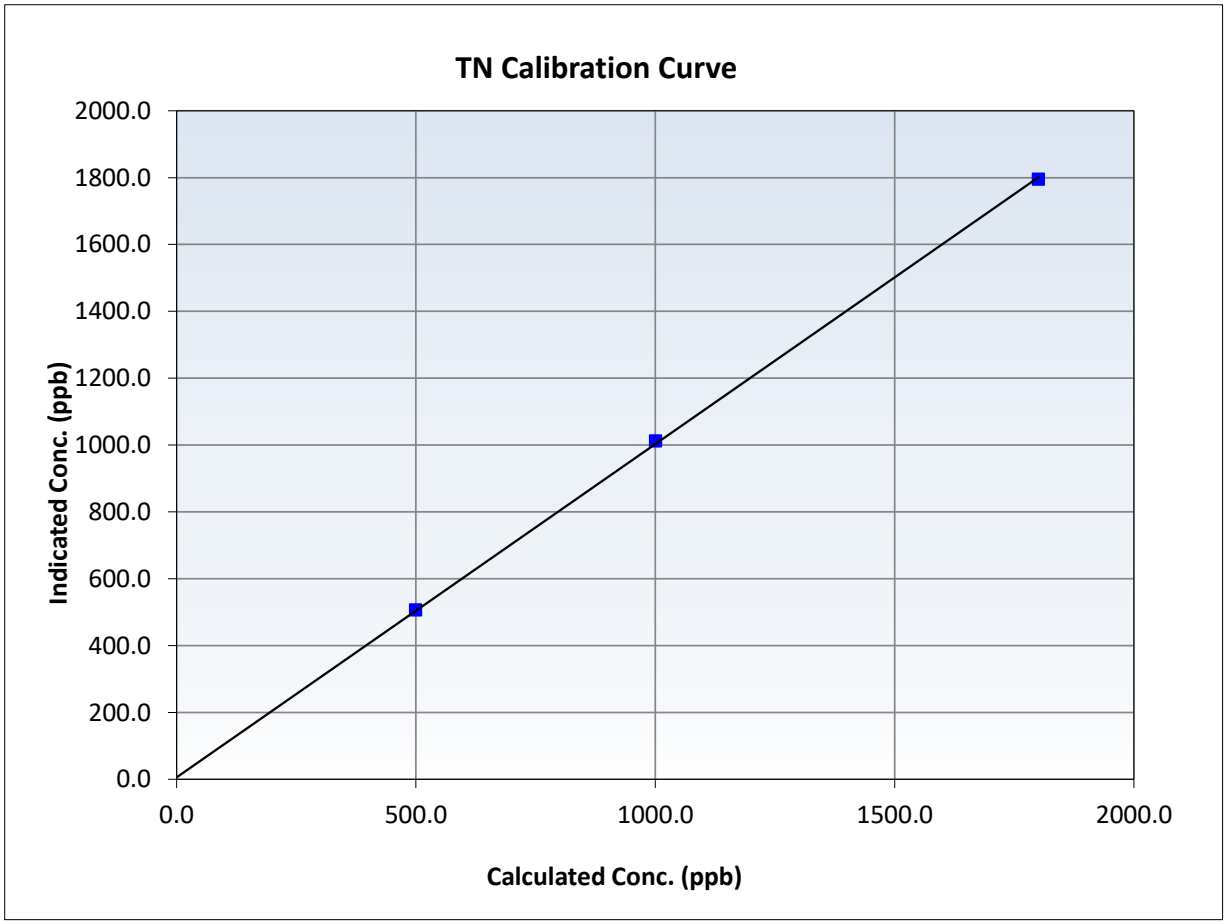
Nt Calibration Summary

Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	7:01	End Time (MST):	11:11
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.9	----	Correlation Coefficient	0.999901	≥0.995
1800.6	1795.1	1.0031	Slope	0.997067	0.90 - 1.10
1000.5	1012.3	0.9884	Intercept	5.735735	+/-20
499.2	507.1	0.9844			



Wood Buffalo Environmental Association

NH_3 Calibration Summary

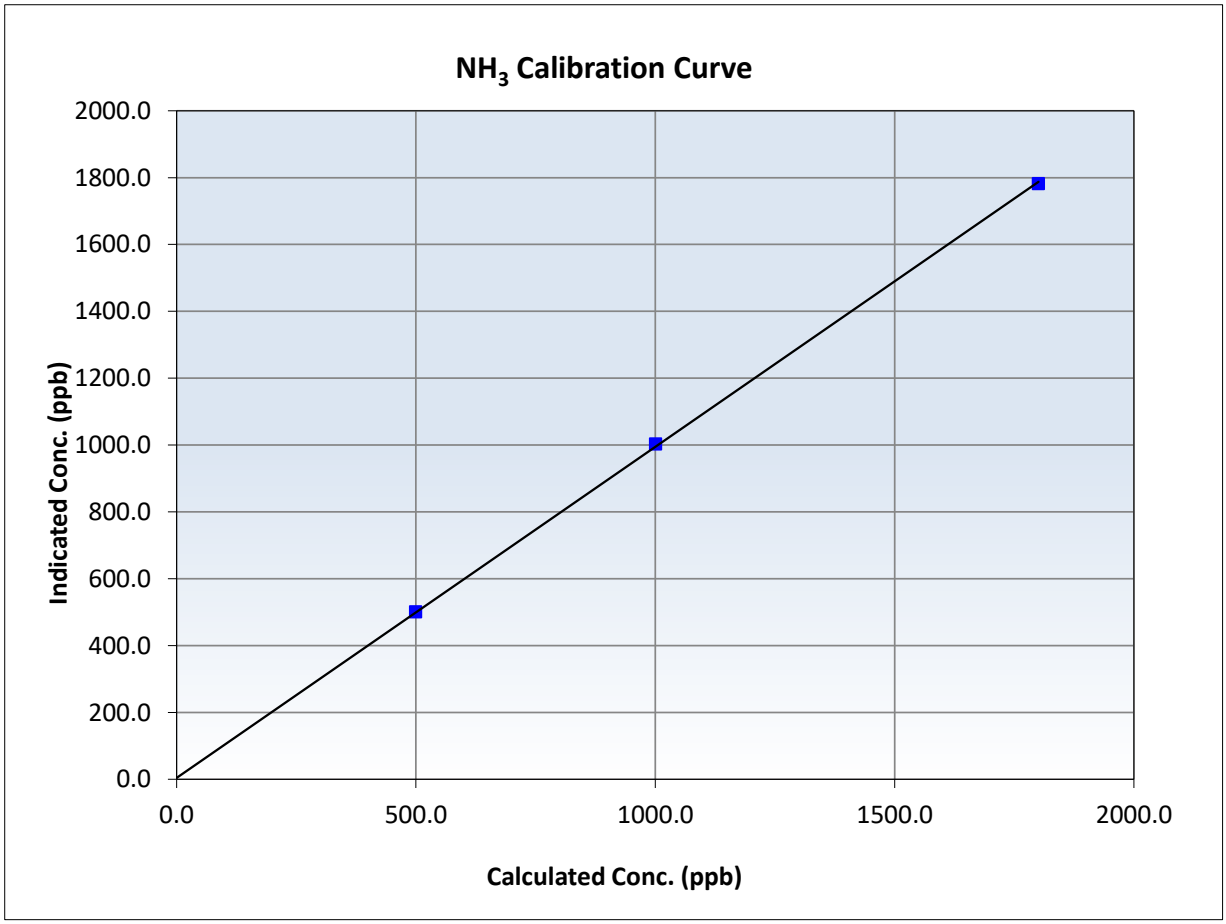
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	7:01	End Time (MST):	11:11
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	1782.1	1.0104
1000.5	1003.2	0.9973
499.2	501.2	0.9959

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999923	*≥0.995*
Slope	0.990318	*0.90 - 1.10*
Intercept	4.179726	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

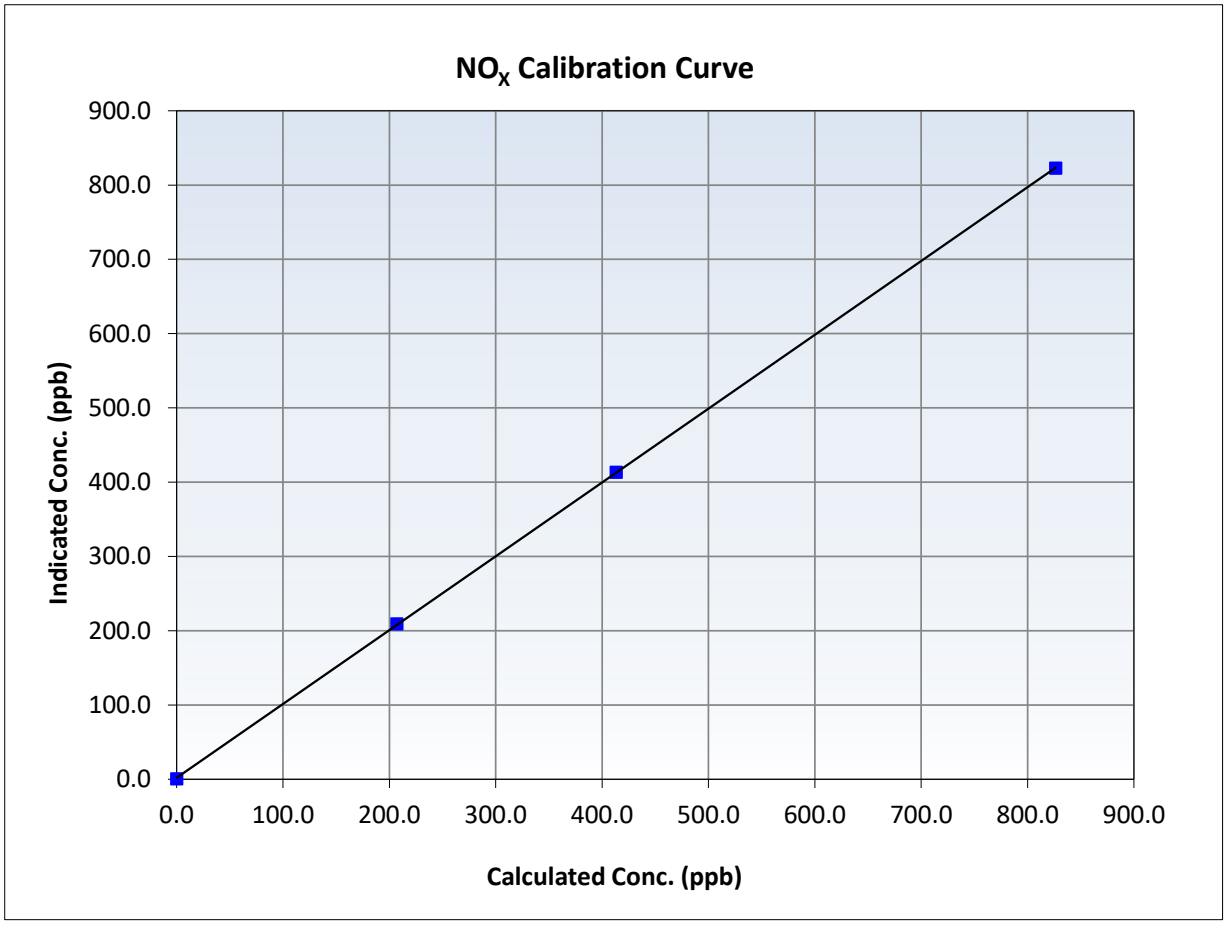
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	7:01	End Time (MST):	11:11
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
826.5	822.8	1.0044
413.2	413.2	1.0001
207.1	209.4	0.9891

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.993922	*0.90 - 1.10*
Intercept	1.997132	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

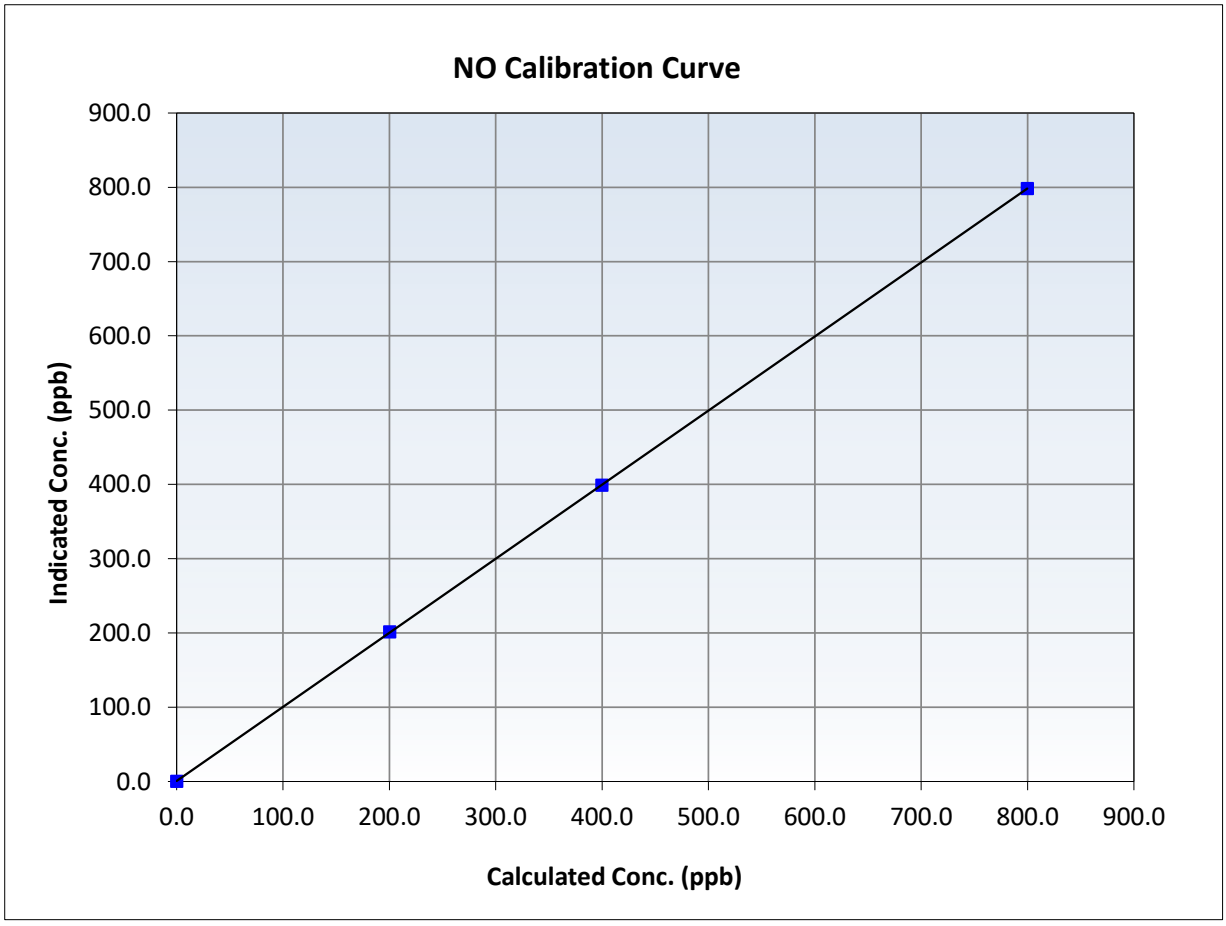
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	7:01	End Time (MST):	11:11
Analyzer make:	API T201	Analyzer serial #:	808

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.7	798.3	1.0018
399.9	399.1	1.0019
200.4	201.4	0.9951

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.997329	*0.90 - 1.10*
Intercept	0.703361	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

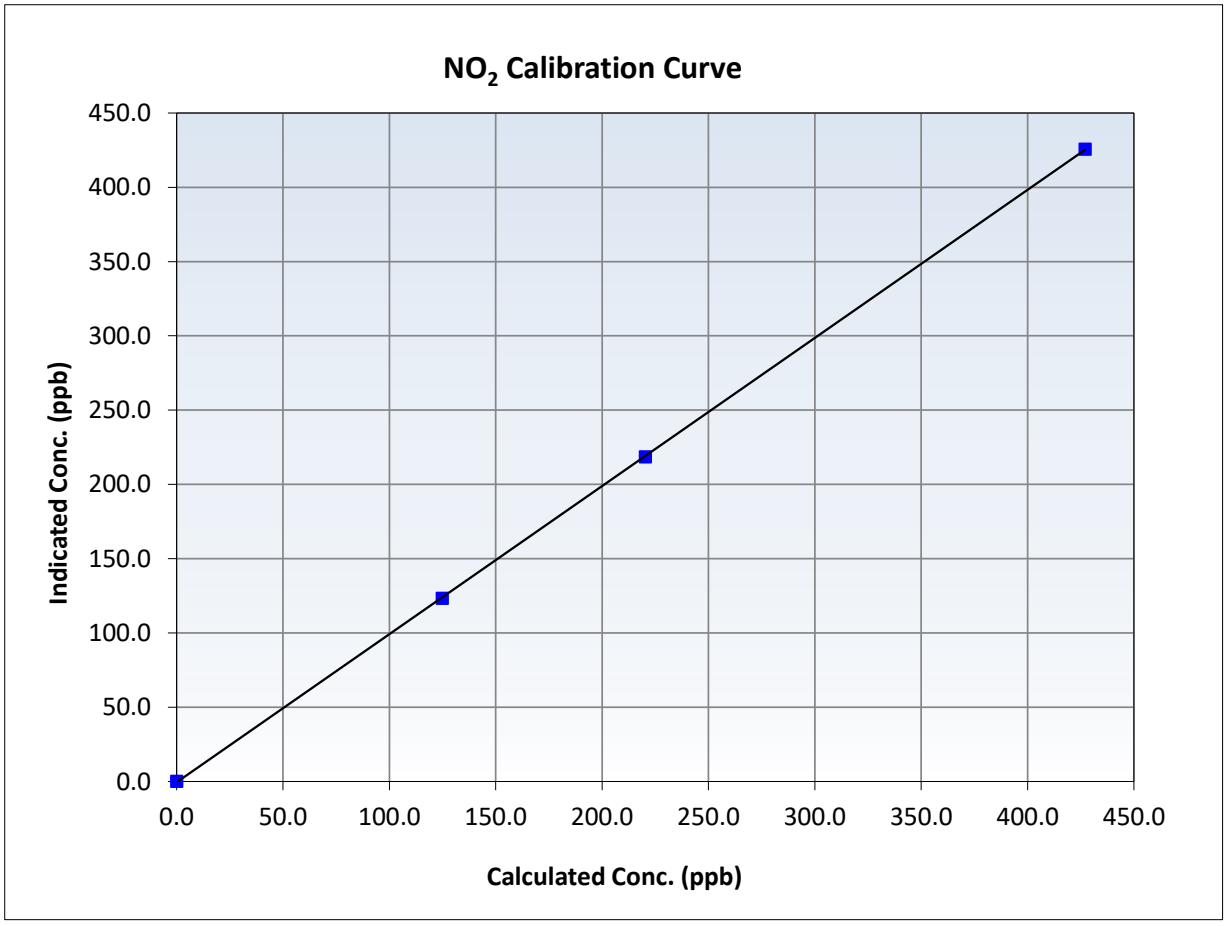
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 6, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	7:01	End Time (MST):	11:11
Analyzer make:	API T201	Analyzer serial #:	808

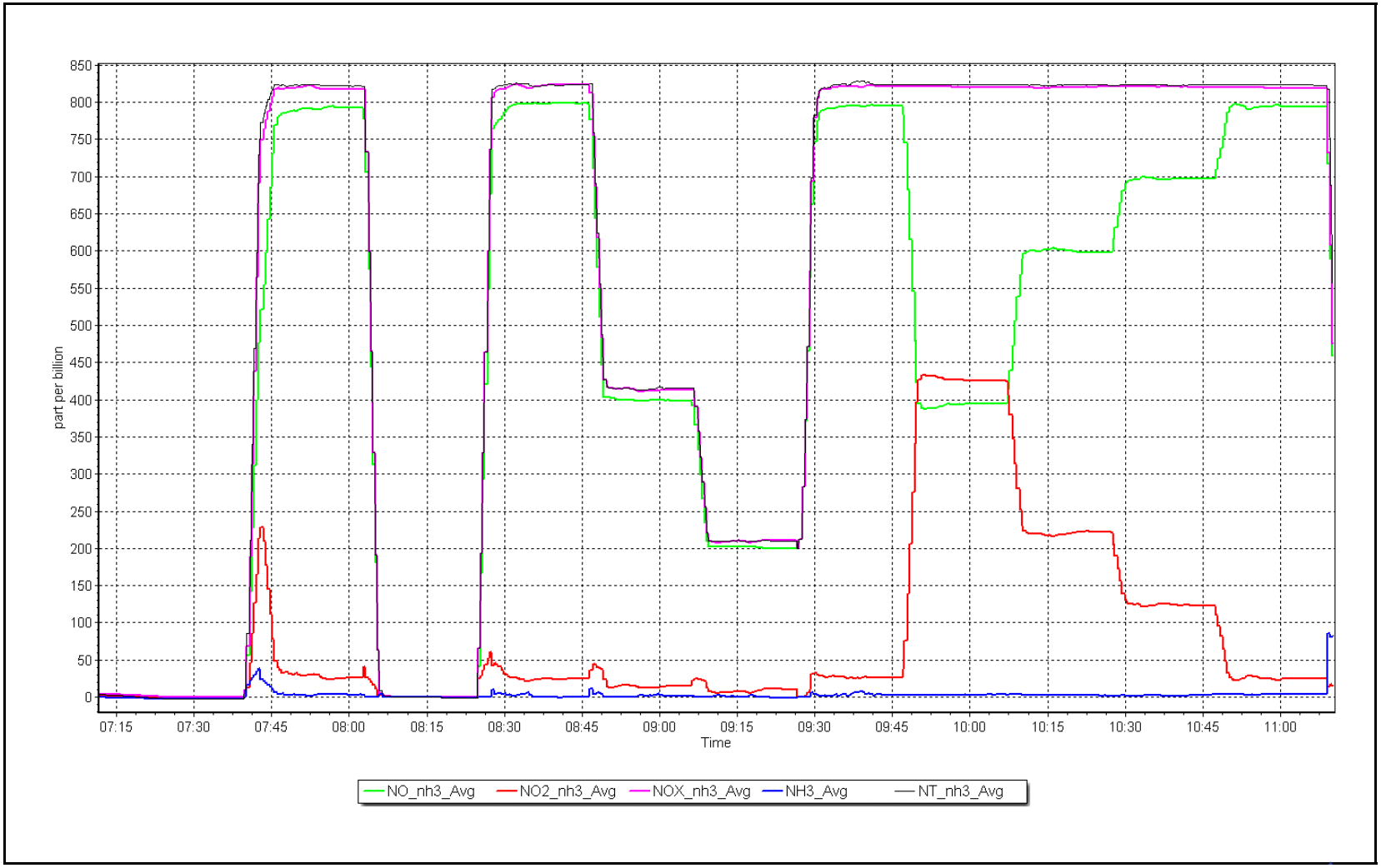
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
427.0	425.7	1.0031
220.3	218.6	1.0079
124.8	123.3	1.0123

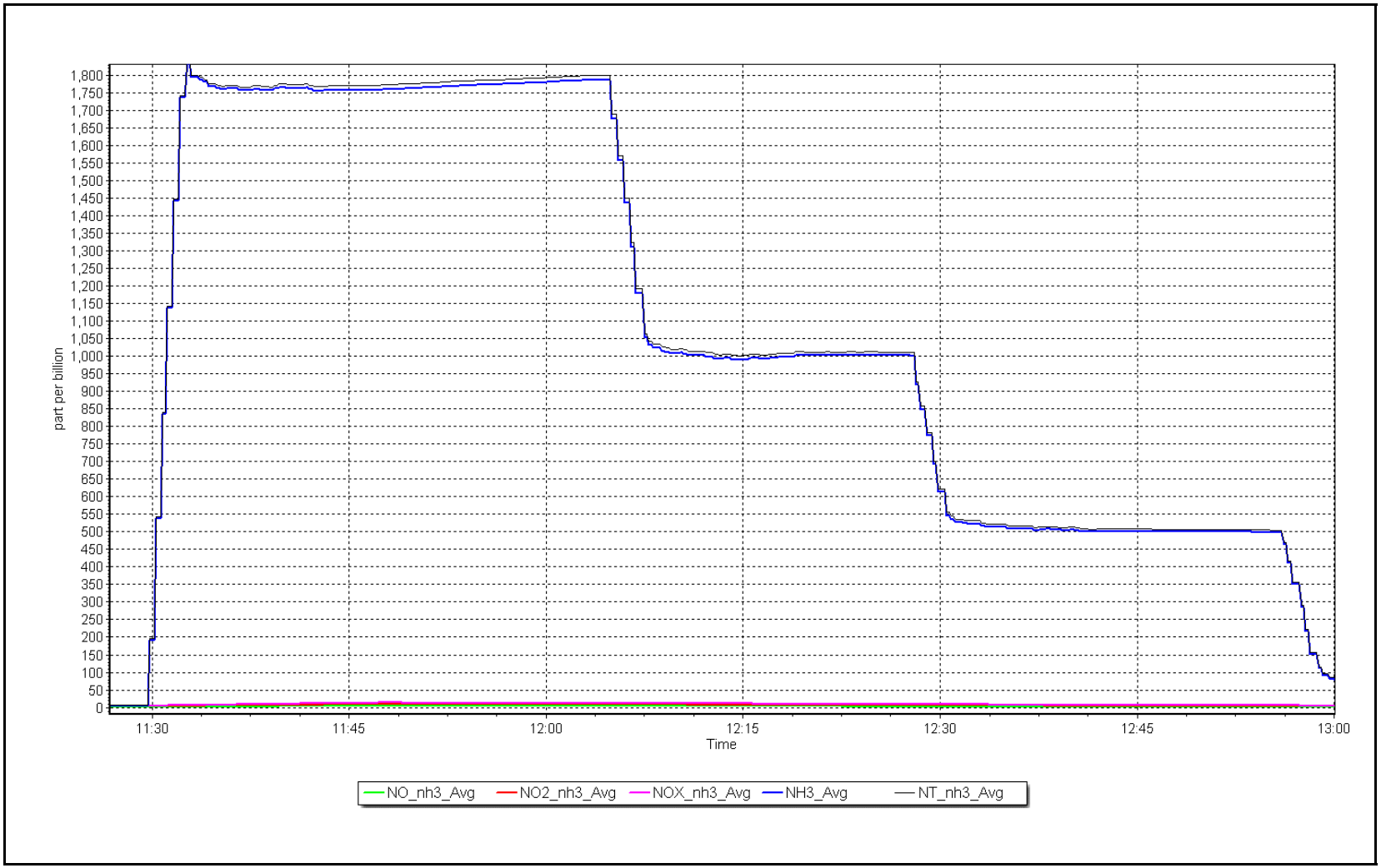
Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	0.997014	*0.90 - 1.10*
Intercept	-0.514270	*+/-20*



NO_X Calibration Plot Date: April 11, 2024 Location: Patricia McInnes



NH_3 Calibration Plot Date: April 11, 2024 Location: Patricia McInnes



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS07
ATHABASCA VALLEY
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	April 10, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	10:45	End time (MST):	14:27
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:	1.000577	1.000104	Backgd or Offset:	2.6	2.6
Calibration intercept:	1.744314	1.984432	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	798.8	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	798.8	Previous response	801.2	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	799.5	0.999
Mid point	4960	39.9	399.5	404.5	0.988
Low point	4980	20.0	200.2	202.5	0.989
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.0	799.1	1.000
				Average Correction Factor:	0.992

Notes: No adjustments made.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

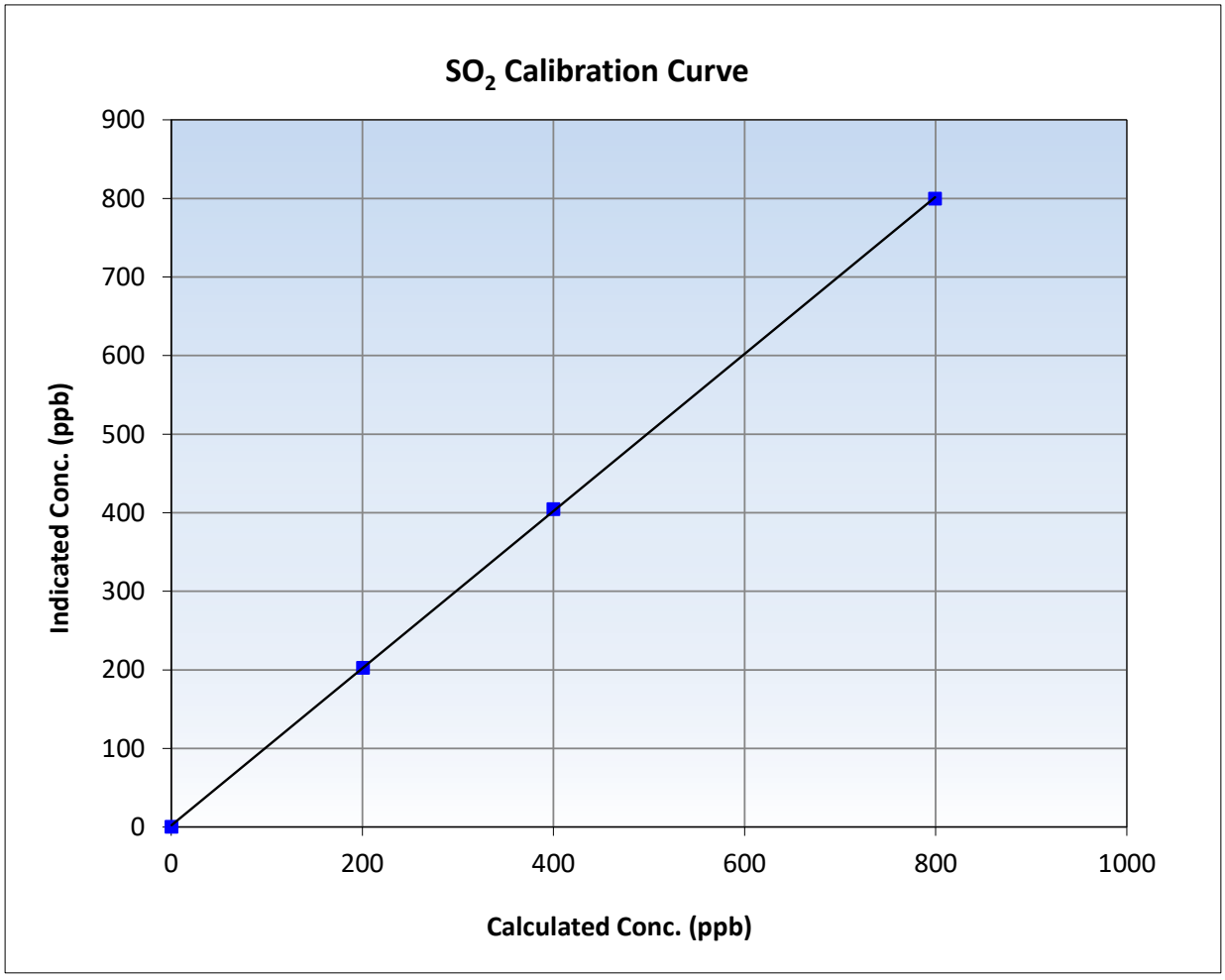
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 22, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:45	End Time (MST):	14:27
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

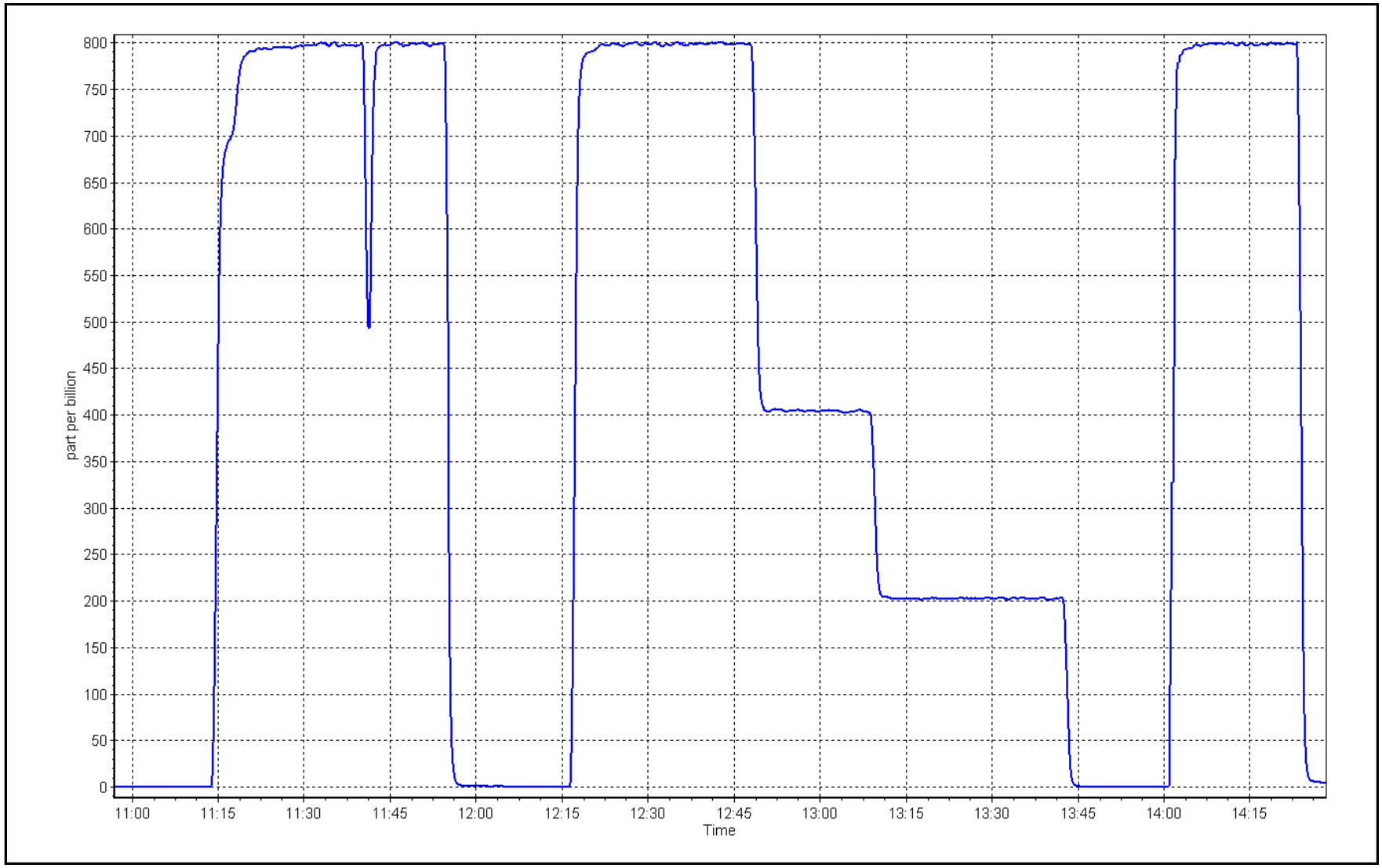
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.0	799.5	0.9994
399.5	404.5	0.9876
200.2	202.5	0.9888

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999959	*≥0.995*
Slope	1.000104	*0.90 - 1.10*
Intercept	1.984432	*+/-30*



SO2 Calibration Plot Date: April 10, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	April 15, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	9:30	End time (MST):	14:27
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:	0.998195	1.013471	Backgd or Offset:	2.4	2.4
Calibration intercept:	0.217844	0.037852	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	0.0	----
As found High point	4925	75.5	79.3	81.0	0.979
As found Mid point	4962	37.7	39.6	40.4	0.980
As found Low point	4981	18.9	19.8	20.0	0.992
New cylinder response					

Baseline Corr As found:	81.0	Prev response:	79.34	*% change:	2.0%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.022992	AF Intercept:	-0.122207
Baseline Corr 3rd AF pt:	20.0	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	4925	75.5	79.3	80.4	0.986
Mid point	4962	37.7	39.6	40.3	0.983
Low point	4981	18.9	19.9	20.0	0.993
As left zero	5000	0.0	0.0	0.3	----
As left span	4925	75.5	79.3	80.6	0.984
SO2 Scrubber Check	4920	79.2	792.1	0.1	----

Date of last scrubber change:	25-Feb-22	Ave Corr Factor	0.987
Date of last converter efficiency test:	April 22, 2022		

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

TRS Calibration Summary

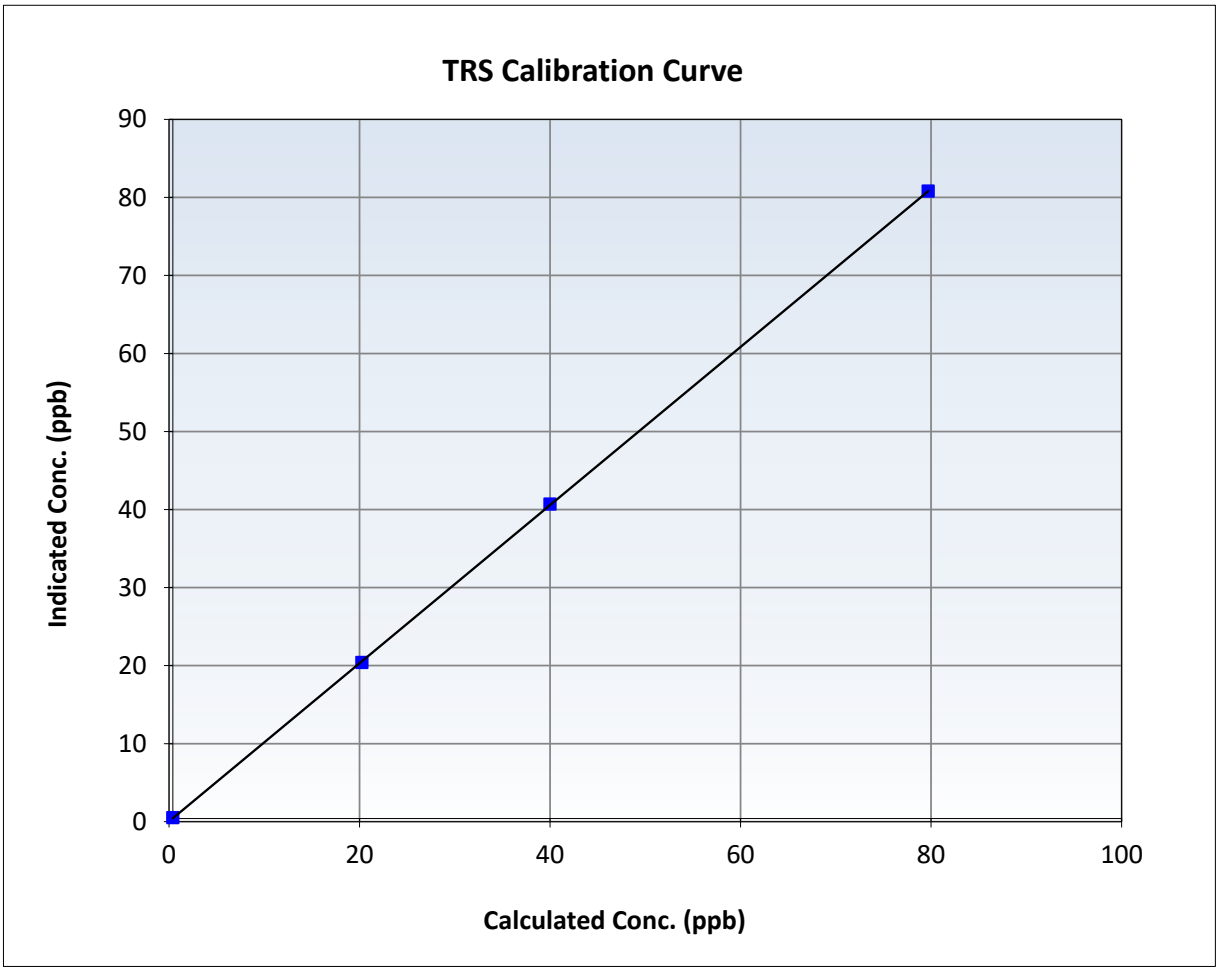
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 7, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	9:30	End Time (MST):	14:27
Analyzer make:	Thermo 43i LTE	Analyzer serial #:	1180540018

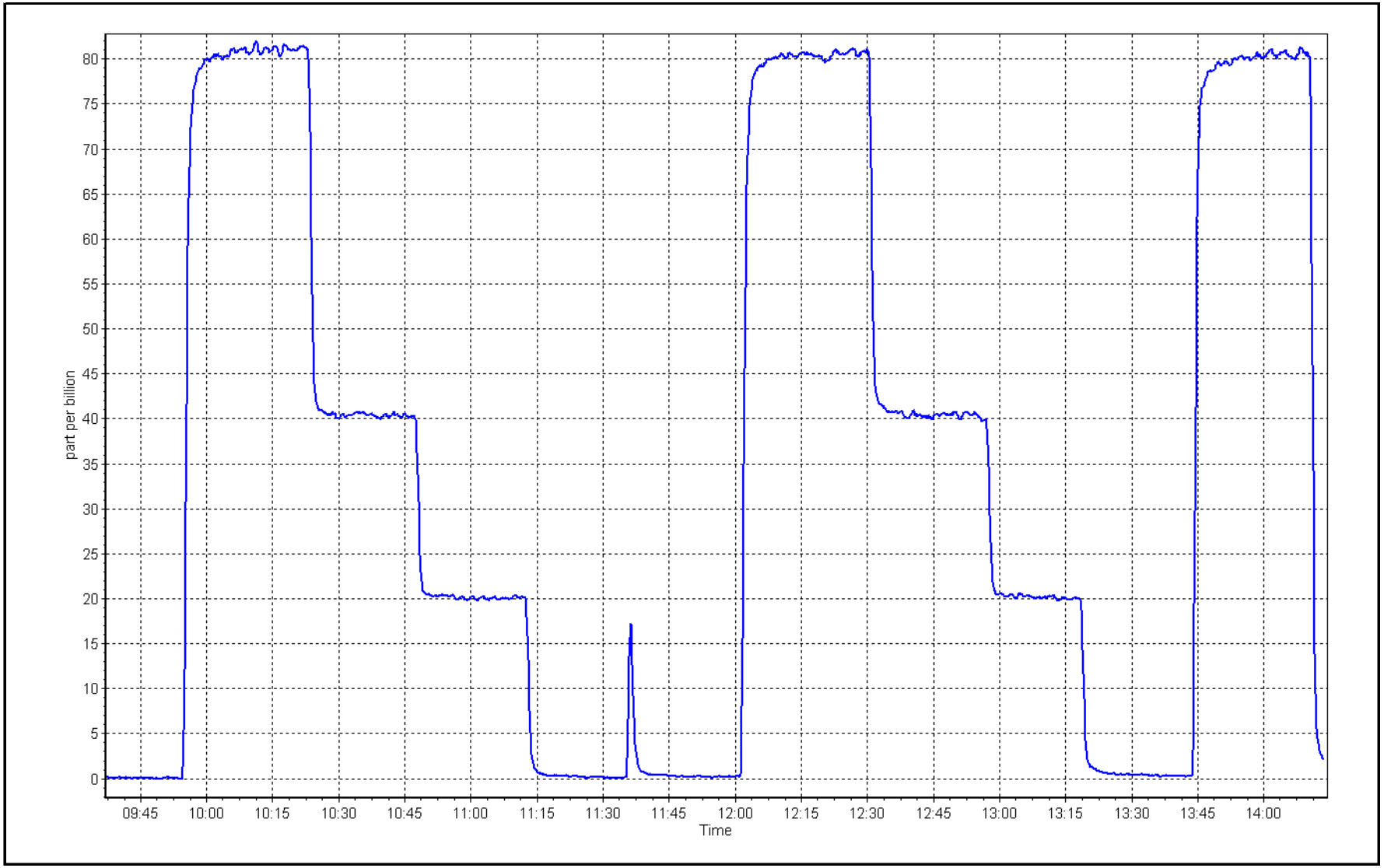
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
79.3	80.4	0.9865
39.6	40.3	0.9829
19.9	20.0	0.9928

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	1.013471	*0.90 - 1.10*
Intercept	0.037852	*+/-3*



TRS Calibration Plot Date: April 15, 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:	April 10, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	10:45	End time (MST):	14:27
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:	2.55E-04	2.60E-05	NMHC SP Ratio:	5.32E-05	5.34E-05
CH4 Retention time:	13.4	13.4	NMHC Peak Area:	169129	168530
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	16.77	1.009
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.77	Prev response	16.97	*% change	-1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	16.91	16.88	1.002
Mid point	4960	39.9	8.46	8.44	1.003
Low point	4980	20.0	4.24	4.27	0.994
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	16.91	16.98	0.996
				Average Correction Factor	1.000

Notes: Hydrogen cylinder swapped out after as founds. 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	9.02	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.02	Prev response	9.06	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.00	8.96	1.004
Mid point	4960	39.9	4.50	4.50	1.000
Low point	4980	20.0	2.26	2.28	0.989
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.00	9.04	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	7.75	1.021
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.75	Prev response	7.91	*% change	-2.0%
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	79.8	7.92	7.92	1.000
Mid point	4960	39.9	3.96	3.94	1.005
Low point	4980	20.0	1.98	1.99	0.999
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	7.92	7.94	0.997
				Average Correction Factor	1.001

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.002451	0.997119
THC Cal Offset:	0.015044	0.013262
CH4 Cal Slope:	1.000657	0.999590
CH4 Cal Offset:	-0.011935	-0.002739
NMHC Cal Slope:	1.003673	0.995046
NMHC Cal Offset:	0.027380	0.016600

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

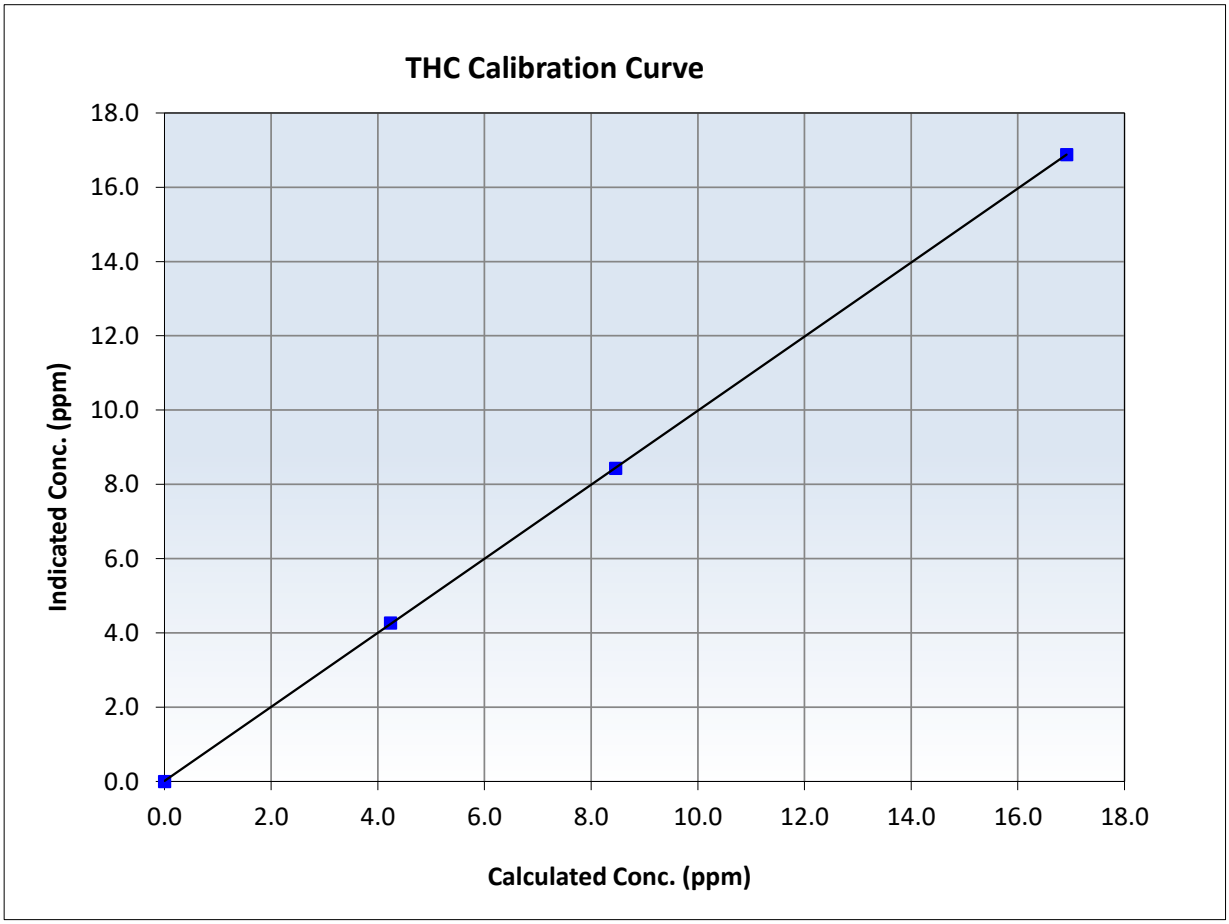
THC Calibration Summary

Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 26, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:45	End Time (MST):	14:27
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	0.999994	*≥0.995*
16.91	16.88	1.0021	Slope	0.997119	*0.90 - 1.10*
8.46	8.44	1.0026	Intercept	0.013262	*+/-0.5*
4.24	4.27	0.9939			



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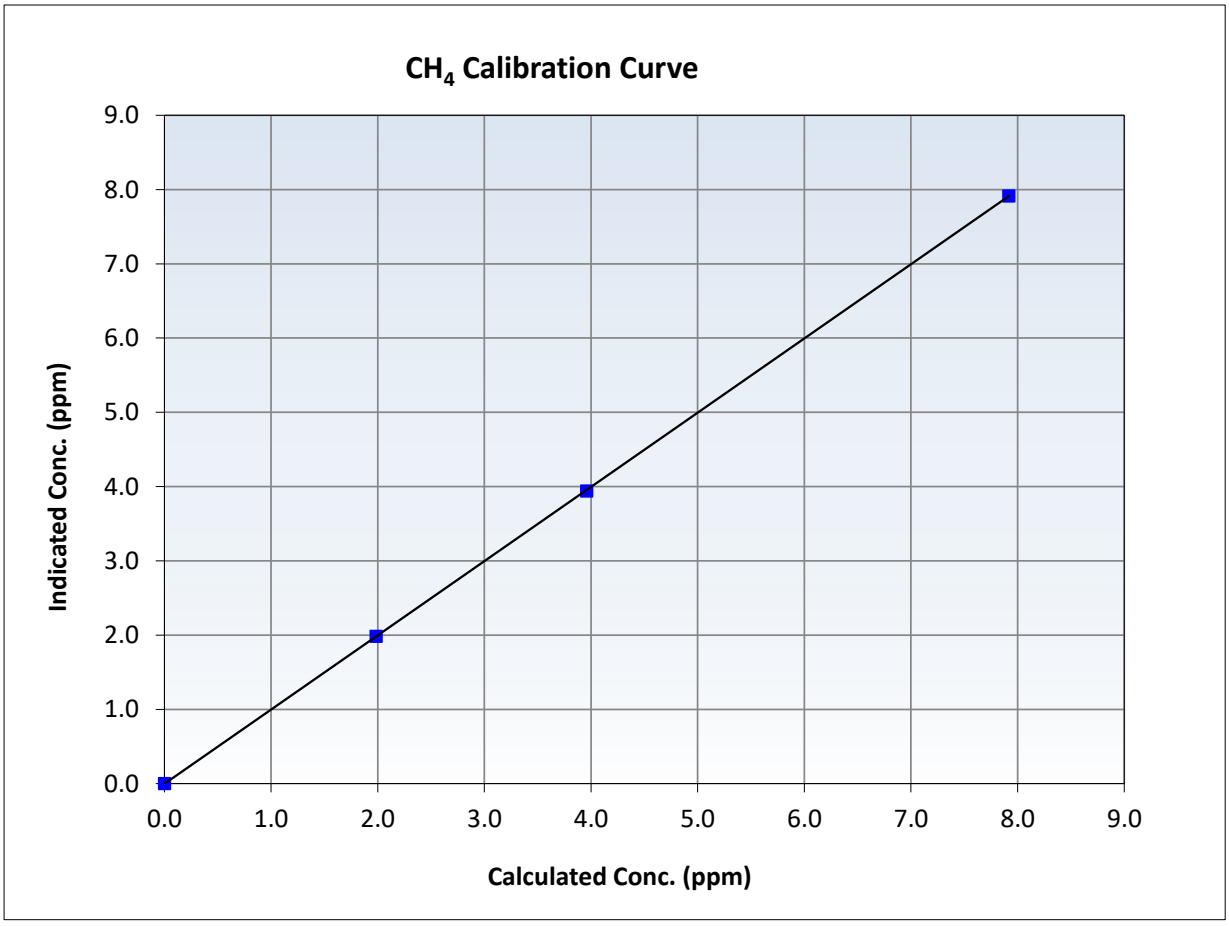
CH_4 Calibration Summary

Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 26, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:45	End Time (MST):	14:27
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	0.999992	*≥0.995*
7.92	7.92	1.0001	Slope	0.999590	*0.90 - 1.10*
3.96	3.94	1.0046			
1.98	1.99	0.9990	Intercept	-0.002739	*+/-0.5*



Wood Buffalo Environmental Association

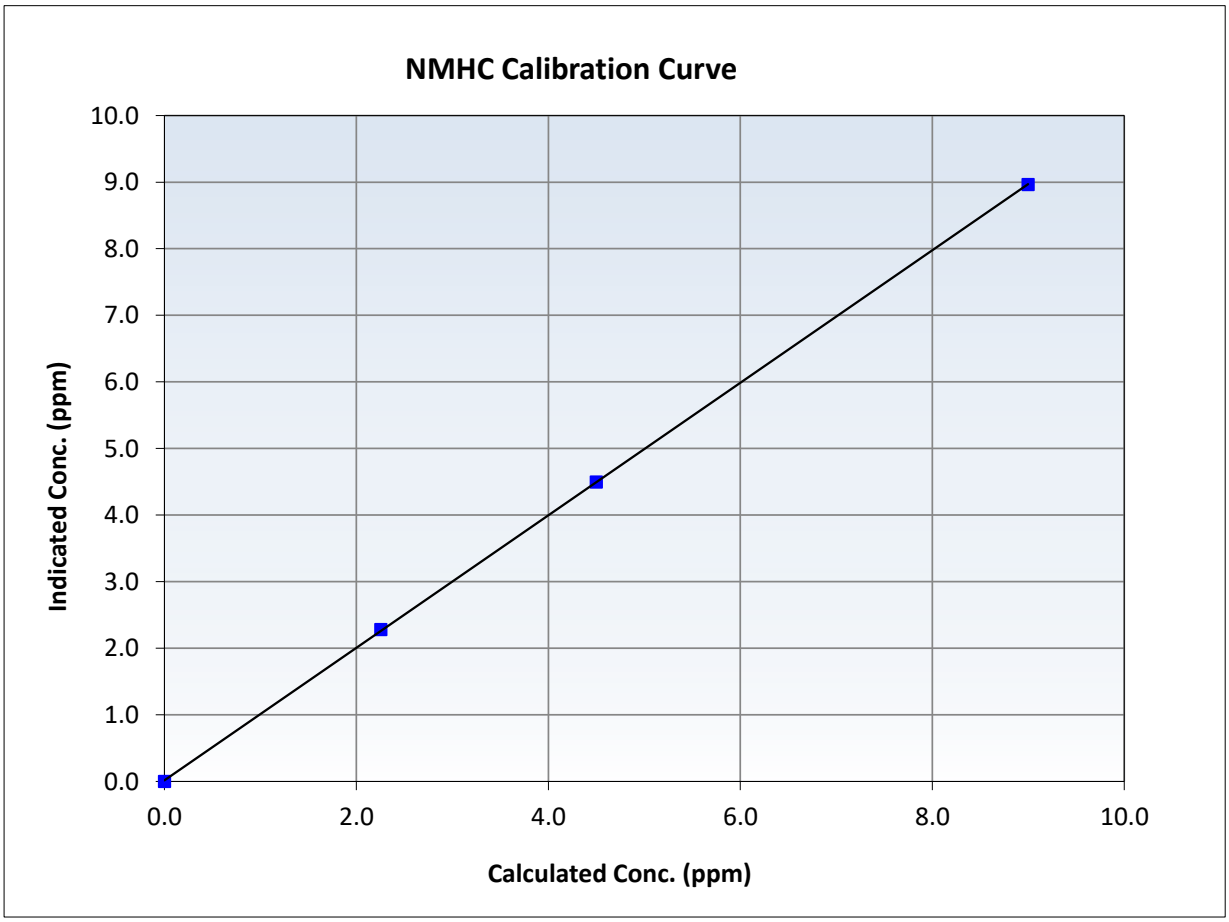
NMHC Calibration Summary

Station Information

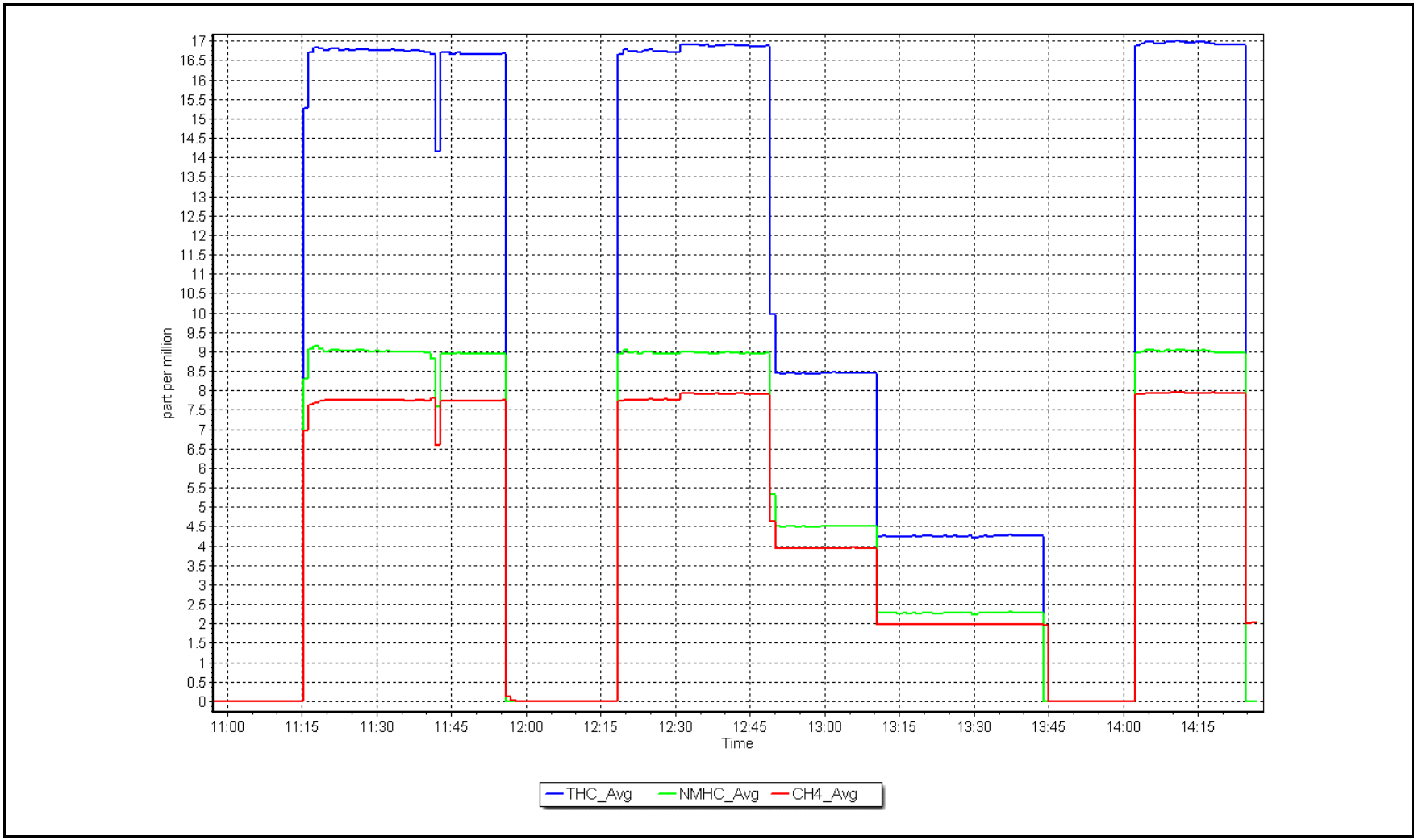
Calibration Date:	April 10, 2024	Previous Calibration:	March 26, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:45	End Time (MST):	14:27
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999984	≥0.995
9.00	8.96	1.0039	Slope	0.995046	0.90 - 1.10
4.50	4.50	1.0004			
2.26	2.28	0.9890	Intercept	0.016600	+/-0.5



NMHC Calibration Plot Date: April 10, 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:	April 9, 2024
Last Cal Date:	February 27, 2024
Start time (MST):	9:00
End time (MST):	14:33
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 =	804.5 ppb	NO =	800.1 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 = -0.6%
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: 1160120024

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.075	1.077	NO bkgnd or offset:	7.6	7.6
NOX coeff or slope:	1.005	1.003	NOX bkgnd or offset:	7.9	7.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	214.5	212.0

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.999973	0.997568
NO_X Cal Offset:	1.541897	1.871922
NO Cal Slope:	0.998014	0.997614
NO Cal Offset:	1.431946	1.471946
NO_2 Cal Slope:	1.008548	1.006328
NO_2 Cal Offset:	1.193739	1.745224

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	0.1	0.2	----	----
High point	4933	66.8	803.0	800.3	2.7	801.7	798.7	3.0	1.0016	1.0020
Mid point	4966	33.4	401.5	400.2	1.3	404.4	402.8	1.6	0.9929	0.9935
Low point	4983	16.7	200.7	200.1	0.7	202.9	201.5	1.4	0.9894	0.9929
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	-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		0.9946	0.9961

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	794.0	397.2	399.5	402.9	0.9915	100.9%
Mid GPT point	794.0	598.8	197.9	201.9	0.9801	102.0%
Low GPT point	794.0	698.3	98.4	102.1	0.9635	103.8%
				Average Correction Factor	0.9783	102.2%

Notes: Span adjusted slightly.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

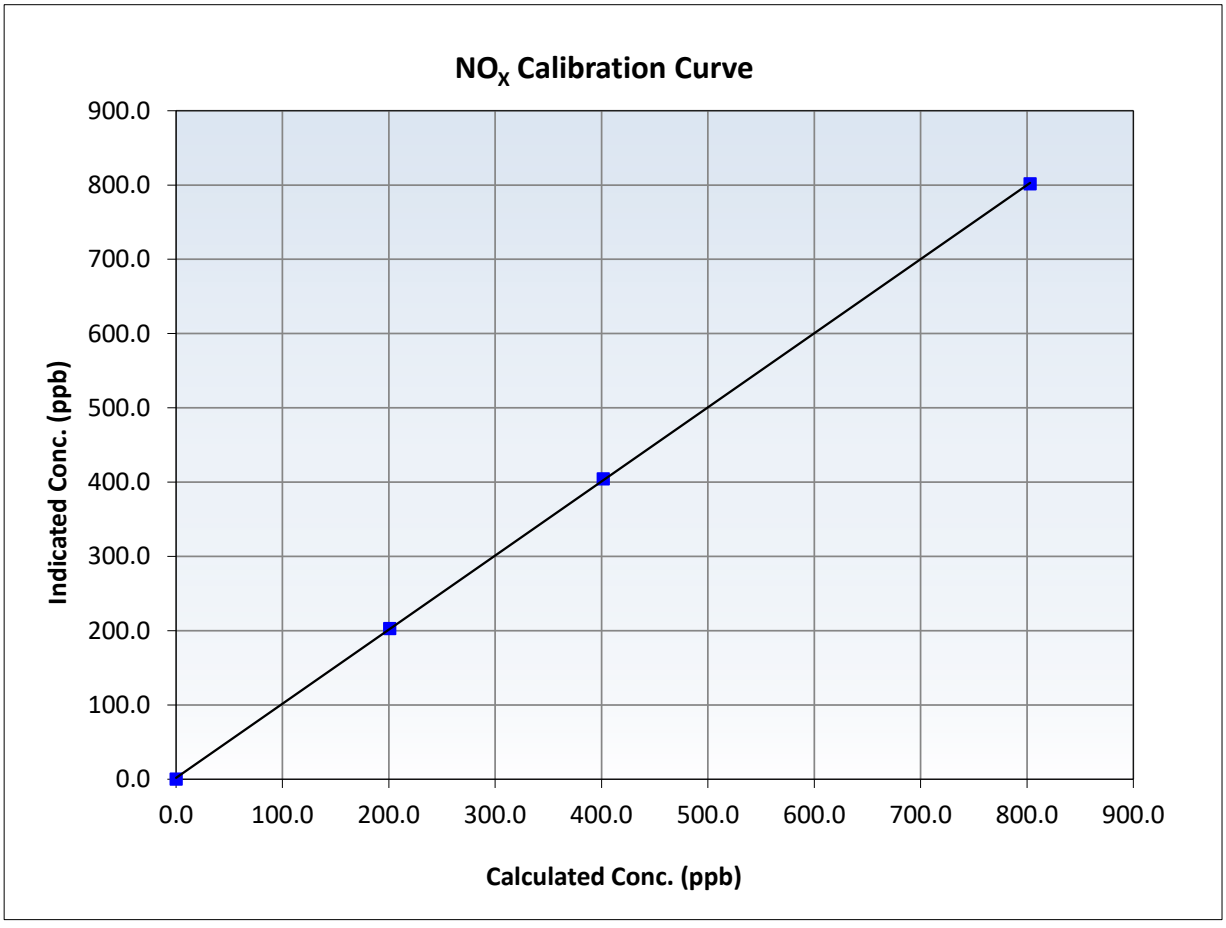
Station Information

Calibration Date:	April 9, 2024	Previous Calibration:	February 27, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:00	End Time (MST):	14:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
803.0	801.7	1.0016
401.5	404.4	0.9929
200.7	202.9	0.9894

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	0.997568	*0.90 - 1.10*
Intercept	1.871922	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

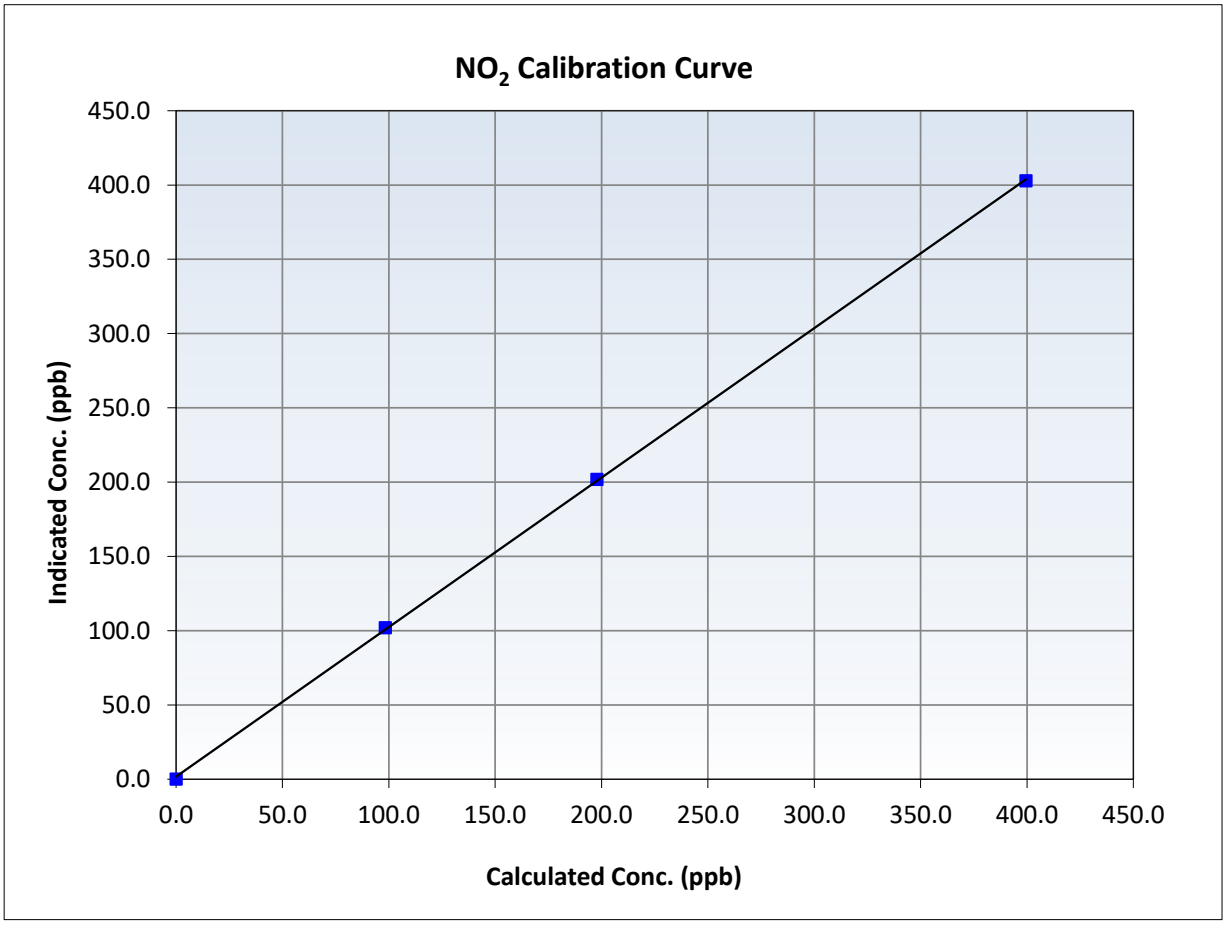
Station Information

Calibration Date:	April 9, 2024	Previous Calibration:	February 27, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:00	End Time (MST):	14:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
399.5	402.9	0.9915
197.9	201.9	0.9801
98.4	102.1	0.9635

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999932	*≥0.995*
Slope	1.006328	*0.90 - 1.10*
Intercept	1.745224	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

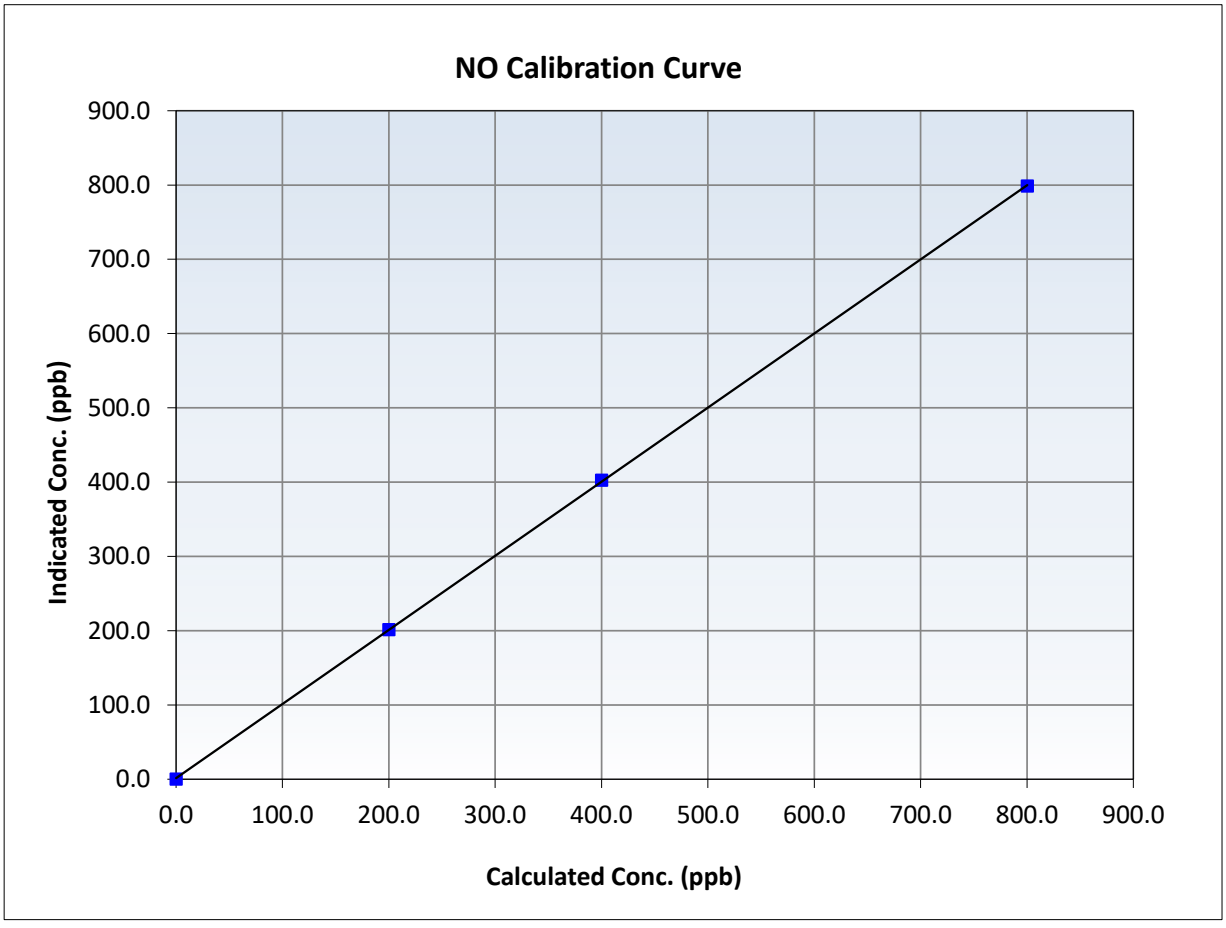
Station Information

Calibration Date:	April 9, 2024	Previous Calibration:	February 27, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	9:00	End Time (MST):	14:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

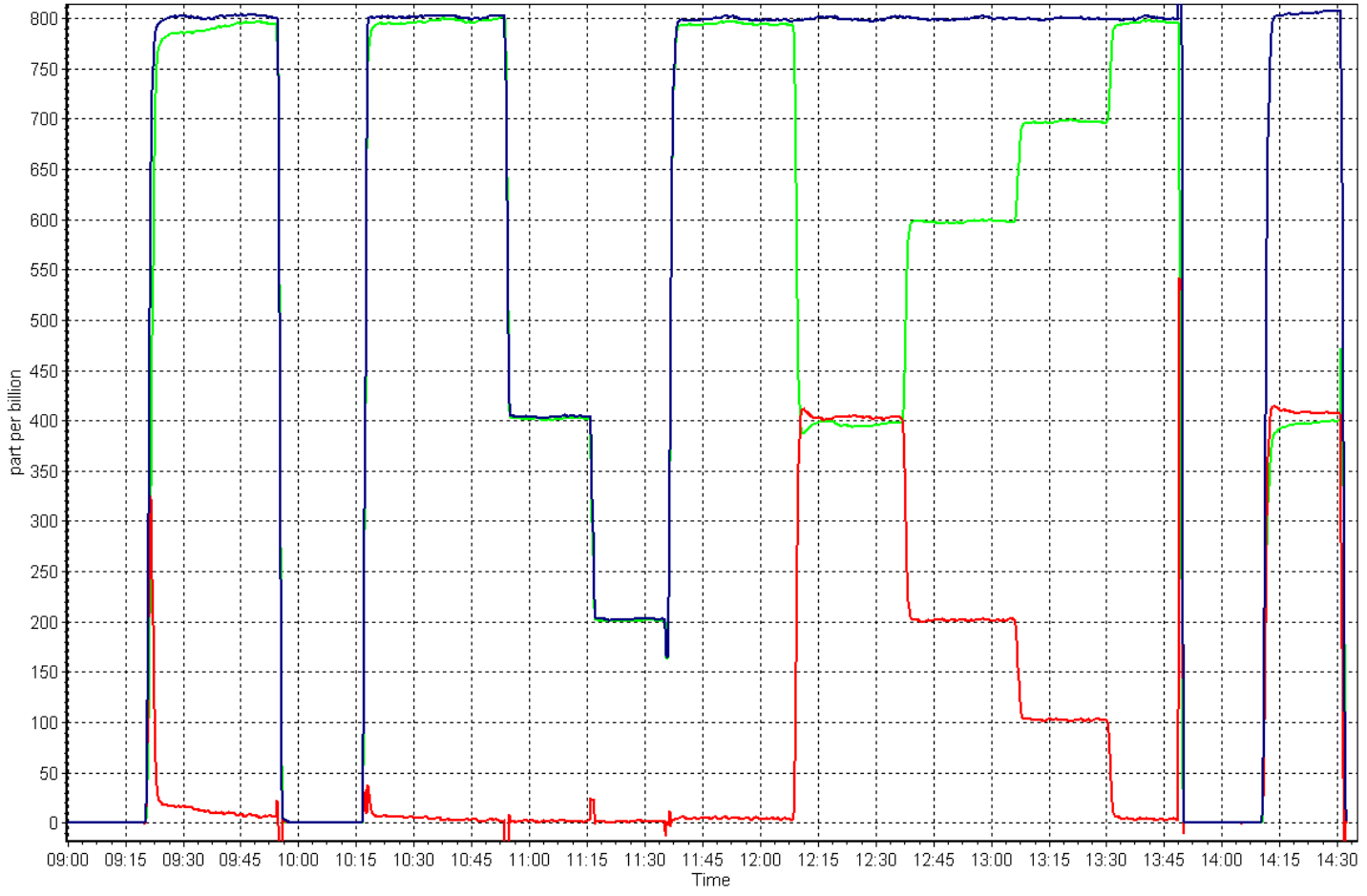
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	798.7	1.0020
400.2	402.8	0.9935
200.1	201.5	0.9929

Statistical Evaluation		Limits
Correlation Coefficient	0.999978	≥0.995
Slope	0.997614	0.90 - 1.10
Intercept	1.471946	+/-20



NO_X Calibration Plot Date: April 9, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	April 12, 2024	Last Cal Date:	March 17, 2024
Start time (MST):	9:55	End time (MST):	14:29
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:	0.993629	0.999857	Backgd or Offset:	-1.6	-1.6
Calibration intercept:	1.040000	0.500000	Coeff or Slope:	1.549	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	5000	0.0	0.0	-2.0	----
As found High point	5000	1522.8	400.0	397.8	1.001
As found Mid point					
As found Low point					
Baseline Corr As found:	399.8	Previous response	398.5	*% 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	

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	-0.5	----
High point	5000	1523.6	400.0	400.0	1.000
Mid point	5000	1088.1	200.0	200.8	0.996
Low point	5000	880.5	100.0	101.6	0.984
As left zero	5000	0.0	0.0	-0.7	----
As left span	5000	1522.4	400.0	404.5	0.989
				Average Correction Factor	0.993

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

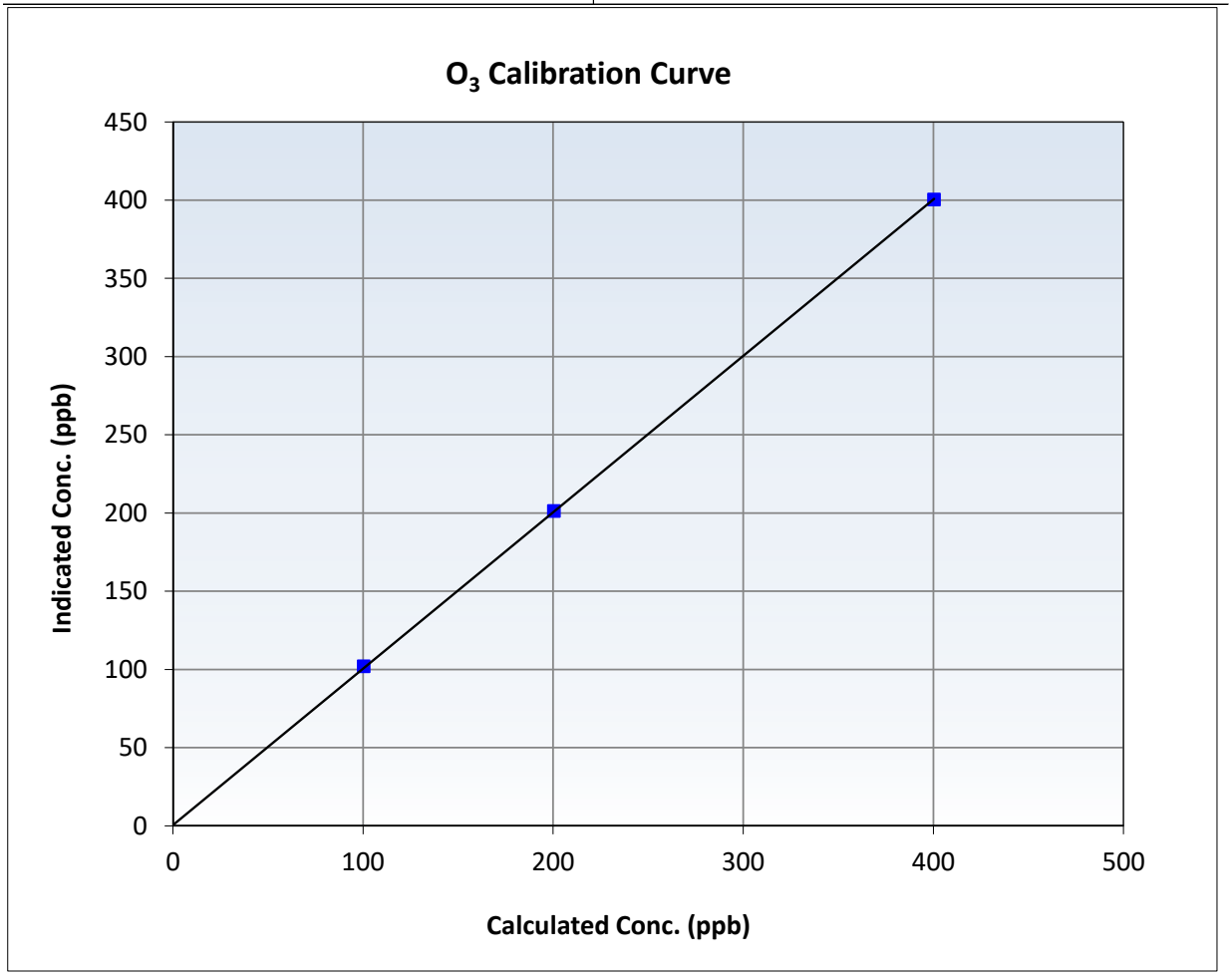
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 17, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	9:55	End Time (MST):	14:29
Analyzer make:	Thermo 49i	Analyzer serial #:	1152220023

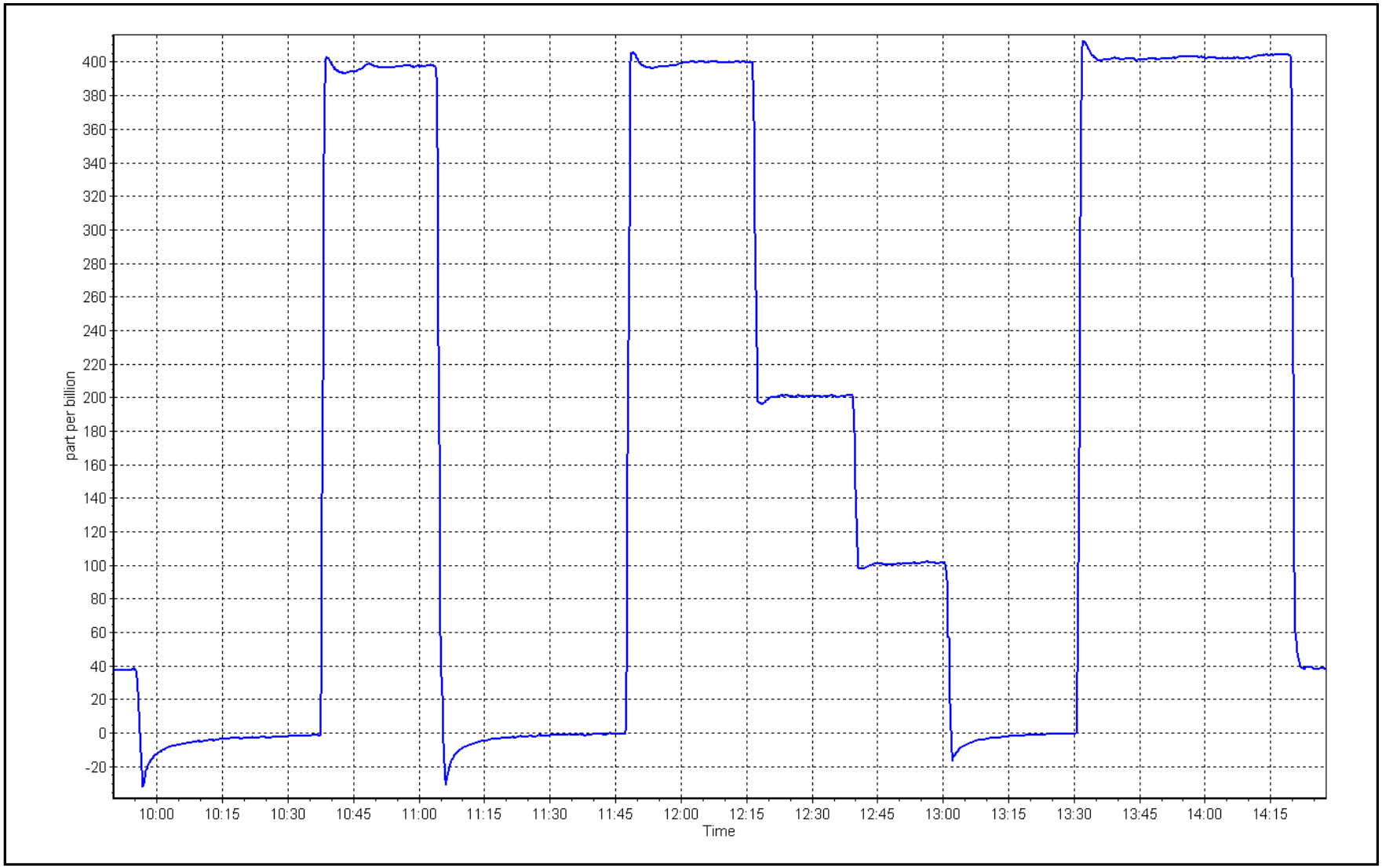
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.5	----
400.0	400.0	1.0000
200.0	200.8	0.9960
100.0	101.6	0.9843

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	0.999857	*0.90 - 1.10*
Intercept	0.500000	*+/- 5*



O_3 Calibration Plot Date: April 12, 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:	April 15, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	13:19	End time (MST):	14:29
Analyzer Make:		S/N:	645
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (^{o}C)	5.4	5.8	5.4	☐	+/- 2 ^{o}C
P (mmHg)	736.1	735	736.1	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.05	5.01	☐	+/- 0.25 LPM
PW% (pump)	37	-----	37	☐	>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: 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: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	April 22, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	12:05	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:	0.994233	0.990260	Backgd or Offset:	4.642	4.819
Calibration intercept:	0.090507	0.092551	Coeff or Slope:	1.087	1.087

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	40.1	1.001
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	39.98	Prev response:	39.88	*% 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	0.0	----
High point	4933	66.7	40.0	39.7	1.009
Mid point	4967	33.3	20.0	20.0	0.998
Low point	4983	16.7	10.0	10.1	0.997
As left zero	5000	0.0	0.0	0.0	----
As left span	4933	66.7	40.0	39.7	1.009
				Average Correction Factor	1.002

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

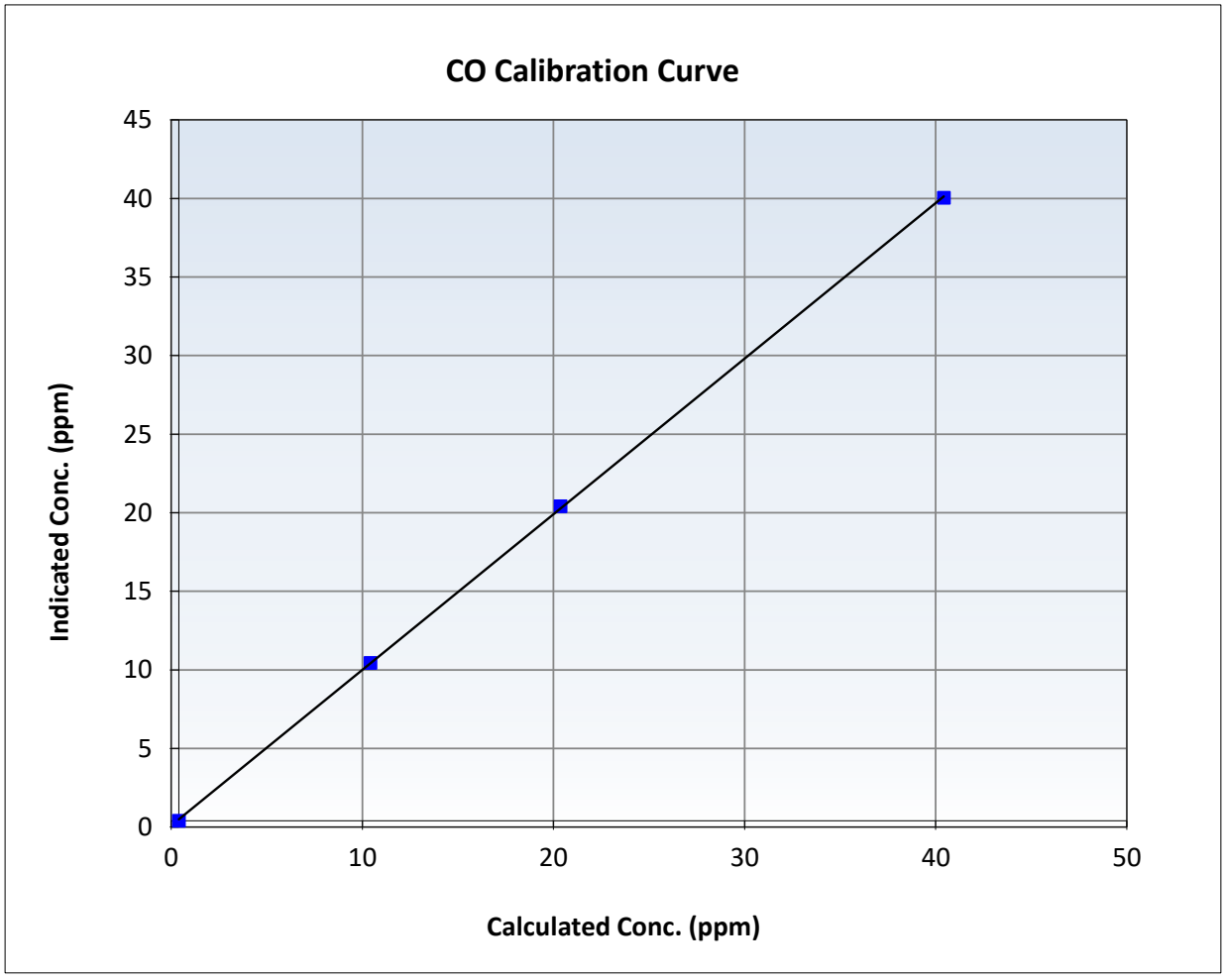
Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	March 27, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	12:05	End Time (MST):	15:00
Analyzer make:	Thermo 48i-TLE	Analyzer serial #:	1408761381

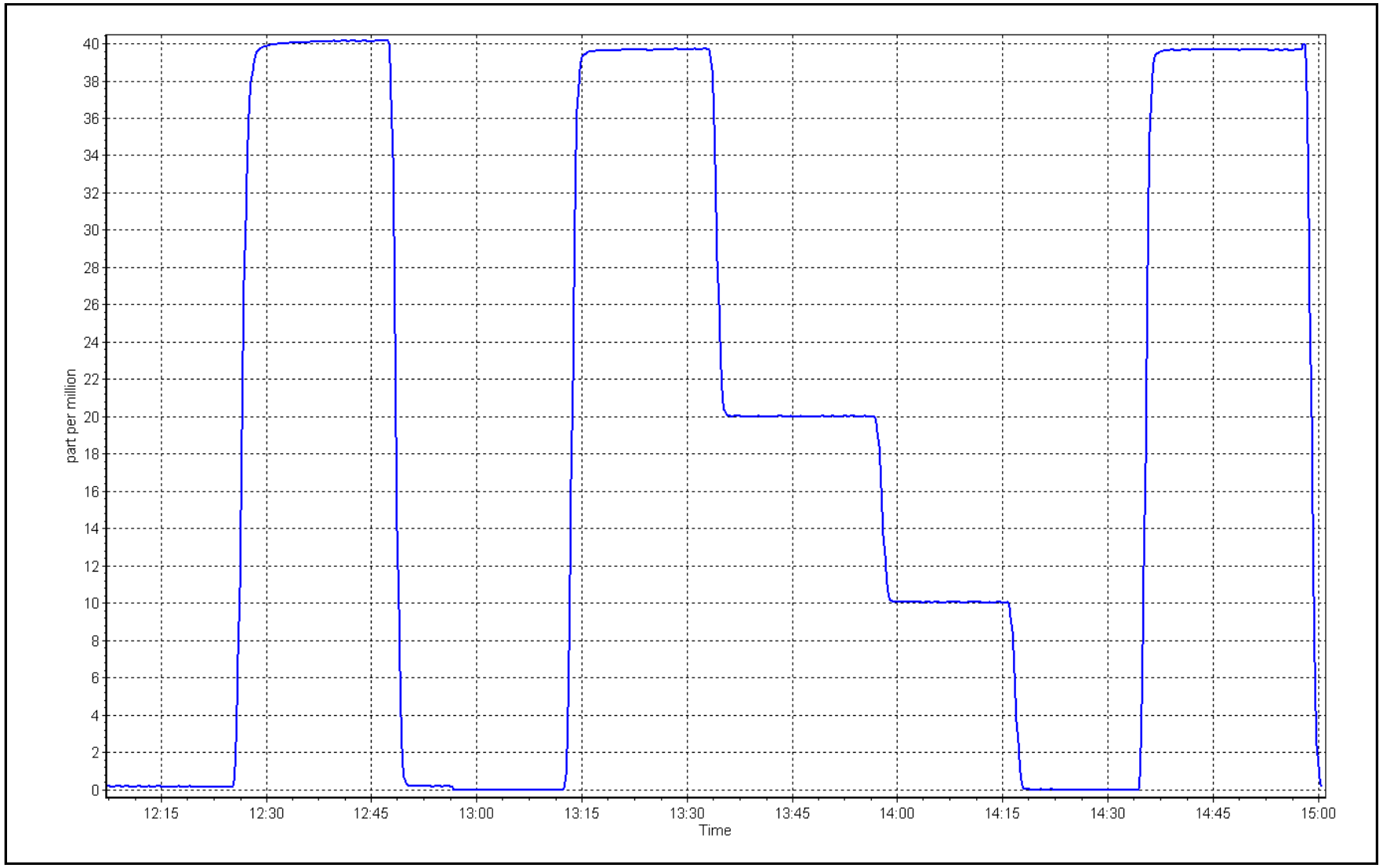
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.0	39.7	1.0094
20.0	20.0	0.9984
10.0	10.1	0.9971

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	0.990260	*0.90 - 1.10*
Intercept	0.092551	*+/-1.5*



CO Calibration Plot Date: April 22, 2024 Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS08
FORT CHIPEWYAN
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	April 17, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	13:49	End time (MST):	16:28
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:	1.003858	0.999602	Backgd or Offset:	1.8	1.8
Calibration intercept:	0.615265	0.656198	Coeff or Slope:	0.989	0.989

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			-0.5	----
As found High point	4920			799.1	
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	-0.3	----
High point	4920	80.3	800.4	801.0	0.999
Mid point	4960	40.2	400.7	399.4	1.003
Low point	4980	20.1	200.4	203.4	0.985
As left zero	5000	0.0	0.0	-0.2	----
As left span	4920	80.3	800.4	799.2	1.001
				Average Correction Factor:	0.996

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

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

SO_2 Calibration Summary

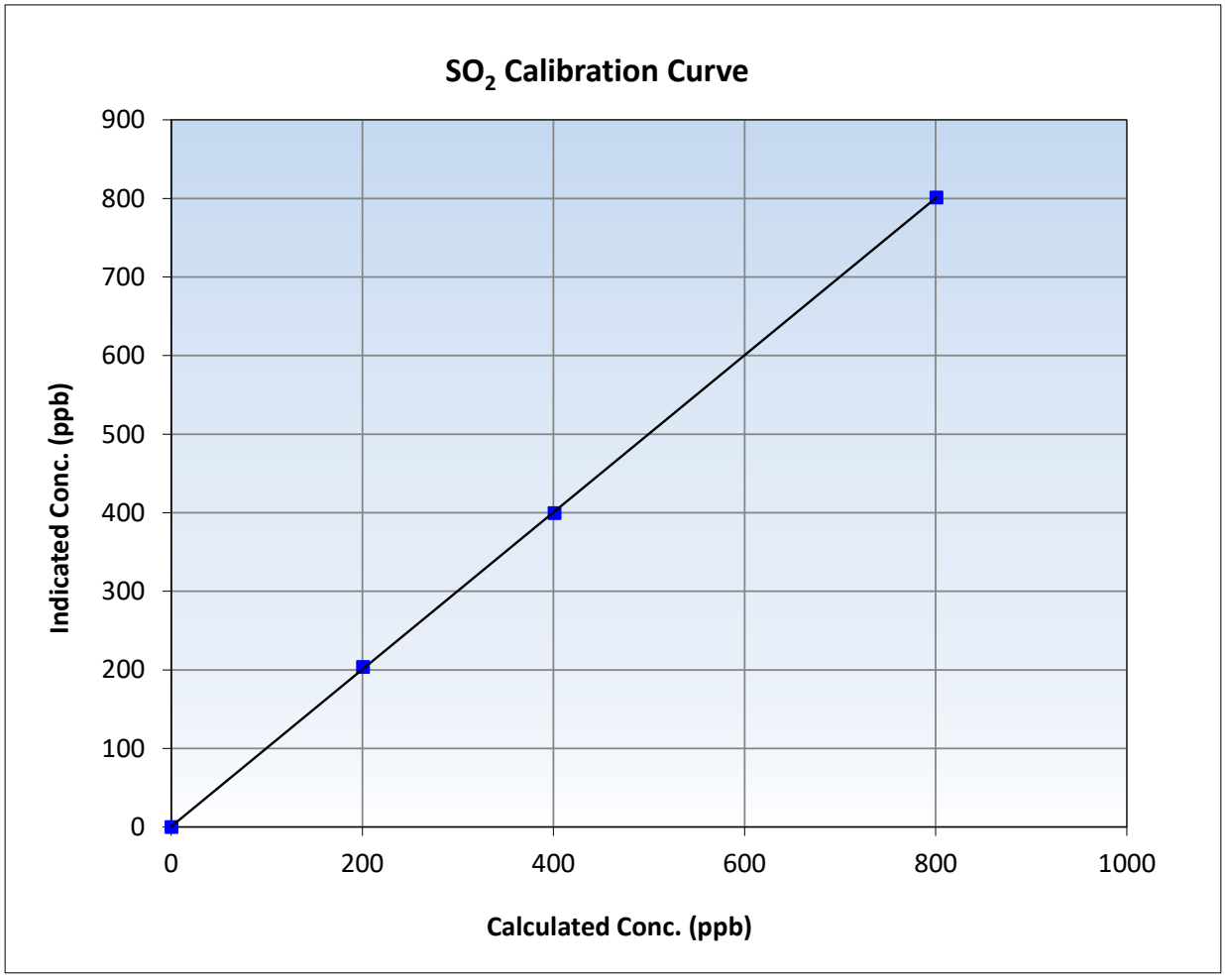
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 20, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	13:49	End Time (MST):	16:28
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

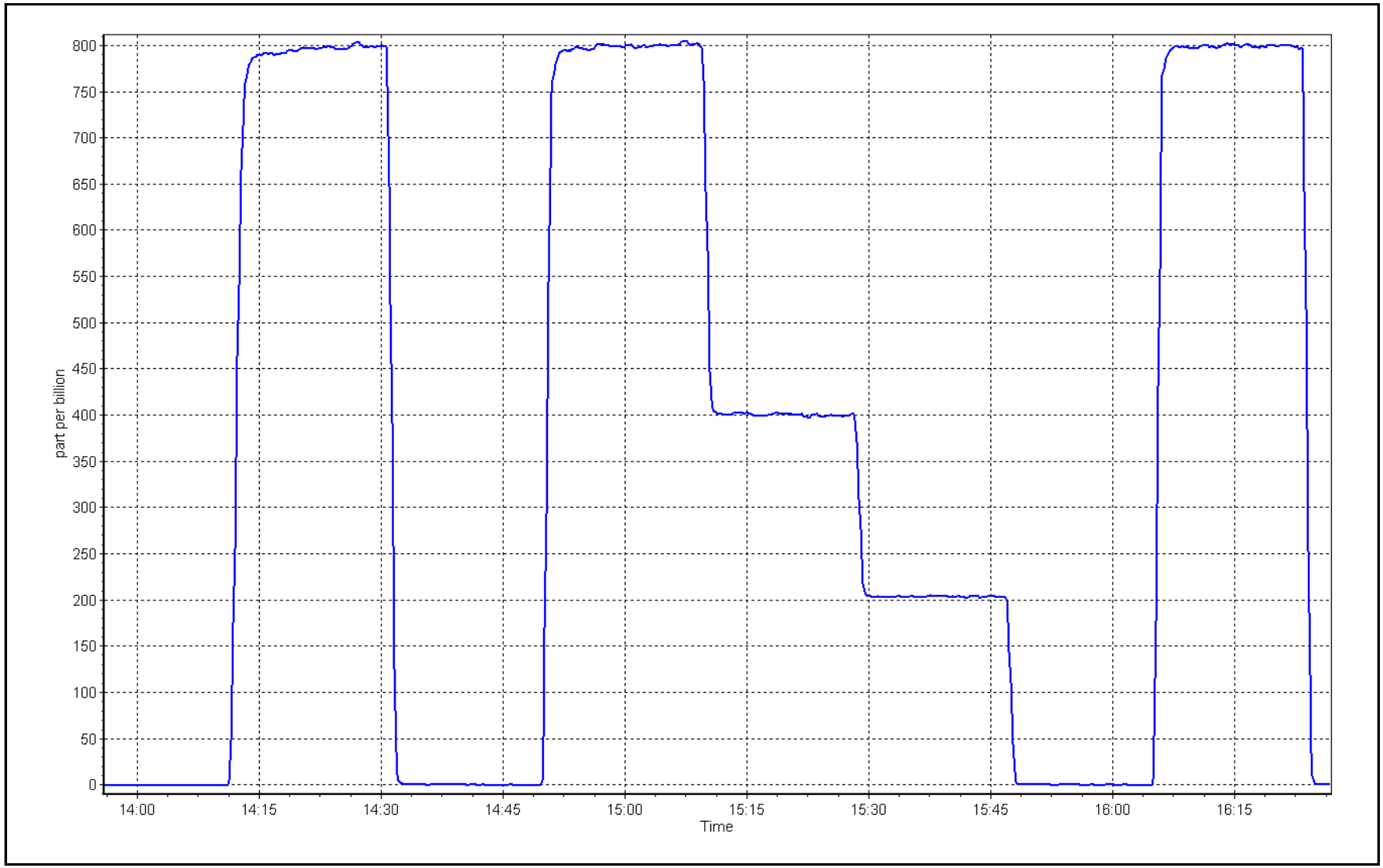
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
800.4	801.0	0.9992
400.7	399.4	1.0032
200.4	203.4	0.9850

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	0.999602	*0.90 - 1.10*
Intercept	0.656198	*+/-30*



SO2 Calibration Plot Date: April 17, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	April 18, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	14:12	End time (MST):	17:57
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:	1.003284	1.007424	Backgd or Offset:	1.0	1.0
Calibration intercept:	0.498794	0.578976	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	0.6	----
As found High point	4920	80.5	80.0	80.5	1.001
As found Mid point	4960	40.2	40.0	40.8	0.994
As found Low point	4980	20.1	20.0	20.8	0.989
New cylinder response					

Baseline Corr As found:	79.9	Prev response:	80.77	*% change:	-1.1%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	0.997996	AF Intercept:	0.758823
Baseline Corr 3rd AF pt:	20.2	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	0.5	----
High point	4920	80.5	80.0	81.1	0.987
Mid point	4960	40.2	40.0	41.0	0.975
Low point	4980	20.1	20.0	20.7	0.965
As left zero	5000	0.0	0.0	0.6	----
As left span	4920	80.5	80.0	81.2	0.985
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	----

Date of last scrubber change:		7-Mar-22		Ave Corr Factor	0.975
Date of last converter efficiency test:		March 15, 2022		100.7%	efficiency

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

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

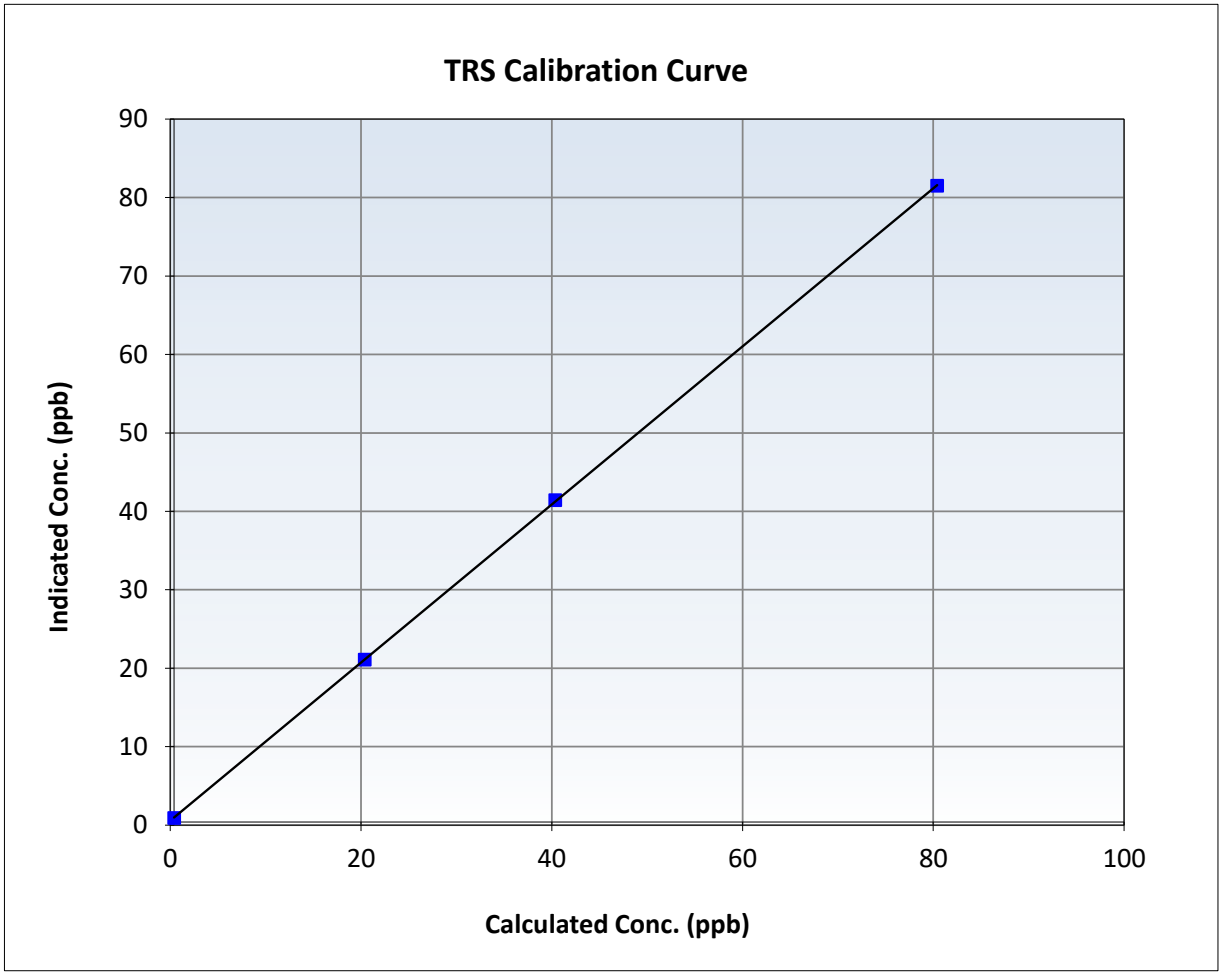
TRS Calibration Summary

Station Information

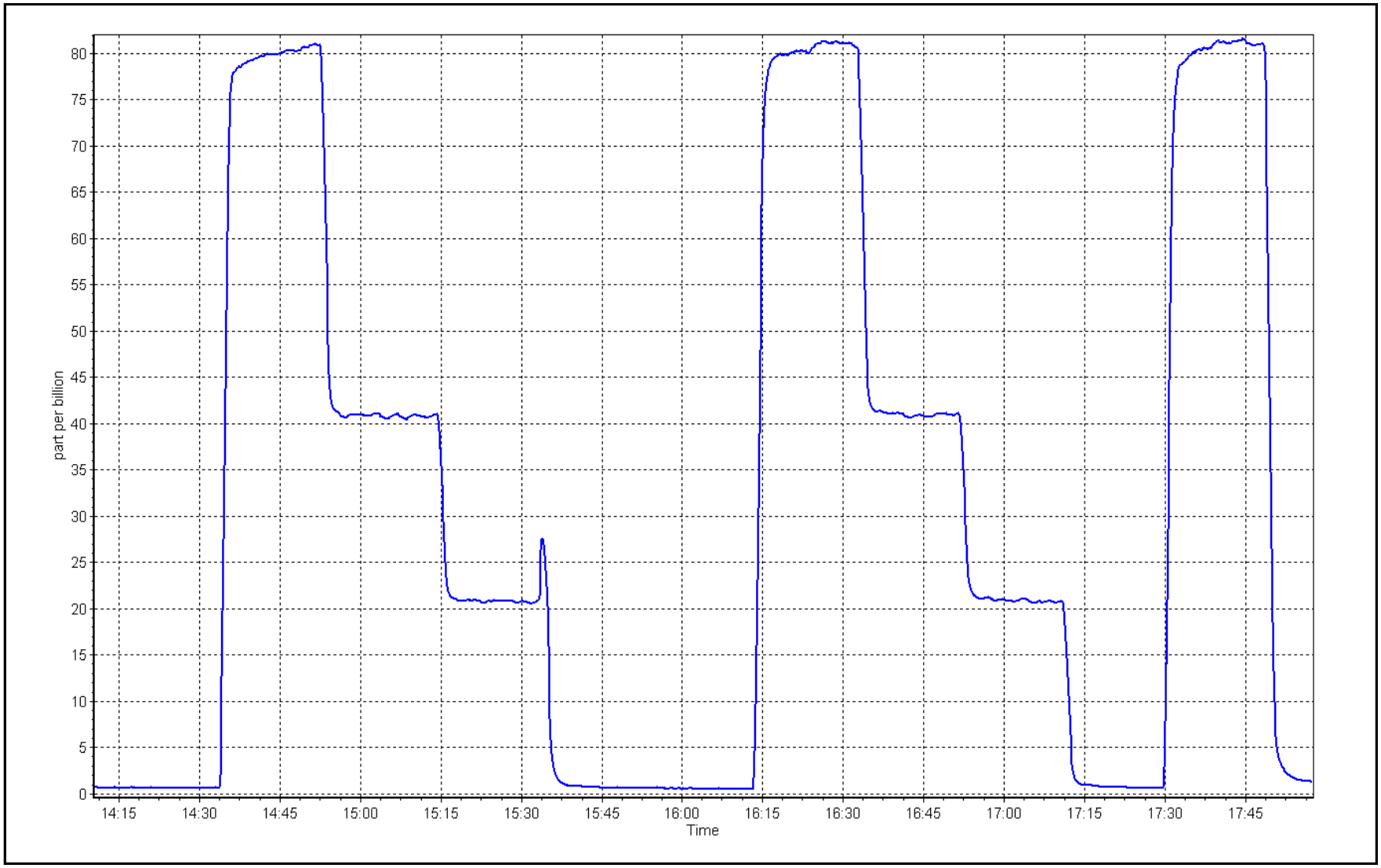
Calibration Date:	April 18, 2024	Previous Calibration:	March 20, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	14:12	End Time (MST):	17:57
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.5	----	Correlation Coefficient	0.999988	*≥0.995*
80.0	81.1	0.9865	Slope	1.007424	*0.90 - 1.10*
40.0	41.0	0.9746			
20.0	20.7	0.9652	Intercept	0.578976	*+/-3*



TRS Calibration Plot Date: April 18, 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:	April 18, 2024
Last Cal Date:	March 20,2024
Start time (MST):	8:24
End time (MST):	13:13
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	779.6	778.0	1.7	1.0320	1.0307
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 802.5 ppb	NO = 800.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -3.1%
Baseline Corr 1st pt	NO_X = 778.2 ppb	NO = 776.6 ppb	As Found Statistics	*Percent Change	NO = -3.1%
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: 4460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.200	1.231	NO bkgnd or offset:	-2.5	2.5
NOX coeff or slope:	1.194	1.229	NOX bkgnd or offset:	-2.2	2.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	-2.9	-1.8

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.995037	1.000160
NO_X Cal Offset:	3.395408	2.195593
NO Cal Slope:	0.998540	0.992944
NO Cal Offset:	1.155021	2.314346
NO_2 Cal Slope:	0.993301	0.997333
NO_2 Cal Offset:	0.722793	1.324008

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	1.6	1.5	0.1	----	----
High point	4933	66.7	803.1	800.4	2.7	804.7	796.7	8.0	0.9980	1.0047
Mid point	4967	33.3	400.9	399.6	1.3	404.8	399.5	5.4	0.9904	1.0002
Low point	4983	16.7	201.1	200.4	0.7	203.0	202.1	0.9	0.9905	0.9916
As left zero	5000	0.0	0.0	0.0	0.0	1.3	1.3	0.0	----	----
As left span	4933	66.7	803.1	385.4	417.7	795.3	385.4	409.7	1.0098	1.0000
							Average Correction Factor		0.9930	0.9988

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	798.4	389.4	411.7	412.0	0.9992	100.1%
Mid GPT point	798.4	597.9	203.2	202.5	1.0033	99.7%
Low GPT point	798.4	703.3	97.8	101.4	0.9642	103.7%
				Average Correction Factor	0.9889	101.2%

Notes: Changed inlet filter after as founds. Adjusted high point span. Low point needs further investigating from senior technician.

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

NO_X Calibration Summary

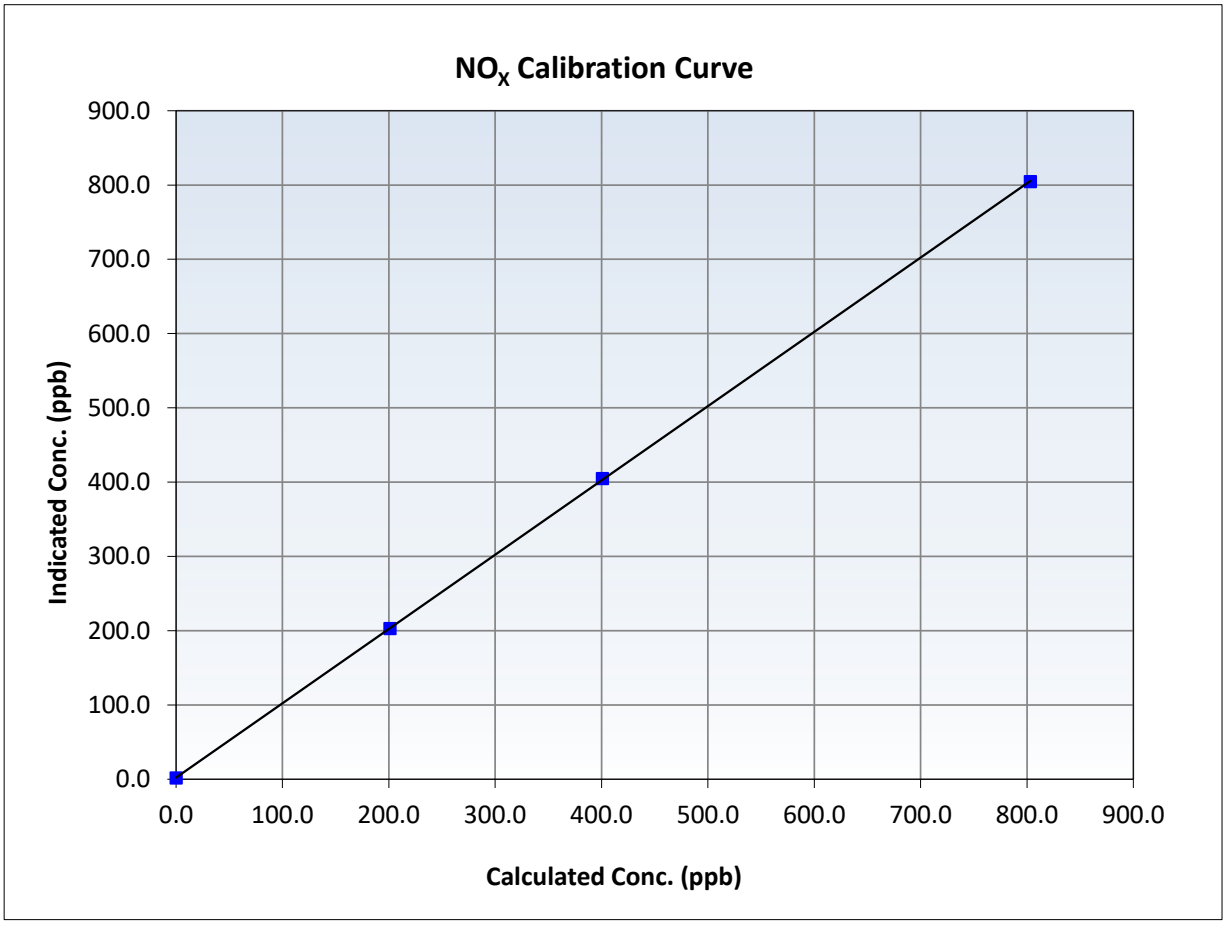
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 20,2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	8:24	End Time (MST):	13:13
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.6	----
803.1	804.7	0.9980
400.9	404.8	0.9904
201.1	203.0	0.9905

Statistical Evaluation		Limits
Correlation Coefficient	0.999990	≥0.995
Slope	1.000160	0.90 - 1.10
Intercept	2.195593	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

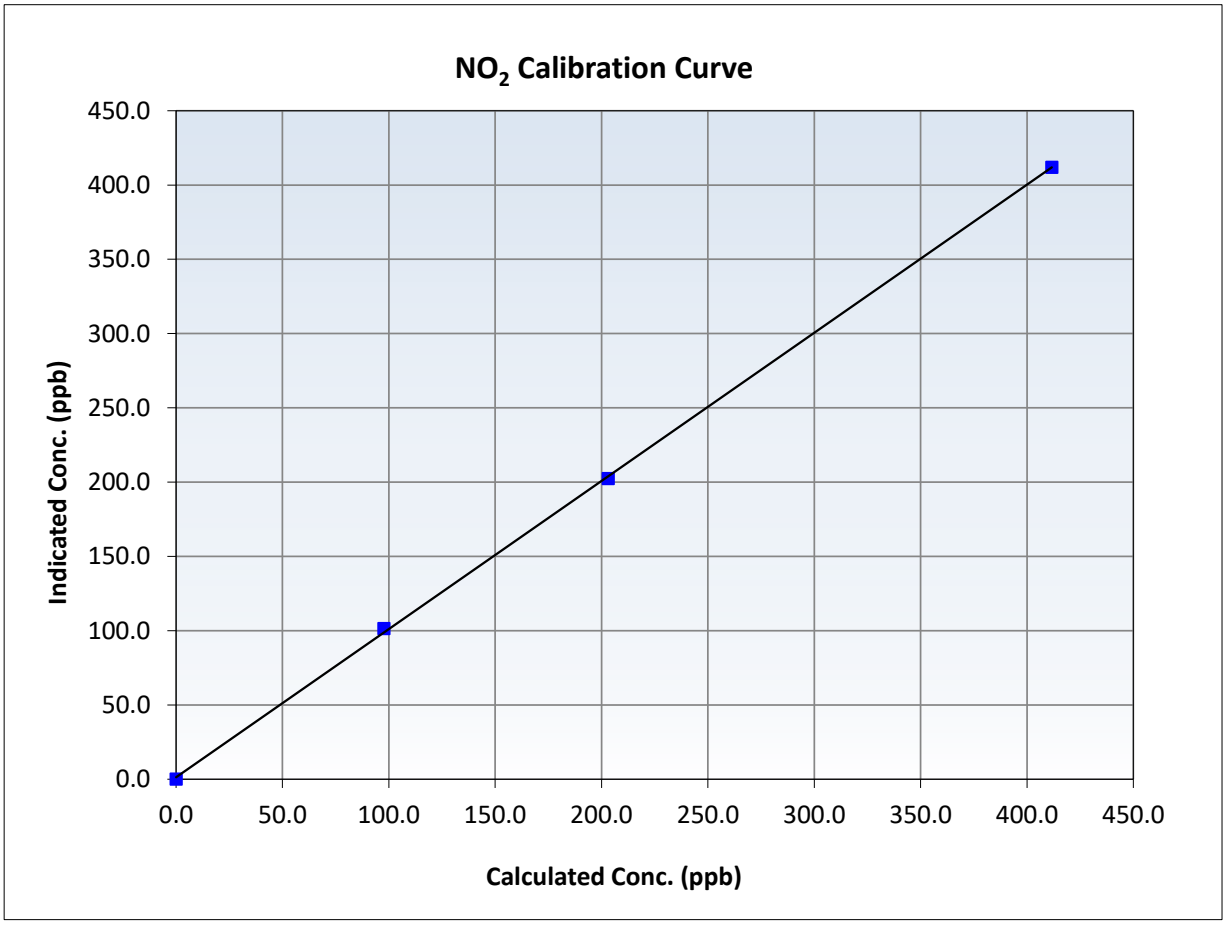
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 20,2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	8:24	End Time (MST):	13:13
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
411.7	412.0	0.9992
203.2	202.5	1.0033
97.8	101.4	0.9642

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999890	*≥0.995*
Slope	0.997333	*0.90 - 1.10*
Intercept	1.324008	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

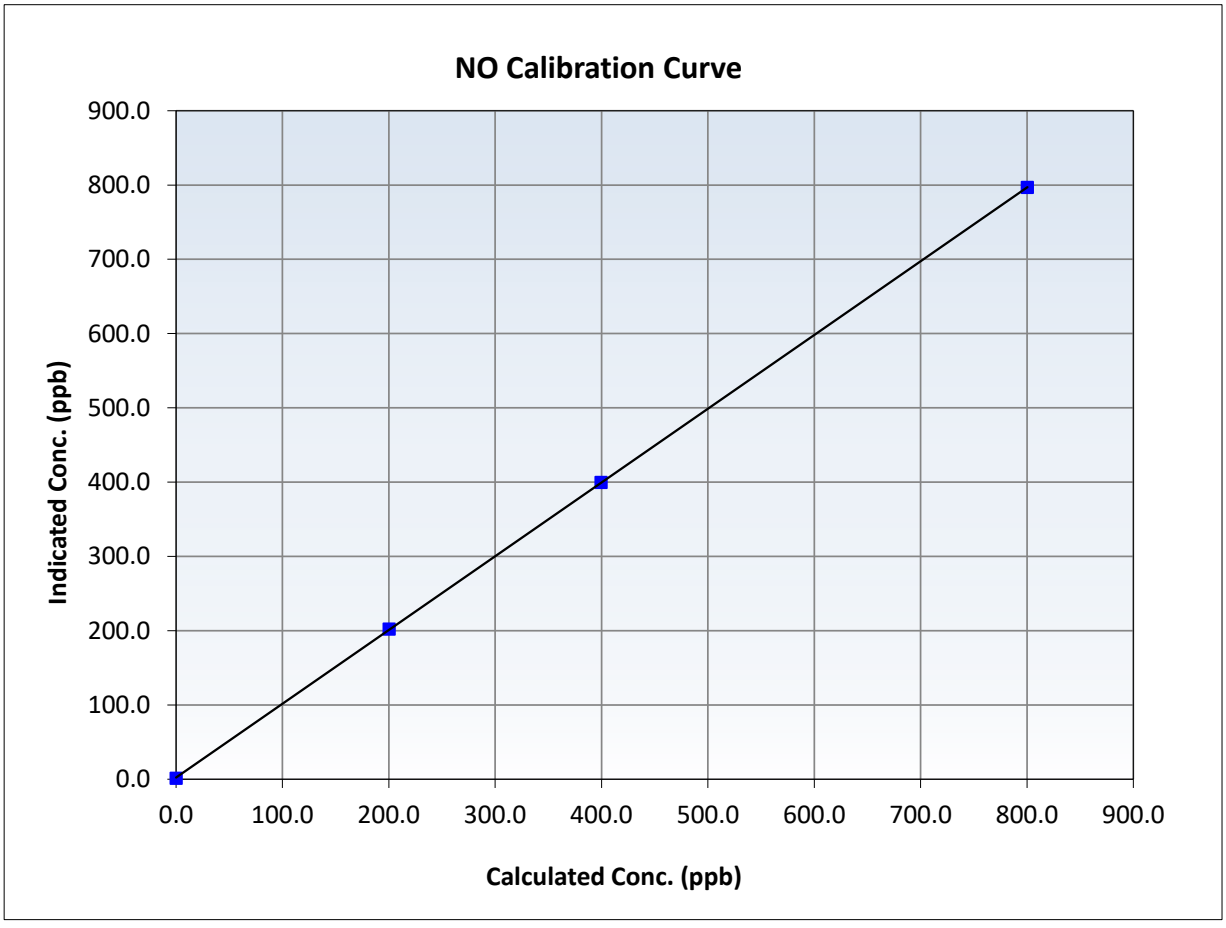
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 20,2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	8:24	End Time (MST):	13:13
Analyzer make:	API T200	Analyzer serial #:	4460

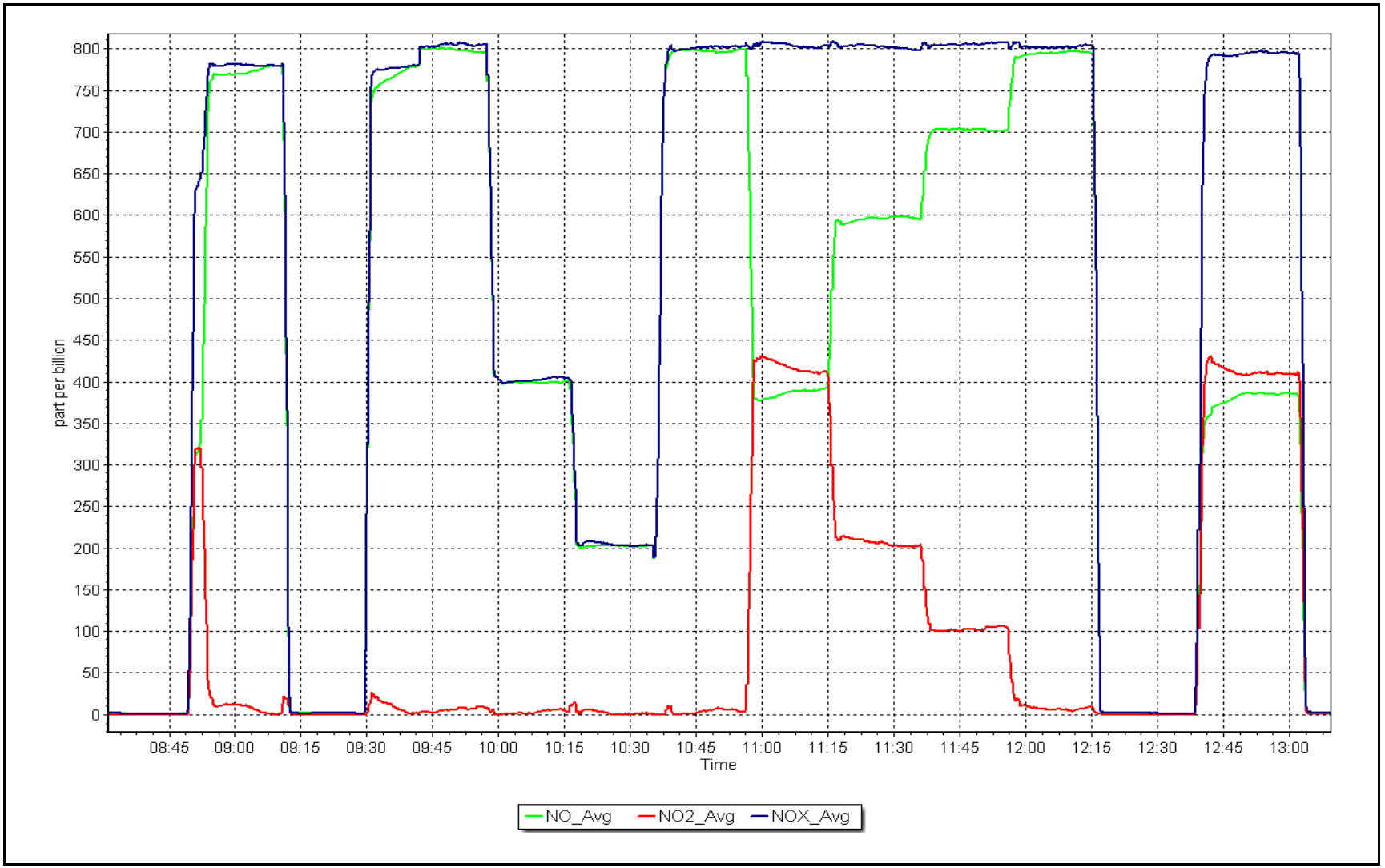
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.5	----
800.4	796.7	1.0047
399.6	399.5	1.0002
200.4	202.1	0.9916

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.992944	*0.90 - 1.10*
Intercept	2.314346	*+/-20*



NO_X Calibration Plot Date: April 18, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	April 16, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	7:02	End time (MST):	9:44
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:	0.994571	0.999086	Backgd or Offset:	-2.0	-1.9
Calibration intercept:	0.100000	0.160000	Coeff or Slope:	1.036	1.019

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	913.0	400.0	409.3	0.978
As found Mid point					
As found Low point					
Baseline Corr As found:	409.1	Previous response	397.9	*% 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	

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	914.7	400.0	400.1	1.000
Mid point	5000	786.4	200.0	199.6	1.002
Low point	5000	701.3	100.0	99.6	1.004
As left zero	5000	0.0	0.0	0.7	----
As left span	5000	963.3	400.0	401.2	0.997
				Average Correction Factor	1.002

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

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

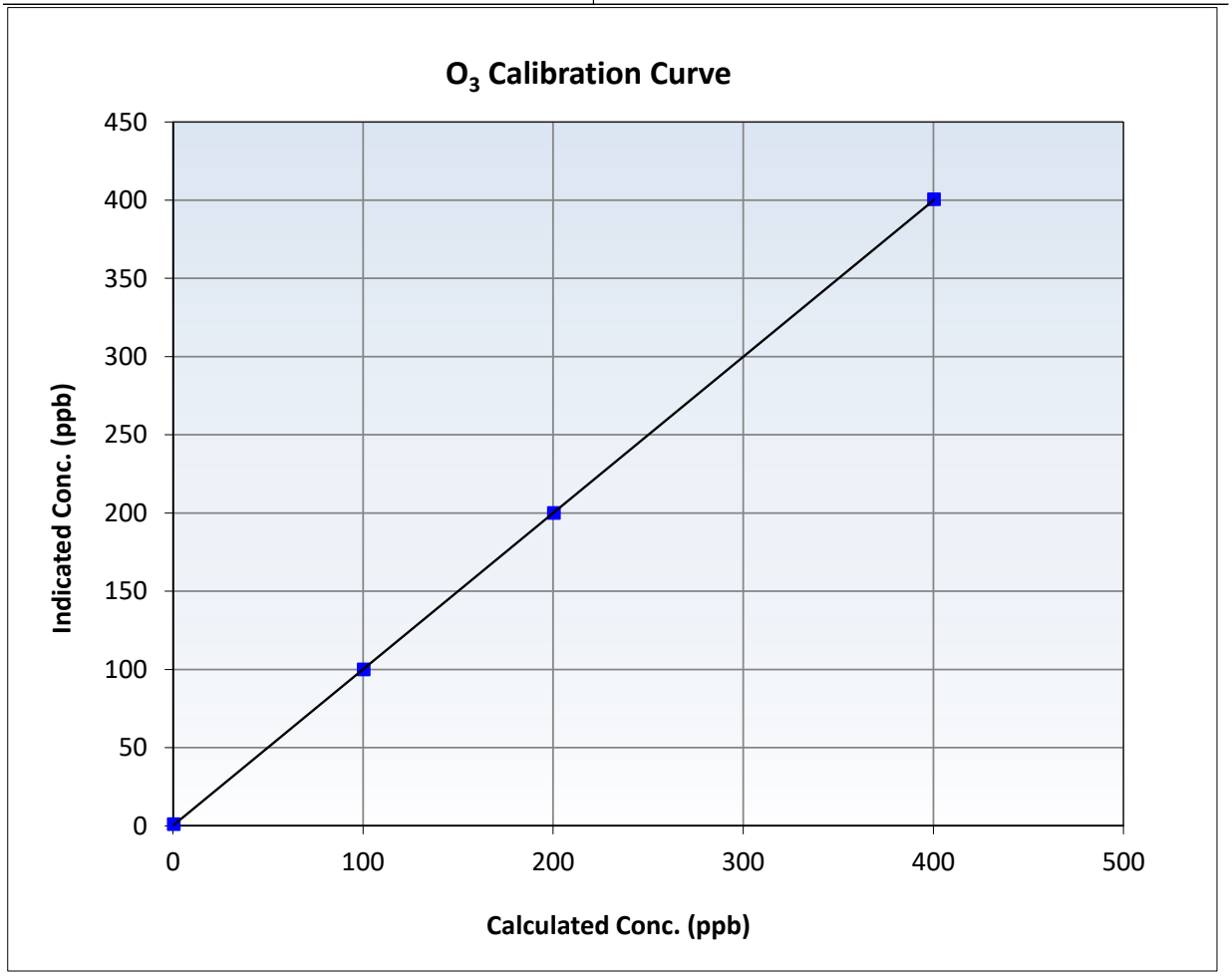
O_3 Calibration Summary

Station Information

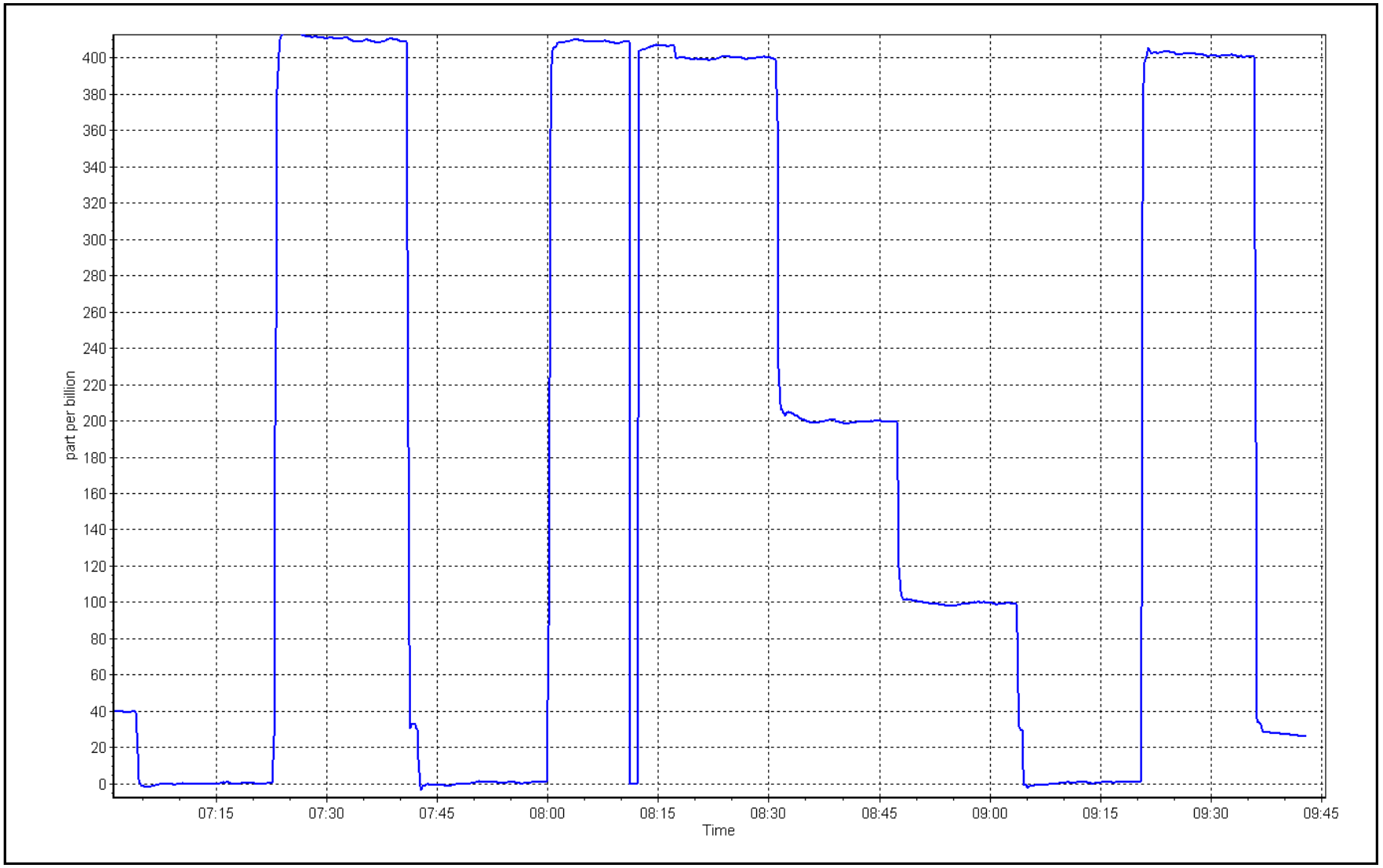
Calibration Date:	April 16, 2024	Previous Calibration:	March 19, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	7:02	End Time (MST):	9:44
Analyzer make:	Teledyne API T400	Analyzer serial #:	3872

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.7	----	Correlation Coefficient	0.999991	≥0.995
400.0	400.1	0.9998	Slope	0.999086	0.90 - 1.10
200.0	199.6	1.0020			
100.0	99.6	1.0040	Intercept	0.160000	+/- 5



O_3 Calibration Plot Date: April 16, 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:	April 29, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	14:28	End time (MST):	15:05
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)	8.60	7.88	8.60	☐	+/- 2 °C
P (mmHg)	734.20	734.9	734.20	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.04	5.00	☐	+/- 0.25 LPM
PW% (pump)	39%			☐	>80%
Zero Verification	PM w/o HEPA:	4.00	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	9.90	0.00	10.80	☐	+/- 0.5

Date Optical Chamber Cleaned: February 20, 2024

Date Disposable Filter Changed: February 20, 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:	April 29, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	12:20	End time (MST):	15:09
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:	0.997054	1.003563	Backgd or Offset:	-0.015	-0.015
Calibration intercept:	0.100939	0.210880	Coeff or Slope:	1.007	1.007

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	40.7	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.63	Prev response:	40.40	*% 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	

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	40.7	0.992
Mid point	4966.7	33.3	20.2	20.5	0.983
Low point	4983.3	16.7	10.1	10.4	0.970
As left zero	5000	0.0	0.0	0.1	----
As left span	2960	40.0	40.4	40.5	0.999
				Average Correction Factor	0.982

Notes: Changed inlet filter after as found, no adjustments made.

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

CO Calibration Summary

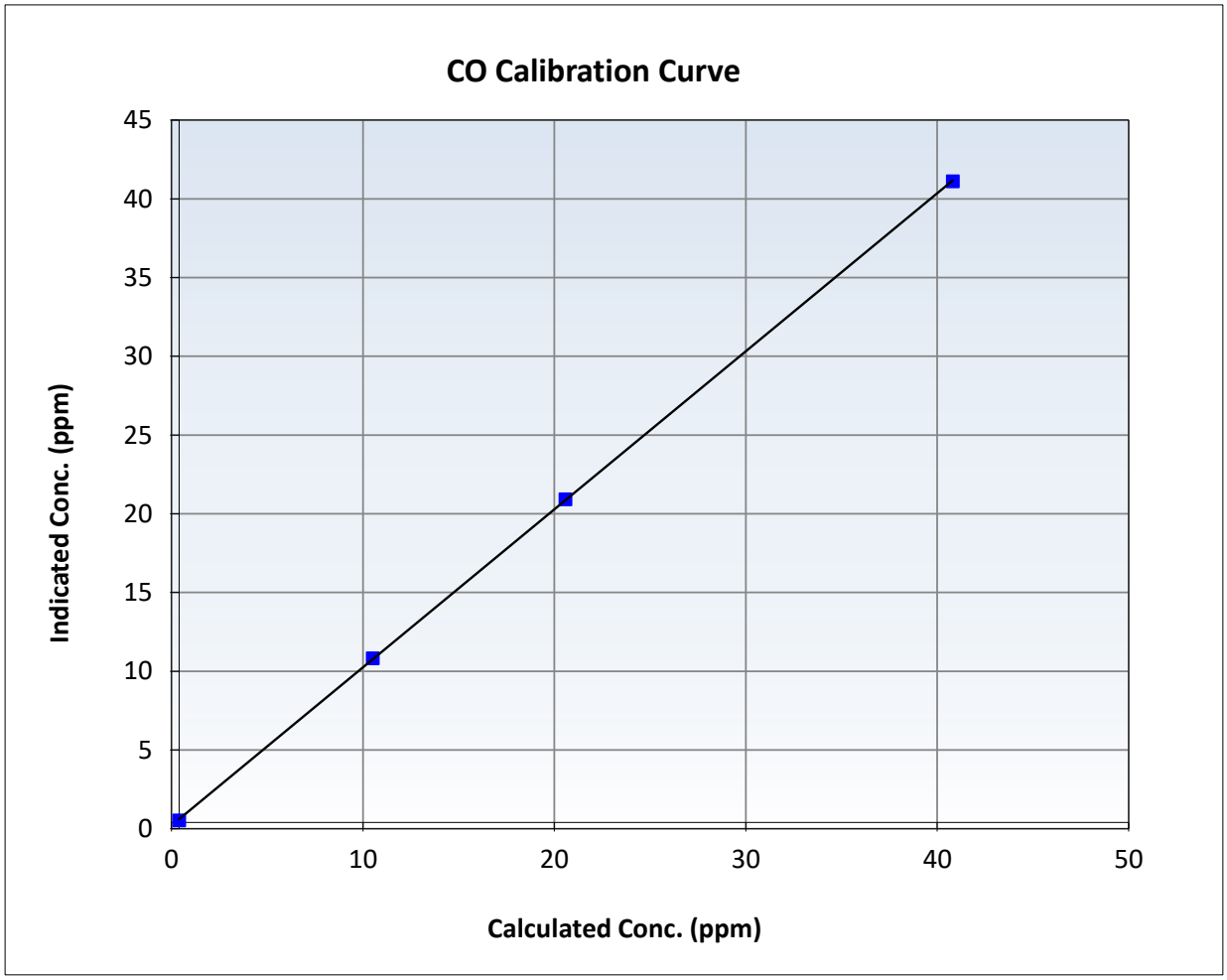
Station Information

Calibration Date:	April 29, 2024	Previous Calibration:	March 19, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	12:20	End Time (MST):	15:09
Analyzer make:	Teledyne API T300	Analyzer serial #:	3505

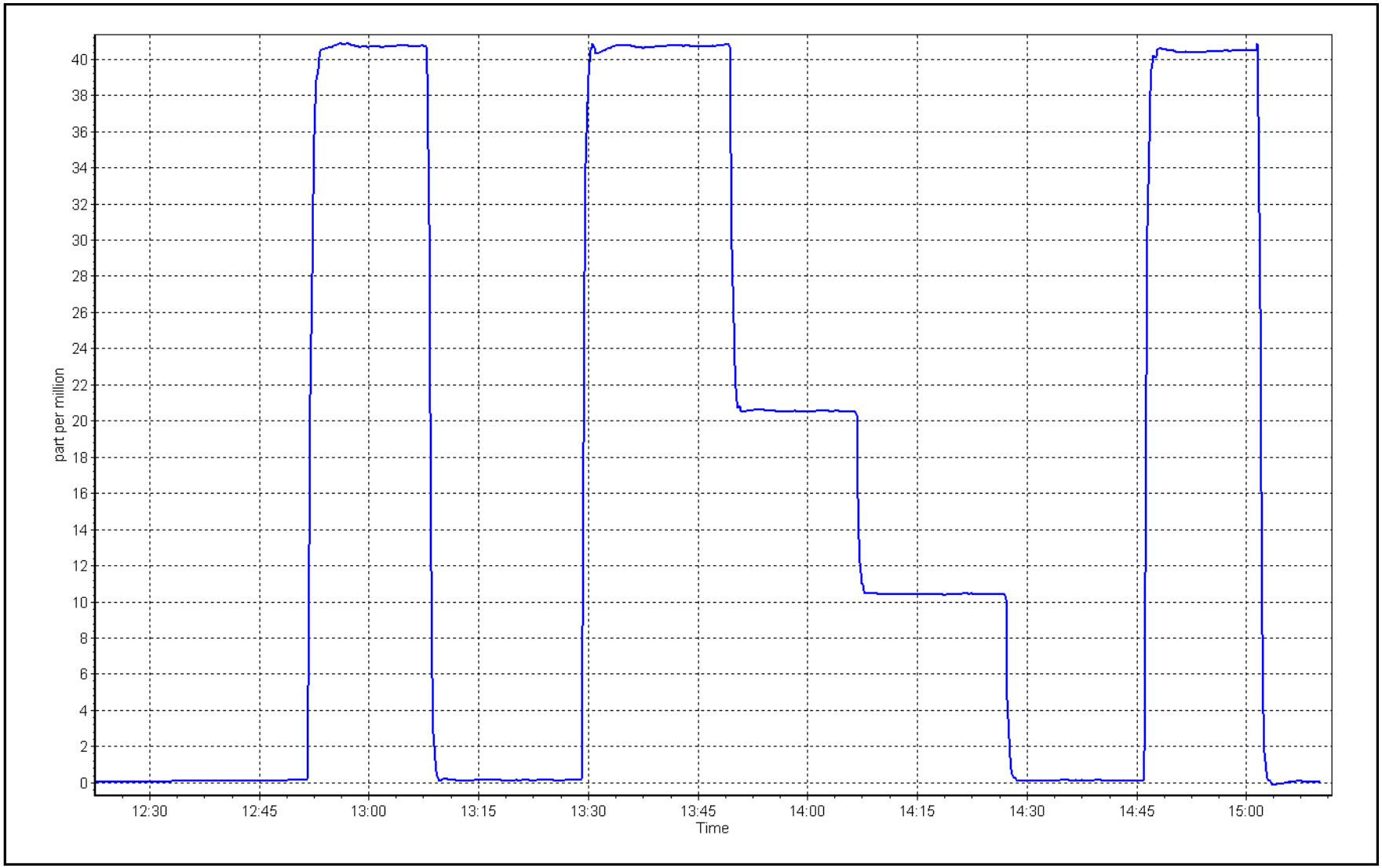
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
40.4	40.7	0.9925
20.2	20.5	0.9829
10.1	10.4	0.9703

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999981	*≥0.995*
Slope	1.003563	*0.90 - 1.10*
Intercept	0.210880	*+/-1.5*



CO Calibration Plot Date: April 29, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	April 16, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	9:50	End time (MST):	13:43
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:	1.011498	1.003378	Backgd or Offset:	-0.063	-0.063
Calibration intercept:	-16.020000	-4.540000	Coeff or Slope:	1.094	1.087

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	-4.9	----
As found High Point	2920	80.0	1605.9	1646.4	0.972
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1651.3	Prev response:	1608.3	*% change:	2.6%
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	-4.9	----
High point	2920	80.0	1605.9	1606.8	0.999
Mid point	2960	40.0	802.9	800.6	1.003
Low point	2980	20.0	401.5	399.1	1.006
As left zero	3000	0.0	0.0	-4.8	----
As left span	2960	40.0	802.9	768.0	1.045
				Average Correction Factor	1.003

Notes: Changed inlet filter after as found, Adjustments span, mid point and low point.

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

CO_2 Calibration Summary

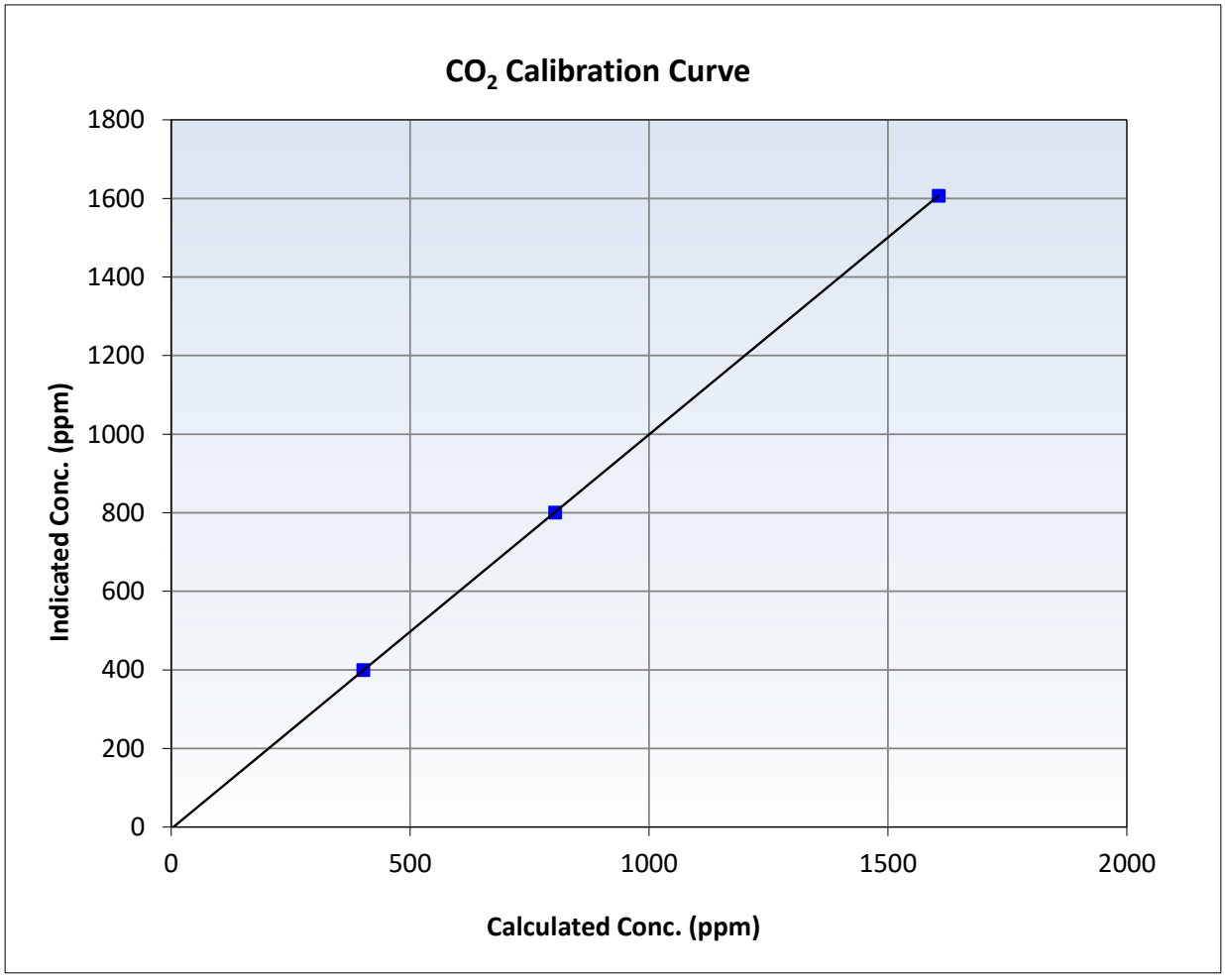
Station Information

Calibration Date	April 16, 2024	Previous Calibration	March 19, 2024
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	9:50	End Time (MST)	13:43
Analyzer make	Teledyne API T360	Analyzer serial #	289

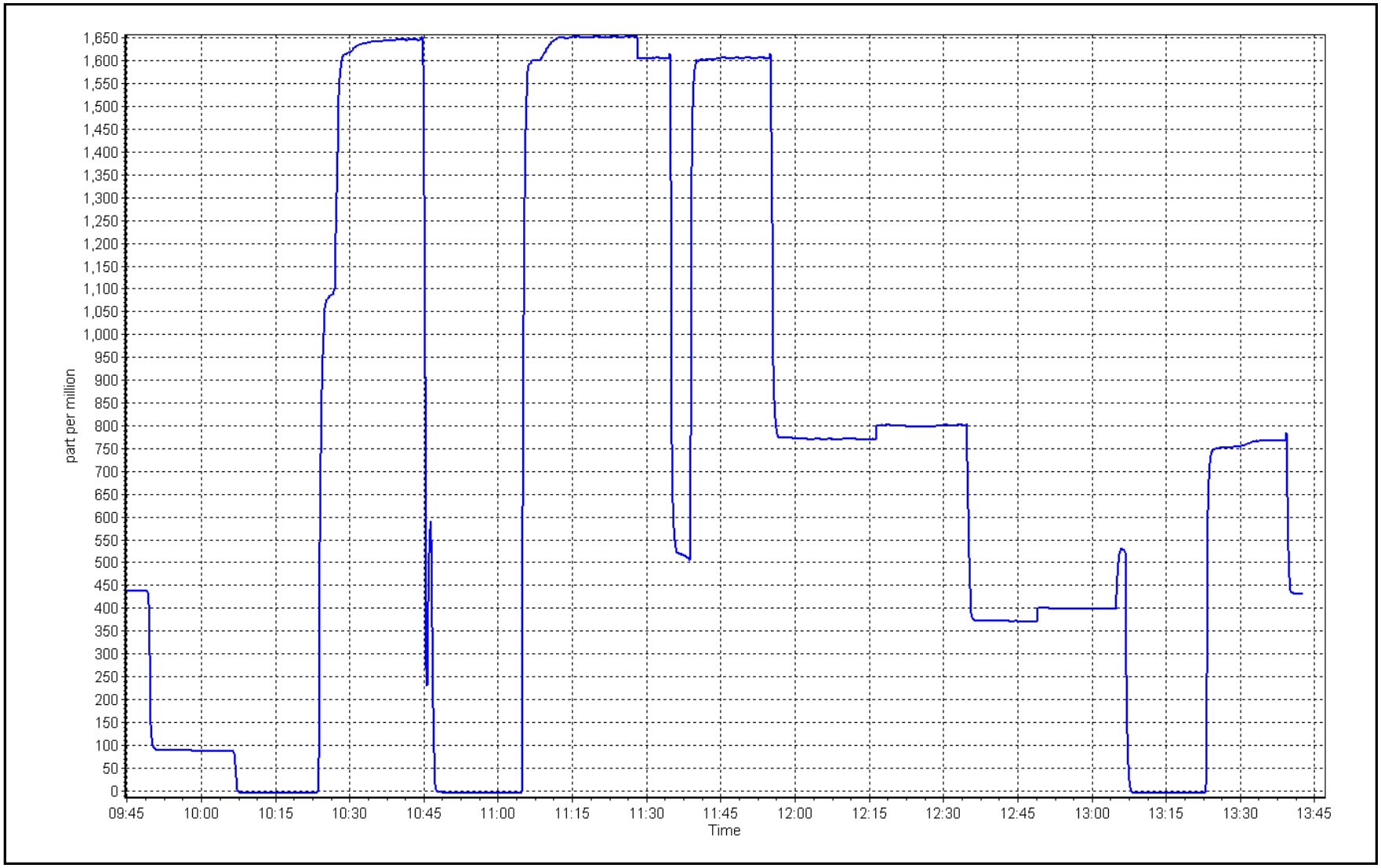
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	-4.9	----
1605.9	1606.8	0.9994
802.9	800.6	1.0029
401.5	399.1	1.0059

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.003378	*0.90 - 1.10*
Intercept	-4.5	*+/-20*



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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09
BARGE LANDING
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	April 2, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	9:18	End time (MST):	12:44
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:	1.001110	0.997204	Backgd or Offset:	10.2	10.1
Calibration intercept:	0.391536	0.710524	Coeff or Slope:	0.963	0.956

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	80.2	801.5	803.1	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.9	Previous response	802.8	*% 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	

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	80.2	801.5	799.7	1.002
Mid point	4959	40.1	400.8	400.8	1.000
Low point	4980	20.0	199.8	200.1	0.999
As left zero	5000	0.0	0.0	0.4	----
As left span	4919	80.2	801.5	802.3	0.999
				Average Correction Factor:	1.000

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

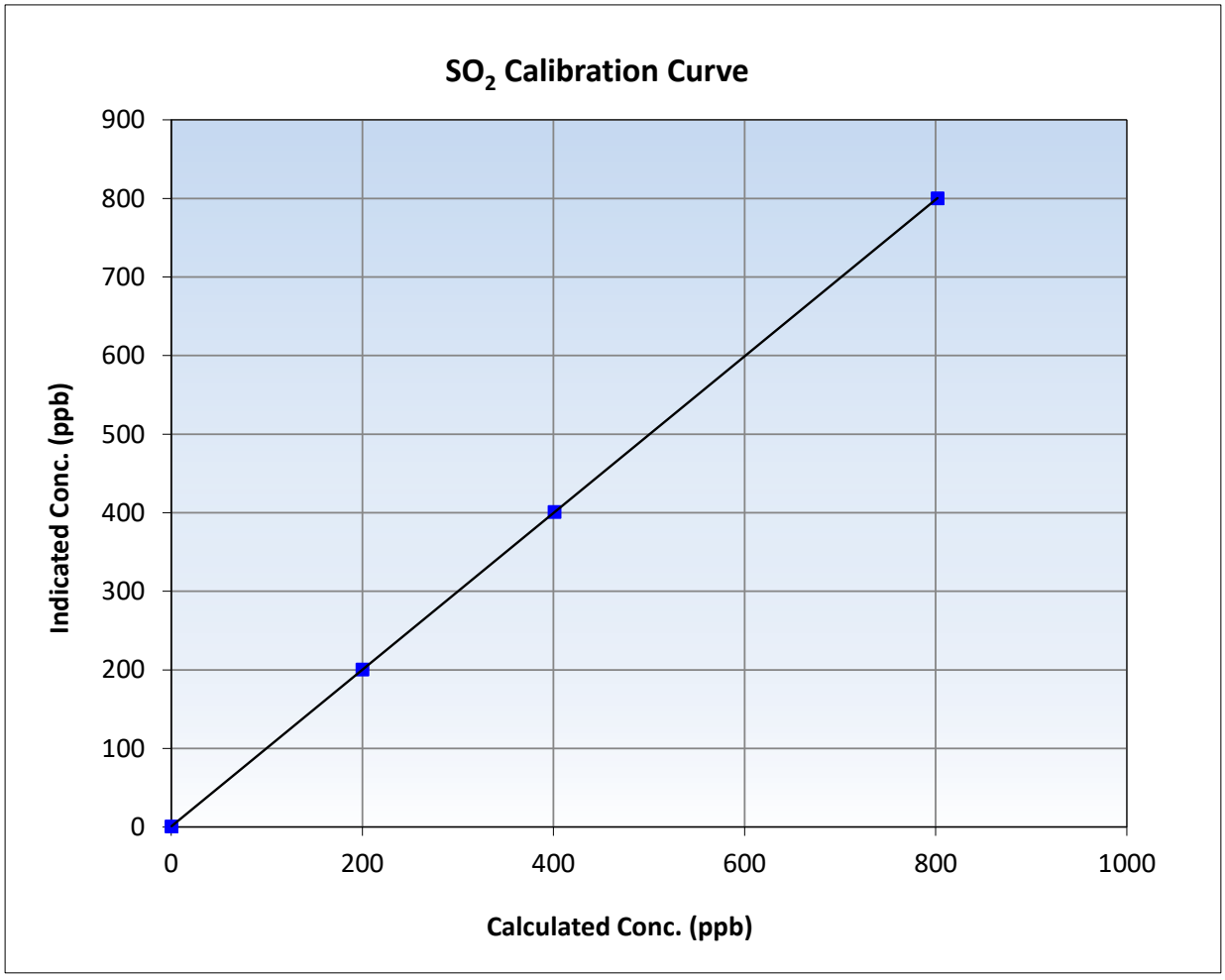
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:18	End Time (MST):	12:44
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

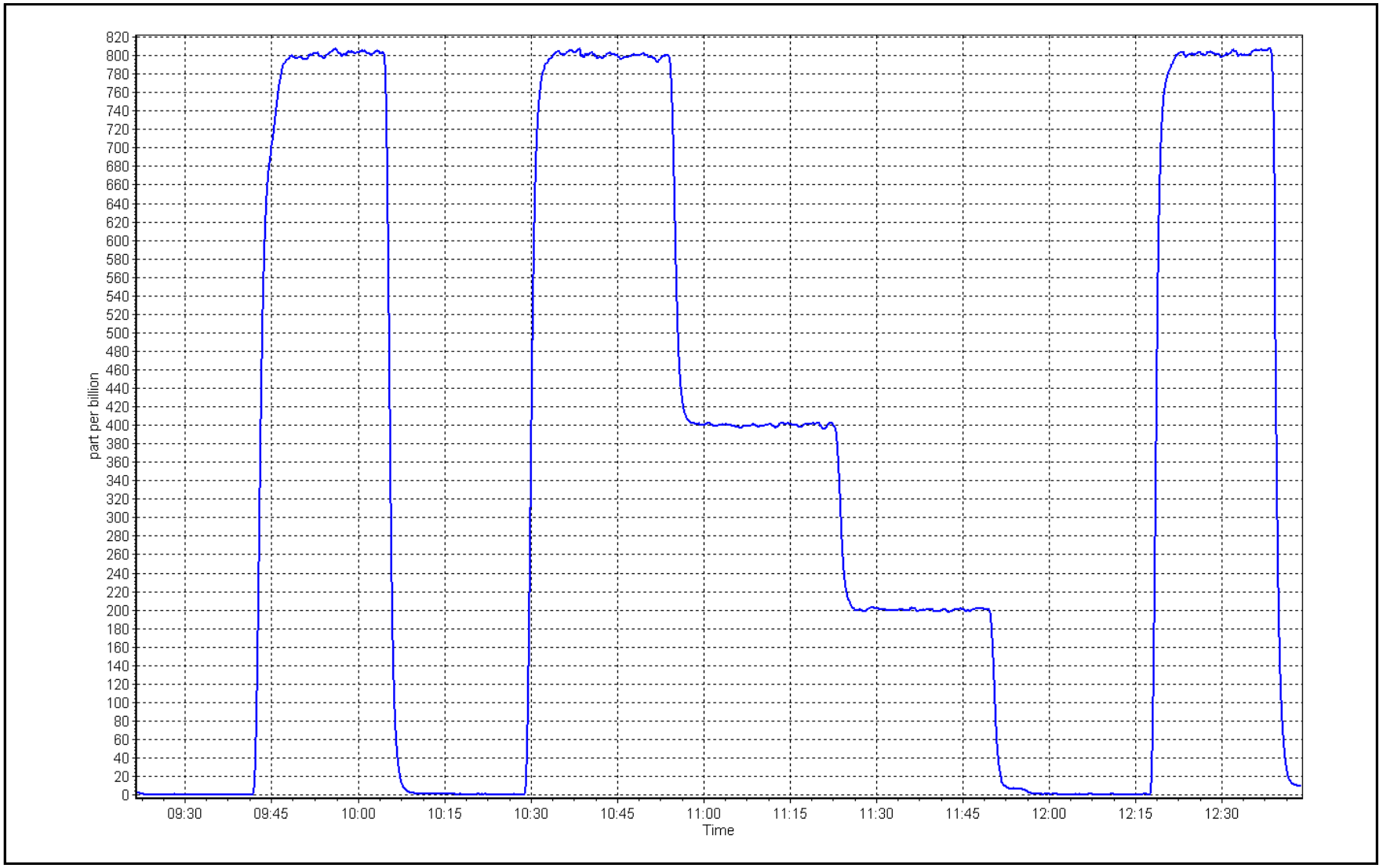
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
801.5	799.7	1.0022
400.8	400.8	0.9999
199.8	200.1	0.9987

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.997204	*0.90 - 1.10*
Intercept	0.710524	*+/-30*



SO2 Calibration Plot Date: April 2, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	April 3, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	8:53	End time (MST):	13:05
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:	1.000835	0.990985	Backgd or Offset:	2.840	2.830
Calibration intercept:	0.139405	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	79.1	1.012
As found Mid point	4961	38.7	40.0	39.7	1.008
As found Low point	4981	19.3	20.0	19.7	1.013
New cylinder response					
Baseline Corr As found:	79.1	Prev response:	80.25	*% change:	-1.4%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.988559	AF Intercept:	0.019148
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999995	* = > +/-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	79.3	1.009
Mid point	4961	38.7	40.0	39.9	1.003
Low point	4981	19.3	20.0	19.8	1.008
As left zero	5000	0.0	0.0	0.2	----
As left span	4923	77.4	80.0	79.4	1.008
SO2 Scrubber Check	4920	80.2	802.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.007
Date of last converter efficiency test:					

Notes: Changed inlet filter after as founds. Pump was changed due to low flow. No adjustments made.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

TRS Calibration Summary

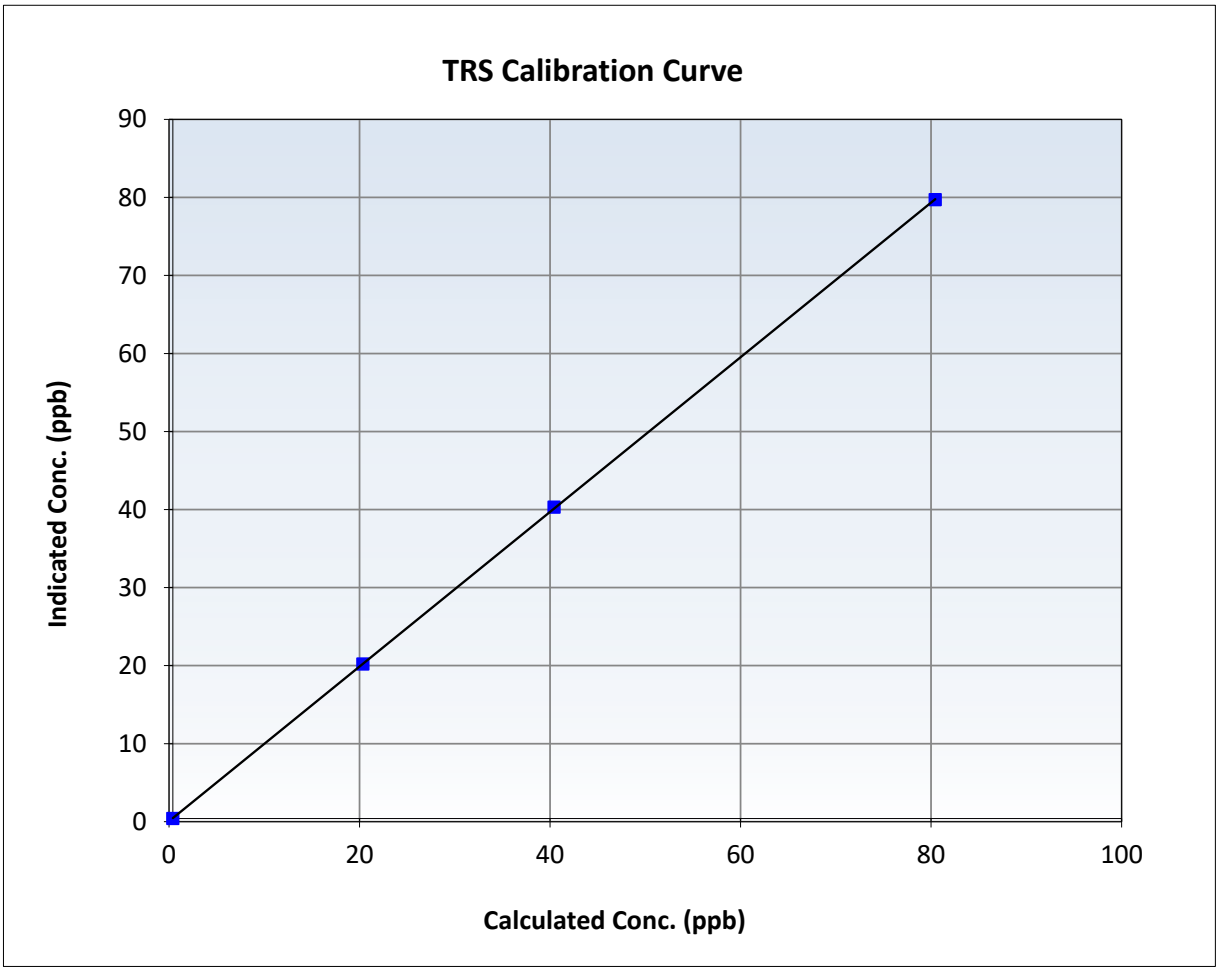
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 7, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	8:53	End Time (MST):	13:05
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320

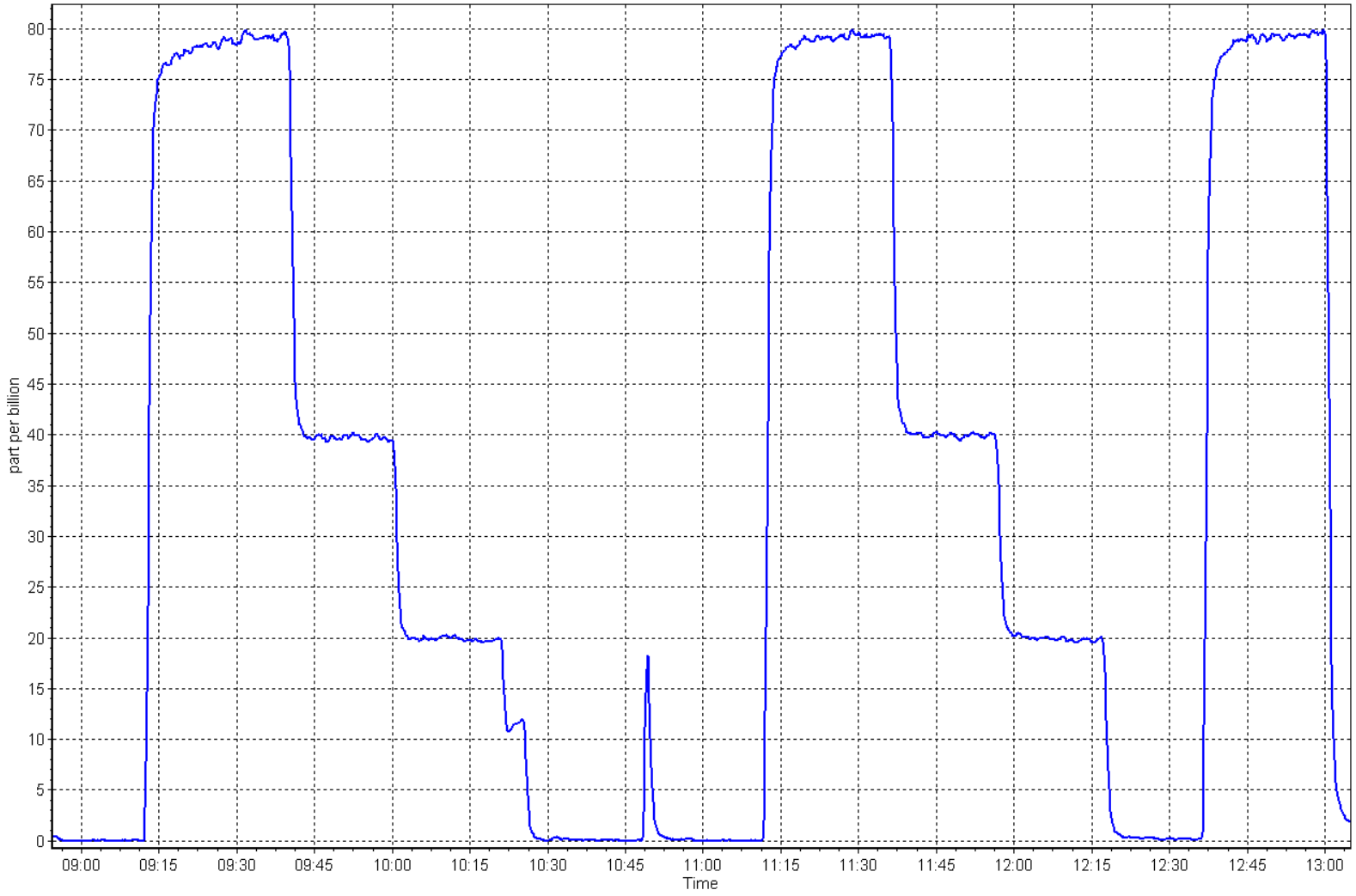
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	79.3	1.0093
40.0	39.9	1.0032
20.0	19.8	1.0080

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	0.990985	*0.90 - 1.10*
Intercept	0.059198	*+/-3*



TRS Calibration Plot Date: April 3, 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:	April 2, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	9:18	End time (MST):	12:44
Reason:	Routine		

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:	2.58E-04	2.60E-04	NMHC SP Ratio:	4.37E-05	4.50E-05
CH4 Retention time:	15.00	15.20	NMHC Peak Area:	209298	205331
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	16.90	1.013
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.90	Prev response	17.04	*% 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	4919	80.2	17.12	17.14	0.999
Mid point	4960	40.1	8.56	8.55	1.000
Low point	4980	20.0	4.27	4.28	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.12	1.000
				Average Correction Factor	0.999

Notes: Changed inlet filter after as founds. 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	4919	80.2	9.14	9.00	1.015
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.00	Prev response	9.08	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	9.14	9.16	0.998
Mid point	4960	40.1	4.57	4.57	0.999
Low point	4980	20.0	2.28	2.29	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.15	0.999
				Average Correction Factor	0.998

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	4919	80.2	7.98	7.90	1.010
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.90	Prev response	7.96	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change 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	3.98	1.002
Low point	4980	20.0	1.99	1.99	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	7.98	1.001
				Average Correction Factor	1.000

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.995217	1.000957
THC Cal Offset:	0.001033	0.000059
CH4 Cal Slope:	0.997716	0.999506
CH4 Cal Offset:	-0.000741	0.000263
NMHC Cal Slope:	0.993146	1.001926
NMHC Cal Offset:	0.001575	0.000995

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

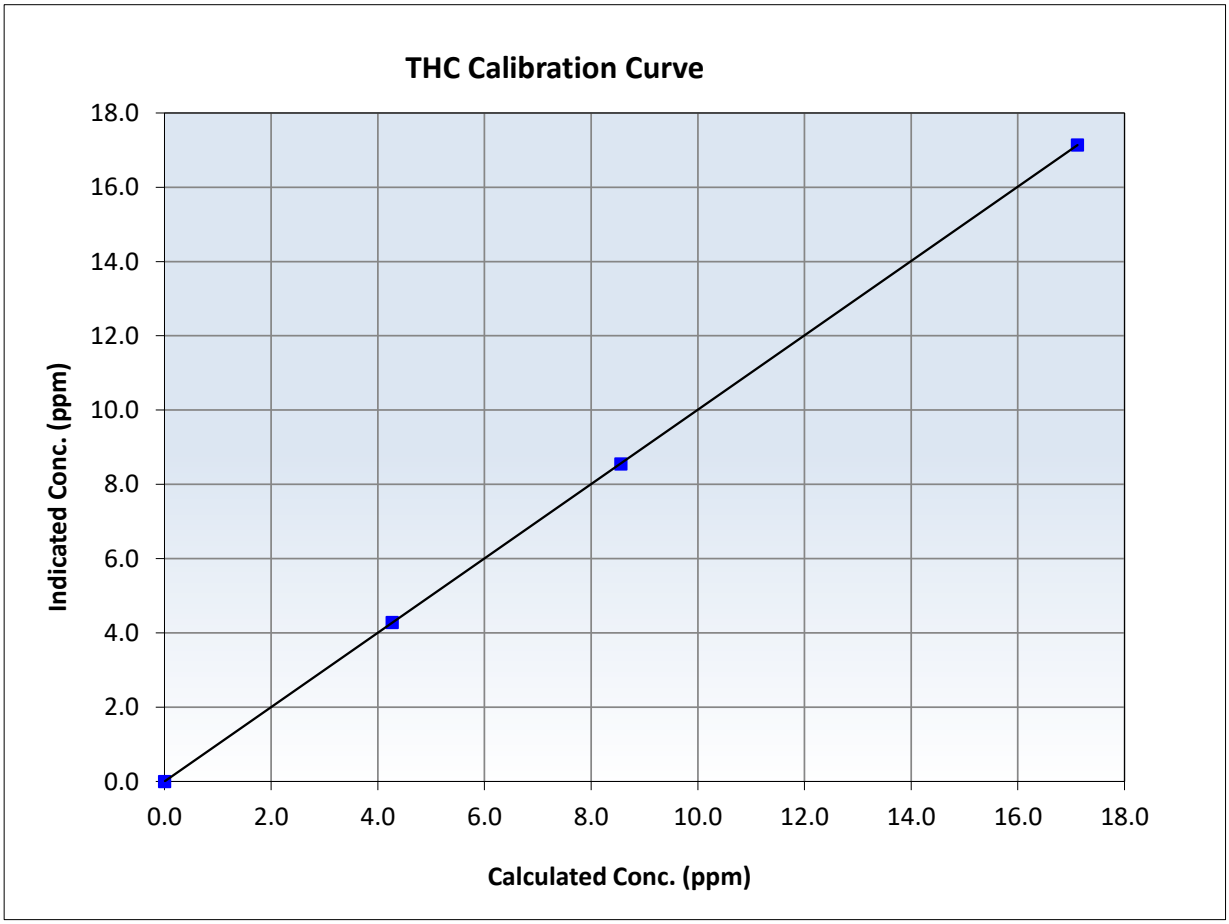
THC Calibration Summary

Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:18	End Time (MST):	12:44
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	0.999998	*≥0.995*
17.12	17.14	0.9988	Slope	1.000957	*0.90 - 1.10*
8.56	8.55	1.0005	Intercept	0.000059	*+/-0.5*
4.27	4.28	0.9971			



Wood Buffalo Environmental Association

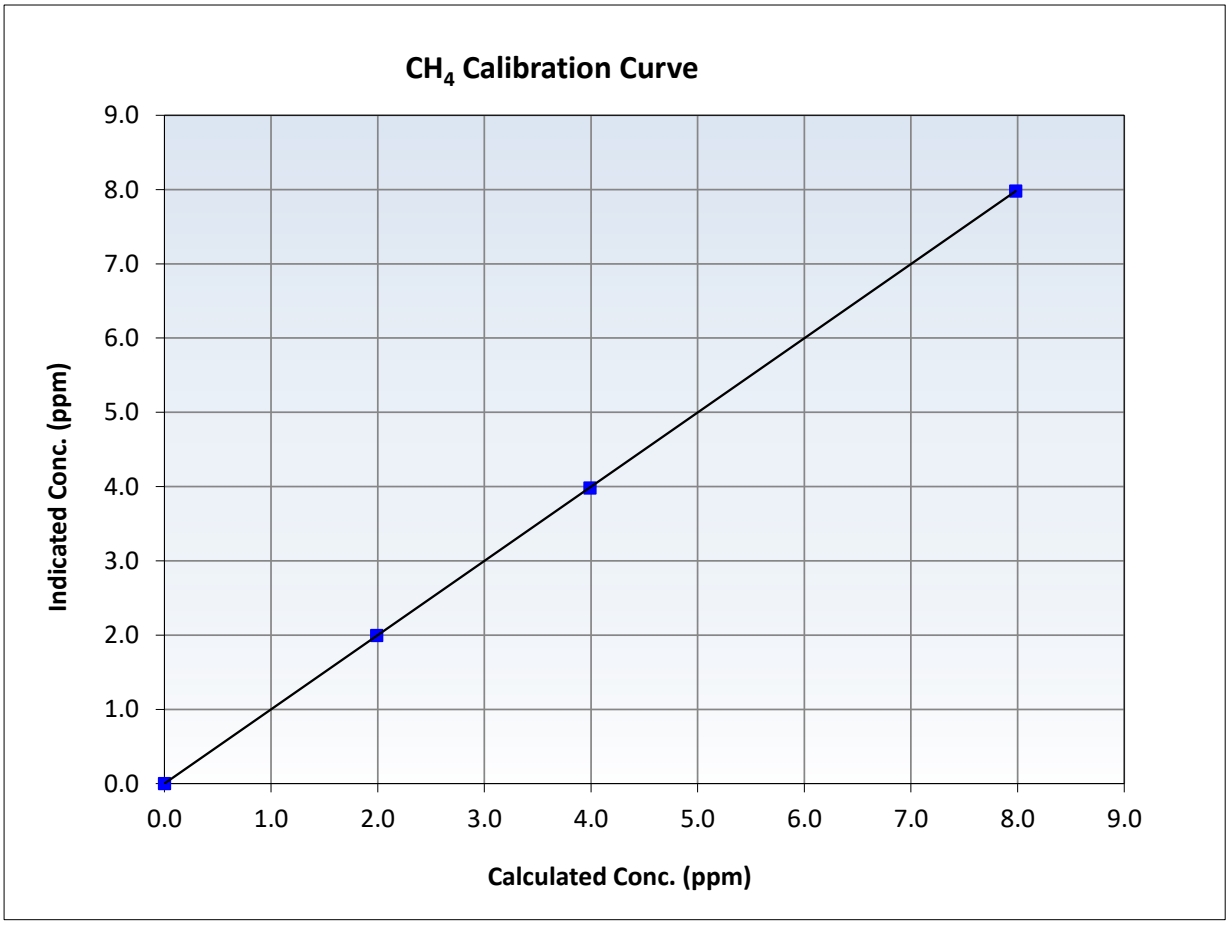
CH_4 Calibration Summary

Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:18	End Time (MST):	12:44
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	0.999998	≥0.995
7.98	7.98	1.0002	Slope	0.999506	0.90 - 1.10
3.99	3.98	1.0019			
1.99	1.99	0.9982	Intercept	0.000263	+/-0.5



Wood Buffalo Environmental Association

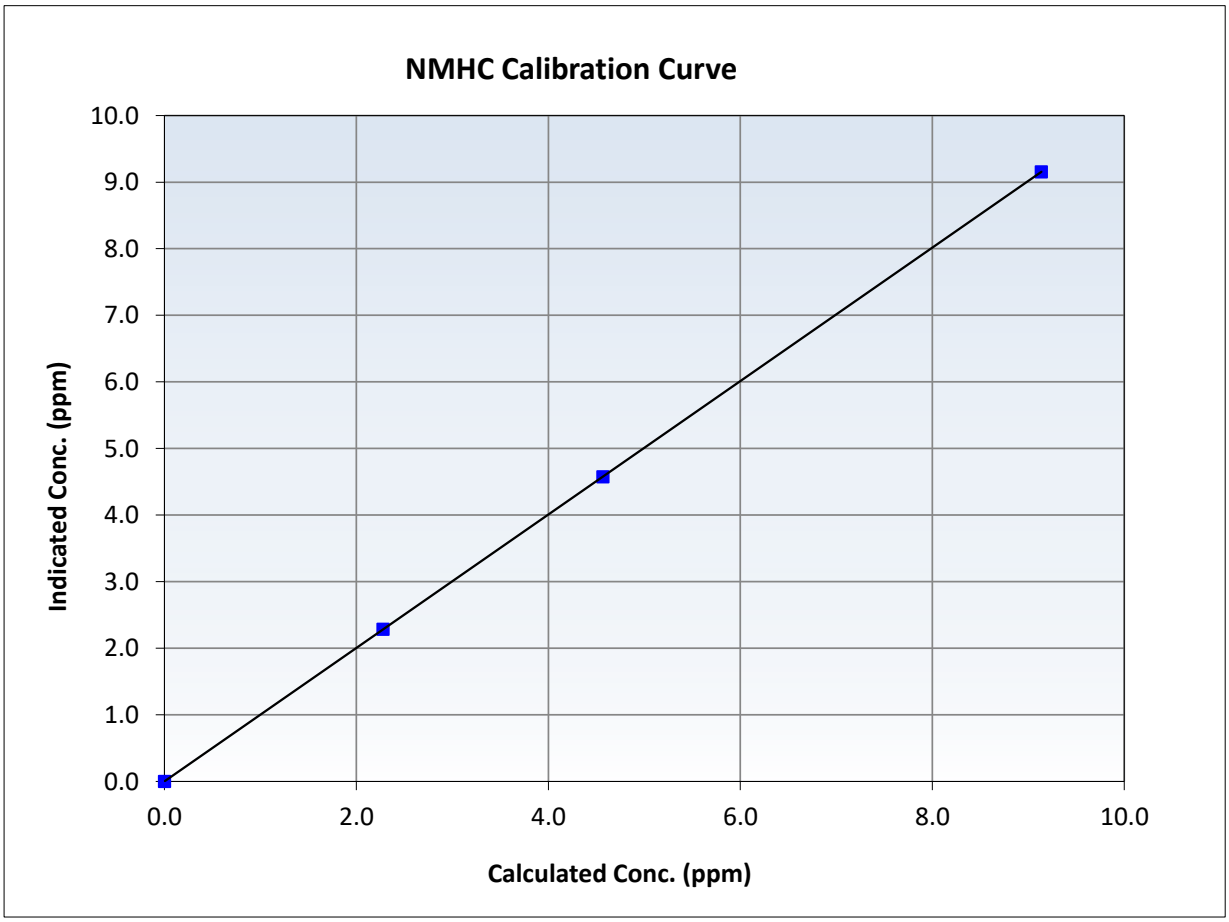
NMHC Calibration Summary

Station Information

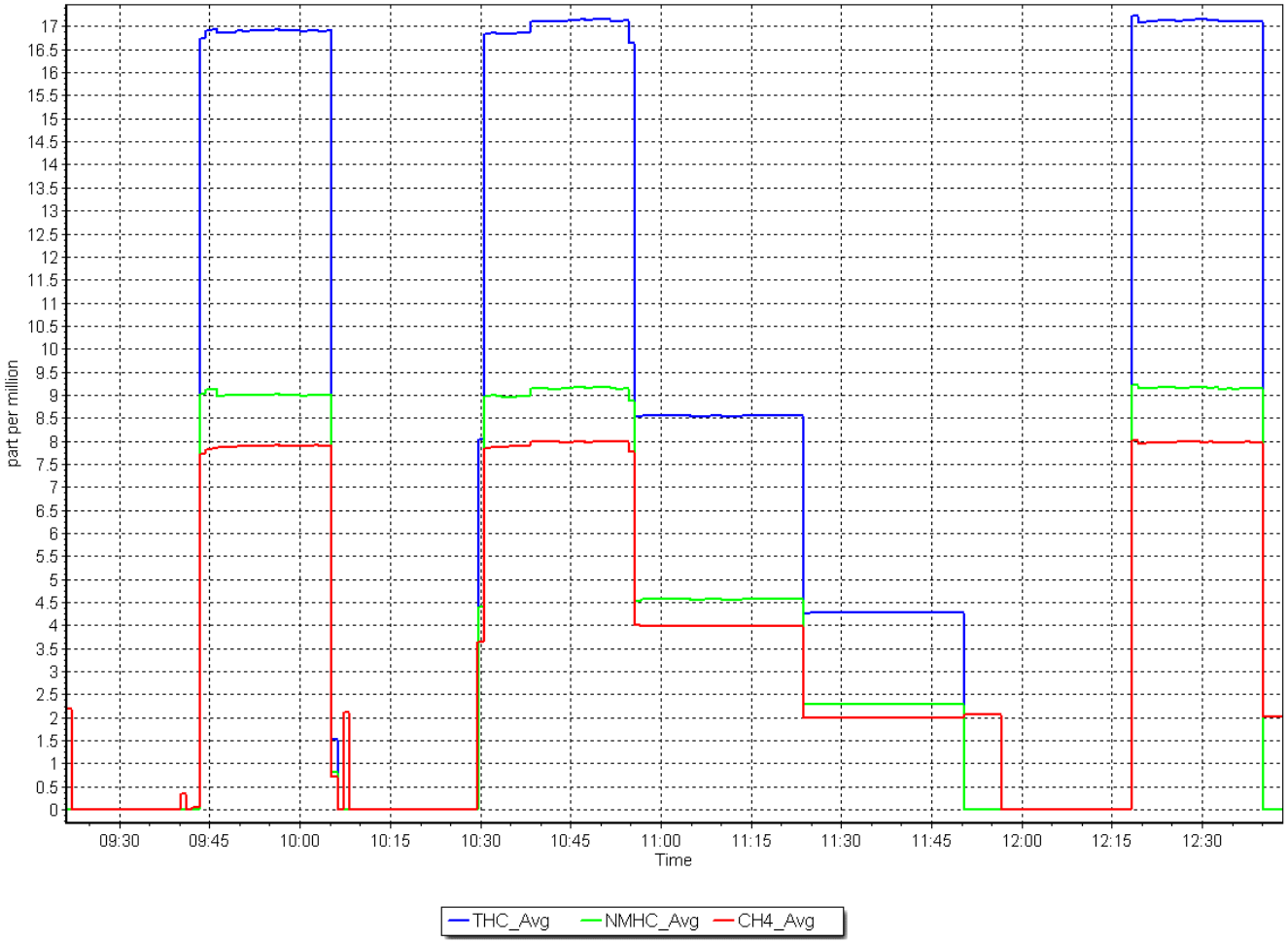
Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:18	End Time (MST):	12:44
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.14	9.16	0.9979	Slope	1.001926	0.90 - 1.10
4.57	4.57	0.9986			
2.28	2.29	0.9961	Intercept	0.000995	+/-0.5



NMHC Calibration Plot Date: April 2, 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:	April 18, 2024
Last Cal Date:	March 22, 2024
Start time (MST):	10:38
End time (MST):	15:03
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	805.3	793.7	11.6	1.0032	1.0088
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 808.7 ppb	NO = 799.8 ppb
Baseline Corr 1st pt	NO_X = 805.7 ppb	NO = 793.8 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 = -0.4%
*Percent Change	NO = -0.8%

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:	1.094	1.101	NO bkgnd or offset:	10.0	10.1
NOX coeff or slope:	0.998	0.998	NOX bkgnd or offset:	10.3	10.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	181.0	182.2

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000294	0.999233
NO_X Cal Offset:	0.198498	0.498364
NO Cal Slope:	0.999838	0.998482
NO Cal Offset:	-0.783809	-0.583944
NO_2 Cal Slope:	0.999826	1.006238
NO_2 Cal Offset:	-1.024158	0.877238

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	807.8	799.2	8.6	1.0006	1.0019
Mid point	4957	42.6	403.7	400.0	3.7	404.2	398.6	5.6	0.9988	1.0034
Low point	4979	21.3	201.8	200.0	1.9	202.9	198.4	4.4	0.9947	1.0078
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
As left span	4915	85.3	808.3	417.7	390.6	806.6	417.7	388.8	1.0021	1.0000
								Average Correction Factor	0.9980	1.0044

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	795.6	414.7	388.4	391.0	0.9934	100.7%
Mid GPT point	795.6	607.1	196.0	199.1	0.9845	101.6%
Low GPT point	795.6	702.5	100.6	102.9	0.9777	102.3%
				Average Correction Factor	0.9852	101.5%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

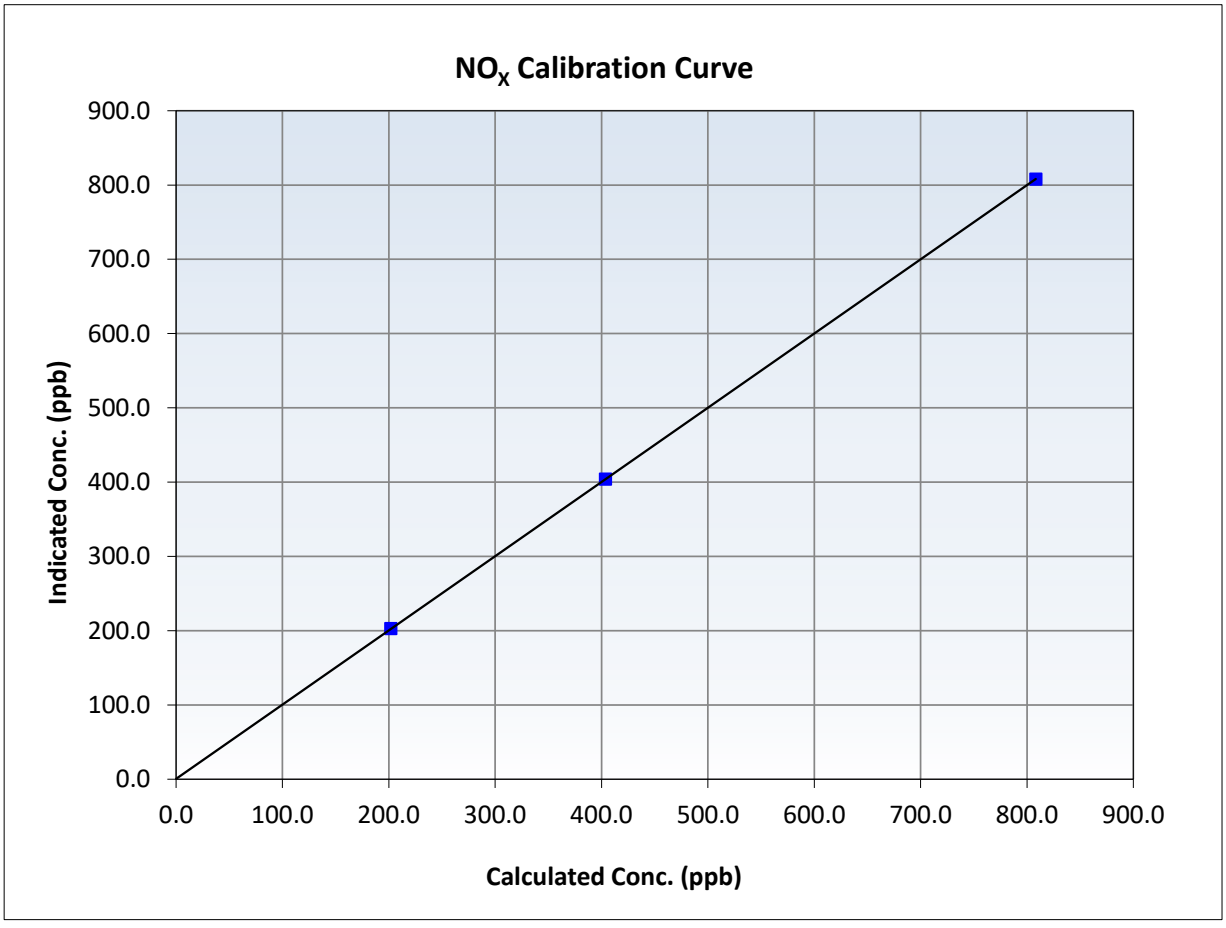
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	10:38	End Time (MST):	15:03
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	807.8	1.0006
403.7	404.2	0.9988
201.8	202.9	0.9947

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.999233	*0.90 - 1.10*
Intercept	0.498364	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

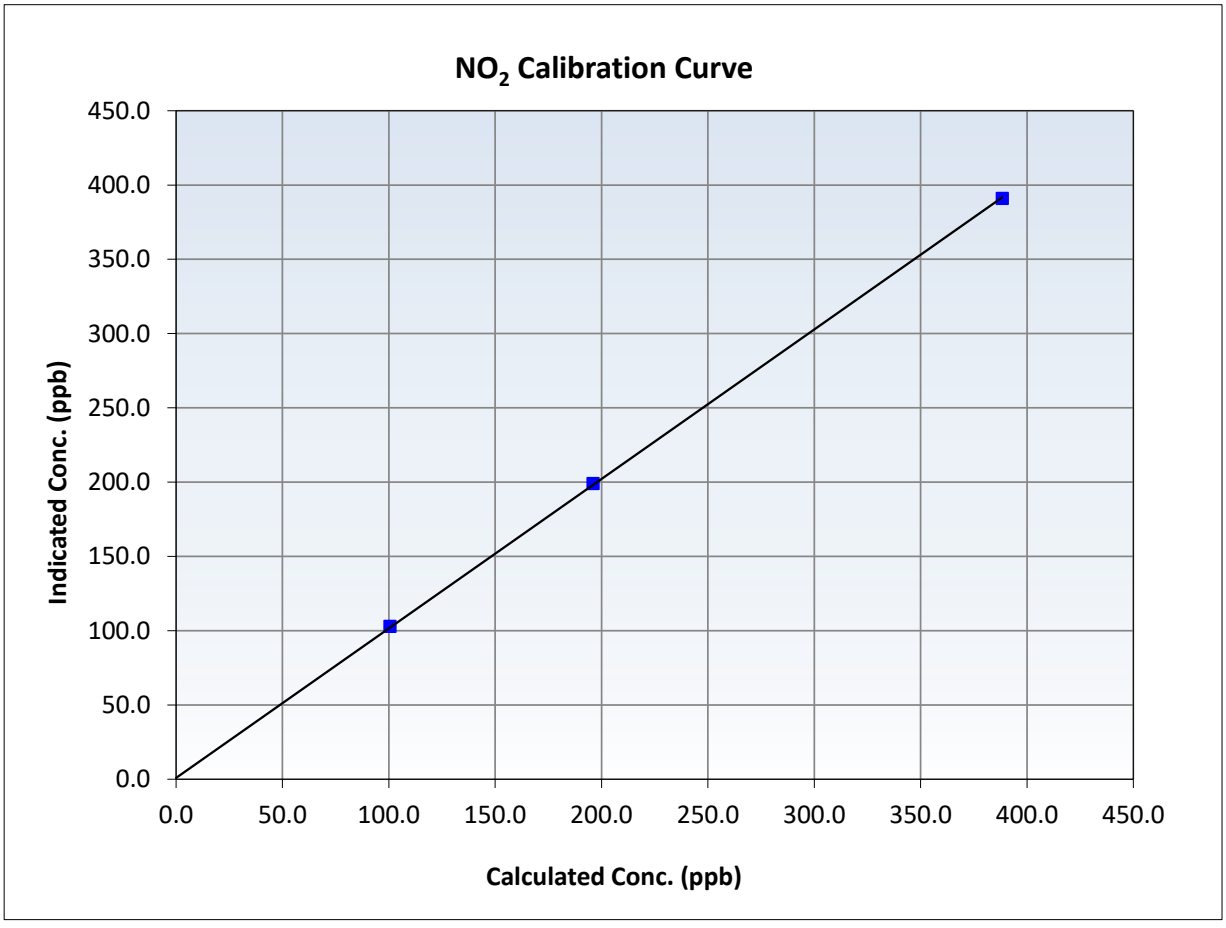
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	10:38	End Time (MST):	15:03
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	----
388.4	391.0	0.9934
196.0	199.1	0.9845
100.6	102.9	0.9777

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	1.006238	*0.90 - 1.10*
Intercept	0.877238	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

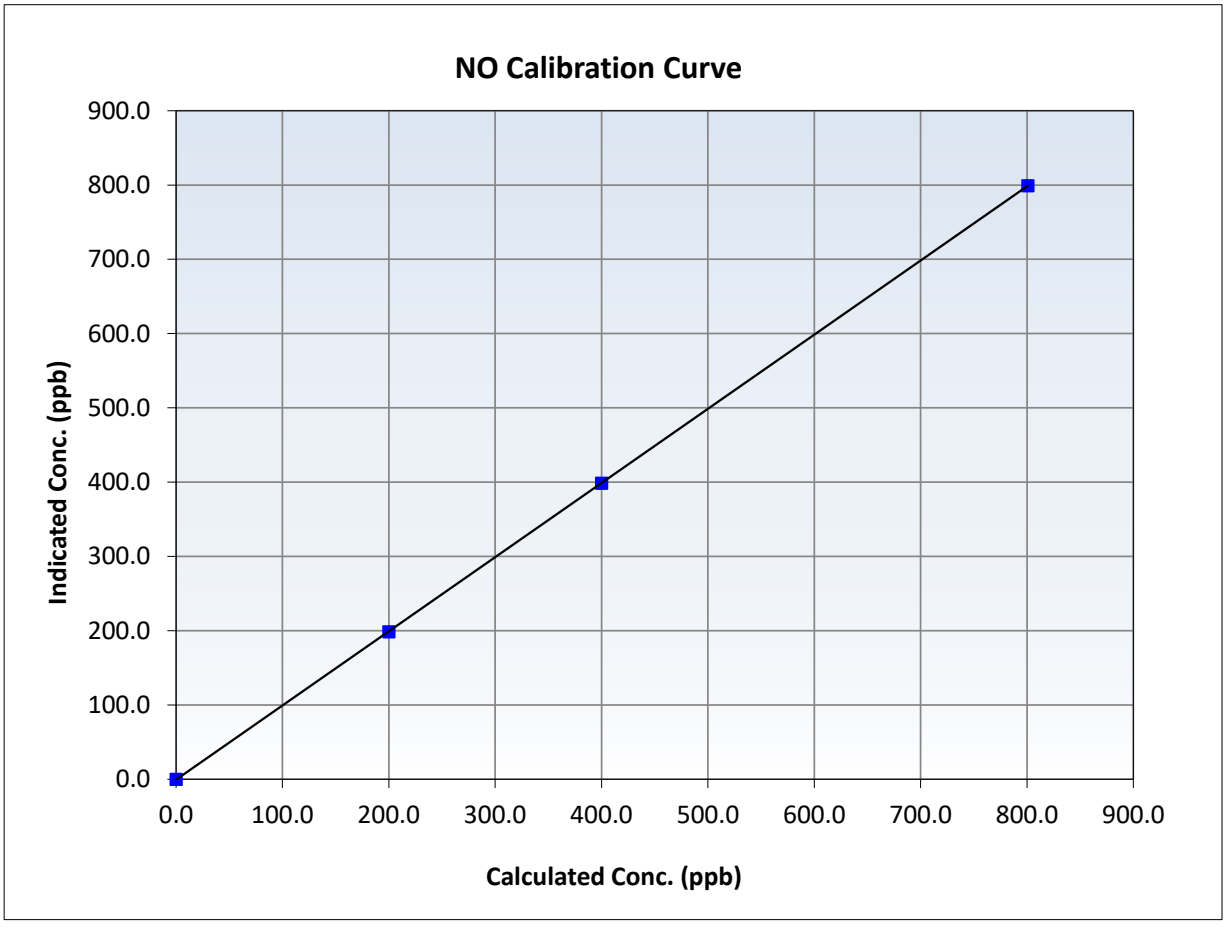
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 22, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	10:38	End Time (MST):	15:03
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

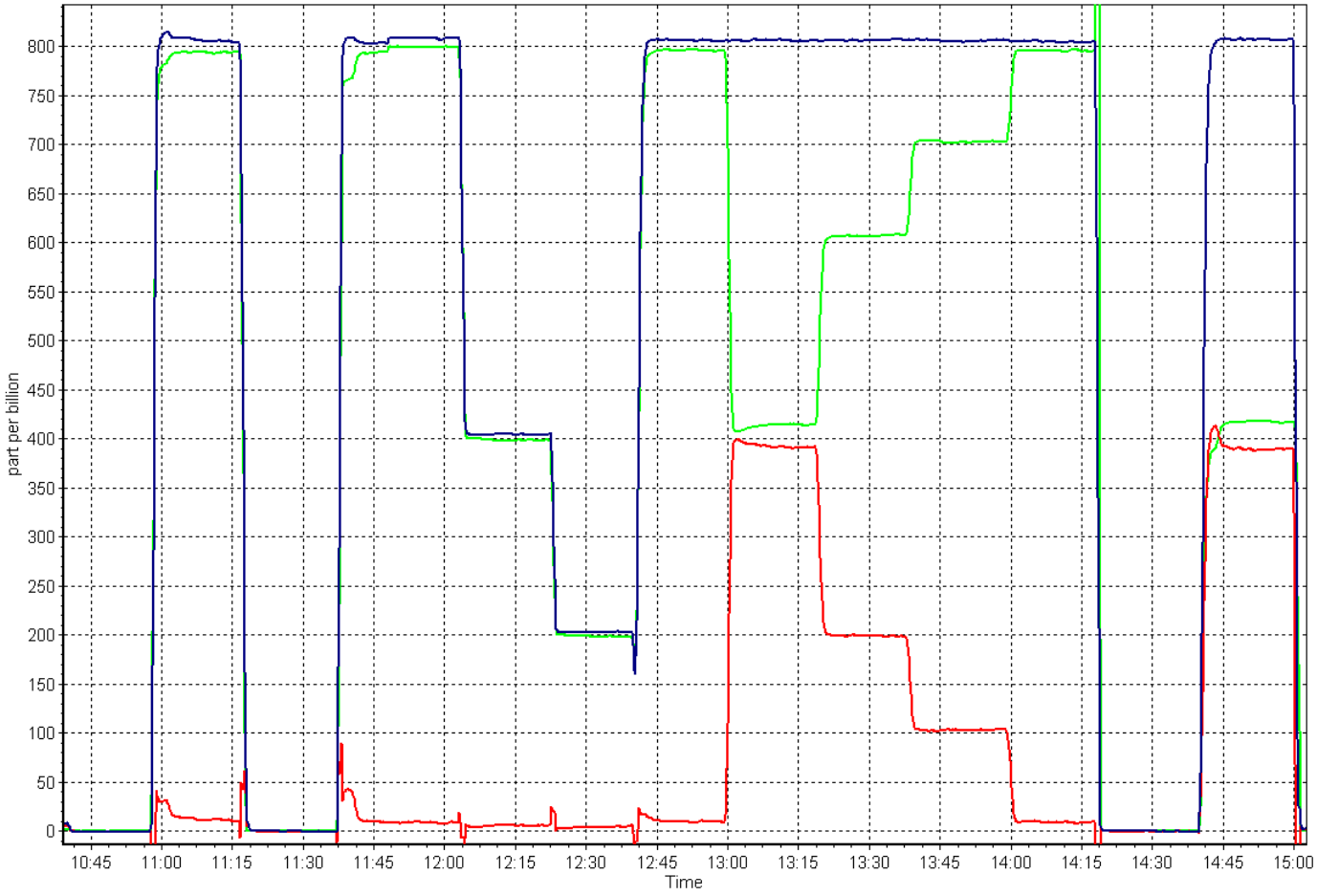
Calibration Data

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	198.4	1.0078

Statistical Evaluation		Limits
Correlation Coefficient	0.999997	≥0.995
Slope	0.998482	0.90 - 1.10
Intercept	-0.583944	+/-20



NO_X Calibration Plot Date: April 18, 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:	April 13, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	10:20	End time (MST):	11:15
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)	10.00	9.40	10.00	☐	+/- 2 °C
P (mmHg)	719.40	727.38	719.40	☐	+/- 10 mmHg
Flow (LPM)	4.95	4.96	4.95	☐	+/- 0.25 LPM
PW% (pump)	36.00	-----	36.00	☐	>80%
Zero Verification	PM w/o HEPA:	5.80	PM w/ HEPA:	6.70	<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	5.00	11.00	11.00	☐	+/- 0.5

Date Optical Chamber Cleaned: April 13, 2024

Date Disposable Filter Changed: April 13, 2024

Post- maintenance Zero Verification: PM w/ HEPA: 0.00 <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: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11
LOWER CAMP
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	April 24, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	10:04	End time (MST):	14:09
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:	0.994478	0.988759	Backgd or Offset:	14.7	14.7
Calibration intercept:	0.097406	-0.098992	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	1.3	----
As found High point	4932	81.4	799.6	788.8	1.015
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	787.5	Previous response	795.3	*% 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	1.2	----
High point	4932	81.4	799.6	791.3	1.011
Mid point	4959	40.7	400.9	395.4	1.014
Low point	4981	20.4	200.9	197.4	1.018
As left zero	5000	0.0	0.0	1.4	----
As left span	4932	81.4	799.6	792.4	1.009
				Average Correction Factor:	1.014

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

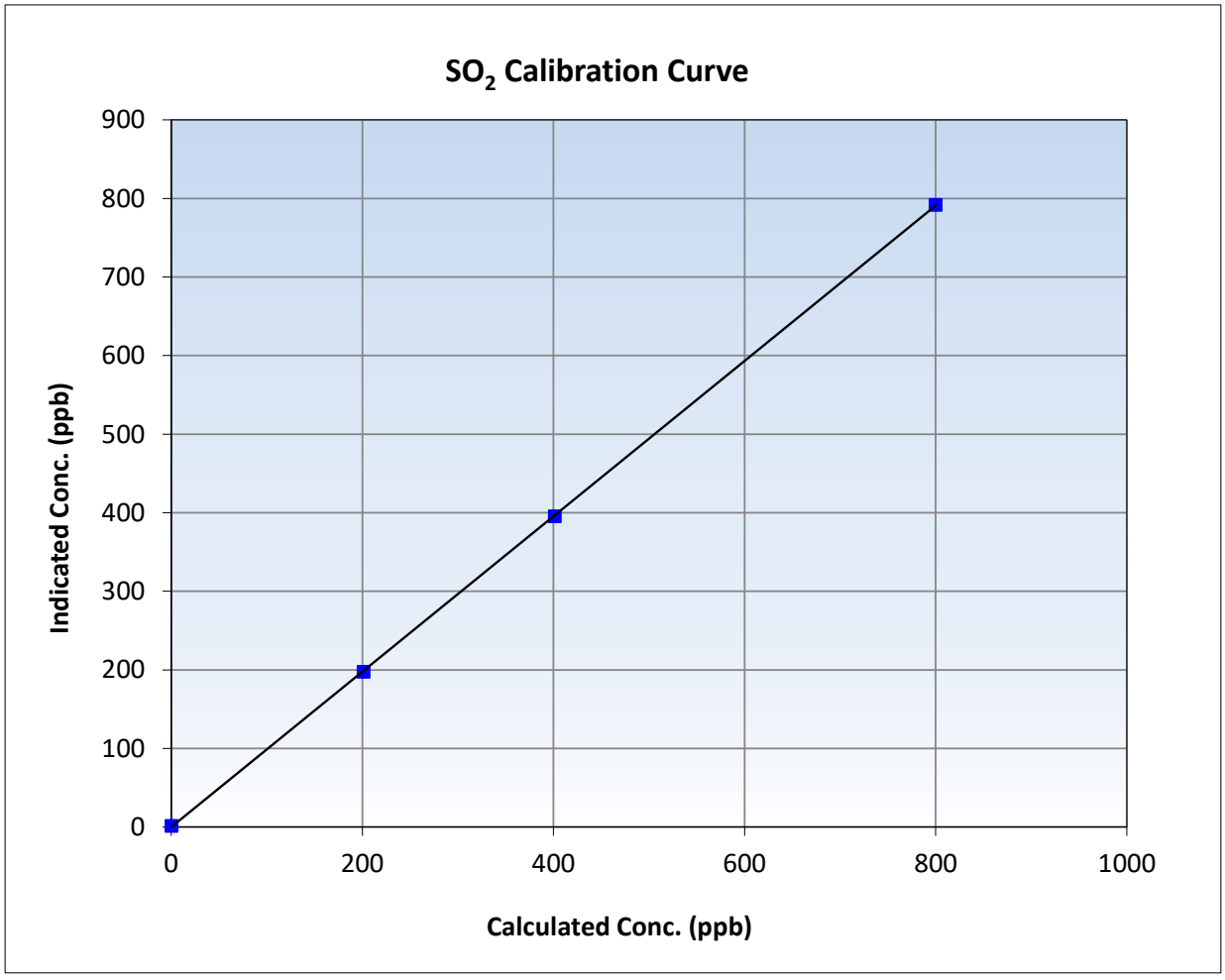
Station Information

Calibration Date:	April 24, 2024	Previous Calibration:	March 26, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:04	End Time (MST):	14:09
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

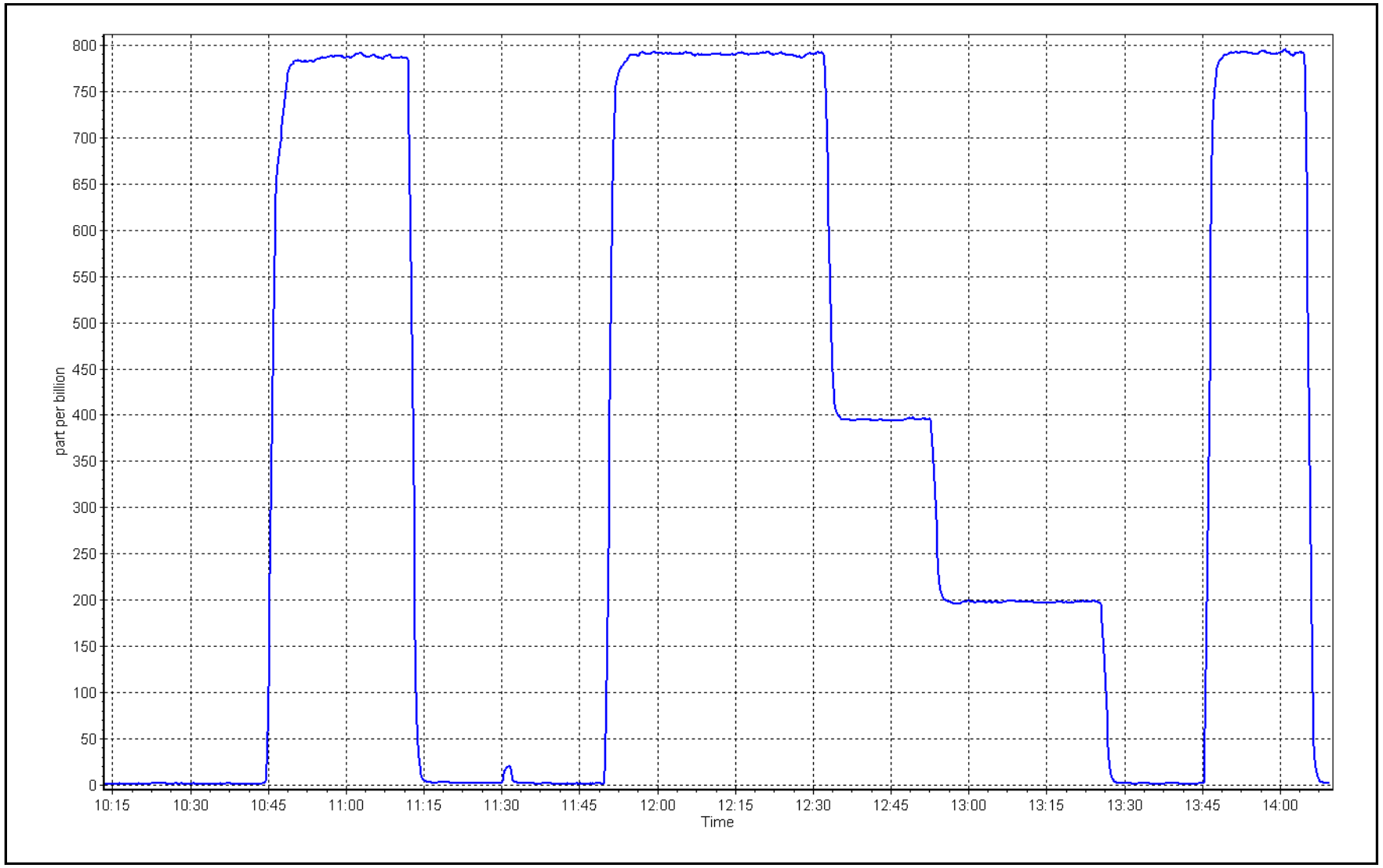
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.2	----
799.6	791.3	1.0105
400.9	395.4	1.0140
200.9	197.4	1.0176

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.988759	*0.90 - 1.10*
Intercept	-0.098992	*+/-30*



SO2 Calibration Plot Date: April 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:	April 23, 2024	Last Cal Date:	March 25, 2024
Start time (MST):	10:14	End time (MST):	14:37
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:	1.012278	0.990021	Backgd or Offset:	3.0	2.5
Calibration intercept:	-0.364532	0.156017	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	-0.6	----
As found High point	4926	73.6	79.9	79.3	1.000
As found Mid point	4963	36.8	40.0	39.5	0.996
As found Low point	4982	18.6	20.2	19.5	1.005
New cylinder response					

Baseline Corr As found:	79.9	Prev response:	80.54	*% change:	-0.8%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	1.000323	AF Intercept:	-0.604758
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999992	* = > +/-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	79.2	1.009
Mid point	4963	36.8	40.0	39.9	1.001
Low point	4982	18.6	20.2	20.1	1.005
As left zero	5000	0.0	0.0	0.1	----
As left span	4926	73.6	79.9	79.9	1.000
SO2 Scrubber Check	4935	81.5	812.3	-0.1	----
Date of last scrubber change:				Ave Corr Factor	1.005
Date of last converter efficiency test:					

Notes: Changed sample inlet filter after as founds. Adjusted zero only. Ran scrubber check after calibrator zero and it passed.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

H_2S Calibration Summary

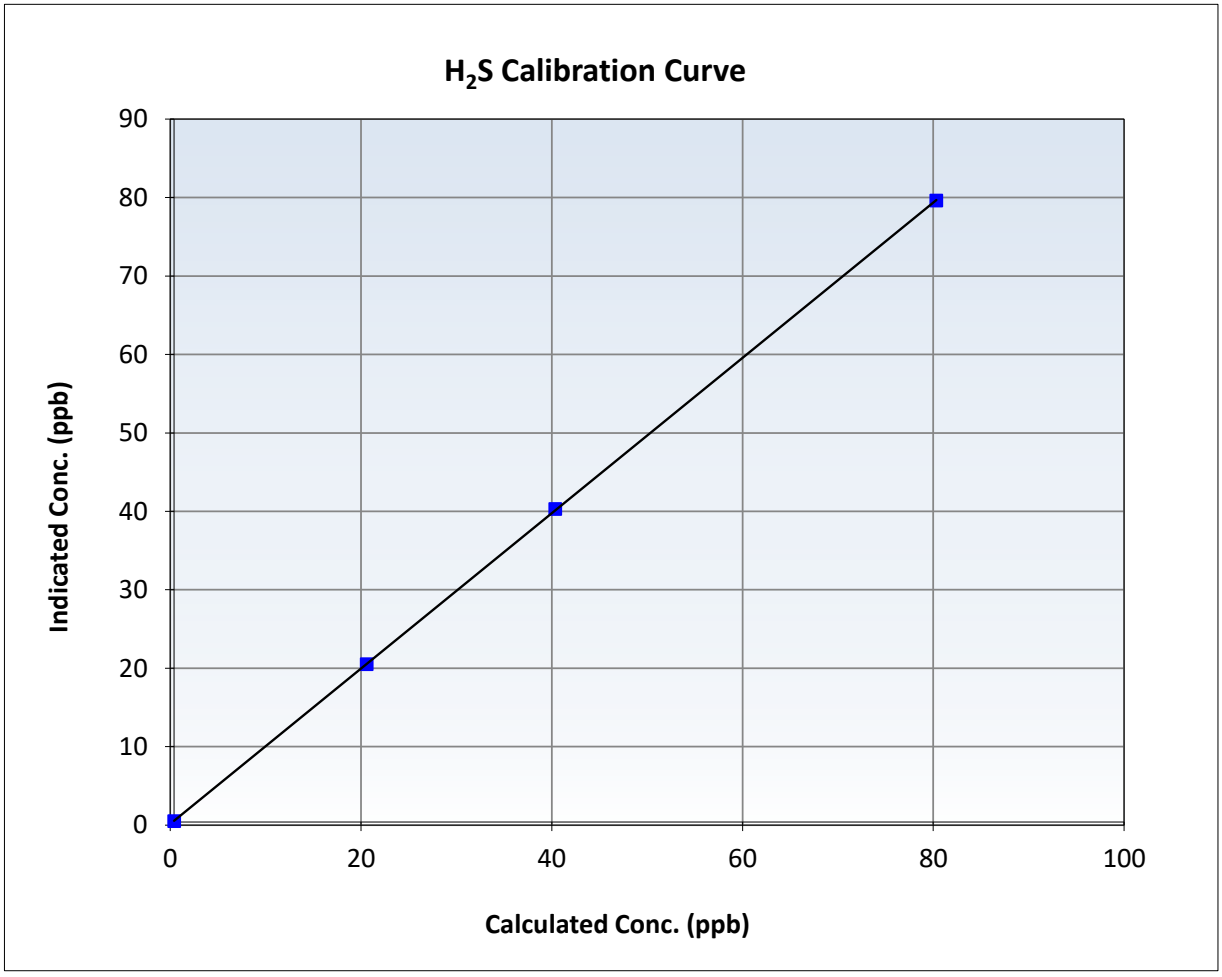
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 25, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:14	End Time (MST):	14:37
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1203169745

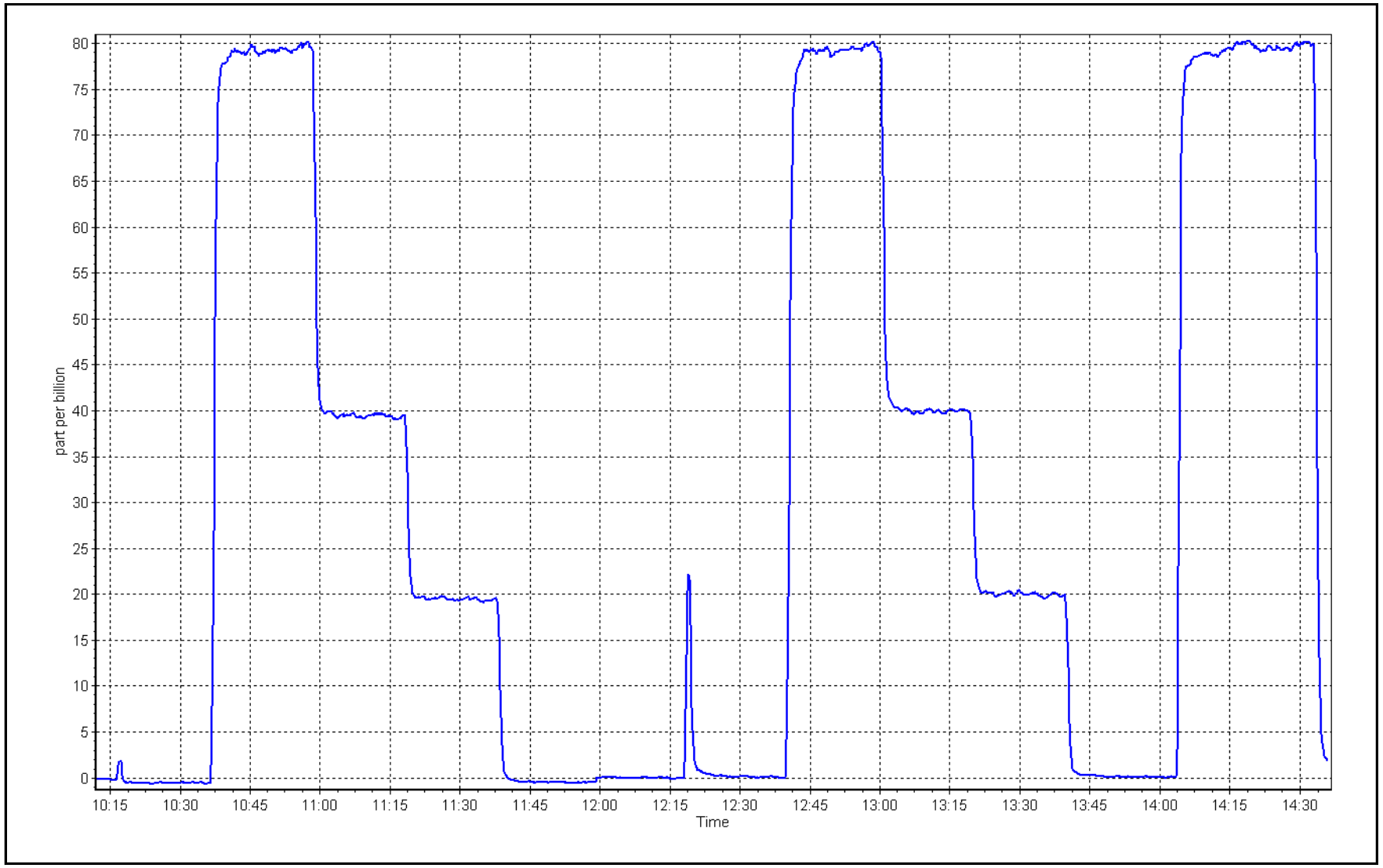
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
79.9	79.2	1.0091
40.0	39.9	1.0015
20.2	20.1	1.0046

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.990021	*0.90 - 1.10*
Intercept	0.156017	*+/-3*



H_2S Calibration Plot Date: April 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:	April 24, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	10:04	End time (MST):	14:09
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:	2.68E-04	2.75E-04	NMHC SP Ratio:	4.81E-05	4.90E-05
CH4 Retention time:	14.6	14.8	NMHC Peak Area:	190907	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	16.82	1.030
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.82	Prev response	17.29	*% 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	4932	81.4	17.33	17.30	1.002
Mid point	4959	40.7	8.69	8.63	1.006
Low point	4981	20.4	4.35	4.31	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	17.33	17.44	0.993
				Average Correction Factor	1.006

Notes: Changed sample inlet filter and nitrogen cylinder 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	4932	81.4	9.18	8.96	1.025
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.96	Prev response	9.16	*% 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	4932	81.4	9.18	9.15	1.002
Mid point	4959	40.7	4.60	4.57	1.006
Low point	4981	20.4	2.31	2.28	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	9.18	9.23	0.994
				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	4932	81.4	8.15	7.86	1.036
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.86	Prev response	8.13	*% change	-3.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	8.15	8.14	1.001
Mid point	4959	40.7	4.09	4.06	1.007
Low point	4981	20.4	2.05	2.02	1.013
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	8.15	8.22	0.992
				Average Correction Factor	1.007

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999083	0.998938
THC Cal Offset:	-0.021522	-0.023918
CH4 Cal Slope:	0.998771	0.999584
CH4 Cal Offset:	-0.011567	-0.013970
NMHC Cal Slope:	0.999149	0.997916
NMHC Cal Offset:	-0.009354	-0.009146

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

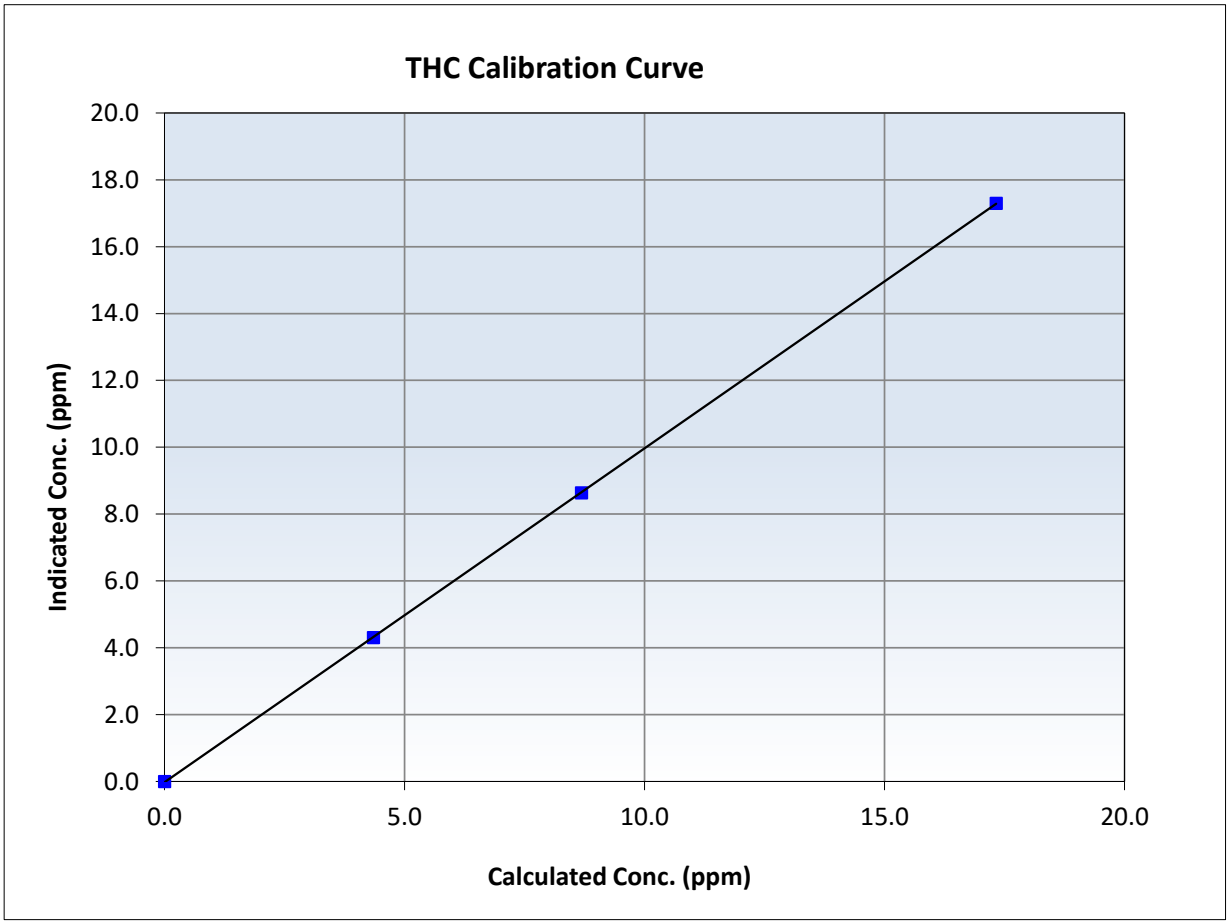
THC Calibration Summary

Station Information

Calibration Date:	April 24, 2024	Previous Calibration:	March 26, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:04	End Time (MST):	14:09
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	0.999991	*≥0.995*
17.33	17.30	1.0016	Slope	0.998938	*0.90 - 1.10*
8.69	8.63	1.0062			
4.35	4.31	1.0108	Intercept	-0.023918	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

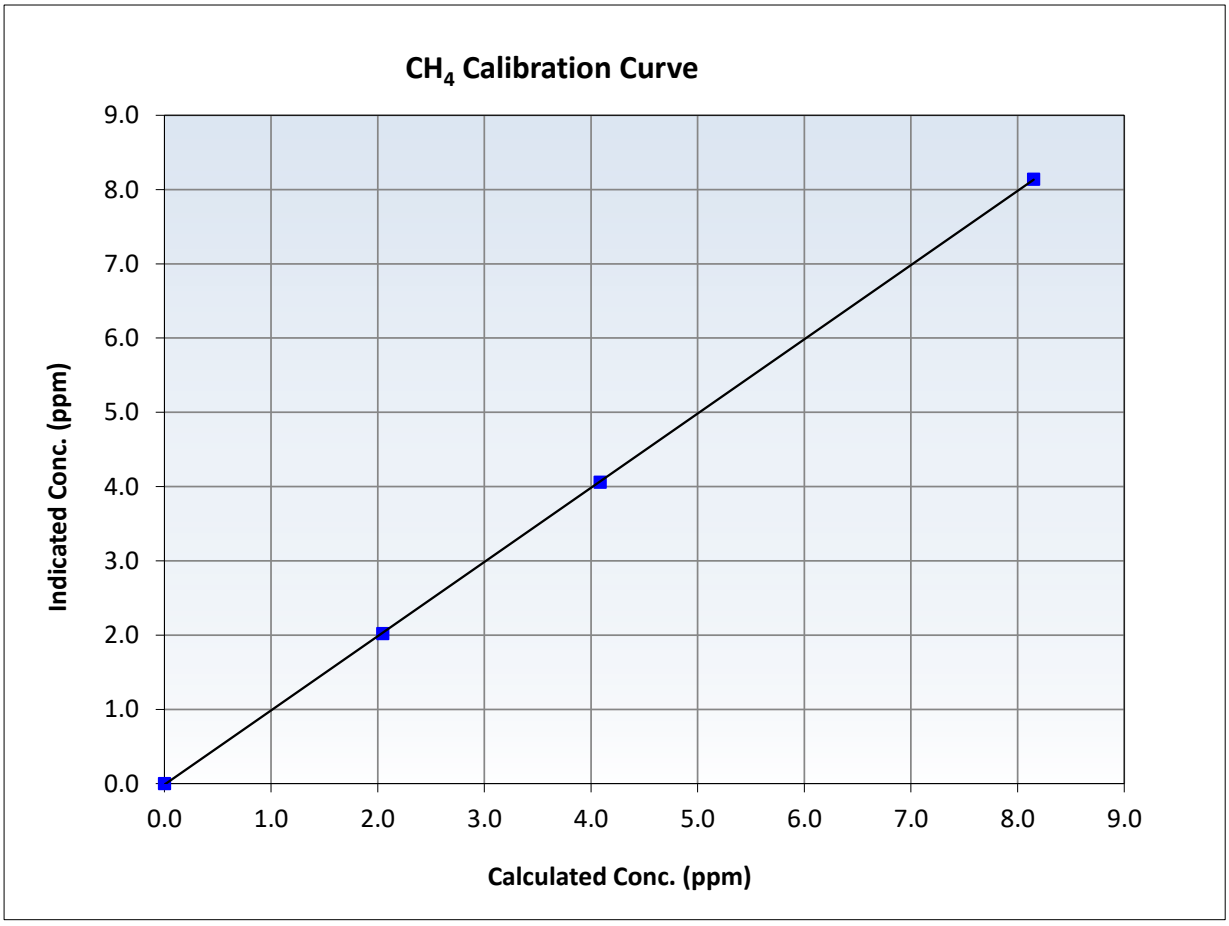
Station Information

Calibration Date:	April 24, 2024	Previous Calibration:	March 26, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:04	End Time (MST):	14:09
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	8.14	1.0011
4.09	4.06	1.0068
2.05	2.02	1.0127

Statistical Evaluation		Limits
Correlation Coefficient	0.999985	≥0.995
Slope	0.999584	0.90 - 1.10
Intercept	-0.013970	+/-0.5



Wood Buffalo Environmental Association

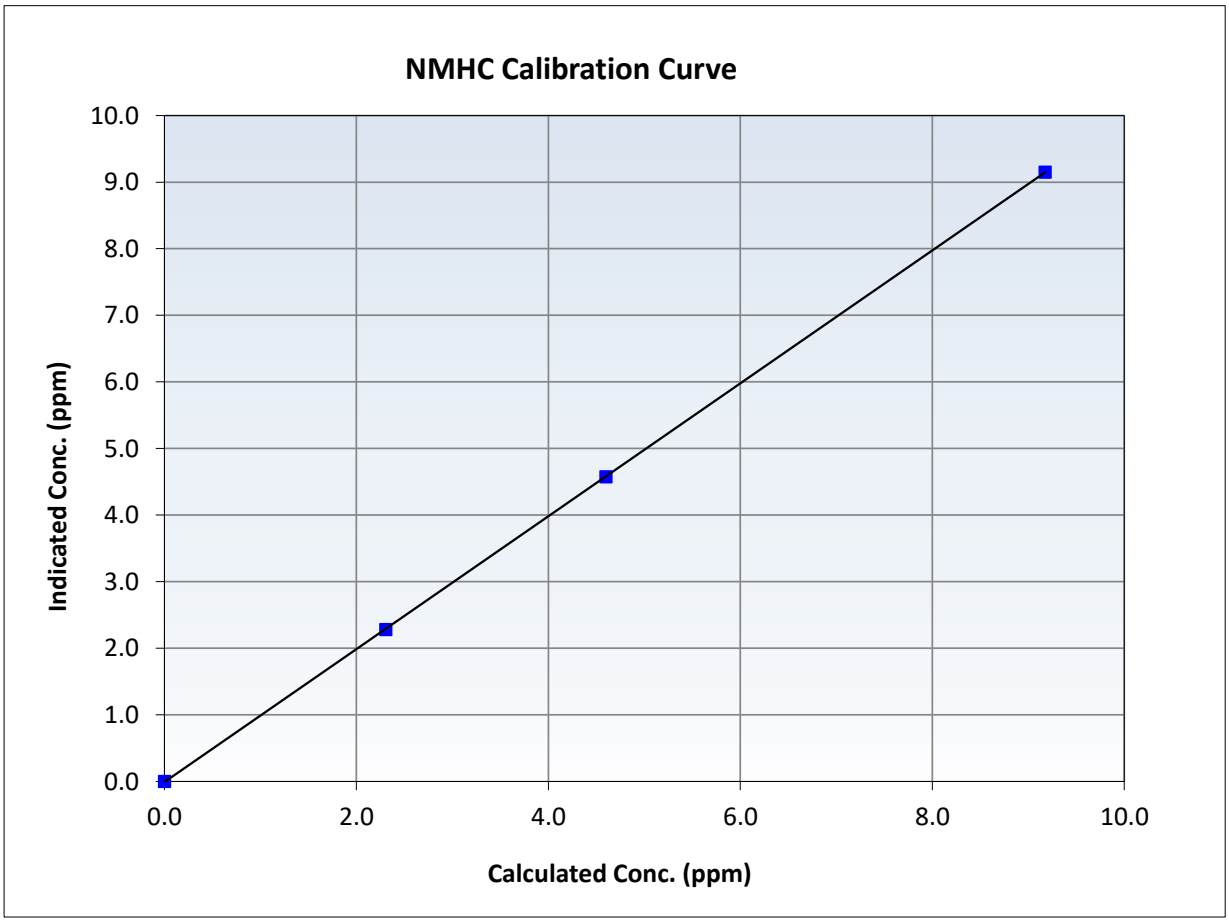
NMHC Calibration Summary

Station Information

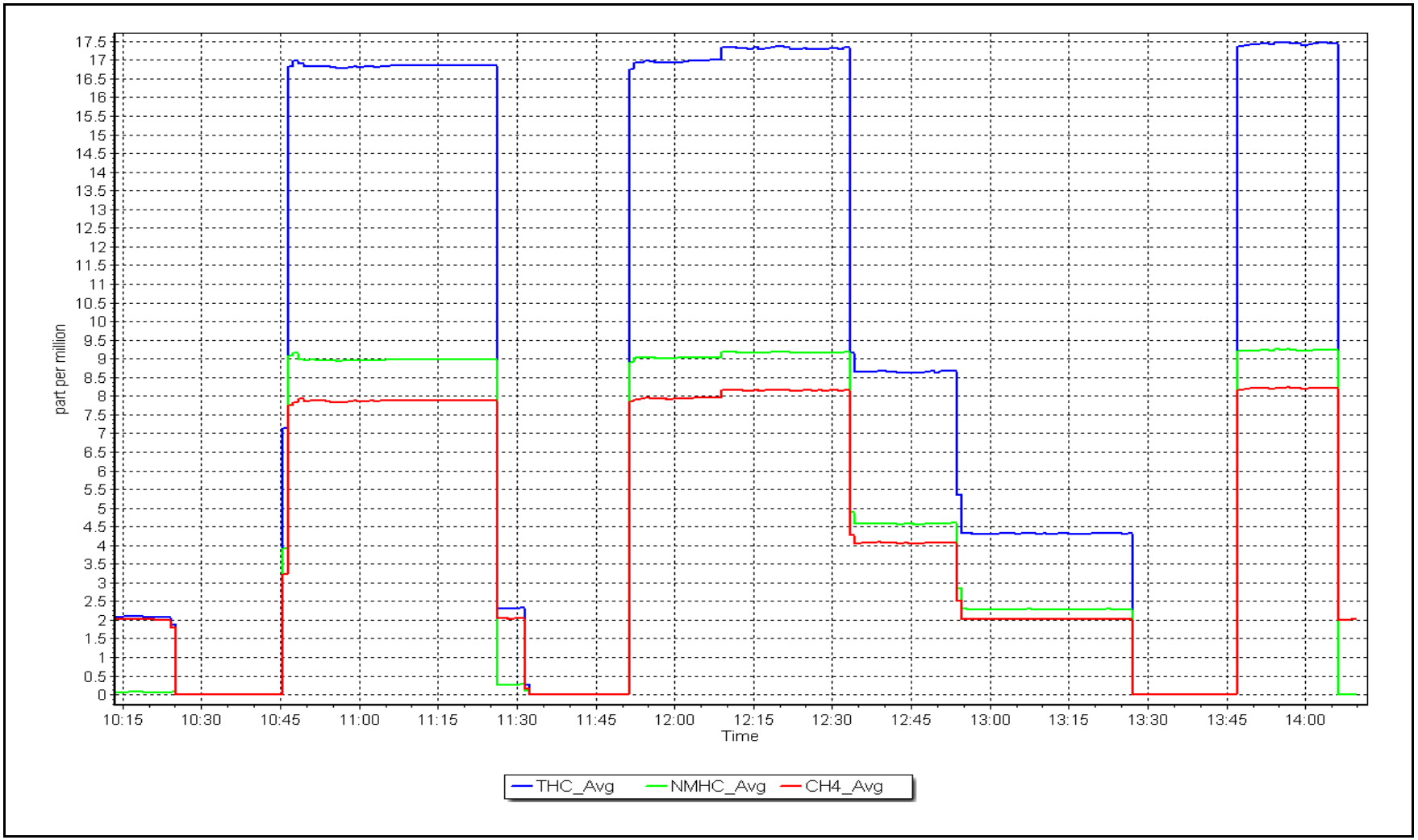
Calibration Date:	April 24, 2024	Previous Calibration:	March 26, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	10:04	End Time (MST):	14:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999995	*≥0.995*
9.18	9.15	1.0025	Slope	0.997916	*0.90 - 1.10*
4.60	4.57	1.0058			
2.31	2.28	1.0092	Intercept	-0.009146	*+/-0.5*



NMHC Calibration Plot Date: April 24, 2024 Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS13
FORT MCKAY SOUTH
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	April 4, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	8:47	End time (MST):	14:27
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:	1.002127	1.004442	Backgd or Offset:	90.0	90.0
Calibration intercept:	-2.338170	-2.497906	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	0.1	----
As found High point	4921	79.1	799.7	800.9	0.999
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	800.8	Previous response	799.0	*% 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	0.1	----
High point	4921	79.1	799.7	801.8	0.997
Mid point	4961	39.5	399.3	398.0	1.003
Low point	4980	19.8	200.2	195.5	1.024
As left zero	5000	0.0	0.0	0.3	----
As left span	4921	79.1	799.7	801.0	0.998
				Average Correction Factor:	1.008

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

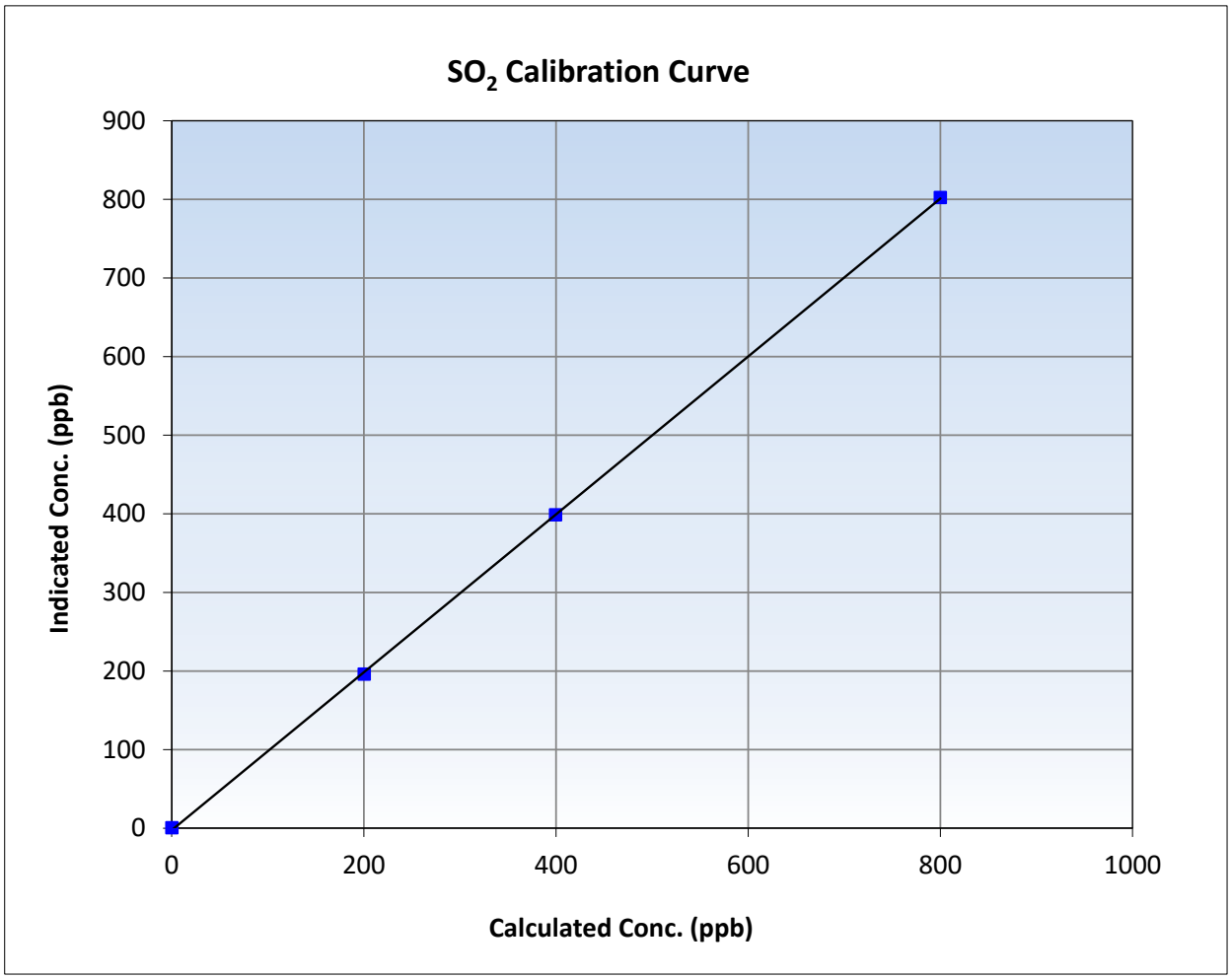
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:47	End Time (MST):	14:27
Analyzer make:	API T100	Analyzer serial #:	599

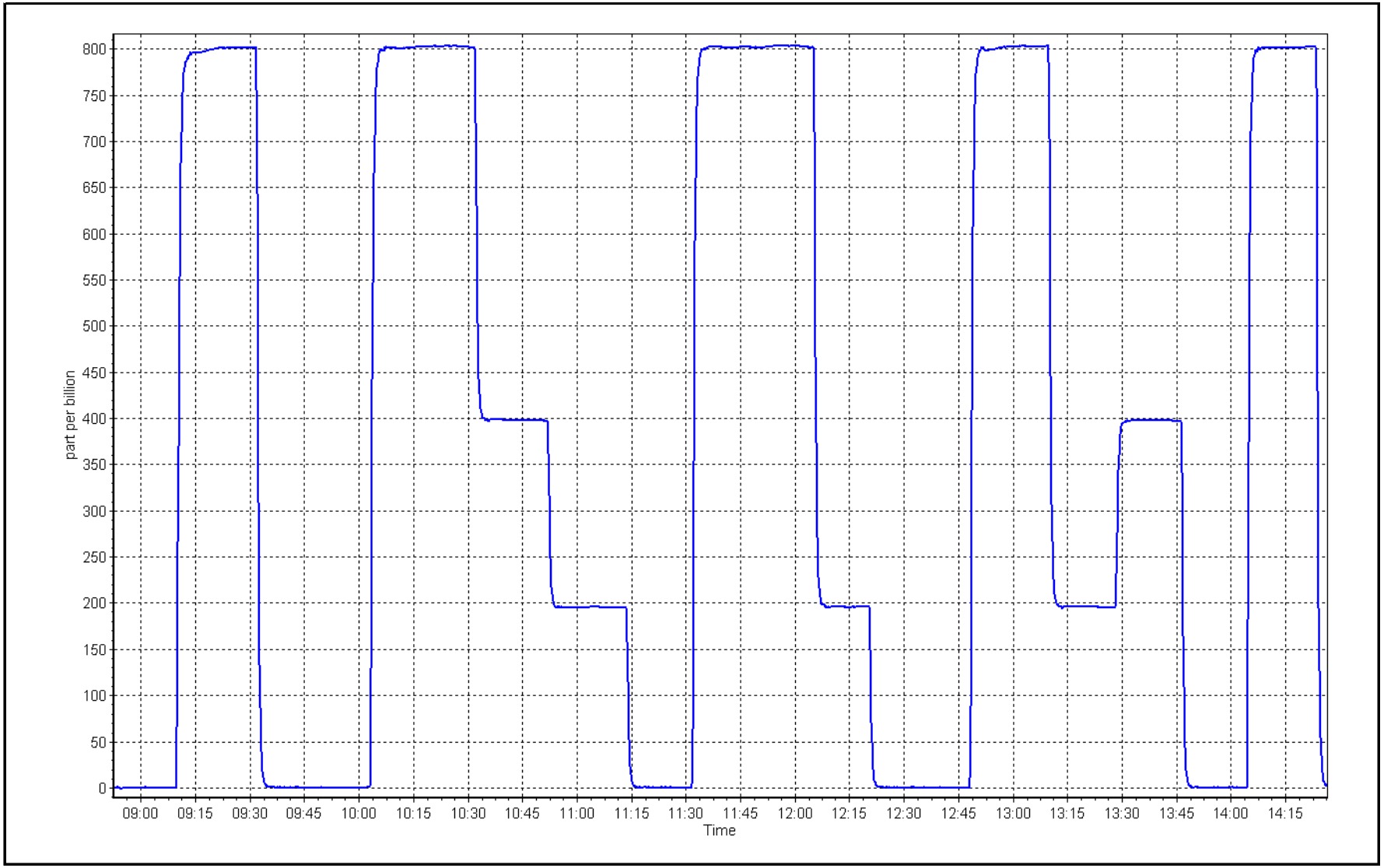
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.7	801.8	0.9974
399.3	398.0	1.0033
200.2	195.5	1.0240

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999950	*≥0.995*
Slope	1.004442	*0.90 - 1.10*
Intercept	-2.497906	*+/-30*



SO2 Calibration Plot Date: April 4, 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:	April 10, 2024	Last Cal Date:	March 21, 2024
Start time (MST):	9:04	End time (MST):	13:13
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:		degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.007879	1.010145	Backgd or Offset:	4.2	4.1
Calibration intercept:	-0.422268	-0.602184	Coeff or Slope:	1.157	1.143

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	82.1	0.976
As found Mid point	4962	37.7	40.3	40.4	0.984
As found Low point	4981	18.9	20.2	19.6	1.004
New cylinder response					
Baseline Corr As found:	82.6	Prev response:	80.84	*% change:	2.1%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.026451	AF Intercept:	-0.802285
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999939	* = > +/-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	-0.4	----
High point	4925	75.5	80.6	80.9	0.997
Mid point	4962	37.7	40.3	40.1	1.004
Low point	4981	18.9	20.2	19.5	1.035
As left zero	5000	0.0	0.0	-0.2	----
As left span	4925	75.5	80.6	80.5	1.002
SO2 Scrubber Check	4921	79.1	791.0	0.0	----
Date of last scrubber change:		20-Jan-20		Ave Corr Factor	1.012
Date of last converter efficiency test:					

Notes: Changed inlet filter after as founds. Srubber checked after calibrator zero. Span adjusted only.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

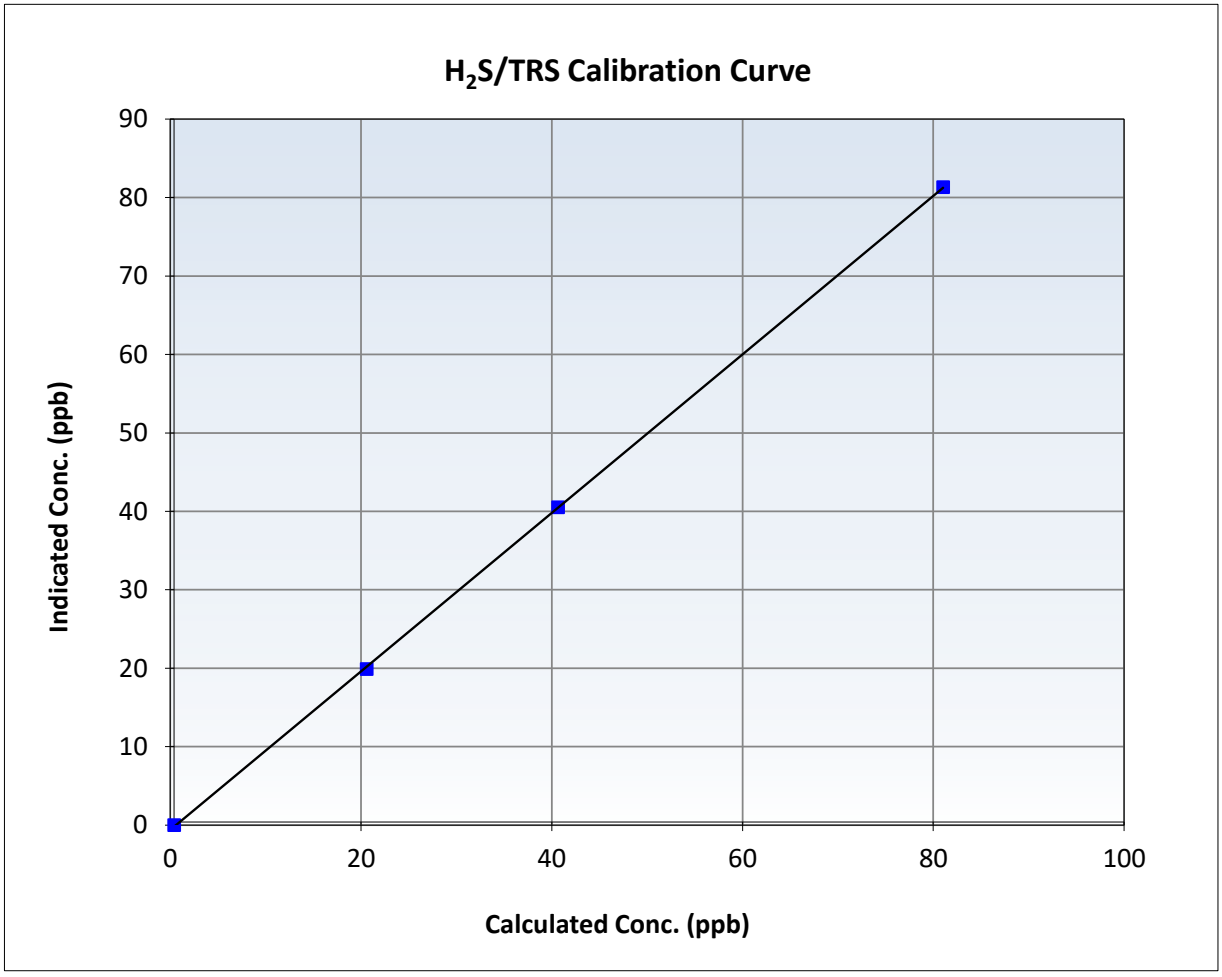
TRS Calibration Summary

Station Information

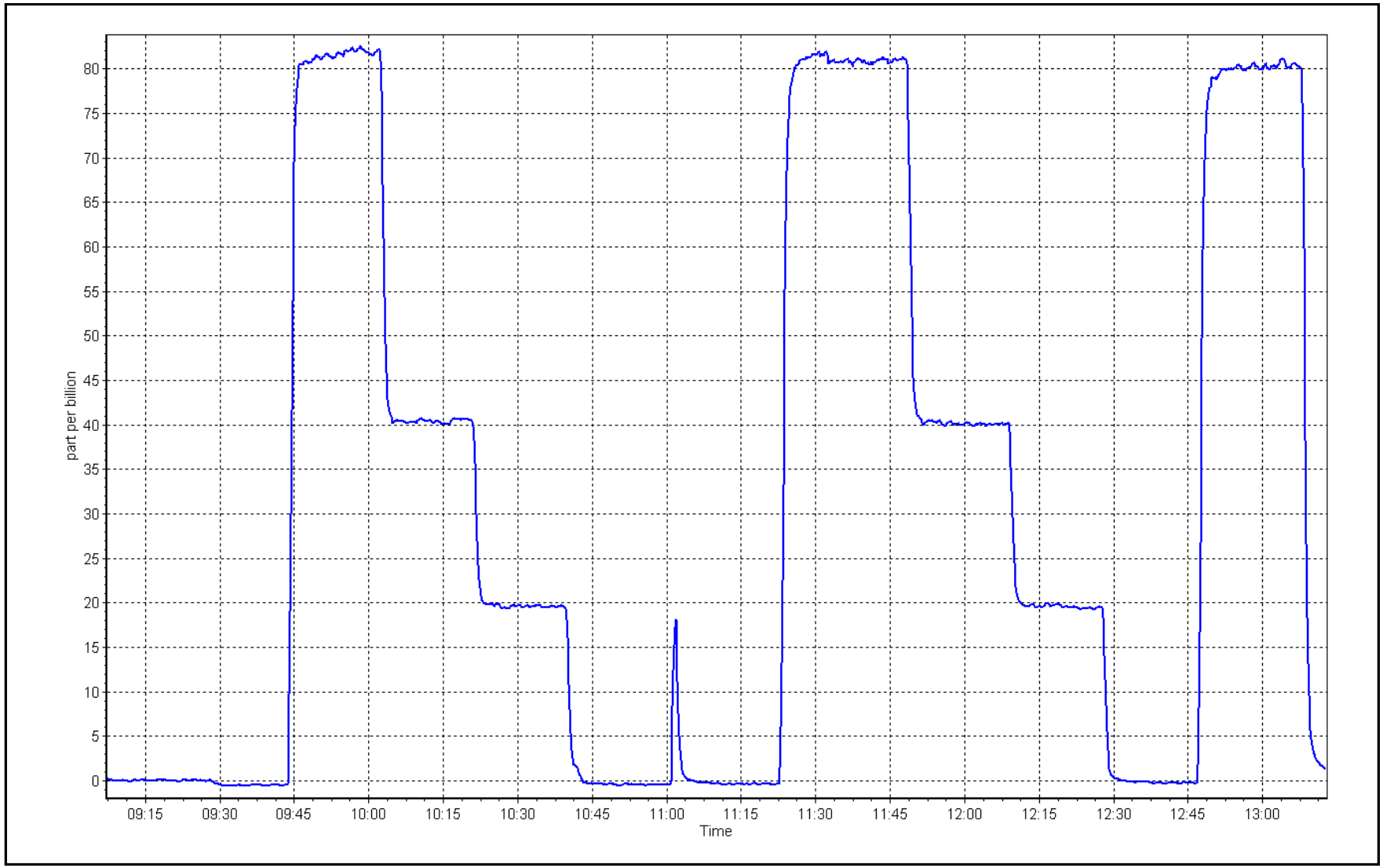
Calibration Date:	April 10, 2024	Previous Calibration:	March 21, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:04	End Time (MST):	13:13
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.4	----	Correlation Coefficient	0.999965	*≥0.995*
80.6	80.9	0.9966	Slope	1.010145	*0.90 - 1.10*
40.3	40.1	1.0041	Intercept	-0.602184	*+/-3*
20.2	19.5	1.0352			



TRS Calibration Plot Date: April 10, 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:	April 4, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	8:47	End time (MST):	14:27
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:	2.95E-04	3.05E-04	NMHC SP Ratio:	5.07E-05	5.21E-05
CH4 Retention time:	15.20	15.40	NMHC Peak Area:	179256	174169
Zero Chromatogram:	OFF	ON	Flat Baseline:	OFF	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	0.02	----
As found High point	4921	79.1	17.05	16.61	1.028
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.59	Prev response	16.99	*% change	-2.4%
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	79.1	17.05	17.07	0.999
Mid point	4961	39.5	8.51	8.52	0.999
Low point	4980	19.8	4.27	4.19	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	17.05	17.14	0.994
				Average Correction Factor	1.006

Notes: Changed inlet filter after as founds. Do zero chromatogram and adjsuted 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	4921	79.1	9.08	8.82	1.029
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.82	Prev response	9.10	*% change	-3.2%
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	4921	79.1	9.08	9.11	0.997
Mid point	4961	39.5	4.53	4.54	0.998
Low point	4980	19.8	2.27	2.26	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.19	0.988
				Average Correction Factor	1.000

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.02	----
As found High point	4921	79.1	7.97	7.96	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.95	Prev response	7.89	*% 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	79.1	7.97	7.96	1.001
Mid point	4961	39.5	3.98	3.98	1.001
Low point	4980	19.8	1.99	1.93	1.035
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	7.95	1.002
				Average Correction Factor	1.012

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001286	1.002927
THC Cal Offset:	-0.078556	-0.034543
CH4 Cal Slope:	0.994805	1.002287
CH4 Cal Offset:	-0.034188	-0.026764
NMHC Cal Slope:	1.007213	1.003450
NMHC Cal Offset:	-0.045569	-0.007378

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

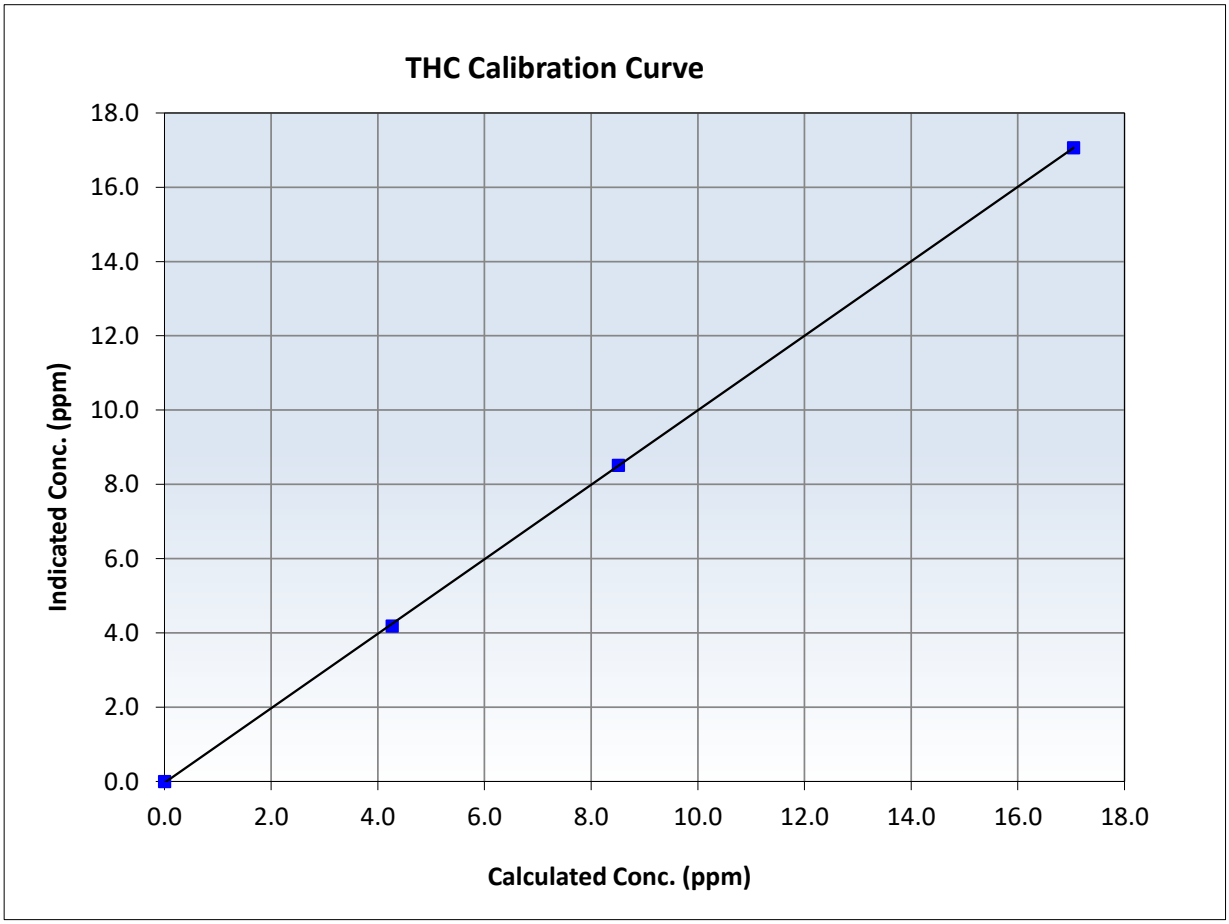
THC Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:47	End Time (MST):	14:27
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	0.999971	≥0.995
17.05	17.07	0.9987	Slope	1.002927	0.90 - 1.10
8.51	8.52	0.9994	Intercept	-0.034543	+/-0.5
4.27	4.19	1.0187			



Wood Buffalo Environmental Association

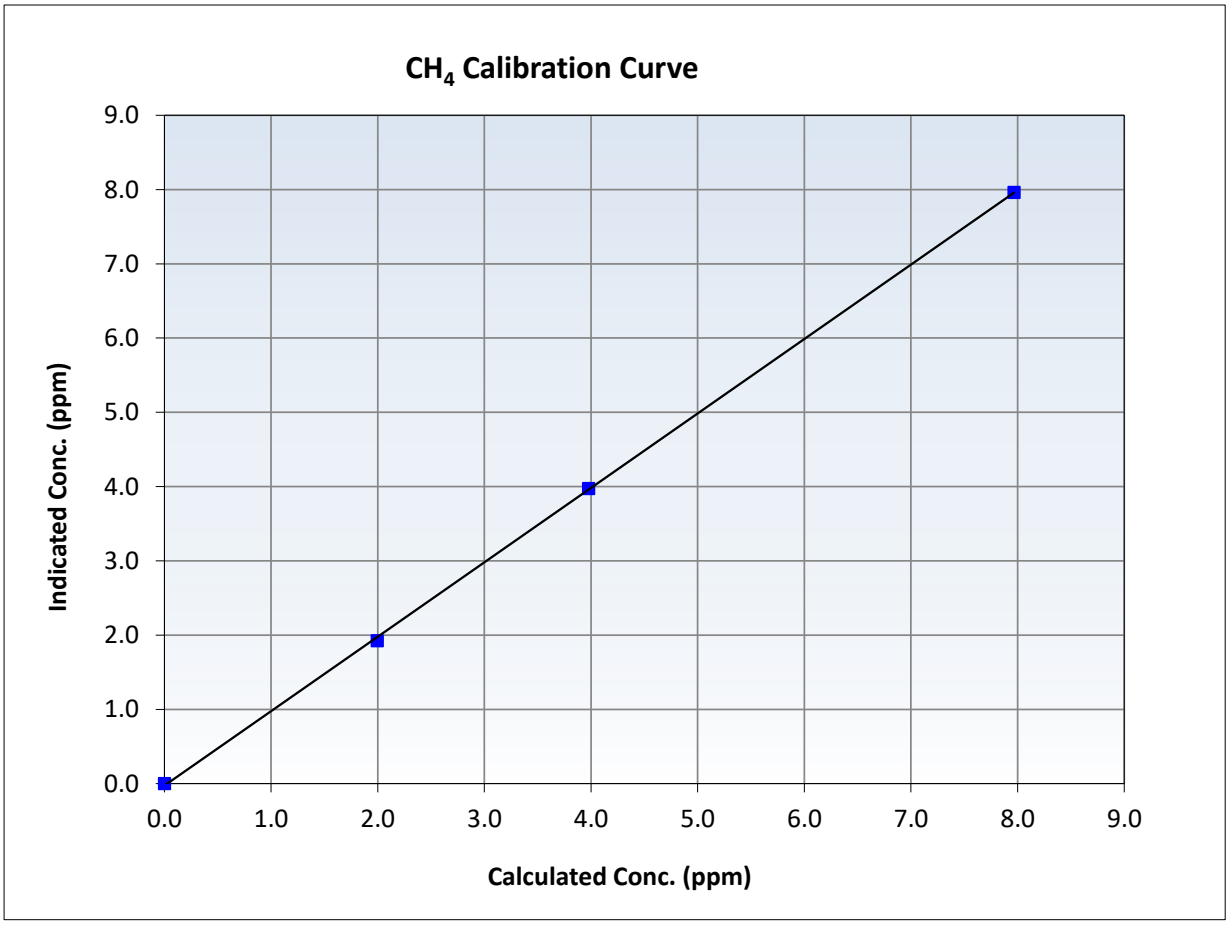
CH_4 Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:47	End Time (MST):	14:27
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	0.999911	*≥0.995*
7.97	7.96	1.0006	Slope	1.002287	*0.90 - 1.10*
3.98	3.98	1.0005			
1.99	1.93	1.0355	Intercept	-0.026764	*+/-0.5*



Wood Buffalo Environmental Association

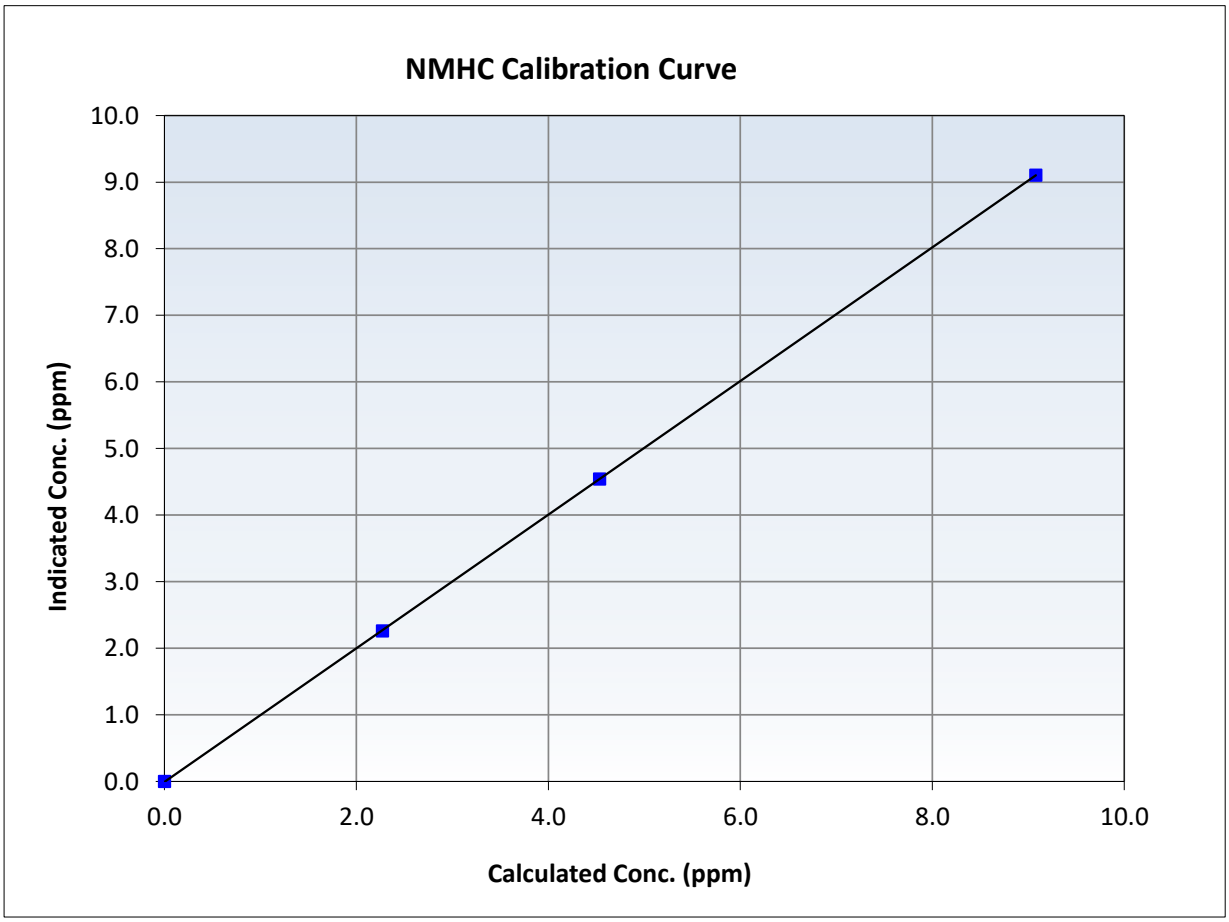
NMHC Calibration Summary

Station Information

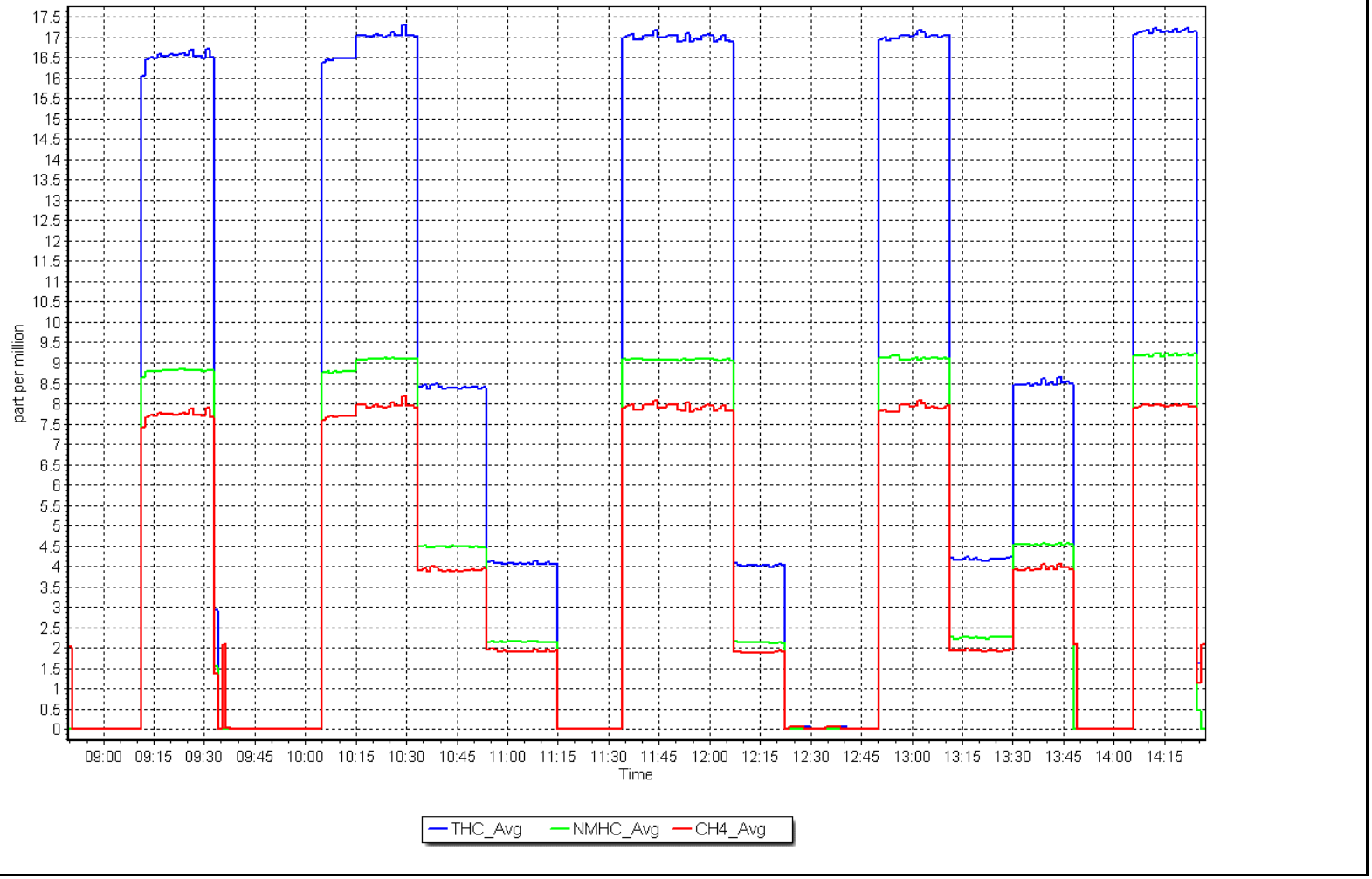
Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:47	End Time (MST):	14:27
Analyzer make:	Thermo 55i	Analyzer serial #:	1172750023

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999996	≥0.995
9.08	9.11	0.9972	Slope	1.003450	0.90 - 1.10
4.53	4.54	0.9977	Intercept	-0.007378	+/-0.5
2.27	2.26	1.0048			



NMHC Calibration Plot Date: April 4, 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:	April 16, 2024
Last Cal Date:	March 27, 2024
Start time (MST):	8:38
End time (MST):	13:10
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	797.9	792.3	5.5	1.0098	1.0091
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.0 ppb	NO = 794.7 ppb
Baseline Corr 1st pt	NO_X = 797.9 ppb	NO = 792.3 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 =	-0.1%	
*Percent Change	NO =	-0.3%	

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: 1410661329

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.128	1.140	NO bkgnd or offset:	10.1	10.2
NOX coeff or slope:	0.999	1.002	NOX bkgnd or offset:	10.2	10.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	157.3	163.5

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.994114	1.000782
NO_X Cal Offset:	-1.991485	-1.593202
NO Cal Slope:	0.997692	1.003482
NO Cal Offset:	-2.930061	-2.631535
NO_2 Cal Slope:	0.999151	1.001146
NO_2 Cal Offset:	-1.075362	-0.447686

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	805.6	801.1	4.5	1.0001	0.9980
Mid point	4958	41.8	403.4	400.3	3.1	401.4	397.7	3.7	1.0049	1.0065
Low point	4979	20.9	201.7	200.1	1.5	198.2	195.2	3.0	1.0176	1.0253
As left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
As left span	4917	83.5	805.7	382.8	422.9	809.6	382.8	426.8	0.9952	1.0000
							Average Correction Factor		1.0076	1.0100

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	795.6	381.3	420.5	420.8	0.9992	100.1%
Mid GPT point	795.6	586.7	215.1	214.5	1.0027	99.7%
Low GPT point	795.6	690.8	111.0	110.3	1.0062	99.4%
				Average Correction Factor	1.0027	99.7%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

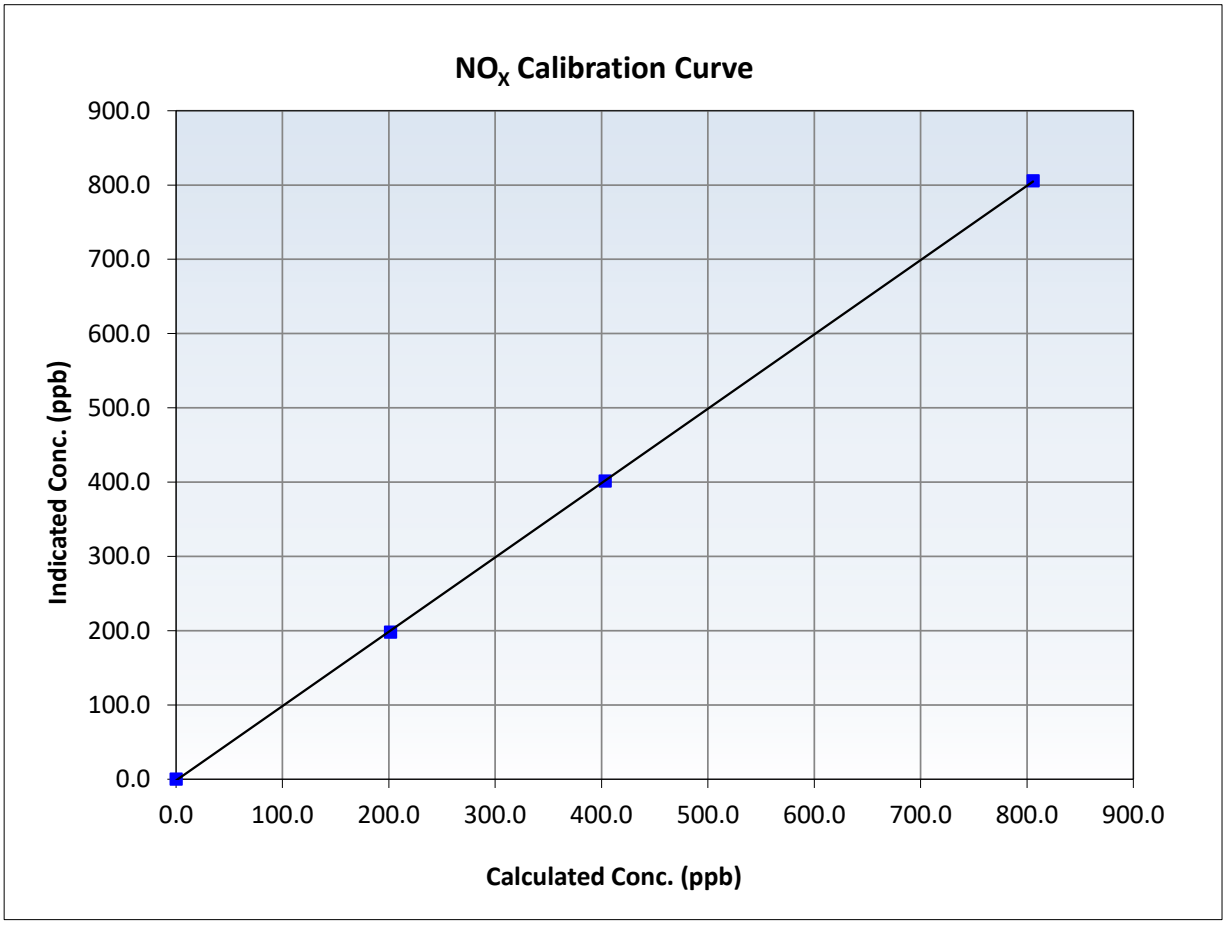
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:38	End Time (MST):	13:10
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	805.6	1.0001
403.4	401.4	1.0049
201.7	198.2	1.0176

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	1.000782	*0.90 - 1.10*
Intercept	-1.593202	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

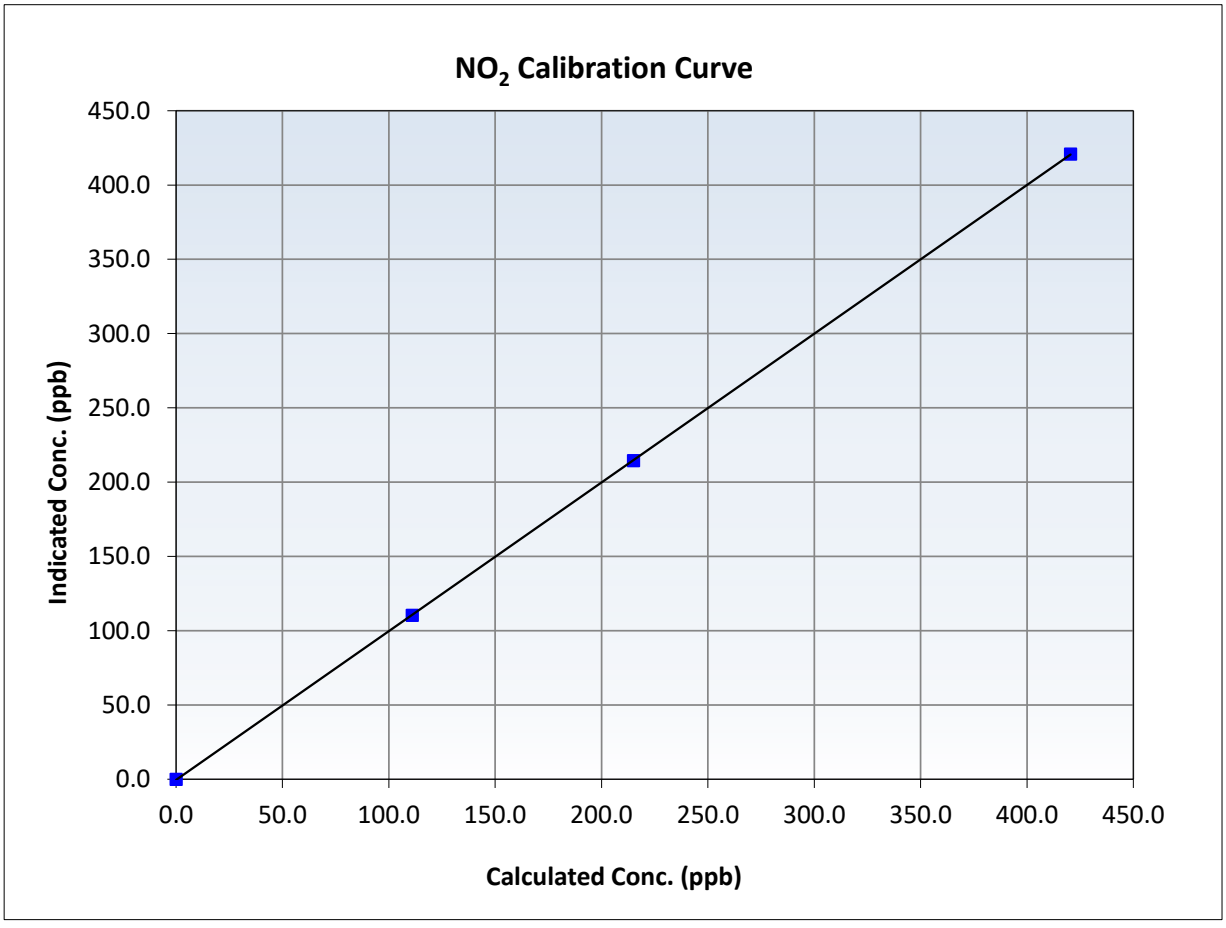
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:38	End Time (MST):	13:10
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	----
420.5	420.8	0.9992
215.1	214.5	1.0027
111.0	110.3	1.0062

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.001146	*0.90 - 1.10*
Intercept	-0.447686	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

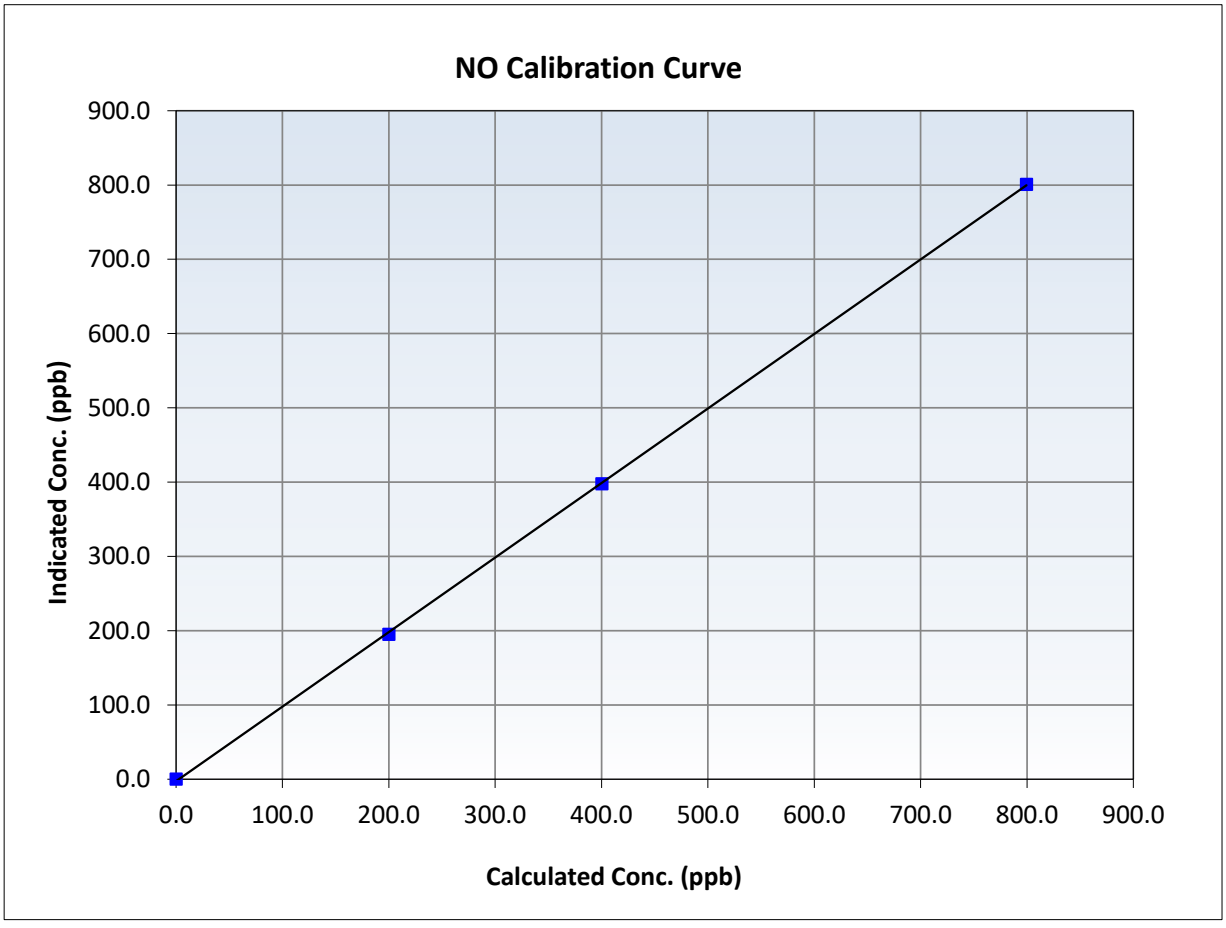
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:38	End Time (MST):	13:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

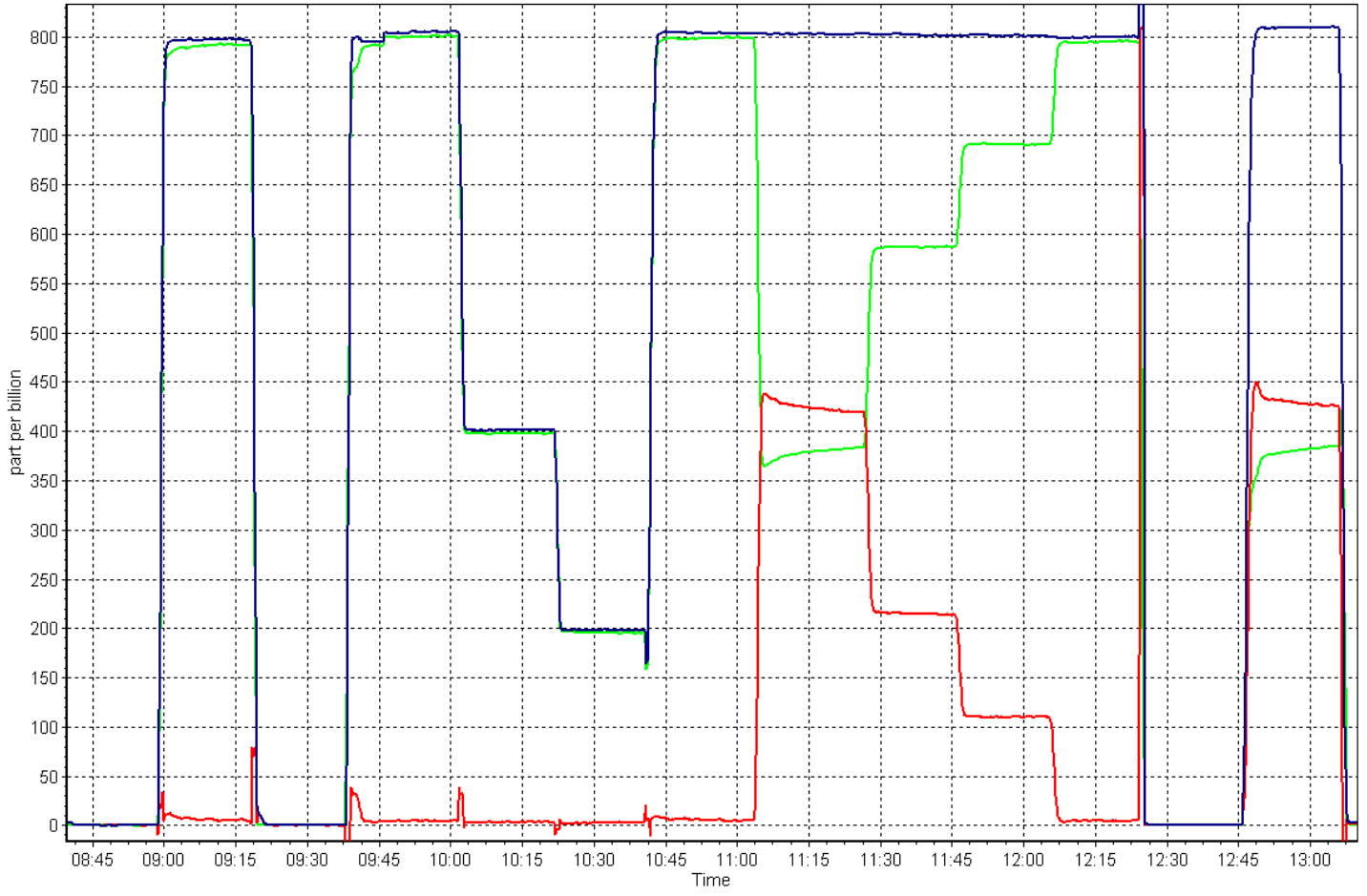
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.5	801.1	0.9980
400.3	397.7	1.0065
200.1	195.2	1.0253

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999939	*≥0.995*
Slope	1.003482	*0.90 - 1.10*
Intercept	-2.631535	*+/-20*



NO_X Calibration Plot Date: April 16, 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:	April 15, 2024	Last Cal Date:	April 5, 2024
Start time (MST):	9:37	End time (MST):	13:08
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:	0.999371	1.001029	Backgd or Offset:	4.0	2.7
Calibration intercept:	0.560000	1.320000	Coeff or Slope:	0.984	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	-1.2	----
As found High point	5000	994.5	400.0	405.2	0.984
As found Mid point					
As found Low point					
Baseline Corr As found:	406.4	Previous response	400.3	*% 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	0.7	----
High point	5000	995.4	400.0	401.3	0.997
Mid point	5000	849.9	200.0	202.2	0.989
Low point	5000	745.1	100.0	101.8	0.982
As left zero	5000	0.0	0.0	0.4	----
As left span	5000	995.4	400.0	401.7	0.996
				Average Correction Factor	0.989

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

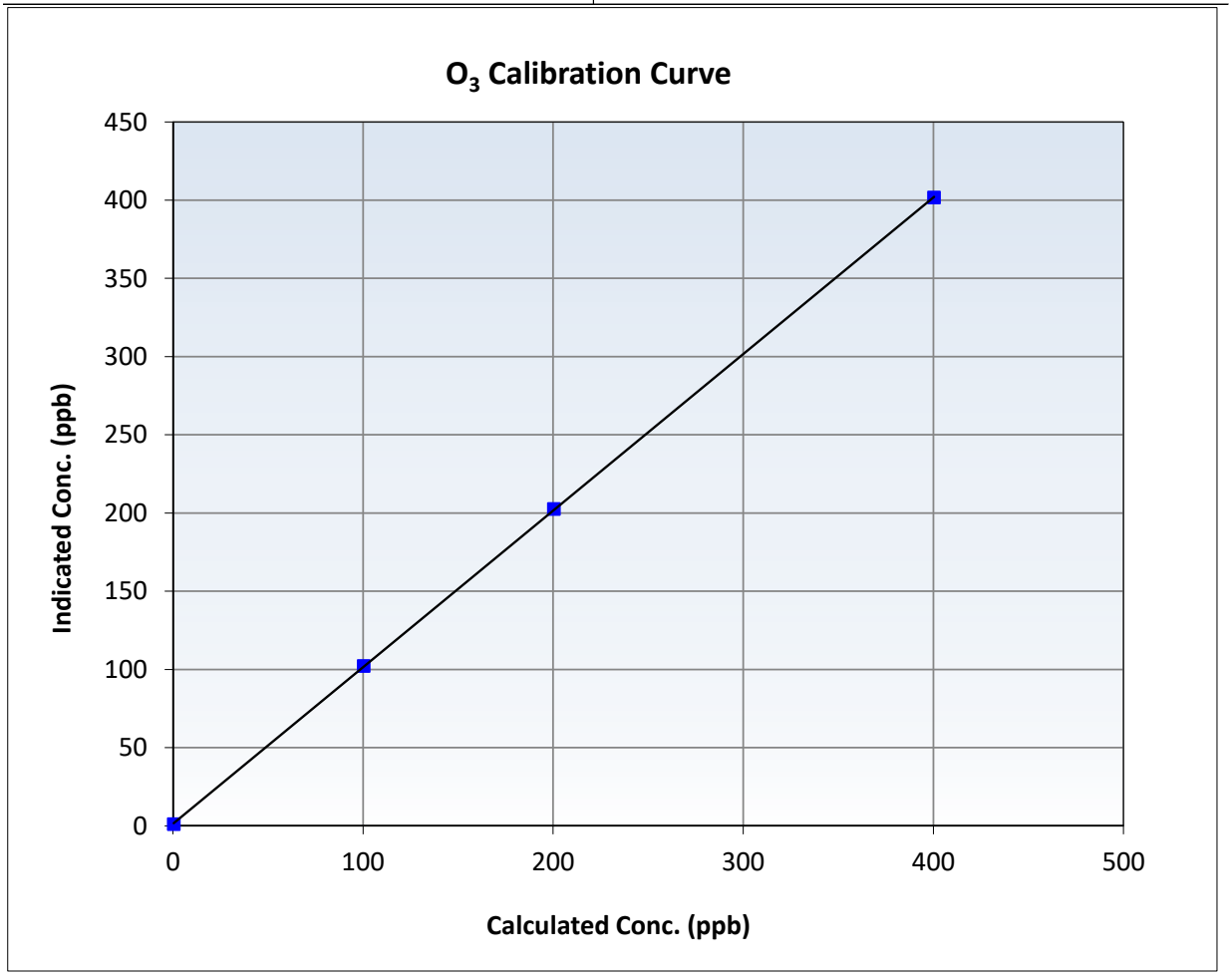
O_3 Calibration Summary

Station Information

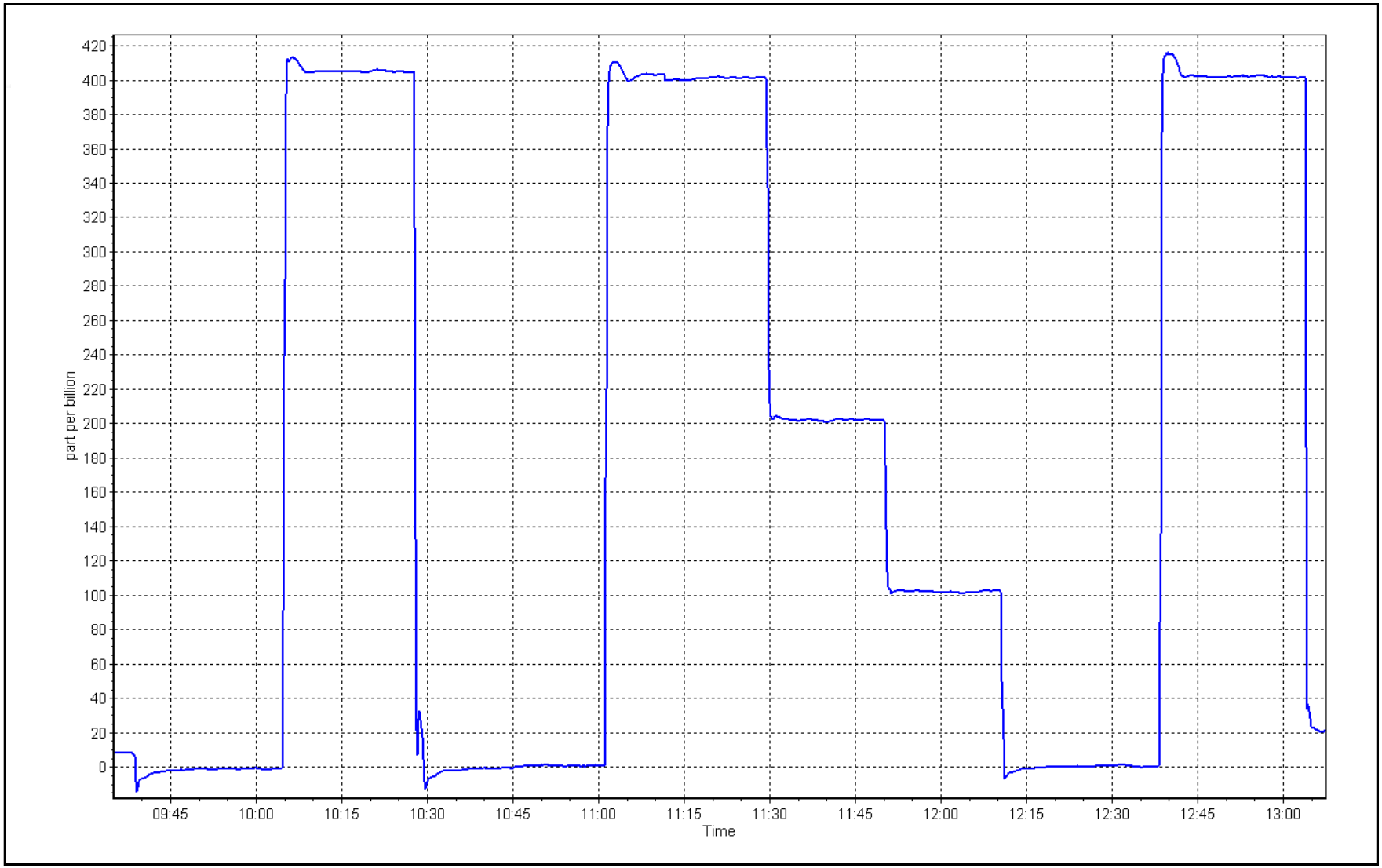
Calibration Date:	April 15, 2024	Previous Calibration:	April 5, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:37	End Time (MST):	13:08
Analyzer make:	Teledyne API T400	Analyzer serial #:	3871

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.7	----	Correlation Coefficient	0.999987	≥0.995
400.0	401.3	0.9968	Slope	1.001029	0.90 - 1.10
200.0	202.2	0.9891			
100.0	101.8	0.9823	Intercept	1.320000	+/- 5



O_3 Calibration Plot Date: April 15, 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:	April 16, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	10:04	End time (MST):	11:59
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)	-0.80	-0.60	-0.80	☐	+/- 2 °C
P (mmHg)	738.80	740.50	738.80	☐	+/- 10 mmHg
Flow (LPM)	5.02	4.95	5.02	☐	+/- 0.25 LPM
PW% (pump)	46.00	-----	46.00	☐	>80%
Zero Verification	PM w/o HEPA:	1.50	PM w/ HEPA:	0.00	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	7.00	10.00	10.90	☑	+/- 0.5

Date Optical Chamber Cleaned: April 16, 2024

Date Disposable Filter Changed: April 16, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: June 29, 2023

Date RH/T Sensor Cleaned: June 29, 2023

Notes: Inlet head cleaned. PMT peak test adjusted. Leak check passed.

Calibration by: Sean Bala

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:	April 19, 2024	Last Cal Date:	April 16, 2024
Start time (MST):	9:02	End time (MST):	9:45
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)	2.50	2.47	2.50	☐	+/- 2 °C
P (mmHg)	749.60	752.03	749.60	☐	+/- 10 mmHg
Flow (LPM)	4.94	4.96	4.94	☐	+/- 0.25 LPM
PW% (pump)	45.00	-----	45.00	☐	>80%
Zero Verification	PM w/o HEPA:	9.20	PM w/ HEPA:	0.00	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	11.00	11.00	11.00	☐	+/- 0.5

Date Optical Chamber Cleaned: April 19, 2024

Date Disposable Filter Changed: April 19, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: June 29, 2023

Date RH/T Sensor Cleaned: June 29, 2023

Notes: Elevated readings since yesterday. Diagnostics and rest of the readings are normal. Completed annual maintenance again. Readings were closer to baseline after cycling power to the instrument.

Calibration by: Max Farrell

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS14
ANZAC
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 2, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	9:54	End time (MST):	13:38
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:	1.005467	0.999403	Backgd or Offset:	26.4	26.5
Calibration intercept:	-1.163959	-1.240981	Coeff or Slope:	0.836	0.836

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	4938	80.3	799.3	802.7	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.2	Previous response	802.5	*% 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	5000	0.0	0.0	1.0	----
High point	4938	80.3	799.3	798.8	1.001
Mid point	4979	40.2	400.1	397.1	1.007
Low point	4998	20.2	201.1	197.7	1.017
As left zero	5000	0.0	0.0	0.8	----
As left span	4938	80.3	799.3	795.4	1.005
				Average Correction Factor:	1.008

Notes: Sample inlet filter changed after as founds. No adjustments made. High point was noisier than usual; maintenance will be performed during the next visit.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

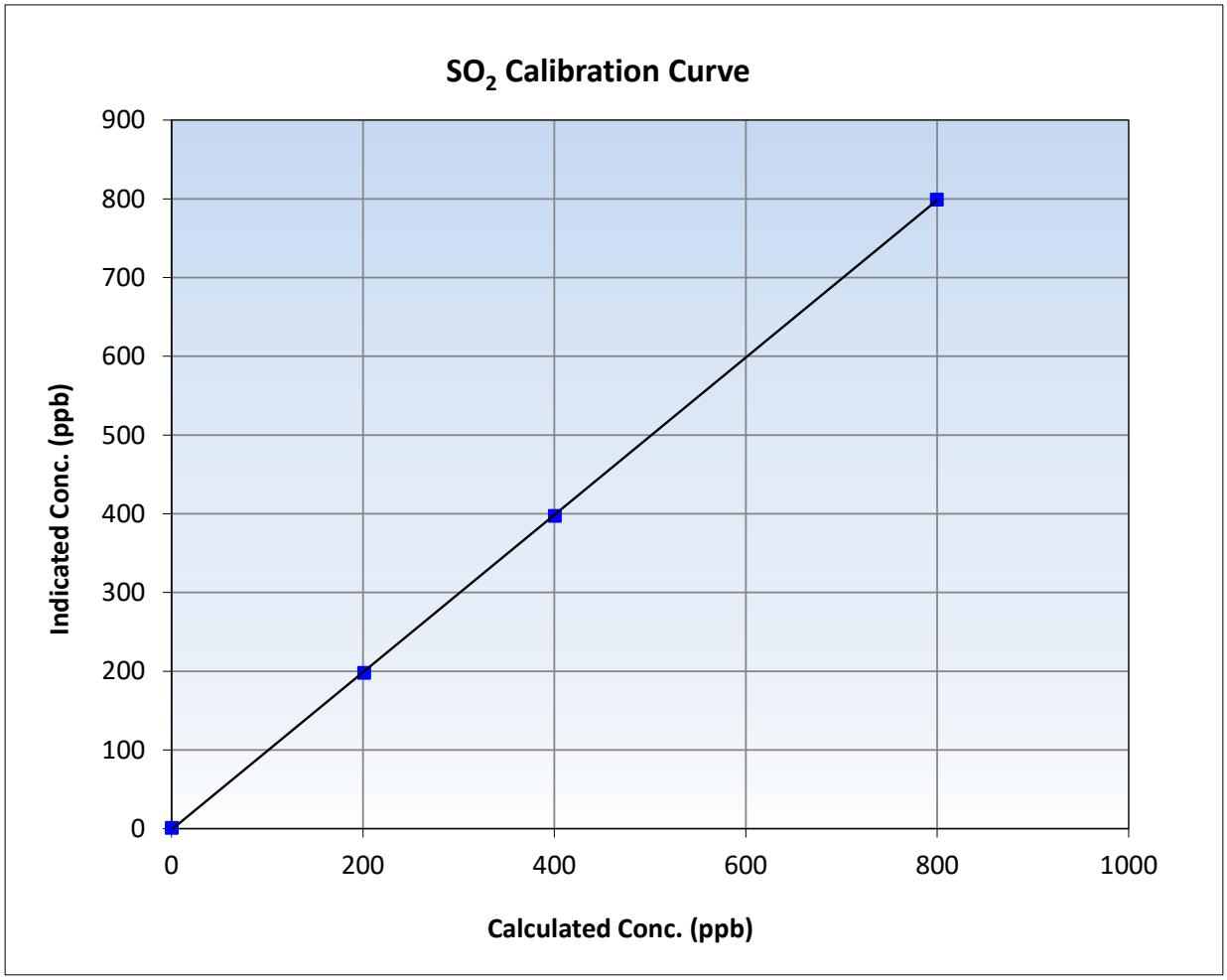
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:54	End Time (MST):	13:38
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

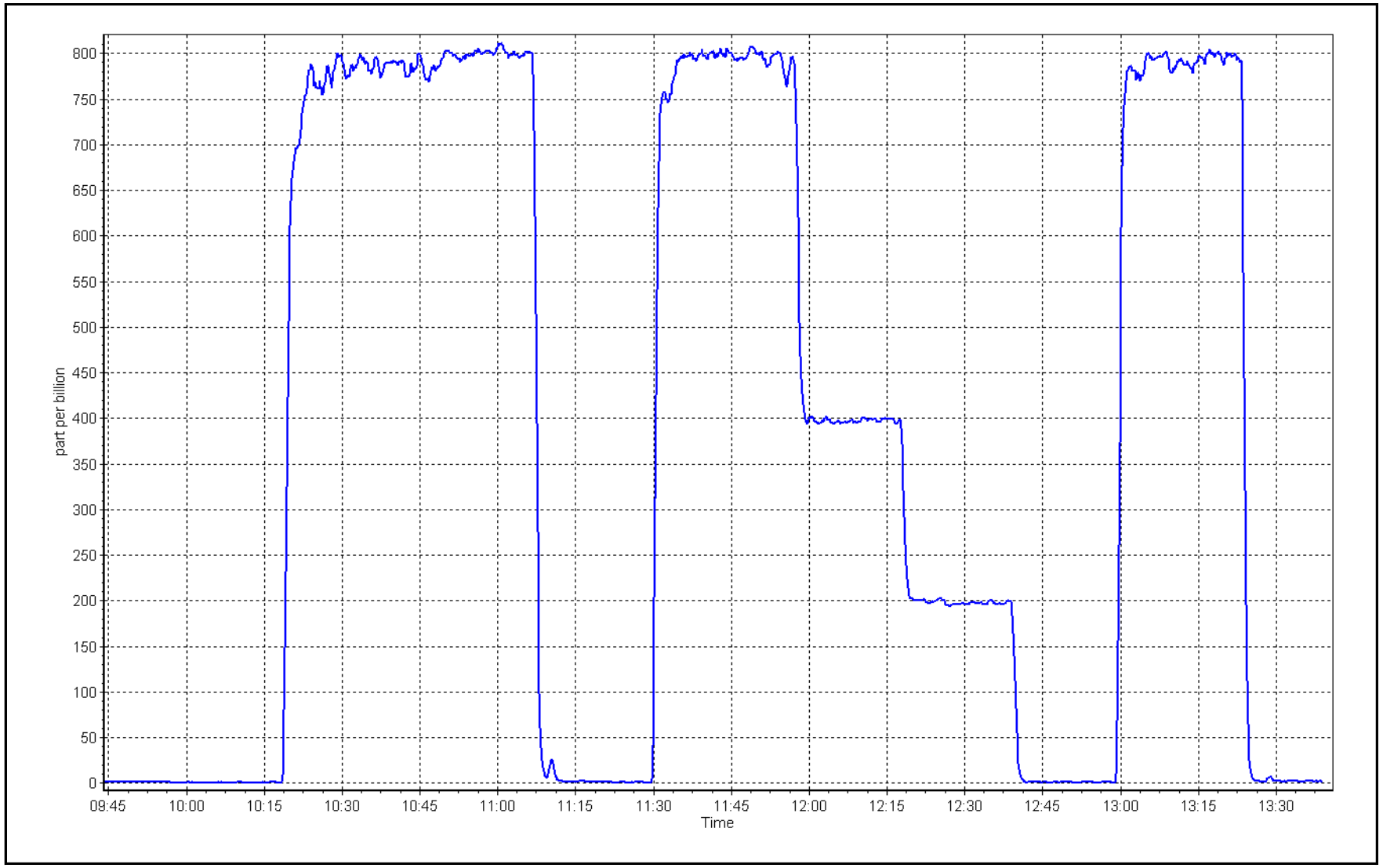
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	1.0	----
799.3	798.8	1.0006
400.1	397.1	1.0075
201.1	197.7	1.0170

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999963	*≥0.995*
Slope	0.999403	*0.90 - 1.10*
Intercept	-1.240981	*+/-30*



SO2 Calibration Plot Date: April 2, 2024 Location: Anzac



Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 16, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	9:03	End time (MST):	10:25
Reason:	As Found		

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:	0.999403	NA	Backgd or Offset:	26.5	NA
Calibration intercept:	-1.240981	NA	Coeff or Slope:	0.836	NA

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	4938	80.3	799.3	772.1	1.036
As found Mid point	4979	40.2	400.1	385.9	1.038
As found Low point	4998	20.2	201.1	187.8	1.073
New cylinder response					
Baseline Corr As found:	771.6	Previous response	797.6	*% change	-3.4%
Baseline Corr 2nd AF pt:	385.4	AF Slope:	0.968168	AF Intercept:	-2.380666
Baseline Corr 3rd AF pt:	187.3	AF Correlation:	0.999909	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

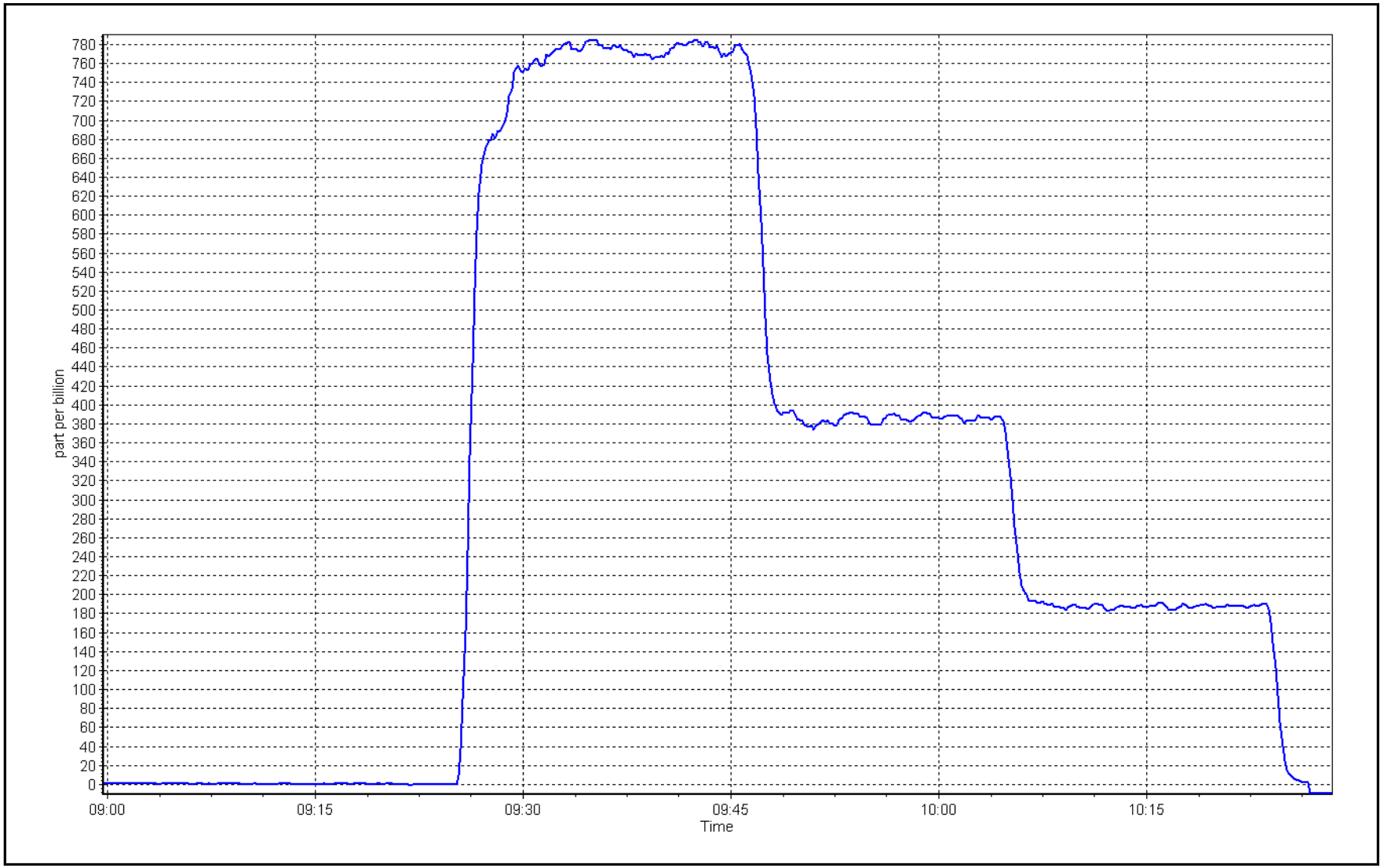
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor:

Notes: Before performing maintenance on the instrument, as-founds were conducted. Investigation was made. No alarms were noticed on the instrument, diagnostics were similar to last calibration, and there were no issues to report with the setup. Suspecting faulty lamp/socket.

Calibration Performed By: Mohammed Kashif

SO2 Calibration Plot Date: April 16, 2024 Location: Anzac



Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 16, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	14:15	End time (MST):	17:10
Reason:	Maintenance		

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:	NA	1.009311	Backgd or Offset:	NA	24.6
Calibration intercept:	NA	-4.184570	Coeff or Slope:	NA	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					
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	-0.4	----
High point	4938	80.3	799.3	804.6	0.993
Mid point	4979	40.2	400.1	397.2	1.007
Low point	4998	20.2	201.1	195.3	1.030
As left zero	5000	0.0	0.0	-0.6	----
As left span	4938	80.3	799.3	806.5	0.991
				Average Correction Factor:	1.010

Notes: In response to the noisy readings during the last calibration, the lamp and socket were replaced. Following this, a PMT and lamp voltages adjustment were carried out, resulting in changes to both flash and PMT voltages values, which are now within limits. A stable and less noisy response was observed post maintenance. Adjusted both zero and span.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

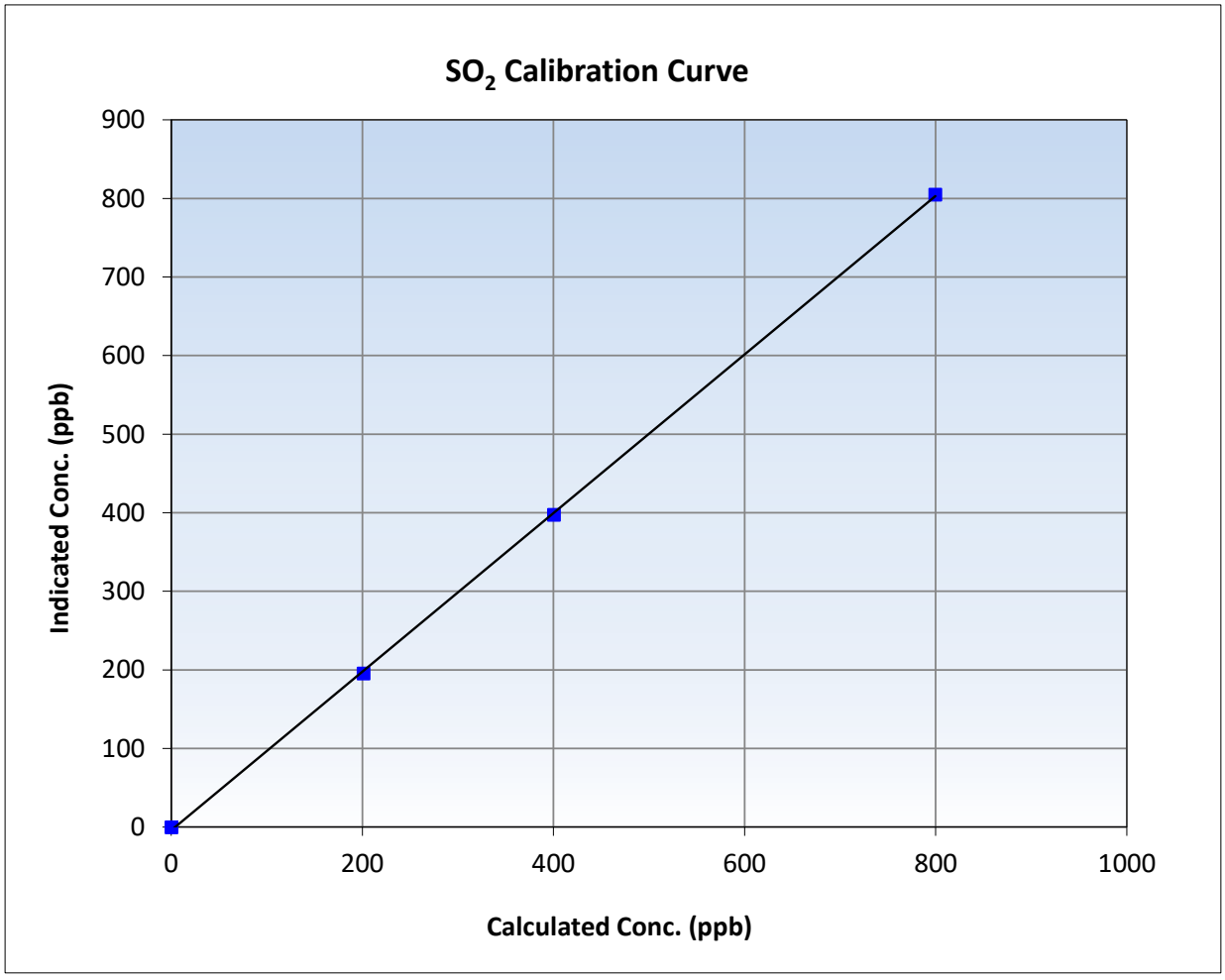
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	April 2, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	14:15	End Time (MST):	17:10
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

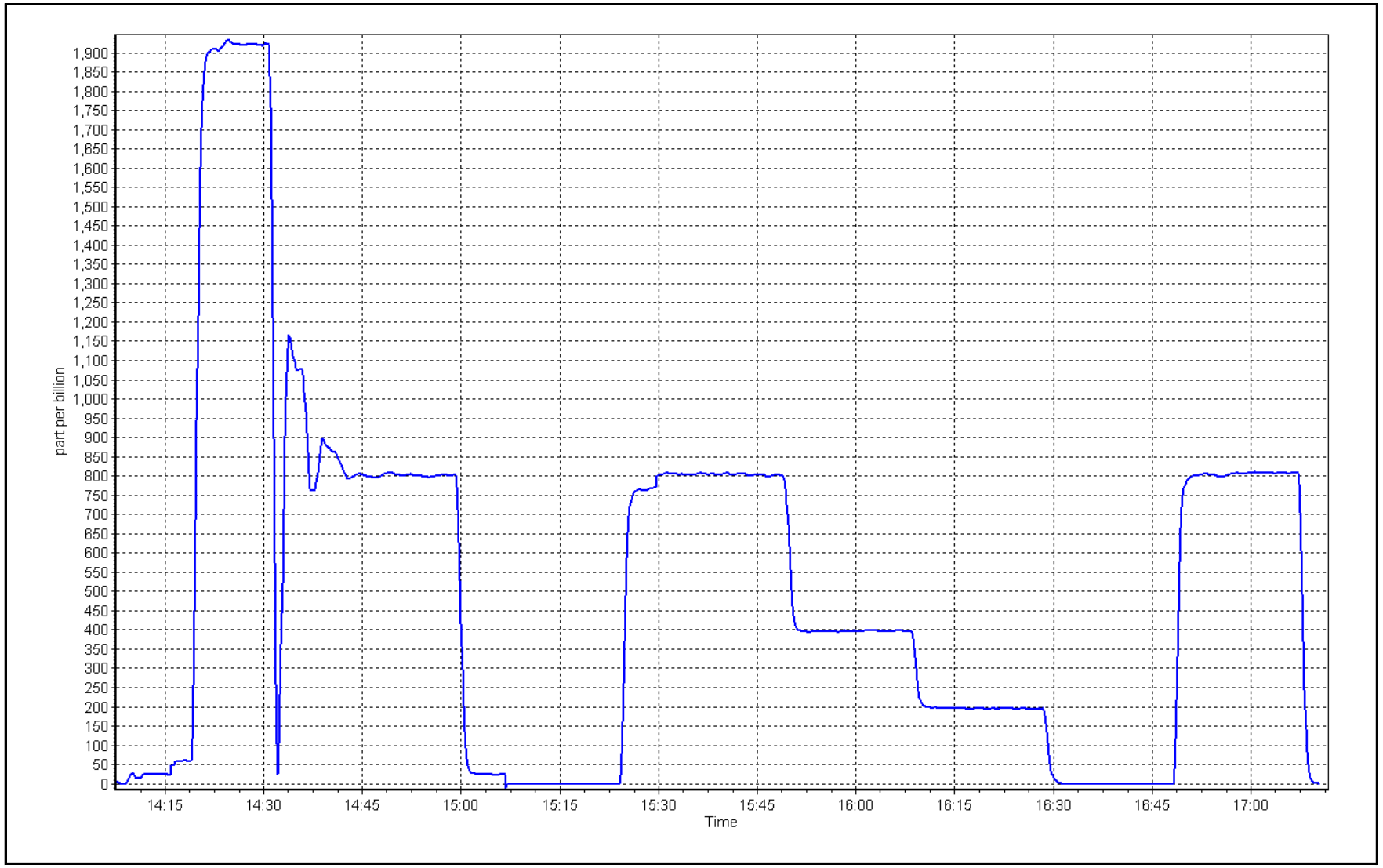
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
799.3	804.6	0.9934
400.1	397.2	1.0072
201.1	195.3	1.0295

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999898	*≥0.995*
Slope	1.009311	*0.90 - 1.10*
Intercept	-4.184570	*+/-30*



SO2 Calibration Plot Date: April 16, 2024 Location: Anzac



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 11, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	9:47	End time (MST):	14:19
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:	1.000445	1.015603	Backgd or Offset:	2.3	2.3
Calibration intercept:	-0.045344	-0.225550	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	81.0	0.986
As found Mid point	4973	38.9	40.0	40.5	0.985
As found Low point	4997	19.5	20.0	20.1	0.991
New cylinder response					
Baseline Corr As found:	81.1	Prev response:	79.97	*% change:	1.4%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.014491	AF Intercept:	-0.125462
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999996	* = > +/-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	81.1	0.986
Mid point	4973	38.9	40.0	40.1	0.996
Low point	4997	19.5	20.0	20.1	0.996
As left zero	5000	0.0	0.0	0.1	----
As left span	4938	77.9	80.0	79.3	1.008
SO2 Scrubber Check	4936	80.3	800.4	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.993
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

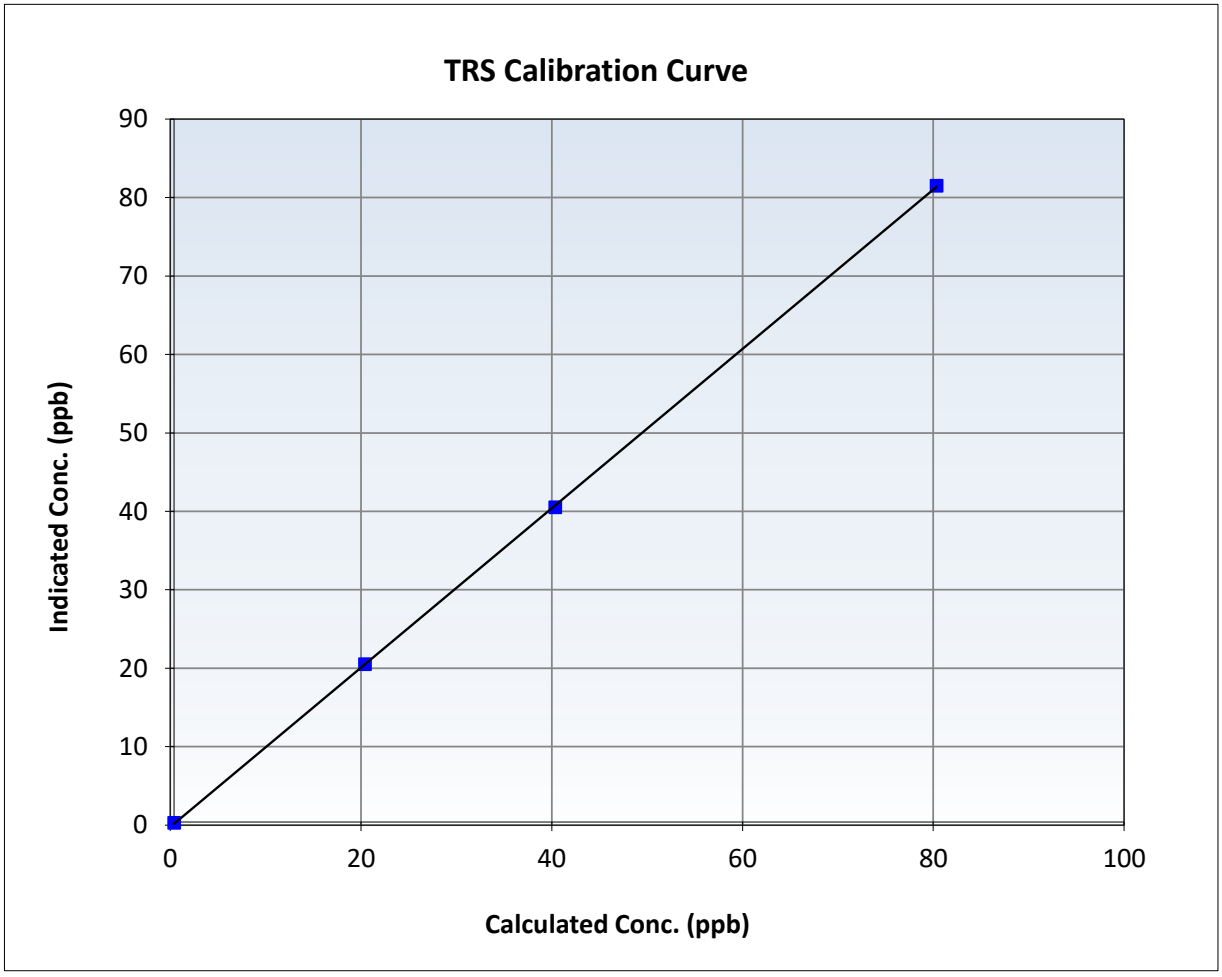
TRS Calibration Summary

Station Information

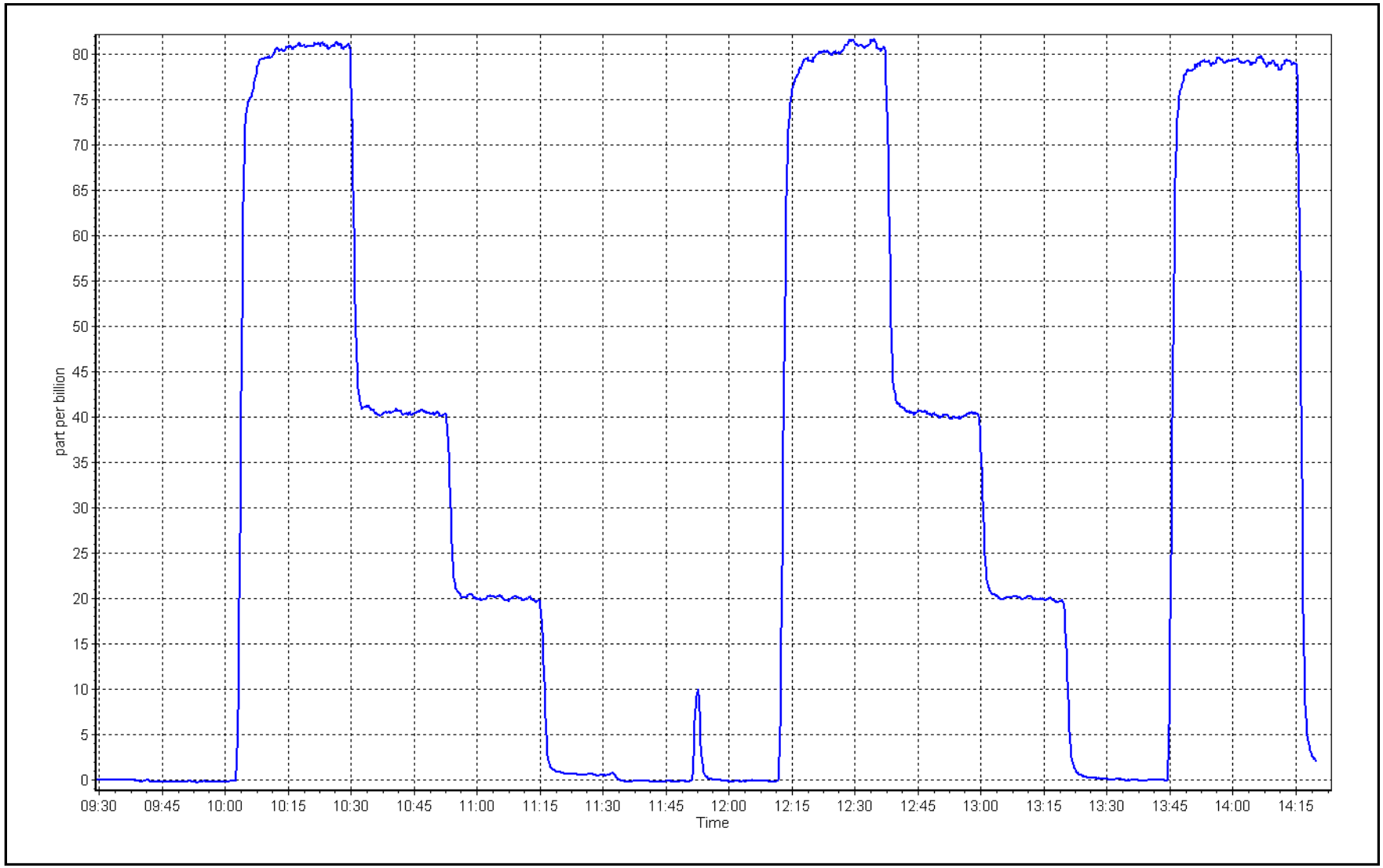
Calibration Date:	April 11, 2024	Previous Calibration:	March 27, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:47	End Time (MST):	14:19
Analyzer make:	CD Nova CDN-101	Analyzer serial #:	503

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999973	*≥0.995*
80.0	81.1	0.9858	Slope	1.015603	*0.90 - 1.10*
40.0	40.1	0.9964			
20.0	20.1	0.9956	Intercept	-0.225550	*+/-3*



TRS Calibration Plot Date: April 11, 2024 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 2, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	9:54	End time (MST):	13:38
Reason:	Routine		

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	2.25E-04	NMHC SP Ratio:	4.11E-05	4.11E-05
CH4 Retention time:	13.30	13.30	NMHC Peak Area:	221451	221451
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	4938	80.3	17.10	16.75	1.021
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.75	Prev response	16.97	*% 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	4938	80.3	17.10	16.74	1.021
Mid point	4979	40.2	8.56	8.29	1.033
Low point	4998	20.2	4.30	4.11	1.047
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	17.10	16.75	1.021
				Average Correction Factor	1.034

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

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	8.89	1.025
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.89	Prev response	9.05	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

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	8.89	1.025
Mid point	4979	40.2	4.56	4.41	1.035
Low point	4998	20.2	2.29	2.19	1.045
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	9.11	8.89	1.025
				Average Correction Factor	1.035

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	7.86	1.017
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.86	Prev response	7.91	*% 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	4938	80.3	7.99	7.86	1.017
Mid point	4979	40.2	4.00	3.88	1.031
Low point	4998	20.2	2.01	1.92	1.050
As left zero	5000	0.0	0.00	0.00	----
As left span	4938	80.3	7.99	7.86	1.017
				Average Correction Factor	1.033

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.995891	0.980408
THC Cal Offset:	-0.064367	-0.060379
CH4 Cal Slope:	0.995346	0.984987
CH4 Cal Offset:	-0.040562	-0.035307
NMHC Cal Slope:	0.995954	0.976268
NMHC Cal Offset:	-0.023403	-0.025072

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

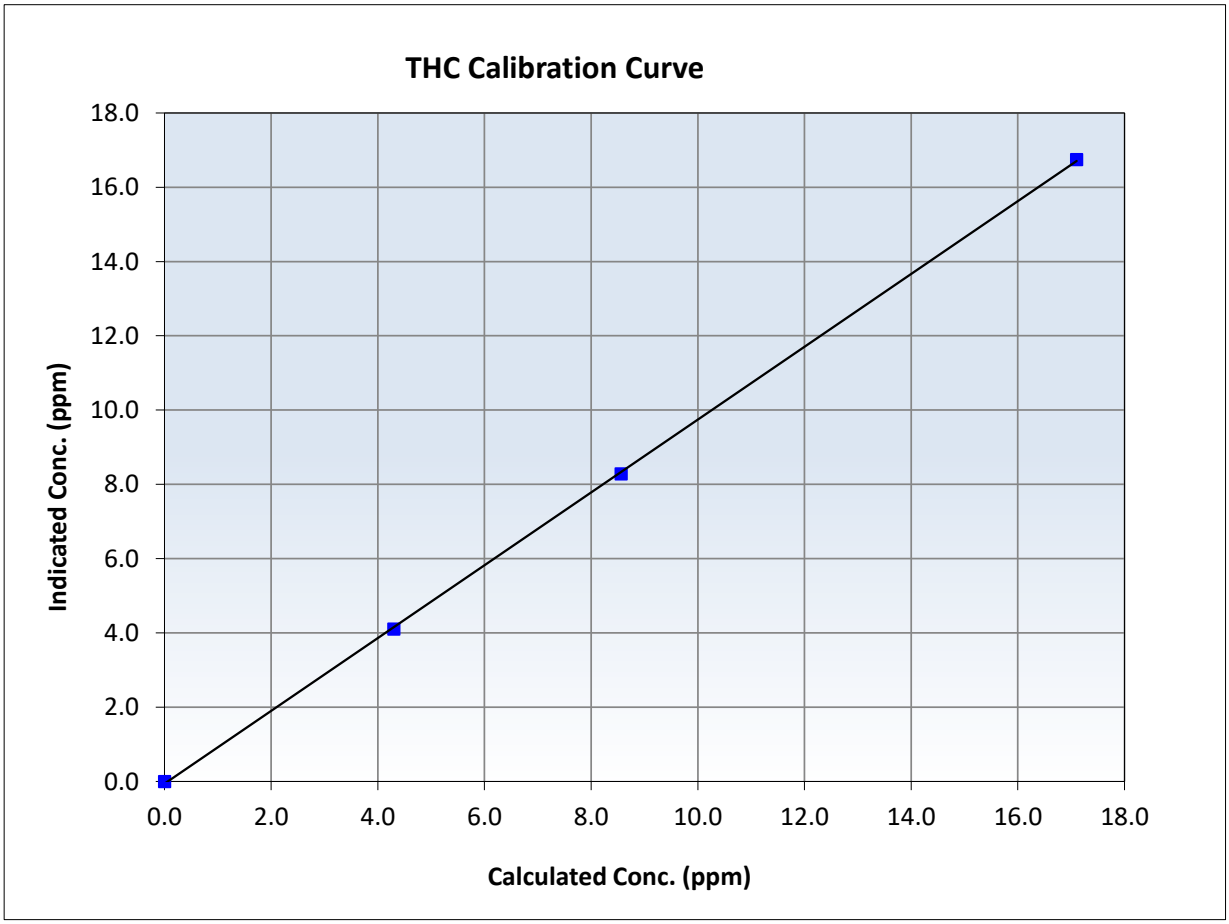
THC Calibration Summary

Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:54	End Time (MST):	13:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999938	≥0.995
17.10	16.74	1.0215	Slope	0.980408	0.90 - 1.10
8.56	8.29	1.0331			
4.30	4.11	1.0473	Intercept	-0.060379	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

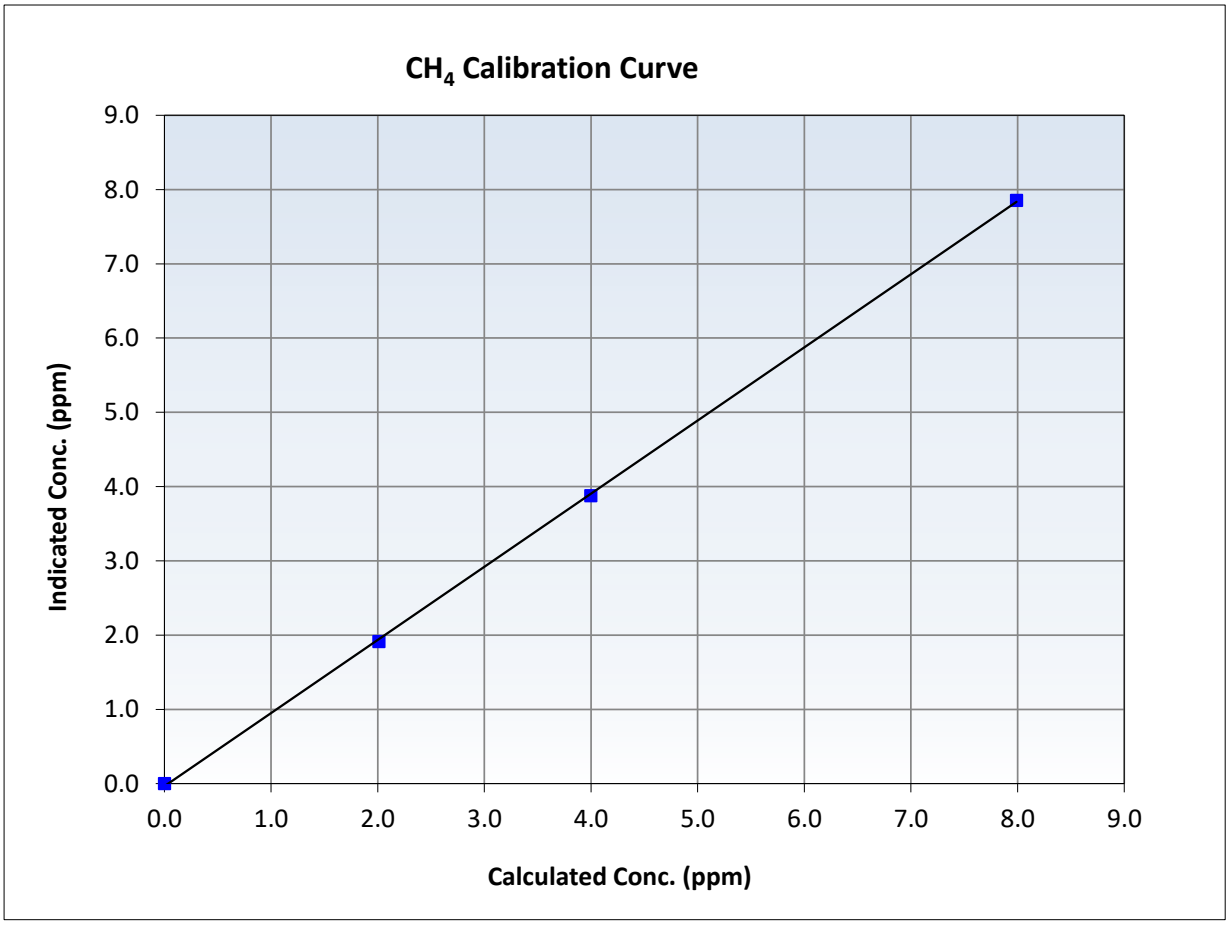
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:54	End Time (MST):	13:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
7.99	7.86	1.0171
4.00	3.88	1.0315
2.01	1.92	1.0495

Statistical Evaluation		Limits
Correlation Coefficient	0.999904	≥0.995
Slope	0.984987	0.90 - 1.10
Intercept	-0.035307	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

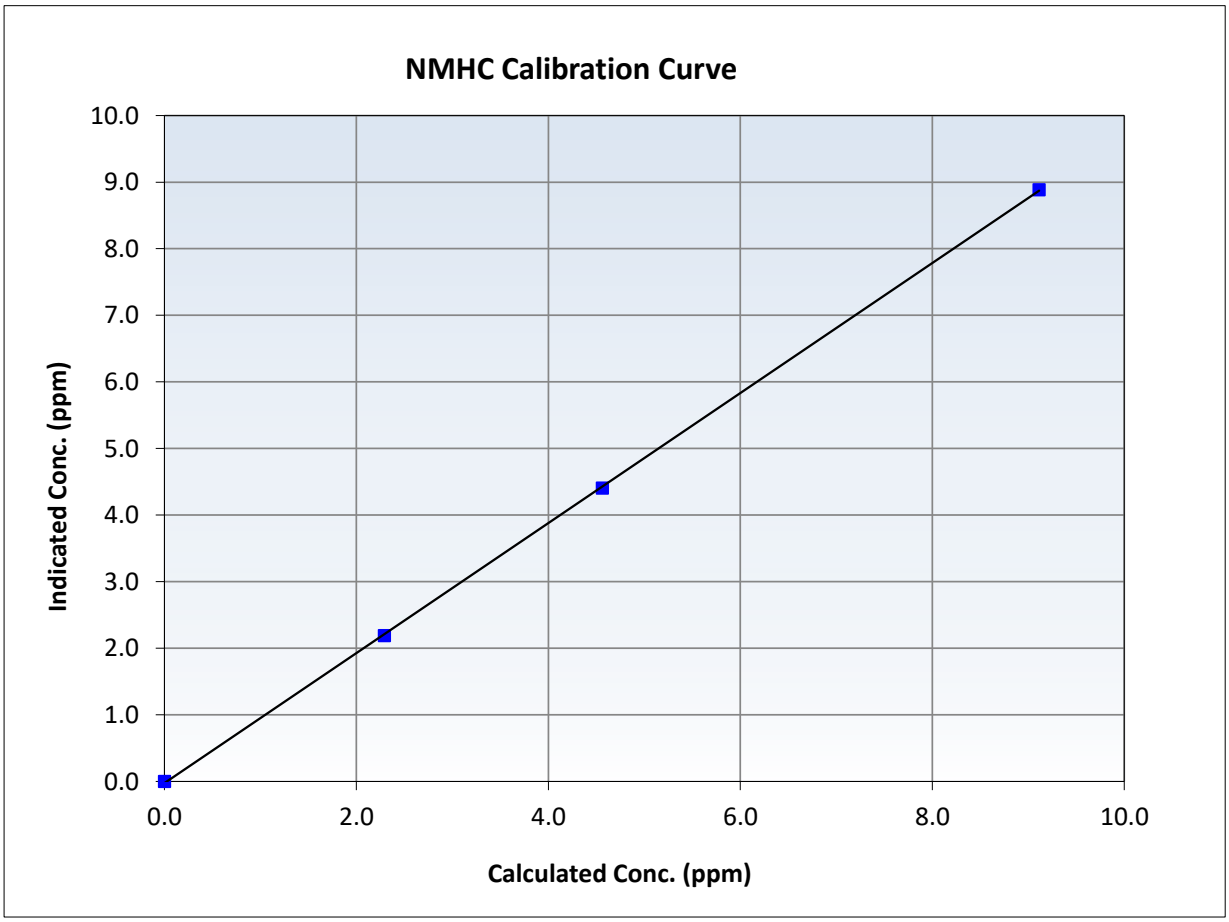
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:54	End Time (MST):	13:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

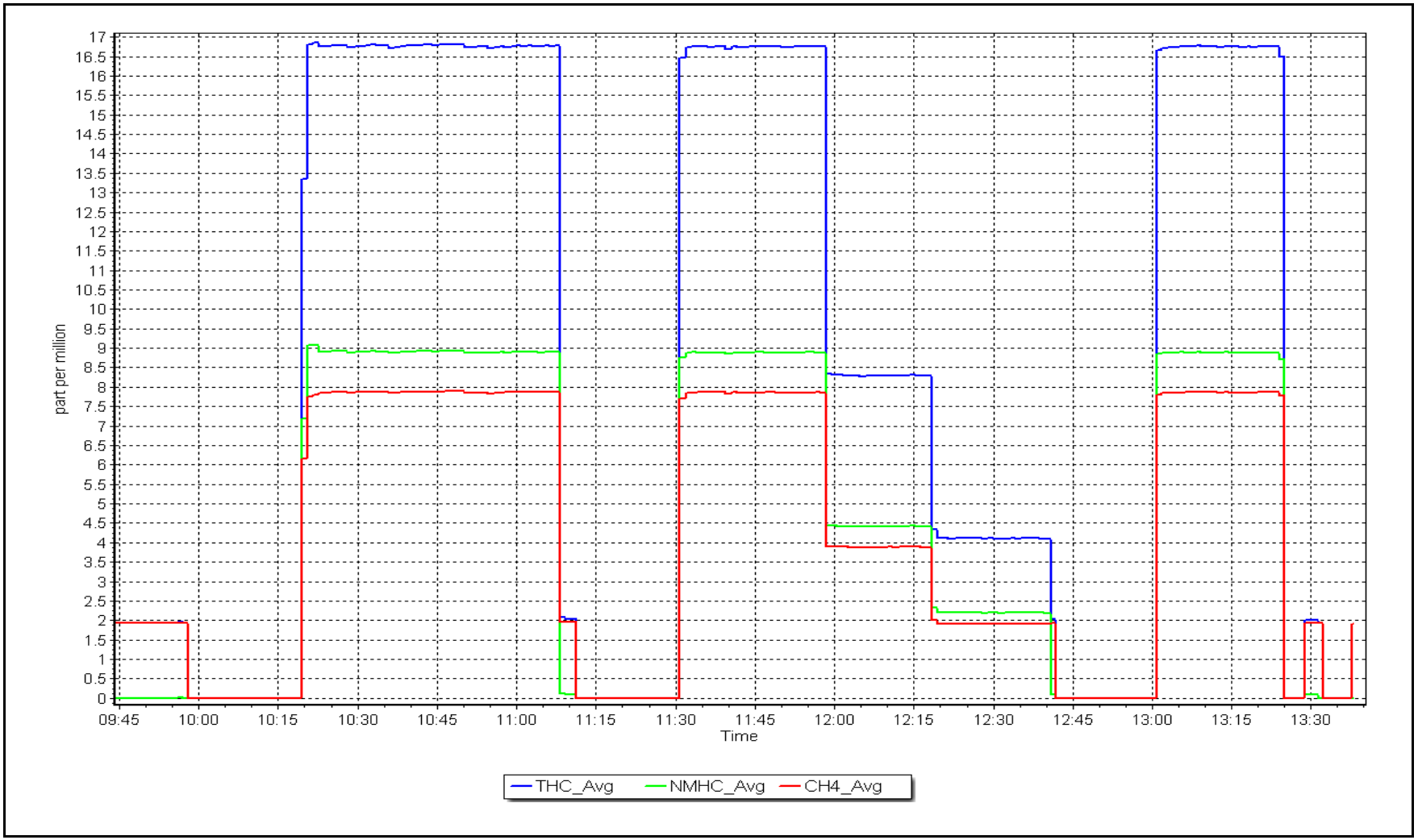
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.11	8.89	1.0255
4.56	4.41	1.0348
2.29	2.19	1.0454

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999961	*≥0.995*
Slope	0.976268	*0.90 - 1.10*
Intercept	-0.025072	*+/-0.5*



NMHC Calibration Plot Date: April 2, 2024 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 30, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	11:12	End time (MST):	13:45
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (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	2.25E-04	NMHC SP Ratio:	4.11E-05	4.11E-05
CH4 Retention time:	13.30	13.30	NMHC Peak Area:	221451	221451
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	4938	80.3	17.10	16.31	1.048
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.31	Prev response	16.71	*% change	-2.4%
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	4938	80.3	17.10	16.33	1.047
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.047

Notes: Hydrogen cylinder changed out.

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	8.56	1.065
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.56	Prev response	8.87	*% 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	4938	80.3	9.11	8.55	1.065
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.065

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	7.75	1.030
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.75	Prev response	7.83	*% 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

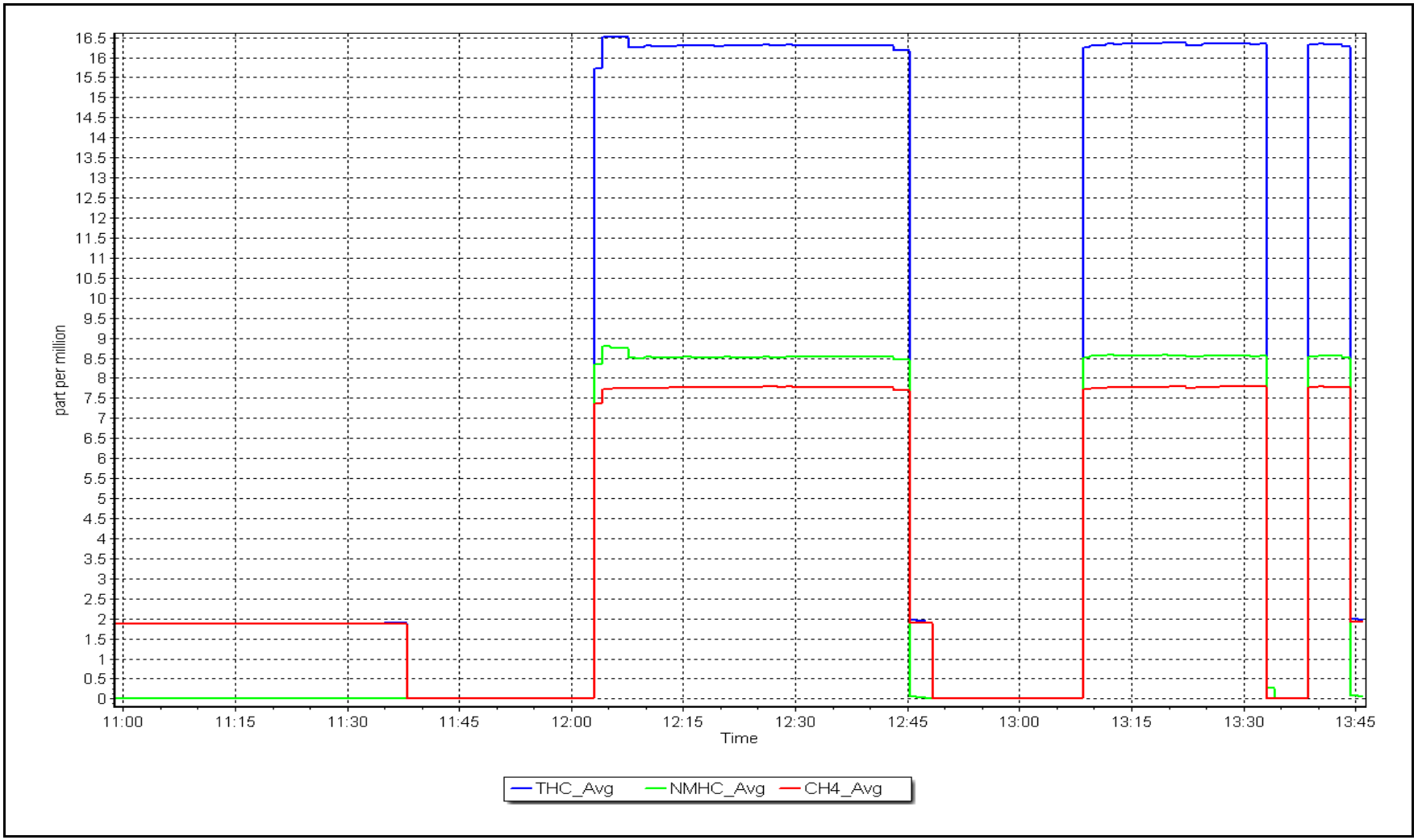
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4938	80.3	7.99	7.78	1.027
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.027

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.980408	0.954935
THC Cal Offset:	-0.060379	0.000000
CH4 Cal Slope:	0.984987	0.973275
CH4 Cal Offset:	-0.035307	0.000000
NMHC Cal Slope:	0.976268	0.938637
NMHC Cal Offset:	-0.025072	0.000000

Calibration Performed By: Mohammed Kashif

NMHC Calibration Plot Date: April 30, 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:	April 3, 2024
Last Cal Date:	March 14, 2024
Start time (MST):	10:17
End time (MST):	15:07
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	0.3	0.0	0.3	----	----
AF High point	4934	66.3	804.8	800.9	4.0	798.1	797.0	1.0	1.0088	1.0048
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	799.1	ppb	NO =	798.7	ppb	
Baseline Corr 1st pt	NO_X =	797.8	ppb	NO =	797.0	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: 1426262592

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:	3.8	3.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	160.0	158.8

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.993607	0.992088
NO_X Cal Offset:	-0.629791	-0.369777
NO Cal Slope:	0.999912	0.998384
NO Cal Offset:	-2.109531	-1.649243
NO_2 Cal Slope:	0.994068	0.993217
NO_2 Cal Offset:	-1.527274	-1.136094

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	0.0	0.3	----	----
High point	4934	66.3	804.8	800.9	4.0	798.3	798.5	-0.2	1.0082	1.0030
Mid point	4985	33.2	401.6	399.6	2.0	398.1	397.2	0.9	1.0088	1.0060
Low point	5004	16.7	201.9	200.9	1.0	199.0	196.8	2.2	1.0146	1.0209
As left zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.3	----	----
As left span	4934	66.3	804.8	403.8	401.0	797.8	403.8	394.0	1.0088	1.0000
								Average Correction Factor	1.0105	1.0100

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	795.5	408.1	391.4	388.2	1.0082	99.2%
Mid GPT point	795.5	610.6	188.9	186.0	1.0155	98.5%
Low GPT point	795.5	703.2	96.3	92.9	1.0364	96.5%
				Average Correction Factor	1.0200	98.1%

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

NO_X Calibration Summary

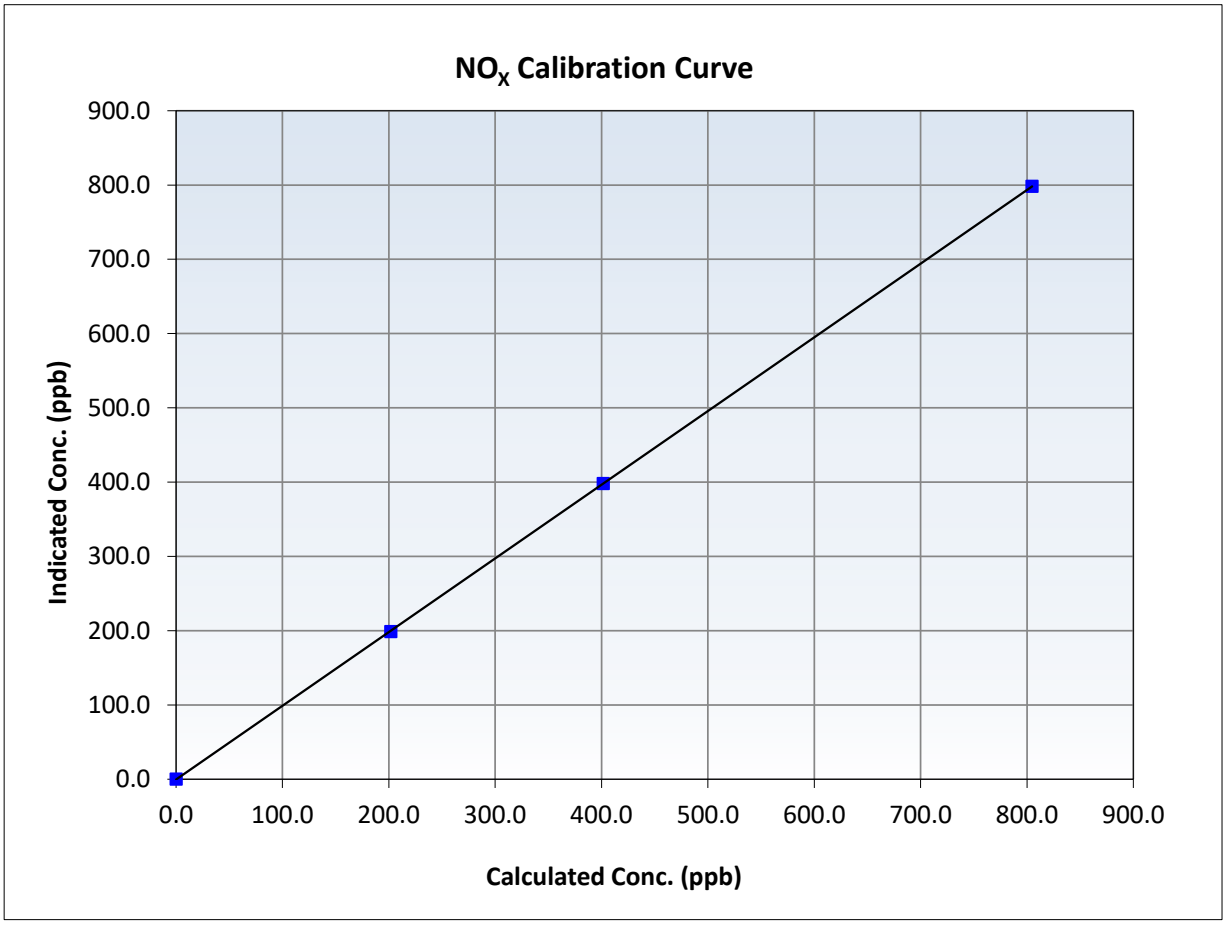
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 14, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:17	End Time (MST):	15:07
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
804.8	798.3	1.0082
401.6	398.1	1.0088
201.9	199.0	1.0146

Statistical Evaluation		Limits
Correlation Coefficient	0.999996	≥0.995
Slope	0.992088	0.90 - 1.10
Intercept	-0.369777	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

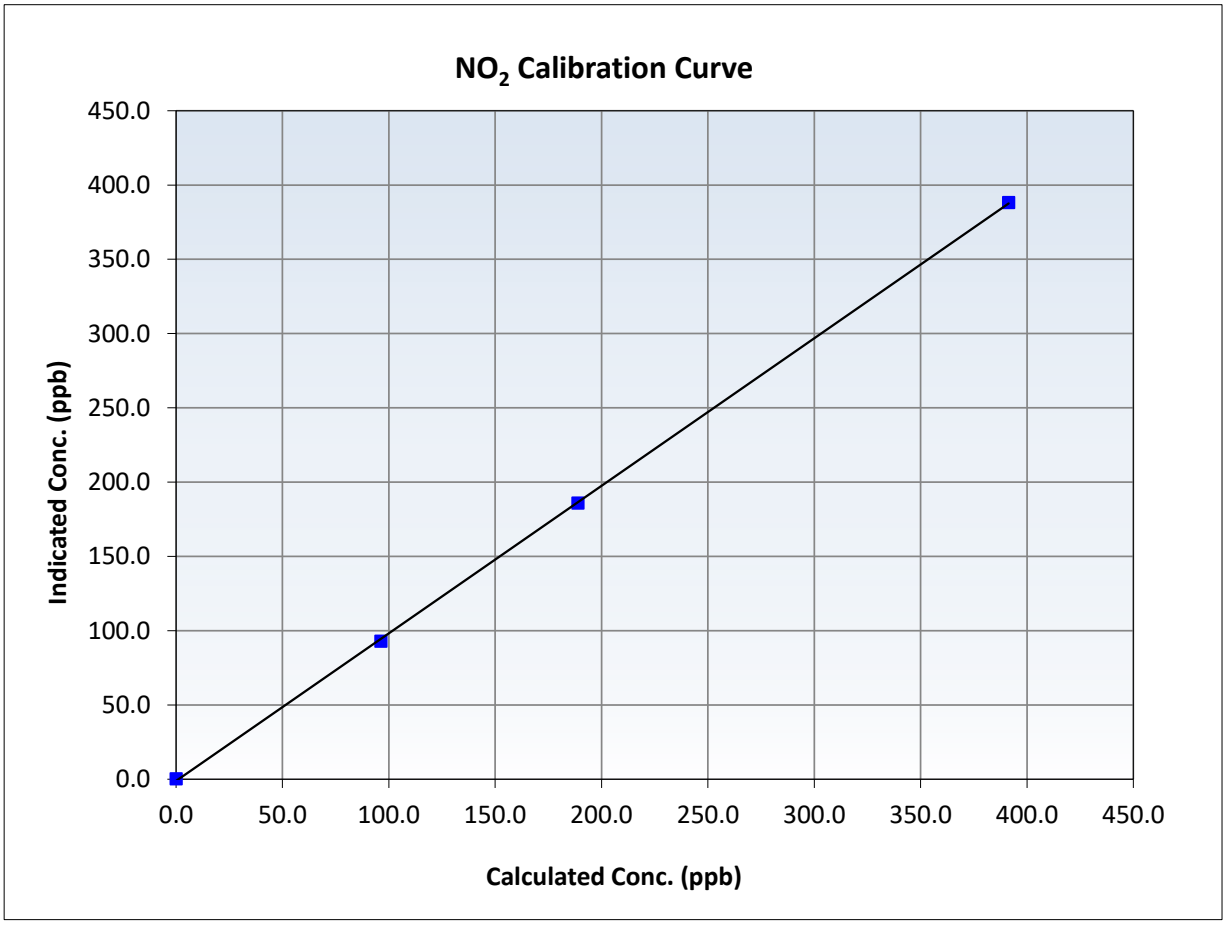
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 14, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:17	End Time (MST):	15:07
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
391.4	388.2	1.0082
188.9	186.0	1.0155
96.3	92.9	1.0364

Statistical Evaluation		Limits
Correlation Coefficient	0.999937	≥0.995
Slope	0.993217	0.90 - 1.10
Intercept	-1.136094	+/-20



Wood Buffalo Environmental Association

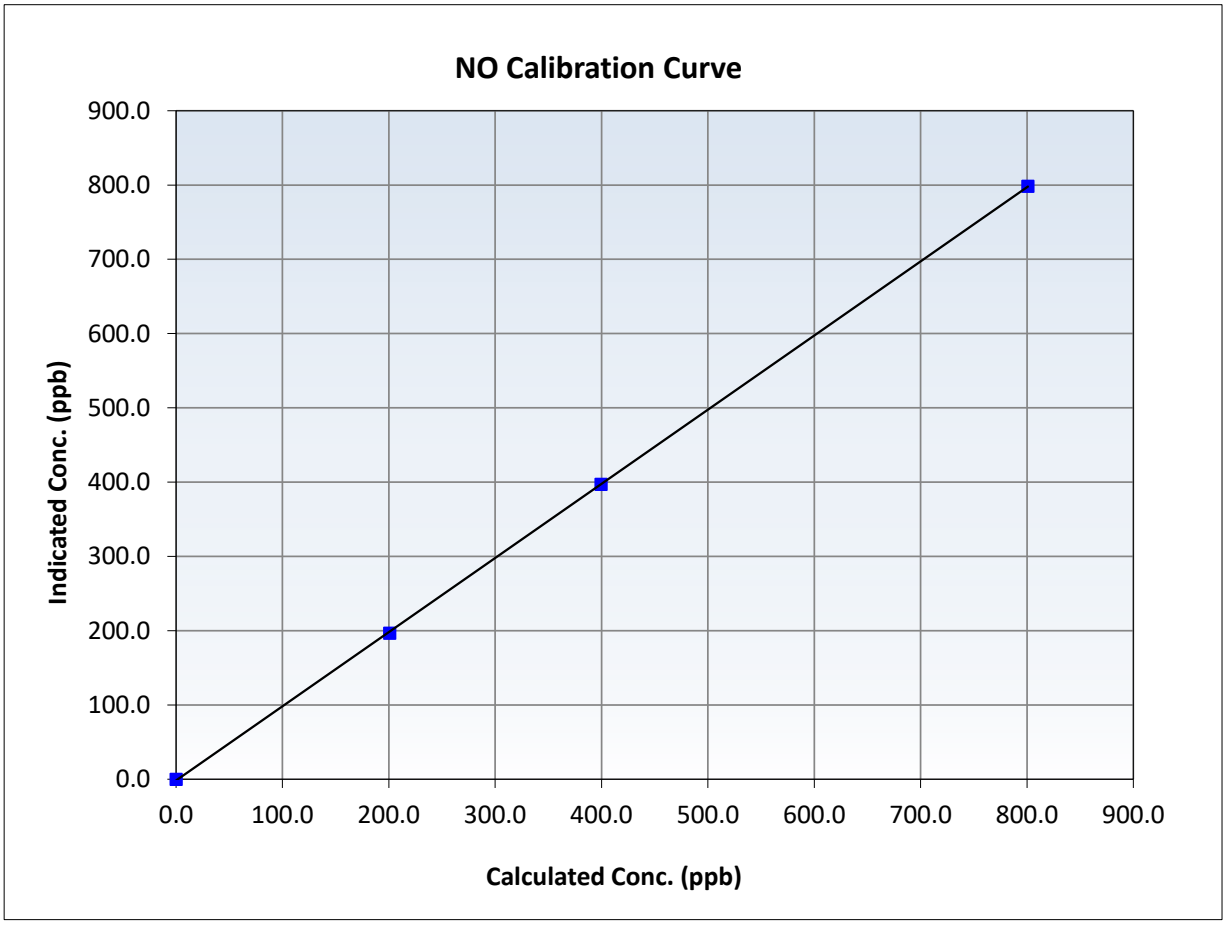
NO Calibration Summary

Station Information

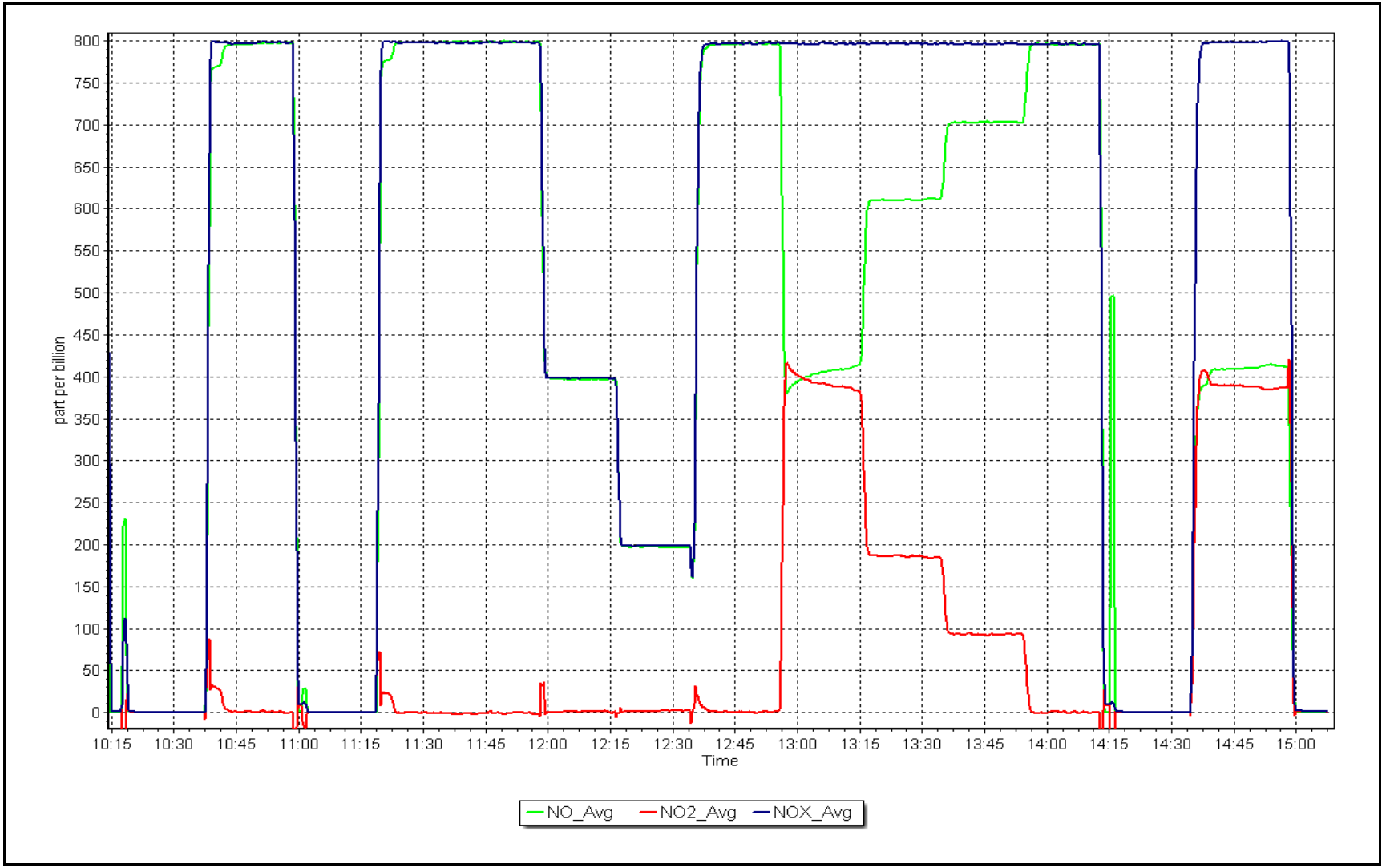
Calibration Date:	April 3, 2024	Previous Calibration:	March 14, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:17	End Time (MST):	15:07
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999978	≥0.995
800.9	798.5	1.0030	Slope	0.998384	0.90 - 1.10
399.6	397.2	1.0060	Intercept	-1.649243	+/-20
200.9	196.8	1.0209			



NO_X Calibration Plot Date: April 3, 2024 Location: Anzac



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	April 9, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	9:31	End time (MST):	14:19
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:	1.004629	0.997086	Backgd or Offset:	1.4	1.4
Calibration intercept:	0.840000	2.260000	Coeff or Slope:	1.620	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	406.2	0.987
As found Mid point	5000	803.8	200.0	206.8	0.971
As found Low point	5000	709.8	100.0	104.6	0.964

Baseline Corr As found:	405.3	Previous response	402.7	*% change	0.6%
Baseline Corr 2nd AF pt:	205.9	AF Slope:	1.012143	AF Intercept:	2.500000
Baseline Corr 3rd AF pt:	103.7	AF Correlation:	0.999909	* = > +/-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	0.5	----
High point	5000	918.8	400.0	400.1	1.000
Mid point	5000	803.8	200.0	202.9	0.986
Low point	5000	709.8	100.0	103.5	0.966
As left zero	5000	0.0	0.0	1.1	----
As left span	5000	918.8	400.0	401.0	0.998
				Average Correction Factor	0.984

Notes: Sample inlet filter changed after as founds. The ozone scrubber was replaced as part of maintenance procedure to address linearity. Adusted span only.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

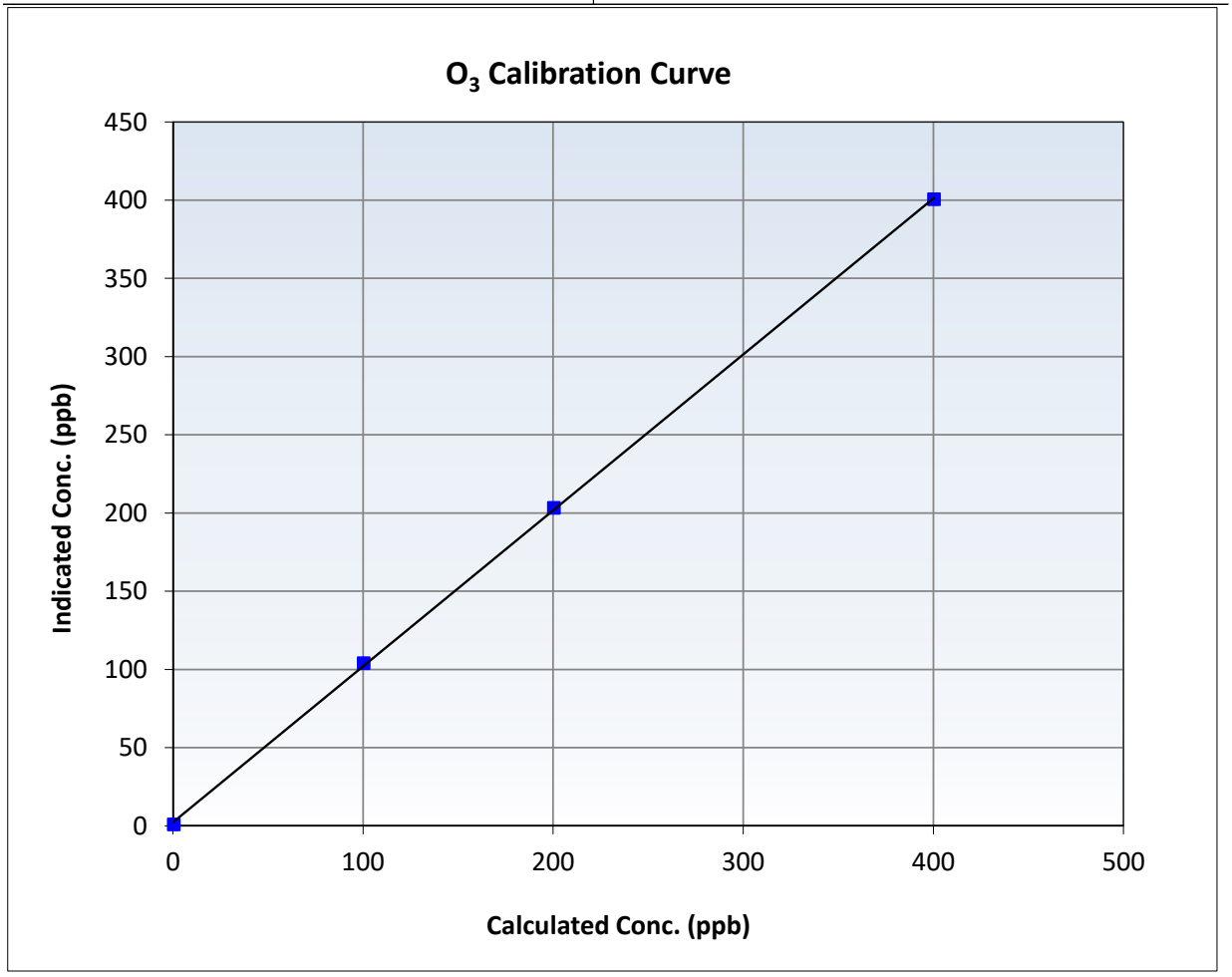
O_3 Calibration Summary

Station Information

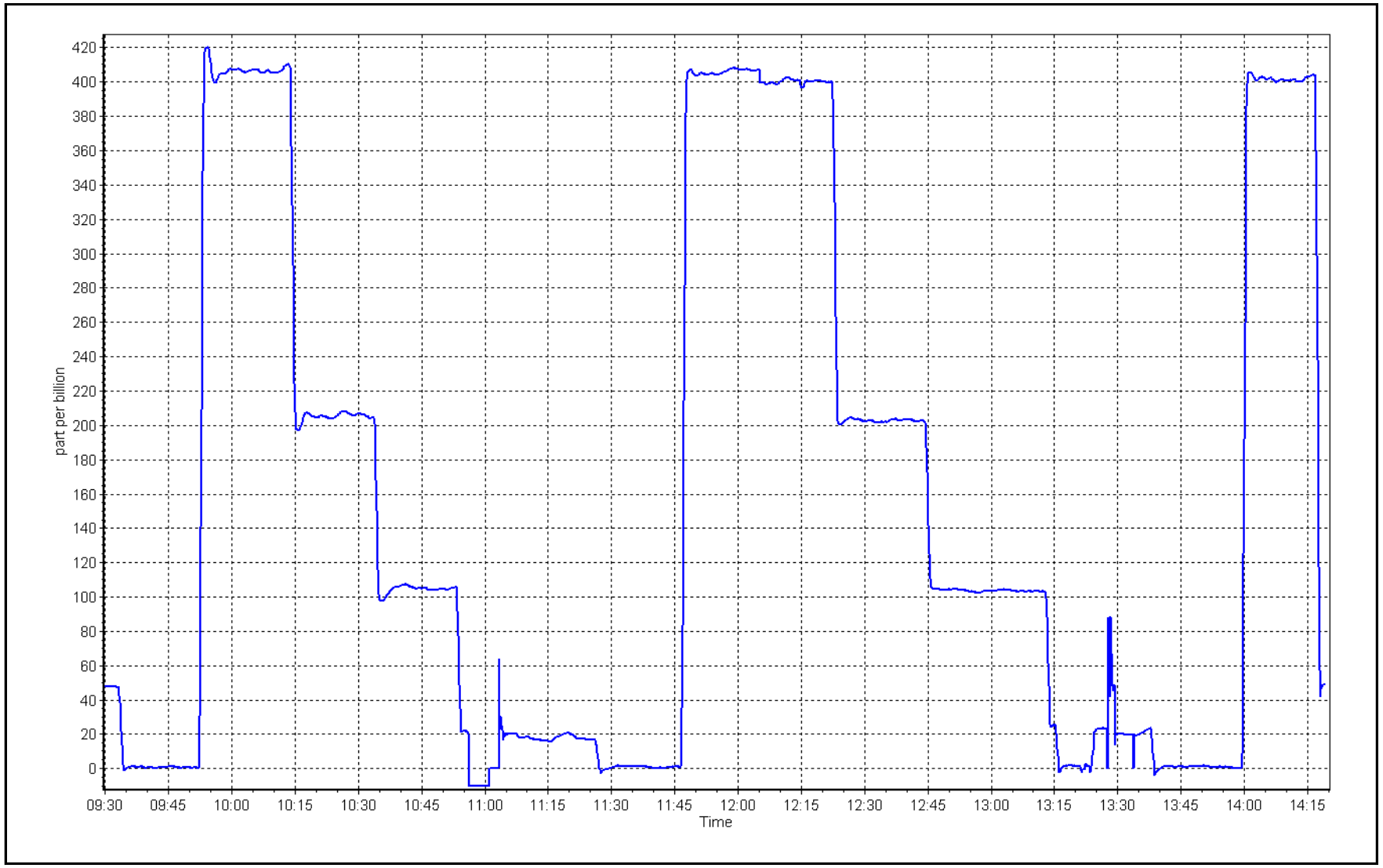
Calibration Date:	April 9, 2024	Previous Calibration:	March 6, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	9:31	End Time (MST):	14:19
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.5	----	Correlation Coefficient	0.999909	≥0.995
400.0	400.1	0.9998	Slope	0.997086	0.90 - 1.10
200.0	202.9	0.9857			
100.0	103.5	0.9662	Intercept	2.260000	+/- 5



O_3 Calibration Plot Date: April 9, 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:	April 30, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	10:26	End time (MST):	12:42
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)	2.6	2.1	2.6	☐	+/- 2 °C
P (mmHg)	711.9	712.89	711.9	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.09	5.01	☐	+/- 0.25 LPM
PW% (pump)	38	-----	38	☐	>80%
Zero Verification	PM w/o HEPA:	4.8	PM w/ HEPA:	0.1	<0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 11.3 — 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: December 6, 2023

Date Disposable Filter Changed: December 6, 2023

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

Annual Maintenance

Date Sample Tube Cleaned: July 6, 2023

Date RH/T Sensor Cleaned: July 6, 2023

Notes: No adjustments made. Leak check passed. Head cleaned.

Calibration by: Mohammed Kashif

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Anzac	Station Number:	AMS 14
Calibration Date:	April 8, 2024	Prev Cal Date:	August 23, 2023
Start Time (MST):	12:15	End Time (MST):	12:30
Tower Height (m):	20.0	Reason:	Removal

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	E5132
WS Calibrator:	MetOne 053	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	20.2	0.2%
400	39.4	39.4	0.1%
600	58.6	58.6	0.1%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		1.000000	*≥0.9995*
Calculated slope		0.999465	*0.90 - 1.10*
Calculated intercept		-0.013446	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	Z1048
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):	13:34	Calc Declination*:	13.23 Degrees
Deadband calc:	#VALUE! 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	NA	---
90	NA	
180	NA	
270	NA	
356	NA	

	Start	***Finish***	*Limits*
Correl Coeff (r^2)			*≥0.9995*
Calculated slope			*0.90 - 1.10*
Calculated intercept			*+/- 4*

Notes: Wind direction sensor was non-functional on arrival due to broken potentiometer connection. Wind speed removal cal only.

Calibration Performed By: Kelly Baragar

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Anzac	Station Number:	AMS 14
Calibration Date:	April 8, 2024	Prev Cal Date:	March 11, 2024
Start Time (MST):	13:15	End Time (MST):	14:30
Tower Height (m):	20.0	Reason:	Install

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	U11126
WS Calibrator:	MetOne 053	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	20.2	0.2%
400	39.4	39.4	0.1%
600	58.6	58.6	0.1%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		1.000000	*≥0.9995*
Calculated slope		0.999465	*0.90 - 1.10*
Calculated intercept		-0.013446	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	C21020
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):	12:26	Calc Declination*:	13.23 Degrees
Deadband calc:	1.9 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	0.9	---
90	89.5	-0.1%
180	179.9	0.0%
270	270.2	0.1%
356	356.0	0.0%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		0.999994	*≥0.9995*
Calculated slope		1.001229	*0.90 - 1.10*
Calculated intercept		-0.320328	*+/- 4*

Notes: Replaced all sensors and cabling.

Calibration Performed By: Kelly Baragar

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS17
WAPASU
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	April 2, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	10:35	End time (MST):	13:38
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.38	ppm	Cal Gas Exp Date:	January 12, 2029
Cal Gas Cylinder #:	ALM066507			
Removed Cal Gas Conc:	50.38	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator 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:	1.003695	0.998796	Backgd or Offset:	13.2	13.3
Calibration intercept:	-1.998962	-1.859943	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	-0.2	----
As found High point	4921	79.4	800.0	790.0	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.2	Previous response	800.9	*% 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	

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	79.4	800.0	798.6	1.002
Mid point	4960	39.7	400.0	395.4	1.012
Low point	4980	19.8	199.5	196.2	1.017
As left zero	5000	0.0	0.0	0.3	----
As left span	4920	79.4	800.1	800.0	1.000
				Average Correction Factor:	1.010

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

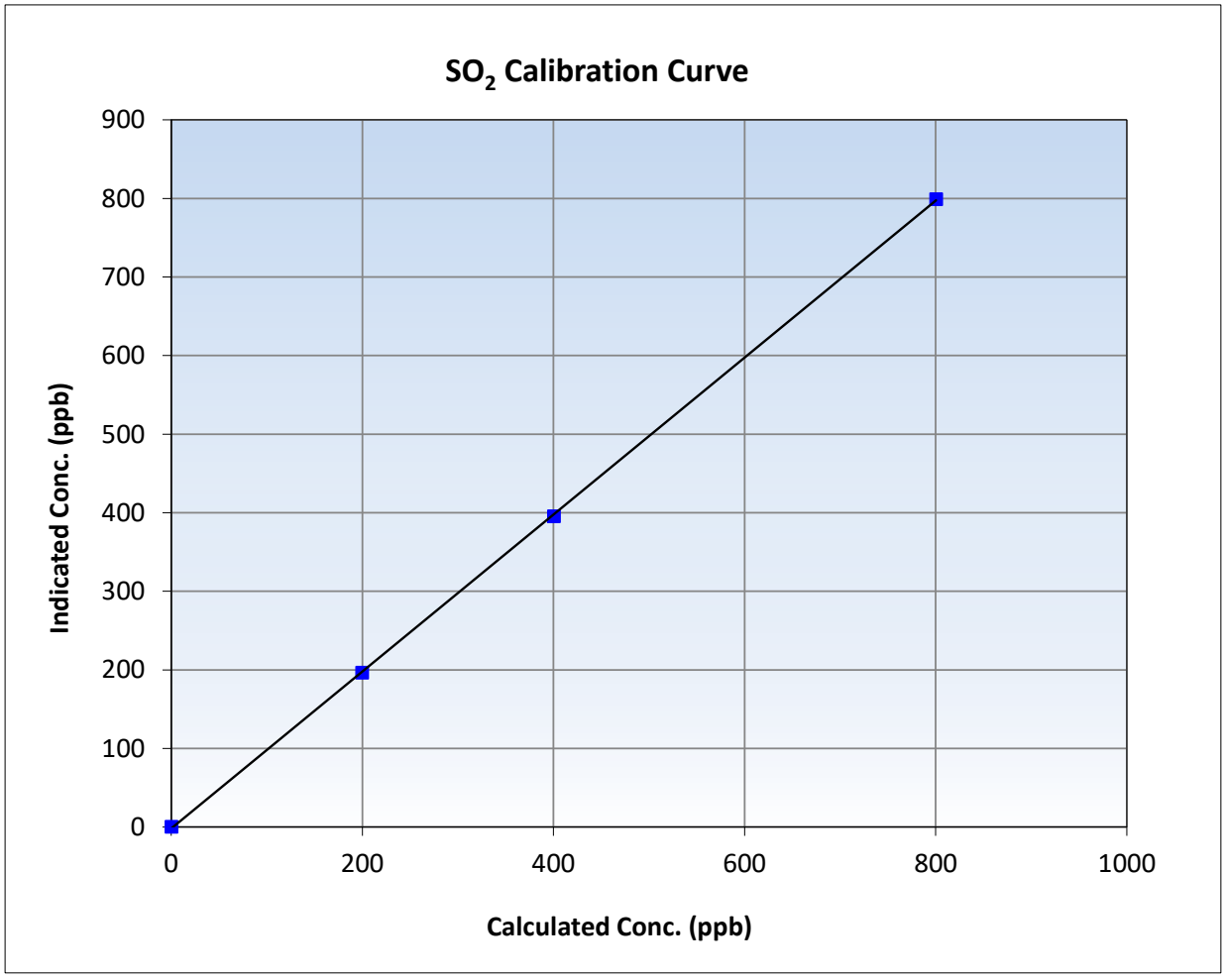
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:35	End Time (MST):	13:38
Analyzer make:	Thermo 43i	Analyzer serial #:	1218153459

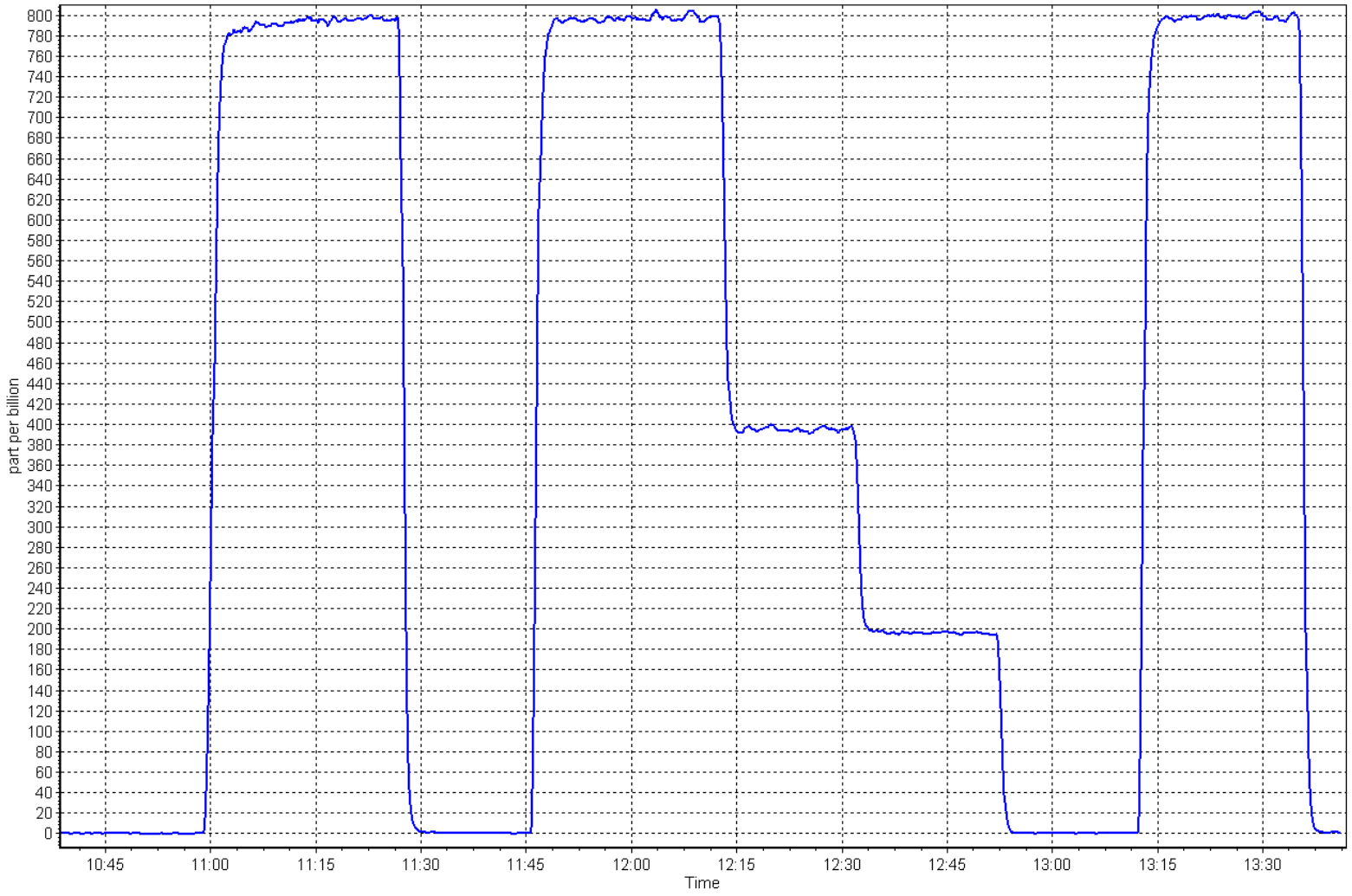
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.0	798.6	1.0017
400.0	395.4	1.0117
199.5	196.2	1.0169

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999962	*≥0.995*
Slope	0.998796	*0.90 - 1.10*
Intercept	-1.859943	*+/-30*



SO2 Calibration Plot Date: April 2, 2024 Location: Wapasu



Wood Buffalo Environmental Association

H_2S/TRS Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	April 8, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	10:28	End time (MST):	16:13
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:	0.995282	0.992711	Backgd or Offset:	11.7	11.8
Calibration intercept:	0.340790	-0.119219	Coeff or Slope:	1.096	1.096

H_2S/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	0.6	----
As found High point	4921	78.8	80.0	80.5	1.001
As found Mid point	4961	39.4	40.0	40.4	1.005
As found Low point	4980	19.7	20.0	20.4	1.010
New cylinder response					

Baseline Corr As found:	79.9	Prev response:	79.96	*% change:	-0.1%
Baseline Corr 2nd AF pt:	39.8	AF Slope:	0.999282	AF Intercept:	0.500796
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999993	* = > +/-5% change initiates investigation	

H_2S/TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4921	78.8	80.0	79.5	1.006
Mid point	4961	39.4	40.0	39.3	1.018
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	78.9	1.014
SO2 Scrubber Check	4921	79.4	793.9	-0.1	----
Date of last scrubber change:		N/A		Ave Corr Factor	1.017
Date of last converter efficiency test:		N/A			

Notes: Zero adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

H_2S/TRS Calibration Summary

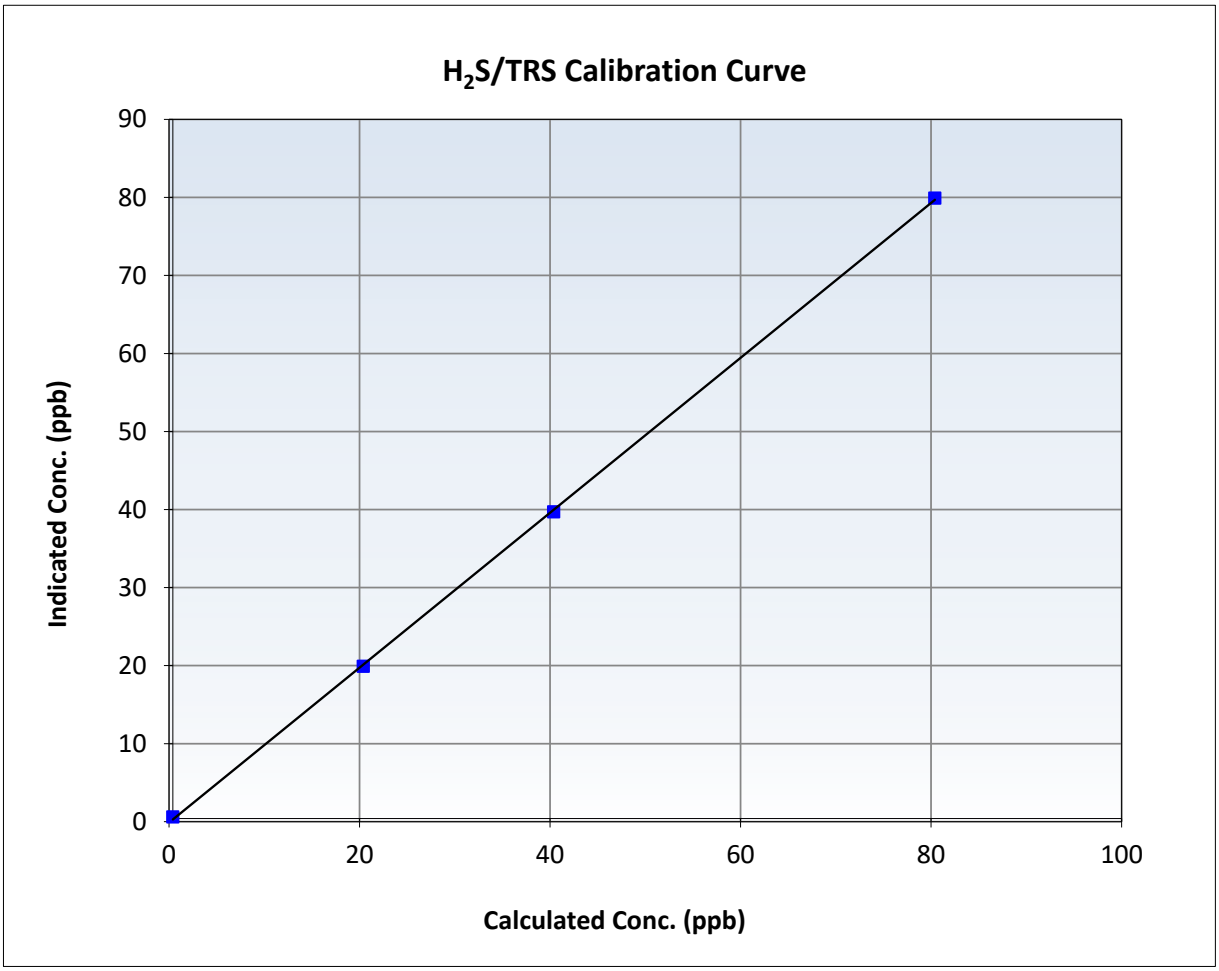
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 12, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:28	End Time (MST):	16:13
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583

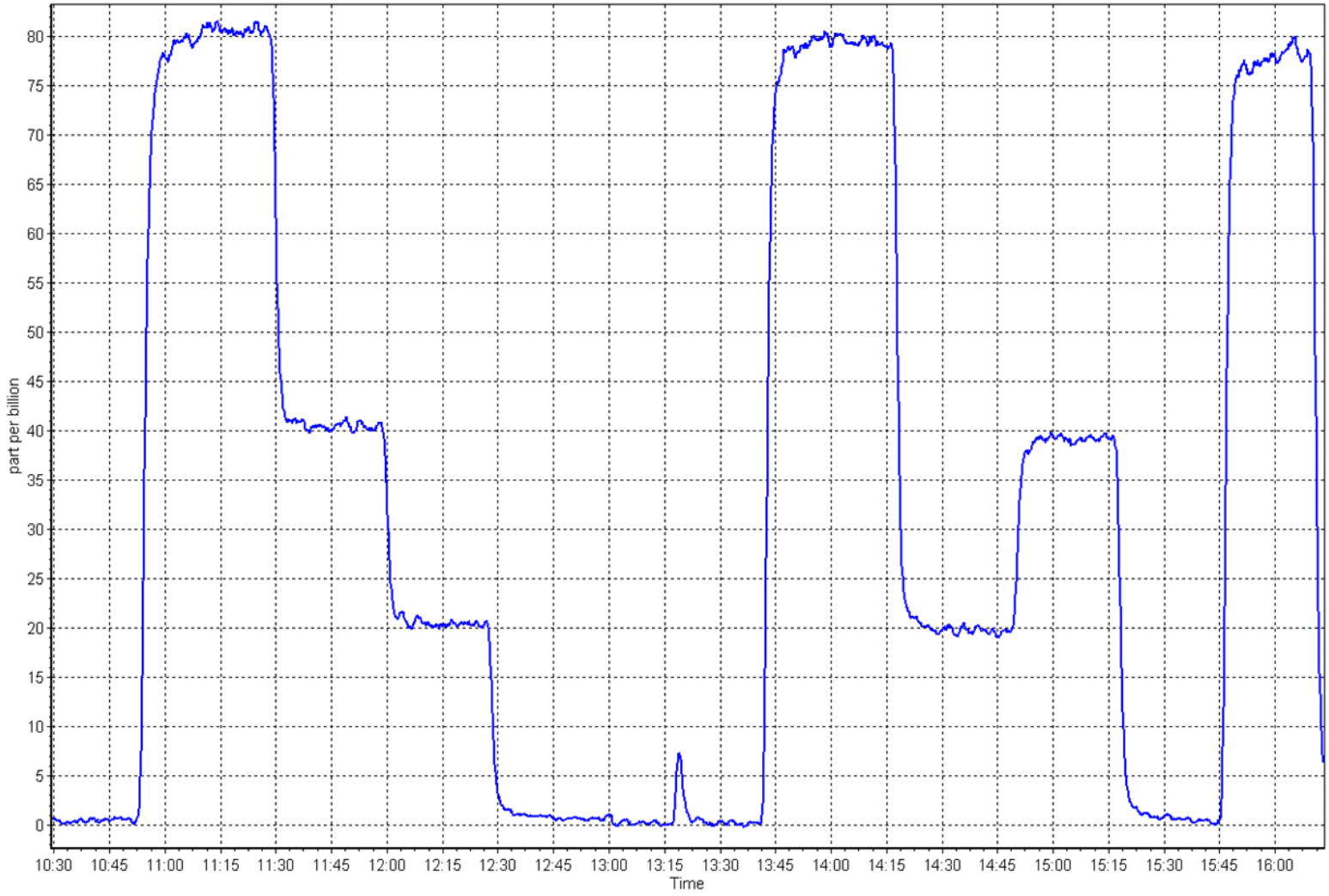
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	79.5	1.0063
40.0	39.3	1.0177
20.0	19.5	1.0257

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999919	*≥0.995*
Slope	0.992711	*0.90 - 1.10*
Intercept	-0.119219	*+/-3*



H_2S/TRS Calibration Plot Date: April 8, 2024 Location: Wapasu



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	April 2, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	10:35	End time (MST):	13:38
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:	0.992946	0.990526	Background:	3.020	3.020
Calibration intercept:	0.028821	0.030412	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	17.05	1.005
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	17.00	Previous response	17.00	*% 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	0.10	----
High point	4921	79.4	17.09	17.01	1.005
Mid point	4960	39.7	8.55	8.41	1.016
Low point	4980	19.8	4.26	4.22	1.011
As left zero	5000	0.0	0.00	0.04	----
As left span	4921	79.4	17.09		
				Average Correction Factor	1.011

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

THC Calibration Summary

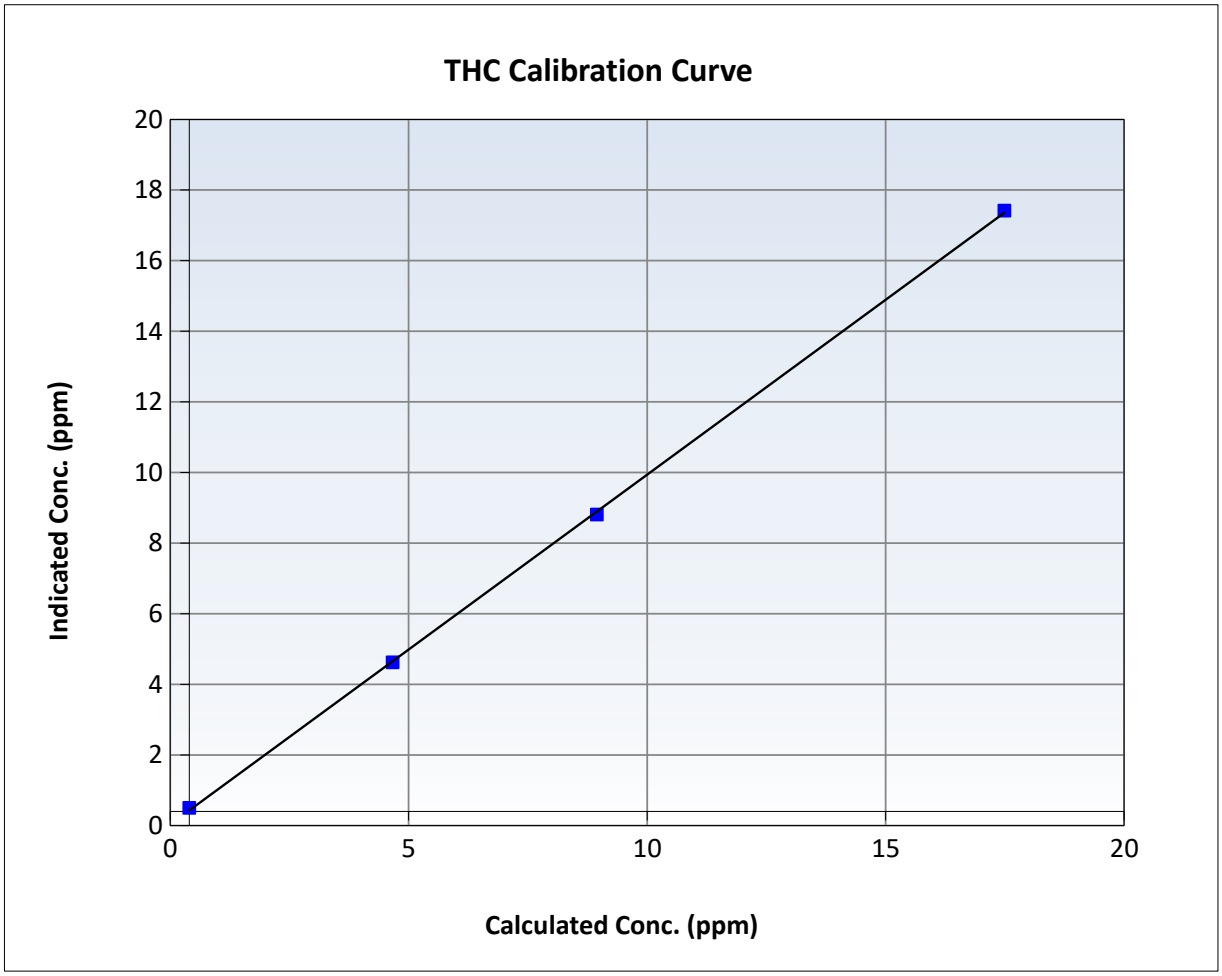
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:35	End Time (MST):	13:38
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

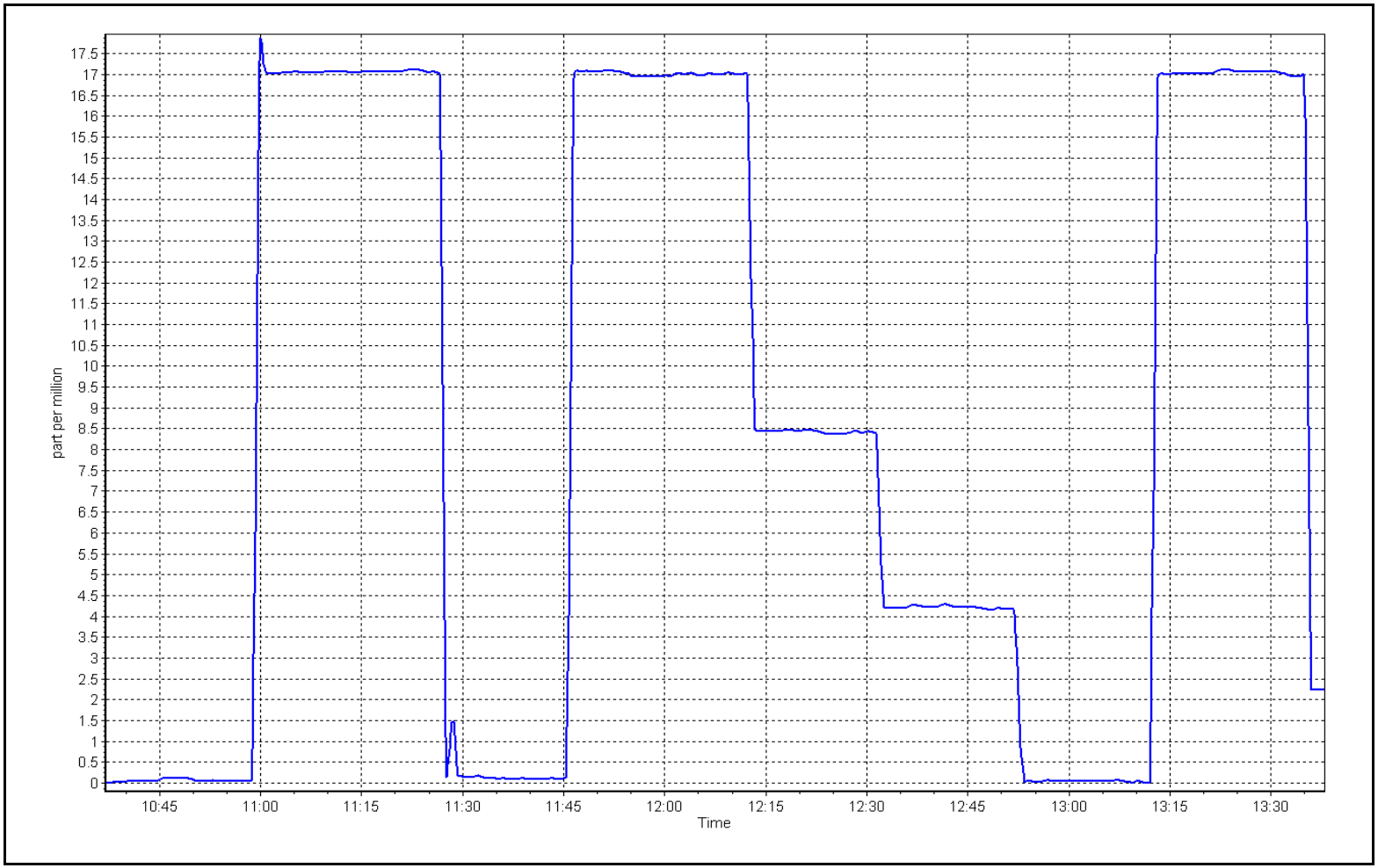
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.10	----
17.09	17.01	1.0047
8.55	8.41	1.0162
4.26	4.22	1.0108

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999897	*≥0.995*
Slope	0.990526	*0.90 - 1.10*
Intercept	0.030412	*+/-1.5*



THC Calibration Plot Date: April 2, 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:	April 16, 2024
Last Cal Date:	March 26, 2024
Start time (MST):	10:35
End time (MST):	N/A
Reason:	As Found

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	-0.3	-0.2	-0.1	----	----
AF High point	4917	83.2	817.2	799.9	17.3	809.8	791.0	18.7	1.0088	1.0110
AF Mid point	4958	41.6	408.6	399.9	8.7	395.7	385.3	10.4	1.0318	1.0375
AF Low point	4979	20.8	204.3	200.0	4.3	193.5	187.4	6.2	1.0542	1.0659
New cyl resp										

Previous Response	NO_X = 816.2 ppb	NO = 796.2 ppb
Baseline Corr 1st pt	NO_X = 810.1 ppb	NO = 791.2 ppb
Baseline Corr 2nd pt	NO_X = 396.0 ppb	NO = 385.5 ppb
Baseline Corr 3rd pt	NO_X = 193.8 ppb	NO = 187.6 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.8%

*Percent Change NO = -0.6%

As Found Statistics

As found	NO_X r^2: 0.999787	Nx Sl: 0.993718	Nx Int: -5.600
As found	NO r^2: 0.999710	NO Sl: 0.992071	NO Int: -6.300
As found	NO_2 r^2: 1.000000	NO2 Sl: 0.991618	NO_2 Int: -0.100

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	-0.1	----	----
As found high GPT point	791.0	390.1	418.2	414.6	1.0087	99.1%
As found mid GPT point	791.0					
As found low GPT point	791.0					

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo Scientific 42iQ
Serial Number: 12300522720
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.345	N/A	NO bkgnd or offset:	8.1	N/A
NOX coeff or slope:	0.994	N/A	NOX bkgnd or offset:	8.1	N/A
NO2 coeff or slope:	1.000	N/A	Reaction cell Press:	404.0	N/A

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.004319	
NO_X Cal Offset:	-4.540000	
NO Cal Slope:	1.001930	
NO Cal Offset:	-5.200000	
NO_2 Cal Slope:	1.007870	
NO_2 Cal Offset:	1.467173	

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		

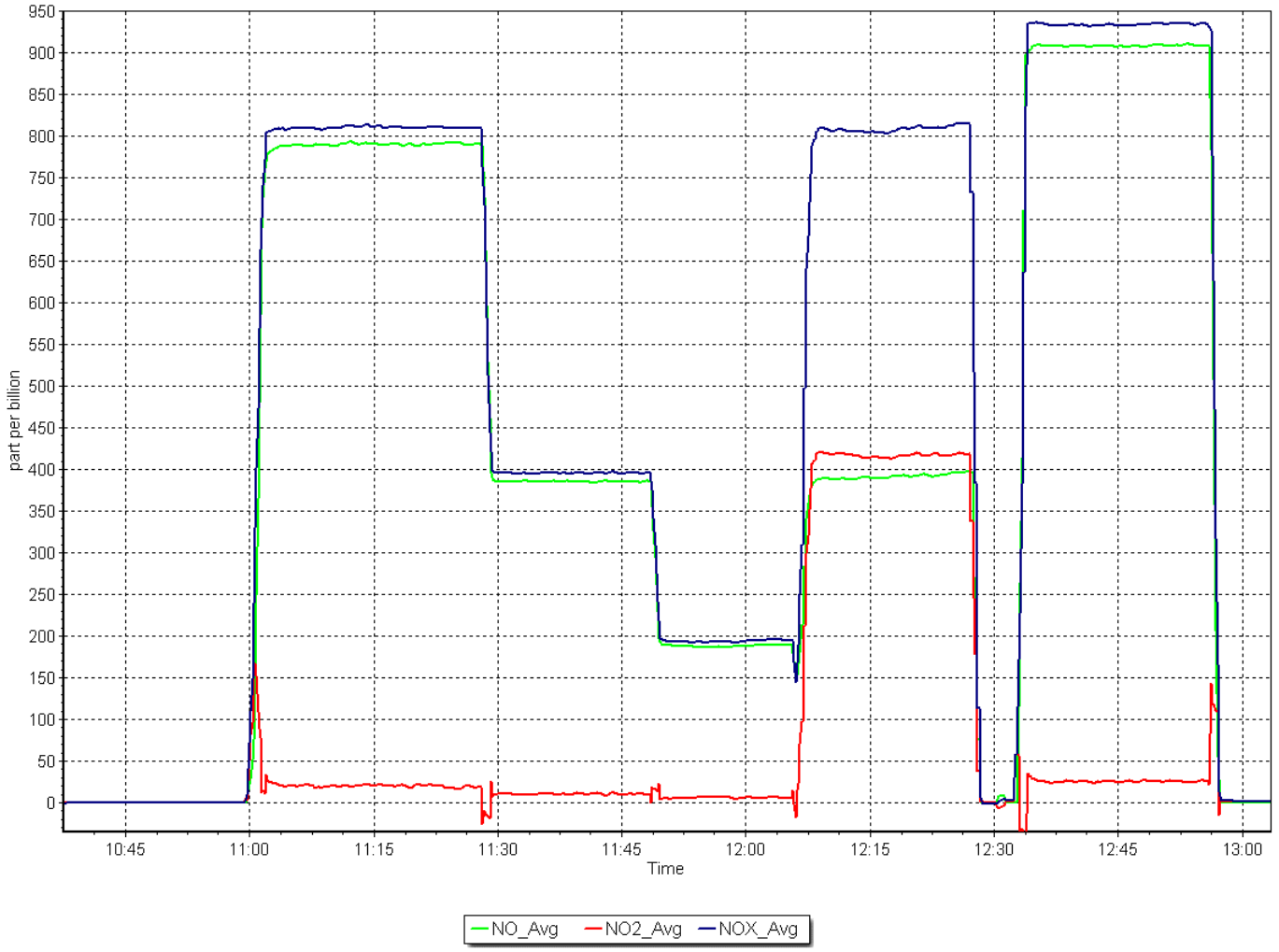
GPT Calibration Data

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: Pump changed out after as founds. Will calibrate instrument tomorrow.

Calibration Performed By: Aswin Sasi Kumar

NO_X Calibration Plot Date: April 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:	April 18, 2024
Last Cal Date:	N/A
Start time (MST):	10:37
End time (MST):	15:02
Reason:	Install

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										
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 Scientific 42i Serial Number: 1218153460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	N/A	1.100	NO bkgnd or offset:	N/A	3.8
NOX coeff or slope:	N/A	0.992	NOX bkgnd or offset:	N/A	4.2
NO2 coeff or slope:	N/A	1.000	Reaction cell Press:	N/A	261.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	N/A	0.999550
NO_X Cal Offset:	N/A	-0.560000
NO Cal Slope:	N/A	1.000573
NO Cal Offset:	N/A	-1.400000
NO_2 Cal Slope:	N/A	0.995649
NO_2 Cal Offset:	N/A	-0.696163

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	0.0	0.0	----	----
High point	4917	83.2	817.2	799.9	17.3	816.8	799.8	17.0	1.0005	1.0001
Mid point	4958	41.6	408.6	399.9	8.7	406.9	397.6	9.3	1.0042	1.0059
Low point	4979	20.8	204.3	200.0	4.3	203.4	197.6	5.8	1.0044	1.0120
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4917	83.2	817.2	401.2	416.0	817.0	401.2	415.8	1.0002	1.0000
							Average Correction Factor		1.0030	1.0060

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	797.8	400.1	415.0	413.3	1.0041	99.6%
Mid GPT point	797.8	593.7	221.4	219.0	1.0110	98.9%
Low GPT point	797.8	593.7	221.4	219.0	1.0110	98.9%
				Average Correction Factor	1.0087	99.1%

Notes: Install calibration. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

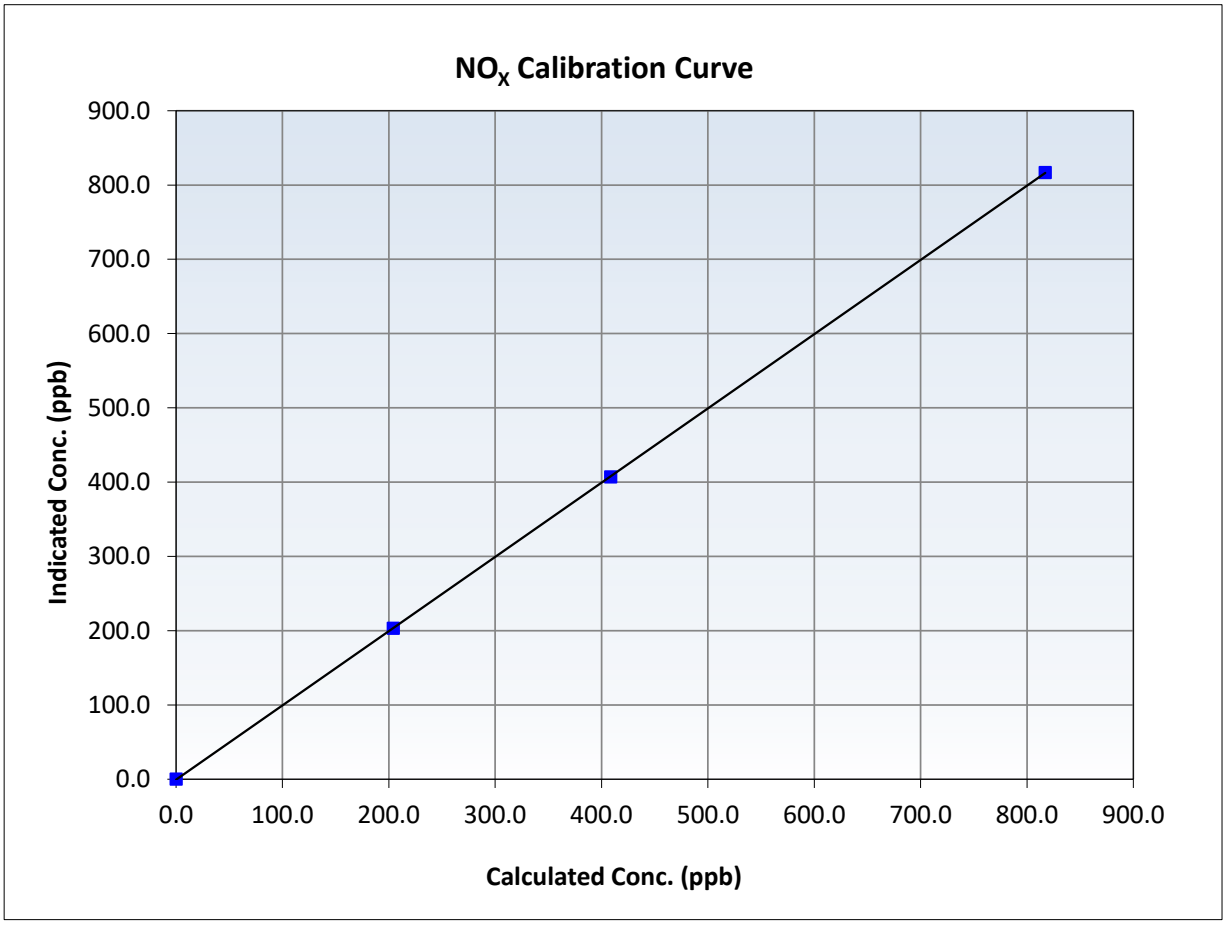
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	N/A
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:37	End Time (MST):	15:02
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	----
817.2	816.8	1.0005
408.6	406.9	1.0042
204.3	203.4	1.0044

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.999550	*0.90 - 1.10*
Intercept	-0.560000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

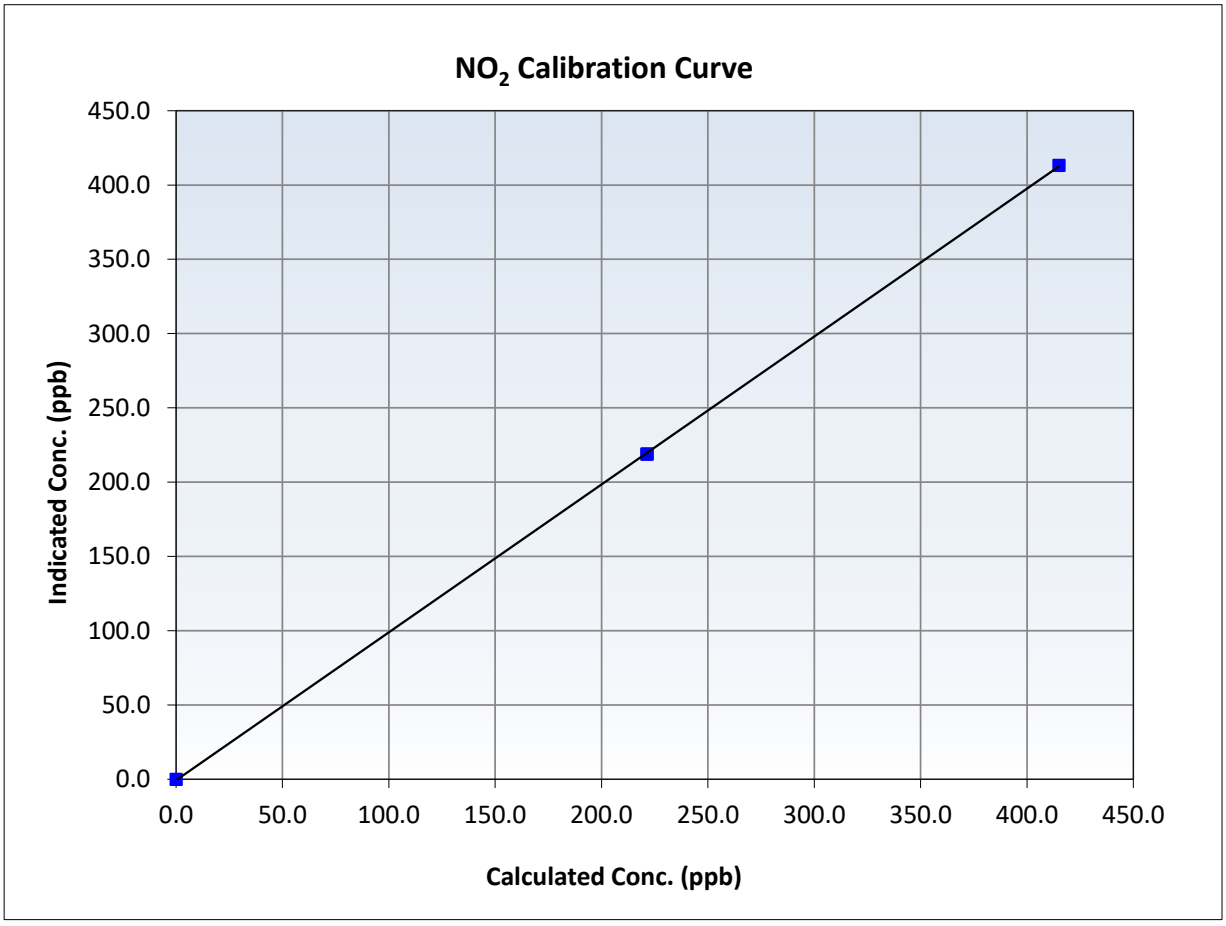
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	N/A
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:37	End Time (MST):	15:02
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
415.0	413.3	1.0041
221.4	219.0	1.0110
221.4	219.0	1.0110

Statistical Evaluation		Limits
Correlation Coefficient	0.999974	≥0.995
Slope	0.995649	0.90 - 1.10
Intercept	-0.696163	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

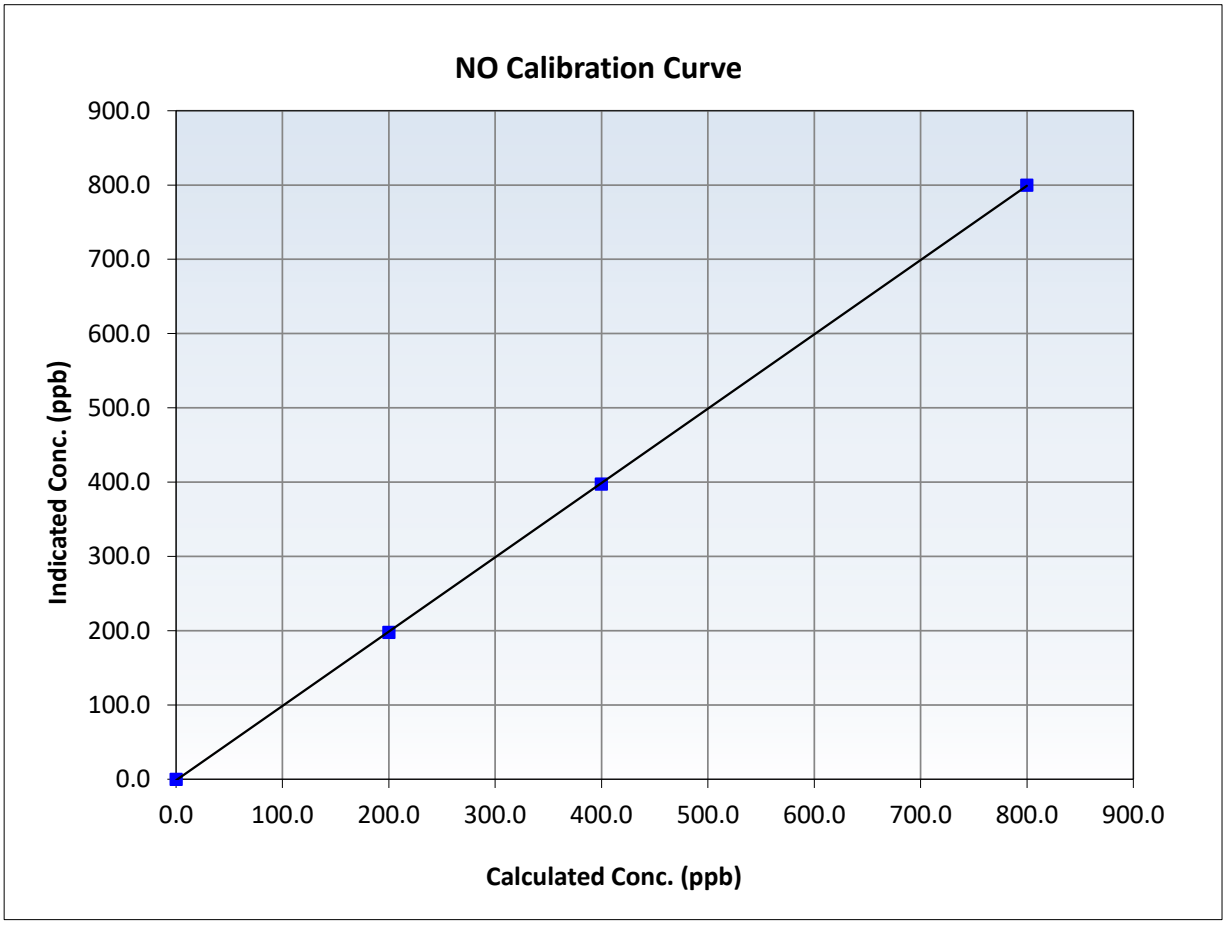
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	N/A
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:37	End Time (MST):	15:02
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

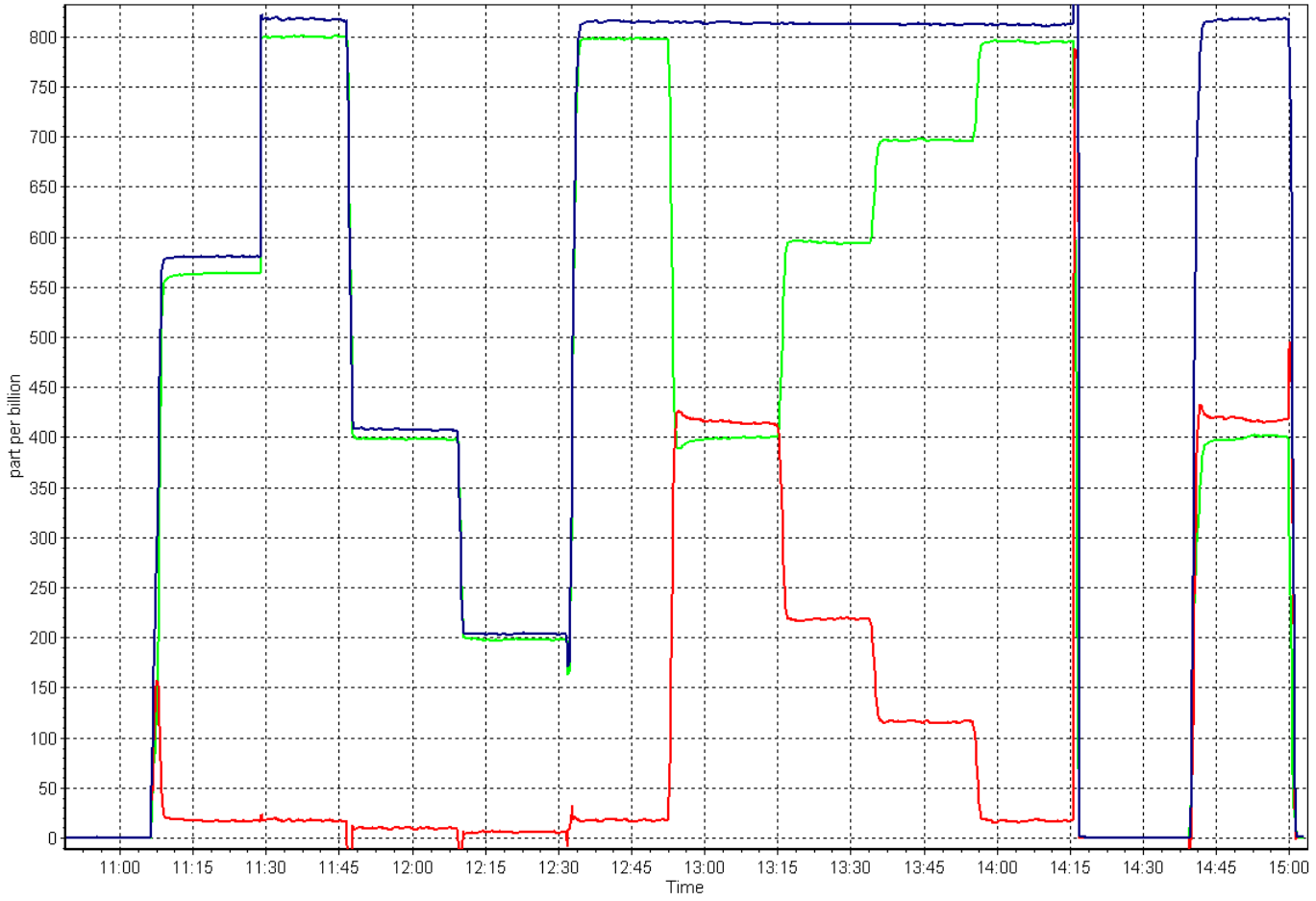
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.9	799.8	1.0001
399.9	397.6	1.0059
200.0	197.6	1.0120

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	1.000573	*0.90 - 1.10*
Intercept	-1.400000	*+/-20*



NO_X Calibration Plot Date: April 18, 2024 Location: Wapasu



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	April 4, 2024	Last Cal Date:	March 11, 2024
Start time (MST):	10:03	End time (MST):	13:20
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:	1.000657	1.000714	Backgd or Offset:	-1.8	-1.8
Calibration intercept:	-0.340000	-0.600000	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	399.4	1.002
As found Mid point					
As found Low point					
Baseline Corr As found:	399.2	Previous response	399.9	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	0.4	----
High point	5000	1077.3	400.0	400.1	1.000
Mid point	5000	900.3	200.0	199.3	1.004
Low point	5000	789.5	100.0	98.3	1.017
As left zero	5000	0.0	0.0	0.6	----
As left span	5000	1077.3	400.0	404.0	0.990
				Average Correction Factor	1.007

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

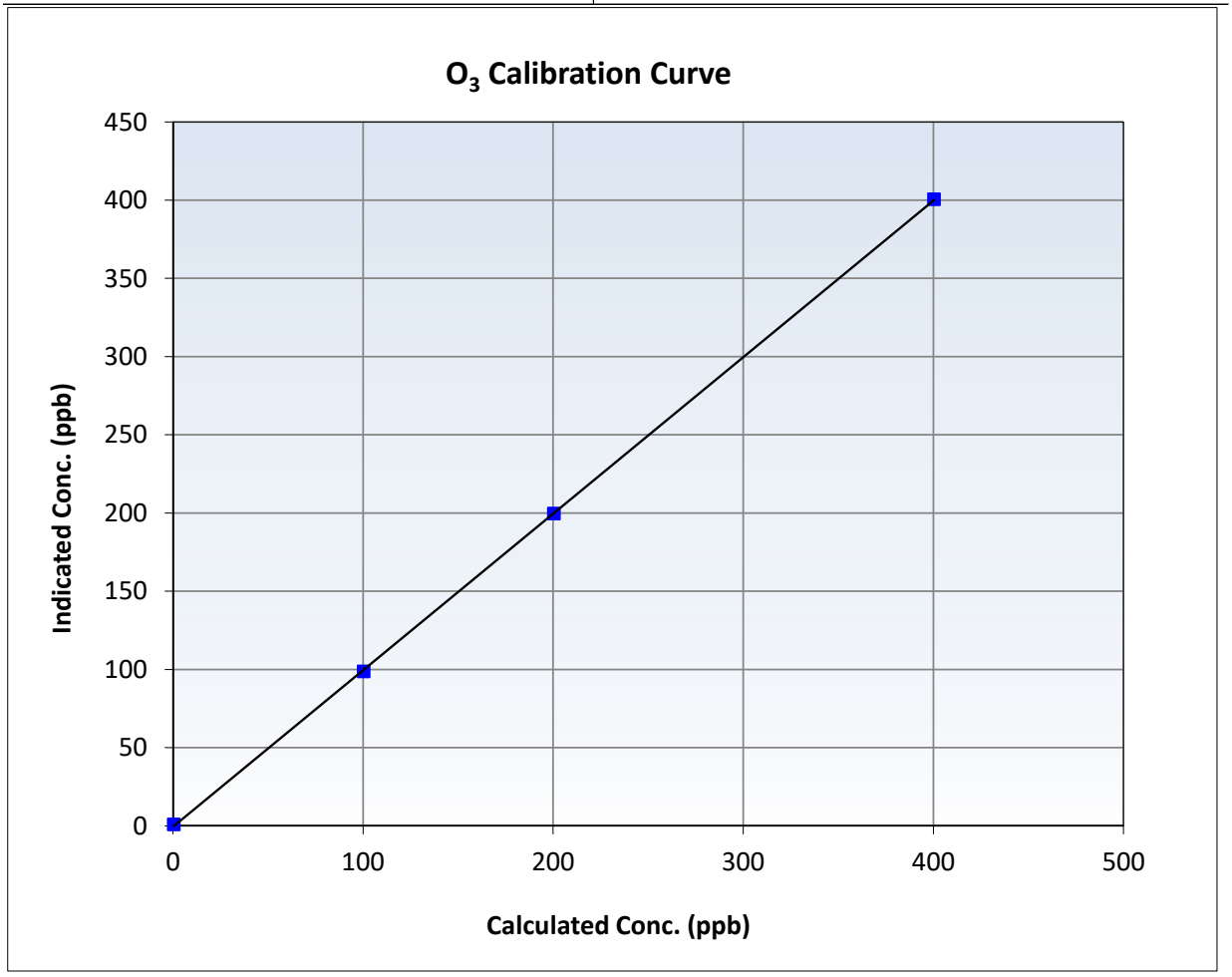
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 11, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:03	End Time (MST):	13:20
Analyzer make:	API T400	Analyzer serial #:	3870

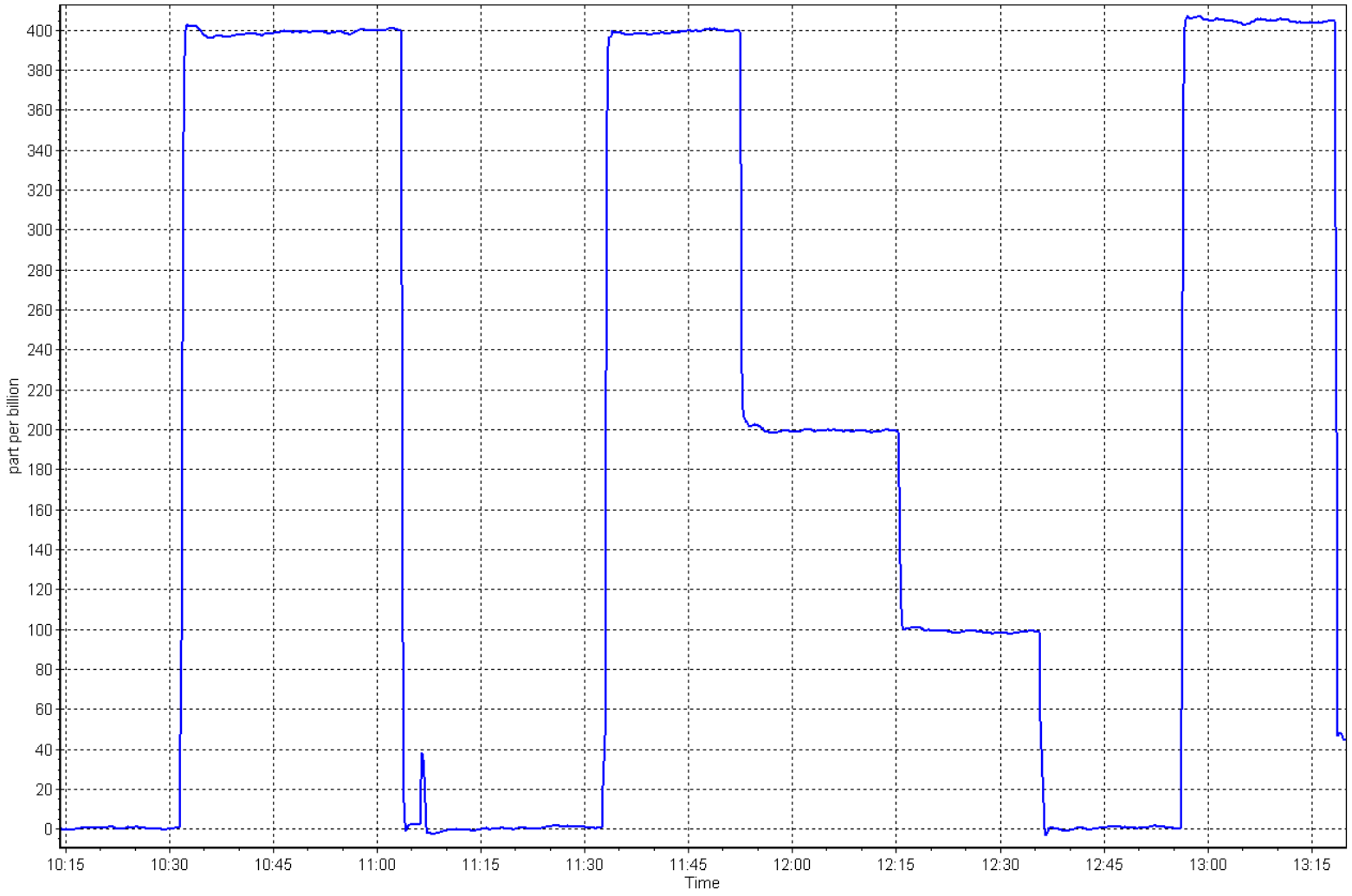
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
400.0	400.1	0.9998
200.0	199.3	1.0035
100.0	98.3	1.0173

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999970	*≥0.995*
Slope	1.000714	*0.90 - 1.10*
Intercept	-0.600000	*+/- 5*



O_3 Calibration Plot Date: April 4, 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:	April 17, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	10:36	End time (MST):	12:28
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)	-3.8	-3.68	-3.8	☐	+/- 2 °C
P (mmHg)	726.3	729.6	726.3	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.00	4.98	☐	+/- 0.25 LPM
PW% (pump)	41	-----	41	☐	>80%
Zero Verification	PM w/o HEPA:	3.1	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	12.7	11.1	11.1	☑	+/- 0.5

Date Optical Chamber Cleaned: February 13, 2024

Date Disposable Filter Changed: February 13, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: _____

Date RH/T Sensor Cleaned: _____

Notes: Temp. pressure and flow checked. Leak check passed. Chamber cleaning completed. PMT adjusted.

Calibration by: Aswin Sasi Kumar

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS18
STONY MOUNTAIN
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	April 3, 2024	Last Cal Date:	March 1, 2024
Start time (MST):	10:20	End time (MST):	14:11
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:	1.000733	1.002389	Backgd or Offset:	22.9	22.9
Calibration intercept:	0.276595	0.496756	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	5009	0.0	0.0	0.8	----
As found High point	4919	81.0	800.3	801.2	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	800.4	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	0.8	----
High point	4919	81.0	800.3	802.5	0.997
Mid point	4959	40.5	400.2	402.5	0.994
Low point	4979	20.2	199.6	199.6	1.000
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:	0.997

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

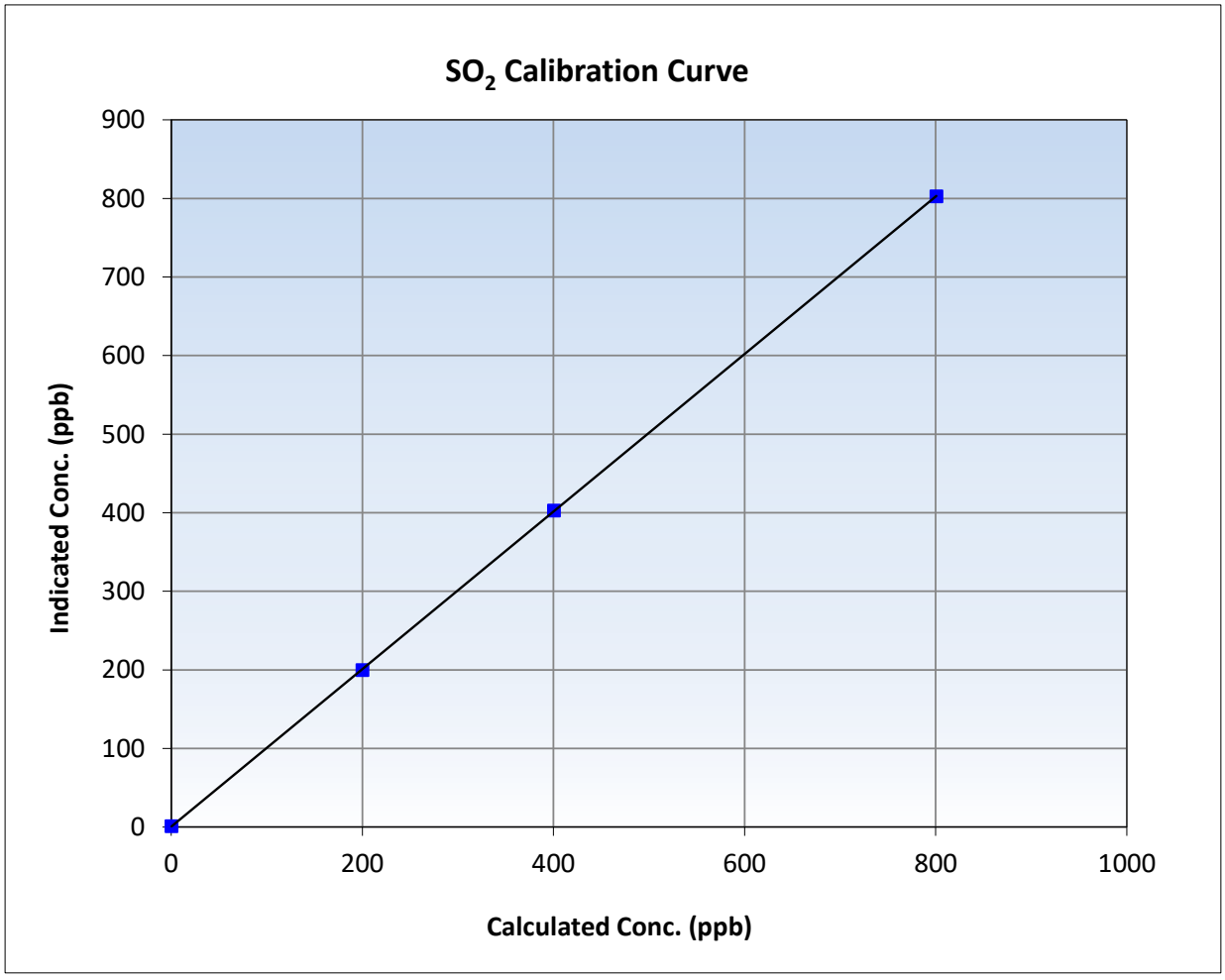
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 1, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:20	End Time (MST):	14:11
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453

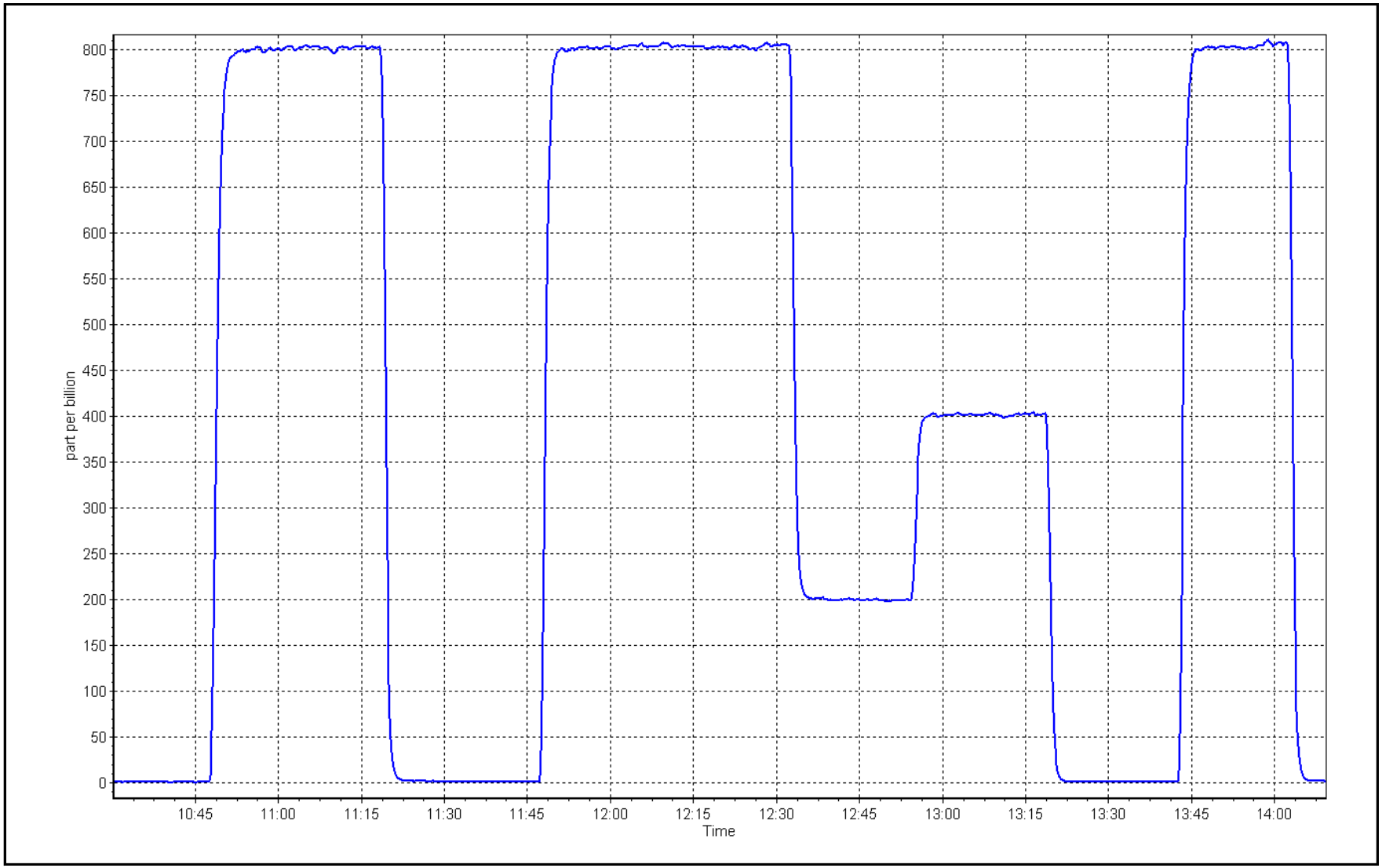
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.8	----
800.3	802.5	0.9972
400.2	402.5	0.9942
199.6	199.6	1.0000

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.002389	*0.90 - 1.10*
Intercept	0.496756	*+/-30*



SO2 Calibration Plot Date: April 3, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS18
Calibration Date:	April 24, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	10:10	End time (MST):	15:25
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:	1.002157	0.993725	Backgd or Offset:	2.7	2.6
Calibration intercept:	0.240997	0.261187	Coeff or Slope:	1.157	1.137

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	82.8	0.968
As found Mid point	4964	36.5	40.0	41.7	0.964
As found Low point	4983	18.3	20.0	20.7	0.978
New cylinder response					

Baseline Corr As found:	82.6	Prev response:	80.41	*% change:	2.7%
Baseline Corr 2nd AF pt:	41.5	AF Slope:	1.033737	AF Intercept:	0.160426
Baseline Corr 3rd AF pt:	20.5	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	0.3	----
High point	4927	73.0	80.0	79.7	1.004
Mid point	4964	36.5	40.0	40.2	0.995
Low point	4983	18.3	20.0	20.0	1.002
As left zero	5000	0.0	0.0	0.3	----
As left span	4927	73.0	80.0	78.6	1.018
SO2 Scrubber Check	4923	77.1	771.0	0.0	----
Date of last scrubber change:		17-Dec-21		Ave Corr Factor	1.000
Date of last converter efficiency test:					

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

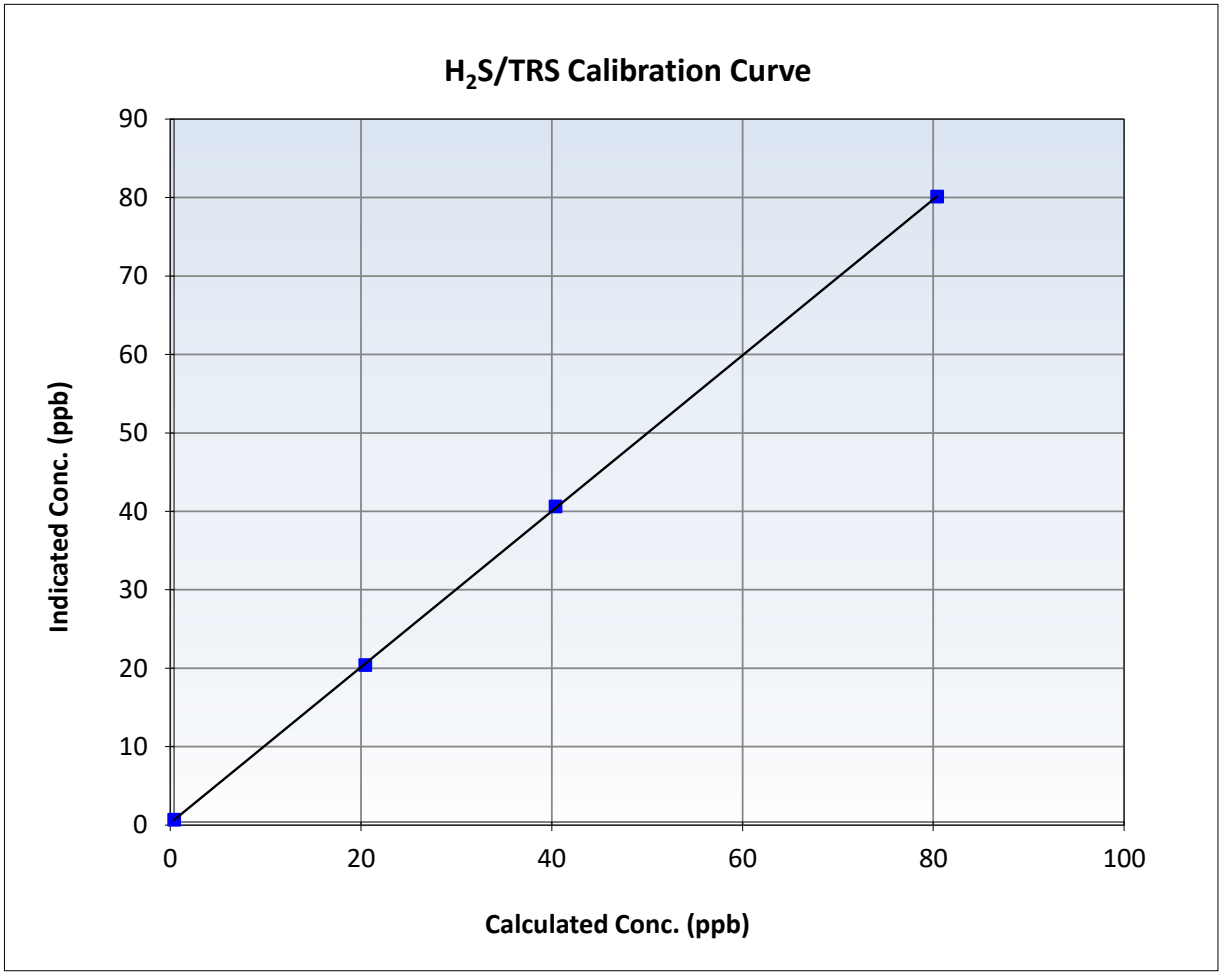
H_2S/TRS Calibration Summary

Station Information

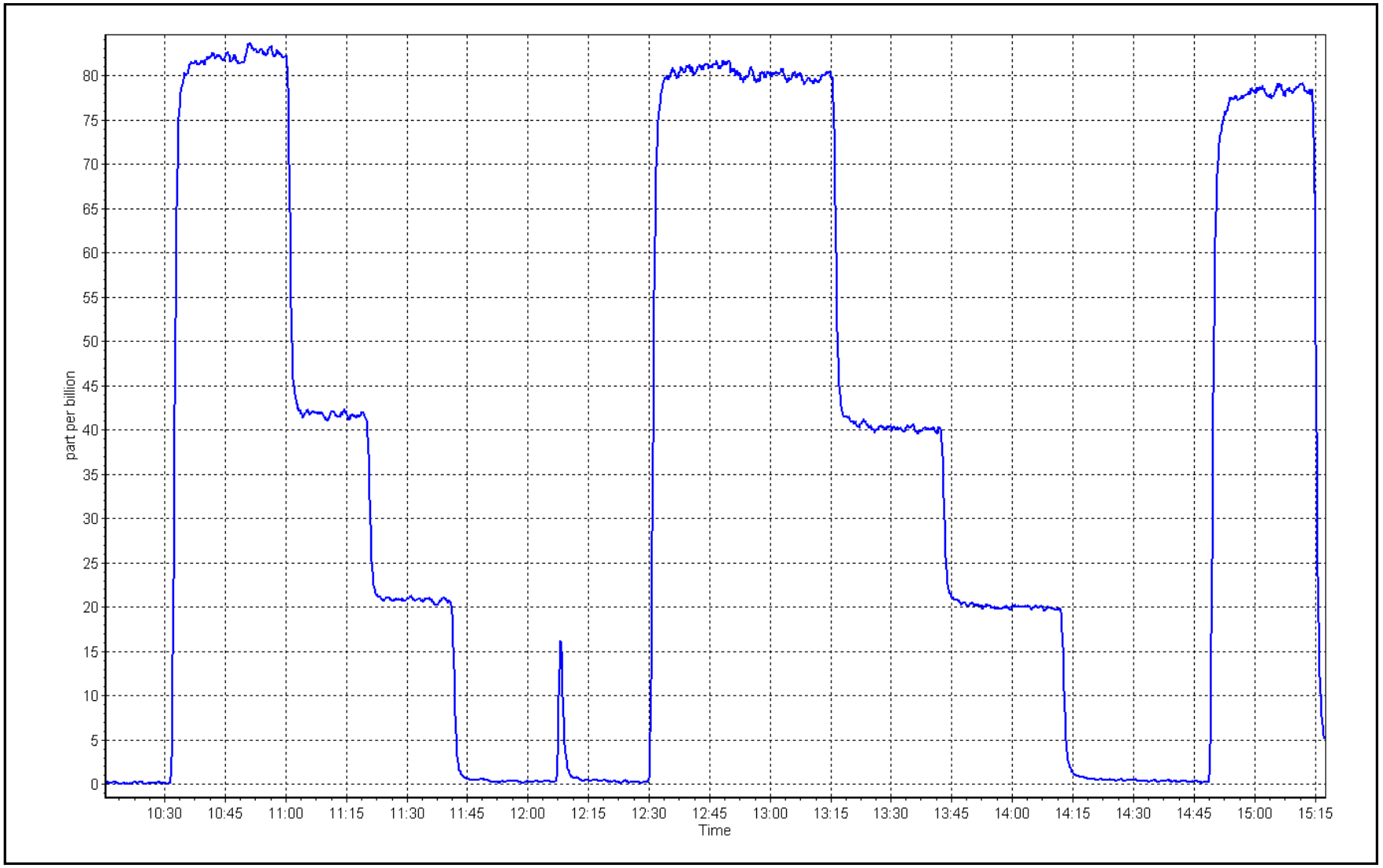
Calibration Date:	April 24, 2024	Previous Calibration:	March 27, 2024
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	10:10	End Time (MST):	15:25
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999978	*≥0.995*
80.0	79.7	1.0037	Slope	0.993725	*0.90 - 1.10*
40.0	40.2	0.9948			
20.0	20.0	1.0024	Intercept	0.261187	*+/-3*



H_2S/TRS Calibration Plot Date: April 24, 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:	April 3, 2024	Last Cal Date:	March 1, 2024
Start time (MST):	10:20	End time (MST):	14:11
Reason:	Routine		

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:	3.10E-04	3.23E-04	NMHC SP Ratio:	5.89E-05	5.94E-05
CH4 Retention time:	16.2	16.4	NMHC Peak Area:	156523	154457
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	0.08	----
As found High point	4919	81.0	17.28	16.83	1.032
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.75	Prev response	17.37	*% change	-3.7%
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	0.07	----
High point	4919	81.0	17.28	17.34	0.997
Mid point	4959	40.5	8.64	8.69	0.994
Low point	4979	20.2	4.31	4.38	0.984
As left zero	5000	0.0	0.00	0.03	----
As left span	4919	81.0	17.28	17.68	0.977
				Average Correction Factor	0.992

Notes: As found CH4 5.4% out. Diagnostics all normal, possible shift after zero chromatogram procedure last month. 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	4919	81.0	9.17	9.06	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.06	Prev response	9.23	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

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	9.19	0.997
Mid point	4959	40.5	4.58	4.62	0.993
Low point	4979	20.2	2.29	2.30	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.0	9.17	9.41	0.974
				Average Correction Factor	0.995

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.08	----
As found High point	4919	81.0	8.11	7.77	1.054
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.70	Prev response	8.15	*% change	-5.9%
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	0.07	----
High point	4919	81.0	8.11	8.15	0.996
Mid point	4959	40.5	4.06	4.07	0.996
Low point	4979	20.2	2.02	2.08	0.971
As left zero	5000	0.0	0.00	0.03	----
As left span	4919	81.0	8.11	8.27	0.981
				Average Correction Factor	0.988

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.003678	0.999037
THC Cal Offset:	0.027639	0.068218
CH4 Cal Slope:	1.002169	0.994973
CH4 Cal Offset:	0.018204	0.061988
NMHC Cal Slope:	1.005151	1.002583
NMHC Cal Offset:	0.009635	0.006430

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

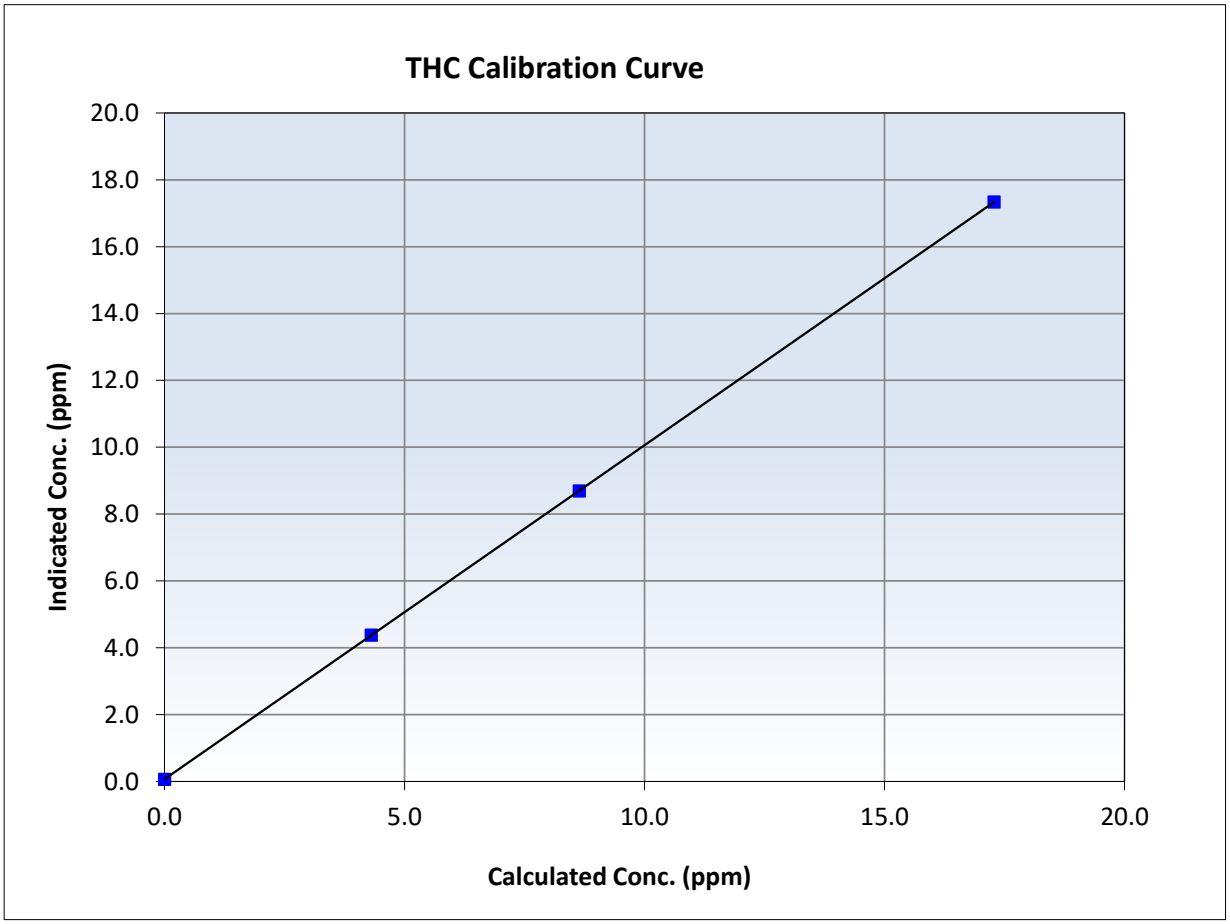
THC Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 1, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:20	End Time (MST):	14:11
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	0.07	----	Correlation Coefficient	0.999999	≥0.995
17.28	17.34	0.9968	Slope	0.999037	0.90 - 1.10
8.64	8.69	0.9944			
4.31	4.38	0.9839	Intercept	0.068218	+/-0.5



Wood Buffalo Environmental Association

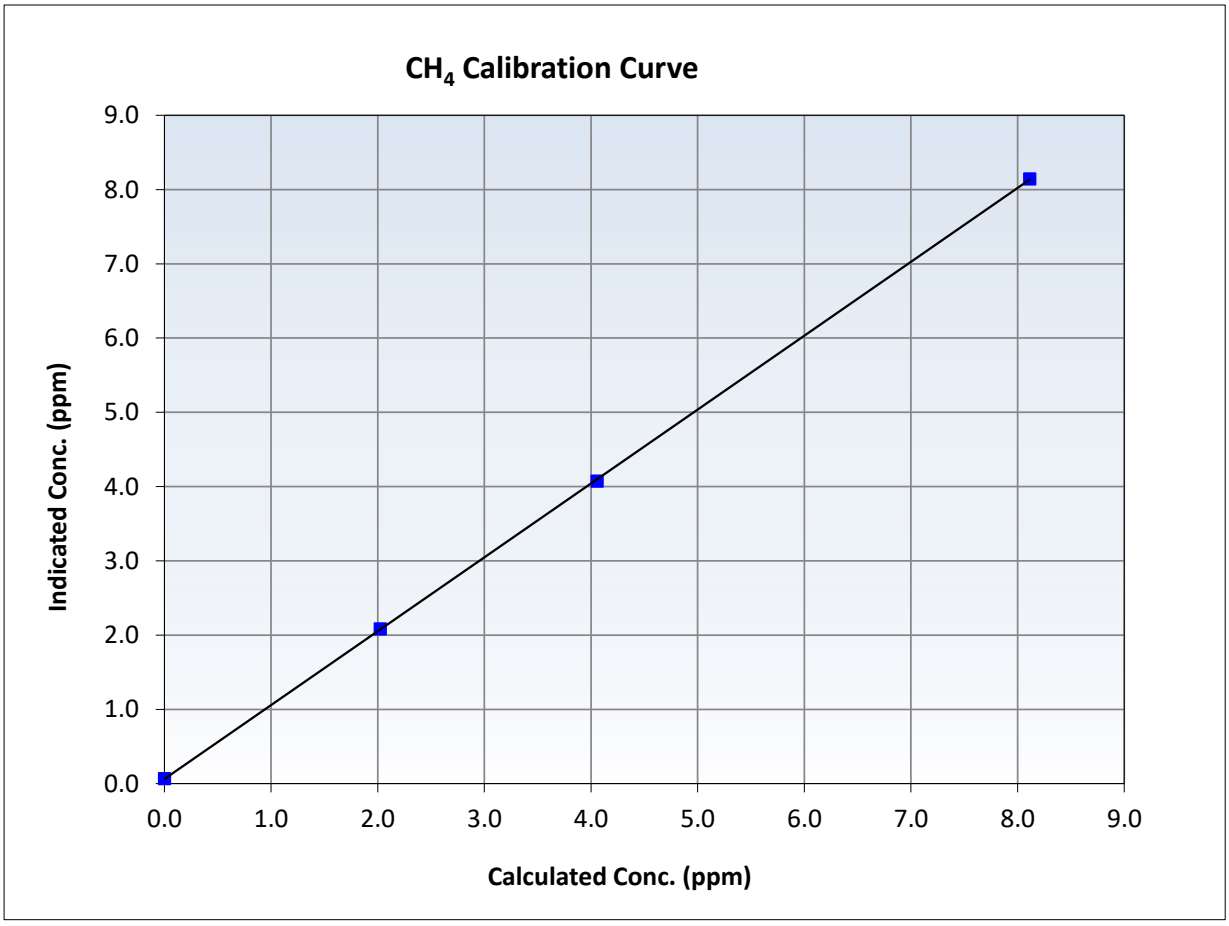
CH_4 Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 1, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:20	End Time (MST):	14:11
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	0.07	----	Correlation Coefficient	0.999975	*≥0.995*
8.11	8.15	0.9961	Slope	0.994973	*0.90 - 1.10*
4.06	4.07	0.9960	Intercept	0.061988	*+/-0.5*
2.02	2.08	0.9715			



Wood Buffalo Environmental Association

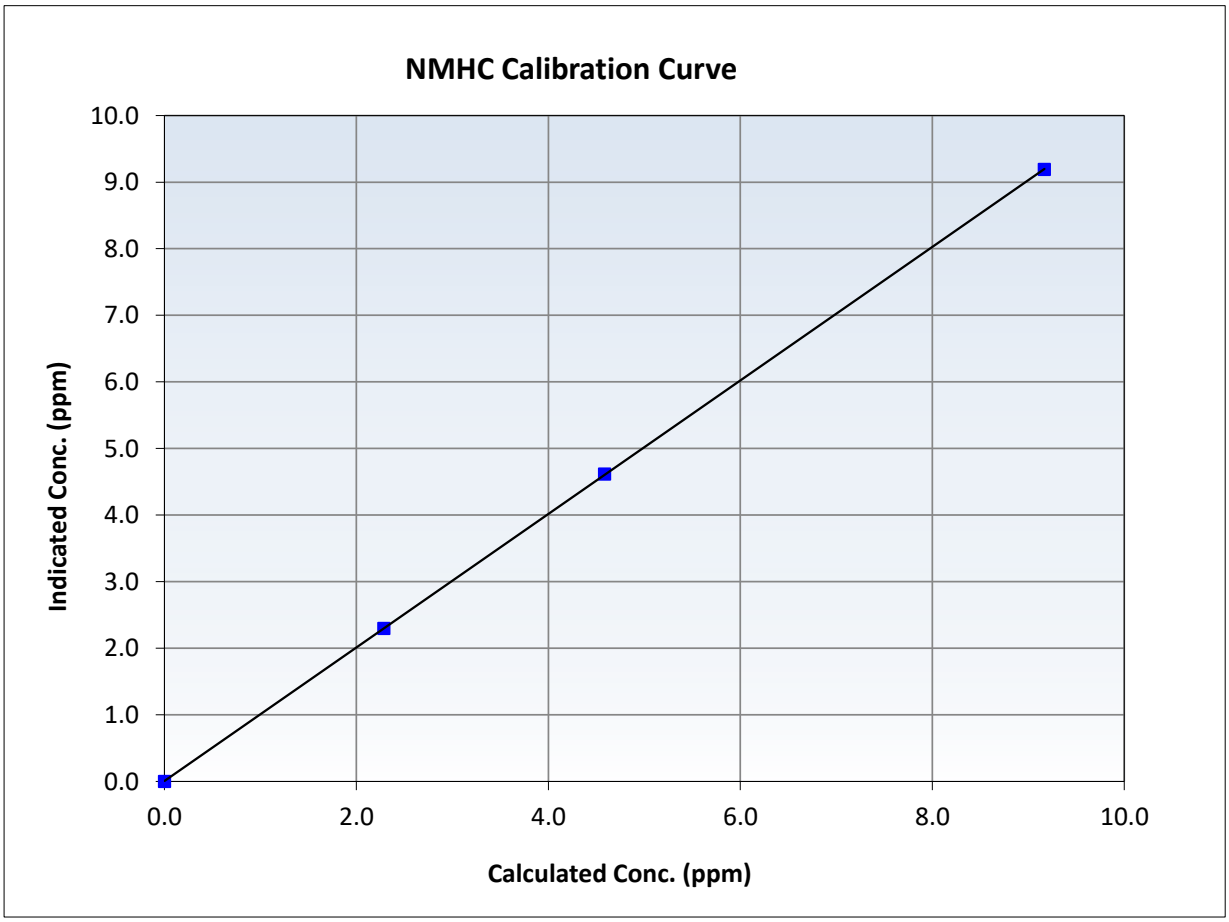
NMHC Calibration Summary

Station Information

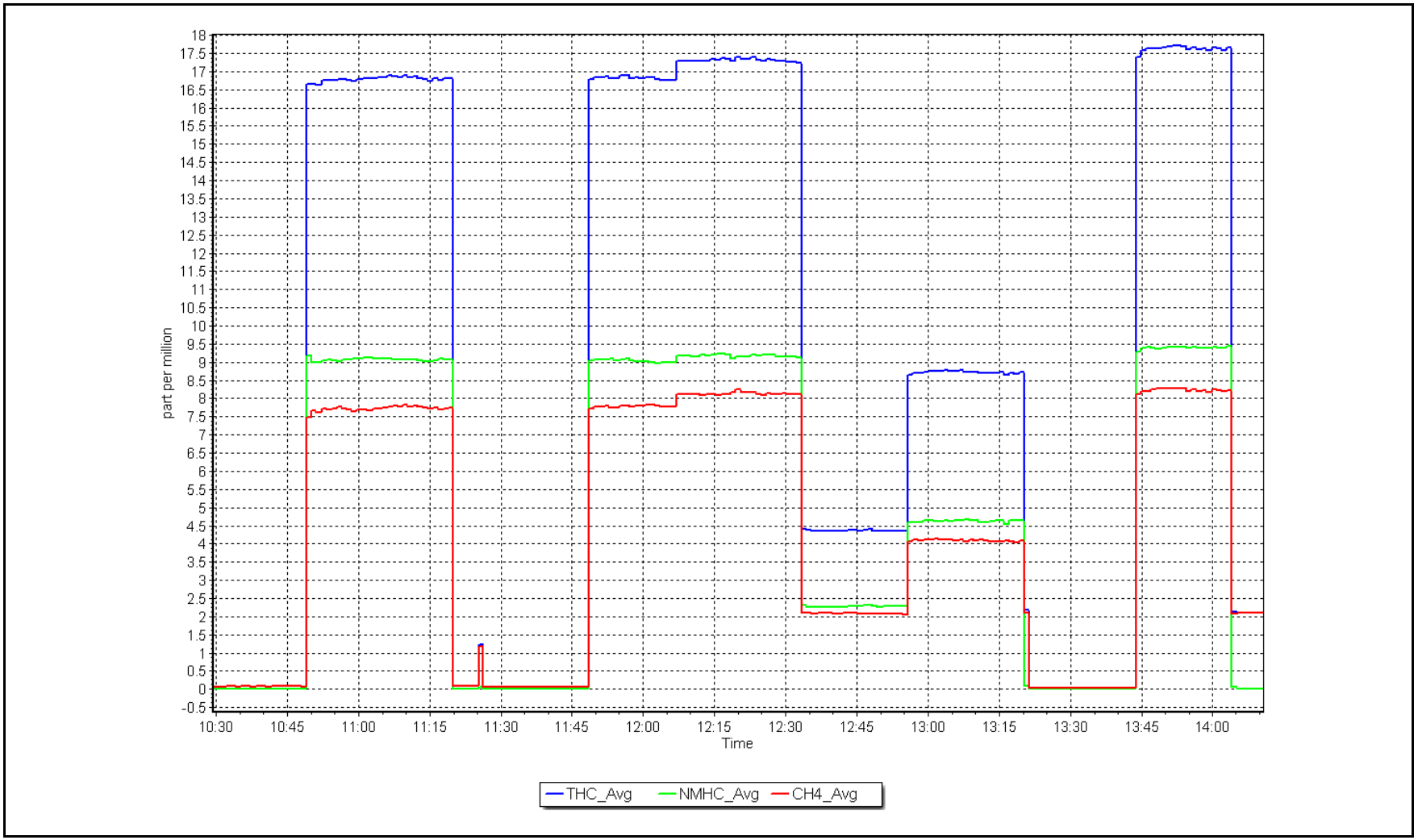
Calibration Date:	April 3, 2024	Previous Calibration:	March 1, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:20	End Time (MST):	14:11
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999994	≥0.995
9.17	9.19	0.9974	Slope	1.002583	0.90 - 1.10
4.58	4.62	0.9932			
2.29	2.30	0.9947	Intercept	0.006430	+/-0.5



NMHC Calibration Plot Date: April 3, 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:	April 26, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	13:45	End time (MST):	15:18
Reason:	Cylinder Change N2		

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	3.23E-04	NMHC SP Ratio:	5.94E-05	5.94E-05
CH4 Retention time:	16.4	16.4	NMHC Peak Area:	154457	154457
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	0.03	----
As found High point	4919	81.0	17.28	17.38	0.996
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.35	Prev response	17.33	*% 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	0.03	----
High point	4919	81.0	17.28	17.44	0.991
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 0.991

Notes: N2 cylinder change

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	81.0	9.17	9.24	0.992
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.24	Prev response	9.20	*% 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	4919	81.0	9.17	9.17	1.000
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.000

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.03	----
As found High point	4919	81.0	8.11	8.15	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.12	Prev response	8.13	*% 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

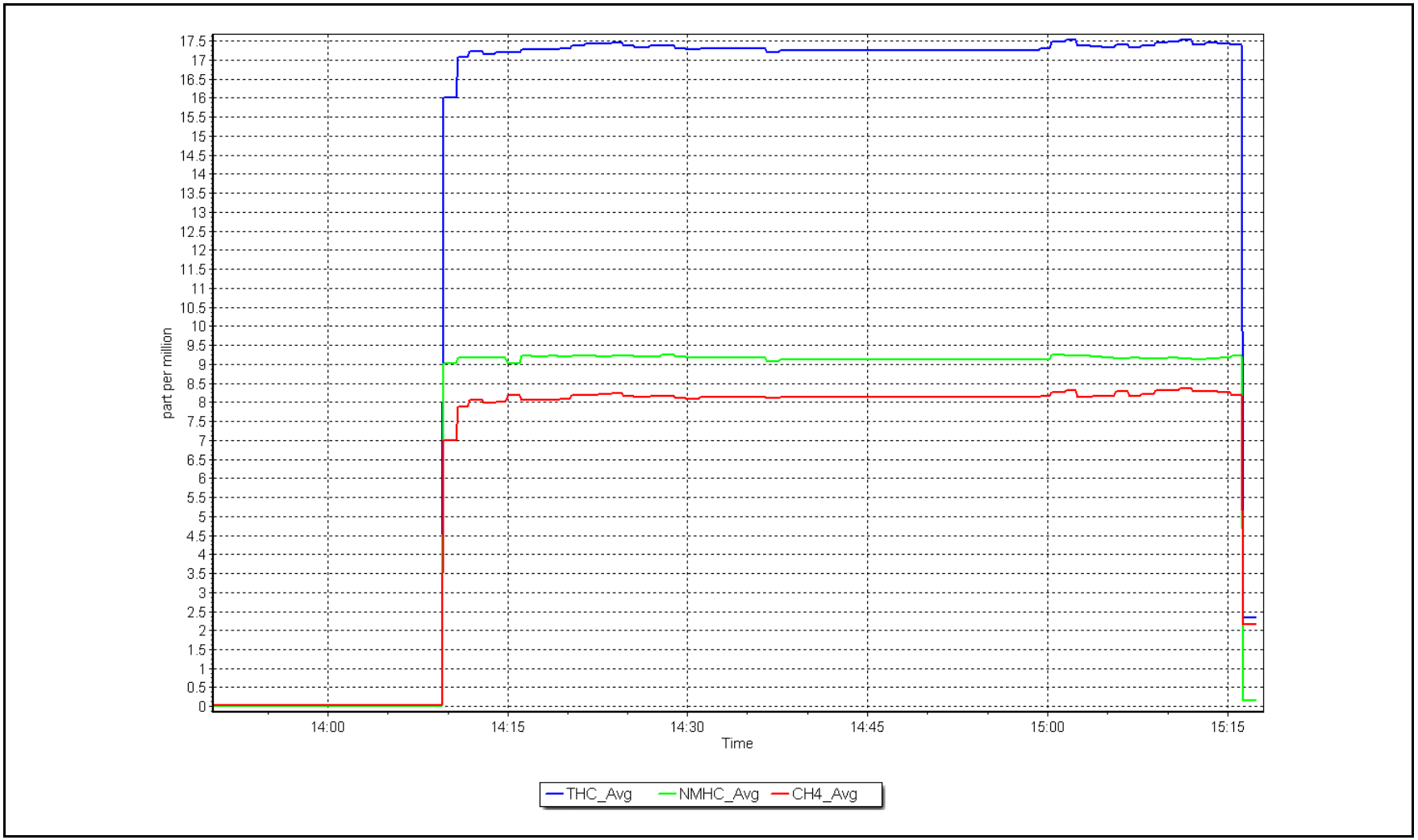
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.03	----
High point	4919	81.0	8.11	8.27	0.981
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.981

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999037	1.007271
THC Cal Offset:	0.068218	0.033000
CH4 Cal Slope:	0.994973	1.015289
CH4 Cal Offset:	0.061988	0.033000
NMHC Cal Slope:	1.002583	1.000176
NMHC Cal Offset:	0.006430	0.000000

Calibration Performed By: Aswin Sasi Kumar

NMHC Calibration Plot Date: April 26, 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:	April 23, 2024
Last Cal Date:	March 26, 2024
Start time (MST):	9:52
End time (MST):	14:53
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	811.7	800.3	11.3	0.9991	0.9986
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 809.1 ppb	NO = 797.8 ppb
Baseline Corr 1st pt	NO_X = 811.8 ppb	NO = 800.5 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 =	0.3%
*Percent Change	NO =	0.3%

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:	3.2	3.1
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	253.2	256.4

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.998146	1.003895
NO_X Cal Offset:	-0.500000	-0.640000
NO Cal Slope:	0.998819	1.005239
NO Cal Offset:	-0.600000	-1.220000
NO_2 Cal Slope:	0.999802	1.001293
NO_2 Cal Offset:	0.793514	-0.223061

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	4916	84.0	811.1	799.3	11.8	813.7	802.7	11.1	0.9968	0.9958
Mid point	4958	42.0	405.6	399.7	5.9	407.0	400.5	6.6	0.9964	0.9979
Low point	4979	21.0	202.8	199.8	2.9	201.6	198.2	3.4	1.0058	1.0083
As left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
As left span	4916	84.0	811.1	371.4	439.7	816.5	371.4	445.1	0.9934	1.0000
							Average Correction Factor		0.9997	1.0007

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	801.4	372.2	441.0	441.6	0.9986	100.1%
Mid GPT point	801.4	588.1	225.1	224.6	1.0020	99.8%
Low GPT point	801.4	696.6	116.6	116.4	1.0014	99.9%
				Average Correction Factor	1.0007	99.9%

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

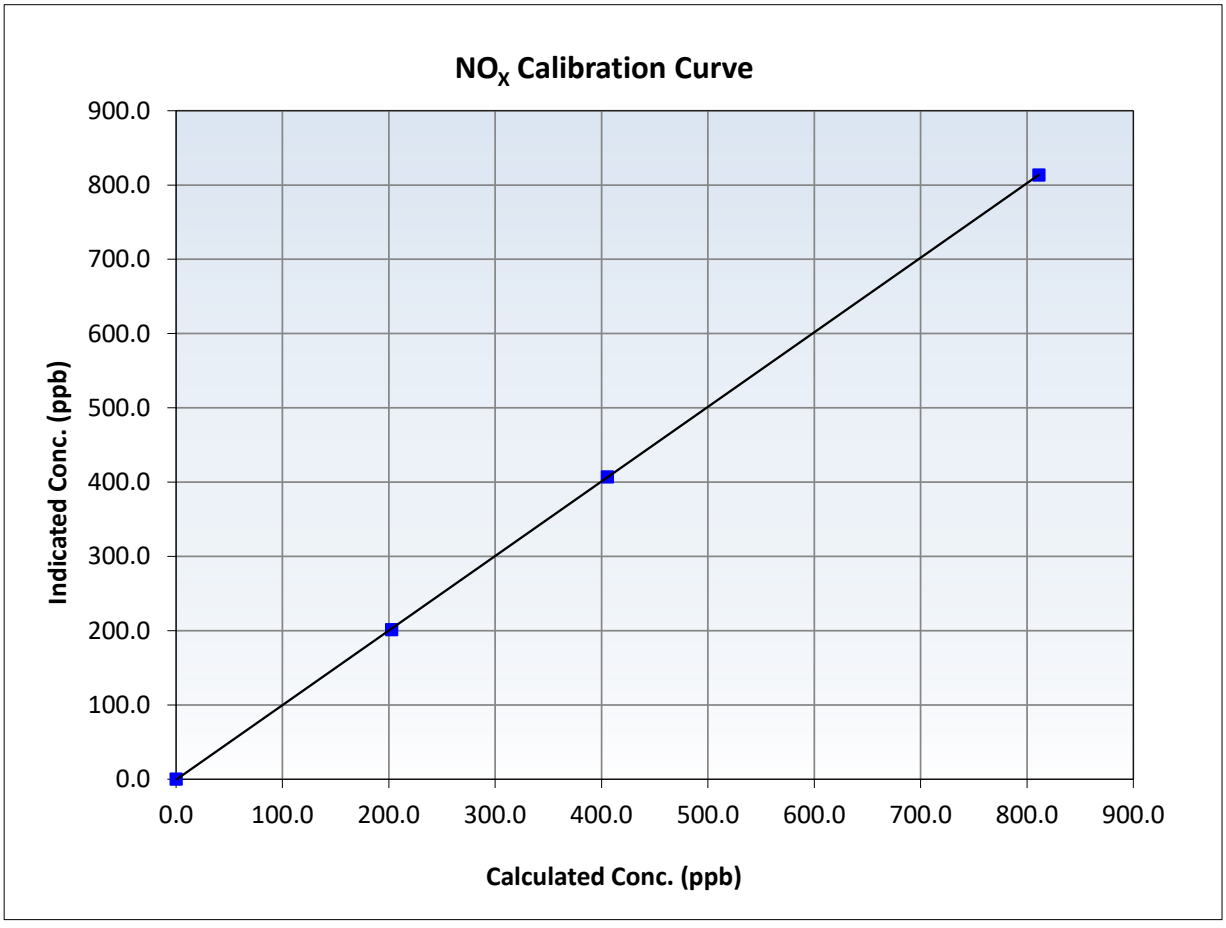
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 26, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	9:52	End Time (MST):	14:53
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
811.1	813.7	0.9968
405.6	407.0	0.9964
202.8	201.6	1.0058

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.003895	*0.90 - 1.10*
Intercept	-0.640000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

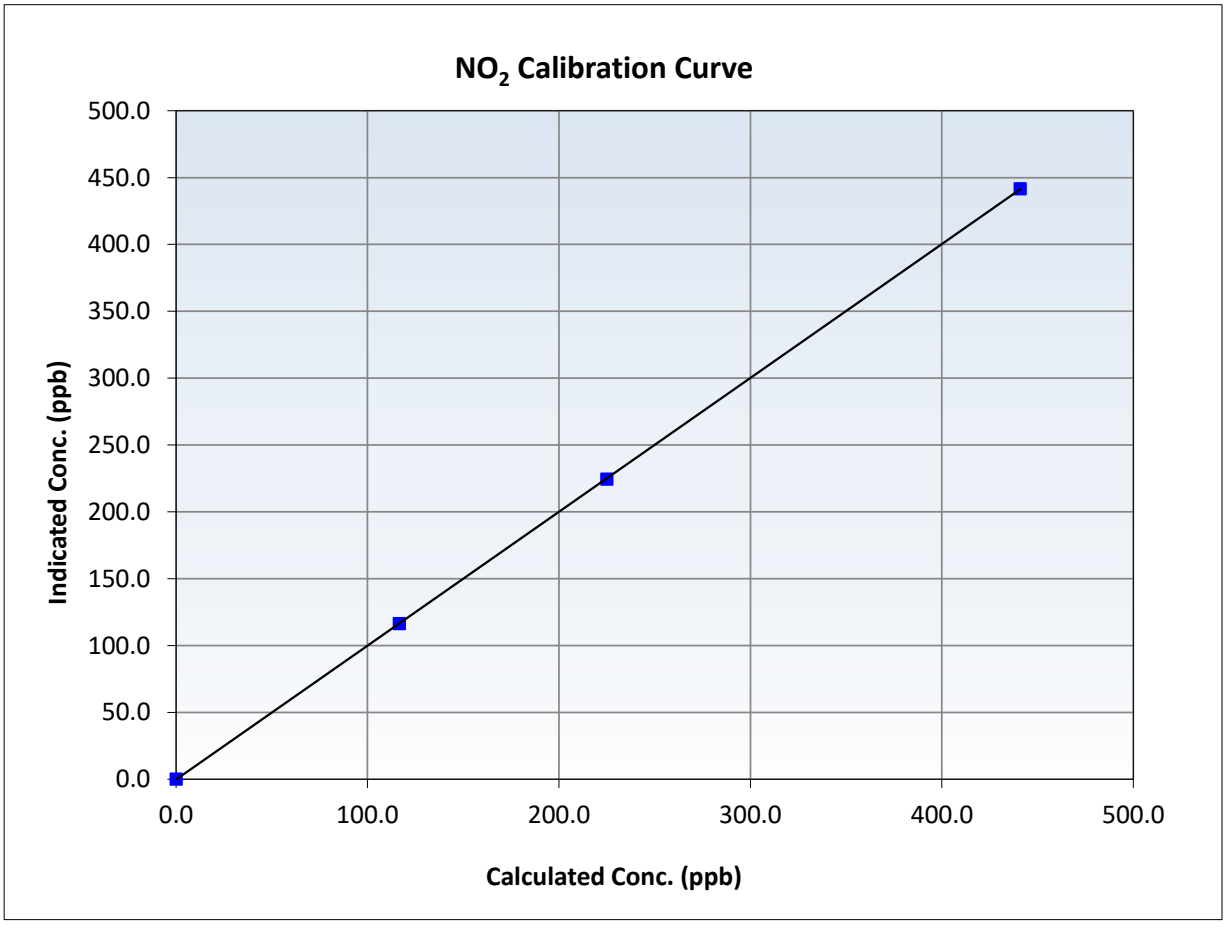
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 26, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	9:52	End Time (MST):	14:53
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
441.0	441.6	0.9986
225.1	224.6	1.0020
116.6	116.4	1.0014

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.001293	*0.90 - 1.10*
Intercept	-0.223061	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

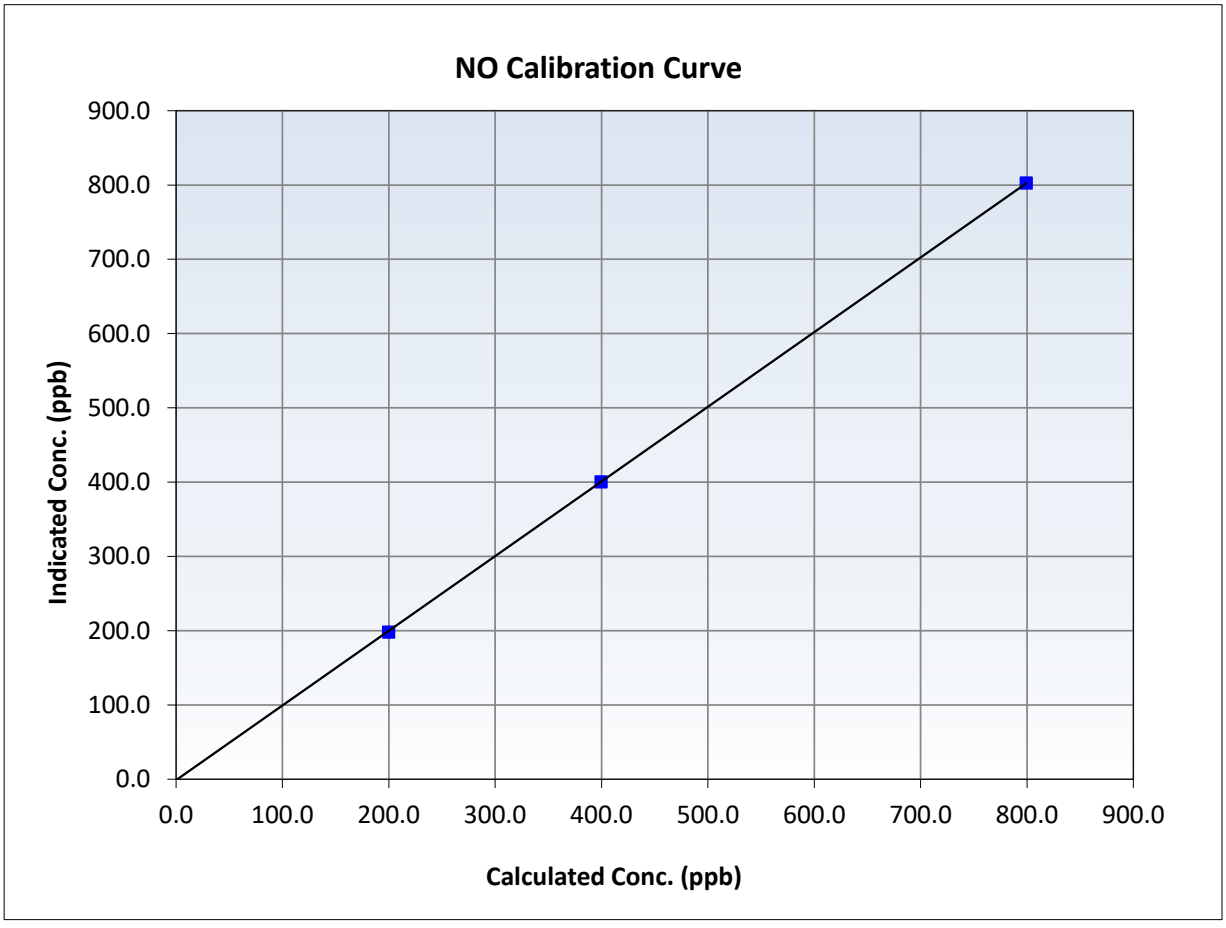
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 26, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	9:52	End Time (MST):	14:53
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

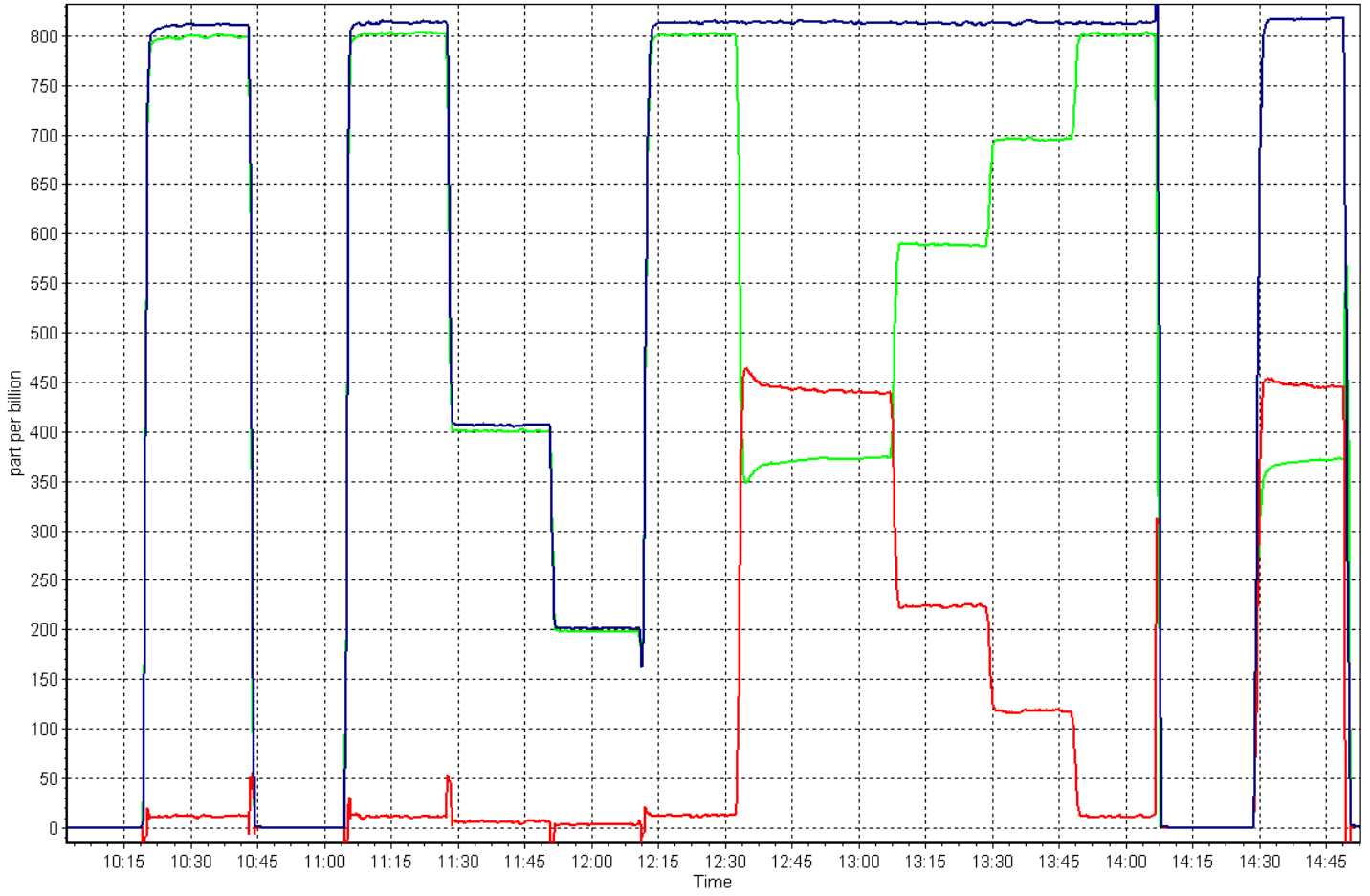
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.3	802.7	0.9958
399.7	400.5	0.9979
199.8	198.2	1.0083

Statistical Evaluation		Limits
Correlation Coefficient	0.999990	≥0.995
Slope	1.005239	0.90 - 1.10
Intercept	-1.220000	+/-20



NO_X Calibration Plot Date: April 23, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	April 11, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	10:35	End time (MST):	14:02
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:	0.995743	1.000029	Backgd or Offset:	0.3	0.3
Calibration intercept:	0.220000	-0.180000	Coeff or Slope:	0.982	0.982

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	-0.4	----
As found High point	4804	1141.9	400.0	402.0	0.994
As found Mid point					
As found Low point					
Baseline Corr As found:	402.4	Previous response	398.5	*% 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	NA	0.0	-0.2	----
High point	4888	1138.1	400.0	399.7	1.001
Mid point	4888	884.5	200.0	200.2	0.999
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	403.0	0.993
				Average Correction Factor	1.001

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

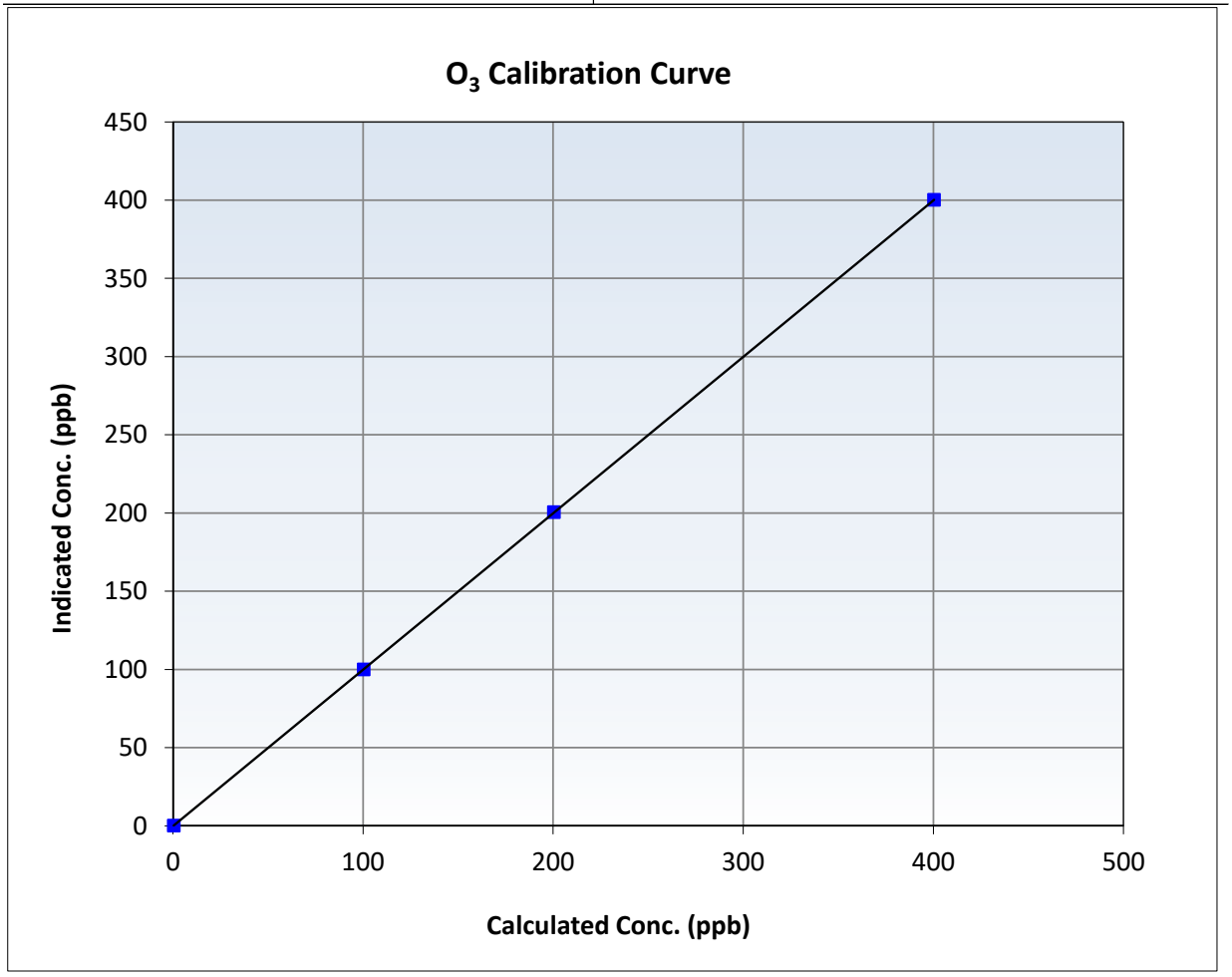
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 20, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:35	End Time (MST):	14:02
Analyzer make:	API T400	Analyzer serial #:	825

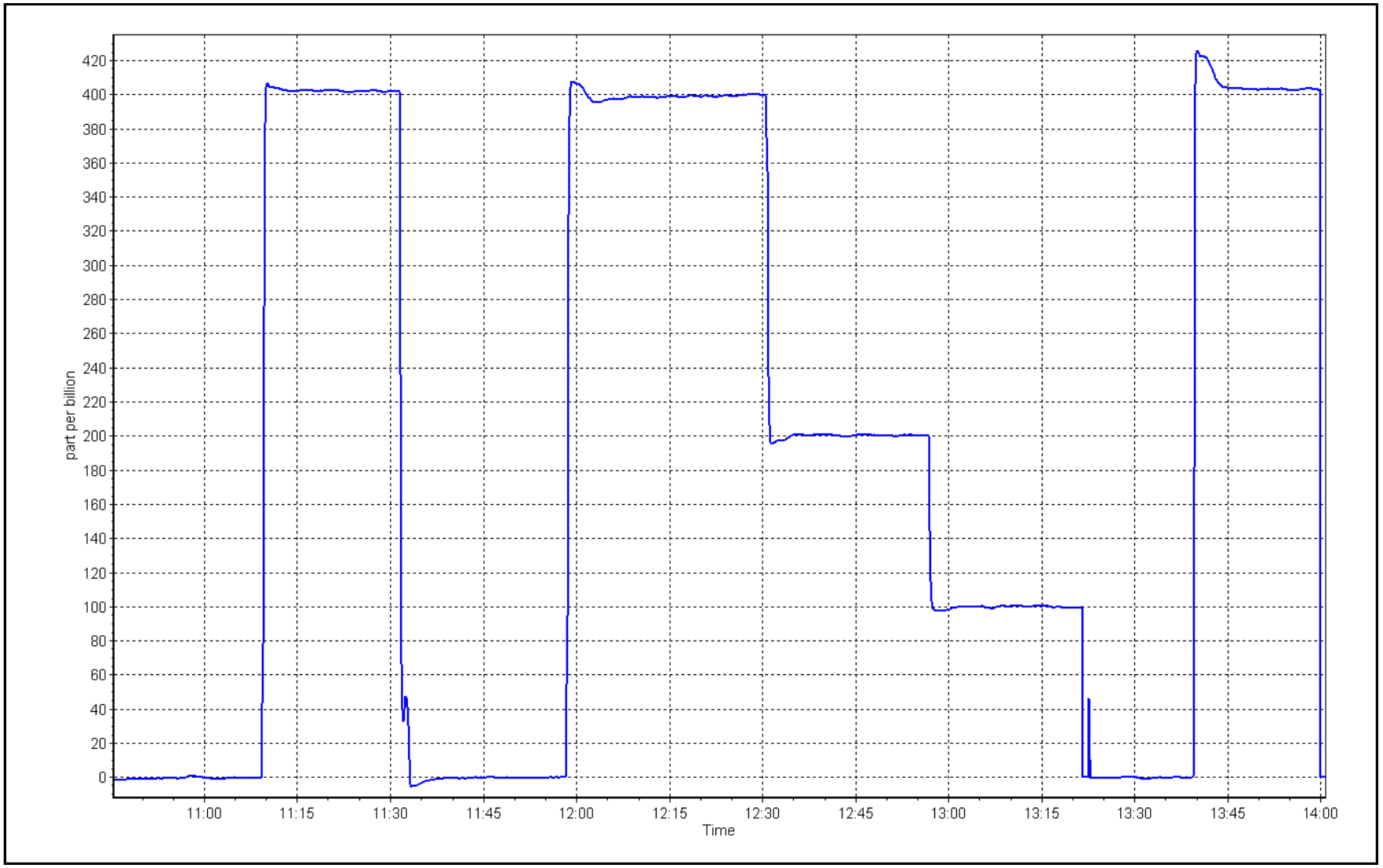
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
400.0	399.7	1.0008
200.0	200.2	0.9990
100.0	99.6	1.0040

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.000029	*0.90 - 1.10*
Intercept	-0.180000	*+/- 5*



O_3 Calibration Plot Date: April 11, 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:	April 26, 2024	Last Cal Date:	March 27, 2024
Start time (MST):	13:07	End time (MST):	13:55
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)	7.4	7.6	7.4	☐	+/- 2 °C
P (mmHg)	701.2	702.4	701.2	☐	+/- 10 mmHg
Flow (LPM)	5.02	5.03	5.02	☐	+/- 0.25 LPM
PW% (pump)	37	-----	37	☐	>80%
Zero Verification	PM w/o HEPA:	2.4	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 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: February 21, 2024

Date Disposable Filter Changed: February 21, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

Notes: Flow, pressure and temp checked. 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:	April 5, 2024	Last Cal Date:	March 14, 2024
Start time (MST):	11:20	End time (MST):	14:03
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:	0.996462	1.006642	Backgd or Offset:	-0.010	-0.010
Calibration intercept:	0.037795	0.249837	Coeff or Slope:	0.905	0.905

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:	41.27	Prev response:	40.98	*% 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	

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	0.2	----
High point	4933	66.7	41.1	41.5	0.990
Mid point	4966	33.3	20.5	21.1	0.970
Low point	4983	16.7	10.3	10.5	0.980
As left zero	5000	0.0	0.0	0.2	----
As left span	4933	66.7	41.1	41.4	0.992
				Average Correction Factor	0.980

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

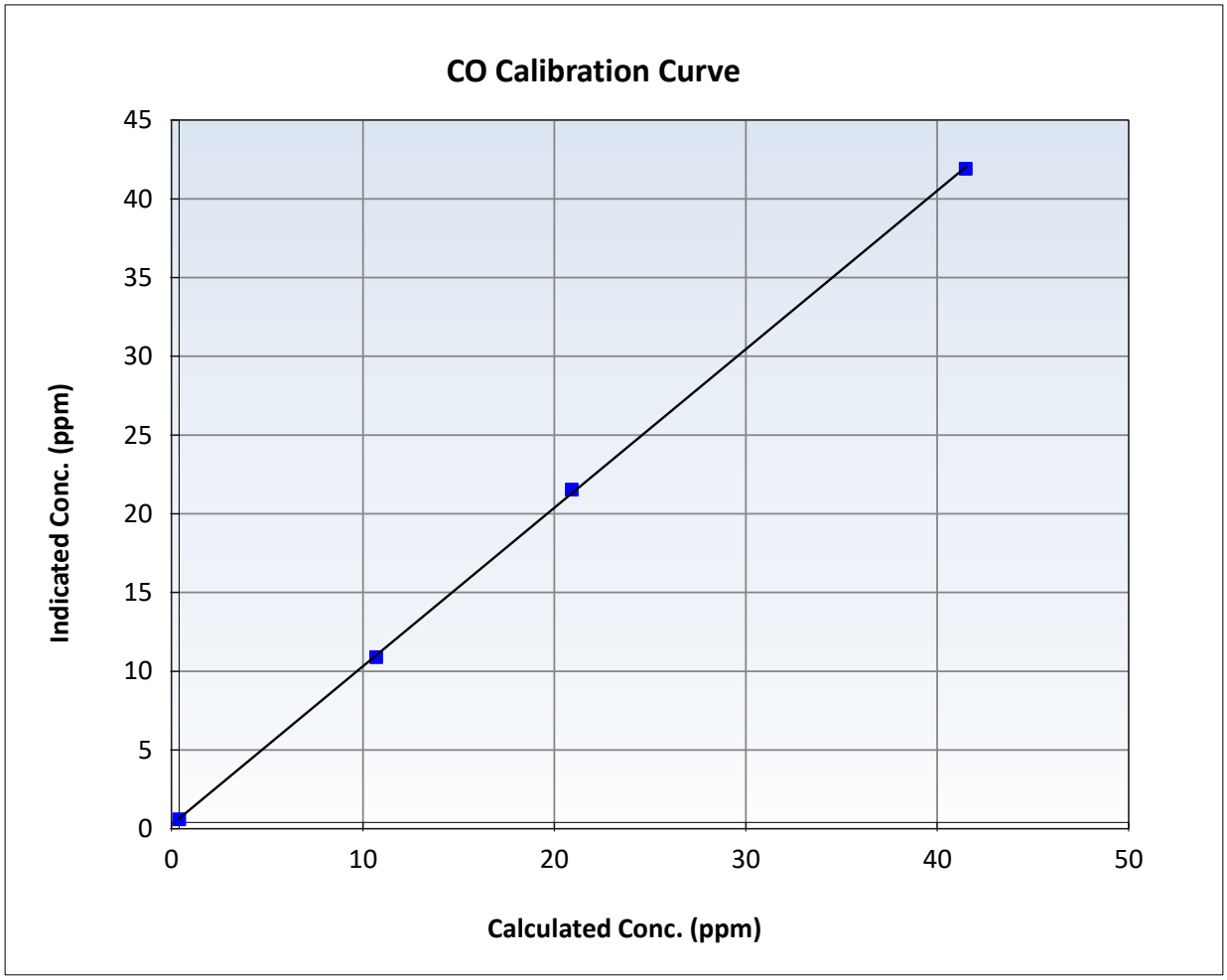
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 14, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:20	End Time (MST):	14:03
Analyzer make:	API T300	Analyzer serial #:	3504

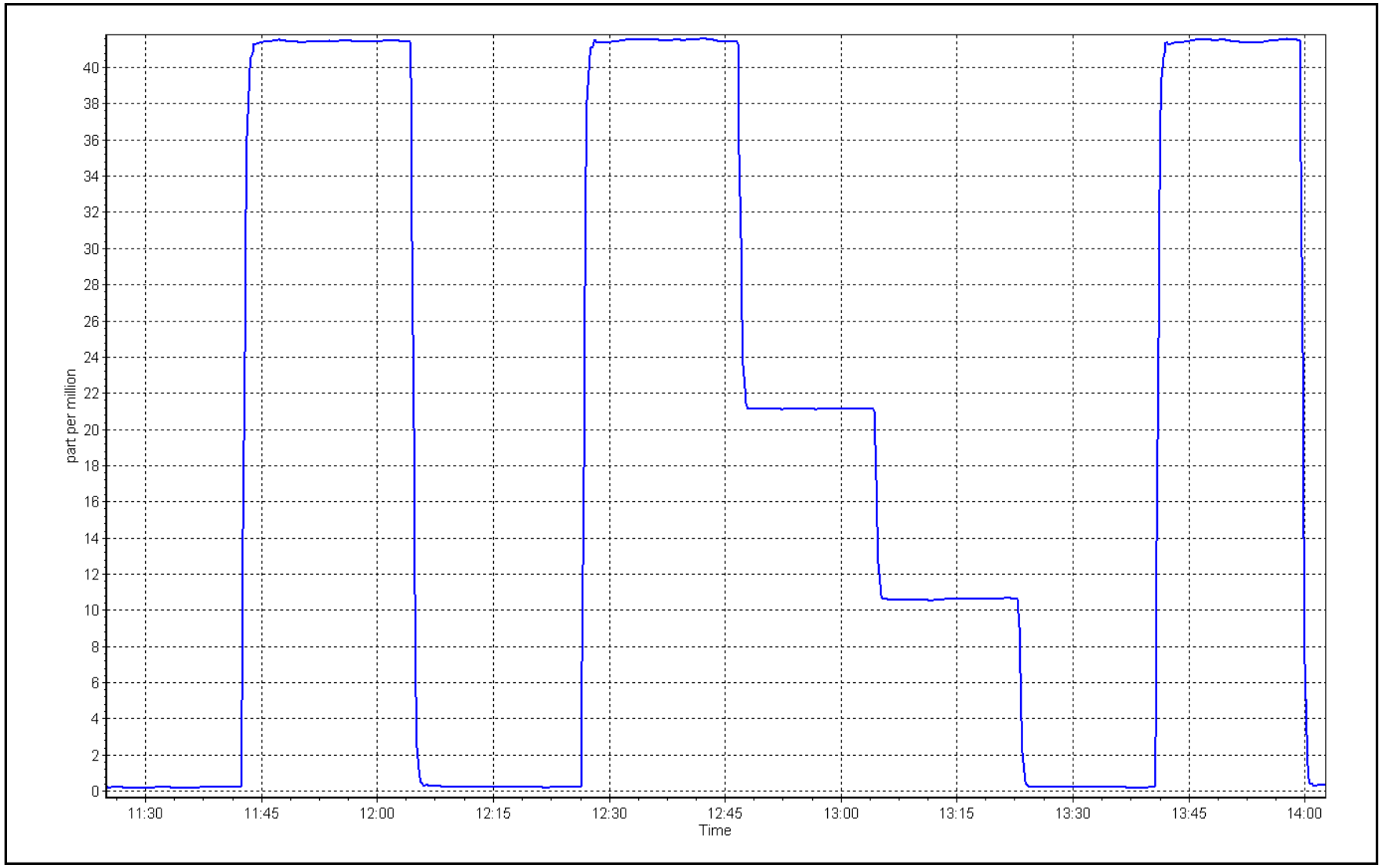
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
41.1	41.5	0.9896
20.5	21.1	0.9705
10.3	10.5	0.9798

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999916	*≥0.995*
Slope	1.006642	*0.90 - 1.10*
Intercept	0.249837	*+/-1.5*



CO Calibration Plot Date: April 5, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	April 26, 2024	Last Cal Date:	March 21, 2024
Start time (MST):	10:05	End time (MST):	13:47
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:	1.000660	1.006157	Backgd or Offset:	-0.037	-0.037
Calibration intercept:	-4.780000	-3.120000	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	0.1	----
As found High Point	2920	80.0	1576.0	1581.2	0.997
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1581.1	Prev response:	1572.3	*% change:	0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	0.5	----
High point	2920	80.0	1576.0	1586.2	0.994
Mid point	2960	40.0	788.0	782.5	1.007
Low point	2980	20.0	394.0	393.3	1.002
As left zero	3000	0.0	0.0	0.0	----
As left span	2930	80.0	1570.8	1584.0	0.992
				Average Correction Factor	1.001

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO_2 Calibration Summary

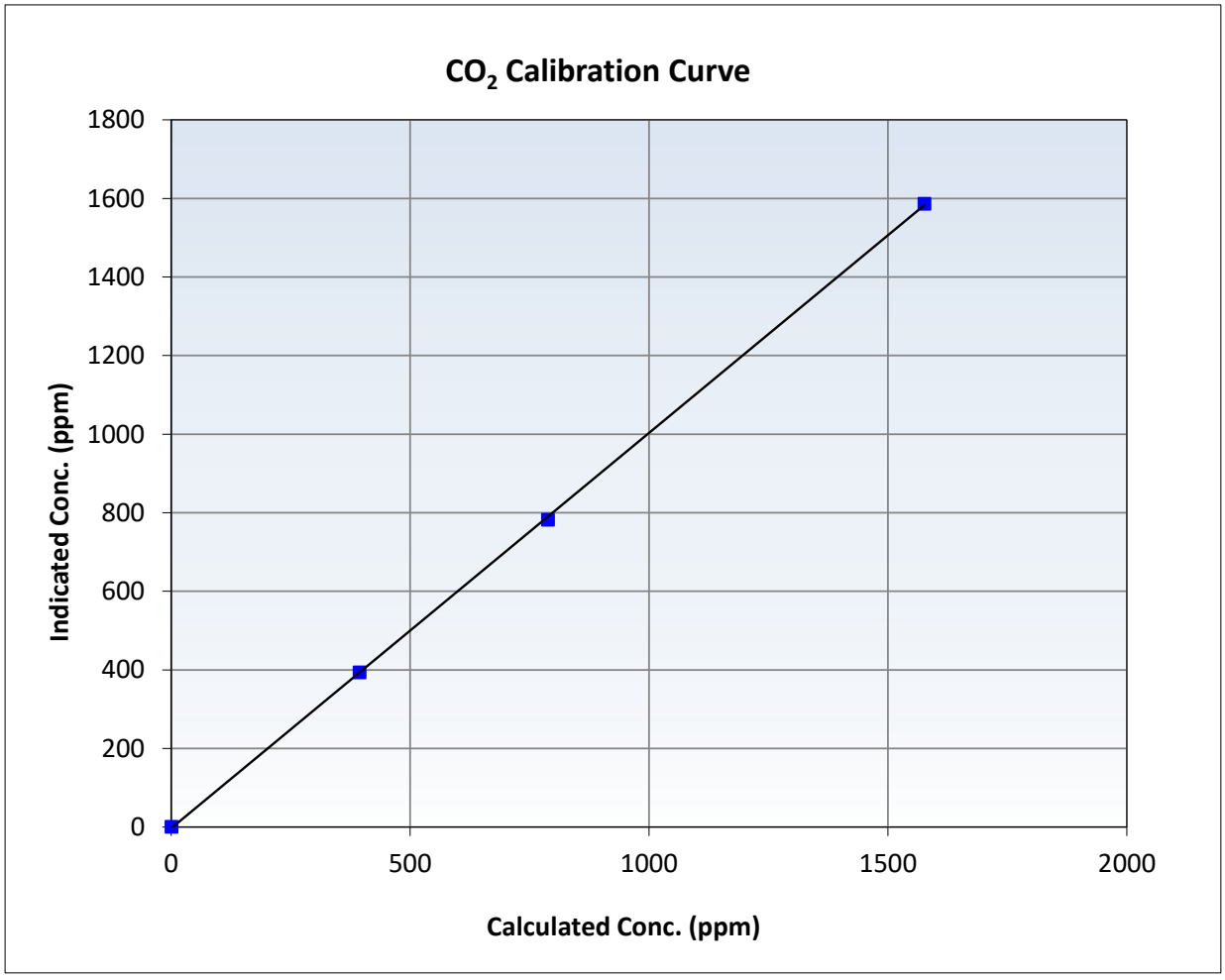
Station Information

Calibration Date	April 26, 2024	Previous Calibration	March 21, 2024
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:05	End Time (MST)	13:47
Analyzer make	API T360	Analyzer serial #	489

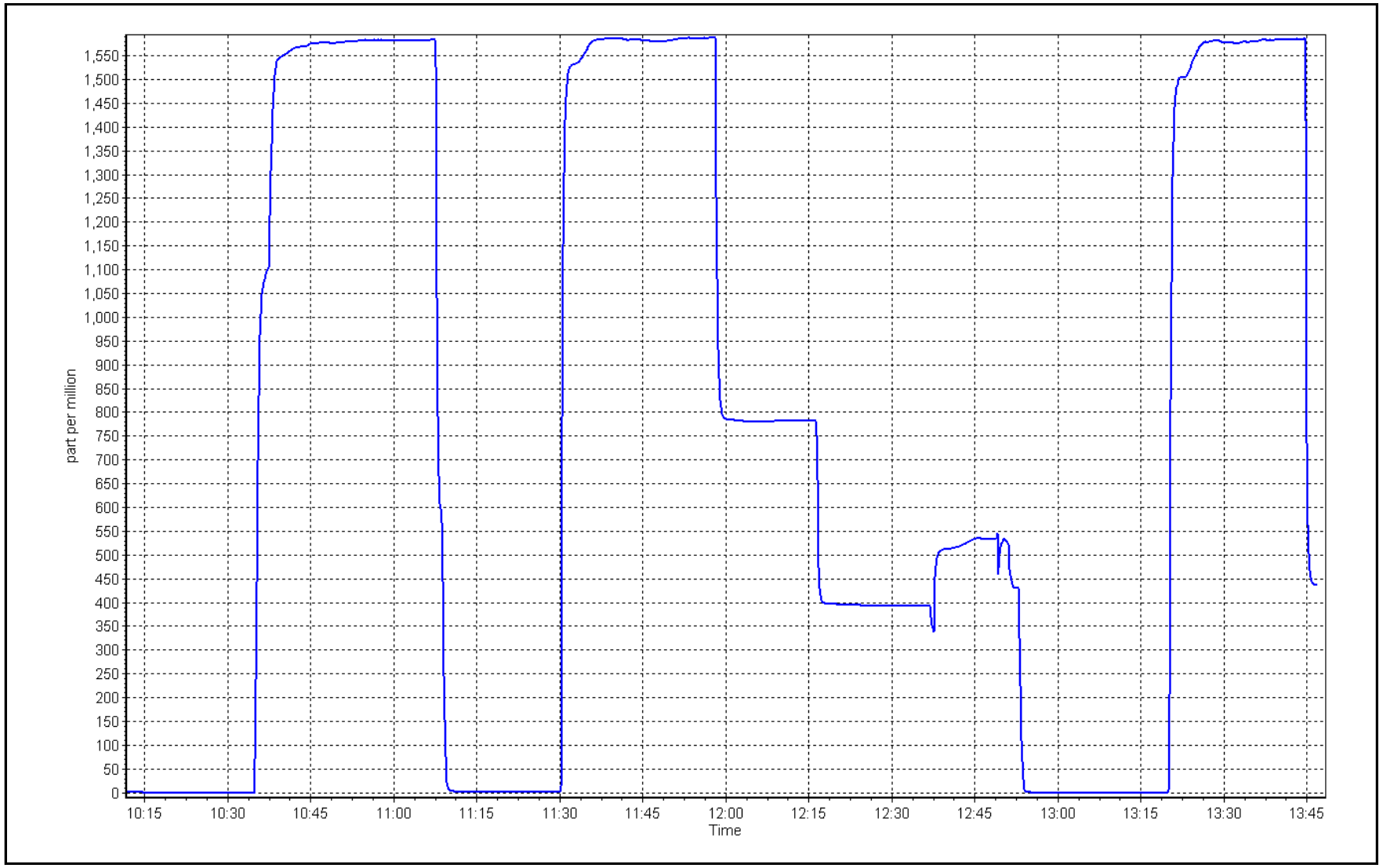
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
1576.0	1586.2	0.9936
788.0	782.5	1.0070
394.0	393.3	1.0018

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999943	*≥0.995*
Slope	1.006157	*0.90 - 1.10*
Intercept	-3.1	*+/-20*



CO_2 Calibration Plot Date: April 26, 2024 Location: Stony Mountain



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19
FIREBAG
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	April 22, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	10:11	End time (MST):	13:21
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:	0.997705	0.996719	Backgd or Offset:	10.5	10.6
Calibration intercept:	0.418240	0.438192	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	-0.1	----
As found High point	4919	81.1	799.5	797.0	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.1	Previous response	798.1	*% 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	4999	0.0	0.0	-0.1	----
High point	4919	81.1	799.5	796.8	1.003
Mid point	4959	40.6	400.3	400.3	1.000
Low point	4980	20.3	200.1	200.0	1.001
As left zero	4999	0.0	0.0	0.2	----
As left span	4919	81.1	799.5	799.2	1.000
				Average Correction Factor:	1.001

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

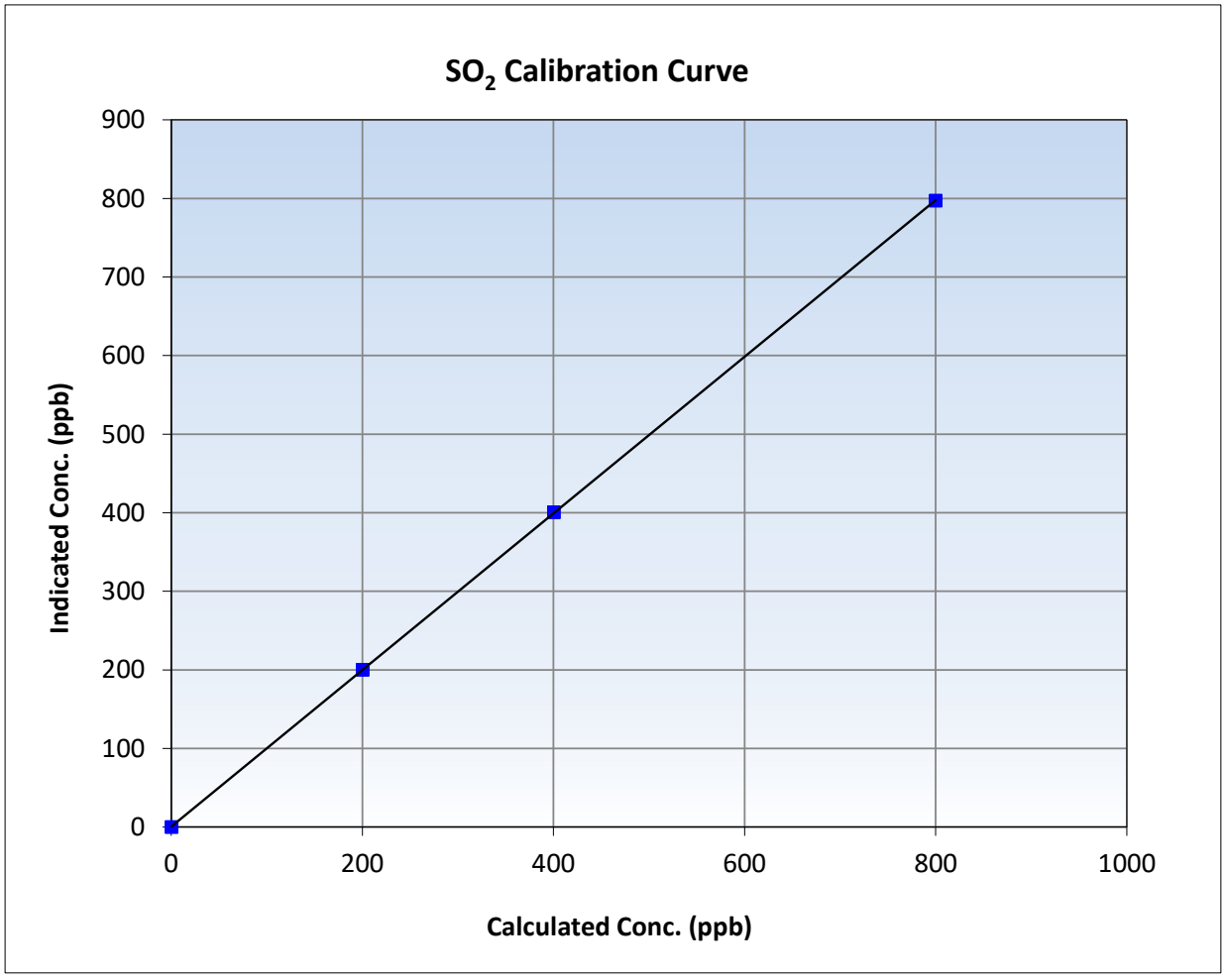
Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	March 12, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:11	End Time (MST):	13:21
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

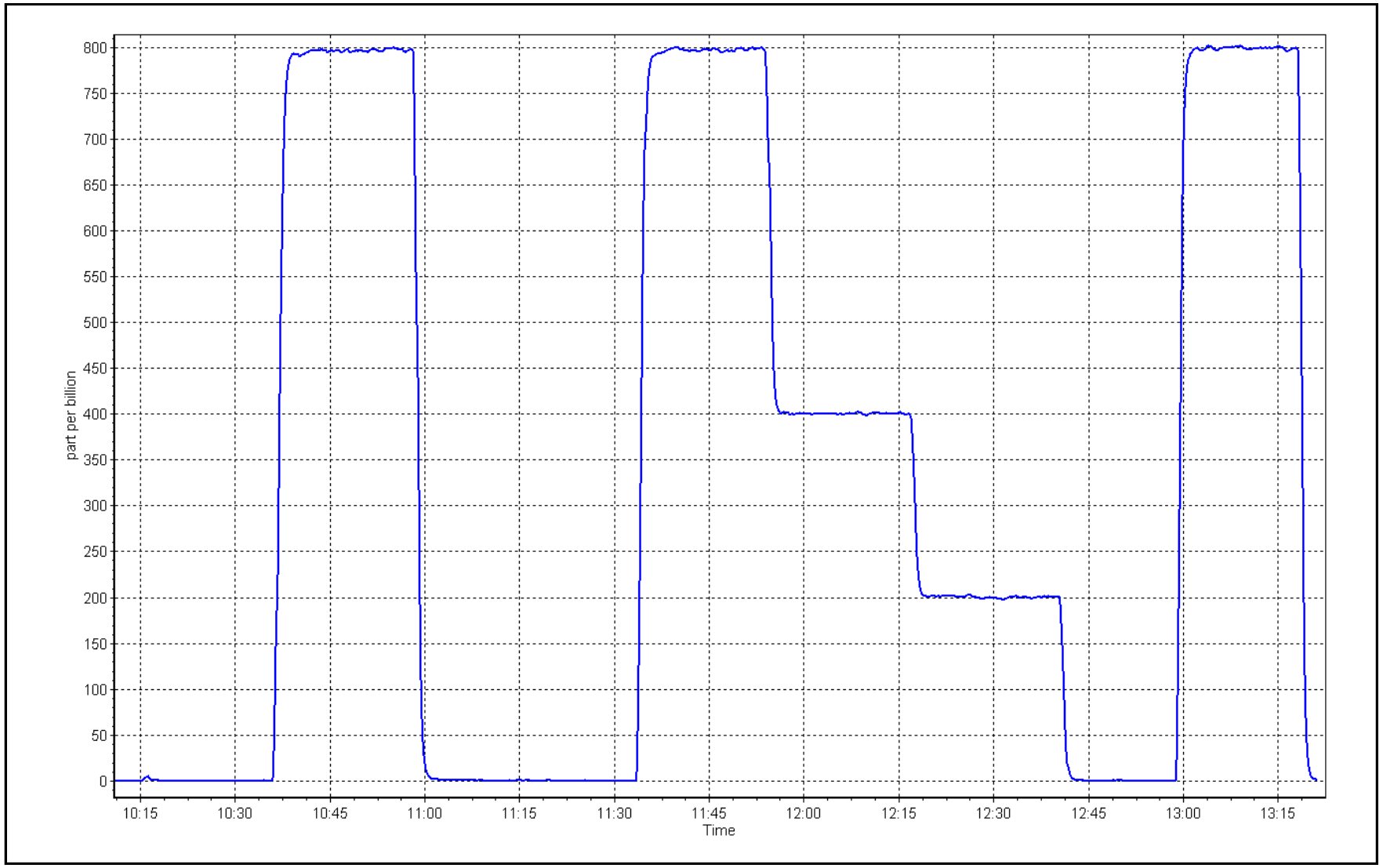
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.5	796.8	1.0033
400.3	400.3	0.9999
200.1	200.0	1.0005

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.996719	*0.90 - 1.10*
Intercept	0.438192	*+/-30*



SO2 Calibration Plot Date: April 22, 2024 Location: Firebag



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	April 16, 2024	Last Cal Date:	March 5, 2024
Start time (MST):	10:19	End time (MST):	14:48
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:	0.999337	1.001197	Backgd or Offset:	3.22	2.72
Calibration intercept:	-0.081535	0.078370	Coeff or Slope:	1.198	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	-0.5	----
As found High point	4922	78.2	80.0	83.0	0.958
As found Mid point	4961	39.1	40.0	41.2	0.959
As found Low point	4980	19.6	20.0	20.4	0.959
New cylinder response					

Baseline Corr As found:	83.5	Prev response:	79.85	*% change:	4.4%
Baseline Corr 2nd AF pt:	41.7	AF Slope:	1.044074	AF Intercept:	-0.522523
Baseline Corr 3rd AF pt:	20.9	AF Correlation:	1.000000	* = > +/-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	20.2	0.992
As left zero	5000	0.0	0.0	0.1	----
As left span	4922	78.2	80.0	79.3	1.009
SO2 Scrubber Check	4922	78.3	783.0	0.0	----

Date of last scrubber change:	18-Jan-23	Ave Corr Factor	0.995
Date of last converter efficiency test:	n/a		

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H2S Calibration Summary

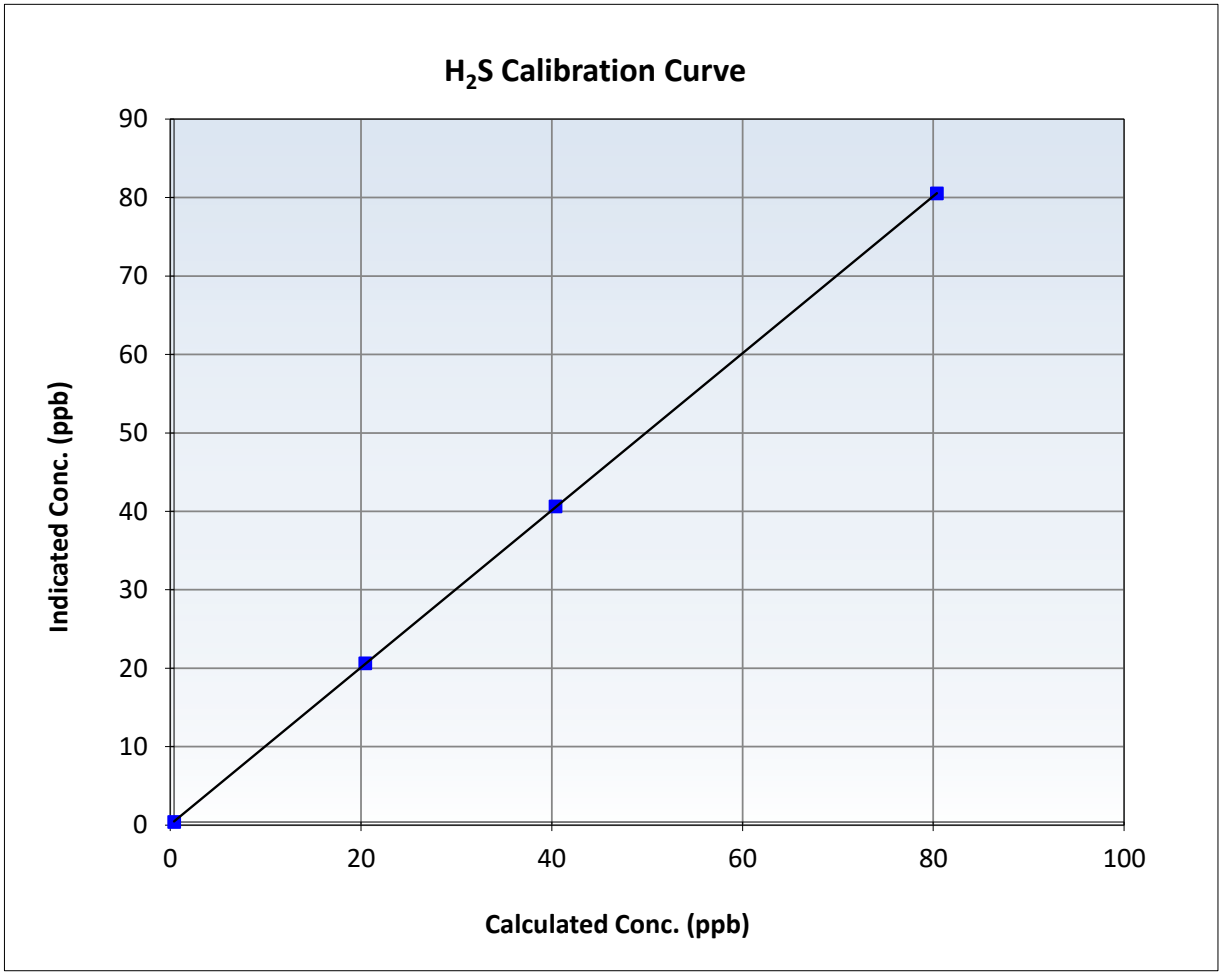
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 5, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:19	End Time (MST):	14:48
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680032

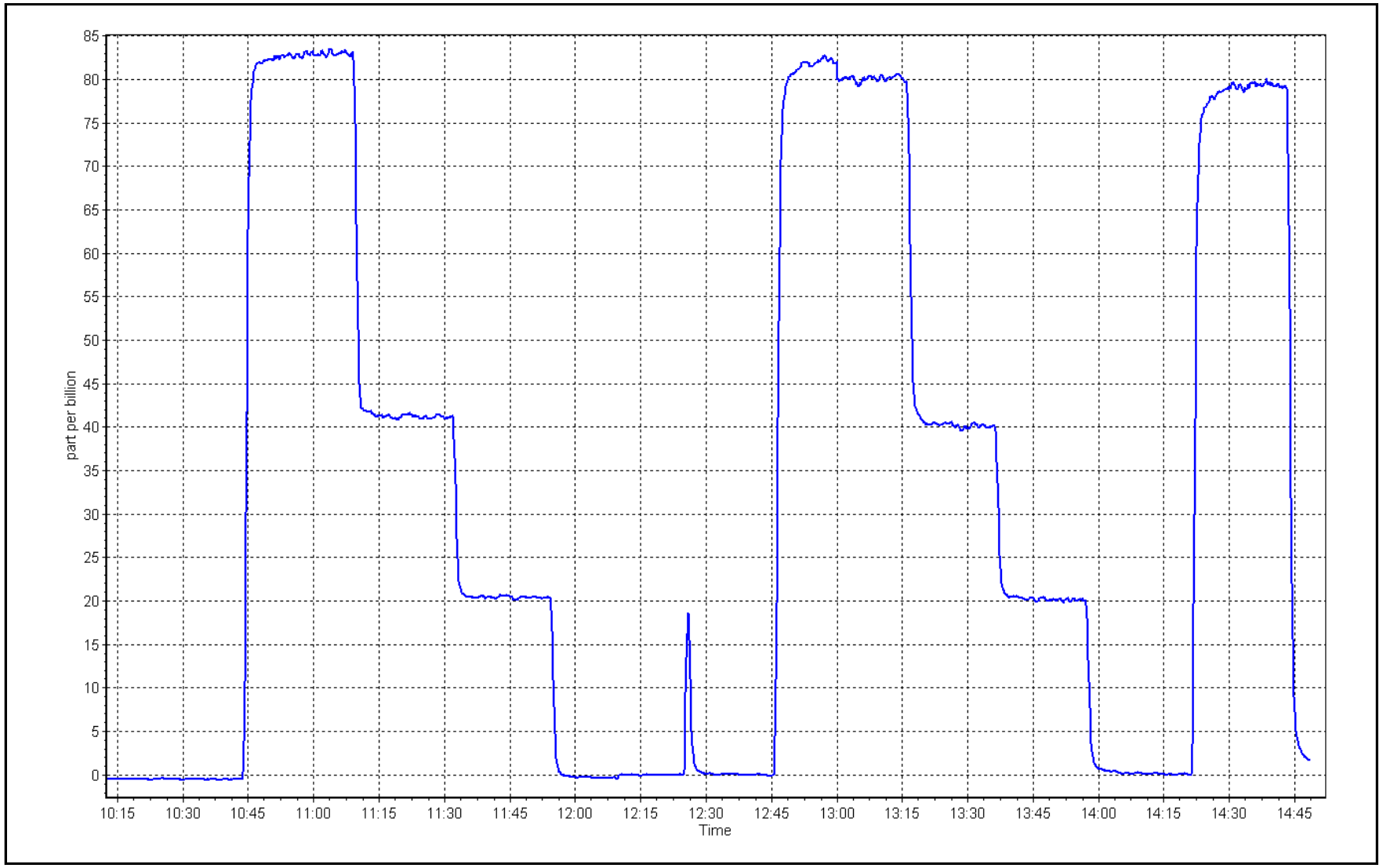
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	80.1	0.9985
40.0	40.2	0.9948
20.0	20.2	0.9925

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.001197	*0.90 - 1.10*
Intercept	0.078370	*+/-3*



H2S Calibration Plot Date: April 16, 2024 Location: Firebag



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	April 22, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	10:11	End time (MST):	13:21
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:	1.003849	0.996237	Background:	2.15	1.99
Calibration intercept:	-0.040348	0.011064	Coefficient:	3.788	3.757

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	-0.06	----
As found High point	4919	81.1	17.31	17.32	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.38	Previous response	17.33	*% 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	

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	0.05	----
High point	4919	81.1	17.31	17.27	1.002
Mid point	4959	40.6	8.66	8.62	1.005
Low point	4980	20.3	4.33	4.30	1.008
As left zero	5000	0.0	0.00	0.03	----
As left span	4919	81.1	17.31	17.40	0.995
				Average Correction Factor	1.005

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

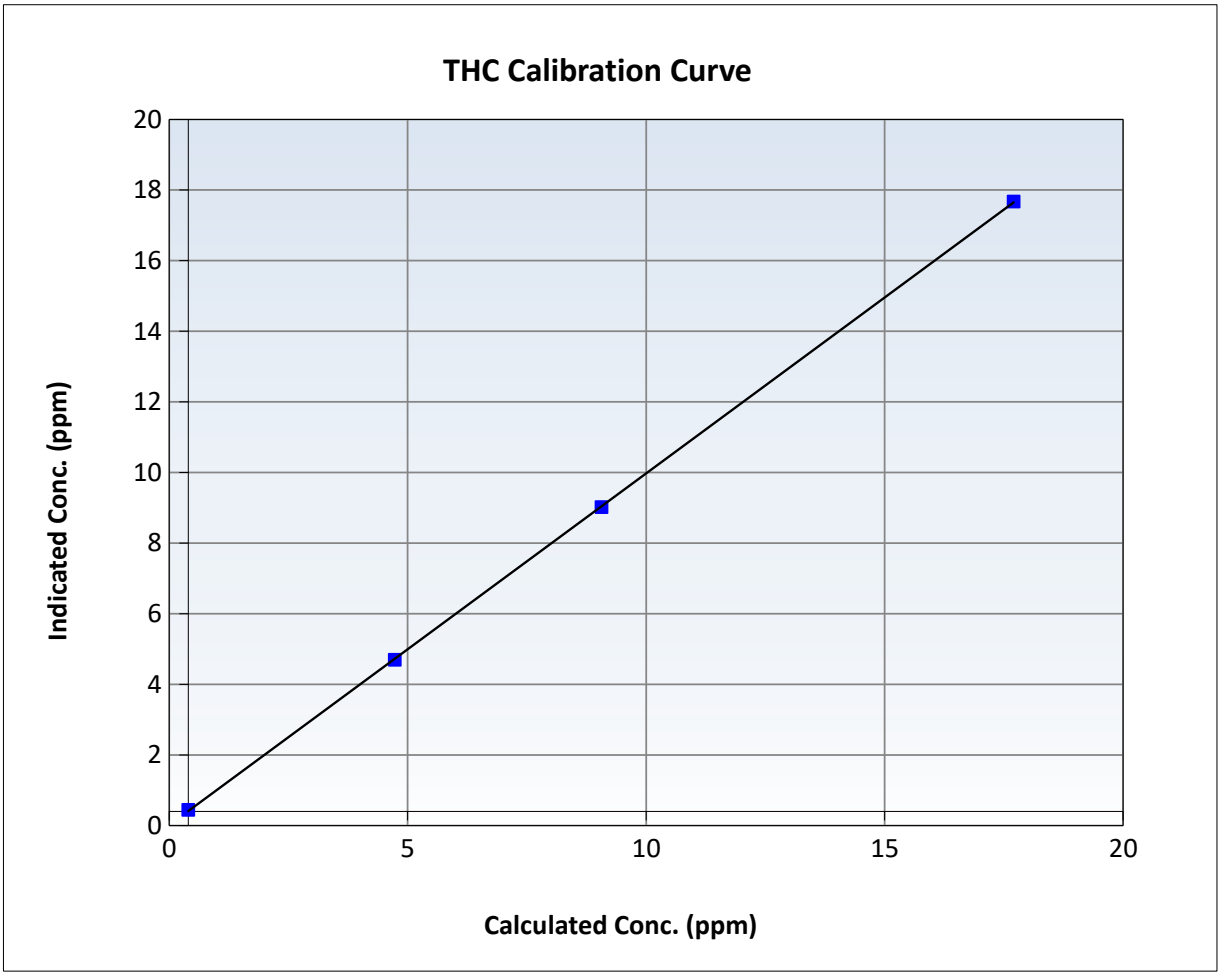
Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	March 12, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:11	End Time (MST):	13:21
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

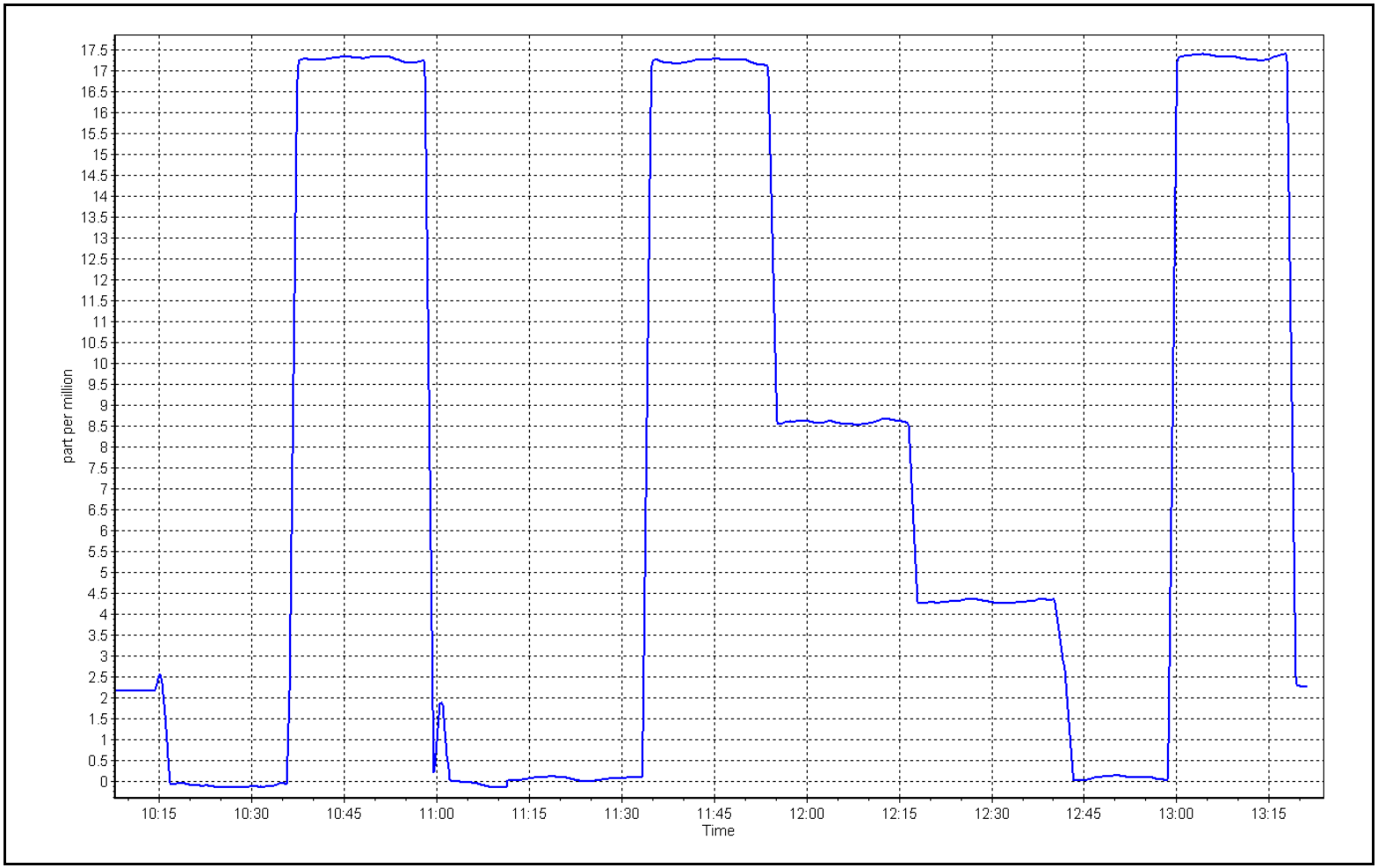
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.05	----
17.31	17.27	1.0020
8.66	8.62	1.0051
4.33	4.30	1.0083

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999982	*≥0.995*
Slope	0.996237	*0.90 - 1.10*
Intercept	0.011064	*+/-1.5*



THC Calibration Plot Date: April 22, 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:	April 3, 2024
Last Cal Date:	March 21, 2024
Start time (MST):	10:40
End time (MST):	13:45
Reason:	Maintenance

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	-0.2	-0.1	-0.1	----	----
AF High point	4918	82.1	802.9	799.7	3.3	772.9	767.5	5.4	1.0386	1.0418
AF Mid point	4959	41.1	402.0	400.3	1.6	387.6	383.8	3.7	1.0365	1.0428
AF Low point	4980	20.5	200.5	199.7	0.8	194.0	191.6	2.4	1.0324	1.0416
New cyl resp										

Previous Response	NO_X = 808.4 ppb	NO = 805.5 ppb
Baseline Corr 1st pt	NO_X = 773.1 ppb	NO = 767.6 ppb
Baseline Corr 2nd pt	NO_X = 387.8 ppb	NO = 383.9 ppb
Baseline Corr 3rd pt	NO_X = 194.2 ppb	NO = 191.7 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -4.6%

*Percent Change NO = -4.9%

As Found Statistics

As found	NO_X r^2: 0.999997	Nx Sl: 0.962454	Nx Int: 0.420
As found	NO r^2: 1.000000	NO Sl: 0.959848	NO Int: -0.160
As found	NO_2 r^2: 0.999965	NO2 Sl: 0.999204	NO_2 Int: -0.649

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	-0.1	----	----
As found high GPT point	765.1	371.3	397.1	396.8	1.0007	99.9%
As found mid GPT point	765.1	568.4	200.0	197.7	1.0116	98.9%
As found low GPT point	765.1	668.2	100.2	99.7	1.0049	99.5%

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:	1.040	1.040	NO bkgnd or offset:	7.3	7.3
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	7.4	7.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	216.5	210.3

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.006289	NA
NO_X Cal Offset:	0.400360	NA
NO Cal Slope:	1.006923	NA
NO Cal Offset:	0.340247	NA
NO_2 Cal Slope:	0.998051	NA
NO_2 Cal Offset:	-0.640112	NA

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		

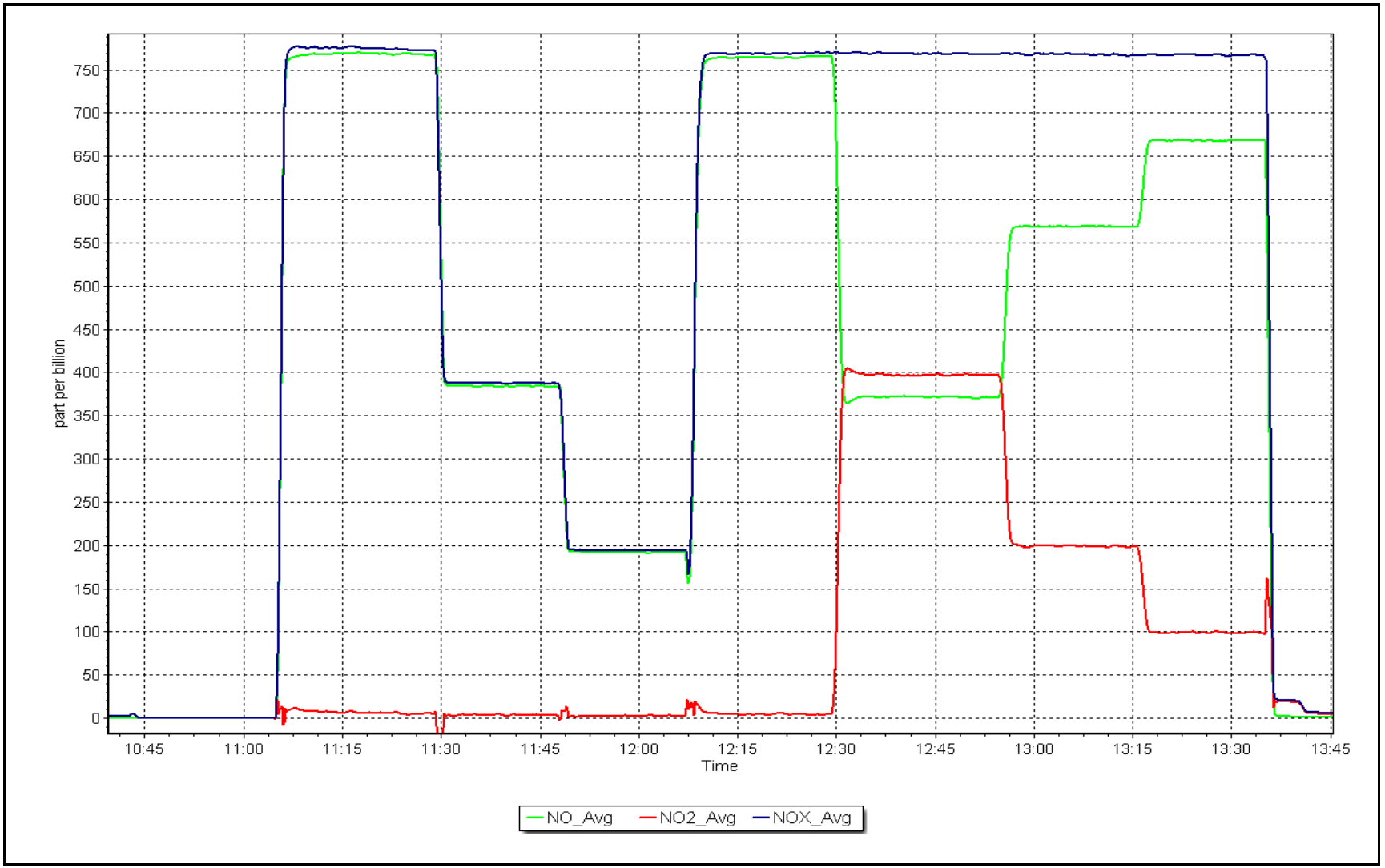
GPT Calibration Data

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: As founds done for maintenance. Changing reaction cell O-rings, pump and charcoal filter.

Calibration Performed By: Braiden Boutilier

NO_X Calibration Plot Date: April 3, 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:	April 4, 2024
Last Cal Date:	April 3, 2024
Start time (MST):	10:15
End time (MST):	15:04
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										
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: 1410661309

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.040	0.990	NO bkgnd or offset:	7.3	5.0
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	7.4	5.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	216.5	177.5

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.006289	0.998971
NO_X Cal Offset:	0.400360	1.739938
NO Cal Slope:	1.006923	1.001345
NO Cal Offset:	0.340247	0.620021
NO_2 Cal Slope:	0.998051	1.000081
NO_2 Cal Offset:	-0.640112	0.547188

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	0.2	----	----
High point	4918	82.1	802.9	799.7	3.3	803.0	801.0	1.8	0.9999	0.9983
Mid point	4959	41.1	402.0	400.3	1.6	404.2	401.8	2.4	0.9945	0.9963
Low point	4980	20.5	200.5	199.7	0.8	203.6	201.3	2.3	0.9847	0.9919
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	384.9	418.0	804.0	384.9	419.3	0.9987	1.0000
							Average Correction Factor		0.9930	0.9955

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	798.0	383.8	417.5	417.7	0.9995	100.1%
Mid GPT point	798.0	593.1	208.2	209.5	0.9937	100.6%
Low GPT point	798.0	697.5	103.8	104.3	0.9951	100.5%
				Average Correction Factor	0.9961	100.4%

Notes: Calibration after maintenance done on April 3. Changed sample inlet filter. Reset calibration factors. Adjusted PMT voltage, zero and span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

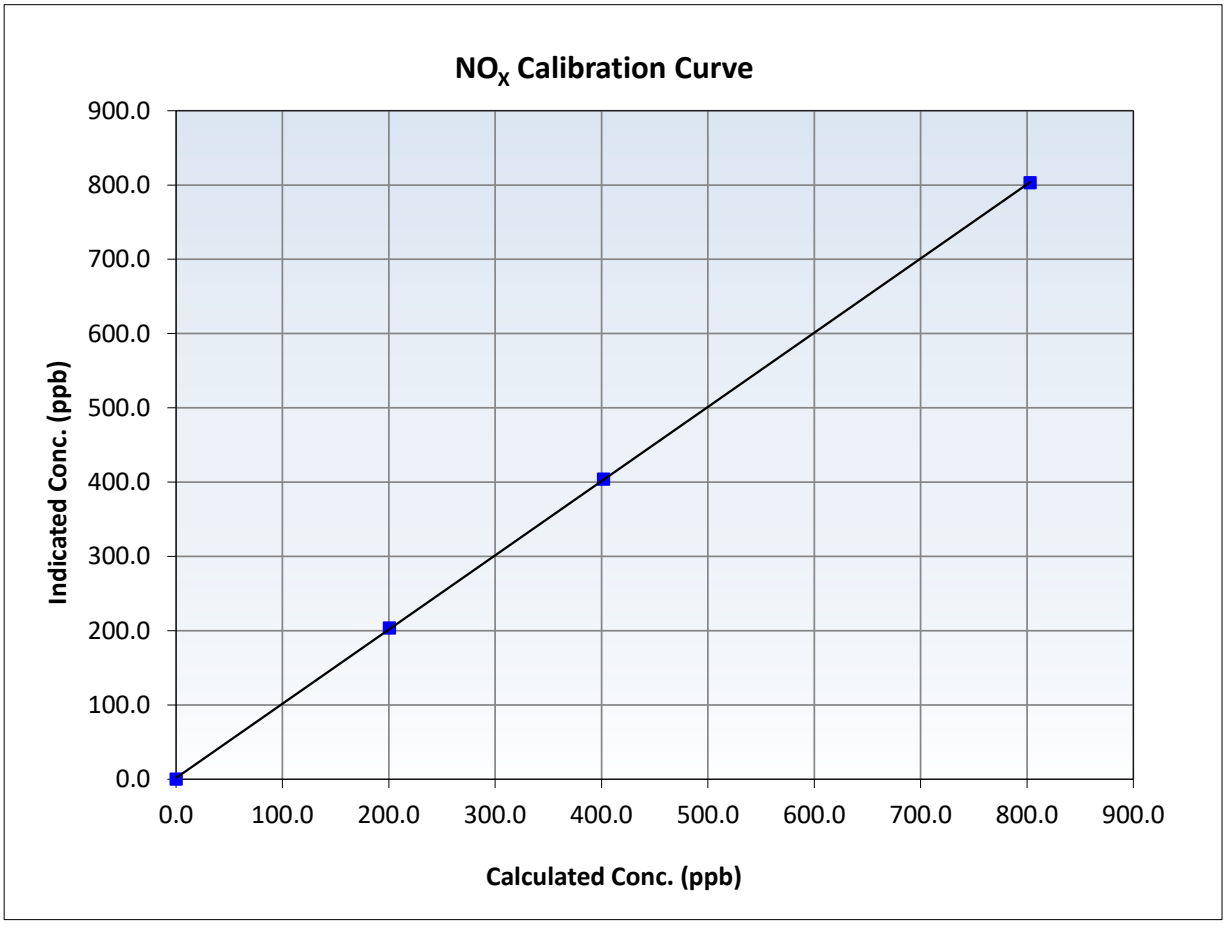
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	April 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:15	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
802.9	803.0	0.9999
402.0	404.2	0.9945
200.5	203.6	0.9847

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999981	*≥0.995*
Slope	0.998971	*0.90 - 1.10*
Intercept	1.739938	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

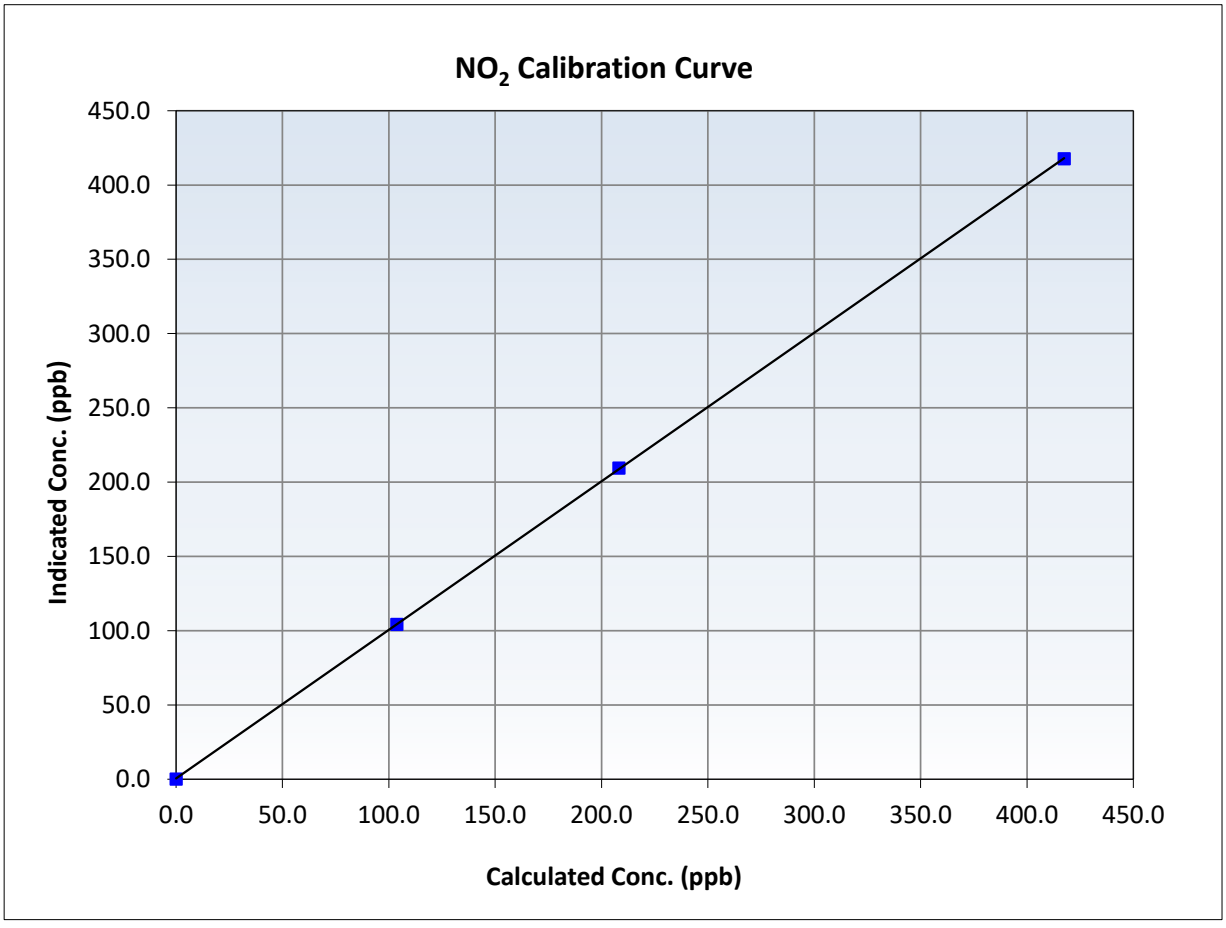
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	April 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:15	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
417.5	417.7	0.9995
208.2	209.5	0.9937
103.8	104.3	0.9951

Statistical Evaluation		Limits
Correlation Coefficient	0.999991	≥0.995
Slope	1.000081	0.90 - 1.10
Intercept	0.547188	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

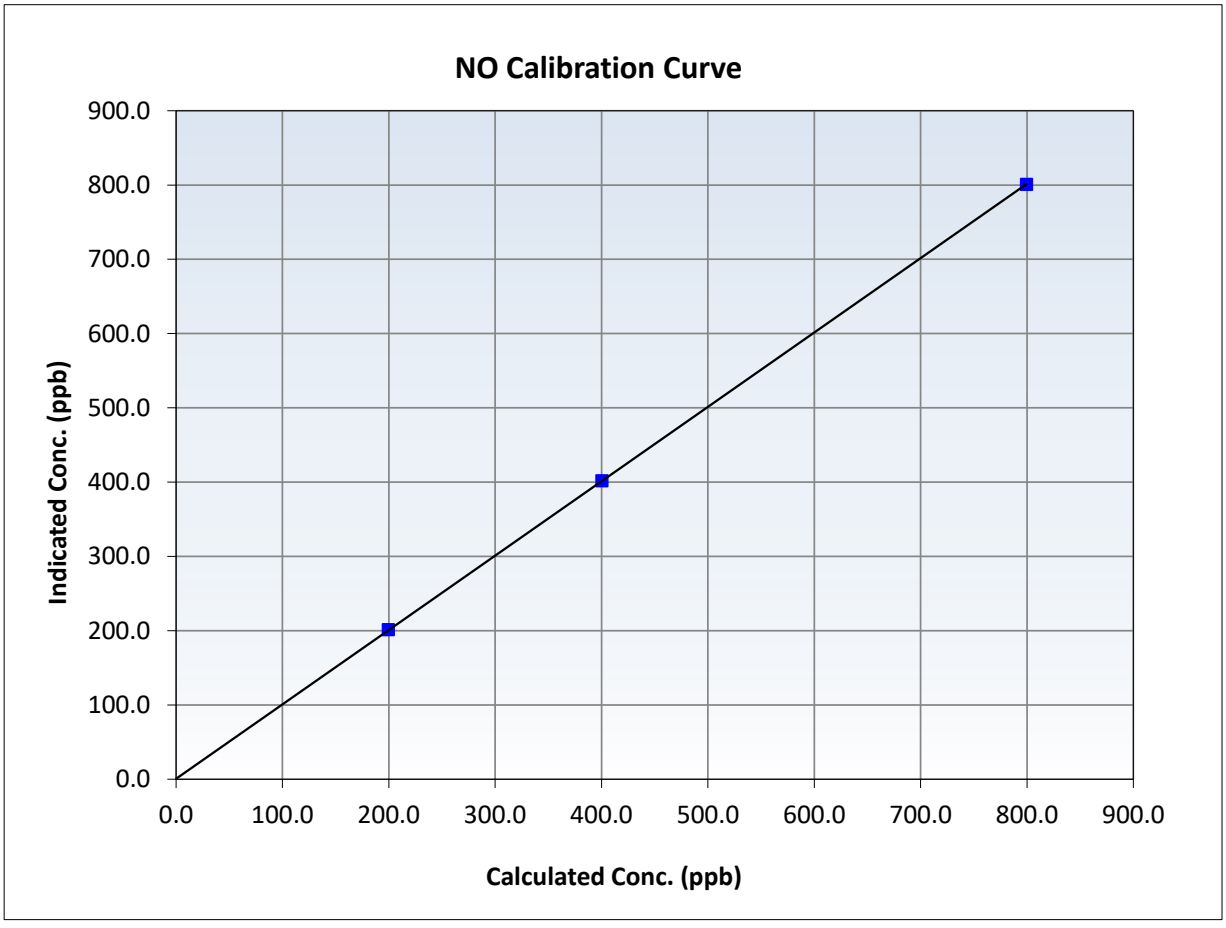
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	April 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:15	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

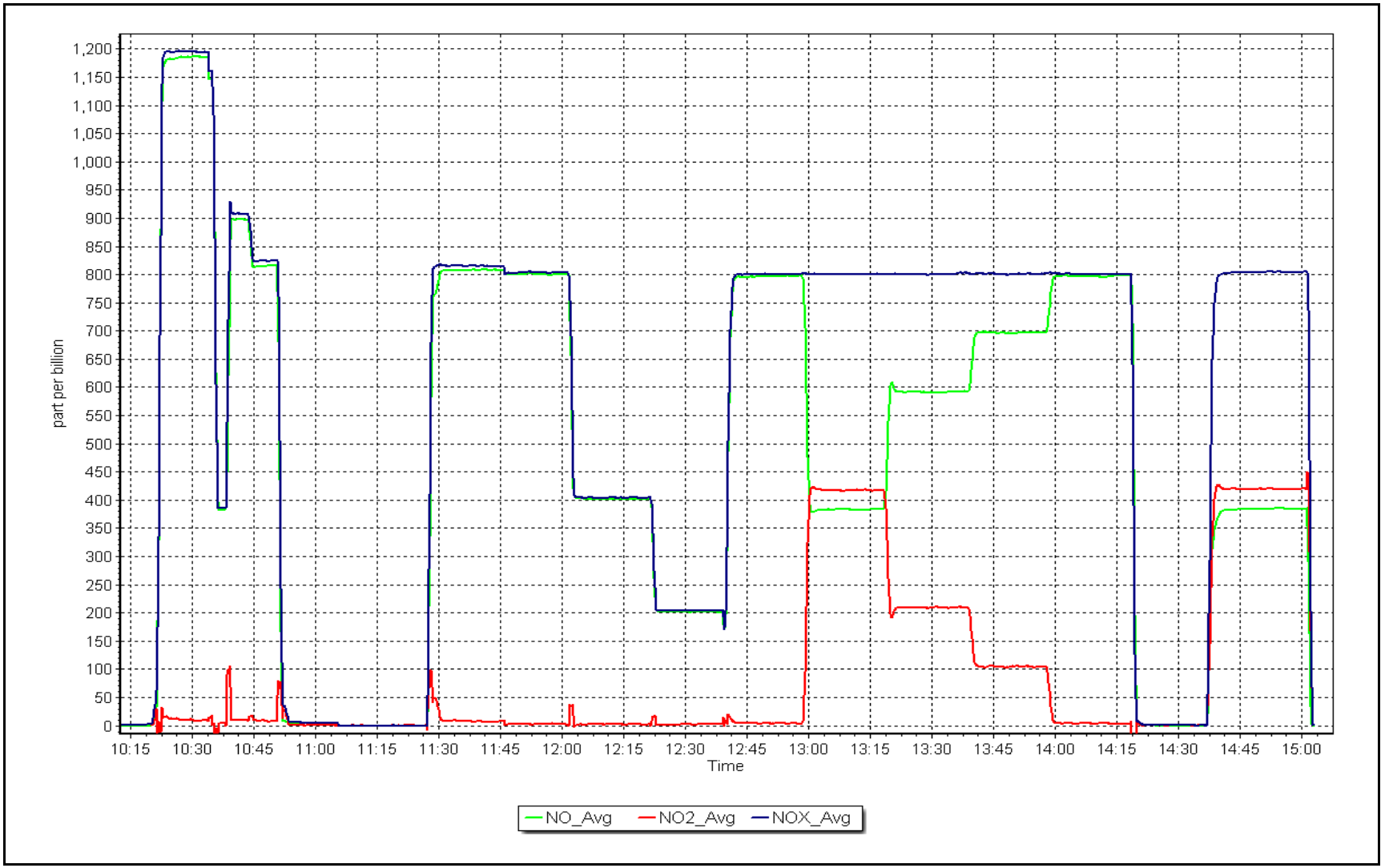
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.7	801.0	0.9983
400.3	401.8	0.9963
199.7	201.3	0.9919

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.001345	*0.90 - 1.10*
Intercept	0.620021	*+/-20*



NO_X Calibration Plot Date: April 4, 2024 Location: Firebag



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20
MACKAY RIVER
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	April 10, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	7:46	End time (MST):	10:29
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:	1.004703	0.994567	Backgd or Offset:	19.7	19.3
Calibration intercept:	2.311780	3.111267	Coeff or Slope:	0.965	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	0.1	----
As found High point	4919	81.3	800.3	814.1	0.983
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	814.0	Previous response	806.3	*% 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	0.6	----
High point	4919	81.3	800.3	798.2	1.003
Mid point	4959	40.7	400.7	401.6	0.998
Low point	4980	20.3	199.8	205.2	0.974
As left zero	5000	0.0	0.0	0.6	----
As left span	4919	81.3	800.3	801.7	0.998
				Average Correction Factor:	0.991

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

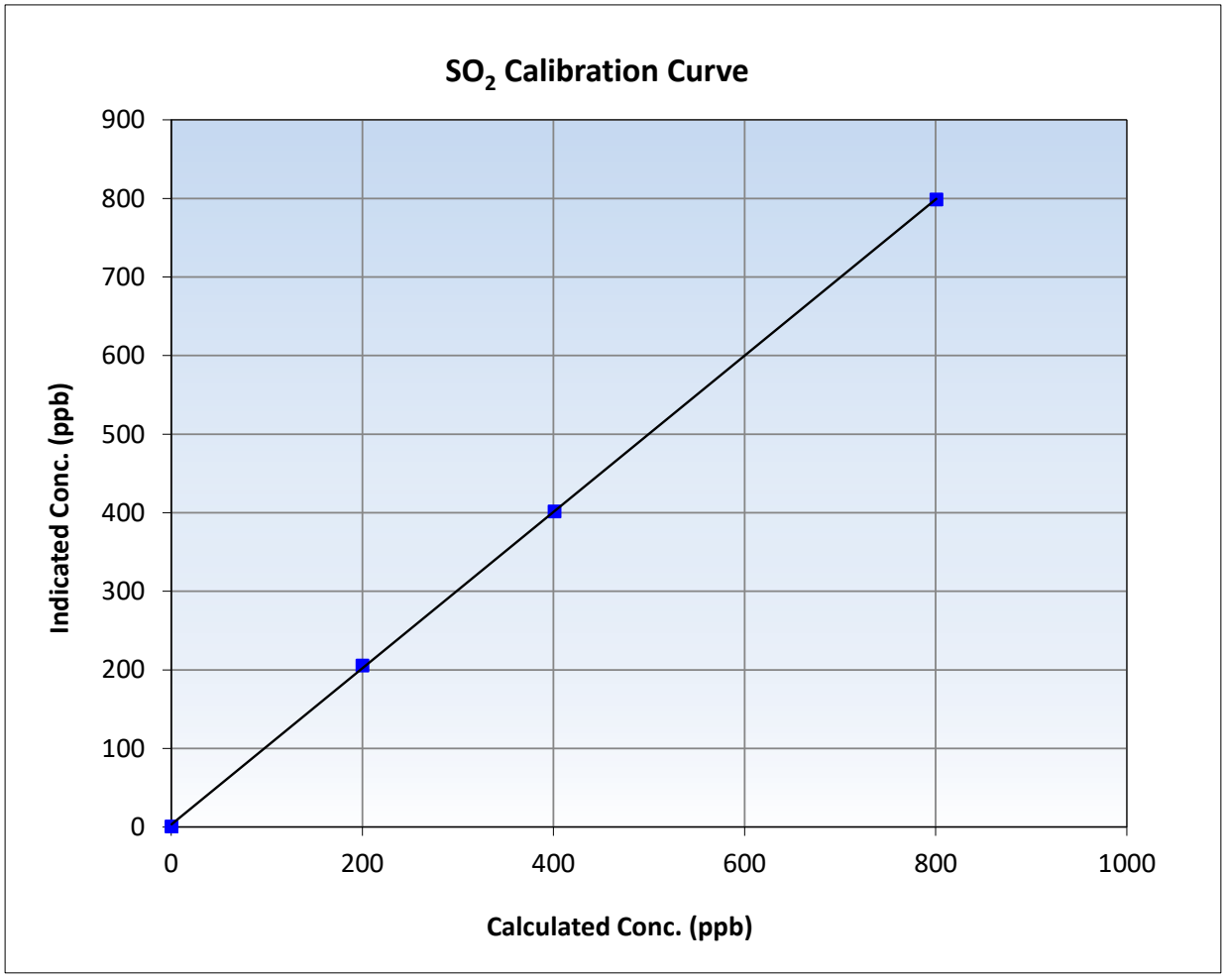
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 7, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	7:46	End Time (MST):	10:29
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

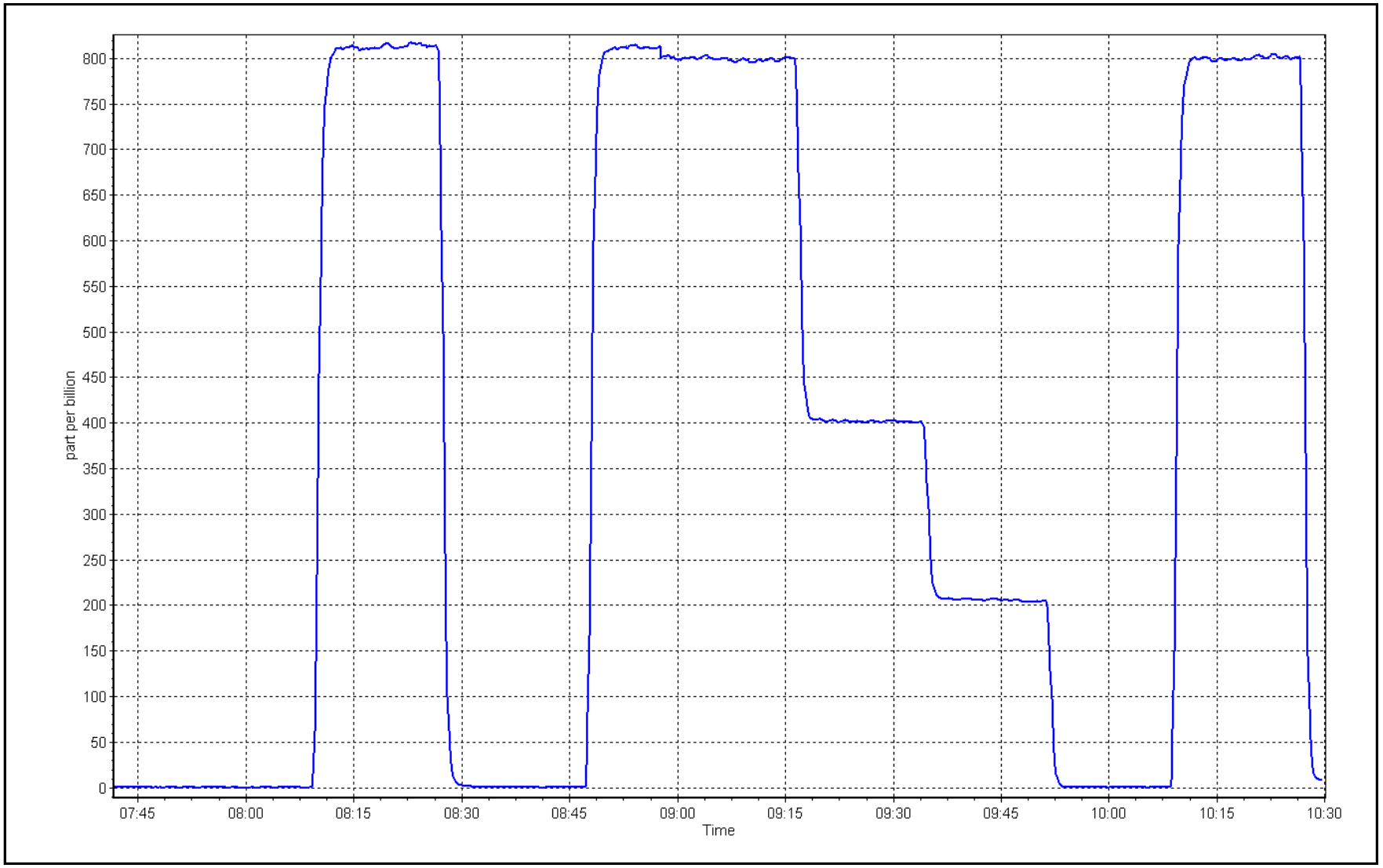
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
800.3	798.2	1.0026
400.7	401.6	0.9977
199.8	205.2	0.9738

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999947	*≥0.995*
Slope	0.994567	*0.90 - 1.10*
Intercept	3.111267	*+/-30*



SO2 Calibration Plot Date: April 10, 2024 Location: MacKay River



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	April 9, 2024	Last Cal Date:	March 5, 2024
Start time (MST):	6:43	End time (MST):	11:00
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:	0.975111	0.984302	Backgd or Offset:	3.2	3.2
Calibration intercept:	0.699032	0.679249	Coeff or Slope:	1.113	1.113

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	80.2	0.998
As found Mid point	4961	39.0	39.9	40.6	0.986
As found Low point	4980	19.5	20.0	20.7	0.969
New cylinder response					

Baseline Corr As found:	80.1	Prev response:	78.68	*% change:	1.8%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	0.999736	AF Intercept:	0.439543
Baseline Corr 3rd AF pt:	20.6	AF Correlation:	0.999916	* = > +/-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	0.3	----
High point	4922	78.1	80.0	79.2	1.010
Mid point	4961	39.0	39.9	40.2	0.993
Low point	4980	19.5	20.0	20.7	0.965
As left zero	5000	0.0	0.0	0.3	----
As left span	4922	78.1	80.0	78.6	1.017
SO2 Scrubber Check	4982	81.3	802.8	0.0	----
Date of last scrubber change:		25-May-23		Ave Corr Factor	0.989
Date of last converter efficiency test:					

Notes: Flow sensor replaced and calibrated. Sox scrubber checked after the calibrator zero. No adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

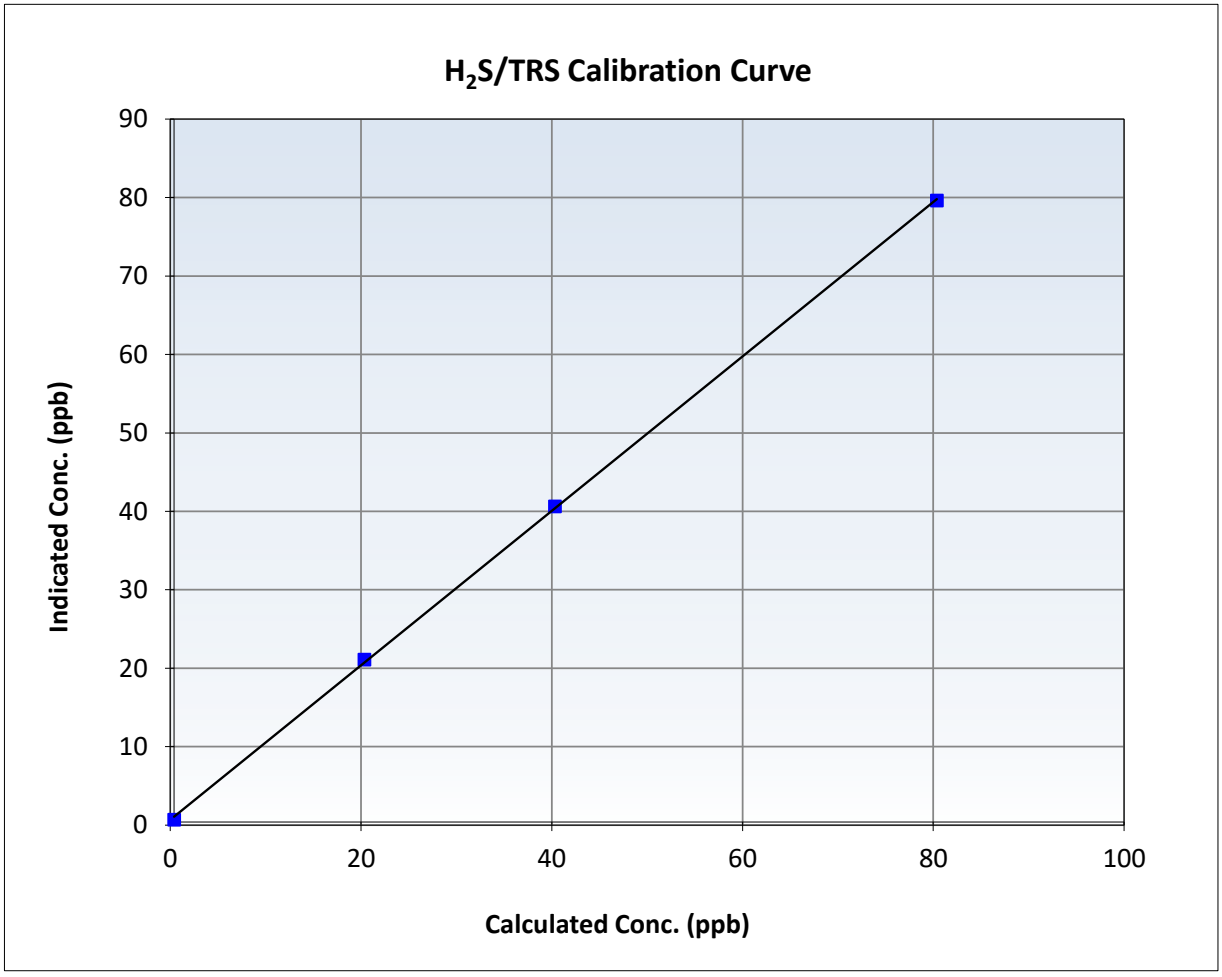
Station Information

Calibration Date:	April 9, 2024	Previous Calibration:	March 5, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:43	End Time (MST):	11:00
Analyzer make:	Global	Analyzer serial #:	2022-226

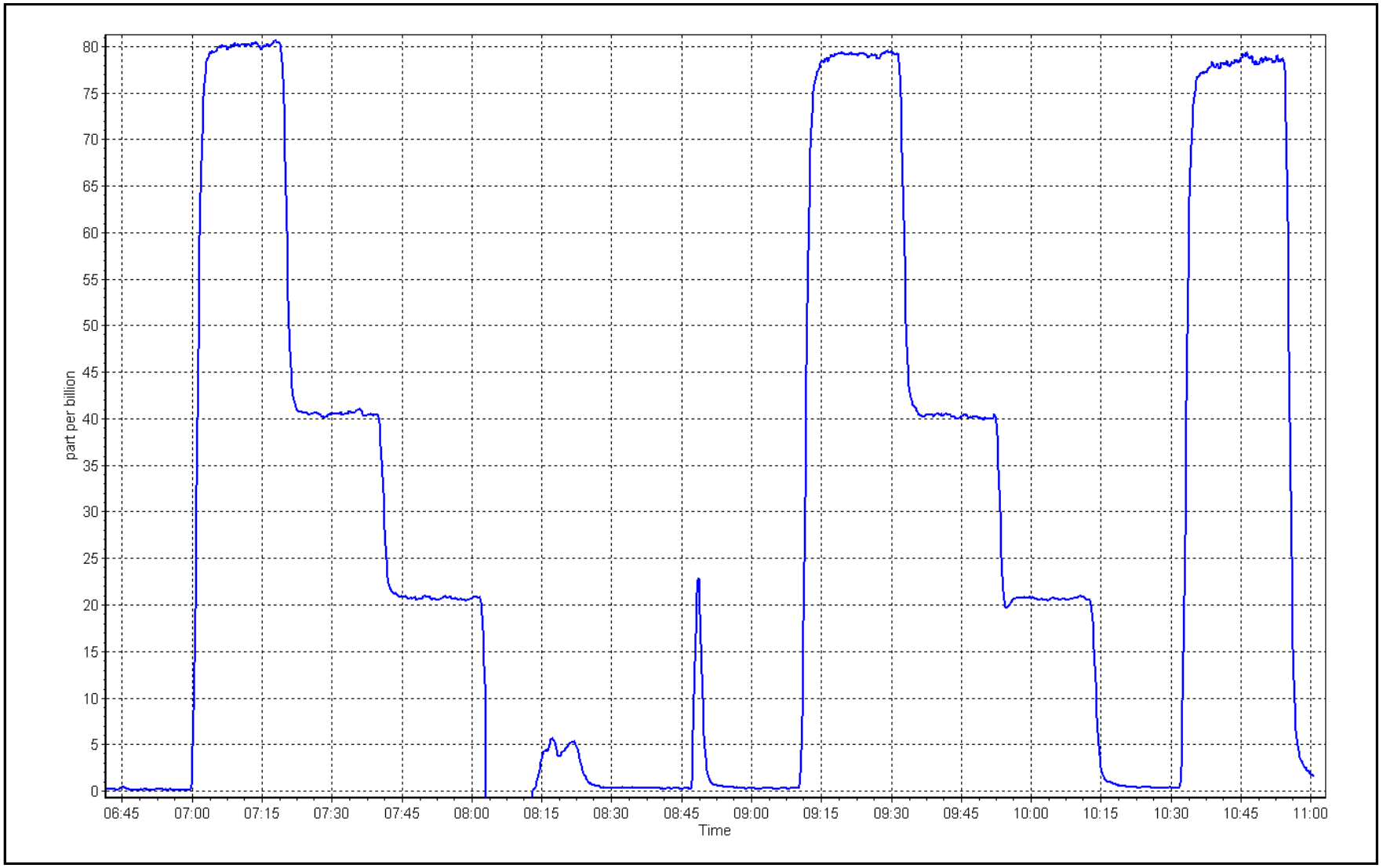
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	79.2	1.0098
39.9	40.2	0.9934
20.0	20.7	0.9647

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999894	*≥0.995*
Slope	0.984302	*0.90 - 1.10*
Intercept	0.679249	*+/-3*



H_2S Calibration Plot Date: April 9, 2024 Location: MacKay River



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	April 10, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	8:45	End time (MST):	10:28
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:	0.997159	0.995490	Background:	3.610	3.680
Calibration intercept:	0.028212	-0.003380	Coefficient:	6.010	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	17.09	1.013
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.13	Previous response	17.32	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.01	----
High point	4919	81.3	17.34	17.27	1.004
Mid point	4959	40.7	8.68	8.60	1.009
Low point	4980	20.3	4.33	4.33	0.999
As left zero	5000	0.0	0.00	-0.10	----
As left span	4919	81.3	17.34	17.31	1.002
				Average Correction Factor	1.004

Notes: No Maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC Calibration Summary

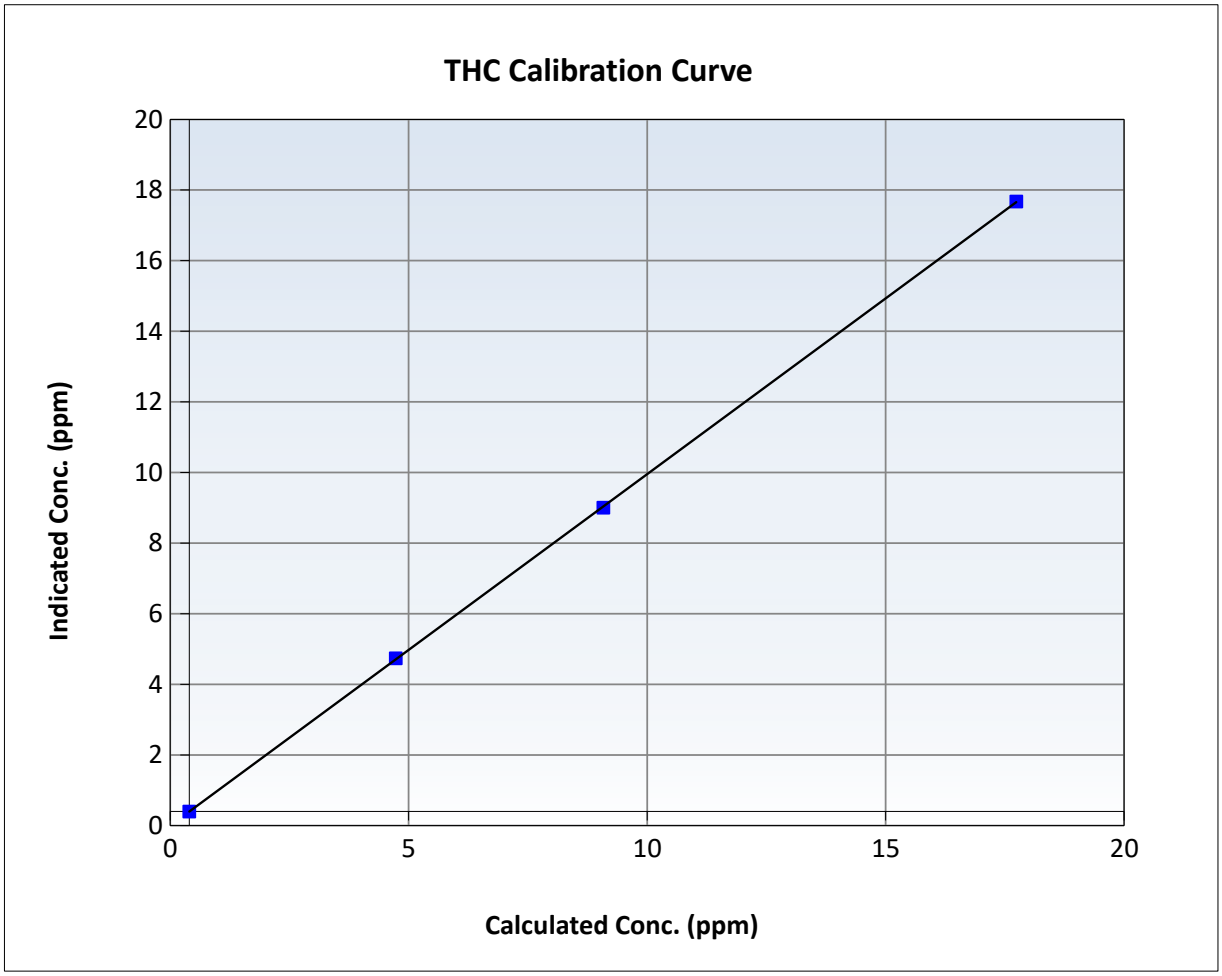
Station Information

Calibration Date:	April 10, 2024	Previous Calibration:	March 7, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:45	End Time (MST):	10:28
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

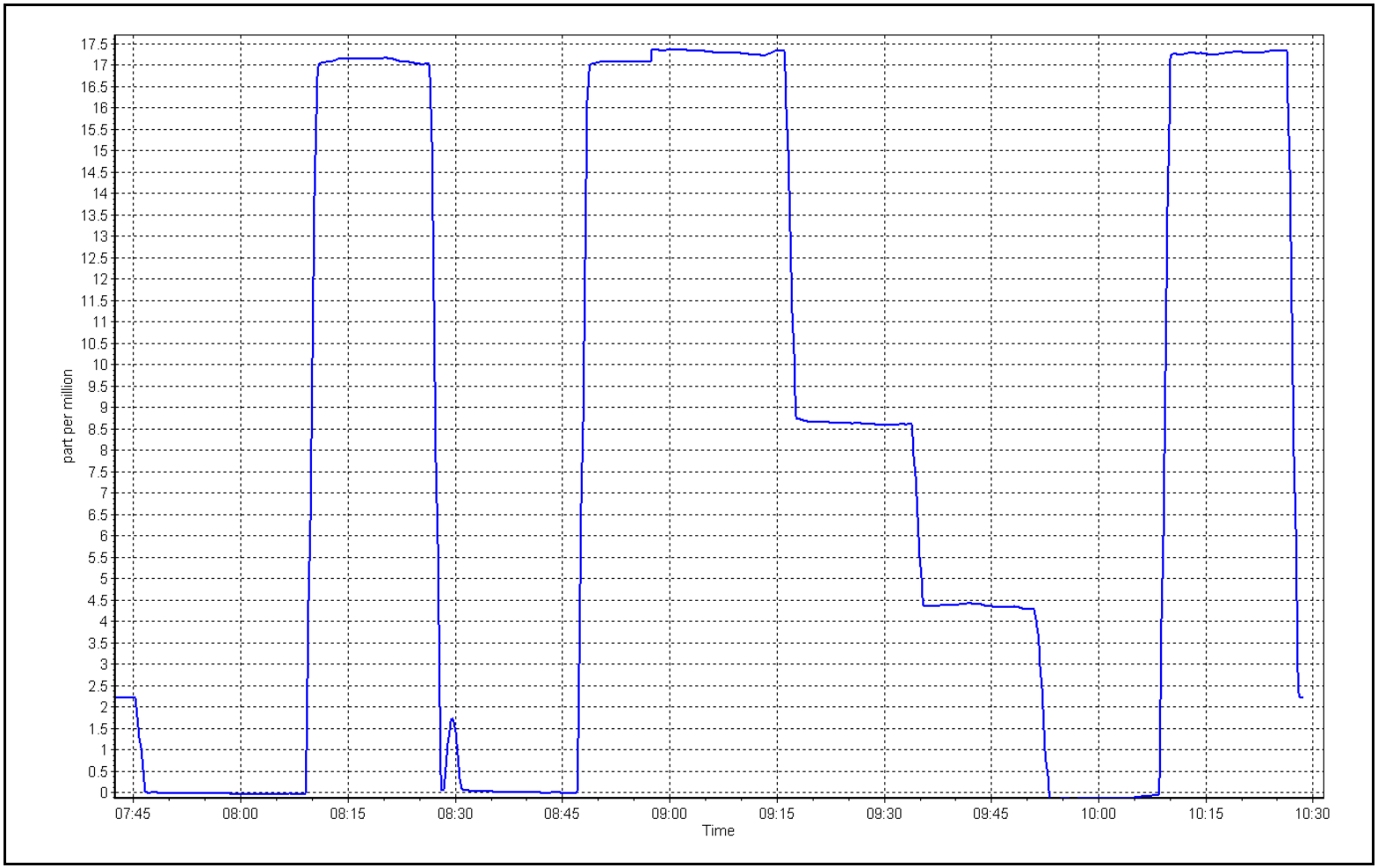
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.01	----
17.34	17.27	1.0040
8.68	8.60	1.0094
4.33	4.33	0.9990

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	0.995490	*0.90 - 1.10*
Intercept	-0.003380	*+/-1.5*



THC Calibration Plot Date: April 10, 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:	April 8, 2024
Last Cal Date:	March 6, 2024
Start time (MST):	6:45
End time (MST):	11:07
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	-0.2	----	----
AF High point	4917	83.3	819.5	800.3	19.2	817.8	797.4	20.4	1.0019	1.0036
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	824.0 ppb	NO =	804.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.7%
Baseline Corr 1st pt	NO_X =	817.9 ppb	NO =	797.4 ppb	As Found Statistics	*Percent Change	NO = -0.8%
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: 1505164379

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	0.990	0.990	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:	1.001037	0.994162
NO_X Cal Offset:	3.662215	3.902461
NO Cal Slope:	1.001142	0.993845
NO Cal Offset:	2.942582	2.922811
NO_2 Cal Slope:	0.998215	1.003001
NO_2 Cal Offset:	-0.831656	-0.362701

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	4917	83.3	819.5	800.3	19.2	816.9	797.1	19.6	1.0031	1.0040
Mid point	4958	41.7	410.3	400.7	9.6	412.9	401.9	11.0	0.9936	0.9970
Low point	4979	20.8	204.6	199.9	4.8	211.8	204.8	7.1	0.9662	0.9759
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4917	83.3	819.5	438.5	381.0	814.7	438.5	376.1	1.0058	1.0000
								Average Correction Factor	0.9876	0.9923

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	793.3	438.0	374.5	375.2	0.9980	100.2%
Mid GPT point	793.3	609.3	203.2	203.8	0.9968	100.3%
Low GPT point	793.3	697.9	114.6	113.9	1.0058	99.4%
				Average Correction Factor	1.0002	100.0%

Notes: No adjustments and maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

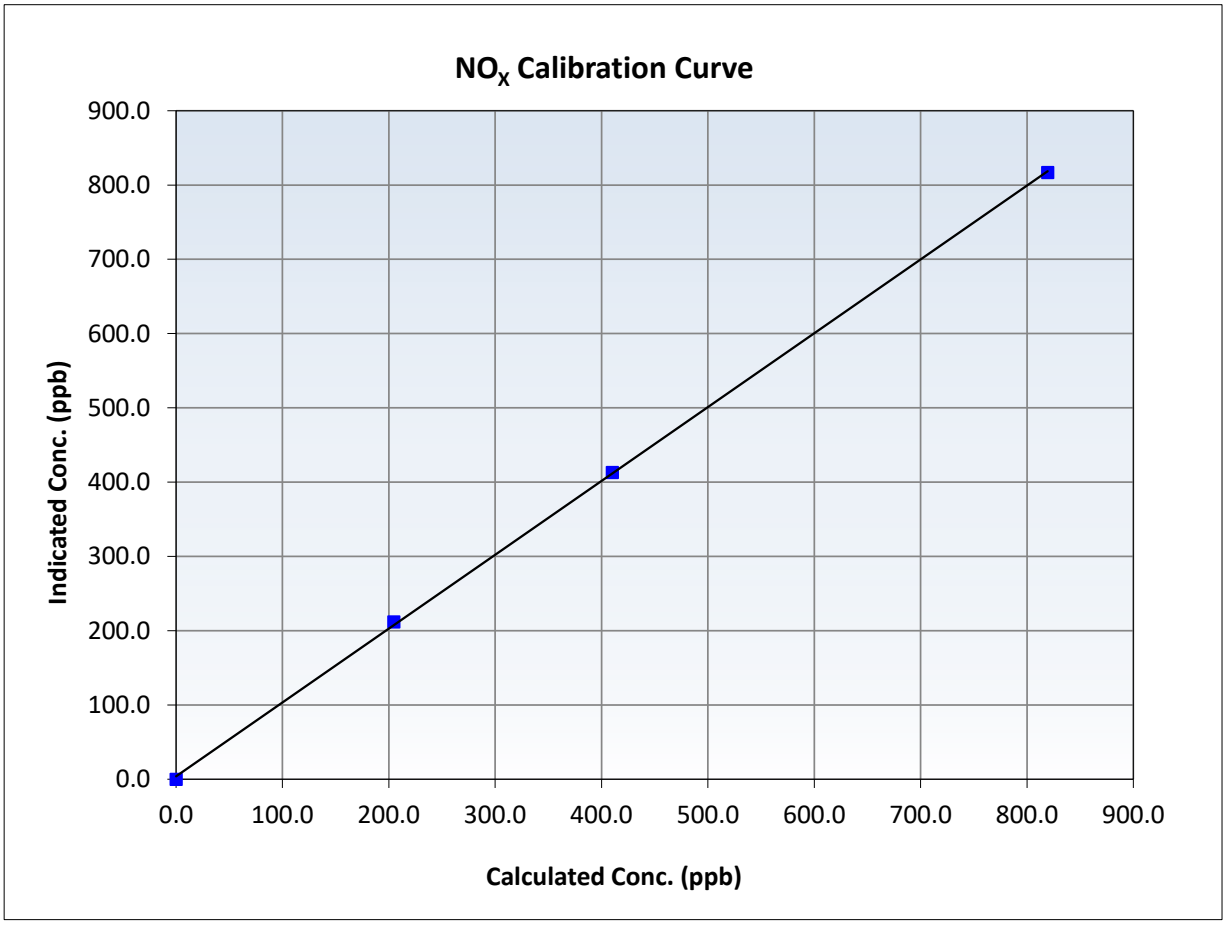
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 6, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:45	End Time (MST):	11:07
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	816.9	1.0031
410.3	412.9	0.9936
204.6	211.8	0.9662

Statistical Evaluation		Limits
Correlation Coefficient	0.999892	≥0.995
Slope	0.994162	0.90 - 1.10
Intercept	3.902461	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

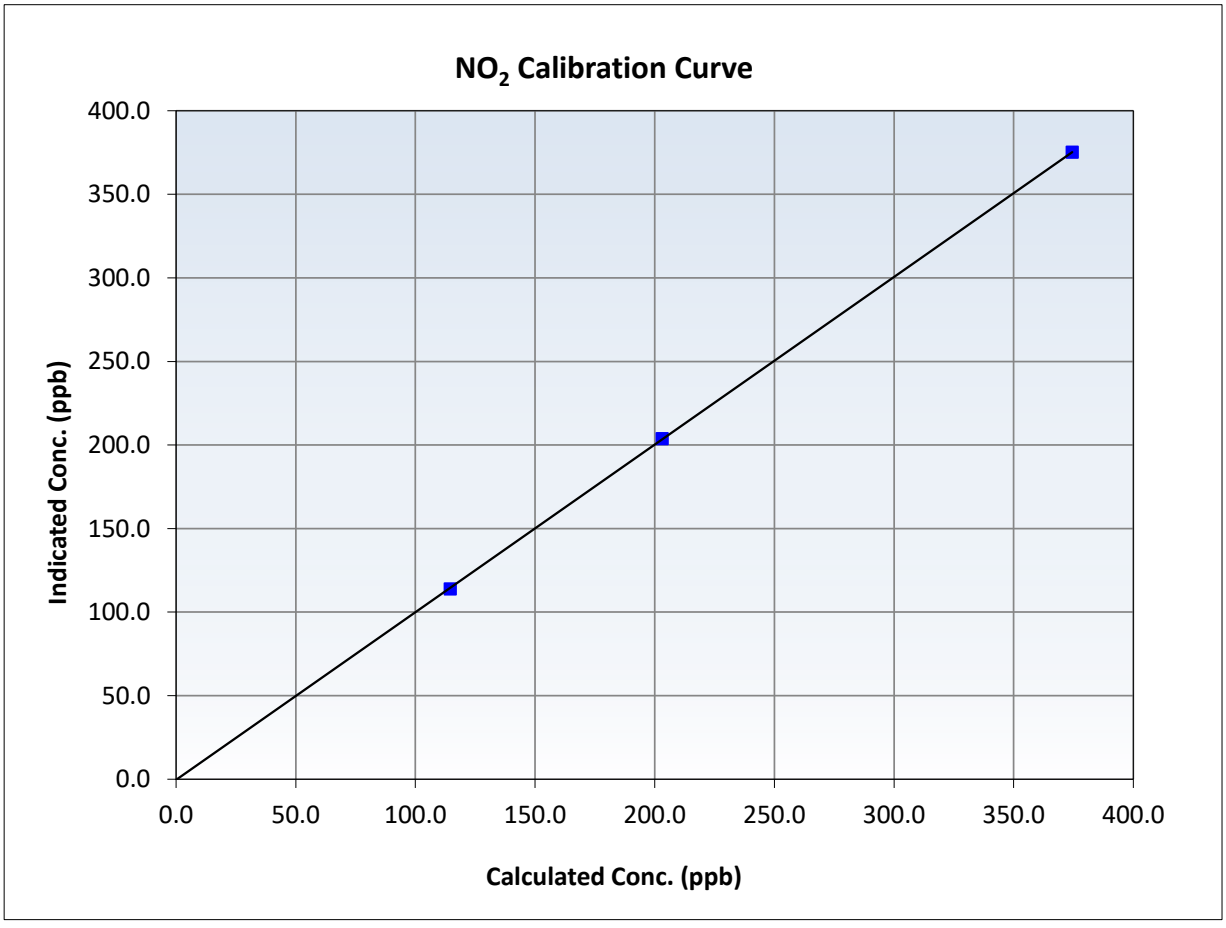
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 6, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:45	End Time (MST):	11:07
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	----
374.5	375.2	0.9980
203.2	203.8	0.9968
114.6	113.9	1.0058

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.003001	*0.90 - 1.10*
Intercept	-0.362701	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

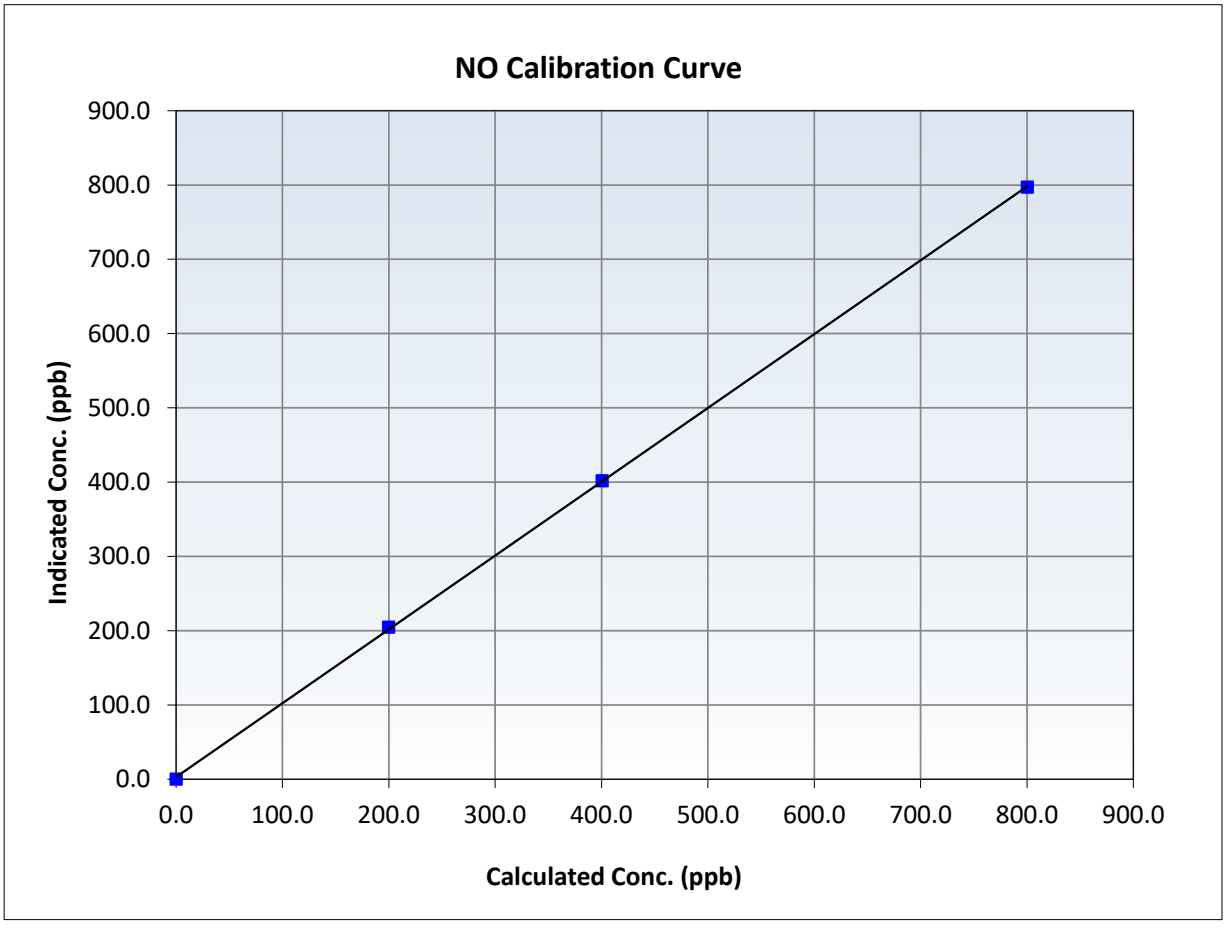
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 6, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	6:45	End Time (MST):	11:07
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

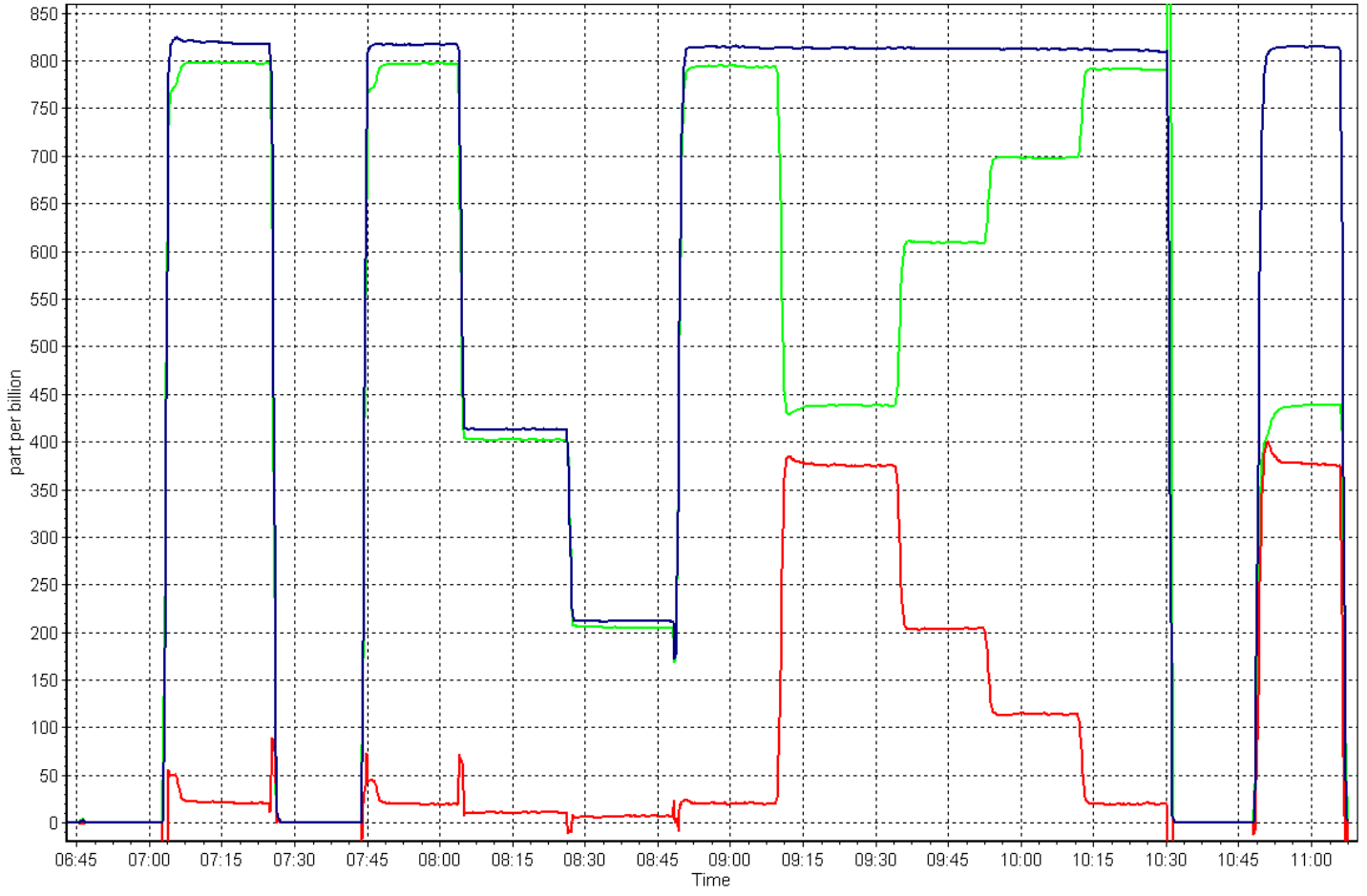
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	797.1	1.0040
400.7	401.9	0.9970
199.9	204.8	0.9759

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999941	*≥0.995*
Slope	0.993845	*0.90 - 1.10*
Intercept	2.922811	*+/-20*



NO_X Calibration Plot Date: April 8, 2024 Location: MacKay River



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS21
CONKLIN
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 3, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	9:14	End time (MST):	12:13
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:	0.997419	0.992525	Backgd or Offset:	28.3	28.3
Calibration intercept:	1.855817	1.395547	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	0.0	----
As found High point	4920	80.2	800.8	794.0	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	794.0	Previous response	800.6	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	80.2	800.8	795.5	1.007
Mid point	4960	40.1	400.4	400.1	1.001
Low point	4980	20.0	200.1	200.5	0.998
As left zero	5005	0.0	0.0	0.5	----
As left span	4920	80.2	800.8	798.2	1.003
				Average Correction Factor:	1.002

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

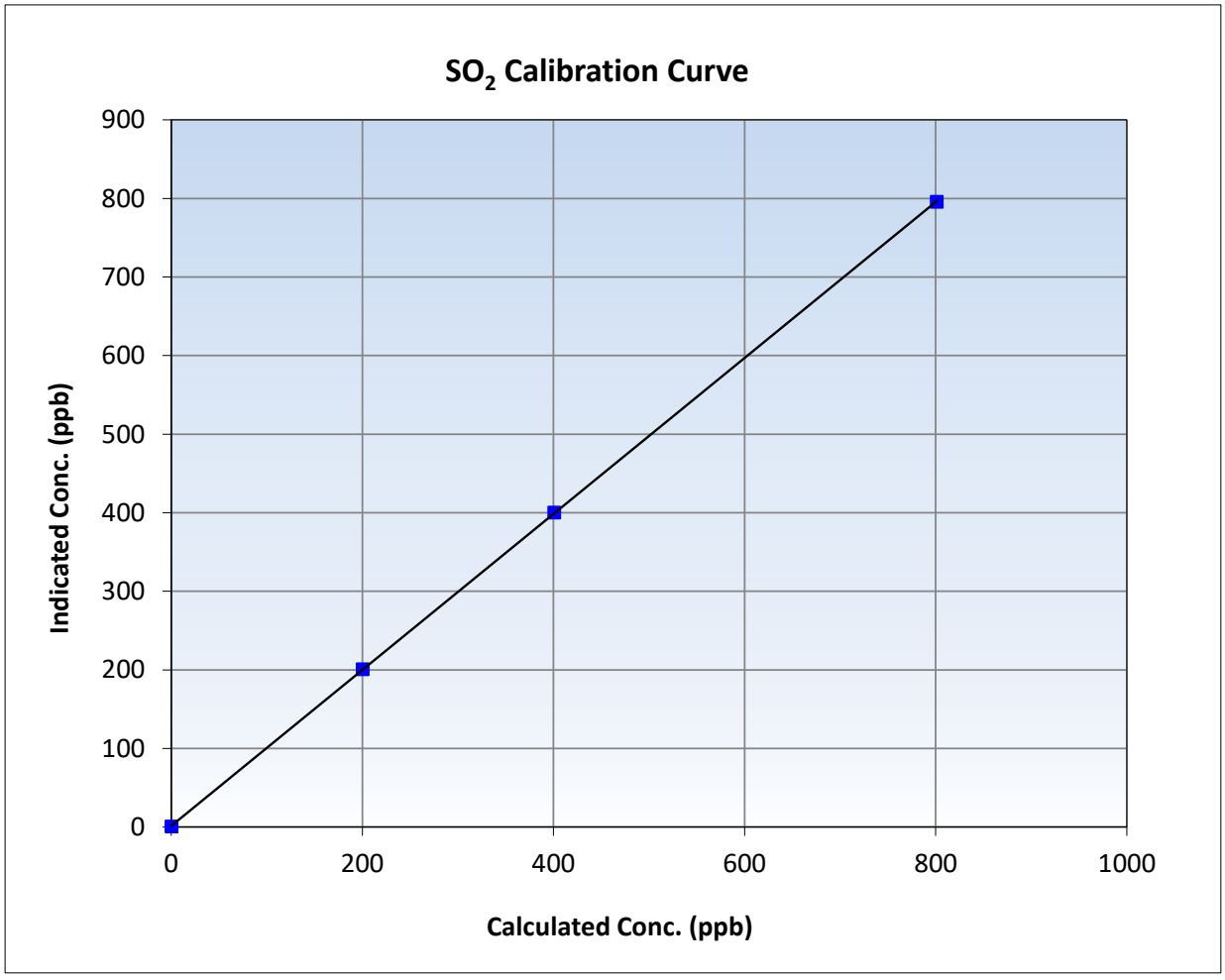
Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 18, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:14	End Time (MST):	12:13
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363

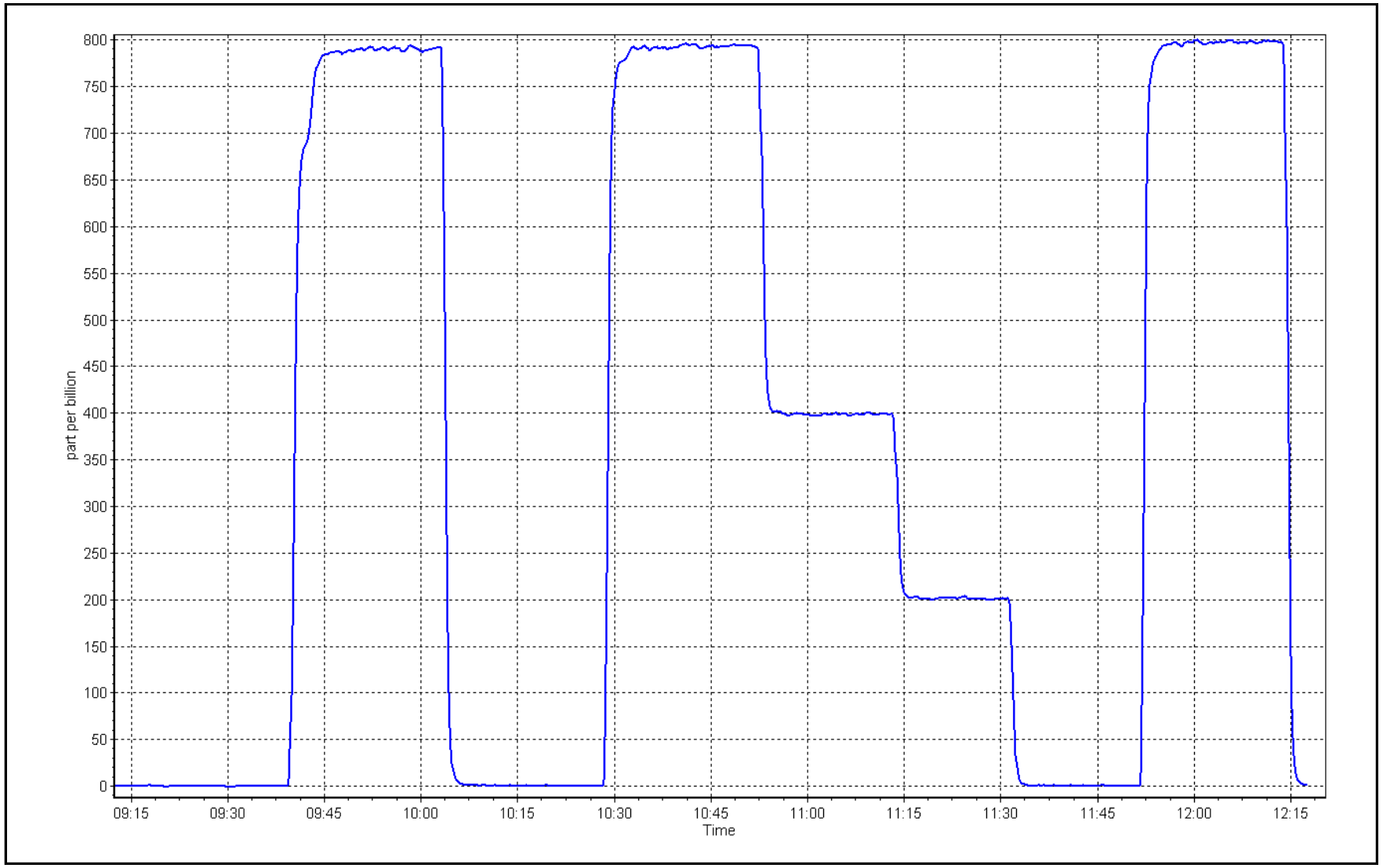
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
800.8	795.5	1.0067
400.4	400.1	1.0008
200.1	200.5	0.9981

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	0.992525	*0.90 - 1.10*
Intercept	1.395547	*+/-30*



SO2 Calibration Plot Date: April 3, 2024 Location: Conklin



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 18, 2024	Last Cal Date:	March 21, 2024
Start time (MST):	10:03	End time (MST):	14:41
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:	1.000286	0.999714	Backgd or Offset:	2.8	2.8
Calibration intercept:	0.140000	0.060000	Coeff or Slope:	0.998	0.998

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	80.0	80.0	80.0	0.998
As found Mid point	4960	40.0	40.0	40.0	0.995
As found Low point	4980	20.0	20.0	20.0	0.990
New cylinder response					

Baseline Corr As found:	80.2	Prev response:	80.16	*% change:	0.0%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	1.002000	AF Intercept:	-0.120000
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999995	* = > +/-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	80.0	1.000
Mid point	4960	40.0	40.0	40.1	0.998
Low point	4980	20.0	20.0	20.1	0.995
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.0	80.0	79.9	1.001
SO2 Scrubber Check	4920	80.2	802.0	-0.1	----
Date of last scrubber change:				Ave Corr Factor	0.998
Date of last converter efficiency test:					

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

TRS Calibration Summary

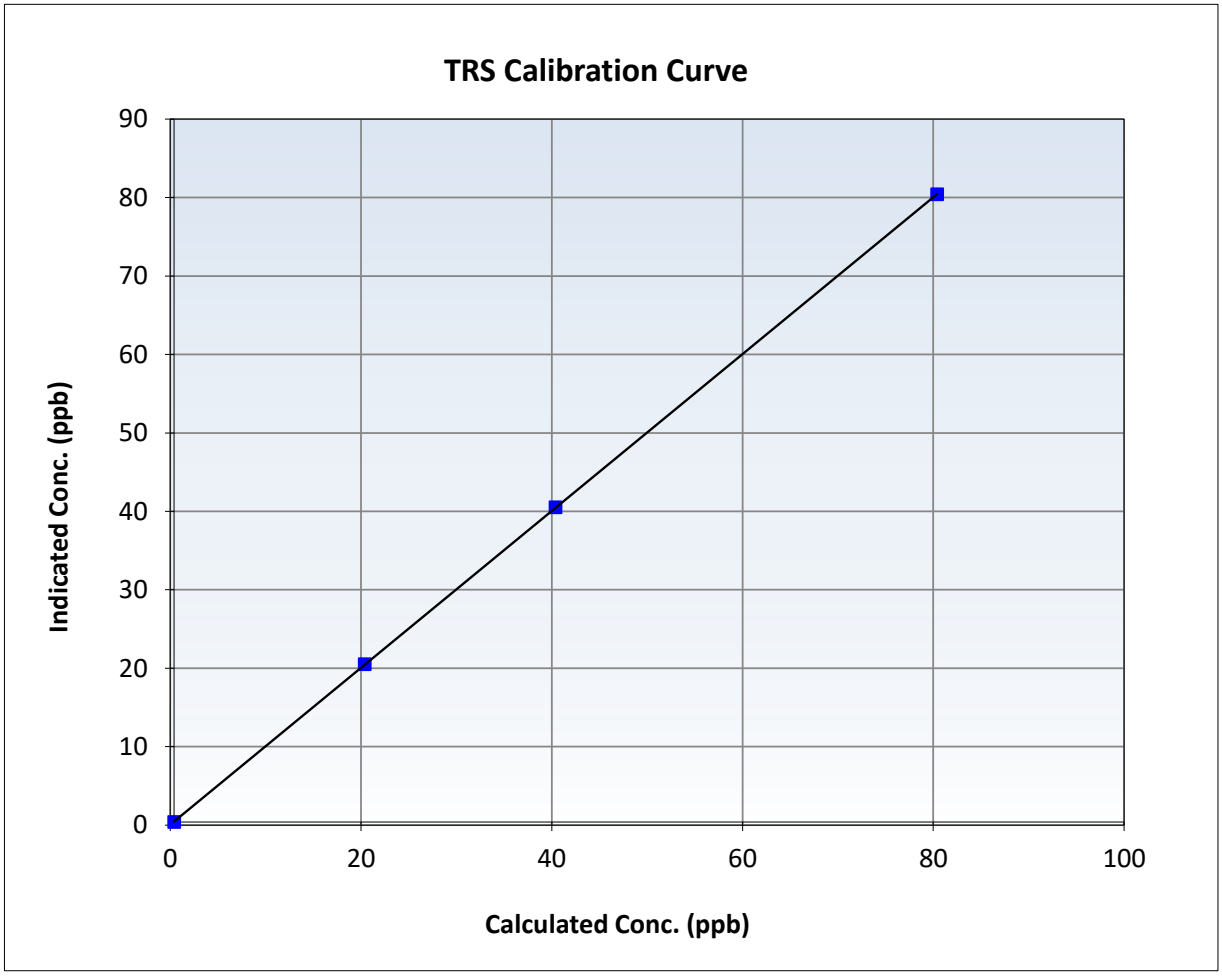
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 21, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:03	End Time (MST):	14:41
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116

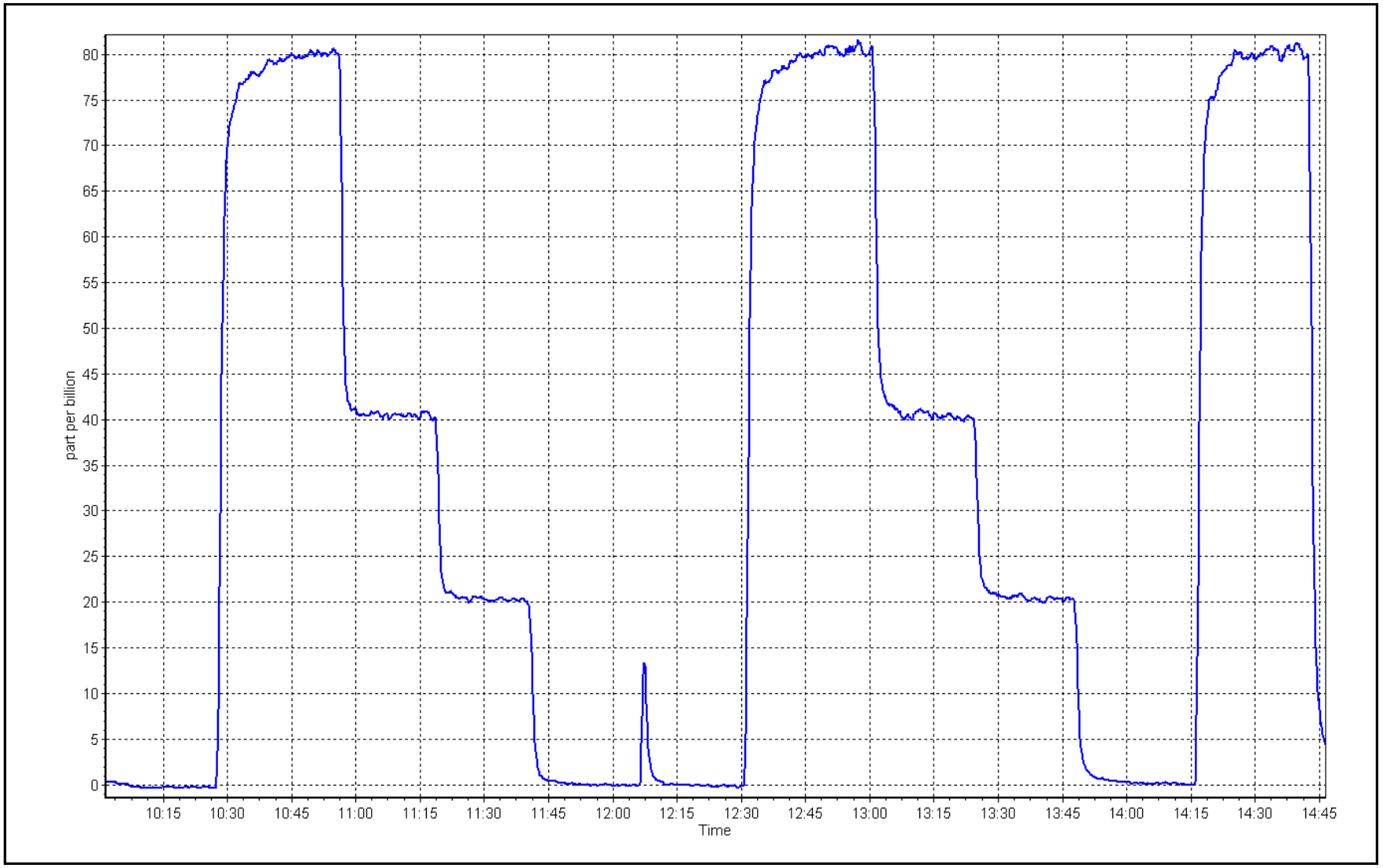
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	80.0	1.0000
40.0	40.1	0.9975
20.0	20.1	0.9950

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.999714	*0.90 - 1.10*
Intercept	0.060000	*+/-3*



TRS Calibration Plot Date: April 18, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 3, 2024	Last Cal Date:	March 20, 2024
Start time (MST):	9:14	End time (MST):	12:13
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:	2.55E-04	2.26E-04	NMHC SP Ratio:	5.96E-05	5.81E-05
CH4 Retention time:	15.0	14.2	NMHC Peak Area:	153262	157380
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	17.13	17.39	0.985
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.39	Prev response	17.07	*% 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	17.11	1.001
Mid point	4960	40.1	8.56	8.58	0.998
Low point	4980	20.0	4.28	4.33	0.988
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.15	0.999
				Average Correction Factor	0.995

Notes: Sample inlet filter 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	4920	80.2	9.14	9.22	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.22	Prev response	9.13	*% change	1.0%
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	80.2	9.14	9.13	1.001
Mid point	4960	40.1	4.57	4.60	0.994
Low point	4980	20.0	2.28	2.34	0.978
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.15	0.999
				Average Correction Factor	0.991

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	7.99	8.17	0.977
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.17	Prev response	7.94	*% change	2.8%
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	4920	80.2	7.99	7.99	1.000
Mid point	4960	40.1	3.99	3.99	1.001
Low point	4980	20.0	2.00	2.00	1.000
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	8.00	0.998
				Average Correction Factor	1.000

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.993227	0.998192
THC Cal Offset:	0.057164	0.027967
CH4 Cal Slope:	0.991351	0.999780
CH4 Cal Offset:	0.026556	-0.000643
NMHC Cal Slope:	0.995229	0.997354
NMHC Cal Offset:	0.029409	0.027410

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

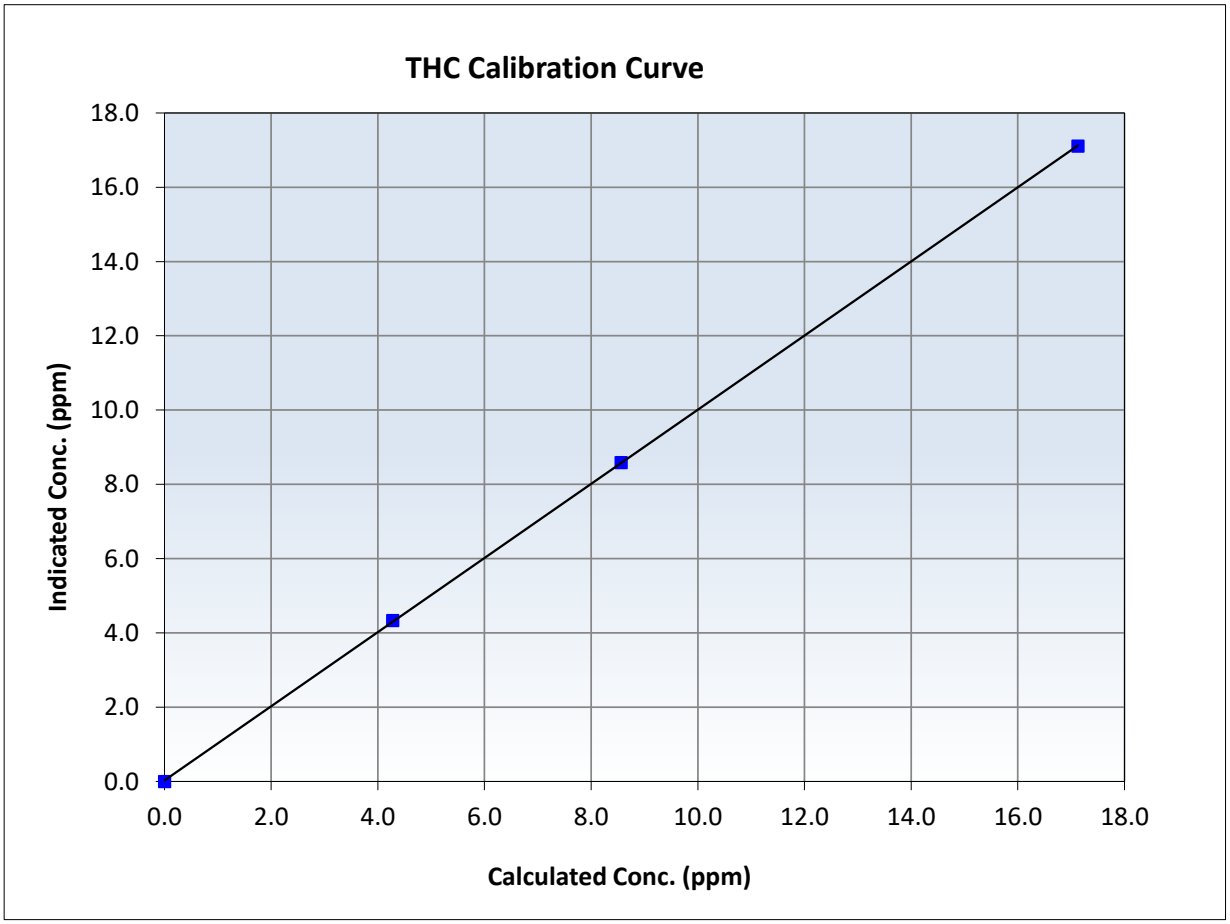
THC Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:14	End Time (MST):	12:13
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	0.999987	≥0.995
17.13	17.11	1.0009	Slope	0.998192	0.90 - 1.10
8.56	8.58	0.9975	Intercept	0.027967	+/-0.5
4.28	4.33	0.9881			



Wood Buffalo Environmental Association

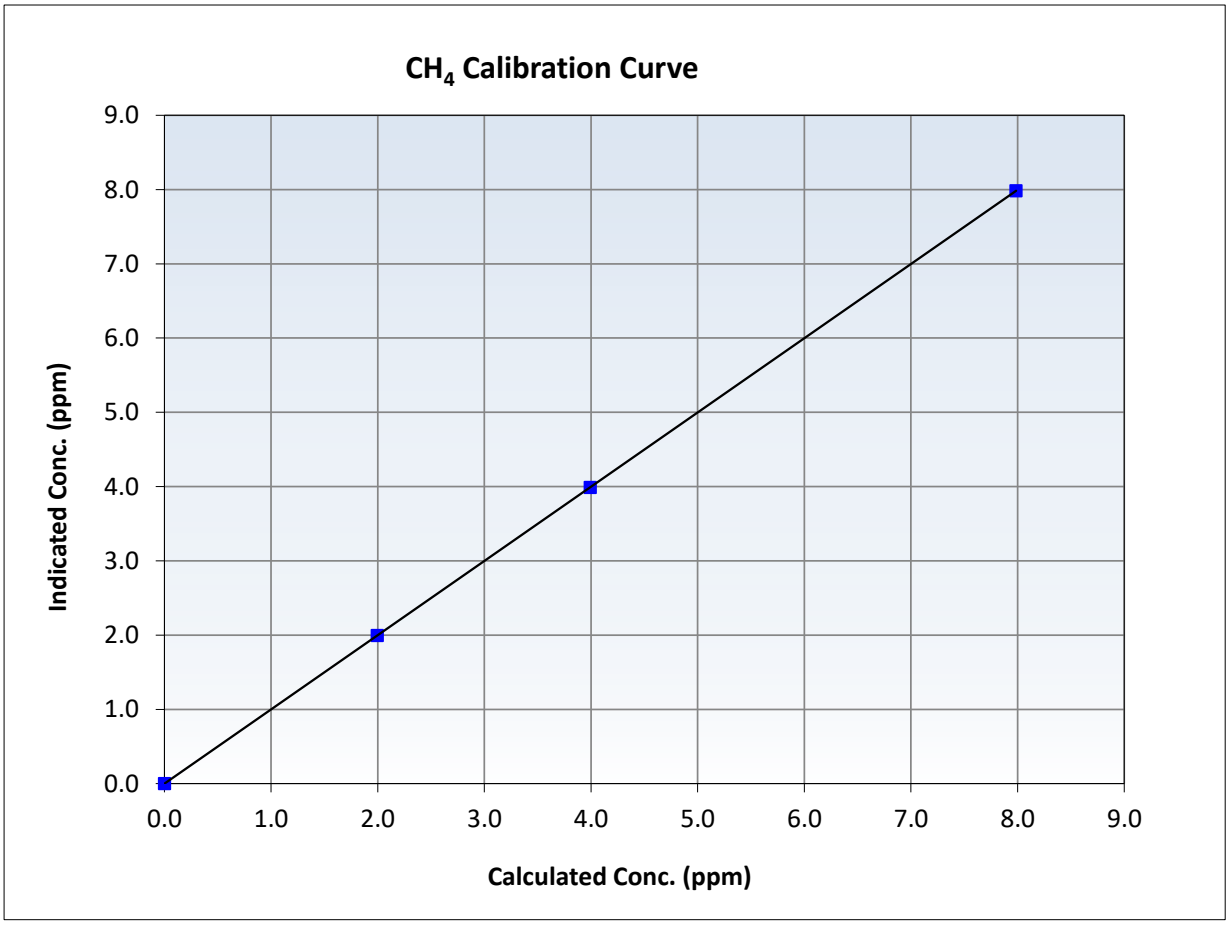
CH_4 Calibration Summary

Station Information

Calibration Date:	April 3, 2024	Previous Calibration:	March 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:14	End Time (MST):	12:13
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	1.000000	*≥0.995*
7.99	7.99	1.0001	Slope	0.999780	*0.90 - 1.10*
3.99	3.99	1.0013			
2.00	2.00	0.9998	Intercept	-0.000643	*+/-0.5*



Wood Buffalo Environmental Association

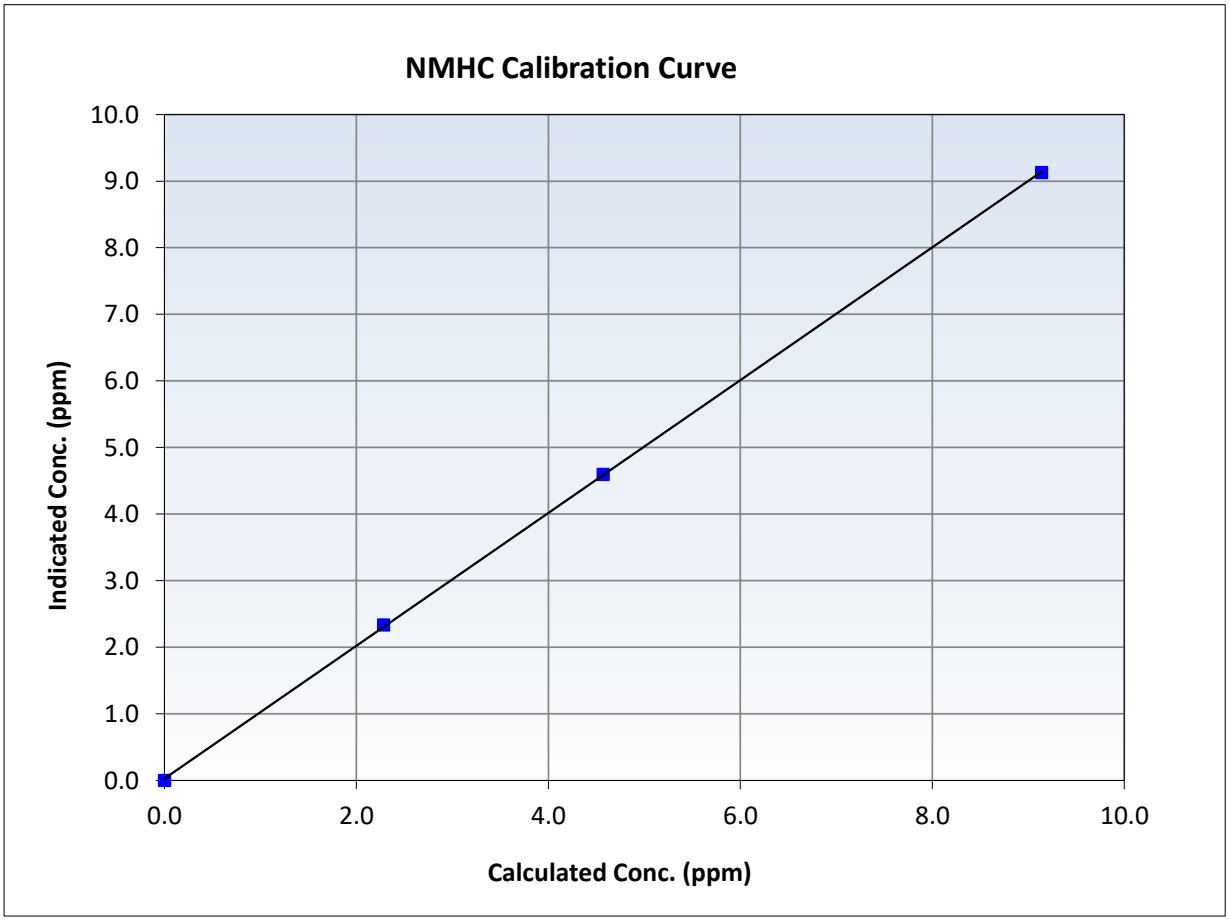
NMHC Calibration Summary

Station Information

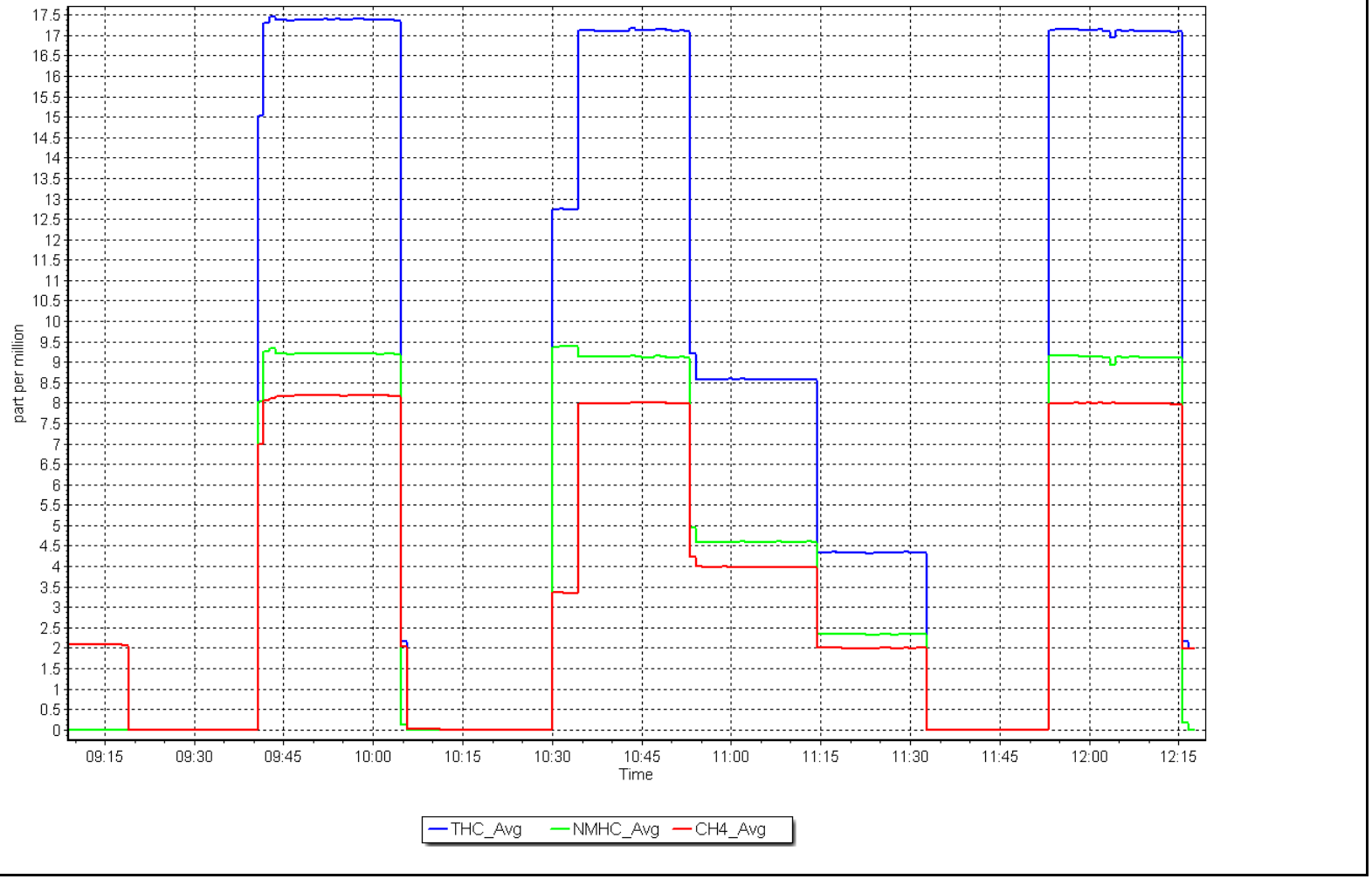
Calibration Date:	April 3, 2024	Previous Calibration:	March 20, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:14	End Time (MST):	12:13
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999958	≥0.995
9.14	9.13	1.0010	Slope	0.997354	0.90 - 1.10
4.57	4.60	0.9945			
2.28	2.34	0.9780	Intercept	0.027410	+/-0.5



NMHC Calibration Plot Date: April 3, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 19, 2024	Last Cal Date:	April 3, 2024
Start time (MST):	10:12	End time (MST):	12:26
Reason:	Maintenance		

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:	NA	2.48E-04	NMHC SP Ratio:	NA	4.50E-05
CH4 Retention time:	NA	15.4	NMHC Peak Area:	NA	202994
Zero Chromatogram:	OFF	ON	Flat Baseline:	OFF	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					
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	0.03	----
High point	4920	80.2	17.13	17.15	0.999
Mid point	4960	40.1	8.56	8.62	0.993
Low point	4980	20.0	4.28	4.35	0.983
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.18	0.997
				Average Correction Factor	0.992

Notes: Actuator was change and inlet filters before calibrator zero. Use flat baseline. 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					
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	80.2	9.14	9.12	1.002
Mid point	4960	40.1	4.57	4.59	0.997
Low point	4980	20.0	2.28	2.32	0.986
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.13	1.001
				Average Correction Factor	0.995

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *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	0.03	----
High point	4920	80.2	7.99	8.02	0.996
Mid point	4960	40.1	3.99	4.03	0.990
Low point	4980	20.0	2.00	2.04	0.980
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	8.05	0.992
				Average Correction Factor	0.989

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	NA	0.999013
THC Cal Offset:	NA	0.053566
CH4 Cal Slope:	NA	1.000152
CH4 Cal Offset:	NA	0.035557
NMHC Cal Slope:	NA	0.996817
NMHC Cal Offset:	NA	0.019809

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

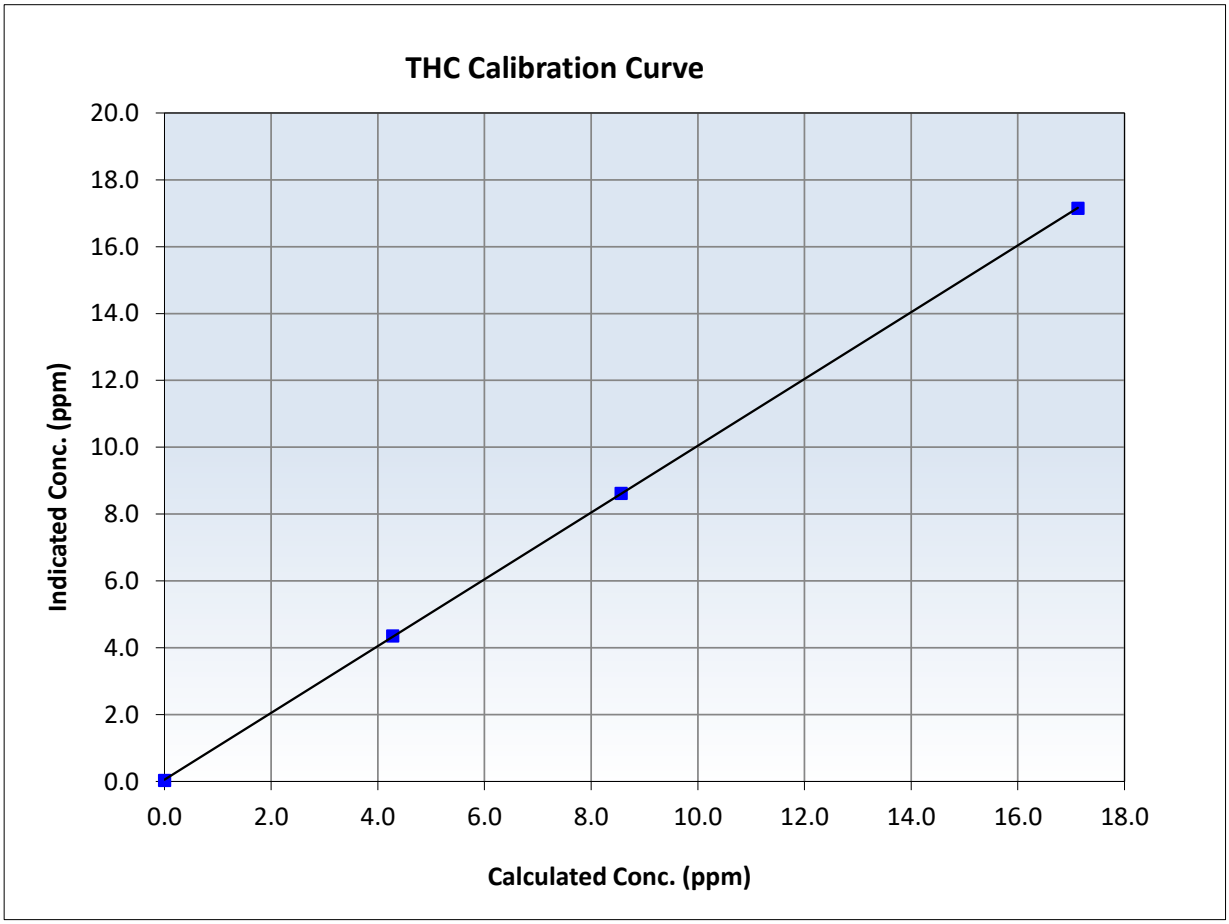
THC Calibration Summary

Station Information

Calibration Date:	April 19, 2024	Previous Calibration:	April 3, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:12	End Time (MST):	12:26
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	0.03	----	Correlation Coefficient	0.999991	≥0.995
17.13	17.15	0.9986	Slope	0.999013	0.90 - 1.10
8.56	8.62	0.9934	Intercept	0.053566	+/-0.5
4.28	4.35	0.9833			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

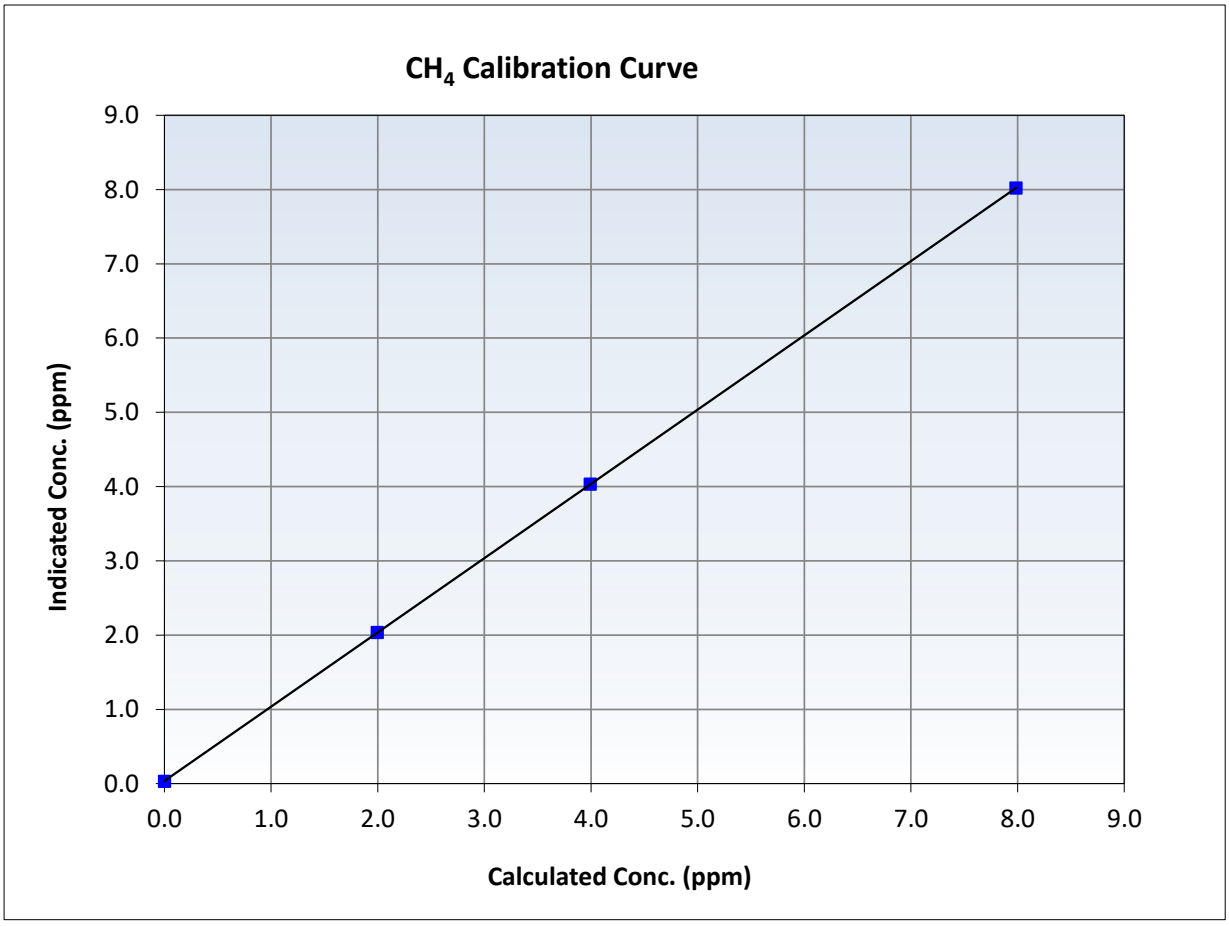
Station Information

Calibration Date:	April 19, 2024	Previous Calibration:	April 3, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:12	End Time (MST):	12:26
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.03	----
7.99	8.02	0.9958
3.99	4.03	0.9903
2.00	2.04	0.9797

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.000152	*0.90 - 1.10*
Intercept	0.035557	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

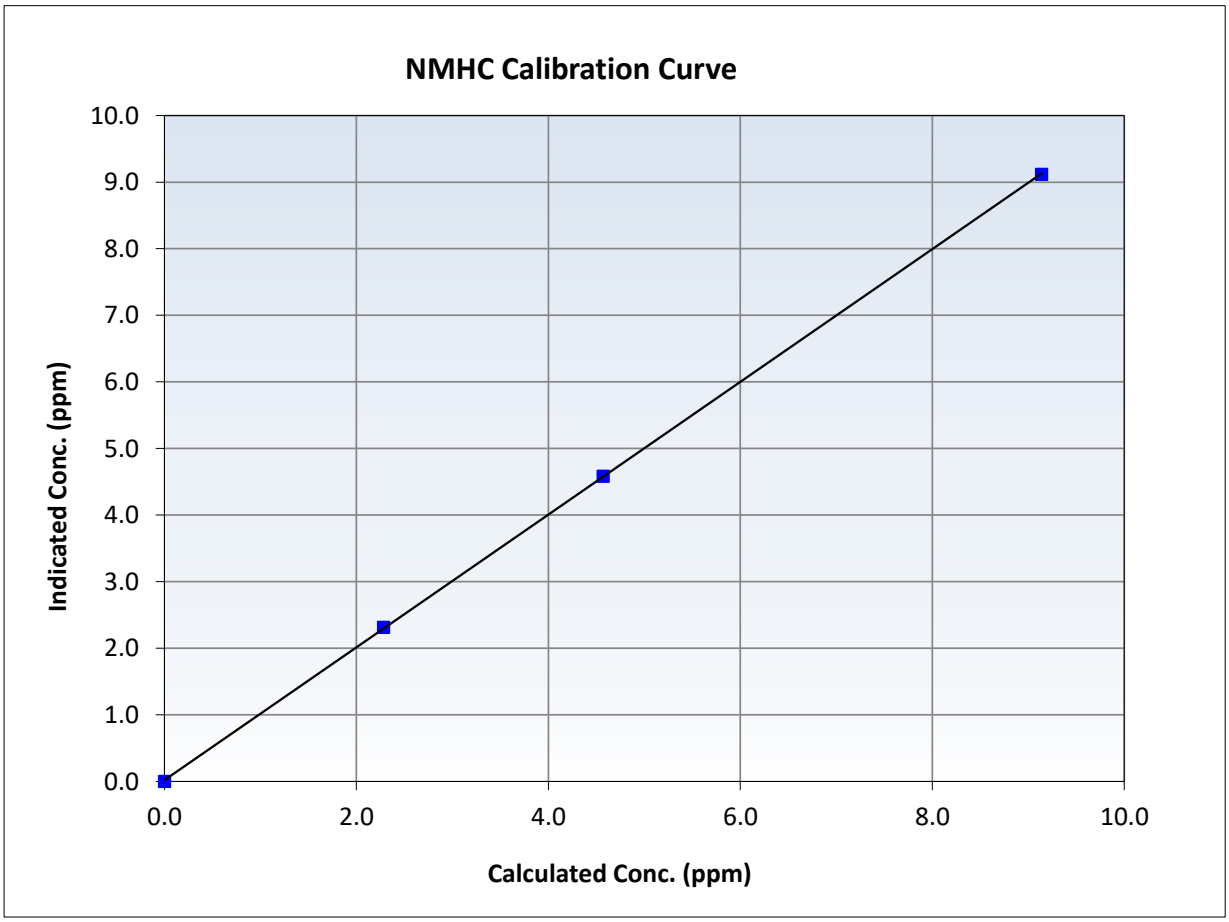
Station Information

Calibration Date:	April 19, 2024	Previous Calibration:	April 3, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:12	End Time (MST):	12:26
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259520

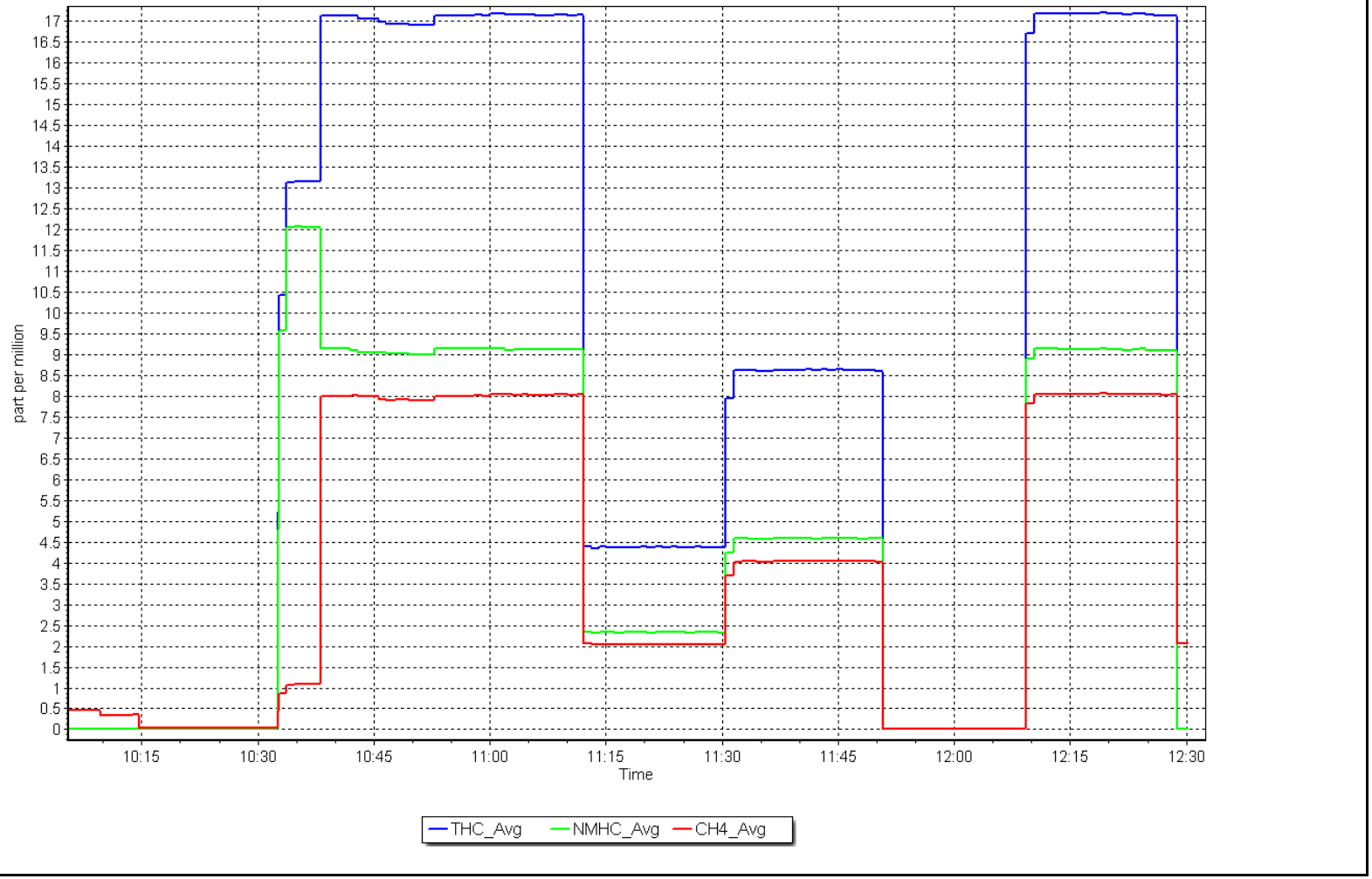
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.14	9.12	1.0021
4.57	4.59	0.9967
2.28	2.32	0.9861

Statistical Evaluation		Limits
Correlation Coefficient	0.999978	≥0.995
Slope	0.996817	0.90 - 1.10
Intercept	0.019809	+/-0.5



NMHC Calibration Plot Date: April 19, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 22, 2024	Last Cal Date:	NA
Start time (MST):	11:59	End time (MST):	14:12
Reason:	Install		

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 #:	1181490018
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	NA	2.64E-04	NMHC SP Ratio:	NA	6.99E-05
CH4 Retention time:	NA	14.4	NMHC Peak Area:	NA	130849
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	4920	80.2	17.13	17.18	0.997
Mid point	4960	40.1	8.56	8.62	0.993
Low point	4980	20.0	4.28	4.38	0.977
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.20	0.995
				Average Correction Factor	0.989

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	4920	80.2	9.14	9.19	0.994
Mid point	4960	40.1	4.57	4.64	0.986
Low point	4980	20.0	2.28	2.36	0.969
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.22	0.992
				Average Correction Factor	0.983

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	80.2	7.99	7.99	1.000
Mid point	4960	40.1	3.99	3.99	1.002
Low point	4980	20.0	2.00	2.02	0.988
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	7.99	1.000
				Average Correction Factor	0.996

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	NA	1.001709
THC Cal Offset:	NA	0.040371
CH4 Cal Slope:	NA	0.998993
CH4 Cal Offset:	NA	0.008358
NMHC Cal Slope:	NA	1.004194
NMHC Cal Offset:	NA	0.031813

Calibration Performed By: Jan Castro and Sean Bala

Wood Buffalo Environmental Association

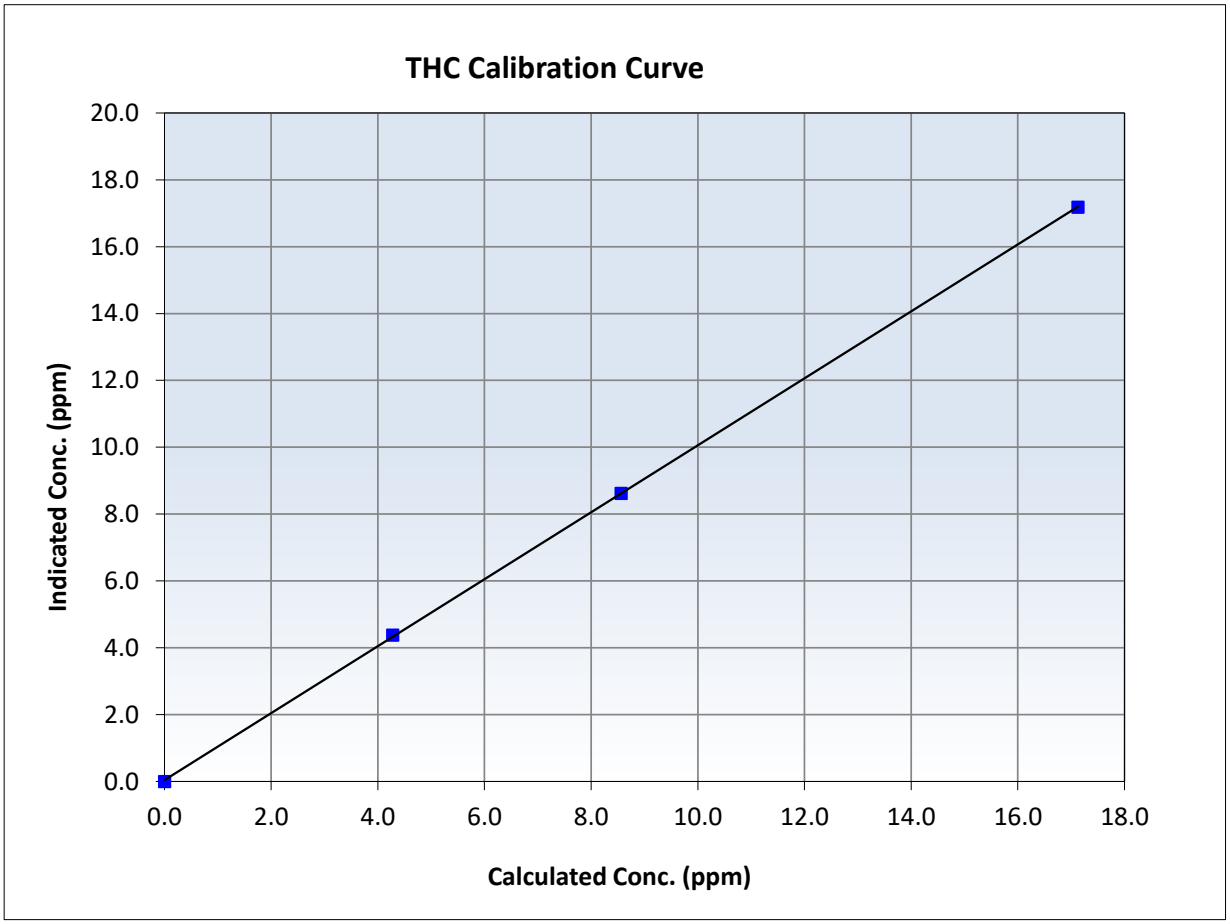
THC Calibration Summary

Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	11:59	End Time (MST):	14:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999972	≥0.995
17.13	17.18	0.9968	Slope	1.001709	0.90 - 1.10
8.56	8.62	0.9931	Intercept	0.040371	+/-0.5
4.28	4.38	0.9775			



Wood Buffalo Environmental Association

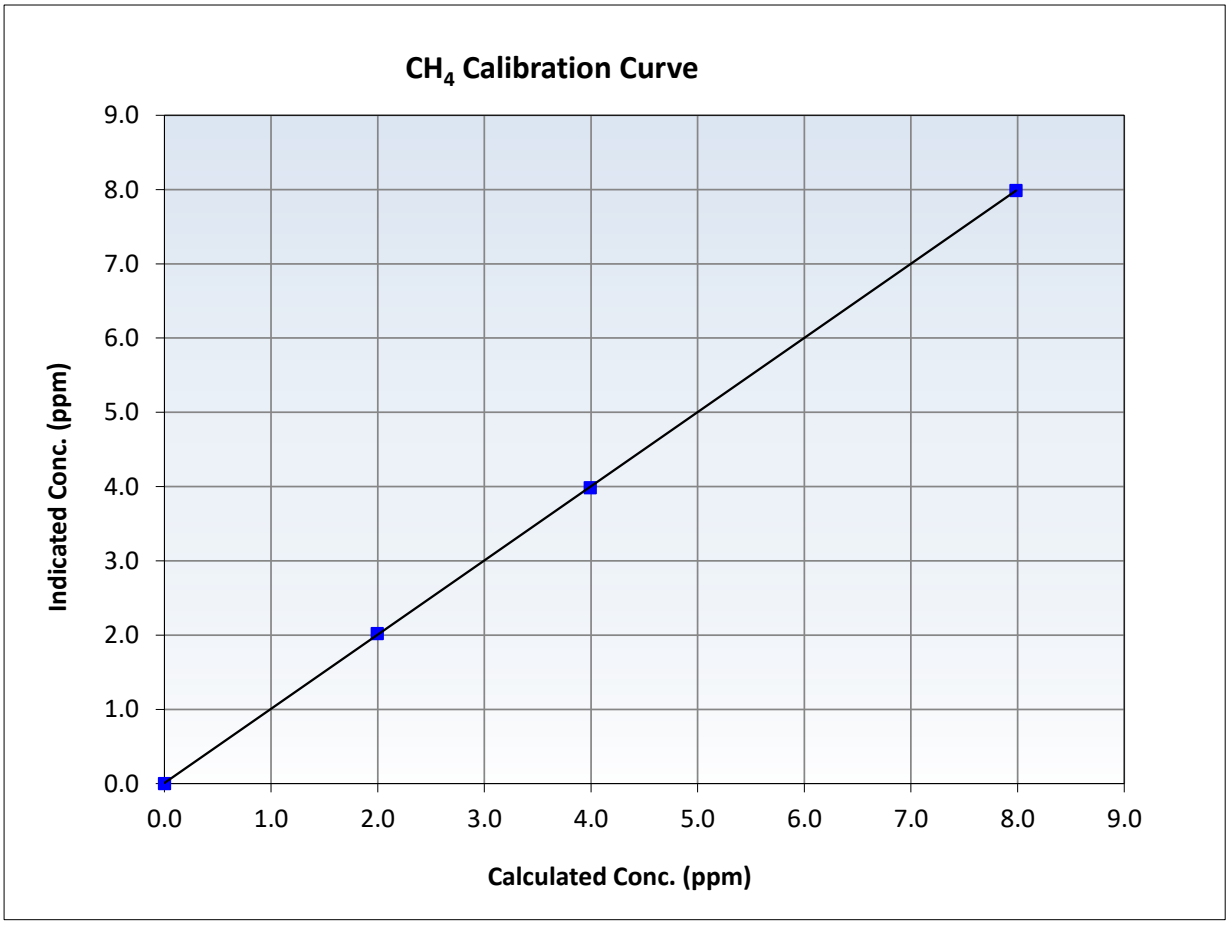
CH_4 Calibration Summary

Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	11:59	End Time (MST):	14:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999985	≥0.995
7.99	7.99	0.9999	Slope	0.998993	0.90 - 1.10
3.99	3.99	1.0015	Intercept	0.008358	+/-0.5
2.00	2.02	0.9879			



Wood Buffalo Environmental Association

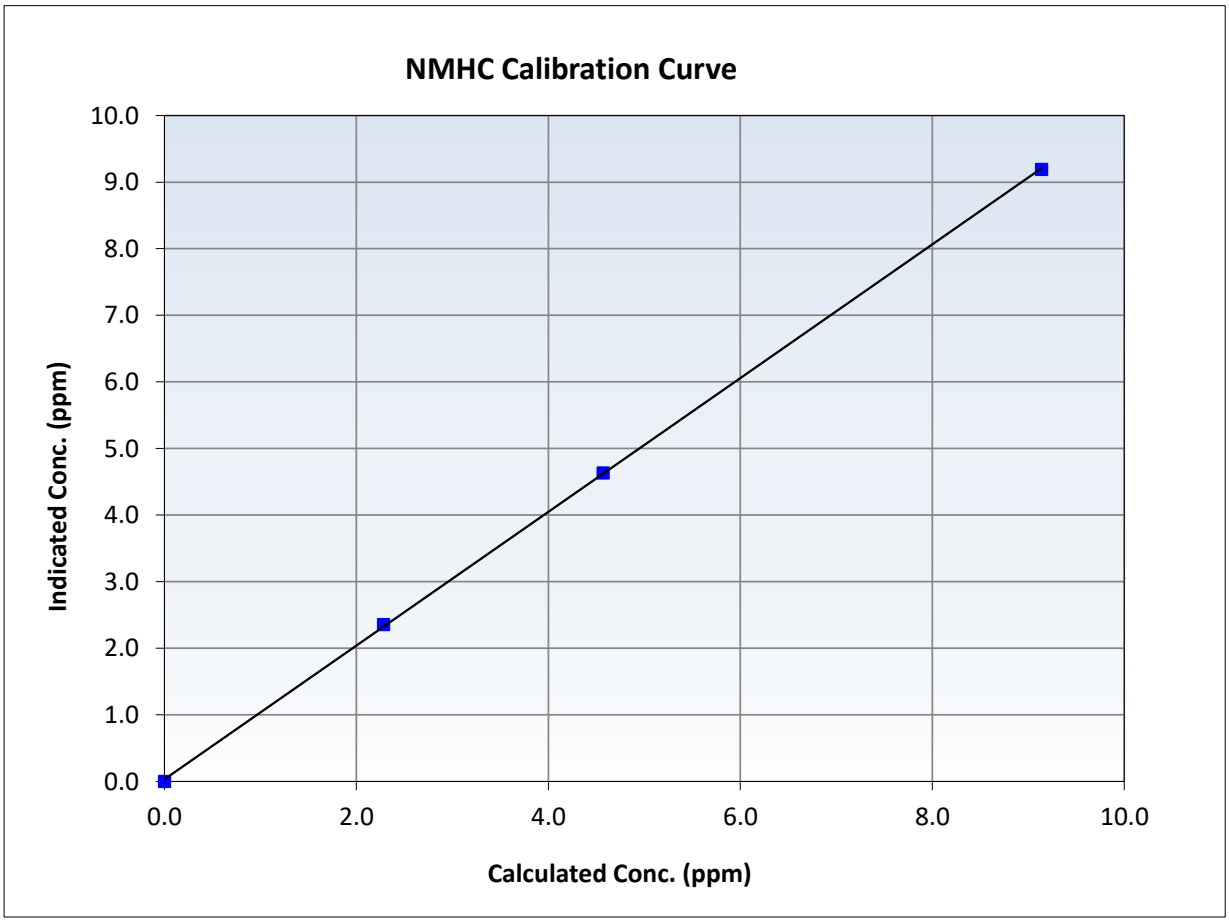
NMHC Calibration Summary

Station Information

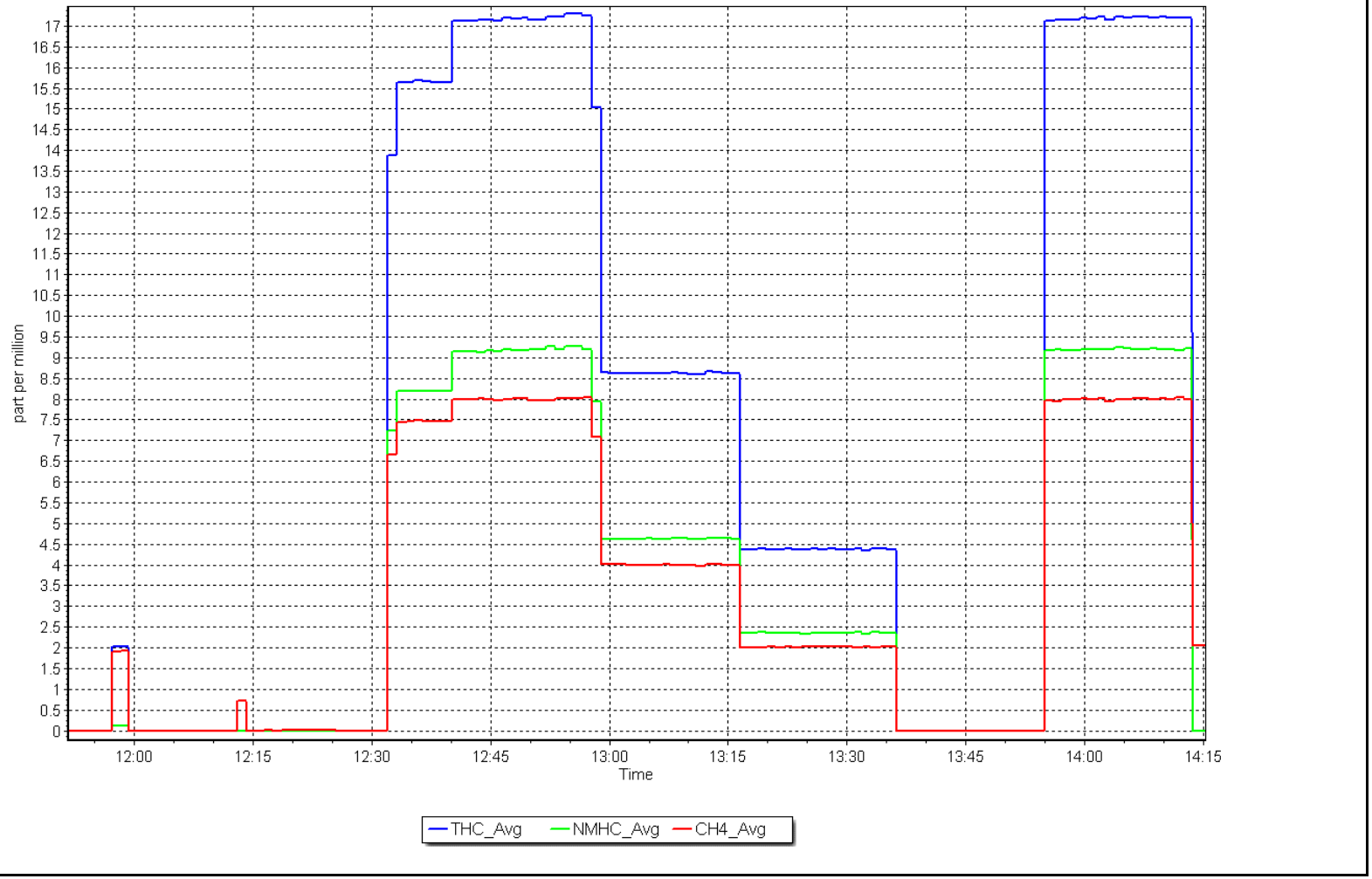
Calibration Date:	April 22, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	11:59	End Time (MST):	14:12
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999945	≥0.995
9.14	9.19	0.9940	Slope	1.004194	0.90 - 1.10
4.57	4.64	0.9859	Intercept	0.031813	+/-0.5
2.28	2.36	0.9685			



NMHC Calibration Plot Date: April 22, 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:	April 12, 2024
Last Cal Date:	March 26, 2024
Start time (MST):	10:29
End time (MST):	14:43
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	-0.4	-0.4	0.0	----	----
AF High point	4918	82.0	802.0	800.3	1.6	865.0	864.0	1.5	0.9267	0.9259
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	800.1 ppb	NO =	801.3 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 7.6%
Baseline Corr 1st pt	NO_X =	865.4 ppb	NO =	864.4 ppb	As Found Statistics	*Percent Change	NO = 7.3%
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: 1501663731

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.004	0.929	NO bkgnd or offset:	10.1	9.3
NOX coeff or slope:	0.993	0.993	NOX bkgnd or offset:	10.2	9.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	147.3	146.2

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.994854	0.996407
NO_X Cal Offset:	2.228020	1.908027
NO Cal Slope:	1.000020	0.998578
NO Cal Offset:	1.008029	1.088012
NO_2 Cal Slope:	0.996734	0.999882
NO_2 Cal Offset:	-0.362609	0.066334

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	4918	82.0	802.0	800.3	1.6	799.8	799.6	0.2	1.0027	1.0009
Mid point	4959	41.0	401.0	400.2	0.8	402.9	401.5	1.4	0.9952	0.9967
Low point	4980	20.5	200.5	200.1	0.4	203.5	201.9	1.6	0.9851	0.9909
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
As left span	4918	82.0	802.0	387.9	414.1	797.1	387.9	409.3	1.0061	1.0000
							Average Correction Factor		0.9943	0.9961

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	384.4	415.4	415.3	1.0003	100.0%
Mid GPT point	798.2	596.2	203.6	204.0	0.9982	100.2%
Low GPT point	798.2	697.8	102.0	102.1	0.9994	100.1%
				Average Correction Factor	0.9993	100.1%

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

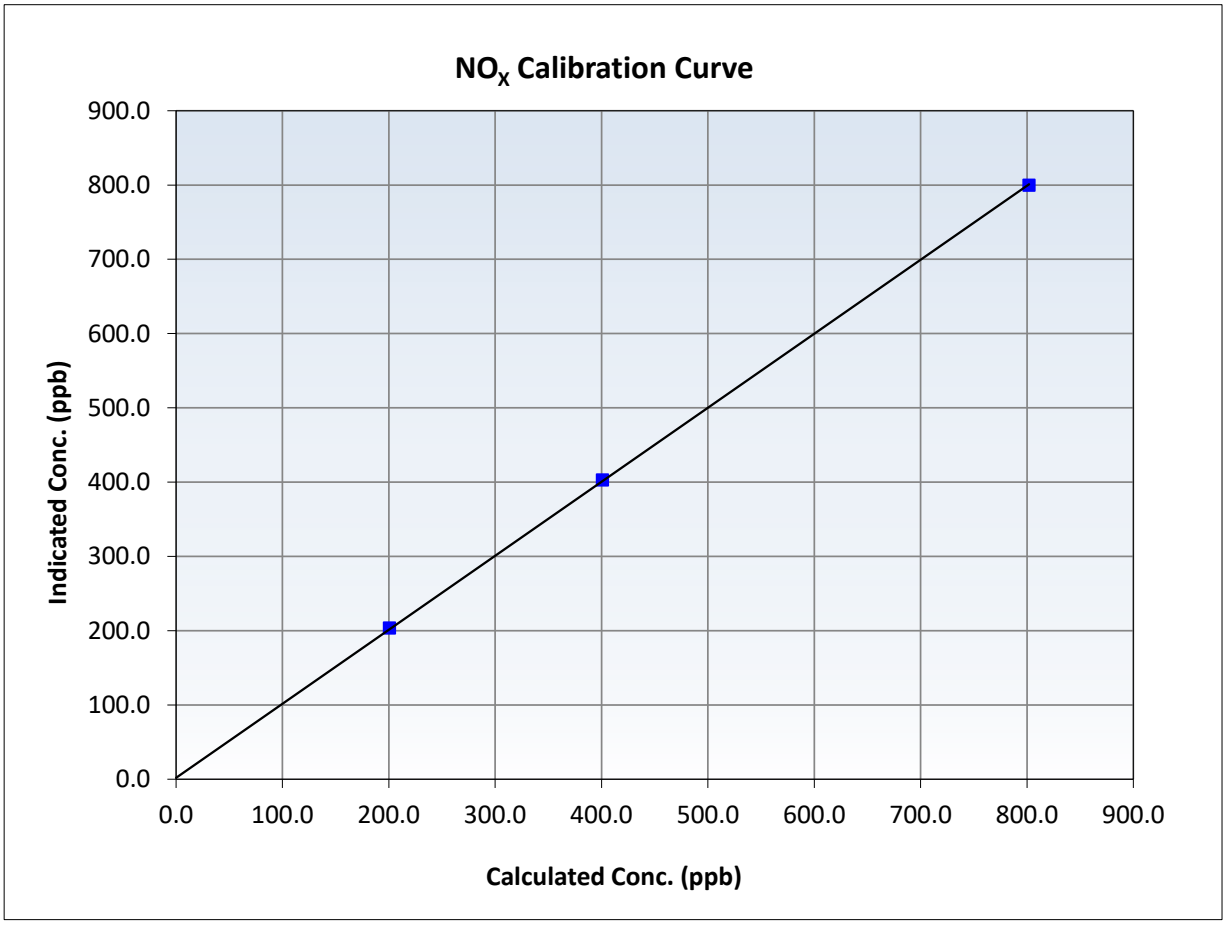
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 26, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:29	End Time (MST):	14:43
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	799.8	1.0027
401.0	402.9	0.9952
200.5	203.5	0.9851

Statistical Evaluation		Limits
Correlation Coefficient	0.999967	≥0.995
Slope	0.996407	0.90 - 1.10
Intercept	1.908027	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

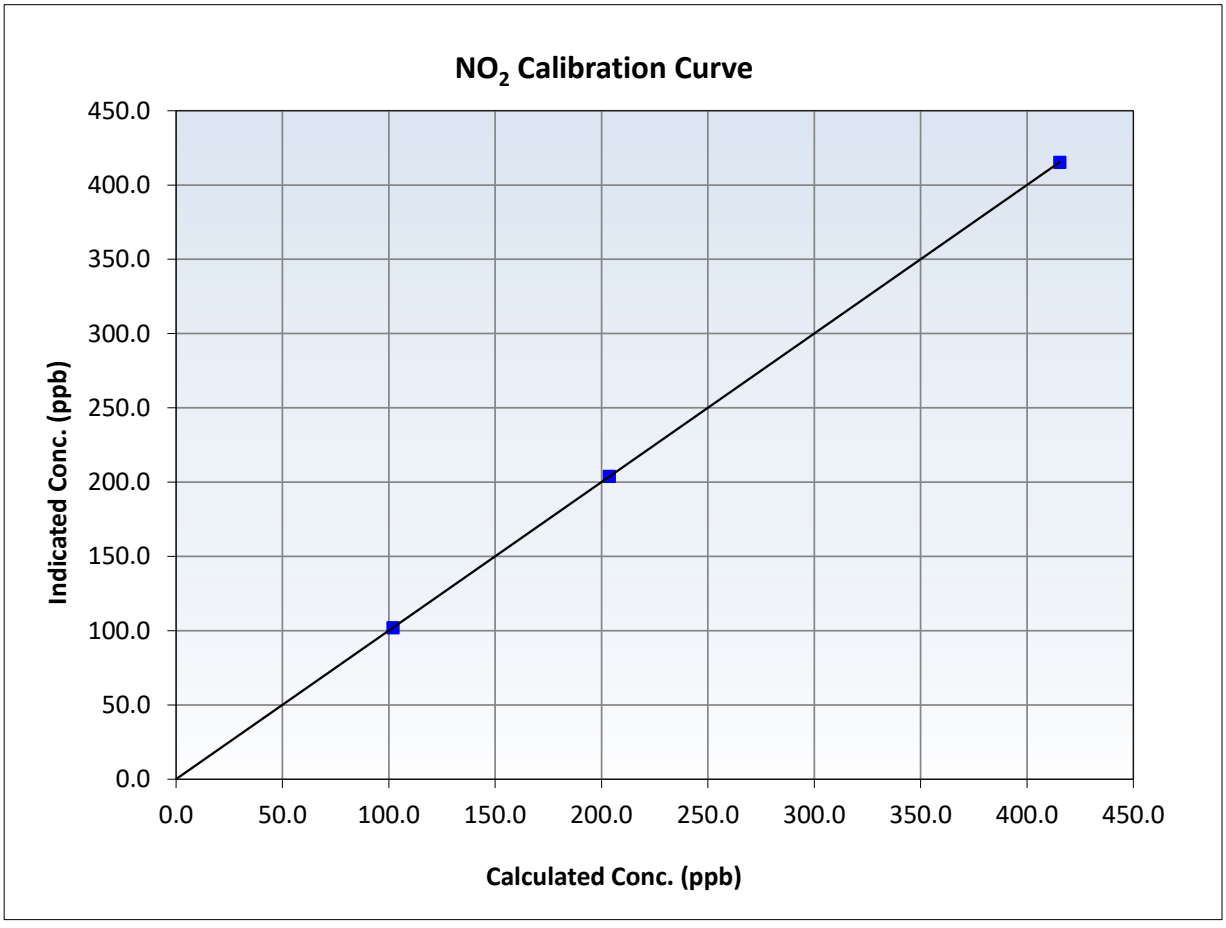
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 26, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:29	End Time (MST):	14:43
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	----
415.4	415.3	1.0003
203.6	204.0	0.9982
102.0	102.1	0.9994

Statistical Evaluation		Limits
Correlation Coefficient	0.999998	≥0.995
Slope	0.999882	0.90 - 1.10
Intercept	0.066334	+/-20



Wood Buffalo Environmental Association

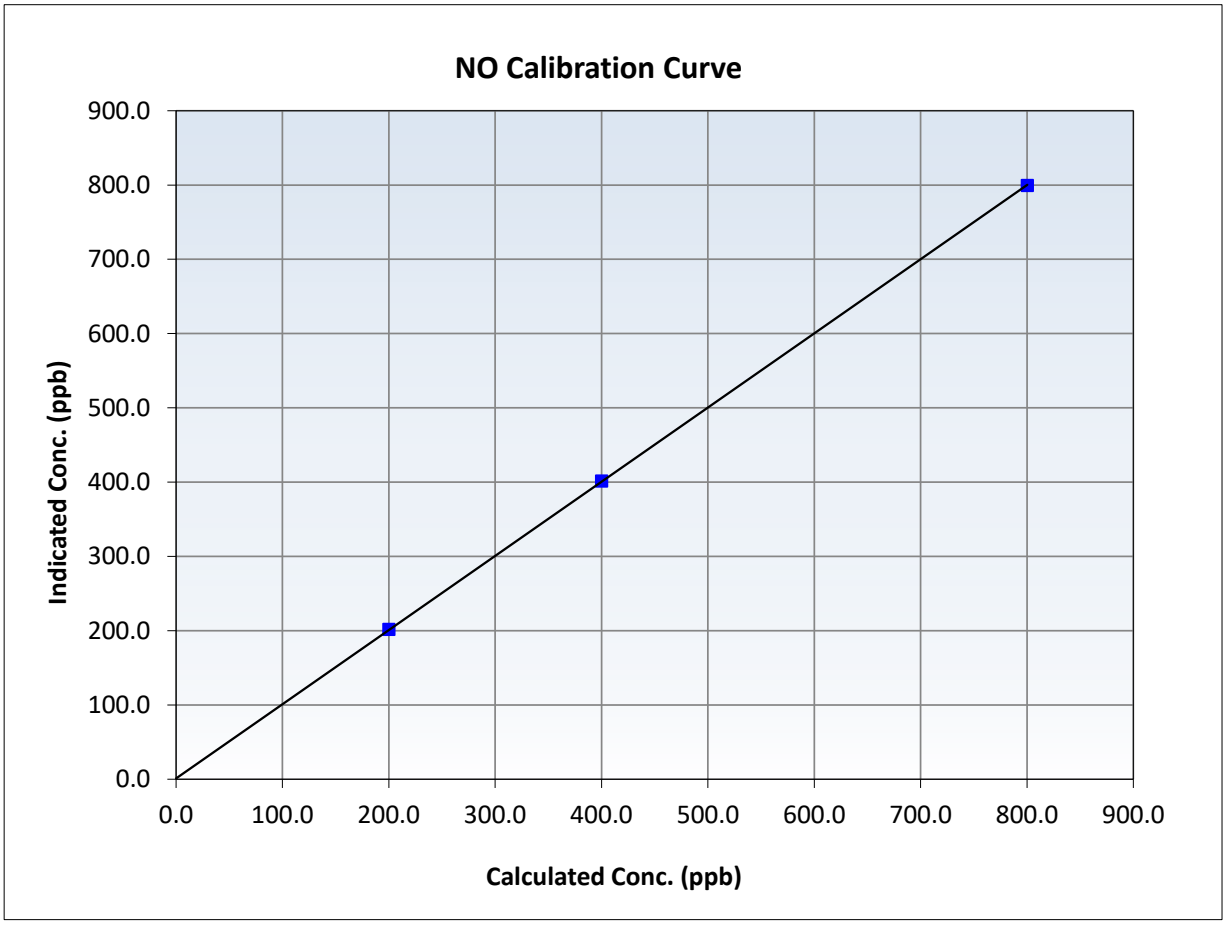
NO Calibration Summary

Station Information

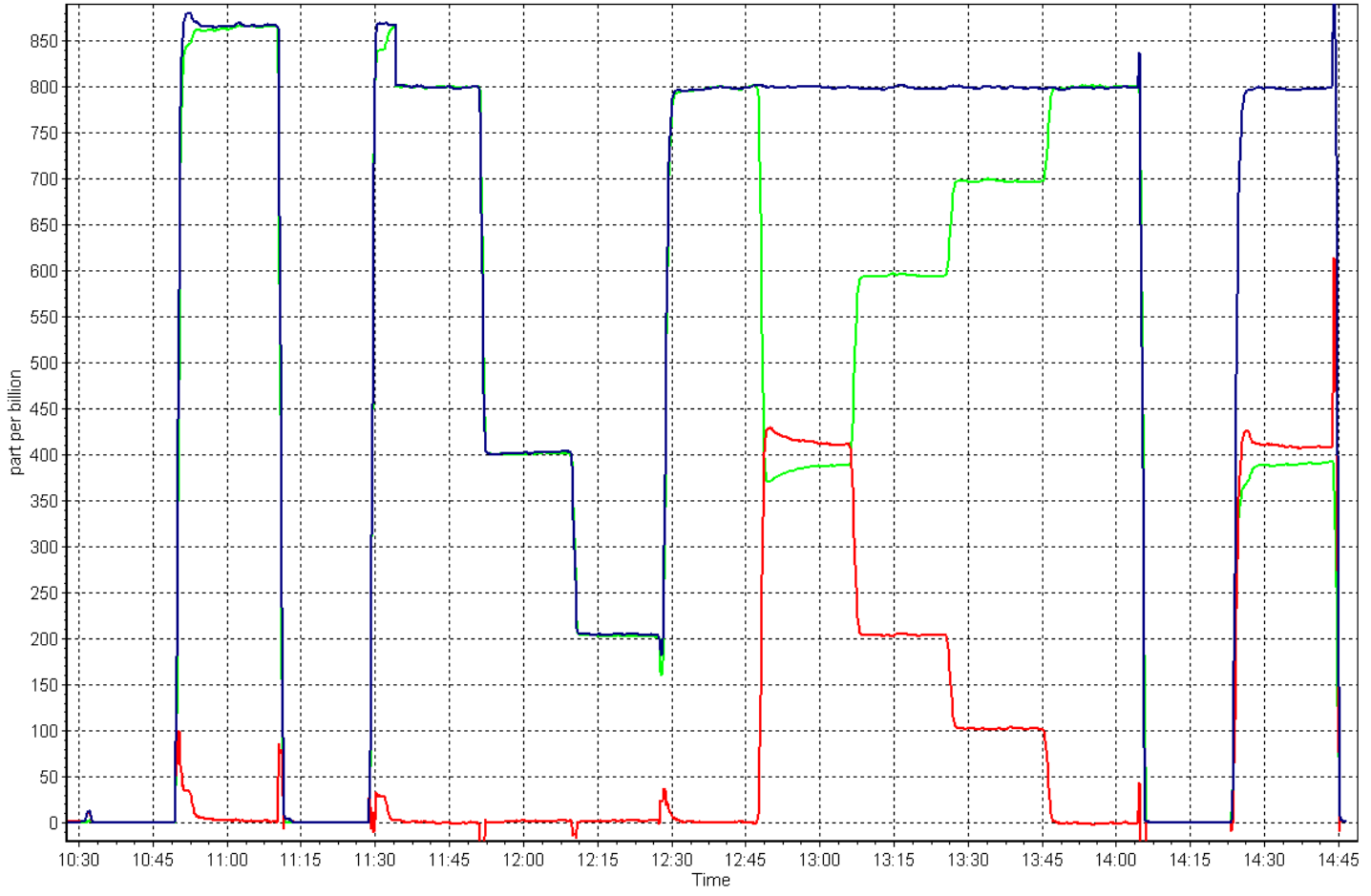
Calibration Date:	April 12, 2024	Previous Calibration:	March 26, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:29	End Time (MST):	14:43
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999990	≥0.995
800.3	799.6	1.0009	Slope	0.998578	0.90 - 1.10
400.2	401.5	0.9967			
200.1	201.9	0.9909	Intercept	1.088012	+/-20



NO_X Calibration Plot Date: April 12, 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:	April 16, 2024
Last Cal Date:	April 12, 2024
Start time (MST):	8:55
End time (MST):	11:00
Reason:	As Found

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	-0.5	-0.5	0.0	----	----
AF High point	4918	82.0	802.0	800.3	1.6	712.5	709.0	3.4	1.1248	1.1280
AF Mid point	4959	41.0	401.0	400.2	0.8	354.5	352.1	2.5	1.1295	1.1349
AF Low point	4980	20.5	200.5	200.1	0.4	181.3	179.1	2.2	1.1027	1.1139
New cyl resp										

Previous Response	NO_X = 801.0 ppb	NO = 800.3 ppb
Baseline Corr 1st pt	NO_X = 713.0 ppb	NO = 709.5 ppb
Baseline Corr 2nd pt	NO_X = 355.0 ppb	NO = 352.6 ppb
Baseline Corr 3rd pt	NO_X = 181.8 ppb	NO = 179.6 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -12.3%

*Percent Change NO = -12.8%

As Found Statistics

As found	NO_X r^2: 0.999954	Nx Sl: 0.887333	Nx Int: 0.627
As found	NO r^2: 0.999967	NO Sl: 0.885252	NO Int: -0.033
As found	NO_2 r^2: 1.000000	NO2 Sl: 1.002046	NO_2 Int: 0.000

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	704.4	334.5	371.5	372.3	0.9980	100.2%
As found mid GPT point	704.4					
As found low GPT point	704.4					

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:	0.929	NA	NO bkgnd or offset:	9.3	NA
NOX coeff or slope:	0.993	NA	NOX bkgnd or offset:	9.4	NA
NO2 coeff or slope:	1.000	NA	Reaction cell Press:	146.2	NA

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.996407	NA
NO_X Cal Offset:	1.908027	NA
NO Cal Slope:	0.998578	NA
NO Cal Offset:	1.088012	NA
NO_2 Cal Slope:	0.999882	NA
NO_2 Cal Offset:	0.066334	NA

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		

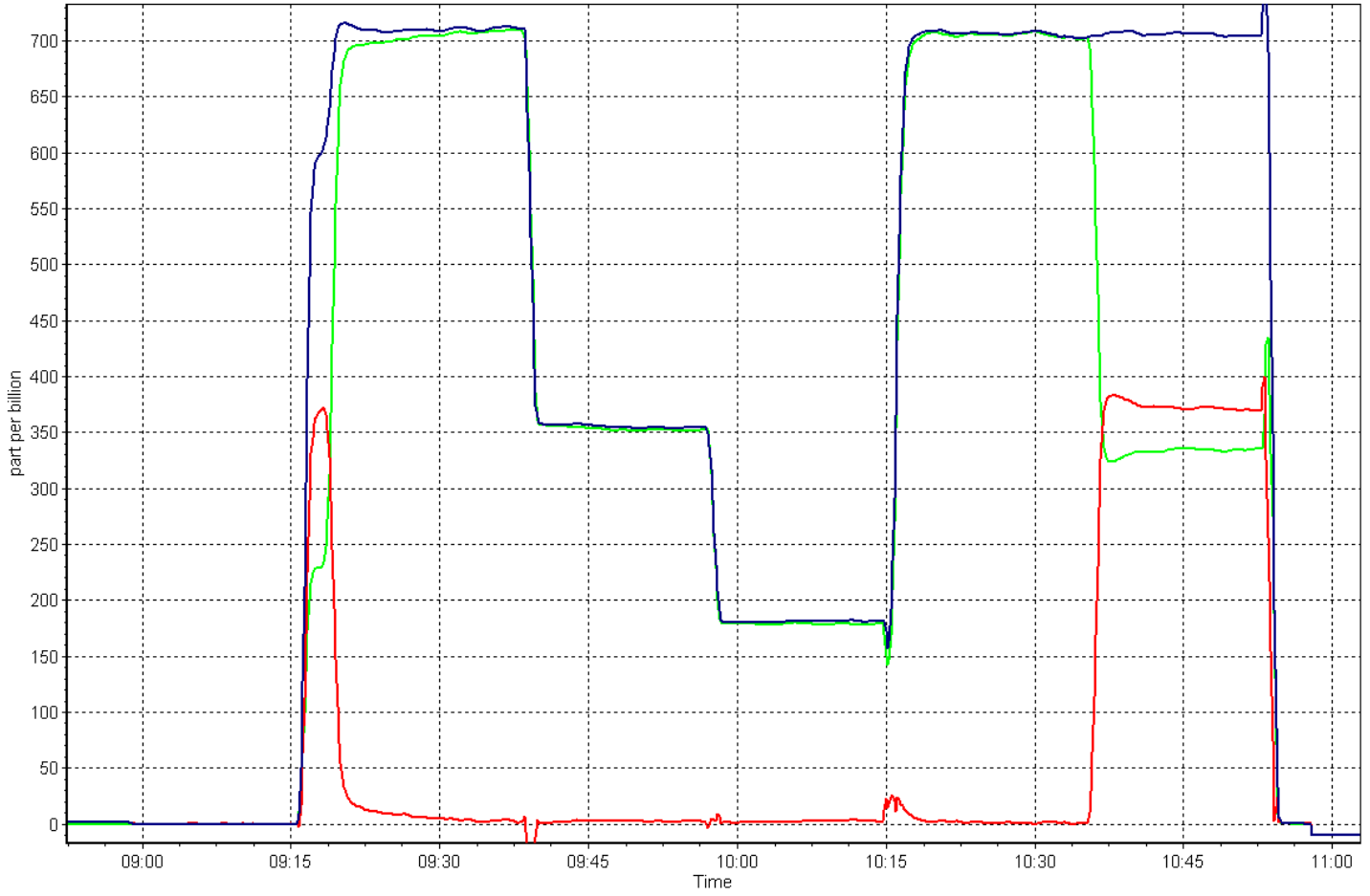
GPT Calibration Data

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: Maintenance is done due to +/- 10% high reading. After multipoint as founds pump and charcoal was replaced. Reaction chamber was cleaned and orings replaced.

Calibration Performed By: Jan Castro

NO_X Calibration Plot Date: April 16, 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:	April 17, 2024
Last Cal Date:	April 12, 2024
Start time (MST):	9:03
End time (MST):	13:09
Reason:	Maintenance

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										
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: 1501663731

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	NA	1.098	NO bkgnd or offset:	NA	12.0
NOX coeff or slope:	NA	0.999	NOX bkgnd or offset:	NA	12.2
NO2 coeff or slope:	NA	1.000	Reaction cell Press:	NA	157.8

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	NA	0.999799
NO_X Cal Offset:	NA	2.168069
NO Cal Slope:	NA	0.998620
NO Cal Offset:	NA	0.948023
NO_2 Cal Slope:	NA	1.011507
NO_2 Cal Offset:	NA	-1.127282

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	0.0	-0.1	----	----
High point	4918	82.0	802.0	800.3	1.6	803.0	800.0	2.9	0.9987	1.0004
Mid point	4959	41.0	401.0	400.2	0.8	403.7	400.1	3.6	0.9933	1.0001
Low point	4980	20.5	200.5	200.1	0.4	205.2	202.3	2.9	0.9769	0.9889
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
As left span	4918	82.0	802.0	385.7	416.3	804.0	385.7	418.6	0.9975	1.0000
								Average Correction Factor	0.9896	0.9965

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	792.8	380.9	413.5	417.6	0.9903	101.0%
Mid GPT point	792.8	586.4	208.0	209.1	0.9949	100.5%
Low GPT point	792.8	687.0	107.4	106.3	1.0107	98.9%
				Average Correction Factor	0.9986	100.1%

Notes: Maintenance calibration. Sample inlet filters changed before calibrator zero. Adjusted zero and span. Used 2nd NO reference point because of drift.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

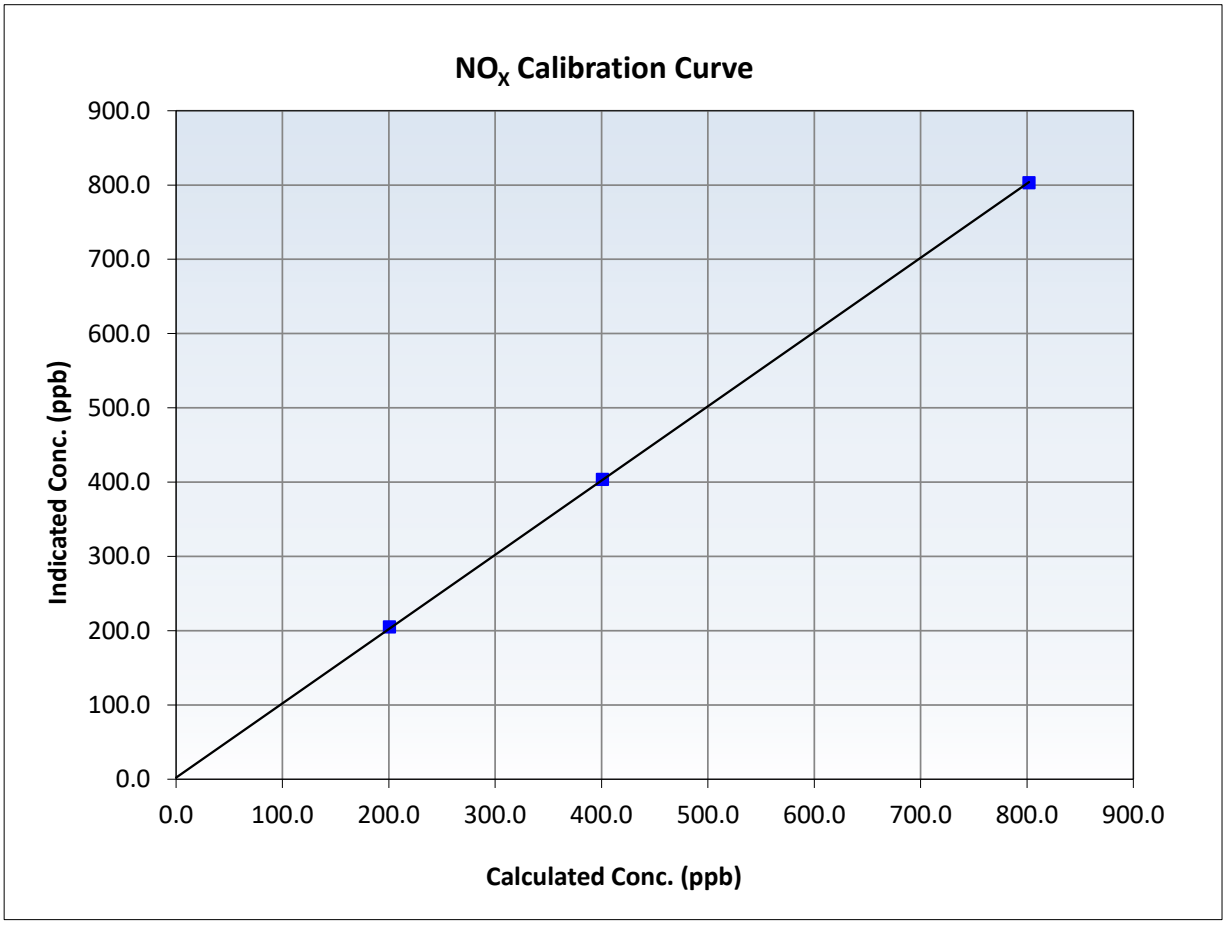
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	April 12, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:03	End Time (MST):	13:09
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	----
802.0	803.0	0.9987
401.0	403.7	0.9933
200.5	205.2	0.9769

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999962	*≥0.995*
Slope	0.999799	*0.90 - 1.10*
Intercept	2.168069	*+/-20*



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NO_2 Calibration Summary

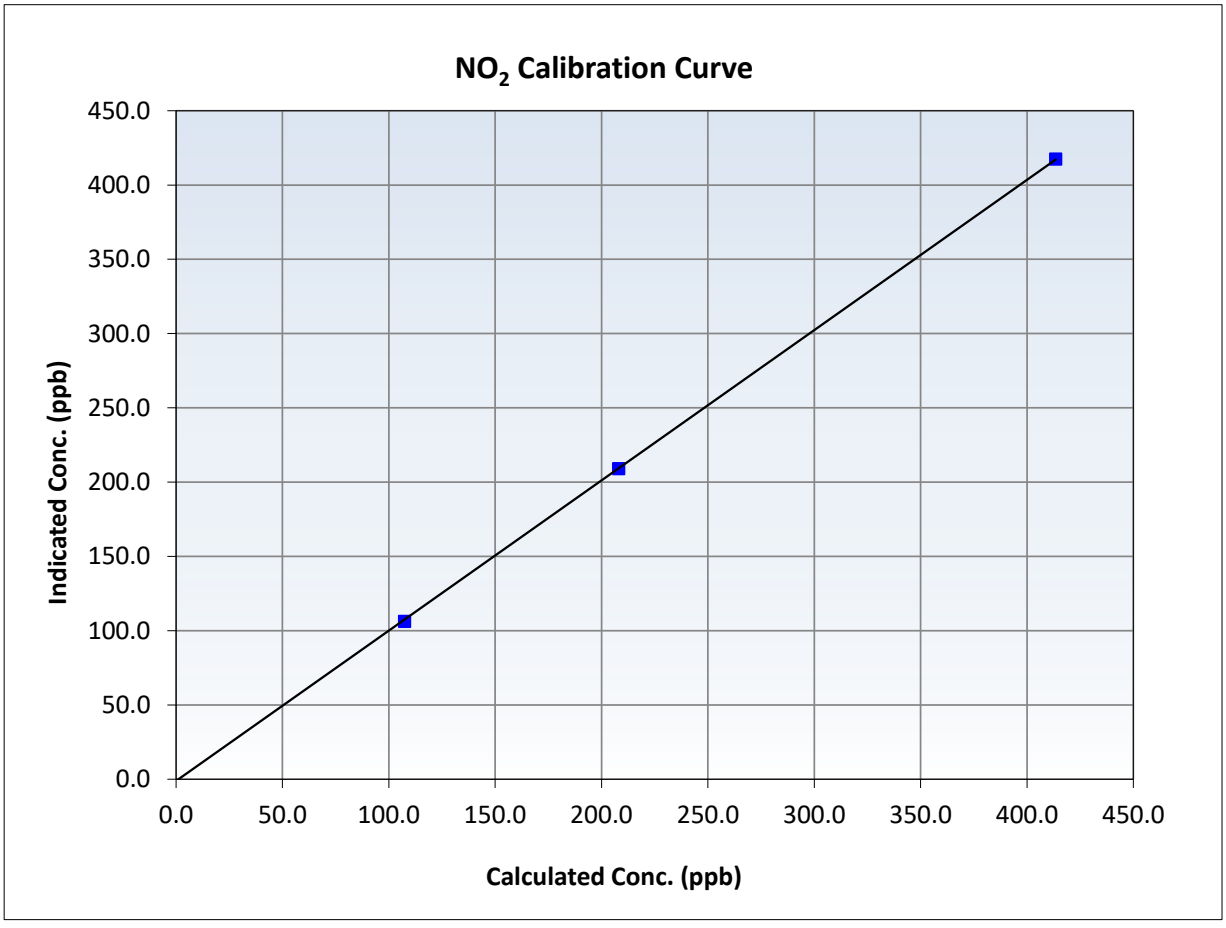
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	April 12, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:03	End Time (MST):	13:09
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	----
413.5	417.6	0.9903
208.0	209.1	0.9949
107.4	106.3	1.0107

Statistical Evaluation		Limits
Correlation Coefficient	0.999970	≥0.995
Slope	1.011507	0.90 - 1.10
Intercept	-1.127282	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

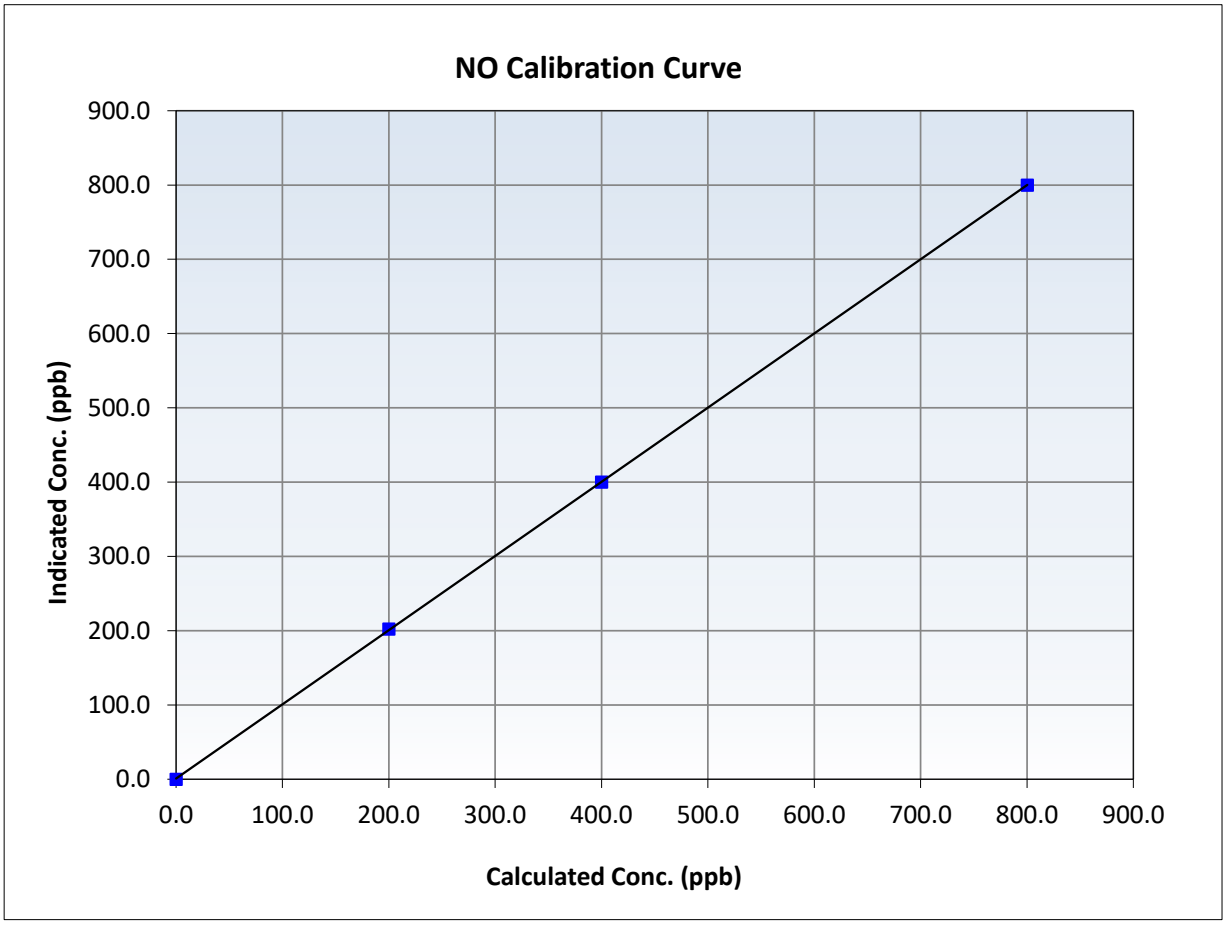
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	April 12, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:03	End Time (MST):	13:09
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

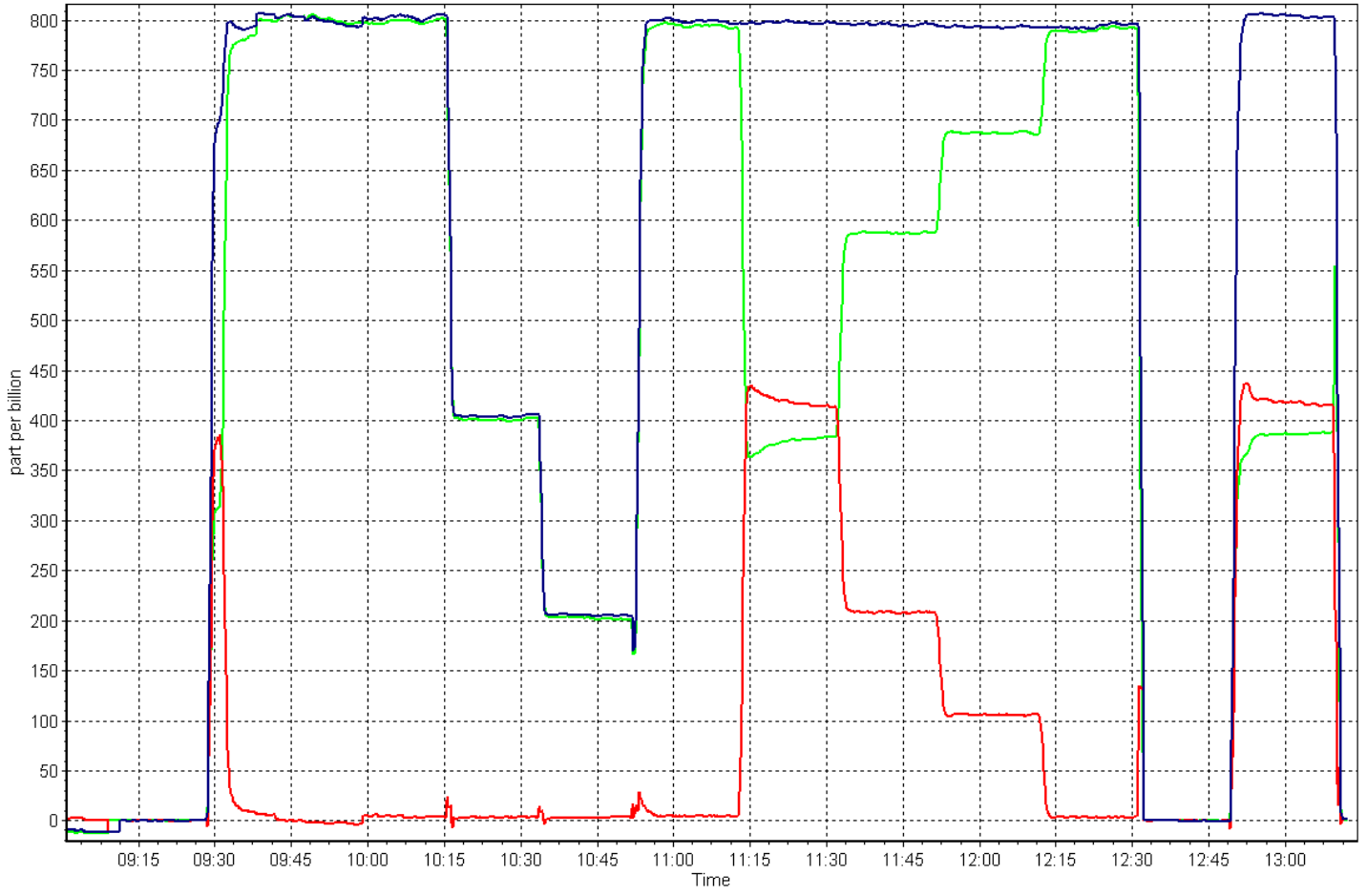
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.3	800.0	1.0004
400.2	400.1	1.0001
200.1	202.3	0.9889

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	0.998620	*0.90 - 1.10*
Intercept	0.948023	*+/-20*



NO_X Calibration Plot Date: April 17, 2024 Location: Conklin



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	April 8, 2024	Last Cal Date:	March 15, 2024
Start time (MST):	10:23	End time (MST):	13:39
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:	0.999171	0.999943	Backgd or Offset:	-1.1	-1.1
Calibration intercept:	0.320000	0.060000	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	0.0	----
As found High point	5000	952.3	400.0	399.9	1.000
As found Mid point					
As found Low point					
Baseline Corr As found:	399.9	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	0.0	----
High point	5000	950.7	400.0	400.0	1.000
Mid point	5000	806.9	200.0	200.1	1.000
Low point	5000	704.5	100.0	100.1	0.999
As left zero	5000	800.0	0.0	0.0	----
As left span	5000	951.8	400.0	401.1	0.997
				Average Correction Factor	1.000

Notes: Changed sample inlet filters after as founds. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

O_3 Calibration Summary

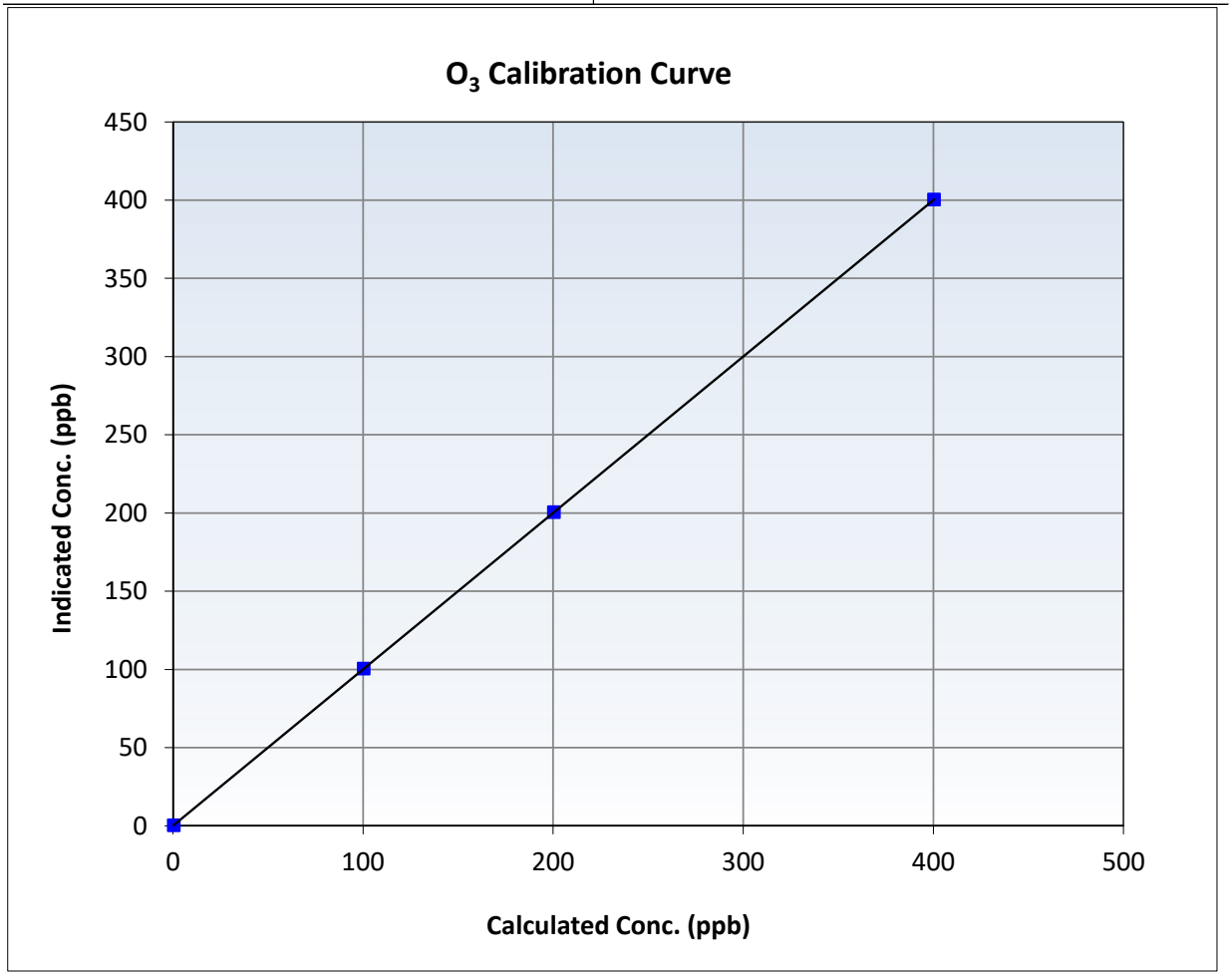
Station Information

Calibration Date:	April 8, 2024	Previous Calibration:	March 15, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:23	End Time (MST):	13:39
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734

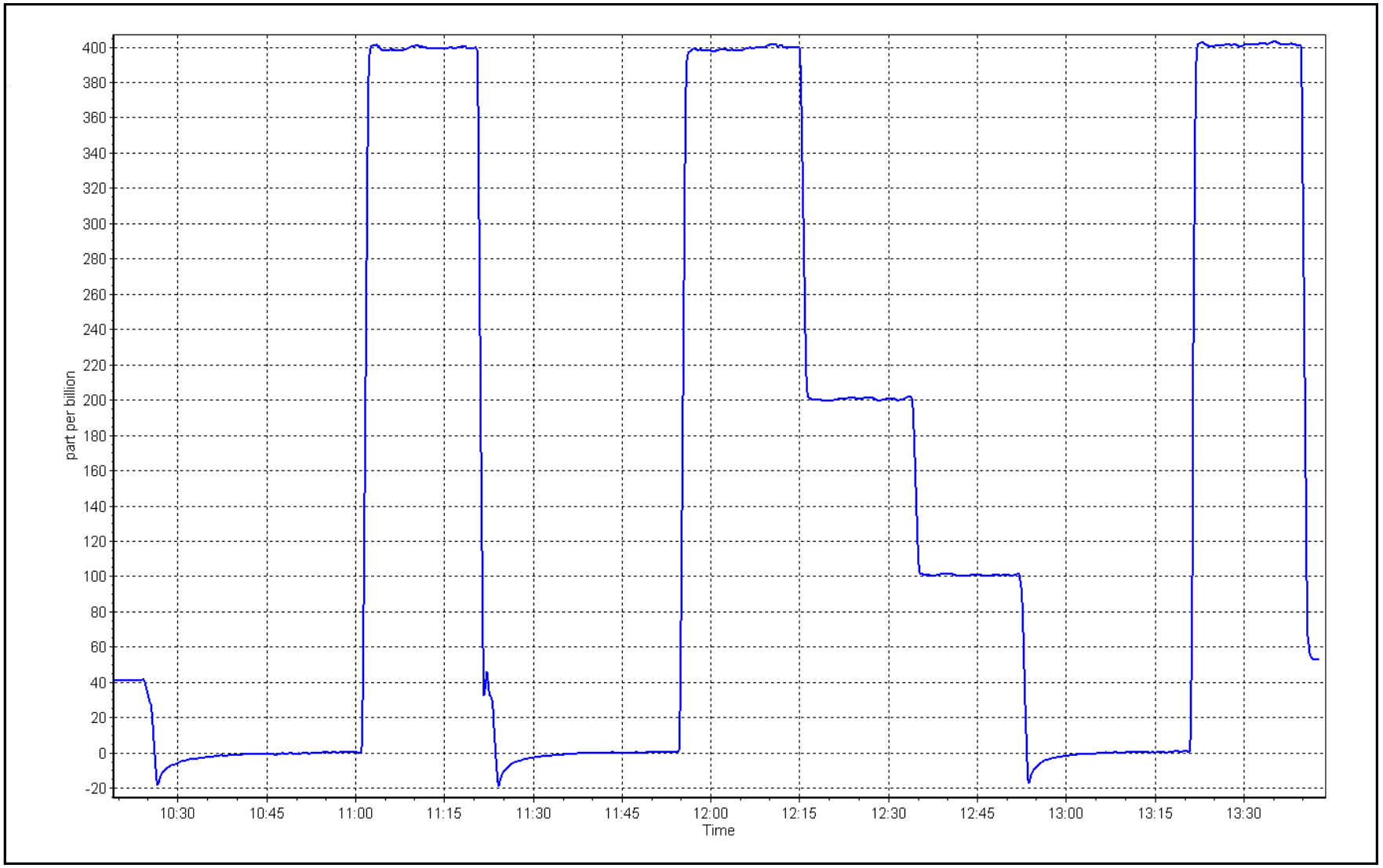
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
400.0	400.0	1.0000
200.0	200.1	0.9995
100.0	100.1	0.9990

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.999943	*0.90 - 1.10*
Intercept	0.060000	*+/- 5*



O_3 Calibration Plot Date: April 8, 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:	April 18, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	11:47	End time (MST):	12:24
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)	-1.00	-1.36	-1.00	☐	+/- 2 °C
P (mmHg)	721.90	723.58	721.90	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.05	5.00	☐	+/- 0.25 LPM
PW% (pump)	40.00	-----	40.00	☐	>80%
Zero Verification	PM w/o HEPA:	2.80	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	9.10	11.00	11.00	☐	+/- 0.5

Date Optical Chamber Cleaned: April 18, 2024

Date Disposable Filter Changed: April 18, 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.Leak check passed. No adjustment made.

Calibration by: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS22
JANVIER
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	April 12, 2024	Last Cal Date:	March 11, 2024
Start time (MST):	11:19	End time (MST):	14:40
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:	0.999806	1.002236	Backgd or Offset:	23.6	24.1
Calibration intercept:	0.664437	-0.036002	Coeff or Slope:	1.022	1.013

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	4920	79.8	799.8	805.6	0.993
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	805.3	Previous response	800.3	*% change	0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	4920	79.8	799.8	801.5	0.998
Mid point	4960	39.9	399.9	400.9	0.997
Low point	4980	20.0	200.4	200.7	0.999
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.8	799.7	1.000
				Average Correction Factor:	0.998

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

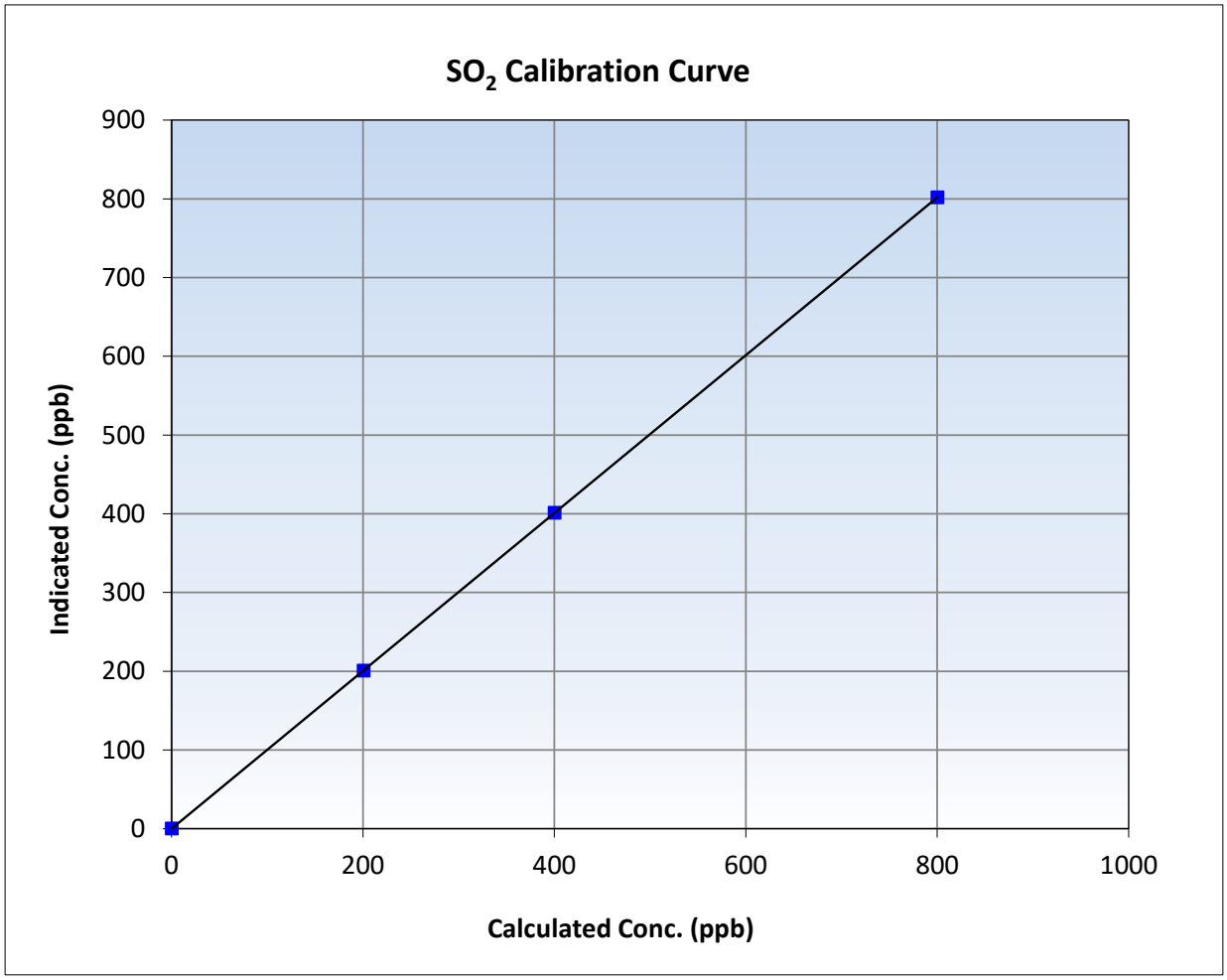
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 11, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:19	End Time (MST):	14:40
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

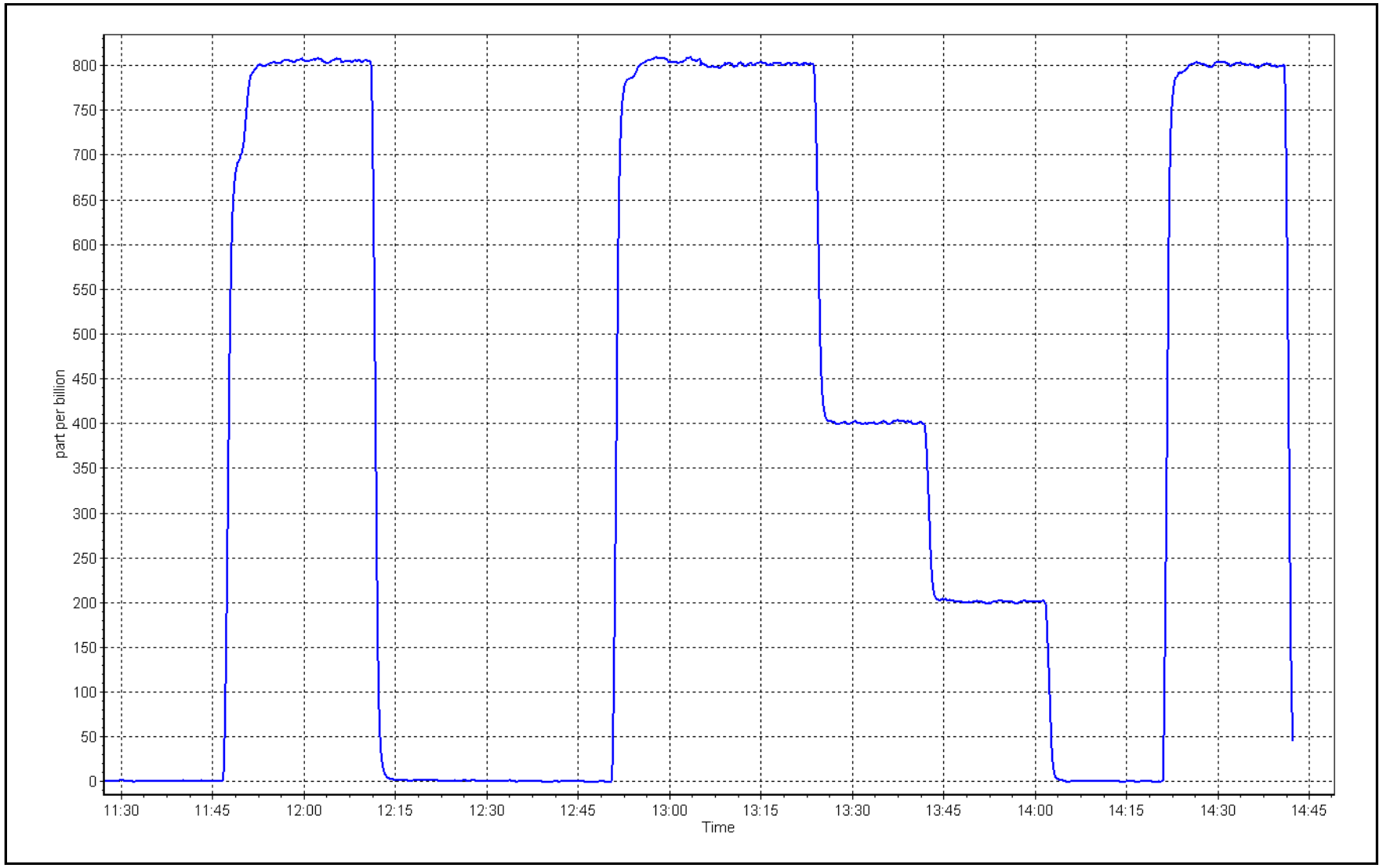
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.8	801.5	0.9979
399.9	400.9	0.9975
200.4	200.7	0.9987

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.002236	*0.90 - 1.10*
Intercept	-0.036002	*+/-30*



SO2 Calibration Plot Date: April 12, 2024 Location: Janvier



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	April 18, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	11:09	End time (MST):	15:32
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:	0.989096	0.995809	Backgd or Offset:	3.65	3.57
Calibration intercept:	0.440430	0.280545	Coeff or Slope:	1.188	1.188

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	4920	79.7	80.0	79.7	1.004
As found Mid point	4960	39.8	40.0	40.4	0.989
As found Low point	4980	19.9	20.0	20.2	0.989
New cylinder response					

Baseline Corr As found:	79.7	Prev response:	79.59	*% change:	0.1%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	0.995519	AF Intercept:	0.240679
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999929	* = > +/-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	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	0.3	----
As left span	4920	79.7	80.0	79.5	1.007
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. No adjustments made.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

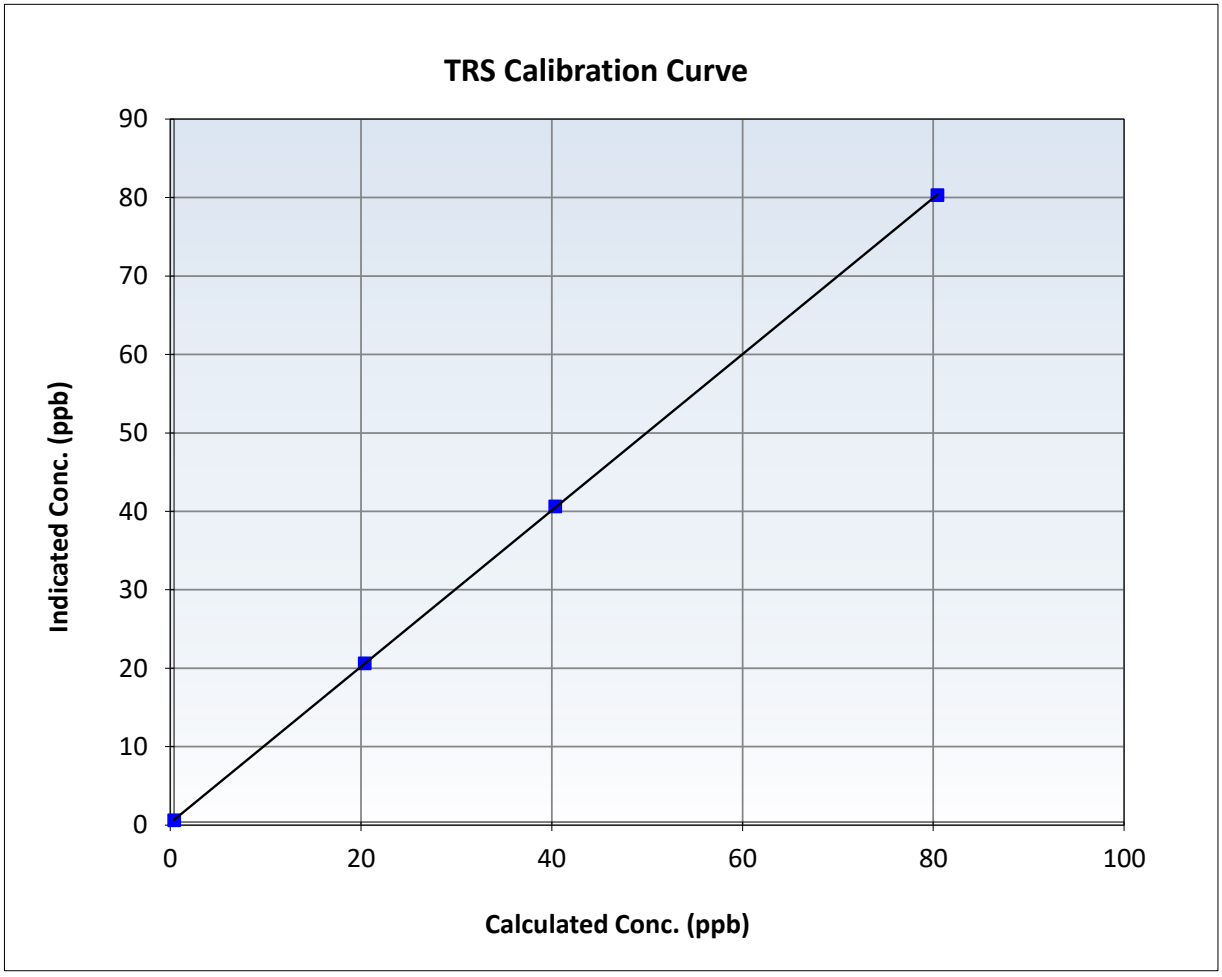
TRS Calibration Summary

Station Information

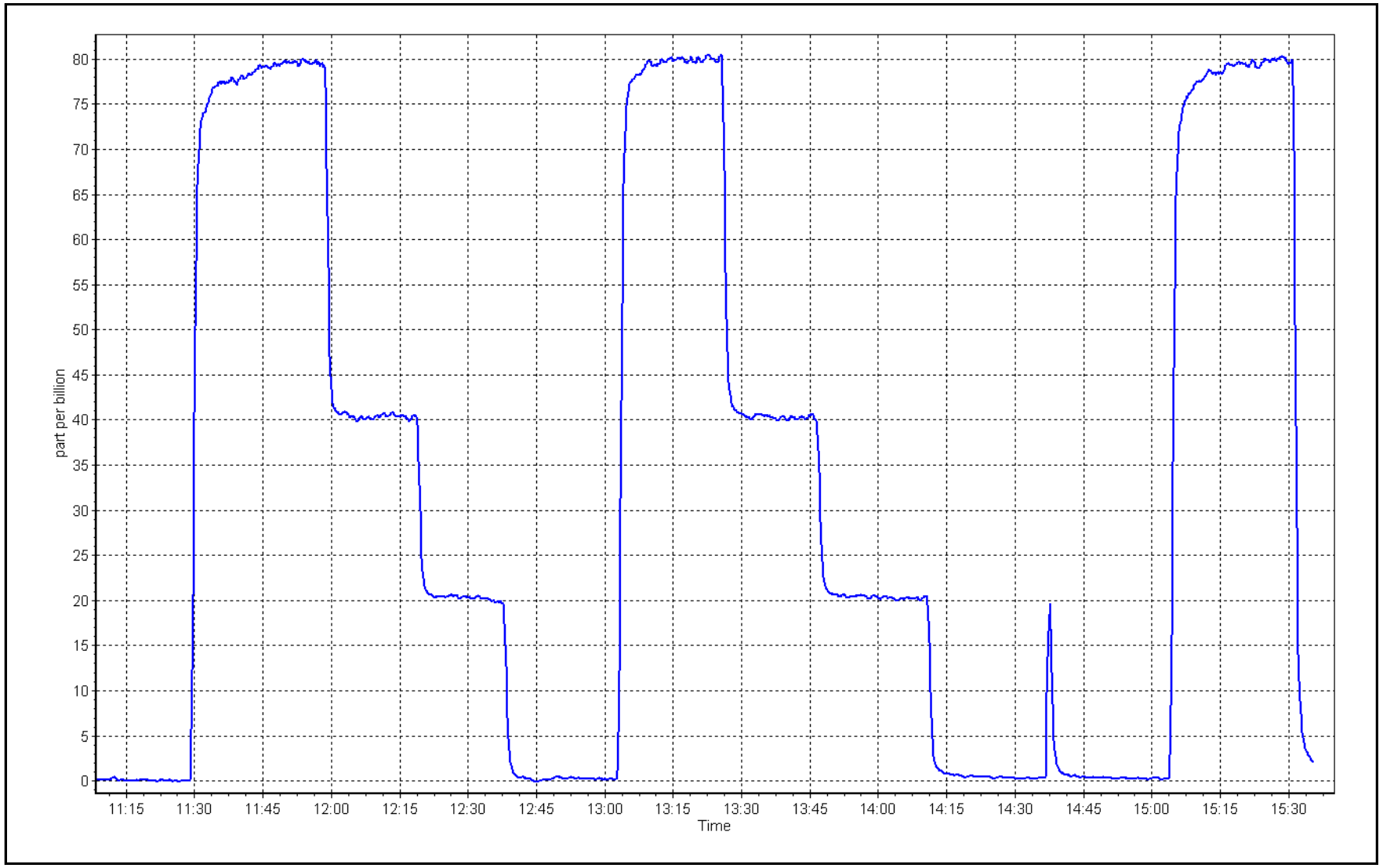
Calibration Date:	April 18, 2024	Previous Calibration:	March 26, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:09	End Time (MST):	15:32
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999992	*≥0.995*
80.0	79.9	1.0015	Slope	0.995809	*0.90 - 1.10*
40.0	40.2	0.9940			
20.0	20.2	0.9891	Intercept	0.280545	*+/-3*



TRS Calibration Plot Date: April 18, 2024 Location: Janvier



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	April 12, 2024	Last Cal Date:	March 25, 2024
Start time (MST):	11:19	End time (MST):	14:40
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:	2.360E-04	2.49E-04	NMHC SP Ratio:	5.52E-05	5.65E-05
CH4 Retention time:	11.6	11.8	NMHC Peak Area:	165650	162086
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	17.10	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.10	Prev response	17.15	*% change	-0.3%
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	79.8	17.17	17.17	1.000
Mid point	4960	39.9	8.59	8.56	1.003
Low point	4980	20.0	4.30	4.29	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	17.17	17.14	1.002
				Average Correction Factor	1.002

Notes: Changed the inlet filter and H2 cylinder 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	9.25	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.25	Prev response	9.14	*% change	1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.15	9.16	0.999
Mid point	4960	39.9	4.57	4.58	0.999
Low point	4980	20.0	2.29	2.30	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.15	9.11	1.004
				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	8.03	7.84	1.023
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.84	Prev response	8.01	*% 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	8.03	8.01	1.002
Mid point	4960	39.9	4.01	3.98	1.008
Low point	4980	20.0	2.01	2.00	1.007
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	8.03	8.03	0.999
				Average Correction Factor	1.006

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.000249	0.999704
THC Cal Offset:	-0.023996	-0.008399
CH4 Cal Slope:	1.001651	0.998349
CH4 Cal Offset:	-0.024958	-0.009359
NMHC Cal Slope:	0.999256	1.001105
NMHC Cal Offset:	0.000762	0.001359

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

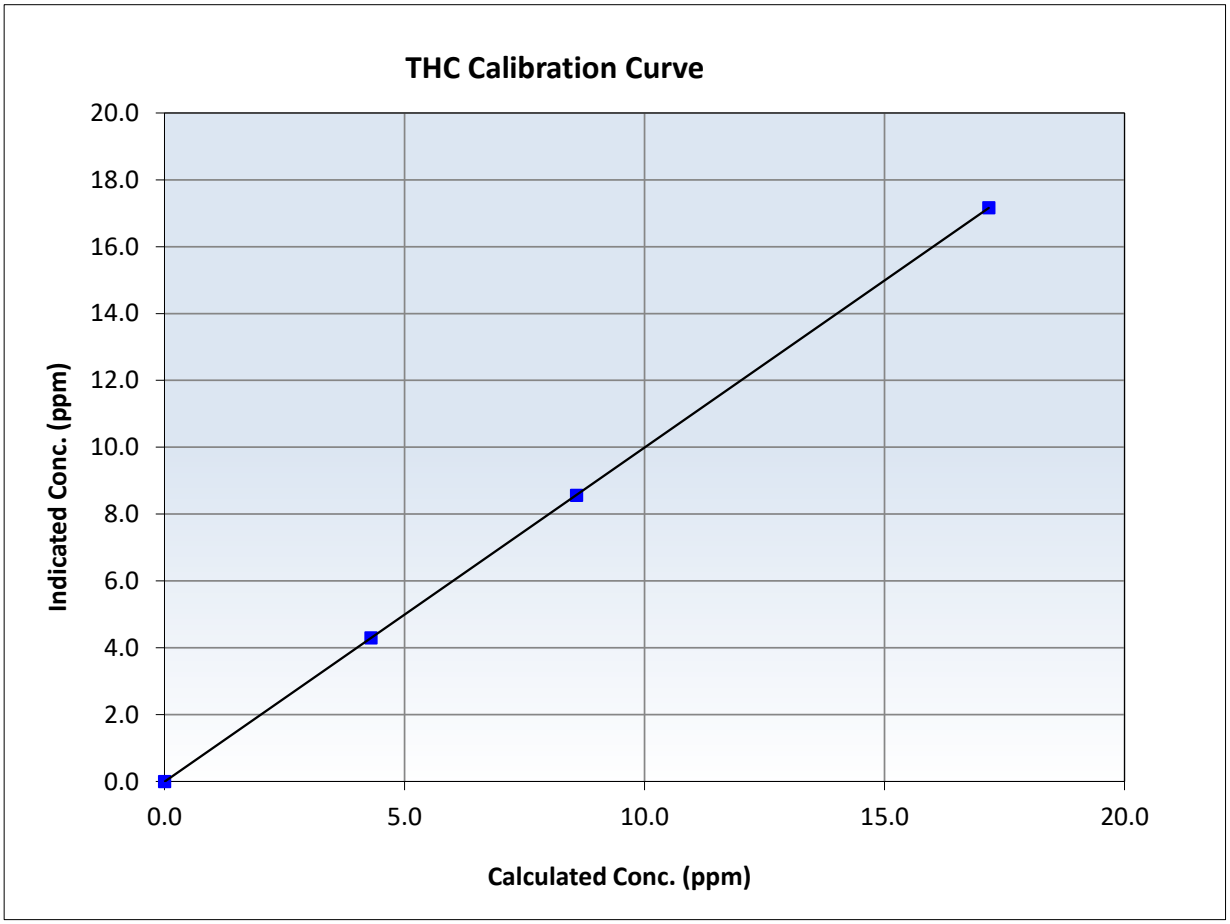
THC Calibration Summary

Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 25, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:19	End Time (MST):	14:40
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	0.999997	≥0.995
17.17	17.17	1.0003	Slope	0.999704	0.90 - 1.10
8.59	8.56	1.0033	Intercept	-0.008399	+/-0.5
4.30	4.29	1.0022			



Wood Buffalo Environmental Association

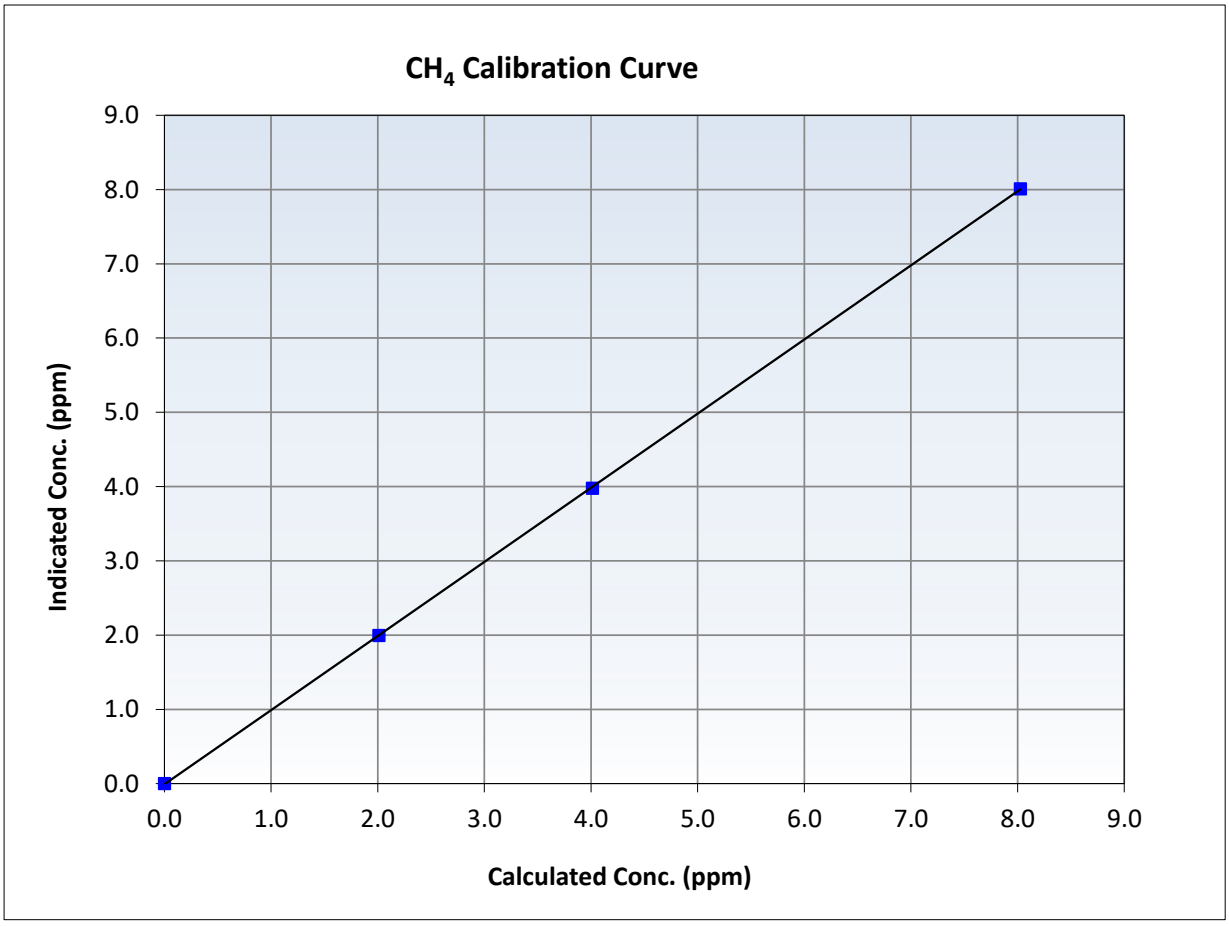
CH_4 Calibration Summary

Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 25, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:19	End Time (MST):	14:40
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*
8.03	8.01	1.0017	Slope	0.998349	*0.90 - 1.10*
4.01	3.98	1.0081			
2.01	2.00	1.0071	Intercept	-0.009359	*+/-0.5*



Wood Buffalo Environmental Association

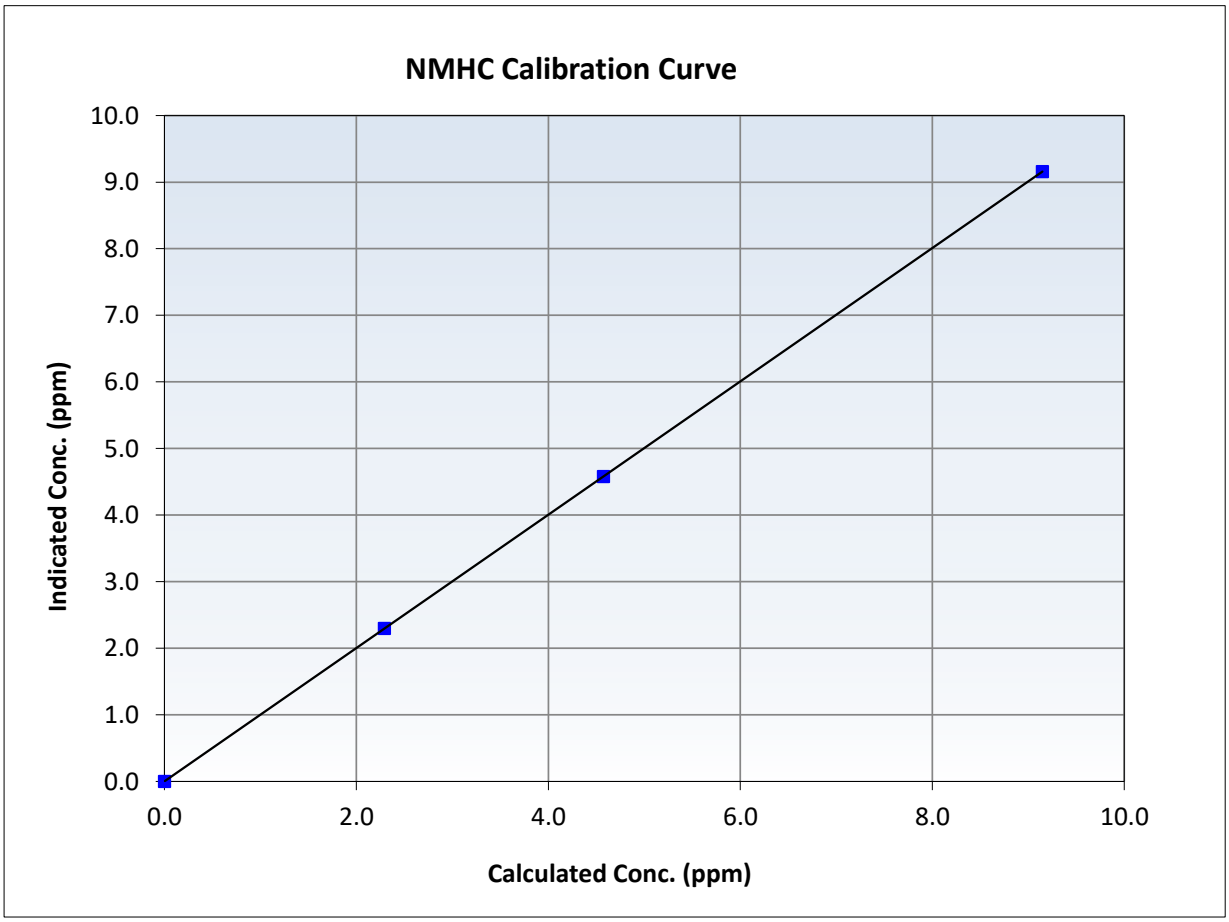
NMHC Calibration Summary

Station Information

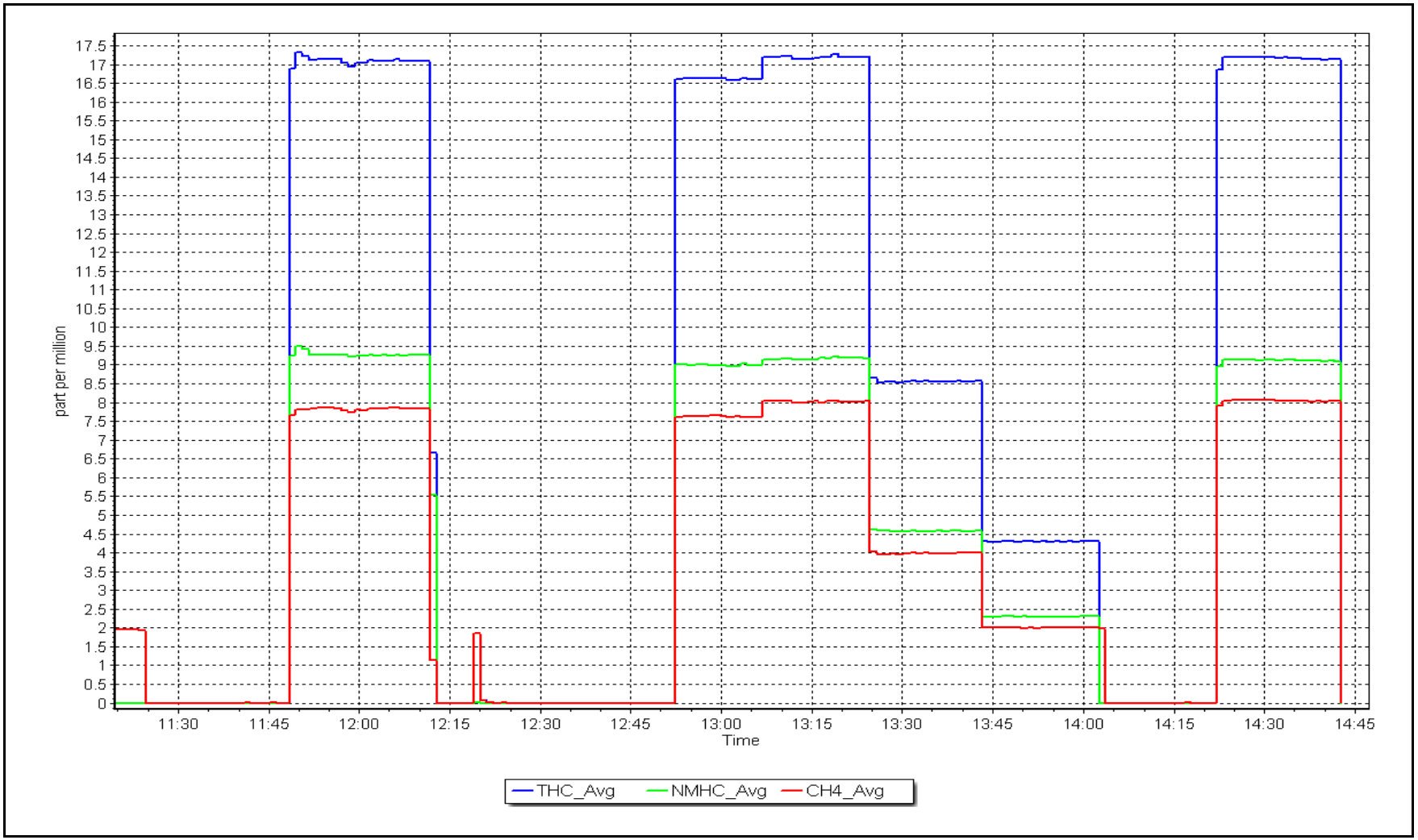
Calibration Date:	April 12, 2024	Previous Calibration:	March 25, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:19	End Time (MST):	14:40
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	1.000000	≥0.995
9.15	9.16	0.9988	Slope	1.001105	0.90 - 1.10
4.57	4.58	0.9986	Intercept	0.001359	+/-0.5
2.29	2.30	0.9976			



NMHC Calibration Plot Date: April 12, 2024 Location: Janvier



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	April 19, 2024	Last Cal Date:	April 12, 2024
Start time (MST):	11:03	End time (MST):	14:47
Reason:	Maintenance		

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:	2.49E-04	2.41E-04	NMHC SP Ratio:	5.65E-05	5.65E-05
CH4 Retention time:	11.8	11.6	NMHC Peak Area:	162086	161932
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	17.42	0.986
As found Mid point	4960	39.9	8.59	8.72	0.985
As found Low point	4980	20.0	4.30	4.37	0.985
New cylinder response					
Baseline Corr AF:	17.42	Prev response	17.16	*% change	1.5%
Baseline Corr 2nd AF:	8.72	AF Slope:	1.014275	AF Intercept:	0.002340
Baseline Corr 3rd AF:	4.37	AF Correlation:	1.000000	* = > +/-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	17.19	0.999
Mid point	4960	39.9	8.59	8.52	1.007
Low point	4980	20.0	4.30	4.24	1.015
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	17.17	17.03	1.008
				Average Correction Factor	1.007

Notes: Changed the actuator 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	9.15	1.000
As found Mid point	4960	39.9	4.57	4.60	0.994
As found Low point	4980	20.0	2.29	2.31	0.992
New cylinder response					
Baseline Corr AF:	9.15	Prev response	9.16	*% change	-0.1%
Baseline Corr 2nd AF:	4.60	AF Slope:	0.999618	AF Intercept:	0.012560
Baseline Corr 3rd AF:	2.31	AF Correlation:	0.999989	* = > +/-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	9.16	0.999
Mid point	4960	39.9	4.57	4.56	1.003
Low point	4980	20.0	2.29	2.27	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.15	9.08	1.007
				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	8.27	0.970
As found Mid point	4960	39.9	4.01	4.12	0.975
As found Low point	4980	20.0	2.01	2.06	0.979
New cylinder response					
Baseline Corr AF:	8.27	Prev response	8.00	*% change	3.2%
Baseline Corr 2nd AF:	4.12	AF Slope:	1.030868	AF Intercept:	-0.010820
Baseline Corr 3rd AF:	2.06	AF Correlation:	0.999991	* = > +/-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	8.04	0.999
Mid point	4960	39.9	4.01	3.97	1.012
Low point	4980	20.0	2.01	1.97	1.021
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	8.03	7.95	1.010
				Average Correction Factor	1.010

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999704	1.002111
THC Cal Offset:	-0.008399	-0.041995
CH4 Cal Slope:	0.998349	1.002620
CH4 Cal Offset:	-0.009359	-0.028359
NMHC Cal Slope:	1.001105	1.001665
NMHC Cal Offset:	0.001359	-0.013635

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

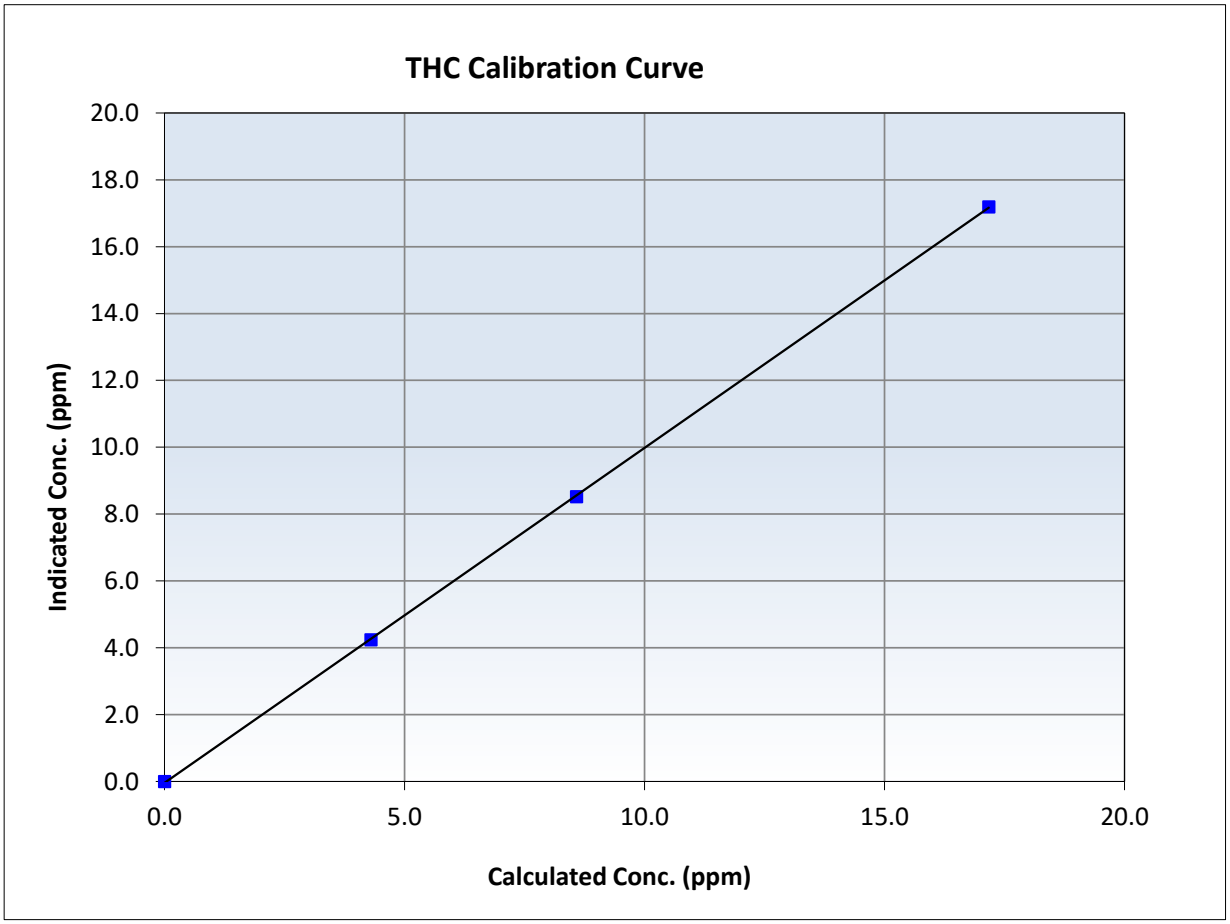
THC Calibration Summary

Station Information

Calibration Date:	April 19, 2024	Previous Calibration:	April 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:03	End Time (MST):	14:47
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	0.999970	≥0.995
17.17	17.19	0.9988	Slope	1.002111	0.90 - 1.10
8.59	8.52	1.0073	Intercept	-0.041995	+/-0.5
4.30	4.24	1.0150			



Wood Buffalo Environmental Association

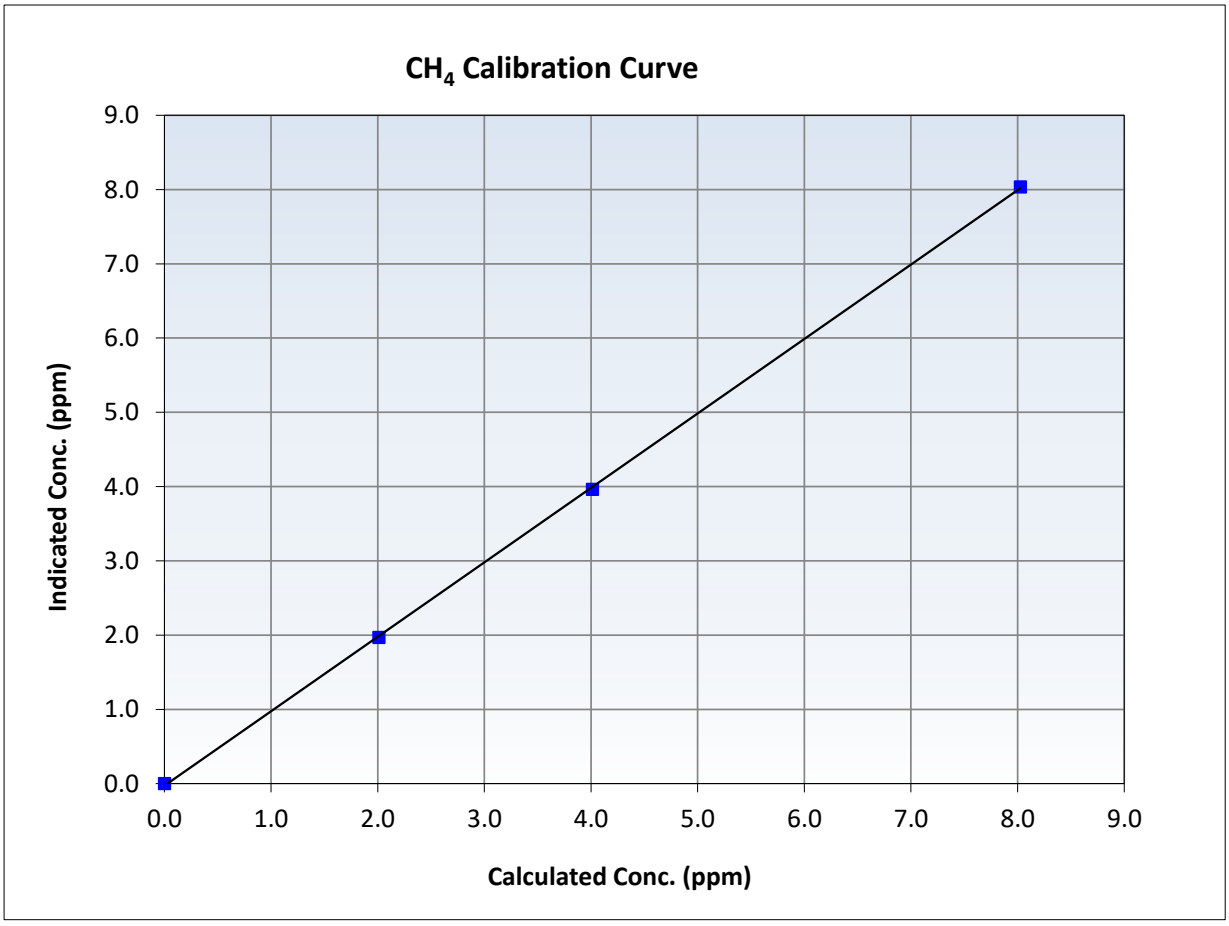
CH_4 Calibration Summary

Station Information

Calibration Date:	April 19, 2024	Previous Calibration:	April 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:03	End Time (MST):	14:47
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	0.999933	*≥0.995*
8.03	8.04	0.9985	Slope	1.002620	*0.90 - 1.10*
4.01	3.97	1.0120			
2.01	1.97	1.0209	Intercept	-0.028359	*+/-0.5*



Wood Buffalo Environmental Association

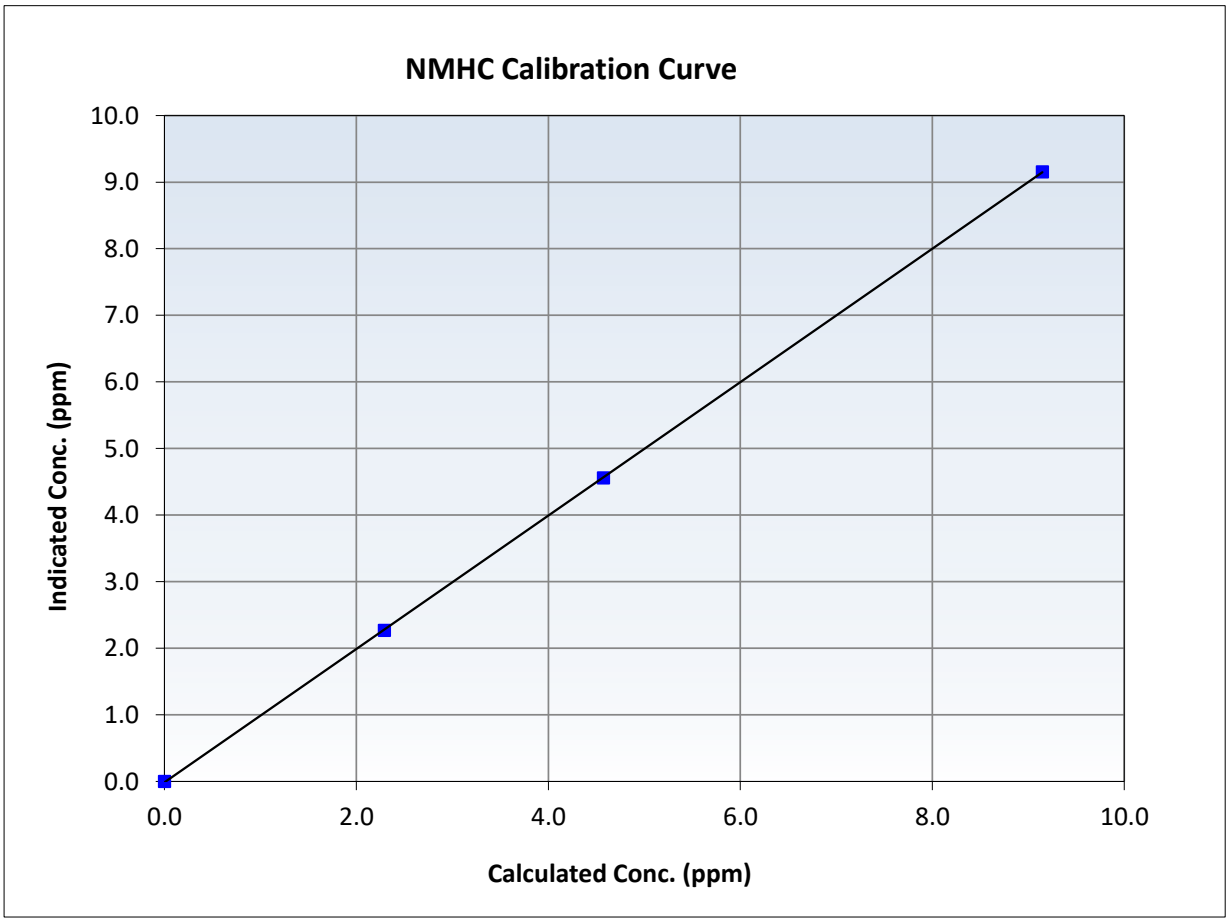
NMHC Calibration Summary

Station Information

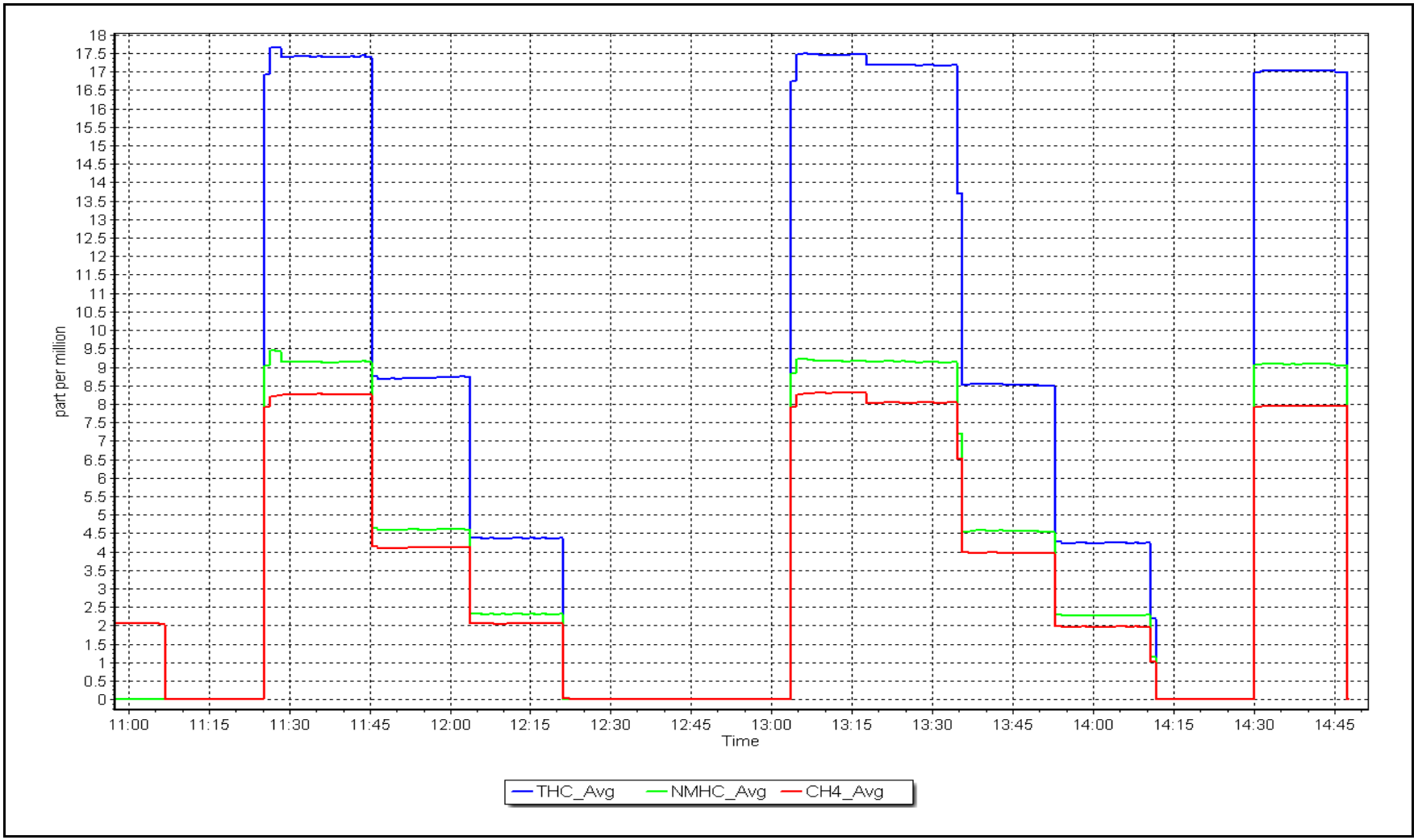
Calibration Date:	April 19, 2024	Previous Calibration:	April 12, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:03	End Time (MST):	14:47
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999990	≥0.995
9.15	9.16	0.9990	Slope	1.001665	0.90 - 1.10
4.57	4.56	1.0032			
2.29	2.27	1.0099	Intercept	-0.013635	+/-0.5



NMHC Calibration Plot Date: April 19, 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:	April 16, 2024
Last Cal Date:	March 27, 2024
Start time (MST):	10:54
End time (MST):	15:52
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	1.0	-0.1	1.0	----	----
AF High point	4918	82.0	802.0	800.3	1.6	807.8	802.6	5.2	0.9940	0.9970
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	805.1 ppb	NO =	804.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 0.2%
Baseline Corr 1st pt	NO_X =	806.8 ppb	NO =	802.7 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: Teledyne API T200 Serial Number: 833

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.853	0.846	NO bkgnd or offset:	0.0	-0.7
NOX coeff or slope:	0.845	0.840	NOX bkgnd or offset:	-0.2	0.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.4	6.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.003829	0.997901
NO_X Cal Offset:	0.024109	0.704052
NO Cal Slope:	1.005929	0.999703
NO Cal Offset:	-0.915862	0.464053
NO_2 Cal Slope:	0.998553	0.997737
NO_2 Cal Offset:	-0.654801	-0.534162

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	4918	82.0	802.0	800.3	1.6	800.6	800.2	0.2	1.0017	1.0001
Mid point	4960	41.0	400.9	400.1	0.8	401.2	401.1	0.1	0.9993	0.9975
Low point	4980	20.5	200.5	200.1	0.4	201.4	200.5	0.9	0.9954	0.9978
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.4	-0.5	----	----
As left span	4918	82.0	802.0	400.1	401.9	795.7	400.1	395.6	1.0079	1.0000
							Average Correction Factor		0.9988	0.9985

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	798.1	400.4	399.3	398.1	1.0031	99.7%
Mid GPT point	798.1	600.6	199.1	198.0	1.0058	99.4%
Low GPT point	798.1	698.7	101.0	99.8	1.0124	98.8%
				Average Correction Factor	1.0071	99.3%

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

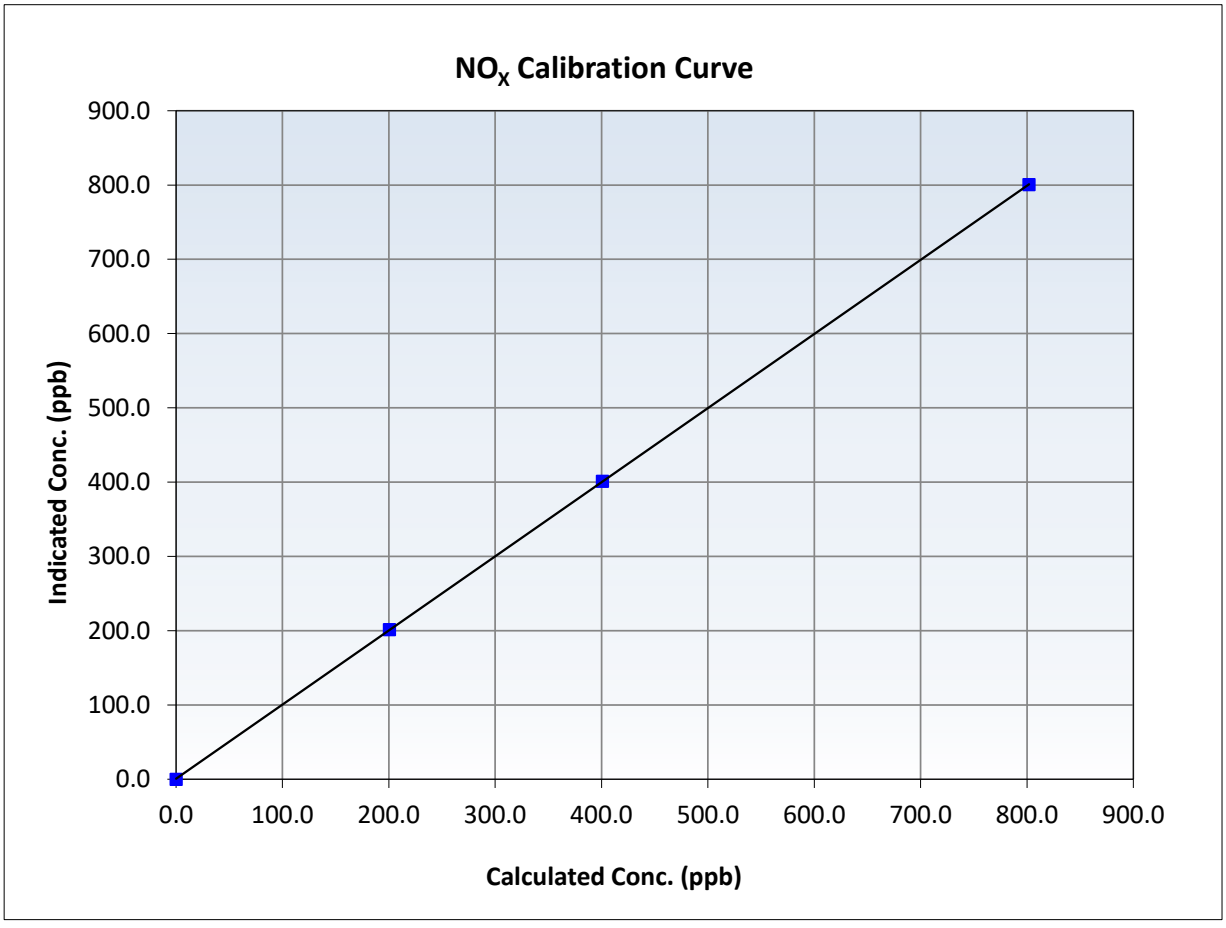
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:54	End Time (MST):	15:52
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
802.0	800.6	1.0017
400.9	401.2	0.9993
200.5	201.4	0.9954

Statistical Evaluation		Limits
Correlation Coefficient	0.999996	≥0.995
Slope	0.997901	0.90 - 1.10
Intercept	0.704052	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

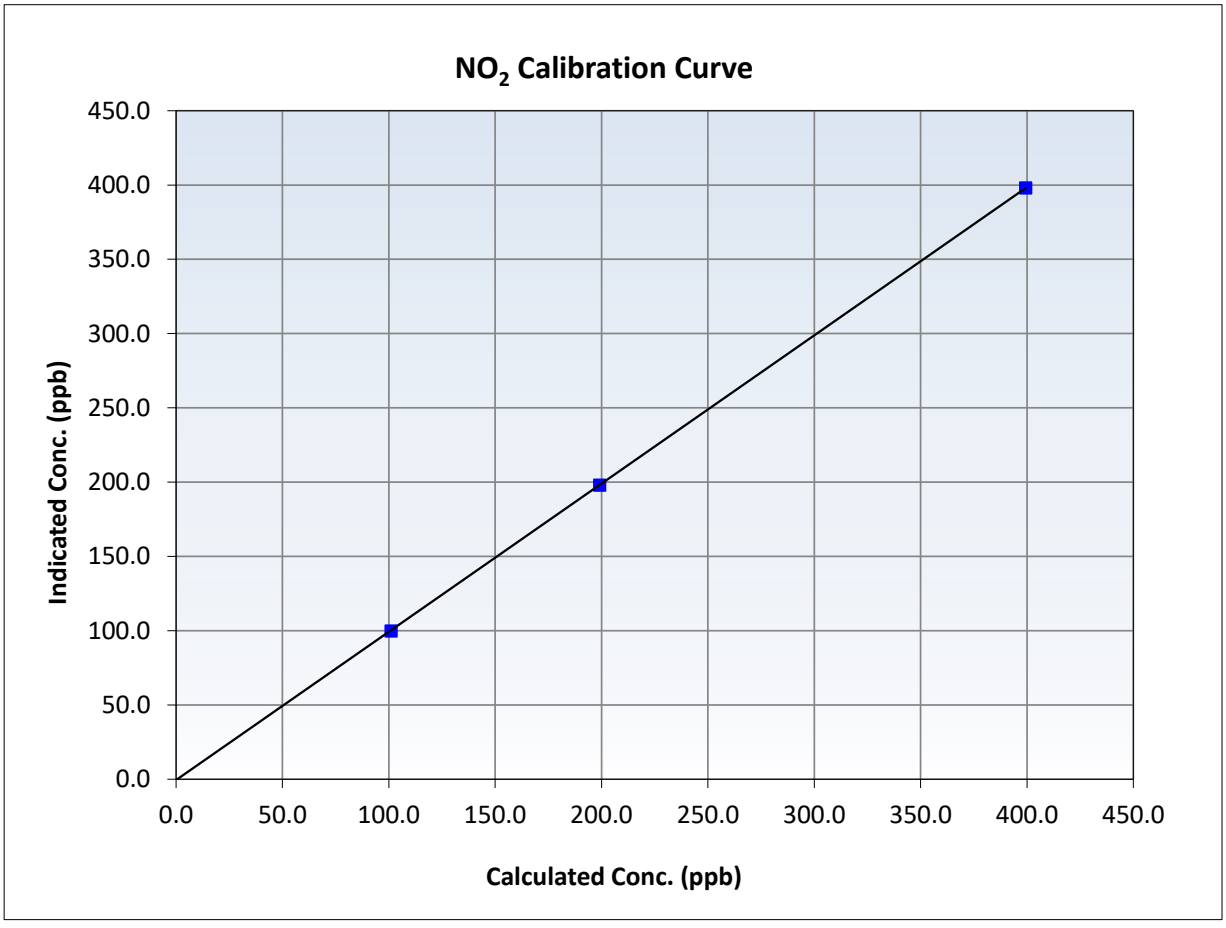
Station Information

Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:54	End Time (MST):	15:52
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	----
399.3	398.1	1.0031
199.1	198.0	1.0058
101.0	99.8	1.0124

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	0.997737	*0.90 - 1.10*
Intercept	-0.534162	*+/-20*



Wood Buffalo Environmental Association

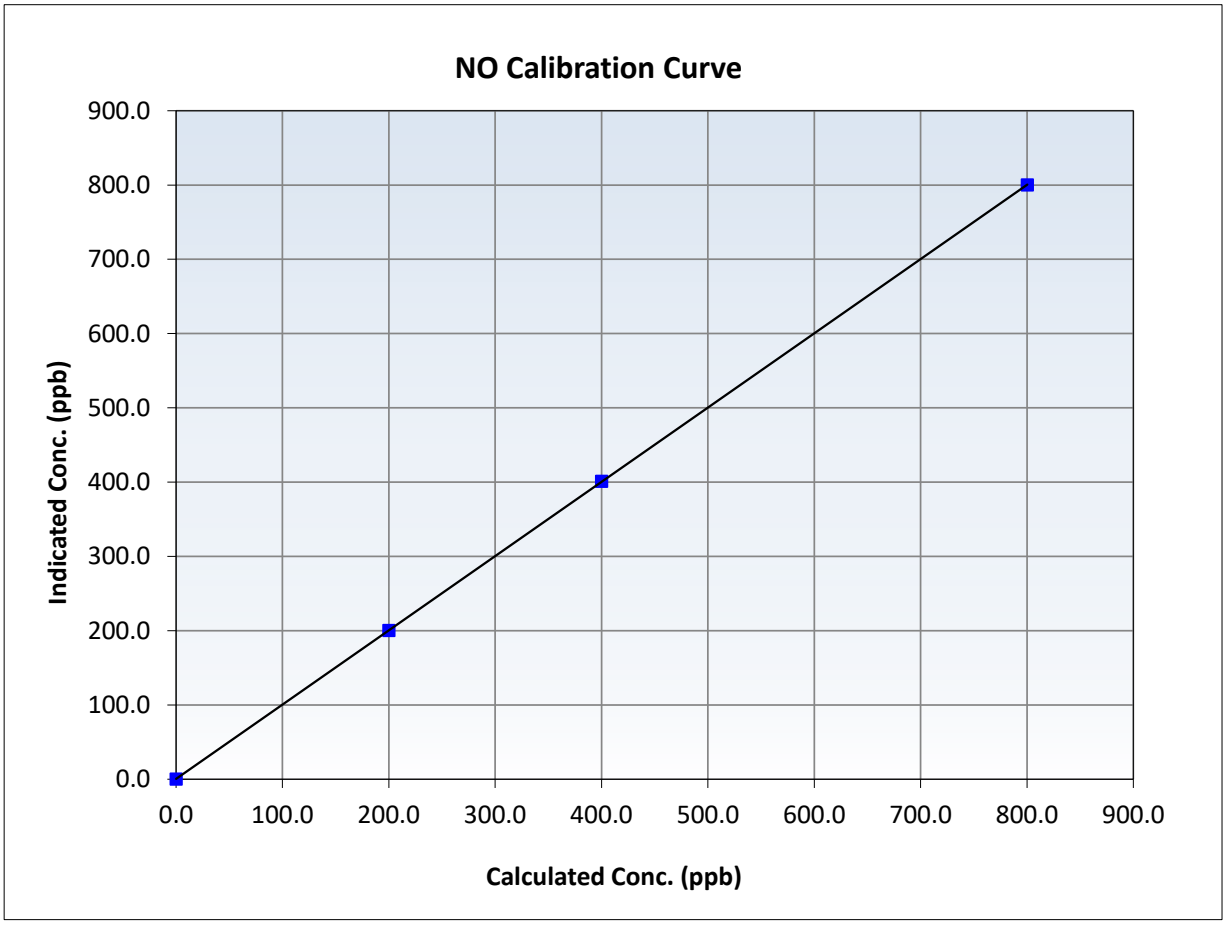
NO Calibration Summary

Station Information

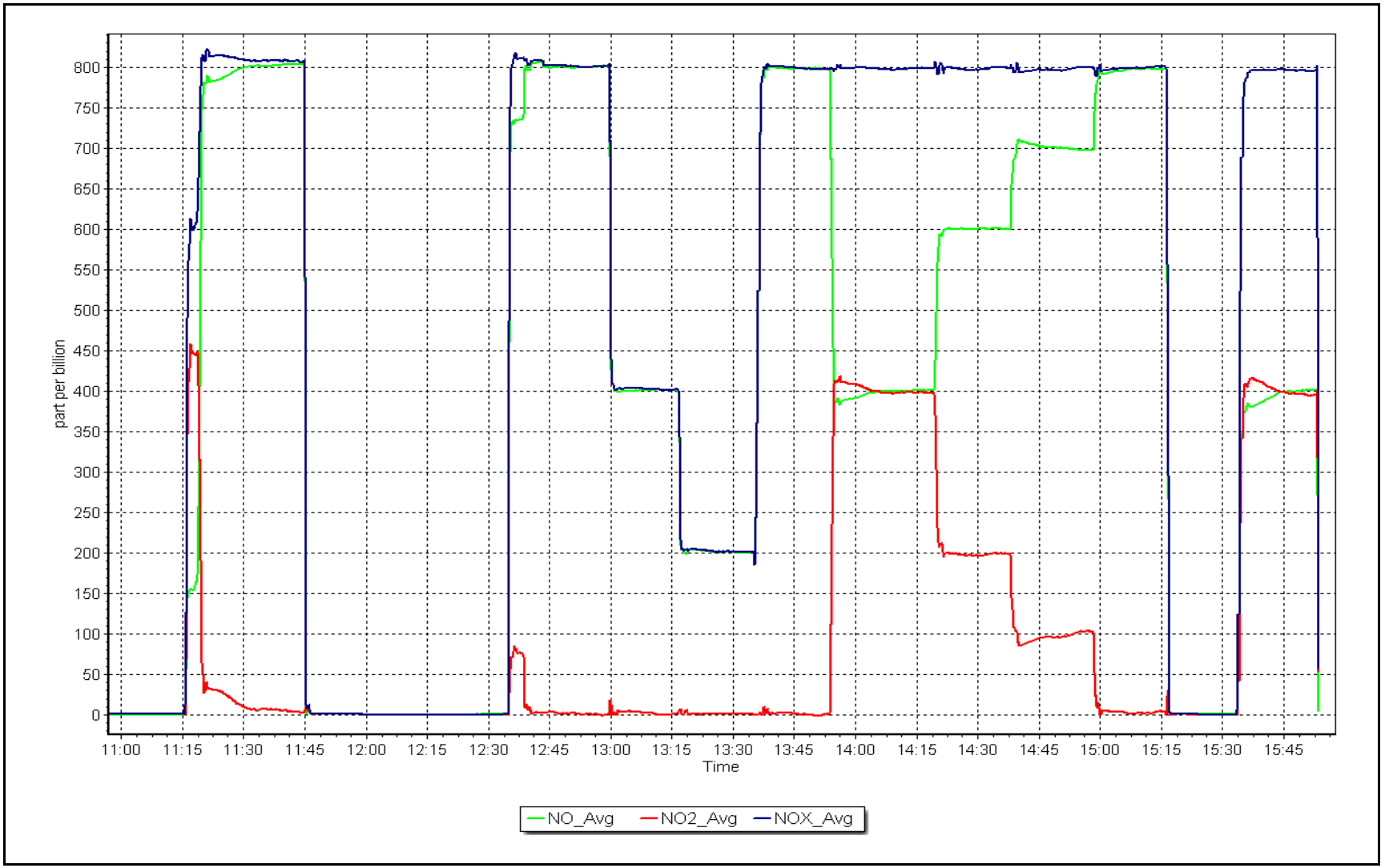
Calibration Date:	April 16, 2024	Previous Calibration:	March 27, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:54	End Time (MST):	15:52
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999998	≥0.995
800.3	800.2	1.0001	Slope	0.999703	0.90 - 1.10
400.1	401.1	0.9975			
200.1	200.5	0.9978	Intercept	0.464053	+/-20



NO_X Calibration Plot Date: April 16, 2024 Location: Janvier



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	April 15, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	10:46	End time (MST):	13:40
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:	1.003829	1.003571	Backgd or Offset:	2.2	2.2
Calibration intercept:	0.480000	0.300000	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	401.0	0.994
As found Mid point					
As found Low point					
Baseline Corr As found:	402.3	Previous response	402.0	*% 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	800.0	0.0	-0.1	----
High point	5000	916.2	400.0	401.4	0.997
Mid point	5000	763.7	200.0	201.6	0.992
Low point	5000	656.1	100.0	100.8	0.992
As left zero	5000	800.0	0.0	0.2	----
As left span	5000	916.2	400.0	403.7	0.991
				Average Correction Factor	0.994

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

O_3 Calibration Summary

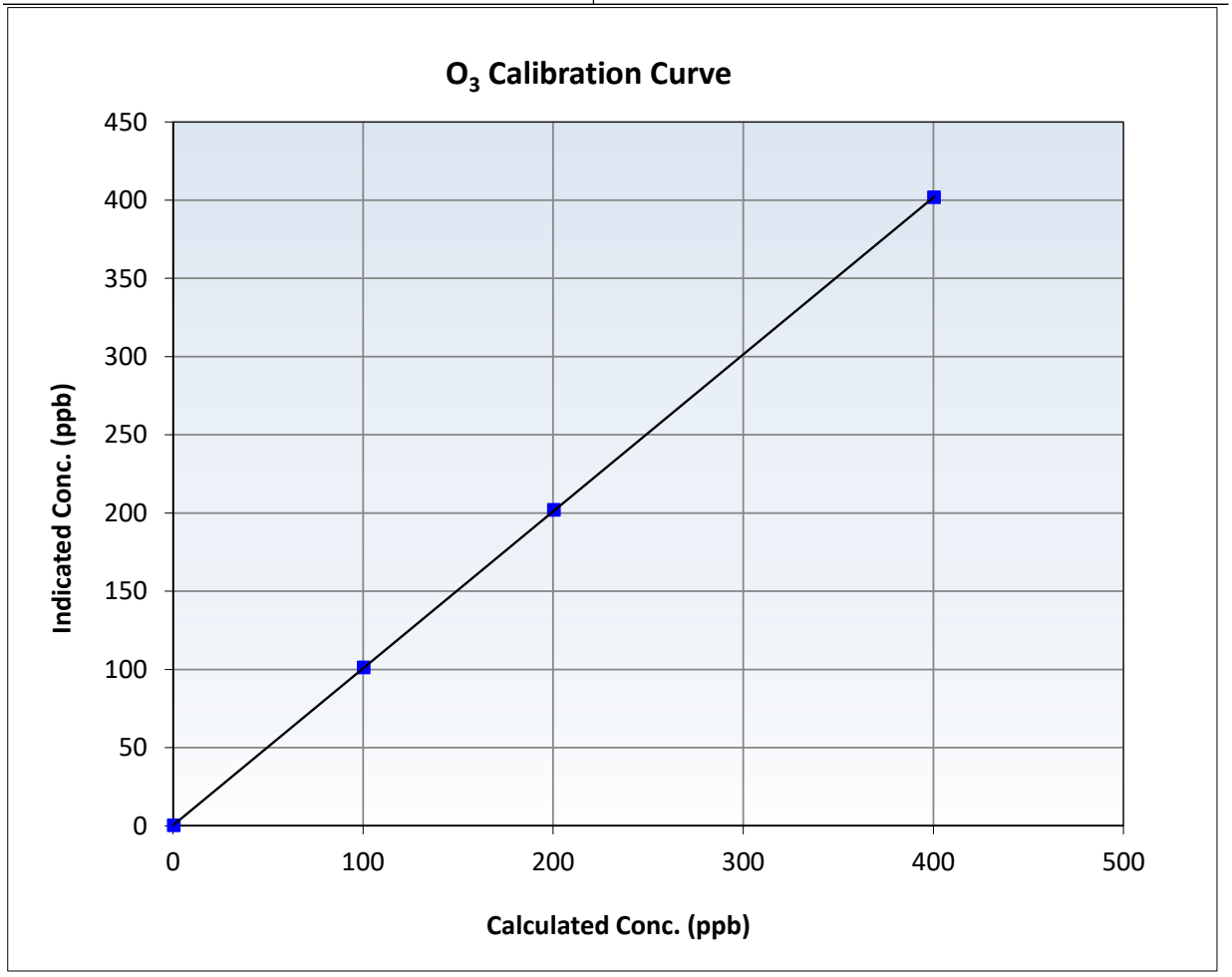
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 22, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:46	End Time (MST):	13:40
Analyzer make:	Teledyne API T400	Analyzer serial #:	7046

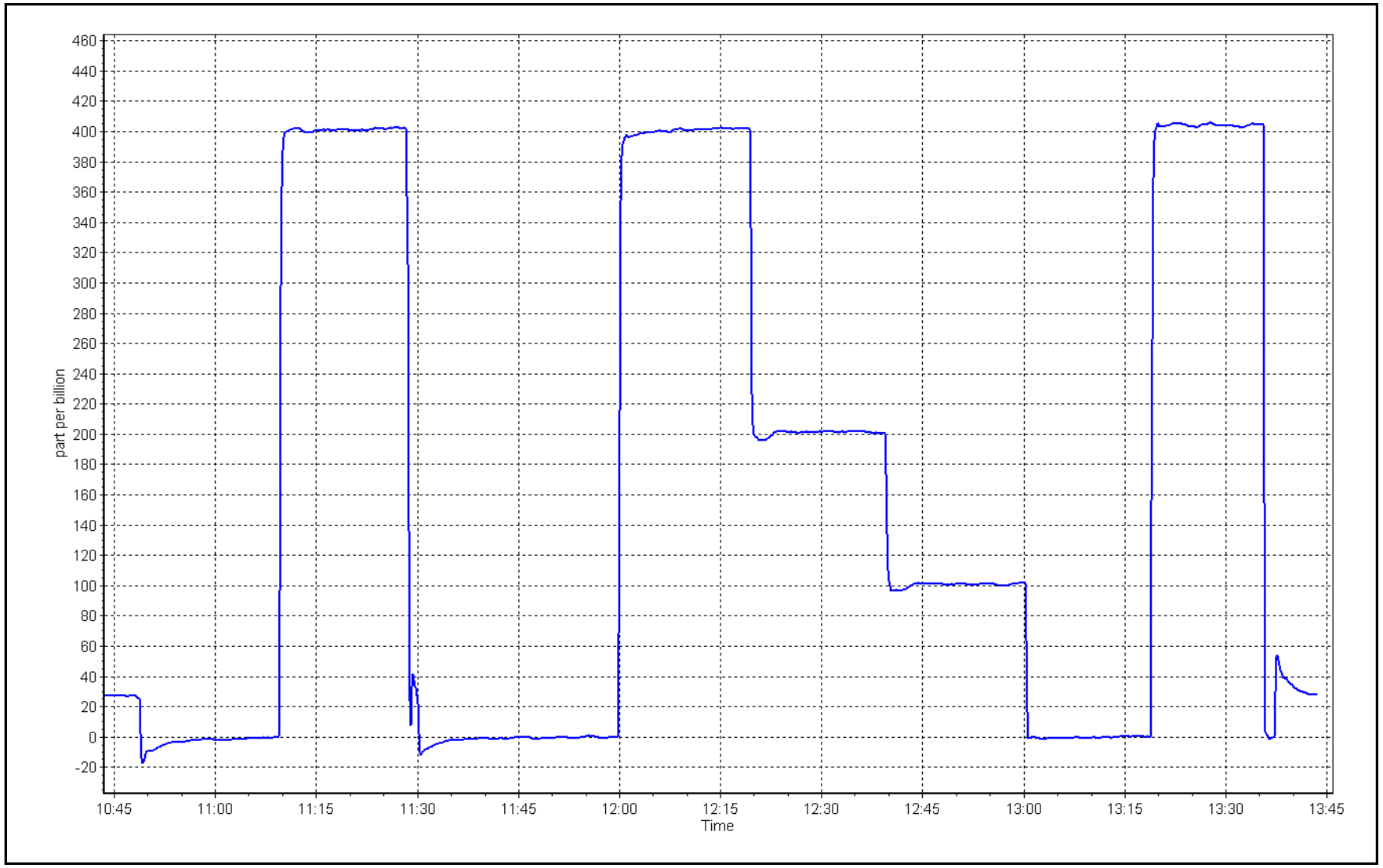
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
400.0	401.4	0.9965
200.0	201.6	0.9921
100.0	100.8	0.9921

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.003571	*0.90 - 1.10*
Intercept	0.300000	*+/- 5*



O_3 Calibration Plot Date: April 15, 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:	April 18, 2024	Last Cal Date:	March 26, 2024
Start time (MST):	13:33	End time (MST):	15:22
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)	0.6	0.16	0.6	☐	+/- 2 °C
P (mmHg)	731.2	731.78	731.2	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.074	5.01	☐	+/- 0.25 LPM
PW% (pump)	38	-----	38	☐	>80%
Zero Verification	PM w/o HEPA:	1.7	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	10.2	11.9	10.9	☑	10.9 +/- 0.5

Date Optical Chamber Cleaned: April 18, 2024

Date Disposable Filter Changed: April 18, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: July 26, 2023

Date RH/T Sensor Cleaned: April 18, 2024

Notes: Verified flow, temperature, and pressure. Leak check passed. PMT peak voltage adjusted. Optical chamber and RH/T sensor cleaned. Disposable filter changed.

Calibration by: Rene Chamberland

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS23
FORT HILLS
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	April 11, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	7:55	End time (MST):	10:48
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:	1.003512	1.009318	Backgd or Offset:	18.5	18.6
Calibration intercept:	-0.524217	-1.305054	Coeff or Slope:	1.063	1.063

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	799.1	802.6	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	803.0	Previous response	801.4	*% 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	-0.1	----
High point	4920	80.3	799.1	805.9	0.992
Mid point	4960	40.2	400.1	401.7	0.996
Low point	4980	20.1	200.0	199.5	1.003
As left zero	5000	0.0	0.0	0.0	----
As left span	4920	80.3	799.1	804.8	0.993
				Average Correction Factor:	0.997

Notes: Zero adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

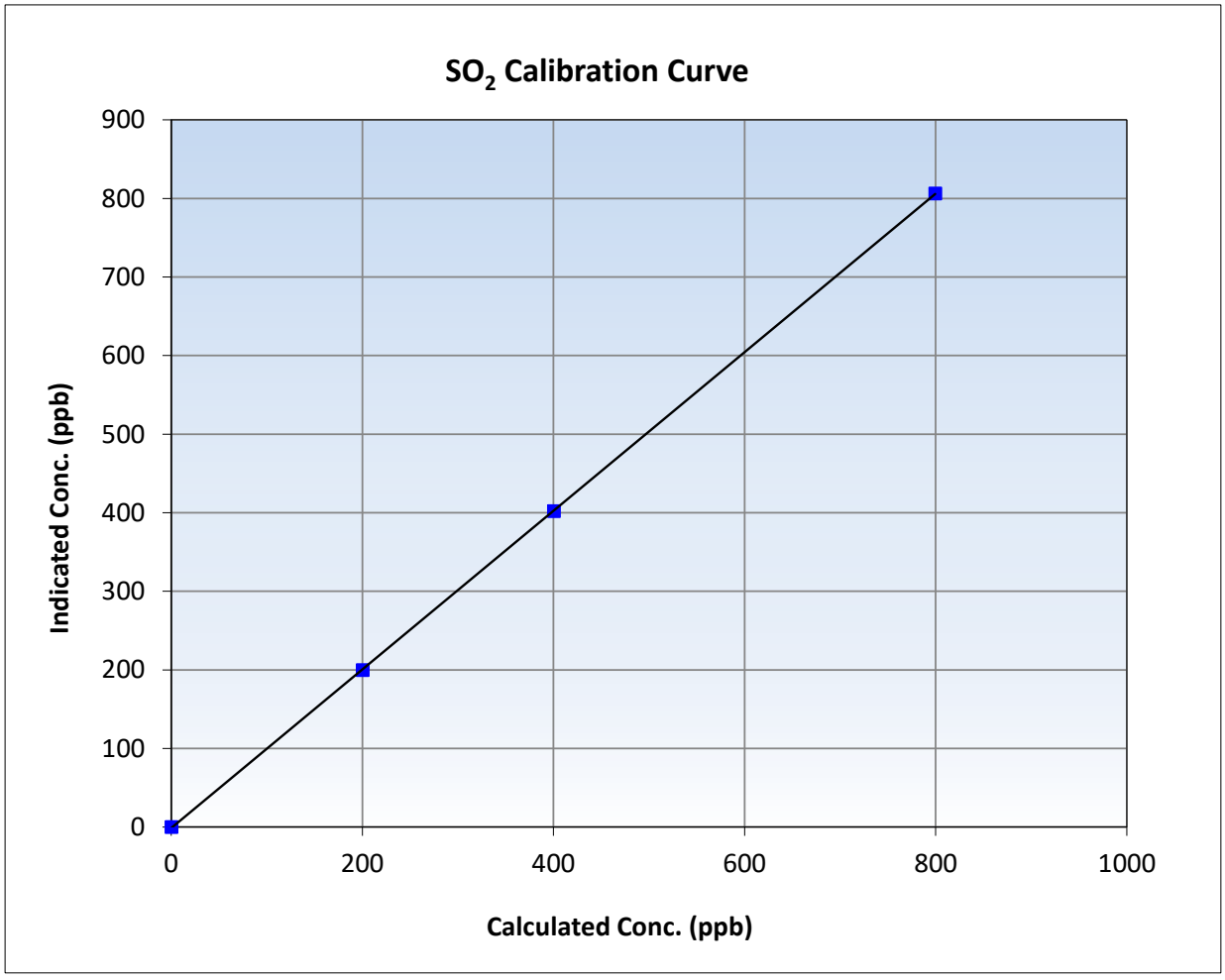
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 8, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	10:48
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012

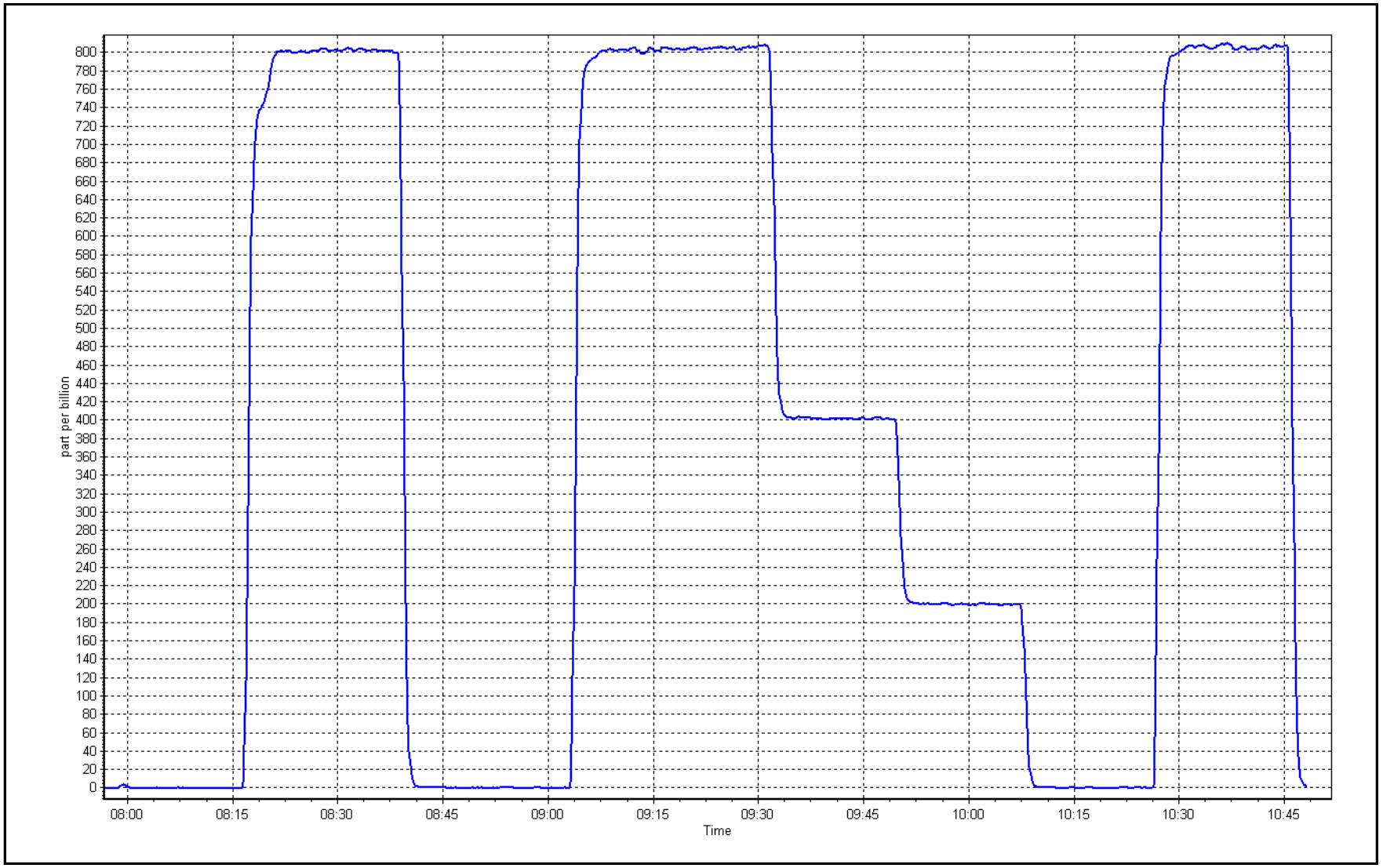
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.1	805.9	0.9916
400.1	401.7	0.9959
200.0	199.5	1.0027

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	1.009318	*0.90 - 1.10*
Intercept	-1.305054	*+/-30*



SO2 Calibration Plot Date: April 11, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	April 12, 2024	Last Cal Date:	March 13, 2024
Start time (MST):	6:50	End time (MST):	10:53
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:	0.991459	1.008213	Backgd or Offset:	2.0	2.1
Calibration intercept:	-0.038309	0.074071	Coeff or Slope:	1.160	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	0.0	----
As found High point	4923	77.0	80.1	77.4	1.035
As found Mid point	4962	38.5	40.0	38.5	1.040
As found Low point	4981	19.2	20.0	19.2	1.040
New cylinder response					

Baseline Corr As found:	77.4	Prev response:	79.36	*% change:	-2.5%
Baseline Corr 2nd AF pt:	38.5	AF Slope:	0.966678	AF Intercept:	-0.078827
Baseline Corr 3rd AF pt:	19.2	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	4923	77.0	80.1	80.7	0.992
Mid point	4962	38.5	40.0	40.7	0.984
Low point	4981	19.2	20.0	20.1	0.992
As left zero	5000	0.0	0.0	0.0	----
As left span	4923	77.0	80.1	83.1	0.964
SO2 Scrubber Check	4920	80.3	803.0	0.0	----
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. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

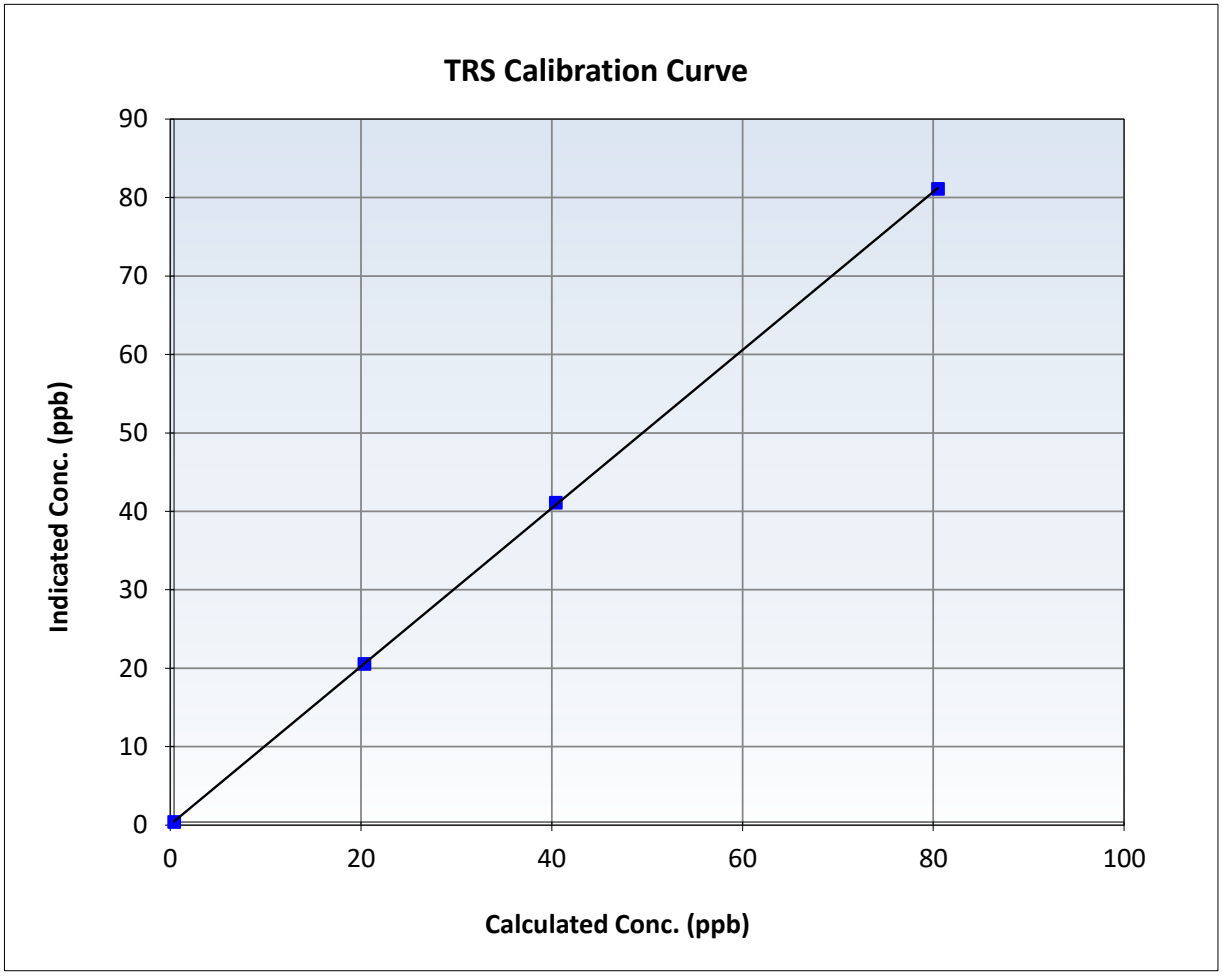
TRS Calibration Summary

Station Information

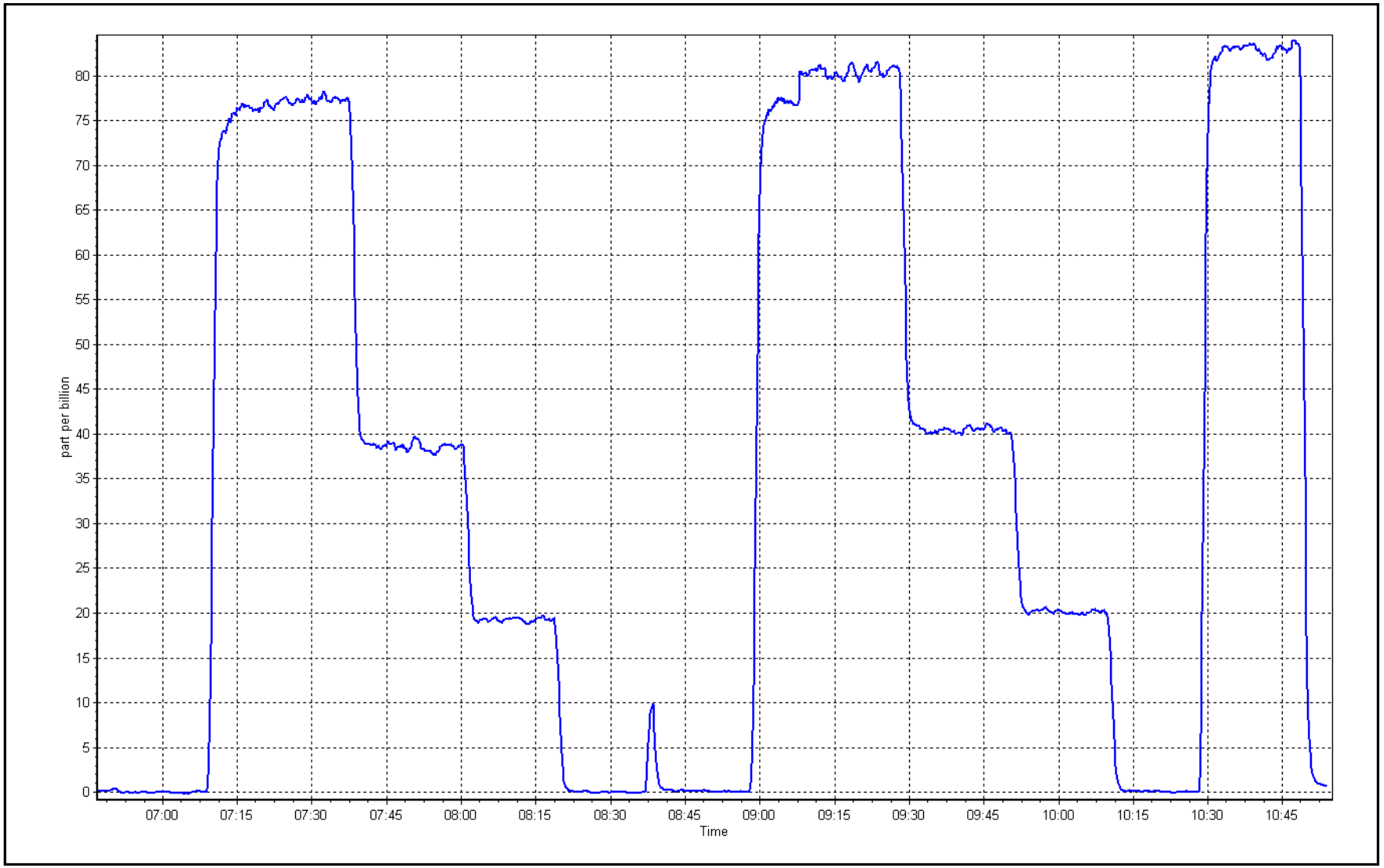
Calibration Date:	April 12, 2024	Previous Calibration:	March 13, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:50	End Time (MST):	10:53
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999974	*≥0.995*
80.1	80.7	0.9923	Slope	1.008213	*0.90 - 1.10*
40.0	40.7	0.9837			
20.0	20.1	0.9919	Intercept	0.074071	*+/-3*



TRS Calibration Plot Date: April 12, 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:	April 11, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	7:55	End time (MST):	10:47
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:	2.35E-04	2.33E-04	NMHC SP Ratio:	4.93E-05	5.01E-05
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	183614	182937
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	17.28	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.28	Prev response	17.27	*% 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	17.19	17.20	0.999
Mid point	4960	40.2	8.61	8.64	0.996
Low point	4980	20.1	4.30	4.32	0.996
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.18	1.001
				Average Correction Factor	0.997

Notes: Nitrogen Cylinder changed. 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	80.3	9.16	9.11	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.11	Prev response	9.17	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.16	9.15	1.001
Mid point	4960	40.2	4.59	4.66	0.985
Low point	4980	20.1	2.29	2.36	0.972
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.13	1.003
				Average Correction Factor	0.986

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	8.17	0.983
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.17	Prev response	8.10	*% 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	4920	80.3	8.03	8.06	0.997
Mid point	4960	40.2	4.02	3.98	1.010
Low point	4980	20.1	2.01	1.96	1.025
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.04	0.999
				Average Correction Factor	1.010

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.004093	1.000451
THC Cal Offset:	0.011596	0.012003
CH4 Cal Slope:	1.012136	1.004637
CH4 Cal Offset:	-0.025657	-0.032039
NMHC Cal Slope:	0.997614	0.997117
NMHC Cal Offset:	0.036452	0.043442

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

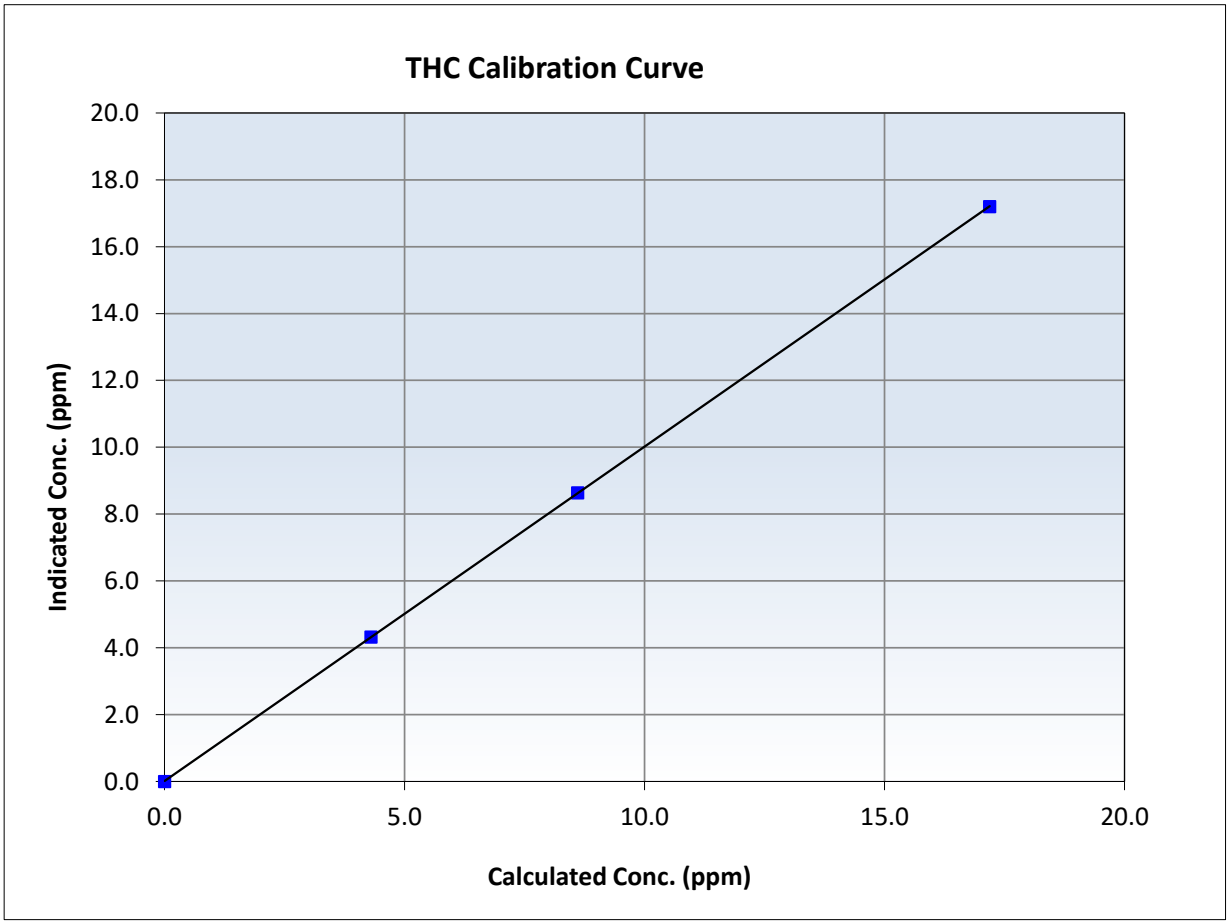
THC Calibration Summary

Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 8, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	10:47
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	0.999997	≥0.995
17.19	17.20	0.9994	Slope	1.000451	0.90 - 1.10
8.61	8.64	0.9962	Intercept	0.012003	+/-0.5
4.30	4.32	0.9957			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

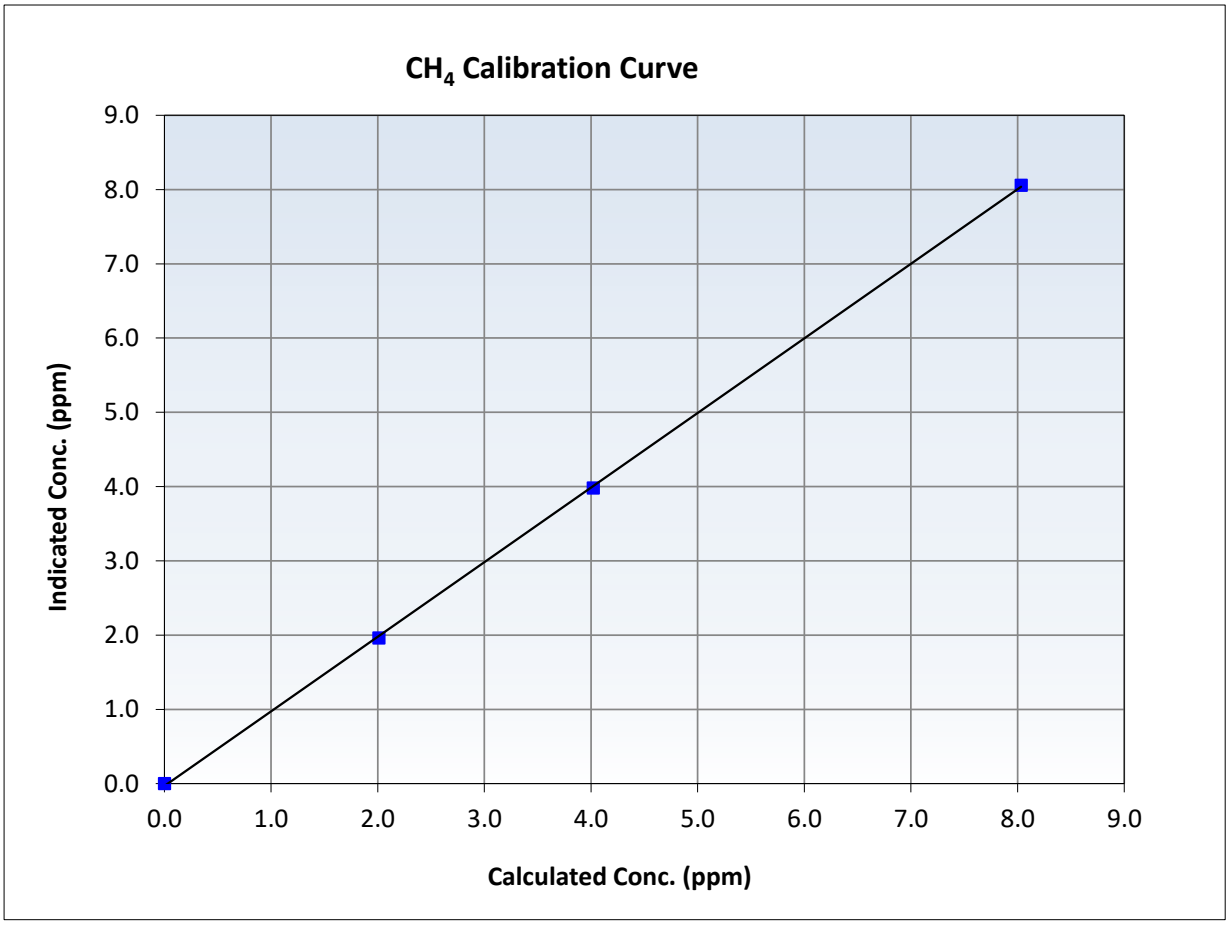
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 8, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	10:47
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.03	8.06	0.9970
4.02	3.98	1.0097
2.01	1.96	1.0249

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999924	*≥0.995*
Slope	1.004637	*0.90 - 1.10*
Intercept	-0.032039	*+/-0.5*



Wood Buffalo Environmental Association

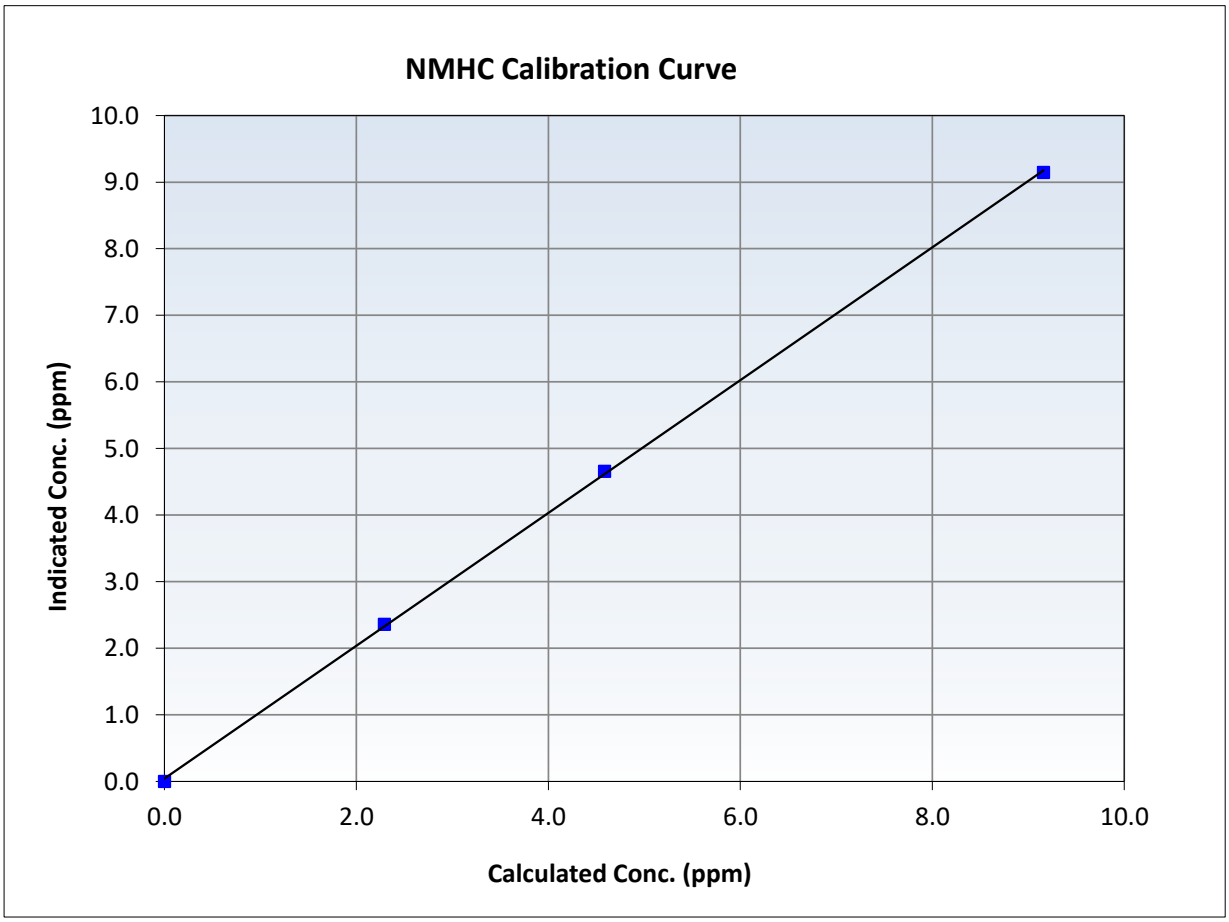
NMHC Calibration Summary

Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 8, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	10:47
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	0.999883	*≥0.995*
9.16	9.15	1.0012	Slope	0.997117	*0.90 - 1.10*
4.59	4.66	0.9846	Intercept	0.043442	*+/-0.5*
2.29	2.36	0.9715			



NMHC Calibration Plot Date: April 11, 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:	April 4, 2024
Last Cal Date:	March 12, 2024
Start time (MST):	6:32
End time (MST):	10:53
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC358149	Cal Gas Expiry Date:	January 5, 2032
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	-0.2	-0.1	-0.1	----	----
AF High point	4934	66.3	799.5	796.9	2.7	777.6	770.3	7.3	1.0279	1.0344
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	798.3 ppb	NO =	794.1 ppb			
Baseline Corr 1st pt	NO_X =	777.8 ppb	NO =	770.4 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 =	-2.6%	
*Percent Change	NO =	-3.1%	

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:	1.132	1.169	NO bkgnd or offset:	3.1	3.2
NOX coeff or slope:	0.996	0.995	NOX bkgnd or offset:	3.3	3.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	177.0	177.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.998626	1.000499
NO_X Cal Offset:	-0.173464	0.045790
NO Cal Slope:	0.998303	1.001459
NO Cal Offset:	-1.451679	-1.552494
NO_2 Cal Slope:	1.002264	1.003459
NO_2 Cal Offset:	0.618019	-1.071483

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	4934	66.3	799.5	796.9	2.7	799.9	797.3	2.7	0.9995	0.9995
Mid point	4967	33.2	400.4	399.0	1.3	400.9	397.3	3.6	0.9987	1.0044
Low point	4983	16.6	200.2	199.5	0.7	200.1	196.6	3.5	1.0006	1.0150
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4934	66.3	799.5	388.0	411.5	804.5	388.0	416.4	0.9938	1.0000
								Average Correction Factor	0.9996	1.0063

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	796.2	386.2	412.7	414.1	0.9965	100.4%
Mid GPT point	796.2	588.0	210.9	208.4	1.0118	98.8%
Low GPT point	796.2	690.9	108.0	107.2	1.0070	99.3%
				Average Correction Factor	1.0051	99.5%

Notes:

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

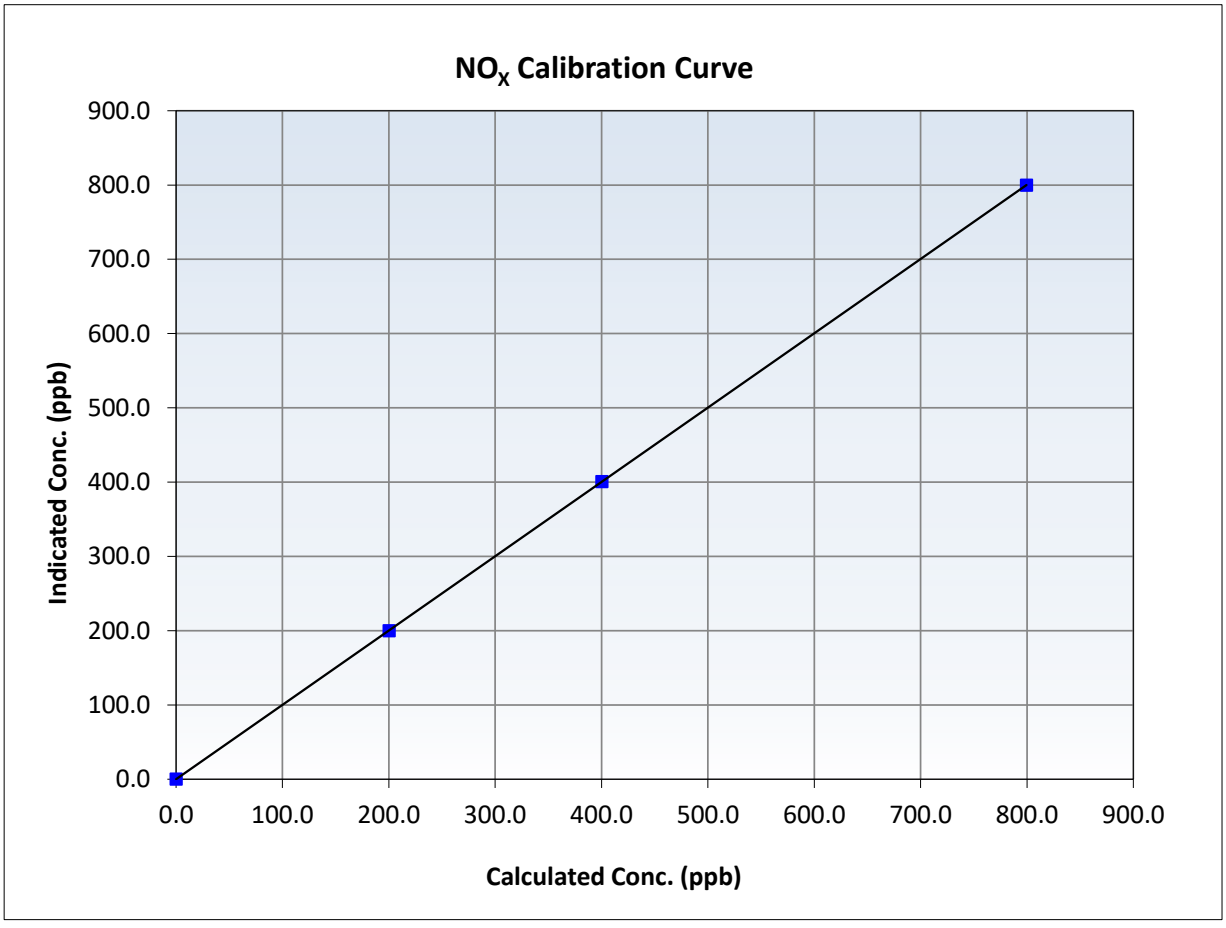
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:32	End Time (MST):	10:53
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	----
799.5	799.9	0.9995
400.4	400.9	0.9987
200.2	200.1	1.0006

Statistical Evaluation		Limits
Correlation Coefficient	1.000000	≥0.995
Slope	1.000499	0.90 - 1.10
Intercept	0.045790	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

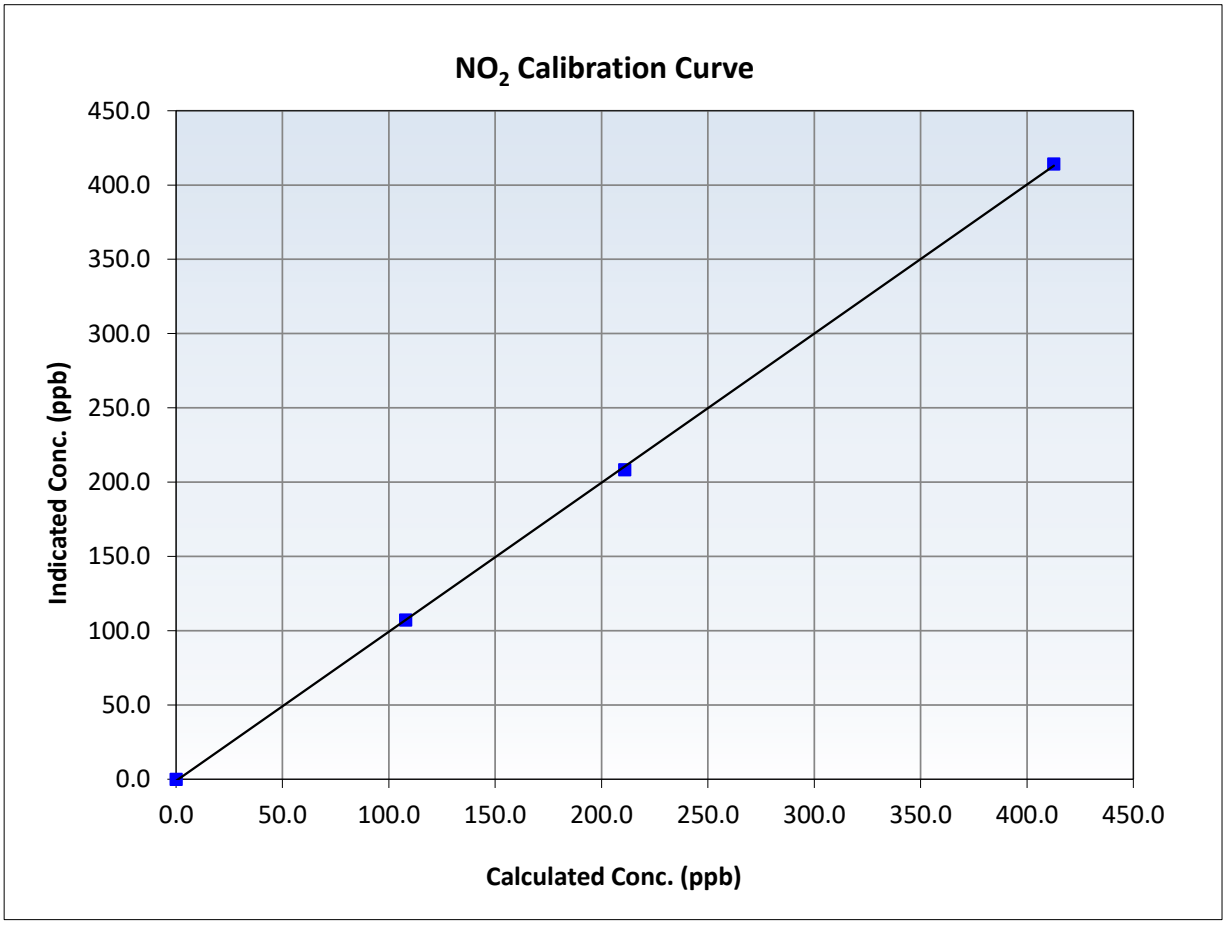
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:32	End Time (MST):	10:53
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	----
412.7	414.1	0.9965
210.9	208.4	1.0118
108.0	107.2	1.0070

Statistical Evaluation		Limits
Correlation Coefficient	0.999927	≥0.995
Slope	1.003459	0.90 - 1.10
Intercept	-1.071483	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

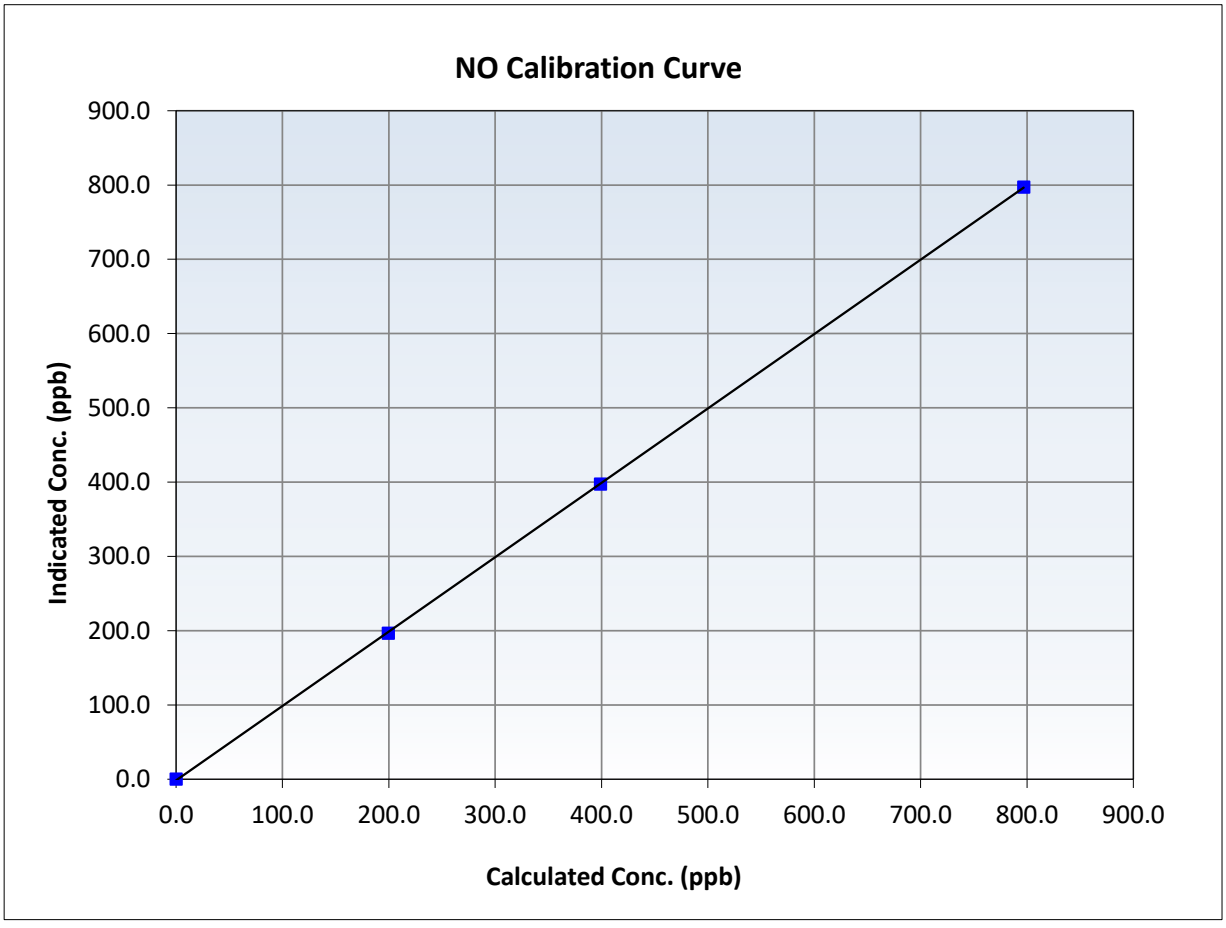
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 12, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:32	End Time (MST):	10:53
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

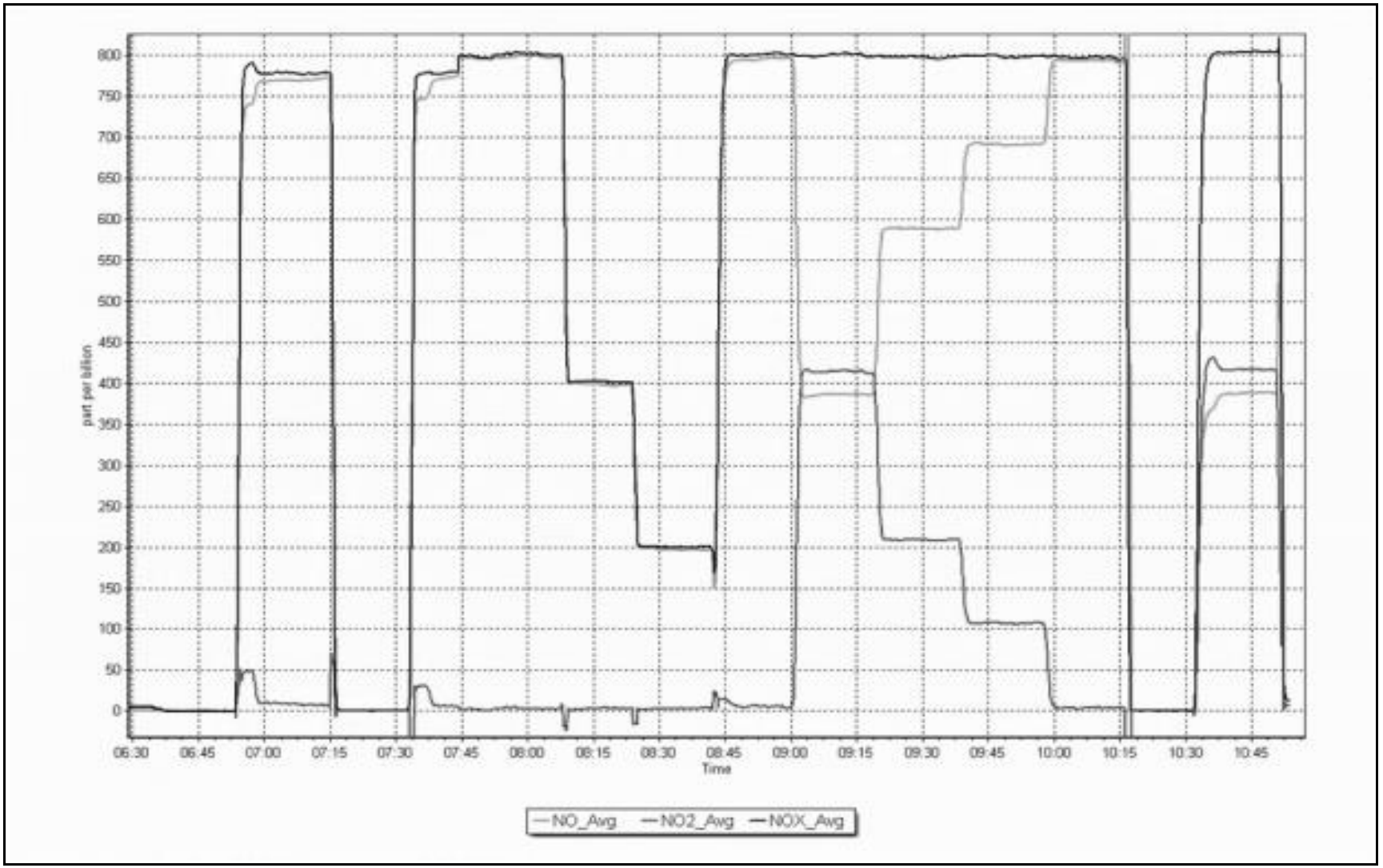
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
796.9	797.3	0.9995
399.0	397.3	1.0044
199.5	196.6	1.0150

Statistical Evaluation		Limits
Correlation Coefficient	0.999980	≥0.995
Slope	1.001459	0.90 - 1.10
Intercept	-1.552494	+/-20



NO_X Calibration Plot Date: April 4, 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:	April 11, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	6:56	End time (MST):	7:56
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)	0.4	-0.6	0.4	☐	+/- 2 °C
P (mmHg)	737.6	737.5	737.6	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.97	5.00	☐	+/- 0.25 LPM
PW% (pump)	42	-----	42	☐	>80%

Zero Verification — PM w/o HEPA: 5.3 — PM w/ HEPA: 0.0 — <0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 10.9 — Expiry Date: 10-Jun-24 — Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	9.1	11	11	☐	+/- 0.5

Date Optical Chamber Cleaned: April 11, 2024

Date Disposable Filter Changed: April 11, 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: No adjustments done. Leak check passed before and after cleaning.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25
WASKŌW OHCI PIMÂTISIWIN
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	April 22, 2024	Last Cal Date:	March 11, 2024
Start time (MST):	7:54	End time (MST):	10:53
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:	1.002469	0.998541	Backgd or Offset:	11.2	10.8
Calibration intercept:	0.048260	-0.052708	Coeff or Slope:	1.056	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	803.0	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	803.4	Previous response	802.1	*% 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	0.1	----
High point	4920	80.5	800.1	798.9	1.001
Mid point	4960	40.2	399.6	399.0	1.001
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	800.2	1.000
				Average Correction Factor:	1.002

Notes: No maintenance done. Zero and span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

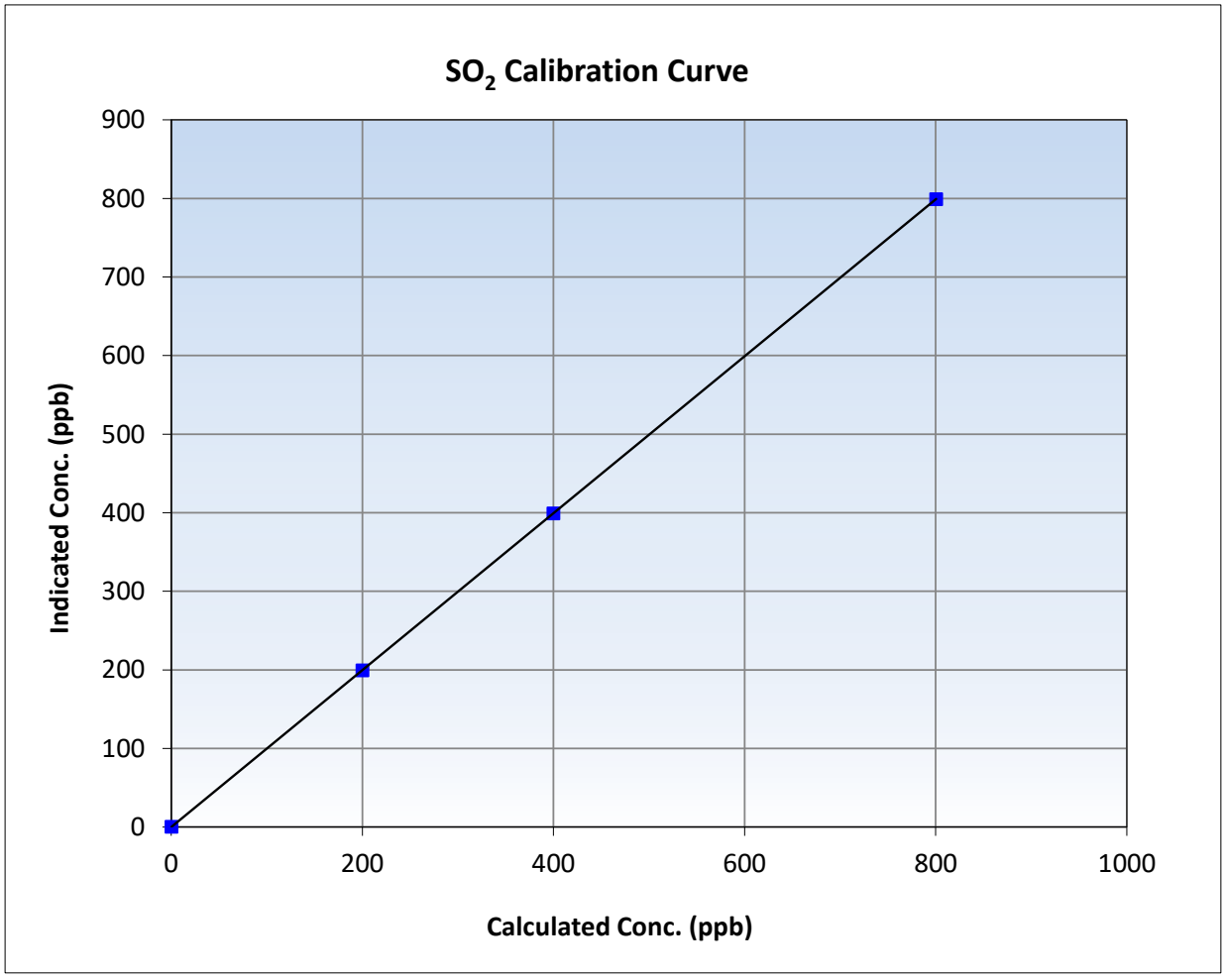
Station Information

Calibration Date:	April 22, 2024	Previous Calibration:	March 11, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	7:54	End Time (MST):	10:53
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

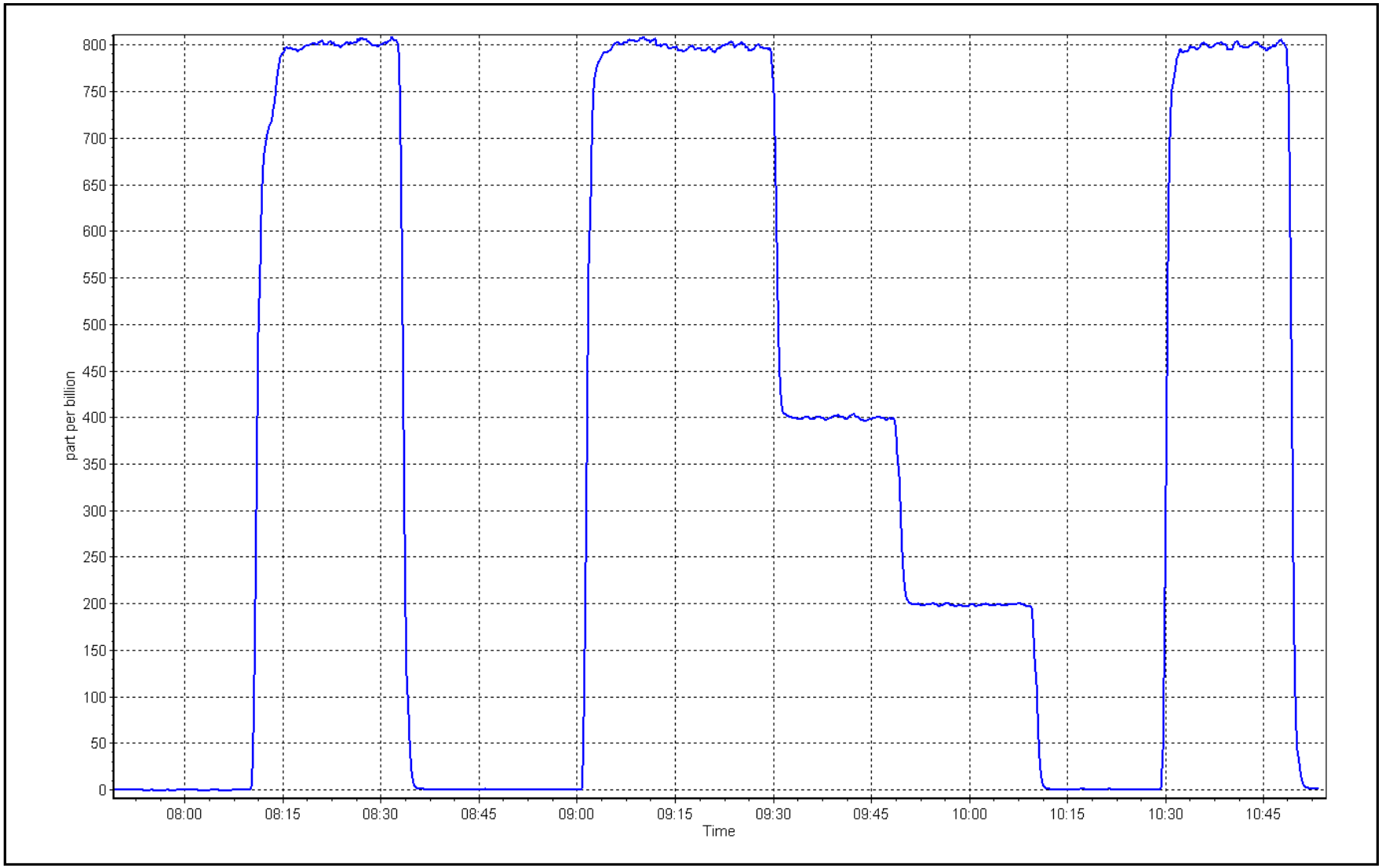
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.1	798.9	1.0015
399.6	399.0	1.0014
199.8	199.2	1.0030

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.998541	*0.90 - 1.10*
Intercept	-0.052708	*+/-30*



SO2 Calibration Plot Date: April 22, 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:	April 17, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	6:15	End time (MST):	10:58
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:	1.008429	1.001868	Backgd or Offset:	3.3	3.2
Calibration intercept:	0.120000	0.120000	Coeff or Slope:	1.113	1.095

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	4920	80.0	79.5	81.3	0.978
As found Mid point	4960	40.0	39.8	40.6	0.979
As found Low point	4980	20.0	19.9	20.4	0.975
New cylinder response					

Baseline Corr As found:	81.3	Prev response:	80.31	*% change:	1.2%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.021989	AF Intercept:	0.020000
Baseline Corr 3rd AF pt:	20.4	AF Correlation:	0.999998	* = > +/-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	4920	80.0	79.5	79.7	0.998
Mid point	4960	40.0	39.8	40.2	0.989
Low point	4980	20.0	19.9	19.9	0.999
As left zero	5000	0.0	0.0	0.2	----
As left span	4912	88.3	800.0	819.8	0.976
SO2 Scrubber Check	4921	79.2	800.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.995
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

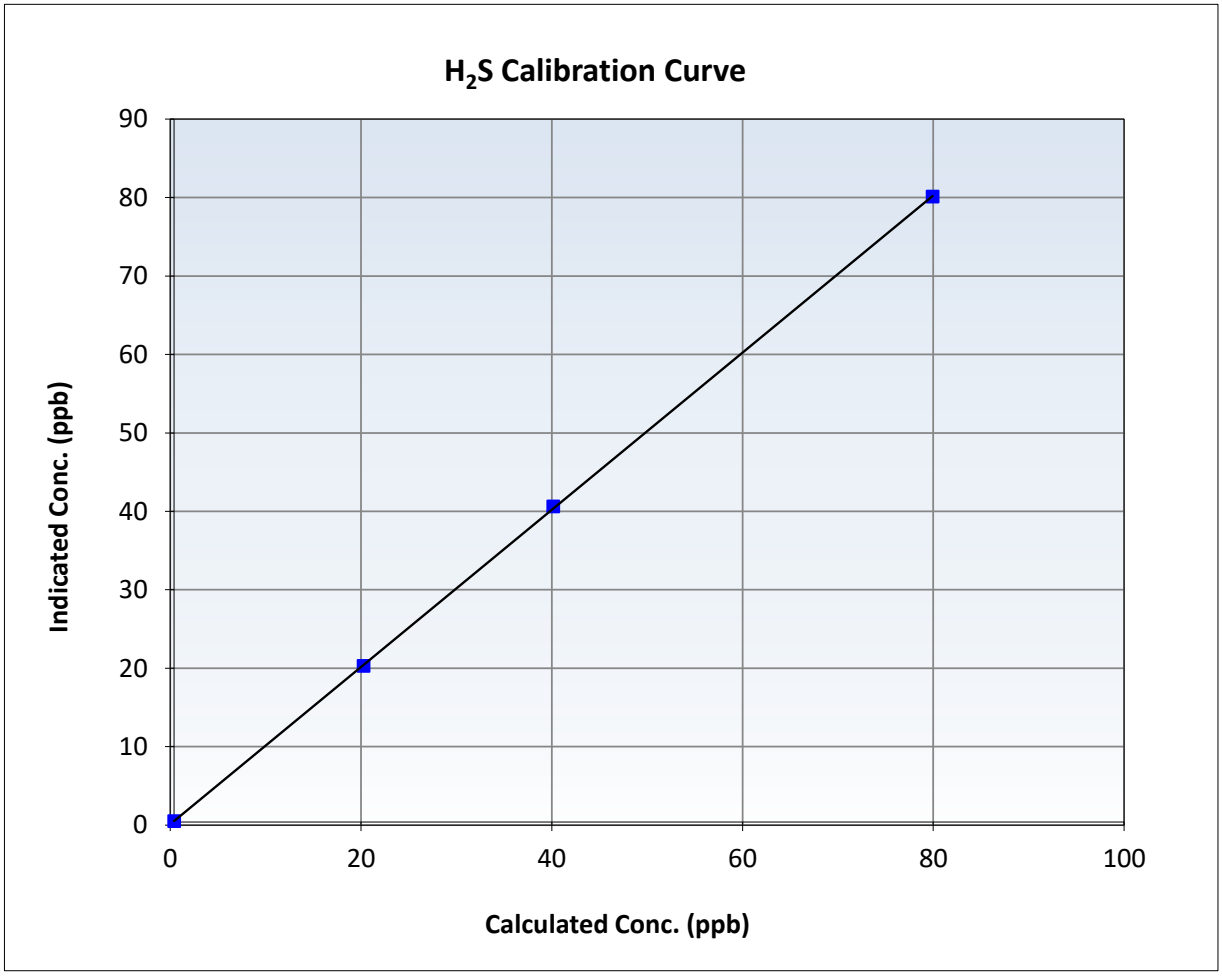
H_2S Calibration Summary

Station Information

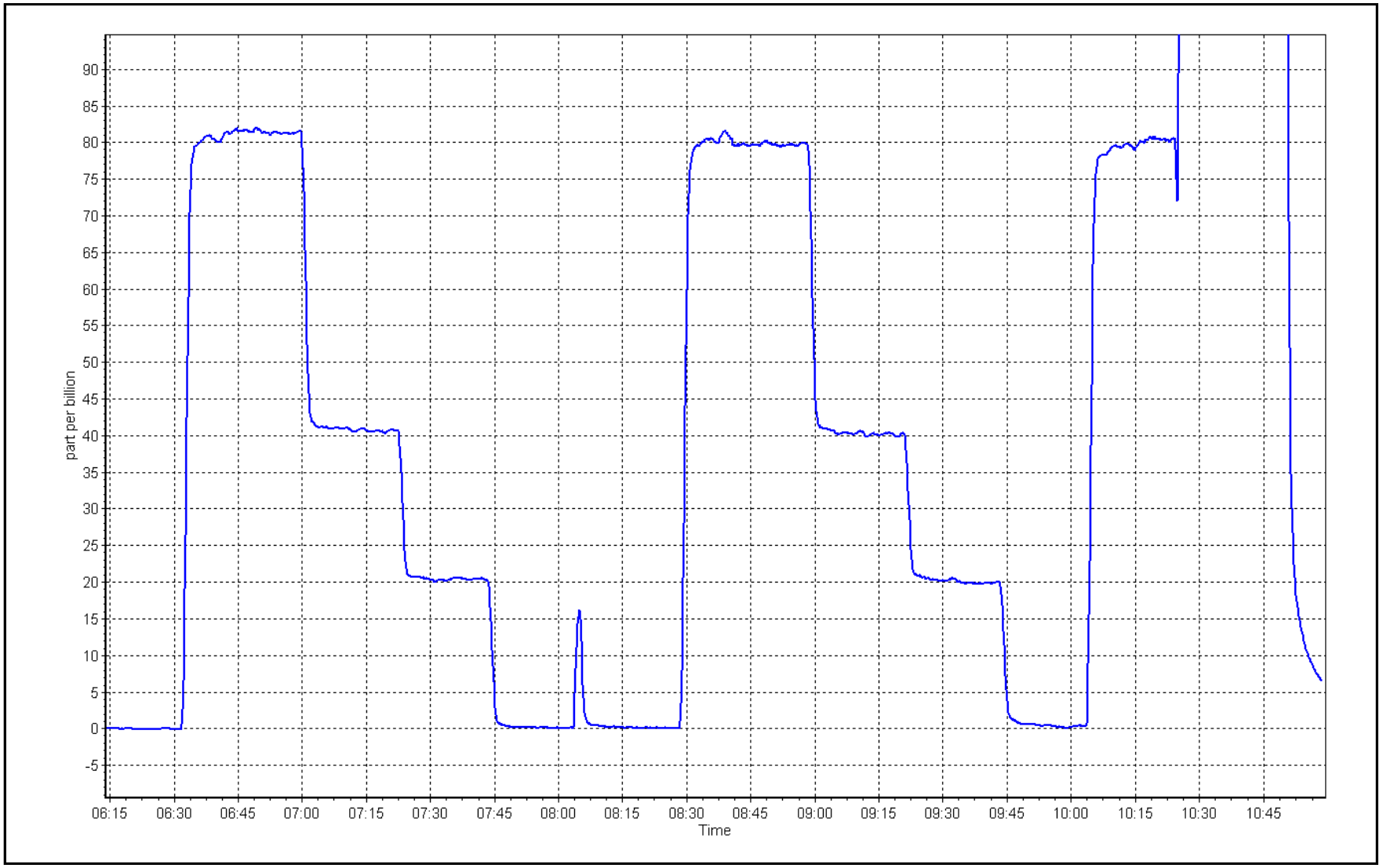
Calibration Date:	April 17, 2024	Previous Calibration:	March 18, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	6:15	End Time (MST):	10:58
Analyzer make:	Global G-150	Analyzer serial #:	2022-219

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999975	*≥0.995*
79.5	79.7	0.9977	Slope	1.001868	*0.90 - 1.10*
39.8	40.2	0.9891			
19.9	19.9	0.9990	Intercept	0.120000	*+/-3*



H_2S Calibration Plot Date: April 17, 2024 Location: Waskow ohci Pimatisiwin



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS26
CHRISTINA LAKE
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	April 9, 2024	Last Cal Date:	March 22, 2024
Start time (MST):	9:46	End time (MST):	12:36
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:	0.997322	0.999449	Backgd or Offset:	25.8	26.5
Calibration intercept:	0.975976	0.556005	Coeff or Slope:	0.956	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	0.3	----
As found High point	4919	80.8	800.9	805.6	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	805.3	Previous response	799.8	*% 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	

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	80.8	800.9	801.0	1.000
Mid point	4960	40.4	400.4	400.4	1.000
Low point	4980	20.2	200.2	201.5	0.994
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	80.8	800.9	800.0	1.001
				Average Correction Factor:	0.998

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

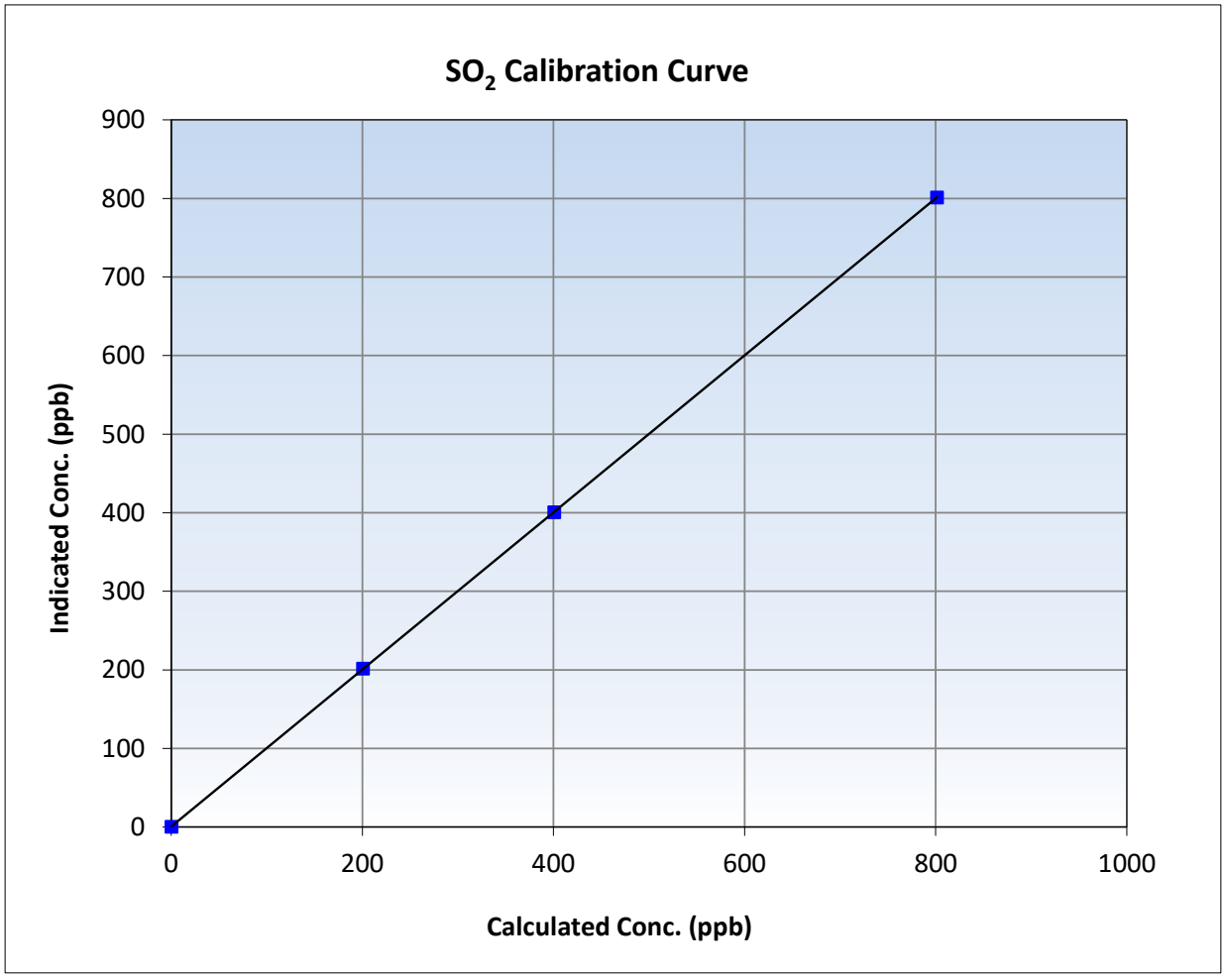
Station Information

Calibration Date:	April 9, 2024	Previous Calibration:	March 22, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:46	End Time (MST):	12:36
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430005

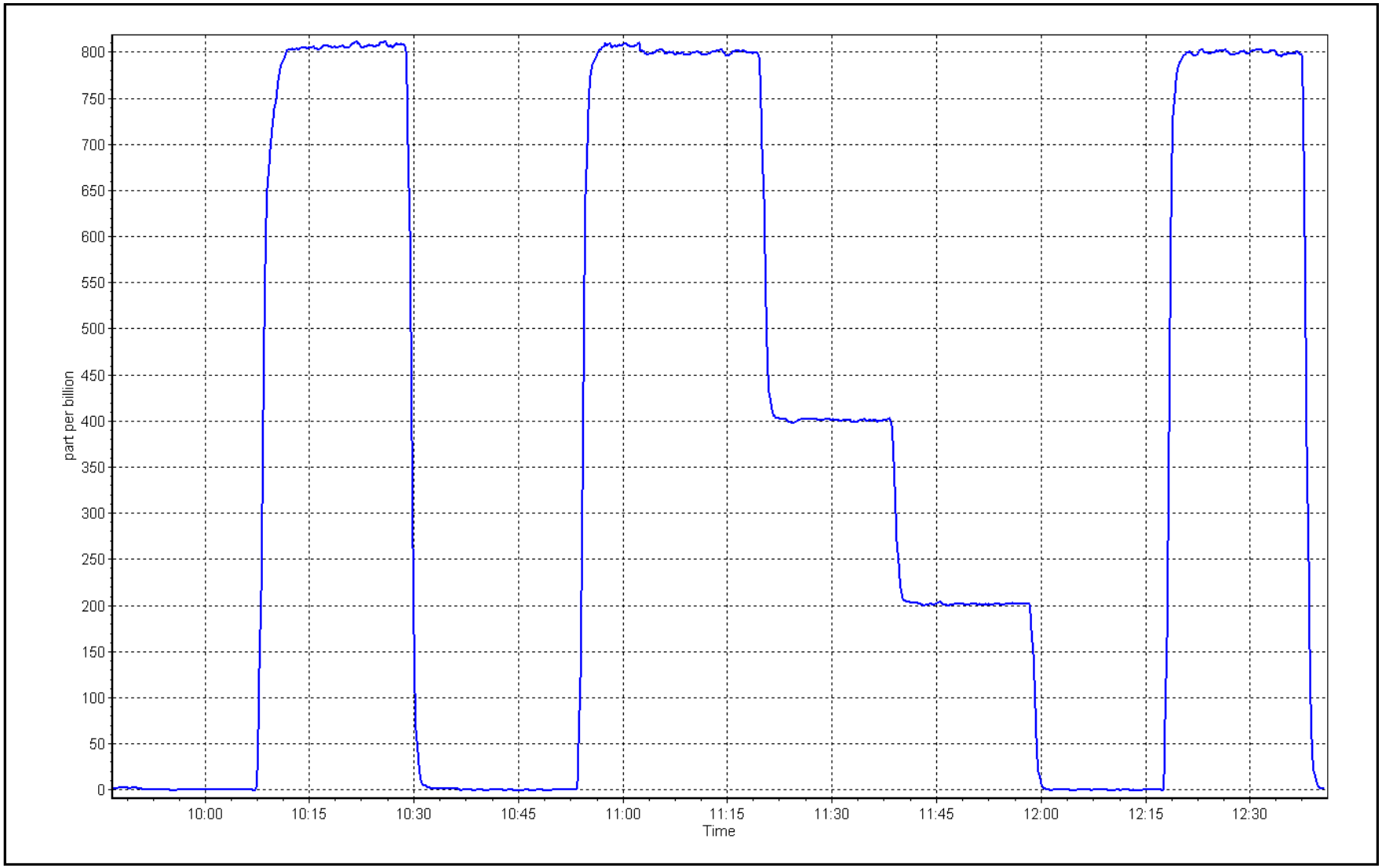
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.9	801.0	0.9999
400.4	400.4	1.0000
200.2	201.5	0.9936

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.999449	*0.90 - 1.10*
Intercept	0.556005	*+/-30*



SO2 Calibration Plot Date: April 9, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	April 10, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	9:43	End time (MST):	11:42
Reason:	Removal		

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 450i		Analyzer serial #:	1180030032
Converter make:	NA		Converter serial #:	NA
Analyzer Range	0 - 100 ppb		Converter Temp:	322 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.996996	NA	Backgd or Offset:	34.5	NA
Calibration intercept:	0.358415	NA	Coeff or Slope:	1.064	NA

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.5	----
As found High point	4921	79.2	80.0	80.2	1.004
As found Mid point	4960	39.6	40.0	40.2	1.008
As found Low point	4980	19.8	20.0	20.0	1.026
New cylinder response					

Baseline Corr As found:	79.7	Prev response:	80.11	*% change:	-0.5%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.997997	AF Intercept:	0.298408
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999968	* = > +/-5% change initiates investigation	

H2S Calibration Data

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

Date of last scrubber change:

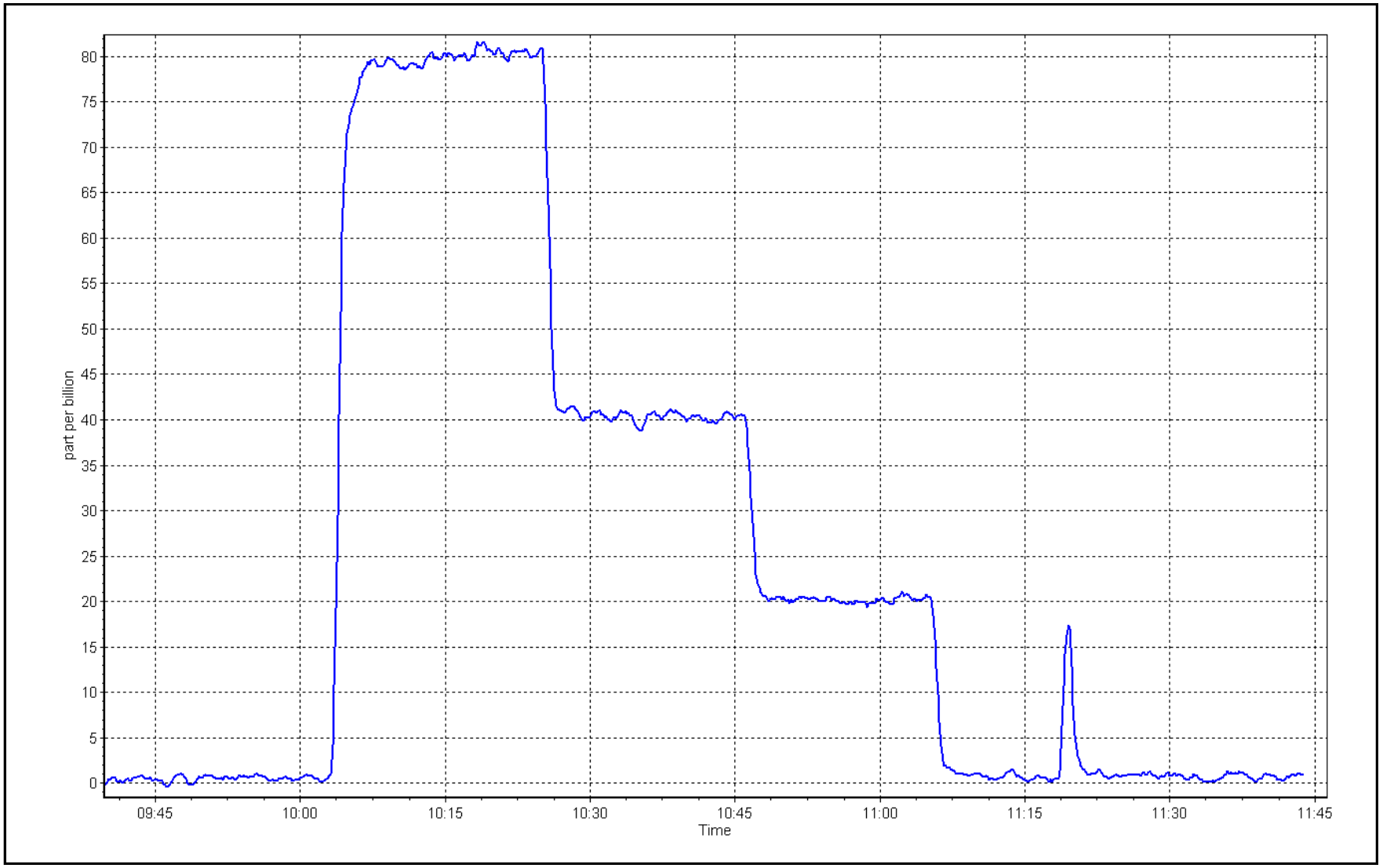
Ave Corr Factor

Date of last converter efficiency test:

Notes: Removing instrument for upgrade. Will install new analyzer with external converter.

Calibration Performed By: Jan Castro

H2S Calibration Plot Date: April 10, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	April 11, 2024	Last Cal Date:	NA
Start time (MST):	10:57	End time (MST):	13:53
Reason:	Install		

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:	NA	1.004141	Backgd or Offset:	NA	1.5
Calibration intercept:	NA	-0.141605	Coeff or Slope:	NA	1.030

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *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

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4921	79.2	80.0	80.2	0.997
Mid point	4960	39.6	40.0	40.0	1.000
Low point	4980	19.8	20.0	19.9	1.005
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	80.0	1.000
SO2 Scrubber Check	4919	80.8	808.0	0.0	----
Date of last scrubber change:		11-Apr-24		Ave Corr Factor	1.001
Date of last converter efficiency test:					

Notes: Install calibrations. Changed sample inlet filters before calibrator zero. Scrubber check done after calibrator zero and passed. Adjusted zero and span.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

H2S Calibration Summary

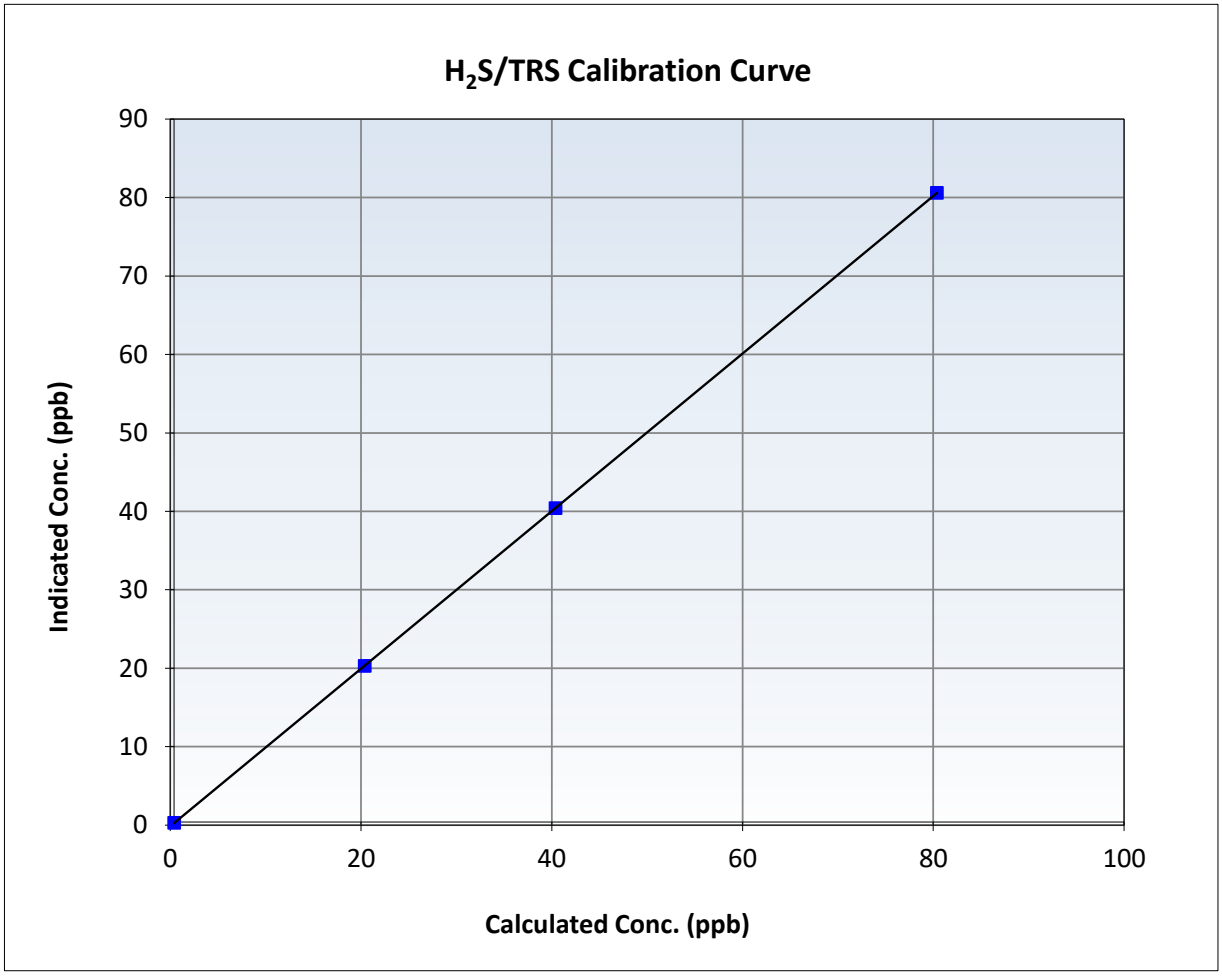
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	NA
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	10:57	End Time (MST):	13:53
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331547

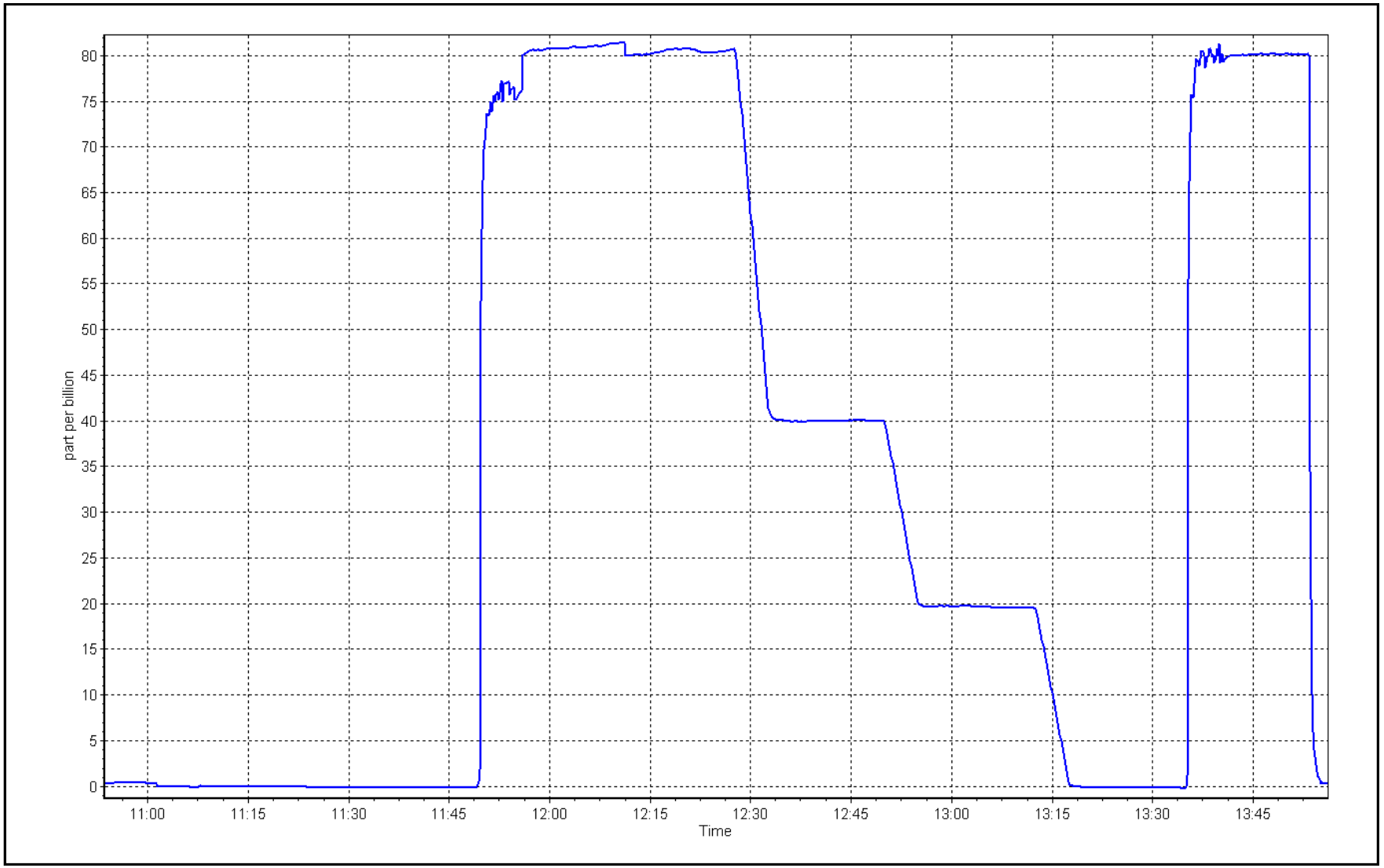
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	80.2	0.9974
40.0	40.0	1.0000
20.0	19.9	1.0050

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.004141	*0.90 - 1.10*
Intercept	-0.141605	*+/-3*



H2S Calibration Plot Date: April 11, 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:	April 23, 2024
Last Cal Date:	March 13, 2024
Start time (MST):	9:37
End time (MST):	14:24
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	5000	0.0	0.0	0.0	0.0	-0.8	-0.2	-0.7	----	----
AF High point	4918	82.1	802.9	799.6	3.3	808.9	803.3	5.5	0.9916	0.9952
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 803.7 ppb	NO = 799.5 ppb
Baseline Corr 1st pt	NO_X = 809.7 ppb	NO = 803.5 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 = 0.7%

*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: 1173480006

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.318	1.329	NO bkgnd or offset:	2.5	2.6
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	3.3	2.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	162.8	162.5

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000066	1.000009
NO_X Cal Offset:	0.766423	-1.813460
NO Cal Slope:	0.999129	0.998685
NO Cal Offset:	0.606305	-2.513223
NO_2 Cal Slope:	1.004655	1.022718
NO_2 Cal Offset:	0.153346	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	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	----	----
High point	4918	82.1	802.9	799.6	3.3	802.1	797.5	4.6	1.0010	1.0027
Mid point	4959	41.1	401.9	400.3	1.6	399.0	395.4	3.6	1.0074	1.0124
Low point	4980	20.5	200.5	199.7	0.8	197.0	194.9	2.1	1.0176	1.0244
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
As left span	4918	82.1	802.9	406.0	396.9	802.7	406.0	396.7	1.0003	1.0000
							Average Correction Factor		1.0087	1.0132

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	775.7	403.3	375.7	384.1	0.9781	102.2%
Mid GPT point	775.7	582.2	196.8	204.3	0.9632	103.8%
Low GPT point	775.7	682.4	96.6	99.7	0.9687	103.2%
				Average Correction Factor	0.9700	103.1%

Notes: Sample inlet filters changed after as founds. Adjusted zero and span. Used 2nd NO reference point because of drift.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

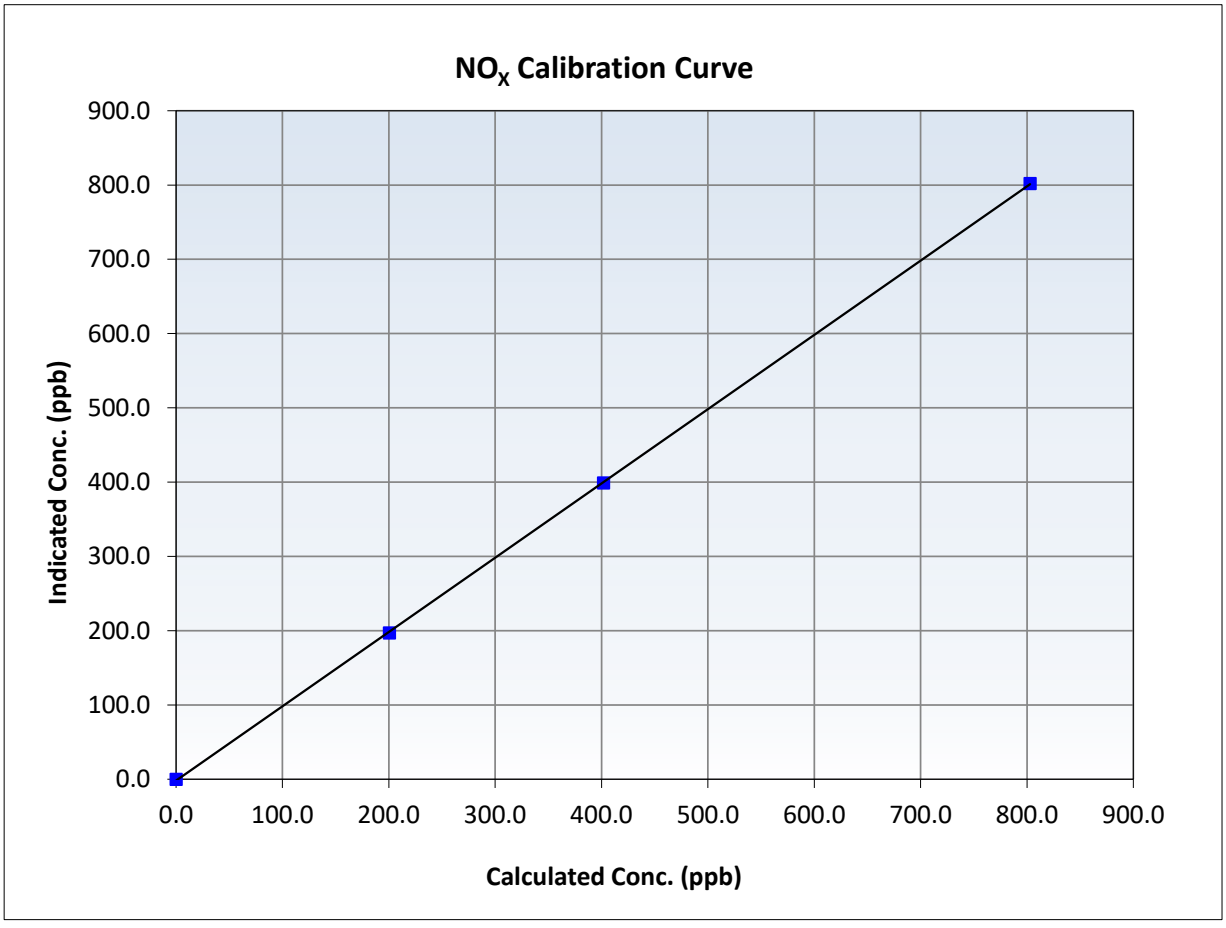
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 13, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:37	End Time (MST):	14:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
802.9	802.1	1.0010
401.9	399.0	1.0074
200.5	197.0	1.0176

Statistical Evaluation		Limits
Correlation Coefficient	0.999976	≥0.995
Slope	1.000009	0.90 - 1.10
Intercept	-1.813460	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

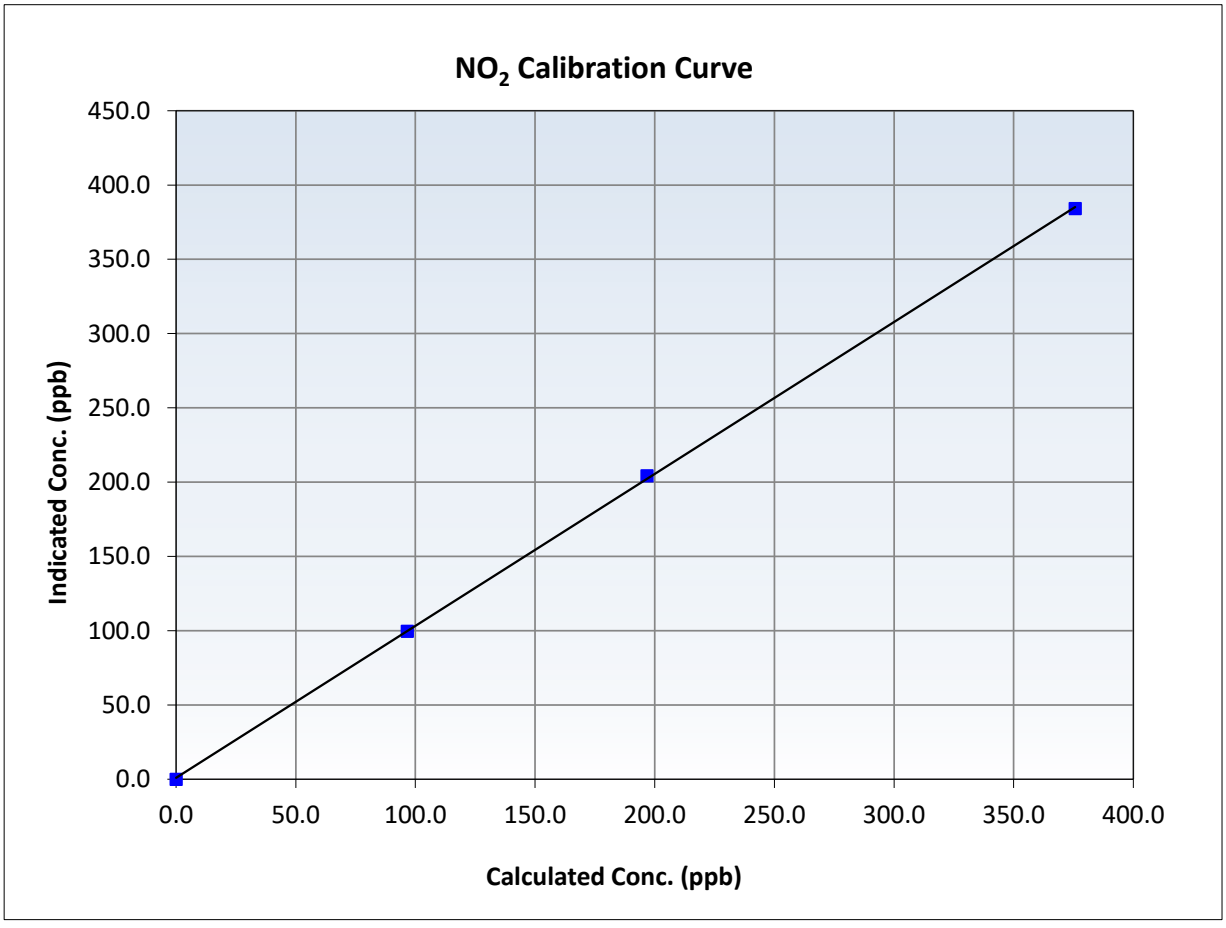
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 13, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:37	End Time (MST):	14:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
375.7	384.1	0.9781
196.8	204.3	0.9632
96.6	99.7	0.9687

Statistical Evaluation		Limits
Correlation Coefficient	0.999920	≥0.995
Slope	1.022718	0.90 - 1.10
Intercept	0.962157	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

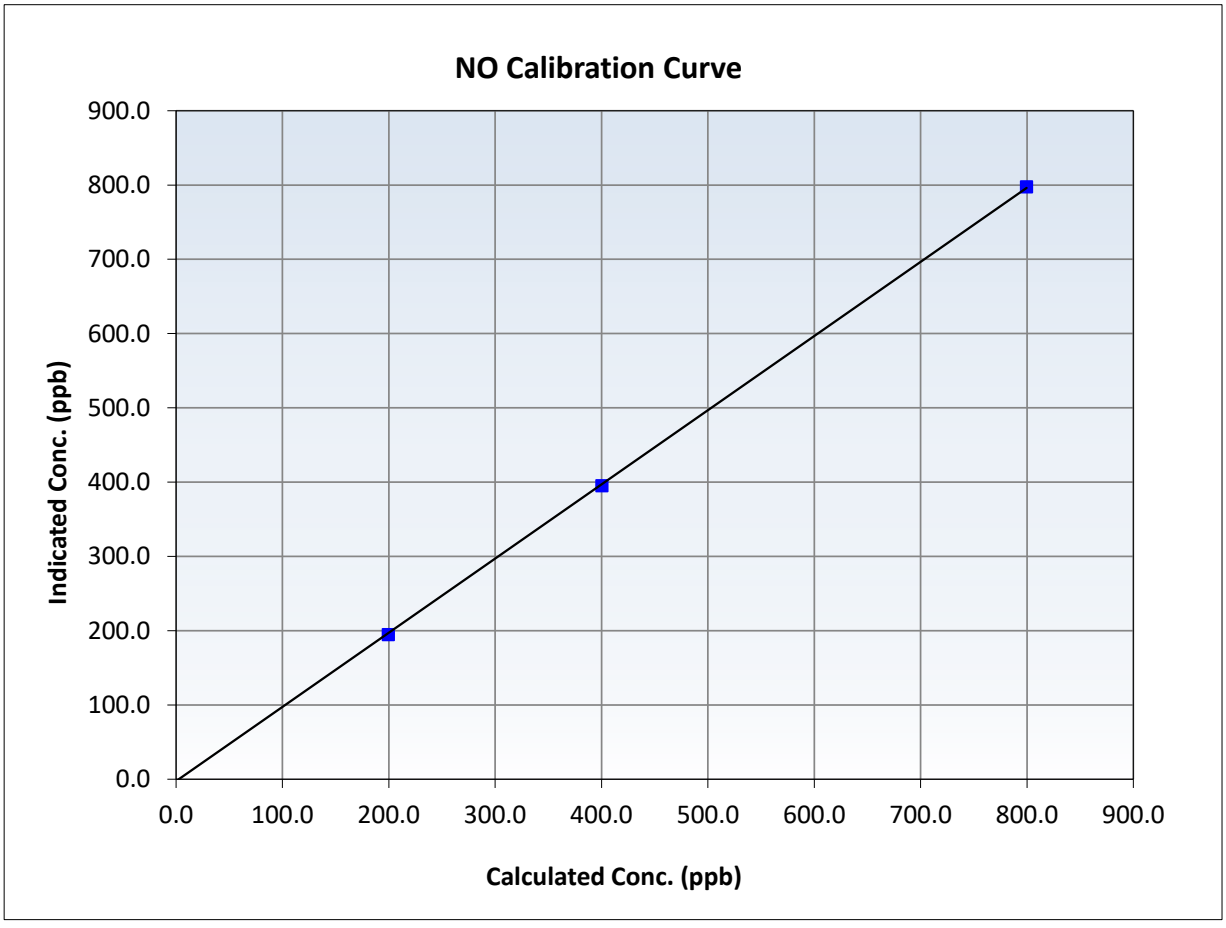
Station Information

Calibration Date:	April 23, 2024	Previous Calibration:	March 13, 2024
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	9:37	End Time (MST):	14:24
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

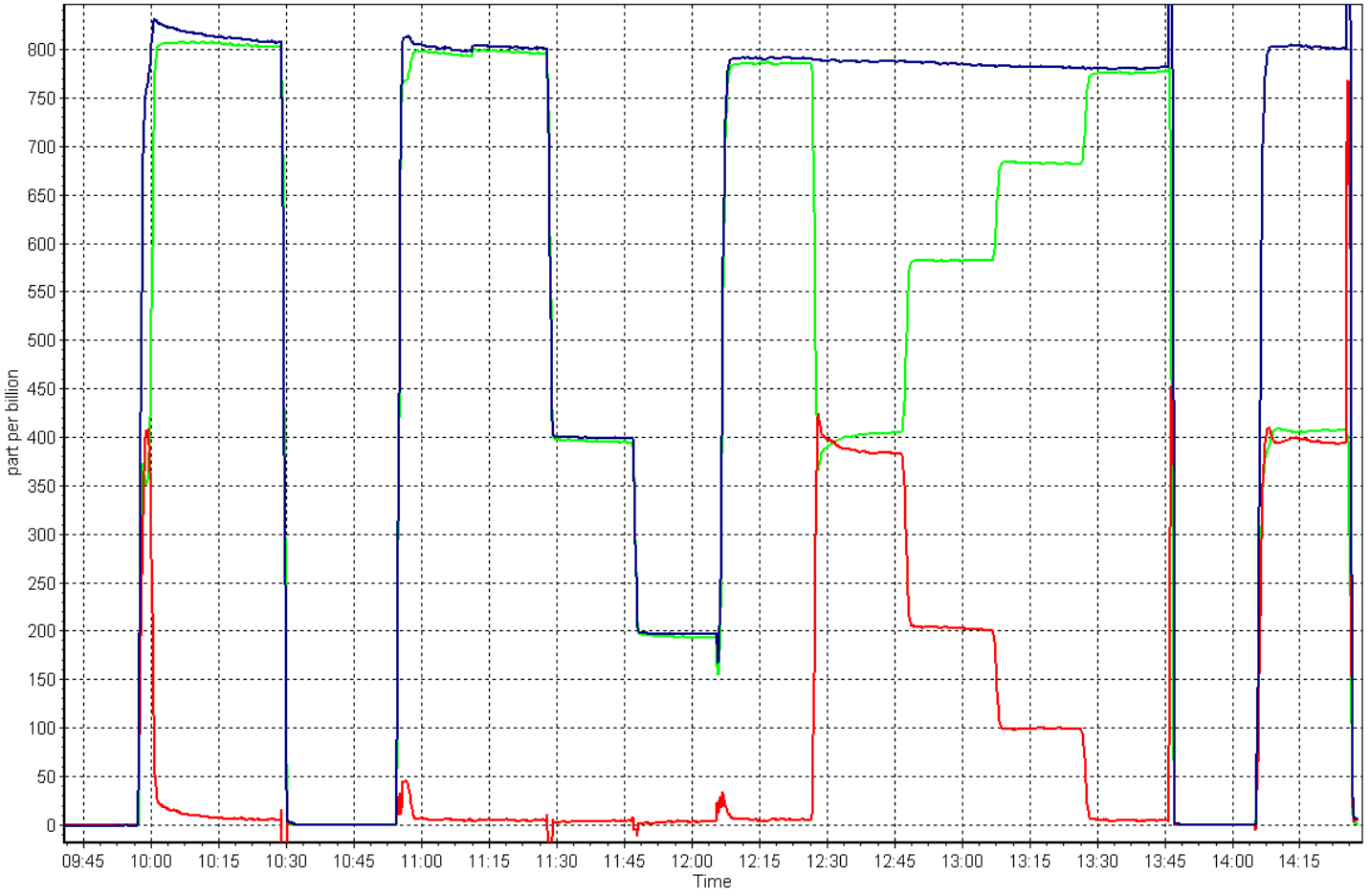
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.6	797.5	1.0027
400.3	395.4	1.0124
199.7	194.9	1.0244

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999956	*≥0.995*
Slope	0.998685	*0.90 - 1.10*
Intercept	-2.513223	*+/-20*



NO_X Calibration Plot Date: April 23, 2024 Location: Christina Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27
JACKFISH 2/3
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	April 15, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	11:03	End time (MST):	14:10
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:	1.003248	0.999989	Backgd or Offset:	8.7	8.4
Calibration intercept:	-1.638441	-1.697880	Coeff or Slope:	0.983	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	-0.2	----
As found High point	4921	79.1	800.2	821.4	0.974
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	821.6	Previous response	801.1	*% change	2.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	4921	79.1	800.2	799.2	1.001
Mid point	4961	39.5	399.5	397.6	1.005
Low point	4980	19.8	200.3	196.1	1.021
As left zero	5000	0.0	0.0	0.1	----
As left span	4921	79.1	800.2	803.7	0.996
				Average Correction Factor:	1.009

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

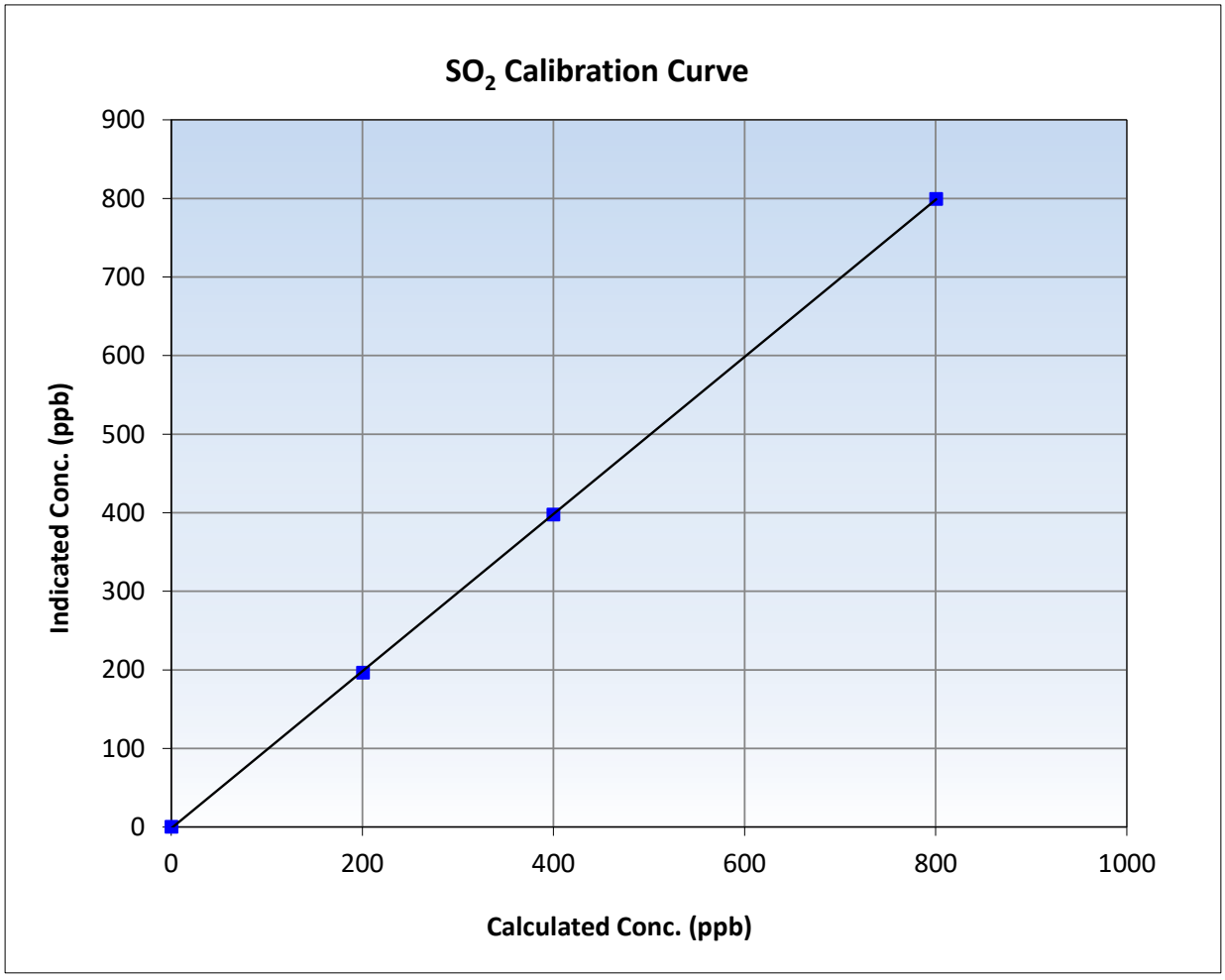
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 8, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:03	End Time (MST):	14:10
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	12124313138

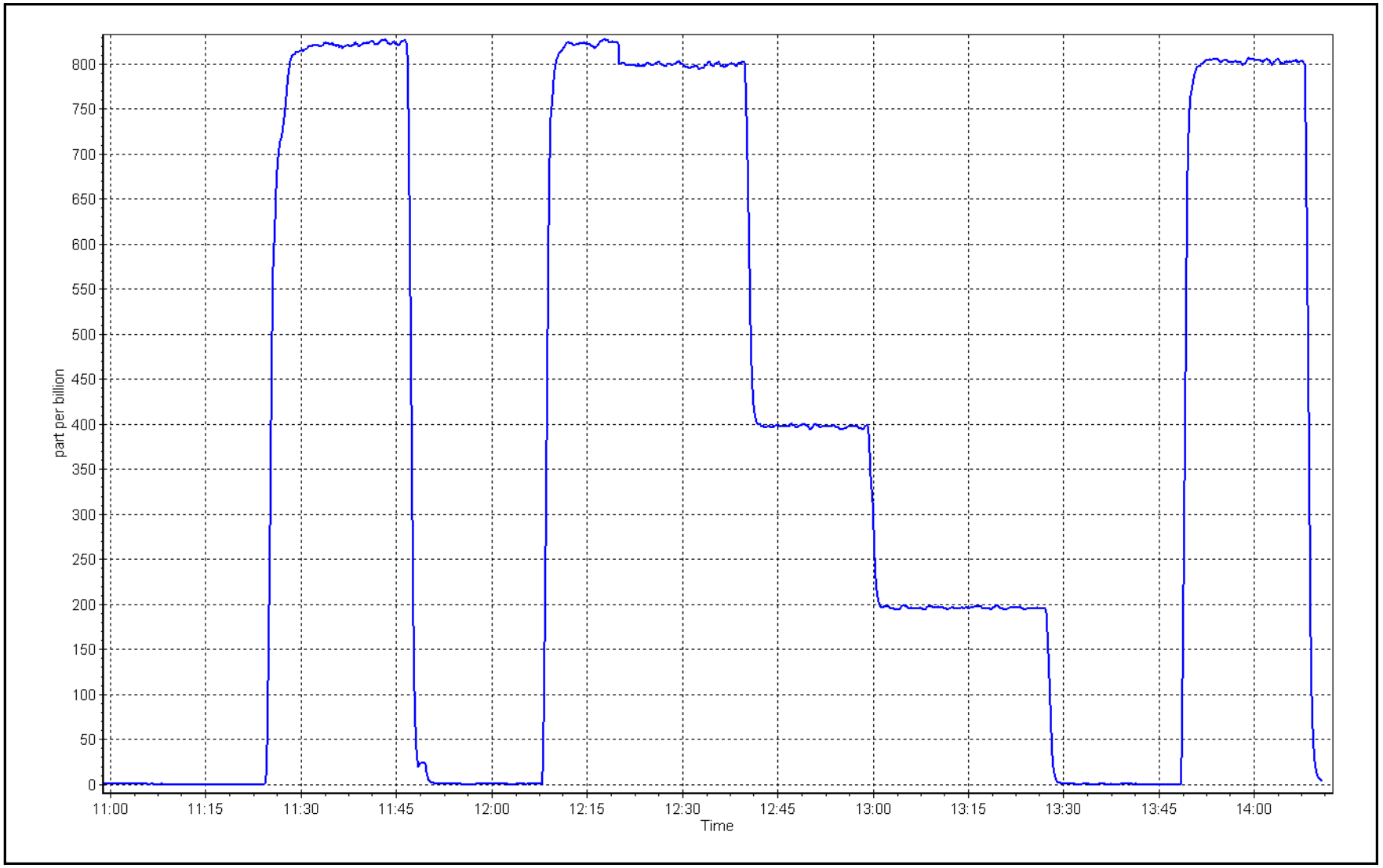
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.2	799.2	1.0012
399.5	397.6	1.0049
200.3	196.1	1.0214

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999969	*≥0.995*
Slope	0.999989	*0.90 - 1.10*
Intercept	-1.697880	*+/-30*



SO2 Calibration Plot Date: April 15, 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:	April 17, 2024	Last Cal Date:	March 12, 2024
Start time (MST):	10:34	End time (MST):	15:17
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:	1.014173	0.990223	Backgd or Offset:	29.9	29.9
Calibration intercept:	-0.277753	-0.338155	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	-0.3	----
As found High point	4926	74.1	80.2	81.0	0.986
As found Mid point	4963	37.0	40.0	40.4	0.984
As found Low point	4982	18.5	20.0	19.4	1.016
New cylinder response					

Baseline Corr As found:	81.3	Prev response:	81.03	*% change:	0.3%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	1.016734	AF Intercept:	-0.517520
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999923	* = > +/-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	80.2	79.1	1.014
Mid point	4963	37.0	40.0	39.4	1.016
Low point	4982	18.5	20.0	19.1	1.048
As left zero	5000	0.0	0.0	0.0	----
As left span	4926	74.1	80.2	79.5	1.008
SO2 Scrubber Check	4921	79.1	791.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.026
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

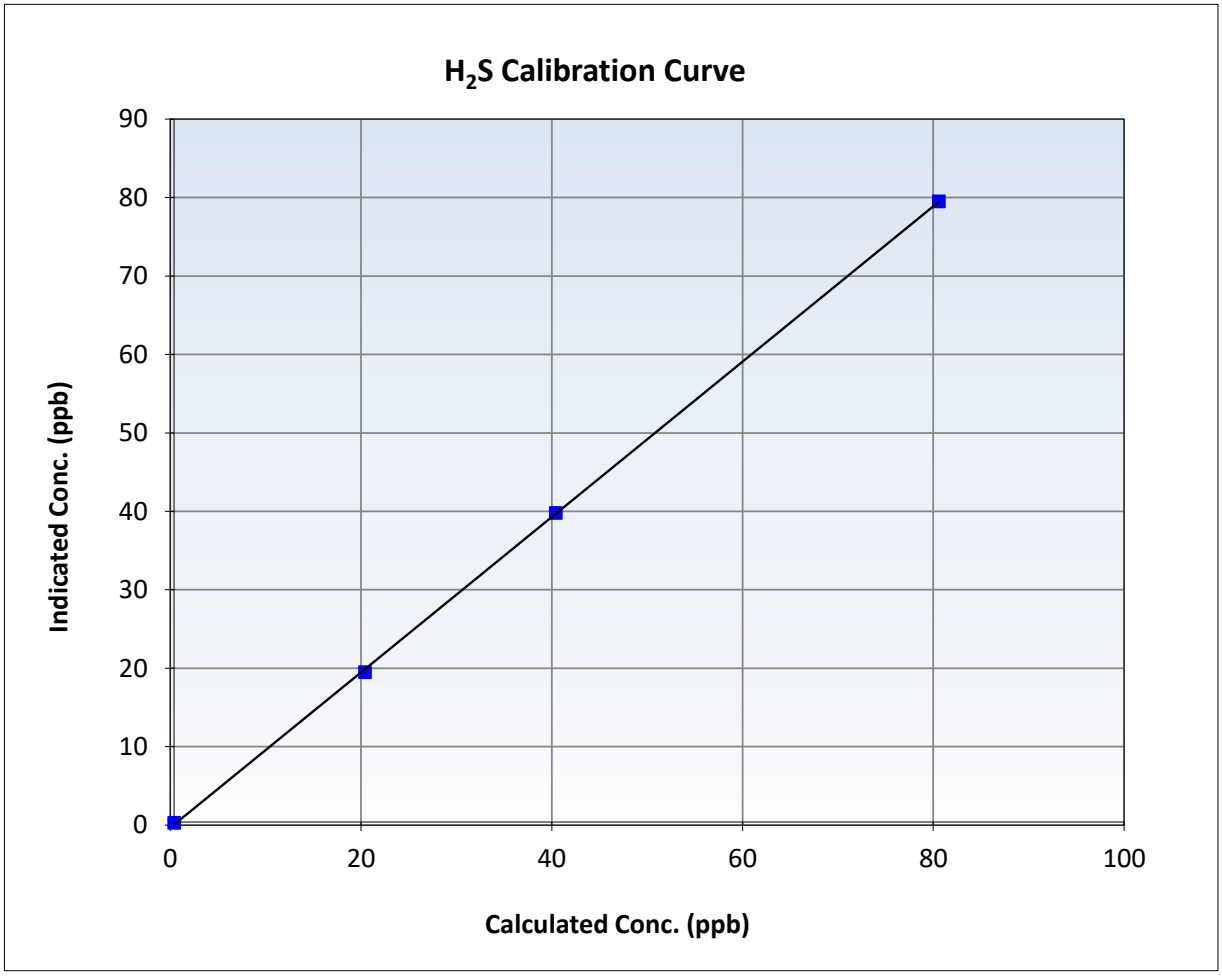
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 12, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	10:34	End Time (MST):	15:17
Analyzer make:	API T101	Analyzer serial #:	621

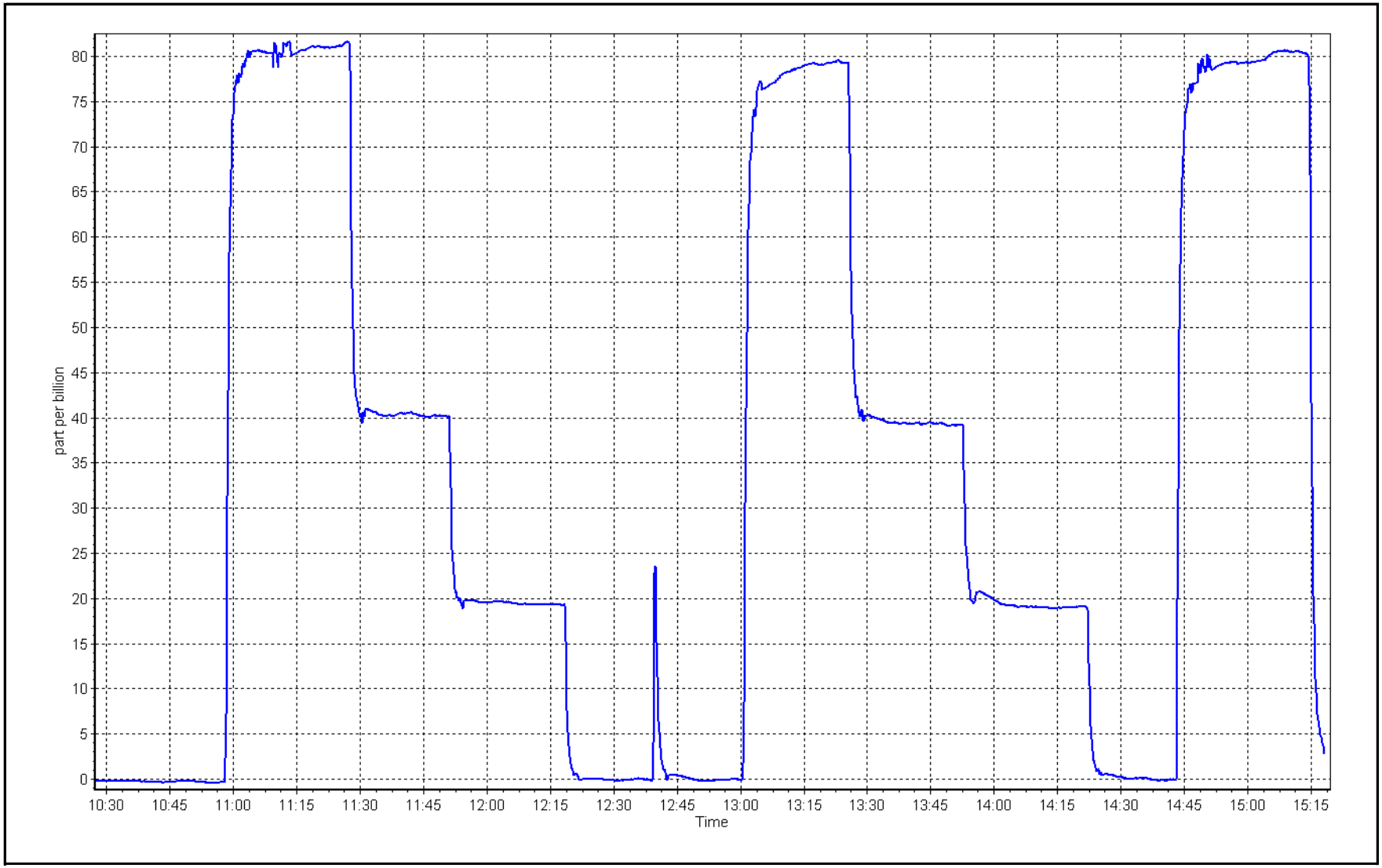
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.2	79.1	1.0136
40.0	39.4	1.0161
20.0	19.1	1.0479

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999938	*≥0.995*
Slope	0.990223	*0.90 - 1.10*
Intercept	-0.338155	*+/-3*



H_2S Calibration Plot Date: April 17, 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:	April 18, 2024
Last Cal Date:	March 19, 2024
Start time (MST):	11:47
End time (MST):	17:26
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	-0.3	-0.3	0.0	----	----
AF High point	4942	66.5	800.6	799.3	1.3	771.6	764.6	7.0	1.0372	1.0450
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 795.9 ppb	NO = 796.6 ppb
Baseline Corr 1st pt	NO_X = 771.9 ppb	NO = 764.9 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 = -3.1%
As found	NO r^2:	*Percent Change	NO = -4.1%
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: API T200 Serial Number: 722

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.236	1.271	NO bkgnd or offset:	0.3	0.3
NOX coeff or slope:	1.217	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:	0.998635	1.004943
NO_X Cal Offset:	-3.655643	-4.114844
NO Cal Slope:	1.002024	0.996905
NO Cal Offset:	-4.335475	-3.695611
NO_2 Cal Slope:	0.991424	0.980873
NO_2 Cal Offset:	-0.986298	1.007817

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	0.5	-0.7	----	----
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	397.2	392.7	4.5	1.0086	1.0185
Low point	4996	16.6	199.7	199.4	0.3	192.2	191.0	1.2	1.0390	1.0438
As left zero	5000	0.0	0.0	0.0	0.0	1.1	2.2	-1.1	----	----
As left span	4942	66.5	800.6	415.6	385.0	799.6	415.6	384.0	1.0013	1.0000
							Average Correction Factor		1.0152	1.0224

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	-0.7	----	----
High GPT point	801.8	413.5	389.6	382.7	1.0181	98.2%
Mid GPT point	801.8	627.2	175.9	173.5	1.0140	98.6%
Low GPT point	801.8	714.4	88.7	90.3	0.9826	101.8%
				Average Correction Factor	1.0049	99.5%

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

NO_X Calibration Summary

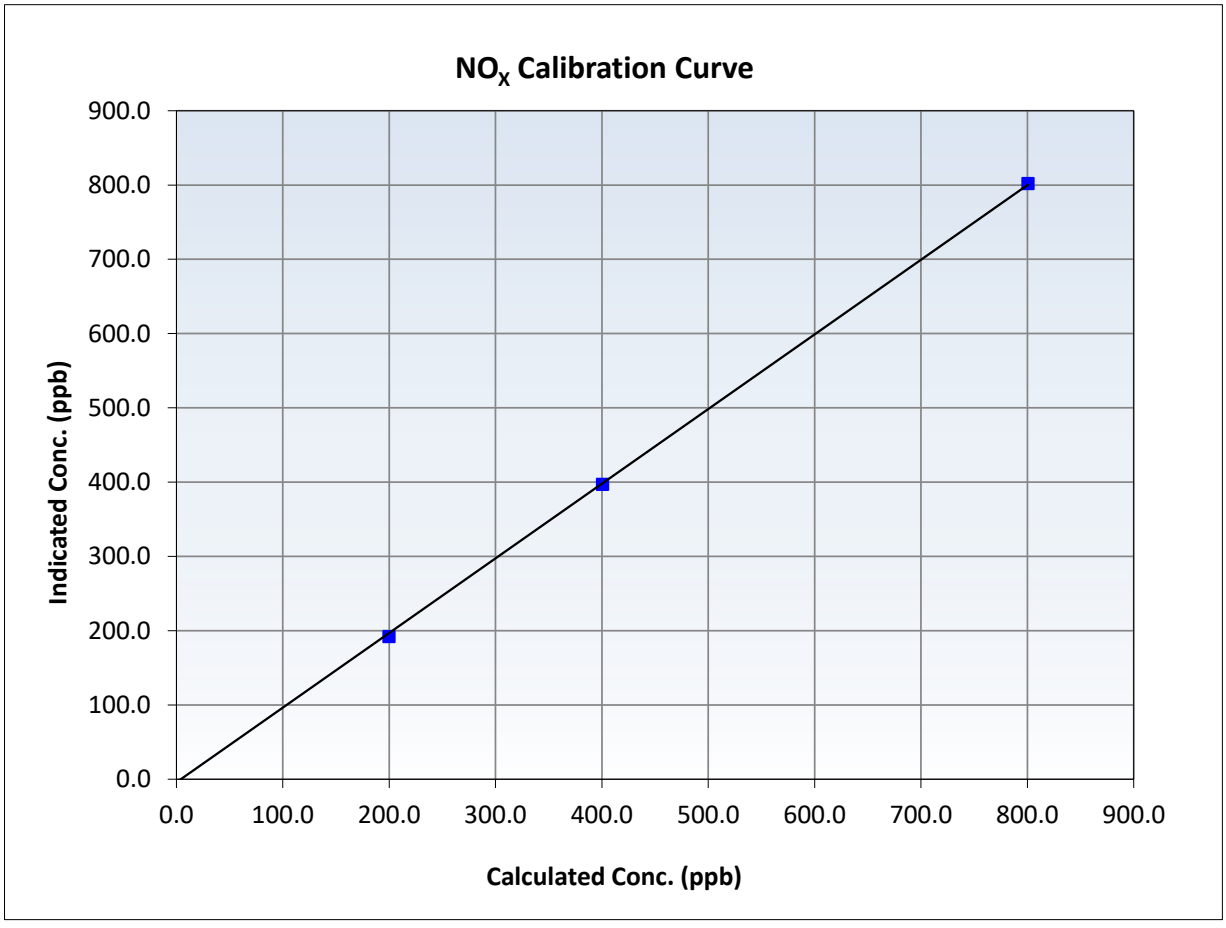
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 19, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:47	End Time (MST):	17:26
Analyzer make:	API T200	Analyzer serial #:	722

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
800.6	802.2	0.9980
400.6	397.2	1.0086
199.7	192.2	1.0390

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999890	*≥0.995*
Slope	1.004943	*0.90 - 1.10*
Intercept	-4.114844	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

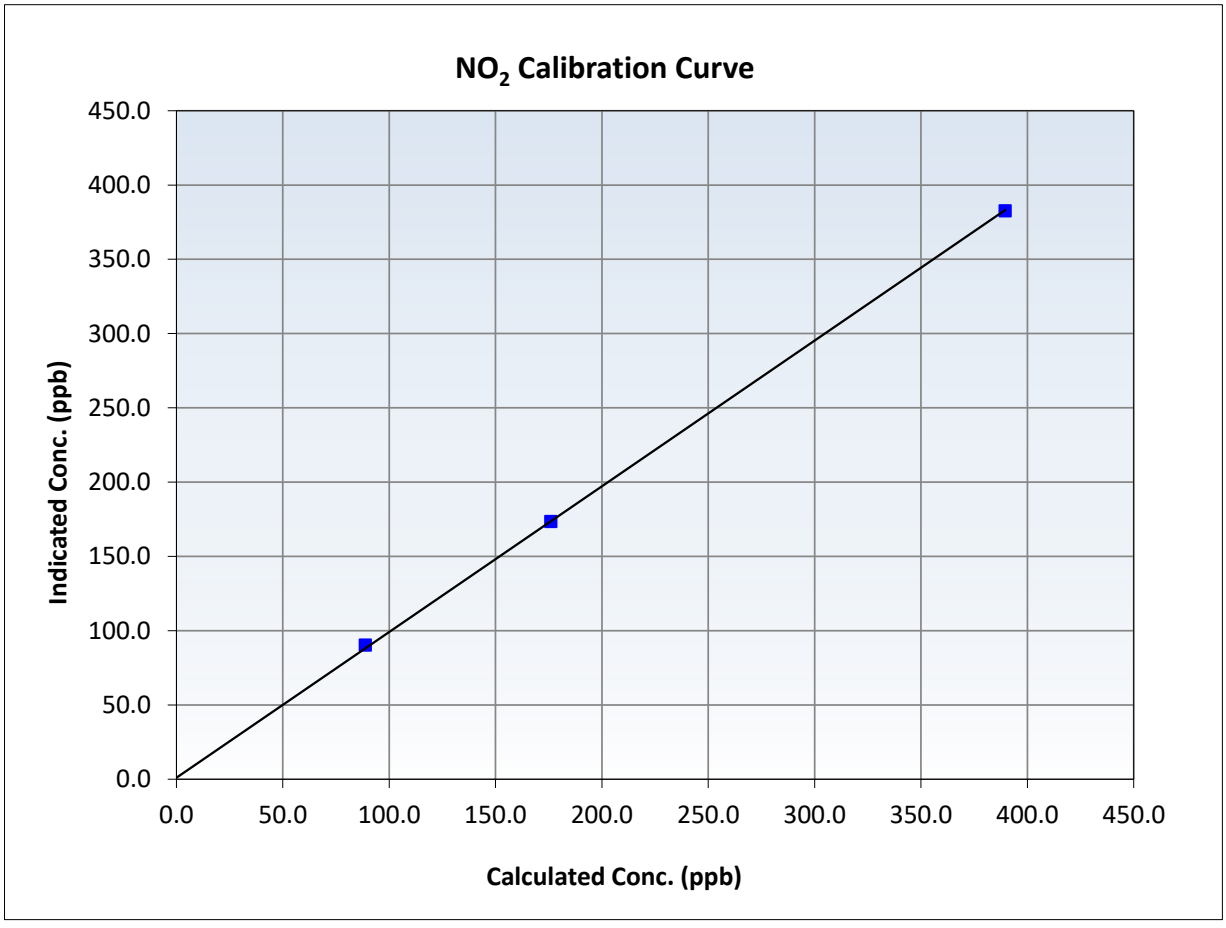
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 19, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:47	End Time (MST):	17:26
Analyzer make:	API T200	Analyzer serial #:	722

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.7	----
389.6	382.7	1.0181
175.9	173.5	1.0140
88.7	90.3	0.9826

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999897	*≥0.995*
Slope	0.980873	*0.90 - 1.10*
Intercept	1.007817	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

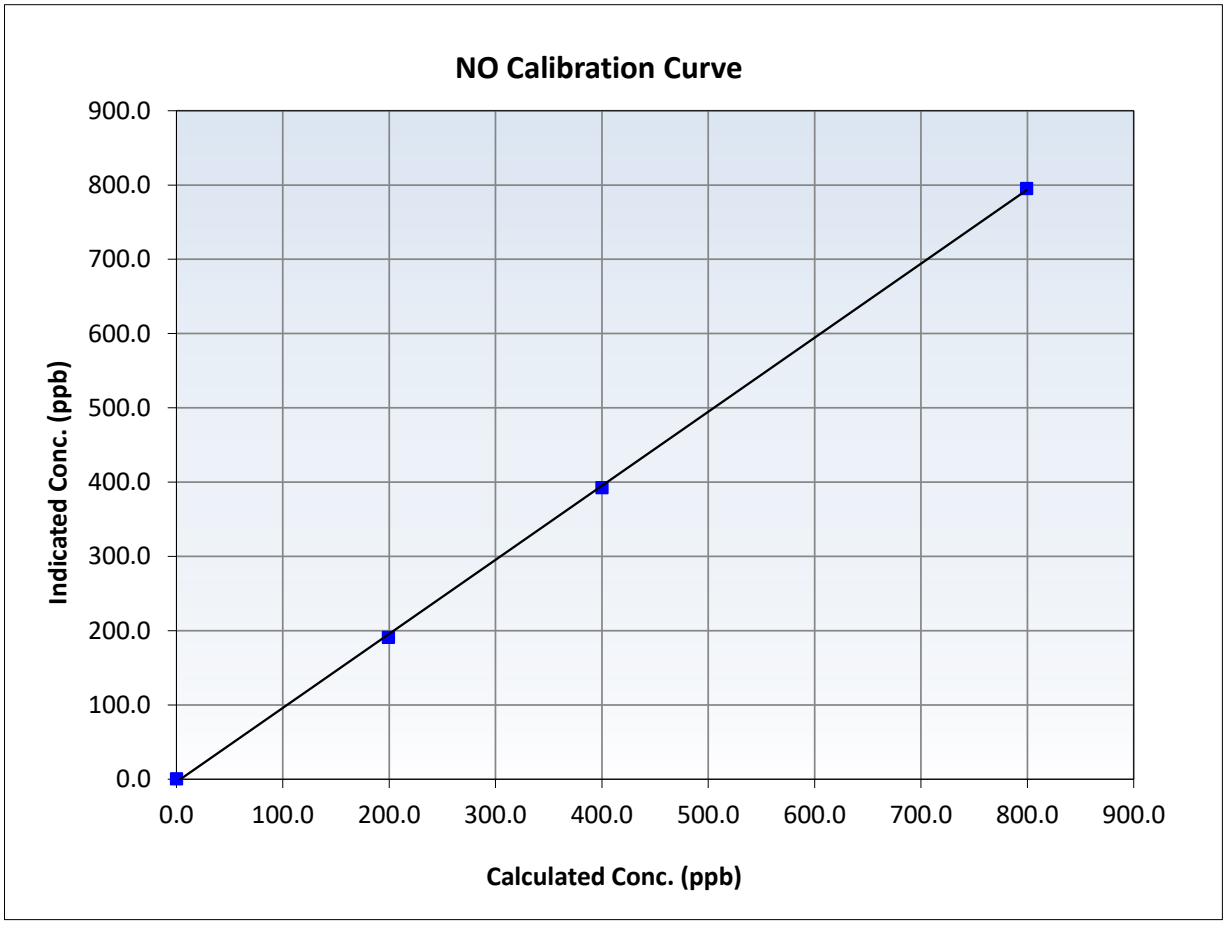
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 19, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:47	End Time (MST):	17:26
Analyzer make:	API T200	Analyzer serial #:	722

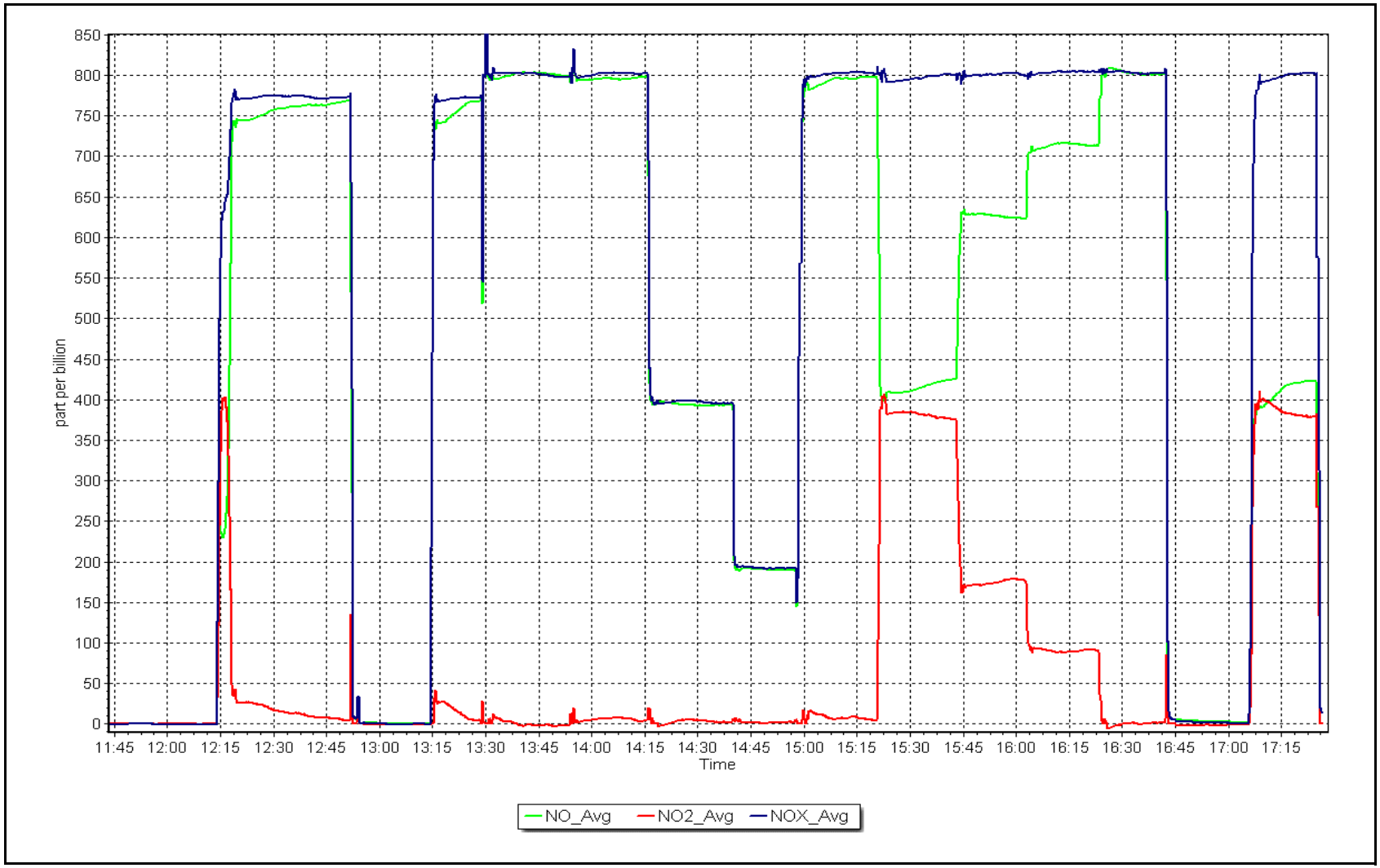
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
799.3	795.3	1.0050
399.9	392.7	1.0185
199.4	191.0	1.0438

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999873	*≥0.995*
Slope	0.996905	*0.90 - 1.10*
Intercept	-3.695611	*+/-20*



NO_X Calibration Plot Date: April 18, 2024 Location: Jackfish 2/3



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS29
SURMONT 2
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	April 12, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	9:45	End time (MST):	14:18
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:	1.007141	1.006014	Backgd or Offset:	12.9	13.0
Calibration intercept:	-1.805499	-1.785690	Coeff or Slope:	0.939	0.939

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	803.0	0.996
As found Mid point	4959	40.7	400.6	400.1	1.001
As found Low point	4979	20.3	199.8	197.6	1.011
New cylinder response					
Baseline Corr As found:	803.1	Previous response	804.0	*% change	-0.1%
Baseline Corr 2nd AF pt:	400.2	AF Slope:	1.004700	AF Intercept:	-1.625629
Baseline Corr 3rd AF pt:	197.7	AF Correlation:	0.999984	* = > +/-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	81.3	800.1	804.0	0.995
Mid point	4959	40.7	400.6	400.4	1.000
Low point	4979	20.3	199.8	197.4	1.012
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	81.3	800.1	803.0	0.996
				Average Correction Factor:	1.003

Notes: No maintenance done. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

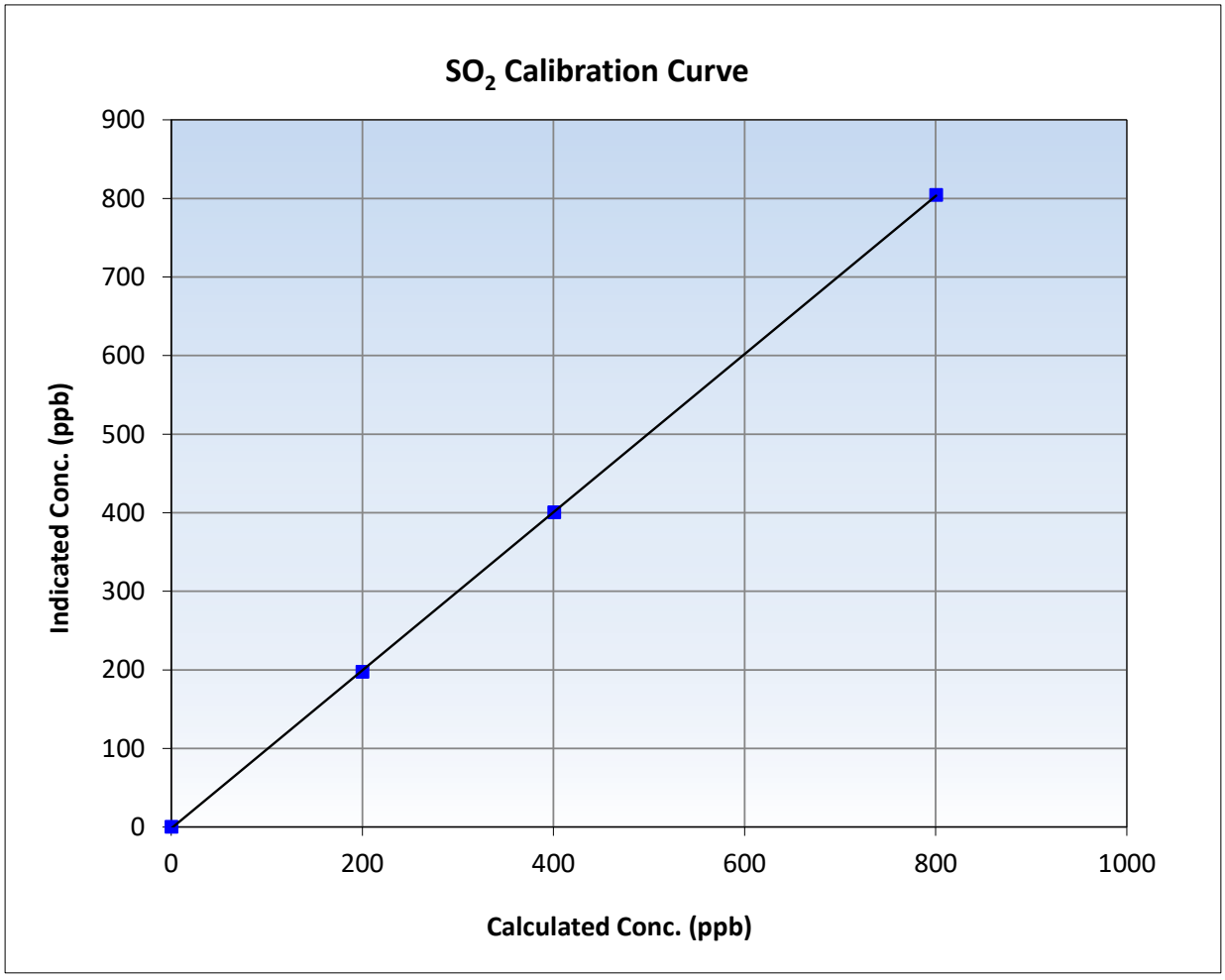
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 8, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:45	End Time (MST):	14:18
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

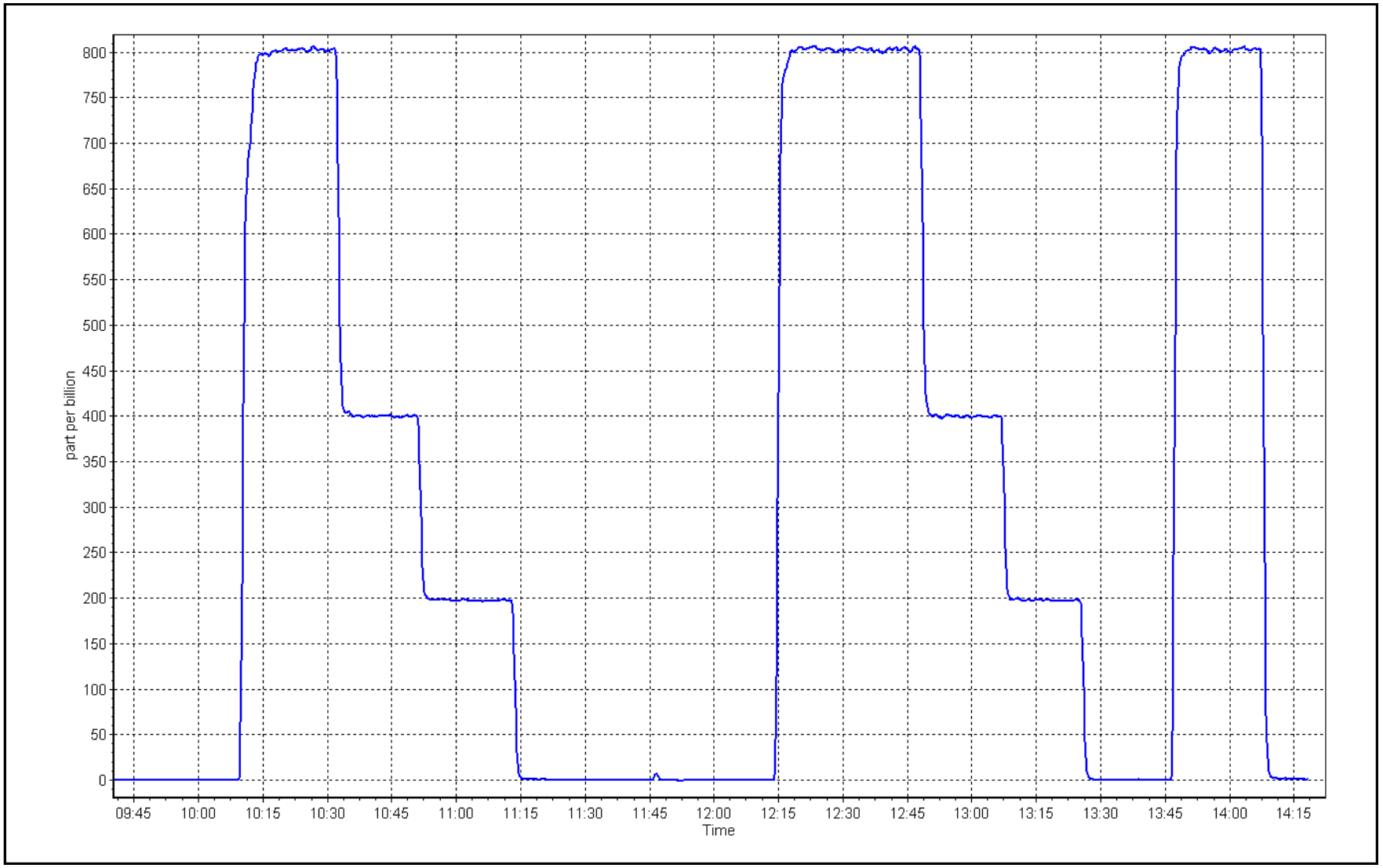
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.1	804.0	0.9952
400.6	400.4	1.0005
199.8	197.4	1.0123

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999977	*≥0.995*
Slope	1.006014	*0.90 - 1.10*
Intercept	-1.785690	*+/-30*



SO2 Calibration Plot Date: April 12, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	April 15, 2024	Last Cal Date:	March 7, 2024
Start time (MST):	10:24	End time (MST):	15:06
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:	0.997613	0.998614	Backgd or Offset:	0.92	0.90
Calibration intercept:	0.017447	-0.142639	Coeff or Slope:	1.074	1.050

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	82.0	0.974
As found Mid point	4962.9	37.2	40.1	41.0	0.976
As found Low point	4981.5	18.6	20.1	20.3	0.983
New cylinder response					

Baseline Corr As found:	82.1	Prev response:	79.83	*% change:	2.8%
Baseline Corr 2nd AF pt:	41.1	AF Slope:	1.026903	AF Intercept:	-0.183896
Baseline Corr 3rd AF pt:	20.4	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4925.8	74.2	80.0	79.8	1.003
Mid point	4962.9	37.2	40.1	39.8	1.008
Low point	4981.5	18.6	20.1	19.9	1.008
As left zero	5000	0.0	0.0	0.0	----
As left span	4925.8	74.2	80.0	79.3	1.009
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

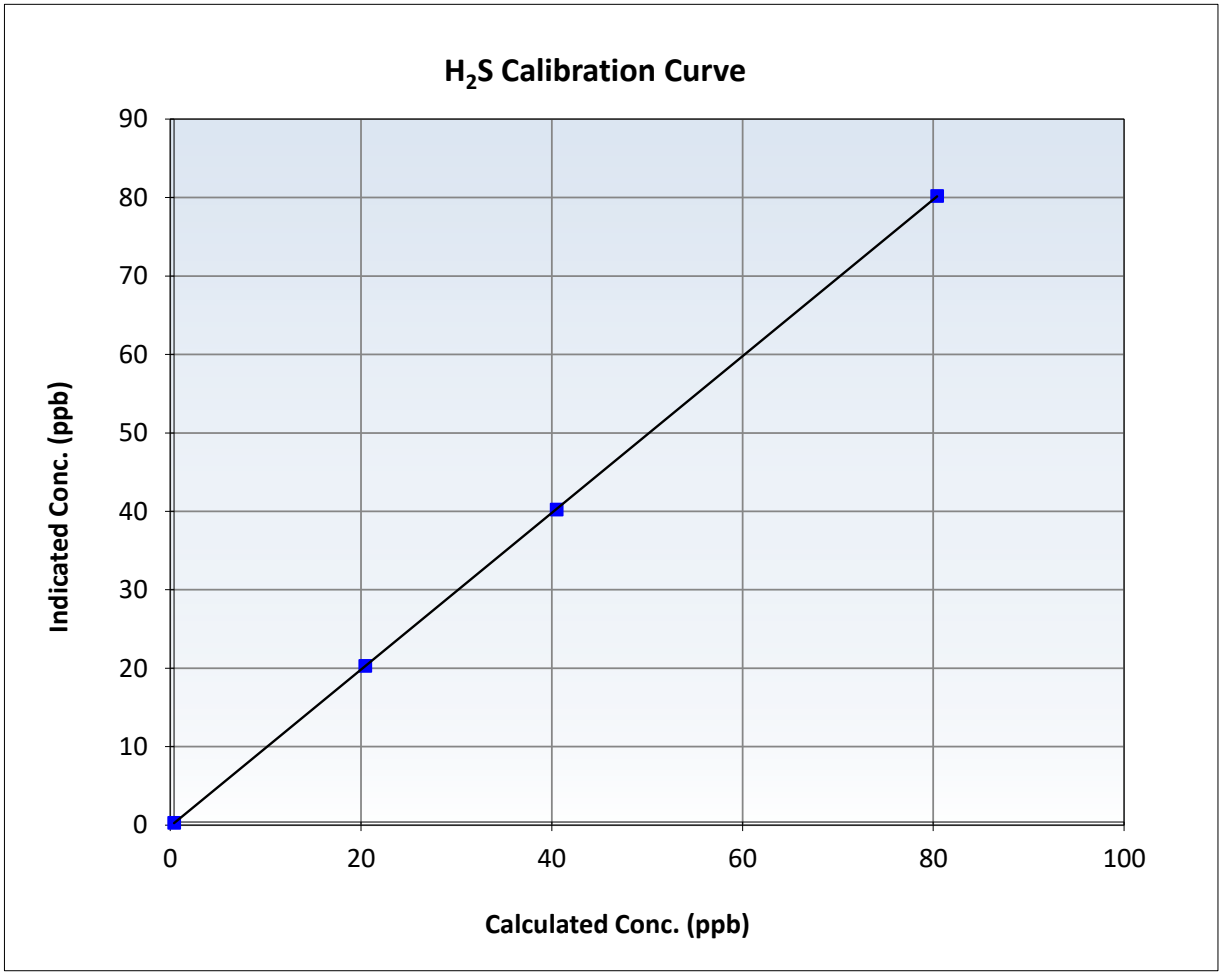
Station Information

Calibration Date:	April 15, 2024	Previous Calibration:	March 7, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:24	End Time (MST):	15:06
Analyzer make:	Thermo 43iQ-TLE	Analyzer serial #:	1200326170

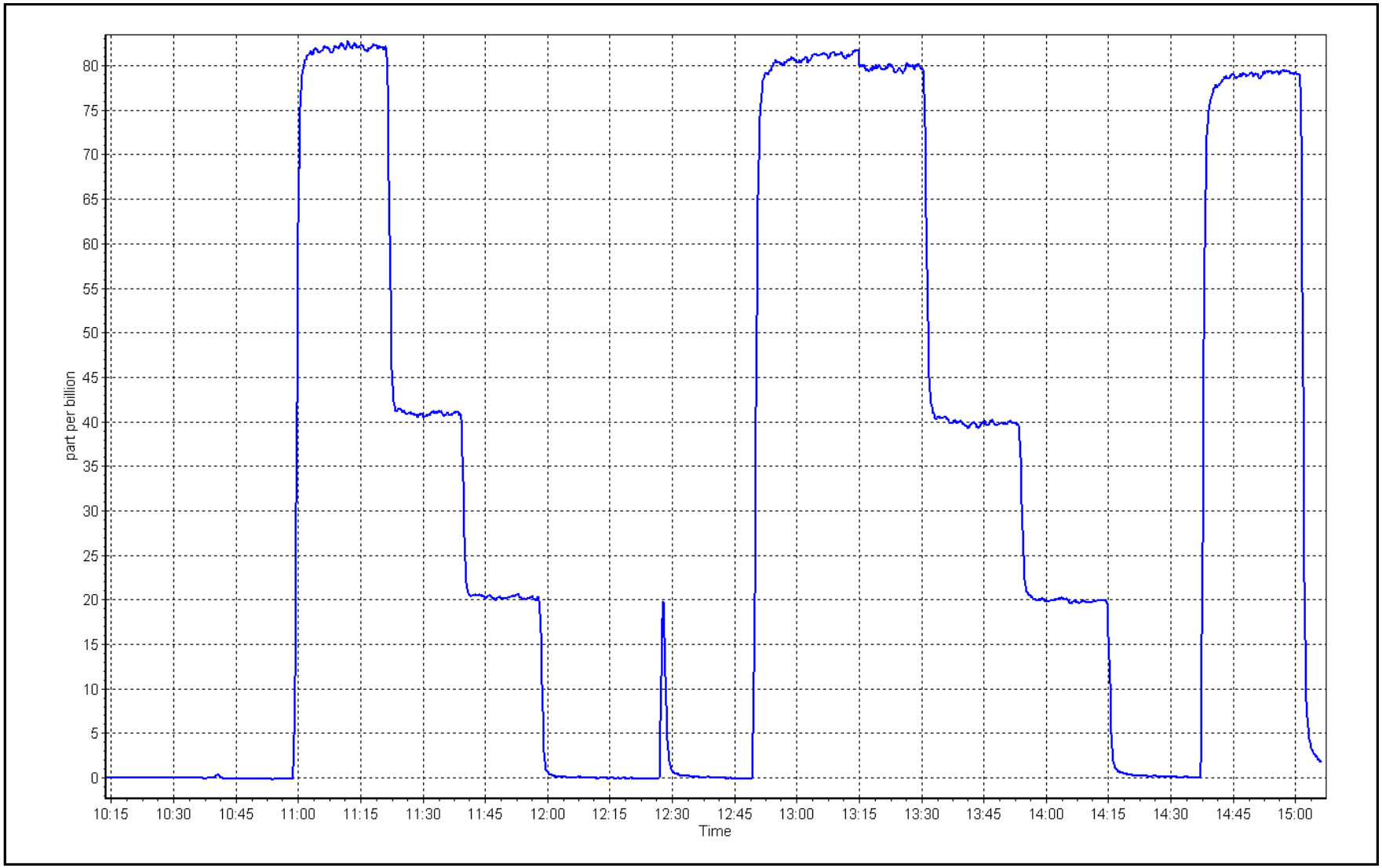
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	79.8	1.0025
40.1	39.8	1.0077
20.1	19.9	1.0077

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.998614	*0.90 - 1.10*
Intercept	-0.142639	*+/-3*



H2S Calibration Plot Date: April 15, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	April 12, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	9:45	End time (MST):	14:18
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC356008		Cal Gas Expiry Date:		
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:	1.004976	0.997593	Background:	3.64	3.50
Calibration intercept:	-0.063439	-0.041046	Coefficient:	4.046	3.886

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	-0.12	----
As found High point	4918	81.3	17.31	16.52	1.040
As found Mid point	4959	40.6	8.65	8.23	1.035
As found Low point	4979	20.3	4.32	4.08	1.029
New cylinder response					
Baseline Corr As found:	16.64	Previous response	17.34	*% change	-4.2%
Baseline Corr 2nd AF pt:	8.35	AF Slope:	0.960509	AF Intercept:	-0.094793
Baseline Corr 3rd AF pt:	4.20	AF Correlation:	0.999988	* = > +/-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	-0.02	----
High point	4918	81.3	17.31	17.23	1.005
Mid point	4959	40.6	8.65	8.61	1.004
Low point	4979	20.3	4.32	4.23	1.023
As left zero	5000	0.0	0.00	-0.04	----
As left span	4918	81.3	17.31	17.43	0.993
				Average Correction Factor	1.011

Notes: Swapped 51i internal pump, nightly Z/S solenoid valve. Adjusted span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

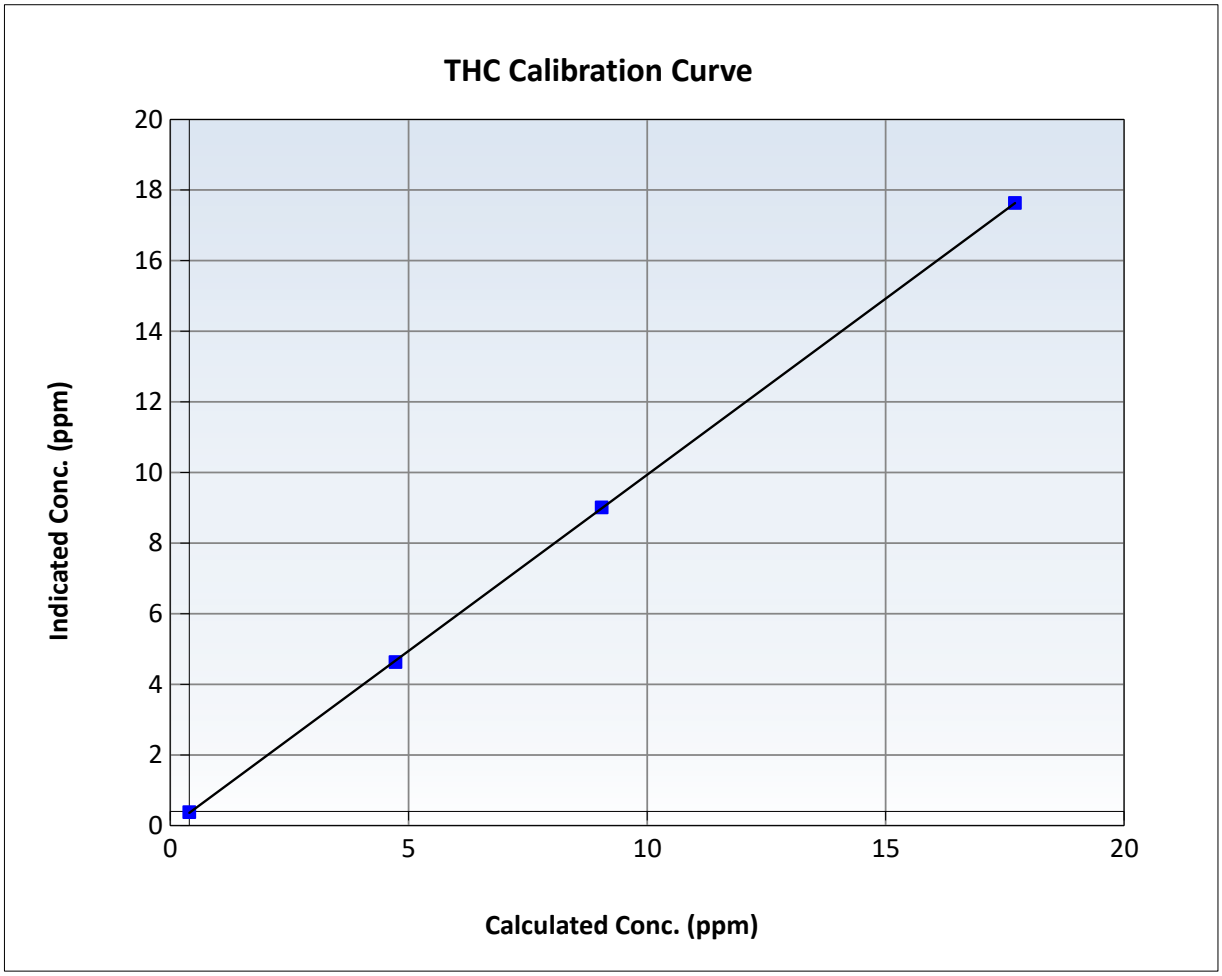
Station Information

Calibration Date:	April 12, 2024	Previous Calibration:	March 8, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:45	End Time (MST):	14:18
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

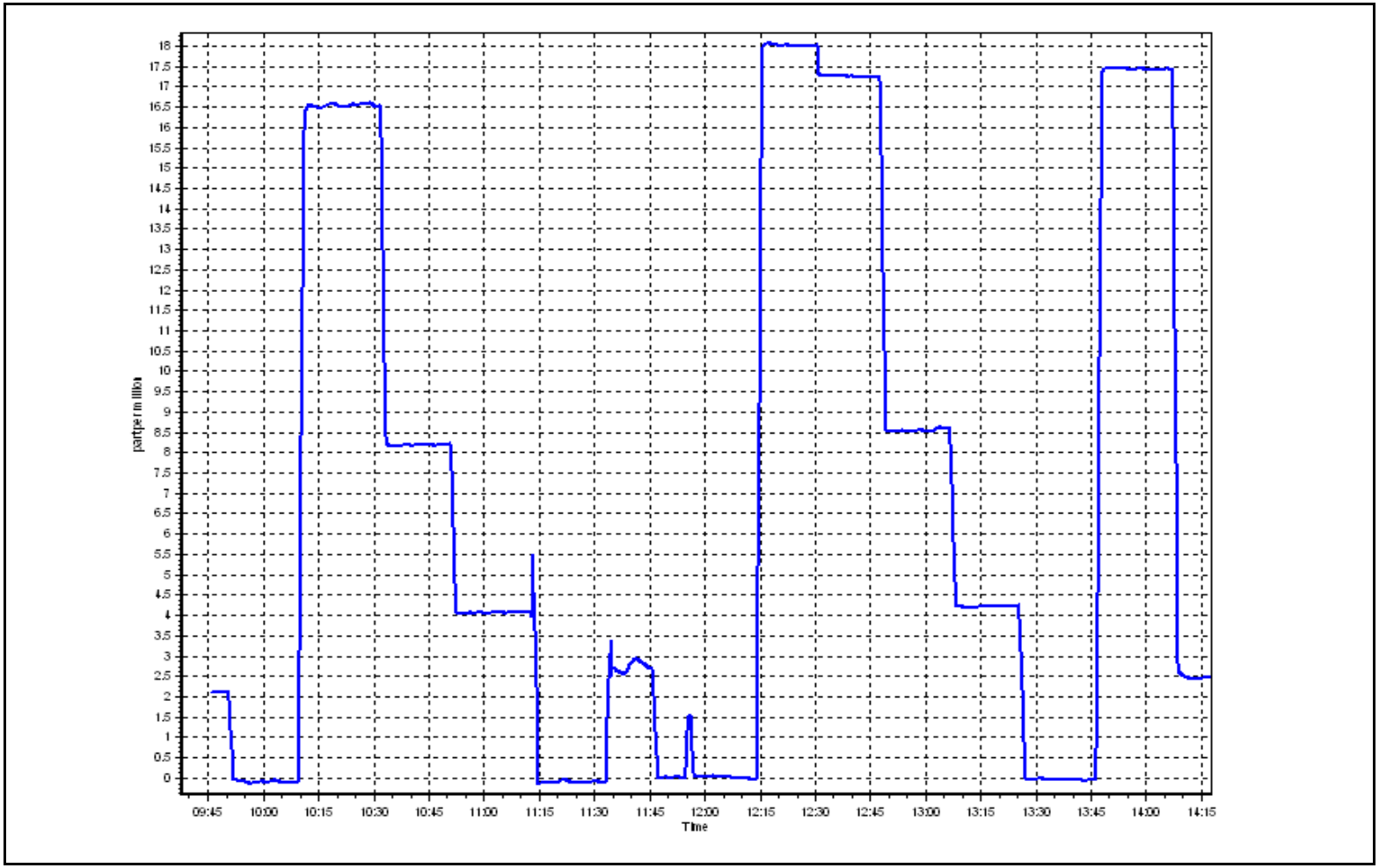
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.02	----
17.31	17.23	1.0049
8.65	8.61	1.0042
4.32	4.23	1.0232

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.997593	*0.90 - 1.10*
Intercept	-0.041046	*+/-1.5*



THC Calibration Plot Date: April 12, 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:	April 2, 2024
Last Cal Date:	March 6, 2024
Start time (MST):	9:50
End time (MST):	14:33
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	-0.2	-0.2	0.0	----	----
AF High point	4916	84.3	800.1	800.1	0.0	790.4	789.8	0.6	1.0121	1.0128
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.7 ppb	NO = 799.0 ppb
Baseline Corr 1st pt	NO_X = 790.6 ppb	NO = 790.0 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 = -1.2%
As found	NO r^2:	*Percent Change	NO = -1.1%
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: 1170050148

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.414	1.429	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	1.4	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	174.7	173.8

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000767	1.001053
NO_X Cal Offset:	-1.012410	-0.812441
NO Cal Slope:	1.000380	1.000036
NO Cal Offset:	-1.452150	-1.731680
NO_2 Cal Slope:	0.998848	1.002282
NO_2 Cal Offset:	0.144949	0.146547

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	84.2	799.2	799.2	0.0	799.2	797.8	1.3	1.0000	1.0017
Mid point	4958	42.1	399.6	399.6	0.0	400.1	398.7	1.4	0.9988	1.0023
Low point	4979	21.1	200.3	200.3	0.0	198.0	195.7	2.3	1.0115	1.0234
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4916	84.2	799.2	408.8	390.4	795.1	408.8	386.3	1.0051	1.0000
								Average Correction Factor	1.0034	1.0091

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	793.2	406.1	387.1	388.2	0.9972	100.3%
Mid GPT point	793.2	608.7	184.5	184.7	0.9989	100.1%
Low GPT point	793.2	701.5	91.7	92.5	0.9914	100.9%
				Average Correction Factor	0.9958	100.4%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

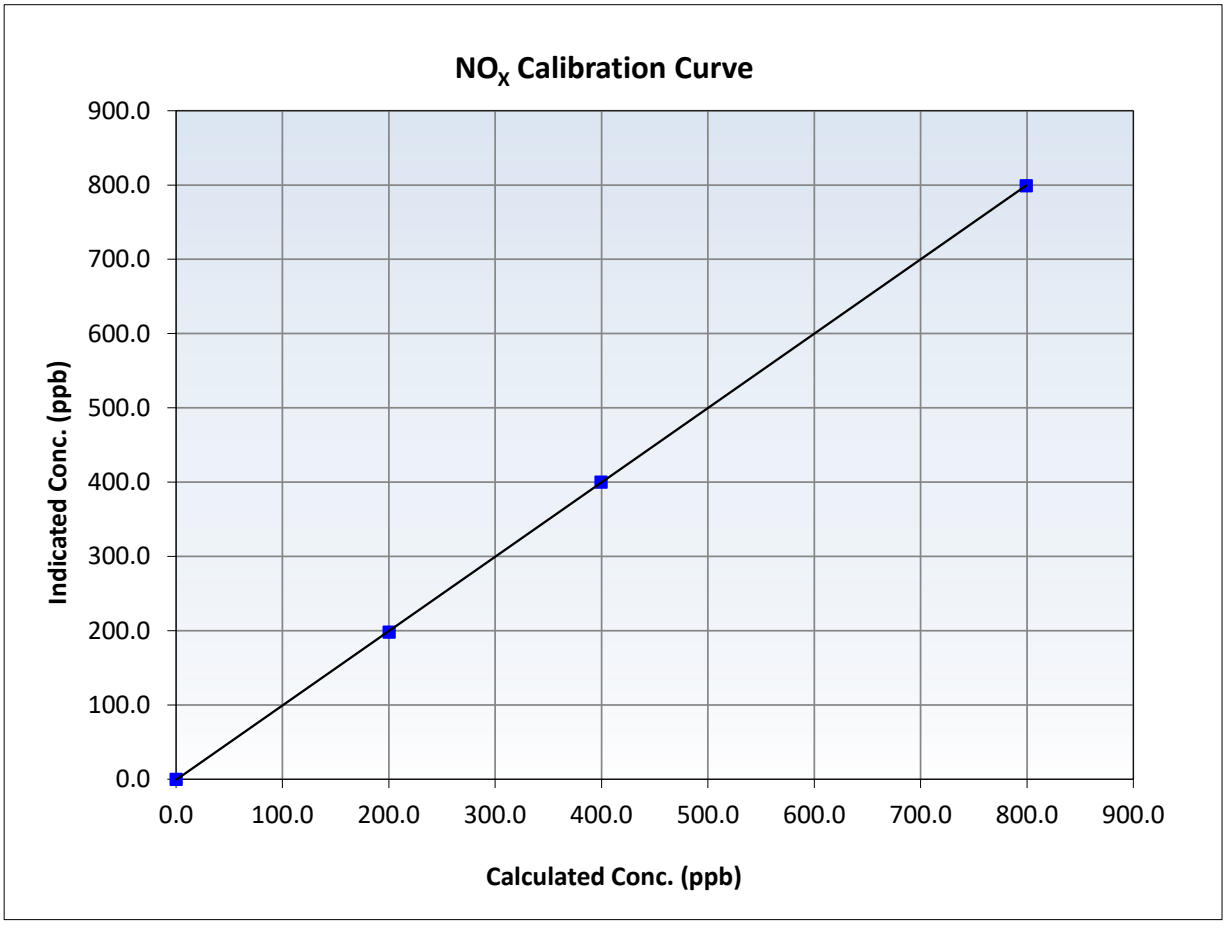
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:50	End Time (MST):	14:33
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	----
799.2	799.2	1.0000
399.6	400.1	0.9988
200.3	198.0	1.0115

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	1.001053	*0.90 - 1.10*
Intercept	-0.812441	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

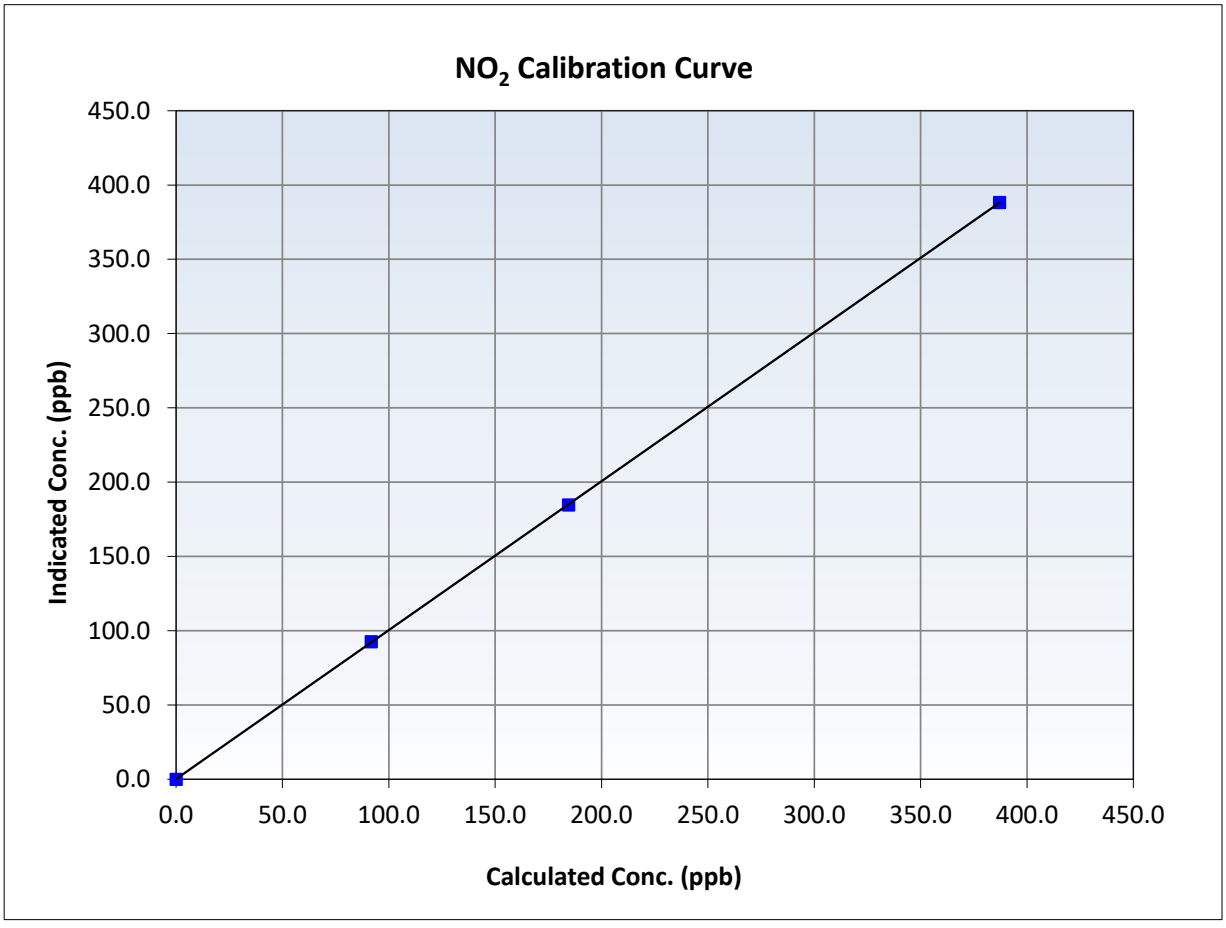
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:50	End Time (MST):	14:33
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	----
387.1	388.2	0.9972
184.5	184.7	0.9989
91.7	92.5	0.9914

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.002282	*0.90 - 1.10*
Intercept	0.146547	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

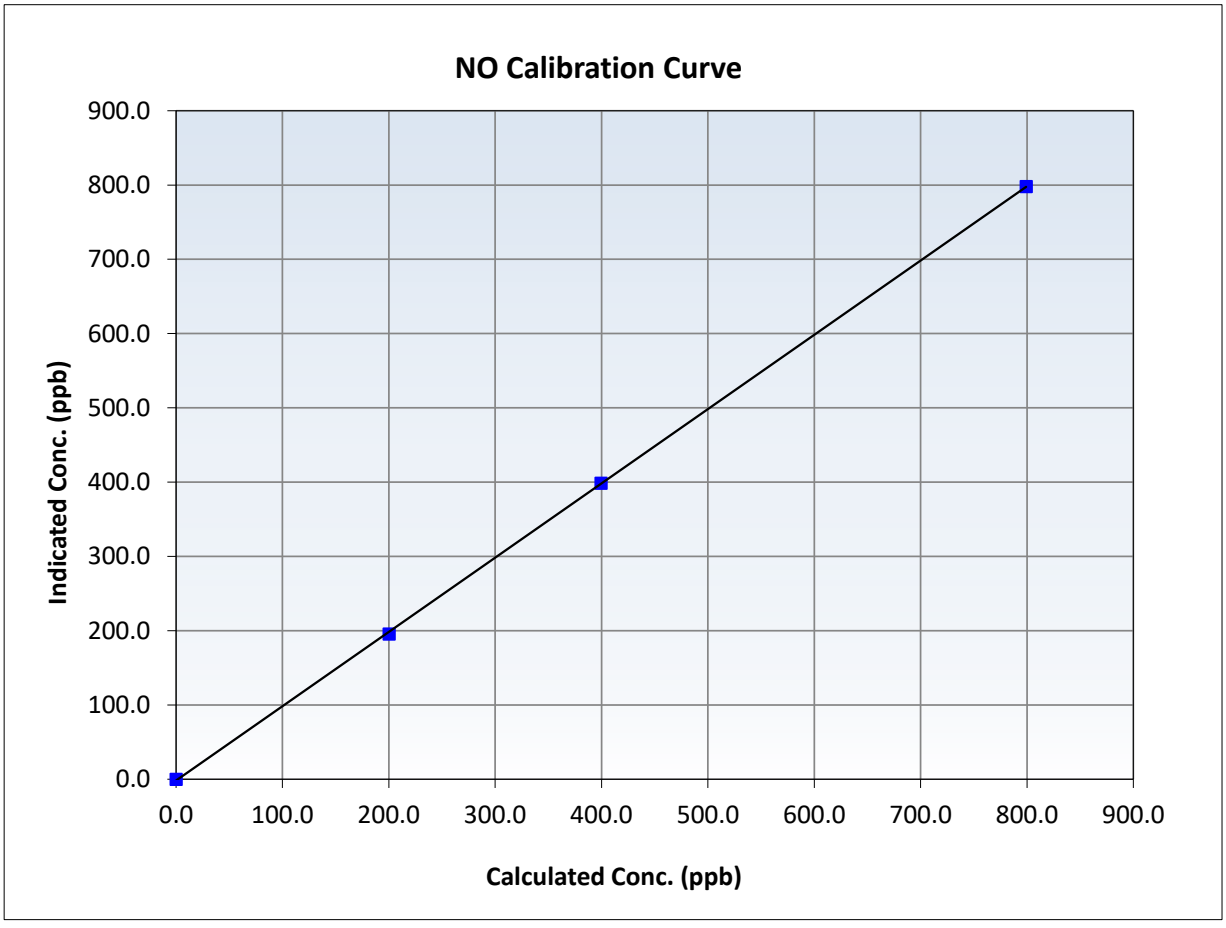
Station Information

Calibration Date:	April 2, 2024	Previous Calibration:	March 6, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	9:50	End Time (MST):	14:33
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

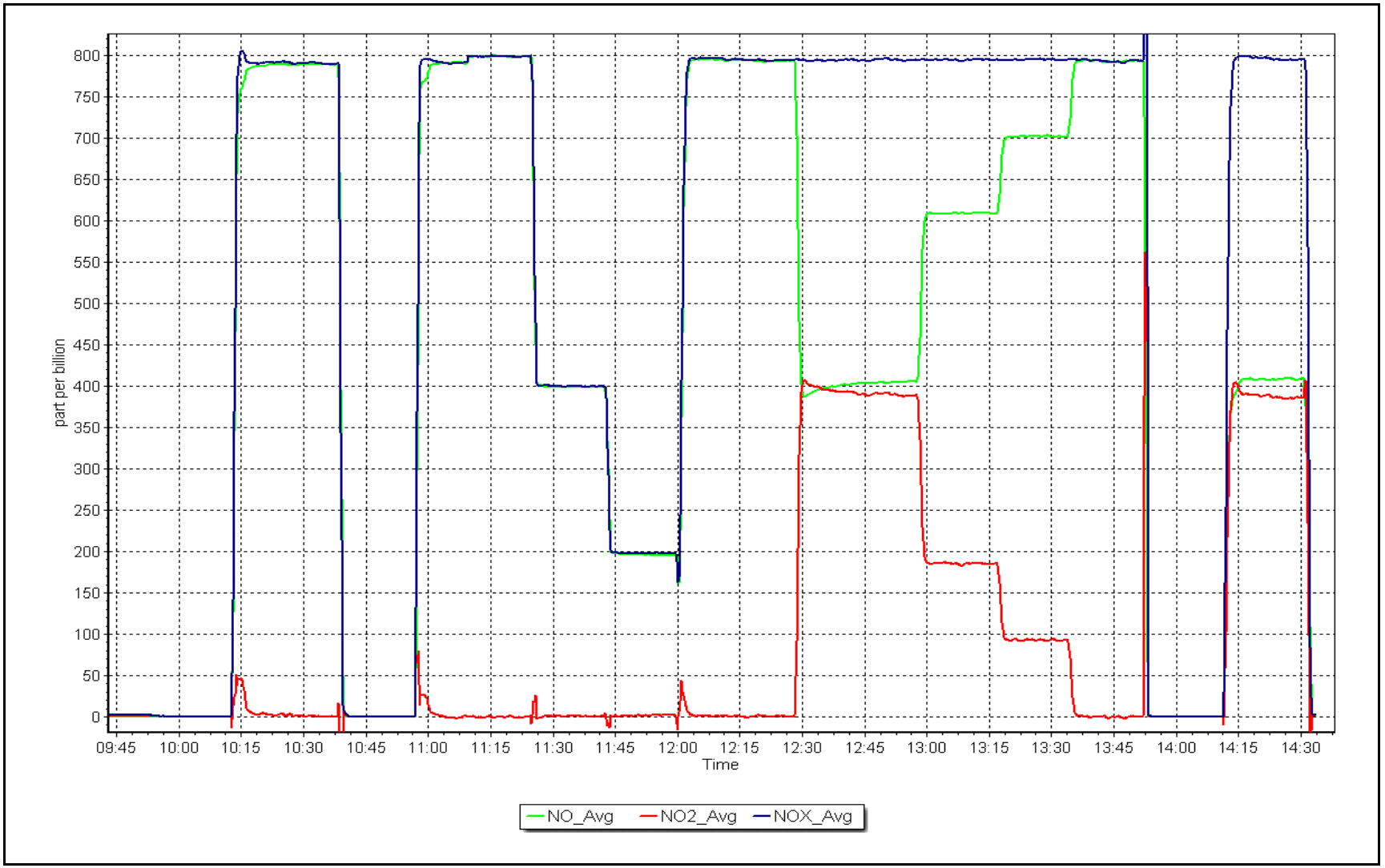
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.2	797.8	1.0017
399.6	398.7	1.0023
200.3	195.7	1.0234

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999966	*≥0.995*
Slope	1.000036	*0.90 - 1.10*
Intercept	-1.731680	*+/-20*



NO_X Calibration Plot Date: April 2, 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:	April 15, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	12:56	End time (MST):	14:13
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)	2.5	2.07	2.5	☐	+/- 2 °C
P (mmHg)	707.3	708.45	707.3	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.088	5.01	☐	+/- 0.25 LPM
PW% (pump)	36	-----	36	☐	>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	10.9	10.8	10.8	☐	+/- 0.5

Date Optical Chamber Cleaned: April 15, 2024

Date Disposable Filter Changed: April 15, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: Otober 25, 2023

Date RH/T Sensor Cleaned: October 25, 2023

Notes: No adjustments made.

Calibration by: Braiden Boutilier

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30
ELLS RIVER
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	April 4, 2024	Last Cal Date:	March 6, 2024
Start time (MST):	8:45	End time (MST):	11:43
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:	1.000331	0.997233	Backgd or Offset:	9.5	9.5
Calibration intercept:	-2.815894	-2.355844	Coeff or Slope:	0.982	0.982

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	79.2	800.4	796.5	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	796.6	Previous response	797.8	*% 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	0.0	----
High point	4921	79.2	800.4	797.2	1.004
Mid point	4960	39.6	400.2	394.9	1.013
Low point	4980	19.8	200.1	195.3	1.025
As left zero	5000	0.0	0.0	0.0	----
As left span	4921	79.2	800.4	797.9	1.003
				Average Correction Factor:	1.014

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

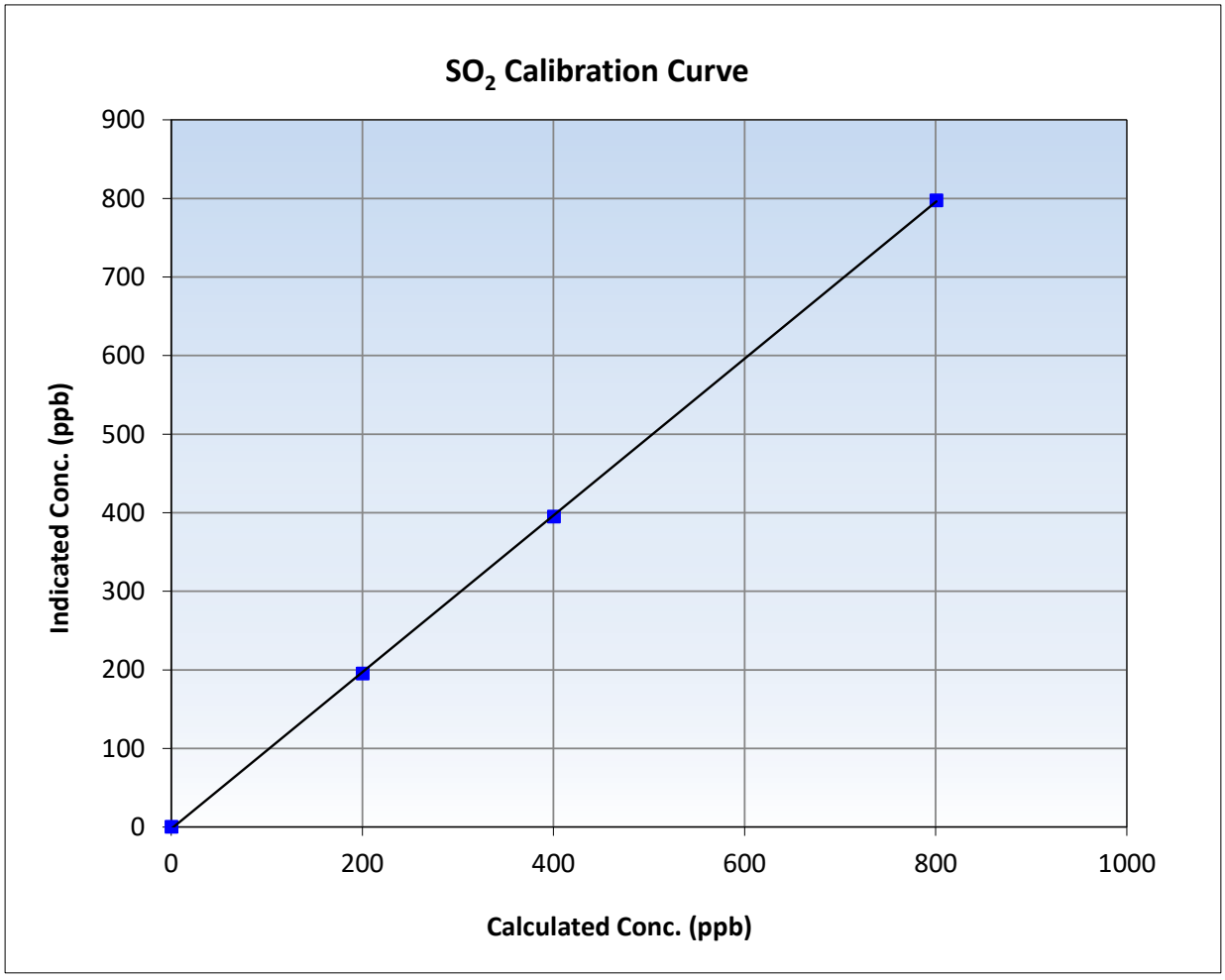
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 6, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:45	End Time (MST):	11:43
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397

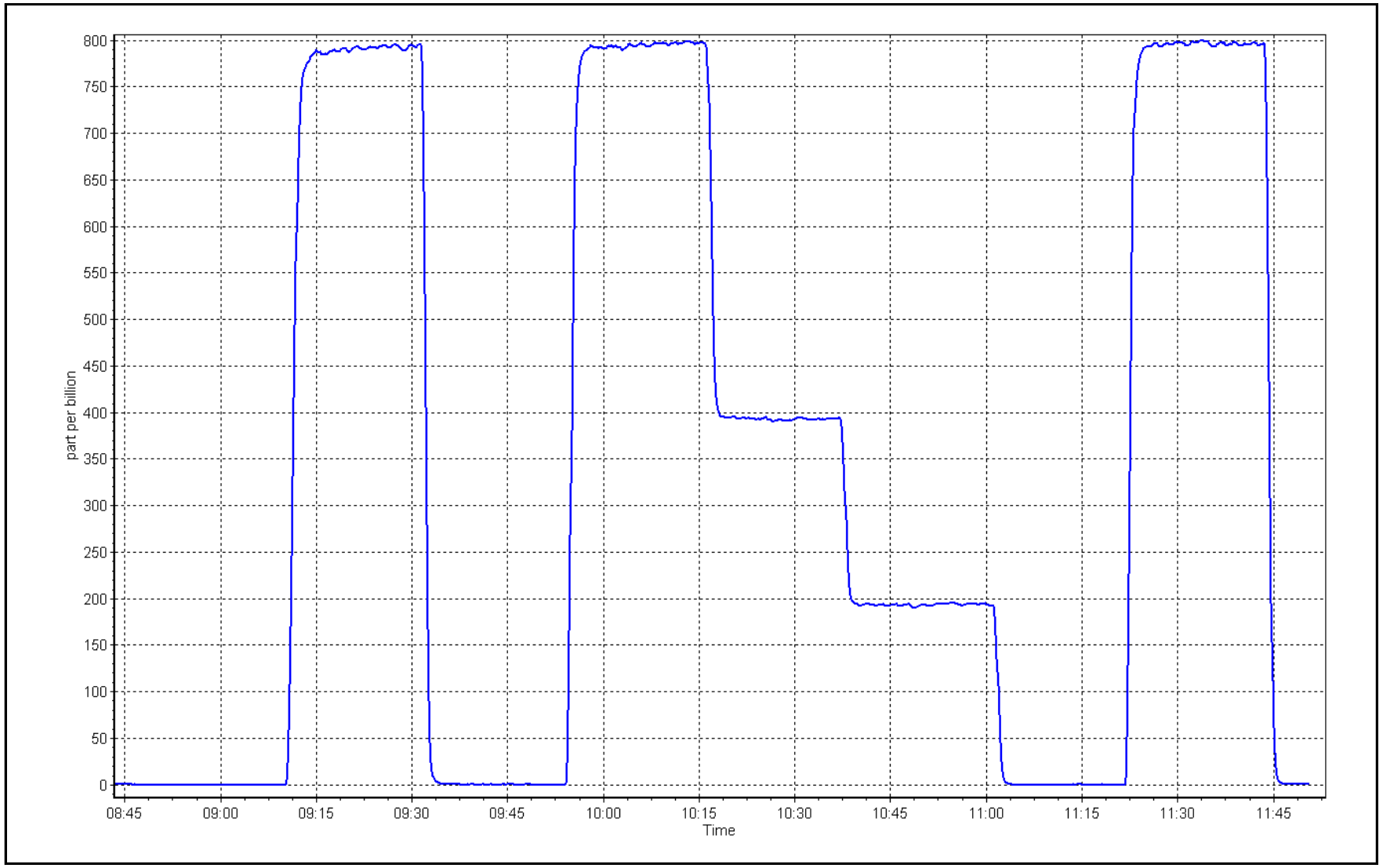
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.4	797.2	1.0040
400.2	394.9	1.0135
200.1	195.3	1.0246

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999958	*≥0.995*
Slope	0.997233	*0.90 - 1.10*
Intercept	-2.355844	*+/-30*



SO2 Calibration Plot Date: April 4, 2024 Location: Ells River



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	April 2, 2024	Last Cal Date:	March 11, 2024
Start time (MST):	9:37	End time (MST):	13:52
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:	1.002902	1.005758	Backgd or Offset:	1.6	1.6
Calibration intercept:	-0.080433	-0.080404	Coeff or Slope:	1.060	1.060

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	4920	80.2	80.0	80.0	1.000
As found Mid point	4960	40.1	40.0	39.7	1.008
As found Low point	4980	20.0	20.0	19.8	1.008
New cylinder response					

Baseline Corr As found:	80.0	Prev response:	80.19	*% change:	-0.2%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.999763	AF Intercept:	-0.120540
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999982	* = > +/-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	80.5	0.994
Mid point	4960	40.1	40.0	40.0	1.000
Low point	4980	20.0	20.0	20.0	0.998
As left zero	5000	0.0	0.0	0.1	----
As left span	4920	80.2	80.0	80.2	0.998
SO2 Scrubber Check	4921	79.2	792.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.998
Date of last converter efficiency test:					

Notes: Change sample inlet filters after multipoint as founds. Sox scrubber check done after calibrator zero and passed. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

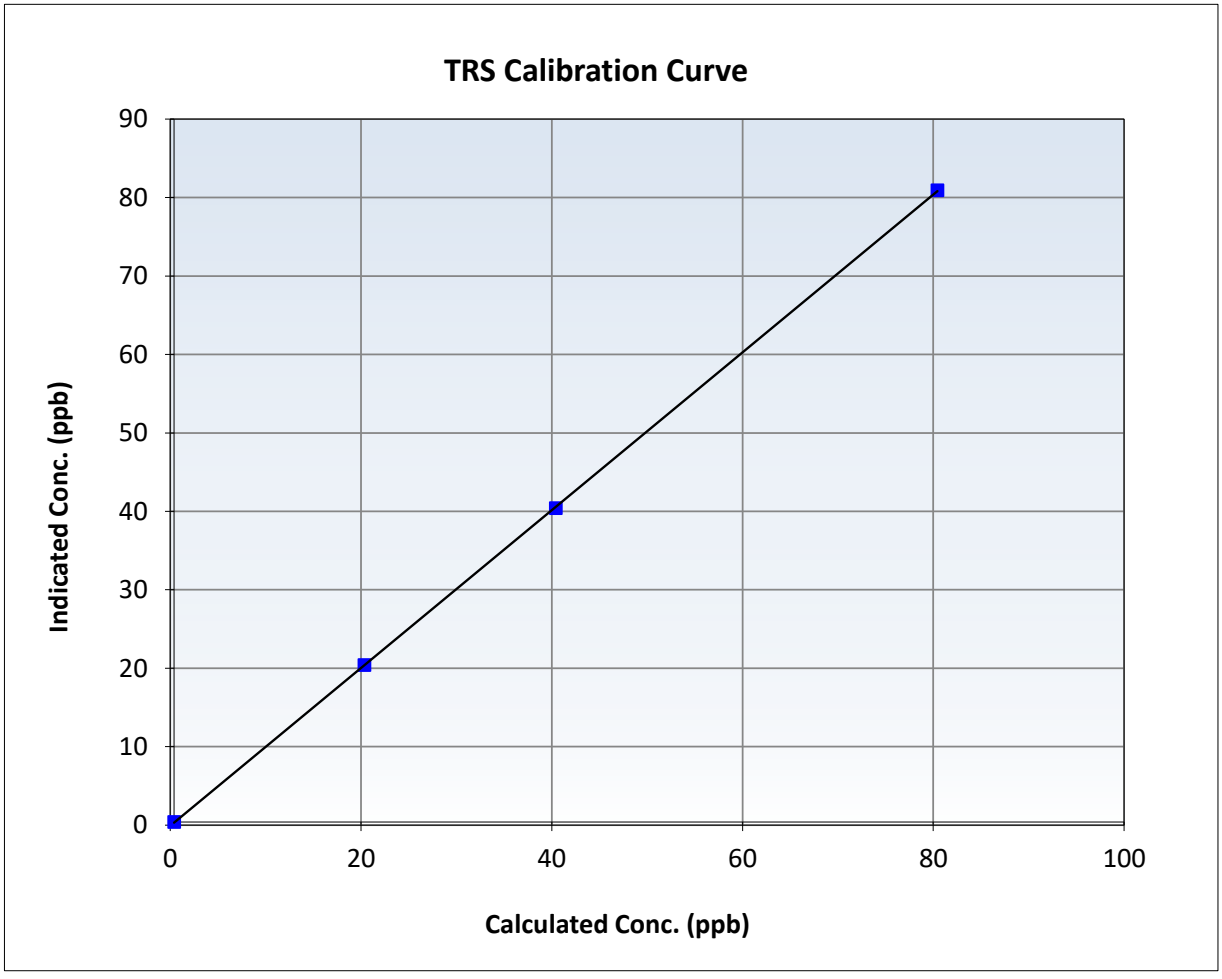
TRS Calibration Summary

Station Information

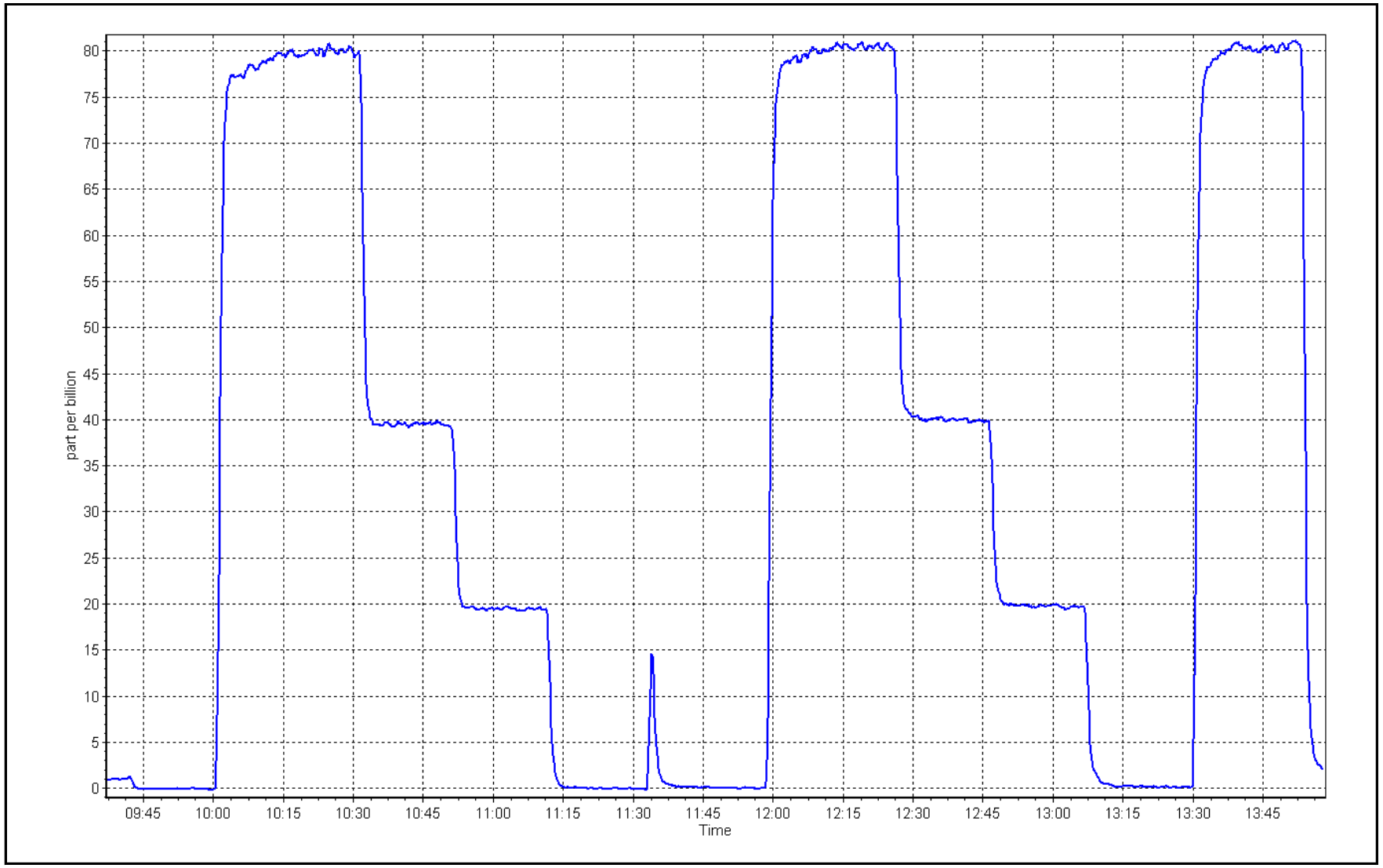
Calibration Date:	April 2, 2024	Previous Calibration:	March 11, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:37	End Time (MST):	13:52
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999988	*≥0.995*
80.0	80.5	0.9942	Slope	1.005758	*0.90 - 1.10*
40.0	40.0	1.0005			
20.0	20.0	0.9980	Intercept	-0.080404	*+/-3*



TRS Calibration Plot Date: April 2, 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:	April 4, 2024	Last Cal Date:	March 28, 2024
Start time (MST):	8:45	End time (MST):	11:43
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:			Removed Gas Expiry:		
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	3.07E-04	NMHC SP Ratio:	6.43E-05	6.43E-05
CH4 Retention time:	17.4	17.4	NMHC Peak Area:	141658	141658
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	4921	79.2	17.03	17.16	0.992
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.16	Prev response	17.04	*% change	0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.2	17.03	17.15	0.993
Mid point	4960	39.6	8.51	8.51	1.001
Low point	4980	19.8	4.26	4.20	1.013
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	17.03	17.18	0.991
				Average Correction Factor	1.002

Notes: Sample inlet filters 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	4921	79.2	9.11	9.30	0.980
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.30	Prev response	9.15	47116	
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	9.29	0.981
Mid point	4960	39.6	4.56	4.62	0.987
Low point	4980	19.8	2.28	2.28	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	9.11	9.30	0.980
				Average Correction Factor	0.989

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	7.86	1.007
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.86	Prev response	7.89	*% 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	4921	79.2	7.91	7.86	1.007
Mid point	4960	39.6	3.96	3.89	1.017
Low point	4980	19.8	1.98	1.92	1.030
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.2	7.91	7.88	1.005
				Average Correction Factor	1.018

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.002121	1.008470
THC Cal Offset:	-0.024340	-0.047141
CH4 Cal Slope:	1.000048	0.994402
CH4 Cal Offset:	-0.029357	-0.025556
NMHC Cal Slope:	1.003946	1.020664
NMHC Cal Offset:	0.005416	-0.021985

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

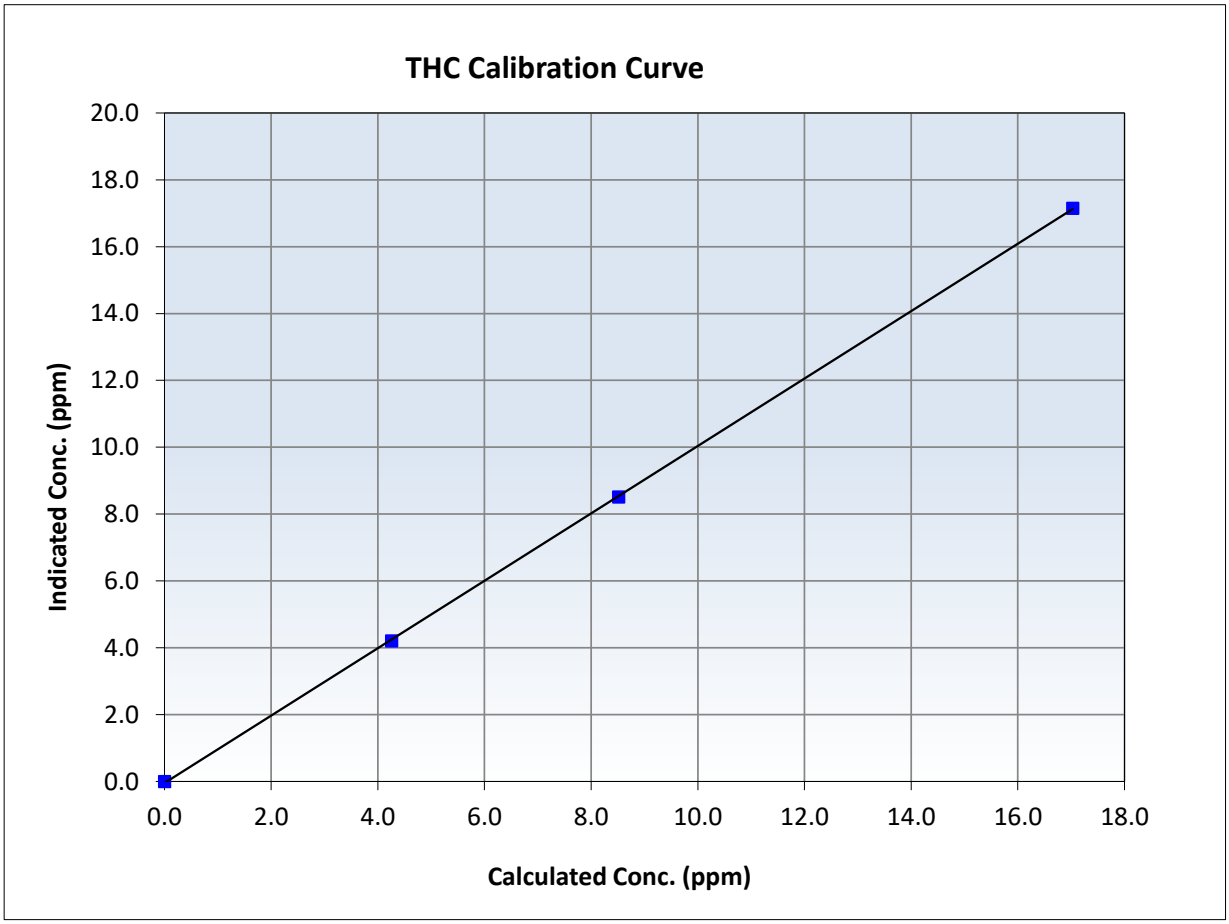
THC Calibration Summary

Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 28, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:45	End Time (MST):	11:43
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999965	≥0.995
17.03	17.15	0.9928	Slope	1.008470	0.90 - 1.10
8.51	8.51	1.0006			
4.26	4.20	1.0129	Intercept	-0.047141	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

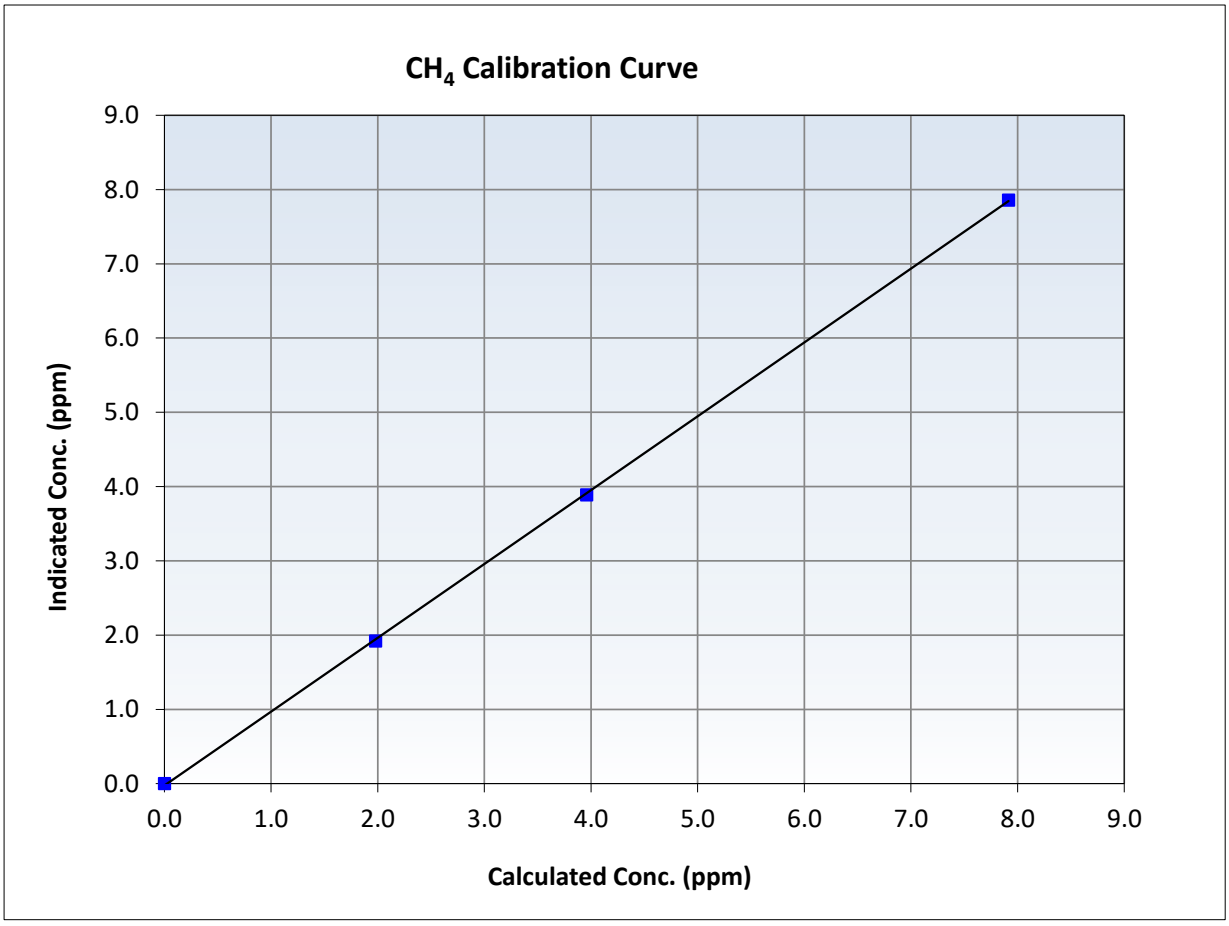
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 28, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:45	End Time (MST):	11:43
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	7.86	1.0070
3.96	3.89	1.0172
1.98	1.92	1.0301

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999950	*≥0.995*
Slope	0.994402	*0.90 - 1.10*
Intercept	-0.025556	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

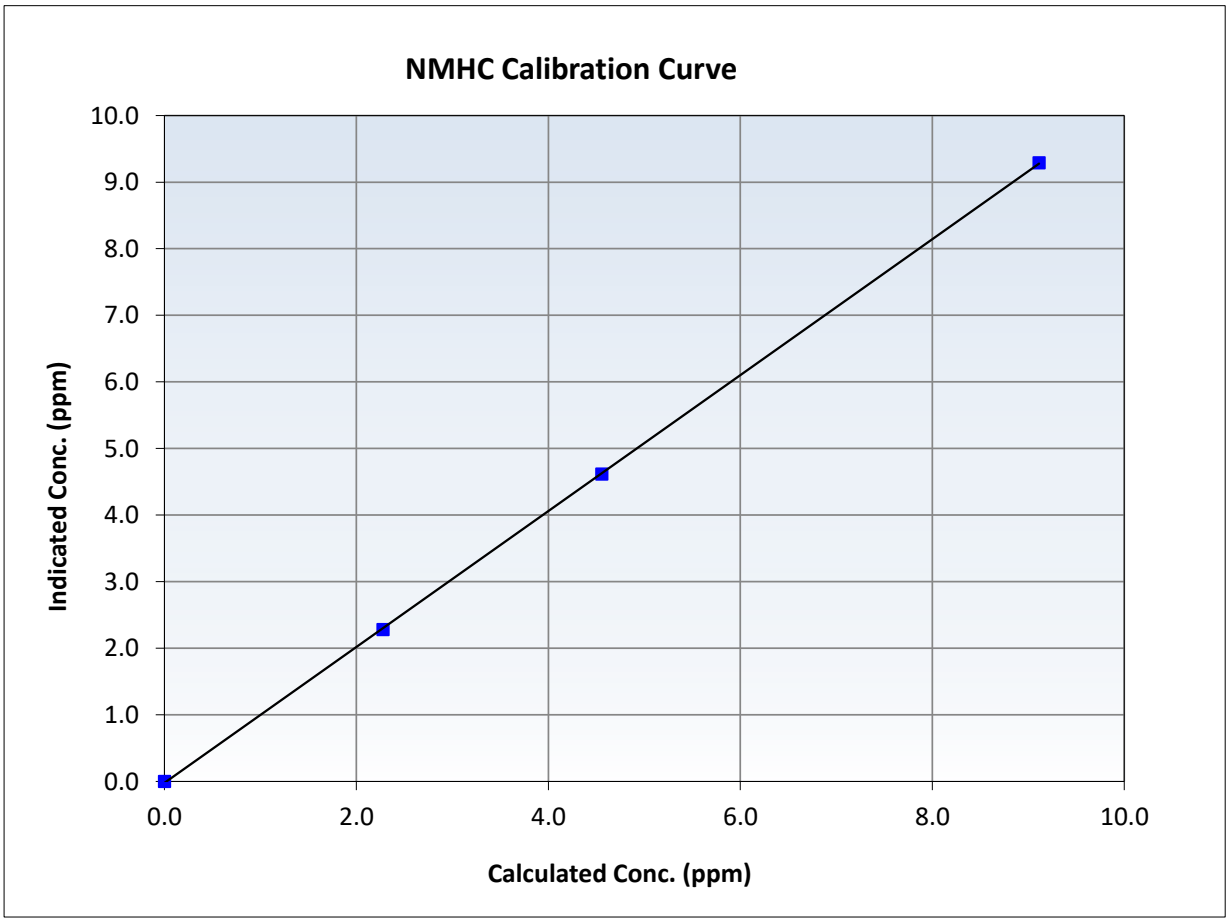
Station Information

Calibration Date:	April 4, 2024	Previous Calibration:	March 28, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	8:45	End Time (MST):	11:43
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

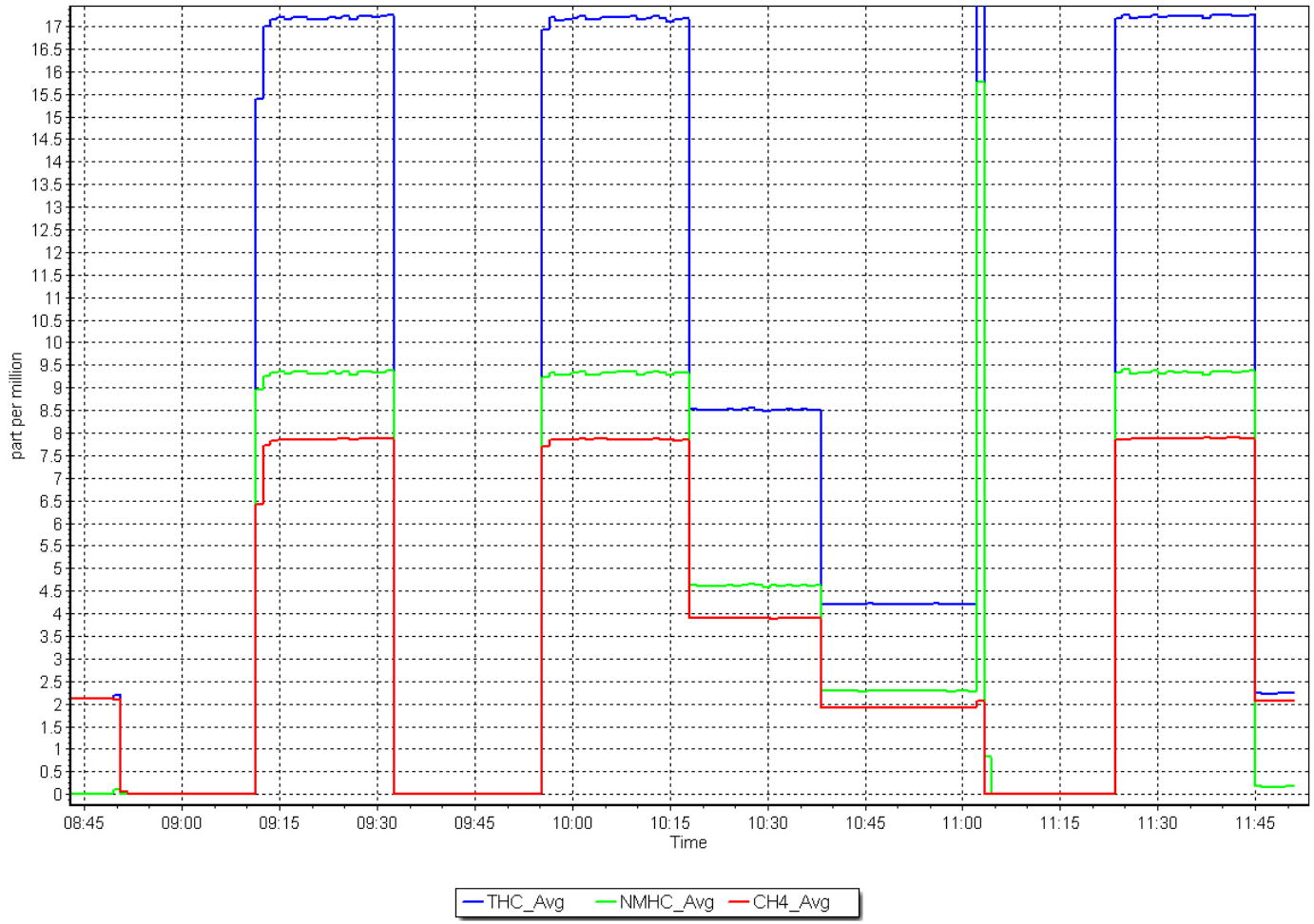
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.11	9.29	0.9809
4.56	4.62	0.9869
2.28	2.28	0.9984

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999974	*≥0.995*
Slope	1.020664	*0.90 - 1.10*
Intercept	-0.021985	*+/-0.5*



NMHC Calibration Plot Date: April 4, 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:	April 5, 2024
Last Cal Date:	March 8, 2024
Start time (MST):	9:44
End time (MST):	14:16
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	-0.2	0.1	----	----
AF High point	4932	67.7	803.0	800.3	2.7	794.6	792.1	2.5	1.0104	1.0100
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 802.0 ppb	NO = 800.8 ppb
Baseline Corr 1st pt	NO_X = 794.7 ppb	NO = 792.3 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 = -0.9%

*Percent Change NO = -1.1%

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: 710321429

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.182	1.195	NO bkgnd or offset:	13.9	14.0
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	13.8	13.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	192.4	193.6

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999616	0.996856
NO_X Cal Offset:	-0.638284	-0.719188
NO Cal Slope:	1.002443	0.999360
NO Cal Offset:	-1.418930	-1.439899
NO_2 Cal Slope:	0.996723	0.994435
NO_2 Cal Offset:	-0.460536	0.194273

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	0.0	0.1	----	----
High point	4932	67.7	803.0	800.3	2.7	800.1	799.1	1.0	1.0036	1.0015
Mid point	4966	33.8	400.9	399.5	1.4	398.6	396.9	1.7	1.0057	1.0066
Low point	4983	16.9	200.4	199.8	0.7	198.2	196.9	1.3	1.0113	1.0145
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
As left span	4932	67.7	803.0	419.1	383.9	801.0	419.1	382.1	1.0025	1.0000
								Average Correction Factor	1.0069	1.0075

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	417.3	382.4	380.4	1.0053	99.5%
Mid GPT point	797.0	613.3	186.4	185.7	1.0038	99.6%
Low GPT point	797.0	703.4	96.3	96.0	1.0032	99.7%
				Average Correction Factor	1.0041	99.6%

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

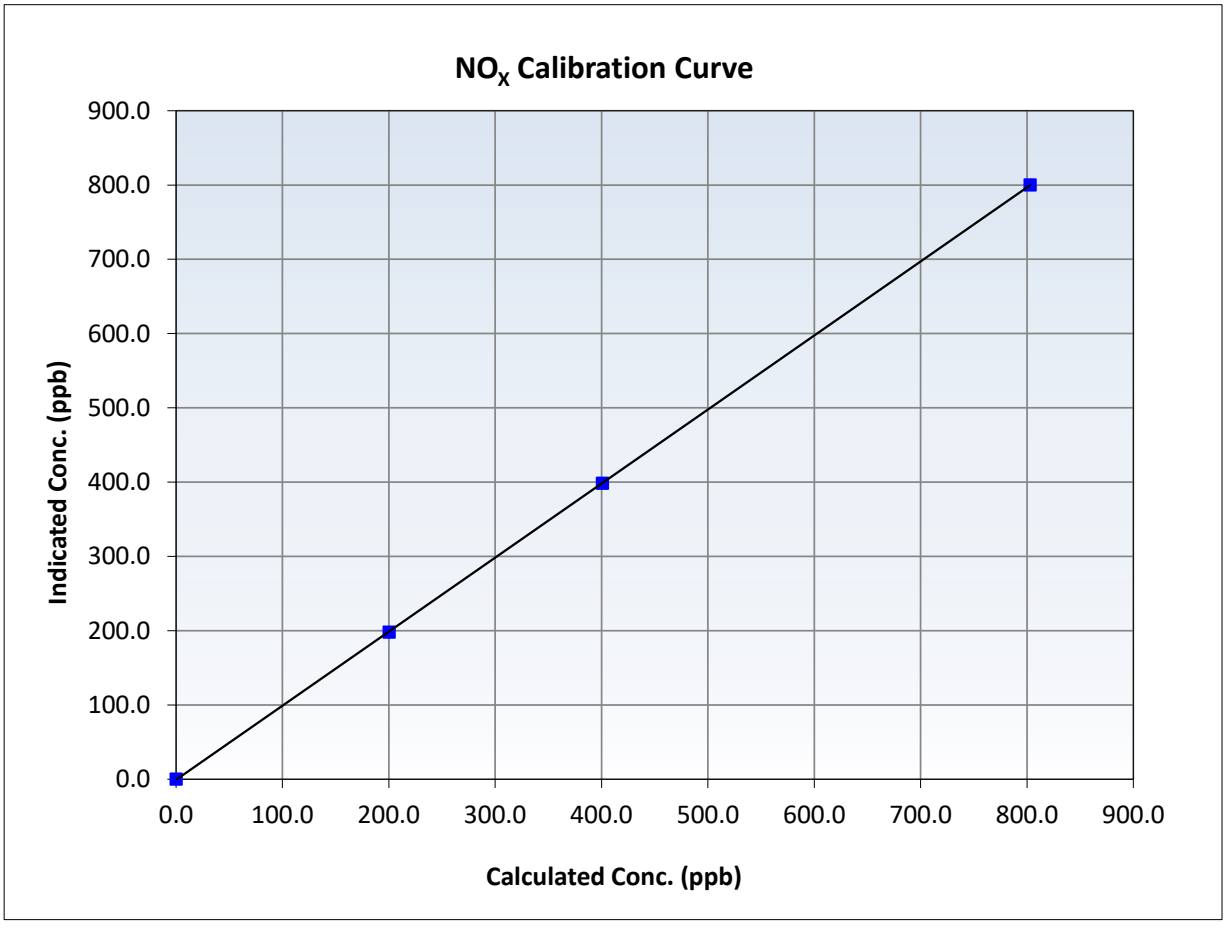
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 8, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:44	End Time (MST):	14:16
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	----
803.0	800.1	1.0036
400.9	398.6	1.0057
200.4	198.2	1.0113

Statistical Evaluation		Limits
Correlation Coefficient	0.999995	≥0.995
Slope	0.996856	0.90 - 1.10
Intercept	-0.719188	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

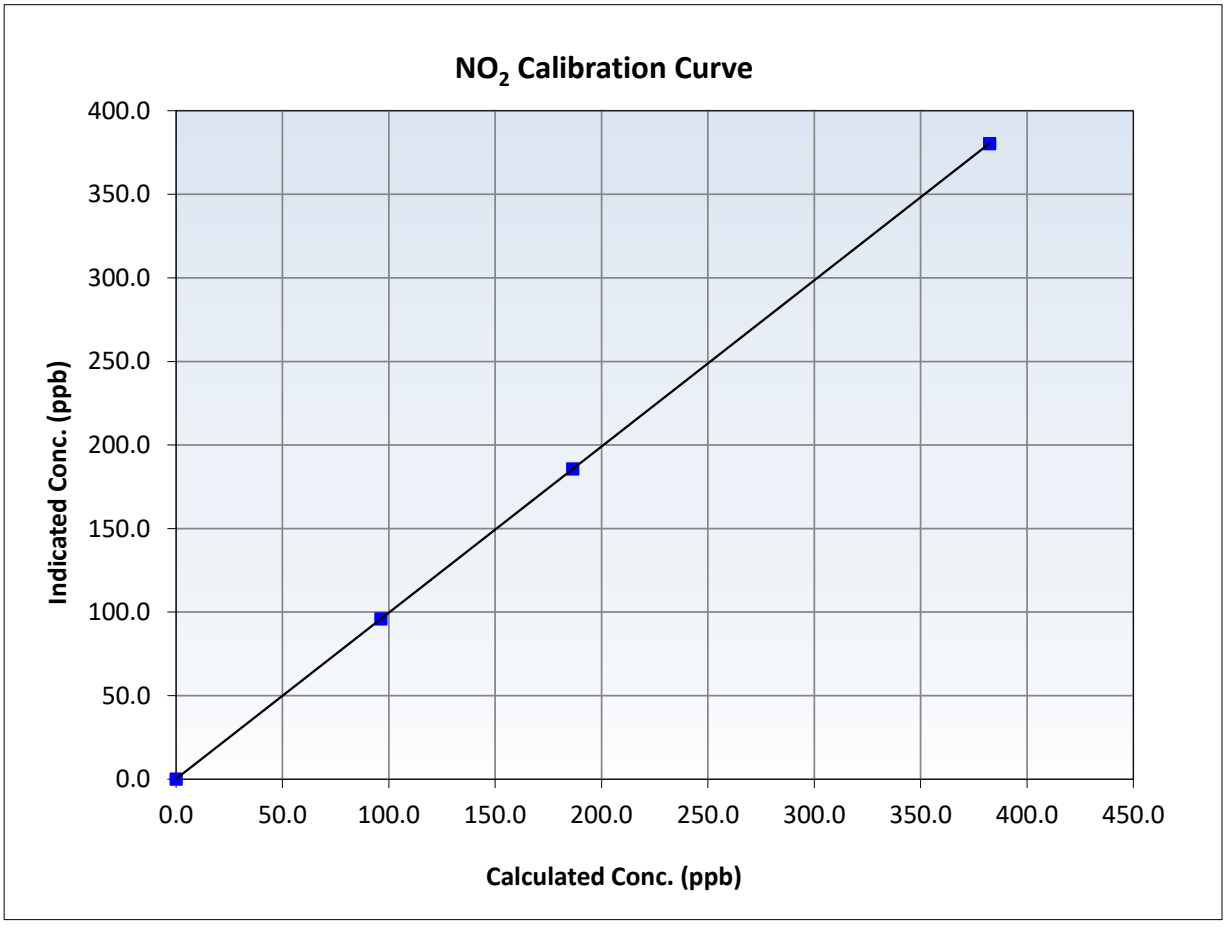
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 8, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:44	End Time (MST):	14:16
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	----
382.4	380.4	1.0053
186.4	185.7	1.0038
96.3	96.0	1.0032

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.994435	*0.90 - 1.10*
Intercept	0.194273	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

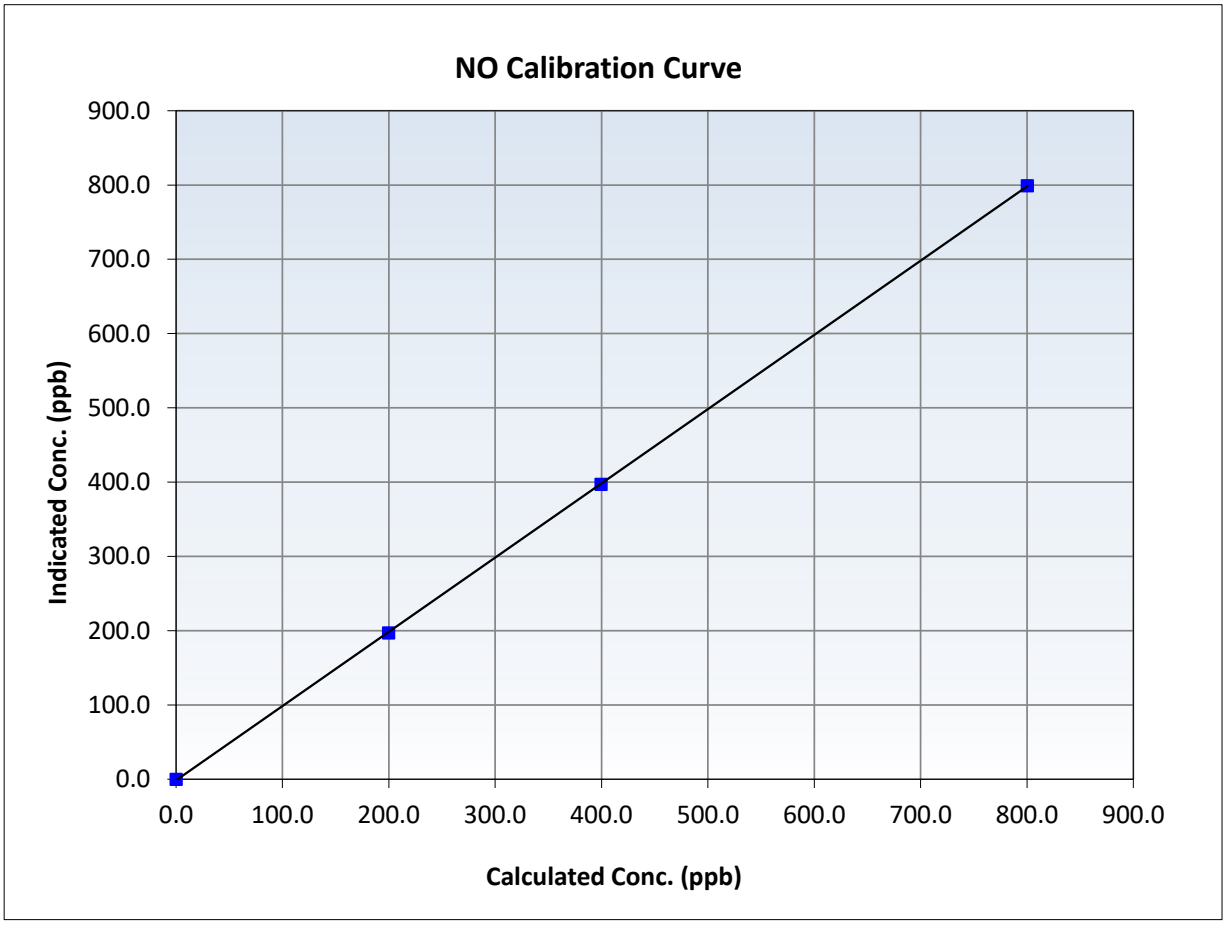
Station Information

Calibration Date:	April 5, 2024	Previous Calibration:	March 8, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:44	End Time (MST):	14:16
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

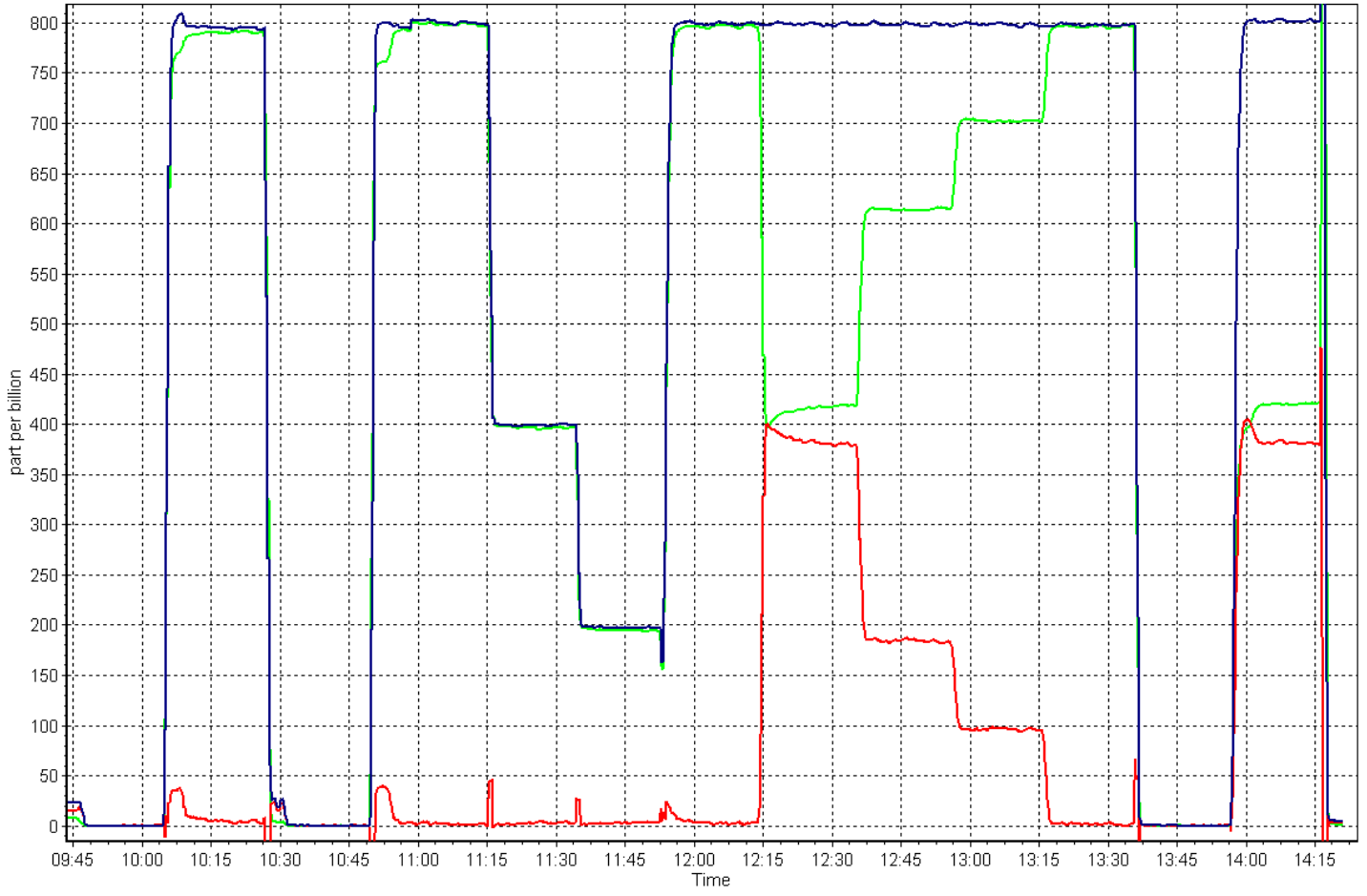
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.3	799.1	1.0015
399.5	396.9	1.0066
199.8	196.9	1.0145

Statistical Evaluation		Limits
Correlation Coefficient	0.999985	≥0.995
Slope	0.999360	0.90 - 1.10
Intercept	-1.439899	+/-20



NO_X Calibration Plot Date: April 5, 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:	April 2, 2024	Last Cal Date:	March 8, 2024
Start time (MST):	10:11	End time (MST):	12:02
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)	6.50	6.33	6.50	☐	+/- 2 ^{o}C
P (mmHg)	726.80	728.54	726.80	☐	+/- 10 mmHg
Flow (LPM)	4.43	4.50	5.01	☐	+/- 0.25 LPM
PW% (pump)	100.00	-----	39.00	☑	>80%
Zero Verification	PM w/o HEPA:	5.70	PM w/ HEPA:	1.60	<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	6.00	10.60	10.60	☐	+/- 0.5

Date Optical Chamber Cleaned: April 2, 2024

Date Disposable Filter Changed: January 22, 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. Pump changed. Leak check passed. No adjustment made.

Calibration by: Jan Castro

Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	April 4, 2024	Last Cal Date:	April 2, 2024
Start time (MST):	11:57	End time (MST):	12:12
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)	2.60	1.89	2.60	☐	+/- 2 ^{o}C
P (mmHg)	737.40	739.59	737.40	☐	+/- 10 mmHg
Flow (LPM)	5.03	5.02	5.03	☐	+/- 0.25 LPM
PW% (pump)	39.00	-----	39.00	☐	>80%

Zero Verification — PM w/o HEPA: 4.80 — PM w/ HEPA: 0.00 — <0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 10.90 — Expiry Date: September 29, 2024 — Lot No.: 100128-050-040

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

Date Optical Chamber Cleaned: April 2, 2024

Date Disposable Filter Changed: April 4, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 27, 2023

Date RH/T Sensor Cleaned: February 23, 2024

Notes: Verified flow, temperature 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
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	April 17, 2024	Last Cal Date:	March 18, 2024
Start time (MST):	9:48	End time (MST):	12:35
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:	0.999393	1.008070	Backgd or Offset:	20.5	20.3
Calibration intercept:	-1.051659	-1.013890	Coeff or Slope:	1.008	1.001

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	4922	77.8	799.8	811.7	0.985
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	812.0	Previous response	798.3	*% change	1.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

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	4922	77.8	799.8	806.1	0.992
Mid point	4961	38.9	399.9	400.9	0.998
Low point	4981	19.5	200.4	200.1	1.002
As left zero	5000	0.0	0.0	0.1	----
As left span	4922	77.8	799.8	805.3	0.993
				Average Correction Factor:	0.997

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

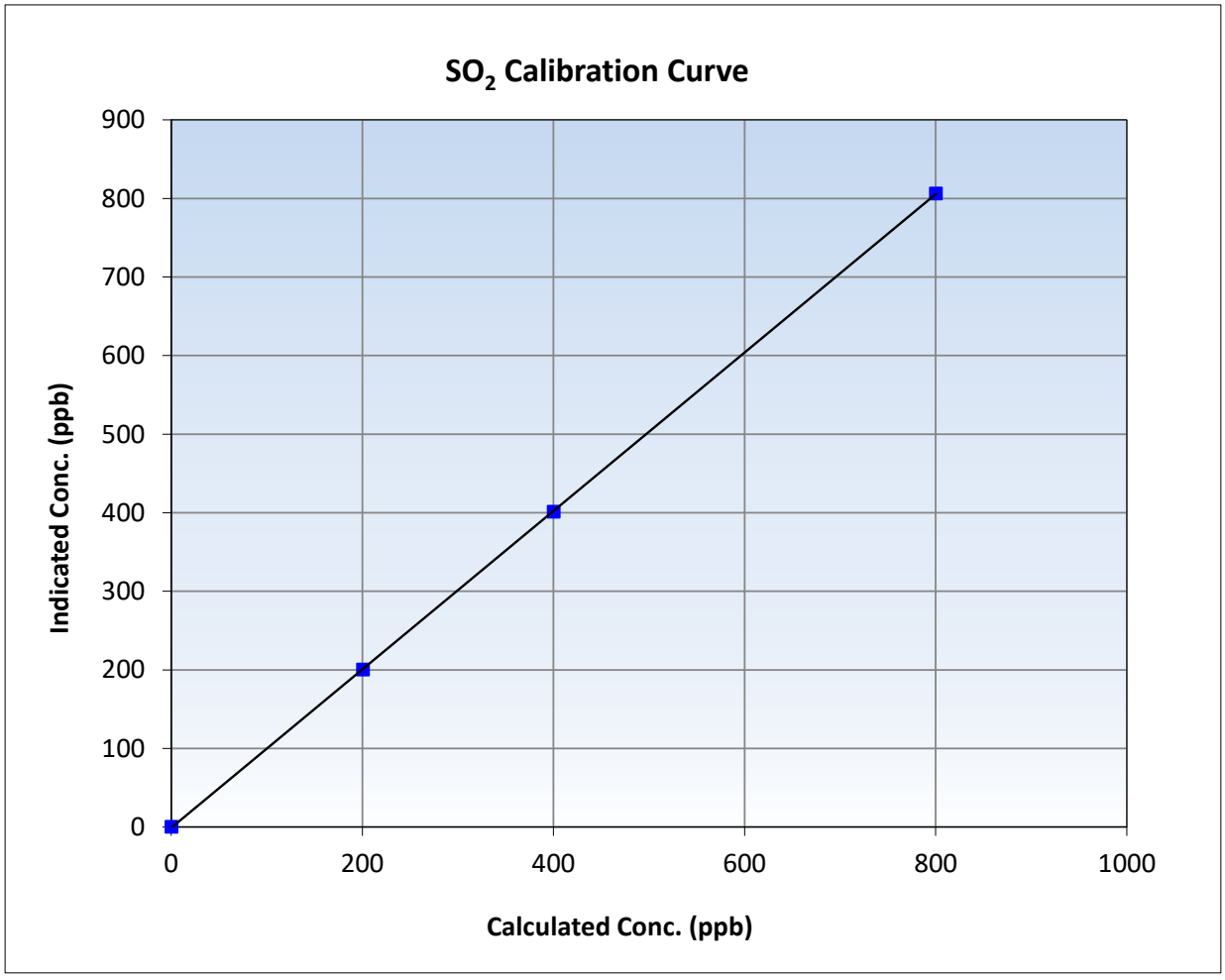
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 18, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	9:48	End Time (MST):	12:35
Analyzer make:	Thermo 43i	Analyzer serial #:	710321323

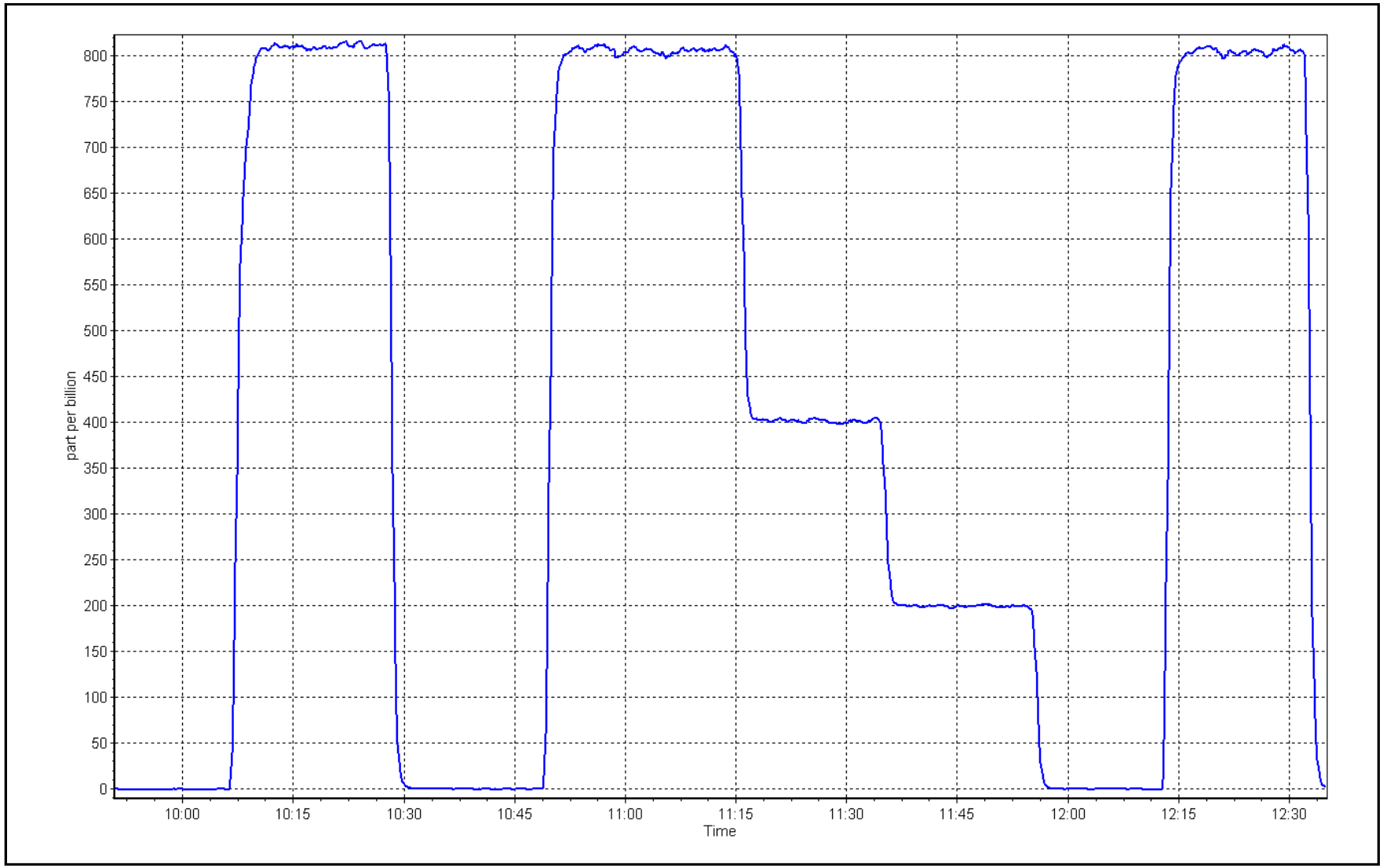
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.8	806.1	0.9922
399.9	400.9	0.9975
200.4	200.1	1.0017

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.008070	*0.90 - 1.10*
Intercept	-1.013890	*+/-30*



SO2 Calibration Plot Date: April 17, 2024 Location: Sawbones Bay



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	April 24, 2024	Last Cal Date:	March 19, 2024
Start time (MST):	8:45	End time (MST):	12:22
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.15	ppm	Cal Gas Exp Date:	February 5, 2024
Cal Gas Cylinder #:	CC517397			
Removed Cal Gas Conc:	5.15	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	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:	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.015068	0.998937	Backgd or Offset:	1.010	0.990
Calibration intercept:	0.002254	-0.158258	Coeff or Slope:	1.119	1.092

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	82.6	0.968
As found Mid point	4961	38.8	40.0	40.8	0.977
As found Low point	4981	19.4	20.0	20.1	0.989
New cylinder response					

Baseline Corr As found:	82.7	Prev response:	81.24	*% change:	1.8%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.034635	AF Intercept:	-0.357524
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999954	* = > +/-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	77.7	80.0	79.9	1.002
Mid point	4961	38.8	40.0	39.6	1.009
Low point	4981	19.4	20.0	19.7	1.014
As left zero	5000	0.0	0.0	0.0	----
As left span	4922	77.7	80.0	79.7	1.004
SO2 Scrubber Check	4922	77.8	778.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.008
Date of last converter efficiency test:					

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

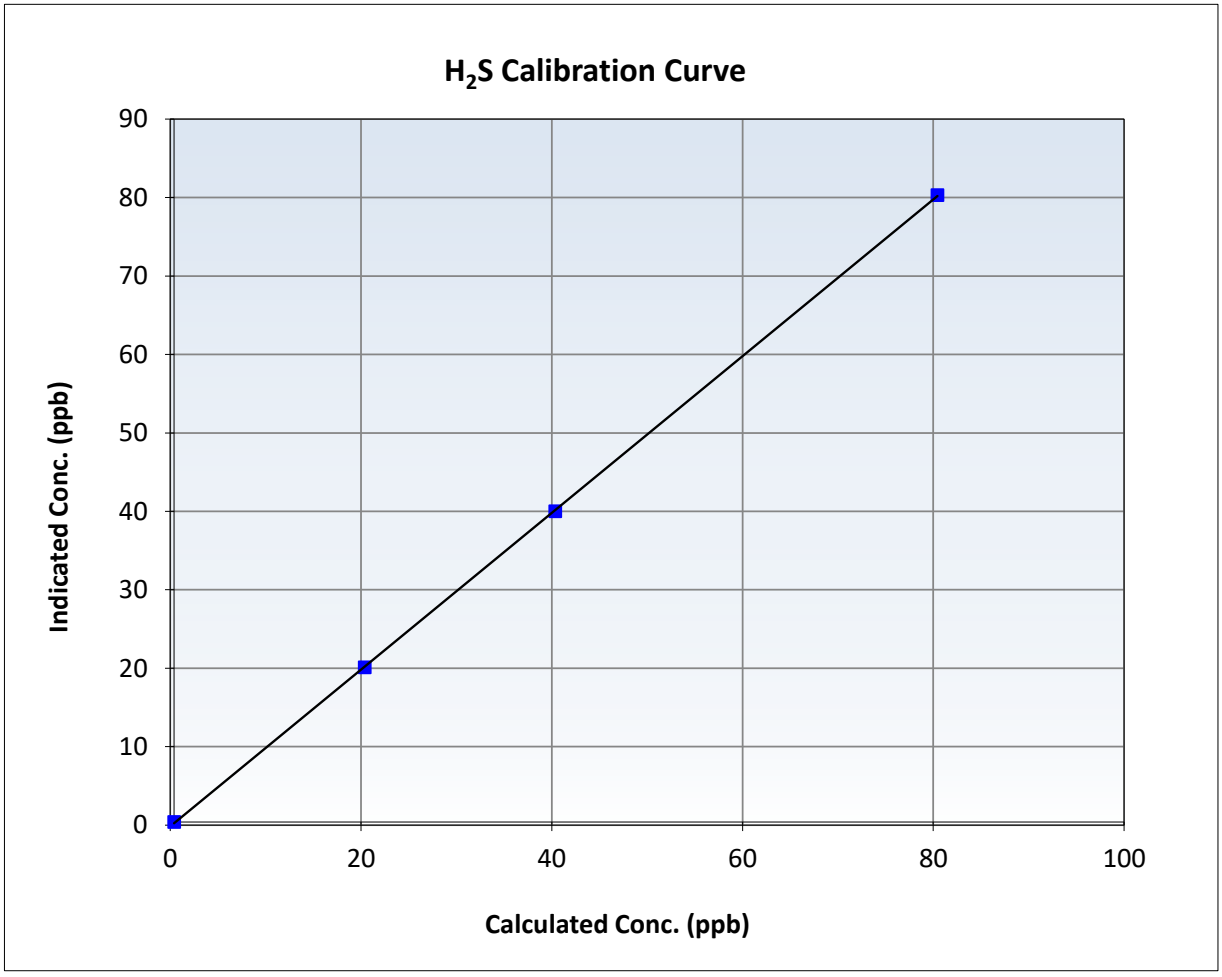
H2S Calibration Summary

Station Information

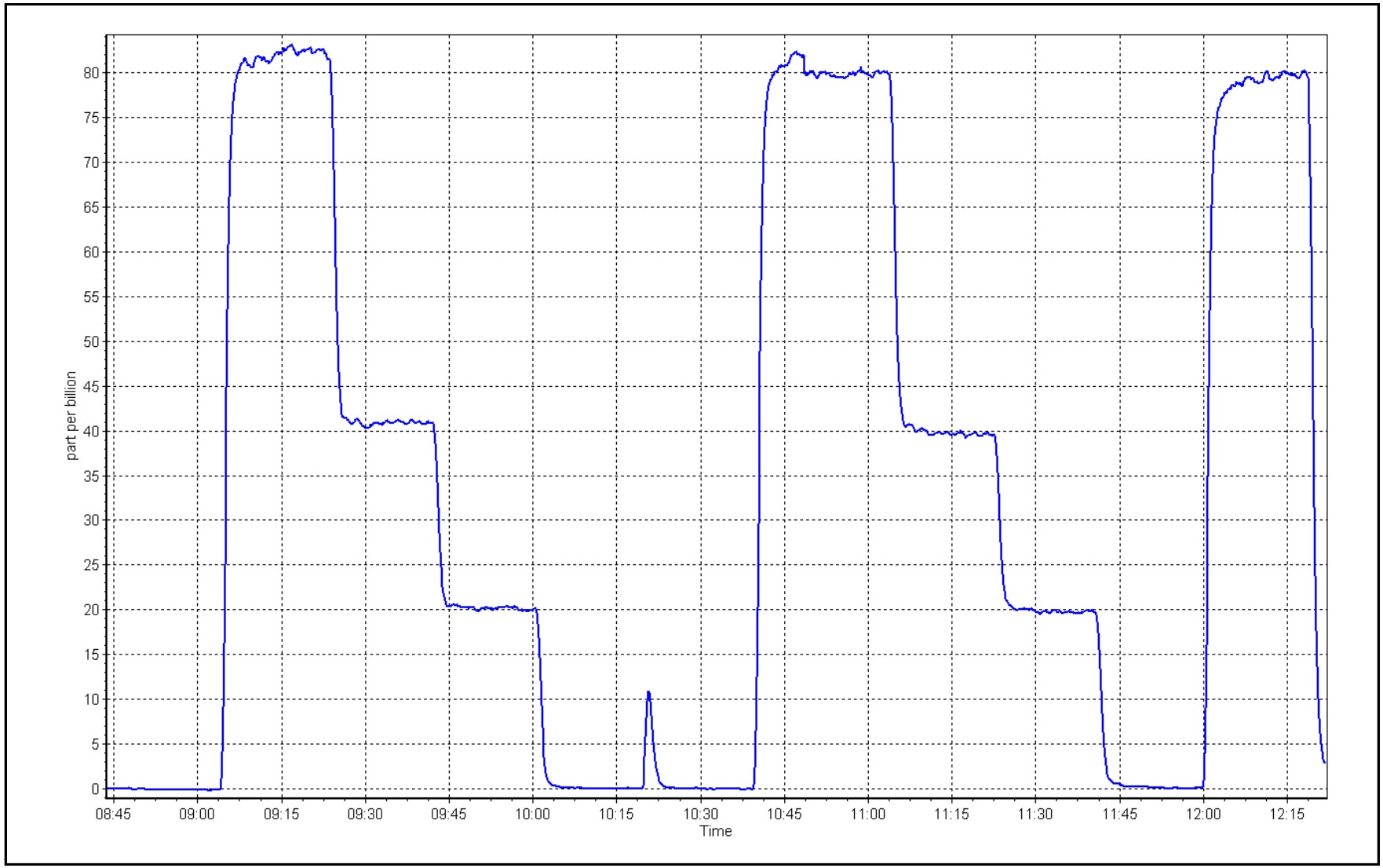
Calibration Date:	April 24, 2024	Previous Calibration:	March 19, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	8:45	End Time (MST):	12:22
Analyzer make:	Thermo 43iQ	Analyzer serial #:	12113311965

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999979	*≥0.995*
80.0	79.9	1.0017	Slope	0.998937	*0.90 - 1.10*
40.0	39.6	1.0092			
20.0	19.7	1.0142	Intercept	-0.158258	*+/-3*



H2S Calibration Plot Date: April 24, 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:	April 11, 2024
Last Cal Date:	March 20, 2024
Start time (MST):	8:44
End time (MST):	13:23
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	1.0	0.5	0.6	----	----
AF High point	4917	83.4	799.6	799.6	0.0	805.0	801.2	3.9	0.9945	0.9986
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.3 ppb	NO = 798.5 ppb
Baseline Corr 1st pt	NO_X = 804.0 ppb	NO = 800.7 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 = 0.3%

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:	1.045	1.044	NO bkgnd or offset:	-1.1	-0.2
NOX coeff or slope:	1.044	1.039	NOX bkgnd or offset:	-0.1	0.7
NO2 coeff or slope:	NA	NA	Reaction cell Press:	8.0	8.1

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.001550	1.001007
NO_X Cal Offset:	-1.470566	-0.830518
NO Cal Slope:	1.000349	1.002164
NO Cal Offset:	-1.350176	-1.110354
NO_2 Cal Slope:	1.002397	0.998476
NO_2 Cal Offset:	0.386621	0.748401

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	-0.2	----	----
High point	4917	83.4	799.6	799.6	0.0	799.6	800.3	-0.6	1.0000	0.9991
Mid point	4958	41.7	399.8	399.8	0.0	400.0	400.5	-0.5	0.9996	0.9984
Low point	4979	20.9	200.4	200.4	0.0	198.4	197.5	0.9	1.0100	1.0146
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3	----	----
As left span	4916	83.4	799.7	341.6	458.0	796.6	341.6	455.0	1.0039	1.0000
								Average Correction Factor	1.0032	1.0040

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	796.8	340.4	456.4	456.0	1.0009	99.9%
Mid GPT point	796.8	549.6	247.2	247.6	0.9984	100.2%
Low GPT point	796.8	651.3	145.5	147.4	0.9871	101.3%
				Average Correction Factor	0.9955	100.5%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

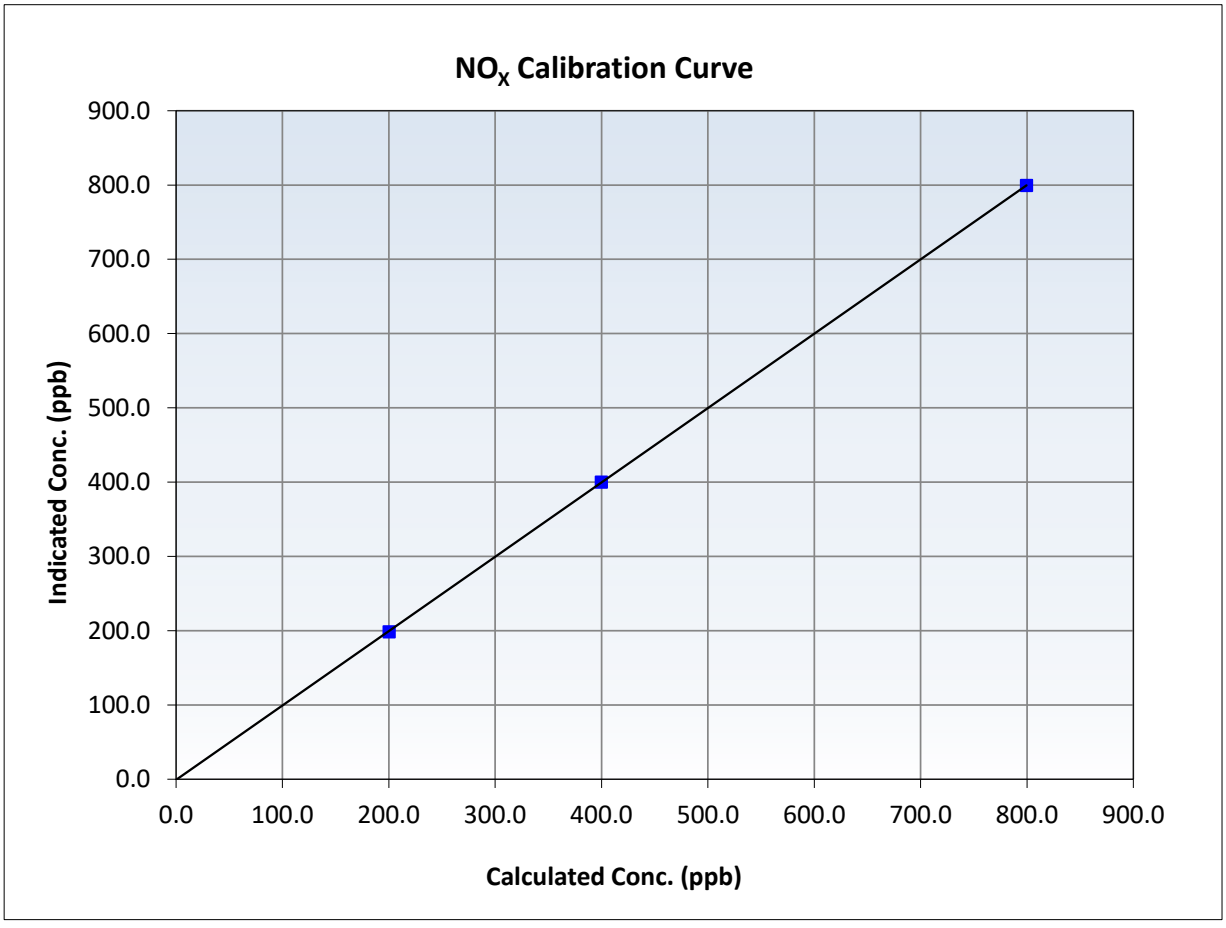
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 20, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	8:44	End Time (MST):	13:23
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	799.6	1.0000
399.8	400.0	0.9996
200.4	198.4	1.0100

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.001007	*0.90 - 1.10*
Intercept	-0.830518	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

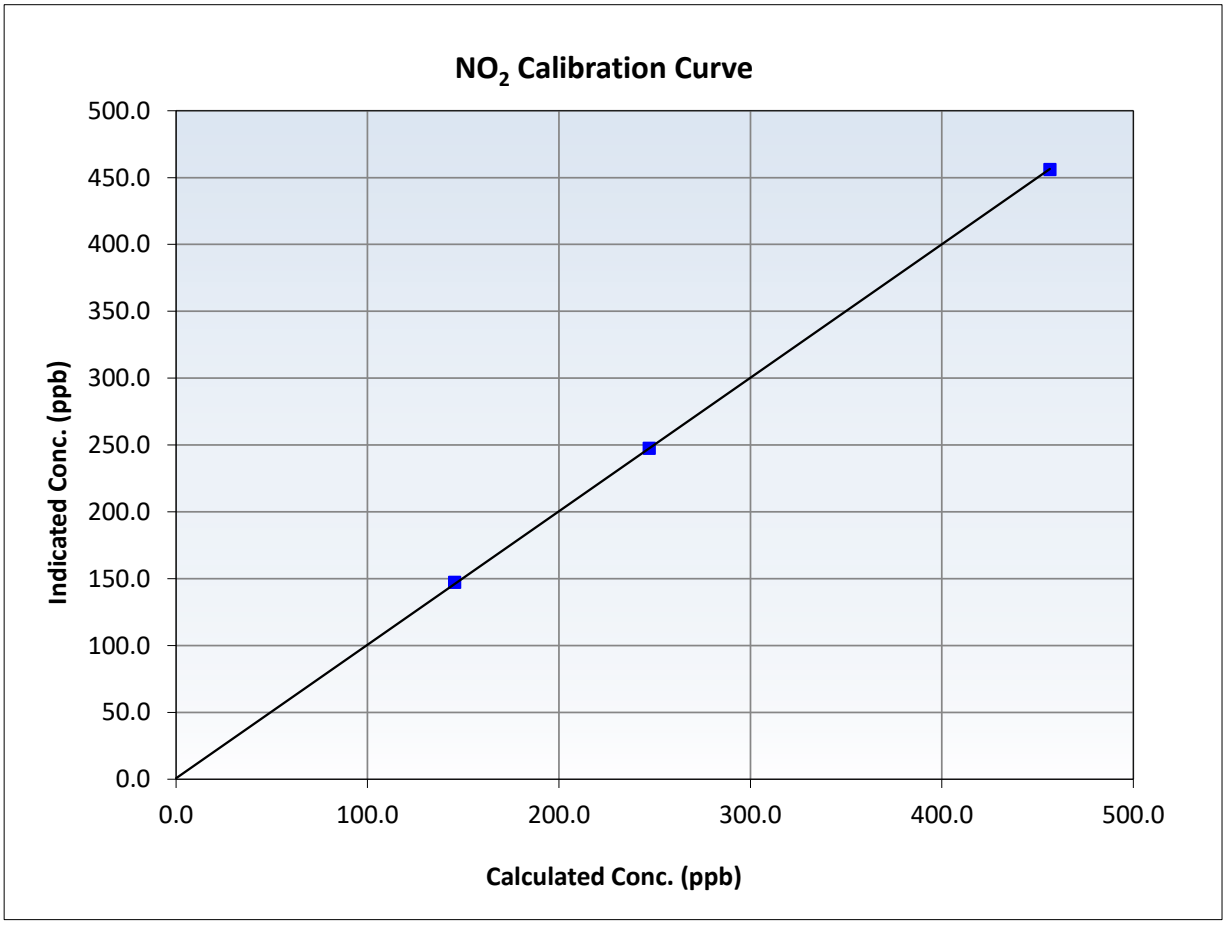
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 20, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	8:44	End Time (MST):	13:23
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	----
456.4	456.0	1.0009
247.2	247.6	0.9984
145.5	147.4	0.9871

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.998476	*0.90 - 1.10*
Intercept	0.748401	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

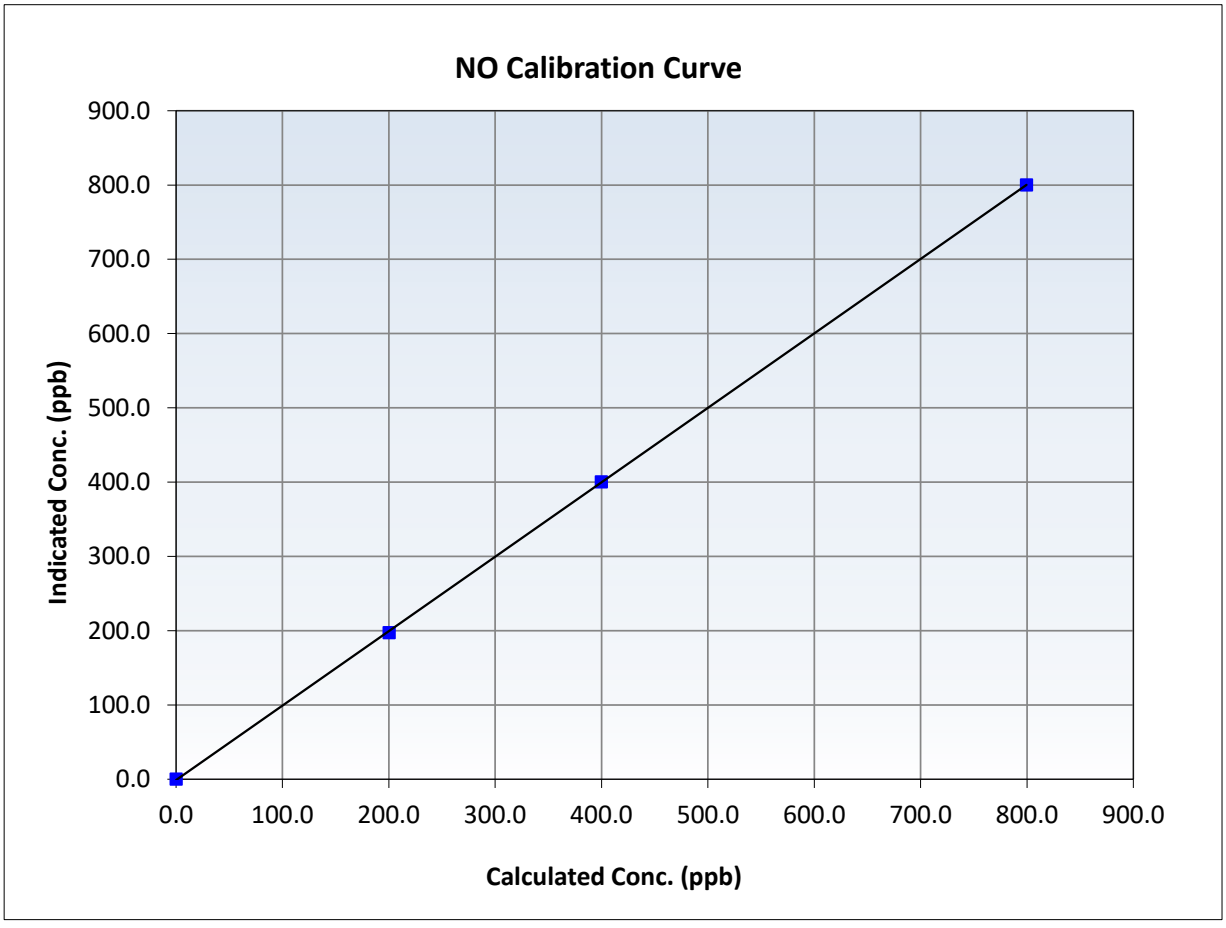
Station Information

Calibration Date:	April 11, 2024	Previous Calibration:	March 20, 2024
Station Name:	Sawbones Bay	Station Number:	AMS 505
Start Time (MST):	8:44	End Time (MST):	13:23
Analyzer make:	API T200	Analyzer serial #:	4260

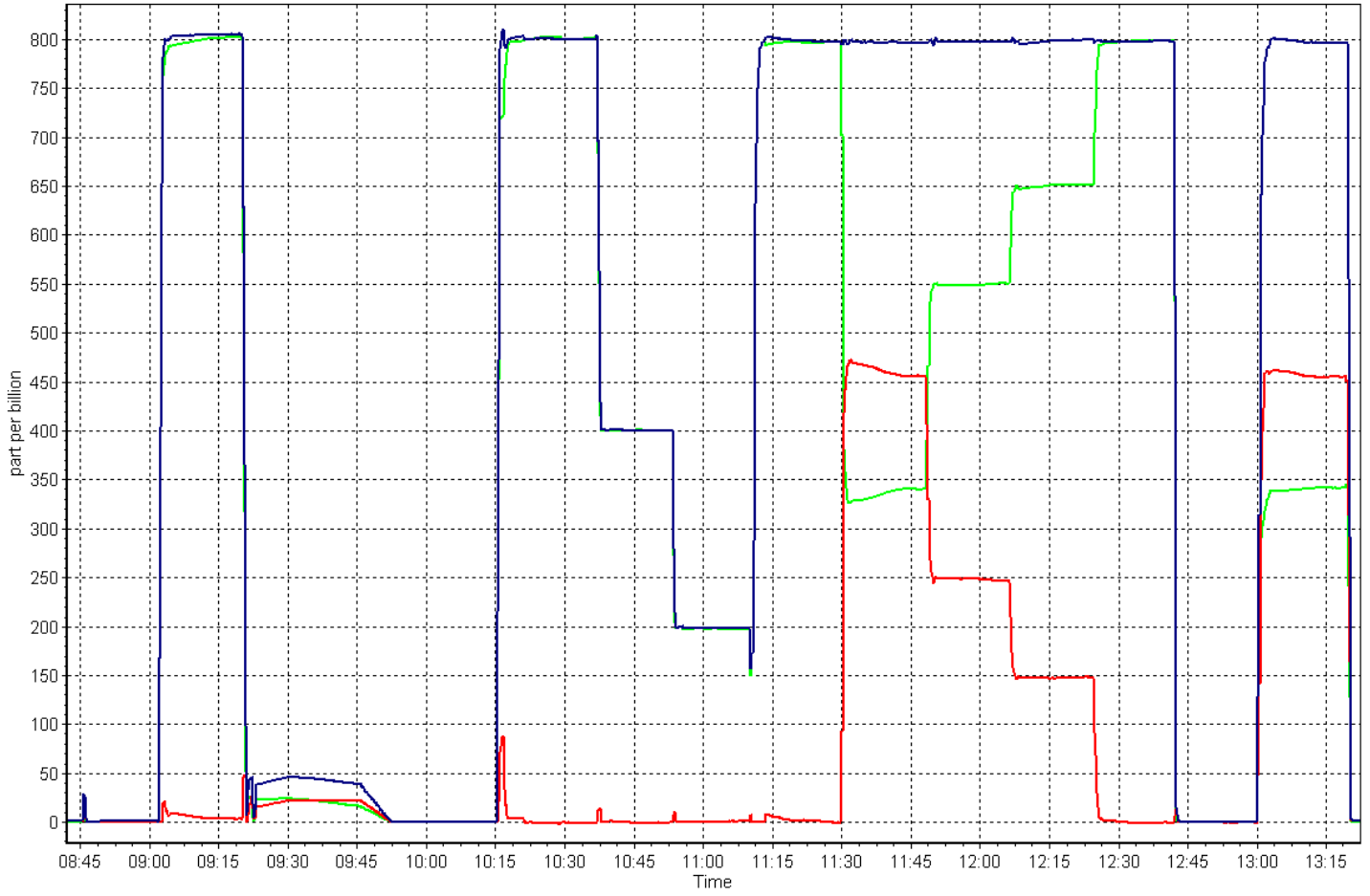
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.6	800.3	0.9991
399.8	400.5	0.9984
200.4	197.5	1.0146

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	1.002164	*0.90 - 1.10*
Intercept	-1.110354	*+/-20*



NO_X Calibration Plot Date: April 11, 2024 Location: Sawbones Bay



CALS_534

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS507
KIRBY SOUTH
APRIL 2024

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

May 31, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	April 18, 2024	Last Cal Date:	March 14, 2024
Start time (MST):	7:45	End time (MST):	11:13
Reason:	Routine		

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:	0.995804	1.000467	Backgd or Offset:	21.7	25.5
Calibration intercept:	0.311657	-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	3.4	----
As found High point	4919	81.3	799.6	801.6	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	798.2	Previous response	796.6	*% 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	-0.3	----
High point	4919	81.3	799.6	798.8	1.001
Mid point	4959	40.7	400.3	399.4	1.002
Low point	4980	20.3	199.7	196.5	1.016
As left zero	5000	0.0	0.0	-0.2	----
As left span	4919	81.3	799.6	801.0	0.998
				Average Correction Factor:	1.006

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

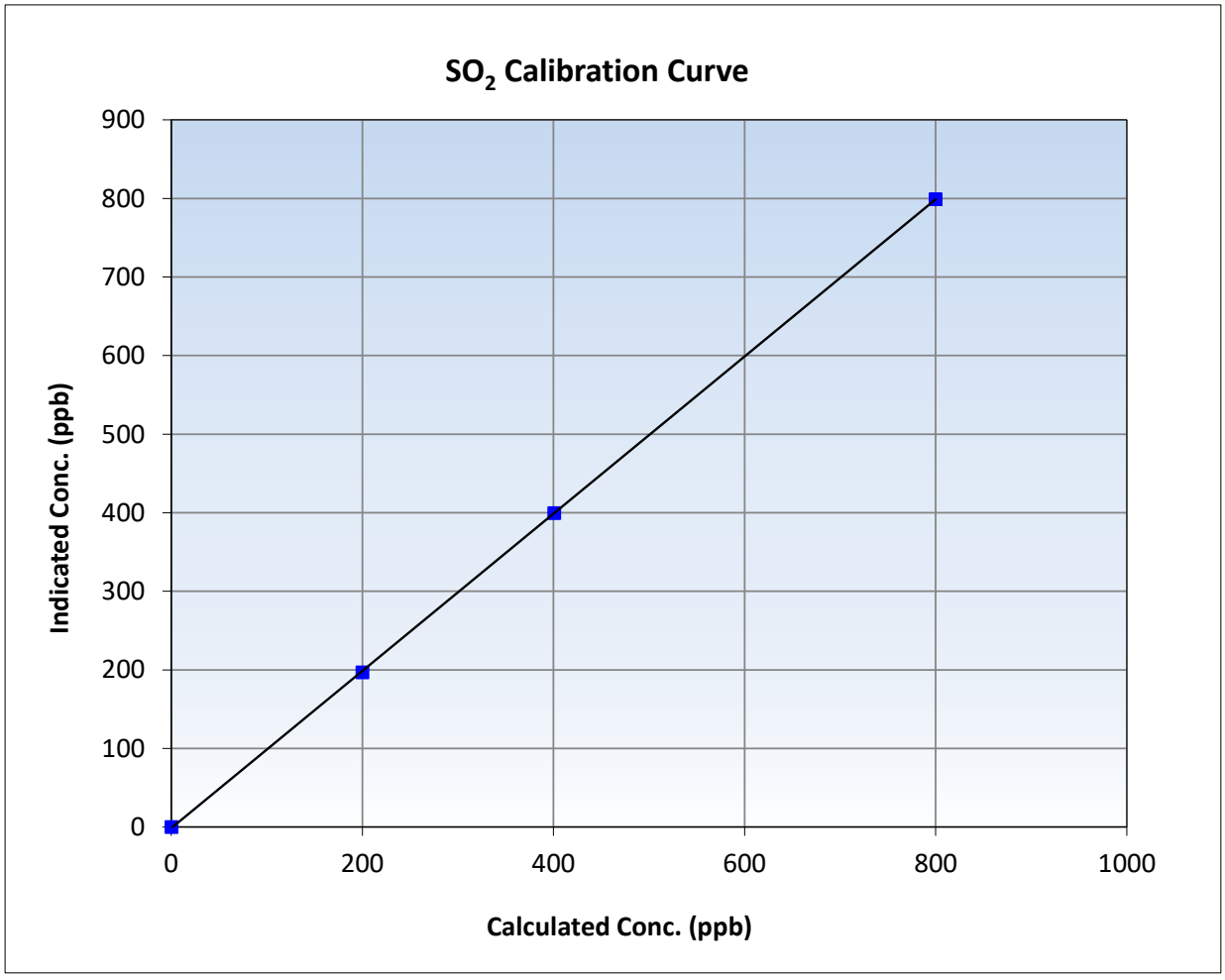
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 14, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	7:45	End Time (MST):	11:13
Analyzer make:	Thermo 43i	Analyzer serial #:	1173410001

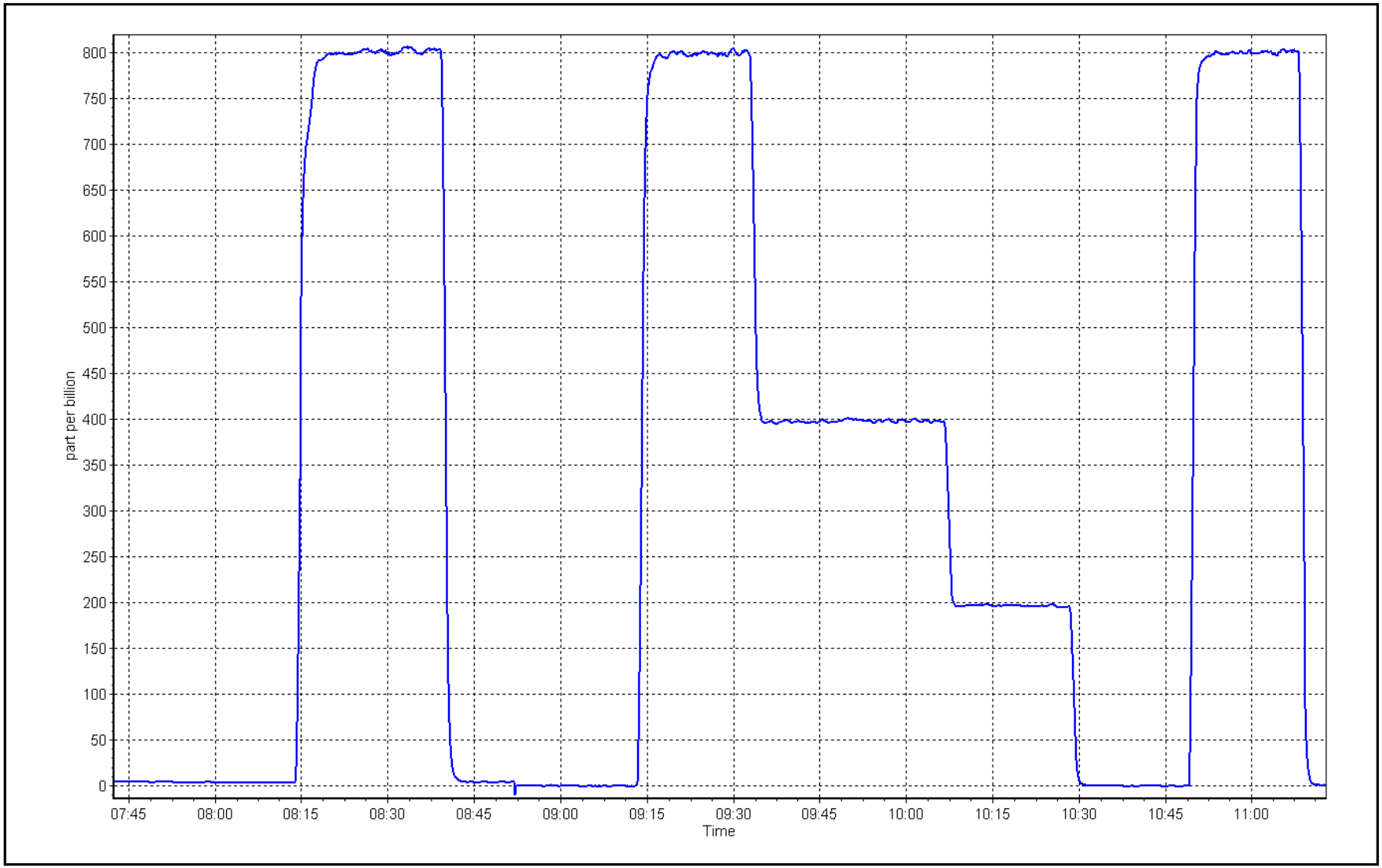
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
799.6	798.8	1.0010
400.3	399.4	1.0024
199.7	196.5	1.0161

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.000467	*0.90 - 1.10*
Intercept	-1.470231	*+/-30*



SO2 Calibration Plot Date: April 18, 2024 Location: Kirby South



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	April 17, 2024	Last Cal Date:	March 13, 2024
Start time (MST):	11:15	End time (MST):	16:07
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 T751		Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb		Converter Temp:	350	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.996813	0.999242	Backgd or Offset:	1.73	1.72
Calibration intercept:	0.139039	-0.020960	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	81.1	0.985
As found Mid point	4960	39.6	40.0	40.0	0.997
As found Low point	4980	19.8	20.0	20.0	0.995
New cylinder response	5000	0.0	0.0		

Baseline Corr As found:	81.2	Prev response:	79.88	*% change:	1.6%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	1.015243	AF Intercept:	-0.280964
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999953	* = > +/-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	79.9	1.001
Mid point	4960	39.6	40.0	40.0	1.000
Low point	4980	19.8	20.0	19.9	1.005
As left zero	5000	0.0	0.0	0.1	----
As left span	4921	79.2	80.0	78.2	1.023
SO2 Scrubber Check	4919	80.0	800.2	0.0	----
Date of last scrubber change:		July 25, 2023		Ave Corr Factor	1.002
Date of last converter efficiency test:		NA			

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H2S Calibration Summary

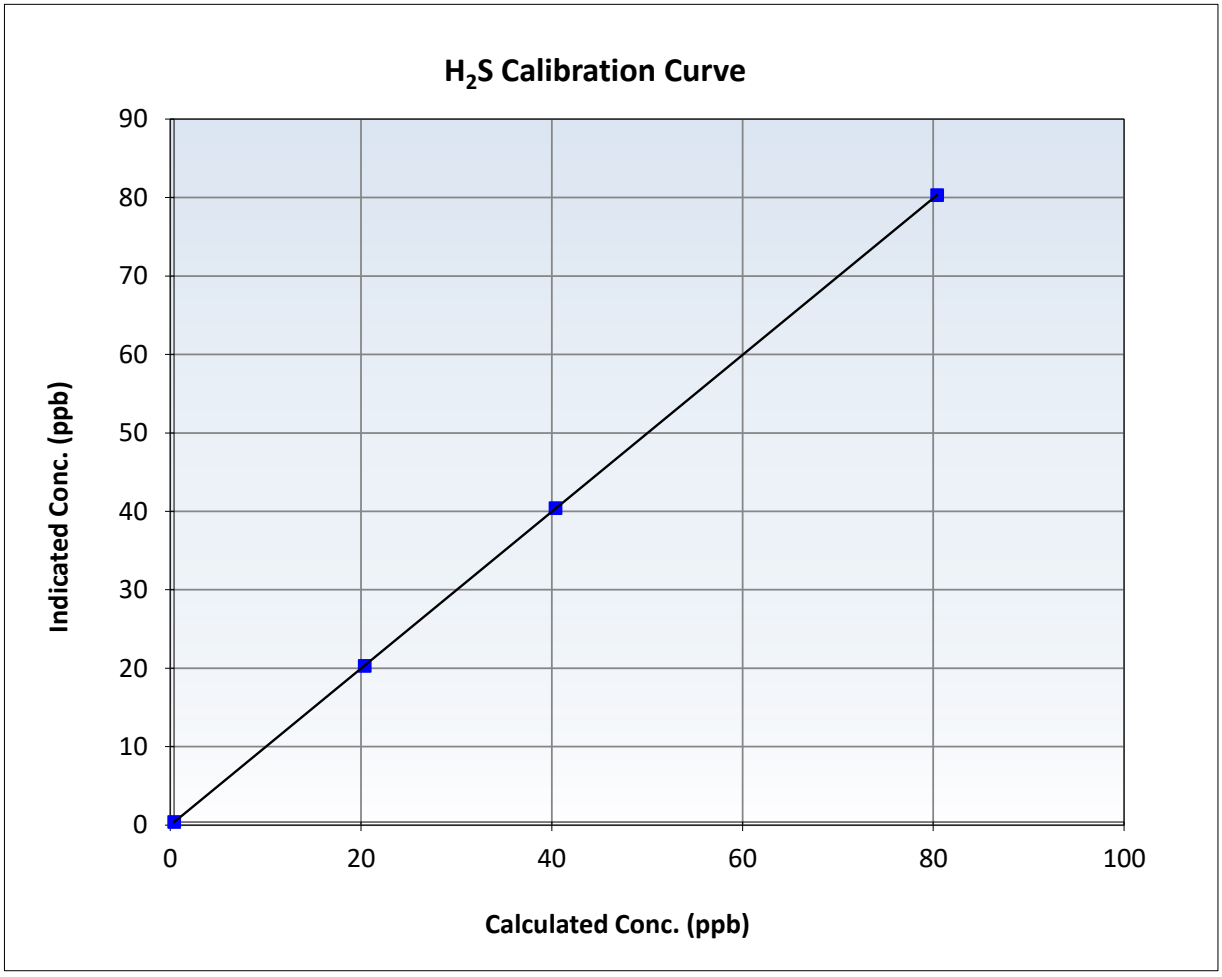
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 13, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	11:15	End Time (MST):	16:07
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

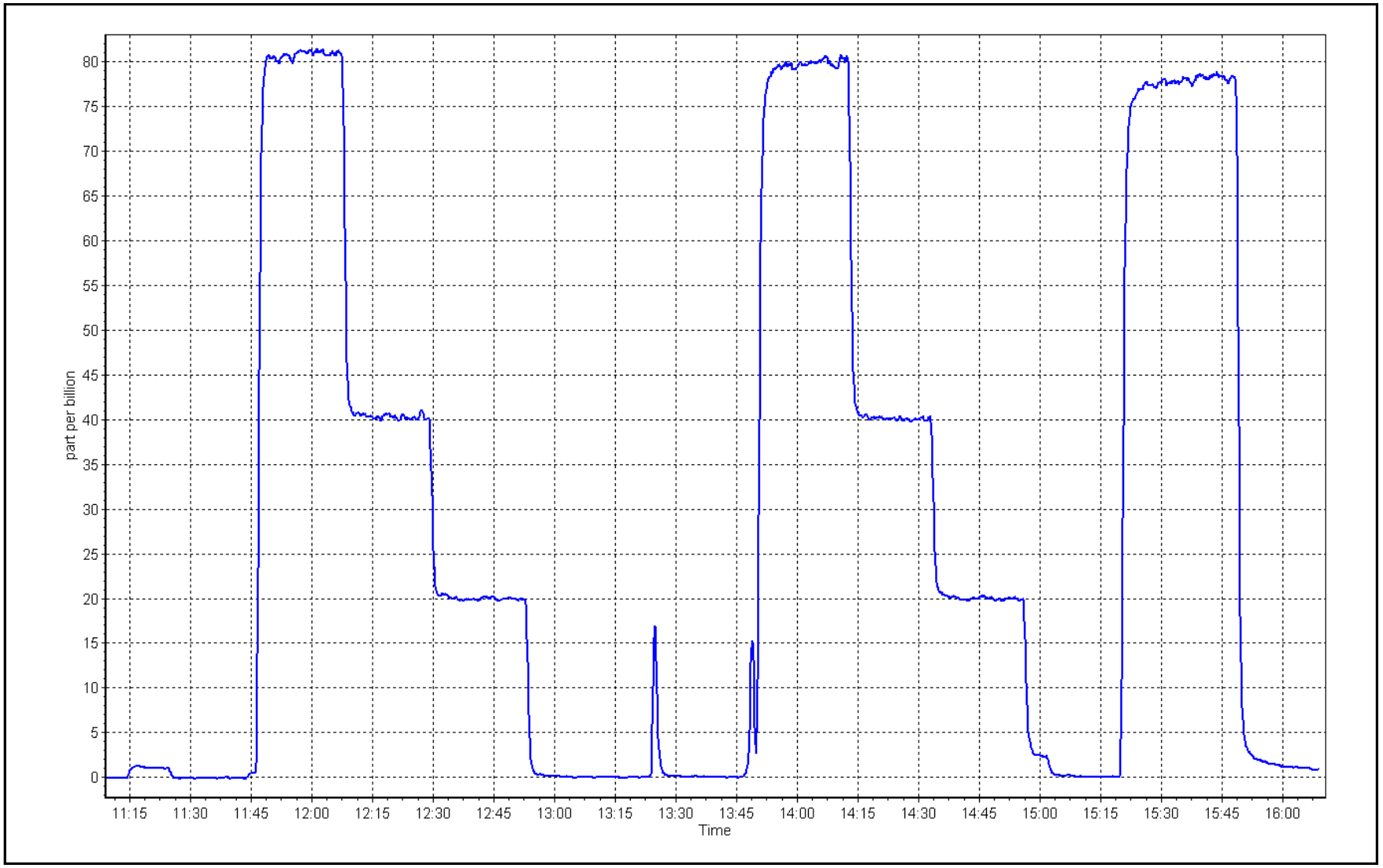
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	79.9	1.0012
40.0	40.0	1.0000
20.0	19.9	1.0050

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	0.999242	*0.90 - 1.10*
Intercept	-0.020960	*+/-3*



H2S Calibration Plot Date: April 17, 2024 Location: Kirby South



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Kirby South	Station number:	AMS 507
Calibration Date:	April 18, 2024	Last Cal Date:	March 14, 2024
Start time (MST):	7:45	End time (MST):	11:13
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:	0.997260	1.001763	Background:	2.15	2.07
Calibration intercept:	0.004217	-0.076111	Coefficient:	3.701	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	17.25	0.998
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.29	Previous response	17.22	*% 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	

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	17.23	1.002
Mid point	4959	40.7	8.64	8.57	1.009
Low point	4980	20.3	4.31	4.21	1.023
As left zero	5000	0.0	0.00	-0.04	----
As left span	4919	81.3	17.26	17.25	1.001
				Average Correction Factor	1.011

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

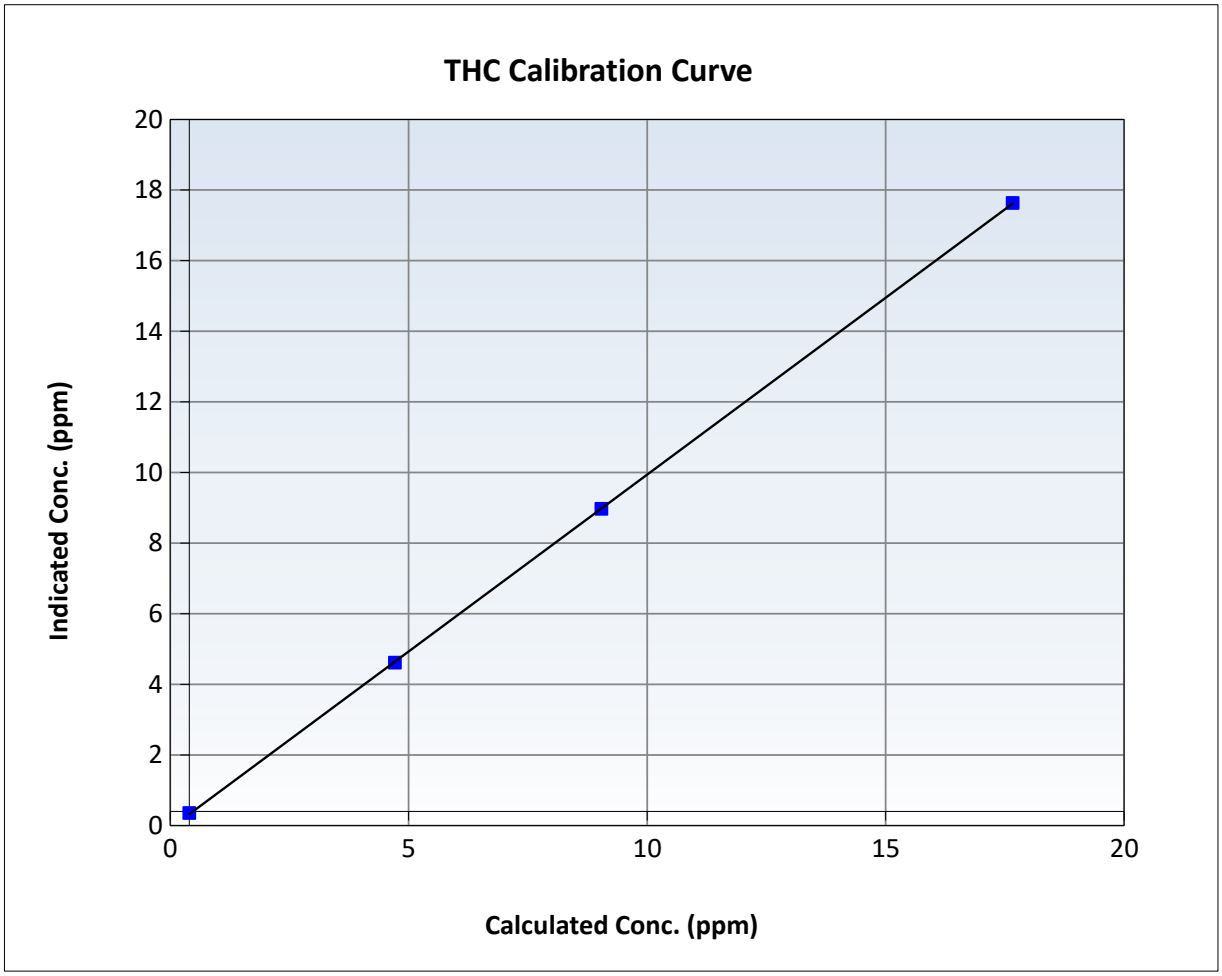
Station Information

Calibration Date:	April 18, 2024	Previous Calibration:	March 14, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	7:45	End Time (MST):	11:13
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1182340005

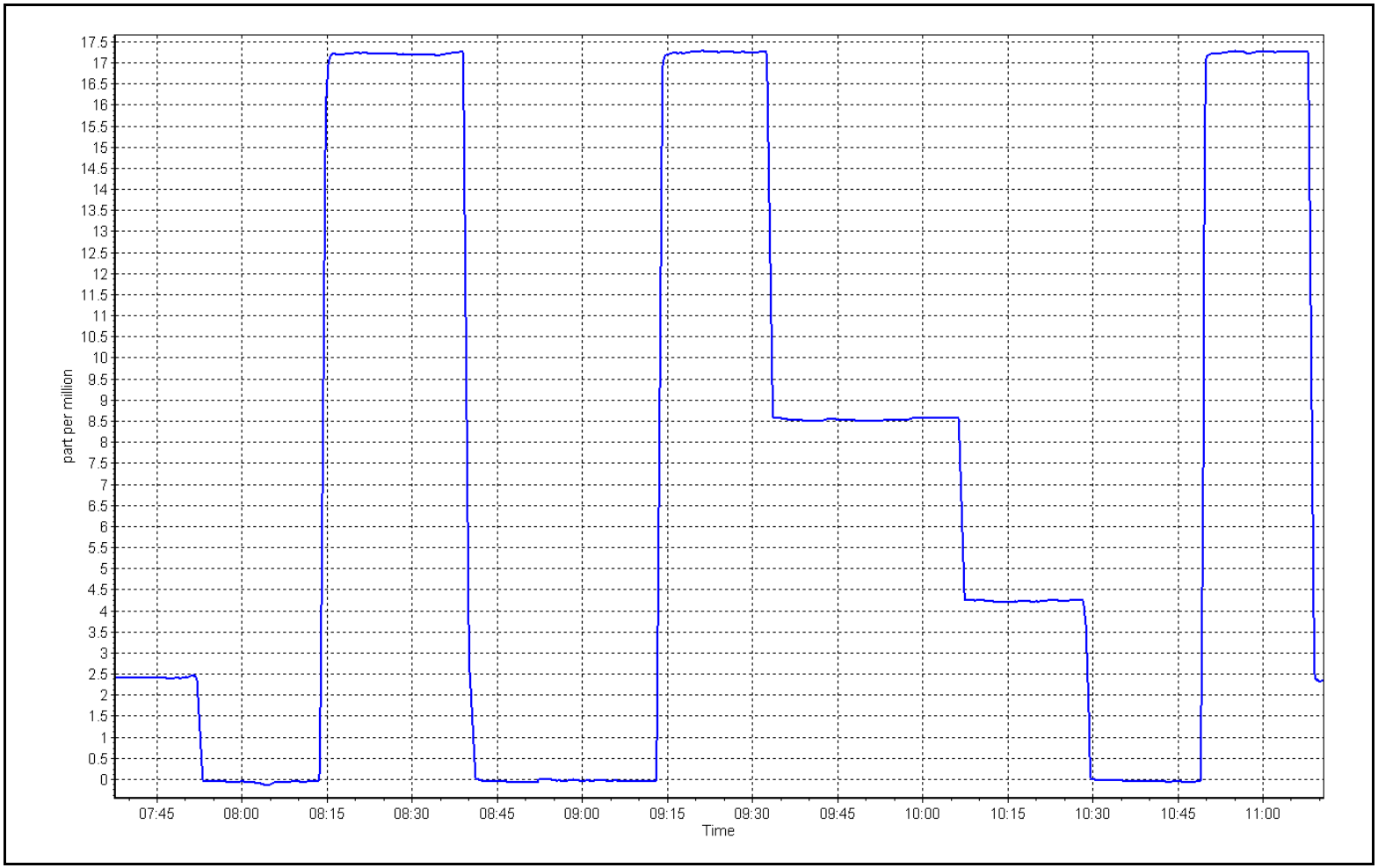
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.05	----
17.26	17.23	1.0019
8.64	8.57	1.0085
4.31	4.21	1.0229

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	1.001763	*0.90 - 1.10*
Intercept	-0.076111	*+/-1.5*



THC Calibration Plot Date: April 18, 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:	April 17, 2024
Last Cal Date:	March 15, 2024
Start time (MST):	11:05
End time (MST):	16:11
Reason:	Routine

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	-1.3	-0.7	-0.6	----	----
AF High point	4919	81.0	800.1	794.1	6.0	832.0	826.0	6.2	0.9602	0.9606
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 796.1 ppb	NO = 790.9 ppb
Baseline Corr 1st pt	NO_X = 833.3 ppb	NO = 826.7 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

*Percent Change NO_X = 4.5%

*Percent Change NO = 4.3%

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 42iQ Serial Number: 12400232071

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.097	1.057	NO bkgnd or offset:	1.8	1.1
NOX coeff or slope:	0.996	0.998	NOX bkgnd or offset:	2.5	1.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	196.86	197.21

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000646	1.000289
NO_X Cal Offset:	-4.504120	-4.604106
NO Cal Slope:	1.002372	1.001623
NO Cal Offset:	-5.105630	-5.445289
NO_2 Cal Slope:	0.996340	0.999497
NO_2 Cal Offset:	0.258912	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	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4919	81.0	800.1	794.1	6.0	798.6	793.7	4.9	1.0019	1.0005
Mid point	4960	40.5	400.1	397.1	3.0	391.6	386.5	5.1	1.0216	1.0273
Low point	4980	20.2	199.5	198.0	1.5	191.5	189.5	2.1	1.0420	1.0451
As left zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	----	----
As left span	4919	81.0	800.1	408.3	391.8	802.0	408.3	393.8	0.9977	1.0000
							Average Correction Factor		1.0218	1.0243

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	787.3	403.7	389.6	389.9	0.9992	100.1%
Mid GPT point	787.3	619.2	174.1	176.3	0.9875	101.3%
Low GPT point	787.3	706.5	86.8	88.6	0.9796	102.1%
				Average Correction Factor	0.9888	101.1%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

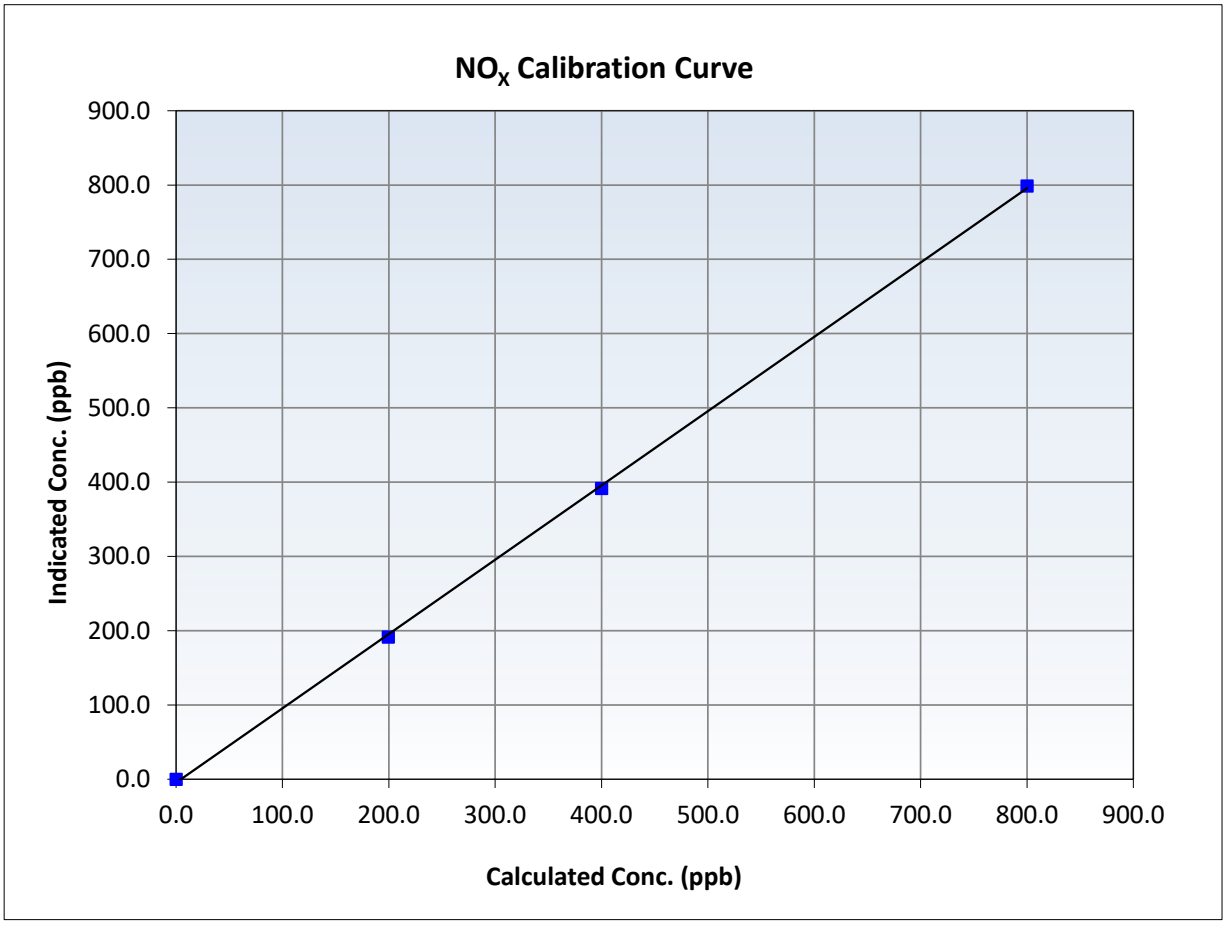
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 15, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	11:05	End Time (MST):	16:11
Analyzer make:	Thermo 42iQ	Analyzer serial #:	12400232071

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.1	798.6	1.0019
400.1	391.6	1.0216
199.5	191.5	1.0420

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999837	*≥0.995*
Slope	1.000289	*0.90 - 1.10*
Intercept	-4.604106	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

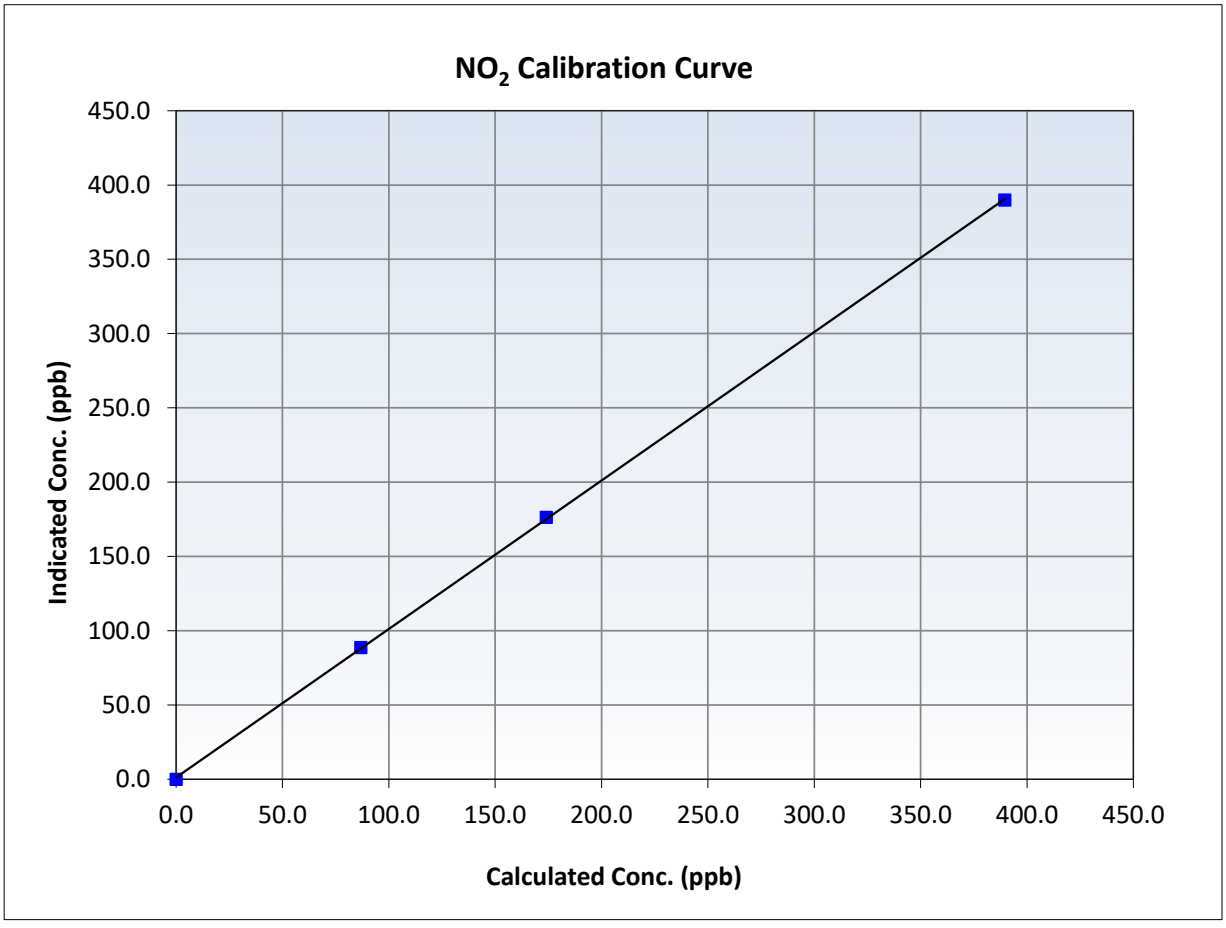
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 15, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	11:05	End Time (MST):	16:11
Analyzer make:	Thermo 42iQ	Analyzer serial #:	12400232071

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
389.6	389.9	0.9992
174.1	176.3	0.9875
86.8	88.6	0.9796

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999958	*≥0.995*
Slope	0.999497	*0.90 - 1.10*
Intercept	1.161308	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

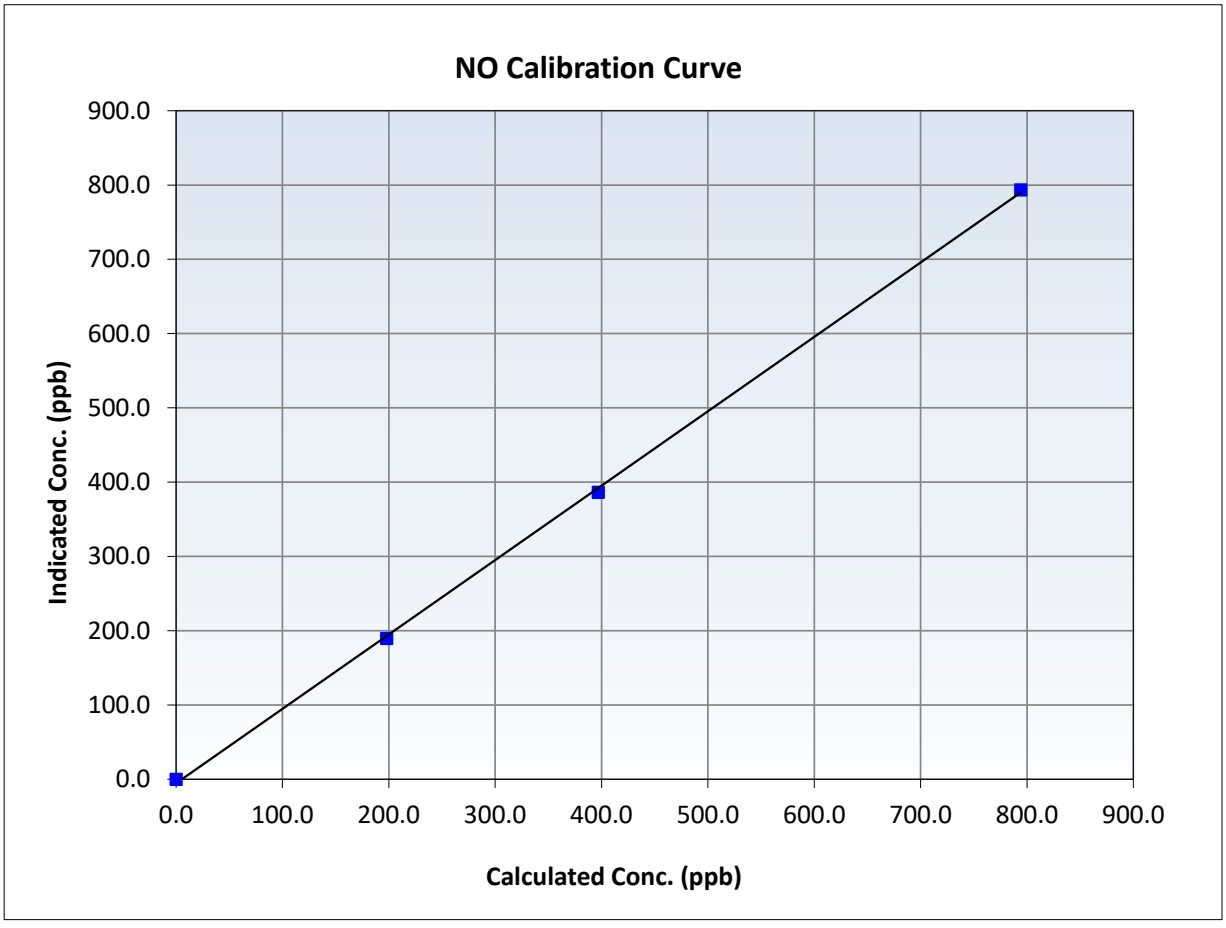
Station Information

Calibration Date:	April 17, 2024	Previous Calibration:	March 15, 2024
Station Name:	Kirby South	Station Number:	AMS 507
Start Time (MST):	11:05	End Time (MST):	16:11
Analyzer make:	Thermo 42iQ	Analyzer serial #:	12400232071

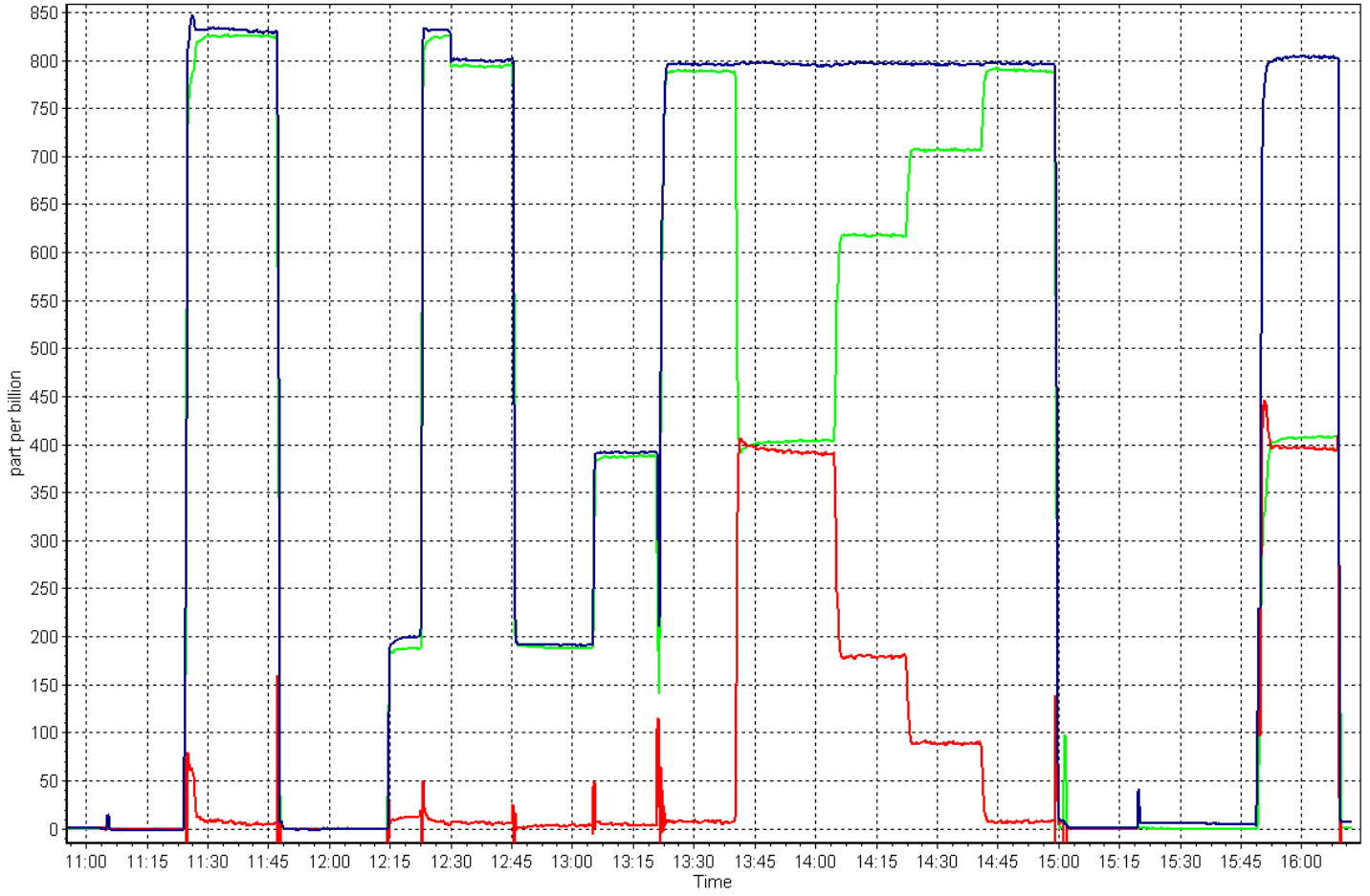
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
794.1	793.7	1.0005
397.1	386.5	1.0273
198.0	189.5	1.0451

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999745	*≥0.995*
Slope	1.001623	*0.90 - 1.10*
Intercept	-5.445289	*+/-20*



NO_X Calibration Plot Date: April 17, 2024 Location: Kirby South



W B E A

End of Report