WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION

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Wood Buffalo Environmental Association

JANUARY 2023

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING

February 28, 2023

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS01
BERTHA GANTER - FORT MCKAY
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 5, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:28	End time (MST):	15:01
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.19	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC486642			
Removed Cal Gas Conc:	49.19	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: JC1501301448

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998745	0.998187	Backgd or Offset:	19.0	19.1
Calibration intercept:	-0.313576	-0.293417	Coeff or Slope:	0.884	0.891

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*
as found zero	5000	0.0	0.0	0.1	----
as found span	4918	81.3	799.9	789.4	1.013
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	----
high point	4918	81.3	799.9	798.6	1.002
second point	4959	40.7	400.4	398.8	1.004
third point	4979	20.3	199.7	198.7	1.005
as left zero	5000	0.0	0.0	0.3	----
as left span	4918	81.3	799.9	799.3	1.001
				Average Correction Factor	1.004

Baseline Corr As found:	789.30	Previous response	798.62	*% change	-1.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

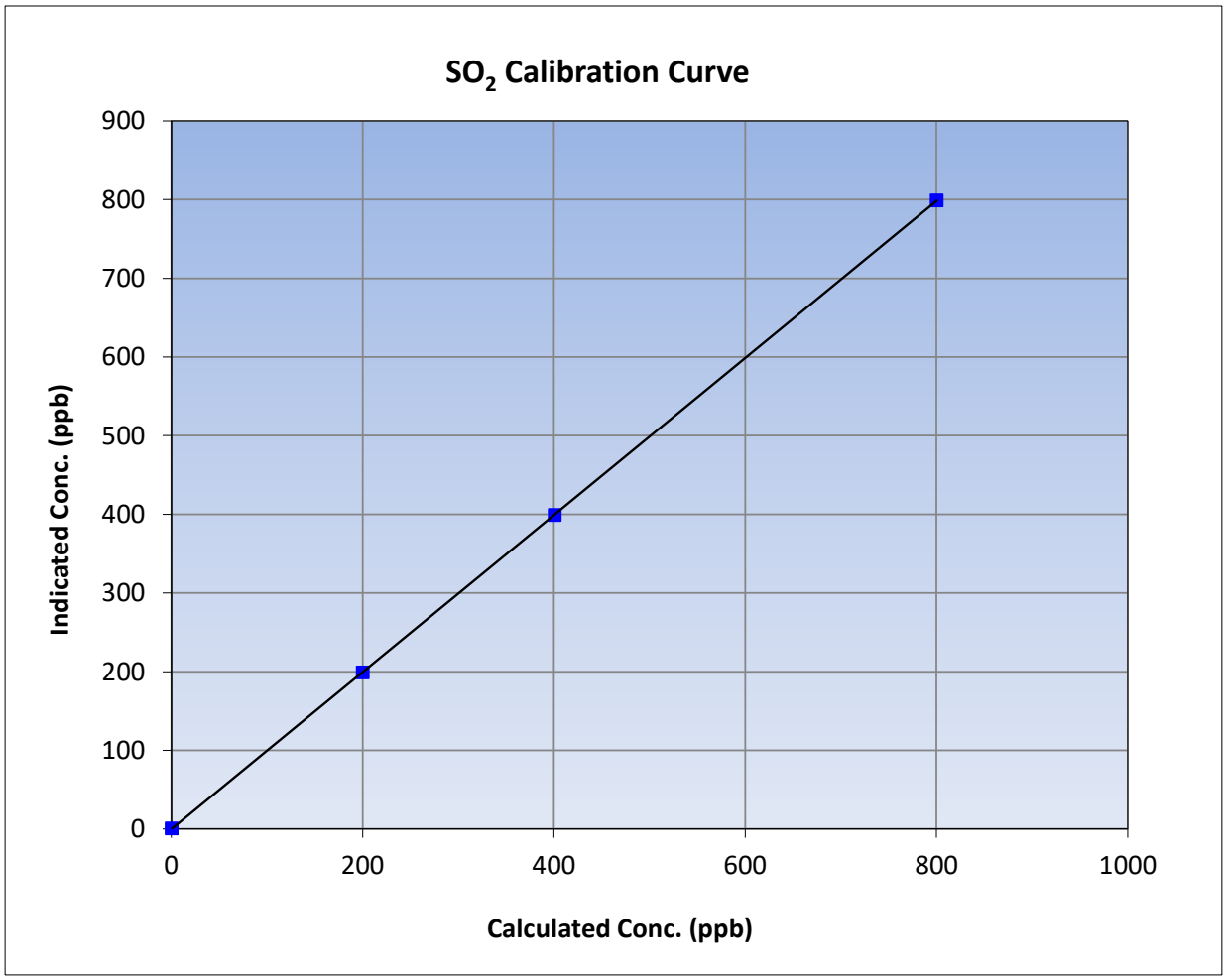
Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:28	End Time (MST):	15:01
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301448

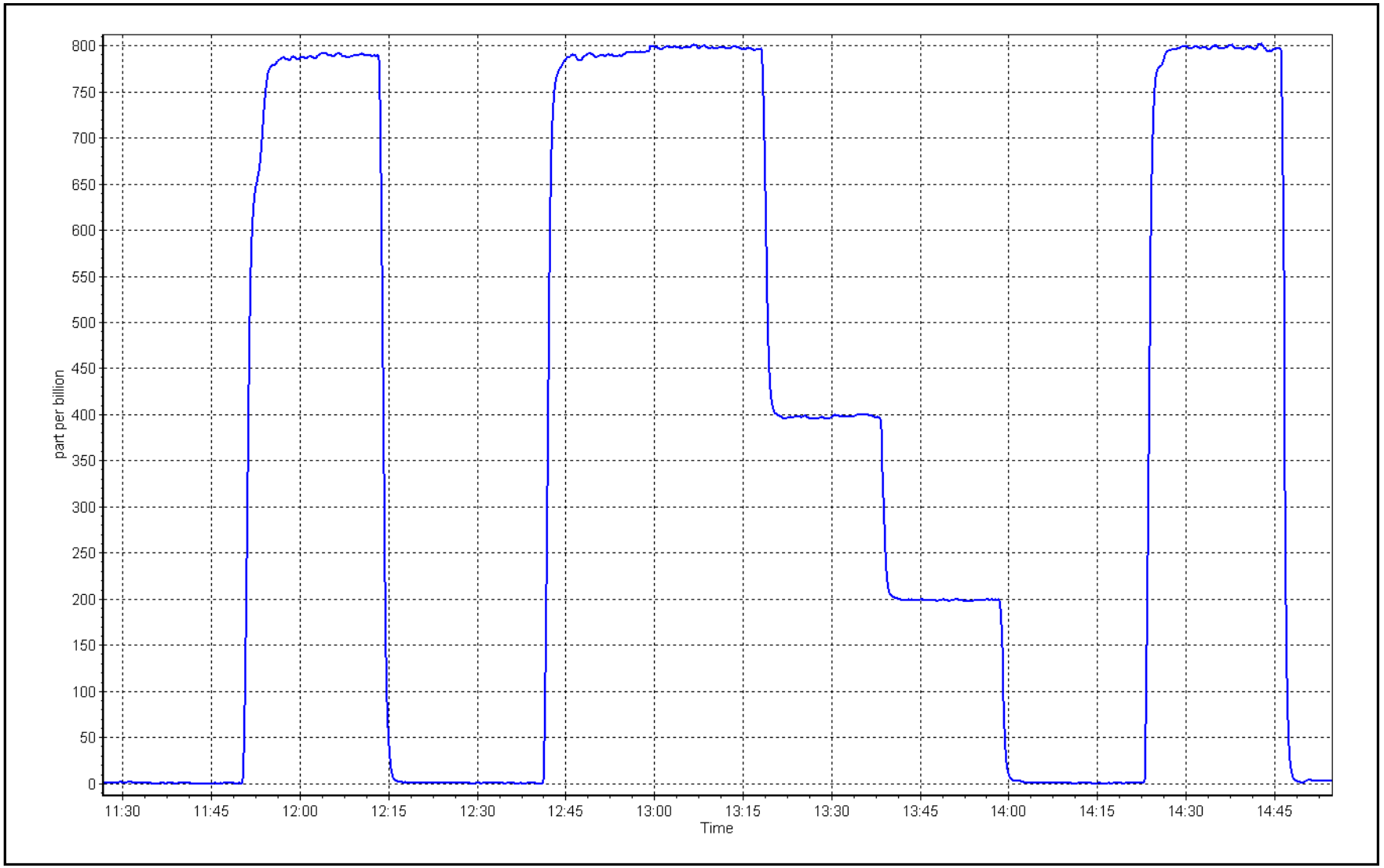
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.9	798.6	1.0017
400.4	398.8	1.0041
199.7	198.7	1.0052

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	0.998187	*0.90 - 1.10*
Intercept	-0.293417	*+/-30*



SO2 Calibration Plot Date: January 5, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 10, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	10:53	End time (MST):	17:26
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:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153461	
Converter make:	CD Nova		Converter serial #:	470	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999935	0.998364	Backgd or Offset:	2.25	2.29
Calibration intercept:	-0.019999	0.059997	Coeff or Slope:	0.908	0.919

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.1	----
as found span	4921	78.4	80.0	78.8	1.016
as found 2nd point	4960	39.2	40.0	39.7	1.010
as found 3rd point	4980	19.6	20.0	19.9	1.010
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.1	----
high point	4921	78.4	80.0	79.9	1.001
second point	4960	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.2	----
as left span	4921	78.4	80.0	79.5	1.006
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:		December 17, 2021		Ave Corr Factor	1.001
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	78.7	Prev response:	79.97	*% change:	-1.6%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.983649	AF Intercept:	0.199998
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999987		

* = > +/-5% change initiates investigation

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

Version-11-2021

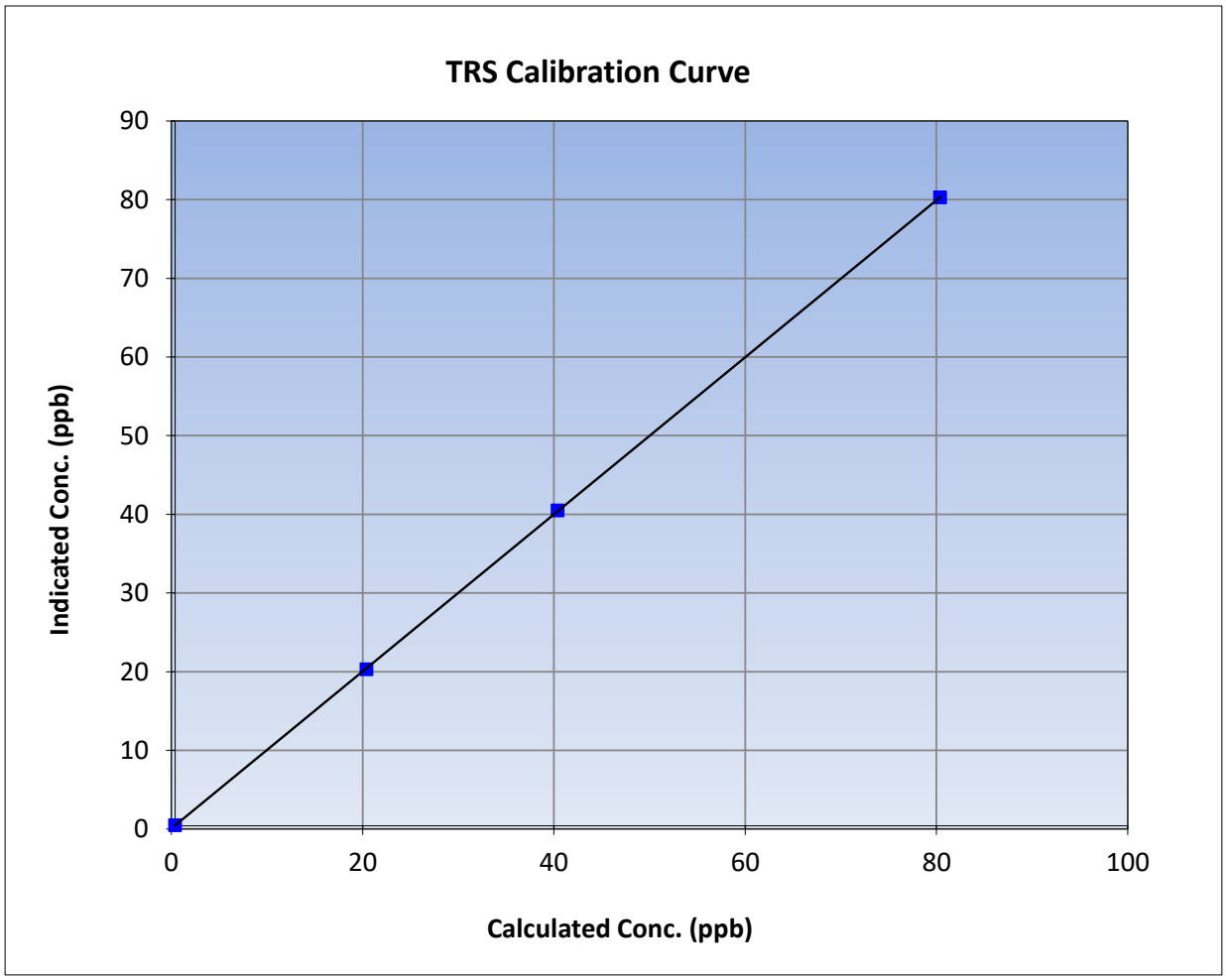
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 13, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	10:53	End Time (MST):	17:26
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

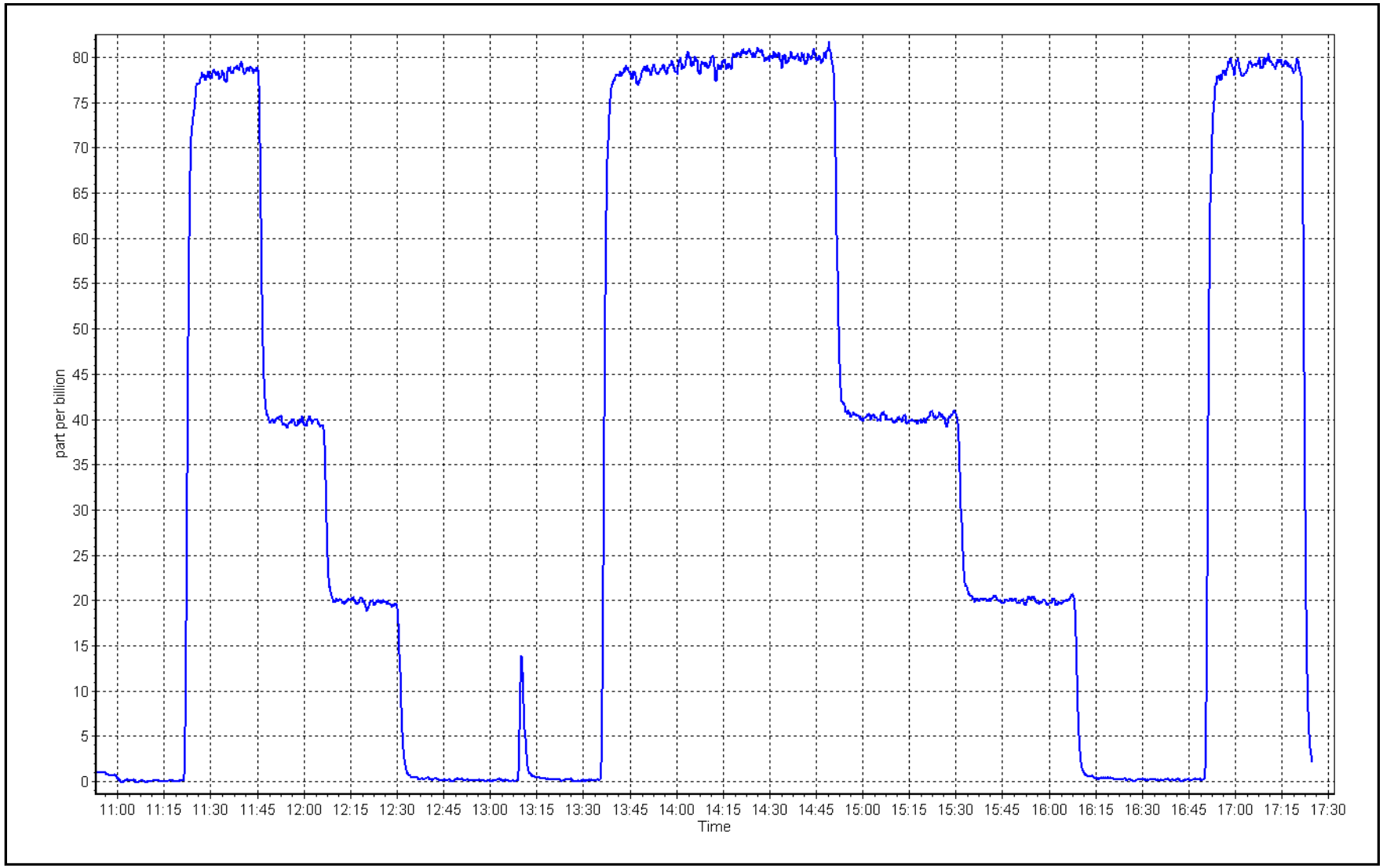
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	79.9	1.0012
40.0	40.1	0.9975
20.0	19.9	1.0049

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	0.998364	*0.90 - 1.10*
Intercept	0.059997	*+/-3*



TRS Calibration Plot Date: January 10, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 10, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	10:53	End time (MST):	17:26
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:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	1200326167	
Converter make:	Thermo Converter		Converter serial #:	N/A	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997946	0.996946	Backgd or Offset:	1.94	1.94
Calibration intercept:	0.301610	0.161599	Coeff or Slope:	1.014	1.014

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 span	4921	78.4	80.0	79.7	1.003
as found 2nd point	4960	39.2	40.0	40.7	0.983
as found 3rd point	4980	19.6	20.0	20.1	0.995
new cylinder response					

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4921	78.4	80.0	79.9	1.001
second point	4961	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	20.0	1.000
as left zero	5000	0.0	0.0	0.5	----
as left span	4921	78.4	80.0	78.9	1.014
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:		March 21, 2022		Ave Corr Factor	0.999
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	79.7	Prev response:	80.11	*% change:	-0.5%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	0.996988	AF Intercept:	0.239990
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999860		

* = > +/-5% change initiates investigation

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

Version-11-2021

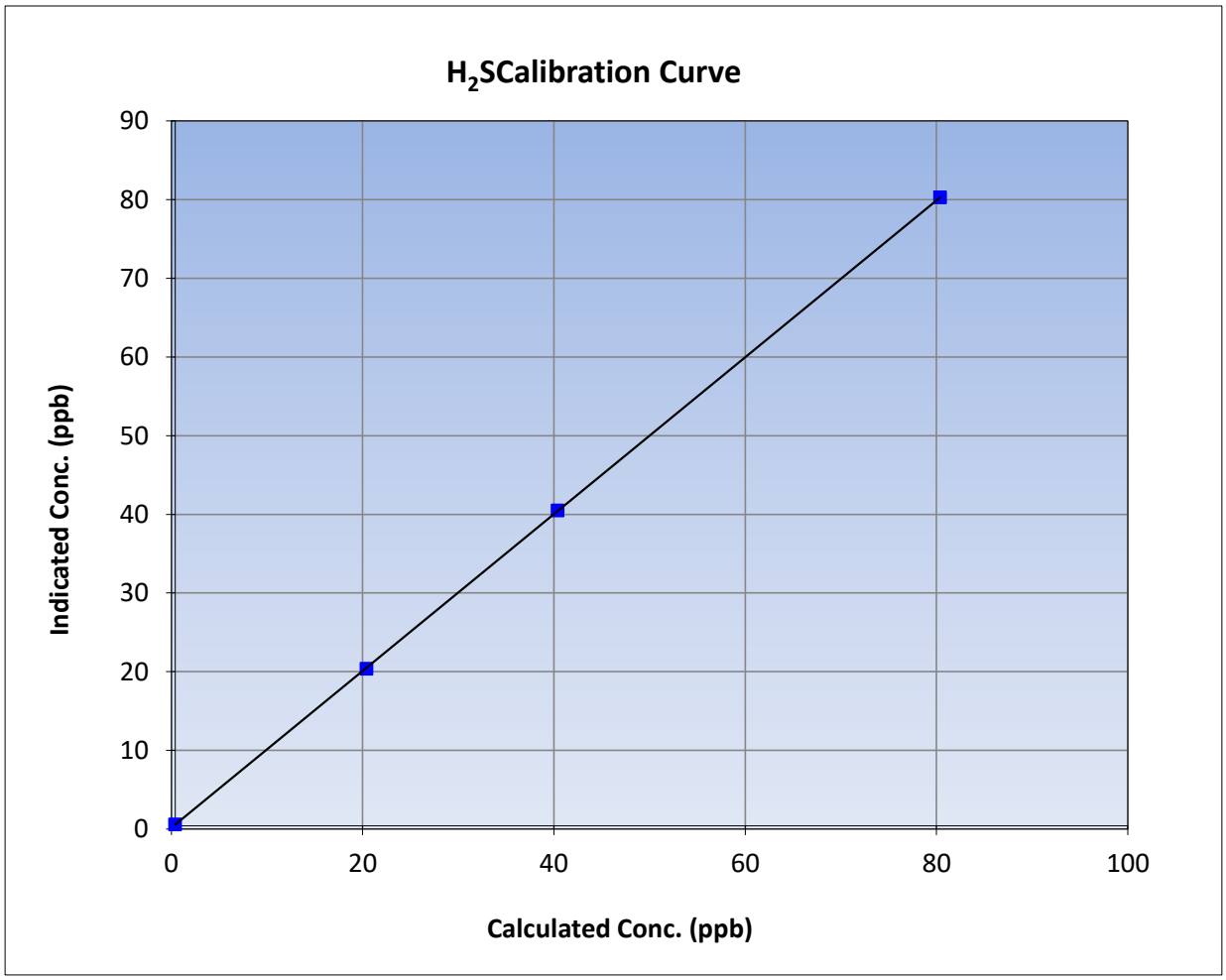
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 13, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	10:53	End Time (MST):	17:26
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1200326167

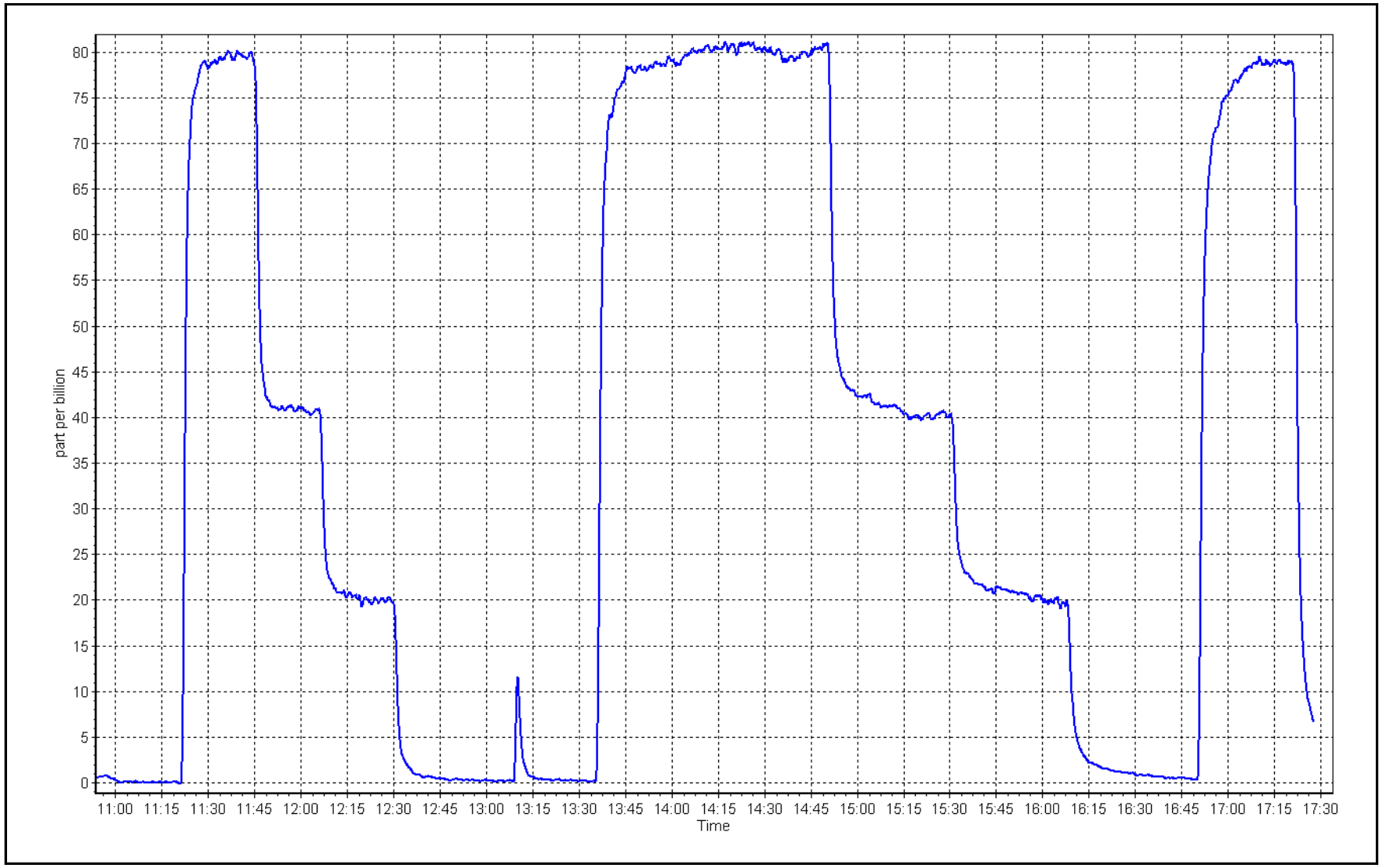
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	79.9	1.0012
40.0	40.1	0.9973
20.0	20.0	0.9999

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.996946	*0.90 - 1.10*
Intercept	0.161599	*+/-3*



H_2S Calibration Plot Date: January 10, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 5, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:28	End time (MST):	15:01
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC486642	Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
C3H8 Cal Gas Conc.	205.6	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
Removed C3H8 Conc.	205.6	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
ZAG make/model:	Teledyne API T701		Serial Number:	5609	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320040	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.50E-04	2.52E-04	NMHC SP Ratio:	5.01E-05	5.11E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	183290	179678

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4918	81.3	17.29	17.13	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4918	81.3	17.29	17.33	0.998
second point	4959	40.7	8.65	8.62	1.004
third point	4979	20.3	4.32	4.33	0.996
as left zero	5000	0.0	0.00	0.00	----
as left span	4918	81.3	17.29	17.40	0.994
				Average Correction Factor	0.999

Baseline Corr AF:	17.13	Prev response	17.27	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4918	81.3	9.19	9.08	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4918	81.3	9.19	9.22	0.997
second point	4959	40.7	4.60	4.61	0.999
third point	4979	20.3	2.30	2.32	0.992
as left zero	5000	0	0.00	0.00	----
as left span	4918	81.3	9.19	9.27	0.992
				Average Correction Factor	0.996
Baseline Corr AF:	9.08	Prev response	9.18	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4918	81.3	8.09	8.04	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4918	81.3	8.09	8.11	0.999
second point	4959	40.7	4.05	4.01	1.009
third point	4979	20.3	2.02	2.02	1.002
as left zero	5000	0.0	0.00	0.00	----
as left span	4918	81.3	8.09	8.13	0.996
				Average Correction Factor	1.003
Baseline Corr AF:	8.04	Prev response	8.09	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999531	1.001778
THC Cal Offset:	-0.010042	-0.008039
CH4 Cal Slope:	1.001390	1.001064
CH4 Cal Offset:	-0.012722	-0.011320
NMHC Cal Slope:	0.998342	1.002294
NMHC Cal Offset:	0.002879	0.003480

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

THC Calibration Summary

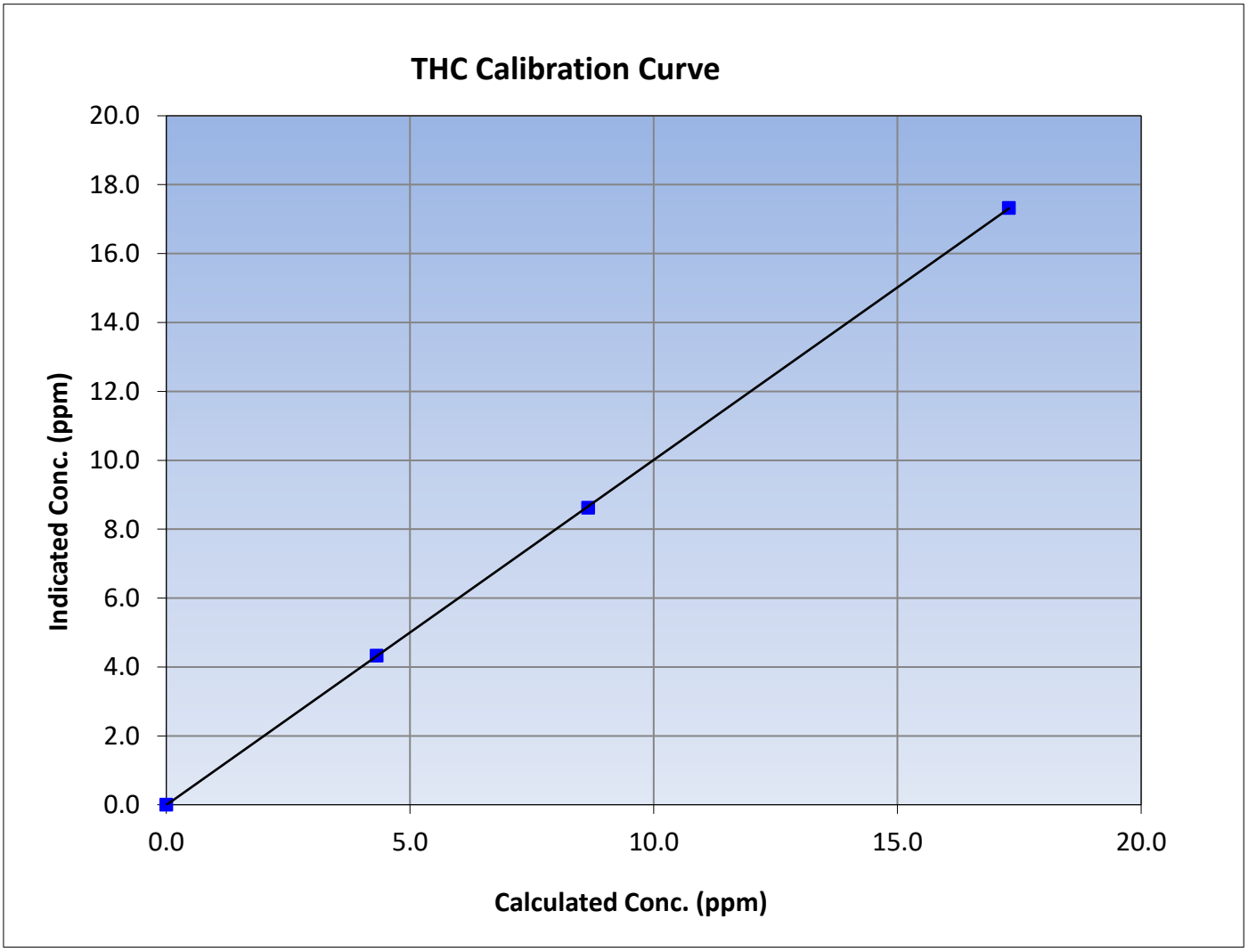
Version-01-2020

Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:28	End Time (MST):	15:01
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	0.999987	≥0.995
17.29	17.33	0.9978			
8.65	8.62	1.0037	Slope	1.001778	0.90 - 1.10
4.32	4.33	0.9965			
			Intercept	-0.008039	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

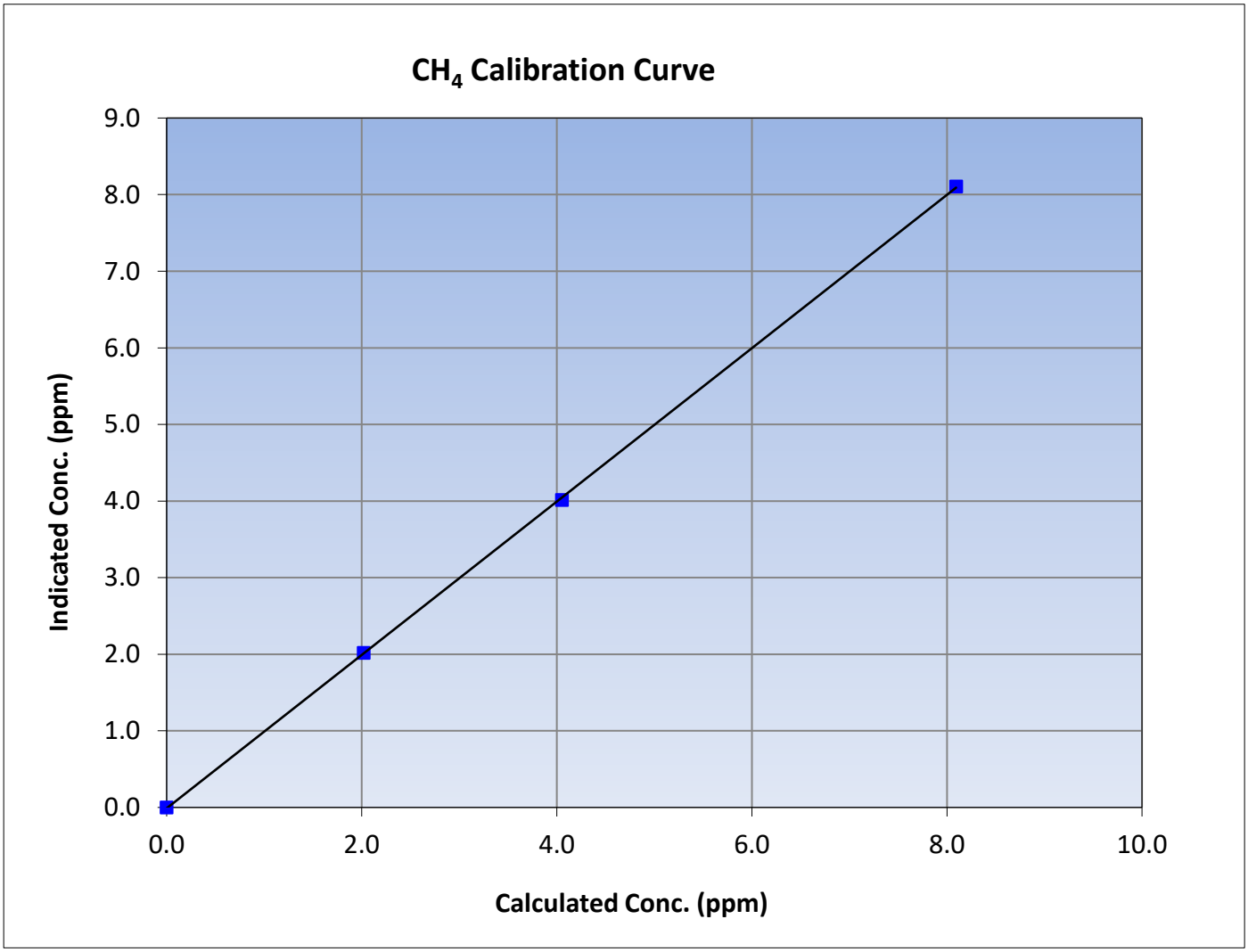
Version-01-2020

Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:28	End Time (MST):	15:01
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	0.999964	*≥0.995*
8.09	8.11	0.9986			
4.05	4.01	1.0093	Slope	1.001064	*0.90 - 1.10*
2.02	2.02	1.0020			
			Intercept	-0.011320	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

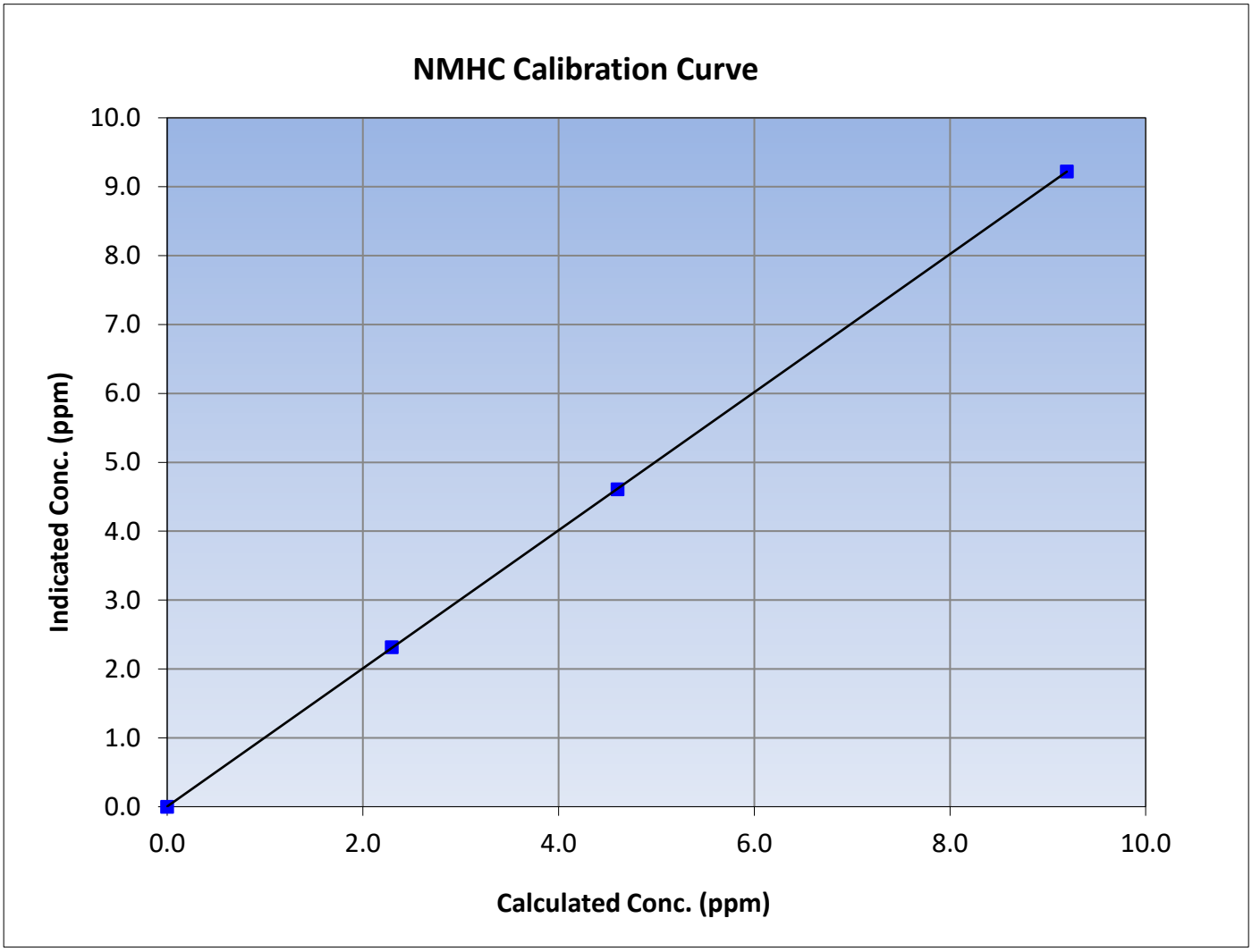
Version-01-2020

Station Information

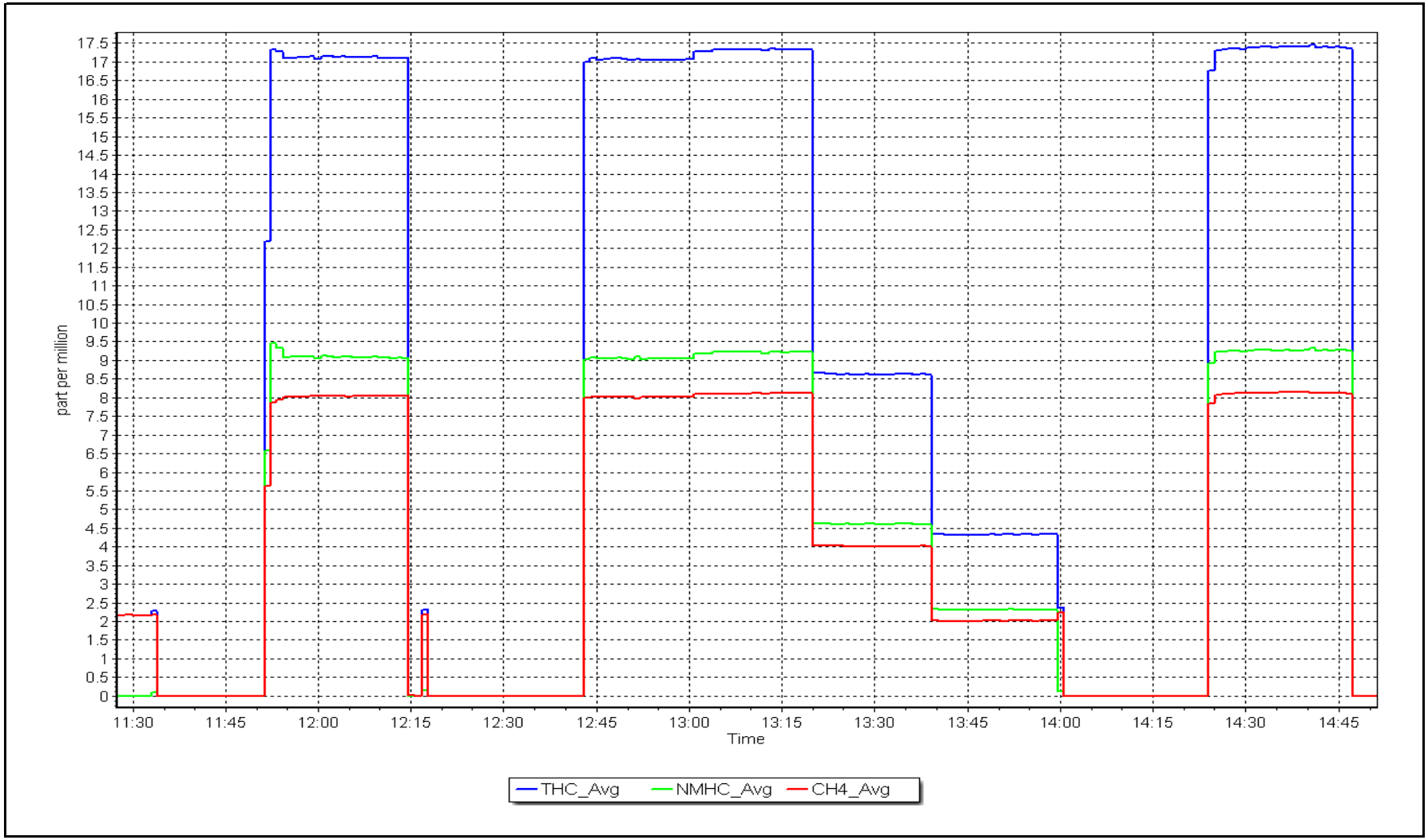
Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:28	End Time (MST):	15:01
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999996	≥0.995
9.19	9.22	0.9971			
4.60	4.61	0.9988	Slope	1.002294	0.90 - 1.10
2.30	2.32	0.9917			
			Intercept	0.003480	+/-0.5



NMHC Calibration Plot Date: January 5, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 23, 2023	Last Cal Date:	January 5, 2023
Start time (MST):	11:35	End time (MST):	14:43
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:		CC486642	Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
C3H8 Cal Gas Conc.	205.6	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
Removed C3H8 Conc.	205.6	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
ZAG make/model:	Teledyne API T701		Serial Number:	5609	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320040	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.52E-04	2.52E-04	NMHC SP Ratio:	5.11E-05	5.11E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	179678	179678

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4918	81.3	17.29	17.80	0.971
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.11	----
as left span	4918	81.3	17.29	18.02	0.960
				Average Correction Factor	
Baseline Corr AF:	17.80	Prev response	17.31	*% change	2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4918	81.3	9.19	9.50	0.968
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	----
as left span	4918	81.3	9.19	9.50	0.968
				Average Correction Factor	
Baseline Corr AF:	9.50	Prev response	9.22	*% change	2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4918	81.3	8.09	8.31	0.974
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.11	----
as left span	4918	81.3	8.09	8.52	0.950
				Average Correction Factor	
Baseline Corr AF:	8.31	Prev response	8.09	*% change	2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

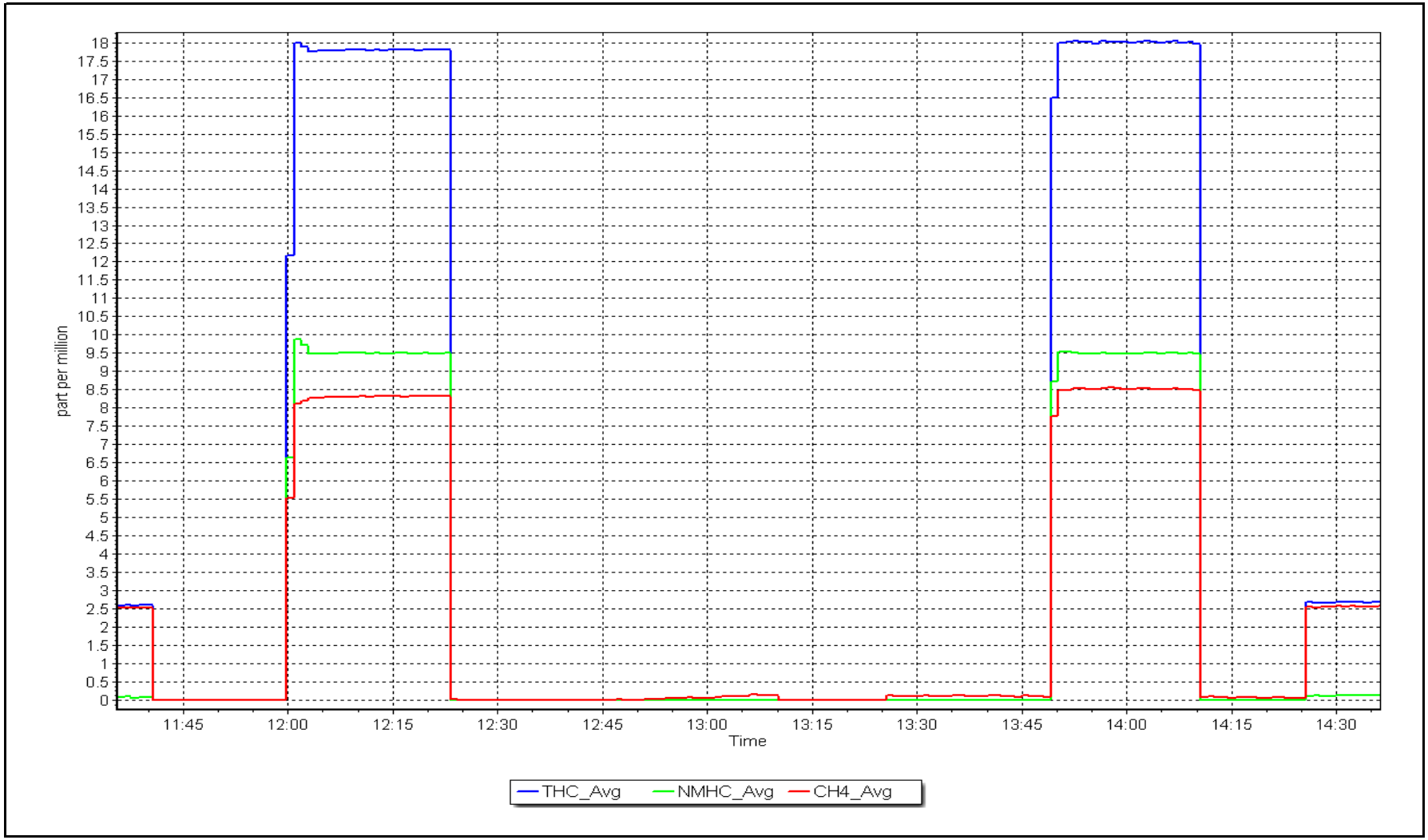
Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001778	
THC Cal Offset:	-0.008039	
CH4 Cal Slope:	1.001064	
CH4 Cal Offset:	-0.011320	
NMHC Cal Slope:	1.002294	
NMHC Cal Offset:	0.003480	

Notes: Swapping out the H2 cylinder. Cylinder was contaminated, swapped the old cylinder back in.

Calibration Performed By: Rene Chamberland

NMHC Calibration Plot Date: January 23, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 24, 2023	Last Cal Date:	January 5, 2023
Start time (MST):	11:32	End time (MST):	15:20
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:		CC486642	Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
C3H8 Cal Gas Conc.	205.6	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm
Removed C3H8 Conc.	205.6	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
ZAG make/model:	Teledyne API T701		Serial Number:	5609	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320040	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.52E-04	2.54E-04	NMHC SP Ratio:	5.11E-05	5.11E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	179678	179761

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	----
high point	4918	81.3	17.29	17.30	1.000
second point	4959	40.7	8.65	8.63	1.003
third point	4980	20.3	4.32	4.32	0.999
as left zero	5000	0.0	0.00	0.01	----
as left span	4918	81.3	17.29	17.29	1.000
				Average Correction Factor	1.001

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	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4918	81.3	9.19	9.20	1.000
second point	4959	40.7	4.60	4.60	1.000
third point	4980	20.3	2.30	2.31	0.995
as left zero	5000	0	0.00	0.00	----
as left span	4918	81.3	9.19	9.22	0.998
				Average Correction Factor	0.998
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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	----
high point	4918	81.3	8.09	8.10	0.999
second point	4959	40.7	4.05	4.03	1.006
third point	4980	20.3	2.02	2.01	1.005
as left zero	5000	0.0	0.00	0.01	----
as left span	4918	81.3	8.09	8.07	1.003
				Average Correction Factor	1.003
Baseline Corr AF:	NA	Prev response	NA	*% change	NA
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001778	0.999160
THC Cal Offset:	-0.008039	0.008295
CH4 Cal Slope:	1.001064	0.998842
CH4 Cal Offset:	-0.011320	0.003433
NMHC Cal Slope:	1.002294	0.999663
NMHC Cal Offset:	0.003480	0.004462

Notes: As founds not completed because the flame was out. Swapping out the H2 cylinder. Enabled the "use zero chromatogram" option. Adjused span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

THC Calibration Summary

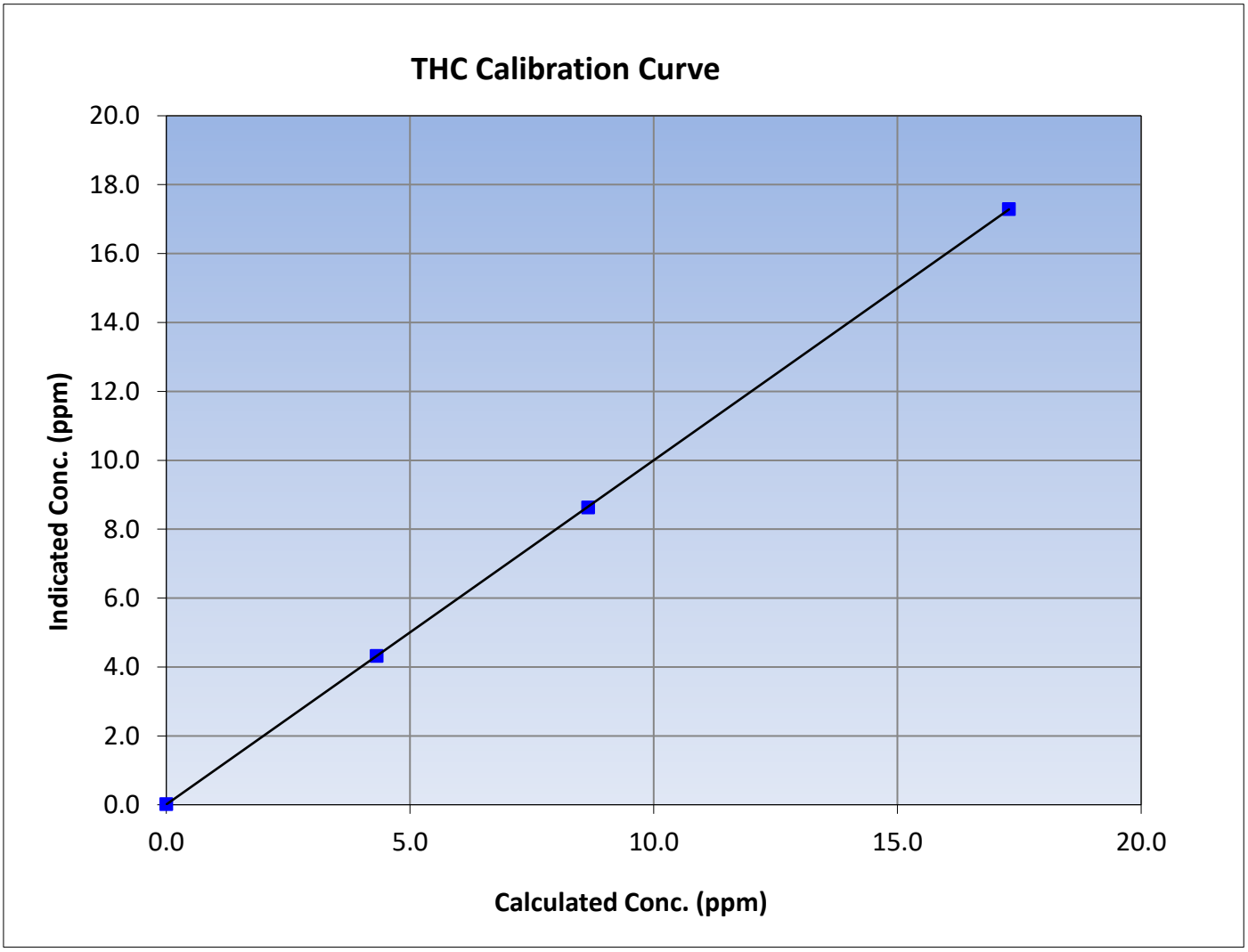
Version-01-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	January 5, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:32	End Time (MST):	15:20
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	0.02	----	Correlation Coefficient	0.999993	*≥0.995*
17.29	17.30	0.9996			
8.65	8.63	1.0030	Slope	0.999160	*0.90 - 1.10*
4.32	4.32	0.9993			
			Intercept	0.008295	*+/-0.5*



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CH_4 Calibration Summary

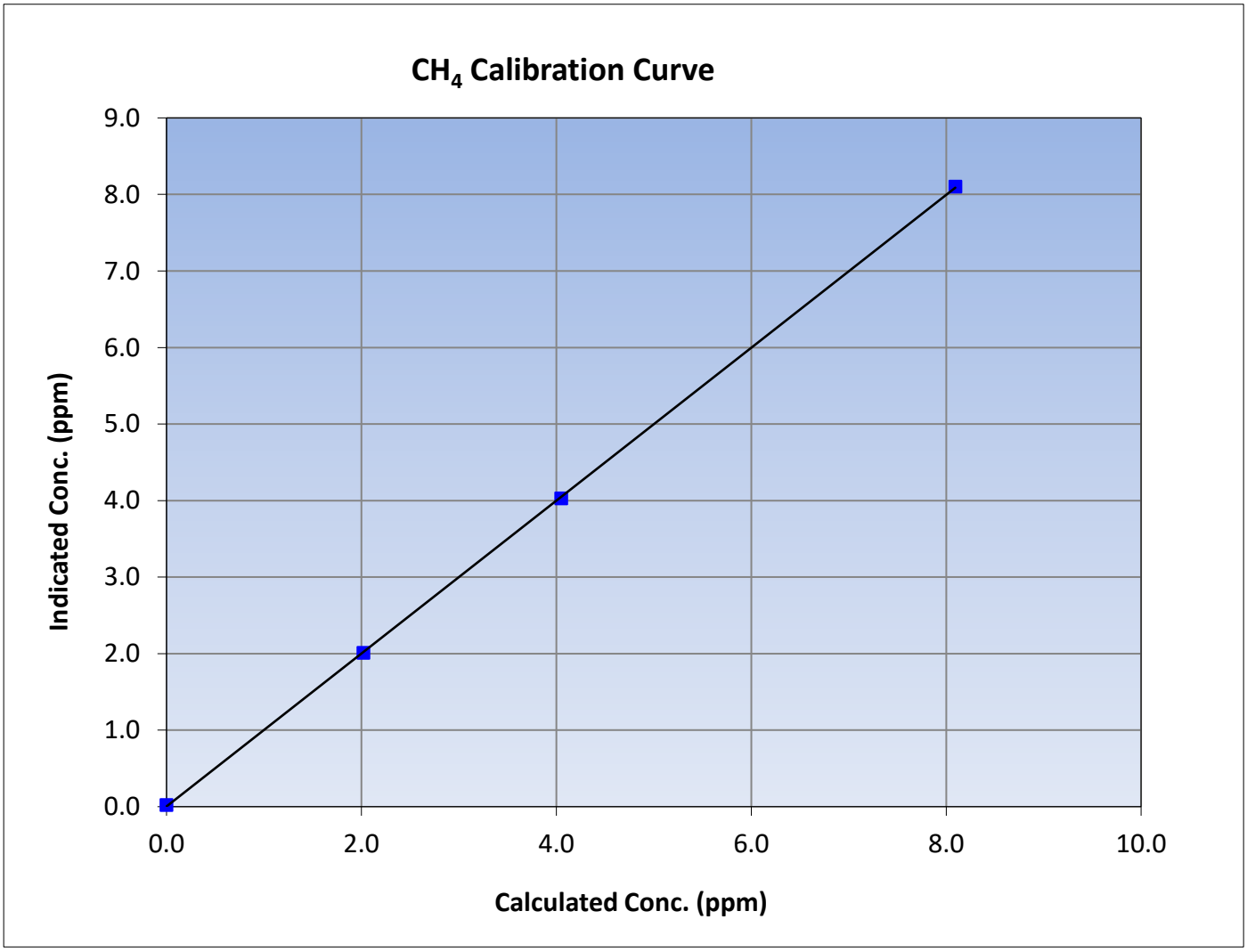
Version-01-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	January 5, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:32	End Time (MST):	15:20
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	0.02	----	Correlation Coefficient	0.999966	*≥0.995*
8.09	8.10	0.9990			
4.05	4.03	1.0060	Slope	0.998842	*0.90 - 1.10*
2.02	2.01	1.0048			
			Intercept	0.003433	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

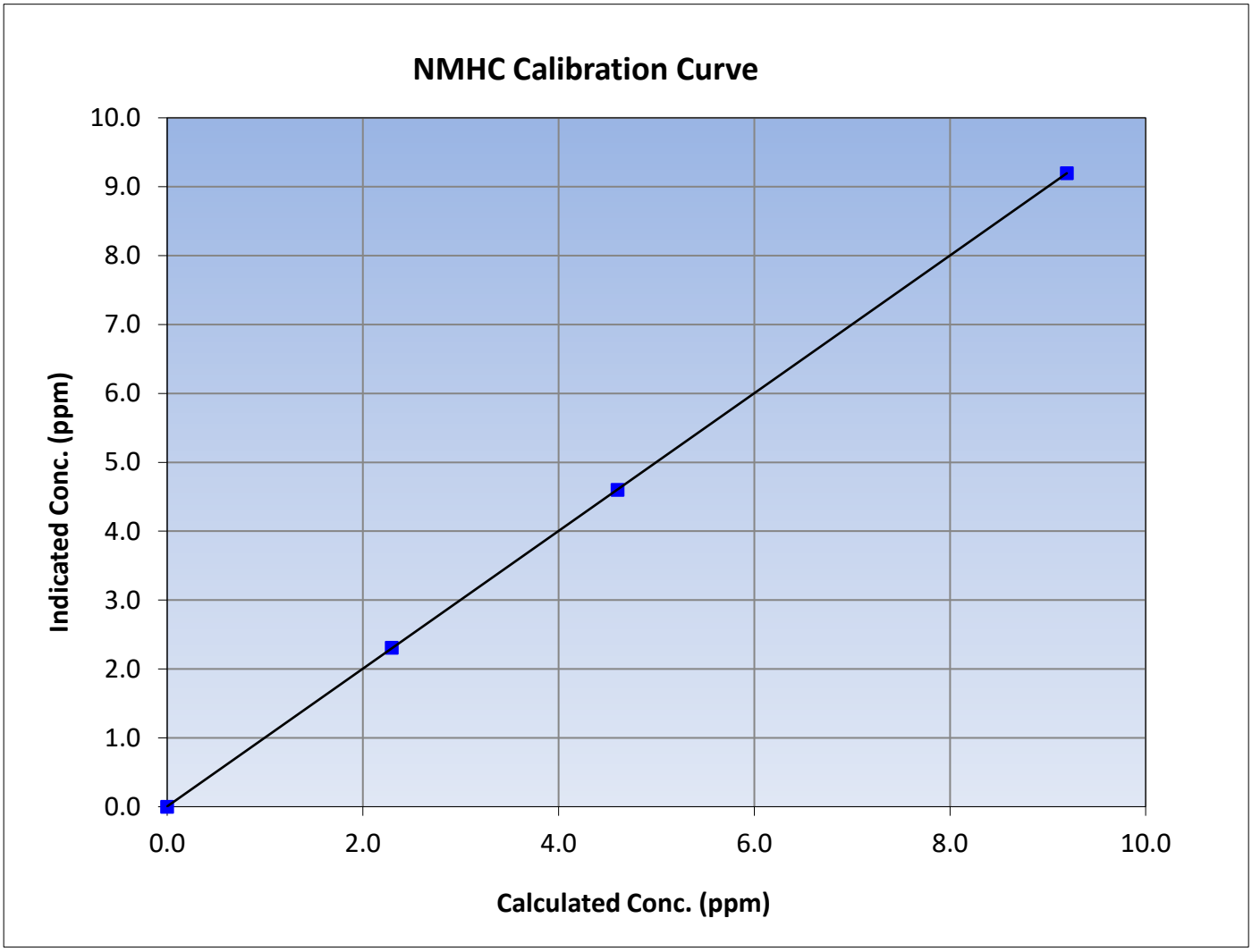
Version-01-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	January 5, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:32	End Time (MST):	15:20
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	0.999998	≥0.995
9.19	9.20	0.9999			
4.60	4.60	1.0003	Slope	0.999663	0.90 - 1.10
2.30	2.31	0.9946			
			Intercept	0.004462	+/-0.5



NMHC Calibration Plot Date: January 24, 2023 Location: Bertha Ganter-Fort McKay

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 6, 2023	Last Cal Date:	December 19, 2022
Start time (MST):	11:13	End time (MST):	16:15
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P9L		Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	50.84	ppm	NO Cal Gas Conc:	50.04	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.84	ppm	Removed Gas NO Conc:	50.04	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
ZAG make/model:	Teledyne API T701		Serial Number:	5609	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1218153357	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.432	1.453	NO bkgnd or offset:	6.7	6.9
NOX coeff or slope:	0.999	0.990	NOX bkgnd or offset:	6.9	7.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	195.4	195.4

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.999185	0.999269
NO_X Cal Offset:	-0.340000	-0.220000
NO Cal Slope:	1.000128	1.000842
NO Cal Offset:	-1.100000	-0.900000
NO_2 Cal Slope:	0.999271	0.996966
NO_2 Cal Offset:	0.358702	-0.078101

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as found span	4920	80.0	813.4	800.6	12.8	803.2	789.2	14.0	1.0127	1.0145
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.1	----	----
high point	4920	80.0	813.4	800.6	12.8	812.9	800.8	12.3	1.0007	0.9998
second point	4960	40.0	406.7	400.3	6.4	406.0	399.8	6.2	1.0018	1.0013
third point	4980	20.0	203.4	200.2	3.2	202.3	197.8	4.5	1.0052	1.0119
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.4	----	----
as left span	4920	80.0	813.4	400.3	413.1	810.3	389.8	420.6	1.0039	1.0270
								Average Correction Factor	1.0026	1.0043

Corrected As found	NO_X = 803.2 ppb	NO = 789.1 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	-1.2%
Previous Response	NO_X = 812.4 ppb	NO = 799.6 ppb			*Percent Change	NO =	-1.3%
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.6	397.3	413.1	412.0	1.0027	99.7%
2nd GPT point (200 ppb O3)	797.6	584.2	226.2	225.0	1.0053	99.5%
3rd GPT point (100 ppb O3)	797.6	695.6	114.8	114.4	1.0035	99.7%
				Average Correction Factor	1.0038	99.6%

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

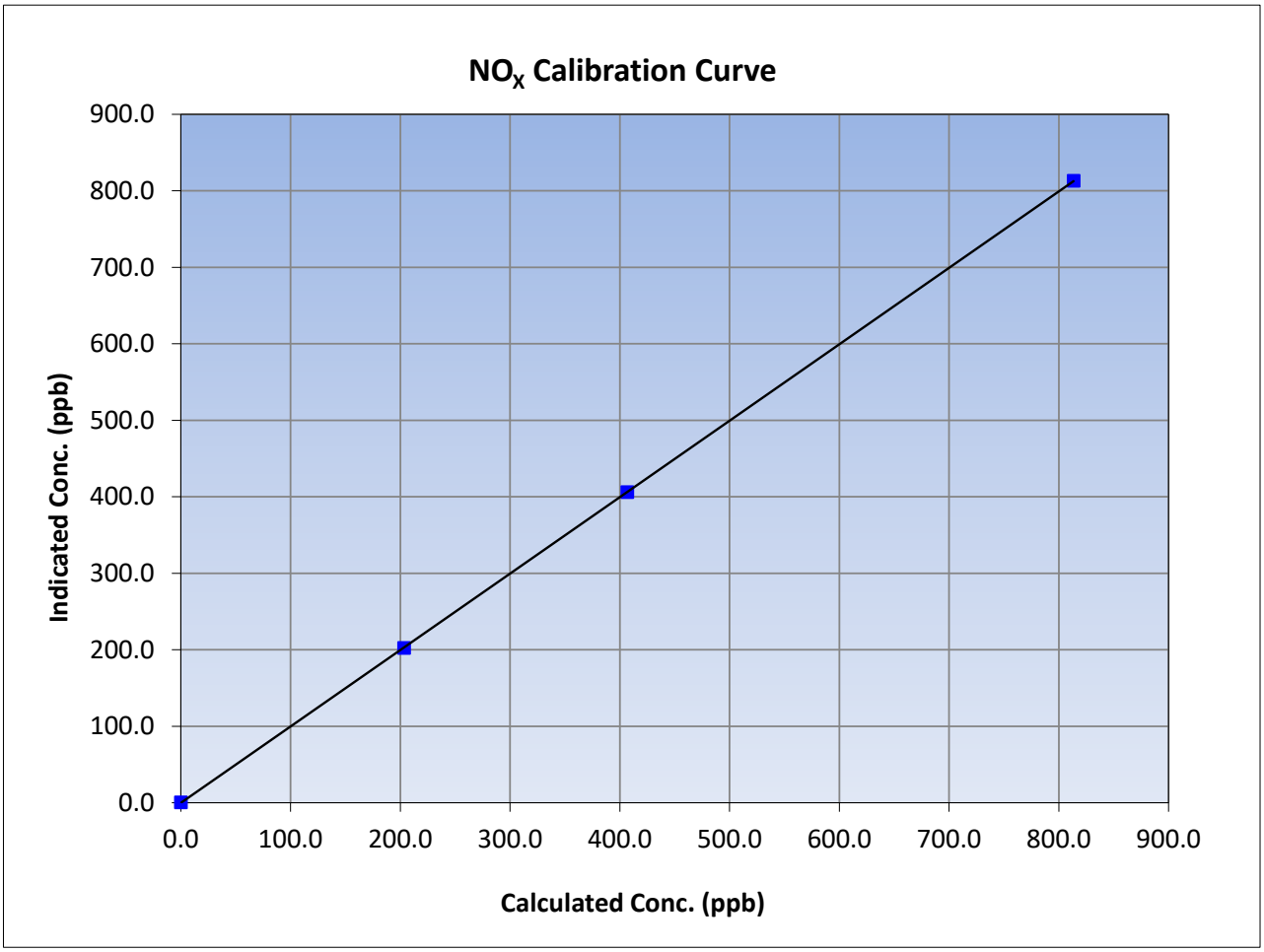
Version-04-2020

Station Information

Calibration Date:	January 6, 2023	Previous Calibration:	December 19, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:13	End Time (MST):	16:15
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	0.999997	≥0.995
813.4	812.9	1.0007			
406.7	406.0	1.0018	Slope	0.999269	0.90 - 1.10
203.4	202.3	1.0052			
			Intercept	-0.220000	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

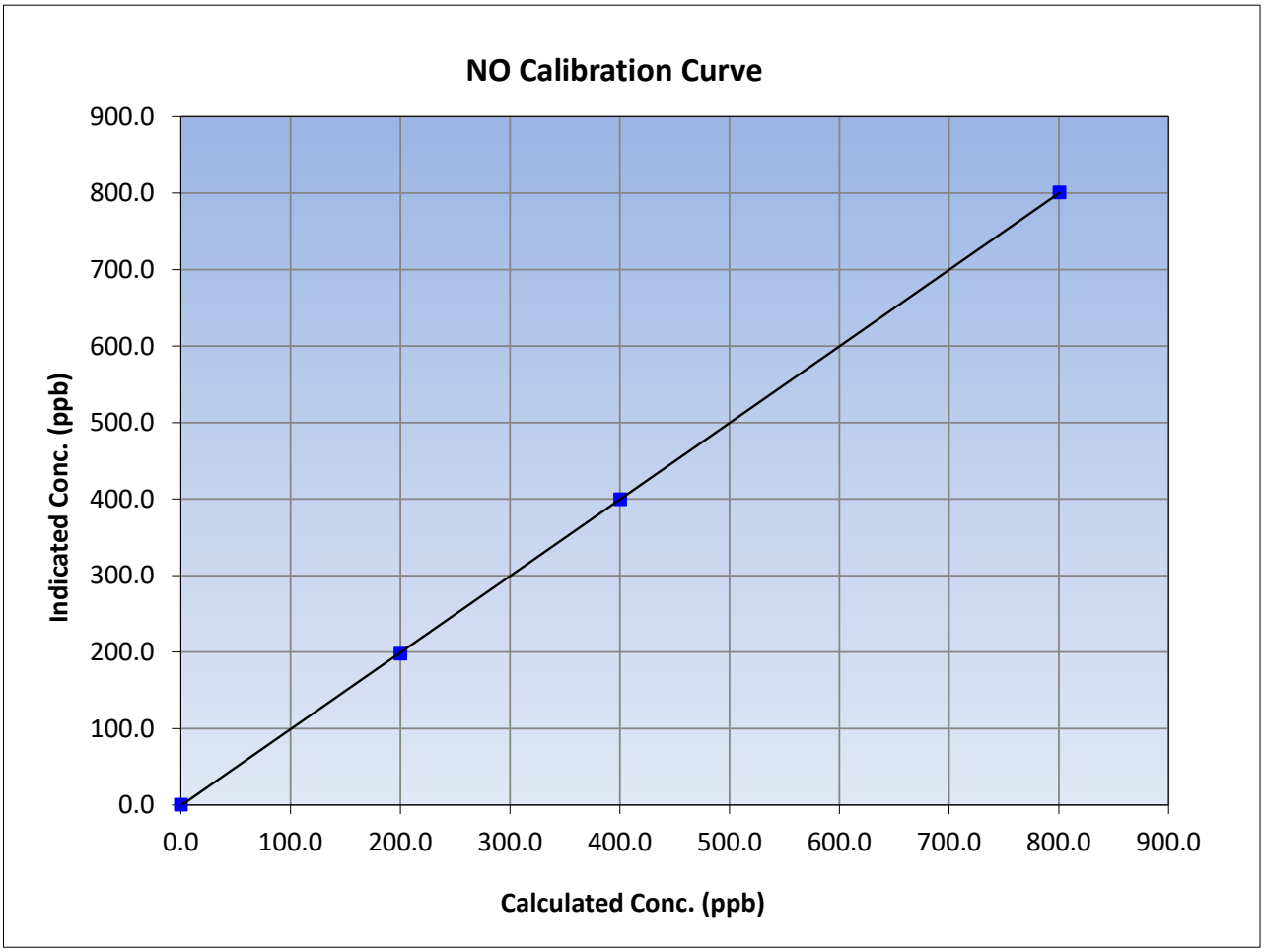
Version-04-2020

Station Information

Calibration Date:	January 6, 2023	Previous Calibration:	December 19, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:13	End Time (MST):	16:15
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	0.3	----	Correlation Coefficient	0.999988	≥0.995
800.6	800.8	0.9998			
400.3	399.8	1.0013	Slope	1.000842	0.90 - 1.10
200.2	197.8	1.0119			
			Intercept	-0.900000	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

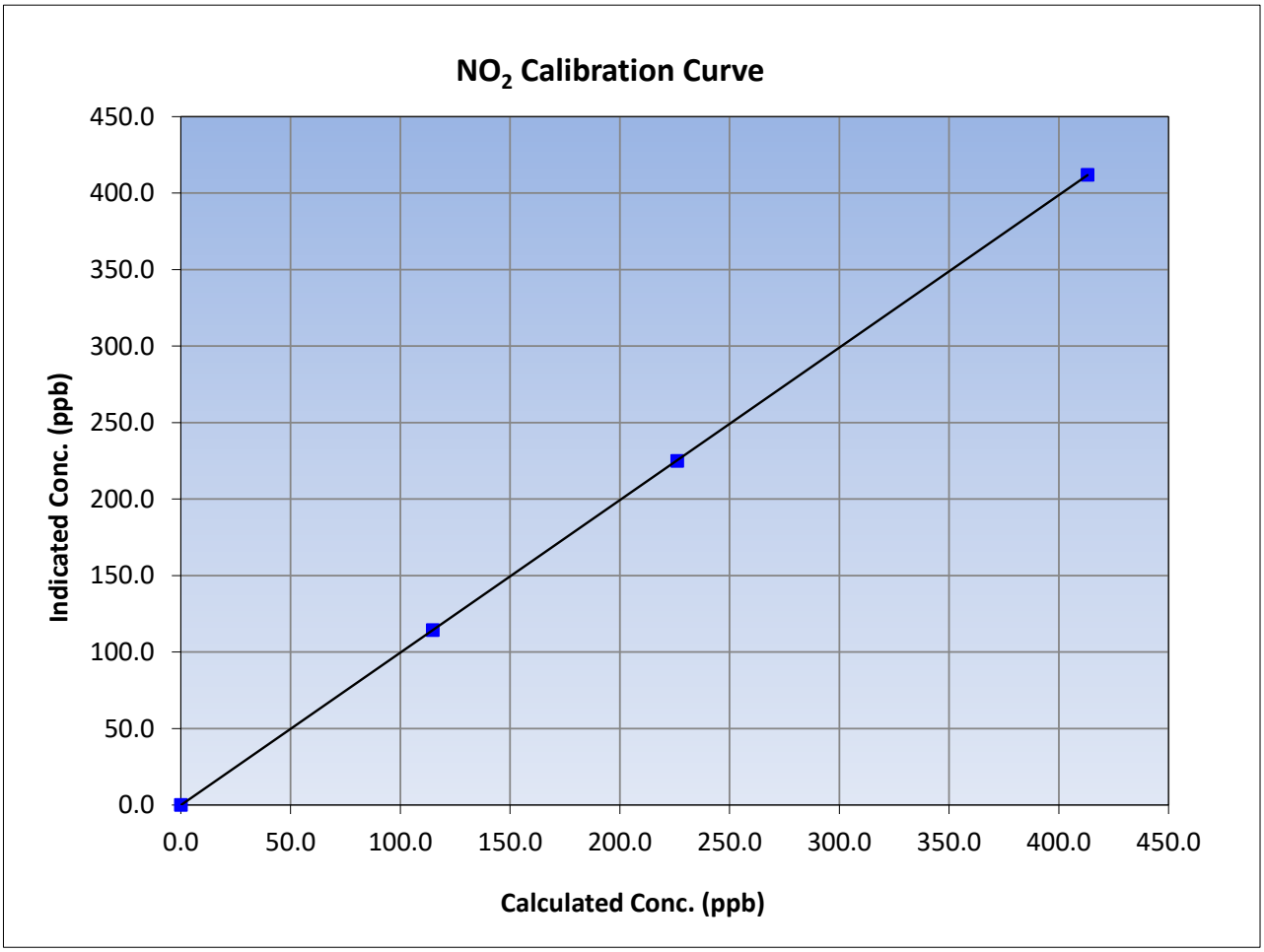
Version-04-2020

Station Information

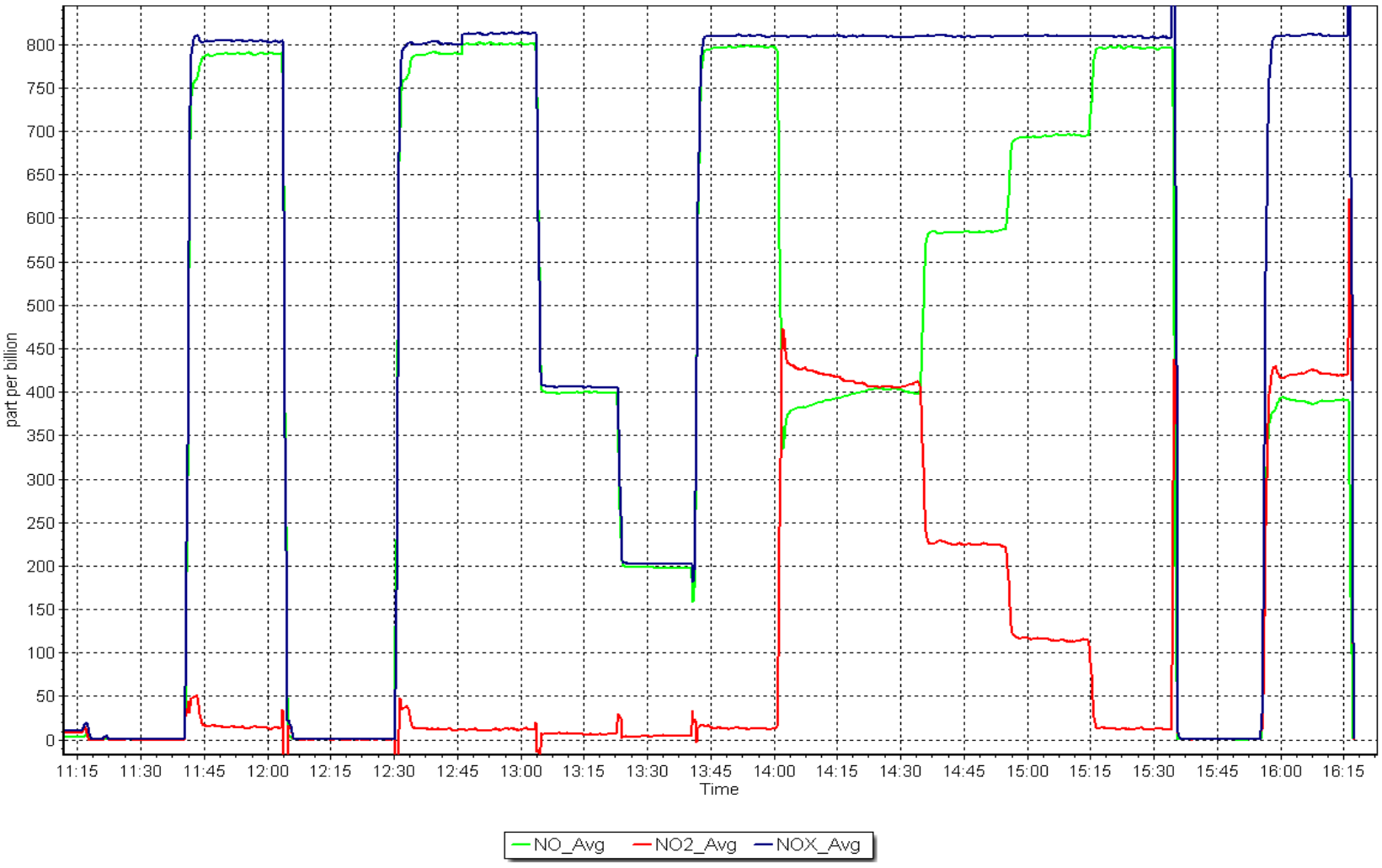
Calibration Date:	January 6, 2023	Previous Calibration:	December 19, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:13	End Time (MST):	16:15
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999997	≥0.995
413.1	412.0	1.0027			
226.2	225.0	1.0053	Slope	0.996966	0.90 - 1.10
114.8	114.4	1.0035			
			Intercept	-0.078101	+/-20



NO_X Calibration Plot Date: January 6, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 4, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:54	End time (MST):	14:09
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:	5609

Analyzer Information

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

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997800	1.001400	Backgd or Offset:	2.0	2.9
Calibration intercept:	0.760000	0.480000	Coeff or Slope:	1.009	1.011

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	855.5	400.0	401.2	0.997
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	855.5	400.0	400.7	0.998
second point	5000	738.6	200.0	201.3	0.994
third point	5000	649.2	100.0	100.9	0.991
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	855.5	400.0	401.8	0.996
				Average Correction Factor	0.994

Baseline Corr As found:	400.9	Previous response	399.9	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

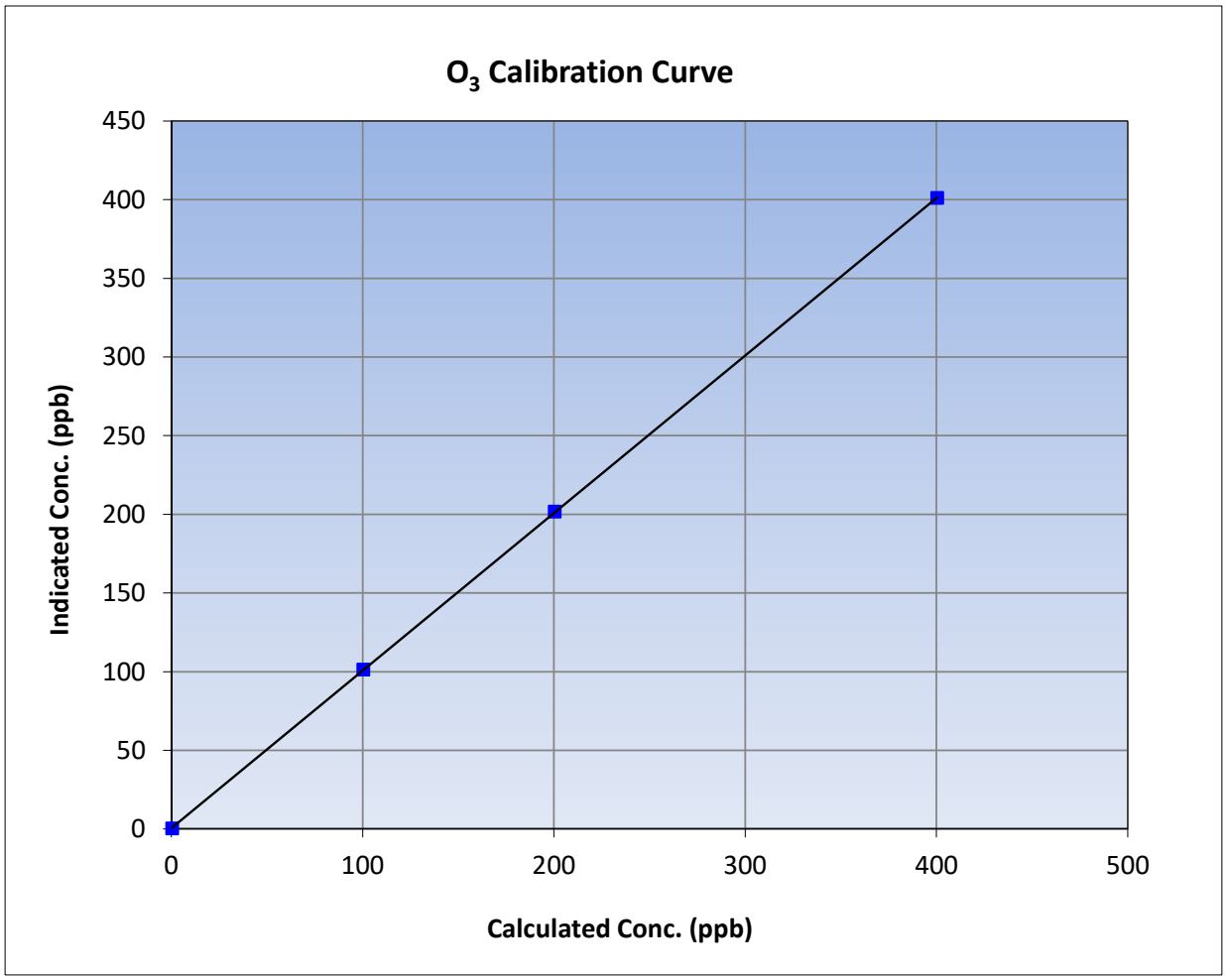
Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 7, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	10:54	End Time (MST):	14:09
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107

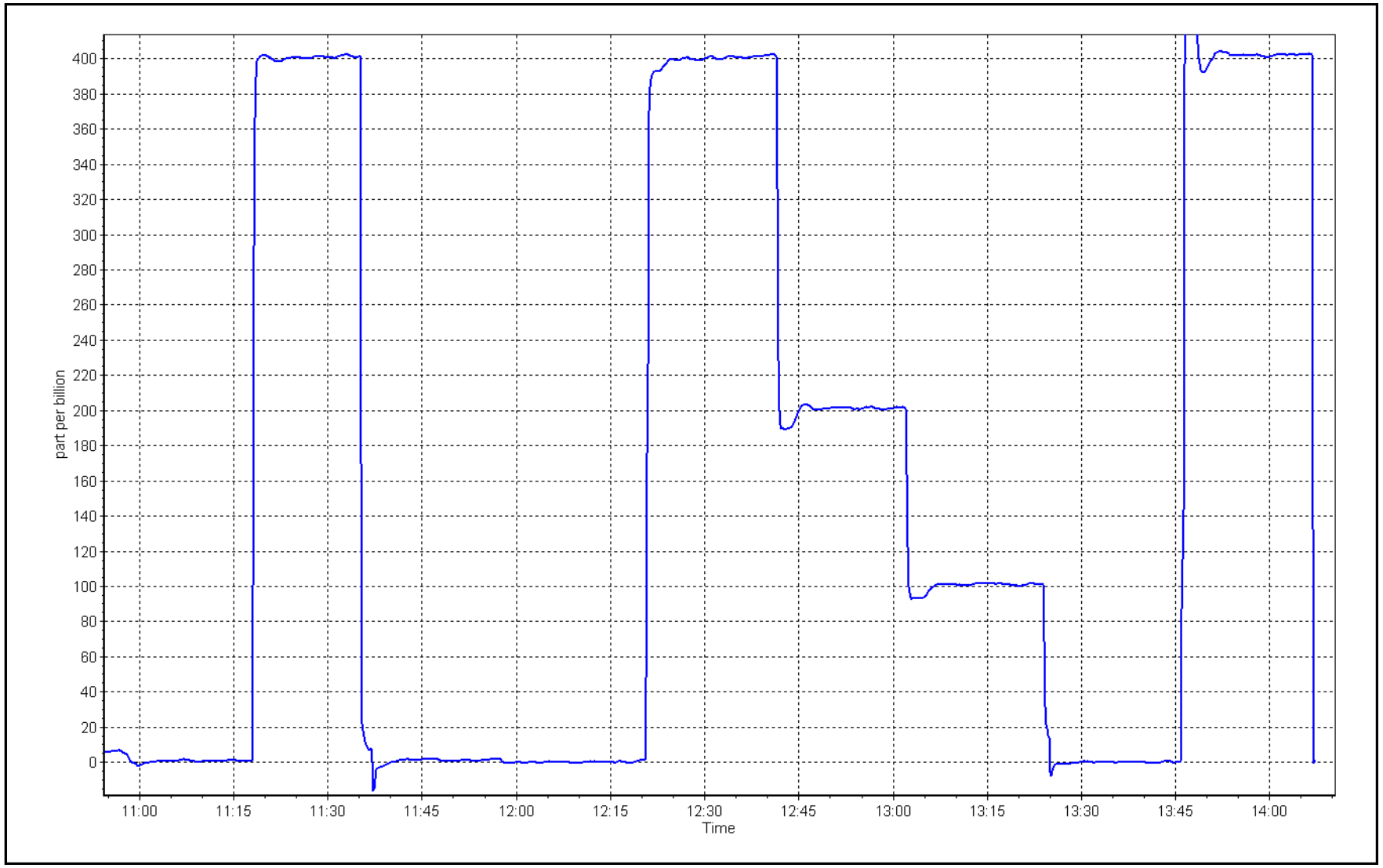
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
400.0	400.7	0.9983
200.0	201.3	0.9935
100.0	100.9	0.9911

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.001400	*0.90 - 1.10*
Intercept	0.480000	*+/- 5*



O_3 Calibration Plot Date: January 4, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	January 24, 2023	Last Cal Date:	December 19, 2022
Start time (MST):	13:55	End time (MST):	14:58
Analyzer Make:	API T640	S/N:	306
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-5.3	-5.4	-5.3	☐	+/- 2 ^{o}C
P (mmHg)	733.8	733.7	733.8	☐	+/- 10 mmHg
flow (LPM)	4.99	4.93	4.99	☐	+/- 0.25 LPM

Leak Test: Date of check: January 24, 2023 Last Cal Date: December 19, 2022

PM w/o HEPA: 6.3 PM w/ HEPA: 0.0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
PMT Peak Test	---	NA	---	☐	10.9 +/- 0.5

Date Optical Chamber Cleaned: December 19, 2022

Disposable Filter Changed: December 19, 2022

Annual Maintenance

Date Sample Tube Cleaned: August 31, 2022

Date RH/T Sensor Cleaned: December 19, 2022

Notes: Flow, temperature and pressure verified. Leak check passed.

Calibration by: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 11, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	11:01	End time (MST):	14:30
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3040	ppm	Cal Gas Exp Date:	December 1, 2028
Cal Gas Cylinder #:	ALM042207			
Removed Cal Gas Conc:	3040	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer make: Teledyne API T300 — Analyzer serial #: 3520

Analyzer Range: 0 - 50 ppm

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000946	0.999735	Backgd or Offset:	-0.012	-0.012
Calibration intercept:	0.195852	0.169836	Coeff or Slope:	0.989	0.989

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.2	----
as found span	4933	66.7	40.6	41.0	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	----
high point	4933	66.7	40.6	40.6	1.000
second point	4966	33.3	20.2	20.7	0.978
third point	4983	16.7	10.2	10.3	0.983
as left zero	5000	0.0	0.0	0.0	----
as left span	2960	40.0	40.5	40.3	1.005
				Average Correction Factor	0.987

Baseline Corr As found:	40.86	Prev response:	40.79	*% change:	0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Summary

Version-01-2020

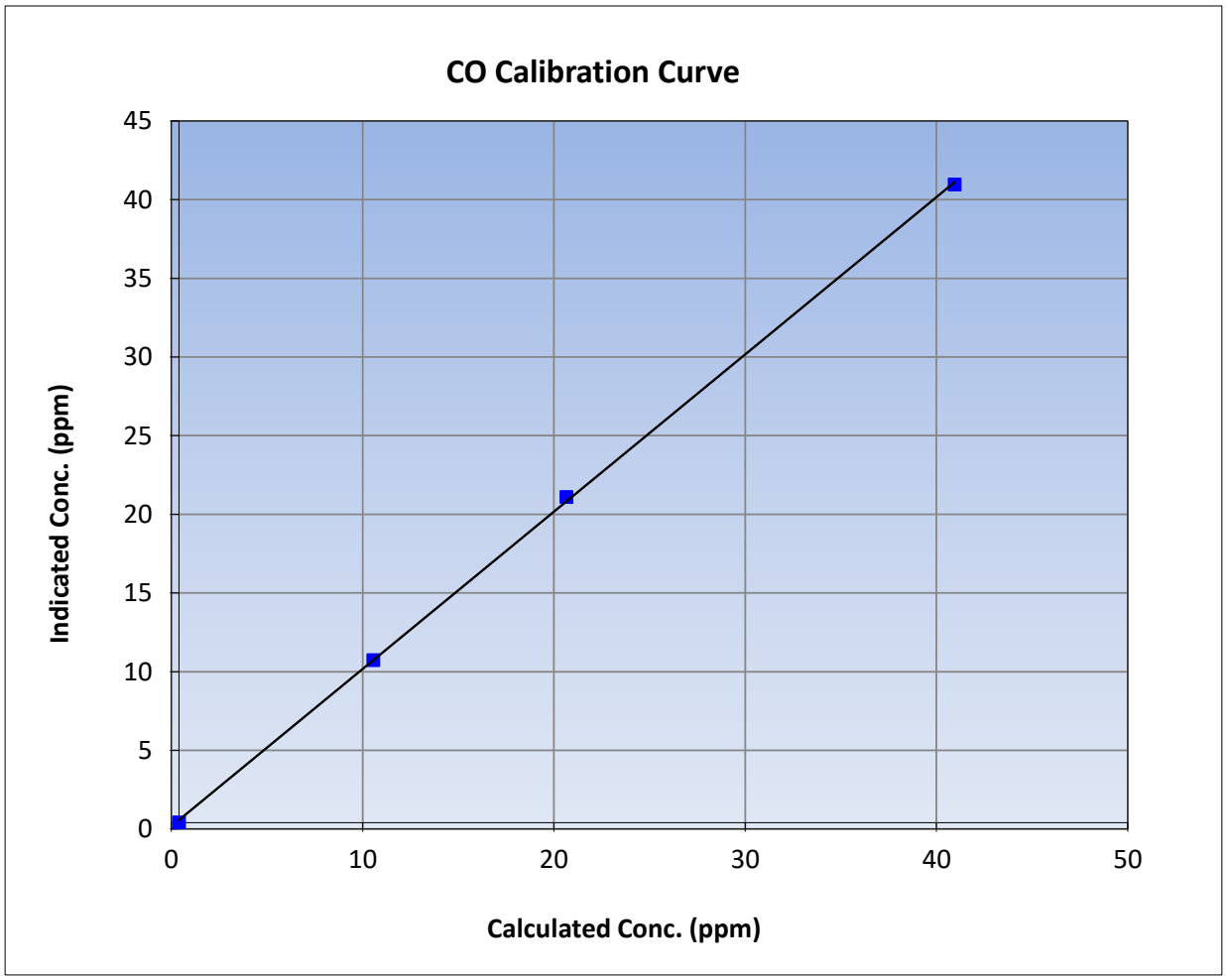
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 8, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:01	End Time (MST):	14:30
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

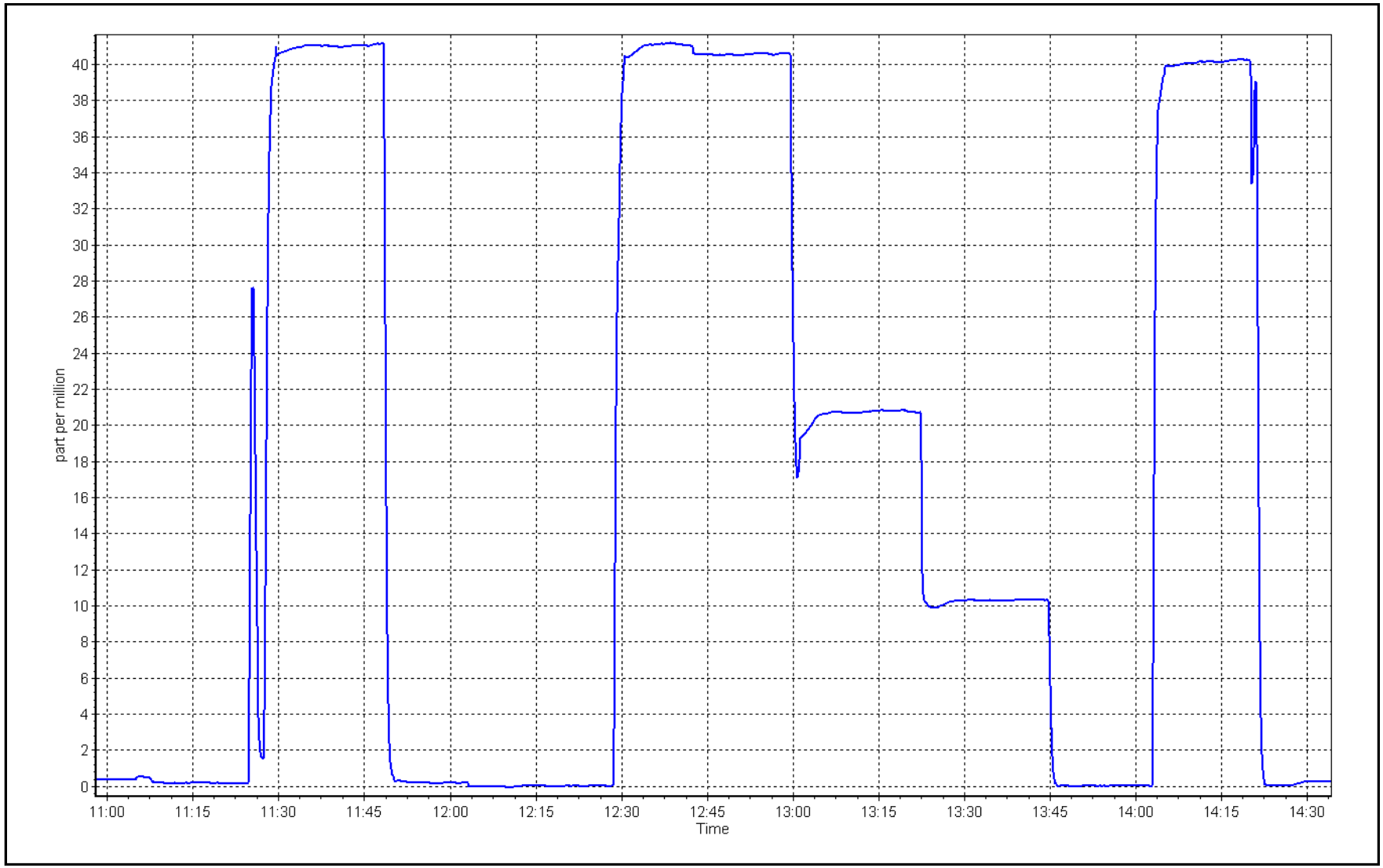
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.6	40.6	0.9997
20.2	20.7	0.9782
10.2	10.3	0.9830

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999860	*≥0.995*
Slope	0.999735	*0.90 - 1.10*
Intercept	0.169836	*+/-1.5*



CO Calibration Plot Date: January 11, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

CO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
Calibration Date:	January 16, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	10:43	End time (MST):	14:35
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 Sci NG5000		Serial Number:	7220900034

Analyzer Information

Analyzer make: Teledyne API 360 — Analyzer serial #: 442

Analyzer Range 0 - 2,000 ppm

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000615	1.002131	Backgd or Offset:	0.037	0.037
Calibration intercept:	-2.540000	-6.480000	Coeff or Slope:	0.879	0.883

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*
as found zero	3000	0.0	0.0	-0.4	----
as found span	2920	80.0	1605.3	1573.6	1.020
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.1	----
high point	2920	80.0	1605.3	1606.4	0.999
second point	2960	40.0	802.7	791.9	1.014
third point	2980	20.0	401.3	391.2	1.026
as left zero	3000	0.0	0.0	-0.2	----
as left span	2960	40.0	802.7	776.0	1.034
				Average Correction Factor	1.013

Baseline Corr As found:	1574.00	Prev response:	1603.78	*% 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

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO_2 Calibration Summary

Version-01-2020

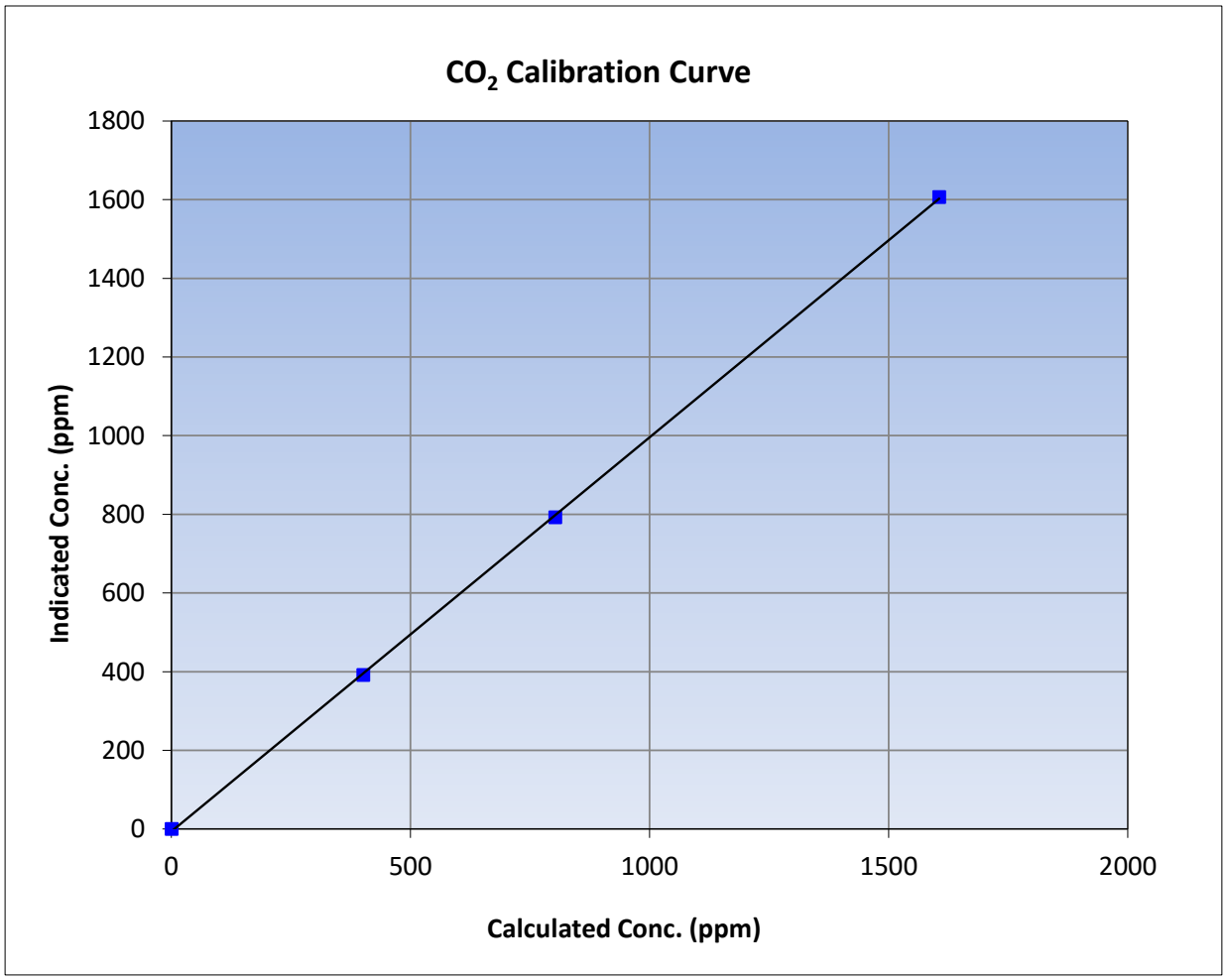
Station Information

Calibration Date	January 16, 2023	Previous Calibration	December 12, 2022
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS01
Start Time (MST)	10:43	End Time (MST)	14:35
Analyzer make	Teledyne API 360	Analyzer serial #	442

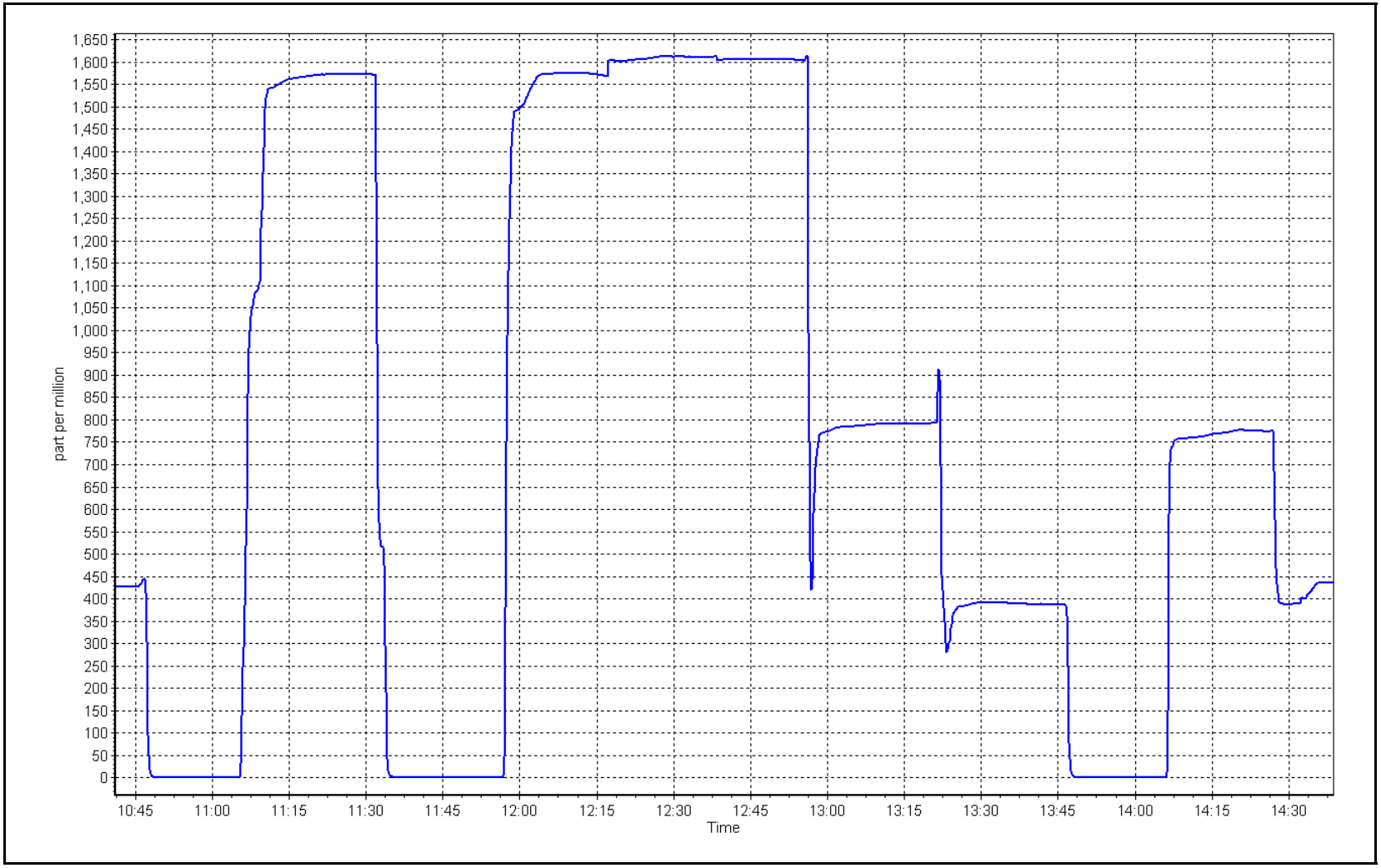
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
1605.3	1606.4	0.9993
802.7	791.9	1.0136
401.3	391.2	1.0259

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999919	*≥0.995*
Slope	1.002131	*0.90 - 1.10*
Intercept	-6.480000	*+/-10*



CO_2 Calibration Plot Date: January 16, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

TN - NO_X - NH_3 Calibration Report

Version-11-2021

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
NOX Cal Date:	January 12, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	11:29	End time (MST):	15:50
NH3 Cal Date:	January 12, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	16:15	End time (MST):	18:53
Reason:	As Found		

Calibration Standards

NOX Cal Gas Conc:	50.84	ppm	NO Gas Cylinder #:	T2Y1P9L
NO Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028
Removed NOX Conc:	50.84	ppm	Removed Cylinder #:	NA
Removed NO Conc:	50.04	ppm	Removed cyl Expiry:	NA
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	74.00	ppm	NH3 Gas Cylinder #:	LL119509
			NH3 Cal Gas Expiry:	February 24, 2022
Removed NH3 Conc:	74.00	ppm	Removed Cylinder #:	NA
NH3 gas Diff:			Removed cyl Expiry:	NA
Calibrator Model:	Teledyne API T700		Serial Number:	3565
ZAG make/model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer model:	Teledyne API T201	Analyzer serial #:	475
Converter model:	Teledyne API T501	Converter serial #:	484
NH3 Range (ppb):	0 - 2000 ppb	Reaction cell Press:	6.00
NOX Range (ppb):	0 - 1000 ppb	Sample Flow:	527

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	1.009	1.001	TN coefficient:	1.009	1.000
NOX coefficient:	1.016	1.008	NO bkgrnd:	0.100	0.100
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.600	0.600
NH3 coefficient:	0.933	0.933	TN bkgrnd:	2.300	2.300

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.002501	1.000436
NO_X Cal Offset:	-0.120000	-0.160000
NO Cal Slope:	1.001242	0.999472
NO Cal Offset:	-1.540000	-0.820000
NO_2 Cal Slope:	1.005272	0.994087
NO_2 Cal Offset:	0.622766	0.253701
NH3 Cal Slope:	1.000243	1.006531
NH3 Cal Offset:	3.207760	3.444505
TN Cal Slope:	1.002735	1.009328
TN Cal Offset:	3.501910	3.486553

Wood Buffalo Environmental Association

TN - NOX - NH_3 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.2	-0.7	----	----
as found NO	4920	80.0	813.4	813.4	----	822.3	820.6	1.9	0.989	----
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high NO point	4920	80.0	813.4	813.4	----	812.7	813.1	-0.8	1.001	----
NO/O3 point	4920	80.0	813.4	813.4	----	810.0	808.1	2.1	1.004	----
as found NH3	2927	73.0	1800.7	----	1800.7	1815.7	----	1810.7	0.992	0.994
new NH3 cyl rp							----			
first NH3	2927	73.0	1800.7	----	1800.7	1815.7	----	1810.7	0.992	0.994
second NH3	2960	40.5	999.0	----	999.0	1022.0	----	1019.0	0.977	0.980
third NH3	2980	20.3	500.7	----	500.7	507.4	----	506.0	0.987	0.990
								Average Correction Factor	1.0026	0.9881

Corrected As found TN = 823.2 ppb NO_X = 820.8 ppb NH3 = 1811.4 ppb

Previous Response TN = 819.2 ppb NO_X = 815.4 ppb NH3 = 1804.3 ppb

*Percent Change TN = 0.5%

*Percent Change NO_X = 0.7%

*Percent Change NH3 = 0.4%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 93.3%

NH3 Current Converter Efficiency = 93.3%

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.9	----	----
as found span	4920	80.0	813.4	800.6	813.4	820.6	802.0	822.3	0.9913	0.9983
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	----	----
high point	4920	80.0	813.4	800.6	813.4	813.1	799.5	812.7	1.0004	1.0014
second point	4960	40.0	406.7	400.3	406.7	408.5	399.9	409.8	0.9956	1.0011
third point	4980	20.0	203.4	200.2	203.4	201.9	197.6	202.0	1.0072	1.0130
								Average Correction Factor	1.0011	1.0051

Baseline Corr As fnd	TN =	823.2 ppb	NO_X =	820.8 ppb	NO =	802.1 ppb	*Percent Change	TN = 0.5%
Previous Response	TN =	819.2 ppb	NO_X =	815.4 ppb	NO =	800.1 ppb	*Percent Change	NO_X = 0.7%
							*Percent Change	NO = 0.3%

* = > +/-5% change initiates investigation

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found zero	----	----	0.0	0.0	----	----
calibration zero	----	----	0.0	-0.1	----	----
1st GPT point (400 ppb O3)	798.4	387.9	423.3	420.1	1.0076	99.2%
2nd GPT point (200 ppb O3)	798.4	595.3	215.9	217.5	0.9926	100.7%
3rd GPT point (100 ppb O3)	798.4	686.9	124.3	122.5	1.0147	98.6%
				Average Correction Factor	1.0050	99.5%

Notes: Changed the inlet filter after as founds. Adjusted NOx and TNx Spans. Used the second GPT reference point. NH3 calibration failed.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TN Calibration Summary

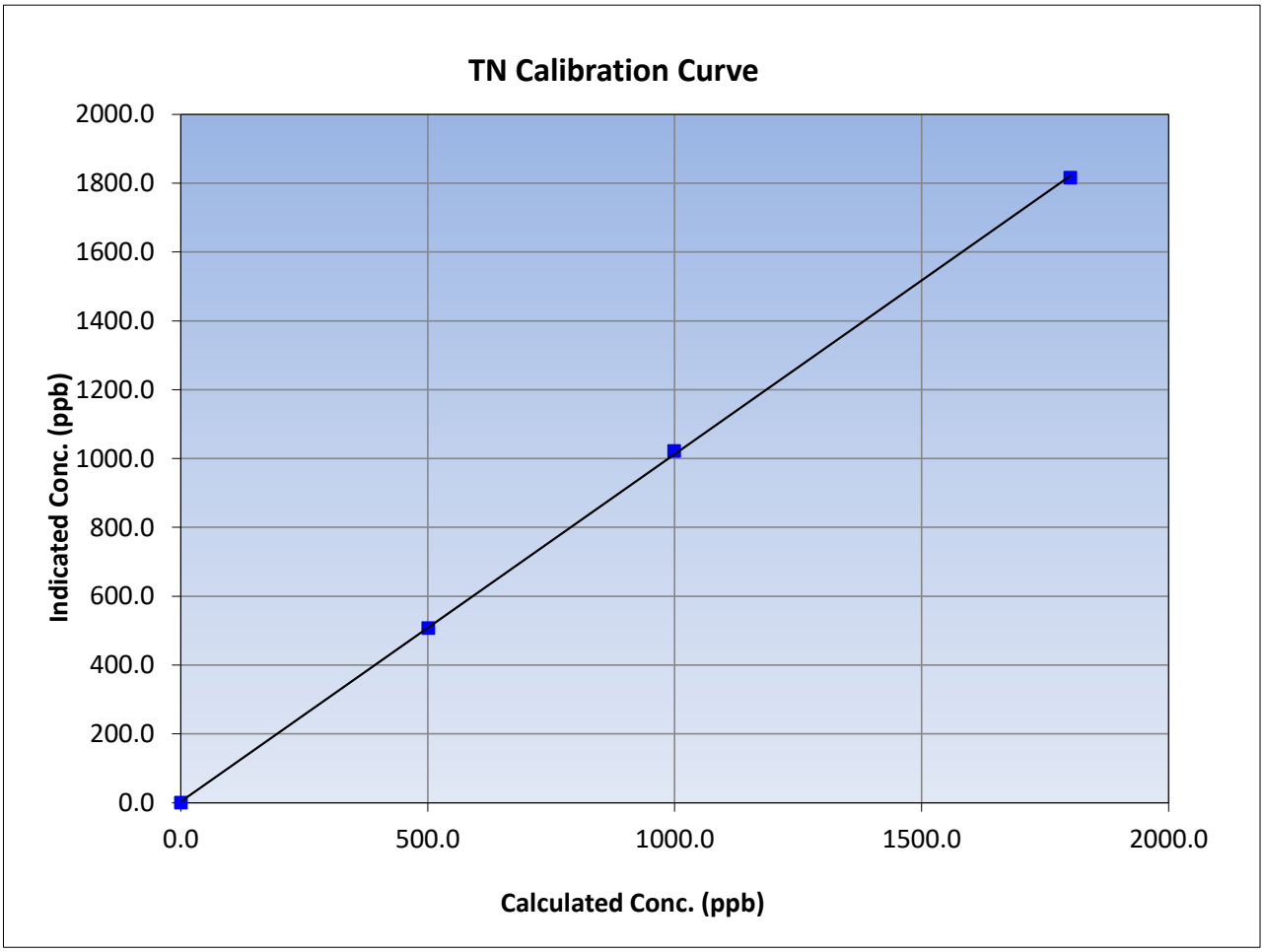
Version-11-2021

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:29	End Time (MST):	15:50
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999919	≥0.995
1800.7	1815.7	0.9917			
999.0	1022.0	0.9775	Slope	1.009328	0.90 - 1.10
500.7	507.4	0.9868			
			Intercept	3.486553	+/-20



Wood Buffalo Environmental Association

NH_3 Calibration Summary

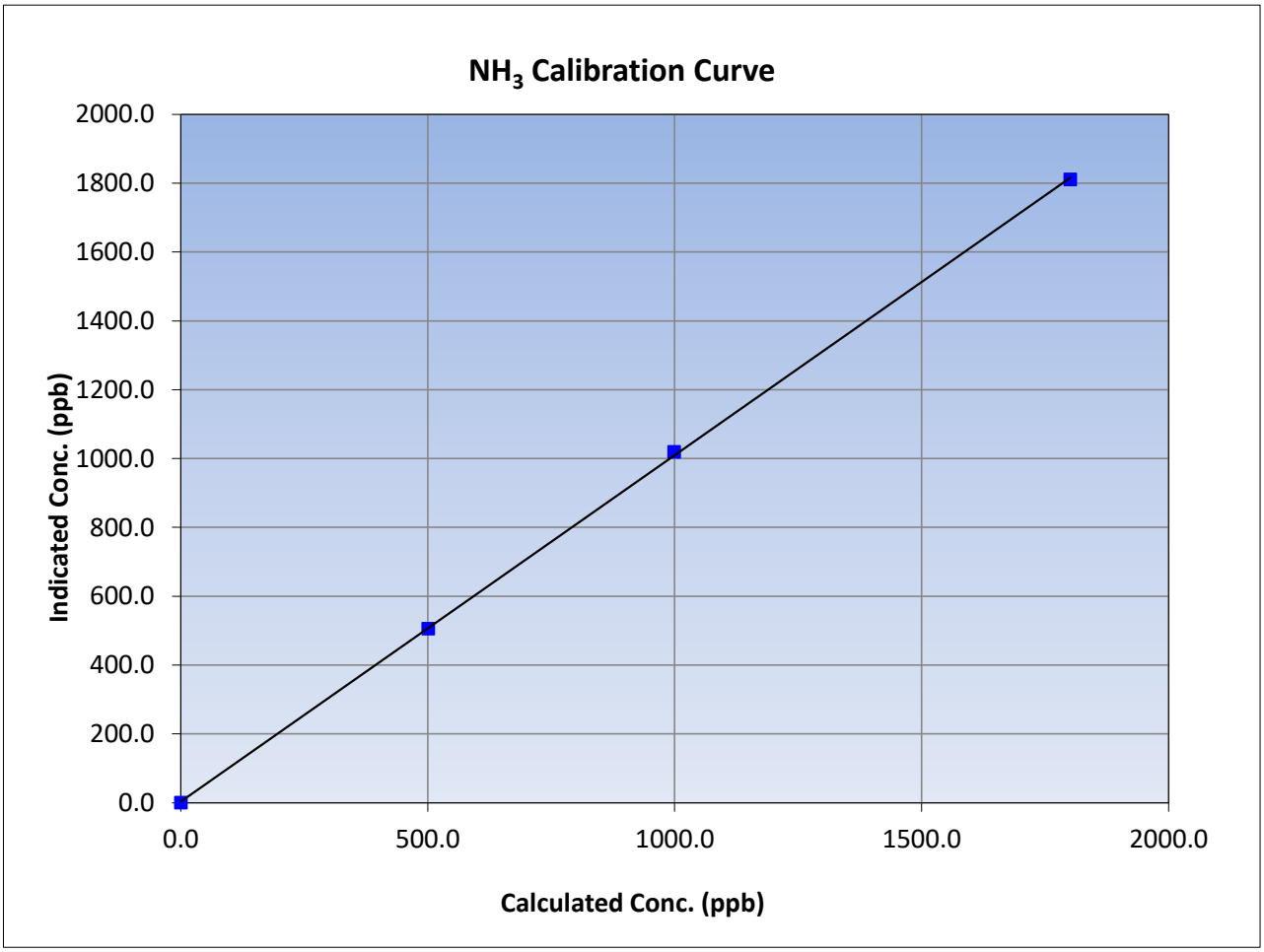
Version-11-2021

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:29	End Time (MST):	15:50
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999921	≥0.995
1800.7	1810.7	0.9945			
999.0	1019.0	0.9804	Slope	1.006531	0.90 - 1.10
500.7	506.0	0.9895			
			Intercept	3.444505	+/-20



Wood Buffalo Environmental Association

NO_X Calibration Summary

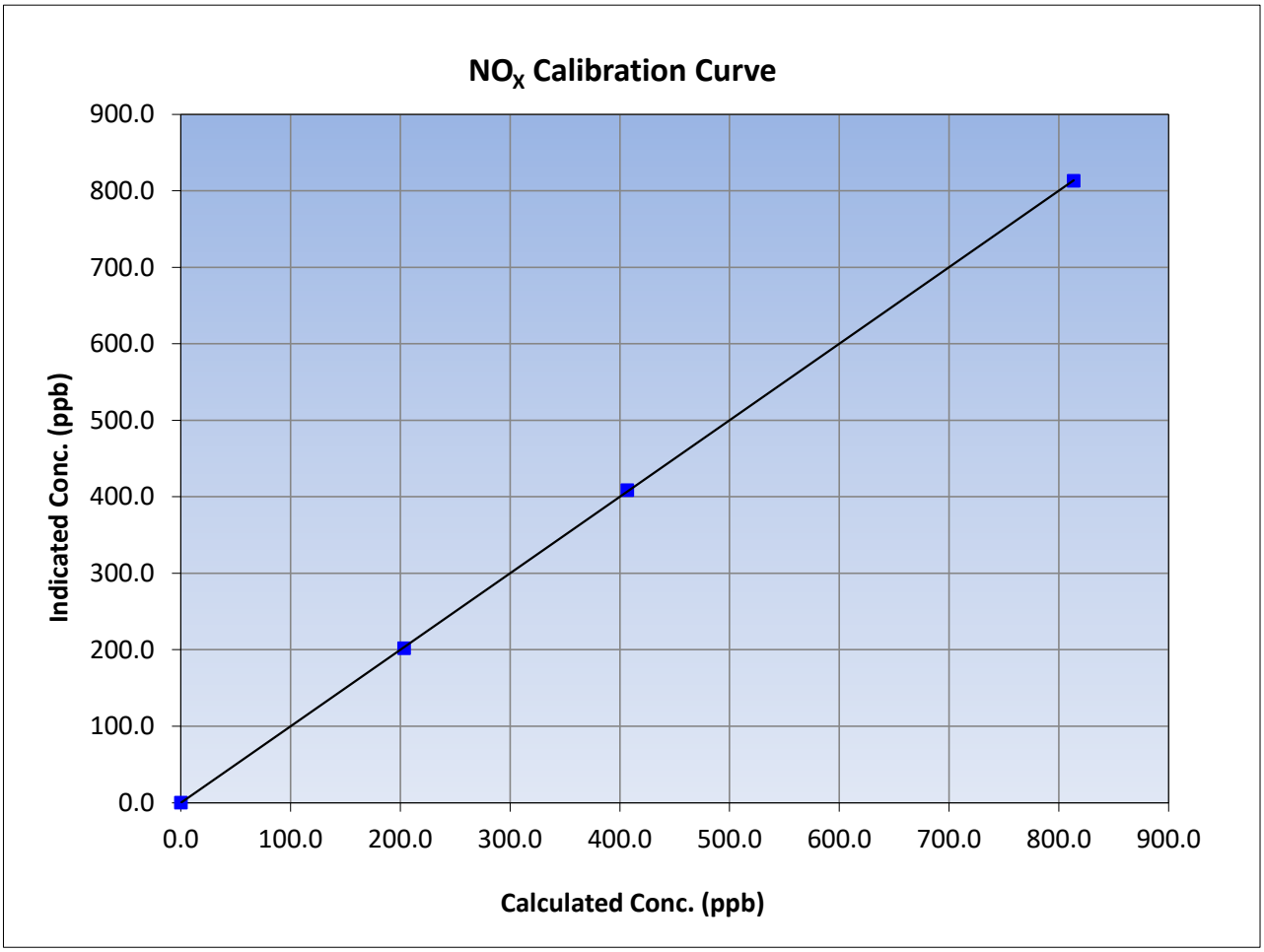
Version-11-2021

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:29	End Time (MST):	15:50
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999985	*≥0.995*
813.4	813.1	1.0004			
406.7	408.5	0.9956	Slope	1.000436	*0.90 - 1.10*
203.4	201.9	1.0072			
			Intercept	-0.160000	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

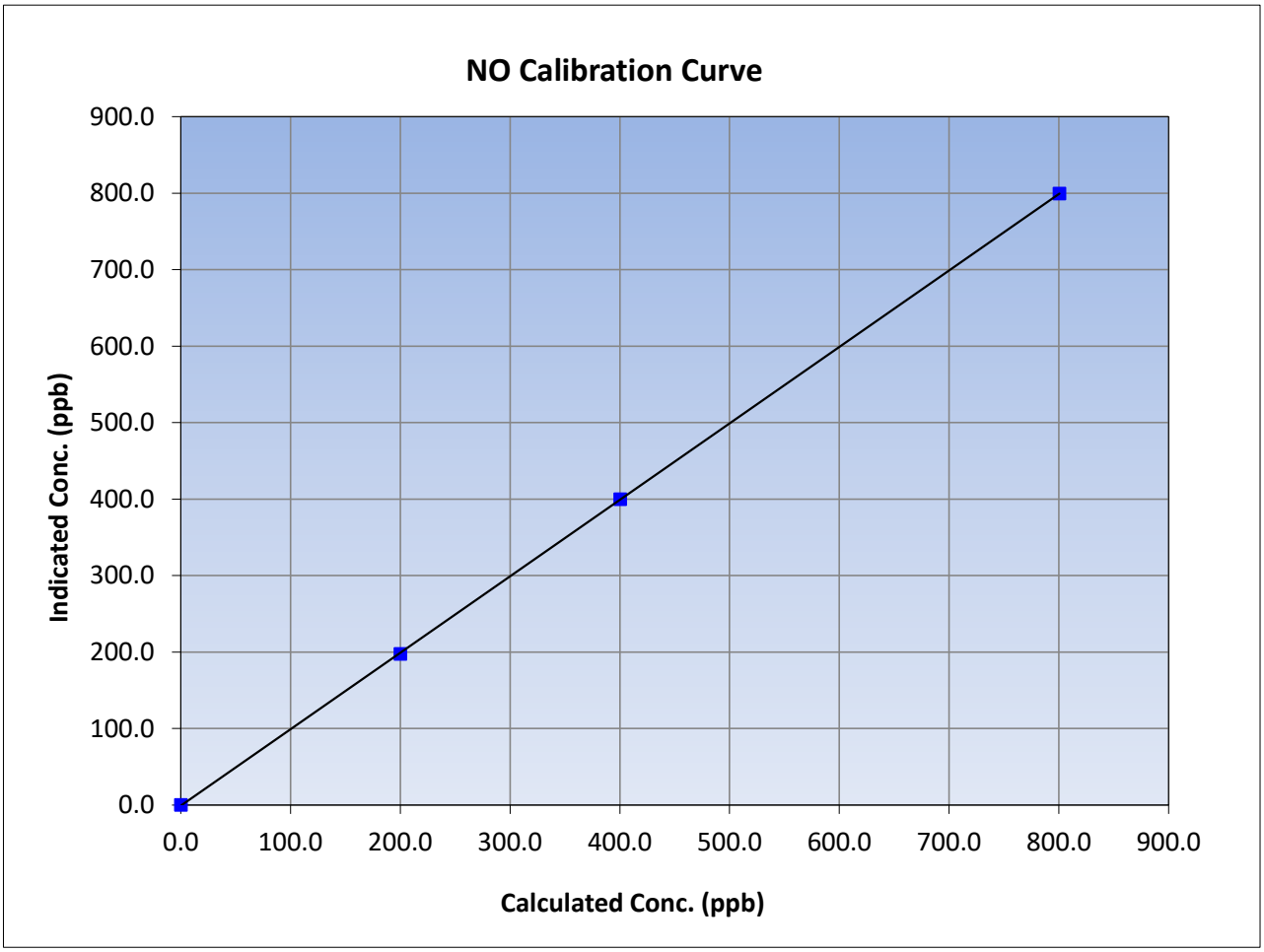
Version-11-2021

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:29	End Time (MST):	15:50
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999989	≥0.995
800.6	799.5	1.0014			
400.3	399.9	1.0011	Slope	0.999472	0.90 - 1.10
200.2	197.6	1.0130			
			Intercept	-0.820000	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

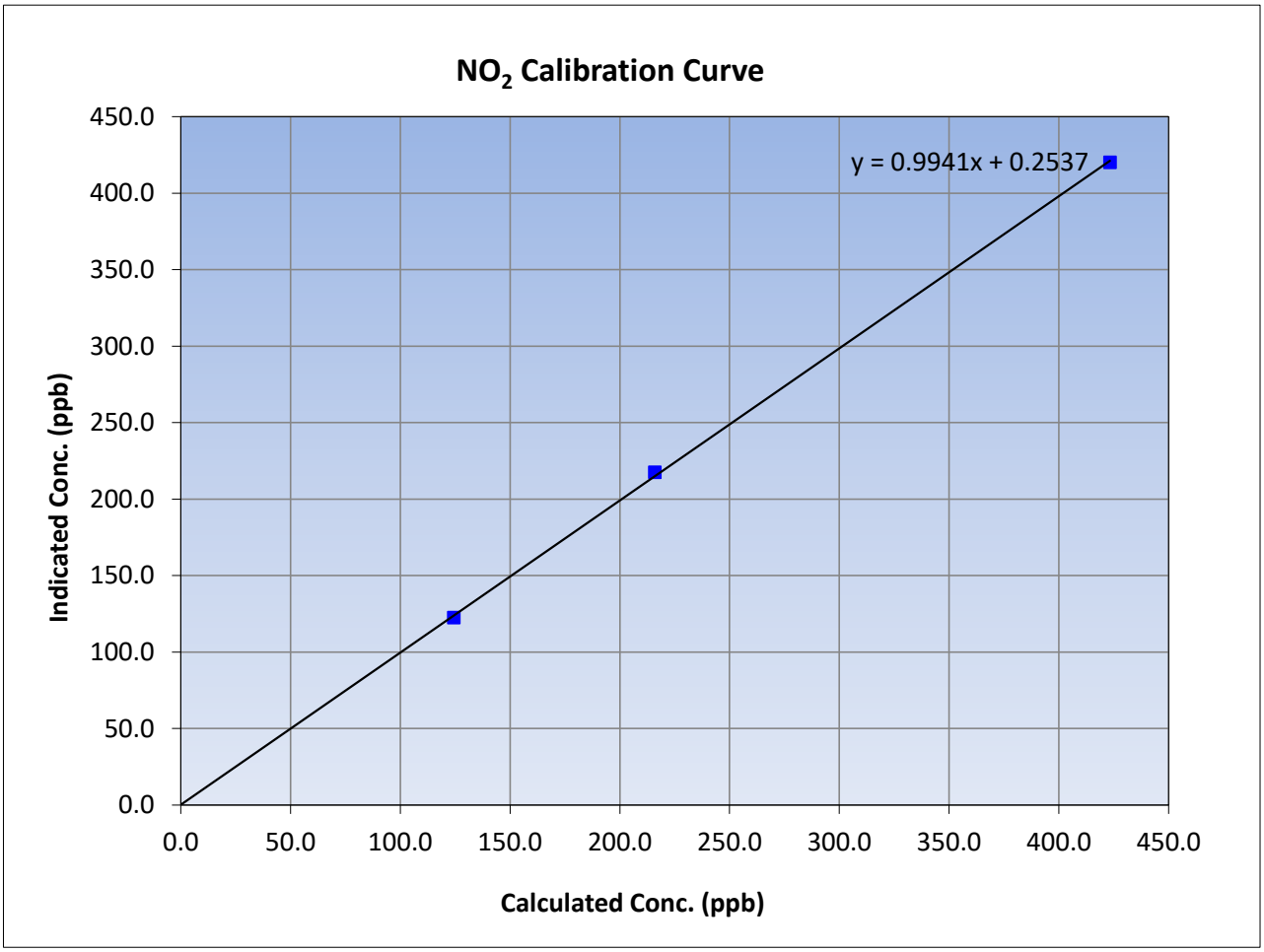
Version-11-2021

Station Information

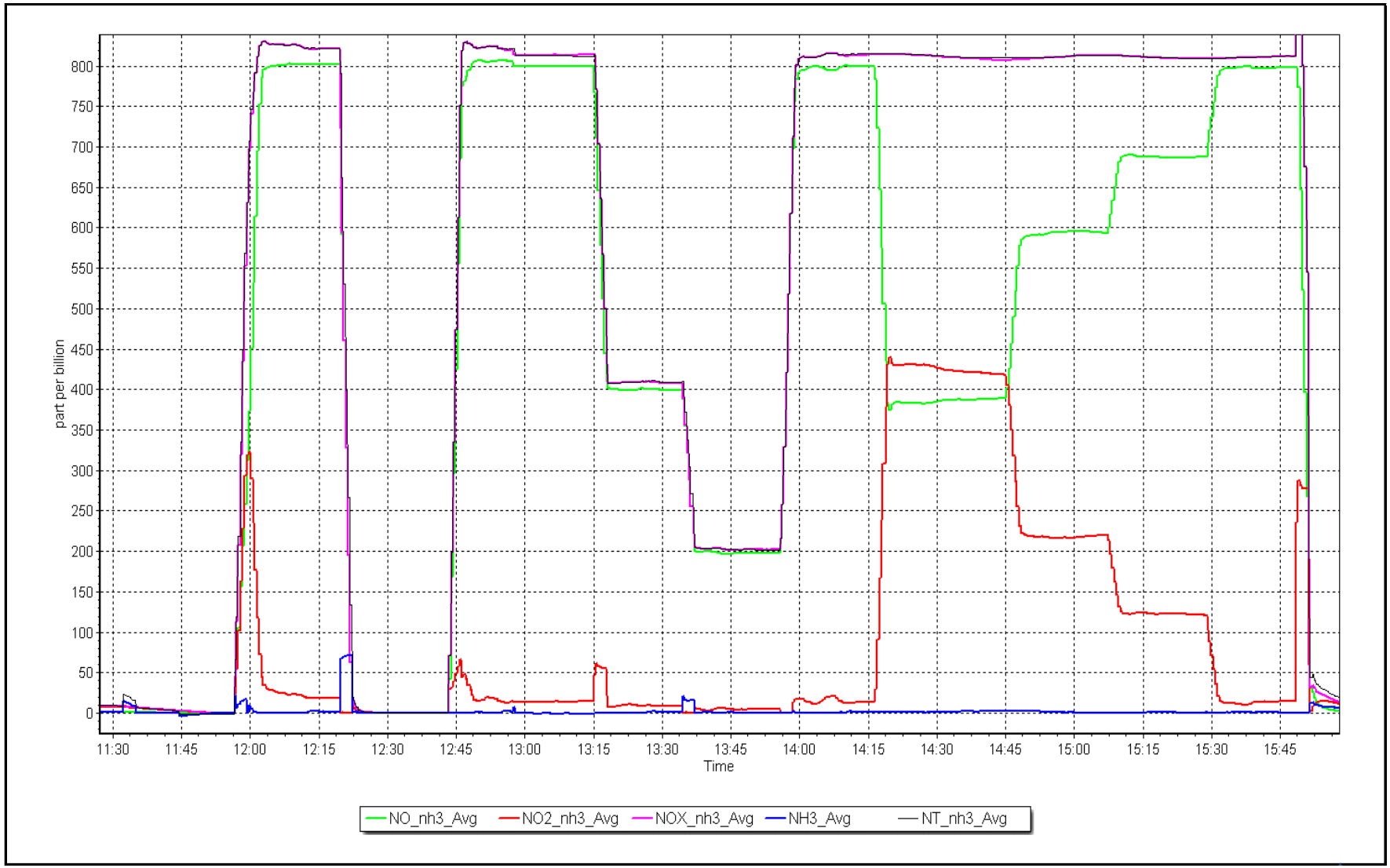
Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:29	End Time (MST):	15:50
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

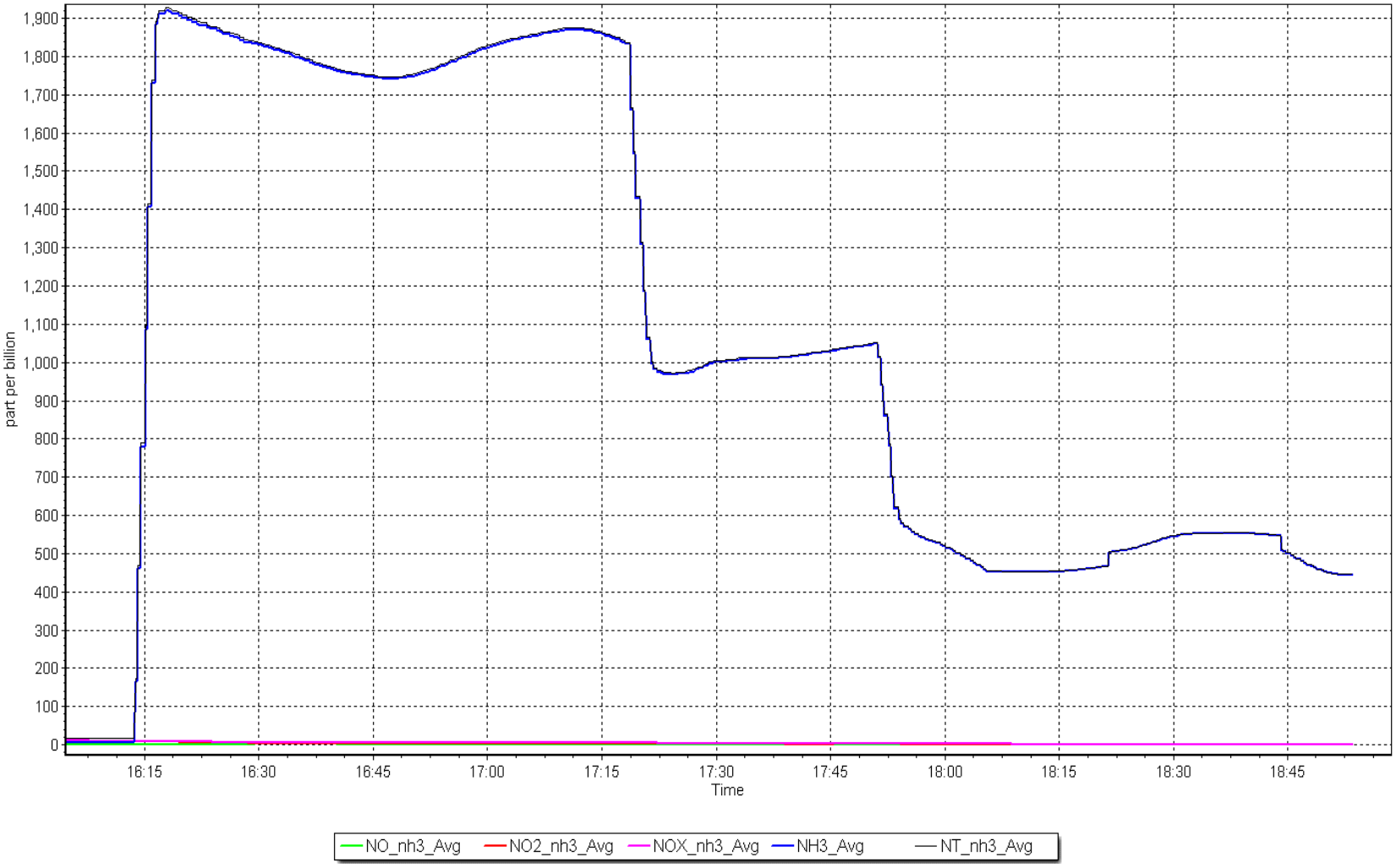
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999898	*≥0.995*
423.3	420.1	1.0076			
215.9	217.5	0.9926	Slope	0.994087	*0.90 - 1.10*
124.3	122.5	1.0147			
			Intercept	0.253701	*+/-20*



NO_X Calibration Plot Date: January 12, 2023 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: January 12, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

TN - NO_X - NH_3 Calibration Report

Version-11-2021

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
NOX Cal Date:	January 13, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	13:00	End time (MST):	14:40
NH3 Cal Date:	January 13, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	15:00	End time (MST):	17:30
Reason:	Maintenance		

Calibration Standards

NOX Cal Gas Conc:	50.84	ppm	NO Gas Cylinder #:	T2Y1P9L
NO Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028
Removed NOX Conc:	50.84	ppm	Removed Cylinder #:	NA
Removed NO Conc:	50.04	ppm	Removed cyl Expiry:	NA
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	72.93	ppm	NH3 Gas Cylinder #:	CC281298
			NH3 Cal Gas Expiry:	February 28, 2023
Removed NH3 Conc:	74.00	ppm	Removed Cylinder #:	LL119509
NH3 gas Diff:			Removed cyl Expiry:	February 24, 2022
Calibrator Model:	Teledyne API T700		Serial Number:	3565
ZAG make/model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer model:	Teledyne API T201	Analyzer serial #:	475
Converter model:	Teledyne API T501	Converter serial #:	217
NH3 Range (ppb):	0 - 2000 ppb	Reaction cell Press:	5.10
NOX Range (ppb):	0 - 1000 ppb	Sample Flow:	505

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	1.001	1.046	TN coefficient:	1.000	1.056
NOX coefficient:	1.008	1.050	NO bkgrnd:	0.100	0.000
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.600	0.600
NH3 coefficient:	0.933	0.933	TN bkgrnd:	2.300	6.300

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000436	0.998476
NO_X Cal Offset:	-0.160000	-0.200000
NO Cal Slope:	0.999472	1.000075
NO Cal Offset:	-0.820000	-0.100000
NO_2 Cal Slope:	0.994087	
NO_2 Cal Offset:	0.253701	
NH3 Cal Slope:	1.021299	1.004278
NH3 Cal Offset:	3.444505	3.834562
TN Cal Slope:	1.024137	1.007082
TN Cal Offset:	3.486553	3.818565

Wood Buffalo Environmental Association

TN - NOX - NH_3 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high NO point	4920	80.0	813.4	813.4	----	813.4	812.0	1.3	1.000	----
NO/O3 point										
as found NH3										
new NH3 cyl rp										
first NH3	2926	74.1	1801.4	----	1801.4	1815.7	----	1810.7	0.992	0.995
second NH3	2959	41.2	1001.6	----	1001.6	1014.2	----	1011.5	0.988	0.990
third NH3	2979	20.6	500.8	----	500.8	512.8	----	511.1	0.977	0.980
								Average Correction Factor	1.0000	0.9883

Corrected As found TN = NA ppb NO_X = NA ppb NH3 = NA ppb

Previous Response TN = NA ppb NO_X = NA ppb NH3 = NA ppb

*Percent Change TN = NA

*Percent Change NO_X = NA

*Percent Change NH3 = NA

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 93.3%

NH3 Current Converter Efficiency = 93.3%

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.3	----	----
high point	4920	80.0	813.4	800.6	813.4	812.0	800.6	813.4	1.0018	1.0000
second point										
third point										
								Average Correction Factor	1.0018	1.0000

Baseline Corr As fnd	TN =	NA	ppb	NO_X =	NA	ppb	NO =	NA	ppb	*Percent Change	TN =	NA
Previous Response	TN =	NA	ppb	NO_X =	NA	ppb	NO =	NA	ppb	*Percent Change	NO_X =	NA
										*Percent Change	NO =	NA

* = > +/-5% change initiates investigation

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found zero						
calibration zero	----	----	0.0	0.0	----	----
1st GPT point (400 ppb O3)						
2nd GPT point (200 ppb O3)						
3rd GPT point (100 ppb O3)						
				Average Correction Factor		

Notes: As founds were performed on January 12. Replaced the NH3 converter, pump, charcoal pack, and calibration gas. Adjusted both zero and span. NH3 calibration is still failing.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TN Calibration Summary

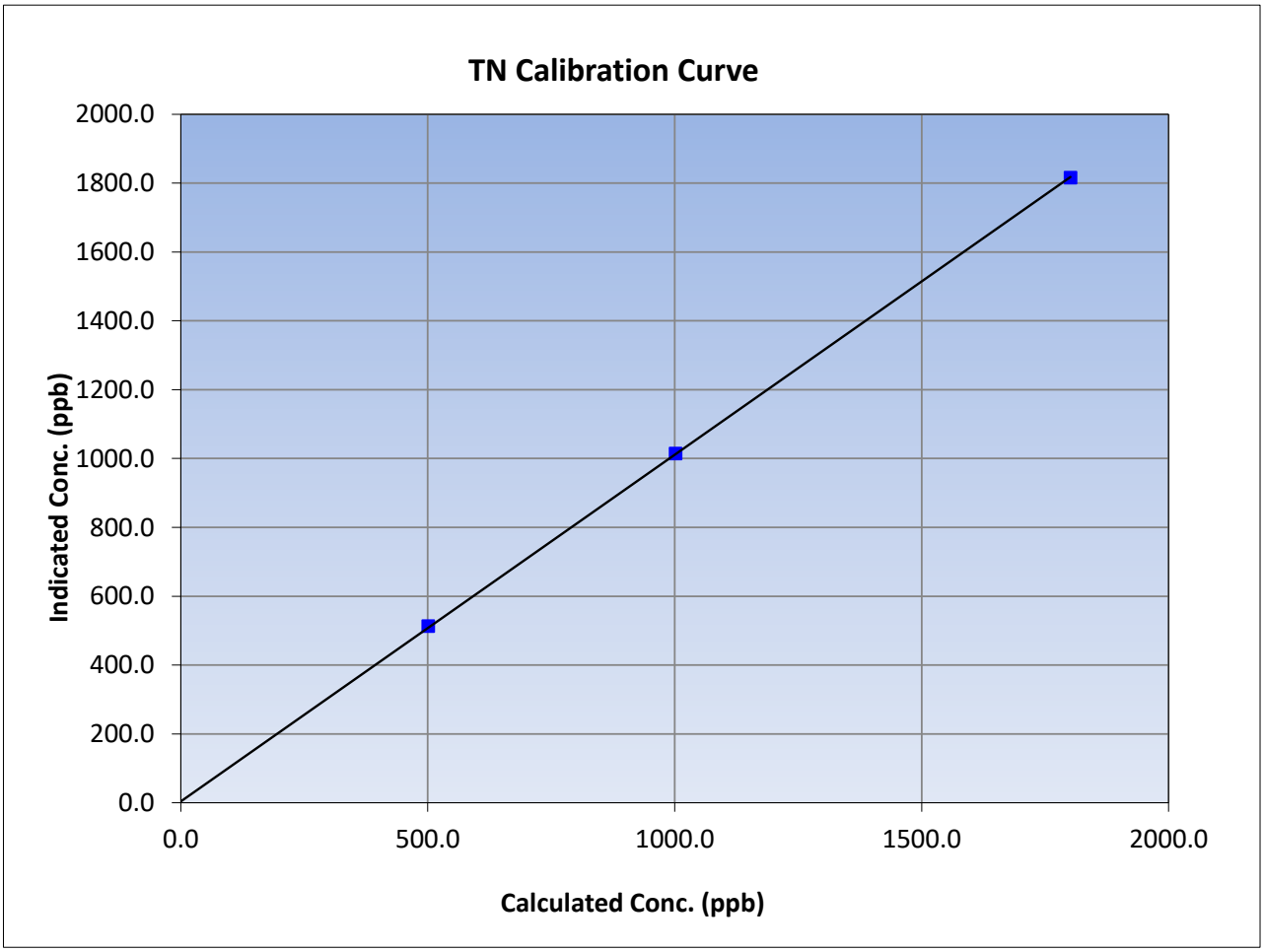
Version-11-2021

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	14:40
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.3	----	Correlation Coefficient	0.999974	≥0.995
1801.4	1815.7	0.9921			
1001.6	1014.2	0.9875	Slope	1.007082	0.90 - 1.10
500.8	512.8	0.9766			
			Intercept	3.818565	+/-20



Wood Buffalo Environmental Association

NH_3 Calibration Summary

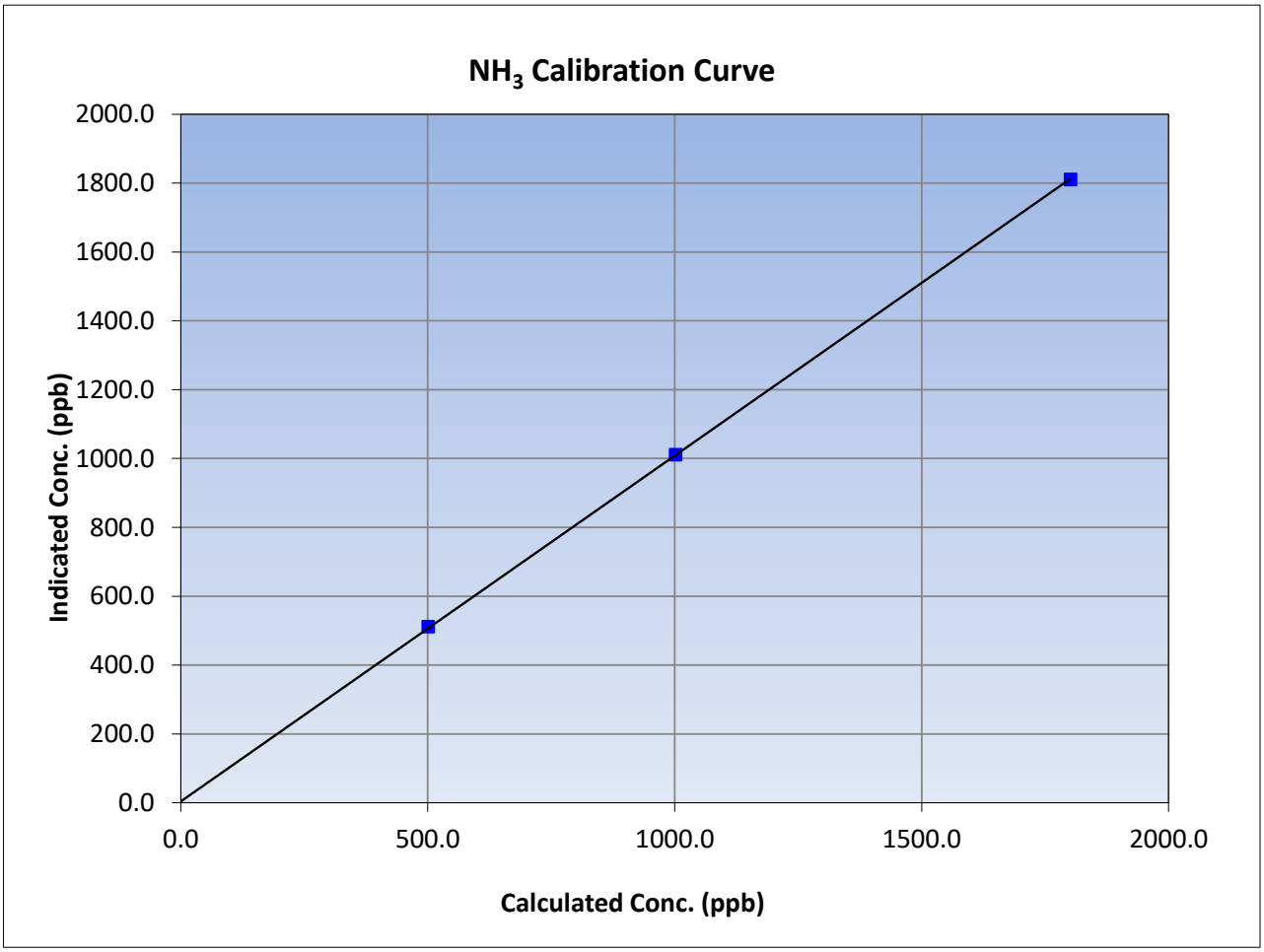
Version-11-2021

Station Information

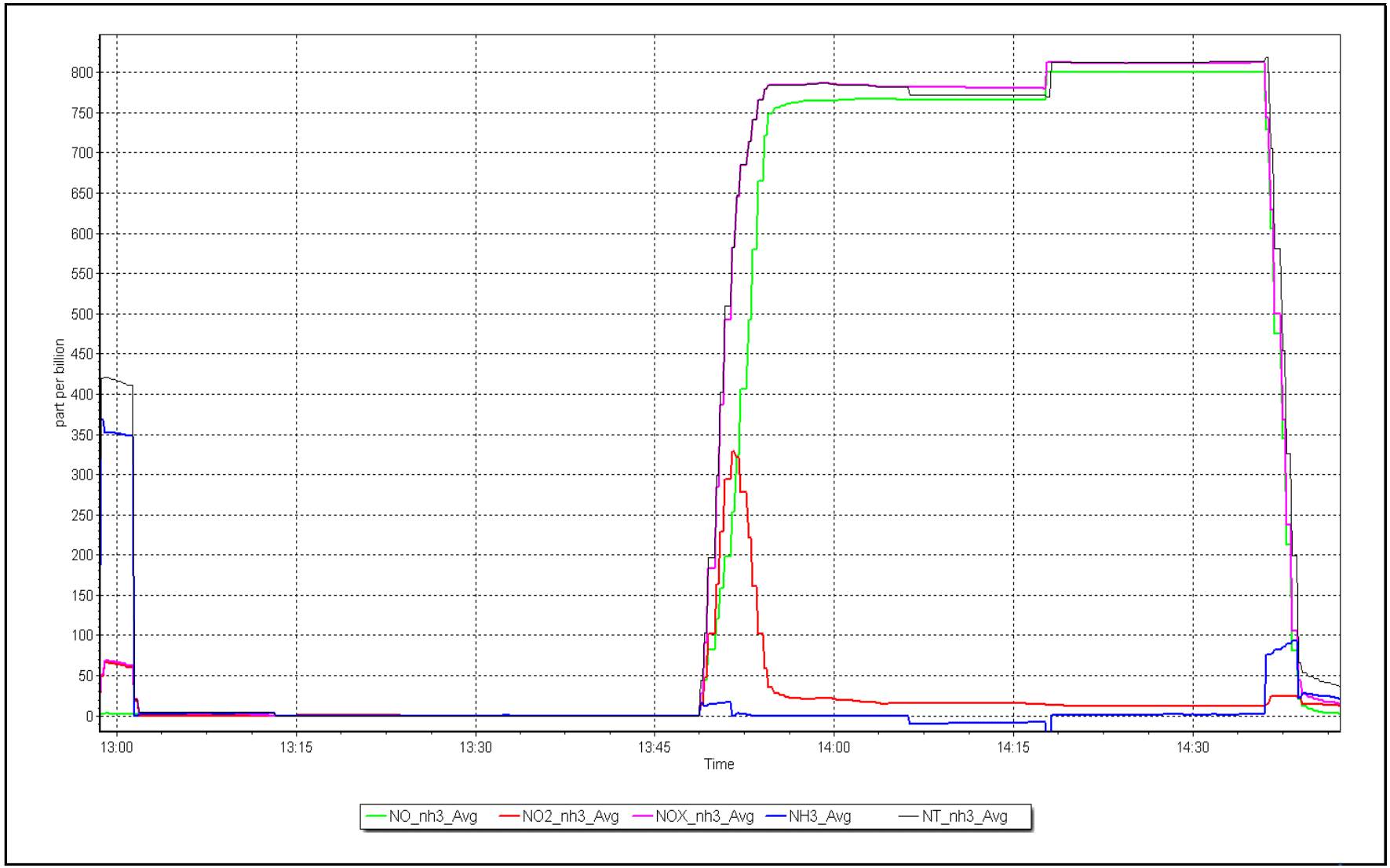
Calibration Date:	January 13, 2023	Previous Calibration:	December 2, 2022
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	14:40
Analyzer make:	Teledyne API T201	Analyzer serial #:	475

Calibration Data

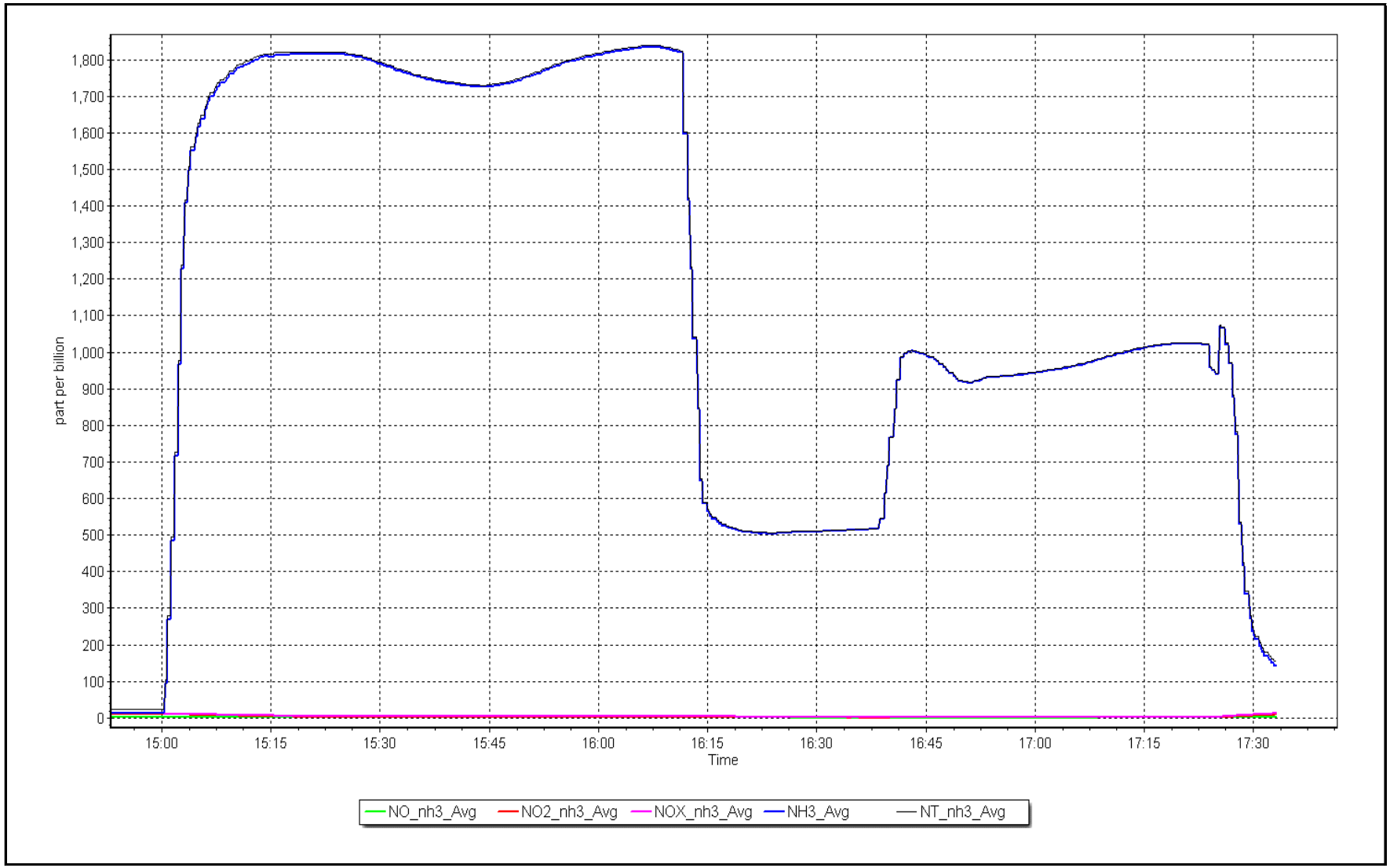
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999976	≥0.995
1801.4	1810.7	0.9948			
1001.6	1011.5	0.9902	Slope	1.004278	0.90 - 1.10
500.8	511.1	0.9798			
			Intercept	3.834562	+/-20



NO_X Calibration Plot Date: January 13, 2023 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: January 13, 2023 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

TN - NO_X - NH_3 Calibration Report

Version-11-2021

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS01
NOX Cal Date:	January 26, 2023	Last Cal Date:	N/A
Start time (MST):	13:00	End time (MST):	15:00
NH3 Cal Date:	January 26, 2023	Last Cal Date:	N/A
Start time (MST):	15:00	End time (MST):	17:00
Reason:	Install	Replaced the instrument	

Calibration Standards

NOX Cal Gas Conc:	50.84	ppm	NO Gas Cylinder #:	T2Y1P9L
NO Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028
Removed NOX Conc:	50.84	ppm	Removed Cylinder #:	NA
Removed NO Conc:	50.04	ppm	Removed cyl Expiry:	NA
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	72.93	ppm	NH3 Gas Cylinder #:	CC281298
			NH3 Cal Gas Expiry:	February 28, 2023
Removed NH3 Conc:	72.93	ppm	Removed Cylinder #:	
NH3 gas Diff:			Removed cyl Expiry:	
Calibrator Model:	Teledyne API T700		Serial Number:	3565
ZAG make/model:	Teledyne API T701		Serial Number:	5609

Analyzer Information

Analyzer model:	Teledyne API T201E	Analyzer serial #:	56
Converter model:	Teledyne API T501	Converter serial #:	217
NH3 Range (ppb):	0 - 2000 ppb	Reaction cell Press:	5.10
NOX Range (ppb):	0 - 1000 ppb	Sample Flow:	505

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	N/A	0.793	TN coefficient:	N/A	0.806
NOX coefficient:	N/A	0.804	NO bkgrnd:	N/A	-1.500
NO2 coefficient:	N/A	1.000	NOX bkgrnd:	N/A	-0.400
NH3 coefficient:	N/A	0.919	TN bkgrnd:	N/A	3.100

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	N/A	1.001644
NO_X Cal Offset:	N/A	-0.440000
NO Cal Slope:	N/A	1.001856
NO Cal Offset:	N/A	-1.080000
NO_2 Cal Slope:	N/A	0.999297
NO_2 Cal Offset:	N/A	0.756159
NH3 Cal Slope:	N/A	0.988888
NH3 Cal Offset:	N/A	14.116543
TN Cal Slope:	N/A	0.996806
TN Cal Offset:	N/A	16.482567

Wood Buffalo Environmental Association

TN - NOX - NH_3 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero										
as found NO										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.3	0.2	----	----
high NO point	4920	80.0	813.4	813.4	----	813.1	815.0	-2.0	1.000	----
NO/O3 point										
as found NH3										
new NH3 cyl rp							----			
first NH3	3413	86.4	1800.6	----	1800.6	1794.1	----	1778.7	1.004	1.012
second NH3	3452	48.0	1000.2	----	1000.2	1042.4	----	1031.0	0.960	0.970
third NH3	3476	24.0	500.1	----	500.1	519.3	----	510.8	0.963	0.979
								Average Correction Factor	1.0004	0.9872

Corrected As found TN = NA ppb NO_X = NA ppb NH3 = NA ppb

Previous Response TN = NA ppb NO_X = NA ppb NH3 = NA ppb

*Percent Change TN = NA

*Percent Change NO_X = NA

*Percent Change NH3 = NA

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = N/A

NH3 Current Converter Efficiency = 91.9%

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero										
as found span										
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.5	----	----
high point	4920	80.0	813.4	800.6	813.4	815.0	801.9	813.1	0.9981	0.9984
second point	4960	40.0	406.7	400.3	406.7	405.7	398.8	405.9	1.0025	1.0038
third point	4980	20.0	203.4	200.2	203.4	203.1	198.4	200.9	1.0013	1.0089
								Average Correction Factor	1.0006	1.0037

Baseline Corr As fnd TN = NA ppb NO_X = NA ppb NO = NA ppb

Previous Response TN = NA ppb NO_X = NA ppb NO = NA ppb

*Percent Change TN = NA

*Percent Change NO_X = NA

*Percent Change NO = NA

* = > +/-5% change initiates investigation

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found zero						
calibration zero	----	----	0.0	-0.1	----	----
1st GPT point (400 ppb O3)	795.5	392.7	415.6	416.8	0.9971	100.3%
2nd GPT point (200 ppb O3)	795.5	581.5	226.8	224.8	1.0089	99.1%
3rd GPT point (100 ppb O3)	795.5	704.1	104.2	107.6	0.9684	103.3%
				Average Correction Factor	0.9915	100.9%

Notes: Replaced the NH3 and the converter. Adjusted zero and span.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

TN Calibration Summary

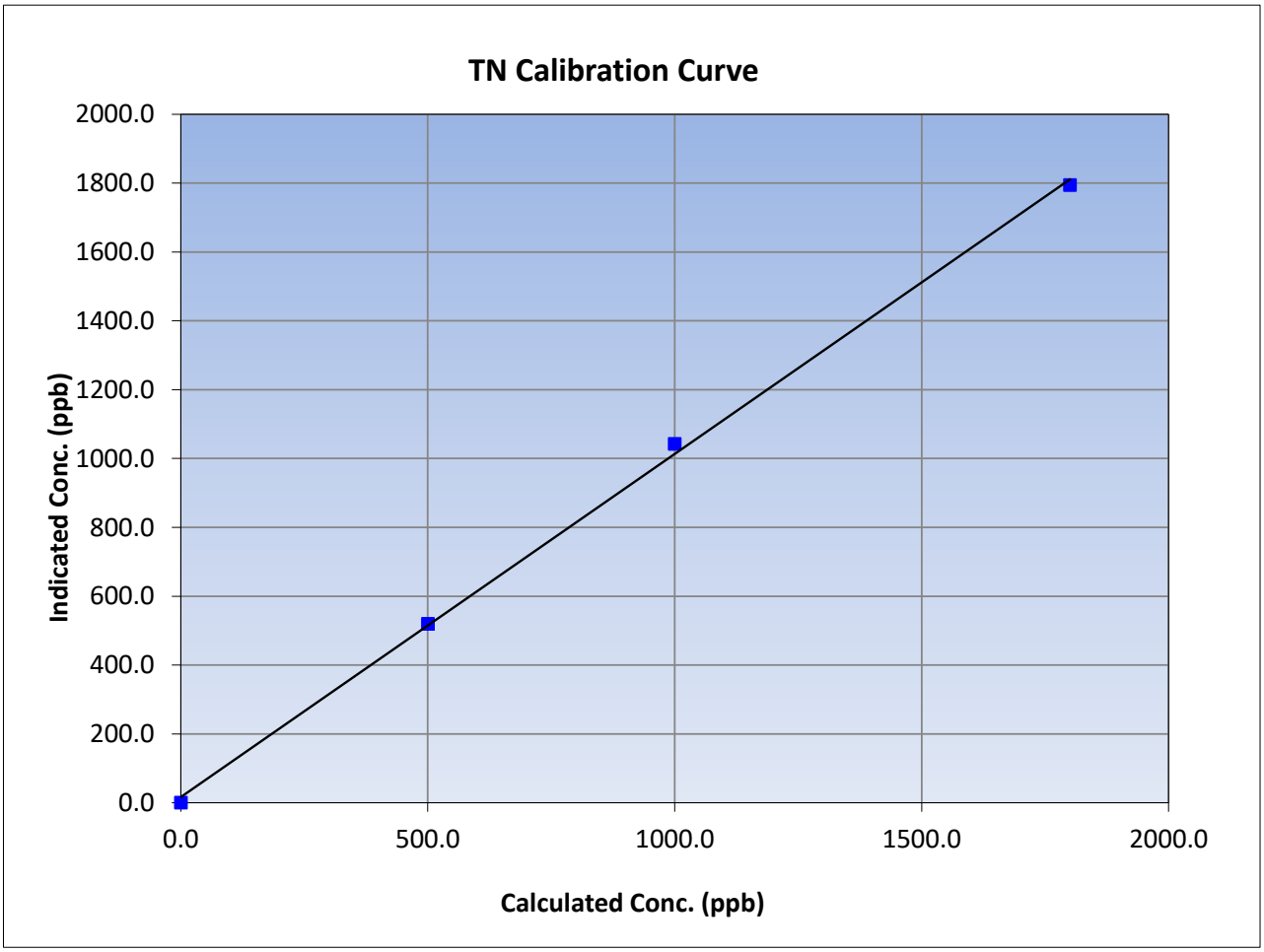
Version-11-2021

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	N/A
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	15:00
Analyzer make:	Teledyne API T201E	Analyzer serial #:	56

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.5	----	Correlation Coefficient	0.999199	*≥0.995*
1800.6	1794.1	1.0036			
1000.2	1042.4	0.9595	Slope	0.996806	*0.90 - 1.10*
500.1	519.3	0.9630			
			Intercept	16.482567	*+/-20*



Wood Buffalo Environmental Association

NH_3 Calibration Summary

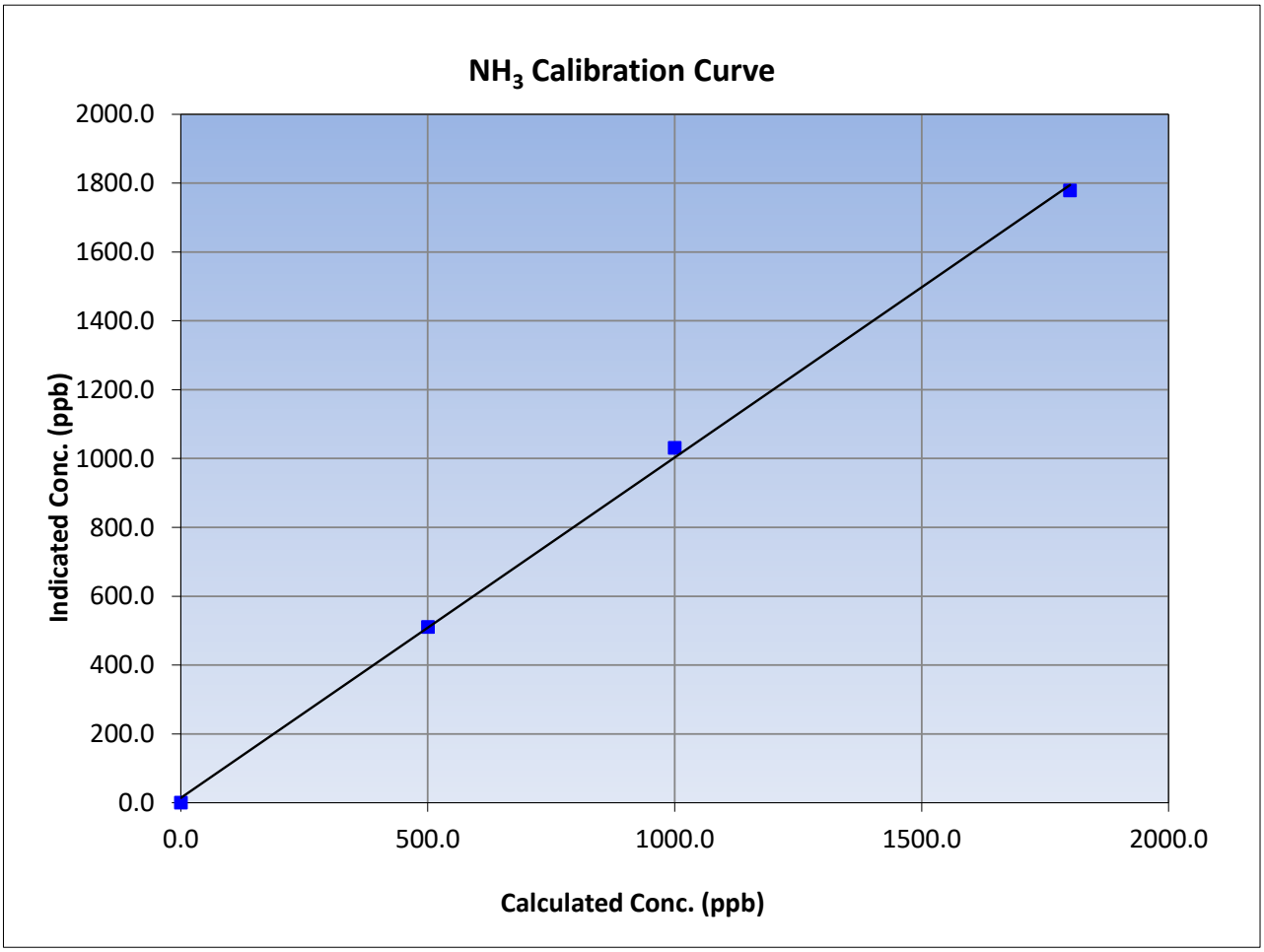
Version-11-2021

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	N/A
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	15:00
Analyzer make:	Teledyne API T201E	Analyzer serial #:	56

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999290	*≥0.995*
1800.6	1778.7	1.0123			
1000.2	1031.0	0.9701	Slope	0.988888	*0.90 - 1.10*
500.1	510.8	0.9790			
			Intercept	14.116543	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

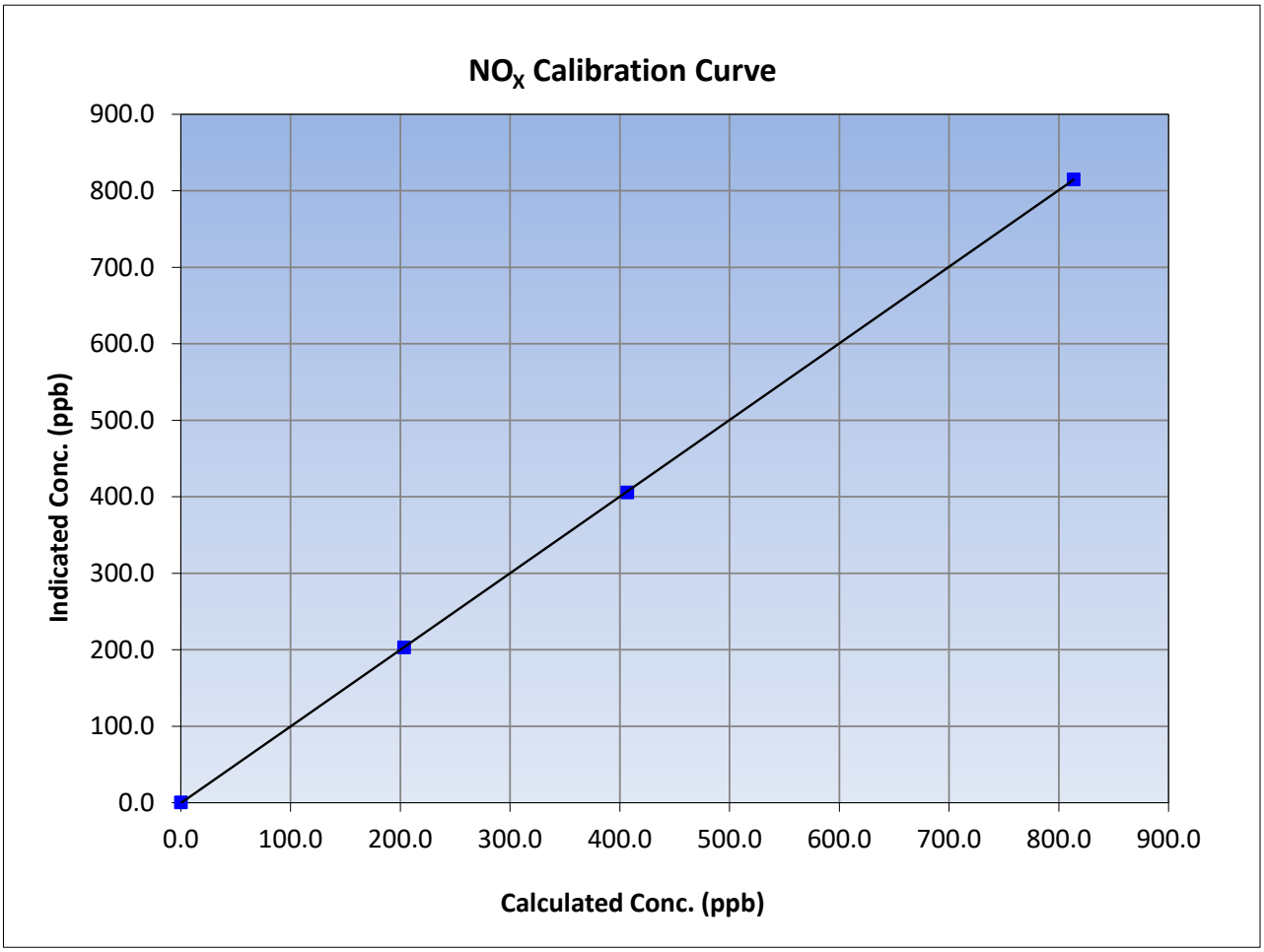
Version-11-2021

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	N/A
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	15:00
Analyzer make:	Teledyne API T201E	Analyzer serial #:	56

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999993	*≥0.995*
813.4	815.0	0.9981			
406.7	405.7	1.0025	Slope	1.001644	*0.90 - 1.10*
203.4	203.1	1.0013			
			Intercept	-0.440000	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

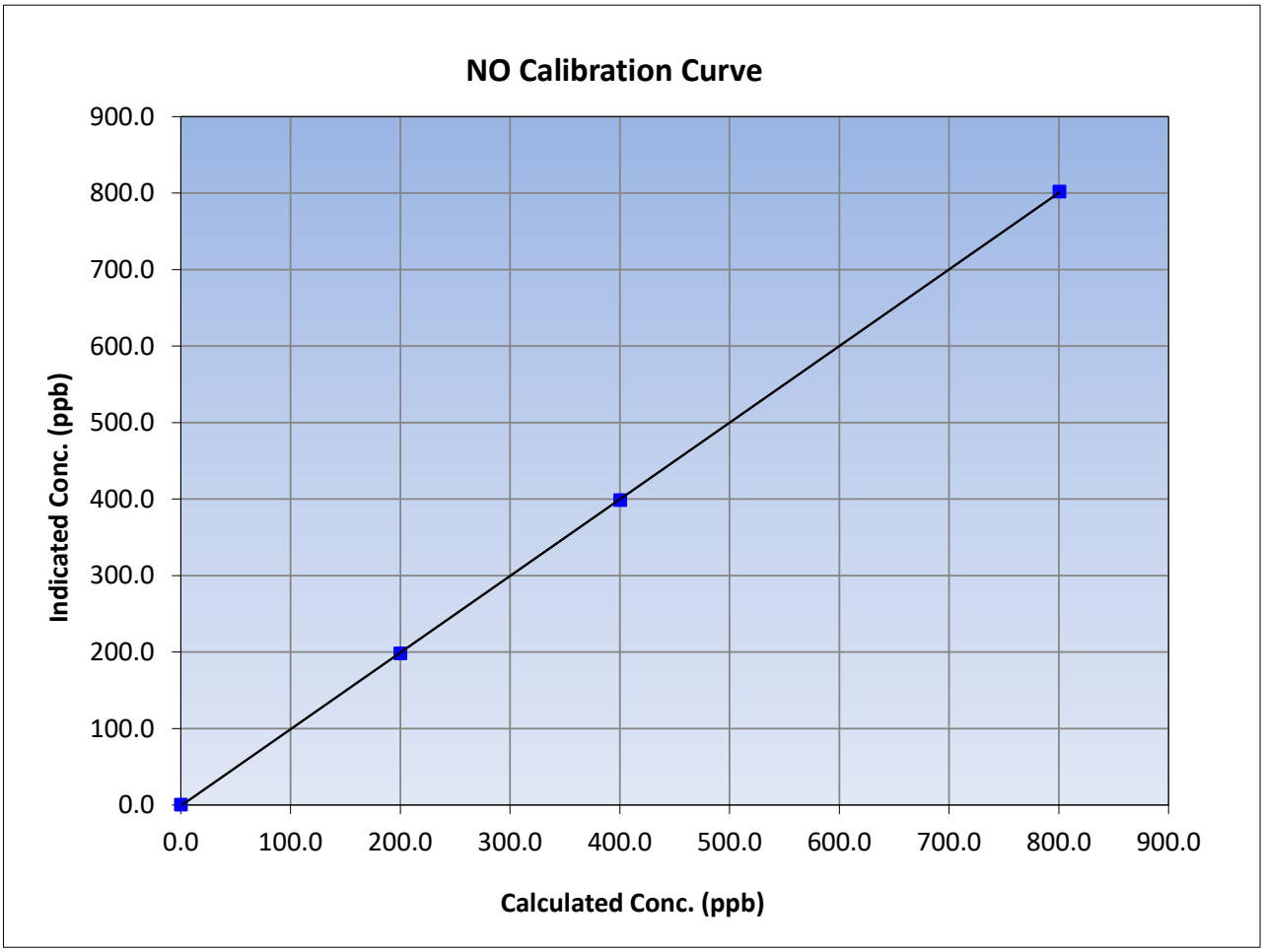
Version-11-2021

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	N/A
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	15:00
Analyzer make:	Teledyne API T201E	Analyzer serial #:	56

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999985	*≥0.995*
800.6	801.9	0.9984			
400.3	398.8	1.0038	Slope	1.001856	*0.90 - 1.10*
200.2	198.4	1.0089			
			Intercept	-1.080000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

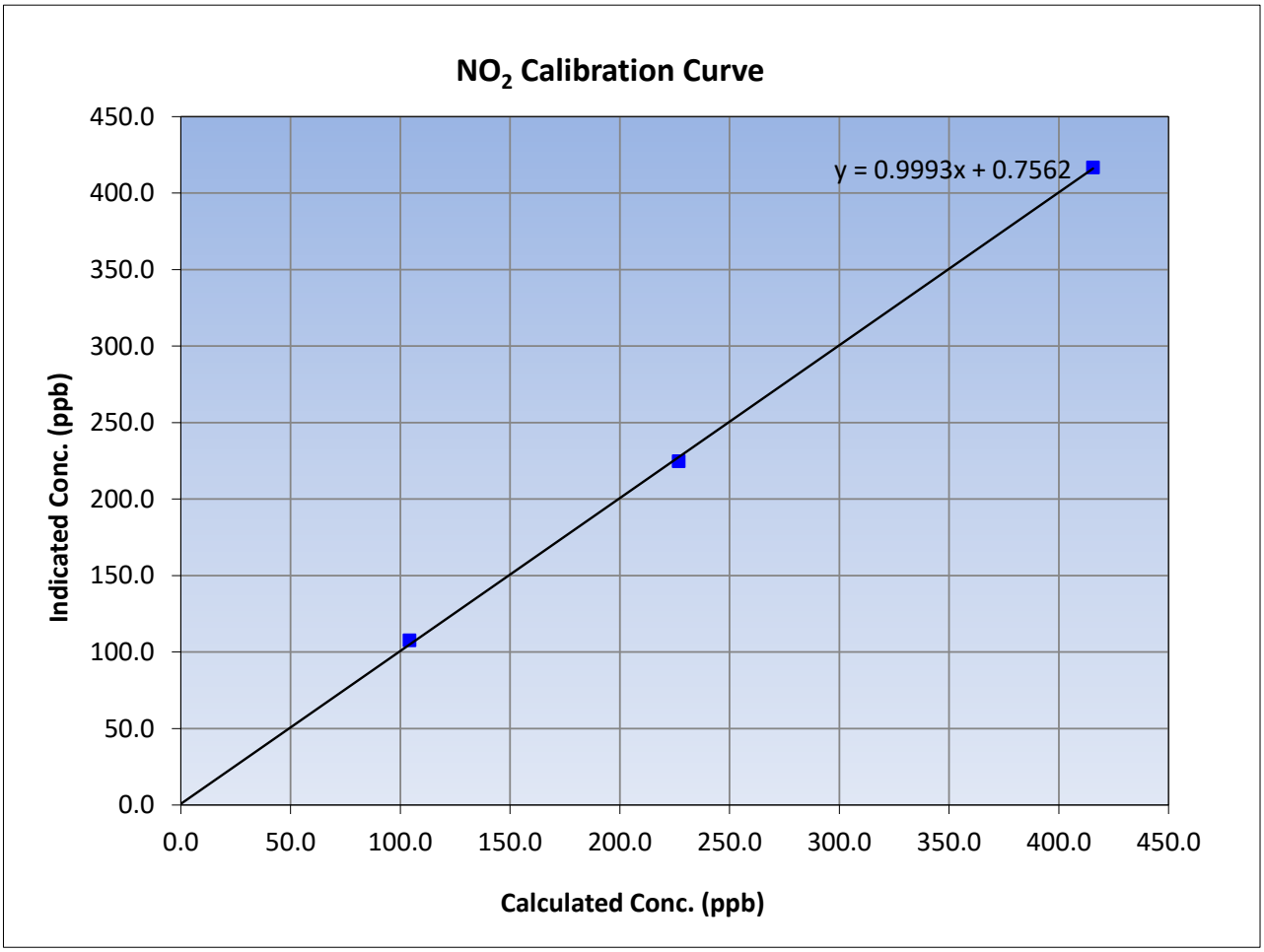
Version-11-2021

Station Information

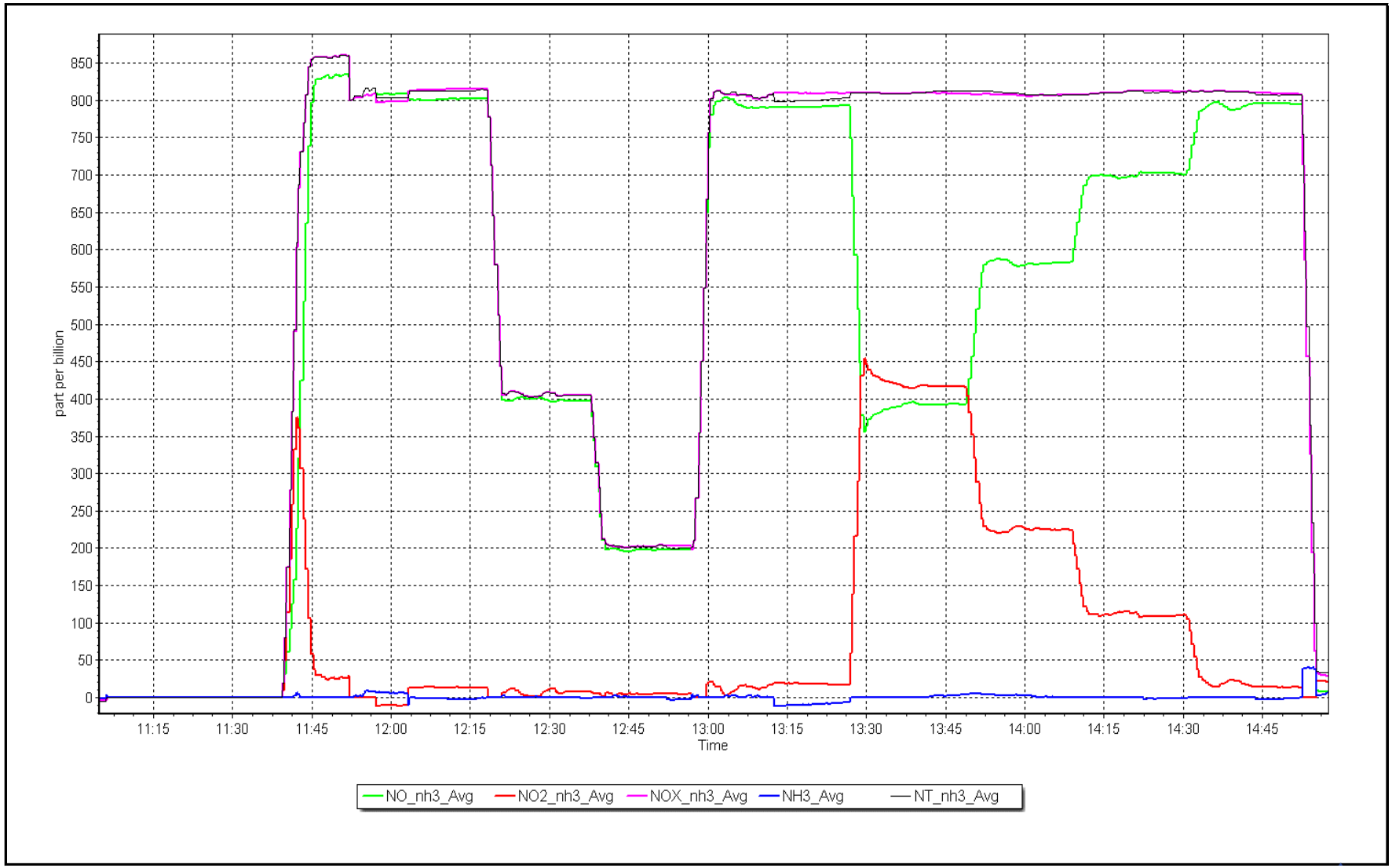
Calibration Date:	January 26, 2023	Previous Calibration:	N/A
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	13:00	End Time (MST):	15:00
Analyzer make:	Teledyne API T201E	Analyzer serial #:	56

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999839	≥0.995
415.6	416.8	0.9971			
226.8	224.8	1.0089	Slope	0.999297	0.90 - 1.10
104.2	107.6	0.9684			
			Intercept	0.756159	+/-20



NO_X Calibration Plot Date: January 26, 2023 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: January 26, 2023 Location: Bertha Ganter-Fort McKay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS02
MILDRED LAKE
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Mildred Lake	Station number:	AMS02
Calibration Date:	January 3, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:03	End time (MST):	13:53
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 Make/Model:	API T700		Serial Number:	1185
ZAG Make/Model:	API T701		Serial Number:	5608

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: JC1404901075

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997165	0.996082	Backgd or Offset:	17.6	17.8
Calibration intercept:	-0.305608	-0.526045	Coeff or Slope:	0.816	0.816

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*
as found zero	5000	0.0	0.0	0.1	----
as found span	4920	80.2	801.6	794.3	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	----
high point	4920	80.2	801.6	798.6	1.004
second point	4960	40.1	400.8	397.9	1.007
third point	4980	20.0	199.9	197.8	1.011
as left zero	5000	0.0	0.0	0.2	----
as left span	4920	80.2	801.6	789.6	1.015
				Average Correction Factor	1.007

Baseline Corr As found:	794.20	Previous response	799.07	*% 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

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

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

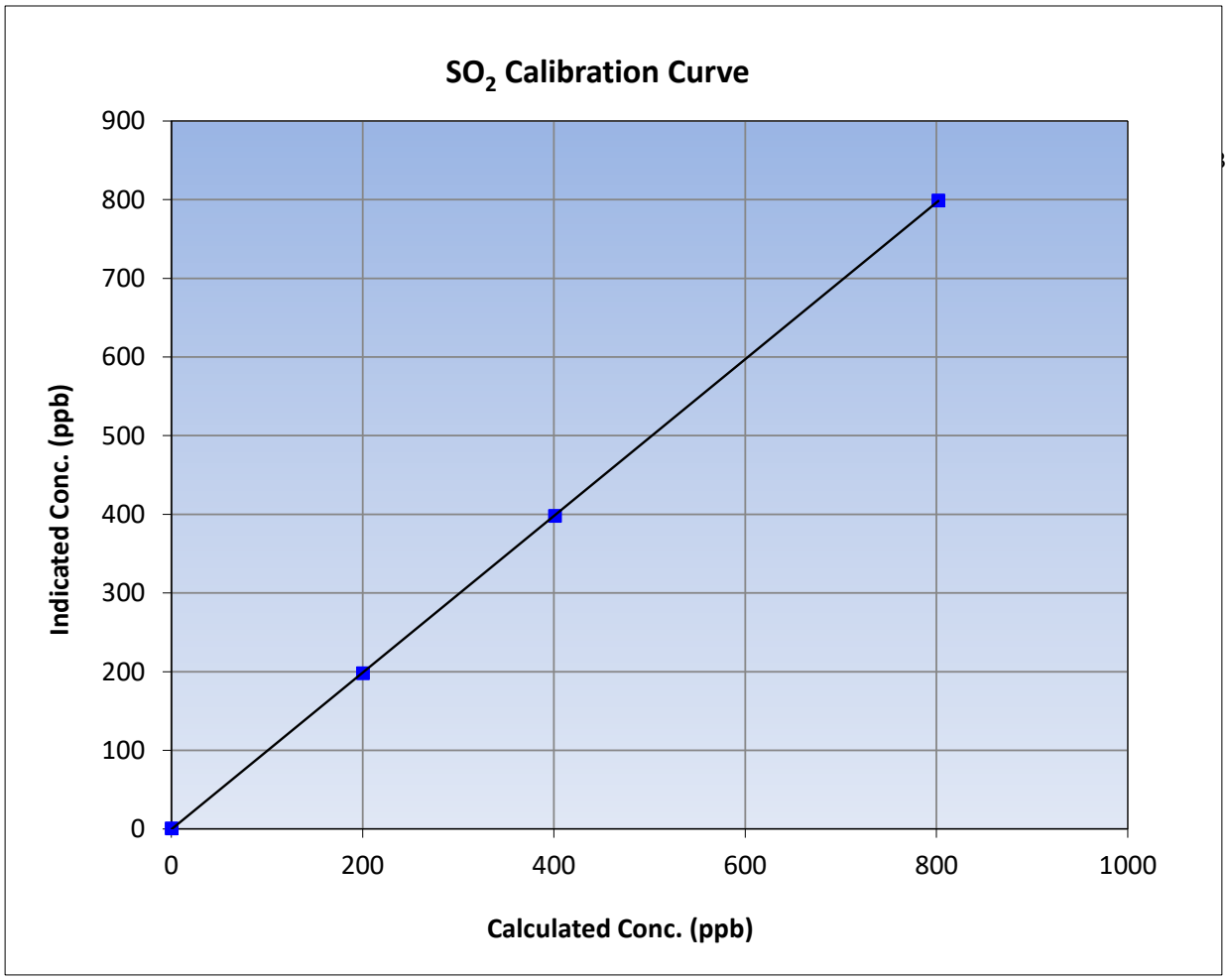
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 5, 2022
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	11:03	End Time (MST):	13:53
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

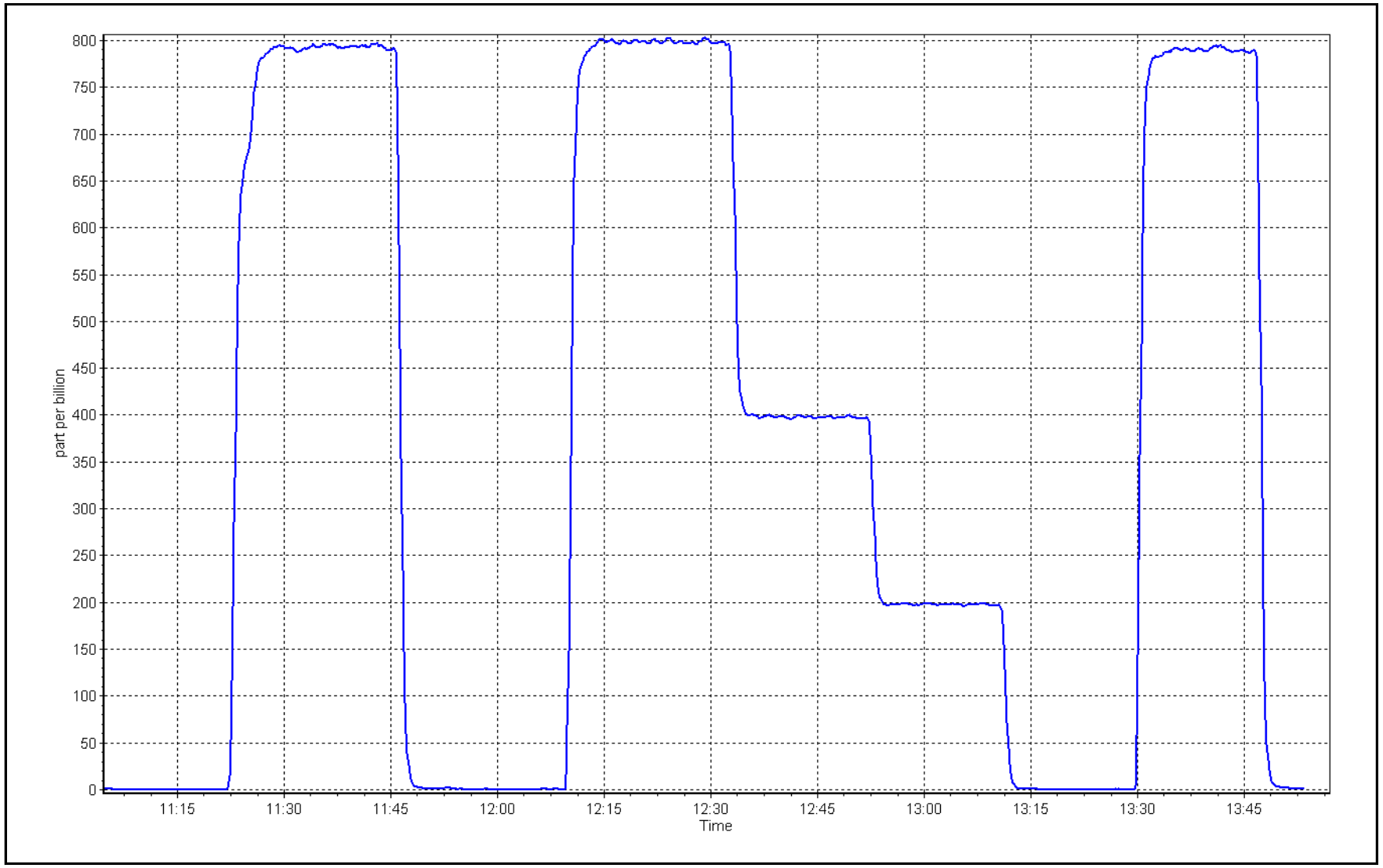
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
801.6	798.6	1.0038
400.8	397.9	1.0074
199.9	197.8	1.0107

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	0.996082	*0.90 - 1.10*
Intercept	-0.526045	*+/-30*



SO2 Calibration Plot Date: January 3, 2023 Location: Mildred Lake



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Mildred Lake	Station number:	AMS02
Calibration Date:	January 17, 2023	Last Cal Date:	December 20, 2022
Start time (MST):	10:31	End time (MST):	14:39
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:	API T700		Serial Number:	1185
ZAG Make/Model:	API T701		Serial Number:	5608

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12113311966	
Converter make:	Global G150		Converter serial #:	2022-198	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.012680	1.010965	Backgd or Offset:	1.88	1.83
Calibration intercept:	-0.239192	-0.179192	Coeff or Slope:	0.887	0.844

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	-0.2	----
as found span	4924	75.6	80.0	84.7	0.942
as found 2nd point	4962	37.8	40.0	42.4	0.939
as found 3rd point	4981	18.9	20.0	20.7	0.957
new cylinder response					

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	4924	75.6	80.0	80.7	0.991
second point	4962	37.8	40.0	40.3	0.992
third point	4981	18.9	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.1	----
as left span	4924	75.6	80.0	80.4	0.995
SO2 Scrubber Check	4920	80.2	802.0	0.0	----
Date of last scrubber change:		12-Sep-22		Ave Corr Factor	0.996
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	84.9	Prev response:	80.77	*% change:	4.9%
Baseline Corr 2nd AF pt:	42.6	AF Slope:	1.062971	AF Intercept:	-0.299150
Baseline Corr 3rd AF pt:	20.9	AF Correlation:	0.999972		

* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds. Ran a SO2 scrubber check after calibrator zero. As found points are high, diagnostics are good, suspecting the scrubber bead hydration level change is the cause of these high points. Adjusted the span.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

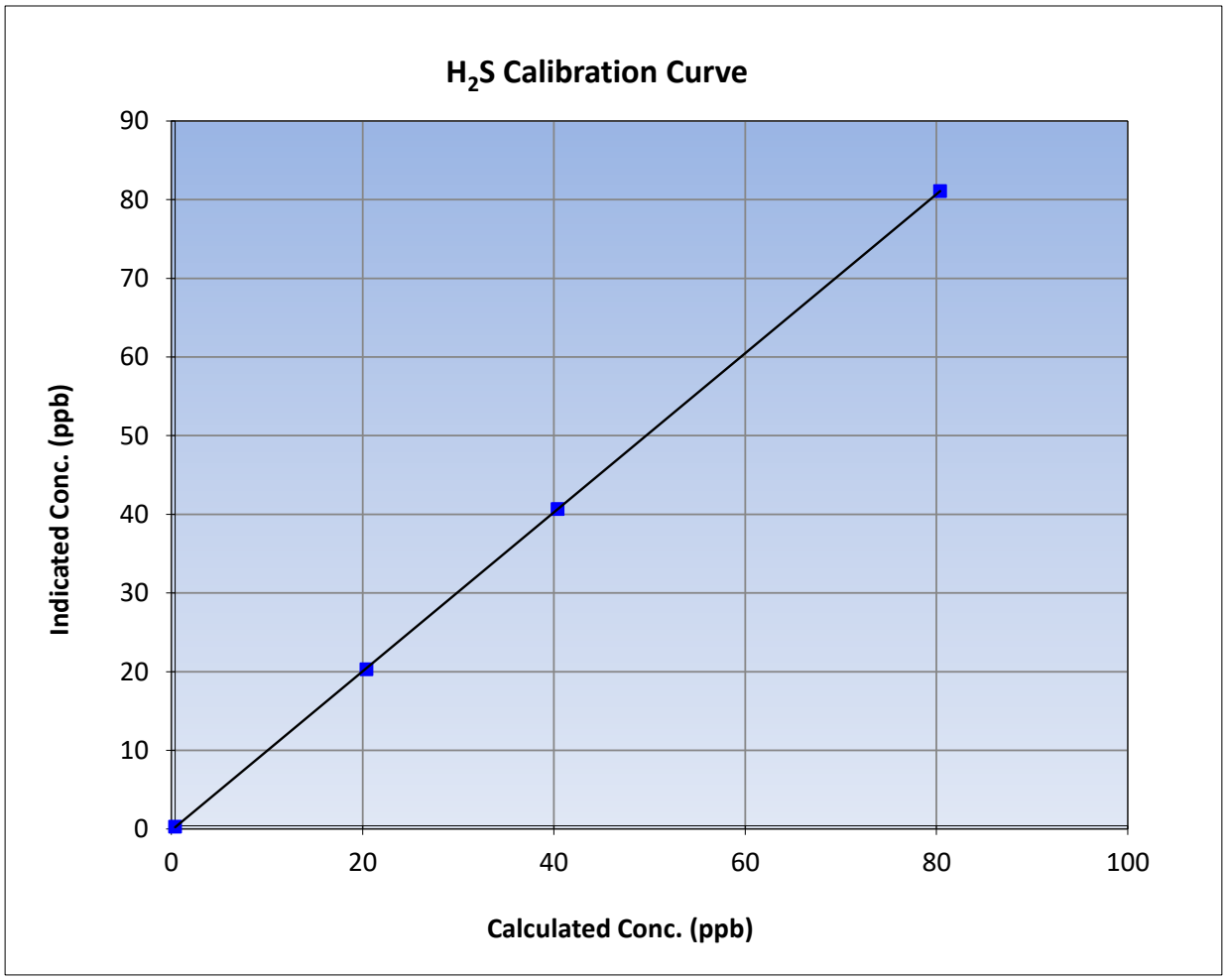
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 20, 2022
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	10:31	End Time (MST):	14:39
Analyzer make:	API T700	Analyzer serial #:	1185

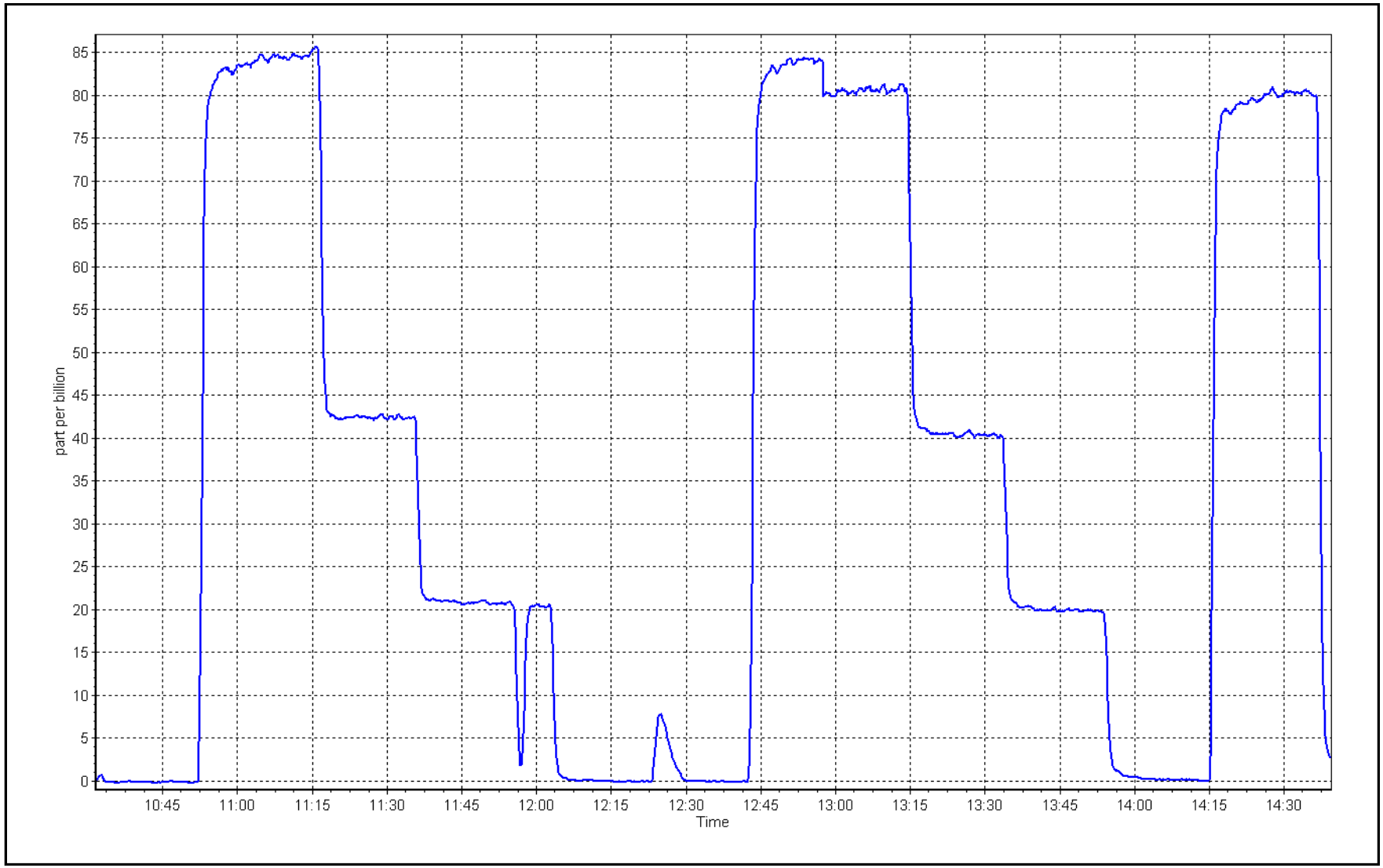
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	80.7	0.9912
40.0	40.3	0.9924
20.0	19.9	1.0049

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.010965	*0.90 - 1.10*
Intercept	-0.179192	*+/-3*



H_2S Calibration Plot Date: January 17, 2023 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-06-2022

Station Information

Station Name:	Mildred Lake	Station number:	AMS02
Calibration Date:	January 3, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:03	End time (MST):	13:49
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC501209	Cal Gas Expiry Date:	August 12, 2024	
CH4 Cal Gas Conc.	500.2	ppm	CH4 Equiv Conc.	1048.6	ppm
C3H8 Cal Gas Conc.	199.4	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:		
Removed CH4 Conc.	500.2	ppm	CH4 Equiv Conc.	1048.6	ppm
Removed C3H8 Conc.	199.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	1185	
ZAG make/model:	Teledyne API T701		Serial Number:	5608	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320038	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.87E-04	2.87E-04	NMHC SP Ratio:	4.52E-04	4.52E-04
CH4 Retention time:	14.6	14.6	NMHC Peak Area:	194883	194883
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.2	16.82	16.89	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.2	16.82	16.87	0.997
second point	4960	40.1	8.41	8.40	1.001
third point	4980	20.0	4.19	4.18	1.002
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	16.82	16.90	0.995
				Average Correction Factor	1.000
Baseline Corr AF:	16.89	Prev response	16.79	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-06-2022

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.2	8.80	8.82	0.998
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.2	8.80	8.79	1.000
second point	4960	40.1	4.40	4.40	1.000
third point	4980	20.0	2.19	2.20	0.997
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	8.80	8.83	0.996
				Average Correction Factor	0.999
Baseline Corr AF:	8.82	Prev response	8.78	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.2	8.02	8.08	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.2	8.02	8.07	0.994
second point	4960	40.1	4.01	4.01	1.002
third point	4980	20.0	2.00	1.99	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	8.02	8.06	0.995
				Average Correction Factor	1.001
Baseline Corr AF:	8.08	Prev response	8.01	*% change	0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999538	1.003029
THC Cal Offset:	-0.018717	-0.014898
CH4 Cal Slope:	1.000755	1.006623
CH4 Cal Offset:	-0.017454	-0.017040
NMHC Cal Slope:	0.998193	0.999387
NMHC Cal Offset:	-0.000864	0.002541

Notes: Changed inlet filter and H2 cylinder after As Founds. No adjustments needed

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

THC Calibration Summary

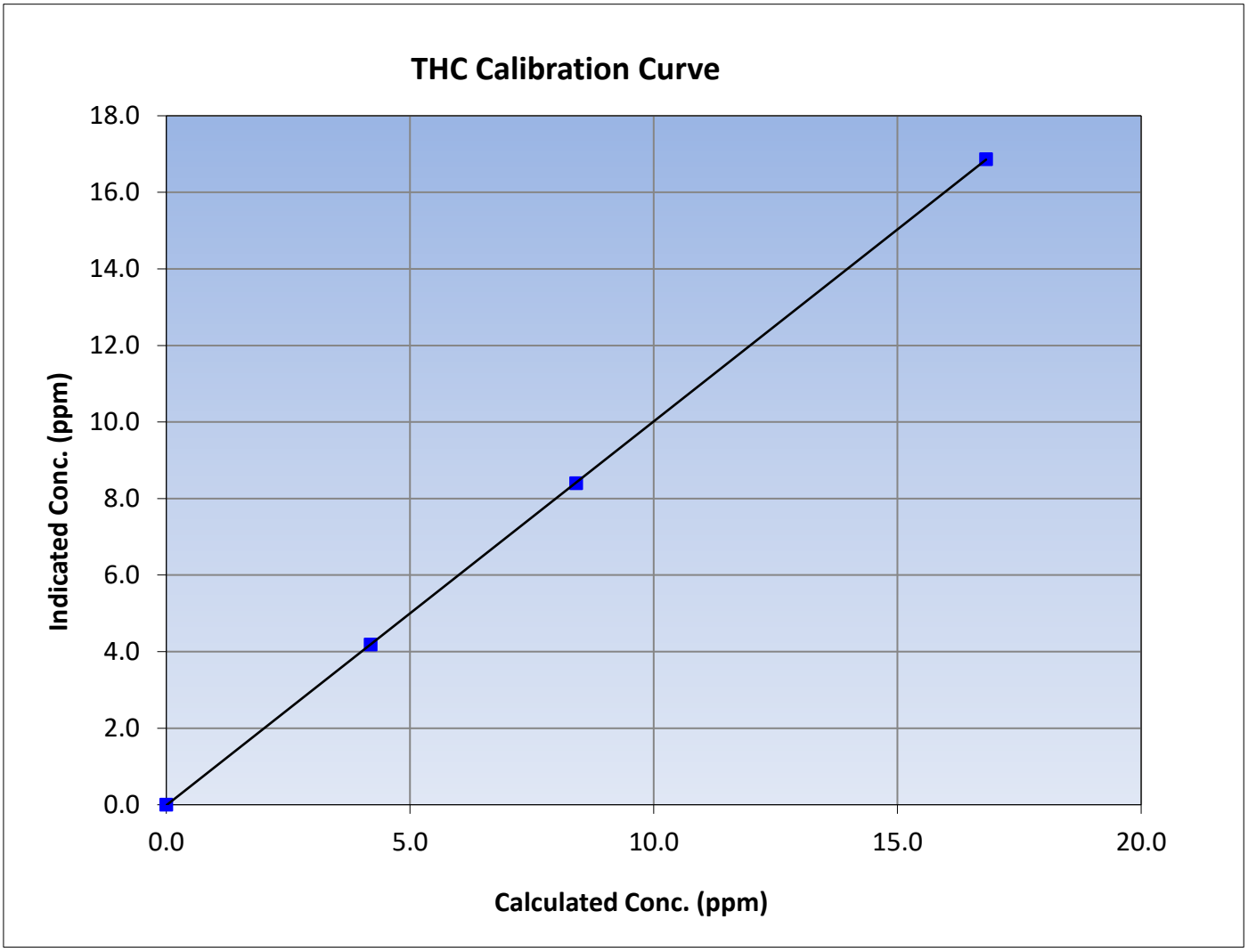
Version-06-2022

Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 5, 2022
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	11:03	End Time (MST):	13:49
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999995	*≥0.995*
16.82	16.87	0.9972			
8.41	8.40	1.0009	Slope	1.003029	*0.90 - 1.10*
4.19	4.18	1.0024			
			Intercept	-0.014898	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

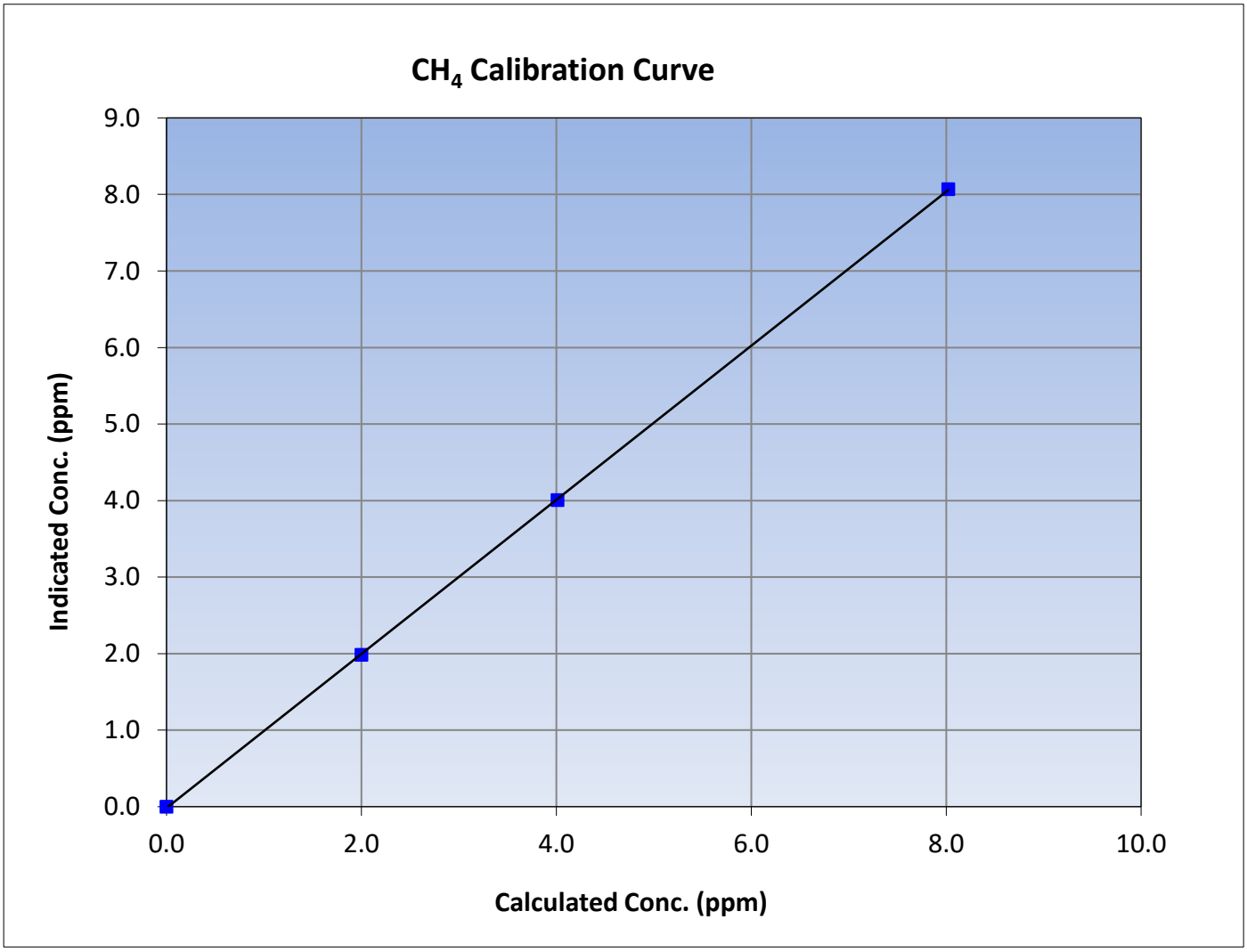
Version-06-2022

Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 5, 2022
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	11:03	End Time (MST):	13:49
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999977	≥0.995
8.02	8.07	0.9942			
4.01	4.01	1.0016	Slope	1.006623	0.90 - 1.10
2.00	1.99	1.0080			
			Intercept	-0.017040	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

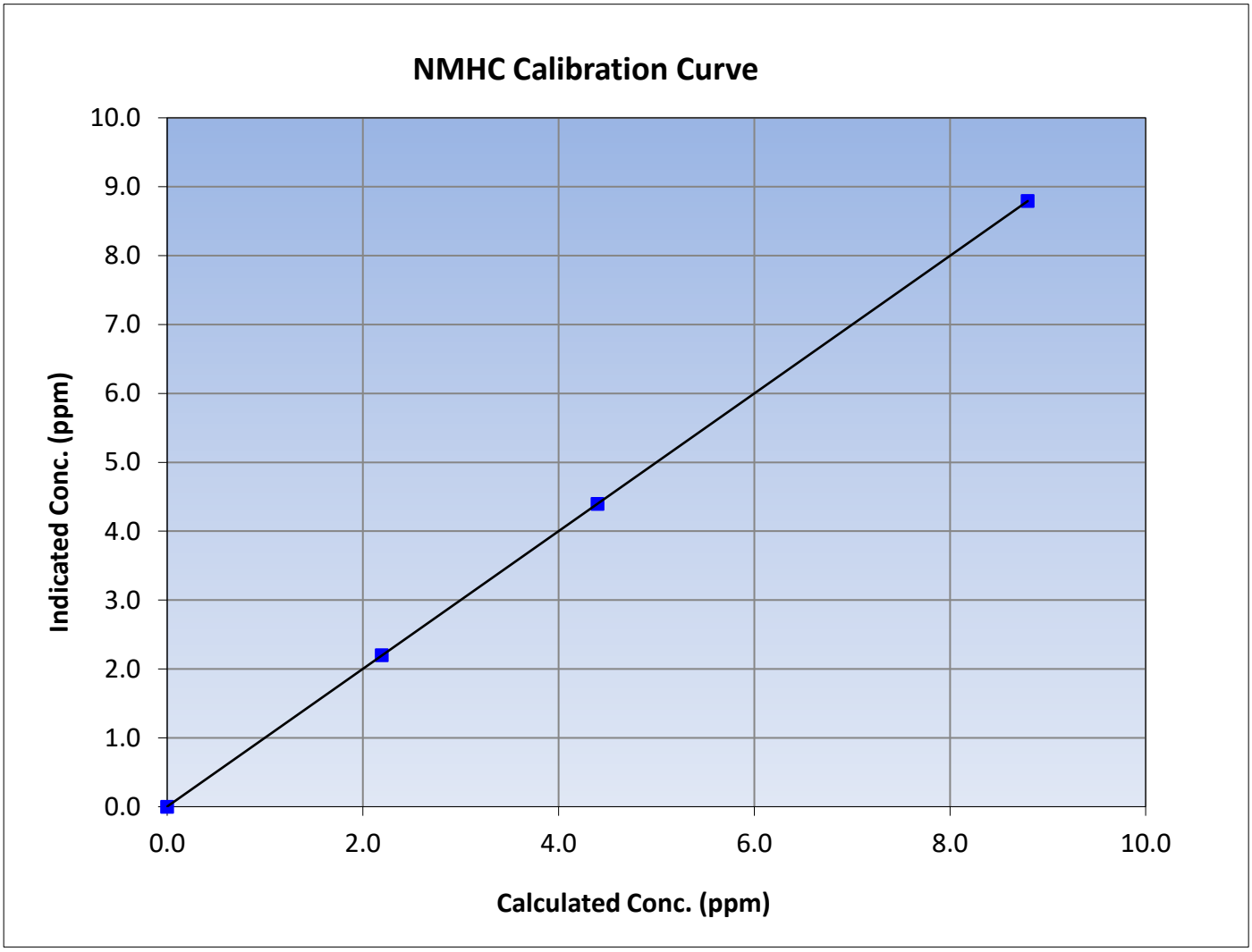
Version-06-2022

Station Information

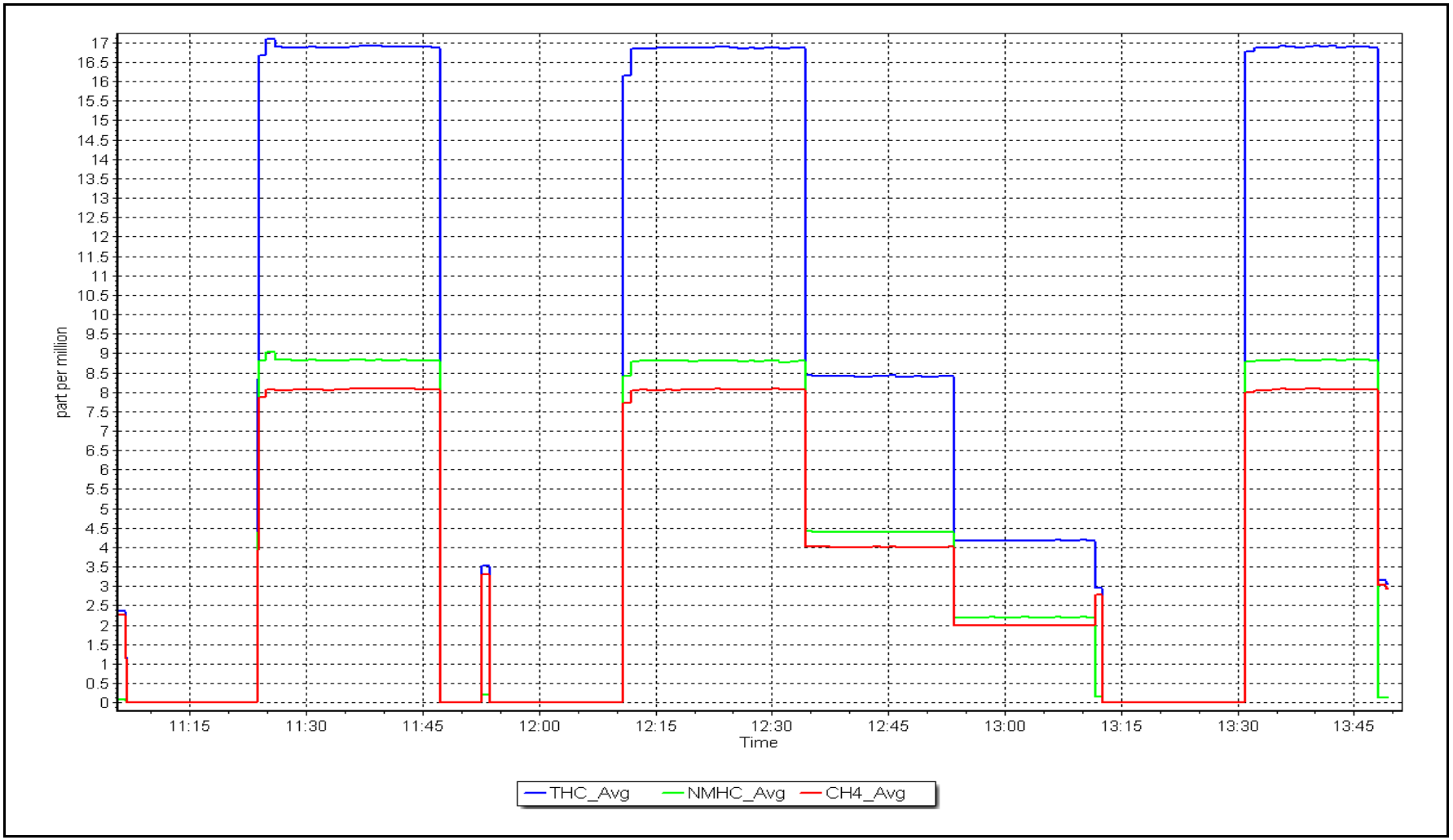
Calibration Date:	January 3, 2023	Previous Calibration:	December 5, 2022
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	11:03	End Time (MST):	13:49
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320038

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
8.80	8.79	1.0004			
4.40	4.40	1.0004	Slope	0.999387	0.90 - 1.10
2.19	2.20	0.9975			
			Intercept	0.002541	+/-0.5



NMHC Calibration Plot Date: January 3, 2023 Location: Mildred Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS04
BUFFALO VIEWPOINT
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS04
Calibration Date:	January 12, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	10:40	End time (MST):	13:09
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.02	ppm	Cal Gas Exp Date:	September 9, 2028
Cal Gas Cylinder #:	CC470284			
Removed Cal Gas Conc:	50.02	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2445
ZAG Make/Model:	API T701		Serial Number:	5611

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: JC1327300932

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001942	0.998800	Backgd or Offset:	21.5	21.5
Calibration intercept:	0.880000	0.680000	Coeff or Slope:	0.869	0.869

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*
as found zero	5000	0.0	0.0	0.4	----
as found span	4920	80.0	800.3	800.3	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	----
high point	4920	80.0	800.3	800.0	1.000
second point	4960	40.0	400.2	400.3	1.000
third point	4980	20.0	200.1	200.8	0.996
as left zero	5000	0.0	0.0	0.5	----
as left span	4920	80.0	800.3	800.5	1.000
				Average Correction Factor	0.999

Baseline Corr As found:	799.90	Previous response	802.75	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No Maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

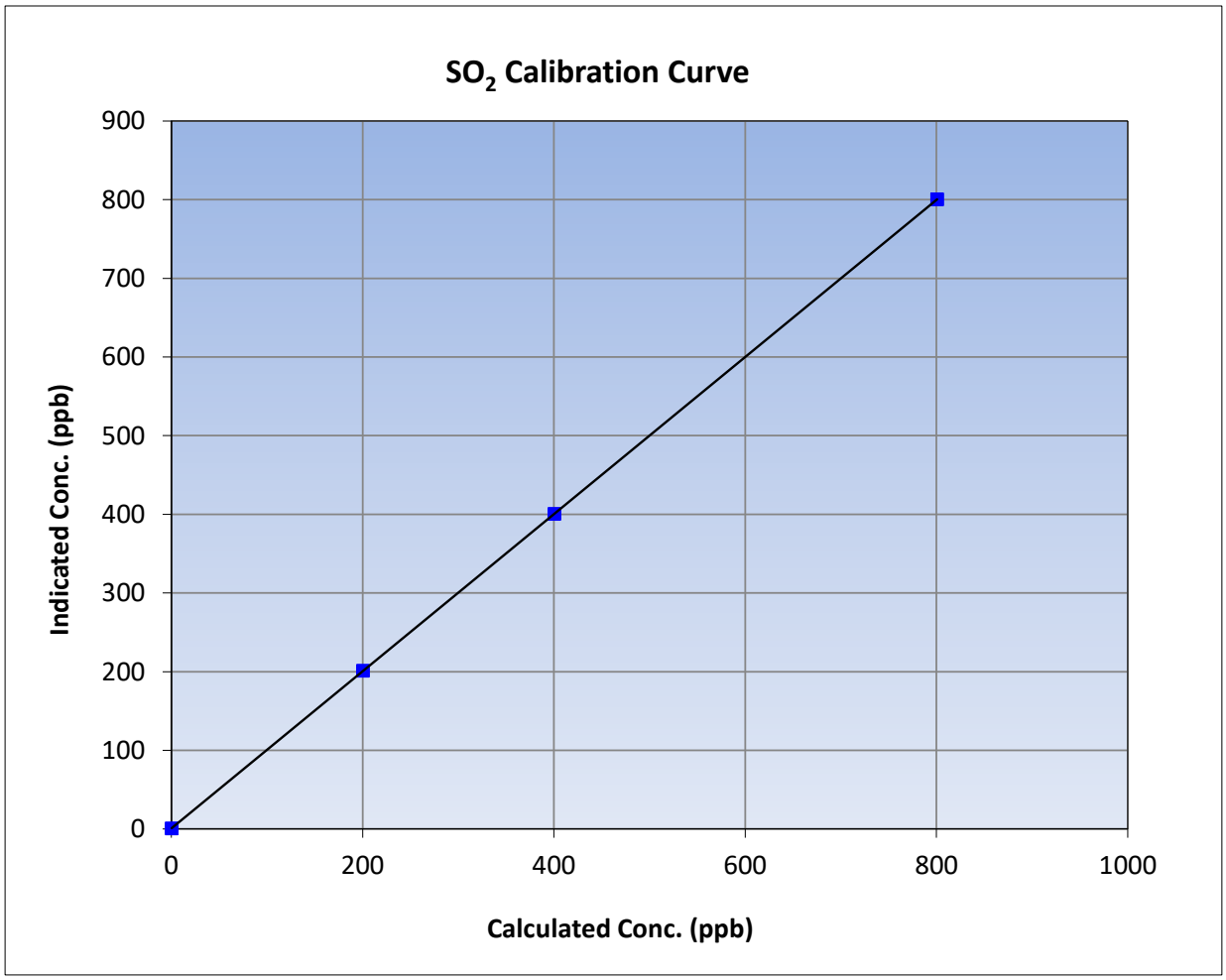
Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 13, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:45	End Time (MST):	13:09
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932

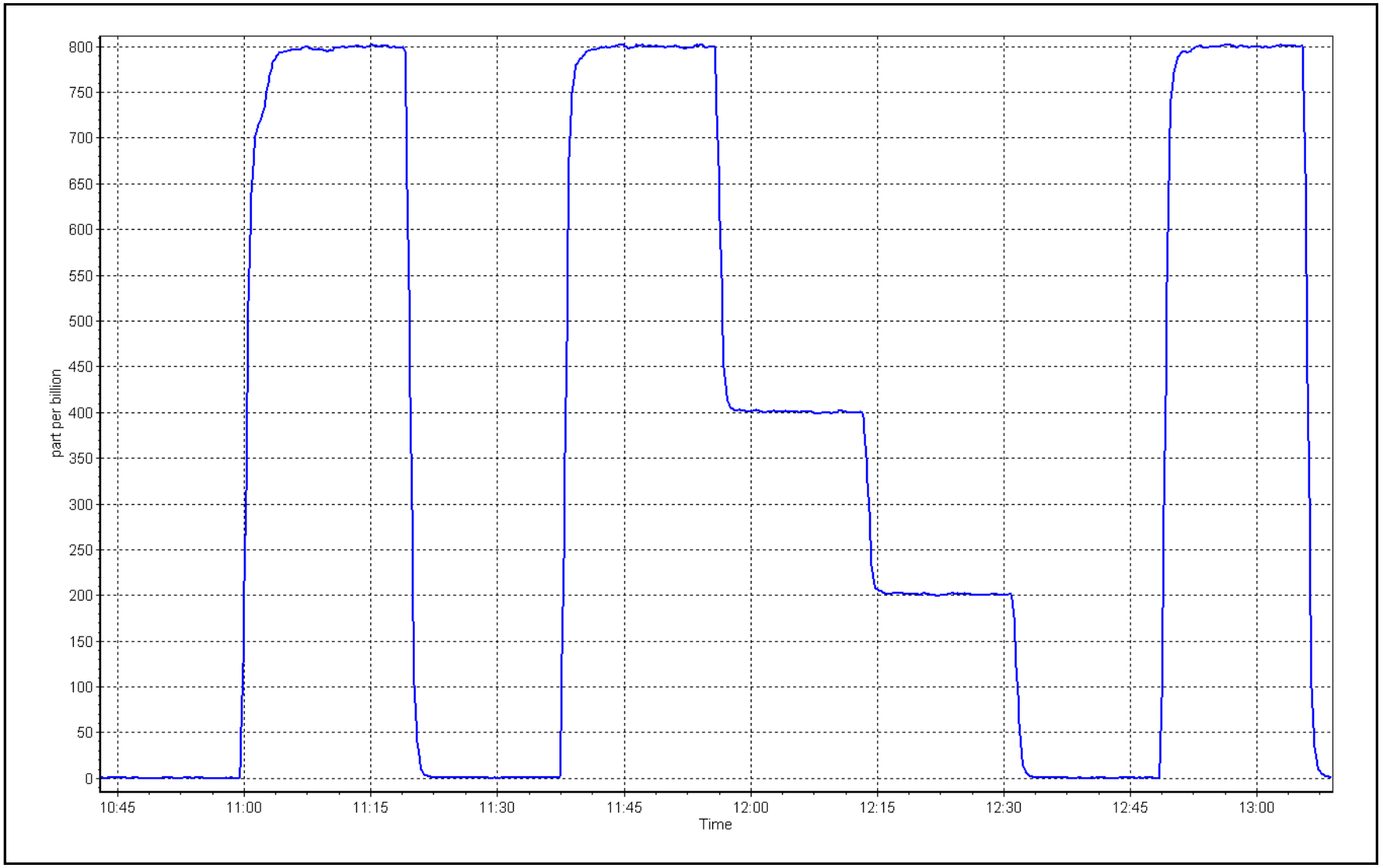
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
800.3	800.0	1.0004
400.2	400.3	0.9997
200.1	200.8	0.9964

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.998800	*0.90 - 1.10*
Intercept	0.680000	*+/-30*



SO2 Calibration Plot Date: January 12, 2023 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS04
Calibration Date:	January 16, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	7:25	End time (MST):	13:09
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:	January 4, 2025
Removed Gas Cyl #:	CC345266		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3060
ZAG Make/Model:	API T701H		Serial Number:	362

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	1336160094	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003620	1.000770	Backgd or Offset:	17.9	20.1
Calibration intercept:	-0.197849	0.002271	Coeff or Slope:	1.074	1.119

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4926	74.1	80.3	81.5	0.988
as found 2nd point	4963	37.0	40.1	40.6	0.993
as found 3rd point	4982	18.5	20.1	20.5	0.988
new cylinder response					

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	80.3	1.000
second point	4963	37.0	40.1	40.3	0.995
third point	4982	18.5	20.1	20.1	0.998
as left zero	5000	0.0	0.0	-0.2	----
as left span	4926	74.1	80.3	80.5	0.998
SO2 Scrubber Check	4920	80.0	800.0	-0.2	----
Date of last scrubber change:				Ave Corr Factor	0.998
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	81.3	Prev response:	80.42	*% change:	1.1%
Baseline Corr 2nd AF pt:	40.4	AF Slope:	1.011872	AF Intercept:	0.162360
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999992		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

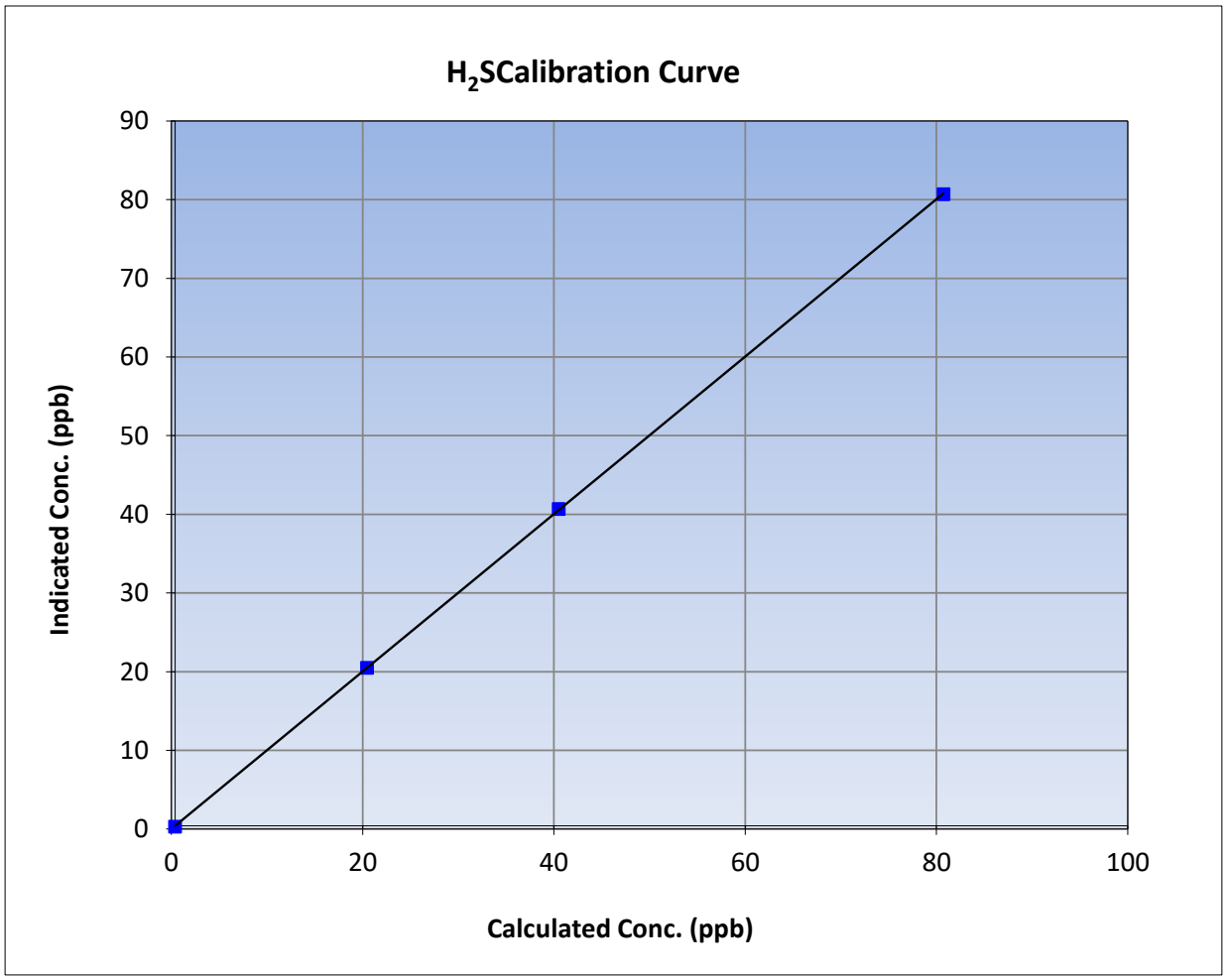
Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 8, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:25	End Time (MST):	13:09
Analyzer make:	Thermo 450i	Analyzer serial #:	1336160094

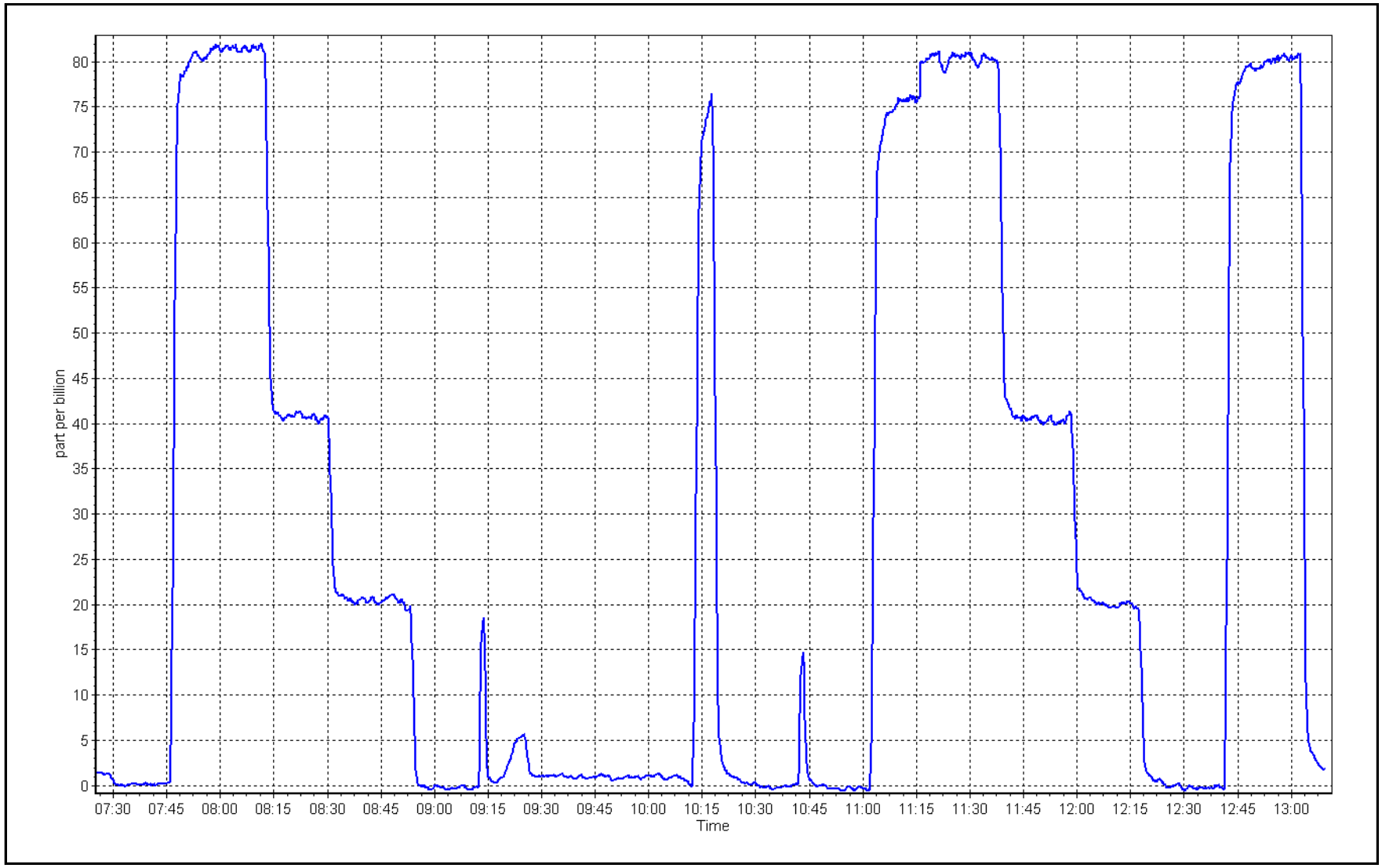
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.3	80.3	1.0003
40.1	40.3	0.9952
20.1	20.1	0.9976

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	1.000770	*0.90 - 1.10*
Intercept	0.002271	*+/-3*



H_2S Calibration Plot Date: January 16, 2023 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS04
Calibration Date:	January 12, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	10:40	End time (MST):	13:10
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC470284	Cal Gas Expiry Date:	September 9, 2028	
CH4 Cal Gas Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	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:	2445	
ZAG make/model:	API T701		Serial Number:	362	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1426262594	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.070E-04	3.070E-04	NMHC SP Ratio:	6.120E-05	6.120E-05
CH4 Retention time:	13.6	13.6	NMHC Peak Area:	147690	147690

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.0	17.01	17.21	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.0	17.01	17.09	0.995
second point	4960	40.0	8.50	8.38	1.015
third point	4980	20.0	4.25	4.18	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.0	17.01	17.04	0.998
				Average Correction Factor	1.009

Baseline Corr AF:	17.21	Prev response	17.03	*% change	1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.04	9.13	0.990
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.0	9.04	9.06	0.998
second point	4960	40.0	4.52	4.49	1.007
third point	4980	20.0	2.26	2.26	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.0	9.04	9.02	1.002
				Average Correction Factor	1.002
Baseline Corr AF:	9.13	Prev response	9.03	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.0	7.96	8.08	0.986
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.0	7.96	8.04	0.991
second point	4960	40.0	3.98	3.89	1.024
third point	4980	20.0	1.99	1.92	1.037
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.0	7.96	8.02	0.993
				Average Correction Factor	1.017
Baseline Corr AF:	8.08	Prev response	7.99	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.005447	1.005648
THC Cal Offset:	-0.066000	-0.070000
CH4 Cal Slope:	1.011020	1.011450
CH4 Cal Offset:	-0.058000	-0.062000
NMHC Cal Slope:	0.999400	1.001675
NMHC Cal Offset:	-0.006000	-0.010000

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

THC Calibration Summary

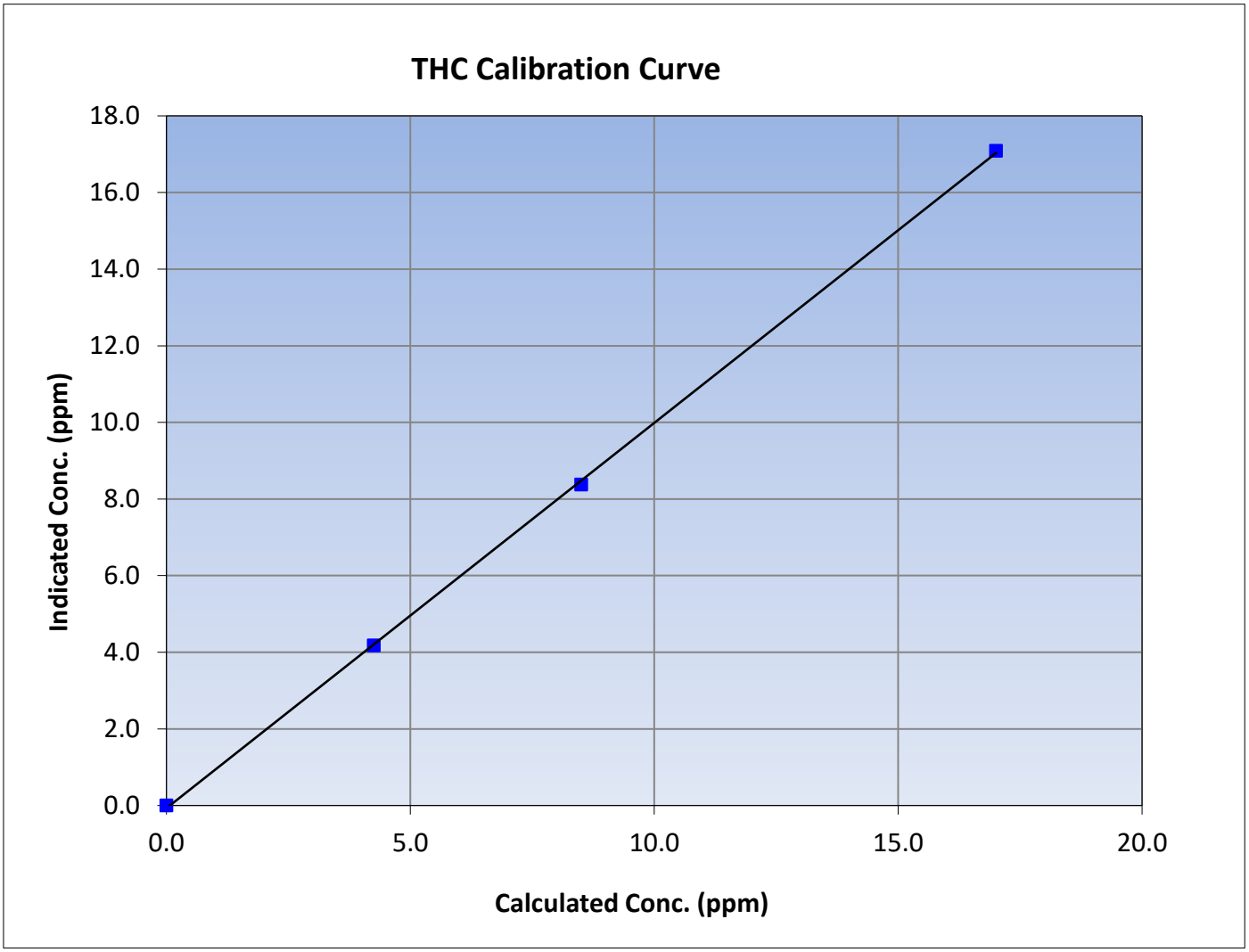
Version-01-2020

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 12, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	10:40	End Time (MST):	13:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999881	≥0.995
17.01	17.09	0.9951			
8.50	8.38	1.0147	Slope	1.005648	0.90 - 1.10
4.25	4.18	1.0172			
			Intercept	-0.070000	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

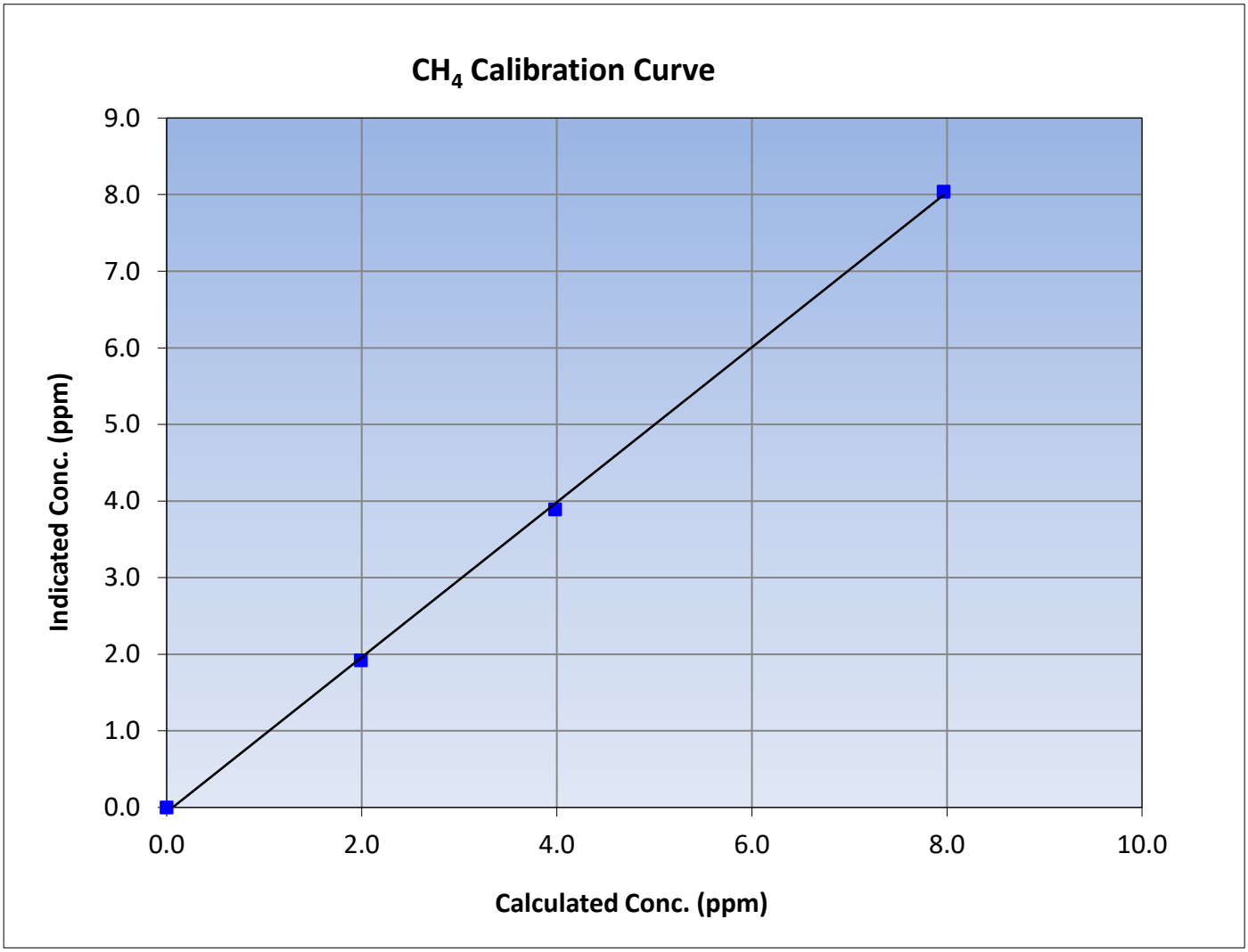
Version-01-2020

Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 12, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	10:40	End Time (MST):	13:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999641	≥0.995
7.96	8.04	0.9906			
3.98	3.89	1.0238	Slope	1.011450	0.90 - 1.10
1.99	1.92	1.0371			
			Intercept	-0.062000	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

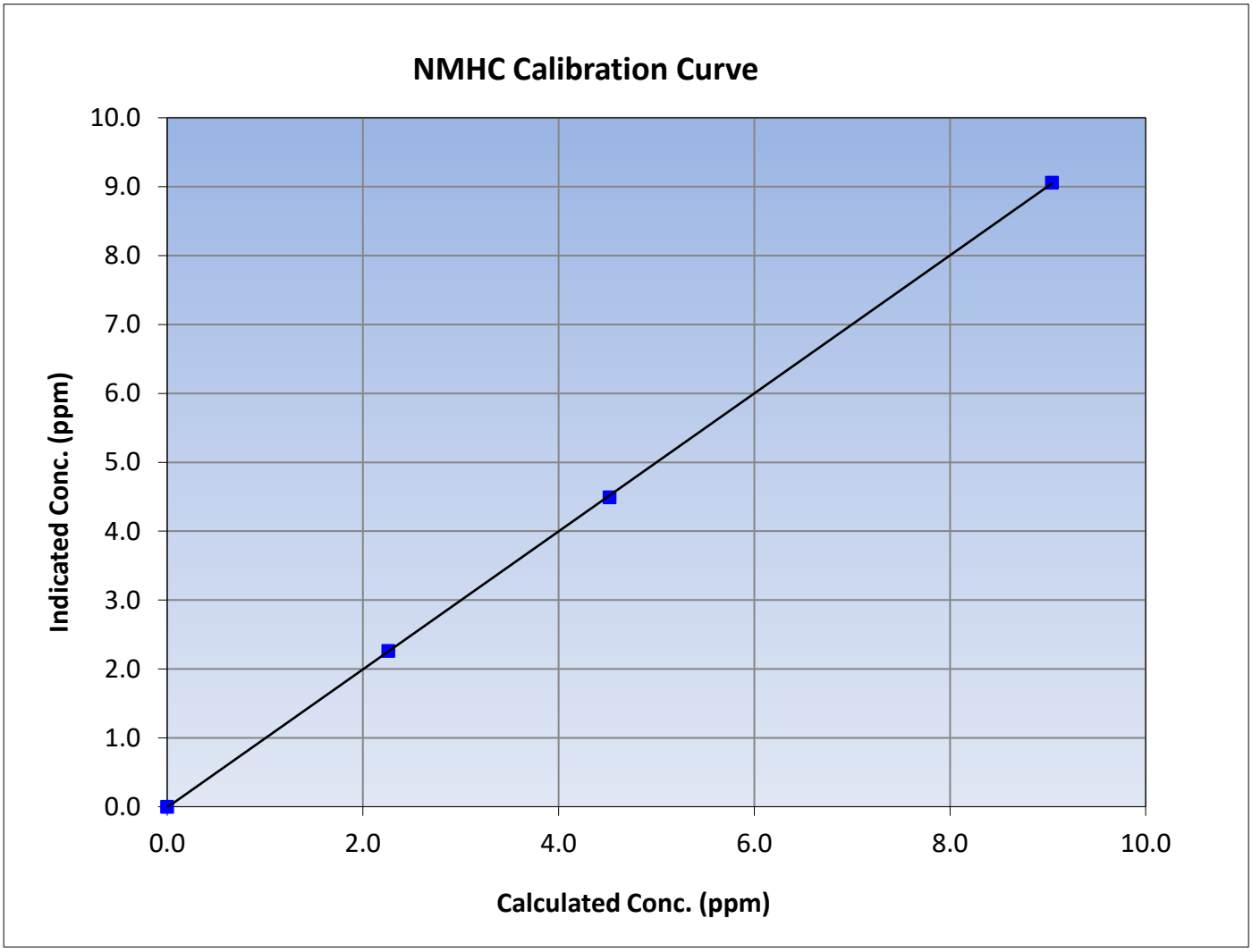
Version-01-2020

Station Information

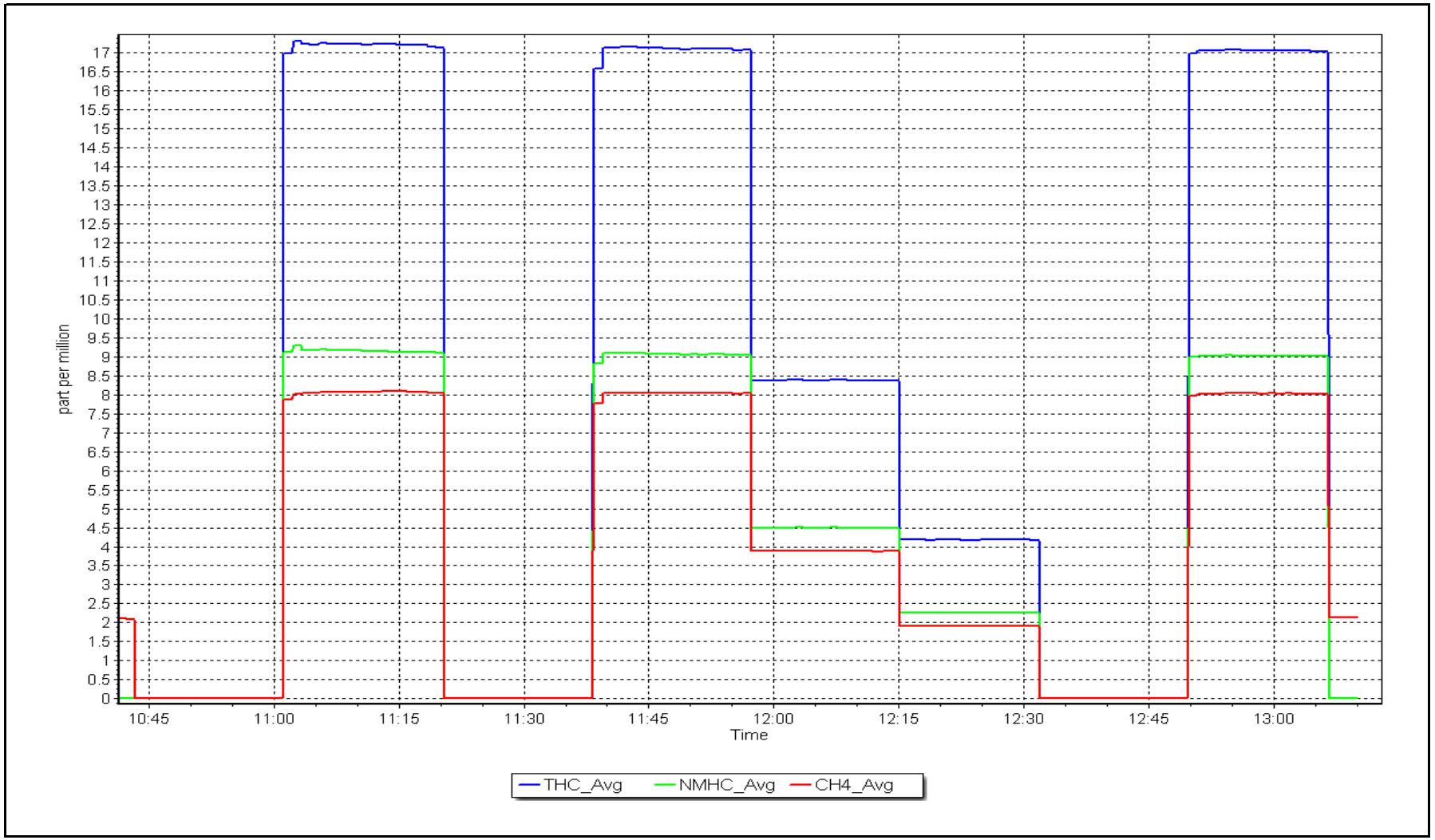
Calibration Date:	January 12, 2023	Previous Calibration:	December 12, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	10:40	End Time (MST):	13:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999975	≥0.995
9.04	9.06	0.9980			
4.52	4.49	1.0069	Slope	1.001675	0.90 - 1.10
2.26	2.26	1.0002			
			Intercept	-0.010000	+/-0.5



NMHC Calibration Plot Date: January 12, 2023 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS04
Calibration Date:	January 13, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	7:12	End time (MST):	12:19
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T36RH1F		Cal Gas Expiry Date:	August 18, 2023	
NOX Cal Gas Conc:	51.16	ppm	NO Cal Gas Conc:	50.91	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	51.16	ppm	Removed Gas NO Conc:	50.91	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2445	
ZAG make/model:	API T701		Serial Number:	362	

Analyzer Information

Analyzer make:	API T200	Analyzer serial #:	723
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.149	1.204	NO bkgnd or offset:	-0.3	-0.3
NOX coeff or slope:	1.147	1.203	NOX bkgnd or offset:	-0.1	-0.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.8	6.8

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.999214	1.000402
NO_X Cal Offset:	0.407361	0.466890
NO Cal Slope:	0.999207	1.001422
NO Cal Offset:	-0.832949	-0.653871
NO_2 Cal Slope:	0.995503	1.000220
NO_2 Cal Offset:	1.627827	1.229528

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.7	0.0	0.7	----	----
as found span	4922	78.1	799.1	795.2	3.9	764.6	757.7	6.9	1.0451	1.0495
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.6	-0.2	----	----
high point	4922	78.1	799.1	795.2	3.9	800.1	796.2	3.9	0.9988	0.9987
second point	4961	39.1	400.1	398.1	2.0	400.0	397.7	2.4	1.0002	1.0010
third point	4981	19.5	199.5	198.5	1.0	200.6	196.7	3.9	0.9945	1.0093
as left zero	5000	0.0	0.0	0.0	0.0	1.4	1.4	0.0	----	----
as left span	4922	78.1	799.1	368.2	430.9	799.0	365.4	433.6	1.0001	1.0077
								Average Correction Factor	0.9978	1.0030

Corrected As found	NO_X = 763.9 ppb	NO = 757.7 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-4.6%
Previous Response	NO_X = 798.9 ppb	NO = 793.7 ppb		*Percent Change	NO =	-4.8%
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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	794.0	367.0	430.9	431.7	0.9982	100.2%
2nd GPT point (200 ppb O3)	794.0	580.5	217.4	218.8	0.9936	100.6%
3rd GPT point (100 ppb O3)	794.0	687.9	110.0	113.1	0.9726	102.8%
				Average Correction Factor	0.9881	101.2%

Notes: Pump and charcoal was changed recently. Diagnostics similar to last months. Span adjusted. No Maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

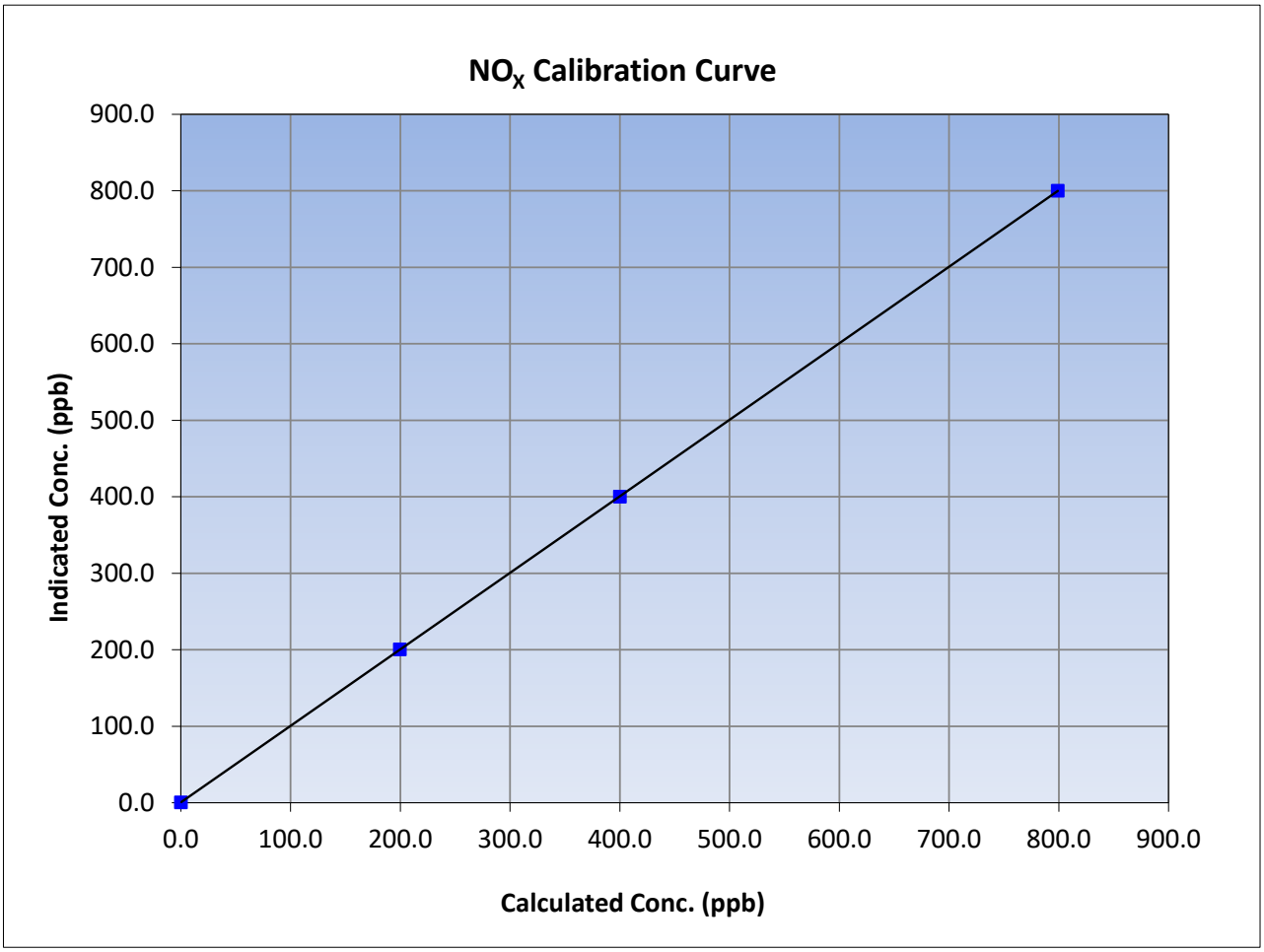
Version-04-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 1, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:12	End Time (MST):	12:19
Analyzer make:	API T200	Analyzer serial #:	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.4	----	Correlation Coefficient	0.999998	≥0.995
799.1	800.1	0.9988			
400.1	400.0	1.0002	Slope	1.000402	0.90 - 1.10
199.5	200.6	0.9945			
			Intercept	0.466890	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

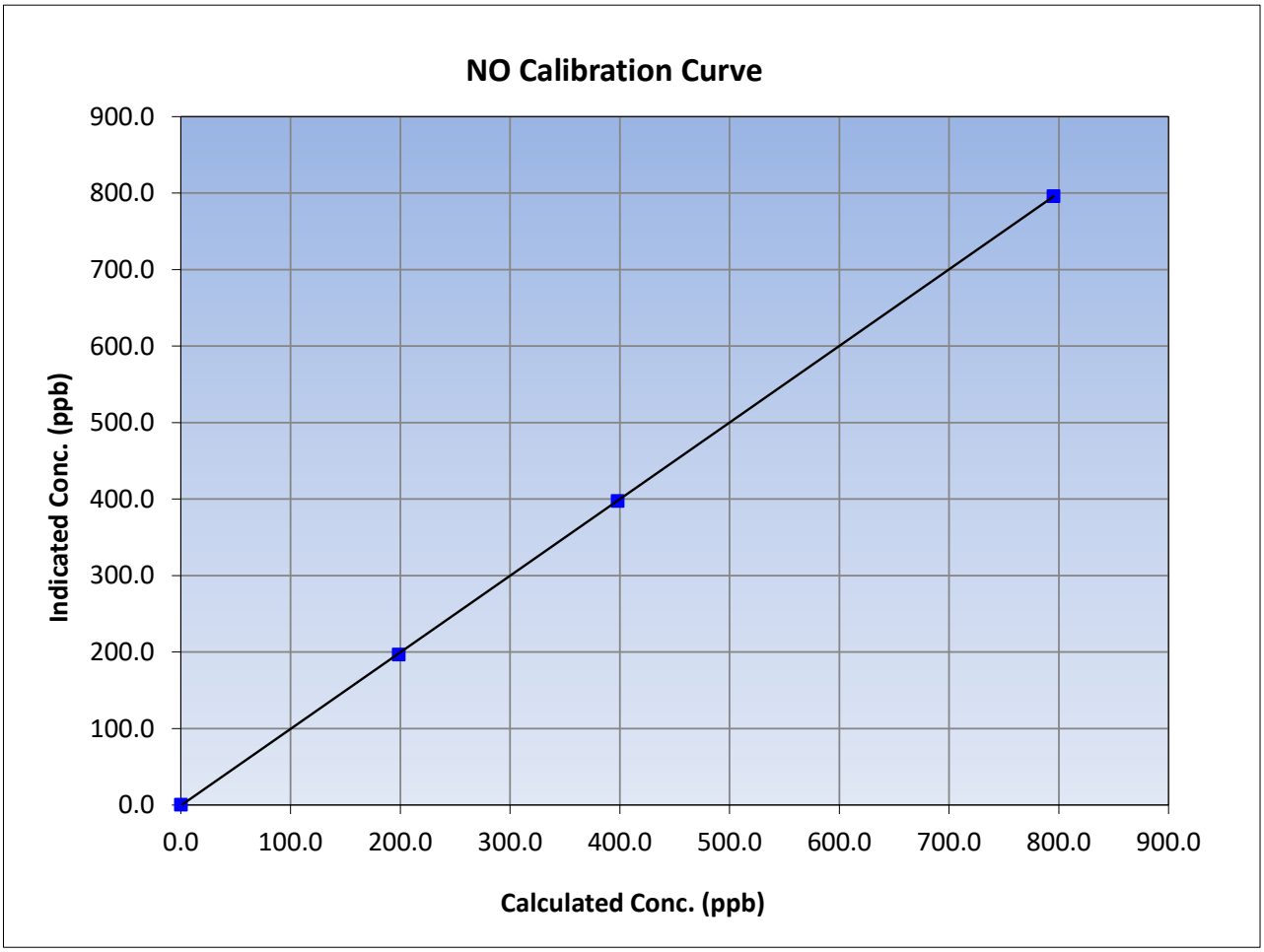
Version-04-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 1, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:12	End Time (MST):	12:19
Analyzer make:	API T200	Analyzer serial #:	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.6	----	Correlation Coefficient	0.999988	≥0.995
795.2	796.2	0.9987			
398.1	397.7	1.0010	Slope	1.001422	0.90 - 1.10
198.5	196.7	1.0093			
			Intercept	-0.653871	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

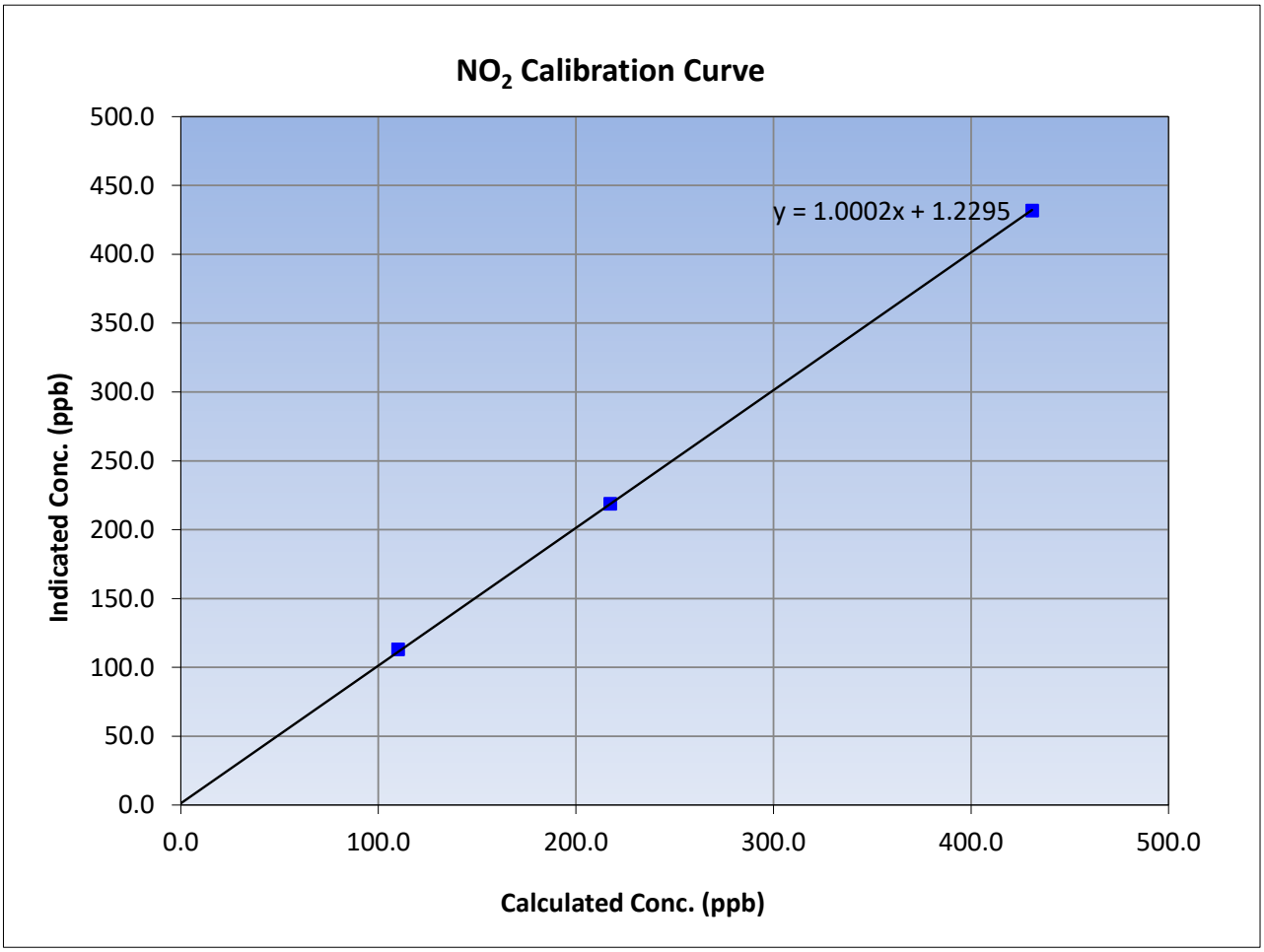
Version-04-2020

Station Information

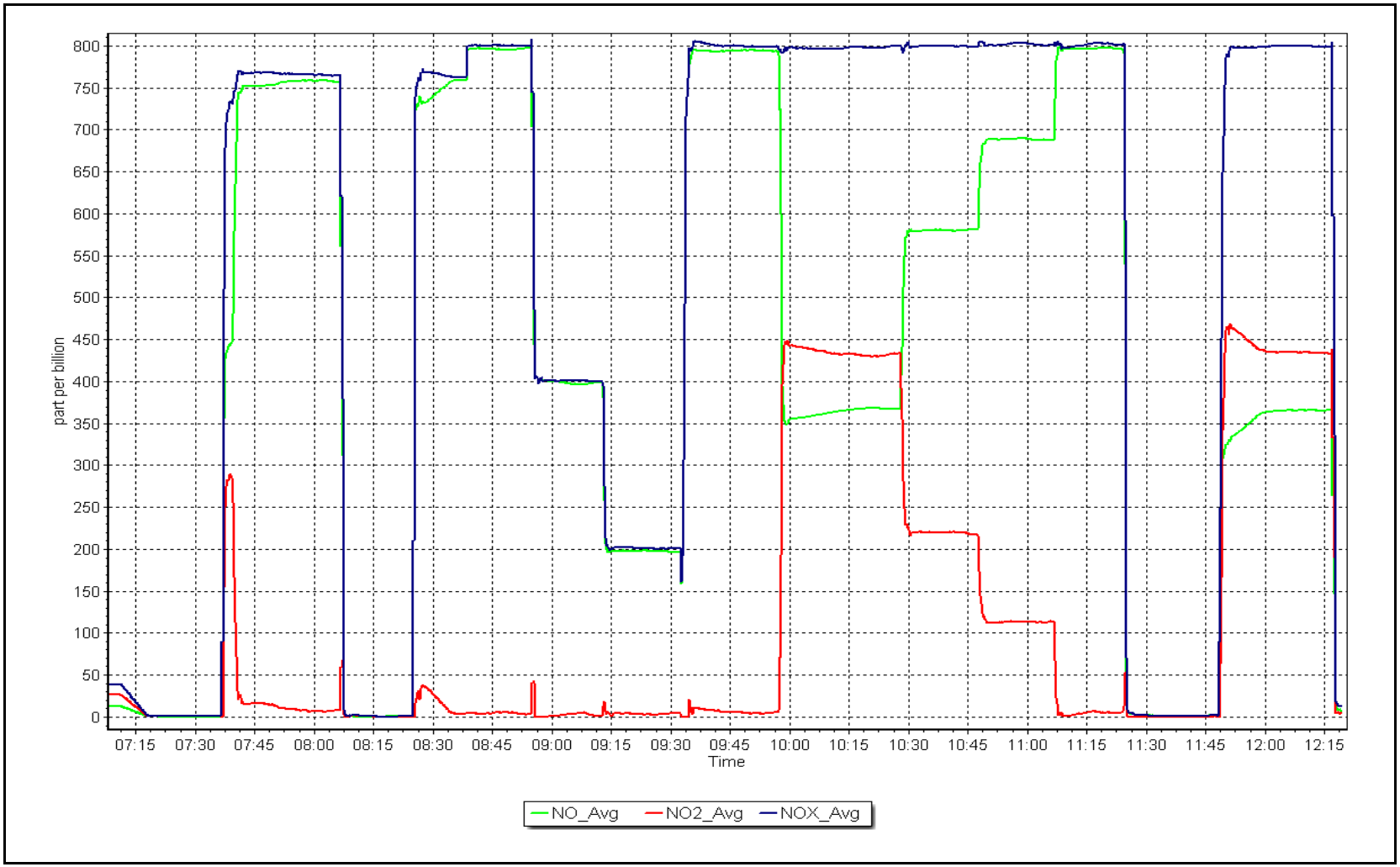
Calibration Date:	January 13, 2023	Previous Calibration:	December 1, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:12	End Time (MST):	12:19
Analyzer make:	API T200	Analyzer serial #:	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.2	----	Correlation Coefficient	0.999943	≥0.995
430.9	431.7	0.9982			
217.4	218.8	0.9936	Slope	1.000220	0.90 - 1.10
110.0	113.1	0.9726			
			Intercept	1.229528	+/-20



NO_X Calibration Plot Date: January 13, 2023 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS04
Calibration Date:	January 12, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	8:07	End time (MST):	10:46
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	2445
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:	0.993086	0.992571	Backgd or Offset:	-3.2	-3.3
Calibration intercept:	2.760000	2.700000	Coeff or Slope:	1.048	1.065

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	1158.7	400.0	394.3	1.014
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.9	----
high point	5000	1160.3	400.0	399.0	1.003
second point	5000	919.0	200.0	201.6	0.992
third point	5000	787.5	100.0	104.1	0.961
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	1159.5	400.0	399.6	1.001
				Average Correction Factor	0.985

Baseline Corr As found:	394.1	Previous response	400.0	*% 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

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

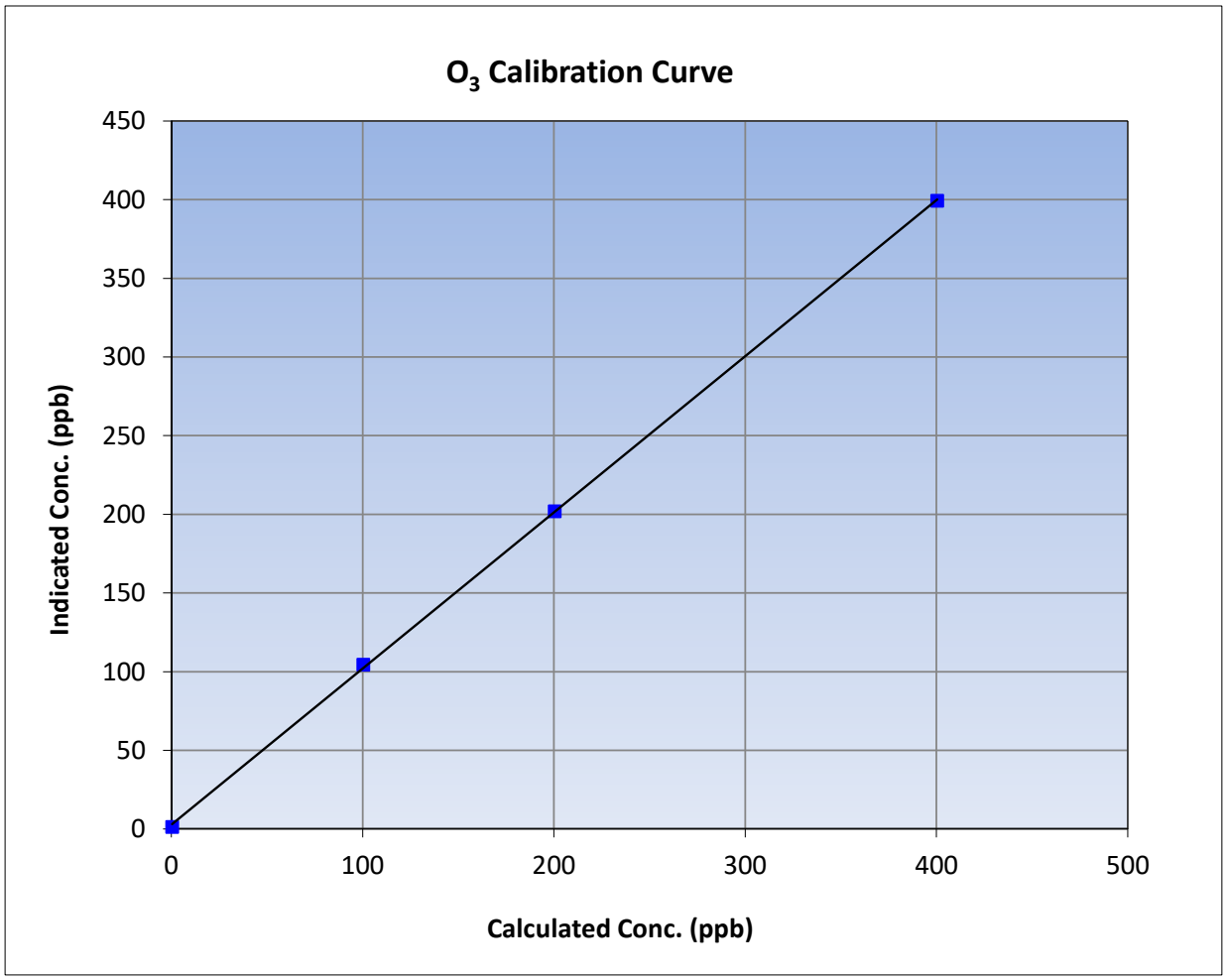
Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 13, 2022
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	8:07	End Time (MST):	10:46
Analyzer make:	API T400	Analyzer serial #:	2961

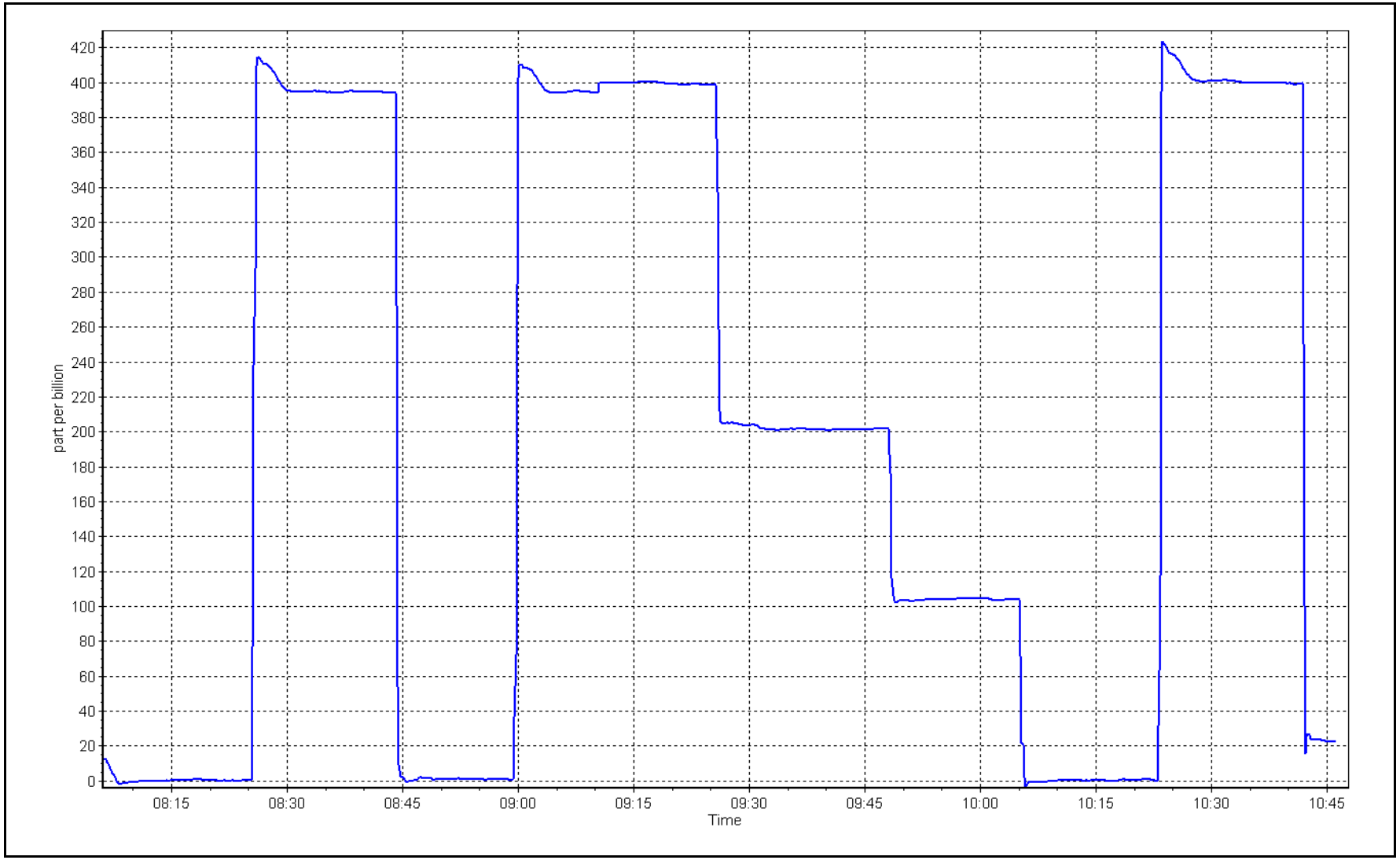
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.9	----
400.0	399.0	1.0025
200.0	201.6	0.9921
100.0	104.1	0.9606

Statistical Evaluation		Limits
Correlation Coefficient	0.999901	≥0.995
Slope	0.992571	0.90 - 1.10
Intercept	2.700000	+/- 5



O_3 Calibration Plot Date: January 12, 2023 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	January 16, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	9:35	End time (MST):	9:58
Analyzer Make:	API T640	S/N:	844
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	AliCat	S/N:	228085
Temp/RH standard:	AliCat	S/N:	228085

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-6.8	-6.6	-6.8	☐	+/- 2 ^{o}C
P (mmHg)	724.3	725.6	724.3	☐	+/- 10 mmHg
flow (LPM)	5	4.60	5	☑	+/- 0.25 LPM

Leak Test: Date of check: January 16, 2023 Last Cal Date: December 13, 2022

PM w/o HEPA: 60 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 13, 2022

Disposable Filter Changed: December 13, 2022

Annual Maintenance

Date Sample Tube Cleaned: September 15, 2022

Date RH/T Sensor Cleaned: September 15, 2022

Notes: Flow Adjusted. Inlet head cleaned.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS05
MANNIX
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Mannix	Station number:	AMS05
Calibration Date:	January 20, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:09	End time (MST):	14:55
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:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	621
ZAG Make/Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1008841399

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999415	0.996673	Backgd or Offset:	8.9	8.9
Calibration intercept:	-0.560000	0.800000	Coeff or Slope:	0.914	0.914

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*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4920	80.0	800.3	797.7	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	----
high point	4920	80.0	800.3	797.5	1.004
second point	4960	40.0	400.2	401.9	0.996
third point	4980	20.0	200.1	199.5	1.003
as left zero	5000	0.0	0.0	0.2	----
as left span	4920	80.0	800.3	802.5	0.997
				Average Correction Factor	1.001

Baseline Corr As found:	797.80	Previous response	799.29	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

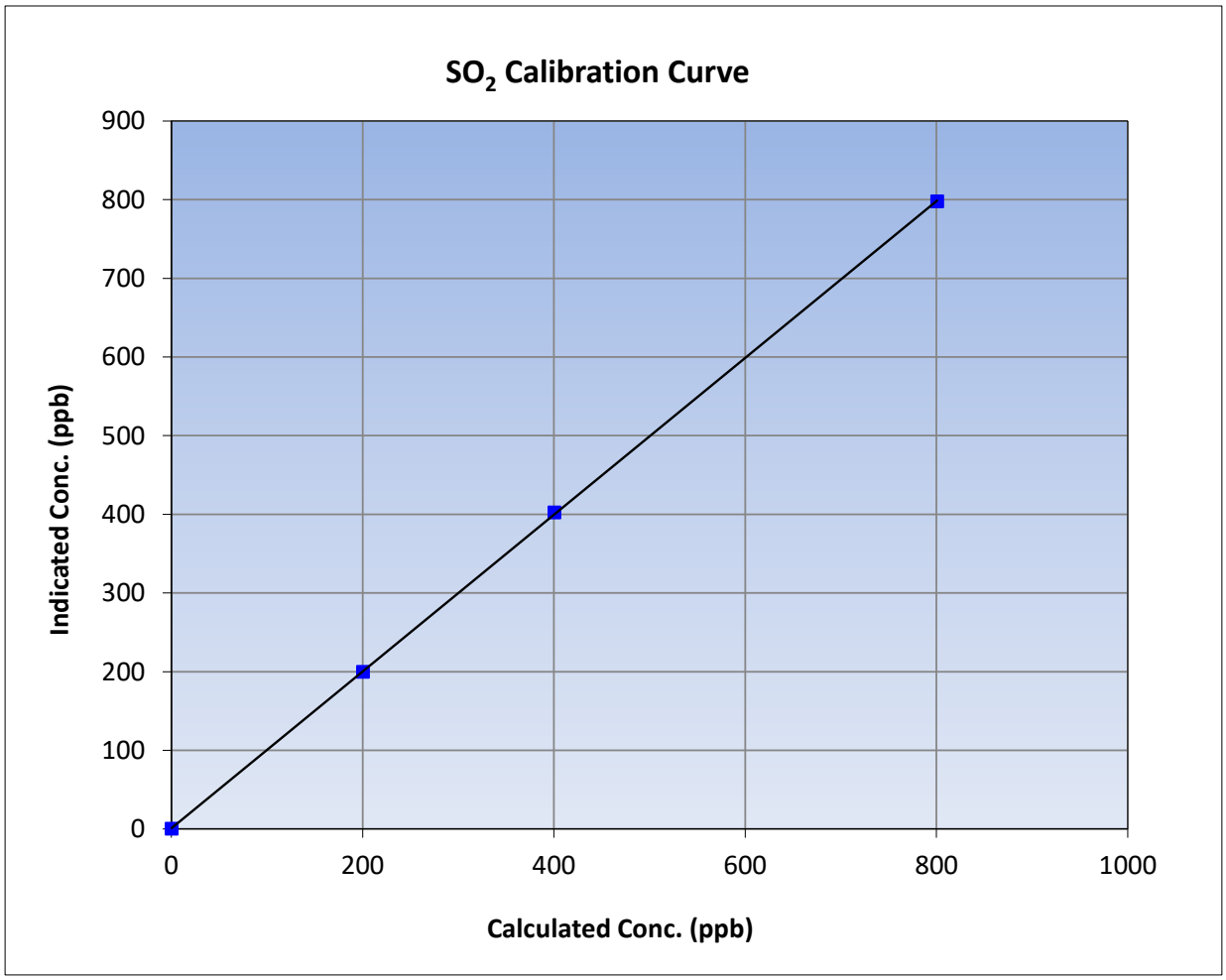
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 2, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:09	End Time (MST):	14:55
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

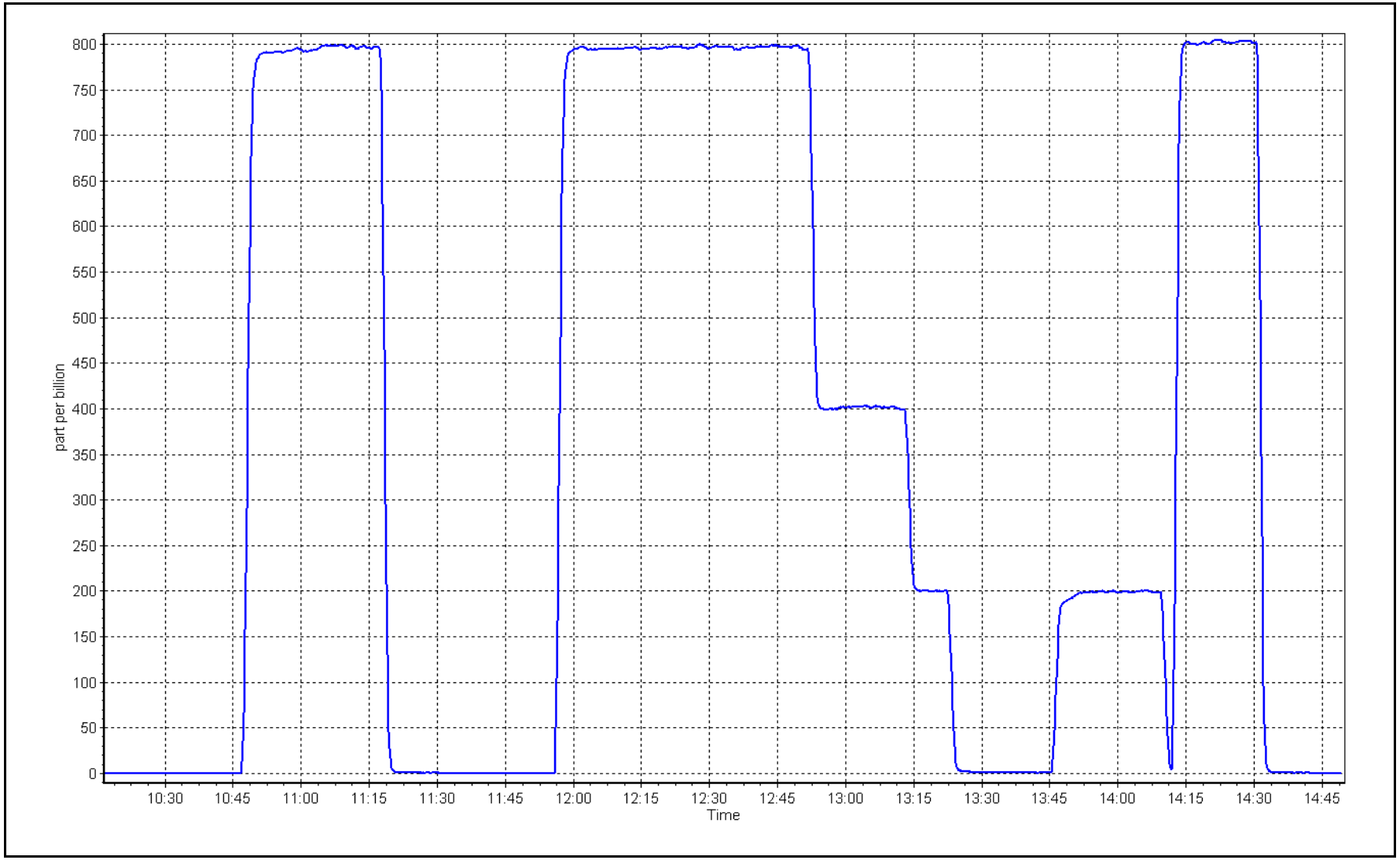
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.3	797.5	1.0035
400.2	401.9	0.9957
200.1	199.5	1.0029

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999980	*≥0.995*
Slope	0.996673	*0.90 - 1.10*
Intercept	0.800000	*+/-30*



SO2 Calibration Plot Date: January 20, 2023 Location: Mannix



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Mannix	Station number:	AMS05
Calibration Date:	January 3, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	10:25	End time (MST):	15:15
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.92	ppm	Cal Gas Exp Date:	February 9, 2024
Cal Gas Cylinder #:	EY0002433			
Removed Cal Gas Conc:	4.92	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	1845
ZAG Make/Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	1203169745	
Converter make:	Global		Converter serial #:	2022-196	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996760	0.998045	Backgd or Offset:	2.15	2.09
Calibration intercept:	0.460517	0.340531	Coeff or Slope:	0.846	0.822

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4919	81.3	80.0	83.2	0.964
as found 2nd point	4960	40.7	40.0	42.1	0.956
as found 3rd point	4980	20.3	20.0	21.1	0.956
new cylinder response					

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	4919	81.3	80.0	80.1	0.999
second point	4960	40.7	40.0	40.5	0.989
third point	4980	20.3	20.0	20.2	0.989
as left zero	5000	0.0	0.0	0.5	----
as left span	4919	81.3	80.0	78.8	1.015
SO2 Scrubber Check	4920	80.0	800.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.992
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	83.0	Prev response:	80.20	*% change:	3.4%
Baseline Corr 2nd AF pt:	41.9	AF Slope:	1.037326	AF Intercept:	0.340572
Baseline Corr 3rd AF pt:	20.9	AF Correlation:	0.999977		

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. Adjusted the span only.

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

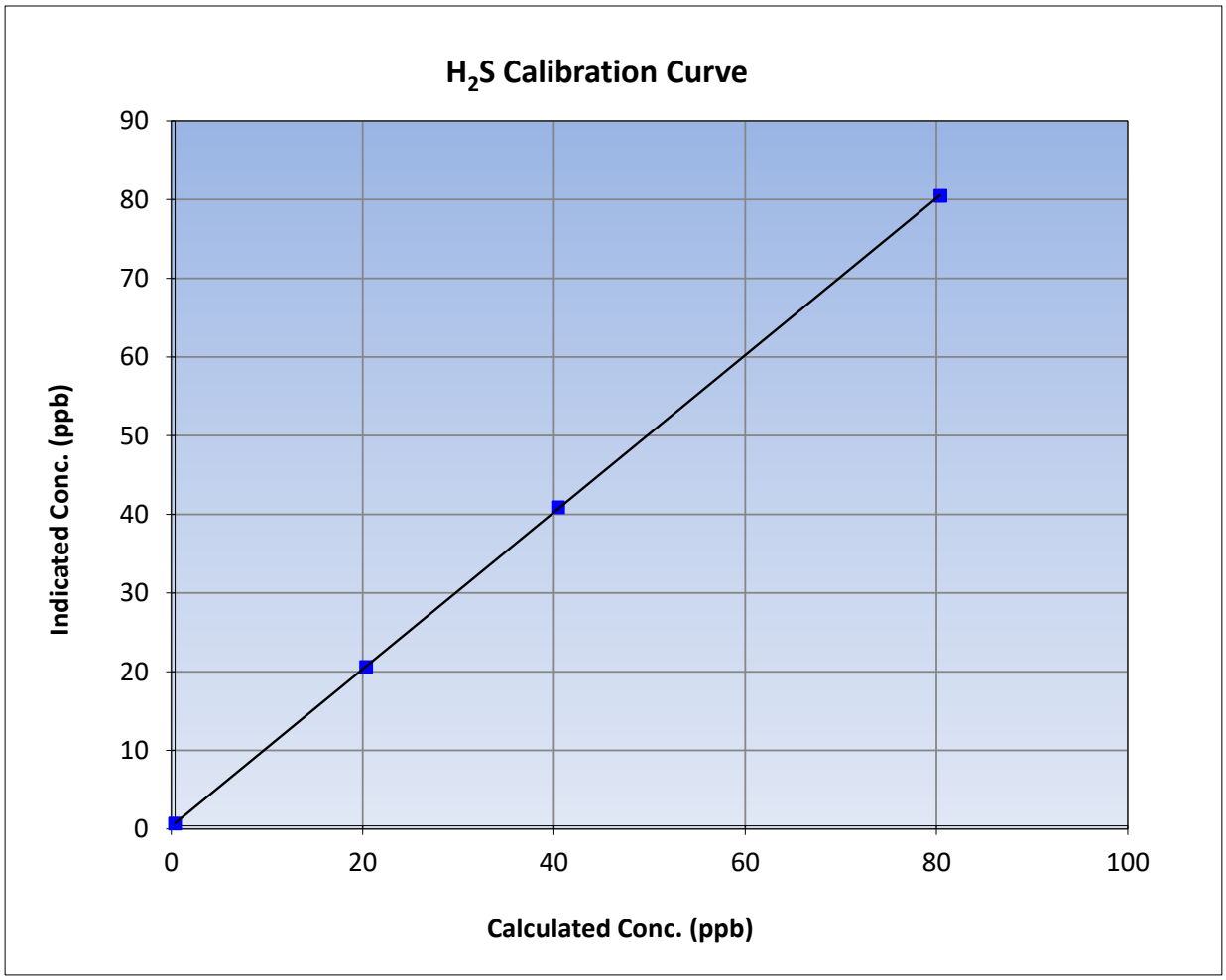
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 8, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:25	End Time (MST):	15:15
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1203169745

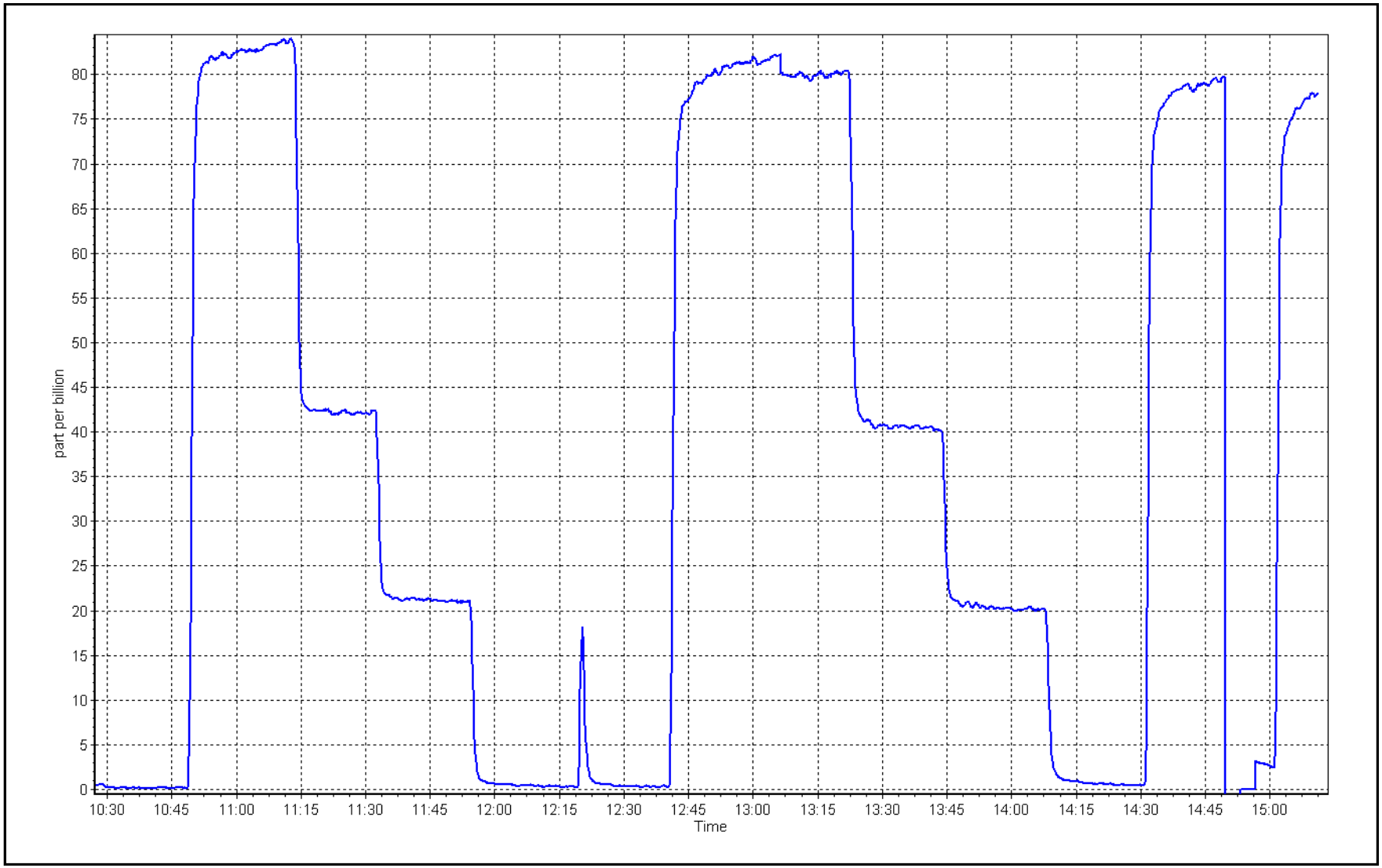
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.1	0.9987
40.0	40.5	0.9887
20.0	20.2	0.9888

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999985	*≥0.995*
Slope	0.998045	*0.90 - 1.10*
Intercept	0.340531	*+/-3*



H_2S Calibration Plot Date: January 3, 2023 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Mannix	Station number:	AMS05
Calibration Date:	January 20, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:09	End time (MST):	14:55
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		XCO268098	Cal Gas Expiry Date:	January 12, 2029	
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:		NA	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	
ZAG make/model:	API T701H		Serial Number:	832	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1152430011	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.64E-04	2.57E-04	NMHC SP Ratio:	4.73E-05	4.41E-05
CH4 Retention time:	14.80	15.00	NMHC Peak Area:	193560	207495

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.0	17.23	18.04	0.955
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.0	17.23	17.32	0.995
second point	4960	40.0	8.61	8.50	1.013
third point	4980	20.0	4.31	4.31	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.0	17.23	17.27	0.997
				Average Correction Factor	1.002

Baseline Corr AF:	18.04	Prev response	17.22	*% change	4.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4920	80	9.15	9.77	0.936
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4920	80	9.15	9.19	0.996
second point	4960	40	4.57	4.53	1.010
third point	4980	20	2.29	2.29	0.998
as left zero	5000	0	0.00	0.00	----
as left span	4920	80	9.15	9.17	0.997
				Average Correction Factor	1.001
Baseline Corr AF:	9.77	Prev response	9.14	*% change	6.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.0	8.08	8.27	0.977
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.0	8.08	8.13	0.993
second point	4960	40.0	4.04	3.97	1.016
third point	4980	20.0	2.02	2.01	1.003
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	1.004
Baseline Corr AF:	8.27	Prev response	8.08	*% change	2.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000481	1.004873
THC Cal Offset:	-0.017000	-0.040600
CH4 Cal Slope:	1.000509	1.006140
CH4 Cal Offset:	-0.005600	-0.026000
NMHC Cal Slope:	1.000444	1.003542
NMHC Cal Offset:	-0.011600	-0.015000

Notes: Investigated high span; zero air generator failed during calibraiton, and most likely caused the unstable response. Repressurized the generator and adjusted station temperature to obtain a better reponse. Inlet filter changed. Captured a new zero chromatogram, and adjusted the span.

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

THC Calibration Summary

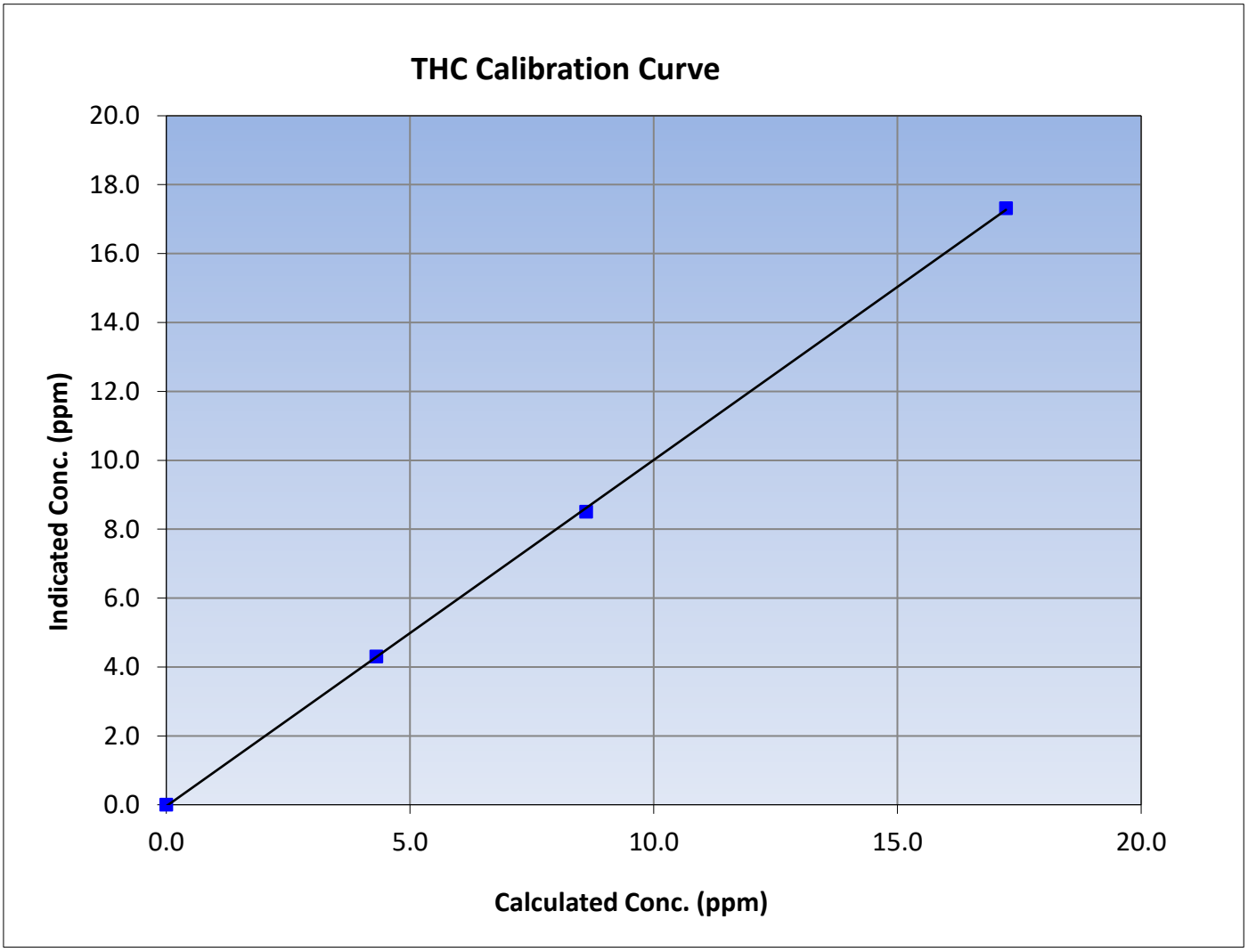
Version-01-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 2, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:09	End Time (MST):	14:55
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	0.999896	*≥0.995*
17.23	17.32	0.9946			
8.61	8.50	1.0129	Slope	1.004873	*0.90 - 1.10*
4.31	4.31	0.9999			
			Intercept	-0.040600	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

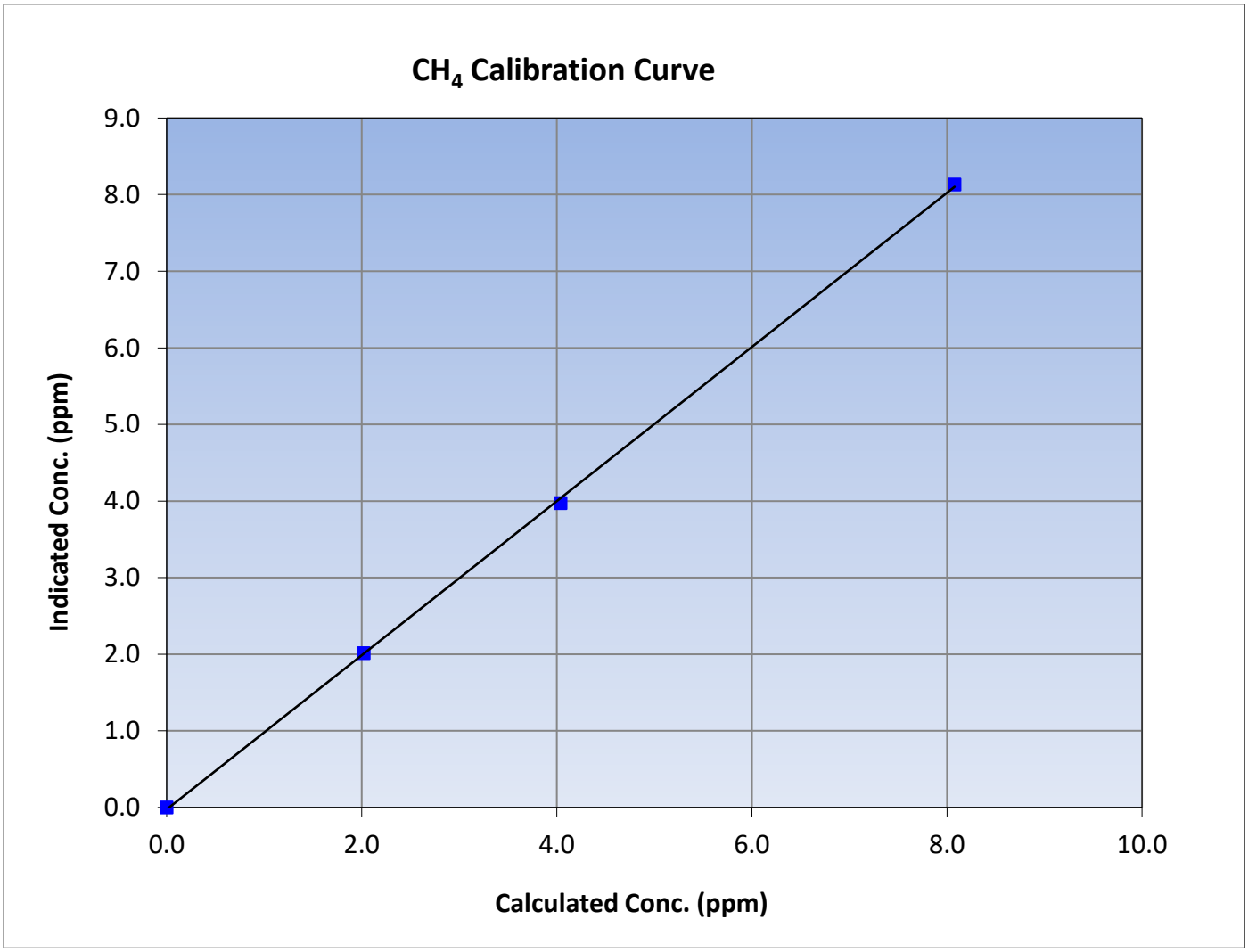
Version-01-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 2, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:09	End Time (MST):	14:55
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	0.999841	≥0.995
8.08	8.13	0.9934			
4.04	3.97	1.0164	Slope	1.006140	0.90 - 1.10
2.02	2.01	1.0028			
			Intercept	-0.026000	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

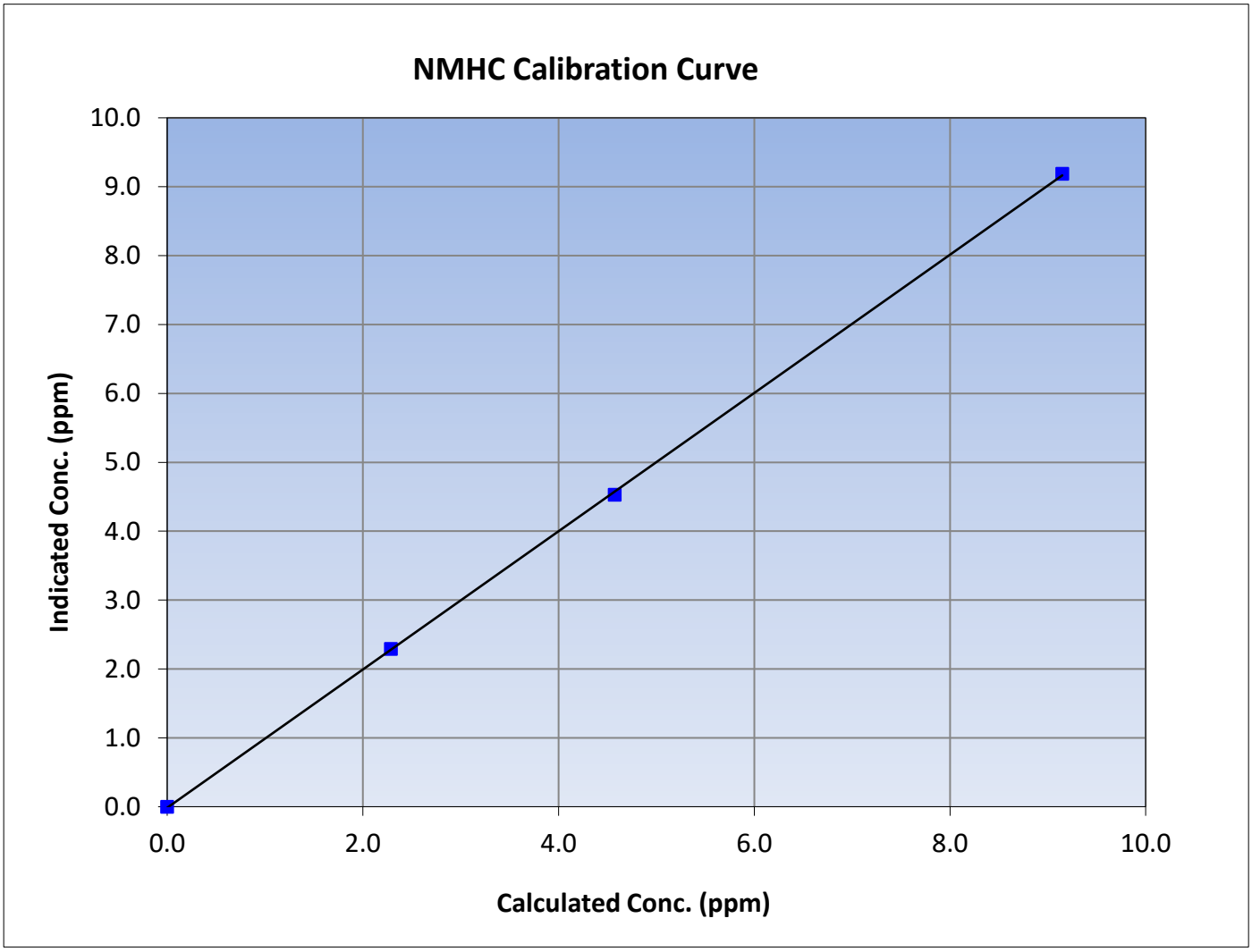
Version-01-2020

Station Information

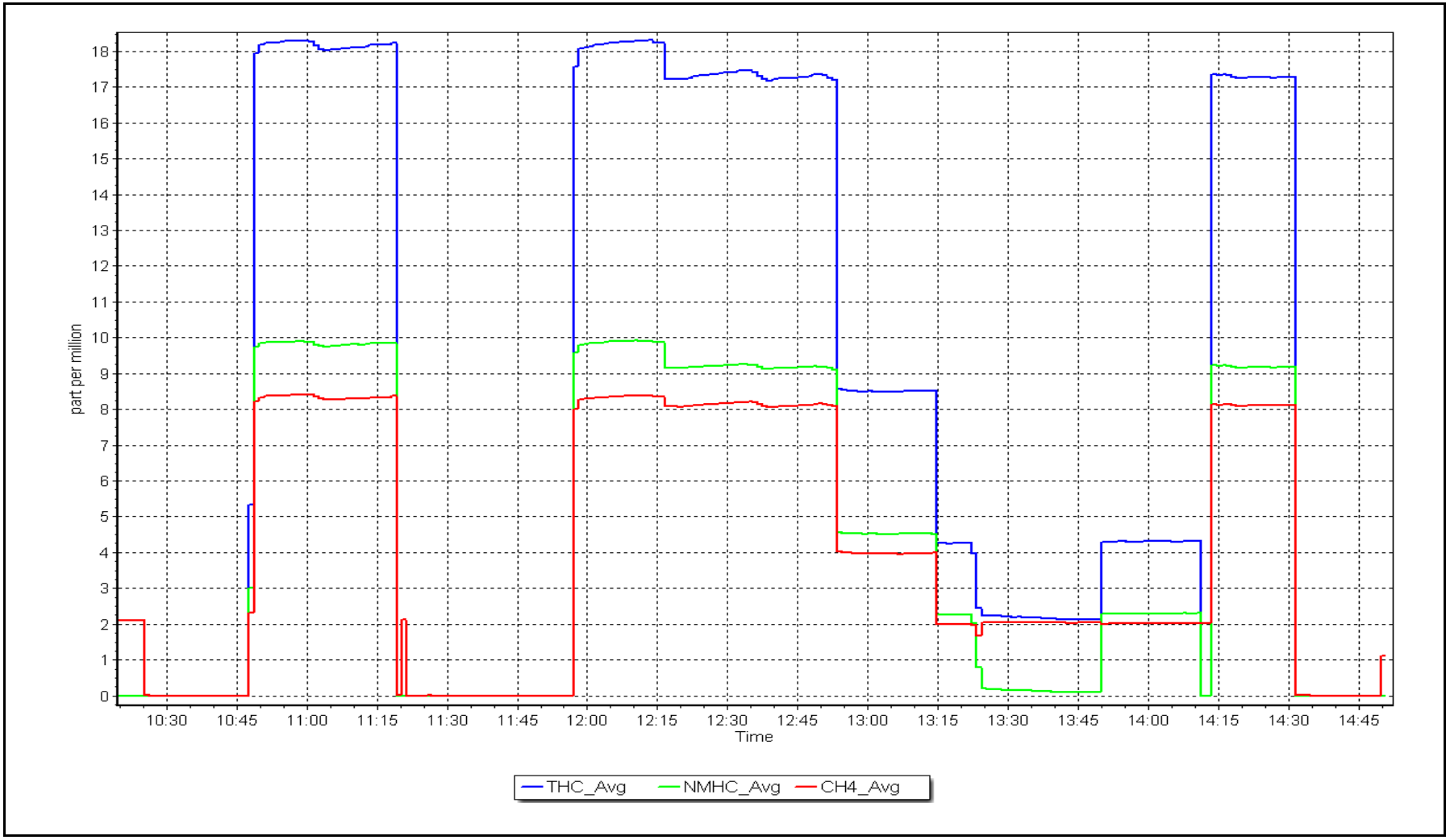
Calibration Date:	January 20, 2023	Previous Calibration:	December 2, 2022
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	10:09	End Time (MST):	14:55
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999932	≥0.995
9.15	9.19	0.9958			
4.57	4.53	1.0103	Slope	1.003542	0.90 - 1.10
2.29	2.29	0.9978			
			Intercept	-0.015000	+/-0.5



NMHC Calibration Plot Date: January 20, 2023 Location: Mannix



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06
PATRICIA MCINNES
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Patricia McInnes	Station number:	AMS06
Calibration Date:	January 9, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:14	End time (MST):	13:09
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:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	689
ZAG Make/Model:	API T701		Serial Number:	3566

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1160290013

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.992599	0.992084	Backgd or Offset:	17.2	17.2
Calibration intercept:	1.461745	1.741680	Coeff or Slope:	0.907	0.907

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*
as found zero	5000	0.0	0.0	-0.3	----
as found span	4920	80.3	799.5	792.2	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	----
high point	4920	80.3	799.5	794.1	1.007
second point	4960	40.2	400.2	399.4	1.002
third point	4980	20.1	200.1	202.2	0.990
as left zero	5000	0.0	0.0	-0.1	----
as left span	4920	80.3	799.5	796.5	1.004
				Average Correction Factor	1.000

Baseline Corr As found:	792.50	Previous response	795.01	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

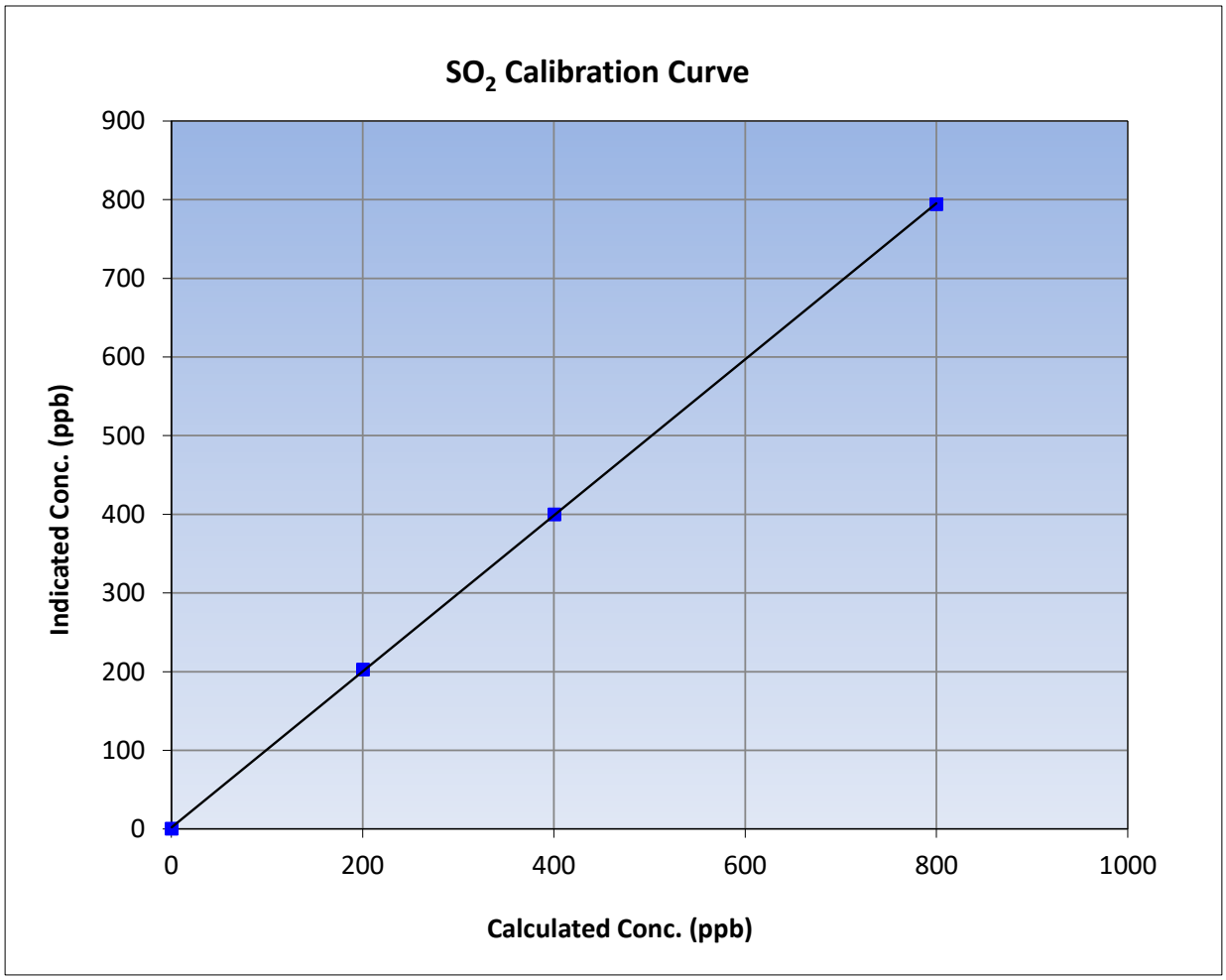
Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:14	End Time (MST):	13:09
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

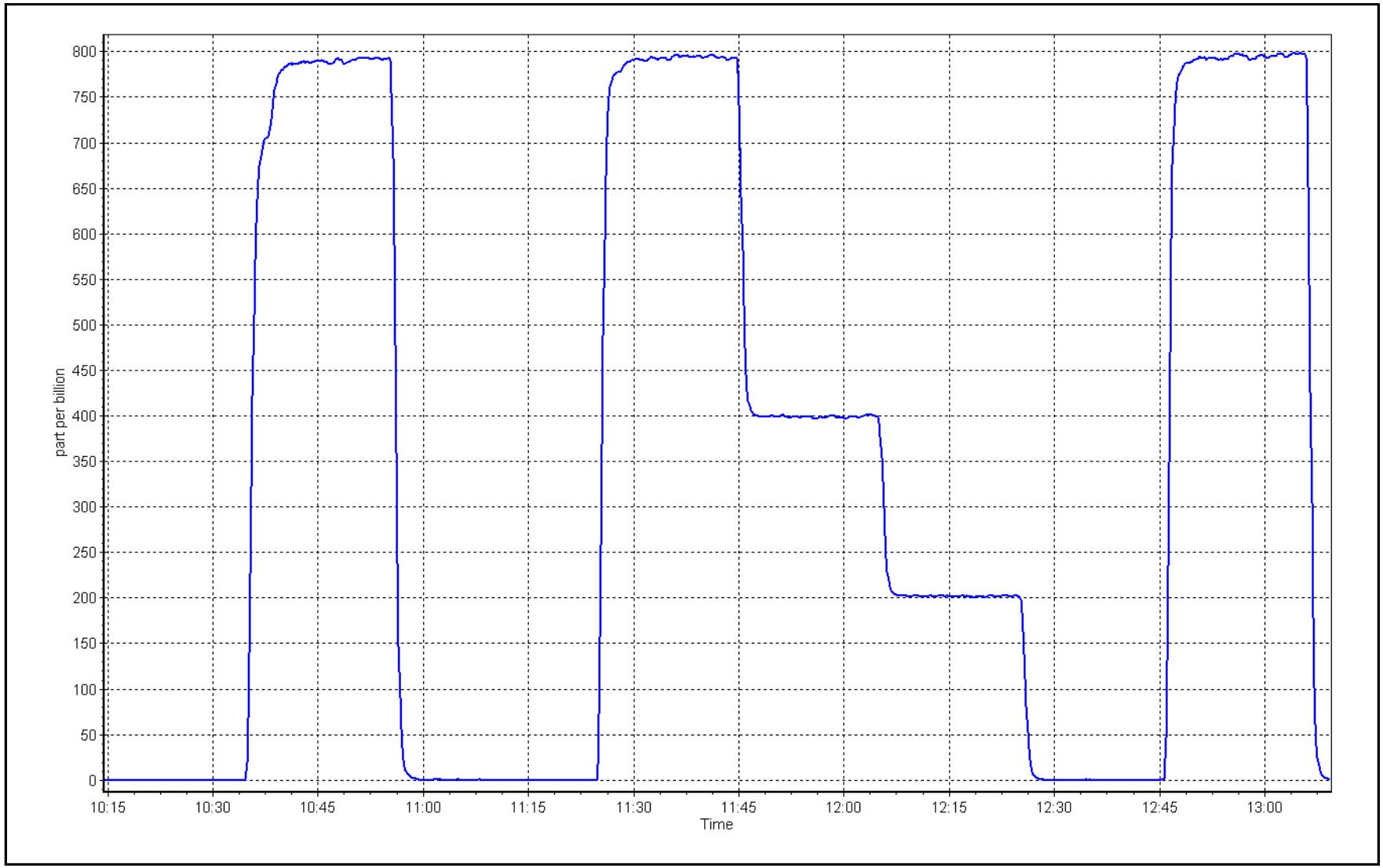
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.5	794.1	1.0068
400.2	399.4	1.0021
200.1	202.2	0.9897

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999978	*≥0.995*
Slope	0.992084	*0.90 - 1.10*
Intercept	1.741680	*+/-30*



SO2 Calibration Plot Date: January 9, 2023 Location: Patricia McInnes



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	January 3, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	12:00	End time (MST):	14:36
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.38	ppm	Cal Gas Exp Date:	March 2, 2023
Cal Gas Cylinder #:	EY0000809			
Removed Cal Gas Conc:	5.38	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3566
ZAG Make/Model:	API T701 H		Serial Number:	689

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1218153358	
Converter make:	Global G150		Converter serial #:	2022-195	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.992920	0.997488	Backgd or Offset:	1.97	2.38
Calibration intercept:	0.677080	0.117191	Coeff or Slope:	1.155	1.049

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.0	----
high point	4926	74.3	79.9	79.8	1.002
second point	4963	37.2	40.0	40.1	0.998
third point	4981	18.6	20.0	20.2	0.991
as left zero	5000	0.0	0.0	-0.1	----
as left span	4926	74.3	79.9	79.2	1.009
SO2 Scrubber Check	4920	80.3	803.0	0.1	----
Date of last scrubber change:		December 20, 2021		Ave Corr Factor	0.997
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:	NA	AF Intercept:	NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:	NA		

* = > +/-5% change initiates investigation

Notes: No as founds due to the converter not working. Replaced the converter. Adjusted both zero and span. Ran a SO2 scrubber check after the calibrator zero.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

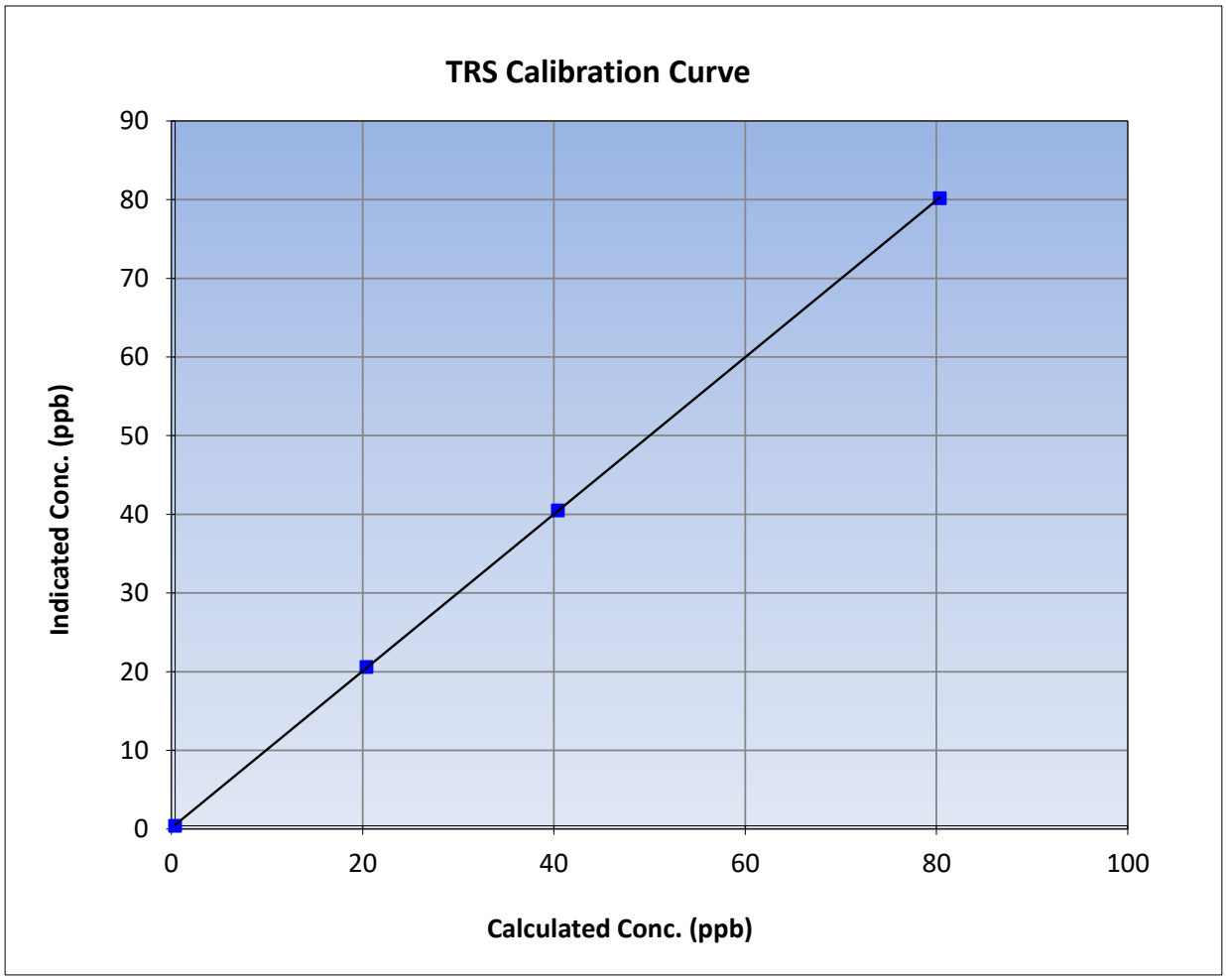
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 12, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	12:00	End Time (MST):	14:36
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

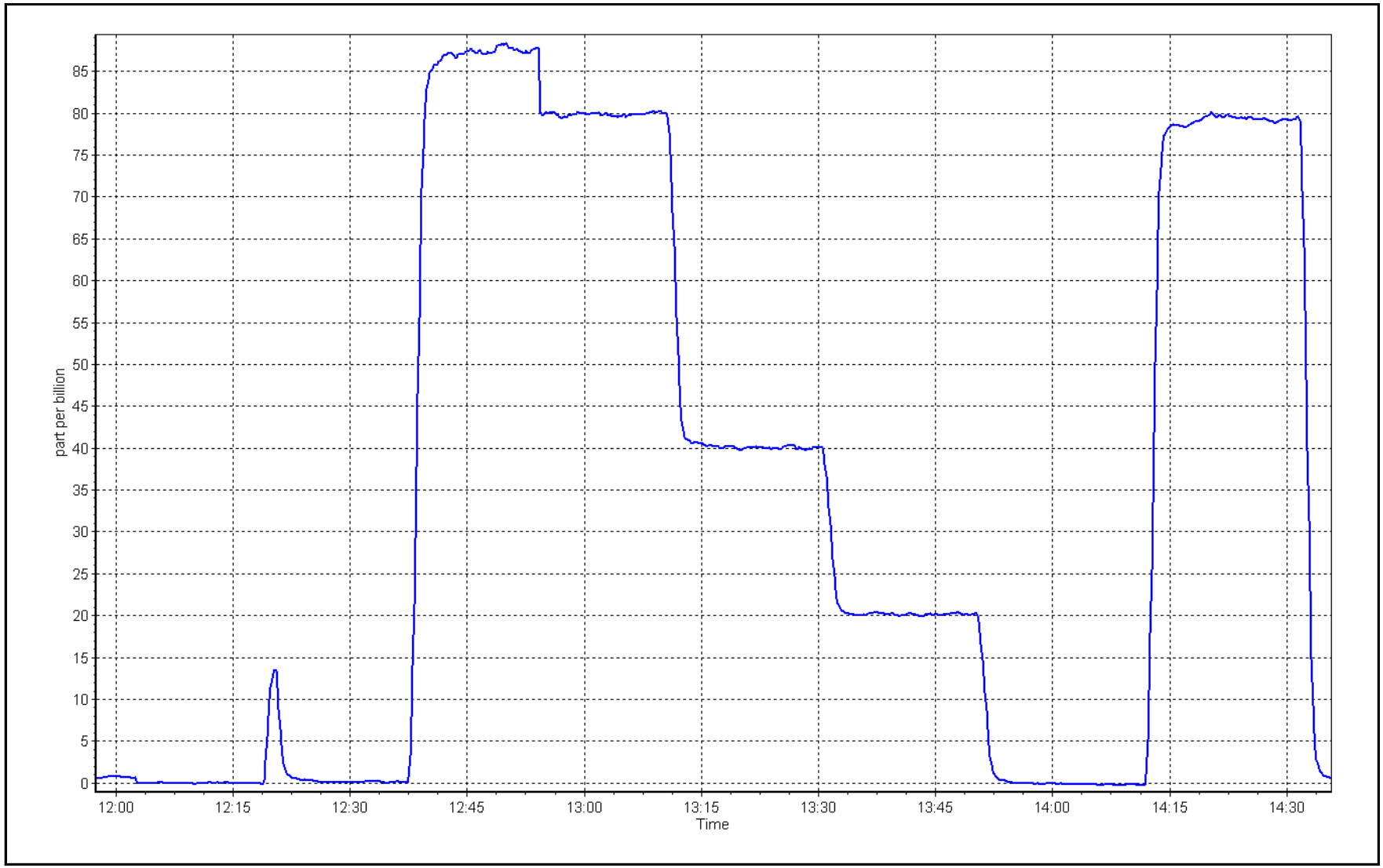
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
79.9	79.8	1.0018
40.0	40.1	0.9981
20.0	20.2	0.9909

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	0.997488	*0.90 - 1.10*
Intercept	0.117191	*+/-3*



TRS Calibration Plot Date: January 3, 2023 Location: Patricia McInnes



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Patricia McInnes	Station number:	AMS06
Calibration Date:	January 9, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:14	End time (MST):	13:09
Reason:	Cylinder Change	N2 cylinder change	

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 Ref.		N/A	Removed Gas Expiry:	N/A	
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:	689	
ZAG make/model:	API T701		Serial Number:	3566	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320037	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.19E-04	3.19E-04	NMHC SP Ratio:	5.63E-05	5.63E-05
CH4 Retention time:	13.8	13.8	NMHC Peak Area:	161210	161210

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	17.12	17.04	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	17.12	17.14	0.999
second point	4960	40.2	8.57	8.53	1.004
third point	4980	20.1	4.29	4.29	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	17.12	17.01	1.007
				Average Correction Factor	1.001

Baseline Corr AF:	17.04	Prev response	17.14	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4920	80.3	9.07	9.01	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4920	80.3	9.07	9.07	0.999
second point	4960	40.2	4.54	4.52	1.004
third point	4980	20.1	2.27	2.27	0.999
as left zero	5000	0	0.00	0.00	----
as left span	4920	80.3	9.07	8.98	1.010
				Average Correction Factor	1.001
Baseline Corr AF:	9.01	Prev response	9.08	*% 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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	8.06	8.03	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	8.06	8.07	0.998
second point	4960	40.2	4.03	4.01	1.005
third point	4980	20.1	2.02	2.02	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	8.06	8.03	1.003
				Average Correction Factor	1.000
Baseline Corr AF:	8.03	Prev response	8.06	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000220	1.000499
THC Cal Offset:	0.011138	-0.007453
CH4 Cal Slope:	1.000512	1.001107
CH4 Cal Offset:	0.003196	-0.004401
NMHC Cal Slope:	1.000100	1.000174
NMHC Cal Offset:	0.008141	-0.003652

Notes: Changed the inlet filter and the N2 cylidner after as founds. No adjustments made.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

THC Calibration Summary

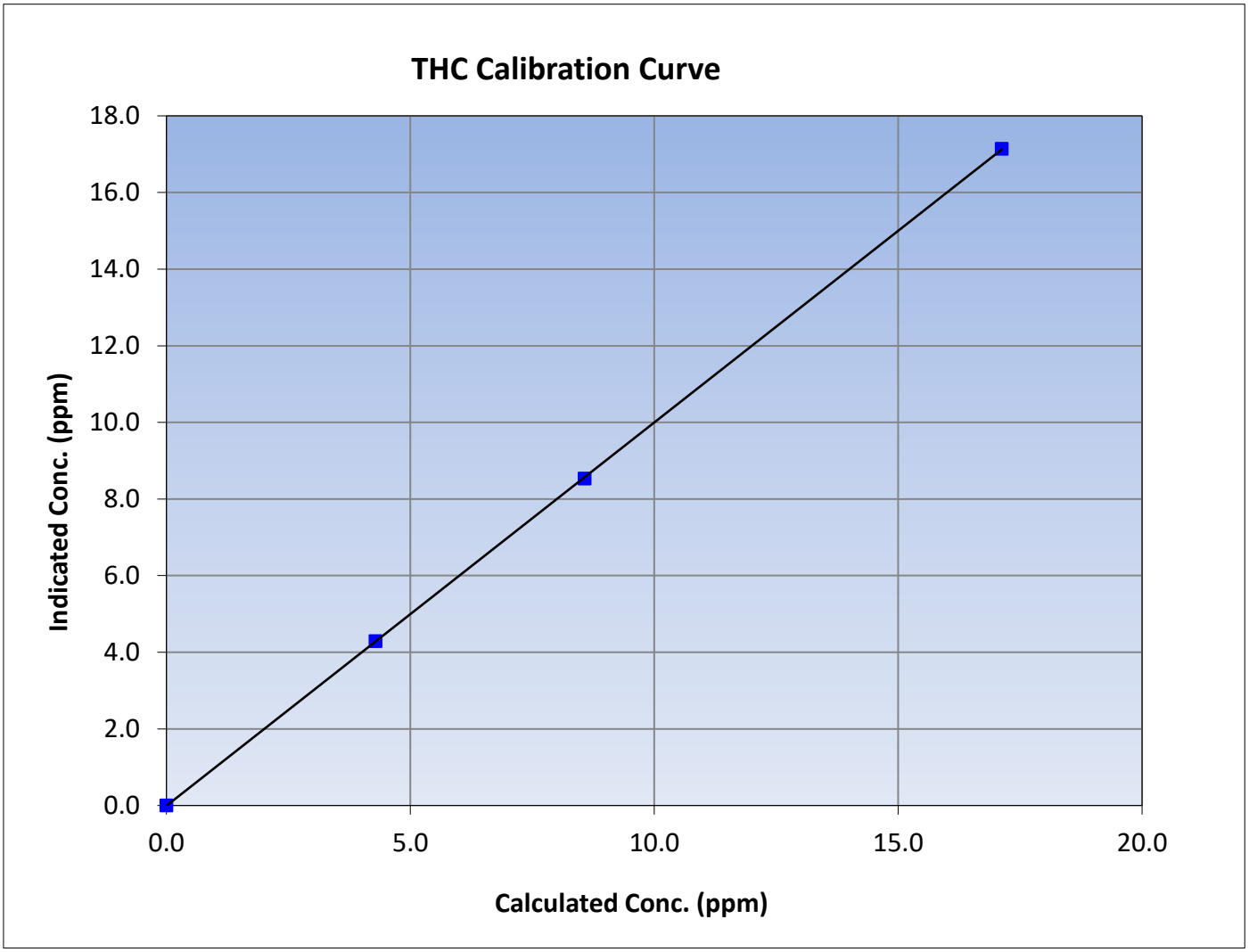
Version-01-2020

Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:14	End Time (MST):	13:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320037

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*
17.12	17.14	0.9991			
8.57	8.53	1.0045	Slope	1.000499	*0.90 - 1.10*
4.29	4.29	0.9981			
			Intercept	-0.007453	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

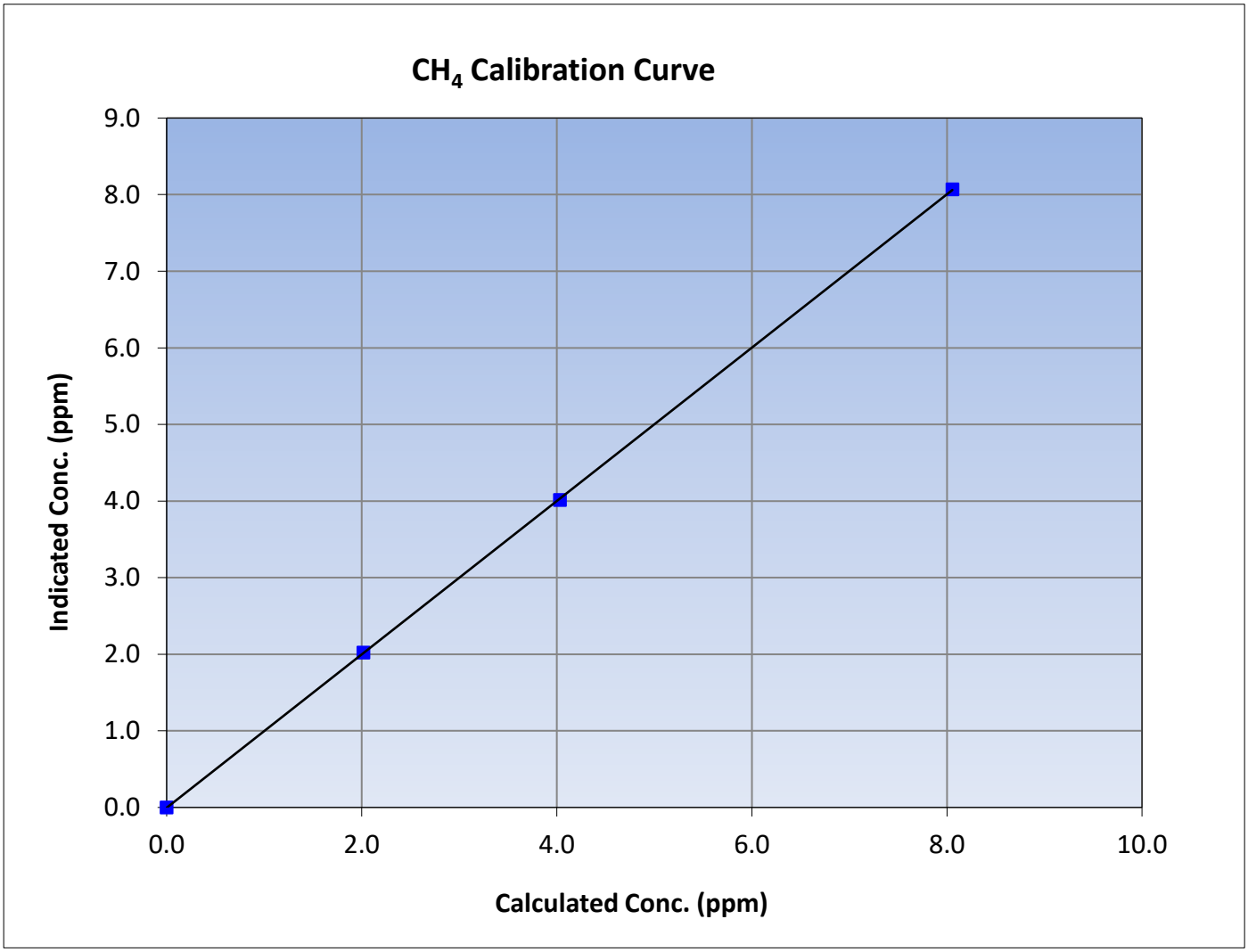
Version-01-2020

Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:14	End Time (MST):	13:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320037

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999986	≥0.995
8.06	8.07	0.9985			
4.03	4.01	1.0047	Slope	1.001107	0.90 - 1.10
2.02	2.02	0.9977			
			Intercept	-0.004401	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

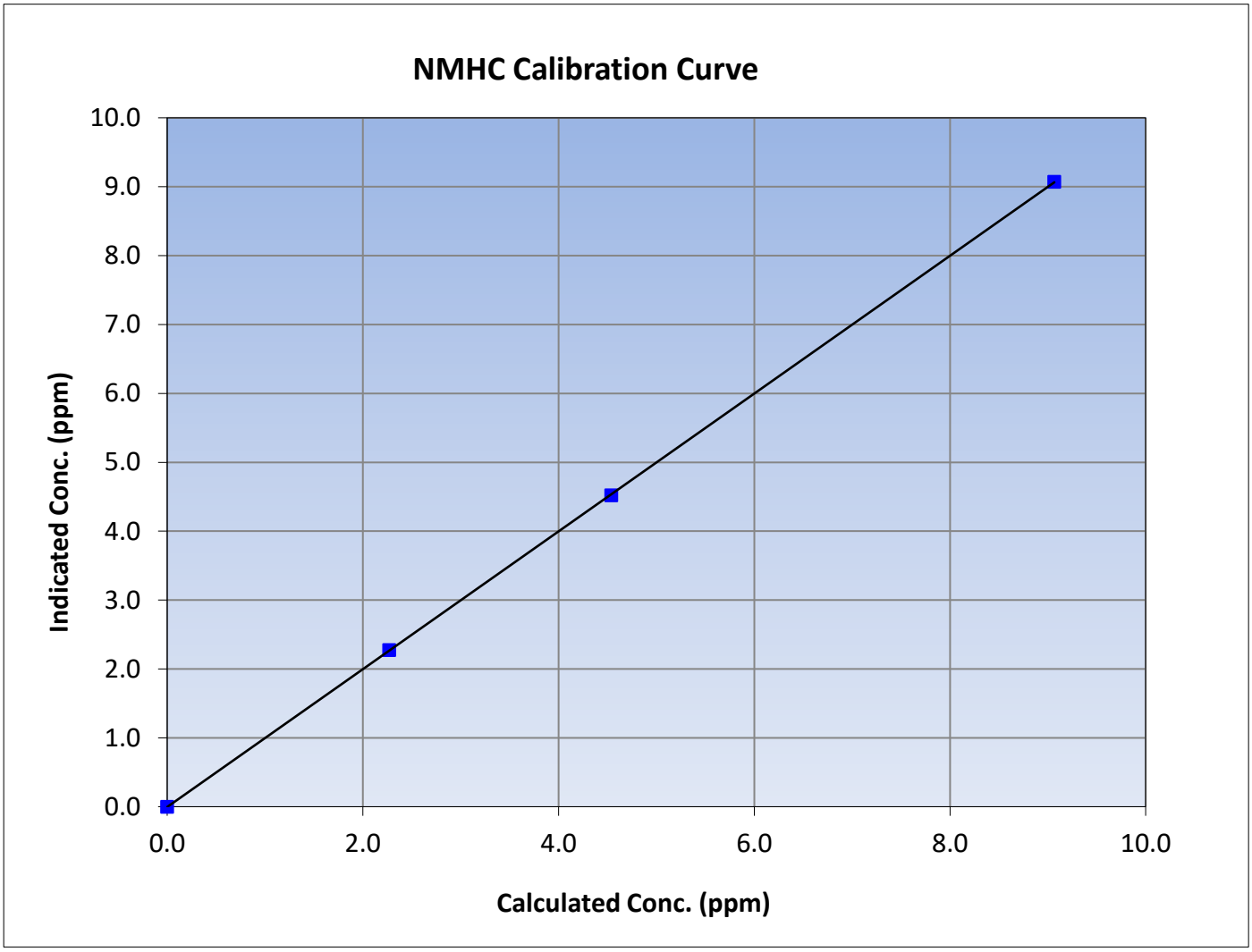
Version-01-2020

Station Information

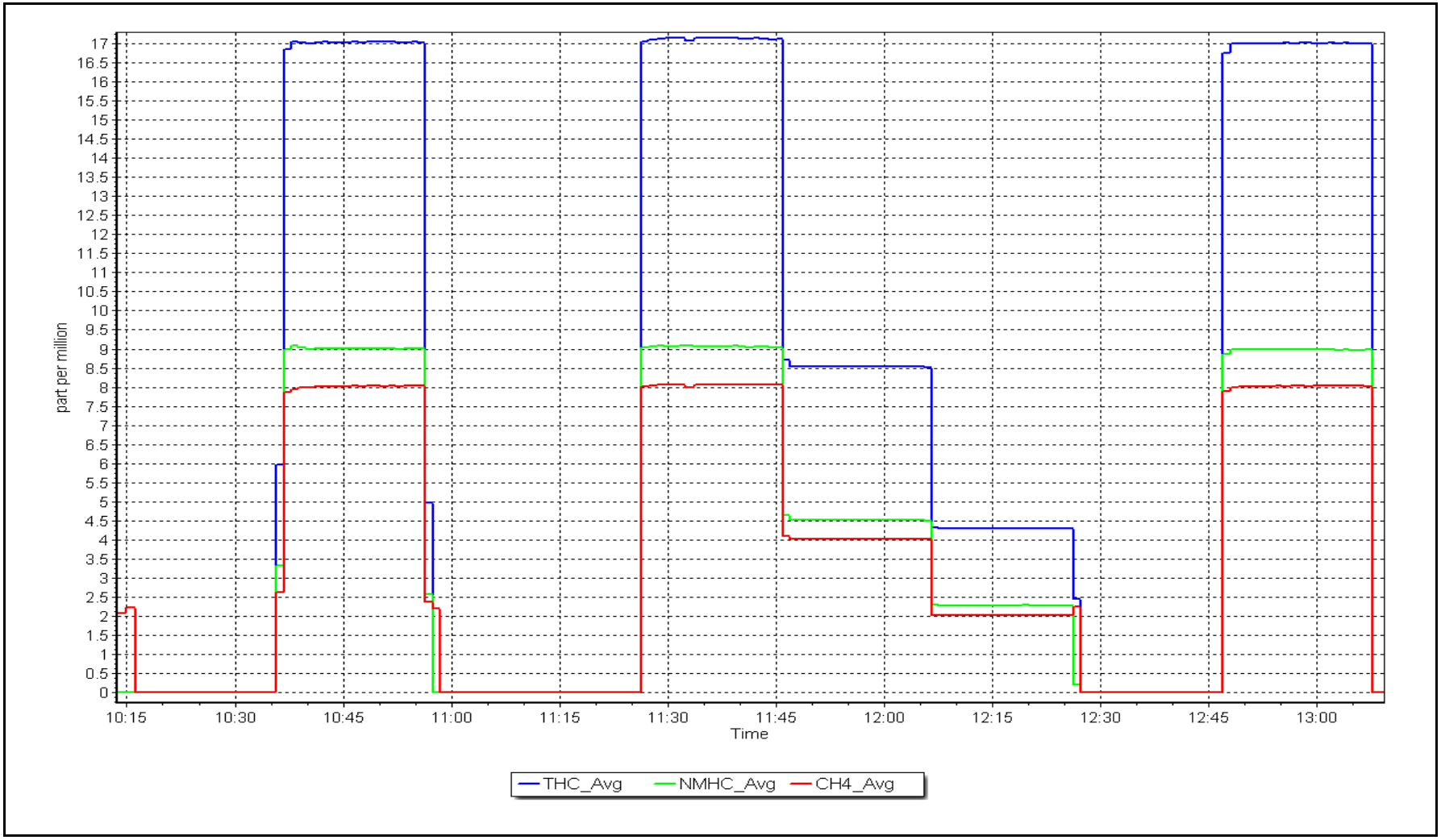
Calibration Date:	January 9, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:14	End Time (MST):	13:09
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320037

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999991	*≥0.995*
9.07	9.07	0.9995			
4.54	4.52	1.0045	Slope	1.000174	*0.90 - 1.10*
2.27	2.27	0.9985			
			Intercept	-0.003652	*+/-0.5*



NMHC Calibration Plot Date: January 9, 2023 Location: Patricia McInnes



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Patricia McInnes	Station number:	AMS06
Calibration Date:	January 5, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	10:11	End time (MST):	14:44
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T26D9MR		Cal Gas Expiry Date:	August 18, 2023	
NOX Cal Gas Conc:	52.51	ppm	NO Cal Gas Conc:	51.98	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date:	N/A	
Removed Gas NOX Conc:	52.51	ppm	Removed Gas NO Conc:	51.98	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3566	
ZAG make/model:	Teledyne API T701		Serial Number:	689	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1172750022	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	0.818	0.818	NO bkgnd or offset:	3.2	3.2
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.8	3.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	156.3	154.2

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.000673	1.000715
NO_X Cal Offset:	2.819985	2.680164
NO Cal Slope:	1.000413	0.999284
NO Cal Offset:	1.780160	1.700041
NO_2 Cal Slope:	1.002852	1.007019
NO_2 Cal Offset:	0.310120	0.124373

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	----	----
as found span	4923	76.9	807.6	799.5	8.2	812.0	799.6	12.4	0.9946	0.9998
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	----	----
high point	4923	76.9	807.6	799.5	8.2	809.7	799.9	9.9	0.9974	0.9994
second point	4962	38.5	404.3	400.2	4.1	408.3	402.3	6.0	0.9903	0.9949
third point	4981	19.2	201.6	199.6	2.0	207.1	202.6	4.5	0.9736	0.9852
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
as left span	4923	76.9	807.6	388.0	419.7	807.4	387.2	420.4	1.0003	1.0019
								Average Correction Factor	0.9871	0.9932

Corrected As found	NO_X = 811.9 ppb	NO = 799.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = 0.1%
Previous Response	NO_X = 811.0 ppb	NO = 801.6 ppb		*Percent Change	NO = -0.3%
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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.7	386.2	419.7	422.6	0.9930	100.7%
2nd GPT point (200 ppb O3)	797.7	590.9	215.0	216.7	0.9919	100.8%
3rd GPT point (100 ppb O3)	797.7	692.7	113.2	114.3	0.9900	101.0%
				Average Correction Factor	0.9916	100.8%

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

NO_X Calibration Summary

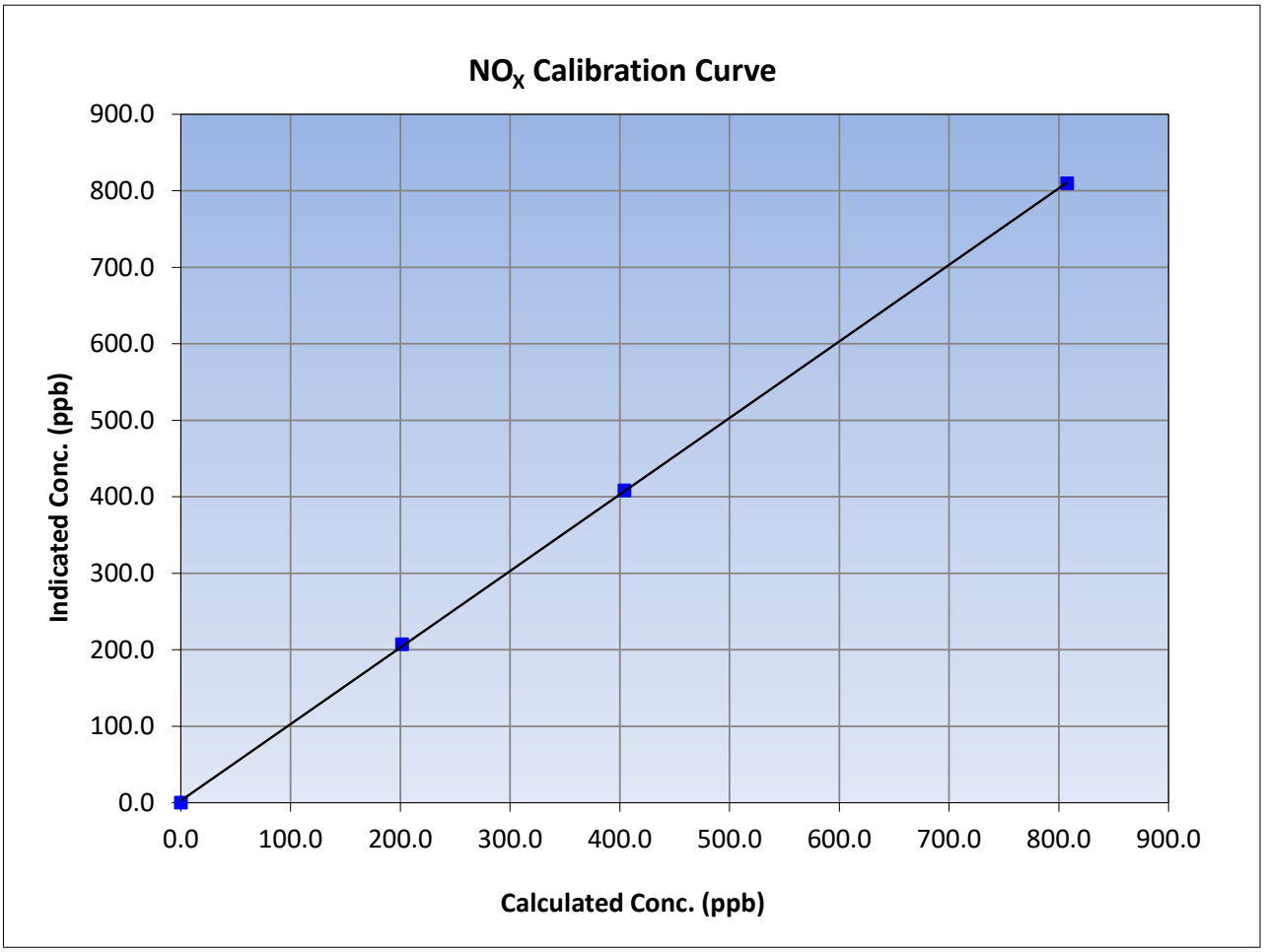
Version-04-2020

Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 1, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:11	End Time (MST):	14:44
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	0.2	----	Correlation Coefficient	0.999957	*≥0.995*
807.6	809.7	0.9974			
404.3	408.3	0.9903	Slope	1.000715	*0.90 - 1.10*
201.6	207.1	0.9736			
			Intercept	2.680164	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

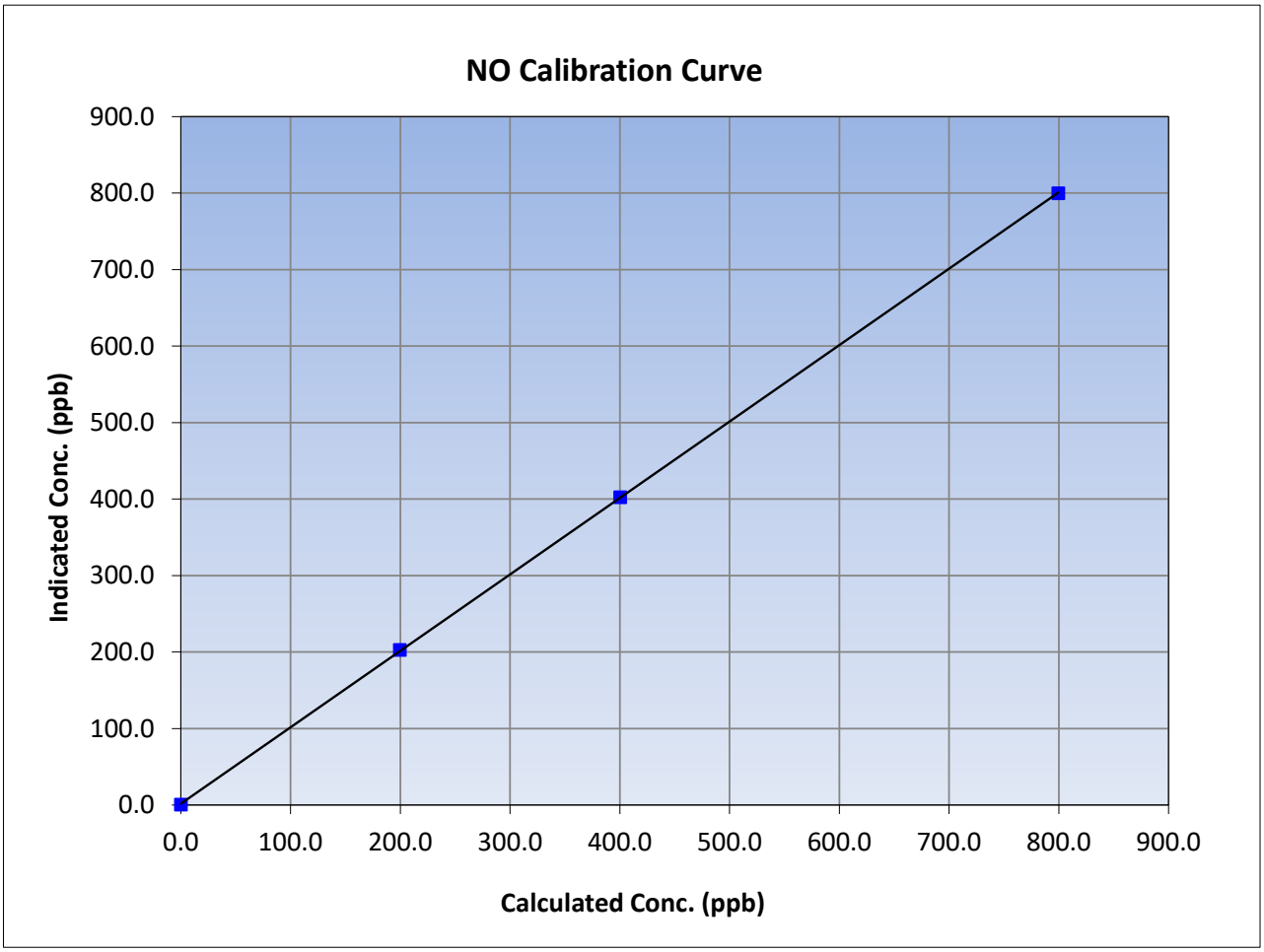
Version-04-2020

Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 1, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:11	End Time (MST):	14:44
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	0.3	----	Correlation Coefficient	0.999986	≥0.995
799.5	799.9	0.9994			
400.2	402.3	0.9949	Slope	0.999284	0.90 - 1.10
199.6	202.6	0.9852			
			Intercept	1.700041	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

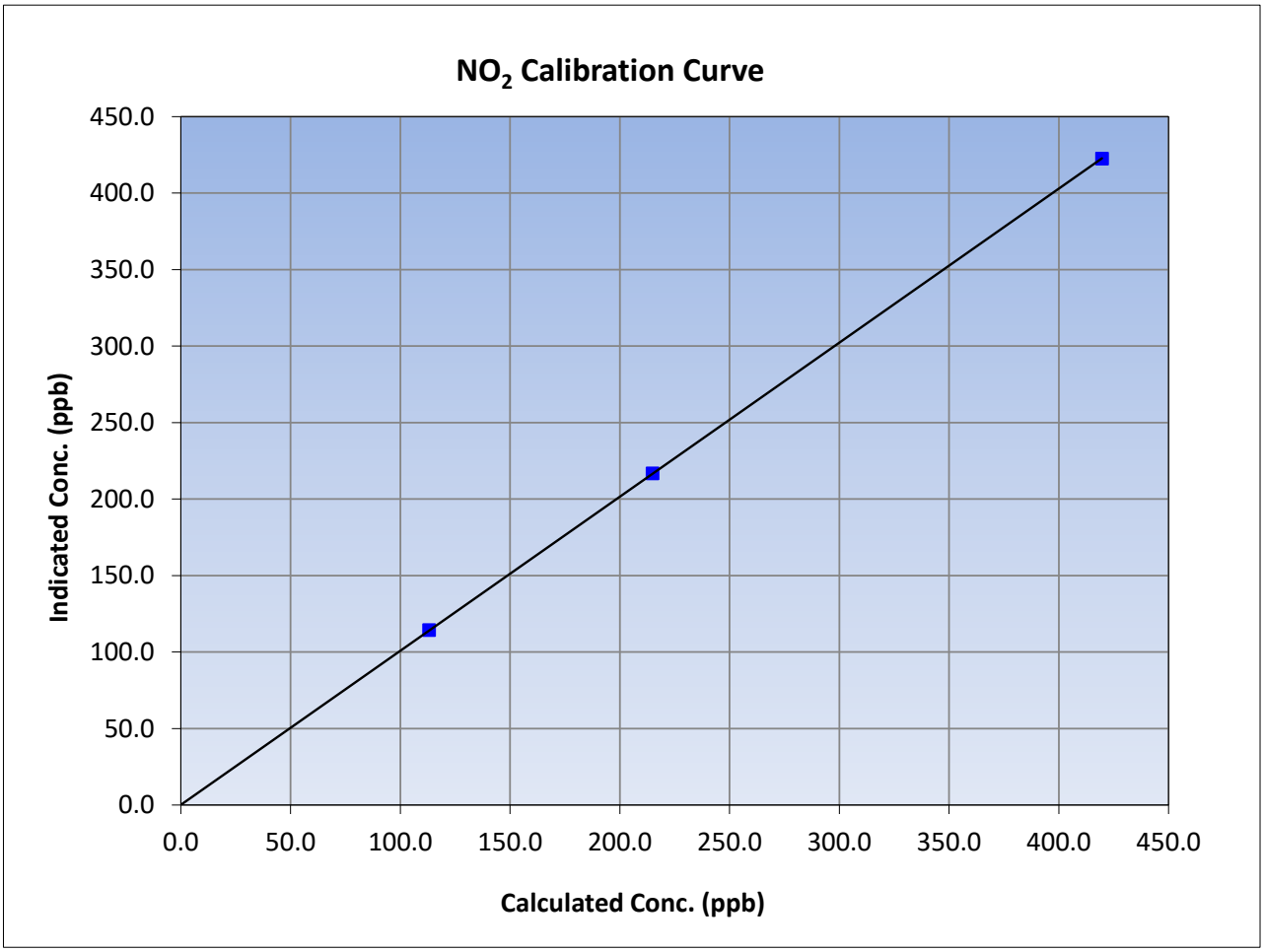
Version-04-2020

Station Information

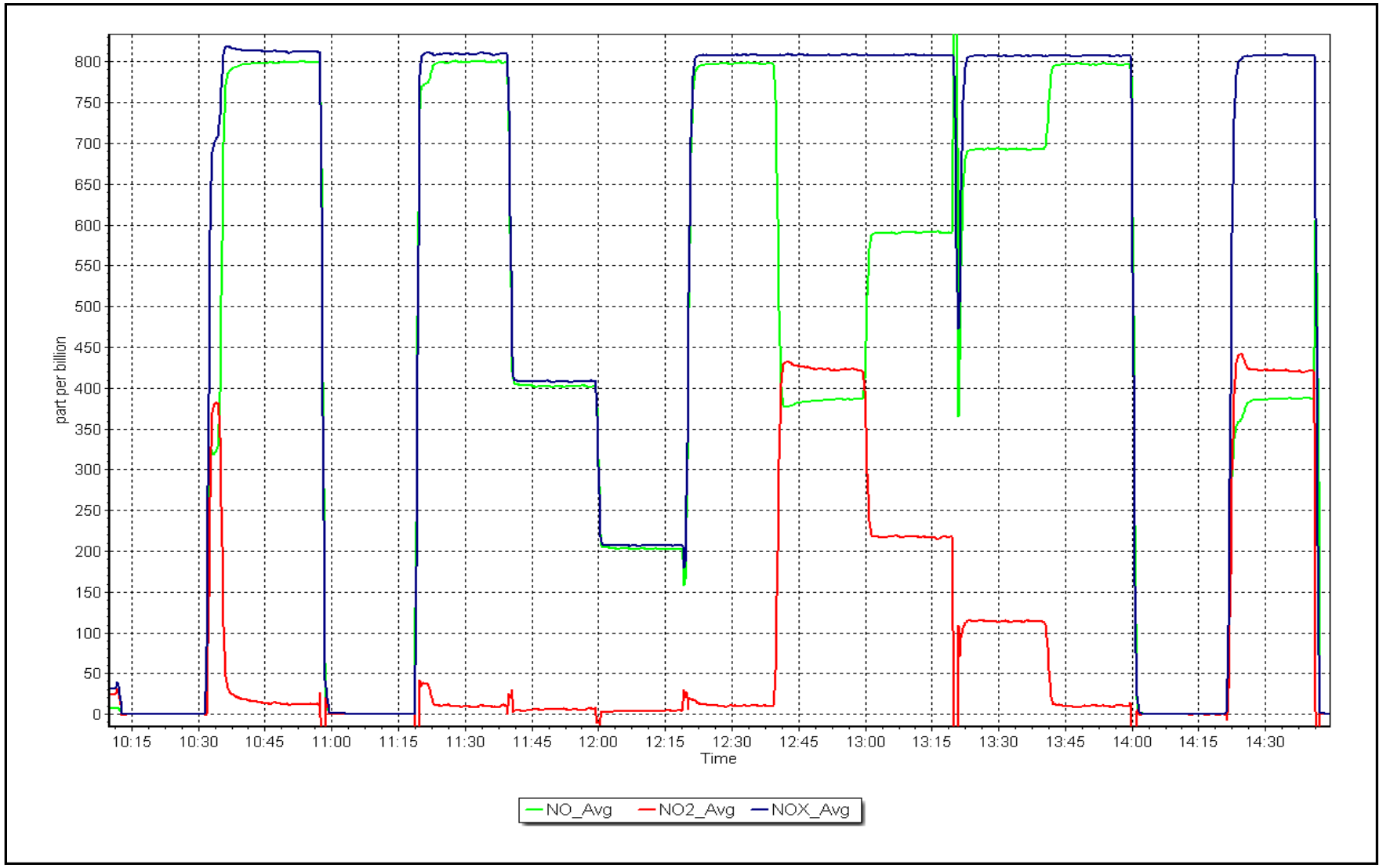
Calibration Date:	January 5, 2023	Previous Calibration:	December 1, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	10:11	End Time (MST):	14:44
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999999	*≥0.995*
419.7	422.6	0.9930			
215.0	216.7	0.9919	Slope	1.007019	*0.90 - 1.10*
113.2	114.3	0.9900			
			Intercept	0.124373	*+/-20*



NO_X Calibration Plot Date: January 5, 2023 Location: Patricia McInnes



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Patricia McInnes	Station number:	AMS06
Calibration Date:	January 12, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	9:55	End time (MST):	13:23
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	3566
ZAG Make/Model:	API T701H	Serial Number:	689

Analyzer Information

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

	Start	Finish		Start	Finish
Calibration slope:	1.007000	1.004914	Backgd or Offset:	-1.2	-1.2
Calibration intercept:	1.200000	1.440000	Coeff or Slope:	1.019	1.019

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	800.0	0.0	0.6	----
as found span	5000	1303.0	400.0	402.6	0.994
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.5	----
high point	5000	1303.0	400.0	402.9	0.993
second point	5000	966.5	200.0	203.0	0.985
third point	5000	794.3	100.0	102.8	0.973
as left zero	5000	800.0	0.0	0.4	----
as left span	5000	1303.0	400.0	404.2	0.990
				Average Correction Factor	0.984

Baseline Corr As found:	402.0	Previous response	404.0	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

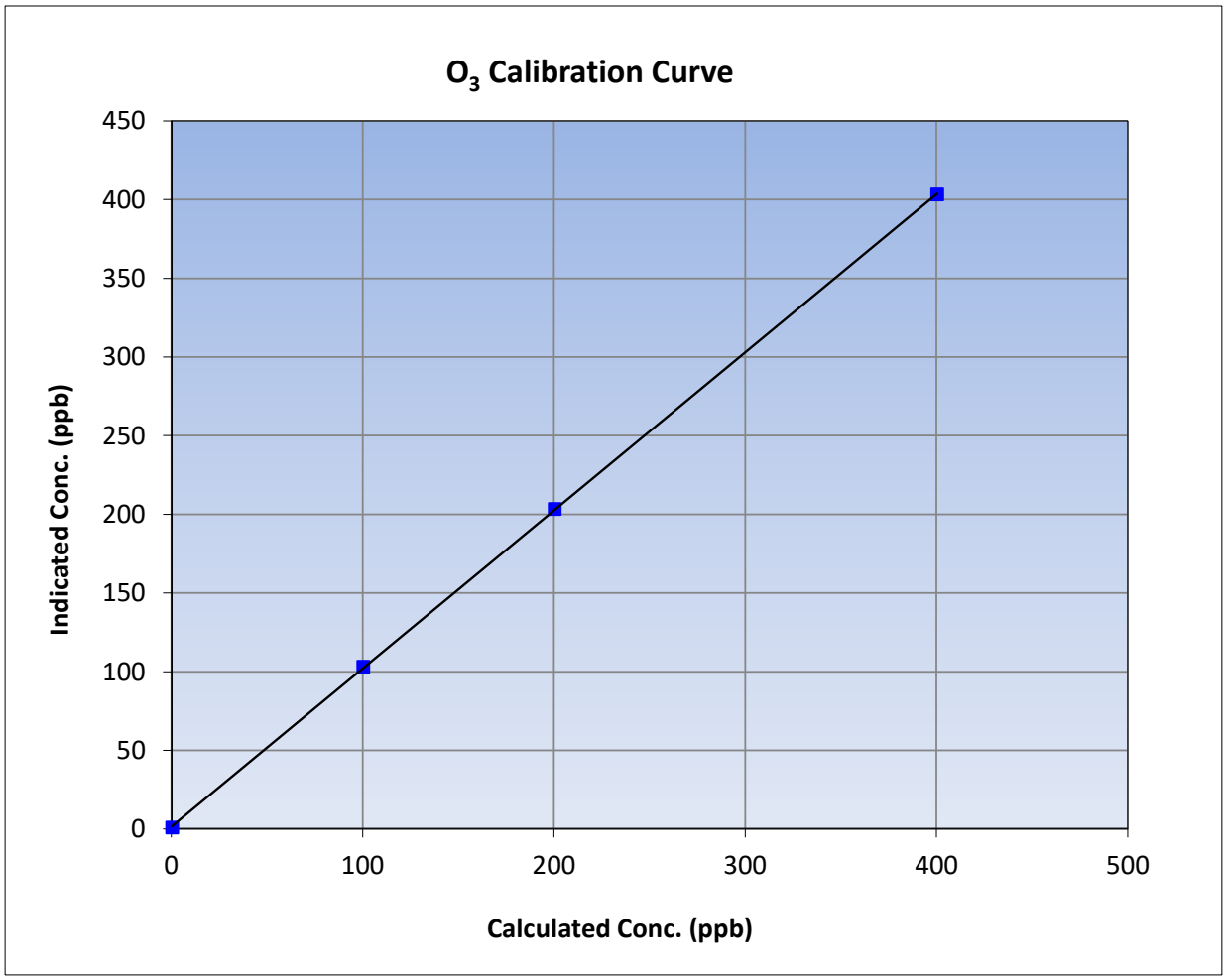
Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 2, 2022
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	9:55	End Time (MST):	13:23
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

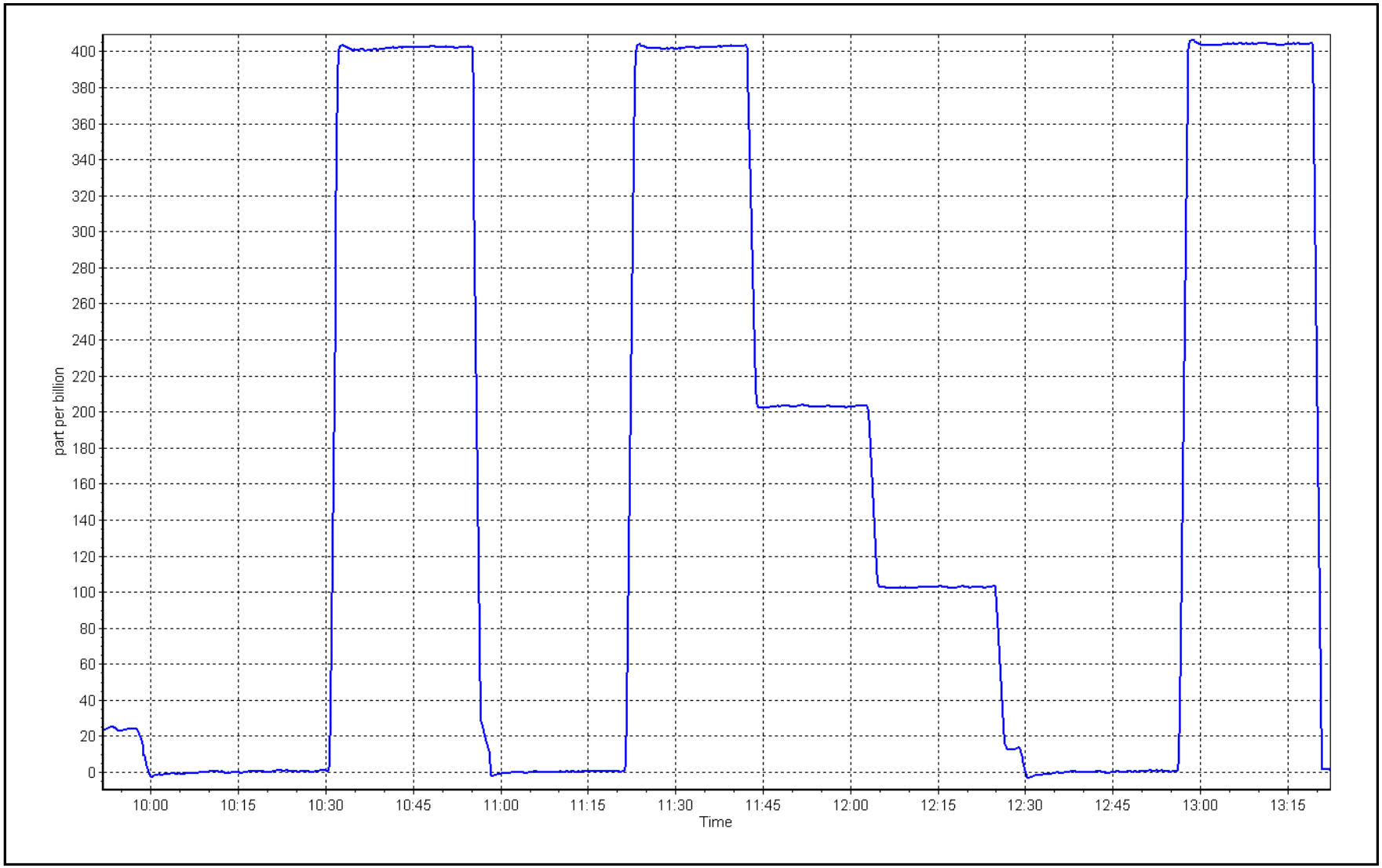
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
400.0	402.9	0.9928
200.0	203.0	0.9852
100.0	102.8	0.9728

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	1.004914	*0.90 - 1.10*
Intercept	1.440000	*+/- 5*



O_3 Calibration Plot Date: January 12, 2023 Location: Patricia McInnes



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	January 9, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	14:07	End time (MST):	15:05
Analyzer Make:	API T640	S/N:	766
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	628
Temp/RH standard:	Delta Cal	S/N:	628

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T (°C)	-8.6	-7.3	-8.6	☐	+/- 2 °C
P (mmHg)	720.4	718	720.4	☐	+/- 10 mmHg
flow (LPM)	4.98	5.16	4.98	☐	+/- 0.25 LPM

Leak Test: Date of check: January 9, 2023 Last Cal Date: December 12, 2022

PM w/o HEPA: 18.5 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: January 9, 2023

Disposable Filter Changed: January 9, 2023

Annual Maintenance

Date Sample Tube Cleaned: August 28, 2020

Date RH/T Sensor Cleaned: August 28, 2020

Notes: PMT Peak test completed. Leak check passed. No adjustments made.

Calibration by: Max Farrell

Wood Buffalo Environmental Association

TN - NO_X - NH_3 Calibration Report

Version-11-2021

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	January 11, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	9:30	End time (MST):	13:41
NH3 Cal Date:	January 11, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	13:41	End time (MST):	15:29
Reason:	Routine		

Calibration Standards

NOX Cal Gas Conc:	52.51	ppm	NO Gas Cylinder #:	T26D9MR
NO Cal Gas Conc:	51.98	ppm	NO Cal Gas Expiry:	August 18, 2023
Removed NOX Conc:	52.51	ppm	Removed Cylinder #:	N/A
Removed NO Conc:	51.98	ppm	Removed cyl Expiry:	N/A
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	73.9	ppm	NH3 Gas Cylinder #:	CC430800
			NH3 Cal Gas Expiry:	January 7, 2023
Removed NH3 Conc:	73.9	ppm	Removed Cylinder #:	
NH3 gas Diff:			Removed cyl Expiry:	
Calibrator Model:		API T700	Serial Number:	3566
ZAG make/model:		API T701	Serial Number:	689

Analyzer Information

Analyzer model:	API T201	Analyzer serial #:	152
Converter model:	API T501	Converter serial #:	147
NH3 Range (ppb):	0 - 2000 ppb	Reaction cell Press:	5.70
NOX Range (ppb):	0 - 1000 ppb	Sample Flow:	531

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	0.823	0.839	TN coefficient:	0.823	0.843
NOX coefficient:	0.823	0.840	NO bkgrnd:	-0.1	-0.1
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.0	0.0
NH3 coefficient:	0.951	0.951	TN bkgrnd:	0.0	0.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.994035	0.996497
NO_X Cal Offset:	2.840711	1.220653
NO Cal Slope:	0.997954	1.002531
NO Cal Offset:	1.640234	-0.260924
NO_2 Cal Slope:	0.996702	1.003819
NO_2 Cal Offset:	-1.098676	1.157200
NH3 Cal Slope:	1.007009	0.998364
NH3 Cal Offset:	8.369635	7.107284
TN Cal Slope:	1.011540	1.003901
TN Cal Offset:	8.804361	5.611013

Wood Buffalo Environmental Association

TN - NOX - NH_3 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-1.1	-1.5	0.4	----	----
as found NO	4923	76.9	807.6	807.6	----	789.9	786.8	3.1	1.022	----
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-1.6	1.4	----	----
high NO point	4923	76.9	807.6	807.6	----	807.9	804.9	3.0	1.000	----
NO/O3 point	4923	76.9	807.6	807.6	----	811.2	802.5	8.7	0.996	----
as found NH3	3415	85.3	1801.0	----	1801.0	1810.5	----	1802.2	0.995	0.999
new NH3 cyl rp							----			
first NH3	3415	85.3	1801.0	----	1801.0	1810.5	----	1802.2	0.995	0.999
second NH3	3453	47.4	1000.8	----	1000.8	1012.8	----	1008.4	0.988	0.992
third NH3	3476	23.7	500.4	----	500.4	514.5	----	513.3	0.973	0.975
								Average Correction Factor	0.9976	0.9889

Corrected As found TN = 791 ppb NO_X = 788.3 ppb NH3 = 1801.8 ppb

Previous Response TN = 825.7 ppb NO_X = 805.6 ppb NH3 = 1822.0 ppb

*Percent Change TN = -4.4%

*Percent Change NO_X = -2.2%

*Percent Change NH3 = -1.1%

* = > +/-5% change initiates investigation

NH3 Previous Converter Efficiency = 95.1%

NH3 Current Converter Efficiency = 95.1%

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

Version-11-2021

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-1.5	-1.7	-1.1	----	----
as found span	4923	76.9	807.6	799.5	807.6	786.8	780.7	789.9	1.0264	1.0240
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.6	-1.2	-0.2	----	----
high point	4923	76.9	807.6	799.5	807.6	804.9	800.3	807.9	1.0034	0.9989
second point	4962	38.5	404.3	400.2	404.3	404.6	402.8	406.5	0.9993	0.9937
third point	4981	19.2	201.6	199.6	201.6	205.6	199.9	206.3	0.9807	0.9985
								Average Correction Factor	0.9945	0.9970

Baseline Corr As fnd	TN =	791 ppb	NO_X =	788.3 ppb	NO =	782.4 ppb	*Percent Change TN = -4.4%
Previous Response	TN =	825.7 ppb	NO_X =	805.6 ppb	NO =	799.5 ppb	*Percent Change NO_X = -2.2%
							*Percent Change NO = -2.2%

* = > +/-5% change initiates investigation

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found zero	----	----	0.0	0.2	----	----
calibration zero	----	----	0.0	-0.4	----	----
1st GPT point (400 ppb O3)	792.5	385.7	415.0	416.7	0.9958	100.4%
2nd GPT point (200 ppb O3)	792.5	589.1	211.6	214.8	0.9849	101.5%
3rd GPT point (100 ppb O3)	792.5	689.6	111.1	113.9	0.9750	102.6%
				Average Correction Factor	0.9852	101.5%

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

TN Calibration Summary

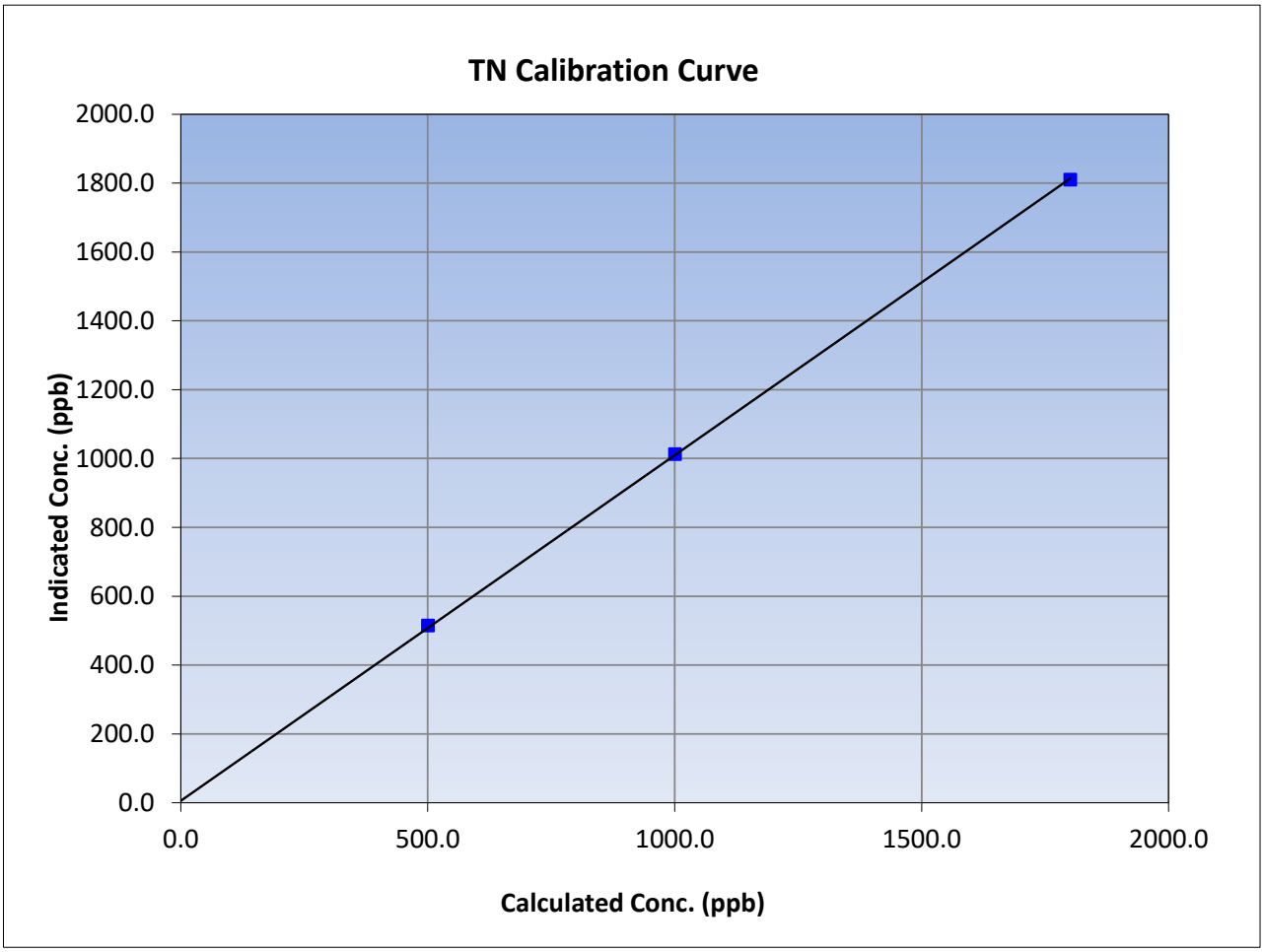
Version-11-2021

Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:41
Analyzer make:	API T201	Analyzer serial #:	152

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.2	----	Correlation Coefficient	0.999948	≥0.995
1801.0	1810.5	0.9948			
1000.8	1012.8	0.9882	Slope	1.003901	0.90 - 1.10
500.4	514.5	0.9726			
			Intercept	5.611013	+/-20



Wood Buffalo Environmental Association

NH_3 Calibration Summary

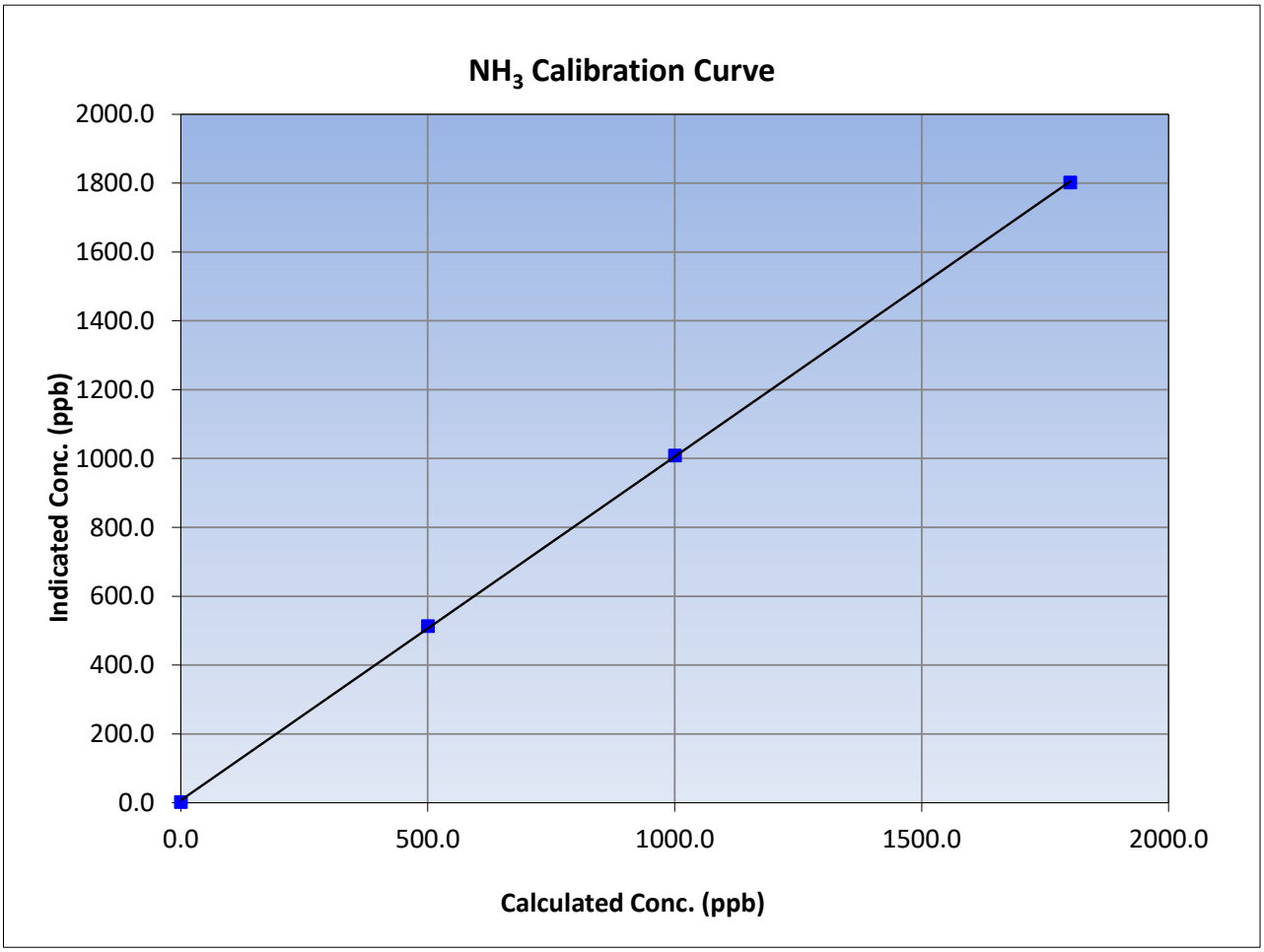
Version-11-2021

Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:41
Analyzer make:	API T201	Analyzer serial #:	152

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	1.4	----	Correlation Coefficient	0.999949	≥0.995
1801.0	1802.2	0.9994			
1000.8	1008.4	0.9925	Slope	0.998364	0.90 - 1.10
500.4	513.3	0.9749			
			Intercept	7.107284	+/-20



Wood Buffalo Environmental Association

NO_X Calibration Summary

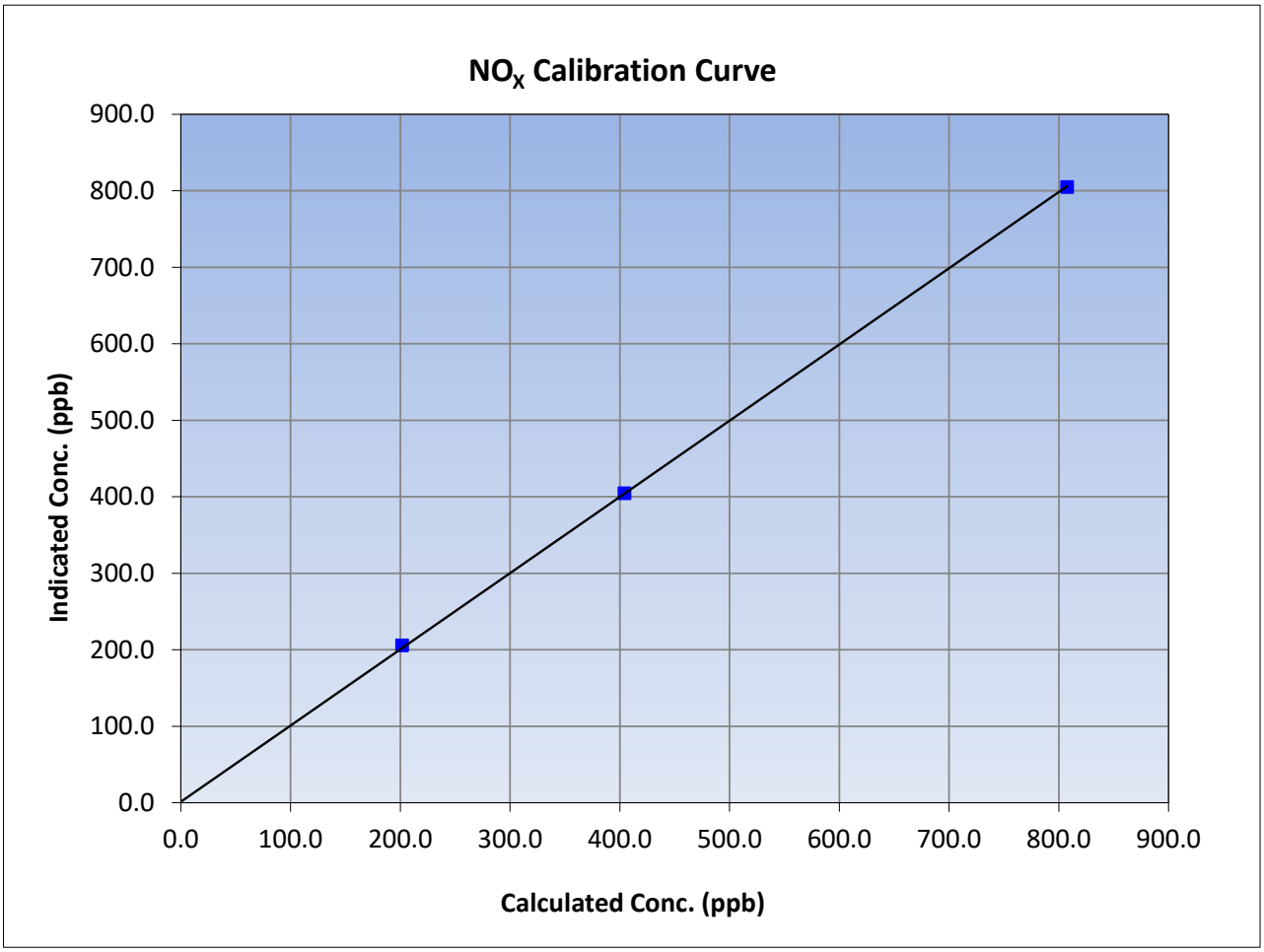
Version-11-2021

Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:41
Analyzer make:	API T201	Analyzer serial #:	152

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-1.6	----	Correlation Coefficient	0.999940	≥0.995
807.6	804.9	1.0034			
404.3	404.6	0.9993	Slope	0.996497	0.90 - 1.10
201.6	205.6	0.9807			
			Intercept	1.220653	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

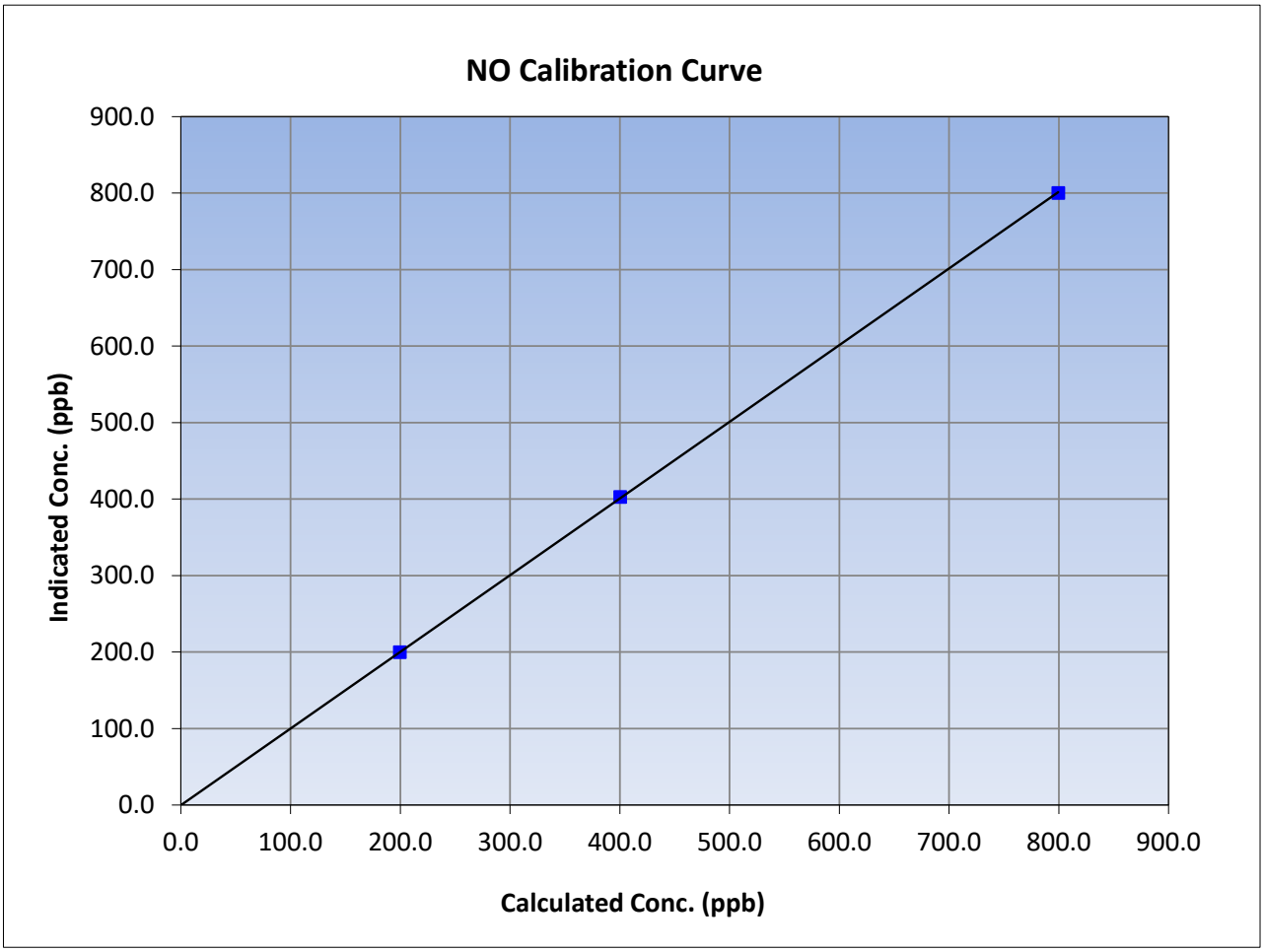
Version-11-2021

Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:41
Analyzer make:	API T201	Analyzer serial #:	152

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-1.2	----	Correlation Coefficient	0.999986	≥0.995
799.5	800.3	0.9989			
400.2	402.8	0.9937	Slope	1.002531	0.90 - 1.10
199.6	199.9	0.9985			
			Intercept	-0.260924	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

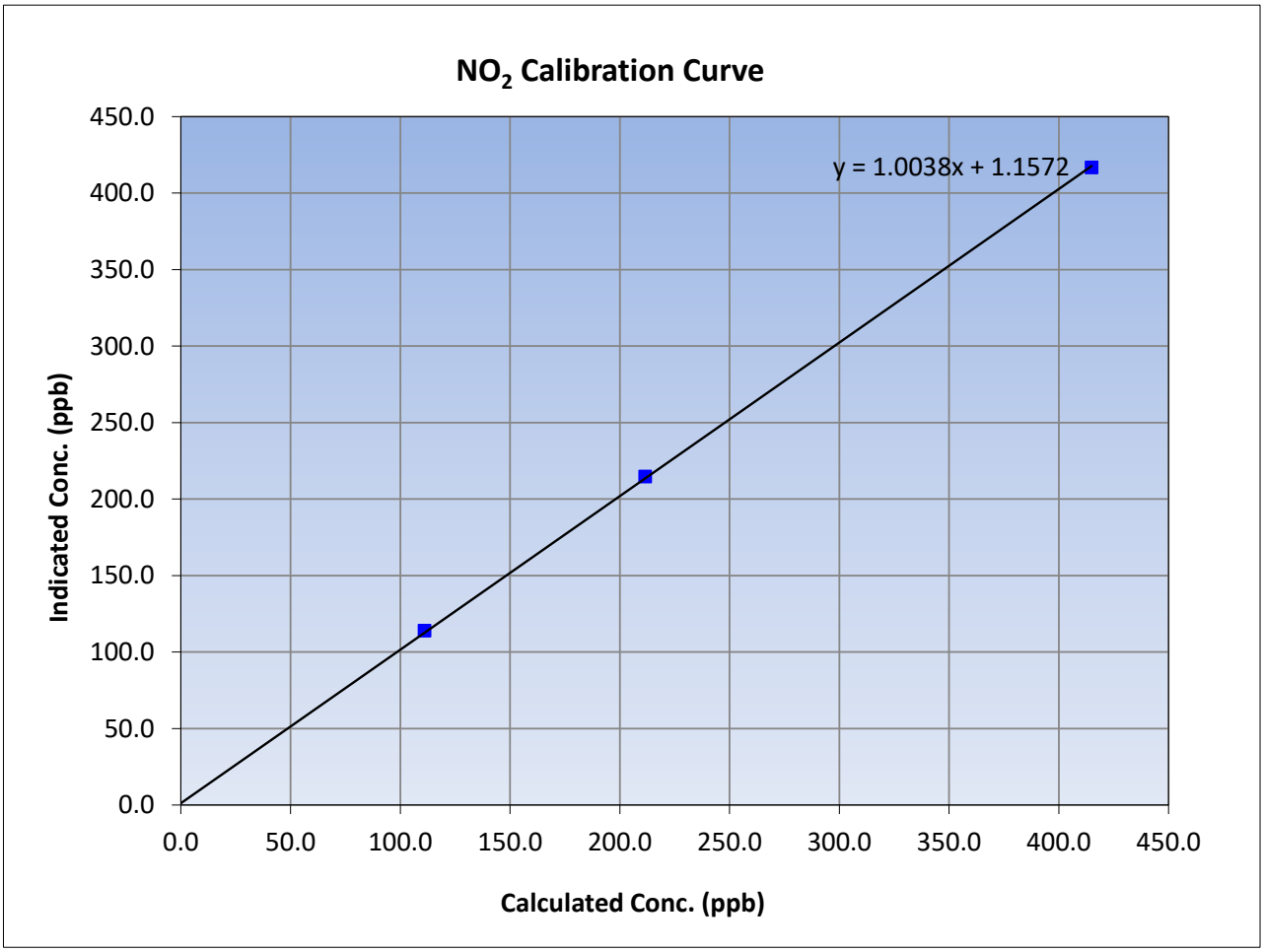
Version-11-2021

Station Information

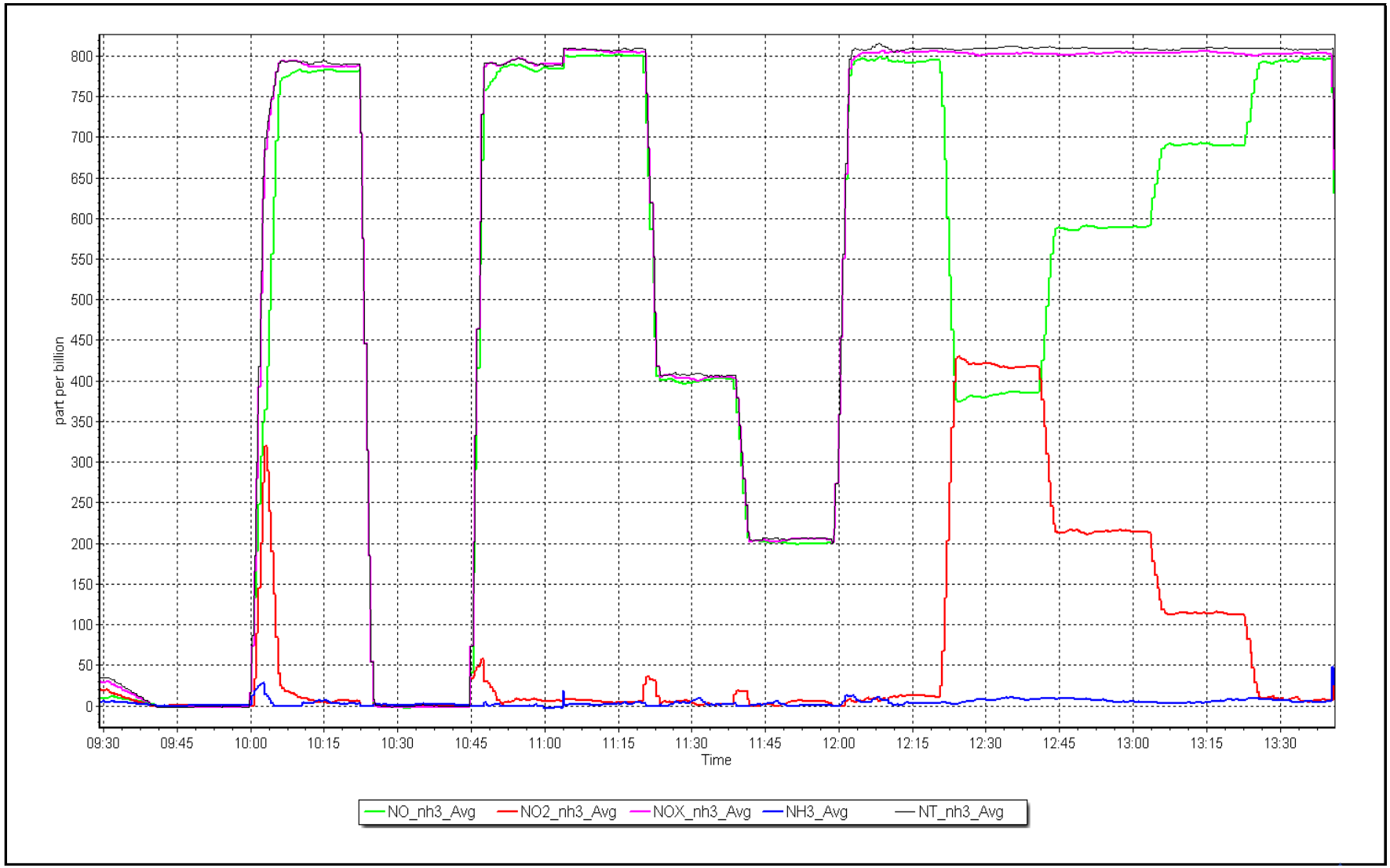
Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:41
Analyzer make:	API T201	Analyzer serial #:	152

Calibration Data

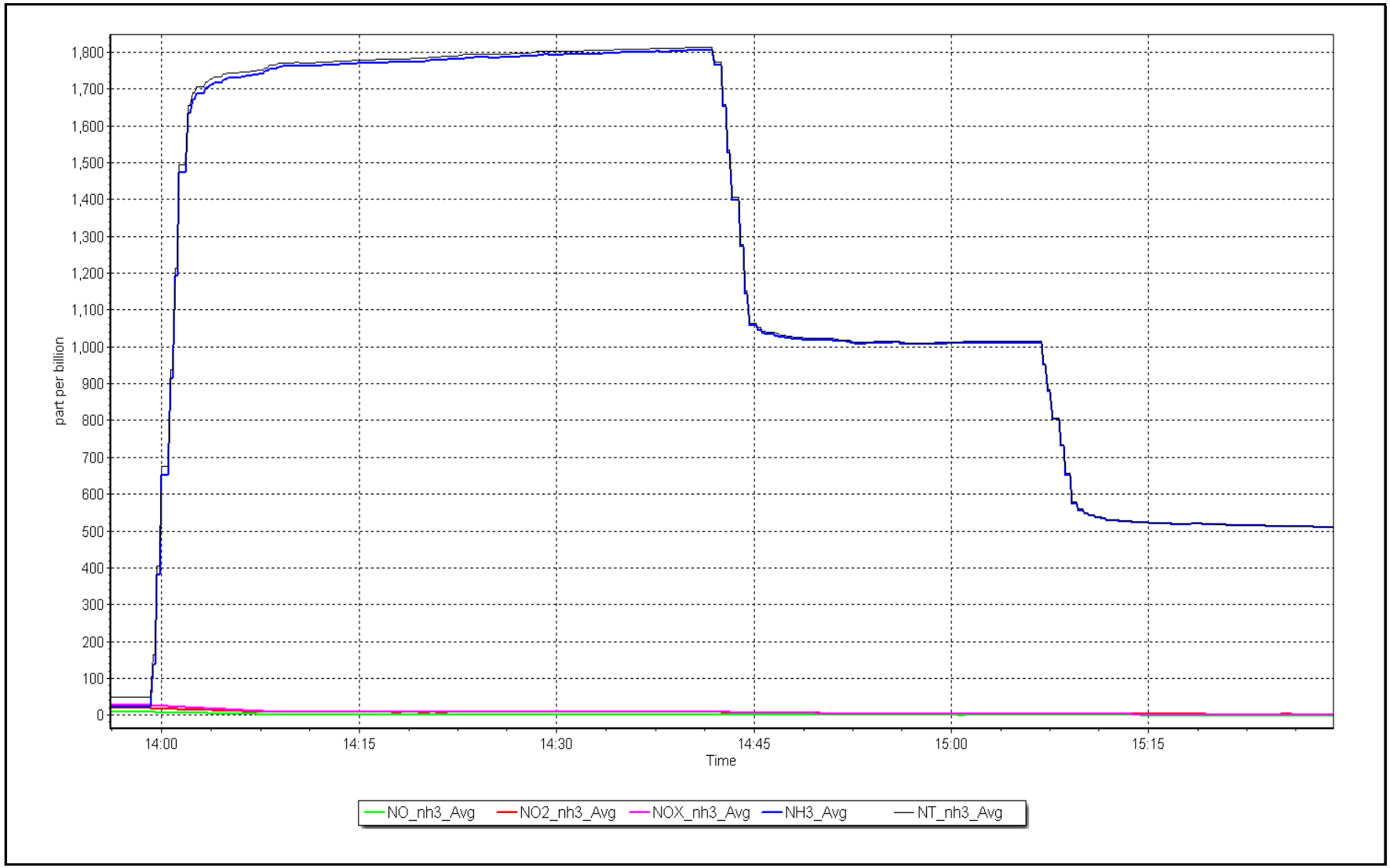
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.4	----	Correlation Coefficient	0.999929	≥0.995
415.0	416.7	0.9958			
211.6	214.8	0.9849	Slope	1.003819	0.90 - 1.10
111.1	113.9	0.9750			
			Intercept	1.157200	+/-20



NO_X Calibration Plot Date: January 11, 2023 Location: Patricia McInnes



NH_3 Calibration Plot Date: January 11, 2023 Location: Patricia McInnes



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS07
ATHABASCA VALLEY
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 16, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:20	End time (MST):	14:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.52	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC282115			
Removed Cal Gas Conc:	50.52	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 701H		Serial Number:	198

Analyzer Information

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

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996995	0.997038	Backgd or Offset:	2.68	2.71
Calibration intercept:	1.923766	1.683589	Coeff or Slope:	0.857	0.857

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*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4921	79.3	801.2	797.1	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	----
high point	4921	79.3	801.2	799.1	1.003
second point	4960	39.6	400.2	403.3	0.992
third point	4980	19.8	200.1	201.5	0.993
as left zero	5000	0.0	0.0	0.1	----
as left span	4921	79.2	800.2	799.9	1.000
				Average Correction Factor	0.996

Baseline Corr As found:	797.20	Previous response	800.71	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No adjustments required.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

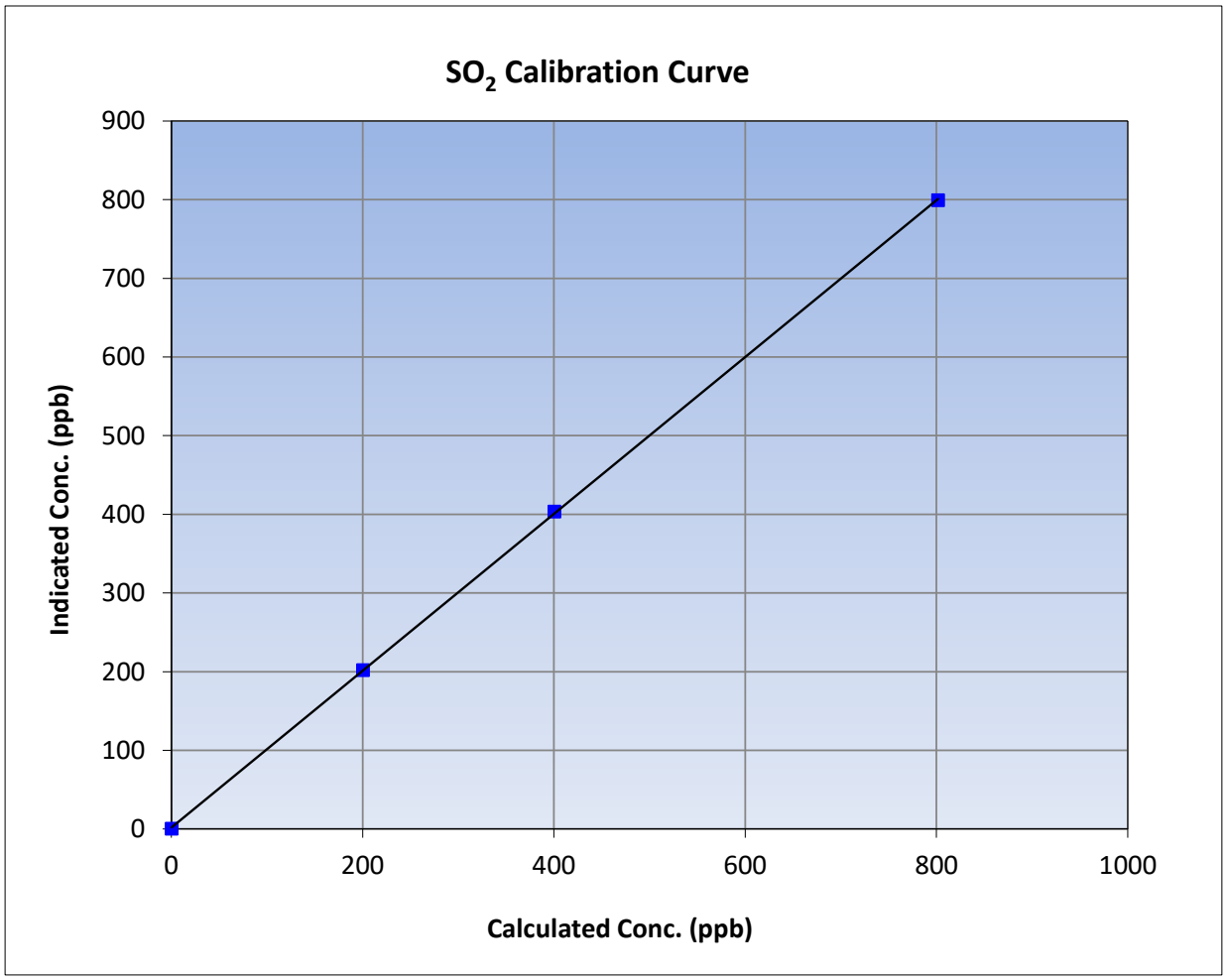
Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 5, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	11:20	End Time (MST):	14:05
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

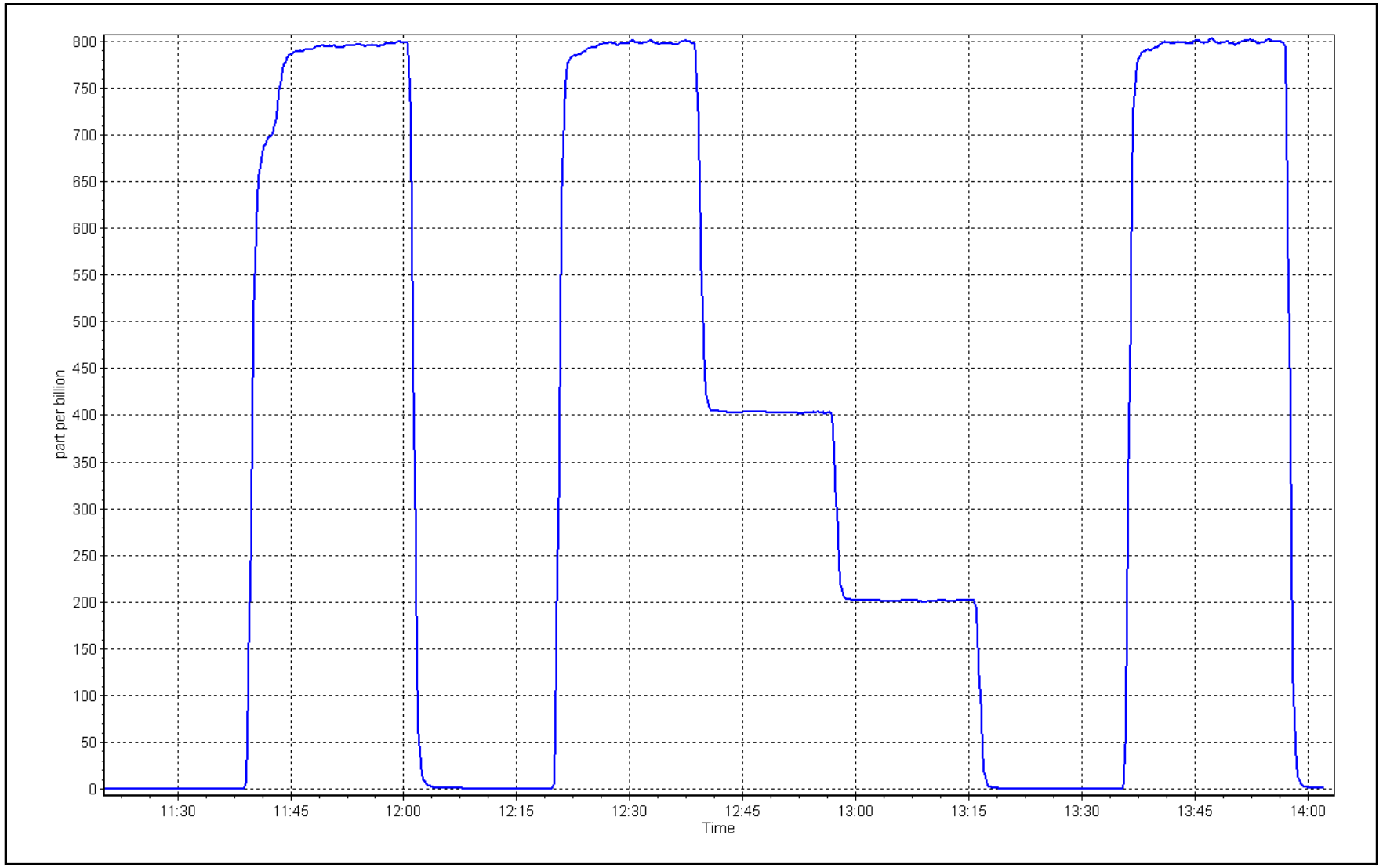
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
801.2	799.1	1.0026
400.2	403.3	0.9922
200.1	201.5	0.9929

Statistical Evaluation		Limits
Correlation Coefficient	0.999967	≥0.995
Slope	0.997038	0.90 - 1.10
Intercept	1.683589	+/-30



SO2 Calibration Plot Date: January 16, 2023 Location: Athabasca Valley



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 17, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	7:00	End time (MST):	10:57
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.94	ppm	Cal Gas Exp Date:	February 9, 2024
Cal Gas Cylinder #:	EY0002277			
Removed Cal Gas Conc:	4.94	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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.993768	0.987815	Backgd or Offset:	2.18	2.18
Calibration intercept:	-0.078405	0.181600	Coeff or Slope:	0.834	0.834

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4918	81.6	80.6	80.1	1.005
as found 2nd point	4959	40.8	40.3	40.1	1.003
as found 3rd point	4980	20.4	20.2	19.7	1.018
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.0	----
high point	4918	81.6	80.6	79.7	1.012
second point	4959	40.8	40.3	40.2	1.003
third point	4980	20.4	20.2	20.2	0.998
as left zero	5000	0.0	0.0	0.7	----
as left span	4918	81.6	80.6	78.3	1.030
SO2 Scrubber Check	4921	79.2	800.2	0.3	----
Date of last scrubber change:		25-Feb-22		Ave Corr Factor	1.004
Date of last converter efficiency test:		April 22, 2022		98.5%	efficiency

Baseline Corr As found:	80.2	Prev response:	80.05	*% change:	0.2%
Baseline Corr 2nd AF pt:	40.2	AF Slope:	0.995894	AF Intercept:	-0.178398
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999983		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

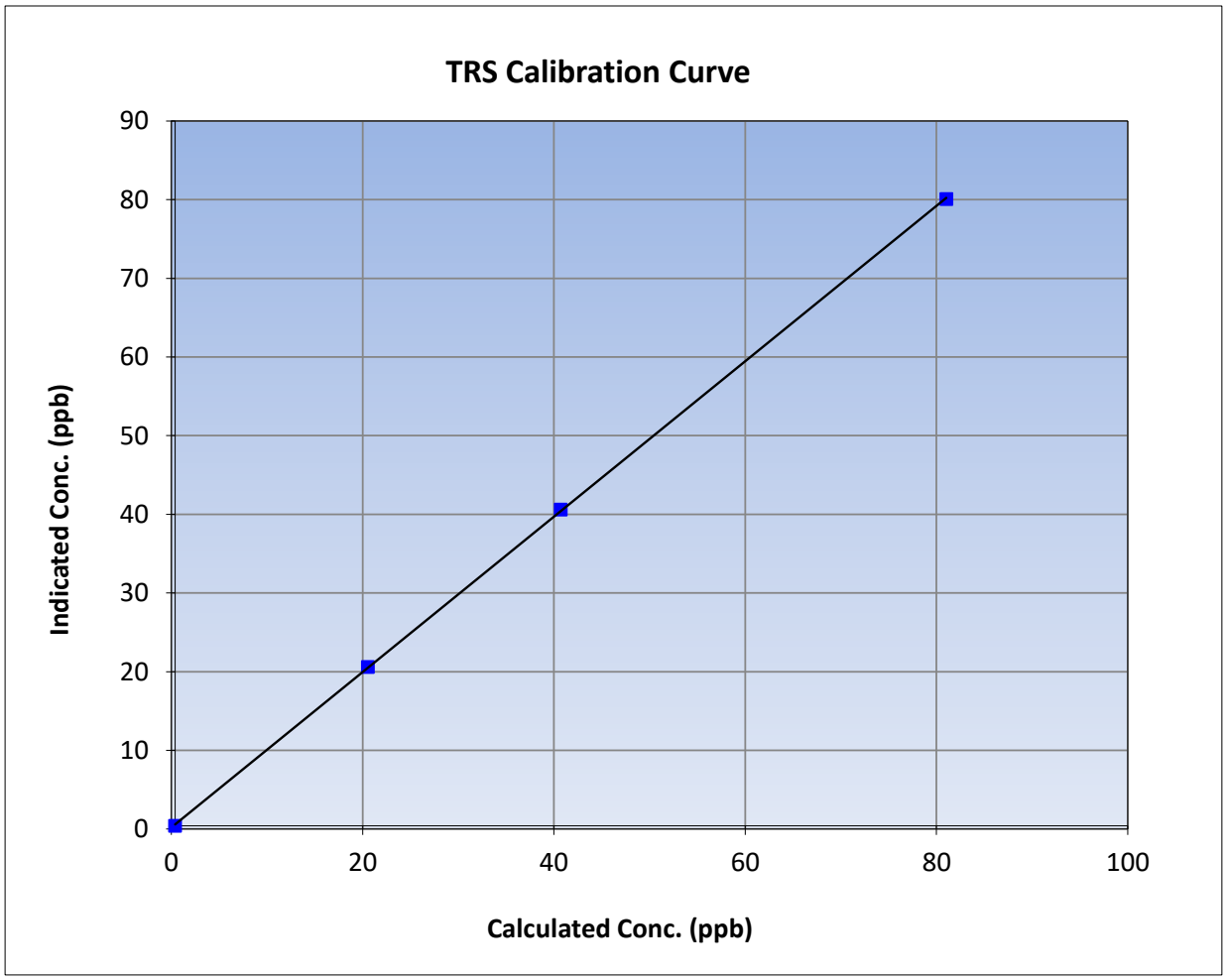
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 13, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:00	End Time (MST):	10:57
Analyzer make:	CDN-101	Analyzer serial #:	551

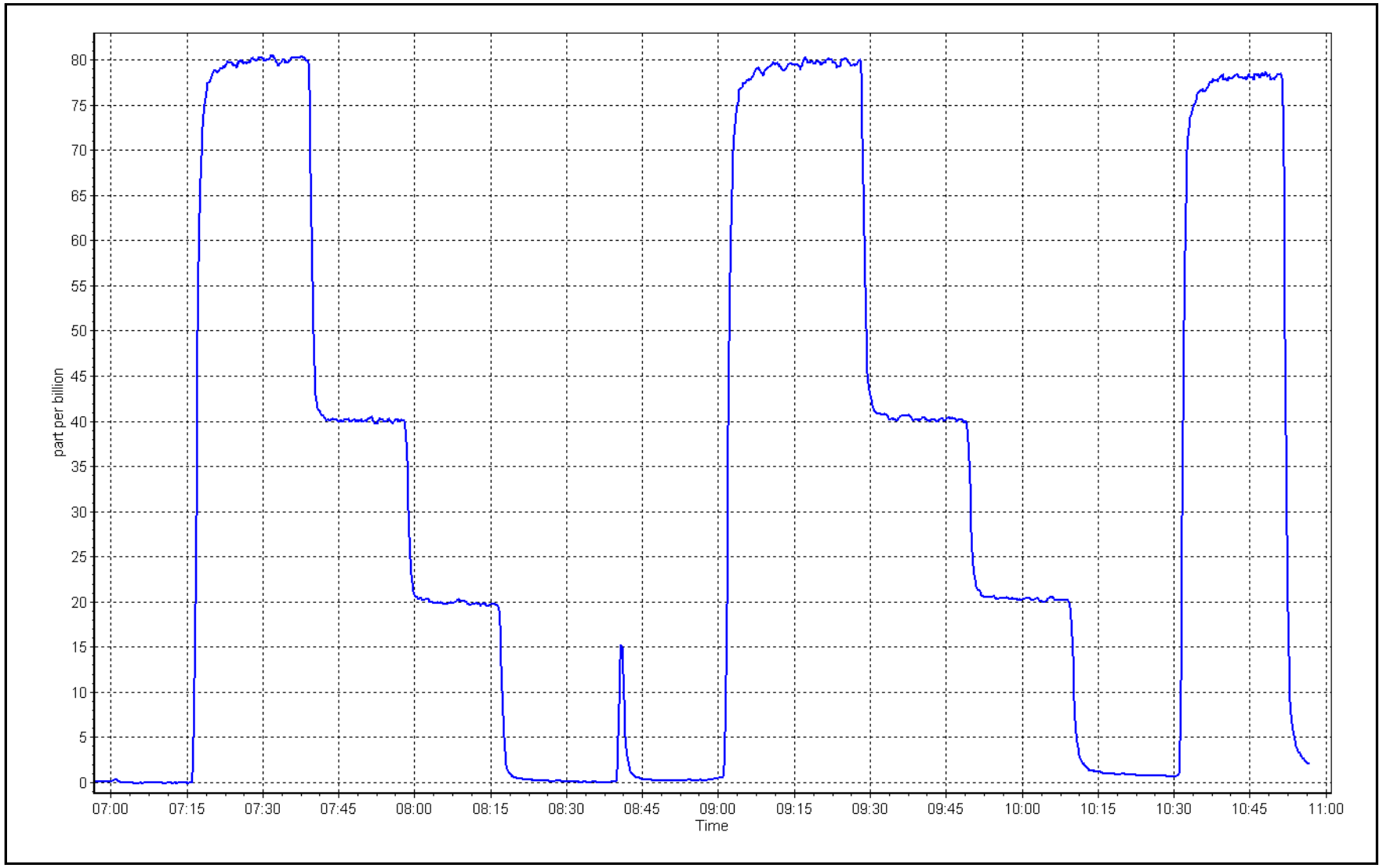
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.6	79.7	1.0116
40.3	40.2	1.0028
20.2	20.2	0.9977

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	0.987815	*0.90 - 1.10*
Intercept	0.181600	*+/-3*



TRS Calibration Plot Date: January 17, 2023 Location: Athabasca Valley



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 16, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:20	End time (MST):	14:05
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC282115	Cal Gas Expiry Date:	December 29, 2028	
CH4 Cal Gas Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
C3H8 Cal Gas Conc.	208.7	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
Removed C3H8 Conc.	208.7	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3805	
ZAG make/model:	API 701H		Serial Number:	198	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1317958219	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	0.000270	0.000270	NMHC SP Ratio:	4.42E-05	4.42E-05
CH4 Retention time:	13.4	13.4	NMHC Peak Area:	205840	205840

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.3	17.05	16.96	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.3	17.05	16.97	1.005
second point	4960	39.6	8.52	8.48	1.004
third point	4980	19.8	4.26	4.26	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	17.03	16.97	1.003
				Average Correction Factor	1.003

Baseline Corr AF:	16.96	Prev response	17.04	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4921	79.3	9.10	9.02	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.3	9.10	9.04	1.007
second point	4960	39.6	4.55	4.52	1.007
third point	4980	19.8	2.27	2.27	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	9.09	9.03	1.007
				Average Correction Factor	1.005
Baseline Corr AF:	9.02	Prev response	9.10	*% 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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.3	7.95	7.94	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.3	7.95	7.94	1.002
second point	4960	39.6	3.97	3.97	1.001
third point	4980	19.8	1.98	1.99	0.999
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	7.94	7.95	0.999
				Average Correction Factor	1.001
Baseline Corr AF:	7.94	Prev response	7.94	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.998506	0.994820
THC Cal Offset:	0.011691	0.009674
CH4 Cal Slope:	0.999047	0.998255
CH4 Cal Offset:	0.000012	0.002012
NMHC Cal Slope:	0.998021	0.992058
NMHC Cal Offset:	0.012480	0.007463

Notes: No adjustments required.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

THC Calibration Summary

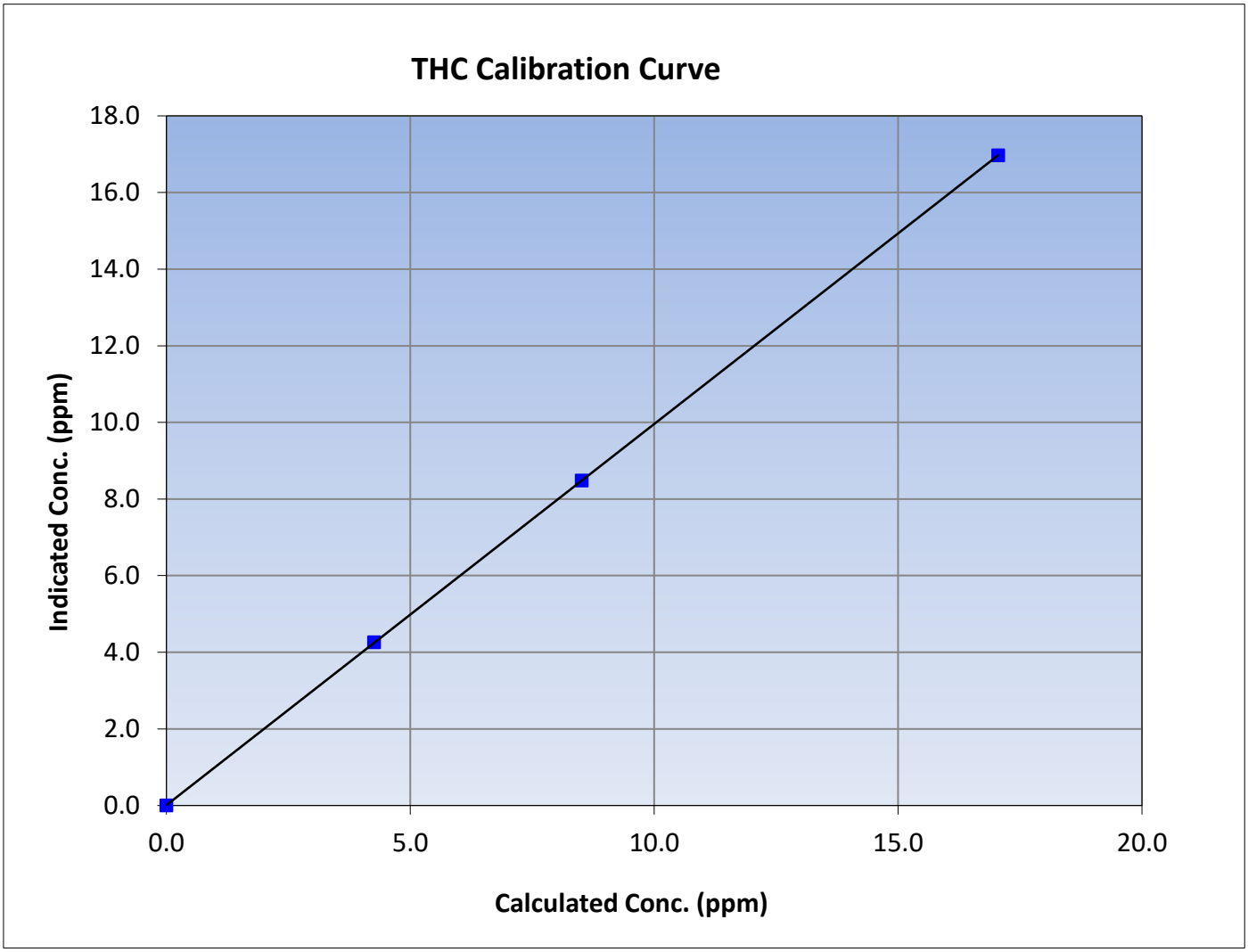
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 5, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	11:20	End Time (MST):	14:05
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	0.999998	*≥0.995*
17.05	16.97	1.0048			
8.52	8.48	1.0042	Slope	0.994820	*0.90 - 1.10*
4.26	4.26	0.9997			
			Intercept	0.009674	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

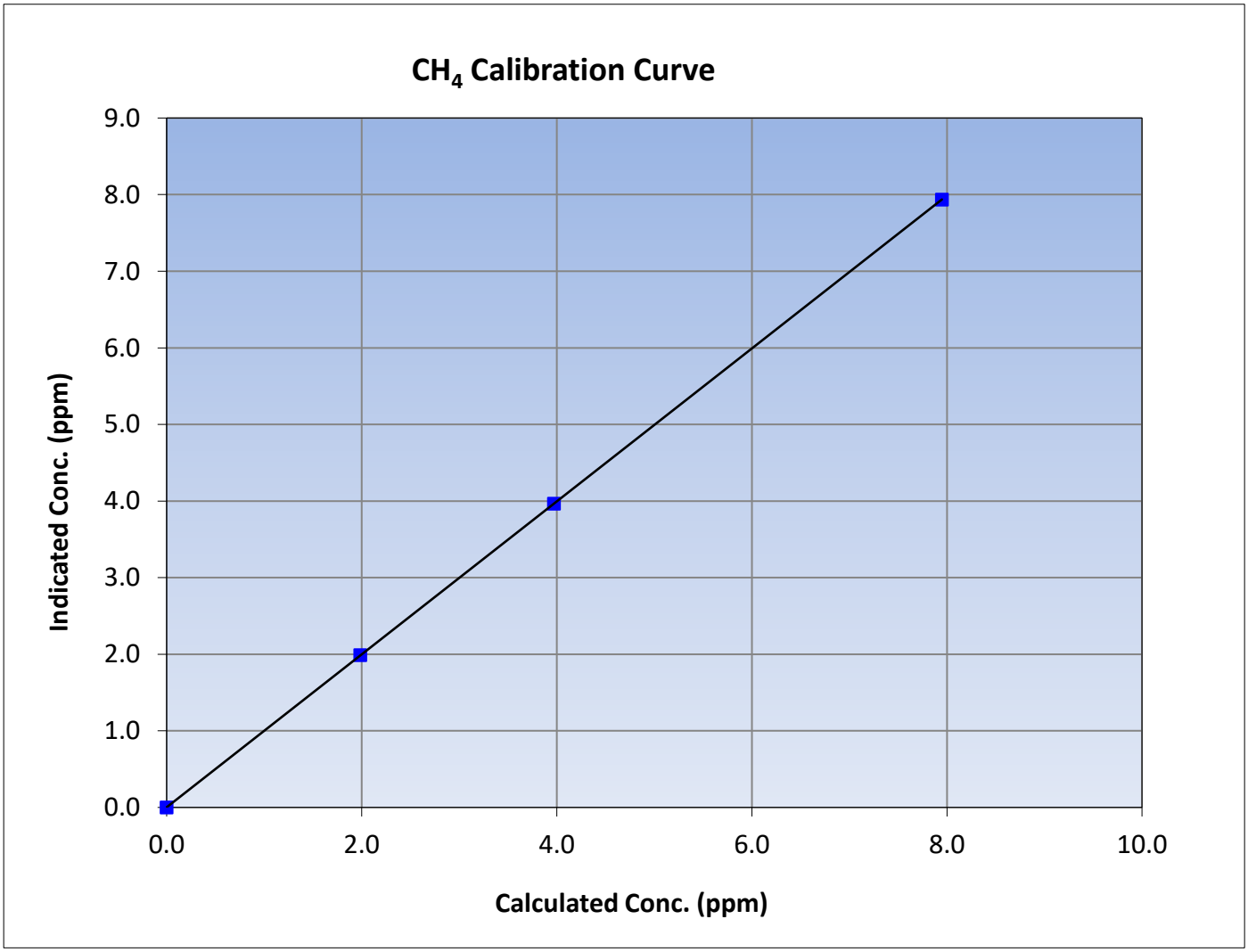
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 5, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	11:20	End Time (MST):	14:05
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*
7.95	7.94	1.0016			
3.97	3.97	1.0012	Slope	0.998255	*0.90 - 1.10*
1.98	1.99	0.9994			
			Intercept	0.002012	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

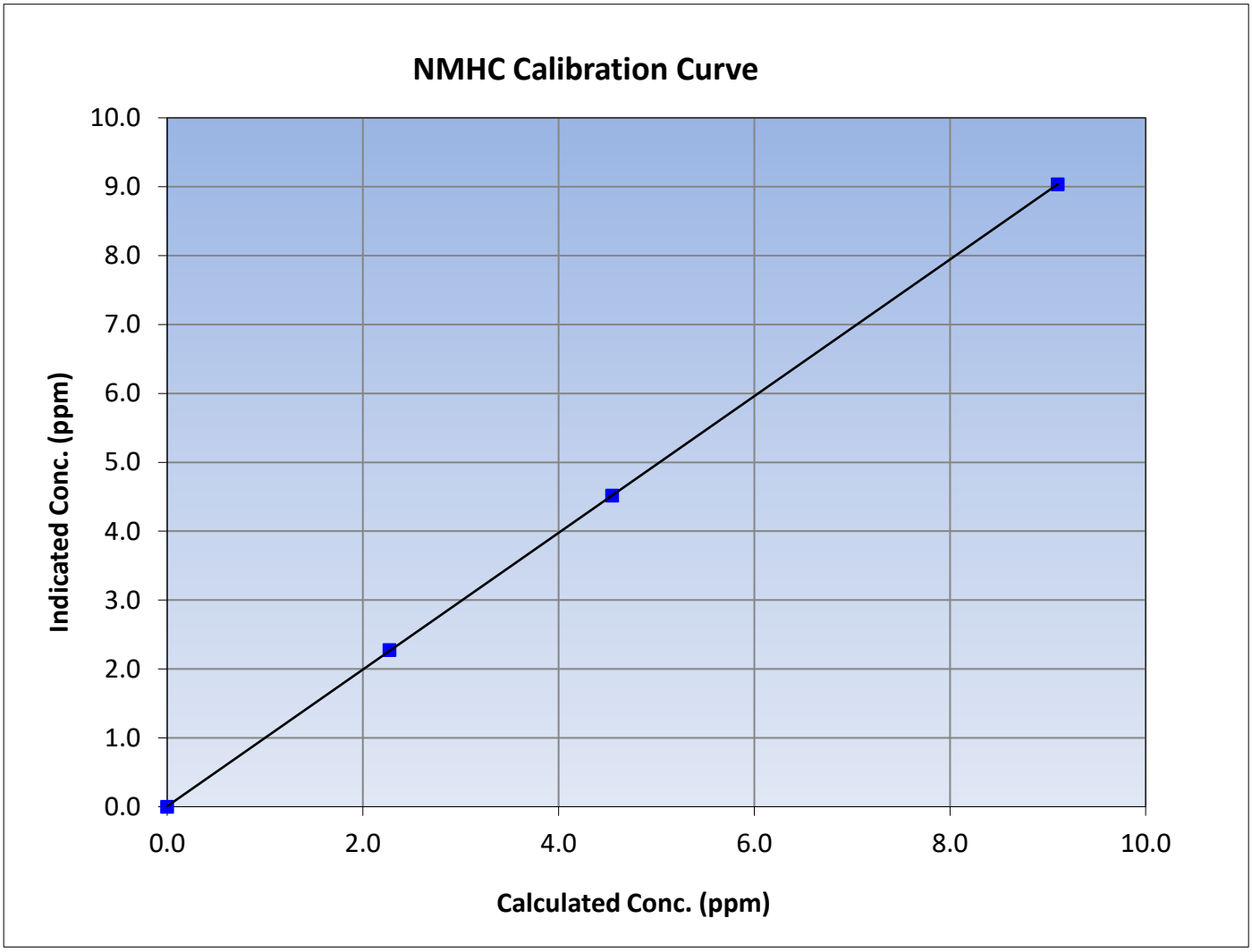
Version-01-2020

Station Information

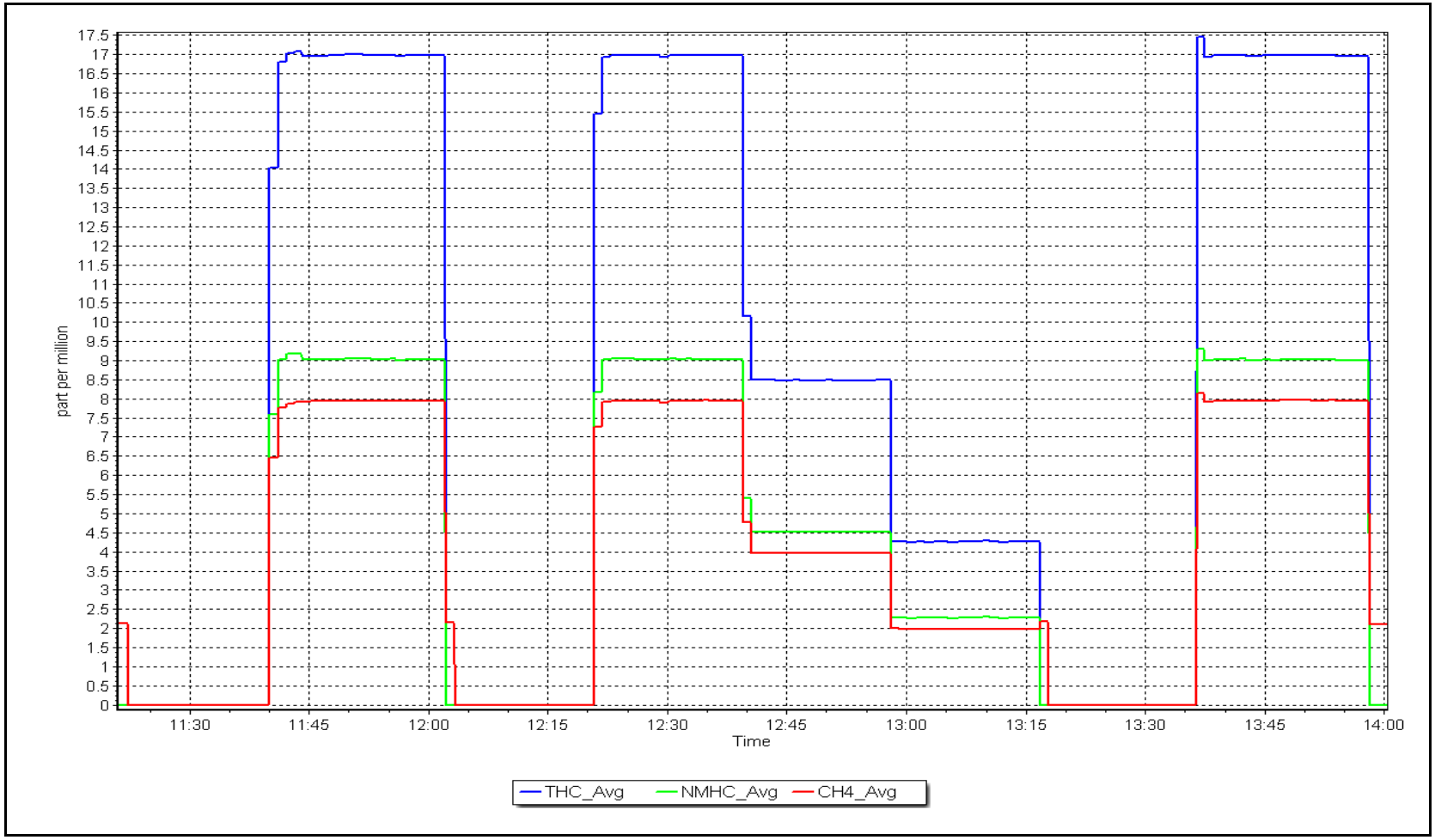
Calibration Date:	January 16, 2023	Previous Calibration:	December 5, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	11:20	End Time (MST):	14:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999996	*≥0.995*
9.10	9.04	1.0074			
4.55	4.52	1.0066	Slope	0.992058	*0.90 - 1.10*
2.27	2.27	0.9999			
			Intercept	0.007463	*+/-0.5*



NMHC Calibration Plot Date: January 16, 2023 Location: Athabasca Valley



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 19, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	7:10	End time (MST):	11:48
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1KA4		Cal Gas Expiry Date:	November 30, 2023	
NOX Cal Gas Conc:	50.92	ppm	NO Cal Gas Conc:	49.92	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.92	ppm	Removed Gas NO Conc:	49.92	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3805	
ZAG make/model:	API T701H		Serial Number:	198	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.048	1.048	NO bkgnd or offset:	7.3	7.3
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	7.5	7.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	198.8	198.8

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.003211	0.991445
NO_X Cal Offset:	1.159557	1.137226
NO Cal Slope:	1.003486	0.991156
NO Cal Offset:	0.775567	0.993235
NO_2 Cal Slope:	1.001755	1.002806
NO_2 Cal Offset:	0.287731	0.326300

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
as found span	4920	80.2	816.7	800.7	16.0	810.1	793.2	16.8	1.0082	1.0094
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
high point	4920	80.2	816.7	800.7	16.0	810.0	793.8	16.2	1.0083	1.0087
second point	4960	40.1	408.4	400.4	8.0	407.6	399.3	8.3	1.0019	1.0026
third point	4980	20.0	203.7	199.7	4.0	203.4	199.1	4.4	1.0014	1.0029
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	4920	80.2	816.7	401.2	415.5	816.5	394.8	421.6	1.0003	1.0162
								Average Correction Factor	1.0039	1.0047

Corrected As found	NO_X = 810.1 ppb	NO = 793.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-1.3%
Previous Response	NO_X = 820.5 ppb	NO = 804.3 ppb		*Percent Change	NO =	-1.4%
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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	792.0	392.5	415.5	416.9	0.9967	100.3%
2nd GPT point (200 ppb O3)	792.0	597.8	210.2	211.3	0.9950	100.5%
3rd GPT point (100 ppb O3)	792.0	693.8	114.2	115.1	0.9925	100.8%
				Average Correction Factor	0.9947	100.5%

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

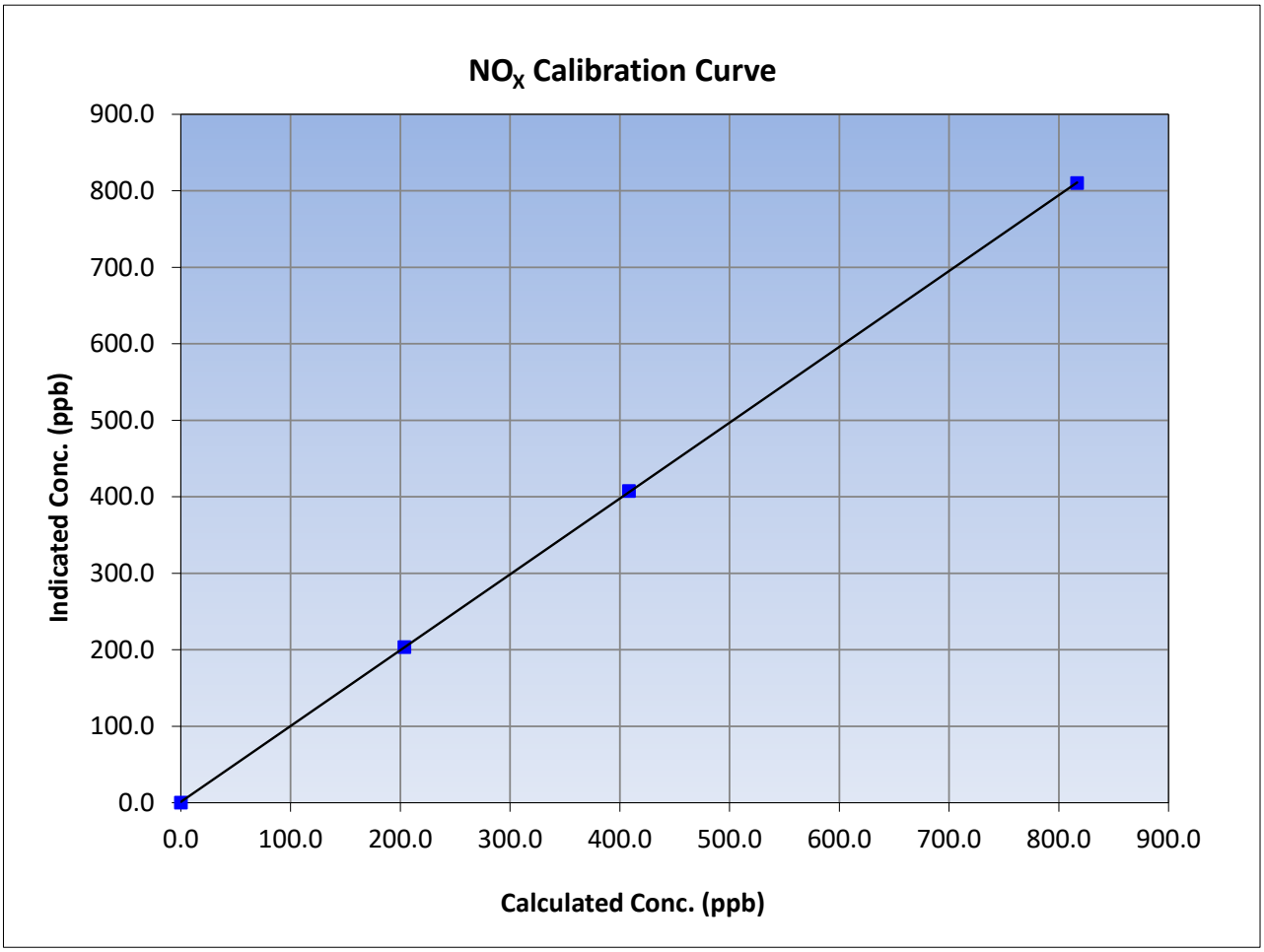
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 12, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:10	End Time (MST):	11:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999988	*≥0.995*
816.7	810.0	1.0083			
408.4	407.6	1.0019	Slope	0.991445	*0.90 - 1.10*
203.7	203.4	1.0014			
			Intercept	1.137226	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

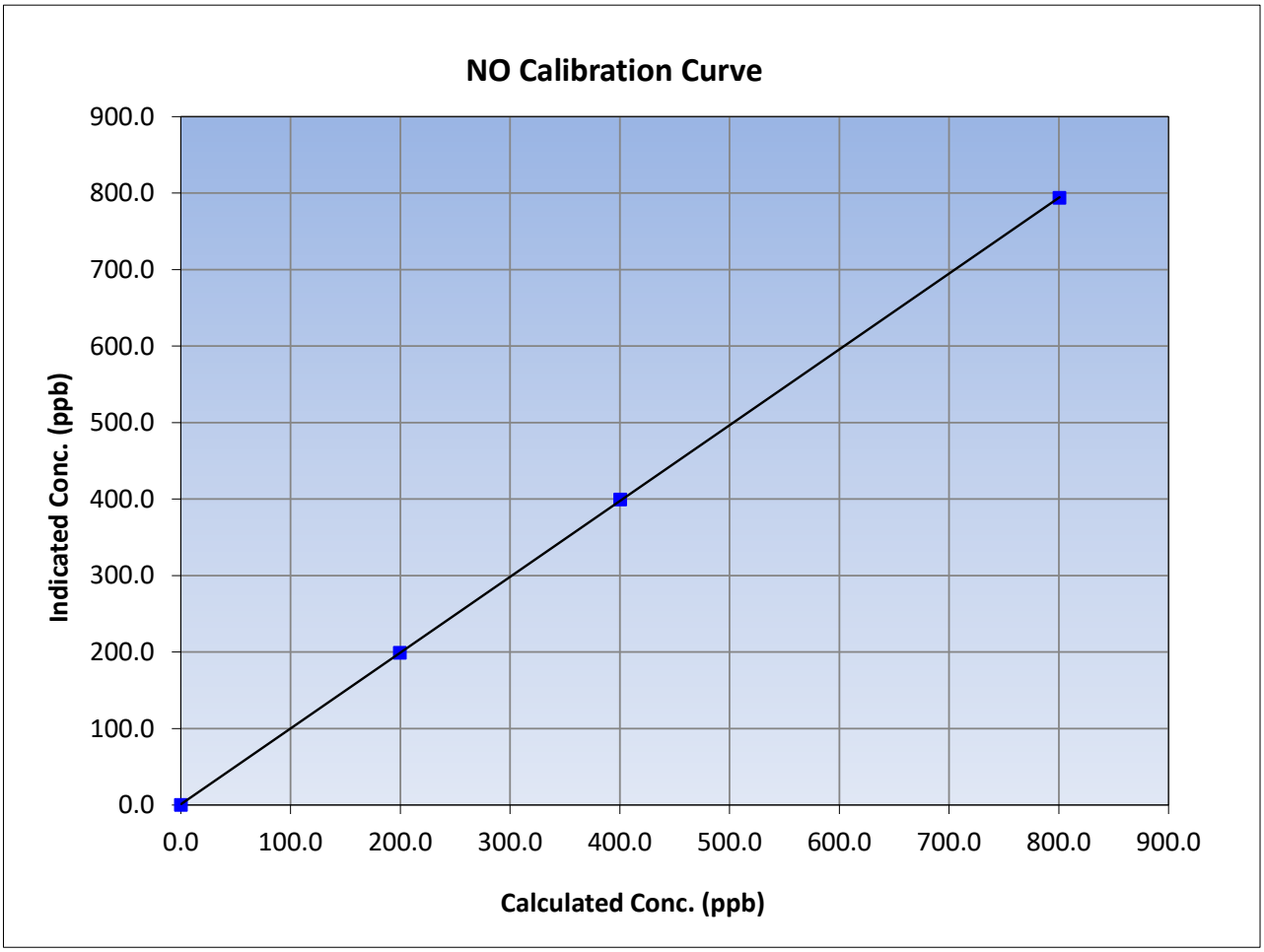
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 12, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:10	End Time (MST):	11:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999989	≥0.995
800.7	793.8	1.0087			
400.4	399.3	1.0026	Slope	0.991156	0.90 - 1.10
199.7	199.1	1.0029			
			Intercept	0.993235	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

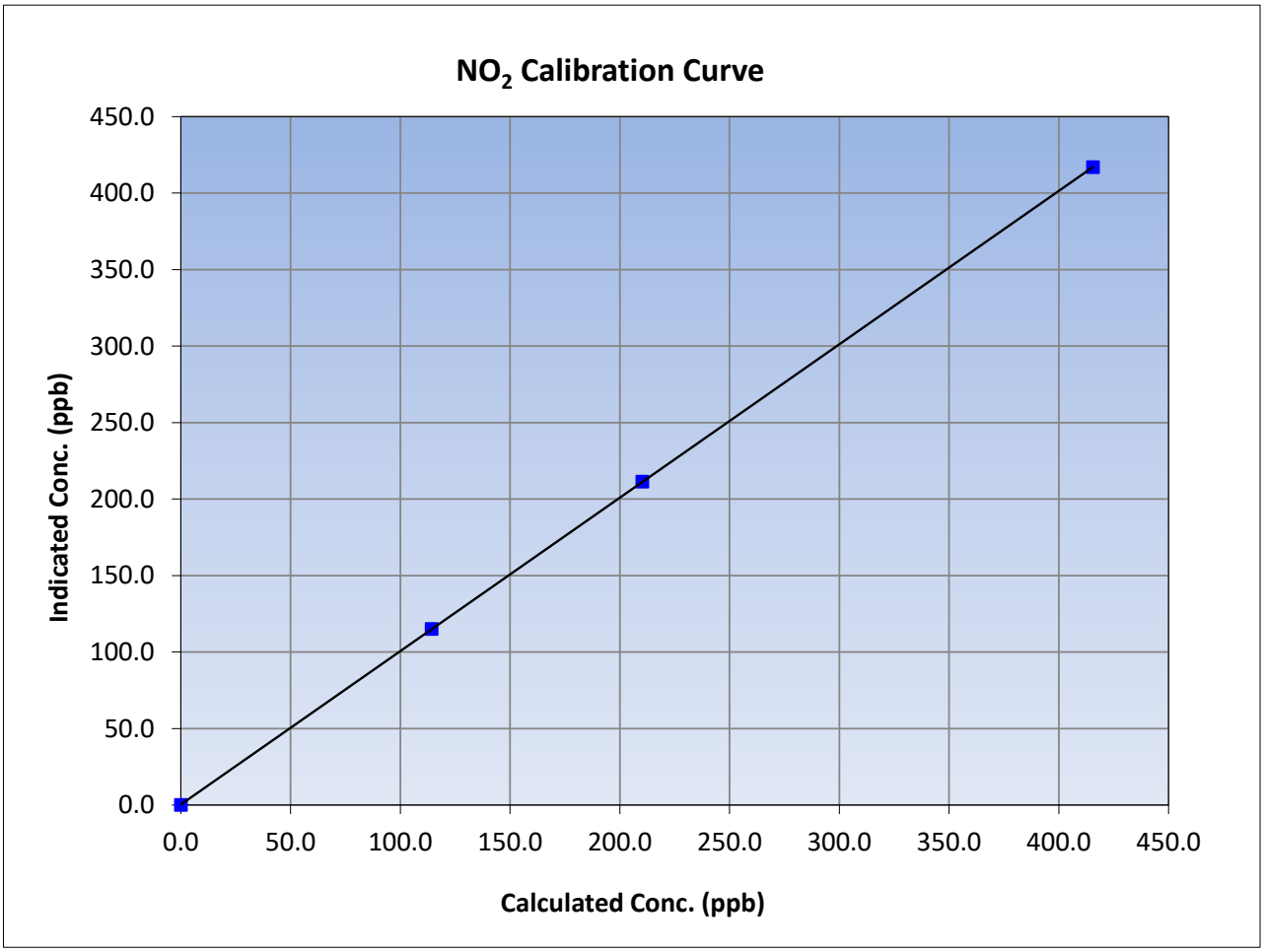
Version-04-2020

Station Information

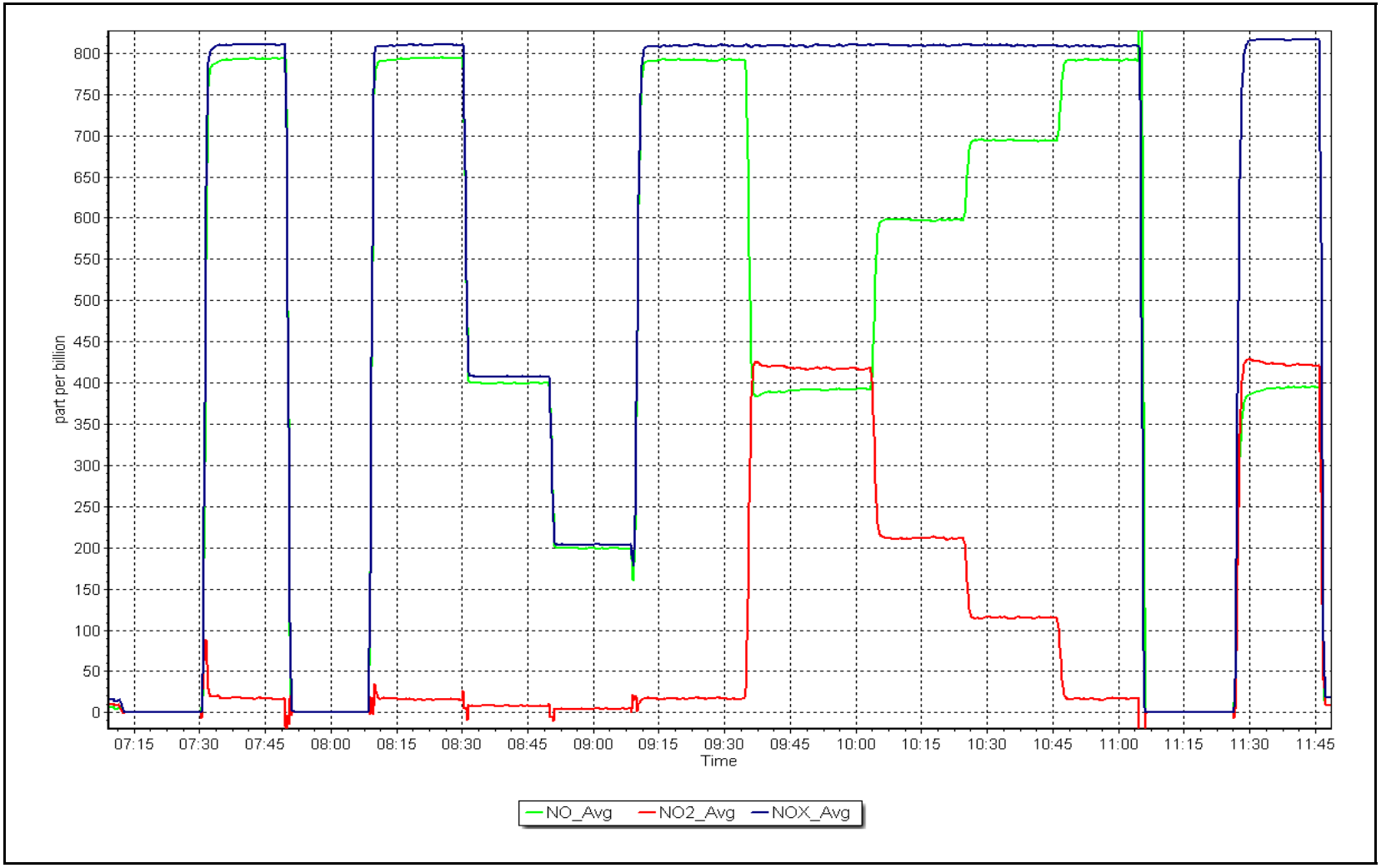
Calibration Date:	January 19, 2023	Previous Calibration:	December 12, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:10	End Time (MST):	11:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999999	*≥0.995*
415.5	416.9	0.9967			
210.2	211.3	0.9950	Slope	1.002806	*0.90 - 1.10*
114.2	115.1	0.9925			
			Intercept	0.326300	*+/-20*



NO_X Calibration Plot Date: January 19, 2023 Location: Athabasca Valley



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 20, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	10:28	End time (MST):	13:37
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 #:	1507964700
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997143	0.995429	Backgd or Offset:	-0.5	-0.6
Calibration intercept:	1.100000	1.500000	Coeff or Slope:	1.070	1.102

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	1374.8	400.0	391.6	1.021
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	1374.3	400.0	399.0	1.003
second point	5000	1017.7	200.0	201.6	0.992
third point	5000	840.4	100.0	101.7	0.983
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	1373.6	400.0	403.5	0.991
				Average Correction Factor	0.993

Baseline Corr As found:	391.7	Previous response	400.0	*% change	-2.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No Maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

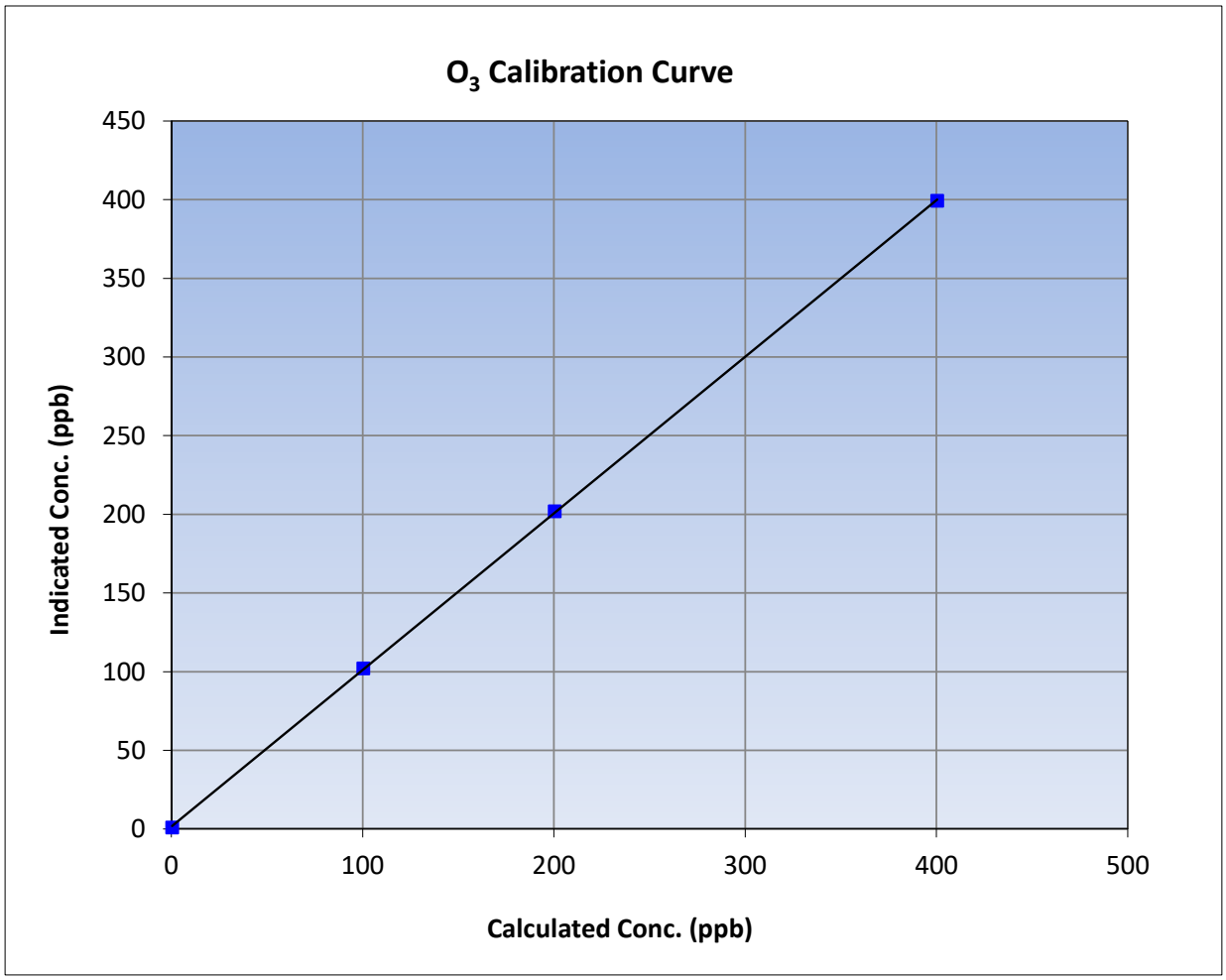
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 6, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:28	End Time (MST):	13:37
Analyzer make:	Thermo 49i	Analyzer serial #:	1507964700

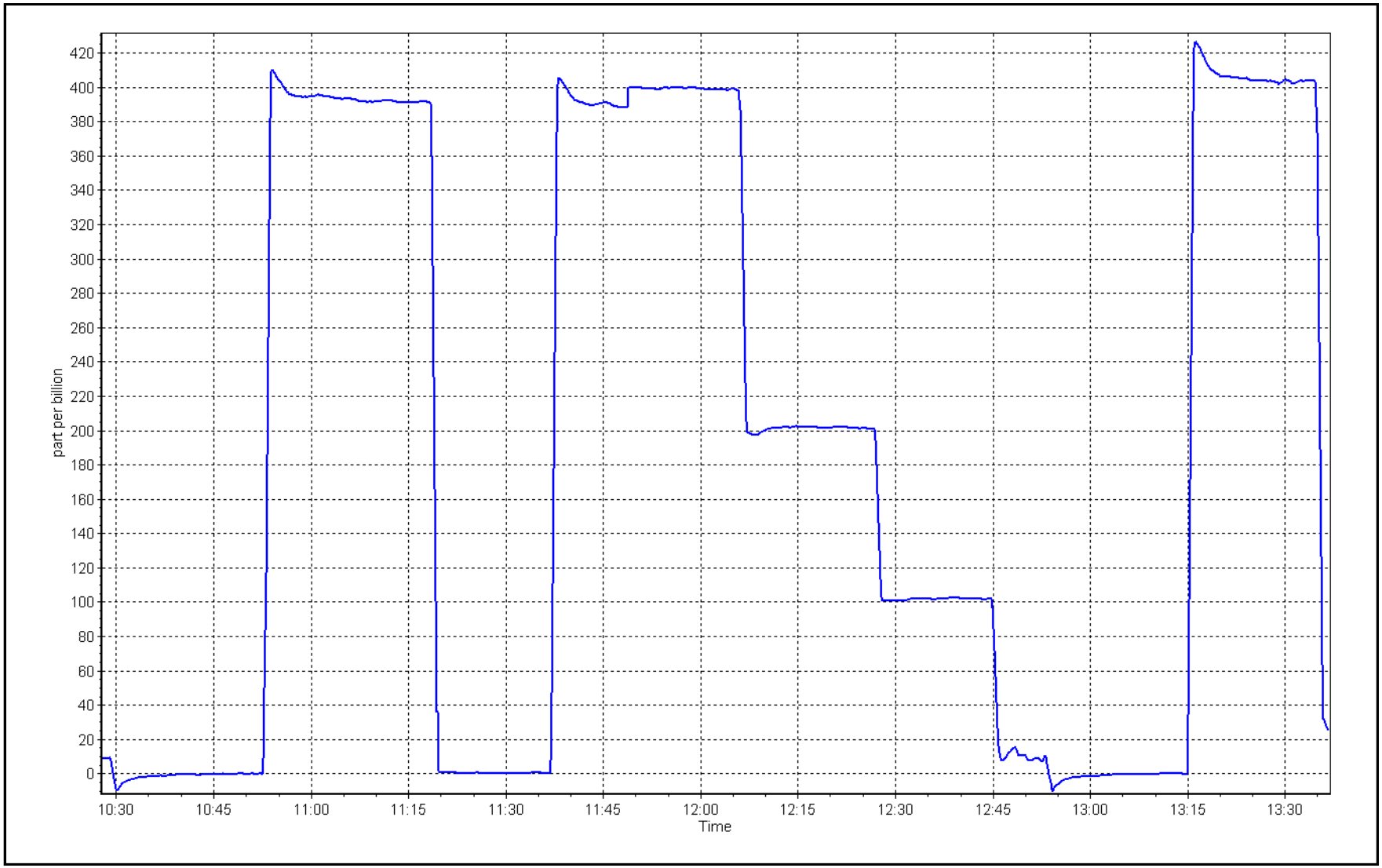
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
400.0	399.0	1.0025
200.0	201.6	0.9921
100.0	101.7	0.9833

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999966	*≥0.995*
Slope	0.995429	*0.90 - 1.10*
Intercept	1.500000	*+/- 5*



O_3 Calibration Plot Date: January 20, 2023 Location: Athabasca Valley



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	January 19, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:51	End time (MST):	12:29
Analyzer Make:	API T640	S/N:	326
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 (^{o}C)	-6.0	-6.1	-6.0	☐	+/- 2 ^{o}C
P (mmHg)	733.1	735.2	733.1	☐	+/- 10 mmHg
flow (LPM)	5.00	5.08	5.00	☐	+/- 0.25 LPM

Leak Test: Date of check: January 19, 2023 December 5, 2022

PM w/o HEPA: 11.2 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 5, 2022

Disposable Filter Changed: December 5, 2022

Annual Maintenance

Date Sample Tube Cleaned: December 5, 2022

Date RH/T Sensor Cleaned: December 5, 2022

Notes: No adjustments done. Inlet Head cleaned.

Calibration by: Melissa Lemay

Wood Buffalo Environmental Association

CO Calibration Report

Version-01-2020

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	January 20, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	7:05	End time (MST):	9:52
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999858	0.999713	Backgd or Offset:	3.341	3.600
Calibration intercept:	0.074542	0.044565	Coeff or Slope:	1.079	1.079

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	----
as found span	4933	66.7	40.0	40.4	0.991
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	----
high point	4933	66.7	40.0	40.0	1.001
second point	4967	33.3	20.0	20.1	0.992
third point	4983	16.7	10.0	10.0	0.998
as left zero	5000	0.0	0.0	0.0	----
as left span	4933	66.7	40.0	40.0	1.001
				Average Correction Factor	0.997

Baseline Corr As found:	40.38	Prev response:	40.09	*% change:	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No Maintenance done. Zero adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

CO Calibration Summary

Version-01-2020

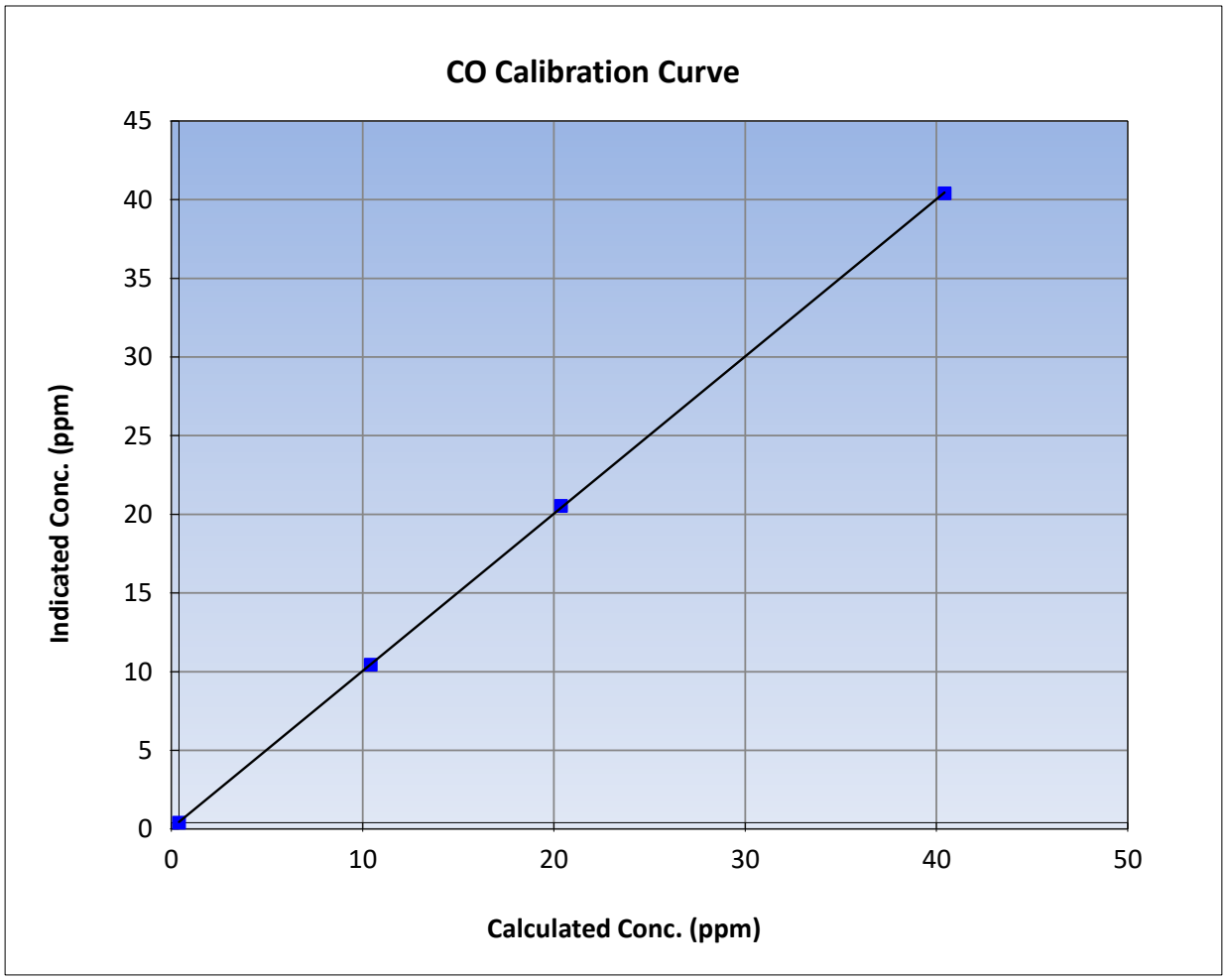
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 14, 2022
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	7:05	End Time (MST):	9:52
Analyzer make:	Thermo 48i-LTE	Analyzer serial #:	1408761381

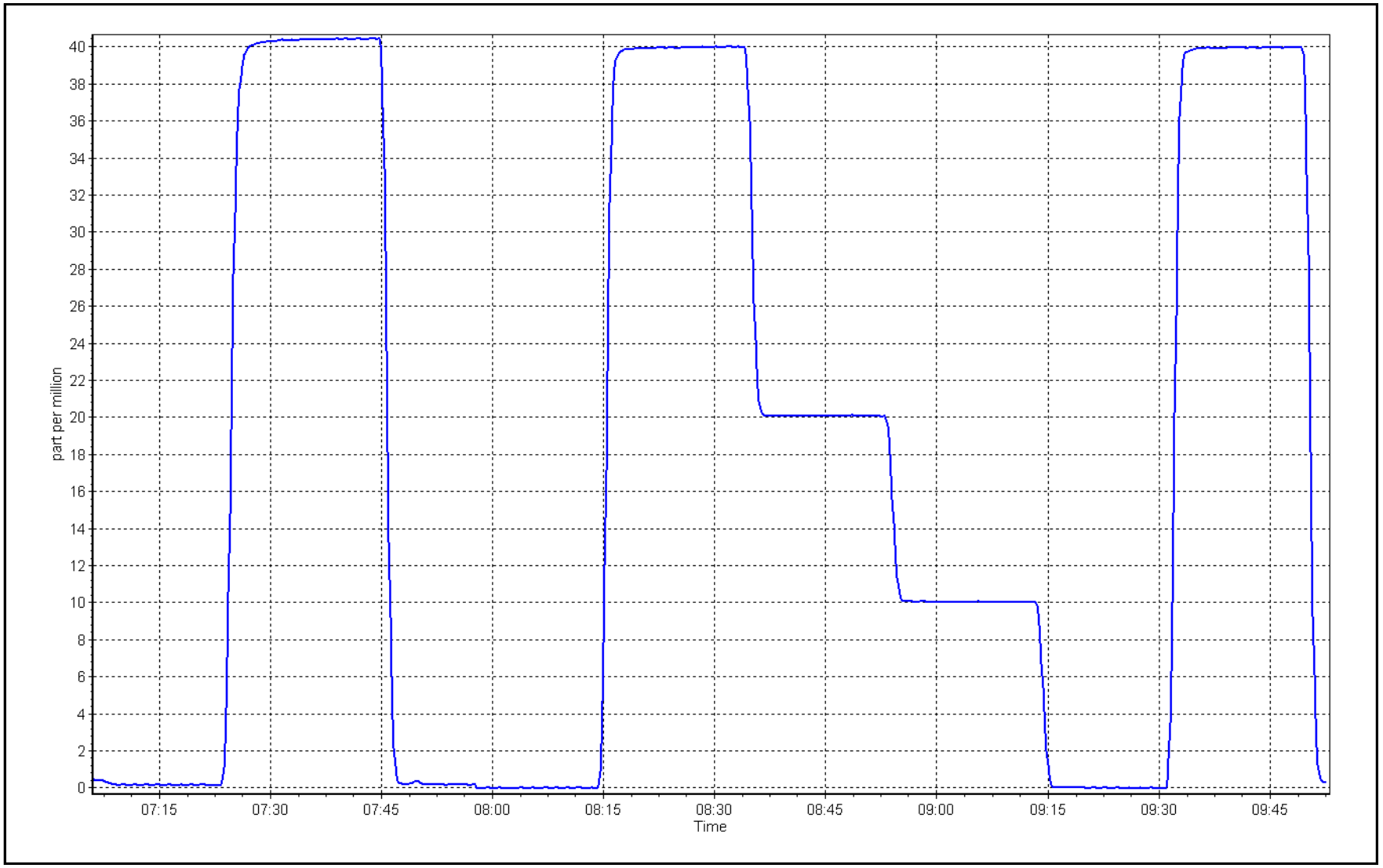
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.0	40.0	1.0006
20.0	20.1	0.9920
10.0	10.0	0.9981

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999977	*≥0.995*
Slope	0.999713	*0.90 - 1.10*
Intercept	0.044565	*+/-1.5*



CO Calibration Plot Date: January 20, 2023 Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS08
FORT CHIPEWYAN
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 11, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	12:19	End time (MST):	3:08 PM
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 Make/Model:	Teledyne API T700		Serial Number:	3252
ZAG Make/Model:	Teledyne API T701		Serial Number:	260

Analyzer Information

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

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999374	1.000787	Backgd or Offset:	1.31	1.32
Calibration intercept:	0.136257	0.415954	Coeff or Slope:	1.006	1.006

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*
as found zero	5000	0.0	0.0	0.1	----
as found span	4920	80.3	800.4	804.8	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	----
high point	4920	80.3	800.4	801.7	0.998
second point	4960	40.2	400.7	400.4	1.001
third point	4980	20.1	200.4	201.9	0.992
as left zero	5000	0.0	0.0	0.3	----
as left span	4920	80.3	800.4	806.4	0.993
				Average Correction Factor	0.997

Baseline Corr As found:	804.70	Previous response	800.02	*% change	0.6%

* = > +/-5% change initiates investigation

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

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

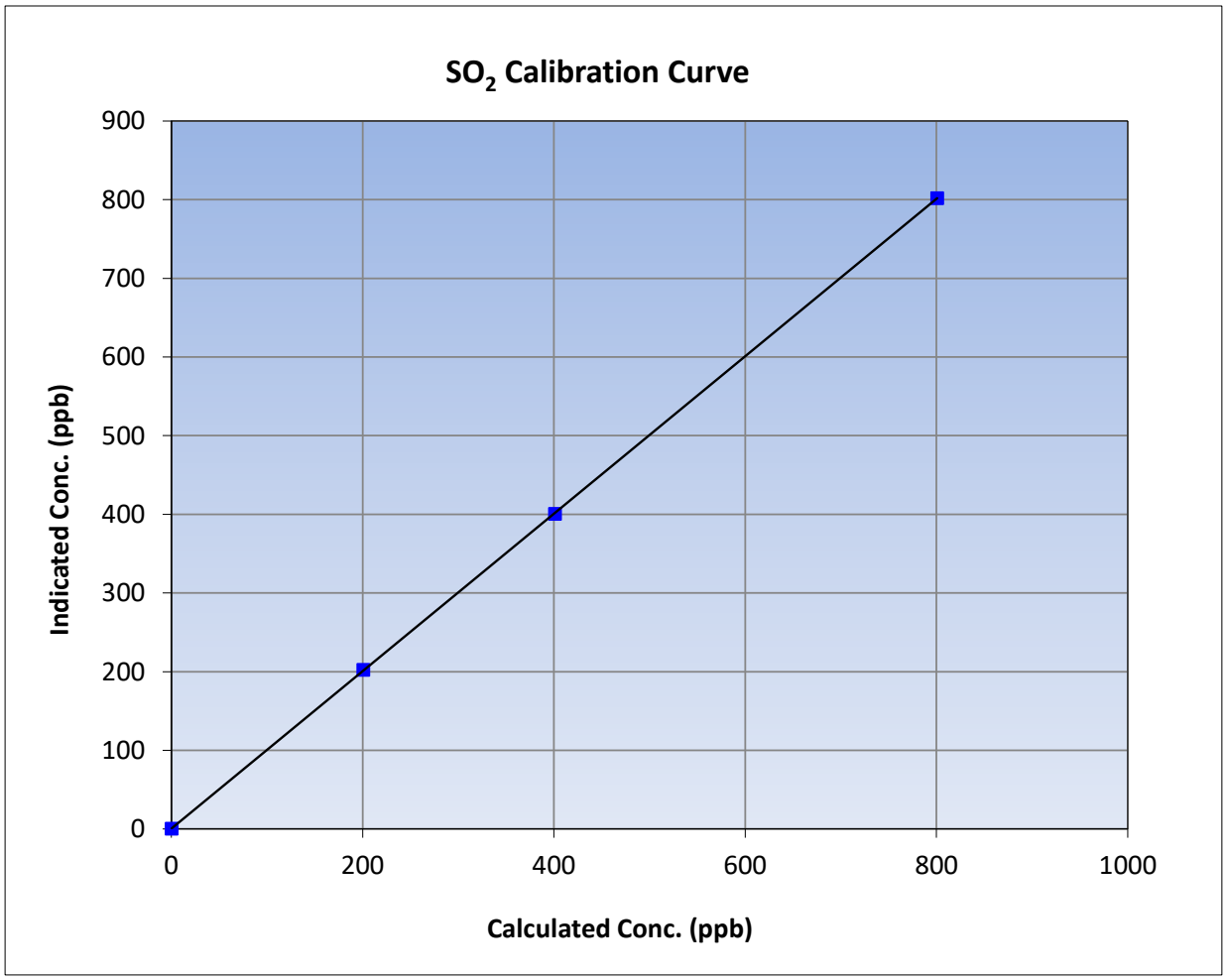
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	12:19	End Time (MST):	15:08
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

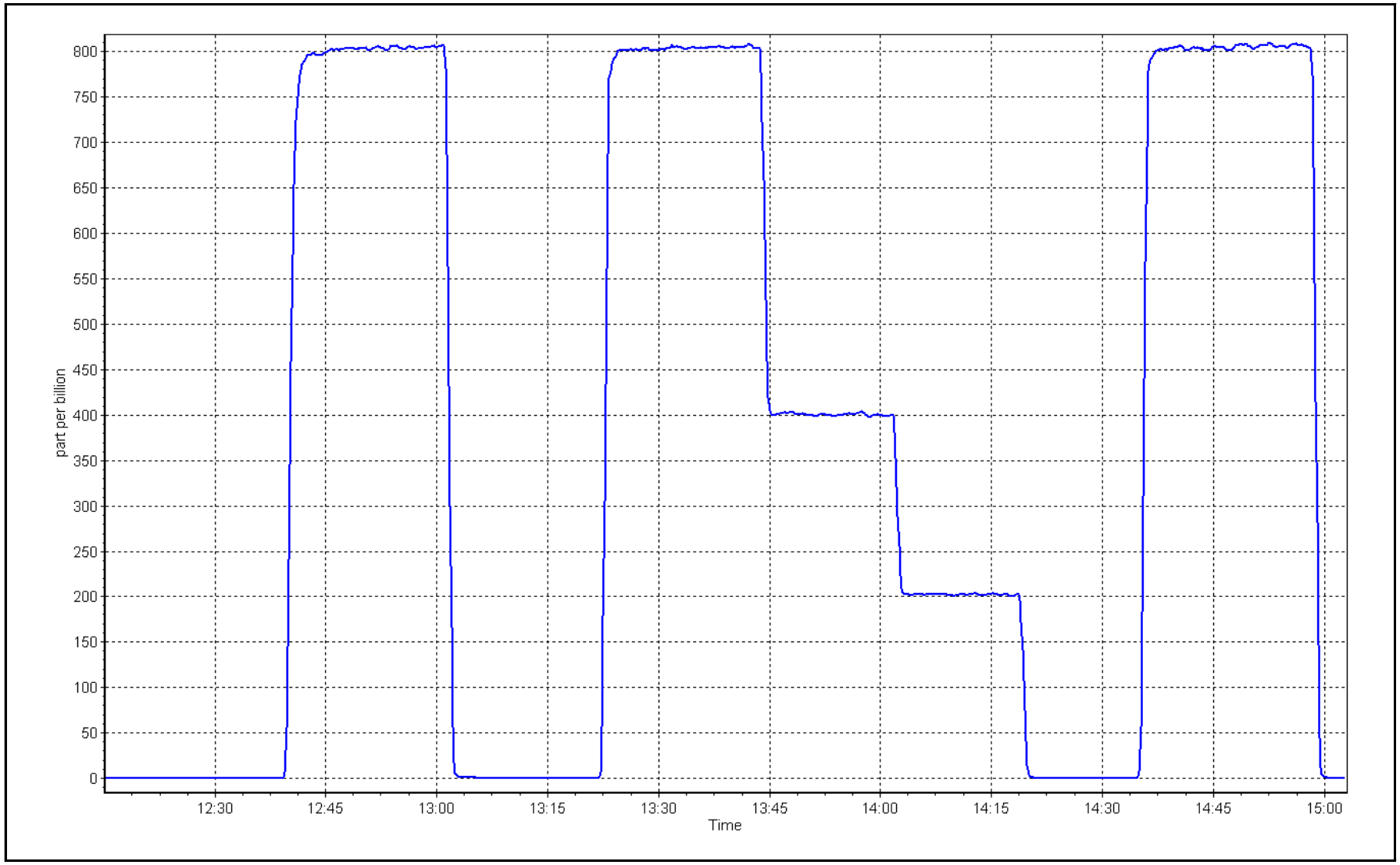
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.4	801.7	0.9984
400.7	400.4	1.0007
200.4	201.9	0.9923

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.000787	*0.90 - 1.10*
Intercept	0.415954	*+/-30*



SO2 Calibration Plot Date: January 11, 2023 Location: Fort Chipewyan



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 11, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	8:20	End time (MST):	12:05
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:	260

Analyzer Information

Analyzer make:	Thermo 43iQ-TL		Analyzer serial #:	1203169744	
Converter make:	CDN-101		Converter serial #:	14639	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001428	0.999140	Backgd or Offset:	1.42	1.42
Calibration intercept:	-0.261248	0.018799	Coeff or Slope:	0.743	0.743

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4920	80.5	80.0	80.1	0.998
as found 2nd point	4960	40.2	40.0	39.9	0.999
as found 3rd point	4980	20.1	20.0	19.7	1.009
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.0	----
high point	4920	80.5	80.0	79.9	1.001
second point	4960	40.2	40.0	40.1	0.996
third point	4980	20.1	20.0	19.9	1.004
as left zero	5000	0.0	0.0	0.1	----
as left span	4920	80.5	80.0	80.1	0.999
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	----
Date of last scrubber change:		March 7, 2022		Ave Corr Factor	1.001
Date of last converter efficiency test:		March 15, 2022		100.7%	efficiency

Baseline Corr As found:	80.2	Prev response:	79.86	*% change:	0.4%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.003284	AF Intercept:	-0.201206
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999991		

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Scrubber check completed after the calibrator zero. No adjustments

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

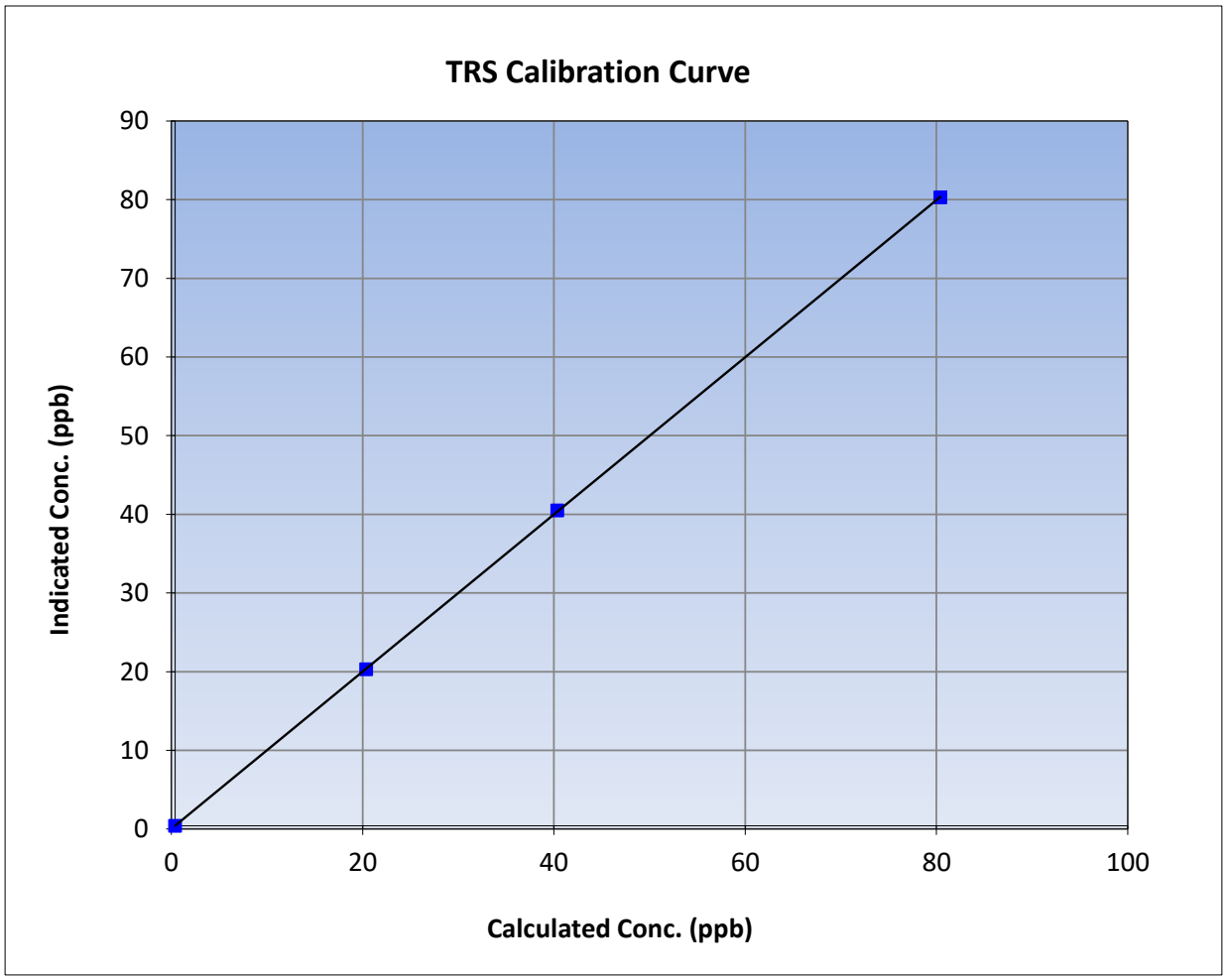
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	8:20	End Time (MST):	12:05
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

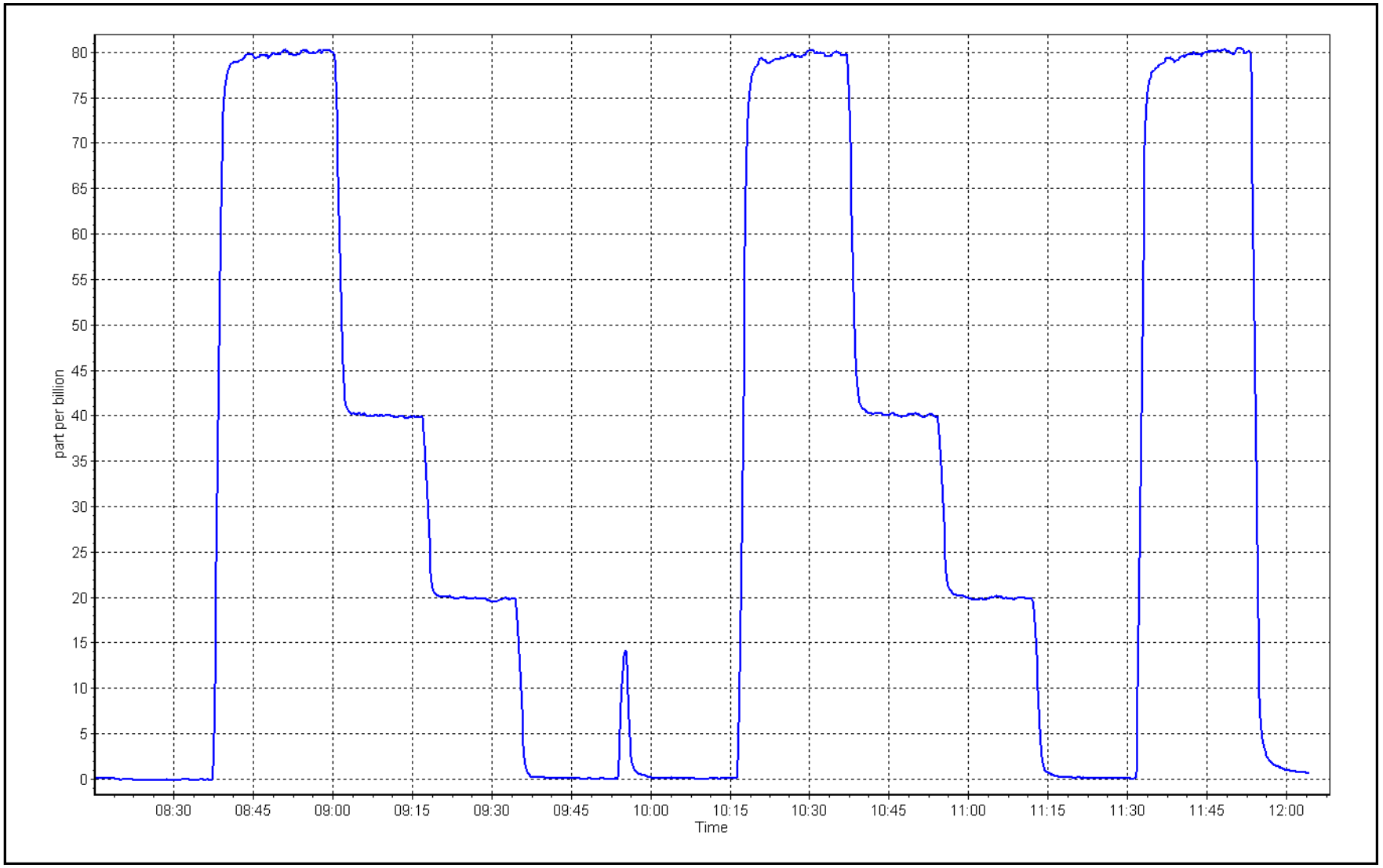
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	79.9	1.0014
40.0	40.1	0.9964
20.0	19.9	1.0040

Statistical Evaluation		Limits
Correlation Coefficient	0.999990	≥0.995
Slope	0.999140	0.90 - 1.10
Intercept	0.018799	+/-3



TRS Calibration Plot Date: January 11, 2023 Location: Fort Chipewyan



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 10, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	10:28	End time (MST):	15:41
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	CC363447		Cal Gas Expiry Date:	February 2, 2024	
NOX Cal Gas Conc:	48.80	ppm	NO Cal Gas Conc:	48.80	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.80	ppm	Removed Gas NO Conc:	48.80	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3252	
ZAG make/model:	Teledyne API T701H		Serial Number:	260	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.819	1.844	NO bkgnd or offset:	6.8	6.9
NOX coeff or slope:	0.997	0.993	NOX bkgnd or offset:	6.8	6.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	252.6	252.6

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.998229	0.995345
NO_X Cal Offset:	-1.120000	0.840000
NO Cal Slope:	1.000300	0.998815
NO Cal Offset:	-2.120000	-0.200000
NO_2 Cal Slope:	1.005217	0.991767
NO_2 Cal Offset:	-0.633827	-0.832054

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.9	0.7	0.1	----	----
as found span	4918	82.0	800.3	800.3	0.0	794.0	787.9	6.8	1.0080	1.0158
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	1.0	0.9	0.1	----	----
high point	4918	82.0	800.3	800.3	0.0	797.7	800.0	-2.2	1.0033	1.0004
second point	4959	41.0	400.2	400.2	0.0	398.5	398.1	0.4	1.0042	1.0052
third point	4980	20.5	200.1	200.1	0.0	200.2	199.1	1.1	0.9994	1.0049
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
as left span	4918	82.0	800.3	412.1	388.2	800.5	412.4	388.3	0.9998	0.9993
								Average Correction Factor	1.0023	1.0035

Corrected As found	NO_X = 793.1 ppb	NO = 787.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.6%		
Previous Response	NO_X = 797.8 ppb	NO = 798.4 ppb		*Percent Change	NO = -1.4%		
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.4	410.2	388.2	384.8	1.0088	99.1%
2nd GPT point (200 ppb O3)	798.4	603.7	194.7	191.3	1.0178	98.3%
3rd GPT point (100 ppb O3)	798.4	704.5	93.9	91.7	1.0240	97.7%
				Average Correction Factor	1.0169	98.3%

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

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

NO_X Calibration Summary

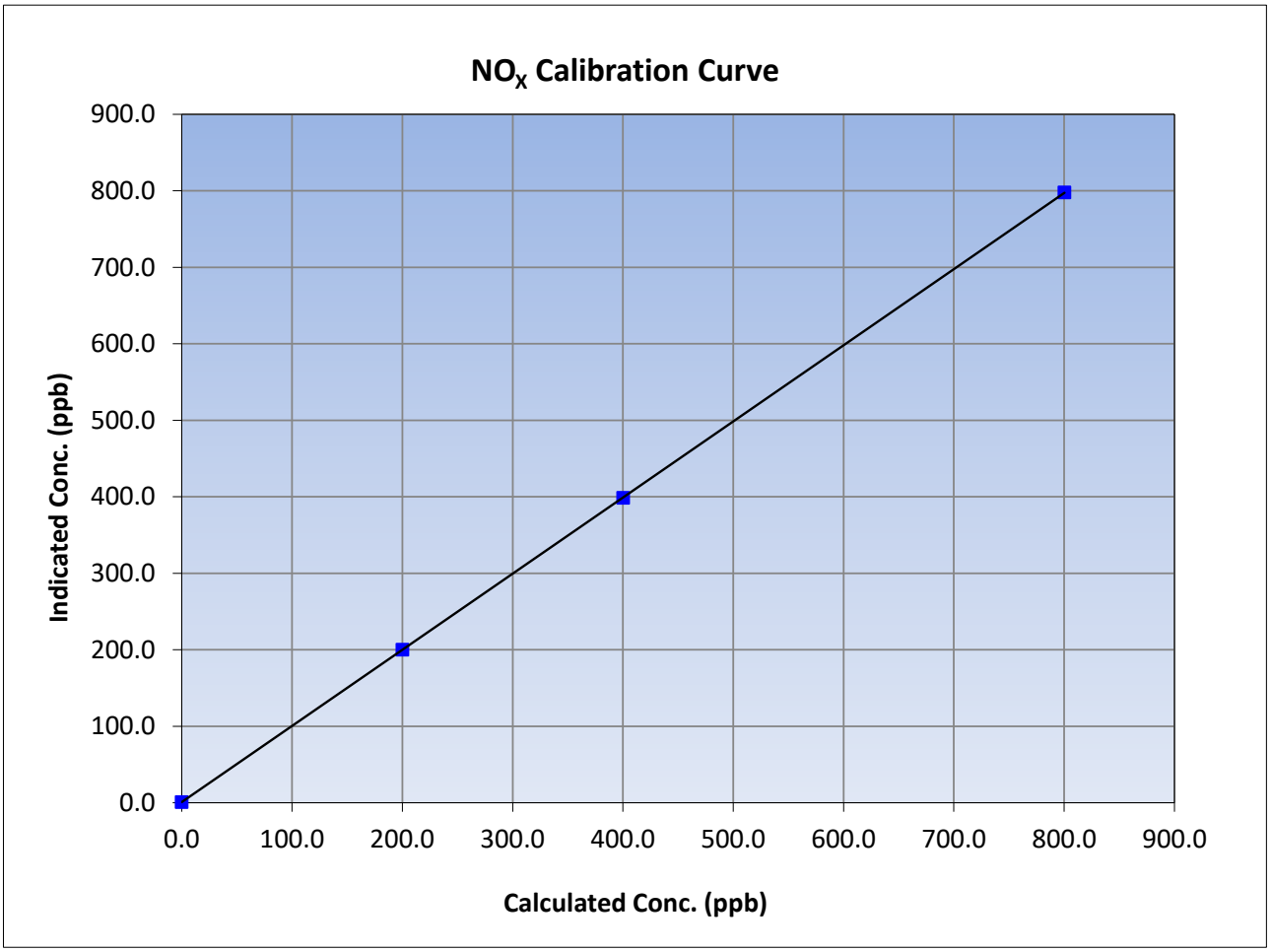
Version-04-2020

Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	10:28	End Time (MST):	15:41
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	1.0	----	Correlation Coefficient	0.999998	≥0.995
800.3	797.7	1.0033			
400.2	398.5	1.0042	Slope	0.995345	0.90 - 1.10
200.1	200.2	0.9994			
			Intercept	0.840000	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

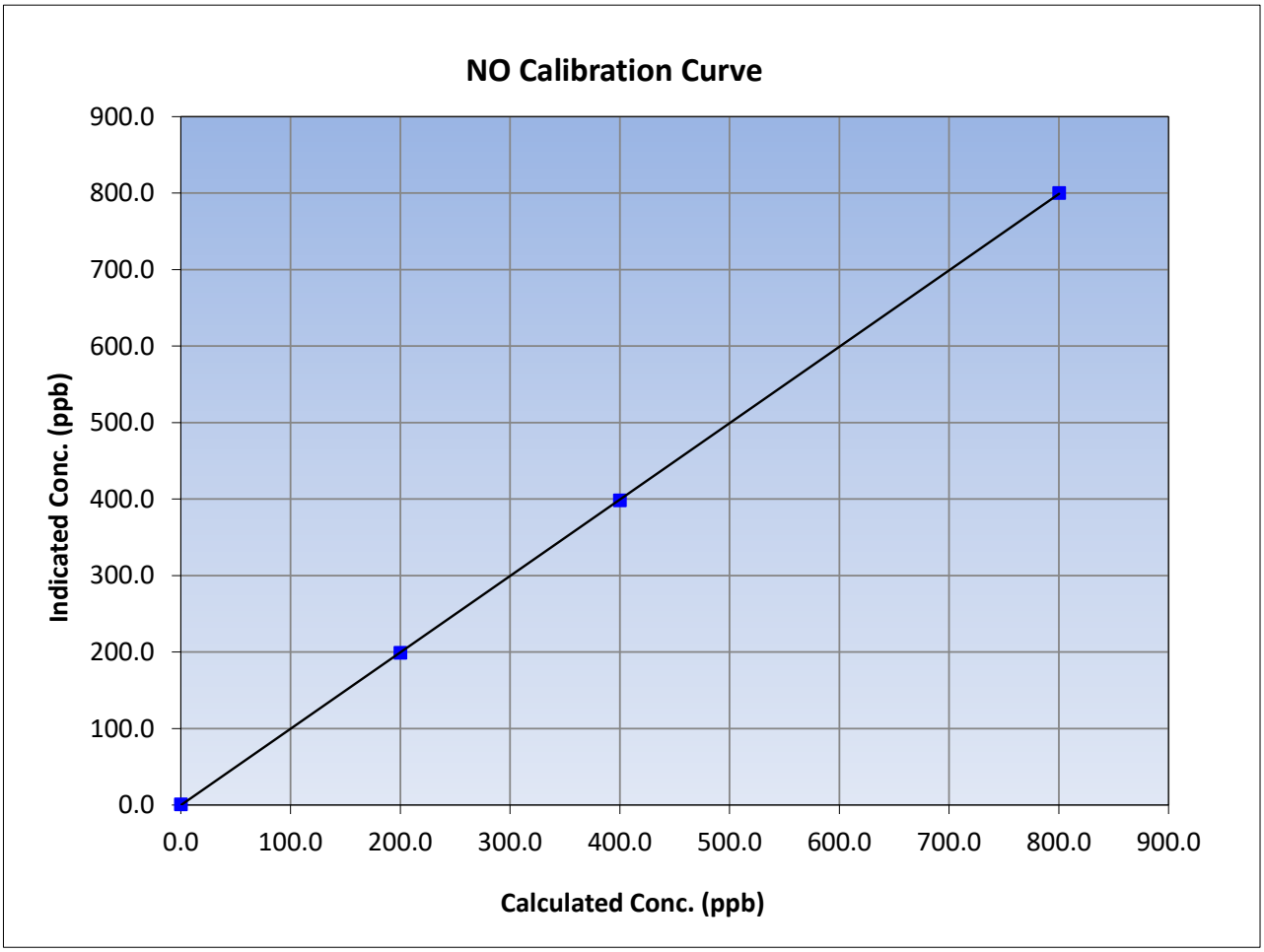
Version-04-2020

Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	10:28	End Time (MST):	15:41
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	0.9	----	Correlation Coefficient	0.999988	≥0.995
800.3	800.0	1.0004			
400.2	398.1	1.0052	Slope	0.998815	0.90 - 1.10
200.1	199.1	1.0049			
			Intercept	-0.200000	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

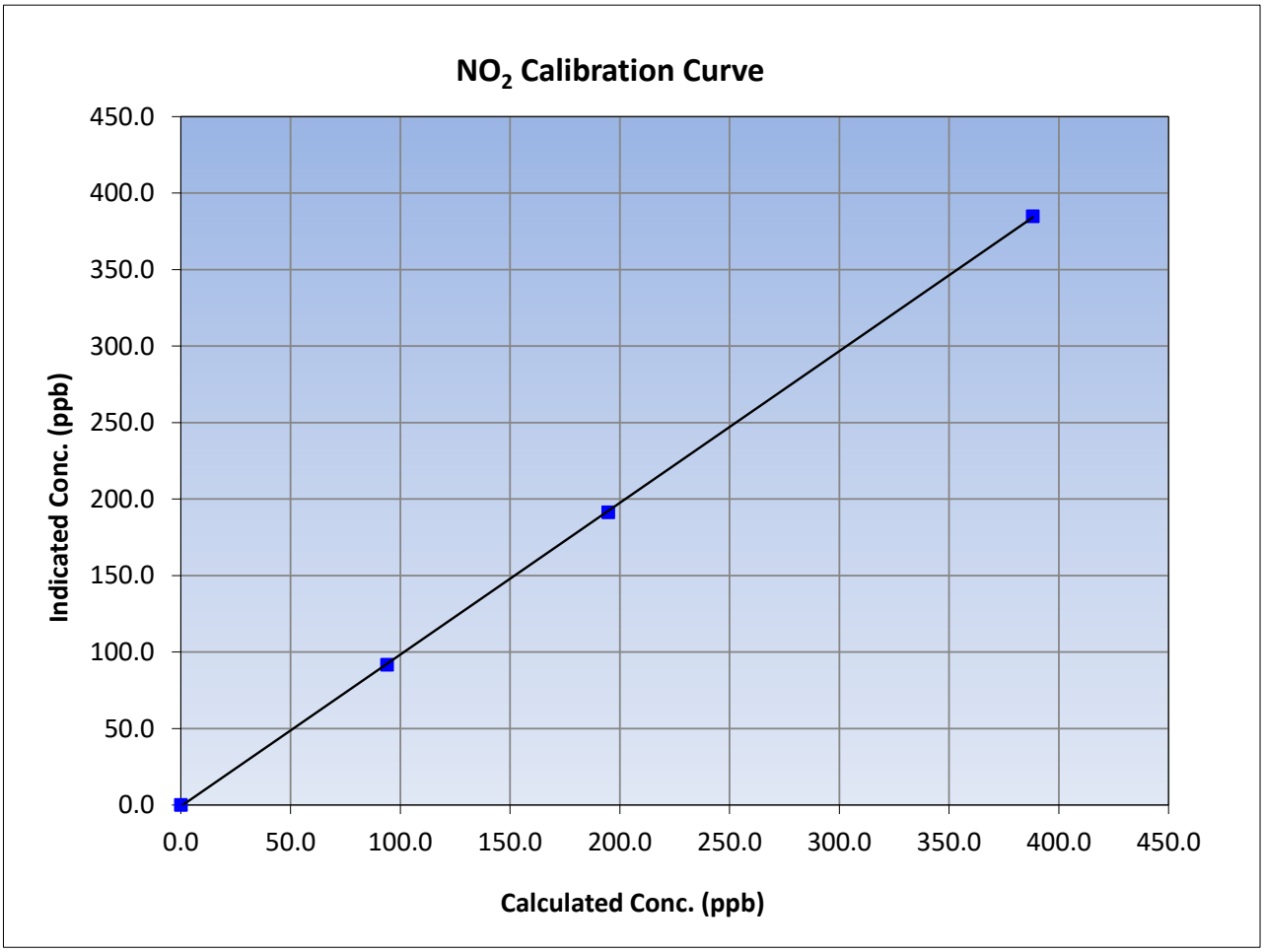
Version-04-2020

Station Information

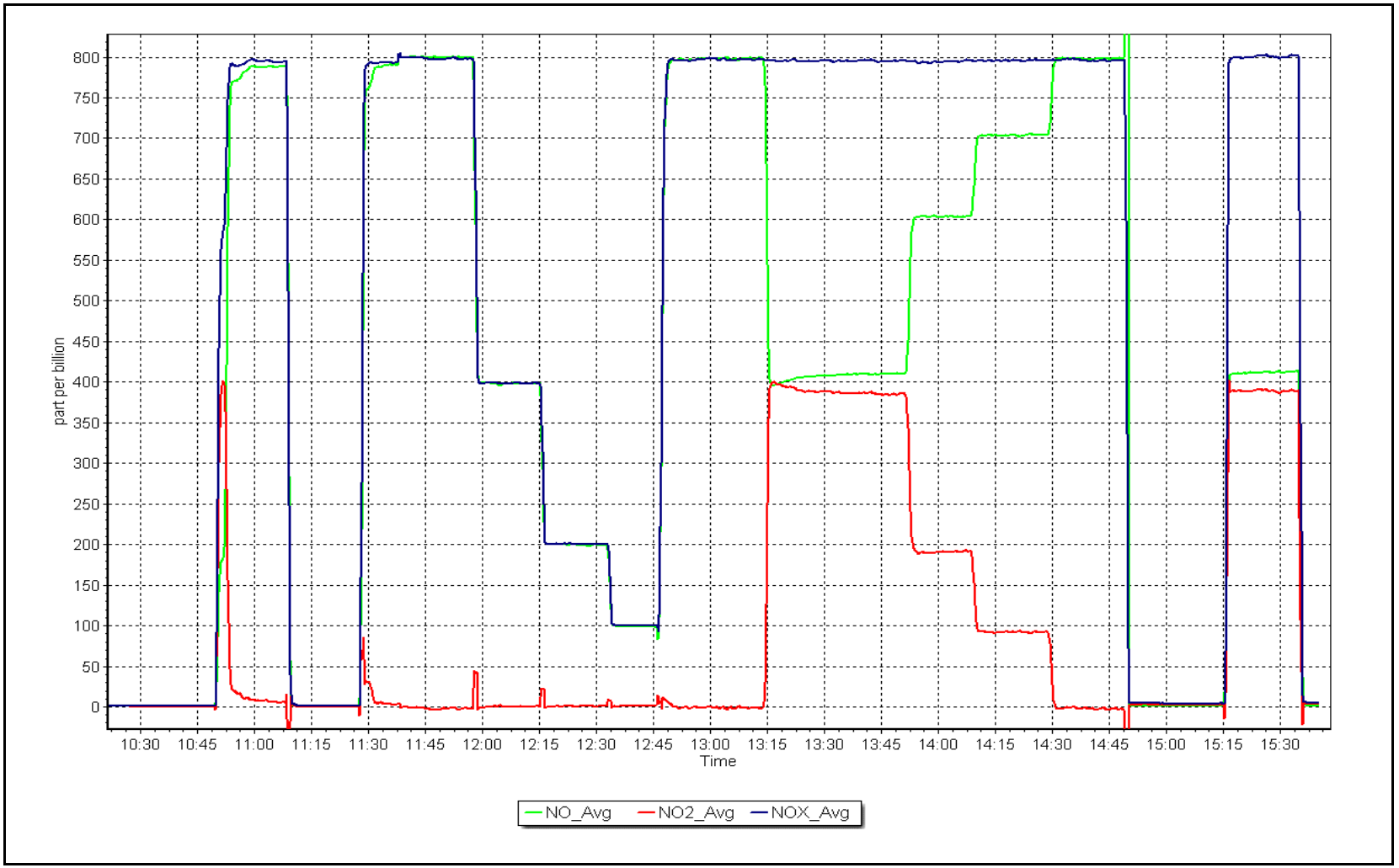
Calibration Date:	January 10, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	10:28	End Time (MST):	15:41
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999969	≥0.995
388.2	384.8	1.0088			
194.7	191.3	1.0178	Slope	0.991767	0.90 - 1.10
93.9	91.7	1.0240			
			Intercept	-0.832054	+/-20



NO_X Calibration Plot Date: January 10, 2023 Location: Fort Chipewyan



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 10, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	7:47	End time (MST):	10:23
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:	260

Analyzer Information

Analyzer make:	Teledyne API T400	Analyzer serial #:	3872
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009714	1.011486	Backgd or Offset:	-2.0	-2.0
Calibration intercept:	-0.900000	-0.960000	Coeff or Slope:	1.036	1.036

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	NA	0.0	0.3	----
as found span	5000	963.6	400.0	404.6	0.989
as found 2nd point					
as found 3rd point					
calibrator zero	5000	NA	0.0	0.5	----
high point	5000	961.7	400.0	404.4	0.989
second point	5000	810.3	200.0	200.5	0.998
third point	5000	701.3	100.0	98.8	1.012
as left zero	5000	NA	0.0	0.1	----
as left span	5000	963.3	400.0	405.2	0.987
				Average Correction Factor	1.000

Baseline Corr As found:	404.3	Previous response	403.0	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Morgan Voyageur

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

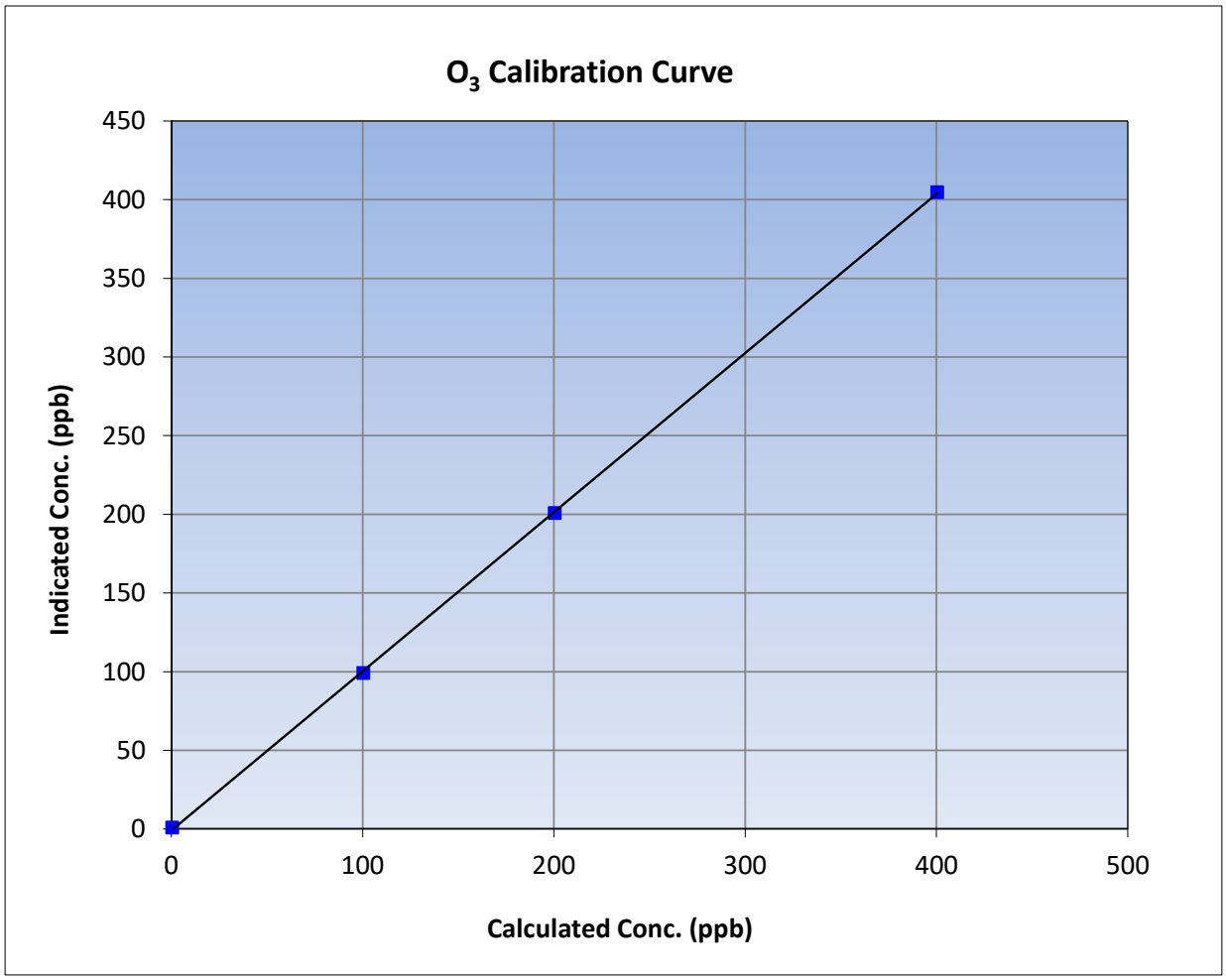
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	7:47	End Time (MST):	10:23
Analyzer make:	Teledyne API T400	Analyzer serial #:	3872

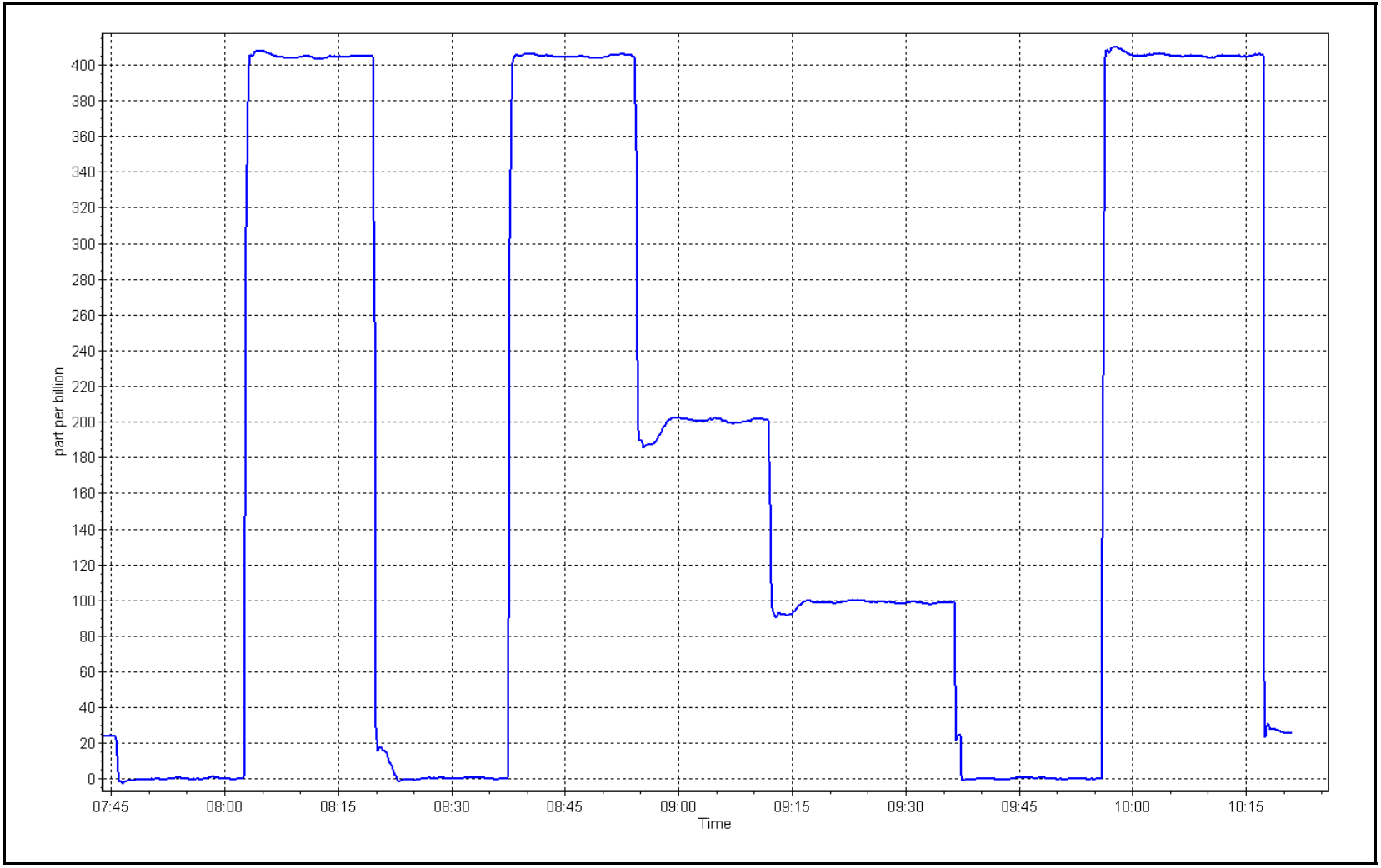
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
400.0	404.4	0.9891
200.0	200.5	0.9975
100.0	98.8	1.0121

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999940	*≥0.995*
Slope	1.011486	*0.90 - 1.10*
Intercept	-0.960000	*+/- 5*



O_3 Calibration Plot Date: January 10, 2023 Location: Fort Chipewyan



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Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	January 11, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	10:55	End time (MST):	11:33
Analyzer Make:	Teledyne API T640	S/N:	216
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1212
Temp/RH standard:	Delta Cal	S/N:	1212

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-8.8	-8.8	-8.8	☐	+/- 2 ^{o}C
P (mmHg)	740.7	741.8	740.7	☐	+/- 10 mmHg
flow (LPM)	5.05	4.99	5.05	☐	+/- 0.25 LPM

Leak Test: Date of check: January 11, 2023 Last Cal Date: December 5, 2022

PM w/o HEPA: 2.8 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
PMT Peak Test				☐	11.1 +/- 0.5

Date Optical Chamber Cleaned: December 5, 2022

Disposable Filter Changed: December 5, 2022

Annual Maintenance

Date Sample Tube Cleaned: July 14, 2022

Date RH/T Sensor Cleaned: July 14, 2022

Notes: No adjustments made.

Calibration by: Morgan Voyageur

Wood Buffalo Environmental Association

CO Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 13, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	10:03	End time (MST):	13:07
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:	API T700		Serial Number:	5272
ZAG Make/Model:	API T701H		Serial Number:	197

Analyzer Information

Analyzer make: API T300 — Analyzer serial #: 3505

Analyzer Range: 0 - 50 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997591	0.995217	Backgd or Offset:	-0.013	-0.013
Calibration intercept:	-0.041052	0.070924	Coeff or Slope:	0.999	0.999

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.05	----
as found span	4933	66.7	40.4	40.3	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	----
high point	4934	66.7	40.4	40.3	1.004
second point	4967	33.3	20.2	20.2	0.998
third point	4983	16.7	10.1	10.1	1.002
as left zero	5000	0.0	0.0	0.1	----
as left span	2960	40.0	40.4	40.2	1.005
				Average Correction Factor	1.001

Baseline Corr As found:	40.26	Prev response:	40.28	*% change:	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Matthew Courtoreille Morgan V

Wood Buffalo Environmental Association

CO Calibration Summary

Version-01-2020

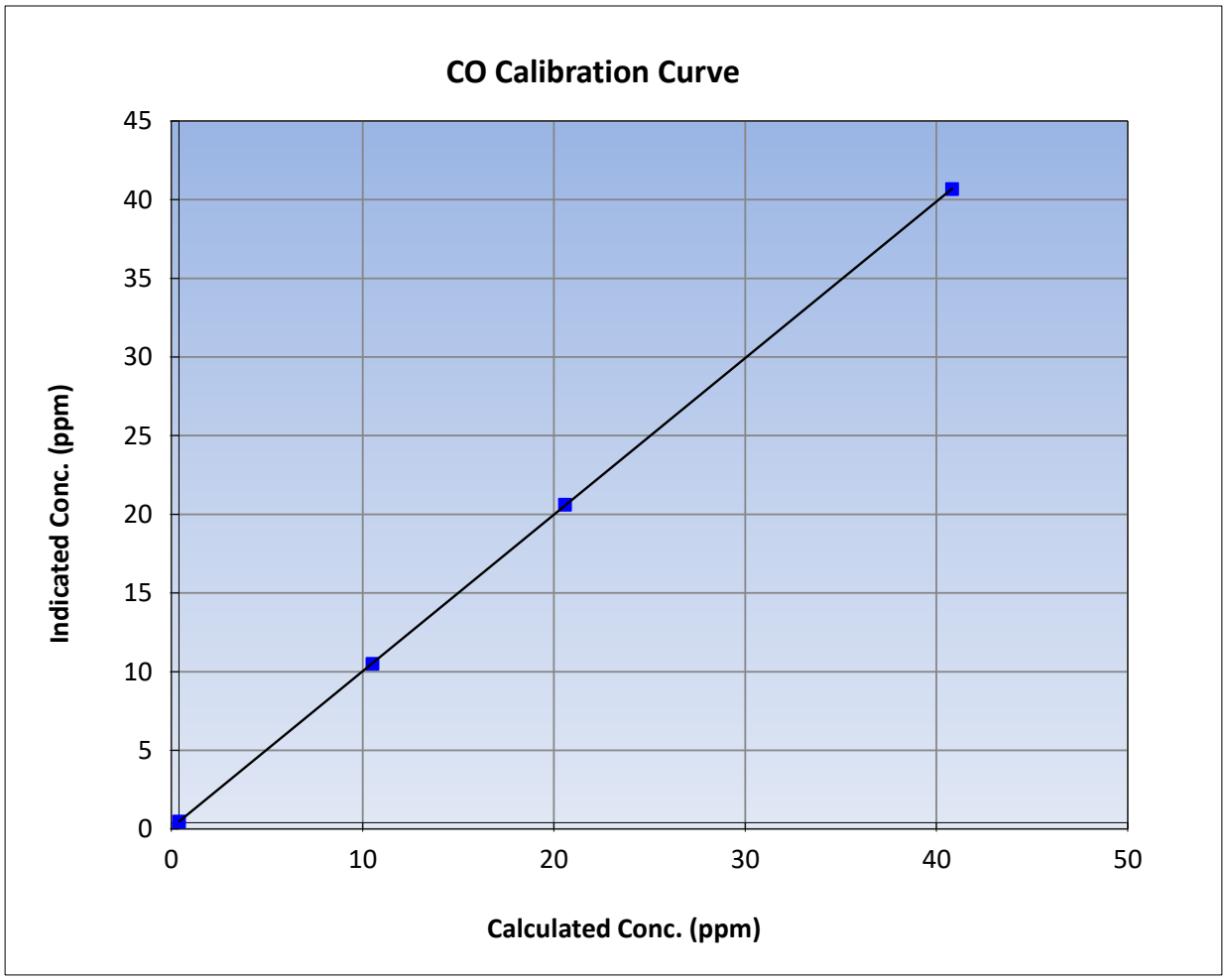
Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	10:03	End Time (MST):	13:07
Analyzer make:	API T300	Analyzer serial #:	3505

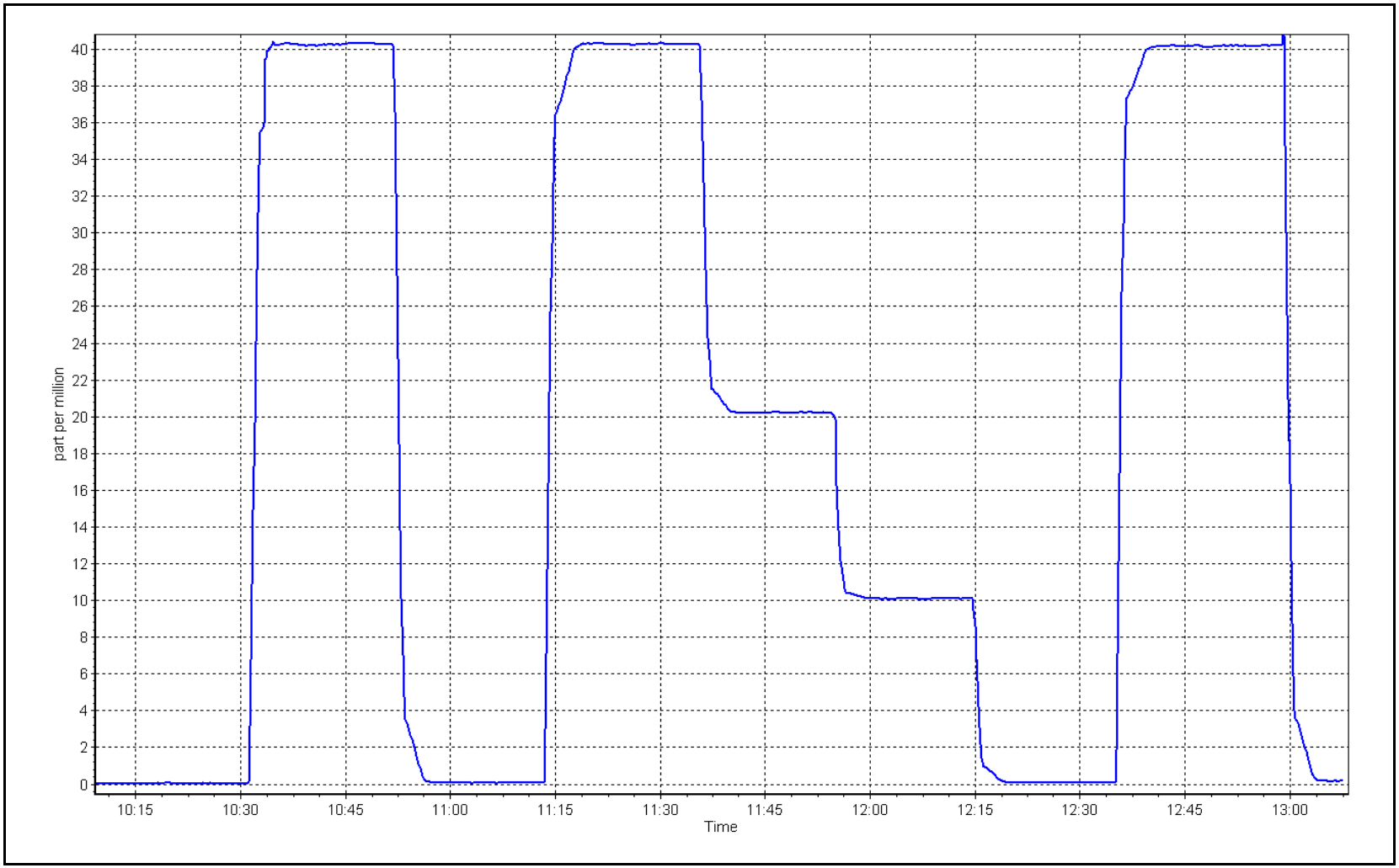
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
40.4	40.3	1.0036
20.2	20.2	0.9980
10.1	10.1	1.0020

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	0.995217	*0.90 - 1.10*
Intercept	0.070924	*+/-1.5*



CO Calibration Plot Date: January 13, 2023 Location: Fort Chipewyan



Wood Buffalo Environmental Association

CO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	January 13, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	13:11	End time (MST):	16:56
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:	5272
N2 Gen Make/Model:	NG 5000		Serial Number:	771048318

Analyzer Information

Analyzer make: Teledyne API T360 — Analyzer serial #: 289

Analyzer Range 0 - 2,000 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998681	0.998112	Backgd or Offset:	0.019	0.019
Calibration intercept:	-5.440000	-5.540000	Coeff or Slope:	1.007	1.011

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*
as found zero	3000	0.0	0.0	-0.2	----
as found span	2920	80.0	1605.9	1574.9	1.020
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	0.1	----
high point	2920	80.0	1605.9	1604.1	1.001
second point	2960	40.0	802.9	781.1	1.028
third point	2980	20.0	401.5	397.5	1.010
as left zero	3000	0.0	0.0	-0.3	----
as left span	2960	40.0	802.9	778.5	1.031
				Average Correction Factor	1.013

Baseline Corr As found:	1575.10	Prev response:	1598.31	*% 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

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

Calibration Performed By: Matthew Courtoreille Morgan V

Wood Buffalo Environmental Association

CO_2 Calibration Summary

Version-01-2020

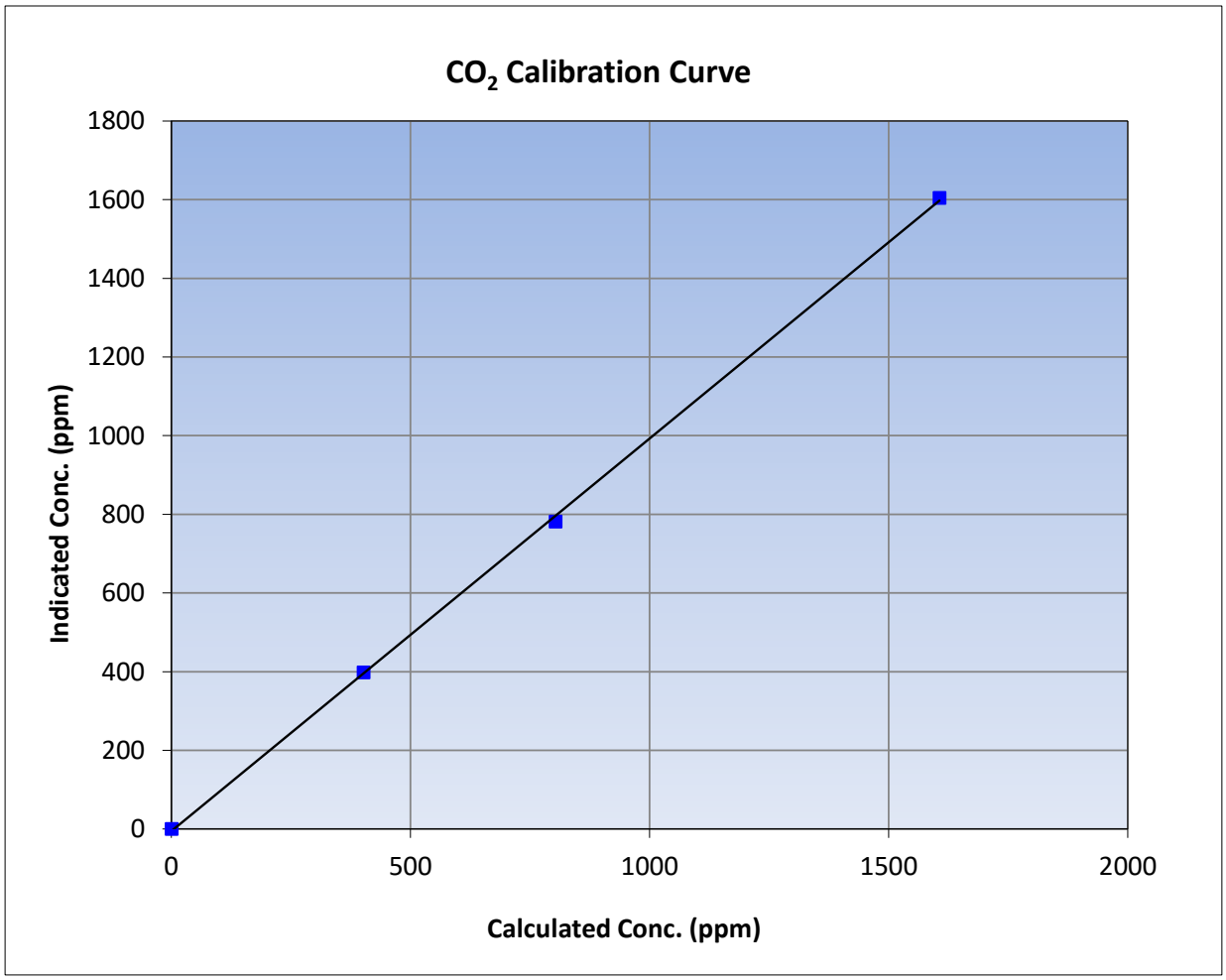
Station Information

Calibration Date	January 13, 2023	Previous Calibration	December 6, 2022
Station Name	Fort Chipewyan	Station Number	AMS08
Start Time (MST)	13:11	End Time (MST)	16:56
Analyzer make	Teledyne API T360	Analyzer serial #	289

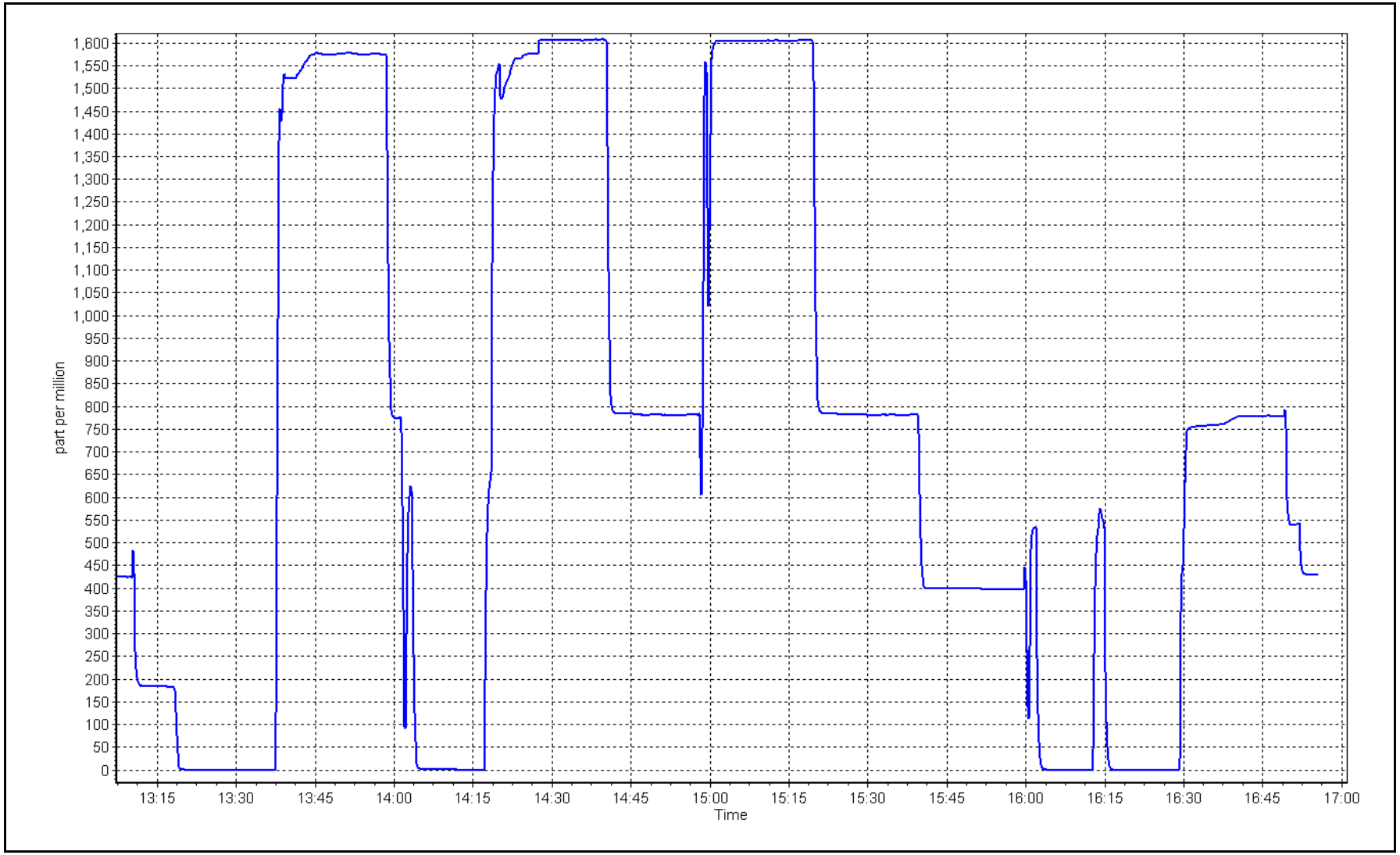
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
1605.9	1604.1	1.0011
802.9	781.1	1.0280
401.5	397.5	1.0100

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999785	*≥0.995*
Slope	0.998112	*0.90 - 1.10*
Intercept	-5.540000	*+/-20*



CO_2 Calibration Plot Date: January 13, 2023 Location: Fort Chipewyan



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09
BARGE LANDING
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Barge Landing	Station number:	AMS09
Calibration Date:	January 13, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	9:50	End time (MST):	13:51
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.96	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC151285			
Removed Cal Gas Conc:	49.96	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3812
ZAG Make/Model:	API T701		Serial Number:	4888

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 1118148498

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997747	0.994624	Backgd or Offset:	9.6	9.8
Calibration intercept:	-0.329817	-0.310040	Coeff or Slope:	0.986	0.986

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*
as found zero	5000	0.0	0.0	0.3	----
as found span	4919	80.2	801.5	796.3	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	----
high point	4919	80.2	801.5	797.5	1.005
second point	4959	40.1	400.8	397.0	1.009
third point	4980	20.0	199.8	198.5	1.007
as left zero	5000	0.0	0.0	0.3	----
as left span	4919	80.2	801.5	796.9	1.006
				Average Correction Factor	1.007

Baseline Corr As found:	796.00	Previous response	799.35	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

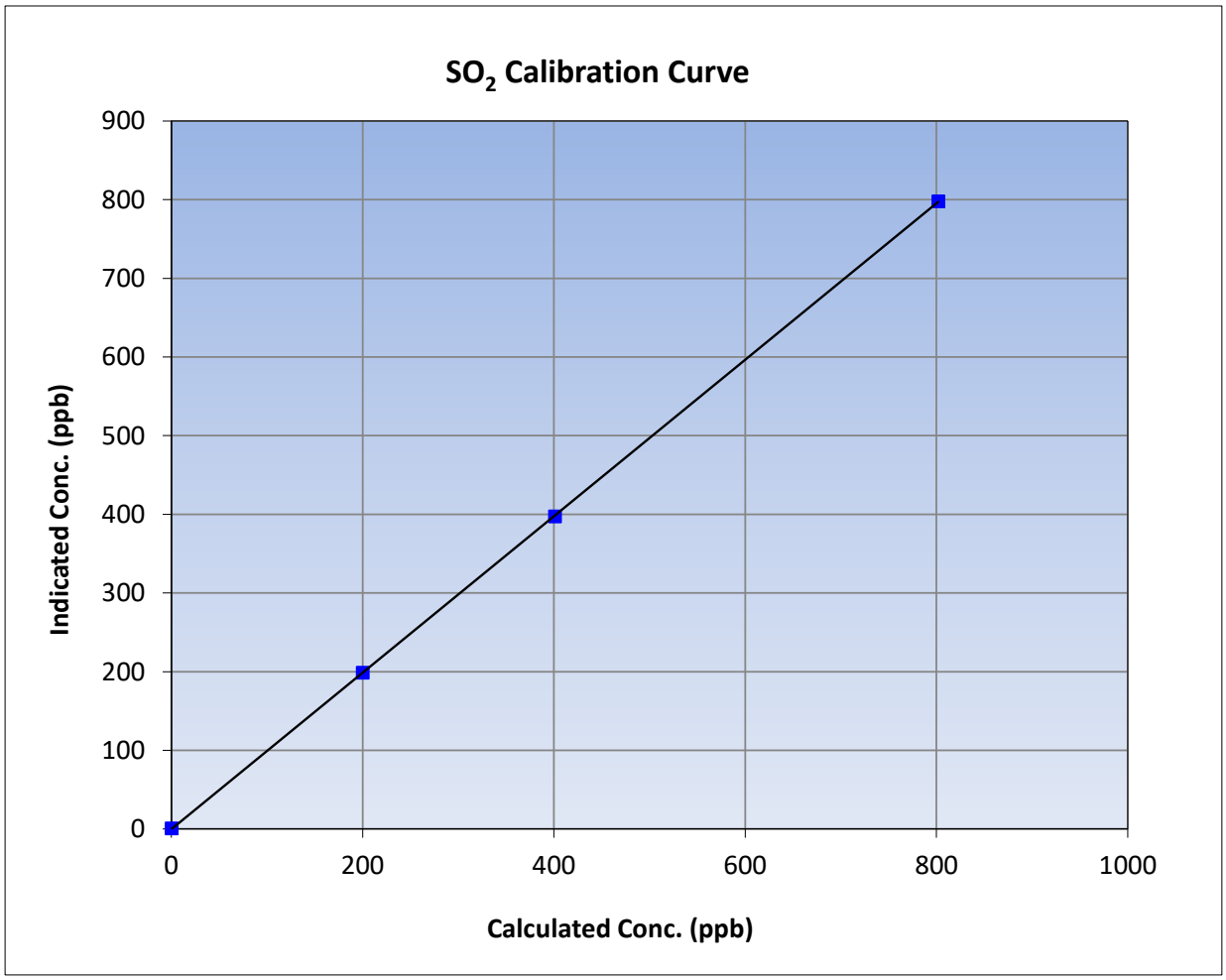
Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 12, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	9:50	End Time (MST):	13:51
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

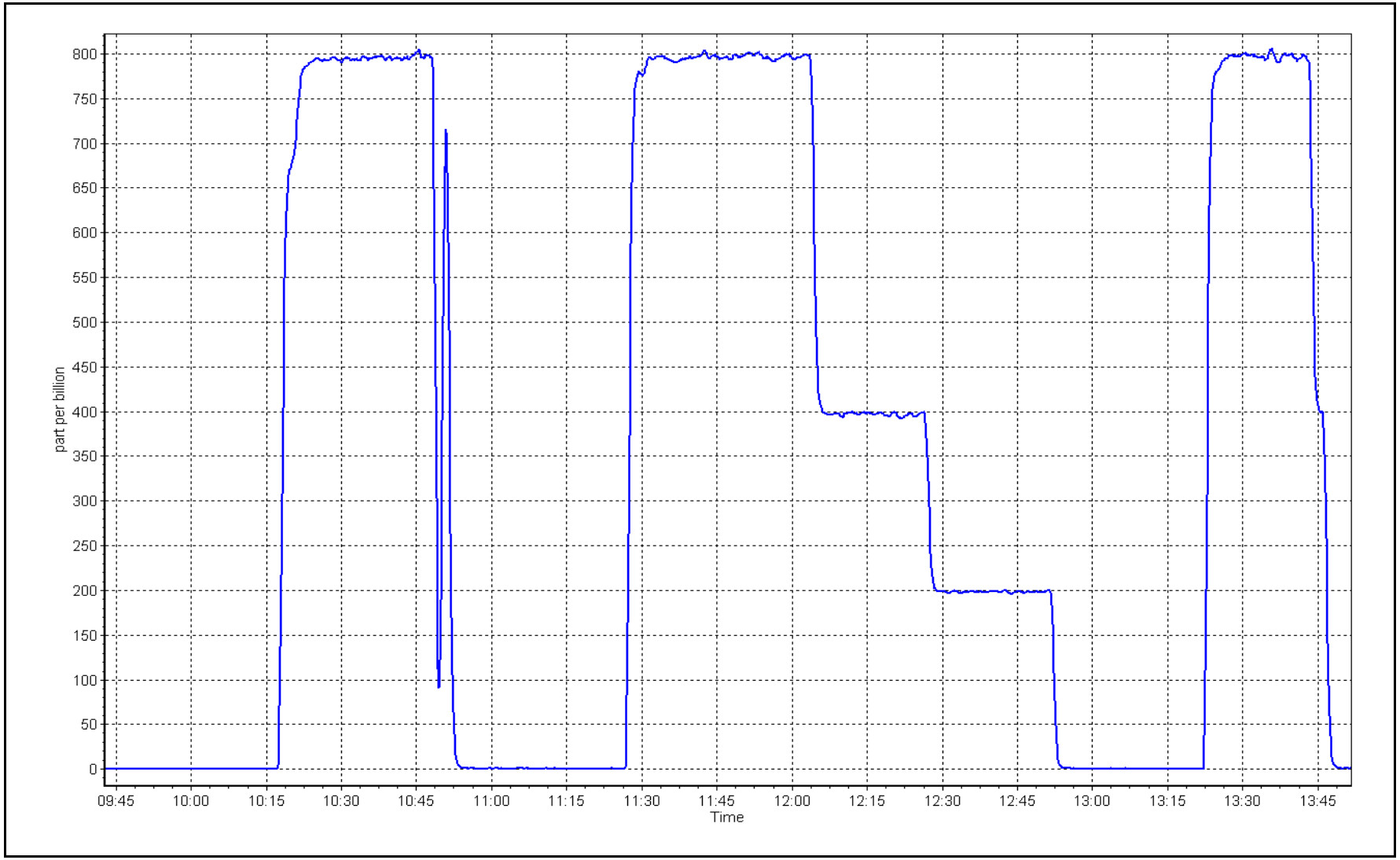
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
801.5	797.5	1.0050
400.8	397.0	1.0094
199.8	198.5	1.0068

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	0.994624	*0.90 - 1.10*
Intercept	-0.310040	*+/-30*



SO2 Calibration Plot Date: January 13, 2023 Location: Barge Landing



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Barge Landing	Station number:	AMS09
Calibration Date:	January 23, 2023	Last Cal Date:	December 20, 2022
Start time (MST):	11:31	End time (MST):	16:01
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.87	ppm	Cal Gas Exp Date:	September 2, 2024
Cal Gas Cylinder #:	EY0002346			
Removed Cal Gas Conc:	4.87	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				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999432	1.003148	Backgd or Offset:	2.46	2.52
Calibration intercept:	0.079028	-0.000990	Coeff or Slope:	1.084	1.091

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.0	----
as found span	4918	82.1	80.0	78.5	1.019
as found 2nd point	4959	41.1	40.0	39.4	1.016
as found 3rd point	4979	20.5	20.0	19.7	1.014
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.0	----
high point	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.2	0.996
third point	4979	20.5	20.0	20.0	0.998
as left zero	5000	0.0	0.0	0.1	----
as left span	4918	82.1	80.0	80.4	0.995
SO2 Scrubber Check	4920	80.2	802.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.997
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	78.5	Prev response:	80.00	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.981427	AF Intercept:	0.059042
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999997		

* = > +/-5% change initiates investigation

Notes: Changed sample inlet filters after as founds. Small span adjustment made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

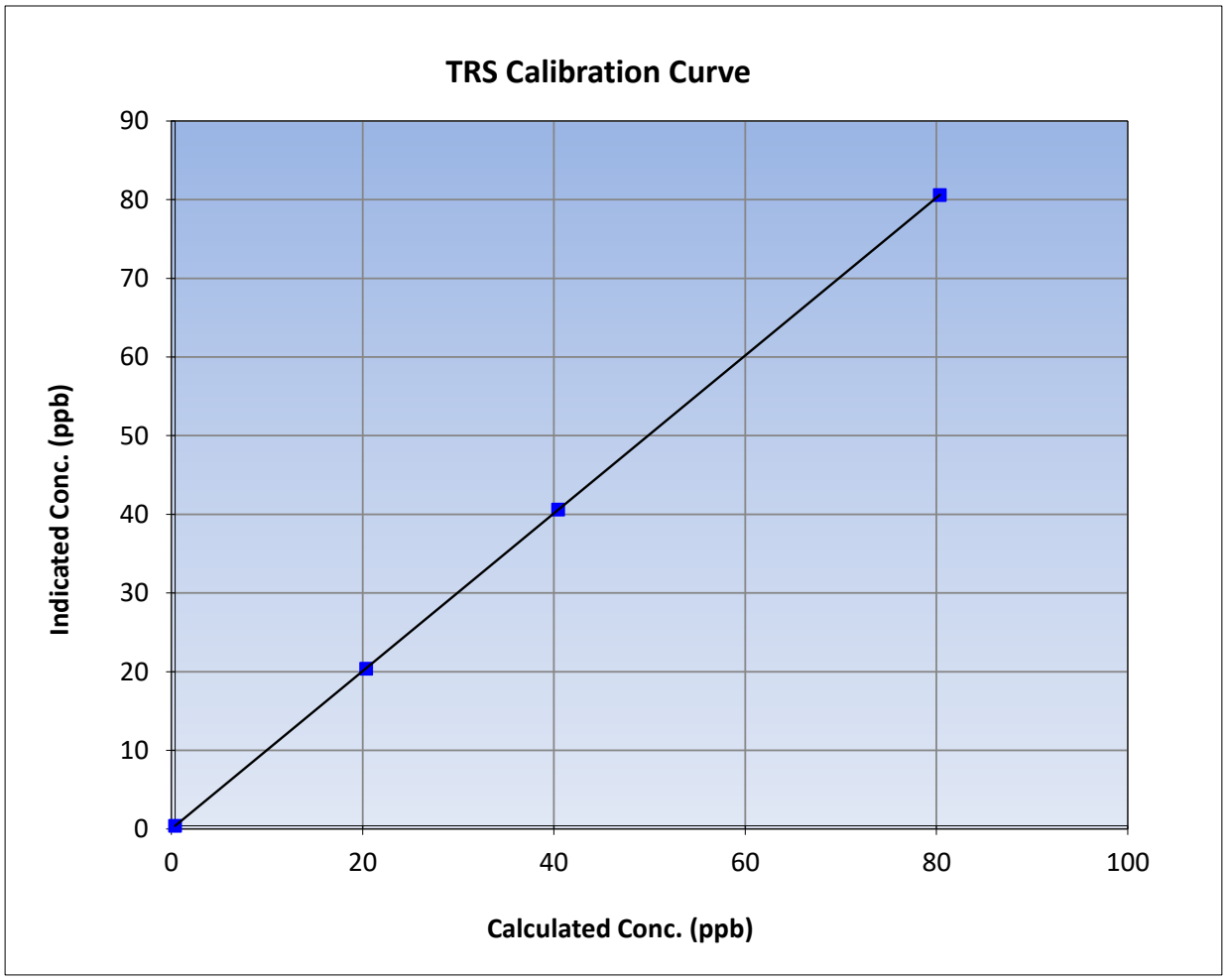
Station Information

Calibration Date:	January 23, 2023	Previous Calibration:	December 20, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	11:31	End Time (MST):	16:01
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320

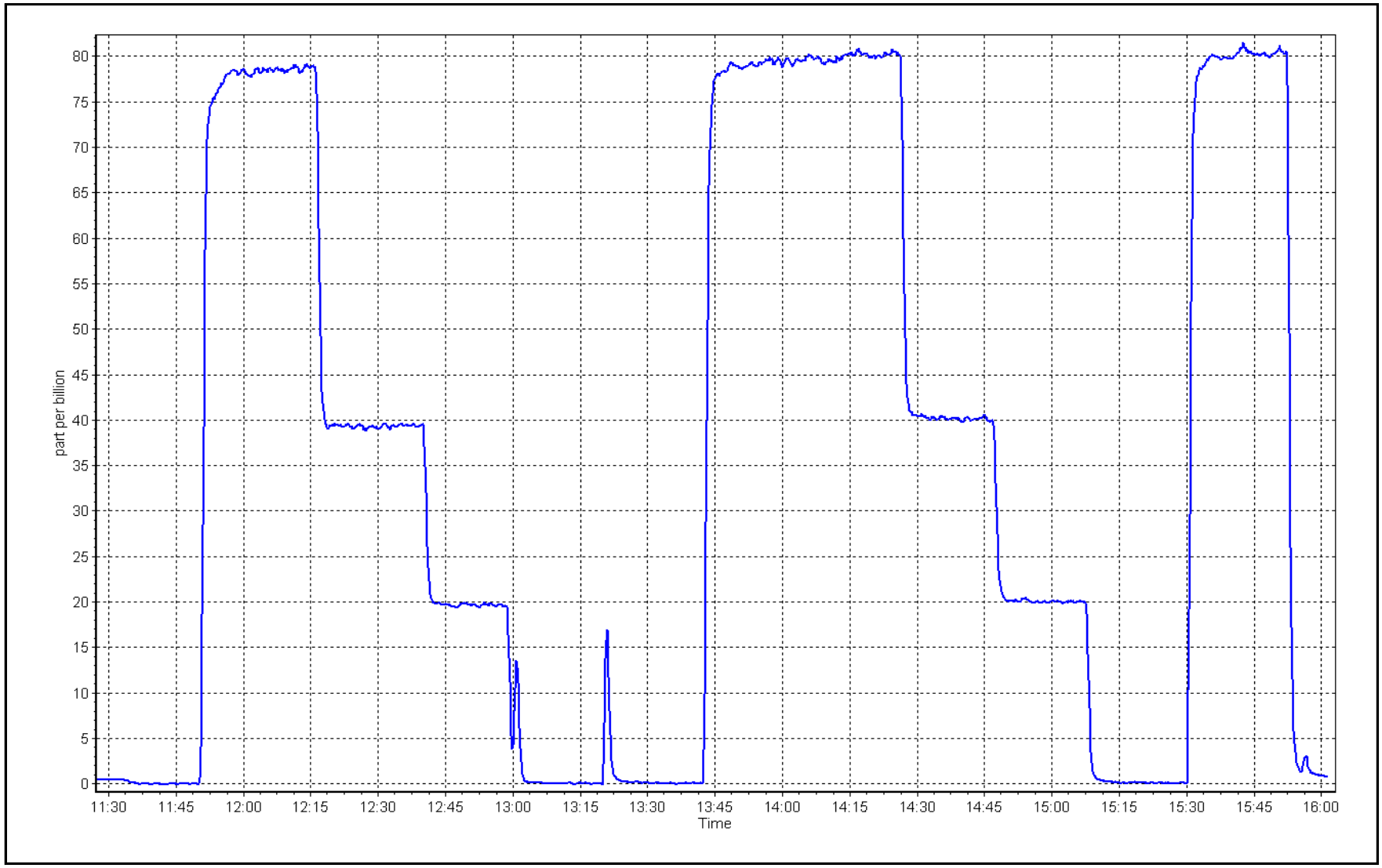
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	80.2	0.9971
40.0	40.2	0.9958
20.0	20.0	0.9984

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.003148	*0.90 - 1.10*
Intercept	-0.000990	*+/-3*



TRS Calibration Plot Date: January 23, 2023 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Barge Landing	Station number:	AMS09
Calibration Date:	January 13, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	9:50	End time (MST):	13:51
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:	NA	
Removed CH4 Conc.	497.6	ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc.	207.1	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3812	
ZAG make/model:	API T701		Serial Number:	4888	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1170050131	
THC Range (ppm):	0 - 100 ppm				
NMHC Range (ppm):	0 - 50 ppm		CH4 Range (ppm):	0 - 50 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	1.96E-04	1.99E-04	NMHC SP Ratio:	4.31E-05	4.28E-05
CH4 Retention time:	12.00	12.2	NMHC Peak Area:	212118	213327

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	80.2	17.12	17.03	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	80.2	17.12	17.15	0.998
second point	4960	40.1	8.56	8.45	1.013
third point	4980	20.0	4.27	4.19	1.019
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	80.2	17.12	17.05	1.004
				Average Correction Factor	1.010

Baseline Corr AF:	17.03	Prev response	17.02	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.0	----
as found span	4919	80.2	9.14	9.21	0.992
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	80.2	9.14	9.17	0.996
second point	4960	40.1	4.57	4.54	1.007
third point	4980	20	2.28	2.25	1.013
as left zero	5000	0	0.00	0.00	----
as left span	4919	80.2	9.14	9.13	1.001
				Average Correction Factor	1.005
Baseline Corr AF:	9.21	Prev response	9.16	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	80.2	7.98	7.81	1.022
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	80.2	7.98	7.98	1.000
second point	4960	40.1	3.99	3.91	1.021
third point	4980	20.0	1.99	1.94	1.025
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	80.2	7.98	7.92	1.008
				Average Correction Factor	1.016
Baseline Corr AF:	7.81	Prev response	7.86	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.995340	1.002709
THC Cal Offset:	-0.022383	-0.059558
CH4 Cal Slope:	0.985022	1.000454
CH4 Cal Offset:	-0.004175	-0.035549
NMHC Cal Slope:	1.004429	1.004517
NMHC Cal Offset:	-0.018008	-0.024610

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

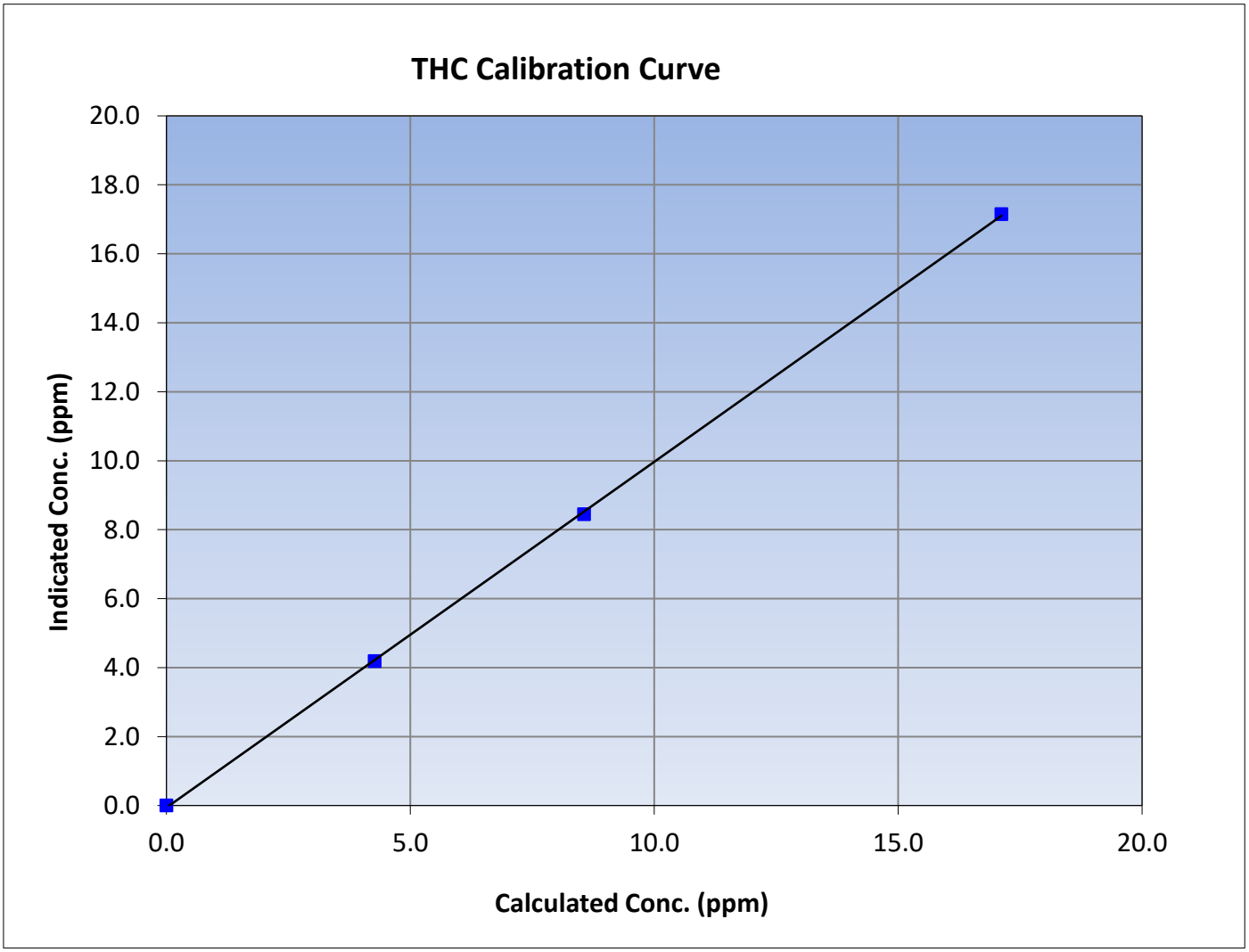
Version-01-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 13, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	9:50	End Time (MST):	13:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999928	*≥0.995*
17.12	17.15	0.9982			
8.56	8.45	1.0128	Slope	1.002709	*0.90 - 1.10*
4.27	4.19	1.0190			
			Intercept	-0.059558	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

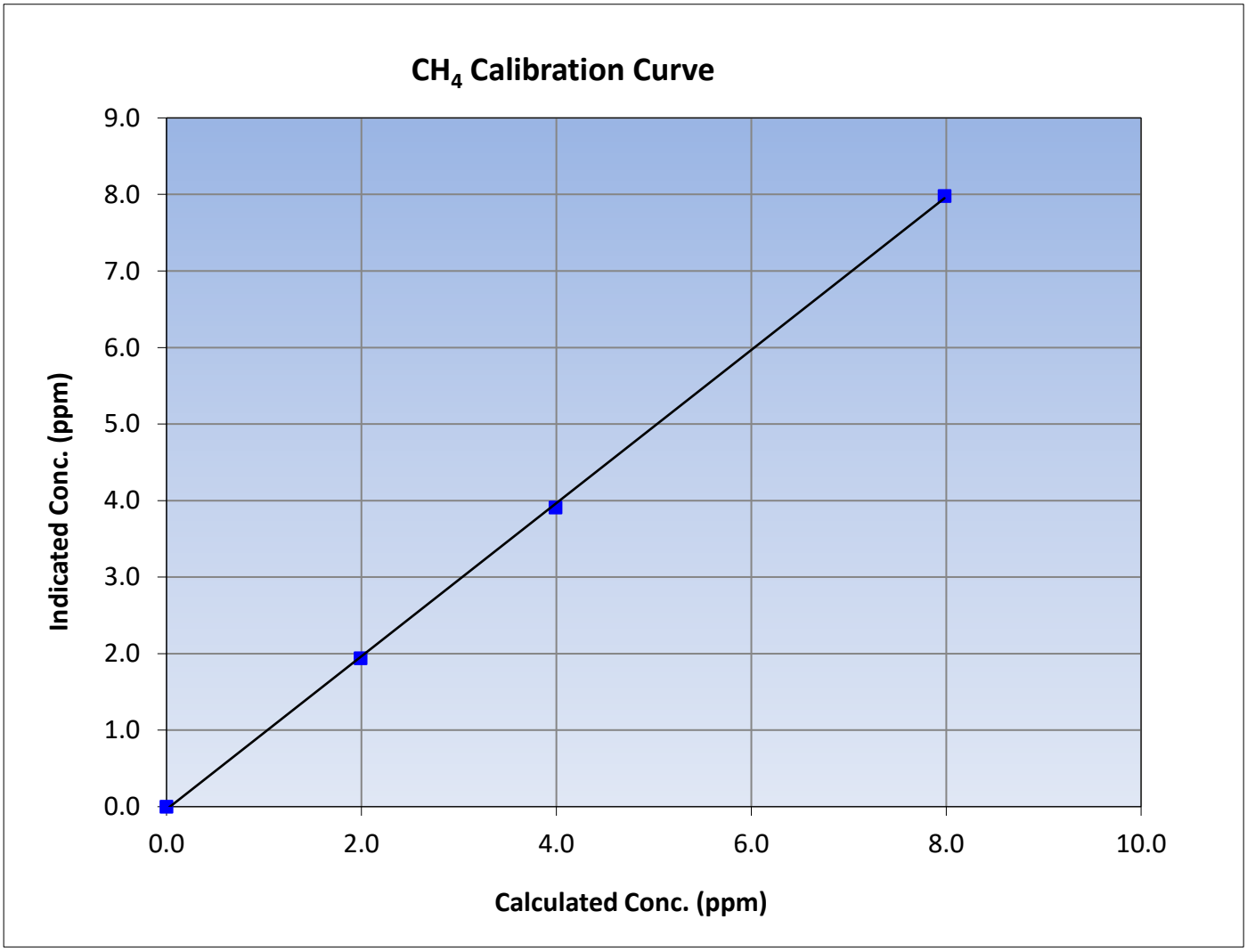
Version-01-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 13, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	9:50	End Time (MST):	13:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999866	≥0.995
7.98	7.98	1.0005			
3.99	3.91	1.0212	Slope	1.000454	0.90 - 1.10
1.99	1.94	1.0255			
			Intercept	-0.035549	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

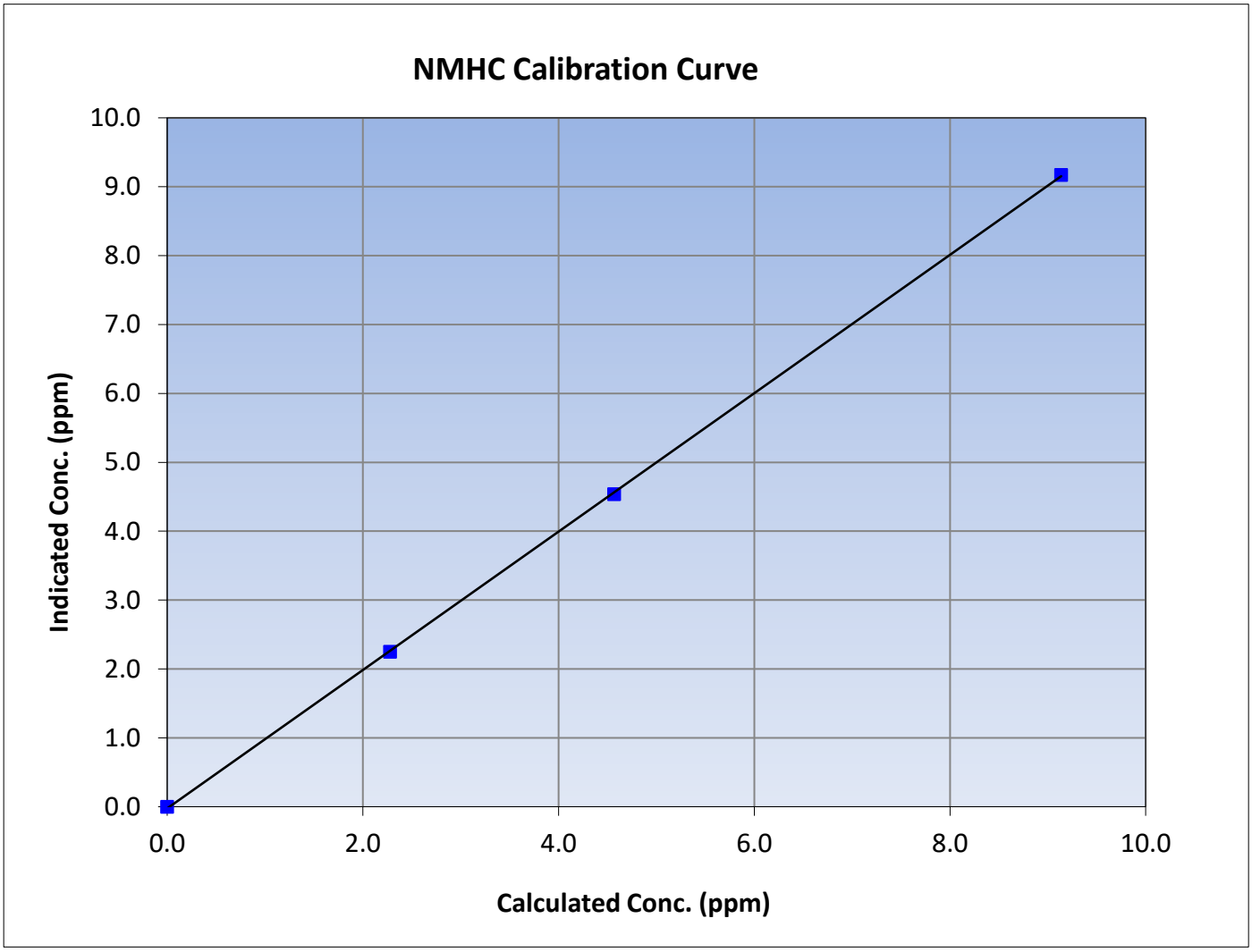
Version-01-2020

Station Information

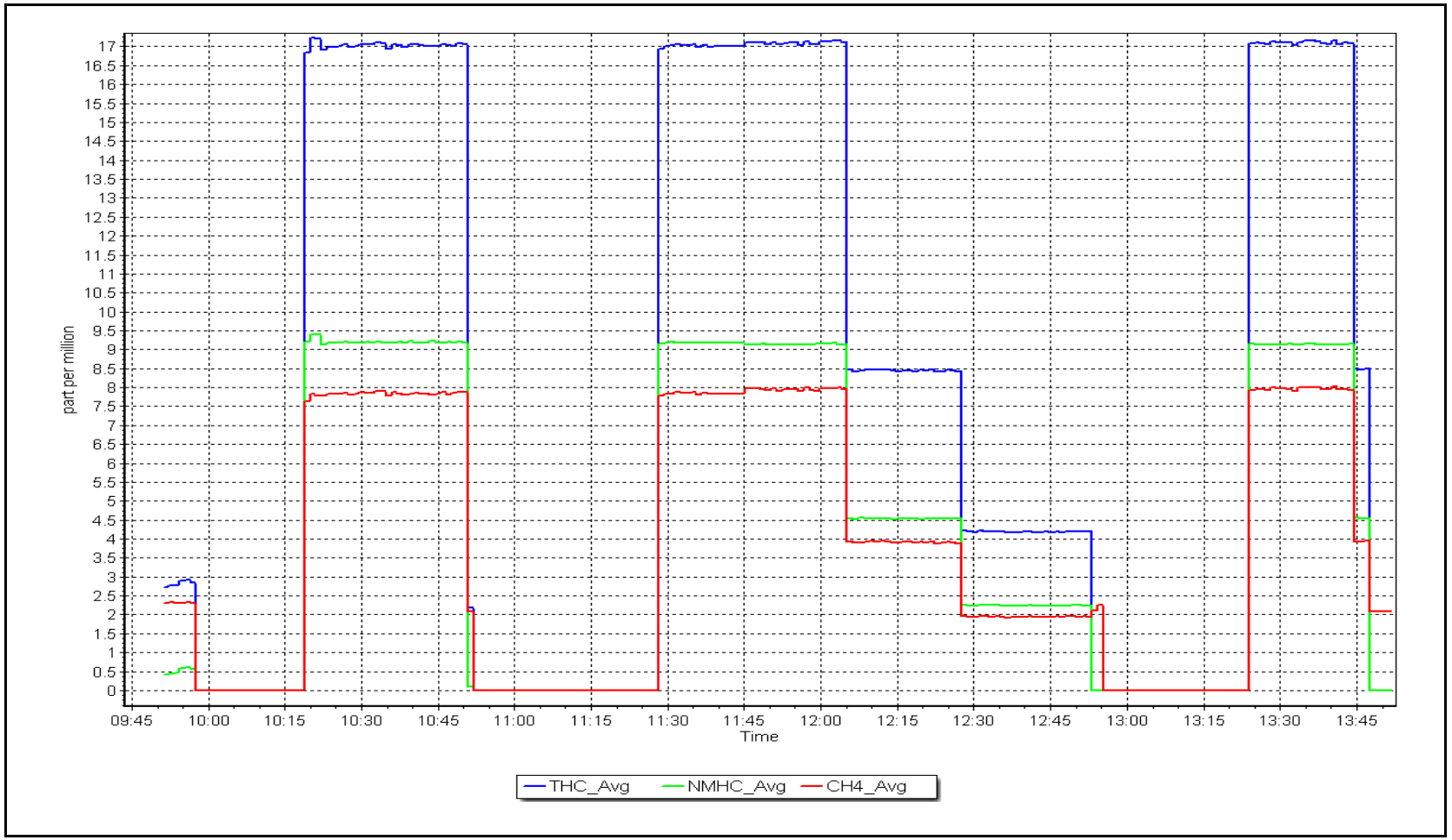
Calibration Date:	January 13, 2023	Previous Calibration:	December 13, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	9:50	End Time (MST):	13:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999961	≥0.995
9.14	9.17	0.9964			
4.57	4.54	1.0065	Slope	1.004517	0.90 - 1.10
2.28	2.25	1.0134			
			Intercept	-0.024610	+/-0.5



NMHC Calibration Plot Date: January 13, 2023 Location: Barge Landing



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Barge Landing	Station number:	AMS09
Calibration Date:	January 20, 2023	Last Cal Date:	December 22, 2022
Start time (MST):	10:52	End time (MST):	15:46
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	DT0036634		Cal Gas Expiry Date:	January 28, 2024	
NOX Cal Gas Conc:	50.00	ppm	NO Cal Gas Conc:	49.70	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.00	ppm	Removed Gas NO Conc:	49.70	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3812	
ZAG make/model:	API T701		Serial Number:	4888	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1426262593	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.164	1.182	NO bkgnd or offset:	10.4	10.6
NOX coeff or slope:	0.997	0.996	NOX bkgnd or offset:	10.5	10.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	178.6	172.5

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.020387	0.998369
NO_X Cal Offset:	0.452747	0.728922
NO Cal Slope:	1.019892	0.997899
NO Cal Offset:	-0.569015	-0.272767
NO_2 Cal Slope:	1.003188	1.000917
NO_2 Cal Offset:	-0.637715	0.473394

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	4919	80.5	805.1	800.3	4.8	795.8	787.6	8.2	1.012	1.016
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	4919	80.5	805.1	800.3	4.8	804.0	798.3	5.8	1.001	1.002
second point	4959	40.2	402.1	399.7	2.4	403.0	398.9	4.1	0.998	1.002
third point	4979	20.1	201.0	199.8	1.2	201.7	198.4	3.3	0.997	1.007
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
as left span	4919	80.5	805.1	447.7	357.4	803.0	445.1	357.8	1.003	1.006
								Average Correction Factor	0.999	1.004

Corrected As found	NO_X = 795.9 ppb	NO = 787.7 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -3.3%
Previous Response	NO_X = 821.9 ppb	NO = 815.6 ppb		*Percent Change	NO = -3.5%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	796.5	443.9	357.4	357.9	0.999	100.1%
2nd GPT point (200 ppb O3)	796.5	667.4	133.9	135.5	0.988	101.2%
3rd GPT point (100 ppb O3)	796.5	731.1	70.2	70.6	0.995	100.5%
				Average Correction Factor	0.994	100.6%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

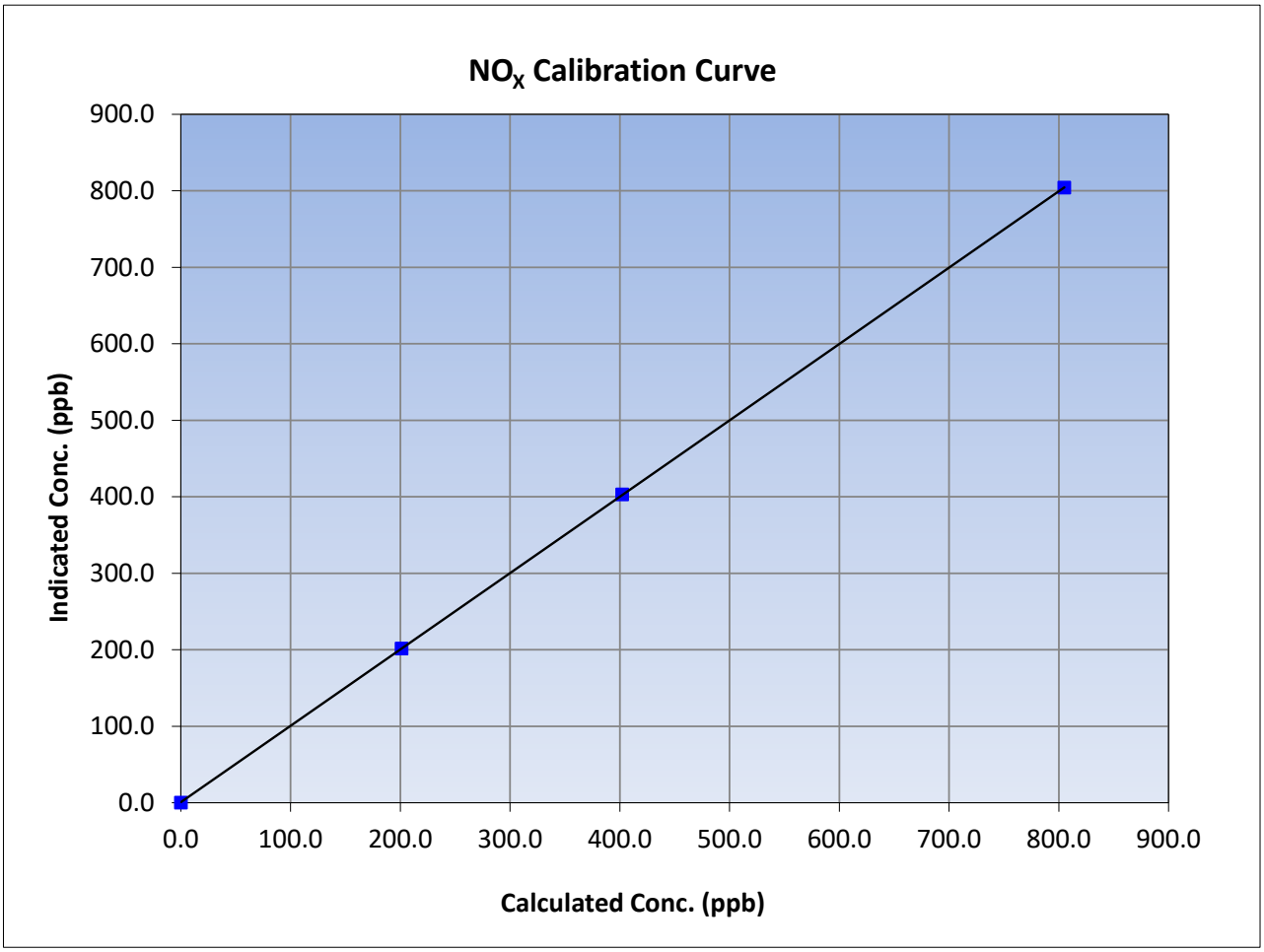
Version-04-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 22, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	10:52	End Time (MST):	15:46
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999996	≥0.995
805.1	804.0	1.0013			
402.1	403.0	0.9977	Slope	0.998369	0.90 - 1.10
201.0	201.7	0.9967			
			Intercept	0.728922	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

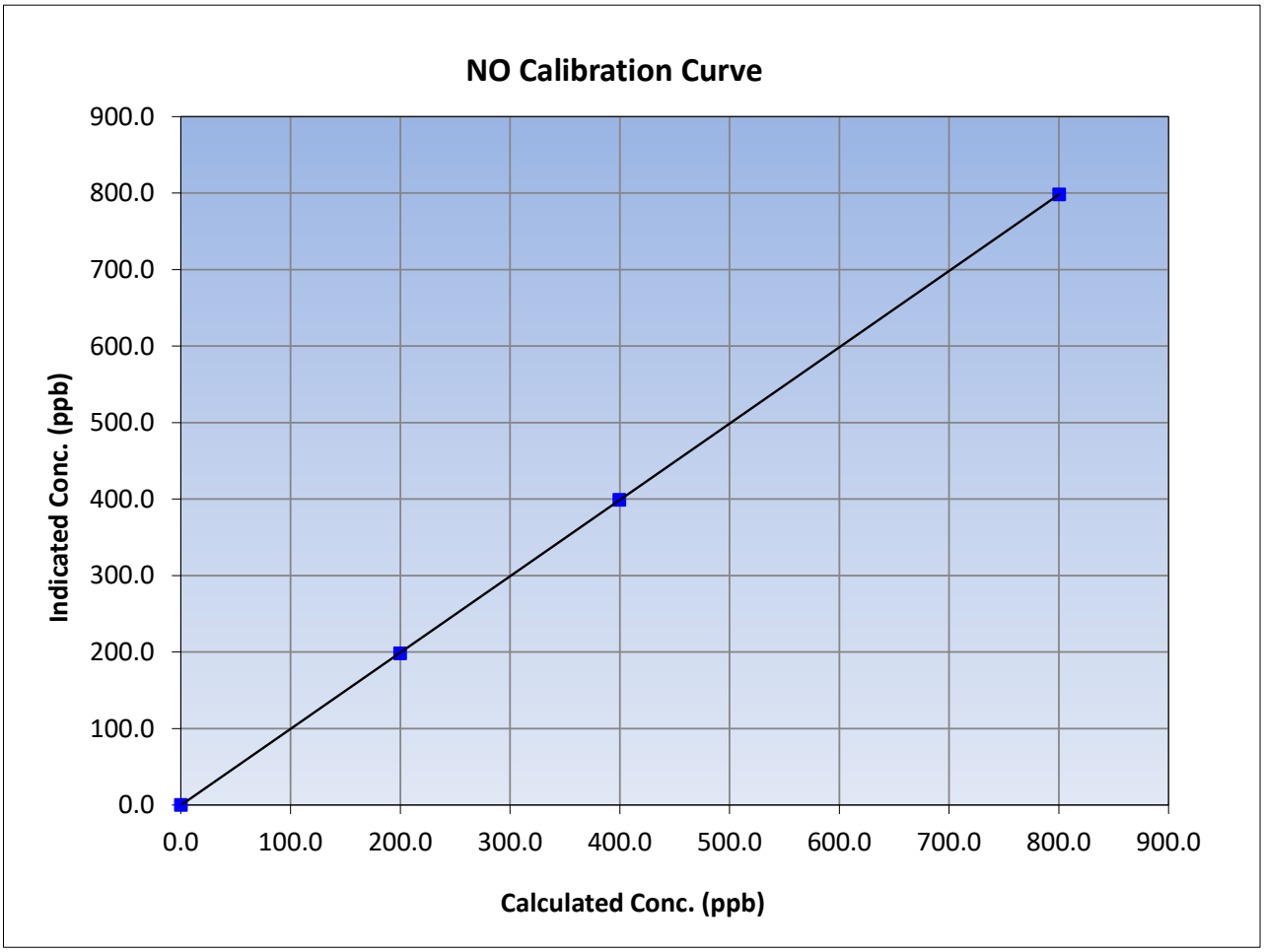
Version-04-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 22, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	10:52	End Time (MST):	15:46
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

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	798.3	1.0024			
399.7	398.9	1.0019	Slope	0.997899	0.90 - 1.10
199.8	198.4	1.0072			
			Intercept	-0.272767	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

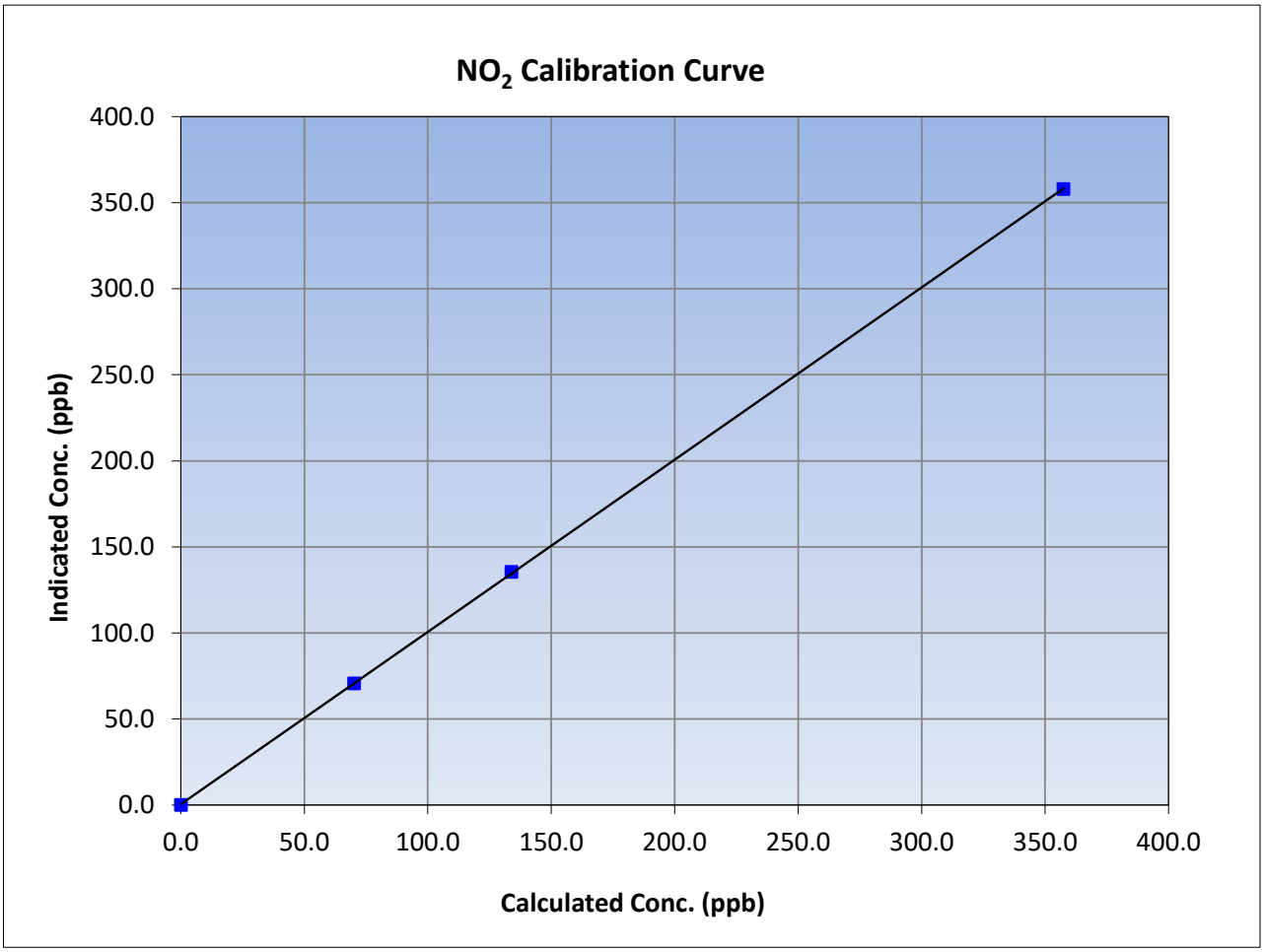
Version-04-2020

Station Information

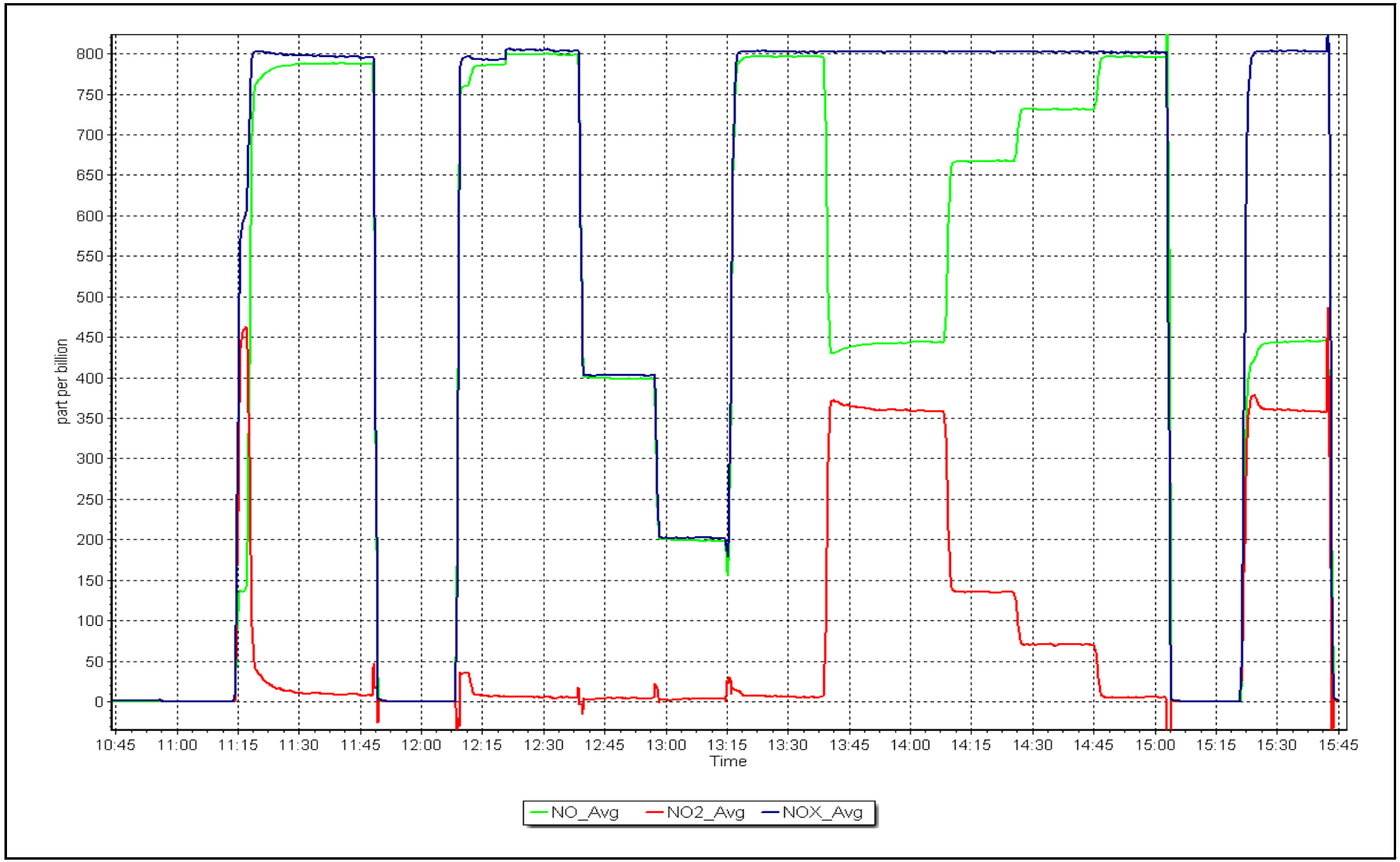
Calibration Date:	January 20, 2023	Previous Calibration:	December 22, 2022
Station Name:	Barge Landing	Station Number:	AMS09
Start Time (MST):	10:52	End Time (MST):	15:46
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999982	≥0.995
357.4	357.9	0.9987			
133.9	135.5	0.9884	Slope	1.000917	0.90 - 1.10
70.2	70.6	0.9948			
			Intercept	0.473394	+/-20



NO_X Calibration Plot Date: January 20, 2023 Location: Barge Landing



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	January 27, 2023	Last Cal Date:	December 22, 2022
Start time (MST):	13:59	End time (MST):	14:19
Analyzer Make:	API T640	S/N:	321
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1102
Temp/RH standard:	Delta Cal	S/N:	1102

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-16.7	-16.6	-16.7	☐	+/- 2 ^{o}C
P (mmHg)	743.1	742.4	743.1	☐	+/- 10 mmHg
flow (LPM)	5.01	5.17	5.01	☐	+/- 0.25 LPM

Leak Test: Date of check: January 27, 2023 Last Cal Date: December 22, 2022

PM w/o HEPA: 15.9 PM w/ HEPA: 0.0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: _____

Disposable Filter Changed: _____

Annual Maintenance

Date Sample Tube Cleaned: November 15, 2022

Date RH/T Sensor Cleaned: November 15, 2022

Notes: Monthly checks showing no issues. No adjustments needed.

Calibration by: Ryan Power

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11
LOWER CAMP
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Lower Camp	Station number:	AMS11
Calibration Date:	January 20, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:58	End time (MST):	14:05
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 100841398

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.987356	0.996844	Backgd or Offset:	14.0	14.2
Calibration intercept:	-0.949290	-0.548951	Coeff or Slope:	1.039	1.051

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*
as found zero	5000	0.0	0.0	0.3	----
as found span	4919	81.3	800.8	787.1	1.017
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	----
high point	4919	81.3	800.8	798.4	1.003
second point	4959	40.7	400.9	397.8	1.008
third point	4980	20.3	199.9	198.5	1.007
as left zero	5000	0.0	0.0	0.1	----
as left span	4919	81.3	800.8	797.9	1.004
				Average Correction Factor	1.006

Baseline Corr As found:	786.80	Previous response	789.68	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

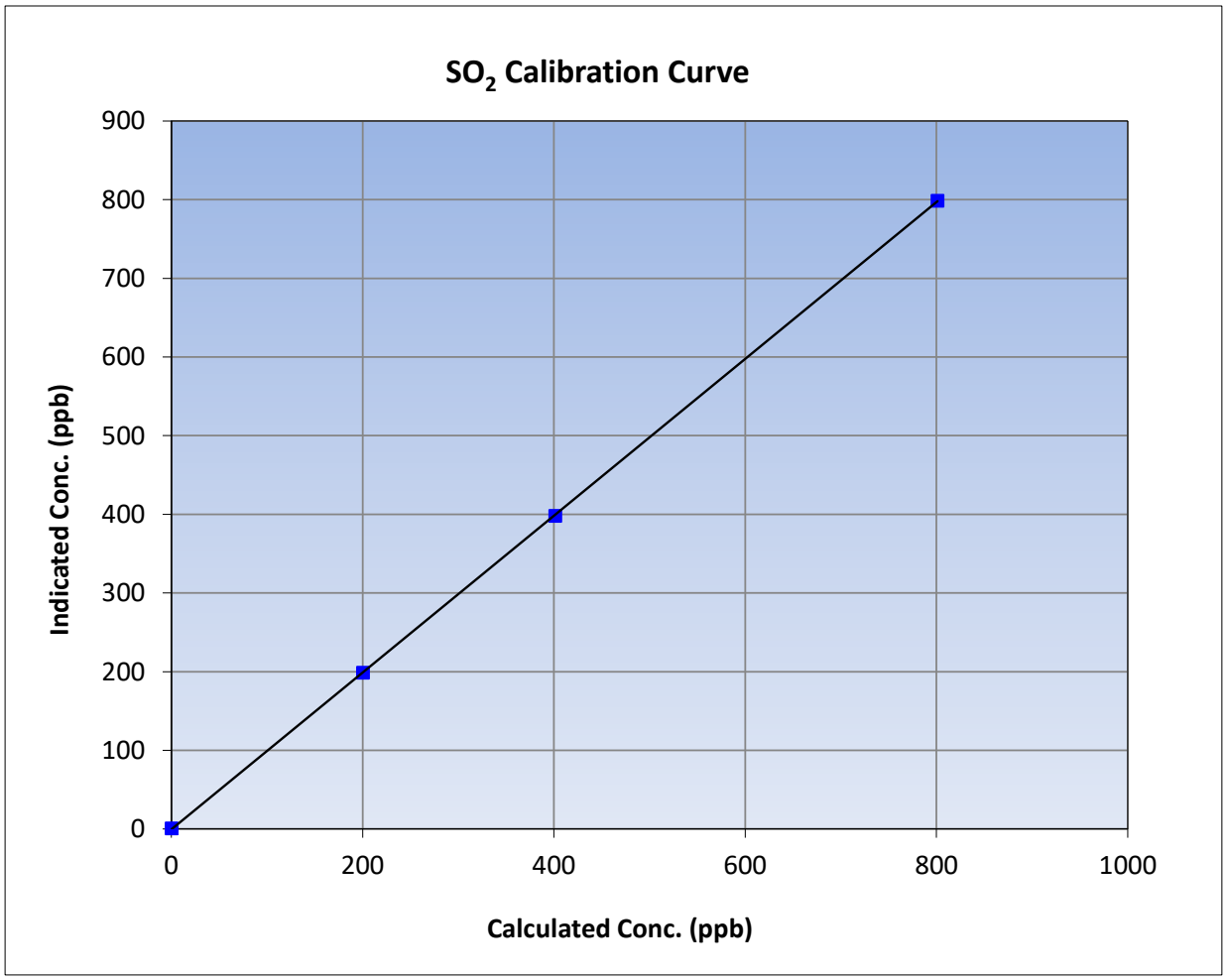
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 7, 2022
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	10:58	End Time (MST):	14:05
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

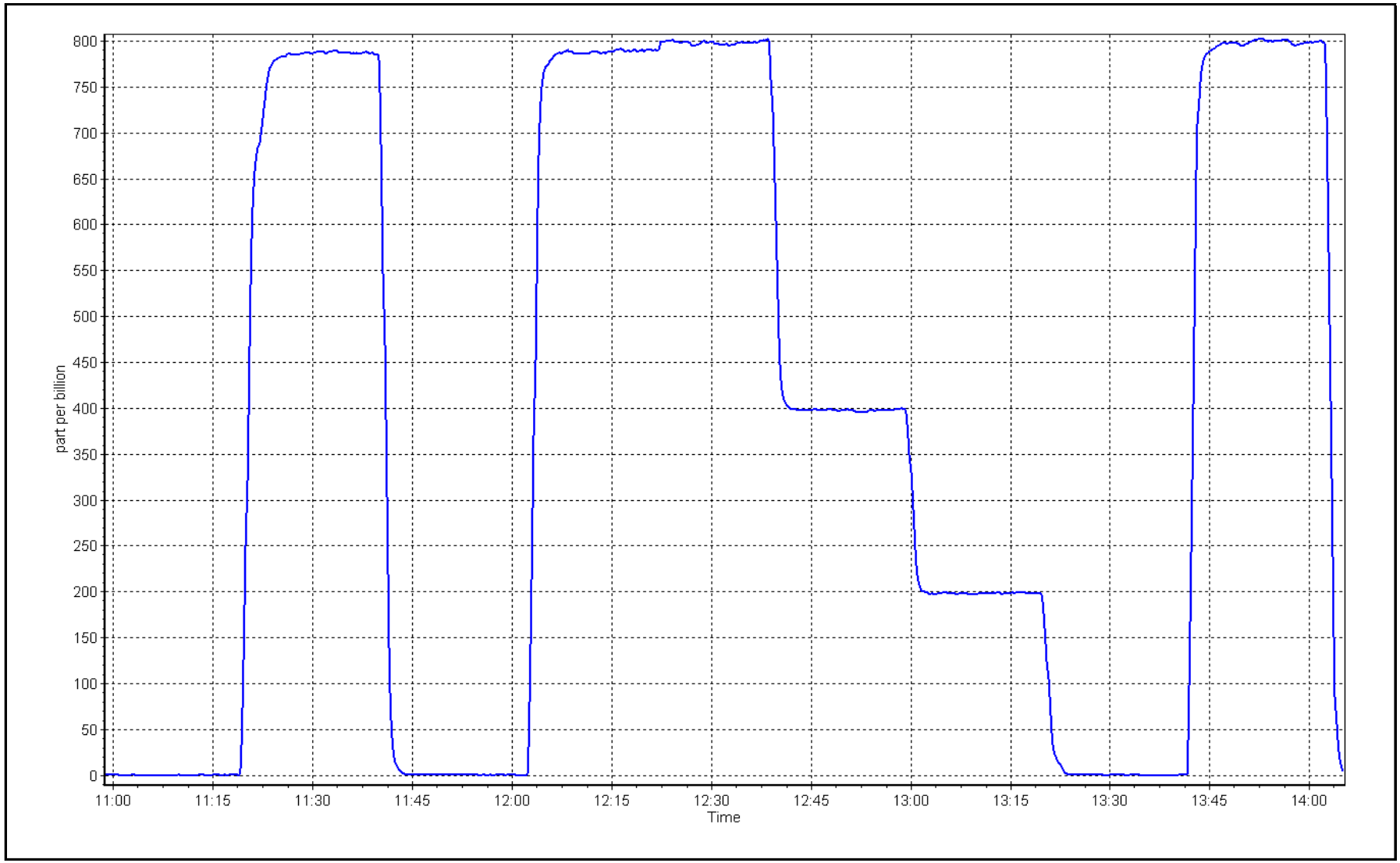
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.8	798.4	1.0030
400.9	397.8	1.0078
199.9	198.5	1.0073

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	0.996844	*0.90 - 1.10*
Intercept	-0.548951	*+/-30*



SO2 Calibration Plot Date: January 20, 2023 Location: Lower Camp



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Lower Camp	Station number:	AMS11
Calibration Date:	January 19, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	10:52	End time (MST):	14:35
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.429	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC501097			
Removed Cal Gas Conc:	5.429	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 450iQ		Analyzer serial #:	CM20080003	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.988178	1.000040	Backgd or Offset:	13.9	13.9
Calibration intercept:	0.595542	0.055163	Coeff or Slope:	1.043	1.043

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 span	4926	73.6	79.9	80.5	0.994
as found 2nd point	4963	36.8	40.0	40.1	0.999
as found 3rd point	4982	18.6	20.2	20.1	1.010
new cylinder response					

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4926	73.6	79.9	80.1	0.998
second point	4963	36.8	40.0	39.8	1.004
third point	4982	18.6	20.2	20.2	1.000
as left zero	5000	0.0	0.0	0.0	----
as left span	4926	73.6	79.9	79.8	1.002
SO2 Scrubber Check	4919	81.1	811.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.000
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	80.4	Prev response:	79.57	*% change:	1.0%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.007046	AF Intercept:	-0.065171
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999981		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

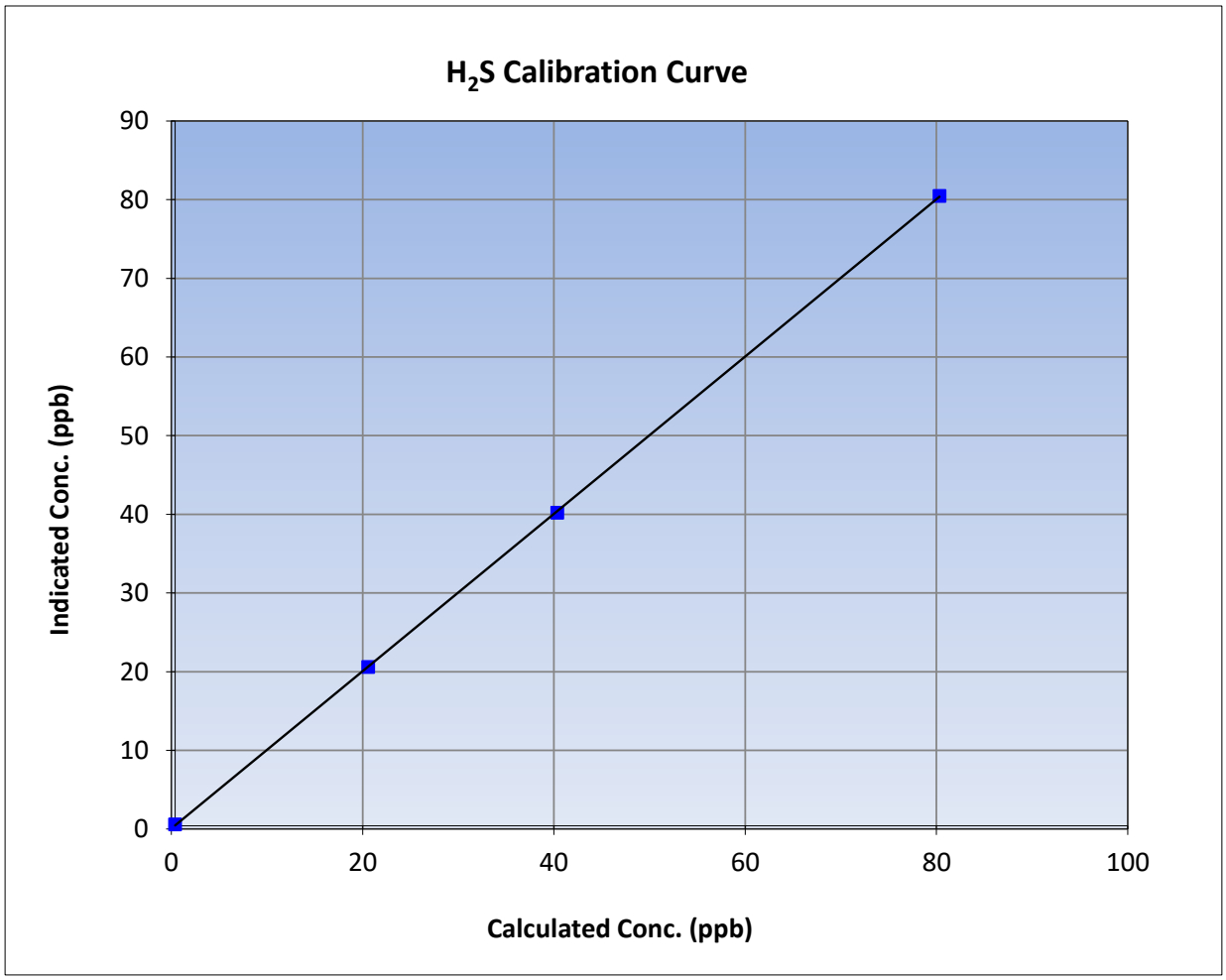
Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 12, 2022
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	10:52	End Time (MST):	14:35
Analyzer make:	Thermo 450iQ	Analyzer serial #:	CM20080003

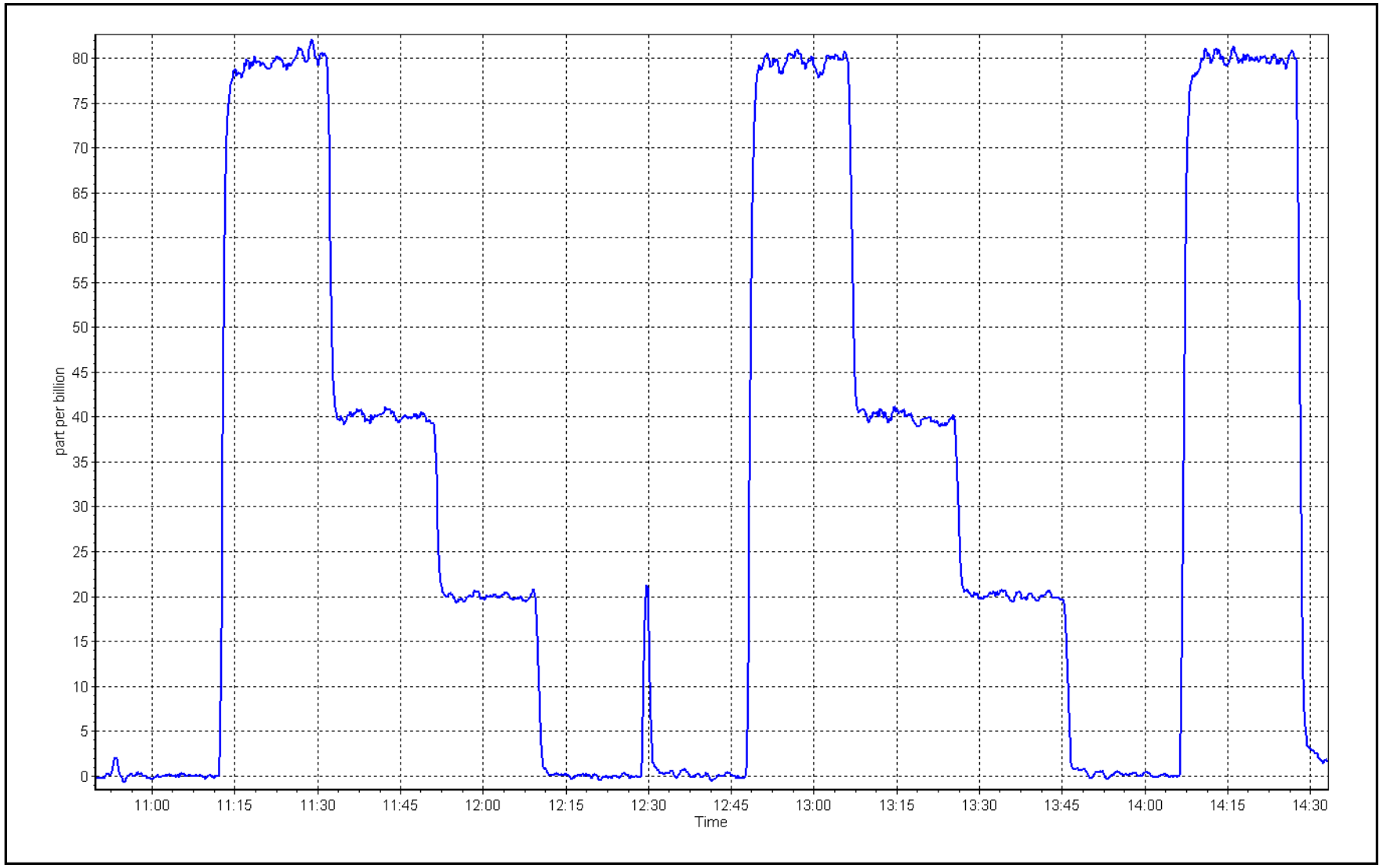
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
79.9	80.1	0.9978
40.0	39.8	1.0040
20.2	20.2	0.9997

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	1.000040	*0.90 - 1.10*
Intercept	0.055163	*+/-3*



H_2S Calibration Plot Date: January 19, 2023 Location: Lower Camp



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Lower Camp	Station number:	AMS11
Calibration Date:	January 20, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:58	End time (MST):	14:07
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:			Removed Gas Expiry:		
Removed CH4 Conc.	502.0	ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3807	
ZAG make/model:	API T701		Serial Number:	196	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1505164381	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.09E-04	3.09E-04	NMHC SP Ratio:	5.97E-05	5.97E-05
CH4 Retention time:	14.0	14.0	NMHC Peak Area:	153551	153551

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	81.3	17.35	17.42	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	81.3	17.35	17.42	0.996
second point	4959	40.7	8.69	8.66	1.003
third point	4980	20.3	4.33	4.32	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	81.3	17.35	17.50	0.991
				Average Correction Factor	1.001

Baseline Corr AF:	17.42	Prev response	17.28	*% change	0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	81.3	9.19	9.21	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	81.3	9.19	9.20	0.999
second point	4959	40.7	4.60	4.58	1.004
third point	4980	20.3	2.29	2.29	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	81.3	9.19	9.26	0.993
				Average Correction Factor	1.002
Baseline Corr AF:	9.21	Prev response	9.12	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	81.3	8.16	8.21	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	81.3	8.16	8.22	0.993
second point	4959	40.7	4.09	4.08	1.003
third point	4980	20.3	2.04	2.03	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	81.3	8.16	8.25	0.990
				Average Correction Factor	0.999
Baseline Corr AF:	8.21	Prev response	8.16	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.996778	1.004292
THC Cal Offset:	-0.017186	-0.024989
CH4 Cal Slope:	1.001133	1.007657
CH4 Cal Offset:	-0.009686	-0.016486
NMHC Cal Slope:	0.992847	1.001092
NMHC Cal Offset:	-0.007499	-0.007903

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

THC Calibration Summary

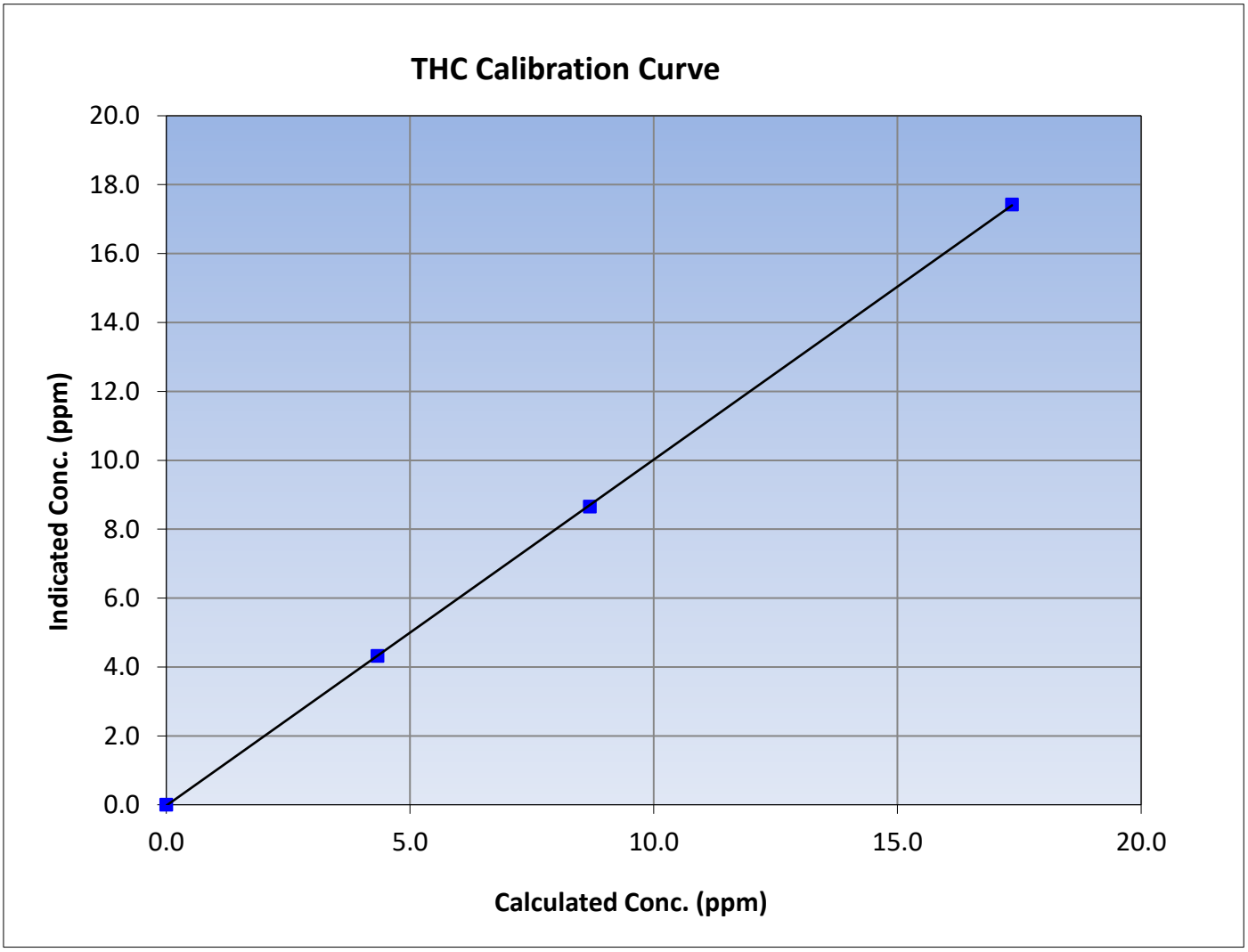
Version-01-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 7, 2022
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	10:58	End Time (MST):	14:07
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	0.999983	≥0.995
17.35	17.42	0.9959			
8.69	8.66	1.0033	Slope	1.004292	0.90 - 1.10
4.33	4.32	1.0028			
			Intercept	-0.024989	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

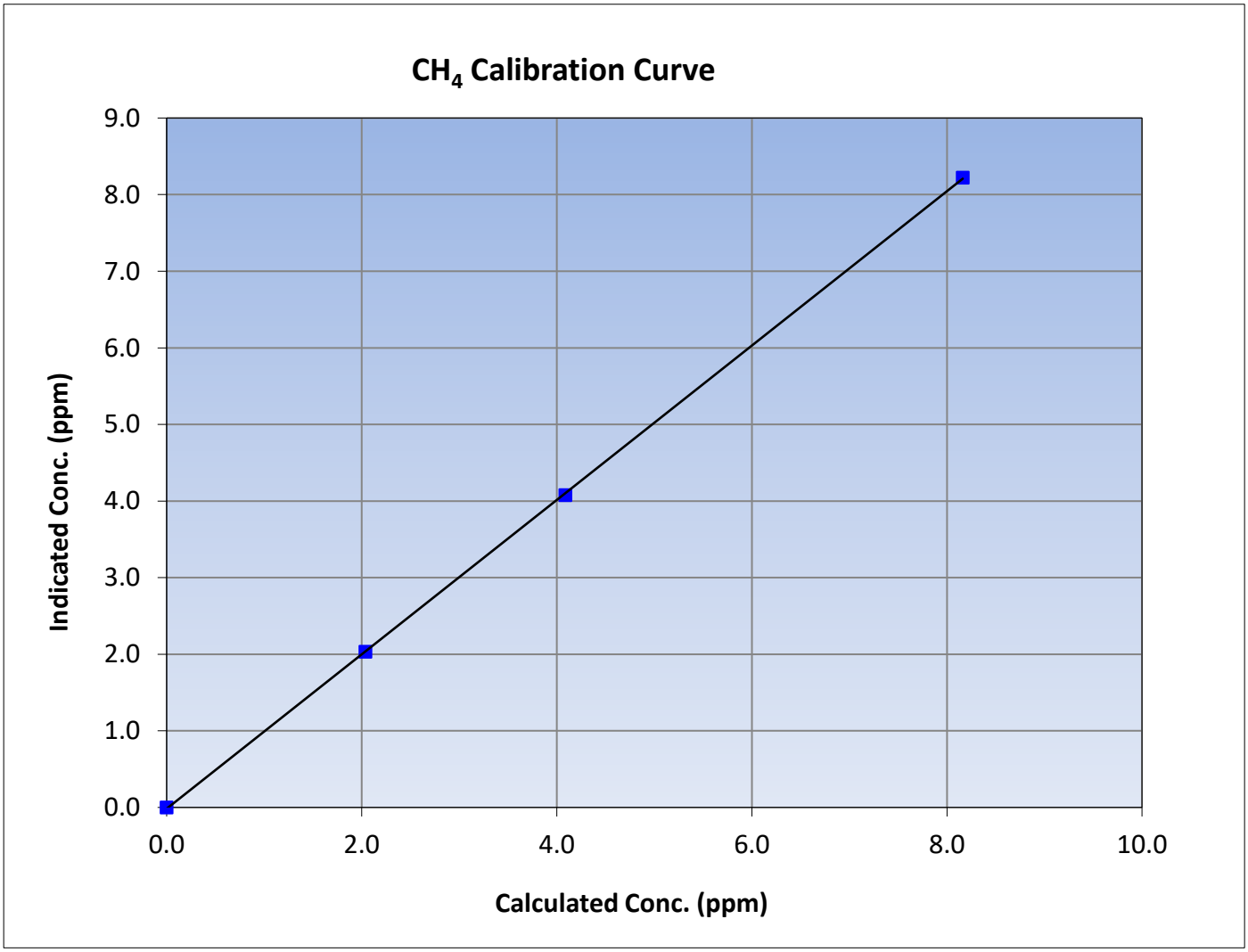
Version-01-2020

Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 7, 2022
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	10:58	End Time (MST):	14:07
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	0.999969	≥0.995
8.16	8.22	0.9927			
4.09	4.08	1.0026	Slope	1.007657	0.90 - 1.10
2.04	2.03	1.0030			
			Intercept	-0.016486	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

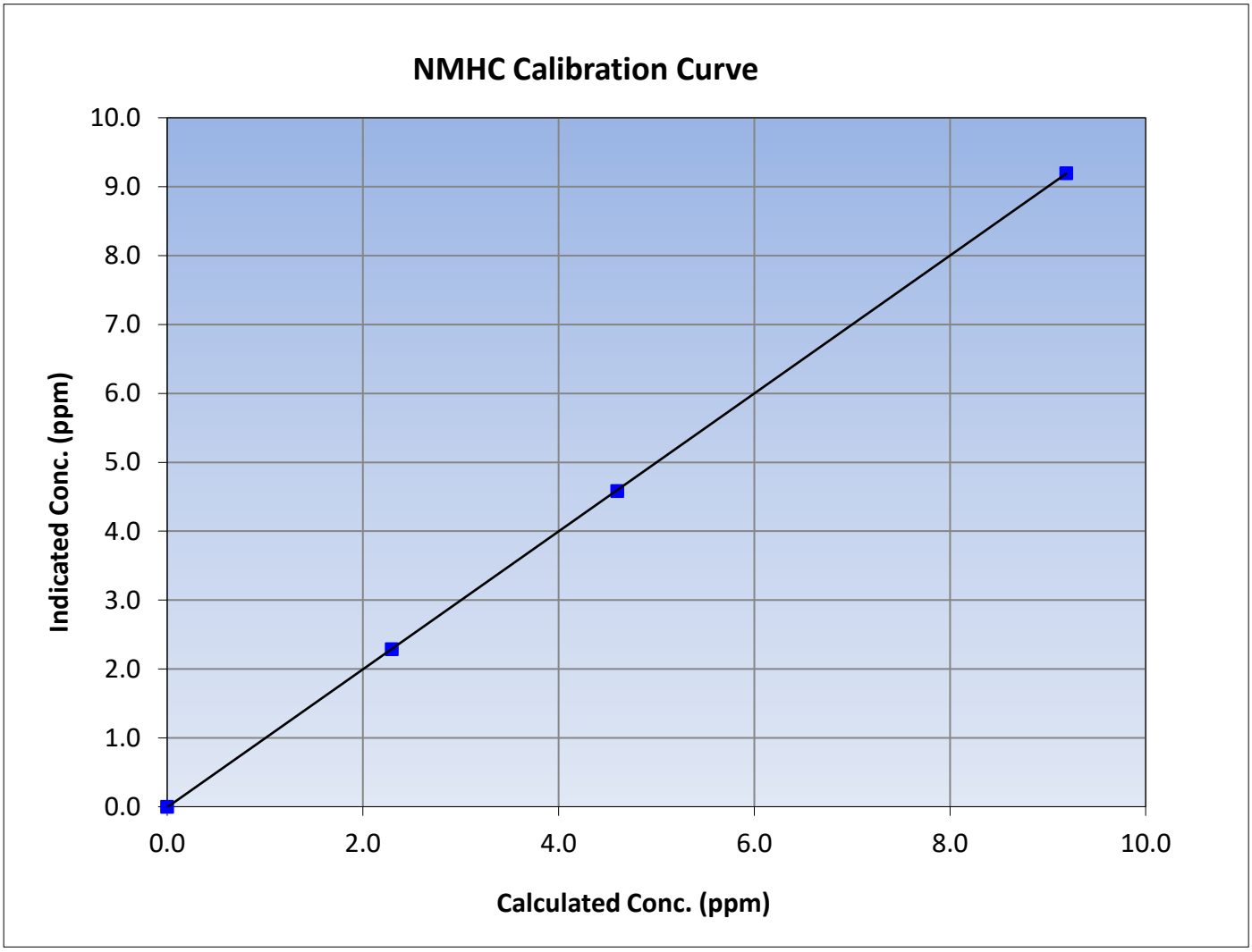
Version-01-2020

Station Information

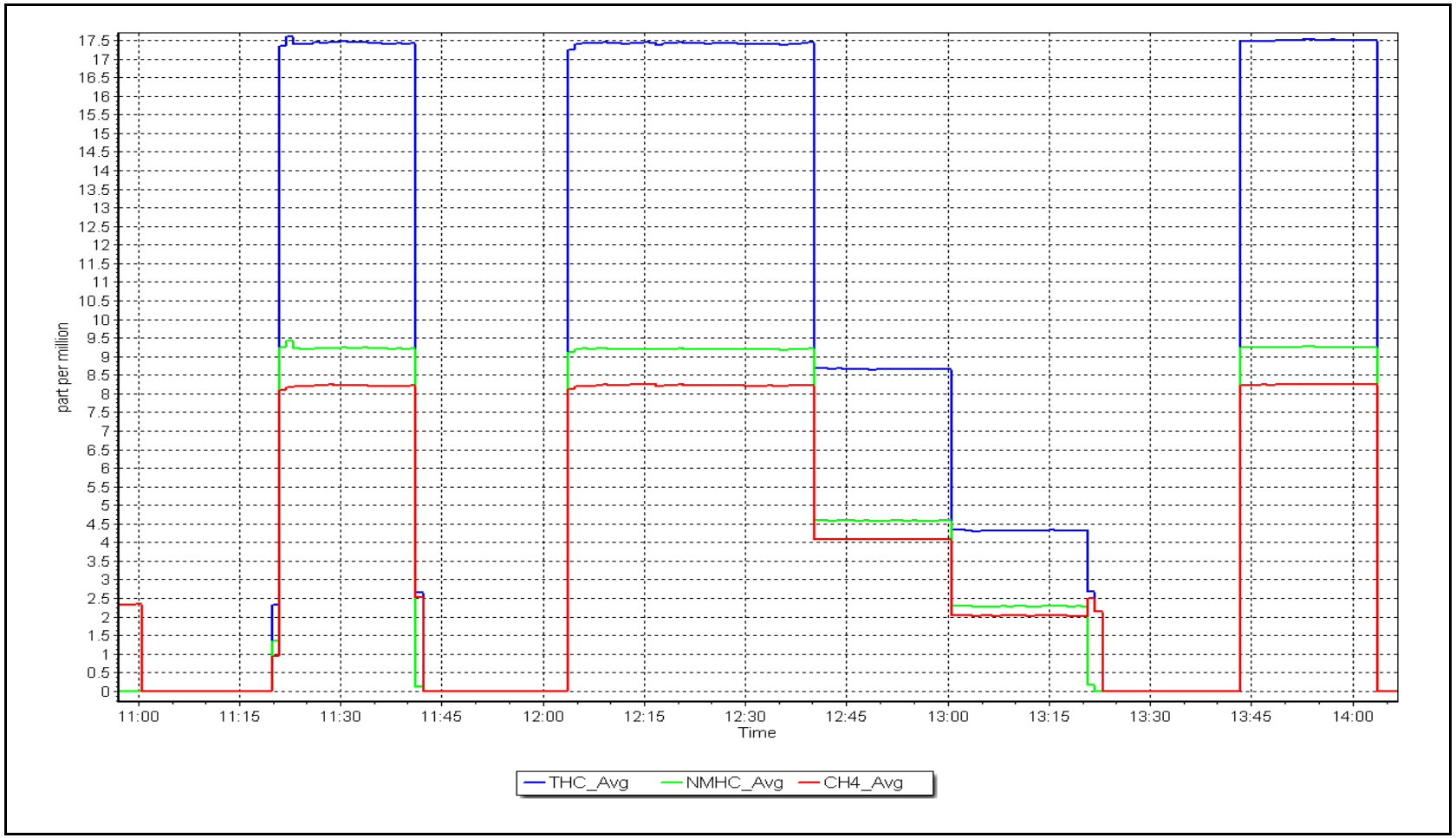
Calibration Date:	January 20, 2023	Previous Calibration:	December 7, 2022
Station Name:	Lower Camp	Station Number:	AMS11
Start Time (MST):	10:58	End Time (MST):	14:07
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999993	*≥0.995*
9.19	9.20	0.9990			
4.60	4.58	1.0038	Slope	1.001092	*0.90 - 1.10*
2.29	2.29	1.0027			
			Intercept	-0.007903	*+/-0.5*



NMHC Calibration Plot Date: January 20, 2023 Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS13
FORT MCKAY SOUTH
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort McKay South	Station number:	AMS13
Calibration Date:	January 16, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:30	End time (MST):	13:37
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:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2448
ZAG Make/Model:	API 701		Serial Number:	1117

Analyzer Information

Analyzer make: API T100 Analyzer serial #: 599

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006001	1.003886	Backgd or Offset:	77.0	79.7
Calibration intercept:	-3.218258	-3.178199	Coeff or Slope:	0.741	0.733

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*
as found zero	5000	0.0	0.0	0.7	----
as found span	4921	79.1	799.7	807.4	0.990
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.2	----
high point	4921	79.1	799.7	801.0	0.998
second point	4961	39.5	399.3	396.5	1.007
third point	4980	19.8	200.2	194.6	1.029
as left zero	5000	0.0	0.0	-0.4	----
as left span	4921	79.1	799.7	800.7	0.999
				Average Correction Factor	1.011

Baseline Corr As found:	806.70	Previous response	801.27	*% change	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

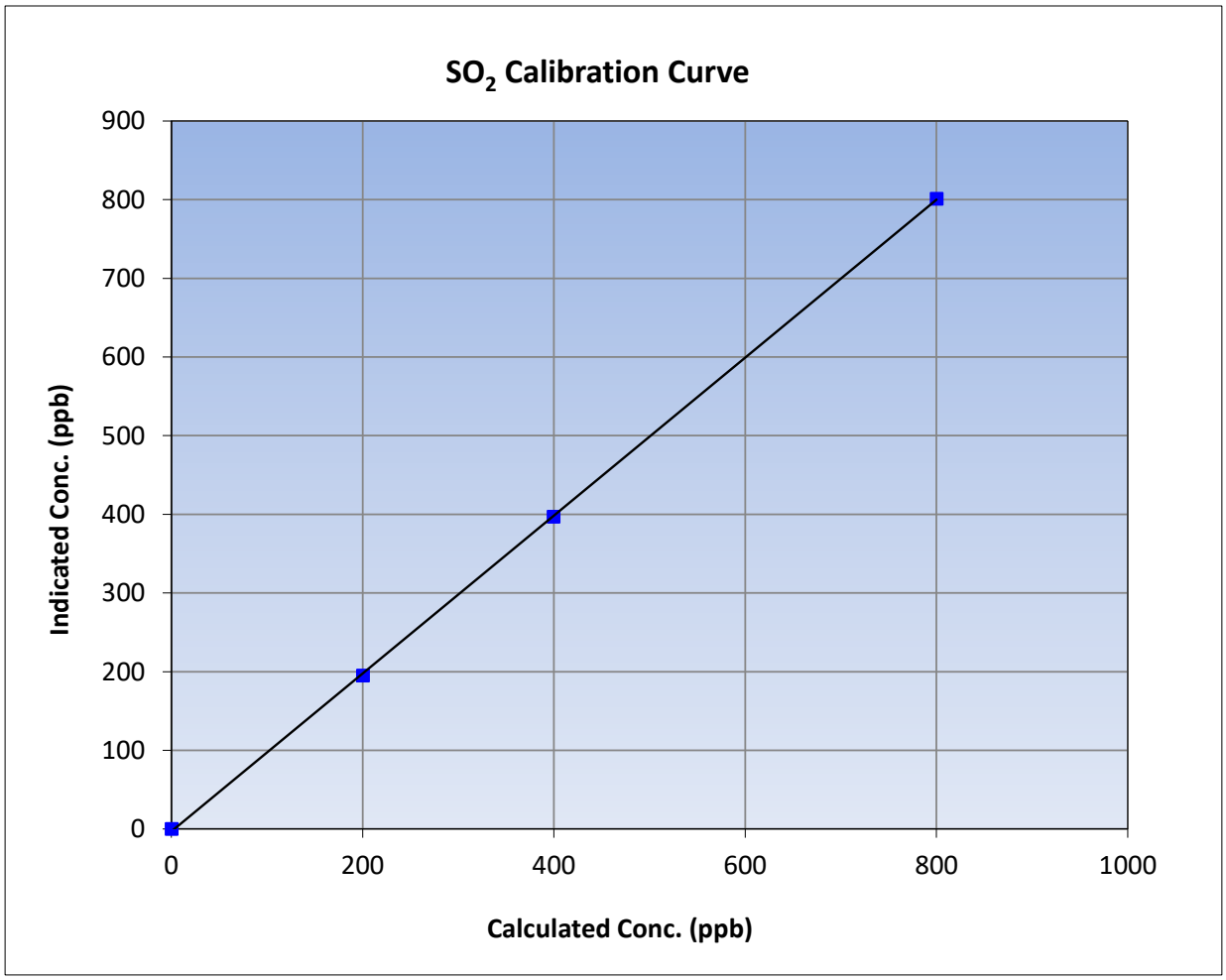
Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 2, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	10:30	End Time (MST):	13:37
Analyzer make:	API T100	Analyzer serial #:	599

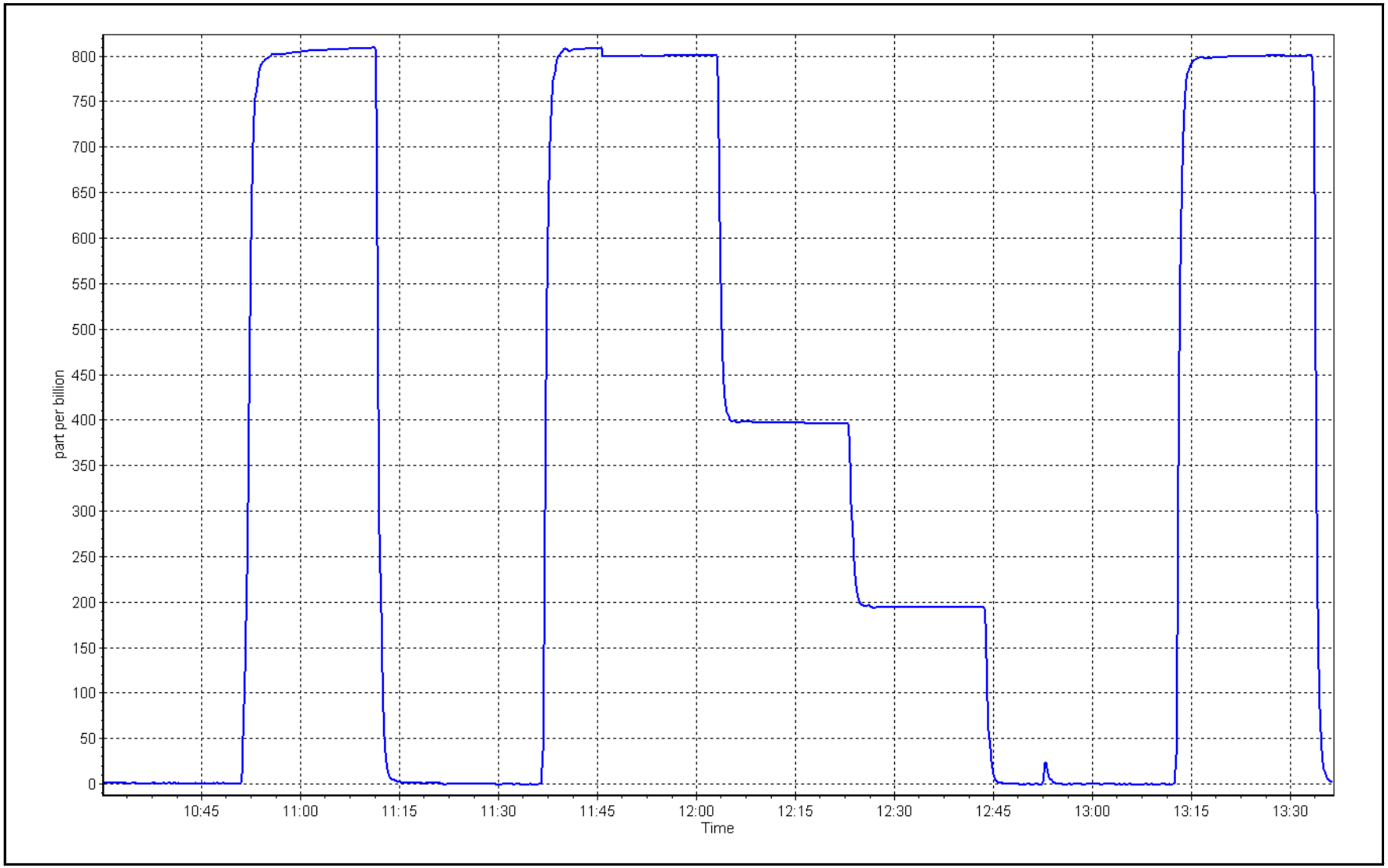
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.7	801.0	0.9984
399.3	396.5	1.0071
200.2	194.6	1.0287

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999937	*≥0.995*
Slope	1.003886	*0.90 - 1.10*
Intercept	-3.178199	*+/-30*



SO2 Calibration Plot Date: January 16, 2023 Location: Fort McKay South



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Fort McKay South	Station number:	AMS13
Calibration Date:	January 17, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	9:27	End time (MST):	14:37
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.34	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC500241			
Removed Cal Gas Conc:	5.32	ppm	Rem Gas Exp Date:	March 2, 2023
Removed Gas Cyl #:	EY0001990		Diff between cyl:	-4.1%
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2448
ZAG Make/Model:	Teledyne API 701		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			

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001418	0.999228	Backgd or Offset:	3.55	3.69
Calibration intercept:	-0.062130	-0.042157	Coeff or Slope:	1.080	1.120

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.1	----
as found span	4925	75.5	80.3	80.2	1.003
as found 2nd point	4962	37.7	40.1	39.8	1.010
as found 3rd point	4981	18.9	20.1	19.6	1.031
new cylinder response	4925	75.5	80.6	77.3	1.043

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4925	75.5	80.6	80.6	1.000
second point	4962	37.7	40.3	40.2	1.002
third point	4981	18.9	20.2	19.8	1.019
as left zero	5000	0.0	0.0	0.3	----
as left span	4925	75.5	80.6	80.4	1.003
SO2 Scrubber Check	4921	79.1	791.0	0.0	----
Date of last scrubber change:		20-Mar-20		Ave Corr Factor	1.007
Date of last converter efficiency test:		NA			efficiency

Baseline Corr As found:	80.1	Prev response:	80.38	*% change:	-0.3%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.999144	AF Intercept:	-0.182203
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999943		

* = > +/-5% change initiates investigation

Notes: Changed the inlet filter after as founds and changed the cylinder as well. Completed a SO2 scrubber check after calibrator zero. Adjusted span only.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

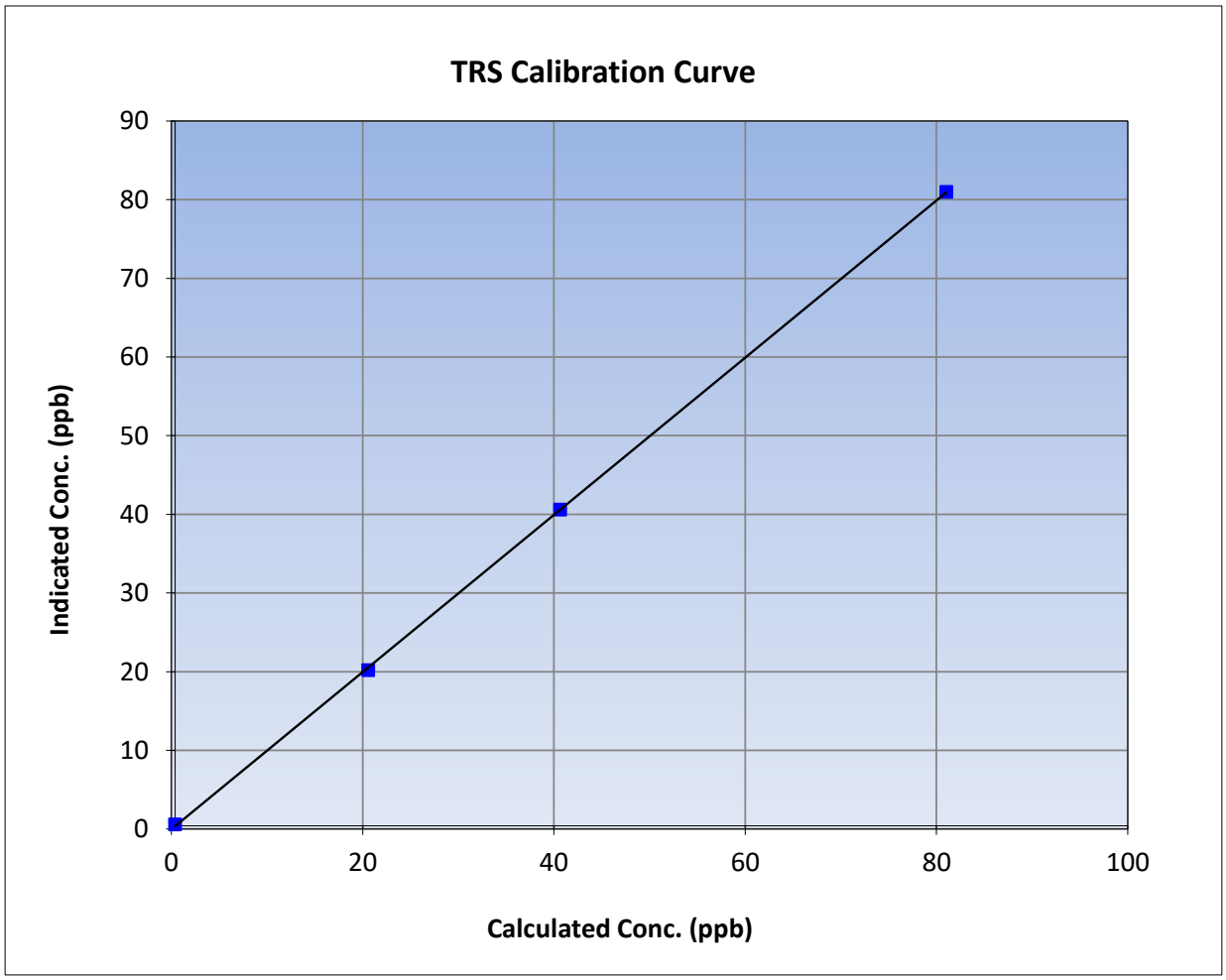
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 13, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	9:27	End Time (MST):	13:36
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017

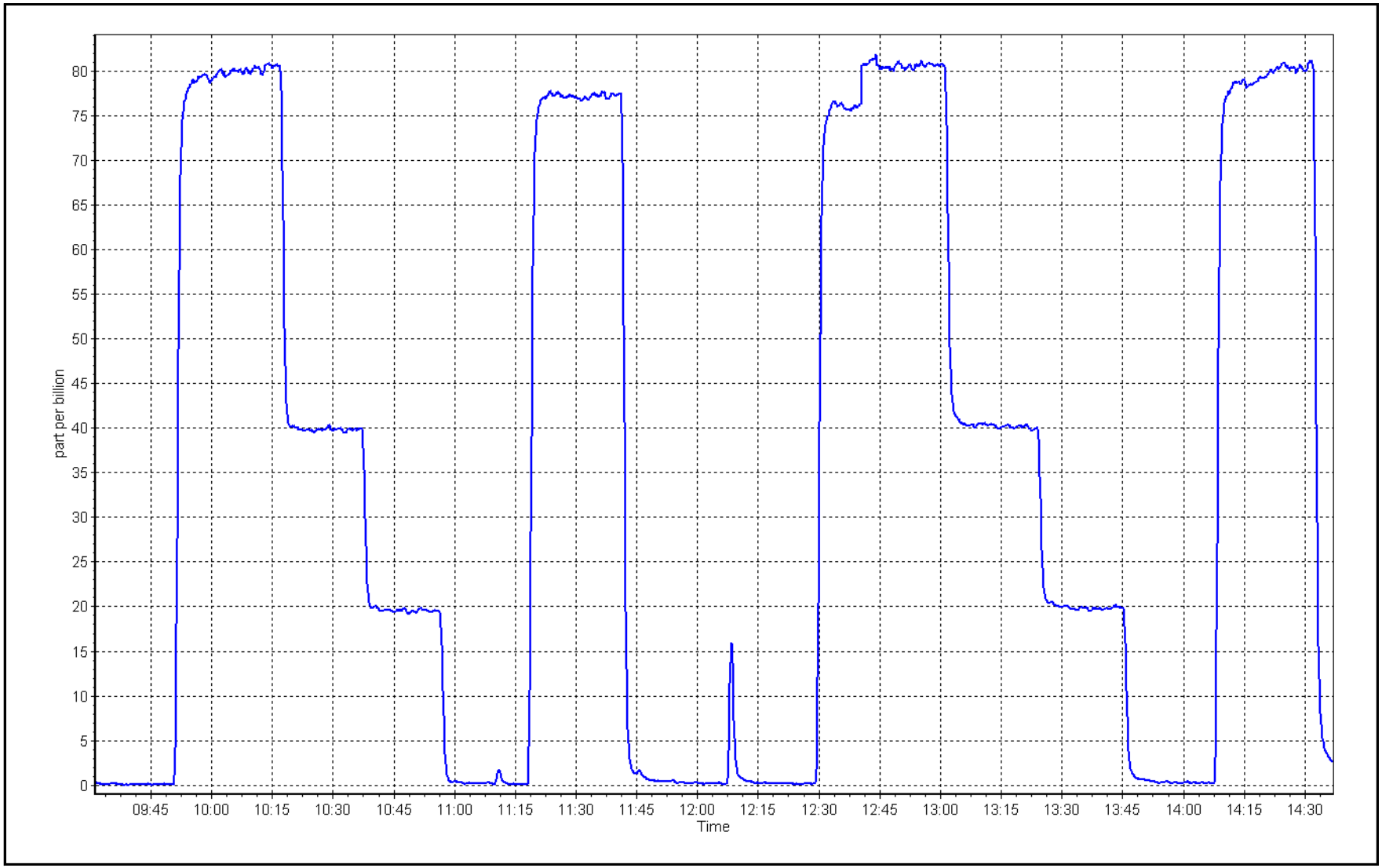
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.6	80.6	1.0003
40.3	40.2	1.0016
20.2	19.8	1.0195

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999951	*≥0.995*
Slope	0.999228	*0.90 - 1.10*
Intercept	-0.042157	*+/-3*



TRS Calibration Plot Date: January 17, 2023 Location: Fort McKay South



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Fort McKay South	Station number:	AMS13
Calibration Date:	January 16, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:30	End time (MST):	13:37
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC260812	Cal Gas Expiry Date:	December 29, 2028	
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:	NA	
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	
ZAG make/model:	API 701		Serial Number:	1117	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1152430012	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.38E-04	2.38E-04	NMHC SP Ratio:	4.69E-05	4.74E-05
CH4 Retention time:	12.0	12.0	NMHC Peak Area:	193414	191456

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.1	17.05	16.99	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.1	17.05	17.06	0.999
second point	4961	39.5	8.51	8.37	1.017
third point	4980	19.8	4.27	4.24	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.1	17.05	17.10	0.997
				Average Correction Factor	1.008

Baseline Corr AF:	16.99	Prev response	16.99	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4921	79.1	9.08	9.02	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4921	79.1	9.08	9.09	0.998
second point	4961	39.5	4.53	4.49	1.010
third point	4980	19.8	2.27	2.28	0.999
as left zero	5000	0	0.00	0.00	----
as left span	4921	79.1	9.08	9.12	0.996
				Average Correction Factor	1.003
Baseline Corr AF:	9.02	Prev response	9.05	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.1	7.97	7.97	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.1	7.97	7.97	1.000
second point	4961	39.5	3.98	3.89	1.024
third point	4980	19.8	1.99	1.96	1.016
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.1	7.97	7.99	0.998
				Average Correction Factor	1.013
Baseline Corr AF:	7.97	Prev response	7.94	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.002563	1.000765
THC Cal Offset:	-0.096578	-0.043424
CH4 Cal Slope:	1.003387	1.000366
CH4 Cal Offset:	-0.054594	-0.031817
NMHC Cal Slope:	1.001929	1.001015
NMHC Cal Offset:	-0.042585	-0.011206

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

THC Calibration Summary

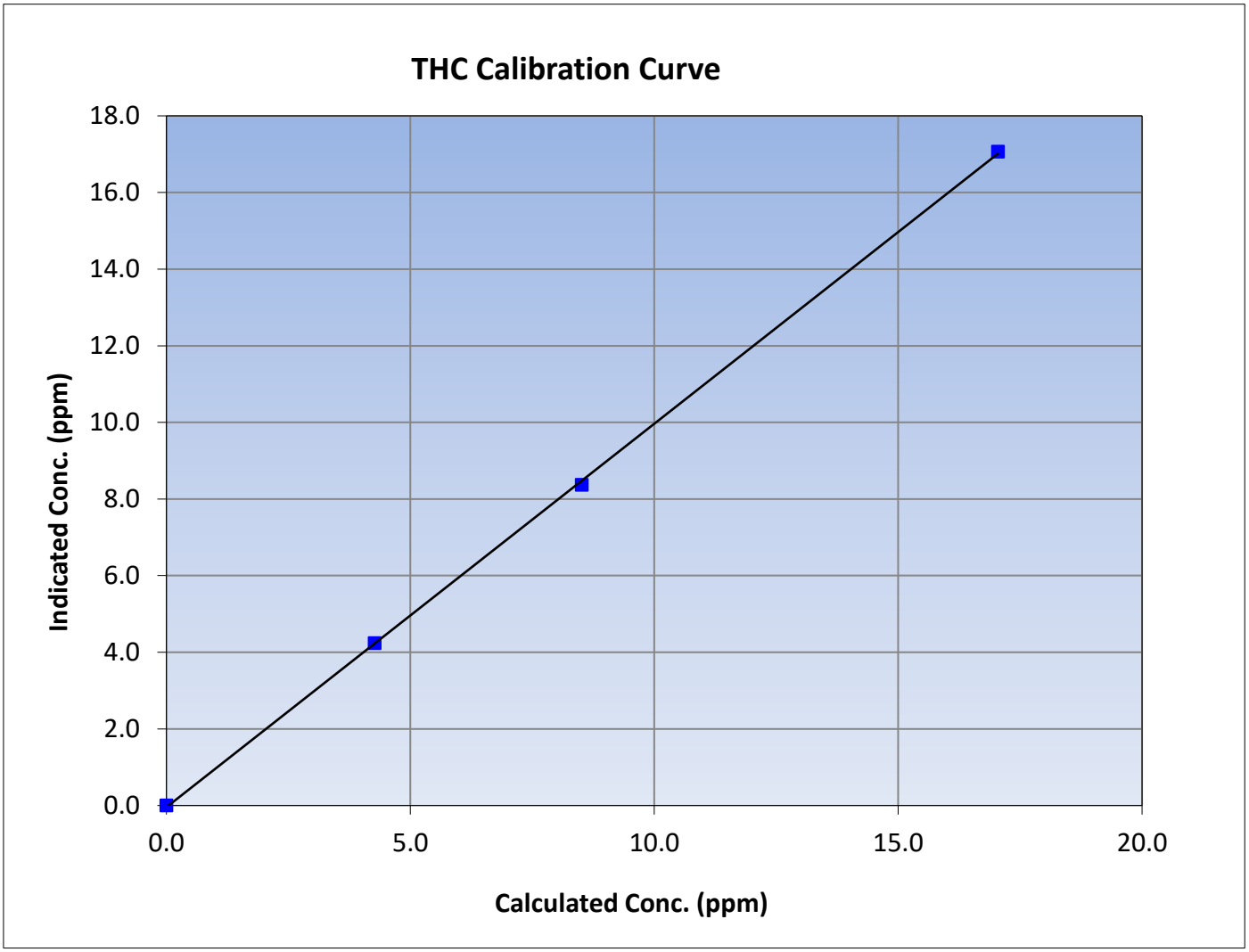
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 2, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	10:30	End Time (MST):	13:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999908	*≥0.995*
17.05	17.06	0.9990			
8.51	8.37	1.0166	Slope	1.000765	*0.90 - 1.10*
4.27	4.24	1.0071			
			Intercept	-0.043424	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

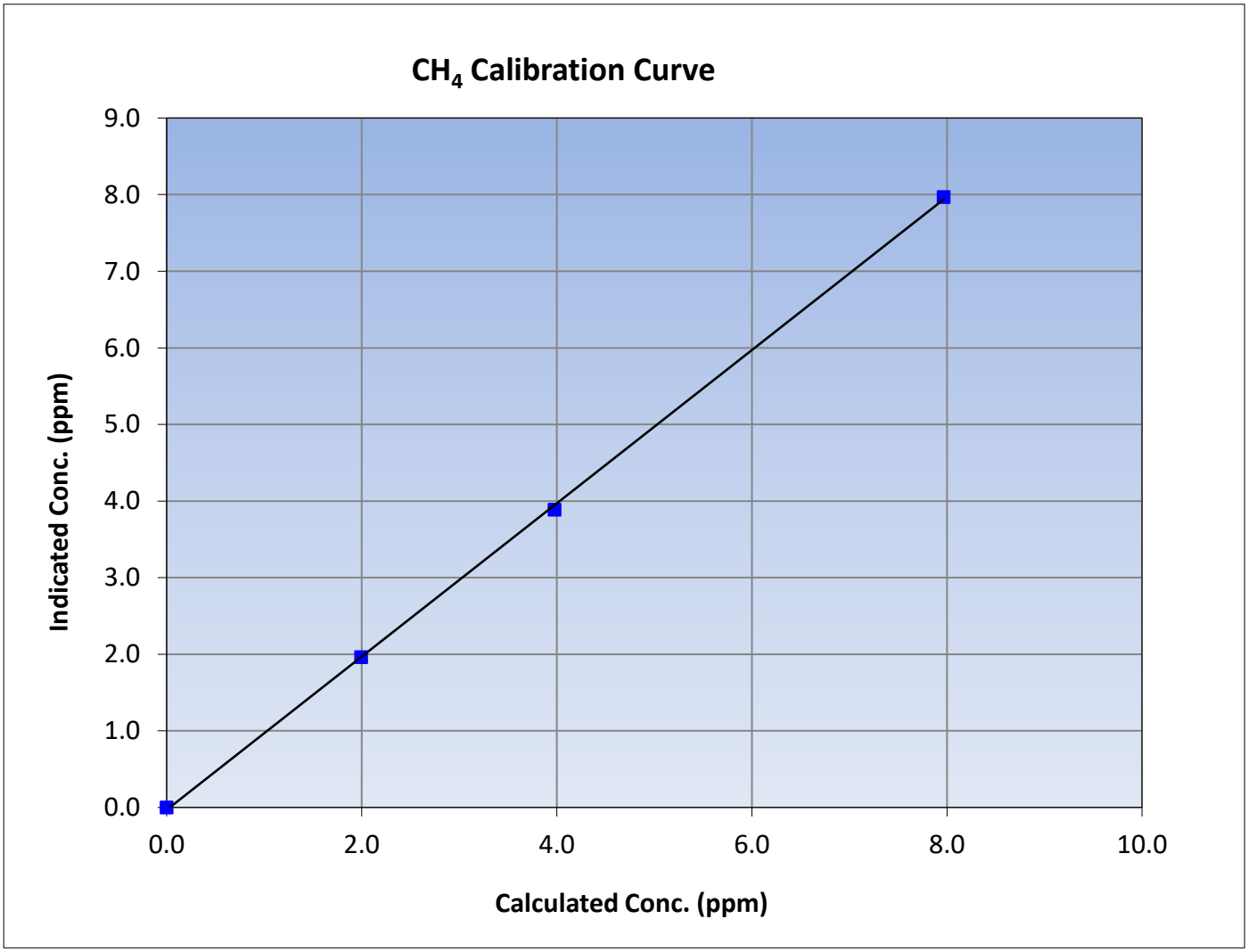
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 2, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	10:30	End Time (MST):	13:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999833	*≥0.995*
7.97	7.97	0.9997			
3.98	3.89	1.0237	Slope	1.000366	*0.90 - 1.10*
1.99	1.96	1.0165			
			Intercept	-0.031817	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

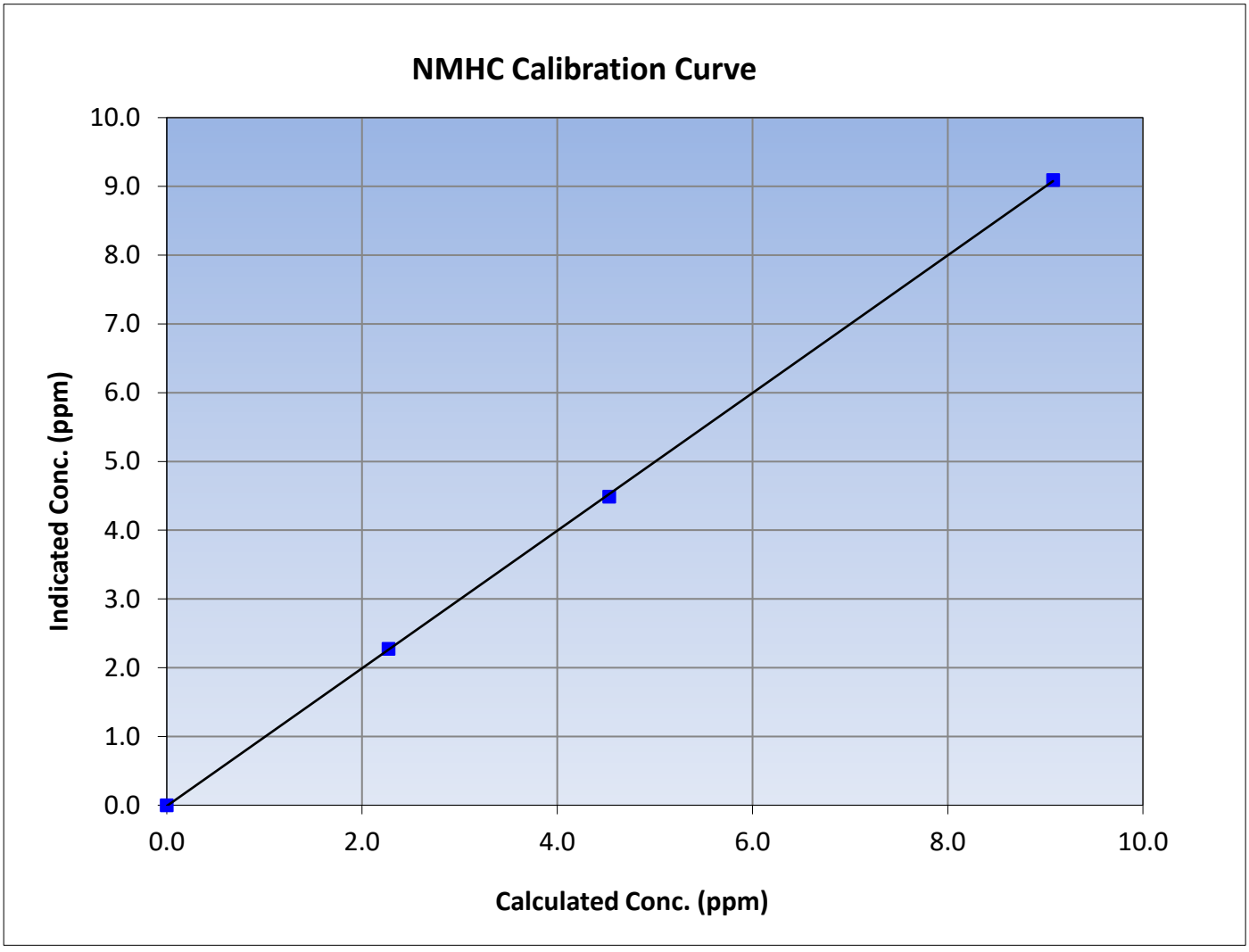
Version-01-2020

Station Information

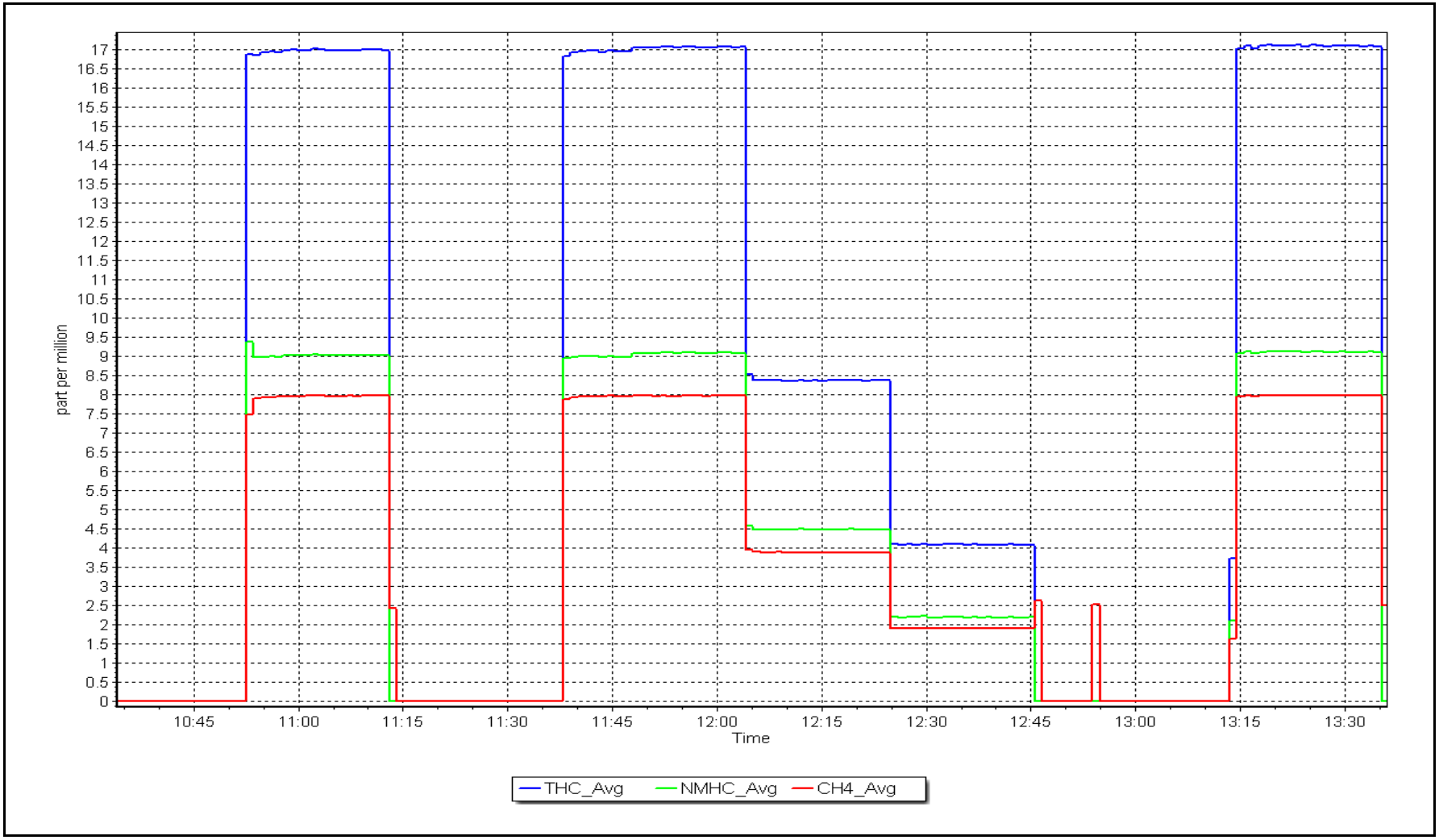
Calibration Date:	January 16, 2023	Previous Calibration:	December 2, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	10:30	End Time (MST):	13:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999955	≥0.995
9.08	9.09	0.9984			
4.53	4.49	1.0102	Slope	1.001015	0.90 - 1.10
2.27	2.28	0.9990			
			Intercept	-0.011206	+/-0.5



NMHC Calibration Plot Date: January 16, 2023 Location: Fort McKay South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	January 19, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	9:27	End time (MST):	13:58
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P76		Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	50.98	ppm	NO Cal Gas Conc:	49.32	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date:	N/A	
Removed Gas NOX Conc:	50.98	ppm	Removed Gas NO Conc:	49.32	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2448	
ZAG make/model:	API T701		Serial Number:	1117	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.182	1.200	NO bkgnd or offset:	9.4	9.6
NOX coeff or slope:	0.991	0.992	NOX bkgnd or offset:	9.4	9.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	195.3	194.1

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.000035	0.999594
NO_X Cal Offset:	-2.551182	-2.291272
NO Cal Slope:	1.003791	1.002005
NO Cal Offset:	-3.305357	-3.105090
NO_2 Cal Slope:	0.996580	1.006533
NO_2 Cal Offset:	-1.621259	-0.433464

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	----	----
as found span	4919	81.1	826.9	800.0	26.9	815.1	787.2	28.0	1.0145	1.0162
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
high point	4919	81.1	826.9	800.0	26.9	825.3	799.9	25.2	1.0019	1.0001
second point	4960	40.6	413.9	400.4	13.5	410.5	396.8	13.7	1.0083	1.0091
third point	4980	20.3	207.0	200.2	6.7	202.3	194.4	8.0	1.0231	1.0300
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as left span	4919	81.1	826.9	386.3	440.6	834.0	389.4	444.6	0.9915	0.9919
								Average Correction Factor	1.0111	1.0131

Corrected As found	NO_X = 815.3 ppb	NO = 787.4 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	-1.1%
Previous Response	NO_X = 824.4 ppb	NO = 799.7 ppb			*Percent Change	NO =	-1.6%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:	
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	792.8	379.1	440.6	443.2	0.9942	100.6%
2nd GPT point (200 ppb O3)	792.8	585.3	234.4	235.8	0.9942	100.6%
3rd GPT point (100 ppb O3)	792.8	689.6	130.1	129.6	1.0040	99.6%
				Average Correction Factor	0.9975	100.3%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

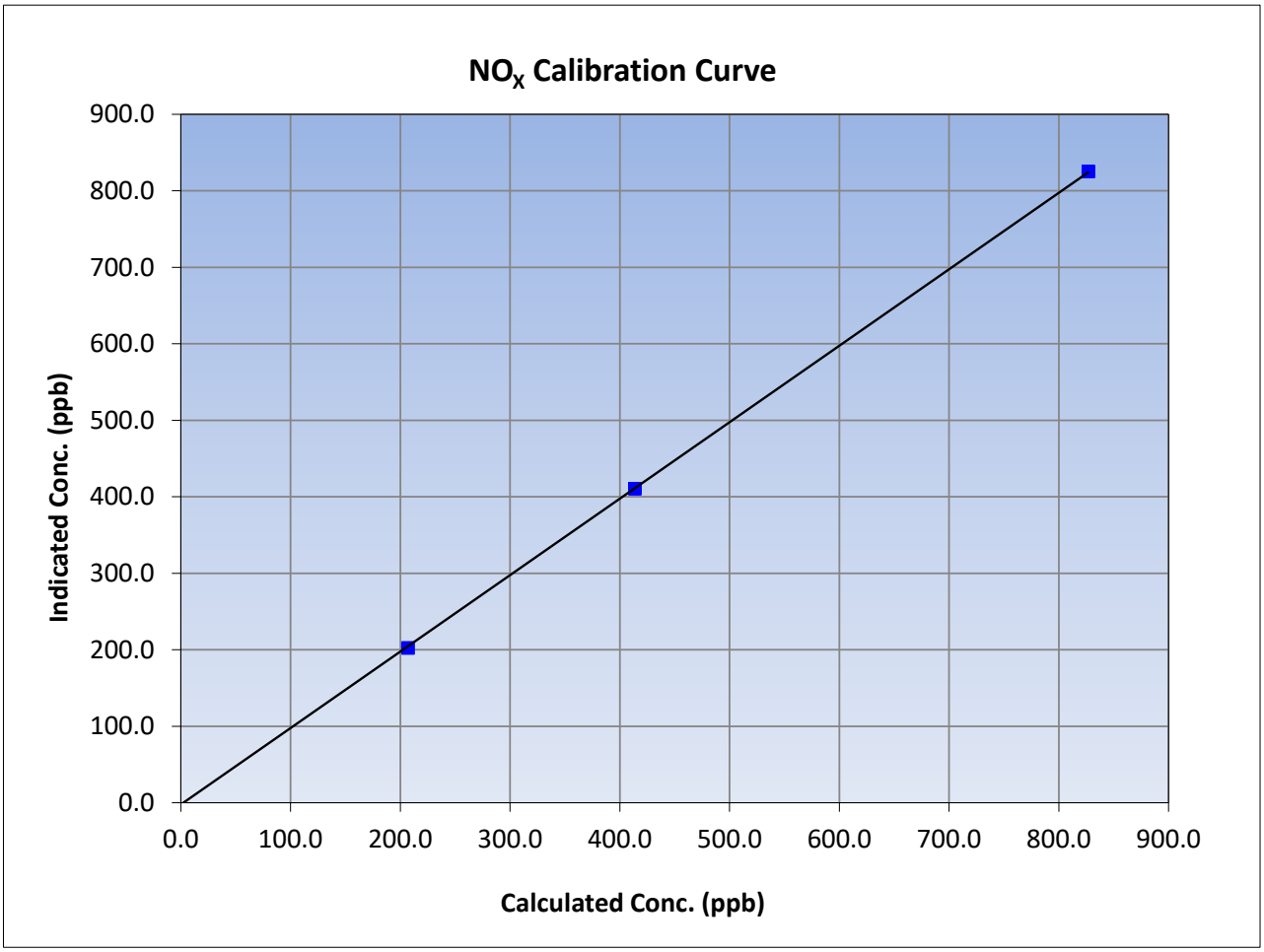
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:27	End Time (MST):	13:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999968	≥0.995
826.9	825.3	1.0019			
413.9	410.5	1.0083	Slope	0.999594	0.90 - 1.10
207.0	202.3	1.0231			
			Intercept	-2.291272	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

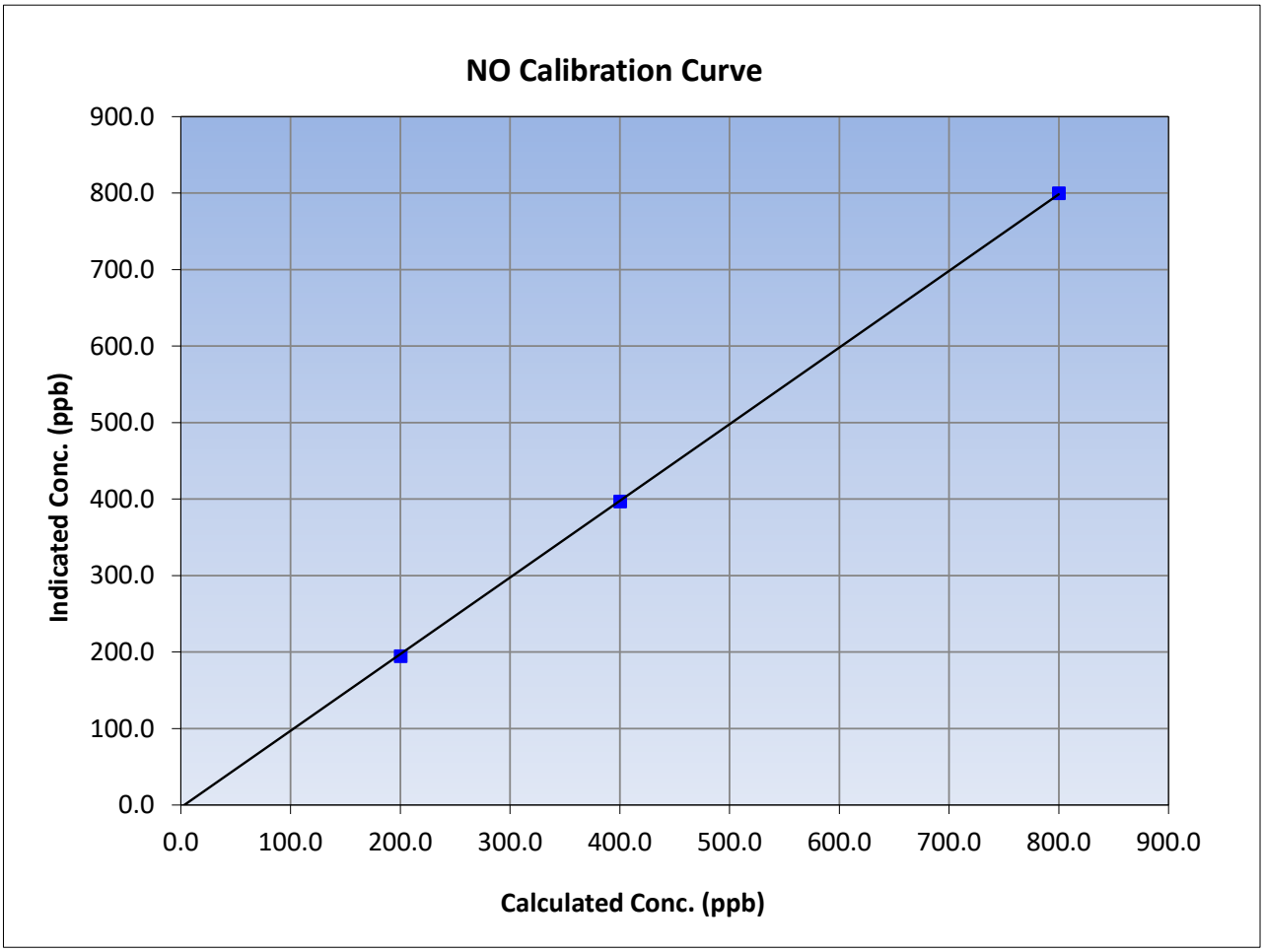
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:27	End Time (MST):	13:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999936	≥0.995
800.0	799.9	1.0001			
400.4	396.8	1.0091	Slope	1.002005	0.90 - 1.10
200.2	194.4	1.0300			
			Intercept	-3.105090	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

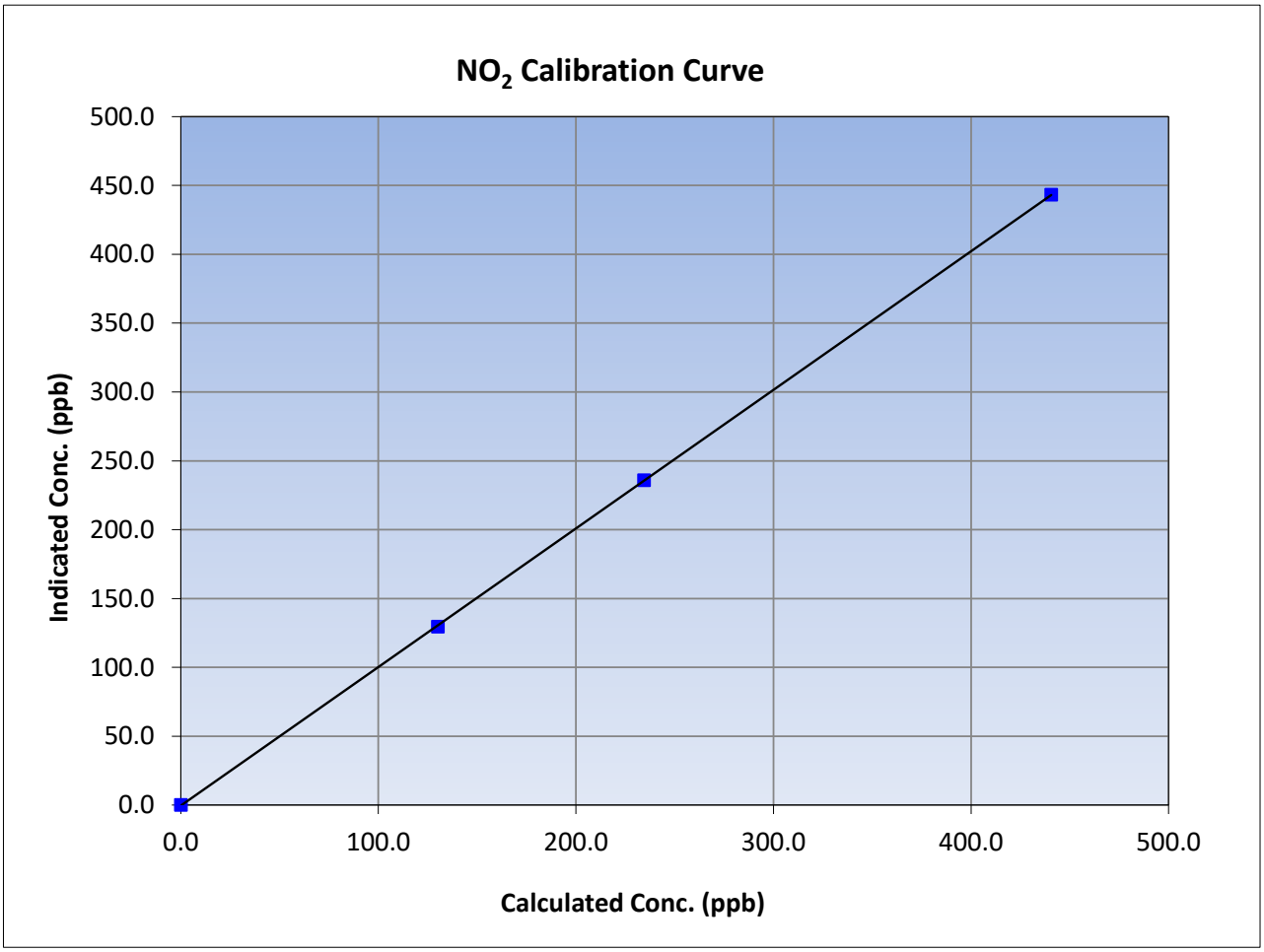
Version-04-2020

Station Information

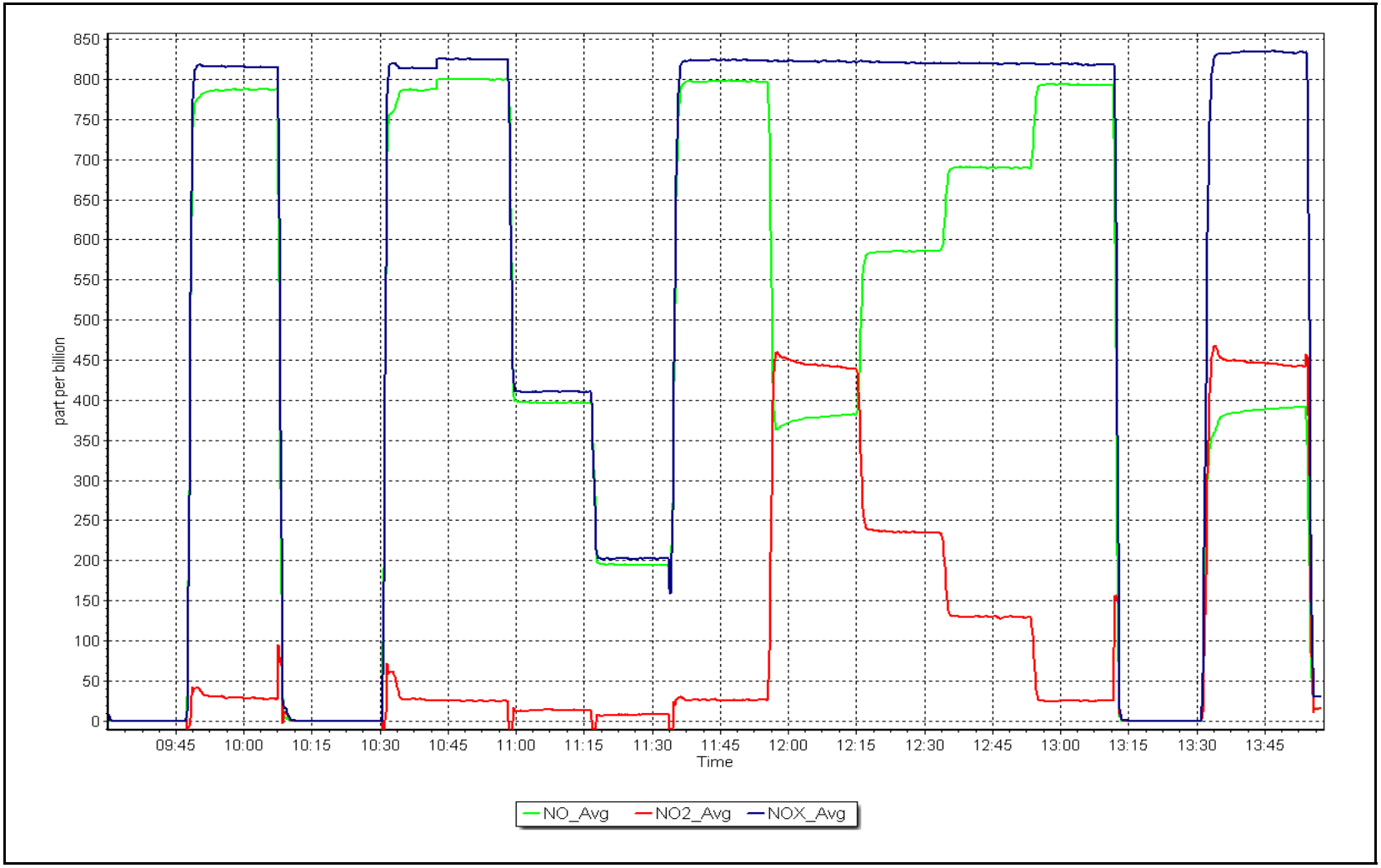
Calibration Date:	January 19, 2023	Previous Calibration:	December 6, 2022
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:27	End Time (MST):	13:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999988	≥0.995
440.6	443.2	0.9942			
234.4	235.8	0.9942	Slope	1.006533	0.90 - 1.10
130.1	129.6	1.0040			
			Intercept	-0.433464	+/-20



NO_X Calibration Plot Date: January 19, 2023 Location: Fort McKay South



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort McKay South	Station number:	AMS13
Calibration Date:	January 18, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	9:14	End time (MST):	12:25
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	2448
ZAG Make/Model:	Teledyne API T701	Serial Number:	1117

Analyzer Information

Analyzer make:	Teledyne API T400	Analyzer serial #:	3871
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000486	0.996143	Backgd or Offset:	2.7	2.7
Calibration intercept:	0.640000	1.300000	Coeff or Slope:	0.962	0.962

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	969.9	400.0	399.1	1.002
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	980.6	400.0	399.3	1.002
second point	5000	838.0	200.0	200.9	0.996
third point	5000	735.3	100.0	102.0	0.980
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	979.1	400.0	401.8	0.996
				Average Correction Factor	0.993

Baseline Corr As found:	399.2	Previous response	400.8	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

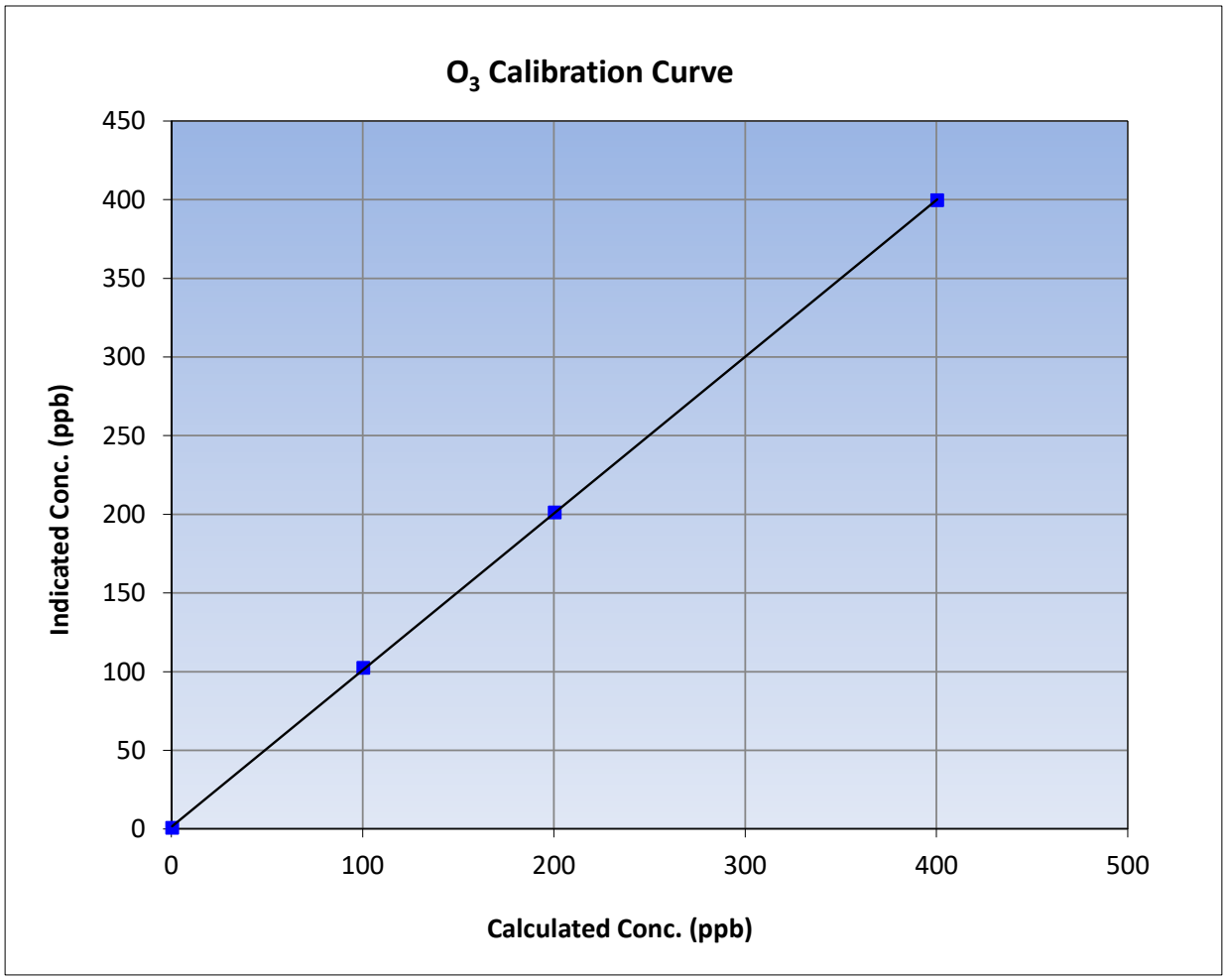
Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	December 1, 2022
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	9:14	End Time (MST):	12:25
Analyzer make:	Teledyne API T400	Analyzer serial #:	3871

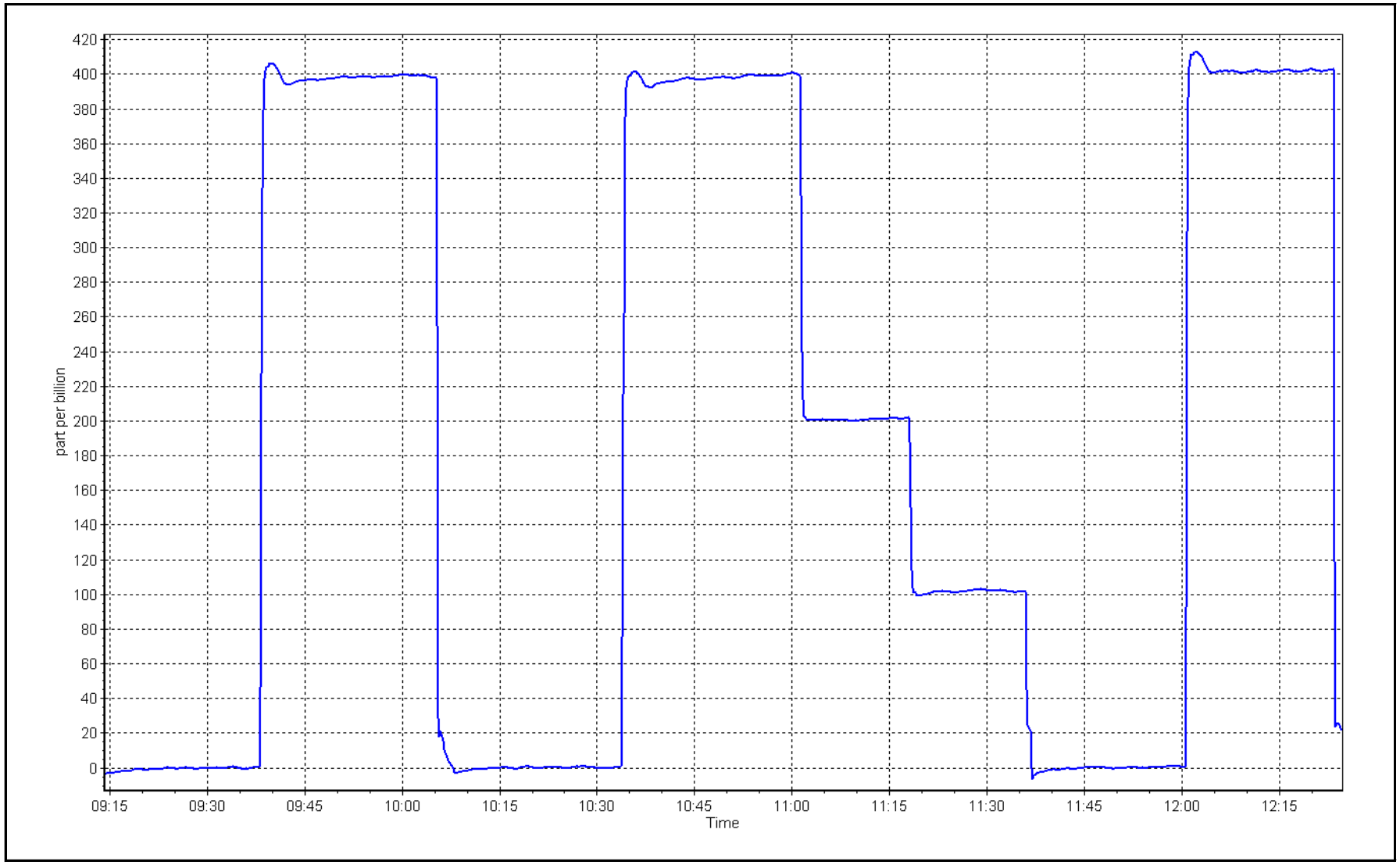
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
400.0	399.3	1.0018
200.0	200.9	0.9955
100.0	102.0	0.9804

Statistical Evaluation		Limits
Correlation Coefficient	0.999971	≥0.995
Slope	0.996143	0.90 - 1.10
Intercept	1.300000	+/- 5



O_3 Calibration Plot Date: January 18, 2023 Location: Fort McKay South



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	January 19, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	10:49	End time (MST):	11:29
Analyzer Make:	API T640	S/N:	319
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	141229
Temp/RH standard:	Delta Cal	S/N:	141229

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-4.5	-4.7	-4.5	☐	+/- 2 °C
P (mmHg)	731.2	731.5	731.2	☐	+/- 10 mmHg
flow (LPM)	4.96	4.98	4.96	☐	+/- 0.25 LPM

Leak Test: Date of check: January 19, 2023 Last Cal Date: December 13, 2022

PM w/o HEPA: 11.1 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 13, 2022

Disposable Filter Changed: December 13, 2022

Annual Maintenance

Date Sample Tube Cleaned: June 29, 2022

Date RH/T Sensor Cleaned: June 29, 2022

Notes: No adjustment made. Leak check passed.

Calibration by: Sean Bala

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS14
ANZAC
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 24, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	7:30	End time (MST):	10:29
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 Make/Model:	API T700		Serial Number:	5239
ZAG Make/Model:	API T701H		Serial Number:	357

Analyzer Information

Analyzer make: Thermo 43i Analyzer serial #: 0710321322

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.995082	0.998268	Backgd or Offset:	24.4	25.1
Calibration intercept:	-1.425034	-1.664595	Coeff or Slope:	0.784	0.795

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*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4920	80.1	800.2	787.4	1.016
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	----
high point	4920	80.1	800.2	798.0	1.003
second point	4960	40.0	399.6	396.5	1.008
third point	4980	20.0	199.8	195.8	1.020
as left zero	5000	0.0	0.0	0.2	----
as left span	4920	80.1	800.2	797.7	1.003
				Average Correction Factor	1.010

Baseline Corr As found:	787.50	Previous response	794.82	*% 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

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

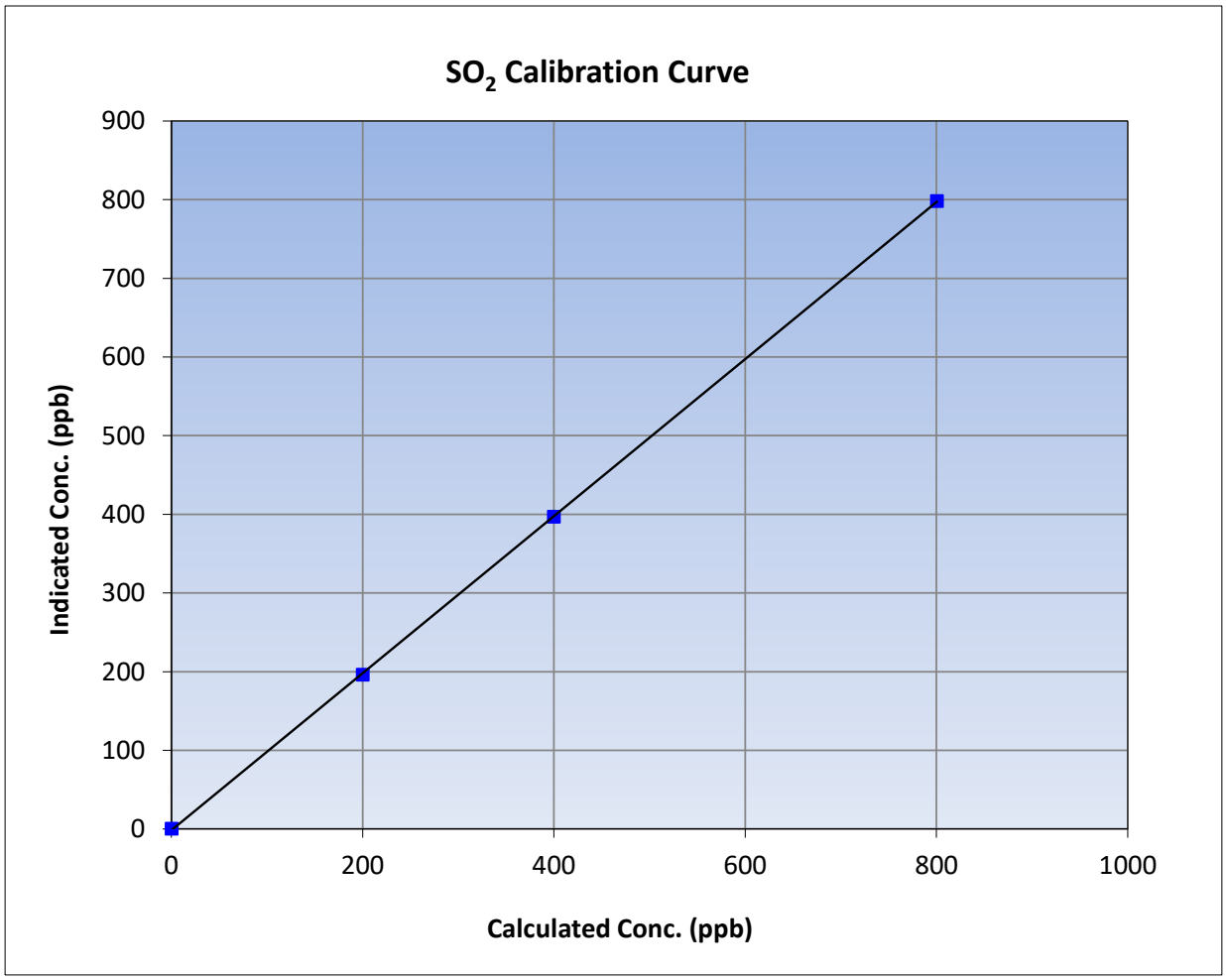
Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 6, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	7:30	End Time (MST):	10:29
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

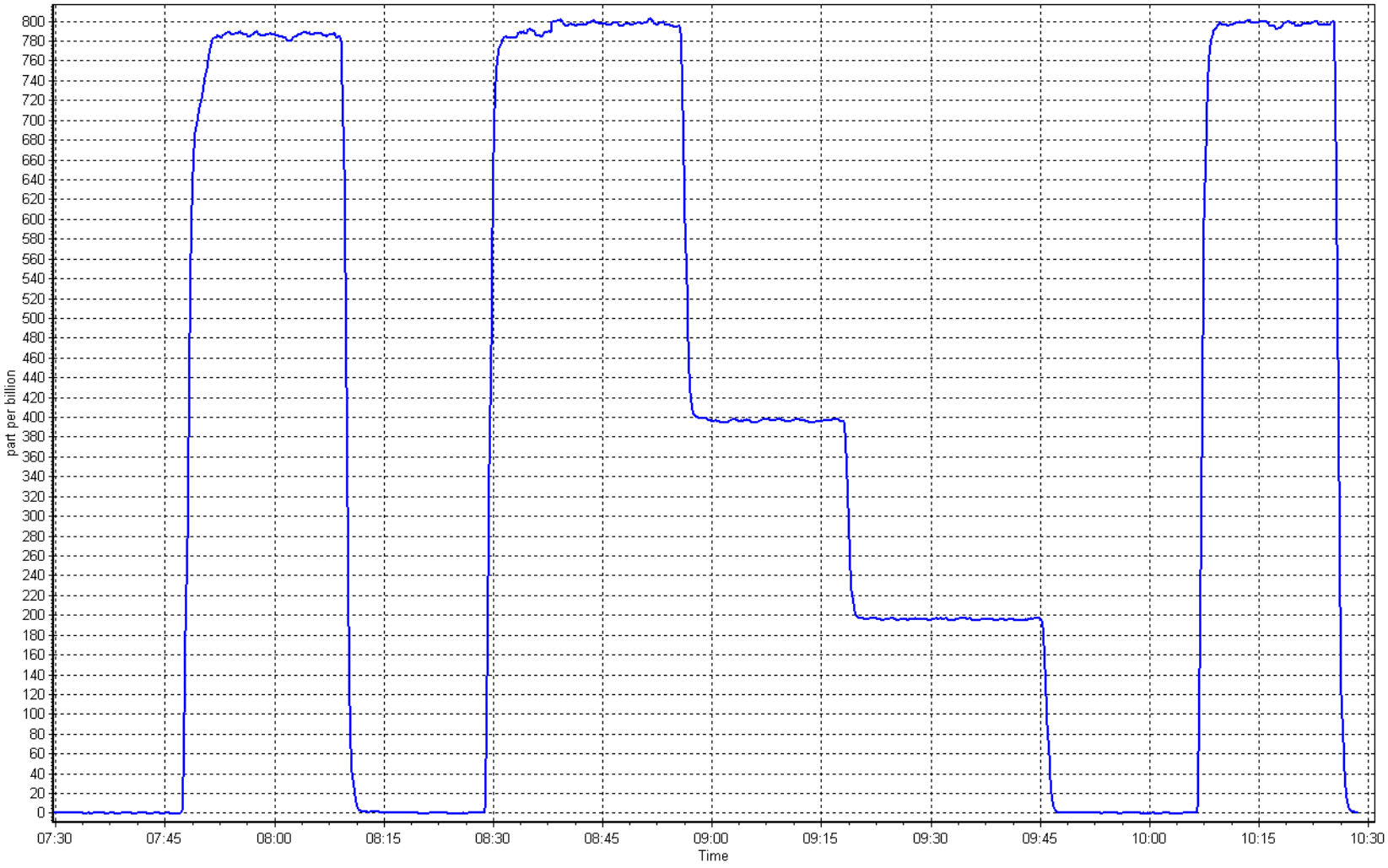
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.2	798.0	1.0027
399.6	396.5	1.0078
199.8	195.8	1.0204

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	0.998268	*0.90 - 1.10*
Intercept	-1.664595	*+/-30*



SO2 Calibration Plot Date: January 24, 2023 Location: Anzac



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Anzac	Station number:	AMS14
Calibration Date:	January 6, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	7:45	End time (MST):	12:29
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.38	ppm	Cal Gas Exp Date:	February 3, 2023
Cal Gas Cylinder #:	EY0000859			
Removed Cal Gas Conc:	5.38	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	5252
ZAG Make/Model:	API 701H		Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1180540019
Converter make:	CD Nova CDN-101		Converter serial #:	503
Analyzer Range	0 - 100 ppb			

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002560	1.003842	Backgd or Offset:	5.61	5.54
Calibration intercept:	0.158711	0.038815	Coeff or Slope:	1.005	0.990

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4925	74.3	80.0	81.4	0.985
as found 2nd point	4962	37.2	40.0	40.8	0.986
as found 3rd point	4981	18.6	20.0	20.0	1.011
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.3	----
high point	4925	74.3	80.0	80.4	0.995
second point	4962	37.2	40.0	40.2	0.996
third point	4981	18.6	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.4	----
as left span	4925	74.3	80.0	79.8	1.002
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.000
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	81.2	Prev response:	80.32	*% change:	1.1%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.017709	AF Intercept:	-0.021532
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999951		

* = > +/-5% change initiates investigation

Notes: Scrubber checked after the calibrator zero. No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

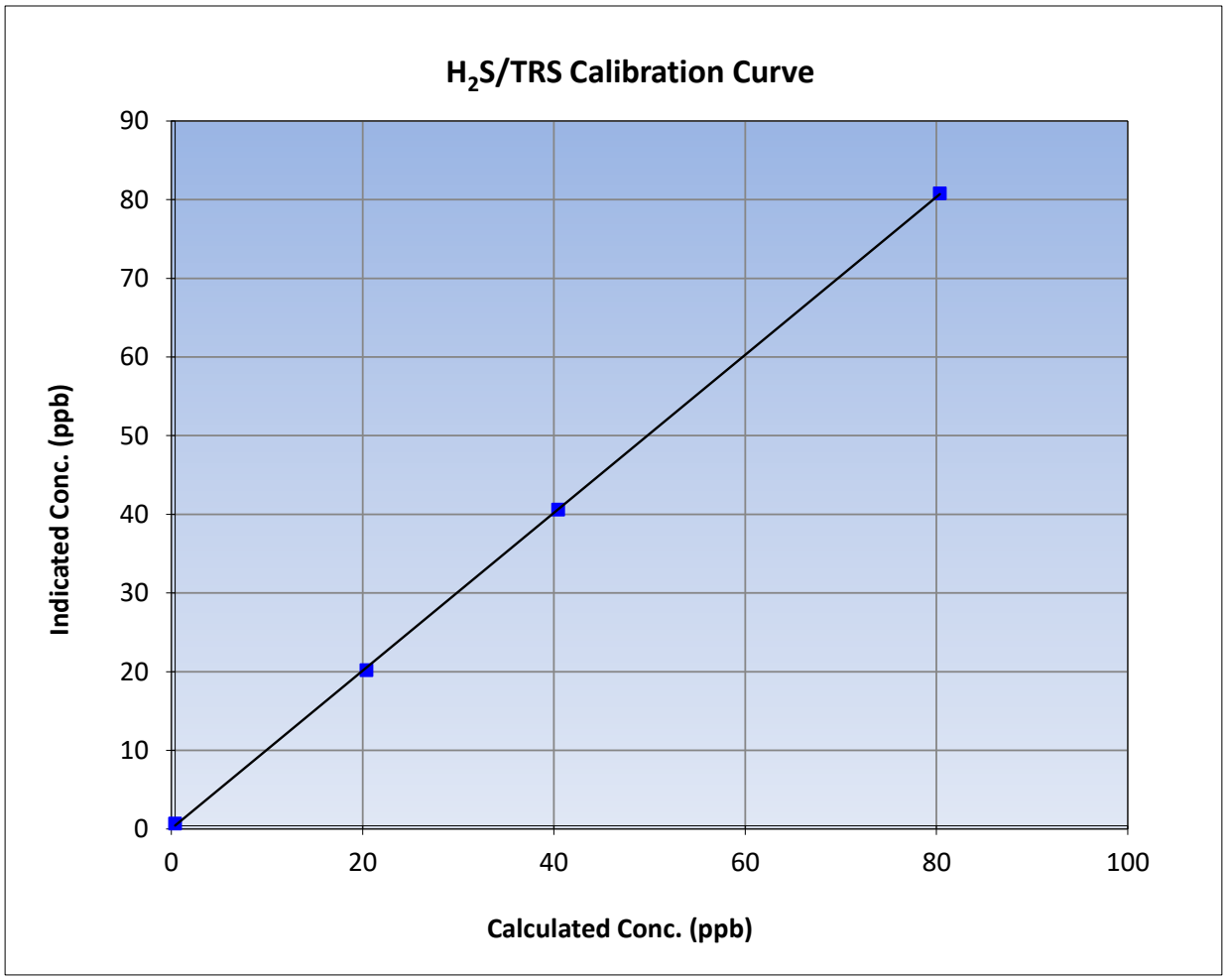
Station Information

Calibration Date:	January 6, 2023	Previous Calibration:	December 5, 2022
Station Name:	Anzac	Station Number:	AMS14
Start Time (MST):	7:45	End Time (MST):	12:29
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540019

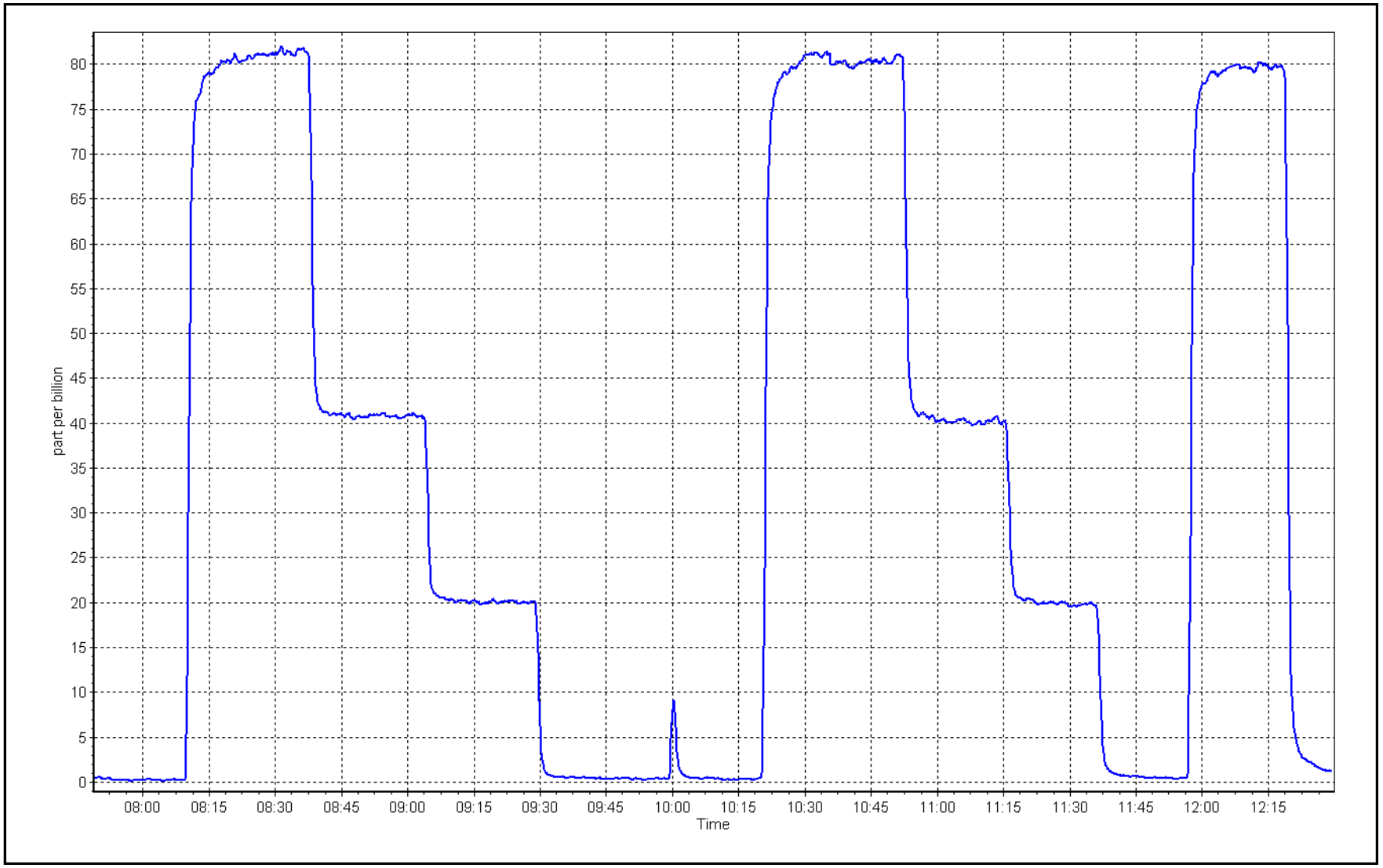
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.4	0.9945
40.0	40.2	0.9959
20.0	19.8	1.0109

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999947	*≥0.995*
Slope	1.003842	*0.90 - 1.10*
Intercept	0.038815	*+/-3*



TRS Calibration Plot Date: January 6, 2023 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 23, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	12:05	End time (MST):	15:15
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:	5252	
ZAG make/model:	API 701H		Serial Number:	357	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148494	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.85E-04	3.85E-04	NMHC SP Ratio:	4.46E-05	4.46E-05
CH4 Retention time:	12.00	12.00	NMHC Peak Area:	204554	204554

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	17.12	17.17	0.997
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	17.12	17.13	1.000
second point	4960	40.0	8.55	8.57	0.998
third point	4980	20.0	4.28	4.25	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.1	17.12	17.17	0.997
				Average Correction Factor	1.002

Baseline Corr AF:	17.17	Prev response	17.10	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	9.12	9.08	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	9.12	9.03	1.010
second point	4960	40.0	4.56	4.51	1.010
third point	4980	20.0	2.28	2.23	1.023
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.1	9.12	9.07	1.006
				Average Correction Factor	1.014
Baseline Corr AF:	9.08	Prev response	9.12	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	8.00	8.09	0.988
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	8.00	8.10	0.988
second point	4960	40.0	3.99	4.06	0.985
third point	4980	20.0	2.00	2.02	0.989
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.1	8.00	8.10	0.987
				Average Correction Factor	0.987
Baseline Corr AF:	8.09	Prev response	7.98	*% change	1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.998499	1.001116
THC Cal Offset:	0.004201	-0.010387
CH4 Cal Slope:	0.995993	1.012466
CH4 Cal Offset:	0.013958	0.001594
NMHC Cal Slope:	1.000697	0.991290
NMHC Cal Offset:	-0.009757	-0.011980

Notes: N2 cylinder changed prior to calibration.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

THC Calibration Summary

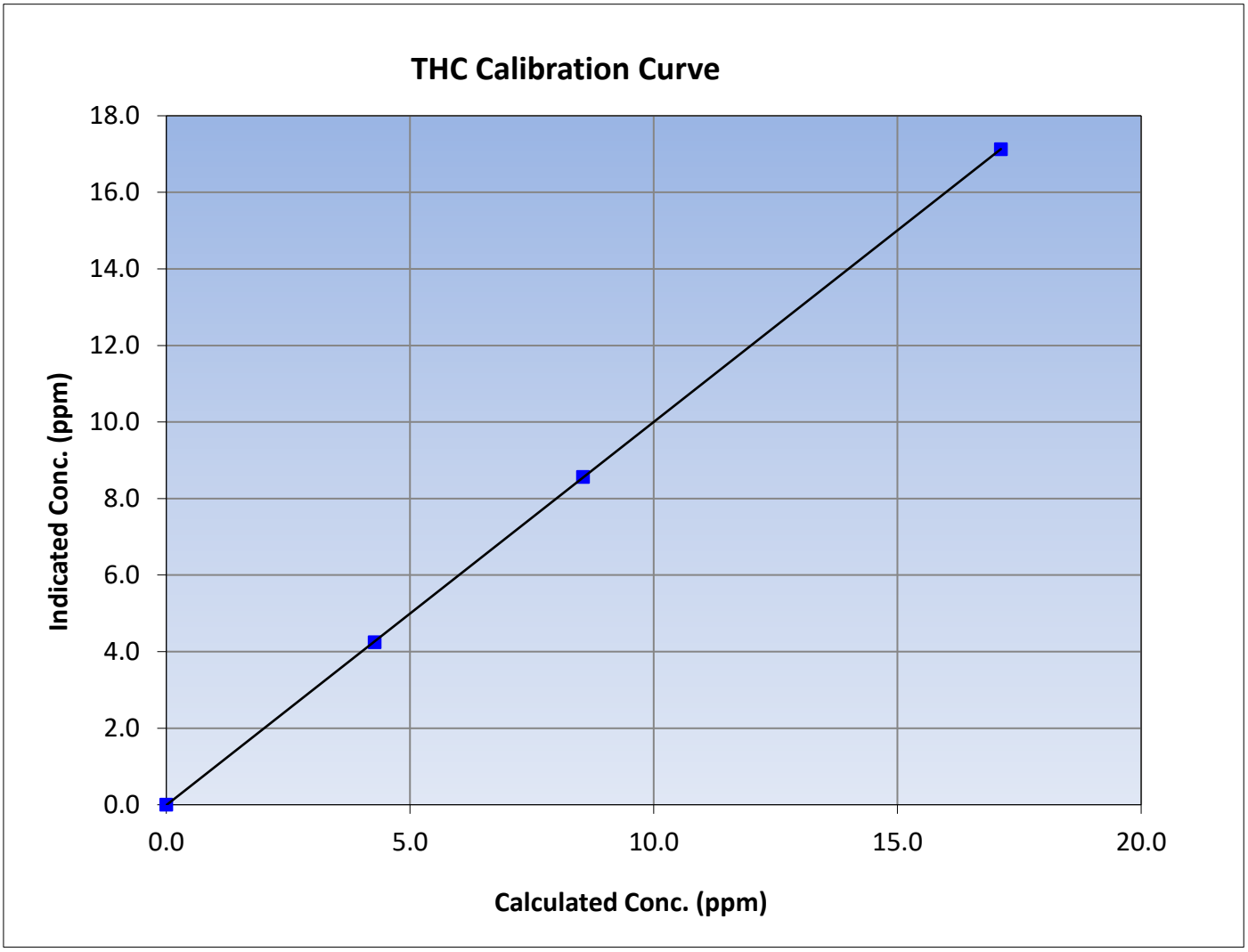
Version-01-2020

Station Information

Calibration Date:	January 23, 2023	Previous Calibration:	December 14, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	12:05	End Time (MST):	15:15
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	0.999994	≥0.995
17.12	17.13	0.9996			
8.55	8.57	0.9982	Slope	1.001116	0.90 - 1.10
4.28	4.25	1.0071			
			Intercept	-0.010387	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

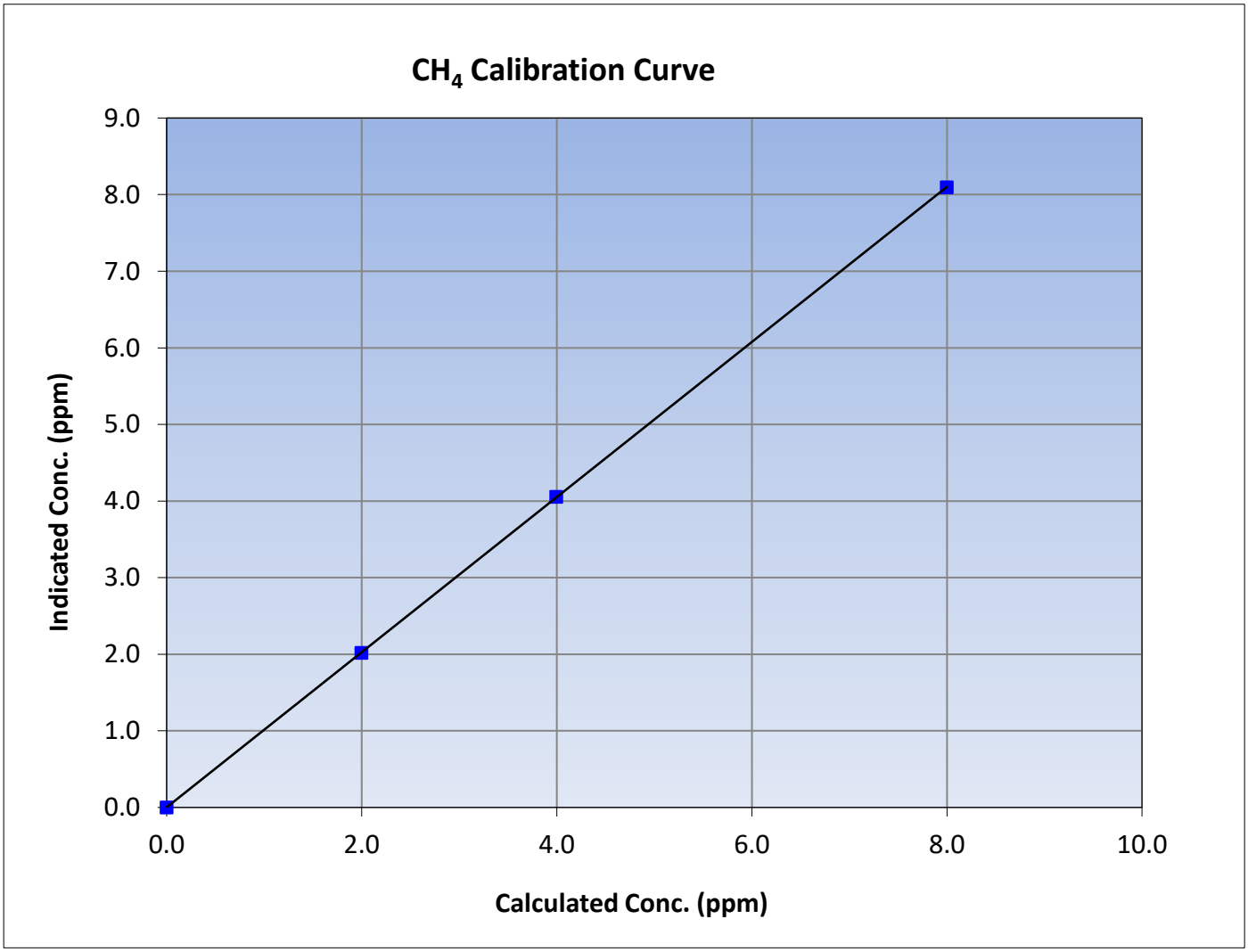
Version-01-2020

Station Information

Calibration Date:	January 23, 2023	Previous Calibration:	December 14, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	12:05	End Time (MST):	15:15
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	0.999996	≥0.995
8.00	8.10	0.9880			
3.99	4.06	0.9848	Slope	1.012466	0.90 - 1.10
2.00	2.02	0.9892			
			Intercept	0.001594	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

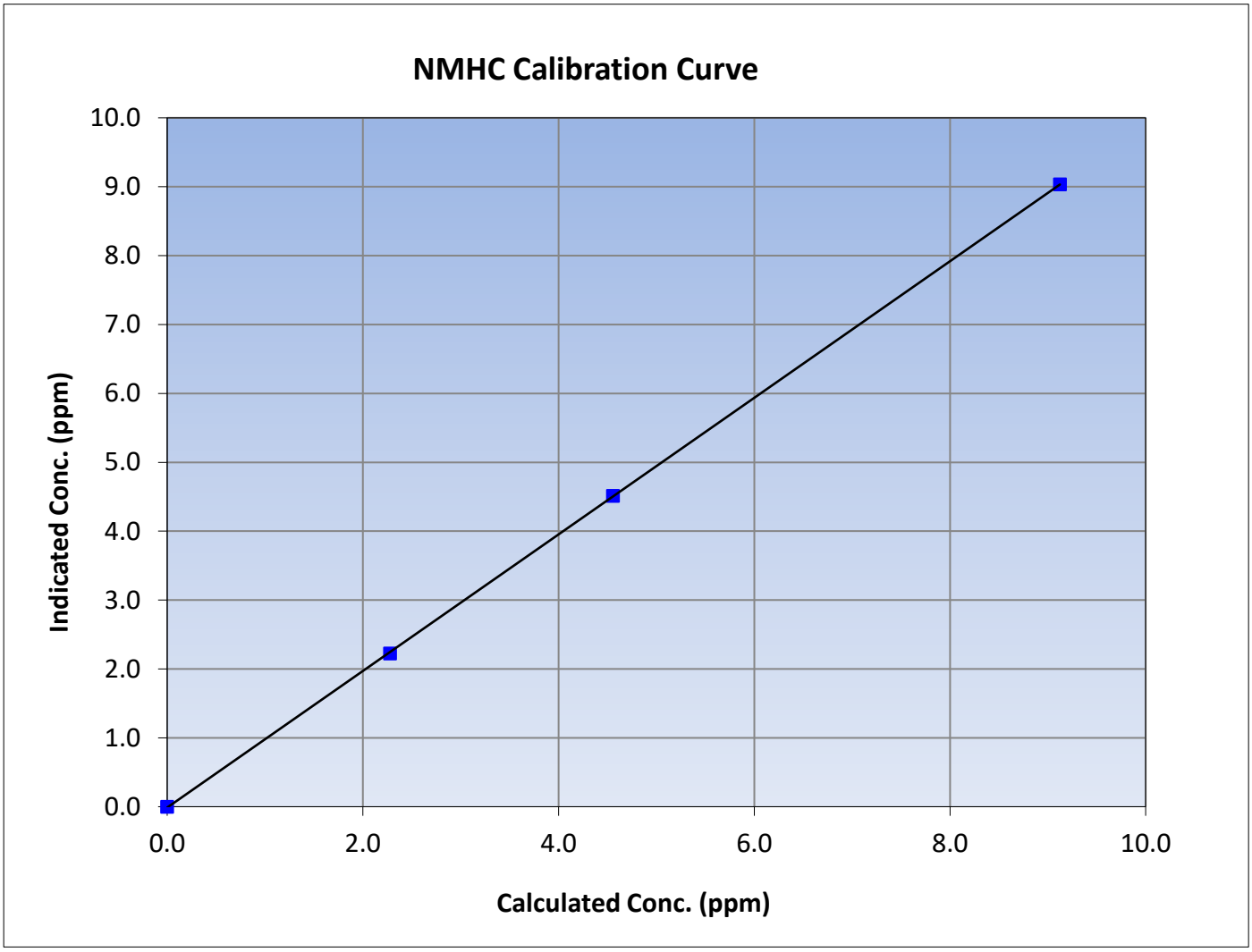
Version-01-2020

Station Information

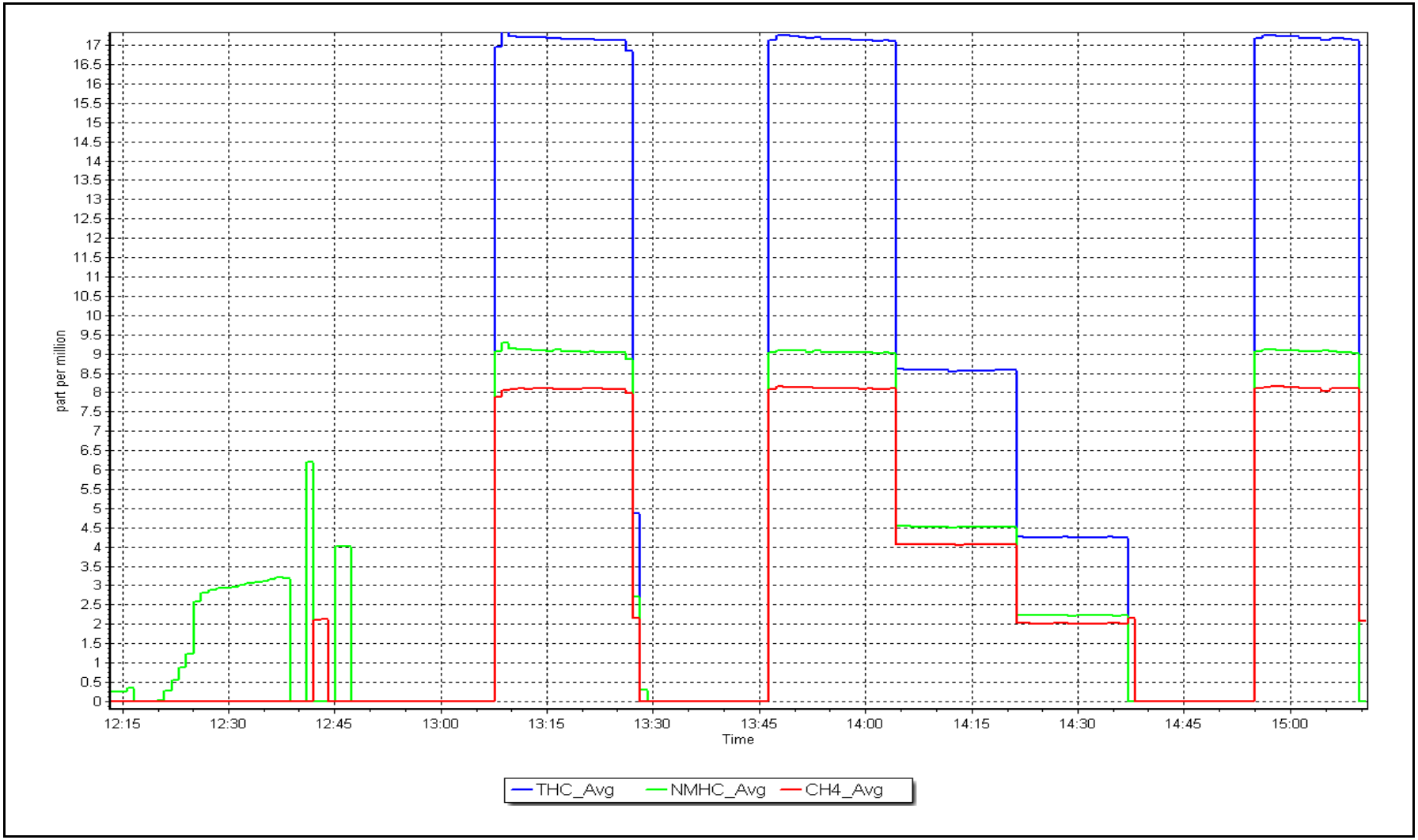
Calibration Date:	January 23, 2023	Previous Calibration:	December 14, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	12:05	End Time (MST):	15:15
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999987	≥0.995
9.12	9.03	1.0099			
4.56	4.51	1.0100	Slope	0.991290	0.90 - 1.10
2.28	2.23	1.0234			
			Intercept	-0.011980	+/-0.5



NMHC Calibration Plot Date: January 23, 2023 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 31, 2023	Last Cal Date:	January 23, 2023
Start time (MST):	7:37	End time (MST):	8:52
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:	5252	
ZAG make/model:	API 701H		Serial Number:	357	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148494	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.85E-04	3.85E-04	NMHC SP Ratio:	4.46E-05	4.46E-05
CH4 Retention time:	12.00	12.00	NMHC Peak Area:	204554	204554

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	17.12	17.09	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	17.12	17.02	1.006
second point					
third point					
as left zero					
as left span					
				Average Correction Factor	1.006

Baseline Corr AF:	17.09	Prev response	17.13	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	9.12	9.06	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	9.12	9.04	1.009
second point					
third point					
as left zero					
as left span					
				Average Correction Factor	1.009
Baseline Corr AF:	9.06	Prev response	9.03	*% 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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.1	8.00	8.03	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.1	8.00	7.98	1.002
second point					
third point					
as left zero					
as left span					
				Average Correction Factor	1.002
Baseline Corr AF:	8.03	Prev response	8.10	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

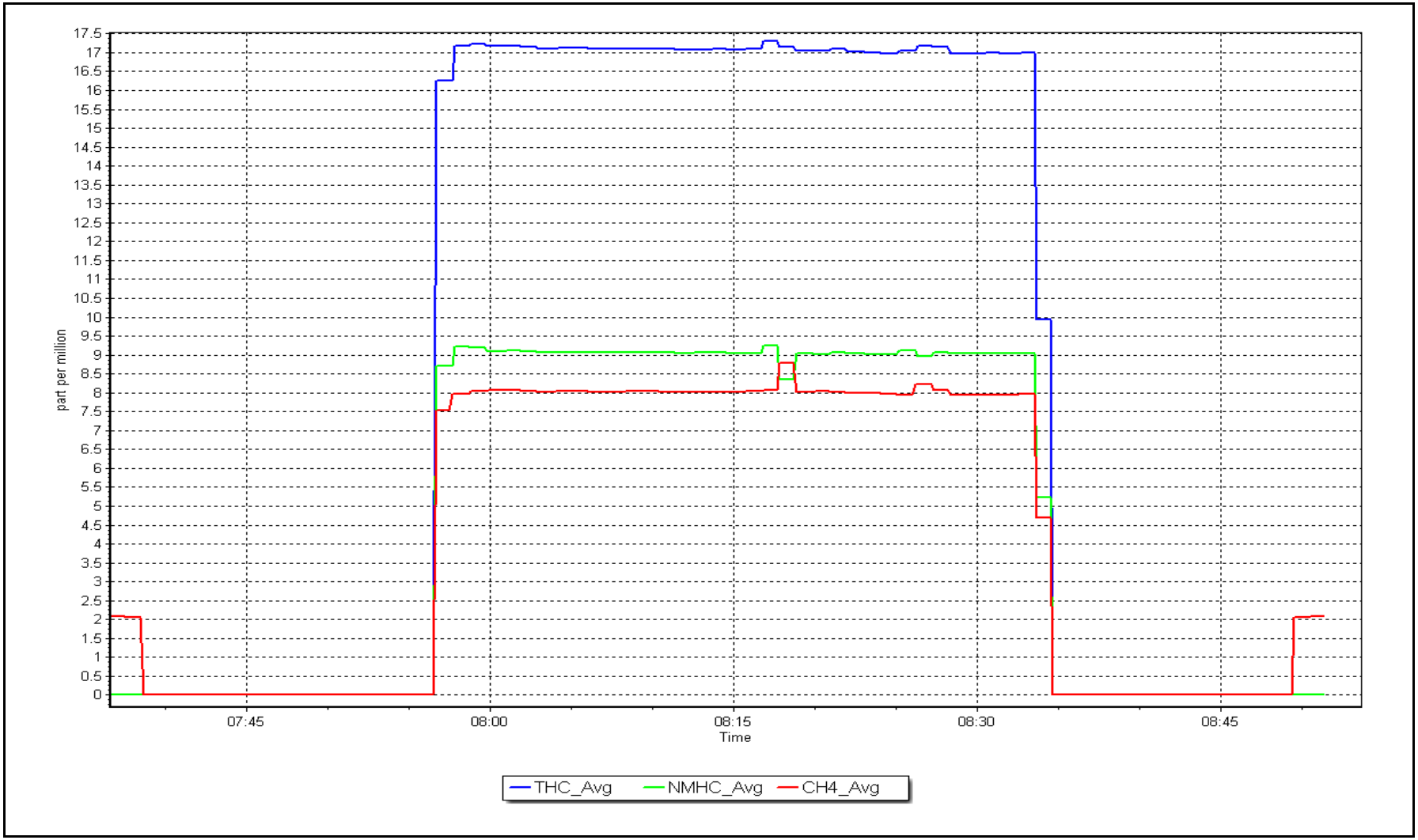
Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001116	0.994029
THC Cal Offset:	-0.010387	0.000000
CH4 Cal Slope:	1.012466	0.997671
CH4 Cal Offset:	0.001594	0.000000
NMHC Cal Slope:	0.991290	0.990836
NMHC Cal Offset:	-0.011980	0.000000

Notes: Hydrogen Cylinder change

Calibration Performed By: Melissa Lemay

NMHC Calibration Plot Date: January 31, 2023 Location: Anzac



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 4, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	7:35	End time (MST):	12:31
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P8D		Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	50.92	ppm	NO Cal Gas Conc:	50.05	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.92	ppm	Removed Gas NO Conc:	50.05	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	5239	
ZAG make/model:	Teledyne API 701H		Serial Number:	357	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1426262592	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.361	1.361	NO bkgnd or offset:	3.7	3.7
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.7	3.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	161.8	163.3

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.002403	0.999876
NO_X Cal Offset:	-1.205267	-0.745750
NO Cal Slope:	1.003086	1.001401
NO Cal Offset:	-2.069261	-1.789671
NO_2 Cal Slope:	1.000735	1.002246
NO_2 Cal Offset:	0.178927	0.204305

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	0.2	----	----
as found span	4921	78.6	800.5	786.8	13.7	800.8	785.7	15.1	0.9997	1.0015
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
high point	4921	78.6	800.5	786.8	13.7	799.9	787.0	12.9	1.0008	0.9998
second point	4961	39.3	400.2	393.4	6.8	399.6	391.6	8.0	1.0015	1.0045
third point	4980	19.6	199.6	196.2	3.4	197.6	192.4	5.3	1.0102	1.0198
as left zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
as left span	4921	78.6	800.5	392.6	407.9	797.7	388.4	409.3	1.0035	1.0109
								Average Correction Factor	1.0042	1.0080

Corrected As found	NO_X = 800.8 ppb	NO = 785.9 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.1%
Previous Response	NO_X = 801.2 ppb	NO = 787.2 ppb		*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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	781.8	387.6	407.9	408.9	0.9975	100.3%
2nd GPT point (200 ppb O3)	781.8	582.4	213.1	213.7	0.9971	100.3%
3rd GPT point (100 ppb O3)	781.8	681.5	114.0	114.9	0.9920	100.8%
				Average Correction Factor	0.9955	100.5%

Notes: No maintenance or adjustments done.

Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

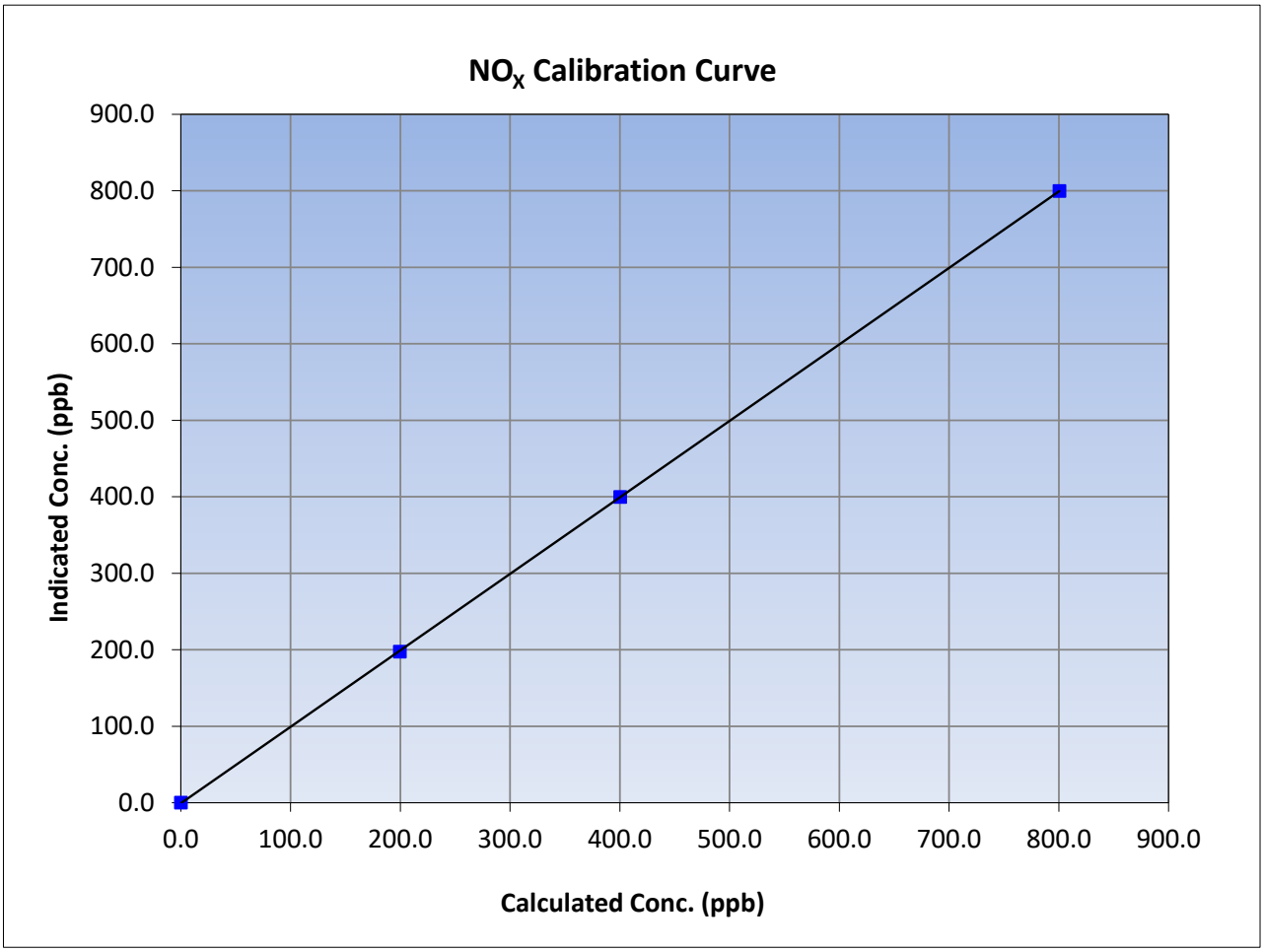
Version-04-2020

Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 2, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	7:35	End Time (MST):	12:31
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	0.1	----	Correlation Coefficient	0.999993	≥0.995
800.5	799.9	1.0008			
400.2	399.6	1.0015	Slope	0.999876	0.90 - 1.10
199.6	197.6	1.0102			
			Intercept	-0.745750	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

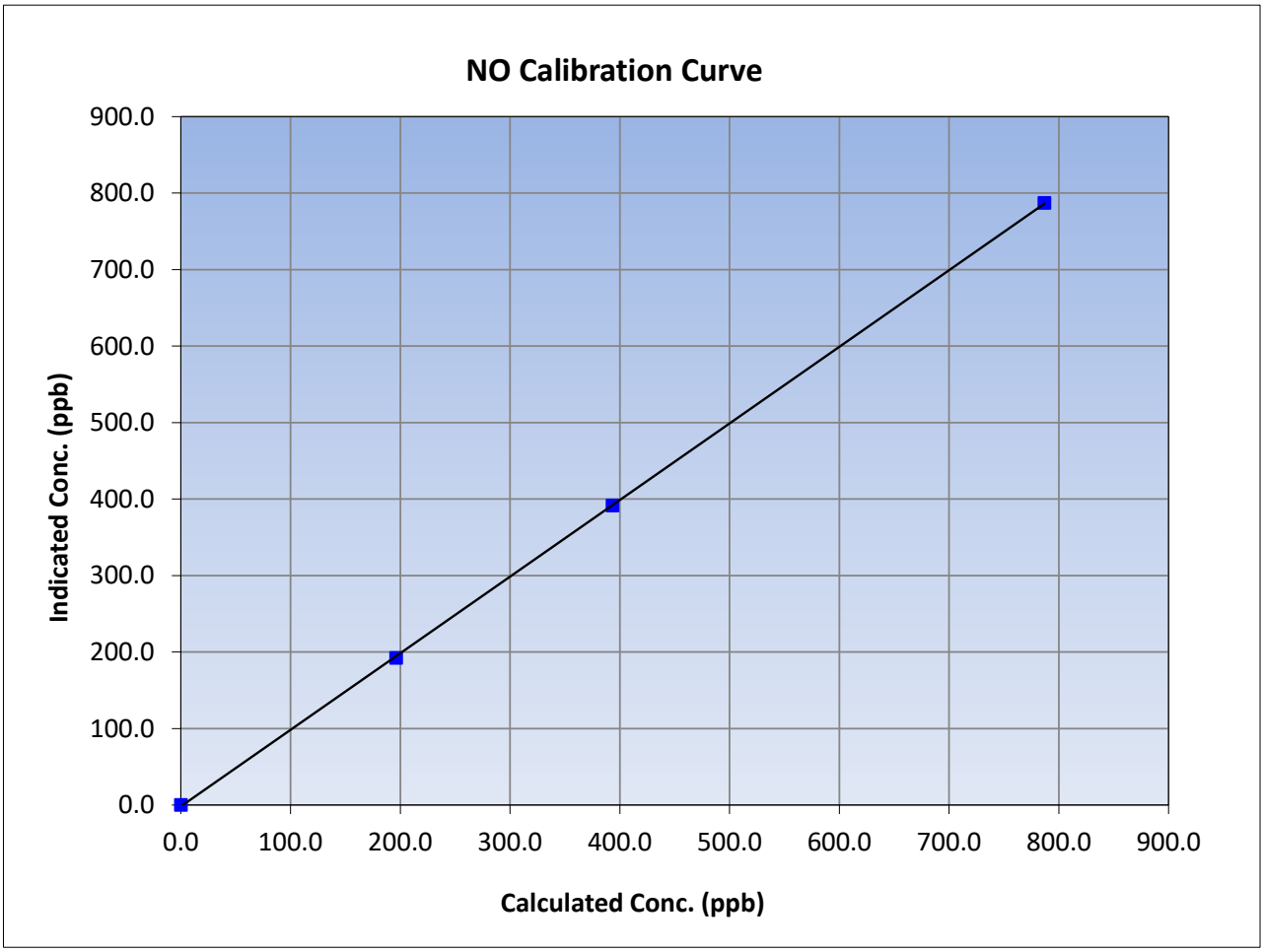
Version-04-2020

Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 2, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	7:35	End Time (MST):	12:31
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	0.2	----	Correlation Coefficient	0.999970	≥0.995
786.8	787.0	0.9998			
393.4	391.6	1.0045	Slope	1.001401	0.90 - 1.10
196.2	192.4	1.0198			
			Intercept	-1.789671	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

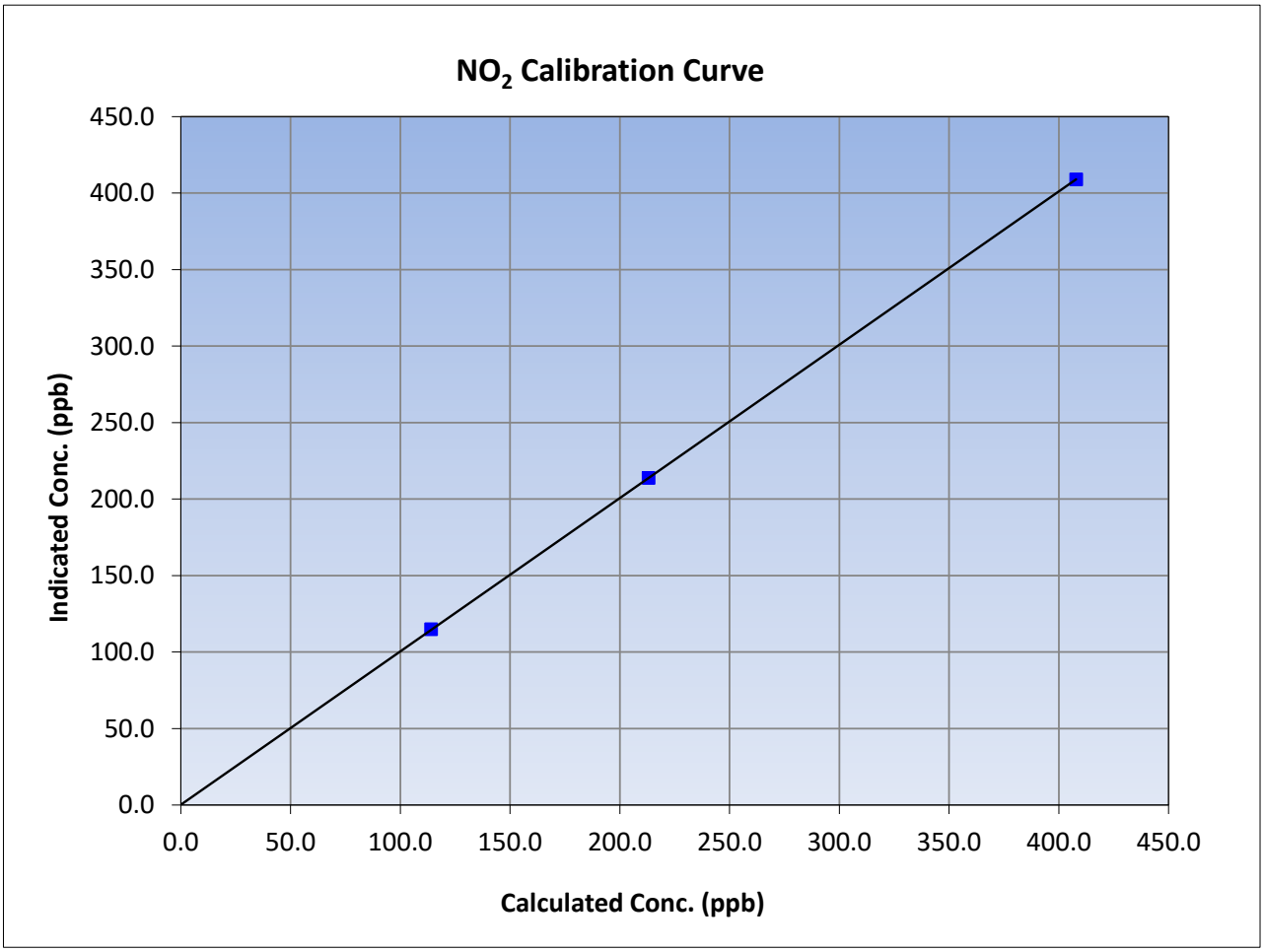
Version-04-2020

Station Information

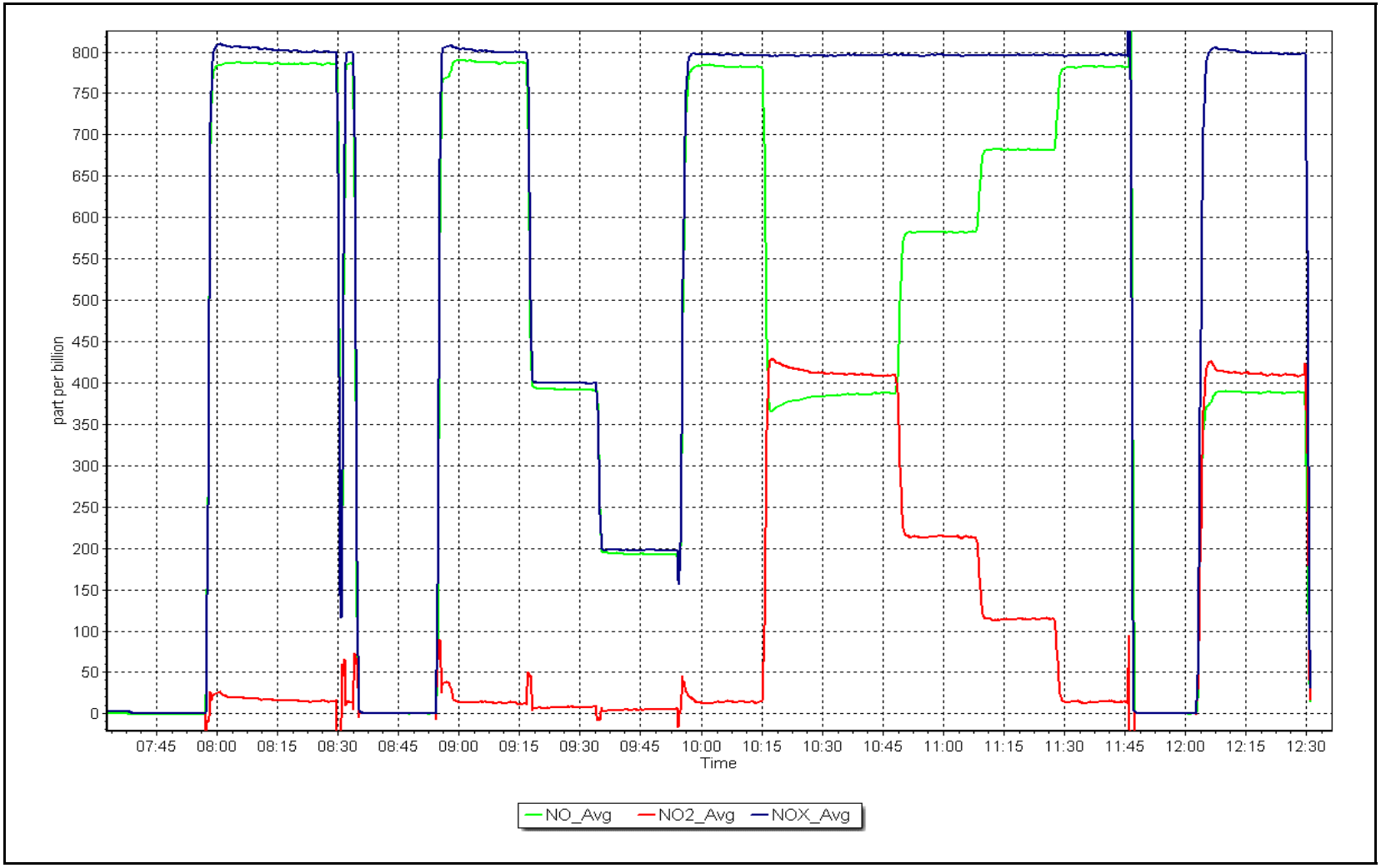
Calibration Date:	January 4, 2023	Previous Calibration:	December 2, 2022
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	7:35	End Time (MST):	12:31
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999996	≥0.995
407.9	408.9	0.9975			
213.1	213.7	0.9971	Slope	1.002246	0.90 - 1.10
114.0	114.9	0.9920			
			Intercept	0.204305	+/-20



NO_X Calibration Plot Date: January 4, 2023 Location: Anzac



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Anzac	Station number:	AMS14
Calibration Date:	January 24, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	10:29	End time (MST):	12:58
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	5239
ZAG Make/Model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595
Analyzer Range	0 - 500 ppb		

	Start	Finish		Start	Finish
Calibration slope:	0.993514	1.005686	Backgd or Offset:	2.8	2.7
Calibration intercept:	-1.440000	-1.420000	Coeff or Slope:	1.534	1.499

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	-1.2	----
as found span	5000	881.5	400.0	410.1	0.975
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-1.8	----
high point	5000	882.6	400.0	400.7	0.998
second point	5000	766.8	200.0	199.8	1.001
third point	5000	669.6	100.0	99.6	1.004
as left zero	5000	0.0	0.0	-2.1	----
as left span	5000	924.8	400.0	400.4	0.999
				Average Correction Factor	1.001

Baseline Corr As found:	411.3	Previous response	396.0	*% change	3.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

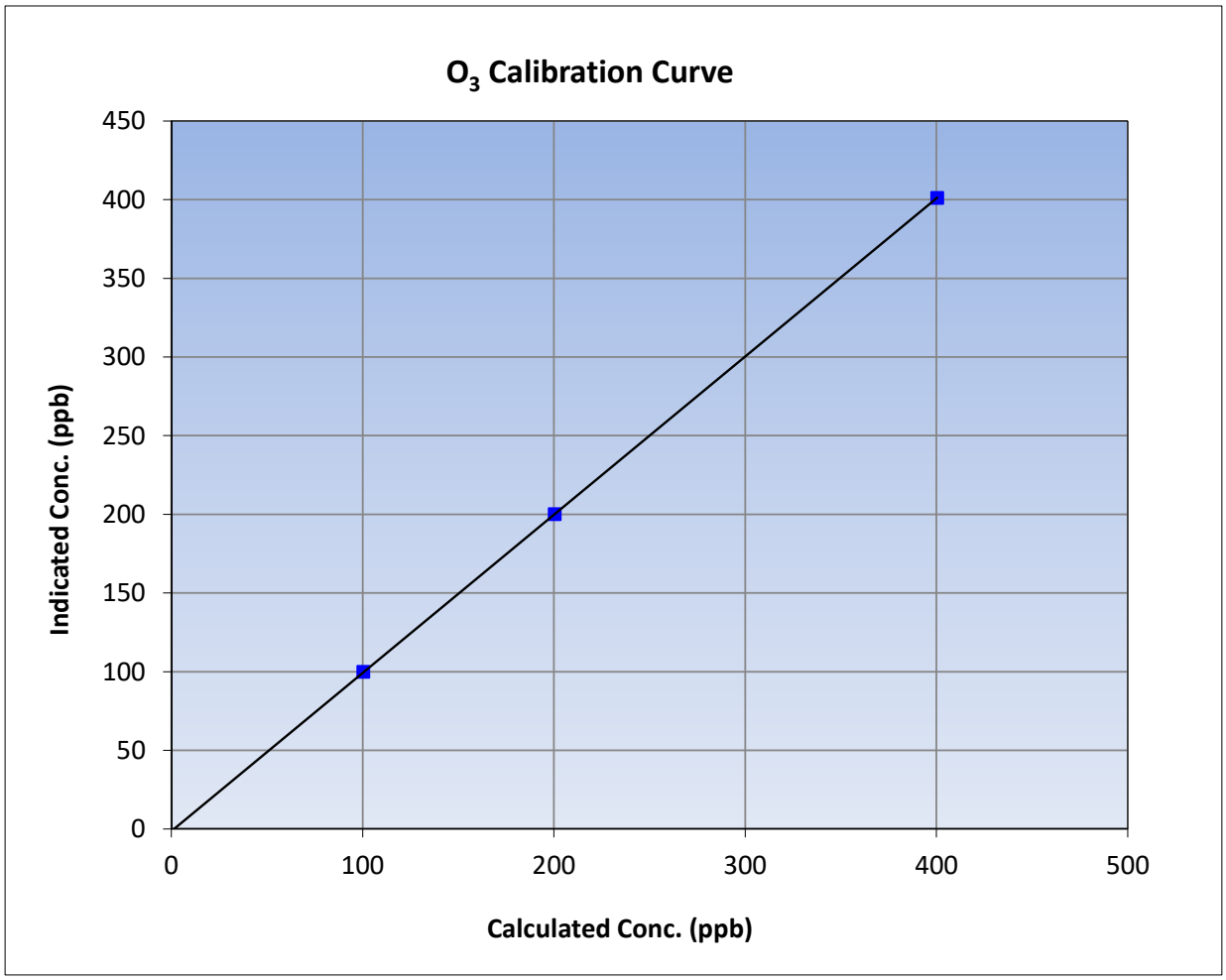
Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 14, 2022
Station Name:	Anzac	Station Number:	AMS14
Start Time (MST):	10:29	End Time (MST):	12:58
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

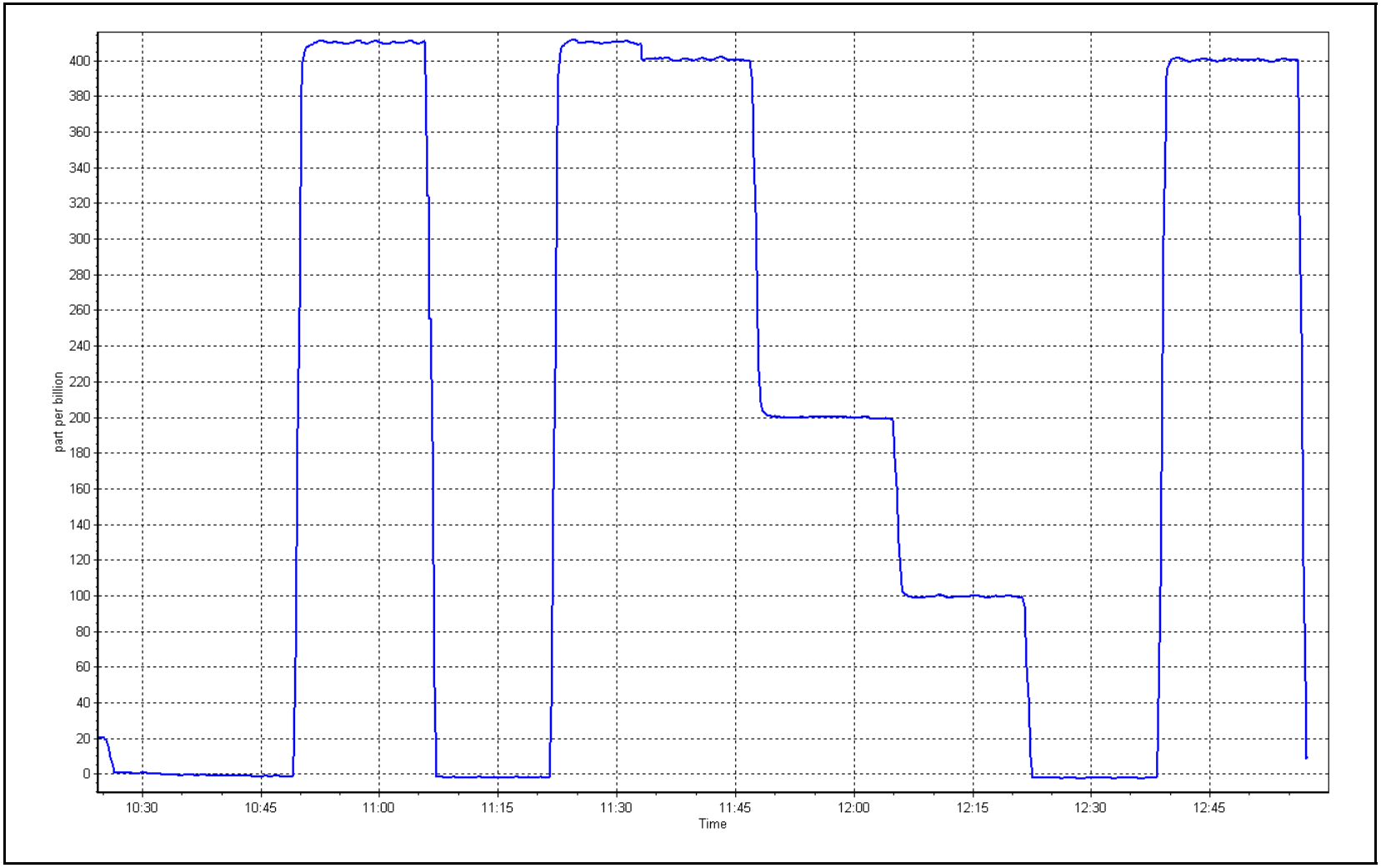
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-1.8	----
400.0	400.7	0.9983
200.0	199.8	1.0010
100.0	99.6	1.0040

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.005686	*0.90 - 1.10*
Intercept	-1.420000	*+/- 5*



O_3 Calibration Plot Date: January 24, 2023 Location: Anzac



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 24, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	11:37	End time (MST):	12:01
Analyzer Make:	API T640	S/N:	825
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25	S/N:	388753
Temp/RH standard:	Alicat FP-25	S/N:	388753

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-4.6	-4	-4.6	☐	+/- 2 °C
P (mmHg)	713.8	714.8	713.8	☐	+/- 10 mmHg
flow (LPM)	5.00	5.1	5.00	☐	+/- 0.25 LPM

Leak Test: Date of check: January 24, 2023 Last Cal Date: December 14, 2022

PM w/o HEPA: 4.2 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 14, 2022

Disposable Filter Changed: December 14, 2022

Annual Maintenance

Date Sample Tube Cleaned: June 21, 2022

Date RH/T Sensor Cleaned: June 21, 2022

Notes: No adjustments done. Inlet Head cleaned.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS17
WAPASU
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	January 10, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:56	End time (MST):	13:48
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.38 ppm	Cal Gas Exp Date:	January 12, 2029
Cal Gas Cylinder #:	ALM066507		
Removed Cal Gas Conc:	50.38 ppm	Rem Gas Exp Date:	n/a
Removed Gas Cyl #:	n/a	Diff between cyl:	
Calibrator Make/Model:	API T700	Serial Number:	2449
ZAG Make/Model:	API 701H	Serial Number:	359

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1218153459

Analyzer Range 0 - 1000 ppb

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001410	0.999825	Backgd or Offset:	12.0	12.0
Calibration intercept:	-1.599411	-1.319798	Coeff or Slope:	1.099	1.099

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*
as found zero	5000	0.0	0.0	0.3	----
as found span	4921	79.4	800.0	798.5	1.002
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	----
high point	4921	79.4	800.0	799.8	1.000
second point	4960	39.7	400.0	396.7	1.008
third point	4980	19.8	199.5	196.9	1.013
as left zero	5000	0.0	0.0	0.6	----
as left span	4920	79.4	800.1	800.6	0.999
				Average Correction Factor	1.007

Baseline Corr As found:	798.20	Previous response	799.50	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

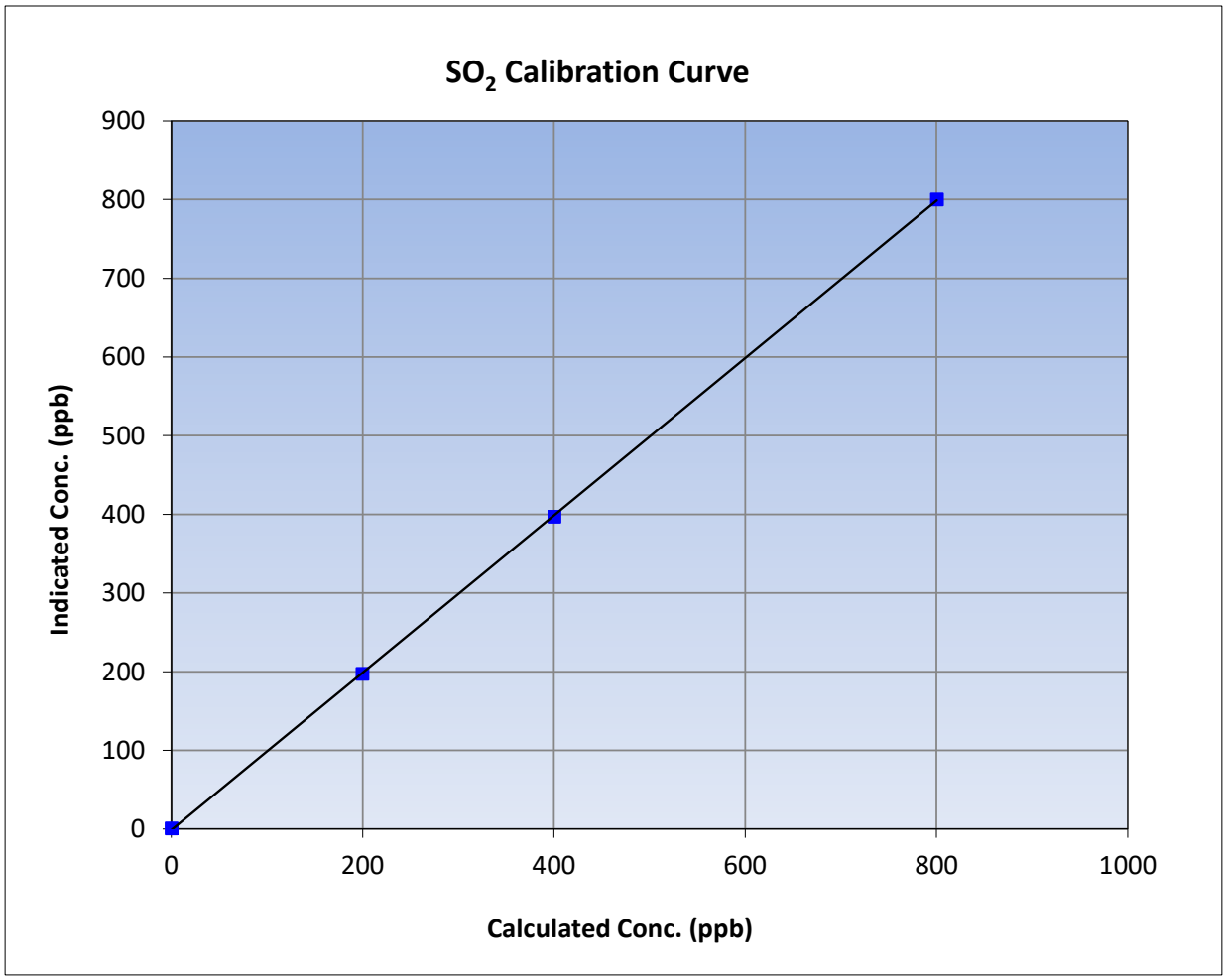
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:56	End Time (MST):	13:48
Analyzer make:	Thermo 43i	Analyzer serial #:	1218153459

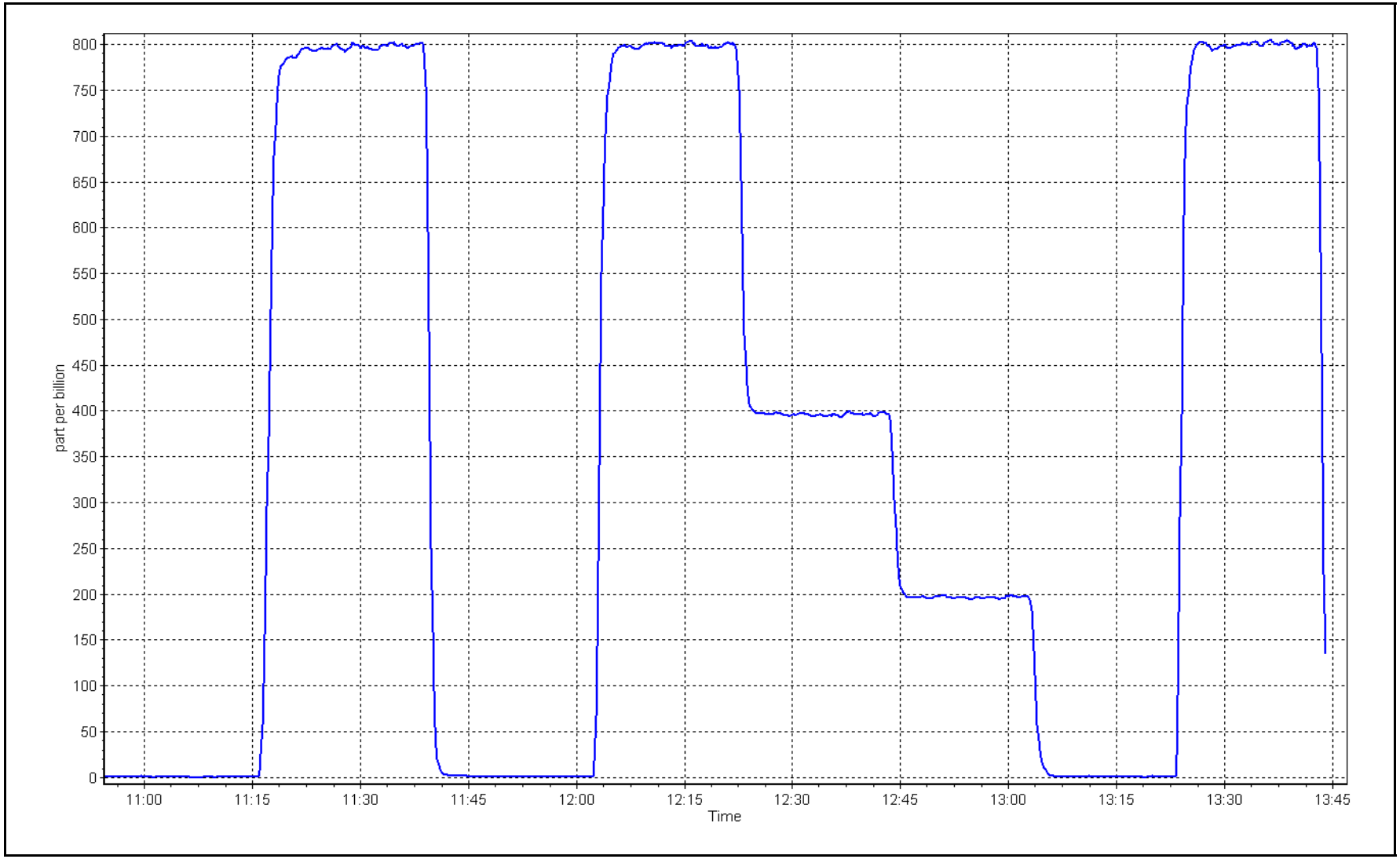
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
800.0	799.8	1.0002
400.0	396.7	1.0084
199.5	196.9	1.0133

Statistical Evaluation		Limits
Correlation Coefficient	0.999969	≥0.995
Slope	0.999825	0.90 - 1.10
Intercept	-1.319798	+/-30



SO2 Calibration Plot Date: January 10, 2023 Location: Wapasu



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	January 5, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	10:23	End time (MST):	14:35
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.076	ppm	Cal Gas Exp Date:	September 16, 2024
Cal Gas Cylinder #:	CC511852			
Removed Cal Gas Conc:	5.076	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:	n/a		Converter serial #:	n/a	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004139	1.002282	Backgd or Offset:	12.8	12.9
Calibration intercept:	0.280806	0.320801	Coeff or Slope:	1.085	1.085

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4921	78.8	80.0	80.1	1.001
as found 2nd point	4961	39.4	40.0	40.3	0.997
as found 3rd point	4980	19.7	20.0	20.1	1.005
new cylinder response					

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	4921	78.8	80.0	80.5	0.994
second point	4961	39.4	40.0	40.4	0.990
third point	4980	19.7	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.7	----
as left span	4921	78.8	80.0	80.6	0.993
SO2 Scrubber Check	4921	79.4	800.0	-0.1	----
Date of last scrubber change:		n/a		Ave Corr Factor	0.988
Date of last converter efficiency test:		n/a			efficiency

Baseline Corr As found:	79.9	Prev response:	80.61	*% change:	-0.9%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	0.999282	AF Intercept:	0.200806
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999992		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

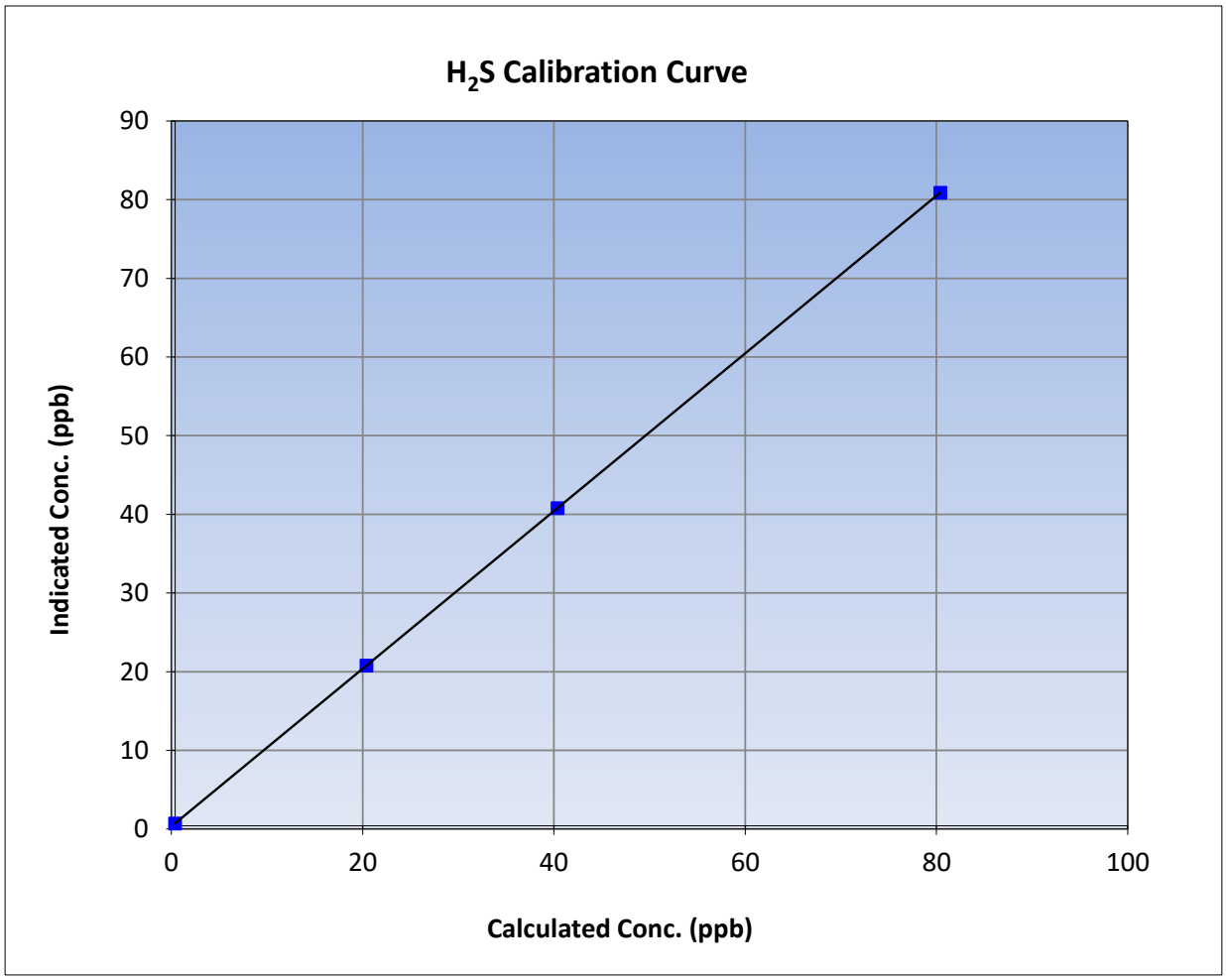
Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 14, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:23	End Time (MST):	14:35
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583

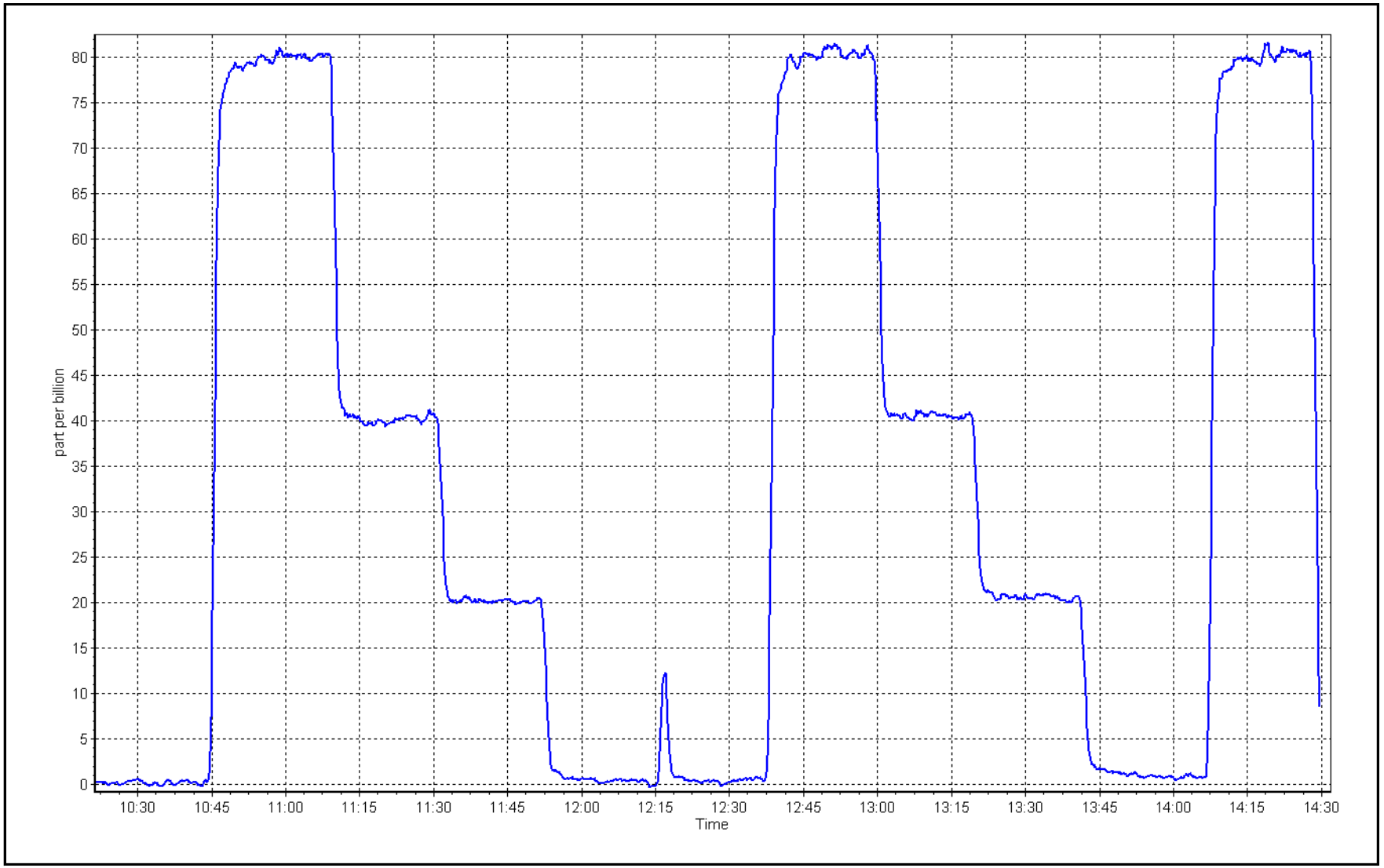
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.5	0.9938
40.0	40.4	0.9900
20.0	20.4	0.9804

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.002282	*0.90 - 1.10*
Intercept	0.320801	*+/-3*



H_2S Calibration Plot Date: January 5, 2023 Location: Wapasu



Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	January 10, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:56	End time (MST):	13:48
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	ALM066507		Cal Gas Expiry Date:	January 12, 2029	
CH4 Cal Gas Conc.	503.5	ppm	CH4 Equiv Conc.	1076.3	ppm
C3H8 Cal Gas Conc.	208.3	ppm			
Removed Gas Cert:	n/a		Removed Gas Expiry:	n/a	
Removed CH4 Conc.	503.5	ppm	CH4 Equiv Conc.	1076.3	ppm
Removed C3H8 Conc.	208.3	ppm	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	2449	
ZAG Make/Model:	API 701H		Serial Number:	359	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1218153352	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002399	1.003975	Background:	2.950	2.950
Calibration intercept:	-0.102337	0.033881	Coefficient:	4.292	4.292

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.00	0.03	----
as found span	4921	79.4	17.09	17.18	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.07	----
high point	4921	79.4	17.09	17.23	0.992
second point	4960	39.7	8.55	8.54	1.001
third point	4980	19.8	4.26	4.31	0.988
as left zero	5000	0.0	0.00	0.03	----
as left span	4920	79.4	17.09	17.24	0.992
				Average Correction Factor	0.994

Baseline Corr As found:	17.14	Previous response	17.03	*% change	0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

THC Calibration Summary

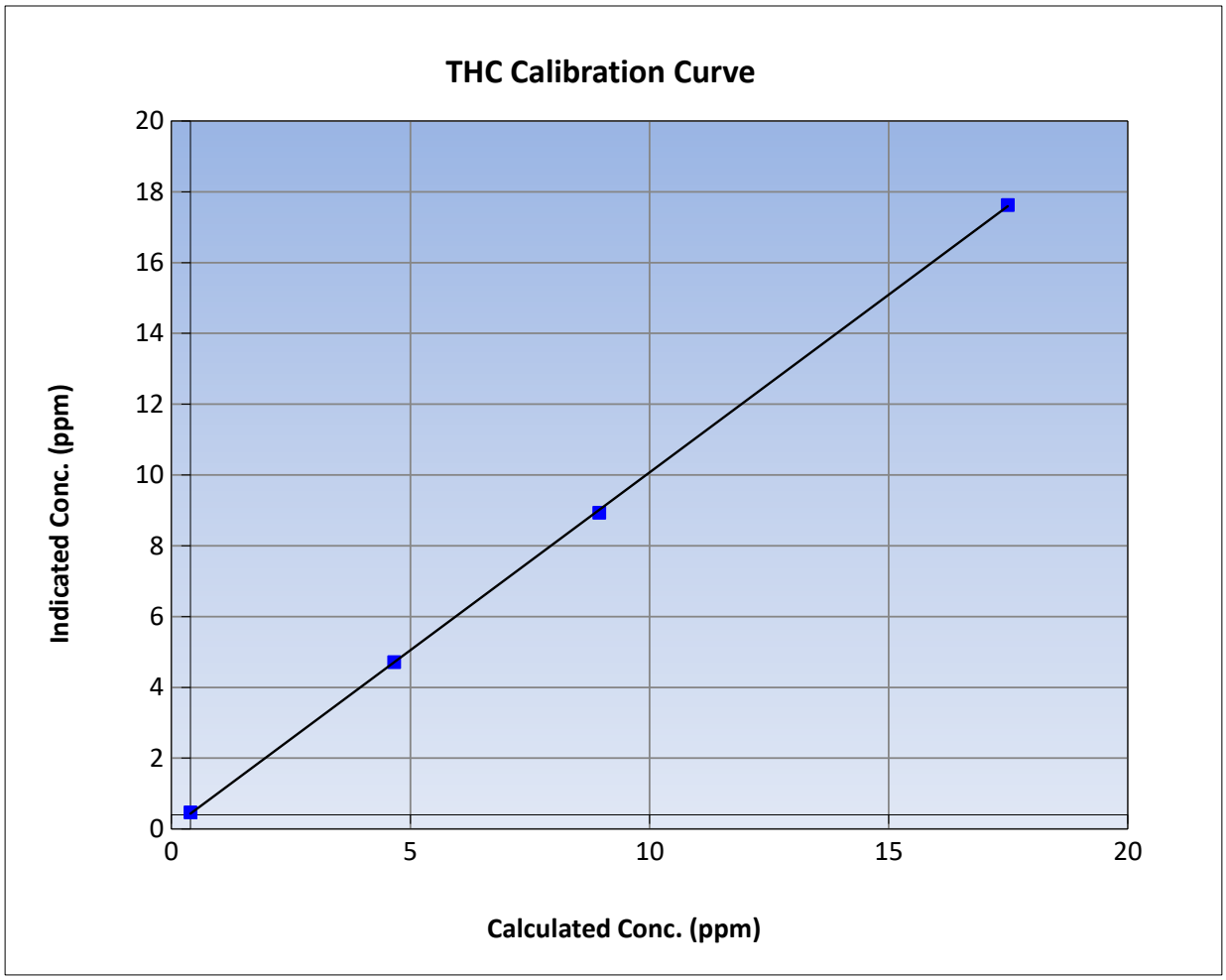
Version-01-2020

Station Information

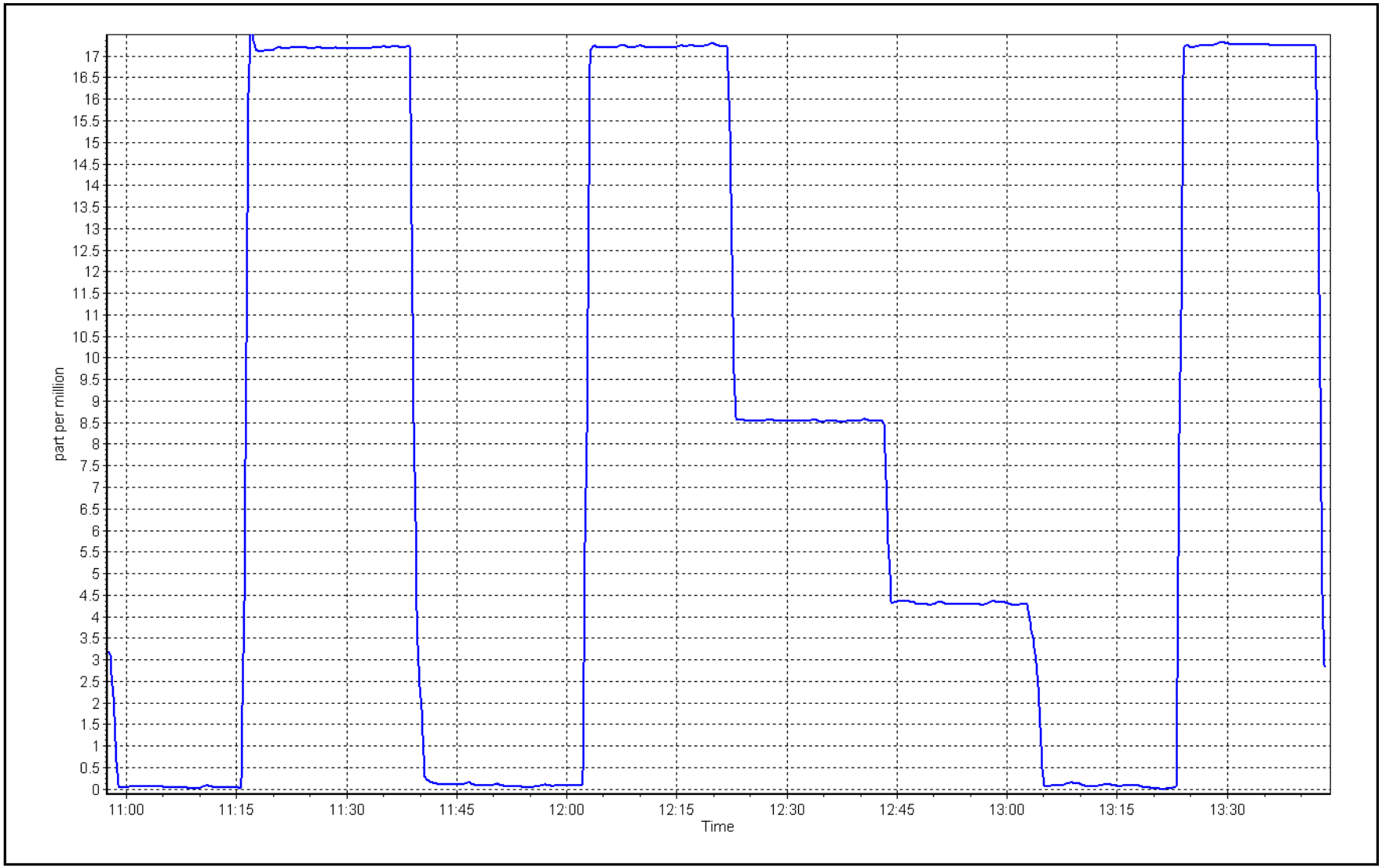
Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:56	End Time (MST):	13:48
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.07	----	Correlation Coefficient	0.999947	*≥0.995*
17.09	17.23	0.9919			
8.55	8.54	1.0009	Slope	1.003975	*0.90 - 1.10*
4.26	4.31	0.9880			
			Intercept	0.033881	*+/-1.5*



THC Calibration Plot Date: January 10, 2023 Location: Wapasu



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	January 19, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	10:33	End time (MST):	15:10
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T375YK8		Cal Gas Expiry Date:	April 13, 2025	
NOX Cal Gas Conc:	49.11	ppm	NO Cal Gas Conc:	48.07	ppm
Removed Cylinder #:			Removed Gas Exp Date:		
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	

Analyzer Information

Analyzer make:	Teledyne API T200	Analyzer serial #:	833
NOX Range (ppb):	0 - 1000 ppb		

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.820	0.820	NO bkgnd or offset:	0.1	0.1
NOX coeff or slope:	0.812	0.812	NOX bkgnd or offset:	-0.4	-0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.3	4.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999732	0.999578
NO_X Cal Offset:	-1.300000	-1.120000
NO Cal Slope:	1.000301	1.000973
NO Cal Offset:	-2.080000	-2.440000
NO_2 Cal Slope:	0.992948	0.996862
NO_2 Cal Offset:	-0.933811	-0.247483

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.3	-0.2	0.5	----	----
as found span	4917	83.2	817.2	799.9	17.3	812.5	794.7	17.9	1.0058	1.0065
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
high point	4917	83.2	817.2	799.9	17.3	816.4	799.9	16.4	1.0010	1.0000
second point	4958	41.6	408.6	399.9	8.7	406.7	395.3	11.4	1.0047	1.0117
third point	4979	20.8	204.3	200.0	4.3	201.6	196.2	5.4	1.0134	1.0192
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	----	----
as left span	4917	83.2	817.2	408.0	409.2	807.5	402.3	405.3	1.0120	1.0141
								Average Correction Factor	1.0063	1.0103

Corrected As found	NO_X = 812.2 ppb	NO = 794.9 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-0.4%
Previous Response	NO_X = 815.7 ppb	NO = 798.0 ppb		*Percent Change	NO =	-0.4%
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	795.4	403.5	409.2	407.5	1.0042	99.6%
2nd GPT point (200 ppb O3)	795.4	595.6	217.1	217.3	0.9991	100.1%
3rd GPT point (100 ppb O3)	795.4	697.4	115.3	113.2	1.0186	98.2%
				Average Correction Factor	1.0073	99.3%

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

NO_X Calibration Summary

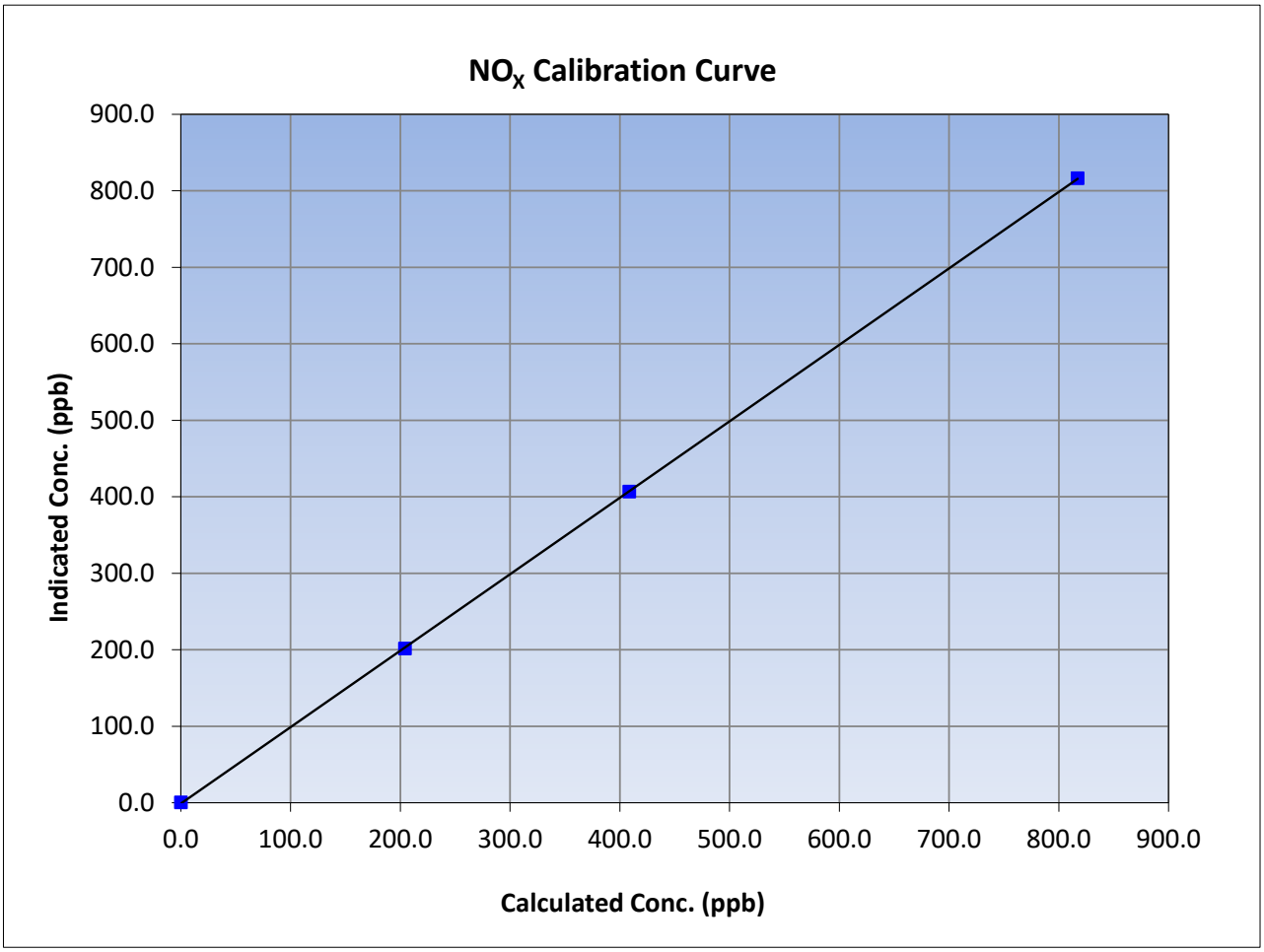
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 8, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:33	End Time (MST):	15:10
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	0.3	----	Correlation Coefficient	0.999986	≥0.995
817.2	816.4	1.0010			
408.6	406.7	1.0047	Slope	0.999578	0.90 - 1.10
204.3	201.6	1.0134			
			Intercept	-1.120000	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

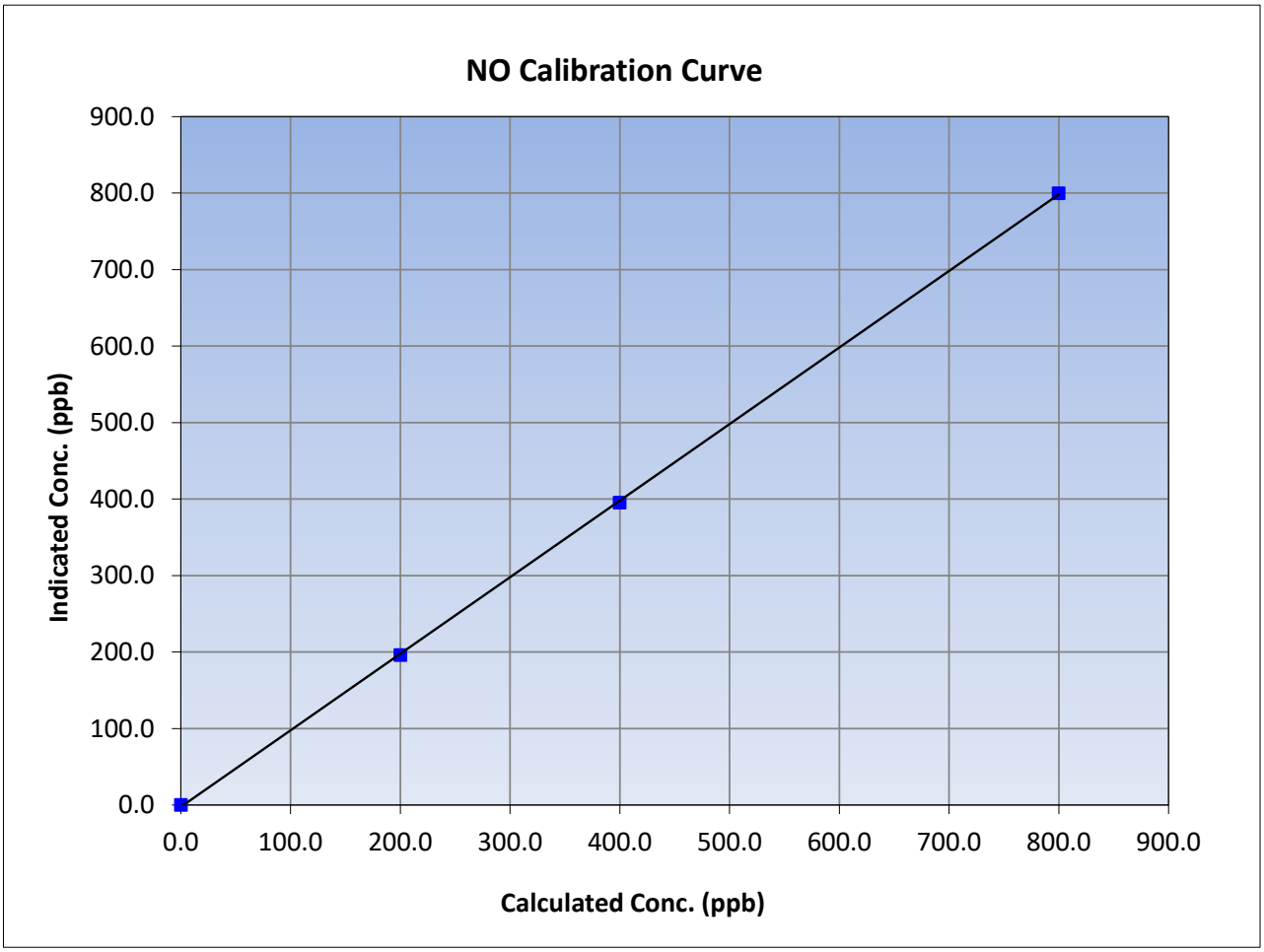
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 8, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:33	End Time (MST):	15:10
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	0.0	----	Correlation Coefficient	0.999949	≥0.995
799.9	799.9	1.0000			
399.9	395.3	1.0117	Slope	1.000973	0.90 - 1.10
200.0	196.2	1.0192			
			Intercept	-2.440000	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

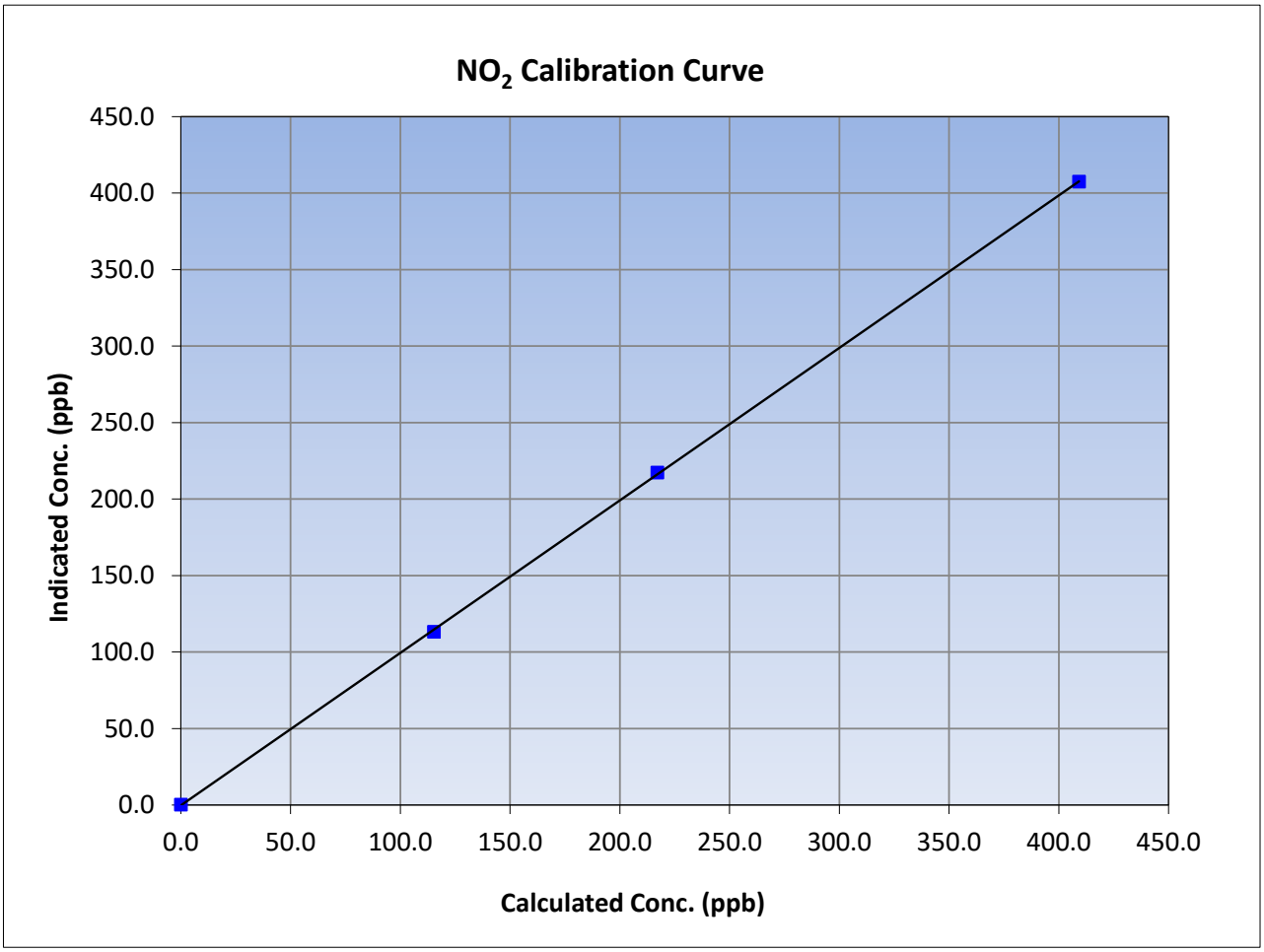
Version-04-2020

Station Information

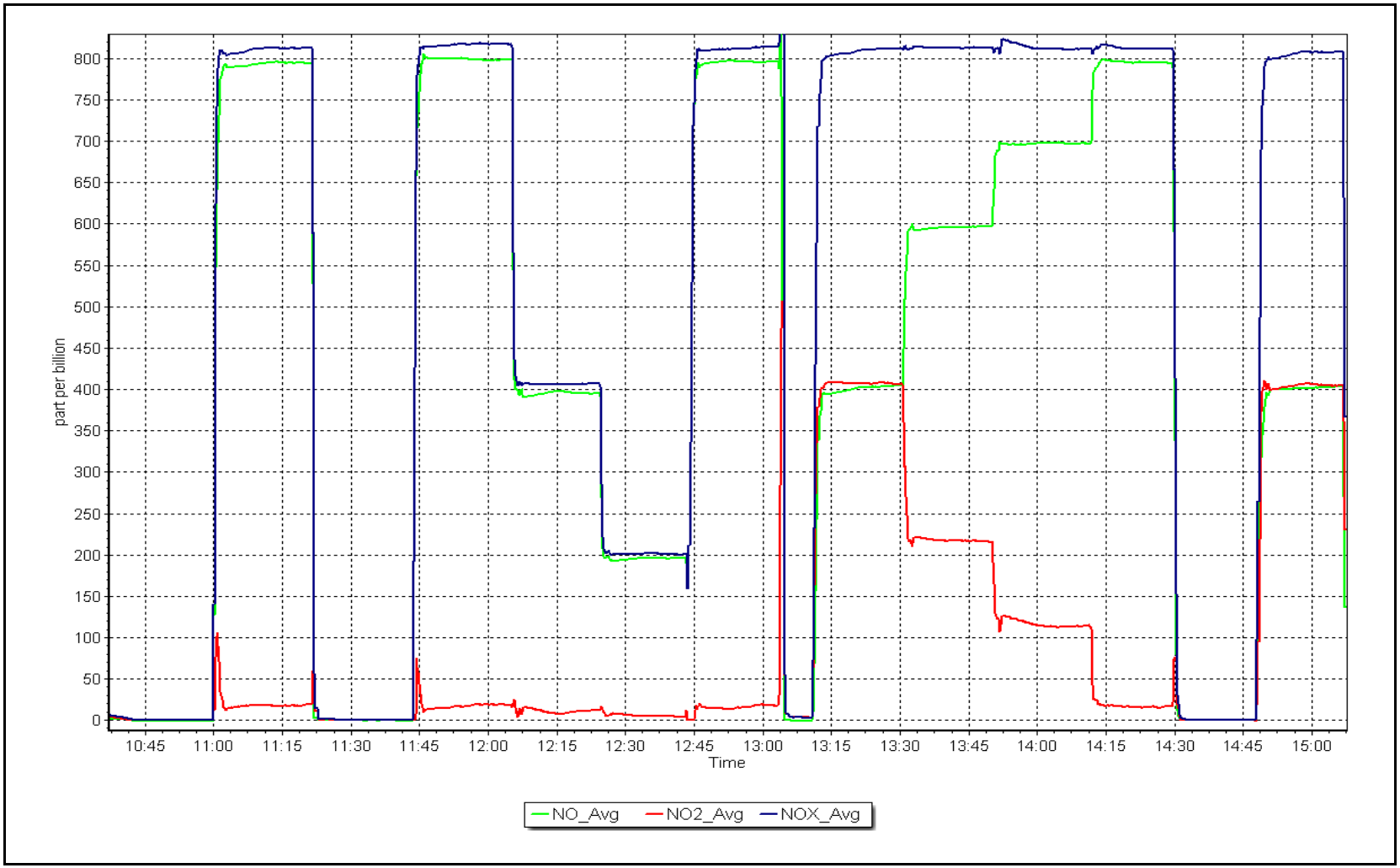
Calibration Date:	January 19, 2023	Previous Calibration:	December 8, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:33	End Time (MST):	15:10
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.3	----	Correlation Coefficient	0.999957	≥0.995
409.2	407.5	1.0042			
217.1	217.3	0.9991	Slope	0.996862	0.90 - 1.10
115.3	113.2	1.0186			
			Intercept	-0.247483	+/-20



NO_X Calibration Plot Date: January 19, 2023 Location: Wapasu



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	January 4, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	10:15	End time (MST):	13:05
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:	1.005114	1.005486	Backgd or Offset:	-1.8	-1.8
Calibration intercept:	-0.320000	-0.360000	Coeff or Slope:	1.020	1.020

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	1077.3	400.0	402.7	0.993
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	1077.3	400.0	402.2	0.995
second point	5000	900.3	200.0	200.2	0.999
third point	5000	789.5	100.0	99.8	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	1077.3	400.0	405.5	0.986
				Average Correction Factor	0.999

Baseline Corr As found:	402.8	Previous response	401.7	*% 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

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

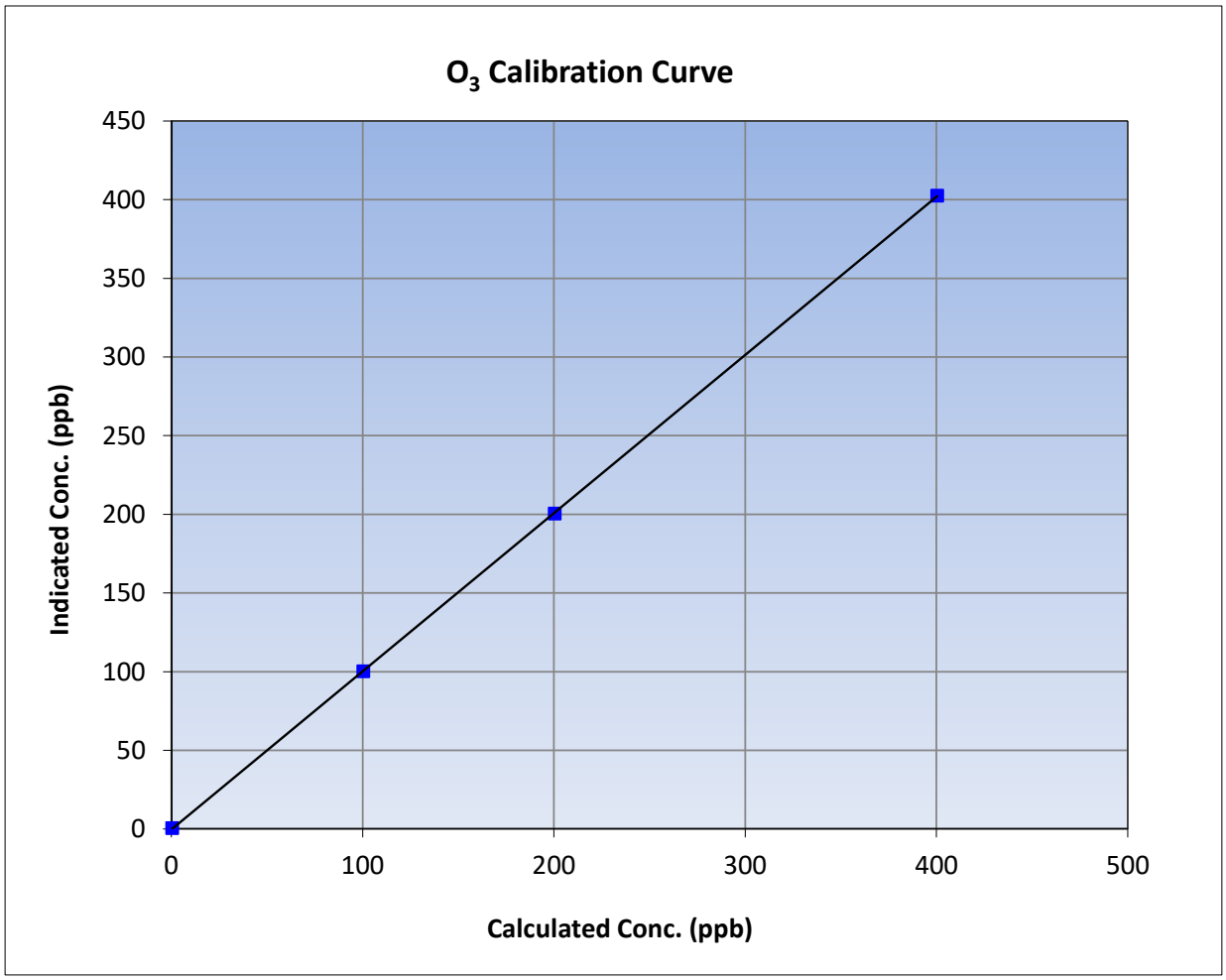
Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 15, 2022
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	10:15	End Time (MST):	13:05
Analyzer make:	API T400	Analyzer serial #:	3870

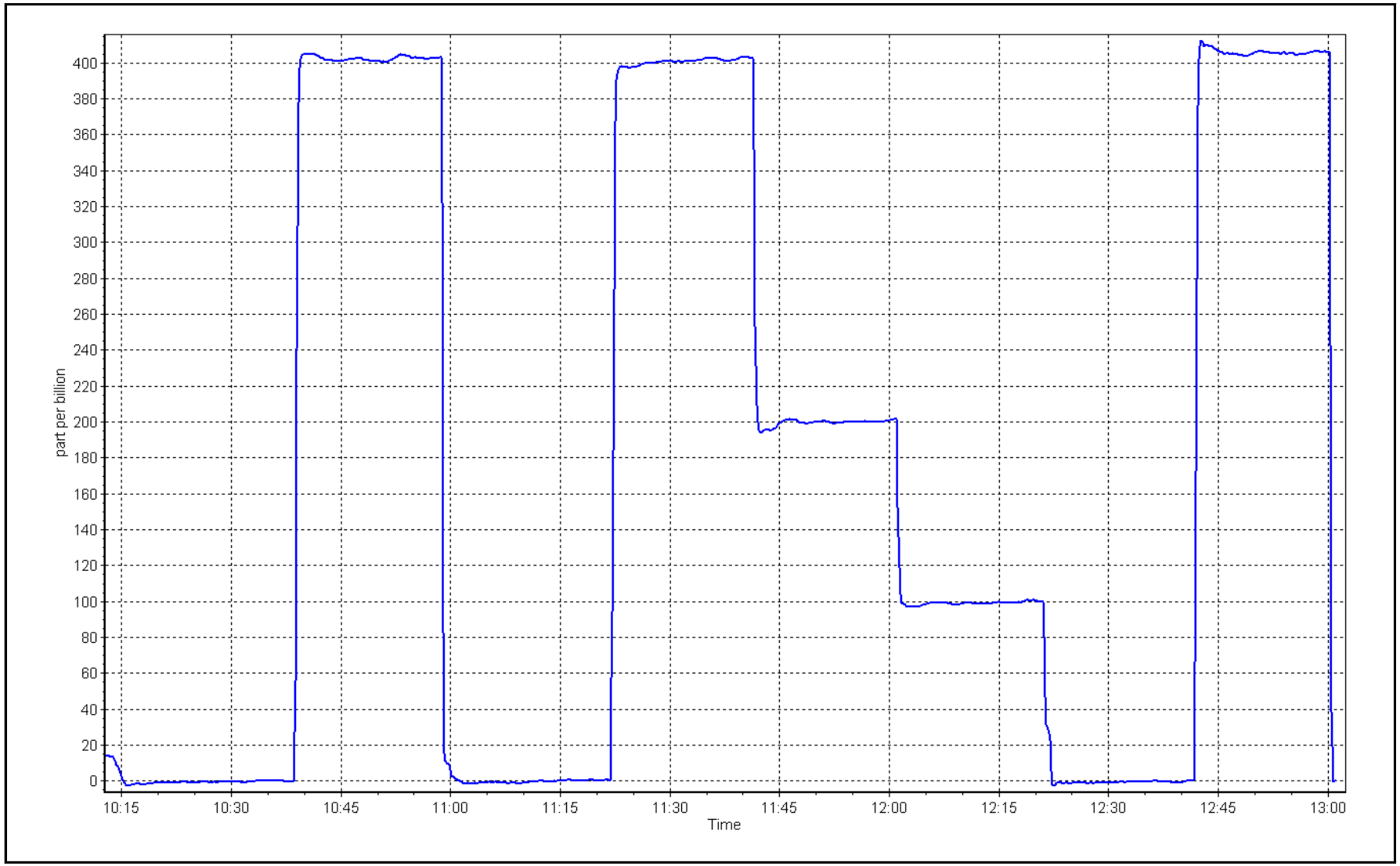
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
400.0	402.2	0.9945
200.0	200.2	0.9990
100.0	99.8	1.0020

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	1.005486	*0.90 - 1.10*
Intercept	-0.360000	*+/- 5*



O_3 Calibration Plot Date: January 4, 2023 Location: Wapasu



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	January 19, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	11:29	End time (MST):	11:55
Analyzer Make:	API T640	S/N:	1183
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1102
Temp/RH standard:	Delta Cal	S/N:	1102

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-4.8	-4.7	-4.8	☐	+/- 2 ^{o}C
P (mmHg)	709.9	711.0	709.9	☐	+/- 10 mmHg
flow (LPM)	5.01	5.05	5.01	☐	+/- 0.25 LPM

Leak Test: Date of check: January 19, 2023 Last Cal Date: December 15, 2022

PM w/o HEPA: 9.6 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 15, 2022

Disposable Filter Changed: December 15, 2022

Annual Maintenance

Date Sample Tube Cleaned: November 22, 2021

Date RH/T Sensor Cleaned: November 22, 2021

Notes: No adjustments made. Leak check passed.

Calibration by: Karan Pandit

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS18
STONY MOUNTAIN
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 16, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	11:35	End time (MST):	14:42
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.40	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC463851			
Removed Cal Gas Conc:	49.40	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
ZAG Make/Model:	Teledyne API 701H		Serial Number:	360

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: JC1501301453

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.994979	1.003075	Backgd or Offset:	22.4	23.0
Calibration intercept:	-1.084581	-1.143339	Coeff or Slope:	0.807	0.817

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*
as found zero	5009	0.0	0.0	-0.5	----
as found span	4919	81.0	800.3	788.7	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	----
high point	4919	81.0	800.3	801.7	0.998
second point	4959	40.5	400.2	400.8	0.998
third point	4979	20.2	199.6	197.6	1.010
as left zero	5000	0.0	0.0	-0.3	----
as left span	4919	81.0	800.3	800.9	0.999
				Average Correction Factor	1.002

Baseline Corr As found:	789.20	Previous response	795.18	*% 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

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

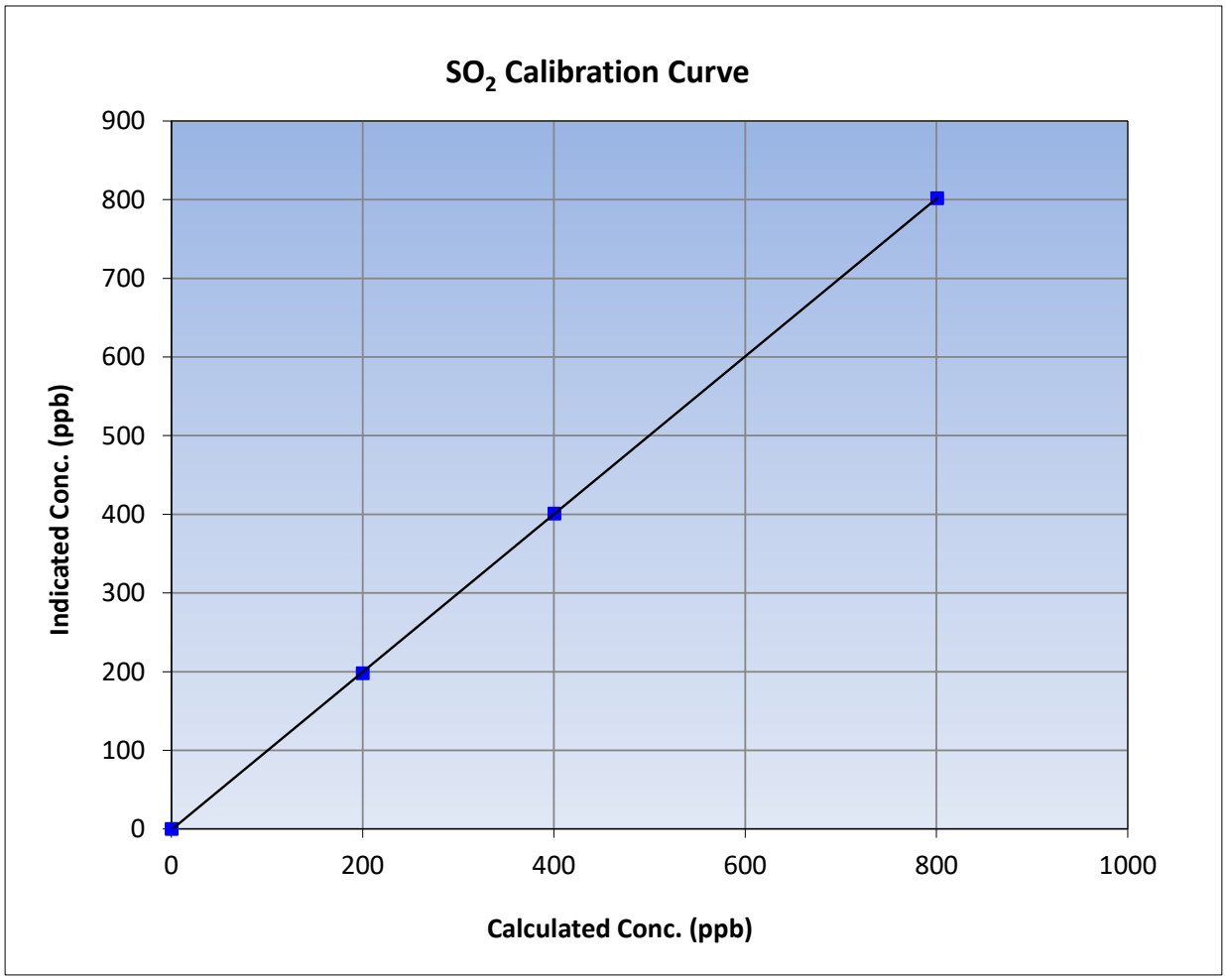
Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 15, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:35	End Time (MST):	14:42
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453

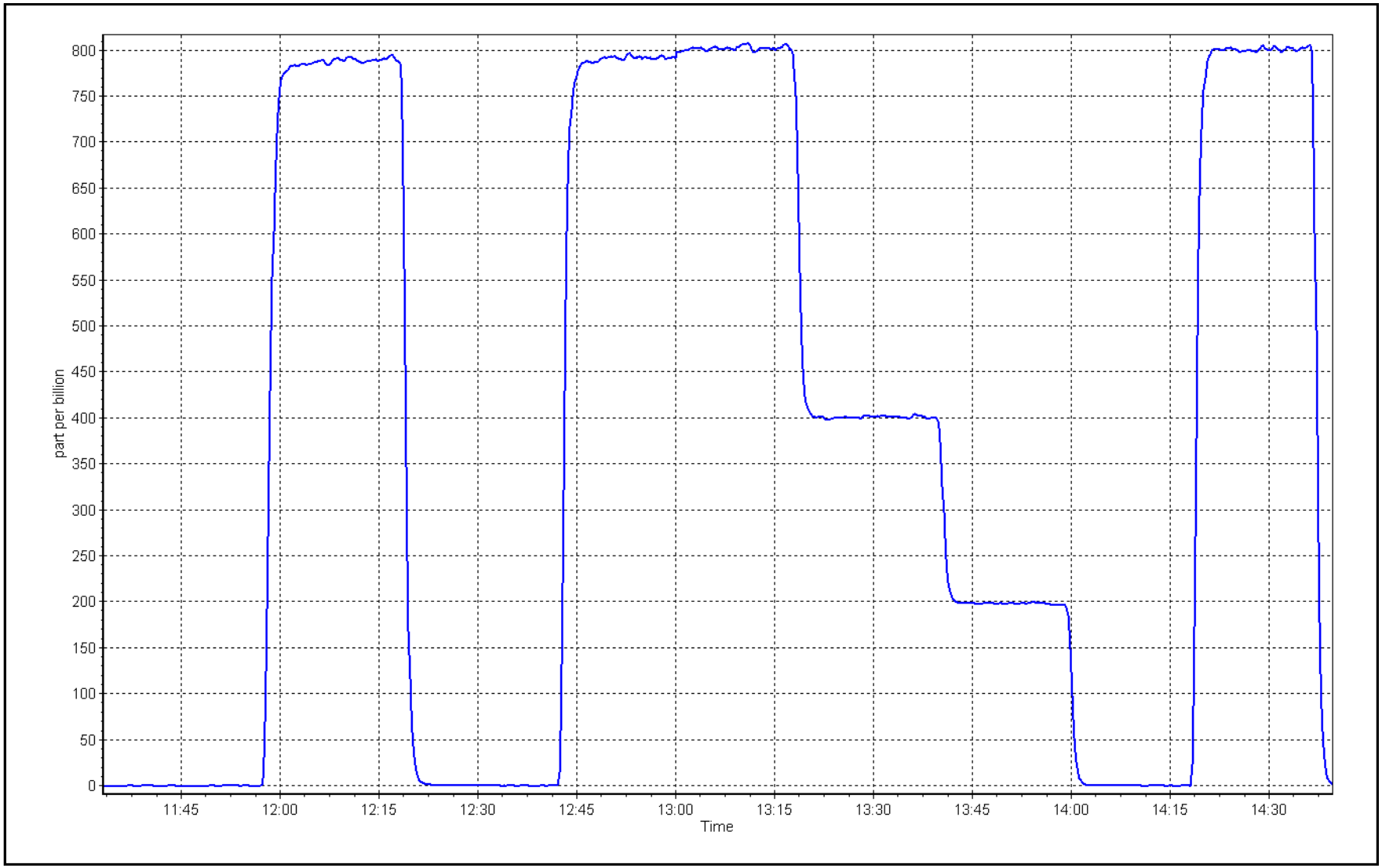
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
800.3	801.7	0.9982
400.2	400.8	0.9985
199.6	197.6	1.0102

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	1.003075	*0.90 - 1.10*
Intercept	-1.143339	*+/-30*



SO2 Calibration Plot Date: January 16, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Stony Mountain	Station number:	AMS18
Calibration Date:	January 18, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	10:24	End time (MST):	14:43
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.479	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC500395			
Removed Cal Gas Conc:	5.479	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
ZAG Make/Model:	Teledyne API T701		Serial Number:	360

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153359	
Converter make:	CD Nova CDN-101		Converter serial #:	555	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.994298	0.989724	Backgd or Offset:	2.53	2.55
Calibration intercept:	0.241122	0.201244	Coeff or Slope:	1.129	1.129

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.1	----
as found span	4927	73.0	80.0	78.4	1.022
as found 2nd point	4964	36.5	40.0	39.6	1.012
as found 3rd point	4983	18.3	20.0	19.7	1.023
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4927	73.0	80.0	79.3	1.009
second point	4964	36.5	40.0	40.0	1.000
third point	4983	18.3	20.0	19.9	1.007
as left zero	5000	0.0	0.0	0.2	----
as left span	4927	73.0	80.0	79.2	1.010
SO2 Scrubber Check	4923	77.1	771.0	0.0	----
Date of last scrubber change:		17-Dec-21		Ave Corr Factor	1.005
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	78.3	Prev response:	79.78	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.5	AF Slope:	0.979436	AF Intercept:	0.161419
Baseline Corr 3rd AF pt:	19.6	AF Correlation:	0.999971		

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. No adjustments made.

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

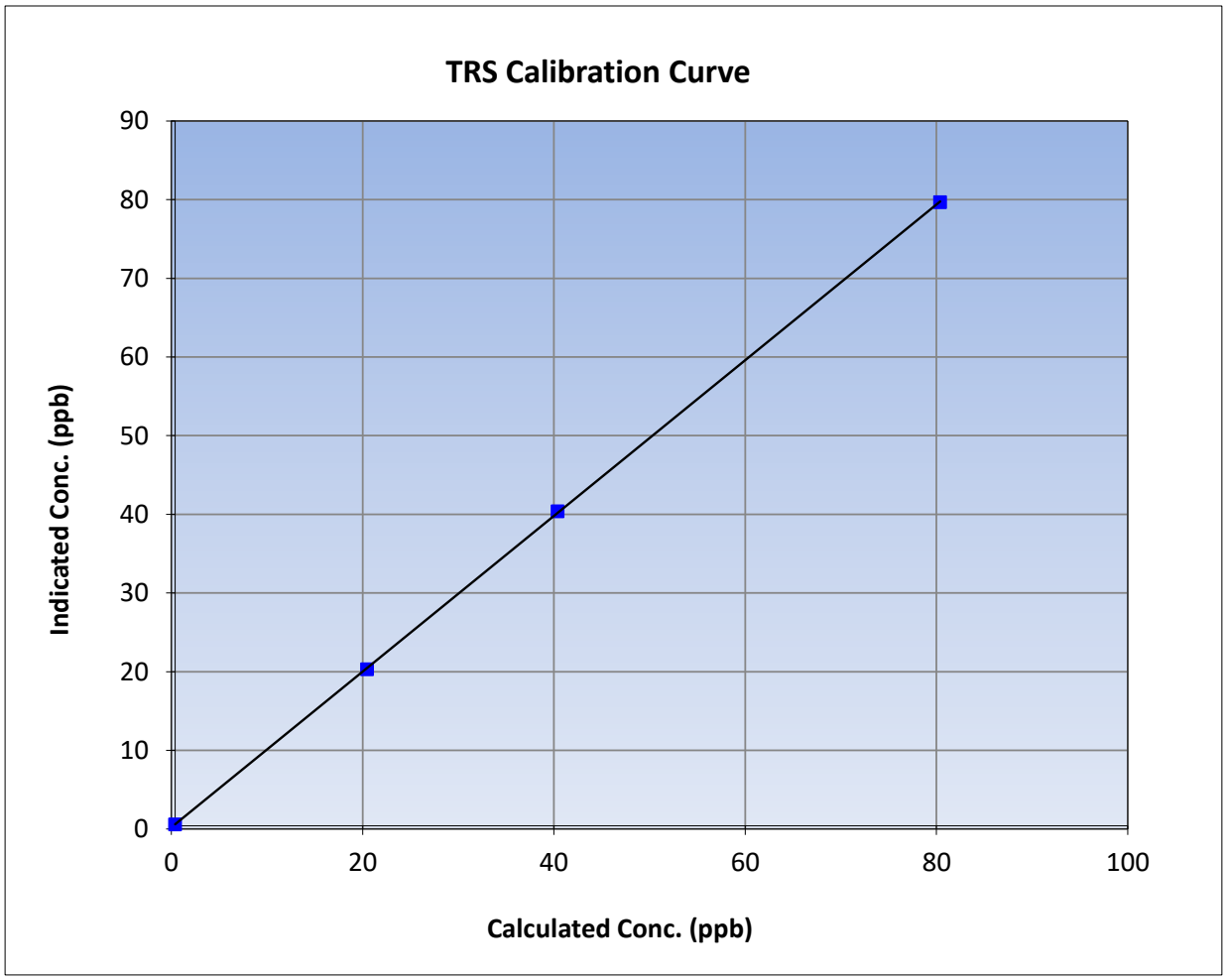
Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	December 14, 2022
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	10:24	End Time (MST):	14:43
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359

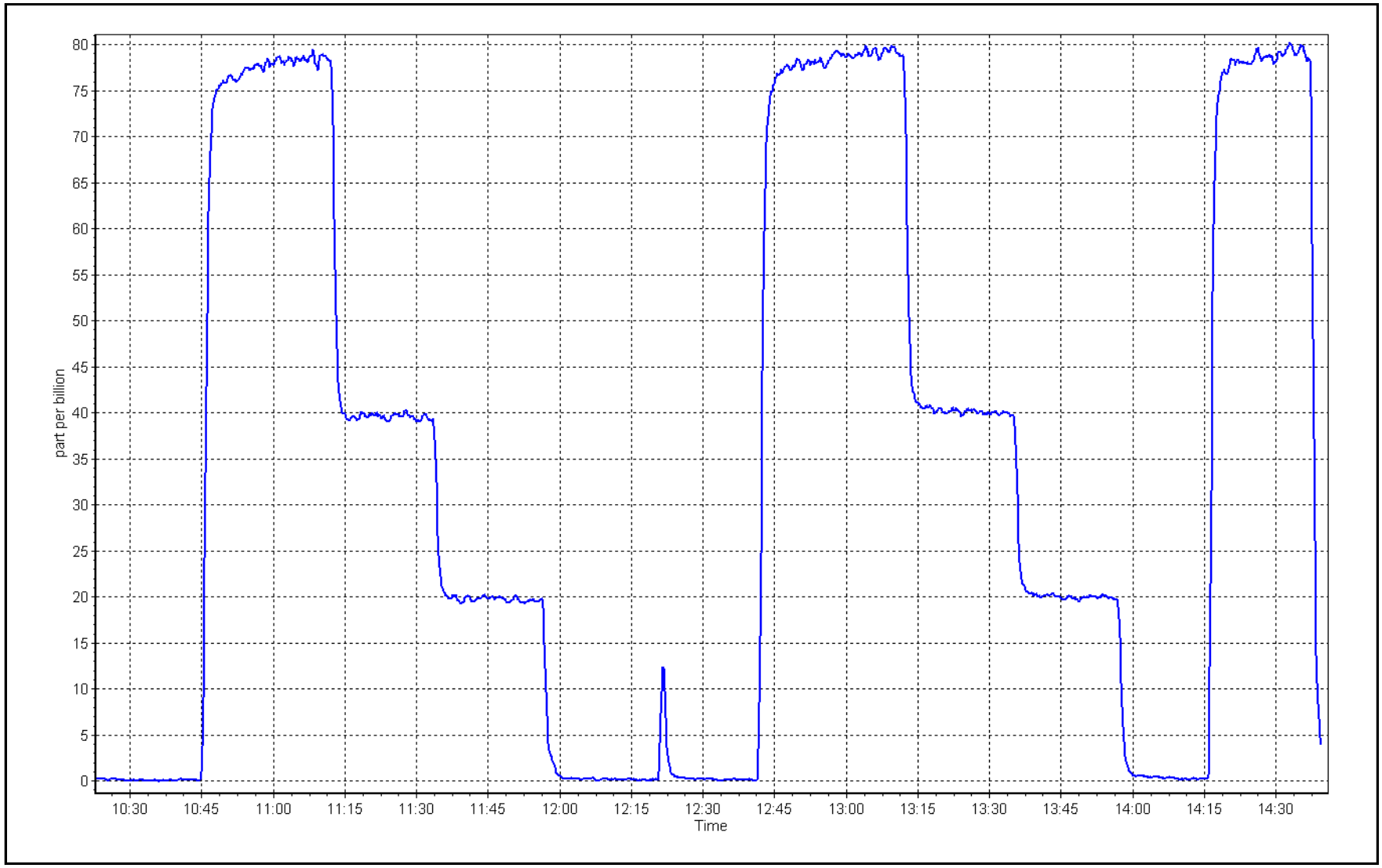
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	79.3	1.0087
40.0	40.0	0.9998
20.0	19.9	1.0074

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.989724	*0.90 - 1.10*
Intercept	0.201244	*+/-3*



TRS Calibration Plot Date: January 18, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 16, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	11:35	End time (MST):	14:42
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:	NA	
Removed CH4 Conc.	500.8	ppm	CH4 Equiv Conc.	1066.8	ppm
Removed C3H8 Conc.	205.8	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	2658	
ZAG make/model:	Teledyne API T701H		Serial Number:	360	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320039	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.03E-04	3.06E-04	NMHC SP Ratio:	5.53E-05	5.66E-05
CH4 Retention time:	14.60	14.60	NMHC Peak Area:	165923	162130

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	81.0	17.28	16.99	1.017
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	81.0	17.28	17.25	1.002
second point	4959	40.5	8.64	8.61	1.004
third point	4979	20.2	4.31	4.29	1.005
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	81.0	17.28	17.35	0.996
				Average Correction Factor	1.004

Baseline Corr AF:	16.99	Prev response	17.31	*% change	-1.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4919	81.0	9.17	8.94	1.026
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4919	81.0	9.17	9.14	1.003
second point	4959	40.5	4.58	4.58	1.002
third point	4979	20.2	2.29	2.29	0.999
as left zero	5000	0	0.00	0.00	----
as left span	4919	81	9.17	9.21	0.996
				Average Correction Factor	1.001
Baseline Corr AF:	8.94	Prev response	9.17	*% change	-2.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4919	81.0	8.11	8.06	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4919	81.0	8.11	8.11	1.001
second point	4959	40.5	4.06	4.03	1.006
third point	4979	20.2	2.02	2.00	1.012
as left zero	5000	0.0	0.00	0.00	----
as left span	4919	81.0	8.11	8.14	0.996
				Average Correction Factor	1.006
Baseline Corr AF:	8.06	Prev response	8.14	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001927	0.998211
THC Cal Offset:	-0.008379	-0.008790
CH4 Cal Slope:	1.005440	0.999750
CH4 Cal Offset:	-0.017403	-0.013212
NMHC Cal Slope:	0.998694	0.996638
NMHC Cal Offset:	0.009024	0.005021

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

THC Calibration Summary

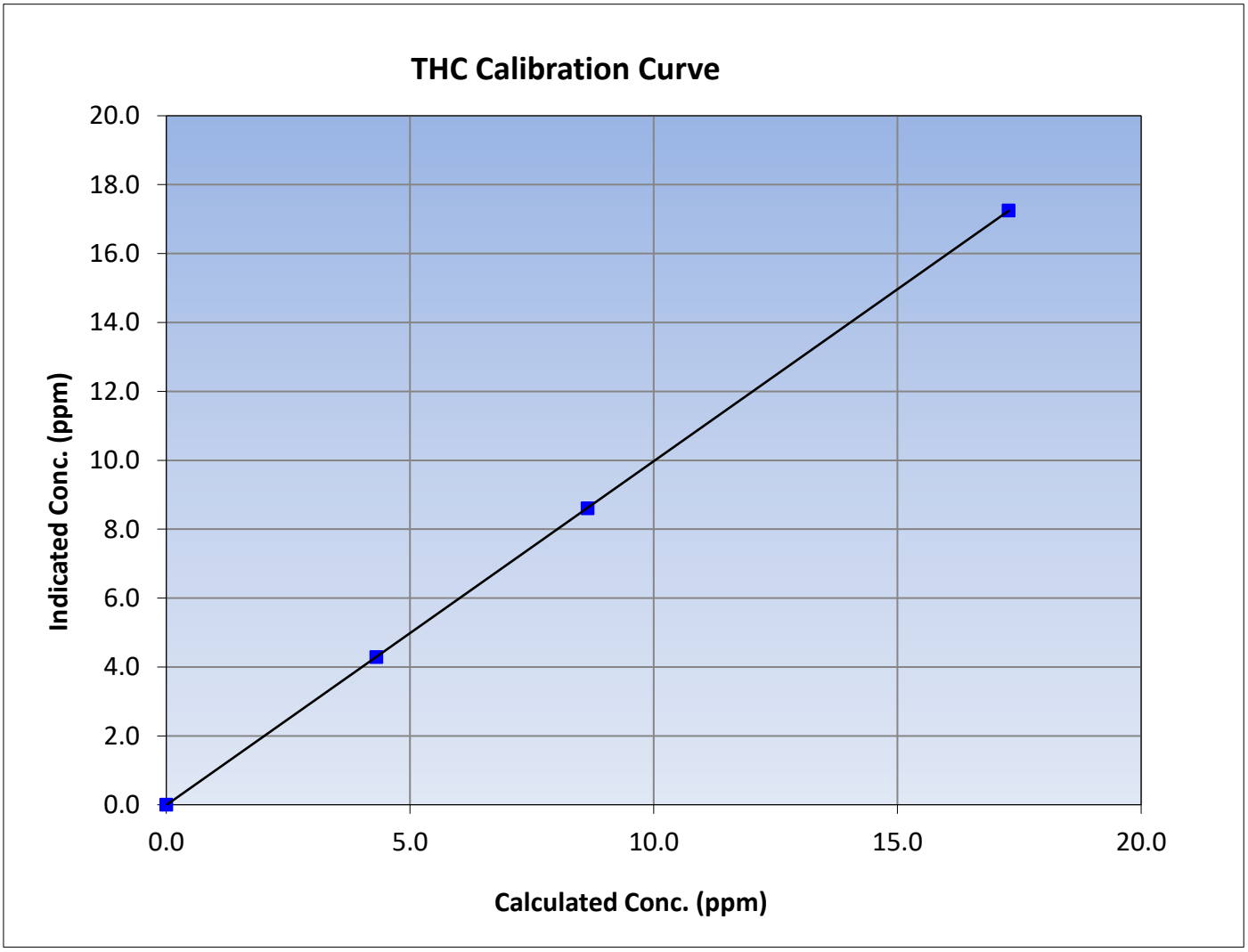
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 15, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:35	End Time (MST):	14:42
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999998	*≥0.995*
17.28	17.25	1.0019			
8.64	8.61	1.0040	Slope	0.998211	*0.90 - 1.10*
4.31	4.29	1.0050			
			Intercept	-0.008790	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

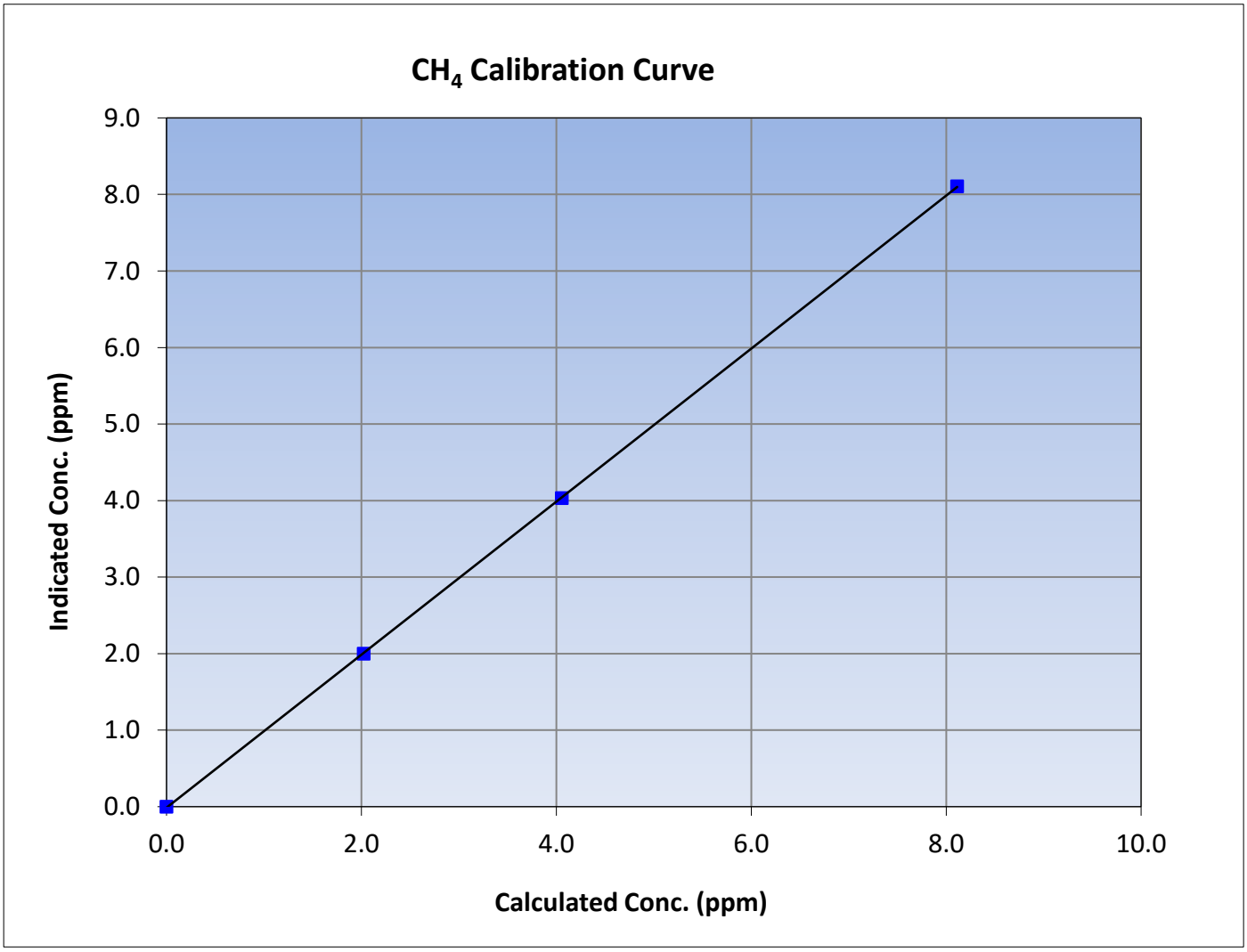
Version-01-2020

Station Information

Calibration Date:	January 16, 2023	Previous Calibration:	December 15, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:35	End Time (MST):	14:42
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999987	*≥0.995*
8.11	8.11	1.0009			
4.06	4.03	1.0064	Slope	0.999750	*0.90 - 1.10*
2.02	2.00	1.0118			
			Intercept	-0.013212	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

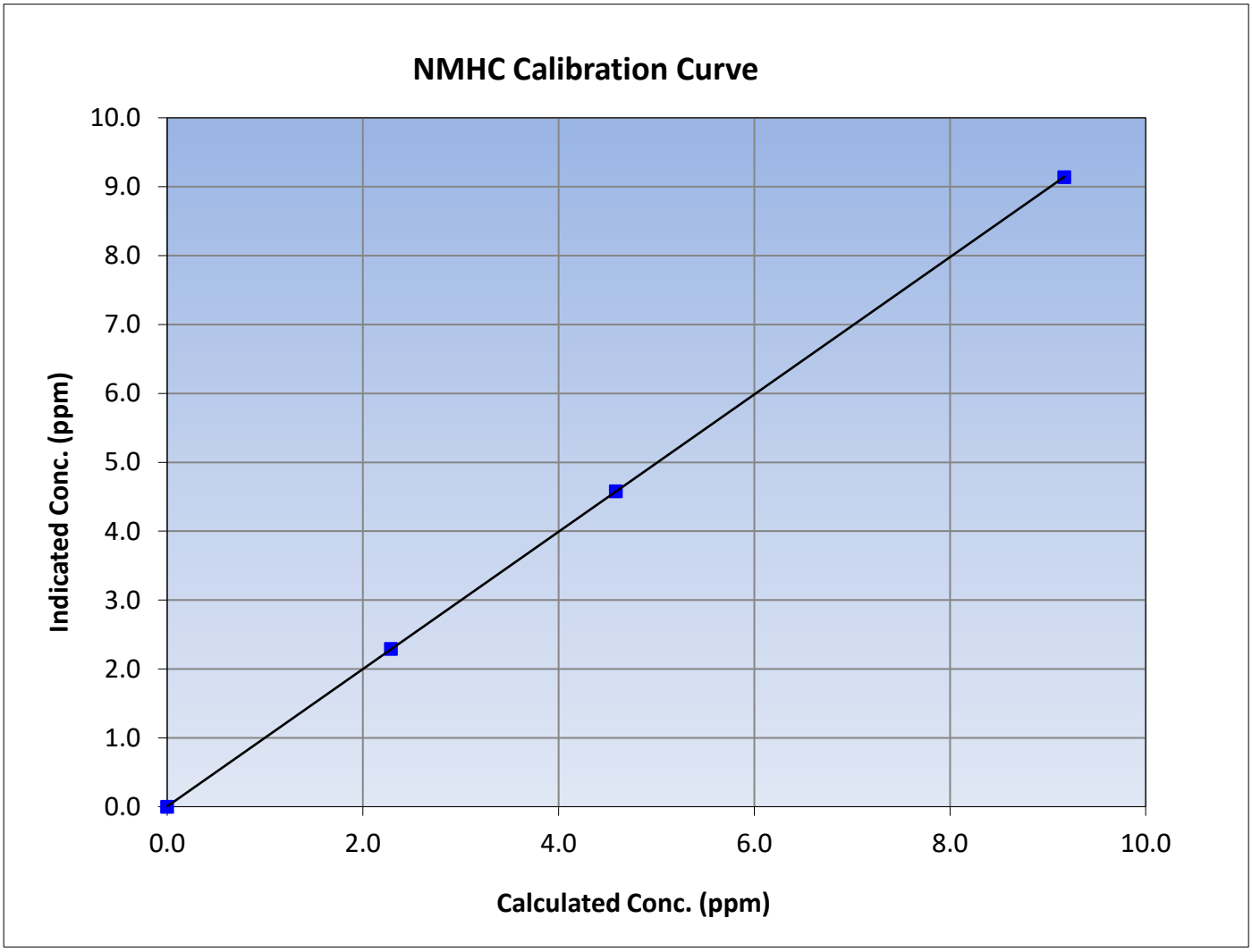
Version-01-2020

Station Information

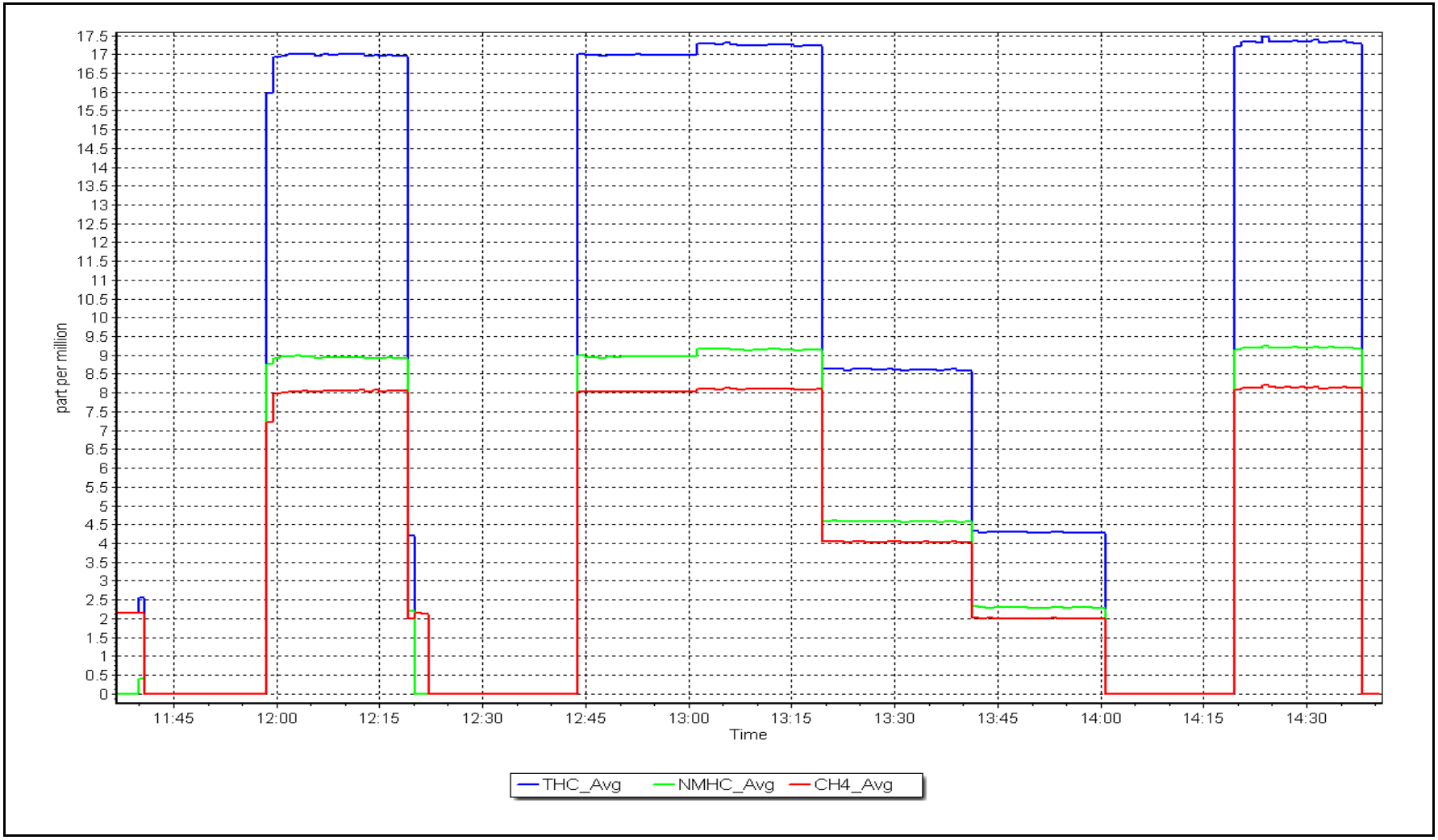
Calibration Date:	January 16, 2023	Previous Calibration:	December 15, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:35	End Time (MST):	14:42
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.17	9.14	1.0031			
4.58	4.58	1.0017	Slope	0.996638	0.90 - 1.10
2.29	2.29	0.9990			
			Intercept	0.005021	+/-0.5



NMHC Calibration Plot Date: January 16, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 24, 2023	Last Cal Date:	December 21, 2022
Start time (MST):	10:19	End time (MST):	15:58
Reason:	Cylinder Change		

Calibration Standards

NO Gas Cylinder #:	T2XX7ME		Cal Gas Expiry Date:	January 14, 2024	
NOX Cal Gas Conc:	50.48	ppm	NO Cal Gas Conc:	49.22	ppm
Removed Cylinder #:	T2Y1P5K		Removed Gas Exp Date:	December 11, 2023	
Removed Gas NOX Conc:	51.06	ppm	Removed Gas NO Conc:	50.35	ppm
NOX gas Diff:	-0.5%		NO gas Diff:	-0.6%	
Calibrator Model:	Teledyne API T700		Serial Number:	2658	
ZAG make/model:	Teledyne API 701H		Serial Number:	360	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.026	1.043	NO bkgnd or offset:	2.9	2.9
NOX coeff or slope:	0.990	0.987	NOX bkgnd or offset:	2.9	2.9
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	225.3	218.6

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.000898	1.000554
NO_X Cal Offset:	-0.096867	0.069933
NO Cal Slope:	1.001322	1.001394
NO Cal Offset:	-1.059867	-0.829546
NO_2 Cal Slope:	0.997471	1.001873
NO_2 Cal Offset:	0.297014	0.315702

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	4921	79.4	810.8	799.5	11.3	804.0	790.1	13.9	1.0084	1.0119
as found 2nd										
as found 3rd										
new cyl resp	4919	81.3	820.8	800.3	20.5	809.7	786.2	23.4	1.0137	1.0179
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	4919	81.3	820.8	800.3	20.5	821.2	801.0	20.2	0.9995	0.9991
second point	4959	40.7	410.9	400.7	10.3	411.5	399.9	11.6	0.9986	1.0019
third point	4980	20.3	204.9	199.8	5.1	204.9	198.5	6.4	1.0002	1.0067
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as left span	4919	81.3	820.8	390.0	430.8	824.1	387.7	436.5	0.9959	1.0059
								Average Correction Factor	0.9994	1.0026

Corrected As found	NO_X = 804.1 ppb	NO = 790.2 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	-0.9%
Previous Response	NO_X = 811.4 ppb	NO = 799.5 ppb			*Percent Change	NO =	-1.2%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:	
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	799.5	389.2	430.8	431.8	0.9977	100.2%
2nd GPT point (200 ppb O3)	799.5	585.7	234.3	235.1	0.9965	100.3%
3rd GPT point (100 ppb O3)	799.5	695.7	124.3	125.1	0.9935	100.7%
				Average Correction Factor	0.9959	100.4%

Notes: Changed calibration gas cylinder after as founds. Sample inlet filter changed after new cylinder response. Adjusted the span only.

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

NO_X Calibration Summary

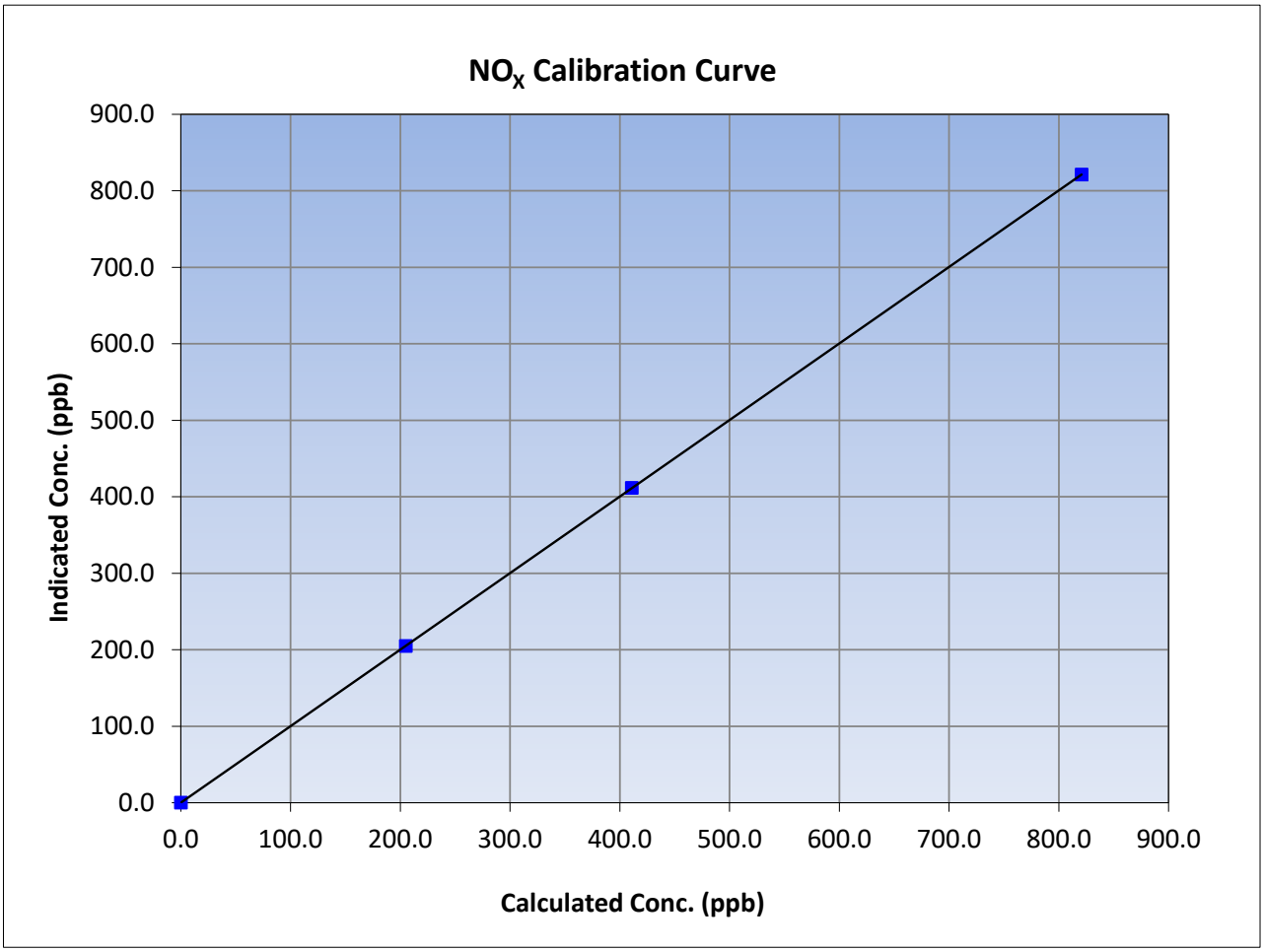
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 21, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:19	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	1.000000	≥0.995
820.8	821.2	0.9995			
410.9	411.5	0.9986	Slope	1.000554	0.90 - 1.10
204.9	204.9	1.0002			
			Intercept	0.069933	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

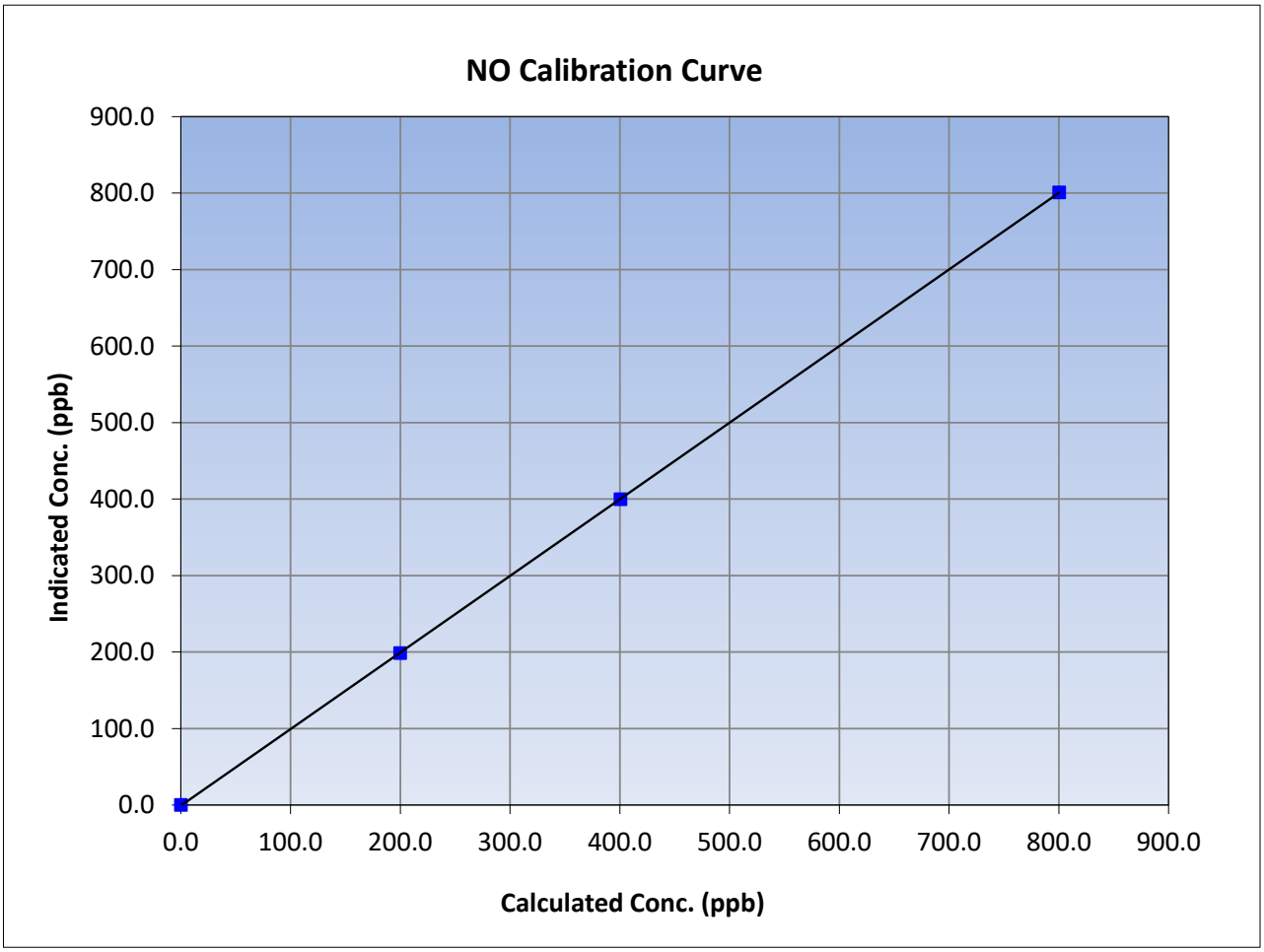
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 21, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:19	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999995	≥0.995
800.3	801.0	0.9991			
400.7	399.9	1.0019	Slope	1.001394	0.90 - 1.10
199.8	198.5	1.0067			
			Intercept	-0.829546	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

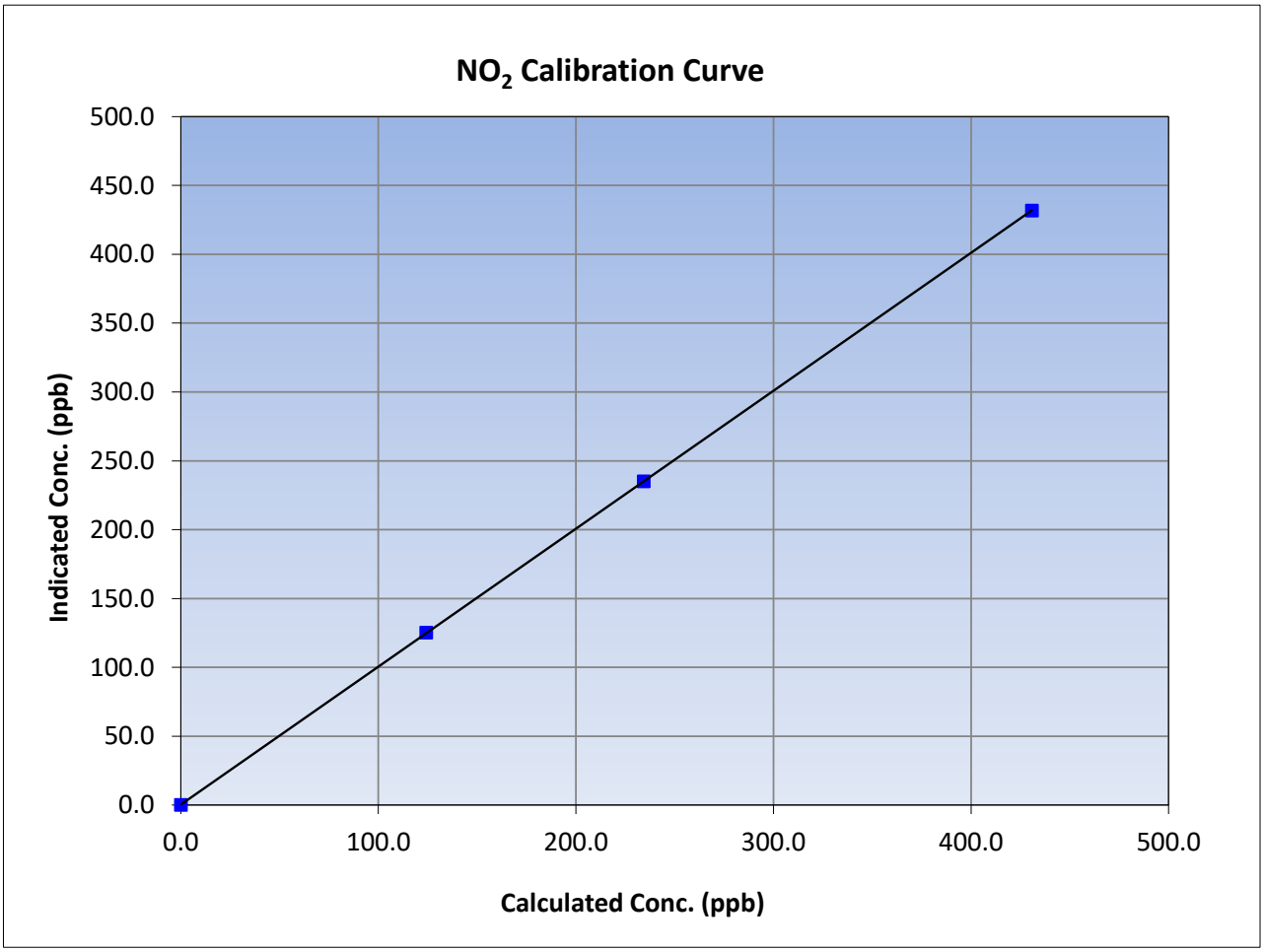
Version-04-2020

Station Information

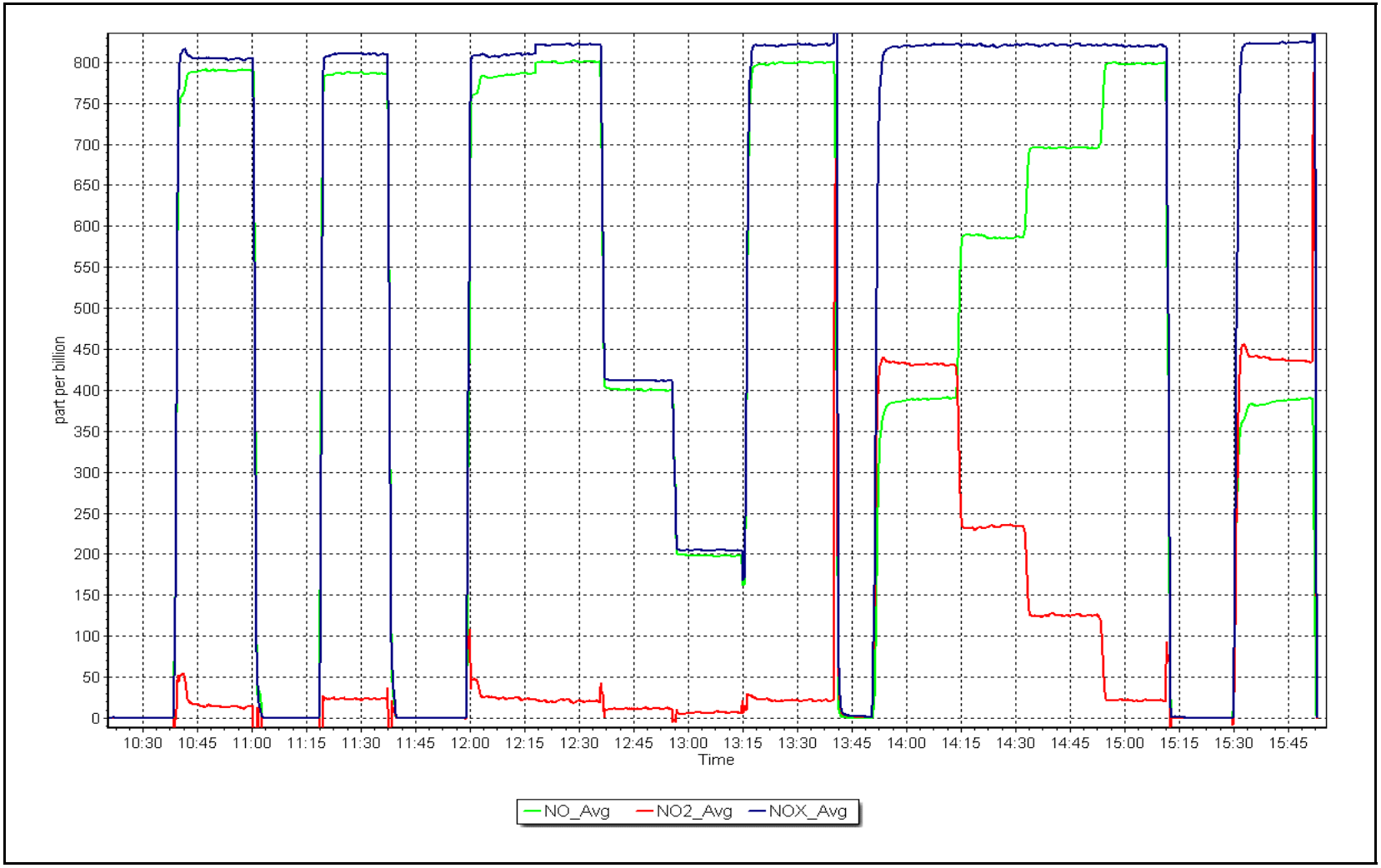
Calibration Date:	January 24, 2023	Previous Calibration:	December 21, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:19	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999999	≥0.995
430.8	431.8	0.9977			
234.3	235.1	0.9965	Slope	1.001873	0.90 - 1.10
124.3	125.1	0.9935			
			Intercept	0.315702	+/-20



NO_X Calibration Plot Date: January 24, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS18
Calibration Date:	January 9, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	11:20	End time (MST):	14:20
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	2658
ZAG Make/Model:	Teledyne API T701H	Serial Number:	360

Analyzer Information

Analyzer make:	API T400	Analyzer serial #:	825
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997743	0.993114	Backgd or Offset:	1.000	1.000
Calibration intercept:	-0.380000	-0.320000	Coeff or Slope:	0.976	0.976

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	800.0	0.0	-0.4	----
as found span	4888	1096.9	400.0	398.2	1.005
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	-0.2	----
high point	4888	1101.7	400.0	396.8	1.008
second point	4888	863.9	200.0	198.8	1.006
third point	4888	741.4	100.0	98.5	1.015
as left zero	5000	800.0	0.0	0.2	----
as left span	4812	1097.9	400.0	397.8	1.006
				Average Correction Factor	1.010

Baseline Corr As found:	398.6	Previous response	398.7	*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

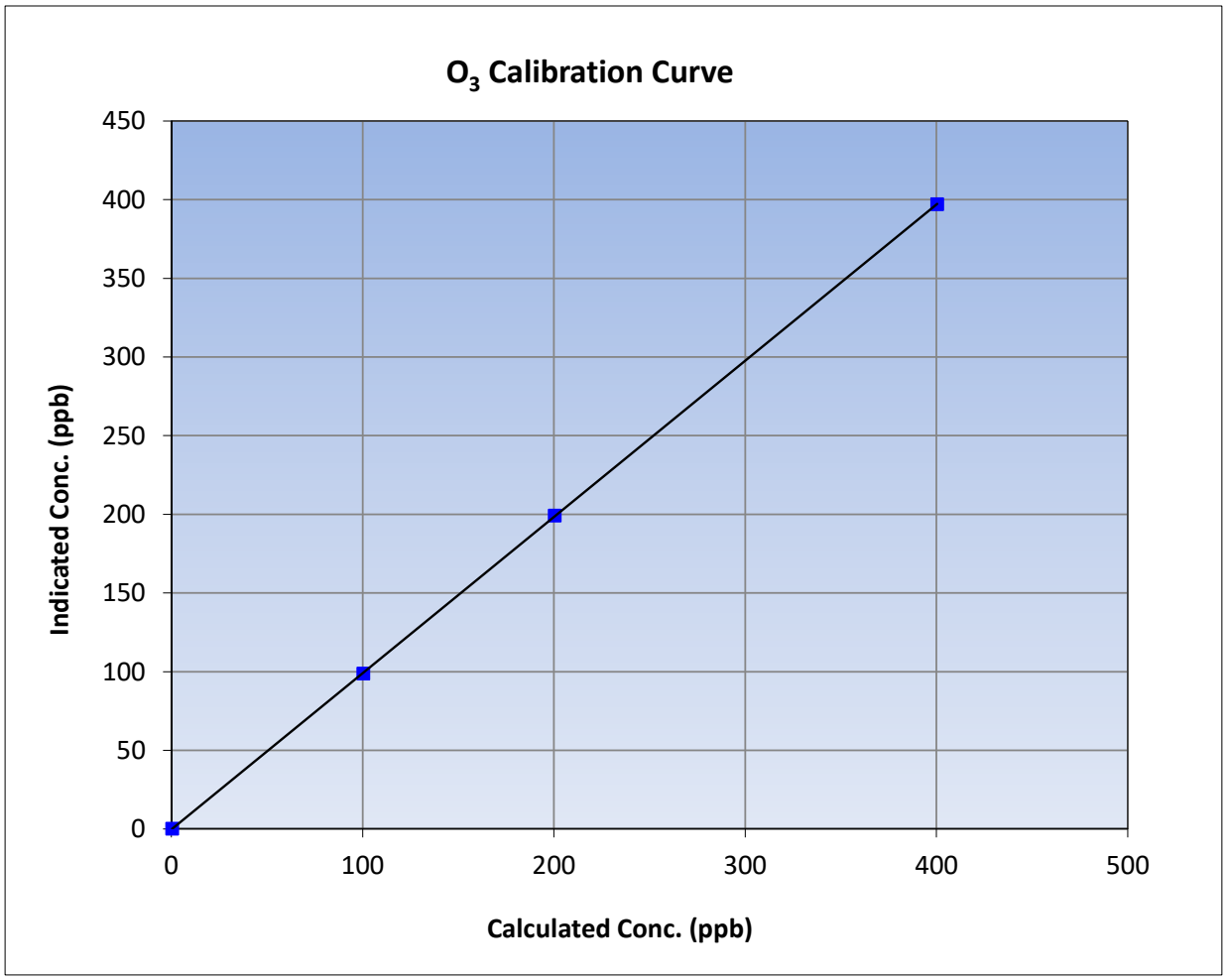
Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 1, 2022
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	11:20	End Time (MST):	14:20
Analyzer make:	API T400	Analyzer serial #:	825

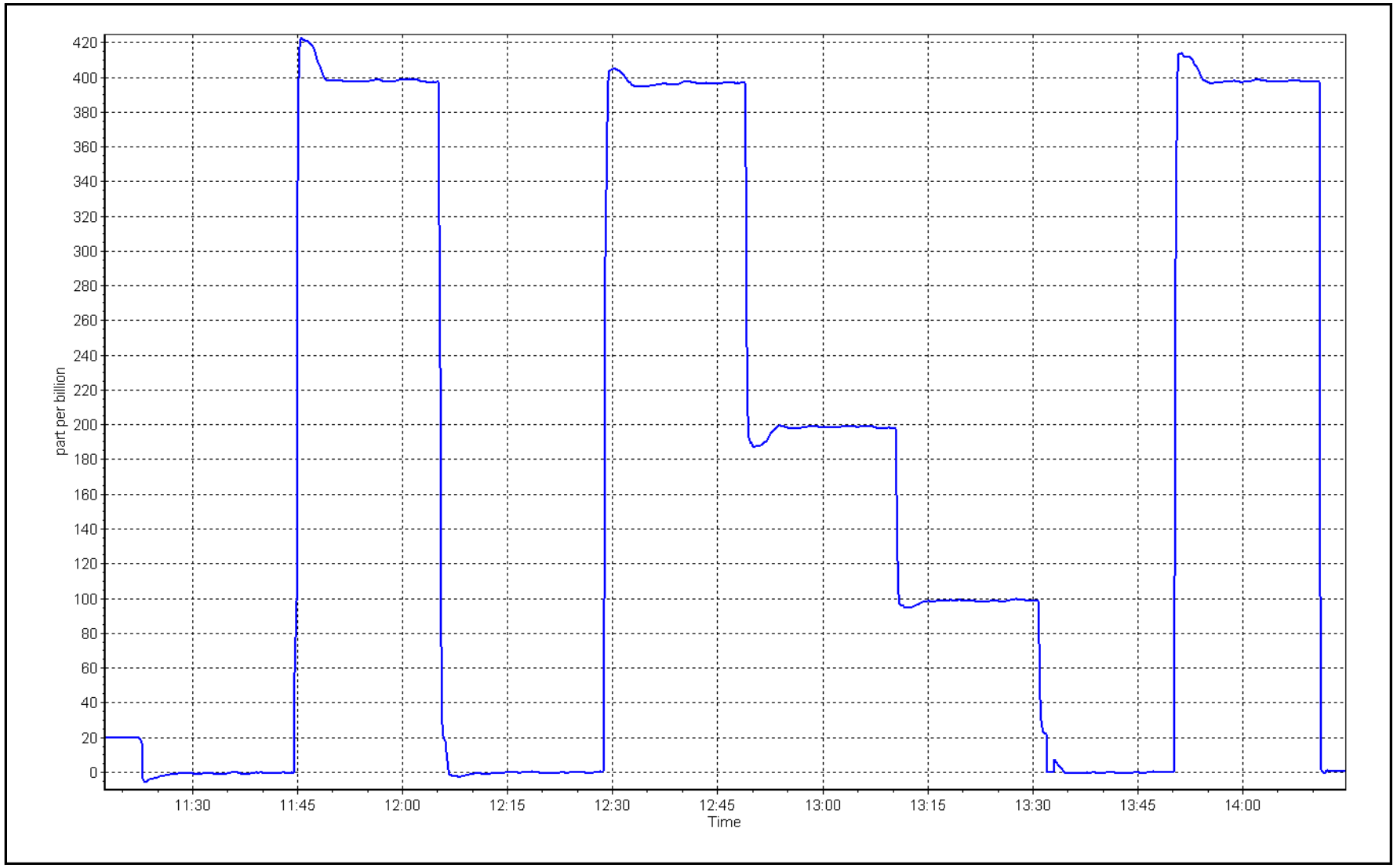
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
400.0	396.8	1.0081
200.0	198.8	1.0060
100.0	98.5	1.0152

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	0.993114	*0.90 - 1.10*
Intercept	-0.320000	*+/- 5*



O_3 Calibration Plot Date: January 9, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 24, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	12:20	End time (MST):	12:50
Analyzer Make:	API T640	S/N:	1335
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	DeltaCal	S/N:	1102
Temp/RH standard:	DeltaCal	S/N:	1102

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-2.4	-2.1	-2.4	☐	+/- 2 °C
P (mmHg)	696.4	698.6	696.4	☐	+/- 10 mmHg
flow (LPM)	5.01	4.95	5.01	☐	+/- 0.25 LPM

Leak Test: Date of check: January 24, 2023 Last Cal Date: December 14, 2022

PM w/o HEPA: 3.2 PM w/ HEPA: 0.0

Inlet cleaning : Inlet Head ☑

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: November 16, 2022

Disposable Filter Changed: November 16, 2022

Annual Maintenance

Date Sample Tube Cleaned: August 30, 2022

Date RH/T Sensor Cleaned: August 30, 2022

Notes: No adjustments made to temperature, pressure or flow. Leak check passed.

Calibration by: Karan Pandit

Wood Buffalo Environmental Association

CO Calibration Report

Version-01-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 6, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	10:46	End time (MST):	13:37
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3,050	ppm	Cal Gas Exp Date:	December 1, 2028
Cal Gas Cylinder #:	ALM063503			
Removed Cal Gas Conc:	3,050	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
ZAG Make/Model:	Teledyne API T701		Serial Number:	360

Analyzer Information

Analyzer make: API T300 — Analyzer serial #: 3504

Analyzer Range: 0 - 50 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009187	1.018233	Backgd or Offset:	-0.009	-0.009
Calibration intercept:	0.095767	0.009764	Coeff or Slope:	0.910	0.916

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.1	----
as found span	4933	66.7	40.7	41.4	0.982
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	----
high point	4933	66.7	40.7	41.4	0.983
second point	4966	33.3	20.3	20.8	0.975
third point	4983	16.7	10.2	10.3	0.987
as left zero	3000	0.0	0.0	0.0	----
as left span	2960	40.0	40.7	41.6	0.979
				Average Correction Factor	0.982

Baseline Corr As found:	41.29	Prev response:	41.16	*% change:	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit

Wood Buffalo Environmental Association

CO Calibration Summary

Version-01-2020

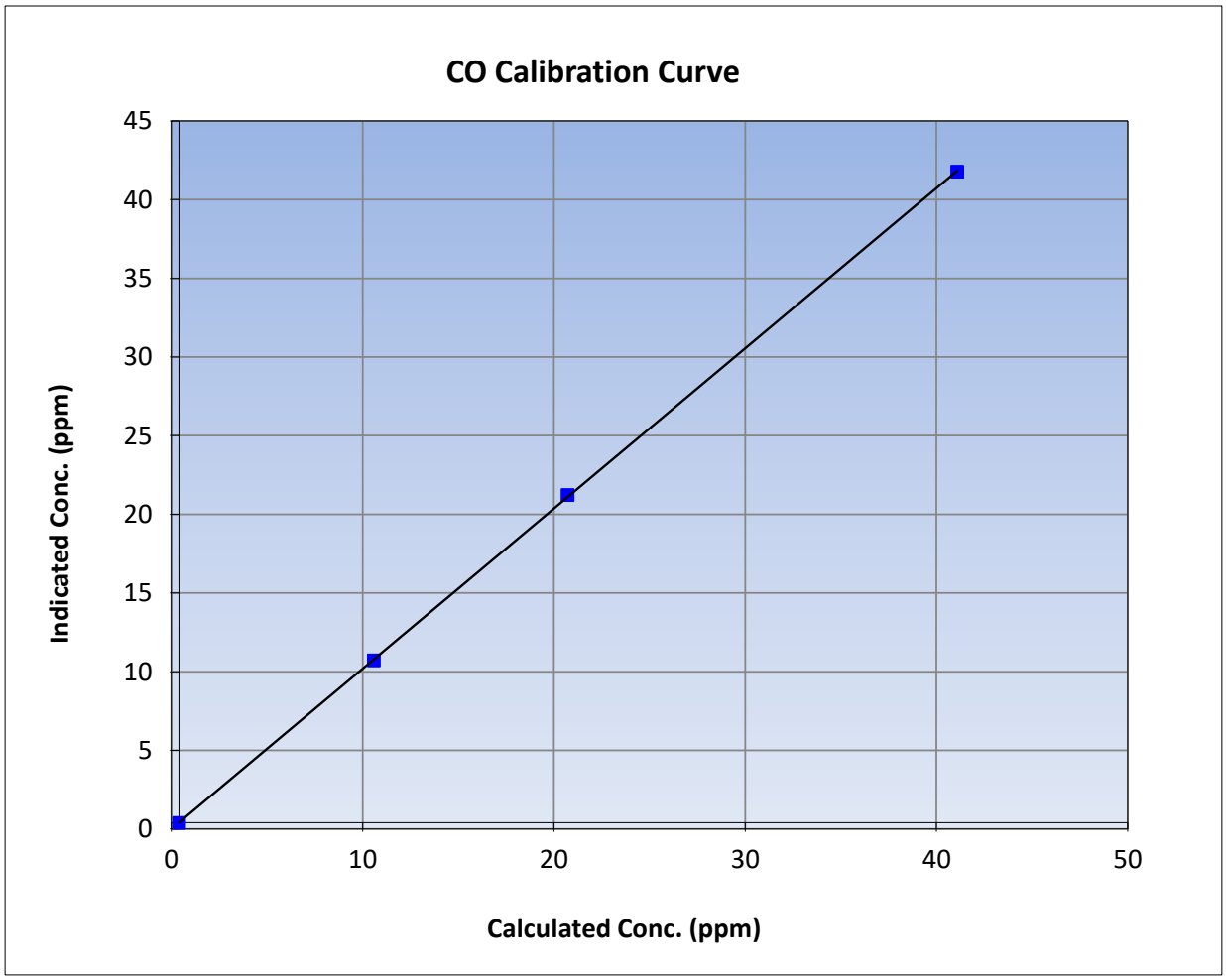
Station Information

Calibration Date:	January 6, 2023	Previous Calibration:	December 12, 2022
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	10:46	End Time (MST):	13:37
Analyzer make:	API T300	Analyzer serial #:	3504

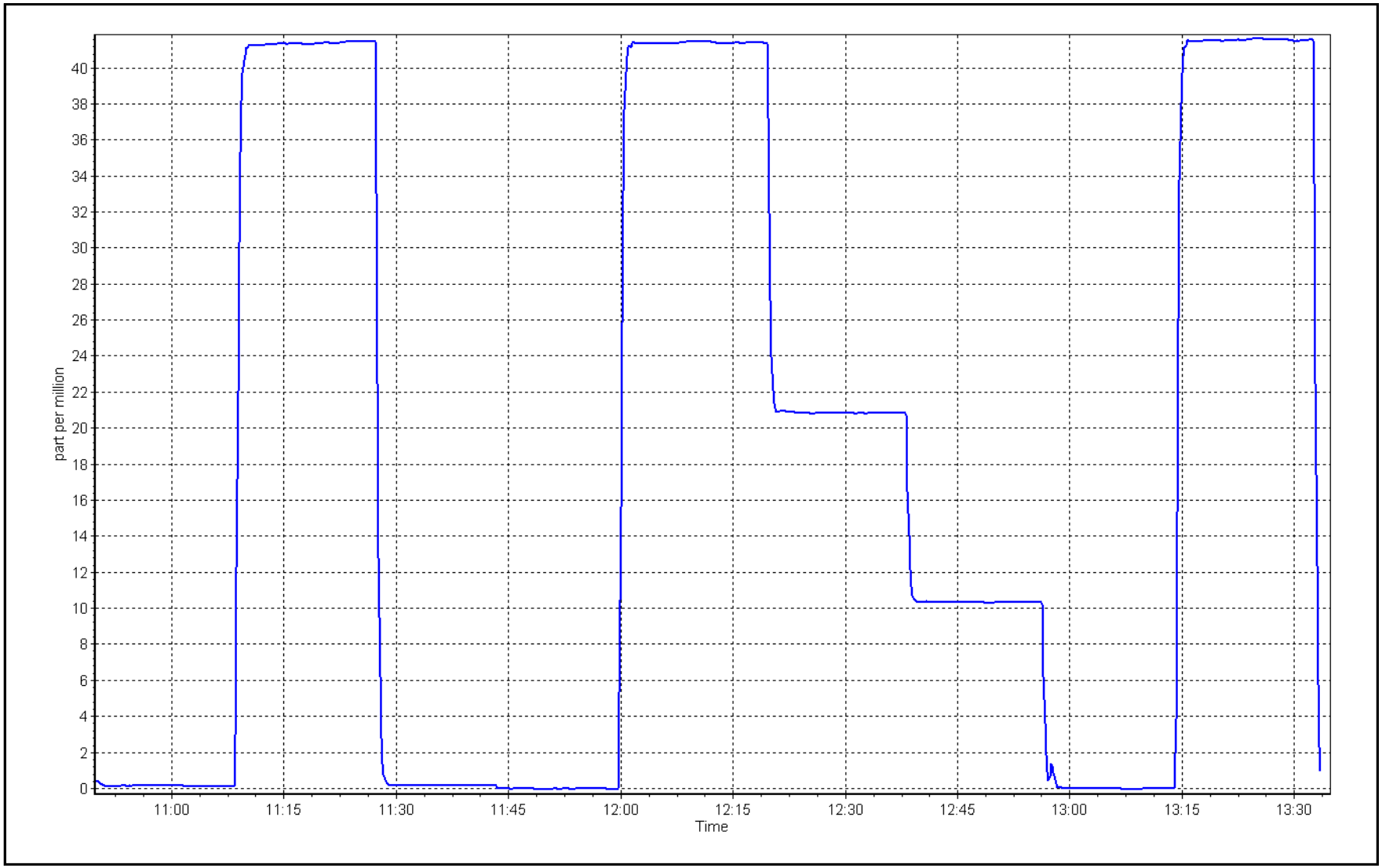
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.7	41.4	0.9831
20.3	20.8	0.9753
10.2	10.3	0.9872

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	1.018233	*0.90 - 1.10*
Intercept	0.009764	*+/-1.5*



CO Calibration Plot Date: January 6, 2023 Location: Stony Mountain



Wood Buffalo Environmental Association

CO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 12, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	10:50	End time (MST):	13:52
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	60,220	ppm	Cal Gas Exp Date:	December 1, 2026
Cal Gas Cylinder #:	ALM063503			
Removed Cal Gas Conc:	60,220	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
N2 Gen Make/Model:	Peak Scientific		Serial Number:	771048317

Analyzer Information

Analyzer make: API T360 — Analyzer serial #: 283

Analyzer Range 0 - 2,000 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000503	1.000425	Backgd or Offset:	-0.045	-0.045
Calibration intercept:	2.940000	5.520000	Coeff or Slope:	1.051	1.051

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*
as found zero	3000	0.0	0.0	0.6	----
as found span	2930	80.0	1600.5	1602.5	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	0.8	----
high point	2930	80.0	1600.5	1601.9	0.999
second point	2970	40.0	800.3	815.9	0.981
third point	2990	20.0	400.1	405.6	0.987
as left zero	3000	0.0	0.0	0.7	----
as left span	2930	80.0	1600.5	1606.2	0.996
				Average Correction Factor	0.989

Baseline Corr As found:	1601.90	Prev response:	1604.28	*% change:	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Karan Pandit and Karina Fenwick

Wood Buffalo Environmental Association

CO_2 Calibration Summary

Version-01-2020

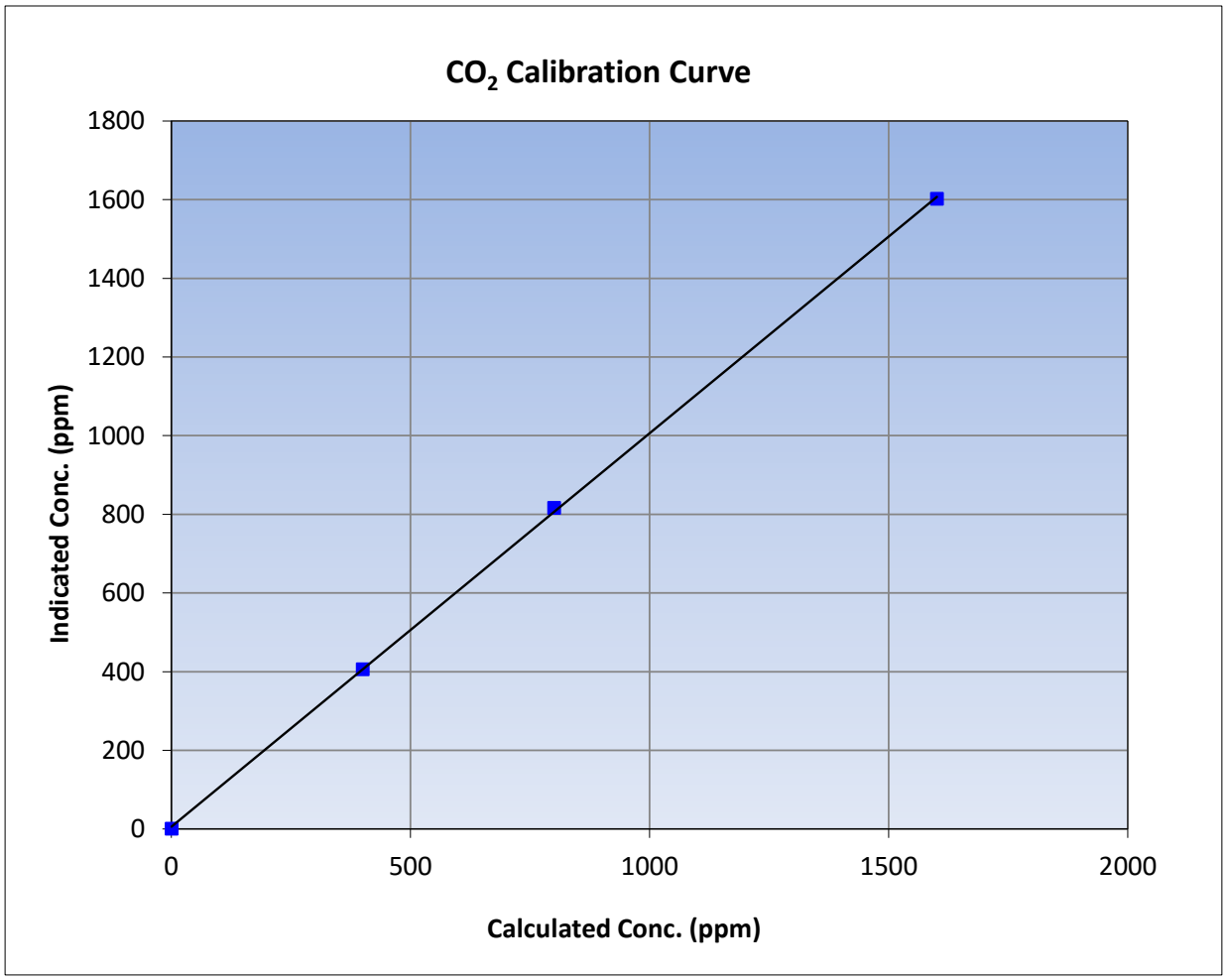
Station Information

Calibration Date	January 12, 2023	Previous Calibration	December 13, 2022
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:50	End Time (MST)	13:52
Analyzer make	API T360	Analyzer serial #	283

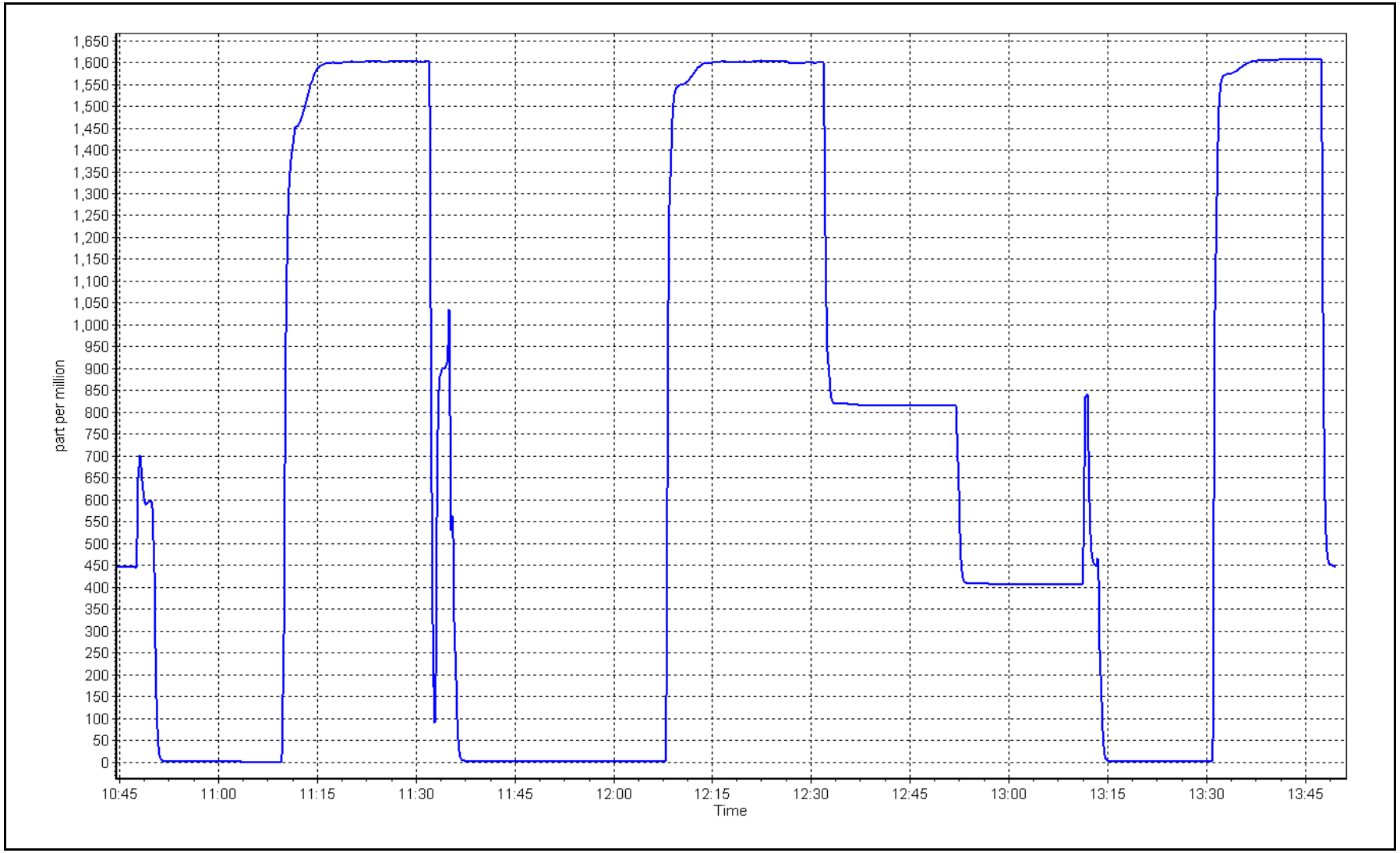
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.8	----
1600.5	1601.9	0.9991
800.3	815.9	0.9808
400.1	405.6	0.9865

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999899	*≥0.995*
Slope	1.000425	*0.90 - 1.10*
Intercept	5.520000	*+/-10*



CO_2 Calibration Plot Date: January 12, 2023 Location: Stony Mountain



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19
FIREBAG
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	January 26, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	11:22	End time (MST):	15:36
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.29	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC716618			
Removed Cal Gas Conc:	49.29	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	1607
ZAG Make/Model:	API T701		Serial Number:	1118

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1410661308

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002165	0.997774	Backgd or Offset:	10.1	10.2
Calibration intercept:	-0.042557	-0.381080	Coeff or Slope:	0.987	0.987

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*
as found zero	4999	0.0	0.0	-0.5	----
as found span	4919	81.1	799.5	797.1	1.003
as found 2nd point	4959	40.6	400.3	399.3	1.002
as found 3rd point	4980	20.3	200.1	200.5	0.998
new cylinder response					
calibrator zero	4999	0.0	0.0	-0.2	----
high point	4919	81.1	799.5	797.7	1.002
second point	4959	40.6	400.3	398.0	1.006
third point	4980	20.3	200.1	199.7	1.002
as left zero	4999	0.0	0.0	-0.3	----
as left span	4919	81.1	799.5	802.0	0.997
				Average Correction Factor	1.003

Baseline Corr As found:	797.60	Previous response	801.16	*% change	-0.4%
Baseline Corr 2nd AF pt:	399.80	AF Slope:	0.997147	AF Intercept:	0.138400
Baseline Corr 3rd AF pt:	201.00	AF Correlation:	0.999997		

* = > +/-5% change initiates investigation

Notes: No adjustments made. Swapped THC valve after MPAF's. Changed sample inlet filter after as founds.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

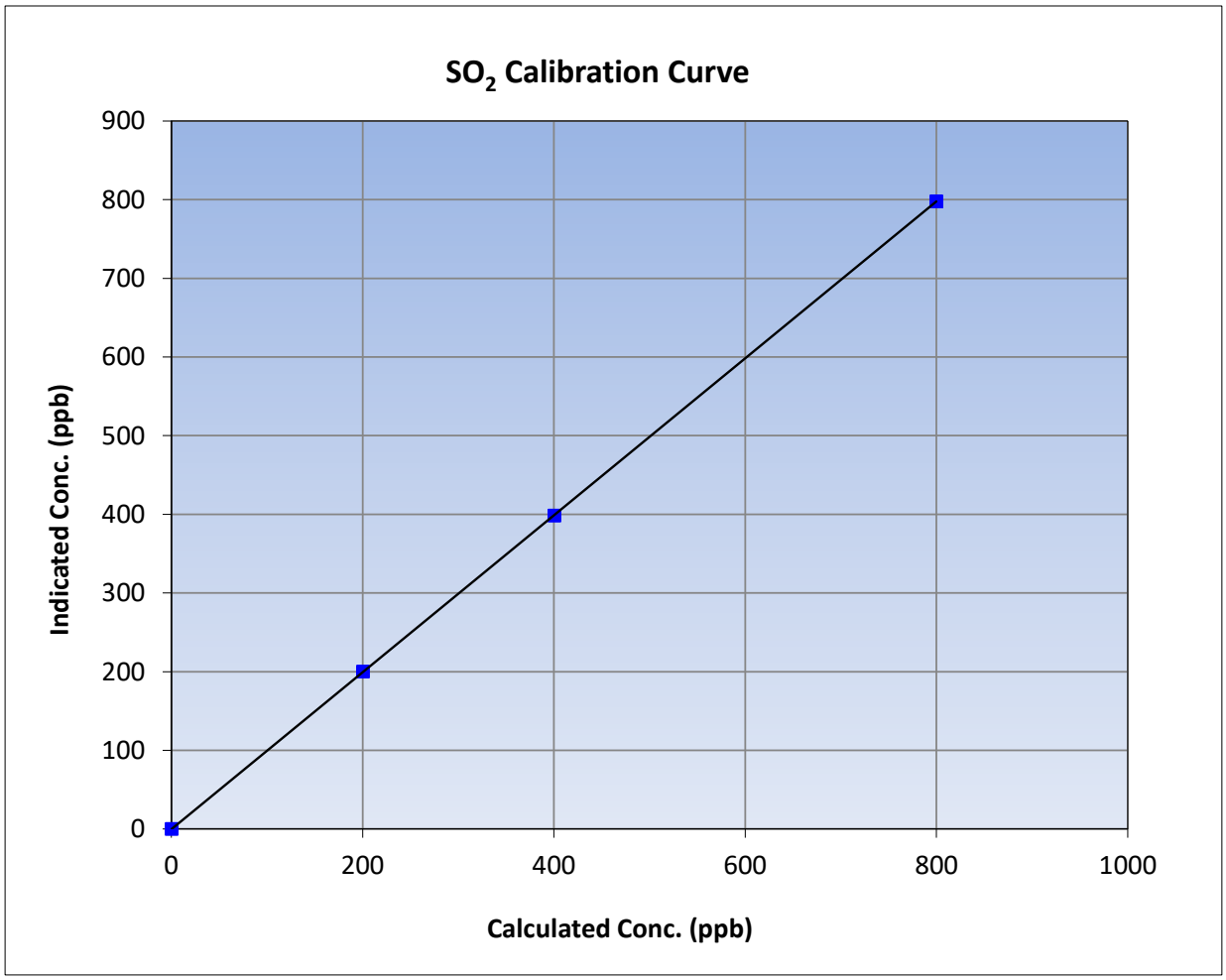
Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	December 5, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:22	End Time (MST):	15:36
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

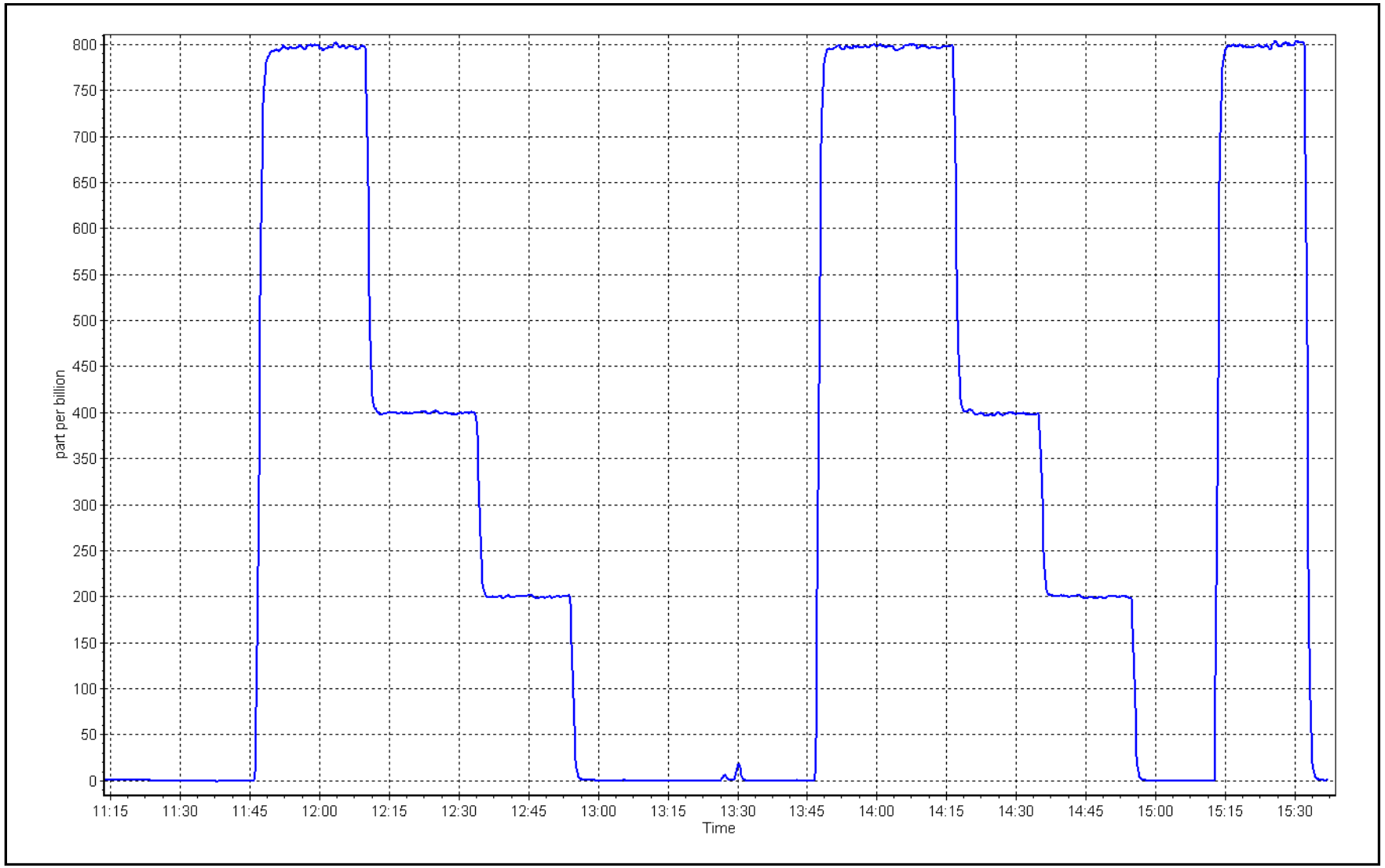
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.5	797.7	1.0022
400.3	398.0	1.0057
200.1	199.7	1.0020

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.997774	*0.90 - 1.10*
Intercept	-0.381080	*+/-30*



SO2 Calibration Plot Date: January 26, 2023 Location: Firebag



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Firebag	Station number:	AMS19
Calibration Date:	January 17, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	10:31	End time (MST):	12:42
Reason:	Removal		

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:	1118

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	CM18360223	
Converter make:	n/a		Converter serial #:	n/a	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.991477		Backgd or Offset:	22.3	22.3
Calibration intercept:	-0.081394		Coeff or Slope:	0.980	0.980

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	1.4	----
as found span	4922	78.2	80.0	82.2	0.990
as found 2nd point	4961	39.1	40.0	41.4	1.000
as found 3rd point	4980	19.6	20.0	21.3	1.007
new cylinder response					

H_2S Calibration Data

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

SO2 Scrubber Check

Date of last scrubber change:	December 9, 2021	Ave Corr Factor	
Date of last converter efficiency test:	n/a		efficiency

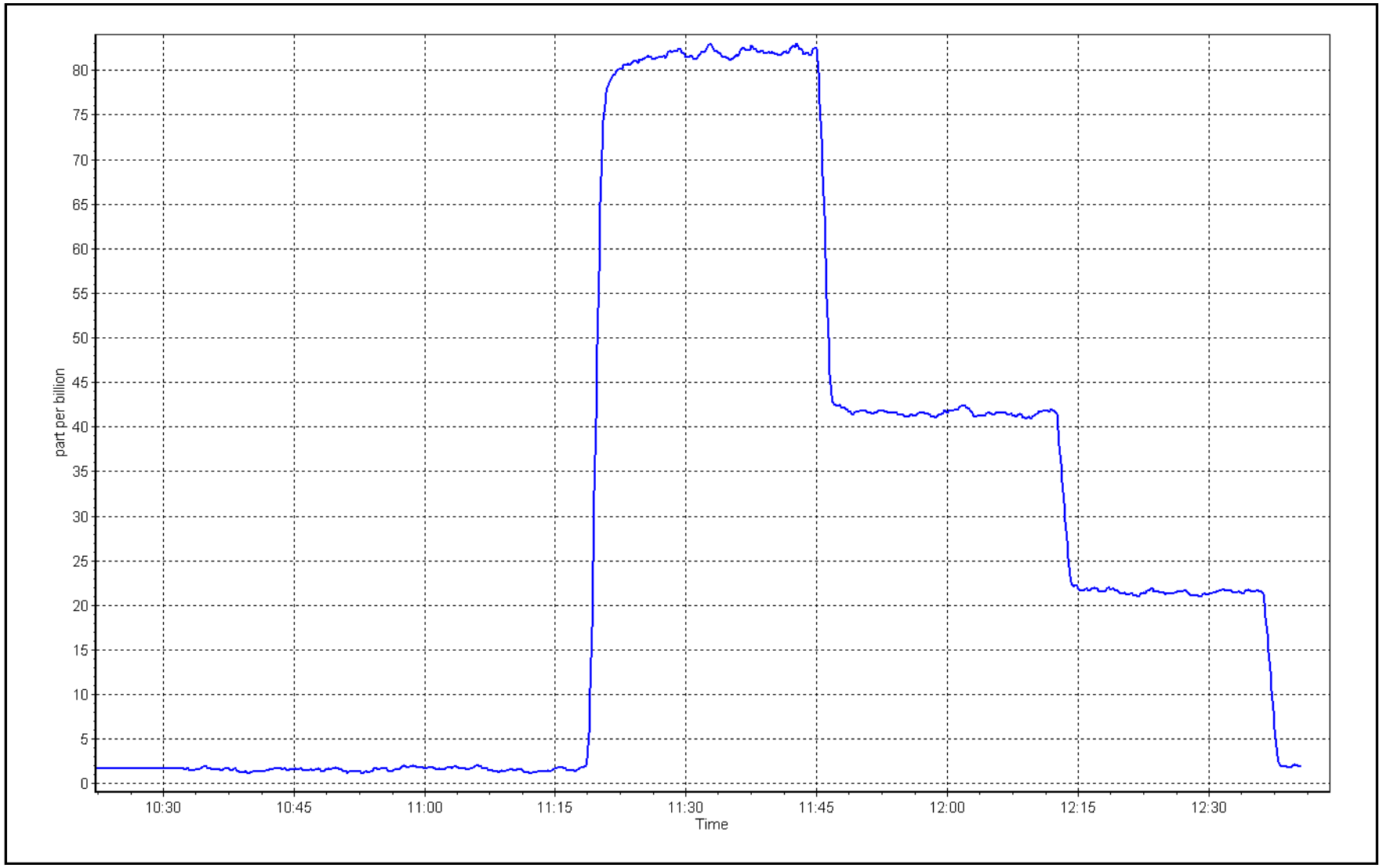
Baseline Corr As found:	80.8	Prev response:	79.22	*% change:	2.0%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.011199	AF Intercept:	1.178264
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999961		

* = > +/-5% change initiates investigation

Notes: Removed 450i, replacing with a 43iTLE and external converter.

Calibration Performed By: Braiden Boutilier

H_2S Calibration Plot Date: January 17, 2023 Location: Firebag



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Firebag	Station number:	AMS19
Calibration Date:	January 18, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	11:07	End time (MST):	14:56
Reason:	Install		

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:	1118

Analyzer Information

Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1336160090
Converter make:	Global	Converter serial #:	2022-222
Analyzer Range	0 - 100 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:		0.998910	Backgd or Offset:		2.88
Calibration intercept:		0.058437	Coeff or Slope:		0.955

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					

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	78.2	80.0	79.9	1.001
second point	4961	39.1	40.0	40.1	0.997
third point	4980	19.6	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.1	----
as left span	4922	78.2	80.0	80.3	0.996
SO2 Scrubber Check	4922	78.3	800.2		----
Date of last scrubber change:		December 9, 2021		Ave Corr Factor	0.999
Date of last converter efficiency test:		n/a			efficiency

Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:	NA	AF Intercept:	NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:	NA		

* = > +/-5% change initiates investigation

Notes: Installed 43i-TLE. Adjusted the zero and span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

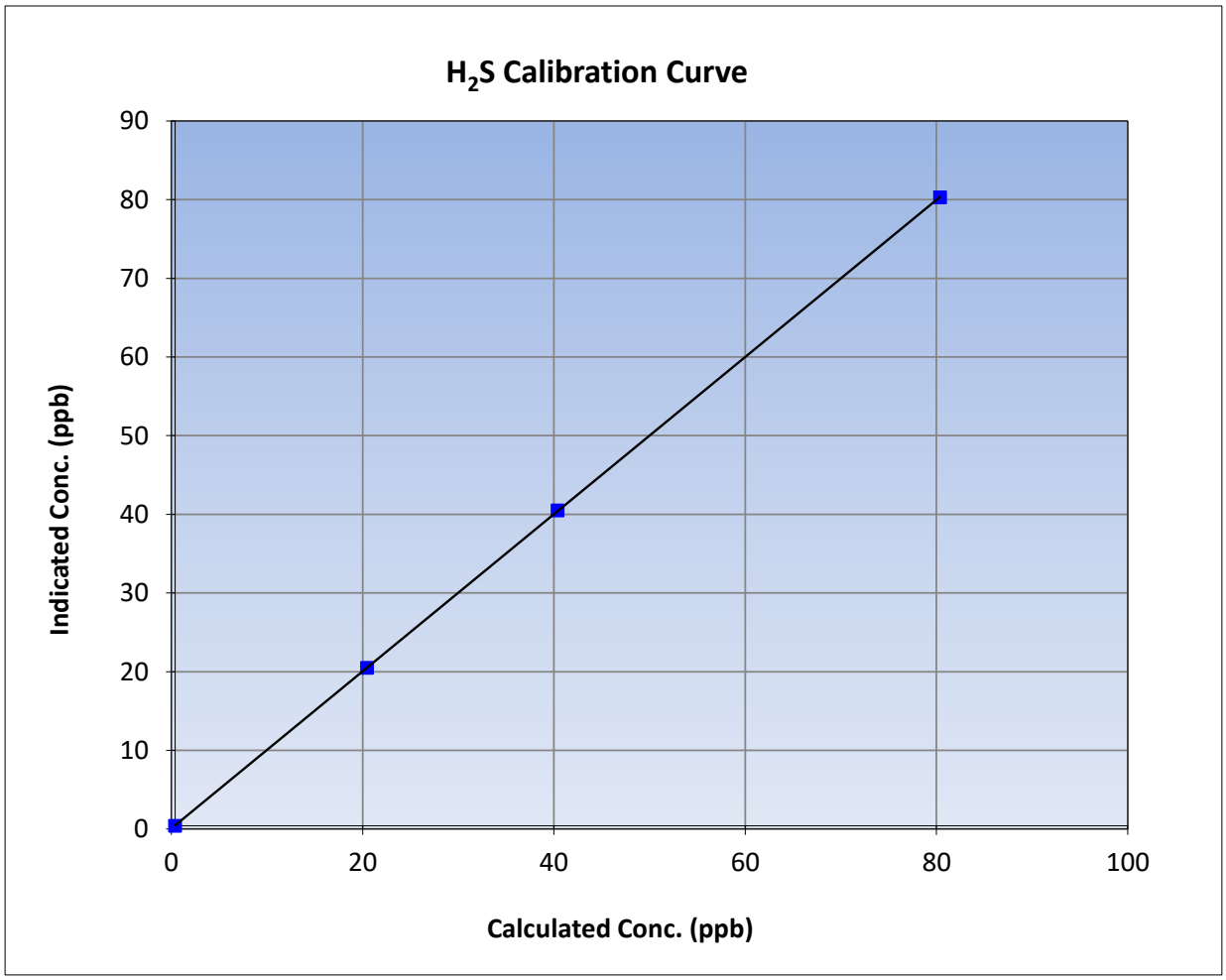
Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	December 1, 2022
Station Name:	Firebag	Station Number:	AMS19
Start Time (MST):	11:07	End Time (MST):	14:56
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1336160090

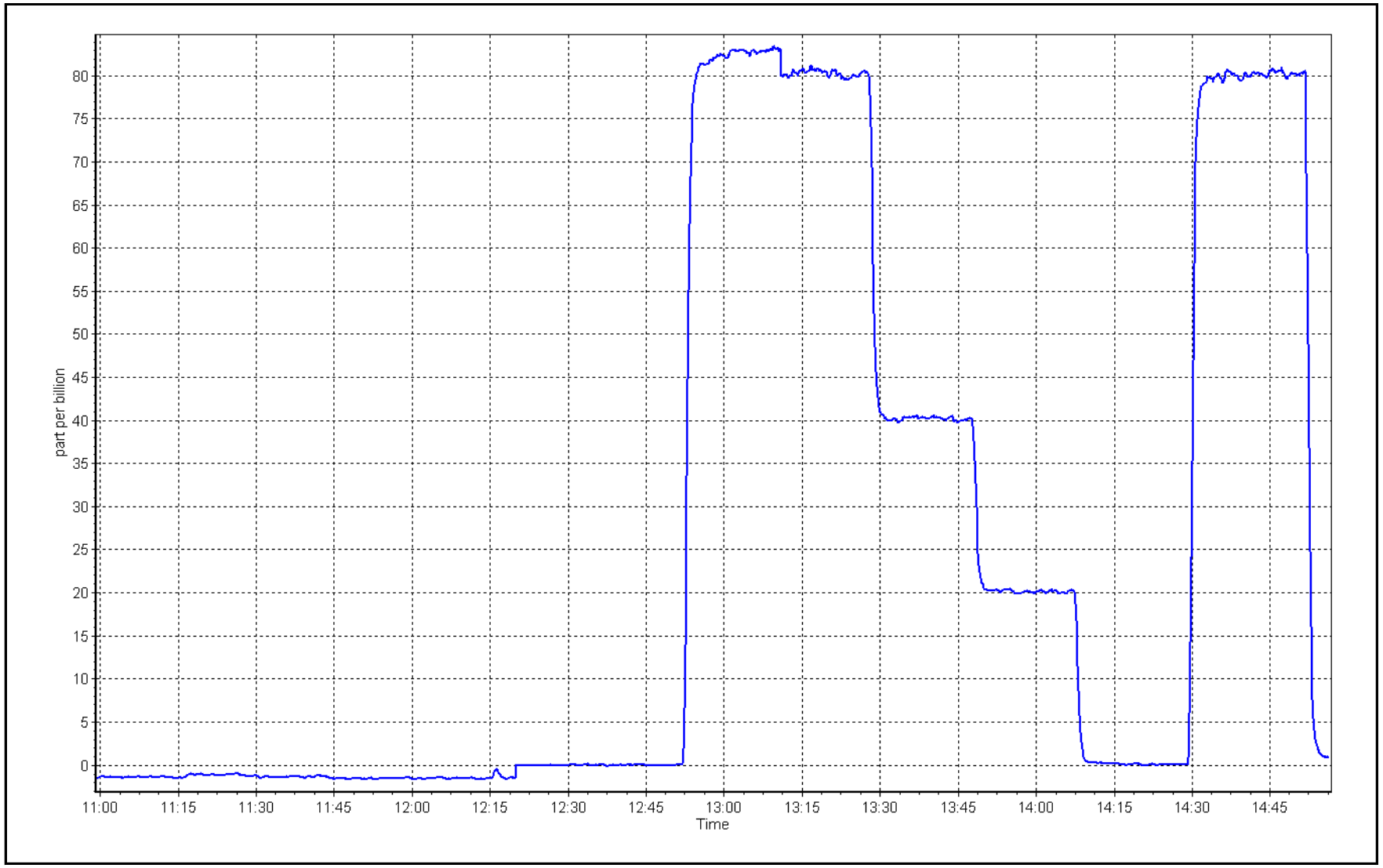
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	79.9	1.0010
40.0	40.1	0.9973
20.0	20.1	0.9974

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.998910	*0.90 - 1.10*
Intercept	0.058437	*+/-3*



H_2S Calibration Plot Date: January 18, 2023 Location: Firebag



Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	January 26, 2023	Last Cal Date:	December 21, 2022
Start time (MST):	11:22	End time (MST):	15:36
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:	API T700		Serial Number:	1607	
ZAG Make/Model:	API T701		Serial Number:	1118	

Analyzer Information

Analyzer make: Thermo 51i-LT
Analyzer serial #: 1336160089
Analyzer Range: 0 - 20 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998886	1.001270	Background:	2.24	2.25
Calibration intercept:	-0.003747	-0.051562	Coefficient:	3.754	3.774

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.00	-0.06	----
as found span	4919	81.1	17.31	17.18	1.007
as found 2nd point	4959	40.6	8.66	8.49	1.021
as found 3rd point	4980	20.3	4.33	4.14	1.048
new cylinder response					
calibrator zero	4999	0.0	0.00	-0.03	----
high point	4919	81.1	17.31	17.29	1.001
second point	4959	40.6	8.66	8.60	1.007
third point	4980	20.3	4.33	4.28	1.013
as left zero	5000	0.0	0.00	-0.06	----
as left span	4919	81.1	17.31	17.31	1.000
				Average Correction Factor	1.007

Baseline Corr As found:	17.24	Previous response	17.28	*% change	-0.2%
Baseline Corr 2nd AF pt:	8.55	AF Slope:	0.998210	AF Intercept:	-0.126132
Baseline Corr 3rd AF pt:	4.20	AF Correlation:	0.999939		

* = > +/-5% change initiates investigation

Notes: Adjusted span. Changed zero/span valve after MPAF's. Changed sample inlet filter after as founds.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

Version-01-2020

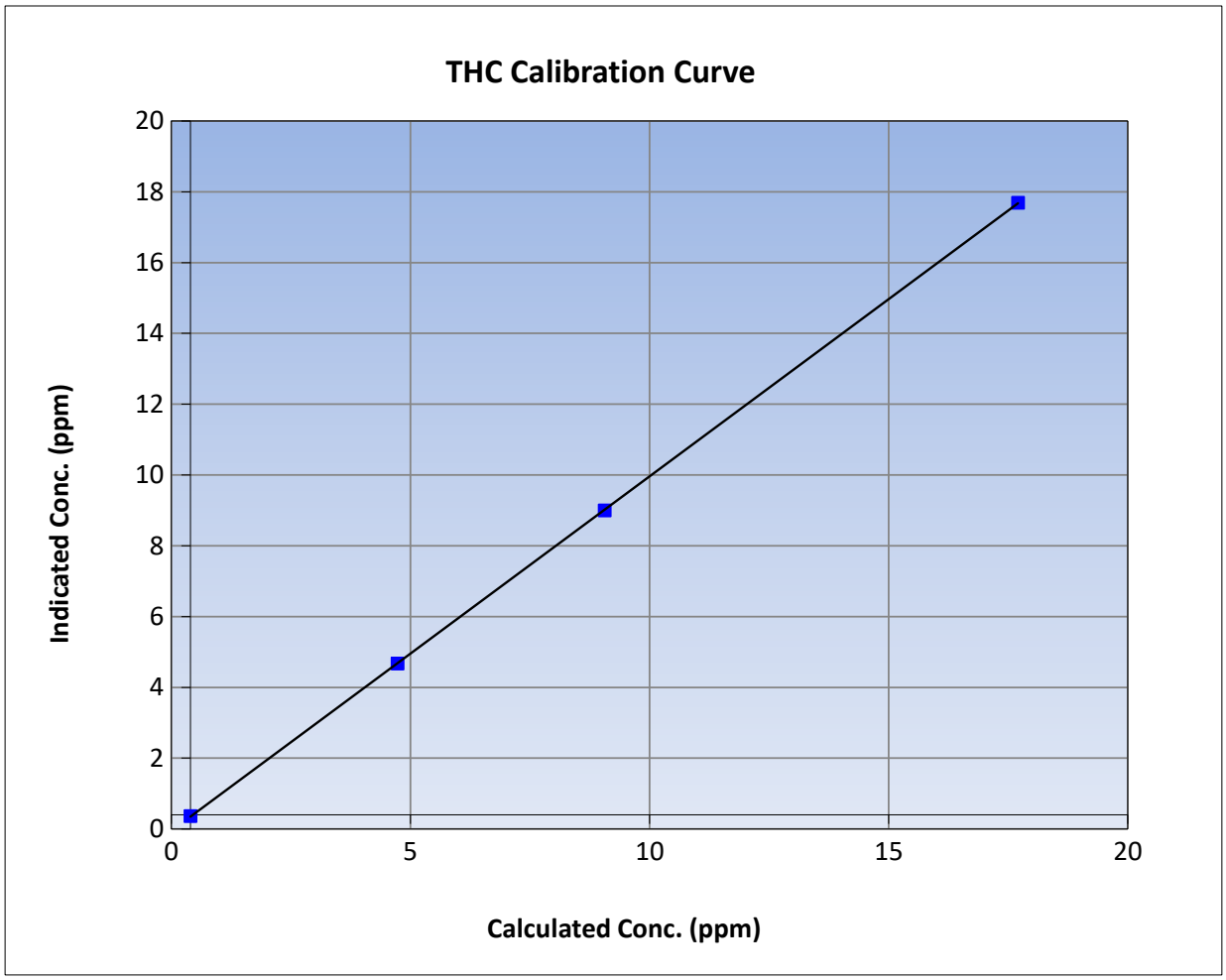
Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	December 21, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:22	End Time (MST):	15:36
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

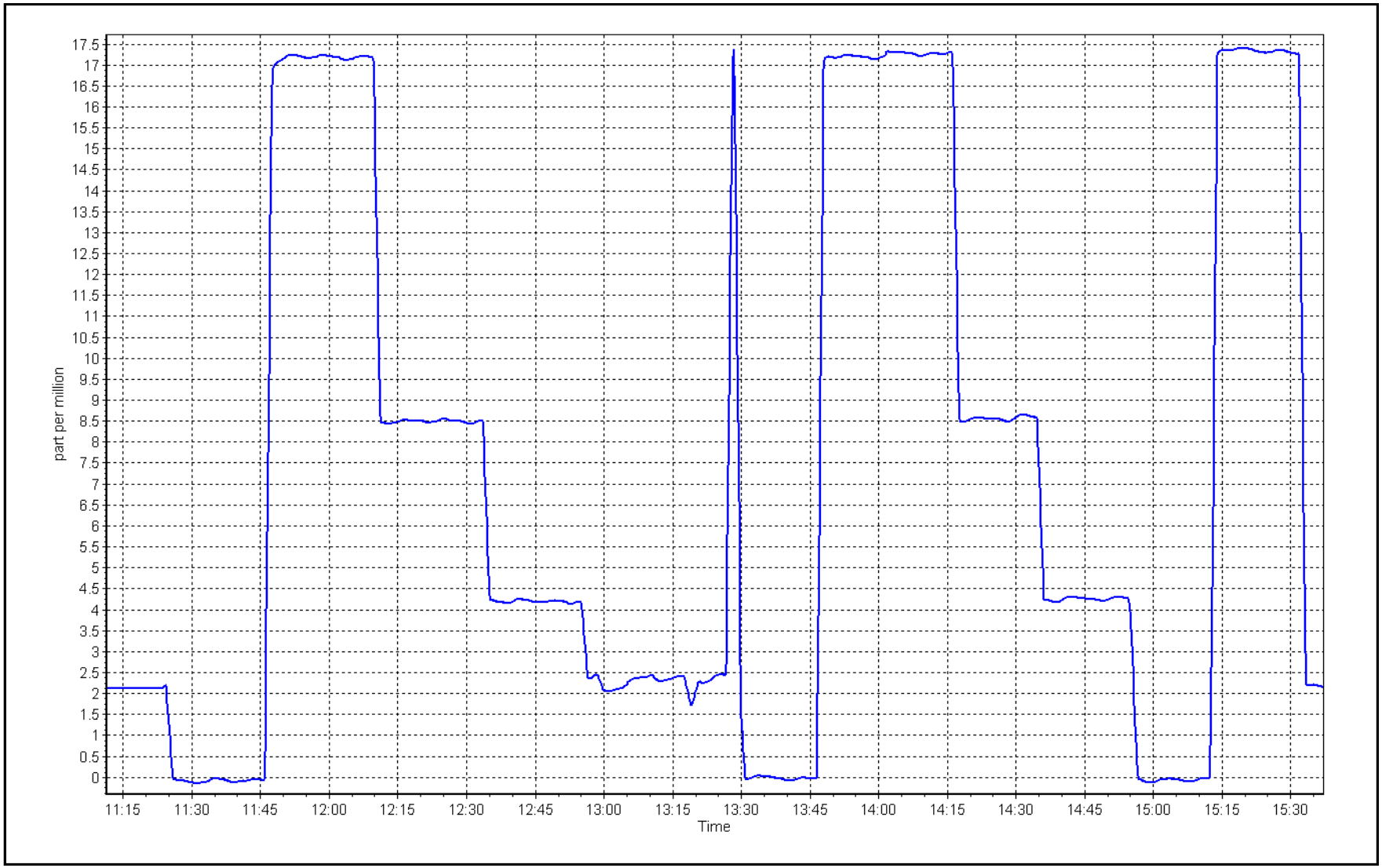
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.03	----
17.31	17.29	1.0009
8.66	8.60	1.0075
4.33	4.28	1.0132

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.001270	*0.90 - 1.10*
Intercept	-0.051562	*+/-1.5*



THC Calibration Plot Date: January 26, 2023 Location: Firebag



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	January 19, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	10:45	End time (MST):	15:05
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1K63		Cal Gas Expiry Date:	November 30, 2023	
NOX Cal Gas Conc:	51.12	ppm	NO Cal Gas Conc:	49.40	ppm
Removed Cylinder #:	n/a		Removed Gas Exp Date:	n/a	
Removed Gas NOX Conc:	51.12	ppm	Removed Gas NO Conc:	49.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	1607	
ZAG make/model:	Teledyne API T701		Serial Number:	1118	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1410661309	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.041	1.041	NO bkgnd or offset:	7.2	7.2
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	7.3	7.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	209.4	207.8

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.997409	0.990896
NO_X Cal Offset:	0.215620	0.574492
NO Cal Slope:	0.999812	0.991188
NO Cal Offset:	-0.371292	0.047030
NO_2 Cal Slope:	0.999908	1.003489
NO_2 Cal Offset:	-0.728179	-1.311603

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	4999	0.0	0.0	0.0	0.0	0.0	-0.2	0.2	----	----
as found span	4919	81.0	828.1	800.3	27.9	824.0	791.2	32.5	1.0050	1.0115
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	4919	81.0	828.1	800.3	27.9	821.0	793.2	27.8	1.0087	1.0089
second point	4960	40.5	414.0	400.1	13.9	410.8	396.7	14.1	1.0079	1.0086
third point	4980	20.2	206.5	199.6	6.9	206.0	198.0	8.0	1.0025	1.0079
as left zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as left span	4919	81.0	828.1	363.9	464.3	815.0	350.6	464.5	1.0161	1.0379
								Average Correction Factor	1.0064	1.0085

Corrected As found	NO_X = 824.0 ppb	NO = 791.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-0.3%
Previous Response	NO_X = 826.2 ppb	NO = 799.8 ppb		*Percent Change	NO =	-1.1%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	788.8	352.4	464.3	465.1	0.9982	100.2%
2nd GPT point (200 ppb O3)	788.8	571.1	245.6	245.3	1.0011	99.9%
3rd GPT point (100 ppb O3)	788.8	679.6	137.1	134.1	1.0221	97.8%
				Average Correction Factor	1.0071	99.3%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

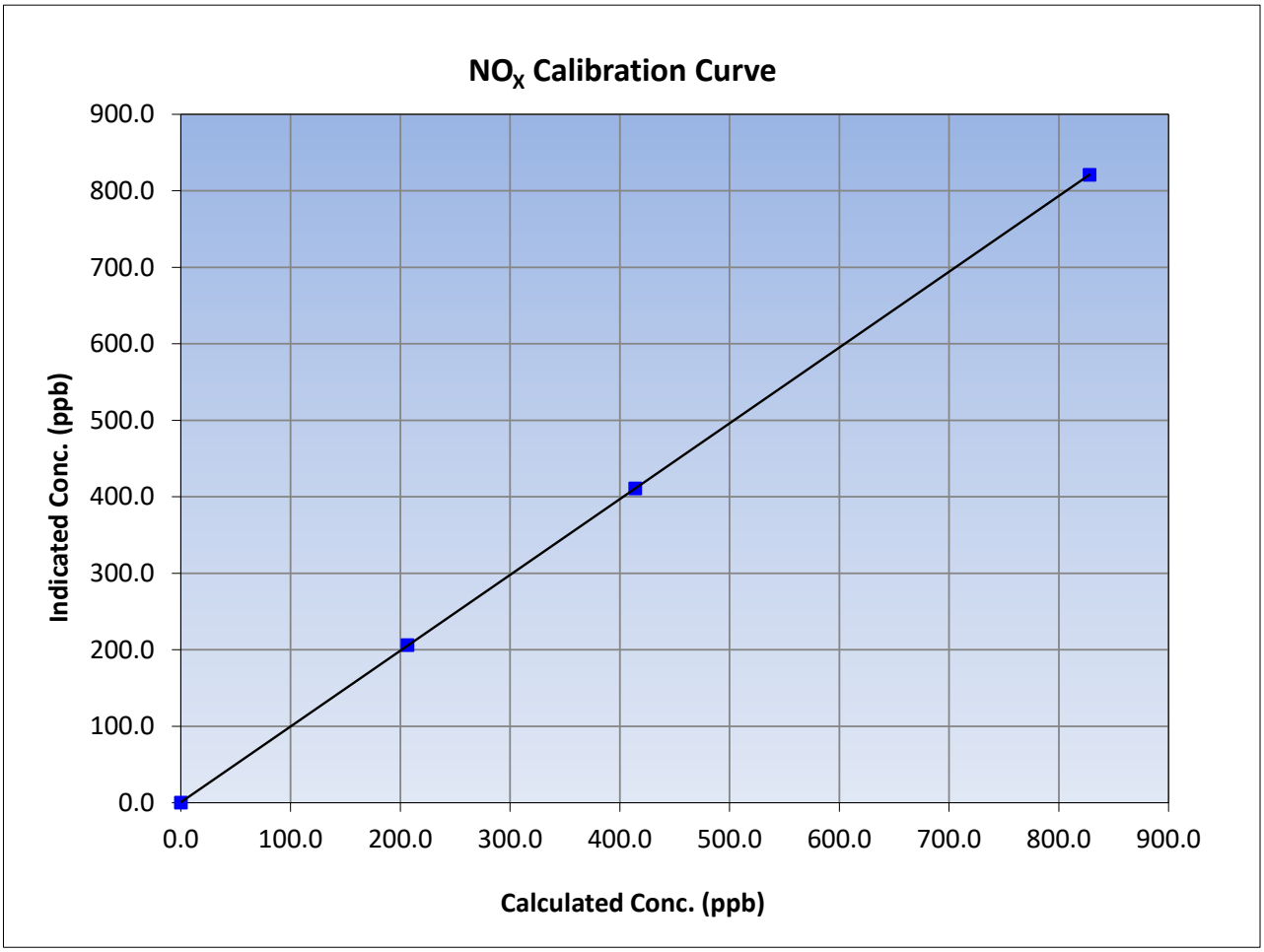
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 1, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:45	End Time (MST):	15:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999997	*≥0.995*
828.1	821.0	1.0087			
414.0	410.8	1.0079	Slope	0.990896	*0.90 - 1.10*
206.5	206.0	1.0025			
			Intercept	0.574492	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

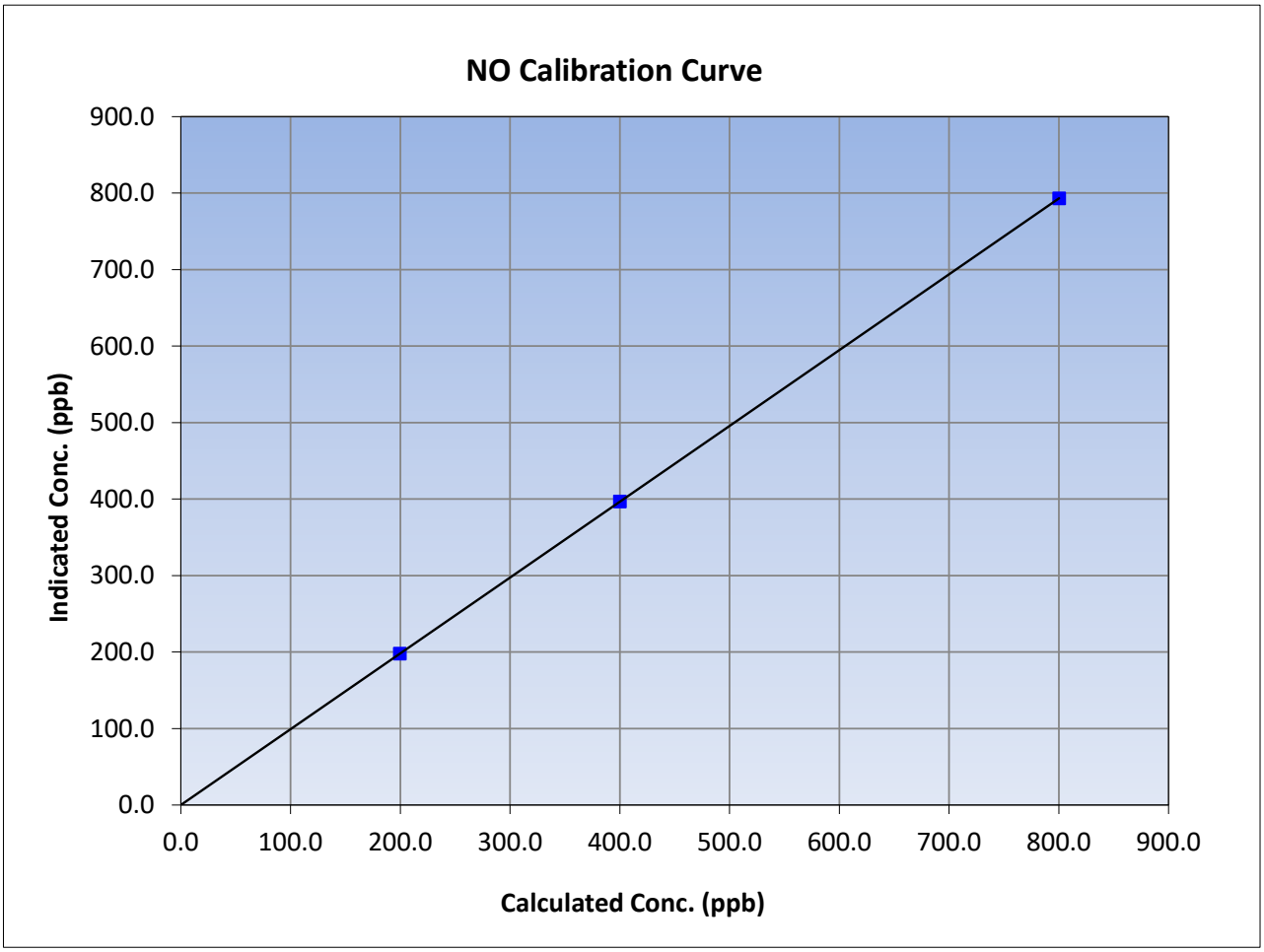
Version-04-2020

Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 1, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:45	End Time (MST):	15:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	1.000000	≥0.995
800.3	793.2	1.0089			
400.1	396.7	1.0086	Slope	0.991188	0.90 - 1.10
199.6	198.0	1.0079			
			Intercept	0.047030	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

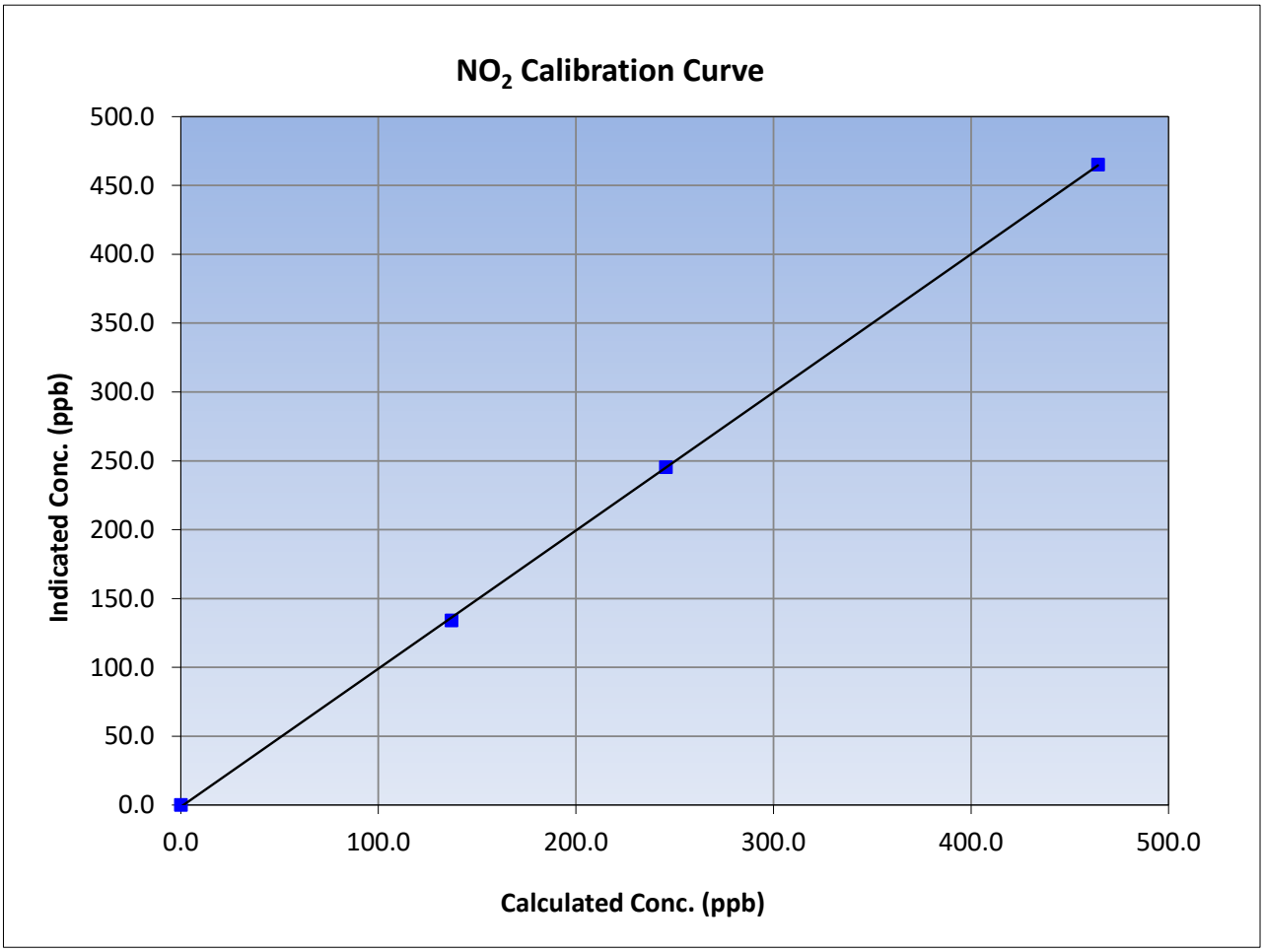
Version-04-2020

Station Information

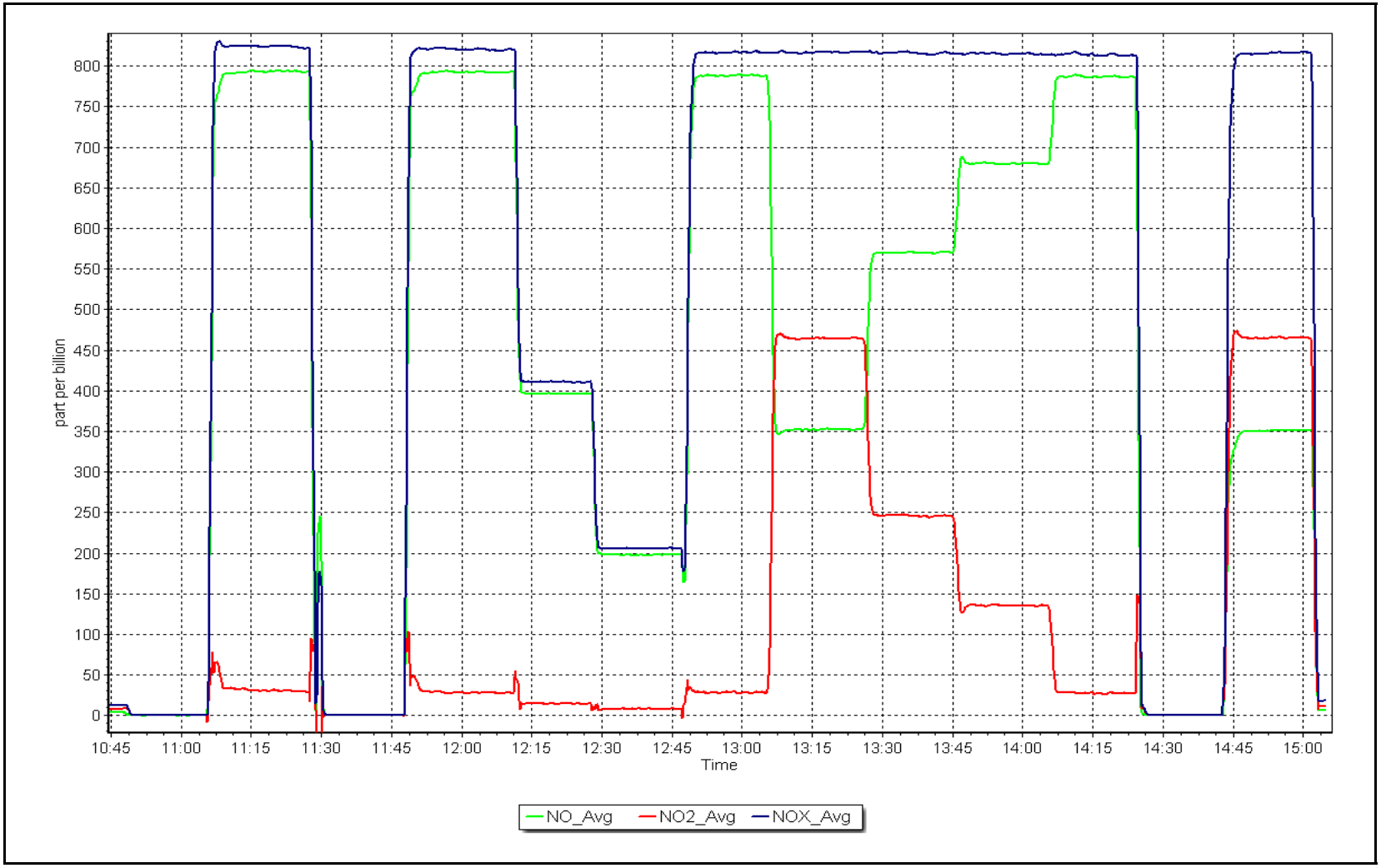
Calibration Date:	January 19, 2023	Previous Calibration:	December 1, 2022
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:45	End Time (MST):	15:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999941	≥0.995
464.3	465.1	0.9982			
245.6	245.3	1.0011	Slope	1.003489	0.90 - 1.10
137.1	134.1	1.0221			
			Intercept	-1.311603	+/-20



NO_X Calibration Plot Date: January 19, 2023 Location: Firebag



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20
MACKAY RIVER
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	MacKay River	Station number:	AMS20
Calibration Date:	January 17, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:55	End time (MST):	14:15
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.22 ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC306868		
Removed Cal Gas Conc:	49.22 ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA	Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700	Serial Number:	1220
ZAG Make/Model:	Teledyne API 701	Serial Number:	4522

Analyzer Information

Analyzer make: Thermo 43i
Analyzer Range 0 - 1000 ppb
Analyzer serial #: 1501301450

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.988213	0.993569	Backgd or Offset:	18.6	18.6
Calibration intercept:	1.411526	3.910928	Coeff or Slope:	0.959	0.974

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*
as found zero	5000	0.0	0.0	-0.1	----
as found span	4919	81.3	800.3	788.4	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	----
high point	4919	81.3	800.3	797.4	1.004
second point	4959	40.7	400.7	403.1	0.994
third point	4980	20.3	199.8	206.8	0.966
as left zero	5000	0.0	0.0	0.1	----
as left span	4919	81.3	800.3	800.5	1.000
				Average Correction Factor	0.988

Baseline Corr As found:	788.50	Previous response	792.25	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

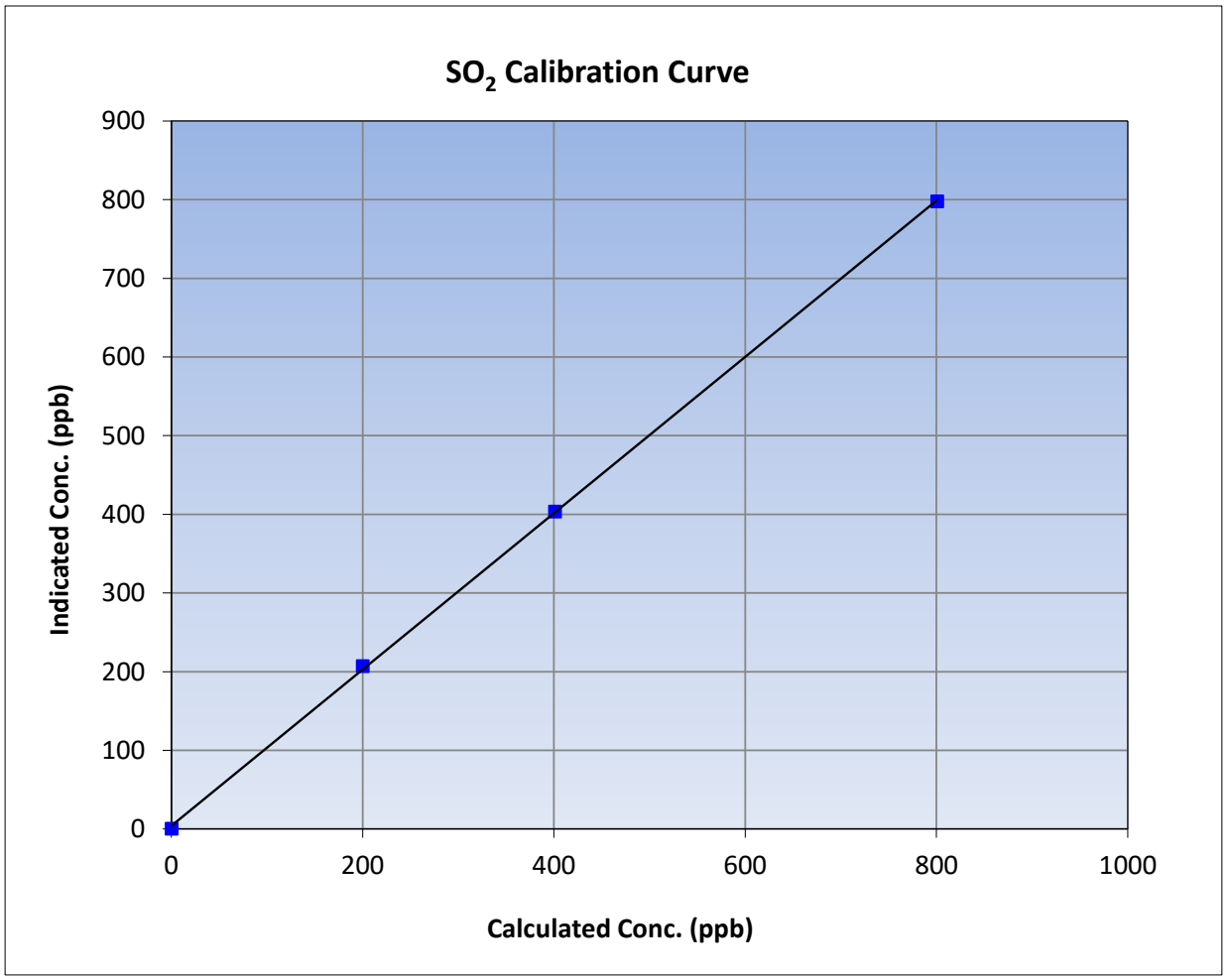
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 2, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	10:55	End Time (MST):	14:15
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

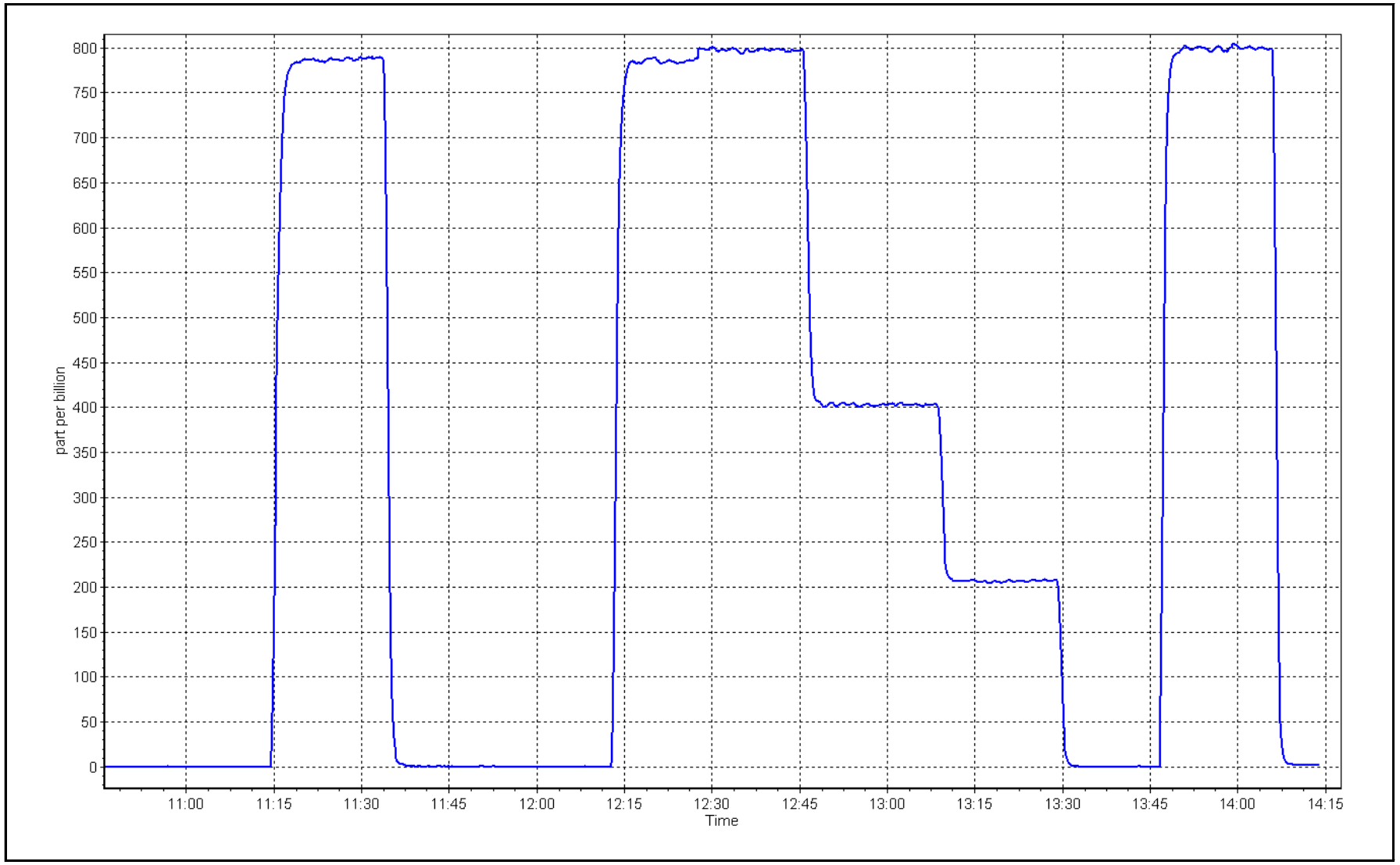
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	797.4	1.0036
400.7	403.1	0.9940
199.8	206.8	0.9663

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999892	*≥0.995*
Slope	0.993569	*0.90 - 1.10*
Intercept	3.910928	*+/-30*



SO2 Calibration Plot Date: January 17, 2023 Location: MacKay River



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	MacKay River	Station number:	AMS20
Calibration Date:	January 23, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	11:31	End time (MST):	15:44
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.87	ppm	Cal Gas Exp Date:	May 5, 2023
Cal Gas Cylinder #:	EY0001922			
Removed Cal Gas Conc:	4.87	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1220
ZAG Make/Model:	Teledyne API 701		Serial Number:	4522

Analyzer Information

Analyzer make:	Teledyne API T101		Analyzer serial #:	196	
Converter make:	Internal		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004863	0.999429	Backgd or Offset:	46.3	46.3
Calibration intercept:	-0.061013	0.379115	Coeff or Slope:	1.035	0.981

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 span	4918	82.1	80.0	84.9	0.942
as found 2nd point	4959	41.1	40.0	43.0	0.931
as found 3rd point	4979	20.5	20.0	22.0	0.908
new cylinder response					

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	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.4	0.991
third point	4979	20.5	20.0	20.7	0.965
as left zero	5000	0.0	0.0	0.2	----
as left span	4918	82.1	80.0	79.9	1.001
SO2 Scrubber Check	4919	80.0	800.2	0.0	----
Date of last scrubber change:		December 15, 2020		Ave Corr Factor	0.984
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	84.9	Prev response:	80.29	*% change:	5.4%
Baseline Corr 2nd AF pt:	43.0	AF Slope:	1.059020	AF Intercept:	0.418989
Baseline Corr 3rd AF pt:	22.0	AF Correlation:	0.999888		

* = > +/-5% change initiates investigation

Notes: Changed inlet filter after multi point as founds. Scrubber test after calibrator zero.Adjusted span only.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

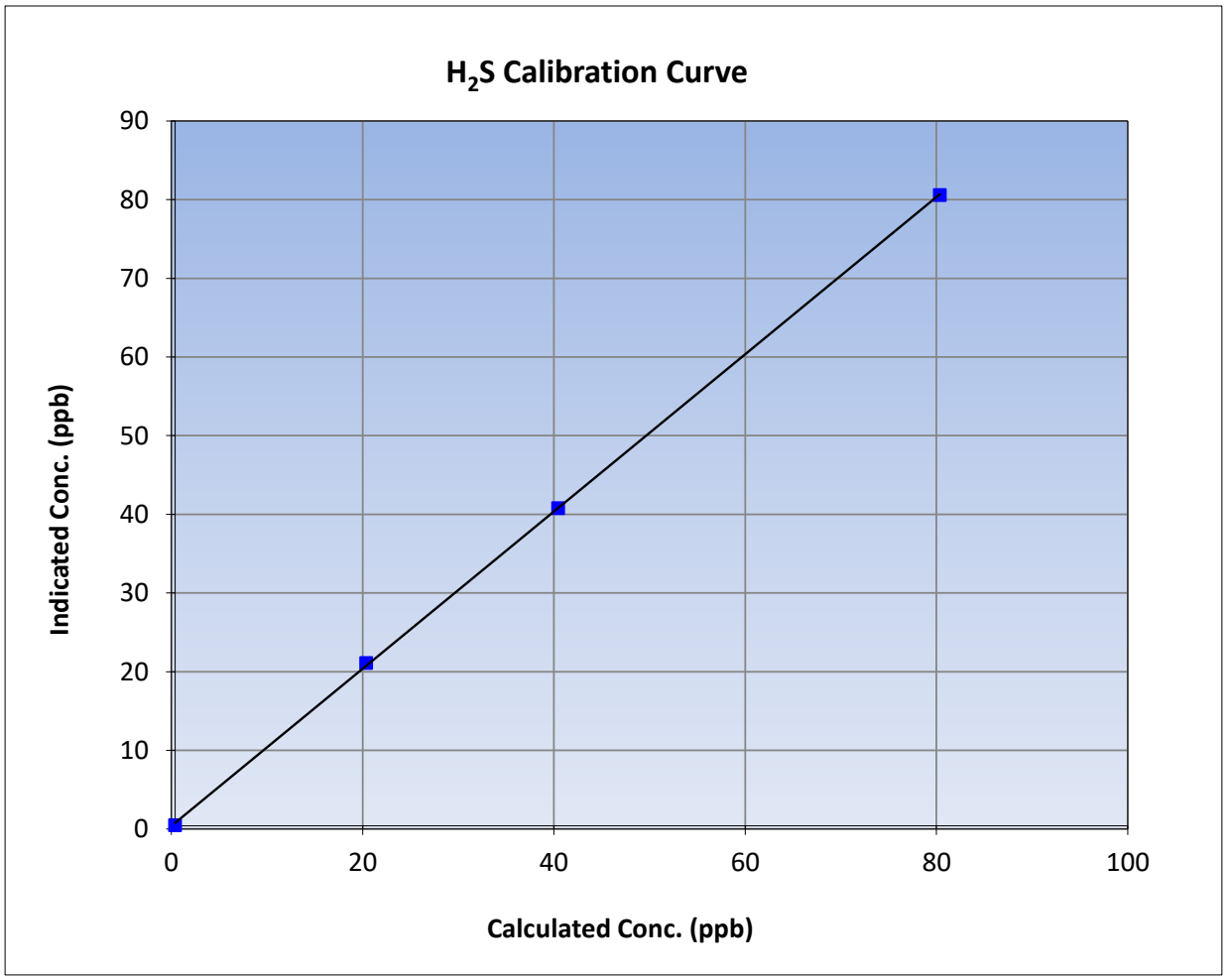
Station Information

Calibration Date:	January 23, 2023	Previous Calibration:	December 6, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	11:31	End Time (MST):	15:44
Analyzer make:	Teledyne API T101	Analyzer serial #:	196

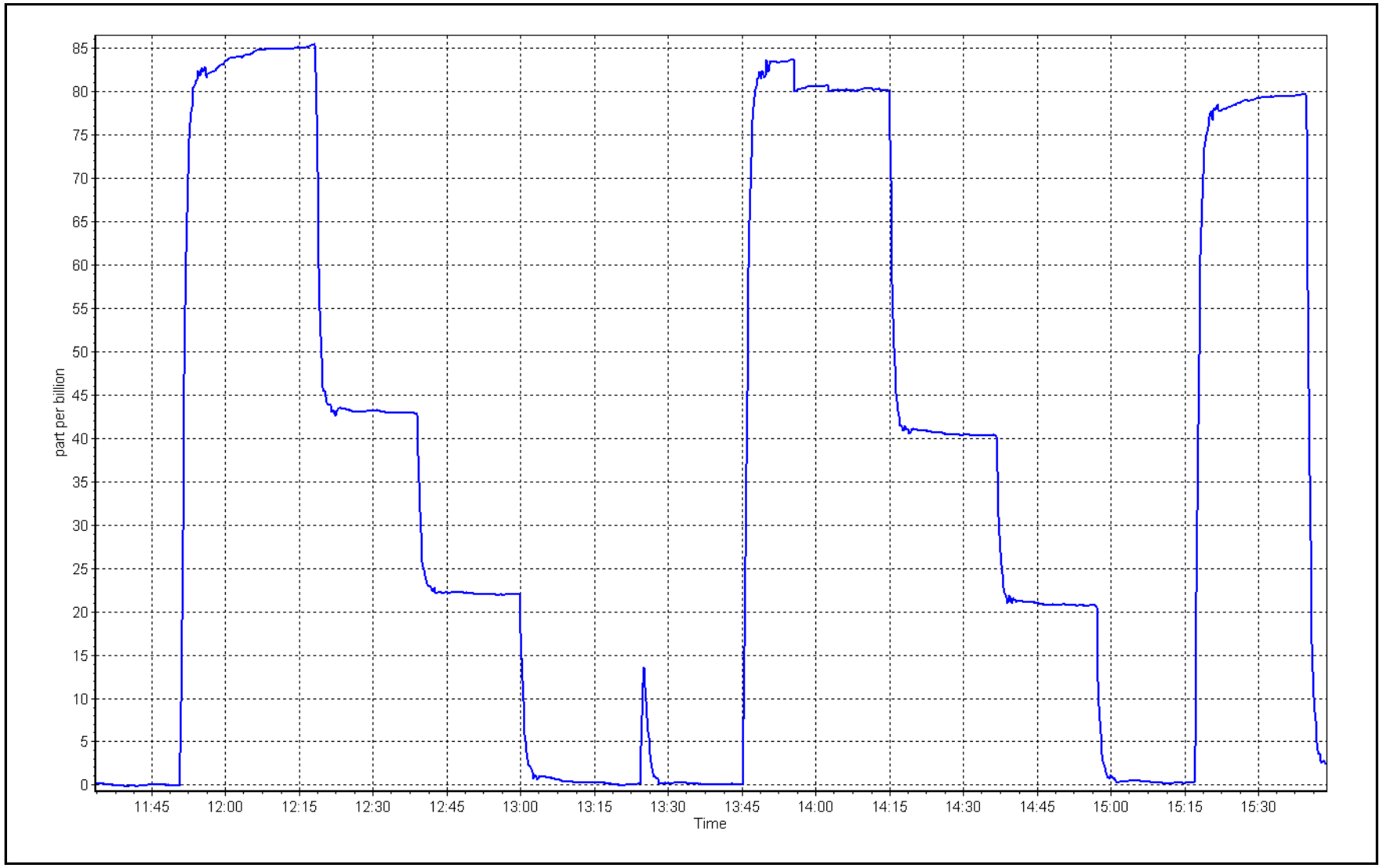
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	80.2	0.9971
40.0	40.4	0.9909
20.0	20.7	0.9647

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999937	*≥0.995*
Slope	0.999429	*0.90 - 1.10*
Intercept	0.379115	*+/-3*



H_2S Calibration Plot Date: January 23, 2023 Location: MacKay River



Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name:	MacKay River	Station number:	AMS20
Calibration Date:	January 17, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:55	End time (MST):	14:15
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC306868		Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	499.40	ppm	CH4 Equiv Conc.	1066.45	ppm
C3H8 Cal Gas Conc.	206.20	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	499.40	ppm	CH4 Equiv Conc.	1066.45	ppm
Removed C3H8 Conc.	206.20	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1220	
ZAG Make/Model:	Teledyne API 701		Serial Number:	4522	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1501663727	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.975440	0.986110	Background:	3.160	3.180
Calibration intercept:	0.264006	0.143798	Coefficient:	5.316	5.471

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.00	0.05	----
as found span	4919	81.3	17.34	17.15	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.06	----
high point	4919	81.3	17.34	17.20	1.008
second point	4959	40.7	8.68	8.74	0.993
third point	4980	20.3	4.33	4.50	0.961
as left zero	5000	0.0	0.00	0.07	----
as left span	4919	81.3	17.34	17.58	0.986
				Average Correction Factor	0.988

Baseline Corr As found:	17.10	Previous response	17.18	*% change	-0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: Sample inlet filter changed after as founds. H2 changed after as founds. Zero and span adjusted

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

THC Calibration Summary

Version-01-2020

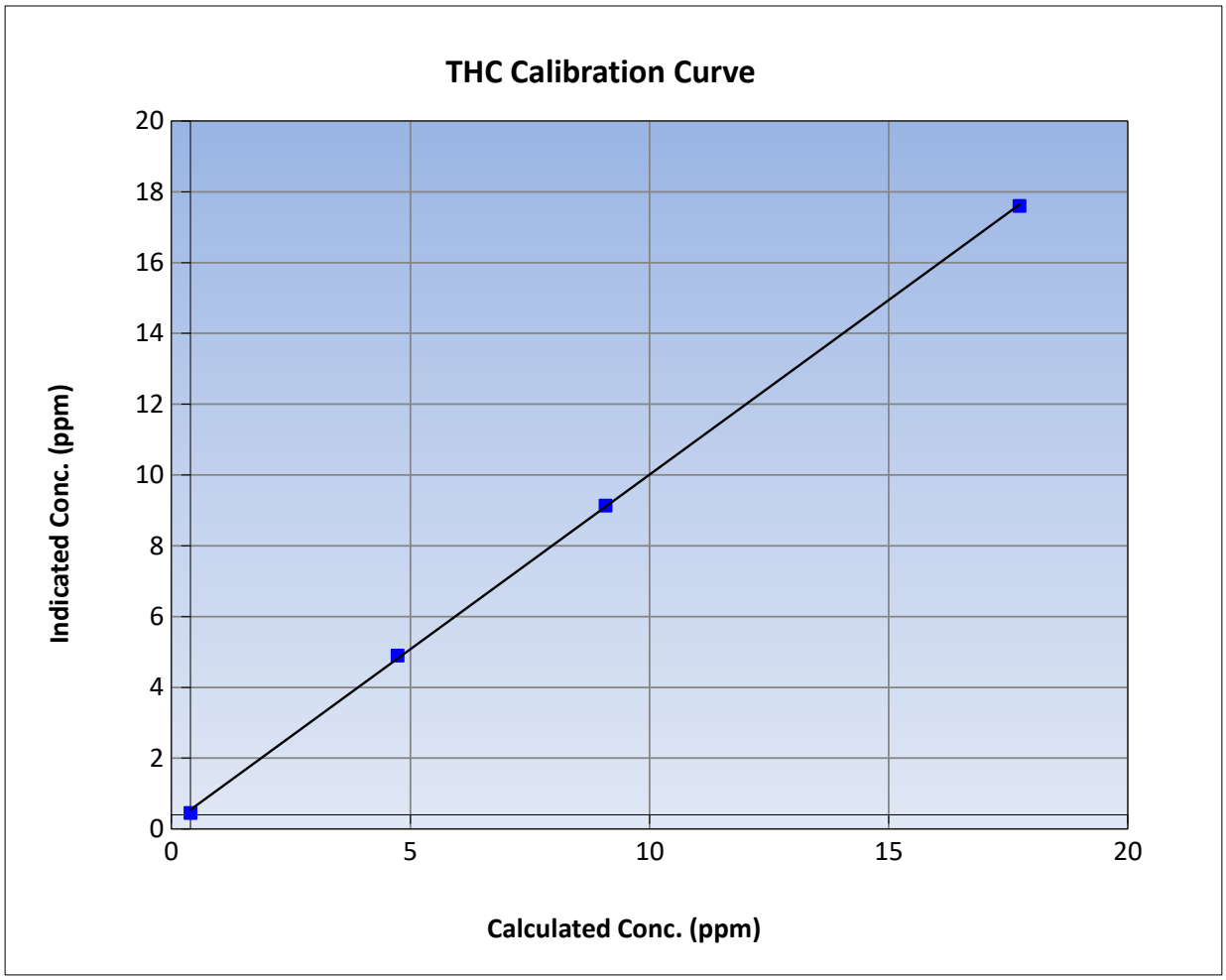
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 2, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	10:55	End Time (MST):	14:15
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

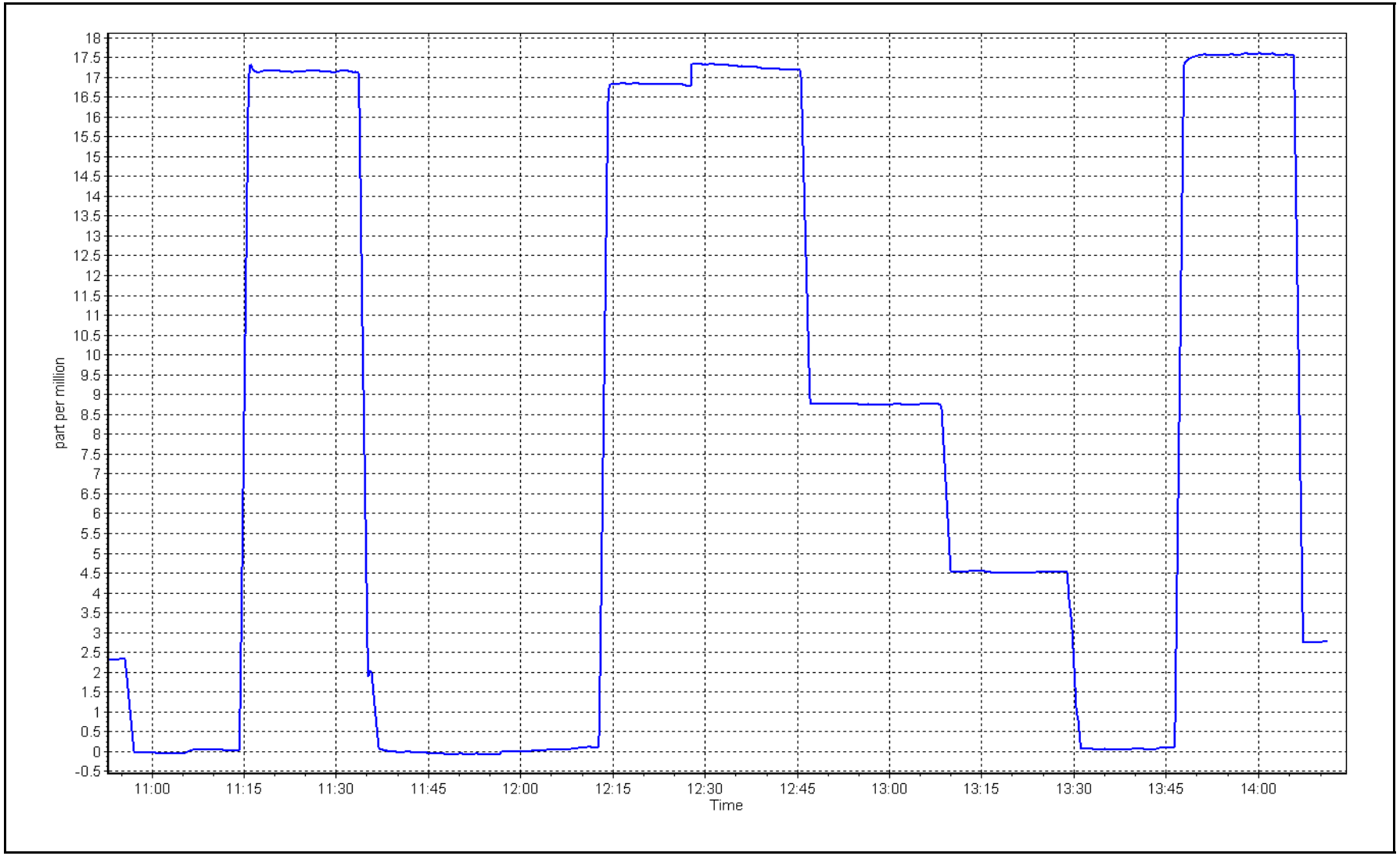
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.06	----
17.34	17.20	1.0080
8.68	8.74	0.9933
4.33	4.50	0.9613

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999884	*≥0.995*
Slope	0.986110	*0.90 - 1.10*
Intercept	0.143798	*+/-1.5*



THC Calibration Plot Date: January 17, 2023 Location: MacKay River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	MacKay River	Station number:	AMS20
Calibration Date:	January 24, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	9:43	End time (MST):	13:48
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 #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	49.19	ppm	Removed Gas NO Conc:	48.04	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	1220	
ZAG make/model:	Teledyne API 701		Serial Number:	4766	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1505164379	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.379	1.409	NO bkgnd or offset:	3.8	3.9
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	3.8	3.9
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	172.3	175.0

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.995546	0.996925
NO_X Cal Offset:	1.090368	2.570800
NO Cal Slope:	0.995349	0.998231
NO Cal Offset:	-0.168545	1.372065
NO_2 Cal Slope:	1.008585	1.007507
NO_2 Cal Offset:	-0.287241	-1.673176

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
as found span	4917	83.3	819.5	800.3	19.2	815.9	789.1	26.8	1.0044	1.0142
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	4917	83.3	819.5	800.3	19.2	819.0	800.3	18.6	1.0006	1.0000
second point	4956	41.7	410.4	400.8	9.6	410.8	400.0	10.8	0.9991	1.0021
third point	4979	20.8	204.6	199.9	4.8	210.5	203.7	6.8	0.9722	0.9811
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	4917	83.3	819.5	466.6	352.9	814.1	453.9	360.1	1.0066	1.0280
								Average Correction Factor	0.9906	0.9944

Corrected As found NO_X = 816.0 ppb NO = 789.2 ppb

Previous Response NO_X = 816.9 ppb NO = 796.4 ppb

Baseline Corr 2nd pt NO_X = NA ppb NO = NA ppb

Baseline Corr 3rd pt NO_X = NA ppb NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.1%

*Percent Change NO = -0.9%

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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	785.7	452.0	352.9	355.4	0.9928	100.7%
2nd GPT point (200 ppb O3)	785.7	611.5	193.4	190.9	1.0129	98.7%
3rd GPT point (100 ppb O3)	785.7	695.8	109.1	107.1	1.0183	98.2%
				Average Correction Factor	1.0080	99.2%

Notes: Adjusted the span only.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

NO_X Calibration Summary

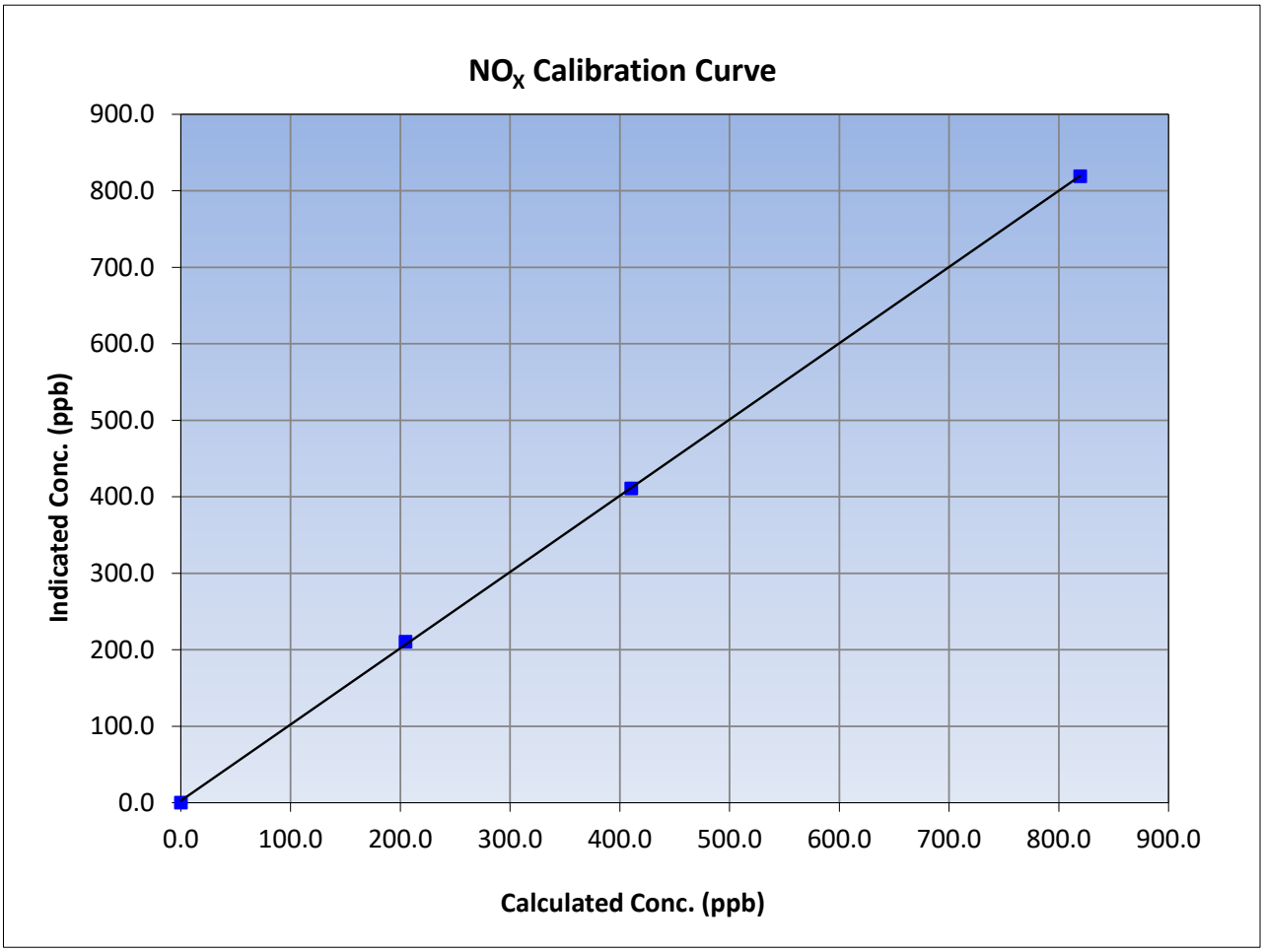
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 8, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	9:43	End Time (MST):	13:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999938	≥0.995
819.5	819.0	1.0006			
410.4	410.8	0.9991	Slope	0.996925	0.90 - 1.10
204.6	210.5	0.9722			
			Intercept	2.570800	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

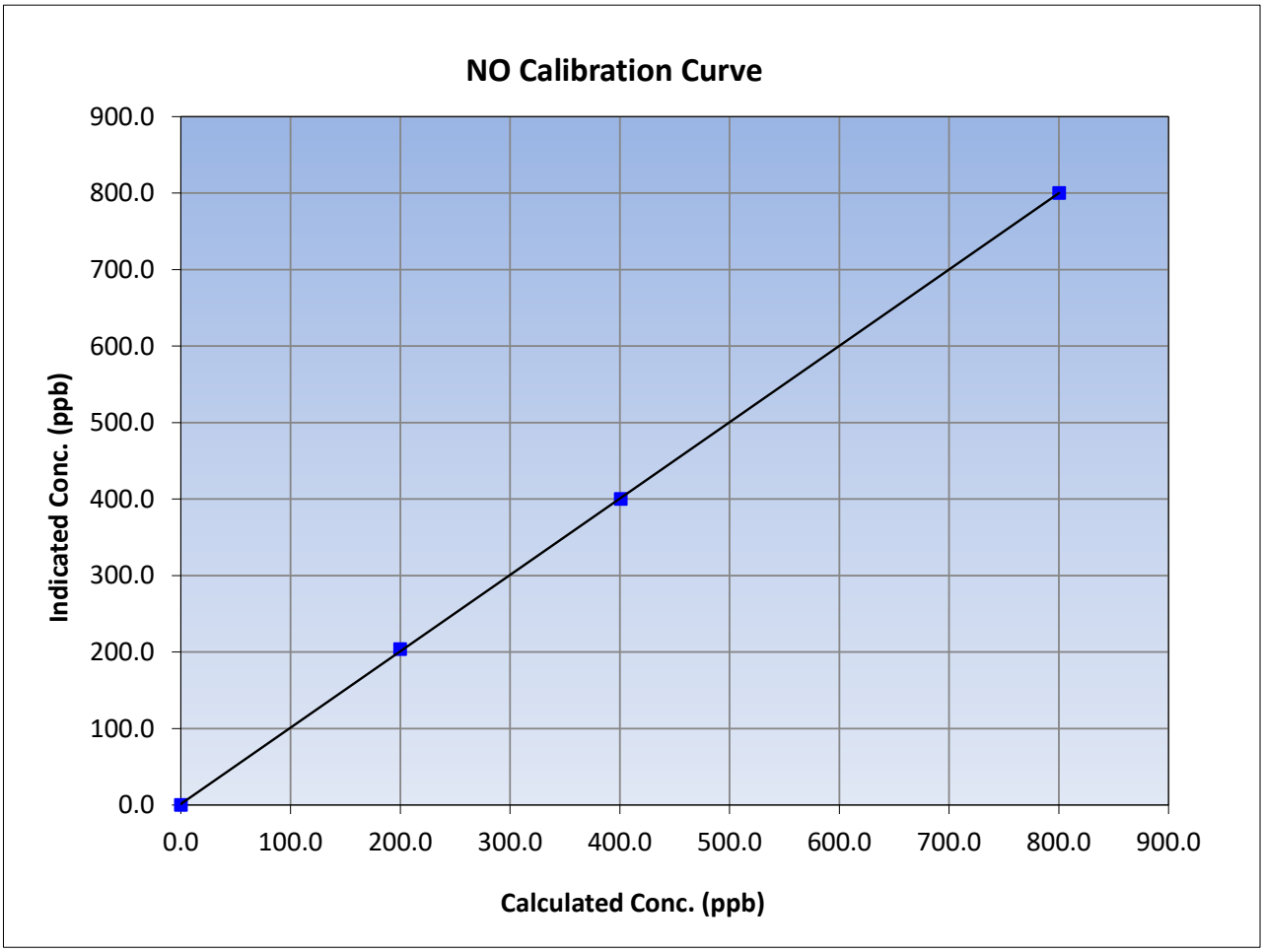
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 8, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	9:43	End Time (MST):	13:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999965	*≥0.995*
800.3	800.3	1.0000			
400.8	400.0	1.0021	Slope	0.998231	*0.90 - 1.10*
199.9	203.7	0.9811			
			Intercept	1.372065	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

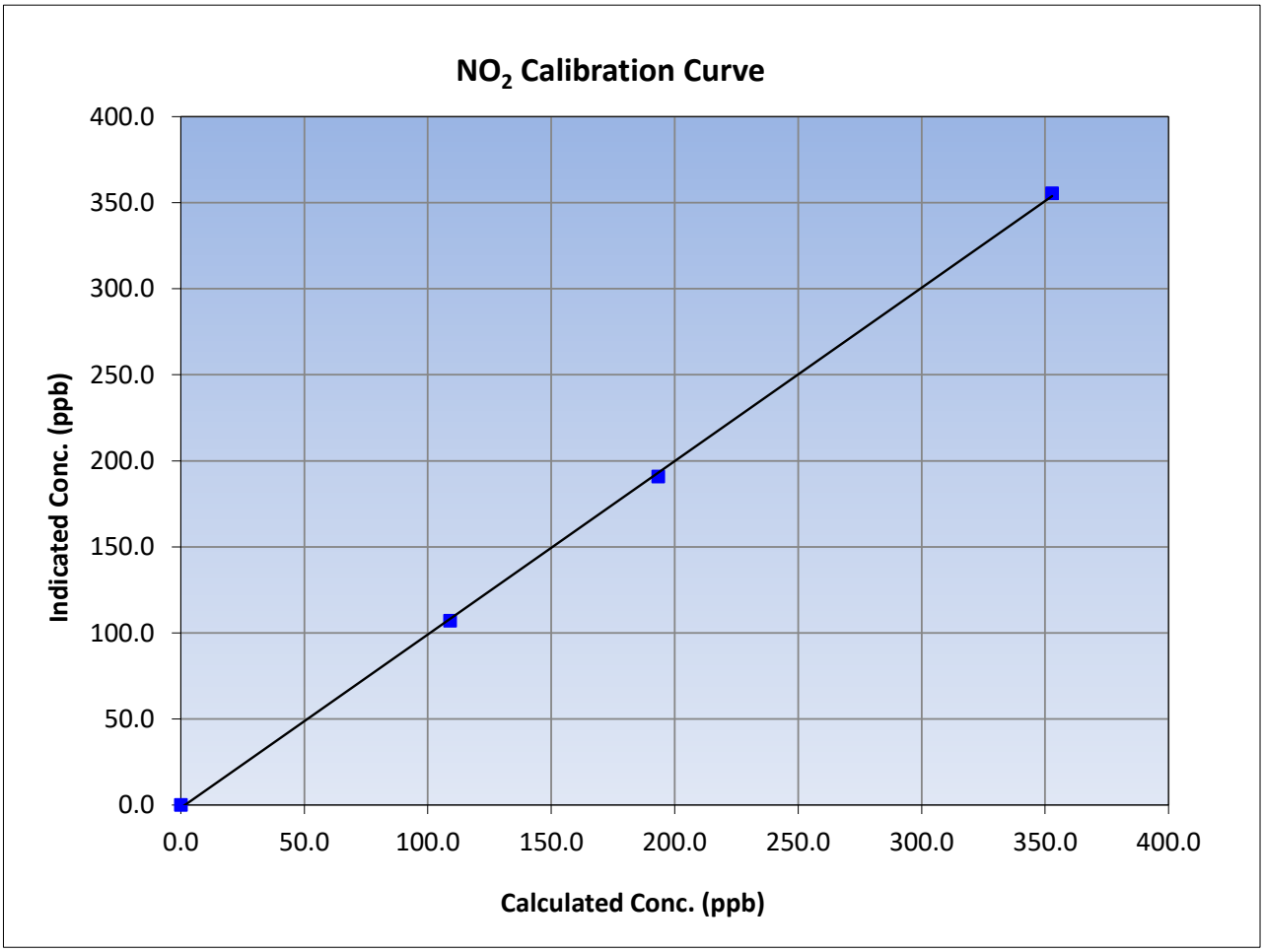
Version-04-2020

Station Information

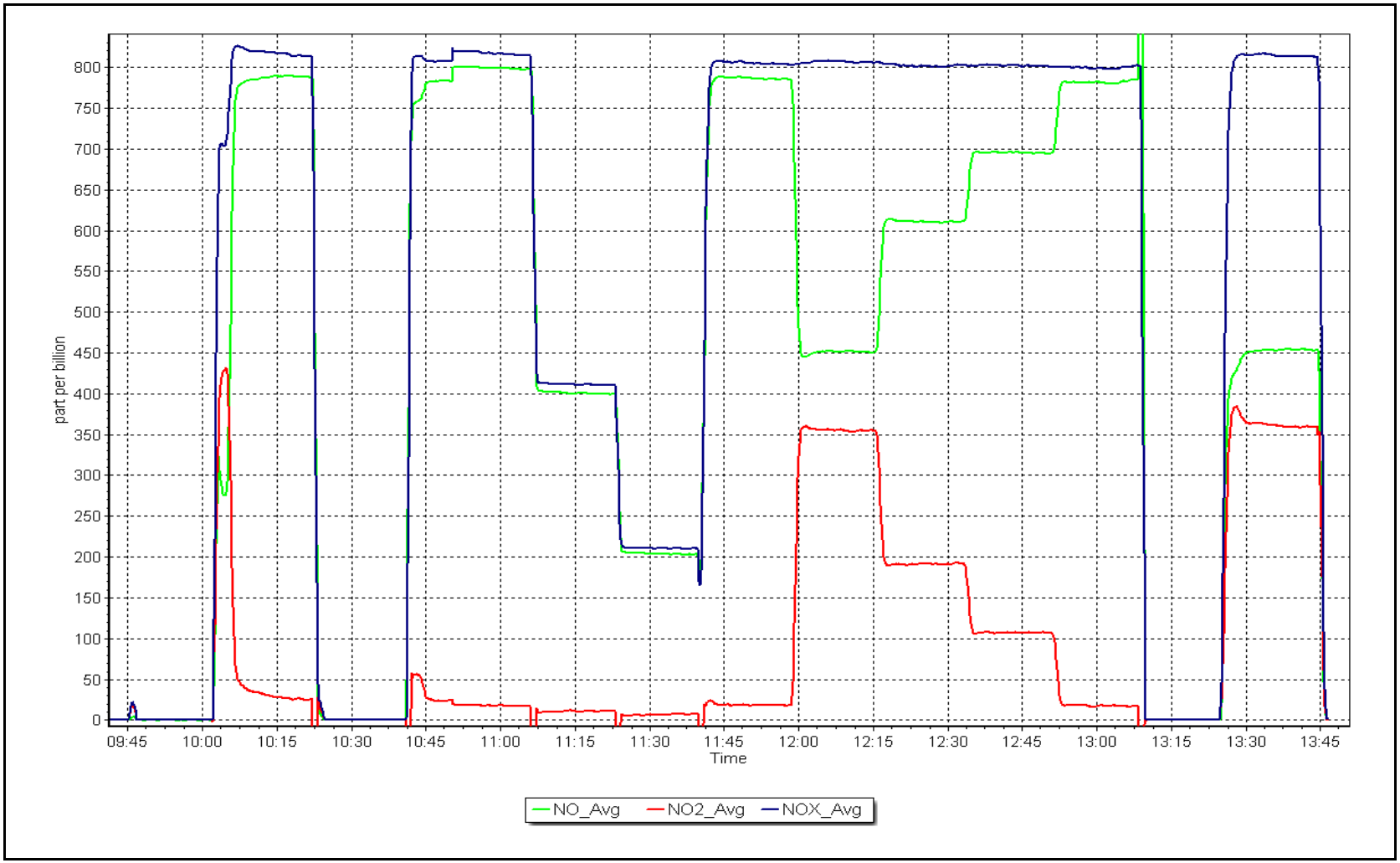
Calibration Date:	January 24, 2023	Previous Calibration:	December 8, 2022
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	9:43	End Time (MST):	13:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999825	≥0.995
352.9	355.4	0.9928			
193.4	190.9	1.0129	Slope	1.007507	0.90 - 1.10
109.1	107.1	1.0183			
			Intercept	-1.673176	+/-20



NO_X Calibration Plot Date: January 24, 2023 Location: MacKay River



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS21
CONKLIN
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 3, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	11:33	End time (MST):	14:50
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.93	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC259455			
Removed Cal Gas Conc:	49.93	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3810
ZAG Make/Model:	Teledyne API 701		Serial Number:	262

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1428701363

Analyzer Range 0 - 1000 ppb

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.997976	1.003298	Backgd or Offset:	27.0	27.9
Calibration intercept:	1.435794	0.595998	Coeff or Slope:	0.914	0.914

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*
as found zero	5005	0.0	0.0	0.5	----
as found span	4920	80.2	800.8	801.0	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5005	0.0	0.0	0.1	----
high point	4920	80.2	800.8	804.1	0.996
second point	4960	40.1	400.4	401.8	0.997
third point	4980	20.0	200.1	202.4	0.989
as left zero	5005	0.0	0.0	0.2	----
as left span	4920	80.2	800.8	802.0	0.999
				Average Correction Factor	0.994

Baseline Corr As found:	800.50	Previous response	800.66	*% 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

Notes: Adjusted the zero only.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

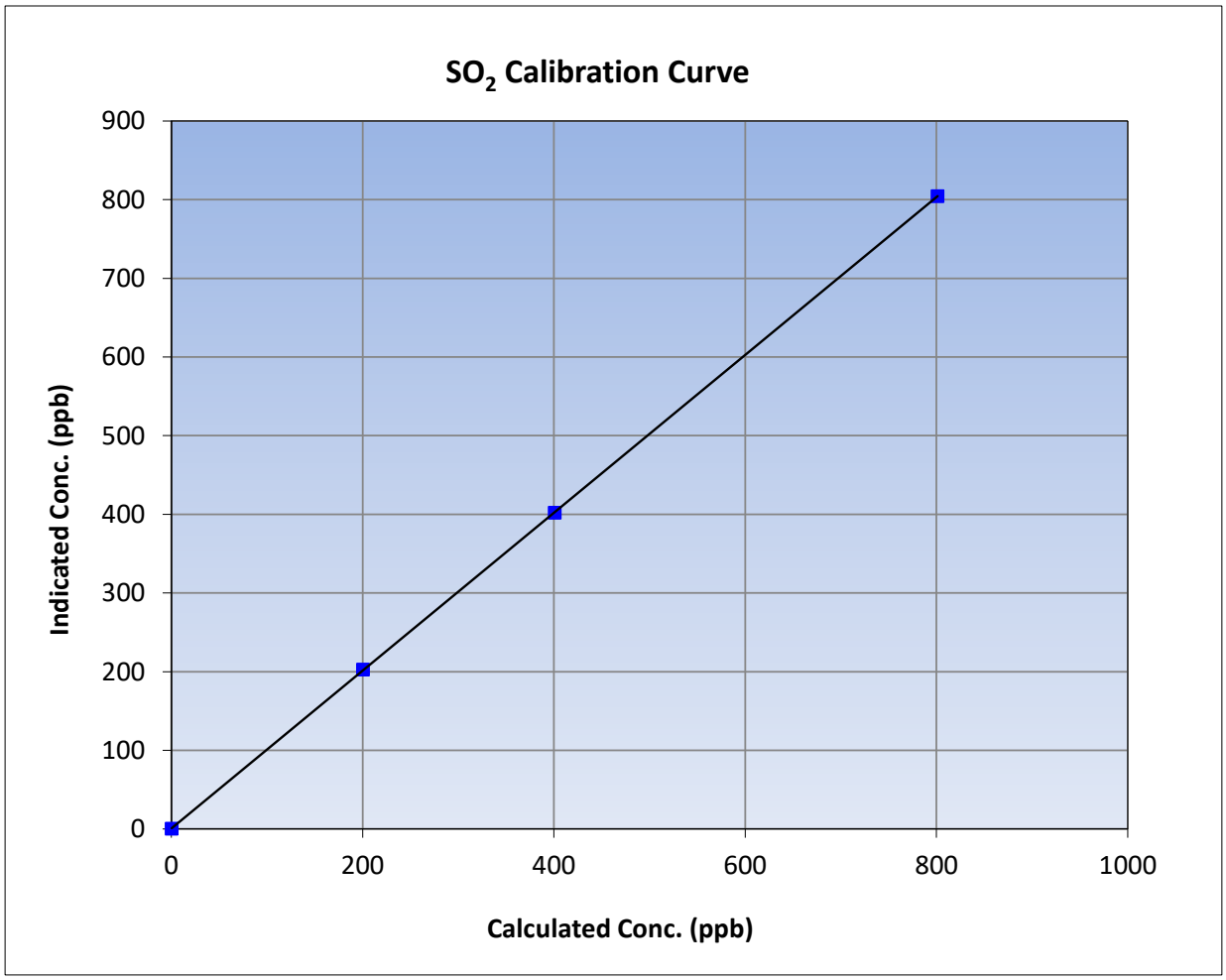
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 13, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	11:33	End Time (MST):	14:50
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363

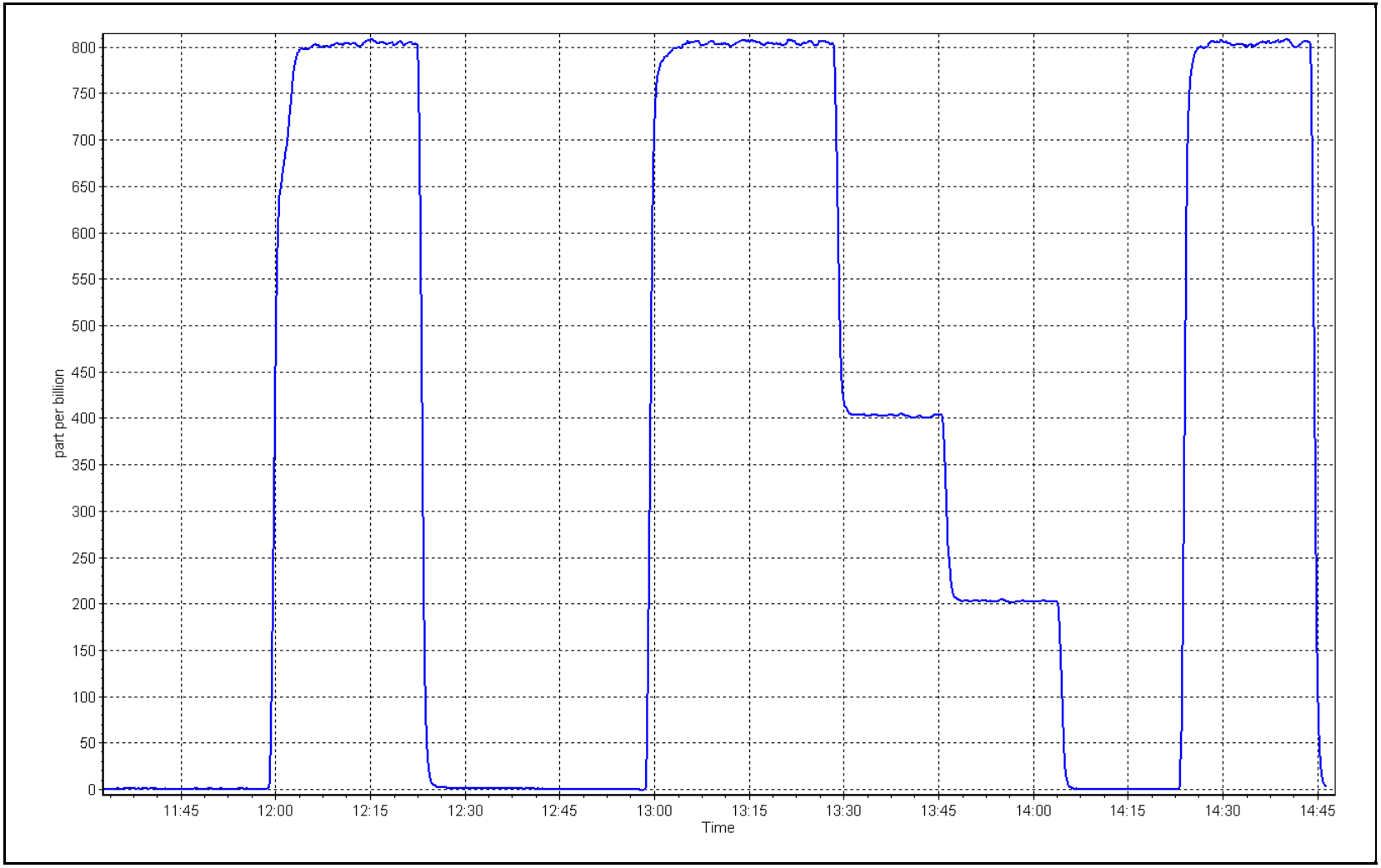
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.8	804.1	0.9960
400.4	401.8	0.9966
200.1	202.4	0.9887

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.003298	*0.90 - 1.10*
Intercept	0.595998	*+/-30*



SO2 Calibration Plot Date: January 3, 2023 Location: Conklin



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 9, 2023	Last Cal Date:	December 22, 2022
Start time (MST):	9:05	End time (MST):	12:51
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.03	ppm	Cal Gas Exp Date:	April 16, 2022
Cal Gas Cylinder #:	CC505493			
Removed Cal Gas Conc:	5.03	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3810
ZAG Make/Model:	API 701		Serial Number:	263

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1236656116	
Converter make:	CD-Nova 101		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999155	1.005143	Backgd or Offset:	3.0	2.8
Calibration intercept:	0.597263	-0.162334	Coeff or Slope:	1.055	0.951

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	-0.4	----
as found span	4921	79.5	80.0	89.1	0.894
as found 2nd point	4960	39.8	40.0	44.6	0.890
as found 3rd point	4980	19.9	20.0	22.3	0.882
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	-0.2	----
high point	4921	79.5	80.0	80.2	0.997
second point	4960	39.8	40.0	40.1	0.999
third point	4980	19.9	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.0	----
as left span	4921	79.5	80.0	79.4	1.007
SO2 Scrubber Check	4920	80.2	802.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.999
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	89.5	Prev response:	80.50	*% change:	10.1%
Baseline Corr 2nd AF pt:	45.0	AF Slope:	1.118193	AF Intercept:	-0.244908
Baseline Corr 3rd AF pt:	22.7	AF Correlation:	0.999986		

* = > +/-5% change initiates investigation

Notes: Adjusted both zero and span.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

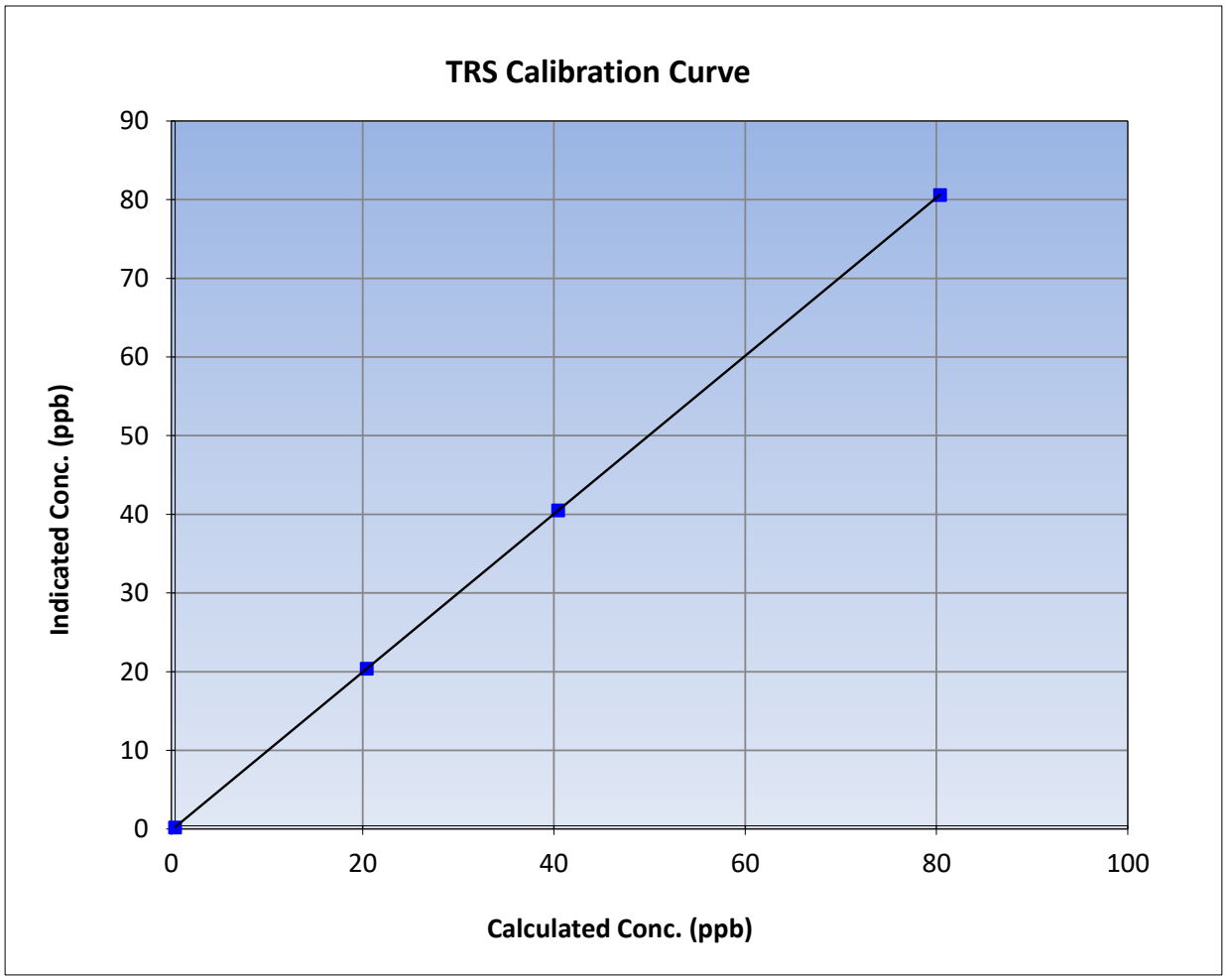
Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 22, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:05	End Time (MST):	12:51
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116

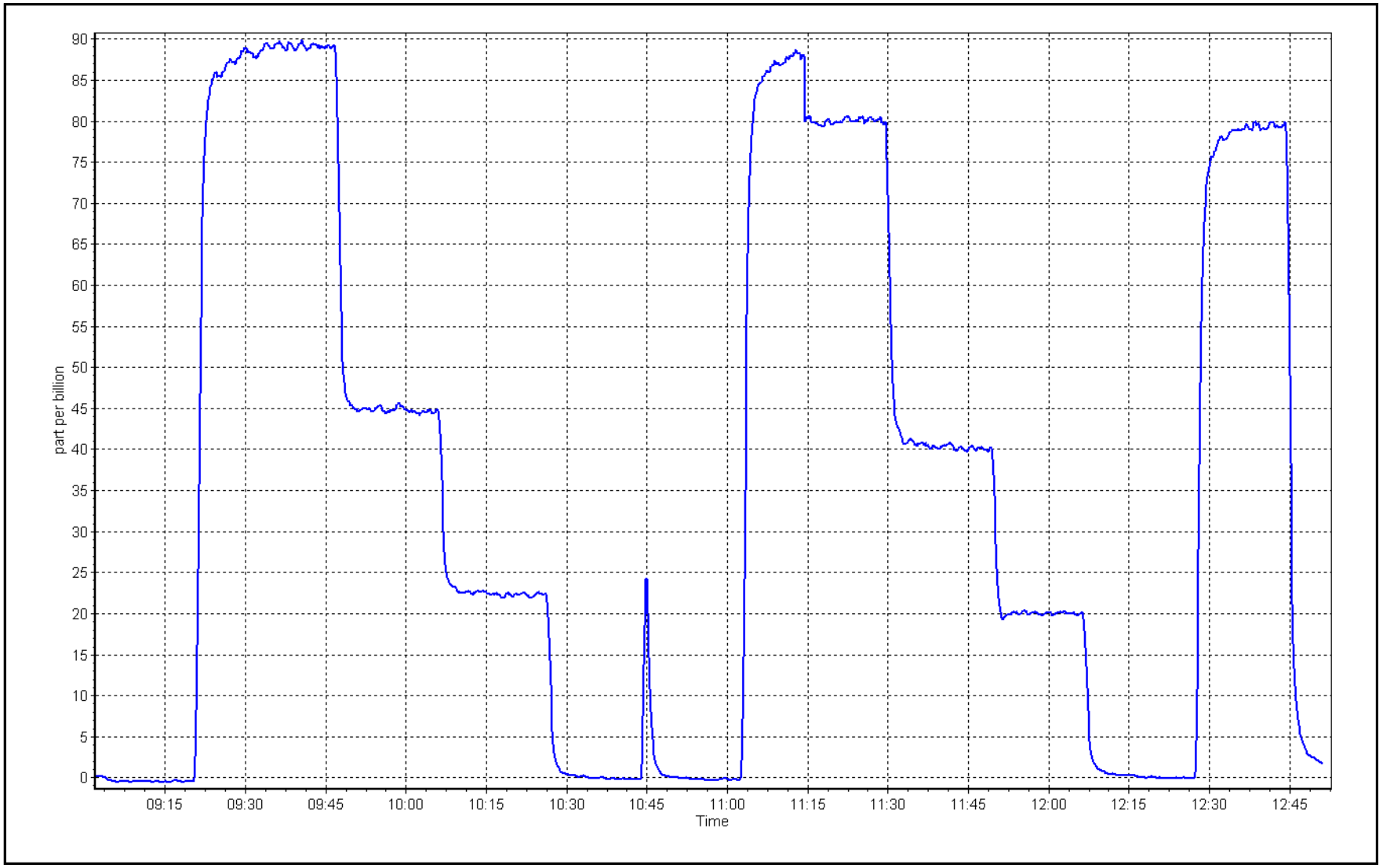
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
80.0	80.2	0.9971
40.0	40.1	0.9985
20.0	20.0	1.0010

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.005143	*0.90 - 1.10*
Intercept	-0.162334	*+/-3*



TRS Calibration Plot Date: January 9, 2023 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 3, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	11:33	End time (MST):	14:50
Reason:	Routine		

Calibration Standards

Gas Cert Reference:		CC259455	Cal Gas Expiry Date:	January 5, 2025	
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	
ZAG make/model:	Teledyne API 701		Serial Number:	262	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	118148495	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	1.81E-04	1.85E-04	NMHC SP Ratio:	4.48E-05	4.66E-05
CH4 Retention time:	12.4	12.2	NMHC Peak Area:	203812	196117

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.2	17.13	13.17	1.301
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.2	17.13	17.13	1.000
second point	4960	40.1	8.56	8.55	1.001
third point	4980	20.0	4.27	4.31	0.991
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	17.13	17.03	1.006
				Average Correction Factor	0.997

Baseline Corr AF:	13.17	Prev response	16.89	*% change	-28.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4920	80.2	9.14	6.78	1.347
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4920	80.2	9.14	9.13	1.001
second point	4960	40.1	4.57	4.58	0.999
third point	4980	20	2.28	2.31	0.989
as left zero	5000	0	0.00	0.00	----
as left span	4920	80.2	9.14	9.05	1.010
				Average Correction Factor	0.996
Baseline Corr AF:	6.78	Prev response	8.99	*% change	-32.6%
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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.2	7.99	6.38	1.252
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.2	7.99	8.00	0.999
second point	4960	40.1	3.99	3.98	1.004
third point	4980	20.0	1.99	2.01	0.993
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	7.99	7.97	1.002
				Average Correction Factor	0.998
Baseline Corr AF:	6.38	Prev response	7.89	*% change	-23.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.986853	0.999155
THC Cal Offset:	-0.014487	0.013380
CH4 Cal Slope:	0.989953	1.000338
CH4 Cal Offset:	-0.012077	0.001151
NMHC Cal Slope:	0.984570	0.998171
NMHC Cal Offset:	-0.003608	0.013029

Notes: Adjusted the span only. N2 and H2 cylinders changed.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

THC Calibration Summary

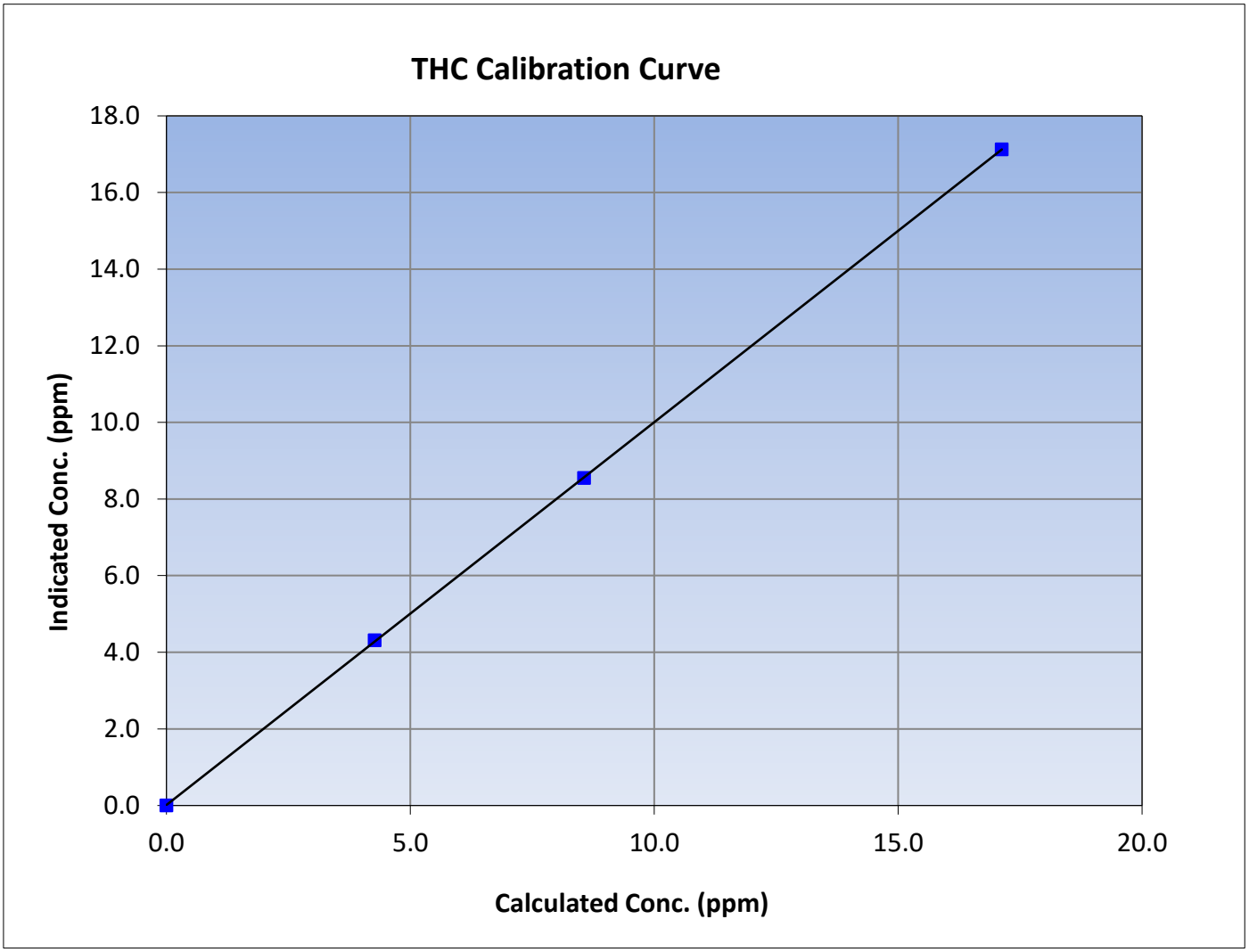
Version-01-2020

Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 13, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	11:33	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	118148495

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*
17.13	17.13	1.0000			
8.56	8.55	1.0015	Slope	0.999155	*0.90 - 1.10*
4.27	4.31	0.9907			
			Intercept	0.013380	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

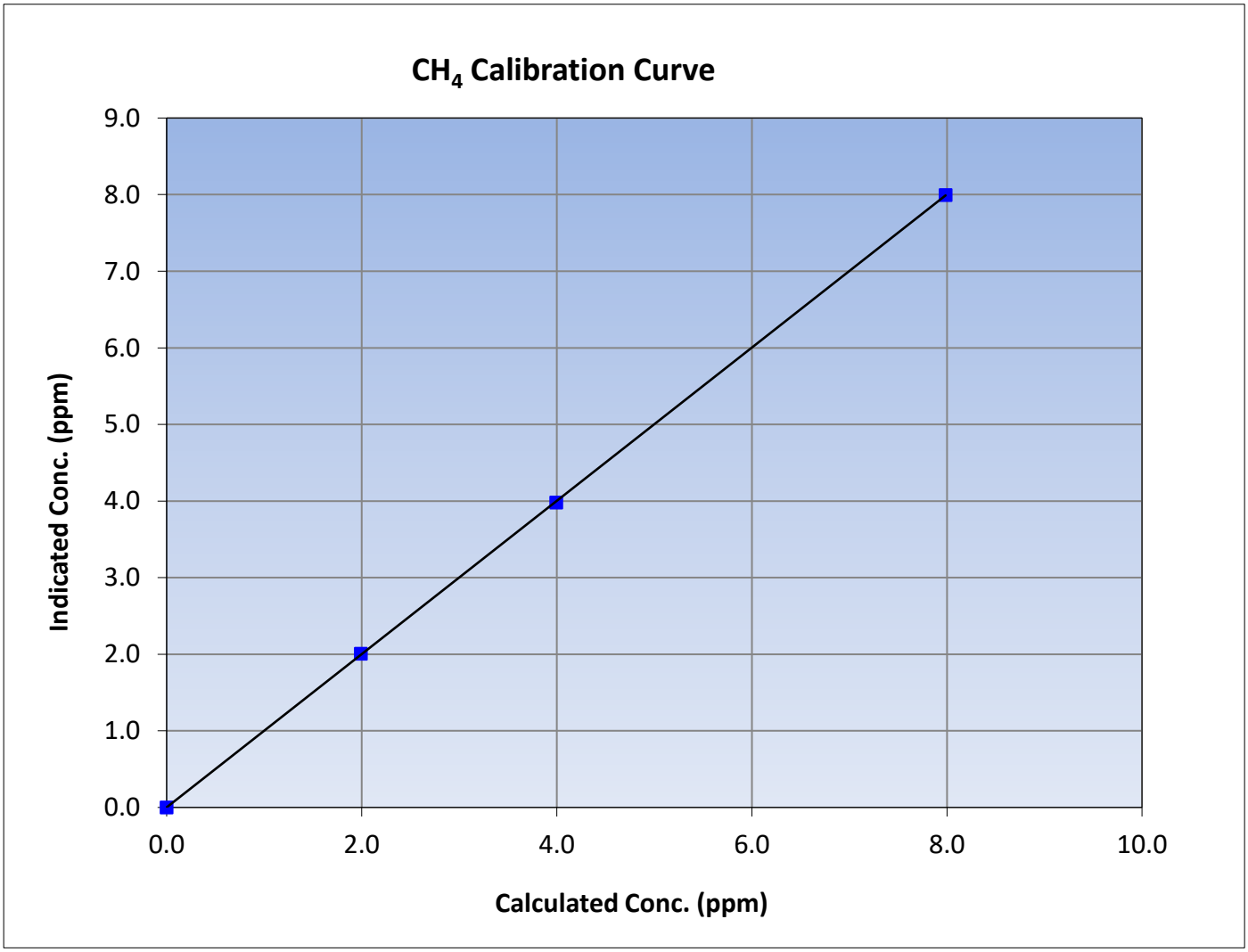
Version-01-2020

Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 13, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	11:33	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	118148495

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*
7.99	8.00	0.9989			
3.99	3.98	1.0035	Slope	1.000338	*0.90 - 1.10*
1.99	2.01	0.9928			
			Intercept	0.001151	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

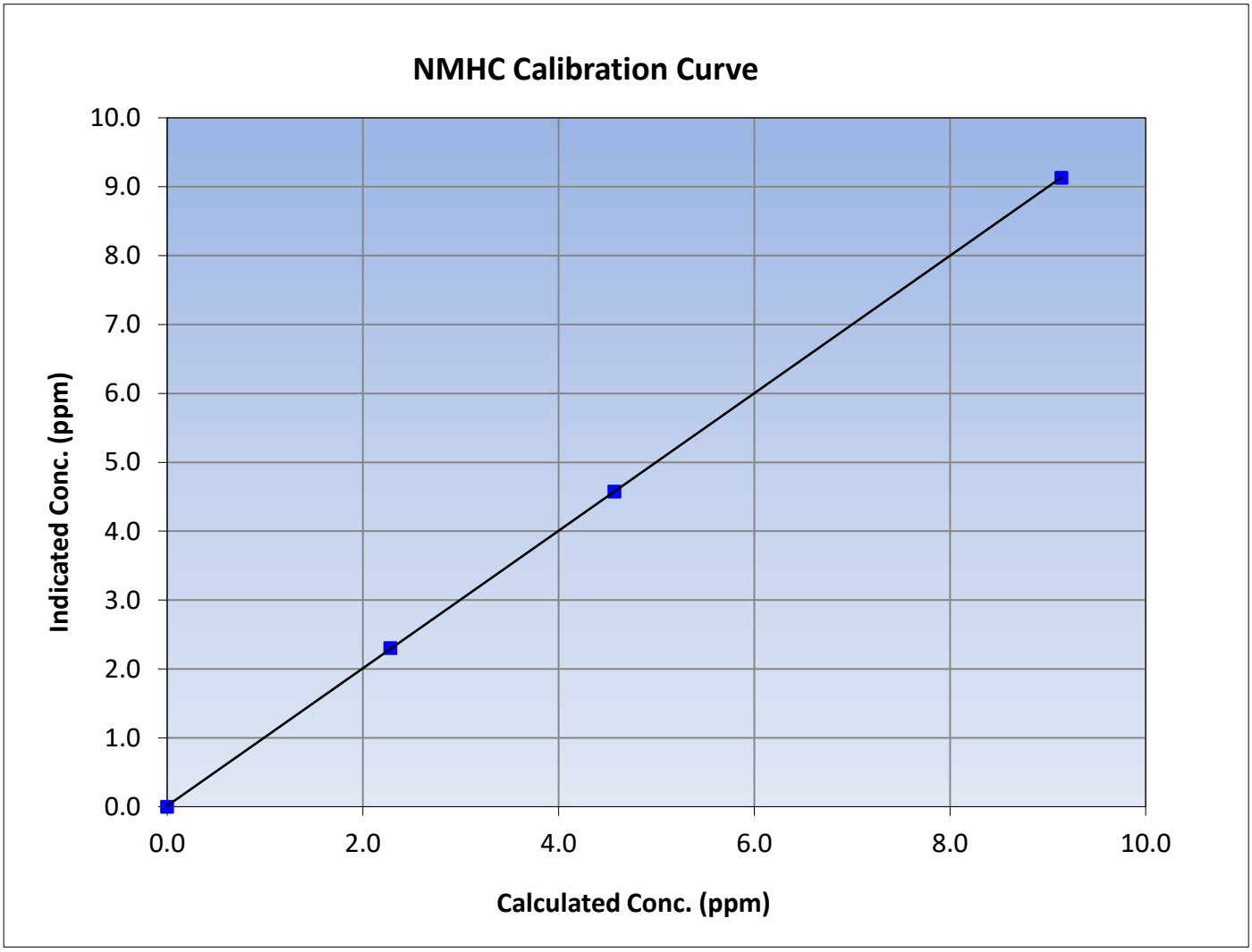
Version-01-2020

Station Information

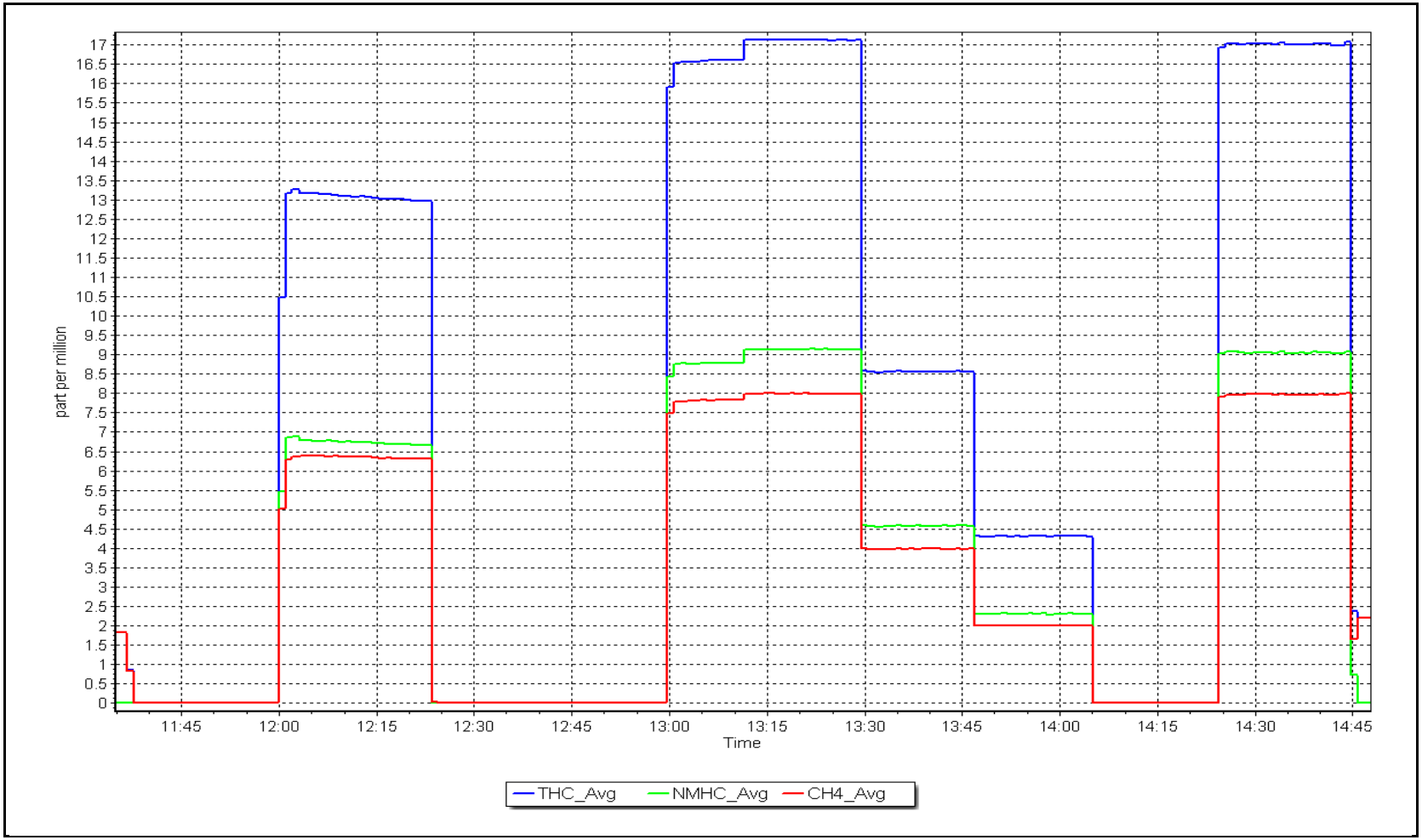
Calibration Date:	January 3, 2023	Previous Calibration:	December 13, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	11:33	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	118148495

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*
9.14	9.13	1.0009			
4.57	4.58	0.9988	Slope	0.998171	*0.90 - 1.10*
2.28	2.31	0.9888			
			Intercept	0.013029	*+/-0.5*



NMHC Calibration Plot Date: January 3, 2023 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 4, 2023	Last Cal Date:	January 3, 2023
Start time (MST):	9:40	End time (MST):	13:40
Reason:	Other:	As Lefts	

Calibration Standards

Gas Cert Reference:		CC259455	Cal Gas Expiry Date:	January 5, 2025	
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	
ZAG make/model:	Teledyne API 701		Serial Number:	262	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	118148495	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	1.81E-04	1.85E-04	NMHC SP Ratio:	4.48E-05	4.66E-05
CH4 Retention time:	12.4	12.2	NMHC Peak Area:	203812	196117

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	17.13	17.03	1.006
				Average Correction Factor	

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	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0	0.00	0.00	----
as left span	4920	80.2	9.14	9.10	1.004
				Average Correction Factor	
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	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.2	7.99	7.93	1.007
				Average Correction Factor	
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	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.986853	
THC Cal Offset:	-0.014487	
CH4 Cal Slope:	0.989953	
CH4 Cal Offset:	-0.012077	
NMHC Cal Slope:	0.984570	
NMHC Cal Offset:	-0.003608	

Notes: H2 leak at cylinder disrupted analyzer operation; leak fixed; as lefts points completed to verify analyzer operation.

Calibration Performed By: Denny Ray Estador

NMHC Calibration Plot Date: January 4, 2023 Location: Conklin

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 17, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	9:28	End time (MST):	13:30
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P1H		Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	51.09	ppm	NO Cal Gas Conc:	50.39	ppm
Removed Cylinder #:	n/a		Removed Gas Exp Date:	n/a	
Removed Gas NOX Conc:	51.09	ppm	Removed Gas NO Conc:	50.39	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T750		Serial Number:	282	
ZAG make/model:	Teledyne API T701		Serial Number:	361	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1501663731	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.144	1.144	NO bkgnd or offset:	11.7	11.7
NOX coeff or slope:	1.001	1.001	NOX bkgnd or offset:	11.9	11.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	231.2	226.7

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.998786	1.001997
NO_X Cal Offset:	1.643904	1.704503
NO Cal Slope:	0.998353	0.998723
NO Cal Offset:	1.000893	1.321276
NO_2 Cal Slope:	0.997669	0.999769
NO_2 Cal Offset:	-1.114017	-0.317822

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
as found span	4921	79.4	811.2	800.1	11.1	812.0	799.0	13.5	0.9991	1.0014
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	4921	79.4	811.2	800.1	11.1	813.8	799.9	13.9	0.9969	1.0003
second point	4960	39.7	405.7	400.1	5.6	408.8	401.2	7.6	0.9924	0.9973
third point	4980	19.8	202.3	199.6	2.8	206.3	202.2	4.1	0.9807	0.9869
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	4921	79.4	811.2	390.7	420.5	812.0	392.2	419.8	0.9991	0.9962
								Average Correction Factor	0.9900	0.9948

Corrected As found	NO_X = 812.2 ppb	NO = 799.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	0.0%
Previous Response	NO_X = 811.9 ppb	NO = 799.8 ppb		*Percent Change	NO =	-0.1%
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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.8	389.4	420.5	420.2	1.0007	99.9%
2nd GPT point (200 ppb O3)	798.8	589.6	220.3	220.0	1.0014	99.9%
3rd GPT point (100 ppb O3)	798.8	695.9	114.0	113.2	1.0072	99.3%
				Average Correction Factor	1.0031	99.7%

Notes: No adjustments required.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

NO_X Calibration Summary

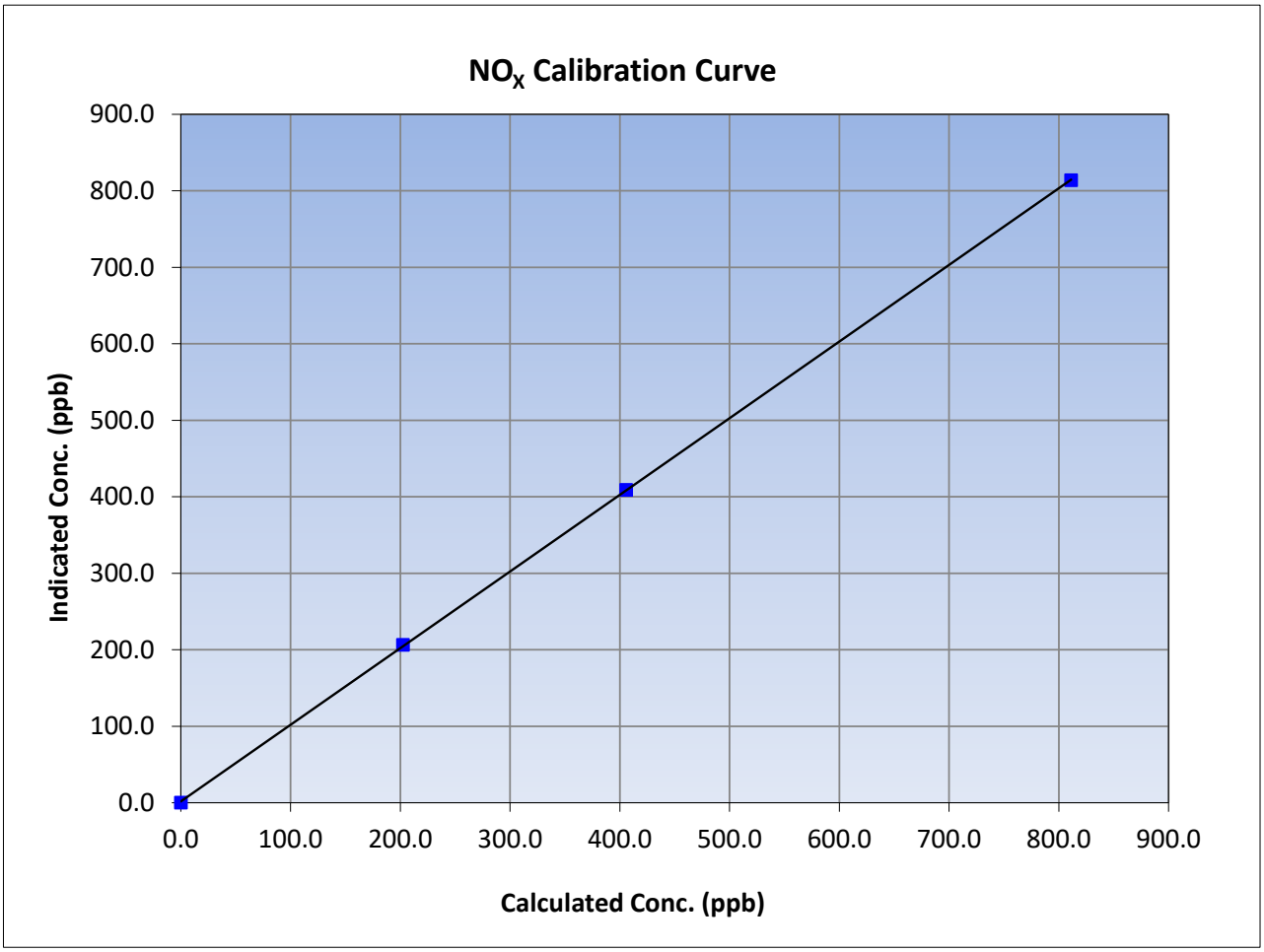
Version-04-2020

Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 7, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:28	End Time (MST):	13:30
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	0.0	----	Correlation Coefficient	0.999980	*≥0.995*
811.2	813.8	0.9969			
405.7	408.8	0.9924	Slope	1.001997	*0.90 - 1.10*
202.3	206.3	0.9807			
			Intercept	1.704503	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

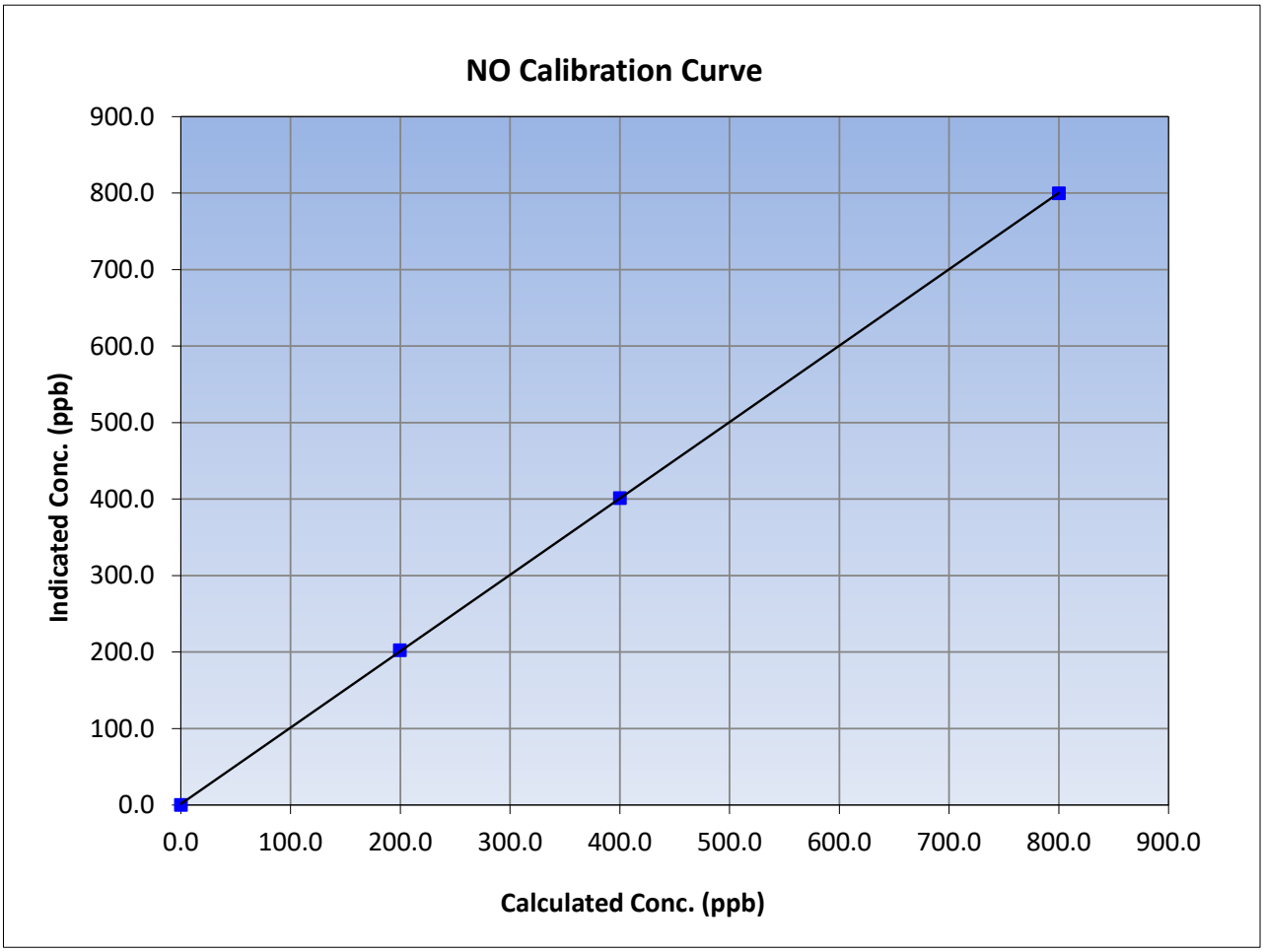
Version-04-2020

Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 7, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:28	End Time (MST):	13:30
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	0.0	----	Correlation Coefficient	0.999987	≥0.995
800.1	799.9	1.0003			
400.1	401.2	0.9973	Slope	0.998723	0.90 - 1.10
199.6	202.2	0.9869			
			Intercept	1.321276	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

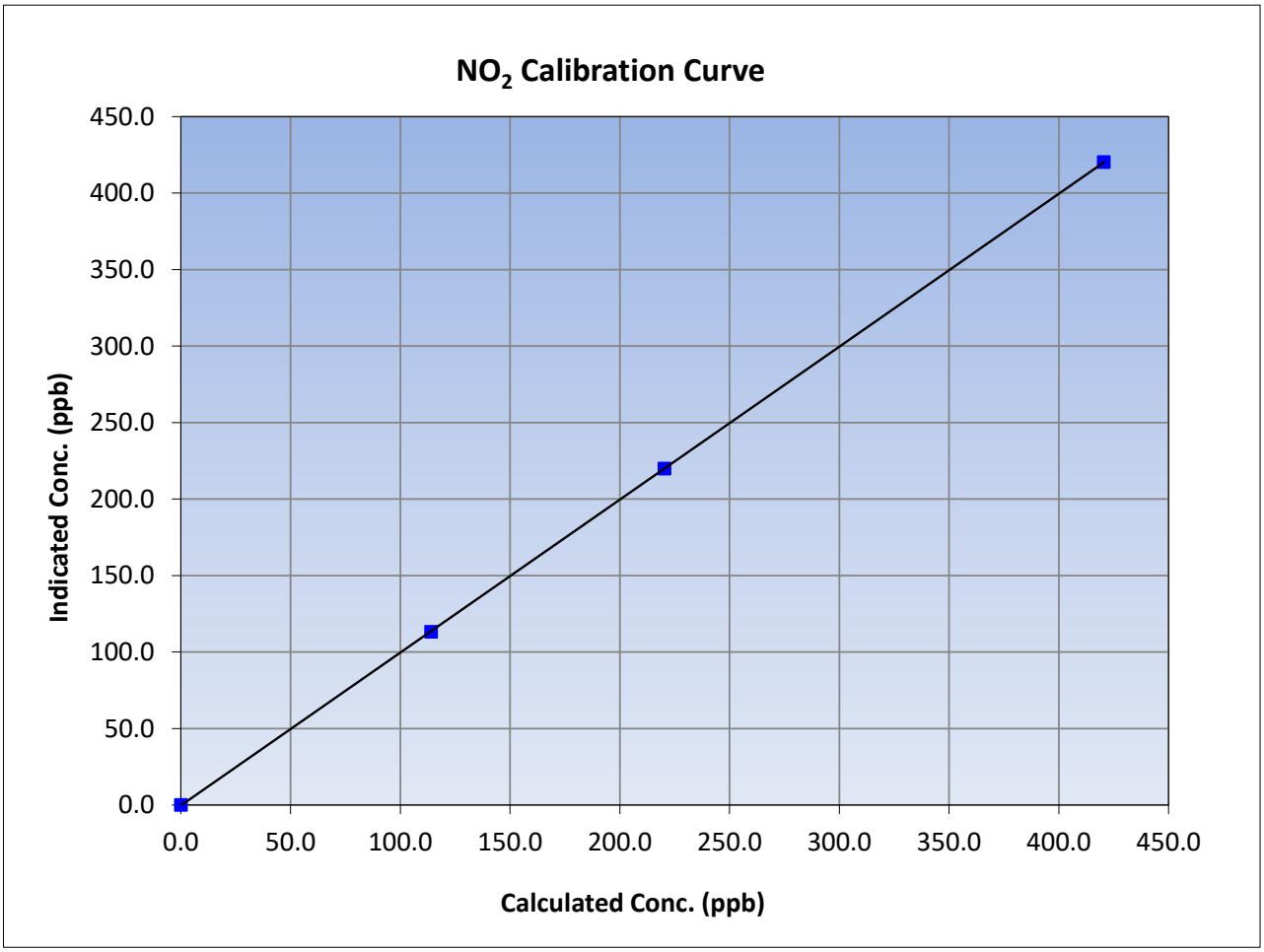
Version-04-2020

Station Information

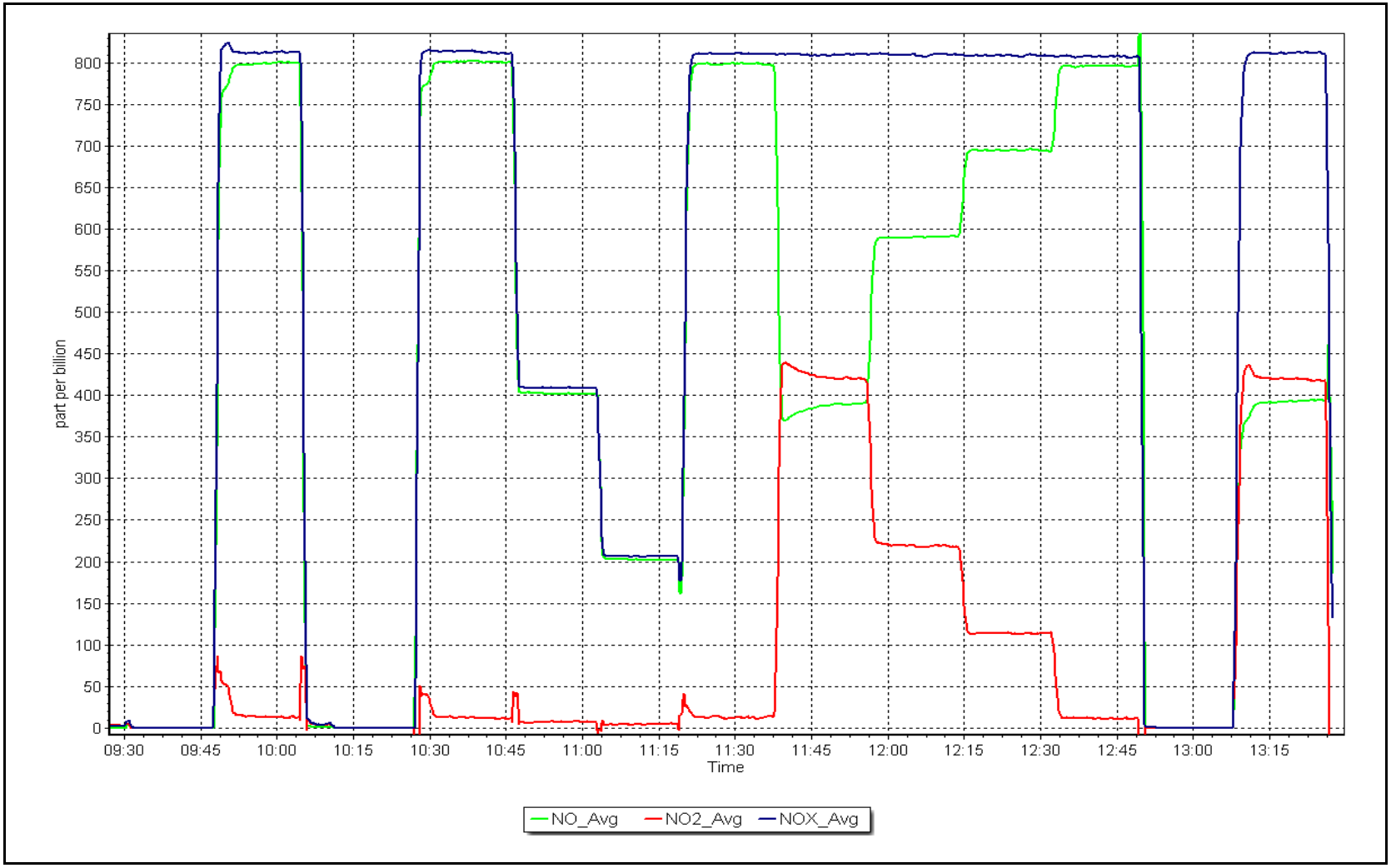
Calibration Date:	January 17, 2023	Previous Calibration:	December 7, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:28	End Time (MST):	13:30
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999996	*≥0.995*
420.5	420.2	1.0007			
220.3	220.0	1.0014	Slope	0.999769	*0.90 - 1.10*
114.0	113.2	1.0072			
			Intercept	-0.317822	*+/-20*



NO_X Calibration Plot Date: January 17, 2023 Location: Conklin



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Conklin	Station number:	AMS21
Calibration Date:	January 20, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	9:32	End time (MST):	12:50
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3810
ZAG Make/Model:	Teledyne API 701	Serial Number:	263

Analyzer Information

Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009514	0.997857	Backgd or Offset:	-0.3	-0.3
Calibration intercept:	0.660000	0.200000	Coeff or Slope:	1.011	1.011

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	-0.7	----
as found span	5000	935.6	400.0	400.0	1.000
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	933.0	400.0	399.0	1.003
second point	5000	799.4	200.0	200.3	0.999
third point	5000	701.9	100.0	100.3	0.997
as left zero	5000	0.0	0.0	-0.3	----
as left span	5000	936.0	400.0	404.0	0.990
				Average Correction Factor	0.999

Baseline Corr As found:	400.7	Previous response	404.5	*% change	-0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

Notes: No adjustments have been made.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

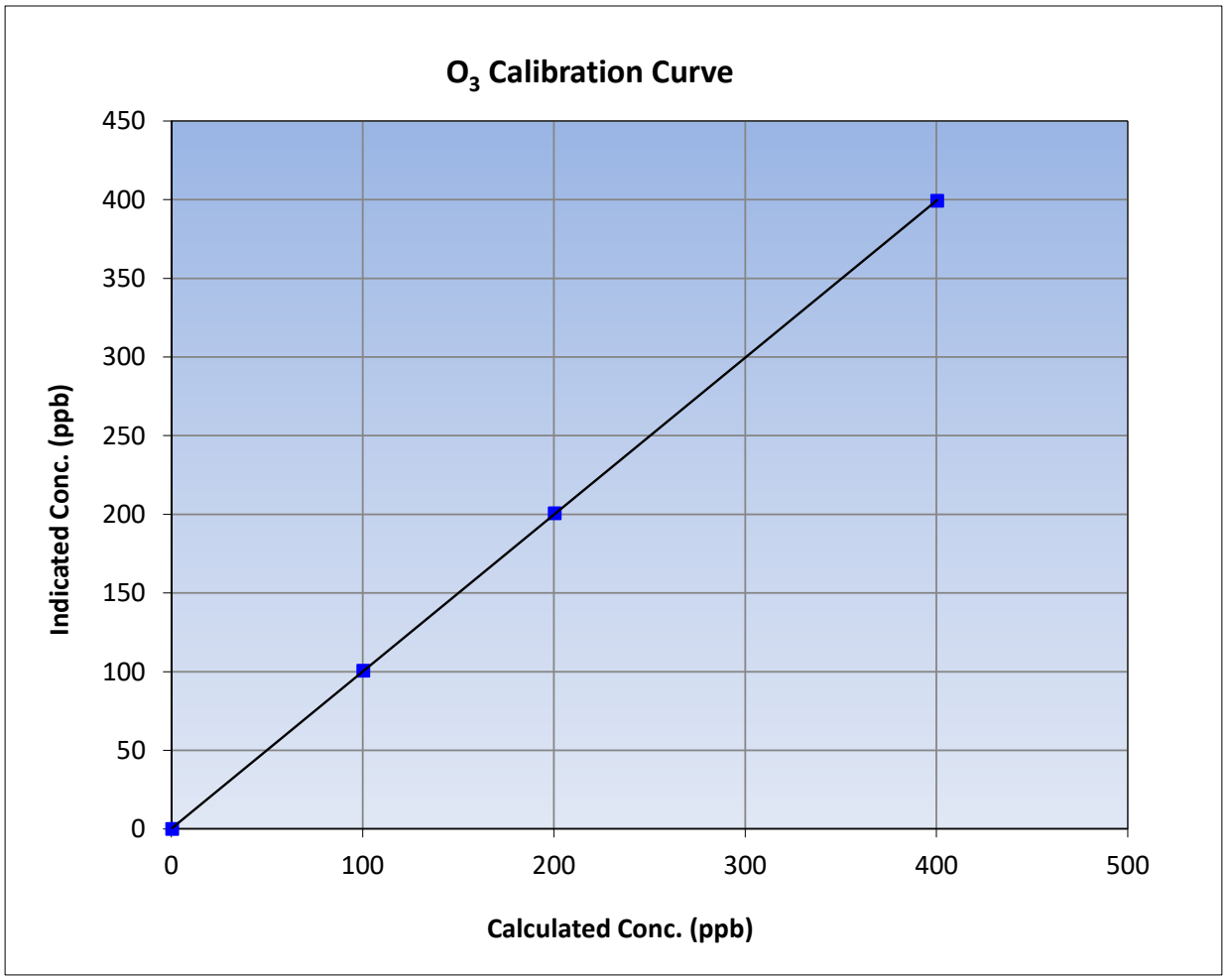
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 6, 2022
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:32	End Time (MST):	12:50
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734

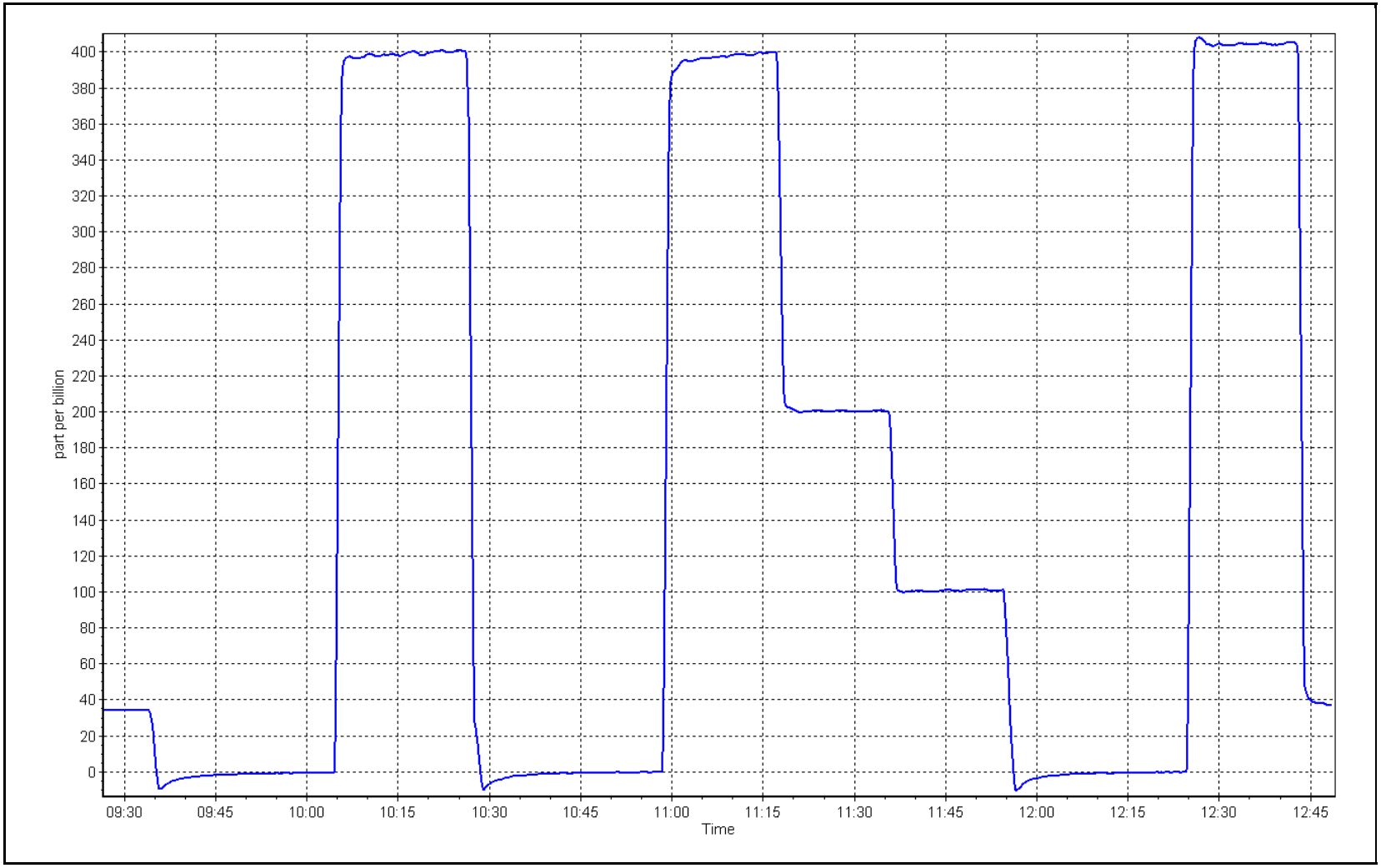
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
400.0	399.0	1.0025
200.0	200.3	0.9985
100.0	100.3	0.9970

Statistical Evaluation		Limits
Correlation Coefficient	0.999991	≥0.995
Slope	0.997857	0.90 - 1.10
Intercept	0.200000	+/- 5



O_3 Calibration Plot Date: January 20, 2023 Location: Conklin



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	January 4, 2023	Last Cal Date:	December 22, 2022
Start time (MST):	11:15	End time (MST):	11:50
Analyzer Make:	API T640	S/N:	1547
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	DeltaCal	S/N:	954
Temp/RH standard:	DeltaCal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-8	-7.6	-8	☐	+/- 2 ^{o}C
P (mmHg)	709.4	703.9	709.4	☐	+/- 10 mmHg
flow (LPM)	5.02	5.13	5.02	☐	+/- 0.25 LPM

Leak Test: Date of Check: January 4, 2023 Last Cal Date: December 22, 2022

PM w/o HEPA: 7.3 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: N/A

Disposable Filter Changed: N/A

Annual Maintenance

Date Sample Tube Cleaned: N/A

Date RH/T Sensor Cleaned: N/A

Notes: Recently installed last December 2022, first monthly calibration test.

Calibration by: Denny Ray Estador

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS22
JANVIER
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 17, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	12:10	End time (MST):	16:51
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 Make/Model:	Teledyne API T700		Serial Number:	3806
ZAG Make/Model:	Teledyne API T701		Serial Number:	4890

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1152430006

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000878	1.000335	Backgd or Offset:	19.3	19.2
Calibration intercept:	0.164277	0.604356	Coeff or Slope:	1.016	1.007

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*
as found zero	5000	0.0	0.0	0.1	----
as found span	4920	79.8	799.8	806.7	0.991
as found 2nd point	4960	39.9	399.9	404.5	0.989
as found 3rd point	4980	20.0	200.4	202.8	0.988
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	----
high point	4920	79.8	799.8	800.2	0.999
second point	4960	39.9	399.9	401.6	0.996
third point	4980	20.0	200.4	201.0	0.997
as left zero	5000	0.0	0.0	0.4	----
as left span	4920	79.8	799.8	802.4	0.997
				Average Correction Factor	0.997

Baseline Corr As found:	806.60	Previous response	800.65	*% change	0.7%
Baseline Corr 2nd AF pt:	404.40	AF Slope:	1.008439	AF Intercept:	0.542651
Baseline Corr 3rd AF pt:	202.70	AF Correlation:	0.999998		

* = > +/-5% change initiates investigation

Notes: Inlet filter changed after as founds. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

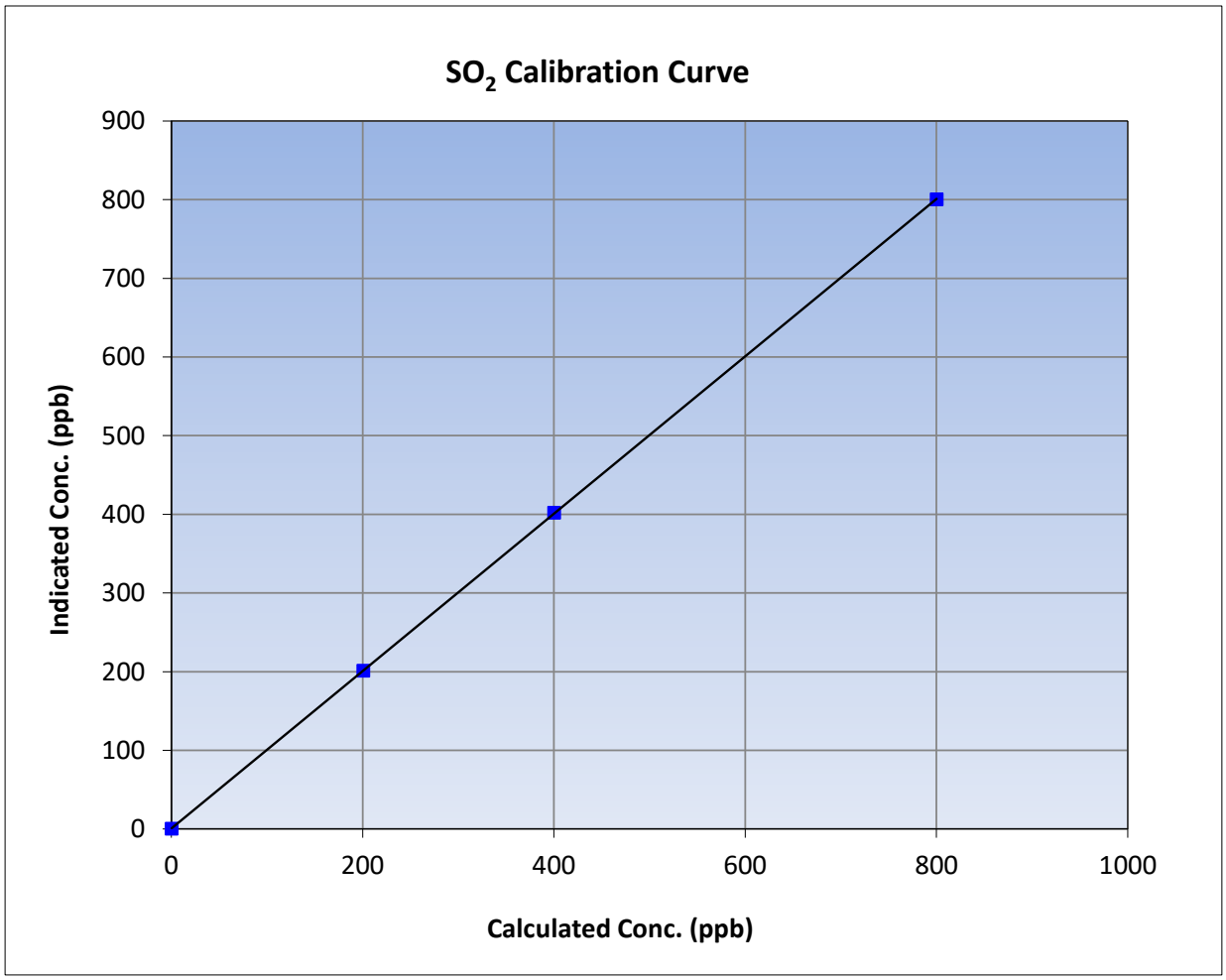
Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 6, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:10	End Time (MST):	16:51
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

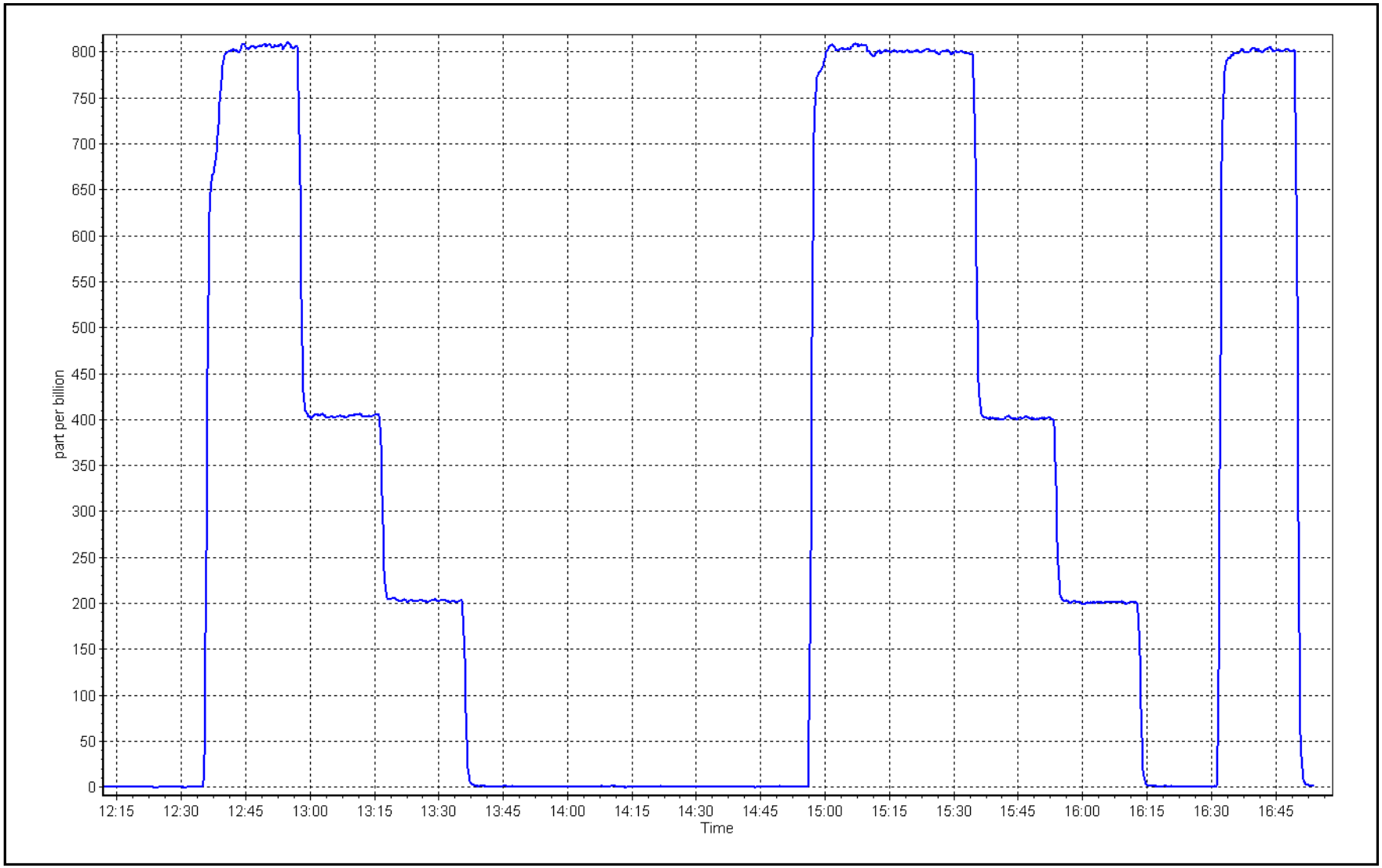
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
799.8	800.2	0.9995
399.9	401.6	0.9957
200.4	201.0	0.9972

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.000335	*0.90 - 1.10*
Intercept	0.604356	*+/-30*



SO2 Calibration Plot Date: January 17, 2023 Location: Janvier



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Janvier	Station number:	AMS22
Calibration Date:	January 20, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	10:30	End time (MST):	15:45
Reason:	Maintenance		

Calibration Standards

Cal Gas Concentration:	5.03	ppm	Cal Gas Exp Date:	April 16, 2022
Cal Gas Cylinder #:	DT0018680			
Removed Cal Gas Conc:	5.03	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 #:	587	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999078	1.005365	Backgd or Offset:	3.39	3.42
Calibration intercept:	0.320986	0.000881	Coeff or Slope:	1.223	1.239

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4920	79.5	80.0	80.4	0.995
second point	4960	39.8	40.0	40.5	0.989
third point	4980	19.9	20.0	19.7	1.016
as left zero	5000	0.0	0.0	0.2	----
as left span	4920	79.5	80.0	79.9	1.001
SO2 Scrubber Check	4920	79.8	798.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.000
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt:	NA	AF Slope:	NA	AF Intercept:	NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:	NA		

* = > +/-5% change initiates investigation

Notes: No as founds completed because of a converter failure. Replaced the TRS converter. Changed out the inlet filter. Scrubber check passed. Increased the converter temperature to 840C. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

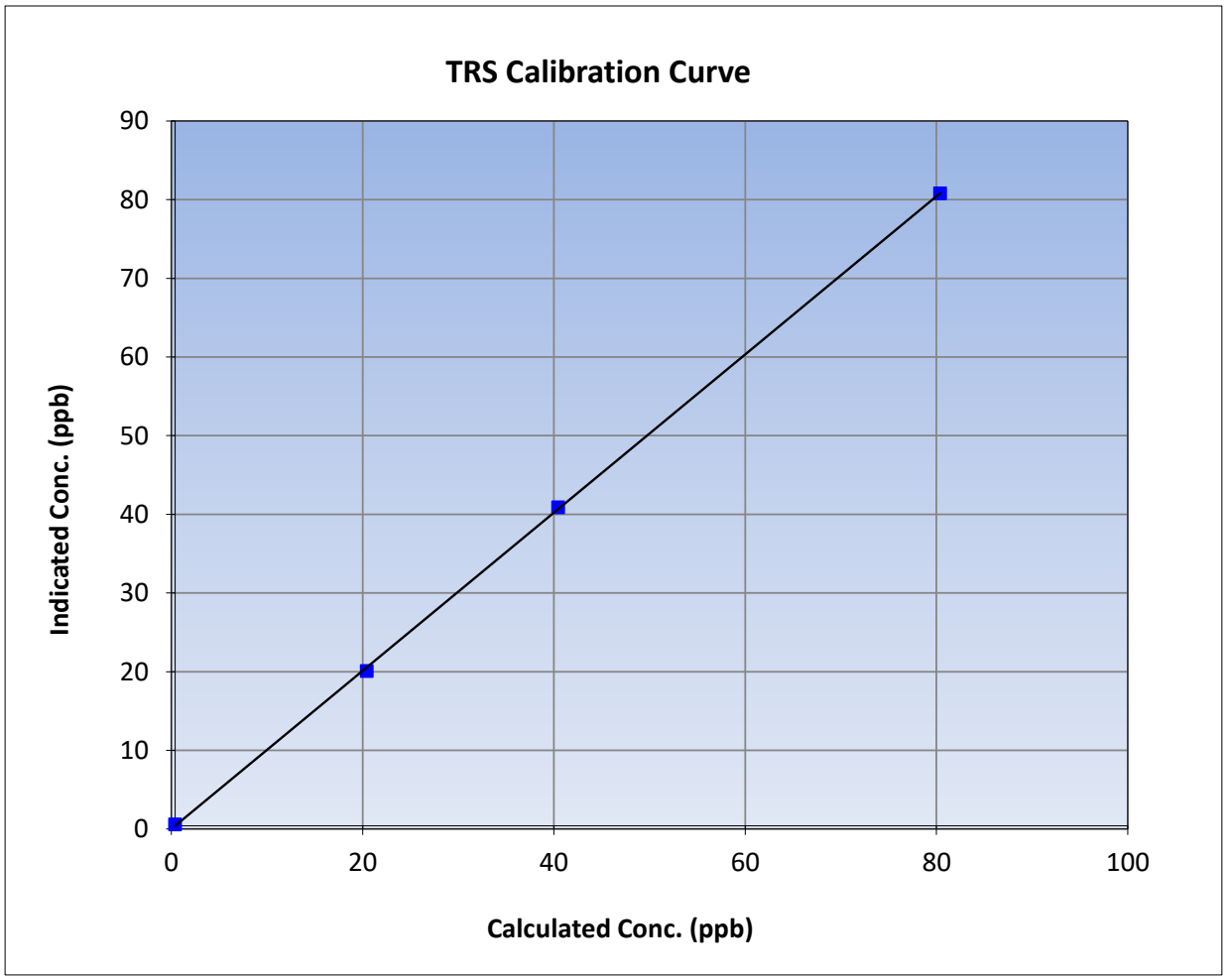
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	December 15, 2022
Station Name:	Janvier	Station Number:	AMS22
Start Time (MST):	10:30	End Time (MST):	15:45
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031

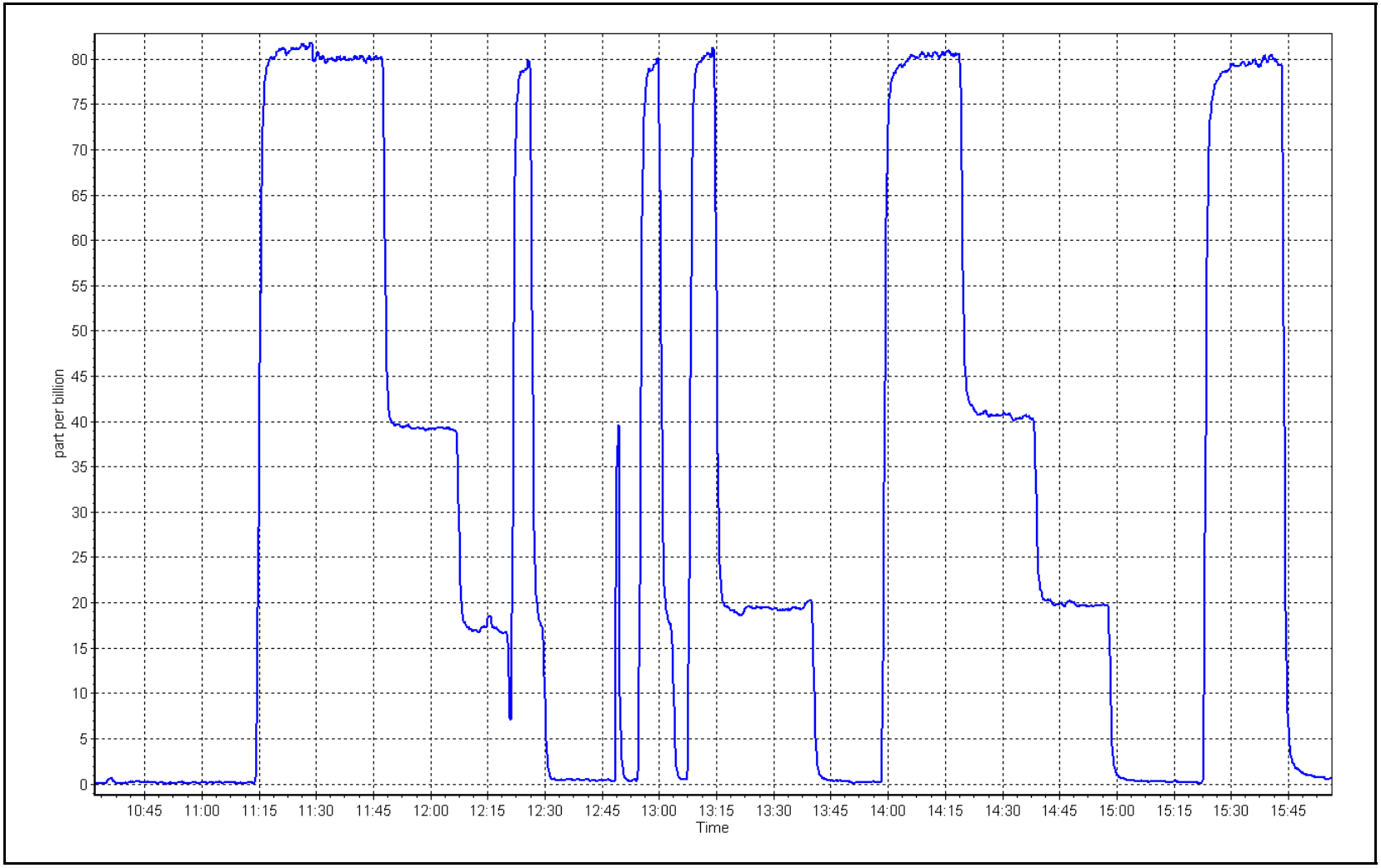
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	80.4	0.9948
40.0	40.5	0.9887
20.0	19.7	1.0162

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999920	*≥0.995*
Slope	1.005365	*0.90 - 1.10*
Intercept	0.000881	*+/-3*



TRS Calibration Plot Date: January 20, 2023 Location: Janvier



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 17, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	12:10	End time (MST):	16:51
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:		N/A	Removed Gas Expiry:	N/A	
Removed CH4 Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
Removed C3H8 Conc.	208.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API 700		Serial Number:	3806	
ZAG make/model:	Teledyne API 701		Serial Number:	4890	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1172750023	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.180E-04	2.180E-04	NMHC SP Ratio:	4.62E-05	4.69E-05
CH4 Retention time:	12.80	13.00	NMHC Peak Area:	198163	195272

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	79.8	17.17	17.34	0.990
as found 2nd point	4960	39.9	8.59	8.63	0.995
as found 3rd point	4980	20.0	4.30	4.32	0.996
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	79.8	17.17	17.14	1.002
second point	4960	39.9	8.59	8.52	1.008
third point	4980	20.0	4.30	4.22	1.020
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	79.8	17.17	17.11	1.004
				Average Correction Factor	1.010

Baseline Corr AF:	17.34	Prev response	17.16	*% change	1.0%
Baseline Corr 2nd AF:	8.6	AF Slope:	1.009988	AF Intercept:	-0.017439
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999993	* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4920	79.8	9.15	9.17	0.997
as found 2nd point	4960	39.9	4.57	4.59	0.997
as found 3rd point	4980	20	2.29	2.28	1.005
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4920	79.8	9.15	9.11	1.004
second point	4960	39.9	4.57	4.53	1.010
third point	4980	20.0	2.29	2.25	1.021
as left zero	5000	0	0.00	0.00	----
as left span	4920	79.8	9.15	9.10	1.006
				Average Correction Factor	1.011
Baseline Corr AF:	9.17	Prev response	9.16	*% change	0.1%
Baseline Corr 2nd AF:	4.6	AF Slope:	1.003390	AF Intercept:	-0.006039
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	79.8	8.03	8.16	0.984
as found 2nd point	4960	39.9	4.01	4.04	0.994
as found 3rd point	4980	20.0	2.01	2.04	0.986
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	79.8	8.03	8.03	1.000
second point	4960	39.9	4.01	3.99	1.005
third point	4980	20.0	2.01	1.97	1.020
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	79.8	8.03	8.01	1.001
				Average Correction Factor	1.008
Baseline Corr AF:	8.16	Prev response	8.00	*% change	2.0%
Baseline Corr 2nd AF:	4.04	AF Slope:	1.016305	AF Intercept:	-0.010190
Baseline Corr 3rd AF:	2.04	AF Correlation:	0.999967	* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999736	0.999594
THC Cal Offset:	-0.008390	-0.041578
CH4 Cal Slope:	0.997864	1.001935
CH4 Cal Offset:	-0.011155	-0.020955
NMHC Cal Slope:	1.001366	0.997466
NMHC Cal Offset:	0.002565	-0.020822

Notes: Changed the inlet filter after as founds. Changed out the N2 and H2 cylinders. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

THC Calibration Summary

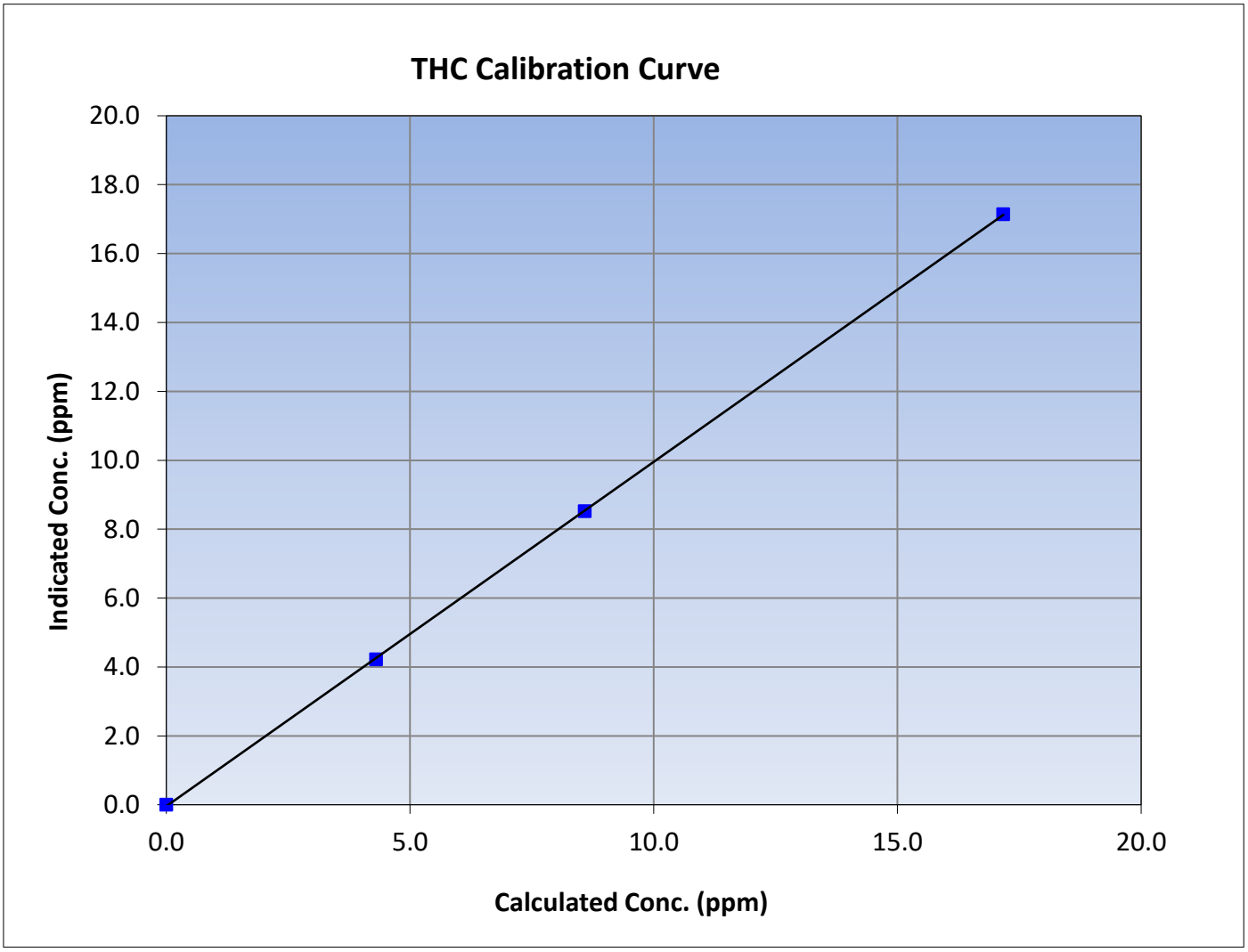
Version-01-2020

Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 6, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:10	End Time (MST):	16:51
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	0.999973	≥0.995
17.17	17.14	1.0016			
8.59	8.52	1.0076	Slope	0.999594	0.90 - 1.10
4.30	4.22	1.0203			
			Intercept	-0.041578	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

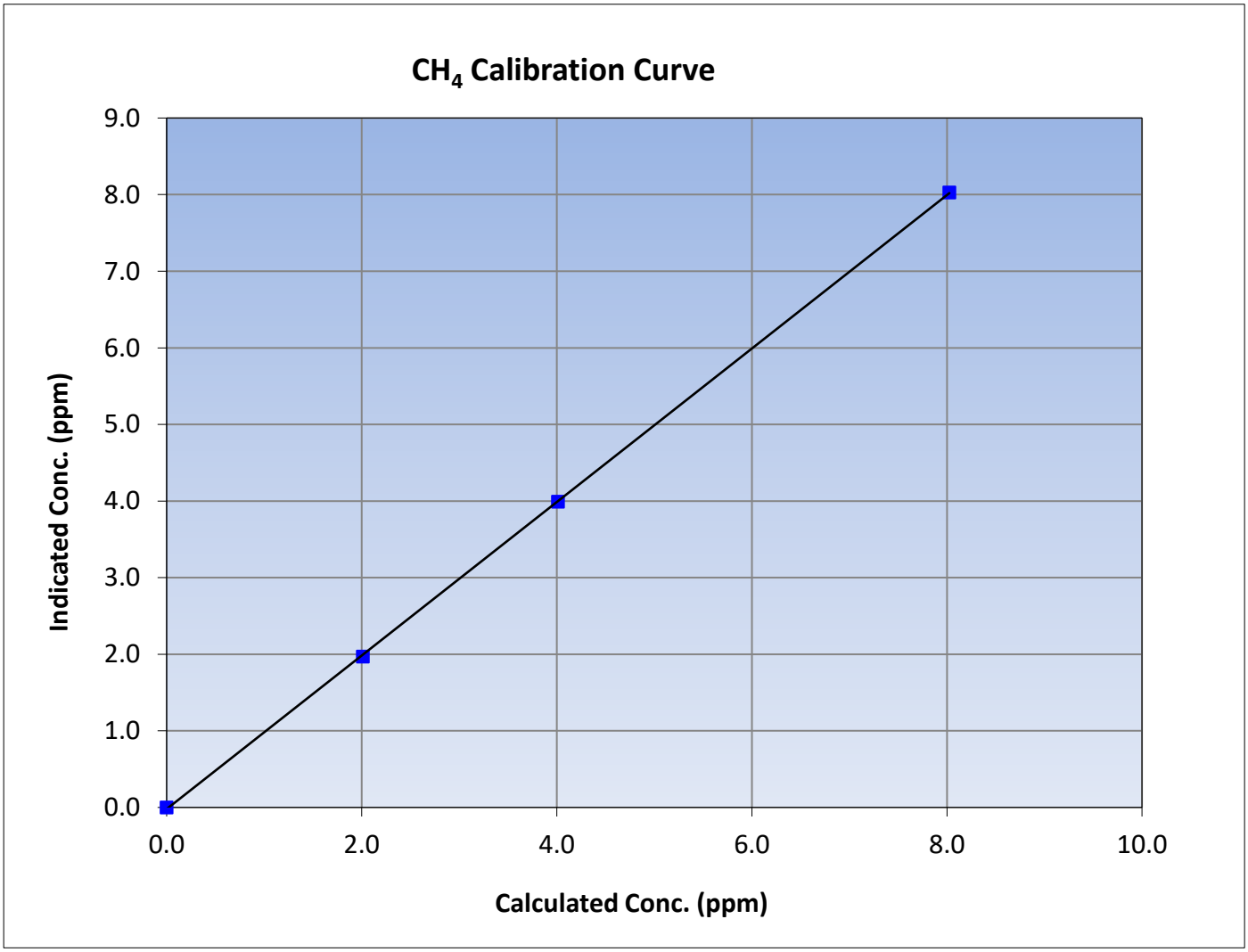
Version-01-2020

Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 6, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:10	End Time (MST):	16:51
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	0.999968	*≥0.995*
8.03	8.03	0.9995			
4.01	3.99	1.0051	Slope	1.001935	*0.90 - 1.10*
2.01	1.97	1.0204			
			Intercept	-0.020955	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

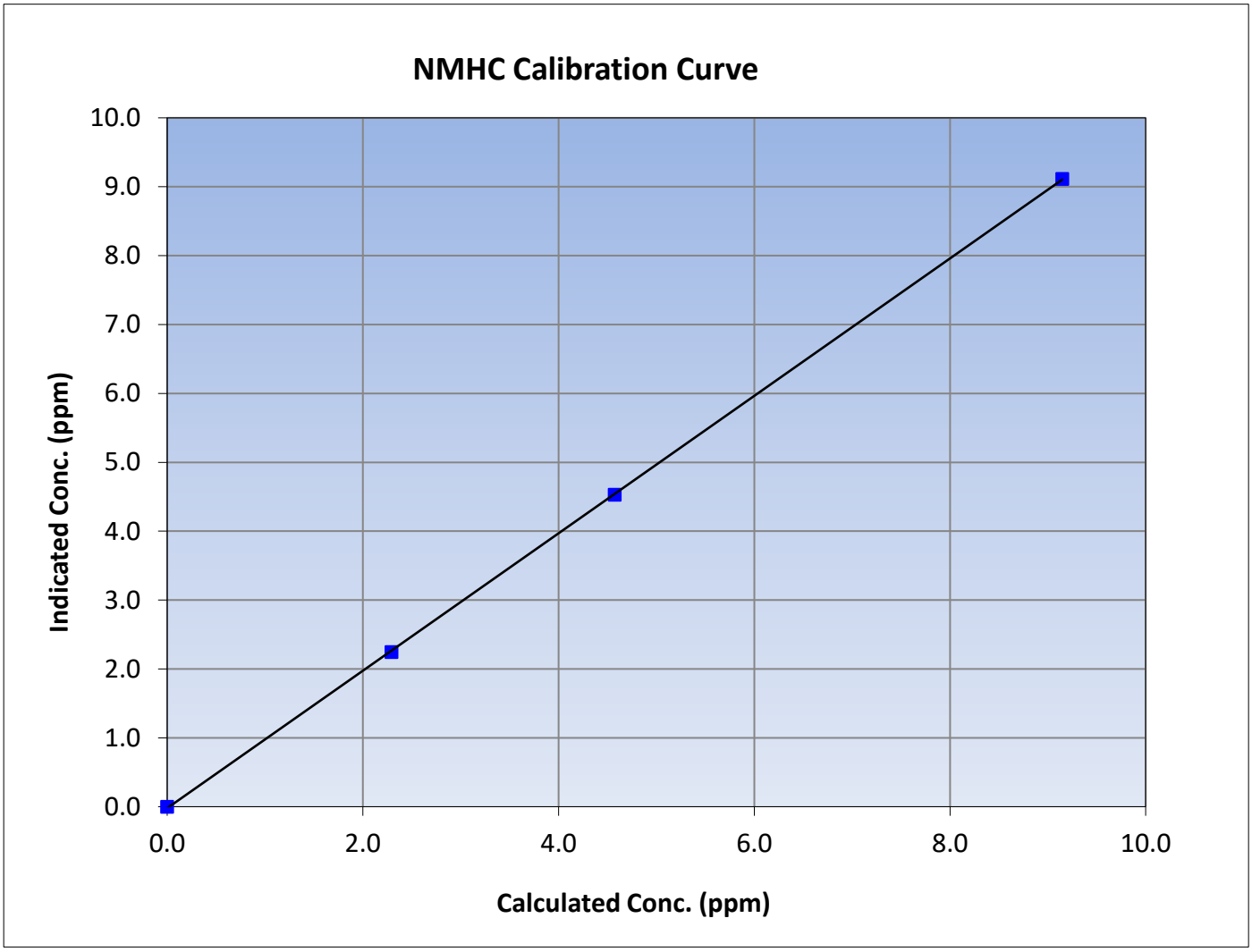
Version-01-2020

Station Information

Calibration Date:	January 17, 2023	Previous Calibration:	December 6, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:10	End Time (MST):	16:51
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	0.999976	≥0.995
9.15	9.11	1.0036			
4.57	4.53	1.0098	Slope	0.997466	0.90 - 1.10
2.29	2.25	1.0207			
			Intercept	-0.020822	+/-0.5



NMHC Calibration Plot Date: January 17, 2023 Location: Janvier

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 26, 2023	Last Cal Date:	December 1, 2022
Start time (MST):	12:16	End time (MST):	17:52
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	CC424183		Cal Gas Expiry Date:	April 16, 2023	
NOX Cal Gas Conc:	48.60	ppm	NO Cal Gas Conc:	48.60	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.60	ppm	Removed Gas NO Conc:	48.60	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3806	
ZAG make/model:	Teledyne API T701		Serial Number:	4890	

Analyzer Information

Analyzer make:	Teledyne API T200	Analyzer serial #:	7117
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.018	1.015	NO bkgnd or offset:	0.0	-0.3
NOX coeff or slope:	1.007	1.004	NOX bkgnd or offset:	0.3	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	5.0	5.0

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.003274	1.004514
NO_X Cal Offset:	0.187776	-0.271695
NO Cal Slope:	1.003586	1.003357
NO Cal Offset:	-0.871493	-0.891348
NO_2 Cal Slope:	1.001086	0.999938
NO_2 Cal Offset:	0.486335	0.560426

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.9	-0.2	1.0	----	----
as found span	4918	82.3	799.9	799.9	0.0	795.6	791.7	4.0	1.0054	1.0104
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
high point	4918	82.3	799.9	799.9	0.0	803.6	802.2	1.5	0.9954	0.9971
second point	4959	41.2	400.4	400.4	0.0	401.1	400.3	0.9	0.9984	1.0004
third point	4980	20.6	200.2	200.2	0.0	201.2	199.2	2.0	0.9951	1.0051
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
as left span	4918	82.3	799.9	411.7	388.2	796.0	409.1	386.9	1.0049	1.0064
								Average Correction Factor	0.9963	1.0009

Corrected As found	NO_X = 794.7 ppb	NO = 791.9 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-1.0%
Previous Response	NO_X = 802.7 ppb	NO = 801.9 ppb		*Percent Change	NO =	-1.3%
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.7	409.5	388.2	388.5	0.9992	100.1%
2nd GPT point (200 ppb O3)	797.7	605.4	192.3	192.9	0.9969	100.3%
3rd GPT point (100 ppb O3)	797.7	700.8	96.9	98.3	0.9858	101.4%
				Average Correction Factor	0.9940	100.6%

Notes: Changed the inlet filter after as founds. Changed out the Purafil and charcoal scrubber canisters on the ZAG. Adjusted both zero and span.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

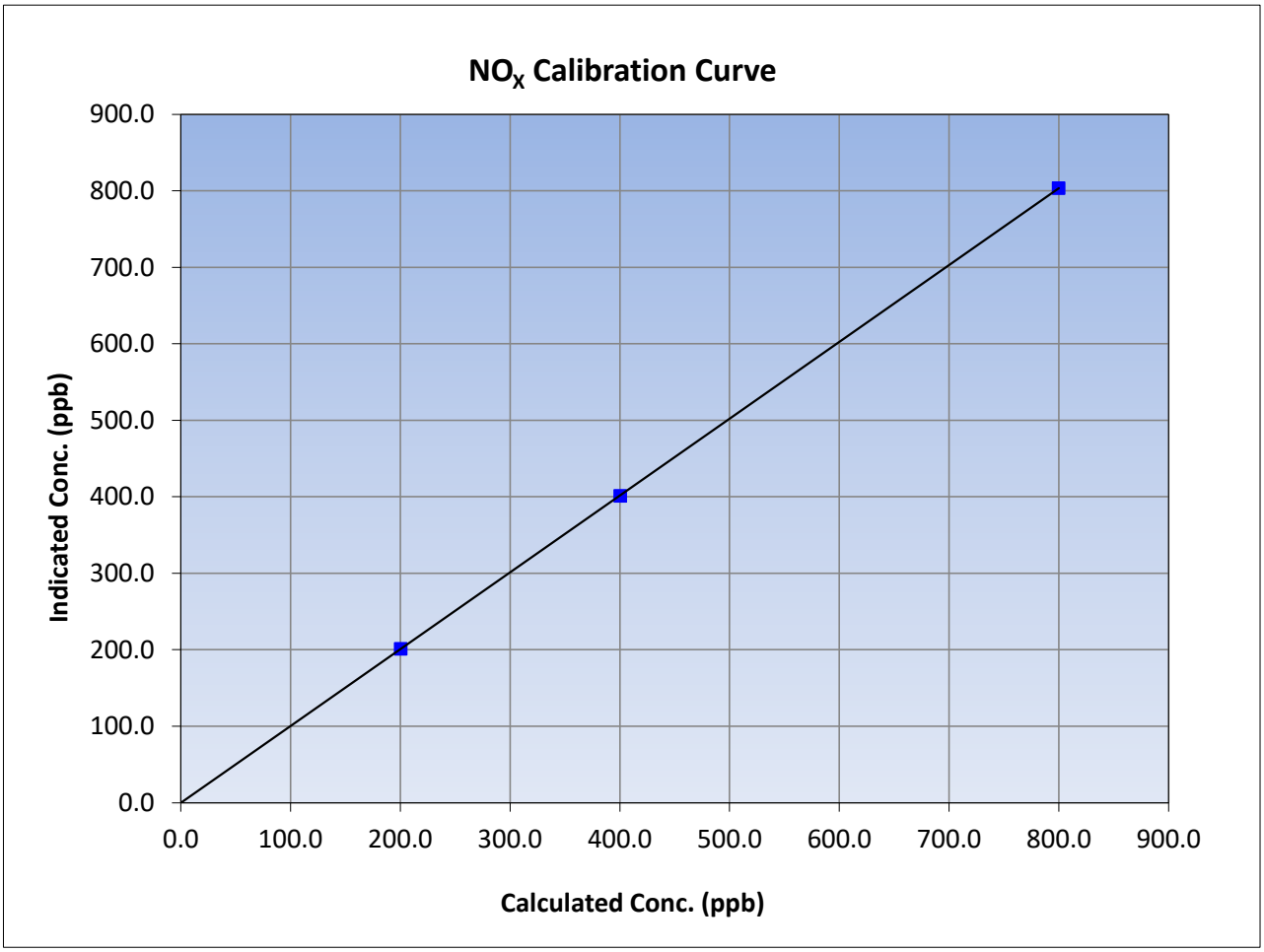
Version-04-2020

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	December 1, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:16	End Time (MST):	17:52
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999997	≥0.995
799.9	803.6	0.9954			
400.4	401.1	0.9984	Slope	1.004514	0.90 - 1.10
200.2	201.2	0.9951			
			Intercept	-0.271695	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

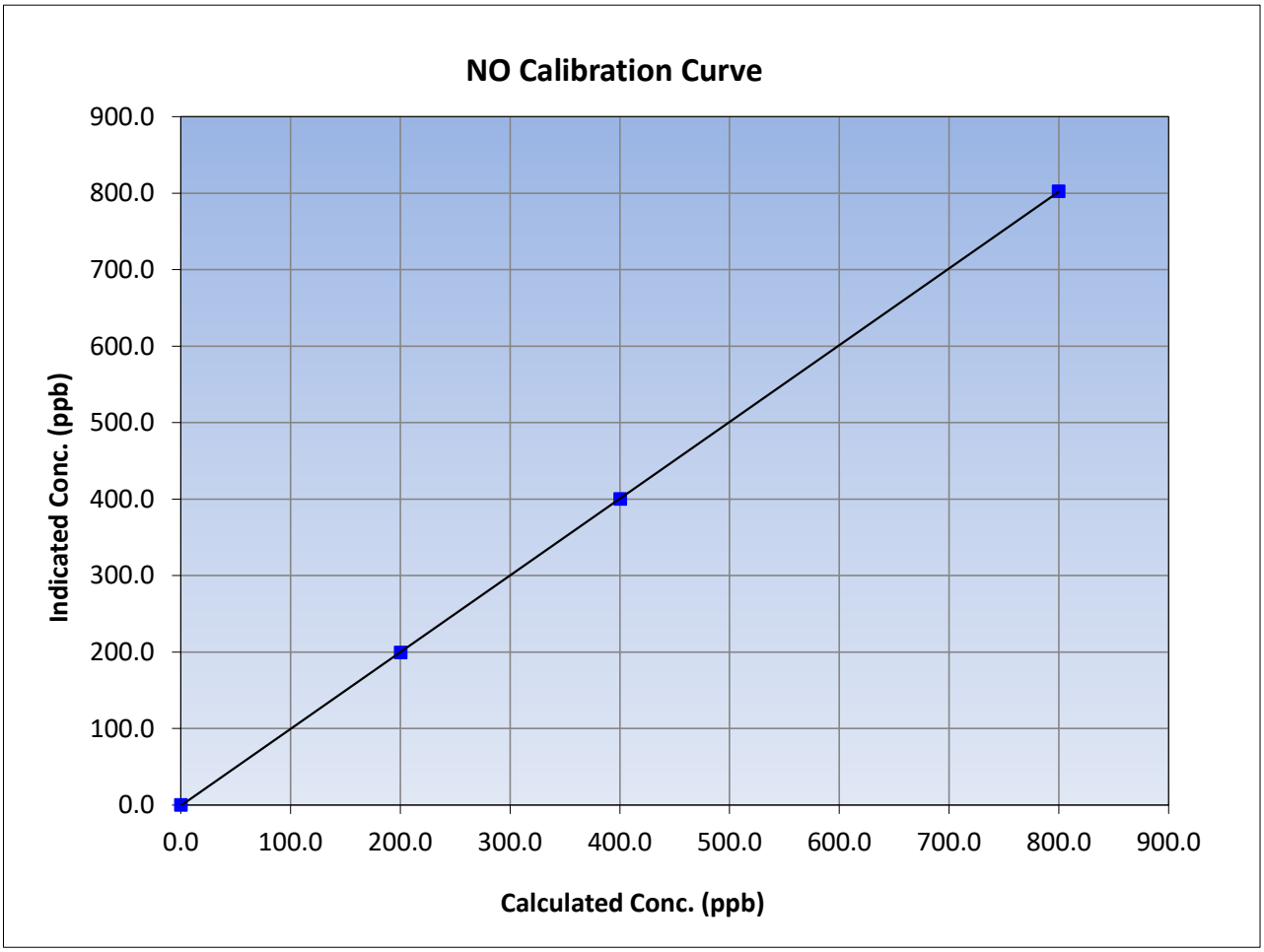
Version-04-2020

Station Information

Calibration Date:	January 26, 2023	Previous Calibration:	December 1, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:16	End Time (MST):	17:52
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999994	≥0.995
799.9	802.2	0.9971			
400.4	400.3	1.0004	Slope	1.003357	0.90 - 1.10
200.2	199.2	1.0051			
			Intercept	-0.891348	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

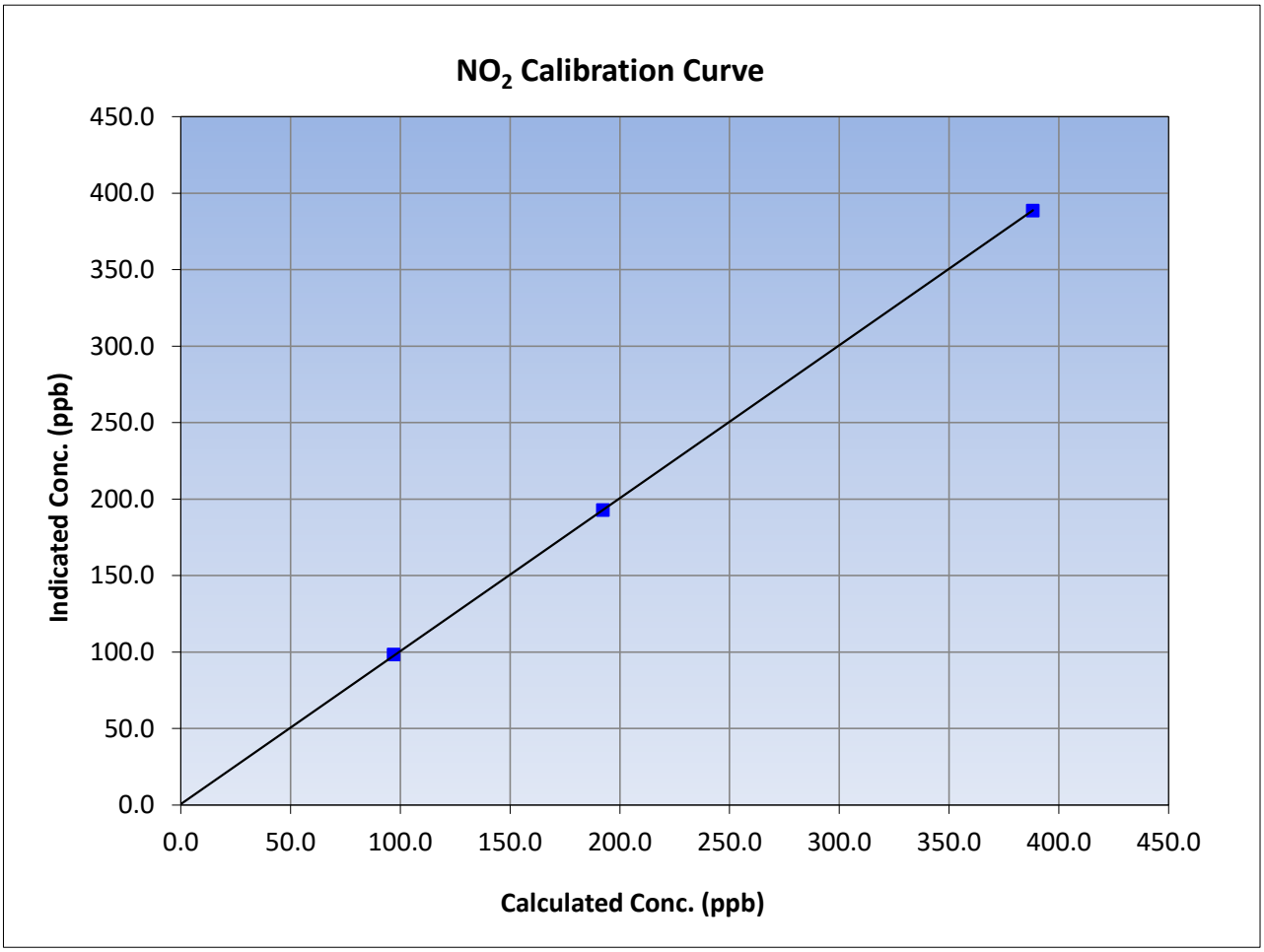
Version-04-2020

Station Information

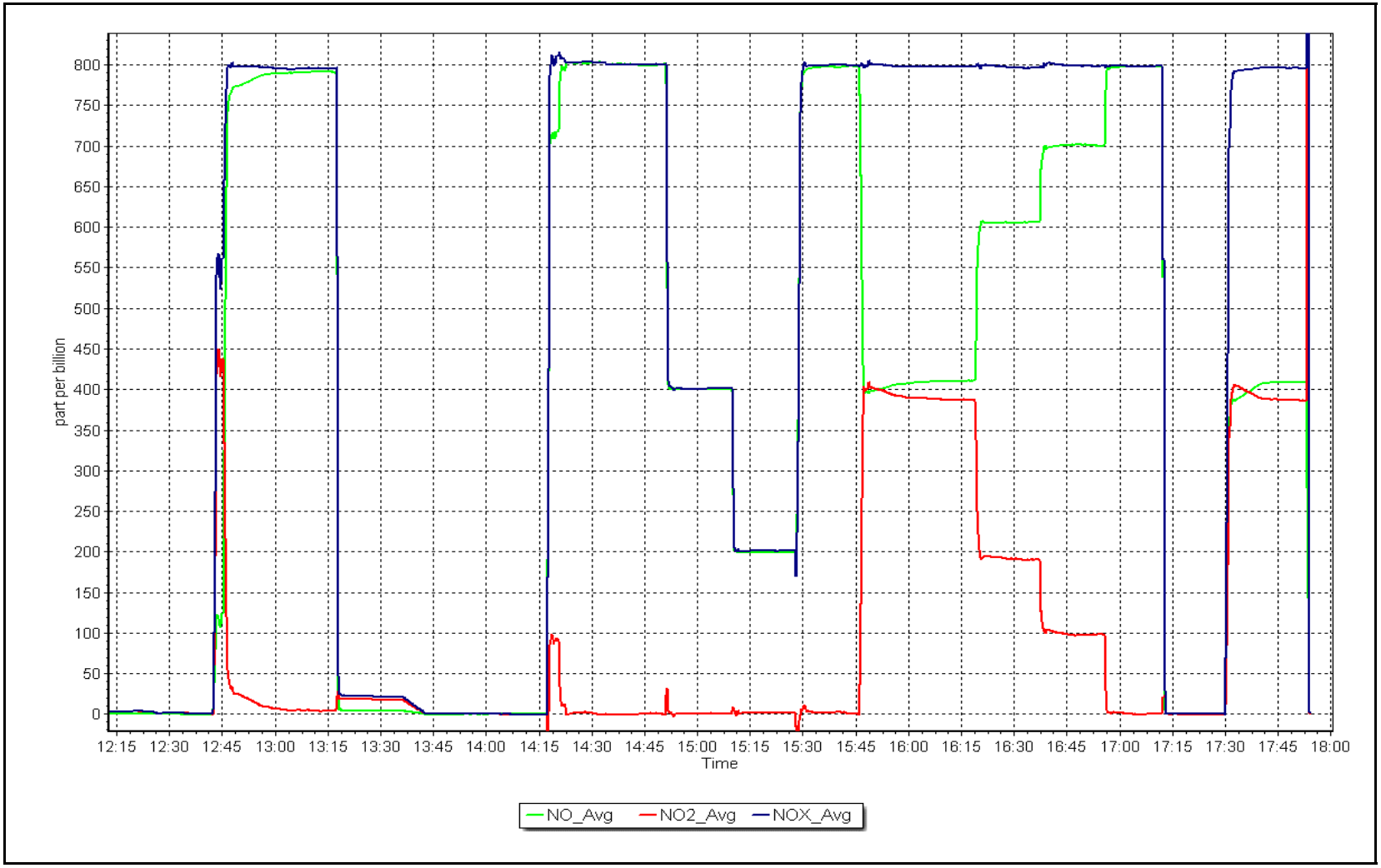
Calibration Date:	January 26, 2023	Previous Calibration:	December 1, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	12:16	End Time (MST):	17:52
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999985	≥0.995
388.2	388.5	0.9992			
192.3	192.9	0.9969	Slope	0.999938	0.90 - 1.10
96.9	98.3	0.9858			
			Intercept	0.560426	+/-20



NO_X Calibration Plot Date: January 26, 2023 Location: Janvier



Wood Buffalo Environmental Association

O_3 Calibration Report

Version-01-2020

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 25, 2023	Last Cal Date:	December 16, 2022
Start time (MST):	11:15	End time (MST):	14:12
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3806
ZAG Make/Model:	Teledyne API T701	Serial Number:	201

Analyzer Information

Analyzer make:	Teledyne API T400	Analyzer serial #:	3869
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998686	0.998486	Backgd or Offset:	-2.0	-2.0
Calibration intercept:	0.480000	0.240000	Coeff or Slope:	1.011	1.011

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	800.0	0.0	0.0	----
as found span	4893	892.5	400.0	398.4	1.004
as found 2nd point					
as found 3rd point					
calibrator zero	5000	800.0	0.0	0.1	----
high point	4893	892.5	400.0	399.6	1.001
second point	4893	747.3	200.0	199.9	1.001
third point	4893	648.9	100.0	100.3	0.997
as left zero	5000	800.0	0.0	0.4	----
as left span	4816	892.5	400.0	401.0	0.998
				Average Correction Factor	1.000

Baseline Corr As found:	398.4	Previous response	400.0	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

O_3 Calibration Summary

Version-01-2020

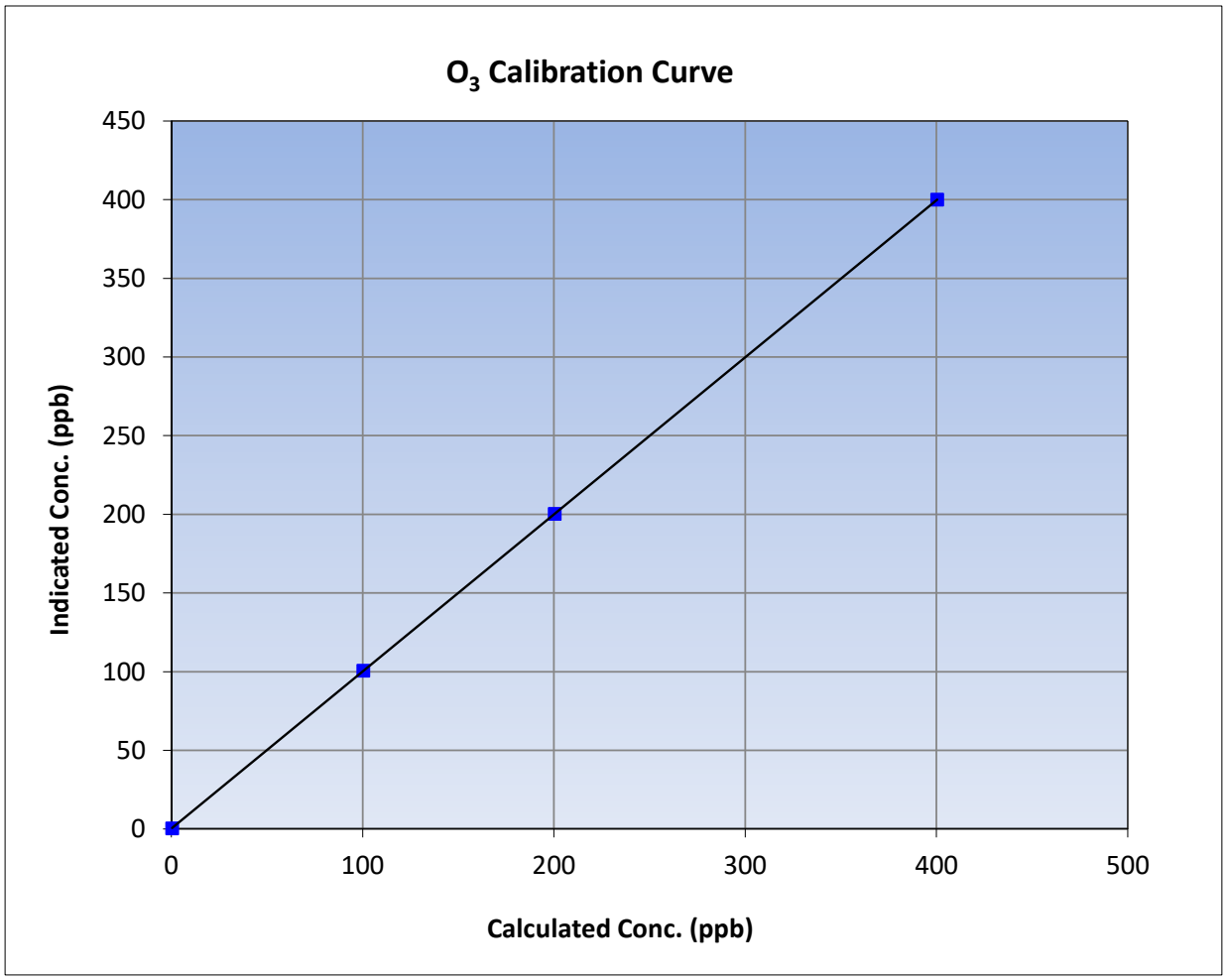
Station Information

Calibration Date:	January 25, 2023	Previous Calibration:	December 16, 2022
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:15	End Time (MST):	14:12
Analyzer make:	Teledyne API T400	Analyzer serial #:	3869

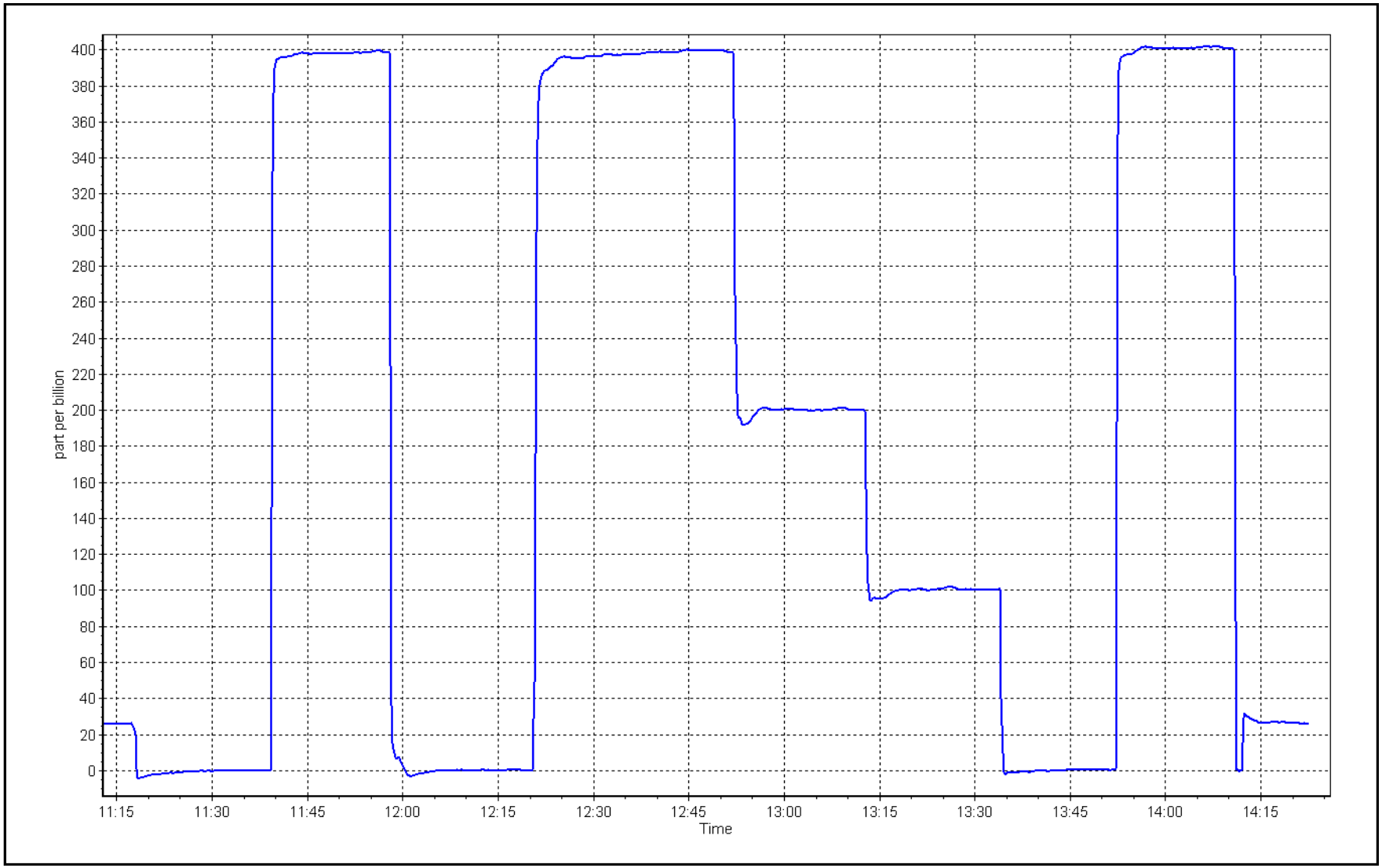
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
400.0	399.6	1.0010
200.0	199.9	1.0005
100.0	100.3	0.9970

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.998486	*0.90 - 1.10*
Intercept	0.240000	*+/- 5*



O_3 Calibration Plot Date: January 25, 2023 Location: Janvier



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 26, 2023	Last Cal Date:	December 16, 2022
Start time (MST):	14:47	End time (MST):	16:29
Analyzer Make:	API T640	S/N:	325
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-3.4	-2.7	-3.4	☐	+/- 2 °C
P (mmHg)	715.1	713.2	715.1	☐	+/- 10 mmHg
flow (LPM)	5.01	5.06	5.01	☐	+/- 0.25 LPM

Leak Test: Date of check: January 26, 2023 — December 16, 2022

PM w/o HEPA: 2.8 — PM w/ HEPA: 0.0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
PMT Peak Test	10.1	------	11.0	☑	10.9 +/- 0.5

Date Optical Chamber Cleaned: January 26, 2023

Disposable Filter Changed: January 26, 2023

Annual Maintenance

Date Sample Tube Cleaned: October 6, 2022

Date RH/T Sensor Cleaned: October 6, 2022

Notes: Verified flow, temperature, and pressure. Leak test passed. PMT peak voltage adjusted from 1382V to 1385V. Optical chamber cleaned and disposable filter changed.

Calibration by: Rene Chamberland

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS23
FORT HILLS
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Hills	Station number:	AMS23
Calibration Date:	January 4, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	10:43	End time (MST):	13:50
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:	N/A
Removed Gas Cyl #:	N/A		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 — Analyzer serial #: 1160290012

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.992999	0.999236	Backgd or Offset:	17.1	18.1
Calibration intercept:	-0.521973	-0.603450	Coeff or Slope:	1.036	1.048

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*
as found zero	5000	0.0	0.0	0.4	----
as found span	4920	80.3	799.1	788.2	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	----
high point	4920	80.3	799.1	798.1	1.001
second point	4960	40.2	400.1	399.2	1.002
third point	4980	20.1	200.0	198.3	1.009
as left zero	5000	0.0	0.0	0.0	----
as left span	4920	80.3	799.1	801.3	0.997
				Average Correction Factor	1.004

Baseline Corr As found:	787.80	Previous response	792.98	*% 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

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

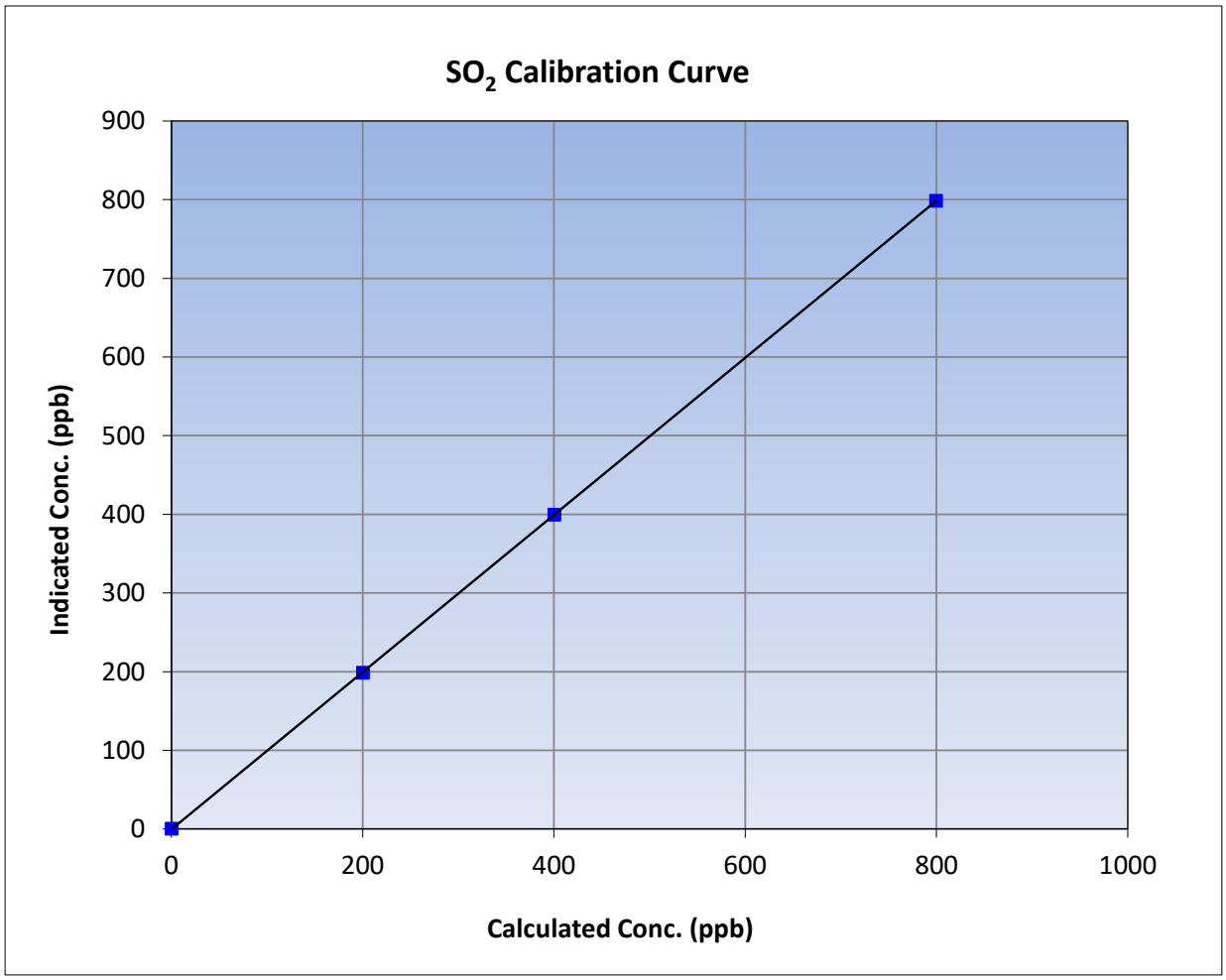
Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:43	End Time (MST):	13:50
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012

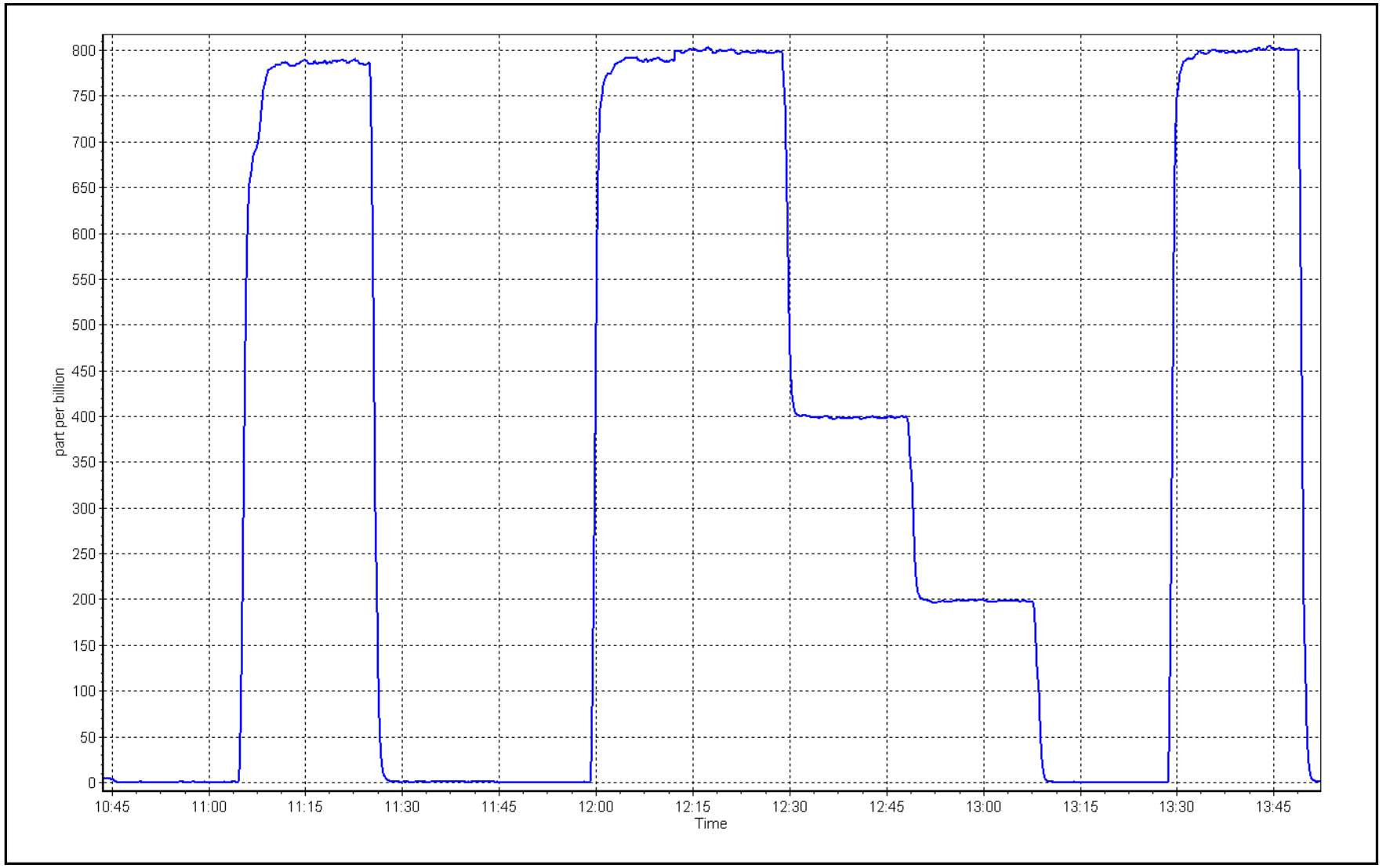
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.1	798.1	1.0013
400.1	399.2	1.0021
200.0	198.3	1.0087

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.999236	*0.90 - 1.10*
Intercept	-0.603450	*+/-30*



SO2 Calibration Plot Date: January 4, 2023 Location: Fort Hills



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Fort Hills	Station number:	AMS23
Calibration Date:	January 10, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	11:01	End time (MST):	14:52
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:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	451
ZAG Make/Model:	API T701		Serial Number:	5611

Analyzer Information

Analyzer make:	Thermo 43iQ TLE		Analyzer serial #:	12113311965	
Converter make:	CDN-101		Converter serial #:	594	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000594	0.988739	Backgd or Offset:	0.96	0.96
Calibration intercept:	0.442079	0.581876	Coeff or Slope:	0.714	0.714

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	0.1	----
as found span	4923	77.0	80.0	79.1	1.013
as found 2nd point	4962	38.5	40.0	39.4	1.018
as found 3rd point	4981	19.2	19.9	19.6	1.023
new cylinder response					

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	0.1	----
high point	4923	77.0	80.0	79.4	1.008
second point	4962	38.5	40.0	40.5	0.988
third point	4981	19.2	19.9	20.7	0.964
as left zero	5000	0.0	0.0	1.4	----
as left span	4923	77.0	80.0	80.9	0.989
SO2 Scrubber Check	4922	78.3	783.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.986
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	79.0	Prev response:	80.49	*% change:	-1.9%
Baseline Corr 2nd AF pt:	39.3	AF Slope:	0.988032	AF Intercept:	-0.018415
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999989		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

H_2S/TRS Calibration Summary

Version-11-2021

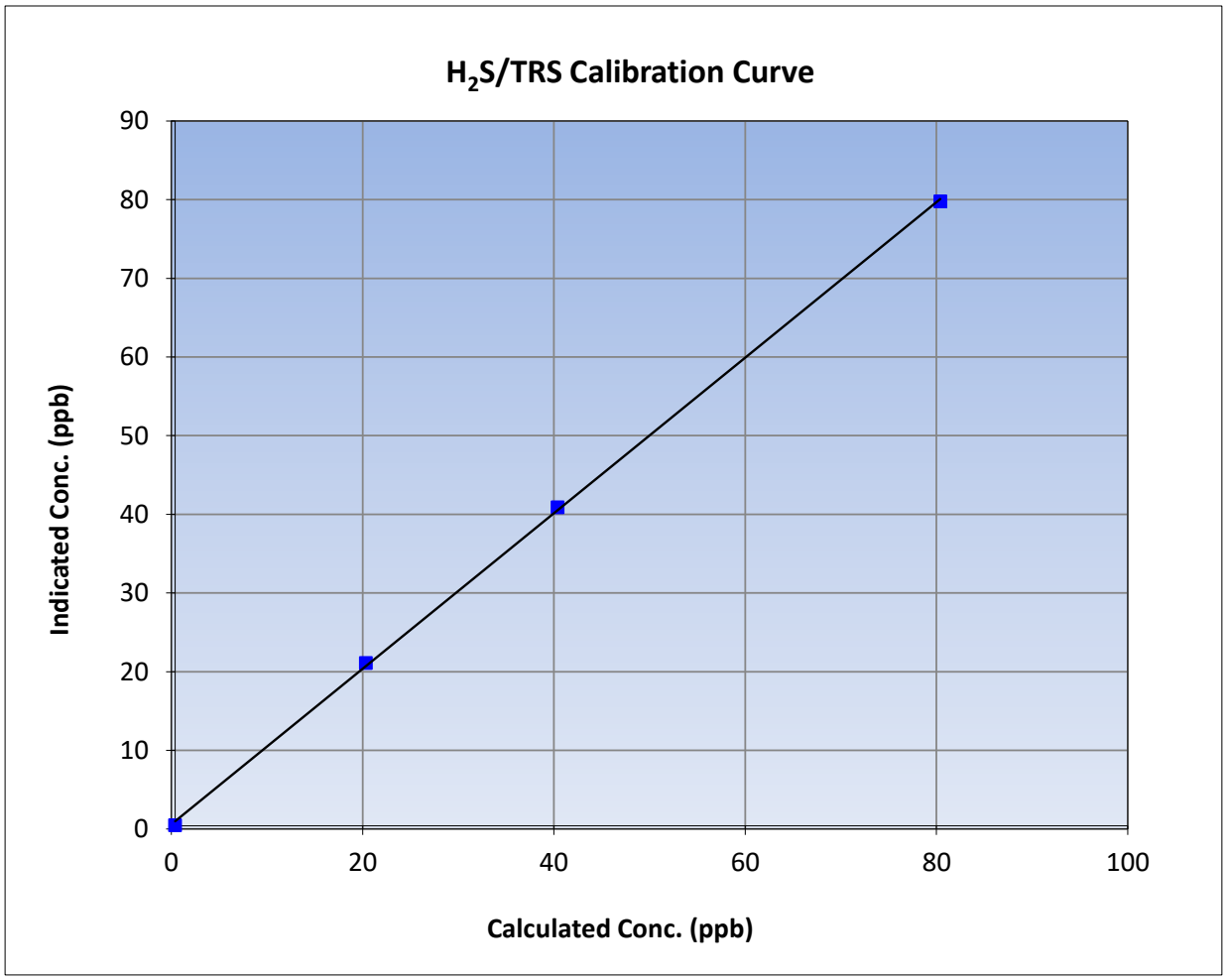
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 8, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	11:01	End Time (MST):	14:52
Analyzer make:	Thermo 43iQ TLE	Analyzer serial #:	12113311965

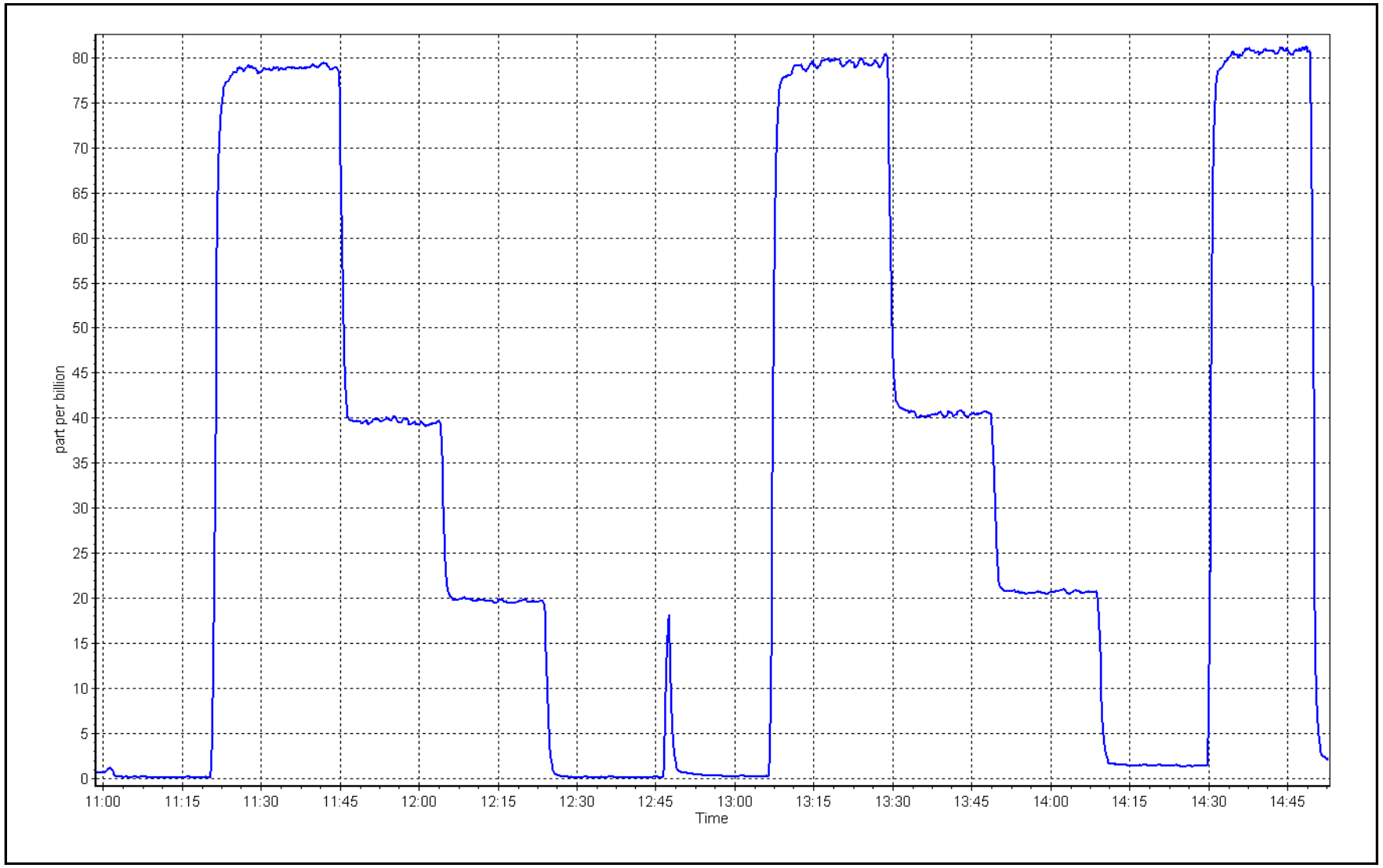
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	79.4	1.0076
40.0	40.5	0.9876
19.9	20.7	0.9637

Statistical Evaluation		Limits
Correlation Coefficient	0.999823	≥0.995
Slope	0.988739	0.90 - 1.10
Intercept	0.581876	+/-3



H_2S/TRS Calibration Plot Date: January 10, 2023 Location: Fort Hills



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Hills	Station number:	AMS23
Calibration Date:	January 4, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	10:43	End time (MST):	13:50
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:		N/A	Removed Gas Expiry:	N/A	
Removed CH4 Conc.	500.2	ppm	CH4 Equiv Conc.	1070.6	ppm
Removed C3H8 Conc.	207.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	451	
ZAG make/model:	API T701		Serial Number:	5611	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1193585648	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.28E-04	2.33E-04	NMHC SP Ratio:	5.04E-05	5.01E-05
CH4 Retention time:	13.0	13.0	NMHC Peak Area:	182523	180258

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	17.19	17.03	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	17.19	17.38	0.989
second point	4960	40.2	8.61	8.65	0.995
third point	4980	20.1	4.30	4.33	0.994
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	17.19	17.35	0.991
				Average Correction Factor	0.993

Baseline Corr AF:	17.03	Prev response	17.22	*% change	-1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	9.16	9.09	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	9.16	9.21	0.995
second point	4960	40.2	4.59	4.64	0.988
third point	4980	20.1	2.29	2.34	0.981
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	9.16	9.19	0.996
				Average Correction Factor	0.988
Baseline Corr AF:	9.09	Prev response	9.18	*% change	-1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	8.03	7.94	1.011
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	8.03	8.17	0.984
second point	4960	40.2	4.02	4.01	1.003
third point	4980	20.1	2.01	2.00	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	8.03	8.16	0.985
				Average Correction Factor	0.998
Baseline Corr AF:	7.94	Prev response	8.04	*% change	-1.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.002403	1.010672
THC Cal Offset:	-0.010188	-0.017415
CH4 Cal Slope:	1.004851	1.017425
CH4 Cal Offset:	-0.027043	-0.035257
NMHC Cal Slope:	1.000606	1.004438
NMHC Cal Offset:	0.016455	0.018841

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

THC Calibration Summary

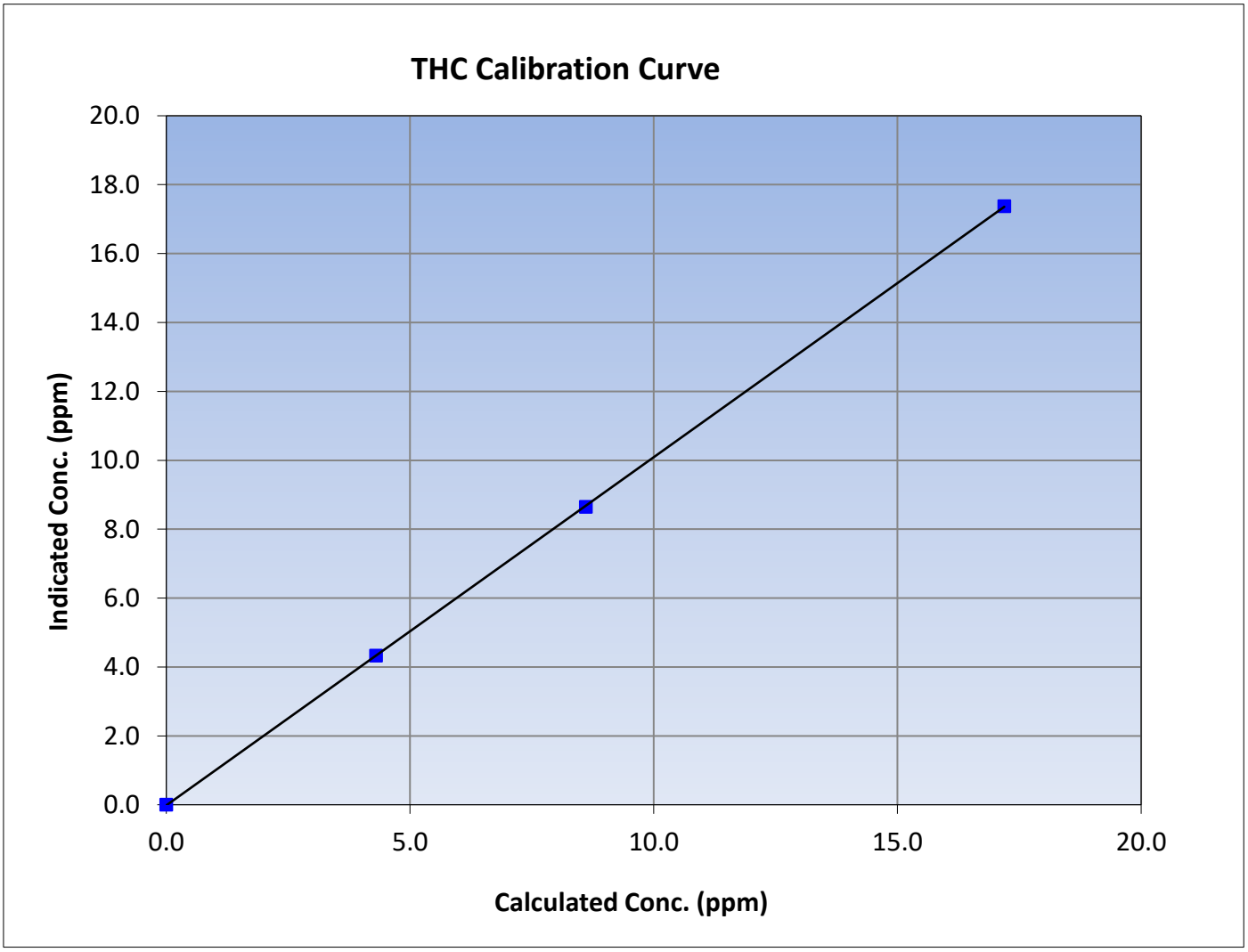
Version-01-2020

Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:43	End Time (MST):	13:50
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	0.999990	*≥0.995*
17.19	17.38	0.9895			
8.61	8.65	0.9952	Slope	1.010672	*0.90 - 1.10*
4.30	4.33	0.9937			
			Intercept	-0.017415	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

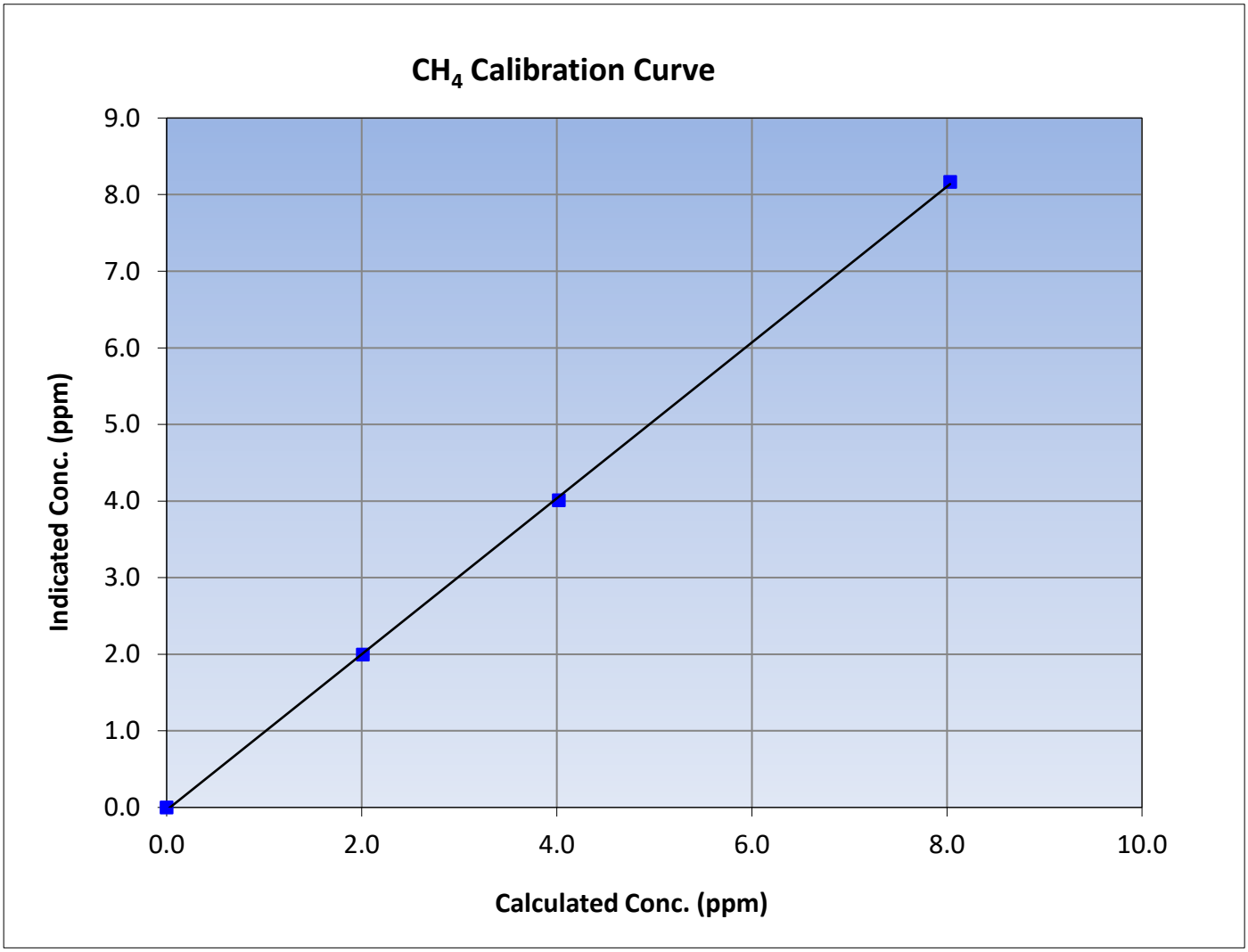
Version-01-2020

Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:43	End Time (MST):	13:50
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	0.999877	*≥0.995*
8.03	8.17	0.9838			
4.02	4.01	1.0031	Slope	1.017425	*0.90 - 1.10*
2.01	2.00	1.0079			
			Intercept	-0.035257	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

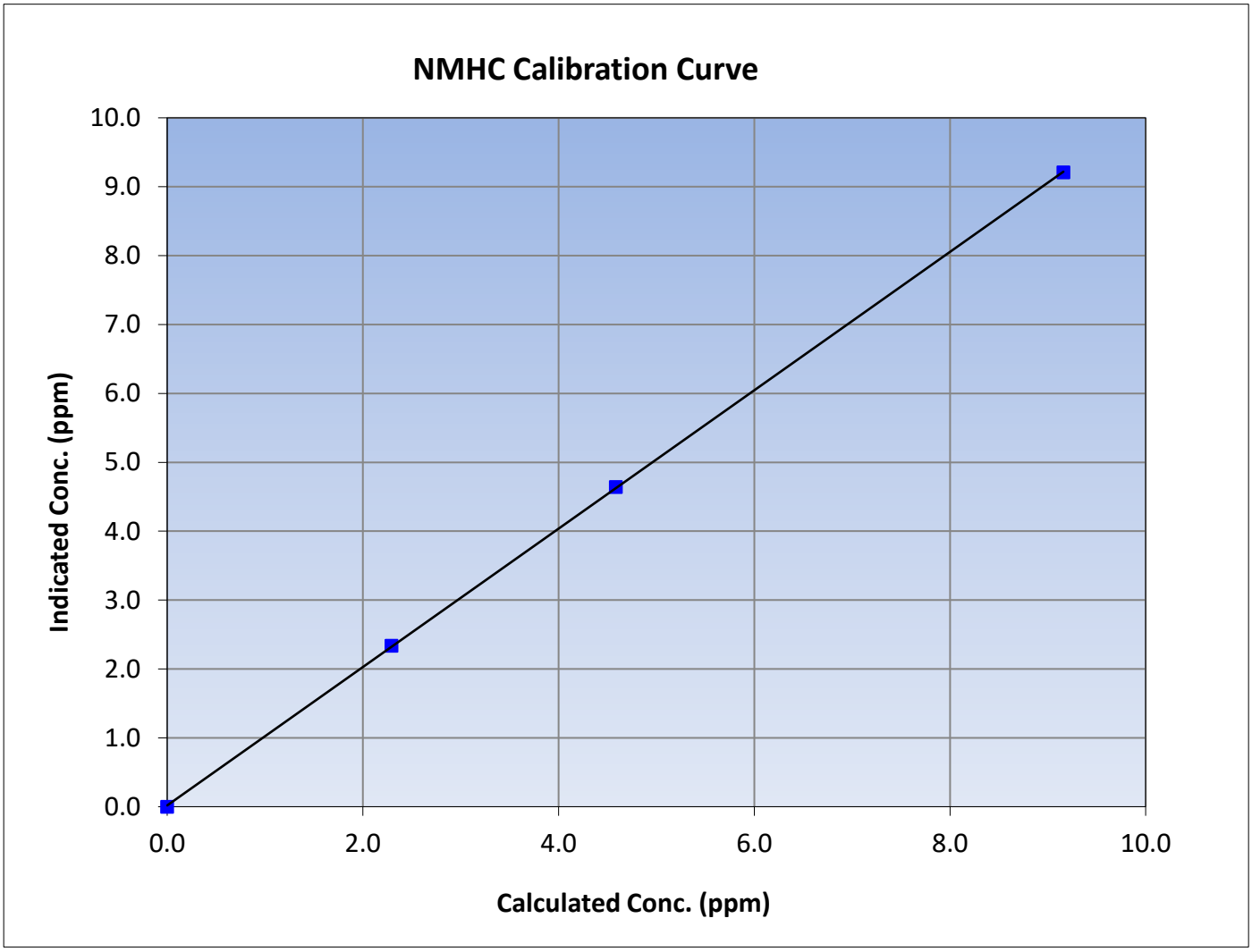
Version-01-2020

Station Information

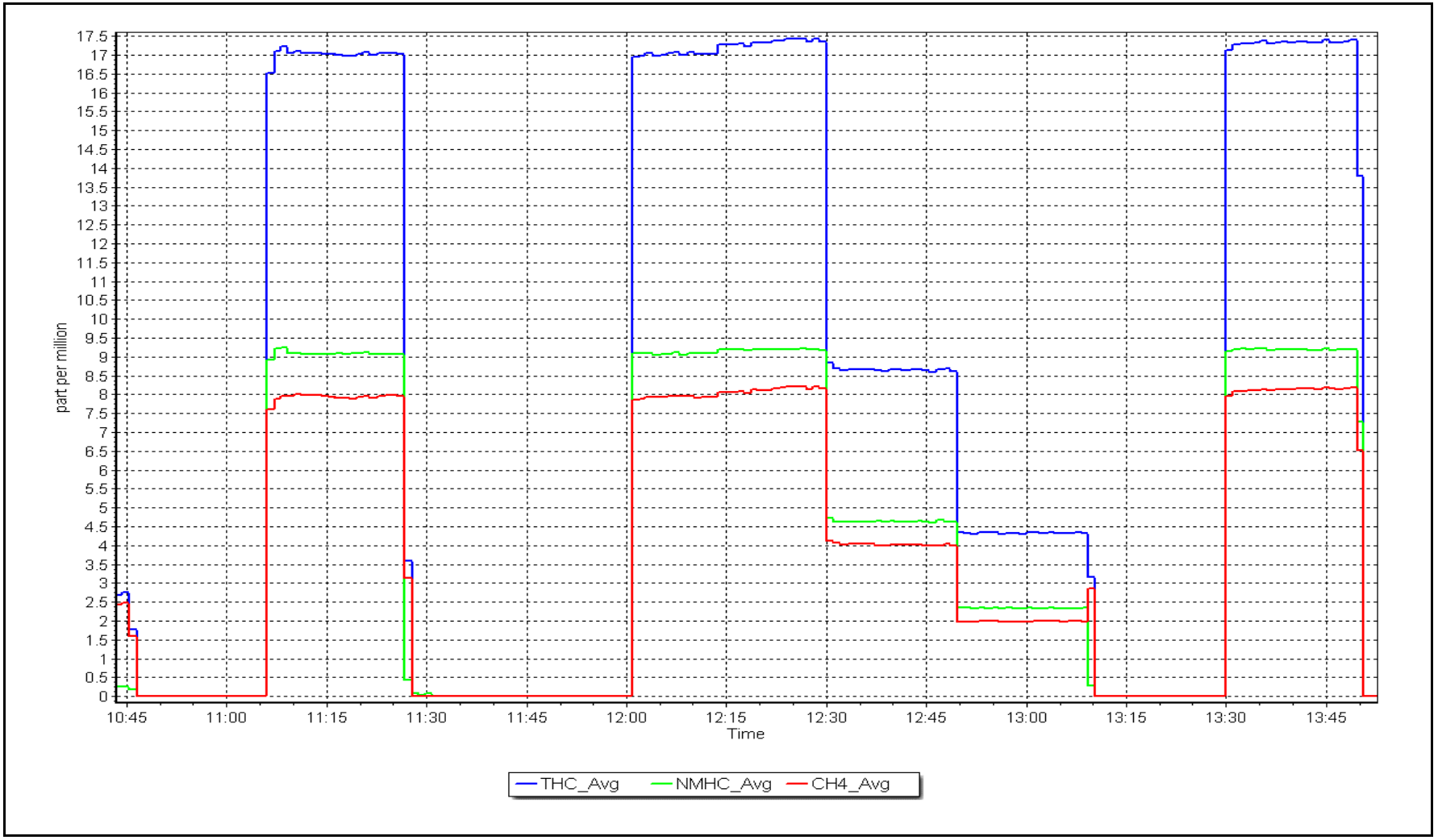
Calibration Date:	January 4, 2023	Previous Calibration:	December 5, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:43	End Time (MST):	13:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999979	≥0.995
9.16	9.21	0.9948			
4.59	4.64	0.9880	Slope	1.004438	0.90 - 1.10
2.29	2.34	0.9815			
			Intercept	0.018841	+/-0.5



NMHC Calibration Plot Date: January 4, 2023 Location: Fort Hills



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Fort Hills	Station number:	AMS23
Calibration Date:	January 18, 2023	Last Cal Date:	January 4, 2023
Start time (MST):	10:24	End time (MST):	14:24
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:		CC281425	Cal Gas Expiry Date:	January 5, 2025	
CH4 Cal Gas Conc.	500.2	ppm	CH4 Equiv Conc.	1070.6	ppm
C3H8 Cal Gas Conc.	207.4	ppm			
Removed Gas Cert:		N/A	Removed Gas Expiry:	N/A	
Removed CH4 Conc.	500.2	ppm	CH4 Equiv Conc.	1070.6	ppm
Removed C3H8 Conc.	207.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	451	
ZAG make/model:	API T701		Serial Number:	5611	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1193585648	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.33E-04	2.33E-04	NMHC SP Ratio:	5.01E-05	5.01E-05
CH4 Retention time:	13.0	13.0	NMHC Peak Area:	180258	180258

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	17.19	14.50	1.185
as found 2nd point	4960	40.2	8.61	7.15	1.203
as found 3rd point	4980	20.1	4.30	3.65	1.180
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	17.19	17.17	1.001
second point	4960	40.2	8.61	8.61	1.000
third point	4980	20.1	4.30	4.31	0.999
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	17.19	17.28	0.995
				Average Correction Factor	1.000

Baseline Corr AF:	14.50	Prev response	17.36	*% change	-19.7%
Baseline Corr 2nd AF:	7.2	AF Slope:	0.842506	AF Intercept:	-0.014862
Baseline Corr 3rd AF:	3.6	AF Correlation:	0.999919	* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	9.16	7.54	1.214
as found 2nd point	4960	40.2	4.59	3.74	1.225
as found 3rd point	4980	20.1	2.29	1.93	1.186
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	9.16	9.13	1.003
second point	4960	40.2	4.59	4.60	0.996
third point	4980	20.1	2.29	2.33	0.985
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	9.16	9.17	0.999
				Average Correction Factor	0.995
Baseline Corr AF:	7.54	Prev response	9.22	*% change	-22.2%
Baseline Corr 2nd AF:	3.7	AF Slope:	0.821429	AF Intercept:	0.011089
Baseline Corr 3rd AF:	1.9	AF Correlation:	0.999905	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4920	80.3	8.03	6.96	1.154
as found 2nd point	4960	40.2	4.02	3.41	1.179
as found 3rd point	4980	20.1	2.01	1.71	1.174
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4920	80.3	8.03	8.04	0.999
second point	4960	40.2	4.02	4.01	1.004
third point	4980	20.1	2.01	1.98	1.015
as left zero	5000	0.0	0.00	0.00	----
as left span	4920	80.3	8.03	8.12	0.990
				Average Correction Factor	1.006
Baseline Corr AF:	6.96	Prev response	8.14	*% change	-16.9%
Baseline Corr 2nd AF:	3.41	AF Slope:	0.866538	AF Intercept:	-0.025951
Baseline Corr 3rd AF:	1.71	AF Correlation:	0.999869	* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.010672	0.998822
THC Cal Offset:	-0.017415	0.006016
CH4 Cal Slope:	1.017425	1.001922
CH4 Cal Offset:	-0.035257	-0.016245
NMHC Cal Slope:	1.004438	0.996115
NMHC Cal Offset:	0.018841	0.022460

Notes: Due to pump failure low as founds. Swapped out the pump and the inlet filter after multipoint as founds. No adjustments needed.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

THC Calibration Summary

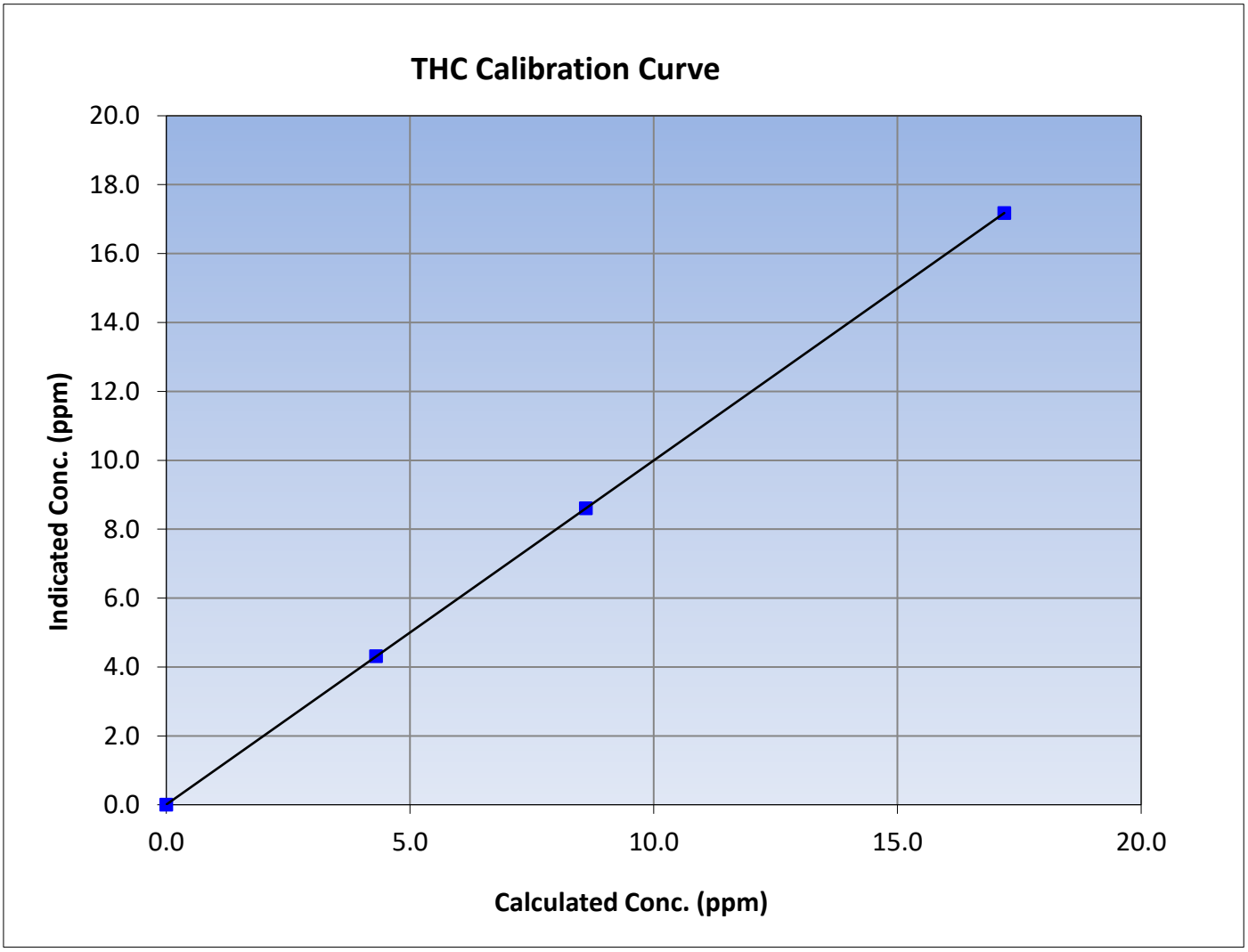
Version-01-2020

Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	January 4, 2023
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:24	End Time (MST):	14:24
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
17.19	17.17	1.0010			
8.61	8.61	0.9999	Slope	0.998822	0.90 - 1.10
4.30	4.31	0.9987			
			Intercept	0.006016	+/-0.5



Wood Buffalo Environmental Association

CH_4 Calibration Summary

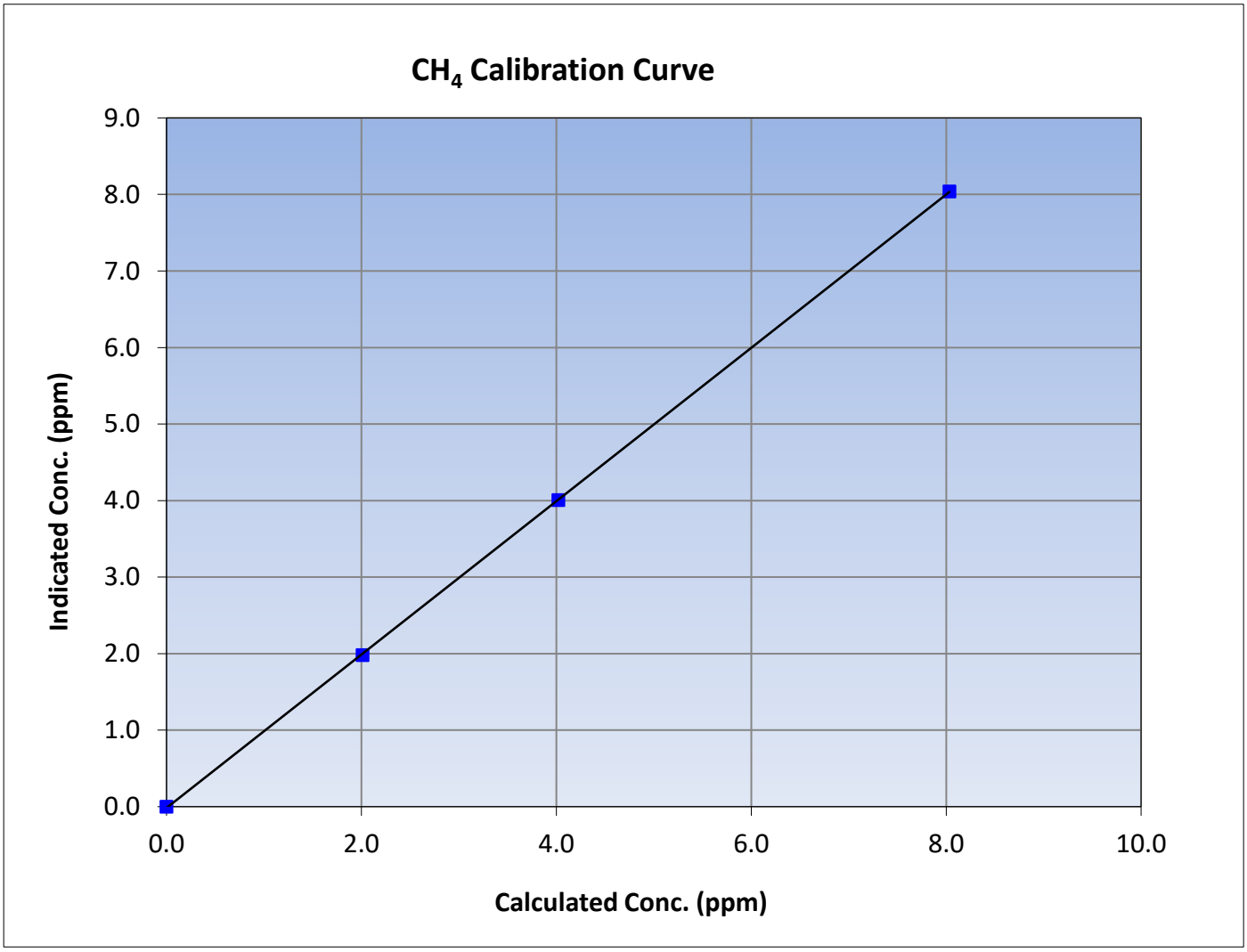
Version-01-2020

Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	January 4, 2023
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:24	End Time (MST):	14:24
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	0.999981	*≥0.995*
8.03	8.04	0.9991			
4.02	4.01	1.0041	Slope	1.001922	*0.90 - 1.10*
2.01	1.98	1.0145			
			Intercept	-0.016245	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

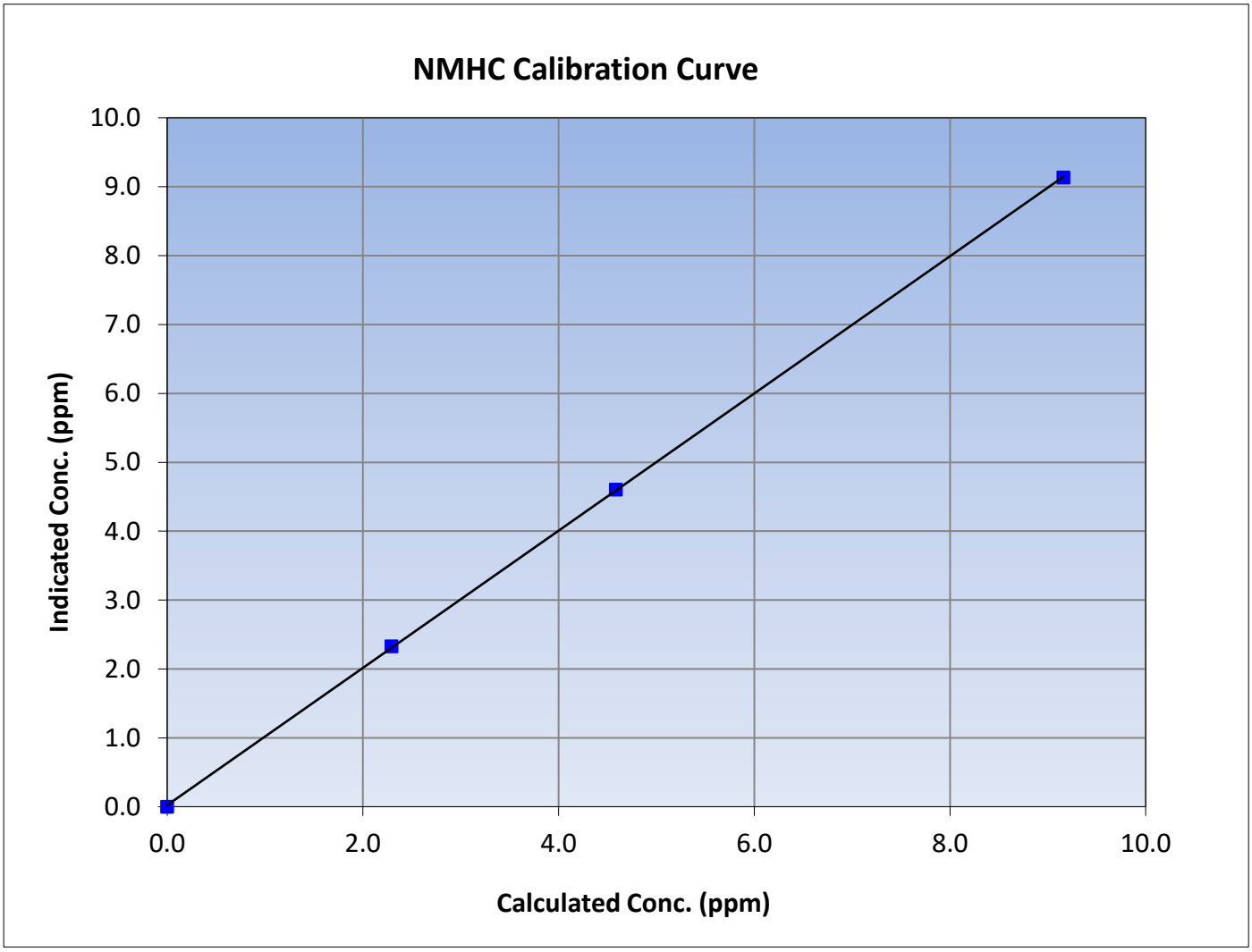
Version-01-2020

Station Information

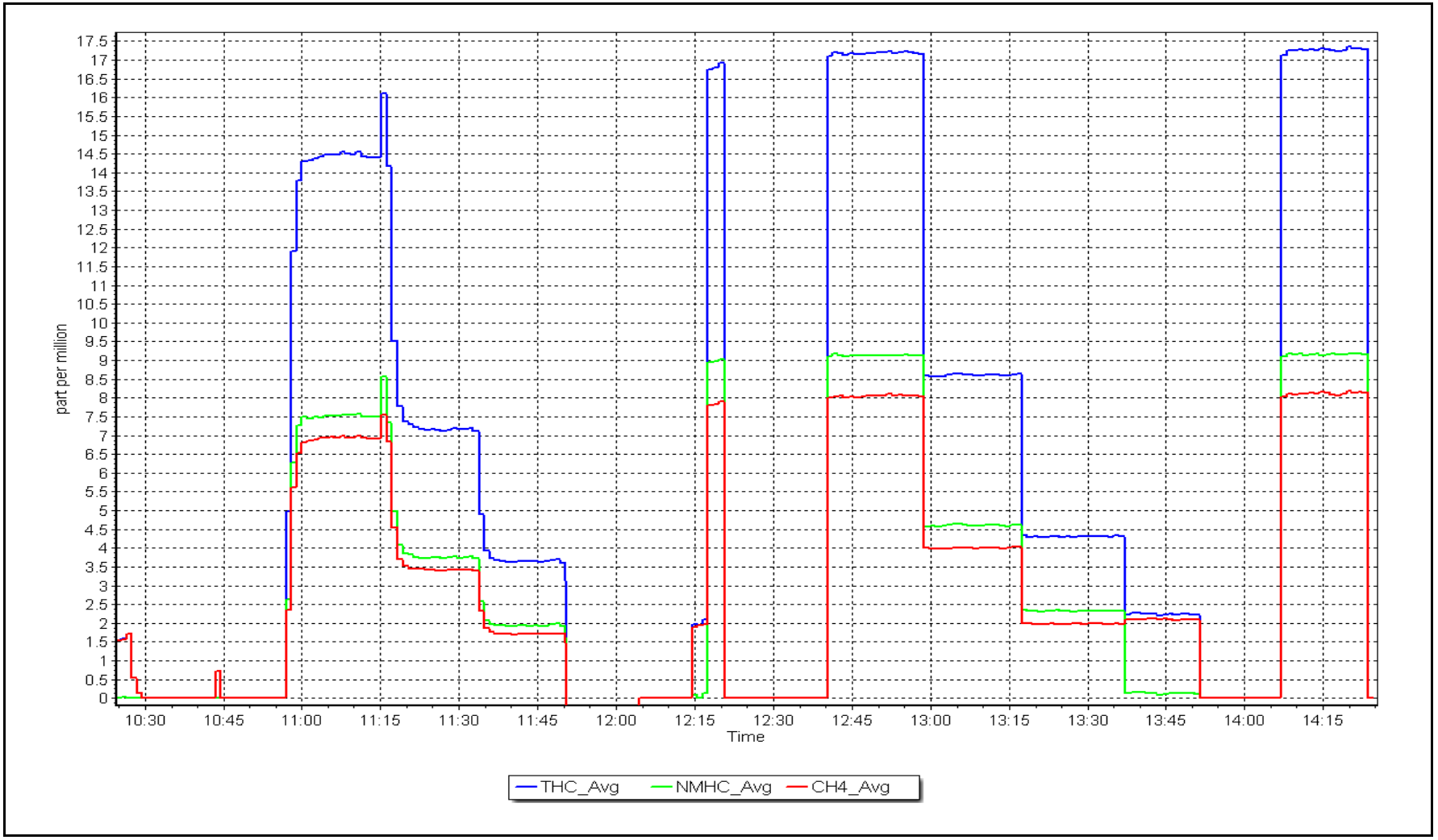
Calibration Date:	January 18, 2023	Previous Calibration:	January 4, 2023
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:24	End Time (MST):	14:24
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585648

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999972	*≥0.995*
9.16	9.13	1.0028			
4.59	4.60	0.9960	Slope	0.996115	*0.90 - 1.10*
2.29	2.33	0.9853			
			Intercept	0.022460	*+/-0.5*



NMHC Calibration Plot Date: January 18, 2023 Location: Fort Hills



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Fort Hills	Station number:	AMS23
Calibration Date:	January 24, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	10:04	End time (MST):	15:17
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	CC332703		Cal Gas Expiry Date:	January 28, 2024	
NOX Cal Gas Conc:	49.7	ppm	NO Cal Gas Conc:	49.7	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date:	N/A	
Removed Gas NOX Conc:	49.7	ppm	Removed Gas NO Conc:	49.7	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T750		Serial Number:	275	
ZAG make/model:	Teledyne API T751H		Serial Number:	307	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1152430007	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.501	1.527	NO bkgnd or offset:	4.2	4.3
NOX coeff or slope:	0.995	0.997	NOX bkgnd or offset:	4.6	4.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	221.4	225.4

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.994625	0.999637
NO_X Cal Offset:	-0.277404	0.644160
NO Cal Slope:	0.996641	0.999282
NO Cal Offset:	-1.157676	-0.256715
NO_2 Cal Slope:	0.992164	1.001046
NO_2 Cal Offset:	-0.103647	0.284247

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.2	----	----
as found span	4920	80.5	800.2	800.2	0.0	787.7	786.0	1.7	1.016	1.018
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.2	----	----
high point	4920	80.5	800.2	800.2	0.0	799.9	799.5	0.4	1.000	1.001
second point	4960	40.2	399.6	399.6	0.0	401.2	399.0	2.2	0.996	1.001
third point	4980	20.1	199.8	199.8	0.0	200.6	198.8	1.8	0.996	1.005
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.3	----	----
as left span	4920	80.5	800.2	436.5	363.7	802.5	435.9	366.6	0.997	1.001
								Average Correction Factor	0.997	1.002

Corrected As found	NO_X = 787.9 ppb	NO = 785.9 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	-1.0%
Previous Response	NO_X = 795.6 ppb	NO = 796.3 ppb			*Percent Change	NO =	-1.3%
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	796.0	432.3	363.7	364.0	0.999	100.1%
2nd GPT point (200 ppb O3)	796.0	617.2	178.8	179.9	0.994	100.6%
3rd GPT point (100 ppb O3)	796.0	704.4	91.6	92.2	0.993	100.7%
				Average Correction Factor	0.996	100.5%

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

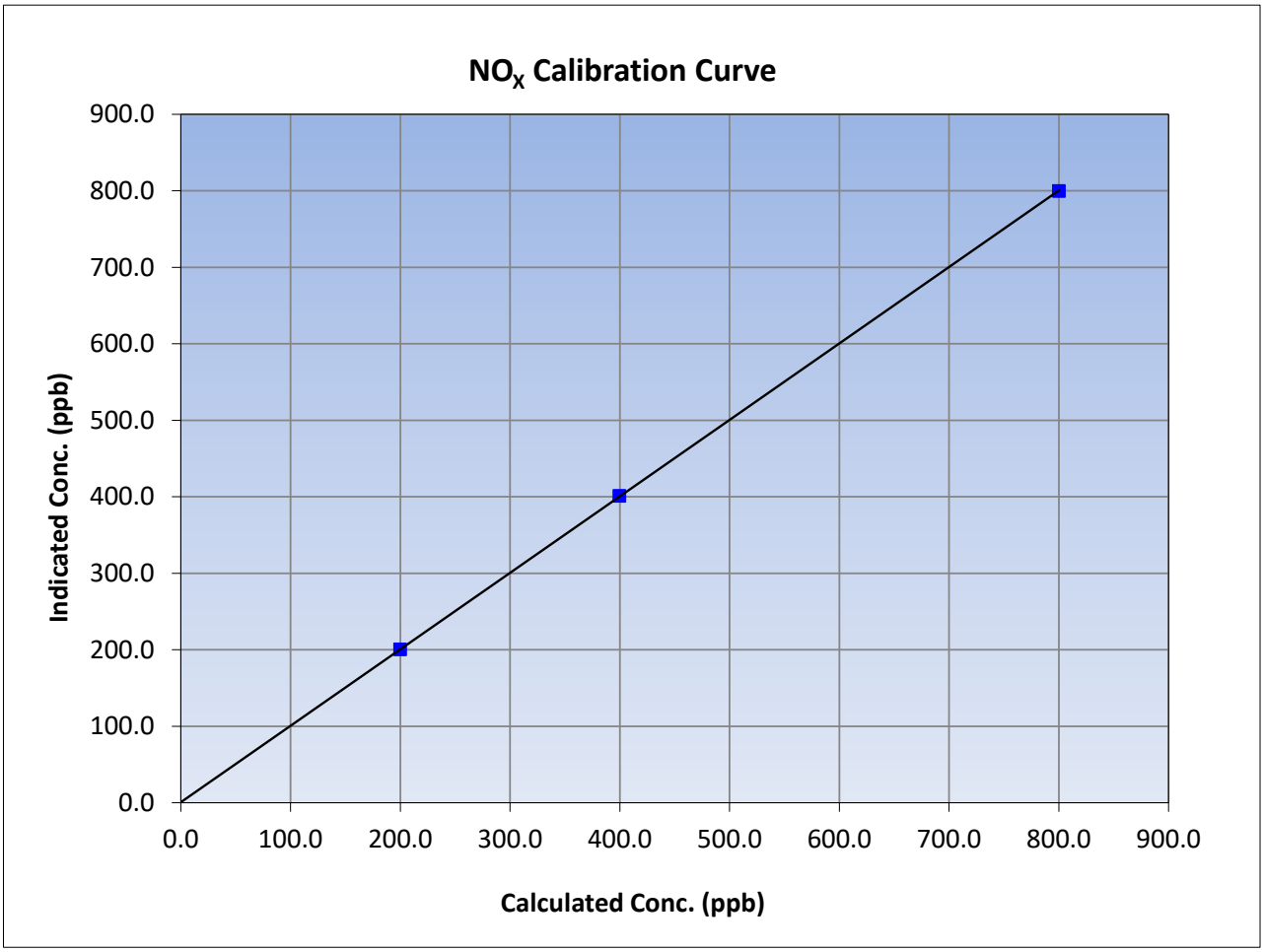
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 7, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:04	End Time (MST):	15:17
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999994	*≥0.995*
800.2	799.9	1.0003			
399.6	401.2	0.9959	Slope	0.999637	*0.90 - 1.10*
199.8	200.6	0.9960			
			Intercept	0.644160	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

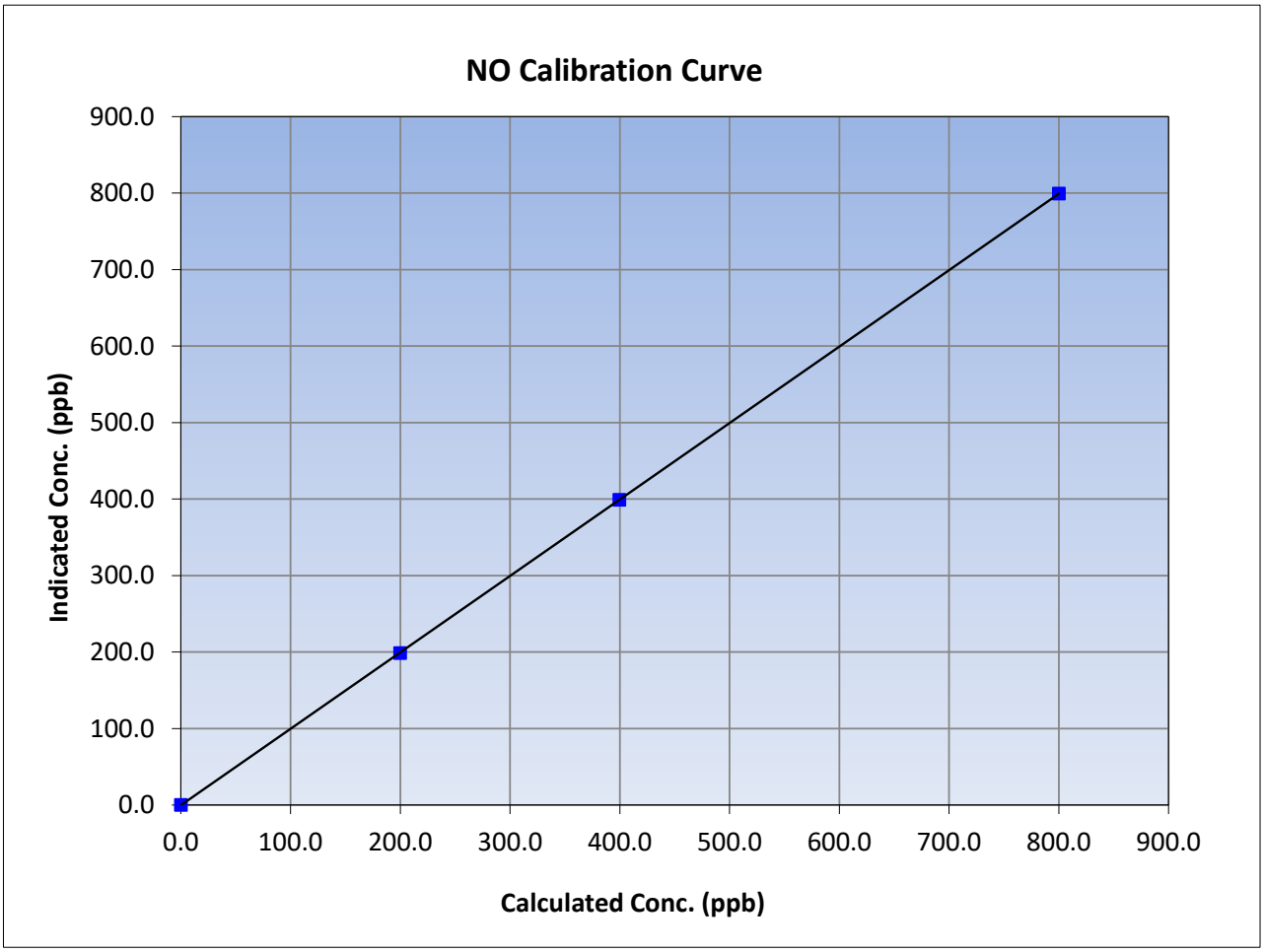
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 7, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:04	End Time (MST):	15:17
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999998	*≥0.995*
800.2	799.5	1.0008			
399.6	399.0	1.0014	Slope	0.999282	*0.90 - 1.10*
199.8	198.8	1.0050			
			Intercept	-0.256715	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

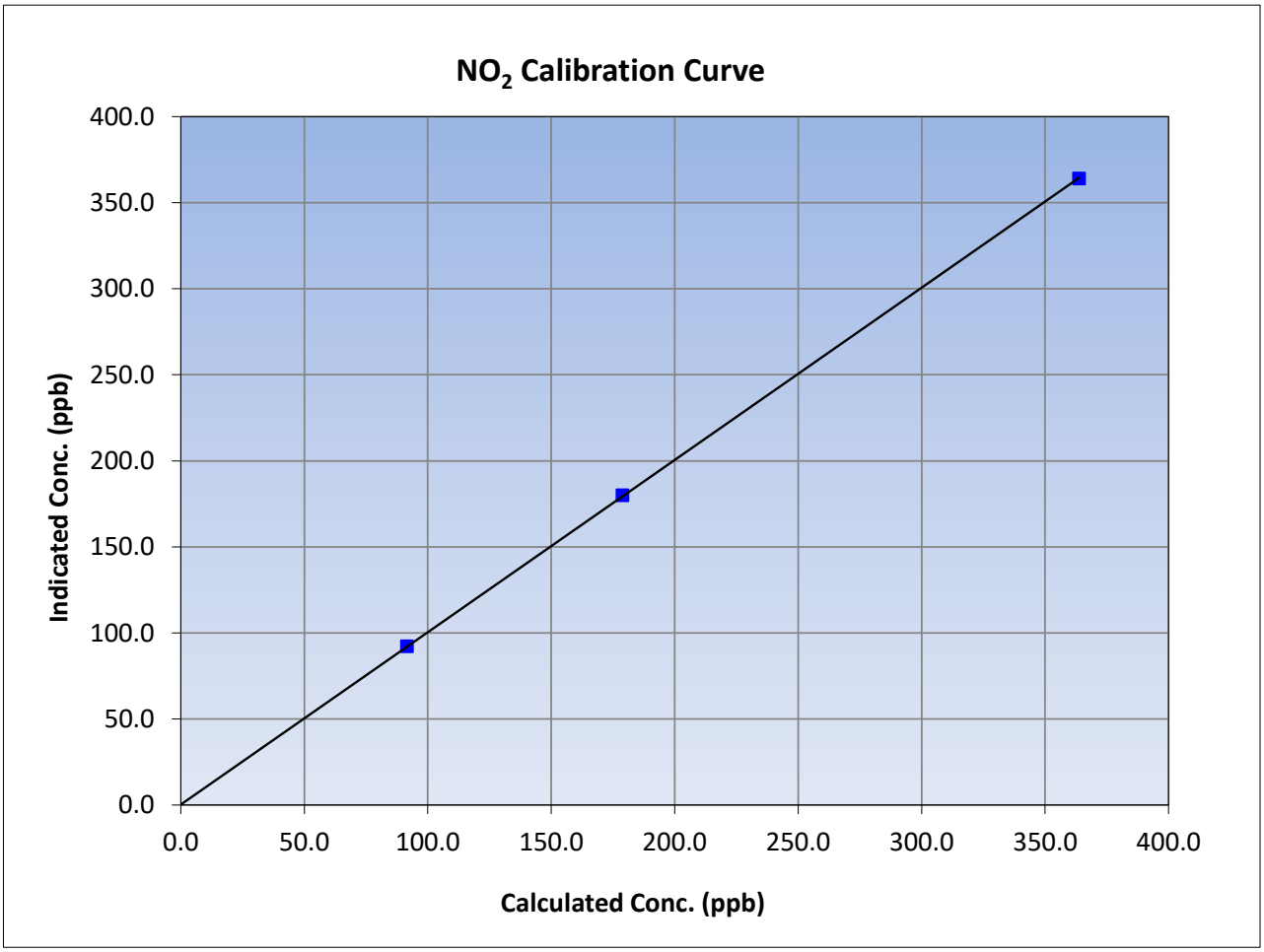
Version-04-2020

Station Information

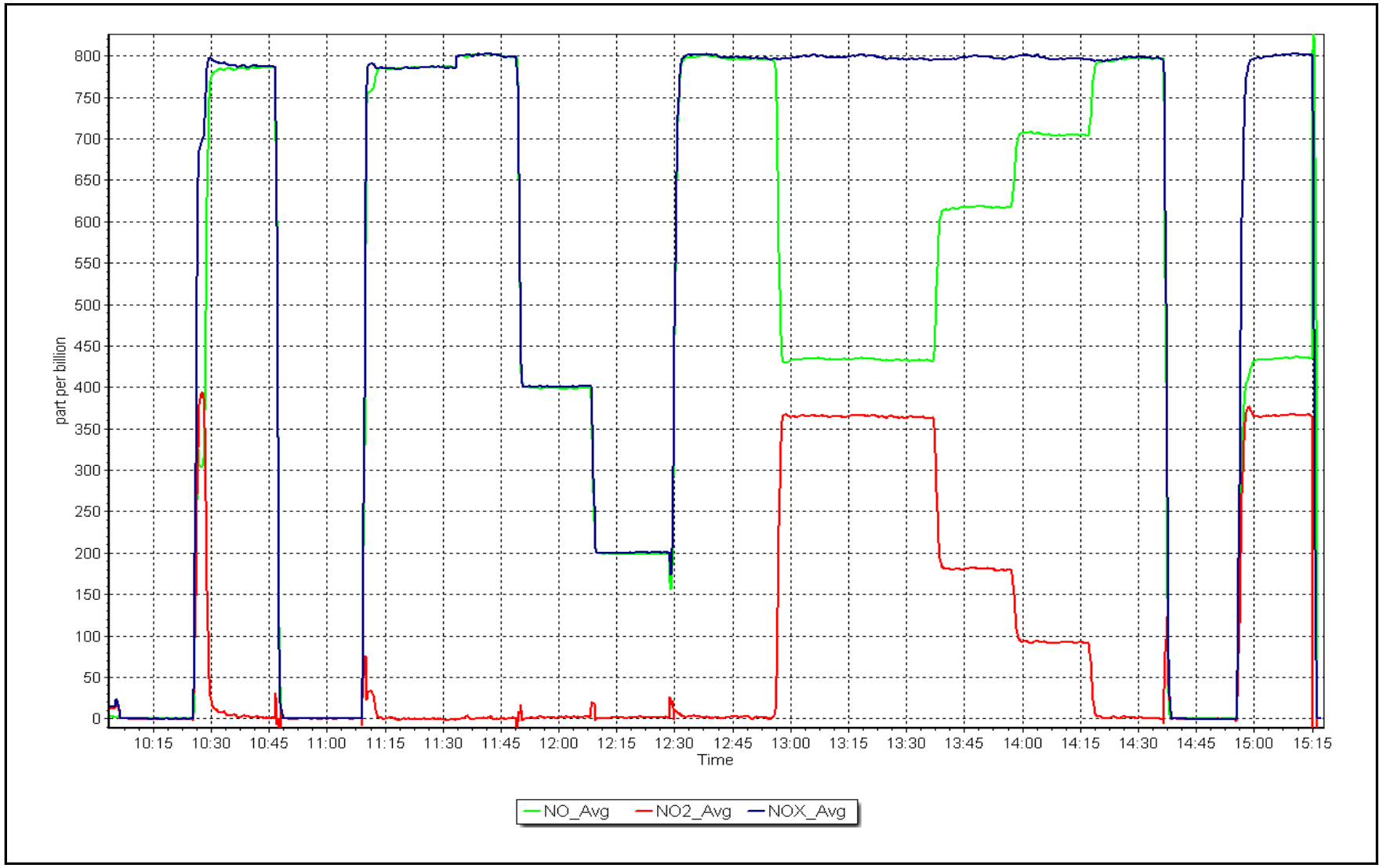
Calibration Date:	January 24, 2023	Previous Calibration:	December 7, 2022
Station Name:	Fort Hills	Station Number:	AMS23
Start Time (MST):	10:04	End Time (MST):	15:17
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.2	----	Correlation Coefficient	0.999989	≥0.995
363.7	364.0	0.9992			
178.8	179.9	0.9939	Slope	1.001046	0.90 - 1.10
91.6	92.2	0.9935			
			Intercept	0.284247	+/-20



NO_X Calibration Plot Date: January 24, 2023 Location: Fort Hills



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25
WASKŌW OHCI PIMÂTISIWIN
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS25
Calibration Date:	January 3, 2023	Last Cal Date:	December 16, 2022
Start time (MST):	10:15	End time (MST):	13:10
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	52.4	ppm	Cal Gas Exp Date:	October 19, 2022
Cal Gas Cylinder #:	ET0016672			
Removed Cal Gas Conc:	52.4	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	747
ZAG Make/Model:	API T701		Serial Number:	261

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1118148497

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003529	0.999783	Backgd or Offset:	9.9	11.0
Calibration intercept:	0.624937	-0.314119	Coeff or Slope:	1.212	1.212

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*
as found zero	5000	0.0	0.0	0.9	----
as found span	4924	76.3	799.6	798.9	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	----
high point	4924	76.3	799.6	799.3	1.000
second point	4962	38.2	400.3	399.6	1.002
third point	4981	19.1	200.2	199.6	1.003
as left zero	5000	0.0	0.0	-0.2	----
as left span	4924	76.3	799.6	797.6	1.002
				Average Correction Factor	1.002

Baseline Corr As found:	798.00	Previous response	803.02	*% 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

Notes: Zero adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

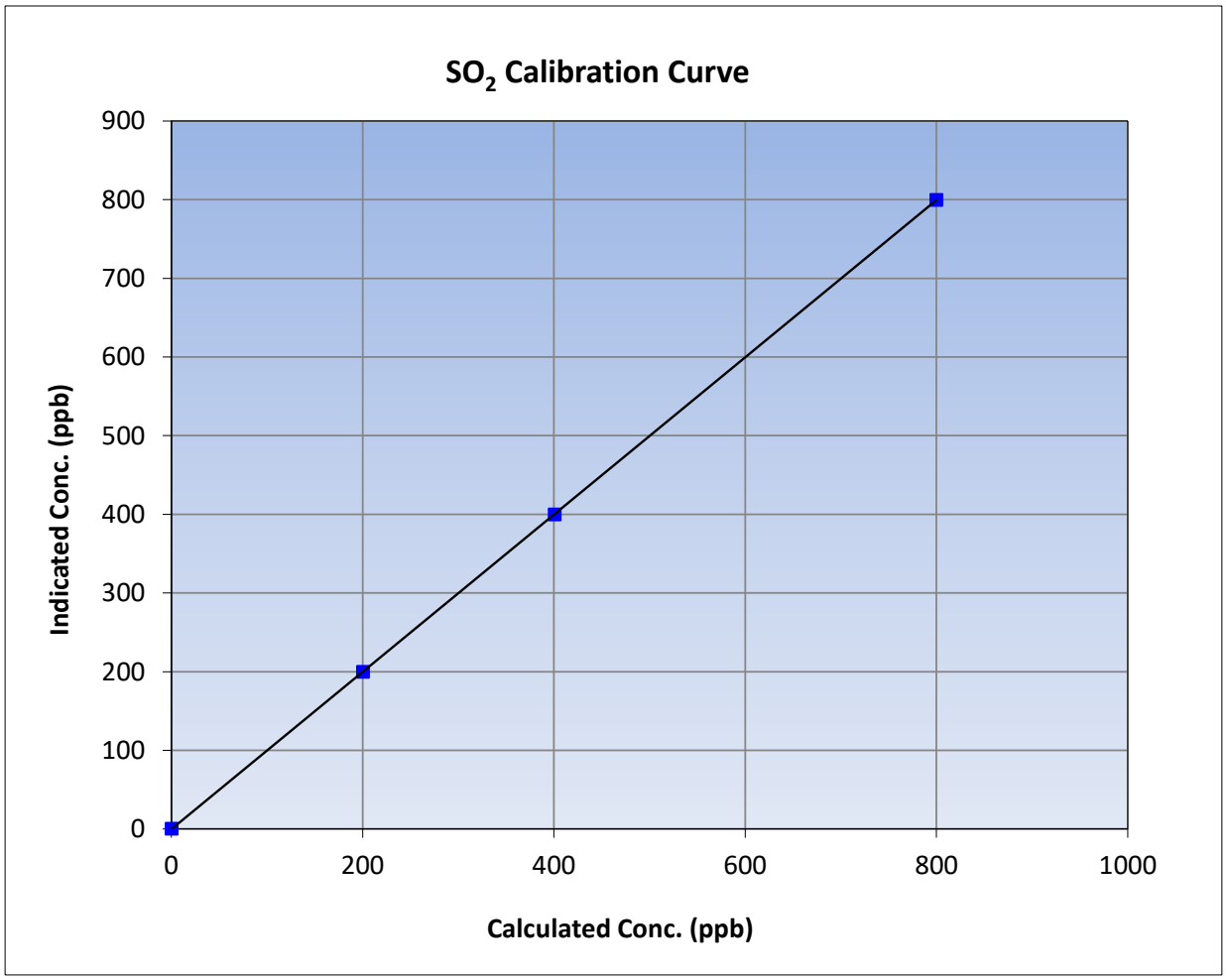
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 16, 2022
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25
Start Time (MST):	10:15	End Time (MST):	13:10
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

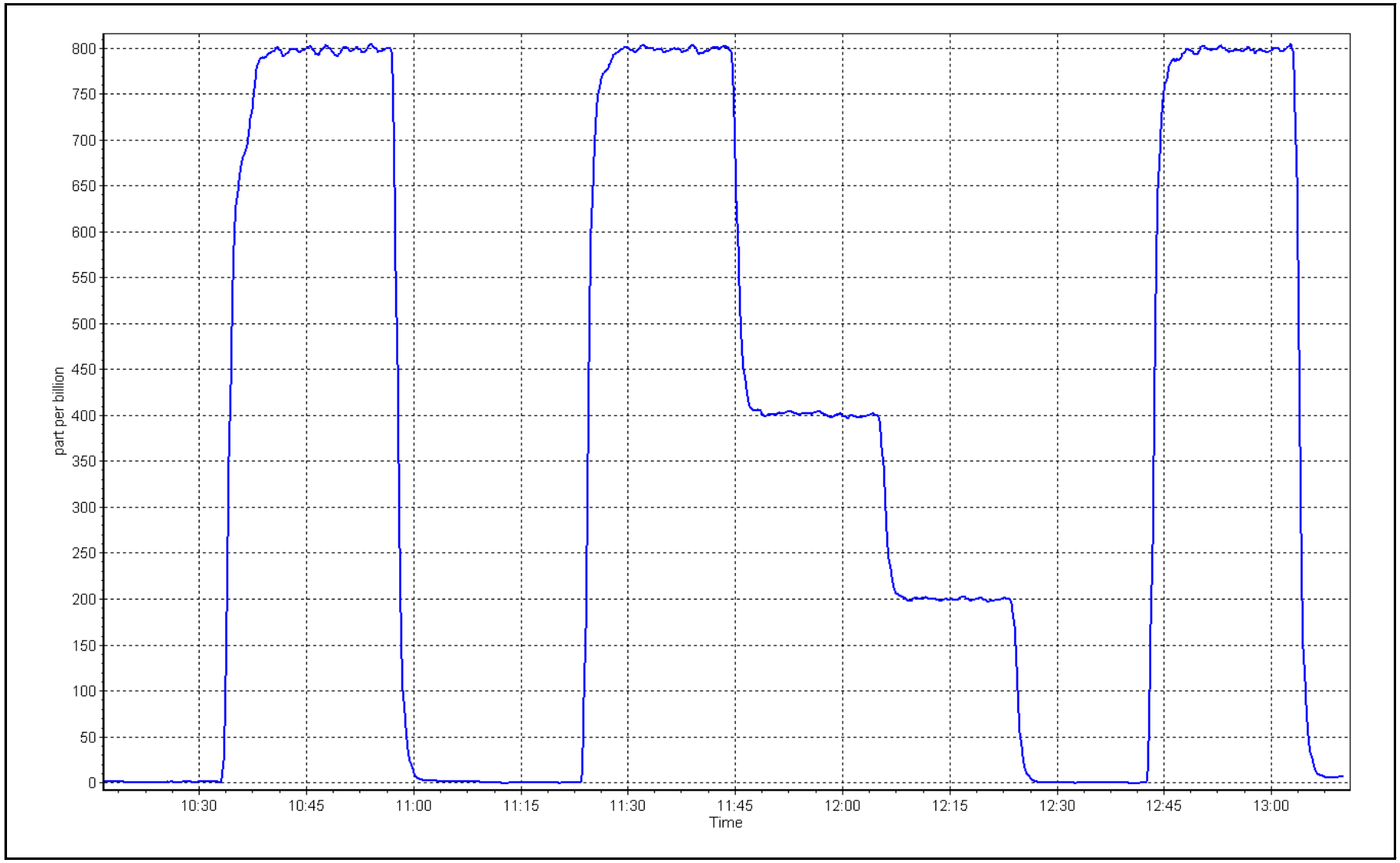
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.6	799.3	1.0003
400.3	399.6	1.0018
200.2	199.6	1.0028

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.999783	*0.90 - 1.10*
Intercept	-0.314119	*+/-30*



SO2 Calibration Plot Date: January 3, 2023 Location: Waskow ohci Pimatisiwin



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS25
Calibration Date:	January 11, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	8:20	End time (MST):	12:44
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.90	ppm	Cal Gas Exp Date:	May 5, 2023
Cal Gas Cylinder #:	LL119538			
Removed Cal Gas Conc:	4.90	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	747
ZAG Make/Model:	API T701		Serial Number:	261

Analyzer Information

Analyzer make:	Thermo 43i-LTE		Analyzer serial #:	1170050146	
Converter make:	Thermo 43C		Converter serial #:	328702539	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002595	1.002738	Backgd or Offset:	3.3	3.3
Calibration intercept:	0.421608	0.341605	Coeff or Slope:	1.085	1.085

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4918	81.6	80.0	80.7	0.993
as found 2nd point	4959	40.8	40.0	40.5	0.992
as found 3rd point	4980	20.4	20.0	20.3	0.995
new cylinder response					

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	4918	81.6	80.0	80.5	0.993
second point	4959	40.8	40.0	40.5	0.987
third point	4980	20.4	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.2	----
as left span	4912	88.3	800.0	801.2	0.999
SO2 Scrubber Check	4924	76.3	800.0	0.1	----
Date of last scrubber change:		19-Jul-10		Ave Corr Factor	0.987
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	80.5	Prev response:	80.60	*% change:	-0.1%
Baseline Corr 2nd AF pt:	40.3	AF Slope:	1.006739	AF Intercept:	0.201610
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999999		

* = > +/-5% change initiates investigation

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

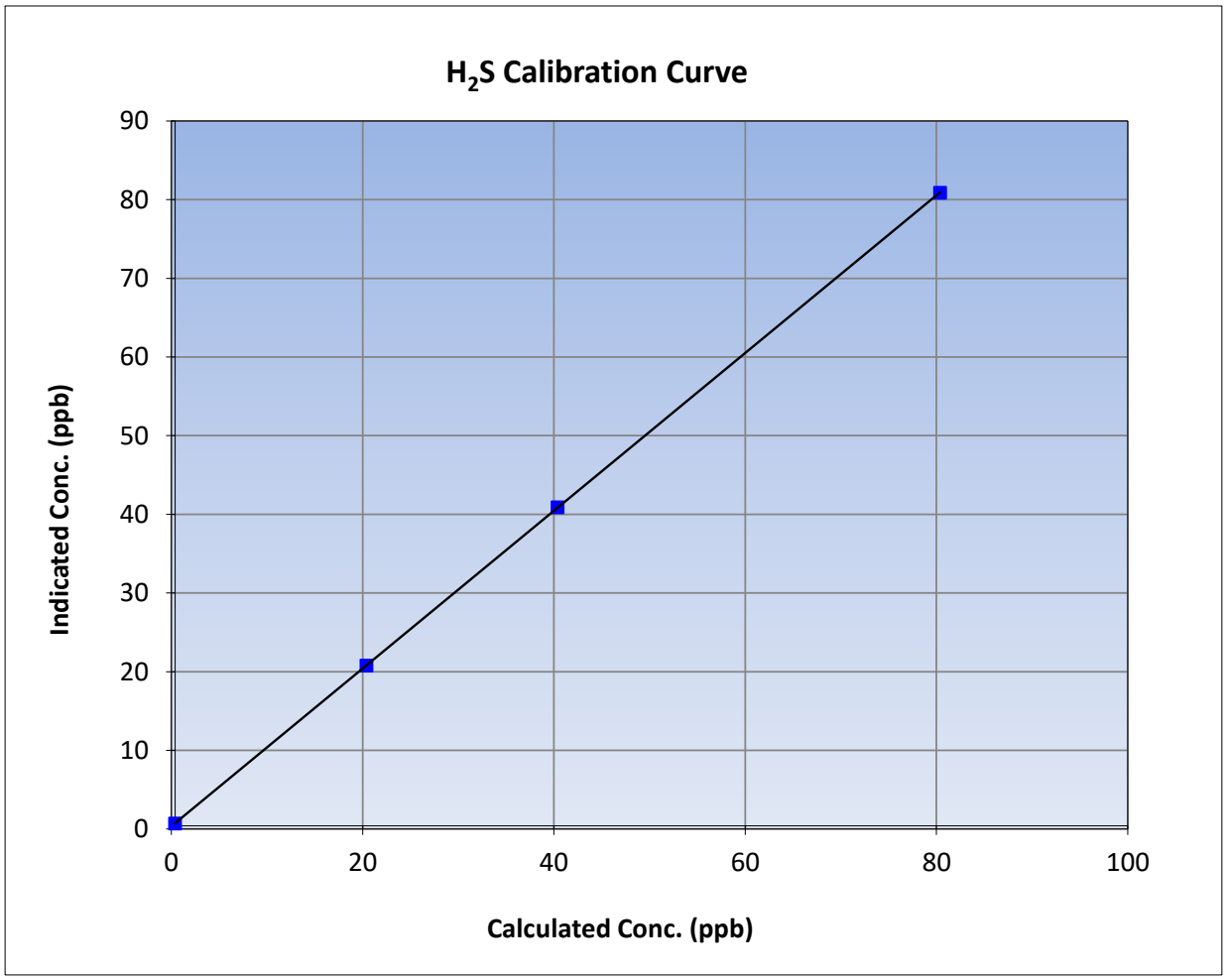
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25
Start Time (MST):	8:20	End Time (MST):	12:44
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146

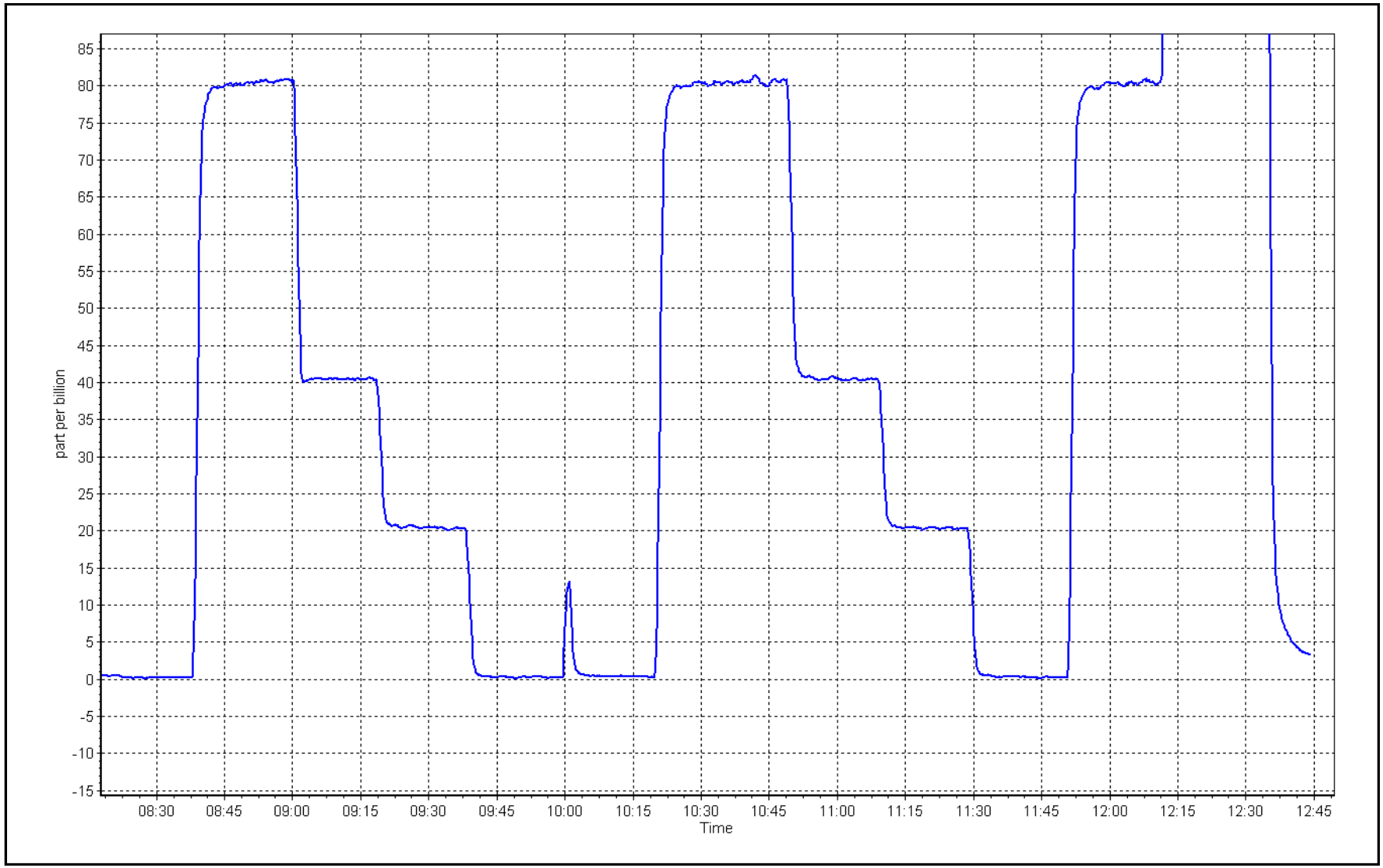
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.5	0.9935
40.0	40.5	0.9873
20.0	20.4	0.9799

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.002738	*0.90 - 1.10*
Intercept	0.341605	*+/-3*



H_2S Calibration Plot Date: January 11, 2023 Location: Waskow ohci Pimatisiwin



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS26
CHRISTINA LAKE
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	January 25, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	8:40	End time (MST):	12:54
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 Make/Model:	API T700		Serial Number:	2447
ZAG Make/Model:	API T701		Serial Number:	953

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1173410001

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004842	1.000779	Backgd or Offset:	15.9	16.4
Calibration intercept:	-2.096815	-2.876133	Coeff or Slope:	0.943	0.929

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*
as found zero	5000	0.0	0.0	0.7	----
as found span	4919	80.6	799.0	812.0	0.984
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	----
high point	4919	80.6	799.0	797.9	1.001
second point	4960	40.3	399.4	396.1	1.008
third point	4980	20.2	200.2	194.3	1.030
as left zero	5000	0.0	0.0	0.1	----
as left span	4919	80.6	799.0	802.0	0.996
				Average Correction Factor	1.013

Baseline Corr As found:	811.30	Previous response	800.74	*% change	1.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

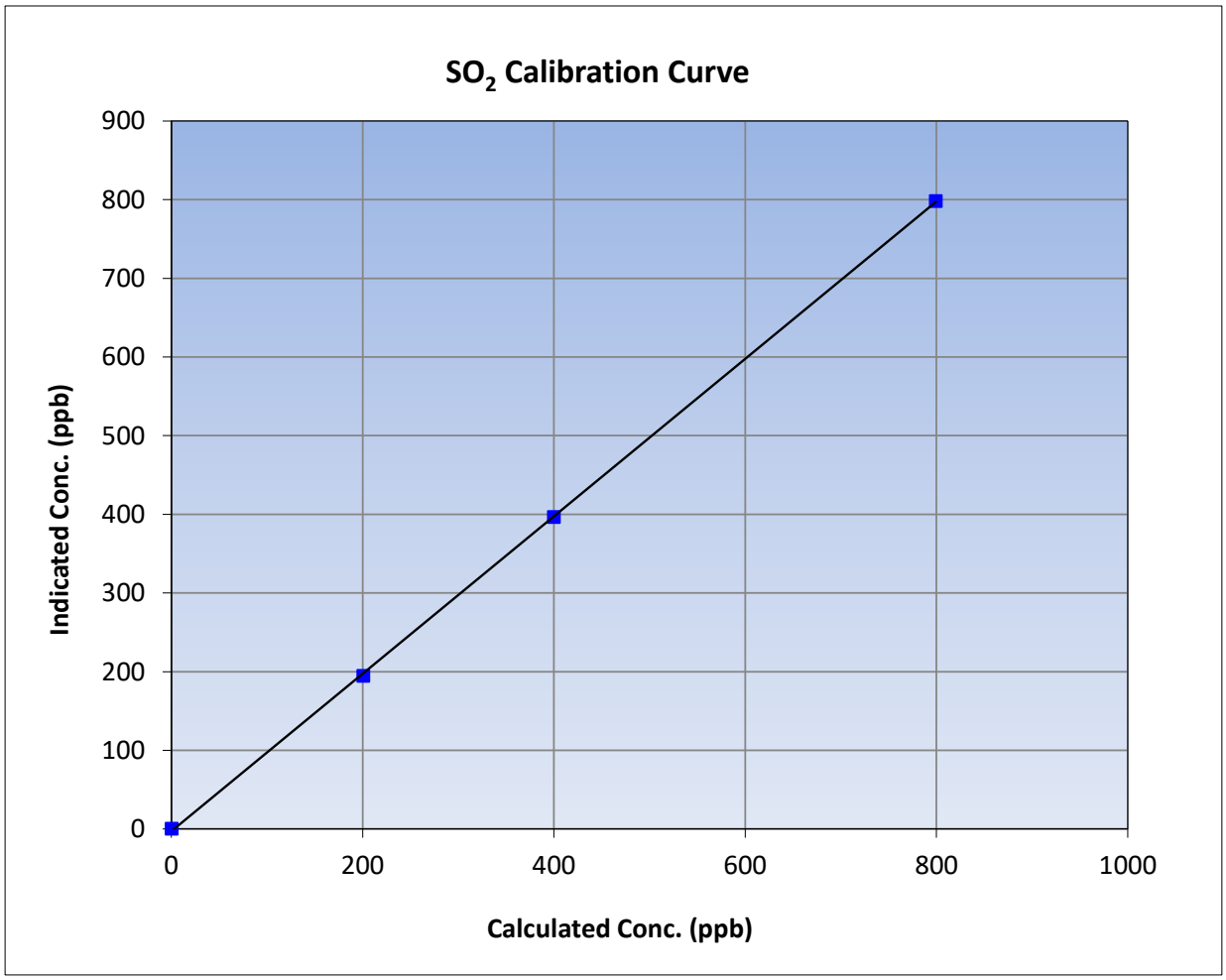
Station Information

Calibration Date:	January 25, 2023	Previous Calibration:	December 15, 2022
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	8:40	End Time (MST):	12:54
Analyzer make:	Thermo 43i	Analyzer serial #:	1173410001

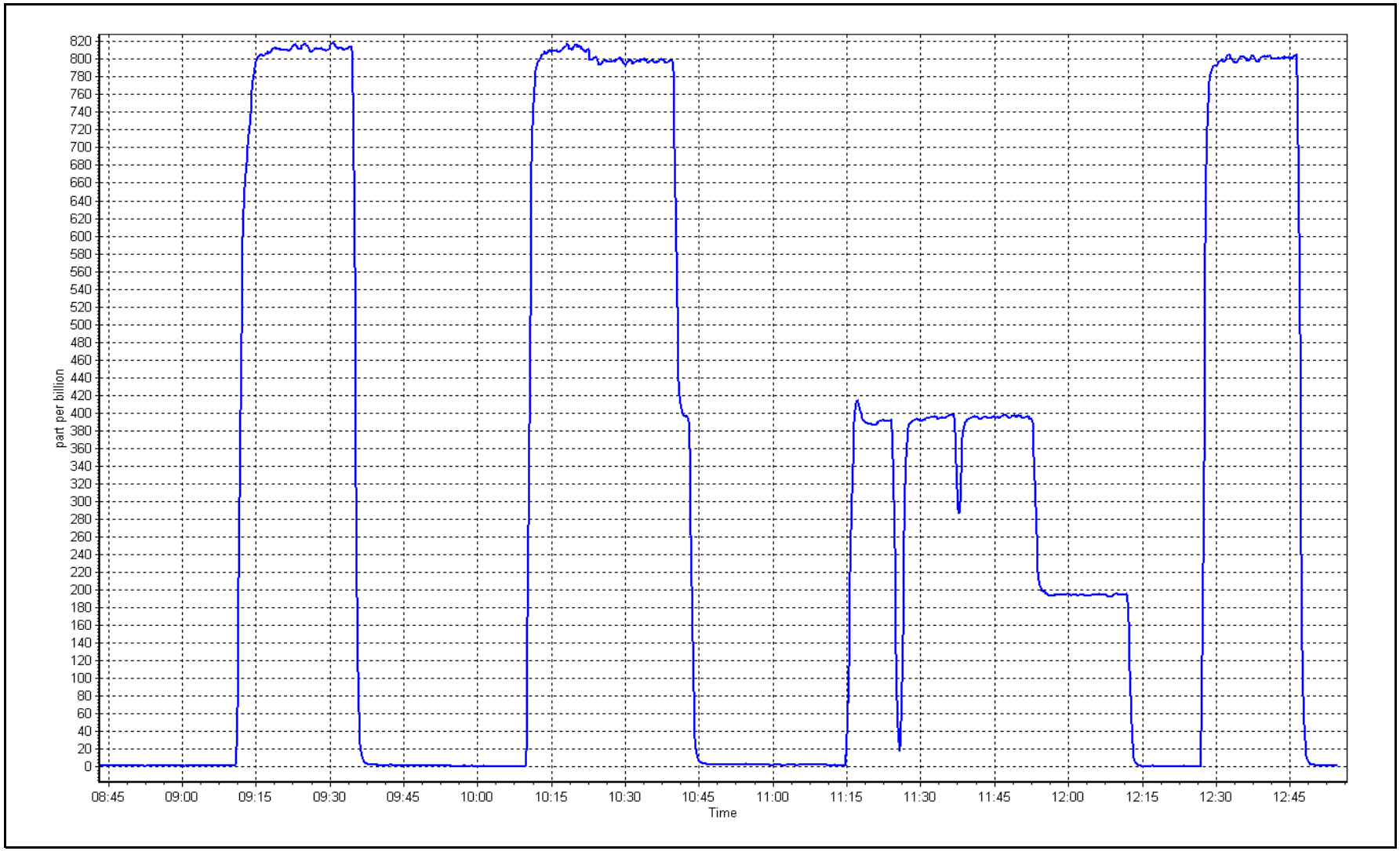
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.0	797.9	1.0013
399.4	396.1	1.0084
200.2	194.3	1.0304

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999943	*≥0.995*
Slope	1.000779	*0.90 - 1.10*
Intercept	-2.876133	*+/-30*



SO2 Calibration Plot Date: January 25, 2023 Location: Christina Lake



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Christina Lake	Station number:	AMS26
Calibration Date:	January 25, 2023	Last Cal Date:	December 13, 2022
Start time (MST):	8:40	End time (MST):	13:36
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.89	ppm	Cal Gas Exp Date:	February 9, 2024
Cal Gas Cylinder #:	EY0002466			
Removed Cal Gas Conc:	4.89	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T750		Serial Number:	282
ZAG Make/Model:	API T751H		Serial Number:	322

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	1180030032	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.993615	1.010037	Backgd or Offset:	33.3	33.3
Calibration intercept:	-0.141127	0.159267	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	-0.2	----
as found span	4918	81.8	80.0	80.8	0.988
as found 2nd point	4959	40.9	40.0	40.3	0.988
as found 3rd point	4979	20.4	20.0	20.0	0.988
new cylinder response					

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4918	81.8	80.0	81.0	0.988
second point	4959	40.9	40.0	40.5	0.988
third point	4979	20.4	20.0	20.3	0.983
as left zero	5000	0.0	0.0	0.2	----
as left span	4918	81.8	80.0	80.2	0.998
SO2 Scrubber Check	4919	80.6	806.1	0.0	----
Date of last scrubber change:		27-Feb-19		Ave Corr Factor	0.986
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	81.0	Prev response:	79.35	*% change:	2.0%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.012465	AF Intercept:	-0.200681
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	1.000000		

* = > +/-5% change initiates investigation

Notes: Ran scrubber check after calibrator zero. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

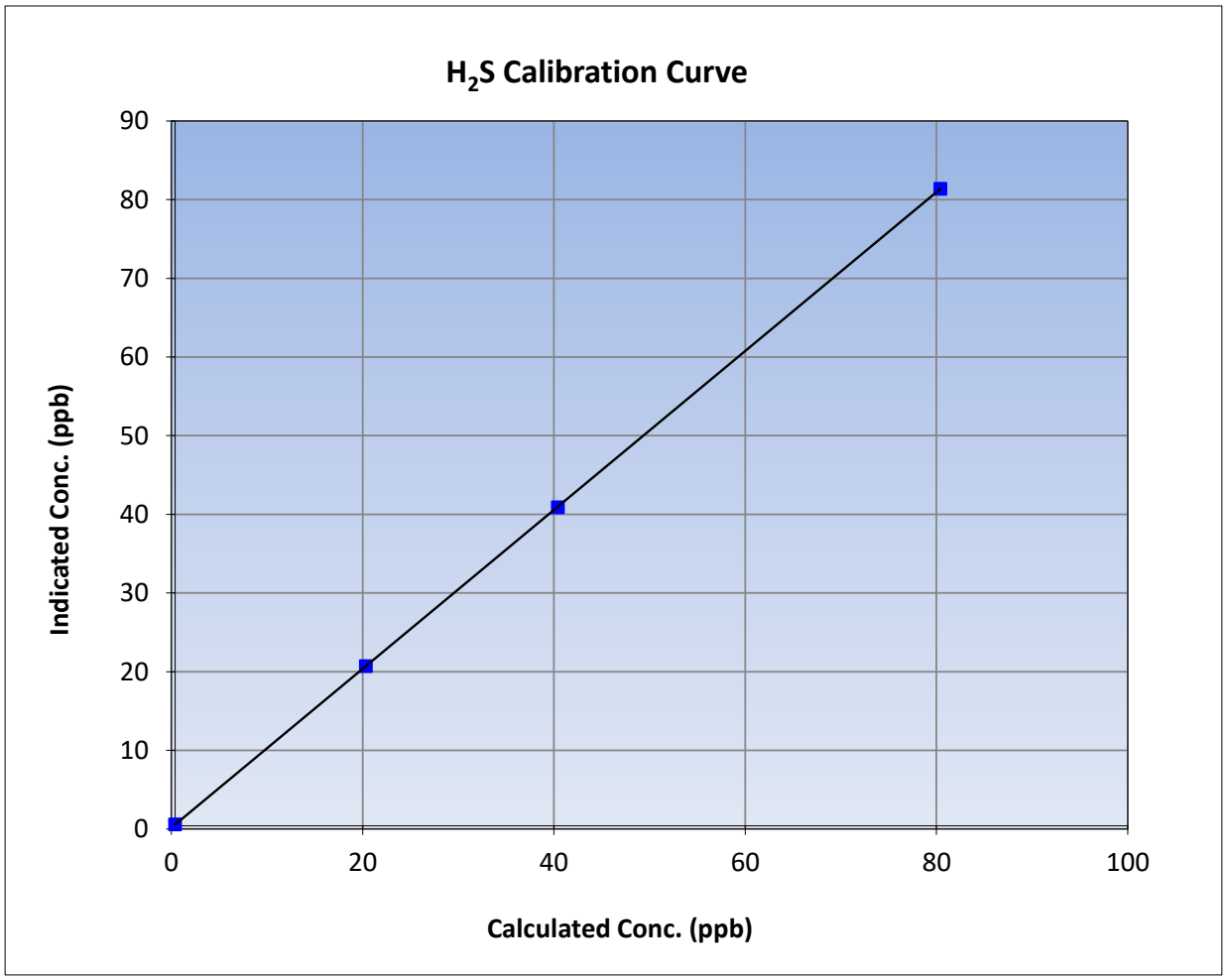
Station Information

Calibration Date:	January 25, 2023	Previous Calibration:	December 13, 2022
Station Name:	Christina Lake	Station Number:	AMS26
Start Time (MST):	8:40	End Time (MST):	13:36
Analyzer make:	Thermo 450i	Analyzer serial #:	1180030032

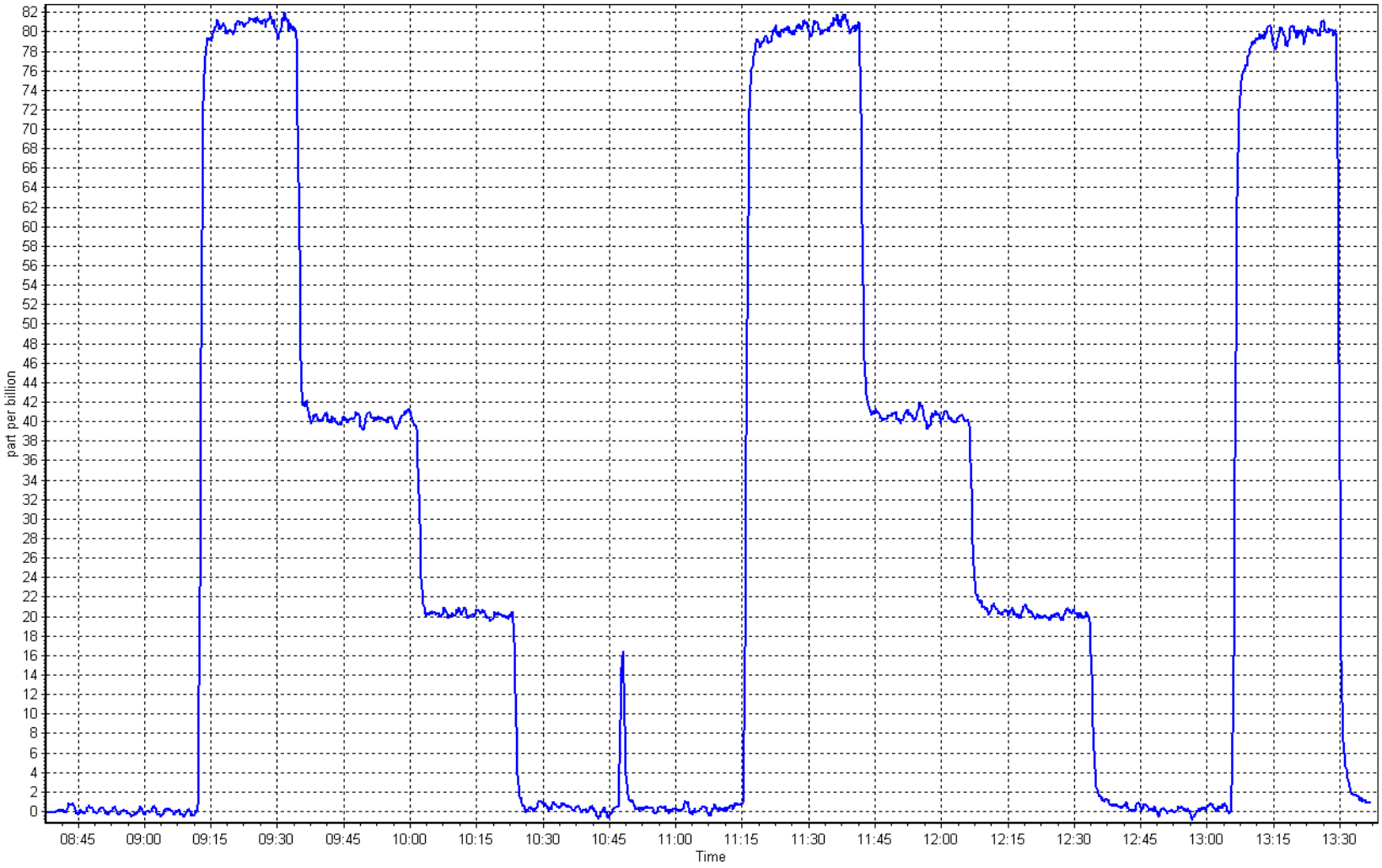
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	81.0	0.9877
40.0	40.5	0.9877
20.0	20.3	0.9829

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.010037	*0.90 - 1.10*
Intercept	0.159267	*+/-3*



H_2S Calibration Plot Date: January 25, 2023 Location: Christina Lake



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	January 24, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	11:33	End time (MST):	16:36
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P4C		Cal Gas Expiry Date:	November 12, 2023	
NOX Cal Gas Conc:	50.82	ppm	NO Cal Gas Conc:	50.02	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	50.82	ppm	Removed Gas NO Conc:	50.02	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2447	
ZAG make/model:	API T701		Serial Number:	953	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.625	1.647	NO bkgnd or offset:	2.7	2.7
NOX coeff or slope:	0.995	0.996	NOX bkgnd or offset:	2.8	2.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	189.8	190.1

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.998735	1.000028
NO_X Cal Offset:	-1.240000	-2.400000
NO Cal Slope:	1.000657	1.000828
NO Cal Offset:	-2.620000	-3.180000
NO_2 Cal Slope:	0.999507	0.997345
NO_2 Cal Offset:	0.641309	-0.231843

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	4920	80.0	813.1	800.3	12.8	805.0	791.5	13.2	1.0101	1.0111
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0	----	----
high point	4920	80.0	813.1	800.3	12.8	812.0	799.6	12.1	1.0014	1.0009
second point	4960	40.0	406.6	400.2	6.4	402.9	395.1	7.8	1.0091	1.0128
third point	4980	20.0	203.3	200.1	3.2	198.4	194.3	4.1	1.0246	1.0297
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	4920	80.0	813.1	392.5	420.6	812.0	387.4	424.2	1.0014	1.0132
								Average Correction Factor	1.0117	1.0145

Corrected As found	NO_X = 805.0 ppb	NO = 791.5 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-0.7%
Previous Response	NO_X = 810.9 ppb	NO = 798.2 ppb		*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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	795.9	388.1	420.6	419.5	1.0026	99.7%
2nd GPT point (200 ppb O3)	795.9	596.1	212.6	211.3	1.0062	99.4%
3rd GPT point (100 ppb O3)	795.9	698.9	109.8	109.3	1.0046	99.5%
				Average Correction Factor	1.0044	99.6%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

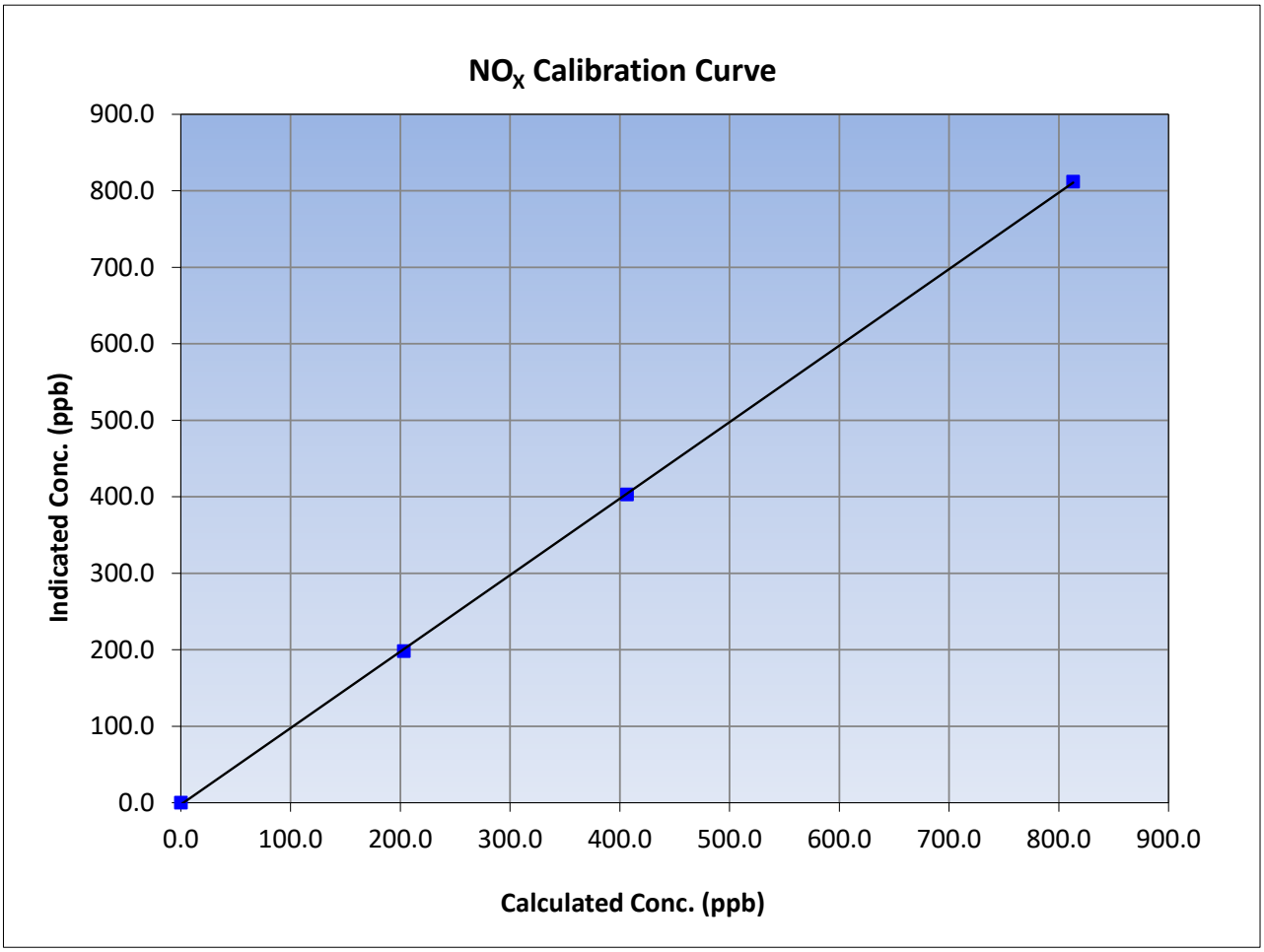
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 14, 2022
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	11:33	End Time (MST):	16:36
Analyzer make:	Thermo 42i	Analyzer serial #:	14:00

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999957	≥0.995
813.1	812.0	1.0014			
406.6	402.9	1.0091	Slope	1.000028	0.90 - 1.10
203.3	198.4	1.0246			
			Intercept	-2.400000	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

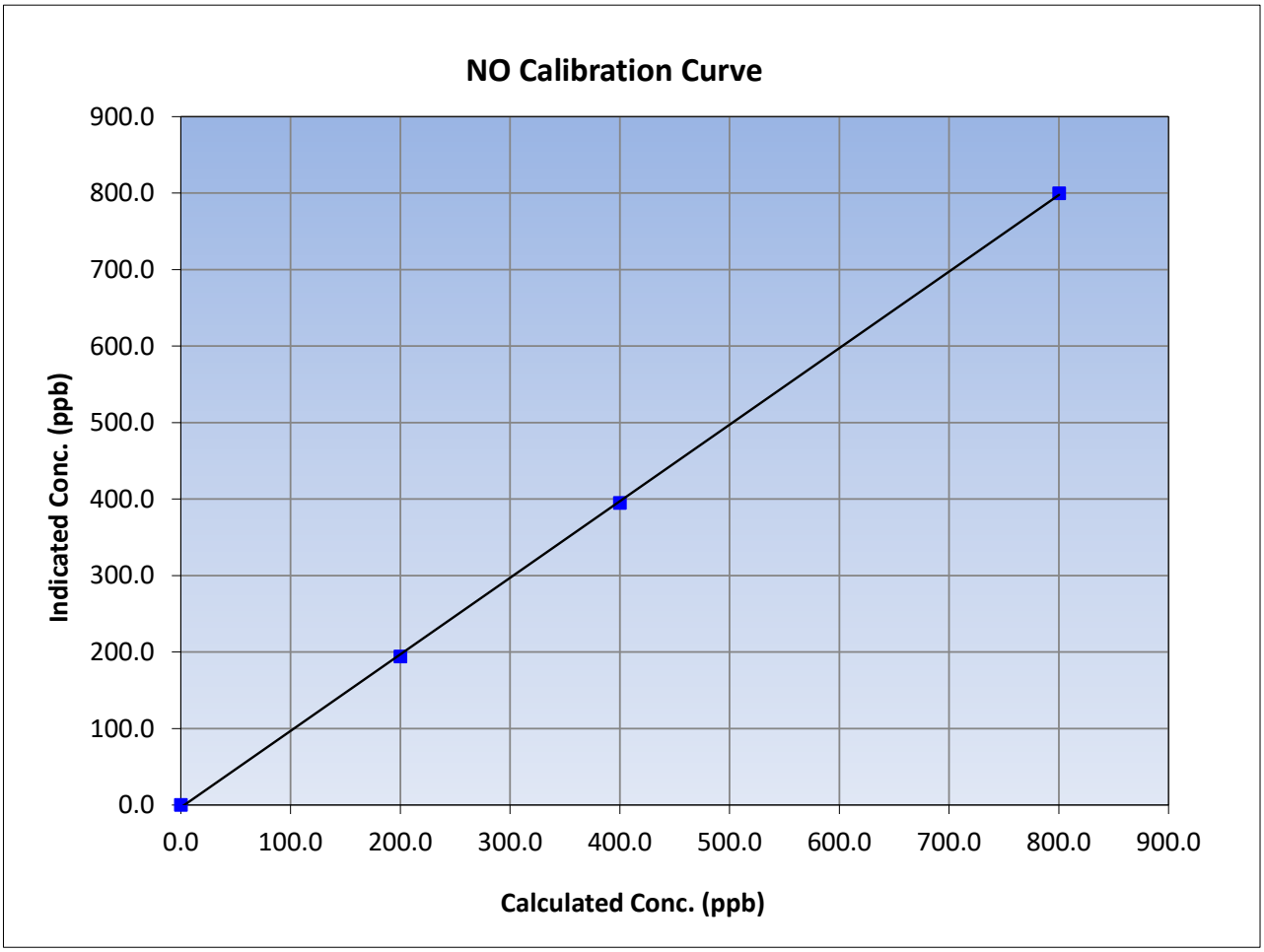
Version-04-2020

Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 14, 2022
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	11:33	End Time (MST):	16:36
Analyzer make:	Thermo 42i	Analyzer serial #:	14:00

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999926	*≥0.995*
800.3	799.6	1.0009			
400.2	395.1	1.0128	Slope	1.000828	*0.90 - 1.10*
200.1	194.3	1.0297			
			Intercept	-3.180000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

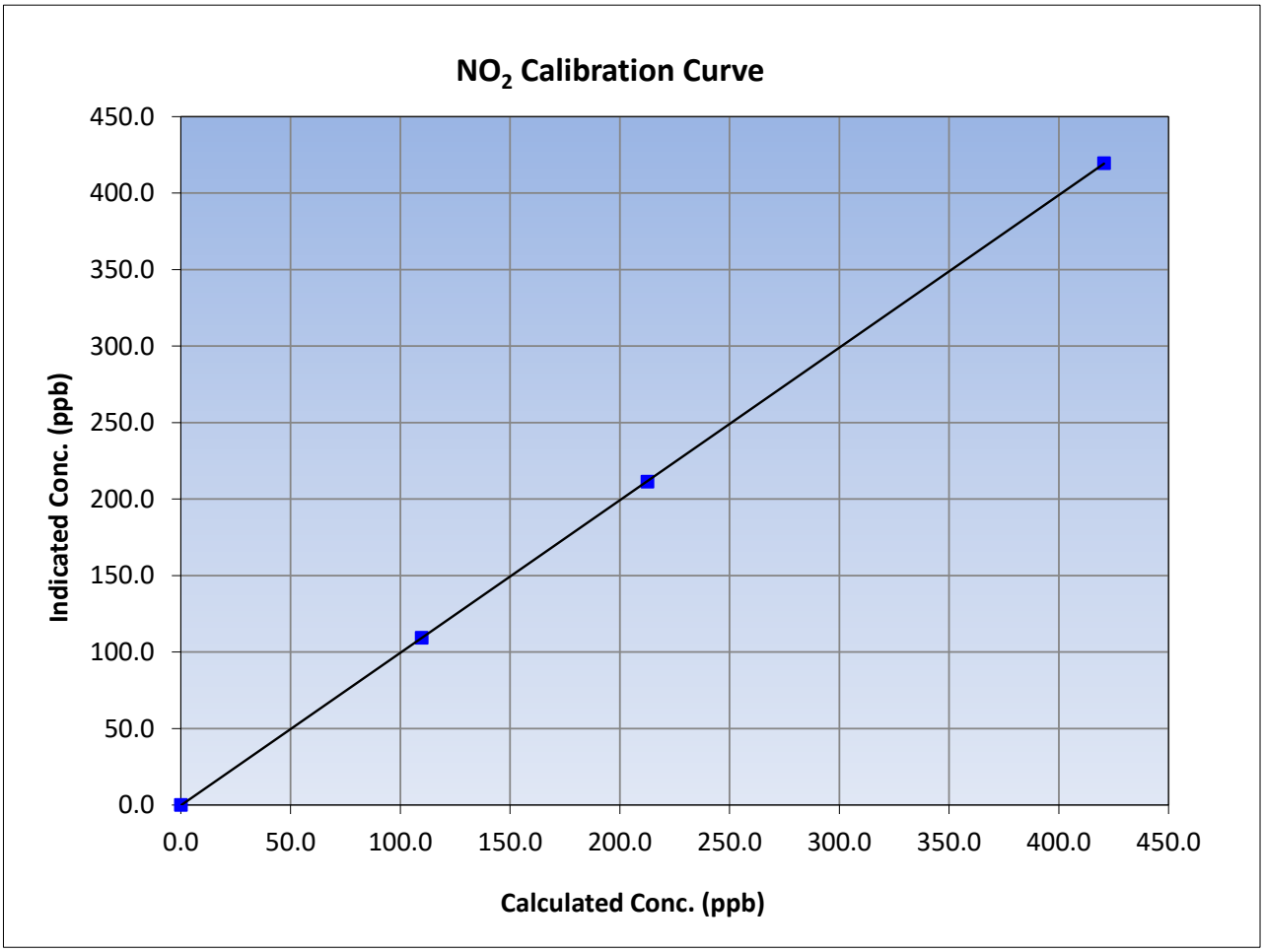
Version-04-2020

Station Information

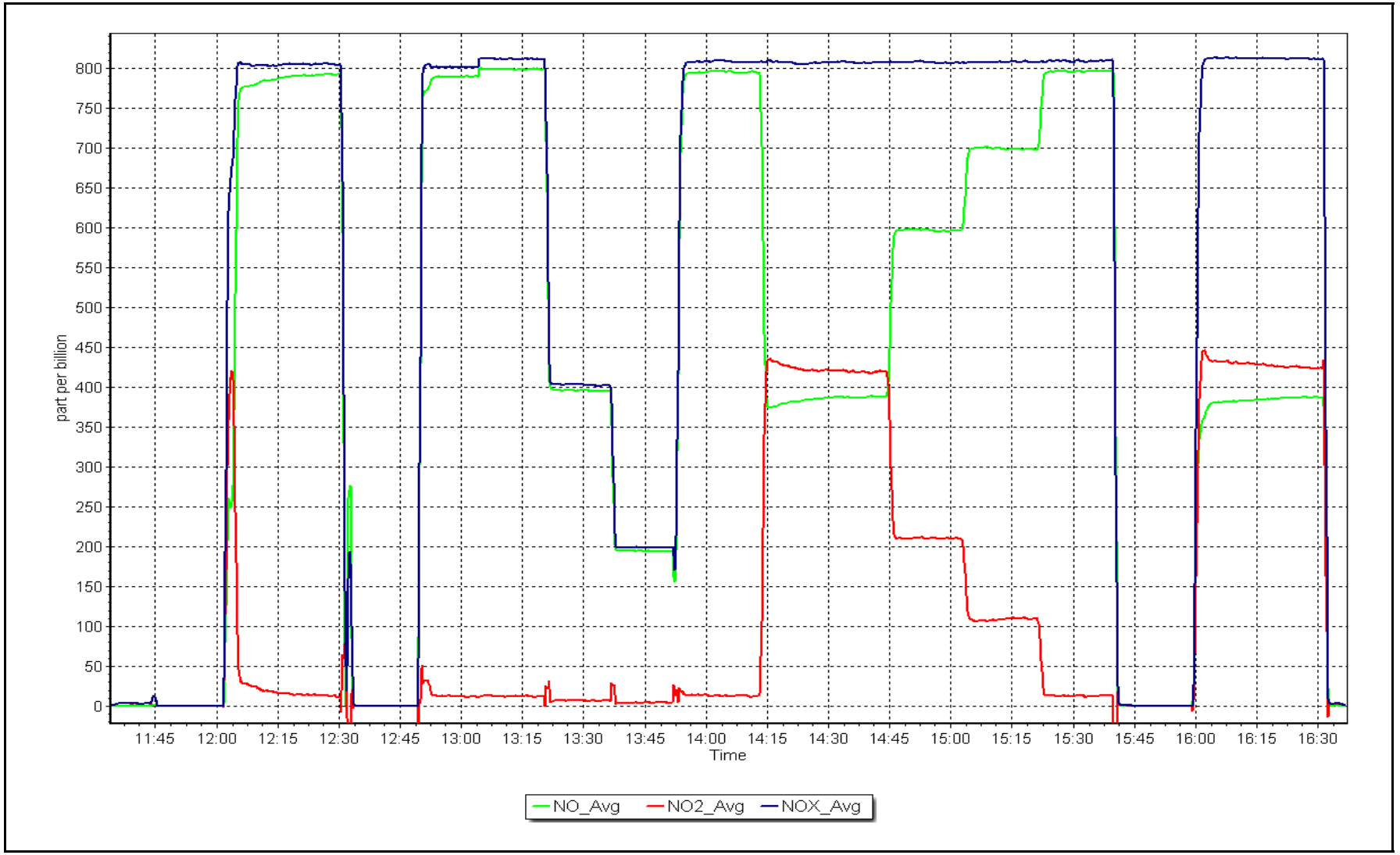
Calibration Date:	January 24, 2023	Previous Calibration:	December 14, 2022
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	11:33	End Time (MST):	16:36
Analyzer make:	Thermo 42i	Analyzer serial #:	14:00

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999996	*≥0.995*
420.6	419.5	1.0026			
212.6	211.3	1.0062	Slope	0.997345	*0.90 - 1.10*
109.8	109.3	1.0046			
			Intercept	-0.231843	*+/-20*



NO_X Calibration Plot Date: January 24, 2023 Location: Christina Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27
JACKFISH 2/3
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	January 19, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	10:10	End time (MST):	12:45
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 Make/Model:	API T700		Serial Number:	3811
ZAG Make/Model:	API 701		Serial Number:	364

Analyzer Information

Analyzer make: Thero 43iQ — Analyzer serial #: 12124313138

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001034	1.001858	Backgd or Offset:	7.6	7.4
Calibration intercept:	-1.838597	-1.876897	Coeff or Slope:	1.002	0.979

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*
as found zero	5000	0.0	0.0	0.0	----
as found span	4921	79.1	800.2	815.0	0.982
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	----
high point	4921	79.1	800.2	800.1	1.000
second point	4961	39.5	399.5	399.5	1.000
third point	4980	19.8	200.3	195.3	1.026
as left zero	5000	0.0	0.0	0.2	----
as left span	4921	79.1	800.2	800.2	1.000
				Average Correction Factor	1.009

Baseline Corr As found:	815.00	Previous response	799.15	*% 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

Notes: Adjusted the span only.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

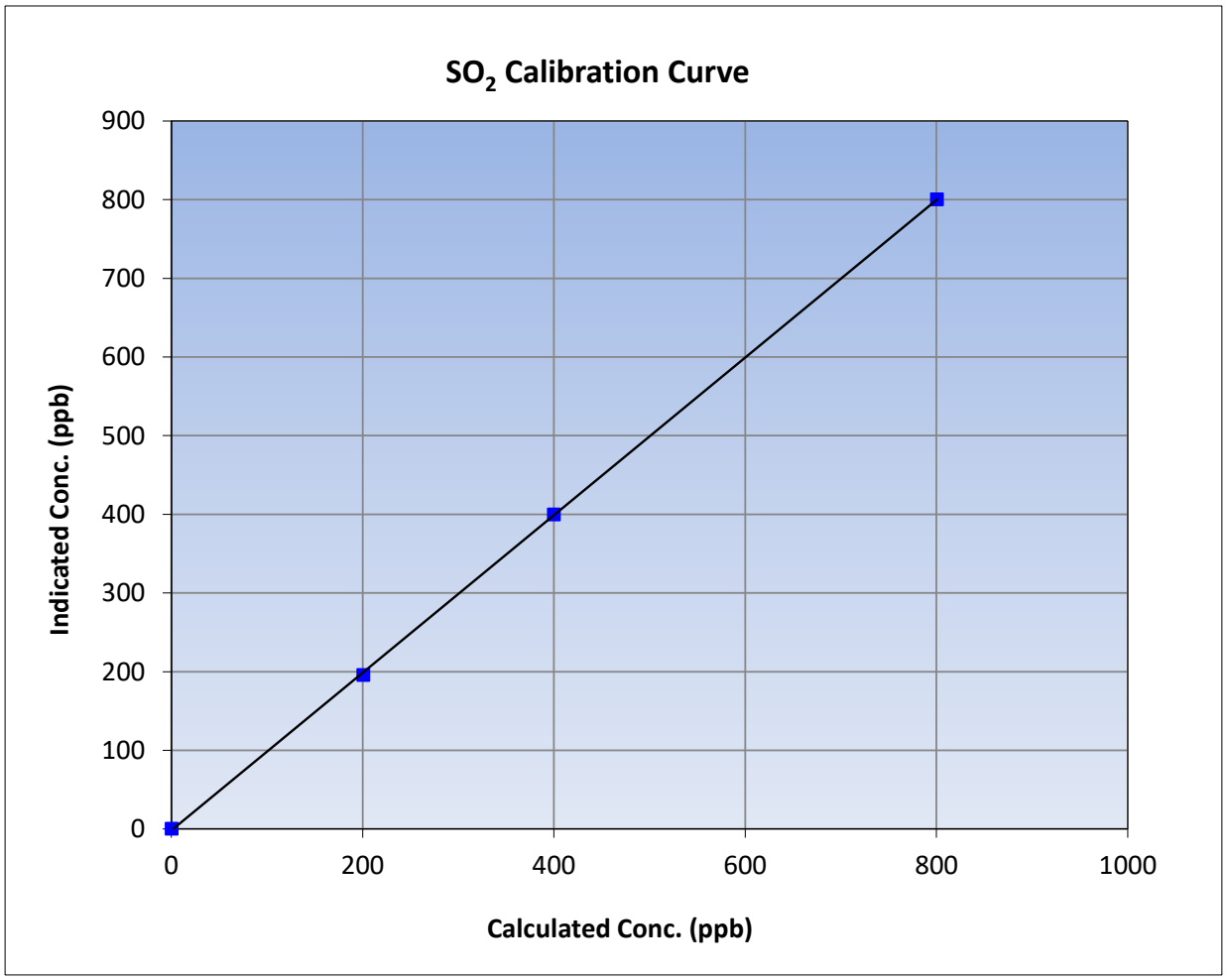
Station Information

Calibration Date:	January 19, 2023	Previous Calibration:	December 8, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	10:10	End Time (MST):	12:45
Analyzer make:	Thero 43iQ	Analyzer serial #:	12124313138

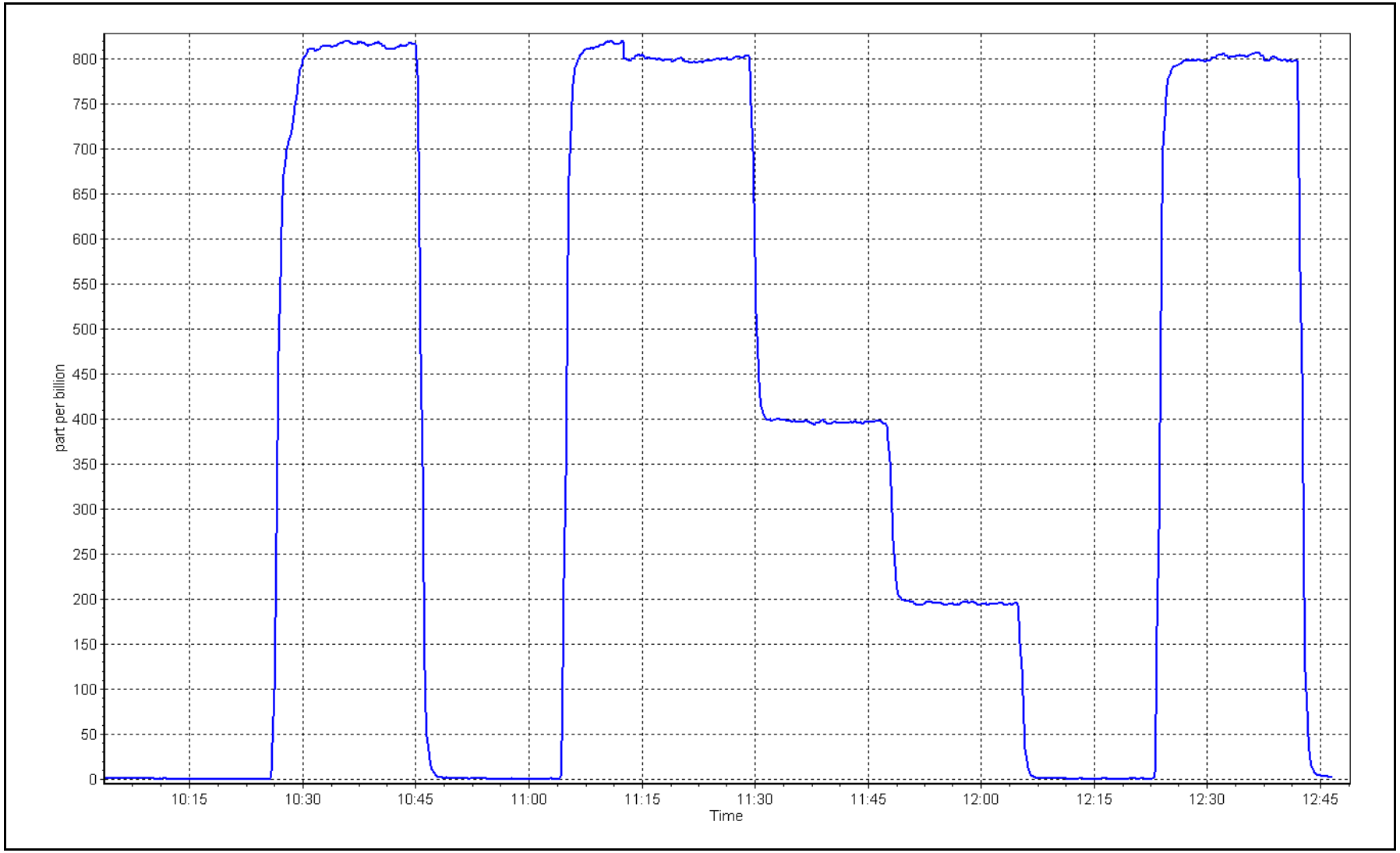
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.2	800.1	1.0001
399.5	399.5	1.0001
200.3	195.3	1.0256

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999949	*≥0.995*
Slope	1.001858	*0.90 - 1.10*
Intercept	-1.876897	*+/-30*



SO2 Calibration Plot Date: January 19, 2023 Location: Jackfish 2/3



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS27
Calibration Date:	January 11, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	10:13	End time (MST):	13:40
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:	364

Analyzer Information

Analyzer make:	API T101		Analyzer serial #:	621	
Converter make:			Converter serial #:		
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003337	0.997920	Backgd or Offset:	24.3	24.3
Calibration intercept:	-0.197871	0.042016	Coeff or Slope:	0.965	0.965

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.2	----
as found span	4926	74.1	80.2	81.0	0.992
as found 2nd point	4963	37.0	40.0	40.2	1.001
as found 3rd point	4982	18.5	20.0	19.9	1.016
new cylinder response					

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4926	74.1	80.2	80.1	1.001
second point	4963	37.0	40.0	40.0	1.001
third point	4982	18.5	20.0	19.8	1.011
as left zero	5000	0.0	0.0	0.3	----
as left span	4926	74.1	80.2	80.0	1.002
SO2 Scrubber Check	4921	79.1	791.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.004
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	80.8	Prev response:	80.24	*% change:	0.7%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.009326	AF Intercept:	-0.057823
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999953		

* = > +/-5% change initiates investigation

Notes: No adjustments have been made.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

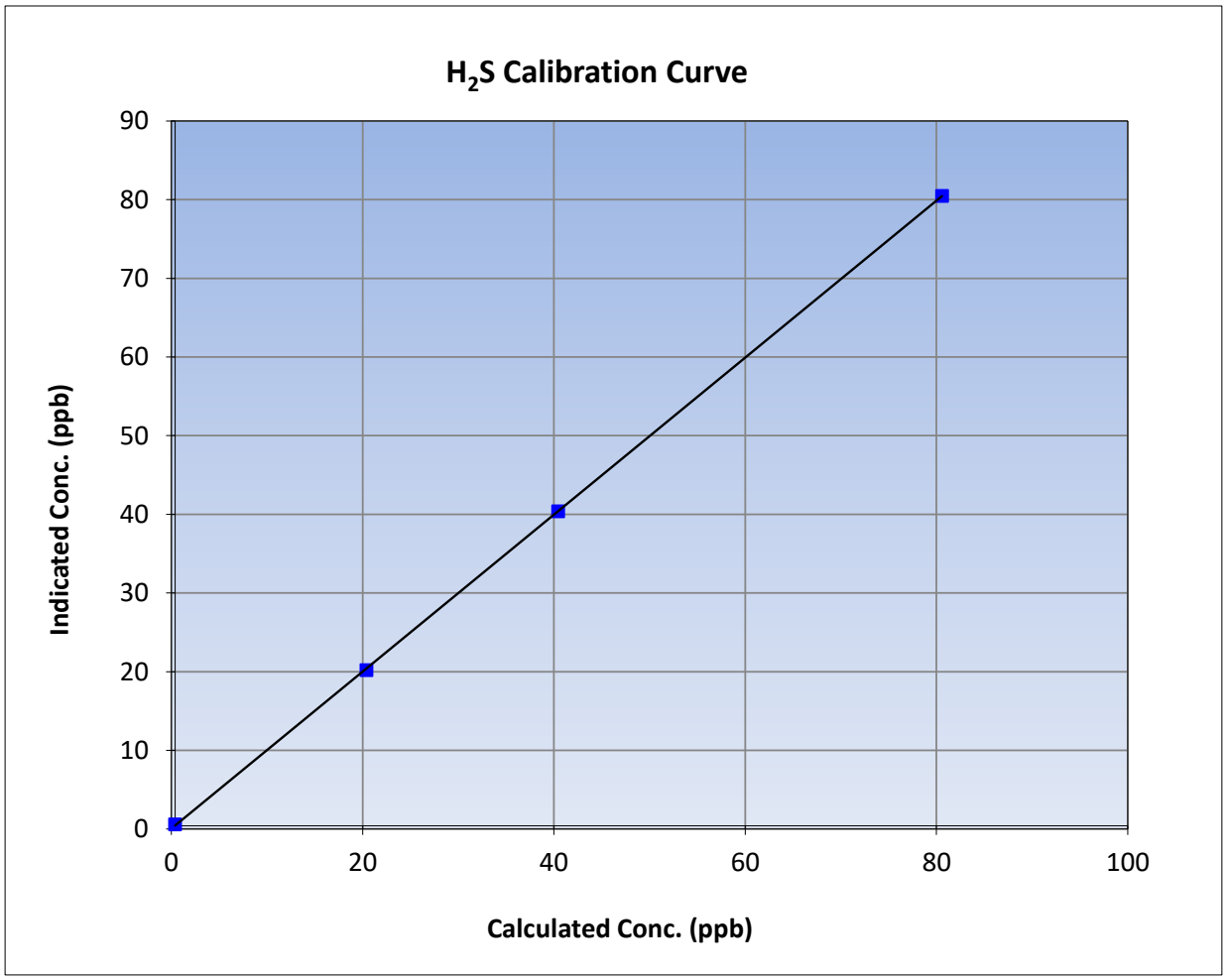
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 14, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	10:13	End Time (MST):	13:40
Analyzer make:	API T101	Analyzer serial #:	621

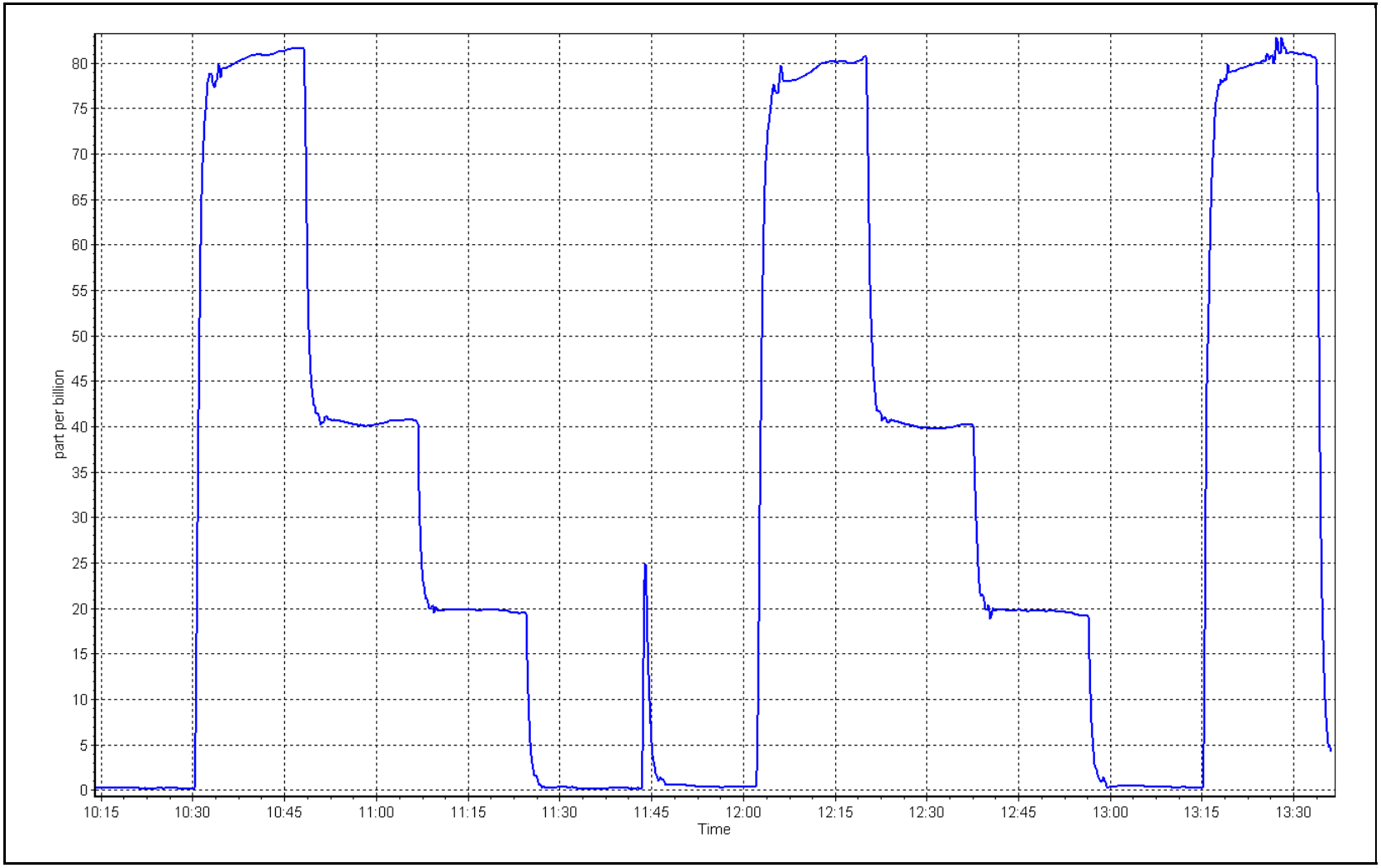
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.2	80.1	1.0009
40.0	40.0	1.0009
20.0	19.8	1.0109

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.997920	*0.90 - 1.10*
Intercept	0.042016	*+/-3*



H_2S Calibration Plot Date: January 11, 2023 Location: Jackfish 2/3



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS27
Calibration Date:	January 18, 2023	Last Cal Date:	December 20, 2022
Start time (MST):	9:08	End time (MST):	13:30
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:	T2Y1P35		Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	51.44	ppm	NO Cal Gas Conc:	50.40	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	51.44	ppm	Removed Gas NO Conc:	50.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T750		Serial Number:	282	
ZAG make/model:	API 751H		Serial Number:	321	

Analyzer Information

Analyzer make:	API T200	Analyzer serial #:	4460
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.256	1.241	NO bkgnd or offset:	1.9	0.9
NOX coeff or slope:	1.252	1.228	NOX bkgnd or offset:	7.8	0.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.4	4.3

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.001524	1.001608
NO_X Cal Offset:	-3.737174	-3.416967
NO Cal Slope:	1.009612	1.005444
NO Cal Offset:	-3.559292	-4.300508
NO_2 Cal Slope:	0.999877	0.998544
NO_2 Cal Offset:	0.211880	0.230642

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	-4.6	-1.2	-3.4	----	----
as found span	4921	79.4	816.8	800.3	16.5	829.2	804.5	24.5	0.9850	0.9948
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	----	----
high point	4921	79.4	816.8	800.3	16.5	816.0	802.0	13.7	1.0010	0.9979
second point	4960	39.7	408.5	400.2	8.3	405.0	397.2	7.7	1.0085	1.0076
third point	4980	19.8	203.7	199.6	4.1	196.8	191.5	5.4	1.0351	1.0423
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
as left span	4921	79.4	816.8	395.6	423.2	813.2	391.9	421.2	1.0044	1.0094
								Average Correction Factor	1.0149	1.0159

Corrected As found	NO_X = 833.8 ppb	NO = 805.7 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	2.3%
Previous Response	NO_X = 814.3 ppb	NO = 804.4 ppb			*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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.4	393.7	423.2	422.8	1.0010	99.9%
2nd GPT point (200 ppb O3)	800.4	615.1	201.8	201.7	1.0006	99.9%
3rd GPT point (100 ppb O3)	800.4	711.2	105.7	106.0	0.9973	100.3%
				Average Correction Factor	0.9996	100.0%

Notes: Adjusted both zero and span.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

NO_X Calibration Summary

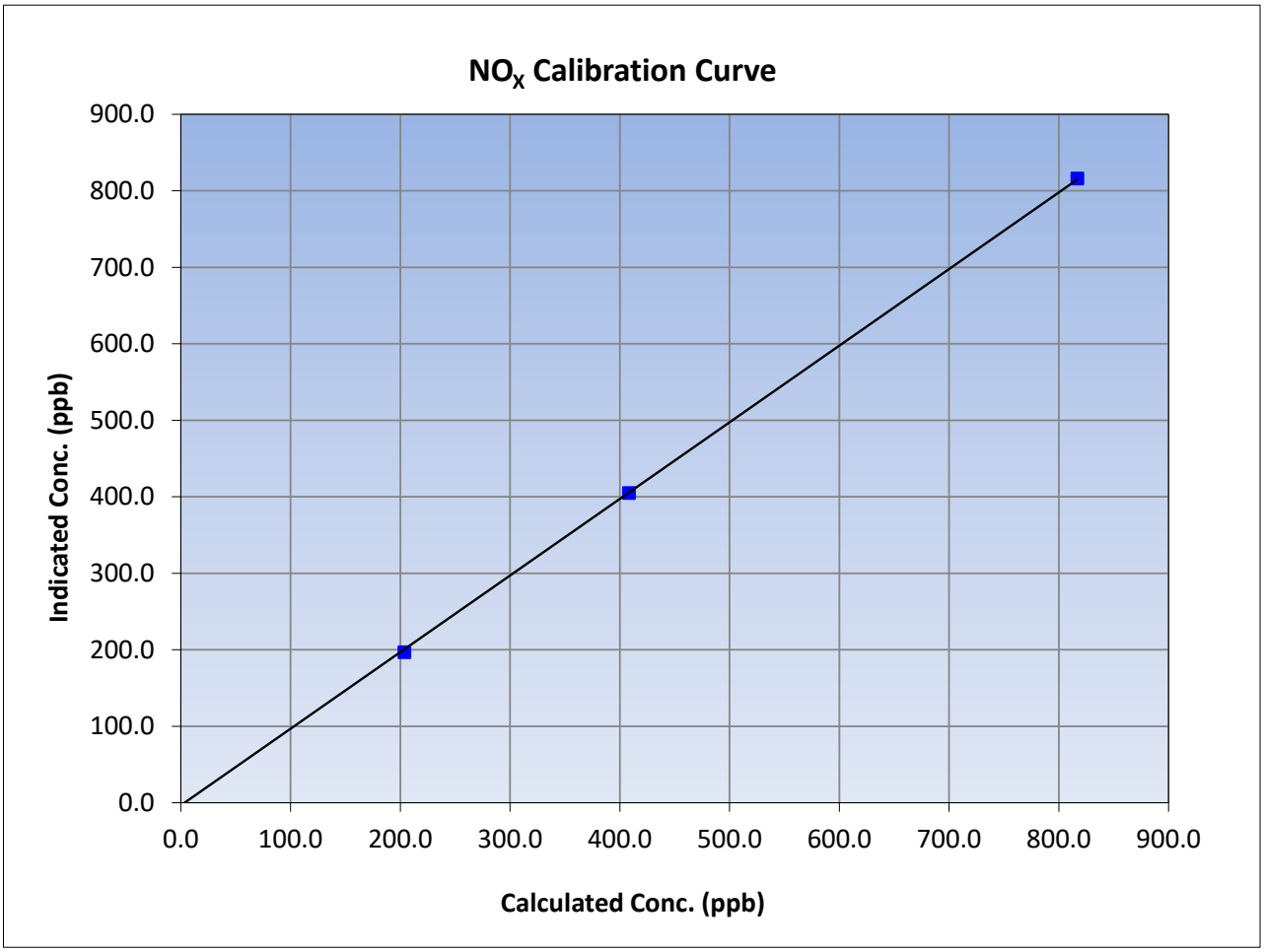
Version-04-2020

Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	December 20, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	9:08	End Time (MST):	13:30
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.2	----	Correlation Coefficient	0.999926	≥0.995
816.8	816.0	1.0010			
408.5	405.0	1.0085	Slope	1.001608	0.90 - 1.10
203.7	196.8	1.0351			
			Intercept	-3.416967	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

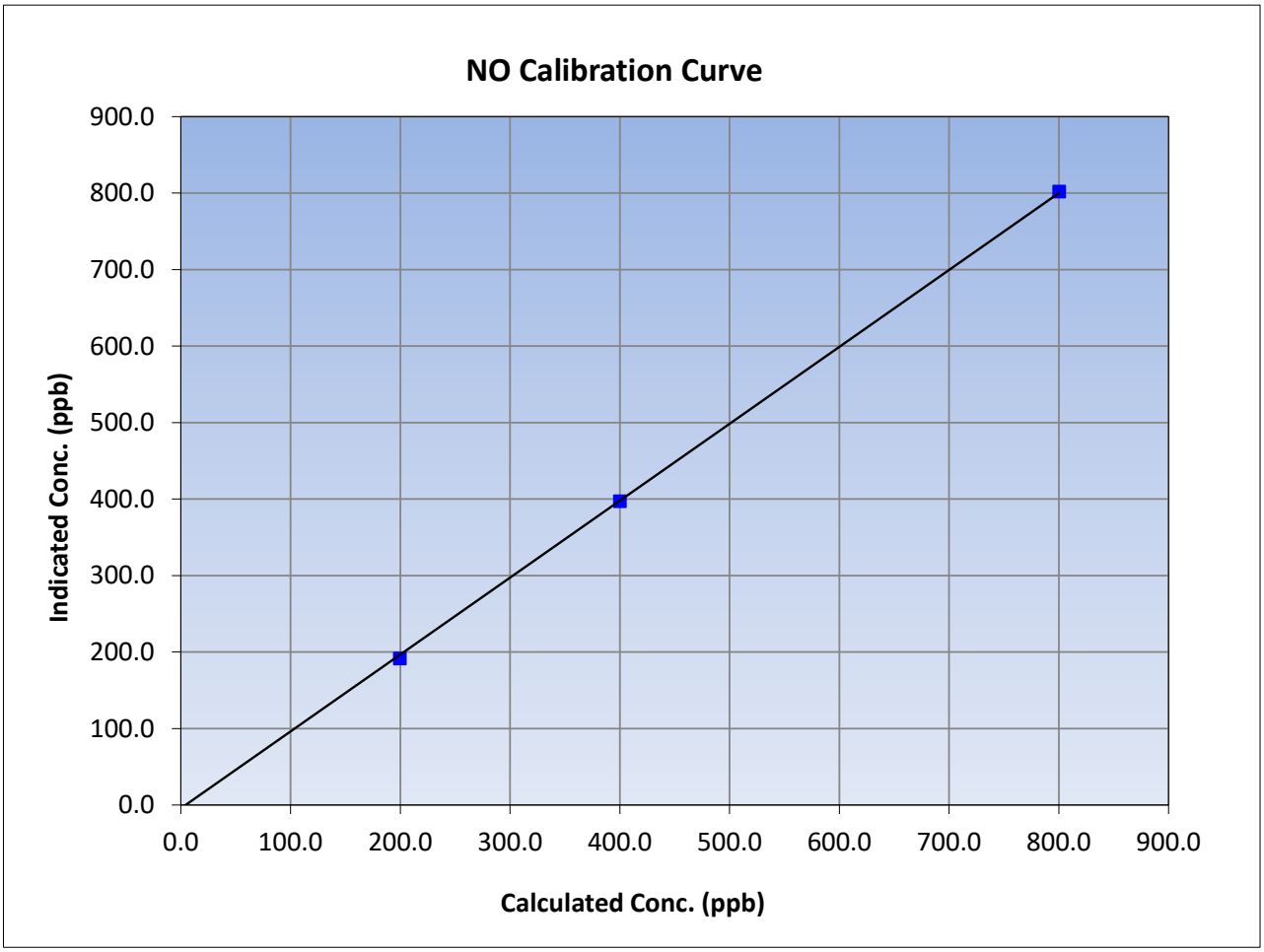
Version-04-2020

Station Information

Calibration Date:	January 18, 2023	Previous Calibration:	December 20, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	9:08	End Time (MST):	13:30
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.2	----	Correlation Coefficient	0.999875	≥0.995
800.3	802.0	0.9979			
400.2	397.2	1.0076	Slope	1.005444	0.90 - 1.10
199.6	191.5	1.0423			
			Intercept	-4.300508	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

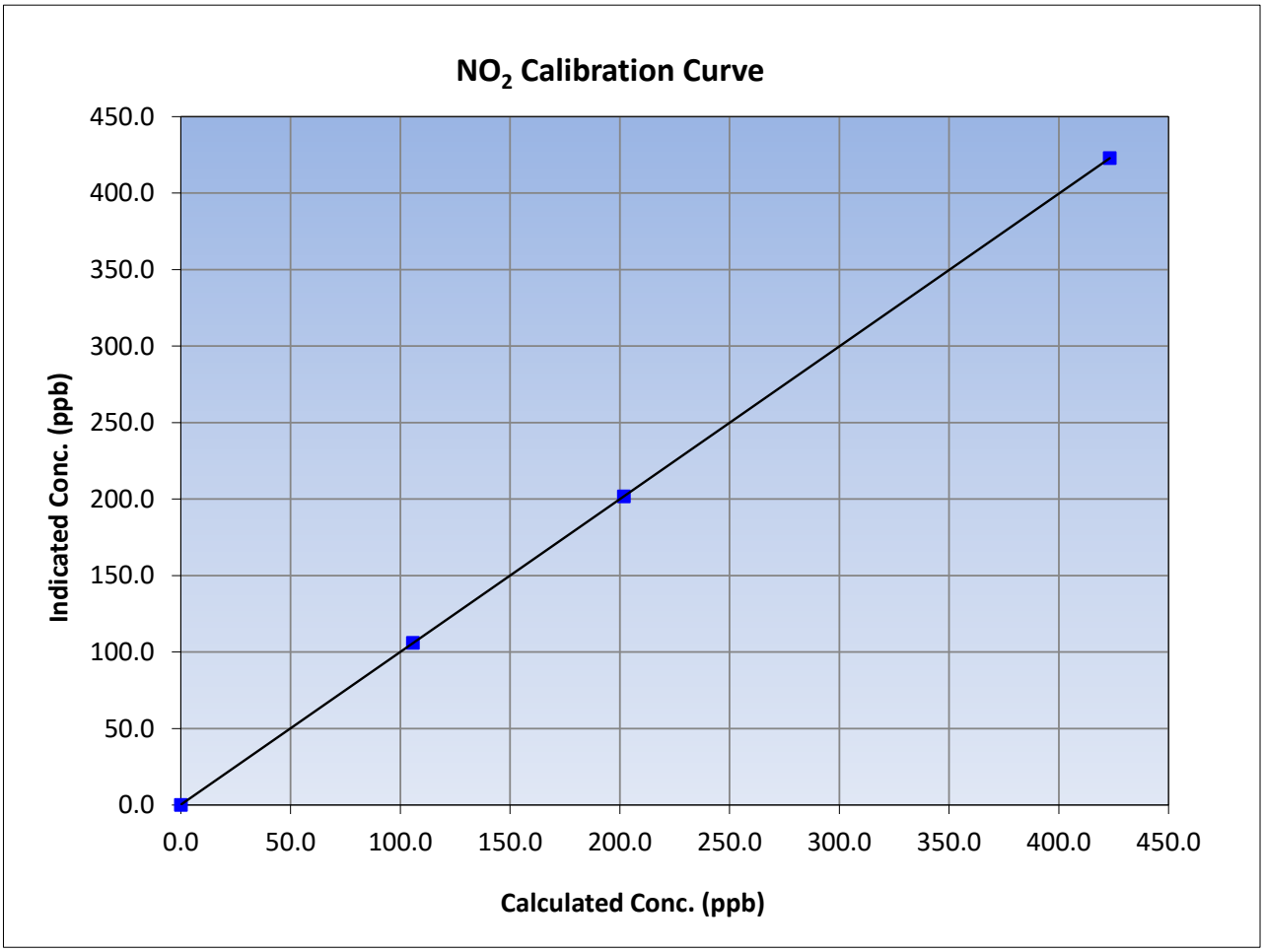
Version-04-2020

Station Information

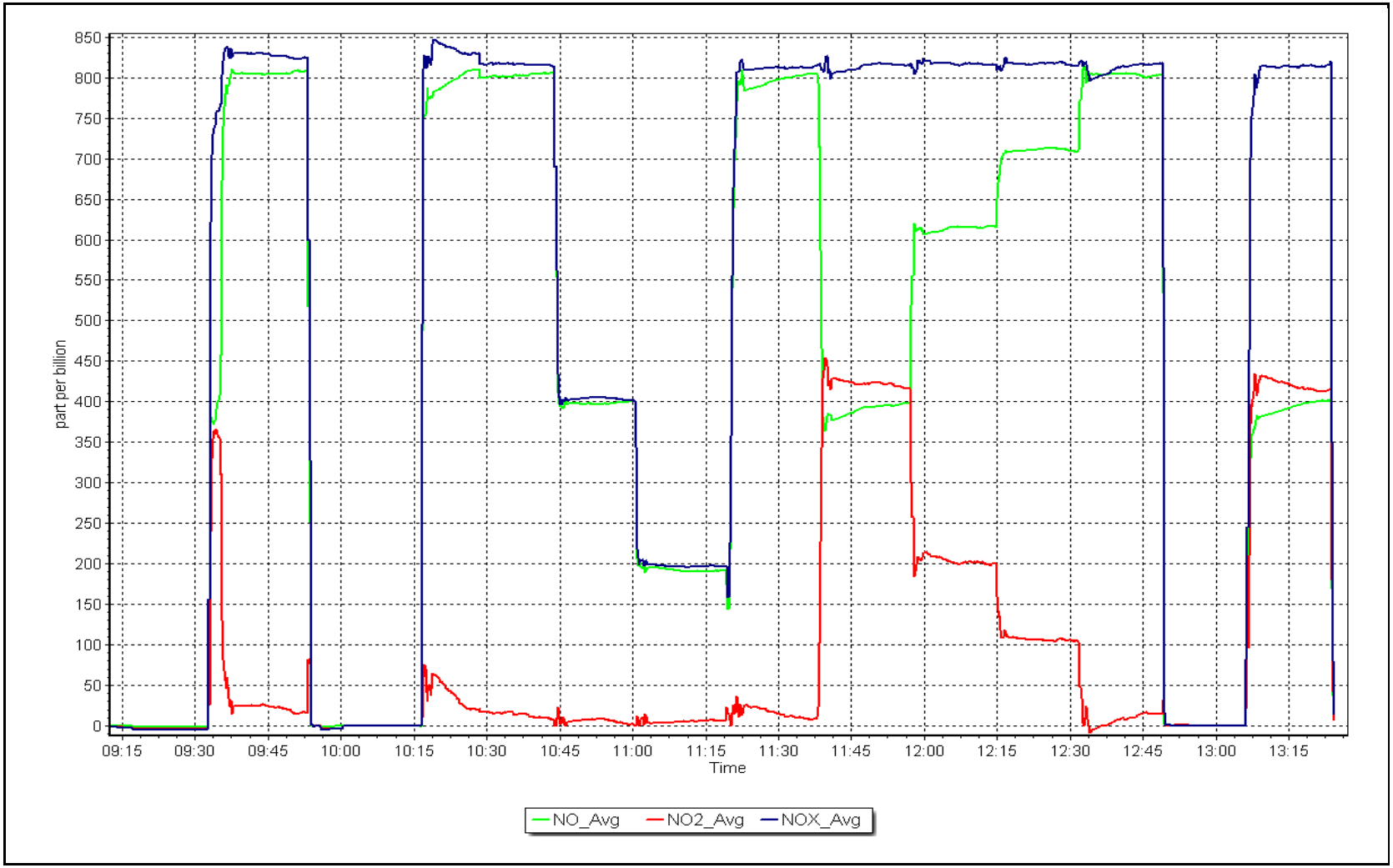
Calibration Date:	January 18, 2023	Previous Calibration:	December 20, 2022
Station Name:	Jackfish 2/3	Station Number:	AMS27
Start Time (MST):	9:08	End Time (MST):	13:30
Analyzer make:	API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999999	≥0.995
423.2	422.8	1.0010			
201.8	201.7	1.0006	Slope	0.998544	0.90 - 1.10
105.7	106.0	0.9973			
			Intercept	0.230642	+/-20



NO_X Calibration Plot Date: January 18, 2023 Location: Jackfish 2/3



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS29
SURMONT 2
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Surmont 2	Station number:	AMS29
Calibration Date:	January 3, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	11:24	End time (MST):	15:04
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 Make/Model:	Teledyne API T700		Serial Number:	3808
ZAG Make/Model:	Teledyne API T701		Serial Number:	4297

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1170050150

Analyzer Range 0 - 1000 ppb

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.998931	0.997244	Backgd or Offset:	12.3	12.4
Calibration intercept:	-0.505941	-0.565207	Coeff or Slope:	0.966	0.966

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*
as found zero	5000	0.0	0.0	0.1	----
as found span	4919	81.3	800.1	796.3	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	----
high point	4919	81.3	800.1	797.9	1.003
second point	4959	40.7	400.6	398.1	1.006
third point	4979	20.3	199.8	198.1	1.009
as left zero	5000	0.0	0.0	0.2	----
as left span	4919	81.3	800.1	799.4	1.001
				Average Correction Factor	1.006

Baseline Corr As found:	796.20	Previous response	798.75	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

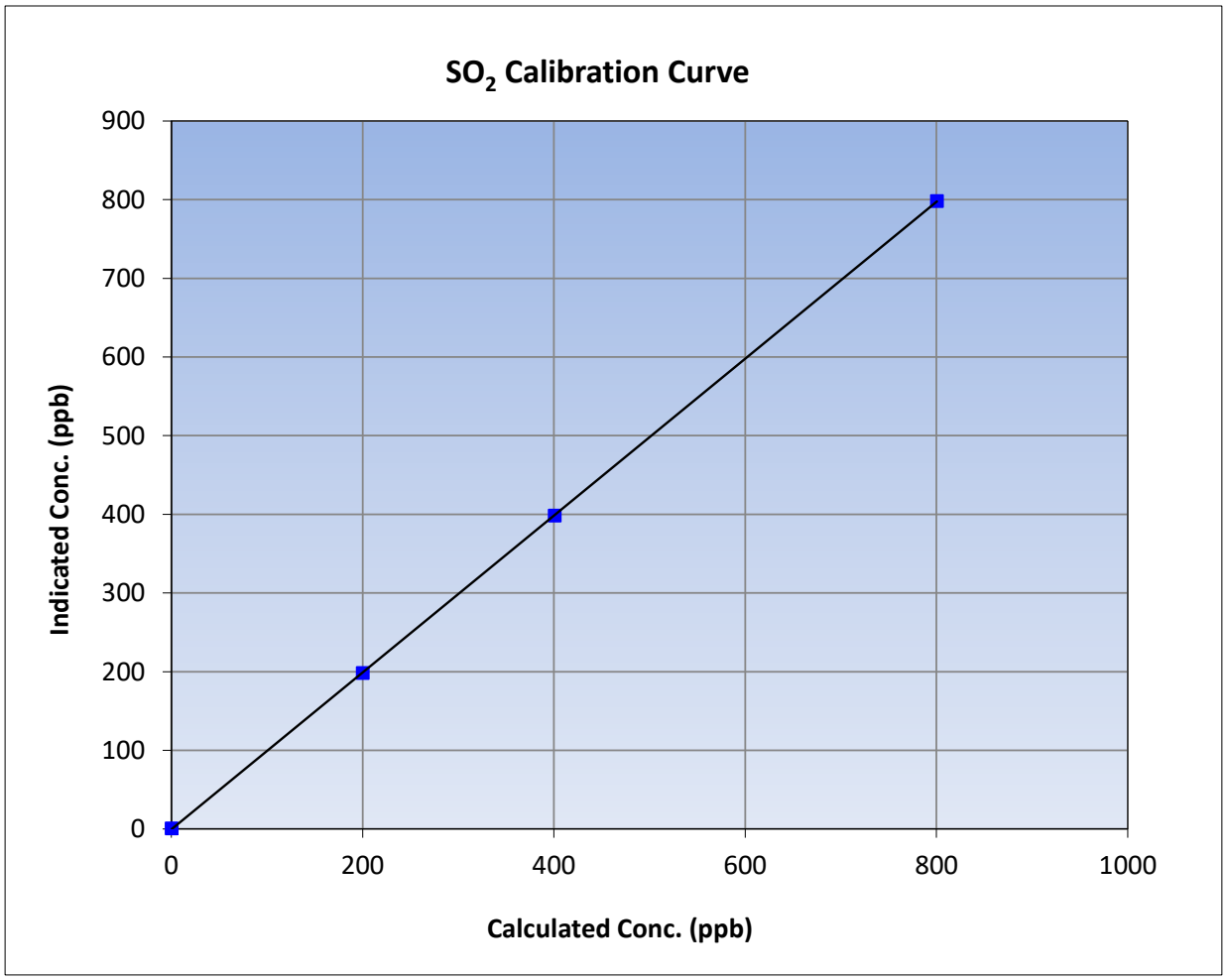
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 15, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:24	End Time (MST):	15:04
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

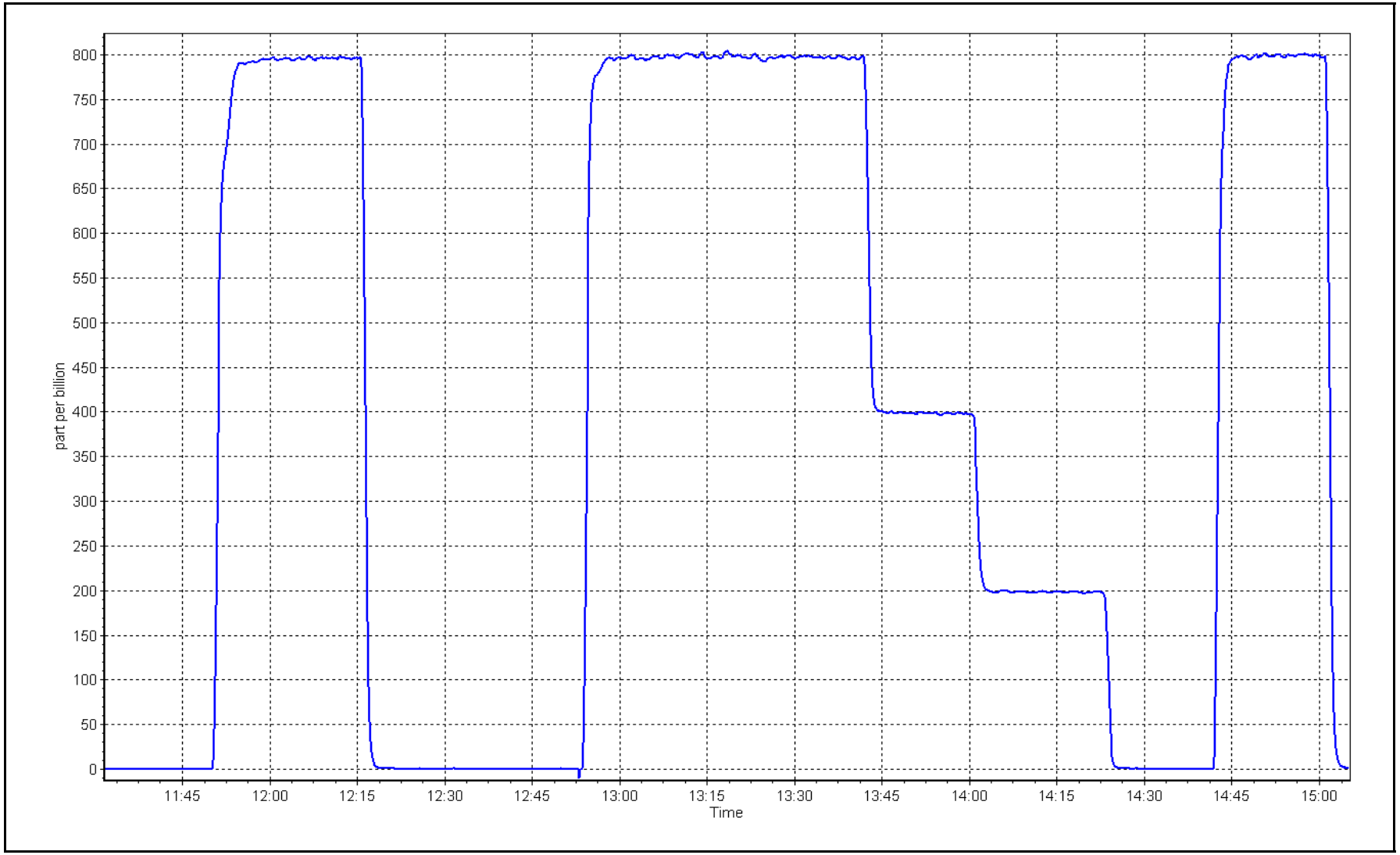
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.1	797.9	1.0028
400.6	398.1	1.0063
199.8	198.1	1.0087

Statistical Evaluation		Limits
Correlation Coefficient	0.999994	≥0.995
Slope	0.997244	0.90 - 1.10
Intercept	-0.565207	+/-30



SO2 Calibration Plot Date: January 3, 2023 Location: Surmont 2



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Surmont 2	Station number:	AMS29
Calibration Date:	January 9, 2023	Last Cal Date:	December 14, 2022
Start time (MST):	11:00	End time (MST):	15:19
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:	3808
ZAG Make/Model:	Teledyne API T701		Serial Number:	4297

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	1170050142	
Converter make:	Internal		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996190	0.996612	Backgd or Offset:	15.8	16.0
Calibration intercept:	-0.082676	0.177532	Coeff or Slope:	1.024	1.024

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 span	4926	74.2	80.0	81.5	0.982
as found 2nd point	4963	37.2	40.1	40.9	0.981
as found 3rd point	4982	18.6	20.1	19.8	1.013
new cylinder response					

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.4	----
high point	4926	74.2	80.0	80.0	1.000
second point	4963	37.2	40.1	40.1	1.000
third point	4982	18.6	20.1	19.9	1.008
as left zero	5000	0.0	0.0	0.3	----
as left span	4926	74.2	80.0	80.1	0.999
SO2 Scrubber Check	4919	81.3	813.0	-0.1	----
Date of last scrubber change:		15-Apr-21		Ave Corr Factor	1.003
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	81.5	Prev response:	79.61	*% change:	2.3%
Baseline Corr 2nd AF pt:	40.9	AF Slope:	1.021474	AF Intercept:	-0.243677
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999922		

* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after MAF's. Conducted SOx scrubber check after calibrator zero. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

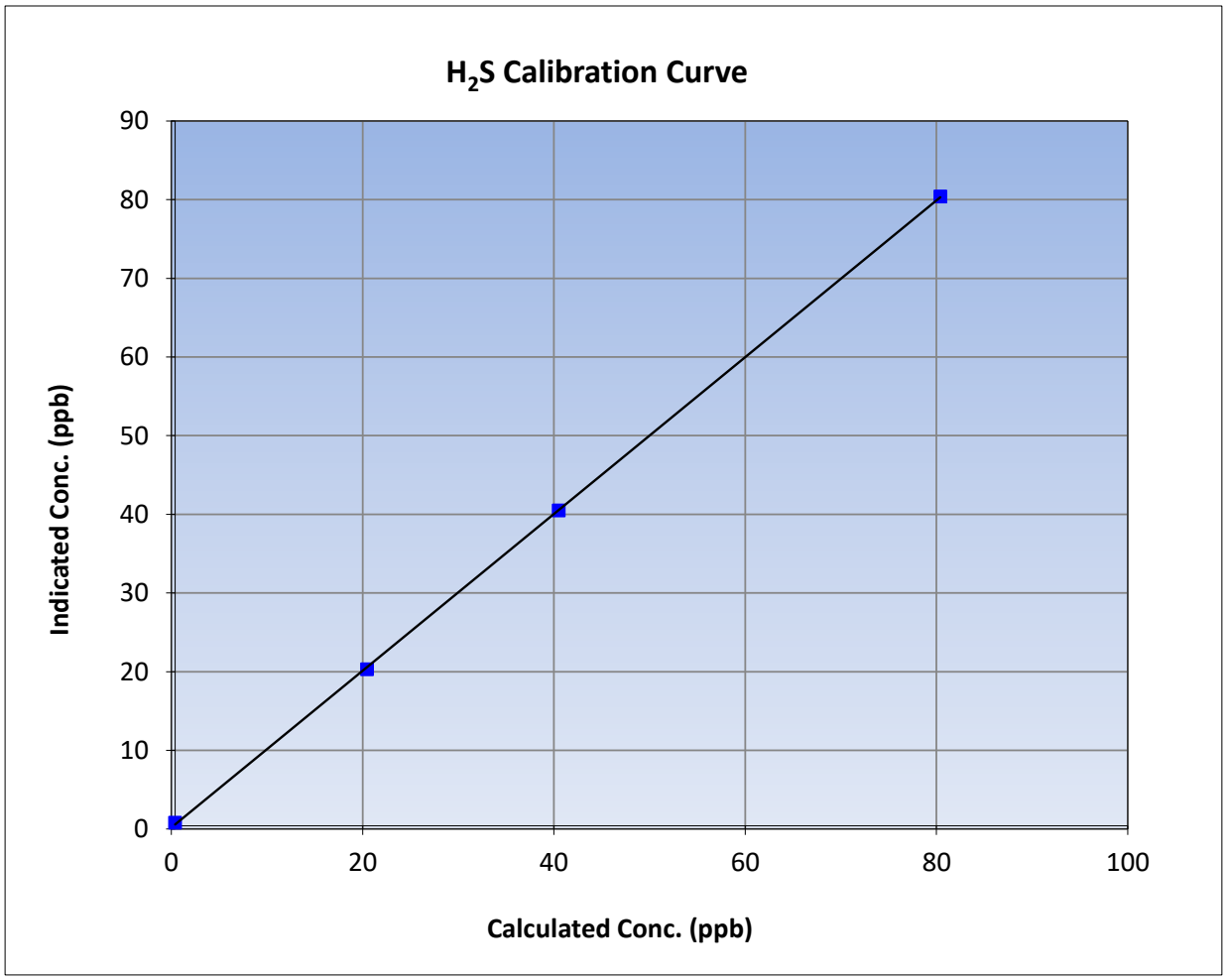
Station Information

Calibration Date:	January 9, 2023	Previous Calibration:	December 14, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:00	End Time (MST):	15:19
Analyzer make:	Thermo 450i	Analyzer serial #:	1170050142

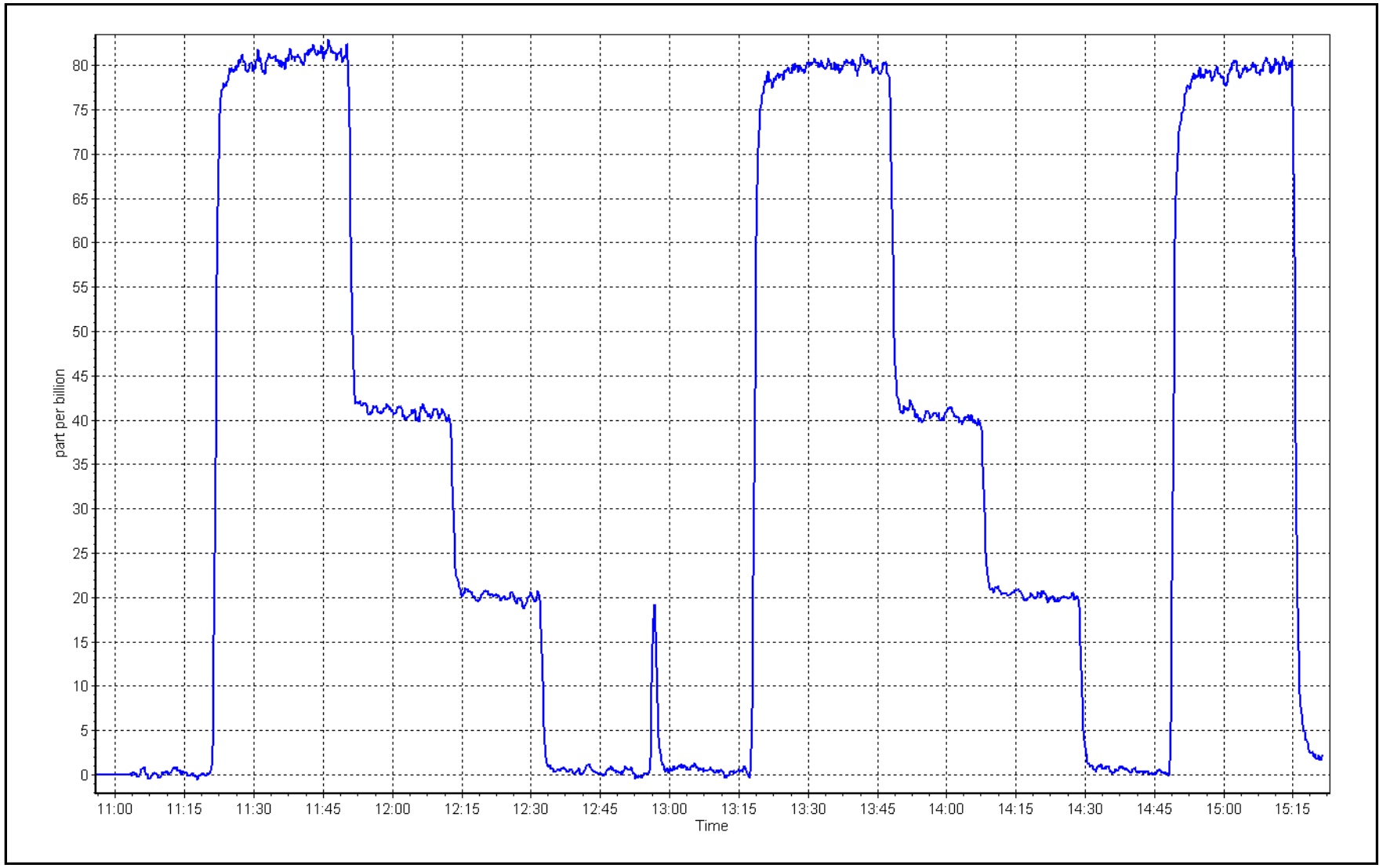
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
80.0	80.0	1.0000
40.1	40.1	1.0002
20.1	19.9	1.0077

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999963	*≥0.995*
Slope	0.996612	*0.90 - 1.10*
Intercept	0.177532	*+/-3*



H_2S Calibration Plot Date: January 9, 2023 Location: Surmont 2



Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name:	Surmont 2	Station number:	AMS29
Calibration Date:	January 3, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	11:24	End time (MST):	15:04
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC356008		Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	499.0	ppm	CH4 Equiv Conc.	1064.7	ppm
C3H8 Cal Gas Conc.	205.7	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	499.0	ppm	CH4 Equiv Conc.	1064.7	ppm
Removed C3H8 Conc.	205.7	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3808	
ZAG Make/Model:	Teledyne API T701		Serial Number:	4297	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1170050149	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000353	0.999326	Background:	4.240	4.510
Calibration intercept:	0.055778	-0.002444	Coefficient:	5.163	5.288

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.00	0.10	----
as found span	4918	81.3	17.31	17.07	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.02	----
high point	4918	81.3	17.31	17.32	1.000
second point	4959	40.7	8.67	8.62	1.005
third point	4979	20.3	4.32	4.32	1.002
as left zero	5000	0.0	0.00	-0.09	----
as left span	4918	81.3	17.31	17.47	0.991
				Average Correction Factor	1.002

Baseline Corr As found:	16.97	Previous response	17.38	*% change	-2.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

Version-01-2020

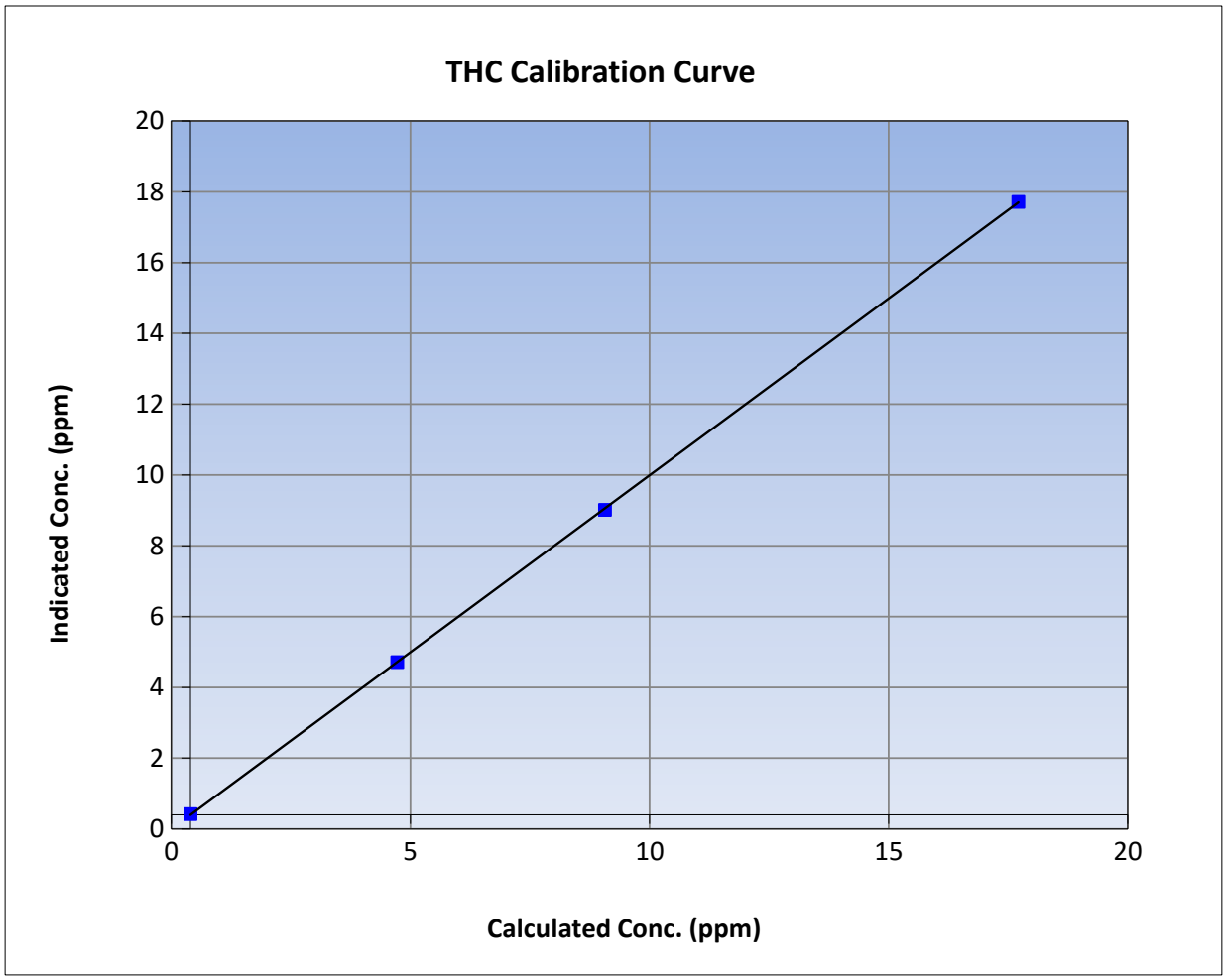
Station Information

Calibration Date:	January 3, 2023	Previous Calibration:	December 15, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	11:24	End Time (MST):	15:04
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

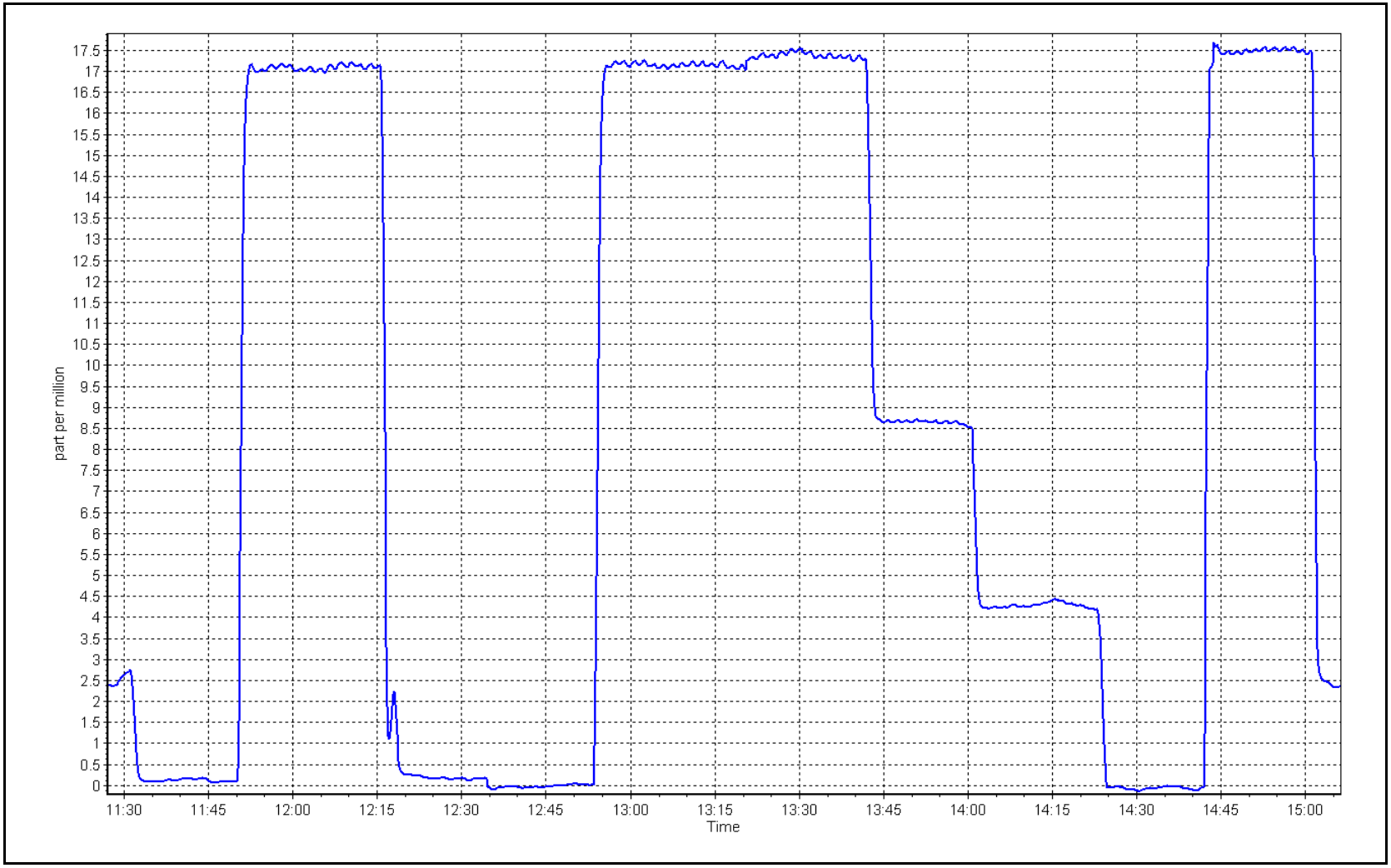
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.02	----
17.31	17.32	0.9997
8.67	8.62	1.0054
4.32	4.32	1.0019

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	0.999326	*0.90 - 1.10*
Intercept	-0.002444	*+/-1.5*



THC Calibration Plot Date: January 3, 2023 Location: Surmont 2



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Surmont 2	Station number:	AMS29
Calibration Date:	January 1, 2023	Last Cal Date:	December 6, 2022
Start time (MST):	12:58	End time (MST):	17:05
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:	3808	
ZAG make/model:	Teledyne API T701		Serial Number:	4297	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1170050148	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.445	1.445	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.995	0.995	NOX bkgnd or offset:	1.5	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	168.4	168.4

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.004874	0.998337
NO_X Cal Offset:	0.426008	0.787346
NO Cal Slope:	1.006946	1.000325
NO Cal Offset:	-0.773758	-0.232760
NO_2 Cal Slope:	1.000565	0.997537
NO_2 Cal Offset:	0.708204	-0.620843

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as found span	4916	84.2	799.2	799.2	0.0	813.1	812.8	0.2	0.9829	0.9833
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.0	0.6	----	----
high point	4916	84.2	799.2	799.2	0.0	798.4	799.1	-0.6	1.0010	1.0001
second point	4958	42.1	399.6	399.6	0.0	400.3	400.1	0.2	0.9983	0.9988
third point	4979	21.1	200.3	200.3	0.0	200.6	199.4	1.1	0.9984	1.0044
as left zero	5000	0.0	0.0	0.0	0.0					
as left span	4916	84.2	799.2	256.7	542.5					
								Average Correction Factor	0.9992	1.0011

Corrected As found	NO_X = 812.9 ppb	NO = 812.8 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	1.2%
Previous Response	NO_X = 803.5 ppb	NO = 804.0 ppb			*Percent Change	NO =	1.1%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:	
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.3	255.8	542.5	541.0	1.0028	99.7%
2nd GPT point (200 ppb O3)	798.3	588.8	209.5	207.7	1.0087	99.1%
3rd GPT point (100 ppb O3)	798.3	690.9	107.4	105.5	1.0180	98.2%
				Average Correction Factor	1.0098	99.0%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

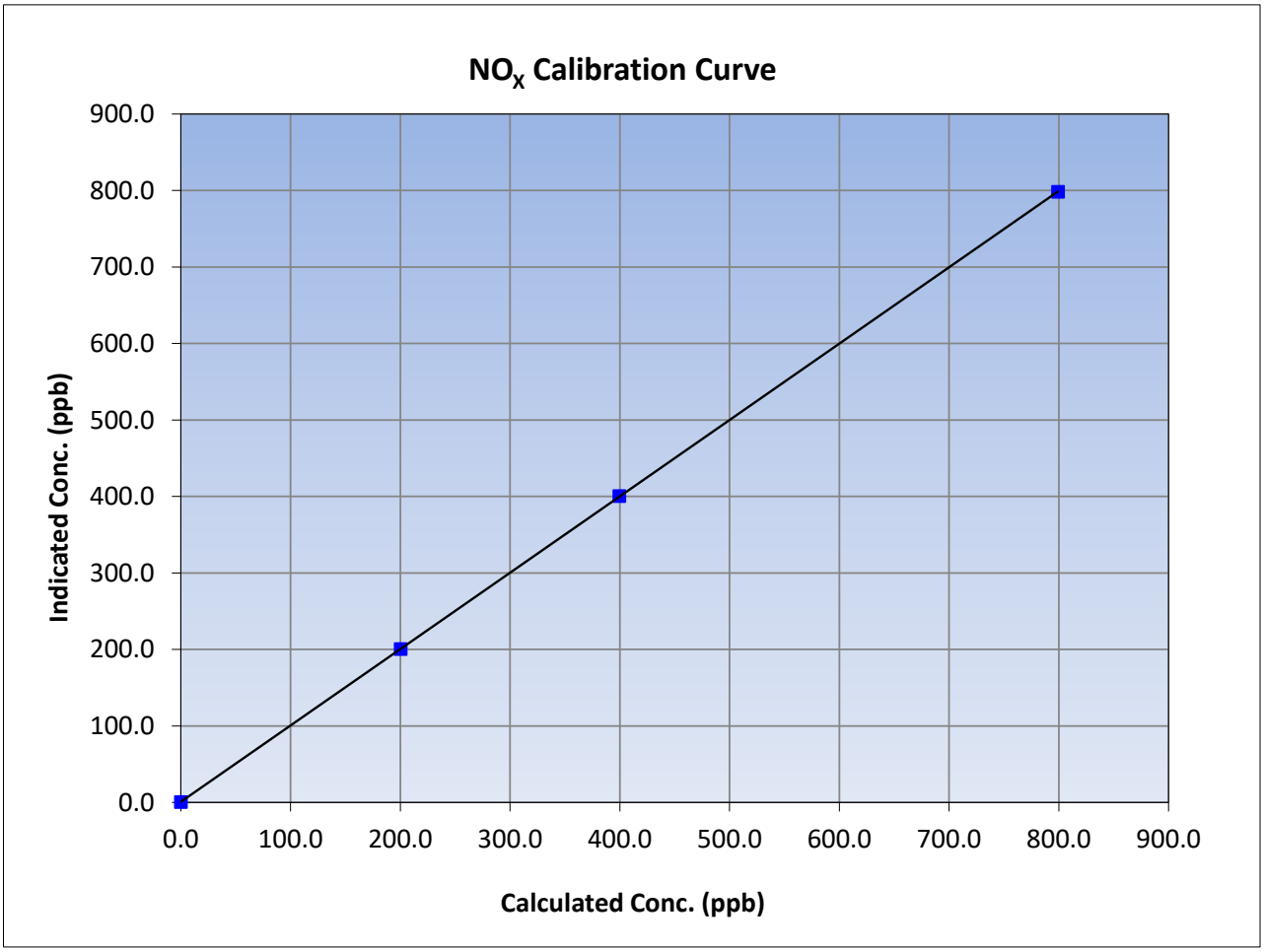
Version-04-2020

Station Information

Calibration Date:	January 1, 2023	Previous Calibration:	December 6, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	12:58	End Time (MST):	17:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.6	----	Correlation Coefficient	0.999999	*≥0.995*
799.2	798.4	1.0010			
399.6	400.3	0.9983	Slope	0.998337	*0.90 - 1.10*
200.3	200.6	0.9984			
			Intercept	0.787346	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

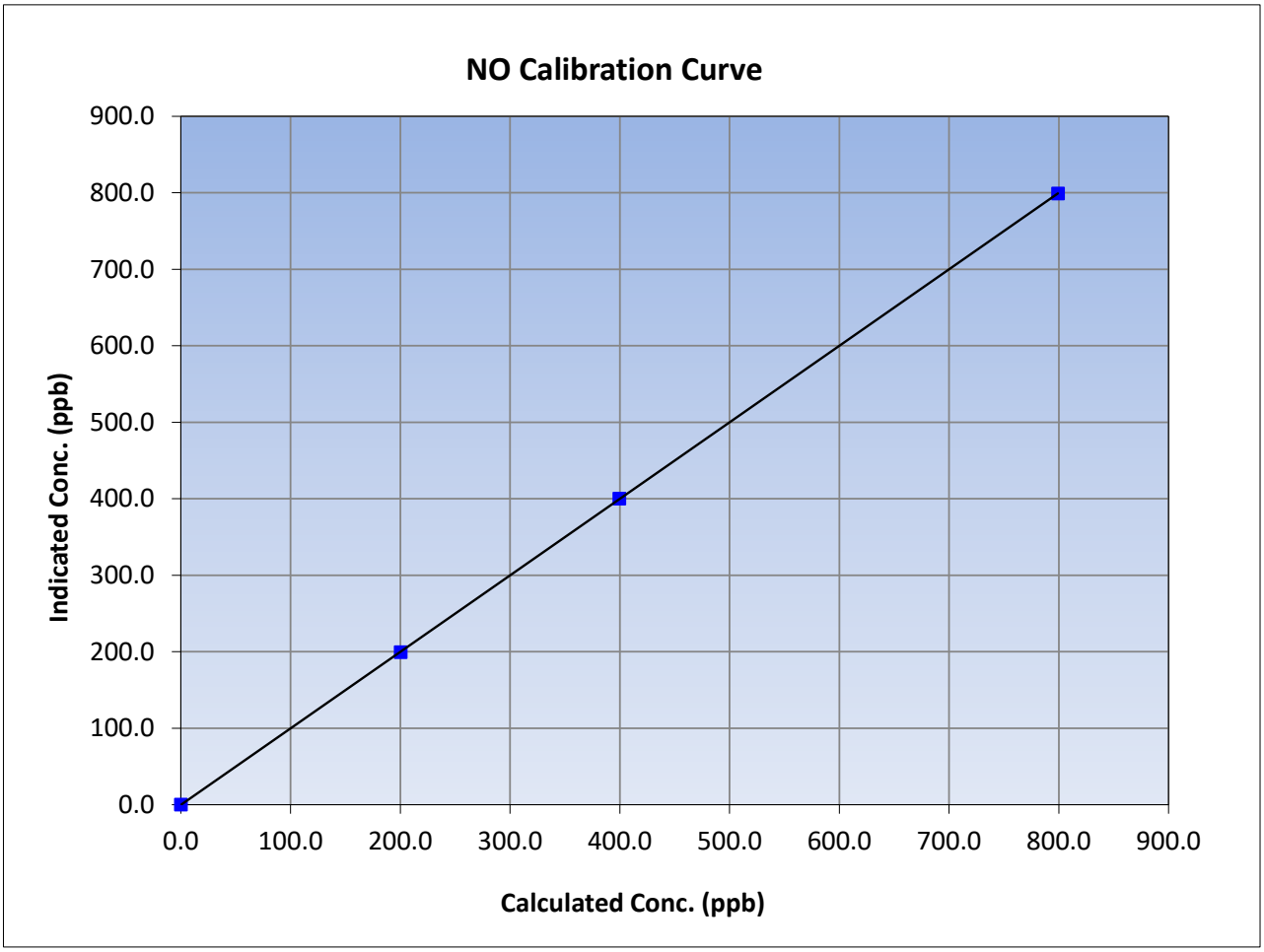
Version-04-2020

Station Information

Calibration Date:	January 1, 2023	Previous Calibration:	December 6, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	12:58	End Time (MST):	17:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999997	≥0.995
799.2	799.1	1.0001			
399.6	400.1	0.9988	Slope	1.000325	0.90 - 1.10
200.3	199.4	1.0044			
			Intercept	-0.232760	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

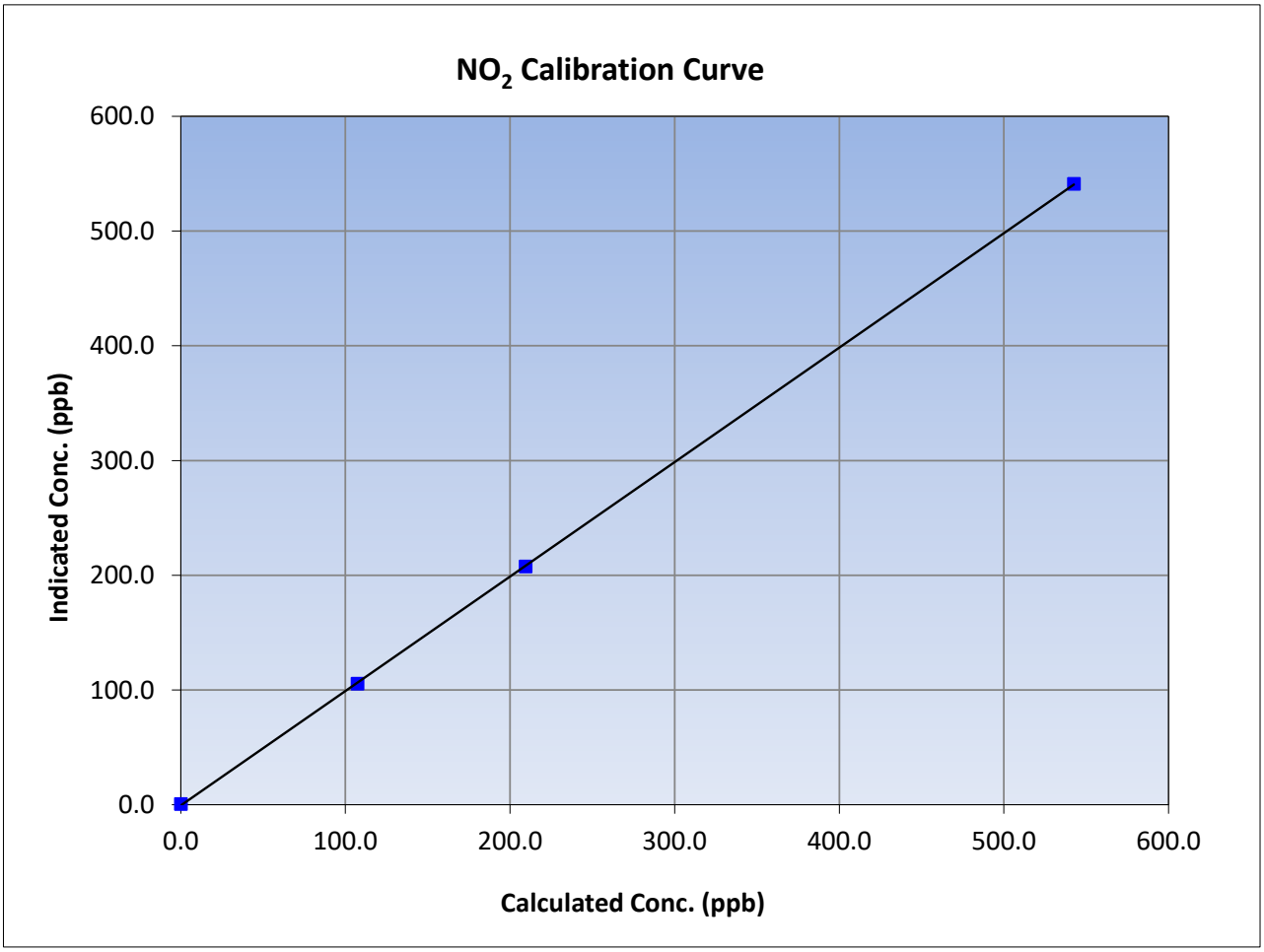
Version-04-2020

Station Information

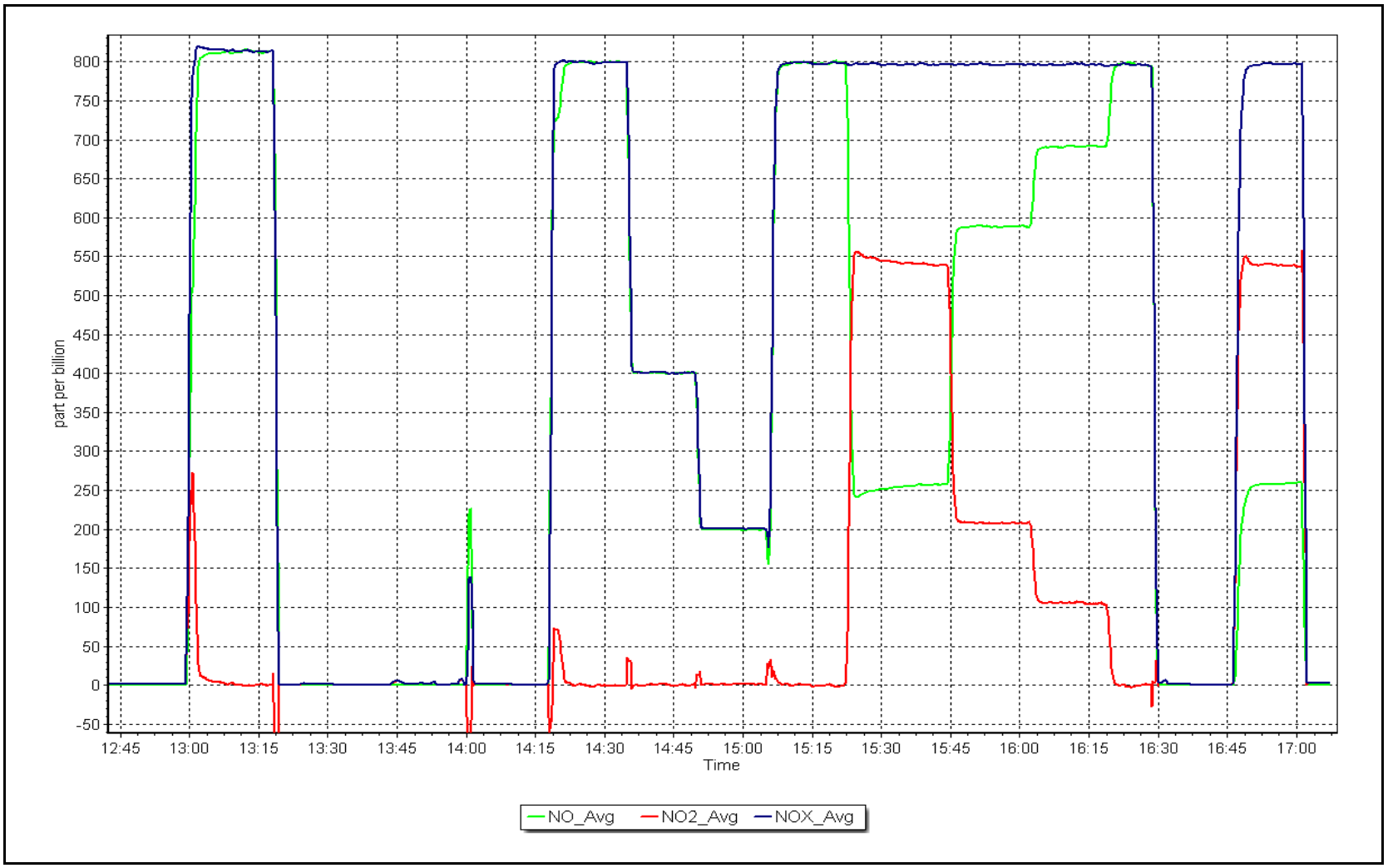
Calibration Date:	January 1, 2023	Previous Calibration:	December 6, 2022
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	12:58	End Time (MST):	17:05
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.6	----	Correlation Coefficient	0.999981	≥0.995
542.5	541.0	1.0028			
209.5	207.7	1.0087	Slope	0.997537	0.90 - 1.10
107.4	105.5	1.0180			
			Intercept	-0.620843	+/-20



NO_X Calibration Plot Date: January 1, 2023 Location: Surmont 2



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	January 12, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	14:24	End time (MST):	14:46
Analyzer Make:	API T640	S/N:	253
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	1018
Temp/RH standard:	Delta Cal	S/N:	1018

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-8.4	-7.8	-8.4	☐	+/- 2 ^{o}C
P (mmHg)	710.4	707.4	710.4	☐	+/- 10 mmHg
flow (LPM)	4.99	4.98	4.99	☐	+/- 0.25 LPM

Leak Test: Date of check: January 12, 2023 Last Cal Date: December 15, 2022

PM w/o HEPA: 9.5 PM w/ HEPA: 0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
PMT Peak Test				☐	11.3 +/- 0.5

Date Optical Chamber Cleaned:

Disposable Filter Changed: September 30, 2022

Annual Maintenance

Date Sample Tube Cleaned: September 30, 2022

Date RH/T Sensor Cleaned: October 6, 2022

Notes: No adjustments made.

Calibration by: Braiden Boutilier

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30
ELLS RIVER
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	January 10, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	10:08	End time (MST):	13:15
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:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3061
ZAG Make/Model:	API T701H		Serial Number:	358

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1008841397

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.005272	1.003501	Backgd or Offset:	9.1	9.3
Calibration intercept:	-2.195981	-2.675936	Coeff or Slope:	0.978	0.988

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*
as found zero	5000	0.0	0.0	-0.5	----
as found span	4921	79.2	800.4	790.7	1.012
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.1	----
high point	4921	79.2	800.4	802.0	0.998
second point	4960	39.6	400.2	397.0	1.008
third point	4980	19.8	200.1	196.0	1.021
as left zero	5000	0.0	0.0	-0.3	----
as left span	4921	79.2	800.4	803.1	0.997
				Average Correction Factor	1.009

Baseline Corr As found:	791.20	Previous response	802.39	*% 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

Notes: Adjusted the span only.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

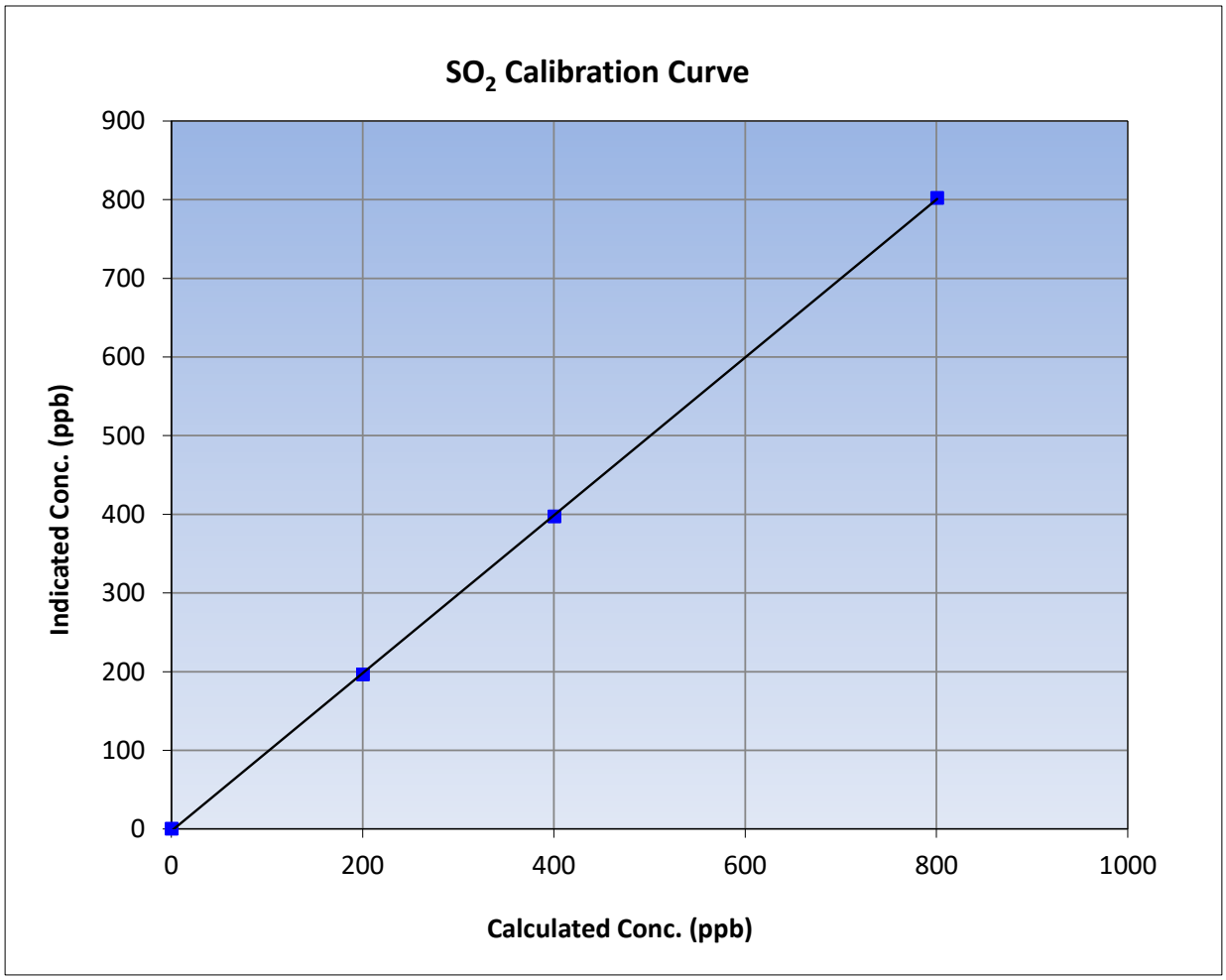
Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 2, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:08	End Time (MST):	13:15
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397

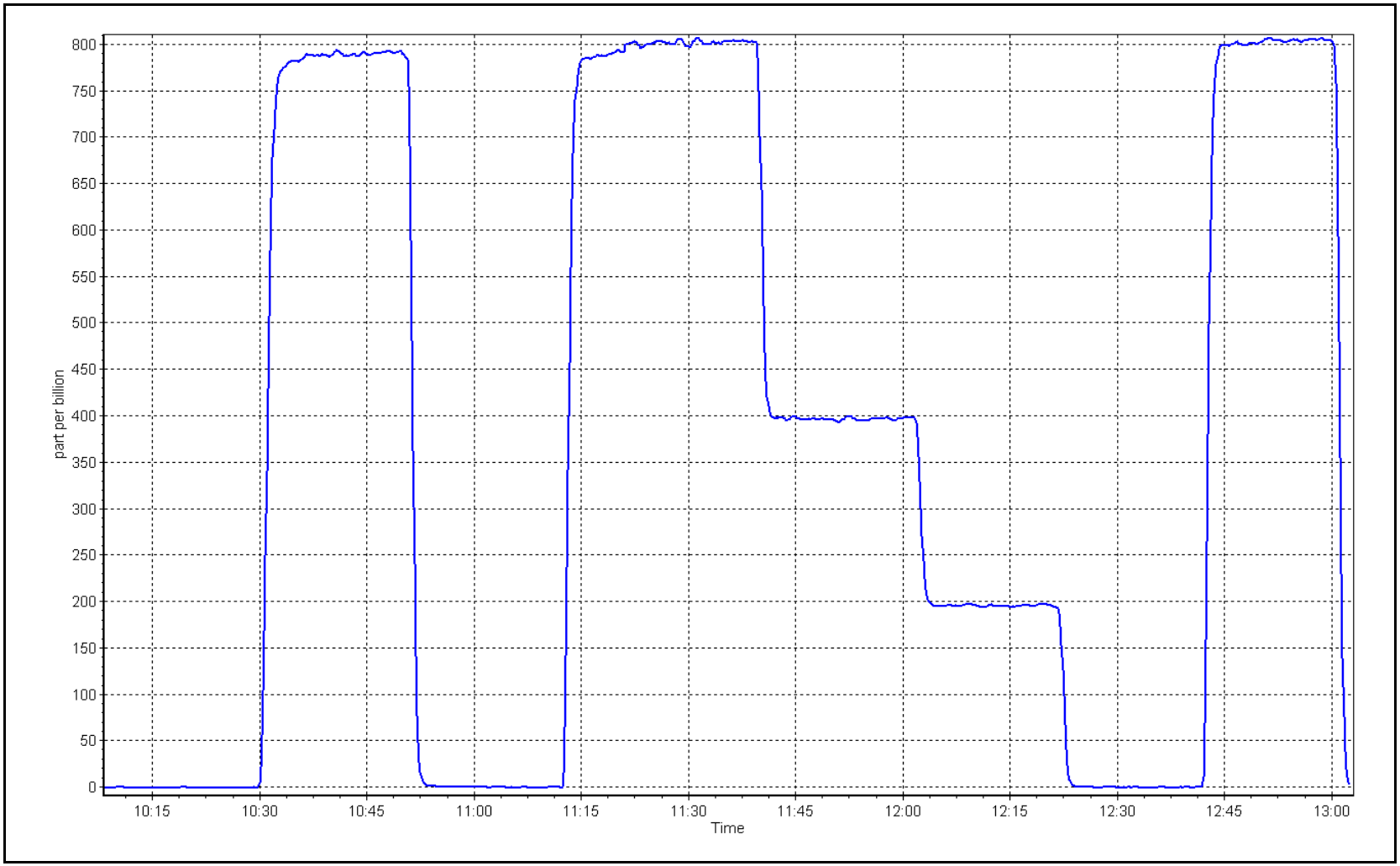
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
800.4	802.0	0.9980
400.2	397.0	1.0081
200.1	196.0	1.0210

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999951	*≥0.995*
Slope	1.003501	*0.90 - 1.10*
Intercept	-2.675936	*+/-30*



SO2 Calibration Plot Date: January 10, 2023 Location: Ells River



Wood Buffalo Environmental Association

TRS Calibration Report

Version-11-2021

Station Information

Station Name:	Ells River	Station number:	AMS30
Calibration Date:	January 5, 2023	Last Cal Date:	December 5, 2022
Start time (MST):	8:33	End time (MST):	12:20
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.08	ppm	Cal Gas Exp Date:	February 9, 2024
Cal Gas Cylinder #:	EY0002443			
Removed Cal Gas Conc:	5.08	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3061
ZAG Make/Model:	API T701H		Serial Number:	358

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1410661331	
Converter make:	CDN - 101		Converter serial #:	555	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.027511	1.029508	Backgd or Offset:	1.58	1.59
Calibration intercept:	0.160157	0.140267	Coeff or Slope:	1.123	1.123

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	0.0	----
as found span	4921	78.7	80.0	82.2	0.973
as found 2nd point	4961	39.4	40.0	40.7	0.983
as found 3rd point	4980	19.7	20.0	20.3	0.986
new cylinder response					

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
calibrator zero	5000	0.0	0.0	0.2	----
high point	4921	78.7	80.0	82.5	0.969
second point	4961	39.4	40.0	41.3	0.969
third point	4980	19.7	20.0	20.7	0.967
as left zero	5000	0.0	0.0	0.4	----
as left span	4921	78.7	80.0	82.3	0.972
SO2 Scrubber Check	4921	79.2	800.4	-0.1	----
Date of last scrubber change:		N/A		Ave Corr Factor	0.968
Date of last converter efficiency test:		N/A		95.1%	efficiency

Baseline Corr As found:	82.2	Prev response:	82.32	*% change:	-0.2%
Baseline Corr 2nd AF pt:	40.7	AF Slope:	1.028504	AF Intercept:	-0.199604
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999961		

* = > +/-5% change initiates investigation

Notes: No adjustments required.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

TRS Calibration Summary

Version-11-2021

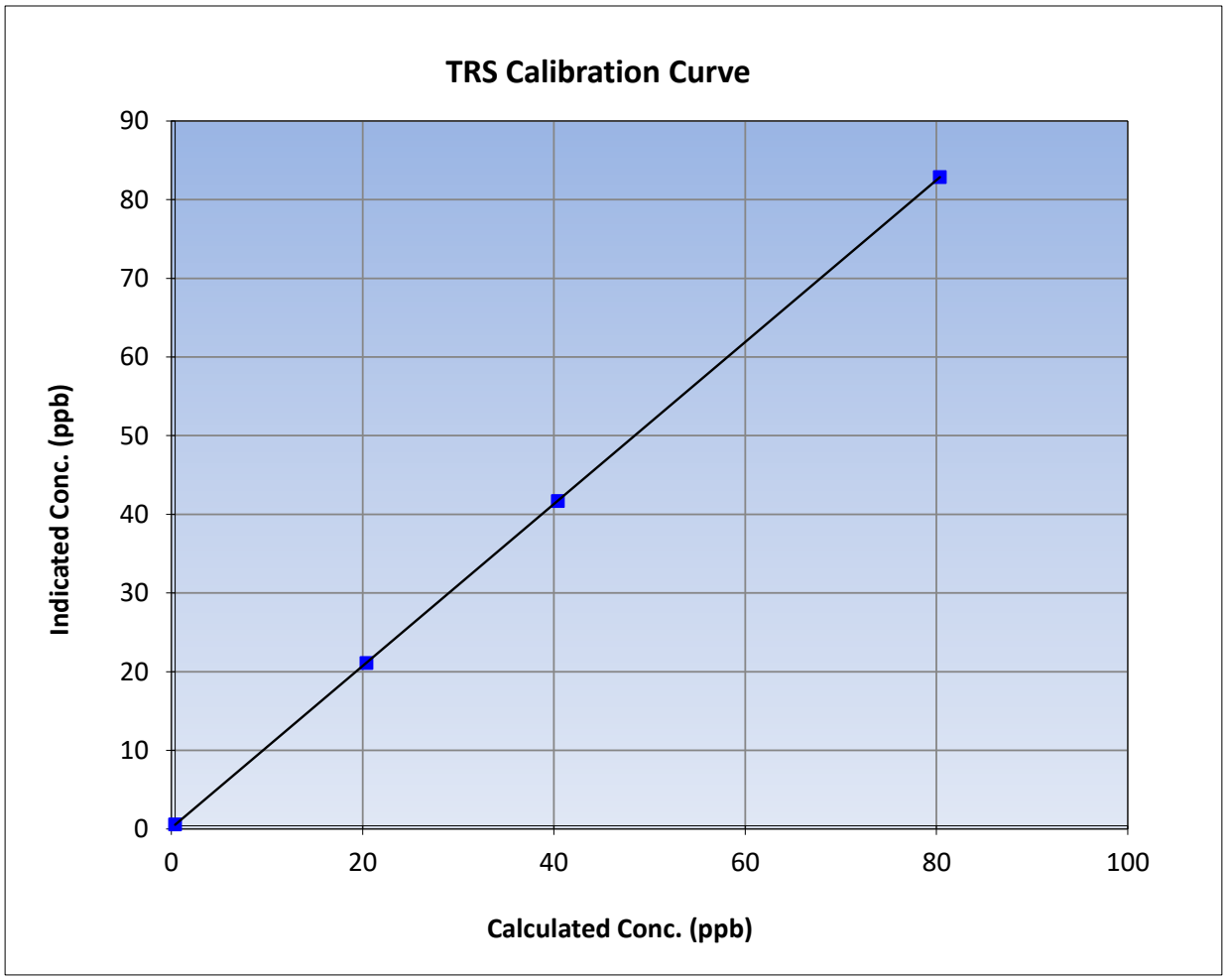
Station Information

Calibration Date:	January 5, 2023	Previous Calibration:	December 5, 2022
Station Name:	Ells River	Station Number:	AMS30
Start Time (MST):	8:33	End Time (MST):	12:20
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

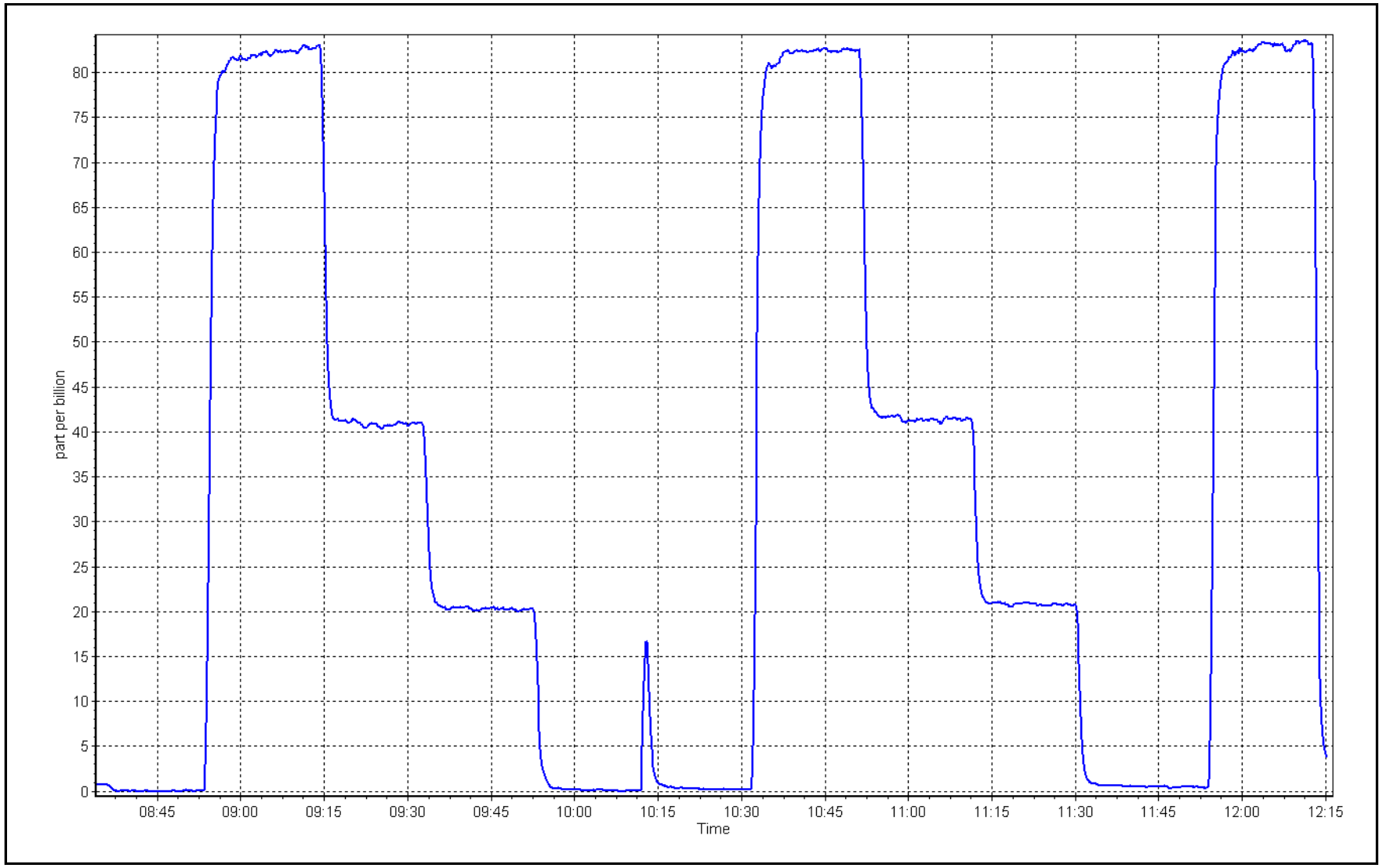
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	82.5	0.9693
40.0	41.3	0.9692
20.0	20.7	0.9670

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.029508	*0.90 - 1.10*
Intercept	0.140267	*+/-3*



TRS Calibration Plot Date: January 5, 2023 Location: Ells River



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	January 1, 2023	Last Cal Date:	December 2, 2022
Start time (MST):	13:30	End time (MST):	17:40
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	
ZAG make/model:	API T701H		Serial Number:	358	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1193585650	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	0.000236	0.000256	NMHC SP Ratio:	5.05E-05	5.68E-05
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	182329	177985

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.2	17.03	16.94	1.005
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.2	17.03	16.96	1.004
second point	4960	39.6	8.51	8.37	1.017
third point	4980	19.8	4.26	4.16	1.024
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	17.03	18.76	0.908
				Average Correction Factor	1.015

Baseline Corr AF:	16.94	Prev response	16.94	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4921	79.2	9.11	9.05	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4921	79.2	9.11	9.10	1.001
second point	4960	39.6	4.56	4.52	1.008
third point	4980	19.8	2.28	2.26	1.009
as left zero	5000	0	0.00	0.00	----
as left span	4921	79.2	9.11	10.19	0.894
				Average Correction Factor	1.006
Baseline Corr AF:	9.05	Prev response	9.07	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.2	7.91	7.89	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.2	7.91	7.86	1.007
second point	4960	39.6	3.96	3.85	1.027
third point	4980	19.8	1.98	1.90	1.042
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	7.91	8.57	0.924
				Average Correction Factor	1.025
Baseline Corr AF:	7.89	Prev response	7.87	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.000865	0.997012
THC Cal Offset:	-0.098736	-0.054536
CH4 Cal Slope:	1.001593	0.994373
CH4 Cal Offset:	-0.052956	-0.040955
NMHC Cal Slope:	0.999982	0.998992
NMHC Cal Offset:	-0.044780	-0.012581

Notes: N2 cylinder changed at 14:07 MST. No change in response to span. Noticed ambient readings were below global background, turned on "use zero chromatogram" and calibrated

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

THC Calibration Summary

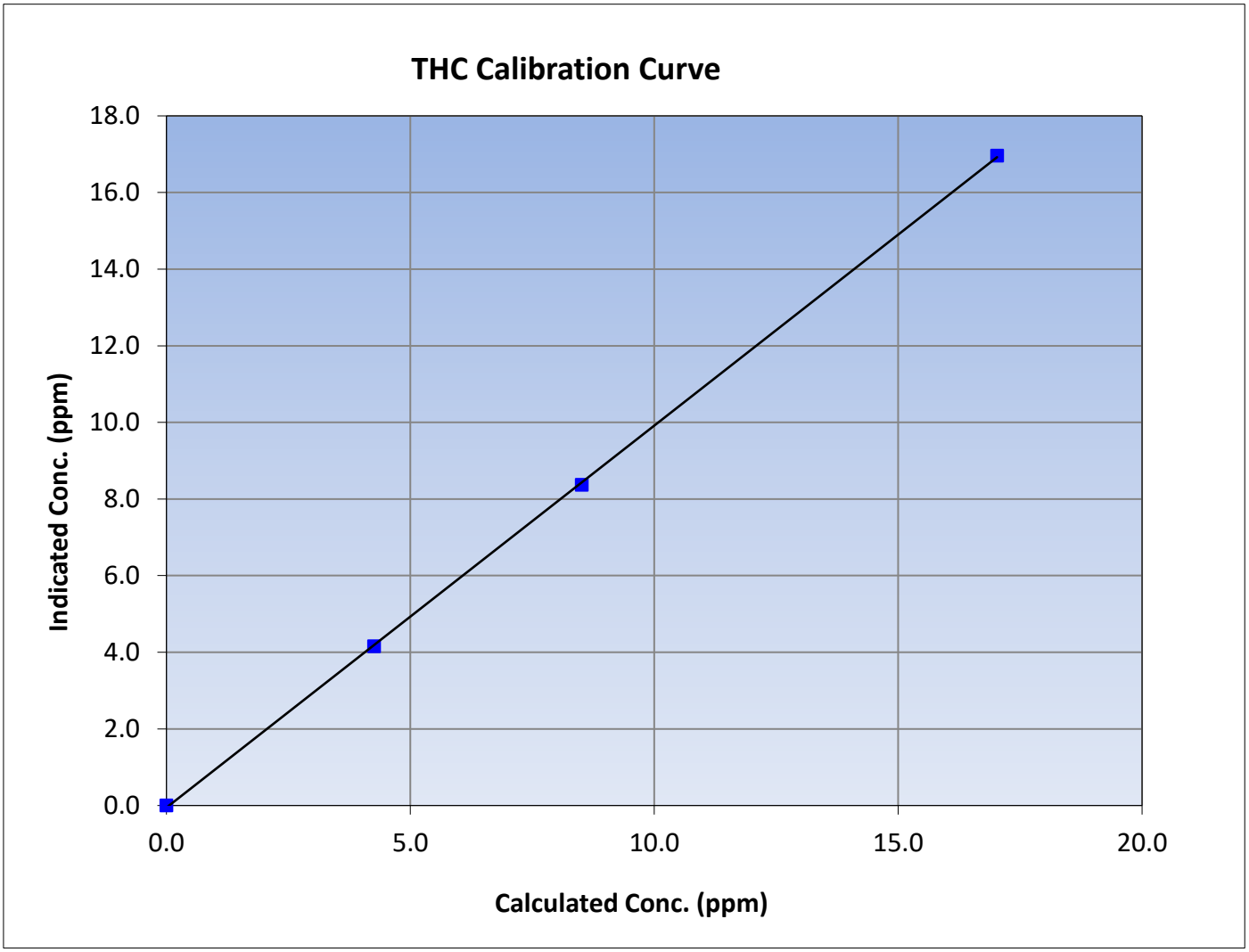
Version-01-2020

Station Information

Calibration Date:	January 1, 2023	Previous Calibration:	December 2, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	13:30	End Time (MST):	17:40
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999940	*≥0.995*
17.03	16.96	1.0039			
8.51	8.37	1.0170	Slope	0.997012	*0.90 - 1.10*
4.26	4.16	1.0236			
			Intercept	-0.054536	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

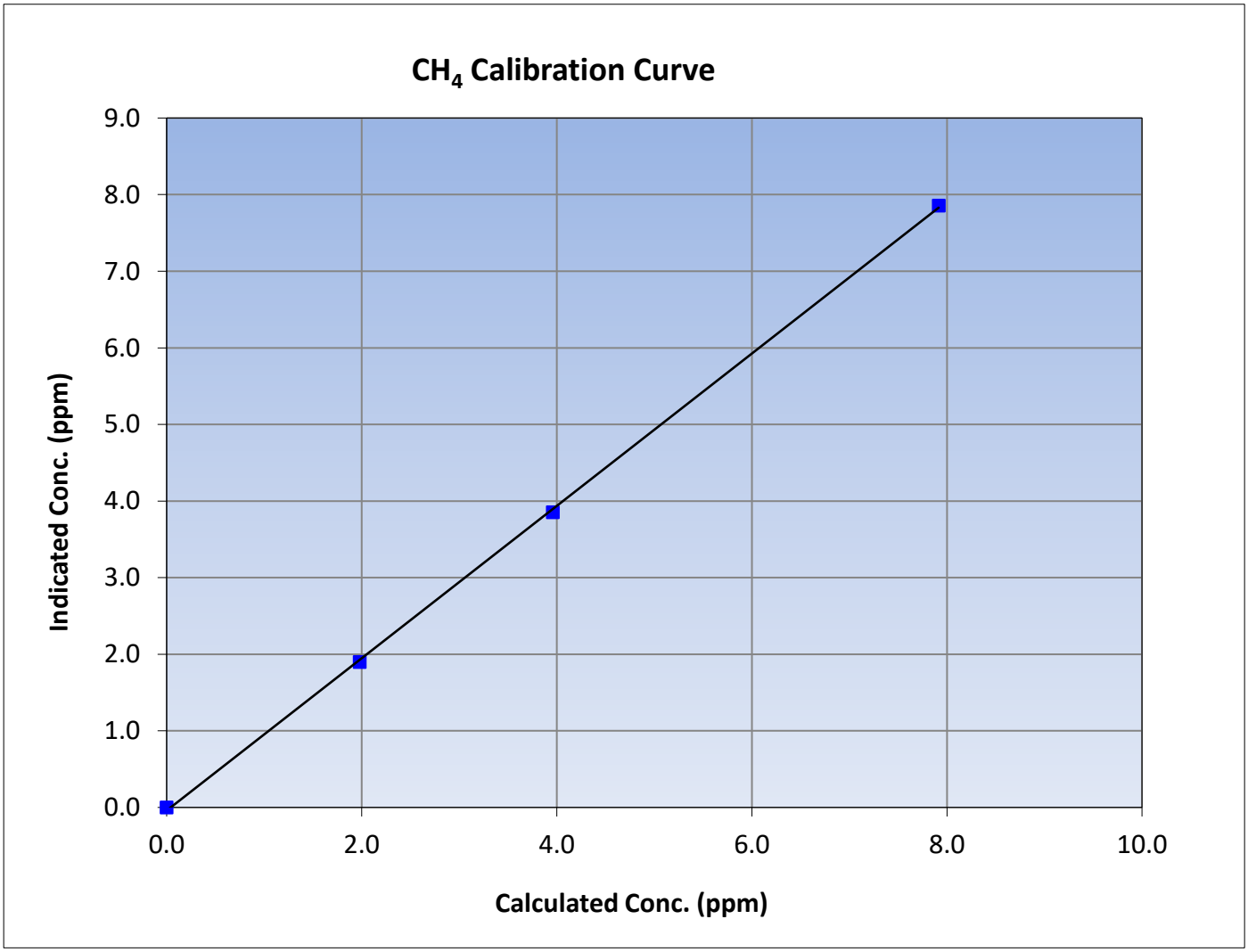
Version-01-2020

Station Information

Calibration Date:	January 1, 2023	Previous Calibration:	December 2, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	13:30	End Time (MST):	17:40
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999856	*≥0.995*
7.91	7.86	1.0074			
3.96	3.85	1.0272	Slope	0.994373	*0.90 - 1.10*
1.98	1.90	1.0415			
			Intercept	-0.040955	*+/-0.5*



Wood Buffalo Environmental Association

NMHC Calibration Summary

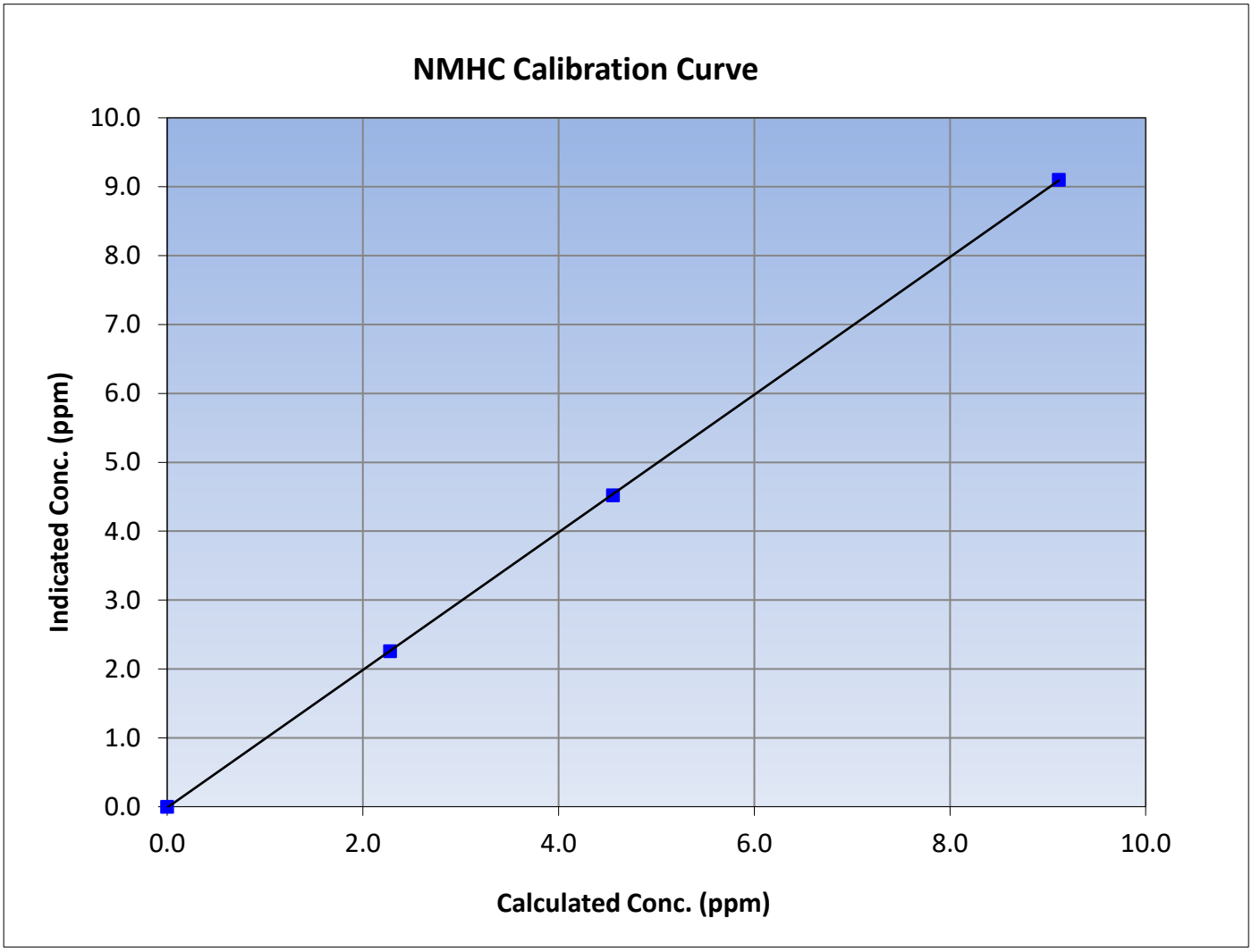
Version-01-2020

Station Information

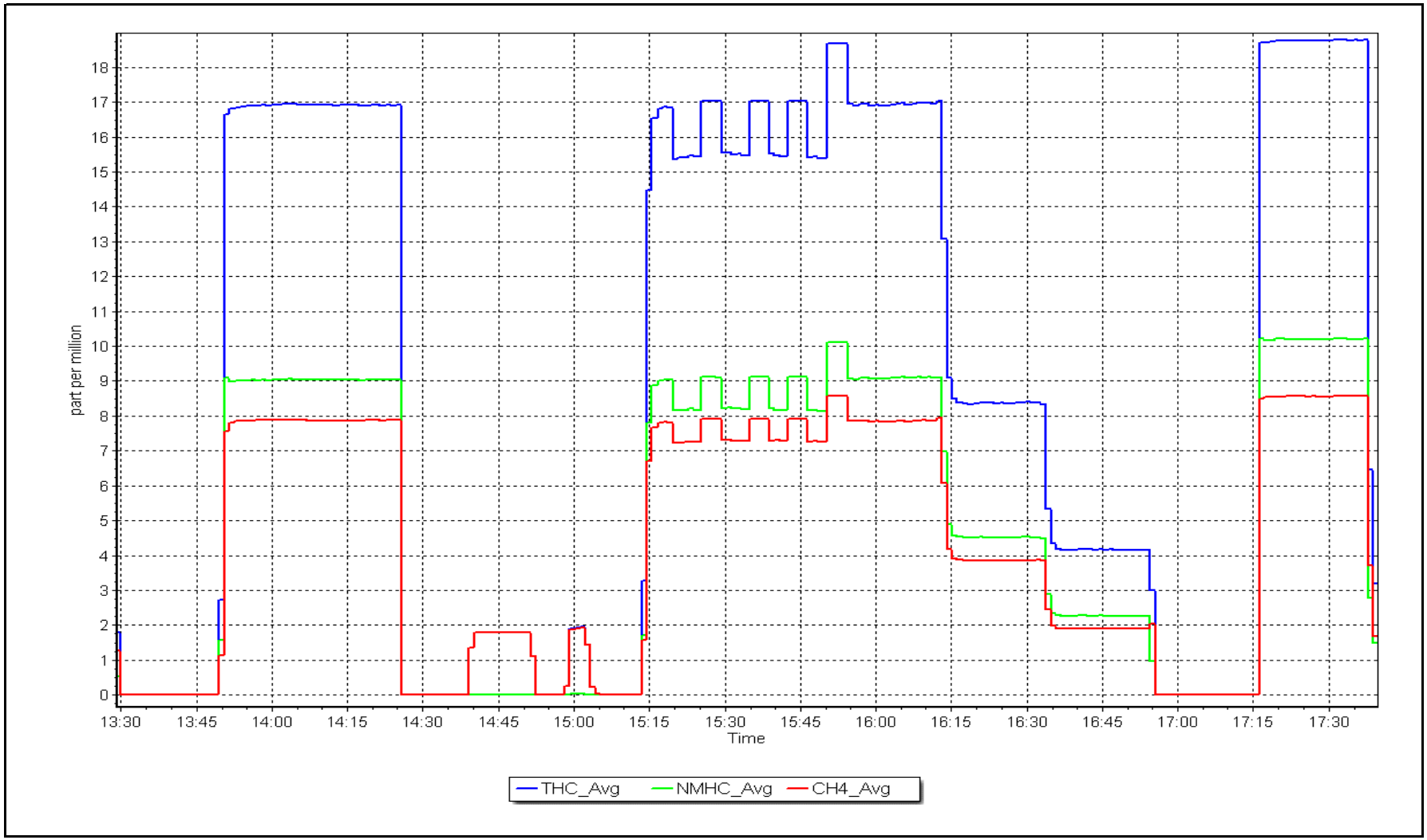
Calibration Date:	January 1, 2023	Previous Calibration:	December 2, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	13:30	End Time (MST):	17:40
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999986	≥0.995
9.11	9.10	1.0013			
4.56	4.52	1.0079	Slope	0.998992	0.90 - 1.10
2.28	2.26	1.0085			
			Intercept	-0.012581	+/-0.5



NMHC Calibration Plot Date: January 1, 2023 Location: Ells River



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	January 2, 2023	Last Cal Date:	January 1, 2023
Start time (MST):	10:20	End time (MST):	14:51
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	
ZAG make/model:	API T701H		Serial Number:	358	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1193585650	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm):	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	0.000256	0.000234	NMHC SP Ratio:	5.68E-05	5.04E-05
CH4 Retention time:	13.2	13.2	NMHC Peak Area:	177985	180847

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.2	17.03	18.22	0.934
as found 2nd point	4960	39.6	8.51	8.89	0.958
as found 3rd point	4980	19.8	4.26	4.38	0.973
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.2	17.03	17.10	0.996
second point	4960	39.6	8.51	8.41	1.012
third point	4980	19.8	4.26	4.14	1.030
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	17.03	17.12	0.995
				Average Correction Factor	1.013

Baseline Corr AF:	18.22	Prev response	16.92	*% change	7.1%
Baseline Corr 2nd AF:	8.9	AF Slope:	1.072185	AF Intercept:	-0.116558
Baseline Corr 3rd AF:	4.4	AF Correlation:	0.999774	* = > +/-5% change initiates investigation	

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0	0.00	0.00	----
as found span	4921	79.2	9.11	9.88	0.922
as found 2nd point	4960	39.6	4.56	4.84	0.941
as found 3rd point	4980	19.8	2.28	2.40	0.951
new cylinder response					
calibrator zero	5000	0	0.00	0.00	----
high point	4921	79.2	9.11	9.17	0.994
second point	4960	39.6	4.56	4.53	1.006
third point	4980	19.8	2.28	2.24	1.019
as left zero	5000	0	0.00	0.00	----
as left span	4921	79.2	9.11	9.18	0.993
				Average Correction Factor	1.006
Baseline Corr AF:	9.88	Prev response	9.09	*% change	8.0%
Baseline Corr 2nd AF:	4.8	AF Slope:	1.085893	AF Intercept:	-0.049795
Baseline Corr 3rd AF:	2.4	AF Correlation:	0.999854	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF *Limit= 0.95-1.05*
as found zero	5000	0.0	0.00	0.00	----
as found span	4921	79.2	7.91	8.34	0.949
as found 2nd point	4960	39.6	3.96	4.05	0.978
as found 3rd point	4980	19.8	1.98	1.98	0.999
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	----
high point	4921	79.2	7.91	7.94	0.997
second point	4960	39.6	3.96	3.88	1.020
third point	4980	19.8	1.98	1.90	1.042
as left zero	5000	0.0	0.00	0.00	----
as left span	4921	79.2	7.91	7.94	0.997
				Average Correction Factor	1.020
Baseline Corr AF:	8.34	Prev response	7.83	*% change	6.1%
Baseline Corr 2nd AF:	4.05	AF Slope:	1.056173	AF Intercept:	-0.065963
Baseline Corr 3rd AF:	1.98	AF Correlation:	0.999667	* = > +/-5% change initiates investigation	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.997012	1.006389
THC Cal Offset:	-0.054536	-0.085138
CH4 Cal Slope:	0.994373	1.004928
CH4 Cal Offset:	-0.040955	-0.050756
NMHC Cal Slope:	0.998992	1.007959
NMHC Cal Offset:	-0.012581	-0.034582

Notes: Troubleshooting after yesterdays failed As Lefts and todays high daily span. Pump changed after As Founds. Tested options for data processing, "use zero chrome" turned on

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

THC Calibration Summary

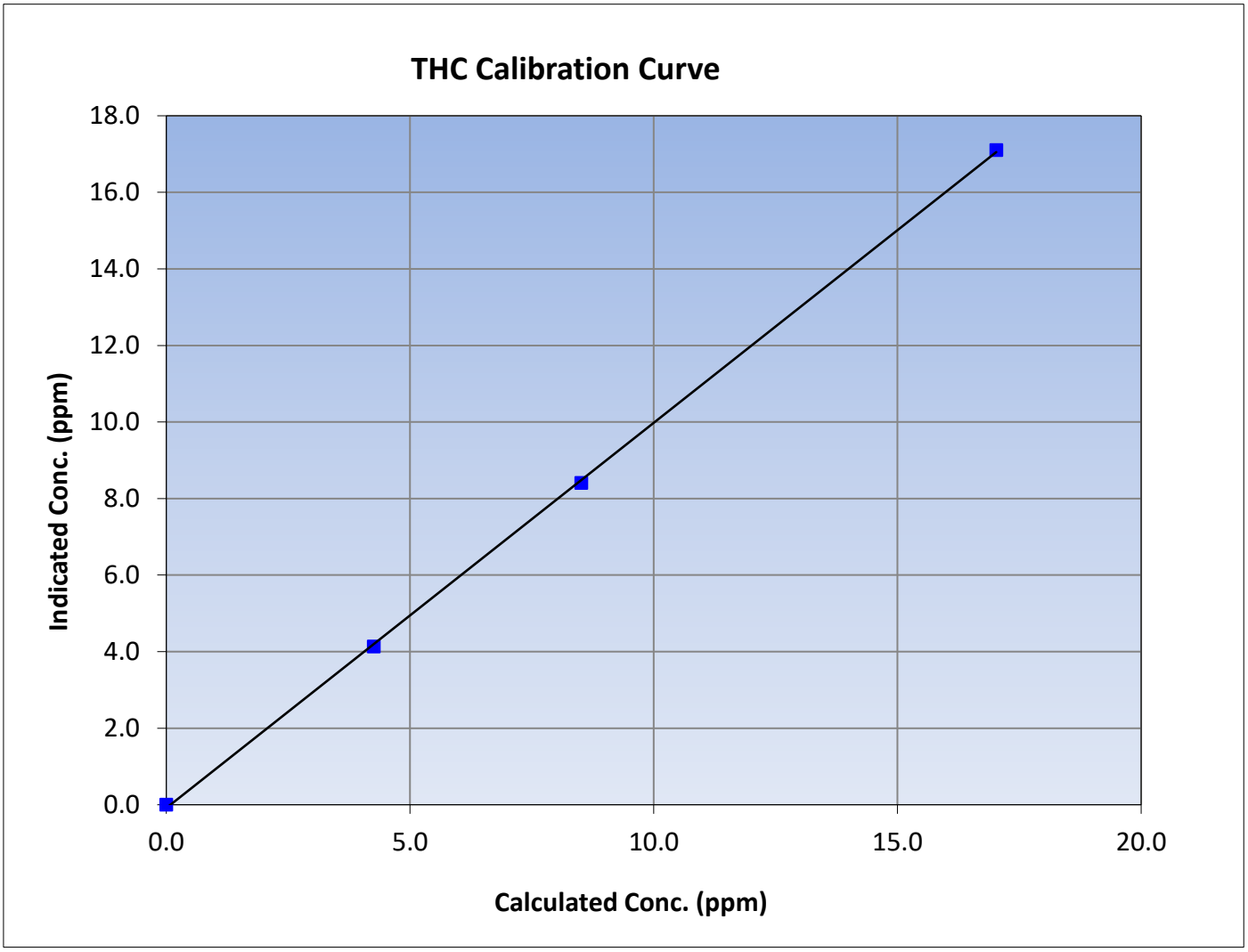
Version-01-2020

Station Information

Calibration Date:	January 2, 2023	Previous Calibration:	January 1, 2023
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:20	End Time (MST):	14:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999878	*≥0.995*
17.03	17.10	0.9955			
8.51	8.41	1.0124	Slope	1.006389	*0.90 - 1.10*
4.26	4.14	1.0295			
			Intercept	-0.085138	*+/-0.5*



Wood Buffalo Environmental Association

CH_4 Calibration Summary

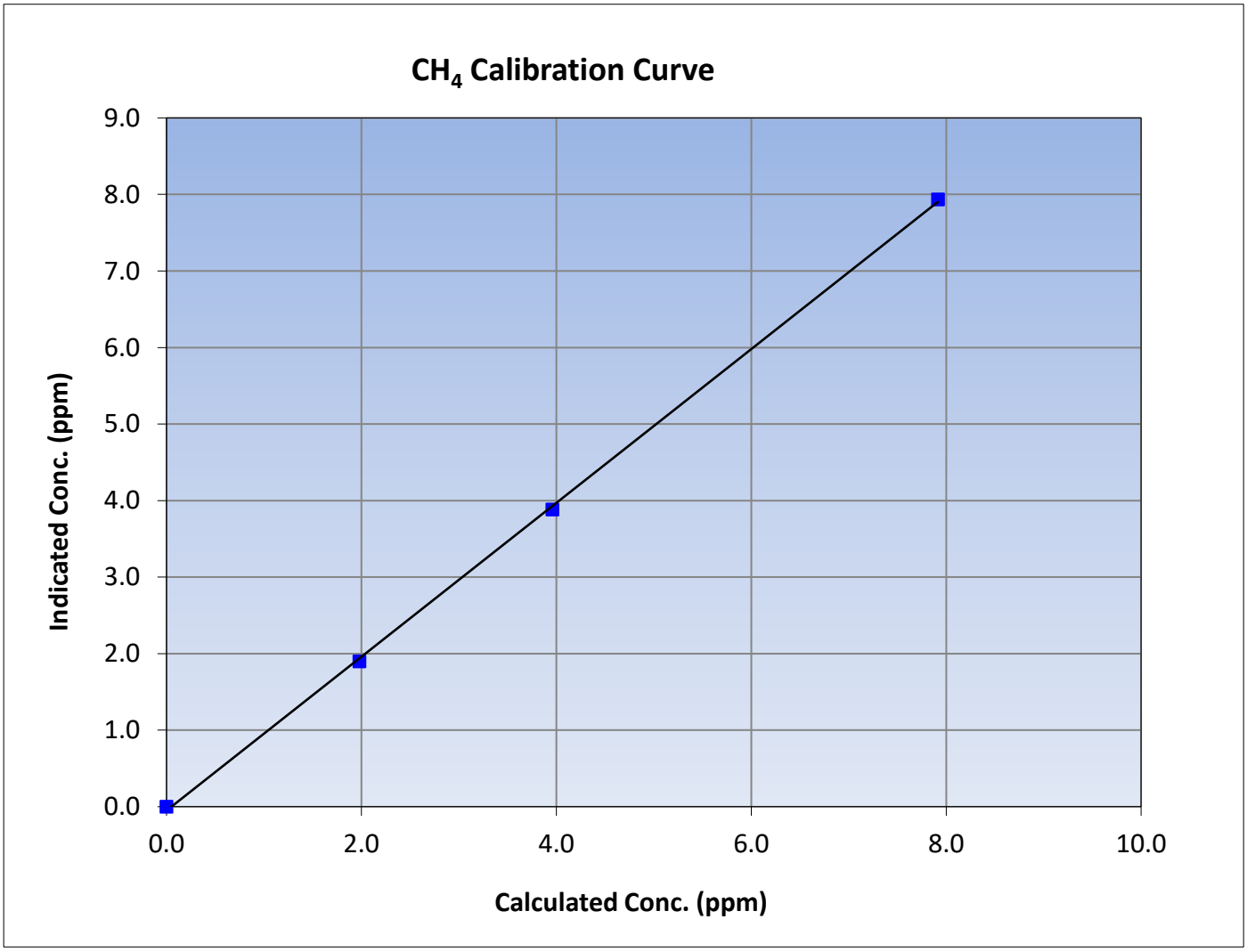
Version-01-2020

Station Information

Calibration Date:	January 2, 2023	Previous Calibration:	January 1, 2023
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:20	End Time (MST):	14:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999797	≥0.995
7.91	7.94	0.9975			
3.96	3.88	1.0196	Slope	1.004928	0.90 - 1.10
1.98	1.90	1.0415			
			Intercept	-0.050756	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

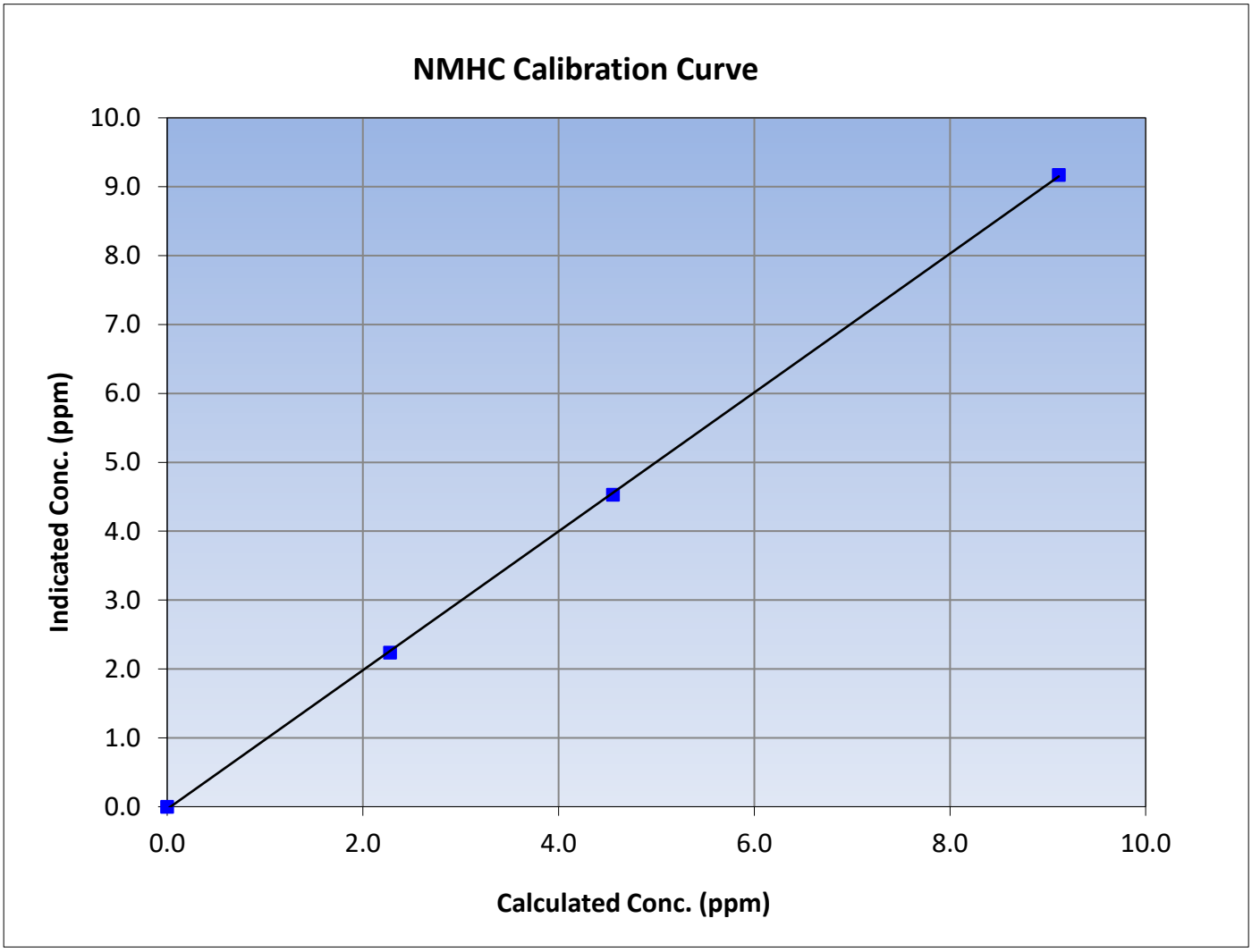
Version-01-2020

Station Information

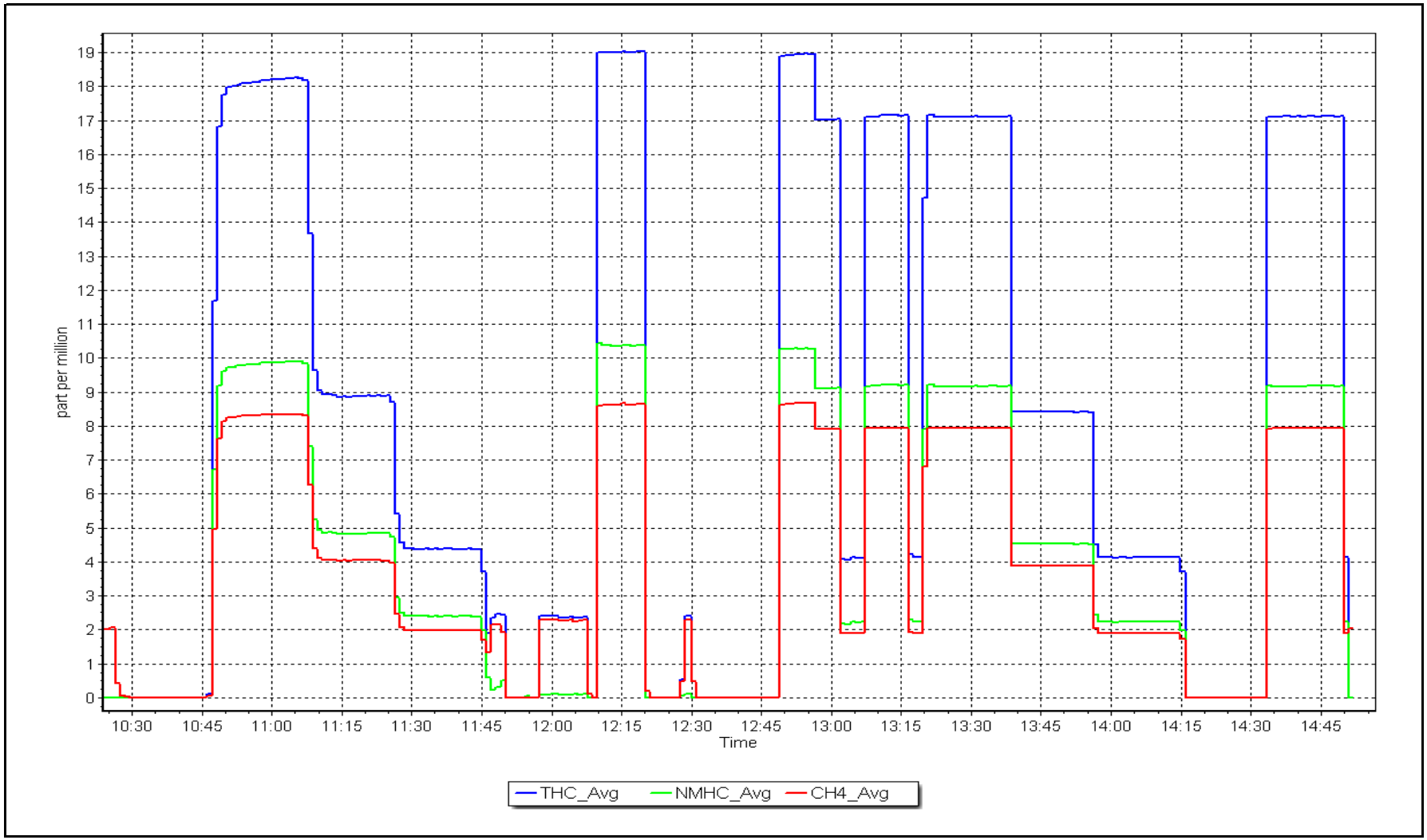
Calibration Date:	January 2, 2023	Previous Calibration:	January 1, 2023
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:20	End Time (MST):	14:51
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585650

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999929	≥0.995
9.11	9.17	0.9935			
4.56	4.53	1.0063	Slope	1.007959	0.90 - 1.10
2.28	2.24	1.0189			
			Intercept	-0.034582	+/-0.5



NMHC Calibration Plot Date: January 2, 2023 Location: Ells River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	January 13, 2023	Last Cal Date:	December 12, 2022
Start time (MST):	9:13	End time (MST):	13:30
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:		T2Y1P2R	Cal Gas Expiry Date:	December 11, 2023	
NOX Cal Gas Conc:	50.83	ppm	NO Cal Gas Conc:	49.97	ppm
Removed Cylinder #:			Removed Gas Exp Date:		
Removed Gas NOX Conc:	50.83	ppm	Removed Gas NO Conc:	49.97	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3061	
ZAG make/model:	API T701H		Serial Number:	358	

Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	710321429
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.017	1.029	NO bkgnd or offset:	12.4	12.6
NOX coeff or slope:	0.995	0.992	NOX bkgnd or offset:	12.3	12.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	182.1	181.5

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.000562	0.998693
NO_X Cal Offset:	-1.060000	-0.720000
NO Cal Slope:	0.996669	0.997541
NO Cal Offset:	-1.600000	-1.280000
NO_2 Cal Slope:	1.009494	1.000846
NO_2 Cal Offset:	0.761787	0.511635

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.3	0.4	----	----
as found span	4920	80.0	813.3	799.5	13.8	808.1	789.2	18.9	1.0064	1.0131
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
high point	4920	80.0	813.3	799.5	13.8	812.0	797.1	14.6	1.0016	1.0030
second point	4960	40.0	406.6	399.8	6.9	404.9	396.3	8.6	1.0043	1.0087
third point	4980	20.0	203.3	199.9	3.4	201.3	197.2	4.1	1.0100	1.0136
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as left span	4920	80.0	813.3	433.3	380.0	813.5	430.9	382.6	0.9997	1.0056
								Average Correction Factor	1.0053	1.0085

Corrected As found	NO_X = 808.1 ppb	NO = 789.5 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-0.6%
Previous Response	NO_X = 812.7 ppb	NO = 795.3 ppb		*Percent Change	NO =	-0.7%
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:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	793.7	427.5	380.0	380.5	0.9986	100.1%
2nd GPT point (200 ppb O3)	793.7	614.7	192.8	194.1	0.9931	100.7%
3rd GPT point (100 ppb O3)	793.7	702.2	105.3	105.7	0.9958	100.4%
				Average Correction Factor	0.9958	100.4%

Notes: Adjusted the span only.

Calibration Performed By: Denny Ray Estador

Wood Buffalo Environmental Association

NO_X Calibration Summary

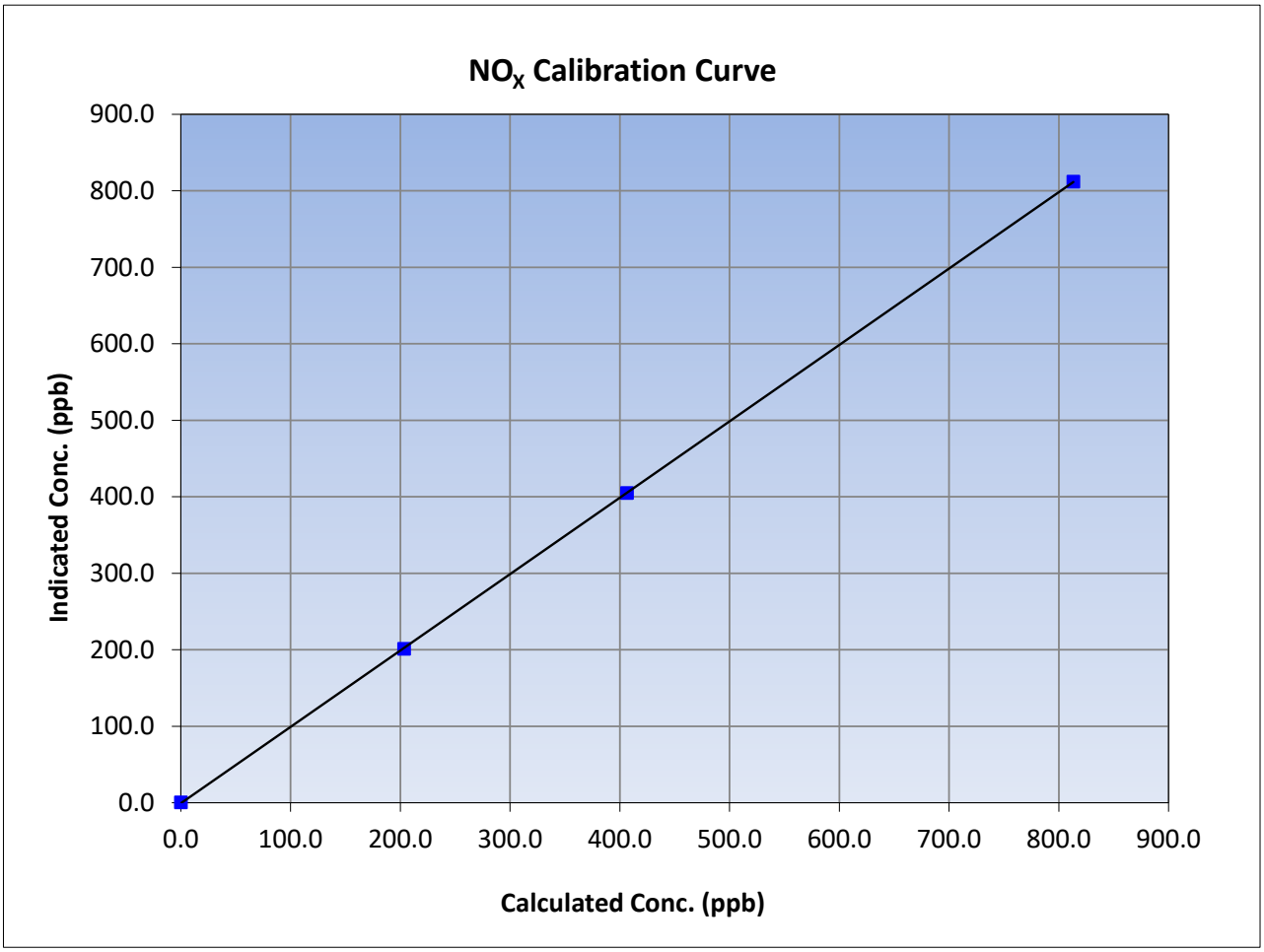
Version-04-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 12, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:13	End Time (MST):	13:30
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.3	----	Correlation Coefficient	0.999993	≥0.995
813.3	812.0	1.0016			
406.6	404.9	1.0043	Slope	0.998693	0.90 - 1.10
203.3	201.3	1.0100			
			Intercept	-0.720000	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

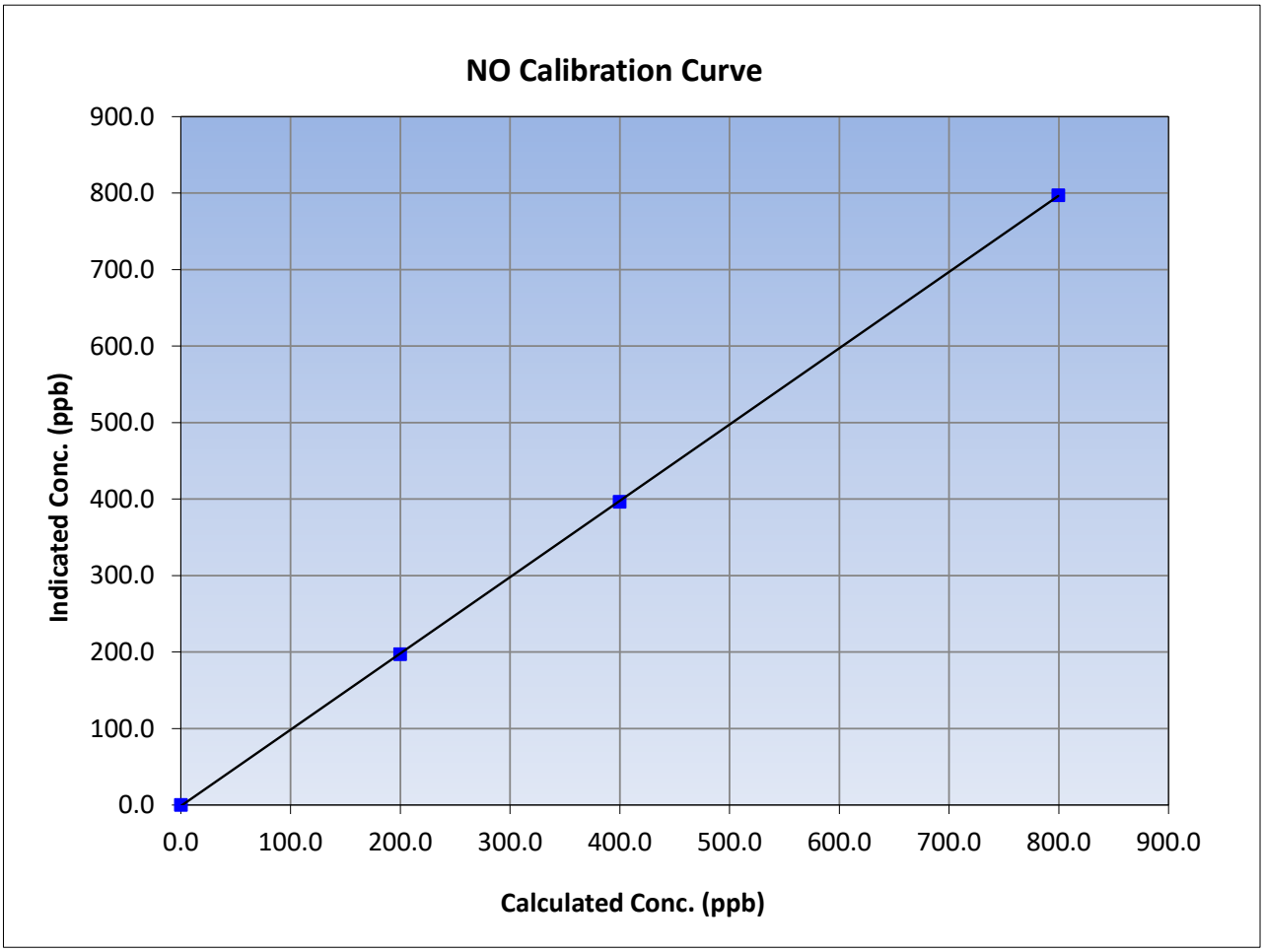
Version-04-2020

Station Information

Calibration Date:	January 13, 2023	Previous Calibration:	December 12, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:13	End Time (MST):	13:30
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999987	≥0.995
799.5	797.1	1.0030			
399.8	396.3	1.0087	Slope	0.997541	0.90 - 1.10
199.9	197.2	1.0136			
			Intercept	-1.280000	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

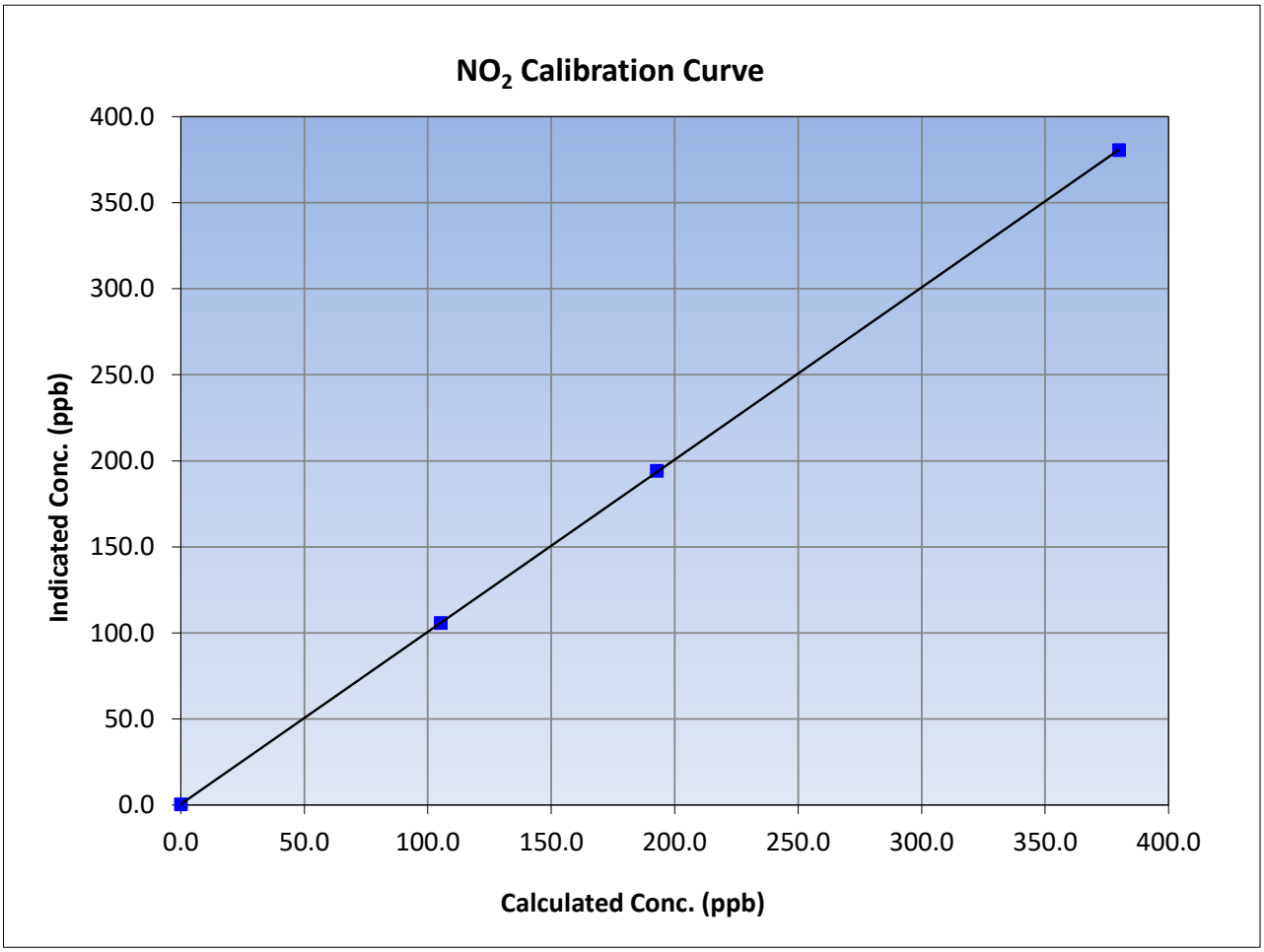
Version-04-2020

Station Information

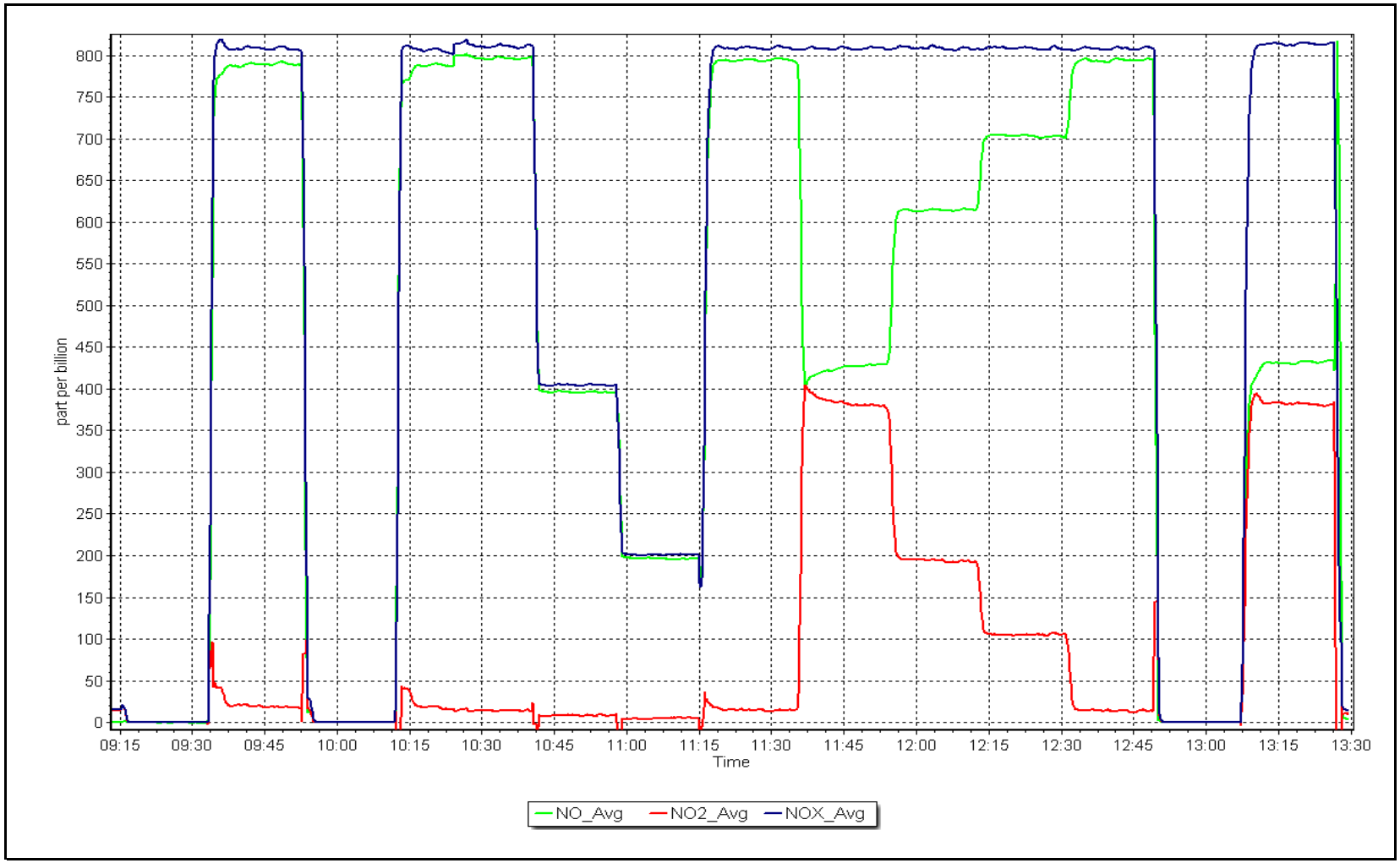
Calibration Date:	January 13, 2023	Previous Calibration:	December 12, 2022
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:13	End Time (MST):	13:30
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.3	----	Correlation Coefficient	0.999992	≥0.995
380.0	380.5	0.9986			
192.8	194.1	0.9931	Slope	1.000846	0.90 - 1.10
105.3	105.7	0.9958			
			Intercept	0.511635	+/-20



NO_X Calibration Plot Date: January 13, 2023 Location: Ells River



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-09-2020

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	January 5, 2023	Last Cal Date:	December 19, 2022
Start time (MST):	11:42	End time (MST):	12:00
Analyzer Make:	API T640	S/N:	875
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Delta Cal	S/N:	954
Temp/RH standard:	Delta Cal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-12.5	-11.9	-12.5	☐	+/- 2 ^{o}C
P (mmHg)	731.6	730.5	731.6	☐	+/- 10 mmHg
flow (LPM)	5.02	5.19	5.02	☐	+/- 0.25 LPM

Leak Test: Date of check: January 5, 2023 Last Cal Date: December 19, 2022

PM w/o HEPA: 12.4 PM w/ HEPA: 0.0

Inlet cleaning : Inlet Head ☐

Quarterly Calibration Test

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

Date Optical Chamber Cleaned: December 19, 2022

Disposable Filter Changed: December 19, 2022

Annual Maintenance

Date Sample Tube Cleaned: October 17, 2022

Date RH/T Sensor Cleaned: October 17, 2022

Notes: No adjustments required. Inspect inlet head; still clean.

Calibration by: Denny Ray Estador

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS506
JACKFISH 1
JANUARY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Jackfish 1	Station number:	AMS 506
Calibration Date:	January 24, 2023	Last Cal Date:	December 16, 2022
Start time (MST):	10:05	End time (MST):	12:49
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:		50.52	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC274266				
Removed Cal Gas Conc:		50.52	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA			Diff between cyl:	
Calibrator Make/Model:	API T700			Serial Number:	2659
ZAG Make/Model:	API 701			Serial Number:	4427

Analyzer Information

Analyzer make: Thermo 43i — Analyzer serial #: 1160290011

Analyzer Range 0 - 1000 ppb

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004057	1.006642	Backgd or Offset:	19.0	19.0
Calibration intercept:	-1.476056	-1.856099	Coeff or Slope:	0.960	0.960

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*
as found zero	5000	0.0	0.0	-0.6	----
as found span	4921	79.2	800.2	803.6	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.3	----
high point	4921	79.2	800.2	804.0	0.995
second point	4960	39.6	400.2	401.5	0.997
third point	4980	19.8	200.1	197.1	1.015
as left zero	5000	0.0	0.0	-0.3	----
as left span	4921	79.2	800.2	804.3	0.995
				Average Correction Factor	1.002

Baseline Corr As found:	804.20	Previous response	801.98	*% change	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

* = > +/-5% change initiates investigation

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

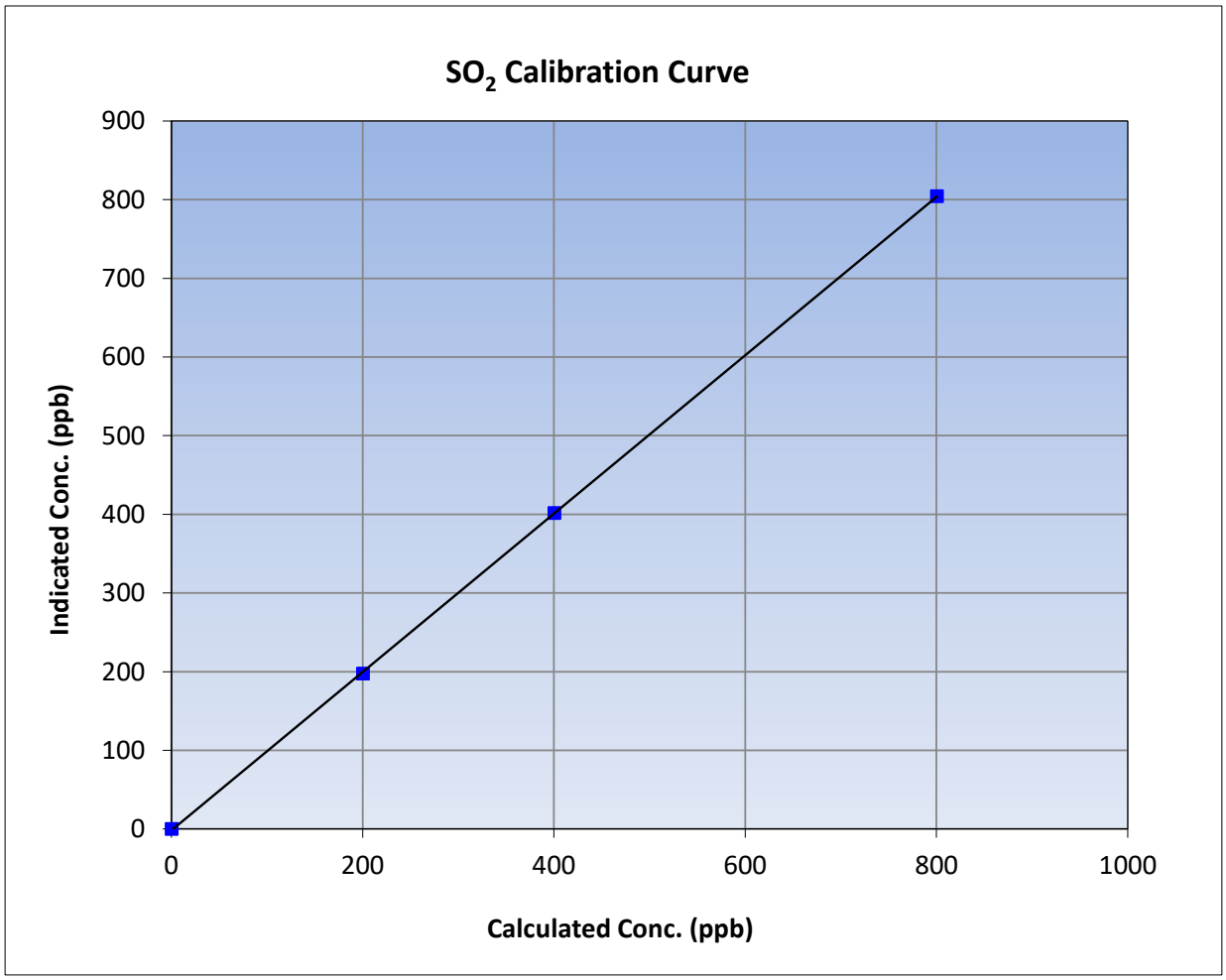
Station Information

Calibration Date:	January 24, 2023	Previous Calibration:	December 16, 2022
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	10:05	End Time (MST):	12:49
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290011

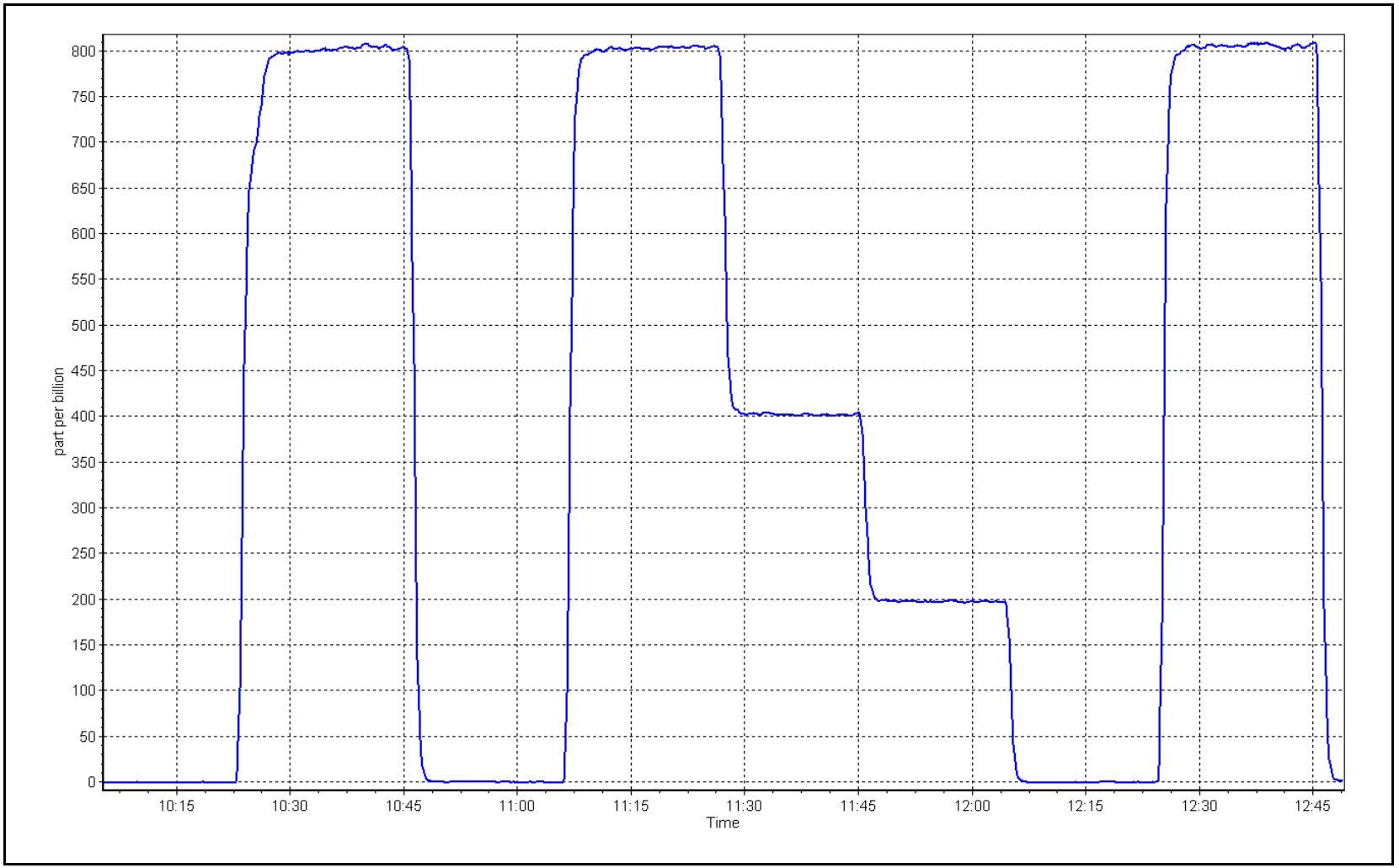
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
800.2	804.0	0.9953
400.2	401.5	0.9966
200.1	197.1	1.0151

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	1.006642	*0.90 - 1.10*
Intercept	-1.856099	*+/-30*



SO2 Calibration Plot Date: January 24, 2023 Location: Jackfish 1



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Jackfish 1	Station number:	AMS506
Calibration Date:	January 4, 2023	Last Cal Date:	December 20, 2022
Start time (MST):	11:55	End time (MST):	16:48
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.14	ppm	Cal Gas Exp Date:	September 16, 2024
Cal Gas Cylinder #:	CC511843			
Removed Cal Gas Conc:	5.14	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2659
ZAG Make/Model:	API 701		Serial Number:	4427

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12124313139	
Converter make:	Global G150		Converter serial #:	2022-200	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.005293	0.999436	Backgd or Offset:	1.08	1.04
Calibration intercept:	-0.338428	-0.058588	Coeff or Slope:	0.774	0.736

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 span	4922	77.8	80.0	77.0	1.040
as found 2nd point	4961	38.9	40.0	37.3	1.075
as found 3rd point	4981	19.4	19.9	17.5	1.146
new cylinder response					

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	77.8	80.0	80.0	1.000
second point	4961	38.9	40.0	39.9	1.002
third point	4981	19.4	19.9	19.4	1.028
as left zero	5000	0.0	0.0	0.6	----
as left span	4922	77.8	80.0	79.6	1.005
SO2 Scrubber Check	4921	79.2	792.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	1.010
Date of last converter efficiency test:		December 1, 2022			efficiency

Baseline Corr As found:	76.9	Prev response:	80.07	*% change:	-4.1%
Baseline Corr 2nd AF pt:	37.2	AF Slope:	0.967301	AF Intercept:	-0.859535
Baseline Corr 3rd AF pt:	17.4	AF Correlation:	0.999297		

* = > +/-5% change initiates investigation

Notes: Arrived to station to investigate low spans, (12.5% low). Hydrator almost empty, inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. Span adjusted

Calibration Performed By: Ryan Power

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

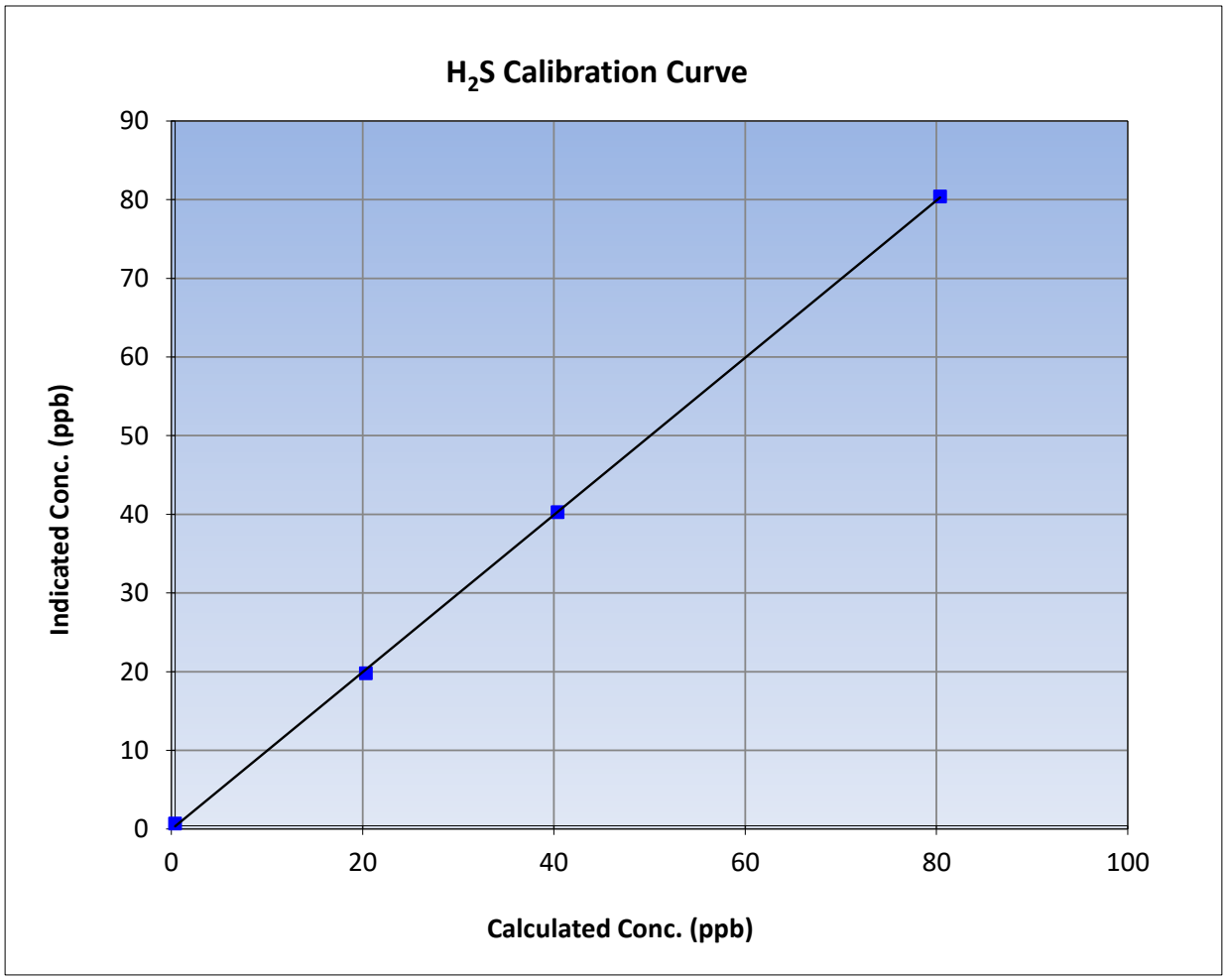
Station Information

Calibration Date:	January 4, 2023	Previous Calibration:	December 20, 2022
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	11:55	End Time (MST):	16:48
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139

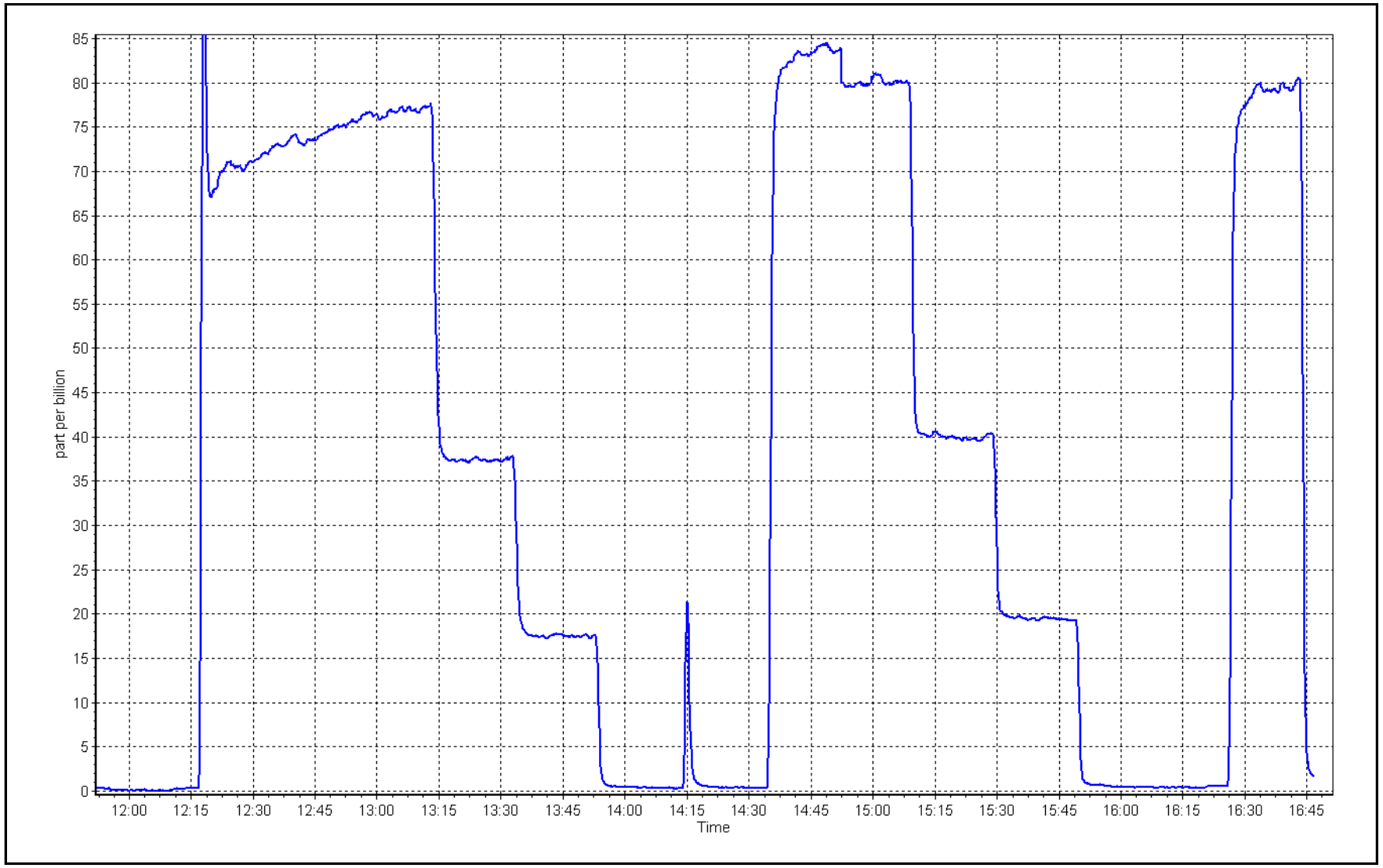
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.0	0.9998
40.0	39.9	1.0023
19.9	19.4	1.0279

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999895	*≥0.995*
Slope	0.999436	*0.90 - 1.10*
Intercept	-0.058588	*+/-3*



H_2S Calibration Plot Date: January 4, 2023 Location: Jackfish 1



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Jackfish 1	Station number:	AMS506
Calibration Date:	January 20, 2023	Last Cal Date:	January 4, 2023
Start time (MST):	9:52	End time (MST):	13:56
Reason:	Maintenance H2S low spans.		

Calibration Standards

Cal Gas Concentration:	5.14 ppm	Cal Gas Exp Date:	September 16, 2024
Cal Gas Cylinder #:	CC511843		
Removed Cal Gas Conc:	5.14 ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA	Diff between cyl:	
Calibrator Make/Model:	API T700	Serial Number:	2659
ZAG Make/Model:	API 701	Serial Number:	4427

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12124313139	
Converter make:	Global G150		Converter serial #:	2022-200	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999436	1.008437	Backgd or Offset:	1.04	1.04
Calibration intercept:	-0.058588	-0.098415	Coeff or Slope:	0.736	0.736

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 span	4922	77.8	80.0	72.7	1.102
as found 2nd point	4961	38.9	40.0	35.8	1.120
as found 3rd point	4981	19.4	19.9	17.1	1.173
new cylinder response					

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	77.8	80.0	80.7	0.991
second point	4961	38.9	40.0	40.2	0.995
third point	4981	19.4	19.9	19.5	1.023
as left zero	5000	0.0	0.0	0.5	----
as left span	4922	77.8	80.0	81.1	0.986
SO2 Scrubber Check	4921	79.2	792.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.003
Date of last converter efficiency test:		December 1, 2022			efficiency

Baseline Corr As found:	72.6	Prev response:	79.88	*% change:	-10.0%
Baseline Corr 2nd AF pt:	35.7	AF Slope:	0.911582	AF Intercept:	-0.460573
Baseline Corr 3rd AF pt:	17.0	AF Correlation:	0.999726		

* = > +/-5% change initiates investigation

Notes: Hydrator is quarter to empty, inlet filter changed and hydrator filled after third As Found, scrubber check after calibrator zero. No adjustment made.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

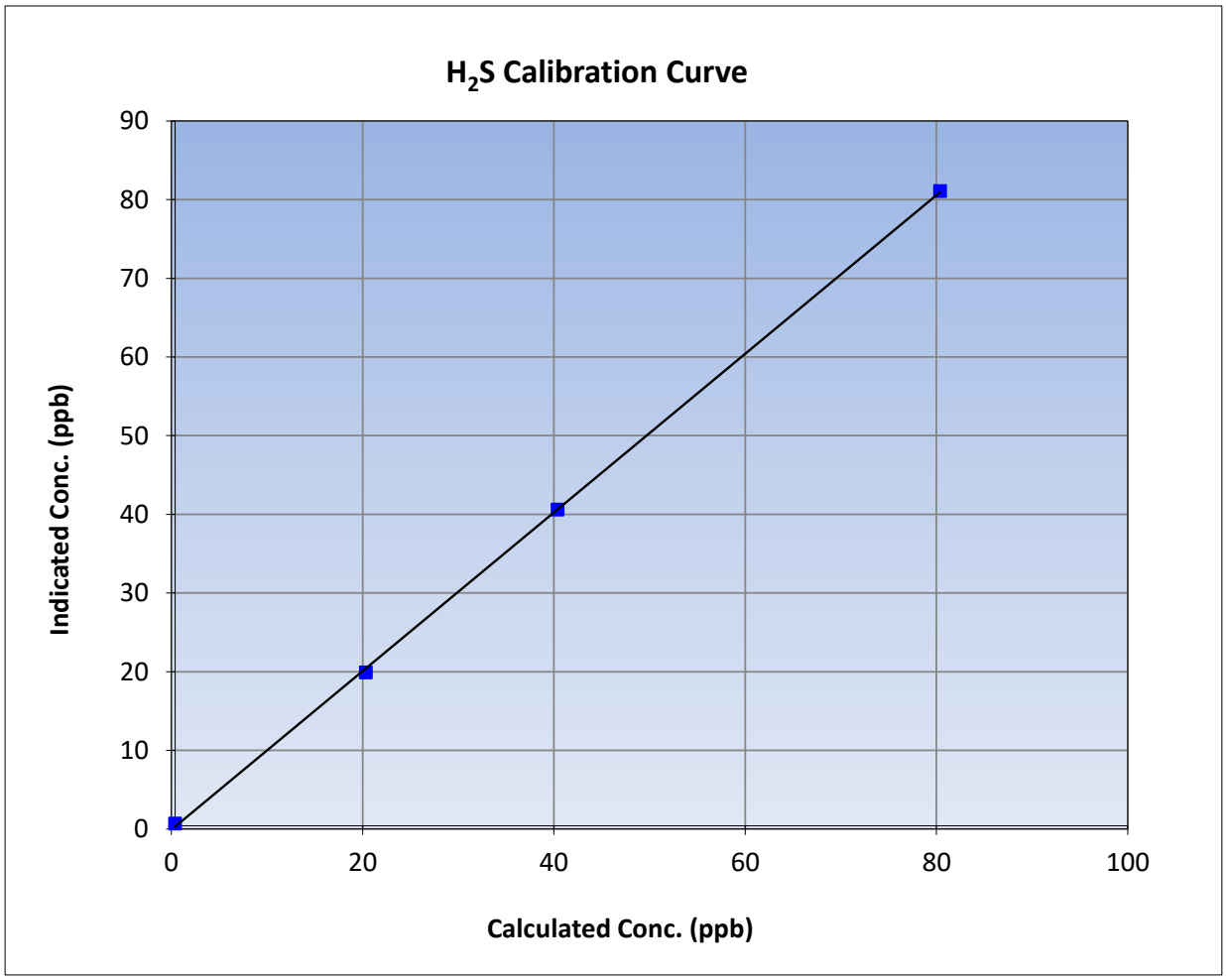
Station Information

Calibration Date:	January 20, 2023	Previous Calibration:	January 4, 2023
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	9:52	End Time (MST):	13:56
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12124313139

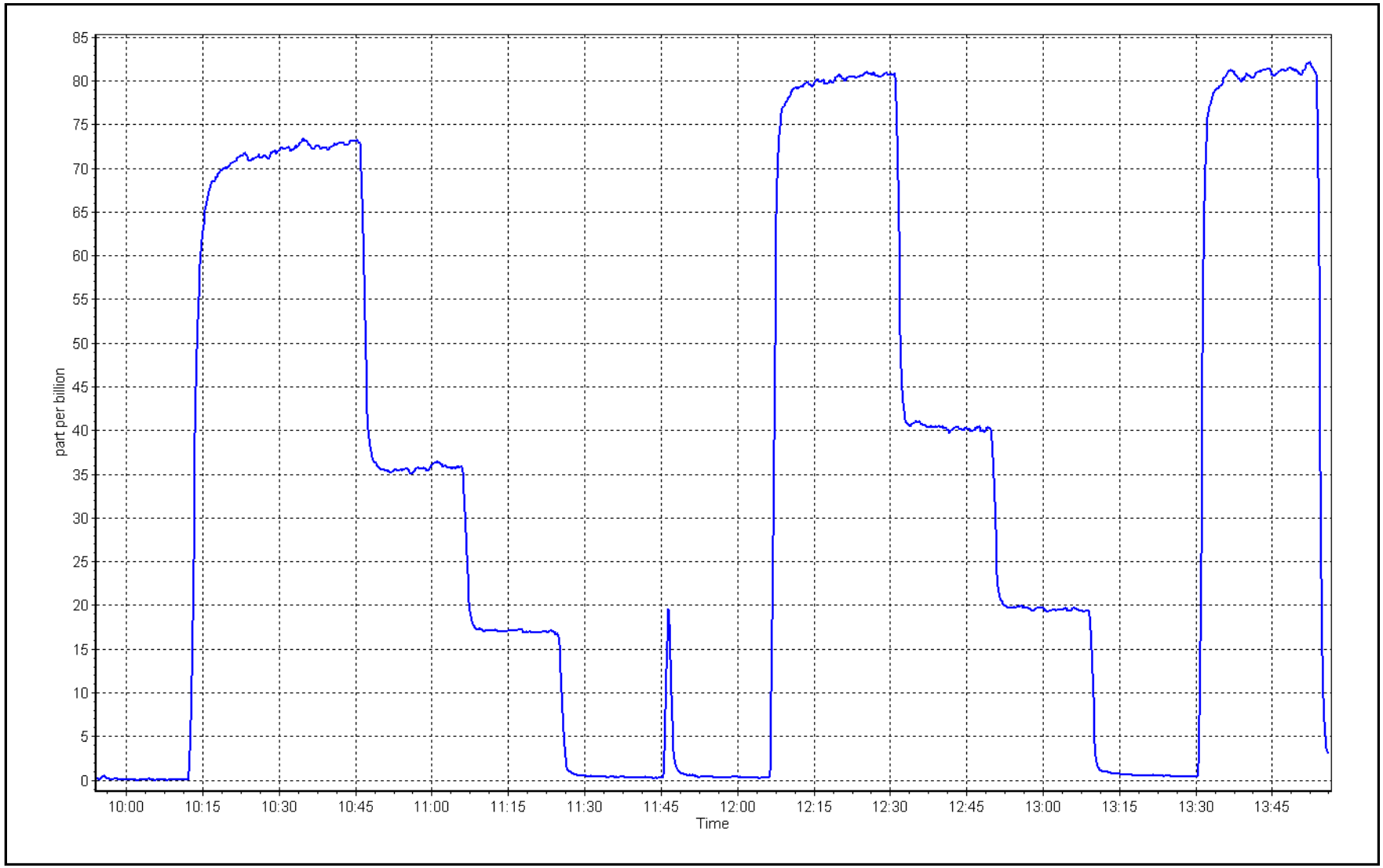
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	80.7	0.9911
40.0	40.2	0.9948
19.9	19.5	1.0226

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999876	*≥0.995*
Slope	1.008437	*0.90 - 1.10*
Intercept	-0.098415	*+/-3*



H_2S Calibration Plot Date: January 20, 2023 Location: Jackfish 1



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Jackfish 1	Station number:	AMS506
Calibration Date:	January 25, 2023	Last Cal Date:	December 15, 2022
Start time (MST):	9:51	End time (MST):	14:18
Reason:	Routine		

Calibration Standards

NO Gas Cylinder #:		T26811M	Cal Gas Expiry Date:	October 30, 2024	
NOX Cal Gas Conc:	47.46	ppm	NO Cal Gas Conc:	47.39	ppm
Removed Cylinder #:		NA	Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	47.46	ppm	Removed Gas NO Conc:	47.39	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2659	
ZAG make/model:	API 701		Serial Number:	4427	

Analyzer Information

Analyzer make:	Thermo 42i		Analyzer serial #:	1218153356	
NOX Range (ppb):	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	1.146	1.151	NO bkgnd or offset:	3.3	3.3
NOX coeff or slope:	0.989	0.991	NOX bkgnd or offset:	3.4	3.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	174.3	174.0

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.001375	0.999577
NO_X Cal Offset:	-1.128010	-0.847995
NO Cal Slope:	1.003326	1.001211
NO Cal Offset:	-1.767998	-2.027974
NO_2 Cal Slope:	0.999583	1.000608
NO_2 Cal Offset:	0.238295	0.007440

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as found span	4916	84.4	801.1	799.9	1.2	799.4	796.5	3.0	1.0021	1.0042
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
high point	4916	84.4	801.1	799.9	1.2	800.0	799.5	0.6	1.0013	1.0005
second point	4958	42.2	400.5	400.0	0.6	400.3	398.6	1.6	1.0006	1.0034
third point	4979	21.1	200.3	200.0	0.3	197.3	195.1	2.3	1.0151	1.0250
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as left span	4916	84.4	801.1	416.2	384.9	795.9	411.4	384.4	1.0065	1.0116
								Average Correction Factor	1.0057	1.0096

Corrected As found	NO_X = 799.3 ppb	NO = 796.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.2%		
Previous Response	NO_X = 801.0 ppb	NO = 800.8 ppb		*Percent Change	NO = -0.5%		
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:	
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	794.2	410.5	384.9	385.2	0.9992	100.1%
2nd GPT point (200 ppb O3)	794.2	588.8	206.6	206.6	0.9999	100.0%
3rd GPT point (100 ppb O3)	794.2	686.7	108.7	108.7	0.9998	100.0%
				Average Correction Factor	0.9996	100.0%

Notes: Adjusted the span only.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

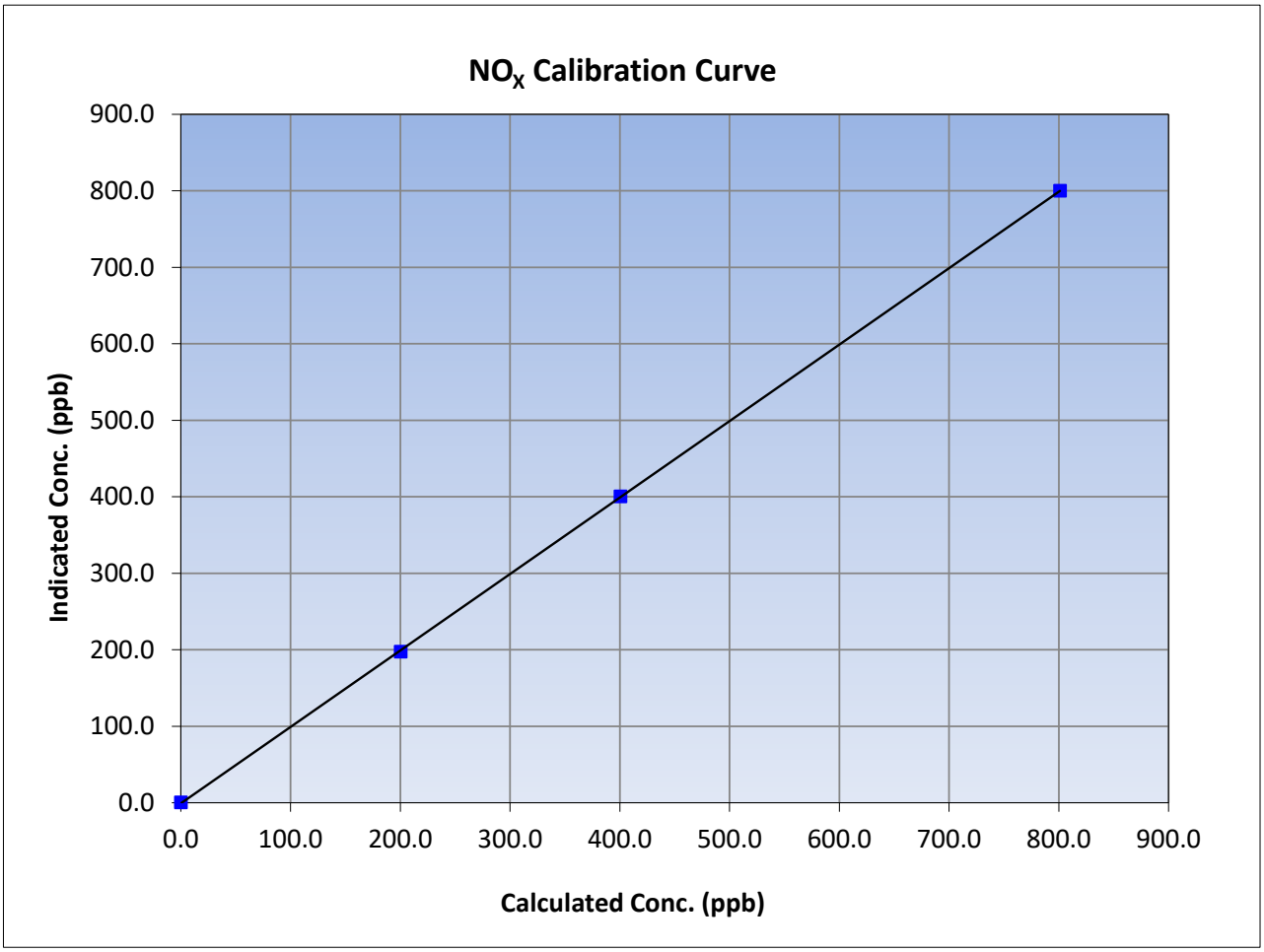
Version-04-2020

Station Information

Calibration Date:	January 25, 2023	Previous Calibration:	December 15, 2022
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	9:51	End Time (MST):	14:18
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.3	----	Correlation Coefficient	0.999983	≥0.995
801.1	800.0	1.0013			
400.5	400.3	1.0006	Slope	0.999577	0.90 - 1.10
200.3	197.3	1.0151			
			Intercept	-0.847995	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

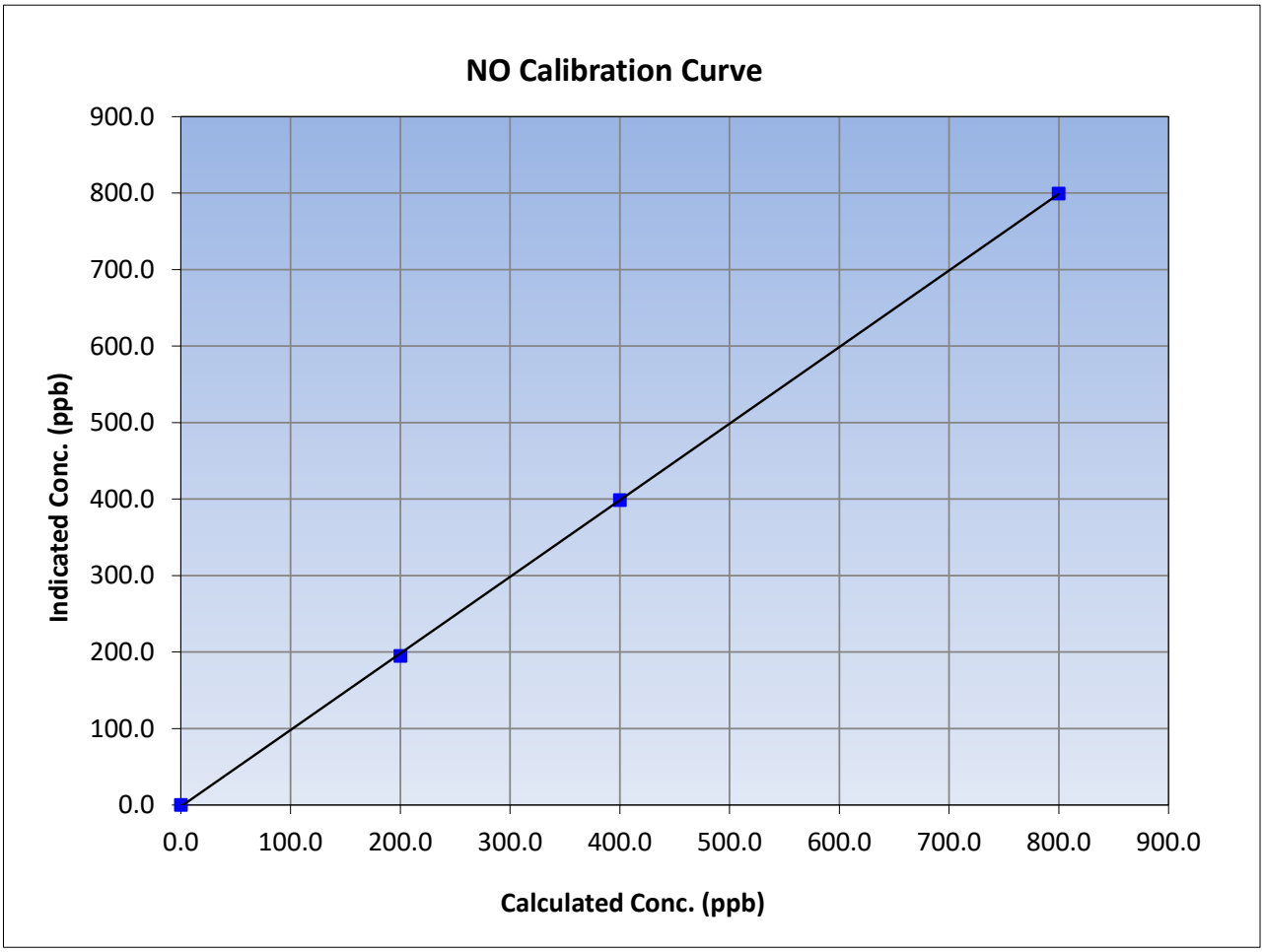
Version-04-2020

Station Information

Calibration Date:	January 25, 2023	Previous Calibration:	December 15, 2022
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	9:51	End Time (MST):	14:18
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.2	----	Correlation Coefficient	0.999957	≥0.995
799.9	799.5	1.0005			
400.0	398.6	1.0034	Slope	1.001211	0.90 - 1.10
200.0	195.1	1.0250			
			Intercept	-2.027974	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

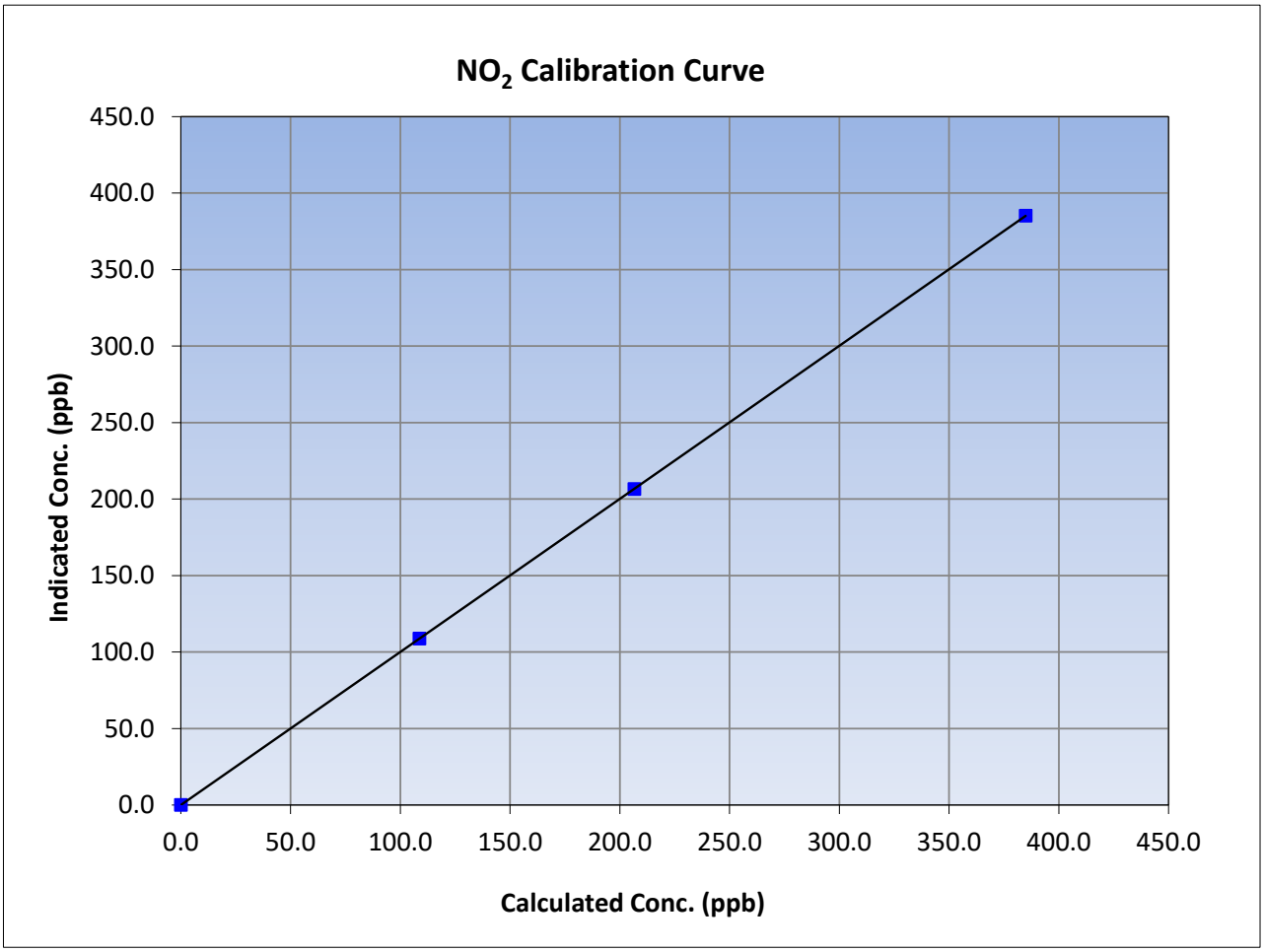
Version-04-2020

Station Information

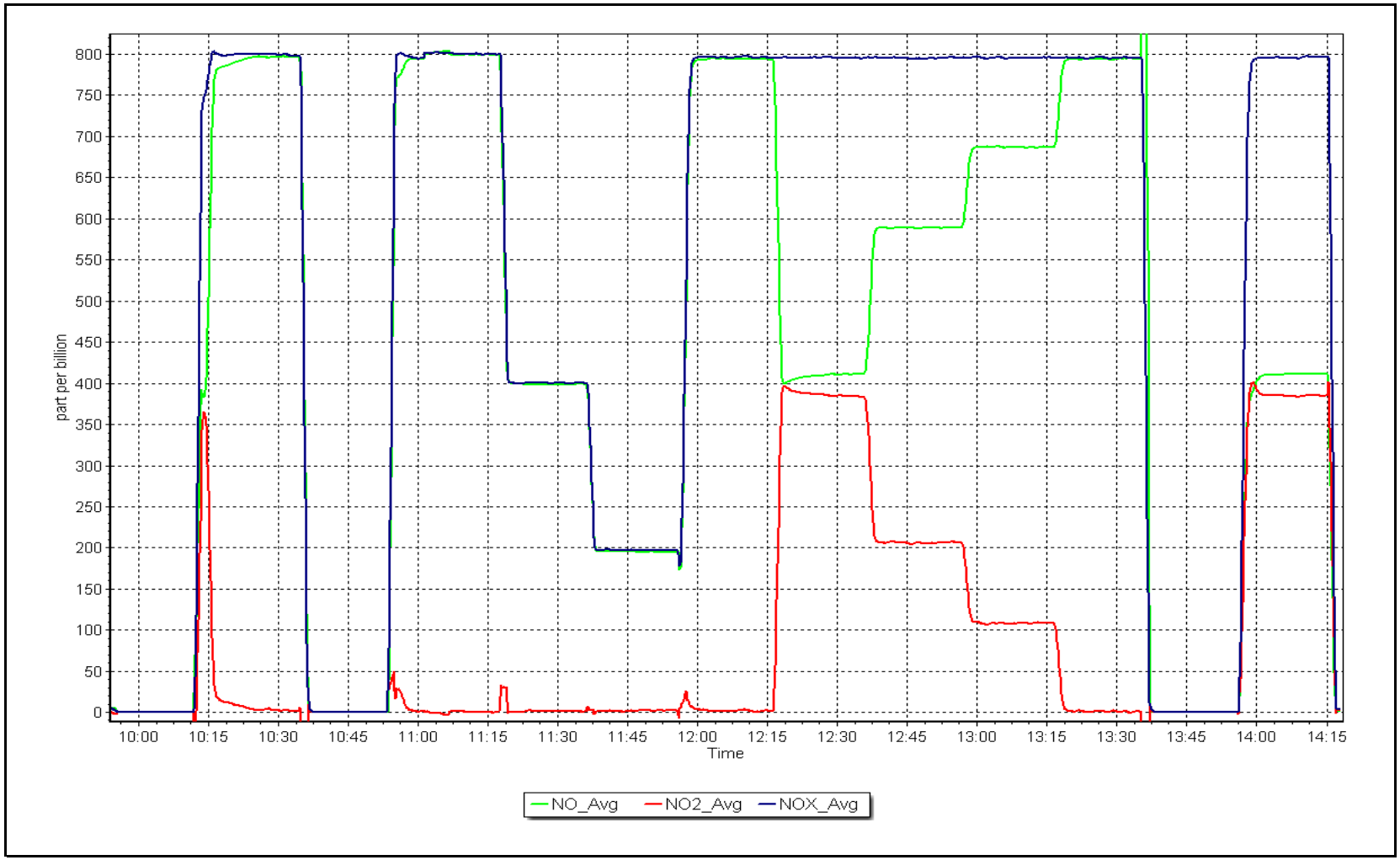
Calibration Date:	January 25, 2023	Previous Calibration:	December 15, 2022
Station Name:	Jackfish 1	Station Number:	AMS506
Start Time (MST):	9:51	End Time (MST):	14:18
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	1.000000	≥0.995
384.9	385.2	0.9992			
206.6	206.6	0.9999	Slope	1.000608	0.90 - 1.10
108.7	108.7	0.9998			
			Intercept	0.007440	+/-20



NO_X Calibration Plot Date: January 25, 2023 Location: Jackfish 1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS508
KIRBY NORTH
JANAURY 2023

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

February 28, 2023

Wood Buffalo Environmental Association

SO_2 Calibration Report

Version-01-2020

Station Information

Station Name:	Kirby North	Station number:	AMS508
Calibration Date:	January 11, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	9:07	End time (MST):	15:03
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 Make/Model:	API T700		Serial Number:	3804
ZAG Make/Model:	API T701H		Serial Number:	880

Analyzer Information

Analyzer make: Thermo 43iQ Analyzer serial #: 1182340007

Analyzer Range 0 - 1000 ppb

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999463	1.001350	Backgd or Offset:	19.6	19.2
Calibration intercept:	0.231120	-0.328940	Coeff or Slope:	1.167	1.151

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*
as found zero	5000	0.0	0.0	0.2	----
as found span	4919	81.3	799.6	820.7	0.974
as found 2nd point	4959	40.7	400.3	408.1	0.981
as found 3rd point	4980	20.3	199.7	204.3	0.977
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	----
high point	4919	81.3	799.6	801.0	0.998
second point	4959	40.7	400.3	399.3	1.003
third point	4980	20.3	199.7	199.6	1.000
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	1.000

Baseline Corr As found:	820.50	Previous response	799.42	*% change	2.6%
Baseline Corr 2nd AF pt:	407.90	AF Slope:	1.026027	AF Intercept:	-0.688756
Baseline Corr 3rd AF pt:	204.10	AF Correlation:	0.999985		

* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Swapped out weak external pump. Adjusted span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

Version-01-2020

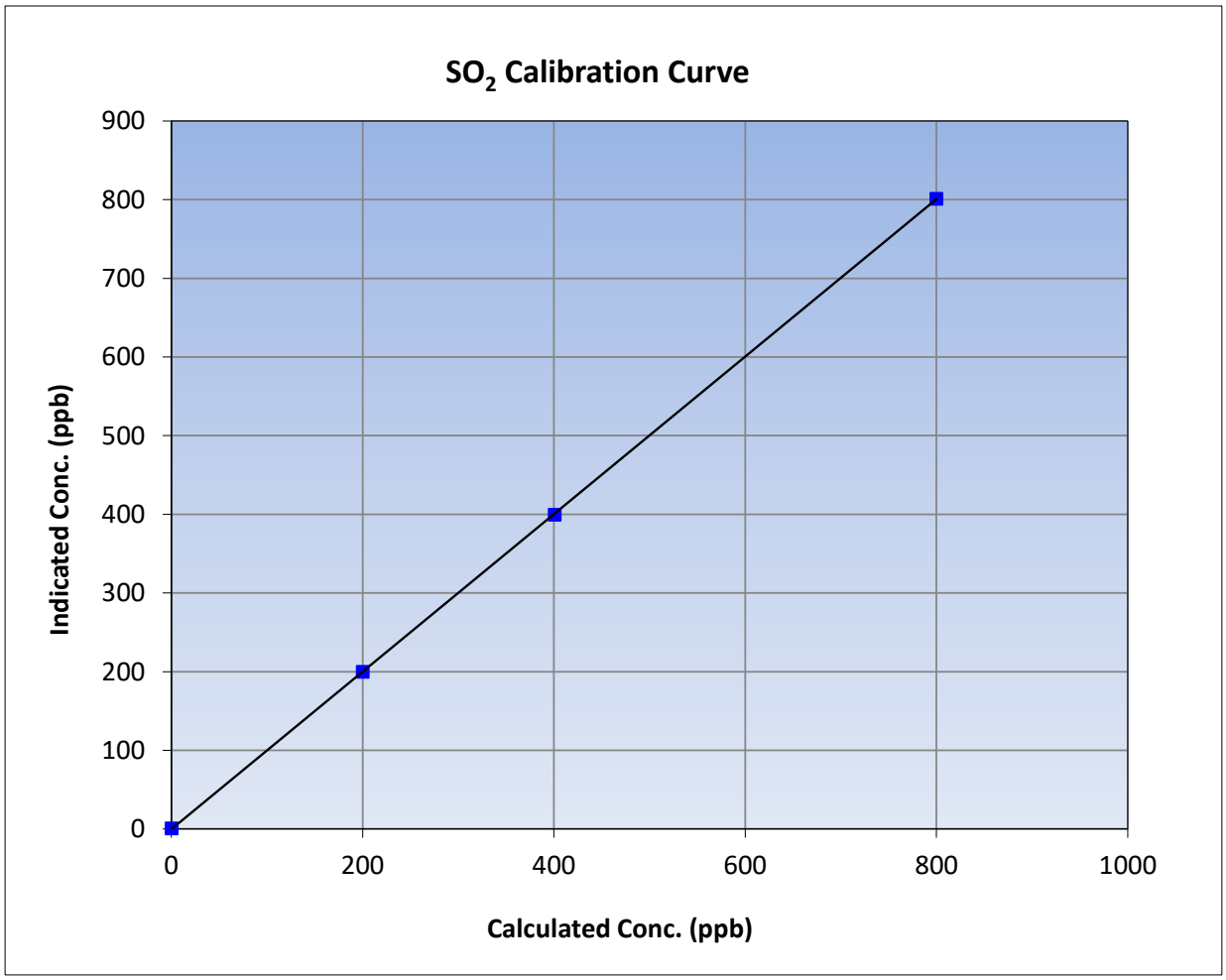
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	9:07	End Time (MST):	15:03
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007

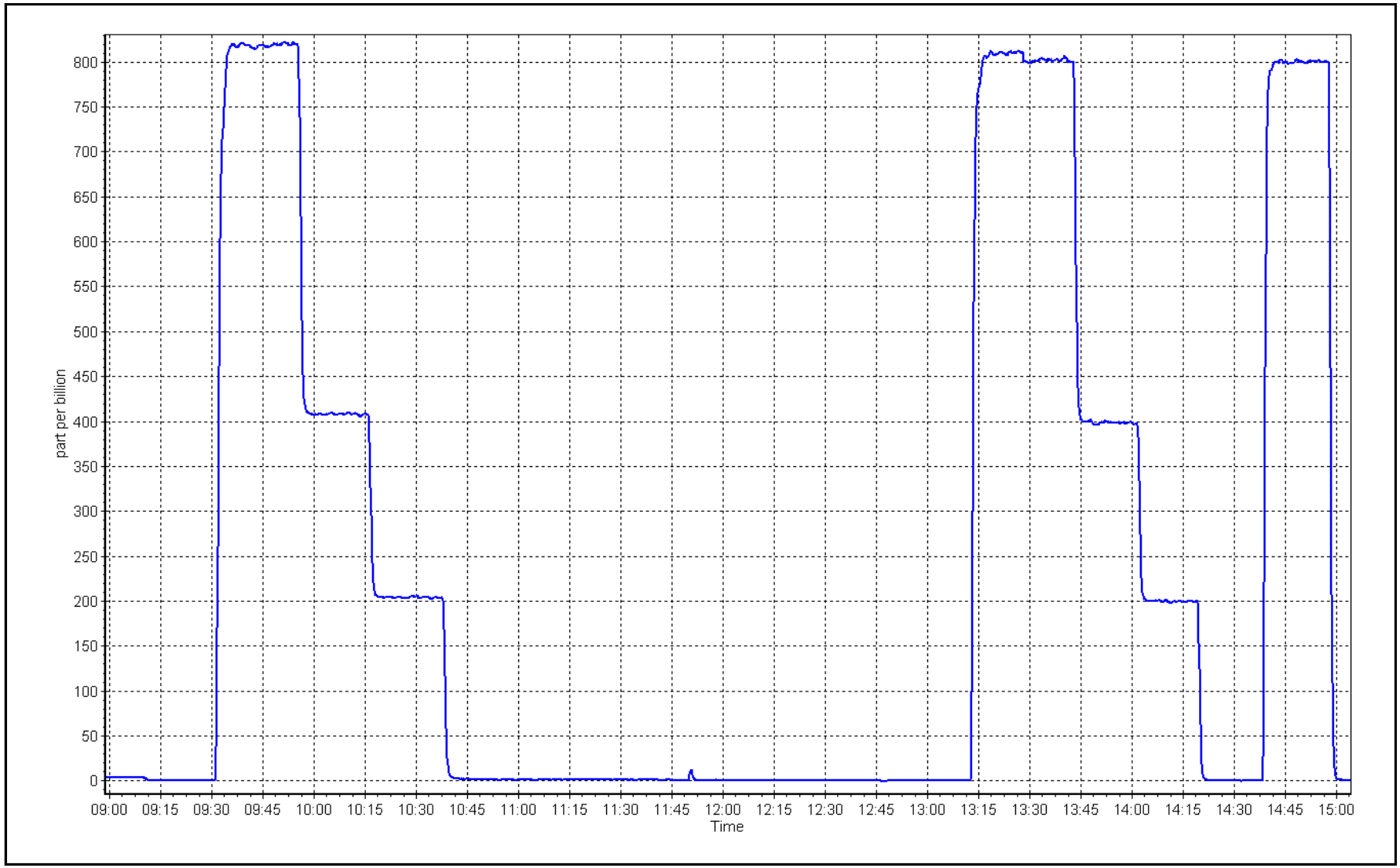
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.6	801.0	0.9983
400.3	399.3	1.0026
199.7	199.6	1.0003

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.001350	*0.90 - 1.10*
Intercept	-0.328940	*+/-30*



SO2 Calibration Plot Date: January 11, 2023 Location: Kirby North



Wood Buffalo Environmental Association

H_2S Calibration Report

Version-11-2021

Station Information

Station Name:	Kirby North	Station number:	AMS508
Calibration Date:	January 12, 2023	Last Cal Date:	December 8, 2022
Start time (MST):	8:05	End time (MST):	12:36
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.167	ppm	Cal Gas Exp Date:	February 5, 2024
Cal Gas Cylinder #:	CC517378			
Removed Cal Gas Conc:	5.167	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3804
ZAG Make/Model:	API 701H		Serial Number:	880

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000172	1.007171	Backgd or Offset:	1.78	1.76
Calibration intercept:	-0.160960	-0.280963	Coeff or Slope:	1.058	1.058

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
as found zero	5000	0.0	0.0	-0.2	----
as found span	4923	77.4	80.0	82.3	0.969
as found 2nd point	4961	38.8	40.1	40.8	0.978
as found 3rd point	4981	19.3	19.9	20.1	0.982
new cylinder response					

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	4923	77.4	80.0	80.4	0.995
second point	4961	38.8	40.1	39.9	1.005
third point	4981	19.3	19.9	19.7	1.012
as left zero	5000	0.0	0.0	0.1	----
as left span	4923	77.4	80.0	80.3	0.996
SO2 Scrubber Check	4920	79.8	798.0	0.0	----
Date of last scrubber change:		27-Nov-19		Ave Corr Factor	1.004
Date of last converter efficiency test:					efficiency

Baseline Corr As found:	82.5	Prev response:	79.83	*% change:	3.2%
Baseline Corr 2nd AF pt:	41.0	AF Slope:	1.032169	AF Intercept:	-0.380988
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999972		

* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. First scrubber check failed. After rehydrating using DI water in a hydrator second test passed. No adjustments made.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H_2S Calibration Summary

Version-11-2021

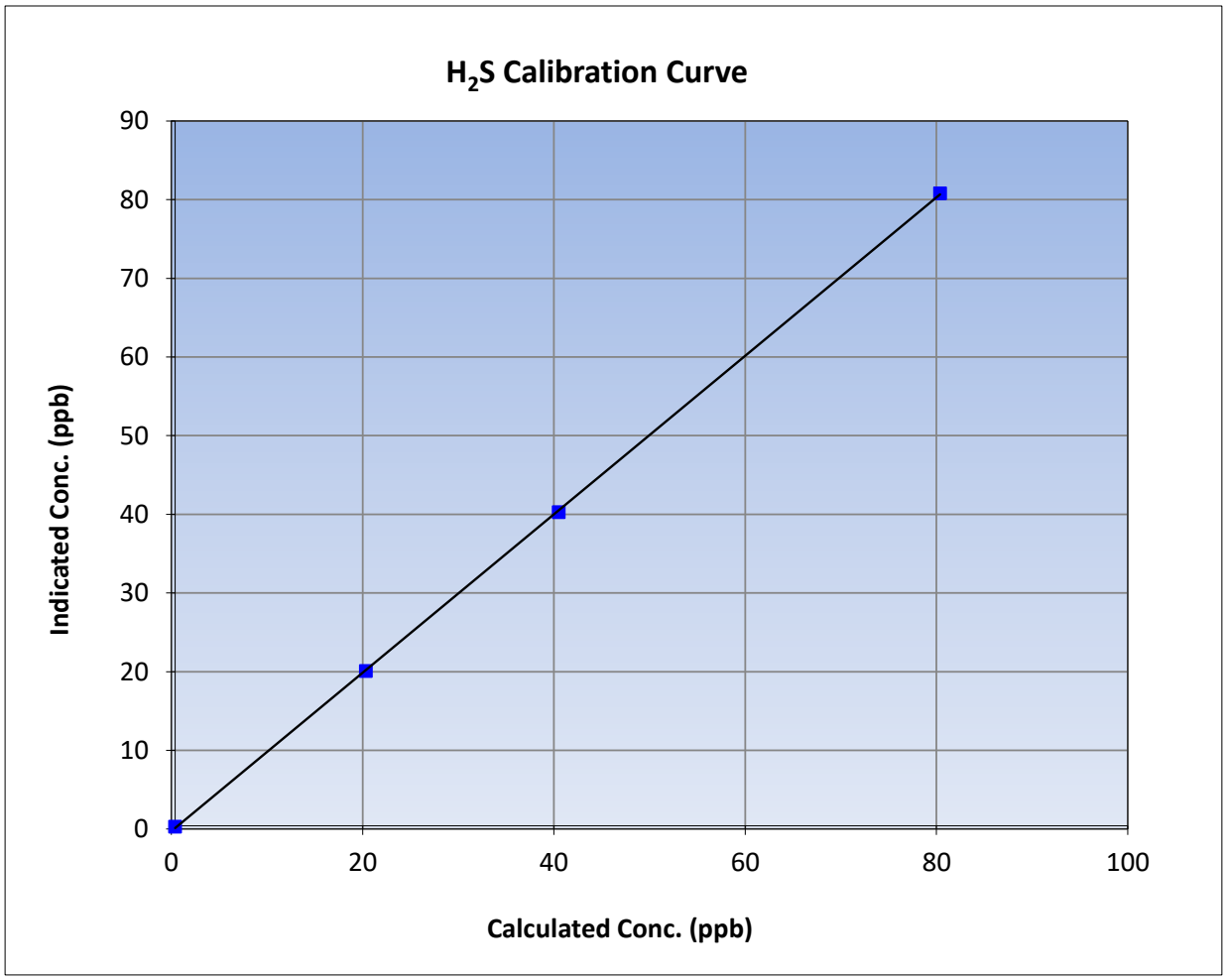
Station Information

Calibration Date:	January 12, 2023	Previous Calibration:	December 8, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	8:05	End Time (MST):	12:36
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

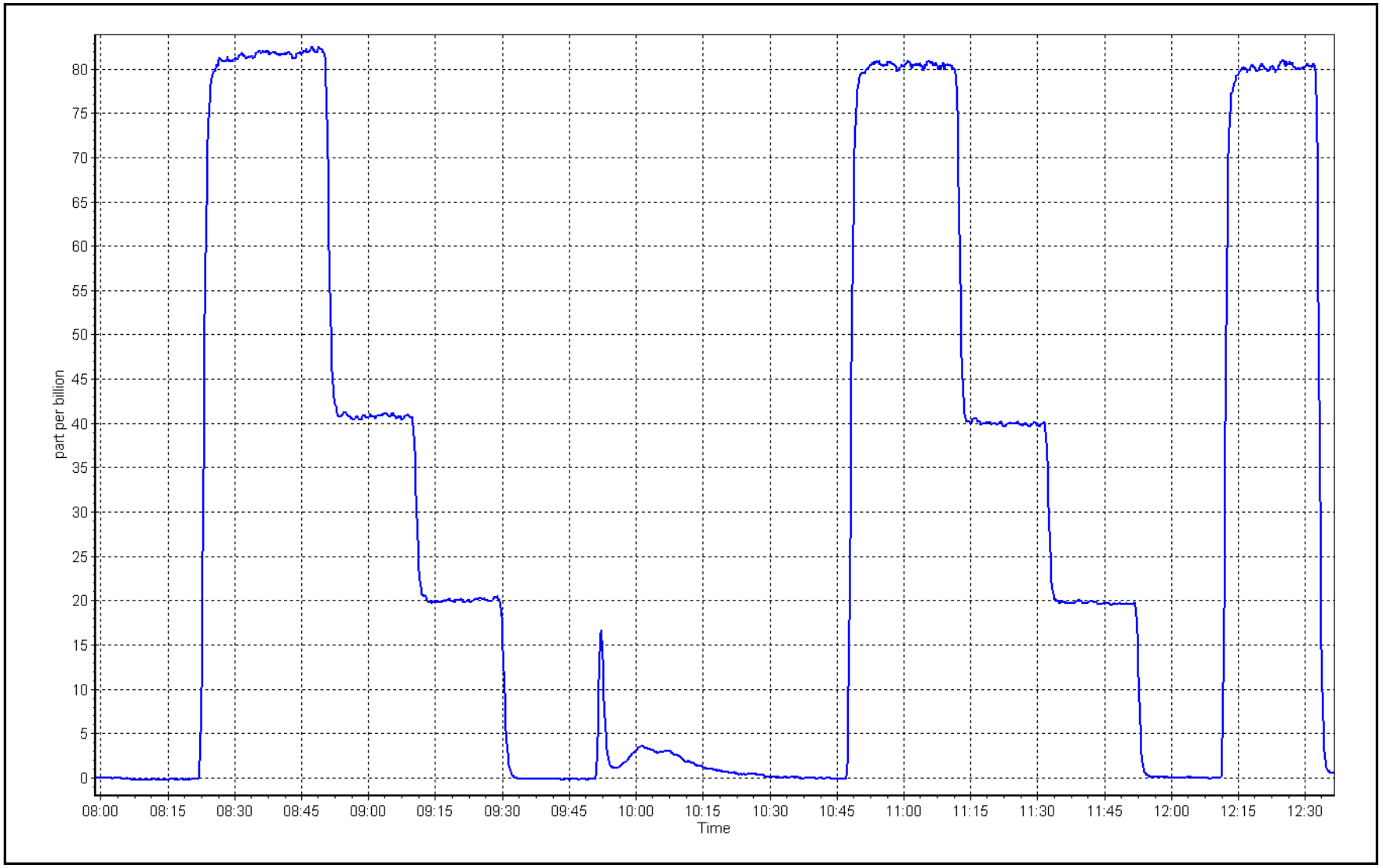
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	80.4	0.9948
40.1	39.9	1.0050
19.9	19.7	1.0124

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	1.007171	*0.90 - 1.10*
Intercept	-0.280963	*+/-3*



H_2S Calibration Plot Date: January 12, 2023 Location: Kirby North



Wood Buffalo Environmental Association

THC Calibration Report

Version-01-2020

Station Information

Station Name:	Kirby North	Station number:	AMS508
Calibration Date:	January 11, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	9:07	End time (MST):	15:03
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:	API T700		Serial Number:	3804	
ZAG Make/Model:	API T701H		Serial Number:	880	

Analyzer Information

Analyzer make: Thermo 51i — Analyzer serial #: 1182340005

Analyzer Range: 0 - 20 ppm

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996667	0.999219	Background:	4.750	2.820
Calibration intercept:	0.016195	-0.026583	Coefficient:	5.494	3.789

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.00	-0.91	----
as found span	4919	81.3	17.26	16.61	1.039
as found 2nd point	4959	40.7	8.64	7.75	1.116
as found 3rd point	4980	20.3	4.31	3.37	1.279
new cylinder response					
calibrator zero	5000	0.0	0.00	0.01	----
high point	4919	81.3	17.26	17.25	1.001
second point	4959	40.7	8.64	8.56	1.010
third point	4980	20.3	4.31	4.27	1.009
as left zero	5000	0.0	0.00	-0.04	----
as left span	4919	81.3	17.26	17.31	0.997
				Average Correction Factor	1.007

Baseline Corr As found:	17.52	Previous response	17.22	*% change	1.7%
Baseline Corr 2nd AF pt:	8.66	AF Slope:	1.016184	AF Intercept:	-0.972986
Baseline Corr 3rd AF pt:	4.28	AF Correlation:	0.999937		

* = > +/-5% change initiates investigation

Notes: Changed sample inlet filter after as founds. Changed internal pump on the 51i after MPAF's. Zero and span adjusted.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

Version-01-2020

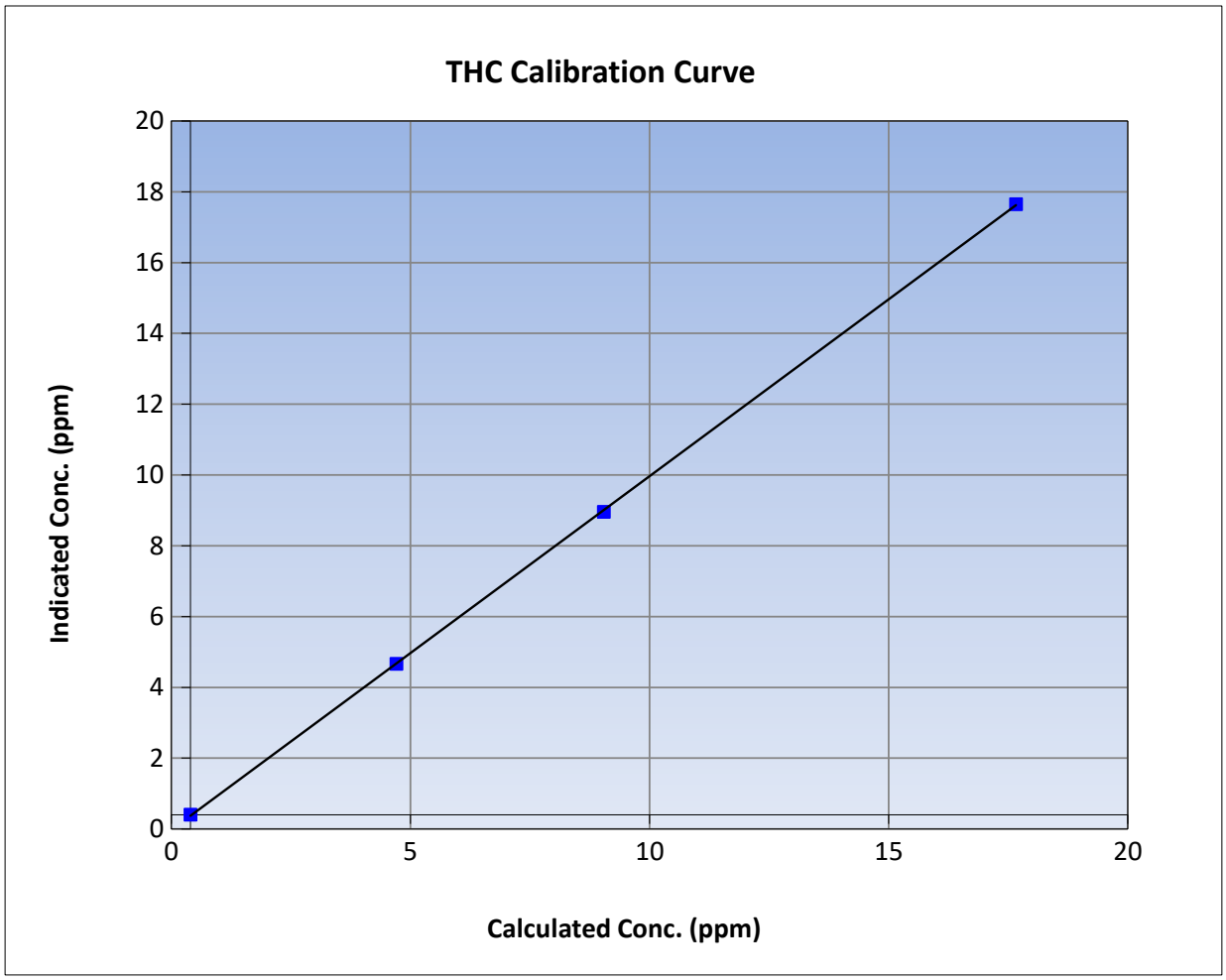
Station Information

Calibration Date:	January 11, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	9:07	End Time (MST):	15:03
Analyzer make:	Thermo 51i	Analyzer serial #:	1182340005

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.01	----
17.26	17.25	1.0007
8.64	8.56	1.0097
4.31	4.27	1.0094

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.999219	*0.90 - 1.10*
Intercept	-0.026583	*+/-1.5*



THC Calibration Plot Date: January 11, 2023 Location: Kirby North

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Kirby North	Station number:	AMS508
Calibration Date:	January 10, 2023	Last Cal Date:	December 7, 2022
Start time (MST):	11:48	End time (MST):	17:00
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:	API T700		Serial Number:	3804	
ZAG make/model:	API 701H		Serial Number:	880	

Analyzer Information

Analyzer make:	API T200	Analyzer serial #:	7029
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	0.977	0.977	NO bkgnd or offset:	0.1	0.1
NOX coeff or slope:	0.972	0.972	NOX bkgnd or offset:	0.3	0.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.6	3.8

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.005786	0.999259
NO_X Cal Offset:	-0.790665	-0.331803
NO Cal Slope:	1.006745	1.000587
NO Cal Offset:	-1.712399	-1.673511
NO_2 Cal Slope:	1.000928	0.999811
NO_2 Cal Offset:	0.299748	1.112079

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3	----	----
as found span	4919	81.0	800.1	794.1	6.0	796.5	788.0	8.5	1.0045	1.0078
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	4919	81.0	800.1	794.1	6.0	799.1	793.7	5.4	1.0013	1.0005
second point	4960	40.5	400.0	397.0	3.0	400.0	394.8	5.2	1.0000	1.0056
third point	4980	20.2	199.5	198.0	1.5	198.2	194.9	3.3	1.0067	1.0161
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	0.2	----	----
as left span	4919	81.0	800.1	412.3	387.8	794.1	406.8	387.3	1.0076	1.0136
								Average Correction Factor	1.0027	1.0074

Corrected As found	NO_X = 796.4 ppb	NO = 788.2 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.9%
Previous Response	NO_X = 804.0 ppb	NO = 797.8 ppb		*Percent Change	NO = -1.2%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	789.8	408.0	387.8	388.4	0.9984	100.2%
2nd GPT point (200 ppb O3)	789.8	593.6	202.2	203.5	0.9936	100.6%
3rd GPT point (100 ppb O3)	789.8	696.1	99.7	102.0	0.9774	102.3%
				Average Correction Factor	0.9898	101.0%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

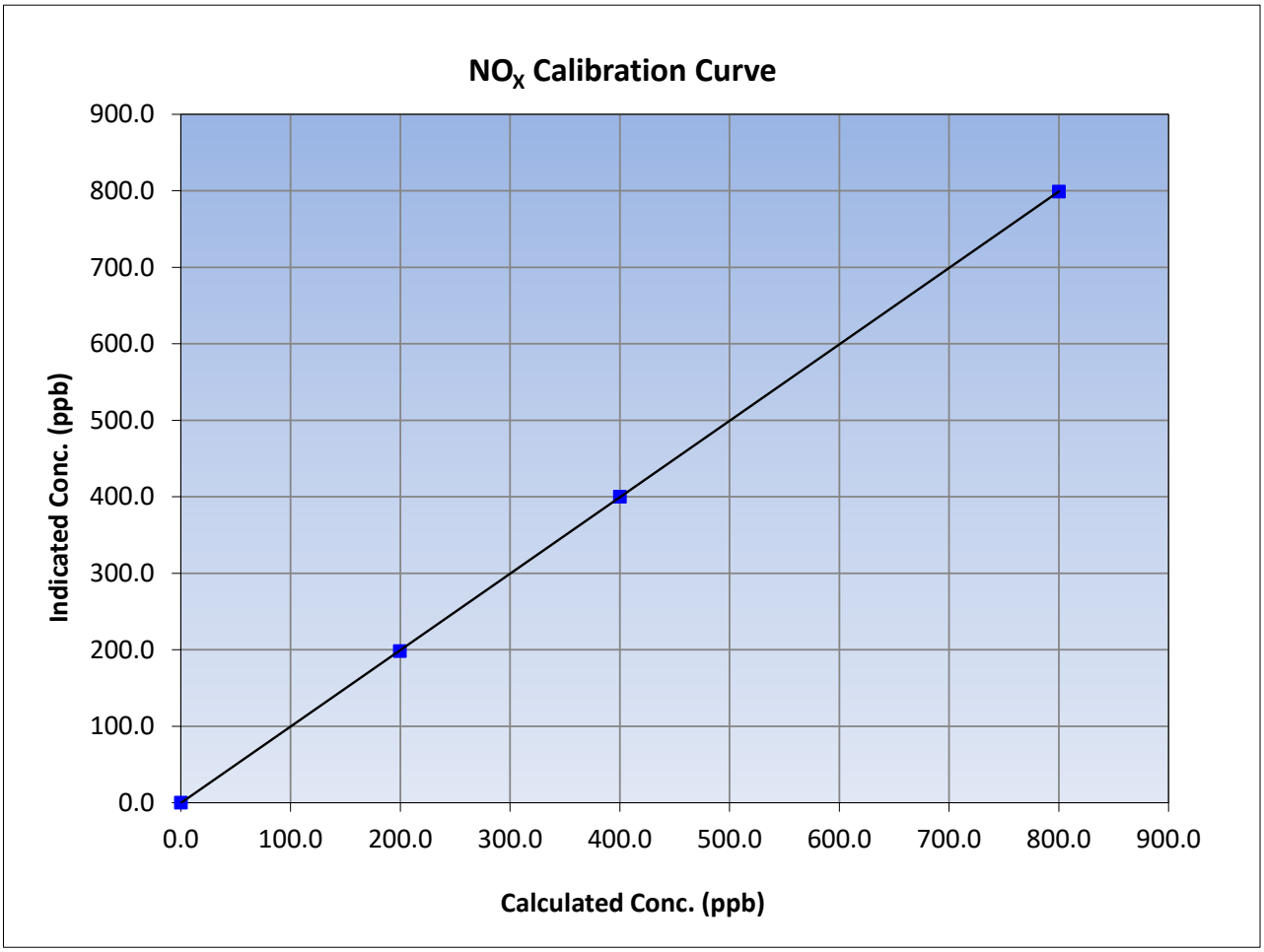
Version-04-2020

Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:48	End Time (MST):	17:00
Analyzer make:	API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999997	≥0.995
800.1	799.1	1.0013			
400.0	400.0	1.0000	Slope	0.999259	0.90 - 1.10
199.5	198.2	1.0067			
			Intercept	-0.331803	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

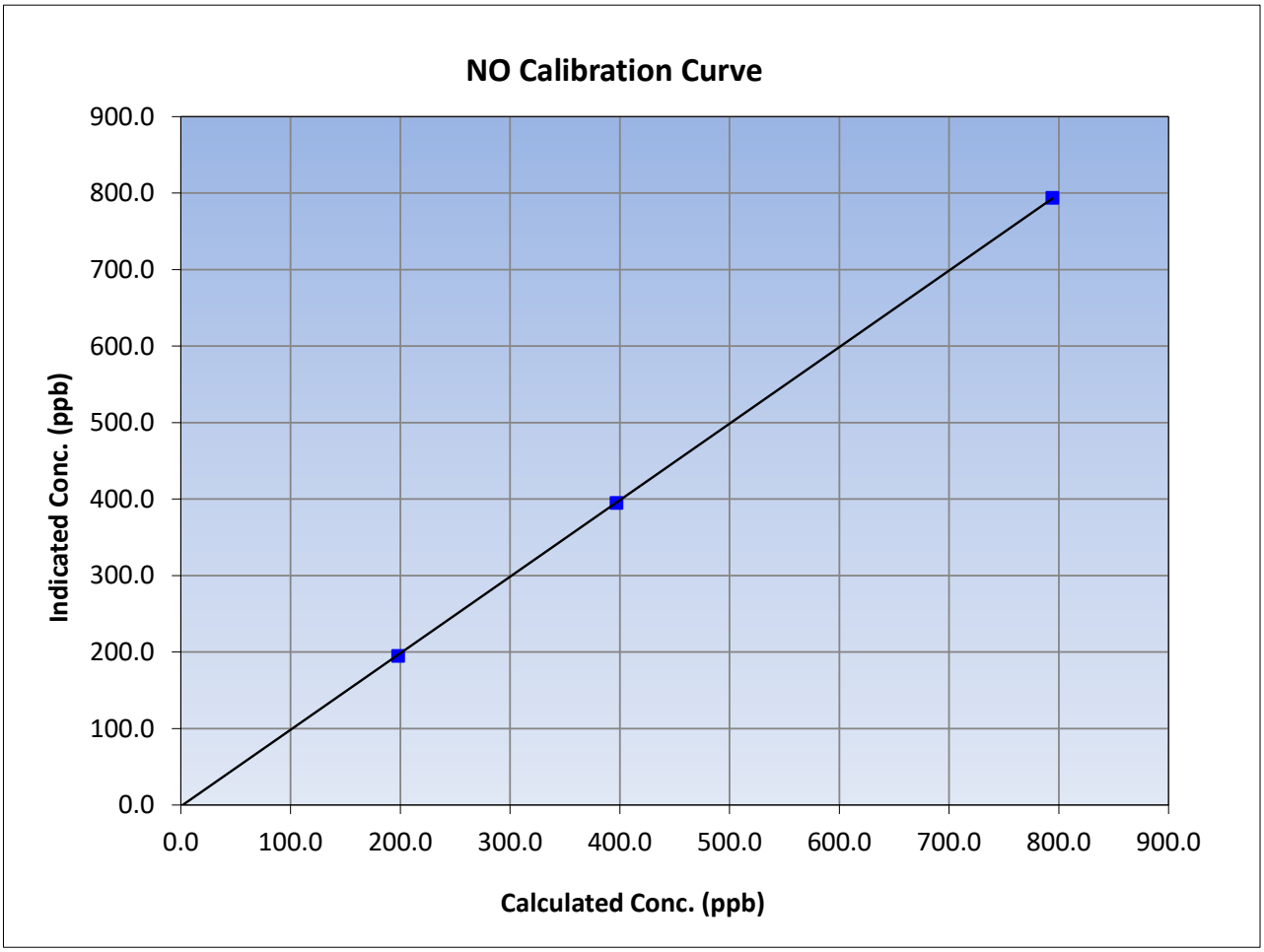
Version-04-2020

Station Information

Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:48	End Time (MST):	17:00
Analyzer make:	API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999982	≥0.995
794.1	793.7	1.0005			
397.0	394.8	1.0056	Slope	1.000587	0.90 - 1.10
198.0	194.9	1.0161			
			Intercept	-1.673511	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

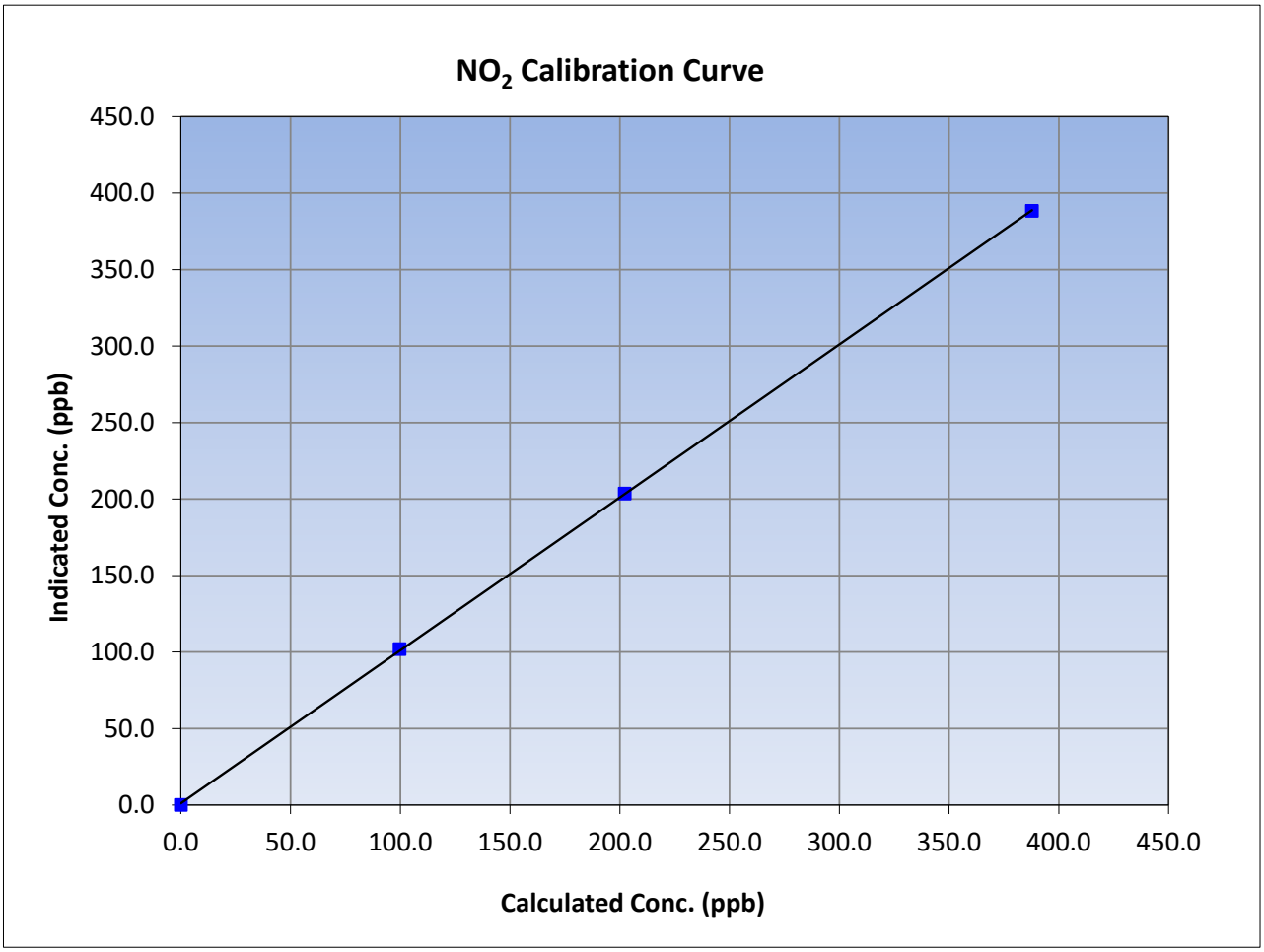
Version-04-2020

Station Information

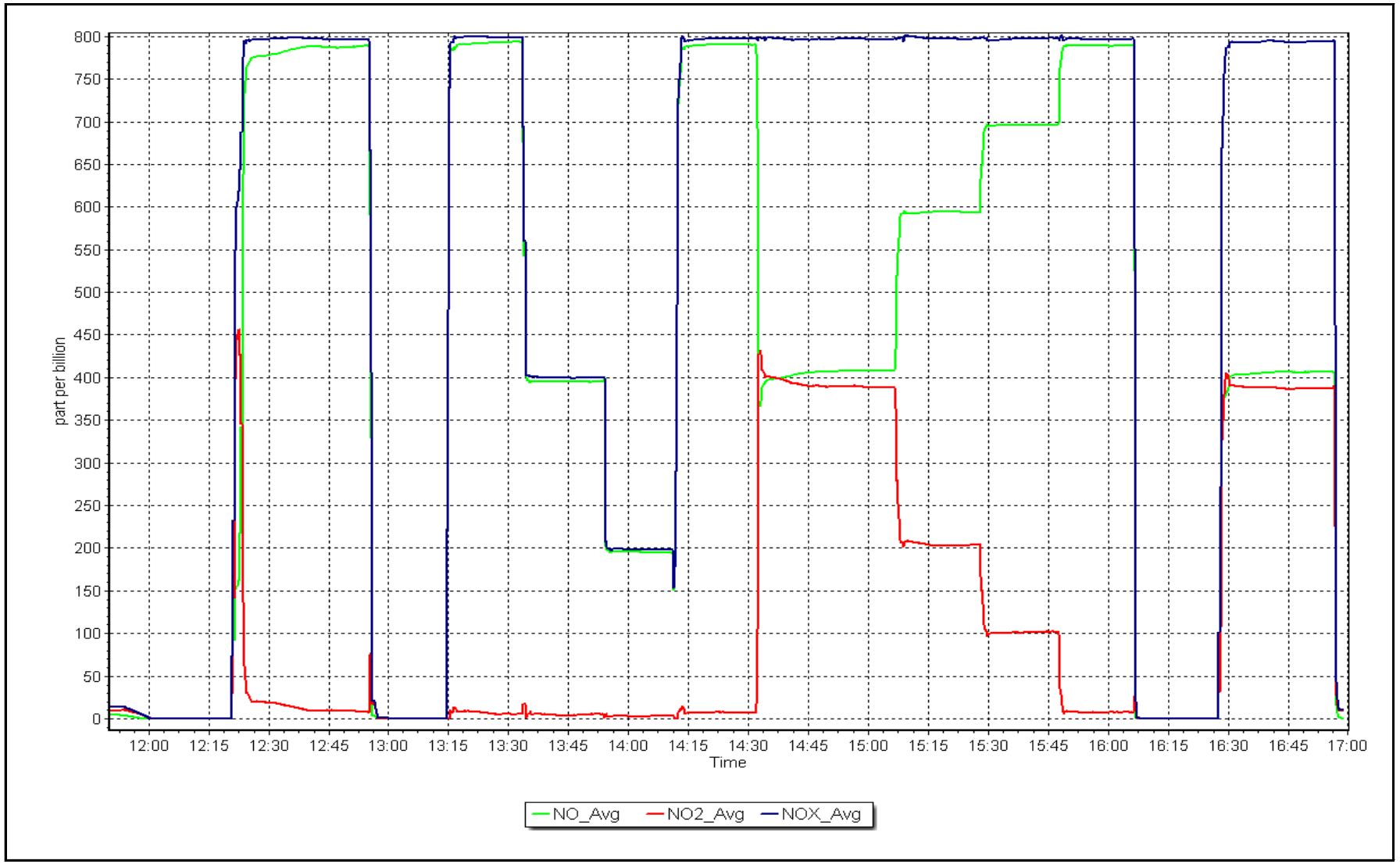
Calibration Date:	January 10, 2023	Previous Calibration:	December 7, 2022
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:48	End Time (MST):	17:00
Analyzer make:	API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.1	----	Correlation Coefficient	0.999967	≥0.995
387.8	388.4	0.9984			
202.2	203.5	0.9936	Slope	0.999811	0.90 - 1.10
99.7	102.0	0.9774			
			Intercept	1.112079	+/-20



NO_X Calibration Plot Date: January 10, 2023 Location: Kirby North



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Station Information

Station Name:	Kirby North	Station number:	AMS508
Calibration Date:	January 22, 2023	Last Cal Date:	January 10, 2023
Start time (MST):	11:22	End time (MST):	16:54
Reason:	Maintenance		

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:	API T700		Serial Number:	3804	
ZAG make/model:	API 701H		Serial Number:	880	

Analyzer Information

Analyzer make:	API T200	Analyzer serial #:	7029
NOX Range (ppb):	0 - 1000 ppb		

	Start	***Finish***		***Start***	***Finish***
NO coeff or slope:	0.977	1.037	NO bkgnd or offset:	0.1	0.1
NOX coeff or slope:	0.972	1.032	NOX bkgnd or offset:	0.3	0.3
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	3.8	4.8

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	0.999259	1.001403
NO_X Cal Offset:	-0.331803	-2.032210
NO Cal Slope:	1.000587	1.002948
NO Cal Offset:	-1.673511	-3.293659
NO_2 Cal Slope:	0.999811	0.998706
NO_2 Cal Offset:	1.112079	0.927800

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Version-04-2020

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3	----	----
as found span	4919	81.0	800.1	794.1	6.0	733.2	726.9	6.3	1.0913	1.0925
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	4919	81.0	800.1	794.1	6.0	800.0	795.0	5.4	1.0001	0.9989
second point	4960	40.5	400.0	397.0	3.0	398.2	392.6	5.6	1.0046	1.0113
third point	4980	20.2	199.5	198.0	1.5	195.3	192.6	2.8	1.0216	1.0282
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as left span	4919	81.0	800.1	411.7	388.4	794.0	406.1	387.8	1.0077	1.0138
								Average Correction Factor	1.0088	1.0128

Corrected As found	NO_X = 733.1 ppb	NO = 727.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	-9.0%
Previous Response	NO_X = 799.2 ppb	NO = 792.9 ppb		*Percent Change	NO =	-9.1%
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:

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Calibration Limit = 0.95-1.05* *As Found Limit = 0.90-1.10*	Converter Efficiency *Calibration Limit = 96-104%*
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	790.3	407.9	388.4	388.2	1.0005	100.0%
2nd GPT point (200 ppb O3)	790.3	594.3	202.0	203.6	0.9921	100.8%
3rd GPT point (100 ppb O3)	790.3	696.3	100.0	101.3	0.9871	101.3%
				Average Correction Factor	0.9932	100.7%

Notes: Changed out external pump. Adjusted span. Large adjustment made, over 6%.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

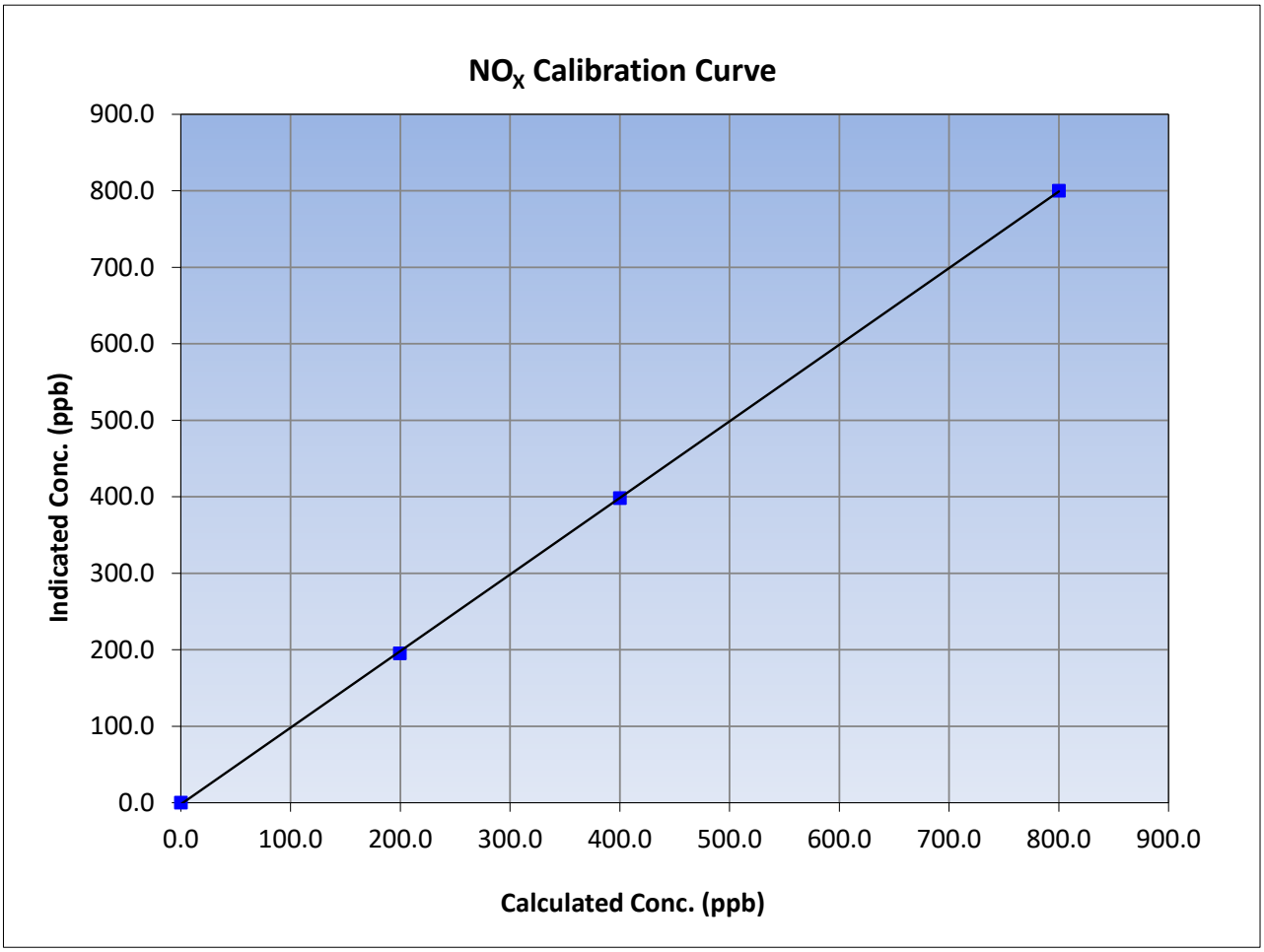
Version-04-2020

Station Information

Calibration Date:	January 22, 2023	Previous Calibration:	January 10, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:22	End Time (MST):	16:54
Analyzer make:	API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999969	≥0.995
800.1	800.0	1.0001			
400.0	398.2	1.0046	Slope	1.001403	0.90 - 1.10
199.5	195.3	1.0216			
			Intercept	-2.032210	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

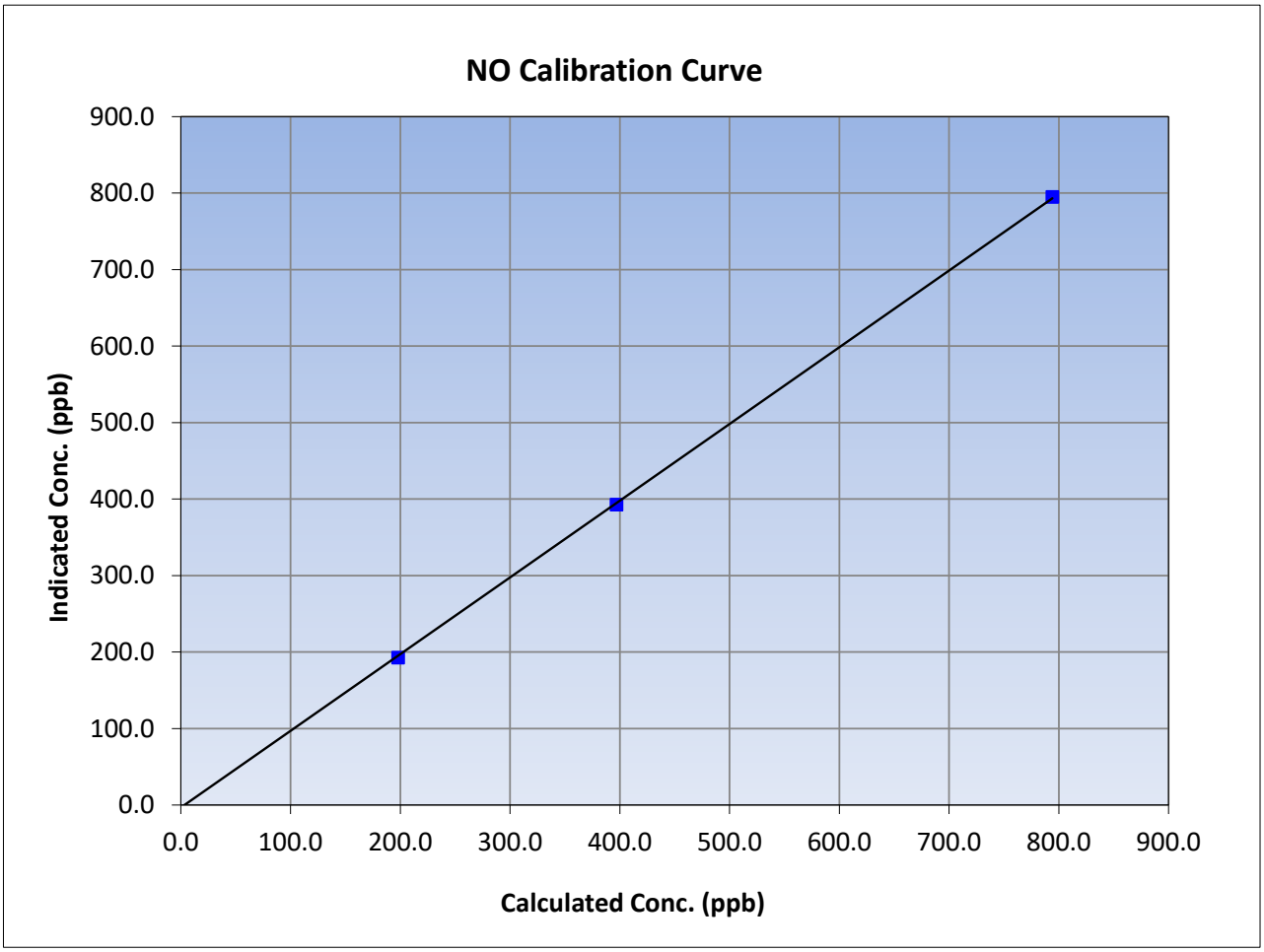
Version-04-2020

Station Information

Calibration Date:	January 22, 2023	Previous Calibration:	January 10, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:22	End Time (MST):	16:54
Analyzer make:	API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999924	≥0.995
794.1	795.0	0.9989			
397.0	392.6	1.0113	Slope	1.002948	0.90 - 1.10
198.0	192.6	1.0282			
			Intercept	-3.293659	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

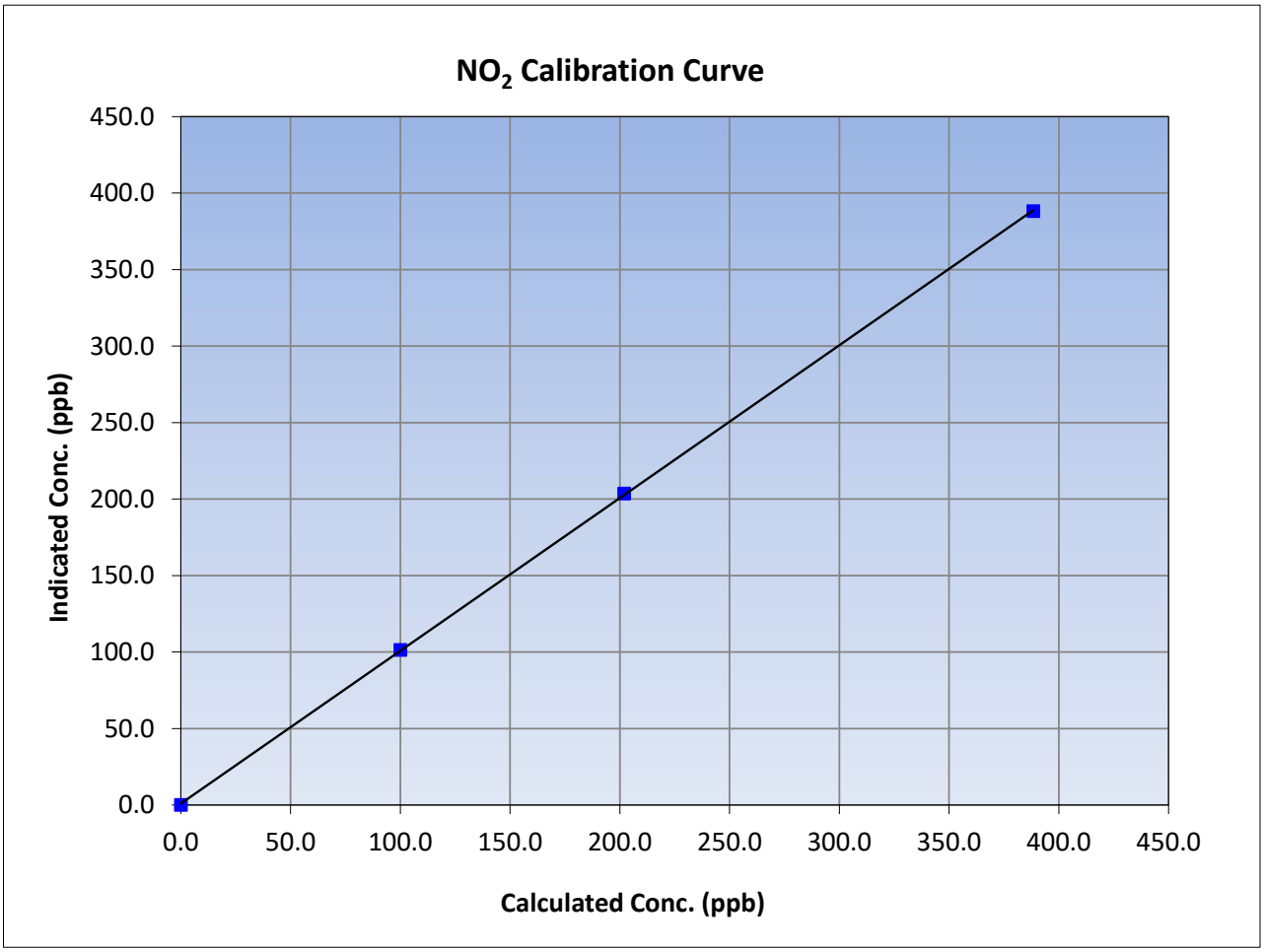
Version-04-2020

Station Information

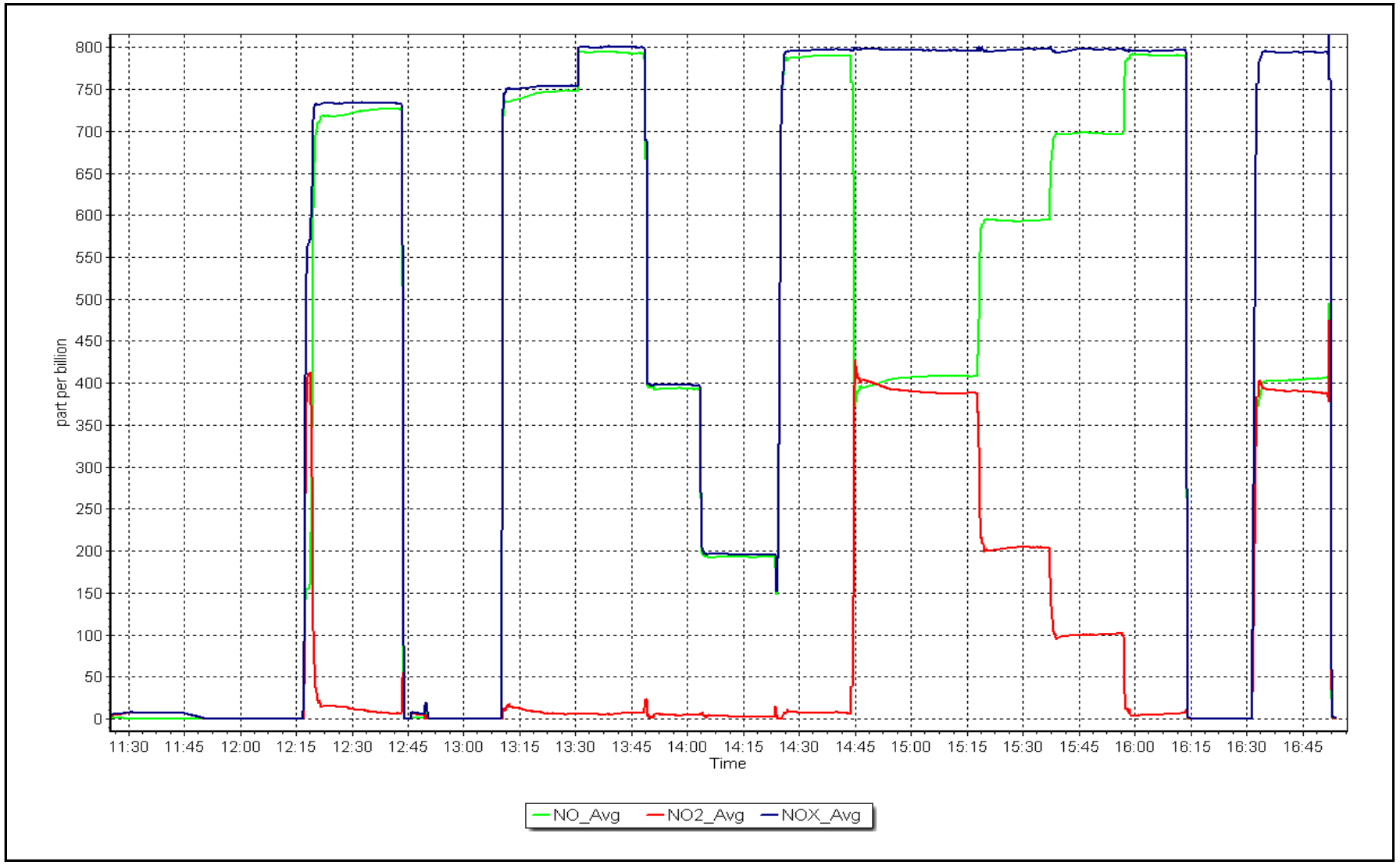
Calibration Date:	January 22, 2023	Previous Calibration:	January 10, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	11:22	End Time (MST):	16:54
Analyzer make:	API T200	Analyzer serial #:	7029

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
388.4	388.2	1.0005			
202.0	203.6	0.9921	Slope	0.998706	0.90 - 1.10
100.0	101.3	0.9871			
			Intercept	0.927800	+/-20



NO_X Calibration Plot Date: January 22, 2023 Location: Kirby North



End of Report