WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION

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Wood Buffalo Environmental Association

NOVEMBER 2024

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING

December 23, 2024

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS01
BERTHA GANTER - FORT MCKAY
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 15, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	11:41	End time (MST):	14:50
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	JC1501301448	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.995198	0.994626	Backgd or Offset:	20.6	20.5
Calibration intercept:	-0.313567	-0.213467	Coeff or Slope:	0.875	0.875

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.4	----
As found High point	4918	81.3	800.3	792.1	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	791.7	Previous response	796.1	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4918	81.3	800.3	796.2	1.005
Mid point	4959	40.7	400.6	397.6	1.008
Low point	4979	20.3	199.8	198.0	1.009
As left zero	5000	0.0	0.0	0.5	----
As left span	4918	81.3	800.3	797.1	1.004
				Average Correction Factor:	1.007

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

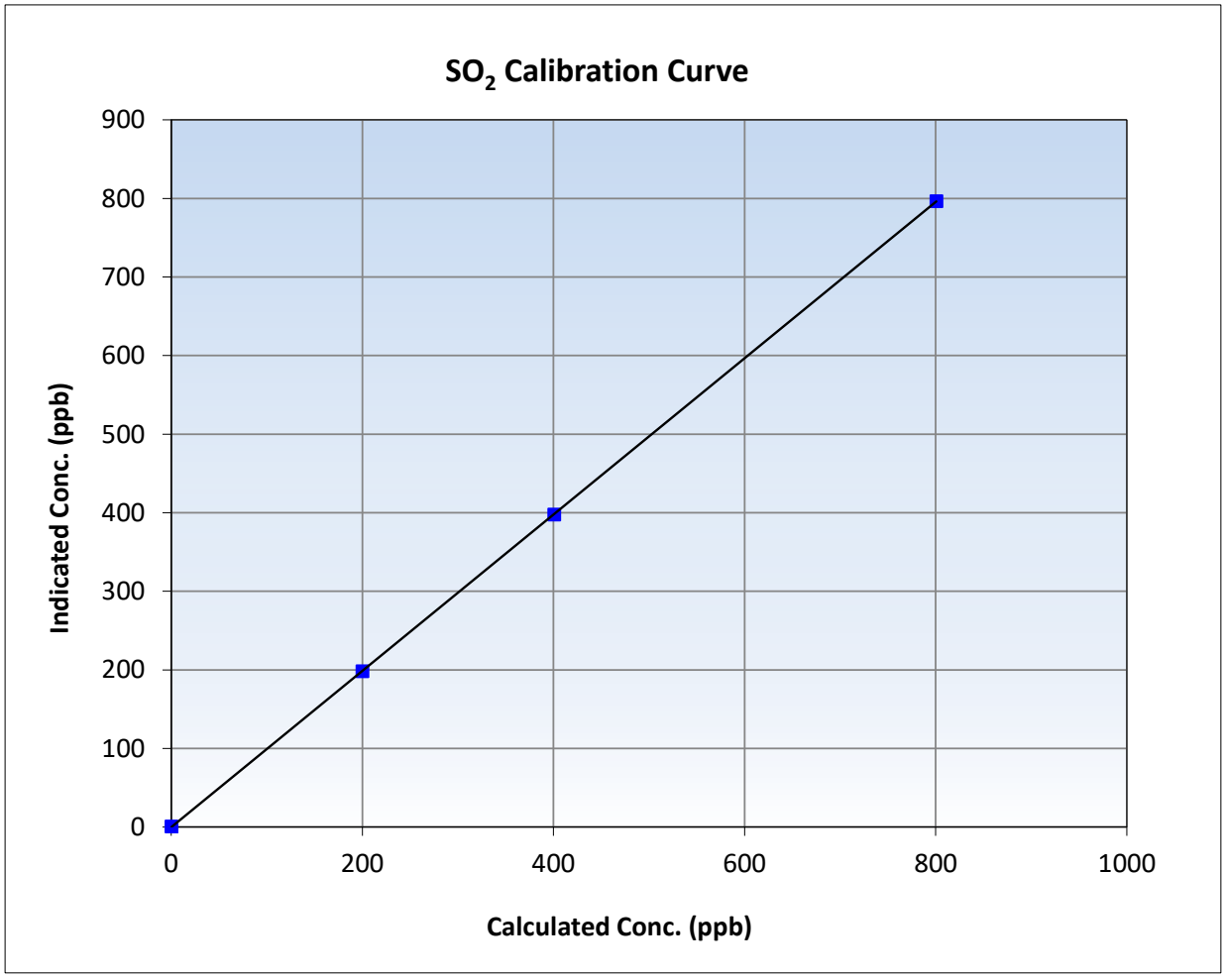
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 4, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	11:41	End Time (MST):	14:50
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301448

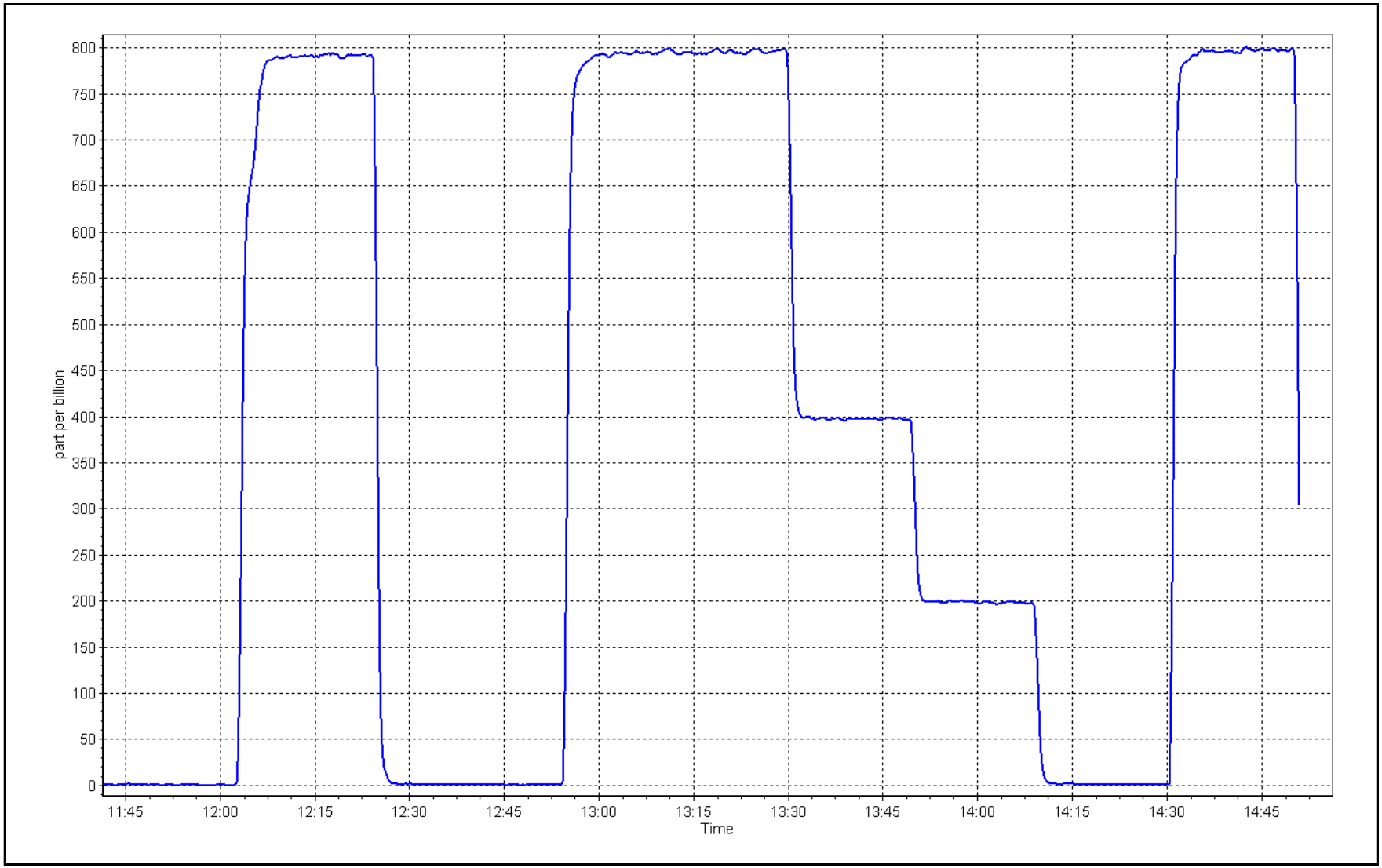
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
800.3	796.2	1.0051
400.6	397.6	1.0075
199.8	198.0	1.0092

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.994626	*0.90 - 1.10*
Intercept	-0.213467	*+/-30*



SO2 Calibration Plot Date: November 15, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 6, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	12:07	End time (MST):	17:28
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.84	ppm	Cal Gas Exp Date:	September 5, 2027
Cal Gas Cylinder #:	CC738239			
Removed Cal Gas Conc:	5.10	ppm	Rem Gas Exp Date:	September 16, 2024
Removed Gas Cyl #:	CC511749		Diff between cyl:	-0.2%
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	4766

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.002275	0.994520	Backgd or Offset:	2.54	2.60
Calibration intercept:	0.079997	0.021668	Coeff or Slope:	0.893	0.910

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4921	78.4	80.0	78.7	1.015
As found Mid point	4960	39.2	40.0	39.5	1.010
As found Low point	4980	19.6	20.0	19.6	1.015
New cylinder response	4917	82.6	80.0	78.5	1.019

Baseline Corr As found:	78.8	Prev response:	80.24	*% change:	-1.8%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.985556	AF Intercept:	-0.060003
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999991	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4917	82.6	80.0	79.5	1.006
Mid point	4959	41.3	40.0	40.0	0.999
Low point	4979	20.7	20.0	19.7	1.017
As left zero	5000	0.0	0.0	0.2	----
As left span	4921	78.4	75.9	78.4	0.968
SO2 Scrubber Check	4919	81.3	813.0	0.1	----

Date of last scrubber change:	December 17, 2021	Ave Corr Factor	1.007
Date of last converter efficiency test:			

Notes: Inlet filter change and scrubber check completed after as founds. Swapped out the calibration gas cylinder. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TRS Calibration Summary

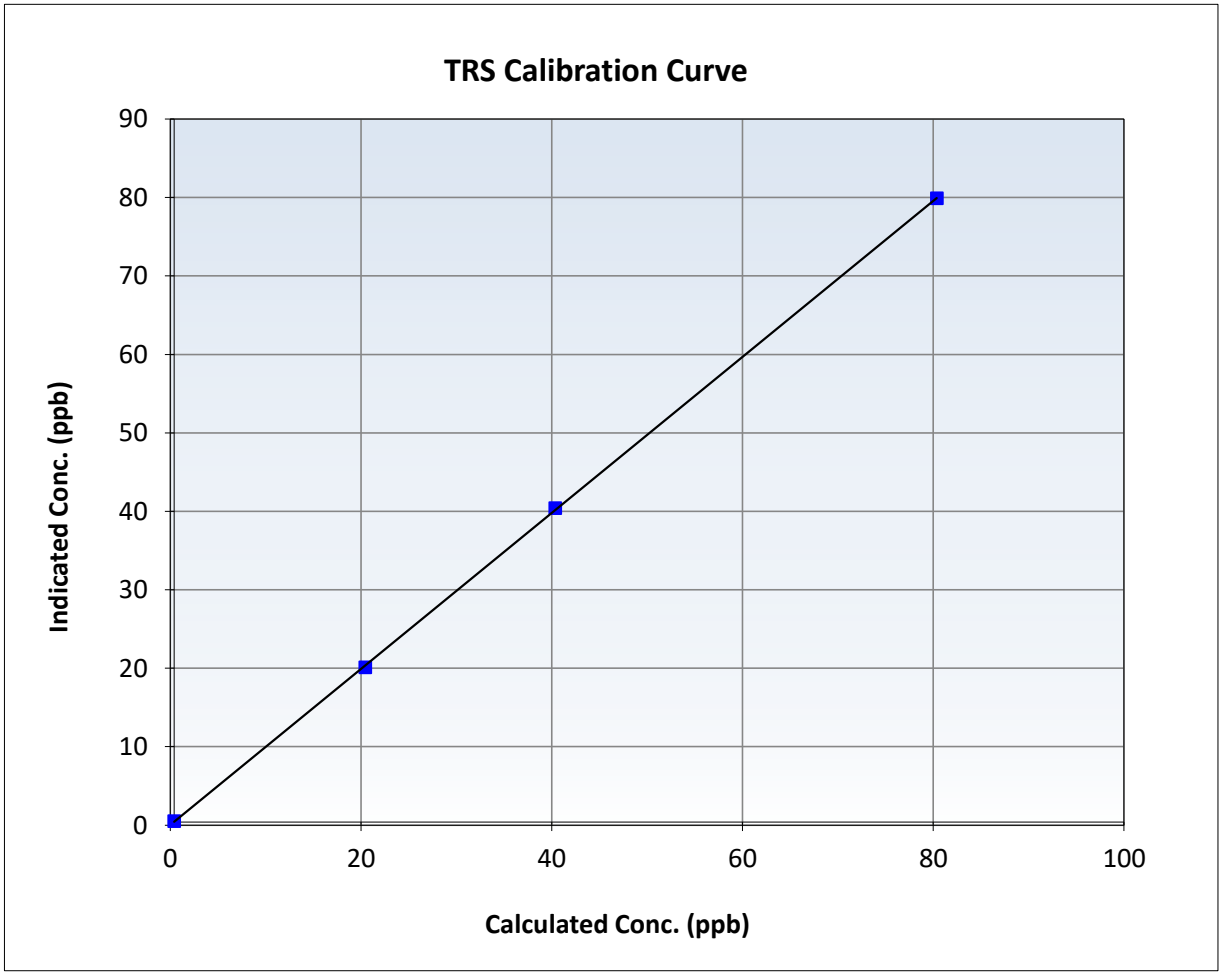
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 7, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:07	End Time (MST):	17:28
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

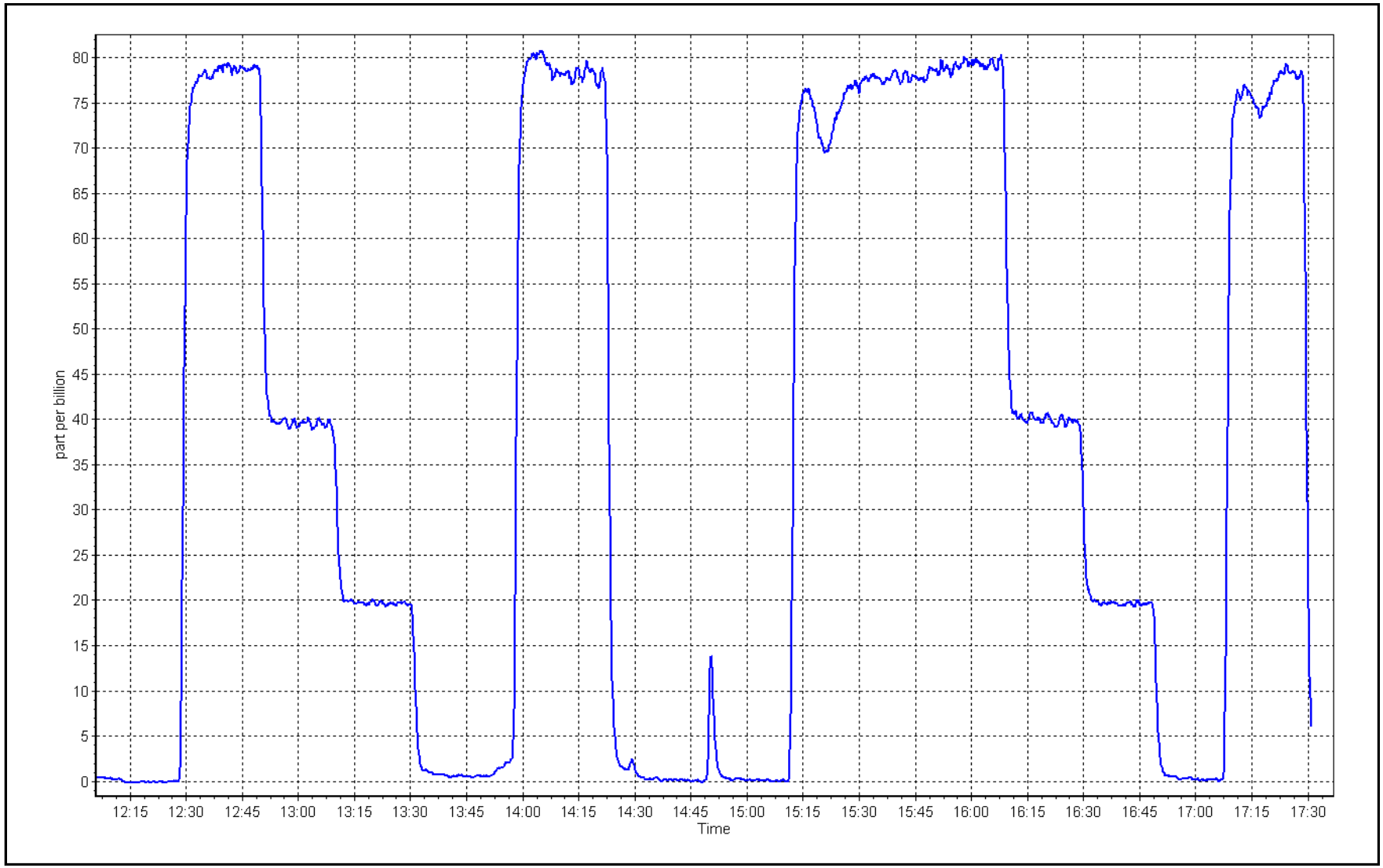
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	79.5	1.0058
40.0	40.0	0.9995
20.0	19.7	1.0172

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999966	*≥0.995*
Slope	0.994520	*0.90 - 1.10*
Intercept	0.021668	*+/-3*



TRS Calibration Plot Date: November 6, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 6, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	12:07	End time (MST):	14:25
Reason:	Cylinder Change		

Calibration Standards

Cal Gas Concentration:	4.84	ppm	Cal Gas Exp Date:	September 5, 2027
Cal Gas Cylinder #:	CC738239			
Removed Cal Gas Conc:	5.10	ppm	Rem Gas Exp Date:	September 16, 2024
Removed Gas Cyl #:	CC511749		Diff between cyl:	-2.4%
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	4766

Analyzer Information

Analyzer make:	Thermo 43iQ-TL		Analyzer serial #:	1200326167
Converter make:	CD Nova		Converter serial #:	2022-221
Analyzer Range	0 - 100 ppb		Converter Temp:	315 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.996193		Backgd or Offset:	1.58	
Calibration intercept:	0.196801		Coeff or Slope:	0.964	

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4922	78.4	80.0	79.8	1.003
As found Mid point	4960	39.2	40.0	40.0	1.002
As found Low point	4980	19.6	20.0	19.9	1.010
New cylinder response	4917	82.6	80.0	77.9	1.026

Baseline Corr As found:	79.7	Prev response:	79.85	*% change:	-0.2%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	0.997336	AF Intercept:	0.056807
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	

H_2S Calibration Data

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

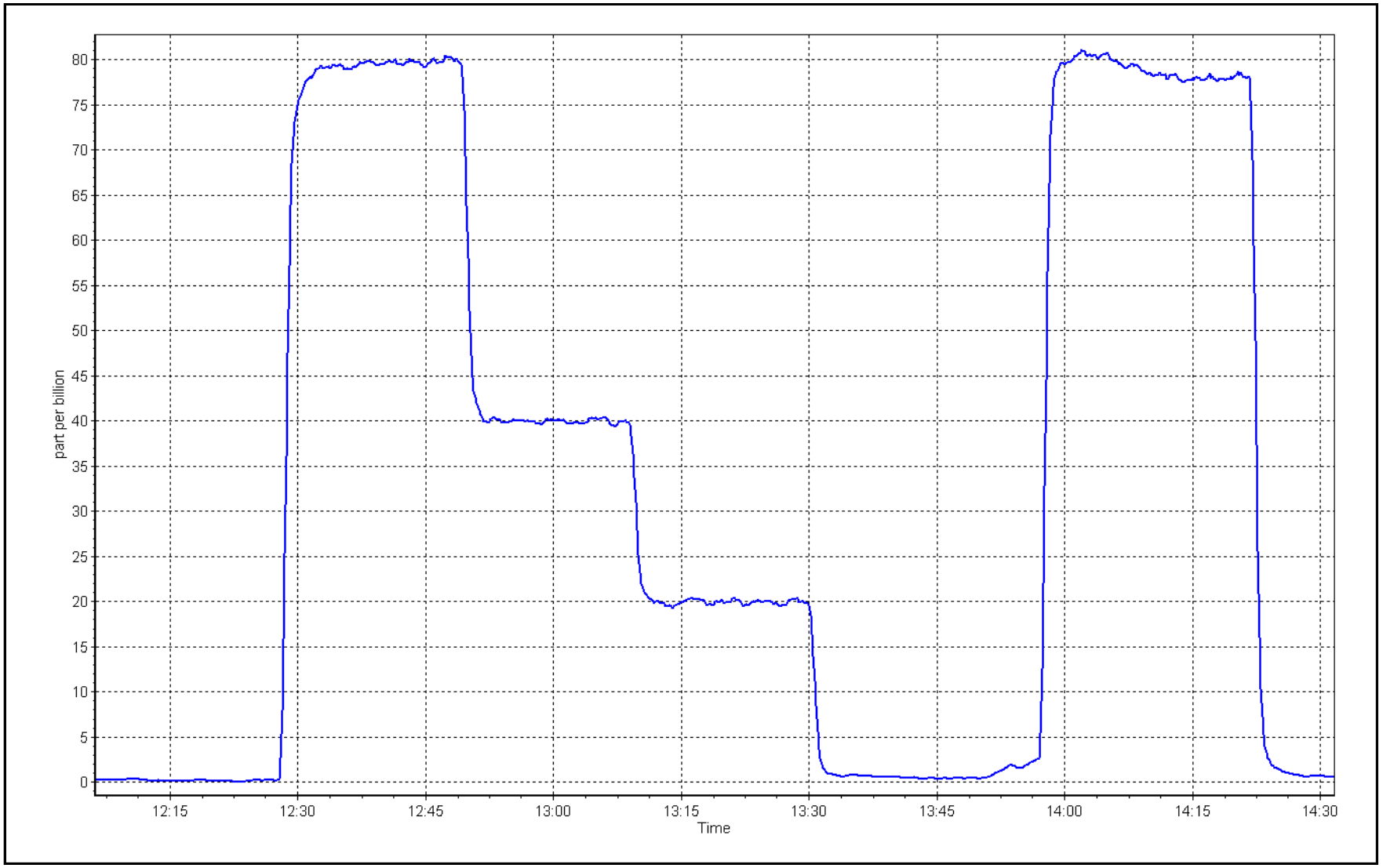
Date of last scrubber change: January 25, 2024 Ave Corr Factor

Date of last converter efficiency test:

Notes: Inlet filter and calibration gas swapped after as founds. Adjusted the converter temperature from 350C to 315C.

Calibration Performed By: Rene Chamberland

H_2S Calibration Plot Date: November 6, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 7, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	12:35	End time (MST):	15:59
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.84	ppm	Cal Gas Exp Date:	September 5, 2027
Cal Gas Cylinder #:	CC738239			
Removed Cal Gas Conc:	4.84	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	4766

Analyzer Information

Analyzer make:	Thermo 43iQ-TL		Analyzer serial #:	1200326167
Converter make:	CD Nova		Converter serial #:	2022-221
Analyzer Range	0 - 100 ppb		Converter Temp:	315 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.996193	0.996526	Backgd or Offset:	1.58	1.58
Calibration intercept:	0.196801	0.202067	Coeff or Slope:	0.964	0.969

H_2S As Found Data

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

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

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4917	82.6	80.0	79.9	1.001
Mid point	4959	41.3	40.0	40.1	0.997
Low point	4979	20.7	20.0	20.0	1.002
As left zero	5000	0.0	0.0	0.4	----
As left span	4917	82.6	80.0	79.8	1.002
SO2 Scrubber Check	4919	81.3	813.0	0.0	----
Date of last scrubber change:		January 25, 2024		Ave Corr Factor	1.000
Date of last converter efficiency test:		November 7, 2024		107.9%	efficiency

Notes: Performed a converter efficiency test and scrubber check. Adjusted span only.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

H_2S Calibration Summary

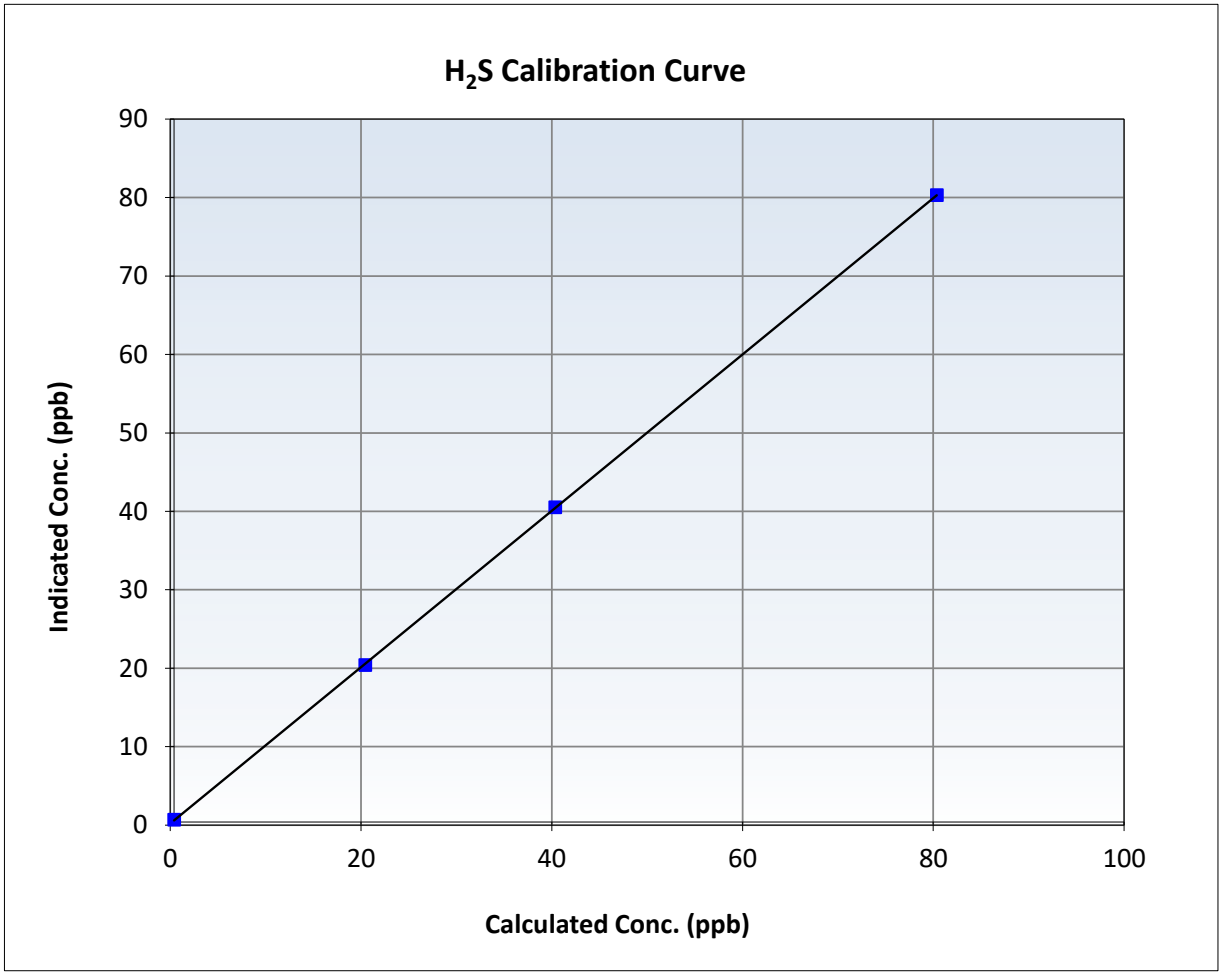
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 7, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:35	End Time (MST):	15:59
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1200326167

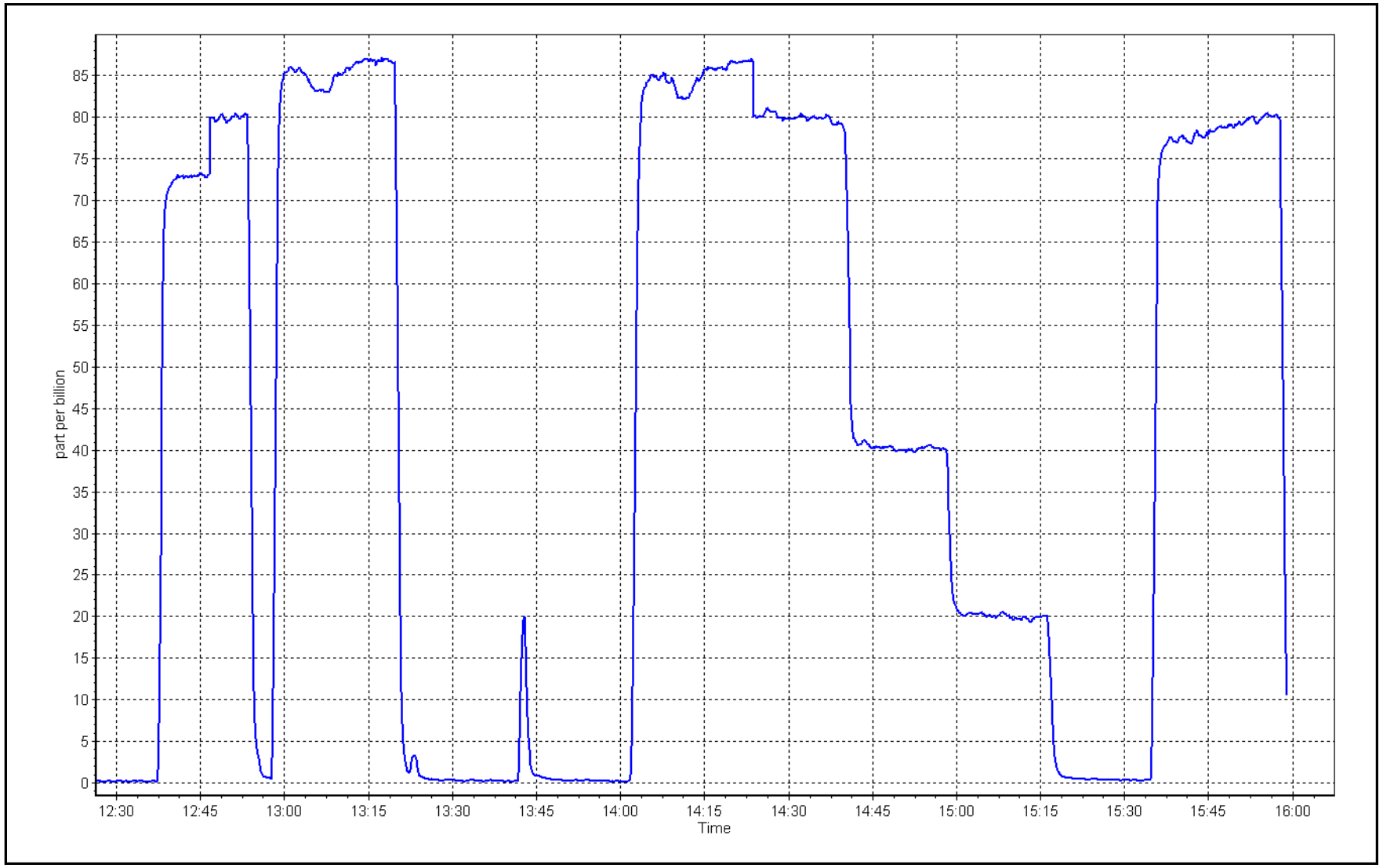
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
80.0	79.9	1.0008
40.0	40.1	0.9969
20.0	20.0	1.0019

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	0.996526	*0.90 - 1.10*
Intercept	0.202067	*+/-3*



H_2S Calibration Plot Date: November 7, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 15, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	11:41	End time (MST):	14:50
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC418809		Cal Gas Expiry Date:	March 10, 2031	
CH4 Cal Gas Conc.	497.2	ppm	CH4 Equiv Conc.	1061.8	ppm
C3H8 Cal Gas Conc.	205.3	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	497.2	ppm	CH4 Equiv Conc.	1061.8	ppm
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T700		Serial Number:	3565	
Zero Air Gen model:	Teledyne API T701		Serial Number:	4766	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1180320040	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	4.45E-04	4.48E-04	NMHC SP Ratio:	8.28E-05	8.38E-05
CH4 Retention time:	16.7	16.7	NMHC Peak Area:	110952	109721
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	17.27	17.18	1.005
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.18	Prev response	17.26	*% change	-0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	17.27	17.25	1.001
Mid point	4959	40.7	8.64	8.49	1.018
Low point	4979	20.3	4.31	4.24	1.016
As left zero	5000	0.0	0.00	0.02	----
As left span	4918	81.3	17.27	17.30	0.998
				Average Correction Factor	1.012

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	9.18	9.09	1.010
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.09	Prev response	9.17	*% change	-0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	9.18	9.16	1.002
Mid point	4959	40.7	4.60	4.54	1.012
Low point	4979	20.3	2.29	2.28	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	81.3	9.18	9.20	0.998
				Average Correction Factor	1.006

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	81.3	8.09	8.10	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.10	Prev response	8.09	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	81.3	8.09	8.09	1.000
Mid point	4959	40.7	4.05	3.95	1.025
Low point	4979	20.3	2.02	1.96	1.030
As left zero	5000	0.0	0.00	0.02	----
As left span	4918	81.3	8.09	8.10	0.998
				Average Correction Factor	1.018

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.001365	0.999339
THC Cal Offset:	-0.033230	-0.055421
CH4 Cal Slope:	1.006927	1.001489
CH4 Cal Offset:	-0.049502	-0.043511
NMHC Cal Slope:	0.996678	0.997471
NMHC Cal Offset:	0.015672	-0.011511

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

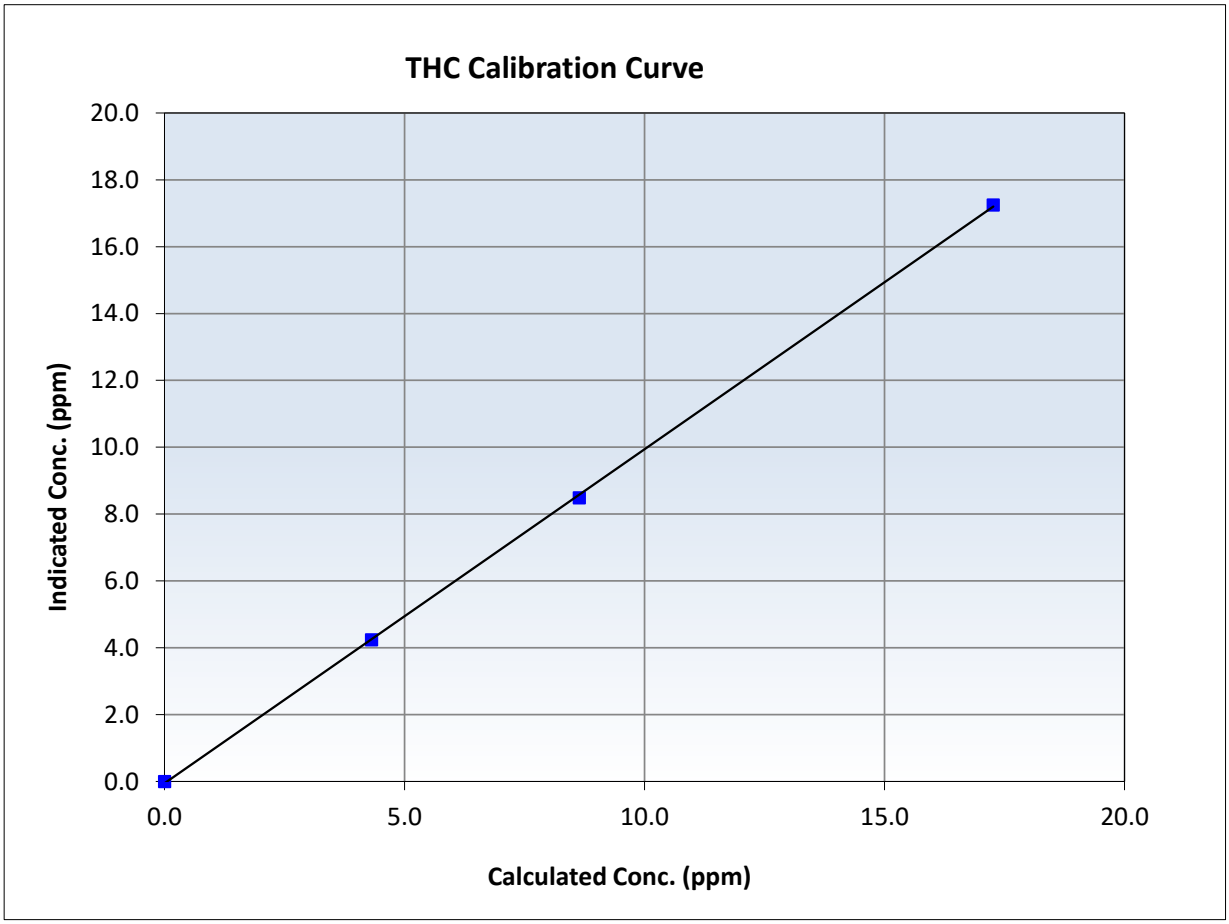
THC Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 4, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	11:41	End Time (MST):	14:50
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	0.999911	*≥0.995*
17.27	17.25	1.0010	Slope	0.999339	*0.90 - 1.10*
8.64	8.49	1.0183	Intercept	-0.055421	*+/-0.5*
4.31	4.24	1.0164			



Wood Buffalo Environmental Association

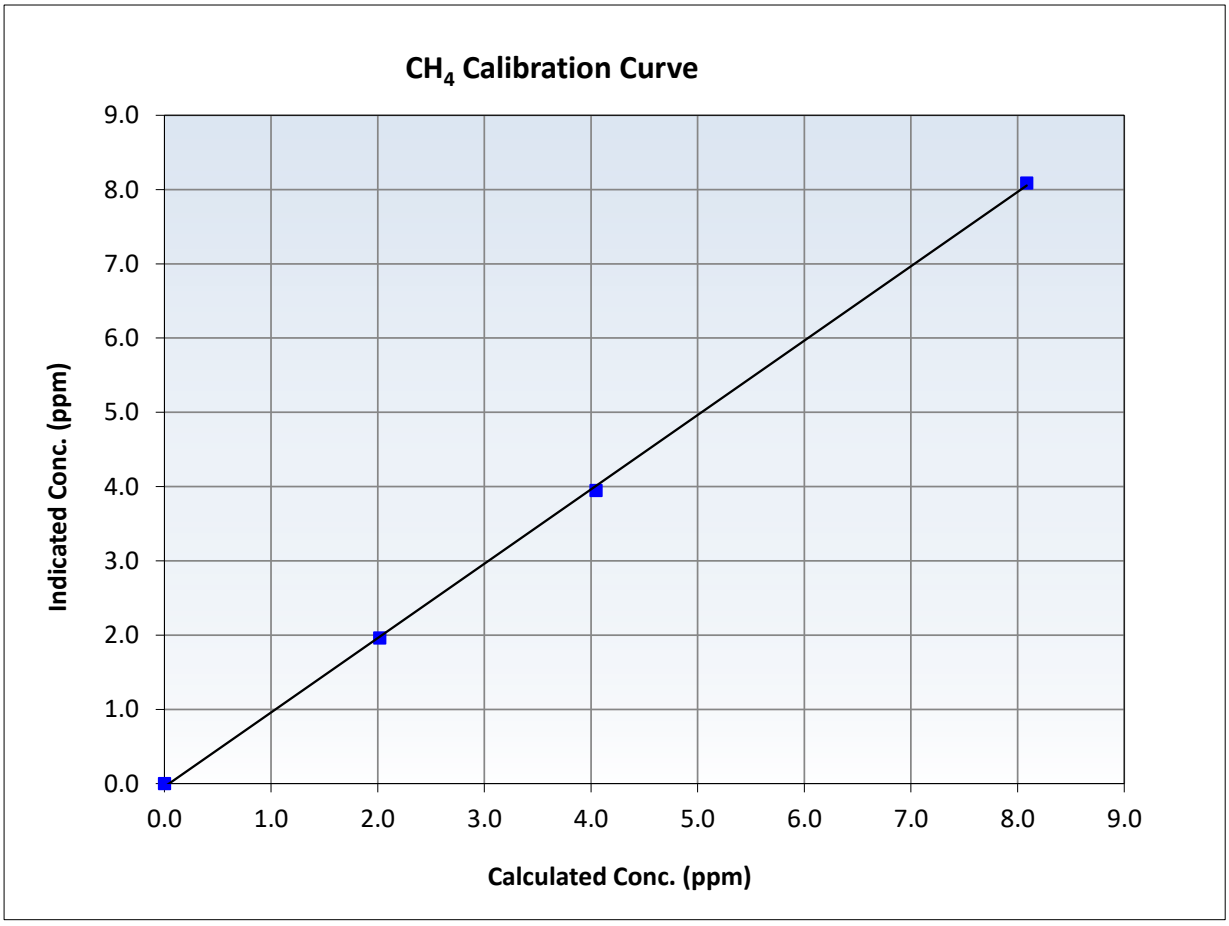
CH_4 Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 4, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	11:41	End Time (MST):	14:50
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	0.999801	≥0.995
8.09	8.09	0.9996	Slope	1.001489	0.90 - 1.10
4.05	3.95	1.0249	Intercept	-0.043511	+/-0.5
2.02	1.96	1.0295			



Wood Buffalo Environmental Association

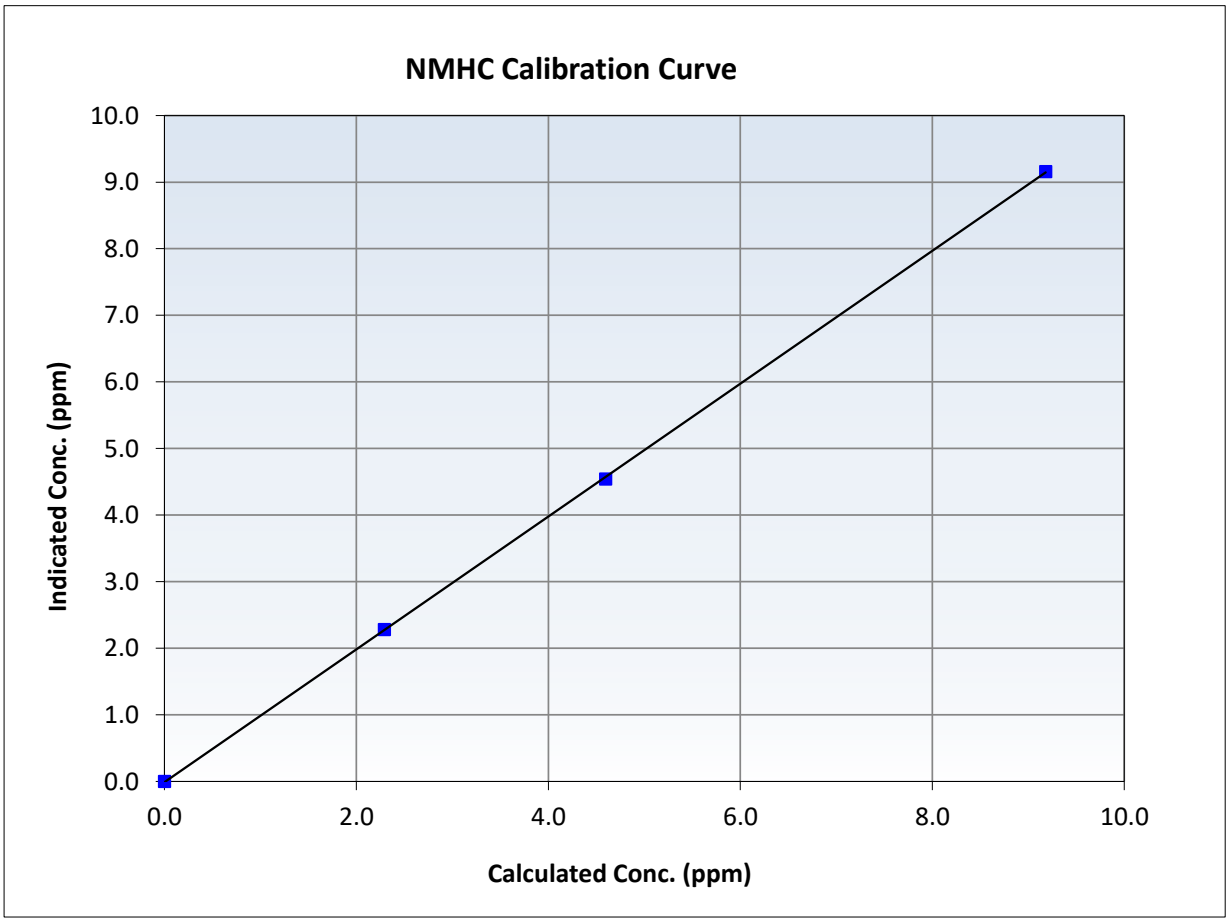
NMHC Calibration Summary

Station Information

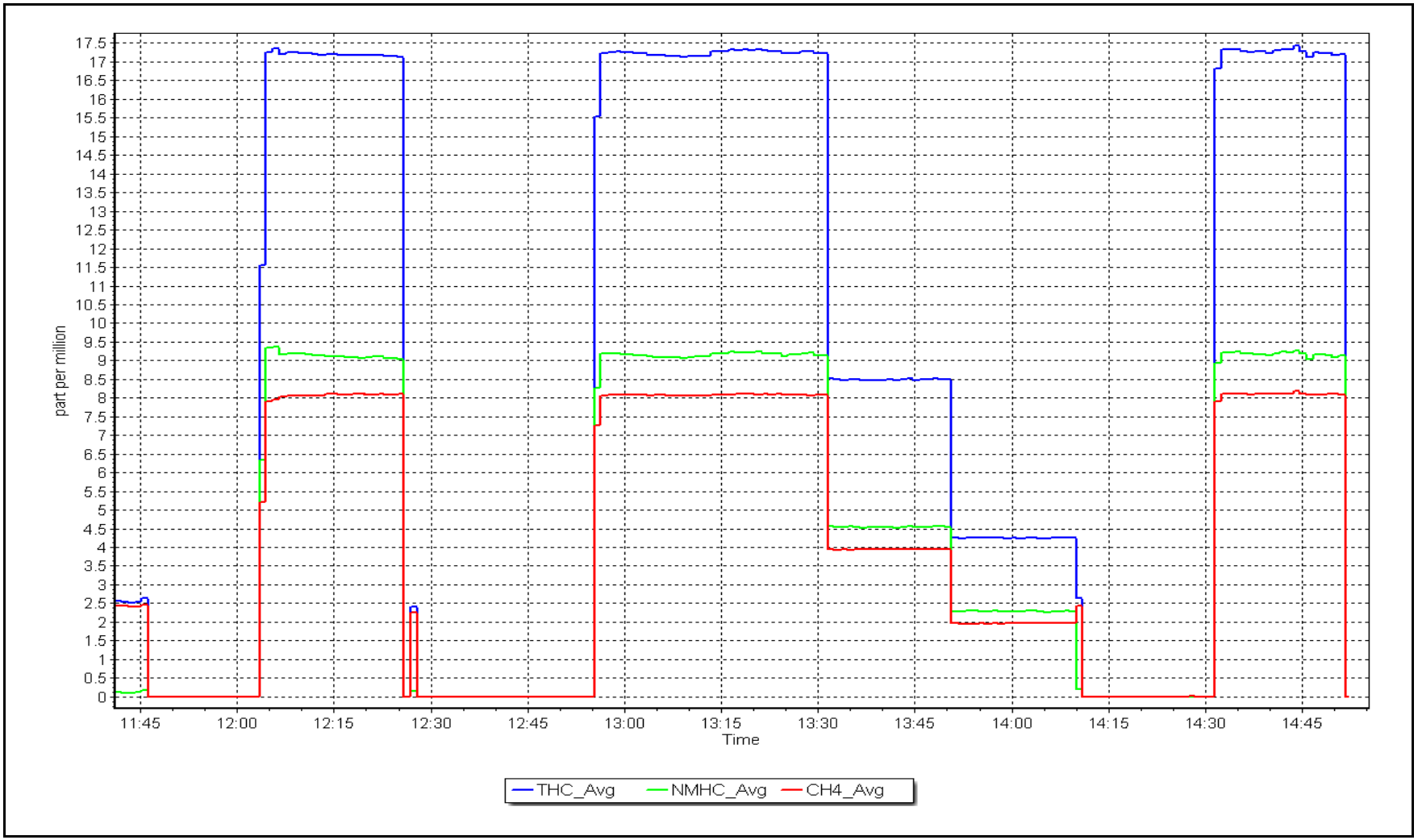
Calibration Date:	November 15, 2024	Previous Calibration:	October 4, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	11:41	End Time (MST):	14:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320040

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999970	≥0.995
9.18	9.16	1.0022	Slope	0.997471	0.90 - 1.10
4.60	4.54	1.0121			
2.29	2.28	1.0050	Intercept	-0.011511	+/-0.5



NMHC Calibration Plot Date: November 15, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay
Station number:	AMS 01
Calibration Date:	November 5, 2024
Last Cal Date:	October 2, 2024
Start time (MST):	10:49
End time (MST):	15:59
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-2.0	-1.9	-0.1	----	----
AF High point	4932	67.6	803.1	800.4	2.7	809.2	792.6	16.6	0.9900	1.0074
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 804.8 ppb	NO = 799.7 ppb
Baseline Corr 1st pt	NO_X = 811.2 ppb	NO = 794.5 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

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

*Percent Change	NO_X = 0.8%
*Percent Change	NO = -0.7%

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 7117

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.156	1.148	NO bkgnd or offset:	0.2	-3.1
NOX coeff or slope:	1.161	1.148	NOX bkgnd or offset:	0.6	-2.9
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	6.8	6.8

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.004110	0.999286
NO_X Cal Offset:	-1.620000	-0.700000
NO Cal Slope:	1.002033	1.000977
NO Cal Offset:	-2.280000	-1.660000
NO_2 Cal Slope:	1.006464	1.000376
NO_2 Cal Offset:	1.510023	-0.520742

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
High point	4932	67.6	803.1	800.4	2.7	802.3	800.2	2.2	1.0010	1.0002
Mid point	4966	33.8	401.5	400.2	1.4	399.7	398.4	1.4	1.0046	1.0045
Low point	4983	16.9	200.8	200.1	0.7	199.7	196.9	2.8	1.0054	1.0162
As left zero	5000	0.0	0.0	0.0	0.0	0.9	0.8	0.1	----	----
As left span	4932	67.6	803.1	385.7	417.4	794.4	385.7	408.6	1.0109	1.0000
							Average Correction Factor		1.0037	1.0070

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	796.4	388.1	411.0	410.6	1.0010	99.9%
Mid GPT point	796.4	593.4	205.7	205.9	0.9990	100.1%
Low GPT point	796.4	695.8	103.3	101.7	1.0158	98.4%
				Average Correction Factor	1.0053	99.5%

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

NO_X Calibration Summary

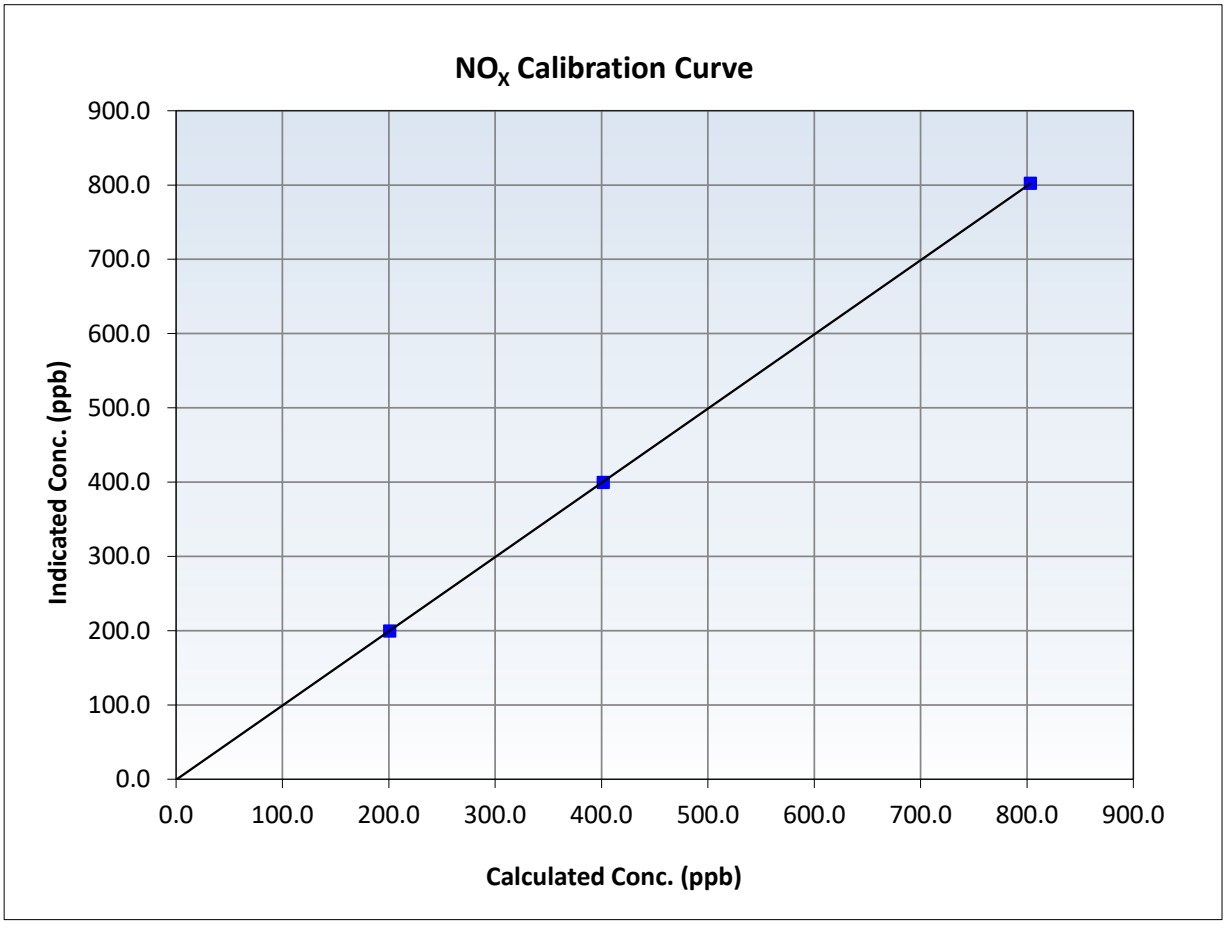
Station Information

Calibration Date:	November 5, 2024	Previous Calibration:	October 2, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:49	End Time (MST):	15:59
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
803.1	802.3	1.0010
401.5	399.7	1.0046
200.8	199.7	1.0054

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.999286	*0.90 - 1.10*
Intercept	-0.700000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

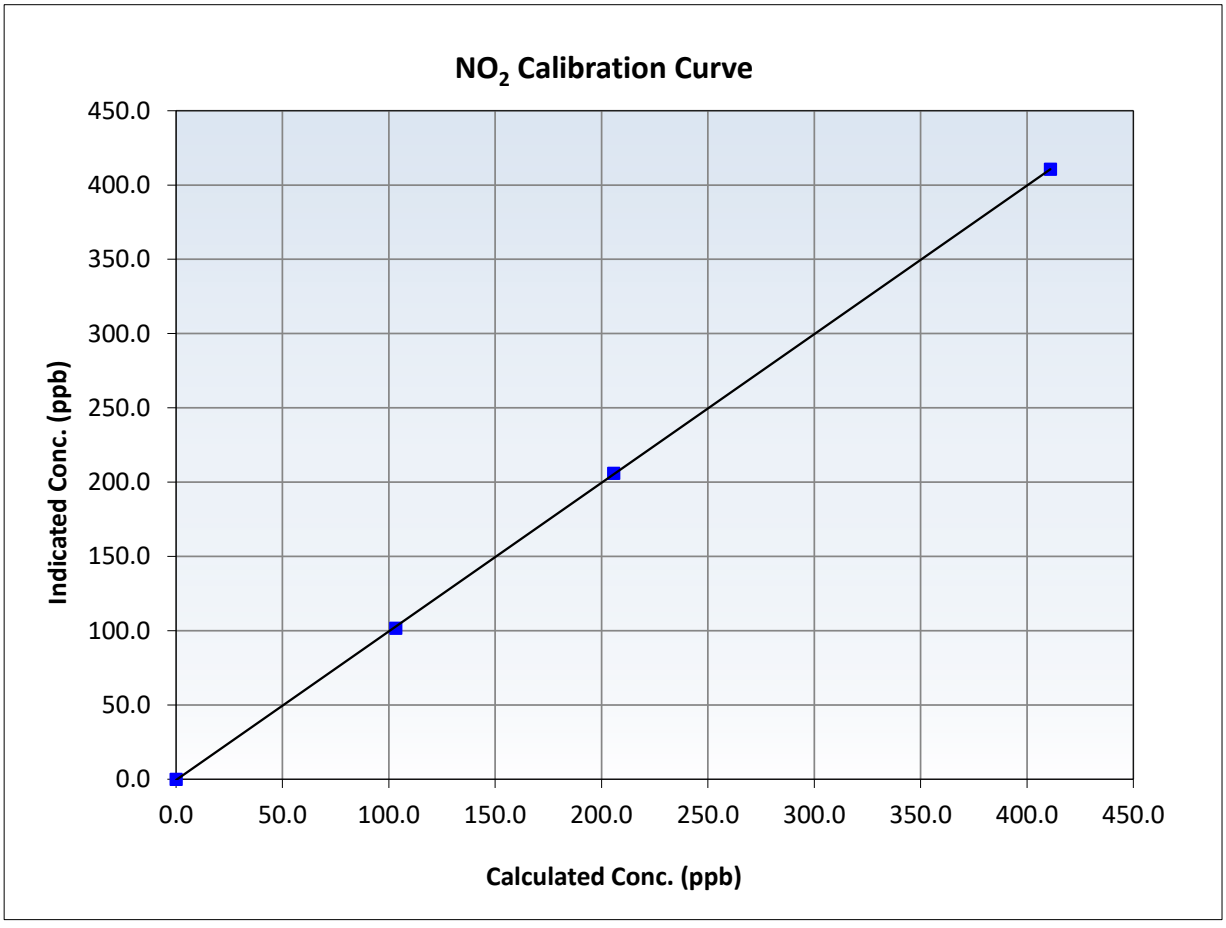
Station Information

Calibration Date:	November 5, 2024	Previous Calibration:	October 2, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:49	End Time (MST):	15:59
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
411.0	410.6	1.0010
205.7	205.9	0.9990
103.3	101.7	1.0158

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	1.000376	*0.90 - 1.10*
Intercept	-0.520742	*+/-20*



Wood Buffalo Environmental Association

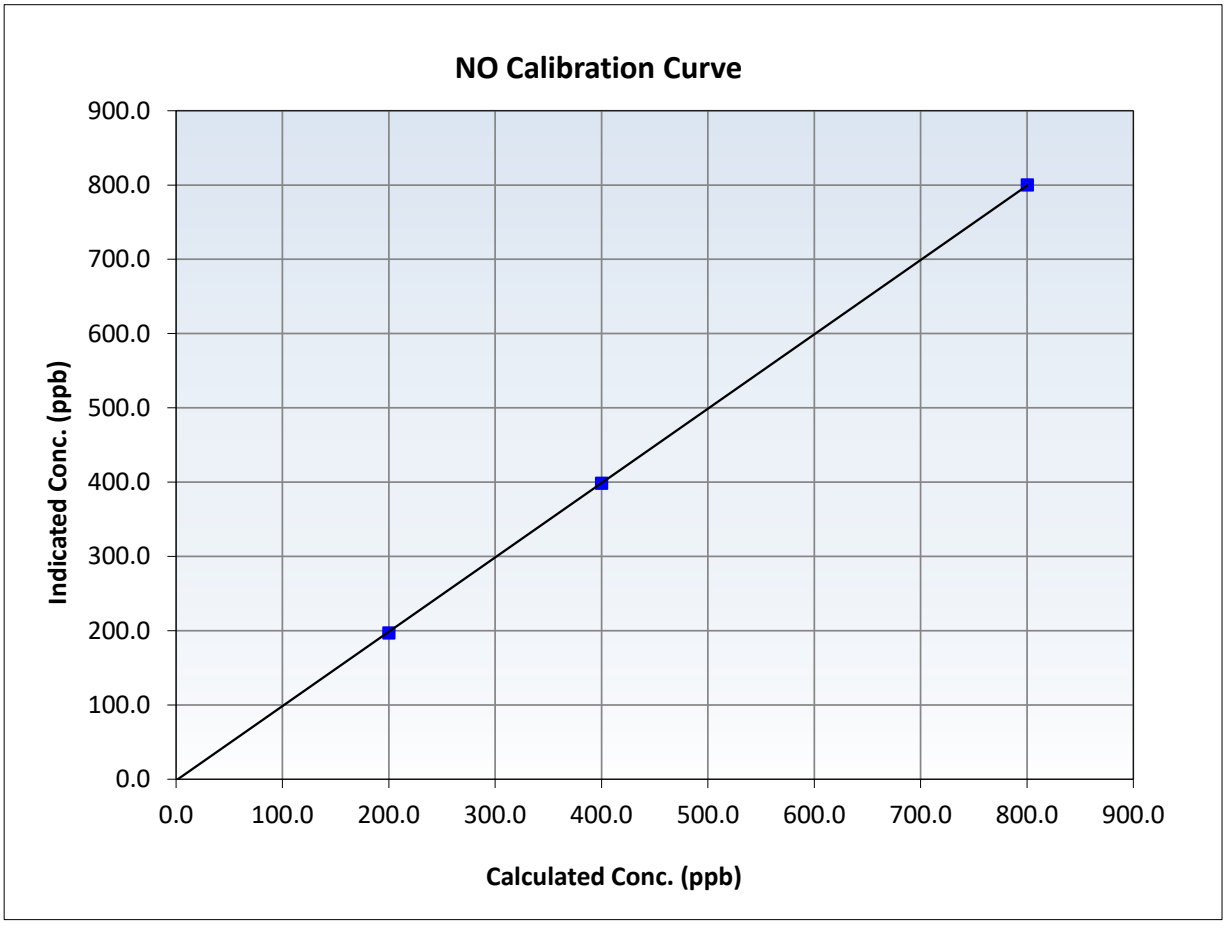
NO Calibration Summary

Station Information

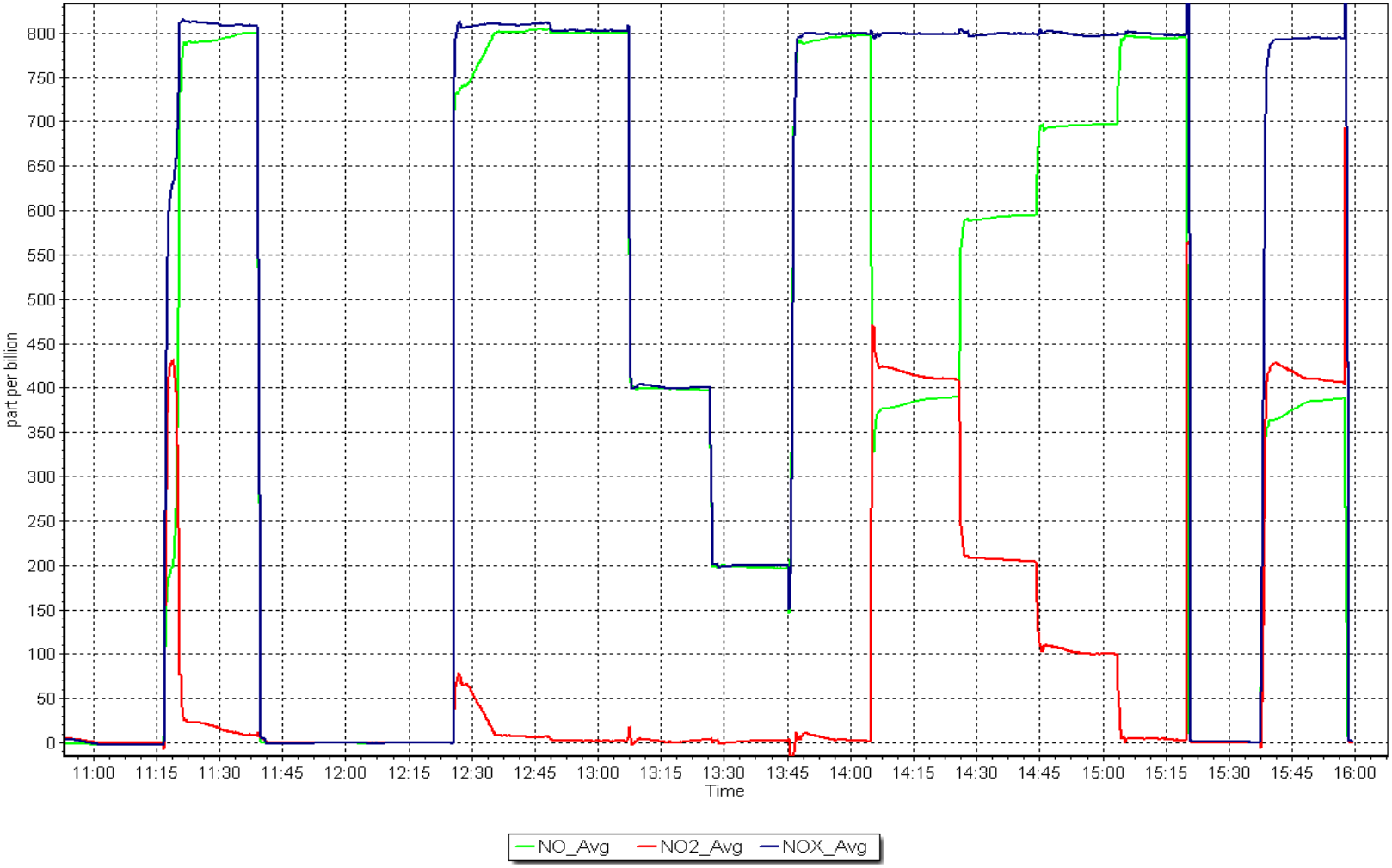
Calibration Date:	November 5, 2024	Previous Calibration:	October 2, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:49	End Time (MST):	15:59
Analyzer make:	Teledyne API T200	Analyzer serial #:	7117

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.1	----	Correlation Coefficient	0.999982	≥0.995
800.4	800.2	1.0002	Slope	1.000977	0.90 - 1.10
400.2	398.4	1.0045			
200.1	196.9	1.0162	Intercept	-1.660000	+/-20



NO_X Calibration Plot Date: November 5, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 1, 2024	Last Cal Date:	October 1, 2024
Start time (MST):	11:08	End time (MST):	14:15
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Teledyne API T400		Analyzer serial #:	1107	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002171	1.003114	Backgd or Offset:	4.2	5.4
Calibration intercept:	0.420000	0.380000	Coeff or Slope:	1.007	1.010

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	1.8	----
As found High point	5000	863.1	400.0	402.7	0.998
As found Mid point					
As found Low point					
Baseline Corr As found:	400.9	Previous response	401.3	*% change	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.4	----
High point	5000	863.1	400.0	401.5	0.996
Mid point	5000	744.0	200.0	201.4	0.993
Low point	5000	651.7	100.0	100.4	0.996
As left zero	5000	0.0	0.0	0.0	----
As left span	5000	863.1	400.0	403.2	0.992
				Average Correction Factor	0.995

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

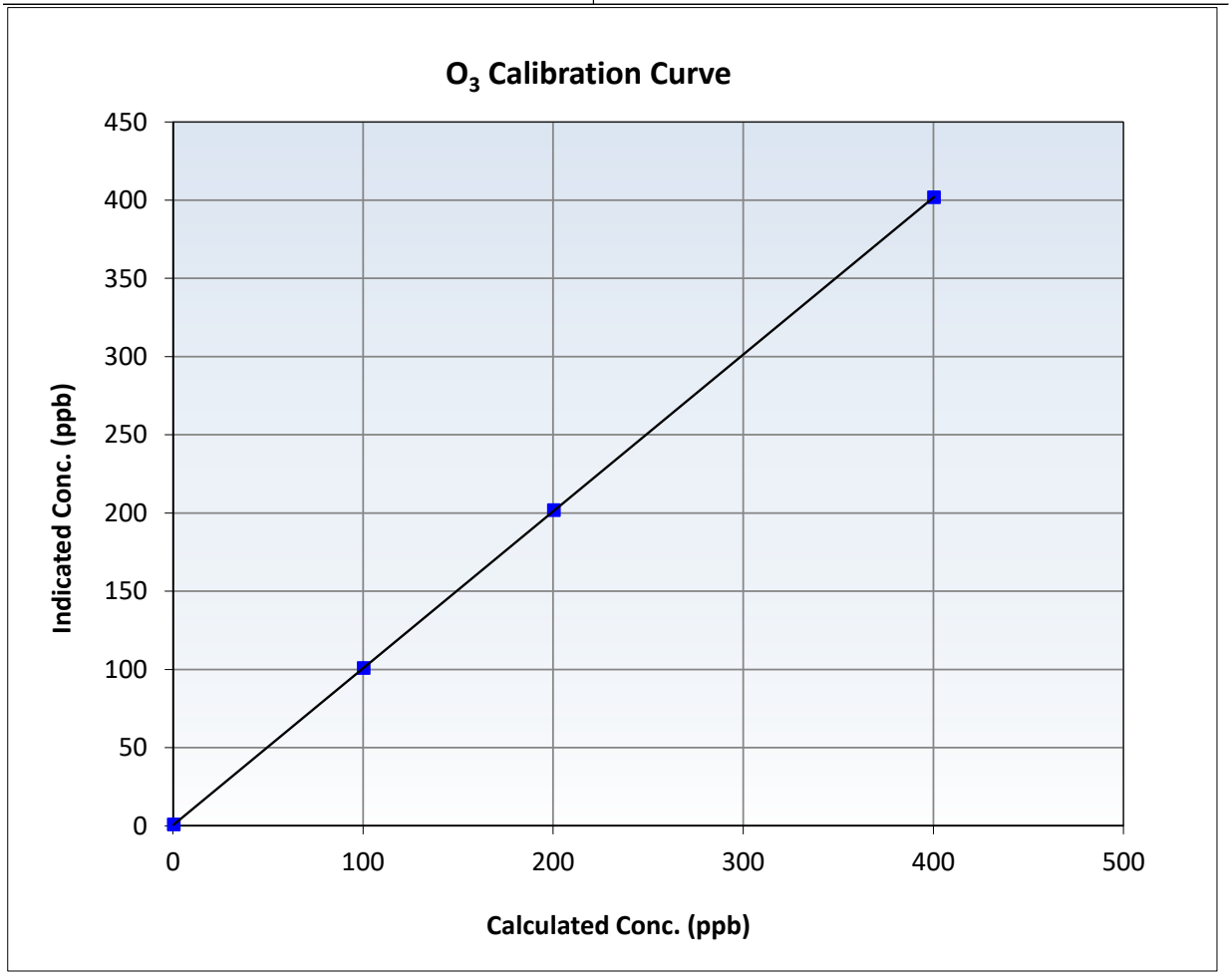
O_3 Calibration Summary

Station Information

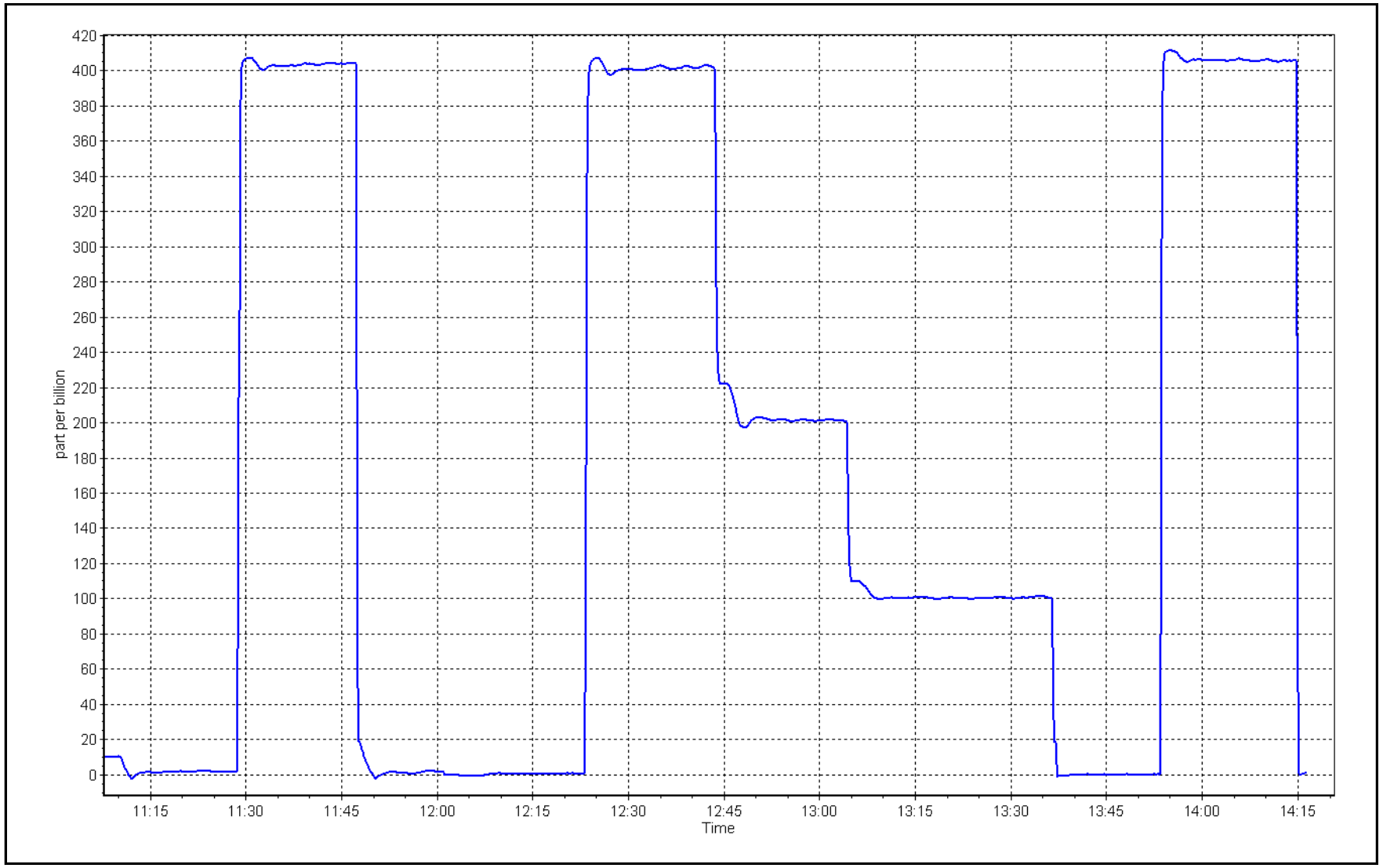
Calibration Date:	November 1, 2024	Previous Calibration:	October 1, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	11:08	End Time (MST):	14:15
Analyzer make:	Teledyne API T400	Analyzer serial #:	1107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.4	----	Correlation Coefficient	0.999997	*≥0.995*
400.0	401.5	0.9963	Slope	1.003114	*0.90 - 1.10*
200.0	201.4	0.9930			
100.0	100.4	0.9960	Intercept	0.380000	*+/- 5*



O_3 Calibration Plot Date: November 1, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	November 15, 2024	Last Cal Date:	October 24, 2024
Start time (MST):	13:22	End time (MST):	14:50
Analyzer Make:	Teledyne API T640	S/N:	322
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388752
Temp/RH standard:	Alicat FP-25BT	S/N:	388752

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-2	-2.6	-2	☐	+/- 2 °C
P (mmHg)	731.9	734.08	731.9	☐	+/- 10 mmHg
Flow (LPM)	5.01	4.971	5.01	☐	+/- 0.25 LPM
PW% (pump)	39		39	☐	>80%
Zero Verification	PM w/o HEPA:	7.1	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 24, 2024

Date Disposable Filter Changed: October 24, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 24, 2024

Date RH/T Sensor Cleaned: October 24, 2024

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

Calibration by: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 4, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	10:46	End time (MST):	14:00
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3,040	ppm	Cal Gas Exp Date:	December 1, 2028
Cal Gas Cylinder #:	ALM042207			
Removed Cal Gas Conc:	3,040	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
ZAG Make/Model:	Teledyne API T701		Serial Number:	4766

Analyzer Information

Analyzer make:	Teledyne API T300		Analyzer serial #:	3520	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998242	1.002581	Backgd or Offset:	-0.014	-0.014
Calibration intercept:	0.183817	0.161850	Coeff or Slope:	0.990	0.990

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4933	66.7	40.6	41.0	0.993
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.83	Prev response:	40.67	*% 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	

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4933	66.7	40.6	40.7	0.997
Mid point	4966	33.3	20.2	20.8	0.975
Low point	4983	16.7	10.2	10.3	0.984
As left zero	5000	0.0	0.0	0.0	----
As left span	2960	40.0	40.5	40.3	1.006
				Average Correction Factor	0.985

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO Calibration Summary

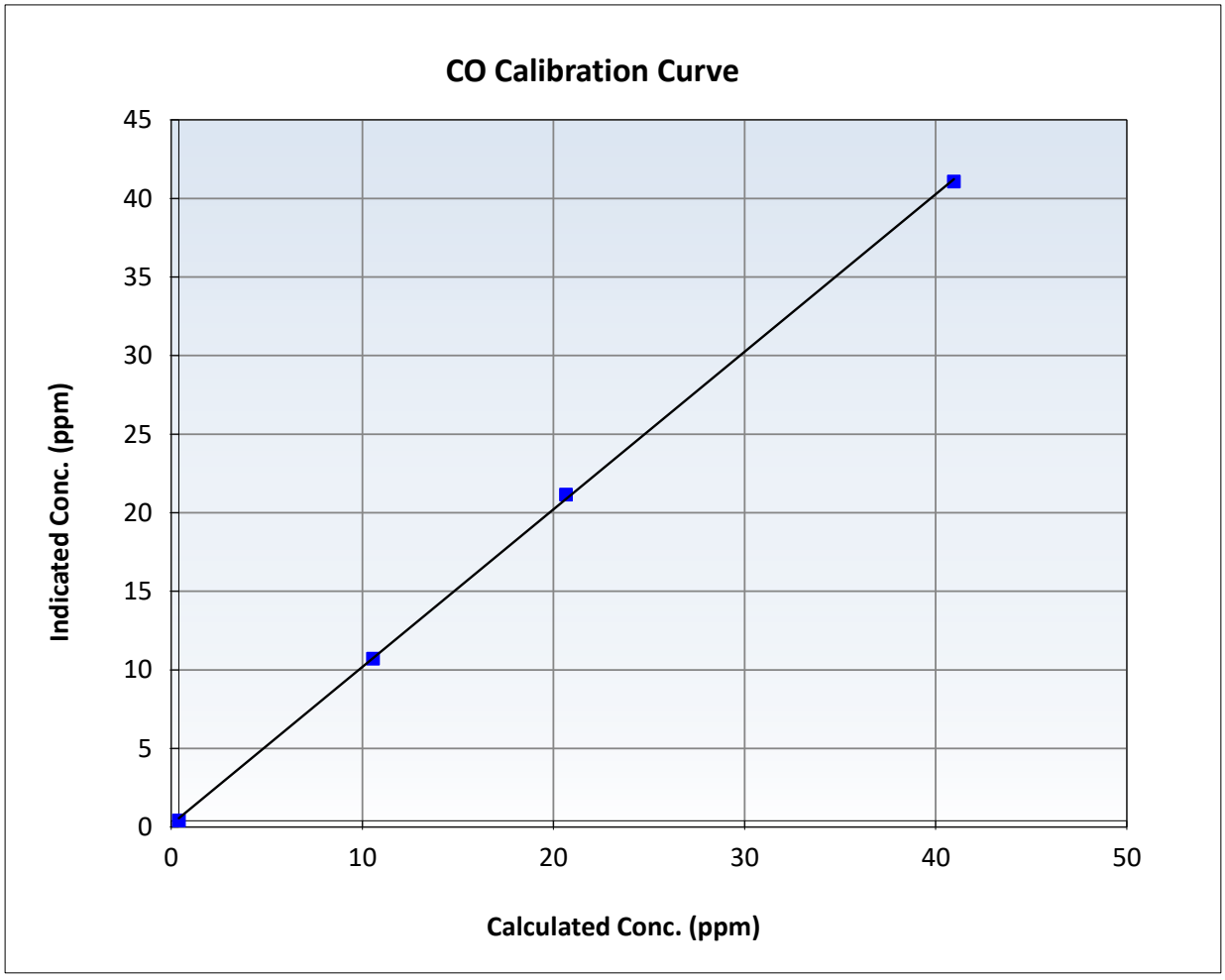
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 3, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	10:46	End Time (MST):	14:00
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

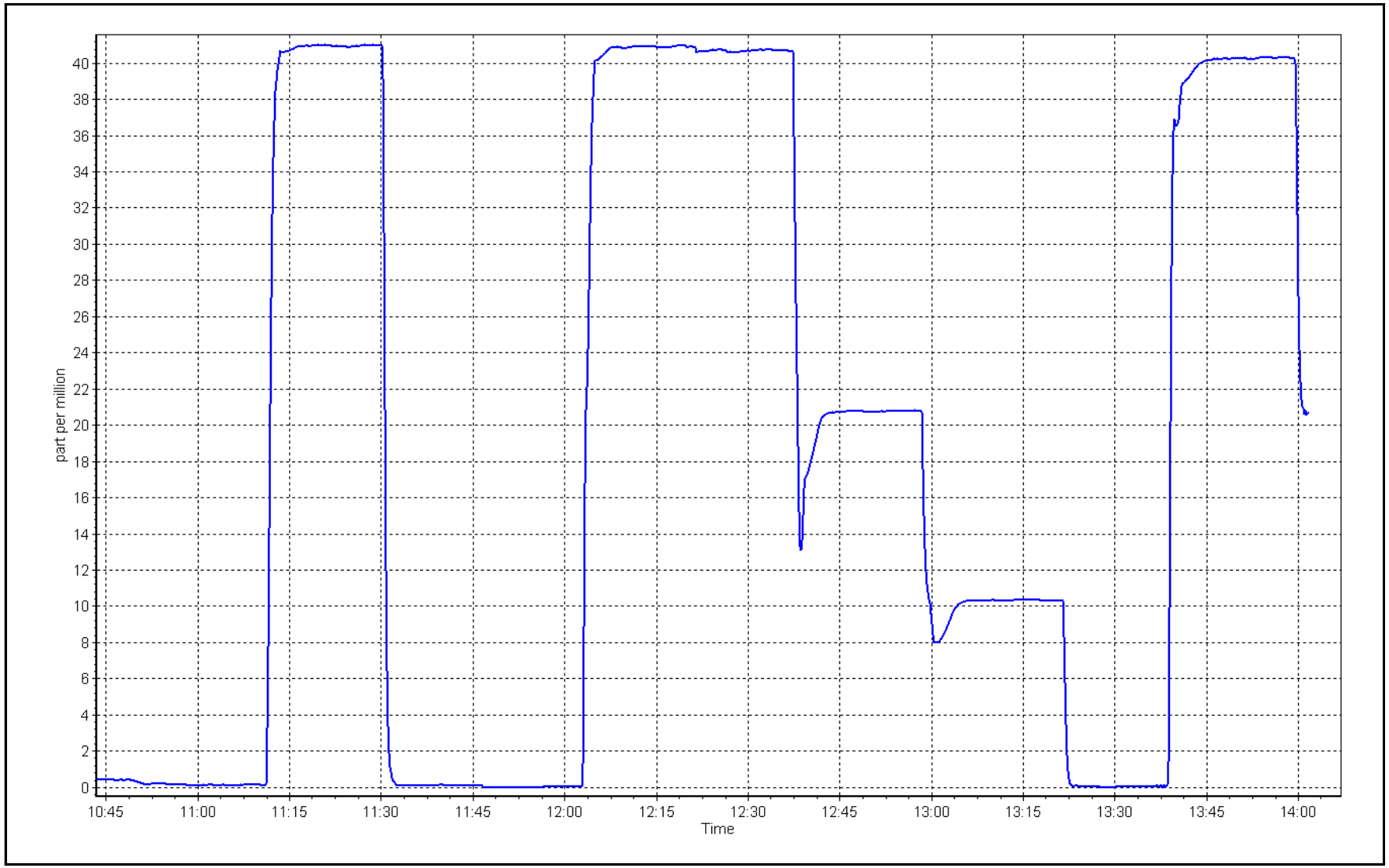
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.6	40.7	0.9970
20.2	20.8	0.9754
10.2	10.3	0.9839

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999860	*≥0.995*
Slope	1.002581	*0.90 - 1.10*
Intercept	0.161850	*+/-1.5*



CO Calibration Plot Date: November 4, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
Calibration Date:	November 12, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	10:55	End time (MST):	14:01
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	60,200	ppm	Cal Gas Exp Date:	December 1, 2028
Cal Gas Cylinder #:	ALM042207			
Removed Cal Gas Conc:	60,200	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565
N2 Gen Make/Model:	Peak Scientific		Serial Number:	7220900034

Analyzer Information

Analyzer make:	Teledyne API 360		Analyzer serial #:	442	
Analyzer Range	0 - 2,000 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998614	0.998806	Backgd or Offset:	0.002	0.002
Calibration intercept:	-2.160000	-1.320000	Coeff or Slope:	0.911	0.911

CO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	3000	0.0	0.0	0.2	----
As found High Point	2920	80.0	1605.3	1606.4	0.999
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1606.2	Prev response:	1600.9	*% 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	

CO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	3000	0.0	0.0	0.5	----
High point	2920	80.0	1605.3	1605.0	1.000
Mid point	2960	40.0	802.7	793.5	1.012
Low point	2980	20.0	401.3	401.7	0.999
As left zero	3000	0.0	0.0	-2.7	----
As left span	2960	40.0	802.7	783.4	1.025
				Average Correction Factor	1.004

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

CO_2 Calibration Summary

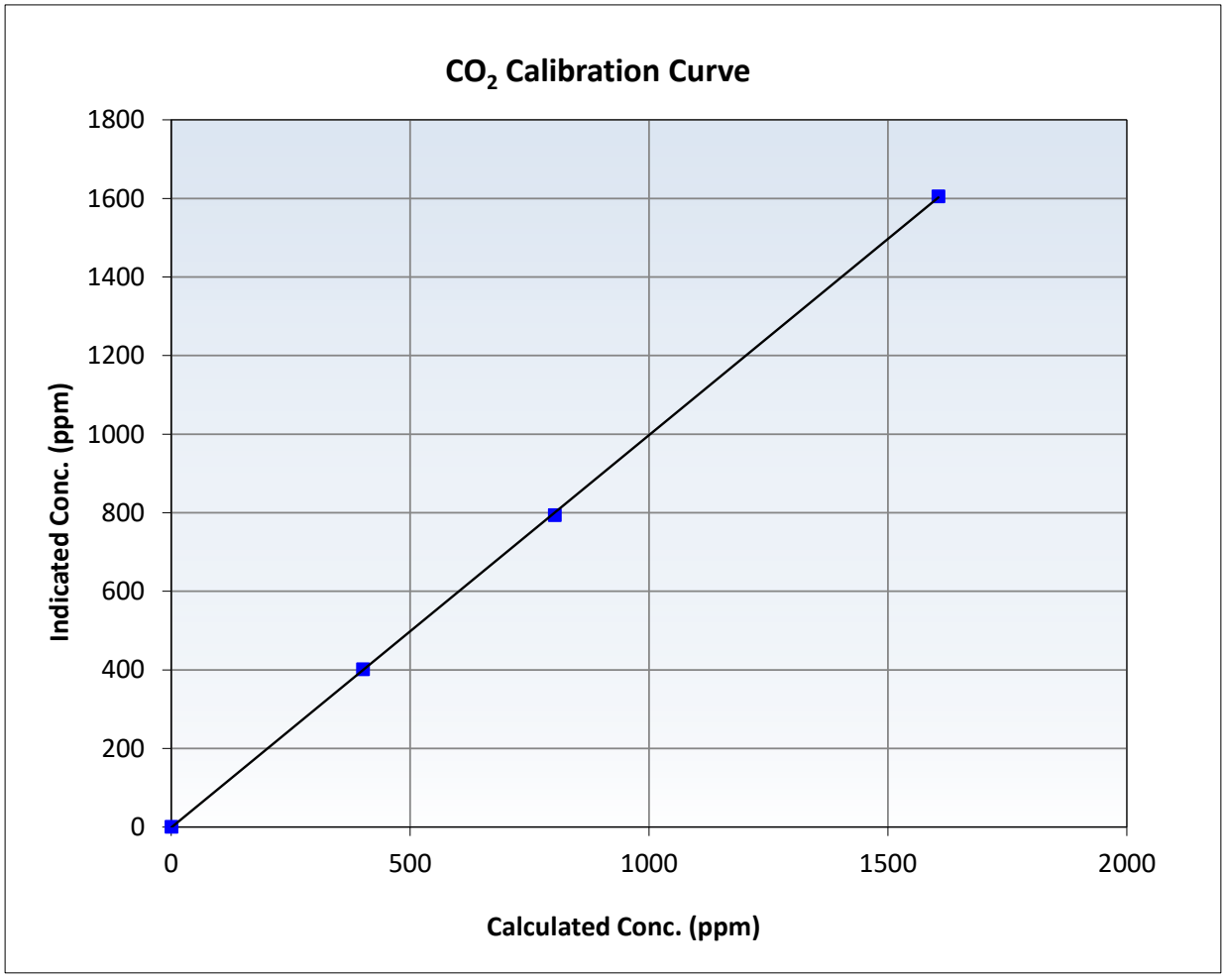
Station Information

Calibration Date	November 12, 2024	Previous Calibration	October 9, 2024
Station Name	Bertha Ganter-Fort McKay	Station Number	AMS 01
Start Time (MST)	10:55	End Time (MST)	14:01
Analyzer make	Teledyne API 360	Analyzer serial #	442

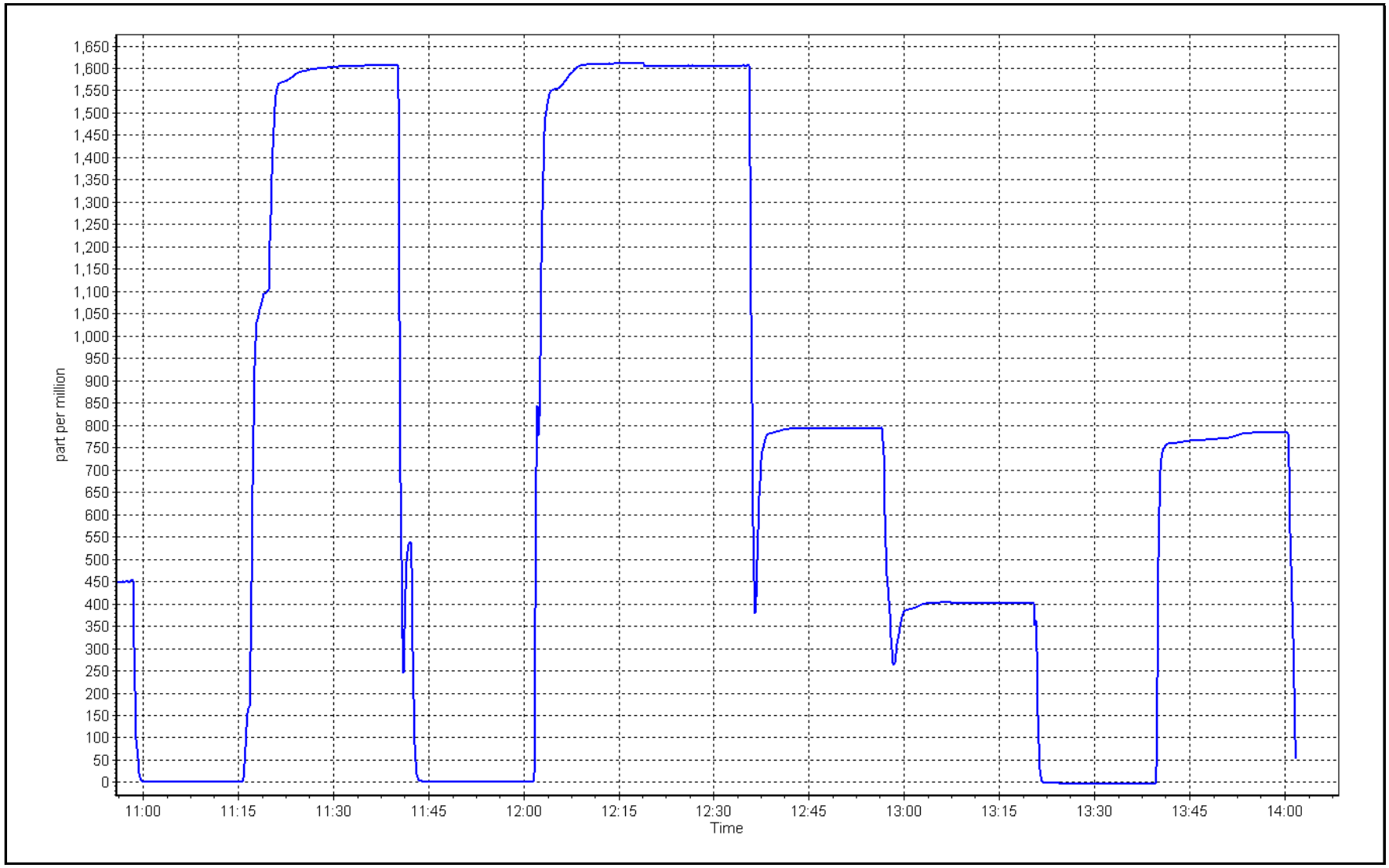
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
1605.3	1605.0	1.0002
802.7	793.5	1.0116
401.3	401.7	0.9991

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999955	*≥0.995*
Slope	0.998806	*0.90 - 1.10*
Intercept	-1.3	*+/-20*



CO_2 Calibration Plot Date: November 12, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Bertha Ganter-Fort McKay	Station number:	AMS 01
NOX Cal Date:	November 19, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	12:24	End time (MST):	16:48
NH3 Cal Date:	November 20, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	12:10	End time (MST):	15:25
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer model:	API T201		Analyzer serial #:	475
Converter model:	API T501		Converter serial #:	824
NH3 Range (ppb):	0 - 2000 ppb		Reaction cell Press:	11.00
NOX Range (ppb):	0 - 1000 ppb		Sample Flow:	524
	Start	***Finish***		***Start***	***Finish***
NO coefficient:	0.853	0.838	Nt coefficient:	0.868	0.851
NOX coefficient:	0.861	0.844	NO bkgrnd:	-0.9	-0.9
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	-0.3	-0.3
NH3 coefficient:	0.946	0.946	Nt bkgrnd:	1.2	1.2

Calibration Statistics

	Start	***Finish***
NO_X Cal Slope:	1.000182	0.999769
NO_X Cal Offset:	-1.940000	-2.020000
NO Cal Slope:	0.999063	0.997664
NO Cal Offset:	-3.140000	-2.300000
NO_2 Cal Slope:	1.004253	0.996402
NO_2 Cal Offset:	0.178447	-0.671037
NH3 Cal Slope:	0.998949	1.003838
NH3 Cal Offset:	-4.233668	-5.989321
Nt Cal Slope:	1.002194	1.006936
Nt Cal Offset:	-4.533867	-6.268143

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

NOx / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NOx Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*	Baseline corr NO Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*
As found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.4	-0.8	----	----
As found span	4932	67.6	803.1	800.4	803.1	820.8	809.6	823.1	0.9784	0.9886
AF GPT span	4932	67.6	803.1	-----	803.1	798.6	-----	802.0	1.0056	-----
new NO cyl rp										

Baseline Corr As Fd	Nt =	823.9 ppb	NO_X =	821.3 ppb	NO =	810.0 ppb	
Previous Response	Nt =	800.32 ppb	NO_X =	801.3 ppb	NO =	796.5 ppb	
**NO_X Δ (NO to GPT response) =		-2.7%					

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

*Percent Change	$Nt_{(NO)}$ =	2.9%
*Percent Change	NO_X =	2.4%
*Percent Change	NO =	1.7%

* = > +/-5% change initiates investigation

NOx / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.8	----	----
High point	4932	67.6	803.1	800.4	803.1	802.0	797.3	801.8	1.0014	1.0039
Mid point	4966	33.8	401.5	400.2	401.5	397.5	395.6	399.8	1.0102	1.0116
Low point	4983	16.9	200.8	200.1	200.8	198.1	195.7	198.9	1.0135	1.0225
								Average Correction Factor	1.0083	1.0126

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Calibration zero	----	----	0.0	-0.2	----	----
High GPT point (400 ppb O3)	795.7	383.9	414.5	412.4	1.0051	99.5%
Mid GPT point (200 ppb O3)	795.7	589.5	208.9	207.8	1.0053	99.5%
Low GPT point (100 ppb O3)	795.7	691.4	107.0	105.1	1.0181	98.2%
				Average Correction Factor	1.0095	99.1%

Wood Buffalo Environmental Association
NH_3 - N_T Calibration Report

NH3 As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Baseline corr Nt Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*
As found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
AF High point	3418	82.2	1798.5	----	1798.5	1810.3	----	1805.2	0.993	0.996
AF Mid point							----			
AF Low point							----			
new NH3 cyl rp										

Baseline Corr As Fd Nt = 1810.6 ppb NH3 = 1805.2 ppb *Percent Change $Nt_{(NH3)}$ = 0.7%

Previous Response Nt = 1797.9 ppb NH3 = 1792.4 ppb * = > +/-5% change initiates investigation *Percent Change NH3 = 0.7%

NH3 Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Nt Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.6	-0.2	----	----
High point	3418	82.2	1798.5	----	1798.5	1810.3	----	1805.2	0.994	0.996
Mid point	3454	45.7	1000.0	----	1000.0	991.7	----	988.7	1.008	1.011
Low point	3477	22.8	498.9	----	498.9	494.0	----	492.4	1.010	1.013
								Average Correction Factor	1.0039	1.0070

NH3 Previous Converter Efficiency = 90.8 %

NH3 Current Converter Efficiency = 90.8 %

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

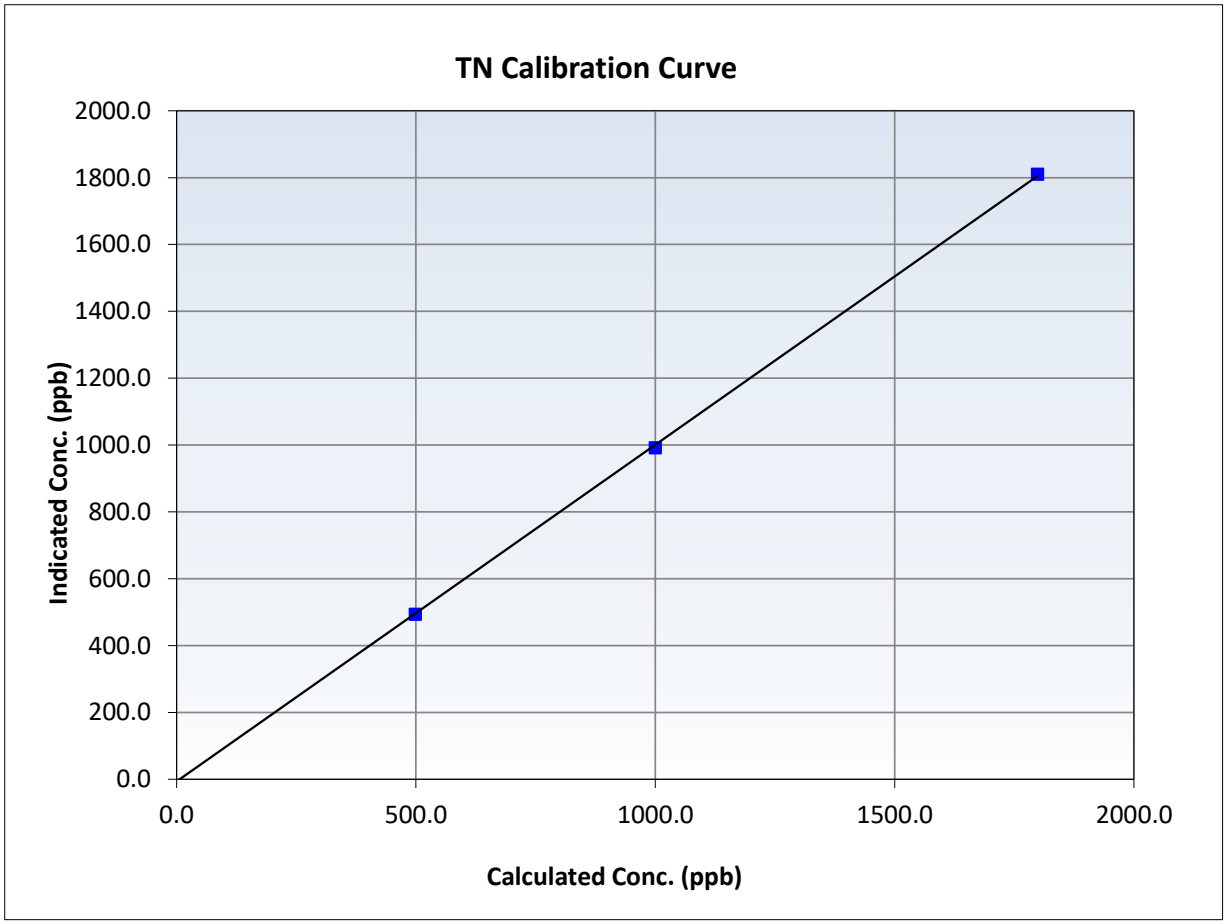
Nt Calibration Summary

Station Information

Calibration Date:	November 20, 2024	Previous Calibration:	October 17, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:24	End Time (MST):	16:48
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	-0.8	----	Correlation Coefficient	0.999919	≥0.995
1798.5	1810.3	0.9935	Slope	1.006936	0.90 - 1.10
1000.0	991.7	1.0084	Intercept	-6.268143	+/-20
498.9	494.0	1.0098			



Wood Buffalo Environmental Association

NH_3 Calibration Summary

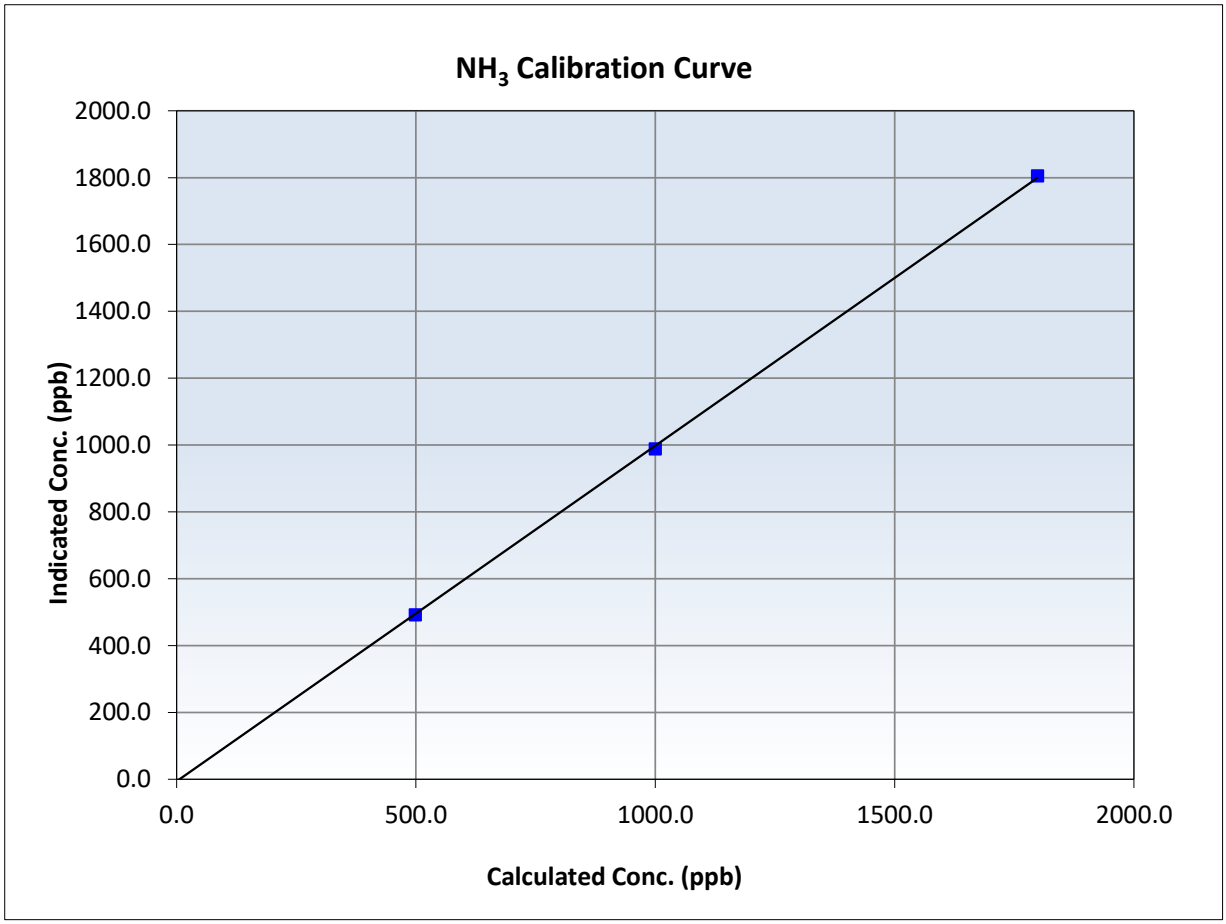
Station Information

Calibration Date:	November 20, 2024	Previous Calibration:	October 17, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:24	End Time (MST):	16:48
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
1798.5	1805.2	0.9963
1000.0	988.7	1.0114
498.9	492.4	1.0131

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999912	*≥0.995*
Slope	1.003838	*0.90 - 1.10*
Intercept	-5.989321	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

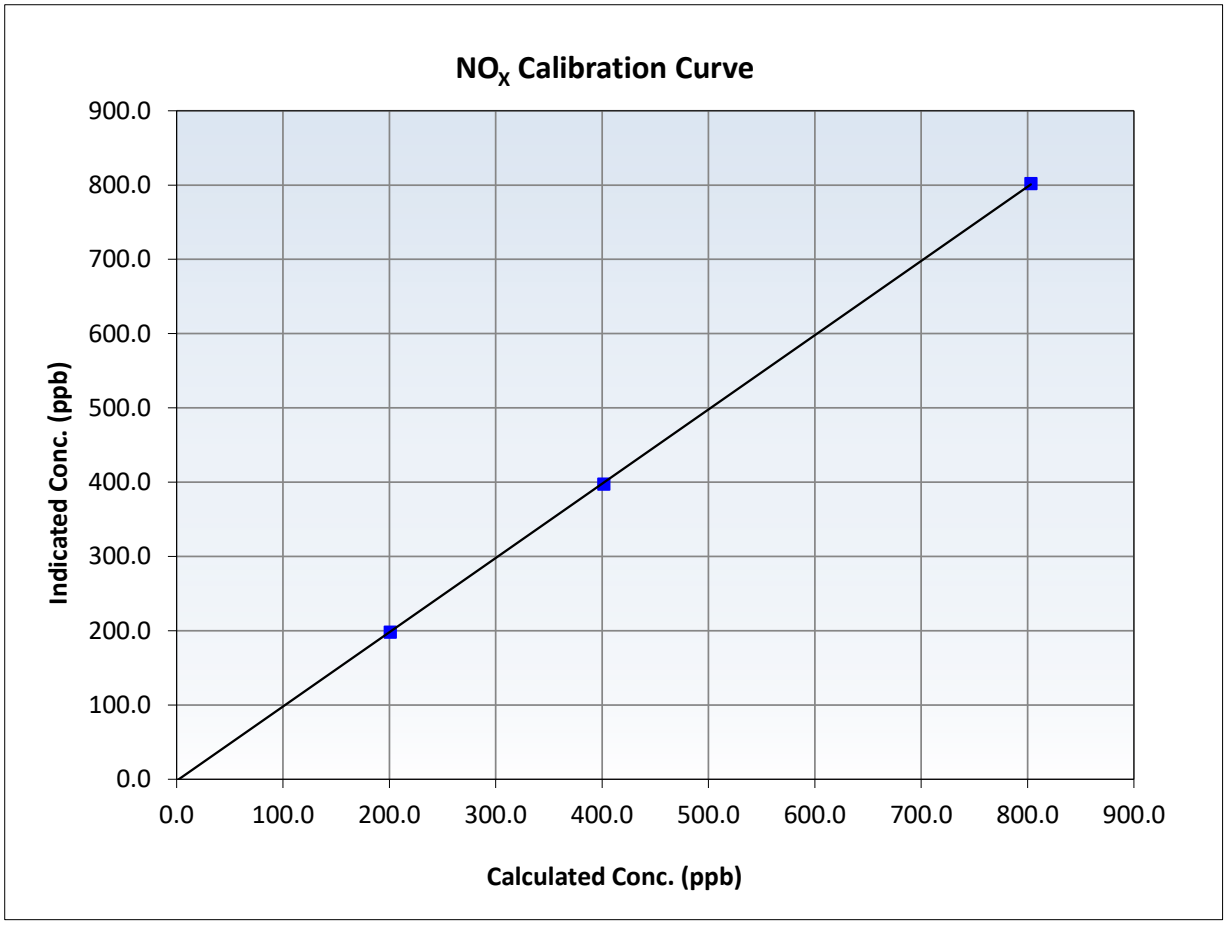
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 17, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:24	End Time (MST):	16:48
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.6	----
803.1	802.0	1.0014
401.5	397.5	1.0102
200.8	198.1	1.0135

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.999769	*0.90 - 1.10*
Intercept	-2.020000	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

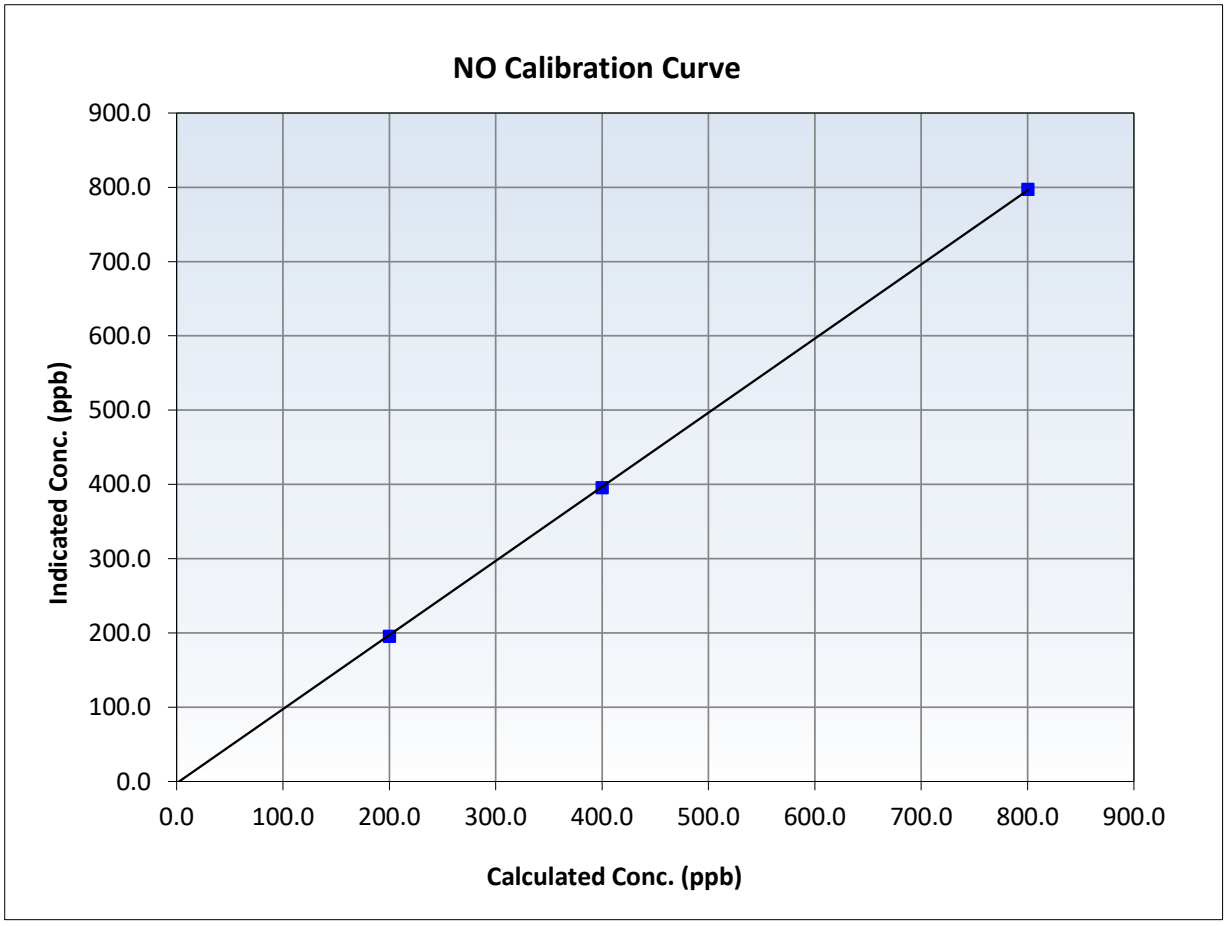
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 17, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:24	End Time (MST):	16:48
Analyzer make:	API T201	Analyzer serial #:	475

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
800.4	797.3	1.0039
400.2	395.6	1.0116
200.1	195.7	1.0225

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.997664	*0.90 - 1.10*
Intercept	-2.300000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

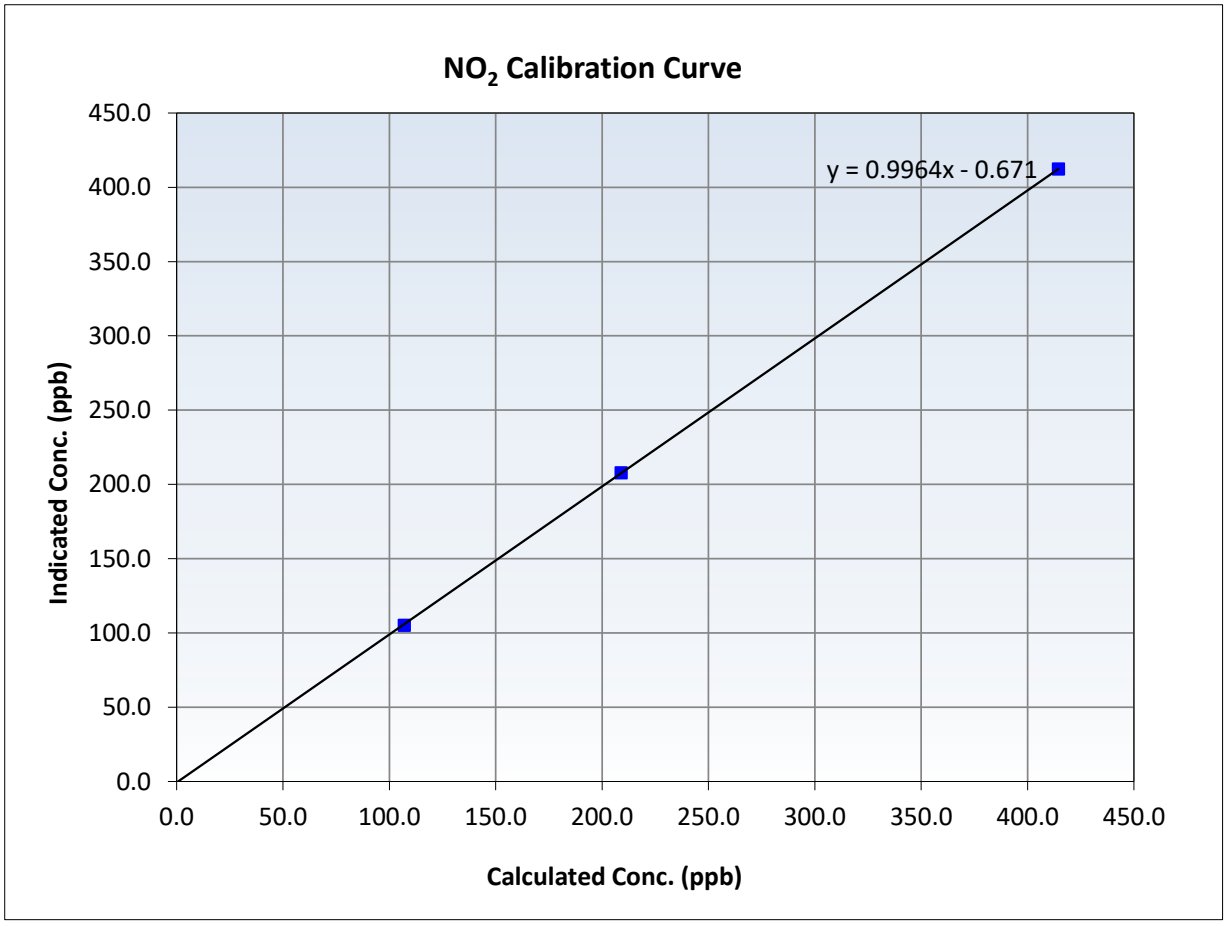
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 17, 2024
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS 01
Start Time (MST):	12:24	End Time (MST):	16:48
Analyzer make:	API T201	Analyzer serial #:	475

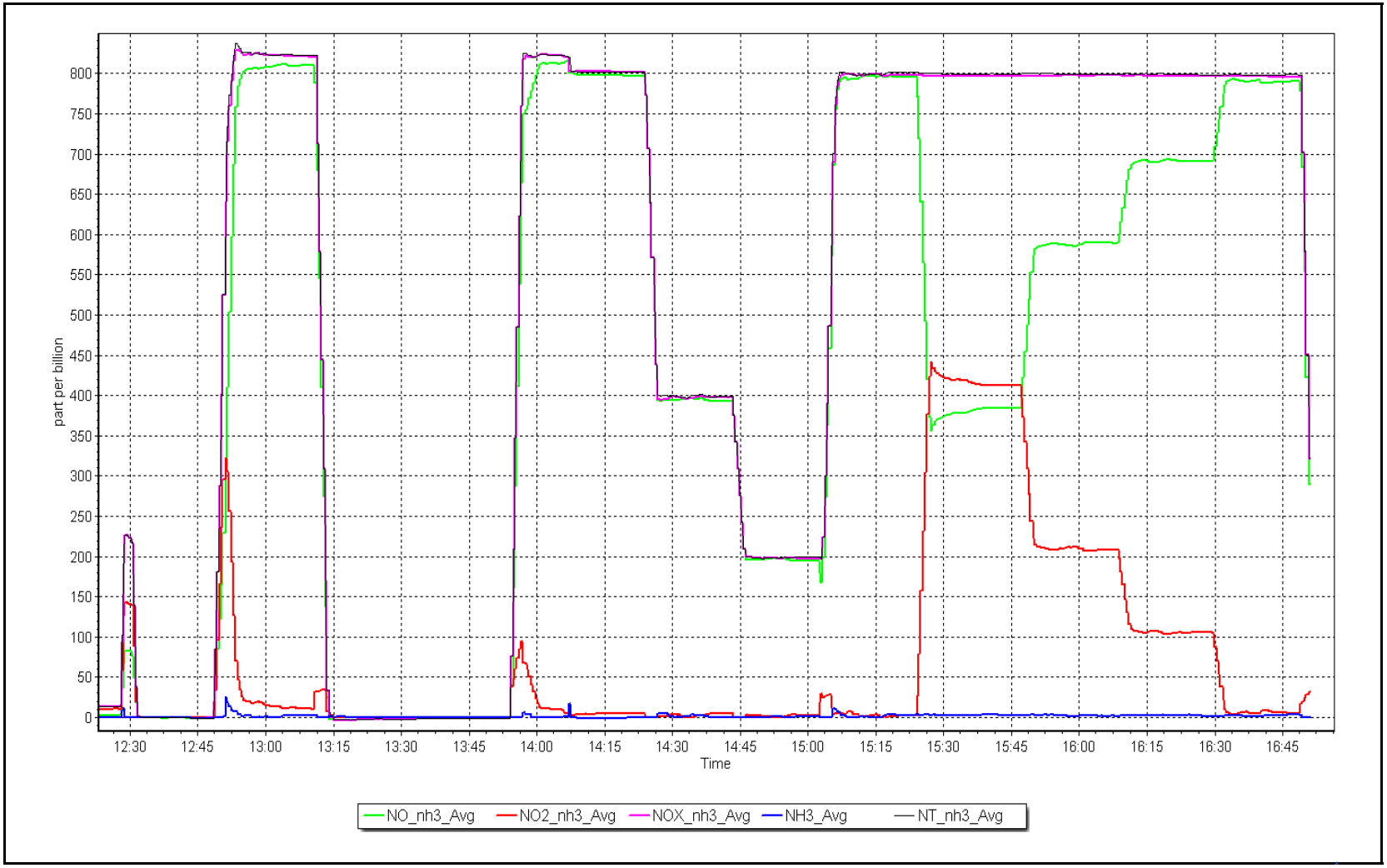
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
414.5	412.4	1.0051
208.9	207.8	1.0053
107.0	105.1	1.0181

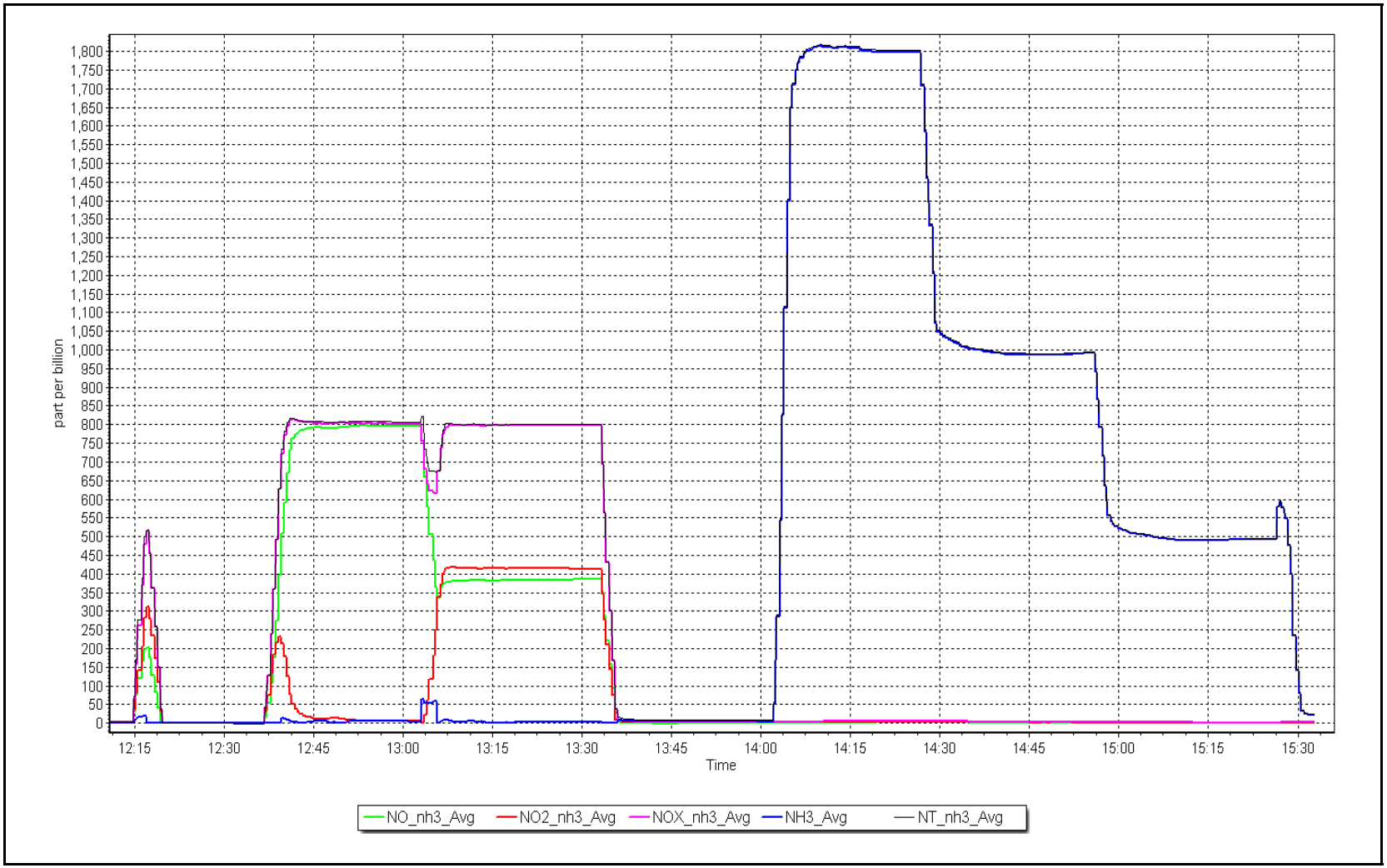
Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	0.996402	*0.90 - 1.10*
Intercept	-0.671037	*+/-20*



NO_X Calibration Plot Date: November 19, 2024 Location: Bertha Ganter-Fort McKay



NH_3 Calibration Plot Date: November 20, 2024 Location: Bertha Ganter-Fort McKay



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Fort McKay - Bertha Ganter	Station Number:	AMS 01
Calibration Date:	November 29, 2024	Prev Cal Date:	October 9, 2024
Start Time (MST):	14:42	End Time (MST):	15:04
Tower Height (m):	10.0	Reason:	Removal

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	P10041
WS Calibrator:	MetOne 053	Serial Number:	

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

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999999		*≥0.9995*
Calculated slope	0.999594		*0.90 - 1.10*
Calculated intercept	-0.028293		*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	R14655
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):		Calc Declination*:	13.74 Degrees
Deadband calc:	-0.2 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	0.1	---
90	91.3	0.4%
180	180.7	0.2%
270	271.4	0.4%
357	357.3	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999997	0.999992	*≥0.9995*
Calculated slope	1.003199	0.999471	*0.90 - 1.10*
Calculated intercept	-1.004699	-0.670725	*+/- 4*

Notes: Sensor removed due to frost build-up.

Calibration Performed By: Aswin Sasi Kumar/ Devin Russell

Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Fort McKay - Bertha Ganter	Station Number:	AMS 01
Calibration Date:	November 29, 2024	Prev Cal Date:	October 9, 2024
Start Time (MST):	14:42	End Time (MST):	15:15
Tower Height (m):	10.0	Reason:	Install

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	P10041
WS Calibrator:	MetOne 053	Serial Number:	

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

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999999		*≥0.9995*
Calculated slope	0.999594		*0.90 - 1.10*
Calculated intercept	-0.028293		*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	X16495
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):		Calc Declination*:	13.74 Degrees
Deadband calc:	5.3 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	0.1	---
90	92.5	0.7%
180	180.4	0.1%
270	269.8	-0.1%
350	351.8	0.5%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999997	0.999965	*≥0.9995*
Calculated slope	1.003199	0.999208	*0.90 - 1.10*
Calculated intercept	-1.004699	-0.776280	*+/- 4*

Notes: Sensor install.

Calibration Performed By: Aswin Sasi Kumar/ Devin Russell

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS02
MILDRED LAKE
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	November 4, 2024	Last Cal Date:	October 1, 2024
Start time (MST):	11:43	End time (MST):	14:47
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	JC1404901075	
Analyzer Range:	0-1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997180	0.999445	Backgd or Offset:	18.7	18.9
Calibration intercept:	-0.485823	-0.705190	Coeff or Slope:	0.768	0.776

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	801.6	790.3	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.4	Previous response	798.9	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.2	801.6	801.0	1.001
Mid point	4960	40.1	400.8	399.1	1.004
Low point	4980	20.0	199.9	198.7	1.006
As left zero	5000	0.0	0.0	-0.2	----
As left span	4920	80.2	801.6	798.7	1.004
				Average Correction Factor:	1.004

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

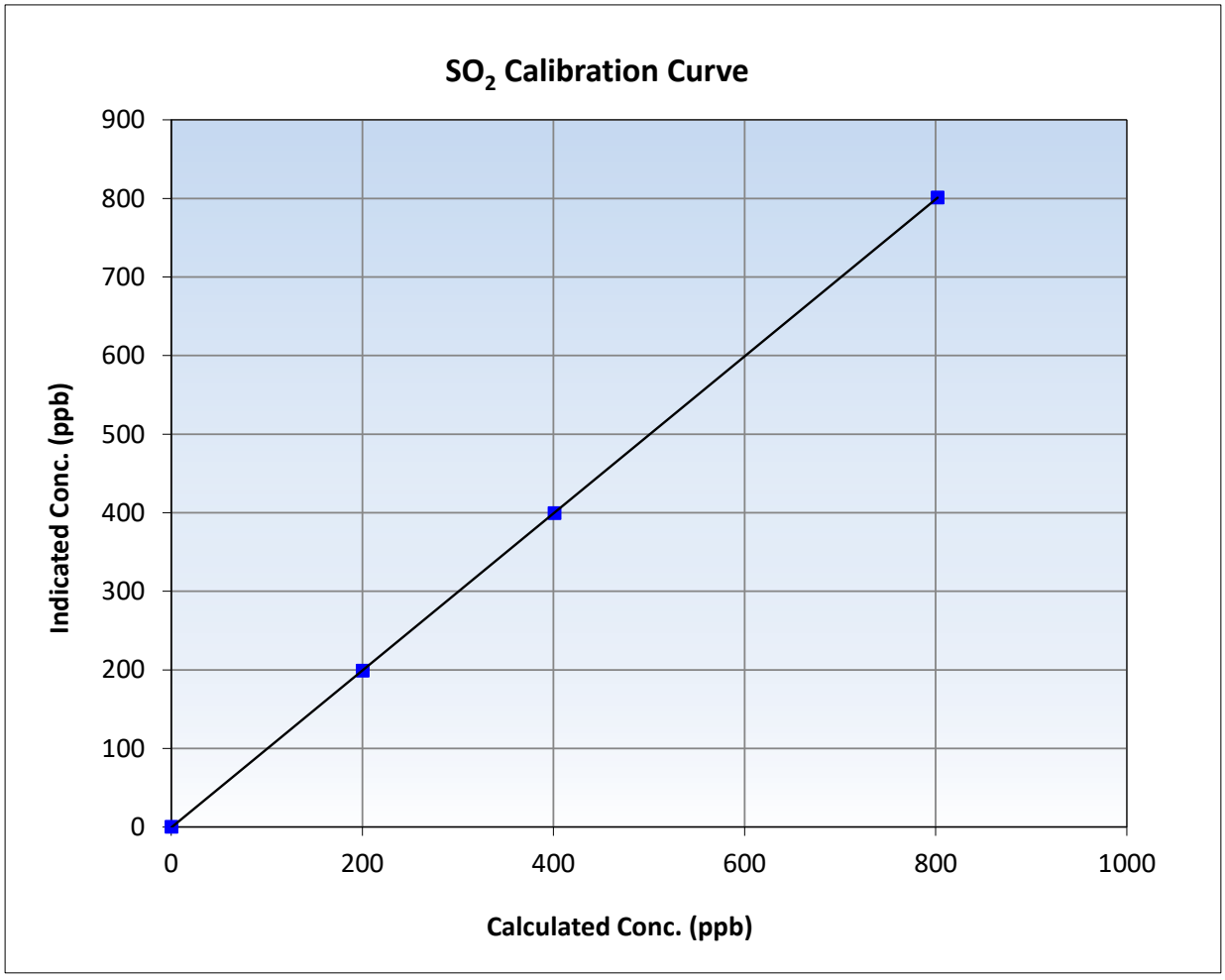
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 1, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	11:43	End Time (MST):	14:47
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

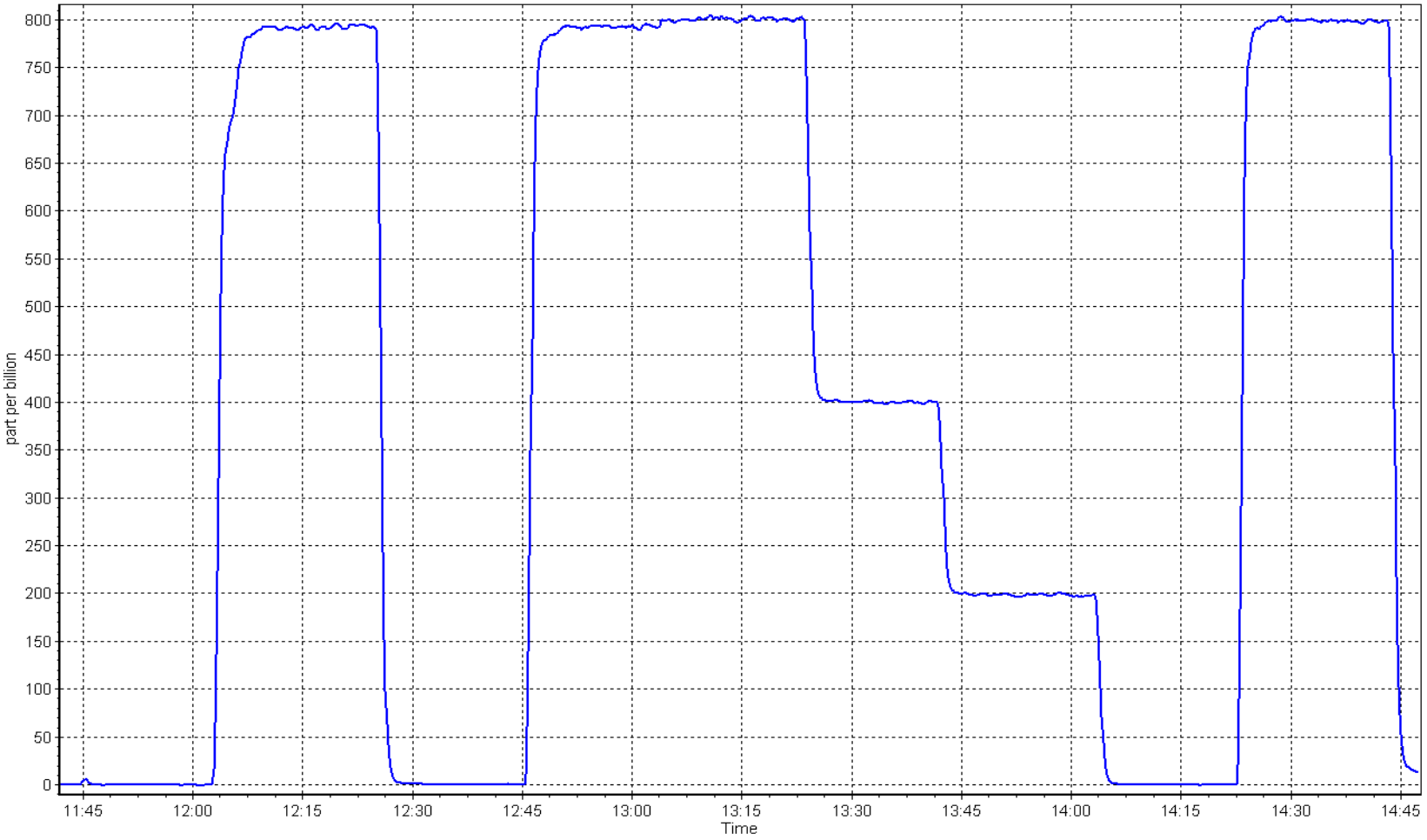
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
801.6	801.0	1.0008
400.8	399.1	1.0043
199.9	198.7	1.0061

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	0.999445	*0.90 - 1.10*
Intercept	-0.705190	*+/-30*



SO2 Calibration Plot Date: November 4, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	November 21, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	10:53	End time (MST):	15:45
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12333331546
Converter make:	Global G150		Converter serial #:	2023-267
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.990678	0.998678	Backgd or Offset:	1.17	1.46
Calibration intercept:	0.080793	-0.099199	Coeff or Slope:	1.007	1.007

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.2	----
As found High point	4924	75.6	80.0	79.7	1.006
As found Mid point	4962	37.8	40.0	39.9	1.007
As found Low point	4981	18.9	20.0	19.7	1.025
New cylinder response					

Baseline Corr As found:	79.5	Prev response:	79.33	*% change:	0.2%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.995392	AF Intercept:	0.040794
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999974	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4924	75.6	80.0	79.7	1.004
Mid point	4962	37.8	40.0	40.1	0.997
Low point	4981	18.9	20.0	19.7	1.015
As left zero	5000	0.0	0.0	0.0	----
As left span	4924	75.6	80.0	79.9	1.001
SO2 Scrubber Check	4920	80.2	802.0	0.1	----

Date of last scrubber change:	July 16, 2024	Ave Corr Factor	1.005
Date of last converter efficiency test:	NA		

Notes: Changed sample inlet filter after as founds. SOX scrubber test done after as founds, no issue. Adjusted zero.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

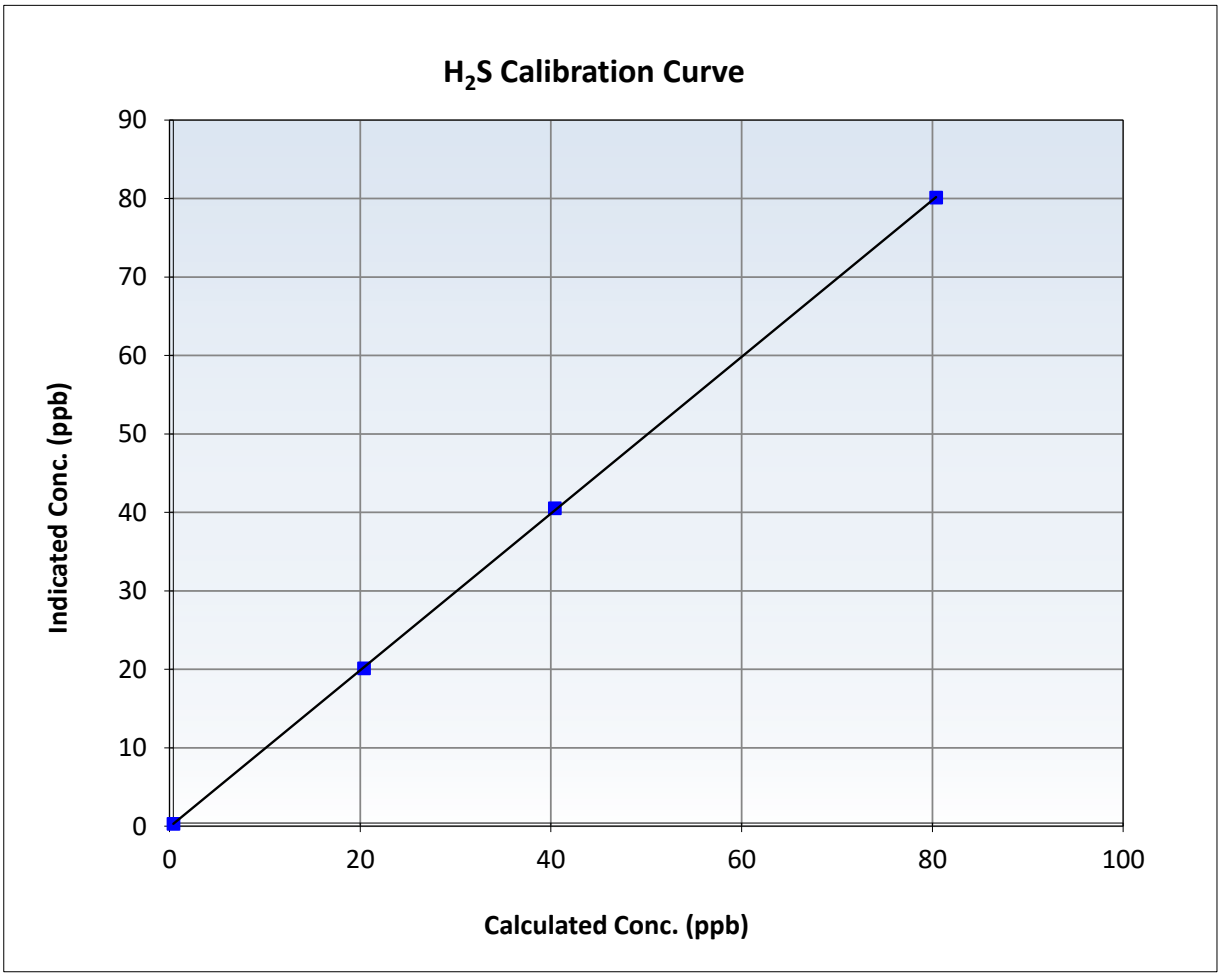
H2S Calibration Summary

Station Information

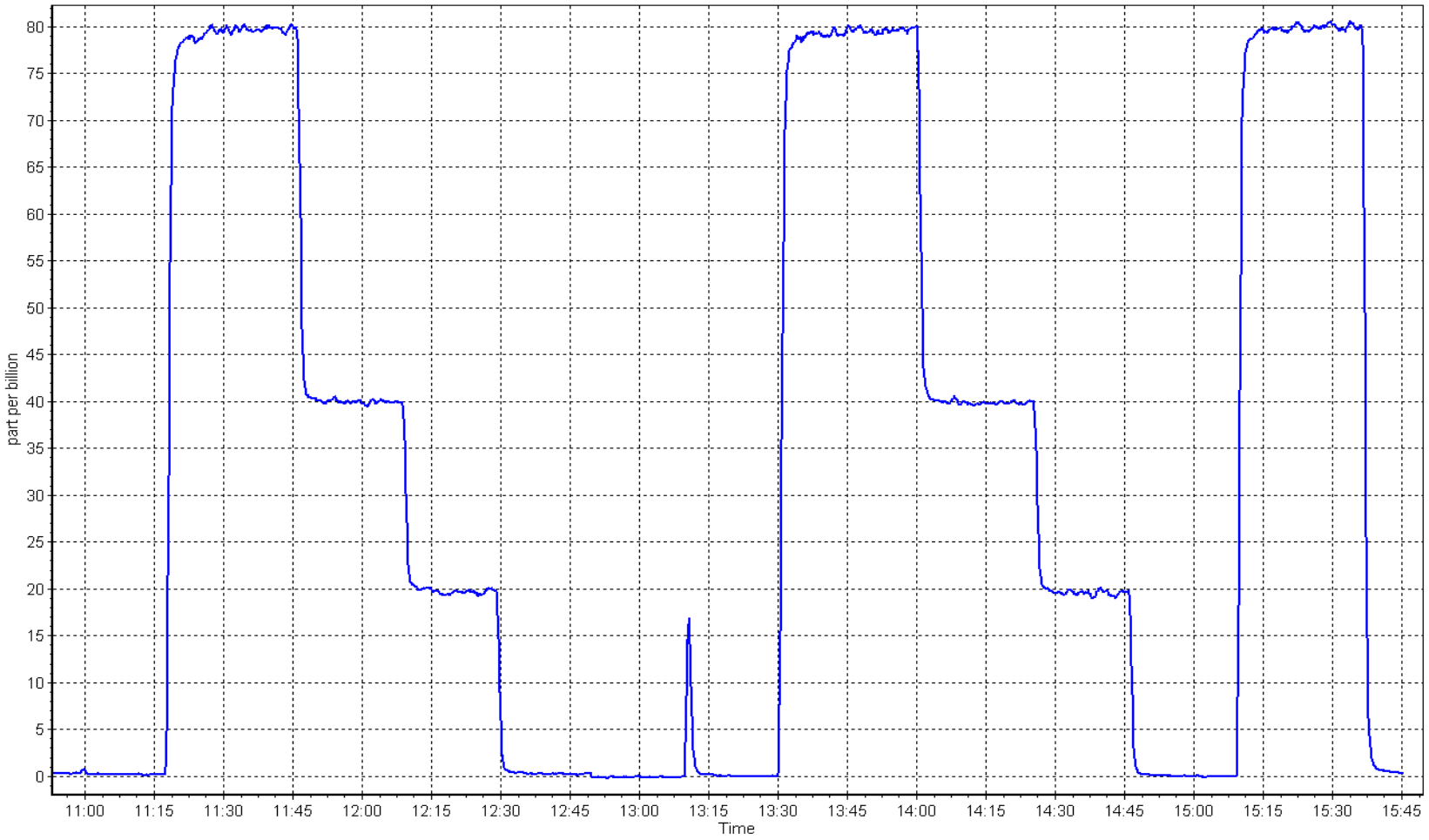
Calibration Date:	November 21, 2024	Previous Calibration:	October 18, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	10:53	End Time (MST):	15:45
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331546

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999970	*≥0.995*
80.0	79.7	1.0037	Slope	0.998678	*0.90 - 1.10*
40.0	40.1	0.9974			
20.0	19.7	1.0151	Intercept	-0.099199	*+/-3*



H2S Calibration Plot Date: November 21, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	November 4, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	11:43	End time (MST):	14:47
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.61E-04	2.60E-04	NMHC SP Ratio:	6.64E-05	6.85E-05
CH4 Retention time:	14.8	14.6	NMHC Peak Area:	132465	128504
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	16.25	1.035
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.25	Prev response	16.77	*% change	-3.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	
High point	4920	80.2	16.82	16.90	0.995
Mid point	4960	40.1	8.41	8.38	1.003
Low point	4980	20.0	4.19	4.16	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	16.84	0.999
				Average Correction Factor	1.003

Notes: Calibrated due to CH4 dips seen during sampling. Adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.80	8.57	1.026
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.57	Prev response	8.75	*% change	-2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.80	8.78	1.002
Mid point	4960	40.1	4.40	4.37	1.006
Low point	4980	20.0	2.19	2.16	1.017
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.86	0.993
				Average Correction Factor	1.008

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.02	7.69	1.044
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.69	Prev response	8.02	*% change	-4.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.02	8.13	0.987
Mid point	4960	40.1	4.01	4.01	1.001
Low point	4980	20.0	2.00	2.00	1.000
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.02	7.98	1.005
				Average Correction Factor	0.996

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.997492	1.005571
THC Cal Offset:	-0.001923	-0.037095
CH4 Cal Slope:	0.999757	1.013671
CH4 Cal Offset:	0.001551	-0.022023
NMHC Cal Slope:	0.995414	0.999351
NMHC Cal Offset:	-0.003674	-0.017070

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

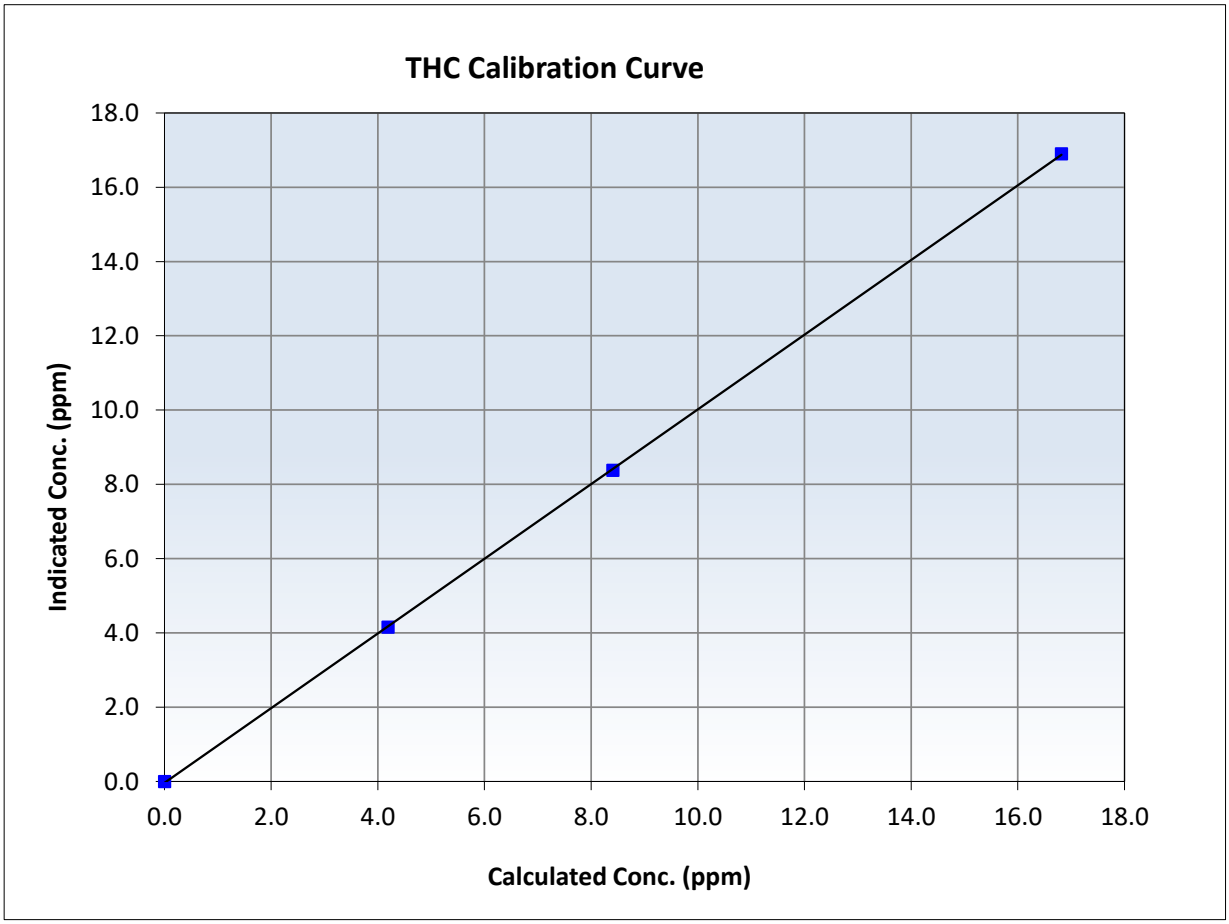
THC Calibration Summary

Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	11:43	End Time (MST):	14:47
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	0.999974	≥0.995
16.82	16.90	0.9952	Slope	1.005571	0.90 - 1.10
8.41	8.38	1.0035			
4.19	4.16	1.0089	Intercept	-0.037095	+/-0.5



Wood Buffalo Environmental Association

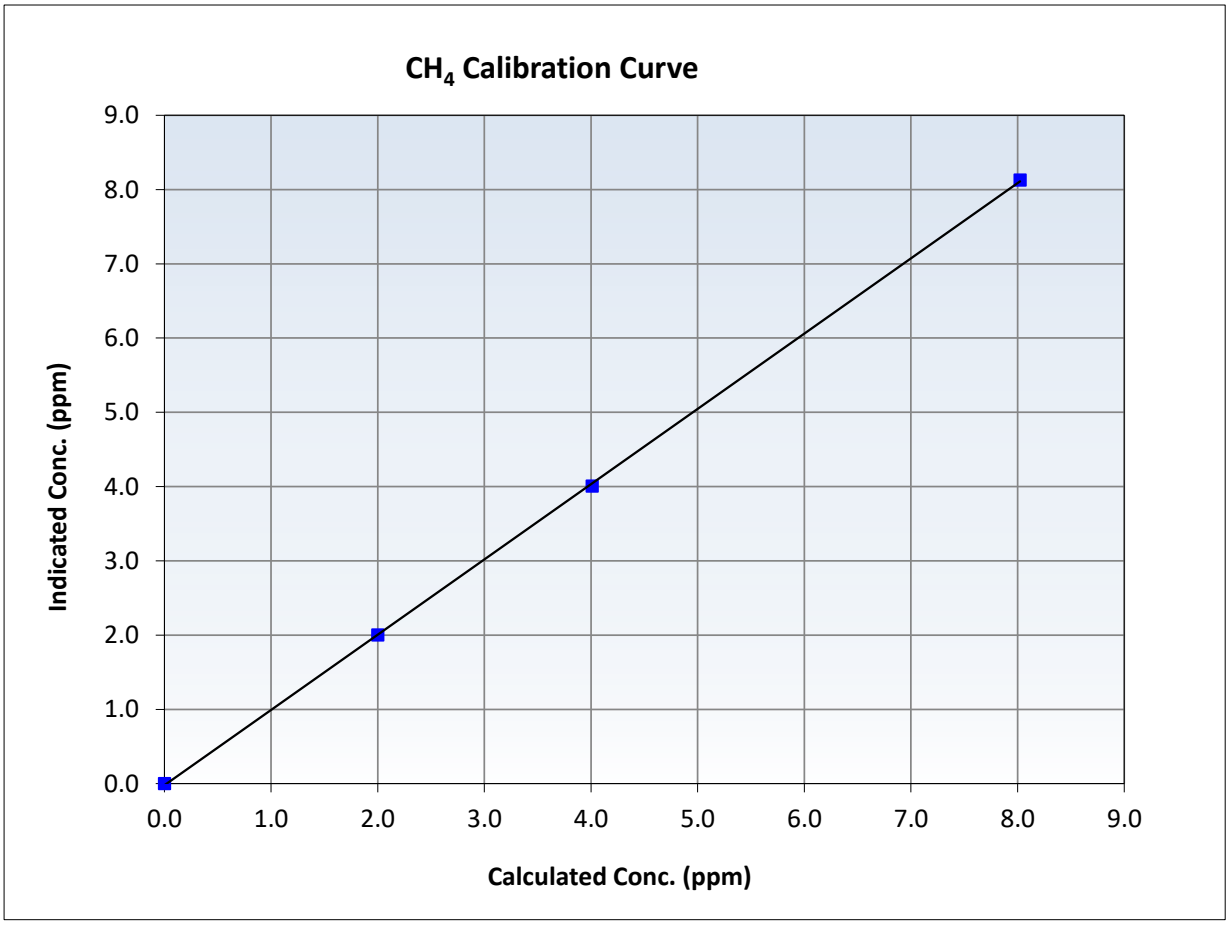
CH_4 Calibration Summary

Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	11:43	End Time (MST):	14:47
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	0.999939	≥0.995
8.02	8.13	0.9868	Slope	1.013671	0.90 - 1.10
4.01	4.01	1.0009	Intercept	-0.022023	+/-0.5
2.00	2.00	0.9999			



Wood Buffalo Environmental Association

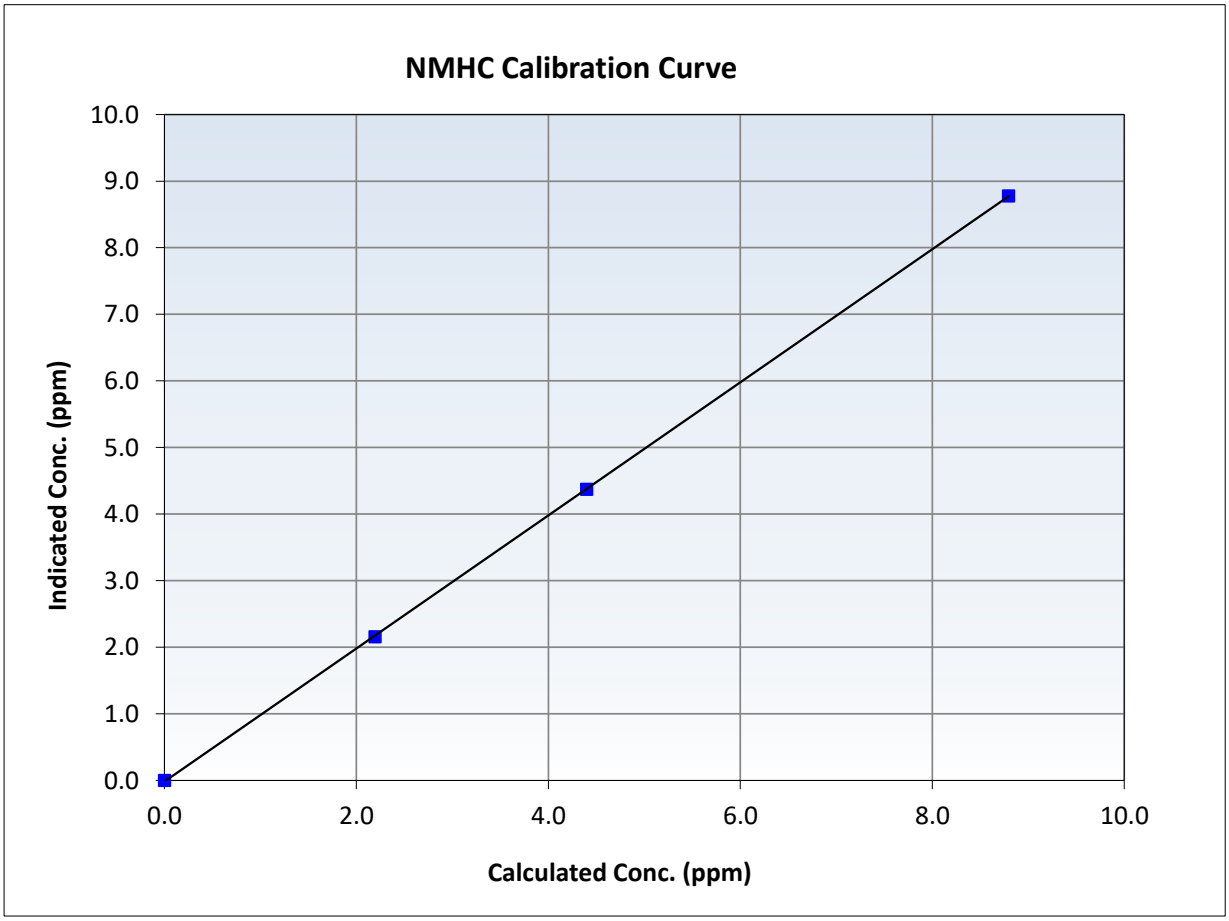
NMHC Calibration Summary

Station Information

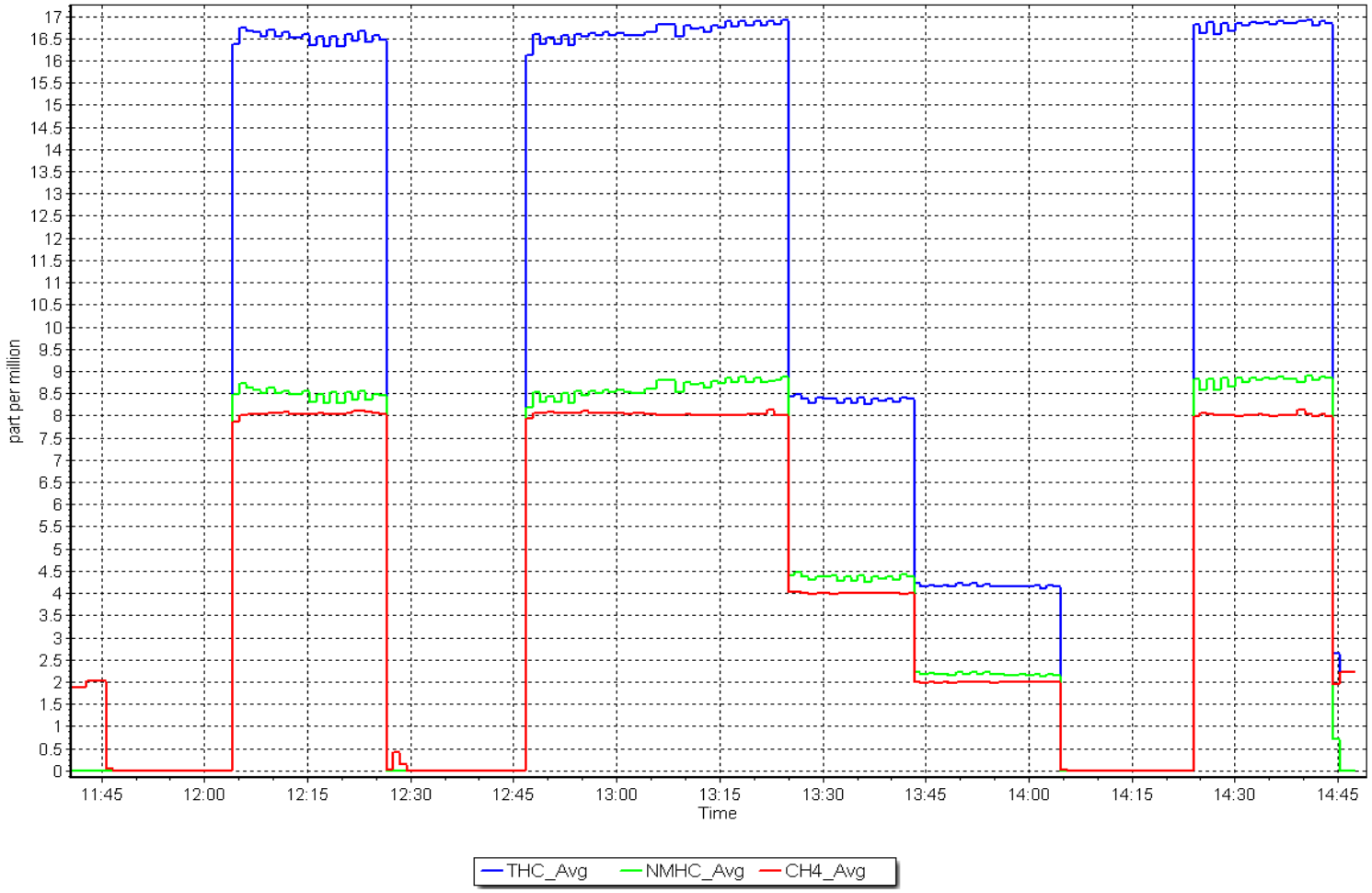
Calibration Date:	November 4, 2024	Previous Calibration:	October 11, 2024
Station Name:	Mildred Lake	Station Number:	AMS 02
Start Time (MST):	11:43	End Time (MST):	14:47
Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999983	≥0.995
8.80	8.78	1.0017	Slope	0.999351	0.90 - 1.10
4.40	4.37	1.0059			
2.19	2.16	1.0173	Intercept	-0.017070	+/-0.5



NMHC Calibration Plot Date: November 4, 2024 Location: Mildred Lake



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	November 8, 2024	Last Cal Date:	November 4, 2024
Start time (MST):	10:25	End time (MST):	12:20
Reason:	Cylinder Change		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1170050131
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.60E-04	2.60E-04	NMHC SP Ratio:	6.85E-05	6.85E-05
CH4 Retention time:	14.6	14.6	NMHC Peak Area:	128504	128504
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	16.82	16.77	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.77	Prev response	16.77	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	16.82	17.00	0.989
				Average Correction Factor	

Notes: Swapped nitrogen cylinder. No issues to note.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.80	8.78	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.78	Prev response	8.75	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.80	8.82	0.997
				Average Correction Factor	

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.02	7.98	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.98	Prev response	8.02	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

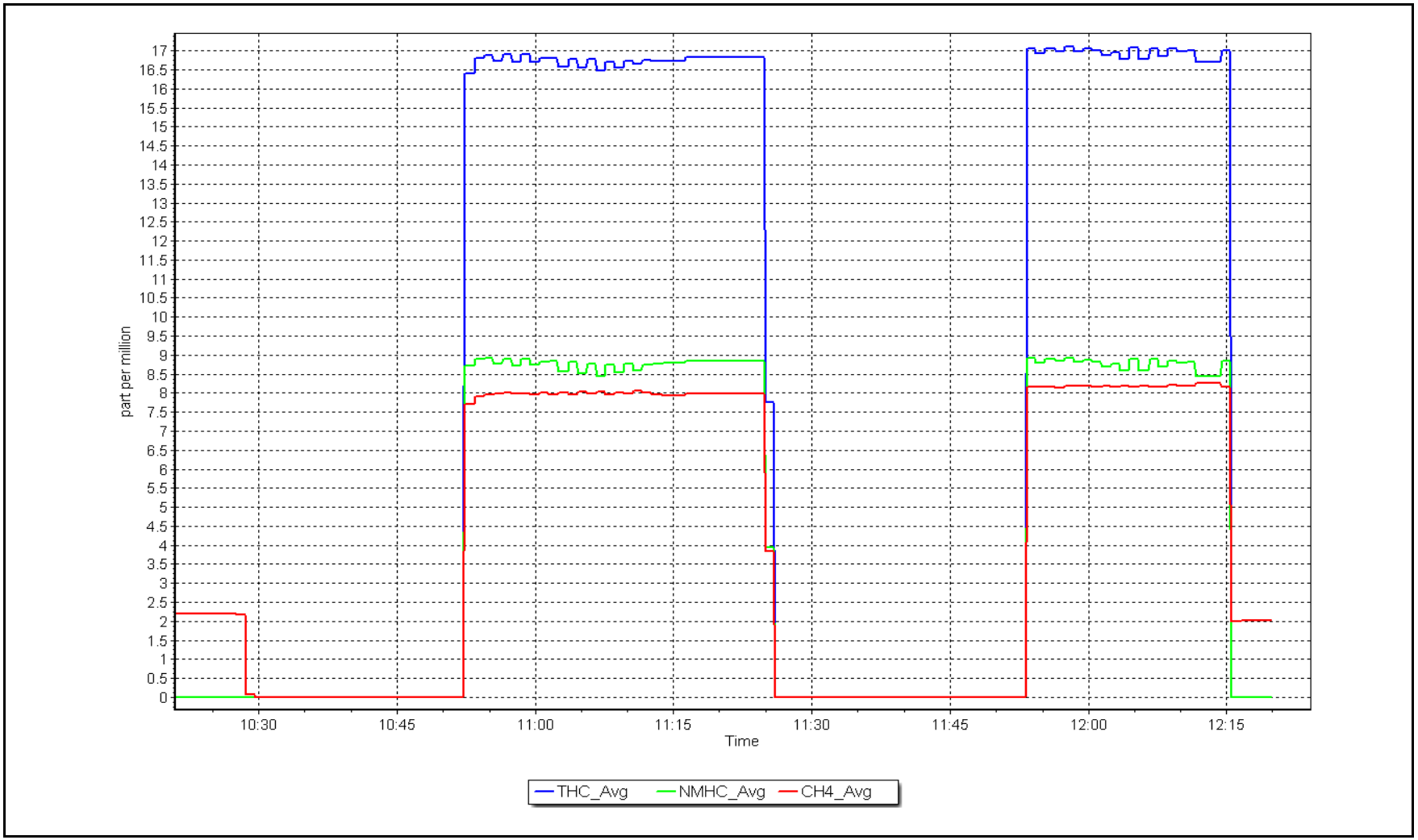
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.02	8.18	0.981
				Average Correction Factor	

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.997492	
THC Cal Offset:	-0.001923	
CH4 Cal Slope:	0.999757	
CH4 Cal Offset:	0.001551	
NMHC Cal Slope:	0.995414	
NMHC Cal Offset:	-0.003674	

Calibration Performed By: Braiden Boutilier

NMHC Calibration Plot Date: November 8, 2024 Location: Mildred Lake



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS04
BUFFALO VIEWPOINT
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 6, 2024	Last Cal Date:	October 10, 2024
Start time (MST):	6:45	End time (MST):	9:24
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	JC1327300932	
Analyzer Range:	0-1000ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000586	1.002759	Backgd or Offset:	26.1	26.5
Calibration intercept:	-0.125278	-0.385234	Coeff or Slope:	0.866	0.877

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4921	78.6	799.7	791.0	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	791.2	Previous response	800.1	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4921	78.6	799.7	801.5	0.998
Mid point	4961	39.3	399.8	401.2	0.997
Low point	4980	19.6	199.4	198.5	1.005
As left zero	5000	0.0	0.0	0.1	----
As left span	4921	78.6	799.7	801.1	0.998
				Average Correction Factor:	1.000

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

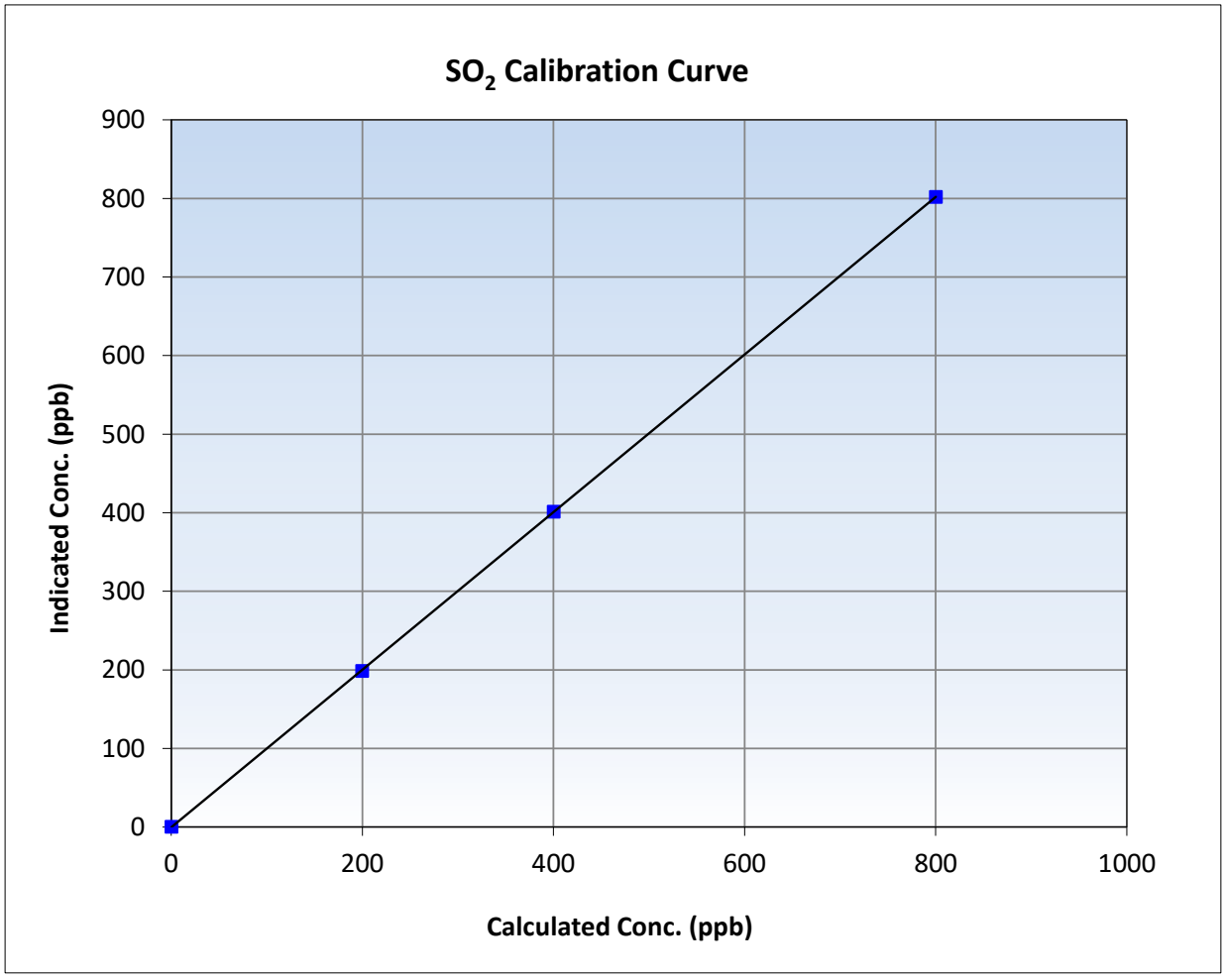
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 10, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:45	End Time (MST):	9:24
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932

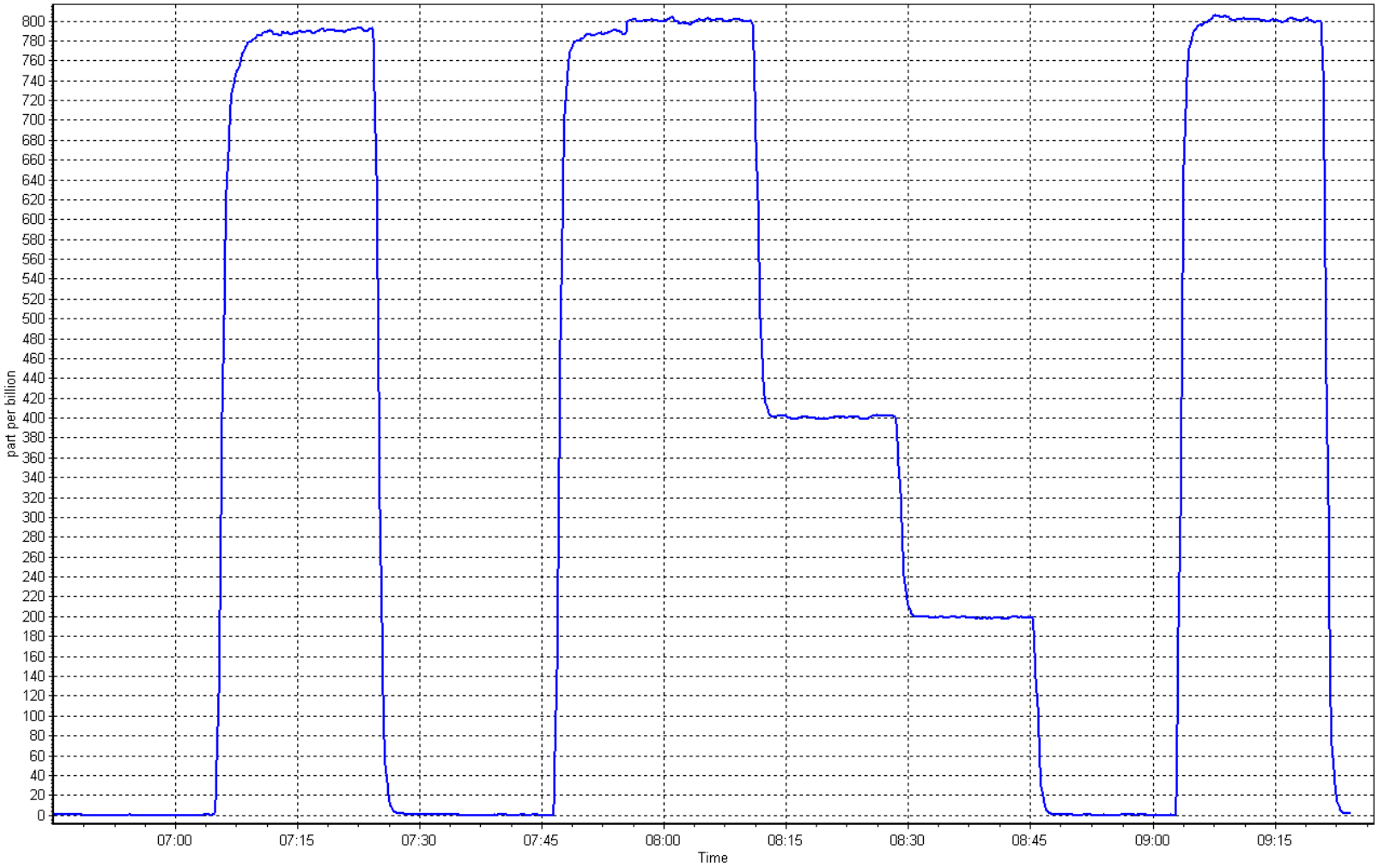
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.7	801.5	0.9978
399.8	401.2	0.9965
199.4	198.5	1.0047

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.002759	*0.90 - 1.10*
Intercept	-0.385234	*+/-30*



SO2 Calibration Plot Date: November 6, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 26, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	7:26	End time (MST):	11:36
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.988107	0.999922	Backgd or Offset:	1.92	1.93
Calibration intercept:	0.021990	-0.117954	Coeff or Slope:	1.108	1.118

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4926	74.1	80.3	79.3	1.013
As found Mid point	4963	37.0	40.1	39.7	1.010
As found Low point	4982	18.5	20.1	19.7	1.018
New cylinder response					

Baseline Corr As found:	79.3	Prev response:	79.39	*% change:	-0.1%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.987824	AF Intercept:	-0.018082
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4926	74.1	80.3	80.3	1.000
Mid point	4963	37.0	40.1	39.9	1.005
Low point	4982	18.5	20.1	19.7	1.018
As left zero	5000	0.0	0.0	0.2	----
As left span	4926	74.1	80.3	79.5	1.010
SO2 Scrubber Check	4920	80.0	800.0	0.0	----
Date of last scrubber change:		16-May-23		Ave Corr Factor	1.008
Date of last converter efficiency test:					

Notes: Flow sensor replaced and calibrated. Sox scrubber checked after the calibrator zero. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

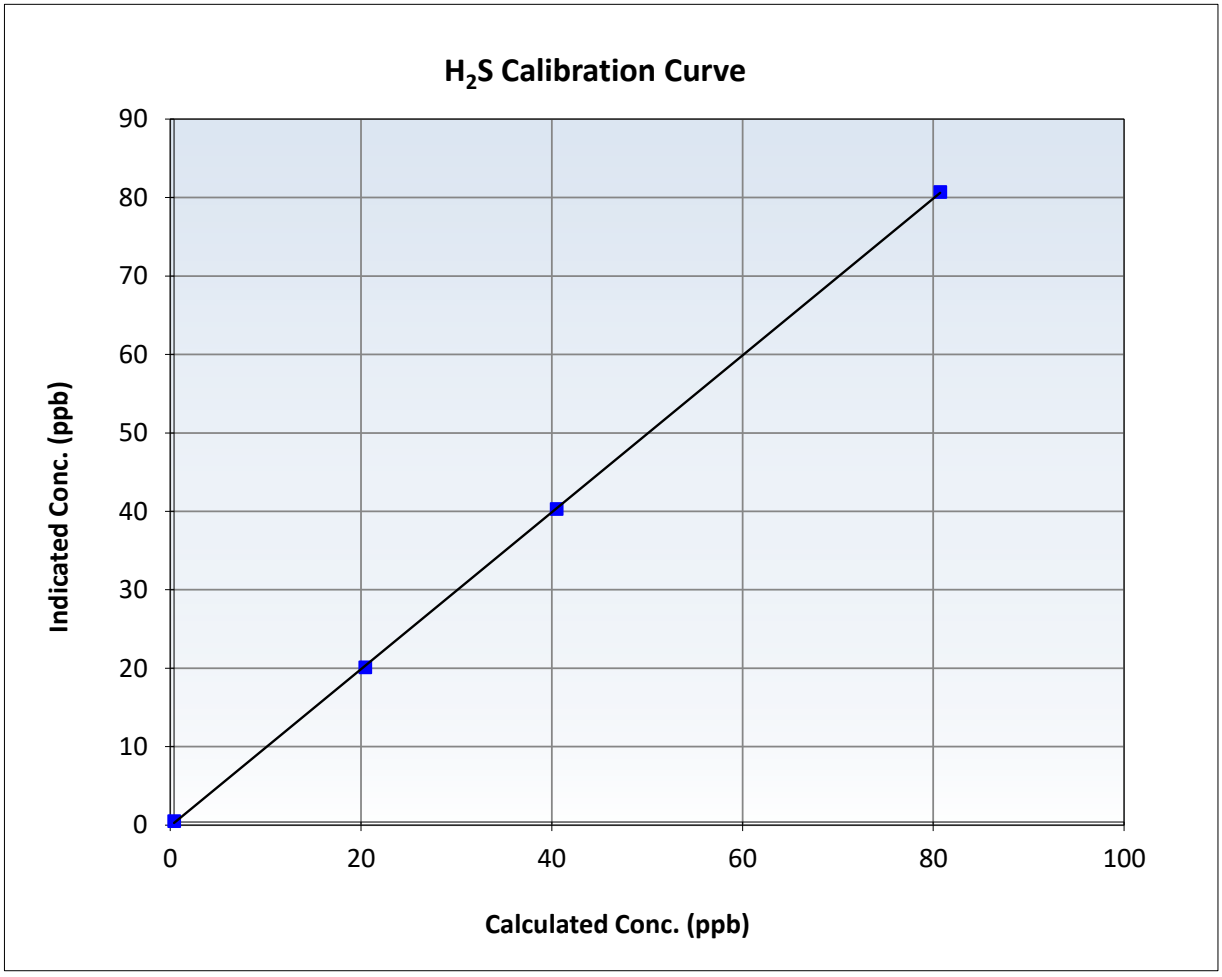
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 8, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	7:26	End Time (MST):	11:36
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1008841400

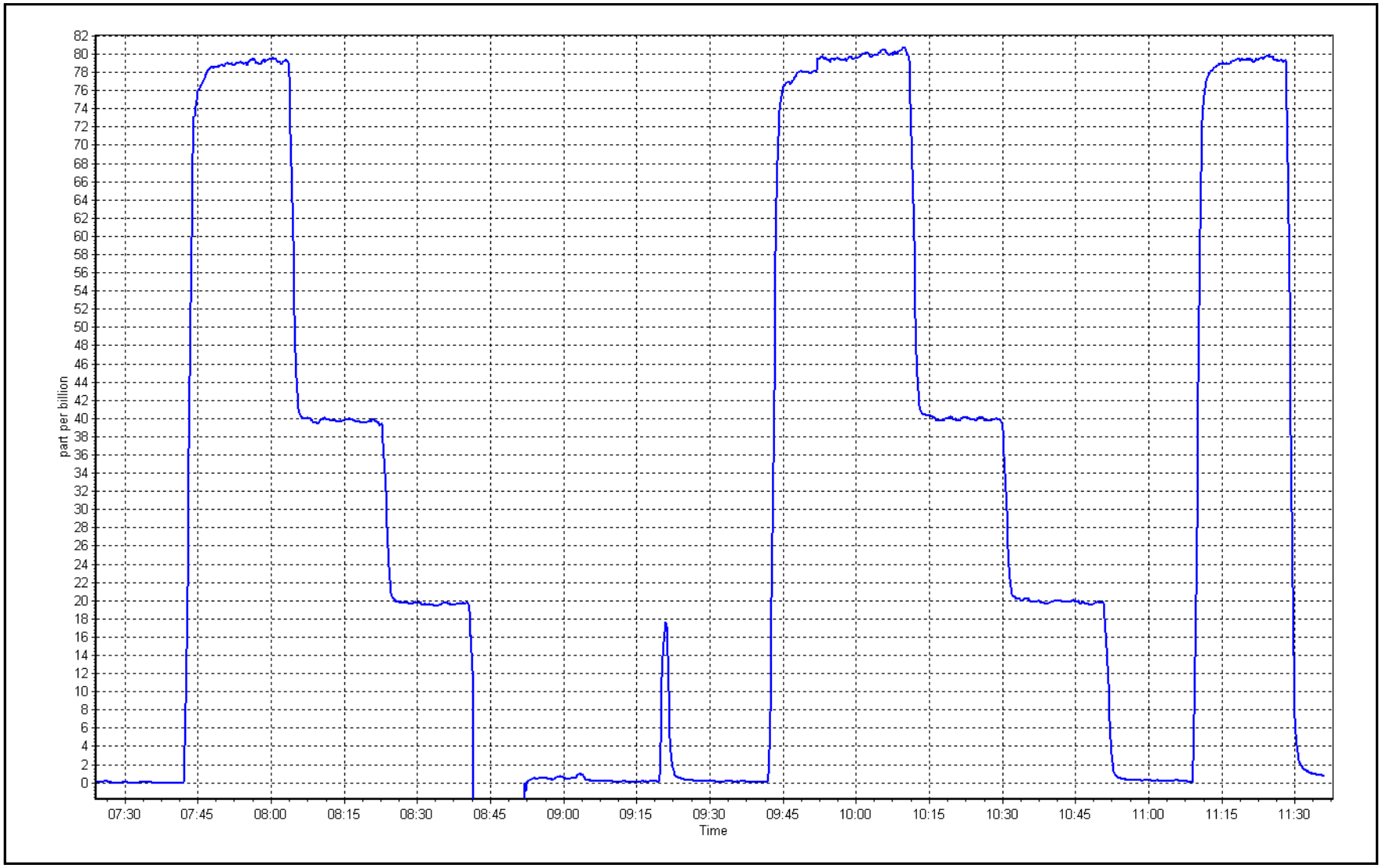
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.3	80.3	1.0003
40.1	39.9	1.0052
20.1	19.7	1.0179

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999966	*≥0.995*
Slope	0.999922	*0.90 - 1.10*
Intercept	-0.117954	*+/-3*



H_2S Calibration Plot Date: November 26, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 6, 2024	Last Cal Date:	October 10, 2024
Start time (MST):	6:45	End time (MST):	9:23
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC446753	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH4 Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
Removed C3H8 Conc.	204.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3808
Zero Air Gen model:	API T701	Serial Number:	362

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.51E-04	4.51E-04	NMHC SP Ratio:	1.15E-04	1.15E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	76662	76662
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	16.64	16.71	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.71	Prev response	16.56	*% change	0.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	16.64	16.66	0.999
Mid point	4961	39.3	8.32	8.30	1.003
Low point	4980	19.6	4.15	4.14	1.003
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	16.64	16.63	1.001
				Average Correction Factor	1.001

Notes: No adjustments or maintenance done.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	8.82	8.87	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.87	Prev response	8.77	*% change	1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.84	0.998
Mid point	4961	39.3	4.41	4.42	0.998
Low point	4980	19.6	2.20	2.21	0.997
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	8.82	8.81	1.001
				Average Correction Factor	0.998

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.84	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.84	Prev response	7.79	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	7.82	7.82	0.999
Mid point	4961	39.3	3.91	3.88	1.008
Low point	4980	19.6	1.95	1.93	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	78.6	7.82	7.81	1.000
				Average Correction Factor	1.006

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.995889	1.001514
THC Cal Offset:	-0.007756	-0.013931
CH4 Cal Slope:	0.998354	1.001161
CH4 Cal Offset:	-0.011510	-0.015104
NMHC Cal Slope:	0.993627	1.001840
NMHC Cal Offset:	0.003553	0.001373

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

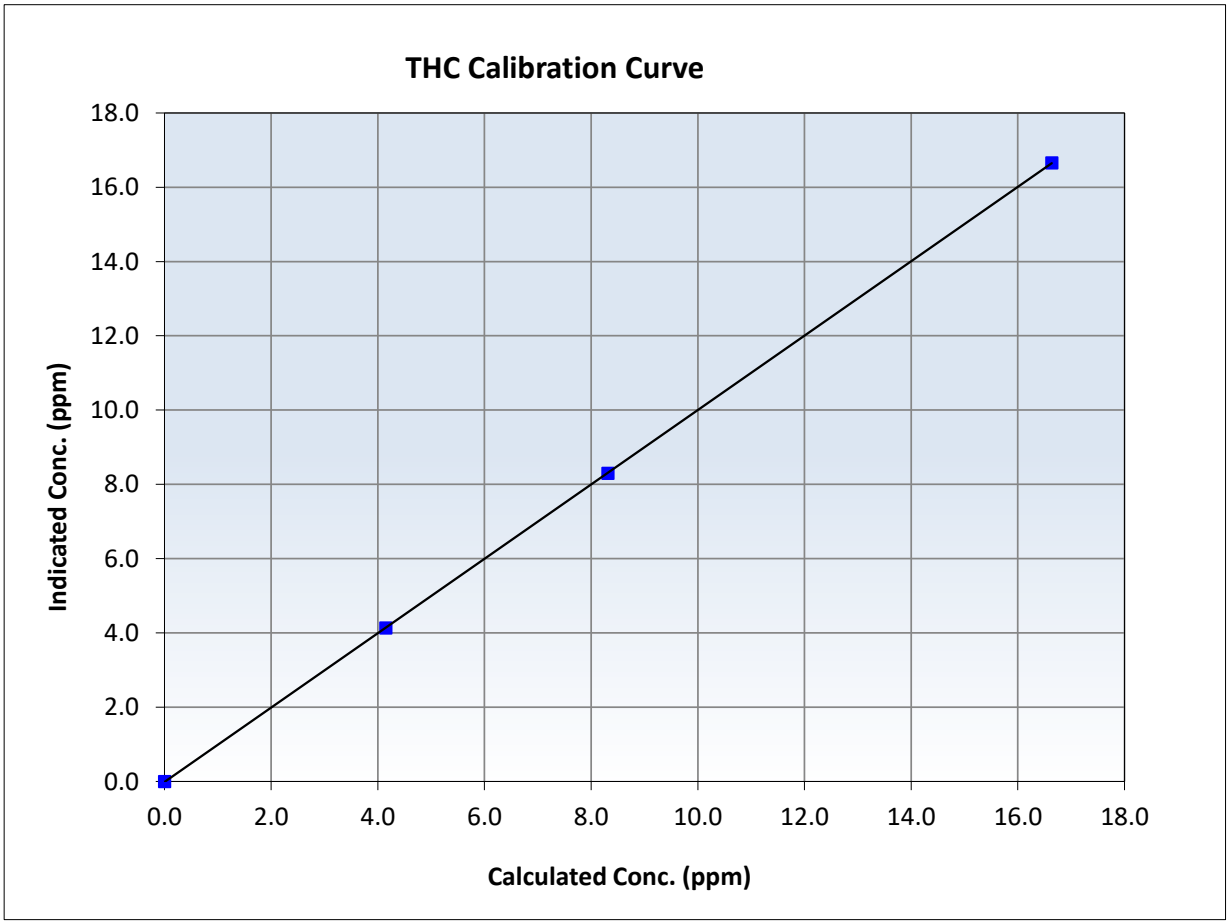
THC Calibration Summary

Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 10, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:45	End Time (MST):	9:23
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	0.999995	≥0.995
16.64	16.66	0.9986	Slope	1.001514	0.90 - 1.10
8.32	8.30	1.0026			
4.15	4.14	1.0030	Intercept	-0.013931	+/-0.5



Wood Buffalo Environmental Association

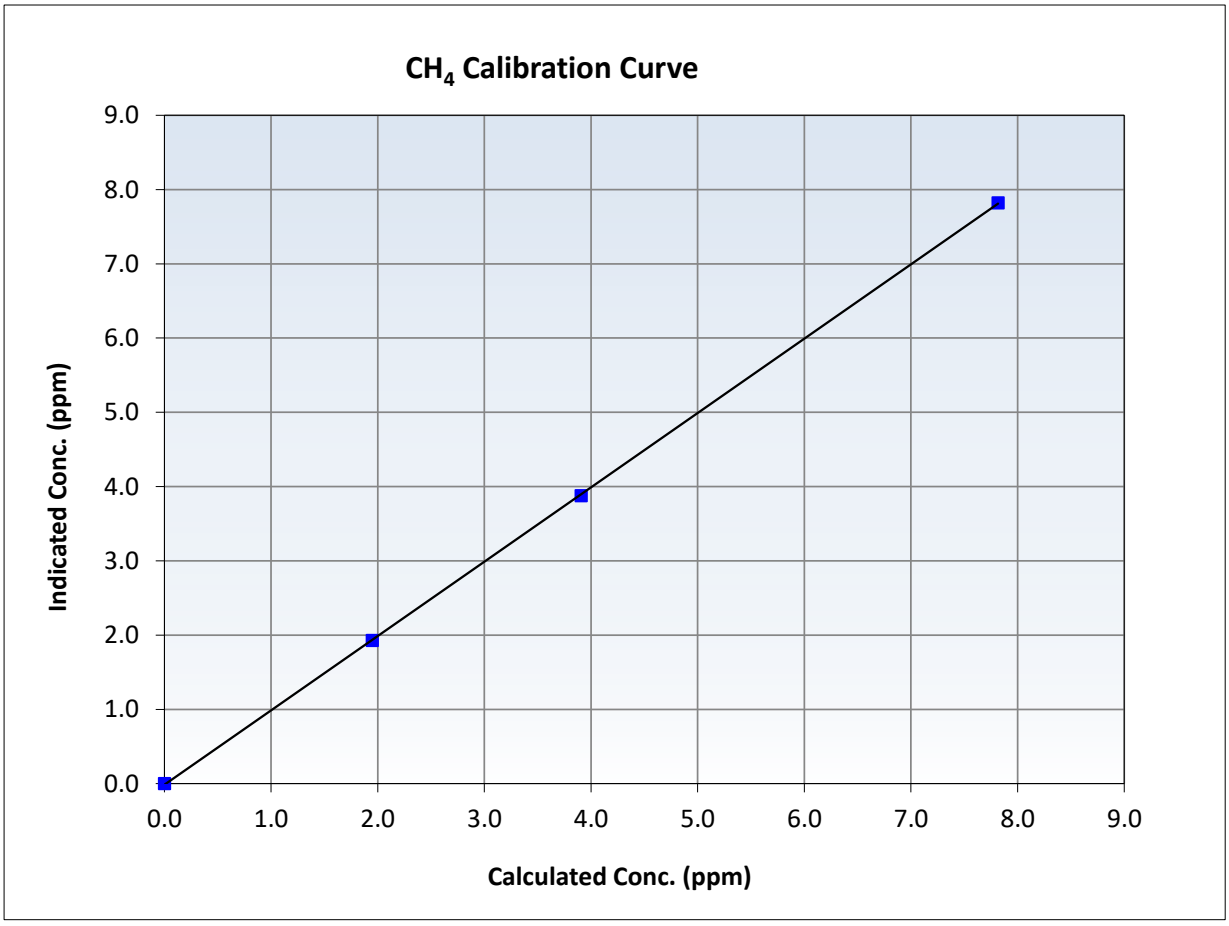
CH_4 Calibration Summary

Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 10, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:45	End Time (MST):	9:23
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	0.999977	≥0.995
7.82	7.82	0.9993	Slope	1.001161	0.90 - 1.10
3.91	3.88	1.0077			
1.95	1.93	1.0105	Intercept	-0.015104	+/-0.5



Wood Buffalo Environmental Association

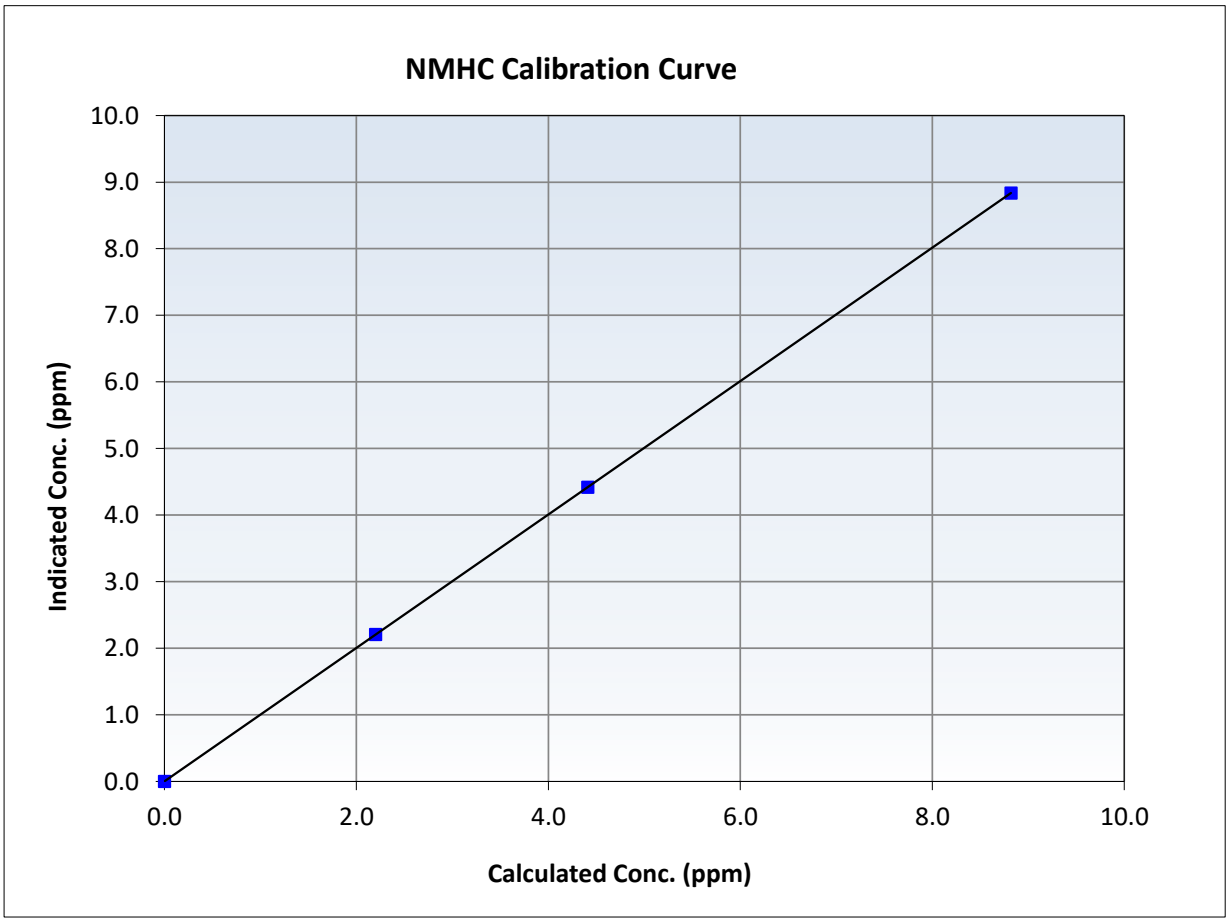
NMHC Calibration Summary

Station Information

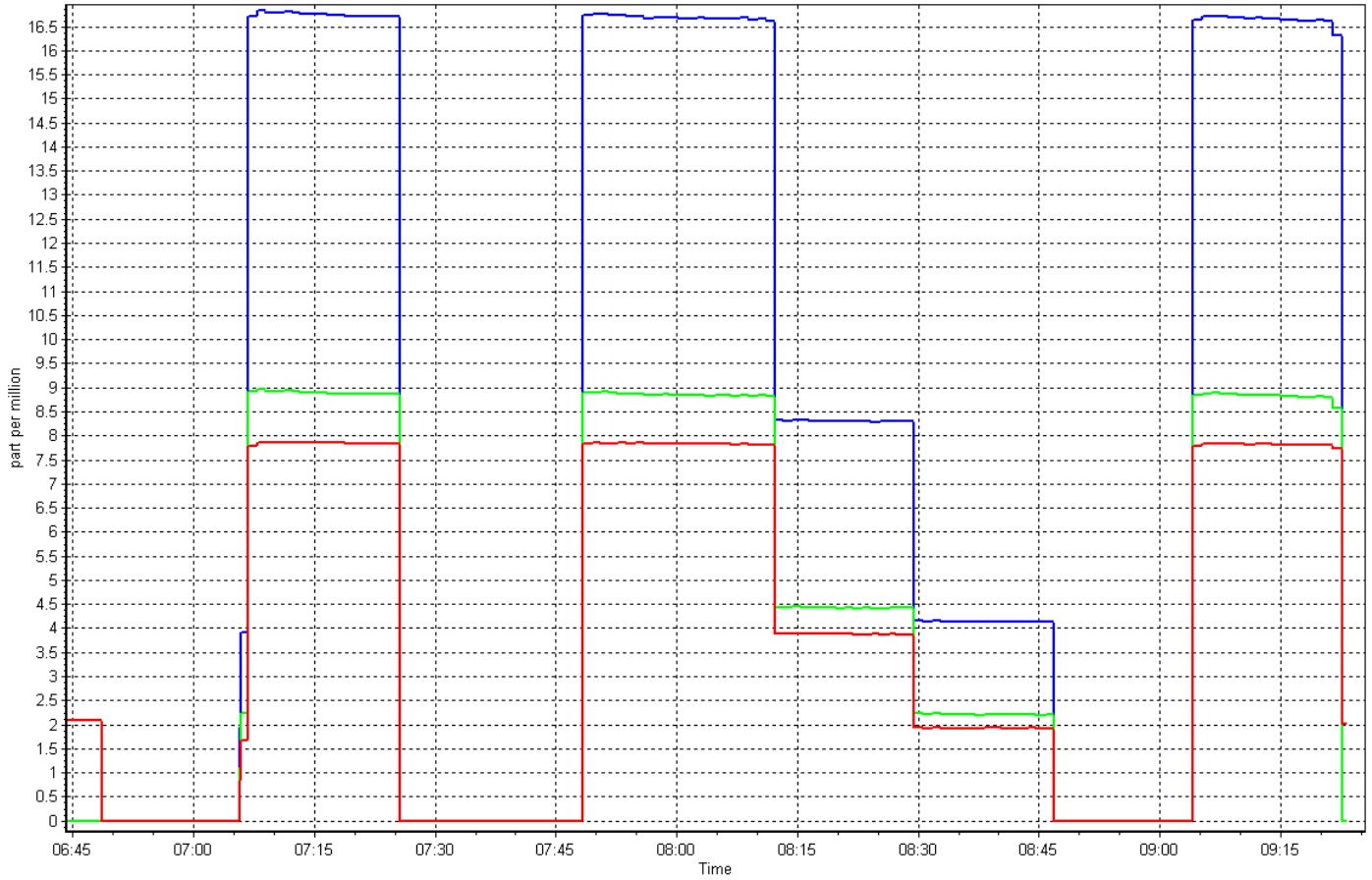
Calibration Date:	November 6, 2024	Previous Calibration:	October 10, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:45	End Time (MST):	9:23
Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	1.000000	≥0.995
8.82	8.84	0.9980	Slope	1.001840	0.90 - 1.10
4.41	4.42	0.9980	Intercept	0.001373	+/-0.5
2.20	2.21	0.9965			



NMHC Calibration Plot Date: November 6, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 25, 2024	Last Cal Date:	November 6, 2024
Start time (MST):	7:17	End time (MST):	8:27
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	CC446753	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH4 Conc.	497.2 ppm	CH4 Equiv Conc.	1058.2 ppm
Removed C3H8 Conc.	204.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3808
Zero Air Gen model:	API T701	Serial Number:	362

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1426262594
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.51E-04	4.51E-04	NMHC SP Ratio:	1.15E-04	1.15E-04
CH4 Retention time:	13.7	13.7	NMHC Peak Area:	76662	76662
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	16.64	16.39	1.015
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.39	Prev response	16.65	*% change	-1.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	16.64	16.31	1.020
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.020

Notes: Nitrogen Cylinder Change.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	8.82	8.71	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.71	Prev response	8.84	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	8.82	8.67	1.017
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.017

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	78.6	7.82	7.67	1.019
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.67	Prev response	7.81	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

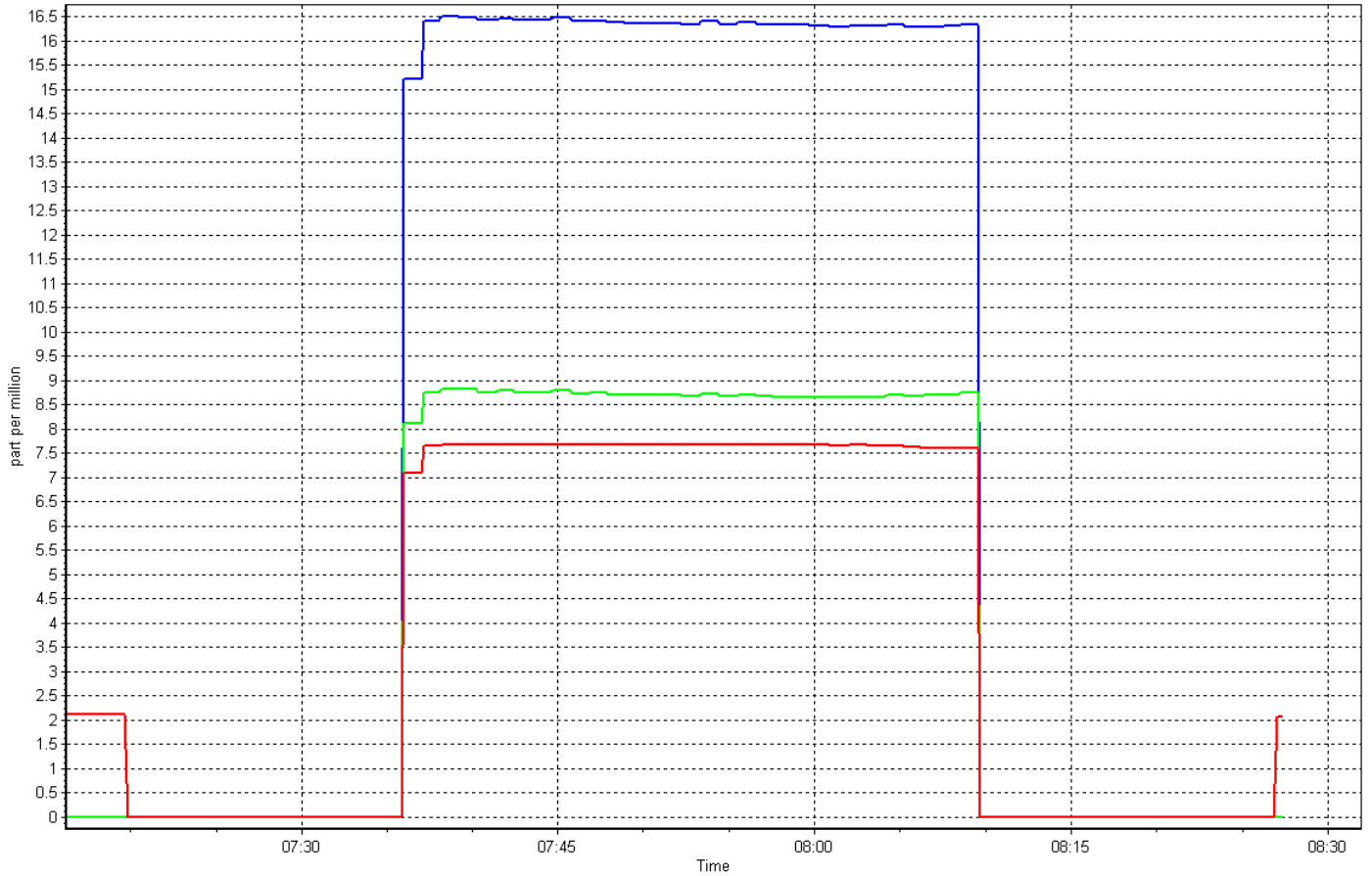
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	78.6	7.82	7.64	1.023
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.023

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001514	0.980570
THC Cal Offset:	-0.013931	0.000000
CH4 Cal Slope:	1.001161	0.977278
CH4 Cal Offset:	-0.015104	0.000000
NMHC Cal Slope:	1.001840	0.983148
NMHC Cal Offset:	0.001373	0.000000

Calibration Performed By: Melissa Lemay

NMHC Calibration Plot Date: November 25, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint
Station number:	AMS 04
Calibration Date:	November 15, 2024
Last Cal Date:	October 17, 2024
Start time (MST):	6:55
End time (MST):	11:27
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.3	0.3	----	----
AF High point	4918	81.8	800.0	798.4	1.6	794.4	787.4	7.0	1.0071	1.0136
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	801.9 ppb	NO =	796.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.9%
Baseline Corr 1st pt	NO_X =	794.4 ppb	NO =	787.7 ppb	As Found Statistics	*Percent Change	NO = -1.1%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 721

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.225	1.240	NO bkgnd or offset:	0.2	0.2
NOX coeff or slope:	1.219	1.228	NOX bkgnd or offset:	-0.2	-0.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.7	4.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000035	1.004121
NO_X Cal Offset:	1.827250	0.547607
NO Cal Slope:	0.996977	1.003031
NO Cal Offset:	0.385657	0.446673
NO_2 Cal Slope:	1.000295	0.992934
NO_2 Cal Offset:	0.996049	0.795535

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
High point	4918	81.8	800.0	798.4	1.6	803.6	800.6	3.0	0.9956	0.9973
Mid point	4959	40.9	400.0	399.2	0.8	402.8	402.5	0.3	0.9931	0.9918
Low point	4980	20.4	199.5	199.1	0.4	200.8	199.5	1.3	0.9935	0.9979
As left zero	5000	0.0	0.0	0.7	-0.7	0.4	0.7	-0.3	----	----
As left span	4918	81.8	800.0	404.5	800.0	796.2	404.5	391.7	1.0048	1.0000
							Average Correction Factor		0.9940	0.9957

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.2	----	----
High GPT point	797.6	400.5	398.7	396.3	1.0061	99.4%
Mid GPT point	797.6	600.9	198.3	198.4	0.9997	100.0%
Low GPT point	797.6	704.2	95.0	95.5	0.9951	100.5%
				Average Correction Factor	1.0003	100.0%

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

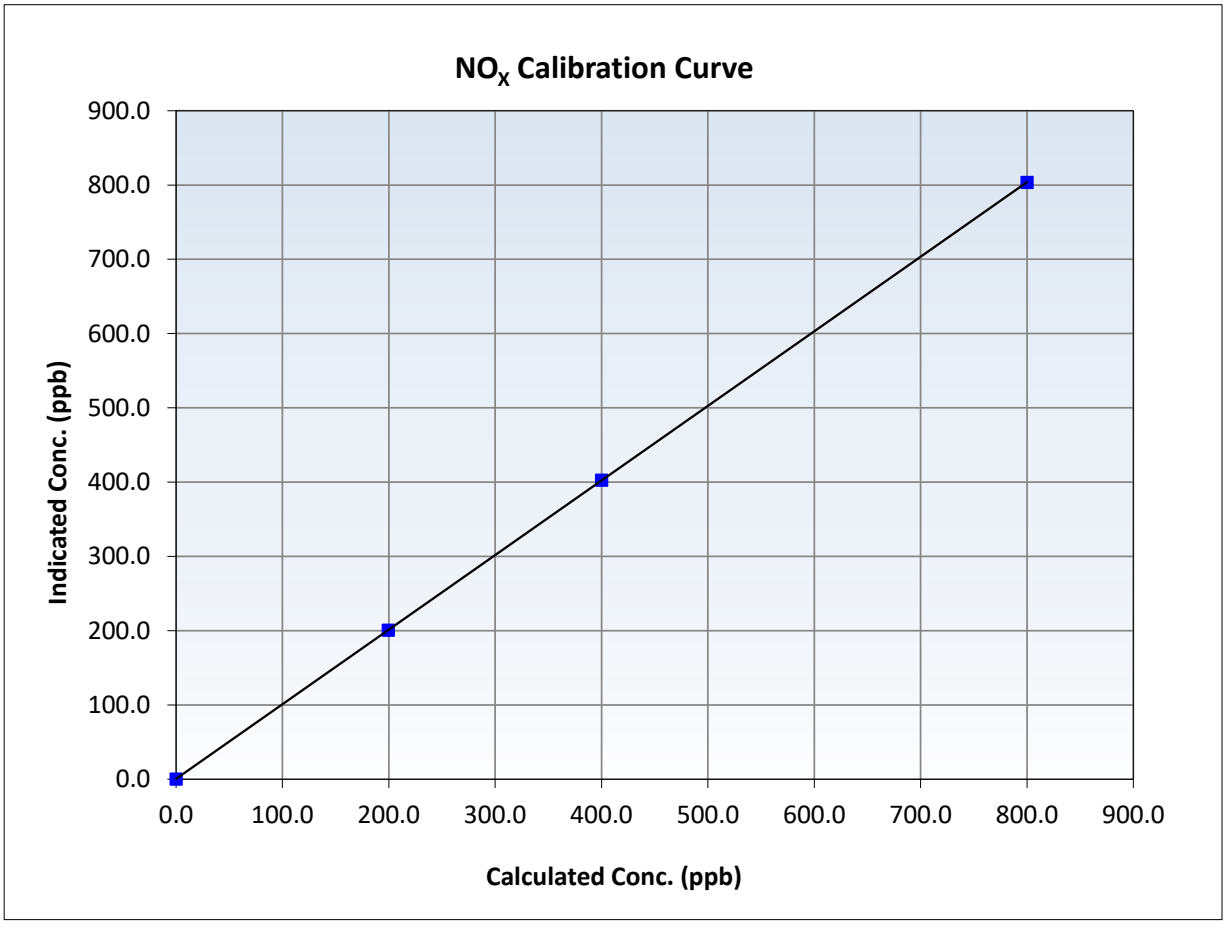
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 17, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:55	End Time (MST):	11:27
Analyzer make:	Teledyne API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.0	803.6	0.9956
400.0	402.8	0.9931
199.5	200.8	0.9935

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	1.004121	*0.90 - 1.10*
Intercept	0.547607	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

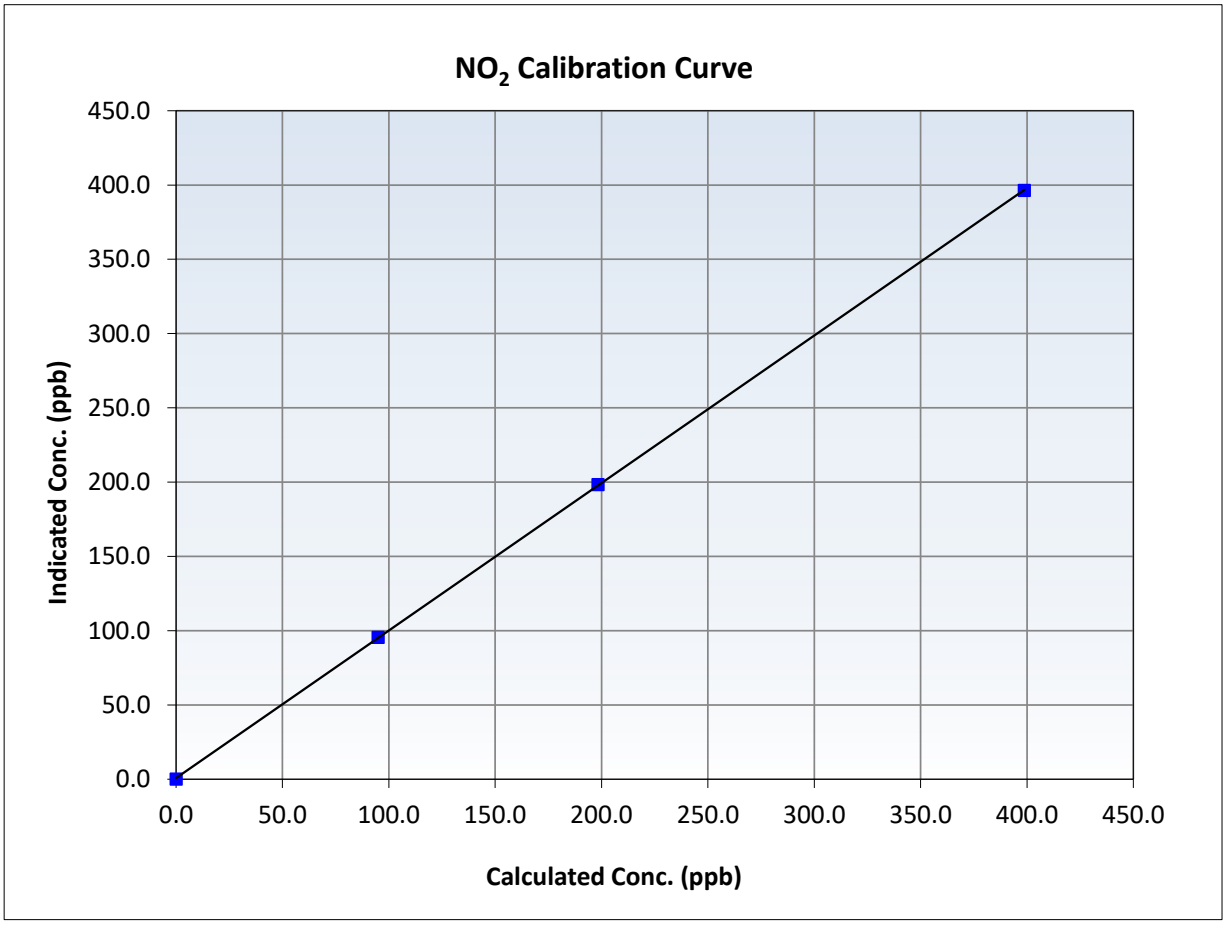
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 17, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:55	End Time (MST):	11:27
Analyzer make:	Teledyne API T200	Analyzer serial #:	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
398.7	396.3	1.0061
198.3	198.4	0.9997
95.0	95.5	0.9951

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	0.992934	*0.90 - 1.10*
Intercept	0.795535	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

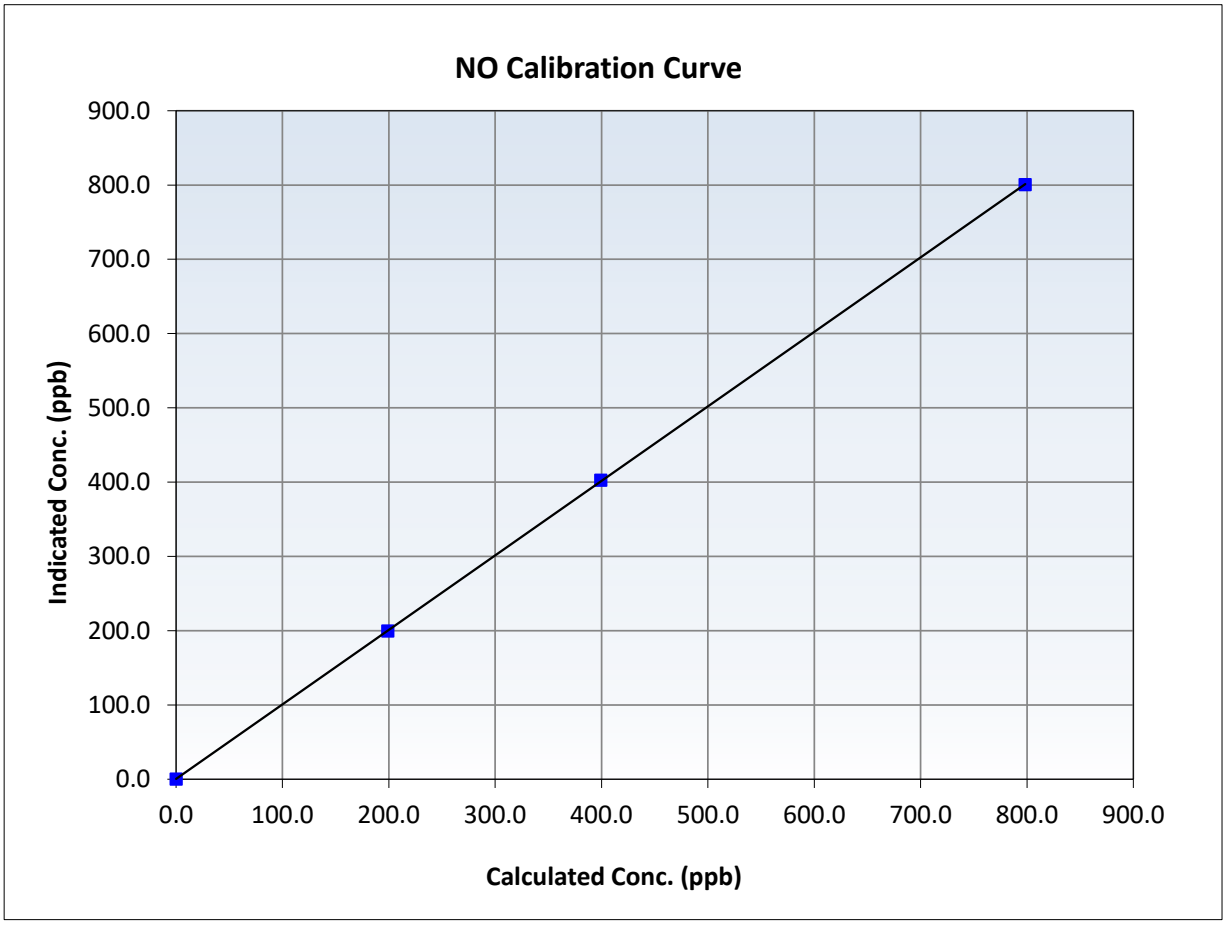
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 17, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	6:55	End Time (MST):	11:27
Analyzer make:	Teledyne API T200	Analyzer serial #:	721

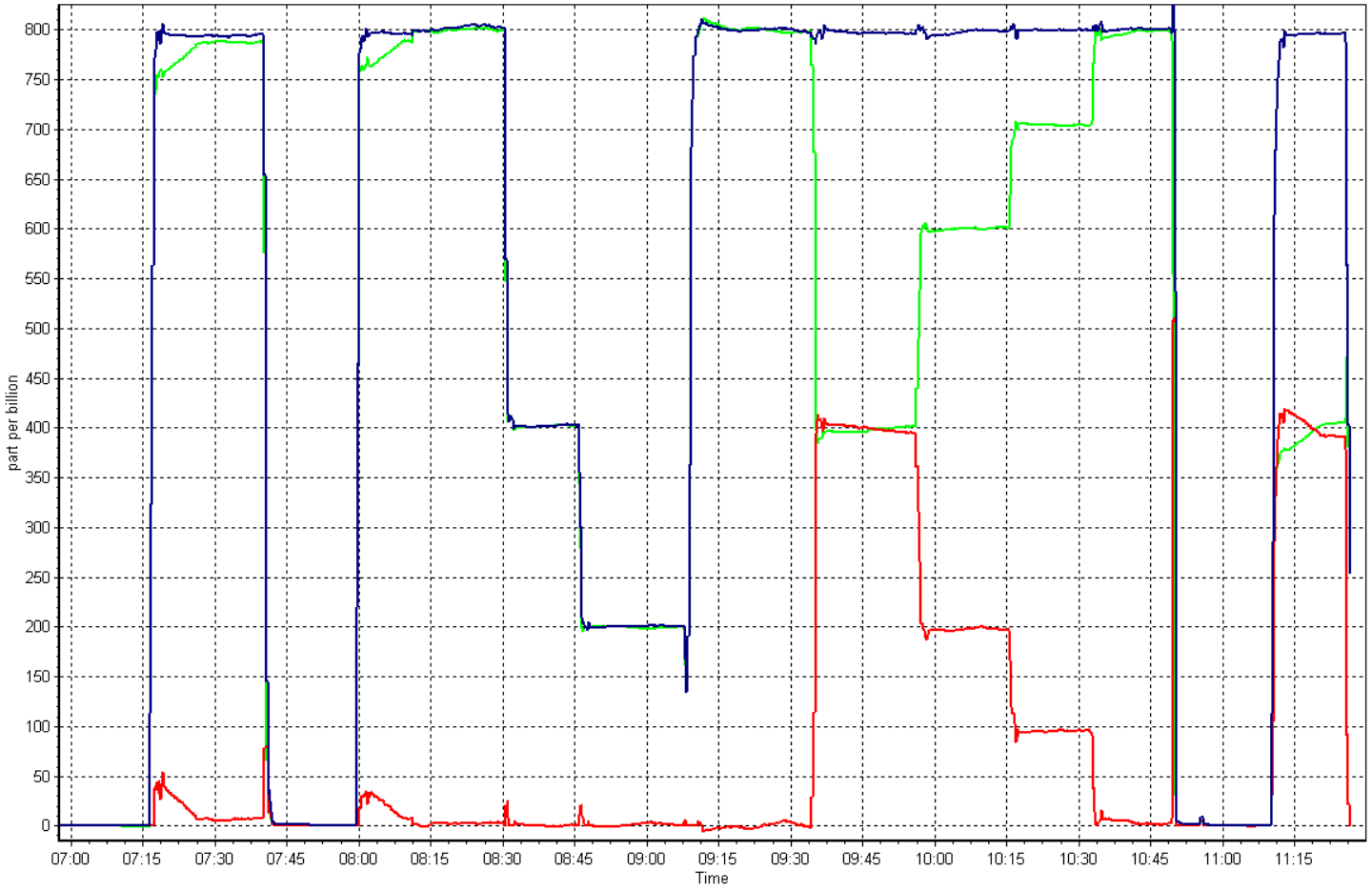
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
798.4	800.6	0.9973
399.2	402.5	0.9918
199.1	199.5	0.9979

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	1.003031	*0.90 - 1.10*
Intercept	0.446673	*+/-20*



NO_X Calibration Plot Date: November 15, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 25, 2024	Last Cal Date:	October 21, 2024
Start time (MST):	8:26	End time (MST):	11:16
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	API T400		Analyzer serial #:	2961	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999486	0.998371	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	0.340000	0.260000	Coeff or Slope:	1.020	1.020

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.9	----
As found High point	5000	993.6	400.0	397.9	1.003
As found Mid point					
As found Low point					
Baseline Corr As found:	398.8	Previous response	400.1	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	5000	994.5	400.0	399.4	1.002
Mid point	5000	818.9	200.0	200.1	1.000
Low point	5000	706.8	100.0	100.6	0.994
As left zero	5000	0.0	0.0	-0.5	----
As left span	5000	995.8	400.0	402.3	0.994
				Average Correction Factor	0.998

Notes: No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

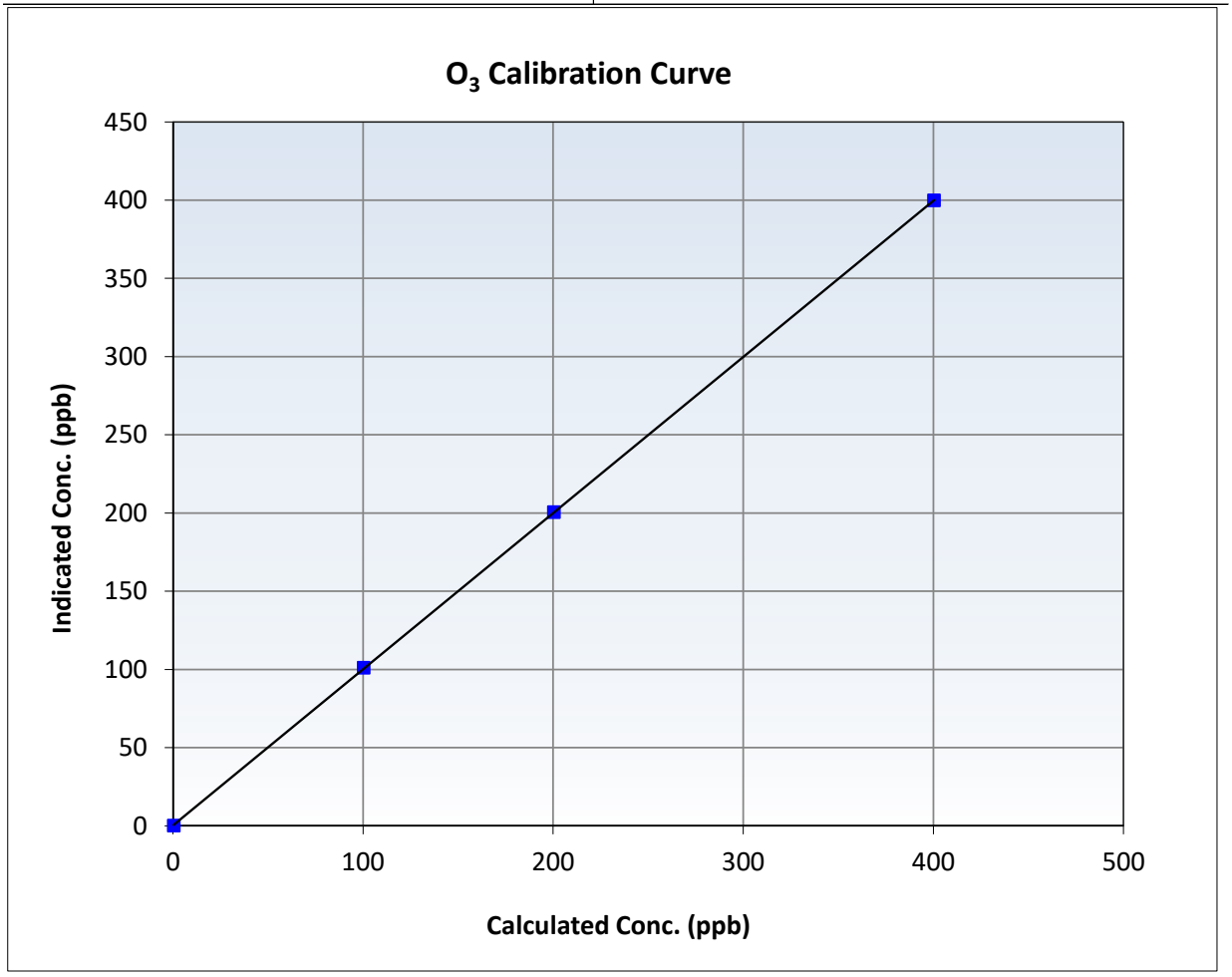
O_3 Calibration Summary

Station Information

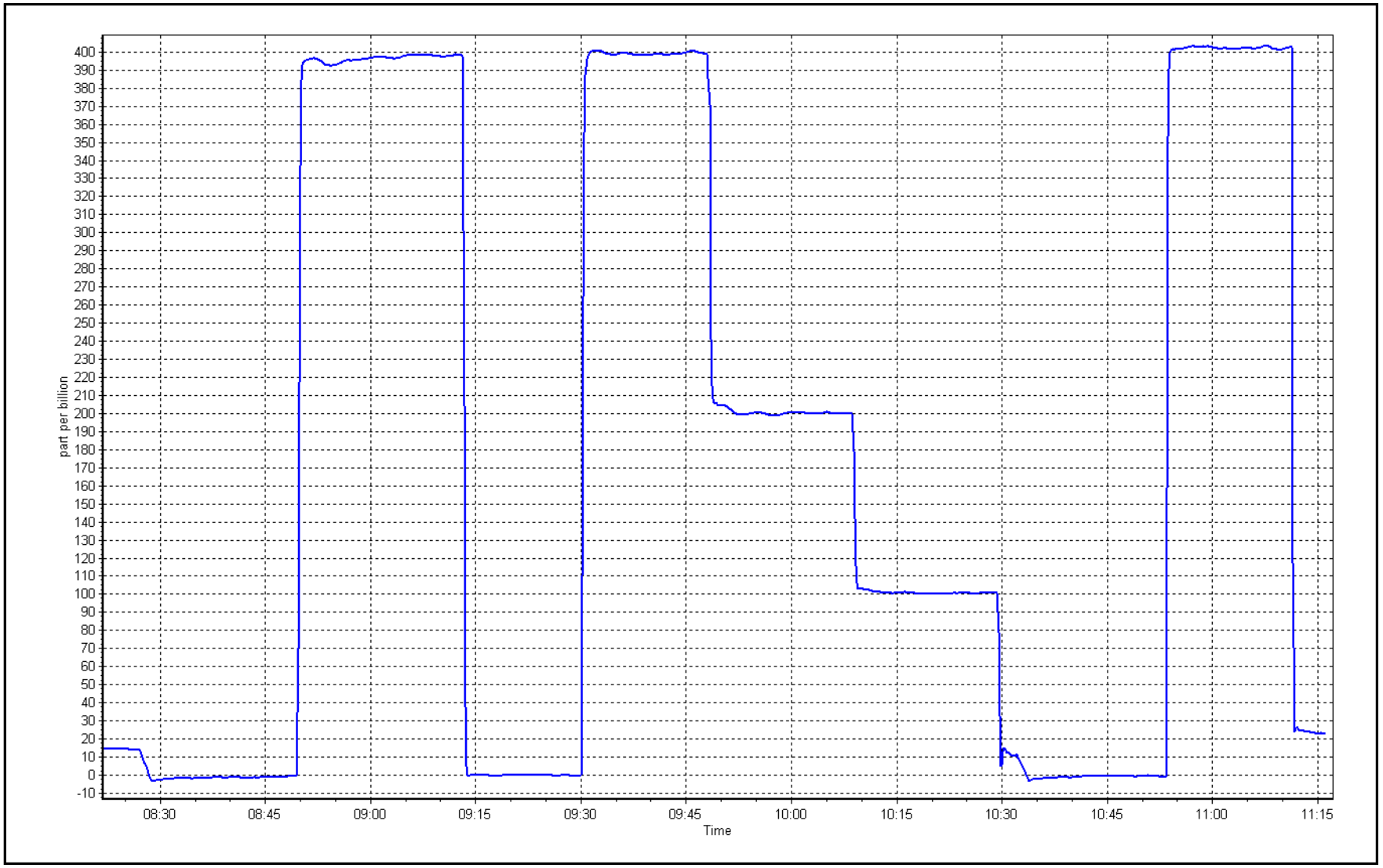
Calibration Date:	November 25, 2024	Previous Calibration:	October 21, 2024
Station Name:	Buffalo Viewpoint	Station Number:	AMS 04
Start Time (MST):	8:26	End Time (MST):	11:16
Analyzer make:	API T400	Analyzer serial #:	2961

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.2	----	Correlation Coefficient	0.999994	*≥0.995*
400.0	399.4	1.0015	Slope	0.998371	*0.90 - 1.10*
200.0	200.1	0.9995			
100.0	100.6	0.9940	Intercept	0.260000	*+/- 5*



O_3 Calibration Plot Date: November 25, 2024 Location: Buffalo Viewpoint



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	November 26, 2024	Last Cal Date:	October 21, 2024
Start time (MST):	6:51	End time (MST):	7:28
Analyzer Make:	Teledyne API T640	S/N:	321
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388753
Temp/RH standard:	Alicat FP-25BT	S/N:	388753

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-12.5	-12.8	-12.5	☐	+/- 2 °C
P (mmHg)	726.4	728.0	726.4	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.99	5.00	☐	+/- 0.25 LPM
PW% (pump)	39	-----	39	☐	>80%
Zero Verification	PM w/o HEPA:	4.0	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: September 23, 2024

Date Disposable Filter Changed: October 21, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: February 27, 2024

Date RH/T Sensor Cleaned: February 27, 2024

No adjustments done. Leak Check Passed. Datalogger data deleted.

Notes:

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS05
MANNIX
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	November 21, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	9:47	End time (MST):	13:00
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1008841399	
Analyzer Range:	1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997715	0.997157	Backgd or Offset:	10.2	10.0
Calibration intercept:	-0.285963	-0.665731	Coeff or Slope:	0.923	0.935

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	80.3	800.4	791.3	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	791.3	Previous response	798.3	*% change	-0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4920	80.3	800.4	797.6	1.003
Mid point	4960	40.1	399.7	398.4	1.003
Low point	4980	20.1	200.4	197.5	1.014
As left zero	5000	0.0	0.0	0.5	----
As left span	4920	80.3	800.4	797.4	1.004
				Average Correction Factor:	1.007

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

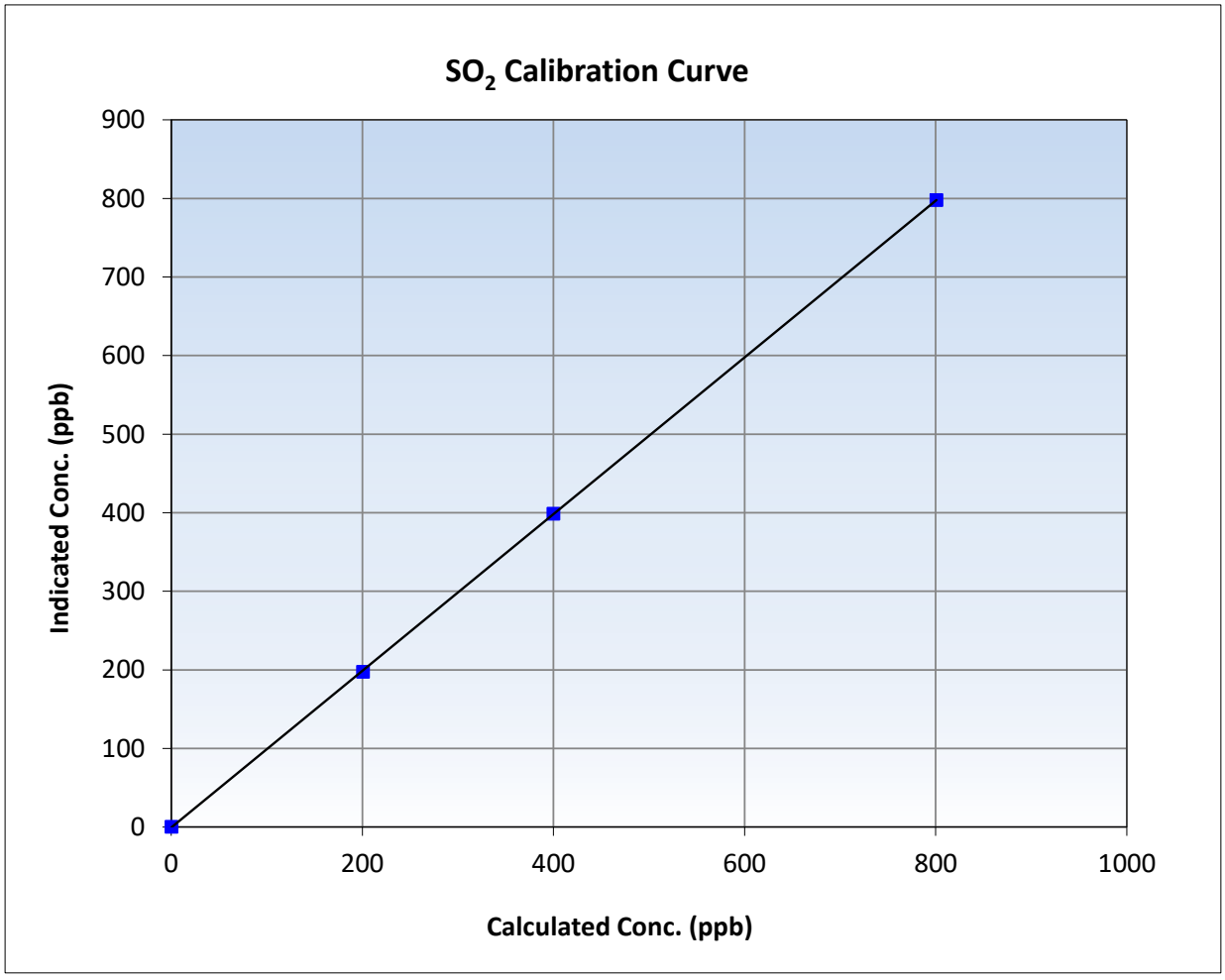
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 7, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:47	End Time (MST):	13:00
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841399

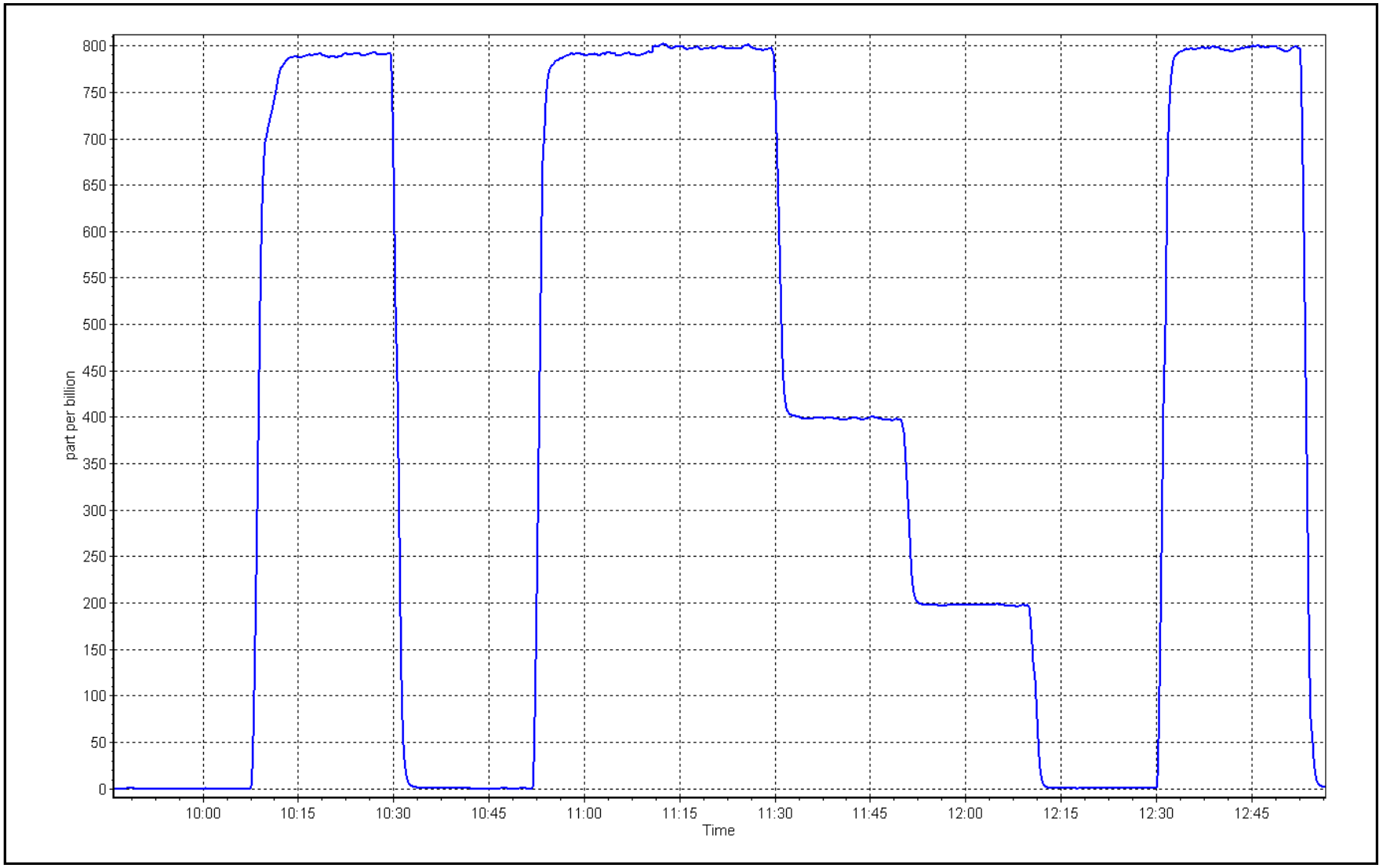
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.4	797.6	1.0035
399.7	398.4	1.0033
200.4	197.5	1.0144

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	0.997157	*0.90 - 1.10*
Intercept	-0.665731	*+/-30*



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



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	November 20, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	11:10	End time (MST):	15:06
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43iQ		Analyzer serial #:	1200326169	
Converter make:	Global		Converter serial #:	2022-225	
Analyzer Range	0 - 100 ppb		Converter Temp:	325	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.980961	0.987394	Backgd or Offset:	1.22	1.22
Calibration intercept:	0.122635	0.022526	Coeff or Slope:	1.009	1.009

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4919	80.6	80.0	79.1	1.011
As found Mid point	4960	40.3	40.0	39.7	1.007
As found Low point	4980	20.2	20.0	19.7	1.017
New cylinder response					
Baseline Corr As found:	79.1	Prev response:	78.56	*% change:	0.7%
Baseline Corr 2nd AF pt:	39.7	AF Slope:	0.989967	AF Intercept:	-0.017518
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999989	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4919	80.6	80.0	78.9	1.013
Mid point	4960	40.3	40.0	39.7	1.007
Low point	4980	20.2	20.0	19.7	1.017
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	80.6	80.0	78.0	1.025
SO2 Scrubber Check	4920	80.3	803.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.013
Date of last converter efficiency test:					

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

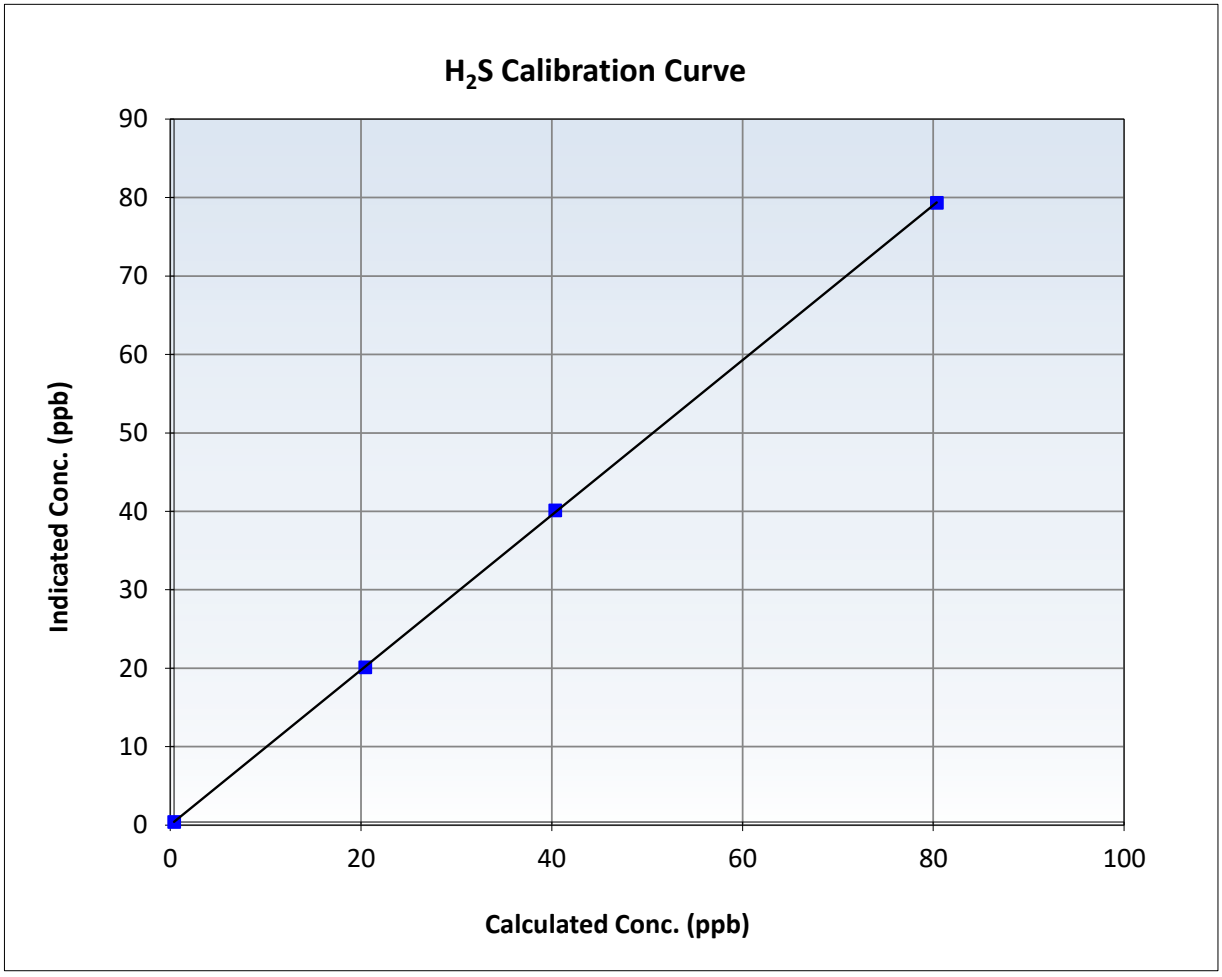
H_2S Calibration Summary

Station Information

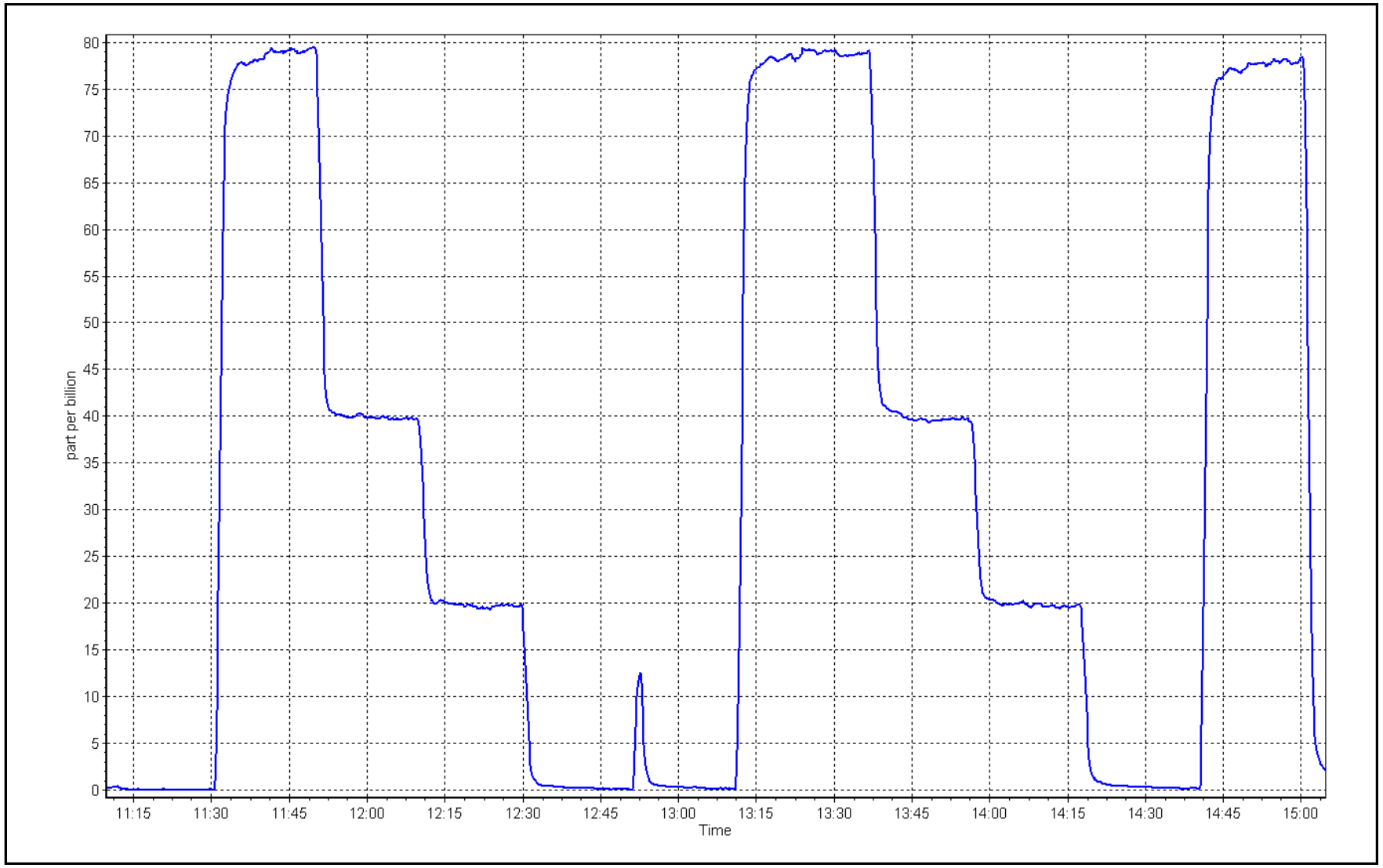
Calibration Date:	November 20, 2024	Previous Calibration:	October 9, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	11:10	End Time (MST):	15:06
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1200326169

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*
80.0	78.9	1.0135	Slope	0.987394	*0.90 - 1.10*
40.0	39.7	1.0069			
20.0	19.7	1.0171	Intercept	0.022526	*+/-3*



H_2S Calibration Plot Date: November 20, 2024 Location: Mannix



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	November 21, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	9:47	End time (MST):	13:00
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.91E-04	2.94E-04	NMHC SP Ratio:	5.29E-05	5.37E-05
CH4 Retention time:	15.6	15.4	NMHC Peak Area:	167221	164658
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	16.99	16.85	1.008
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.85	Prev response	16.96	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	16.99	17.07	0.995
Mid point	4960	40.1	8.48	8.54	0.993
Low point	4980	20.1	4.25	4.26	0.999
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	16.99	17.06	0.996
				Average Correction Factor	0.996

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.84	8.81	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.81	Prev response	8.81	*% change	0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.84	8.97	0.986
Mid point	4960	40.1	4.42	4.48	0.986
Low point	4980	20.1	2.21	2.23	0.991
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.84	8.96	0.987
				Average Correction Factor	0.987

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.15	8.04	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.04	Prev response	8.15	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.15	8.09	1.006
Mid point	4960	40.1	4.07	4.06	1.002
Low point	4980	20.1	2.04	2.02	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.15	8.11	1.005
				Average Correction Factor	1.006

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999287	1.005080
THC Cal Offset:	-0.017324	-0.003124
CH4 Cal Slope:	1.001581	0.994044
CH4 Cal Offset:	-0.006059	0.001544
NMHC Cal Slope:	0.997147	1.014886
NMHC Cal Offset:	-0.010665	-0.004268

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

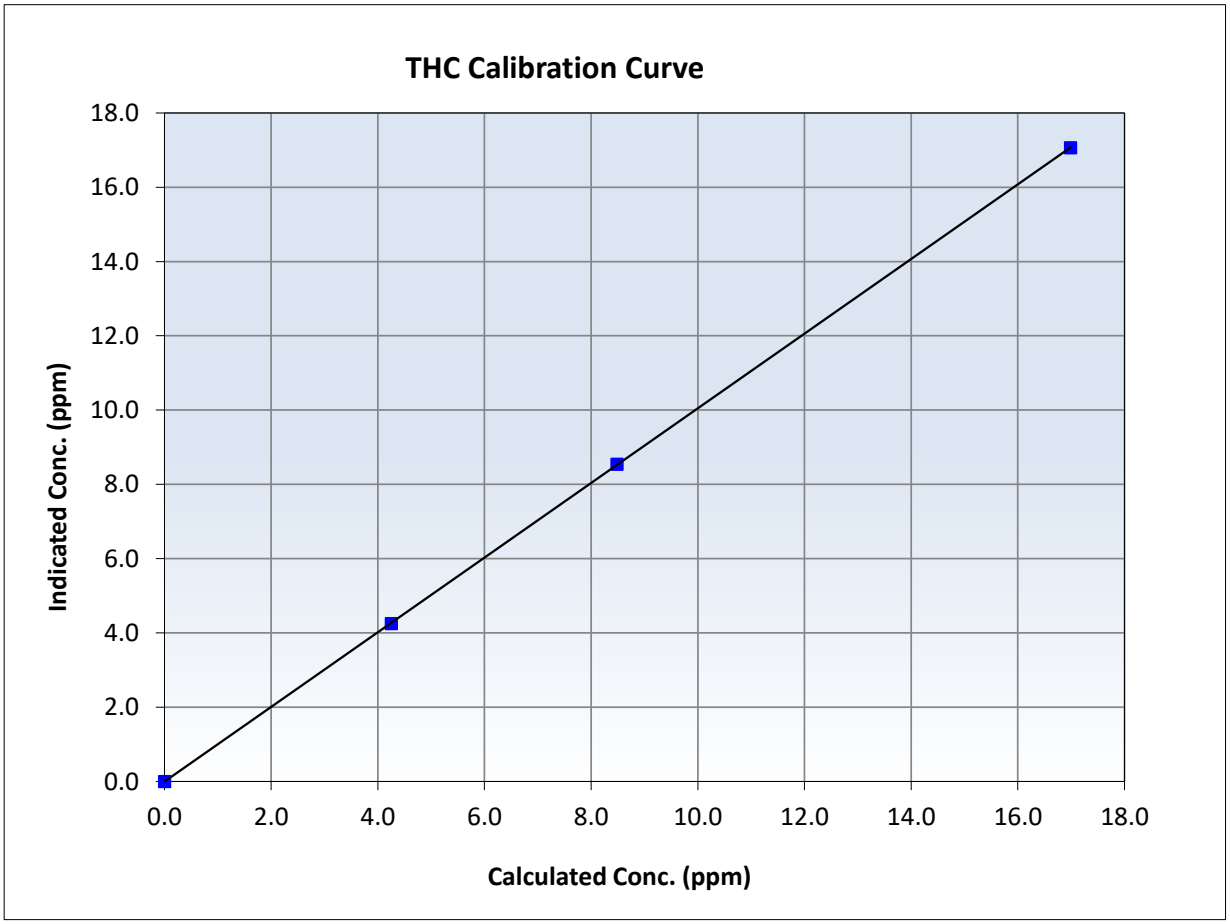
THC Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:47	End Time (MST):	13:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999996	≥0.995
16.99	17.07	0.9954	Slope	1.005080	0.90 - 1.10
8.48	8.54	0.9933			
4.25	4.26	0.9993	Intercept	-0.003124	+/-0.5



Wood Buffalo Environmental Association

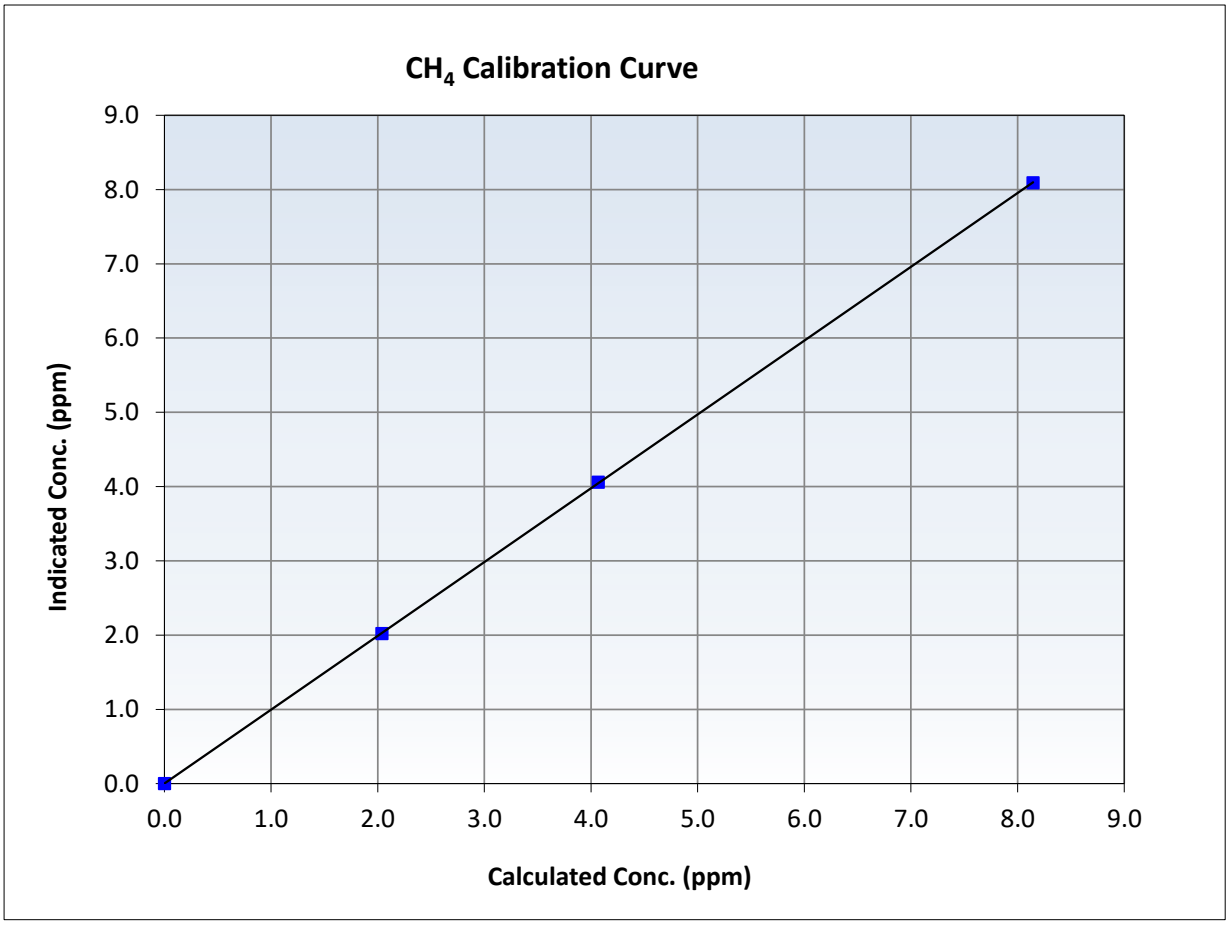
CH_4 Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:47	End Time (MST):	13:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999992	≥0.995
8.15	8.09	1.0064	Slope	0.994044	0.90 - 1.10
4.07	4.06	1.0021			
2.04	2.02	1.0089	Intercept	0.001544	+/-0.5



Wood Buffalo Environmental Association

NMHC Calibration Summary

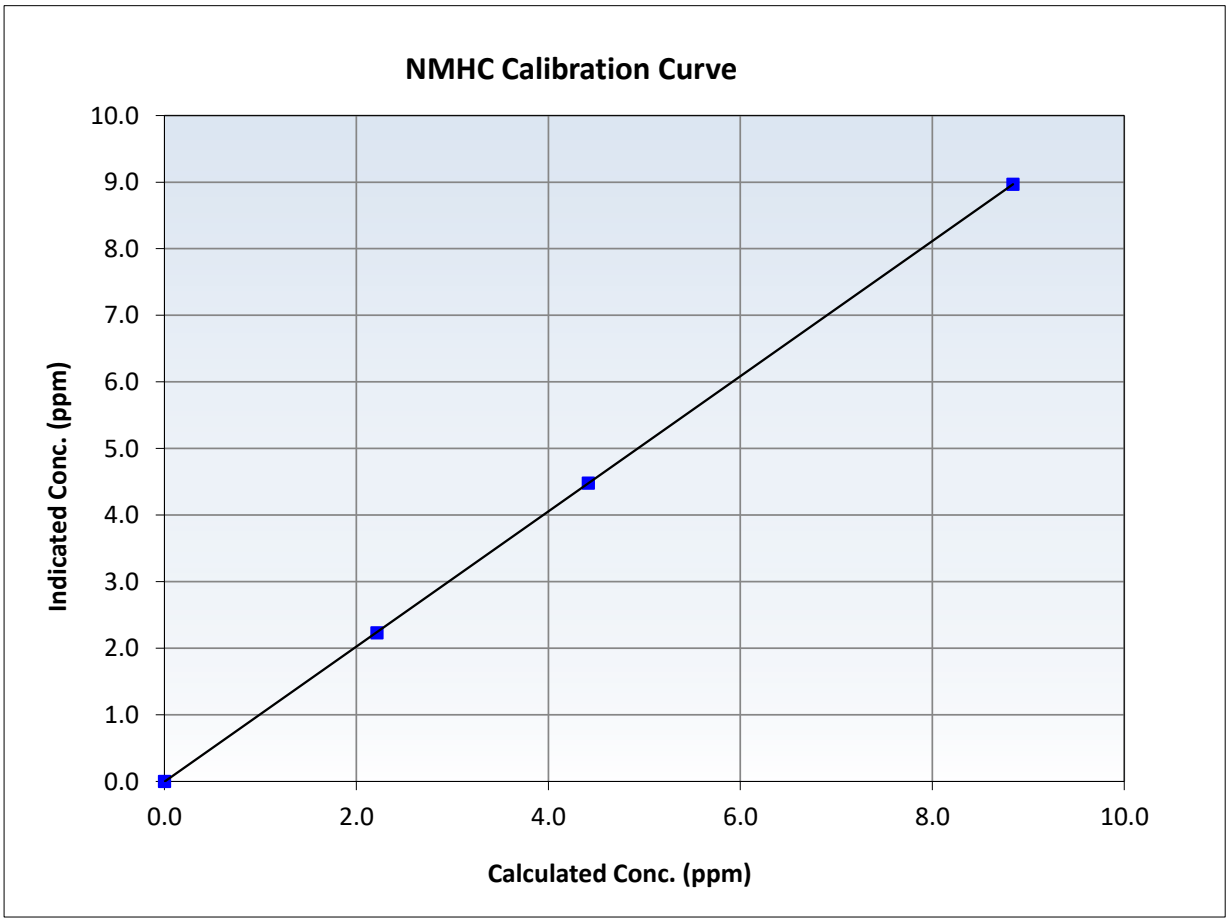
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Mannix	Station Number:	AMS 05
Start Time (MST):	9:47	End Time (MST):	13:00
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585649

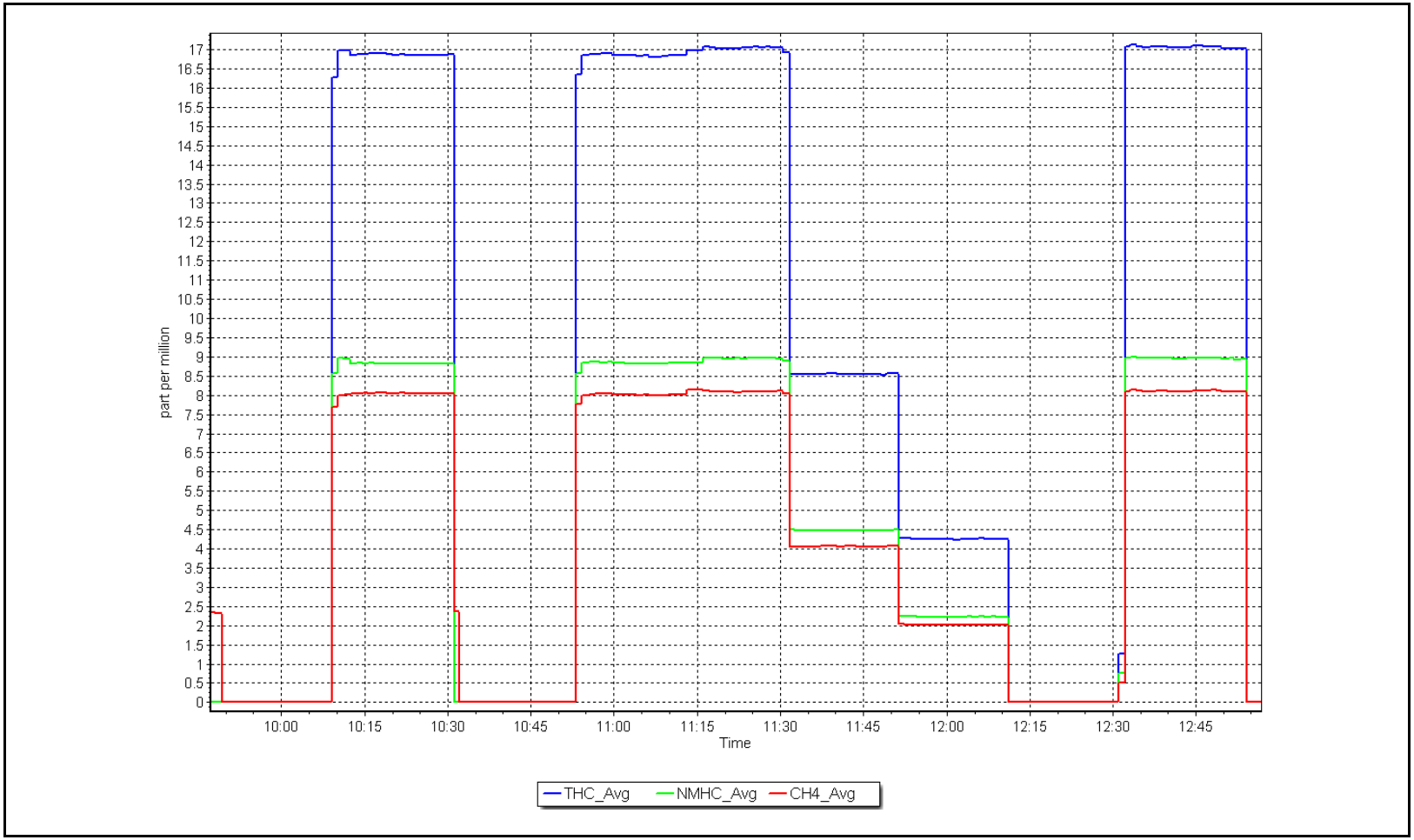
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.84	8.97	0.9858
4.42	4.48	0.9856
2.21	2.23	0.9907

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.014886	*0.90 - 1.10*
Intercept	-0.004268	*+/-0.5*



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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS06
PATRICIA MCINNES
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 4, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	11:05	End time (MST):	14:42
Reason:	Maintenance		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1160290013	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004767	0.998832	Backgd or Offset:	18.1	18.1
Calibration intercept:	2.178482	1.880203	Coeff or Slope:	0.910	0.910

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4919.7	80.3	799.5	808.6	0.988
As found Mid point	4959.8	40.2	400.2	406.9	0.983
As found Low point	4979.9	20.1	200.1	205.8	0.971
New cylinder response					
Baseline Corr As found:	808.8	Previous response	805.5	*% change	0.4%
Baseline Corr 2nd AF pt:	407.1	AF Slope:	1.010469	AF Intercept:	1.657905
Baseline Corr 3rd AF pt:	206.0	AF Correlation:	0.999976	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4919.7	80.3	799.5	799.5	1.000
Mid point	4959.8	40.2	400.2	402.3	0.995
Low point	4979.9	20.1	200.1	204.1	0.980
As left zero	5000	0.0	0.0	-0.1	----
As left span	4919.7	80.3	799.5	800.5	0.999
				Average Correction Factor:	0.992

Notes: Changed the external pump after multipoint as founds due to flow being low. Changed the inlet filter after as founds. No adjustments made.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

SO_2 Calibration Summary

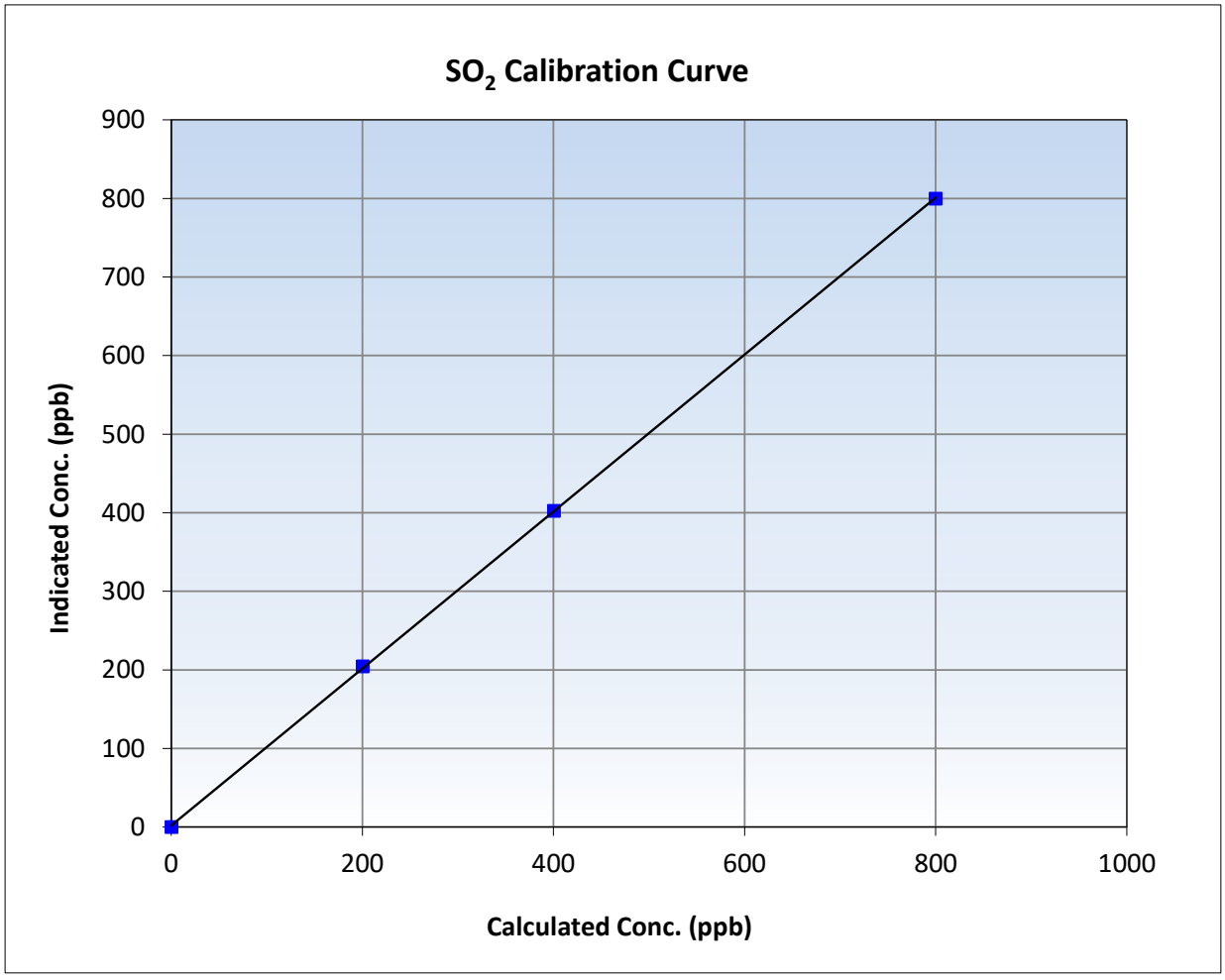
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 4, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	11:05	End Time (MST):	14:42
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

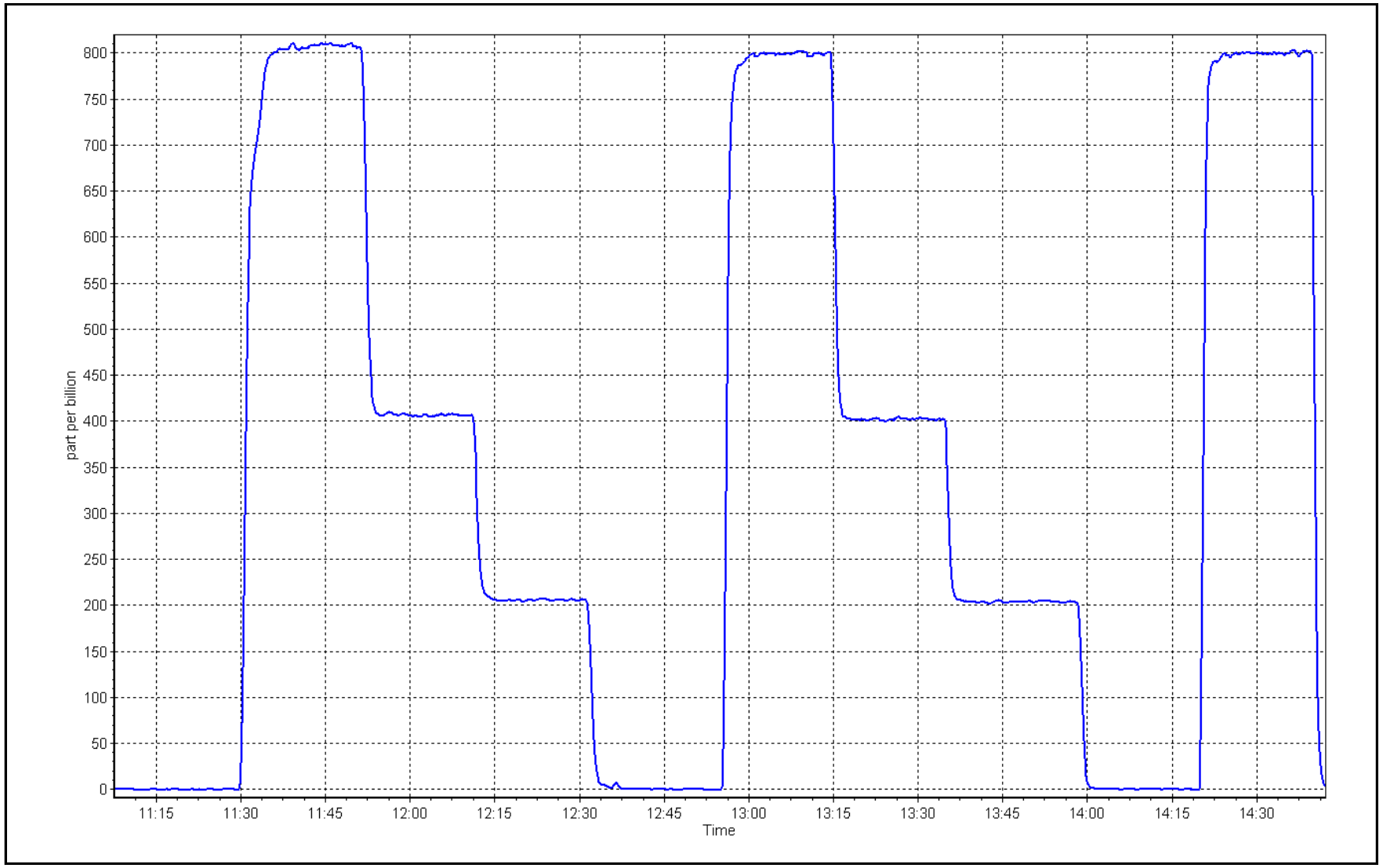
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.5	799.5	1.0000
400.2	402.3	0.9949
200.1	204.1	0.9805

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	0.998832	*0.90 - 1.10*
Intercept	1.880203	*+/-30*



SO2 Calibration Plot Date: November 4, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 27, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	9:30	End time (MST):	13:45
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1218153358
Converter make:	CDN-101		Converter serial #:	517
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.995318	1.002736	Backgd or Offset:	2.02	1.99
Calibration intercept:	0.160113	0.300485	Coeff or Slope:	1.153	1.153

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4925	75.1	80.0	82.3	0.974
As found Mid point	4963	37.5	40.0	41.5	0.965
As found Low point	4981	18.8	20.0	20.6	0.977
New cylinder response					

Baseline Corr As found:	82.2	Prev response:	79.81	*% change:	2.9%
Baseline Corr 2nd AF pt:	41.4	AF Slope:	1.028022	AF Intercept:	0.140361
Baseline Corr 3rd AF pt:	20.5	AF Correlation:	0.999970	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4925	75.1	80.0	80.4	0.995
Mid point	4963	37.5	40.0	40.8	0.979
Low point	4981	18.8	20.0	20.1	0.997
As left zero	5000	0.0	0.0	0.3	----
As left span	4925	75.1	80.0	80.7	0.992
SO2 Scrubber Check	4920	80.3	803.0	0.0	----

Date of last scrubber change:	December 20, 2021	Ave Corr Factor	0.990
Date of last converter efficiency test:			

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

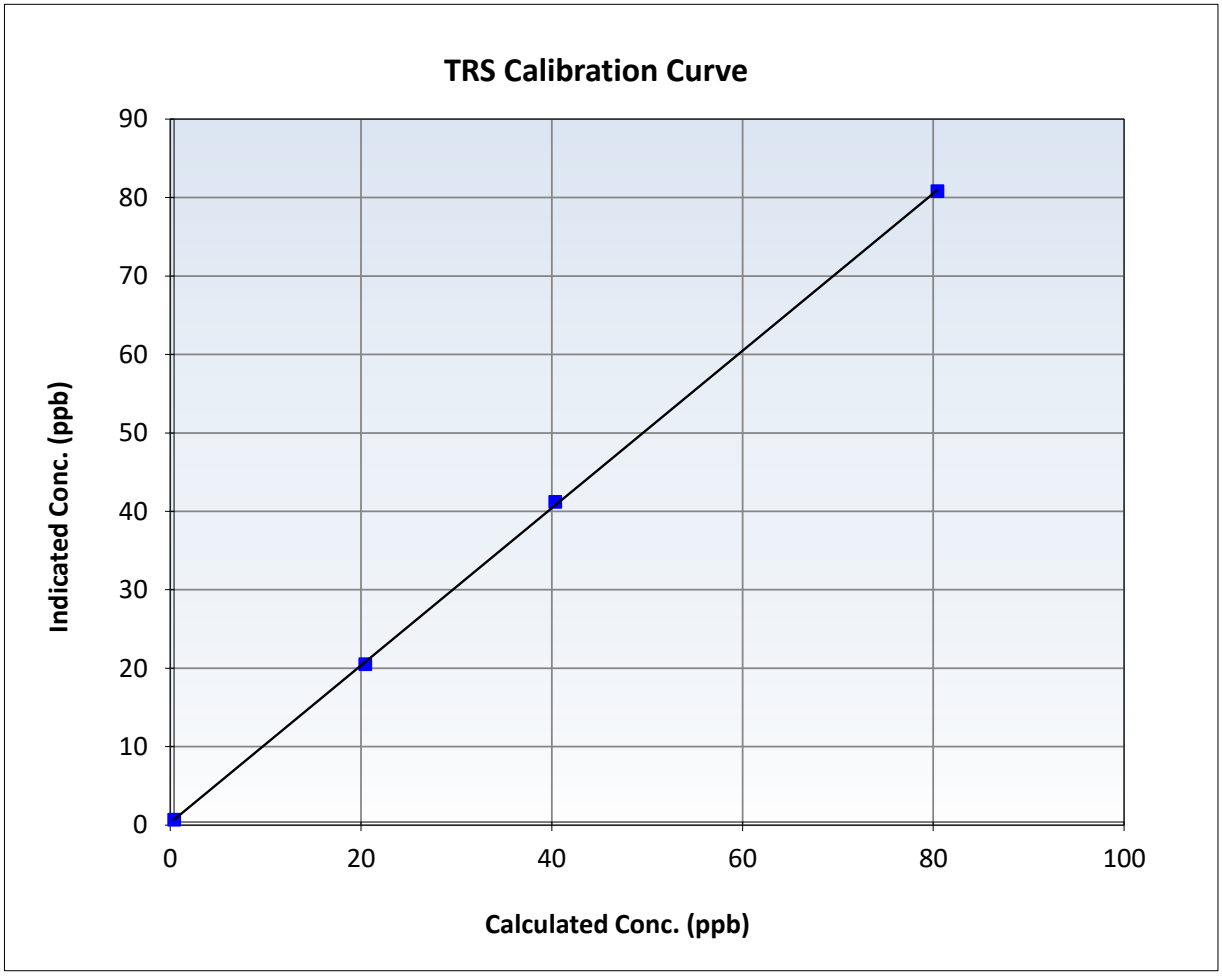
TRS Calibration Summary

Station Information

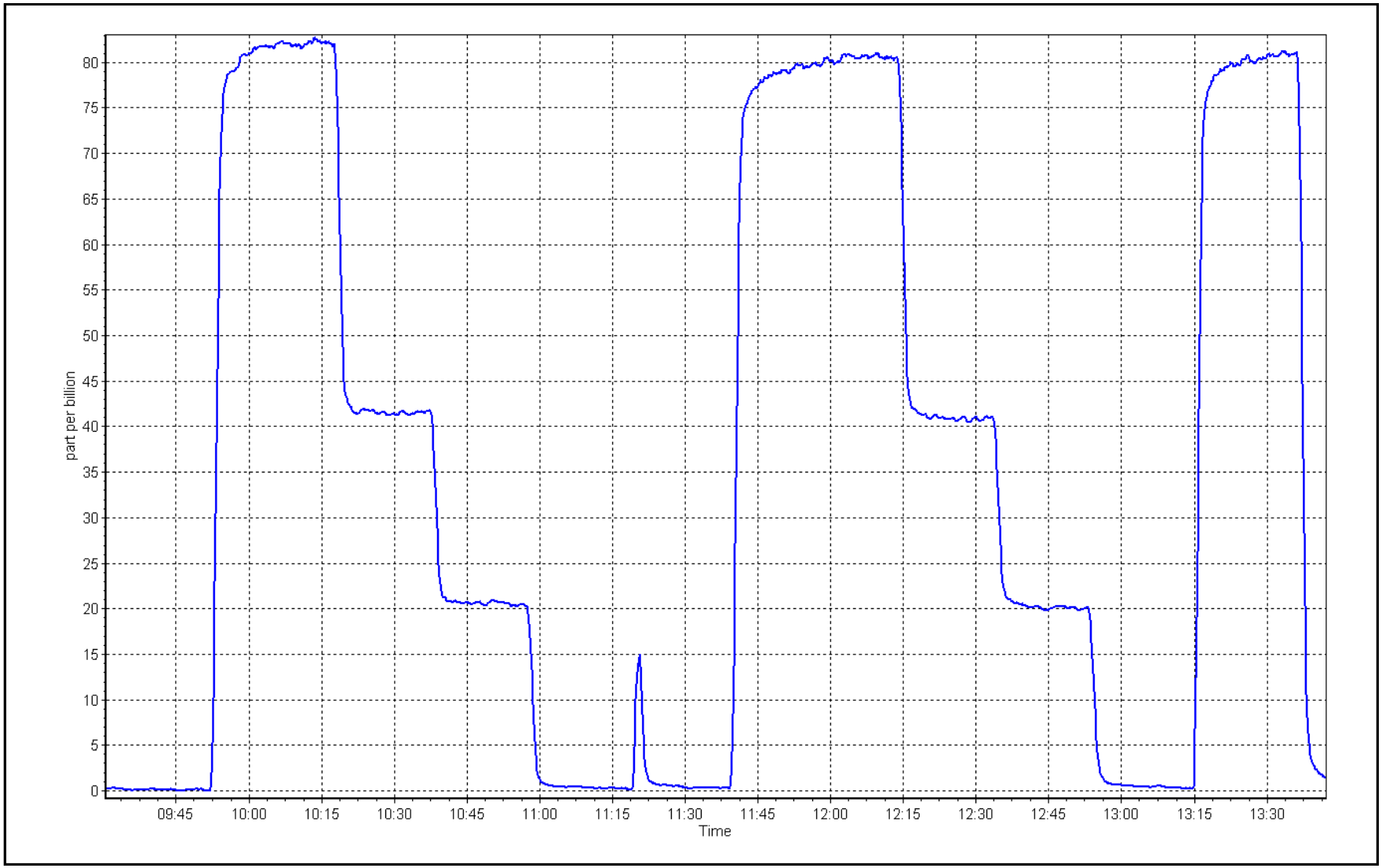
Calibration Date:	November 27, 2024	Previous Calibration:	October 7, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:30	End Time (MST):	13:45
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999917	*≥0.995*
80.0	80.4	0.9953	Slope	1.002736	*0.90 - 1.10*
40.0	40.8	0.9793			
20.0	20.1	0.9967	Intercept	0.300485	*+/-3*



TRS Calibration Plot Date: November 27, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 2, 2024	Last Cal Date:	October 23, 2024
Start time (MST):	9:24	End time (MST):	12:15
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148495	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.36E-04	2.54E-04	NMHC SP Ratio:	5.10E-05	5.23E-05
CH4 Retention time:	15.2	15.6	NMHC Peak Area:	177745	173500
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	16.45	1.041
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.45	Prev response	17.17	*% change	-4.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.11	1.001
Mid point	4960	40.2	8.57	8.60	0.997
Low point	4980	20.1	4.29	4.36	0.982
As left zero	5000	0.0	0.00	0.01	----
As left span	4920	80.3	17.12	17.12	1.000
				Average Correction Factor	0.993

Notes: Calibration done due to CH4 dips seen during sampling.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.07	8.93	1.015
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.93	Prev response	9.09	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.07	9.06	1.001
Mid point	4960	40.2	4.54	4.58	0.991
Low point	4980	20.1	2.27	2.33	0.972
As left zero	5000	0.0	0.00	0.01	----
As left span	4920	80.3	9.07	9.08	0.999
				Average Correction Factor	0.988

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.06	7.51	1.072
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.51	Prev response	8.09	*% change	-7.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.06	8.05	1.001
Mid point	4960	40.2	4.03	4.02	1.004
Low point	4980	20.1	2.02	2.03	0.994
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.04	1.002
				Average Correction Factor	1.000

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999657	0.997881
THC Cal Offset:	0.054619	0.039032
CH4 Cal Slope:	1.005454	0.998498
CH4 Cal Offset:	-0.009907	0.002848
NMHC Cal Slope:	0.995737	0.997294
NMHC Cal Offset:	0.061020	0.035585

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

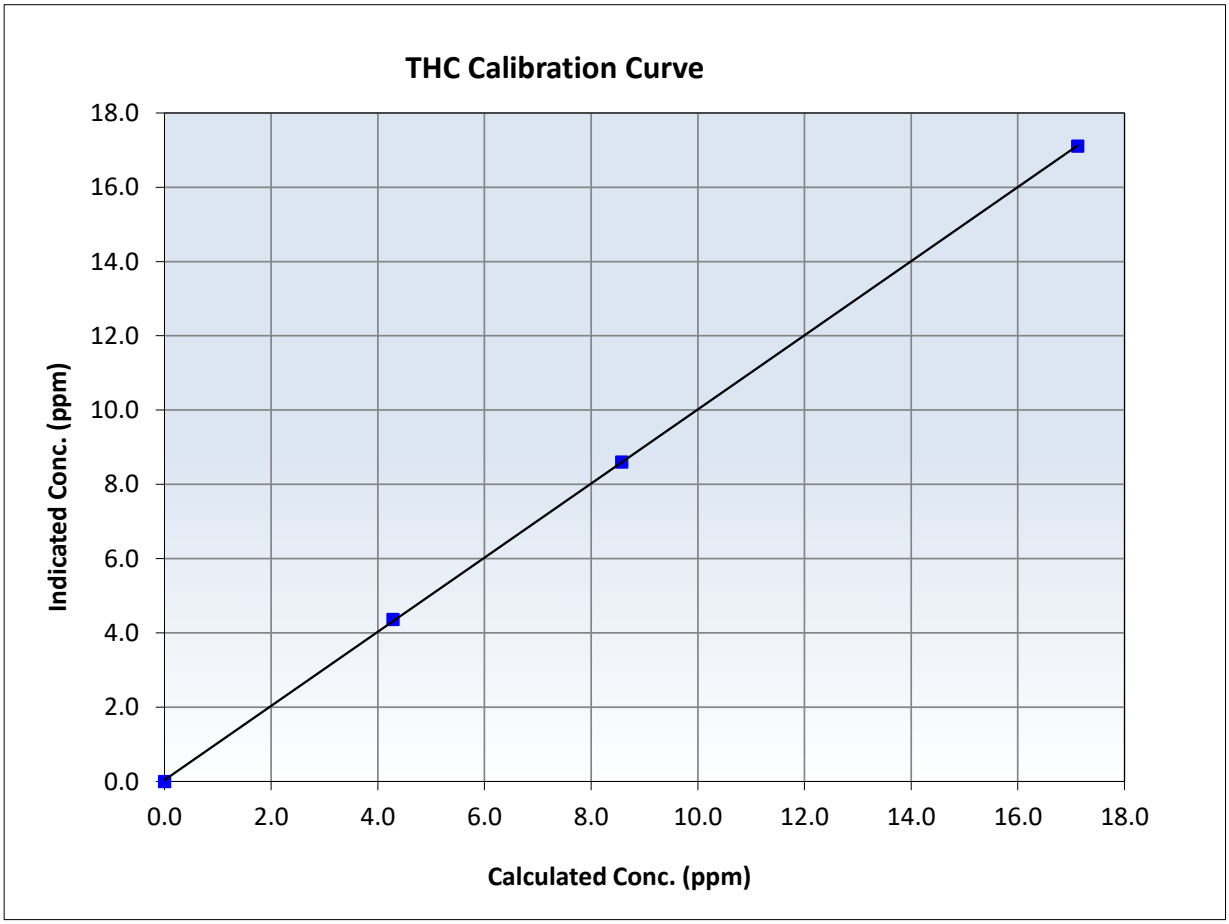
THC Calibration Summary

Station Information

Calibration Date:	November 2, 2024	Previous Calibration:	October 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:24	End Time (MST):	12:15
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999975	*≥0.995*
17.12	17.11	1.0007	Slope	0.997881	*0.90 - 1.10*
8.57	8.60	0.9967	Intercept	0.039032	*+/-0.5*
4.29	4.36	0.9823			



Wood Buffalo Environmental Association

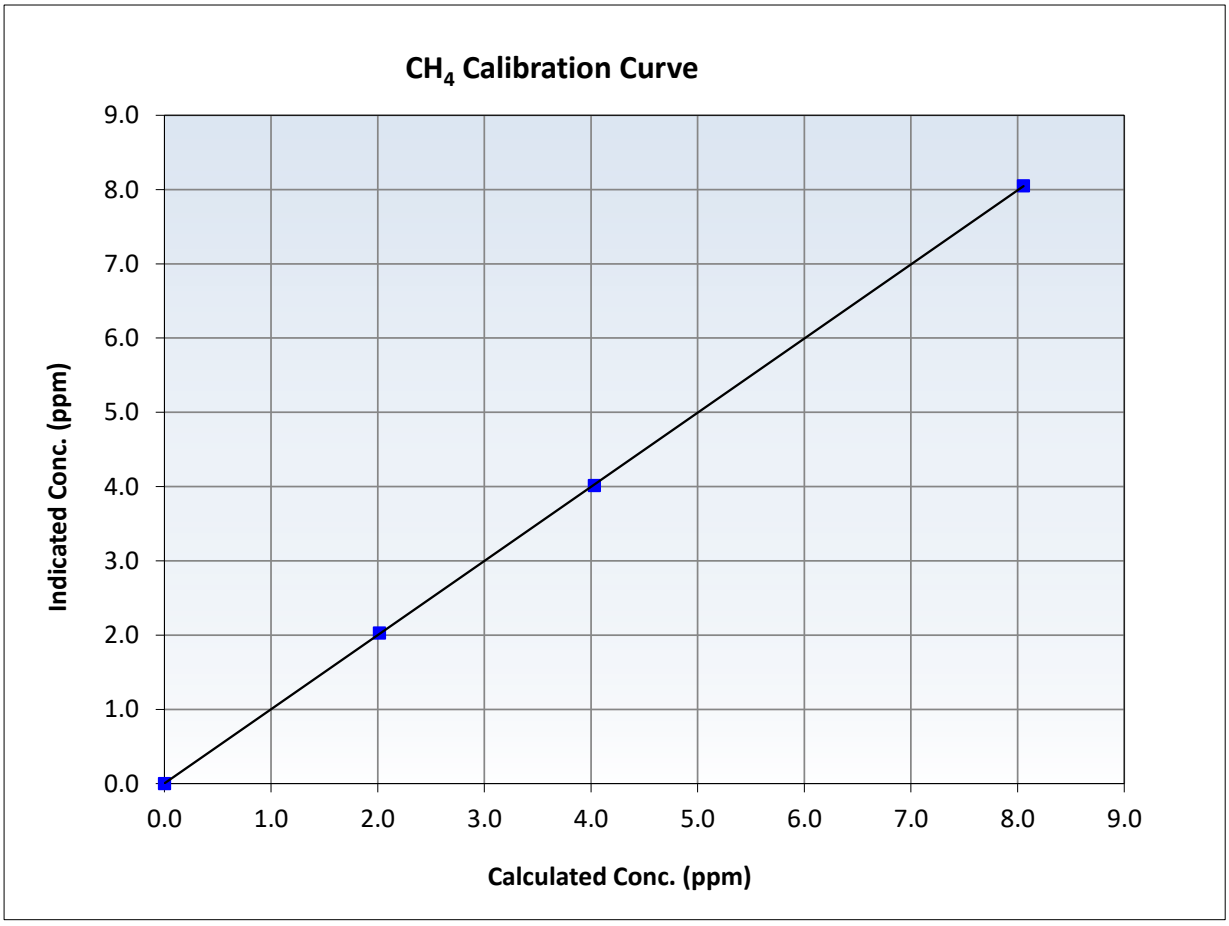
CH_4 Calibration Summary

Station Information

Calibration Date:	November 2, 2024	Previous Calibration:	October 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:24	End Time (MST):	12:15
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999990	≥0.995
8.06	8.05	1.0007	Slope	0.998498	0.90 - 1.10
4.03	4.02	1.0042	Intercept	0.002848	+/-0.5
2.02	2.03	0.9938			



Wood Buffalo Environmental Association

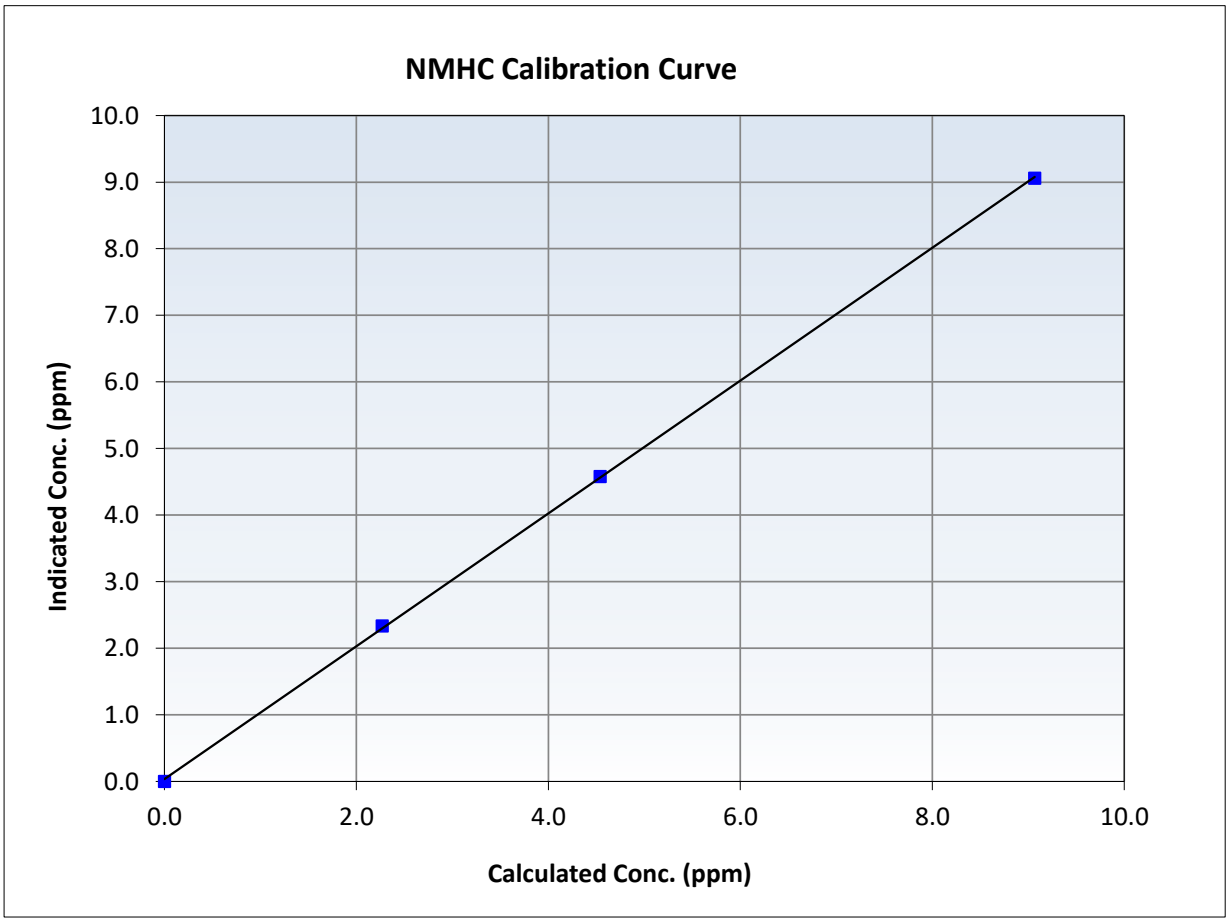
NMHC Calibration Summary

Station Information

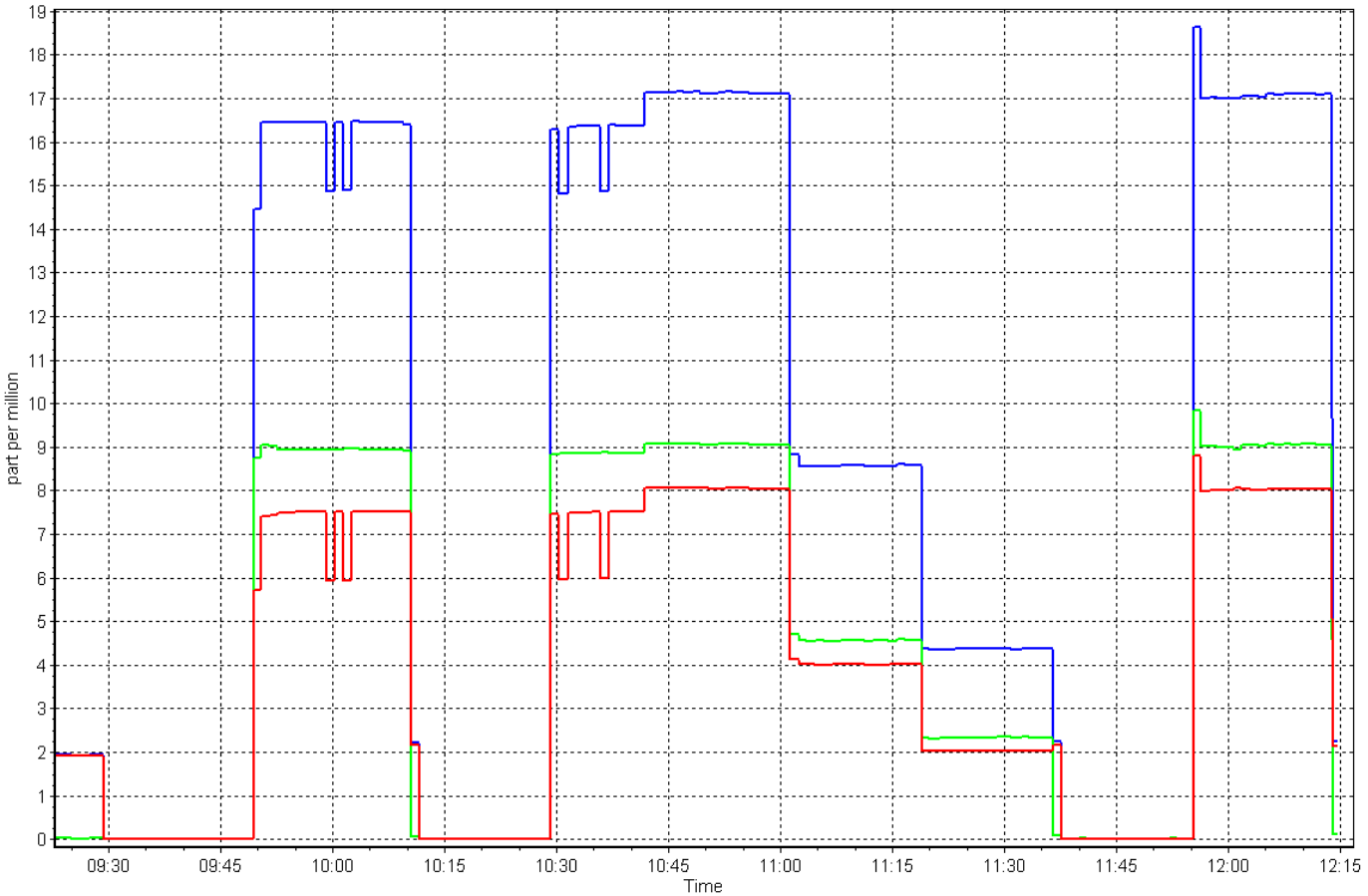
Calibration Date:	November 2, 2024	Previous Calibration:	October 23, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:24	End Time (MST):	12:15
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999929	≥0.995
9.07	9.06	1.0008	Slope	0.997294	0.90 - 1.10
4.54	4.58	0.9908	Intercept	0.035585	+/-0.5
2.27	2.33	0.9724			



NMHC Calibration Plot Date: November 2, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 15, 2024	Last Cal Date:	November 2, 2024
Start time (MST):	10:00	End time (MST):	14:30
Reason:	Maintenance		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148495	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.54E-04	2.79E-04	NMHC SP Ratio:	5.23E-05	5.53E-05
CH4 Retention time:	15.6	16.0	NMHC Peak Area:	173500	164148
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	15.88	1.078
As found Mid point	4960	40.2	8.57	8.00	1.072
As found Low point	4980	20.1	4.29	4.06	1.057
New cylinder response					
Baseline Corr AF:	15.88	Prev response	17.13	*% change	-7.8%
Baseline Corr 2nd AF:	8.00	AF Slope:	0.926375	AF Intercept:	0.040726
Baseline Corr 3rd AF:	4.06	AF Correlation:	0.999970	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.02	1.006
Mid point	4960	40.2	8.57	8.65	0.991
Low point	4980	20.1	4.29	4.37	0.981
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.12	17.35	0.987
				Average Correction Factor	0.992

Notes: Instrument started dipping. Changed the actuator after multipoint as founds. Adjusted the span and ran a zero chromatogram. Chromatograms and diagnostics are looking good.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.07	8.57	1.059
As found Mid point	4960	40.2	4.54	4.34	1.047
As found Low point	4980	20.1	2.27	2.21	1.026
New cylinder response					
Baseline Corr AF:	8.57	Prev response	9.08	*% change	-6.0%
Baseline Corr 2nd AF:	4.34	AF Slope:	0.942715	AF Intercept:	0.036704
Baseline Corr 3rd AF:	2.21	AF Correlation:	0.999915	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.07	9.01	1.006
Mid point	4960	40.2	4.54	4.62	0.983
Low point	4980	20.1	2.27	2.34	0.972
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.07	9.22	0.984
				Average Correction Factor	0.987

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.06	7.32	1.100
As found Mid point	4960	40.2	4.03	3.66	1.102
As found Low point	4980	20.1	2.02	1.84	1.093
New cylinder response					
Baseline Corr AF:	7.32	Prev response	8.05	*% change	-9.9%
Baseline Corr 2nd AF:	3.66	AF Slope:	0.908479	AF Intercept:	0.003023
Baseline Corr 3rd AF:	1.84	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.06	8.01	1.006
Mid point	4960	40.2	4.03	4.04	0.999
Low point	4980	20.1	2.02	2.03	0.991
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.13	0.991
				Average Correction Factor	0.999

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.997881	0.992745
THC Cal Offset:	0.039032	0.070022
CH4 Cal Slope:	0.998498	0.993210
CH4 Cal Offset:	0.002848	0.017245
NMHC Cal Slope:	0.997294	0.991879
NMHC Cal Offset:	0.035585	0.053577

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

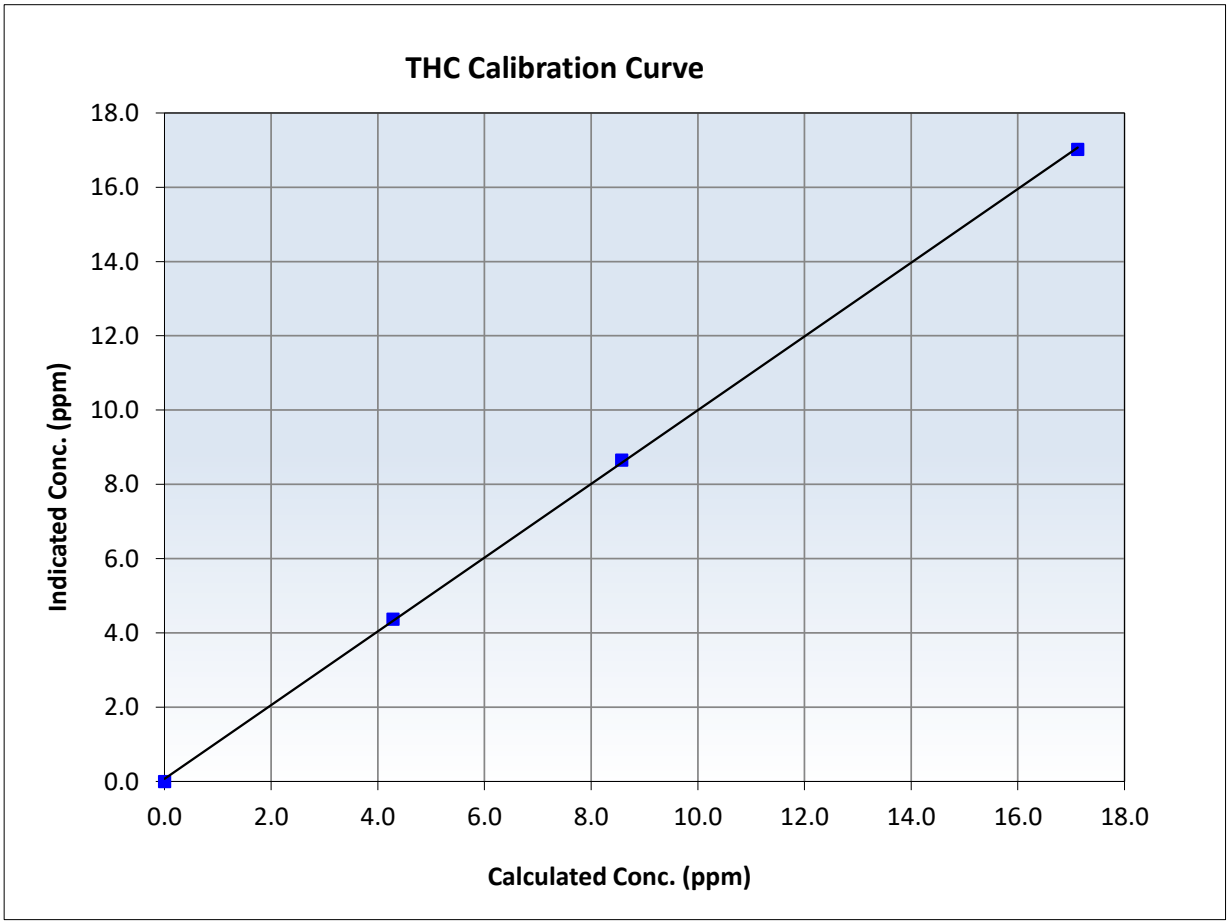
THC Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	November 2, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:00	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999909	≥0.995
17.12	17.02	1.0060	Slope	0.992745	0.90 - 1.10
8.57	8.65	0.9907	Intercept	0.070022	+/-0.5
4.29	4.37	0.9808			



Wood Buffalo Environmental Association

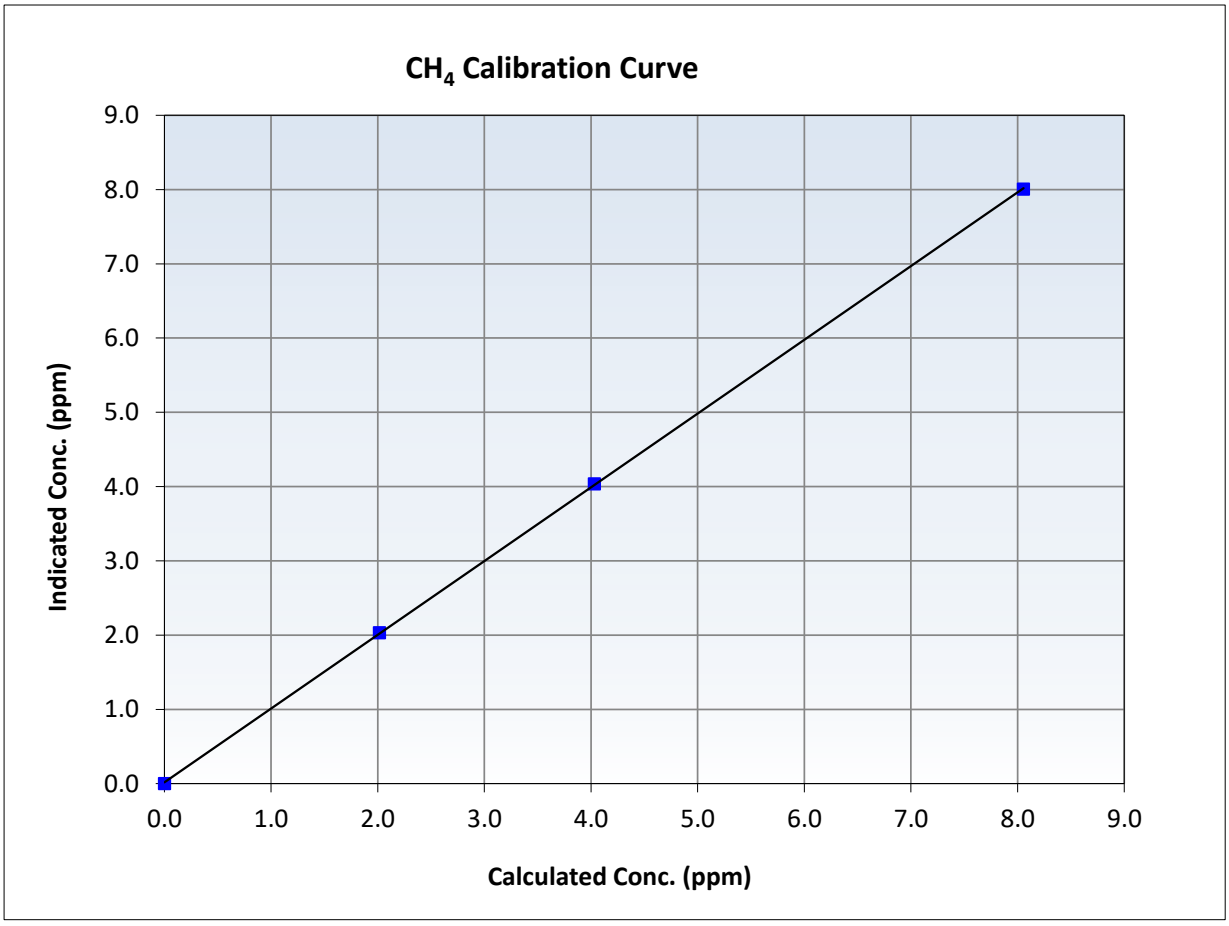
CH_4 Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	November 2, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:00	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999978	≥0.995
8.06	8.01	1.0060	Slope	0.993210	0.90 - 1.10
4.03	4.04	0.9992	Intercept	0.017245	+/-0.5
2.02	2.03	0.9913			



Wood Buffalo Environmental Association

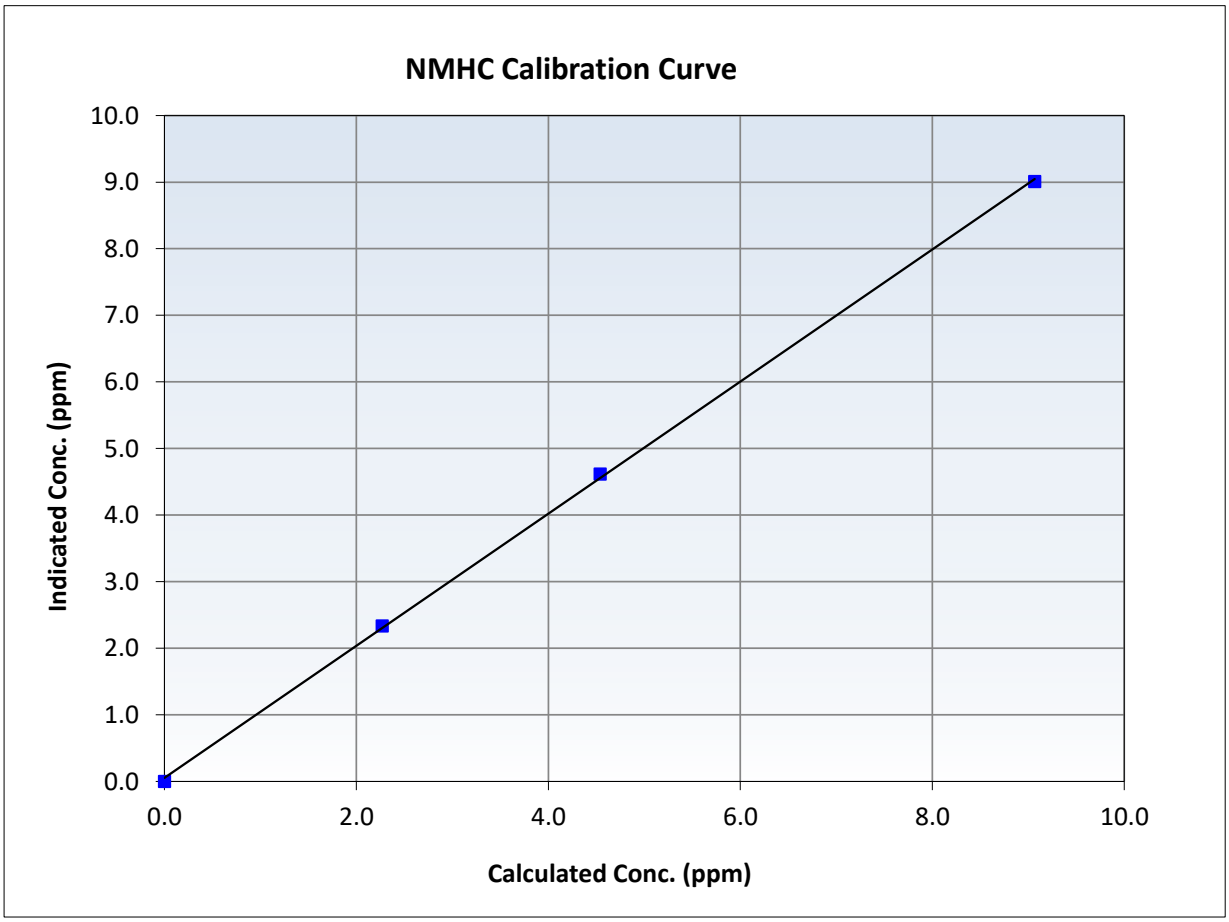
NMHC Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	November 2, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:00	End Time (MST):	14:30
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999798	*≥0.995*
9.07	9.01	1.0064	Slope	0.991879	*0.90 - 1.10*
4.54	4.62	0.9833	Intercept	0.053577	*+/-0.5*
2.27	2.34	0.9716			



NMHC Calibration Plot Date: November 15, 2024 Location: Patricia McInnes

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 22, 2024	Last Cal Date:	November 15, 2024
Start time (MST):	10:27	End time (MST):	14:45
Reason:	Maintenance		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148495	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.79E-04	2.61E-04	NMHC SP Ratio:	5.53E-05	5.00E-05
CH4 Retention time:	16.0	16.2	NMHC Peak Area:	164148	181518
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	16.87	1.015
As found Mid point	4960	40.2	8.57	8.46	1.014
As found Low point	4980	20.1	4.29	4.29	1.000
New cylinder response					
Baseline Corr AF:	16.87	Prev response	17.07	*% change	-1.2%
Baseline Corr 2nd AF:	8.46	AF Slope:	0.984236	AF Intercept:	0.027298
Baseline Corr 3rd AF:	4.29	AF Correlation:	0.999983	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.12	17.07	1.003
Mid point	4960	40.2	8.57	8.54	1.004
Low point	4980	20.1	4.29	4.31	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.12	16.98	1.009
				Average Correction Factor	1.001

Notes: There were slight spikes occurring every 40 minutes or so. Adjusted the window timings and completed a zero chromatogram adjustment and span adjustment.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.07	9.21	0.985
As found Mid point	4960	40.2	4.54	4.63	0.981
As found Low point	4980	20.1	2.27	2.36	0.964
New cylinder response					
Baseline Corr AF:	9.21	Prev response	9.05	*% change	1.8%
Baseline Corr 2nd AF:	4.63	AF Slope:	1.013993	AF Intercept:	0.023557
Baseline Corr 3rd AF:	2.36	AF Correlation:	0.999967	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.07	9.03	1.004
Mid point	4960	40.2	4.54	4.54	1.000
Low point	4980	20.1	2.27	2.29	0.990
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.07	8.98	1.009
				Average Correction Factor	0.998

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.06	7.67	1.051
As found Mid point	4960	40.2	4.03	3.83	1.054
As found Low point	4980	20.1	2.02	1.93	1.043
New cylinder response					
Baseline Corr AF:	7.67	Prev response	8.02	*% change	-4.6%
Baseline Corr 2nd AF:	3.83	AF Slope:	0.951112	AF Intercept:	0.002941
Baseline Corr 3rd AF:	1.93	AF Correlation:	0.999990	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.06	8.04	1.001
Mid point	4960	40.2	4.03	4.00	1.007
Low point	4980	20.1	2.02	2.01	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.06	8.00	1.007
				Average Correction Factor	1.003

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.992745	0.996370
THC Cal Offset:	0.070022	0.011854
CH4 Cal Slope:	0.993210	0.998185
CH4 Cal Offset:	0.017245	-0.004547
NMHC Cal Slope:	0.991879	0.994934
NMHC Cal Offset:	0.053577	0.016200

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

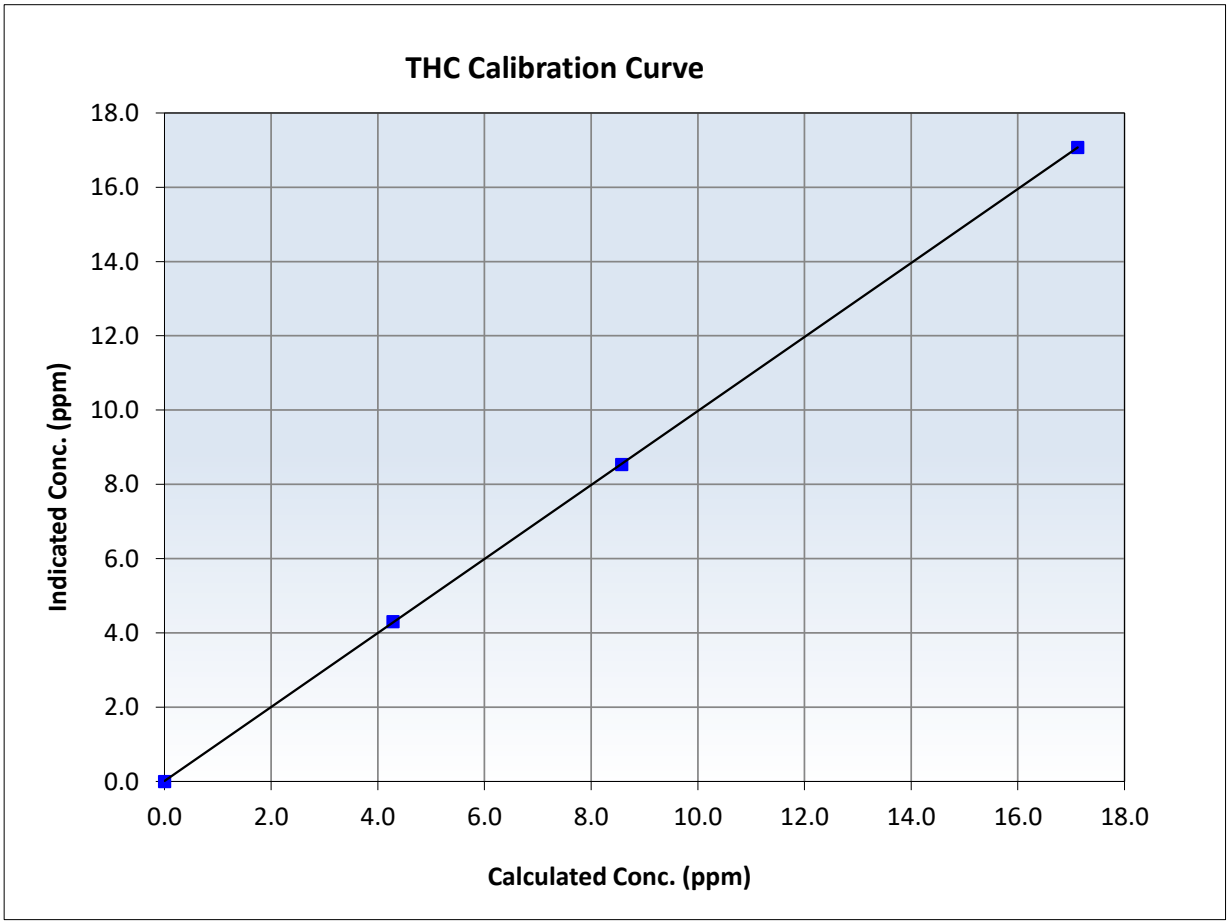
THC Calibration Summary

Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	November 15, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:27	End Time (MST):	14:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999994	≥0.995
17.12	17.07	1.0029	Slope	0.996370	0.90 - 1.10
8.57	8.54	1.0038	Intercept	0.011854	+/-0.5
4.29	4.31	0.9951			



Wood Buffalo Environmental Association

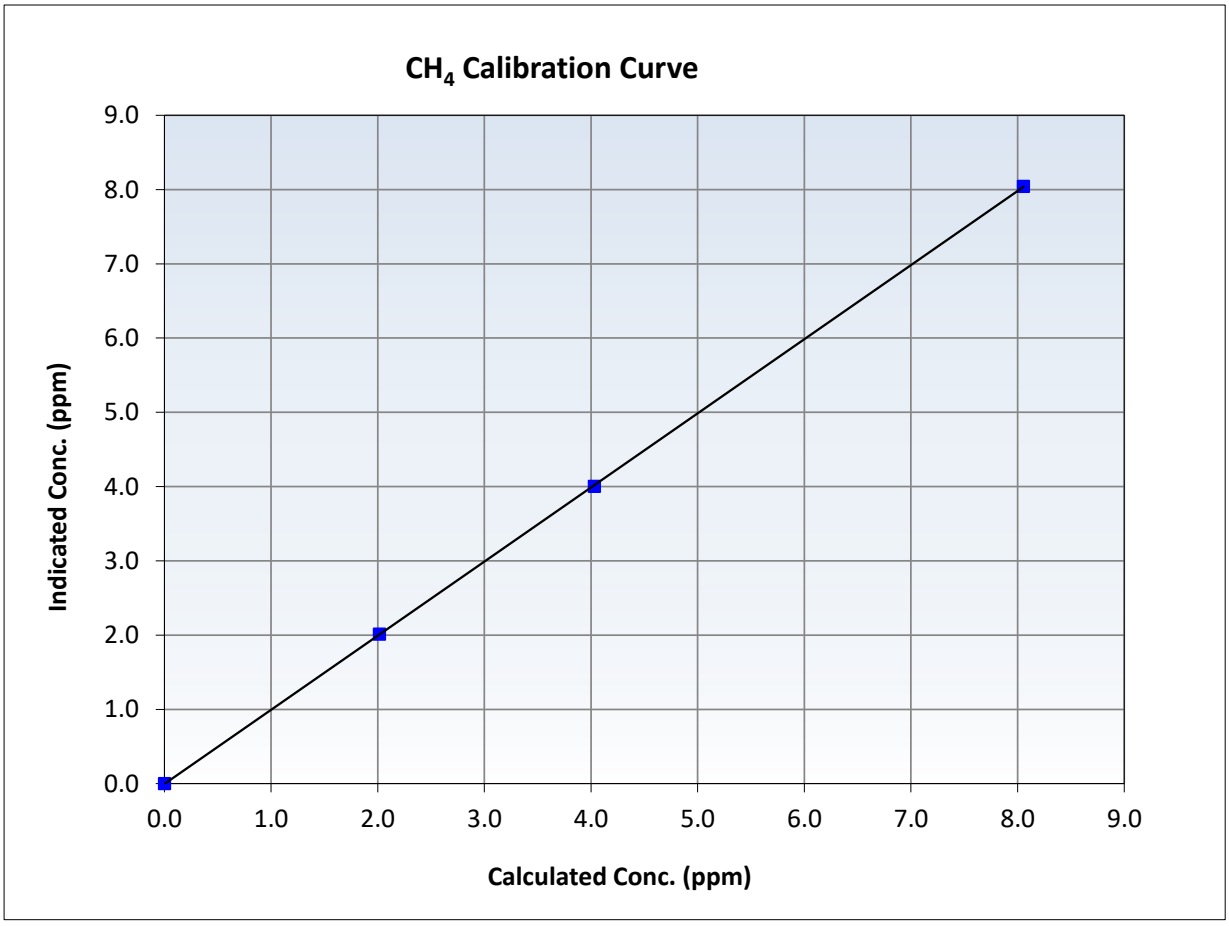
CH_4 Calibration Summary

Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	November 15, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:27	End Time (MST):	14:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999988	≥0.995
8.06	8.04	1.0015	Slope	0.998185	0.90 - 1.10
4.03	4.00	1.0074			
2.02	2.01	1.0012	Intercept	-0.004547	+/-0.5



Wood Buffalo Environmental Association

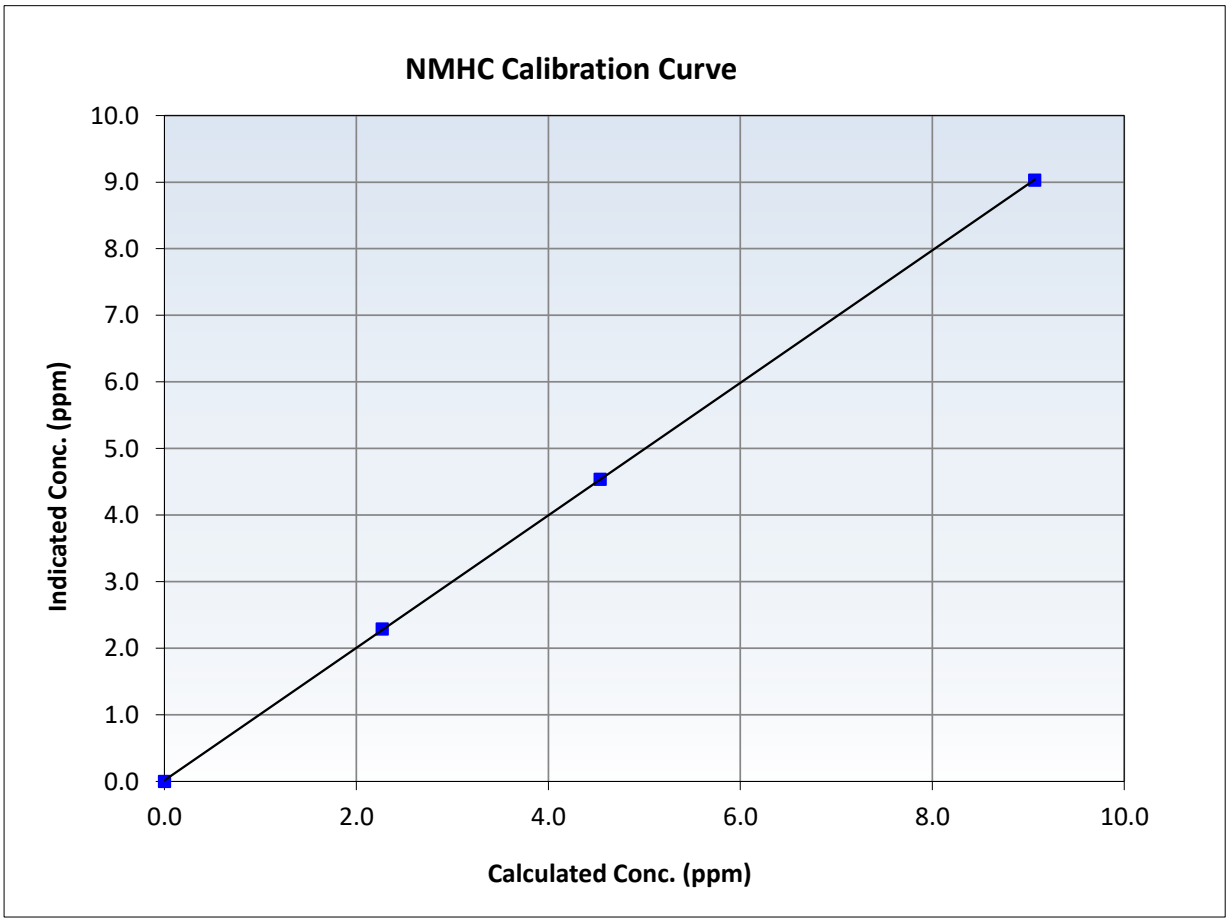
NMHC Calibration Summary

Station Information

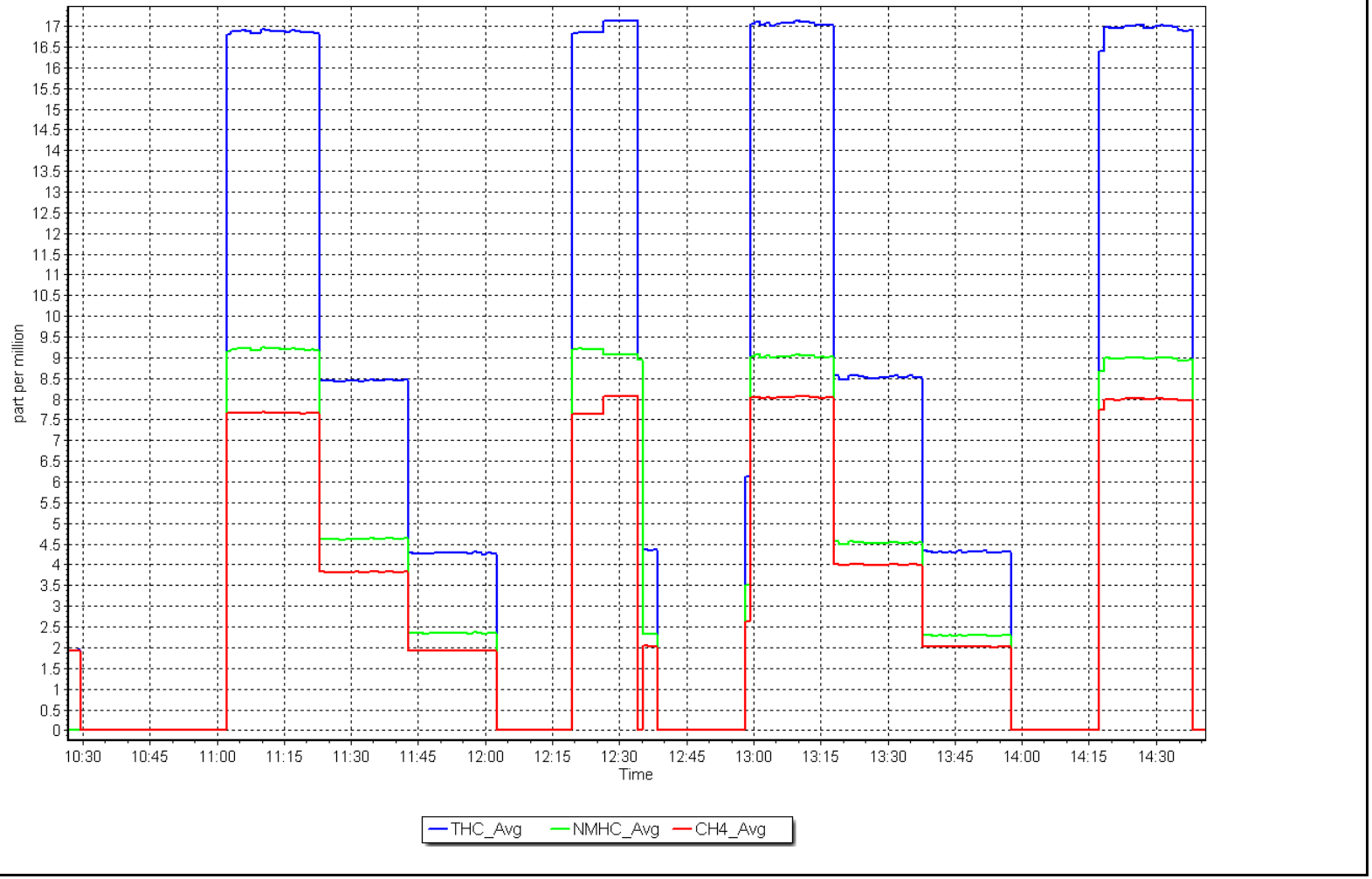
Calibration Date:	November 22, 2024	Previous Calibration:	November 15, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:27	End Time (MST):	14:45
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148495

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999985	*≥0.995*
9.07	9.03	1.0041	Slope	0.994934	*0.90 - 1.10*
4.54	4.54	1.0002	Intercept	0.016200	*+/-0.5*
2.27	2.29	0.9902			



NMHC Calibration Plot Date: November 22, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 26, 2024	Last Cal Date:	November 22, 2024
Start time (MST):	12:34	End time (MST):	14:30
Reason:	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 Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3566	
Zero Air Gen model:	API T701		Serial Number:	4602	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1118148495	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.61E-04	2.61E-04	NMHC SP Ratio:	5.00E-05	5.00E-05
CH4 Retention time:	16.2	16.2	NMHC Peak Area:	181518	181518
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.12	16.72	1.024
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.72	Prev response	17.07	*% change	-2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.05	----
High point	4920	80.3	17.12	16.64	1.029
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 1.029

Notes: Swapped out the H2 cylinder after as founds.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.07	8.81	1.029
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.81	Prev response	9.04	*% change	-2.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.07	8.71	1.041
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.041

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.06	7.91	1.018
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.91	Prev response	8.04	*% change	-1.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

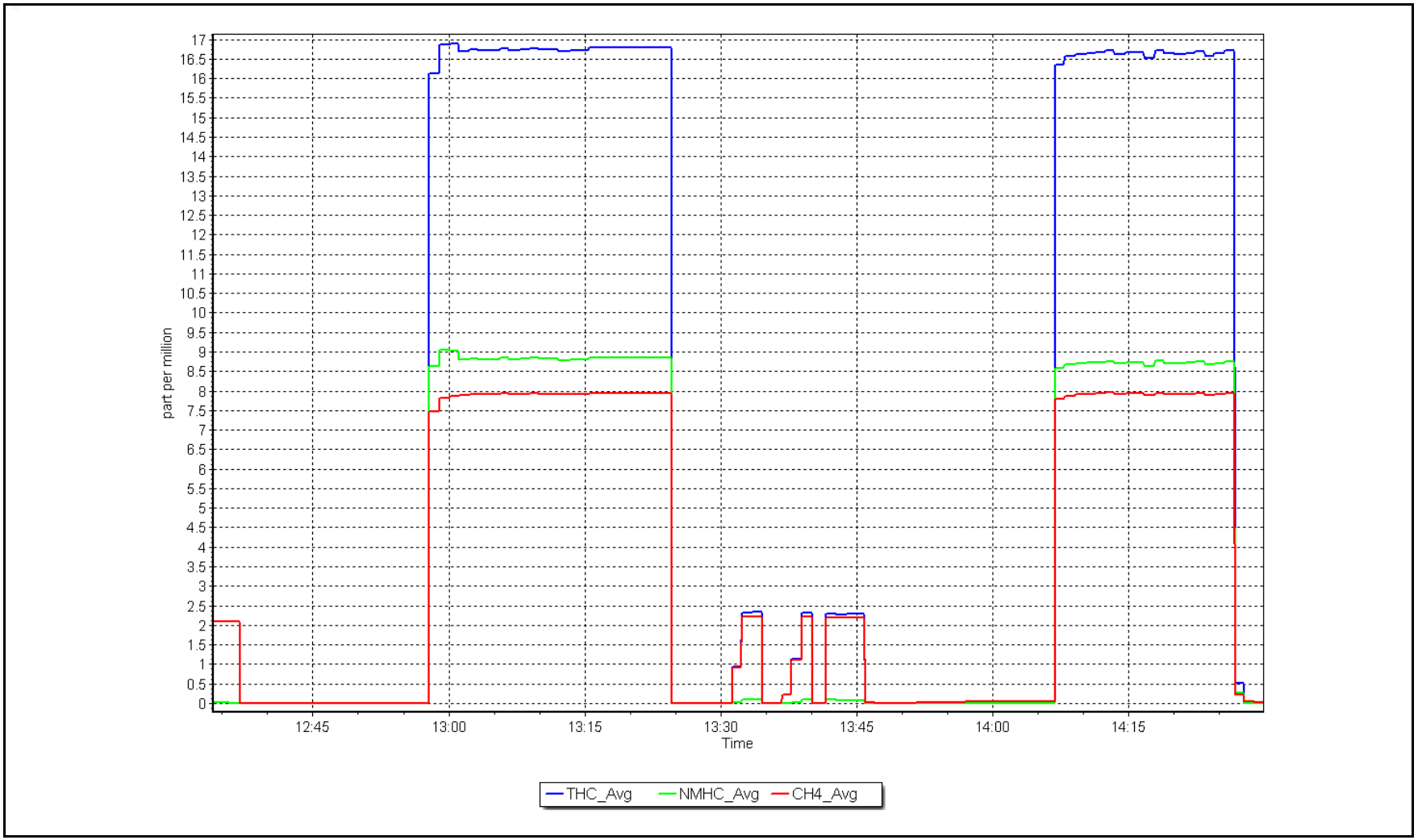
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.05	----
High point	4920	80.3	8.06	7.93	1.016
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	1.016

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.996370	0.969002
THC Cal Offset:	0.011854	0.048000
CH4 Cal Slope:	0.998185	0.977817
CH4 Cal Offset:	-0.004547	0.048000
NMHC Cal Slope:	0.994934	0.960949
NMHC Cal Offset:	0.016200	0.000000

Calibration Performed By: Max Farrell

NMHC Calibration Plot Date: November 26, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Patricia McInnes
Station number:	AMS 06
Calibration Date:	November 13, 2024
Last Cal Date:	October 3, 2024
Start time (MST):	9:35
End time (MST):	14:22
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.2	-0.6	----	----
AF High point	4914	86.2	826.5	799.7	26.7	827.5	796.3	31.1	0.9978	1.0041
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 829.8 ppb	NO = 802.2 ppb
Baseline Corr 1st pt	NO_X = 828.3 ppb	NO = 796.5 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.2%

*Percent Change NO = -0.7%

As Found Statistics

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

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1172750022

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.832	0.832	NO bkgnd or offset:	3.7	3.7
NOX coeff or slope:	0.989	0.989	NOX bkgnd or offset:	4.7	4.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	155.1	155.1

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.001752	0.996717
NO_X Cal Offset:	1.915209	1.636275
NO Cal Slope:	1.001660	0.995700
NO Cal Offset:	1.162365	1.223377
NO_2 Cal Slope:	1.002990	1.005126
NO_2 Cal Offset:	0.278909	0.370755

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.3	----	----
High point	4914	86.2	826.5	799.7	26.7	824.3	796.8	27.5	1.0026	1.0037
Mid point	4957	43.1	413.2	399.9	13.4	414.6	400.1	14.4	0.9967	0.9994
Low point	4978	21.6	207.1	200.4	6.7	210.2	202.2	7.9	0.9853	0.9912
As left zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.2	-0.4	----	----
As left span	4914	86.2	826.5	397.3	429.2	823.8	397.3	426.5	1.0032	1.0000
							Average Correction Factor		0.9949	0.9981

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.3	----	----
High GPT point	795.5	398.3	423.9	426.1	0.9949	100.5%
Mid GPT point	795.5	598.7	223.5	225.3	0.9921	100.8%
Low GPT point	795.5	698.2	124.0	125.8	0.9859	101.4%
				Average Correction Factor	0.9909	100.9%

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

NO_X Calibration Summary

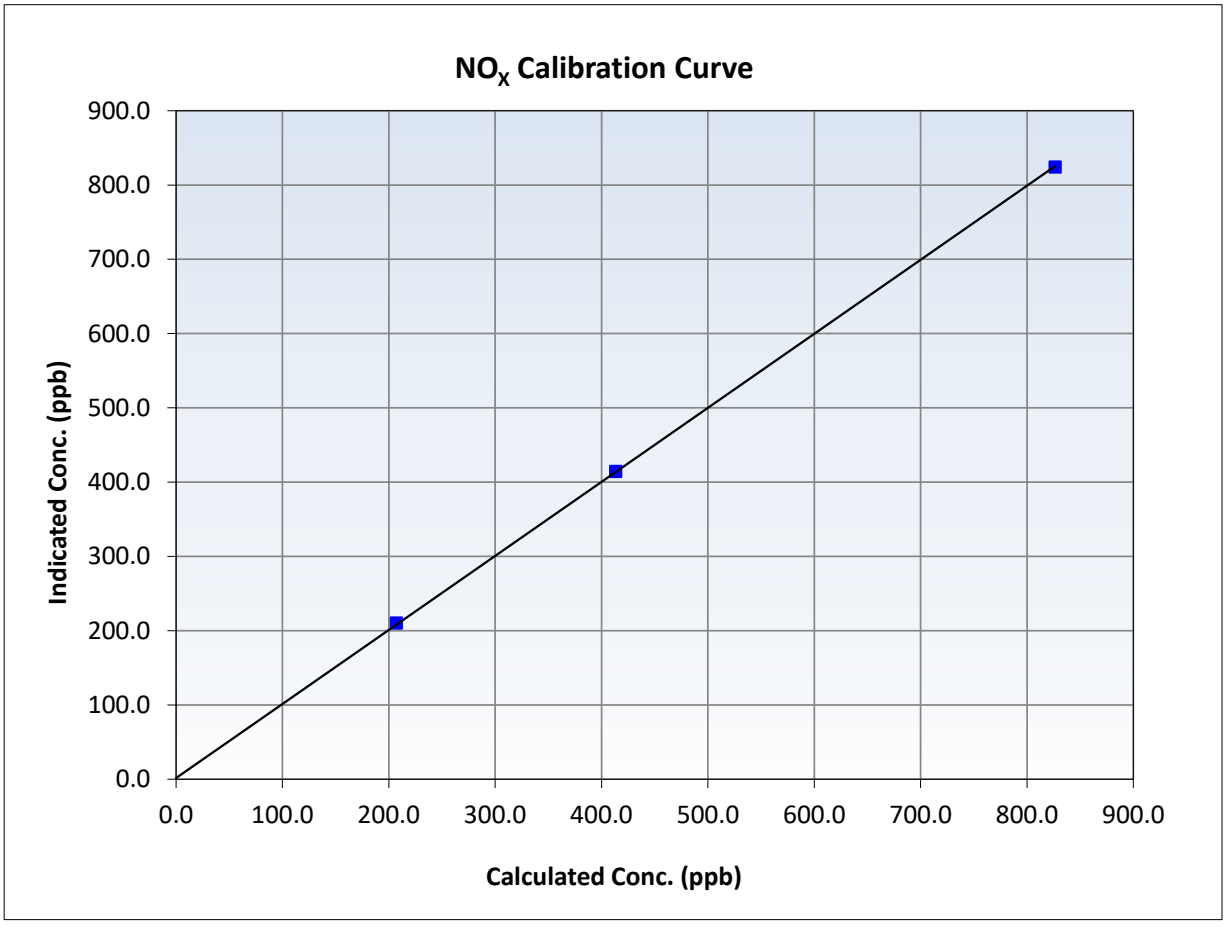
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 3, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:35	End Time (MST):	14:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.5	----
826.5	824.3	1.0026
413.2	414.6	0.9967
207.1	210.2	0.9853

Statistical Evaluation		Limits
Correlation Coefficient	0.999969	≥0.995
Slope	0.996717	0.90 - 1.10
Intercept	1.636275	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

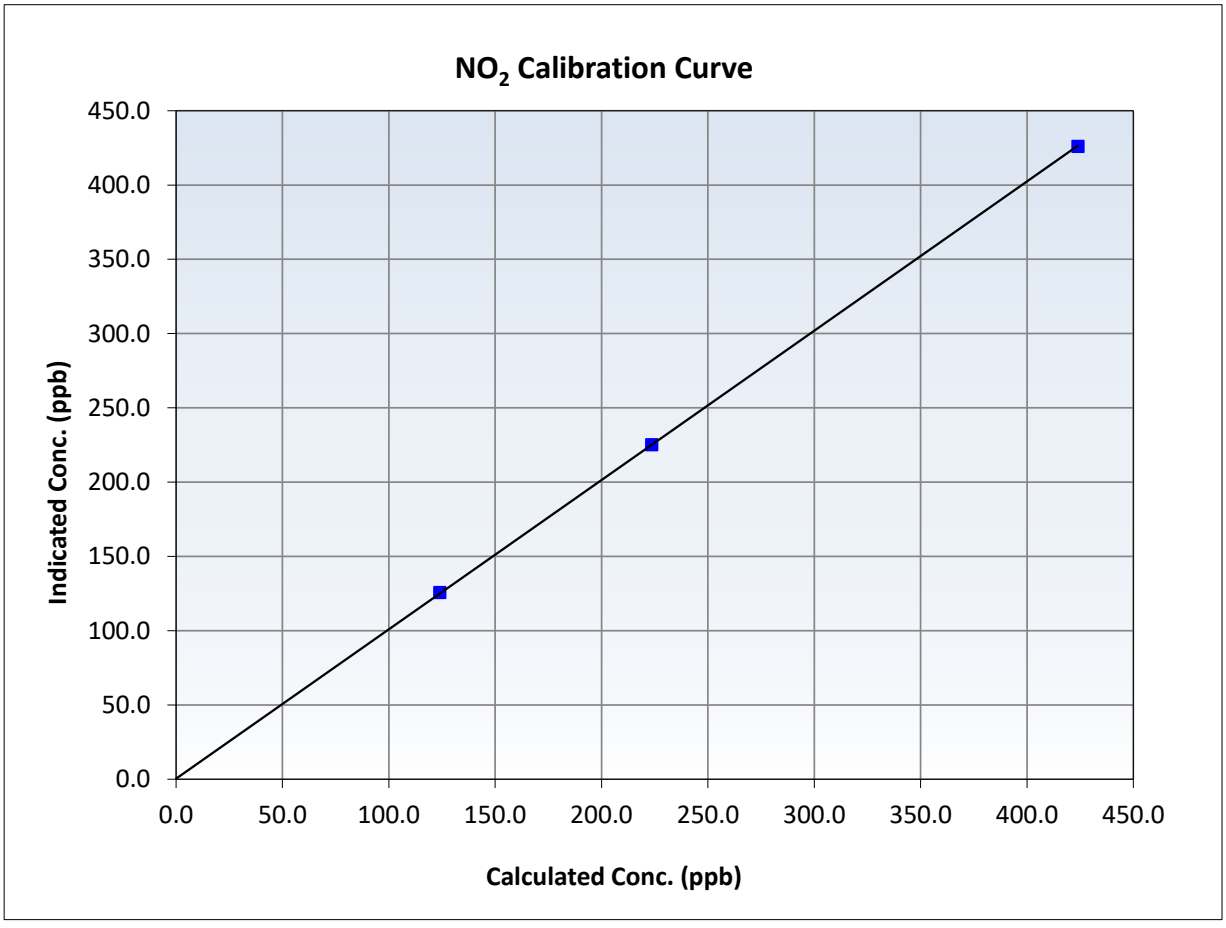
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 3, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:35	End Time (MST):	14:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
423.9	426.1	0.9949
223.5	225.3	0.9921
124.0	125.8	0.9859

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	1.005126	*0.90 - 1.10*
Intercept	0.370755	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

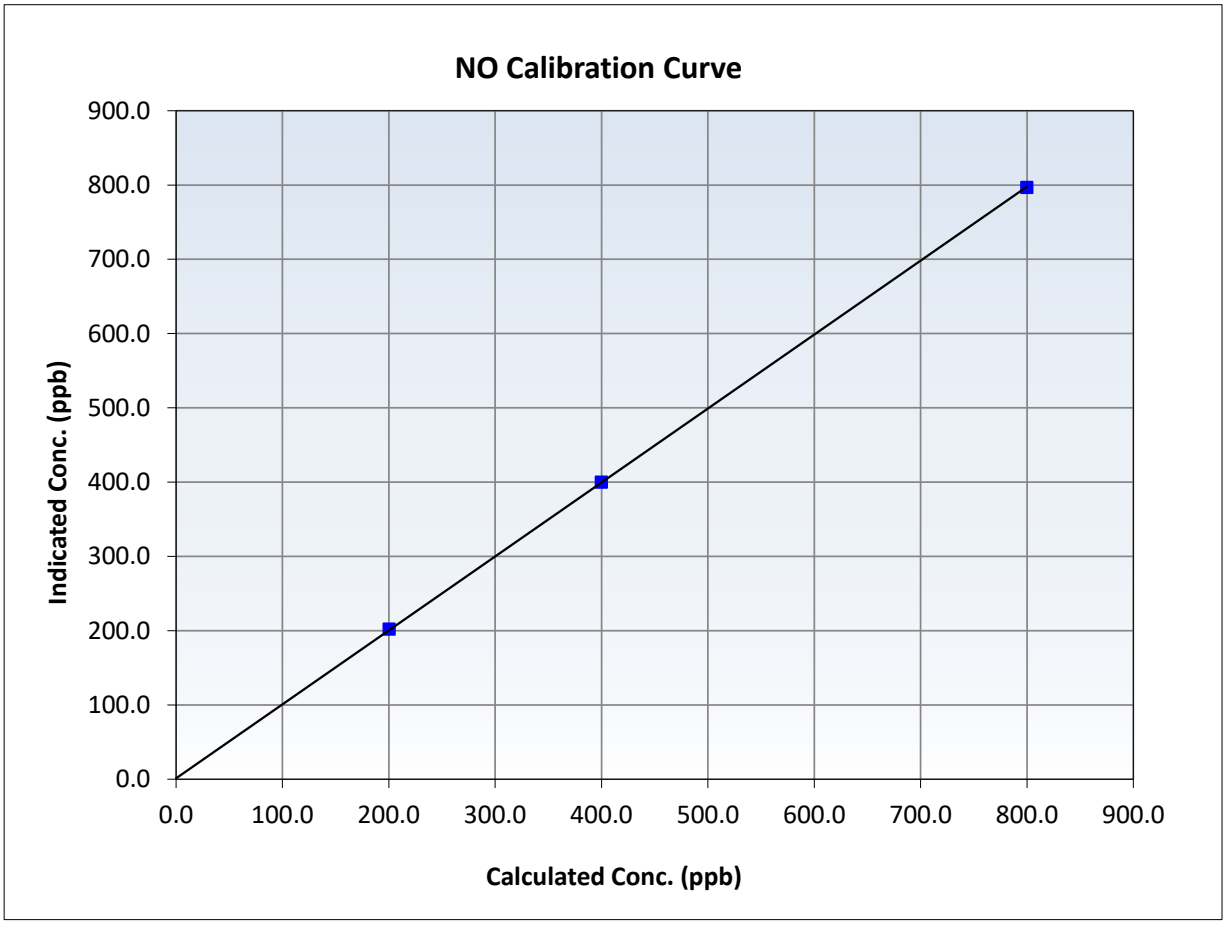
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 3, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:35	End Time (MST):	14:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1172750022

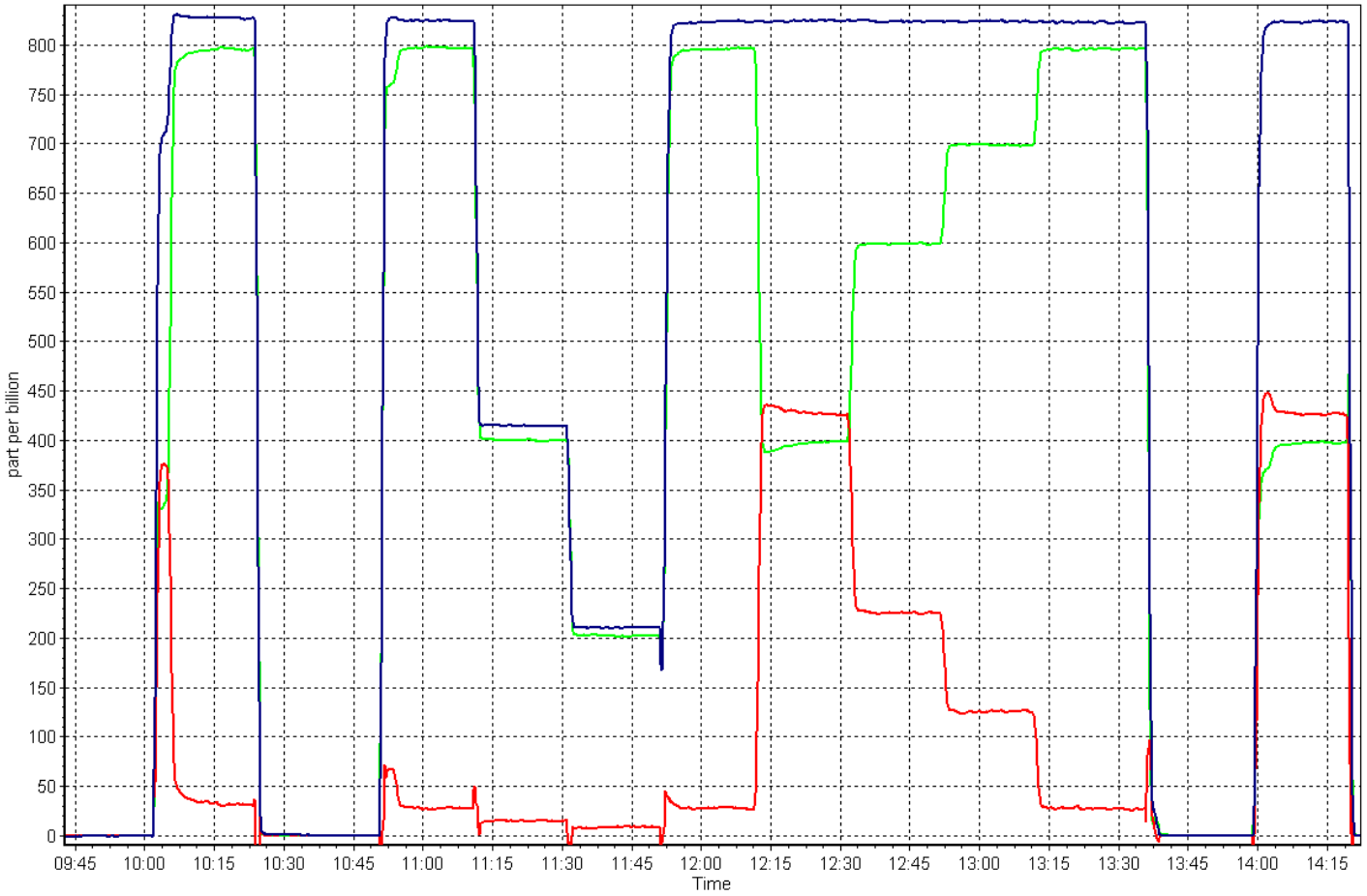
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.7	796.8	1.0037
399.9	400.1	0.9994
200.4	202.2	0.9912

Statistical Evaluation		Limits
Correlation Coefficient	0.999985	≥0.995
Slope	0.995700	0.90 - 1.10
Intercept	1.223377	+/-20



NO_X Calibration Plot Date: November 13, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 5, 2024	Last Cal Date:	October 1, 2024
Start time (MST):	10:30	End time (MST):	13:30
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.998857	1.000771	Backgd or Offset:	-0.9	-0.9
Calibration intercept:	0.400000	0.140000	Coeff or Slope:	1.020	1.020

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	0.2	----
As found High point	5000	1031.0	400.0	399.8	1.001
As found Mid point					
As found Low point					

Baseline Corr As found:	399.6	Previous response	399.9	*% change	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.5	----
High point	5000	1031.0	400.0	400.7	0.998
Mid point	5000	821.4	200.0	199.9	1.001
Low point	5000	699.5	100.0	100.0	1.000
As left zero	5000	800.0	0.0	-0.1	----
As left span	5000	1031.0	400.0	402.8	0.993
				Average Correction Factor	1.000

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

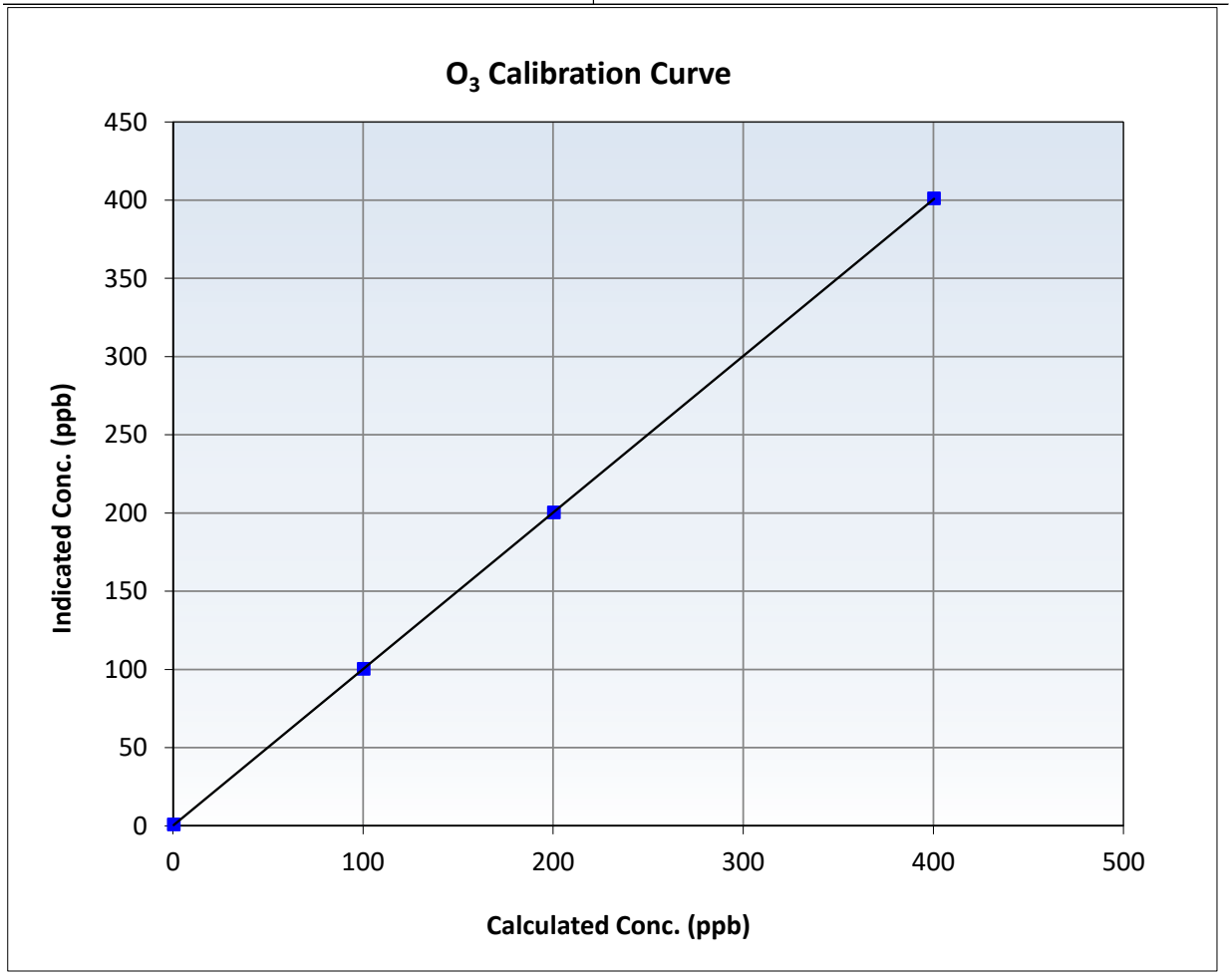
O_3 Calibration Summary

Station Information

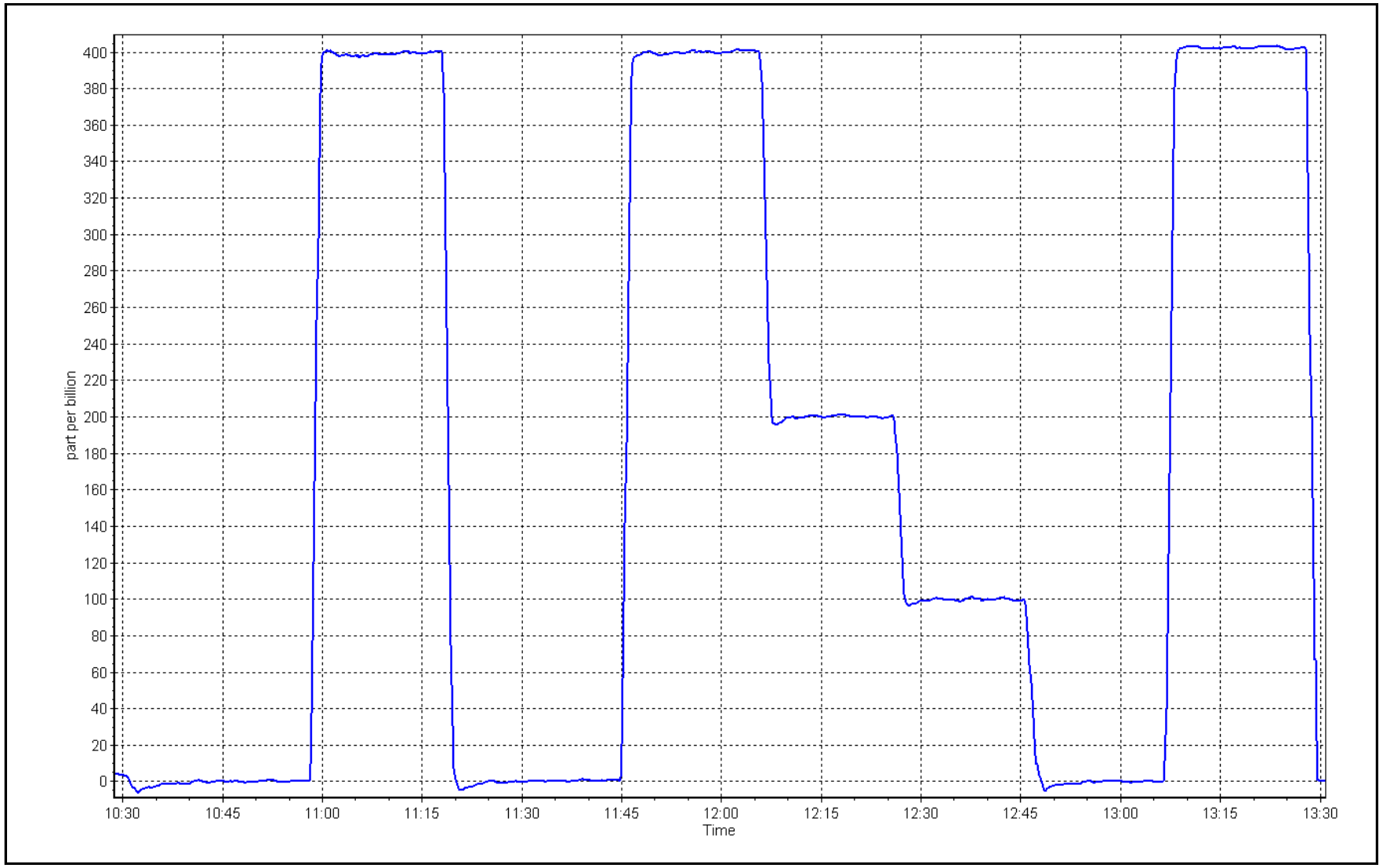
Calibration Date:	November 5, 2024	Previous Calibration:	October 1, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	10:30	End Time (MST):	13:30
Analyzer make:	Thermo 49i	Analyzer serial #:	1300156234

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.5	----	Correlation Coefficient	0.999995	*≥0.995*
400.0	400.7	0.9983	Slope	1.000771	*0.90 - 1.10*
200.0	199.9	1.0005			
100.0	100.0	1.0000	Intercept	0.140000	*+/- 5*



O_3 Calibration Plot Date: November 5, 2024 Location: Patricia McInnes



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	November 26, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	14:55	End time (MST):	15:22
Analyzer Make:	API T640	S/N:	766
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388755
Temp/RH standard:	Alicat FP-25BT	S/N:	388755

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-9.7	-9.5	-9.7	☐	+/- 2 °C
P (mmHg)	721.80	724.40	721.80	☐	+/- 10 mmHg
Flow (LPM)	5.00	5.15	5.00	☐	+/- 0.25 LPM
PW% (pump)	42	-----	42	☐	>80%
Zero Verification	PM w/o HEPA:	10.20	PM w/ HEPA:	0.00	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: September 6, 2024

Date Disposable Filter Changed: September 6, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: April 13, 2023

Date RH/T Sensor Cleaned: April 13, 2023

Notes: Parameters within limits. Leak check passed. No adjustment needed.

Calibration by: Max Farrell

Wood Buffalo Environmental Association

Nt - NOX - NH3 Calibration Report

Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	November 19, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	9:44	End time (MST):	13:45
NH3 Cal Date:	November 19, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	14:00	End time (MST):	15:48
Reason:	Routine		

Calibration Standards

NOX Cal Gas Conc:	47.94	ppm	NO Gas Cylinder #:	T30YCWN
NO Cal Gas Conc:	46.39	ppm	NO Cal Gas Expiry:	April 11, 2025
Removed NOX Conc:	47.94	ppm	Removed Cylinder #:	N/A
Removed NO Conc:	46.39	ppm	Removed cyl Expiry:	N/A
NOX gas Diff:			NO gas Diff:	
NH3 Cal Gas Conc:	76.3	ppm	NH3 Gas Cylinder #:	EB0108520
			NH3 Cal Gas Expiry:	August 22, 2024
Removed NH3 Conc:	76.3	ppm	Removed Cylinder #:	N/A
NH3 gas Diff:			Removed cyl Expiry:	N/A
Calibrator Model:	API T700		Serial Number:	3566
ZAG make/model:	API T701		Serial Number:	4602

Analyzer Information

Analyzer model:	API T201		Analyzer serial #:	215
Converter model:	API T501		Converter serial #:	147
NH3 Range (ppb):	0 - 2000 ppb		Reaction cell Press:	6.20
NOX Range (ppb):	0 - 1000 ppb		Sample Flow:	25.4

	Start	*Finish*		*Start*	*Finish*
NO coefficient:	1.009	1.009	Nt coefficient:	1.700	1.700
NOX coefficient:	1.002	1.002	NO bkgrnd:	0.200	0.2
NO2 coefficient:	1.000	1.000	NOX bkgrnd:	0.100	0.1
NH3 coefficient:	1.200	1.200	Nt bkgrnd:	0.000	0.0

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.004586	1.005599
NO_X Cal Offset:	1.115074	1.473664
NO Cal Slope:	1.005019	1.003405
NO Cal Offset:	0.261891	-0.298339
NO_2 Cal Slope:	1.004672	1.002194
NO_2 Cal Offset:	1.225223	2.833619
NH3 Cal Slope:	0.999207	0.995698
NH3 Cal Offset:	4.720243	7.440608
Nt Cal Slope:	1.002641	0.999133
Nt Cal Offset:	4.562161	7.756362

Wood Buffalo Environmental Association

NO_X - NO - NO_2 Calibration Report

NOx / NO / Nt As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	Baseline corr NOx Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*	Baseline corr NO Correction factor (Cc/Ic) *Limit = 0.9 - 1.0*
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	-0.5	----	----
As found span	4914	86.2	826.5	799.7	826.5	831.5	799.2	835.6	0.9939	1.0007
AF GPT span										
new NO cyl rp										

Baseline Corr As Fd	Nt =	836.1	ppb	NO_X =	831.7	ppb	NO =	799.5 ppb
Previous Response	Nt =	833.2	ppb	NO_X =	831.4	ppb	NO =	804.0 ppb

**NO_X Δ (NO to GPT response) =

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

*Percent Change $Nt_{(NO)}$ = 0.3%

*Percent Change NO_X = 0.0%

*Percent Change NO = -0.6%

* = > +/-5% change initiates investigation

NOx / NO / Nt Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated Nt concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated Nt concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
High point	4914	86.2	826.5	799.7	826.5	833.3	803.4	832.8	0.9918	0.9954
Mid point	4957	43.1	413.2	399.9	413.2	413.6	397.5	413.6	0.9991	1.0060
Low point	4978	21.6	207.1	200.4	207.1	213.6	202.7	212.9	0.9697	0.9888
								Average Correction Factor	0.9868	0.9967

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
As Found zero	----	----	0.0	0.0	----	----
Calibration zero	----	----	0.0	0.3	----	----
High GPT point (400 ppb O3)	802.5	400.4	428.8	430.4	0.9963	100.4%
Mid GPT point (200 ppb O3)	802.5	604.9	224.3	231.2	0.9702	103.1%
Low GPT point (100 ppb O3)	802.5	706.4	122.8	127.1	0.9663	103.5%
				Average Correction Factor	0.9776	102.3%

Wood Buffalo Environmental Association
NH_3 - N_T Calibration Report

NH3 As Found Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Baseline corr Nt Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*	Baseline corr NH3 Correction factor (Cc/(Ic-zero)) *Limit = 0.9 - 1.1*
As found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.2	-0.3	----	----
AF High point	3417	82.6	1800.6	0.0	1800.6	1802.1	6.4	1795.7	0.999	1.003
AF Mid point										
AF Low point										
new NH3 cyl rp										

Baseline Corr As Fd Nt = 1802.6 ppb NH3 = 1796.0 ppb *Percent Change $Nt_{(NH3)}$ = -0.4%

Previous Response Nt = 1810.0 ppb NH3 = 1803.9 ppb * = > +/-5% change initiates investigation *Percent Change NH3 = -0.4%

NH3 Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated Nt concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated Nt concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	Nt Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NH3 Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibration zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.1	----	----
High point	3417	82.6	1800.6	0.0	1800.6	1802.1	6.4	1795.7	0.999	1.003
Mid point	3454	45.9	1000.5	0.0	1000.5	1012.3	3.9	1008.4	0.988	0.992
Low point	3477	22.9	499.2	0.0	499.2	513.8	2.0	511.7	0.972	0.976
								Average Correction Factor	0.9864	0.9902

NH3 Previous Converter Efficiency = 90.2 %

NH3 Current Converter Efficiency = 91.2 %

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

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

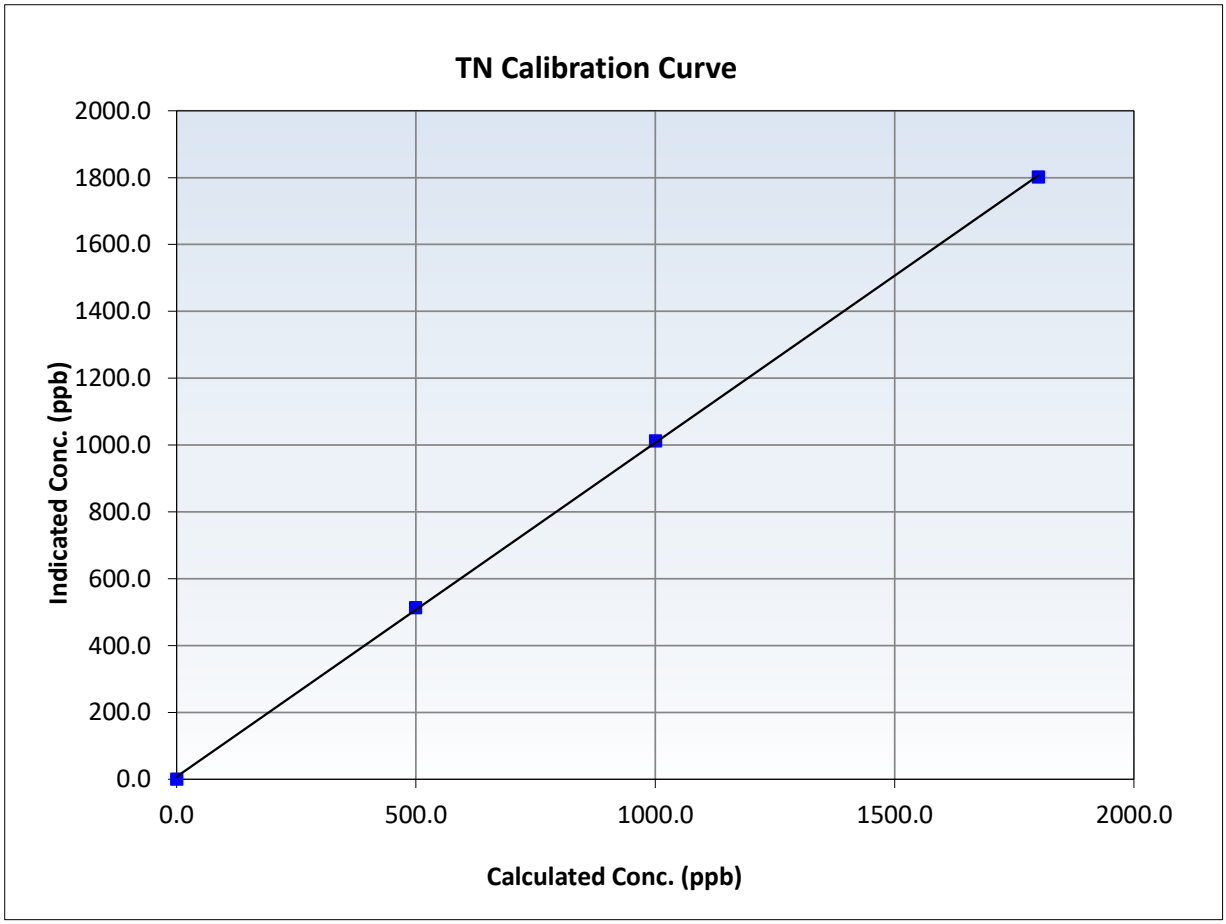
Nt Calibration Summary

Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 9, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:44	End Time (MST):	13:45
Analyzer make:	API T201	Analyzer serial #:	215

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999912	*≥0.995*
1800.6	1802.1	0.9992	Slope	0.999133	*0.90 - 1.10*
1000.5	1012.3	0.9884	Intercept	7.756362	*+/-20*
499.2	513.8	0.9715			



Wood Buffalo Environmental Association

NH_3 Calibration Summary

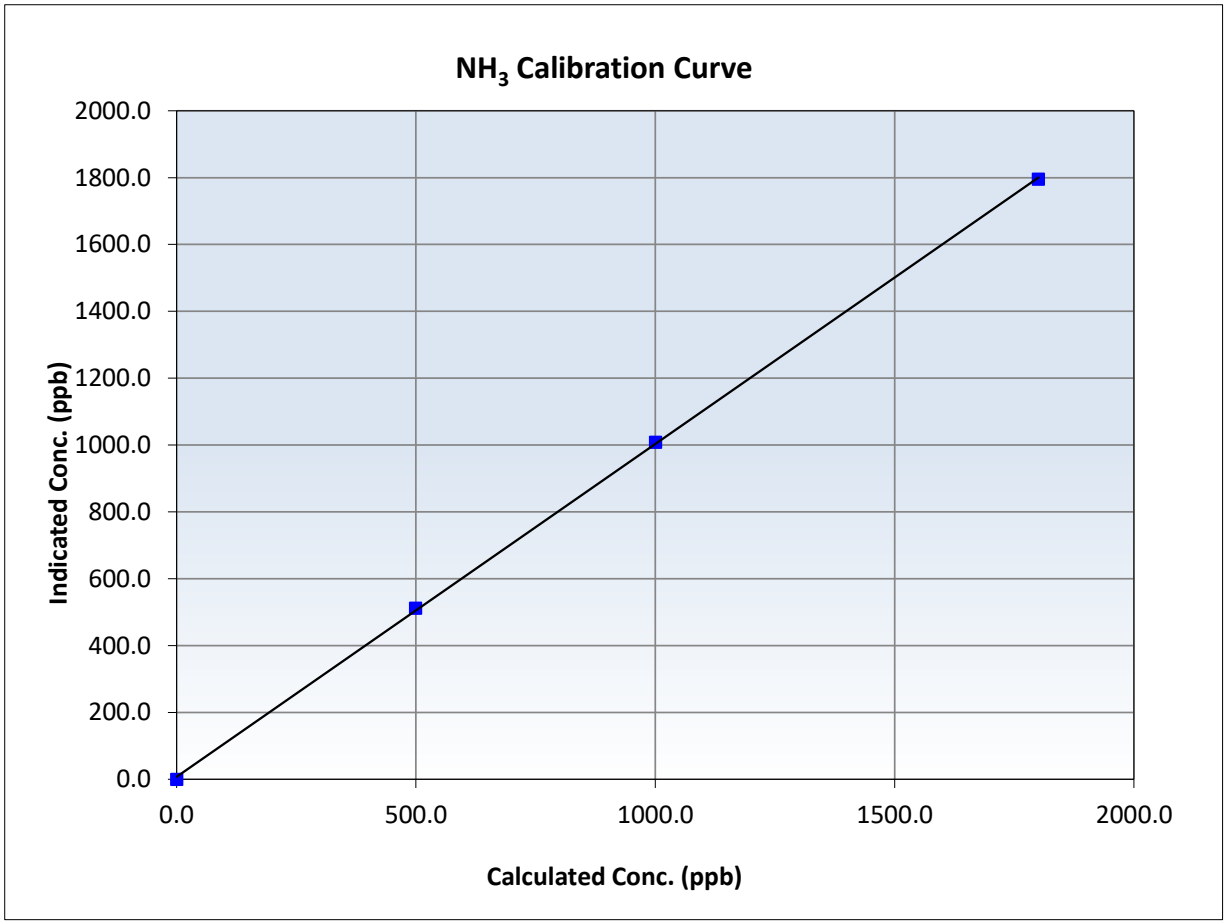
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 9, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:44	End Time (MST):	13:45
Analyzer make:	API T201	Analyzer serial #:	215

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
1800.6	1795.7	1.0028
1000.5	1008.4	0.9922
499.2	511.7	0.9755

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999914	*≥0.995*
Slope	0.995698	*0.90 - 1.10*
Intercept	7.440608	*+/-20*



Wood Buffalo Environmental Association

NO_X Calibration Summary

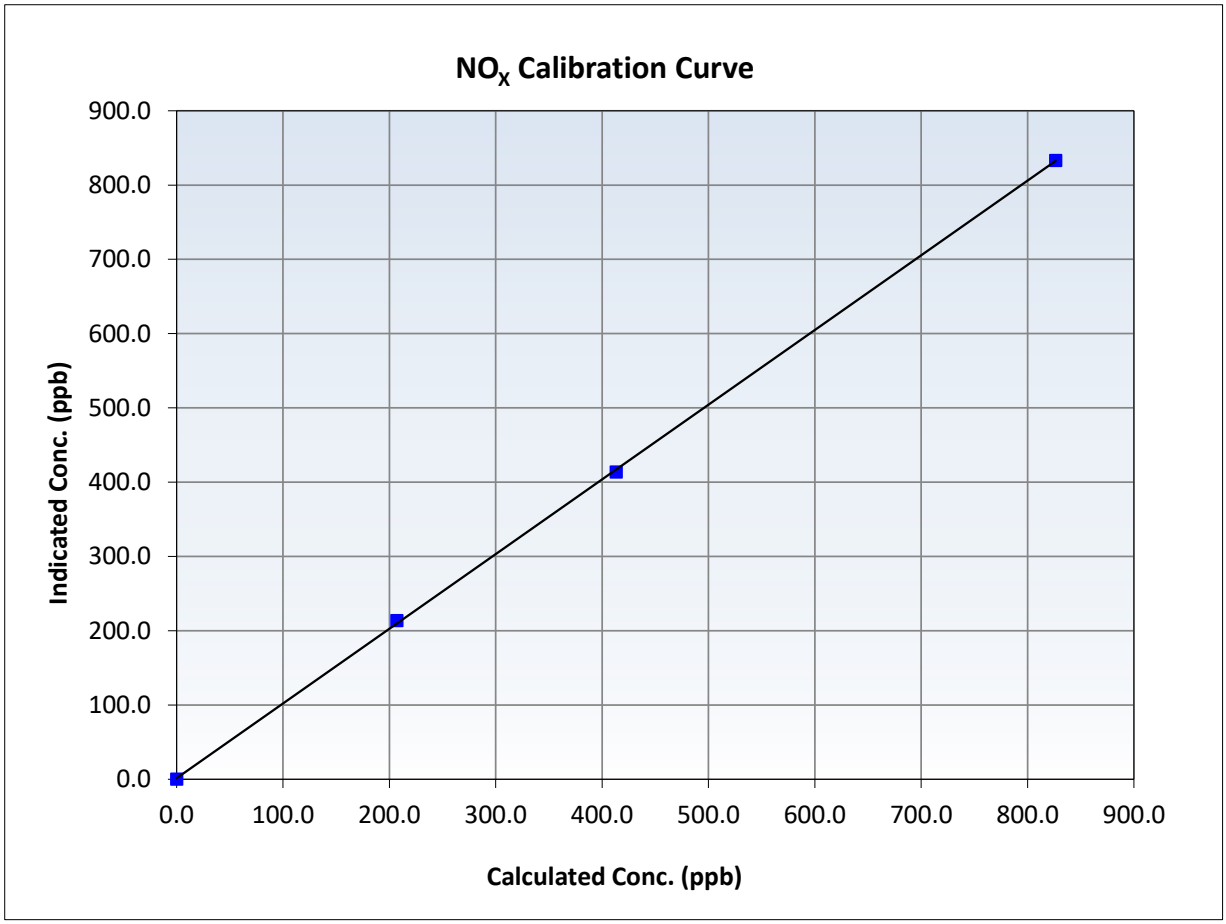
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 9, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:44	End Time (MST):	13:45
Analyzer make:	API T201	Analyzer serial #:	215

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
826.5	833.3	0.9918
413.2	413.6	0.9991
207.1	213.6	0.9697

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999925	*≥0.995*
Slope	1.005599	*0.90 - 1.10*
Intercept	1.473664	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

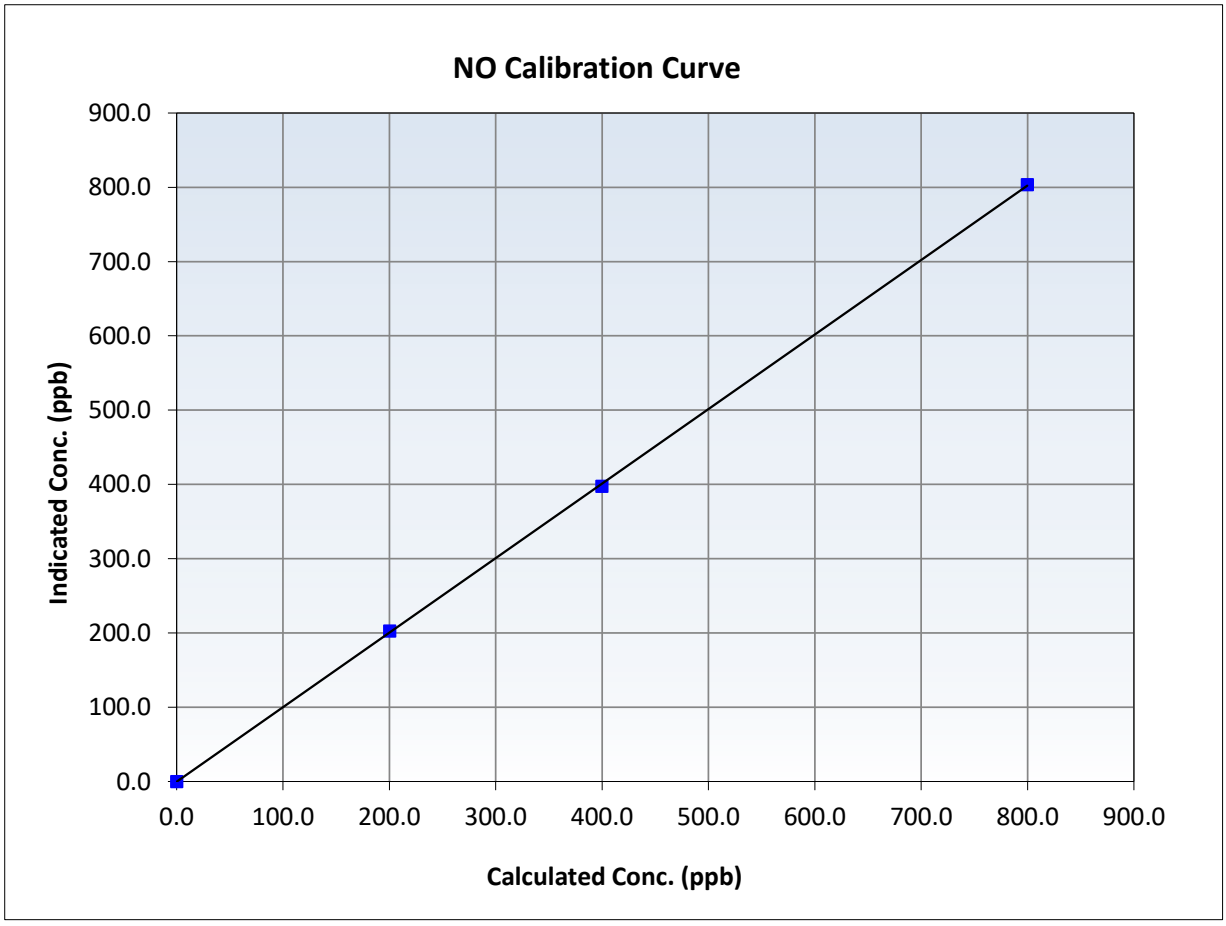
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 9, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:44	End Time (MST):	13:45
Analyzer make:	API T201	Analyzer serial #:	215

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.7	803.4	0.9954
399.9	397.5	1.0060
200.4	202.7	0.9888

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999952	*≥0.995*
Slope	1.003405	*0.90 - 1.10*
Intercept	-0.298339	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

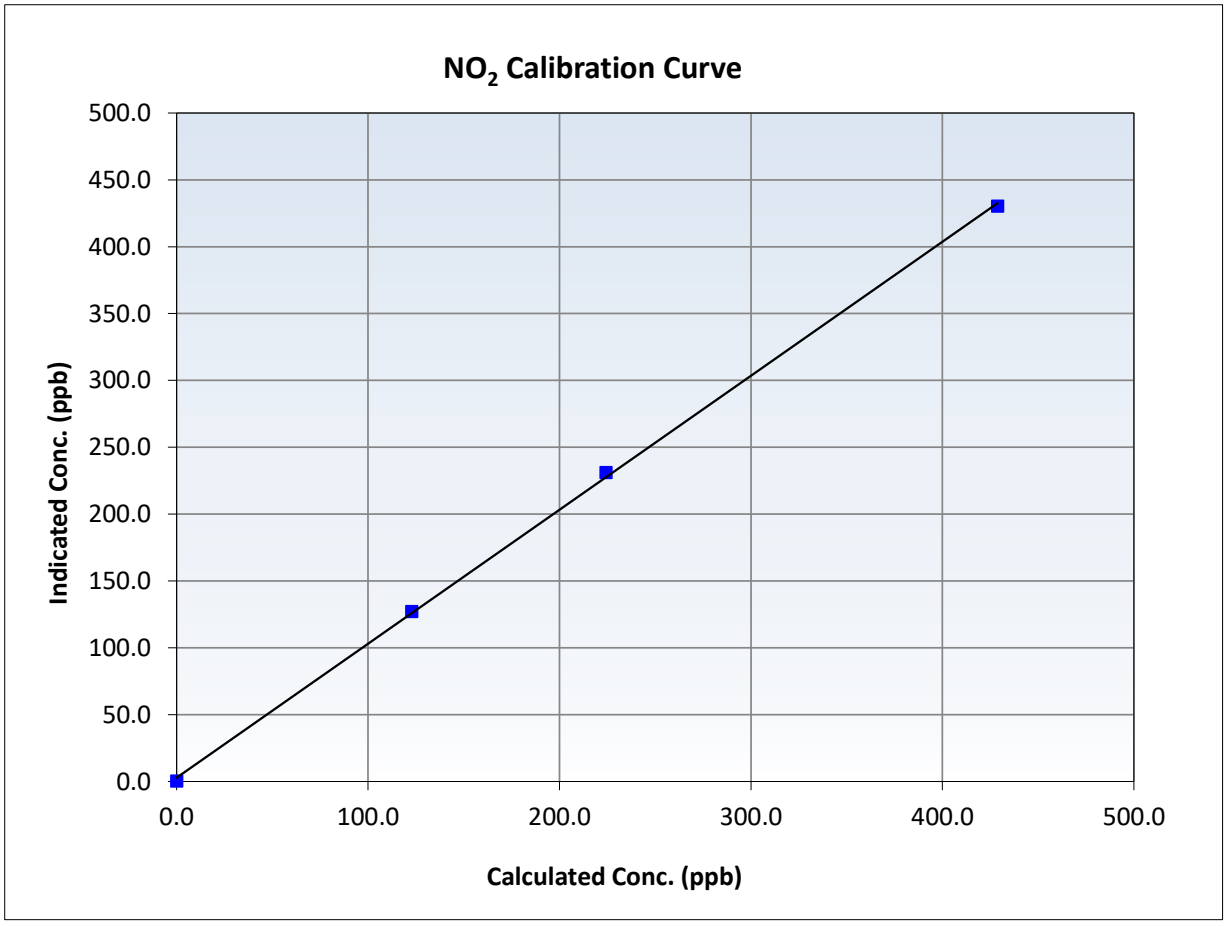
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 9, 2024
Station Name:	Patricia McInnes	Station Number:	AMS 06
Start Time (MST):	9:44	End Time (MST):	13:45
Analyzer make:	API T201	Analyzer serial #:	215

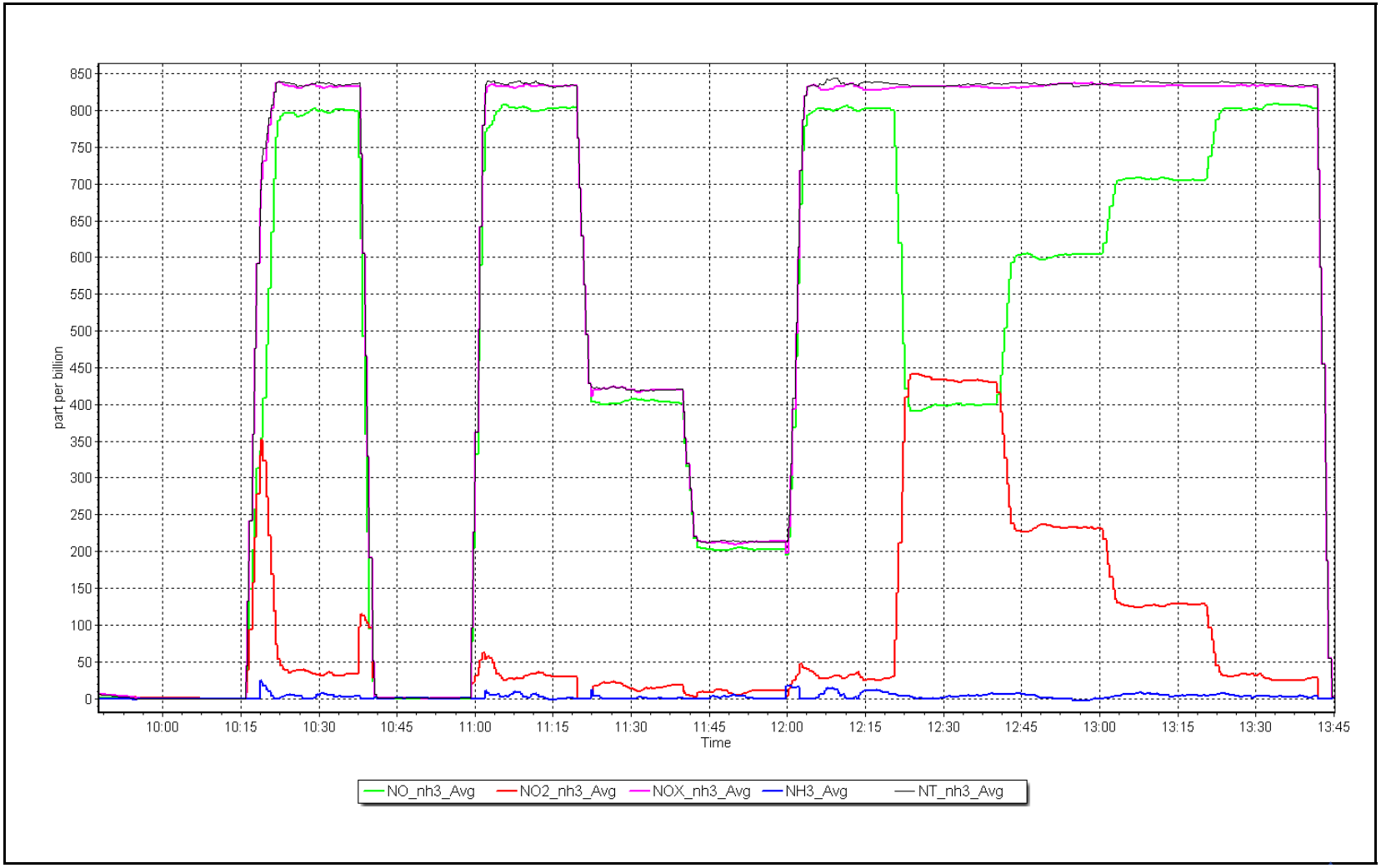
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
428.8	430.4	0.9963
224.3	231.2	0.9702
122.8	127.1	0.9663

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999746	*≥0.995*
Slope	1.002194	*0.90 - 1.10*
Intercept	2.833619	*+/-20*



NO_X Calibration Plot Date: November 19, 2024 Location: Patricia McInnes



NH_3 Calibration Plot Date: November 19, 2024 Location: Patricia McInnes

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS07
ATHABASCA VALLEY
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	November 15, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	10:13	End time (MST):	13:11
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i-LTE		Serial Number:	1507864683	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.994596	1.000034	Backgd or Offset:	2.64	2.66
Calibration intercept:	1.885408	1.583979	Coeff or Slope:	0.834	0.847

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	79.8	799.0	788.0	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	788.1	Previous response	796.6	*% change	-1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	79.8	799.0	799.8	0.999
Mid point	4960	39.9	399.5	402.1	0.994
Low point	4980	20.0	200.2	203.0	0.986
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	79.8	799.0	795.1	1.005
				Average Correction Factor:	0.993

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

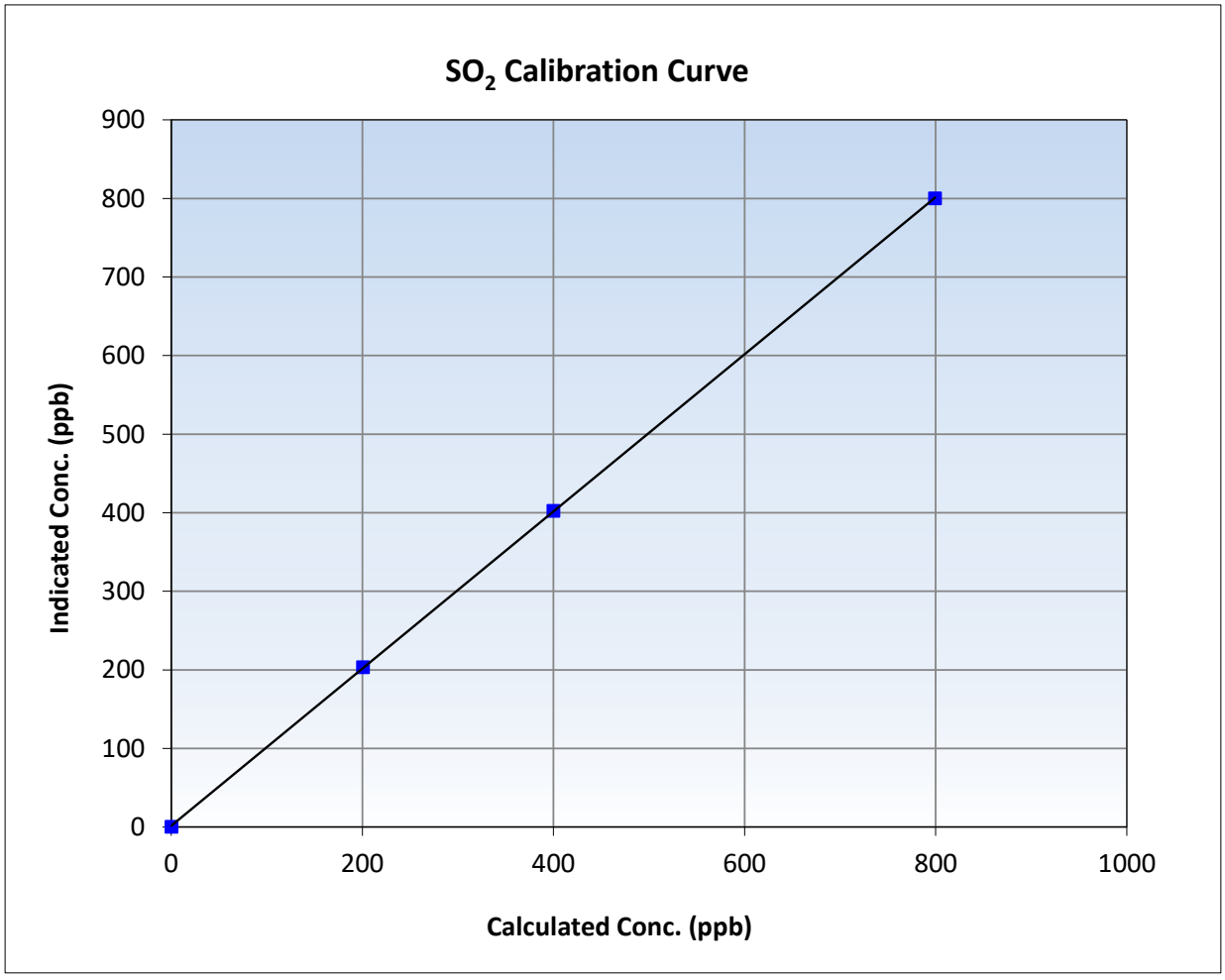
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 3, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:13	End Time (MST):	13:11
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1507864683

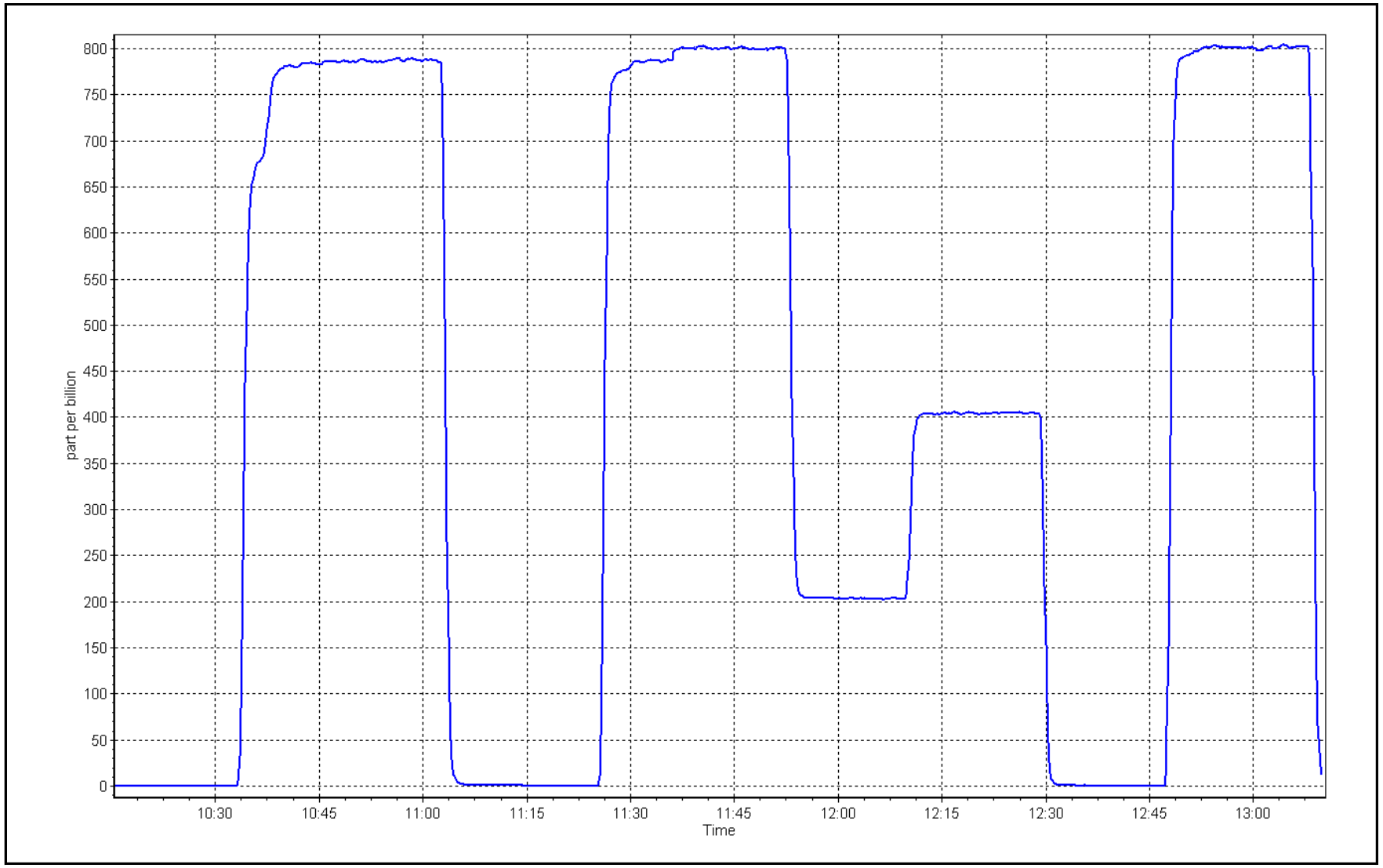
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
799.0	799.8	0.9990
399.5	402.1	0.9935
200.2	203.0	0.9864

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.000034	*0.90 - 1.10*
Intercept	1.583979	*+/-30*



SO2 Calibration Plot Date: November 15, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	November 5, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	10:20	End time (MST):	14:59
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.009293	1.004828	Backgd or Offset:	2.8	2.7
Calibration intercept:	-0.142183	-0.162299	Coeff or Slope:	0.916	0.900

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4925	75.5	79.3	81.2	0.974
As found Mid point	4962	37.7	39.6	40.3	0.977
As found Low point	4981	18.9	19.8	20.1	0.978
New cylinder response					

Baseline Corr As found:	81.4	Prev response:	79.86	*% change:	1.9%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.027033	AF Intercept:	-0.262318
Baseline Corr 3rd AF pt:	20.3	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4925	75.5	79.3	79.6	0.996
Mid point	4962	37.7	39.6	39.5	1.003
Low point	4981	18.9	19.9	19.8	1.003
As left zero	5000	0.0	0.0	0.0	----
As left span	4925	75.5	79.3	79.3	1.000
SO2 Scrubber Check	4920	79.2	792.1	0.4	----
Date of last scrubber change:		25-Feb-22		Ave Corr Factor	1.001
Date of last converter efficiency test:		April 22, 2022			

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

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

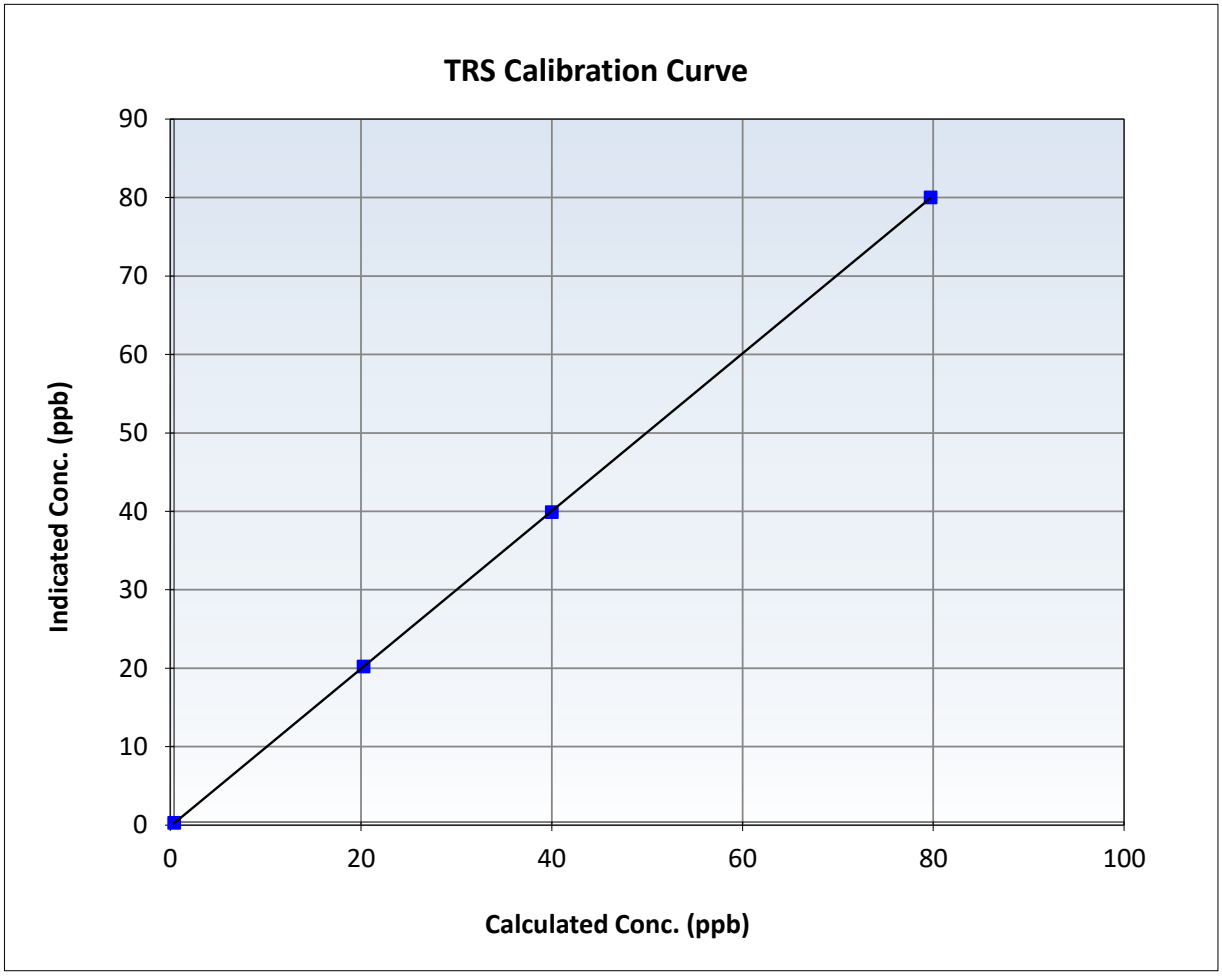
TRS Calibration Summary

Station Information

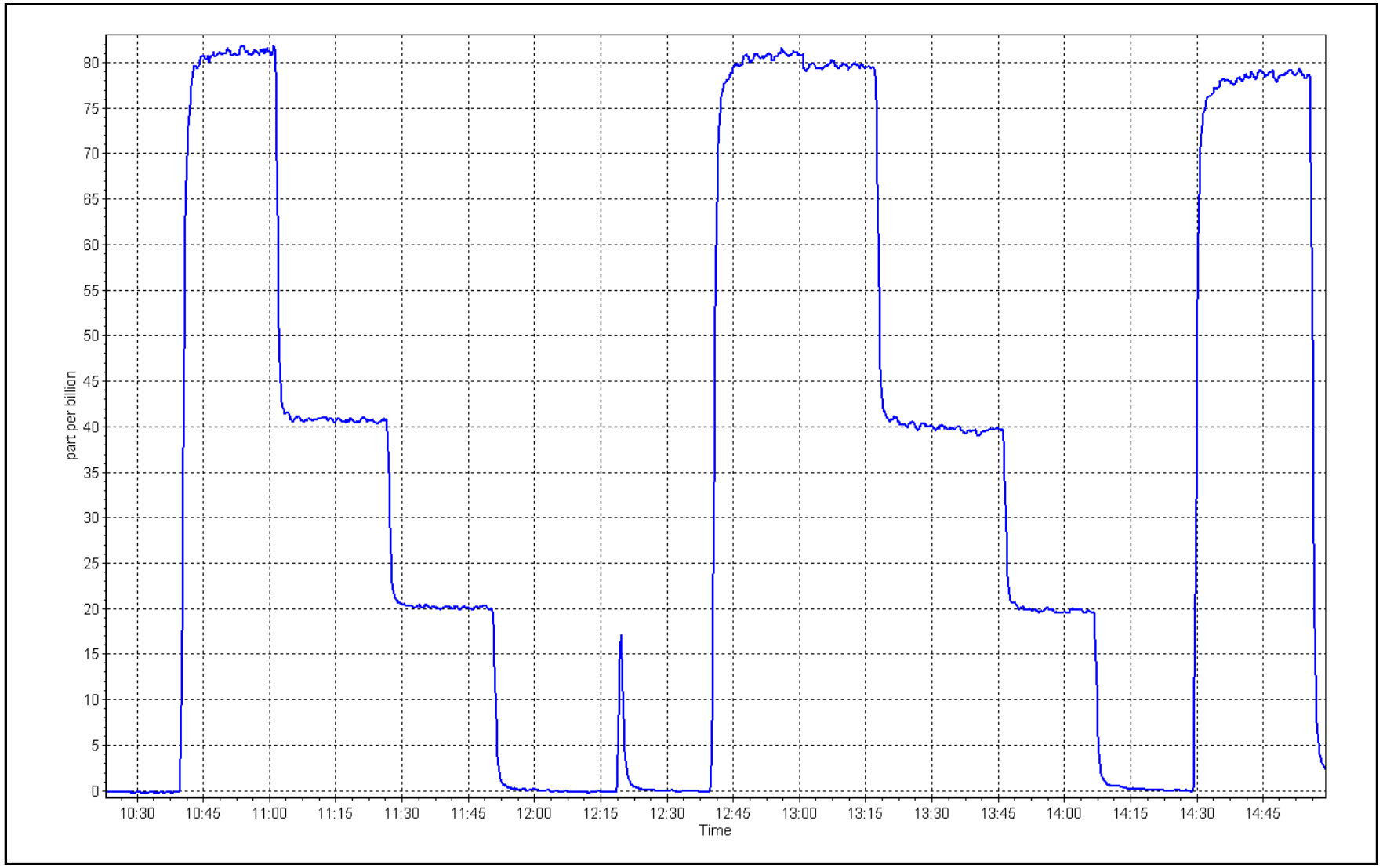
Calibration Date:	November 5, 2024	Previous Calibration:	October 17, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	10:20	End Time (MST):	14:59
Analyzer make:	Thermo 43i LTE	Analyzer serial #:	1180540018

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.1	----	Correlation Coefficient	0.999992	*≥0.995*
79.3	79.6	0.9964	Slope	1.004828	*0.90 - 1.10*
39.6	39.5	1.0028			
19.9	19.8	1.0029	Intercept	-0.162299	*+/-3*



TRS Calibration Plot Date: November 5, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	November 15, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	10:13	End time (MST):	13:11
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC320556	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
Removed C3H8 Conc.	205.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	3805
Zero Air Gen model:	Teledyne API T701H	Serial Number:	198

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.95E-04	2.90E-04	NMHC SP Ratio:	7.06E-05	6.44E-05
CH4 Retention time:	13.4	13.6	NMHC Peak Area:	127449	139822
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	16.91	18.03	0.938
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	18.03	Prev response	16.84	*% change	6.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	16.91	16.81	1.006
Mid point	4960	39.9	8.46	8.35	1.013
Low point	4980	20.0	4.24	4.19	1.013
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	16.91	16.80	1.007
				Average Correction Factor	1.011

Notes: NM high during nightly spans, chromatograms looks fine. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.00	9.94	0.905
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.94	Prev response	8.94	*% change	10.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.00	8.94	1.007
Mid point	4960	39.9	4.50	4.47	1.007
Low point	4980	20.0	2.26	2.25	1.004
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.00	8.93	1.008
				Average Correction Factor	1.006

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	7.92	8.09	0.979
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.09	Prev response	7.90	*% change	2.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	7.92	7.88	1.005
Mid point	4960	39.9	3.96	3.88	1.020
Low point	4980	20.0	1.98	1.94	1.024
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	7.92	7.87	1.006
				Average Correction Factor	1.016

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.996758	0.994272
THC Cal Offset:	-0.023317	-0.022911
CH4 Cal Slope:	1.000944	0.995631
CH4 Cal Offset:	-0.027931	-0.025522
NMHC Cal Slope:	0.993139	0.993088
NMHC Cal Offset:	0.004613	0.002812

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

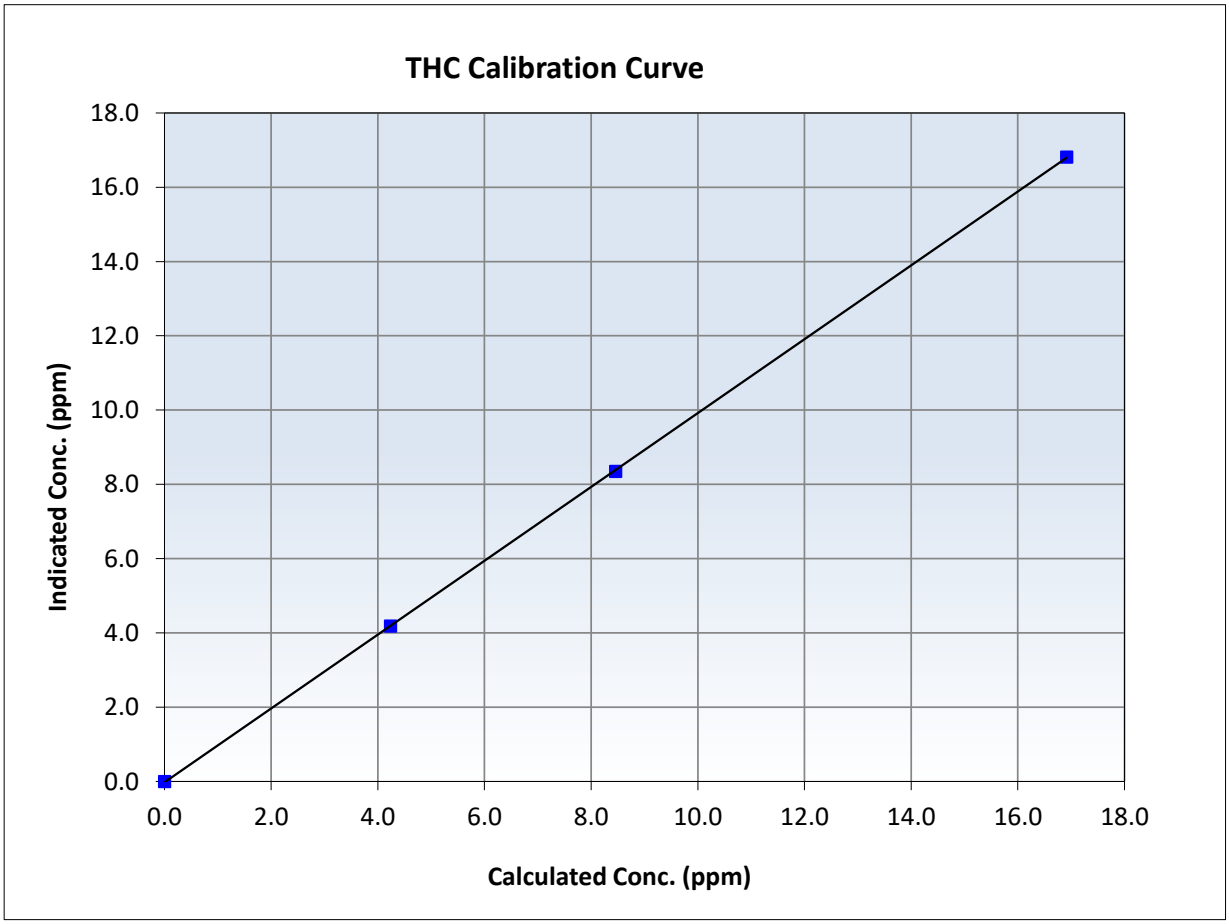
THC Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 3, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:13	End Time (MST):	13:11
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999986	≥0.995
16.91	16.81	1.0060	Slope	0.994272	0.90 - 1.10
8.46	8.35	1.0128			
4.24	4.19	1.0129	Intercept	-0.022911	+/-0.5



Wood Buffalo Environmental Association

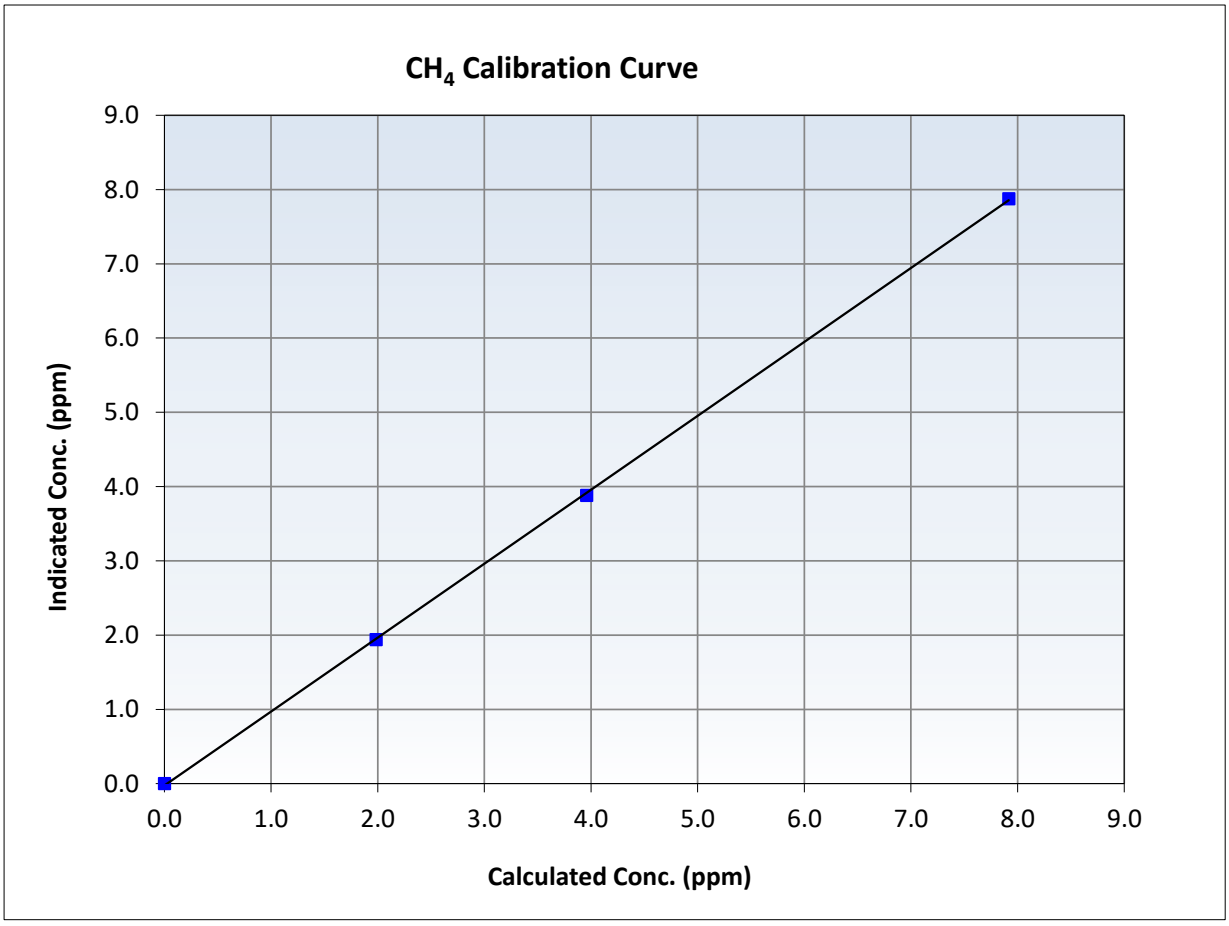
CH_4 Calibration Summary

Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 3, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:13	End Time (MST):	13:11
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999933	≥0.995
7.92	7.88	1.0051	Slope	0.995631	0.90 - 1.10
3.96	3.88	1.0196			
1.98	1.94	1.0237	Intercept	-0.025522	+/-0.5



Wood Buffalo Environmental Association

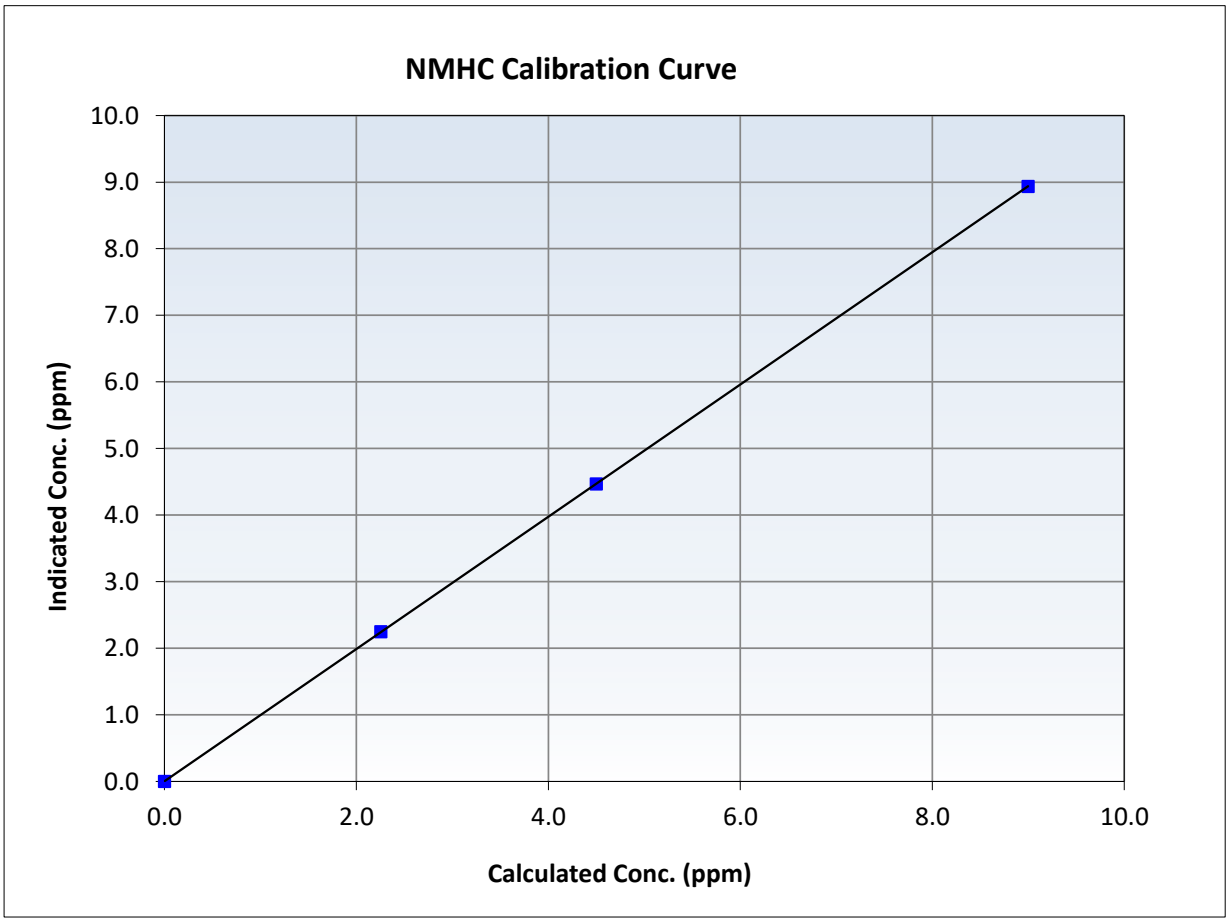
NMHC Calibration Summary

Station Information

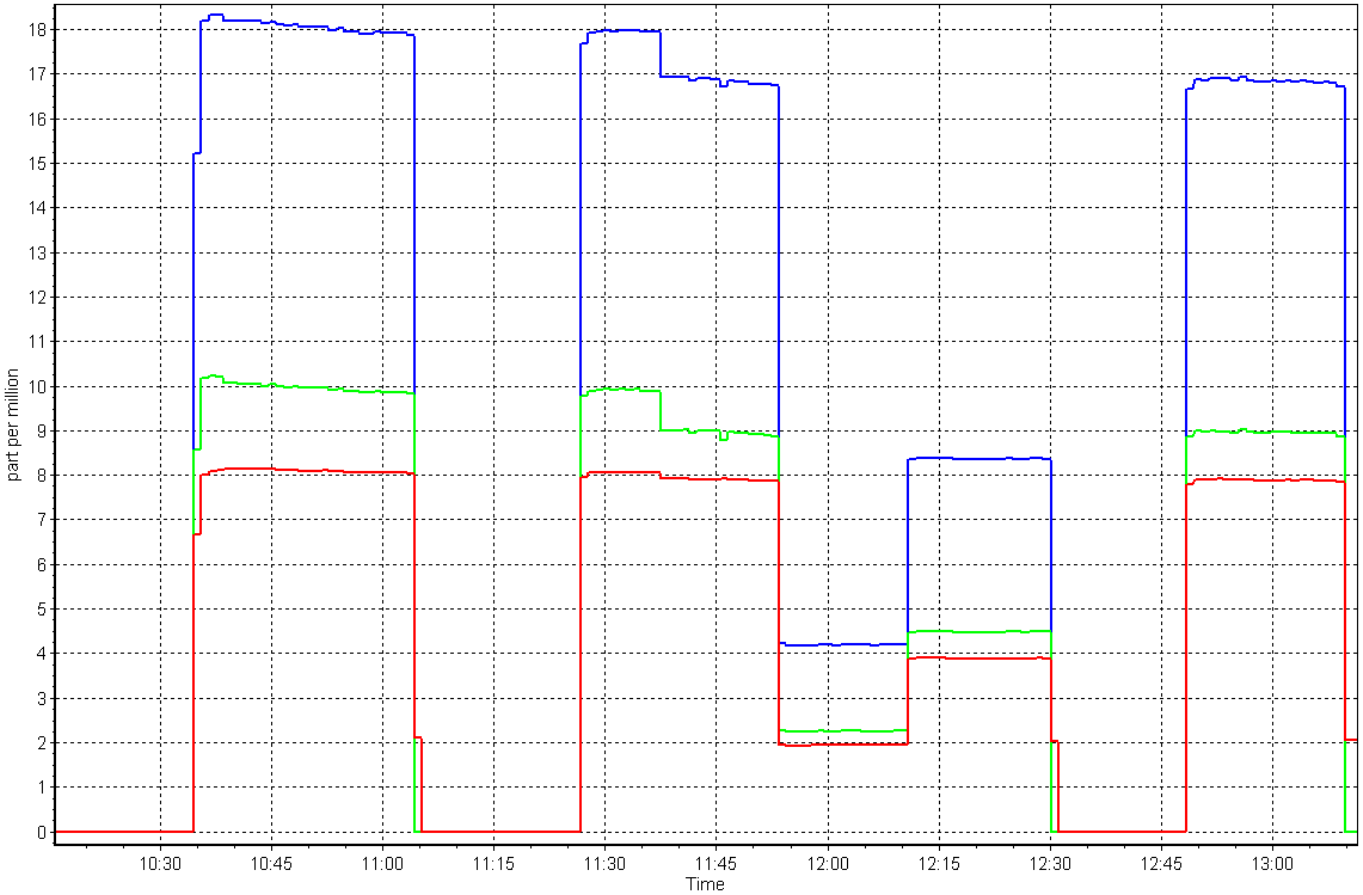
Calibration Date:	November 15, 2024	Previous Calibration:	October 3, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:13	End Time (MST):	13:11
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.00	8.94	1.0067	Slope	0.993088	0.90 - 1.10
4.50	4.47	1.0067			
2.26	2.25	1.0036	Intercept	0.002812	+/-0.5



NMHC Calibration Plot Date: November 15, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	November 28, 2024	Last Cal Date:	November 15, 2024
Start time (MST):	9:52	End time (MST):	11:26
Reason:	Cylinder Change		

Calibration Standards

Gas Cert Reference:	CC320556	Cal Gas Expiry Date:	March 10, 2031
CH4 Cal Gas Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	496.0 ppm	CH4 Equiv Conc.	1059.8 ppm
Removed C3H8 Conc.	205.0 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	Teledyne API T700	Serial Number:	3805
Zero Air Gen model:	Teledyne API T701H	Serial Number:	198

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620777
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.90E-04	2.90E-04	NMHC SP Ratio:	6.44E-05	6.44E-05
CH4 Retention time:	13.6	13.6	NMHC Peak Area:	139822	139822
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	16.91	17.69	0.956
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.69	Prev response	16.79	*% change	5.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	16.91	17.30	0.978
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor: 0.978

Notes: H2 cylinder change out.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.00	9.64	0.934
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.64	Prev response	8.94	*% change	7.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.00	9.35	0.963
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.963

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	7.92	8.05	0.984
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.05	Prev response	7.86	*% change	2.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

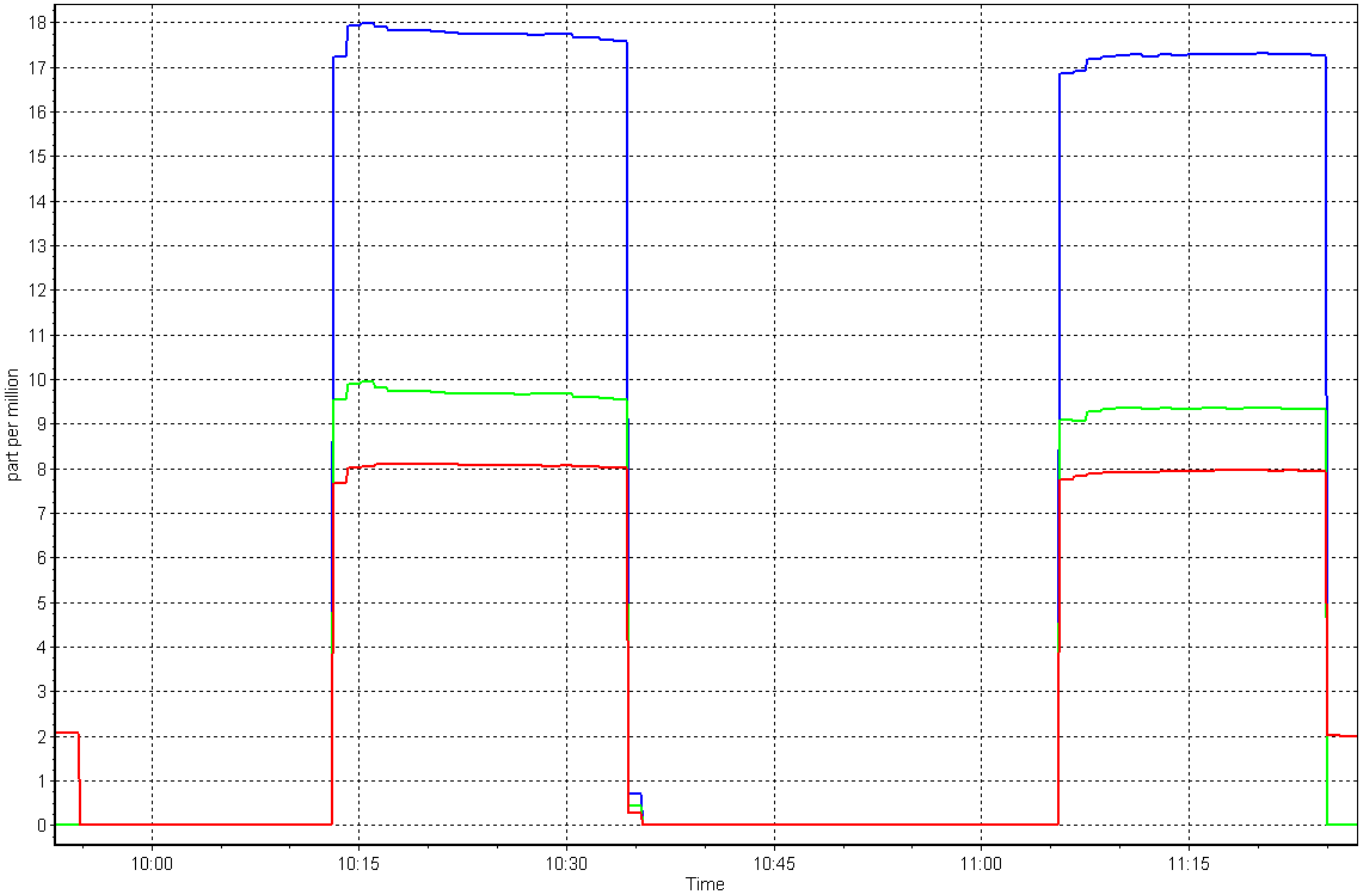
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	7.92	7.95	0.996
Mid point					
Low point					
As left zero					
As left span					
				Average Correction Factor	0.996

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.994272	1.022804
THC Cal Offset:	-0.022911	0.000000
CH4 Cal Slope:	0.995631	1.004361
CH4 Cal Offset:	-0.025522	0.000000
NMHC Cal Slope:	0.993088	1.038919
NMHC Cal Offset:	0.002812	0.000000

Calibration Performed By: Sean Bala

NMHC Calibration Plot Date: November 28, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley
Station number:	AMS 07
Calibration Date:	November 22, 2024
Last Cal Date:	October 18, 2024
Start time (MST):	10:23
End time (MST):	15:22
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	----	----
AF High point	4933	66.8	803.0	800.3	2.7	789.3	787.3	1.9	1.0172	1.0165
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 804.1 ppb	NO = 802.6 ppb
Baseline Corr 1st pt	NO_X = 789.4 ppb	NO = 787.3 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

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

*Percent Change	NO_X = -1.9%
*Percent Change	NO = -1.9%

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1160120024

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.167	1.187	NO bkgnd or offset:	8.4	8.5
NOX coeff or slope:	1.000	1.005	NOX bkgnd or offset:	8.6	8.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	229.8	239.3

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.998934	1.000827
NO_X Cal Offset:	1.991909	1.451920
NO Cal Slope:	1.000813	0.998899
NO Cal Offset:	1.651919	1.271961
NO_2 Cal Slope:	0.996399	1.004263
NO_2 Cal Offset:	-0.236510	0.892899

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
High point	4933	66.8	803.0	800.3	2.7	804.2	799.9	4.3	0.9985	1.0005
Mid point	4966	33.4	401.5	400.2	1.3	404.5	402.3	2.2	0.9926	0.9947
Low point	4983	16.7	200.7	200.1	0.7	203.5	201.7	1.8	0.9865	0.9920
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.1	----	----
As left span	4933	66.8	803.0	397.1	405.9	805.5	397.1	408.3	0.9969	1.0000
								Average Correction Factor	0.9925	0.9957

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	795.2	394.0	403.9	405.7	0.9955	100.5%
Mid GPT point	795.2	597.9	200.0	203.0	0.9851	101.5%
Low GPT point	795.2	695.2	102.7	104.6	0.9816	101.9%
				Average Correction Factor	0.9874	101.3%

Notes: Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

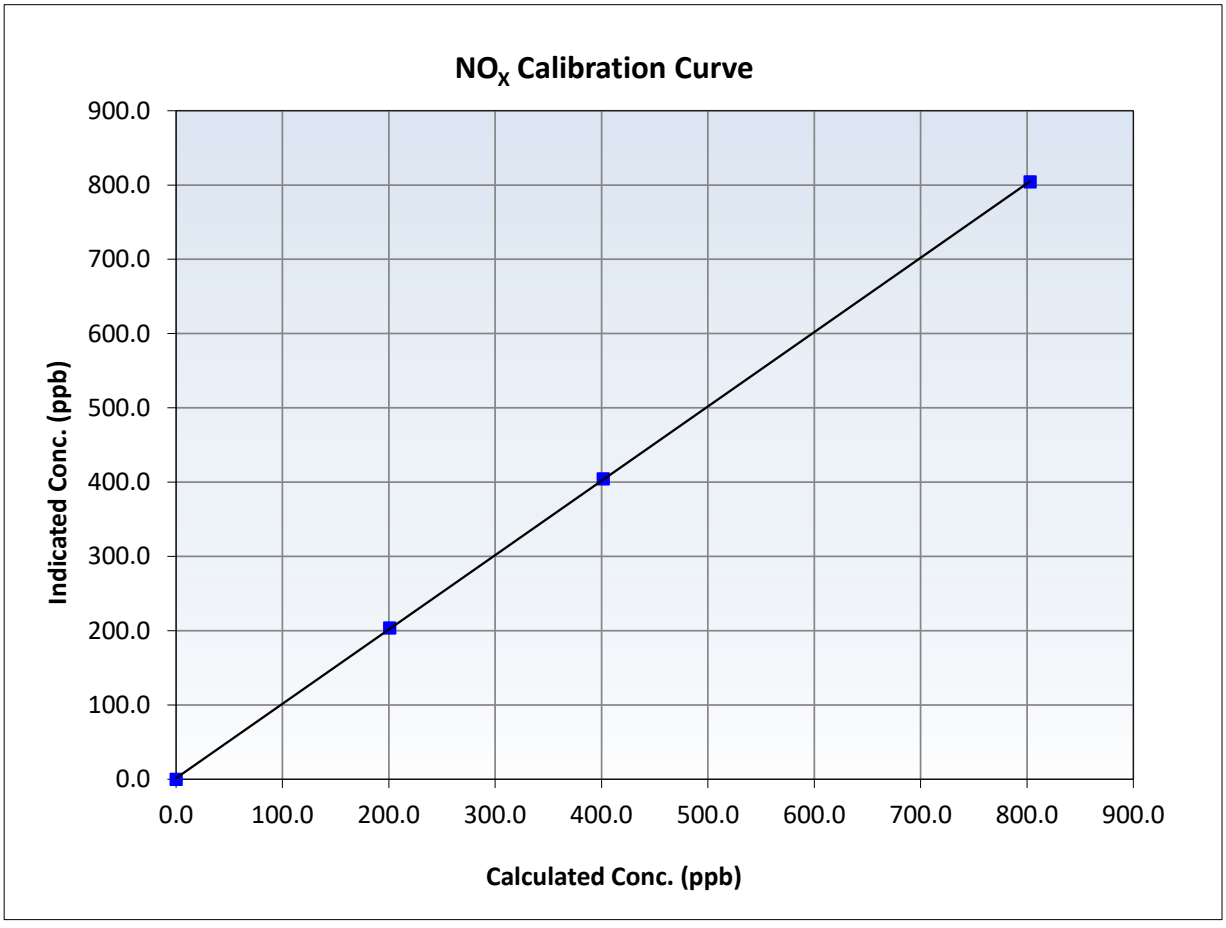
Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	October 18, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:23	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
803.0	804.2	0.9985
401.5	404.5	0.9926
200.7	203.5	0.9865

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	1.000827	*0.90 - 1.10*
Intercept	1.451920	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

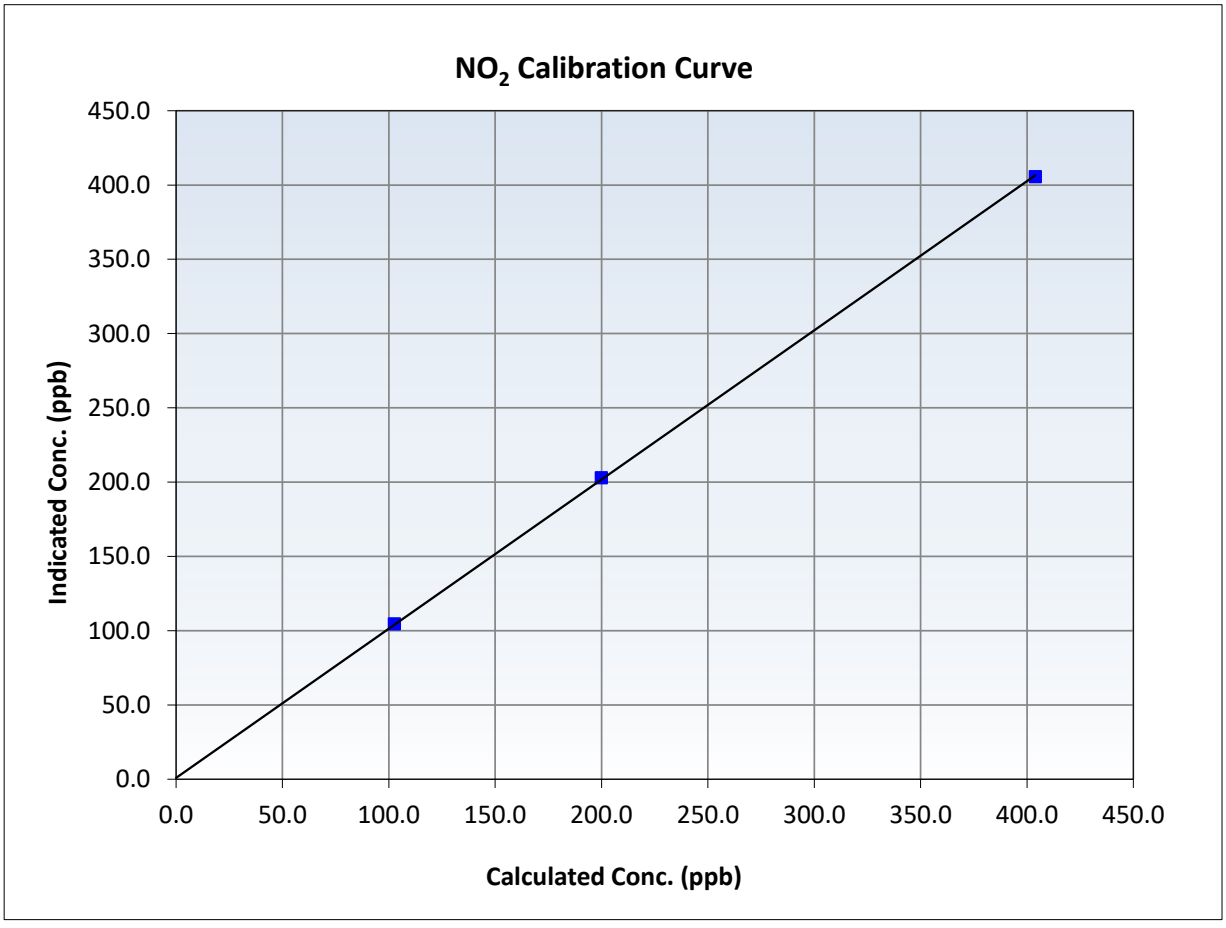
Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	October 18, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:23	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
403.9	405.7	0.9955
200.0	203.0	0.9851
102.7	104.6	0.9816

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999957	*≥0.995*
Slope	1.004263	*0.90 - 1.10*
Intercept	0.892899	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

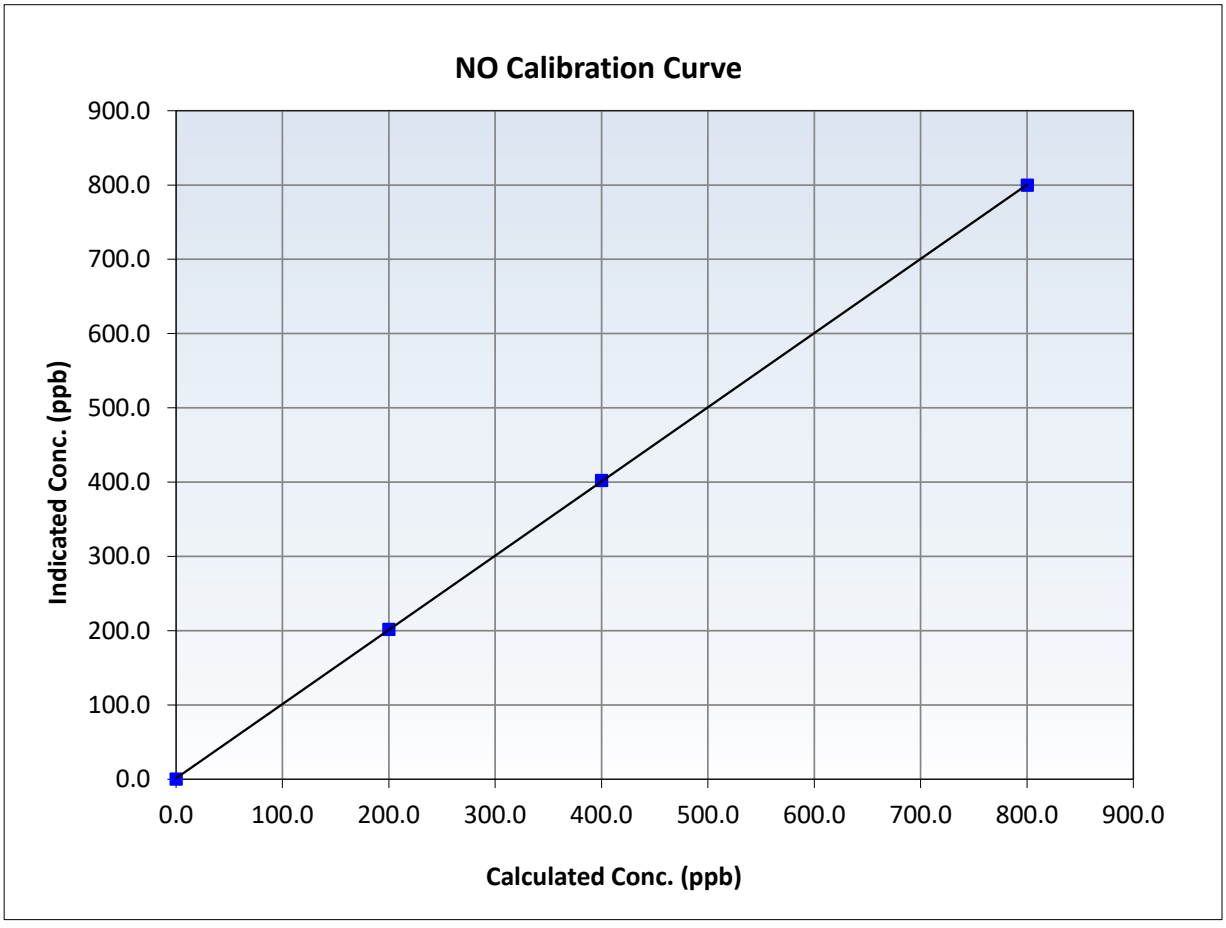
Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	October 18, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:23	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

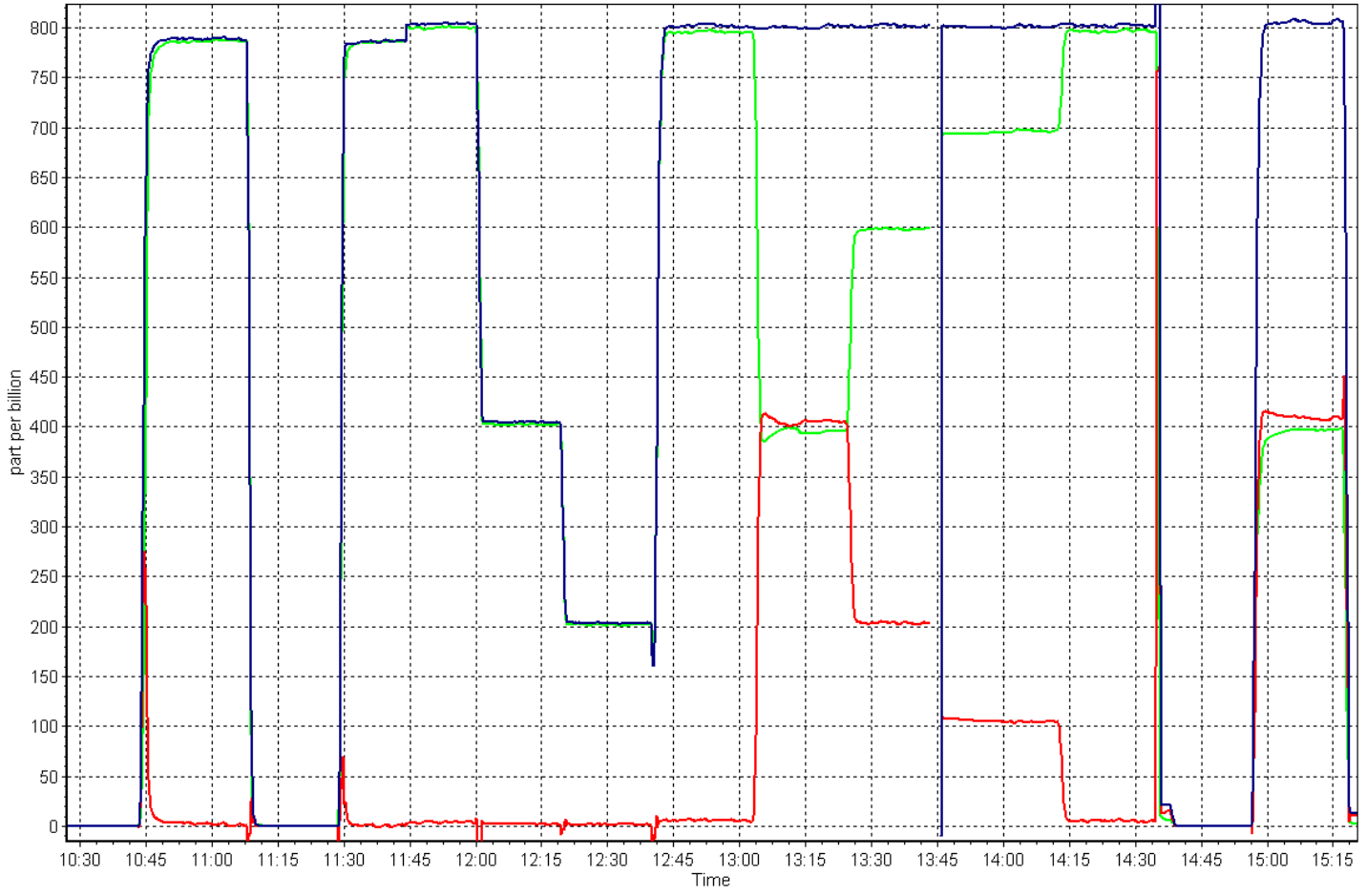
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.3	799.9	1.0005
400.2	402.3	0.9947
200.1	201.7	0.9920

Statistical Evaluation		Limits
Correlation Coefficient	0.999989	≥0.995
Slope	0.998899	0.90 - 1.10
Intercept	1.271961	+/-20



NO_X Calibration Plot Date: November 22, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Athabasca Valley
Station number:	AMS 07
Calibration Date:	November 27, 2024
Last Cal Date:	November 22, 2024
Start time (MST):	11:00
End time (MST):	15:58
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC2940	Cal Gas Expiry Date:	January 9, 2032
NOX Cal Gas Conc:	60.10 ppm	NO Cal Gas Conc:	59.90 ppm
Removed Cylinder #:	DT0033919	Removed Gas Exp Date:	N/A
Removed Gas NOX Conc:	60.10 ppm	Removed Gas NO Conc:	59.90 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3805
ZAG make/model:	API T701H	Serial Number:	198

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
AF High point										
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = NA	ppb	NO = NA	ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	NA
Baseline Corr 1st pt	NO_X = NA	ppb	NO = NA	ppb	As Found Statistics	*Percent Change	NO =	NA
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO r^2:	NO Sl:	NO Int:	
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:	

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i

Serial Number: 1160120024

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.187	1.168	NO bkgnd or offset:	8.5	8.4
NOX coeff or slope:	1.005	0.997	NOX bkgnd or offset:	8.8	8.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	239.3	234.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000827	1.000414
NO_X Cal Offset:	1.451920	1.371903
NO Cal Slope:	0.998899	1.000141
NO Cal Offset:	1.271961	0.711953
NO_2 Cal Slope:	1.004263	1.000715
NO_2 Cal Offset:	0.892899	-0.278129

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
High point	4933	66.8	803.0	800.3	2.7	803.5	800.4	3.1	0.9993	0.9999
Mid point	4966	33.4	401.5	400.2	1.3	404.9	402.2	2.7	0.9916	0.9950
Low point	4983	16.7	200.7	200.1	0.7	203.2	201.2	2.0	0.9879	0.9944
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
As left span	4933	66.8	803.0	396.2	406.8	802.0	396.2	405.6	1.0012	1.0000
							Average Correction Factor		0.9930	0.9964

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	794.9	395.3	402.3	402.1	1.0004	100.0%
Mid GPT point	794.9	604.4	193.2	193.8	0.9968	100.3%
Low GPT point	794.9	699.1	98.5	97.5	1.0100	99.0%
				Average Correction Factor	1.0024	99.8%

Notes: No as founds done since cal gas cylinder was empty. Calibration gas cylinder swapped out. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

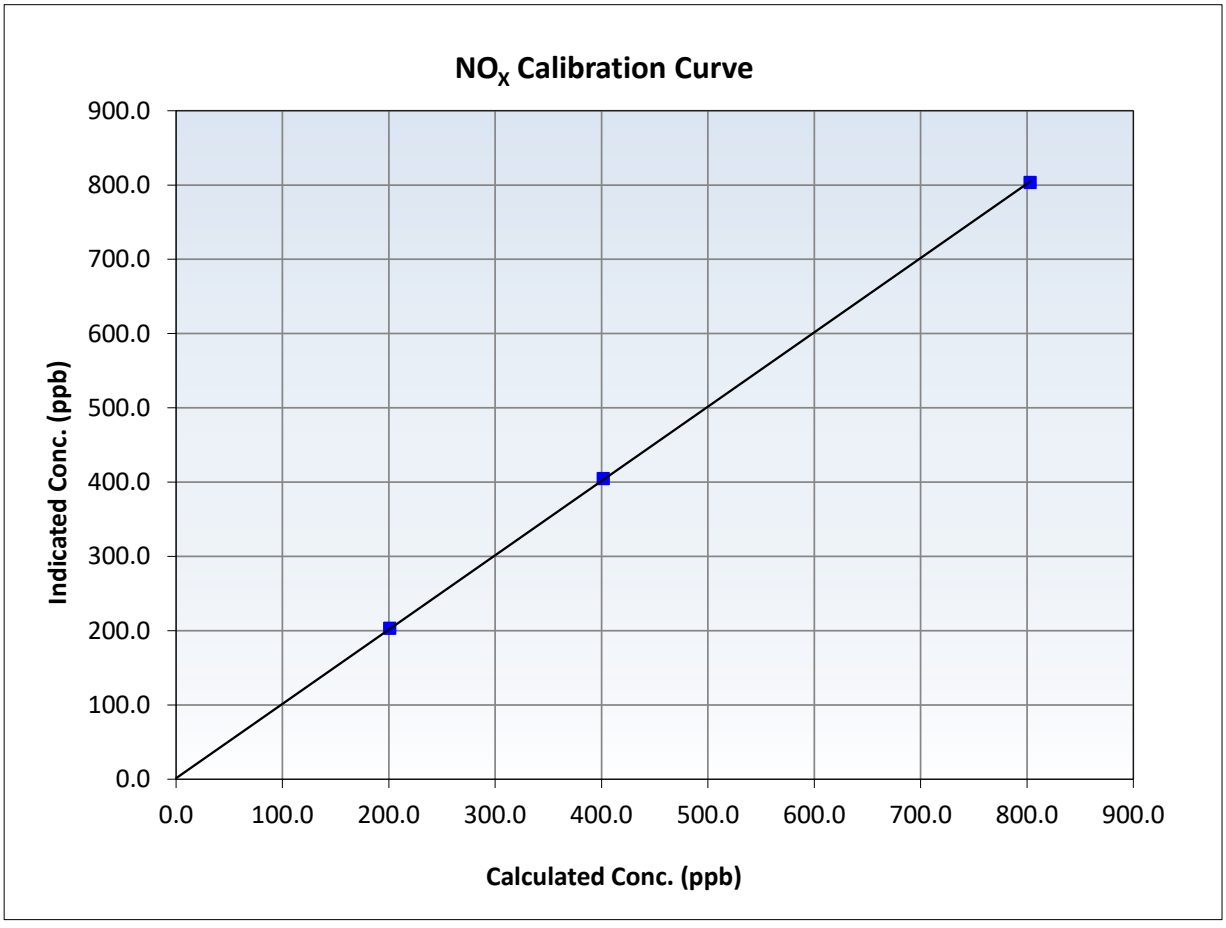
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	November 22, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	11:00	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
803.0	803.5	0.9993
401.5	404.9	0.9916
200.7	203.2	0.9879

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	1.000414	*0.90 - 1.10*
Intercept	1.371903	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

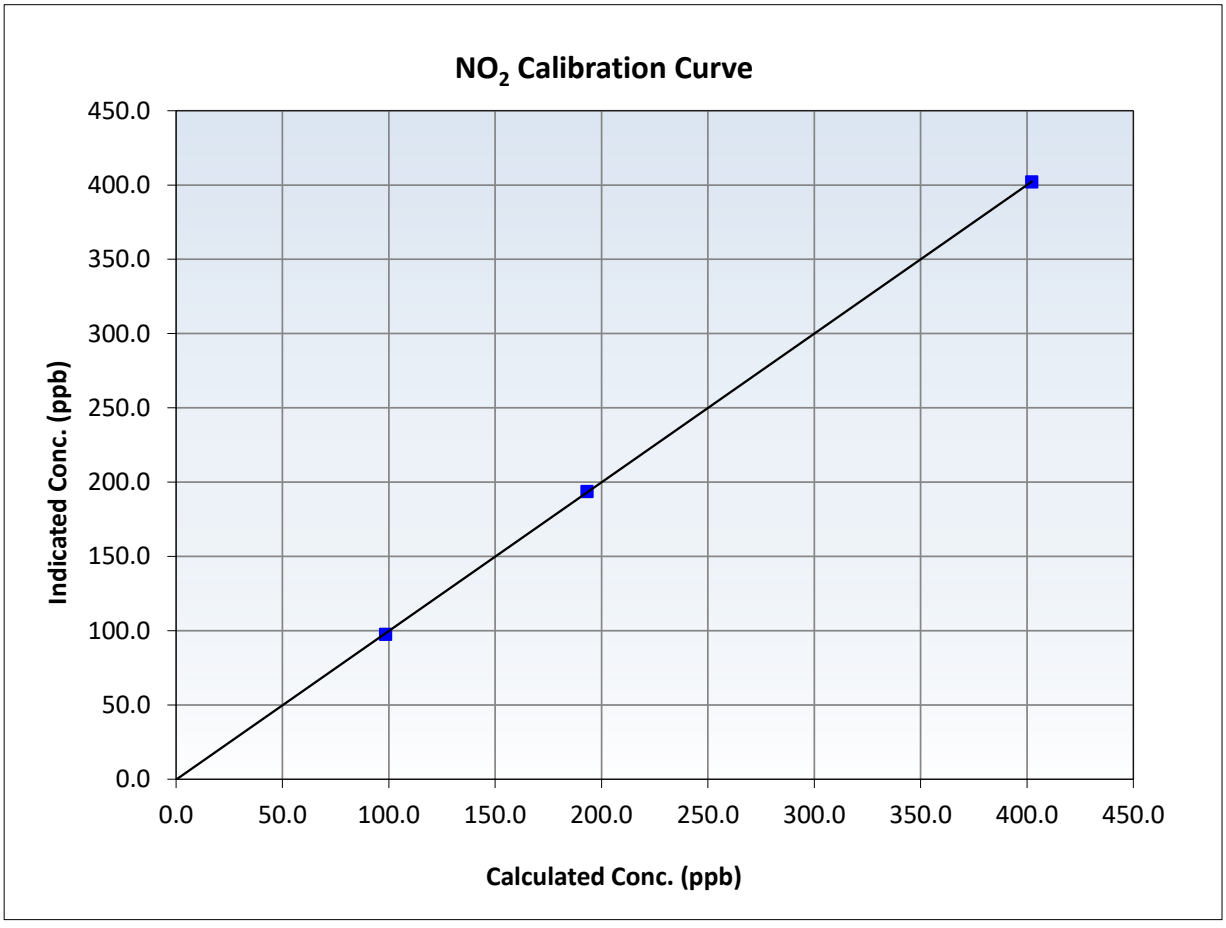
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	November 22, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	11:00	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
402.3	402.1	1.0004
193.2	193.8	0.9968
98.5	97.5	1.0100

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.000715	*0.90 - 1.10*
Intercept	-0.278129	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

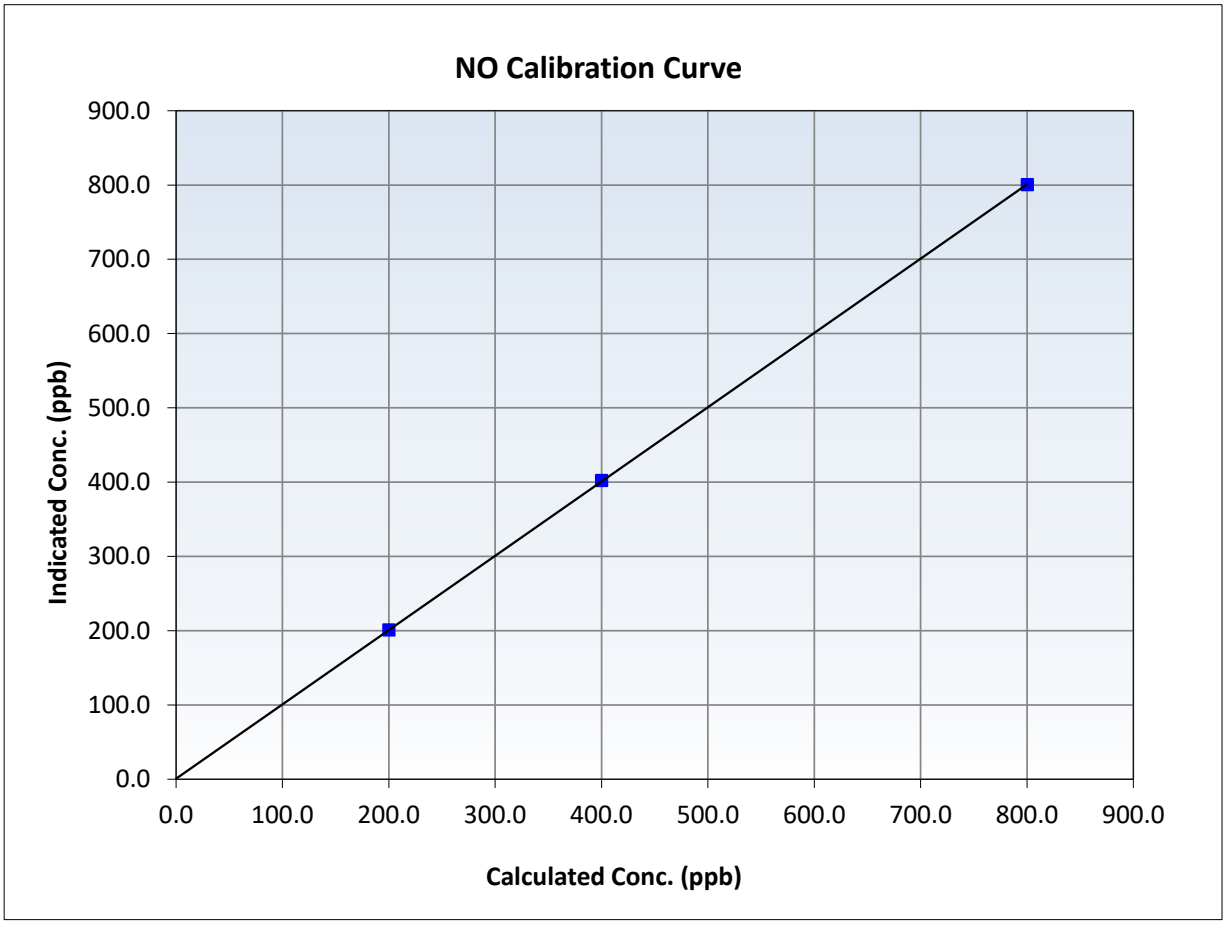
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	November 22, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	11:00	End Time (MST):	15:58
Analyzer make:	Thermo 42i	Analyzer serial #:	1160120024

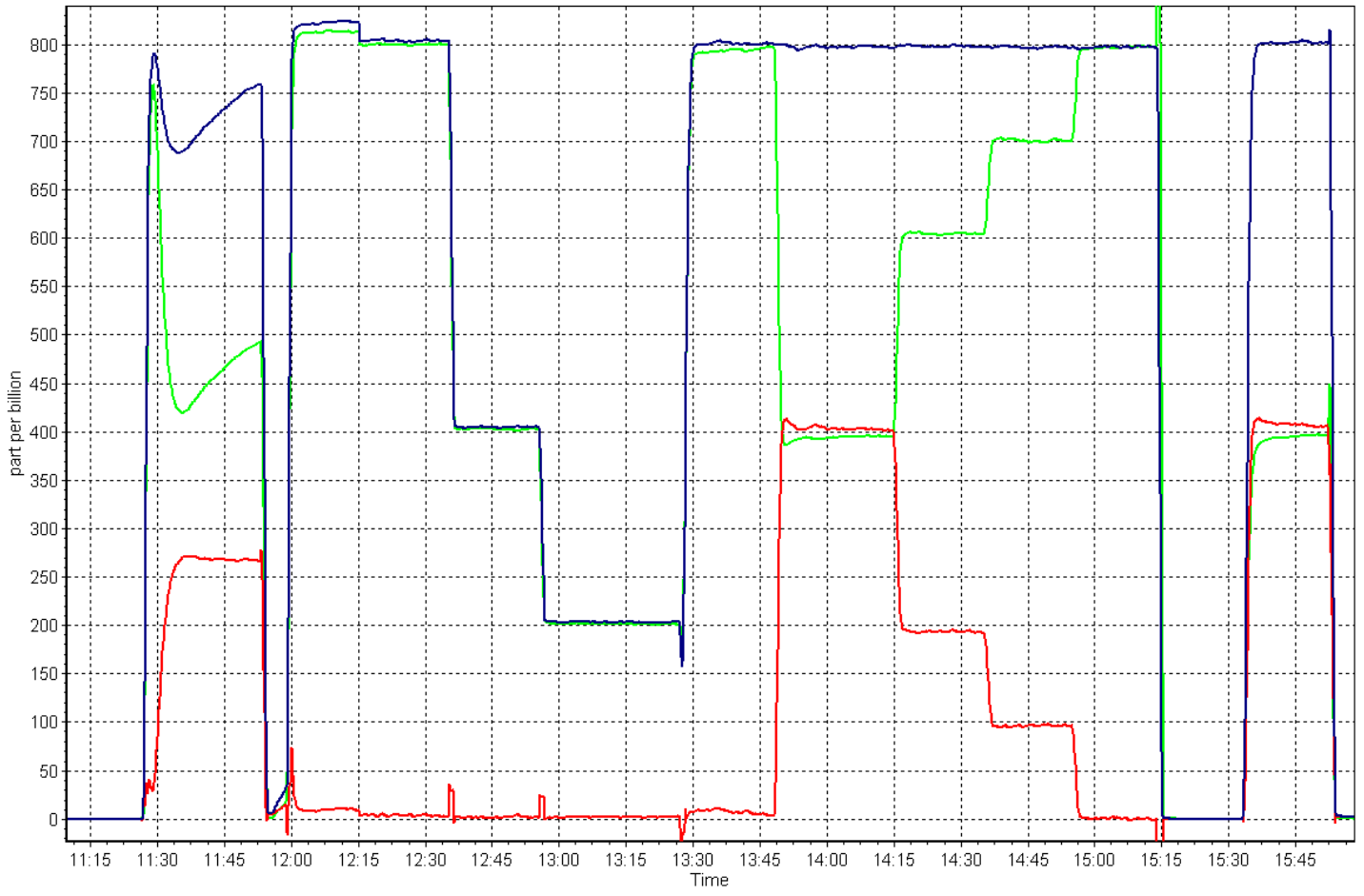
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
800.3	800.4	0.9999
400.2	402.2	0.9950
200.1	201.2	0.9944

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	1.000141	*0.90 - 1.10*
Intercept	0.711953	*+/-20*



NO_X Calibration Plot Date: November 27, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS07
Calibration Date:	November 1, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	9:35	End time (MST):	12:58
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.002029	0.997857	Backgd or Offset:	-2.0	-2.0
Calibration intercept:	1.120000	1.000000	Coeff or Slope:	1.552	1.560

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	0.2	----
As found High point	5000	1582.6	400.0	398.2	1.005
As found Mid point					
As found Low point					
Baseline Corr As found:	398.0	Previous response	401.9	*% change	-1.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.6	----
High point	5000	1582.6	400.0	400.0	1.000
Mid point	5000	1118.0	200.0	200.6	0.997
Low point	5000	897.8	100.0	101.3	0.987
As left zero	5000	400.0	0.0	0.1	----
As left span	5000	1582.6	400.0	404.0	0.990
				Average Correction Factor	0.995

Notes: Sample inlet filters changed after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

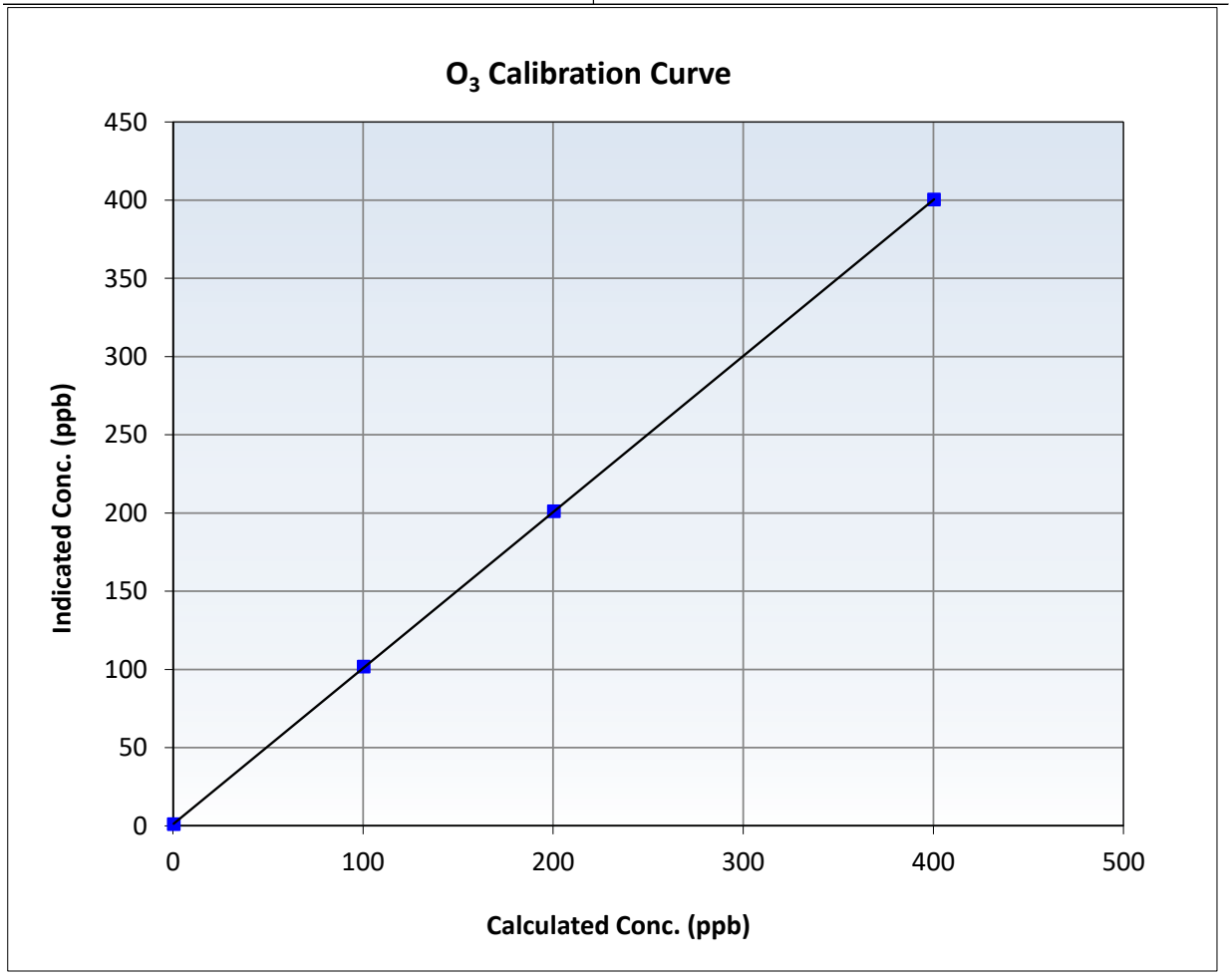
Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 4, 2024
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	9:35	End Time (MST):	12:58
Analyzer make:	Thermo 49i	Analyzer serial #:	1152220023

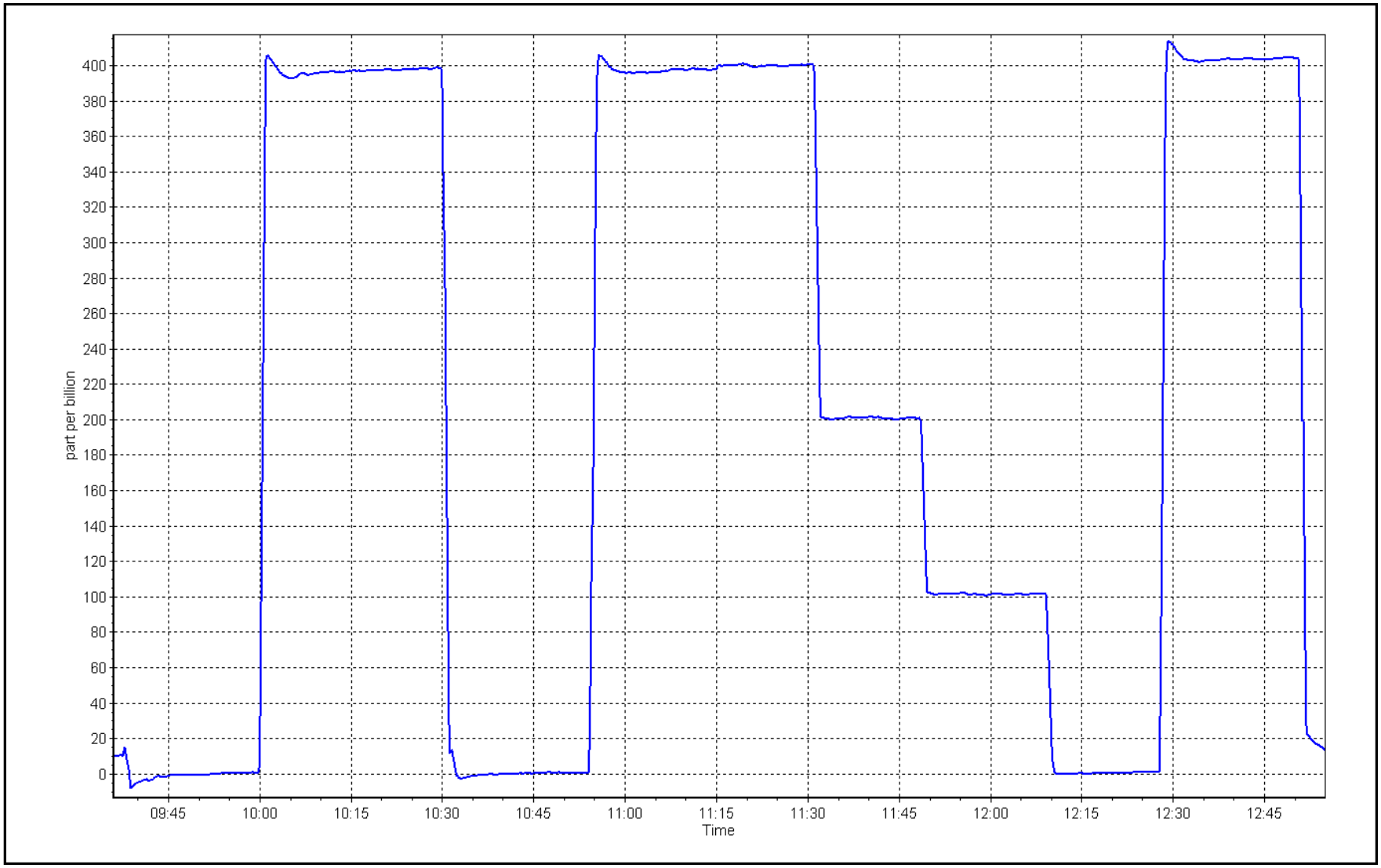
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.6	----
400.0	400.0	1.0000
200.0	200.6	0.9970
100.0	101.3	0.9872

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	0.997857	*0.90 - 1.10*
Intercept	1.000000	*+/- 5*



O_3 Calibration Plot Date: November 1, 2024 Location: Athabasca Valley



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	November 22, 2024	Last Cal Date:	October 21, 2024
Start time (MST):	12:50	End time (MST):	14:55
Analyzer Make:	API T640	S/N:	645
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388749
Temp/RH standard:	Alicat FP-25BT	S/N:	388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-9.9	-10.8	-9.9	☐	+/- 2 ^{o}C
P (mmHg)	748.7	745.2	748.7	☐	+/- 10 mmHg
Flow (LPM)	4.94	4.96	4.94	☐	+/- 0.25 LPM
PW% (pump)	39	-----	39	☐	>80%
Zero Verification	PM w/o HEPA:	5.2	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	9.1	9.1	11.0	☑	+/- 0.5

Date Optical Chamber Cleaned: November 22, 2024

Date Disposable Filter Changed: August 16, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: July 8, 2024

Date RH/T Sensor Cleaned: July 8, 2024

Notes: Flow, temp and pressure. Leak check passed. Chamber cleaned. PMT adjusted.

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	November 12, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	10:30	End time (MST):	13:53
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	2,953	ppm	Cal Gas Exp Date:	September 30, 2029
Cal Gas Cylinder #:	T1TWKRN			
Removed Cal Gas Conc:	2,953	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T750		Serial Number:	282
ZAG Make/Model:	Teledyne API 751H		Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 48i-TLE		Analyzer serial #:	1408761381	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997785	0.998781	Backgd or Offset:	4.872	5.219
Calibration intercept:	0.121940	0.102000	Coeff or Slope:	1.043	1.068

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.2	----
As found High point	4932	67.8	40.0	39.5	1.019
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	39.31	Prev response:	40.08	*% change:	-2.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4932	67.8	40.0	40.0	1.001
Mid point	4966	33.9	20.0	20.2	0.990
Low point	4983	16.9	10.0	10.1	0.984
As left zero	5000	0.0	0.0	0.0	----
As left span	4932	67.8	40.0	40.0	1.001
				Average Correction Factor	0.992

Notes: Performed zero and span adjustment.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

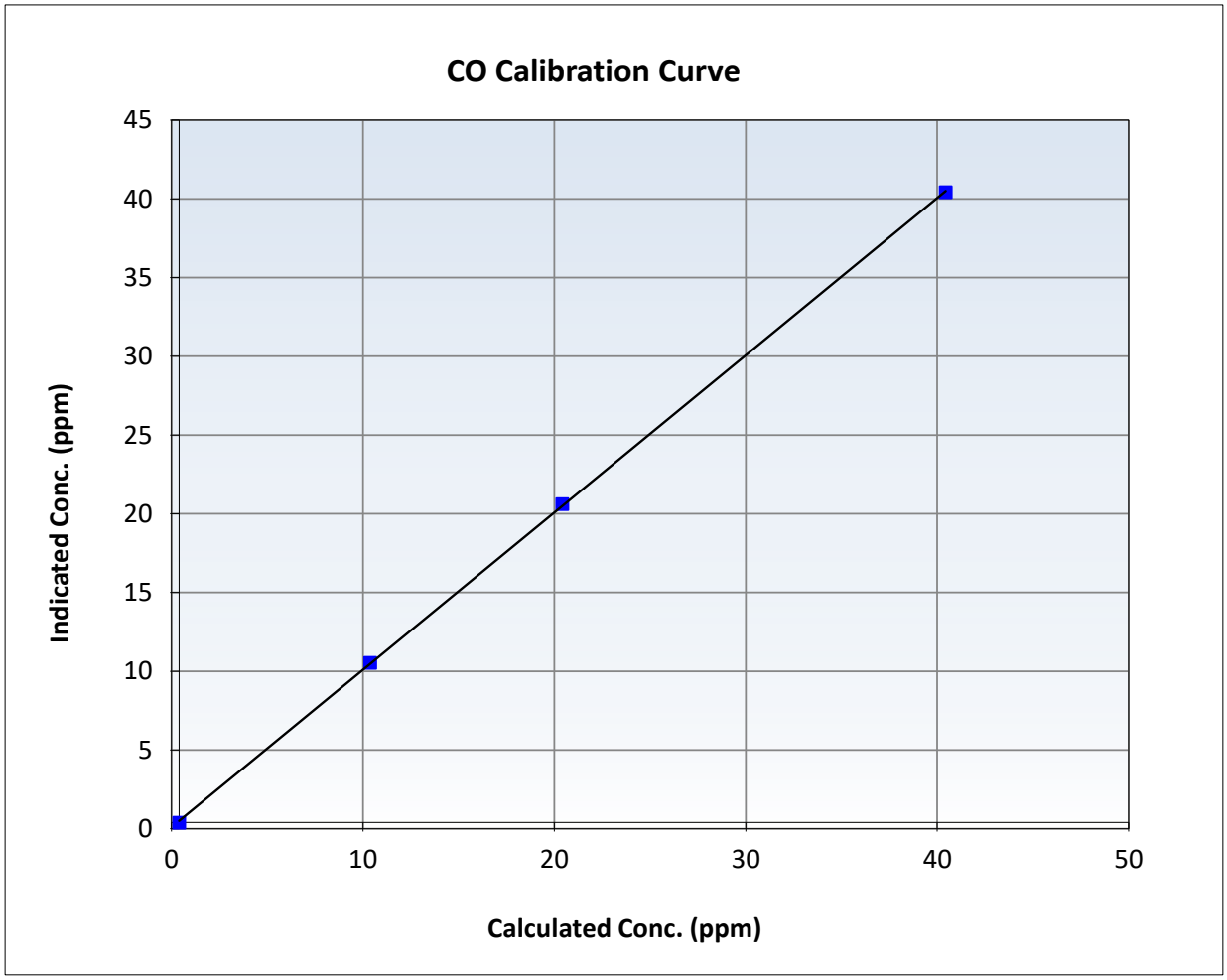
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 3, 2024
Station Name:	Athabasca Valley	Station Number:	AMS 07
Start Time (MST):	10:30	End Time (MST):	13:53
Analyzer make:	Thermo 48i-TLE	Analyzer serial #:	1408761381

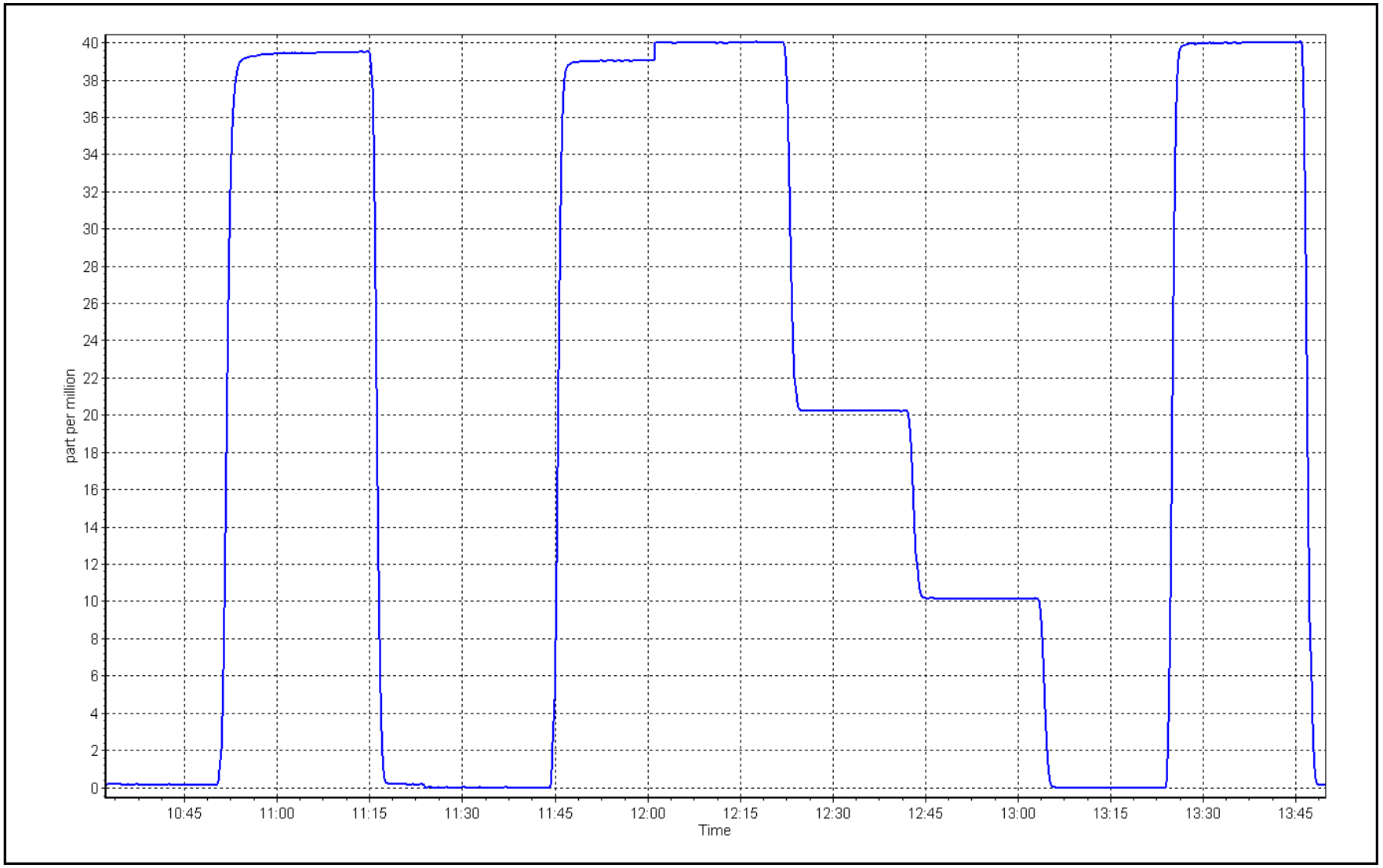
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
40.0	40.0	1.0006
20.0	20.2	0.9902
10.0	10.1	0.9844

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999957	*≥0.995*
Slope	0.998781	*0.90 - 1.10*
Intercept	0.102000	*+/-1.5*



CO Calibration Plot Date: November 12, 2024 Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS08
FORT CHIPEWYAN
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS08
Calibration Date:	November 15, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	11:11	End time (MST):	13:45
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Serial Number:	1136451241	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.008151	0.994277	Backgd or Offset:	1.8	1.8
Calibration intercept:	-2.863936	0.297009	Coeff or Slope:	0.959	0.959

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	4920	80.3	800.4	797.1	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.5	Previous response	804.0	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.3	----
High point	4920	80.3	800.4	796.1	1.005
Mid point	4960	40.2	400.7	398.1	1.007
Low point	4980	20.1	200.4	200.7	0.998
As left zero	5000	0.0	0.0	-0.3	----
As left span	4920	80.3	800.4	798.4	1.002
				Average Correction Factor:	1.003

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

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

SO_2 Calibration Summary

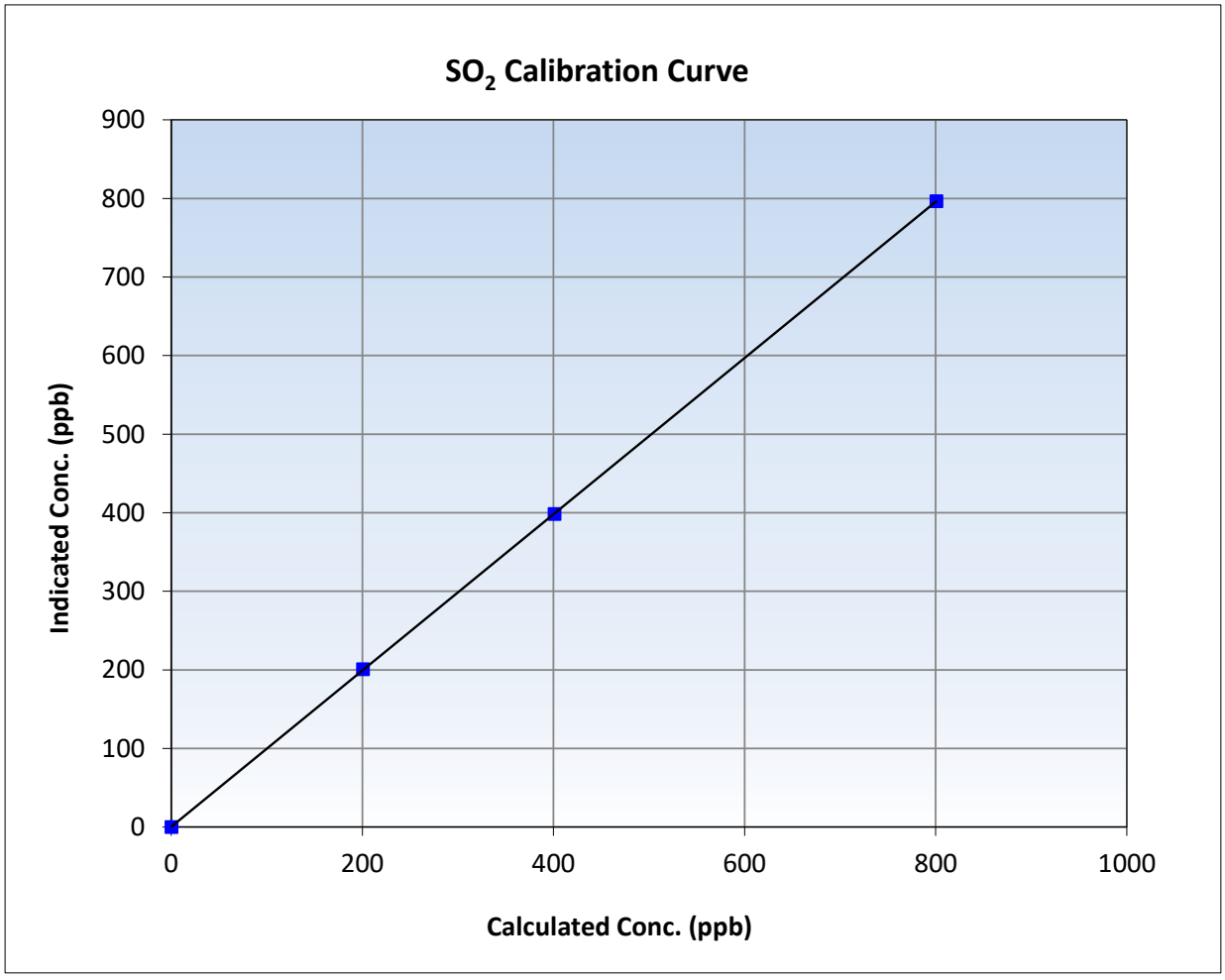
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 7, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	11:11	End Time (MST):	13:45
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

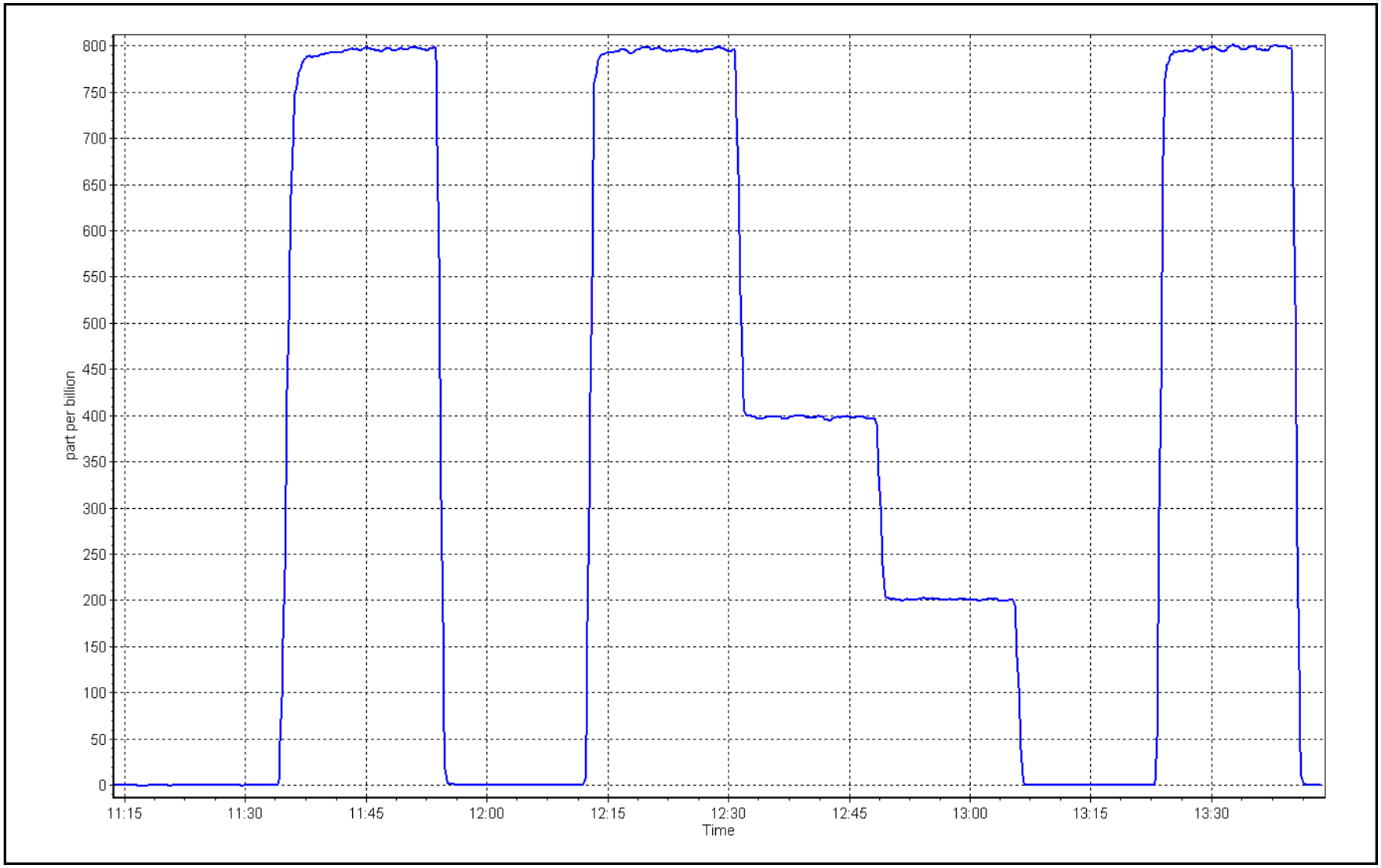
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
800.4	796.1	1.0054
400.7	398.1	1.0065
200.4	200.7	0.9983

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	0.994277	*0.90 - 1.10*
Intercept	0.297009	*+/-30*



SO2 Calibration Plot Date: November 15, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	November 29, 2024	Last Cal Date:	October 22, 2024
Start time (MST):	10:00	End time (MST):	13:48
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:	3810
ZAG Make/Model:	Teledyne API T701		Serial Number:	135

Analyzer Information

Analyzer make:	Thermo 43iQ-TL		Analyzer serial #:	1203169744
Converter make:	CDN-101		Converter serial #:	14639
Analyzer Range	0 - 100 ppb		Converter Temp:	833 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.001283	0.985428	Backgd or Offset:	1.5	1.4
Calibration intercept:	0.118812	0.198526	Coeff or Slope:	0.762	0.742

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4920	80.5	80.0	79.0	1.014
As found Mid point	4960	40.2	40.0	39.7	1.009
As found Low point	4980	20.1	20.0	19.6	1.025
New cylinder response					

Baseline Corr As found:	78.9	Prev response:	80.23	*% change:	-1.7%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.987284	AF Intercept:	0.058569
Baseline Corr 3rd AF pt:	19.5	AF Correlation:	0.999978	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	80.5	80.0	79.0	1.013
Mid point	4960	40.2	40.0	39.7	1.006
Low point	4980	20.1	20.0	19.8	1.009
As left zero	5000	0.0	0.0	0.3	----
As left span	4920	80.5	80.0	80.3	0.996
SO2 Scrubber Check	4919.7	80.3	803.0	0.1	----

Date of last scrubber change:	March 7, 2022	Ave Corr Factor	1.009
Date of last converter efficiency test:	March 15, 2022	100.7%	efficiency

Notes: Changed inlet filter after multipoint as founds. SO2 scrubber check done after calibrator zero and passed.

Calibration Performed By: Morgan Voyageur, Sabian Voyageur,

Wood Buffalo Environmental Association

TRS Calibration Summary

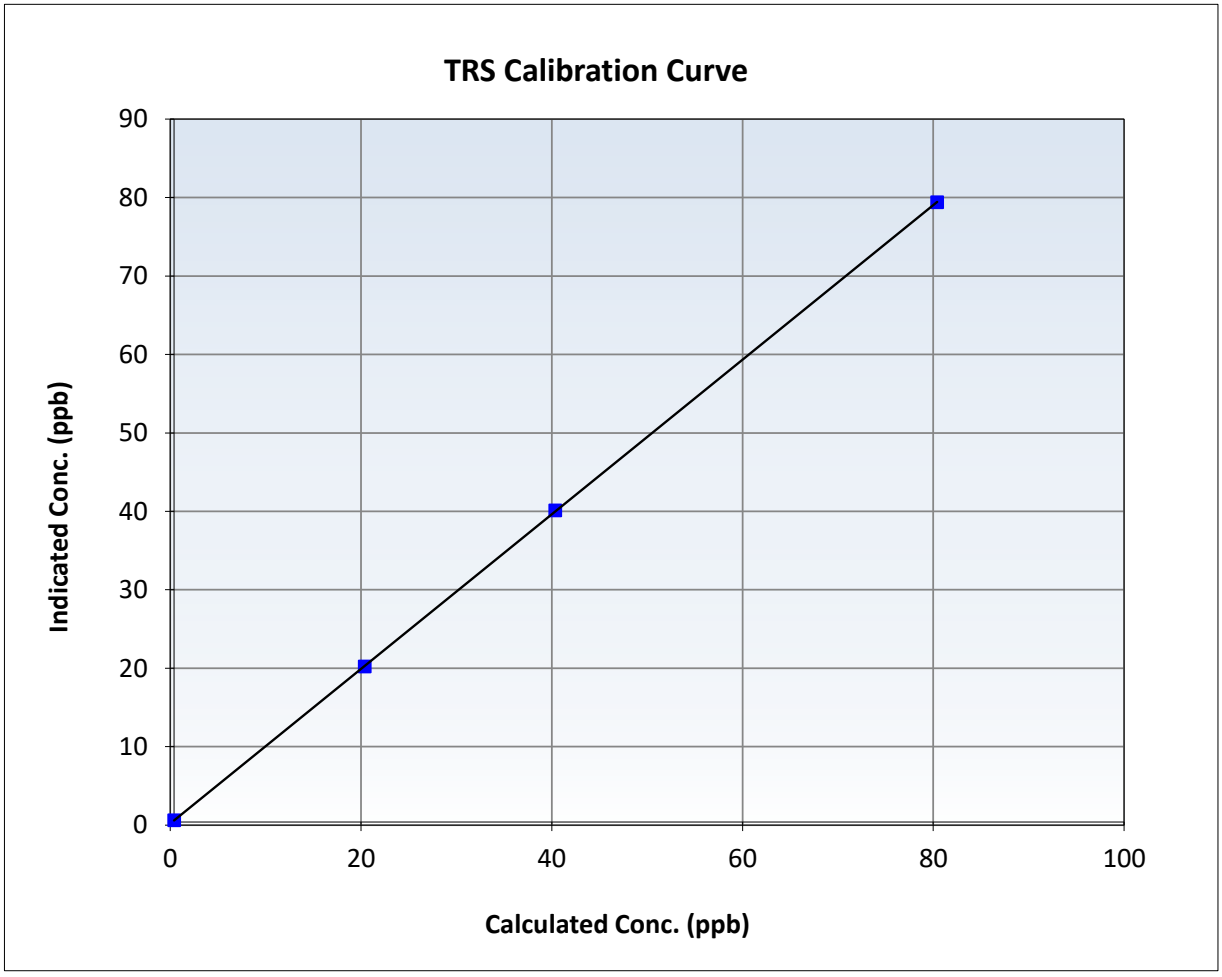
Station Information

Calibration Date:	November 29, 2024	Previous Calibration:	October 22, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	10:00	End Time (MST):	13:48
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

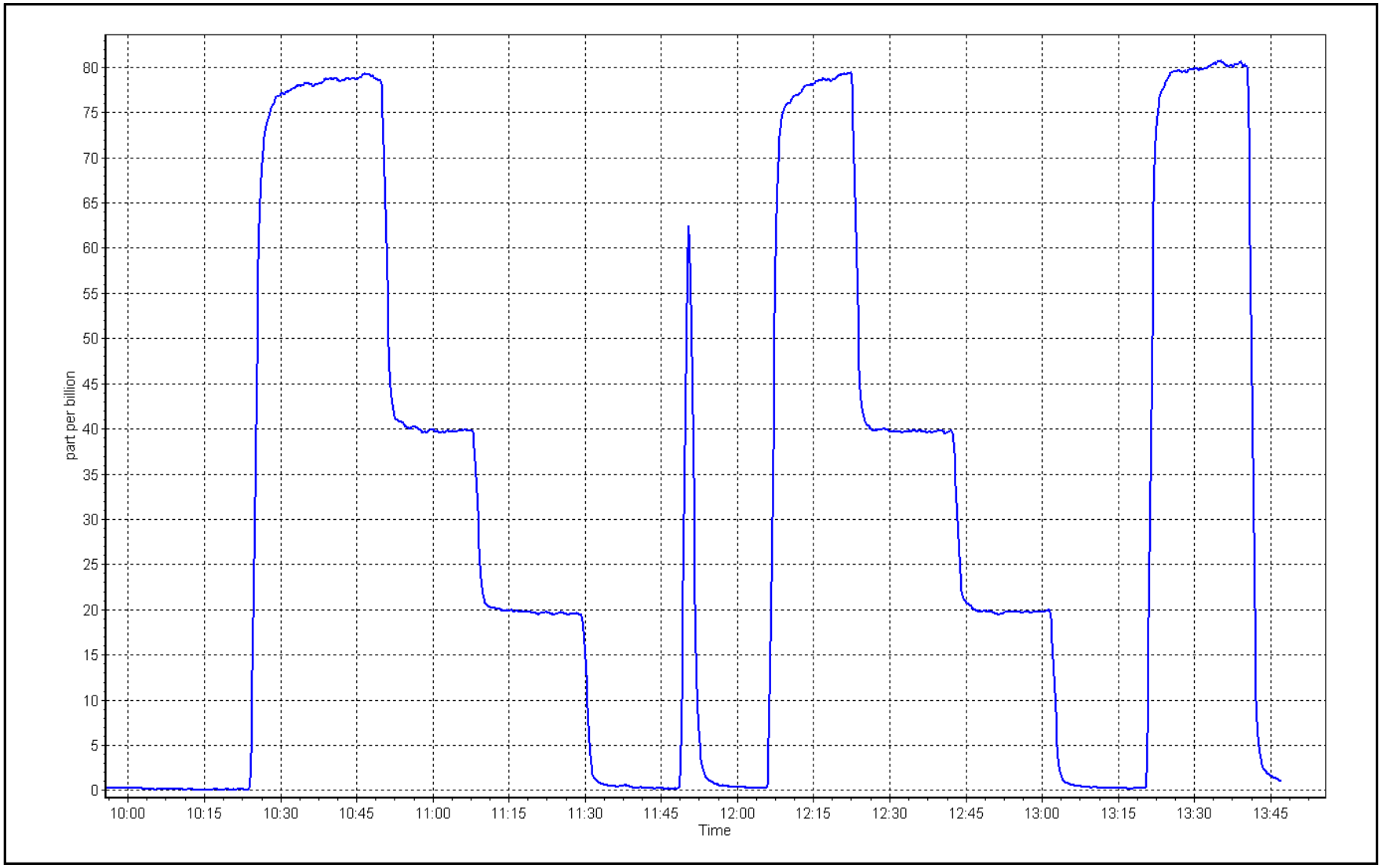
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	79.0	1.0128
40.0	39.7	1.0065
20.0	19.8	1.0090

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	0.985428	*0.90 - 1.10*
Intercept	0.198526	*+/-3*



TRS Calibration Plot Date: November 29, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan
Station number:	AMS 08
Calibration Date:	November 16, 2024
Last Cal Date:	October 8, 2024
Start time (MST):	13:03
End time (MST):	17:42
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.2	----	----
AF High point	4933	66.7	803.1	800.4	2.7	812.4	814.0	-1.6	0.9887	0.9831
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 801.9 ppb	NO = 799.9 ppb
Baseline Corr 1st pt	NO_X = 812.3 ppb	NO = 814.2 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = 1.3%
As found	NO r^2:	*Percent Change	NO = 1.8%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 4460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.220	1.195	NO bkgnd or offset:	0.0	0.9
NOX coeff or slope:	1.213	1.194	NOX bkgnd or offset:	0.1	0.6
NO2 coeff or slope:	2.100	2.100	Reaction cell Press:	2.8	2.9

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000518	0.992491
NO_X Cal Offset:	-1.605150	1.414756
NO Cal Slope:	1.004498	0.996043
NO Cal Offset:	-4.105817	-0.145628
NO_2 Cal Slope:	0.994192	1.010685
NO_2 Cal Offset:	0.366290	0.893977

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.4	0.3	----	----
High point	4933	66.7	803.1	800.4	2.7	797.6	797.0	0.6	1.0069	1.0043
Mid point	4967	33.3	400.9	399.6	1.3	400.5	398.0	2.5	1.0010	1.0040
Low point	4983	16.7	201.1	200.4	0.7	202.2	199.7	2.5	0.9944	1.0035
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.4	0.2	----	----
As left span	4933	66.7	803.1	391.9	411.2	795.7	391.9	403.9	1.0093	1.0000
							Average Correction Factor		1.0008	1.0039

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.3	----	----
High GPT point	794.6	390.4	406.9	410.8	0.9904	101.0%
Mid GPT point	794.6	584.2	213.1	219.4	0.9711	103.0%
Low GPT point	794.6	685.4	111.9	112.7	0.9926	100.7%
				Average Correction Factor	0.9847	101.6%

Notes: Changed inlet filter after as founds. Made adjustments to zero point and span high point.

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

NO_X Calibration Summary

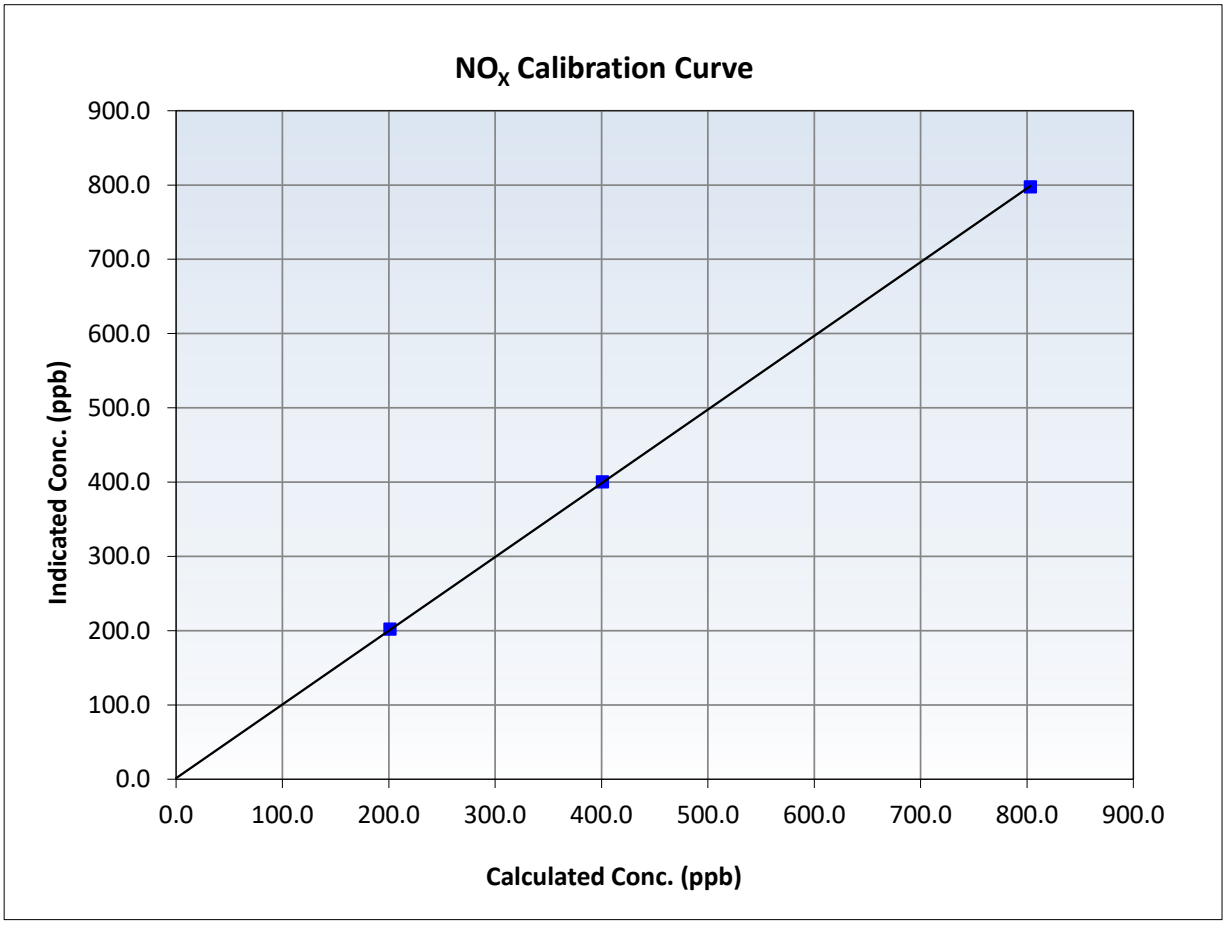
Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 8, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	13:03	End Time (MST):	17:42
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
803.1	797.6	1.0069
400.9	400.5	1.0010
201.1	202.2	0.9944

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999983	*≥0.995*
Slope	0.992491	*0.90 - 1.10*
Intercept	1.414756	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

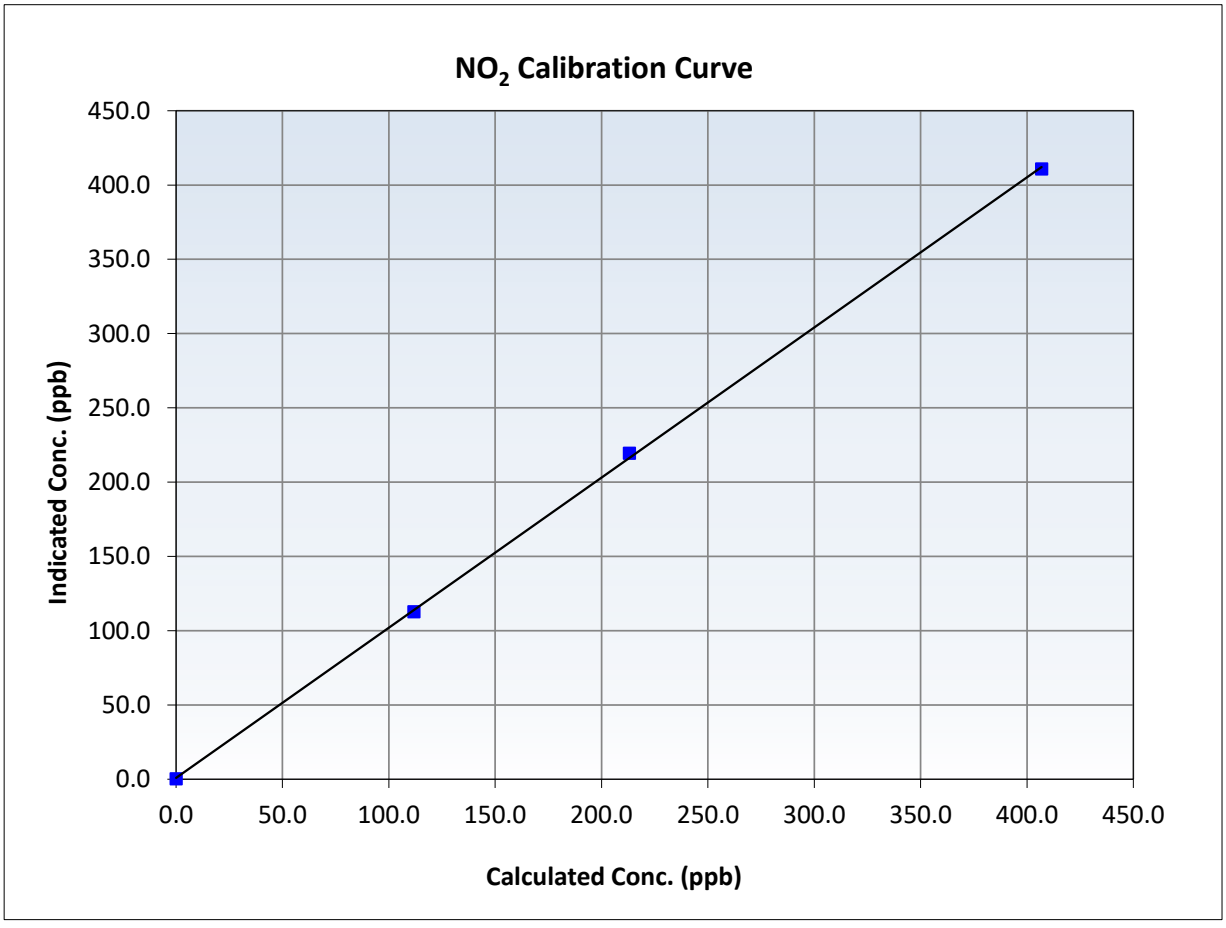
Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 8, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	13:03	End Time (MST):	17:42
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
406.9	410.8	0.9904
213.1	219.4	0.9711
111.9	112.7	0.9926

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999851	*≥0.995*
Slope	1.010685	*0.90 - 1.10*
Intercept	0.893977	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

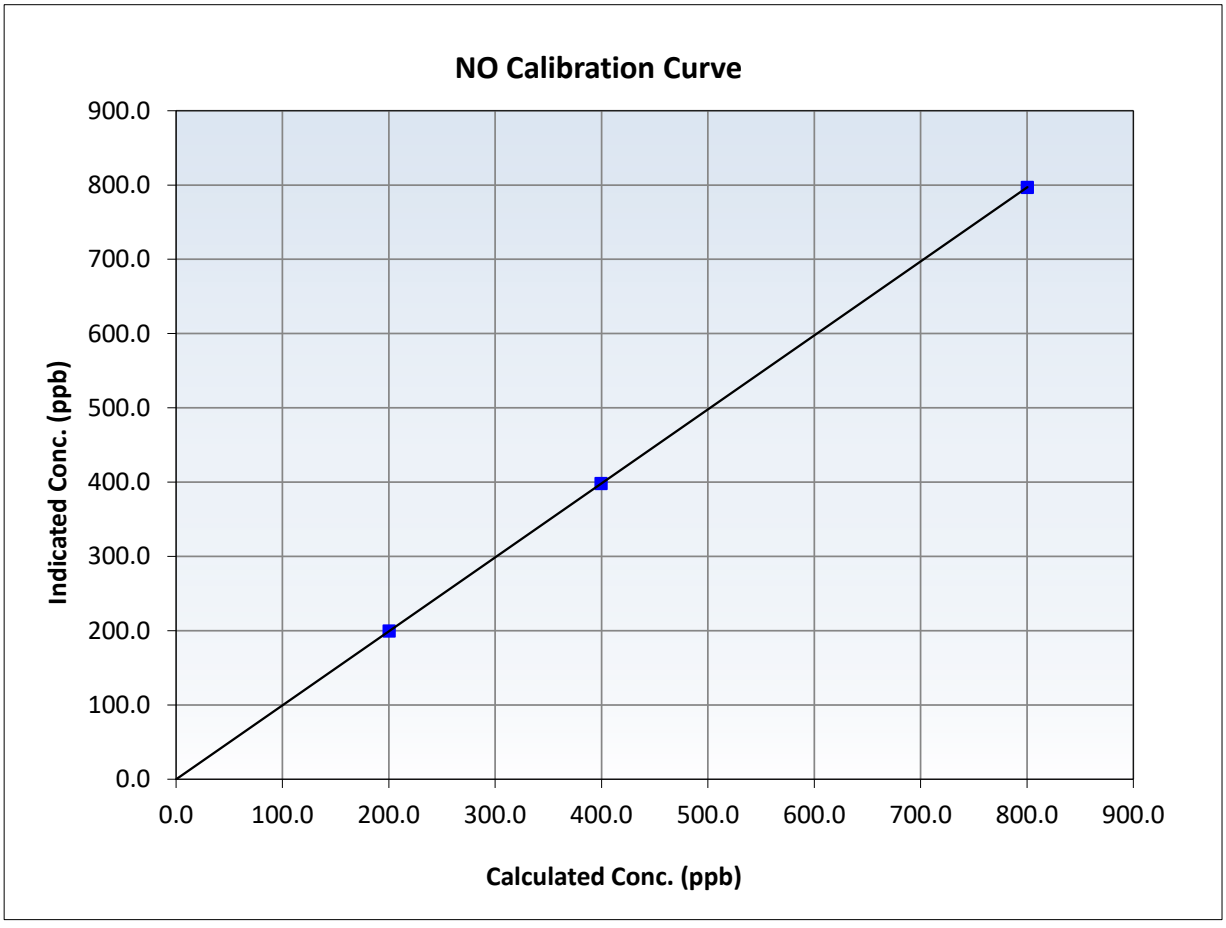
Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 8, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	13:03	End Time (MST):	17:42
Analyzer make:	Teledyne API T200	Analyzer serial #:	4460

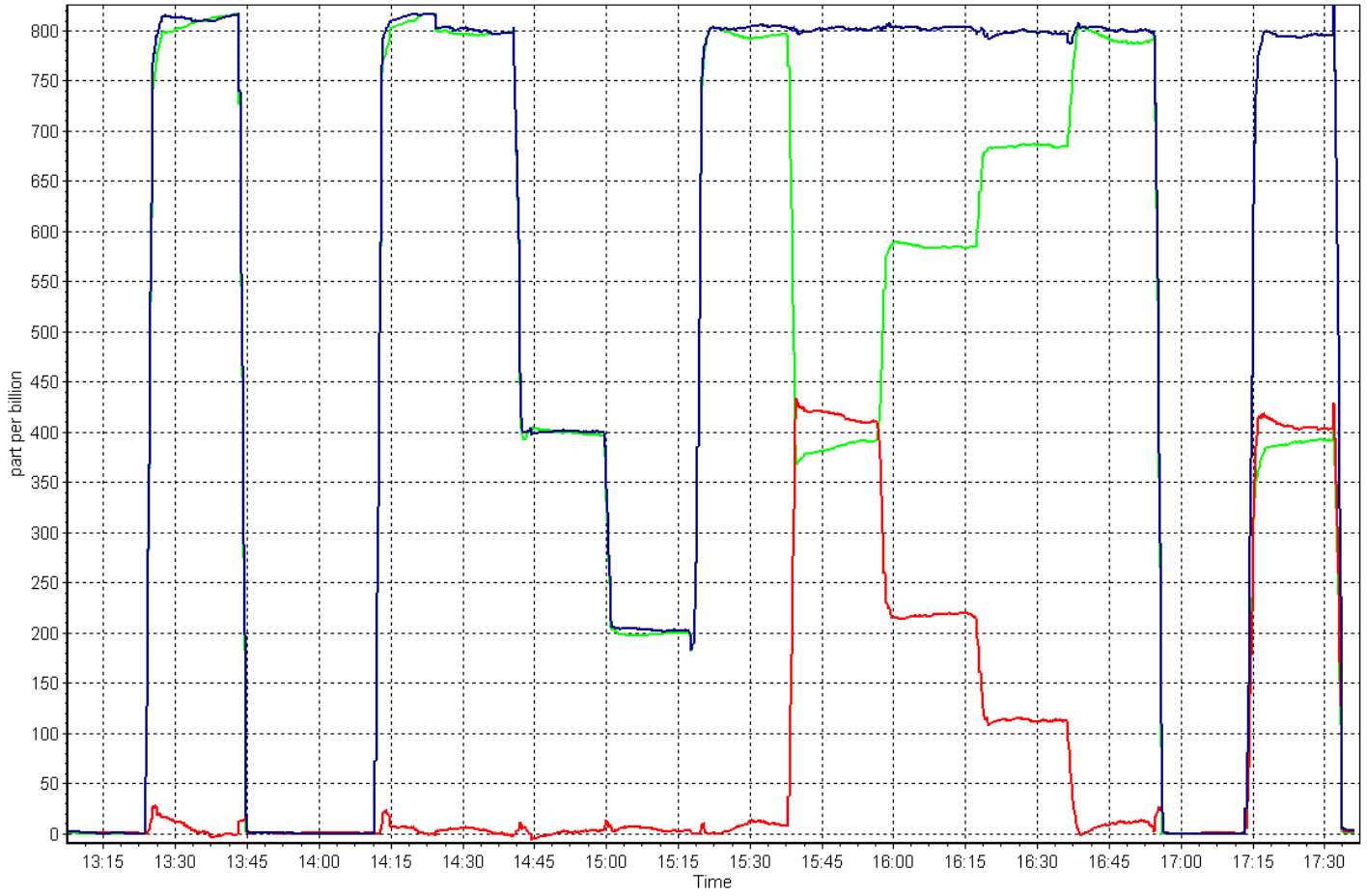
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
800.4	797.0	1.0043
399.6	398.0	1.0040
200.4	199.7	1.0035

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.996043	*0.90 - 1.10*
Intercept	-0.145628	*+/-20*



NO_X Calibration Plot Date: November 16, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	November 5, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	9:07	End time (MST):	11:39
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3810
ZAG Make/Model:	Teledyne API T701	Serial Number:	135

Analyzer Information

Analyzer make:	Teledyne API T400		Analyzer serial #:	3872	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.008286	0.987743	Backgd or Offset:	-2.2	-2.2
Calibration intercept:	0.700000	1.220000	Coeff or Slope:	0.982	0.982

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	1.2	----
As found High point	5000	913.0	400.0	398.2	1.008
As found Mid point					
As found Low point					
Baseline Corr As found:	397.0	Previous response	404.0	*% change	-1.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	1.3	----
High point	5000	914.7	400.0	396.4	1.009
Mid point	5000	786.4	200.0	198.6	1.007
Low point	5000	701.3	100.0	100.0	1.000
As left zero	5000	0.0	0.0	1.6	----
As left span	5000	963.3	400.0	397.4	1.007
				Average Correction Factor	1.005

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

Calibration Performed By: Morgan Voyageur, Sabian Voyageur Jeremy Cardinal

Wood Buffalo Environmental Association

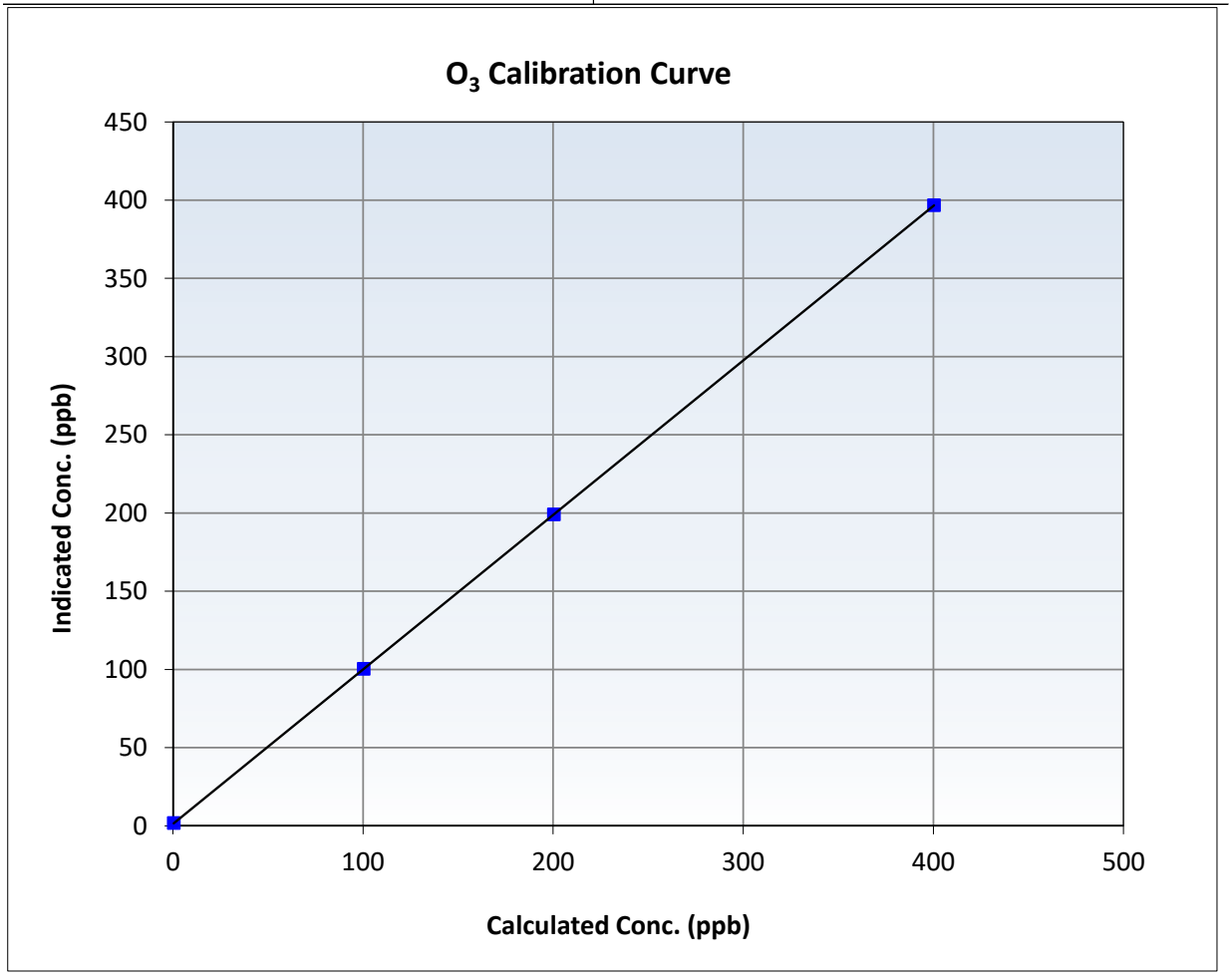
O_3 Calibration Summary

Station Information

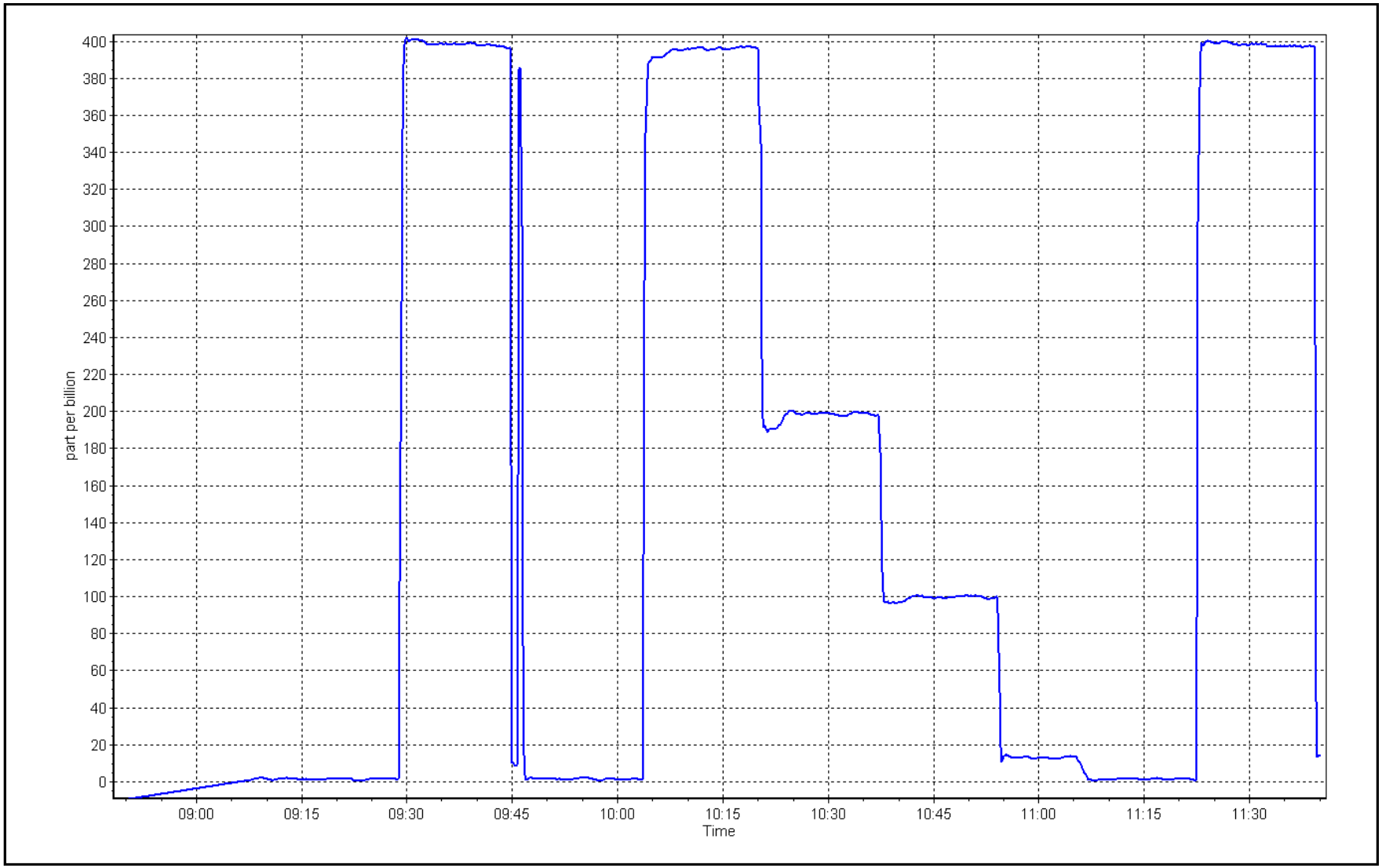
Calibration Date:	November 5, 2024	Previous Calibration:	October 17, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	9:07	End Time (MST):	11:39
Analyzer make:	Teledyne API T400	Analyzer serial #:	3872

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	1.3	----	Correlation Coefficient	1.000000	≥0.995
400.0	396.4	1.0091	Slope	0.987743	0.90 - 1.10
200.0	198.6	1.0070			
100.0	100.0	1.0000	Intercept	1.220000	+/- 5



O_3 Calibration Plot Date: November 5, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	November 5, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	14:02	End time (MST):	16:33
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3,030	ppm	Cal Gas Exp Date:	December 1, 2028
Cal Gas Cylinder #:	ALM014846			
Removed Cal Gas Conc:	3,030	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3810
ZAG Make/Model:	Teledyne API T701H		Serial Number:	135

Analyzer Information

Analyzer make:	Teledyne API T300		Analyzer serial #:	3505	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.005625	1.008286	Backgd or Offset:	-0.015	-0.015
Calibration intercept:	-0.113073	-0.085114	Coeff or Slope:	1.005	1.005

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4934	66.7	40.4	40.6	0.994
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	40.66	Prev response:	40.53	*% change:	0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4934	66.7	40.4	40.7	0.994
Mid point	4966.7	33.3	20.2	20.3	0.994
Low point	4983.3	16.7	10.1	10.1	1.002
As left zero	5000	0.0	0.0	0.0	----
As left span	2960	40.0	40.4	40.5	0.999
				Average Correction Factor	0.997

Notes: Changed inlet filter after as found. No adjusted made

Calibration Performed By: Morgan Voyageur, Sabian Voyageur, Jermey Cardinal

Wood Buffalo Environmental Association

CO Calibration Summary

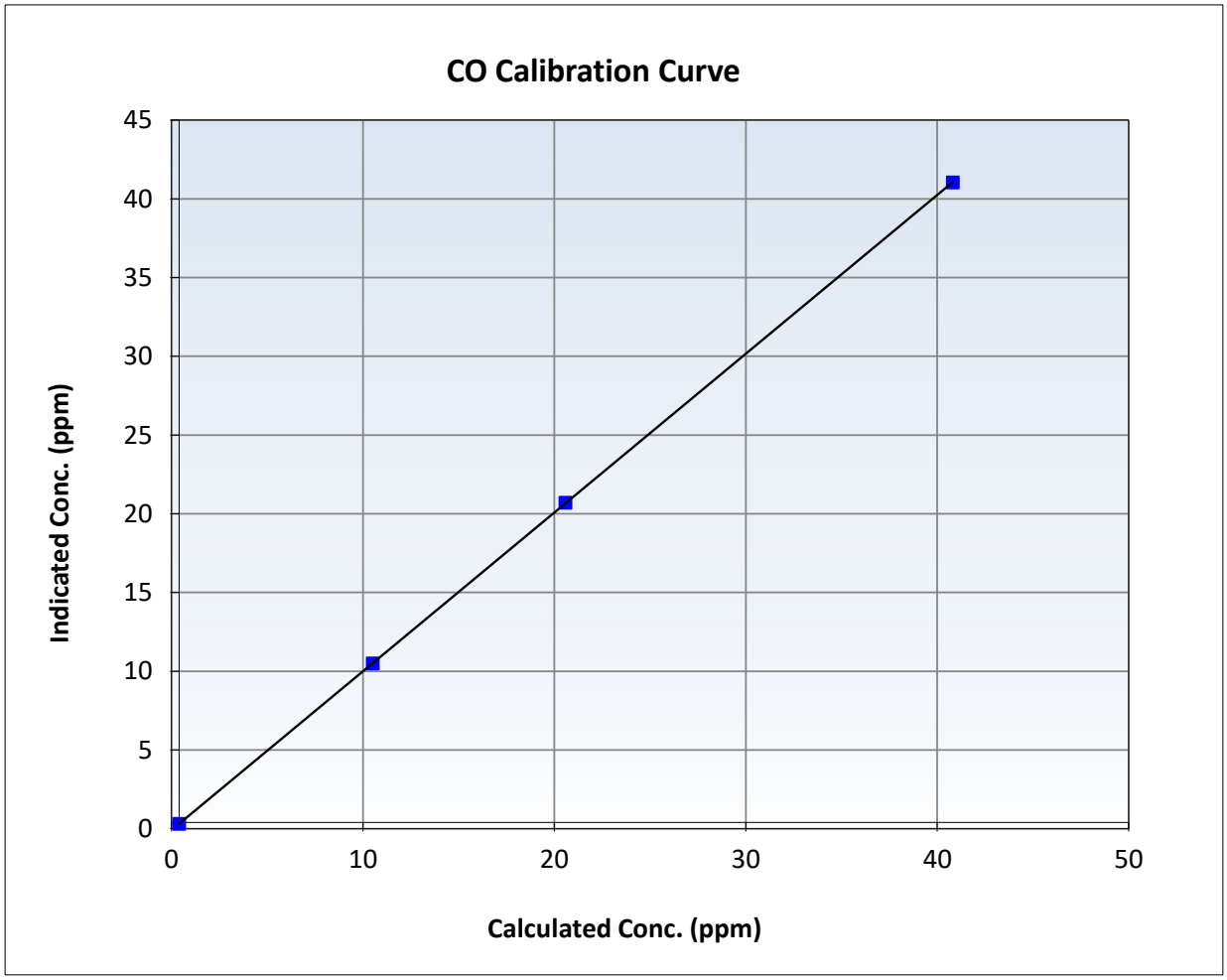
Station Information

Calibration Date:	November 5, 2024	Previous Calibration:	October 8, 2024
Station Name:	Fort Chipewyan	Station Number:	AMS 08
Start Time (MST):	14:02	End Time (MST):	16:33
Analyzer make:	Teledyne API T300	Analyzer serial #:	3505

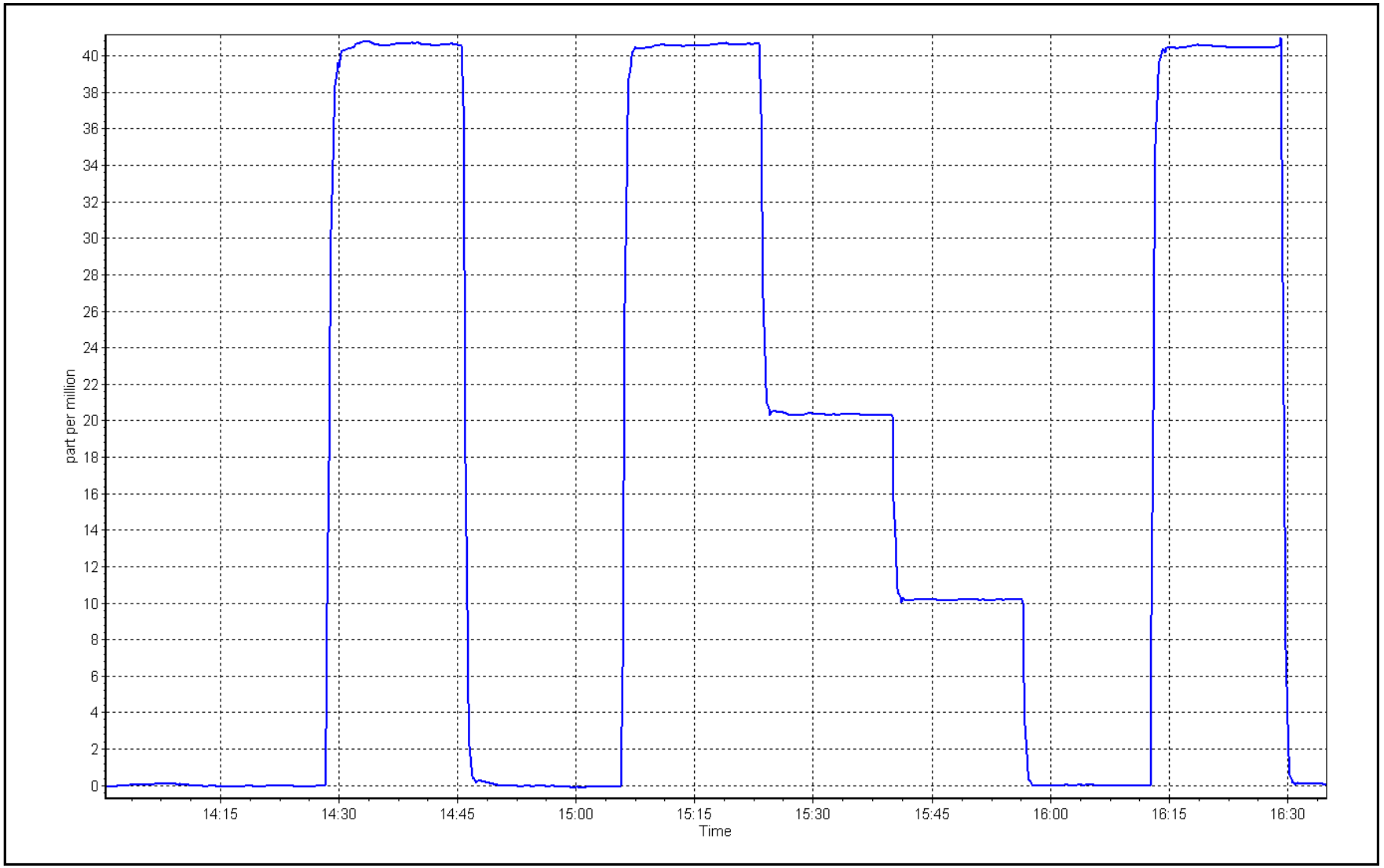
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
40.4	40.7	0.9942
20.2	20.3	0.9941
10.1	10.1	1.0020

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.008286	*0.90 - 1.10*
Intercept	-0.085114	*+/-1.5*



CO Calibration Plot Date: November 5, 2024 Location: Fort Chipewyan



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	November 18, 2024	Last Cal Date:	October 17,2024
Start time (MST):	14:31	End time (MST):	17:15
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:	3810
N2 Gen Make/Model:	Peak Scientific		Serial Number:	135

Analyzer Information

Analyzer make:	Teledyne API T360		Analyzer serial #:	289	
Analyzer Range	0 - 2,000 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.015235	1.008701	Backgd or Offset:	-0.016	-0.016
Calibration intercept:	-5.820000	-6.680000	Coeff or Slope:	1.034	1.034

CO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	3000	0.0	0.0	-0.4	----
As found High Point	2920	80.0	1605.9	1614.2	0.995
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1614.6	Prev response:	1624.5	*% change:	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	3000	0.0	0.0	0.1	----
High point	2920	80.0	1605.9	1620.9	0.991
Mid point	2960	40.0	802.9	786.8	1.021
Low point	2980	20.0	401.5	400.2	1.003
As left zero	3000	0.0	0.0	-0.4	----
As left span	2960	40.0	802.9	784.1	1.024
				Average Correction Factor	1.005

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

Calibration Performed By: Matthew Courtoreille

Wood Buffalo Environmental Association

CO_2 Calibration Summary

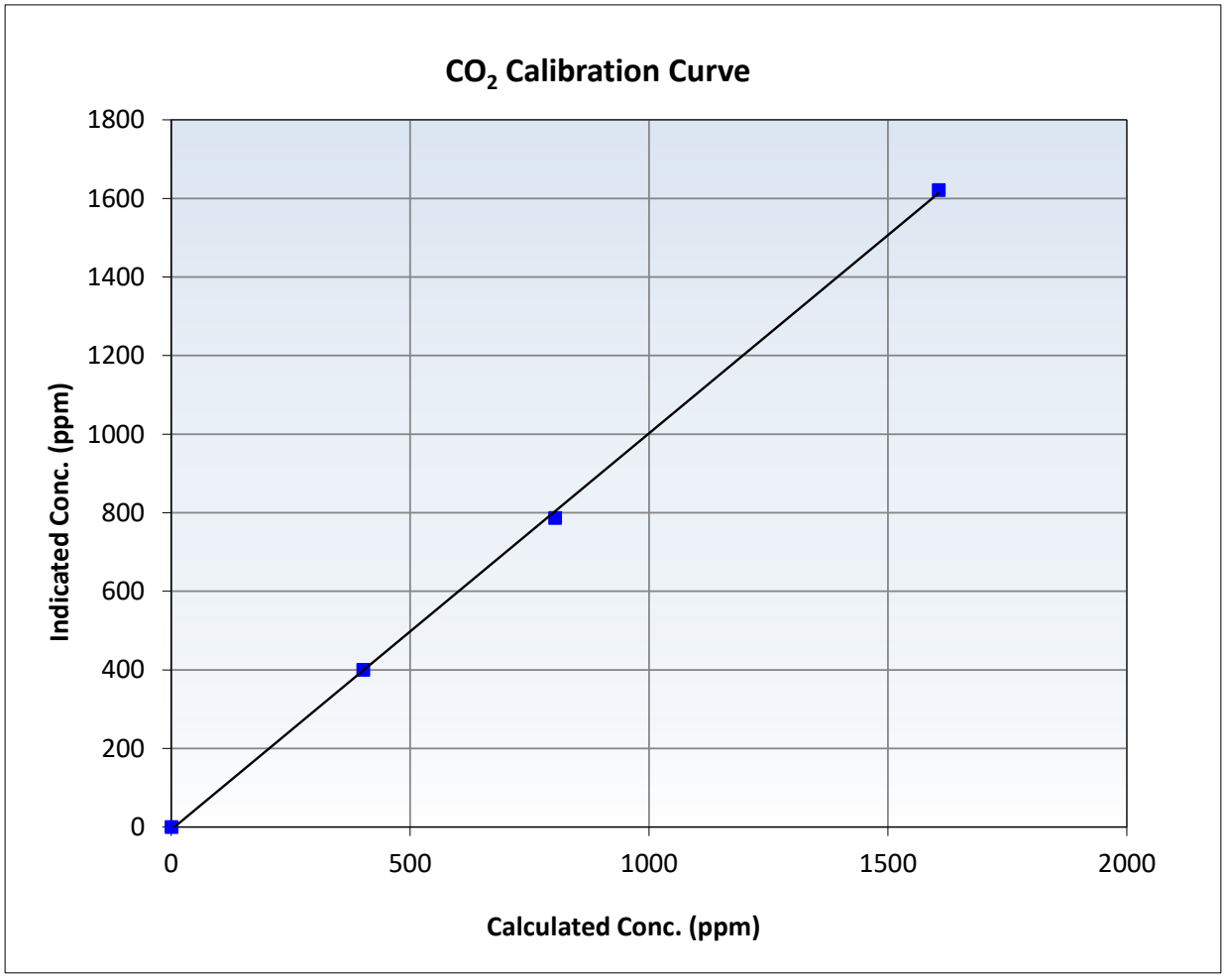
Station Information

Calibration Date	November 18, 2024	Previous Calibration	October 17,2024
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	14:31	End Time (MST)	17:15
Analyzer make	Teledyne API T360	Analyzer serial #	289

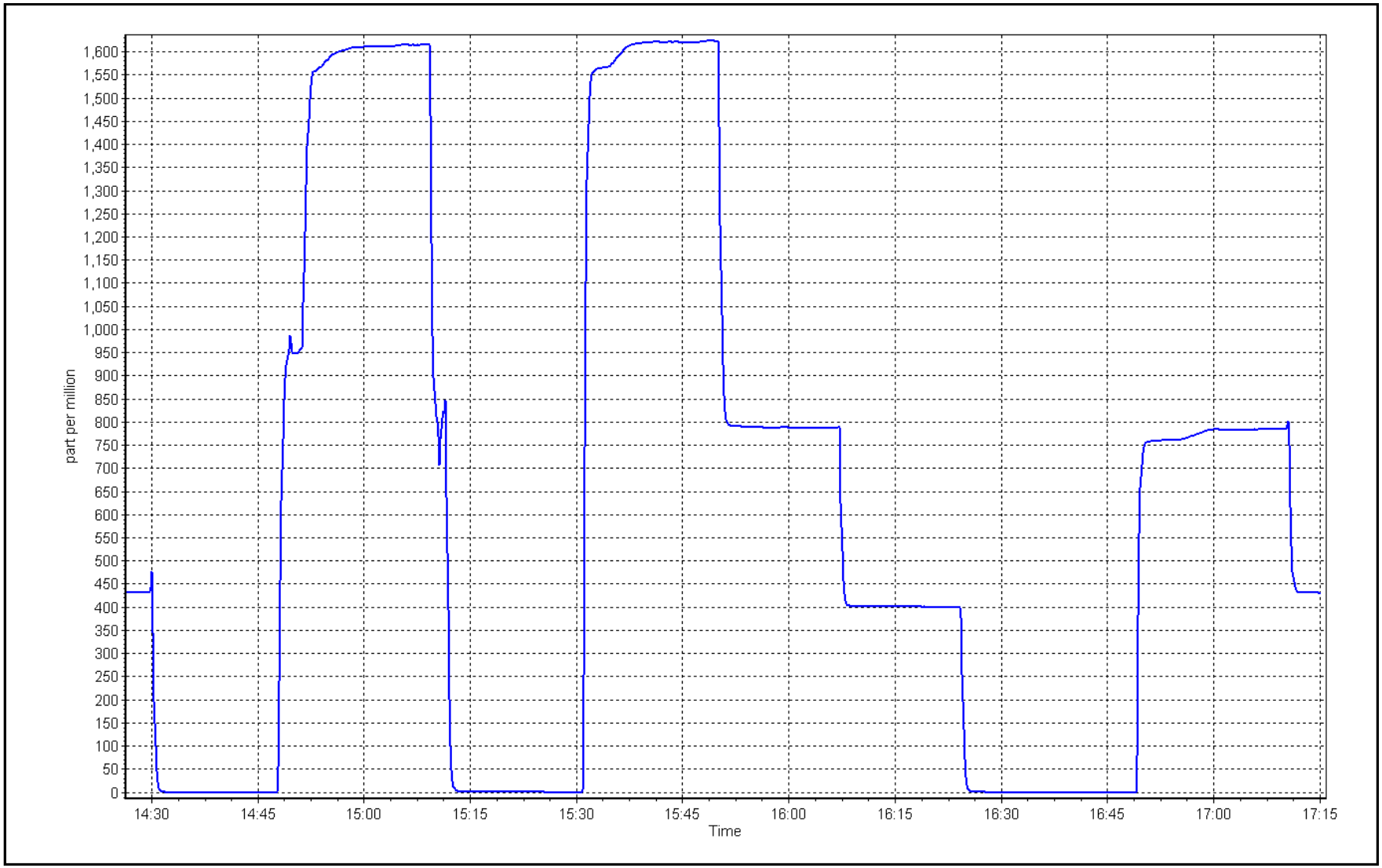
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
1605.9	1620.9	0.9907
802.9	786.8	1.0205
401.5	400.2	1.0032

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999735	*≥0.995*
Slope	1.008701	*0.90 - 1.10*
Intercept	-6.7	*+/-20*



CO_2 Calibration Plot Date: November 18, 2024 Location: Fort Chipewyan



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS09
BARGE LANDING
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	November 7, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	9:38	End time (MST):	13:19
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1118148498	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997258	0.994978	Backgd or Offset:	10.2	10.9
Calibration intercept:	0.786672	0.085896	Coeff or Slope:	0.963	0.963

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.4	----
As found High point	4919	80.2	801.5	798.3	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	797.9	Previous response	800.1	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4919	80.2	801.5	797.5	1.005
Mid point	4960	40.1	400.7	398.9	1.004
Low point	4980	20.0	199.8	198.8	1.005
As left zero	5000	0.0	0.0	-0.1	----
As left span	4919	80.2	801.5	797.1	1.006
				Average Correction Factor:	1.005

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

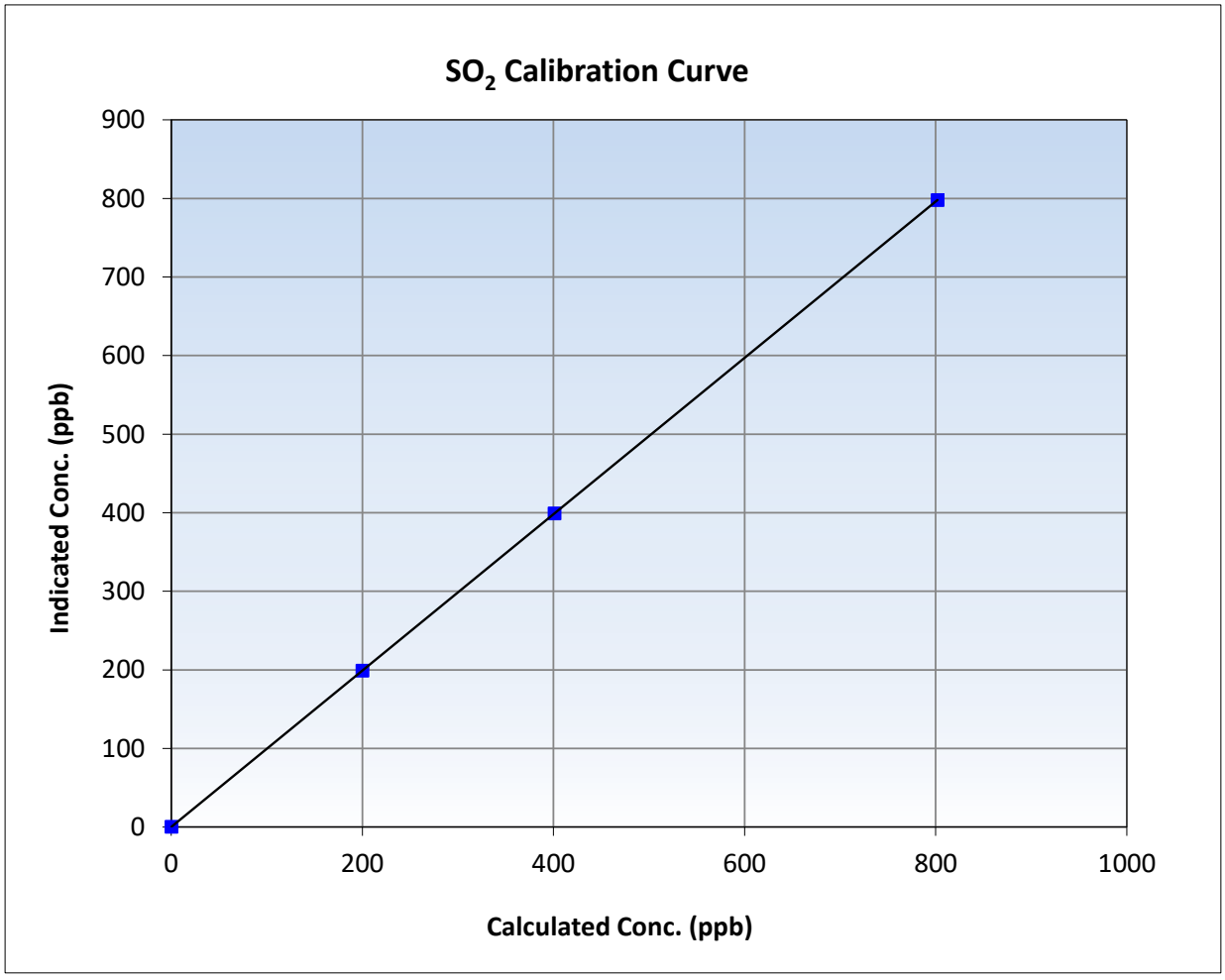
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 4, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:38	End Time (MST):	13:19
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498

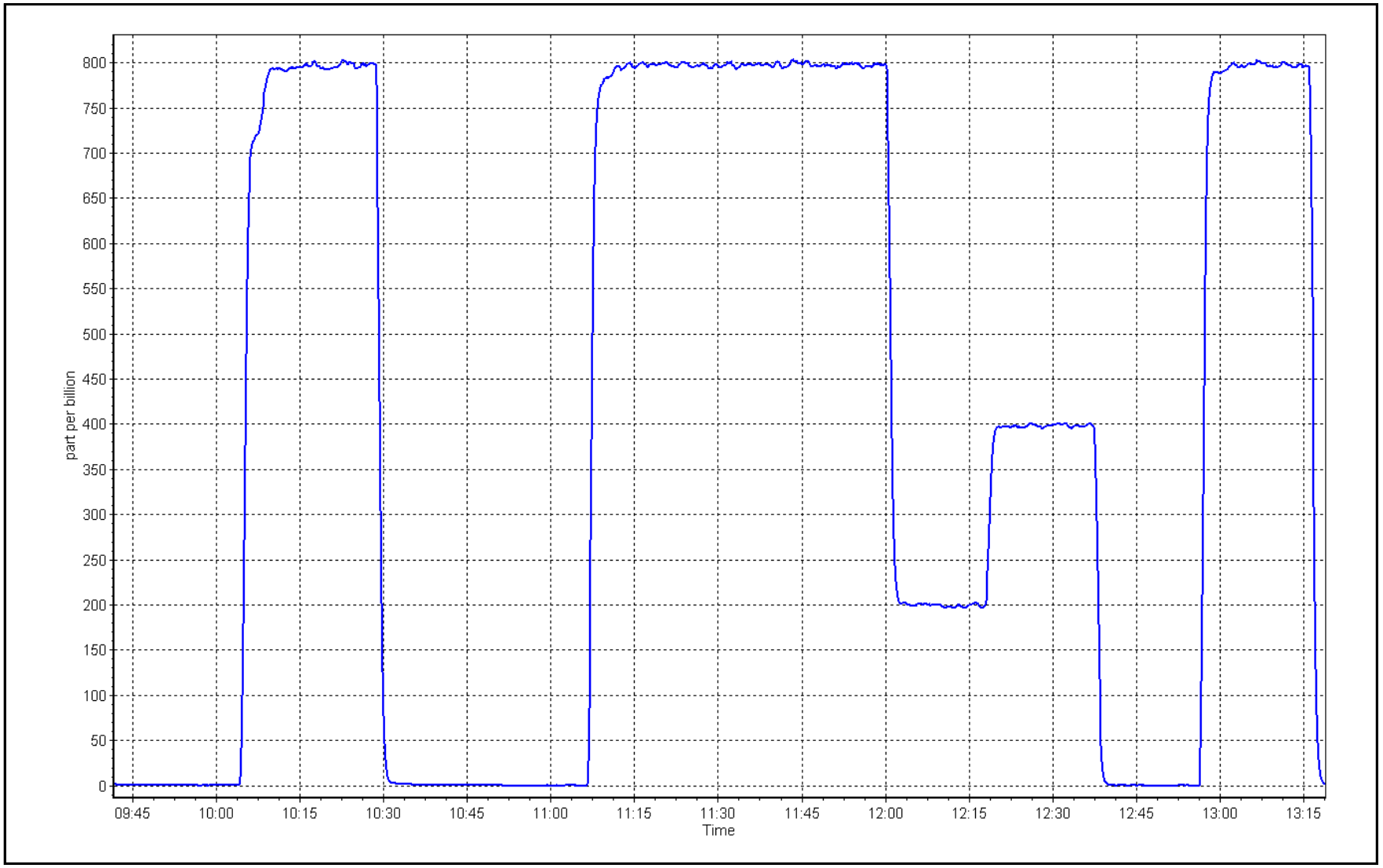
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
801.5	797.5	1.0050
400.7	398.9	1.0044
199.8	198.8	1.0052

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.994978	*0.90 - 1.10*
Intercept	0.085896	*+/-30*



SO2 Calibration Plot Date: November 7, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	November 12, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	10:33	End time (MST):	14:44
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999836	1.001976	Backgd or Offset:	2.860	2.860
Calibration intercept:	0.199355	0.099442	Coeff or Slope:	1.182	1.182

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4923	77.4	80.0	79.9	1.002
As found Mid point	4961	38.7	40.0	40.0	1.001
As found Low point	4981	19.3	20.0	20.0	0.998
New cylinder response					

Baseline Corr As found:	79.9	Prev response:	80.23	*% change:	-0.4%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	0.997979	AF Intercept:	0.039384
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999999	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4923	77.4	80.0	80.3	0.997
Mid point	4961	38.7	40.0	40.2	0.996
Low point	4981	19.3	20.0	20.1	0.993
As left zero	5000	0.0	0.0	0.1	----
As left span	4923	77.4	80.0	80.3	0.997
SO2 Scrubber Check	4920	80.2	802.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.995
Date of last converter efficiency test:					

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

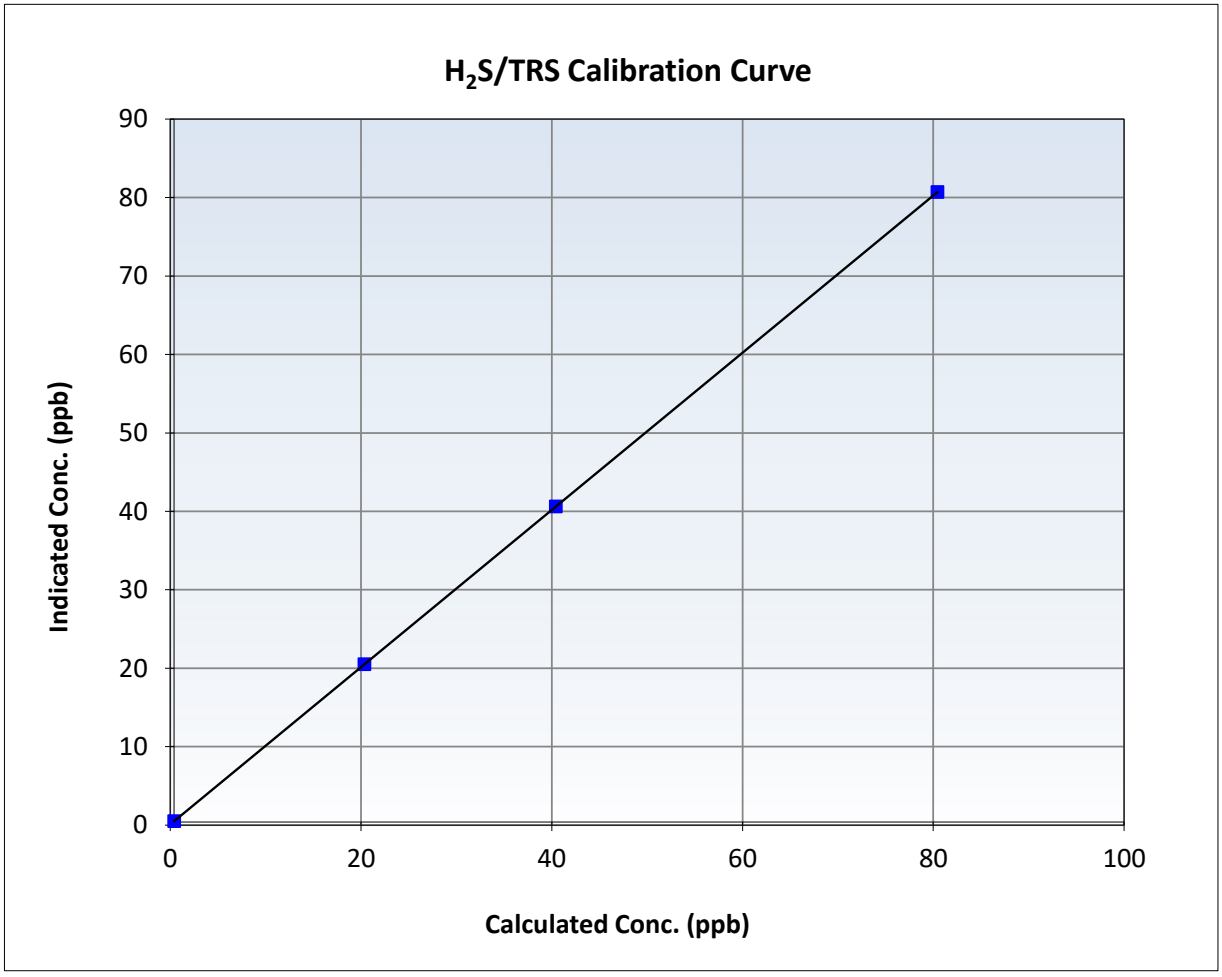
TRS Calibration Summary

Station Information

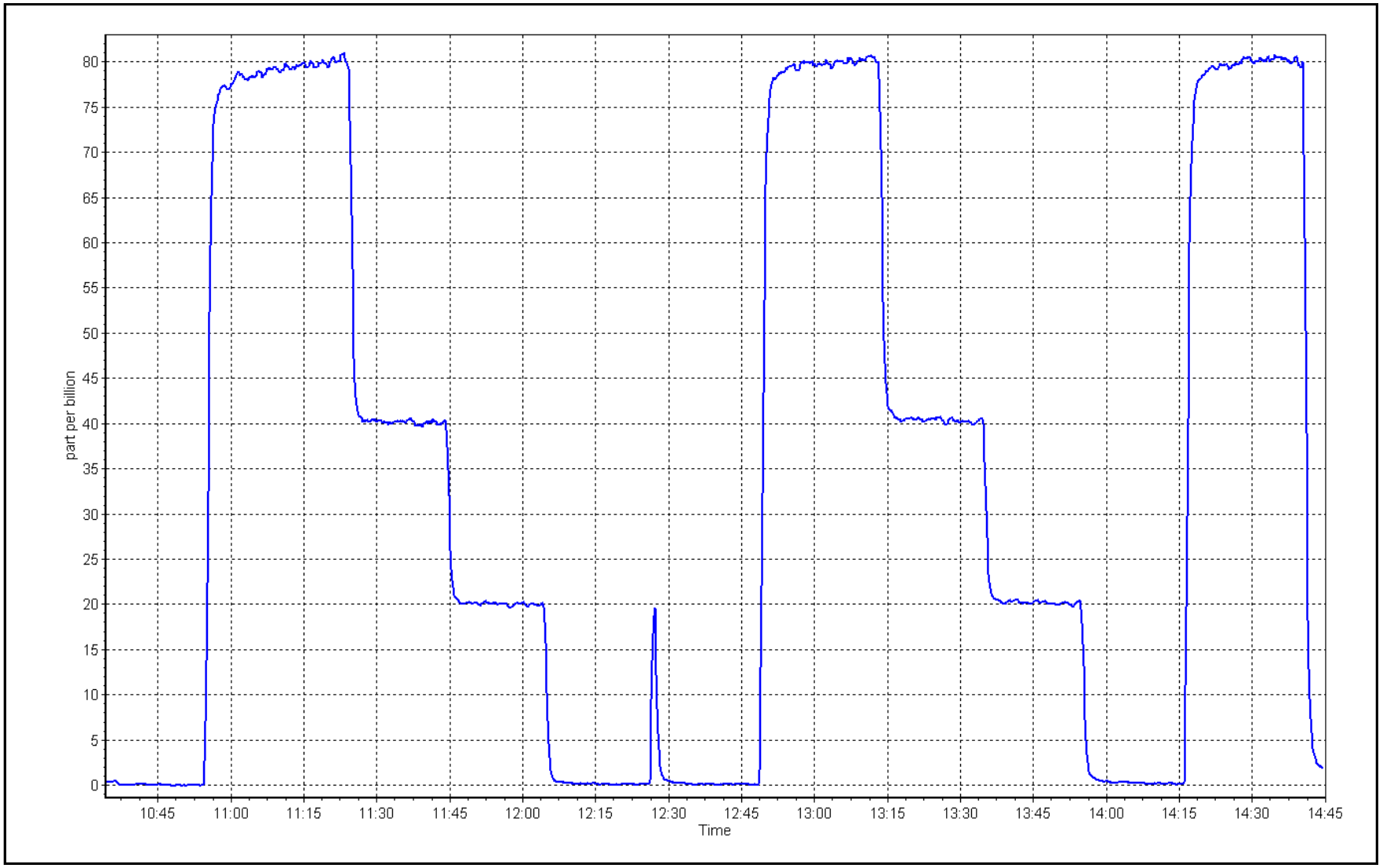
Calibration Date:	November 12, 2024	Previous Calibration:	October 3, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	10:33	End Time (MST):	14:44
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	1.000000	*≥0.995*
80.0	80.3	0.9968	Slope	1.001976	*0.90 - 1.10*
40.0	40.2	0.9957			
20.0	20.1	0.9930	Intercept	0.099442	*+/-3*



TRS Calibration Plot Date: November 12, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	November 7, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	9:38	End time (MST):	13:19
Reason:	Routine		

Calibration Standards

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

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.33E-04	2.29E-04	NMHC SP Ratio:	5.51E-05	5.49E-05
CH4 Retention time:	14.0	14.0	NMHC Peak Area:	165855	166530
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	17.12	16.80	1.019
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.80	Prev response	17.12	*% change	-1.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	17.12	17.20	0.995
Mid point	4960	40.1	8.56	8.73	0.981
Low point	4980	20.0	4.27	4.37	0.978
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	17.12	17.44	0.982
				Average Correction Factor	0.985

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	9.14	8.88	1.029
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.88	Prev response	9.14	*% change	-2.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	9.14	9.19	0.994
Mid point	4960	40.1	4.57	4.65	0.982
Low point	4980	20.0	2.28	2.33	0.979
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	9.14	9.32	0.980
				Average Correction Factor	0.985

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4919	80.2	7.98	7.93	1.007
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.93	Prev response	7.98	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4919	80.2	7.98	8.01	0.996
Mid point	4960	40.1	3.99	4.07	0.980
Low point	4980	20.0	1.99	2.04	0.977
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	80.2	7.98	8.12	0.983
				Average Correction Factor	0.985

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999081	1.004139
THC Cal Offset:	0.017856	0.055488
CH4 Cal Slope:	0.999520	1.002924
CH4 Cal Offset:	0.003464	0.029078
NMHC Cal Slope:	0.998410	1.004963
NMHC Cal Offset:	0.014792	0.026610

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

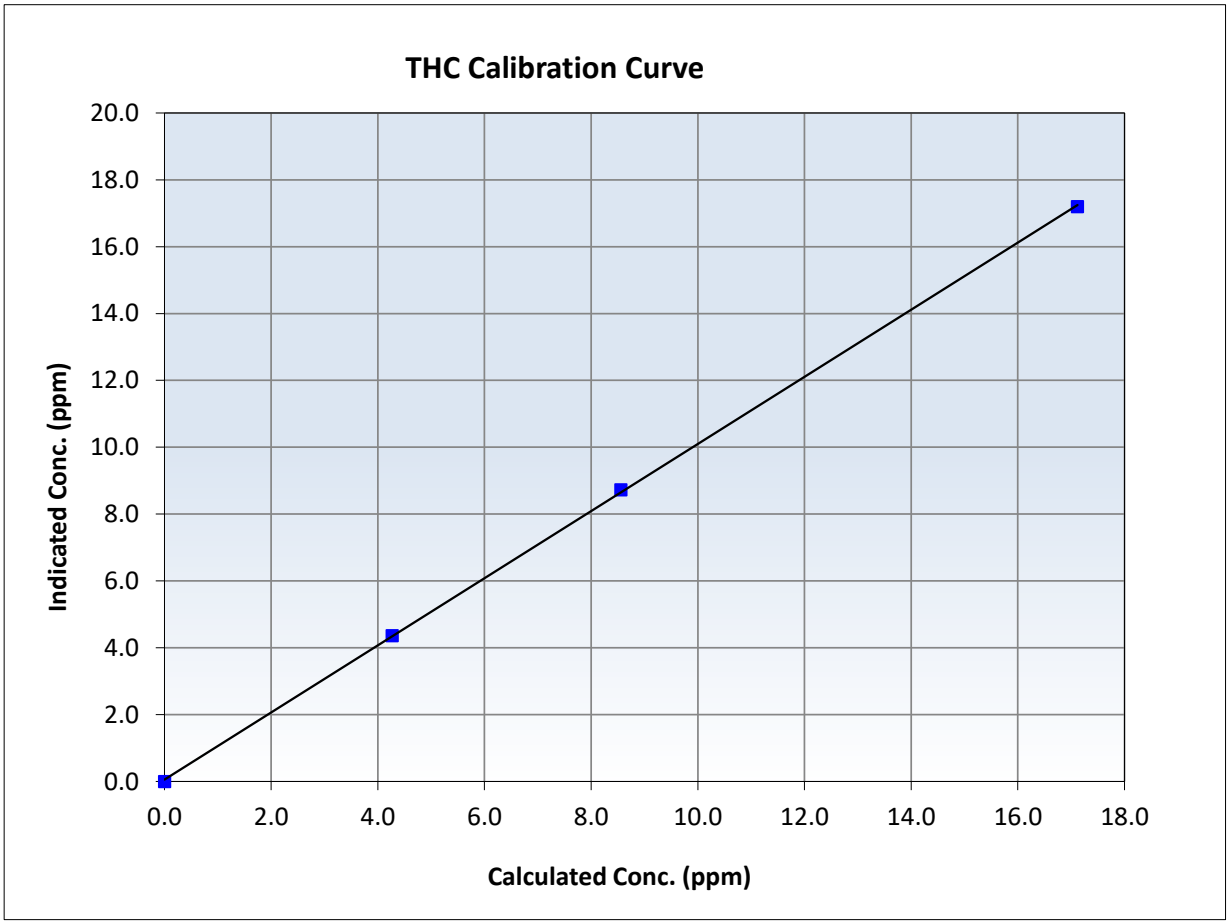
THC Calibration Summary

Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 4, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:38	End Time (MST):	13:19
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	0.999930	≥0.995
17.12	17.20	0.9952	Slope	1.004139	0.90 - 1.10
8.56	8.73	0.9809	Intercept	0.055488	+/-0.5
4.27	4.37	0.9779			



Wood Buffalo Environmental Association

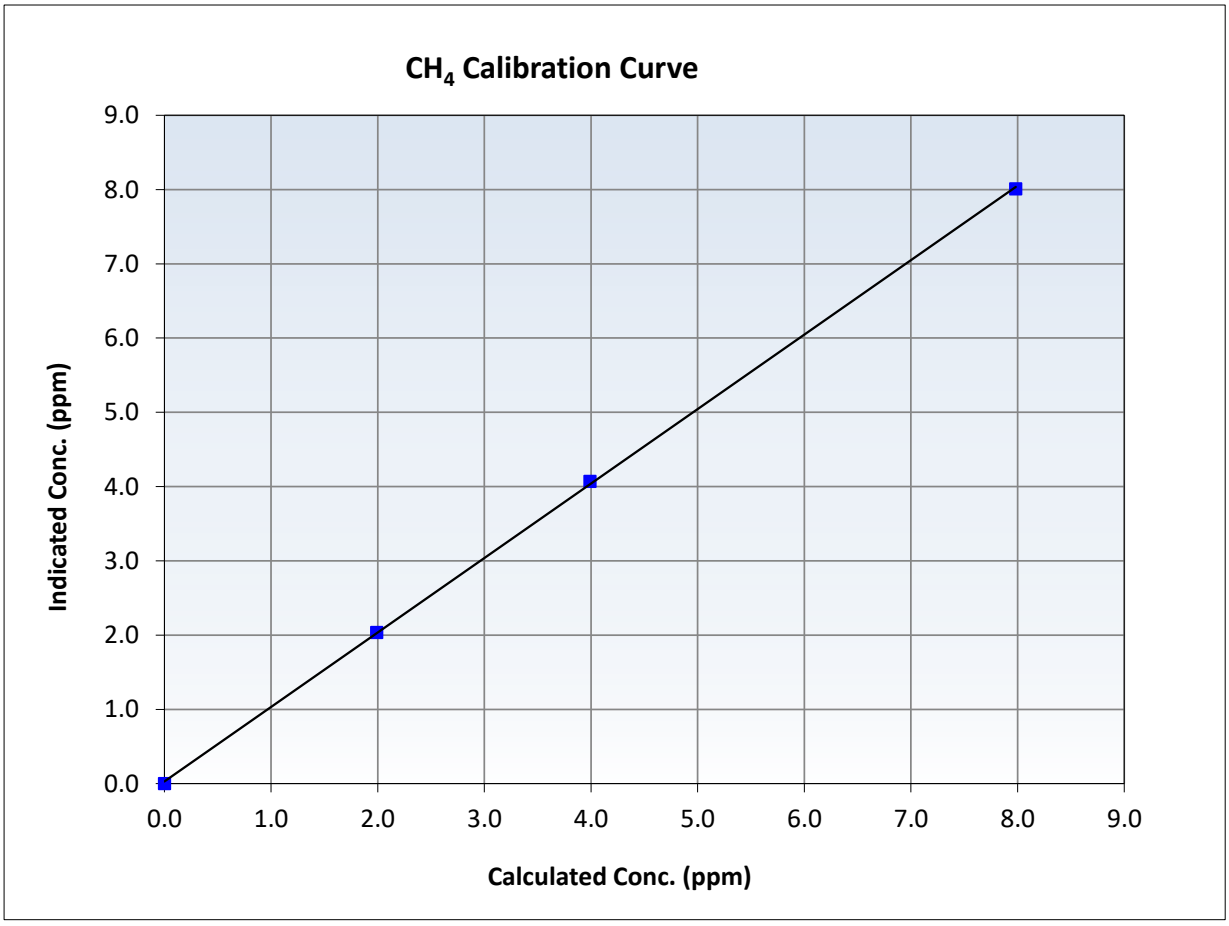
CH_4 Calibration Summary

Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 4, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:38	End Time (MST):	13:19
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	0.999910	≥0.995
7.98	8.01	0.9964	Slope	1.002924	0.90 - 1.10
3.99	4.07	0.9800			
1.99	2.04	0.9771	Intercept	0.029078	+/-0.5



Wood Buffalo Environmental Association

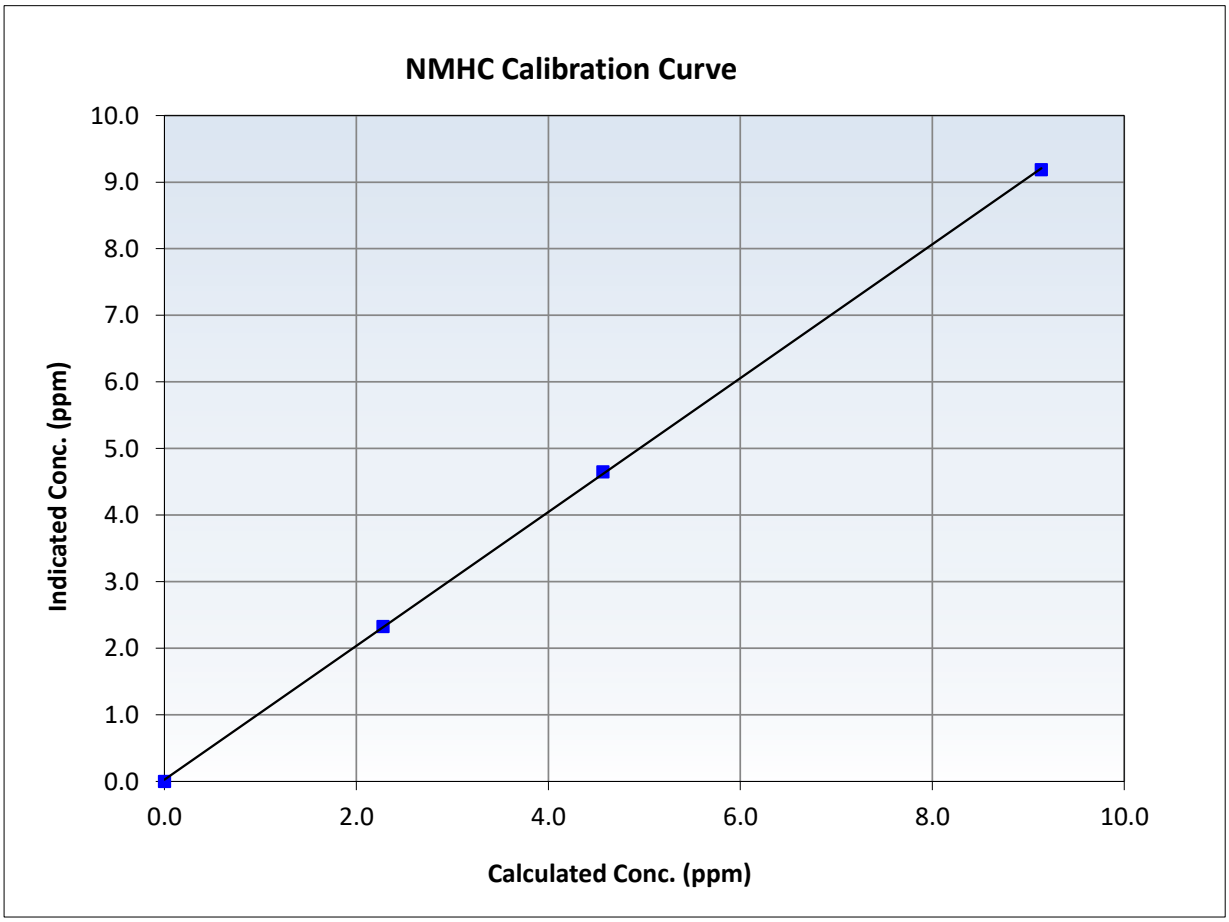
NMHC Calibration Summary

Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 4, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:38	End Time (MST):	13:19
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	0.999945	≥0.995
9.14	9.19	0.9944	Slope	1.004963	0.90 - 1.10
4.57	4.65	0.9818	Intercept	0.026610	+/-0.5
2.28	2.33	0.9786			



NMHC Calibration Plot Date: November 7, 2024 Location: Barge Landing

CALS_220

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Barge Landing
Station number:	AMS 09
Calibration Date:	November 15, 2024
Last Cal Date:	October 8, 2024
Start time (MST):	9:51
End time (MST):	14:25
Reason:	Routine

Calibration Standards

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

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
AF High point	4915	85.3	808.3	800.7	7.5	817.8	809.9	7.9	0.9880	0.9886
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 806.6 ppb	NO = 799.9 ppb
Baseline Corr 1st pt	NO_X = 818.1 ppb	NO = 810.0 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = 1.4%

*Percent Change NO = 1.2%

As Found Statistics

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

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1426262593

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.107	1.095	NO bkgnd or offset:	10.1	10.0
NOX coeff or slope:	1.000	1.000	NOX bkgnd or offset:	10.4	10.3
NO2 coeff or slope:	0.996	0.997	Reaction cell Press:	175.9	176.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.997339	0.997622
NO_X Cal Offset:	0.517931	0.317920
NO Cal Slope:	0.999824	0.999938
NO Cal Offset:	-0.703748	-0.643839
NO_2 Cal Slope:	1.003274	0.999704
NO_2 Cal Offset:	-0.154393	-0.753159

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	----	----
High point	4915	85.3	808.3	800.7	7.5	806.5	800.5	5.9	1.0022	1.0003
Mid point	4957	42.6	403.7	400.0	3.7	403.1	398.6	4.5	1.0015	1.0034
Low point	4979	21.3	201.8	200.0	1.9	202.2	198.9	3.3	0.9982	1.0053
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
As left span	4915	85.3	808.3	412.6	395.7	801.2	412.6	388.7	1.0088	1.0000
								Average Correction Factor	1.0006	1.0030

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	795.6	412.4	390.7	390.2	1.0013	99.9%
Mid GPT point	795.6	604.4	198.7	197.4	1.0066	99.3%
Low GPT point	795.6	699.7	103.4	102.2	1.0118	98.8%
				Average Correction Factor	1.0066	99.3%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

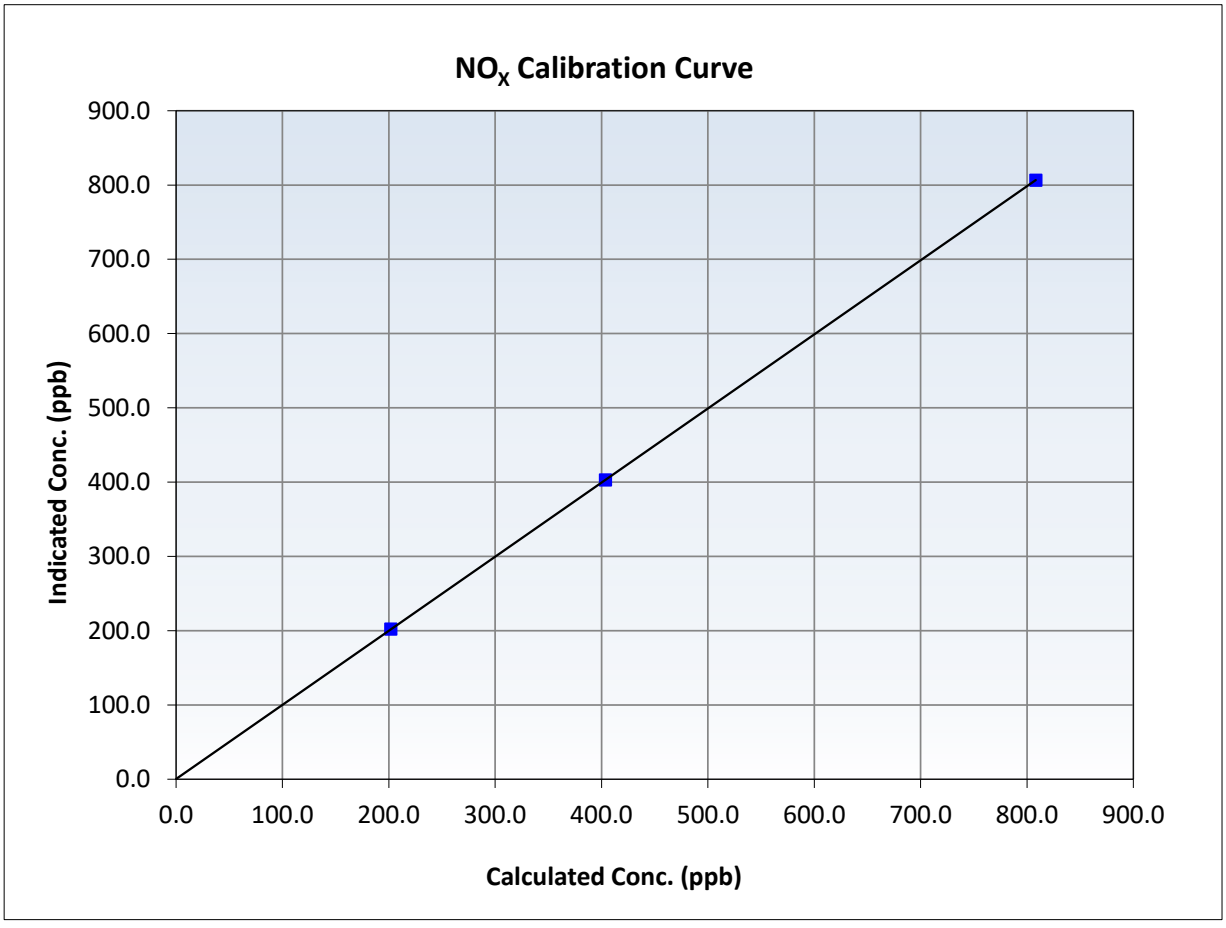
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
808.3	806.5	1.0022
403.7	403.1	1.0015
201.8	202.2	0.9982

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.997622	0.90 - 1.10
Intercept	0.317920	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

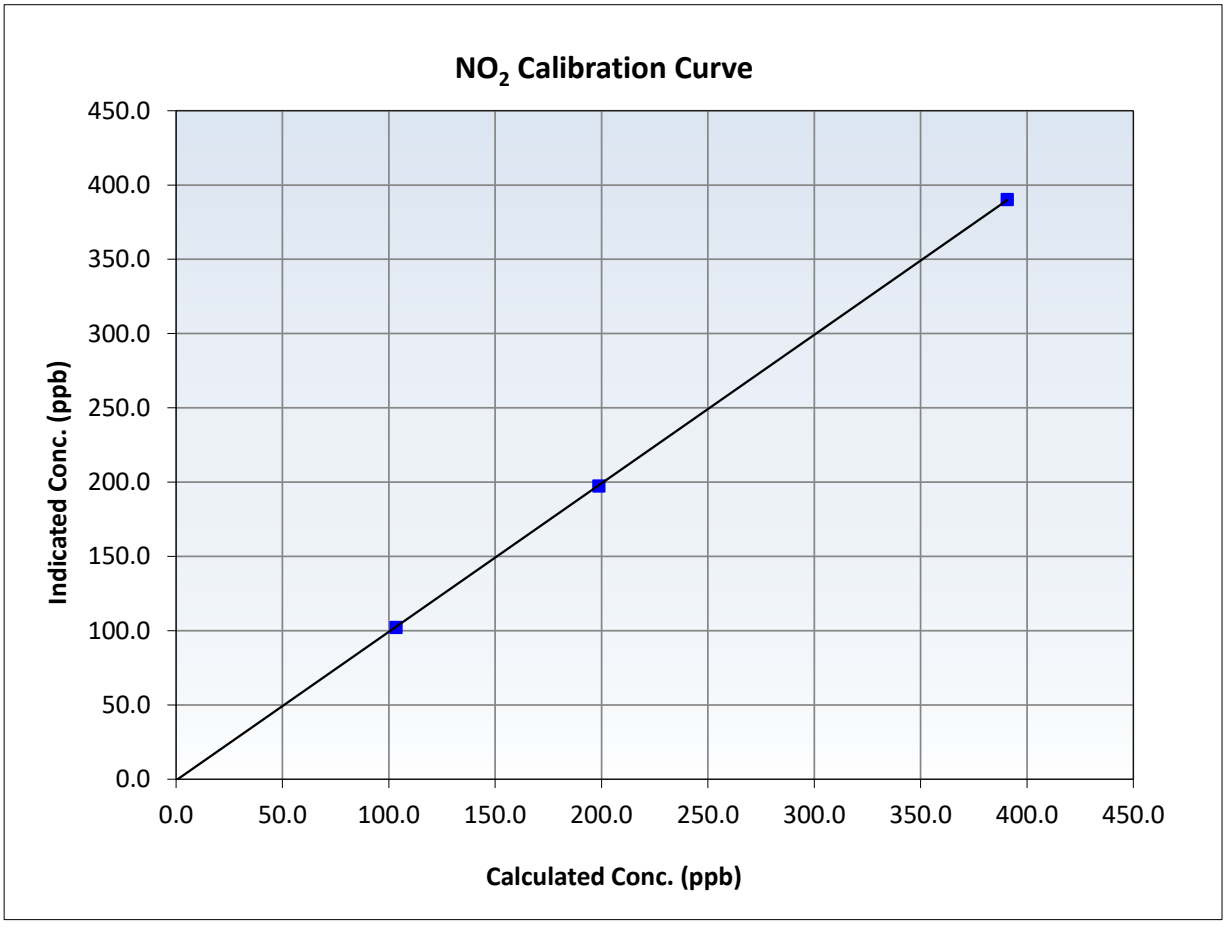
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
390.7	390.2	1.0013
198.7	197.4	1.0066
103.4	102.2	1.0118

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999990	*≥0.995*
Slope	0.999704	*0.90 - 1.10*
Intercept	-0.753159	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

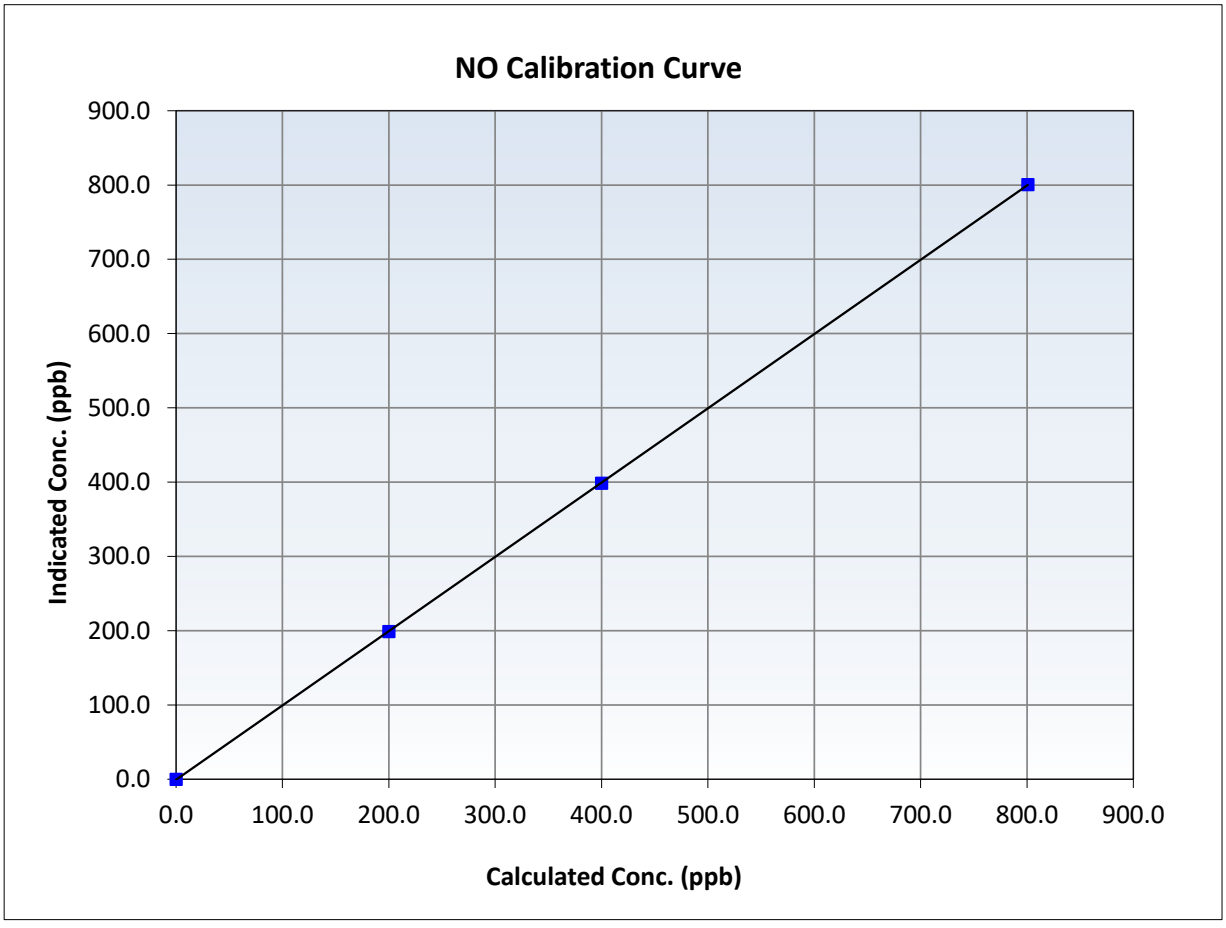
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 8, 2024
Station Name:	Barge Landing	Station Number:	AMS 09
Start Time (MST):	9:51	End Time (MST):	14:25
Analyzer make:	Thermo 42i	Analyzer serial #:	1426262593

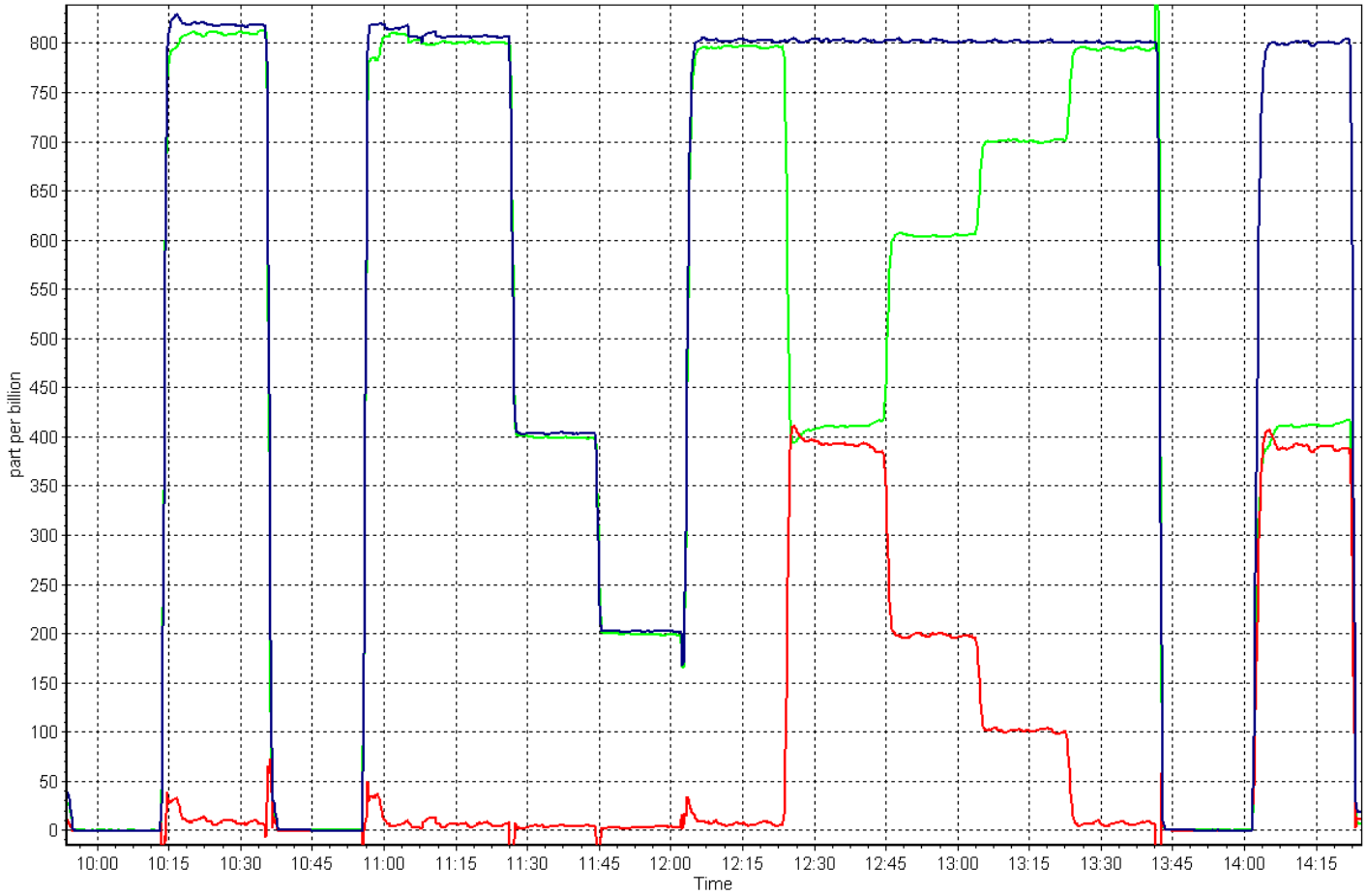
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.7	800.5	1.0003
400.0	398.6	1.0034
200.0	198.9	1.0053

Statistical Evaluation		Limits
Correlation Coefficient	0.999996	≥0.995
Slope	0.999938	0.90 - 1.10
Intercept	-0.643839	+/-20



NO_X Calibration Plot Date: November 15, 2024 Location: Barge Landing



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	November 26, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	12:38	End time (MST):	12:51
Analyzer Make:	API T640	S/N:	844
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-10.70	-10.28	-10.70	☐	+/- 2 °C
P (mmHg)	723.90	731.96	723.90	☐	+/- 10 mmHg
Flow (LPM)	5.03	5.14	5.03	☐	+/- 0.25 LPM
PW% (pump)	40	-----	40	☐	>80%
Zero Verification	PM w/o HEPA:	14.20	PM w/ HEPA:	0.00	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 18, 2024

Date Disposable Filter Changed: October 18, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 18, 2024

Date RH/T Sensor Cleaned: October 18, 2024

Notes: Verified flow, pressure, temperature and pump power. No adjustment needed. Leak check passed.

Calibration by: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS11
LOWER CAMP
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	November 18, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	11:47	End time (MST):	15:22
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	100841398	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.994576	1.005641	Backgd or Offset:	15.9	15.8
Calibration intercept:	-0.962057	-0.988705	Coeff or Slope:	0.977	0.977

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4932	81.4	799.6	803.0	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.9	Previous response	794.3	*% change	1.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4932	81.4	799.6	804.2	0.994
Mid point	4959	40.7	400.9	400.6	1.001
Low point	4981	20.4	200.9	200.1	1.004
As left zero	5000	0.0	0.0	0.3	----
As left span	4932	81.4	799.6	801.0	0.998
				Average Correction Factor:	1.000

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

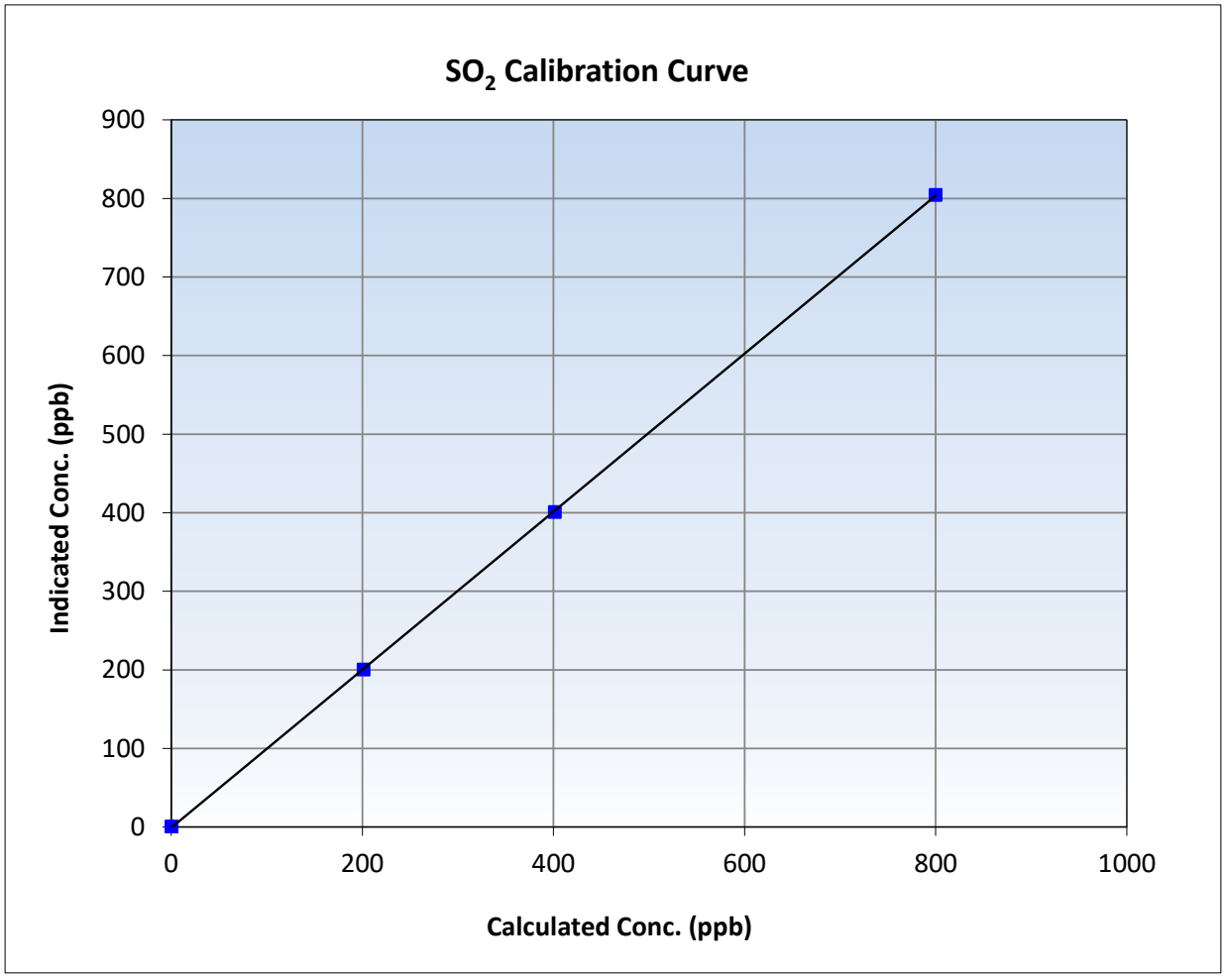
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	11:47	End Time (MST):	15:22
Analyzer make:	Thermo 43i	Analyzer serial #:	100841398

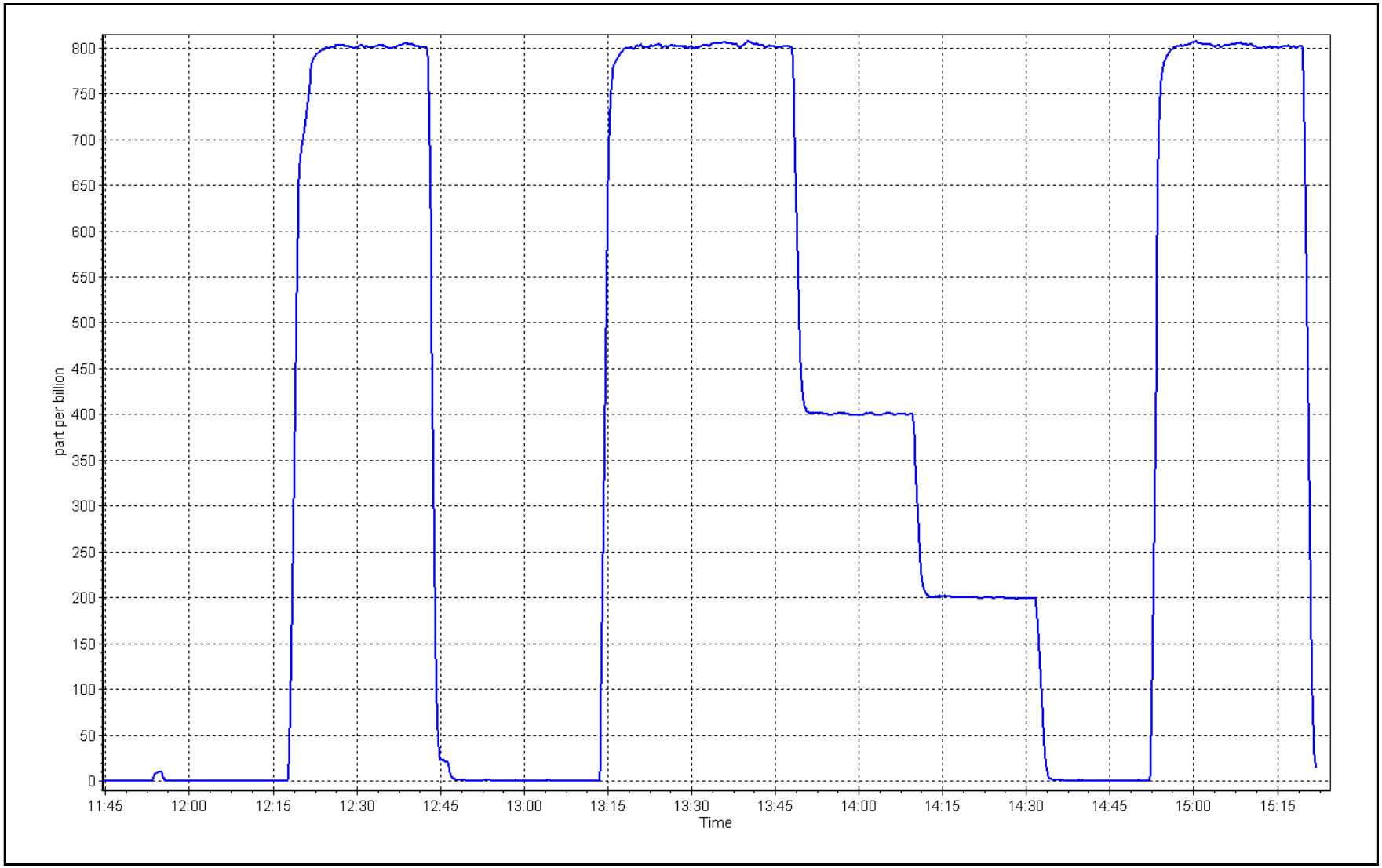
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
799.6	804.2	0.9943
400.9	400.6	1.0008
200.9	200.1	1.0039

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999981	*≥0.995*
Slope	1.005641	*0.90 - 1.10*
Intercept	-0.988705	*+/-30*



SO2 Calibration Plot Date: November 18, 2024 Location: Lower Camp



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	November 26, 2024	Last Cal Date:	October 30, 2024
Start time (MST):	12:46	End time (MST):	16:59
Reason:	Routine		

Calibration Standards

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

Analyzer Information

Analyzer make:	Thermo 43iQ		Analyzer serial #:	1203169745	
Converter make:	Global G150		Converter serial #:	2022-223	
Analyzer Range	0 - 100 ppb		Converter Temp:	325	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.006762	0.991875	Backgd or Offset:	2.6	2.6
Calibration intercept:	-0.205241	-0.183931	Coeff or Slope:	0.769	0.769

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.3	----
As found High point	4926	73.6	79.9	78.6	1.013
As found Mid point	4963	36.8	40.0	39.3	1.009
As found Low point	4982	18.6	20.2	19.7	1.010
New cylinder response					

Baseline Corr As found:	78.9	Prev response:	80.26	*% change:	-1.7%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.987162	AF Intercept:	-0.243864
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999995	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4926	73.6	79.9	79.0	1.012
Mid point	4963	36.8	40.0	39.7	1.007
Low point	4982	18.6	20.2	19.7	1.025
As left zero	5000	0.0	0.0	-0.1	----
As left span	4926	73.6	79.9	78.6	1.017
SO2 Scrubber Check	4935	81.5	812.3	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.014
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

H_2S Calibration Summary

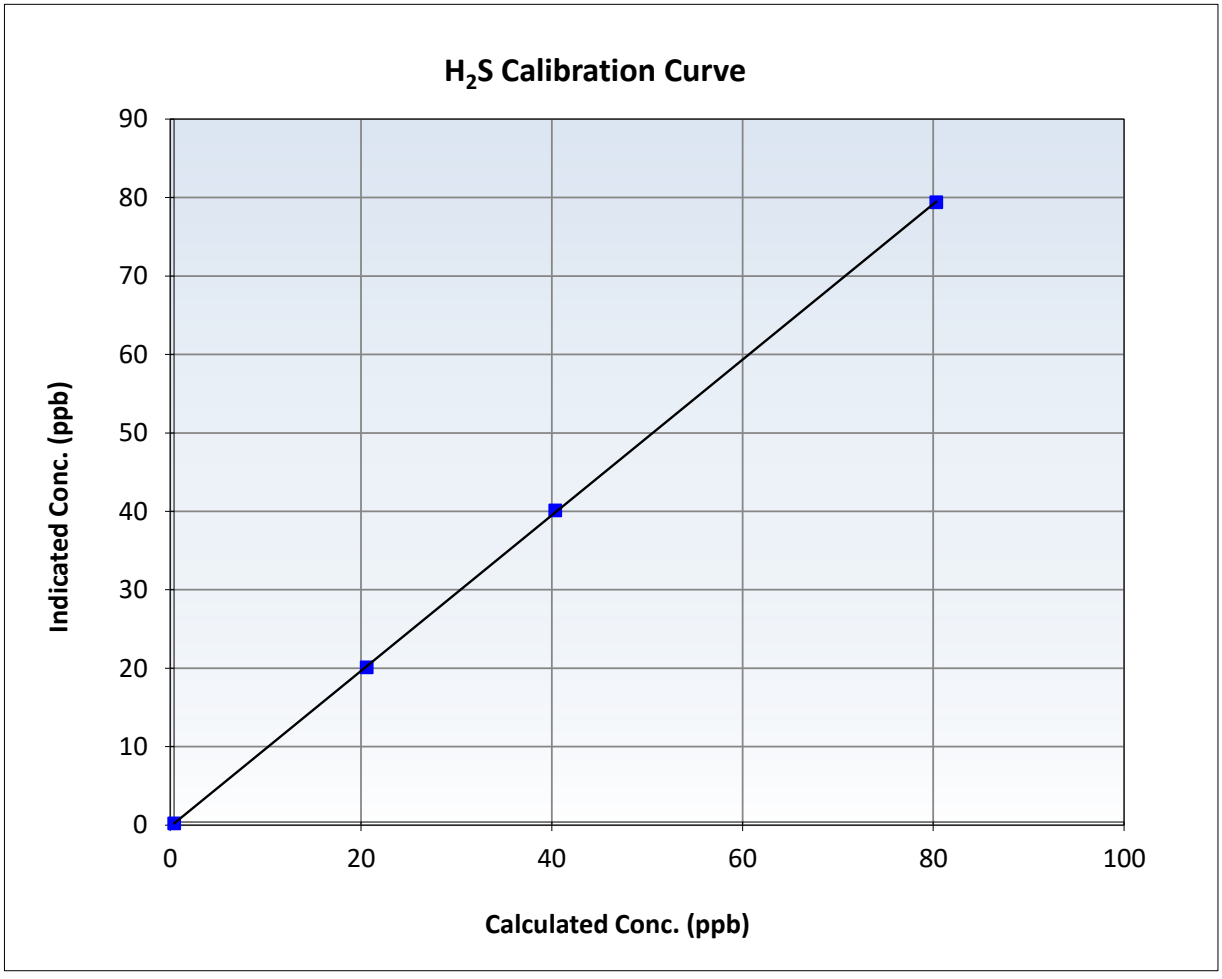
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 30, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	12:46	End Time (MST):	16:59
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1203169745

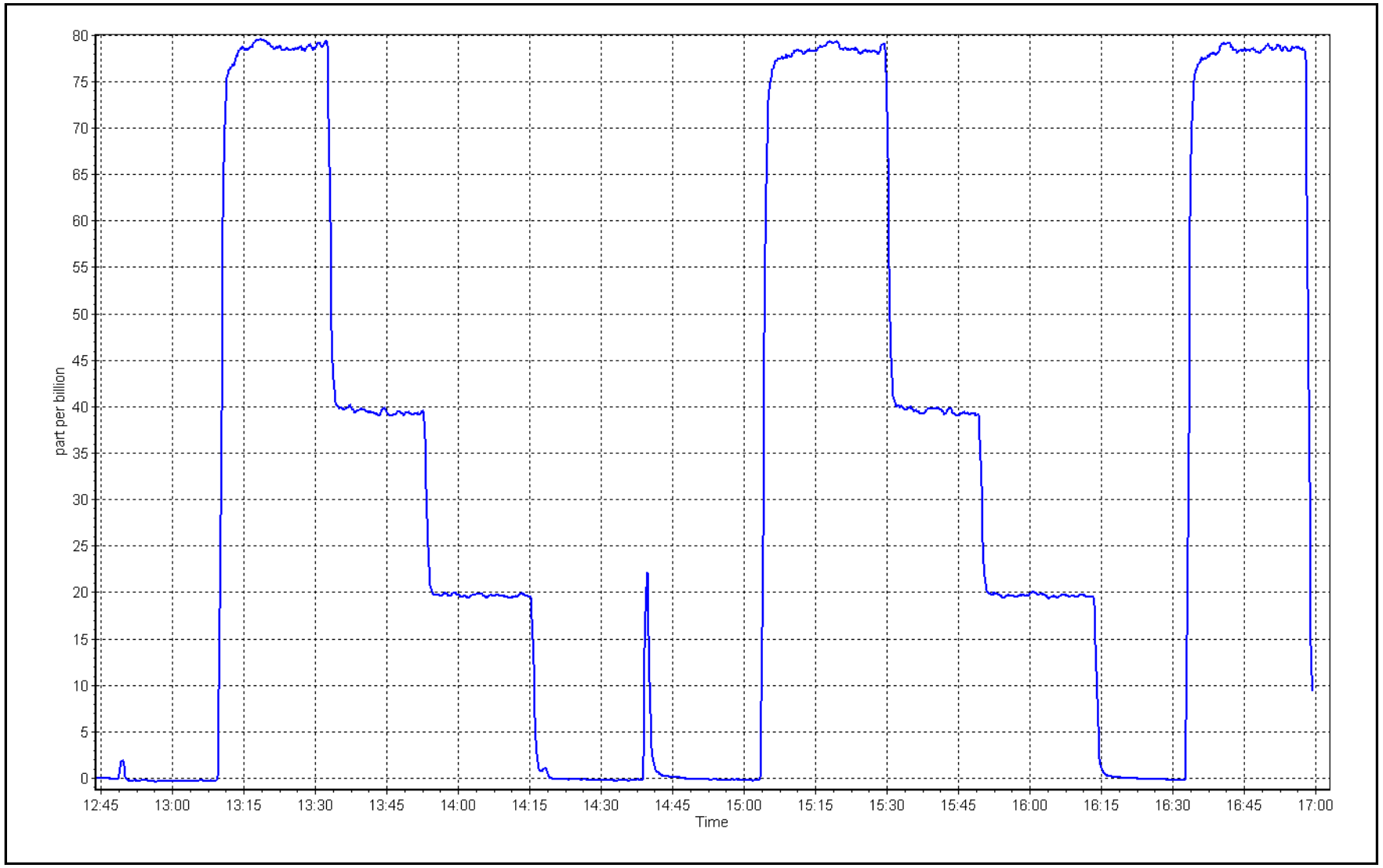
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
79.9	79.0	1.0117
40.0	39.7	1.0065
20.2	19.7	1.0250

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	0.991875	*0.90 - 1.10*
Intercept	-0.183931	*+/-3*



H_2S Calibration Plot Date: November 26, 2024 Location: Lower Camp



Wood Buffalo Environmental Association

THC / CH4 / NMHC Calibration Report

Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	November 18, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	11:47	End time (MST):	15:22
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC2216	Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	502.0 ppm	CH4 Equiv Conc.	1067.1	ppm
C3H8 Cal Gas Conc.	205.5 ppm			
Removed Gas Cert:	NA	Removed Gas Expiry:	NA	
Removed CH4 Conc.	502.0 ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc.	205.5 ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):		Diff between cyl (NM):		
Calibrator Model:	API T700	Serial Number:	3807	
Zero Air Gen model:	API T701	Serial Number:	196	

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.68E-04	2.63E-04	NMHC SP Ratio:	4.57E-05	4.48E-05
CH4 Retention time:	15.0	15.4	NMHC Peak Area:	200719	204852
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	17.33	17.41	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.41	Prev response	17.29	*% change	0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	17.33	17.32	1.001
Mid point	4959	40.7	8.69	8.62	1.008
Low point	4981	20.4	4.35	4.31	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	17.33	17.33	1.000
				Average Correction Factor	1.006

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	9.18	9.36	0.981
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.36	Prev response	9.16	*% change	2.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	9.18	9.17	1.001
Mid point	4959	40.7	4.60	4.58	1.006
Low point	4981	20.4	2.31	2.29	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	9.18	9.19	0.998
				Average Correction Factor	1.004

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4932	81.4	8.15	8.05	1.013
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.05	Prev response	8.13	*% change	-1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4932	81.4	8.15	8.15	1.001
Mid point	4959	40.7	4.09	4.04	1.011
Low point	4981	20.4	2.05	2.02	1.016
As left zero	5000	0.0	0.00	0.00	----
As left span	4932	81.4	8.15	8.14	1.002
				Average Correction Factor	1.009

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.000114	0.999787
THC Cal Offset:	-0.039101	-0.030112
CH4 Cal Slope:	1.000406	1.000126
CH4 Cal Offset:	-0.021157	-0.021159
NMHC Cal Slope:	0.999980	0.999609
NMHC Cal Offset:	-0.017945	-0.008955

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

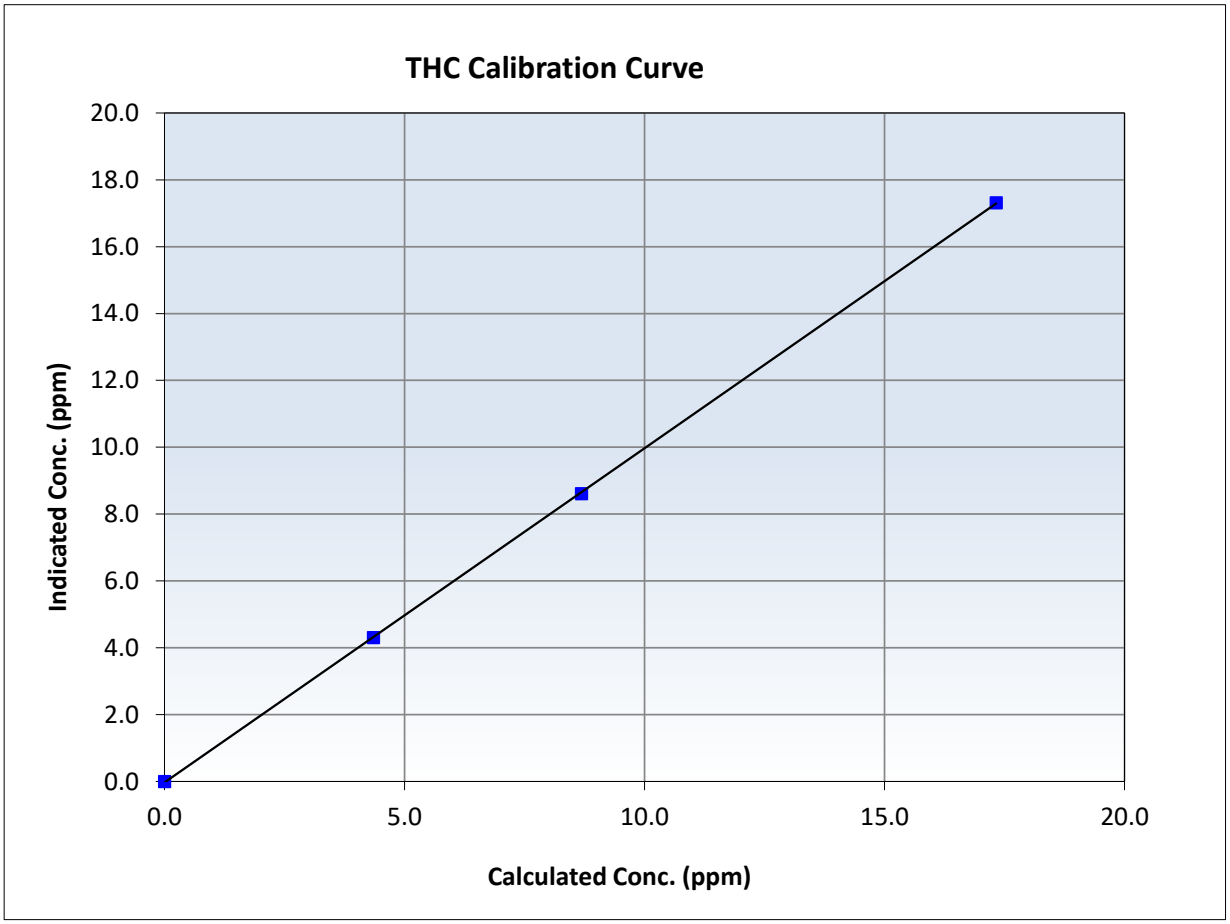
THC Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	11:47	End Time (MST):	15:22
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	0.999980	*≥0.995*
17.33	17.32	1.0006	Slope	0.999787	*0.90 - 1.10*
8.69	8.62	1.0083			
4.35	4.31	1.0104	Intercept	-0.030112	*+/-0.5*



Wood Buffalo Environmental Association

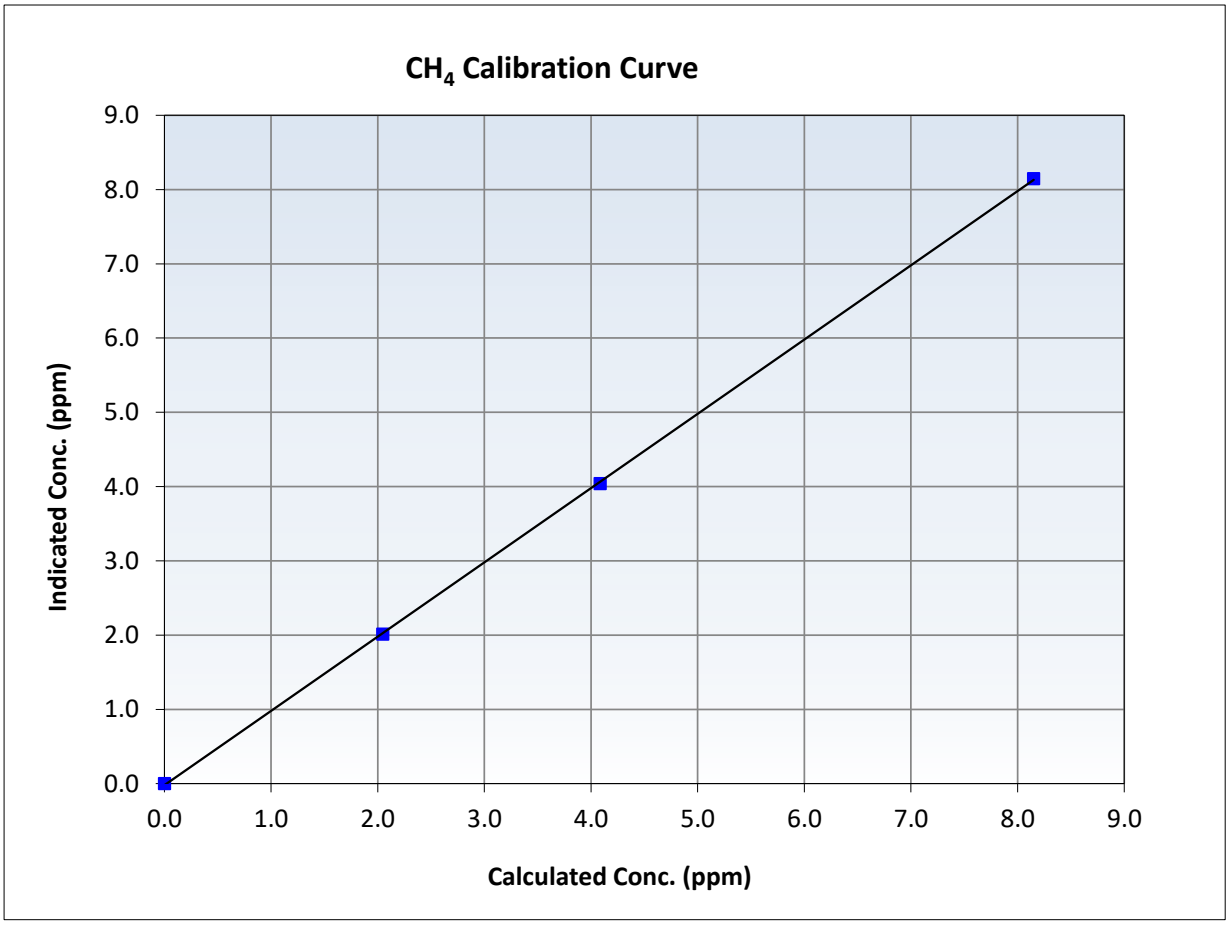
CH_4 Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	11:47	End Time (MST):	15:22
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999960	≥0.995
8.15	8.15	1.0006	Slope	1.000126	0.90 - 1.10
4.09	4.04	1.0113			
2.05	2.02	1.0162	Intercept	-0.021159	+/-0.5



Wood Buffalo Environmental Association

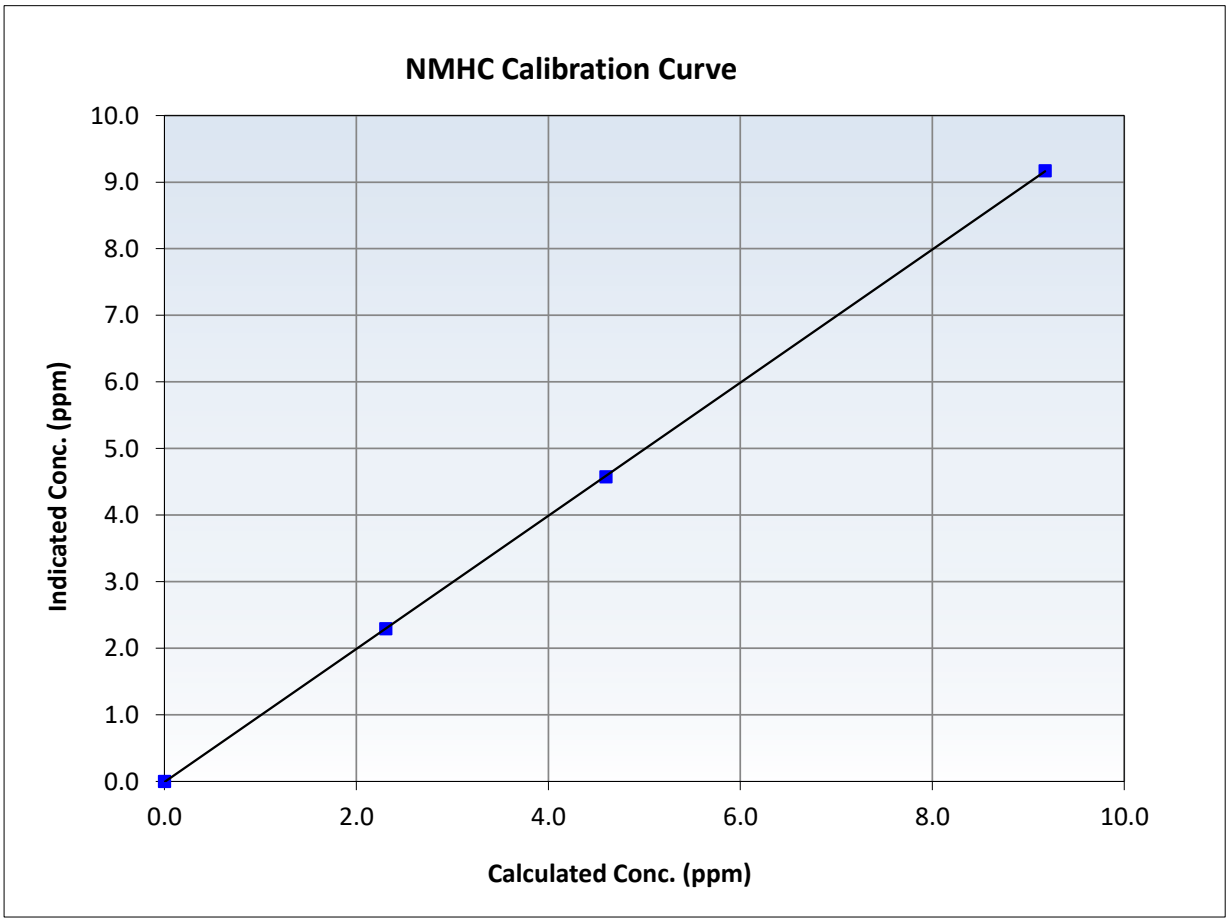
NMHC Calibration Summary

Station Information

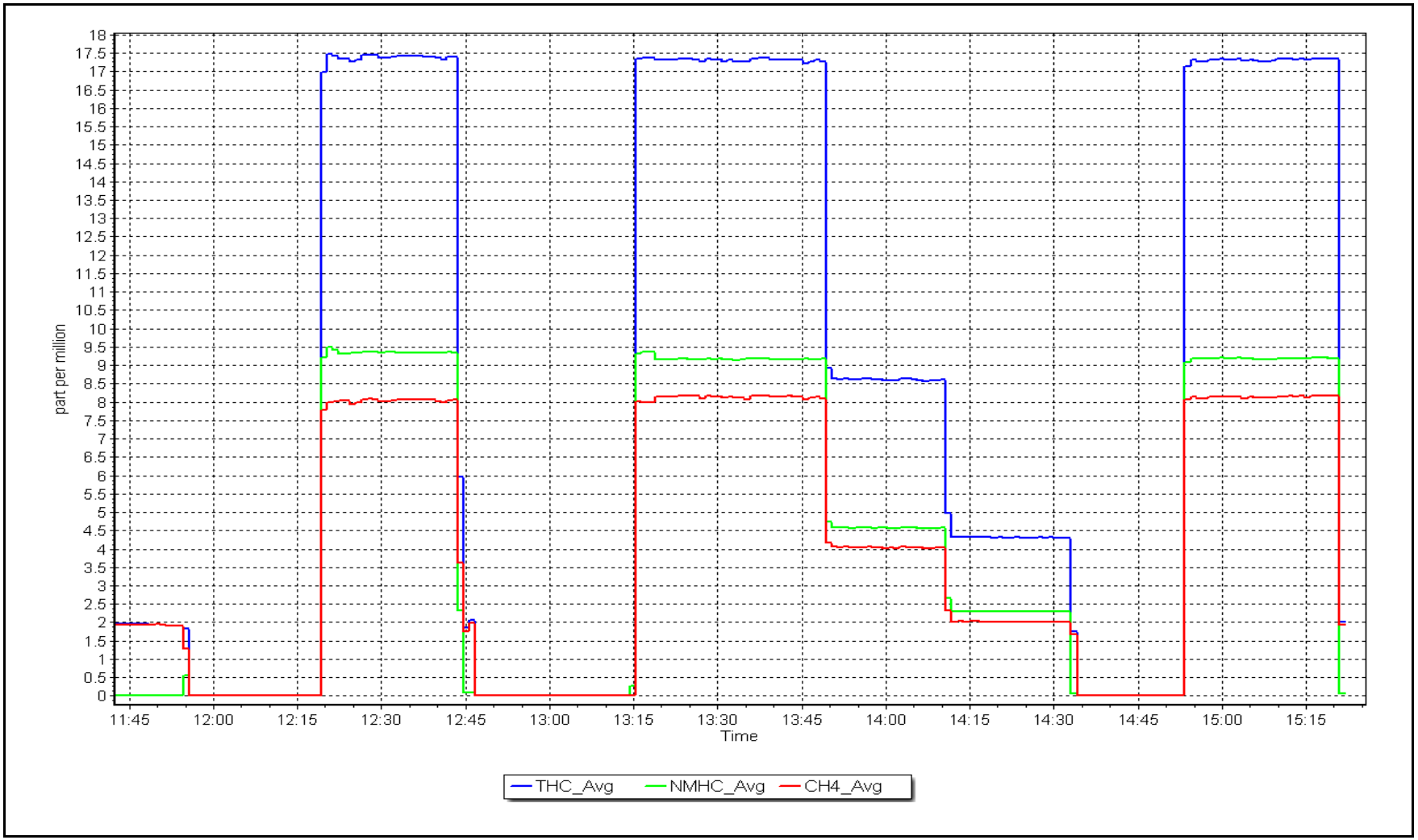
Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Lower Camp	Station Number:	AMS 11
Start Time (MST):	11:47	End Time (MST):	15:22
Analyzer make:	Thermo 55i	Analyzer serial #:	1505164381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999992	*≥0.995*
9.18	9.17	1.0005	Slope	0.999609	*0.90 - 1.10*
4.60	4.58	1.0056			
2.31	2.29	1.0053	Intercept	-0.008955	*+/-0.5*



NMHC Calibration Plot Date: July 18, 2024 Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS13
FORT MCKAY SOUTH
NOVEMBER 2024

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

December 23, 2024

CALS_241

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 1, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	9:45	End time (MST):	12:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.55	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC260812			
Removed Cal Gas Conc:	50.55	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	2448
Zero Air Gen Model:	API T701		Serial Number:	1118

Analyzer Information

Analyzer make:	API T100		Serial Number:	599	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004785	1.003744	Backgd or Offset:	99.5	99.5
Calibration intercept:	-2.717874	-3.278551	Coeff or Slope:	0.697	0.697

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.6	----
As found High point	4921	79.1	799.7	798.9	1.000
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	799.5	Previous response	800.8	*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	4921	79.1	799.7	800.9	0.998
Mid point	4961	39.5	399.3	395.9	1.009
Low point	4980	19.8	200.2	194.9	1.027
As left zero	5000	0.0	0.0	-0.3	----
As left span	4921	79.1	799.7	799.0	1.001
				Average Correction Factor:	1.011

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

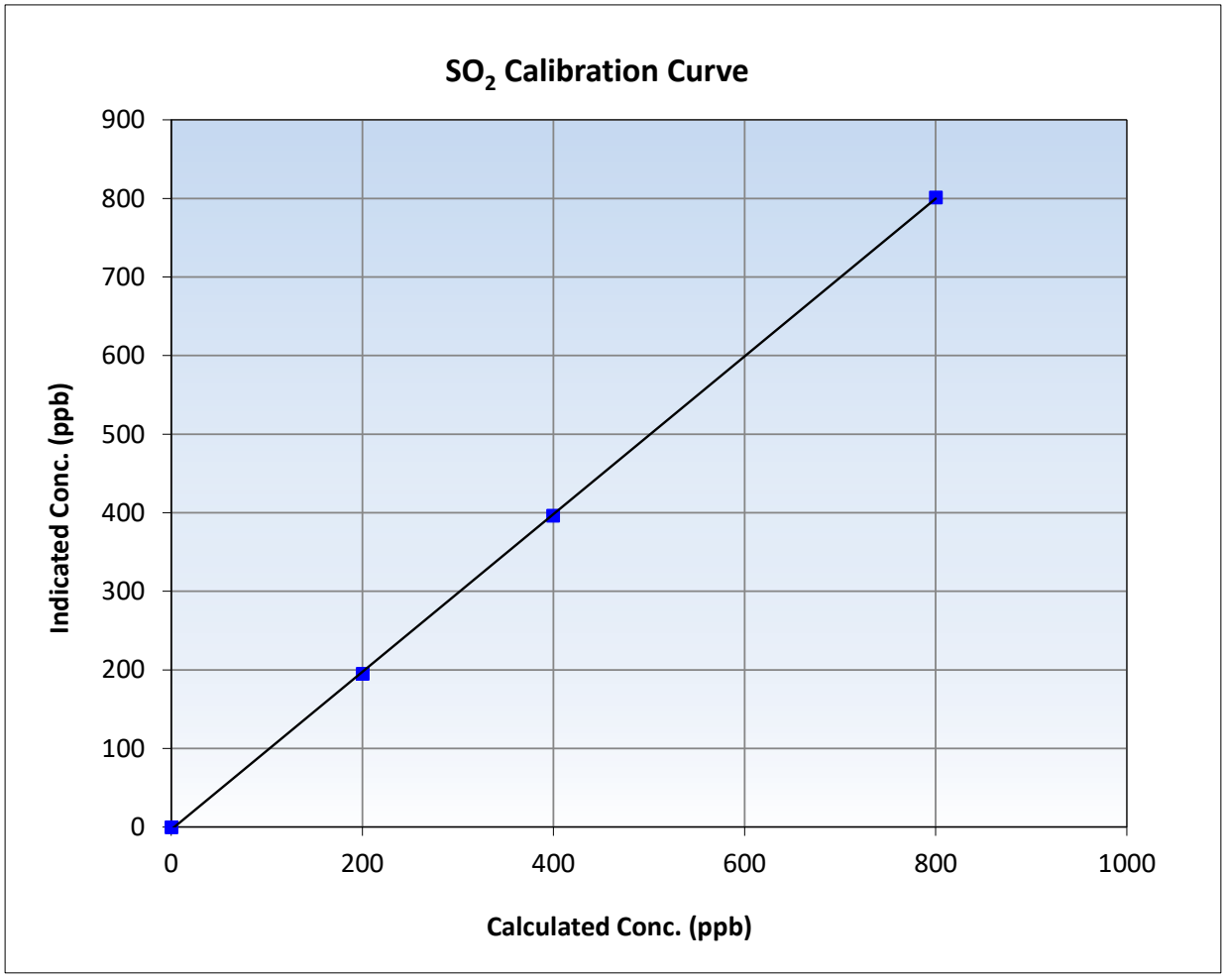
Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:45	End Time (MST):	12:55
Analyzer make:	API T100	Analyzer serial #:	599

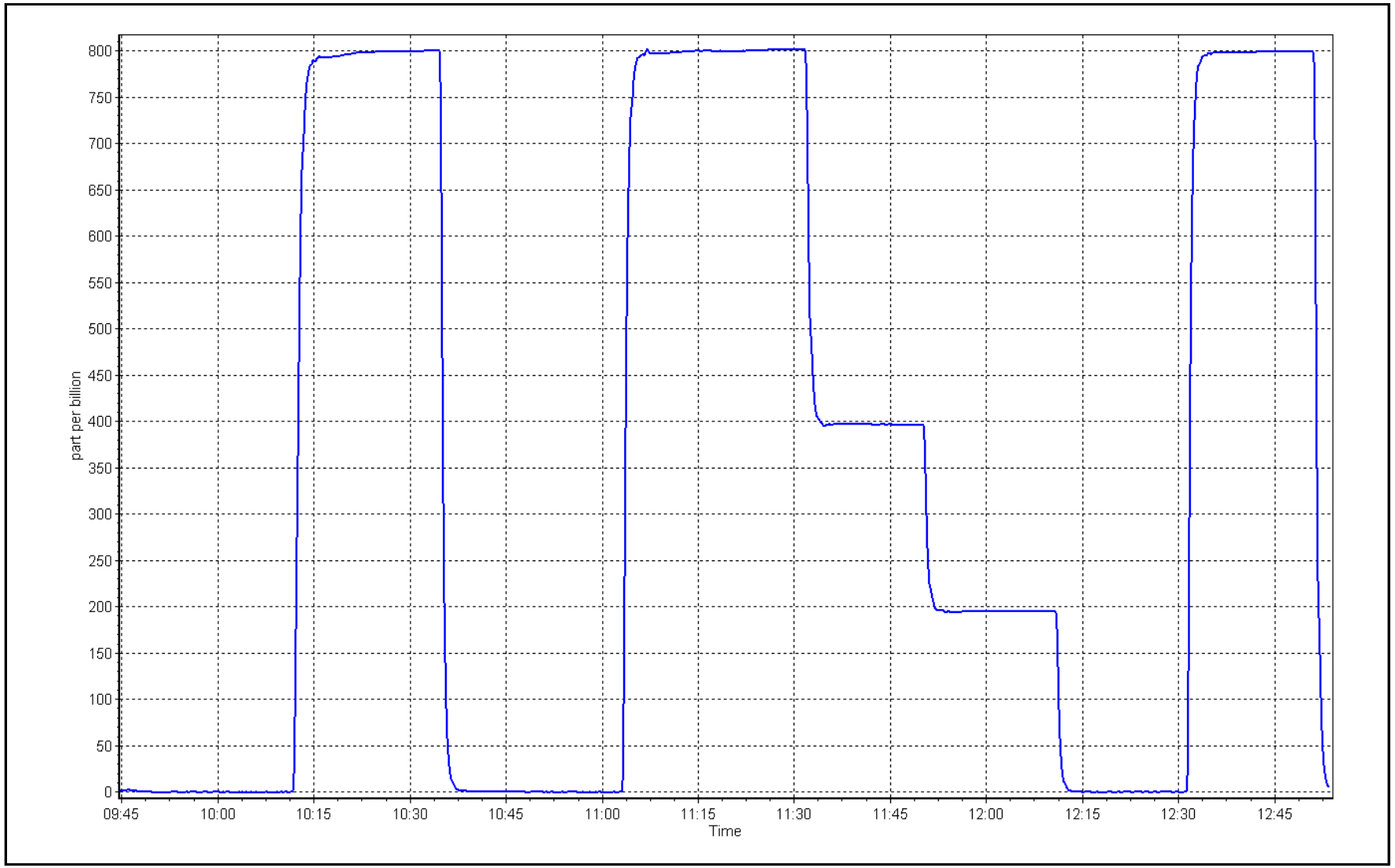
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
799.7	800.9	0.9985
399.3	395.9	1.0086
200.2	194.9	1.0271

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999941	*≥0.995*
Slope	1.003744	*0.90 - 1.10*
Intercept	-3.278551	*+/-30*



SO2 Calibration Plot Date: November 1, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 13, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	9:42	End time (MST):	14:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.34	ppm	Cal Gas Exp Date:	January 1, 2025
Cal Gas Cylinder #:	CC500241			
Removed Cal Gas Conc:	5.34	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2448
ZAG Make/Model:	API T701		Serial Number:	5609

Analyzer Information

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

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.007024	0.986610	Backgd or Offset:	3.69	3.69
Calibration intercept:	-0.242118	-0.122144	Coeff or Slope:	1.13	1.13

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4925	75.5	80.6	80.8	0.997
As found Mid point	4962	37.7	40.3	39.9	1.007
As found Low point	4981	18.9	20.2	19.7	1.019
New cylinder response					

Baseline Corr As found:	80.9	Prev response:	80.95	*% change:	-0.1%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.004761	AF Intercept:	-0.362296
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999950	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4925	75.5	80.6	79.5	1.014
Mid point	4962	37.7	40.3	39.6	1.017
Low point	4981	18.9	20.2	19.5	1.035
As left zero	5000	0.0	0.0	0.1	----
As left span	4925	75.5	80.6	77.8	1.036
SO2 Scrubber Check	4921	79.1	791.0	0.0	----

Date of last scrubber change:	20-Jan-20	Ave Corr Factor	1.022
Date of last converter efficiency test:			

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

TRS Calibration Summary

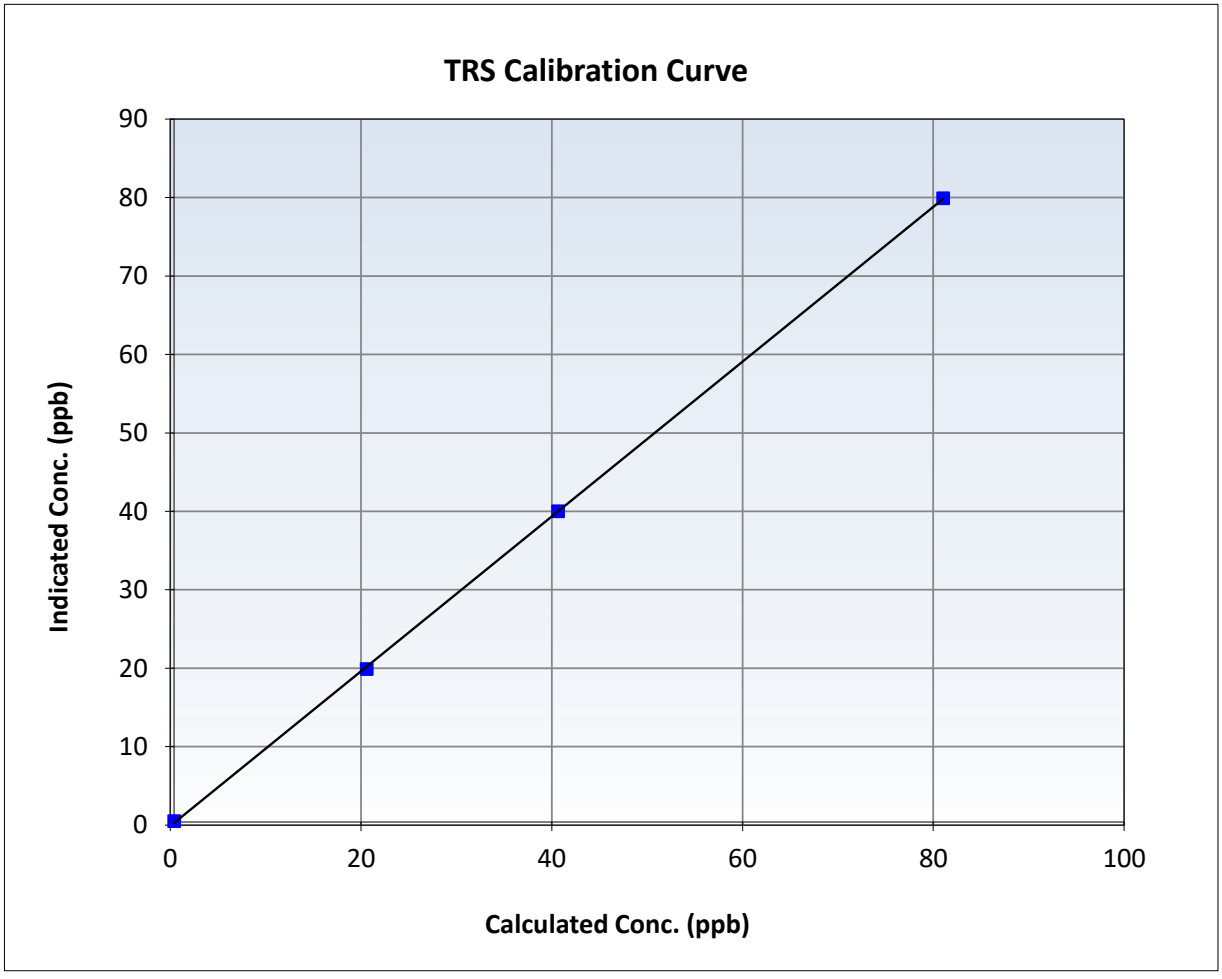
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 2, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:42	End Time (MST):	14:05
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017

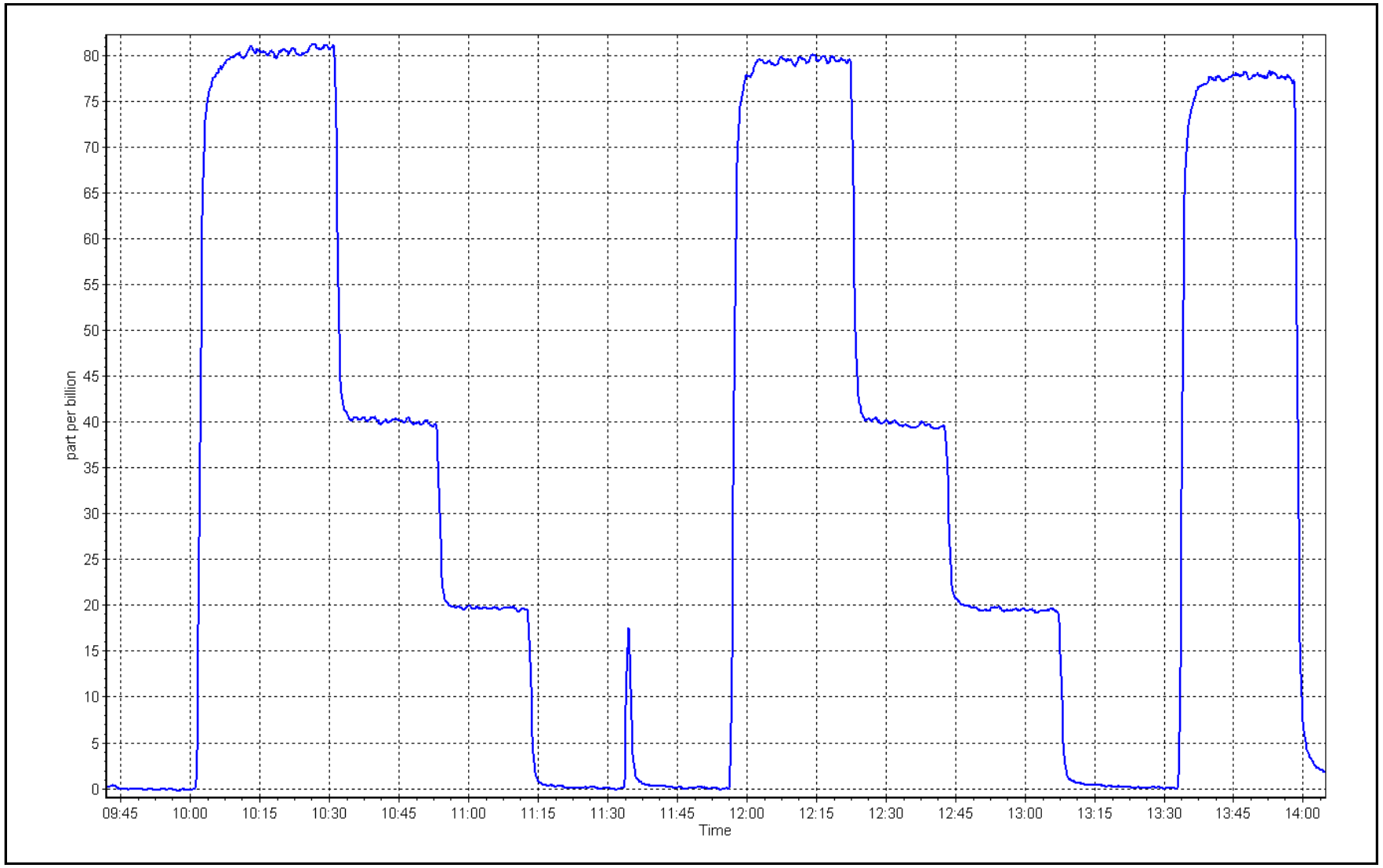
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.6	79.5	1.0142
40.3	39.6	1.0168
20.2	19.5	1.0352

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999959	*≥0.995*
Slope	0.986610	*0.90 - 1.10*
Intercept	-0.122144	*+/-3*



TRS Calibration Plot Date: November 13, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 1, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	9:45	End time (MST):	12:55
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC2608112	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
C3H8 Cal Gas Conc.	208.7 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
Removed C3H8 Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	2448
Zero Air Gen model:	API T701	Serial Number:	1118

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.19E-04	3.29E-04	NMHC SP Ratio:	7.87E-05	8.01E-05
CH4 Retention time:	14.80	15.20	NMHC Peak Area:	115427	113404
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	17.05	16.52	1.032
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	16.52	Prev response	16.99	*% change	-2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	17.05	17.01	1.002
Mid point	4961	39.5	8.51	8.45	1.008
Low point	4980	19.8	4.27	4.19	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	17.05	17.12	0.996
				Average Correction Factor	1.010

Notes: Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	9.08	8.91	1.019
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.91	Prev response	9.02	*% change	-1.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	9.08	9.05	1.003
Mid point	4961	39.5	4.53	4.51	1.005
Low point	4980	19.8	2.27	2.25	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.17	0.990
				Average Correction Factor	1.006

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	7.97	7.61	1.047
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.61	Prev response	7.96	*% change	-4.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	7.97	7.96	1.001
Mid point	4961	39.5	3.98	3.94	1.011
Low point	4980	19.8	1.99	1.94	1.028
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	7.95	1.003
				Average Correction Factor	1.013

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999550	0.999215
THC Cal Offset:	-0.053365	-0.038367
CH4 Cal Slope:	1.002466	1.000974
CH4 Cal Offset:	-0.025385	-0.029187
NMHC Cal Slope:	0.996916	0.997761
NMHC Cal Offset:	-0.027178	-0.009782

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

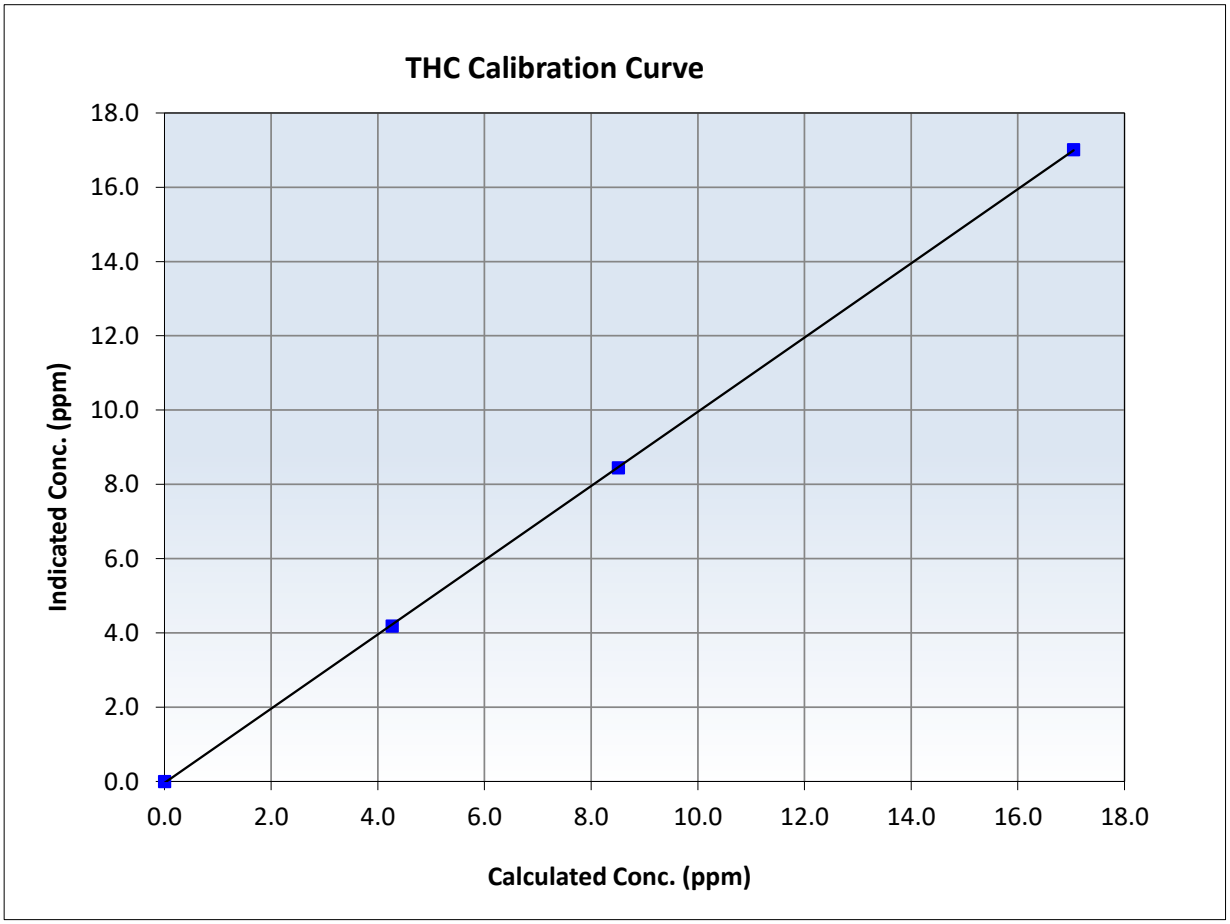
THC Calibration Summary

Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:45	End Time (MST):	12:55
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999977	≥0.995
17.05	17.01	1.0019	Slope	0.999215	0.90 - 1.10
8.51	8.45	1.0078			
4.27	4.19	1.0189	Intercept	-0.038367	+/-0.5



Wood Buffalo Environmental Association

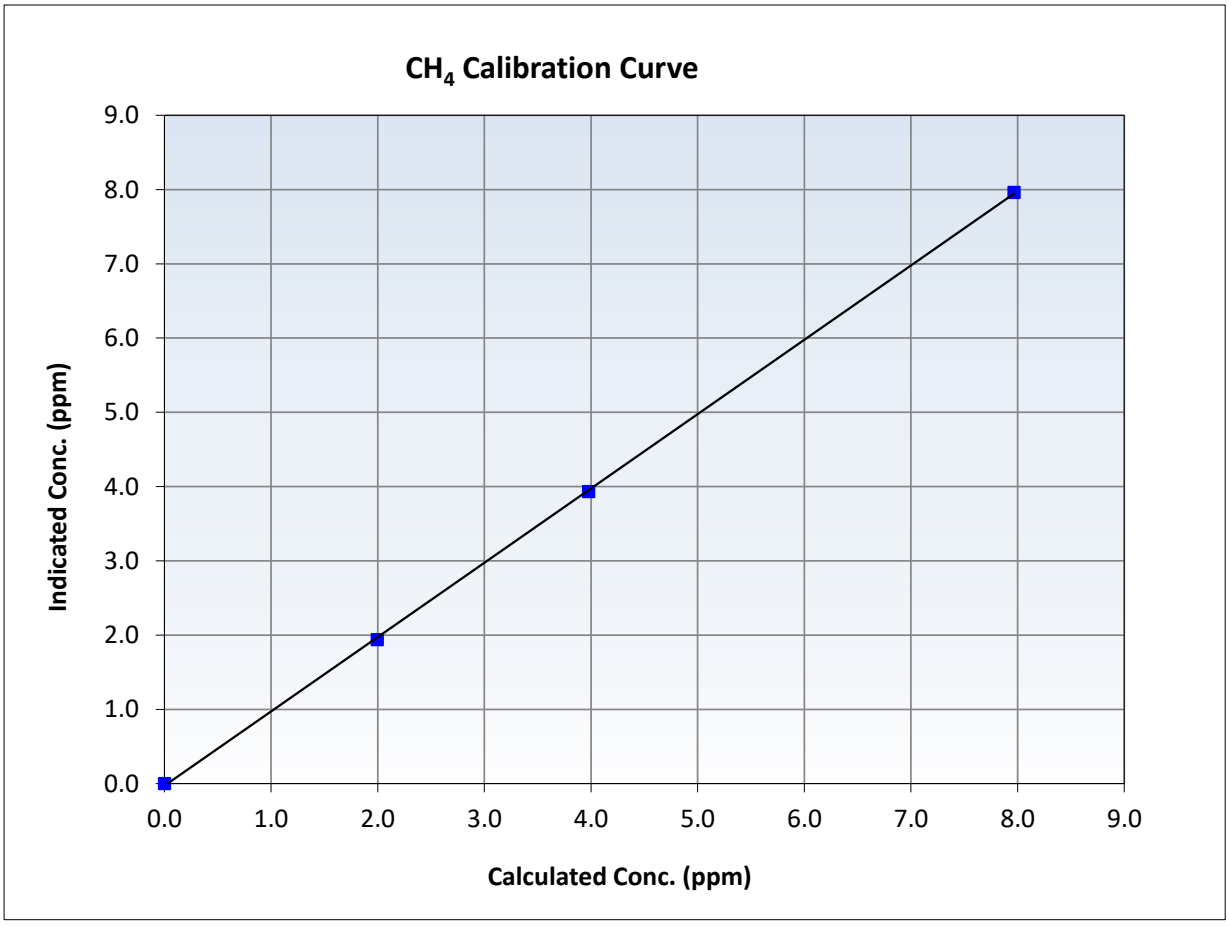
CH_4 Calibration Summary

Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:45	End Time (MST):	12:55
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999938	≥0.995
7.97	7.96	1.0007	Slope	1.000974	0.90 - 1.10
3.98	3.94	1.0109			
1.99	1.94	1.0280	Intercept	-0.029187	+/-0.5



Wood Buffalo Environmental Association

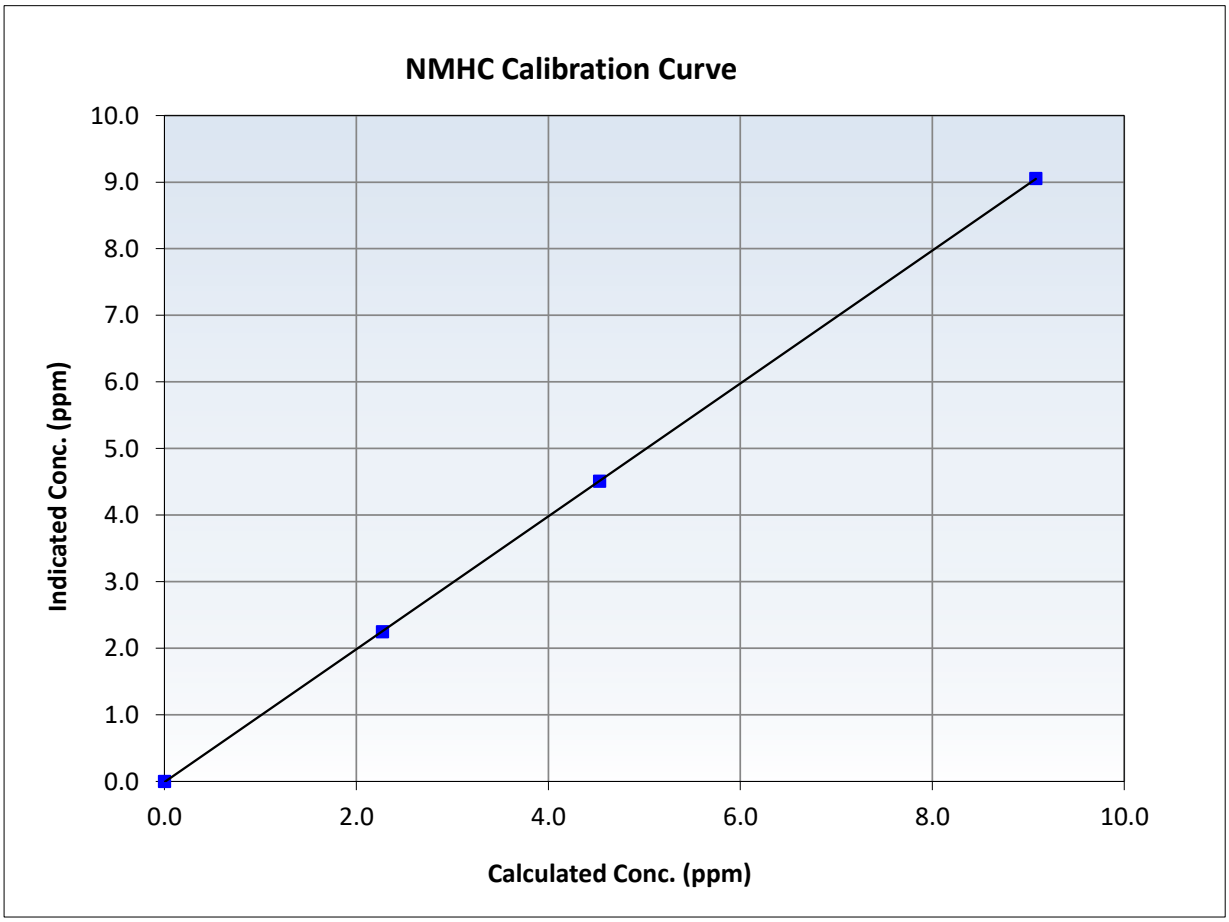
NMHC Calibration Summary

Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:45	End Time (MST):	12:55
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999995	≥0.995
9.08	9.05	1.0028	Slope	0.997761	0.90 - 1.10
4.53	4.51	1.0054			
2.27	2.25	1.0110	Intercept	-0.009782	+/-0.5



NMHC Calibration Plot Date: November 1, 2024 Location: Fort McKay South

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 18, 2024	Last Cal Date:	November 1, 2024
Start time (MST):	10:41	End time (MST):	14:02
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:	CC2608112	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
C3H8 Cal Gas Conc.	208.7 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
Removed C3H8 Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	2448
Zero Air Gen model:	API T701	Serial Number:	1118

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.29E-04	3.53E-04	NMHC SP Ratio:	8.01E-05	9.10E-05
CH4 Retention time:	15.20	15.60	NMHC Peak Area:	113404	99747
Zero Chromatogram:	OFF	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.02	----
As found High point	4921	79.1	17.05	15.34	1.113
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	15.32	Prev response	16.99	*% change	-10.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	17.05	17.04	1.001
Mid point	4961	39.5	8.51	8.43	1.009
Low point	4980	19.8	4.27	4.15	1.029
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	1.013

Notes: As found span response was low probably cause the chromatogram shifted. Do zero chromatogram and use chromatogram. Adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	9.08	8.09	1.122
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.09	Prev response	9.05	*% change	-11.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	9.08	9.06	1.002
Mid point	4961	39.5	4.53	4.49	1.010
Low point	4980	19.8	2.27	2.21	1.029
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.14	0.993
				Average Correction Factor	1.014

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.02	----
As found High point	4921	79.1	7.97	7.25	1.102
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.23	Prev response	7.95	*% change	-9.9%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	7.97	7.97	1.000
Mid point	4961	39.5	3.98	3.94	1.009
Low point	4980	19.8	1.99	1.94	1.030
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	7.96	1.001
				Average Correction Factor	1.013

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999215	1.001233
THC Cal Offset:	-0.038367	-0.062164
CH4 Cal Slope:	1.000974	1.002379
CH4 Cal Offset:	-0.029187	-0.030583
NMHC Cal Slope:	0.997761	0.999989
NMHC Cal Offset:	-0.009782	-0.031381

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

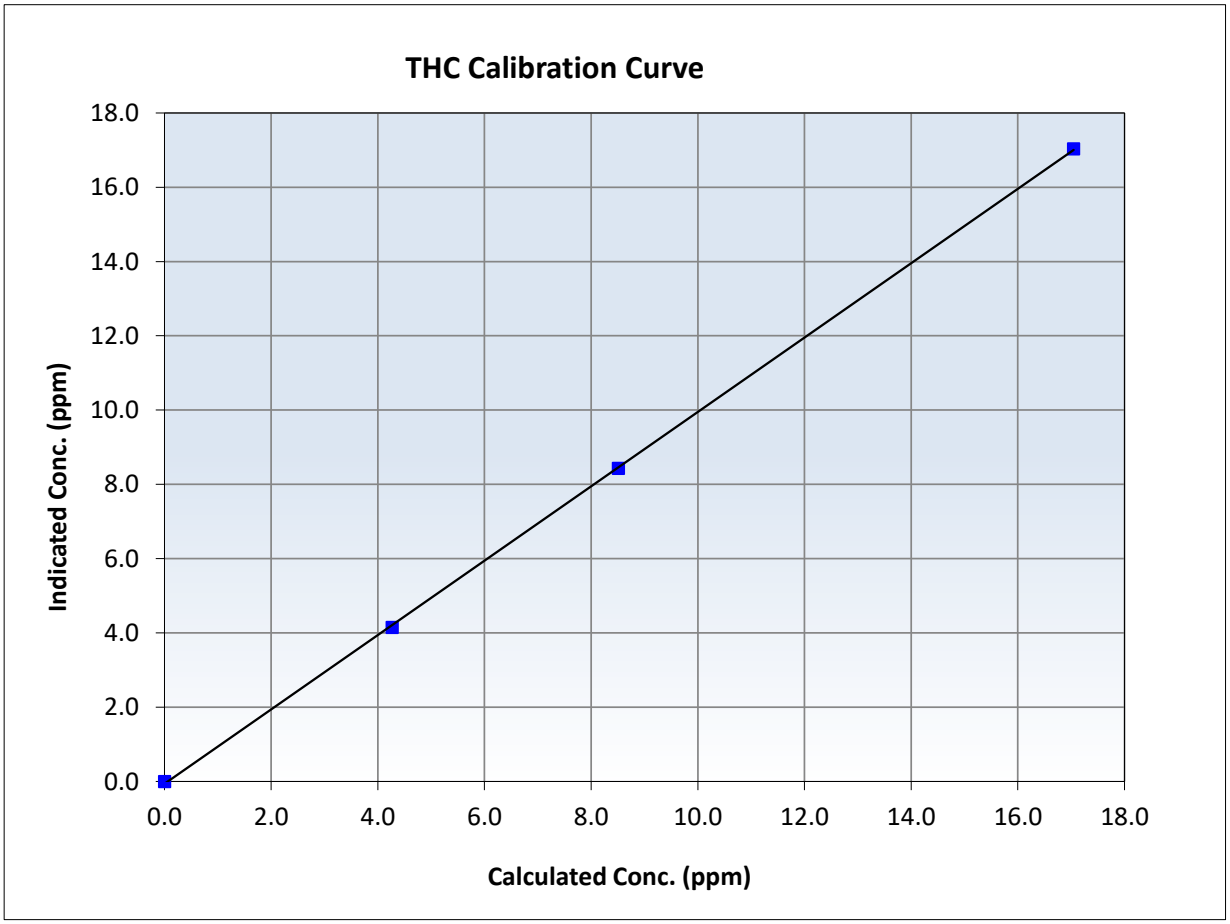
THC Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	November 1, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:41	End Time (MST):	14:02
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999939	≥0.995
17.05	17.04	1.0007	Slope	1.001233	0.90 - 1.10
8.51	8.43	1.0094			
4.27	4.15	1.0292	Intercept	-0.062164	+/-0.5



Wood Buffalo Environmental Association

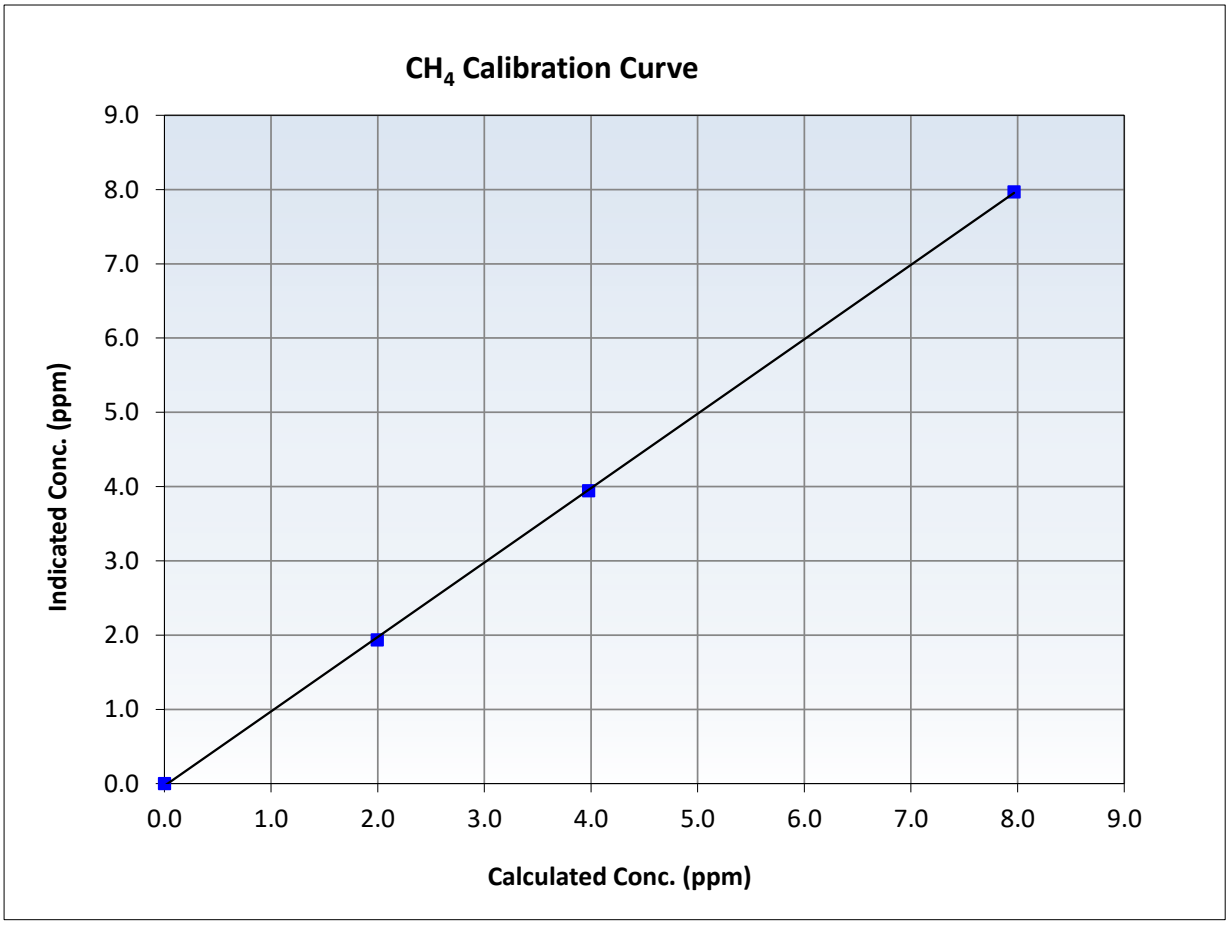
CH_4 Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	November 1, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:41	End Time (MST):	14:02
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999933	≥0.995
7.97	7.97	0.9996	Slope	1.002379	0.90 - 1.10
3.98	3.94	1.0089			
1.99	1.94	1.0296	Intercept	-0.030583	+/-0.5



Wood Buffalo Environmental Association

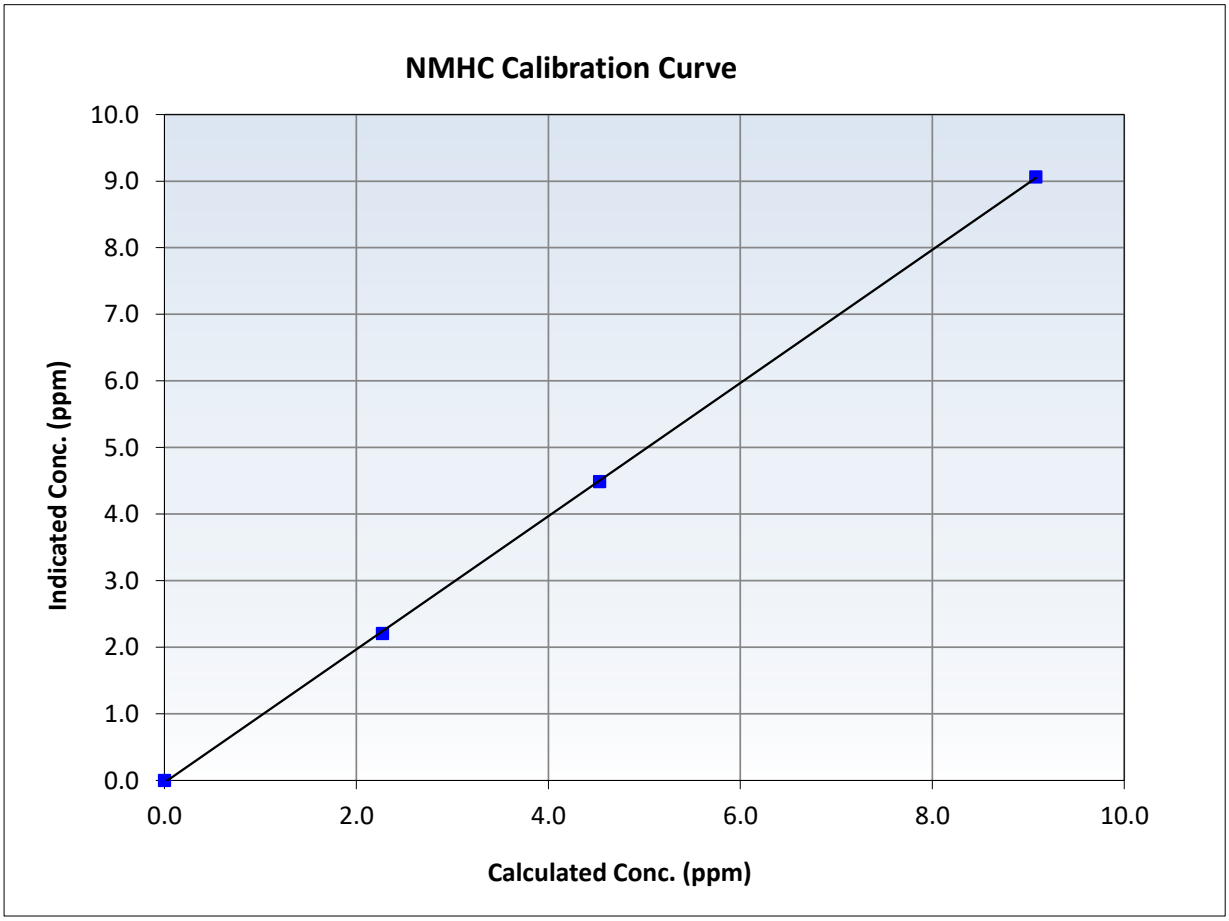
NMHC Calibration Summary

Station Information

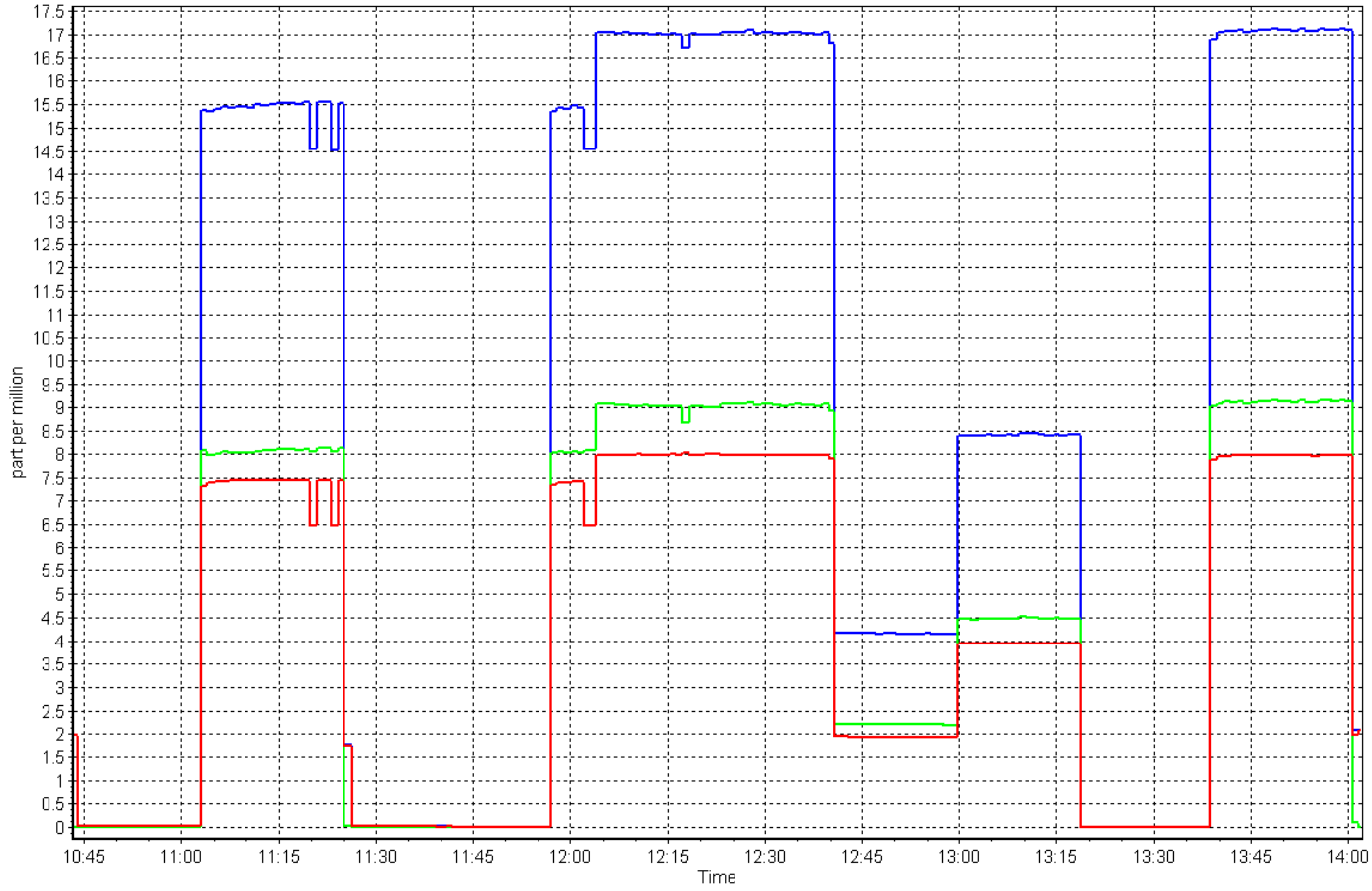
Calibration Date:	November 18, 2024	Previous Calibration:	November 1, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:41	End Time (MST):	14:02
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999945	≥0.995
9.08	9.06	1.0018	Slope	0.999989	0.90 - 1.10
4.53	4.49	1.0102			
2.27	2.21	1.0289	Intercept	-0.031381	+/-0.5



NMHC Calibration Plot Date: November 18, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 22, 2024	Last Cal Date:	November 18, 2024
Start time (MST):	9:48	End time (MST):	13:30
Reason:	Maintenance address the dipping issue		

Calibration Standards

Gas Cert Reference:	CC2608112	Cal Gas Expiry Date:	
CH4 Cal Gas Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
C3H8 Cal Gas Conc.	208.7 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	
Removed CH4 Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
Removed C3H8 Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	2448
Zero Air Gen model:	API T701	Serial Number:	1118

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	3.53E-04	3.81E-04	NMHC SP Ratio:	9.10E-05	9.82E-05
CH4 Retention time:	15.60	16.00	NMHC Peak Area:	99747	92440
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	17.05	15.77	1.081
As found Mid point	4961	39.5	8.51	7.79	1.092
As found Low point	4980	19.8	4.27	3.87	1.103
New cylinder response					
Baseline Corr AF:	15.77	Prev response	17.00	*% change	-7.9%
Baseline Corr 2nd AF:	7.79	AF Slope:	0.925983	AF Intercept:	-0.047581
Baseline Corr 3rd AF:	3.87	AF Correlation:	0.999955	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	17.05	17.06	0.999
Mid point	4961	39.5	8.51	8.40	1.013
Low point	4980	19.8	4.27	4.12	1.036
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	17.05	16.63	1.025
				Average Correction Factor	1.016

Notes: Actuator was changed after as founds. Do zero chromatogram and use zero chromatogram. Adjusted span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	9.08	8.32	1.091
As found Mid point	4961	39.5	4.53	4.18	1.085
As found Low point	4980	19.8	2.27	2.05	1.110
New cylinder response					
Baseline Corr AF:	8.32	Prev response	9.05	*% change	-8.7%
Baseline Corr 2nd AF:	4.18	AF Slope:	0.918188	AF Intercept:	-0.009763
Baseline Corr 3rd AF:	2.05	AF Correlation:	0.999959	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	9.08	9.08	1.000
Mid point	4961	39.5	4.53	4.46	1.017
Low point	4980	19.8	2.27	2.19	1.038
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	8.78	1.035
				Average Correction Factor	1.018

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4921	79.1	7.97	7.44	1.071
As found Mid point	4961	39.5	3.98	3.62	1.100
As found Low point	4980	19.8	1.99	1.82	1.096
New cylinder response					
Baseline Corr AF:	7.44	Prev response	7.96	*% change	-6.9%
Baseline Corr 2nd AF:	3.62	AF Slope:	0.934609	AF Intercept:	-0.037417
Baseline Corr 3rd AF:	1.82	AF Correlation:	0.999782	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	7.97	7.98	0.999
Mid point	4961	39.5	3.98	3.94	1.009
Low point	4980	19.8	1.99	1.93	1.033
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	7.86	1.014
				Average Correction Factor	1.013

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.001233	1.002871
THC Cal Offset:	-0.062164	-0.083374
CH4 Cal Slope:	1.002379	1.003670
CH4 Cal Offset:	-0.030583	-0.034583
NMHC Cal Slope:	0.999989	1.002081
NMHC Cal Offset:	-0.031381	-0.048191

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

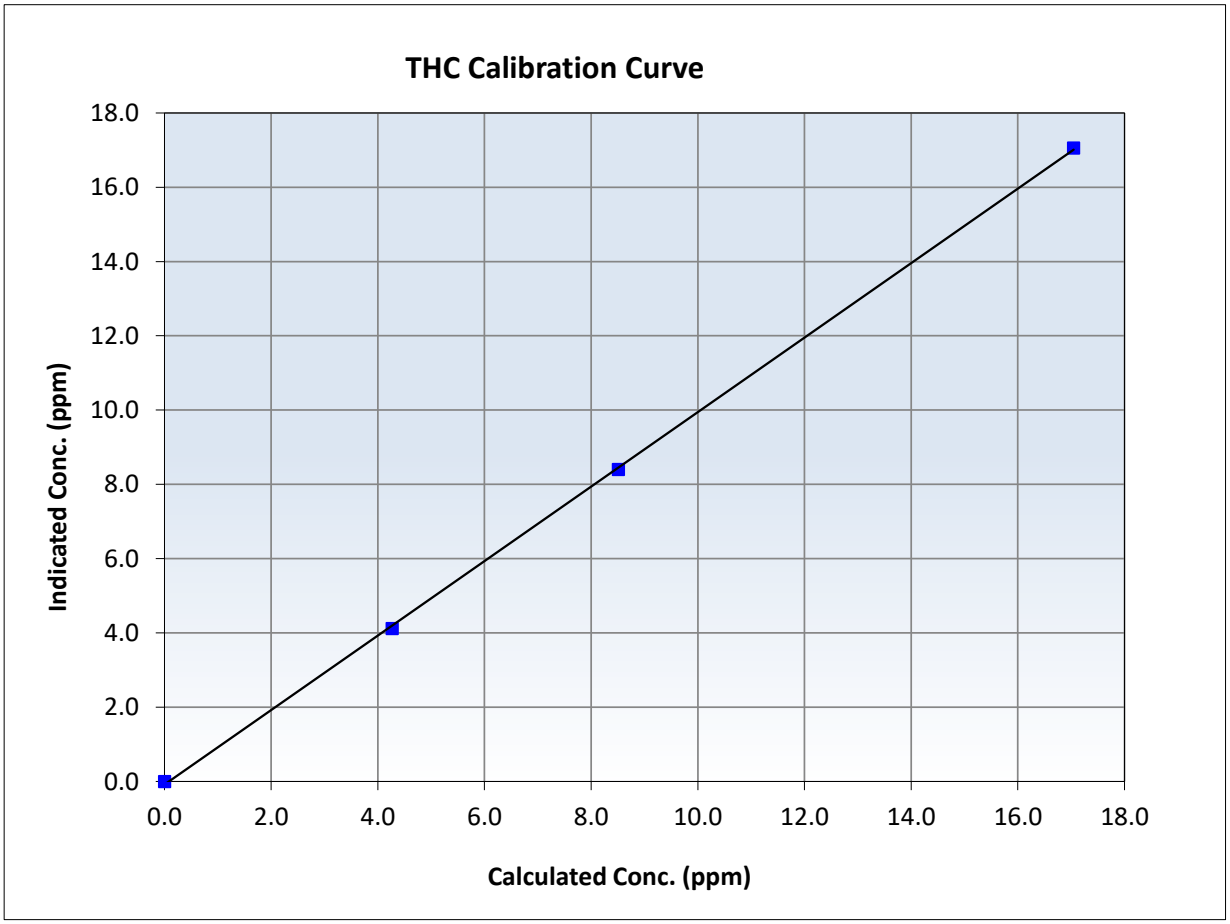
THC Calibration Summary

Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	November 18, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:48	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999890	≥0.995
17.05	17.06	0.9994	Slope	1.002871	0.90 - 1.10
8.51	8.40	1.0133	Intercept	-0.083374	+/-0.5
4.27	4.12	1.0357			



Wood Buffalo Environmental Association

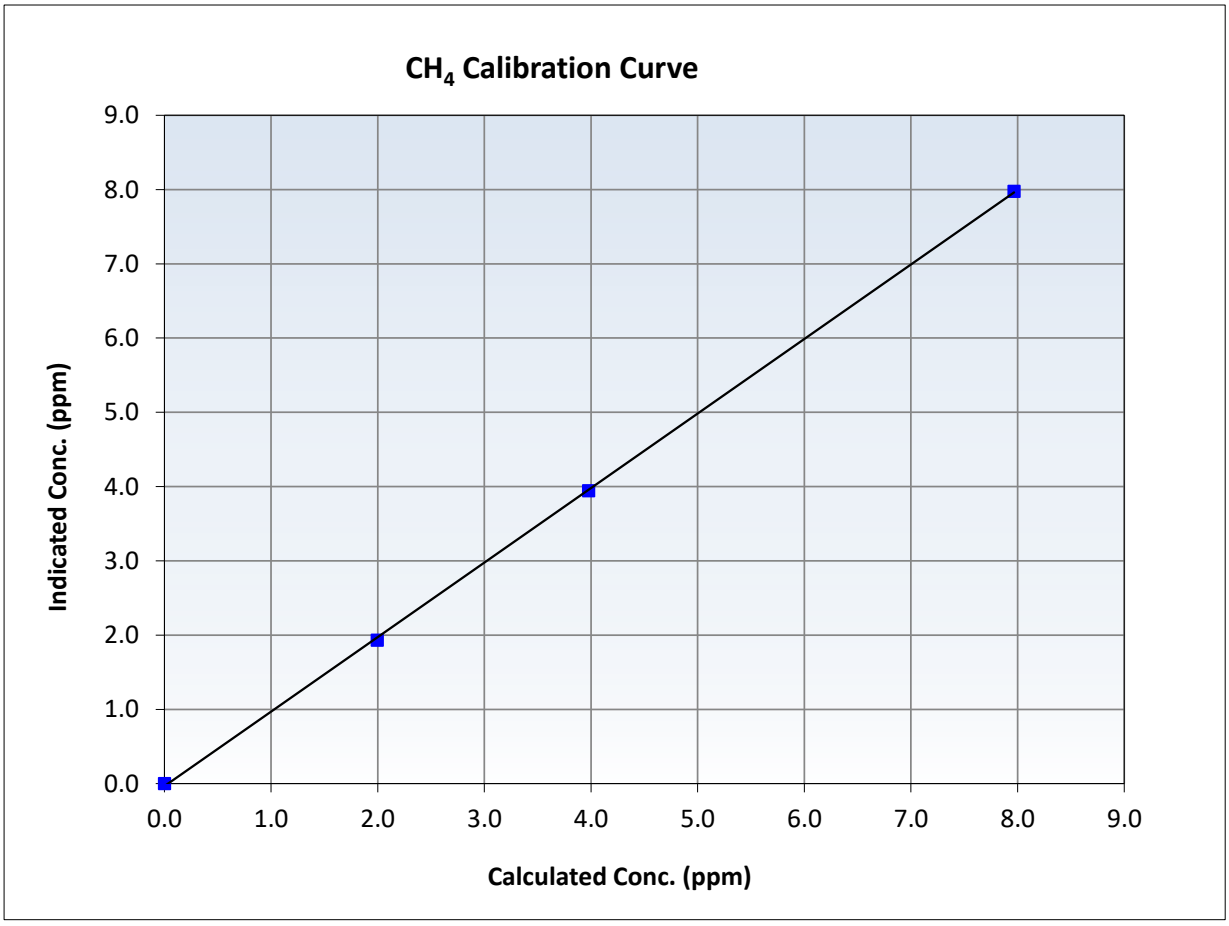
CH_4 Calibration Summary

Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	November 18, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:48	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999914	≥0.995
7.97	7.98	0.9986	Slope	1.003670	0.90 - 1.10
3.98	3.94	1.0089			
1.99	1.93	1.0328	Intercept	-0.034583	+/-0.5



Wood Buffalo Environmental Association

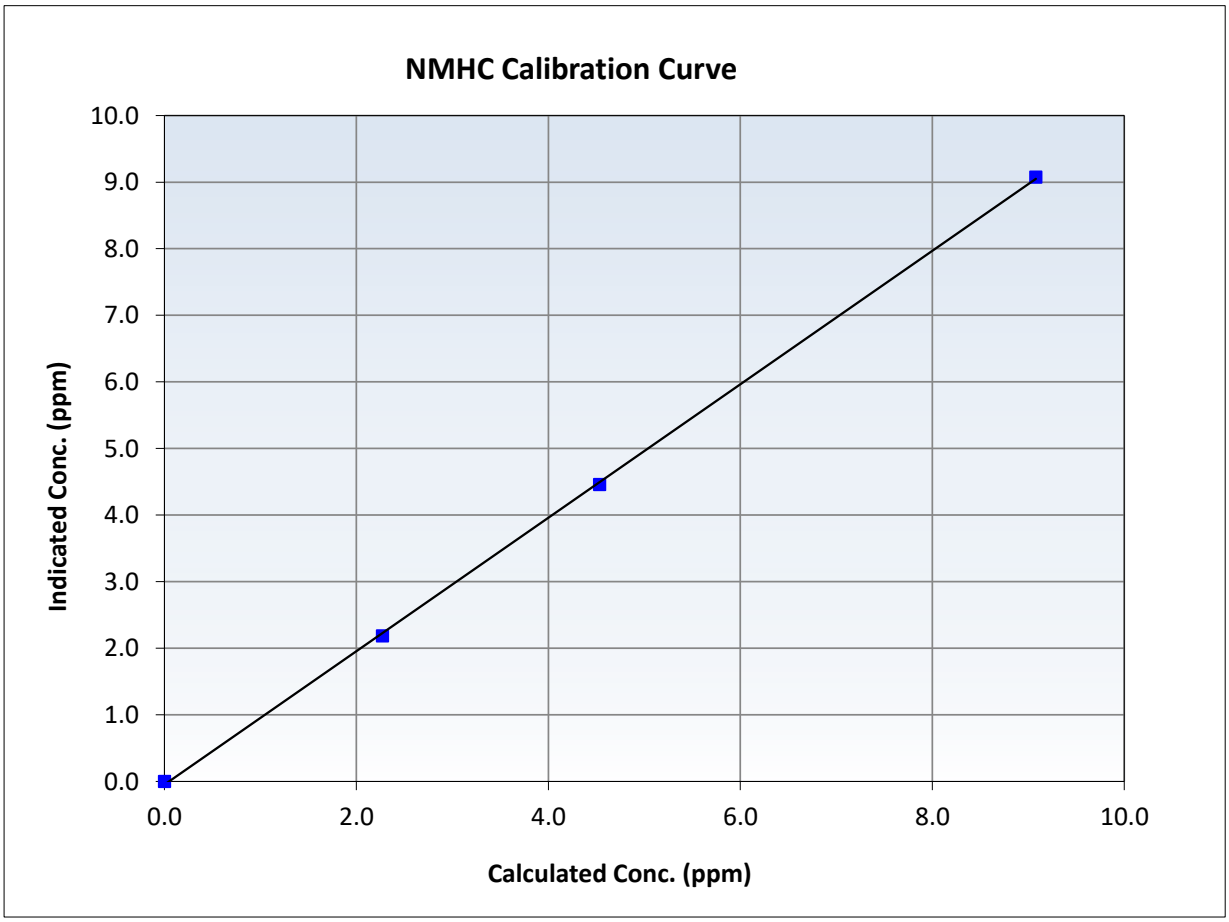
NMHC Calibration Summary

Station Information

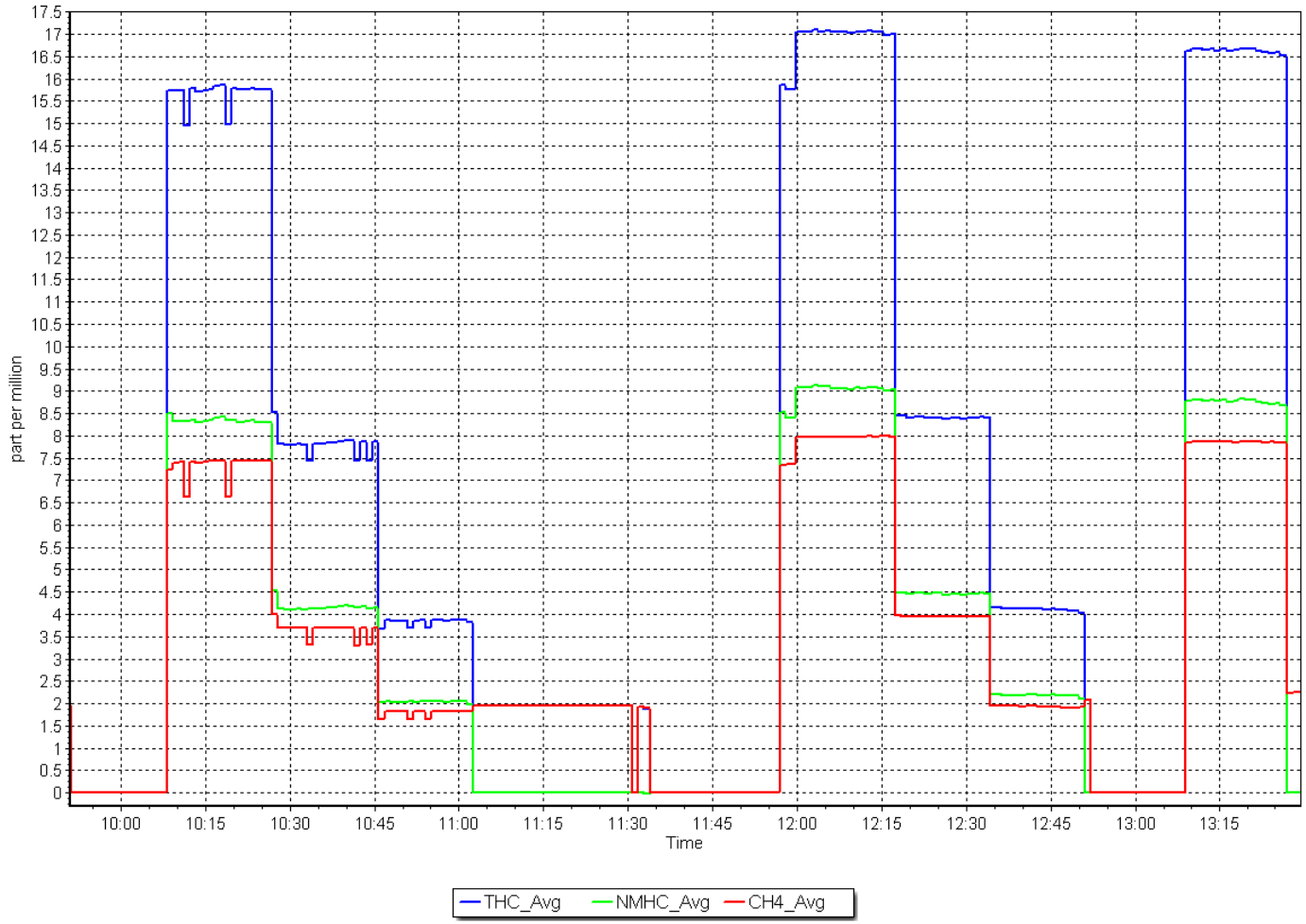
Calibration Date:	November 22, 2024	Previous Calibration:	November 18, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:48	End Time (MST):	13:30
Analyzer make:	Thermo 55i	Analyzer serial #:	12227620776

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999867	≥0.995
9.08	9.08	1.0001	Slope	1.002081	0.90 - 1.10
4.53	4.46	1.0167			
2.27	2.19	1.0383	Intercept	-0.048191	+/-0.5



NMHC Calibration Plot Date: November 22, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 25, 2024	Last Cal Date:	November 22, 2024
Start time (MST):	11:17	End time (MST):	15:37
Reason:	Install		

Calibration Standards

Gas Cert Reference:	CC2608112	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:	
Removed CH4 Conc.	503.6 ppm	CH4 Equiv Conc.	1077.5 ppm
Removed C3H8 Conc.	208.7 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	2448
Zero Air Gen model:	API T701	Serial Number:	1118

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	NA	2.58E-04	NMHC SP Ratio:	NA	5.87E-05
CH4 Retention time:	NA	14.60	NMHC Peak Area:	NA	154800
Zero Chromatogram:		OFF	Flat Baseline:		OFF

THC As Found Data

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

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	17.05	17.08	0.998
Mid point	4961	39.5	8.51	8.53	0.998
Low point	4980	19.8	4.27	4.22	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	17.05	17.13	0.995
				Average Correction Factor	1.002

Notes: Install Calibration.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

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

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

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	9.08	9.10	0.997
Mid point	4961	39.5	4.53	4.57	0.992
Low point	4980	19.8	2.27	2.27	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	9.08	9.11	0.997
				Average Correction Factor	0.997

CH4 As Found Data

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

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

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4921	79.1	7.97	7.98	0.999
Mid point	4961	39.5	3.98	3.96	1.005
Low point	4980	19.8	1.99	1.95	1.022
As left zero	5000	0.0	0.00	0.00	----
As left span	4921	79.1	7.97	8.02	0.993
				Average Correction Factor	1.009

Calibration Statistics

	Start	***Finish***
THC Cal Slope:		1.003277
THC Cal Offset:		-0.023150
CH4 Cal Slope:		1.002838
CH4 Cal Offset:		-0.023183
NMHC Cal Slope:		1.003297
NMHC Cal Offset:		0.000232

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

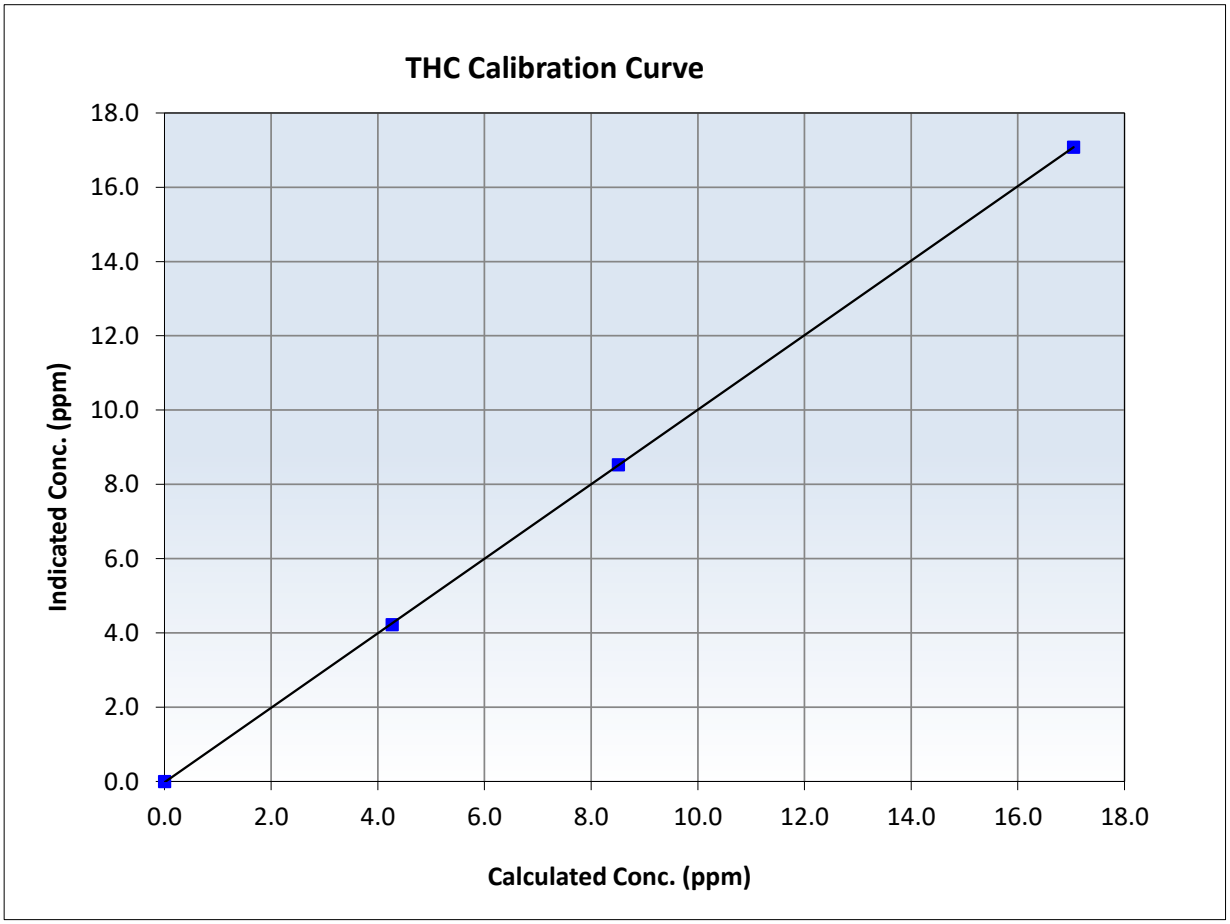
THC Calibration Summary

Station Information

Calibration Date:	November 25, 2024	Previous Calibration:	November 22, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:17	End Time (MST):	15:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999987	≥0.995
17.05	17.08	0.9978	Slope	1.003277	0.90 - 1.10
8.51	8.53	0.9982			
4.27	4.22	1.0112	Intercept	-0.023150	+/-0.5



Wood Buffalo Environmental Association

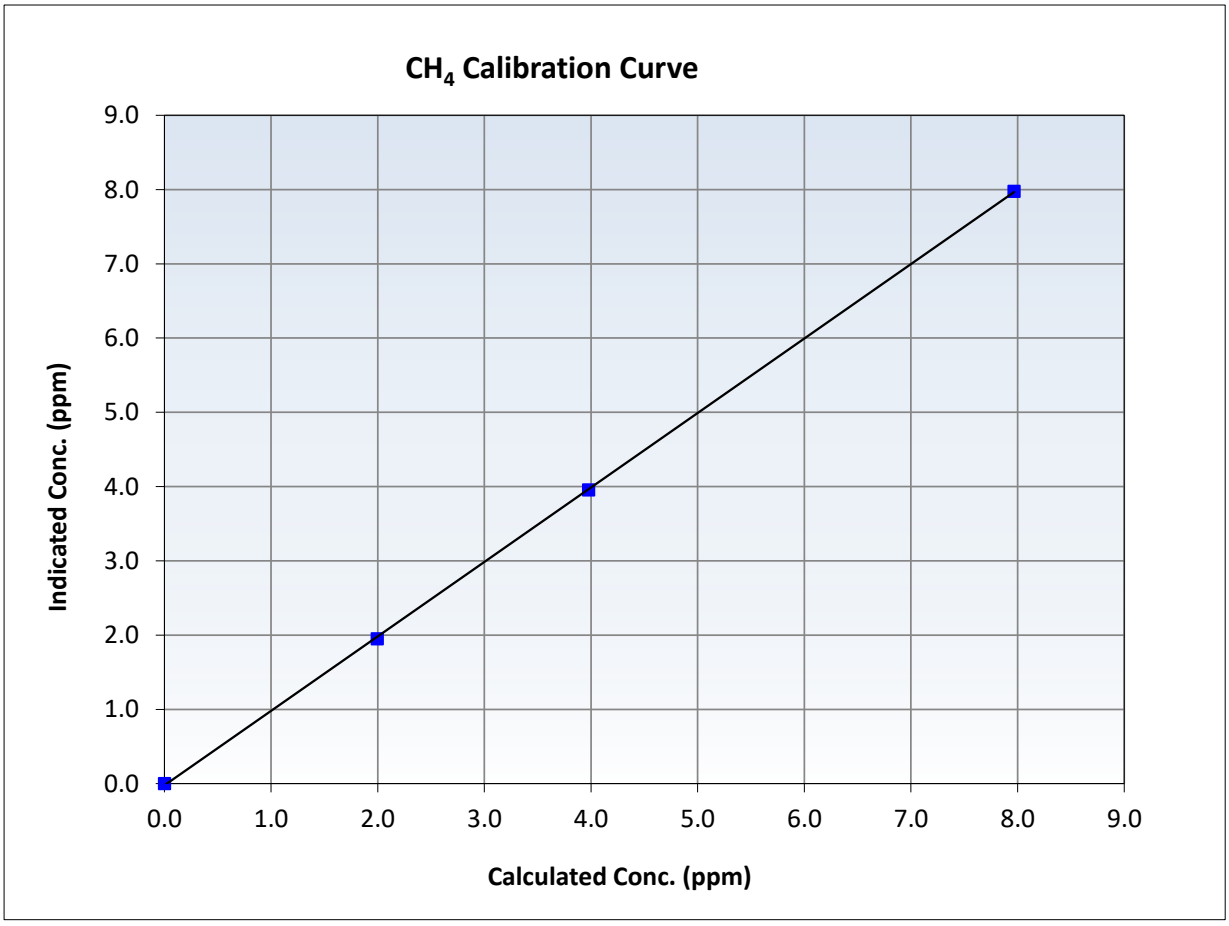
CH_4 Calibration Summary

Station Information

Calibration Date:	November 25, 2024	Previous Calibration:	November 22, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:17	End Time (MST):	15:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999961	≥0.995
7.97	7.98	0.9987	Slope	1.002838	0.90 - 1.10
3.98	3.96	1.0053			
1.99	1.95	1.0217	Intercept	-0.023183	+/-0.5



Wood Buffalo Environmental Association

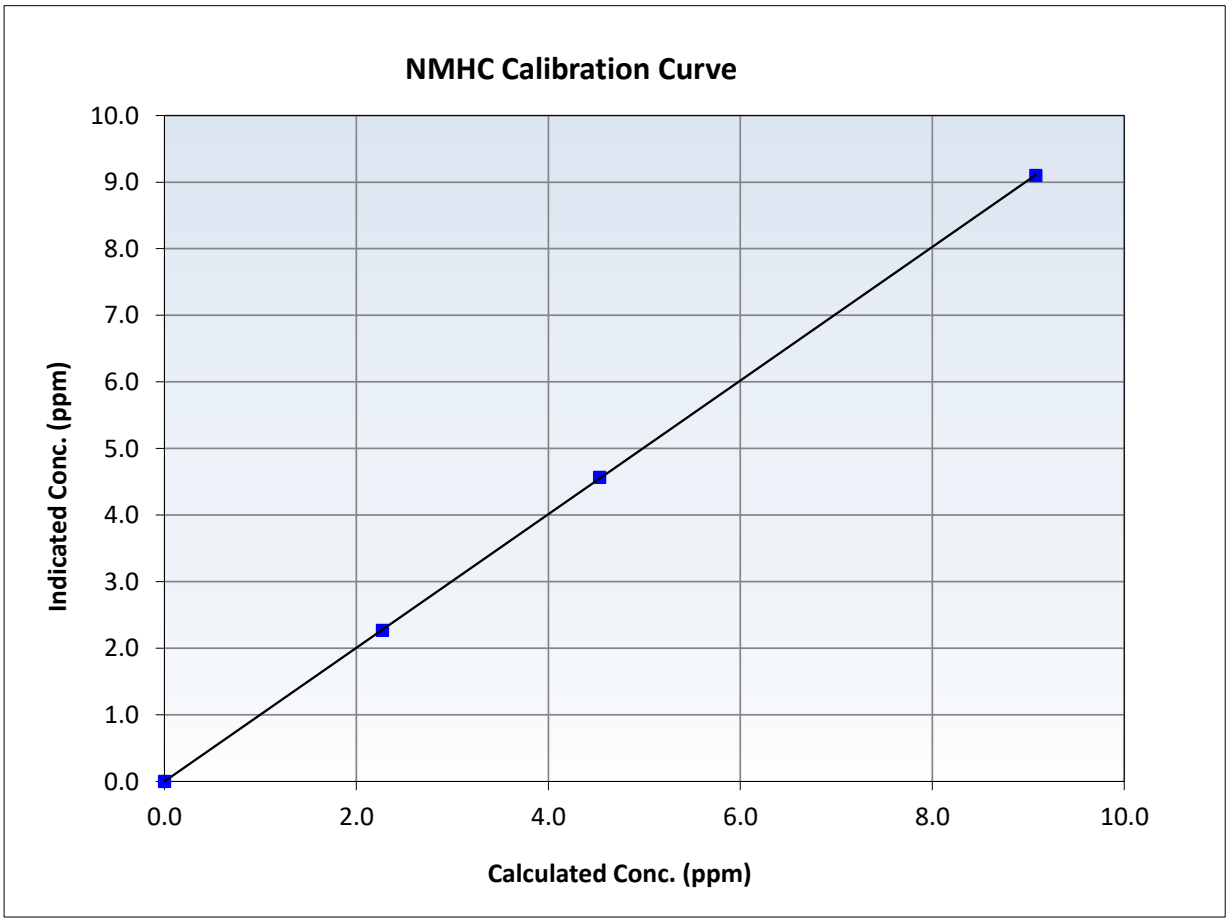
NMHC Calibration Summary

Station Information

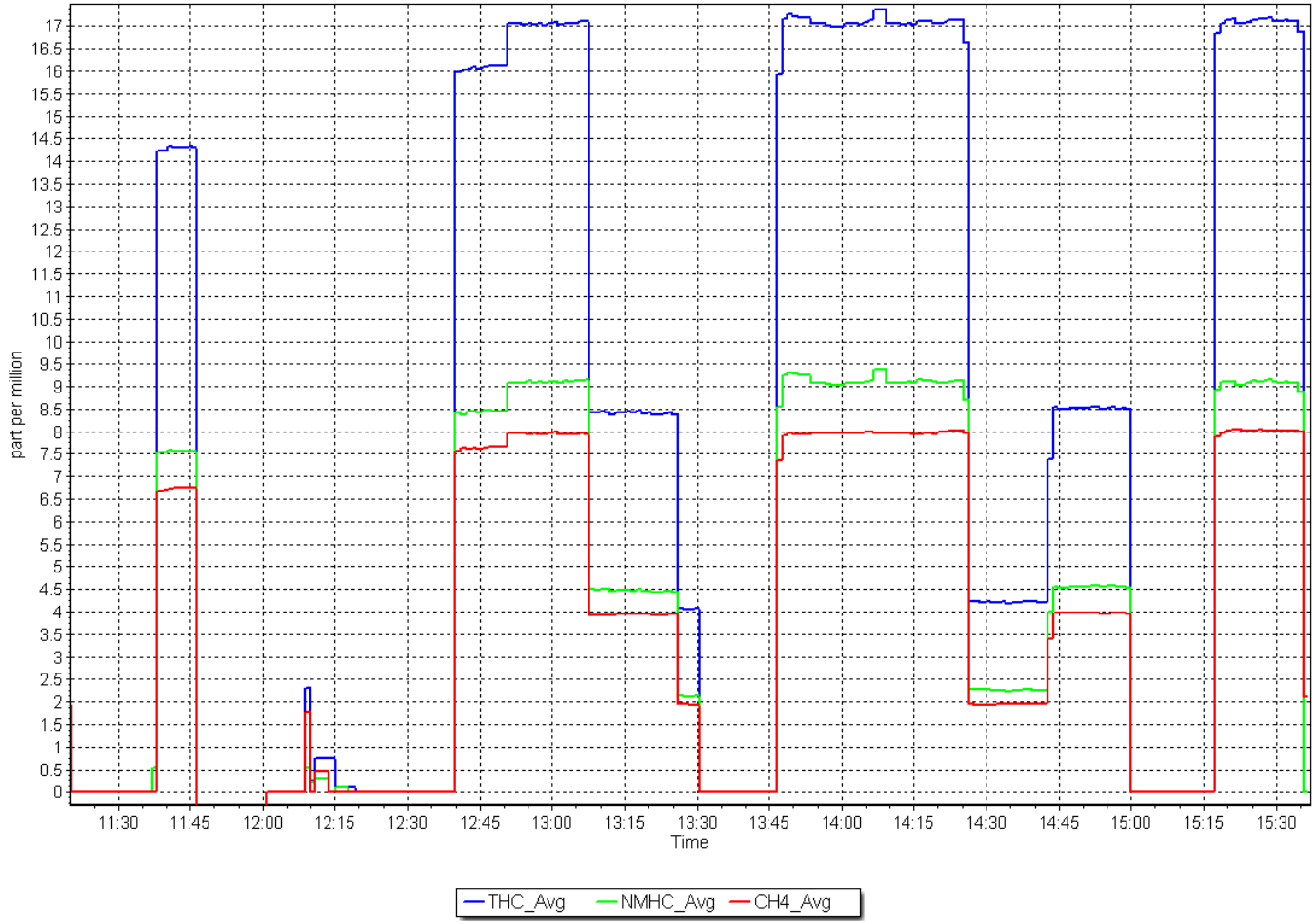
Calibration Date:	November 25, 2024	Previous Calibration:	November 22, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:17	End Time (MST):	15:37
Analyzer make:	Thermo 55i	Analyzer serial #:	1181490018

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999987	≥0.995
9.08	9.10	0.9974	Slope	1.003297	0.90 - 1.10
4.53	4.57	0.9925	Intercept	0.000232	+/-0.5
2.27	2.27	1.0021			



NMHC Calibration Plot Date: November 25, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort McKay South
Station number:	AMS 13
Calibration Date:	November 5, 2024
Last Cal Date:	October 7, 2024
Start time (MST):	9:52
End time (MST):	12:30
Reason:	As Found

Calibration Standards

NO Gas Cylinder #:	T2UP1RP	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	48.25 ppm	NO Cal Gas Conc:	47.88 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.25 ppm	Removed Gas NO Conc:	47.88 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	2448
ZAG make/model:	APIT701	Serial Number:	1118

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	2.0	2.1	-0.1	----	----
AF High point	4917	83.5	805.7	799.5	6.2	806.9	797.9	9.0	1.0010	1.0047
AF Mid point	4958	41.8	403.4	400.3	3.1	402.3	396.9	5.4	1.0077	1.0139
AF Low point	4979	20.9	201.7	200.1	1.5	200.1	195.9	4.2	1.0181	1.0327
New cyl resp										

Previous Response	NO_X = 802.8 ppb	NO = 795.7 ppb
Baseline Corr 1st pt	NO_X = 804.9 ppb	NO = 795.8 ppb
Baseline Corr 2nd pt	NO_X = 400.3 ppb	NO = 394.8 ppb
Baseline Corr 3rd pt	NO_X = 198.1 ppb	NO = 193.8 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = 0.3%

*Percent Change NO = 0.0%

As Found Statistics

As found	NO_X r^2: 0.999974	Nx Sl: 1.000072	Nx Int: 0.107
As found	NO r^2: 0.999940	NO Sl: 0.997149	NO Int: -0.790
As found	NO_2 r^2: 0.999963	NO2 Sl: 1.001672	NO_2 Int: -1.197

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
As Found GPT zero	----	----	0.0	-0.1	----	----
As found high GPT point	795.6	380.5	421.3	421.2	1.0002	100.0%
As found mid GPT point	795.6	585.6	216.2	215.3	1.0041	99.6%
As found low GPT point	795.6	689.2	112.6	110.1	1.0225	97.8%

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i

Serial Number: 1410661329

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.148	1.148	NO bkgnd or offset:	10.2	10.2
NOX coeff or slope:	1.004	1.004	NOX bkgnd or offset:	10.4	10.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	160.8	160.8

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.998739	
NO_X Cal Offset:	-1.872630	
NO Cal Slope:	0.998579	
NO Cal Offset:	-2.690624	
NO_2 Cal Slope:	1.000882	
NO_2 Cal Offset:	-1.053016	

Dilution Calibration Data

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

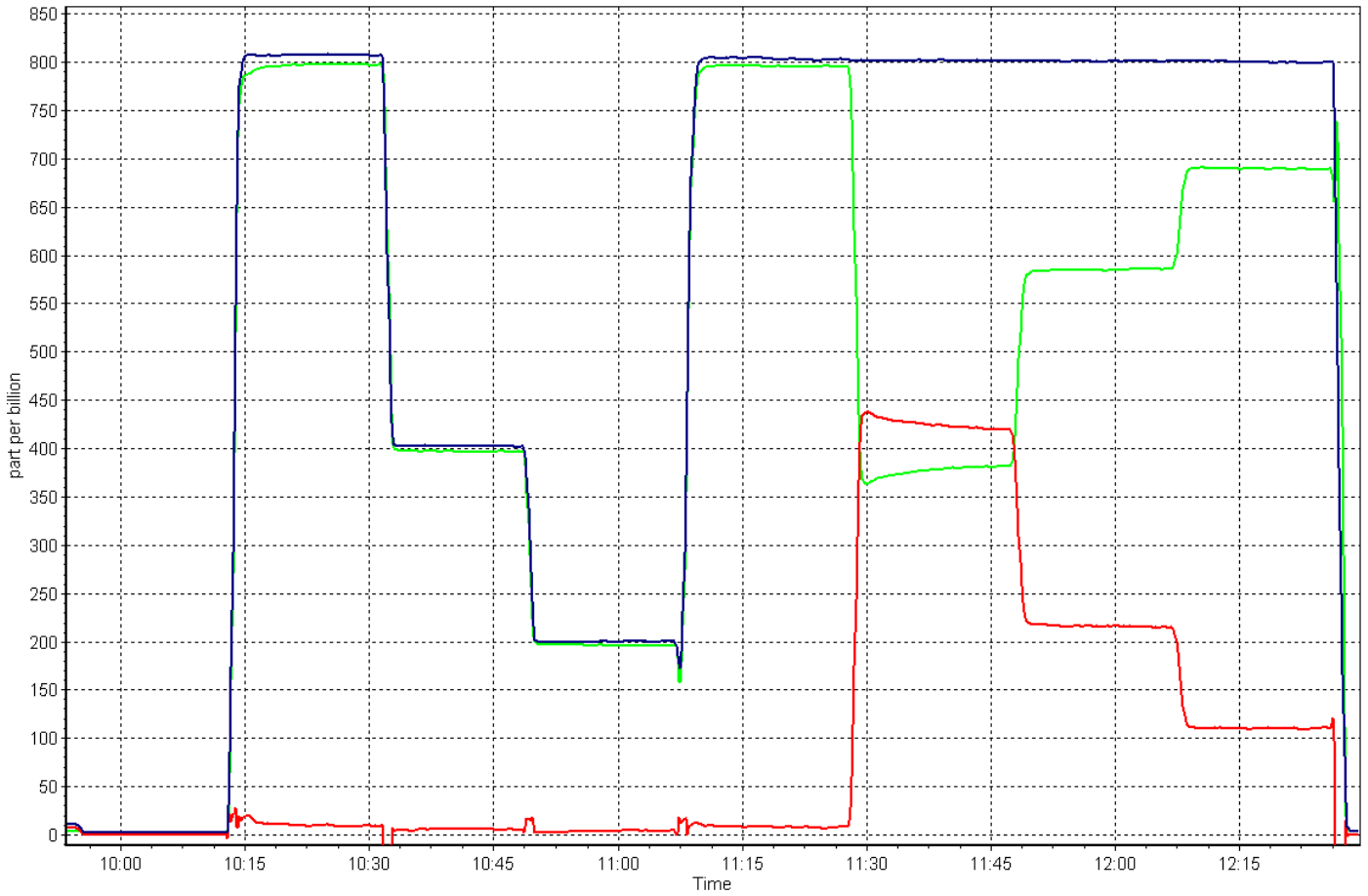
GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero						
High GPT point						
Mid GPT point						
Low GPT point						
				Average Correction Factor		

Notes: PMT fan changed and PMT cooler fins cleaned.

Calibration Performed By: Sean Bala

NO_X Calibration Plot Date: November 5, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort McKay South
Station number:	AMS 13
Calibration Date:	November 6, 2024
Last Cal Date:	November 5, 2024
Start time (MST):	9:50
End time (MST):	13:36
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T2UP1RP	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	48.25 ppm	NO Cal Gas Conc:	47.88 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.25 ppm	Removed Gas NO Conc:	47.88 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	2448
ZAG make/model:	APIT701	Serial Number:	1118

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
AF High point										
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = NA	ppb	NO = NA	ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	NA
Baseline Corr 1st pt	NO_X = NA	ppb	NO = NA	ppb	As Found Statistics	*Percent Change	NO =	NA
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO r^2:	NO Sl:	NO Int:	
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:	

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1410661329

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.148	1.148	NO bkgnd or offset:	10.2	10.2
NOX coeff or slope:	1.004	1.004	NOX bkgnd or offset:	10.4	10.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	160.8	159.6

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.998739	0.997562
NO_X Cal Offset:	-1.872630	-2.032369
NO Cal Slope:	0.998579	0.994805
NO Cal Offset:	-2.690624	-2.769719
NO_2 Cal Slope:	1.000882	1.000308
NO_2 Cal Offset:	-1.053016	0.284103

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	0.0	----	----
High point	4917	83.5	805.7	799.5	6.2	802.7	794.0	8.6	1.0037	1.0069
Mid point	4958	41.8	403.4	400.3	3.1	399.4	394.1	5.3	1.0100	1.0157
Low point	4979	20.9	201.7	200.1	1.5	197.1	193.4	3.7	1.0233	1.0349
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
As left span	4917	83.5	805.7	381.8	423.9	805.8	381.8	424.0	0.9999	1.0000
							Average Correction Factor		1.0123	1.0192

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	791.6	378.6	419.2	419.3	0.9997	100.0%
Mid GPT point	791.6	584.7	213.1	214.0	0.9957	100.4%
Low GPT point	791.6	689.0	108.8	109.1	0.9971	100.3%
				Average Correction Factor	0.9975	100.3%

Notes: Changed inlet filter. No adjustment made.

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

NO_X Calibration Summary

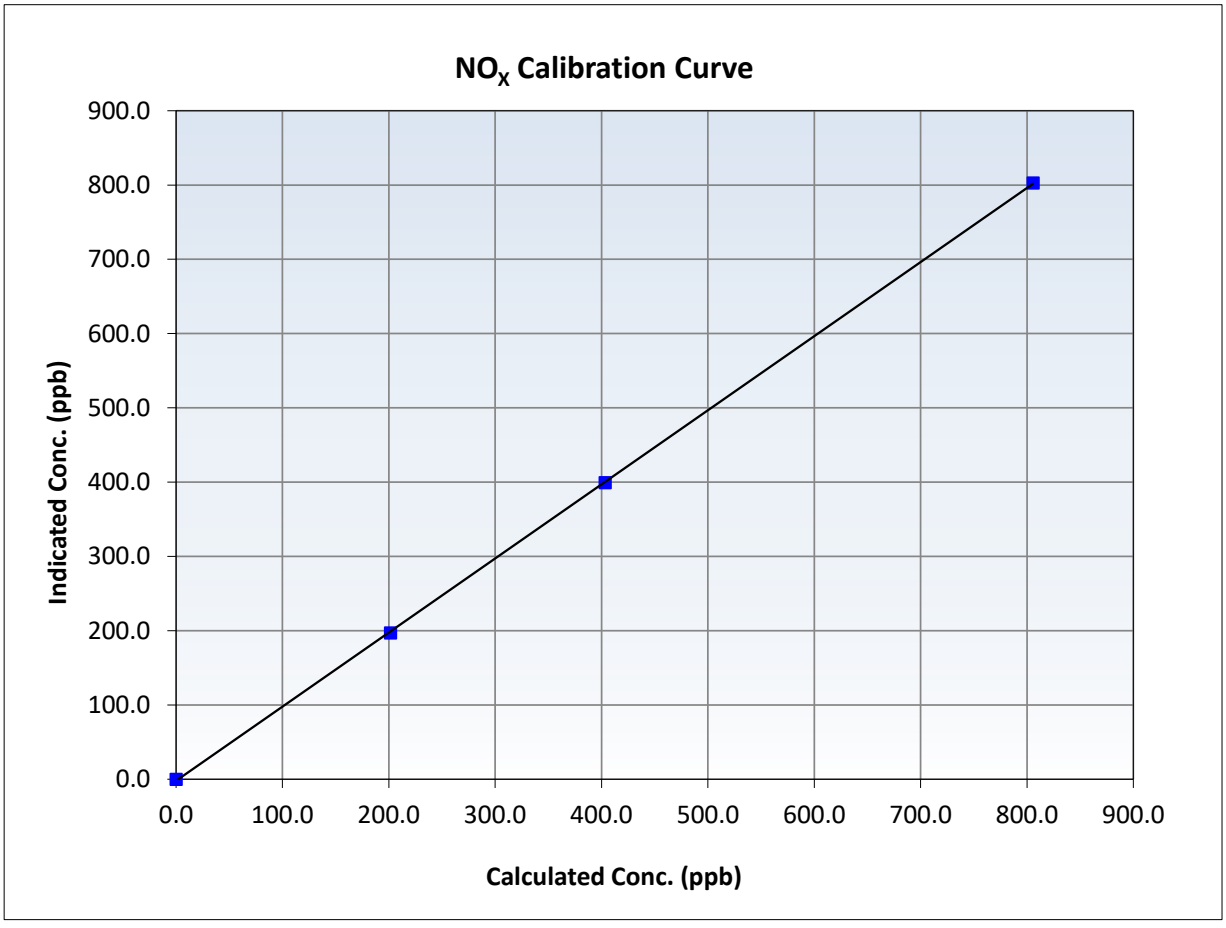
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	November 5, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:50	End Time (MST):	13:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
805.7	802.7	1.0037
403.4	399.4	1.0100
201.7	197.1	1.0233

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999971	*≥0.995*
Slope	0.997562	*0.90 - 1.10*
Intercept	-2.032369	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

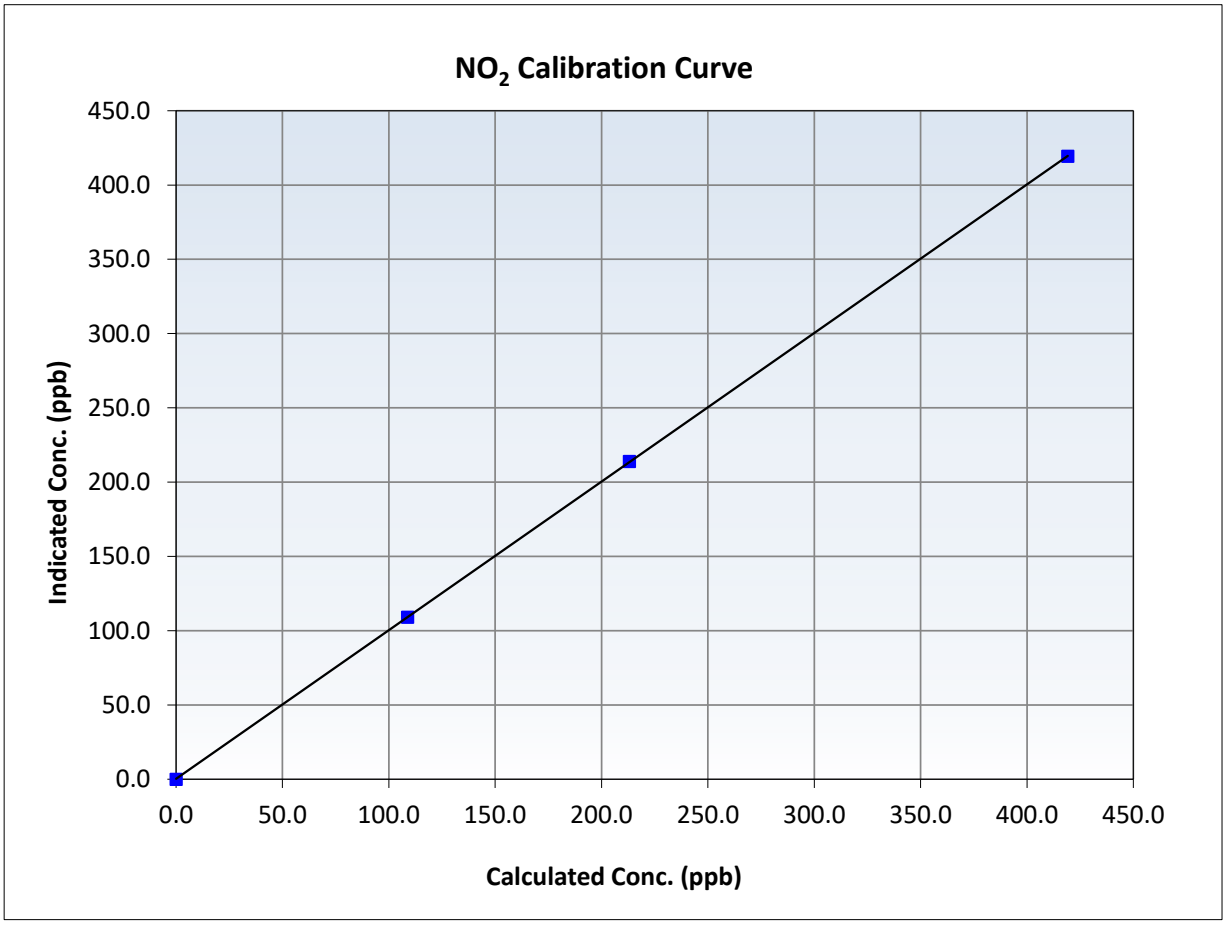
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	November 5, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:50	End Time (MST):	13:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
419.2	419.3	0.9997
213.1	214.0	0.9957
108.8	109.1	0.9971

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999995	*≥0.995*
Slope	1.000308	*0.90 - 1.10*
Intercept	0.284103	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

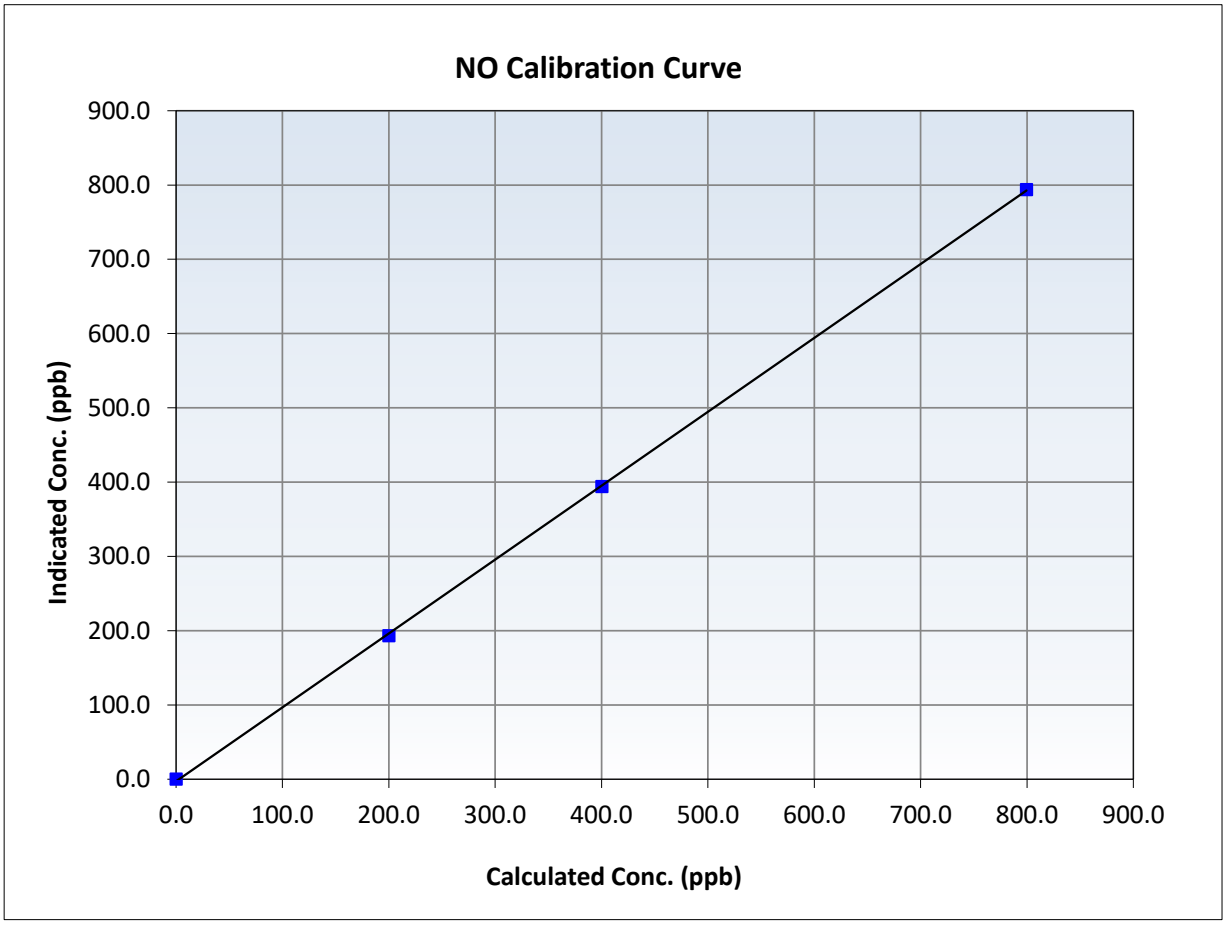
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	November 5, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	9:50	End Time (MST):	13:36
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329

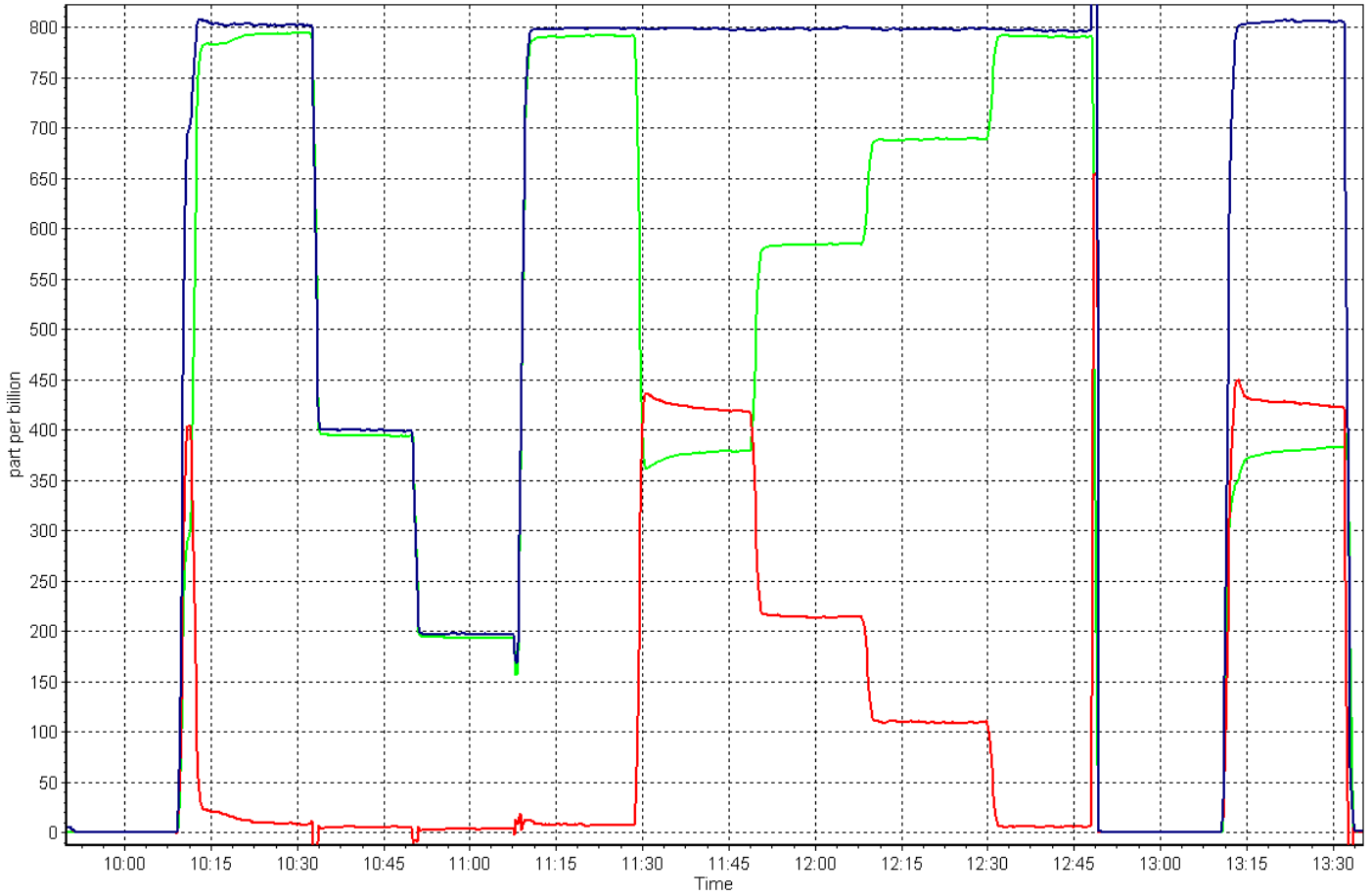
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.5	794.0	1.0069
400.3	394.1	1.0157
200.1	193.4	1.0349

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999940	*≥0.995*
Slope	0.994805	*0.90 - 1.10*
Intercept	-2.769719	*+/-20*



NO_X Calibration Plot Date: November 6, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 4, 2024	Last Cal Date:	October 1, 2024
Start time (MST):	10:47	End time (MST):	14:12
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:	1118

Analyzer Information

Analyzer make:	Teledyne API T400		Analyzer serial #:	3871	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002286	1.002457	Backgd or Offset:	2.7	2.7
Calibration intercept:	0.800000	1.220000	Coeff or Slope:	0.973	0.973

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	5000	997.5	400.0	402.2	0.994
As found Mid point					
As found Low point					
Baseline Corr As found:	402.3	Previous response	401.7	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	5000	996.1	400.0	401.6	0.996
Mid point	5000	850.2	200.0	202.6	0.987
Low point	5000	751.7	100.0	102.1	0.979
As left zero	5000	0.0	0.0	0.4	----
As left span	5000	996.1	400.0	404.0	0.990
				Average Correction Factor	0.988

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

O_3 Calibration Summary

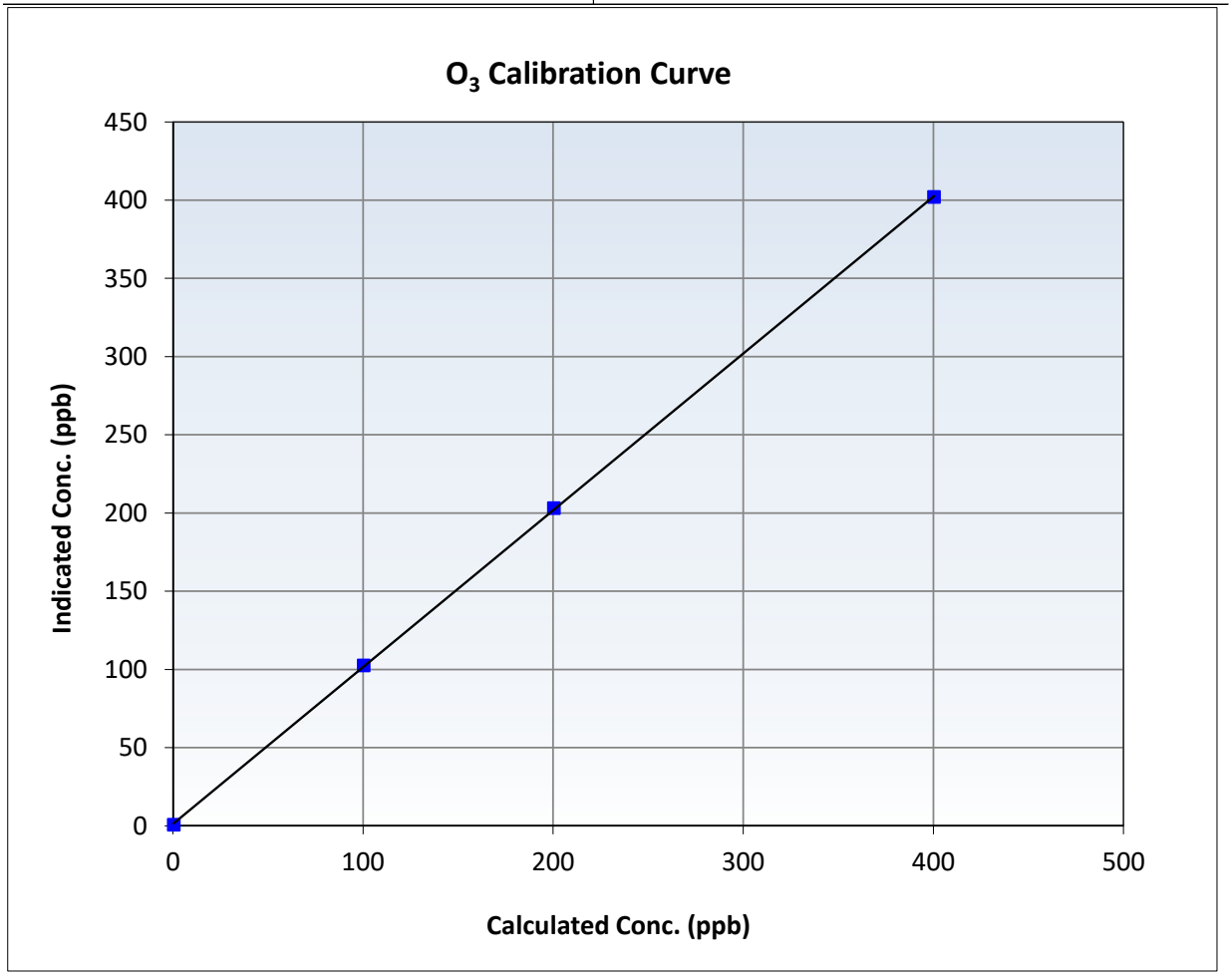
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 1, 2024
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	10:47	End Time (MST):	14:12
Analyzer make:	Teledyne API T400	Analyzer serial #:	3871

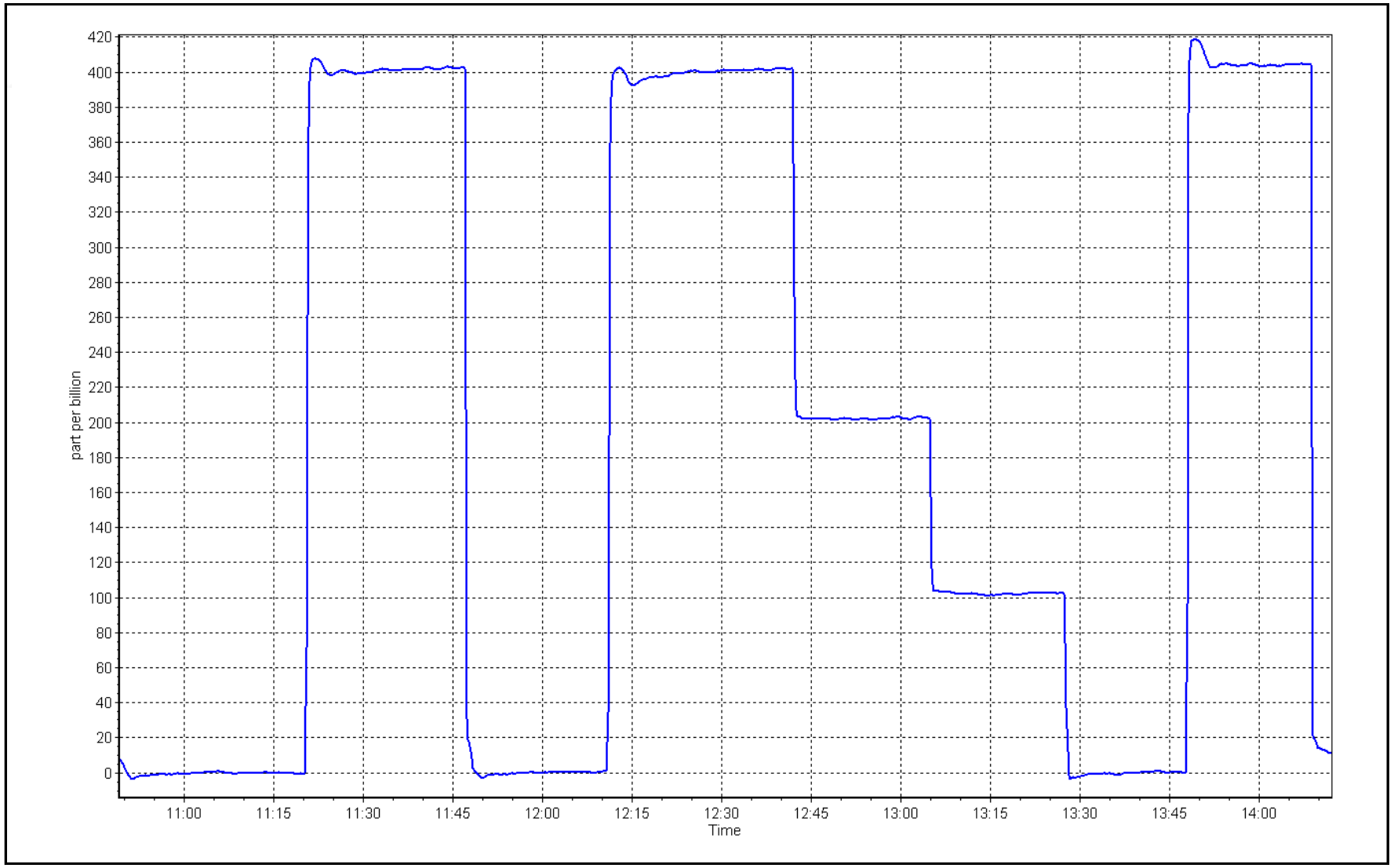
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
400.0	401.6	0.9960
200.0	202.6	0.9872
100.0	102.1	0.9794

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999973	*≥0.995*
Slope	1.002457	*0.90 - 1.10*
Intercept	1.220000	*+/- 5*



O_3 Calibration Plot Date: November 4, 2024 Location: Fort McKay South



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	November 13, 2024	Last Cal Date:	October 1, 2024
Start time (MST):	11:02	End time (MST):	11:18
Analyzer Make:	API T640	S/N:	1335
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388746
Temp/RH standard:	Alicat FP-25BT	S/N:	388746

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-7.80	-7.22	-7.80	☐	+/- 2 ^{o}C
P (mmHg)	731.20	732.50	731.20	☐	+/- 10 mmHg
Flow (LPM)	5.00	4.96	5.00	☐	+/- 0.25 LPM
PW% (pump)	44	-----	44	☐	>80%
Zero Verification	PM w/o HEPA:	4.3	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 1, 2024

Date Disposable Filter Changed: October 1, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 1, 2024

Date RH/T Sensor Cleaned: October 1, 2024

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
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 7, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	10:48	End time (MST):	14:38
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.95	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC279389			
Removed Cal Gas Conc:	49.95	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	3060
Zero Air Gen Model:	API T701H		Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	0710321322	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.009245	1.006657	Backgd or Offset:	24.9	24.8
Calibration intercept:	-2.986479	-2.605499	Coeff or Slope:	1.043	1.043

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.5	----
As found High point	4938	80.3	799.3	802.1	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	802.6	Previous response	803.7	*% change	-0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	4938	80.3	799.3	803.4	0.995
Mid point	4979	40.2	400.1	398.1	1.005
Low point	4998	20.2	201.1	198.2	1.014
As left zero	5000	0.0	0.0	-0.3	----
As left span	4938	80.3	799.3	803.8	0.994
				Average Correction Factor:	1.005

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

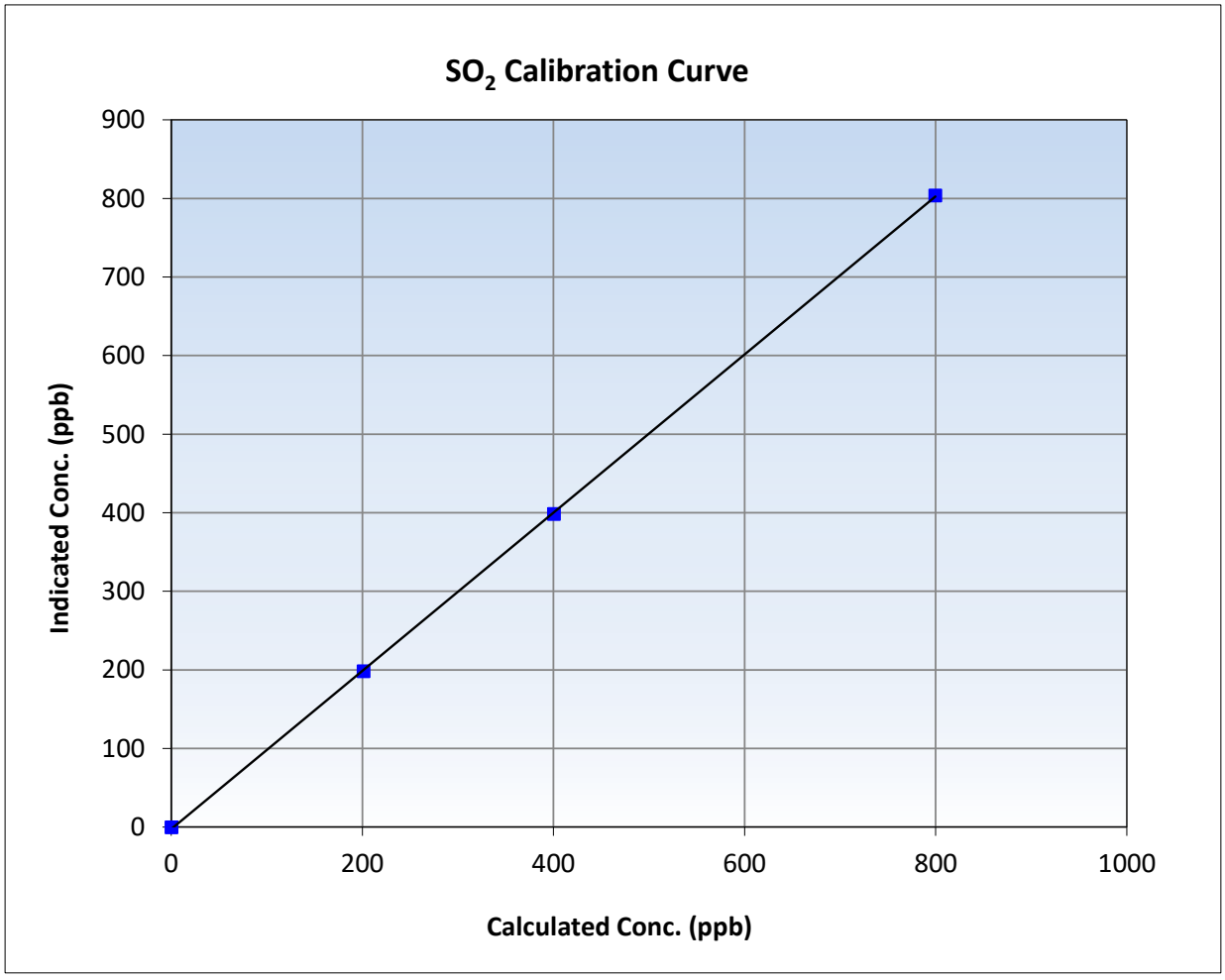
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 18, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:48	End Time (MST):	14:38
Analyzer make:	Thermo 43i	Analyzer serial #:	0710321322

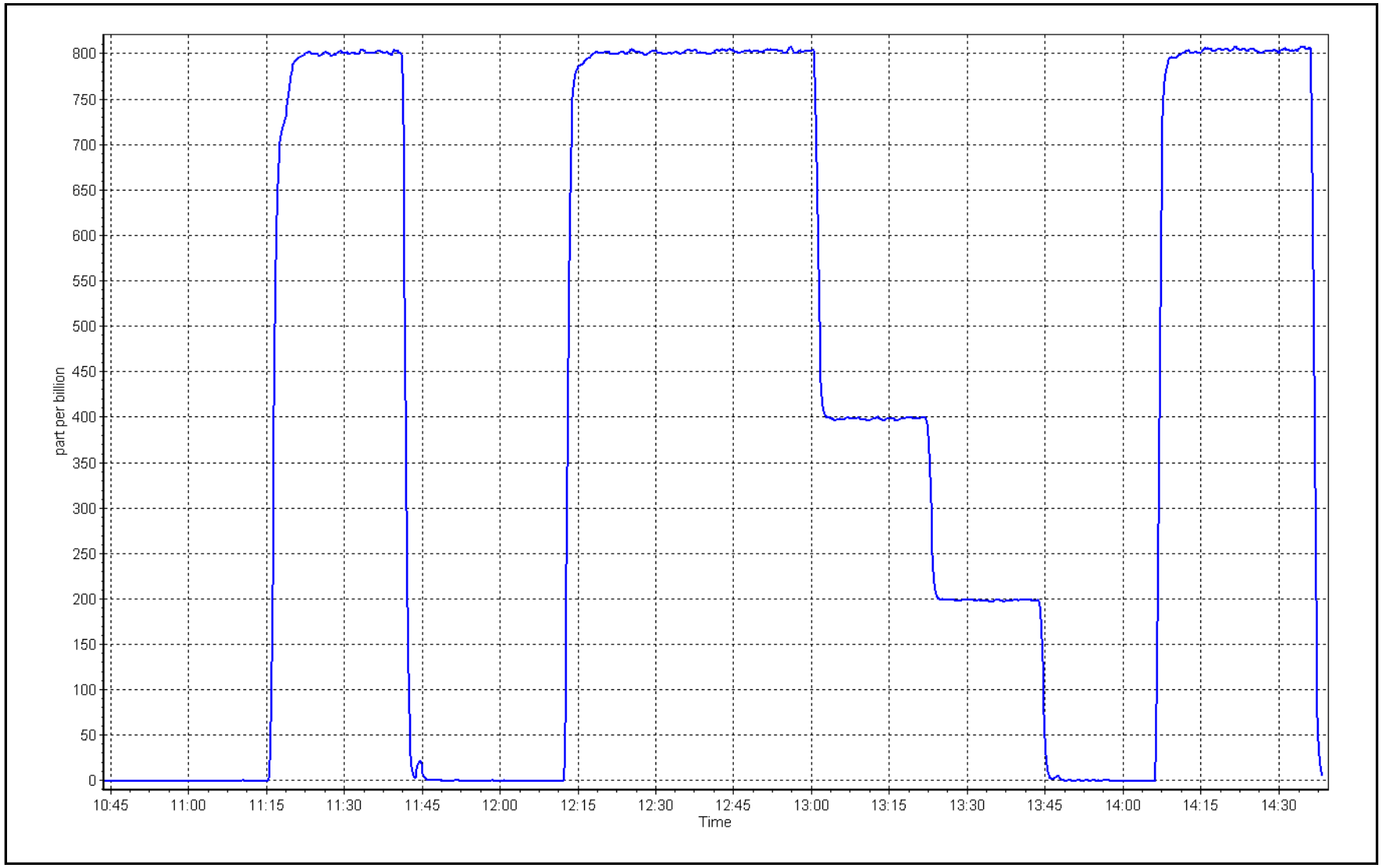
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
799.3	803.4	0.9949
400.1	398.1	1.0049
201.1	198.2	1.0145

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999962	*≥0.995*
Slope	1.006657	*0.90 - 1.10*
Intercept	-2.605499	*+/-30*



SO2 Calibration Plot Date: November 7, 2024 Location: Anzac



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 27, 2024	Last Cal Date:	October 4, 2024
Start time (MST):	10:31	End time (MST):	14:59
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.15	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC510379			
Removed Cal Gas Conc:	5.15	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3060
ZAG Make/Model:	API 701H		Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153582	
Converter make:	CD Nova CDN-101		Converter serial #:	503	
Analyzer Range	0 - 100 ppb		Converter Temp:	800	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004736	0.975285	Backgd or Offset:	2.3	2.3
Calibration intercept:	-0.345439	-0.065266	Coeff or Slope:	0.995	0.995

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4938	77.9	80.0	78.8	1.014
As found Mid point	4973	38.9	40.0	39.3	1.015
As found Low point	4997	19.5	20.0	19.5	1.021
New cylinder response					

Baseline Corr As found:	78.9	Prev response:	80.02	*% change:	-1.4%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.987053	AF Intercept:	-0.165323
Baseline Corr 3rd AF pt:	19.6	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4938	77.9	80.0	78.0	1.025
Mid point	4973	38.9	40.0	38.8	1.030
Low point	4997	19.5	20.0	19.3	1.037
As left zero	5000	0.0	0.0	0.1	----
As left span	4938	77.9	80.0	76.4	1.046
SO2 Scrubber Check	4936	80.3	800.4		----
Date of last scrubber change:				Ave Corr Factor	1.031
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

TRS Calibration Summary

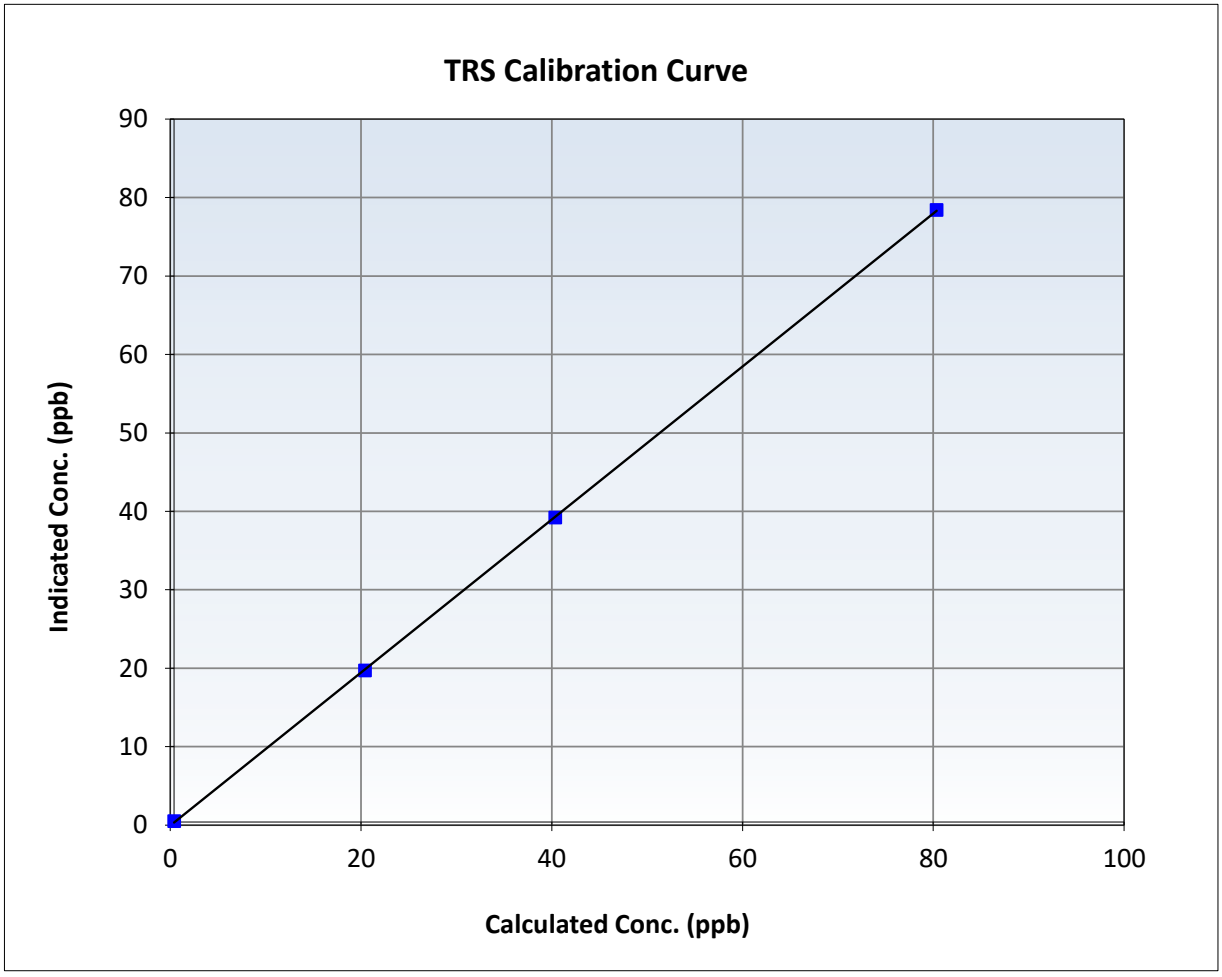
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	October 4, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:31	End Time (MST):	14:59
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153582

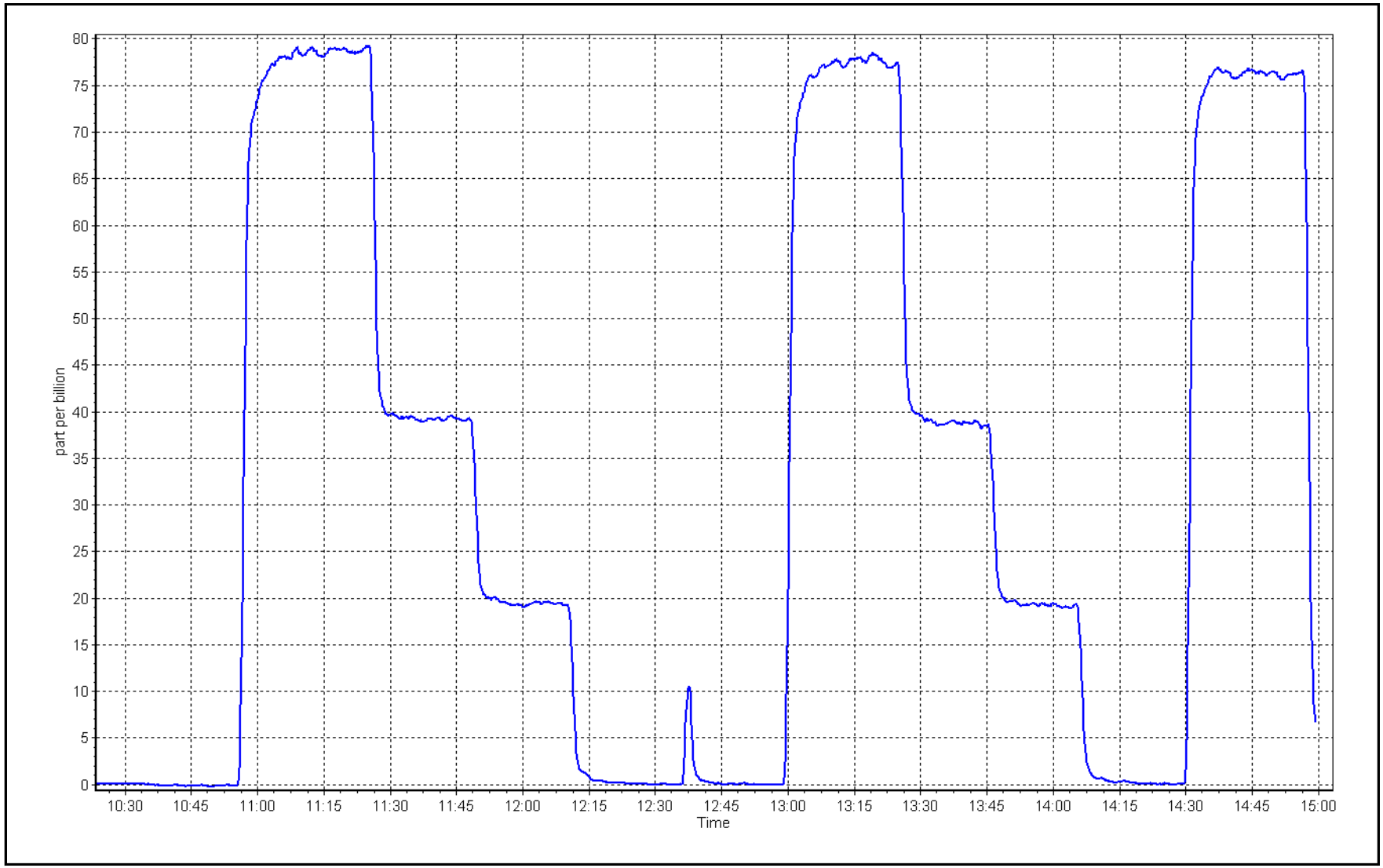
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	78.0	1.0250
40.0	38.8	1.0298
20.0	19.3	1.0368

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.975285	*0.90 - 1.10*
Intercept	-0.065266	*+/-3*



TRS Calibration Plot Date: November 27, 2024 Location: Anzac



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 7, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	10:48	End time (MST):	14:38
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3060
Zero Air Gen model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.10E-04	4.21E-04	NMHC SP Ratio:	4.51E-05	4.48E-05
CH4 Retention time:	14.40	14.60	NMHC Peak Area:	202367	203847
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.14	17.05	1.006
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.05	Prev response	17.19	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.14	17.12	1.002
Mid point	4960	40.1	8.57	8.51	1.007
Low point	4980	20.0	4.28	4.20	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.14	17.00	1.008
				Average Correction Factor	1.009

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

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.13	9.24	0.989
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.24	Prev response	9.21	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.13	9.12	1.001
Mid point	4960	40.1	4.57	4.54	1.006
Low point	4980	20.0	2.28	2.25	1.014
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.13	9.11	1.002
				Average Correction Factor	1.007

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.01	7.81	1.025
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.81	Prev response	7.98	*% change	-2.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.01	7.99	1.002
Mid point	4960	40.1	4.00	3.97	1.009
Low point	4980	20.0	2.00	1.95	1.024
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.01	7.89	1.015
				Average Correction Factor	1.012

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	1.004551	0.999580
THC Cal Offset:	-0.030216	-0.038448
CH4 Cal Slope:	0.998221	0.999607
CH4 Cal Offset:	-0.012257	-0.022863
NMHC Cal Slope:	1.010564	0.999420
NMHC Cal Offset:	-0.018558	-0.015785

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

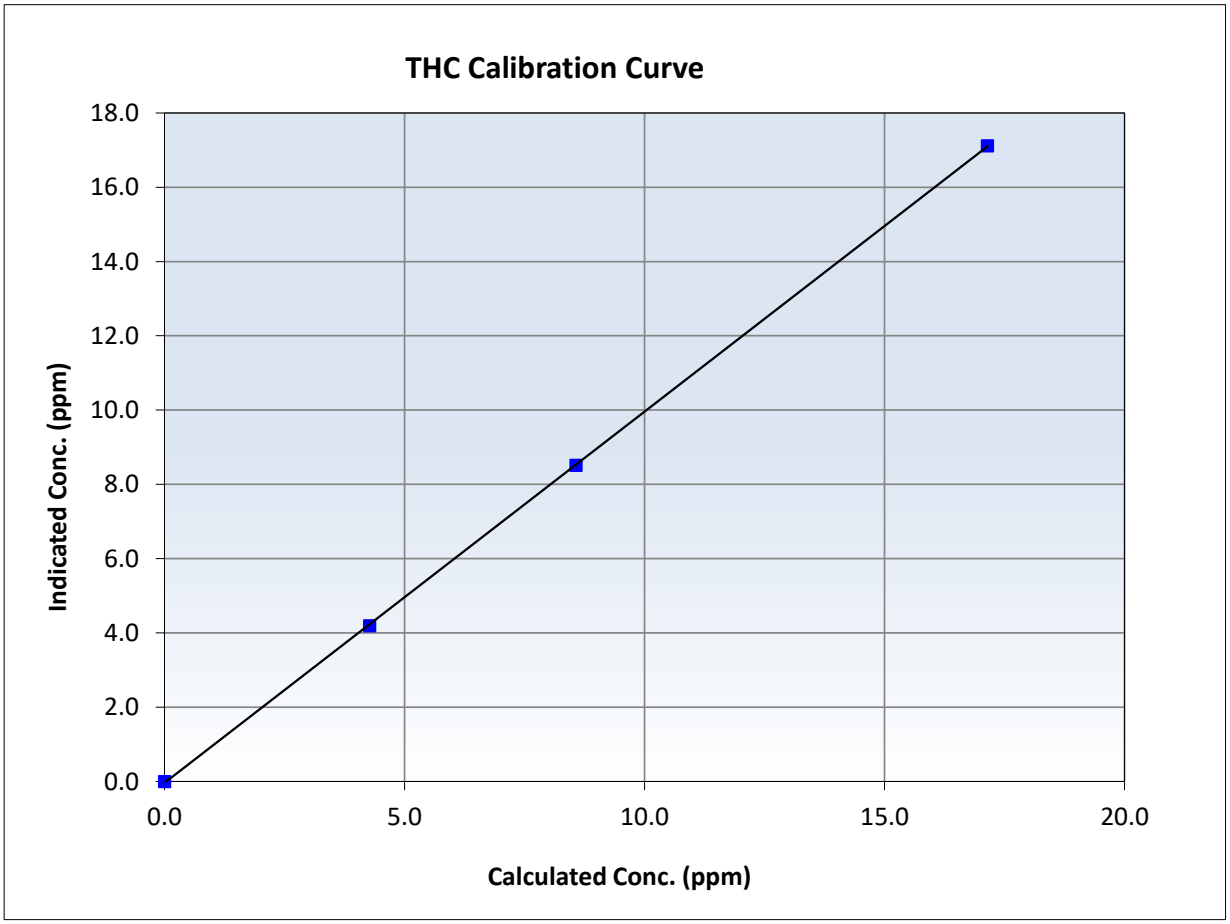
THC Calibration Summary

Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 18, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:48	End Time (MST):	14:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999977	≥0.995
17.14	17.12	1.0015	Slope	0.999580	0.90 - 1.10
8.57	8.51	1.0073	Intercept	-0.038448	+/-0.5
4.28	4.20	1.0187			



Wood Buffalo Environmental Association

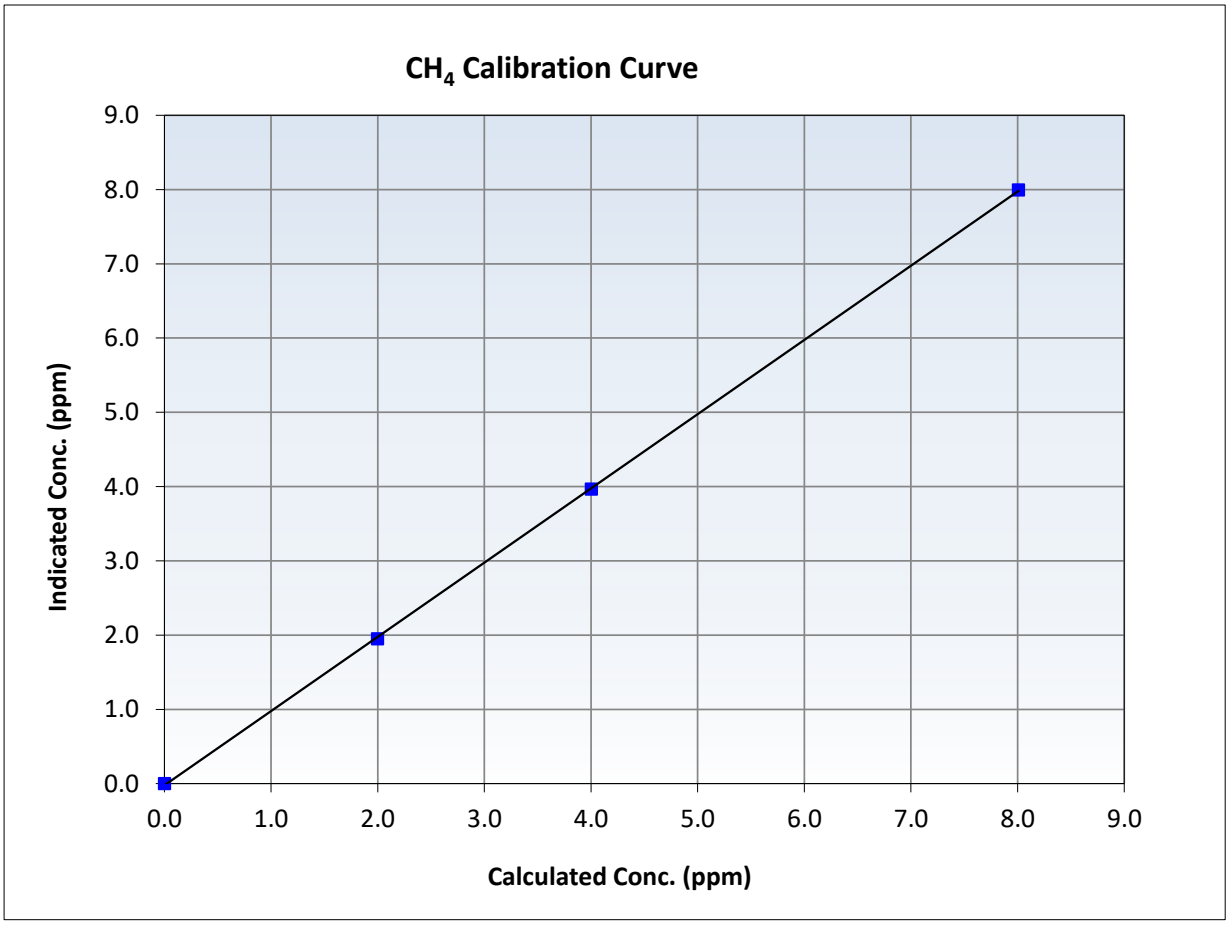
CH_4 Calibration Summary

Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 18, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:48	End Time (MST):	14:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999963	≥0.995
8.01	7.99	1.0018	Slope	0.999607	0.90 - 1.10
4.00	3.97	1.0091			
2.00	1.95	1.0237	Intercept	-0.022863	+/-0.5



Wood Buffalo Environmental Association

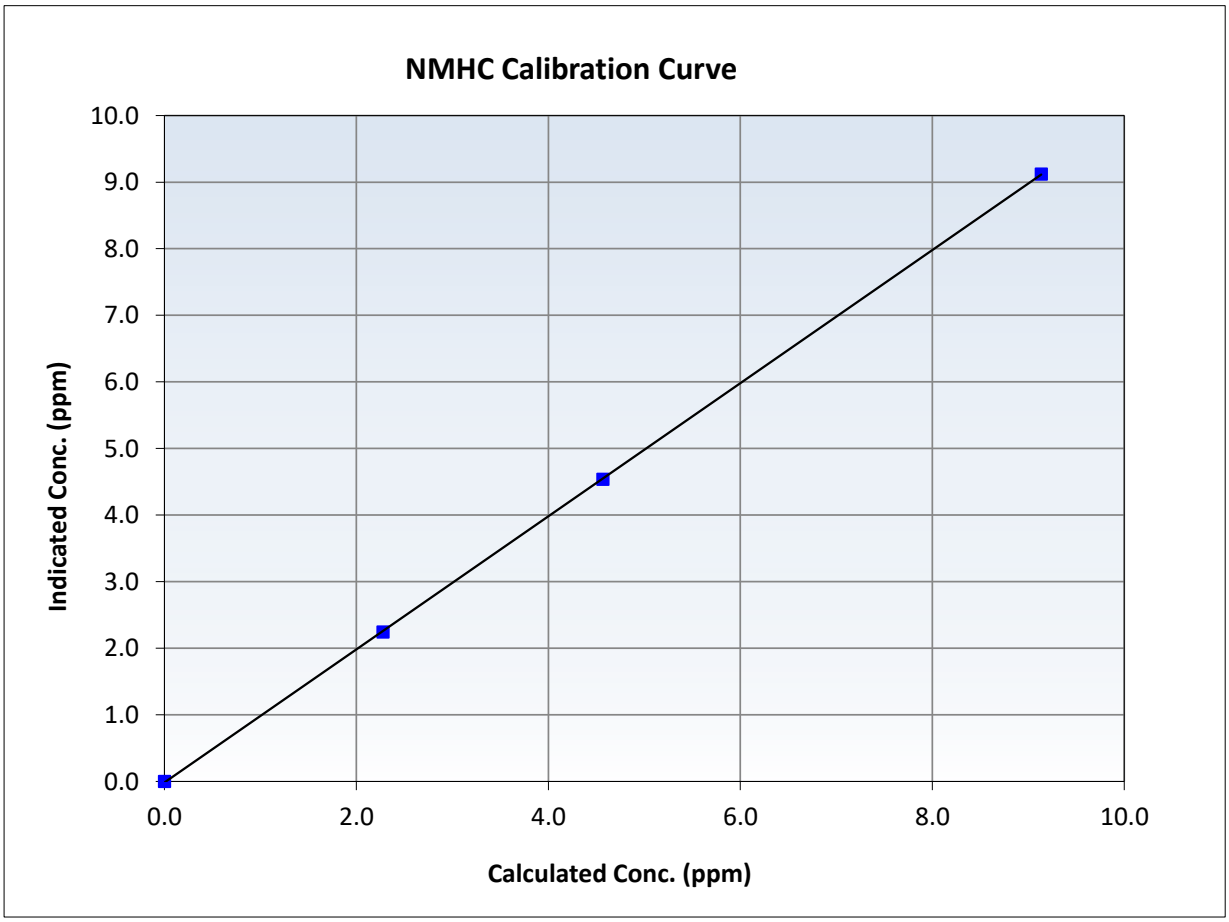
NMHC Calibration Summary

Station Information

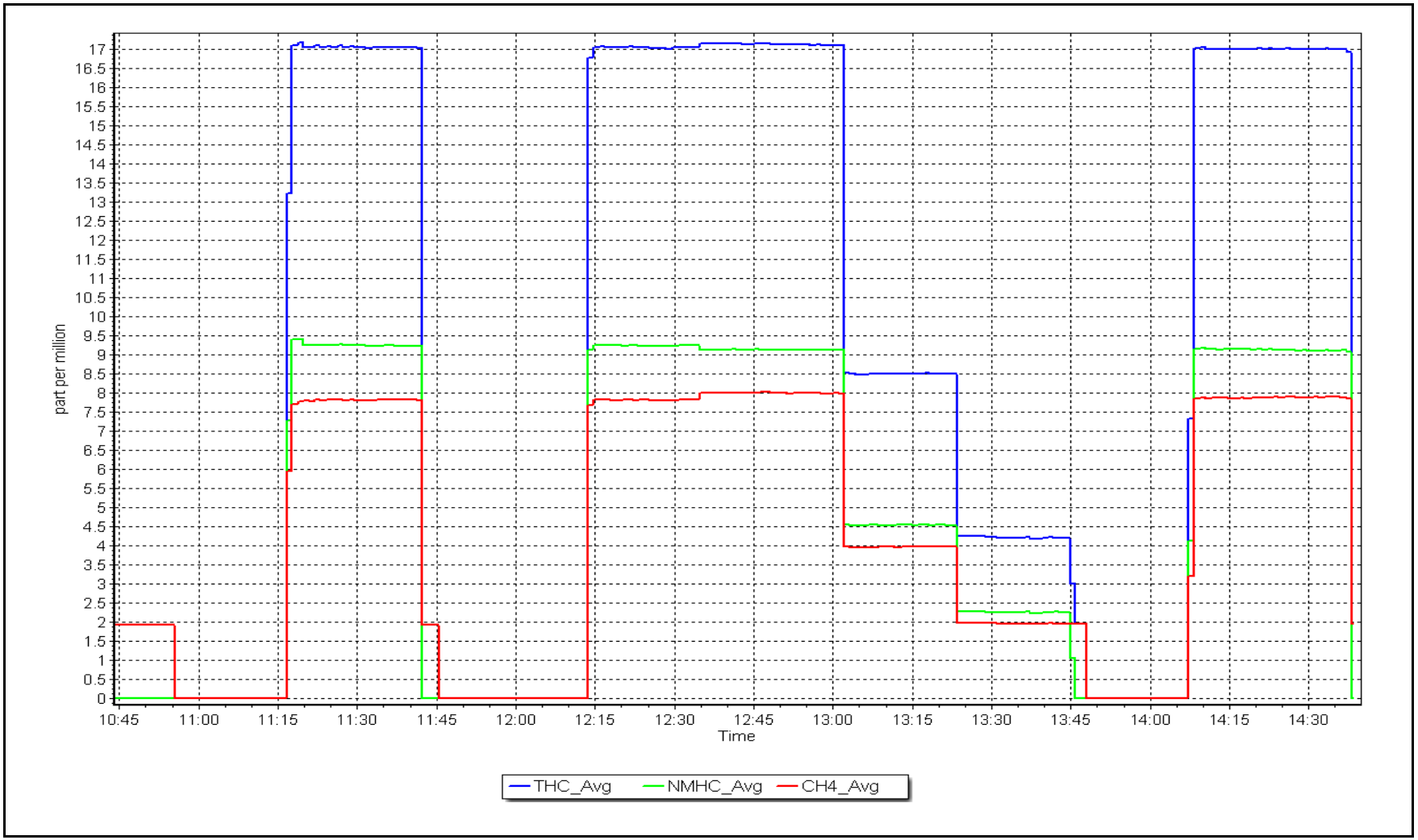
Calibration Date:	November 7, 2024	Previous Calibration:	October 18, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:48	End Time (MST):	14:38
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999986	≥0.995
9.13	9.12	1.0014	Slope	0.999420	0.90 - 1.10
4.57	4.54	1.0061			
2.28	2.25	1.0143	Intercept	-0.015785	+/-0.5



NMHC Calibration Plot Date: November 7, 2024 Location: Anzac



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THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 21, 2024	Last Cal Date:	November 7, 2024
Start time (MST):	11:34	End time (MST):	17:50
Reason:	Maintenance		

Calibration Standards

Gas Cert Reference:	CC279389	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	207.1 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
Removed CH4 Conc.	499.3 ppm	CH4 Equiv Conc.	1068.8 ppm
Removed C3H8 Conc.	207.1 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	3060
Zero Air Gen model:	API 701H	Serial Number:	357

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	4.21E-04	4.60E-04	NMHC SP Ratio:	4.48E-05	4.49E-05
CH4 Retention time:	14.60	14.80	NMHC Peak Area:	203847	203545
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.14	16.20	1.058
As found Mid point	4960	40.1	8.57	8.04	1.066
As found Low point	4980	20.0	4.28	4.00	1.068
New cylinder response					
Baseline Corr AF:	16.20	Prev response	17.10	*% change	-5.5%
Baseline Corr 2nd AF:	8.04	AF Slope:	0.945272	AF Intercept:	-0.027262
Baseline Corr 3rd AF:	4.00	AF Correlation:	0.999981	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.14	17.14	1.000
Mid point	4960	40.1	8.57	8.55	1.003
Low point	4980	20.0	4.28	4.28	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.14	17.18	0.998
				Average Correction Factor	1.000

Notes: Upon investigation, no alarms were detected. The diagnostics were consistent with previous calibration results; there were no discrepancies in the chromatograms compared to the last calibration except slight drift in alignment. It is suspected that these issues may have arisen due to flow rate hence pump was swapped. Adjusted zero and span.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.13	9.09	1.005
As found Mid point	4960	40.1	4.57	4.51	1.013
As found Low point	4980	20.0	2.28	2.24	1.019
New cylinder response					
Baseline Corr AF:	9.09	Prev response	9.11	*% change	-0.3%
Baseline Corr 2nd AF:	4.51	AF Slope:	0.995604	AF Intercept:	-0.019793
Baseline Corr 3rd AF:	2.24	AF Correlation:	0.999975	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.13	9.12	1.002
Mid point	4960	40.1	4.57	4.54	1.007
Low point	4980	20.0	2.28	2.27	1.005
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.13	9.13	1.000
				Average Correction Factor	1.005

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	8.01	7.11	1.126
As found Mid point	4960	40.1	4.00	3.53	1.134
As found Low point	4980	20.0	2.00	1.77	1.130
New cylinder response					
Baseline Corr AF:	7.11	Prev response	7.98	*% change	-12.3%
Baseline Corr 2nd AF:	3.53	AF Slope:	0.887874	AF Intercept:	-0.007269
Baseline Corr 3rd AF:	1.77	AF Correlation:	0.999987	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	8.01	8.03	0.998
Mid point	4960	40.1	4.00	4.01	0.999
Low point	4980	20.0	2.00	2.02	0.990
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	8.01	8.05	0.994
				Average Correction Factor	0.996

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999580	0.999637
THC Cal Offset:	-0.038448	-0.001623
CH4 Cal Slope:	0.999607	1.001585
CH4 Cal Offset:	-0.022863	0.004958
NMHC Cal Slope:	0.999420	0.997917
NMHC Cal Offset:	-0.015785	-0.006781

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

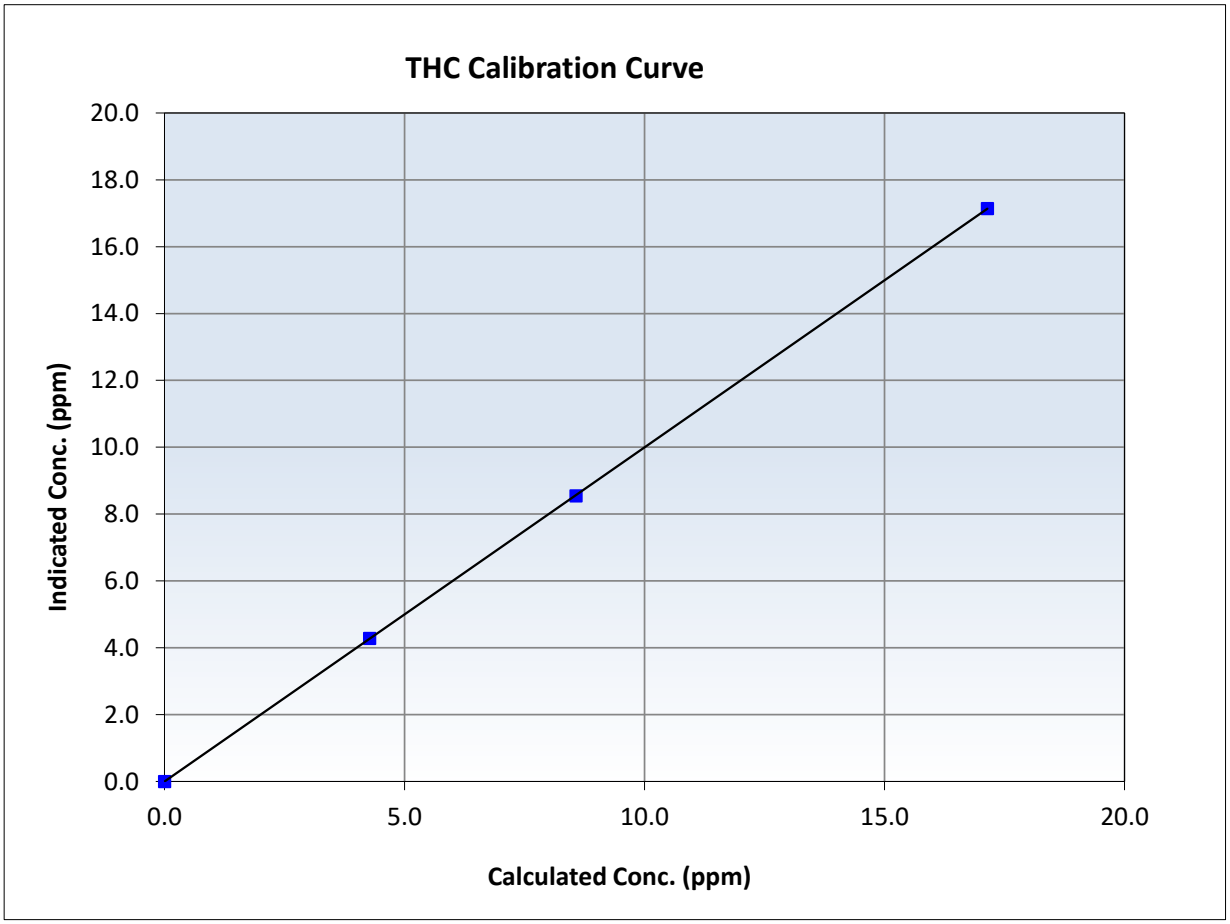
THC Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	November 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:34	End Time (MST):	17:50
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
17.14	17.14	1.0000	Slope	0.999637	0.90 - 1.10
8.57	8.55	1.0030	Intercept	-0.001623	+/-0.5
4.28	4.28	0.9980			



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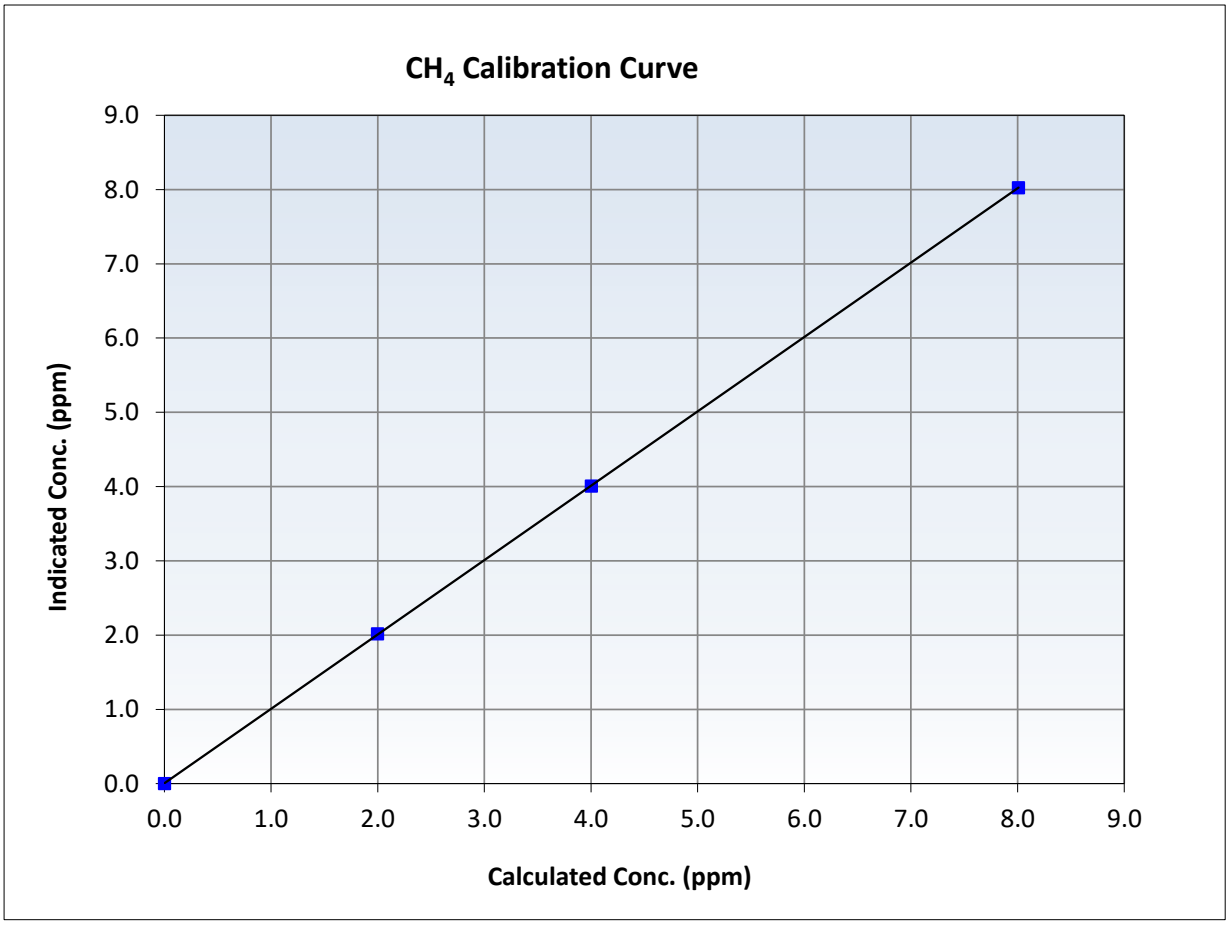
CH_4 Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	November 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:34	End Time (MST):	17:50
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*
8.01	8.03	0.9977	Slope	1.001585	*0.90 - 1.10*
4.00	4.01	0.9991	Intercept	0.004958	*+/-0.5*
2.00	2.02	0.9902			



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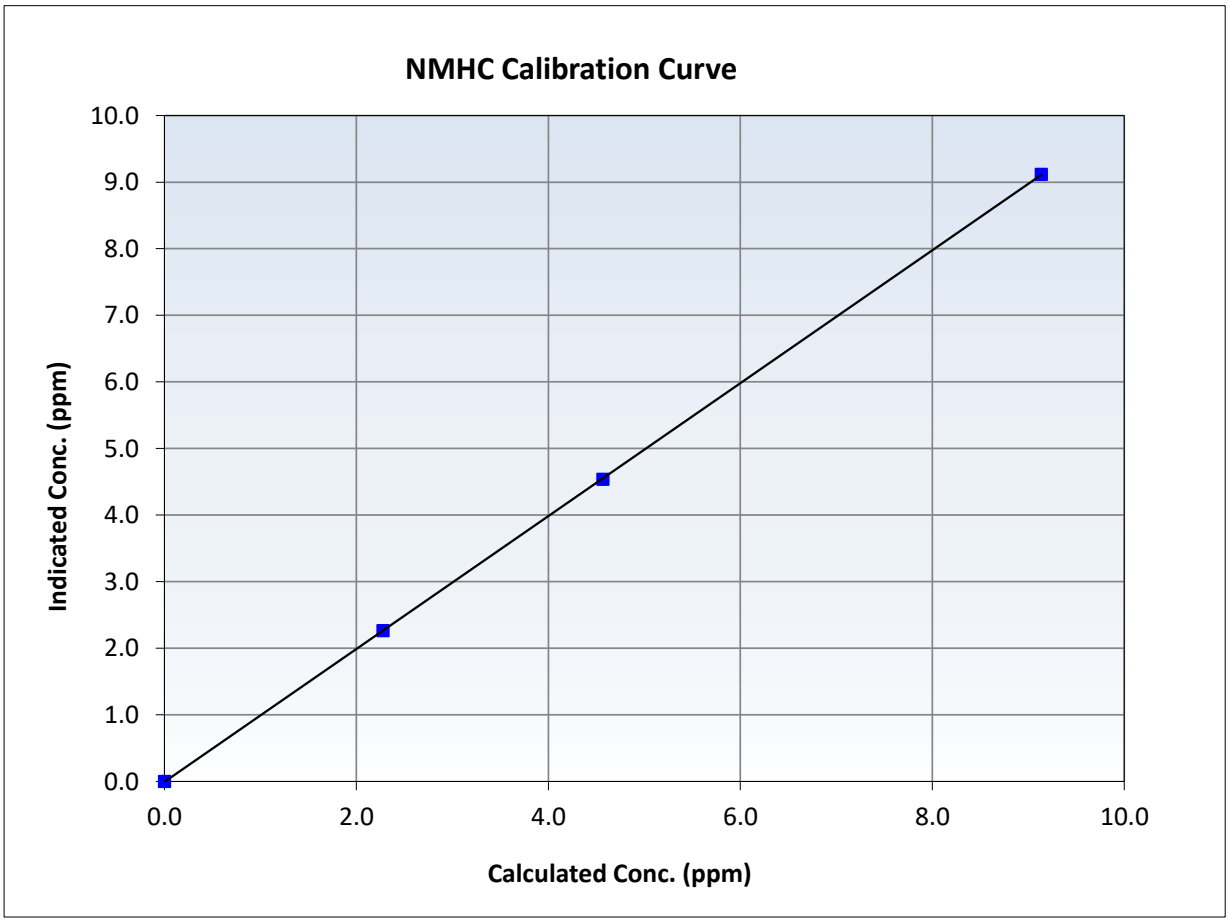
NMHC Calibration Summary

Station Information

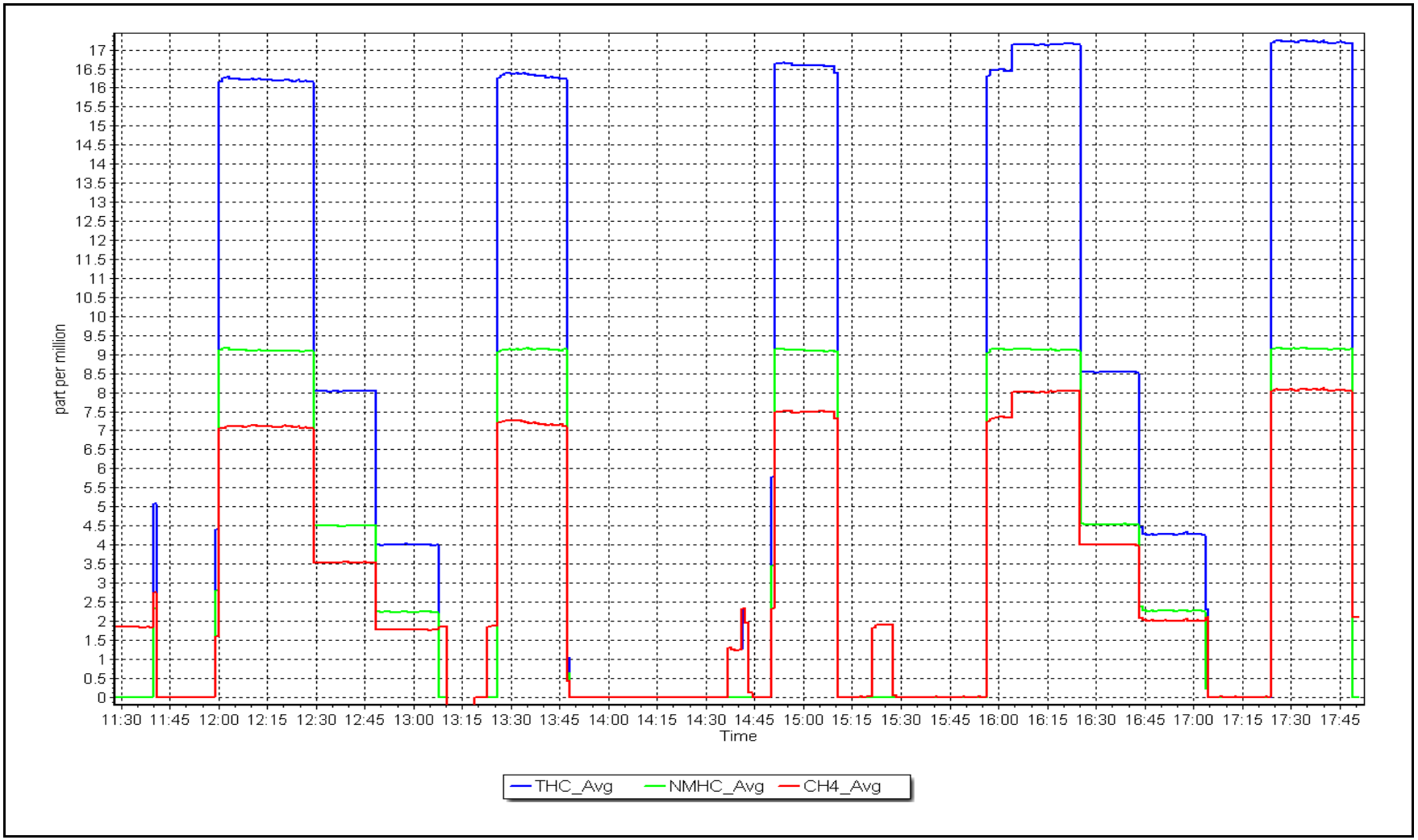
Calibration Date:	November 21, 2024	Previous Calibration:	November 7, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:34	End Time (MST):	17:50
Analyzer make:	Thermo 55i	Analyzer serial #:	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999993	≥0.995
9.13	9.12	1.0021	Slope	0.997917	0.90 - 1.10
4.57	4.54	1.0067			
2.28	2.27	1.0049	Intercept	-0.006781	+/-0.5



NMHC Calibration Plot Date: November 21, 2024 Location: Anzac



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Anzac
Station number:	AMS 14
Calibration Date:	November 6, 2024
Last Cal Date:	October 29, 2024
Start time (MST):	10:04
End time (MST):	15:22
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0037092		Cal Gas Expiry Date:	May 16, 2031	
NOX Cal Gas Conc:	60.7	ppm	NO Cal Gas Conc:	60.40	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	60.70	ppm	Removed Gas NO Conc:	60.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3060	
ZAG make/model:	Teledyne API T700H		Serial Number:	357	

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
AF High point	4934	66.3	804.8	800.9	4.0	806.5	801.8	4.6	0.9978	0.9987
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	804.4	ppb	NO =	801.6	ppb	
Baseline Corr 1st pt	NO_X =	806.6	ppb	NO =	801.9	ppb	
Baseline Corr 2nd pt	NO_X =	NA	ppb	NO =	NA	ppb	
Baseline Corr 3rd pt	NO_X =	NA	ppb	NO =	NA	ppb	

* = > +/-5% change initiates investigation

*Percent Change	NO_X =	0.3%	
*Percent Change	NO =	0.0%	
Nx Sl:	Nx Int:		
NO Sl:	NO Int:		
NO2 Sl:	NO_2 Int:		

As Found Statistics

As found	NO_X r^2:
As found	NO r^2:
As found	NO_2 r^2:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
Serial Number: 1152430008
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.424	1.424	NO bkgnd or offset:	3.9	3.9
NOX coeff or slope:	0.996	0.996	NOX bkgnd or offset:	3.8	3.8
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	157.2	155.7

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000426	0.997812
NO_X Cal Offset:	-0.730542	-0.710232
NO Cal Slope:	1.003525	1.001538
NO Cal Offset:	-2.050413	-2.229291
NO_2 Cal Slope:	0.994540	1.001925
NO_2 Cal Offset:	-1.639659	-1.159515

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
High point	4934	66.3	804.8	800.9	4.0	802.6	800.7	1.7	1.0028	1.0002
Mid point	4985	33.2	401.6	399.6	2.0	400.1	397.7	2.5	1.0037	1.0048
Low point	5004	16.7	201.9	200.9	1.0	199.6	196.2	3.4	1.0115	1.0240
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4934	66.3	804.8	420.7	384.1	801.2	420.7	380.6	1.0045	1.0000
								Average Correction Factor	1.0060	1.0097

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	797.7	419.2	382.5	382.7	0.9994	100.1%
Mid GPT point	797.7	605.8	195.9	194.5	1.0071	99.3%
Low GPT point	797.7	702.2	99.5	97.2	1.0234	97.7%
				Average Correction Factor	1.0100	99.0%

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

NO_X Calibration Summary

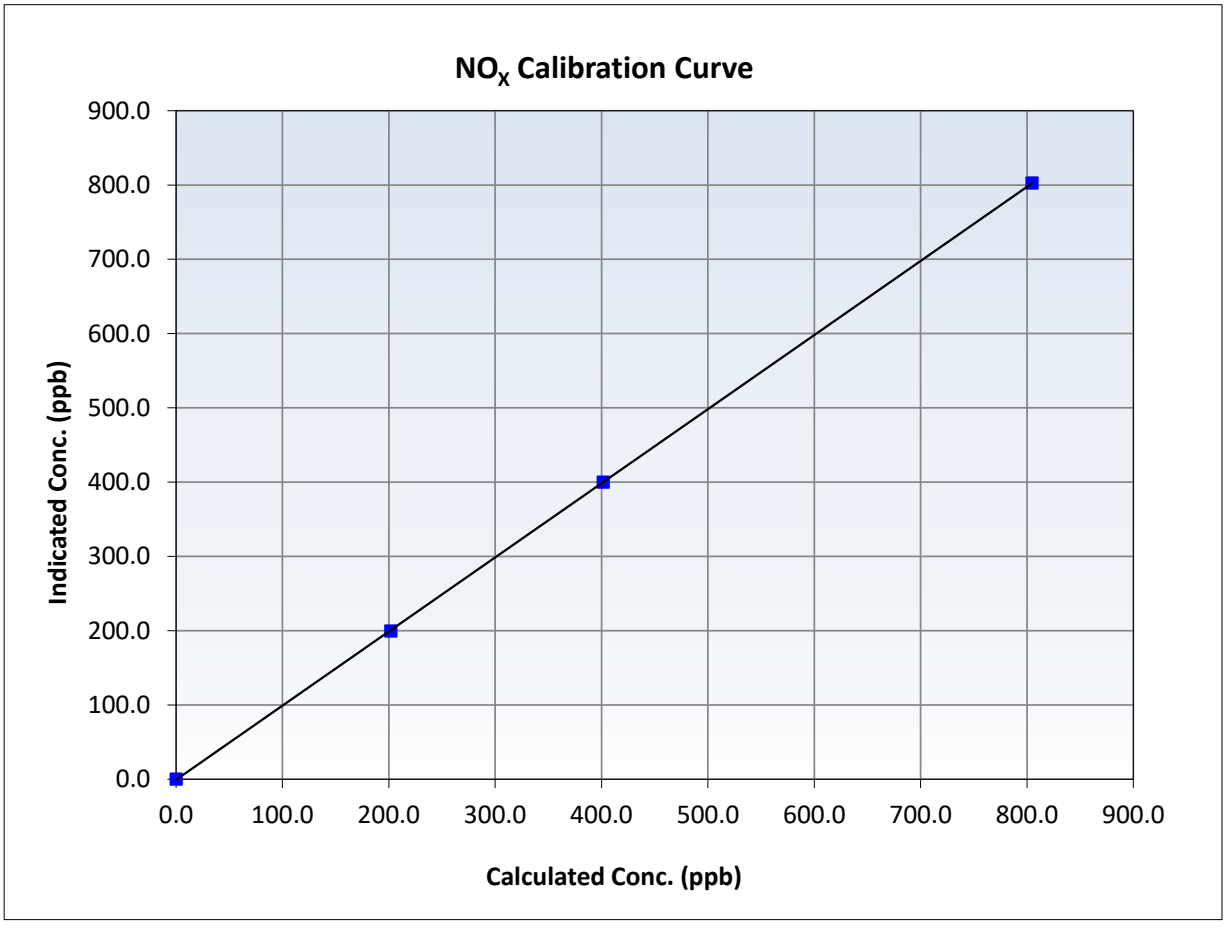
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:04	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
804.8	802.6	1.0028
401.6	400.1	1.0037
201.9	199.6	1.0115

Statistical Evaluation		Limits
Correlation Coefficient	0.999994	≥0.995
Slope	0.997812	0.90 - 1.10
Intercept	-0.710232	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

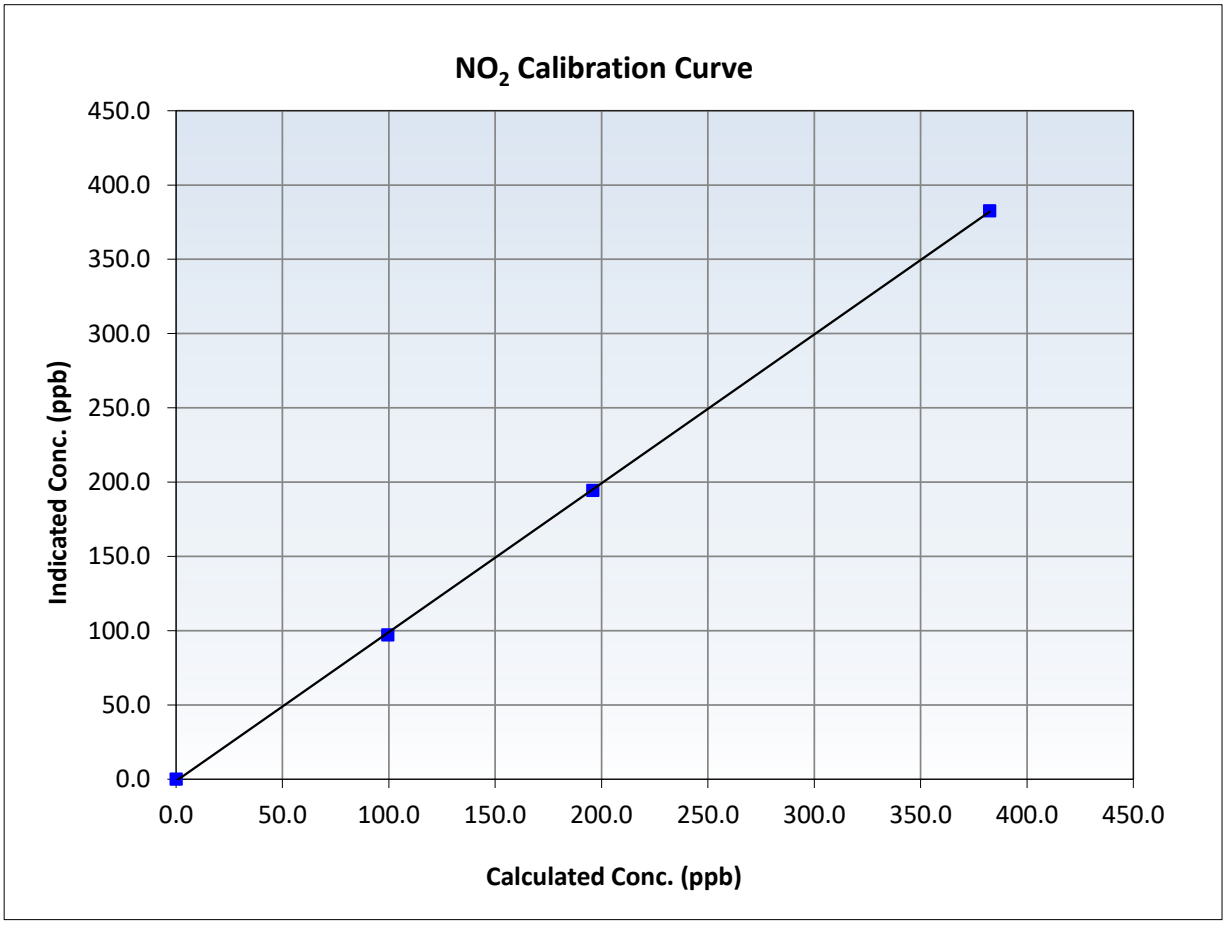
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:04	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
382.5	382.7	0.9994
195.9	194.5	1.0071
99.5	97.2	1.0234

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999949	*≥0.995*
Slope	1.001925	*0.90 - 1.10*
Intercept	-1.159515	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

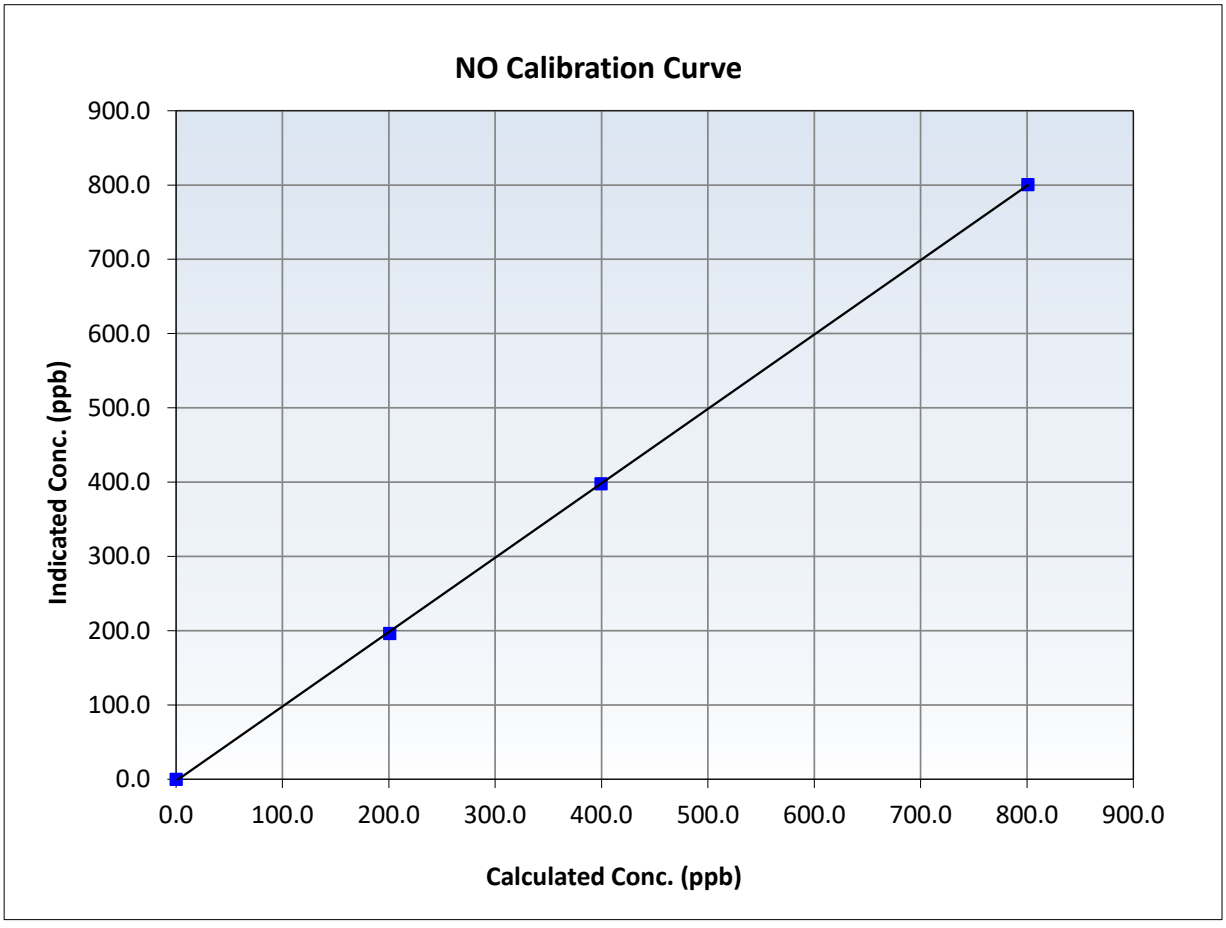
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 29, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:04	End Time (MST):	15:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430008

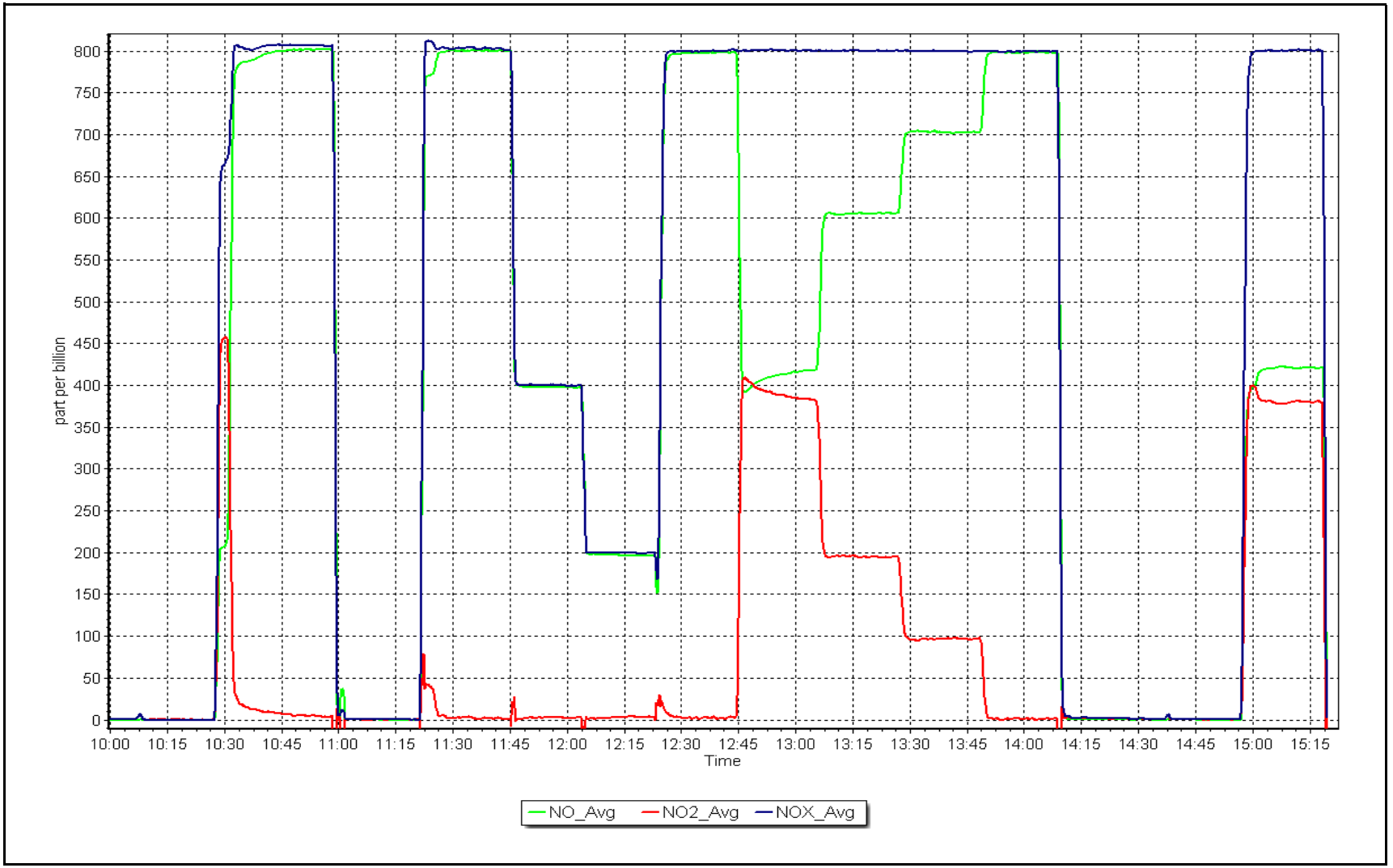
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.9	800.7	1.0002
399.6	397.7	1.0048
200.9	196.2	1.0240

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999962	*≥0.995*
Slope	1.001538	*0.90 - 1.10*
Intercept	-2.229291	*+/-20*



NO_X Calibration Plot Date: November 6, 2024 Location: Anzac



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 25, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	12:04	End time (MST):	14:59
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	API T700	Serial Number:	3060
ZAG Make/Model:	API 701H	Serial Number:	357

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.009543	1.002457	Backgd or Offset:	2.0	2.1
Calibration intercept:	-1.120000	-1.180000	Coeff or Slope:	1.667	1.667

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	5000	918.8	400.0	399.8	1.000
As found Mid point					
As found Low point					
Baseline Corr As found:	400.0	Previous response	402.7	*% change	-0.7%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.4	----
High point	5000	918.8	400.0	400.1	1.000
Mid point	5000	803.8	200.0	199.2	1.004
Low point	5000	709.8	100.0	98.1	1.019
As left zero	5000	0.0	0.0	-0.6	----
As left span	5000	918.8	400.0	404.2	0.990
				Average Correction Factor	1.008

Notes: Sample inlet filter changed after asfounds. No adjustments needed.

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

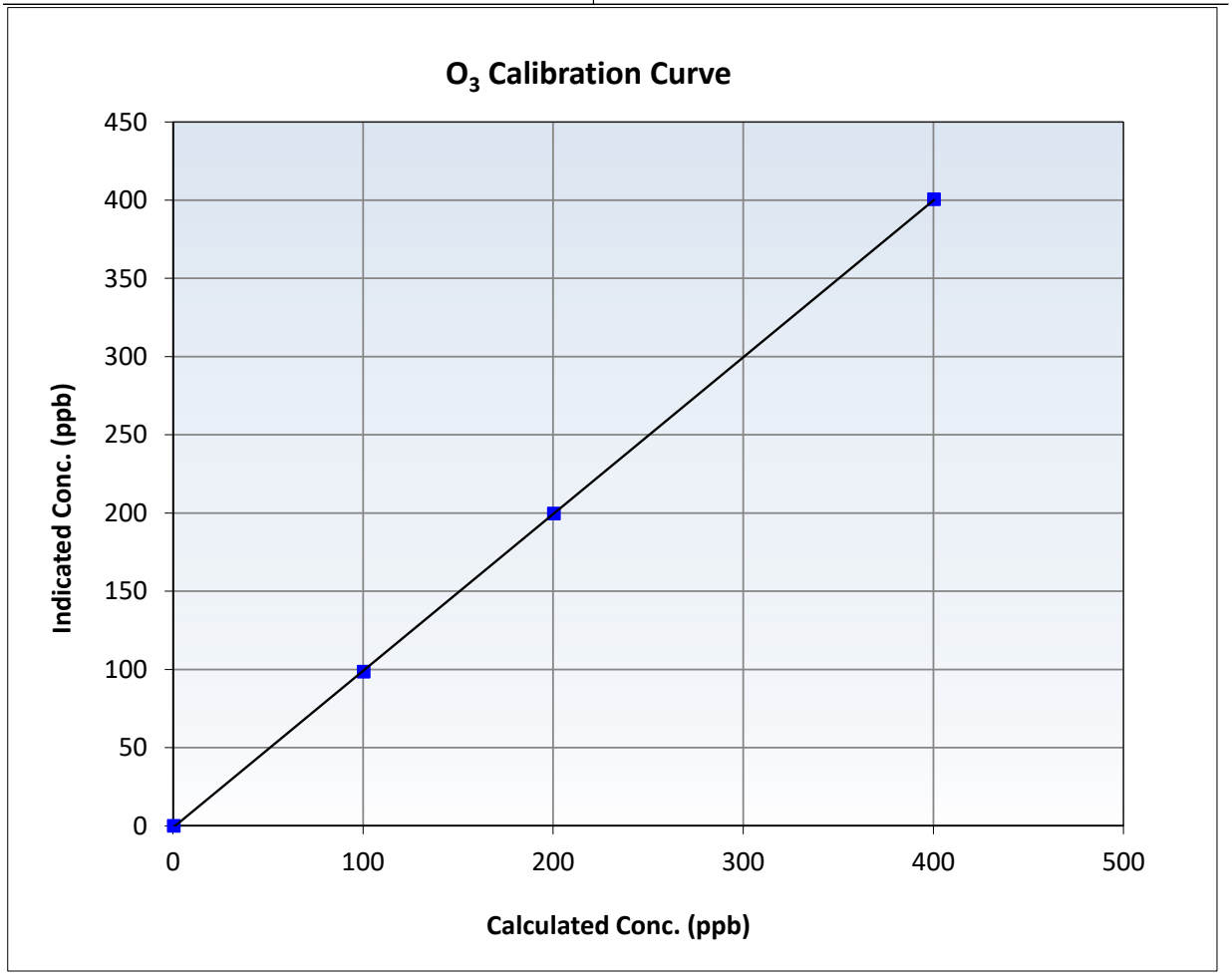
O_3 Calibration Summary

Station Information

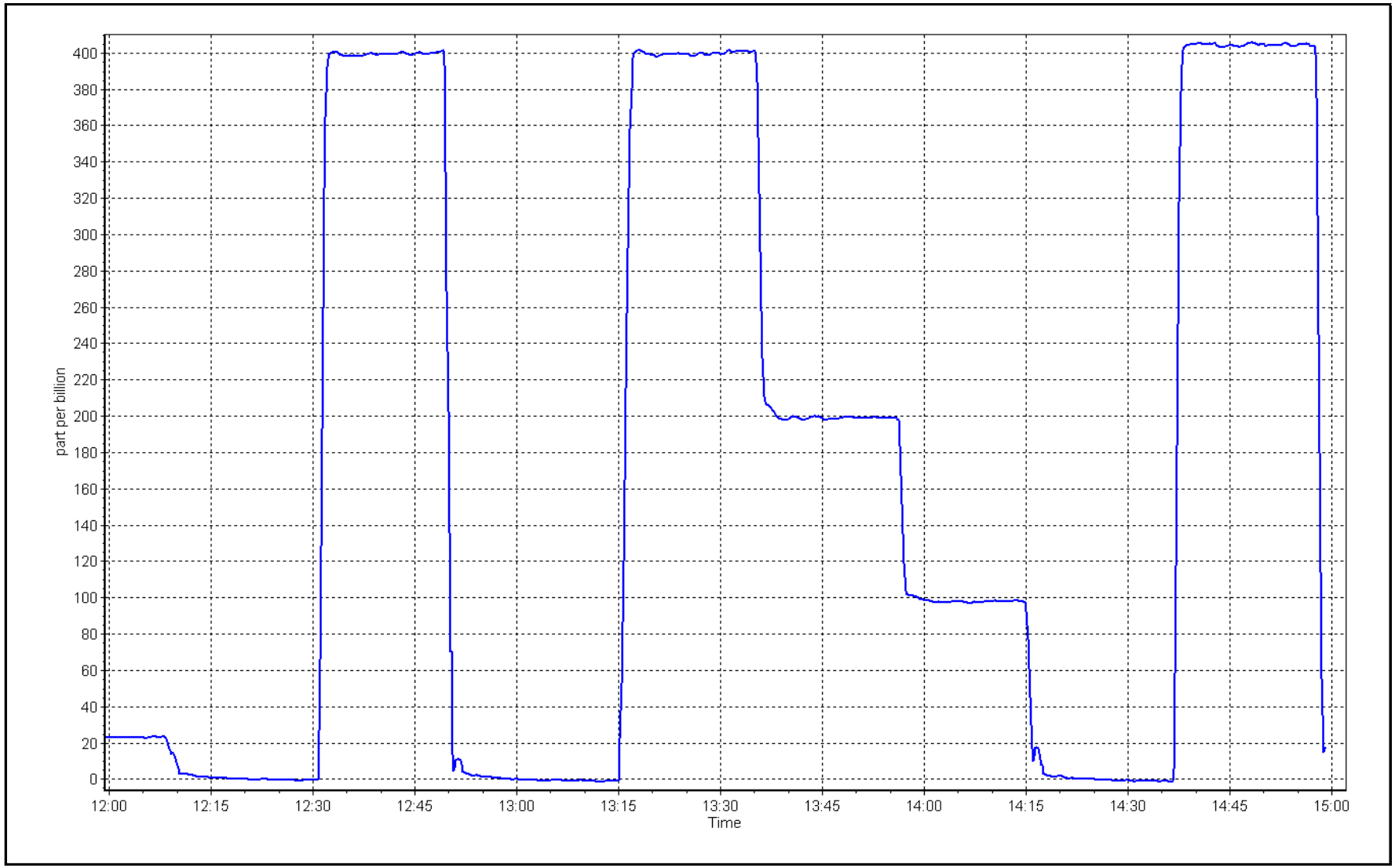
Calibration Date:	November 25, 2024	Previous Calibration:	October 17, 2024
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	12:04	End Time (MST):	14:59
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.4	----	Correlation Coefficient	0.999981	*≥0.995*
400.0	400.1	0.9998	Slope	1.002457	*0.90 - 1.10*
200.0	199.2	1.0040			
100.0	98.1	1.0194	Intercept	-1.180000	*+/- 5*



O_3 Calibration Plot Date: November 25, 2024 Location: Anzac



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	November 27, 2024	Last Cal Date:	October 29, 2024
Start time (MST):	13:49	End time (MST):	14:16
Analyzer Make:	AP T640	S/N:	825
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388749
Temp/RH standard:	Alicat FP-25BT	S/N:	388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	-13.7	-14.37	-13.7	☐	+/- 2 ^{o}C
P (mmHg)	719.6	720.55	719.6	☐	+/- 10 mmHg
Flow (LPM)	4.99	4.98	4.99	☐	+/- 0.25 LPM
PW% (pump)	41	-----	41	☐	>80%
Zero Verification	PM w/o HEPA:	3.0	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: — Lot No.: — Expiry Date:

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

Date Optical Chamber Cleaned: August 29, 2024

Date Disposable Filter Changed: August 29, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: August 29, 2024

Date RH/T Sensor Cleaned: August 29, 2024

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

Calibration by: Mohammed Kashif

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS17
WAPASU
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	November 4, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	12:00	End time (MST):	16:15
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.38	ppm	Cal Gas Exp Date:	January 12, 2029
Cal Gas Cylinder #:	ALM066507			
Removed Cal Gas Conc:	50.38	ppm	Rem Gas Exp Date:	N/A
Removed Gas Cyl #:	N/A		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	2449
Zero Air Gen Model:	Teledyne API 701H		Serial Number:	359

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1218153459	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997840	0.999668	Backgd or Offset:	13.4	13.4
Calibration intercept:	-1.600285	-1.939863	Coeff or Slope:	1.109	1.109

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4921	79.4	800.0	796.6	1.005
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	796.3	Previous response	796.6	*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.4	----
High point	4921	79.4	800.0	799.4	1.001
Mid point	4960	39.7	400.0	395.4	1.012
Low point	4980	19.8	199.5	196.1	1.017
As left zero	5000	0.0	0.0	0.7	----
As left span	4920	79.4	800.1	803.5	0.996
				Average Correction Factor:	1.010

Notes: No adjustments performed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

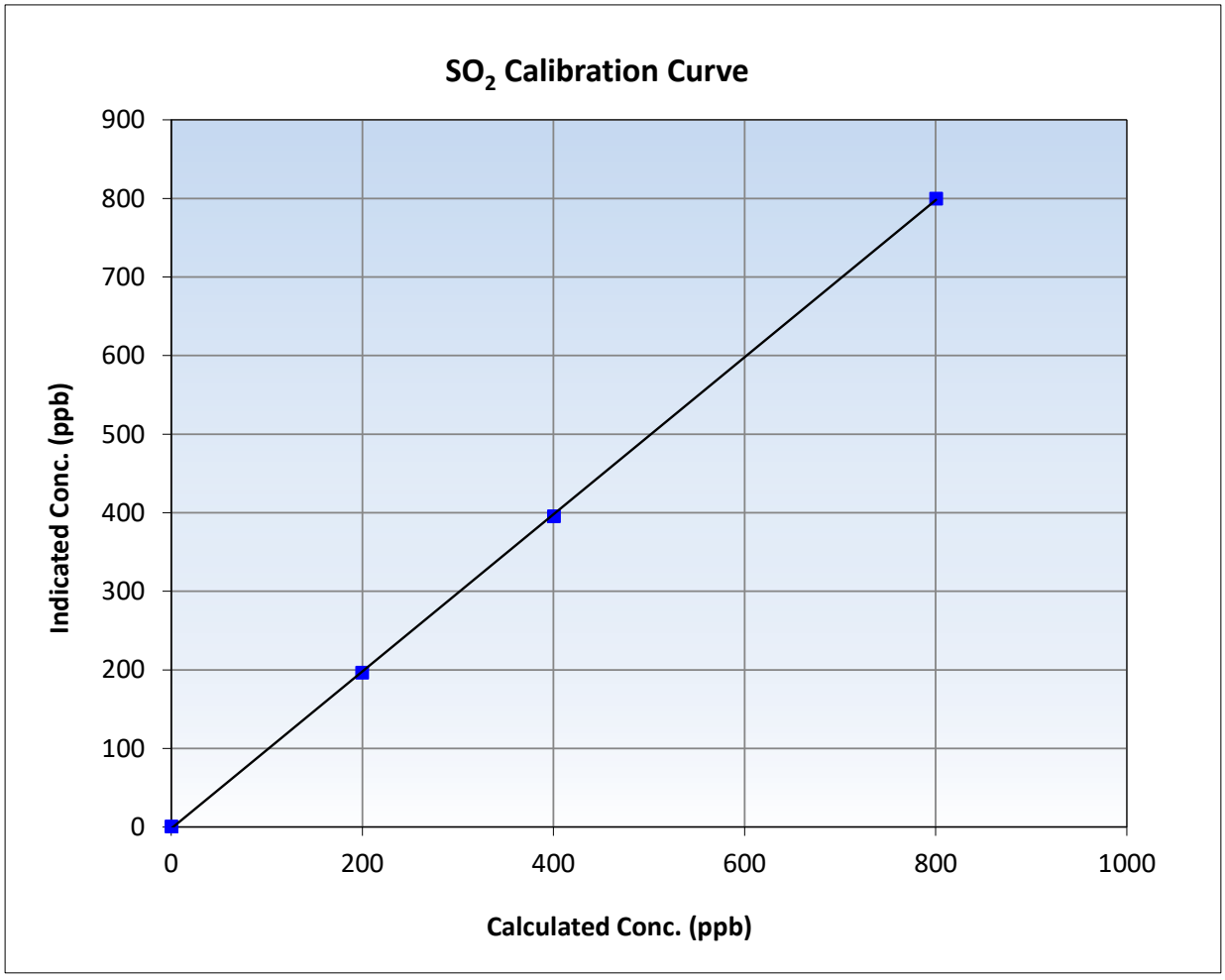
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 7, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	12:00	End Time (MST):	16:15
Analyzer make:	Thermo 43i	Analyzer serial #:	1218153459

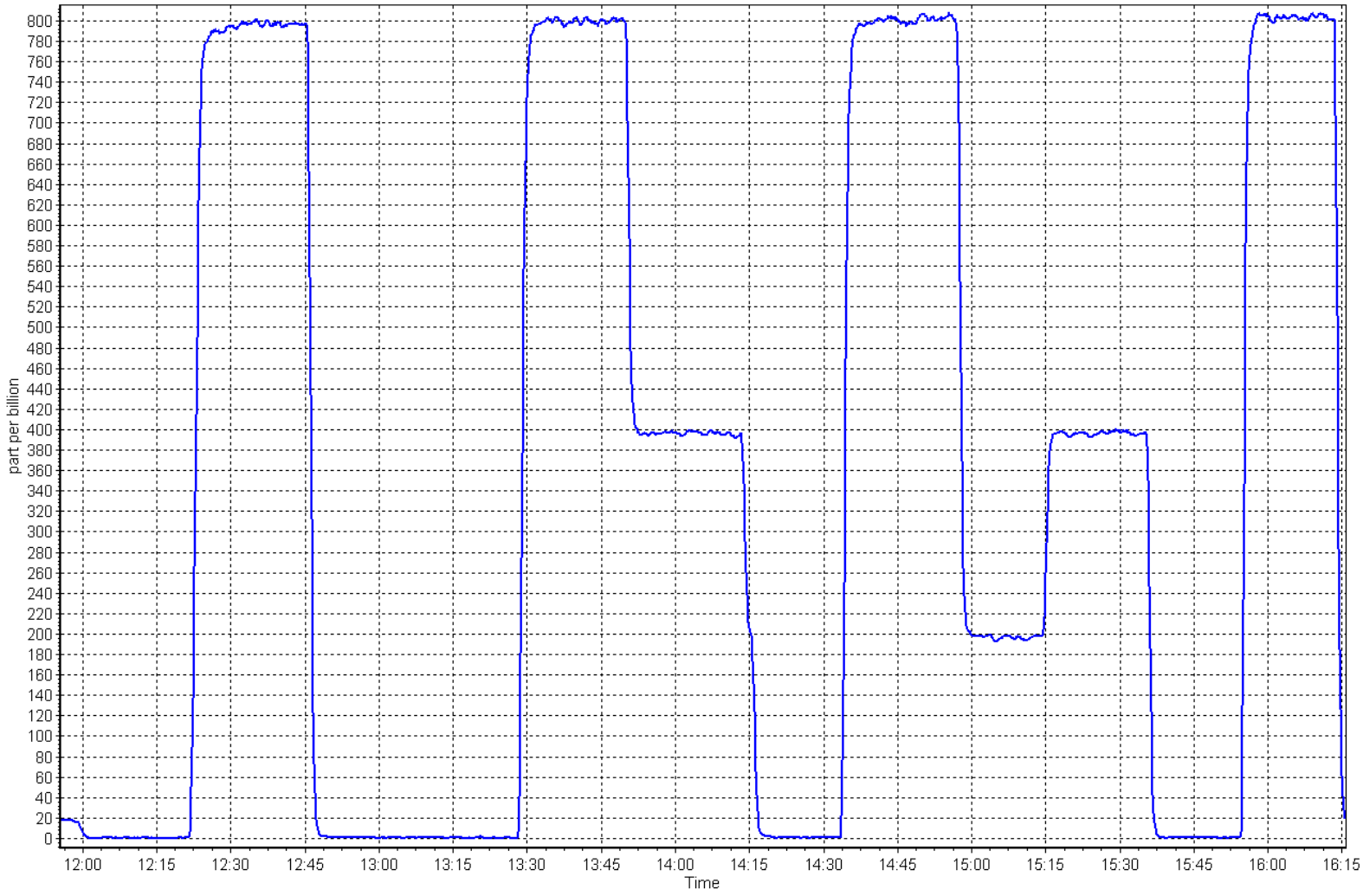
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.4	----
800.0	799.4	1.0007
400.0	395.4	1.0117
199.5	196.1	1.0174

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999952	*≥0.995*
Slope	0.999668	*0.90 - 1.10*
Intercept	-1.939863	*+/-30*



SO2 Calibration Plot Date: November 4, 2024 Location: Wapasu



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	November 26, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	11:54	End time (MST):	17:03
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.77	ppm	Cal Gas Exp Date:	August 28, 2027
Cal Gas Cylinder #:	DT20029267			
Removed Cal Gas Conc:	5.08	ppm	Rem Gas Exp Date:	September 16, 2024
Removed Gas Cyl #:	CC511852		Diff between cyl:	-3.7%
Calibrator Make/Model:	API T700		Serial Number:	2449
ZAG Make/Model:	API T701H		Serial Number:	359

Analyzer Information

Analyzer make:	Thermo 450i		Analyzer serial #:	1218153583
Converter make:	CD Nova		Converter serial #:	N/A
Analyzer Range	0 - 100 ppb		Converter Temp:	340 degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001854	0.997214	Backgd or Offset:	13.3	13.5
Calibration intercept:	-0.339218	-0.239842	Coeff or Slope:	1.116	1.141

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4921	78.8	80.0	80.7	0.989
As found Mid point	4961	39.4	40.0	39.9	0.997
As found Low point	4980	19.7	20.0	19.7	1.005
New cylinder response	4916	83.9	80.0	77.8	1.029

Baseline Corr As found:	80.9	Prev response:	79.81	*% change:	1.3%
Baseline Corr 2nd AF pt:	40.1	AF Slope:	1.012140	AF Intercept:	-0.399199
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999969	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4916	83.9	80.0	79.6	1.006
Mid point	4958	41.9	40.0	39.6	1.009
Low point	4979	21.0	20.0	19.7	1.017
As left zero	5000	0.0	0.0	0.4	----
As left span	4916	83.9	80.0	77.8	1.029
SO2 Scrubber Check	4921	79.4	793.9	0.3	----

Date of last scrubber change:	N/A	Ave Corr Factor	1.011
Date of last converter efficiency test:	N/A		

Notes: Changed the sample inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. Calibration gas changed out. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

H_2S Calibration Summary

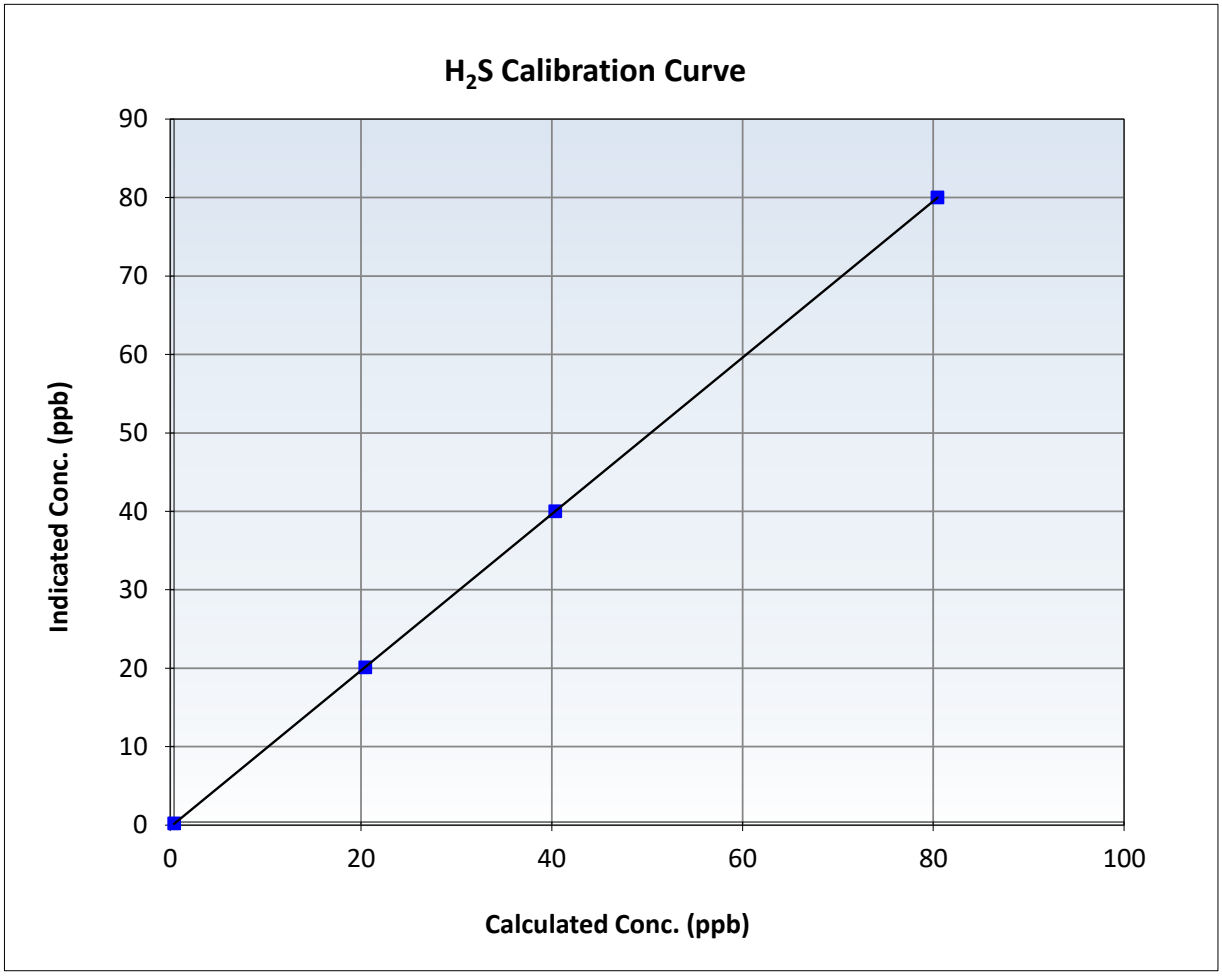
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 9, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	11:54	End Time (MST):	17:03
Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583

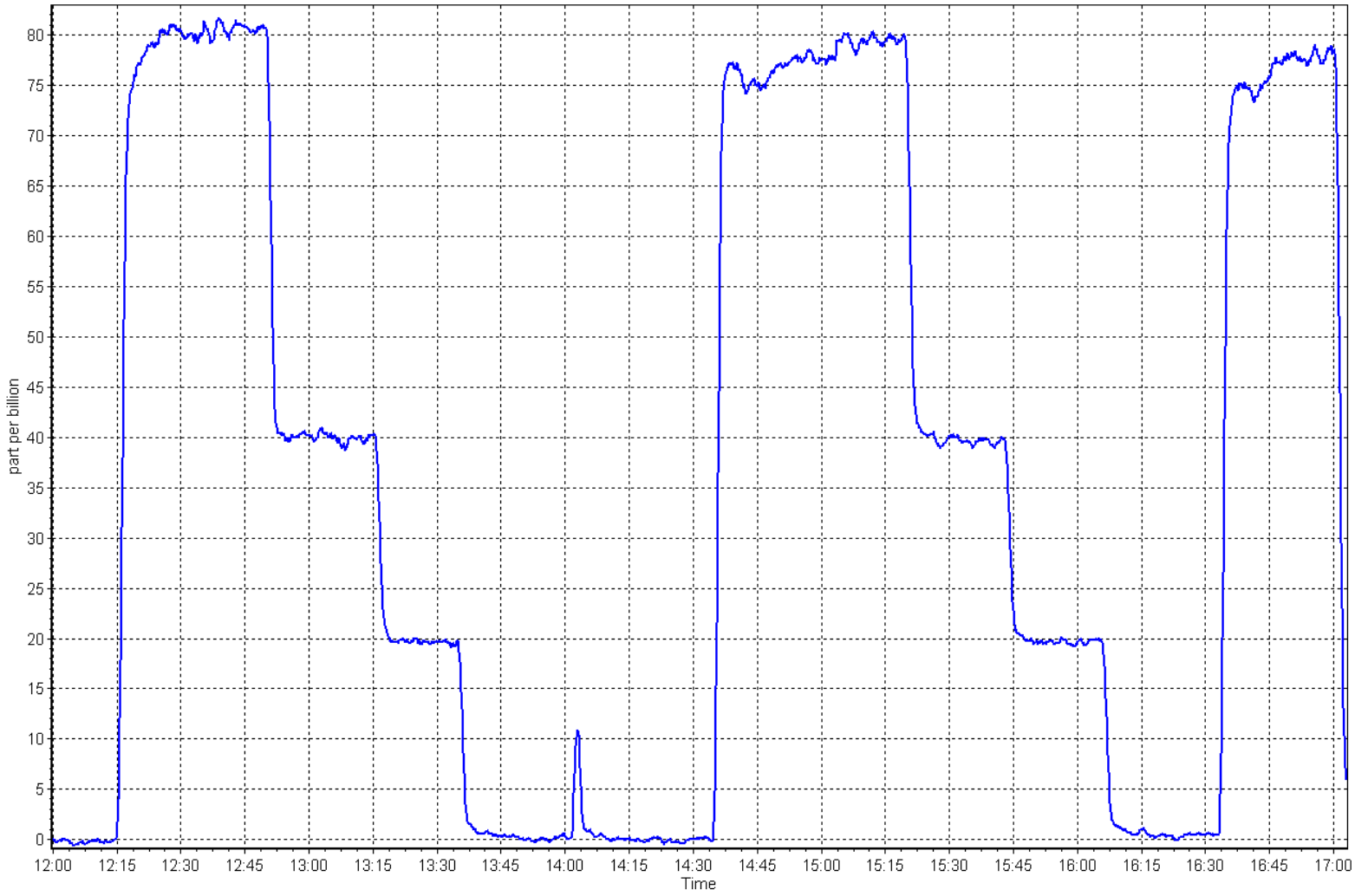
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
80.0	79.6	1.0056
40.0	39.6	1.0094
20.0	19.7	1.0170

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.997214	*0.90 - 1.10*
Intercept	-0.239842	*+/-3*



H_2S Calibration Plot Date: November 26, 2024 Location: Wapasu



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	November 4, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	12:00	End time (MST):	16:15
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	ALM066507		Cal Gas Expiry Date:		
CH4 Cal Gas Conc.	503.5	ppm	CH4 Equiv Conc.	1076.3	ppm
C3H8 Cal Gas Conc.	208.3	ppm			
Removed Gas Cert:		n/a	Removed Gas Expiry:		
Removed CH4 Conc.	503.5	ppm	CH4 Equiv Conc.	1076.3	ppm
Removed C3H8 Conc.	208.3	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2449	
ZAG Make/Model:	Teledyne 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:	1.004239	0.996481	Background:	3.320	3.020
Calibration intercept:	-0.142343	-0.038354	Coefficient:	4.505	4.475

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.27	----
As found High point	4921	79.4	17.09	16.87	0.997
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.14	Previous response	17.02	*% 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	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4921	79.4	17.09	17.03	1.003
Mid point	4960	39.7	8.55	8.40	1.017
Low point	4980	19.8	4.26	4.20	1.015
As left zero	5000	0.0	0.00	-0.07	----
As left span	4921	79.4	17.09	17.00	1.006
				Average Correction Factor	1.012

Notes: Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Version 03-2024

CALS_321

Wood Buffalo Environmental Association

THC Calibration Summary

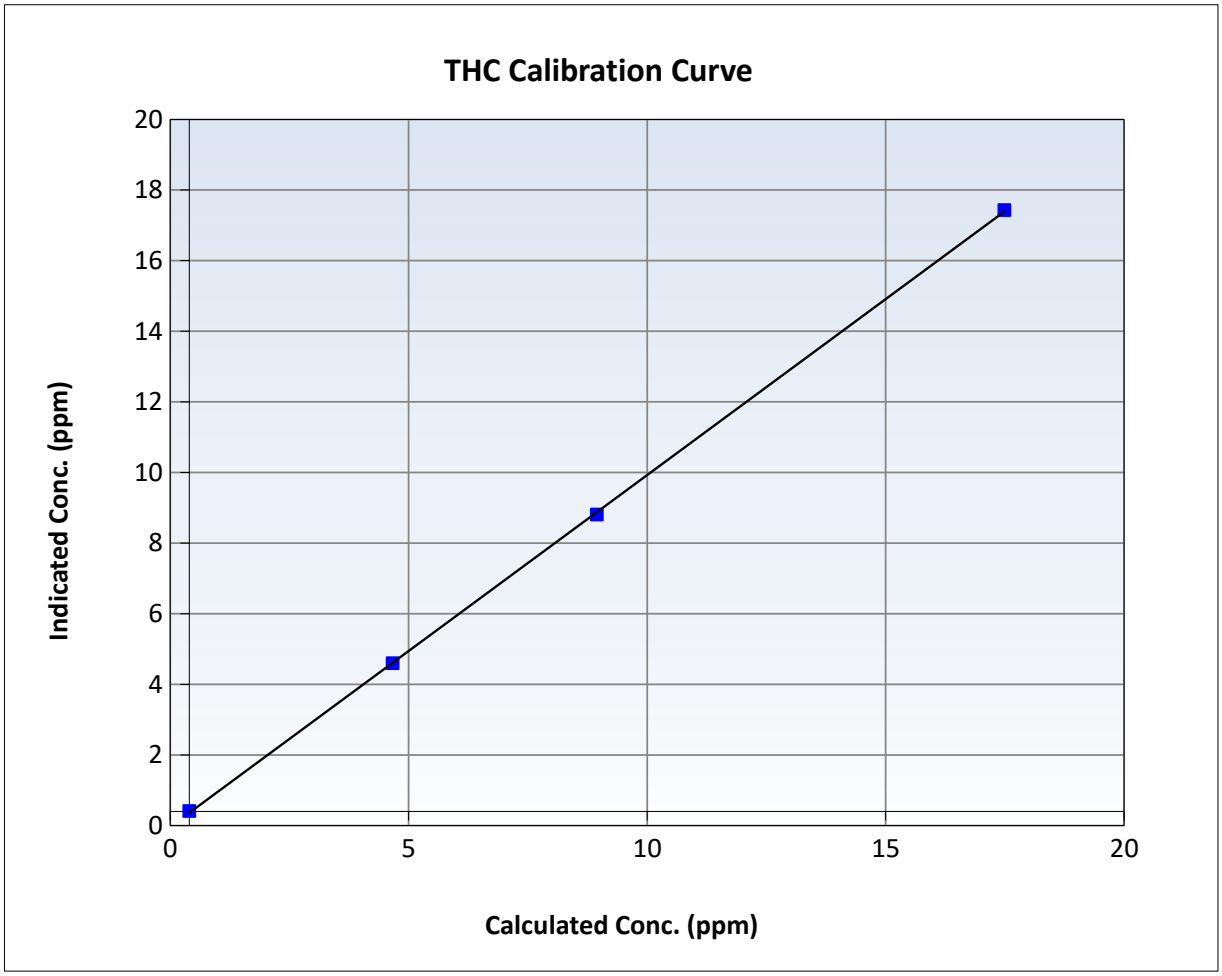
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 7, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	12:00	End Time (MST):	16:15
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

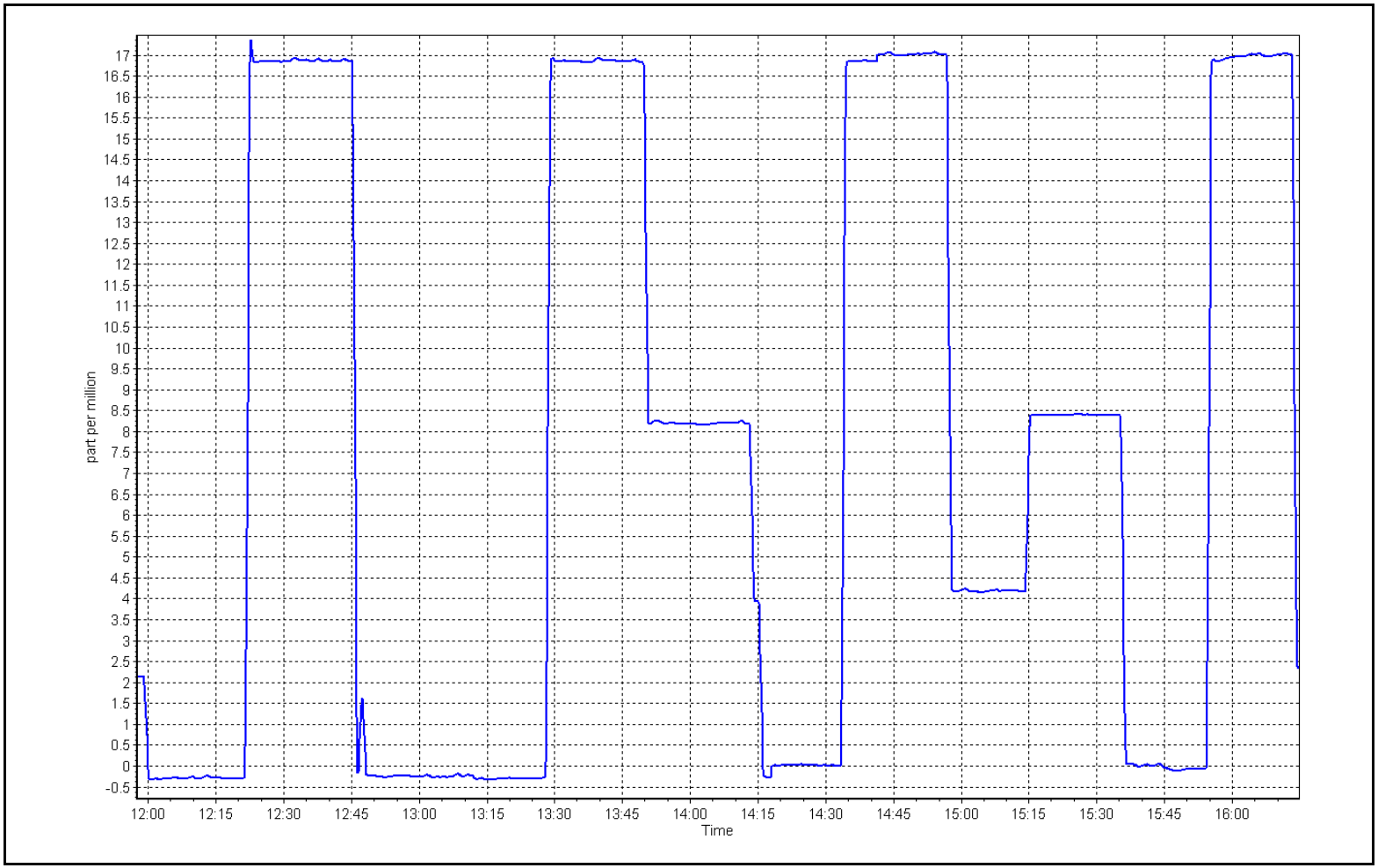
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.01	----
17.09	17.03	1.0034
8.55	8.40	1.0170
4.26	4.20	1.0153

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999942	*≥0.995*
Slope	0.996481	*0.90 - 1.10*
Intercept	-0.038354	*+/-1.5*



THC Calibration Plot Date: November 4, 2024 Location: Wapasu



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Wapasu
Station number:	AMS 17
Calibration Date:	November 13, 2024
Last Cal Date:	October 18, 2024
Start time (MST):	10:55
End time (MST):	15:55
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 #:	N/A	Removed Gas Exp Date:	N/A
Removed Gas NOX Conc:	49.11 ppm	Removed Gas NO Conc:	48.07 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	2449
ZAG make/model:	API T701H	Serial Number:	359

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.3	-0.4	----	----
AF High point	4917	83.2	817.2	799.9	17.3	821.3	802.4	19.0	0.9941	0.9965
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 817.5 ppb	NO = 799.1 ppb
Baseline Corr 1st pt	NO_X = 822.0 ppb	NO = 802.7 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = 0.5%
As found	NO r^2:	*Percent Change	NO = 0.5%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo Scientific 42i Serial Number: 1218153460

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.094	1.087	NO bkgnd or offset:	3.8	3.8
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	4.2	4.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	241.5	241.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.001788	1.000138
NO_X Cal Offset:	-1.160000	-1.420000
NO Cal Slope:	1.001130	1.000015
NO Cal Offset:	-1.720000	-1.880000
NO_2 Cal Slope:	1.002543	1.002948
NO_2 Cal Offset:	0.175219	-0.302443

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.1	-0.4	----	----
High point	4917	83.2	817.2	799.9	17.3	816.5	799.0	17.6	1.0008	1.0011
Mid point	4958	41.6	408.6	399.9	8.7	406.3	396.9	9.4	1.0056	1.0077
Low point	4979	20.8	204.3	200.0	4.3	202.3	196.5	5.8	1.0099	1.0177
As left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	----	----
As left span	4917	83.2	817.2	400.5	416.7	816.3	400.5	415.8	1.0011	1.0000
							Average Correction Factor		1.0055	1.0088

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.4	----	----
High GPT point	796.2	399.4	414.1	415.0	0.9978	100.2%
Mid GPT point	796.2	597.8	215.7	216.0	0.9986	100.1%
Low GPT point	796.2	699.4	114.1	114.3	0.9983	100.2%
				Average Correction Factor	0.9983	100.2%

Notes: Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

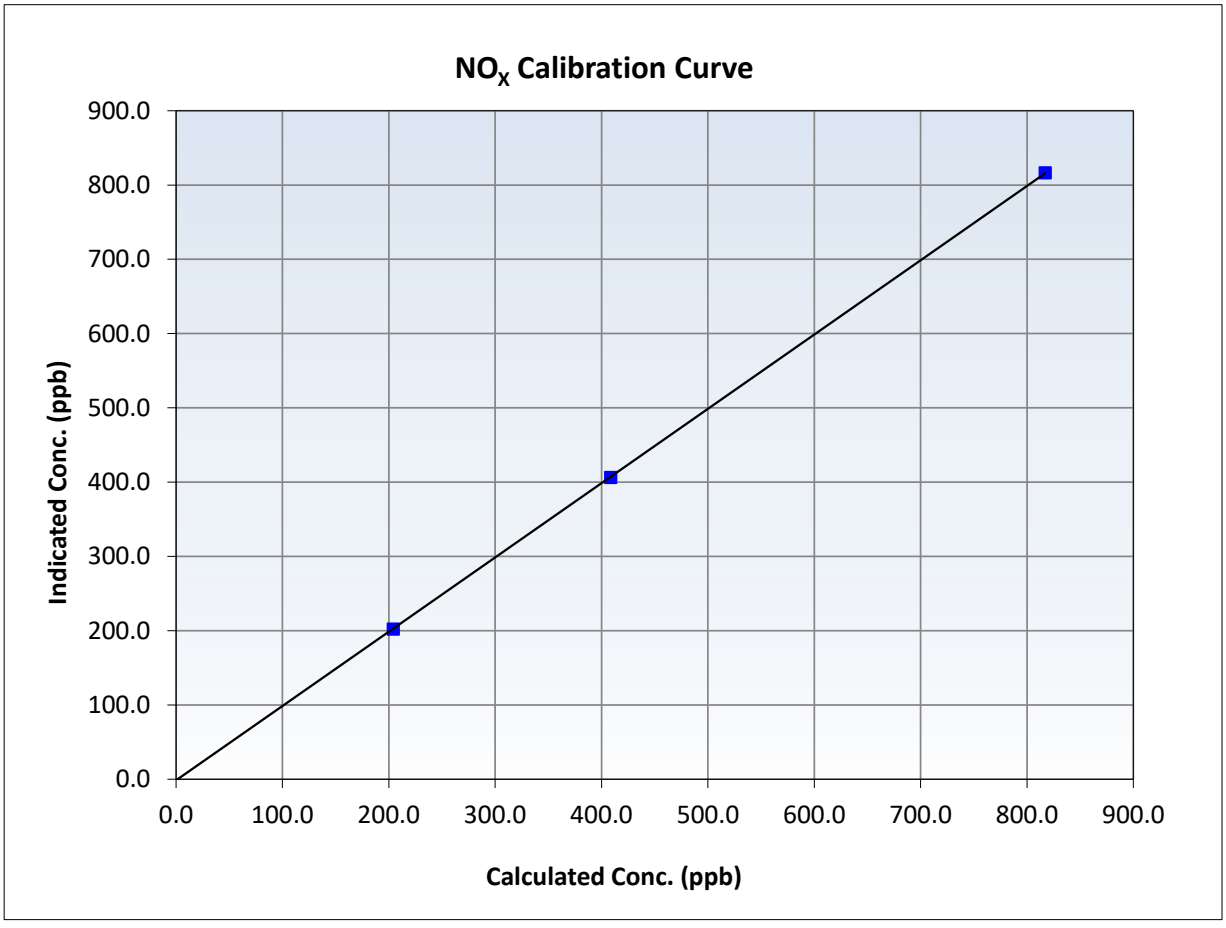
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:55	End Time (MST):	15:55
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.5	----
817.2	816.5	1.0008
408.6	406.3	1.0056
204.3	202.3	1.0099

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.000138	*0.90 - 1.10*
Intercept	-1.420000	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

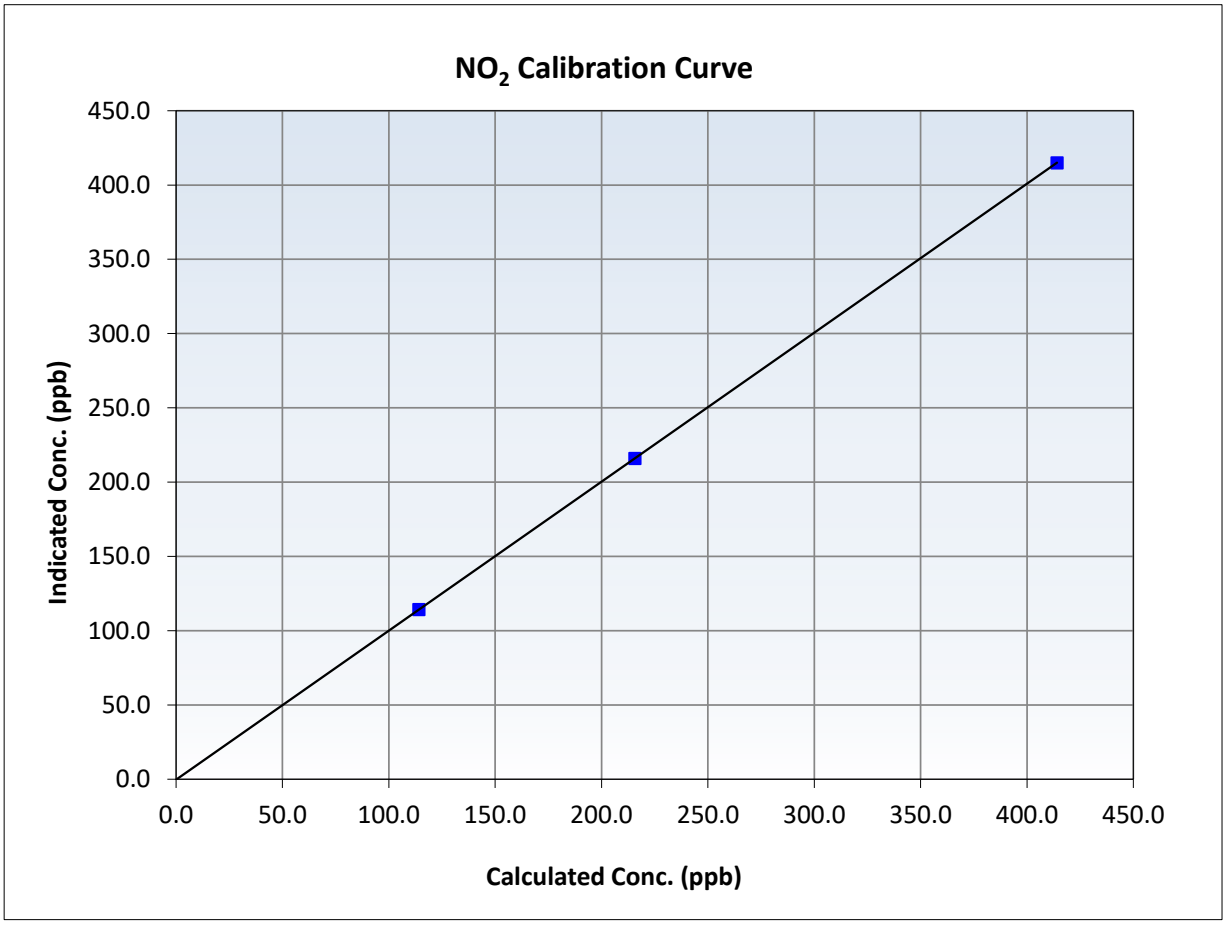
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:55	End Time (MST):	15:55
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.4	----
414.1	415.0	0.9978
215.7	216.0	0.9986
114.1	114.3	0.9983

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.002948	*0.90 - 1.10*
Intercept	-0.302443	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

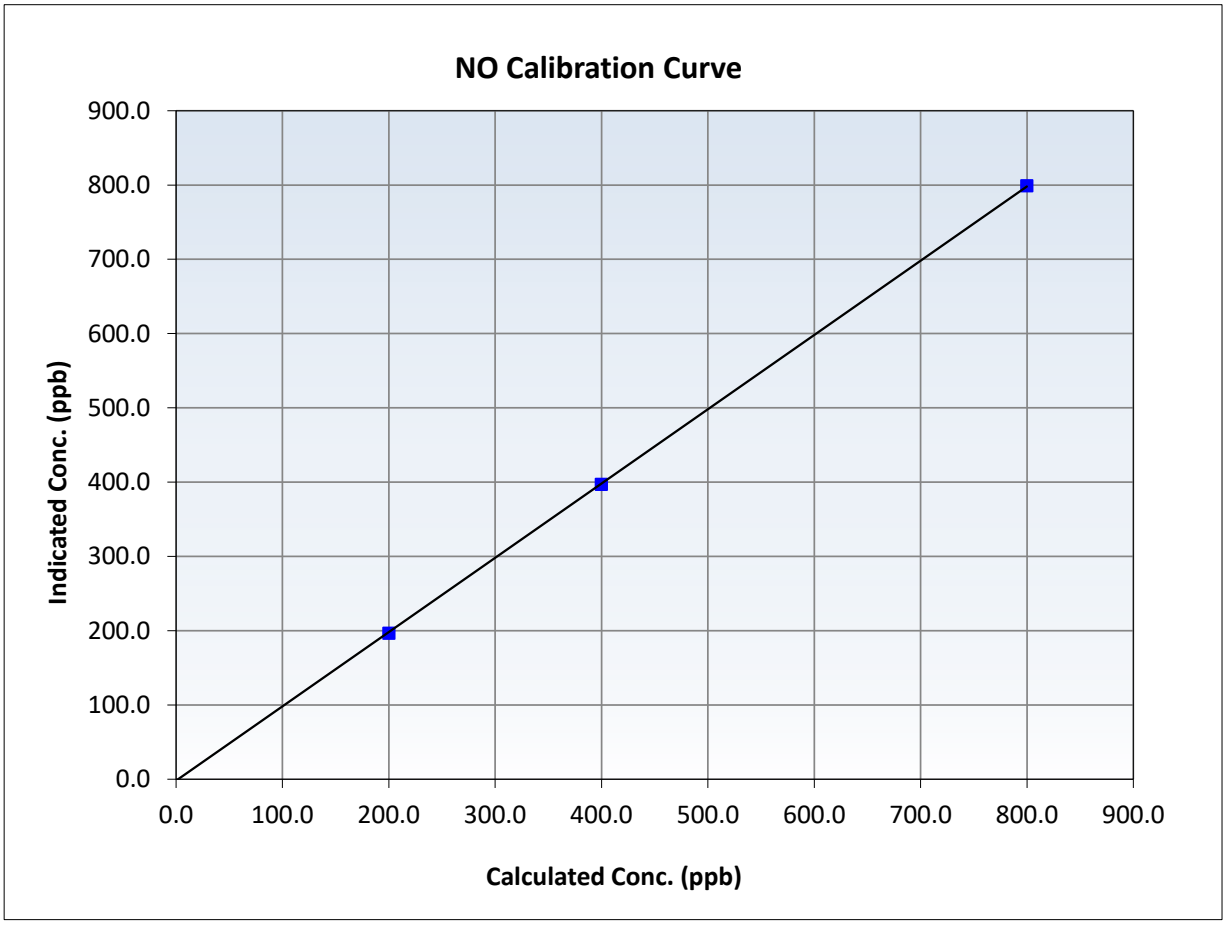
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 18, 2024
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	10:55	End Time (MST):	15:55
Analyzer make:	Thermo Scientific 42i	Analyzer serial #:	1218153460

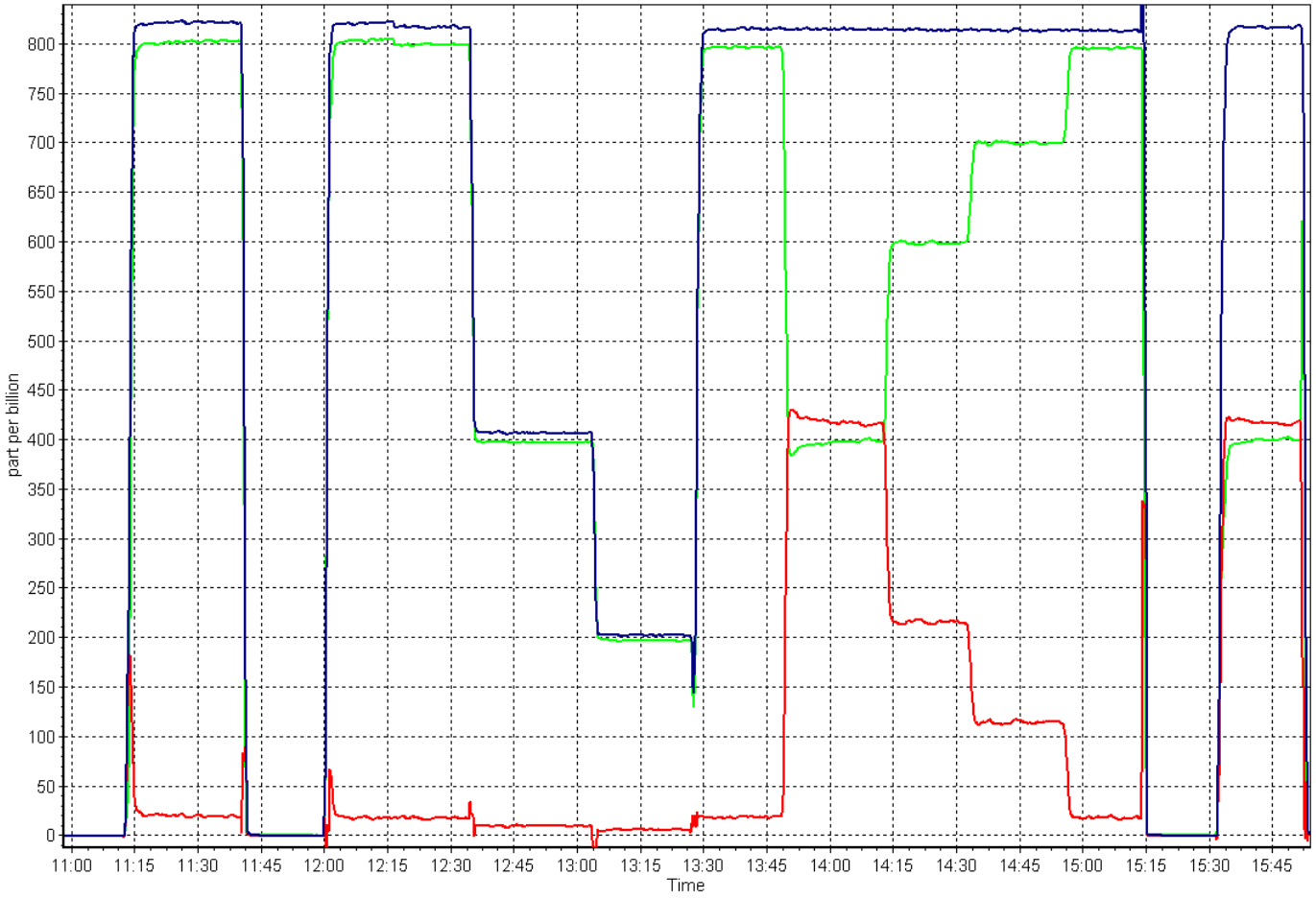
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.9	799.0	1.0011
399.9	396.9	1.0077
200.0	196.5	1.0177

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999977	*≥0.995*
Slope	1.000015	*0.90 - 1.10*
Intercept	-1.880000	*+/-20*



NO_X Calibration Plot Date: November 13, 2024 Location: Wapasu



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Wapasu	Station number:	AMS17
Calibration Date:	November 6, 2024	Last Cal Date:	October 15, 2024
Start time (MST):	11:15	End time (MST):	14:26
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 #:	7045	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001229	1.001086	Backgd or Offset:	0.6	0.6
Calibration intercept:	-0.540000	-0.740000	Coeff or Slope:	1.018	1.018

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.4	----
As found High point	5000	1104.7	400.0	399.9	0.999
As found Mid point					
As found Low point					
Baseline Corr As found:	400.3	Previous response	400.0	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	5000	1104.7	400.0	400.3	0.999
Mid point	5000	917.3	200.0	198.7	1.007
Low point	5000	797.9	100.0	98.5	1.015
As left zero	5000	0.0	0.0	0.3	----
As left span	5000	1104.0	400.0	404.5	0.989
				Average Correction Factor	1.007

Notes: Inlet filter changed after as founds. No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

O_3 Calibration Summary

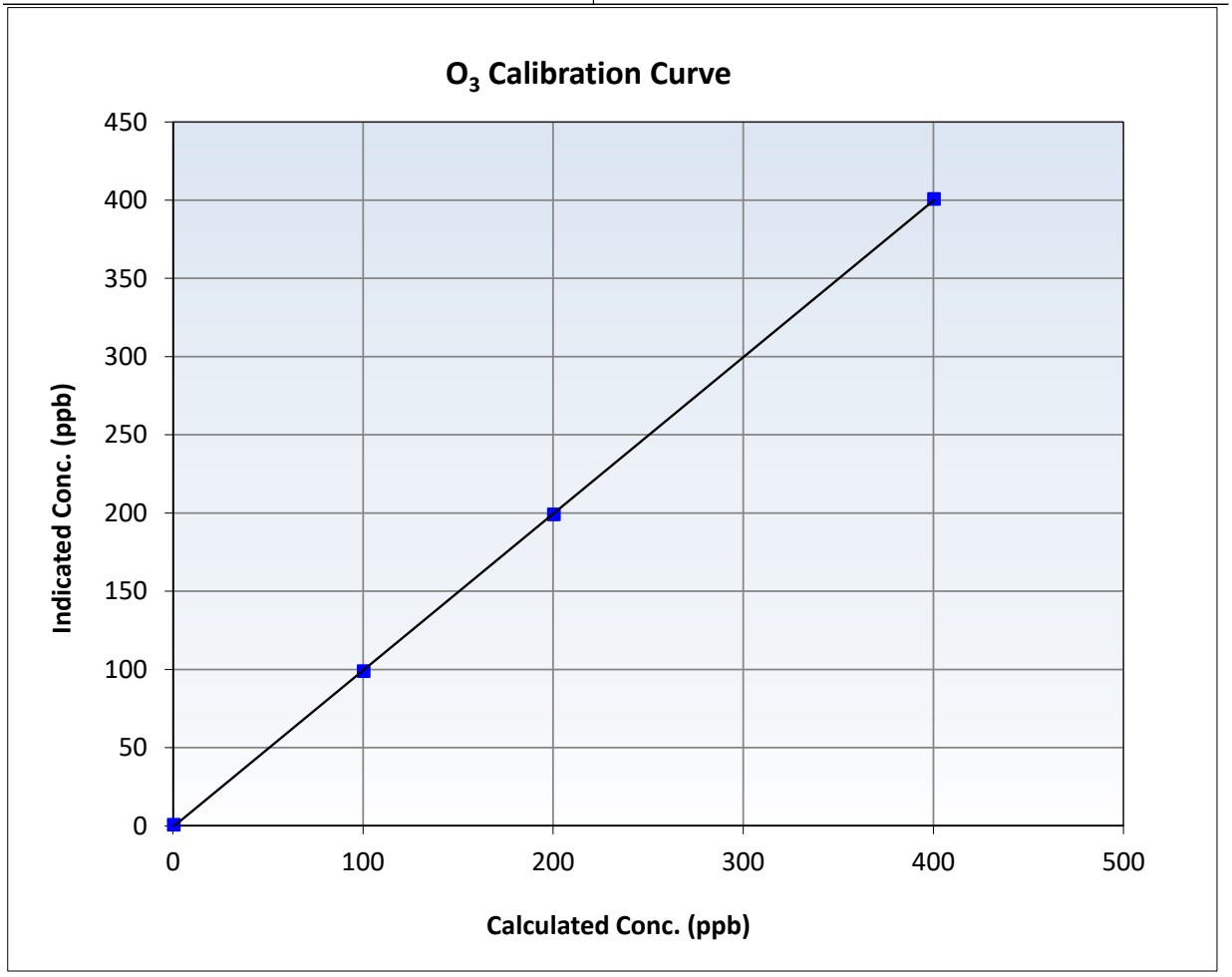
Station Information

Calibration Date:	November 6, 2024	Previous Calibration:	October 15, 2024
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	11:15	End Time (MST):	14:26
Analyzer make:	API T400	Analyzer serial #:	7045

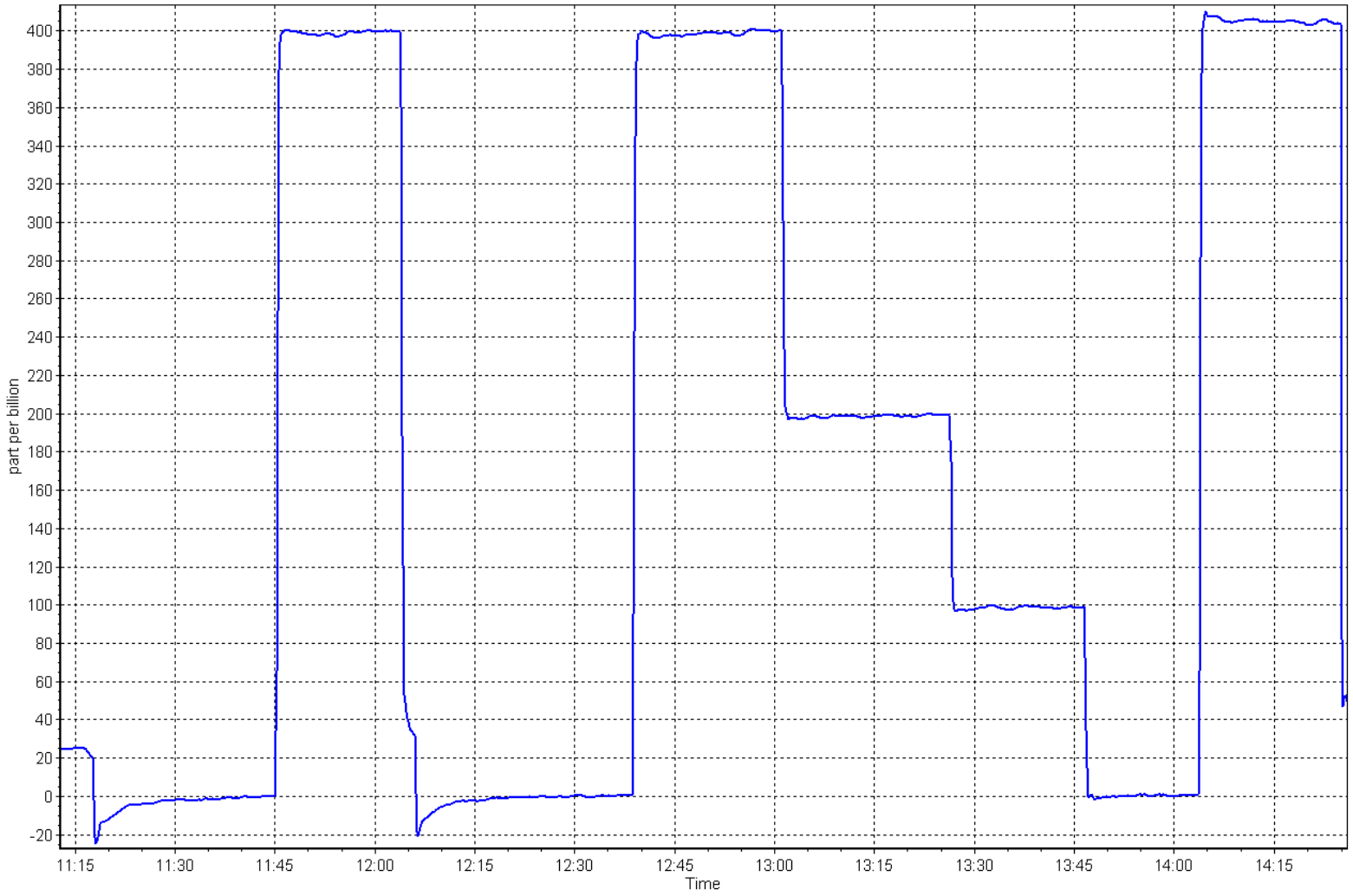
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
400.0	400.3	0.9993
200.0	198.7	1.0065
100.0	98.5	1.0152

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999968	*≥0.995*
Slope	1.001086	*0.90 - 1.10*
Intercept	-0.740000	*+/- 5*



O_3 Calibration Plot Date: November 6, 2024 Location: Wapasu



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	November 26, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	15:43	End time (MST):	16:19
Analyzer Make:	Teledyne API T640	S/N:	1183
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388749
Temp/RH standard:	Alicat FP-25BT	S/N:	388749

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-11.60	-12.10	-11.60	☐	+/- 2 °C
P (mmHg)	709.80	708.60	709.80	☐	+/- 10 mmHg
Flow (LPM)	4.99	5.02	4.99	☐	+/- 0.25 LPM
PW% (pump)	70	-----	70	☐	>80%
Zero Verification	PM w/o HEPA:	3.30	PM w/ HEPA:	0.00	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 18, 2024

Date Disposable Filter Changed: September 16, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: July 23, 2024

Date RH/T Sensor Cleaned: July 23, 2024

Notes: Temperature, pressure, flow and pump power checked. PMT adjusted. Leak check passed. Pump at 70%, will swap out next month.

Calibration by: Aswin Sasi Kumar

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS18
STONY MOUNTAIN
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 21, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	11:30	End time (MST):	16:04
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 #:	XC026809B		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	2658
Zero Air Gen Model:	Teledyne API 701H		Serial Number:	360

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	JC1501301453	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002856	0.997772	Backgd or Offset:	23.6	23.6
Calibration intercept:	-0.640000	-0.160000	Coeff or Slope:	0.797	0.797

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.0	800.3	792.0	1.011
As found Mid point				397.9	
As found Low point				195.2	
New cylinder response					
Baseline Corr As found:	791.7	Previous response	802.0	*% change	-1.3%
Baseline Corr 2nd AF pt:	397.6	AF Slope:	0.989229	AF Intercept:	0.300000
Baseline Corr 3rd AF pt:	194.9	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4920	80.0	800.3	798.4	1.002
Mid point	4960	40.0	400.2	399.7	1.001
Low point	4980	20.0	200.1	198.2	1.009
As left zero	5000	0.0	0.0	0.3	----
As left span	4919	81.0	810.3	794.7	1.020
				Average Correction Factor:	1.004

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

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

SO_2 Calibration Summary

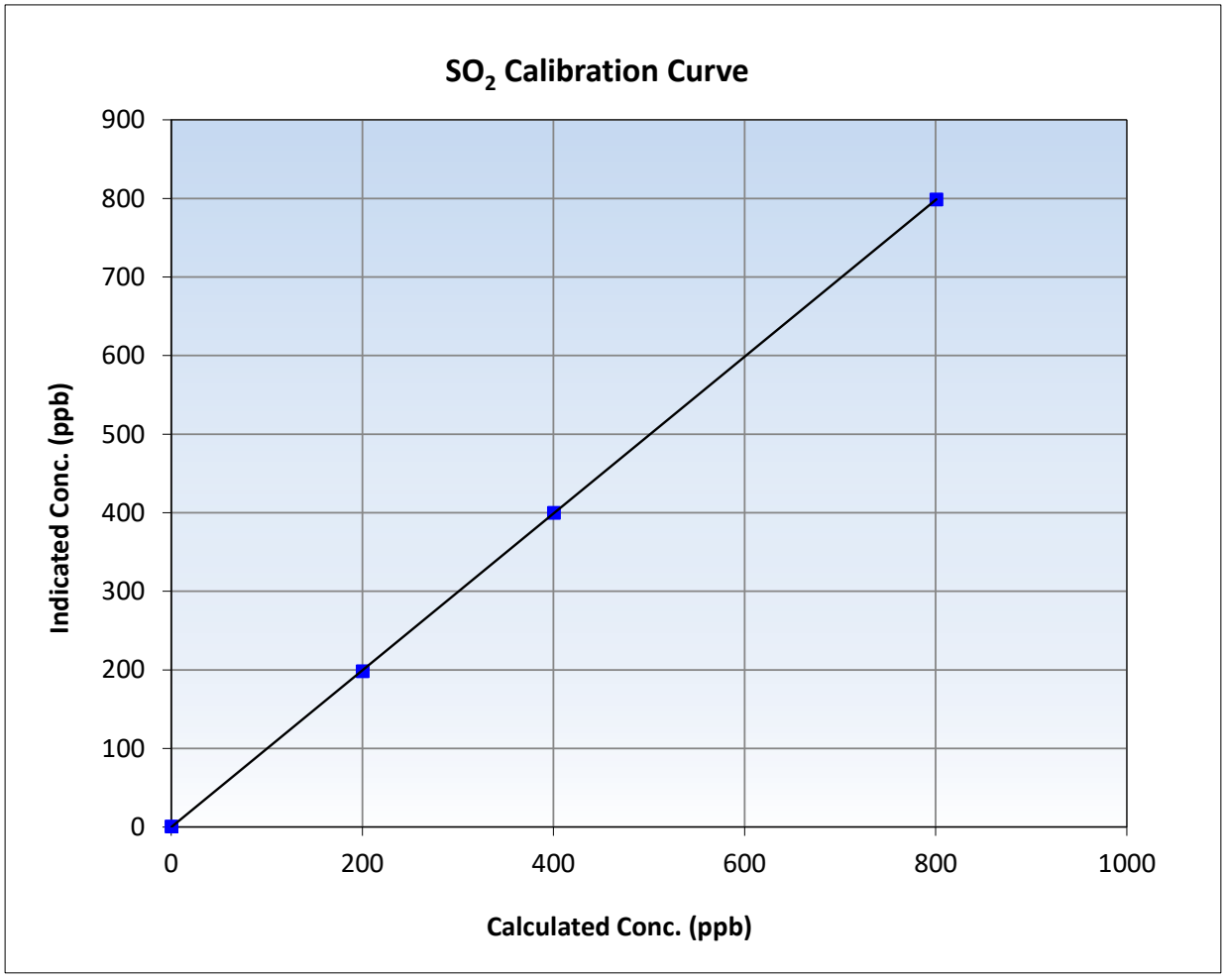
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:30	End Time (MST):	16:04
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453

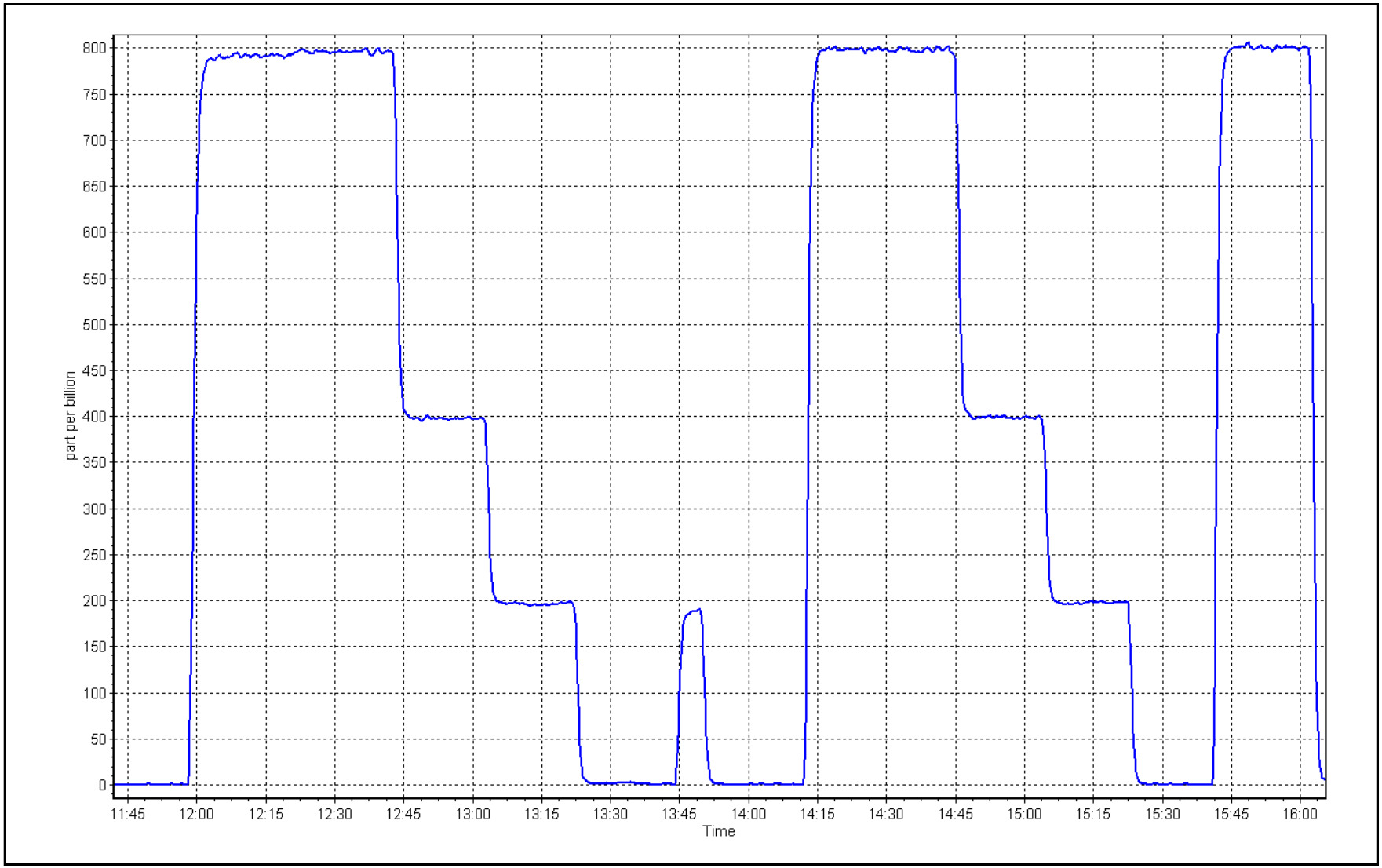
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
800.3	798.4	1.0024
400.2	399.7	1.0012
200.1	198.2	1.0095

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	0.997772	*0.90 - 1.10*
Intercept	-0.160000	*+/-30*



SO2 Calibration Plot Date: November 21, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS18
Calibration Date:	November 28, 2024	Last Cal Date:	October 23, 2024
Start time (MST):	11:42	End time (MST):	16:50
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.48	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC500395			
Removed Cal Gas Conc:	5.48	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
ZAG Make/Model:	Teledyne API T701		Serial Number:	360

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153359
Converter make:	CD Nova CDN-101		Converter serial #:	555
Analyzer Range	0 - 100 ppb		Converter Temp:	800 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000868	1.001158	Backgd or Offset:	3.1	3.28
Calibration intercept:	-0.038877	0.400939	Coeff or Slope:	1.228	1.335

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4927	73.0	80.0	74.1	1.081
As found Mid point	4964	36.5	40.0	37.2	1.078
As found Low point	4983	18.3	20.0	18.5	1.090
New cylinder response					

Baseline Corr As found:	74.0	Prev response:	80.02	*% change:	-8.1%
Baseline Corr 2nd AF pt:	37.1	AF Slope:	0.925848	AF Intercept:	0.062446
Baseline Corr 3rd AF pt:	18.4	AF Correlation:	0.999990	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4927	73.0	80.0	80.4	0.995
Mid point	4964	36.5	40.0	40.6	0.985
Low point	4983	18.3	20.0	20.5	0.978
As left zero	5000	0.0	0.0	0.5	----
As left span	4927	73.0	80.0	80.8	0.990
SO2 Scrubber Check	4923	77.1	771.0	0.1	----
Date of last scrubber change:		17-Dec-21		Ave Corr Factor	0.986
Date of last converter efficiency test:					

Notes: Asfounds low due to cold weather. Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

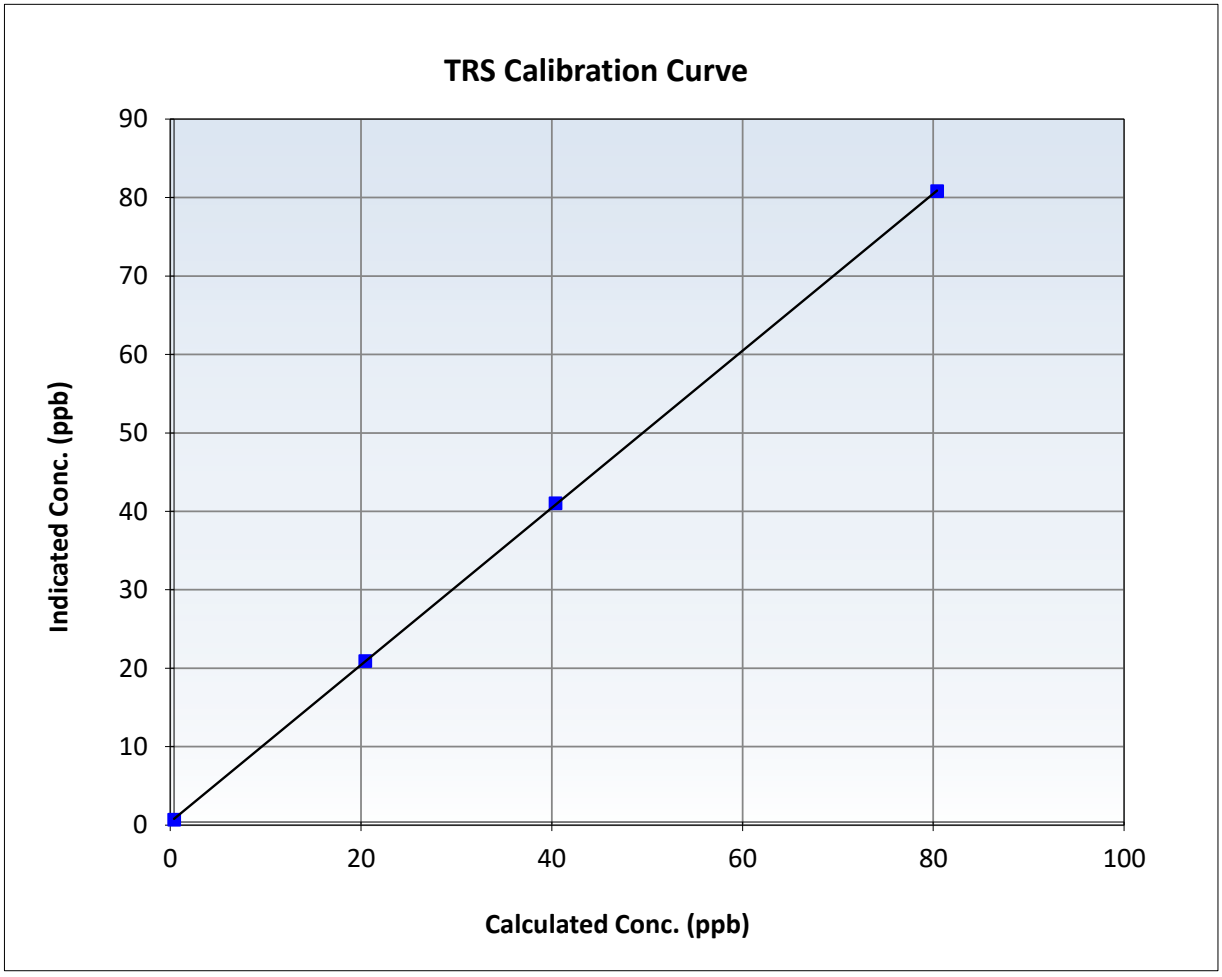
TRS Calibration Summary

Station Information

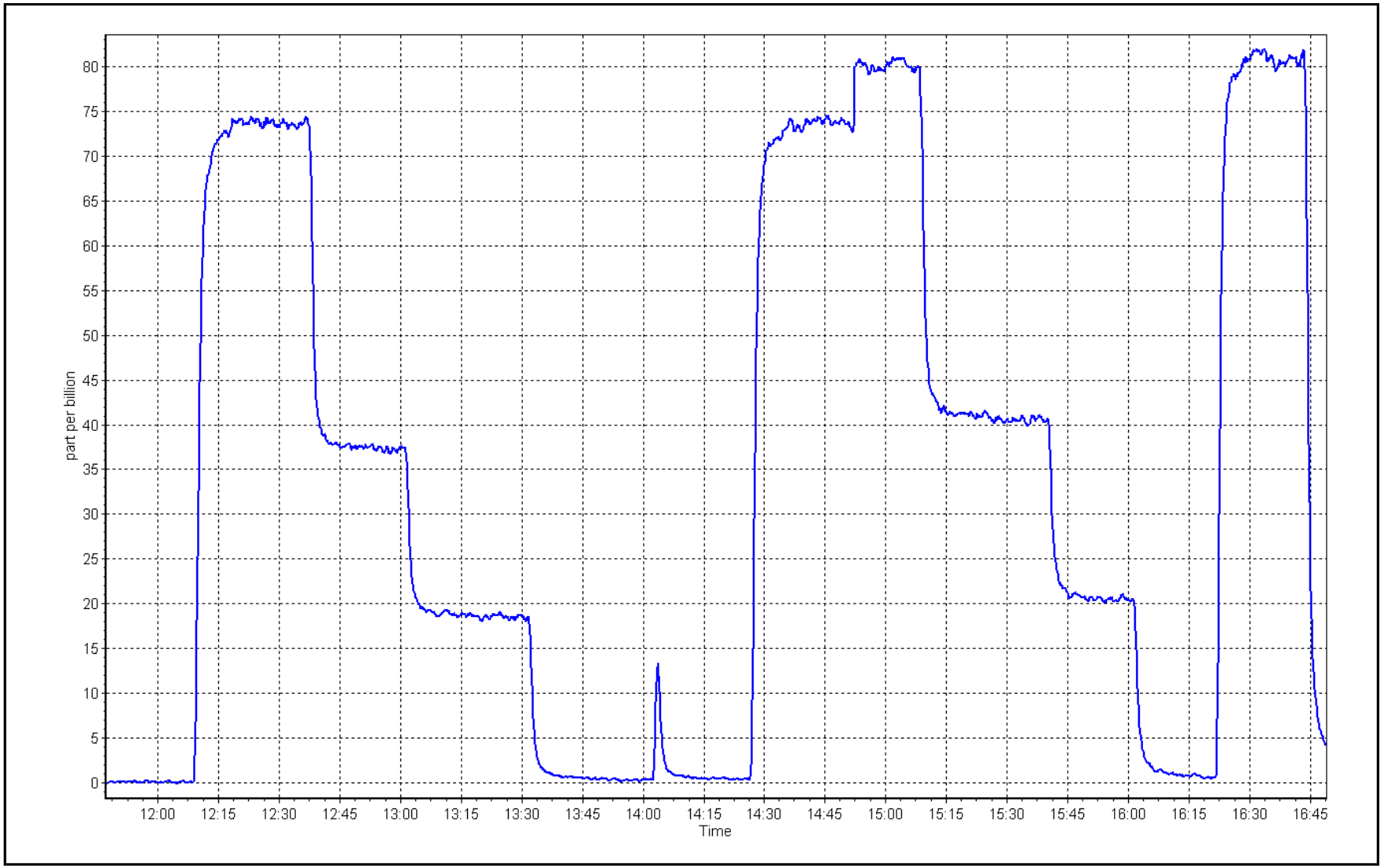
Calibration Date:	November 28, 2024	Previous Calibration:	October 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS18
Start Time (MST):	11:42	End Time (MST):	16:50
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999987	*≥0.995*
80.0	80.4	0.9949	Slope	1.001158	*0.90 - 1.10*
40.0	40.6	0.9850			
20.0	20.5	0.9779	Intercept	0.400939	*+/-3*



TRS Calibration Plot Date: November 28, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 21, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	11:30	End time (MST):	16:04
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	XC026809B	Cal Gas Expiry Date:	January 12, 2029
CH4 Cal Gas Conc.	504.9 ppm	CH4 Equiv Conc.	1076.6 ppm
C3H8 Cal Gas Conc.	207.9 ppm		
Removed Gas Cert:	NA	Removed Gas Expiry:	NA
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:	Teledyne API T750	Serial Number:	282
Zero Air Gen model:	Teledyne API T751H	Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.69E-04	2.71E-04	NMHC SP Ratio:	4.16E-05	4.16E-05
CH4 Retention time:	16.4	16.4	NMHC Peak Area:	219833	223110
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.01	----
As found High point	4920	80.0	17.23	17.30	0.997
As found Mid point	4960	40.0	8.61	8.67	0.995
As found Low point	4980	20.0	4.31	4.37	0.990
New cylinder response					
Baseline Corr AF:	17.28	Prev response	17.17	*% change	0.7%
Baseline Corr 2nd AF:	8.66	AF Slope:	1.002856	AF Intercept:	0.029600
Baseline Corr 3rd AF:	4.35	AF Correlation:	0.999996	* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4920	80.0	17.23	17.19	1.002
Mid point	4960	40.0	8.61	8.65	0.996
Low point	4980	20.0	4.31	4.33	0.995
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	17.23	17.39	0.990
				Average Correction Factor	0.998

Notes: H2 cylider changed out after as founds. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.0	9.15	9.28	0.986
As found Mid point	4960	40.0	4.57	4.59	0.996
As found Low point	4980	20.0	2.29	2.34	0.977
New cylinder response					
Baseline Corr AF:	9.28	Prev response	9.13	*% change	1.6%
Baseline Corr 2nd AF:	4.59	AF Slope:	1.012612	AF Intercept:	-0.000800
Baseline Corr 3rd AF:	2.34	AF Correlation:	0.999946	* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.0	9.15	9.15	0.999
Mid point	4960	40.0	4.57	4.60	0.994
Low point	4980	20.0	2.29	2.31	0.990
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	9.15	9.24	0.990
				Average Correction Factor	0.995

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.01	----
As found High point	4920	80.0	8.08	8.02	1.009
As found Mid point	4960	40.0	4.04	4.08	0.993
As found Low point	4980	20.0	2.02	2.03	1.004
New cylinder response					
Baseline Corr AF:	8.01	Prev response	8.04	*% change	-0.4%
Baseline Corr 2nd AF:	4.07	AF Slope:	0.991568	AF Intercept:	0.031000
Baseline Corr 3rd AF:	2.01	AF Correlation:	0.999914	* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.01	----
High point	4920	80.0	8.08	8.04	1.005
Mid point	4960	40.0	4.04	4.05	0.998
Low point	4980	20.0	2.02	2.02	1.001
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.0	8.08	8.16	0.990
				Average Correction Factor	1.001

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.995611	0.997150
THC Cal Offset:	0.019200	0.029600
CH4 Cal Slope:	0.993761	0.993818
CH4 Cal Offset:	0.011000	0.016800
NMHC Cal Slope:	0.997420	1.000106
NMHC Cal Offset:	0.008000	0.013000

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

THC Calibration Summary

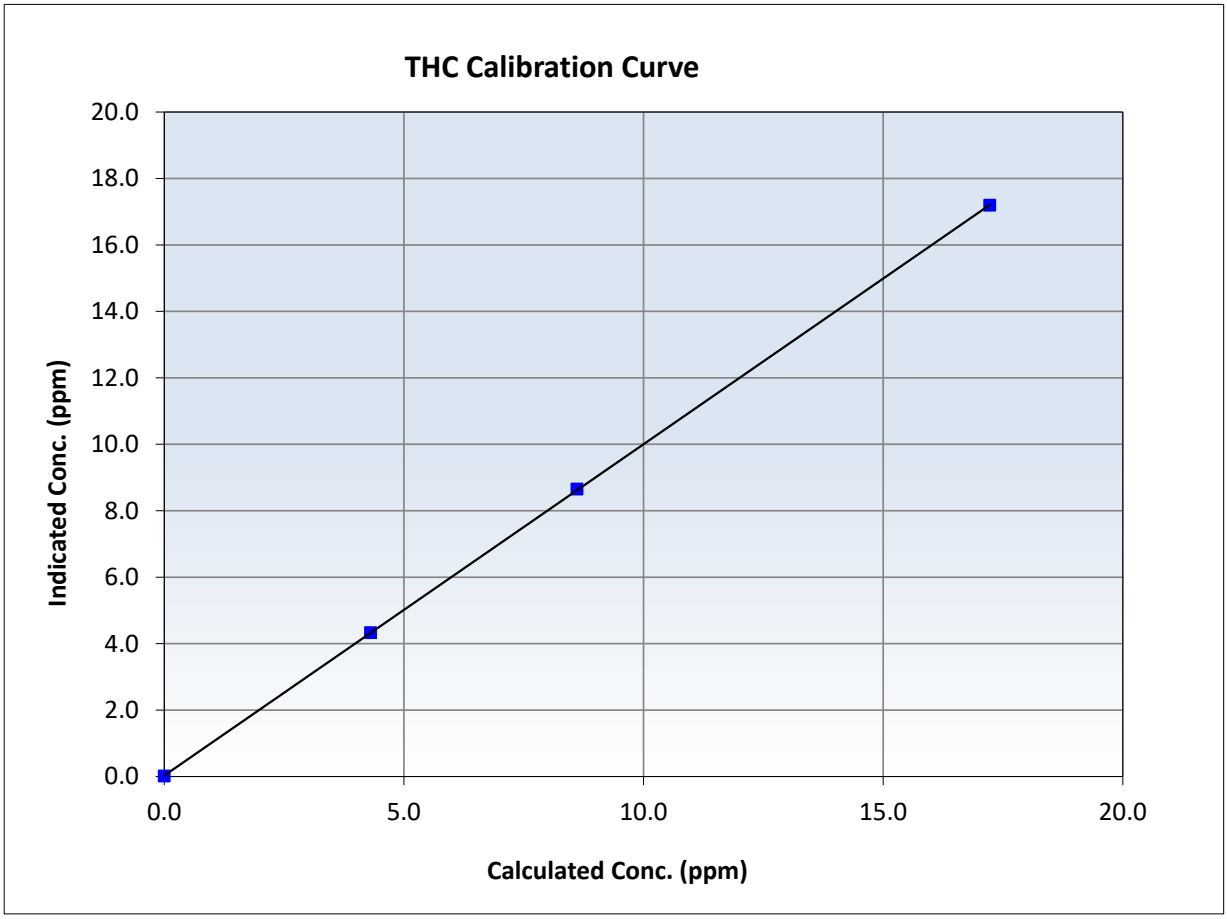
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:30	End Time (MST):	16:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.01	----
17.23	17.19	1.0020
8.61	8.65	0.9960
4.31	4.33	0.9955

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	0.997150	*0.90 - 1.10*
Intercept	0.029600	*+/-0.5*



Wood Buffalo Environmental Association

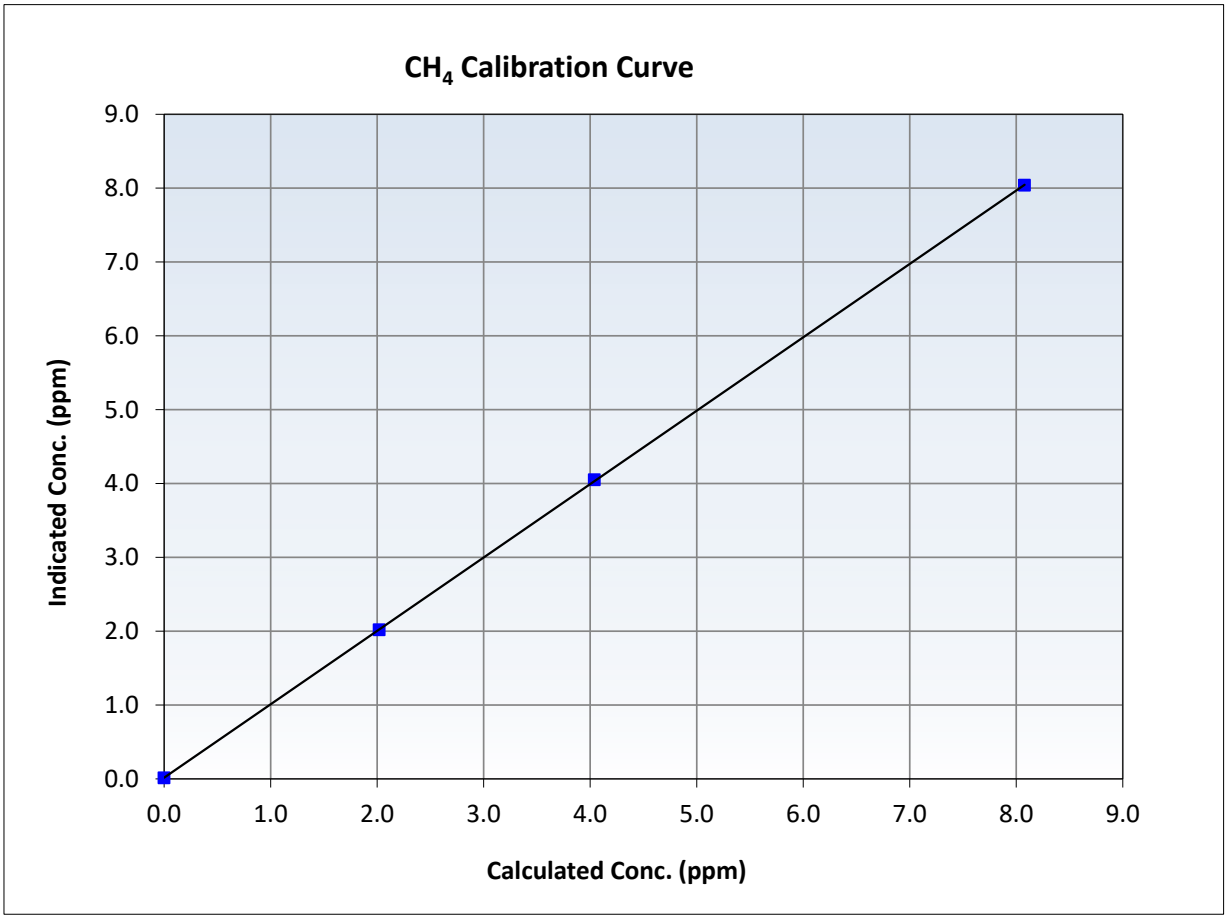
CH_4 Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:30	End Time (MST):	16:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.01	----	Correlation Coefficient	0.999988	≥0.995
8.08	8.04	1.0050	Slope	0.993818	0.90 - 1.10
4.04	4.05	0.9976			
2.02	2.02	1.0013	Intercept	0.016800	+/-0.5



Wood Buffalo Environmental Association

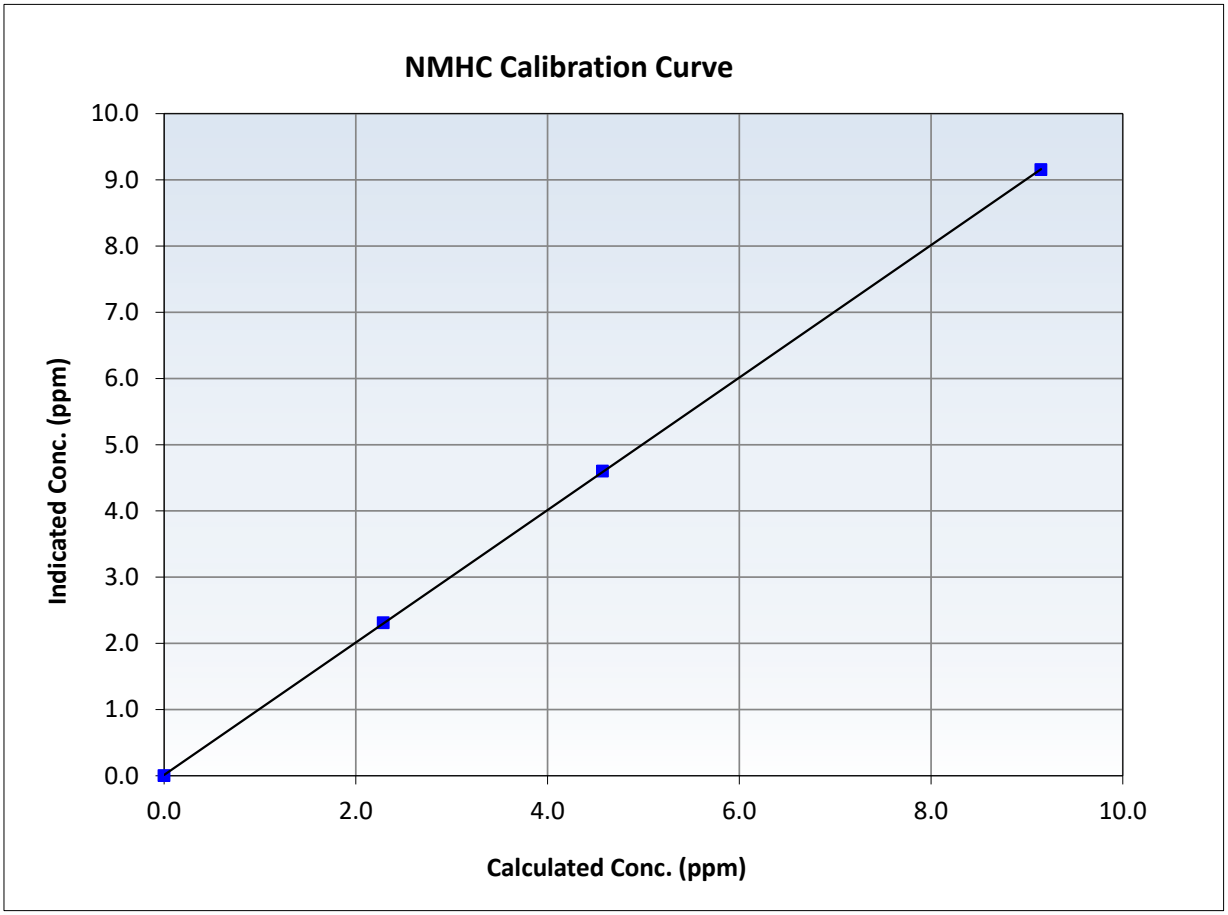
NMHC Calibration Summary

Station Information

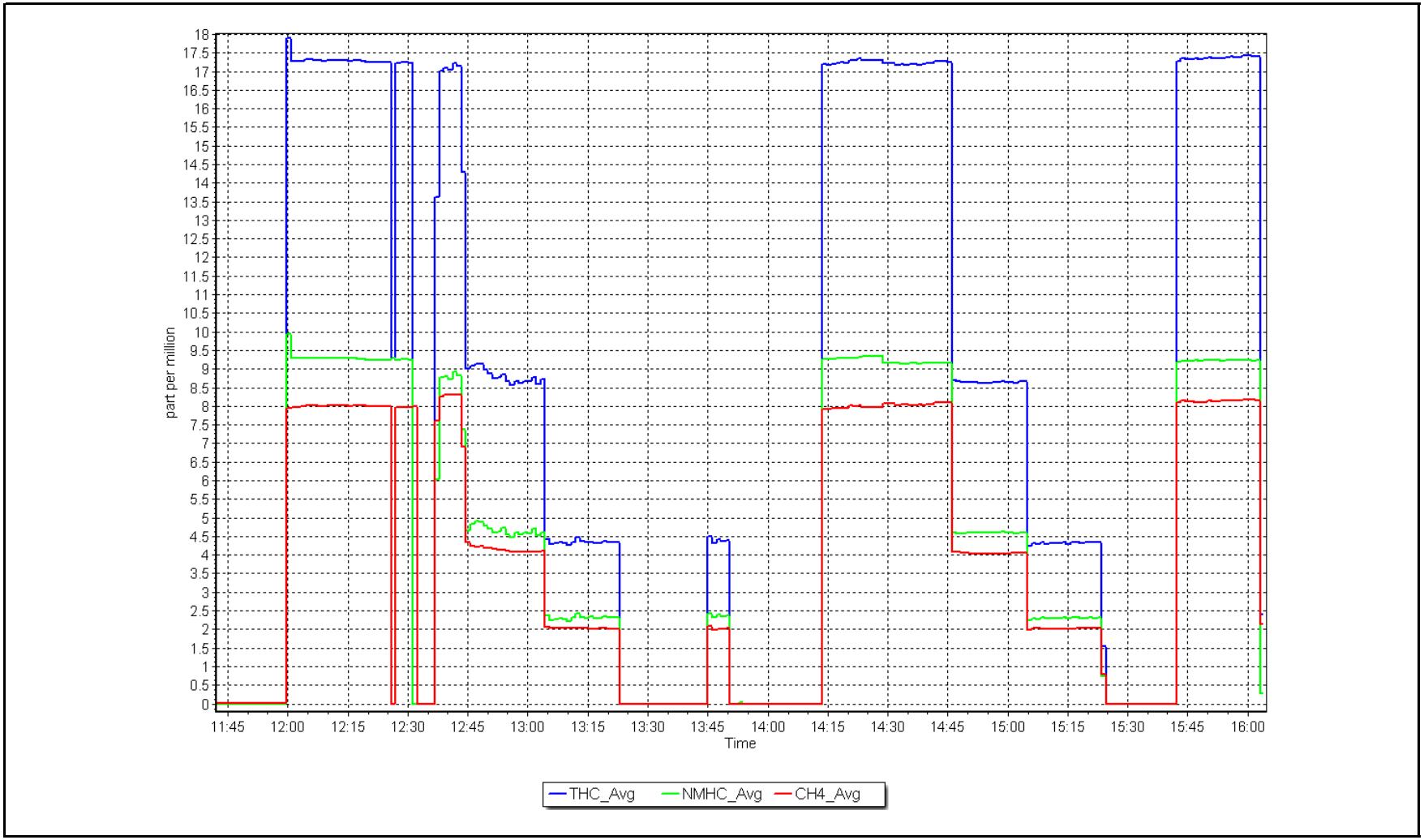
Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:30	End Time (MST):	16:04
Analyzer make:	Thermo 55i	Analyzer serial #:	1193585647

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999989	≥0.995
9.15	9.15	0.9994	Slope	1.000106	0.90 - 1.10
4.57	4.60	0.9943	Intercept	0.013000	+/-0.5
2.29	2.31	0.9904			



NMHC Calibration Plot Date: November 21, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Stony Mountain
Station number:	AMS 18
Calibration Date:	November 28, 2024
Last Cal Date:	October 23, 2024
Start time (MST):	11:42
End time (MST):	17:05
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0045516	Cal Gas Expiry Date:	November 17, 2026
NOX Cal Gas Conc:	60.30 ppm	NO Cal Gas Conc:	60.10 ppm
Removed Cylinder #:	N/A	Removed Gas Exp Date:	N/A
Removed Gas NOX Conc:	60.30 ppm	Removed Gas NO Conc:	60.10 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T750	Serial Number:	282
ZAG make/model:	Teledyne API 751H	Serial Number:	321

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	6.5	6.2	0.3	----	----
AF High point	4933	66.6	803.3	800.6	2.7	815.9	813.1	2.8	0.9924	0.9922
AF Mid point										
AF Low point										
New cyl resp										

Previous Respo 4933 NO_X = 806.1 ppb NO = 804.7 ppb

Baseline Corr 1st pt NO_X = 809.4 ppb NO = 806.9 ppb

Baseline Corr 2nd pt NO_X = NA ppb NO = NA ppb

Baseline Corr 3rd pt NO_X = NA ppb NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = 0.4%

*Percent Change NO = 0.3%

As Found Statistics

As found NO_X r^2: Nx Sl: Nx Int:

As found NO r^2: NO Sl: NO Int:

As found NO_2 r^2: NO2 Sl: NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 1035

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.910	0.906	NO bkgnd or offset:	-55.2	-38.0
NOX coeff or slope:	0.909	0.904	NOX bkgnd or offset:	-54.8	-37.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	7.0	7.2

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.002362	1.001325
NO_X Cal Offset:	0.933941	-0.027026
NO Cal Slope:	1.004515	1.002817
NO Cal Offset:	0.472863	-0.207696
NO_2 Cal Slope:	1.001034	0.990356
NO_2 Cal Offset:	-0.074456	1.039482

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.4	-0.5	----	----
High point	4933	66.6	803.3	800.6	2.7	803.5	802.4	1.0	0.9997	0.9978
Mid point	4967	33.3	401.6	400.2	1.3	403.6	401.7	1.9	0.9950	0.9964
Low point	4983	16.6	200.2	199.5	0.7	200.6	199.8	0.8	0.9981	0.9987
As left zero										
As left span										
								Average Correction Factor	0.9976	0.9976

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.5	----	----
High GPT point	798.3	416.3	384.7	381.0	1.0096	99.0%
Mid GPT point	798.3	612.9	188.1	188.8	0.9961	100.4%
Low GPT point	798.3	704.8	96.2	97.3	0.9883	101.2%
				Average Correction Factor	0.9980	100.2%

Notes: Portable setup used for calibration. Zero and span adjusted. No as lefts done.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

NO_X Calibration Summary

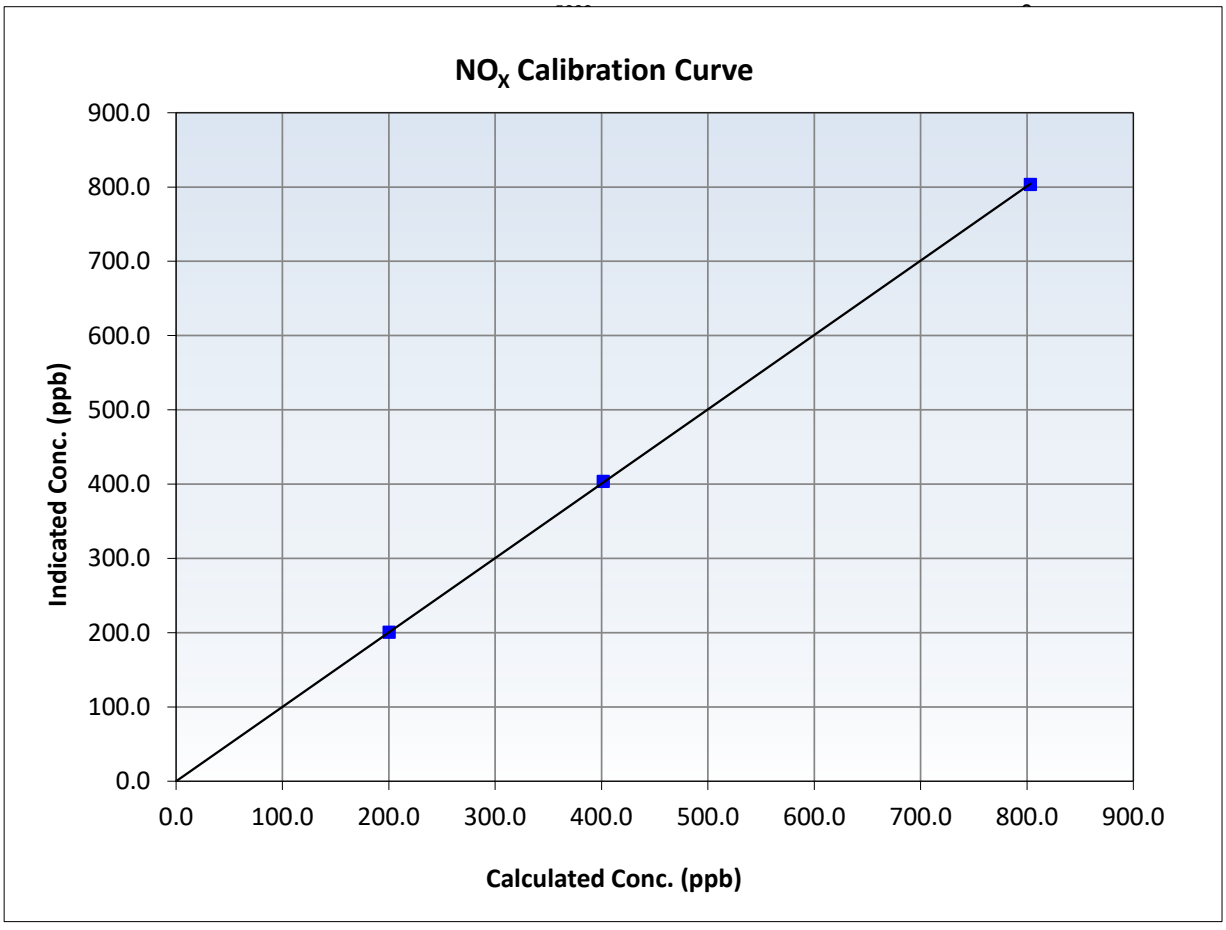
Station Information

Calibration Date:	November 28, 2024	Previous Calibration:	October 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:42	End Time (MST):	17:05
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.9	----
803.3	803.5	0.9997
401.6	403.6	0.9950
200.2	200.6	0.9981

Statistical Evaluation		Limits
Correlation Coefficient	0.999989	≥0.995
Slope	1.001325	0.90 - 1.10
Intercept	-0.027026	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

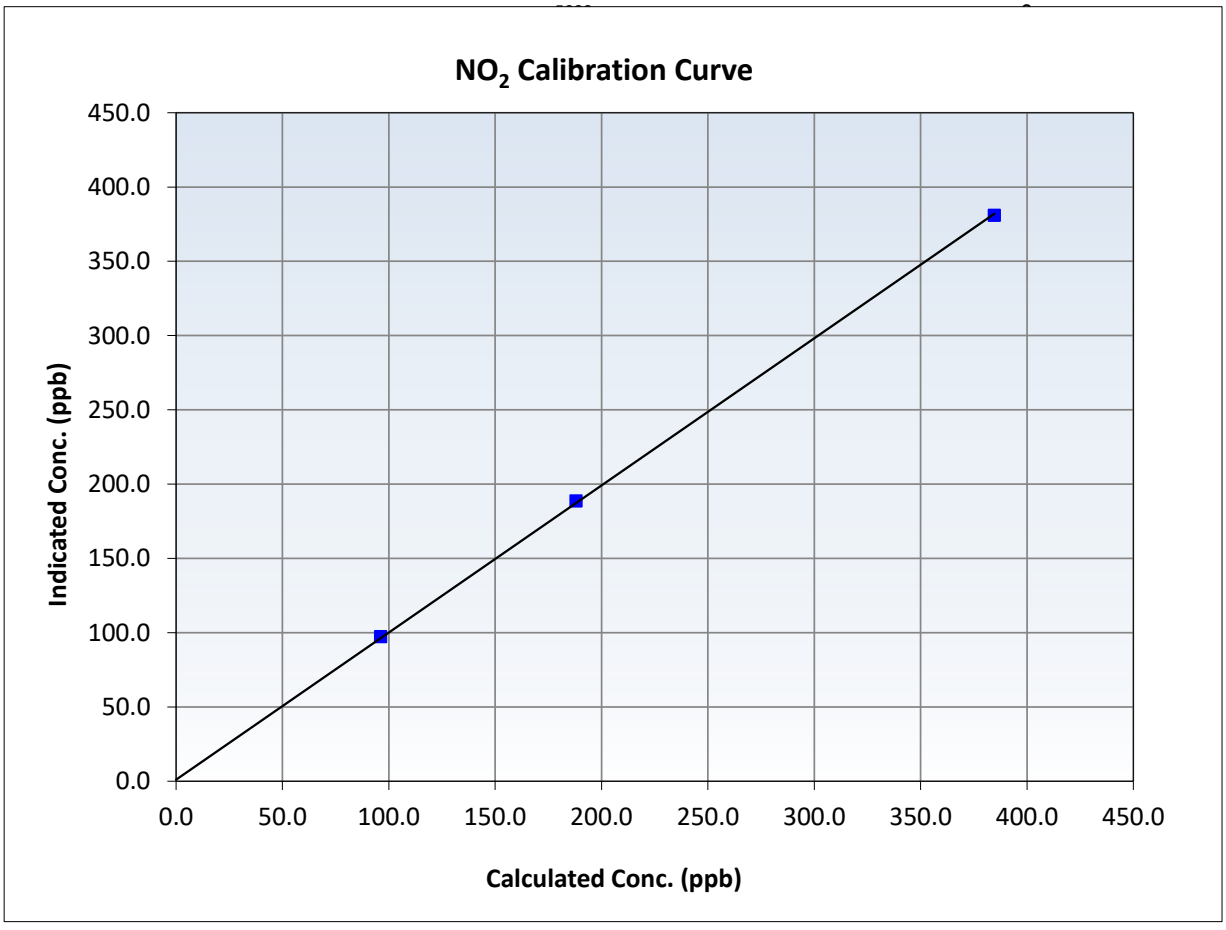
Station Information

Calibration Date:	November 28, 2024	Previous Calibration:	October 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:42	End Time (MST):	17:05
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.5	----
384.7	381.0	1.0096
188.1	188.8	0.9961
96.2	97.3	0.9883

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999916	*≥0.995*
Slope	0.990356	*0.90 - 1.10*
Intercept	1.039482	*+/-20*



Wood Buffalo Environmental Association

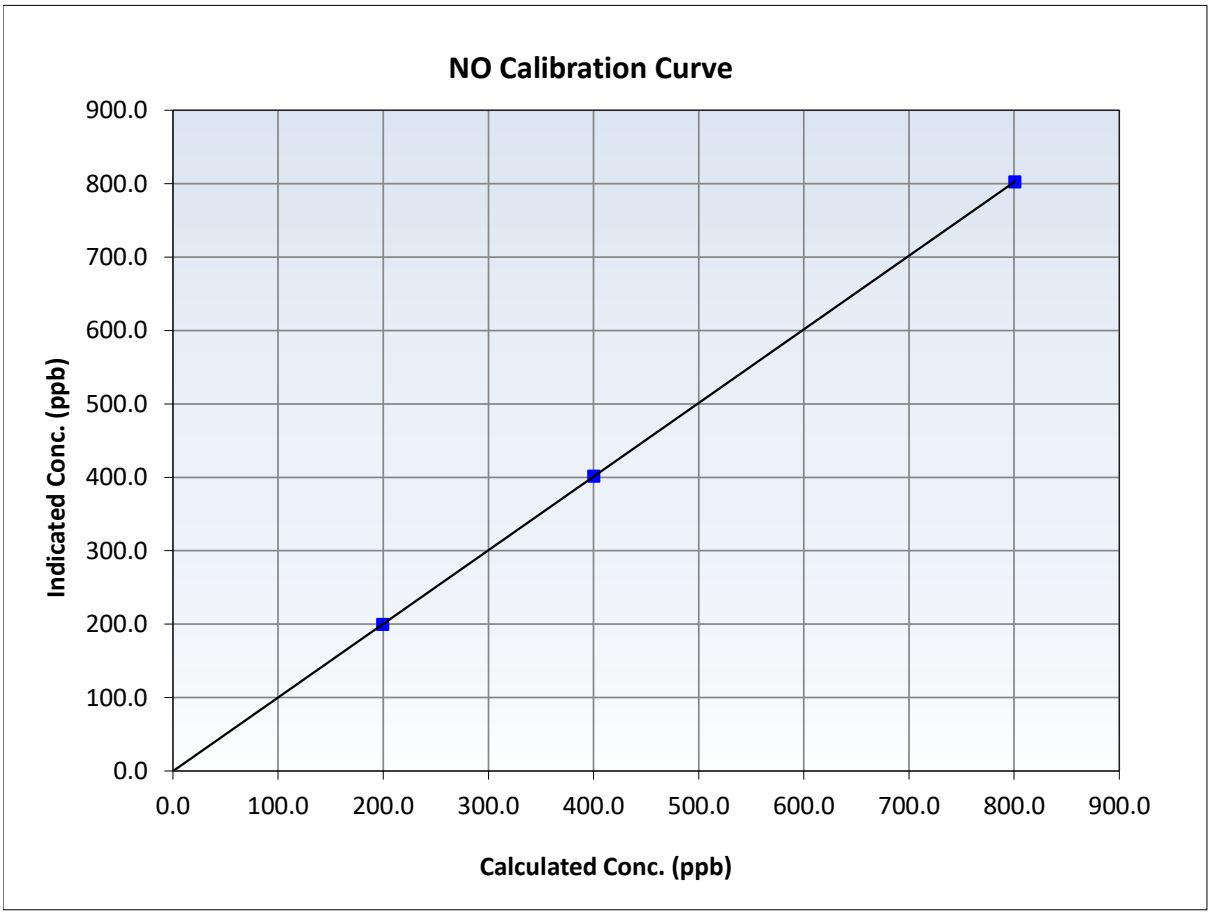
NO Calibration Summary

Station Information

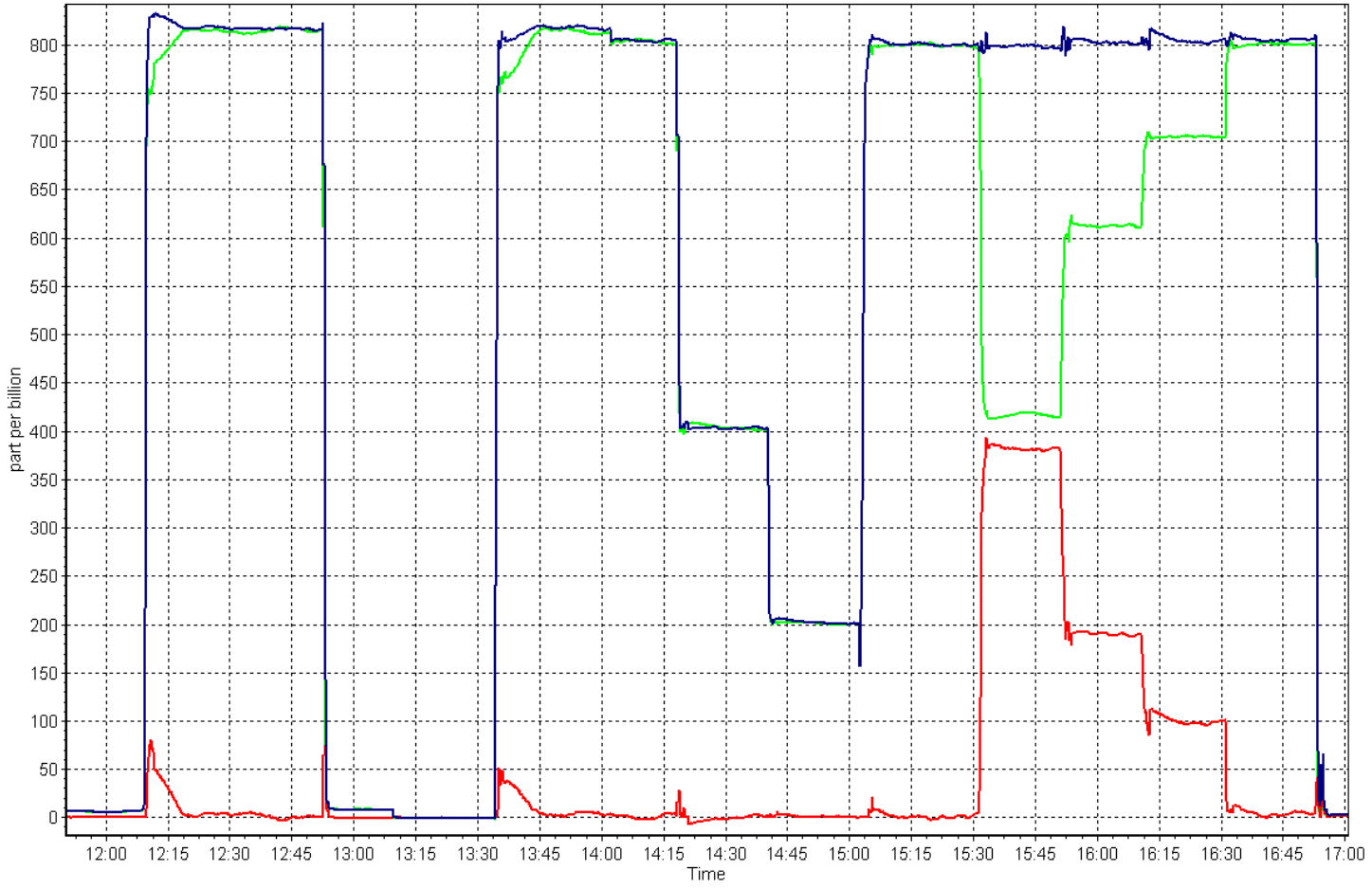
Calibration Date:	November 28, 2024	Previous Calibration:	October 23, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:42	End Time (MST):	17:05
Analyzer make:	Teledyne API T200	Analyzer serial #:	1035

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	-0.4	----	Correlation Coefficient	0.999999	*≥0.995*
800.6	802.4	0.9978	Slope	1.002817	*0.90 - 1.10*
400.2	401.7	0.9964			
199.5	199.8	0.9987	Intercept	-0.207696	*+/-20*
		5000		0	
		4933		66.6	



NO_X Calibration Plot Date: November 28, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 20, 2024	Last Cal Date:	October 22, 2024
Start time (MST):	11:15	End time (MST):	15:16
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	2658
ZAG Make/Model:	Teledyne API 701H	Serial Number:	355

Analyzer Information

Analyzer make:	API T400		Analyzer serial #:	825	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000600	0.999629	Backgd or Offset:	2.8	2.0
Calibration intercept:	-2.080000	0.540000	Coeff or Slope:	1.008	0.994

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	NA	0.0	-0.8	----
As found High point	4888	1138.1	400.0	405.5	0.984
As found Mid point					
As found Low point					
Baseline Corr As found:	406.3	Previous response	398.2	*% change	2.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	NA	0.0	0.2	----
High point	4888	1138.1	400.0	400.2	1.000
Mid point	4888	884.5	200.0	200.7	0.997
Low point	4888	741.4	100.0	100.8	0.992
As left zero	5000	NA	0.0	0.2	----
As left span	4812	1097.9	400.0	401.6	0.996
				Average Correction Factor	0.996

Notes: Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

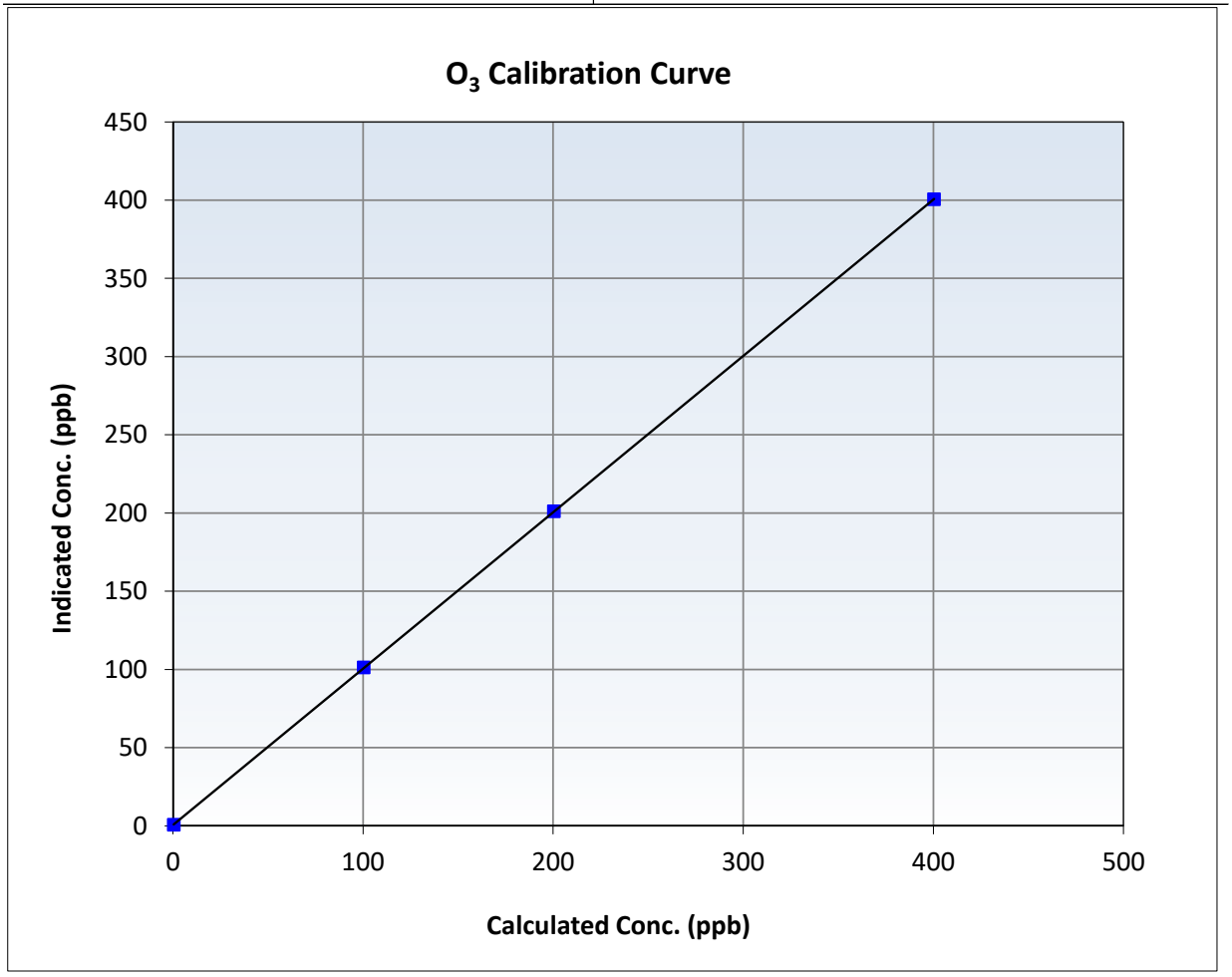
O_3 Calibration Summary

Station Information

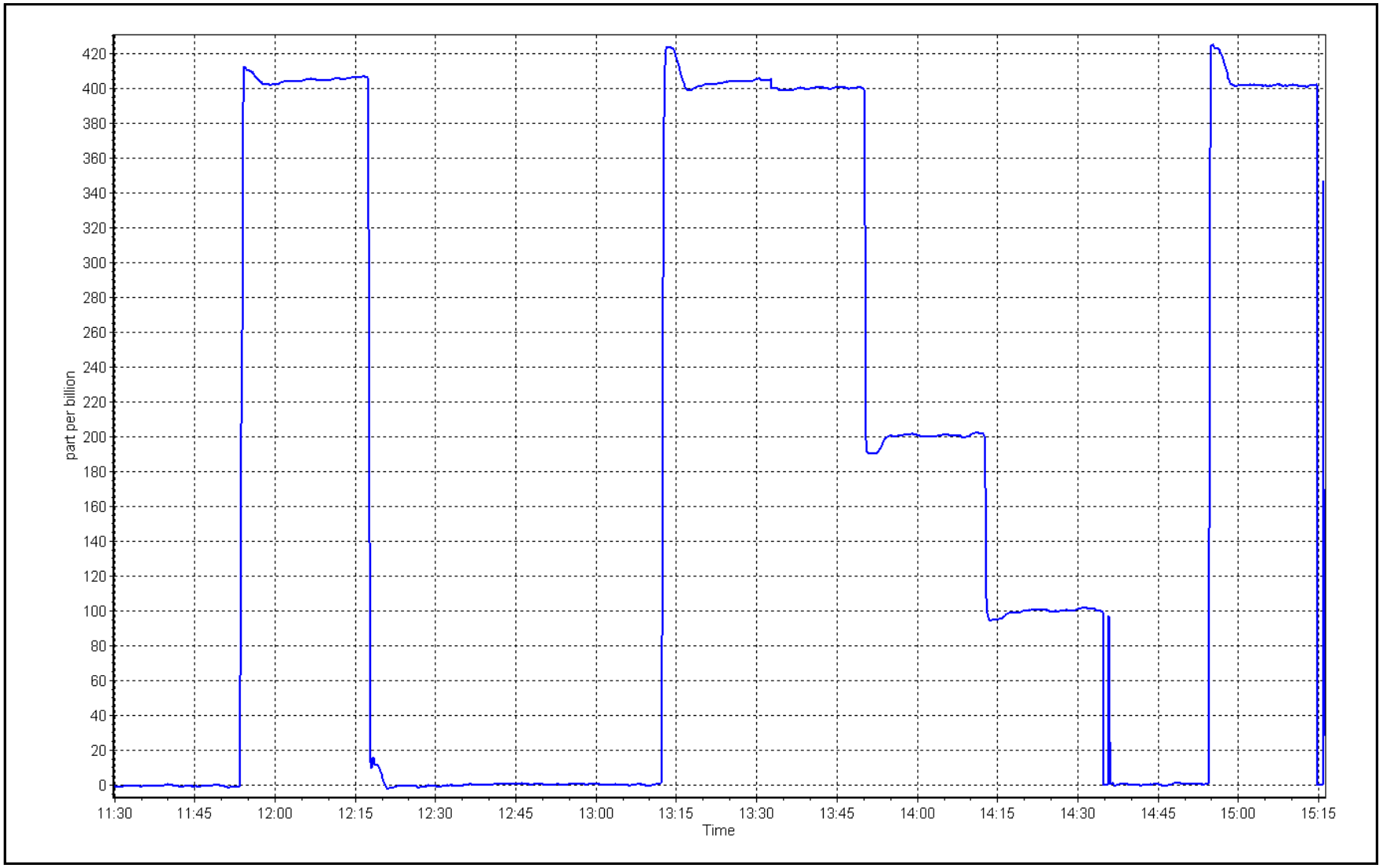
Calibration Date:	November 20, 2024	Previous Calibration:	October 22, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:15	End Time (MST):	15:16
Analyzer make:	API T400	Analyzer serial #:	825

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999997	*≥0.995*
400.0	400.2	0.9995	Slope	0.999629	*0.90 - 1.10*
200.0	200.7	0.9965			
100.0	100.8	0.9921	Intercept	0.540000	*+/- 5*



O_3 Calibration Plot Date: November 20, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 28, 2024	Last Cal Date:	October 31, 2024
Start time (MST):	16:22	End time (MST):	17:11
Analyzer Make:	API T640	S/N:	324
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388750
Temp/RH standard:	Alicat FP-25BT	S/N:	388750

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-20.1	-21.3	-20.1	☐	+/- 2 °C
P (mmHg)	710	697.30	710	☐	+/- 10 mmHg
Flow (LPM)	4.99	5.05	4.99	☐	+/- 0.25 LPM
PW% (pump)	45	-----	45	☐	>80%
Zero Verification	PM w/o HEPA:	3.4	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: September 24, 2024

Date Disposable Filter Changed: September 24, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: July 4, 2024

Date RH/T Sensor Cleaned: July 4, 2024

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

Calibration by: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 7, 2024	Last Cal Date:	October 22, 2024
Start time (MST):	11:15	End time (MST):	14:03
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	3,080	ppm	Cal Gas Exp Date:	November 4, 2028
Cal Gas Cylinder #:	EB0065608			
Removed Cal Gas Conc:	3,080	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
ZAG Make/Model:	Teledyne API T701H		Serial Number:	355

Analyzer Information

Analyzer make:	Teledyne API T300		Analyzer serial #:	3504	
Analyzer Range:	0 - 50 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.005783	1.005671	Backgd or Offset:	-0.011	-0.011
Calibration intercept:	0.127776	0.149779	Coeff or Slope:	0.909	0.909

CO As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4933	66.7	41.1	41.5	0.993
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr As found:	41.38	Prev response:	41.46	*% change:	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4933	66.7	41.1	41.4	0.993
Mid point	4966	33.3	20.5	21.0	0.979
Low point	4983	16.7	10.3	10.5	0.984
As left zero	5000	0.0	0.0	0.1	----
As left span	4933	66.7	41.1	41.4	0.992
				Average Correction Factor	0.985

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO Calibration Summary

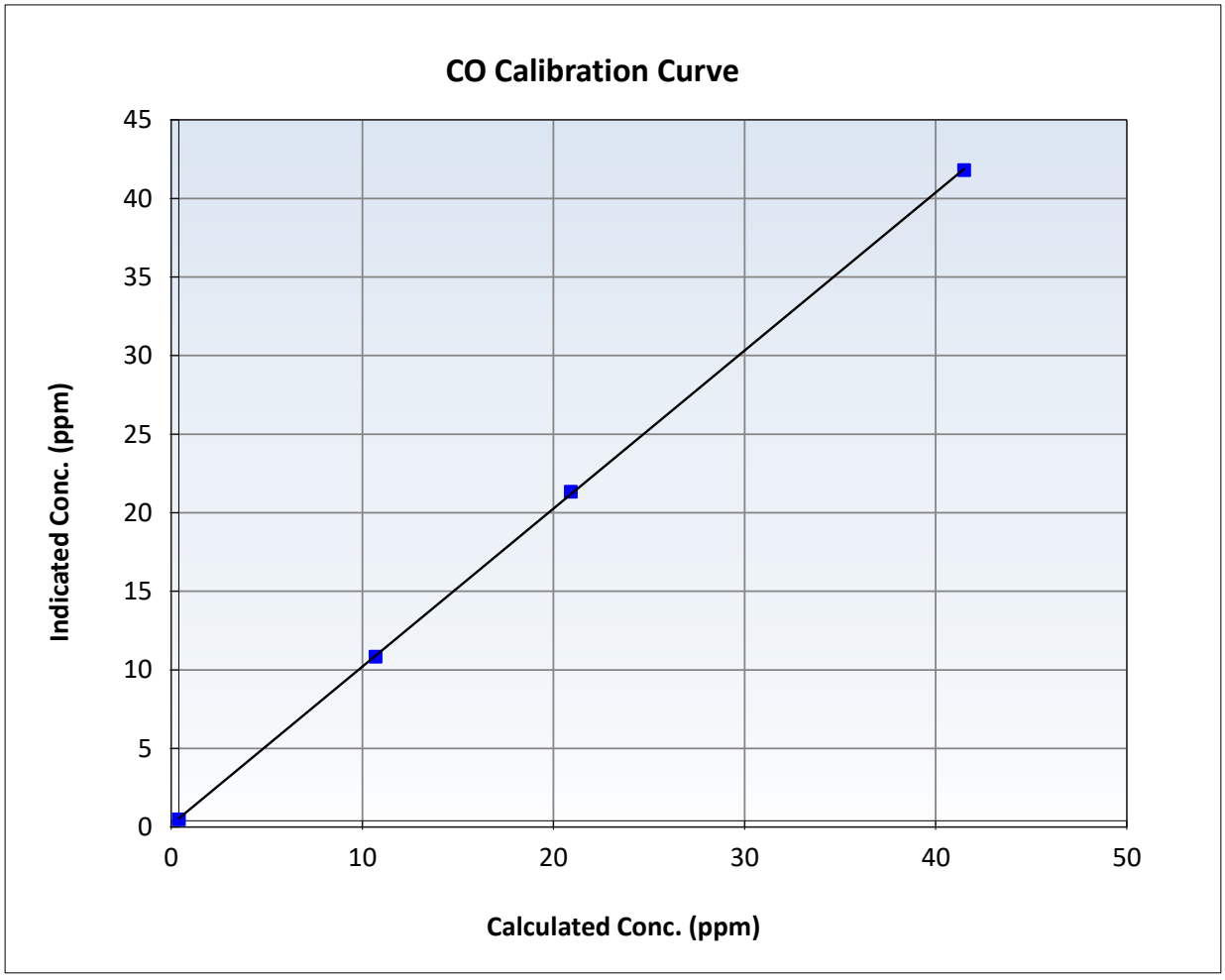
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 22, 2024
Station Name:	Stony Mountain	Station Number:	AMS 18
Start Time (MST):	11:15	End Time (MST):	14:03
Analyzer make:	Teledyne API T300	Analyzer serial #:	3504

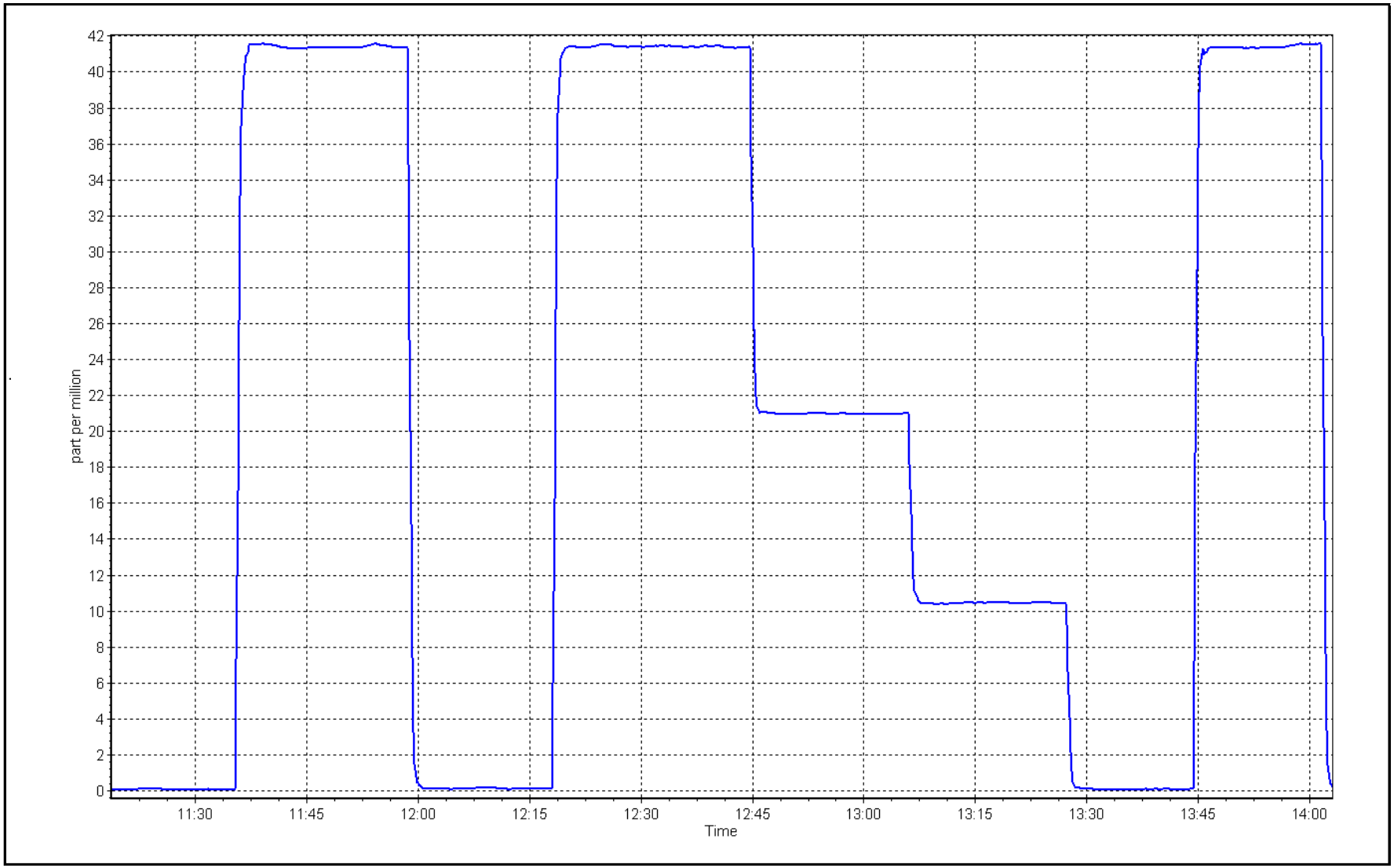
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
41.1	41.4	0.9925
20.5	21.0	0.9793
10.3	10.5	0.9845

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999959	*≥0.995*
Slope	1.005671	*0.90 - 1.10*
Intercept	0.149779	*+/-1.5*



CO Calibration Plot Date: November 7, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

CO_2 Calibration Report

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	November 19, 2024	Last Cal Date:	October 31, 2024
Start time (MST):	11:27	End time (MST):	14:33
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	59,100	ppm	Cal Gas Exp Date:	November 4, 2028
Cal Gas Cylinder #:	EB0065608			
Removed Cal Gas Conc:	59,100	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658
N2 Gen Make/Model:	Peak Scientific		Serial Number:	771048317

Analyzer Information

Analyzer make:	API T360		Analyzer serial #:	489	
Analyzer Range	0 - 2,000 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999739	1.001022	Backgd or Offset:	-0.068	-0.068
Calibration intercept:	-5.220000	-5.080000	Coeff or Slope:	0.961	0.961

CO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	3000	0.0	0.0	-0.6	----
As found High Point	2920	80.0	1576.0	1573.6	1.001
As found Mid Point					
As found Low Point					
New cylinder response					

Baseline Corr As found:	1574.2	Prev response:	1570.4	*% change:	0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	3000	0.0	0.0	-0.2	----
High point	2920	80.0	1576.0	1577.0	0.999
Mid point	2960	40.0	788.0	775.2	1.017
Low point	2980	20.0	394.0	388.5	1.014
As left zero	3000	0.0	0.0	-0.6	----
As left span	2930	80.0	1570.8	1573.6	0.998
				Average Correction Factor	1.010

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar

Wood Buffalo Environmental Association

CO_2 Calibration Summary

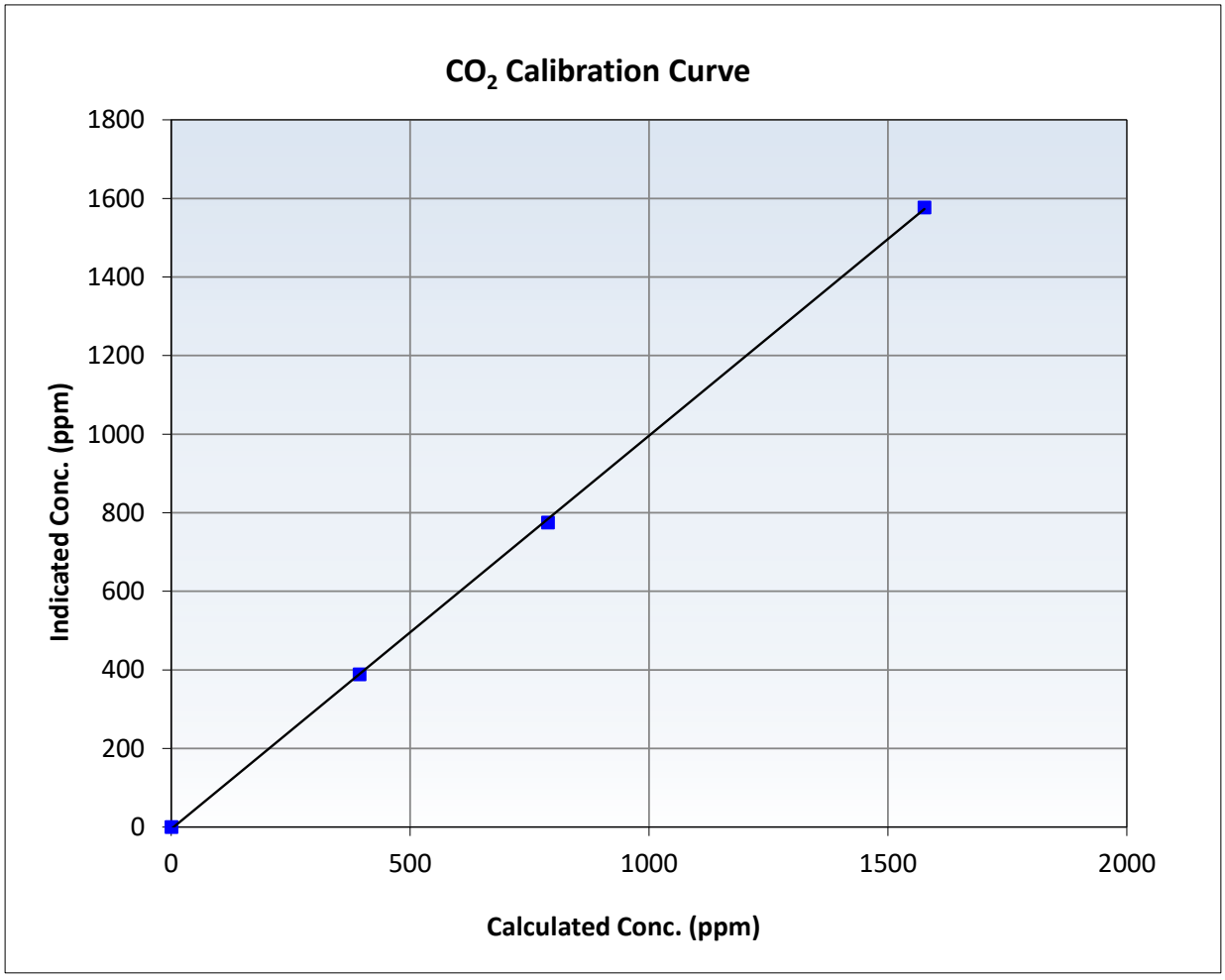
Station Information

Calibration Date	November 19, 2024	Previous Calibration	October 31, 2024
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:27	End Time (MST)	14:33
Analyzer make	API T360	Analyzer serial #	489

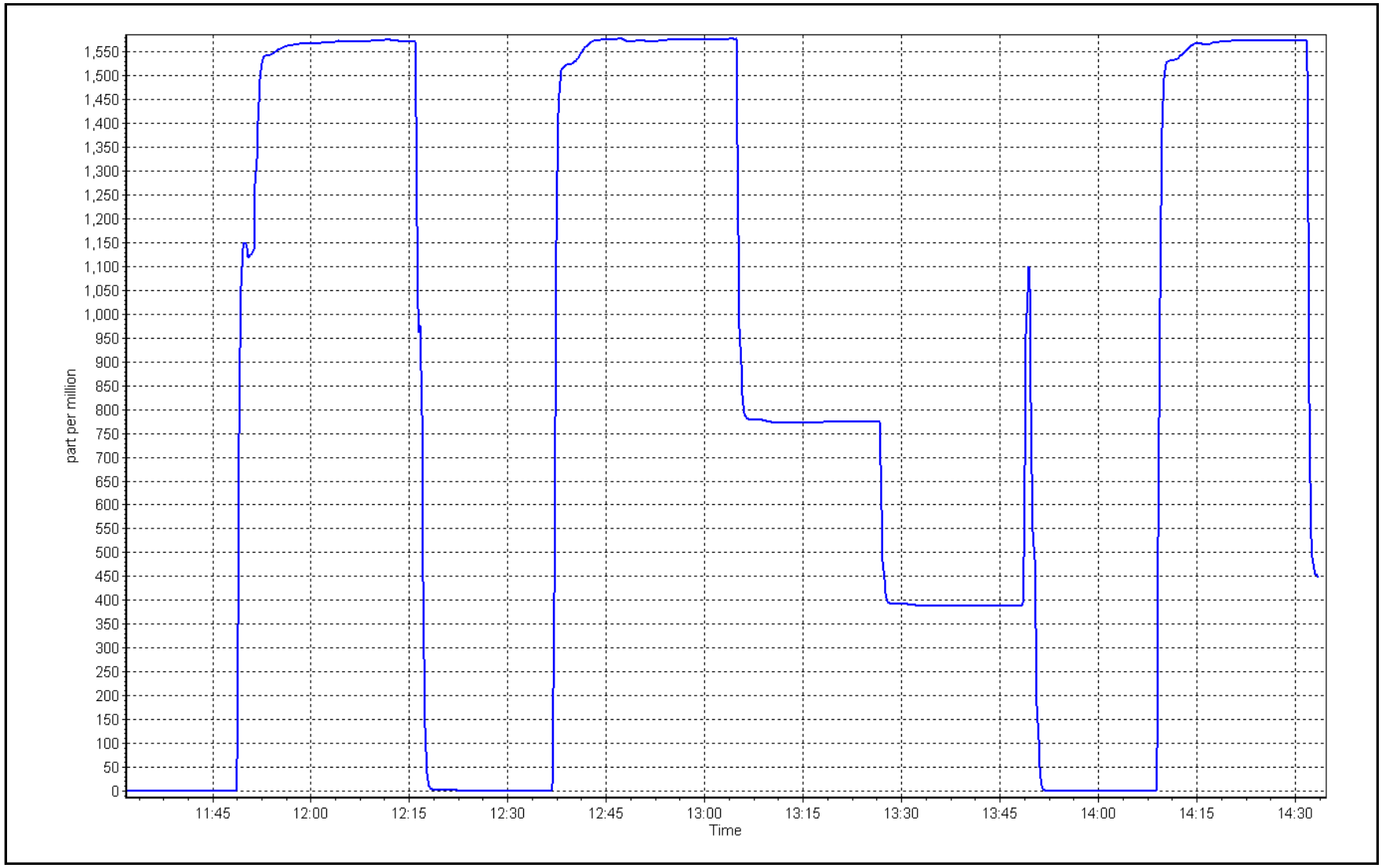
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
1576.0	1577.0	0.9994
788.0	775.2	1.0165
394.0	388.5	1.0142

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999914	*≥0.995*
Slope	1.001022	*0.90 - 1.10*
Intercept	-5.1	*+/-20*



CO_2 Calibration Plot Date: November 19, 2024 Location: Stony Mountain



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Stony Mountain	Station Number:	AMS 18
Calibration Date:	November 13, 2024	Prev Cal Date:	October 8, 2024
Start Time (MST):	11:30	End Time (MST):	12:30
Tower Height (m):	20.0	Reason:	Install

Wind Speed Information

Sensor make/model:	Met One 010C	Serial Number:	W23536
WS Calibrator:	RM Young 053-120	Serial Number:	NA

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error *Limit = +/- 1.5%*
0	0.0	0.0	---
200	20.2	20.3	0.4%
400	39.4	39.4	0.1%
600	58.6	58.7	0.2%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		0.999999	*≥0.9995*
Calculated slope		0.998843	*0.90 - 1.10*
Calculated intercept		-0.025014	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	C21021
As Found Declination (deg east of True North):	14	As Left Declination (deg east of True North):	14
Solar noon time (MST):	NA	Calc Declination*:	14 Degrees
Deadband calc:	3.0 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	0.2	---
90	87.4	-0.7%
180	180.1	0.0%
270	267.9	-0.6%
355	354.2	-0.2%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)		0.999961	*≥0.9995*
Calculated slope		1.001576	*0.90 - 1.10*
Calculated intercept		0.765537	*+/- 4*

Notes: WS sensor replaced. WD direction information is from October install.

Calibration Performed By: Devin Russell/Ryan Power

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS19
FIREBAG
NOVEMBER 2024

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

December 23, 2024

CALS_364

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	November 18, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	11:33	End time (MST):	14:48
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.29	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC716618			
Removed Cal Gas Conc:	49.29	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	1607
Zero Air Gen Model:	Teledyne API T701H		Serial Number:	201

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1410661308	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.007593	1.002779	Backgd or Offset:	10.6	10.5
Calibration intercept:	-0.542421	0.417366	Coeff or Slope:	0.989	0.981

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	4999	0.0	0.0	0.1	----
As found High point	4919	81.1	799.5	806.0	0.992
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	805.9	Previous response	805.0	*% change	0.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	4999	0.0	0.0	0.3	----
High point	4919	81.1	799.5	802.0	0.997
Mid point	4959	40.6	400.3	402.0	0.996
Low point	4980	20.3	200.1	201.1	0.995
As left zero	4999	0.0	0.0	0.4	----
As left span	4919	81.1	799.5	801.0	0.998
				Average Correction Factor:	0.996

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

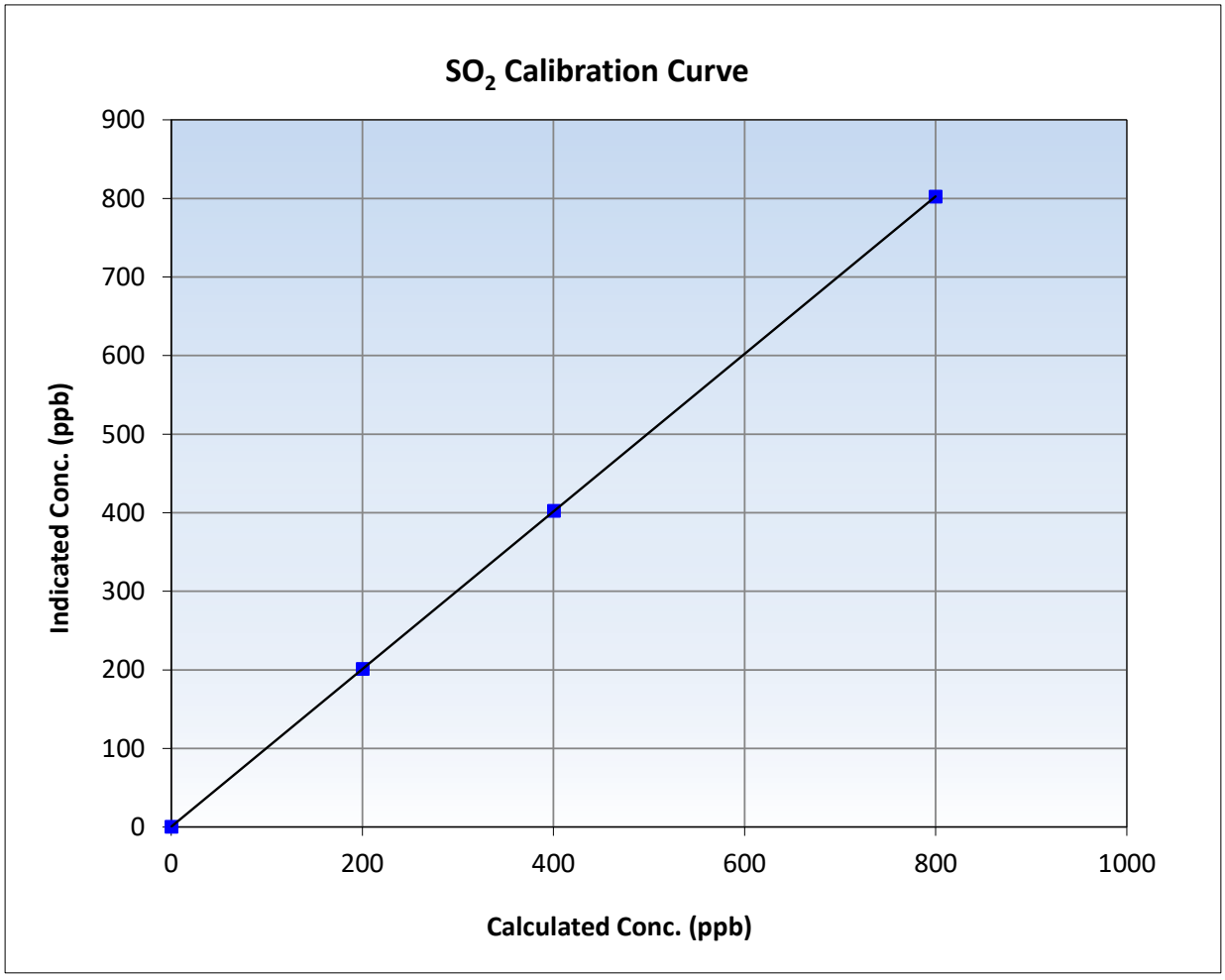
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 9, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:33	End Time (MST):	14:48
Analyzer make:	Thermo 43i	Analyzer serial #:	1410661308

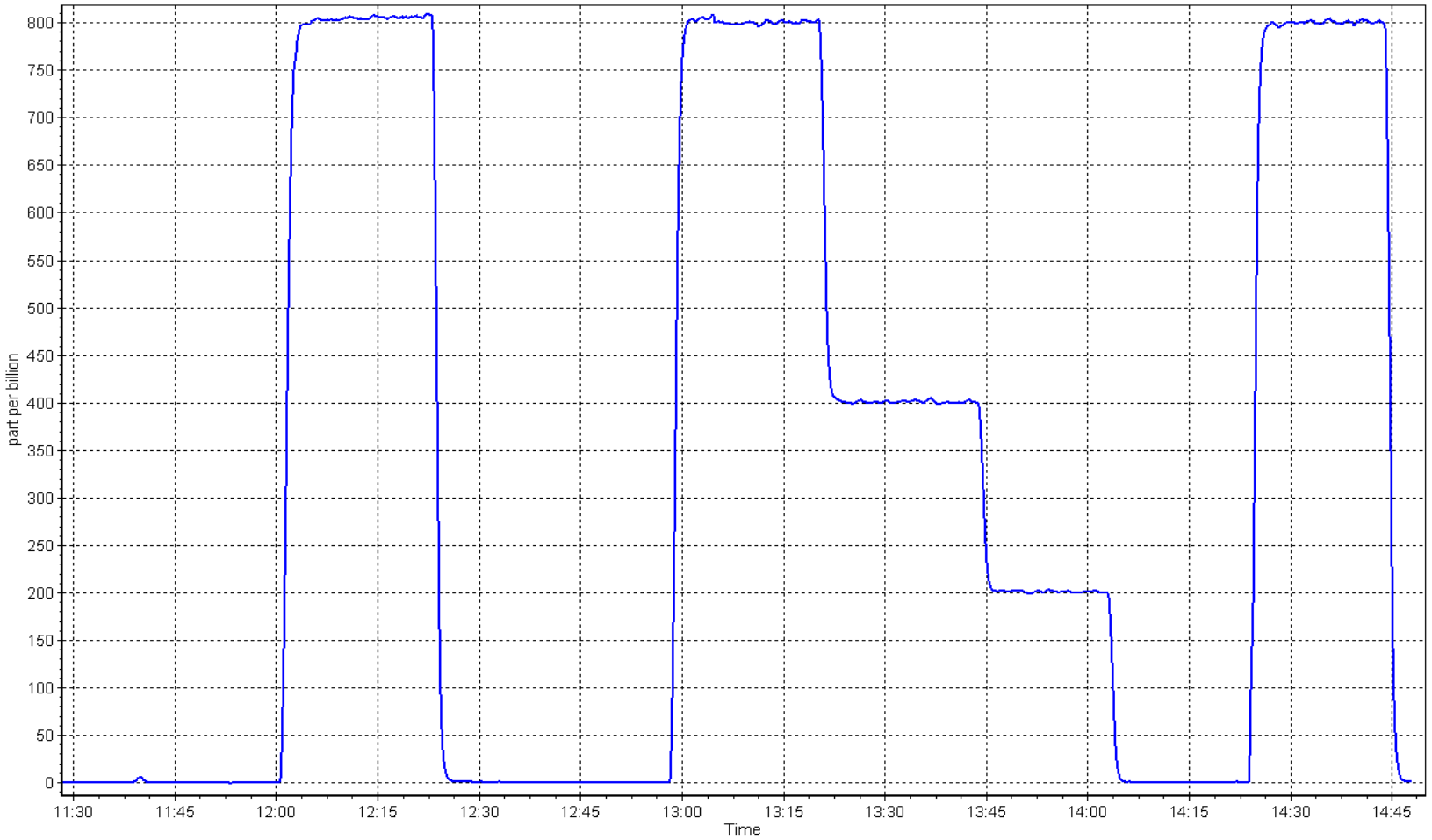
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.5	802.0	0.9968
400.3	402.0	0.9957
200.1	201.1	0.9951

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.002779	*0.90 - 1.10*
Intercept	0.417366	*+/-30*



SO2 Calibration Plot Date: November 18, 2024 Location: Firebag



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	November 25, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	13:03	End time (MST):	14:48
Reason:	As Found		

Calibration Standards

Cal Gas Concentration:	5.29	ppm	Cal Gas Exp Date:	March 19, 2027
Cal Gas Cylinder #:	DT0010492			
Removed Cal Gas Conc:	5.29	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1607
ZAG Make/Model:	Teledyne API T701		Serial Number:	201

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1151680032
Converter make:	Global		Converter serial #:	2022-222
Analyzer Range	0 - 100 ppb		Converter Temp:	350 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999333		Backgd or Offset:	2.80	2.80
Calibration intercept:	-0.020000		Coeff or Slope:	1.197	1.197

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.2	----
As found High point	4924	75.6	80.0	78.5	1.022
As found Mid point	4962	37.8	40.0	39.5	1.018
As found Low point	4981	18.9	20.0	19.9	1.015
New cylinder response					

Baseline Corr As found:	78.3	Prev response:	79.91	*% change:	-2.1%
Baseline Corr 2nd AF pt:	39.3	AF Slope:	0.978615	AF Intercept:	0.280000
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999994	* = > +/-5% change initiates investigation	

H2S Calibration Data

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

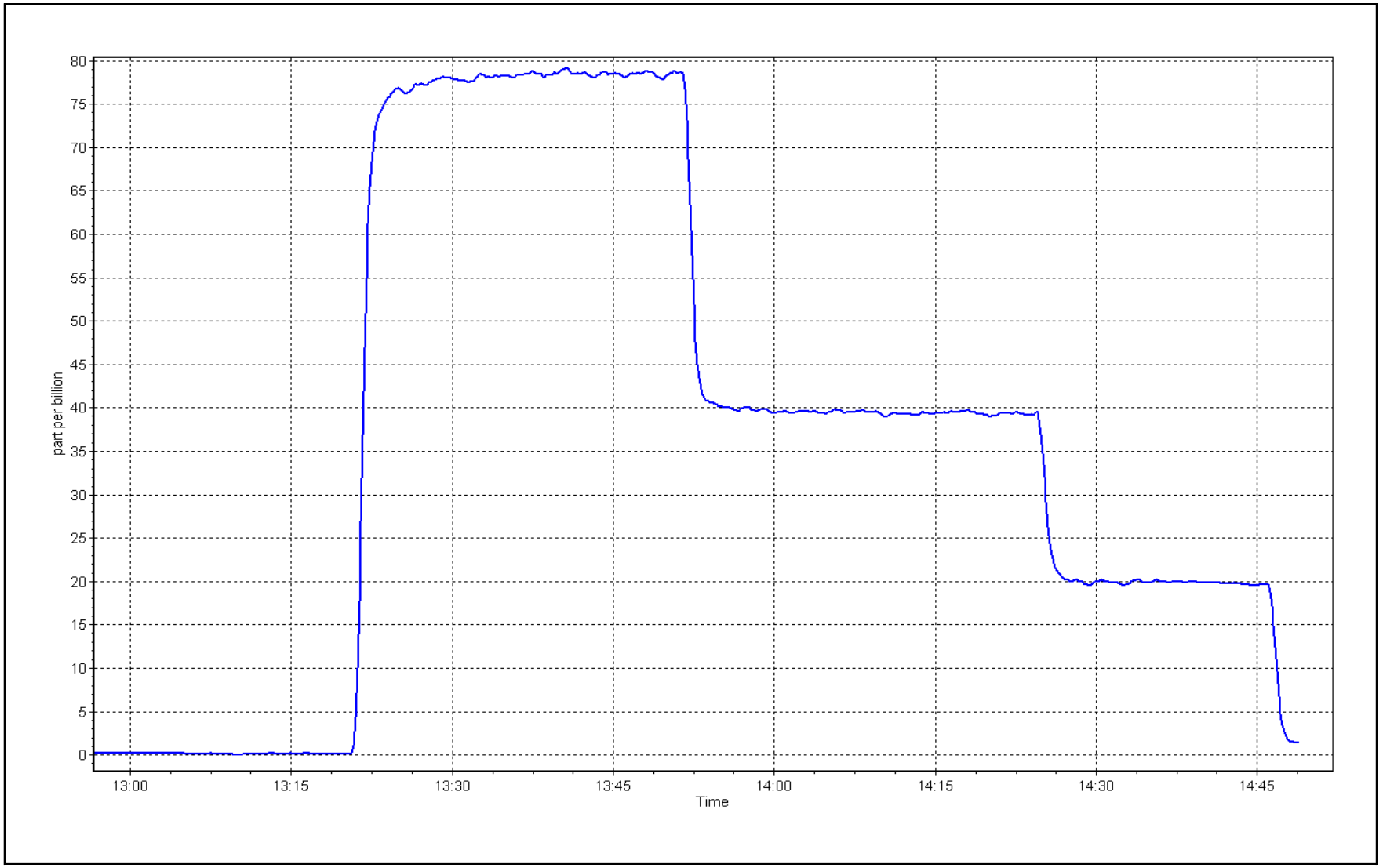
Date of last scrubber change: 18-Jan-23 Ave Corr Factor

Date of last converter efficiency test: n/a

Notes: As founds completed. After as founds, changed converter temperature from 350°C to 325°C. Calibration will be completed November 26.

Calibration Performed By: Braiden Boutilier

H2S Calibration Plot Date: November 25, 2024 Location: Firebag



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	November 26, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	11:20	End time (MST):	15:38
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.29	ppm	Cal Gas Exp Date:	March 19, 2027
Cal Gas Cylinder #:	DT0010492			
Removed Cal Gas Conc:	5.29	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1607
ZAG Make/Model:	Teledyne API T701		Serial Number:	201

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1151680032
Converter make:	Global		Converter serial #:	2022-222
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.999333	0.994189	Backgd or Offset:	2.80	2.94
Calibration intercept:	-0.020000	0.160000	Coeff or Slope:	1.197	1.205

H2S As Found Data

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

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

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4924	75.6	80.0	79.6	1.005
Mid point	4962	37.8	40.0	40.1	0.997
Low point	4981	18.9	20.0	20.0	1.000
As left zero	5000	0.0	0.0	0.2	----
As left span	4924	75.6	80.0	79.0	1.012
SO2 Scrubber Check	4922	78.3	783.0	0.0	----

Date of last scrubber change:	18-Jan-23	Ave Corr Factor	1.001	
Date of last converter efficiency test:	November 26, 2024	106.2%	efficiency	

Notes: Converter efficiency test completed. Adjusted zero and span.

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

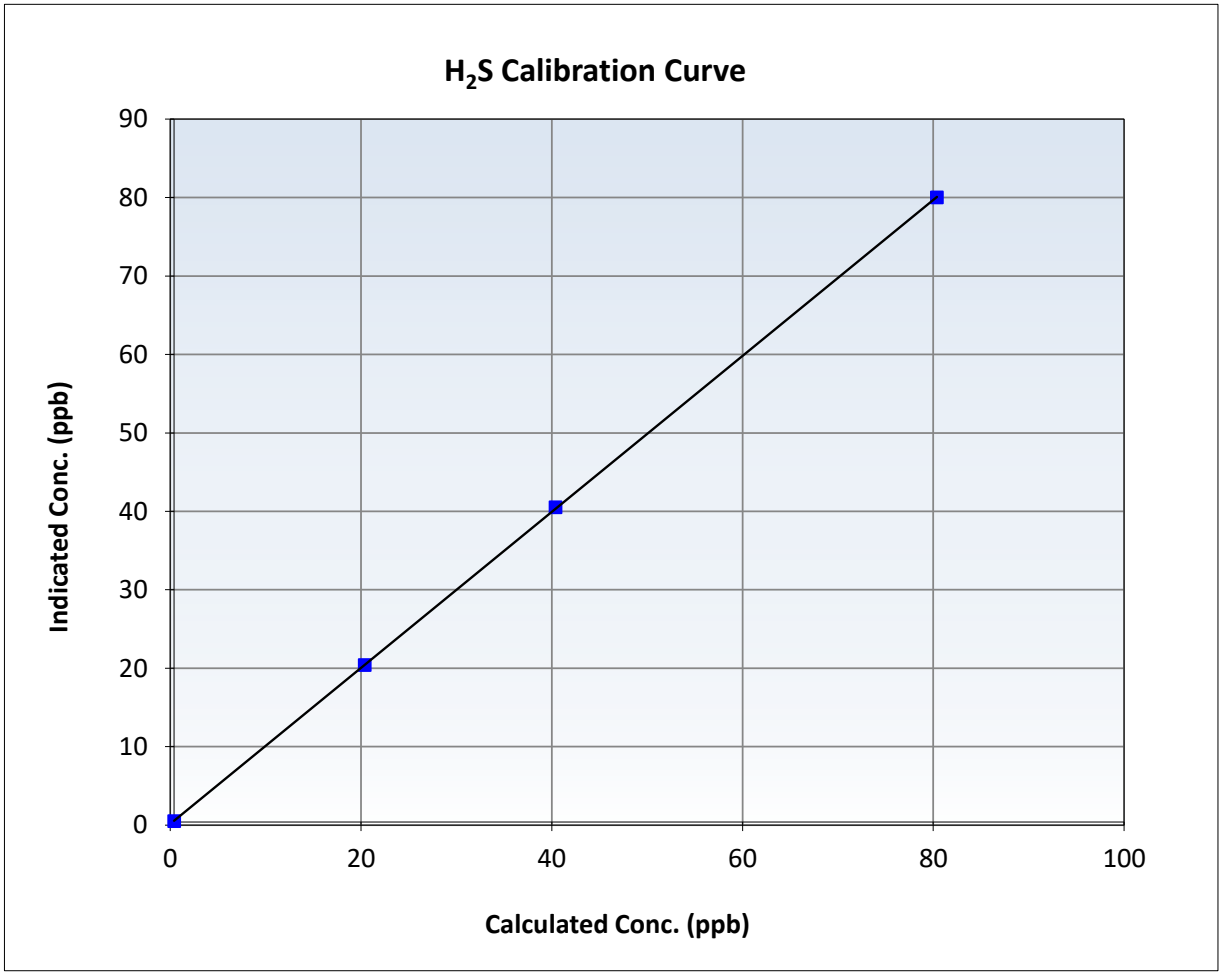
H2S Calibration Summary

Station Information

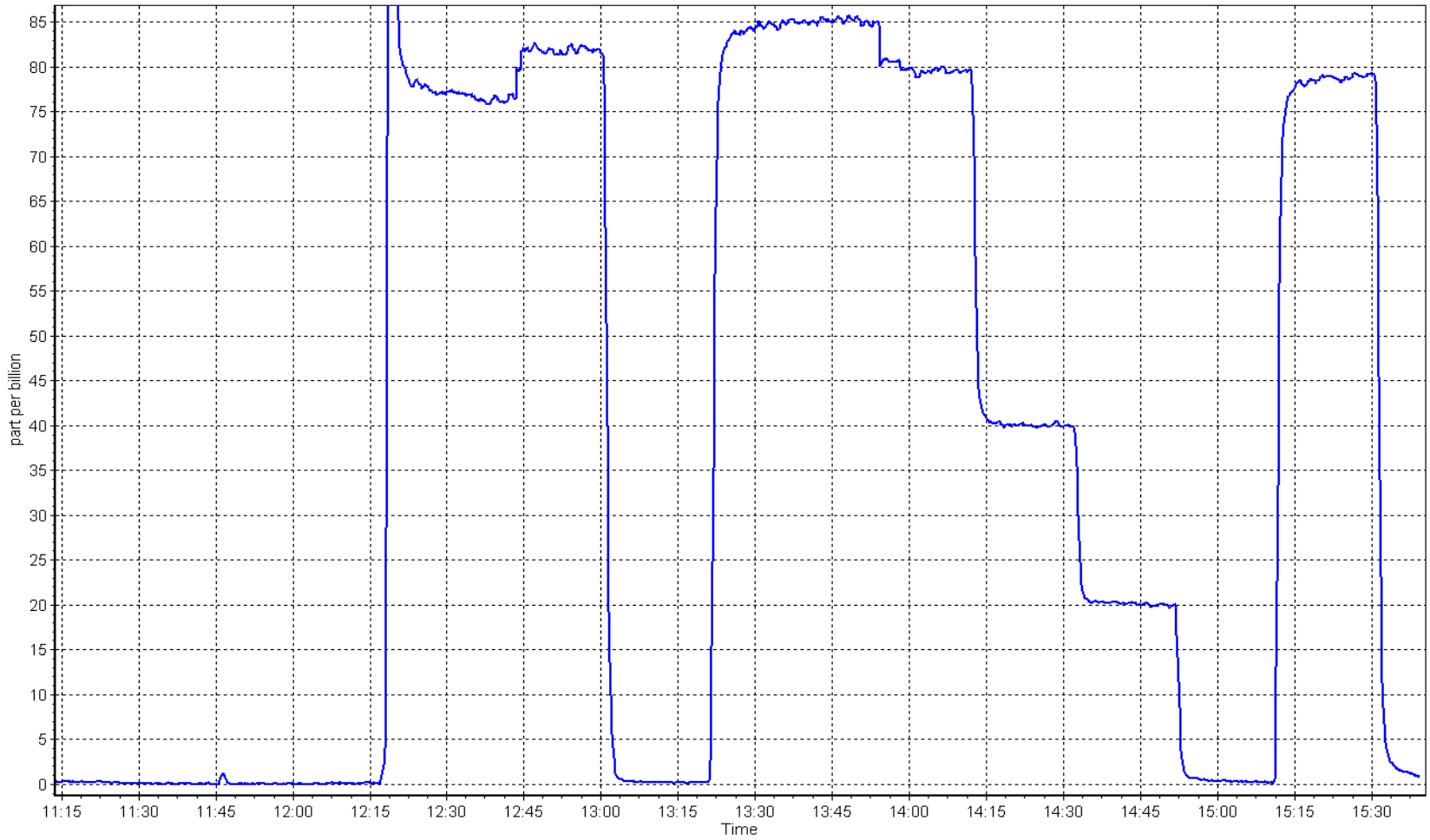
Calibration Date:	November 26, 2024	Previous Calibration:	October 2, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:20	End Time (MST):	15:38
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.1	----	Correlation Coefficient	0.999987	*≥0.995*
80.0	79.6	1.0048	Slope	0.994189	*0.90 - 1.10*
40.0	40.1	0.9973			
20.0	20.0	0.9998	Intercept	0.160000	*+/-3*



H2S Calibration Plot Date: November 26, 2024 Location: Firebag



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	November 18, 2024	Last Cal Date:	October 9, 2024
Start time (MST):	11:33	End time (MST):	14:48
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC716618		Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	500.7	ppm	CH4 Equiv Conc.	1066.9	ppm
C3H8 Cal Gas Conc.	205.9	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	500.7	ppm	CH4 Equiv Conc.	1066.9	ppm
Removed C3H8 Conc.	205.9	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1607	
ZAG Make/Model:	Teledyne API T701H		Serial Number:	201	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1336160089	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.991837	0.998247	Background:	2.07	1.93
Calibration intercept:	-0.023105	-0.033912	Coefficient:	3.835	3.877

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	4999	0.0	0.00	-0.13	----
As found High point	4919	81.1	17.31	16.94	1.014
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.07	Previous response	17.14	*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	4999	0.0	0.00	0.02	----
High point	4919	81.1	17.31	17.29	1.001
Mid point	4959	40.6	8.66	8.52	1.017
Low point	4980	20.3	4.33	4.28	1.011
As left zero	5000	0.0	0.00	0.01	----
As left span	4919	81.1	17.31	17.26	1.003
				Average Correction Factor	1.010

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

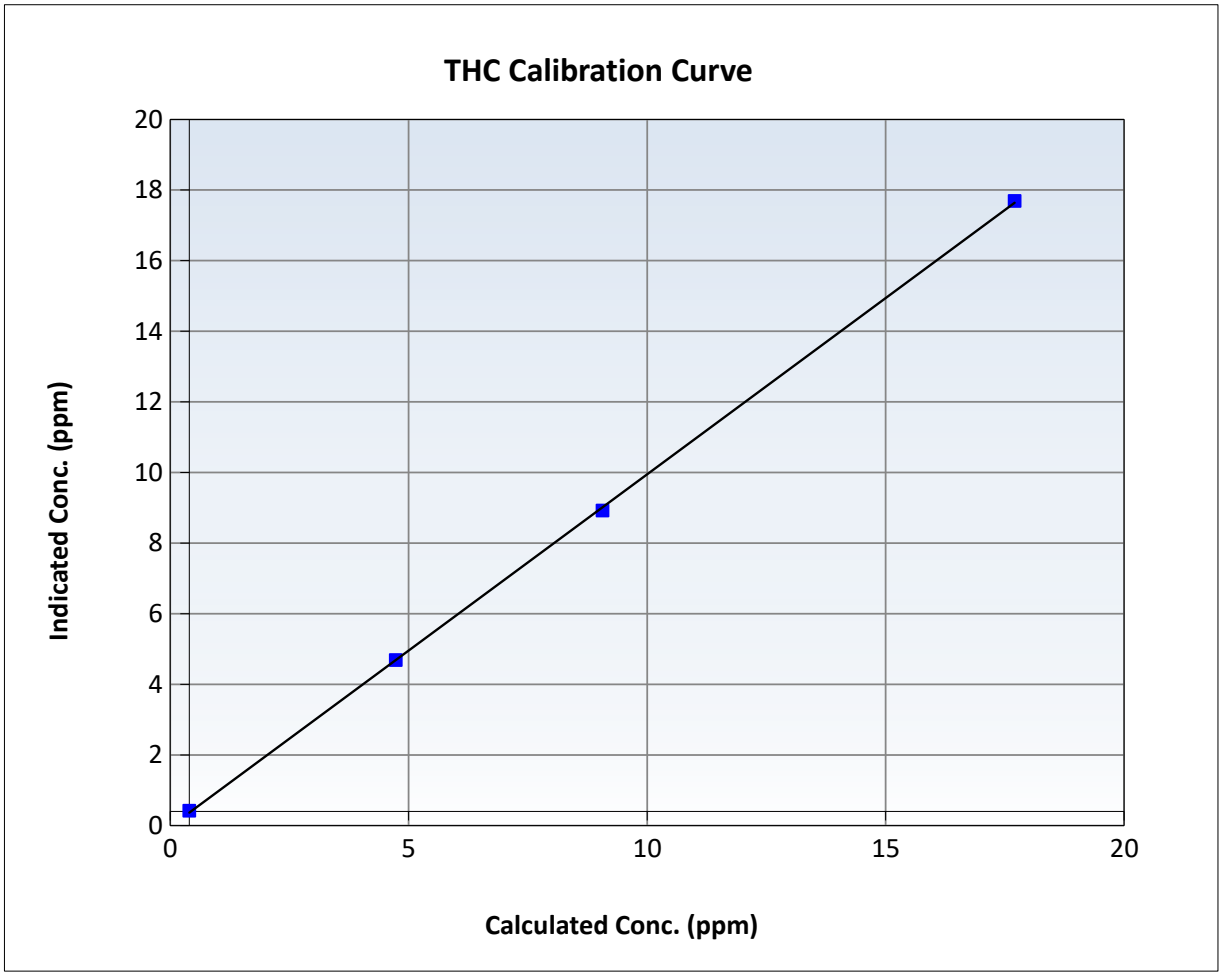
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 9, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:33	End Time (MST):	14:48
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

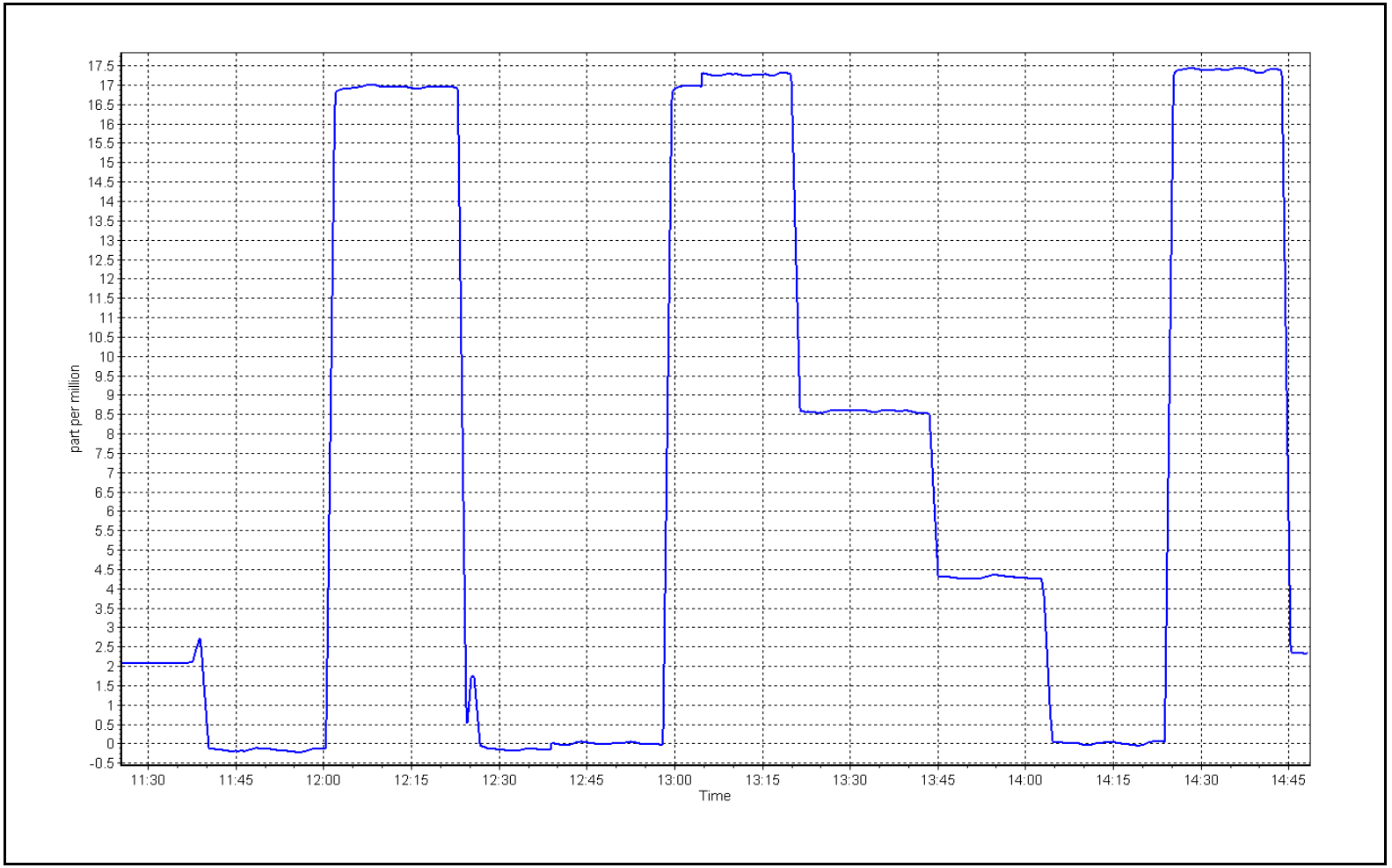
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.02	----
17.31	17.29	1.0009
8.66	8.52	1.0169
4.33	4.28	1.0111

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999913	*≥0.995*
Slope	0.998247	*0.90 - 1.10*
Intercept	-0.033912	*+/-1.5*



THC Calibration Plot Date: November 18, 2024 Location: Firebag



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Firebag
Station number:	AMS 19
Calibration Date:	November 12, 2024
Last Cal Date:	October 3, 2024
Start time (MST):	11:07
End time (MST):	16:10
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0044018	Cal Gas Expiry Date:	November 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	1607
ZAG make/model:	Teledyne API T701H	Serial Number:	201

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
AF High point	4918	82.1	802.9	799.7	3.3	798.8	792.8	6.1	1.0051	1.0085
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	809.3 ppb	NO =	807.1 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -1.3%
Baseline Corr 1st pt	NO_X =	798.9 ppb	NO =	792.9 ppb	As Found Statistics	*Percent Change	NO = -1.8%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1410661309

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.911	0.918	NO bkgnd or offset:	4.6	4.6
NOX coeff or slope:	0.995	0.994	NOX bkgnd or offset:	4.6	4.6
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	163.0	160.5

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.008318	1.000536
NO_X Cal Offset:	-0.318946	1.140119
NO Cal Slope:	1.010359	1.001187
NO Cal Offset:	-0.859044	0.600188
NO_2 Cal Slope:	0.997413	1.003587
NO_2 Cal Offset:	-0.644750	0.606716

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
High point	4918	82.1	802.9	799.7	3.3	804.0	801.0	3.0	0.9987	0.9983
Mid point	4959	41.1	402.0	400.3	1.6	403.7	401.4	2.4	0.9957	0.9973
Low point	4980	20.5	200.5	199.7	0.8	203.0	201.3	1.8	0.9876	0.9919
As left zero	5000	0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
As left span	4918	82.1	802.9	416.5	386.4	806.0	416.5	389.3	0.9962	1.0000
								Average Correction Factor	0.9940	0.9958

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	797.6	415.9	385.0	386.8	0.9953	100.5%
Mid GPT point	797.6	606.8	194.1	195.3	0.9938	100.6%
Low GPT point	797.6	705.0	95.9	97.7	0.9814	101.9%
				Average Correction Factor	0.9902	101.0%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

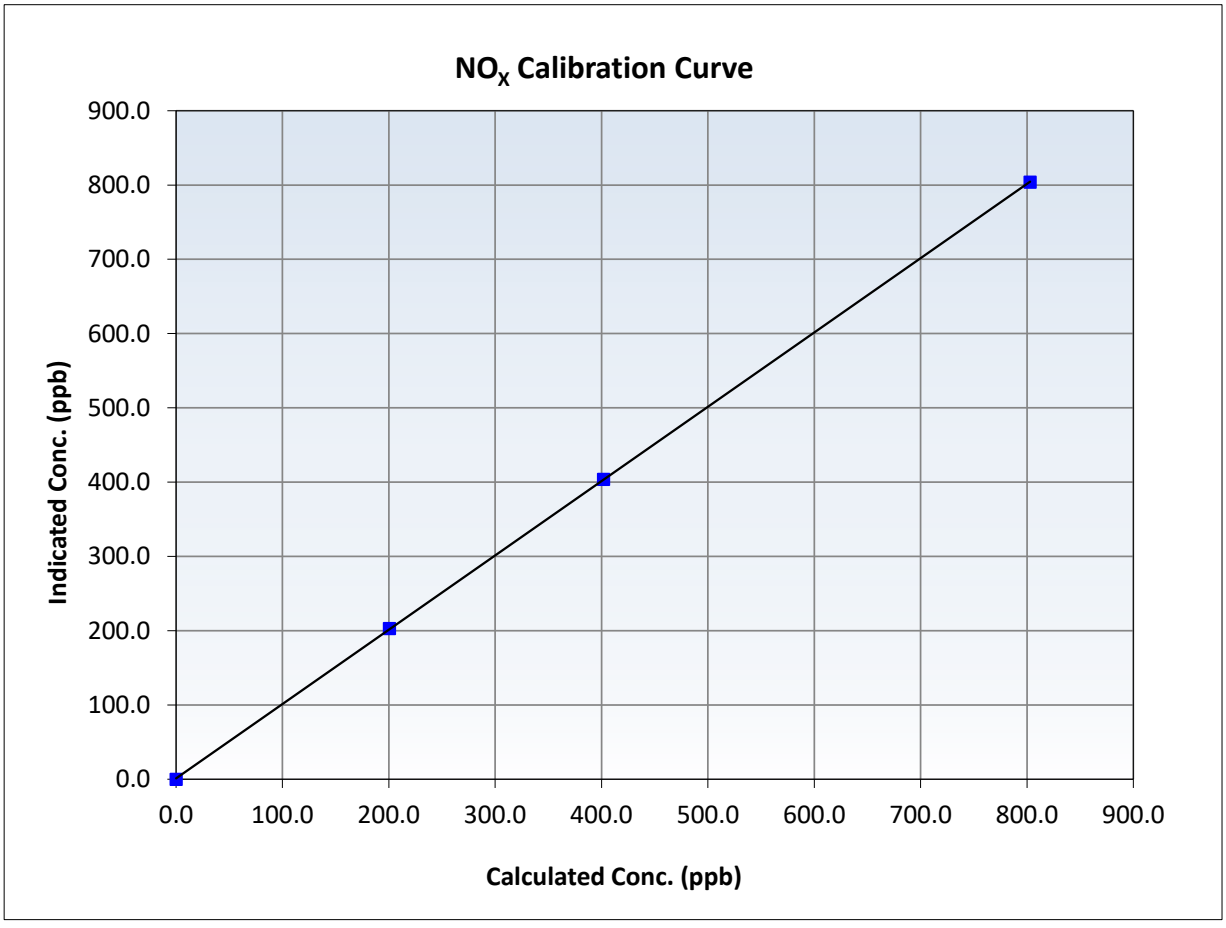
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:07	End Time (MST):	16:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
802.9	804.0	0.9987
402.0	403.7	0.9957
200.5	203.0	0.9876

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	1.000536	*0.90 - 1.10*
Intercept	1.140119	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

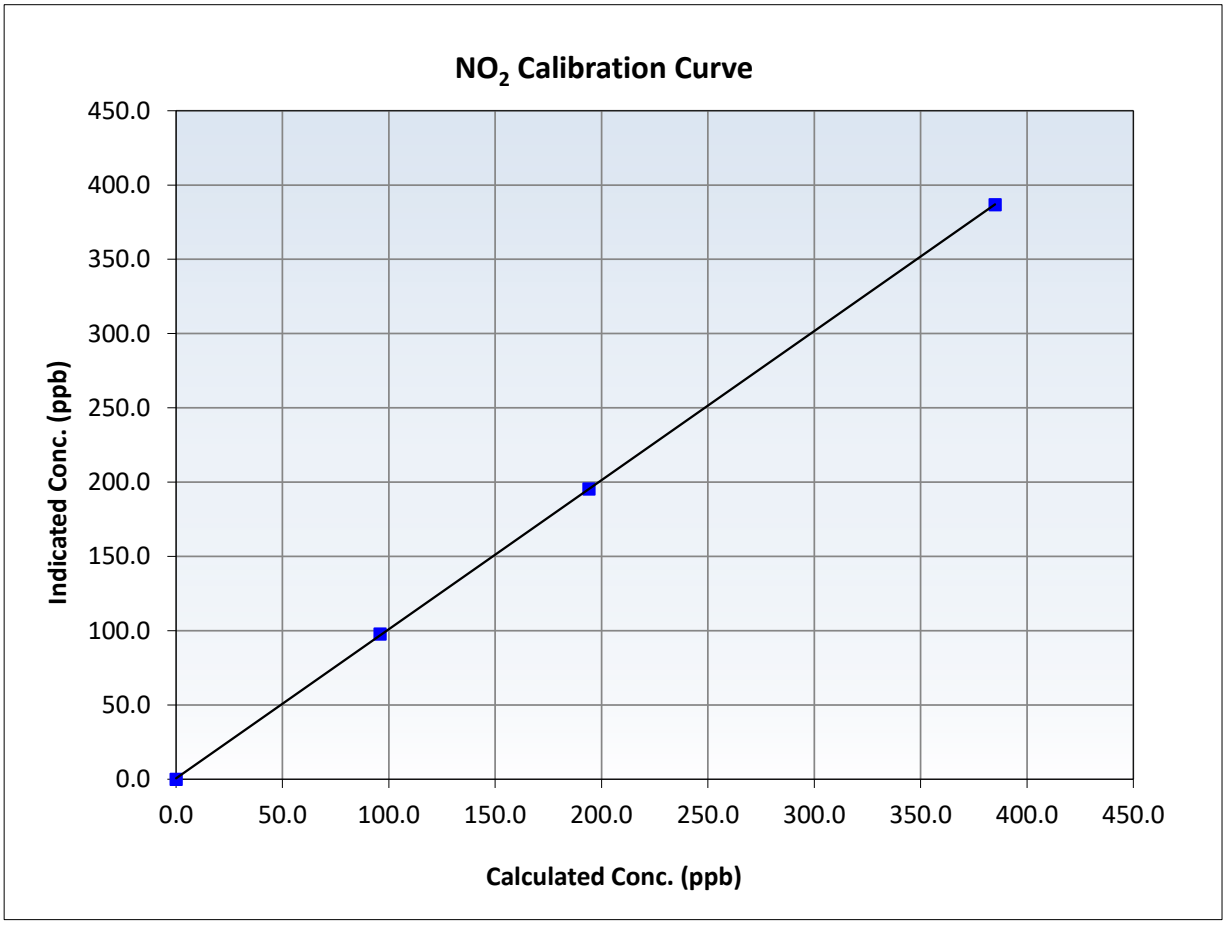
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:07	End Time (MST):	16:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
385.0	386.8	0.9953
194.1	195.3	0.9938
95.9	97.7	0.9814

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999986	*≥0.995*
Slope	1.003587	*0.90 - 1.10*
Intercept	0.606716	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

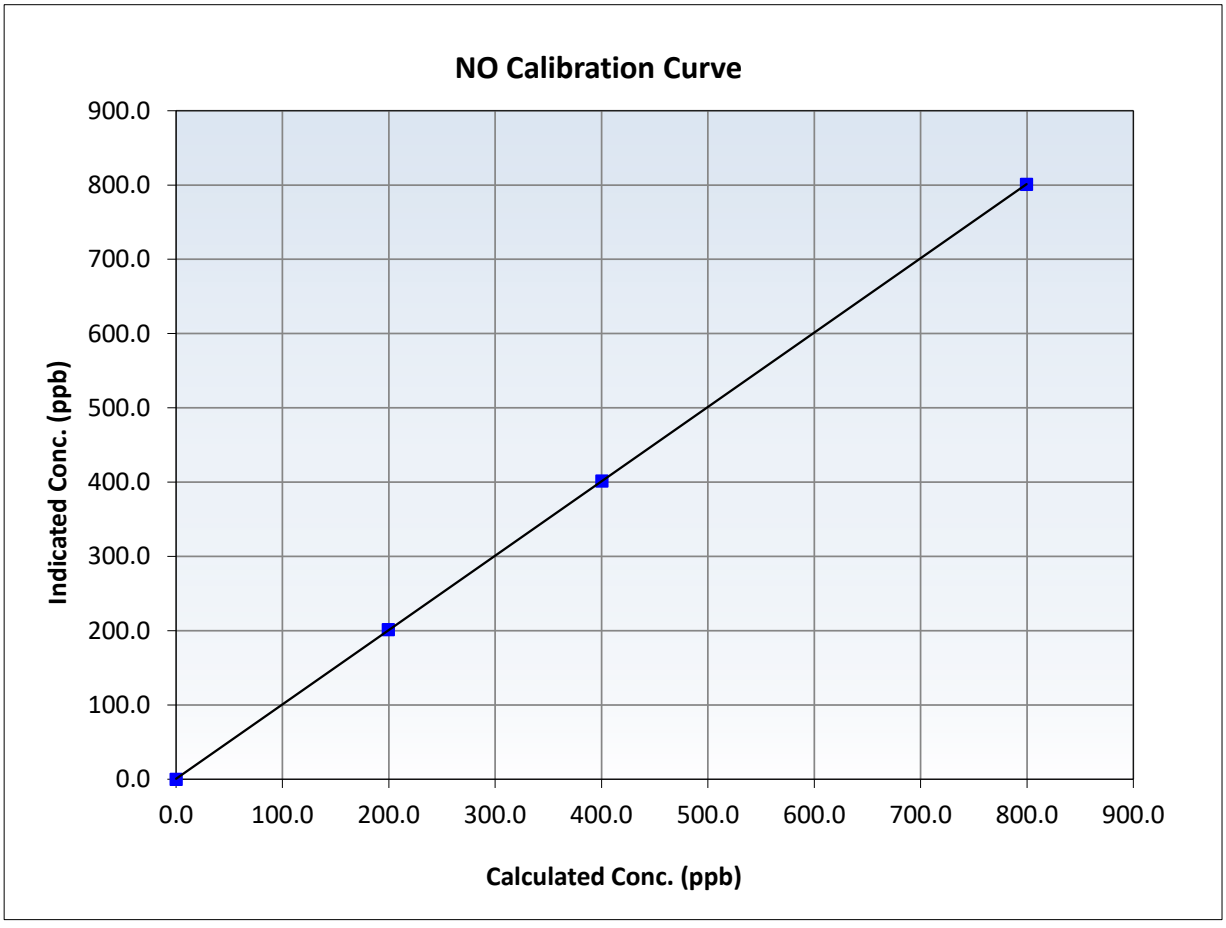
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 3, 2024
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	11:07	End Time (MST):	16:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309

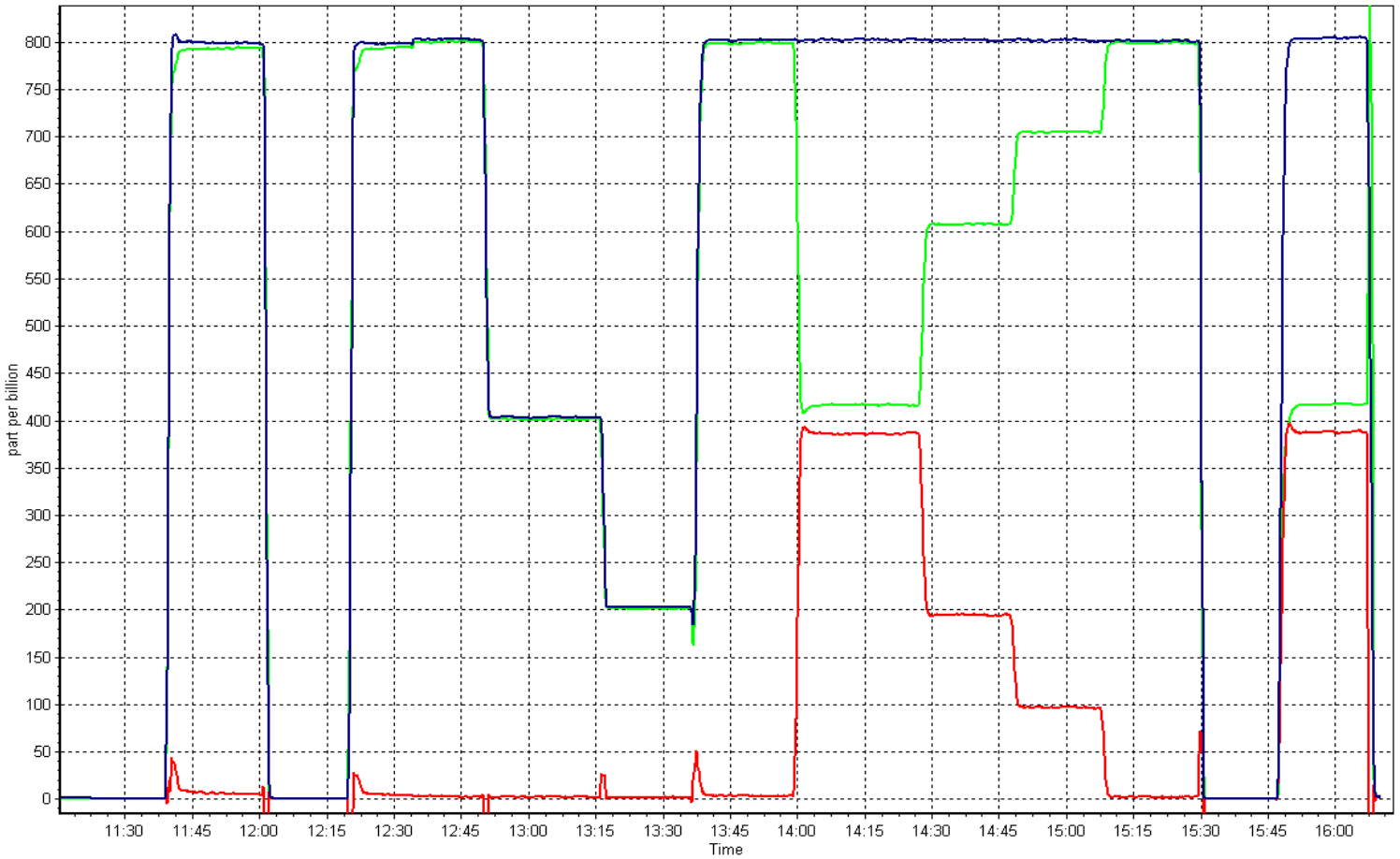
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.7	801.0	0.9983
400.3	401.4	0.9973
199.7	201.3	0.9919

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.001187	*0.90 - 1.10*
Intercept	0.600188	*+/-20*



NO_X Calibration Plot Date: November 12, 2024 Location: Firebag



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS20
MACKAY RIVER
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	November 19, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	8:15	End time (MST):	11:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.22	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC30686			
Removed Cal Gas Conc:	49.22	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	1220
Zero Air Gen Model:	API 701		Serial Number:	4522

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1501301450	
Analyzer Range:	0-1000ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999050	0.996067	Backgd or Offset:	18.5	18.9
Calibration intercept:	3.491261	3.811121	Coeff or Slope:	0.930	0.930

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.7	----
As found High point	4919	81.3	800.3	798.8	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	798.1	Previous response	803.0	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4919	81.3	800.3	799.5	1.001
Mid point	4959	40.7	400.7	403.6	0.993
Low point	4980	20.3	199.8	207.2	0.964
As left zero	5000	0.0	0.0	0.6	----
As left span	4919	81.3	800.3	802.6	0.997
				Average Correction Factor:	0.986

Notes: No Maintenance done. Zero adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

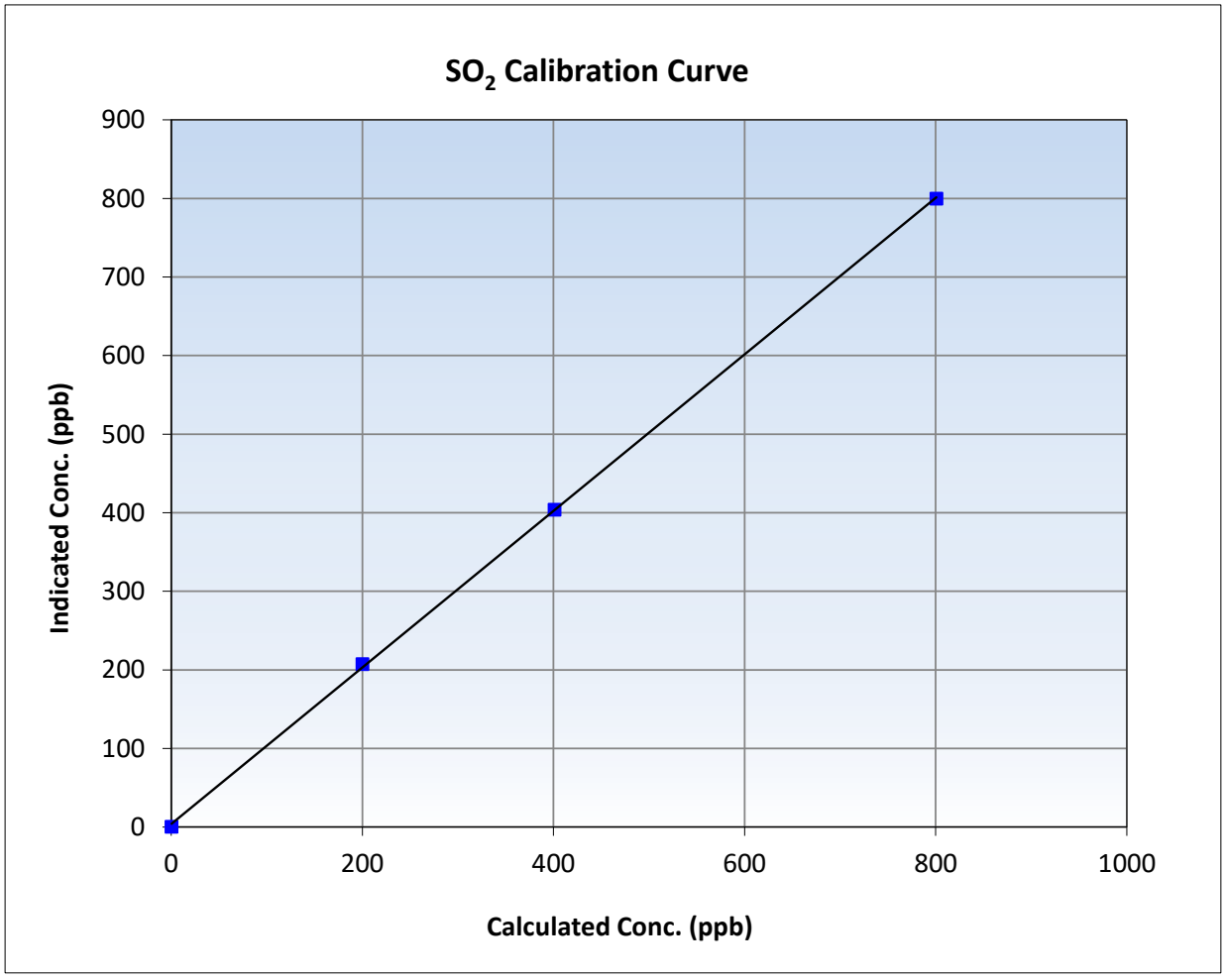
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 3, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:15	End Time (MST):	11:05
Analyzer make:	Thermo 43i	Analyzer serial #:	1501301450

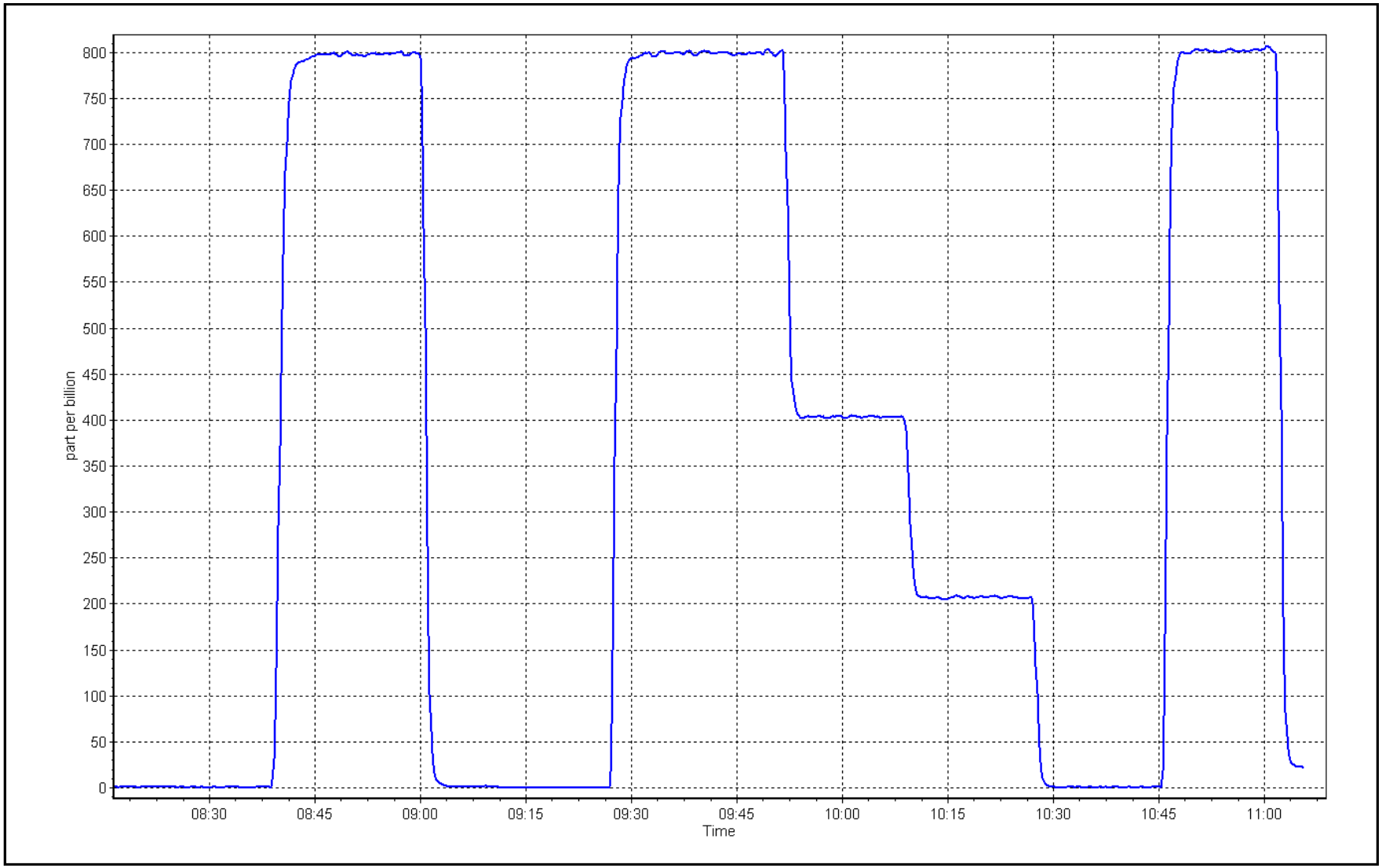
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.3	799.5	1.0010
400.7	403.6	0.9928
199.8	207.2	0.9644

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999901	*≥0.995*
Slope	0.996067	*0.90 - 1.10*
Intercept	3.811121	*+/-30*



SO2 Calibration Plot Date: November 19, 2024 Location: MacKay River



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	November 13, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	8:12	End time (MST):	11:57
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.12	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC515997			
Removed Cal Gas Conc:	5.12	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	1220
ZAG Make/Model:	API 701		Serial Number:	4522

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1236656117
Converter make:	Global		Converter serial #:	2022-226
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.977727	0.981587	Backgd or Offset:	3.43	3.43
Calibration intercept:	0.559179	0.599198	Coeff or Slope:	1.051	1.051

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4922	78.1	80.0	79.7	1.005
As found Mid point	4961	39.0	39.9	40.4	0.991
As found Low point	4980	19.5	20.0	20.7	0.969
New cylinder response					

Baseline Corr As found:	79.6	Prev response:	78.75	*% change:	1.1%
Baseline Corr 2nd AF pt:	40.3	AF Slope:	0.993019	AF Intercept:	0.499435
Baseline Corr 3rd AF pt:	20.6	AF Correlation:	0.999884	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4922	78.1	80.0	78.9	1.014
Mid point	4961	39.0	39.9	40.0	0.998
Low point	4980	19.5	20.0	20.6	0.969
As left zero	5000	0.0	0.0	0.4	----
As left span	4922	78.1	80.0	78.1	1.024
SO2 Scrubber Check	4982	81.3	802.8	0.1	----
Date of last scrubber change:		25-May-23		Ave Corr Factor	0.994
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

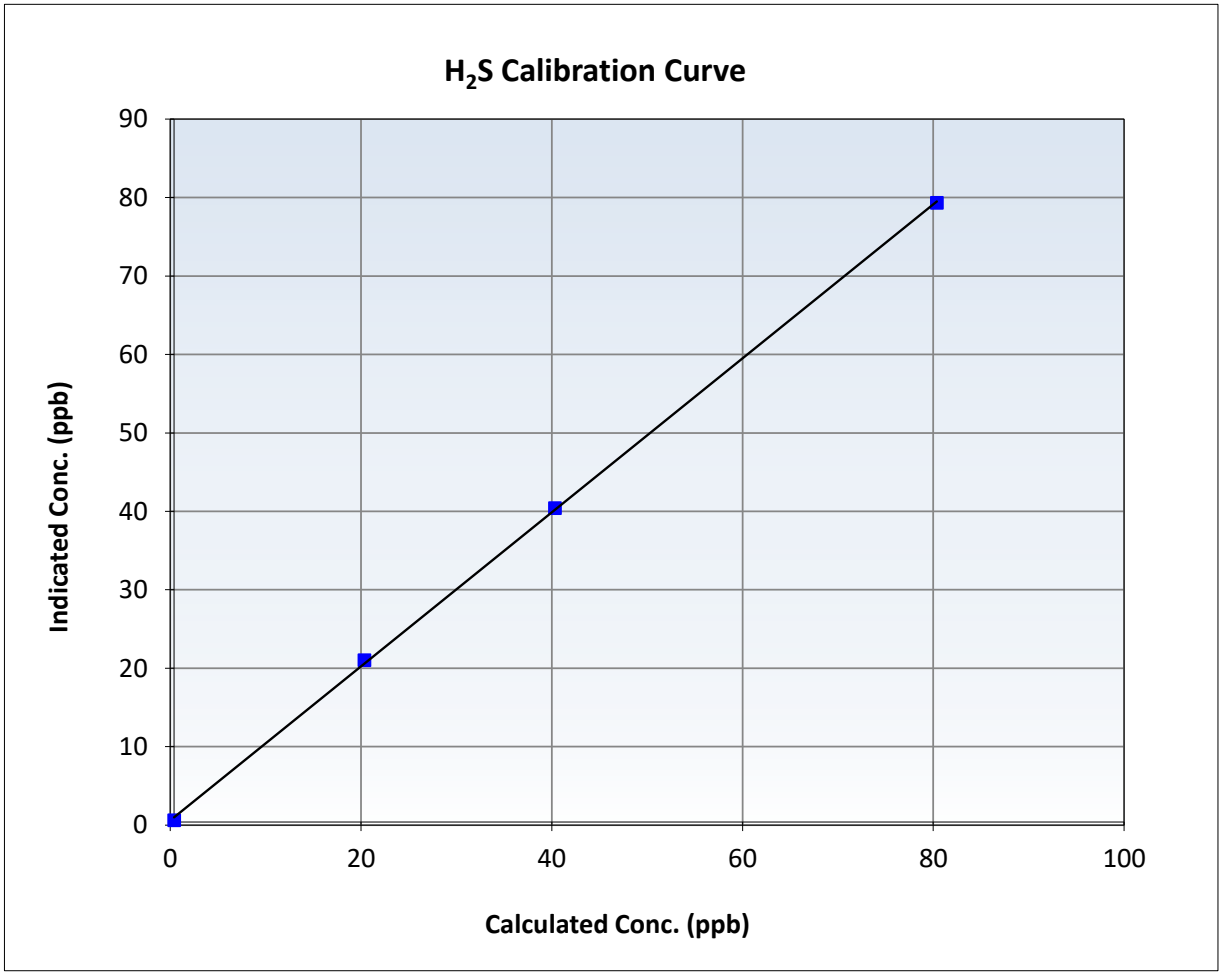
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 7, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:12	End Time (MST):	11:57
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1236656117

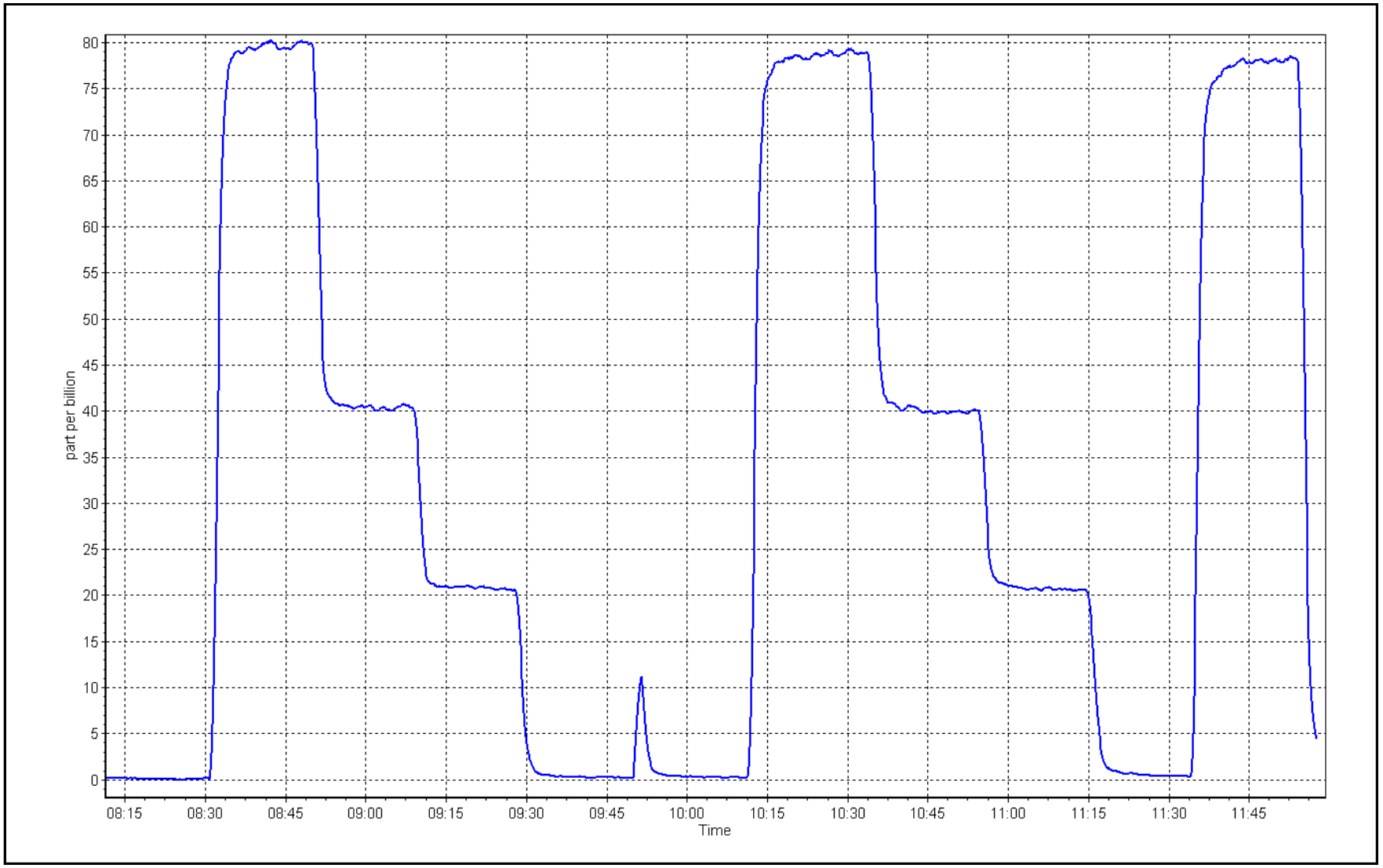
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	78.9	1.0136
39.9	40.0	0.9984
20.0	20.6	0.9694

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999882	*≥0.995*
Slope	0.981587	*0.90 - 1.10*
Intercept	0.599198	*+/-3*



H_2S Calibration Plot Date: November 13, 2024 Location: MacKay River



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	November 19, 2024	Last Cal Date:	October 3, 2024
Start time (MST):	8:15	End time (MST):	11:04
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC306868		Cal Gas Expiry Date:	February 23, 2024	
CH4 Cal Gas Conc.	499.4	ppm	CH4 Equiv Conc.	1066.5	ppm
C3H8 Cal Gas Conc.	206.2	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	499.4	ppm	CH4 Equiv Conc.	1066.5	ppm
Removed C3H8 Conc.	206.2	ppm	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	1220	
ZAG Make/Model:	API 701		Serial Number:	4522	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1501663727	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.995690	0.994787	Background:	3.800	4.310
Calibration intercept:	0.039606	0.087208	Coefficient:	5.302	5.600

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.31	----
As found High point	4919	81.3	17.34	16.78	1.053
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	16.47	Previous response	17.30	*% change	-5.1%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.02	----
High point	4919	81.3	17.34	17.29	1.003
Mid point	4959	40.7	8.68	8.75	0.992
Low point	4980	20.3	4.33	4.51	0.959
As left zero	5000	0.0	0.00	0.00	----
As left span	4919	81.3	17.34	17.41	0.996
				Average Correction Factor	0.985

Notes: No maintenance. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay

Version 03-2024

CALS_390

Wood Buffalo Environmental Association

THC Calibration Summary

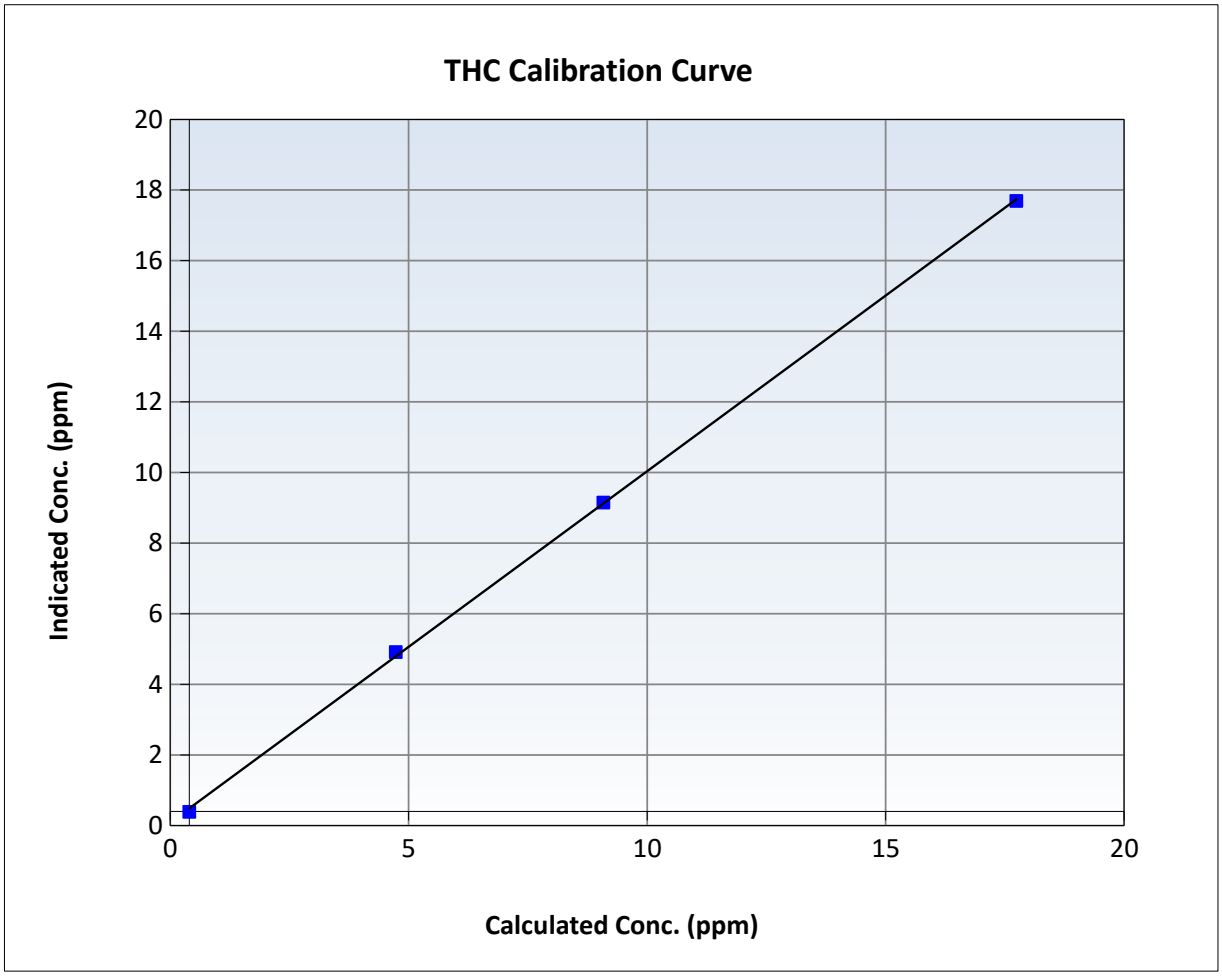
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 3, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:15	End Time (MST):	11:04
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

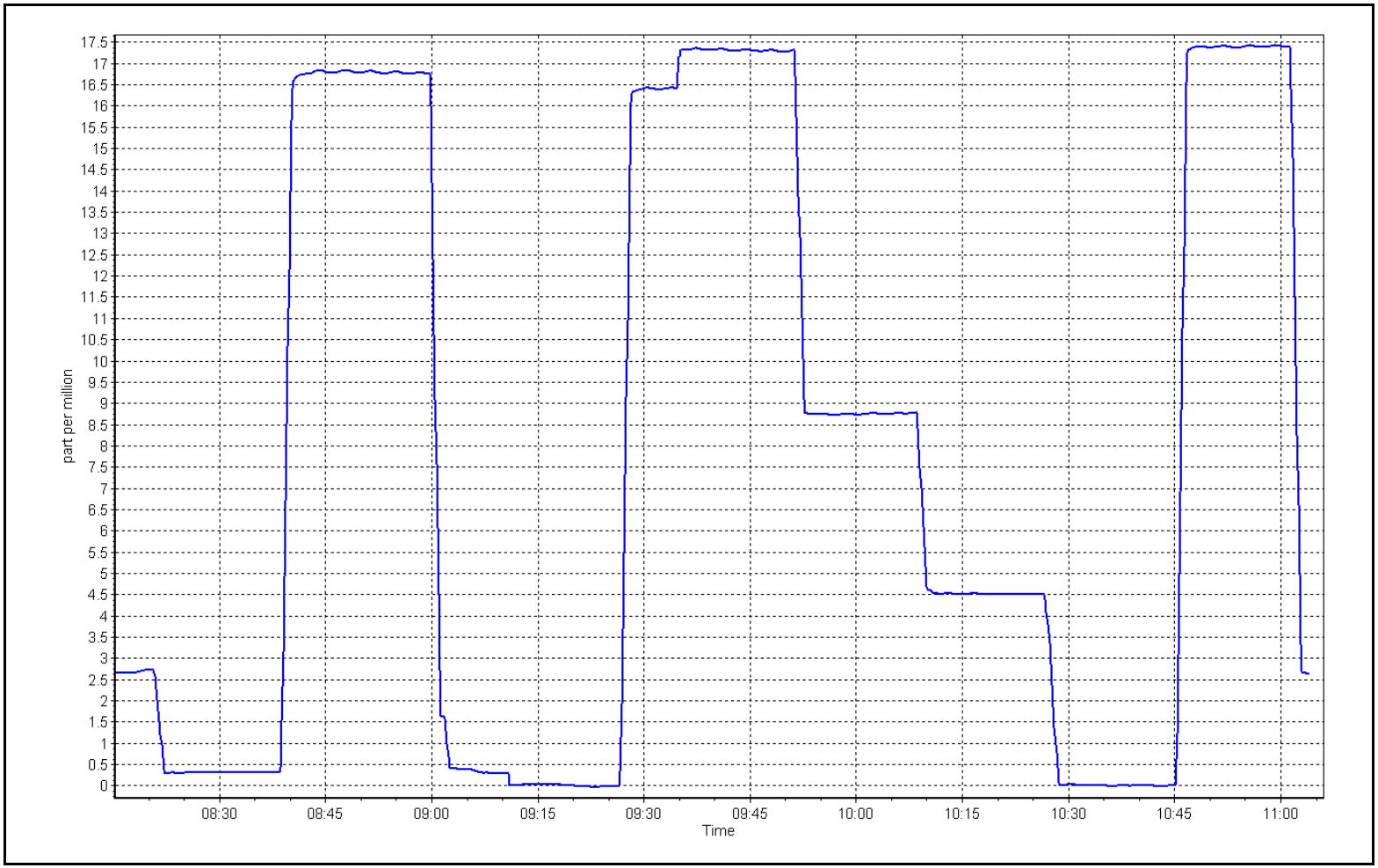
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.02	----
17.34	17.29	1.0027
8.68	8.75	0.9922
4.33	4.51	0.9591

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999831	*≥0.995*
Slope	0.994787	*0.90 - 1.10*
Intercept	0.087208	*+/-1.5*



THC Calibration Plot Date: November 19, 2024 Location: MacKay River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	MacKay River
Station number:	AMS 20
Calibration Date:	November 14, 2024
Last Cal Date:	October 1, 2024
Start time (MST):	8:05
End time (MST):	12:22
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T376265	Cal Gas Expiry Date:	April 13, 2025
NOX Cal Gas Conc:	49.19 ppm	NO Cal Gas Conc:	48.04 ppm
Removed Cylinder #:		Removed Gas Exp Date:	
Removed Gas NOX Conc:	49.19 ppm	Removed Gas NO Conc:	48.04 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	1220
ZAG make/model:	API T701	Serial Number:	4522

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
AF High point	4917	83.3	819.5	800.3	19.2	821.3	799.8	21.4	0.9975	1.0006
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 820.5 ppb	NO = 799.5 ppb
Baseline Corr 1st pt	NO_X = 821.5 ppb	NO = 799.8 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = 0.1%

*Percent Change NO = 0.0%

As Found Statistics

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

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1505164379

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.001	1.001	NO bkgnd or offset:	2.8	2.8
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	3.0	3.0
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	160.6	160.6

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.996267	0.996324
NO_X Cal Offset:	4.122439	4.202261
NO Cal Slope:	0.994888	0.996144
NO Cal Offset:	3.282748	3.242757
NO_2 Cal Slope:	1.005386	1.002283
NO_2 Cal Offset:	-0.450485	-0.864534

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	----	----
High point	4917	83.3	819.5	800.3	19.2	818.7	799.1	19.5	1.0009	1.0015
Mid point	4958	41.7	410.3	400.7	9.6	414.5	403.3	11.2	0.9898	0.9935
Low point	4979	20.8	204.6	199.9	4.8	212.8	205.9	6.9	0.9616	0.9706
As left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
As left span	4917	83.3	819.5	437.2	382.3	819.9	437.2	382.7	0.9995	1.0000
							Average Correction Factor		0.9841	0.9885

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	795.2	440.3	374.1	374.4	0.9991	100.1%
Mid GPT point	795.2	610.2	204.2	203.6	1.0027	99.7%
Low GPT point	795.2	698.5	115.9	114.4	1.0127	98.7%
				Average Correction Factor	1.0049	99.5%

Notes: No maintenance or adjustments done.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

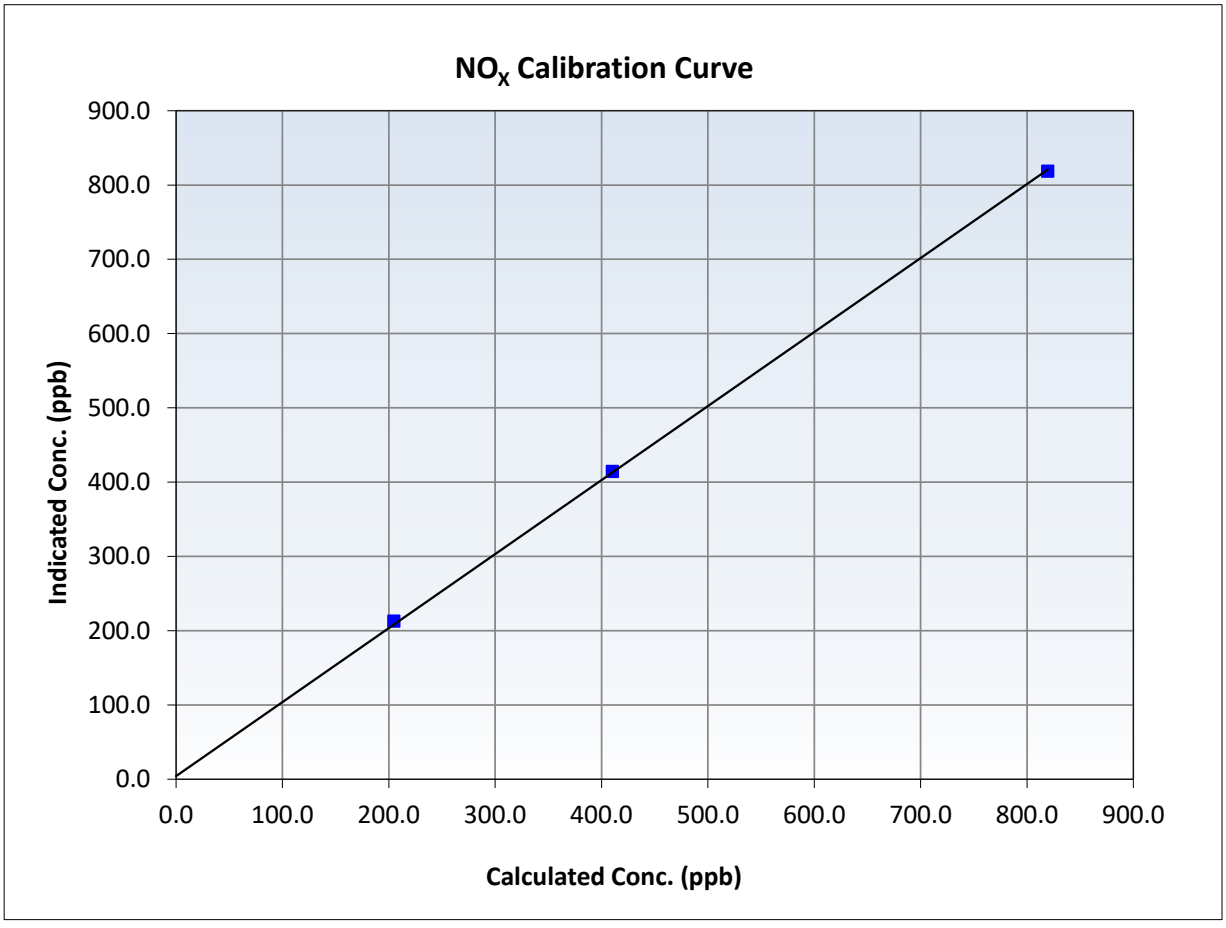
Station Information

Calibration Date:	November 14, 2024	Previous Calibration:	October 1, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:05	End Time (MST):	12:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
819.5	818.7	1.0009
410.3	414.5	0.9898
204.6	212.8	0.9616

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999872	*≥0.995*
Slope	0.996324	*0.90 - 1.10*
Intercept	4.202261	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

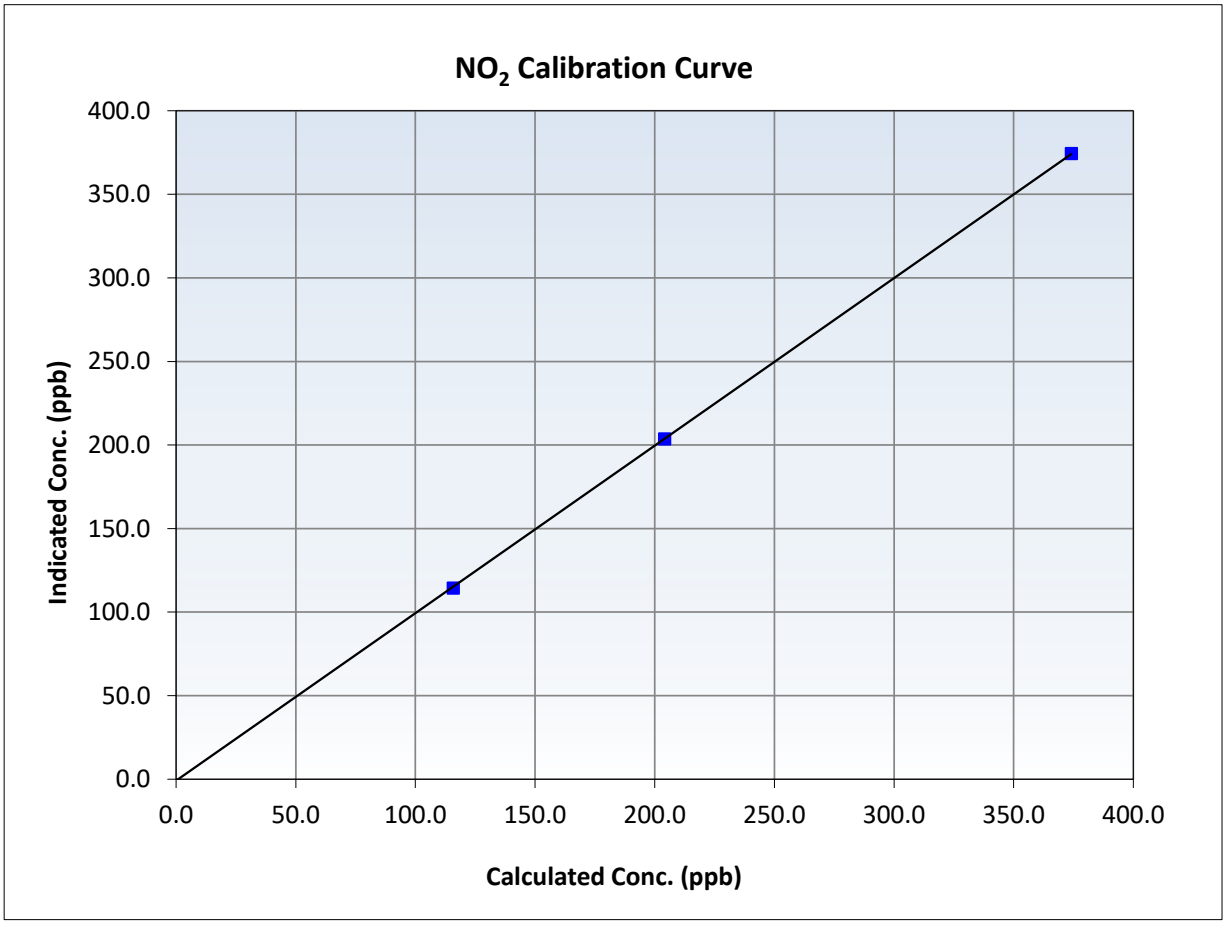
Station Information

Calibration Date:	November 14, 2024	Previous Calibration:	October 1, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:05	End Time (MST):	12:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
374.1	374.4	0.9991
204.2	203.6	1.0027
115.9	114.4	1.0127

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999982	*≥0.995*
Slope	1.002283	*0.90 - 1.10*
Intercept	-0.864534	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

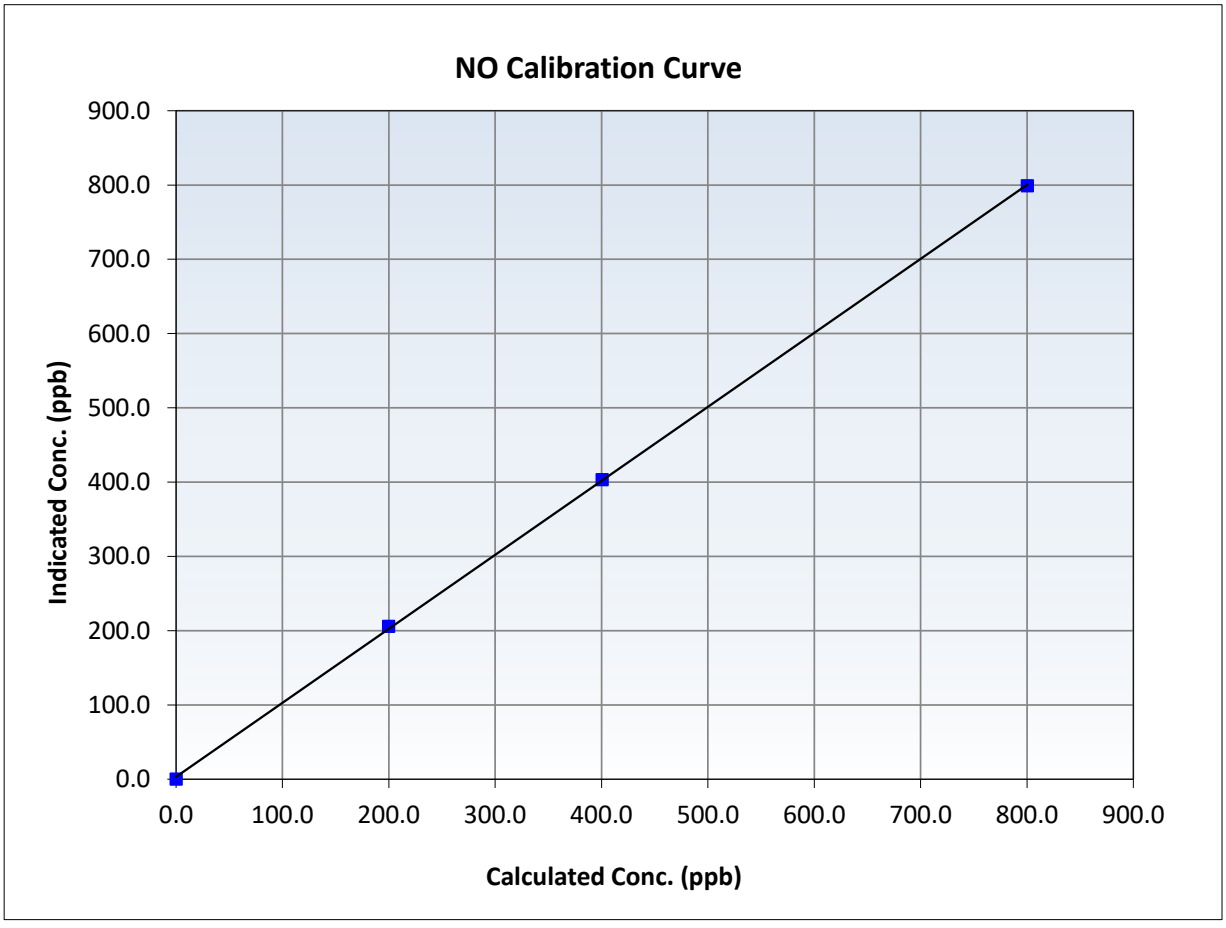
Station Information

Calibration Date:	November 14, 2024	Previous Calibration:	October 1, 2024
Station Name:	MacKay River	Station Number:	AMS 20
Start Time (MST):	8:05	End Time (MST):	12:22
Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379

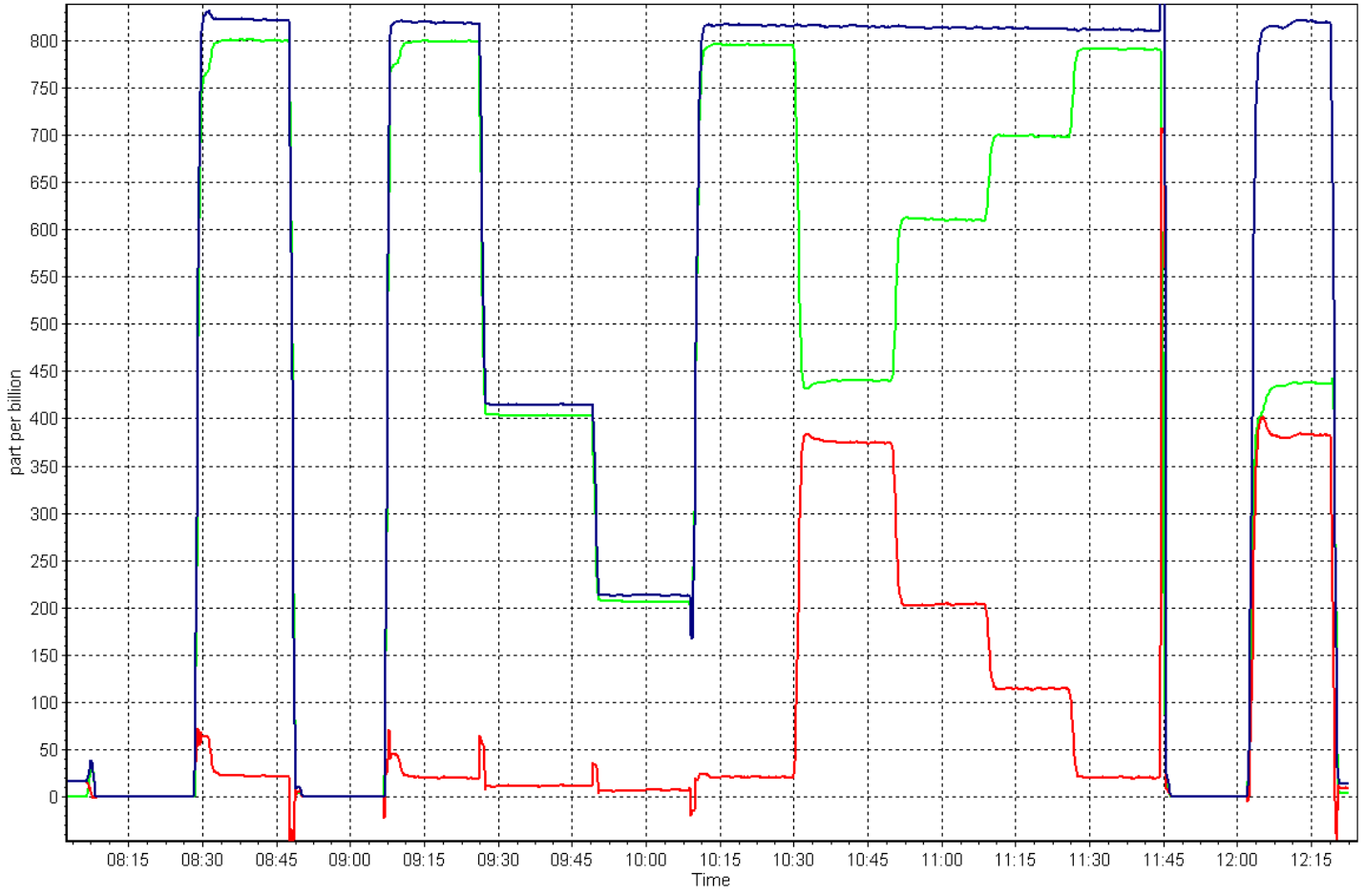
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.3	799.1	1.0015
400.7	403.3	0.9935
199.9	205.9	0.9706

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999927	*≥0.995*
Slope	0.996144	*0.90 - 1.10*
Intercept	3.242757	*+/-20*



NO_X Calibration Plot Date: November 14, 2024 Location: MacKay River



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS21
CONKLIN
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 28, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	10:12	End time (MST):	13:09
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.93	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC259455			
Removed Cal Gas Conc:	49.93	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	5252
Zero Air Gen Model:	Teledyne API T701		Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1428701363	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998604	0.999503	Backgd or Offset:	28.7	28.6
Calibration intercept:	0.115740	-0.024227	Coeff or Slope:	0.876	0.886

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	800.8	790.5	1.013
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.6	Previous response	799.8	*% change	-1.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.2	800.8	800.5	1.000
Mid point	4960	40.1	400.4	400.0	1.001
Low point	4980	20.0	200.1	200.1	1.000
As left zero	5005	0.0	0.0	0.0	----
As left span	4920	80.2	800.8	803.3	0.997
				Average Correction Factor:	1.001

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

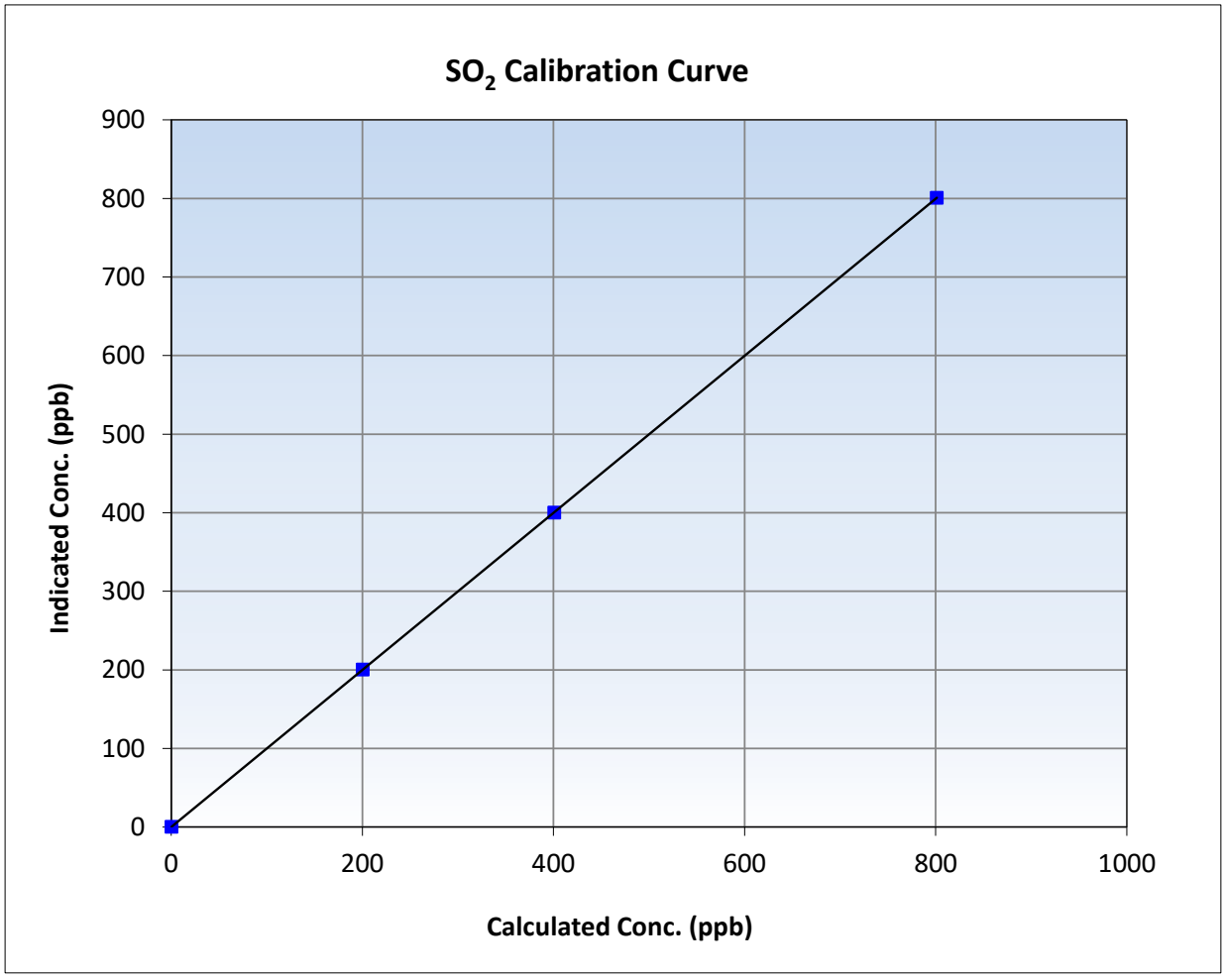
Station Information

Calibration Date:	November 28, 2024	Previous Calibration:	October 16, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:12	End Time (MST):	13:09
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363

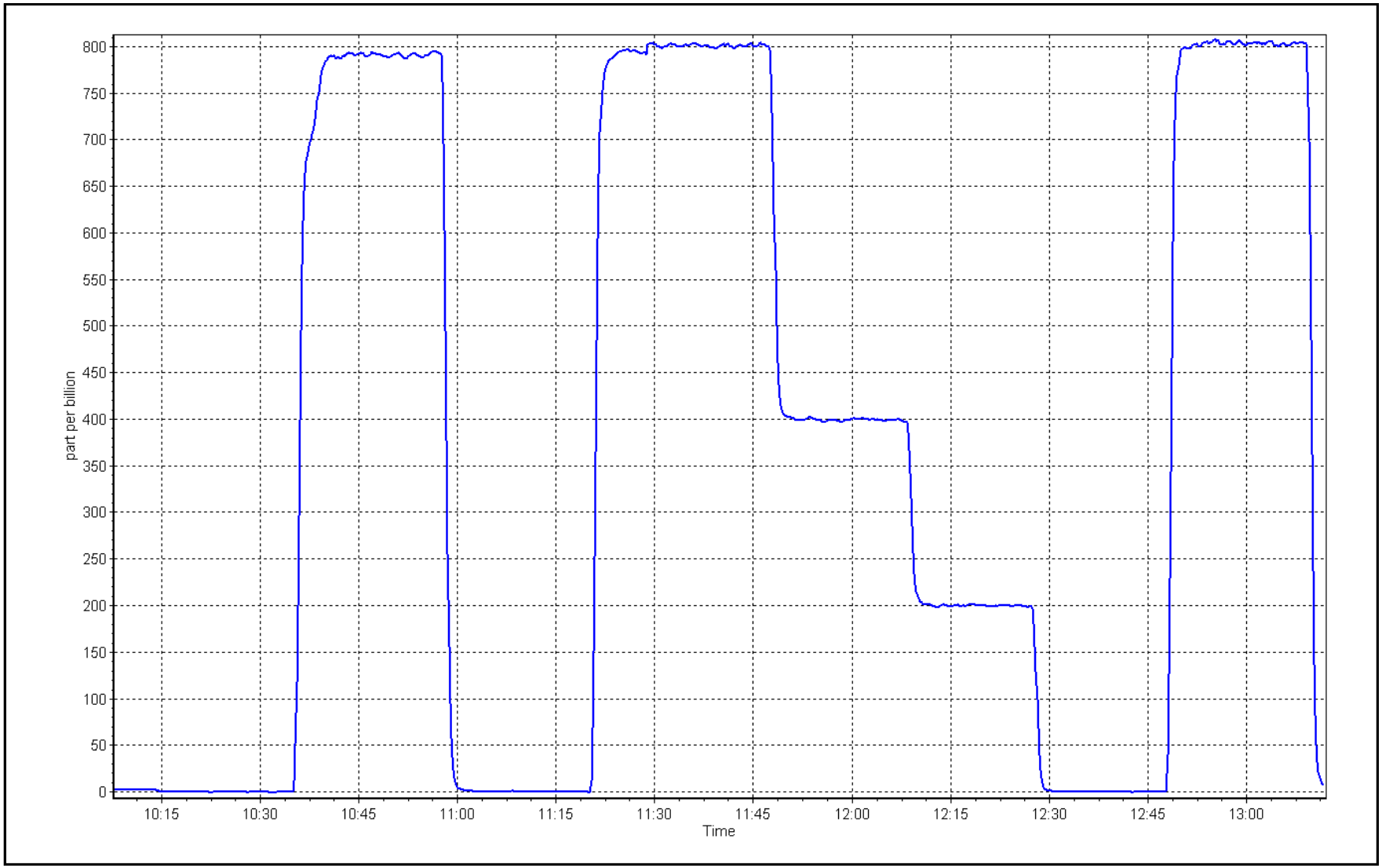
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.8	800.5	1.0004
400.4	400.0	1.0011
200.1	200.1	1.0001

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.999503	*0.90 - 1.10*
Intercept	-0.024227	*+/-30*



SO2 Calibration Plot Date: November 28, 2024 Location: Conklin



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 13, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	10:29	End time (MST):	18:55
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.00	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC501204			
Removed Cal Gas Conc:	5.00	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne T700		Serial Number:	5252
ZAG Make/Model:	Teledyne T701		Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 43i-QTL		Analyzer serial #:	12228021058
Converter make:	CD-Nova 101		Converter serial #:	565
Analyzer Range	0 - 100 ppb		Converter Temp:	850 degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001857	1.001714	Backgd or Offset:	2.4	3.1
Calibration intercept:	-0.240000	-0.060000	Coeff or Slope:	1.520	1.517

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.0	80.0	79.8	1.006
As found Mid point	4960	40.0	40.0	39.8	1.013
As found Low point	4980	20.0	20.0	19.3	1.053
New cylinder response					

Baseline Corr As found:	79.5	Prev response:	79.91	*% change:	-0.5%
Baseline Corr 2nd AF pt:	39.5	AF Slope:	0.997143	AF Intercept:	-0.100000
Baseline Corr 3rd AF pt:	19.0	AF Correlation:	0.999865	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4920	80.0	80.0	80.1	0.999
Mid point	4960	40.0	40.0	39.9	1.003
Low point	4980	20.0	20.0	20.1	0.995
As left zero	5000	0.0	0.0	0.1	----
As left span	4920	80.0	80.0	80.0	1.000
SO2 Scrubber Check	4920	80.2	802.0	0.1	----

Date of last scrubber change:	November 13, 2024	Ave Corr Factor	0.999
Date of last converter efficiency test:			

Notes: Sample inlet filter and scrubber was changed after multipoint as founds. SO2 scrubber check done after calibrator zero and passed. Adjusted zero and span. Converter temperature adjusted to 850.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

TRS Calibration Summary

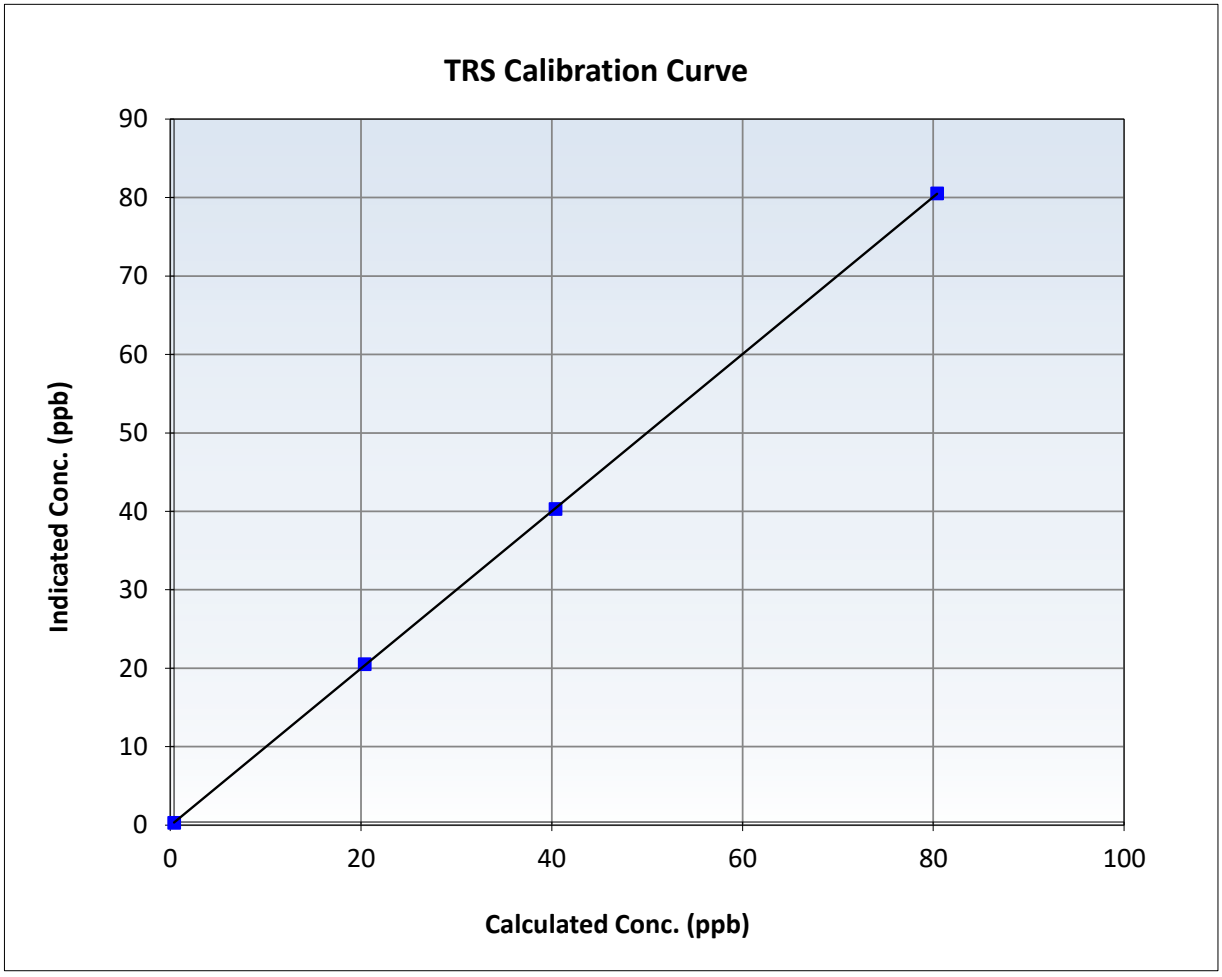
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 17, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	10:29	End Time (MST):	18:55
Analyzer make:	Thermo 43i-QTL	Analyzer serial #:	12228021058

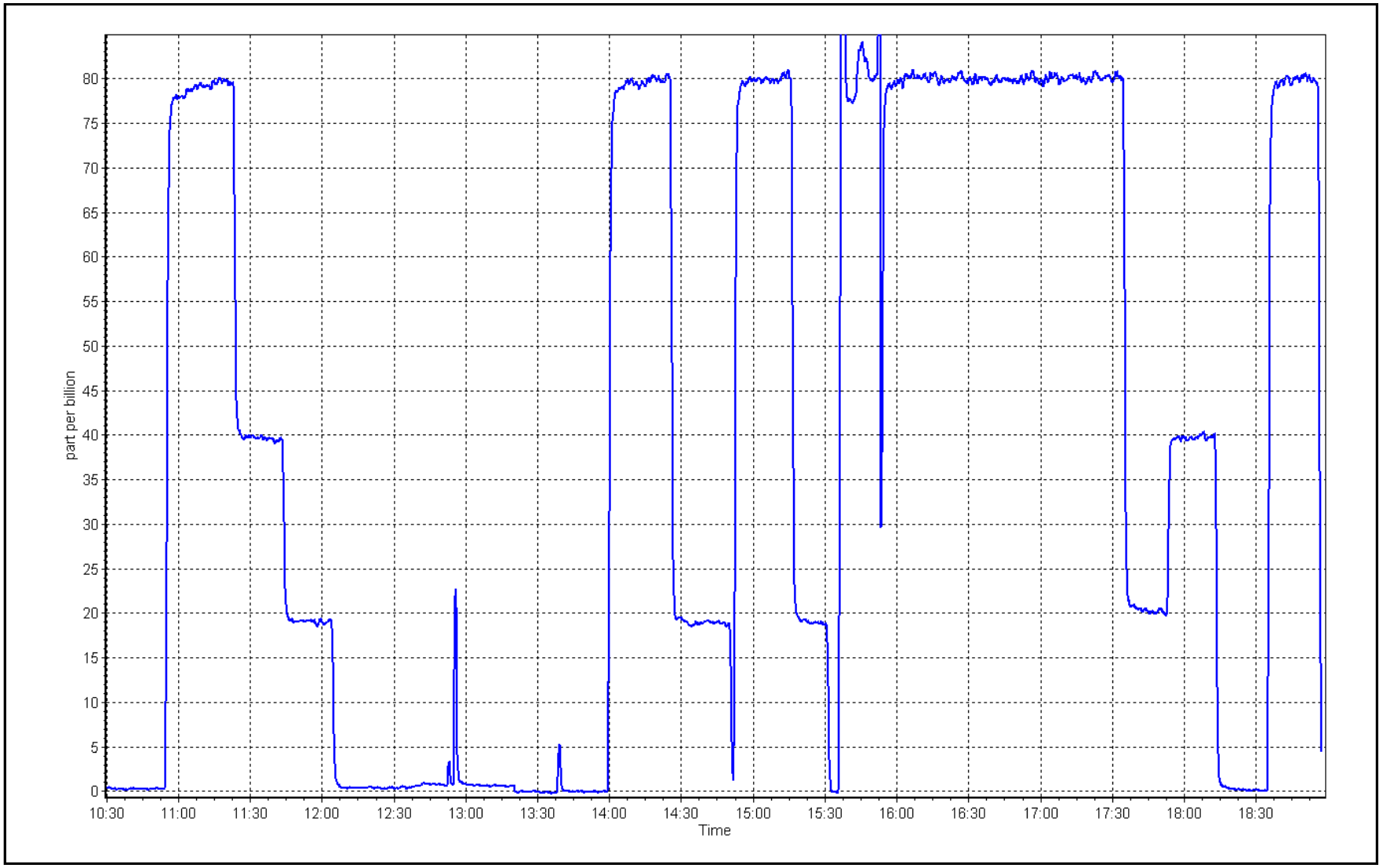
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
80.0	80.1	0.9988
40.0	39.9	1.0025
20.0	20.1	0.9950

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.001714	*0.90 - 1.10*
Intercept	-0.060000	*+/-3*



TRS Calibration Plot Date: November 13, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 5, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	11:58	End time (MST):	13:24
Reason:	Cylinder Change		

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:	5252
Zero Air Gen model:	Teledyne API T701	Serial Number:	953

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.71E-04	2.71E-04	NMHC SP Ratio:	5.58E-05	5.58E-05
CH4 Retention time:	14.0	14.0	NMHC Peak Area:	166844	163925
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	17.13	17.06	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	17.06	Prev response	17.06	*% change	0.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.00	1.007
				Average Correction Factor	

Notes: Changed out N2 and H2 support gases.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.14	9.11	1.004
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.11	Prev response	9.13	*% change	-0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.07	1.008
				Average Correction Factor	

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	7.99	7.96	1.003
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.96	Prev response	7.93	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

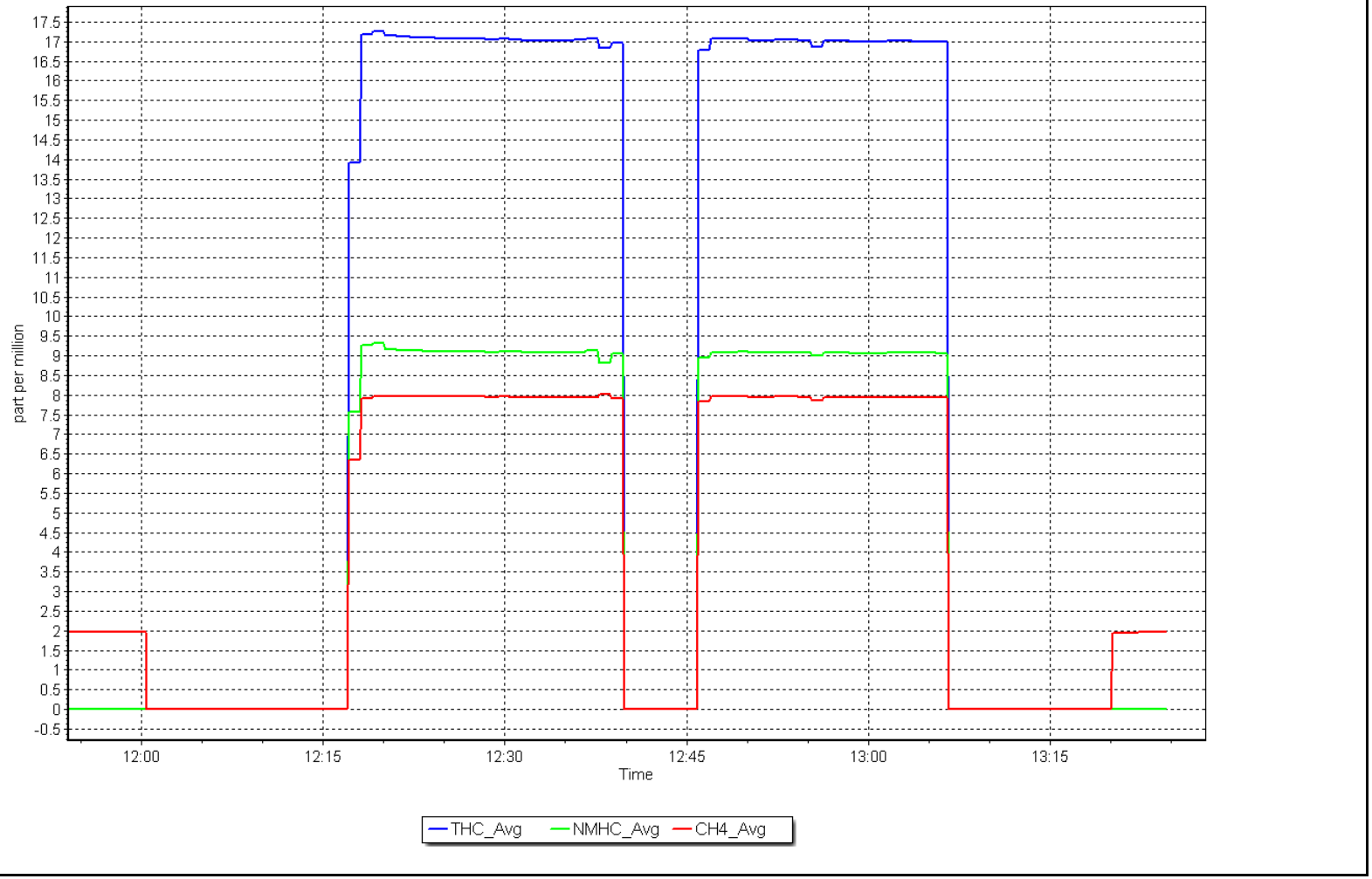
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	7.94	1.006
				Average Correction Factor	

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	0.999628	
THC Cal Offset:	-0.060038	
CH4 Cal Slope:	0.999695	
CH4 Cal Offset:	-0.051846	
NMHC Cal Slope:	0.999293	
NMHC Cal Offset:	-0.007592	

Calibration Performed By: Kelly Baragar

NMHC Calibration Plot Date: November 5, 2024 Location: Conklin



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 16, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	12:23	End time (MST):	15:36
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:	5252
Zero Air Gen model:	Teledyne API T701	Serial Number:	953

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.71E-04	2.80E-05	NMHC SP Ratio:	5.58E-05	6.94E-05
CH4 Retention time:	14.0	15.6	NMHC Peak Area:	163925	131779
Zero Chromatogram:	OFF	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.15	----
As found High point	4920	80.2	17.13	8.92	1.952
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	8.78	Prev response	17.03	*% change	-94.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.13	17.16	0.998
Mid point	4960	40.1	8.56	8.41	1.018
Low point	4980	20.0	4.28	4.24	1.009
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	17.55	0.976
				Average Correction Factor	1.008

Notes: Low span response. Diagnostics seems fine but the chromatogram shifted. Sample inlet filter changed after as founds. Do zero chromatogram and used zero chromatogram. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.2	9.14	7.75	1.179
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	7.75	Prev response	9.10	*% change	-17.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.14	9.16	0.998
Mid point	4960	40.1	4.57	4.49	1.018
Low point	4980	20.0	2.28	2.29	0.998
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	9.46	0.966
				Average Correction Factor	1.004

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.15	----
As found High point	4920	80.2	7.99	1.17	7.791
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	1.03	Prev response	7.93	*% change	-673.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	7.99	8.00	0.998
Mid point	4960	40.1	3.99	3.92	1.018
Low point	4980	20.0	2.00	1.95	1.023
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	8.09	0.987
				Average Correction Factor	1.013

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.997505	1.001642
THC Cal Offset:	-0.047639	-0.051632
CH4 Cal Slope:	0.999008	1.002457
CH4 Cal Offset:	-0.046446	-0.034243
NMHC Cal Slope:	0.996430	1.001256
NMHC Cal Offset:	-0.002392	-0.018189

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

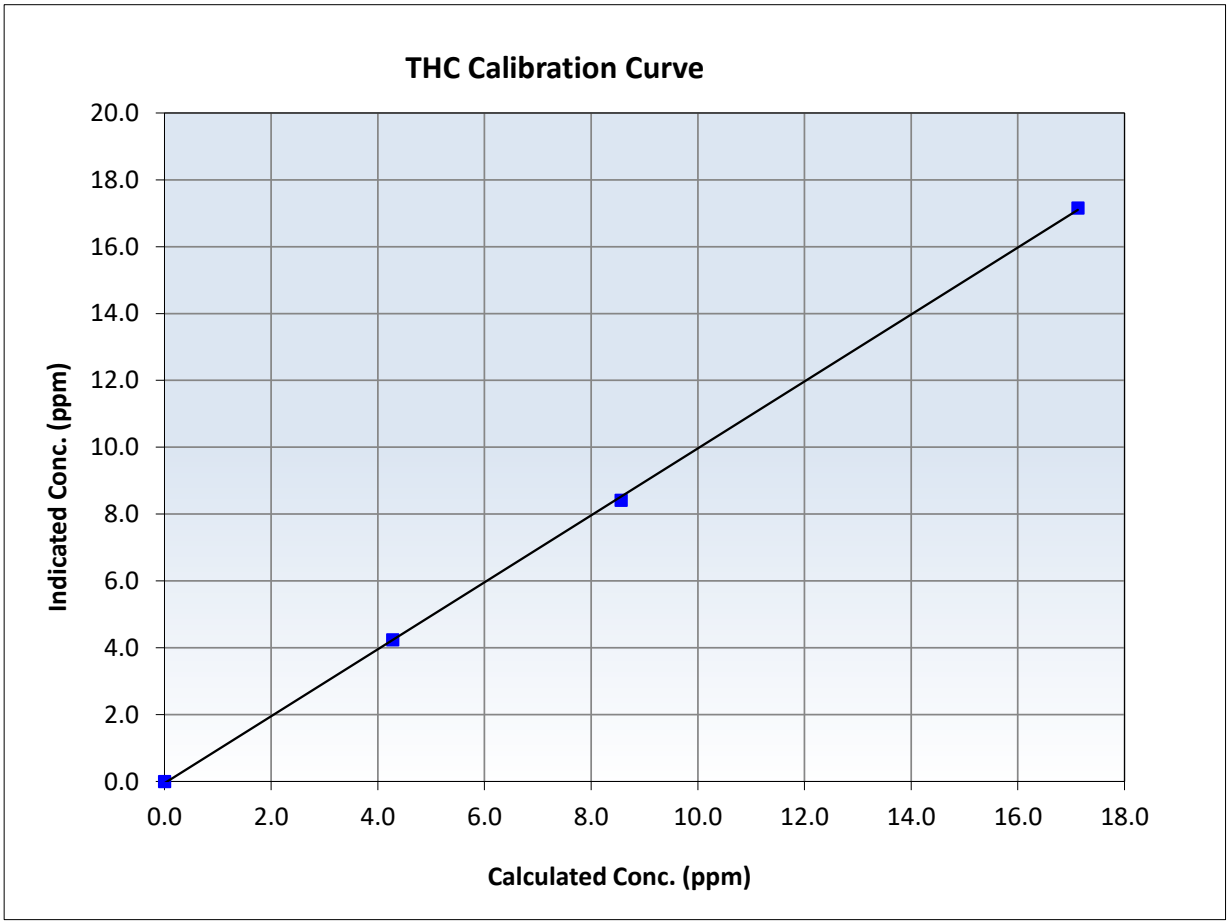
THC Calibration Summary

Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 16, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:23	End Time (MST):	15:36
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999888	*≥0.995*
17.13	17.16	0.9982	Slope	1.001642	*0.90 - 1.10*
8.56	8.41	1.0177	Intercept	-0.051632	*+/-0.5*
4.28	4.24	1.0093			



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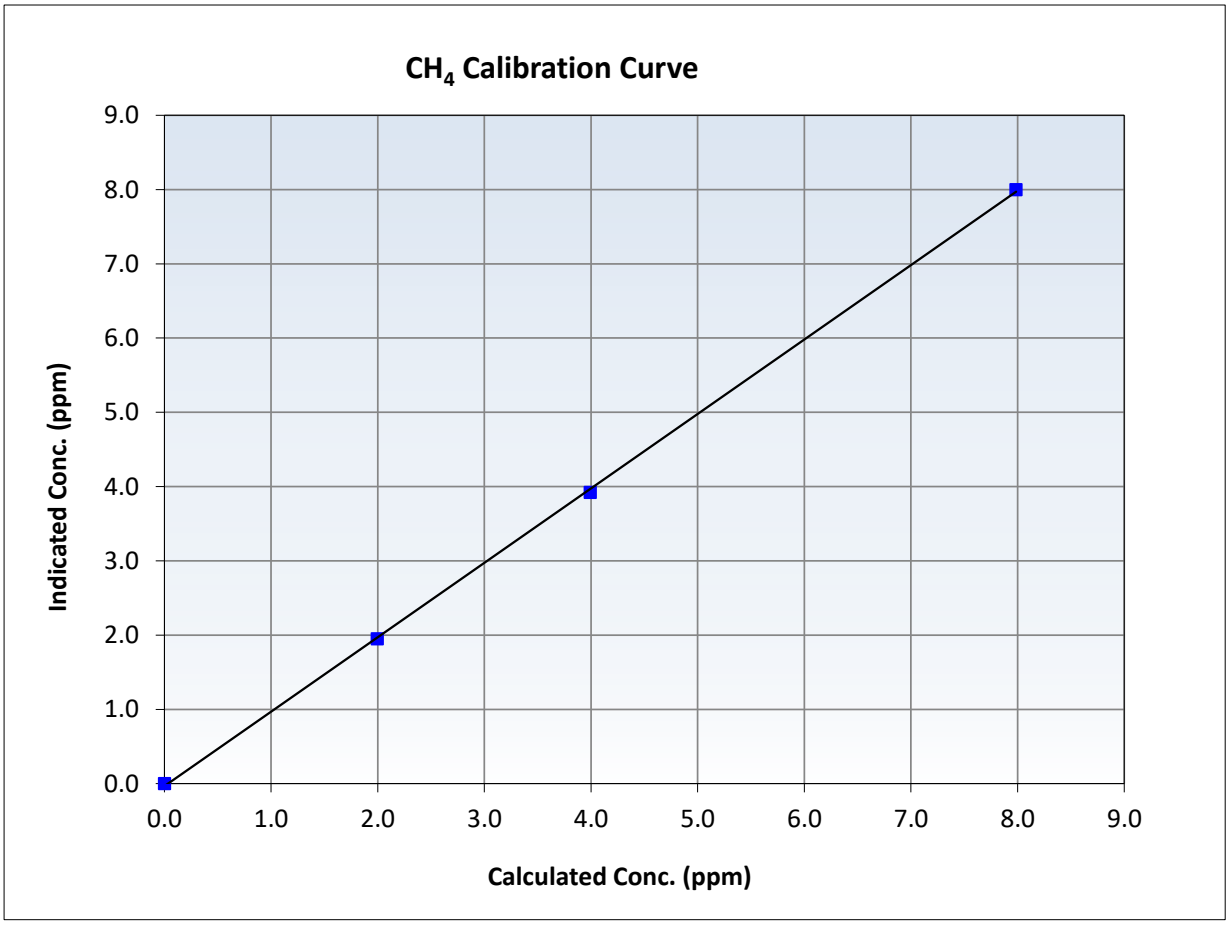
CH_4 Calibration Summary

Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 16, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:23	End Time (MST):	15:36
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999880	≥0.995
7.99	8.00	0.9985	Slope	1.002457	0.90 - 1.10
3.99	3.92	1.0179			
2.00	1.95	1.0228	Intercept	-0.034243	+/-0.5



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NMHC Calibration Summary

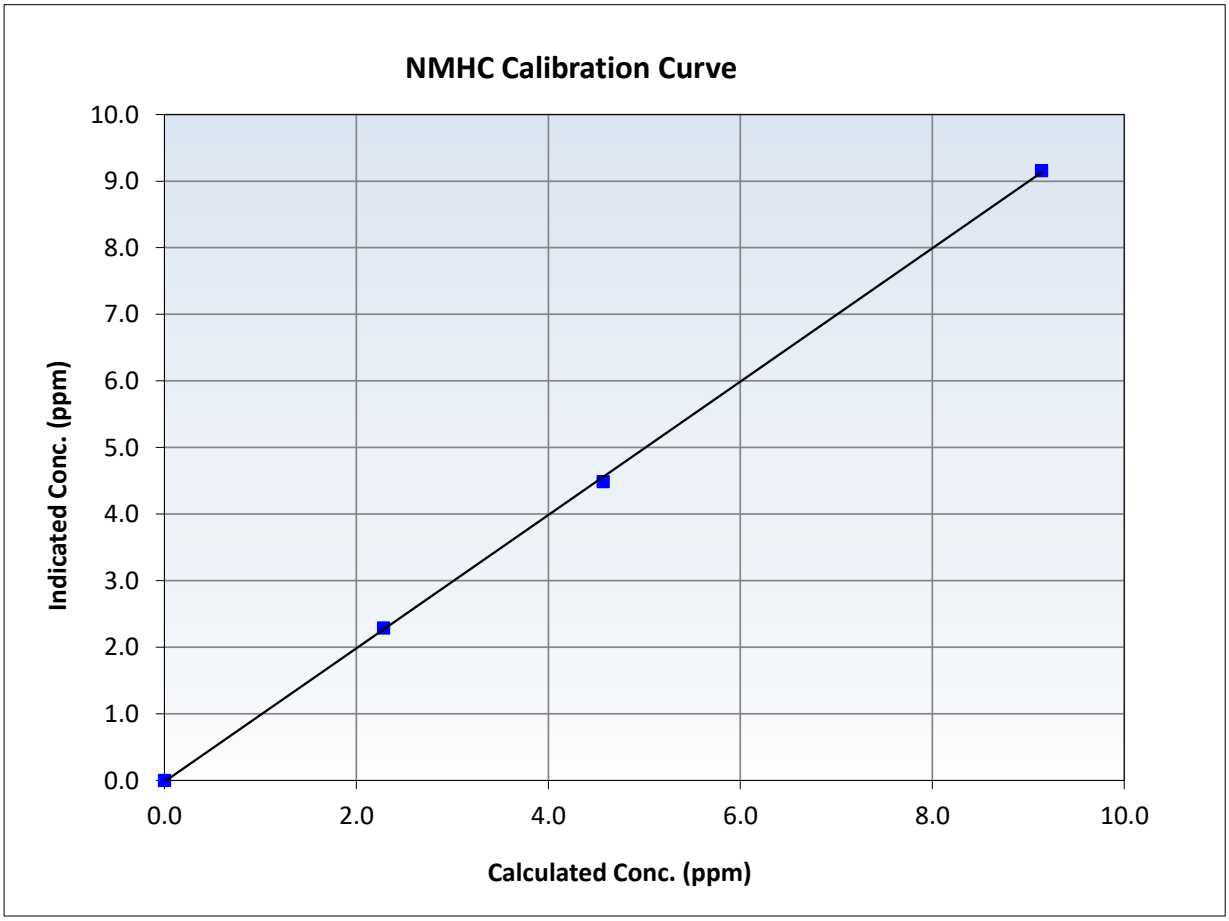
Station Information

Calibration Date:	November 16, 2024	Previous Calibration:	October 16, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:23	End Time (MST):	15:36
Analyzer make:	Thermo 55i	Analyzer serial #:	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
9.14	9.16	0.9976
4.57	4.49	1.0178
2.28	2.29	0.9977

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999867	*≥0.995*
Slope	1.001256	*0.90 - 1.10*
Intercept	-0.018189	*+/-0.5*



NMHC Calibration Plot Date: November 16, 2024 Location: Conklin

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THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 18, 2024	Last Cal Date:	NA
Start time (MST):	12:30	End time (MST):	15:20
Reason:	Install		

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:	5252
Zero Air Gen model:	Teledyne API T701	Serial Number:	953

Analyzer Information

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

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	NA	2.27E-04	NMHC SP Ratio:	NA	4.60E-05
CH4 Retention time:	NA	15.0	NMHC Peak Area:	NA	198650
Zero Chromatogram:		OFF	Flat Baseline:		OFF

THC As Found Data

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

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

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	17.13	17.02	1.006
Mid point	4960	40.1	8.56	8.64	0.991
Low point	4980	20.0	4.28	4.35	0.984
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	17.13	16.85	1.016
				Average Correction Factor	0.994

Notes: Install calibration

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

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

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

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	9.14	9.03	1.012
Mid point	4960	40.1	4.57	4.67	0.979
Low point	4980	20.0	2.28	2.37	0.962
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	9.14	8.90	1.027
				Average Correction Factor	0.984

CH4 As Found Data

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

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

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.2	7.99	7.99	1.000
Mid point	4960	40.1	3.99	3.97	1.006
Low point	4980	20.0	2.00	1.97	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.2	7.99	7.95	1.004
				Average Correction Factor	1.006

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	NA	0.992600
THC Cal Offset:	NA	0.064362
CH4 Cal Slope:	NA	1.000525
CH4 Cal Offset:	NA	-0.013244
NMHC Cal Slope:	NA	0.985800
NMHC Cal Offset:	NA	0.076606

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

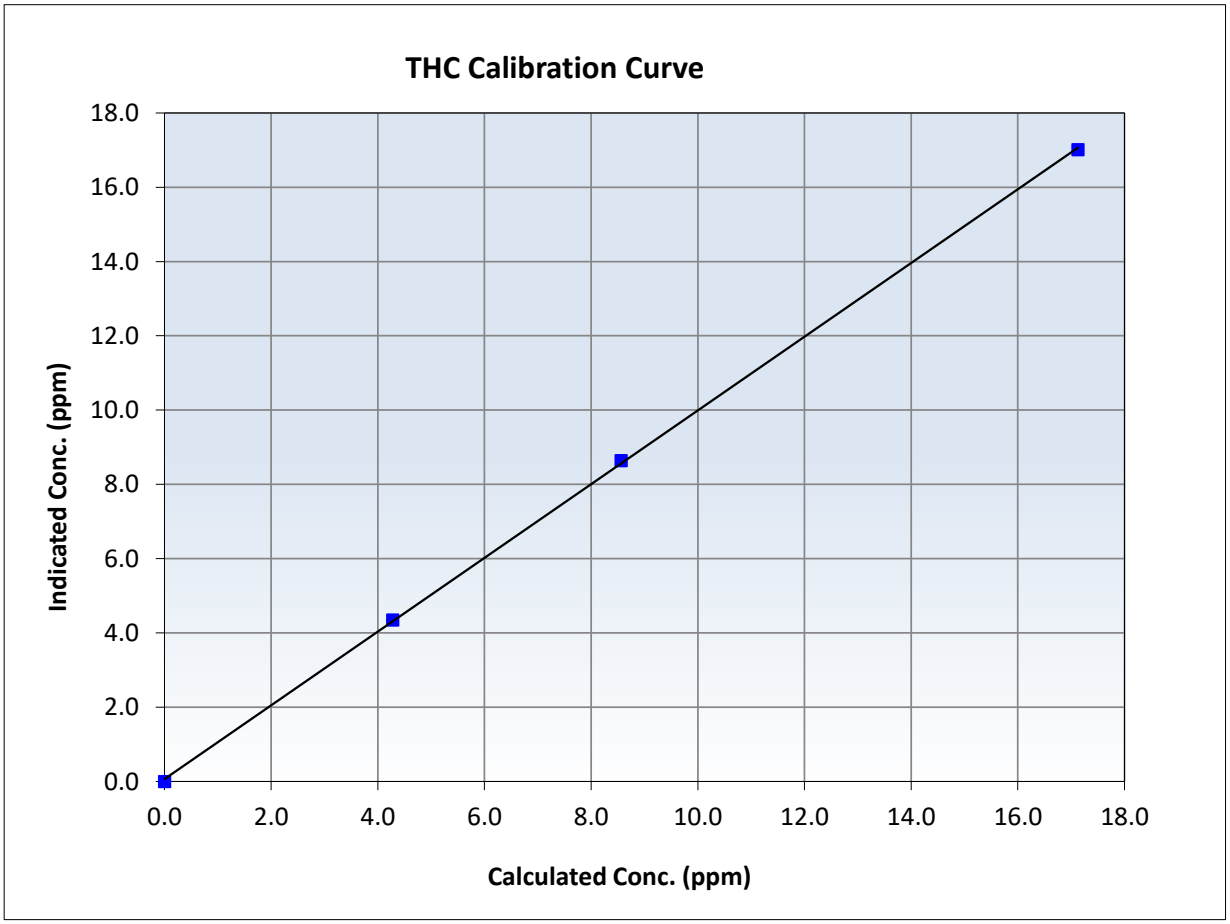
THC Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:30	End Time (MST):	15:20
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	0.999915	≥0.995
17.13	17.02	1.0064	Slope	0.992600	0.90 - 1.10
8.56	8.64	0.9911	Intercept	0.064362	+/-0.5
4.28	4.35	0.9844			



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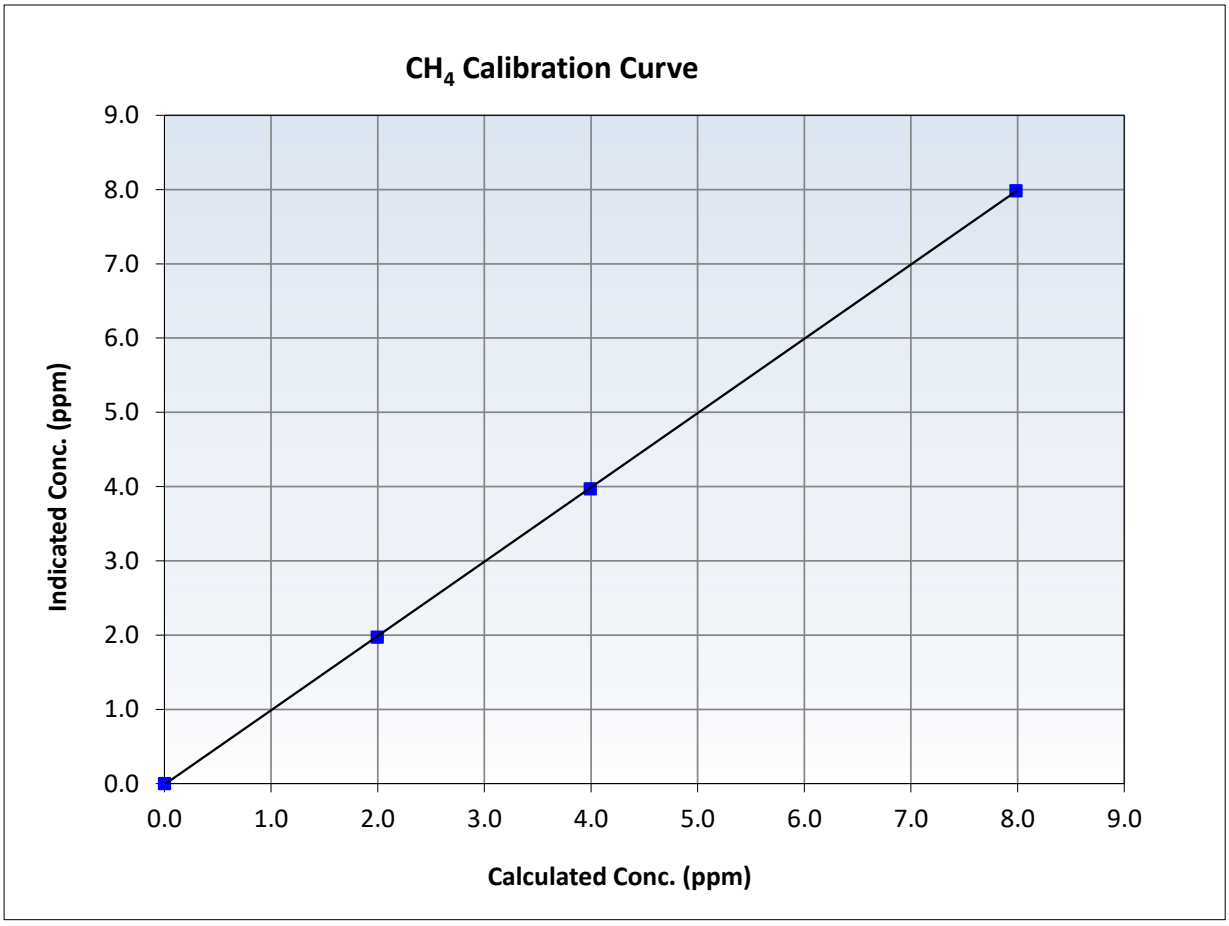
CH_4 Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:30	End Time (MST):	15:20
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
7.99	7.99	1.0001	Slope	1.000525	0.90 - 1.10
3.99	3.97	1.0056			
2.00	1.97	1.0114	Intercept	-0.013244	+/-0.5



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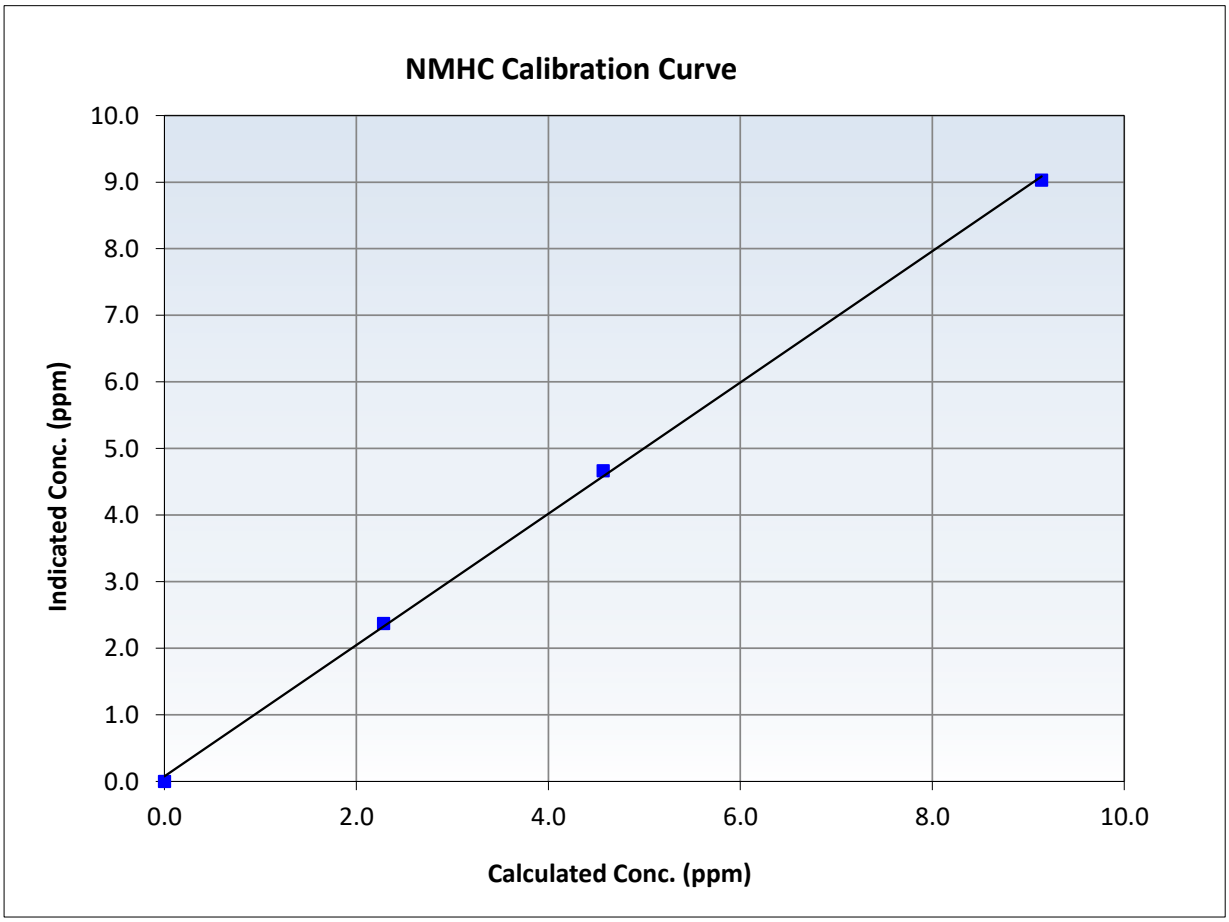
NMHC Calibration Summary

Station Information

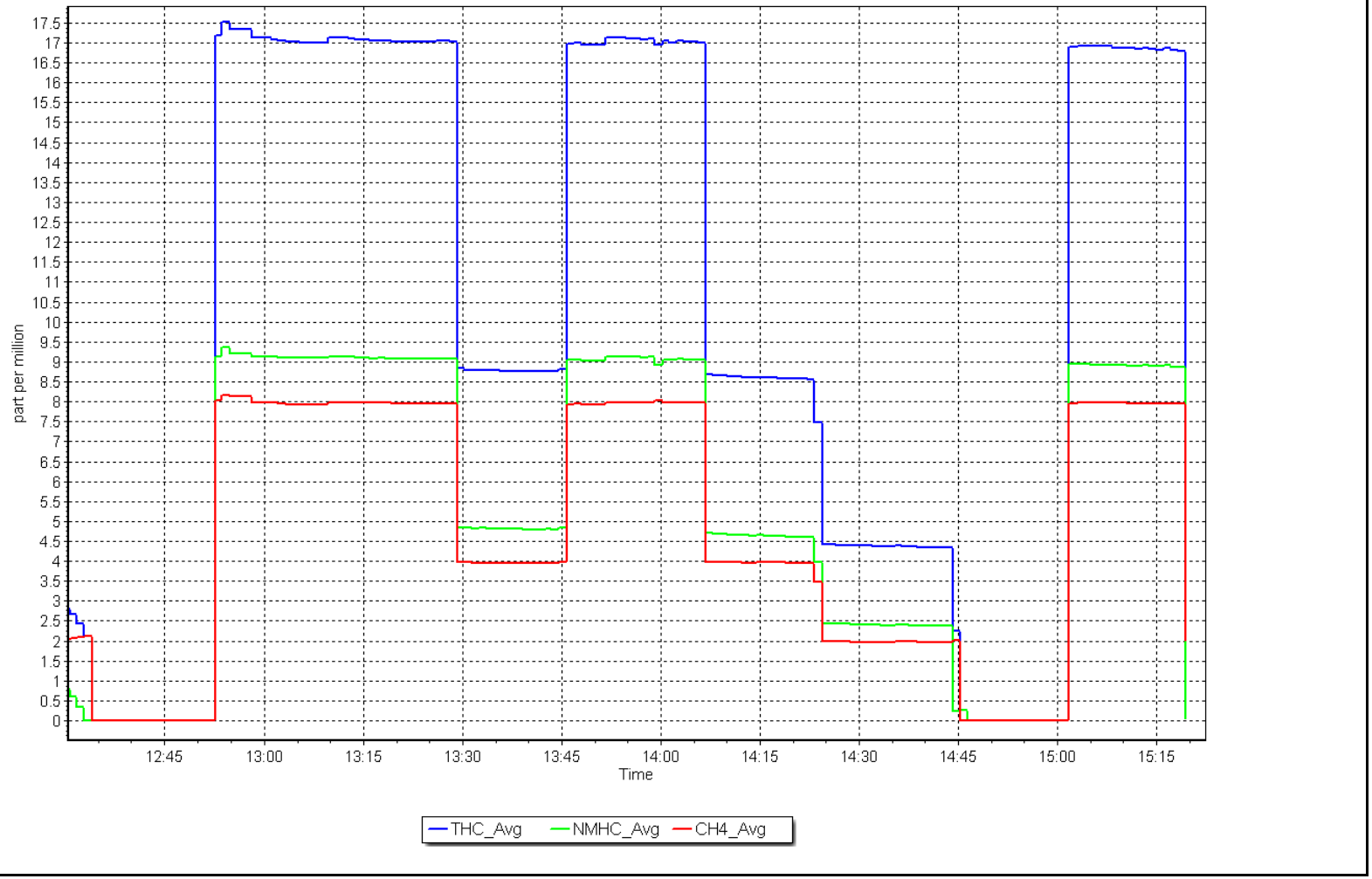
Calibration Date:	November 18, 2024	Previous Calibration:	NA
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:30	End Time (MST):	15:20
Analyzer make:	Thermo 55i	Analyzer serial #:	1180320039

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999591	≥0.995
9.14	9.03	1.0119	Slope	0.985800	0.90 - 1.10
4.57	4.67	0.9792	Intercept	0.076606	+/-0.5
2.28	2.37	0.9624			



NMHC Calibration Plot Date: November 18, 2024 Location: Conklin



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Conklin
Station number:	AMS 21
Calibration Date:	November 27, 2024
Last Cal Date:	October 22, 2024
Start time (MST):	9:39
End time (MST):	14:14
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	SA18828	Cal Gas Expiry Date:	November 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.80 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.80 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5252
ZAG make/model:	Teledyne API T701H	Serial Number:	953

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
AF High point	4918	82.0	802.0	800.3	1.6	825.8	819.8	5.9	0.9711	0.9762
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 803.9 ppb	NO = 800.2 ppb
Baseline Corr 1st pt	NO_X = 825.8 ppb	NO = 819.8 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = 2.6%
As found	NO r^2:	*Percent Change	NO = 2.4%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1501663731

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.003	0.982	NO bkgnd or offset:	9.8	9.6
NOX coeff or slope:	0.998	0.995	NOX bkgnd or offset:	9.8	9.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	148.2	148.8

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000868	0.999101
NO_X Cal Offset:	1.268044	1.088026
NO Cal Slope:	0.999920	1.001291
NO Cal Offset:	-0.032004	-0.312001
NO_2 Cal Slope:	1.003451	1.003757
NO_2 Cal Offset:	1.394565	-0.410756

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
High point	4918	82.0	802.0	800.3	1.6	801.7	801.0	0.9	1.0003	0.9992
Mid point	4959	41.0	401.0	400.2	0.8	402.6	400.8	1.8	0.9960	0.9984
Low point	4980	20.5	200.5	200.1	0.4	202.1	199.3	2.8	0.9919	1.0038
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
As left span	4918	82.0	802.0	408.3	393.7	797.1	408.3	388.8	1.0061	1.0000
								Average Correction Factor	0.9961	1.0005

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.1	----	----
High GPT point	794.6	402.4	393.8	395.2	0.9966	100.3%
Mid GPT point	794.6	608.5	187.7	187.6	1.0007	99.9%
Low GPT point	794.6	706.3	89.9	89.5	1.0049	99.5%
				Average Correction Factor	1.0007	99.9%

Notes: Sample inlet filter changed after as founds. Adjusted span only. Used 2nd NO reference point because of drift.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

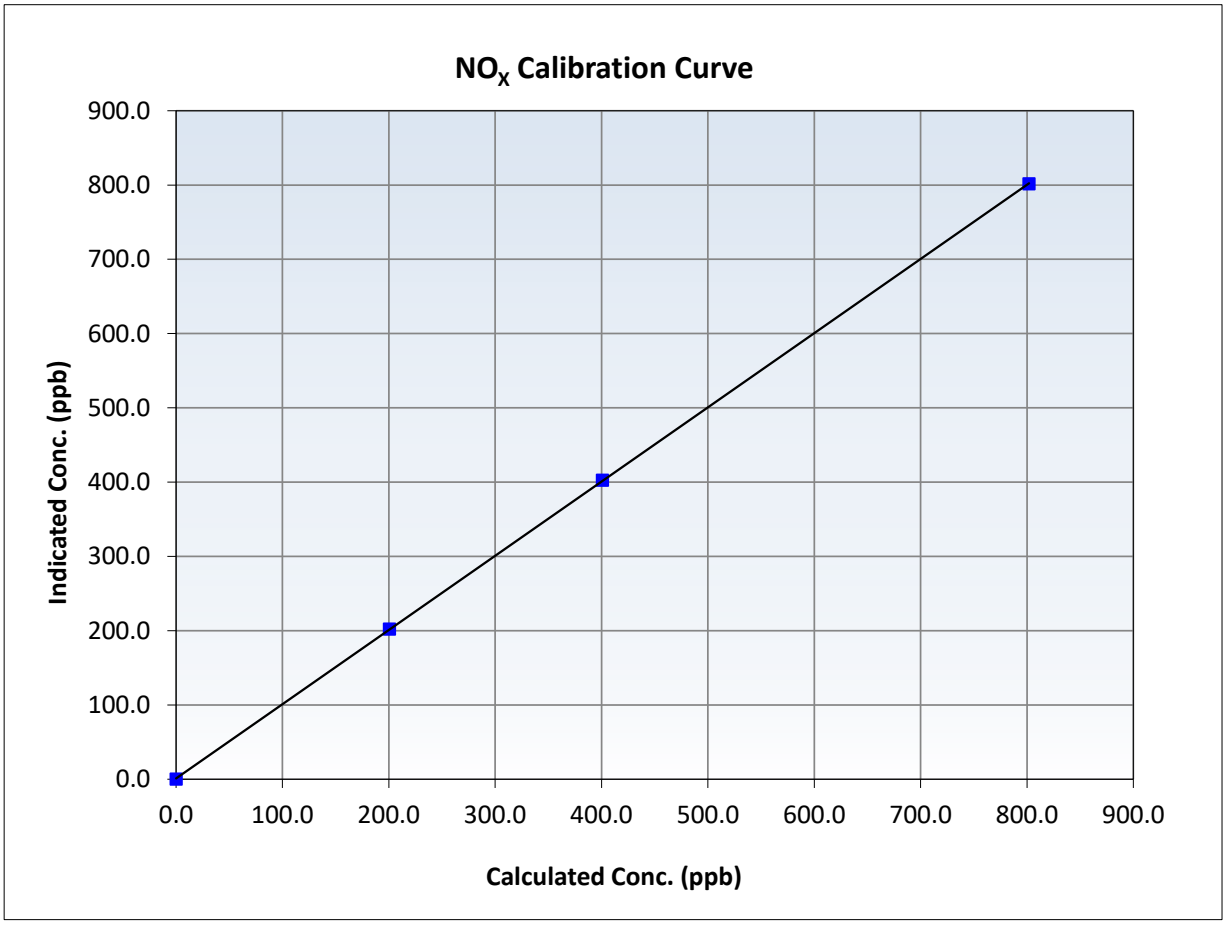
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	October 22, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:39	End Time (MST):	14:14
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
802.0	801.7	1.0003
401.0	402.6	0.9960
200.5	202.1	0.9919

Statistical Evaluation		Limits
Correlation Coefficient	0.999992	≥0.995
Slope	0.999101	0.90 - 1.10
Intercept	1.088026	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

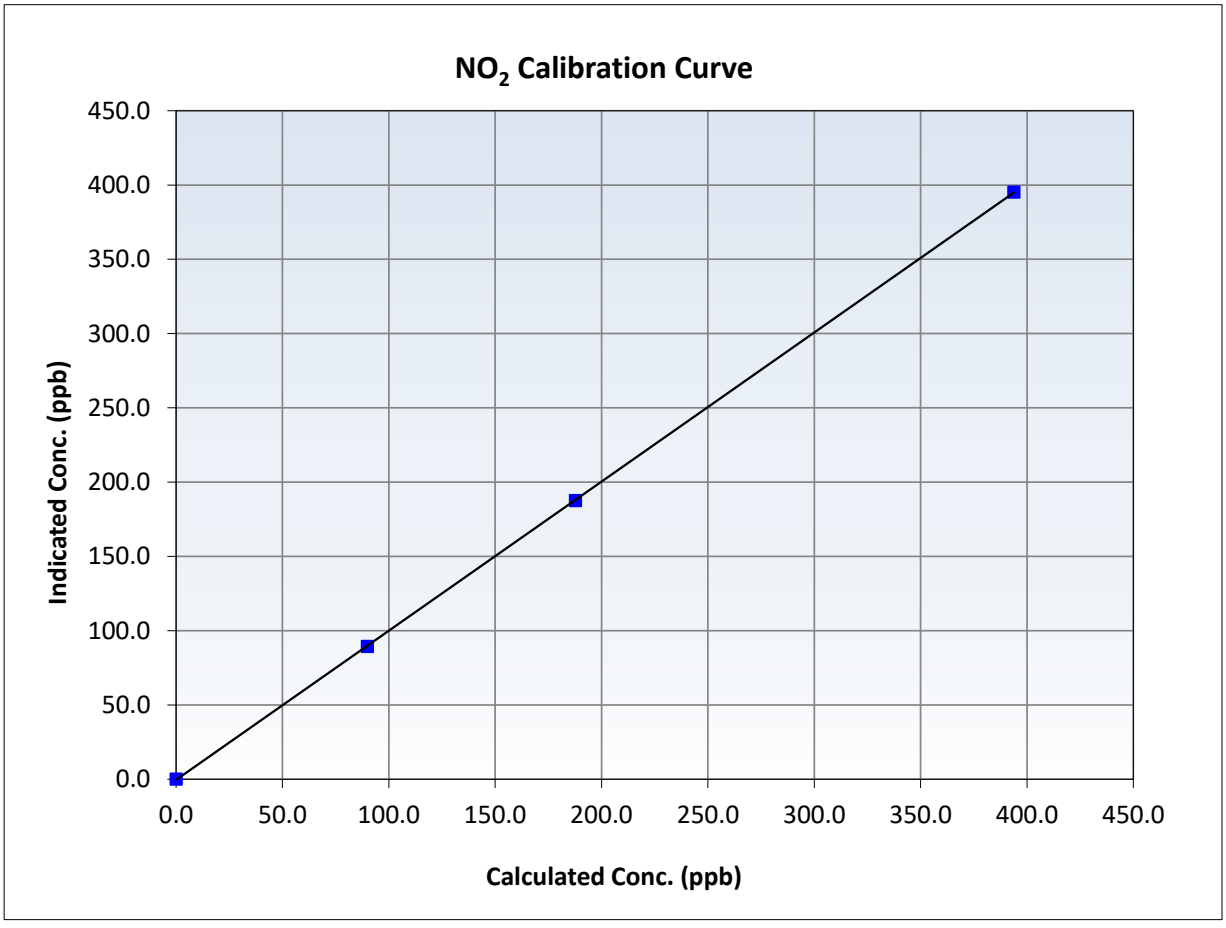
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	October 22, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:39	End Time (MST):	14:14
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
393.8	395.2	0.9966
187.7	187.6	1.0007
89.9	89.5	1.0049

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	1.003757	*0.90 - 1.10*
Intercept	-0.410756	*+/-20*



Wood Buffalo Environmental Association

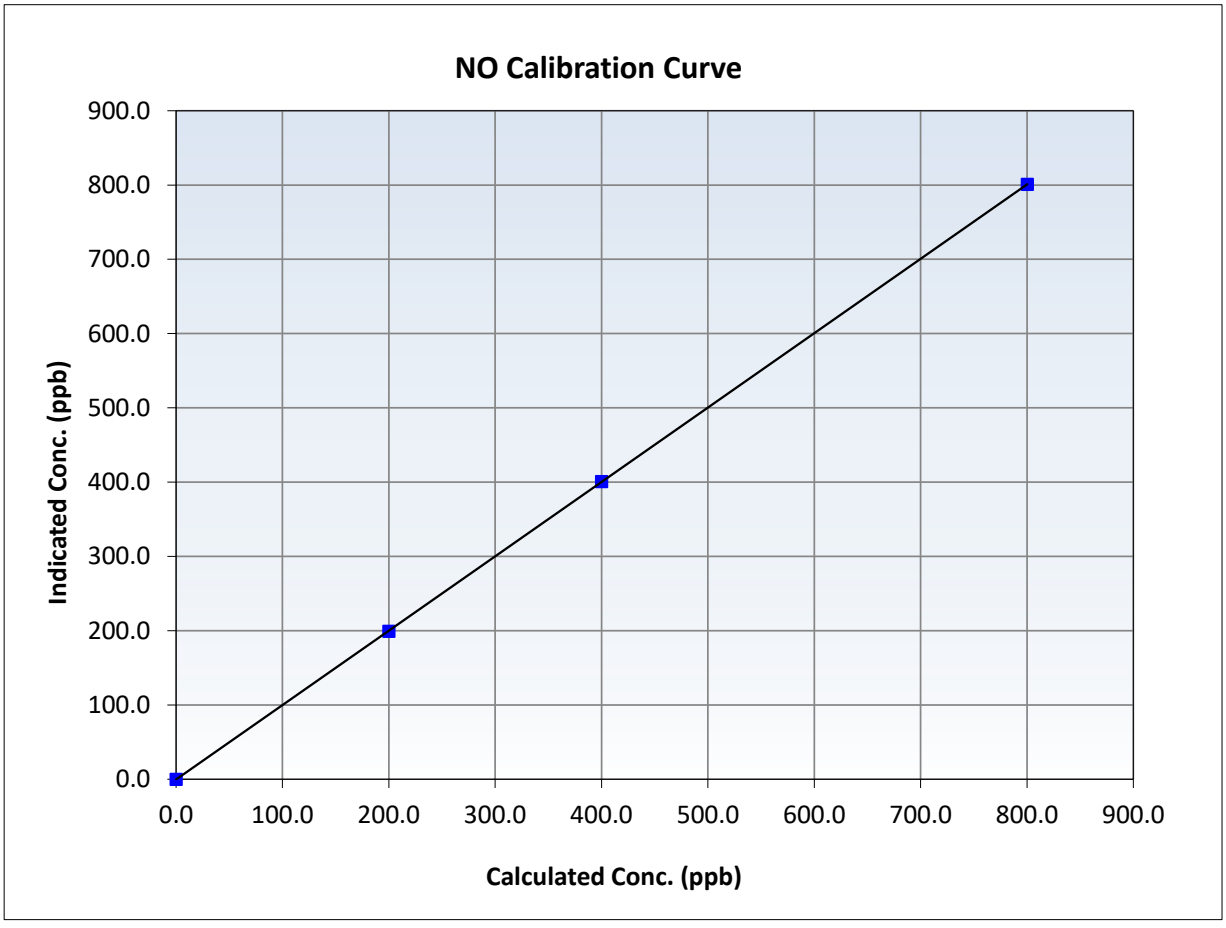
NO Calibration Summary

Station Information

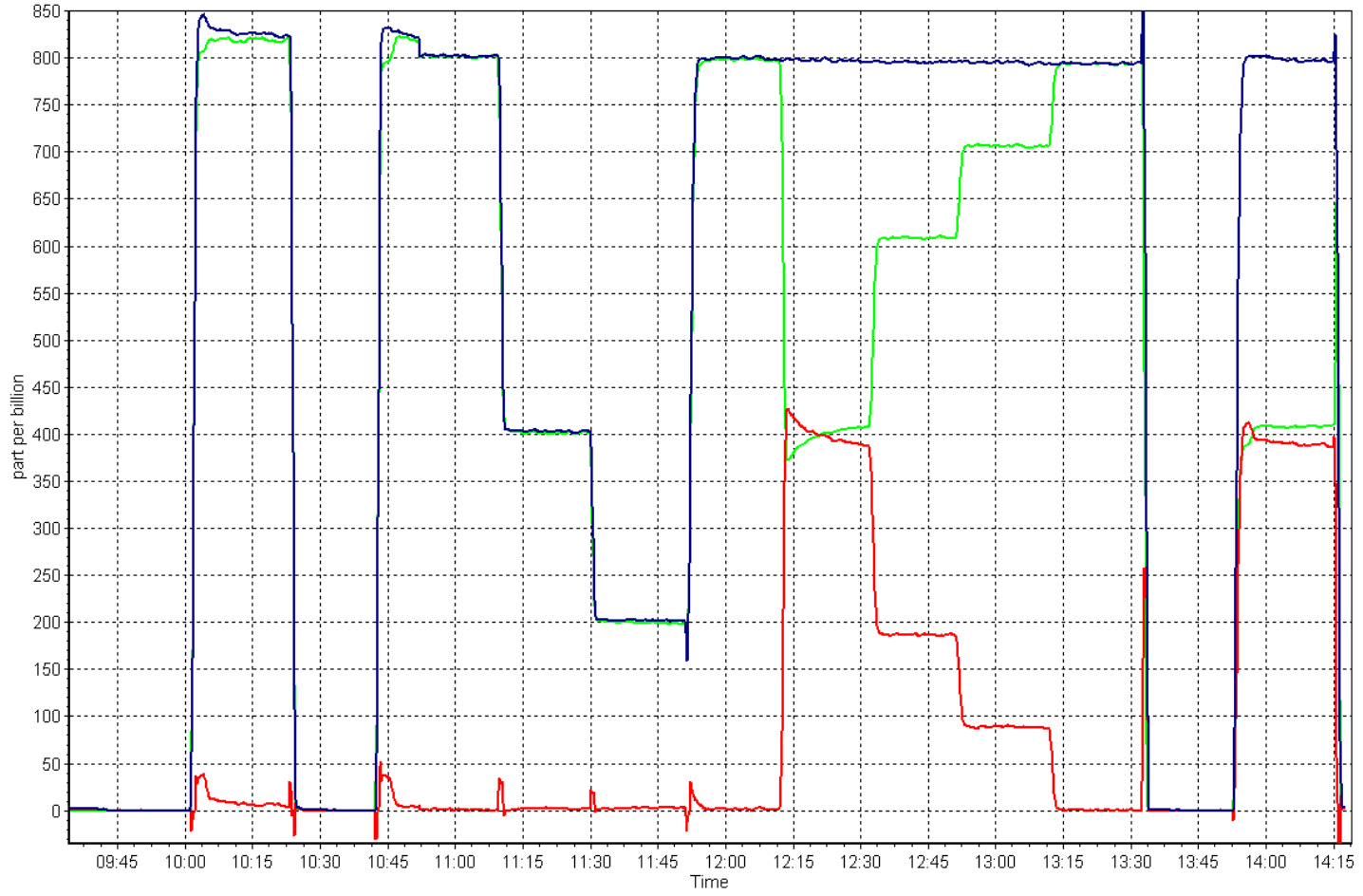
Calibration Date:	November 27, 2024	Previous Calibration:	October 22, 2024
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	9:39	End Time (MST):	14:14
Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.0	0.0	----	Correlation Coefficient	0.999998	≥0.995
800.3	801.0	0.9992	Slope	1.001291	0.90 - 1.10
400.2	400.8	0.9984	Intercept	-0.312001	+/-20
200.1	199.3	1.0038			



NO_X Calibration Plot Date: November 27, 2024 Location: Conklin



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 7, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	11:10	End time (MST):	12:32
Reason:	Removal		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	5252
ZAG Make/Model:	Teledyne API 701	Serial Number:	953

Analyzer Information

Analyzer make:	Teledyne API 7400	Analyzer serial #:	7412
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000943	N/A	Backgd or Offset:	-6.0	N/A
Calibration intercept:	-0.340000	N/A	Coeff or Slope:	1.017	N/A

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	800.0	0.0	3.2	----
As found High point	5000	921.5	400.0	408.1	0.988
As found Mid point	5000	814.5	200.0	205.3	0.990
As found Low point	5000	719.1	100.0	102.8	1.004

Baseline Corr As found:	404.9	Previous response	400.0	*% change	1.2%
Baseline Corr 2nd AF pt:	202.1	AF Slope:	1.013543	AF Intercept:	2.480000
Baseline Corr 3rd AF pt:	99.6	AF Correlation:	0.999982	* = > +/-5% change initiates investigation	

O_3 Calibration Data

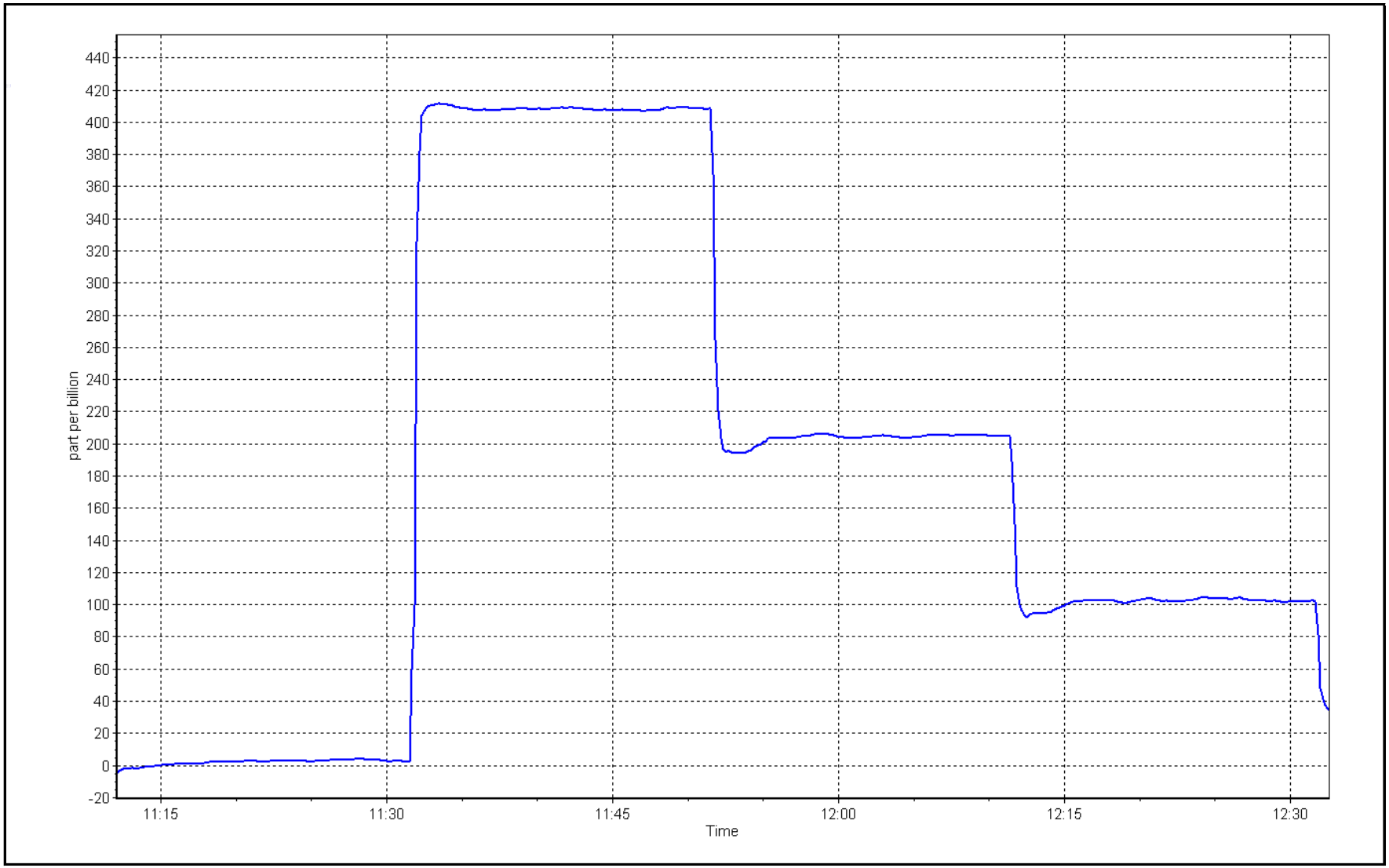
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor

Notes: Removed the instrument due to memory full error that has been occuring.

Calibration Performed By: Max Farrell

O_3 Calibration Plot Date: November 7, 2024 Location: Conklin



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 7, 2024	Last Cal Date:	N/A
Start time (MST):	12:50	End time (MST):	15:18
Reason:	Install		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	5252
ZAG Make/Model:	Teledyne API 701	Serial Number:	953

Analyzer Information

Analyzer make:	Thermo 49i		Analyzer serial #:	1501663734	
Analyzer Range	0 - 500 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	N/A	1.006886	Backgd or Offset:	N/A	2.3
Calibration intercept:	N/A	-0.980000	Coeff or Slope:	N/A	1.119

O_3 As Found Data

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

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.2	----
High point	5000	921.5	400.0	402.4	0.994
Mid point	5000	814.5	200.0	199.7	1.002
Low point	5000	719.1	100.0	98.6	1.014
As left zero	5000	800.0	0.0	-0.8	----
As left span	5000	921.5	400.0	415.2	0.963
				Average Correction Factor	1.003

Notes: Replaced the previous instrument due to a full memory error. Adjusted zero and span.

Calibration Performed By: Max Farrell

Wood Buffalo Environmental Association

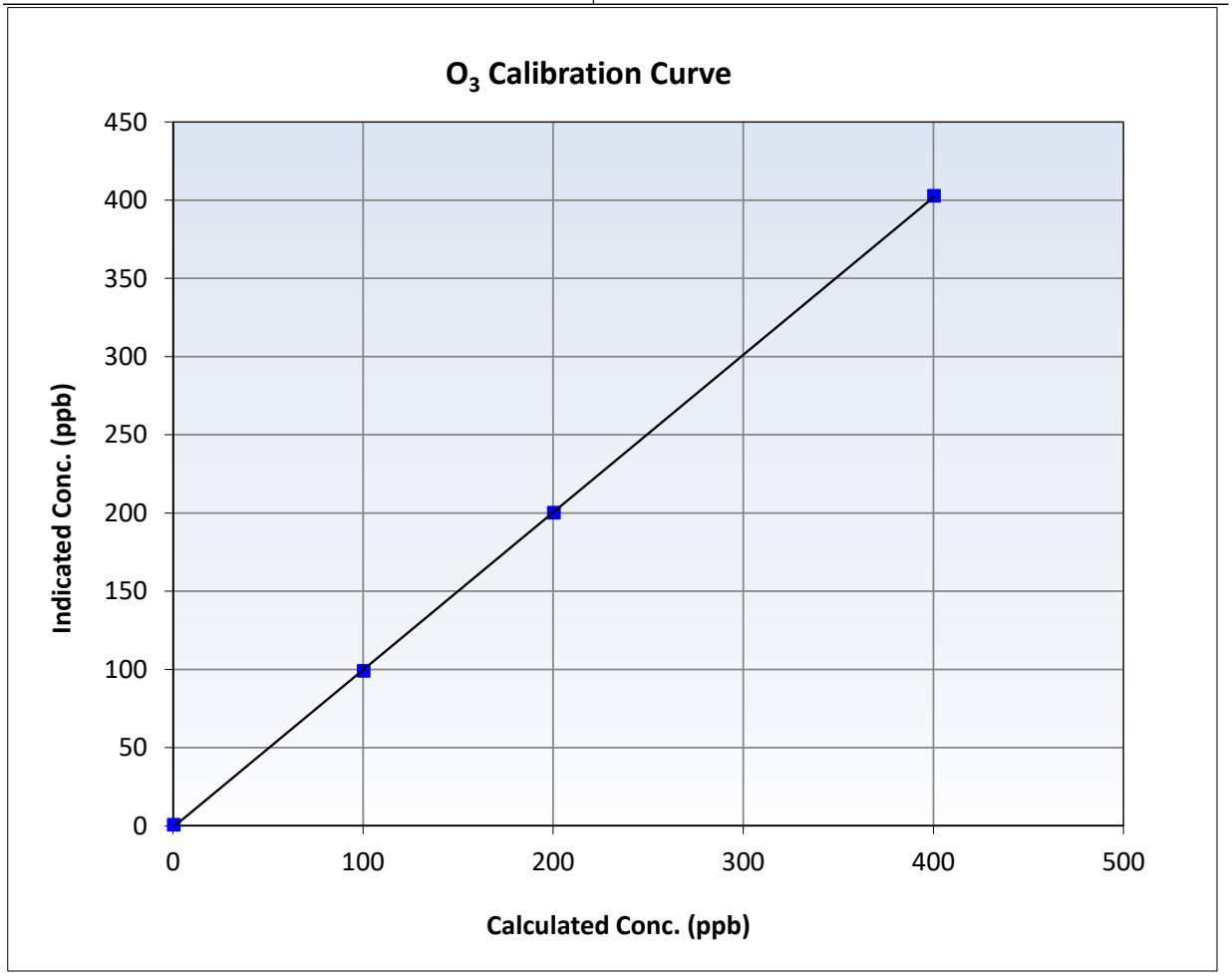
O_3 Calibration Summary

Station Information

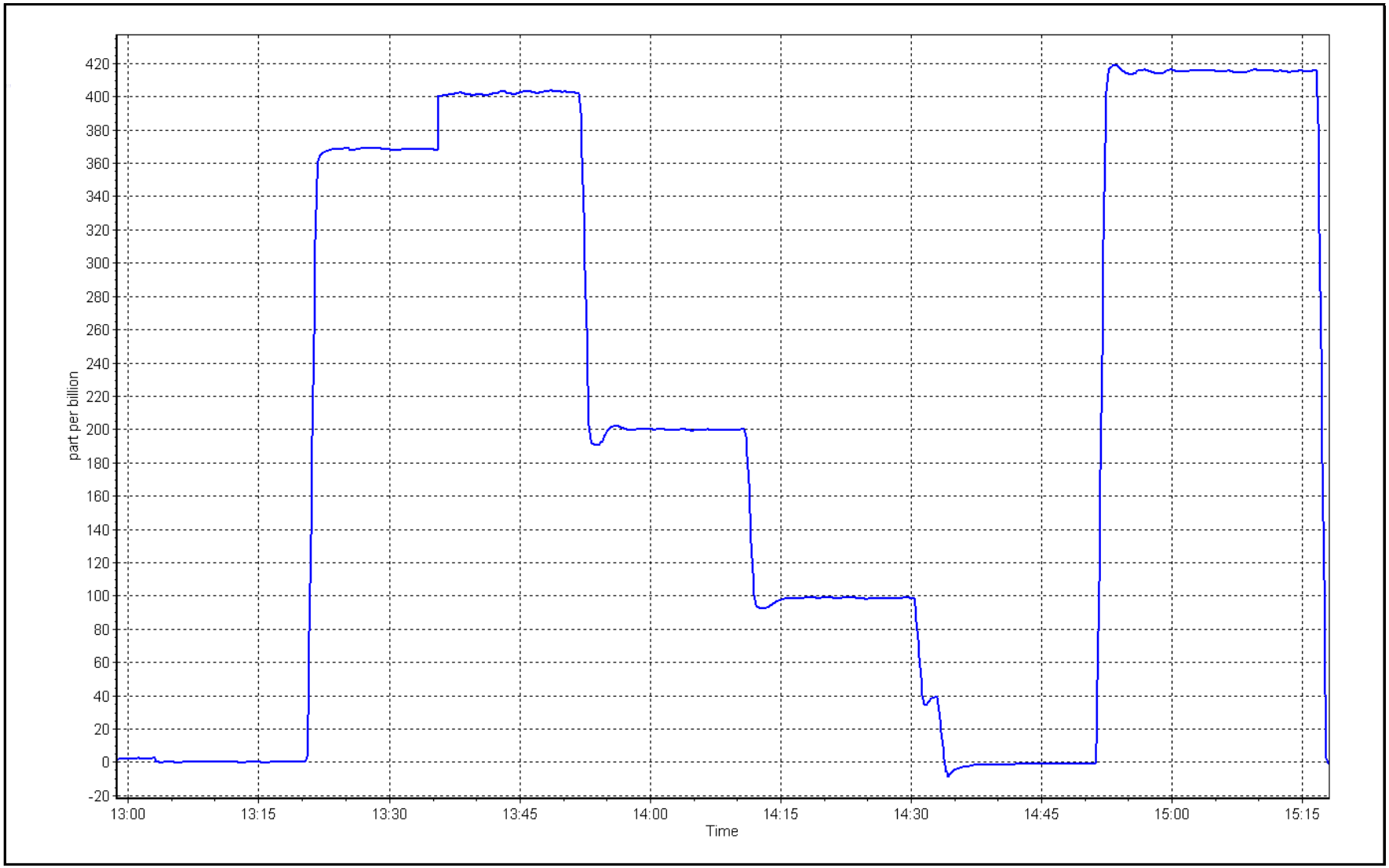
Calibration Date:	November 7, 2024	Previous Calibration:	N/A
Station Name:	Conklin	Station Number:	AMS 21
Start Time (MST):	12:50	End Time (MST):	15:18
Analyzer make:	Thermo 49i	Analyzer serial #:	1501663734

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.2	----	Correlation Coefficient	0.999961	*≥0.995*
400.0	402.4	0.9940	Slope	1.006886	*0.90 - 1.10*
200.0	199.7	1.0015			
100.0	98.6	1.0142	Intercept	-0.980000	*+/- 5*



O_3 Calibration Plot Date: November 7, 2024 Location: Conklin



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	November 27, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	10:58	End time (MST):	11:50
Analyzer Make:	API T640	S/N:	326
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-13.00	-13.37	-13.00	☐	+/- 2 °C
P (mmHg)	712.90	714.87	712.90	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.09	4.98	☐	+/- 0.25 LPM
PW% (pump)	42	-----	42	☐	>80%

Zero Verification — PM w/o HEPA: 1.60 — PM w/ HEPA: 0.00 — <0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 10.90 — Expiry Date: September 29, 2024 — Lot No.: 100128-050-040

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	9.80	10.70	10.70	☐	+/- 0.5

Date Optical Chamber Cleaned: November 27, 2024

Date Disposable Filter Changed: November 27, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: August 9, 2024

Date RH/T Sensor Cleaned: August 9, 2024

Notes: Verified flow, pressure, temperature and pump power. No adjustment needed. Leak check passed.

Calibration by: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS22
JANVIER
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	November 18, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	11:24	End time (MST):	15:05
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.11	ppm	Cal Gas Exp Date:	January 18, 2029
Cal Gas Cylinder #:	CC281519			
Removed Cal Gas Conc:	50.11	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	3806
Zero Air Gen Model:	Teledyne API T701		Serial Number:	691

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1152430006	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000621	1.002936	Backgd or Offset:	24.8	25.0
Calibration intercept:	0.004124	0.043822	Coeff or Slope:	1.004	1.024

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4920	79.8	799.8	785.7	1.018
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	785.9	Previous response	800.3	*% change	-1.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	79.8	799.8	802.1	0.997
Mid point	4960	39.9	399.9	401.3	0.996
Low point	4980	20.0	200.4	201.0	0.997
As left zero	5000	0.0	0.0	-0.1	----
As left span	4920	79.8	799.8	804.8	0.994
				Average Correction Factor:	0.997

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

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

SO_2 Calibration Summary

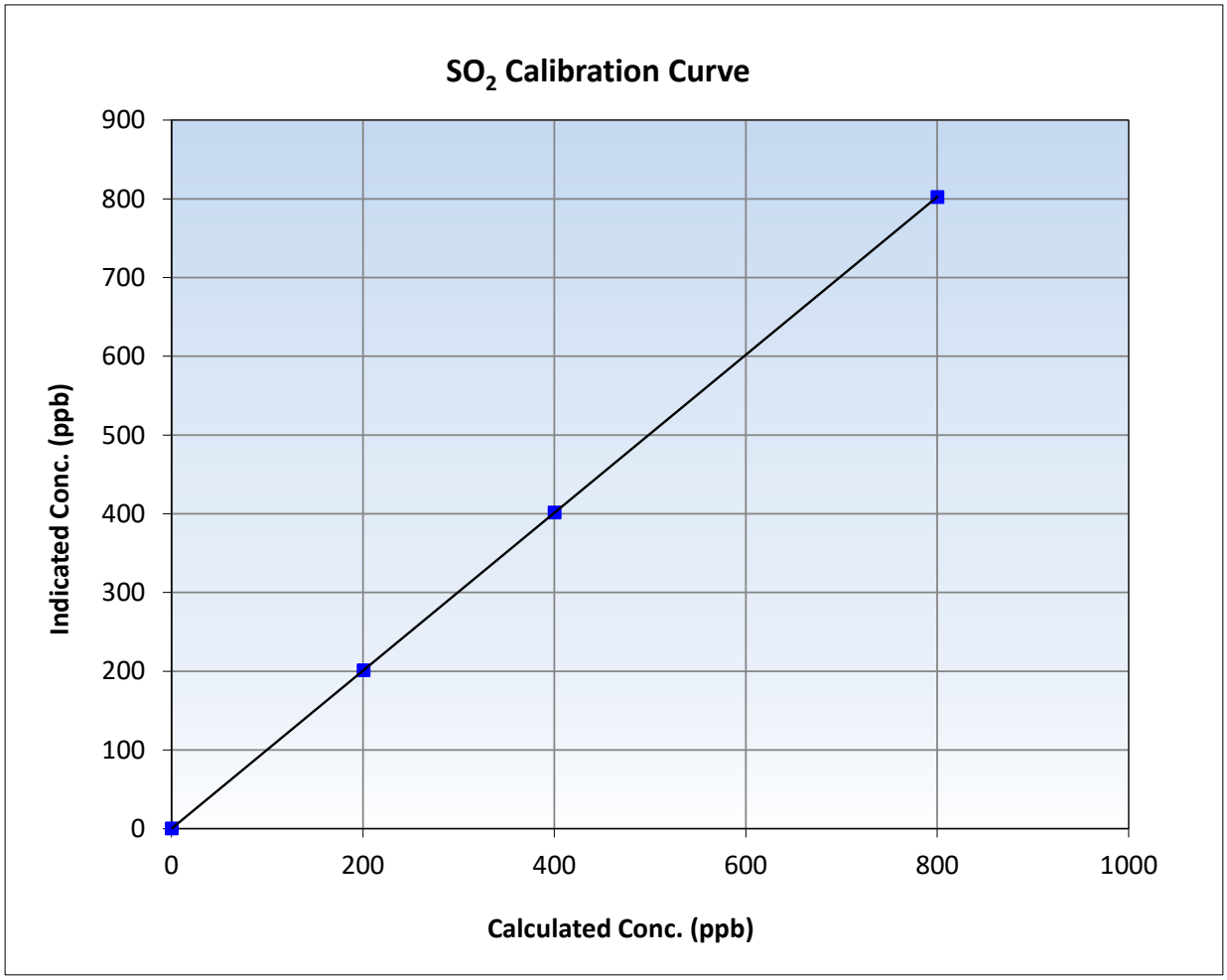
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:24	End Time (MST):	15:05
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

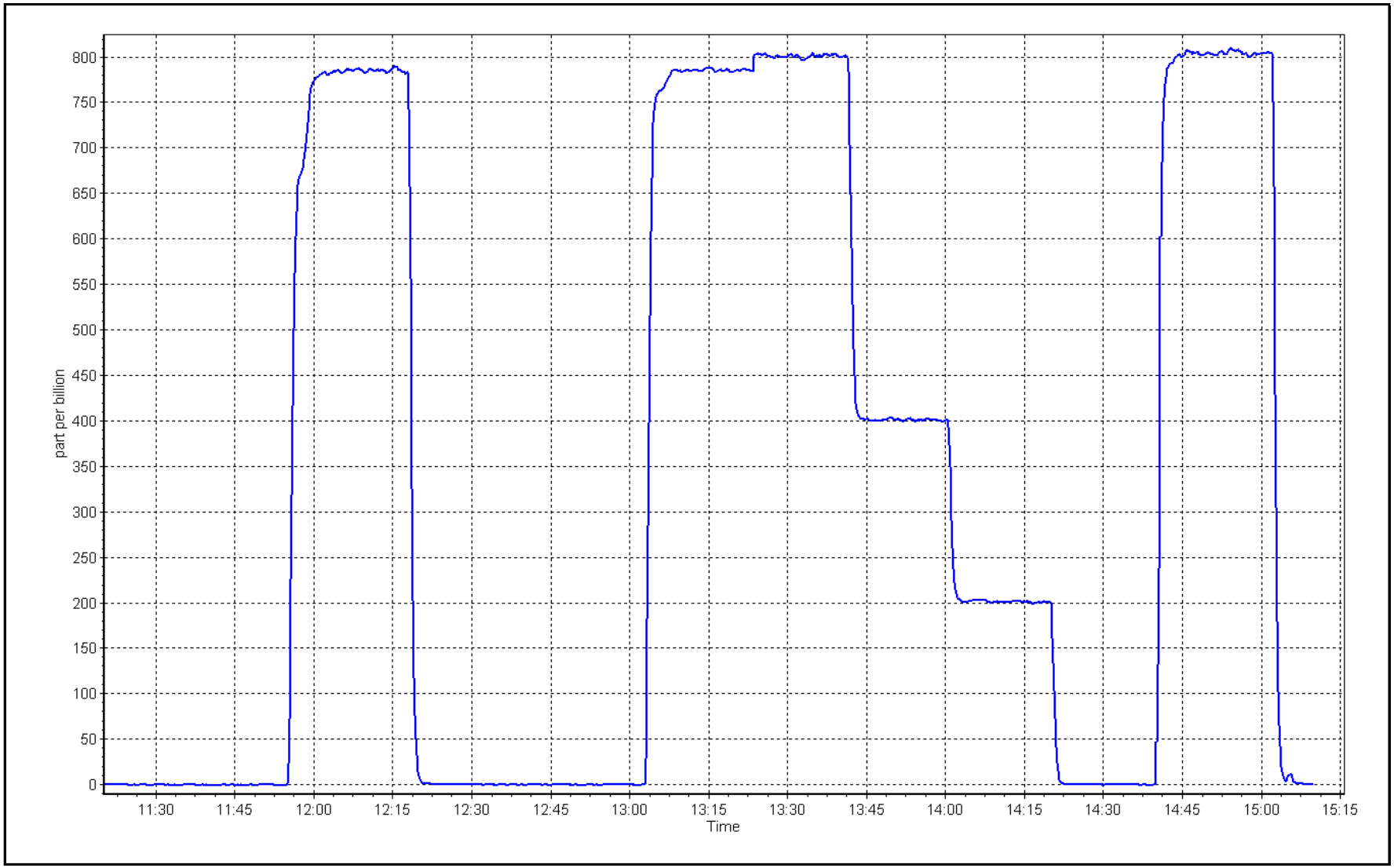
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.8	802.1	0.9971
399.9	401.3	0.9965
200.4	201.0	0.9972

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.002936	*0.90 - 1.10*
Intercept	0.043822	*+/-30*



SO2 Calibration Plot Date: November 18, 2024 Location: Janvier



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	November 21, 2024	Last Cal Date:	October 29, 2024
Start time (MST):	9:54	End time (MST):	14:20
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.02	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	CC424047			
Removed Cal Gas Conc:	5.02	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3806
ZAG Make/Model:	Teledyne API T701		Serial Number:	691

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1151680031
Converter make:	CDN-101		Converter serial #:	620
Analyzer Range	0 - 100 ppb		Converter Temp:	850 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.973815	0.987240	Backgd or Offset:	3.26	3.74
Calibration intercept:	0.600153	0.280383	Coeff or Slope:	1.166	1.197

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 High point	4920	79.7	80.0	77.9	1.033
As found Mid point	4960	39.8	40.0	39.8	1.014
As found Low point	4980	19.9	20.0	20.1	1.014
New cylinder response					

Baseline Corr As found:	77.5	Prev response:	78.53	*% change:	-1.3%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.967956	AF Intercept:	0.680147
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999898	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4920	79.7	80.0	79.2	1.010
Mid point	4960	39.8	40.0	39.9	1.002
Low point	4980	19.9	20.0	20.0	0.999
As left zero	5000	0.0	0.0	0.5	----
As left span	4920	79.7	80.0	78.5	1.019
SO2 Scrubber Check	4920	79.8	798.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.004
Date of last converter efficiency test:					

Notes: Perfomed the inlet filter change and scrubber test after the as founds. Adjusted both the zero and span.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

TRS Calibration Summary

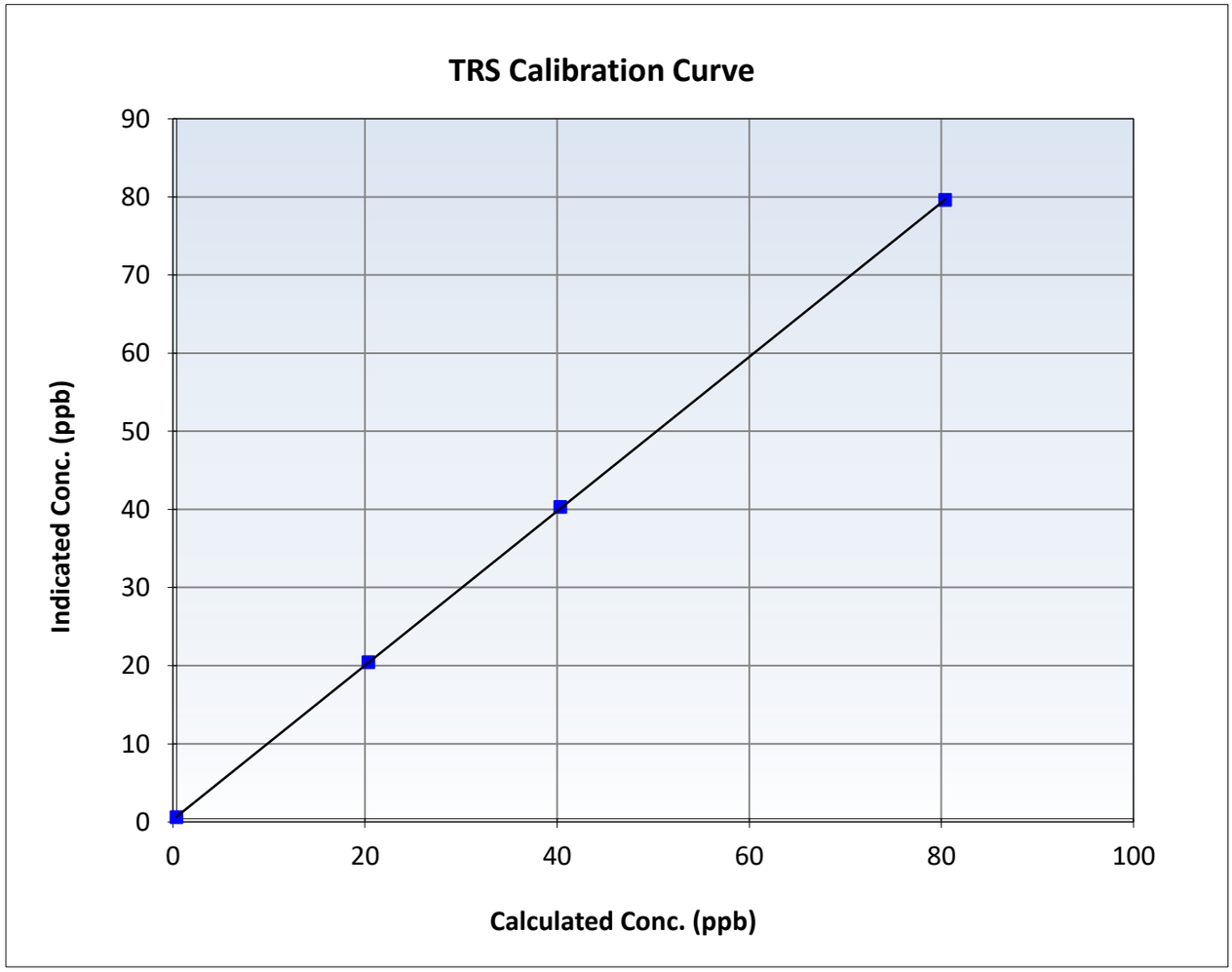
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 29, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	9:54	End Time (MST):	14:20
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031

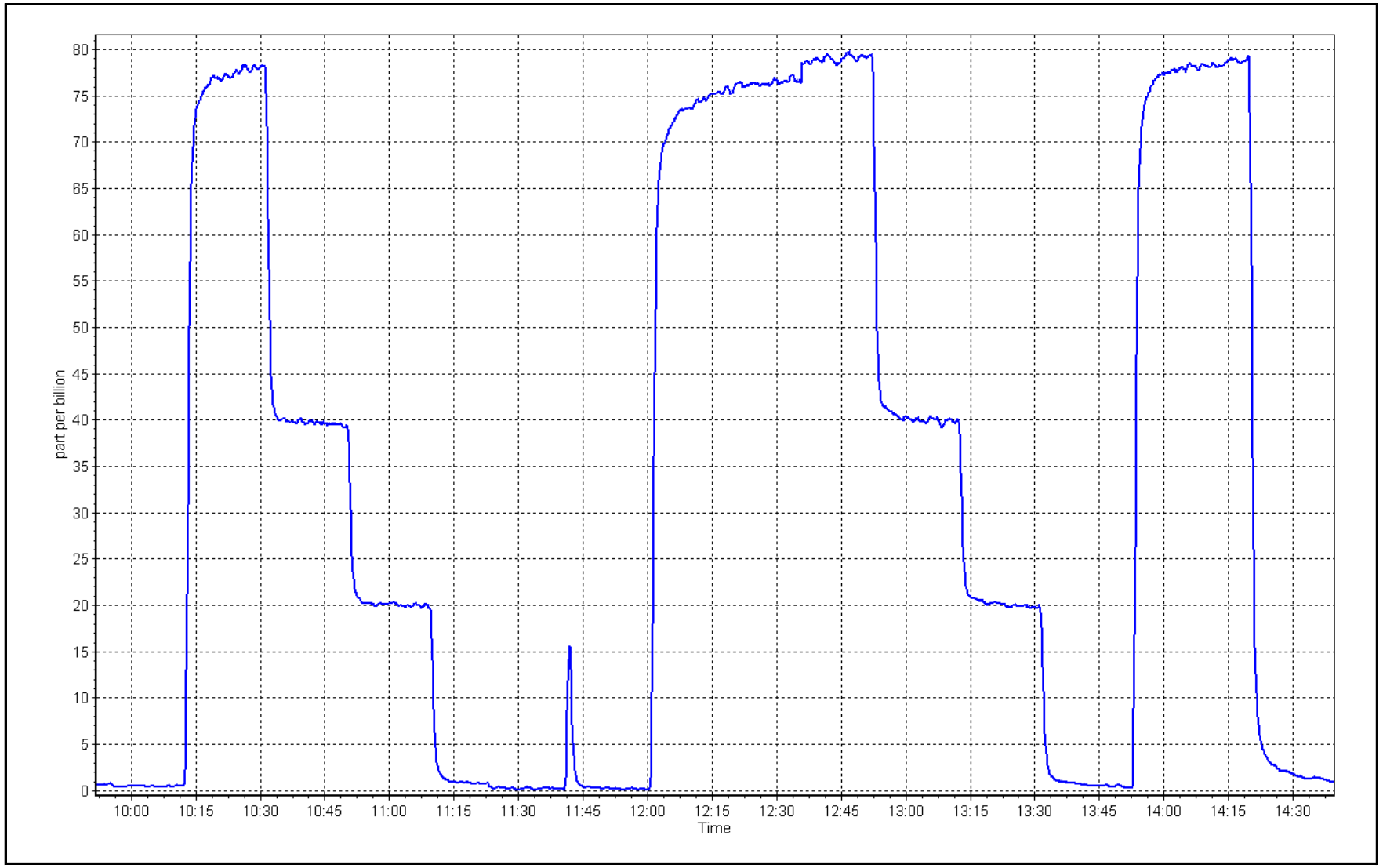
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
80.0	79.2	1.0104
40.0	39.9	1.0015
20.0	20.0	0.9990

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999988	*≥0.995*
Slope	0.987240	*0.90 - 1.10*
Intercept	0.280383	*+/-3*



TRS Calibration Plot Date: November 21, 2024 Location: Janvier



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	November 18, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	11:24	End time (MST):	15:05
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC281519		Cal Gas Expiry Date:	January 18, 2029	
CH4 Cal Gas Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
C3H8 Cal Gas Conc.	208.4	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
Removed C3H8 Conc.	208.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API 700		Serial Number:	3806	
Zero Air Gen model:	Teledyne API 701		Serial Number:	691	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1317958219	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	2.47E-04	2.49E-04	NMHC SP Ratio:	5.90E-05	5.95E-05
CH4 Retention time:	11.6	11.6	NMHC Peak Area:	155091	153693
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	17.17	17.26	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.26	Prev response	17.15	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	17.17	17.16	1.001
Mid point	4960	39.9	8.59	8.53	1.007
Low point	4980	20.0	4.30	4.26	1.010
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	17.17	17.13	1.003
				Average Correction Factor	1.006

Notes: Changed the inlet filter and H2 cylinder after as founds. Adjusted span only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	9.15	9.23	0.991
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.23	Prev response	9.16	*% change	0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	9.15	9.14	1.001
Mid point	4960	39.9	4.57	4.56	1.003
Low point	4980	20.0	2.29	2.29	1.003
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	9.15	9.12	1.003
				Average Correction Factor	1.002

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	79.8	8.03	8.04	0.999
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.04	Prev response	7.99	*% change	0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	79.8	8.03	8.03	1.000
Mid point	4960	39.9	4.01	3.97	1.012
Low point	4980	20.0	2.01	1.97	1.019
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	79.8	8.03	8.01	1.002
				Average Correction Factor	1.010

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999843	0.999803
THC Cal Offset:	-0.018195	-0.027392
CH4 Cal Slope:	0.998291	1.001053
CH4 Cal Offset:	-0.017155	-0.024358
NMHC Cal Slope:	1.001205	0.999092
NMHC Cal Offset:	-0.001040	-0.003835

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

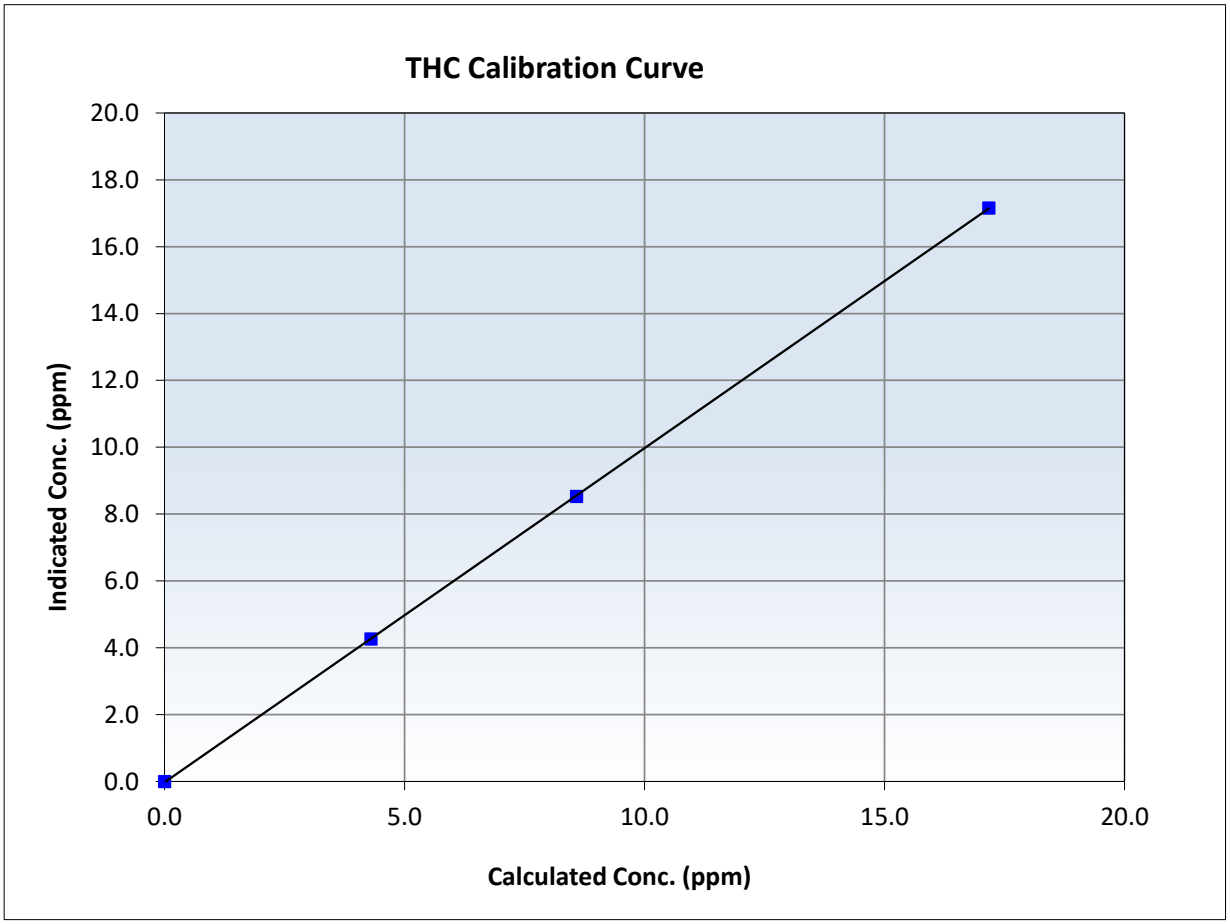
THC Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:24	End Time (MST):	15:05
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	0.999985	≥0.995
17.17	17.16	1.0006	Slope	0.999803	0.90 - 1.10
8.59	8.53	1.0071			
4.30	4.26	1.0102	Intercept	-0.027392	+/-0.5



Wood Buffalo Environmental Association

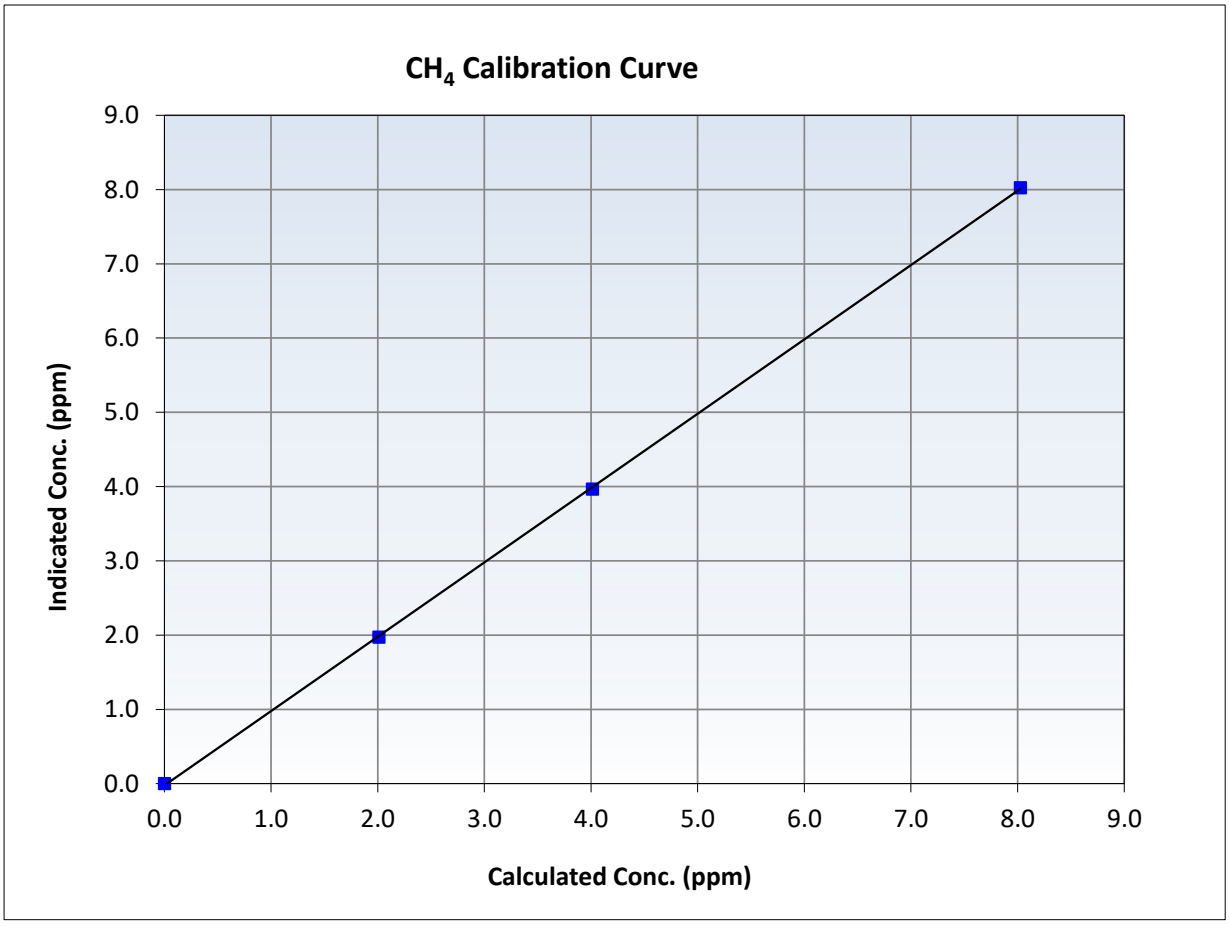
CH_4 Calibration Summary

Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:24	End Time (MST):	15:05
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	0.999949	≥0.995
8.03	8.03	0.9999	Slope	1.001053	0.90 - 1.10
4.01	3.97	1.0117			
2.01	1.97	1.0188	Intercept	-0.024358	+/-0.5



Wood Buffalo Environmental Association

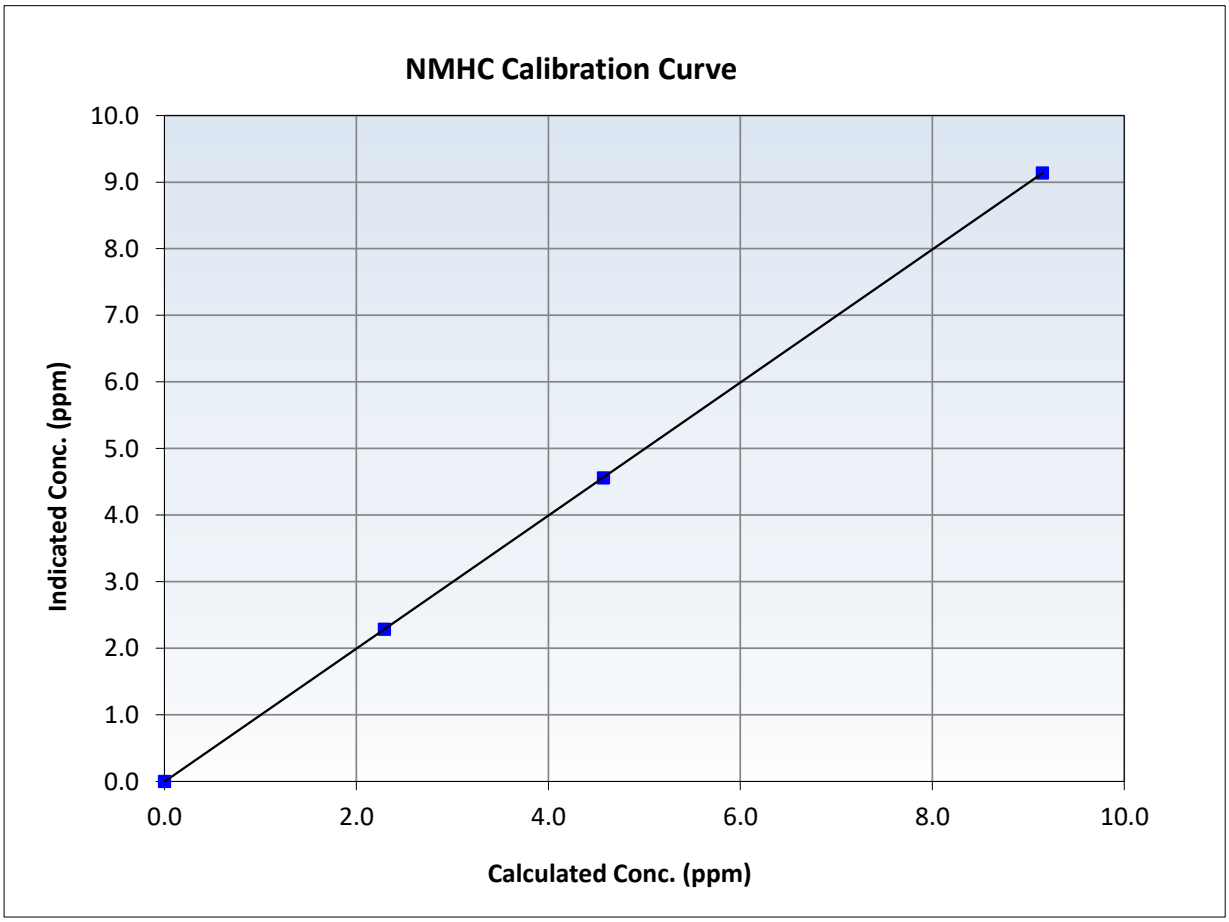
NMHC Calibration Summary

Station Information

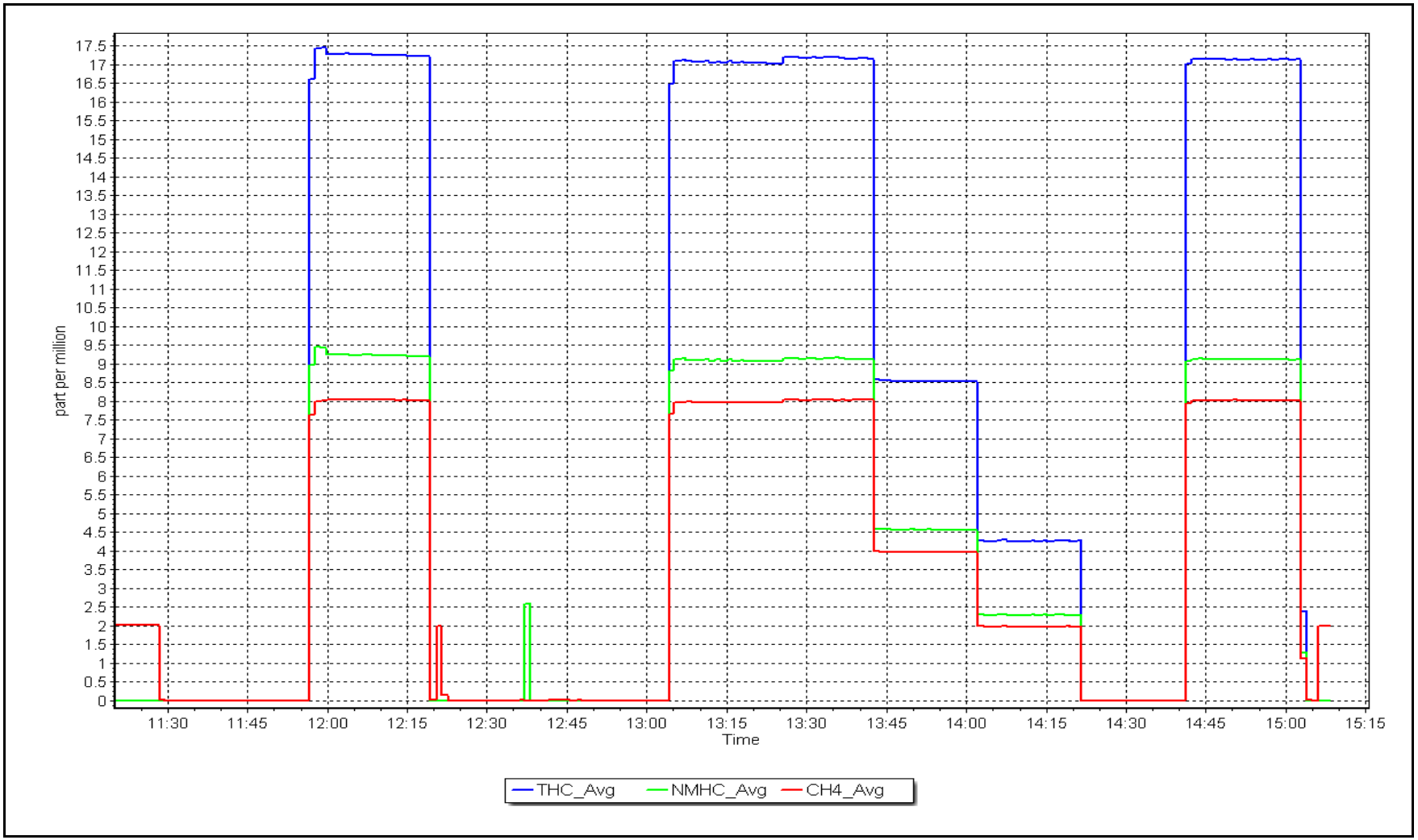
Calibration Date:	November 18, 2024	Previous Calibration:	October 8, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:24	End Time (MST):	15:05
Analyzer make:	Thermo 55i	Analyzer serial #:	1317958219

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		Limits
0.00	0.00	----	Correlation Coefficient	0.999999	≥0.995
9.15	9.14	1.0010	Slope	0.999092	0.90 - 1.10
4.57	4.56	1.0029			
2.29	2.29	1.0032	Intercept	-0.003835	+/-0.5



NMHC Calibration Plot Date: November 18, 2024 Location: Janvier



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Janvier
Station number:	AMS 22
Calibration Date:	November 26, 2024
Last Cal Date:	October 23, 2024
Start time (MST):	11:16
End time (MST):	15:12
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0047765	Cal Gas Expiry Date:	March 11, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.80 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.80 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3806
ZAG make/model:	Teledyne API T701	Serial Number:	691

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.5	-0.5	----	----
AF High point	4918	82.0	802.0	800.3	1.6	797.9	787.4	10.5	1.0051	1.0171
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X =	801.9 ppb	NO =	795.4 ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X = -0.5%
Baseline Corr 1st pt	NO_X =	797.9 ppb	NO =	786.9 ppb	As Found Statistics	*Percent Change	NO = -1.1%
Baseline Corr 2nd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO_X r^2:	Nx Sl:	Nx Int:
Baseline Corr 3rd pt	NO_X =	NA ppb	NO =	NA ppb	As found NO r^2:	NO Sl:	NO Int:
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 833

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.880	0.880	NO bkgnd or offset:	-0.7	-0.7
NOX coeff or slope:	0.879	0.879	NOX bkgnd or offset:	0.5	0.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	8.4	8.4

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.998827	0.991246
NO_X Cal Offset:	0.904139	0.163866
NO Cal Slope:	0.993834	0.988179
NO Cal Offset:	0.043774	-0.576326
NO_2 Cal Slope:	1.015859	1.001375
NO_2 Cal Offset:	0.165557	-0.096837

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	----	----
High point	4918	82.0	802.0	800.3	1.6	795.0	790.7	4.4	1.0088	1.0122
Mid point	4960	41.0	400.9	400.1	0.8	397.9	394.4	3.5	1.0075	1.0144
Low point	4980	20.5	200.5	200.1	0.4	198.6	196.2	2.4	1.0094	1.0197
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.6	-0.6	----	----
As left span	4918	82.0	802.0	392.3	409.7	789.0	392.3	396.7	1.0164	1.0000
							Average Correction Factor		1.0086	1.0154

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	788.7	390.6	399.7	400.1	0.9991	100.1%
Mid GPT point	788.7	590.3	200.0	200.5	0.9977	100.2%
Low GPT point	788.7	686.5	103.8	103.7	1.0014	99.9%
				Average Correction Factor	0.9994	100.1%

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

Calibration Performed By: Kelly Baragar

Wood Buffalo Environmental Association

NO_X Calibration Summary

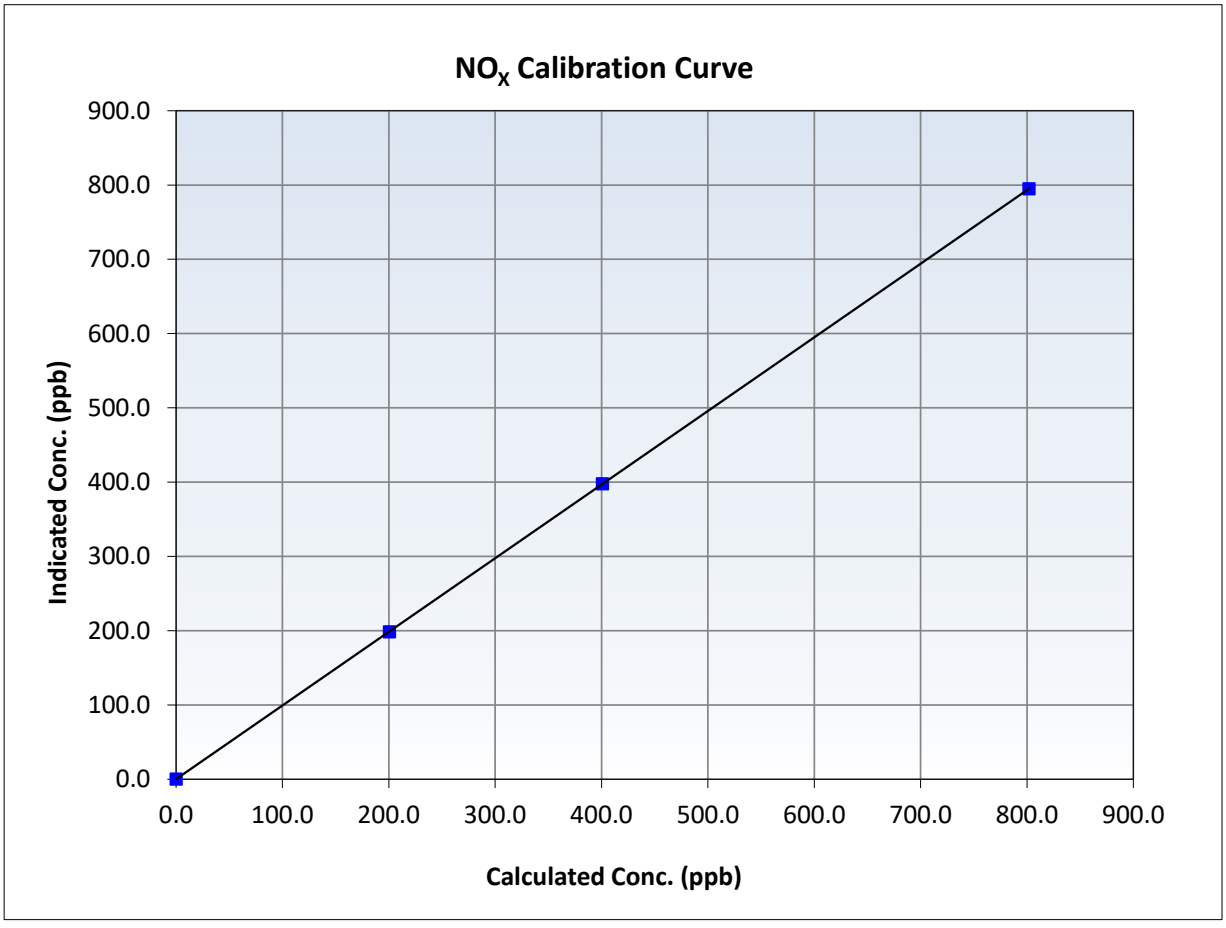
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 23, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:16	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
802.0	795.0	1.0088
400.9	397.9	1.0075
200.5	198.6	1.0094

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.991246	0.90 - 1.10
Intercept	0.163866	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

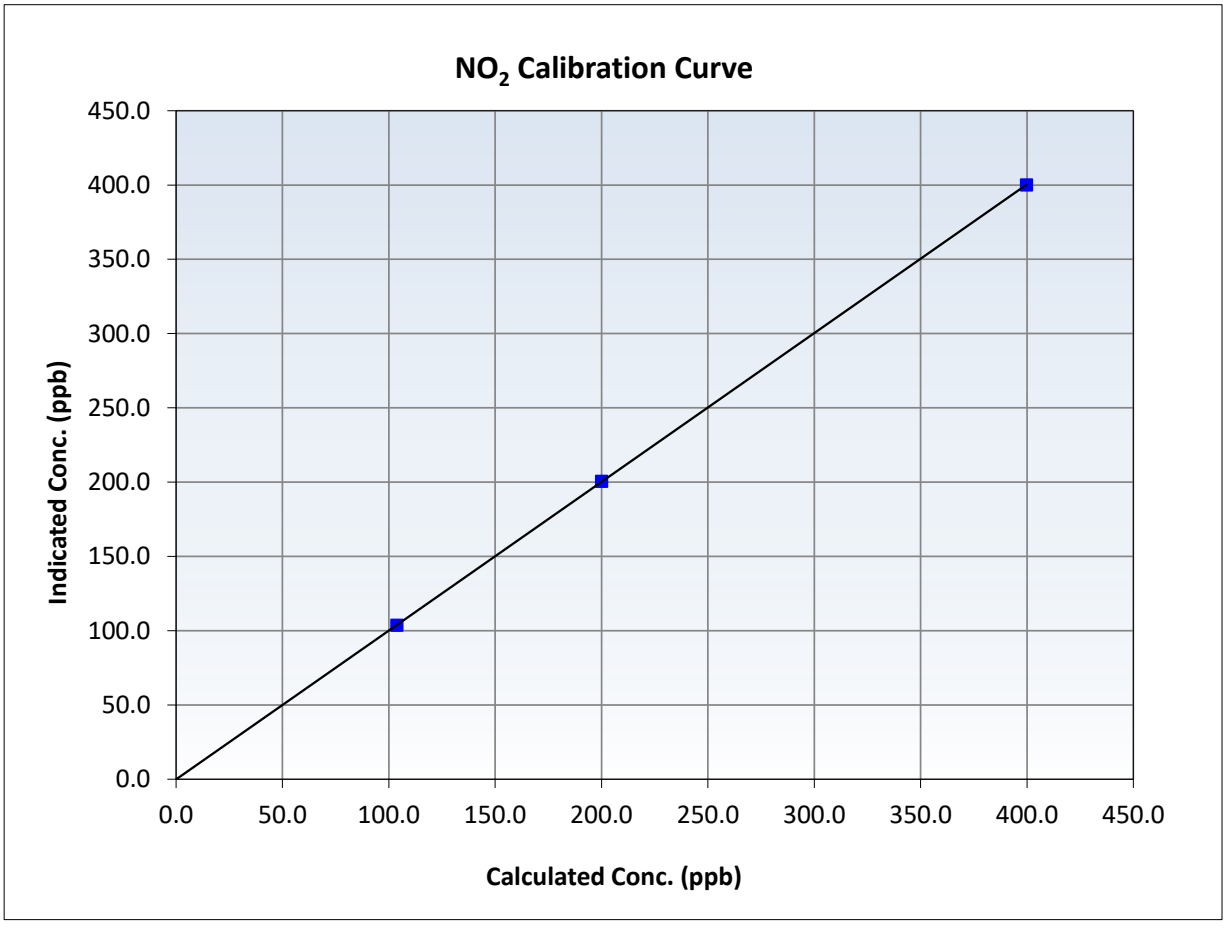
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 23, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:16	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
399.7	400.1	0.9991
200.0	200.5	0.9977
103.8	103.7	1.0014

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	1.001375	0.90 - 1.10
Intercept	-0.096837	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

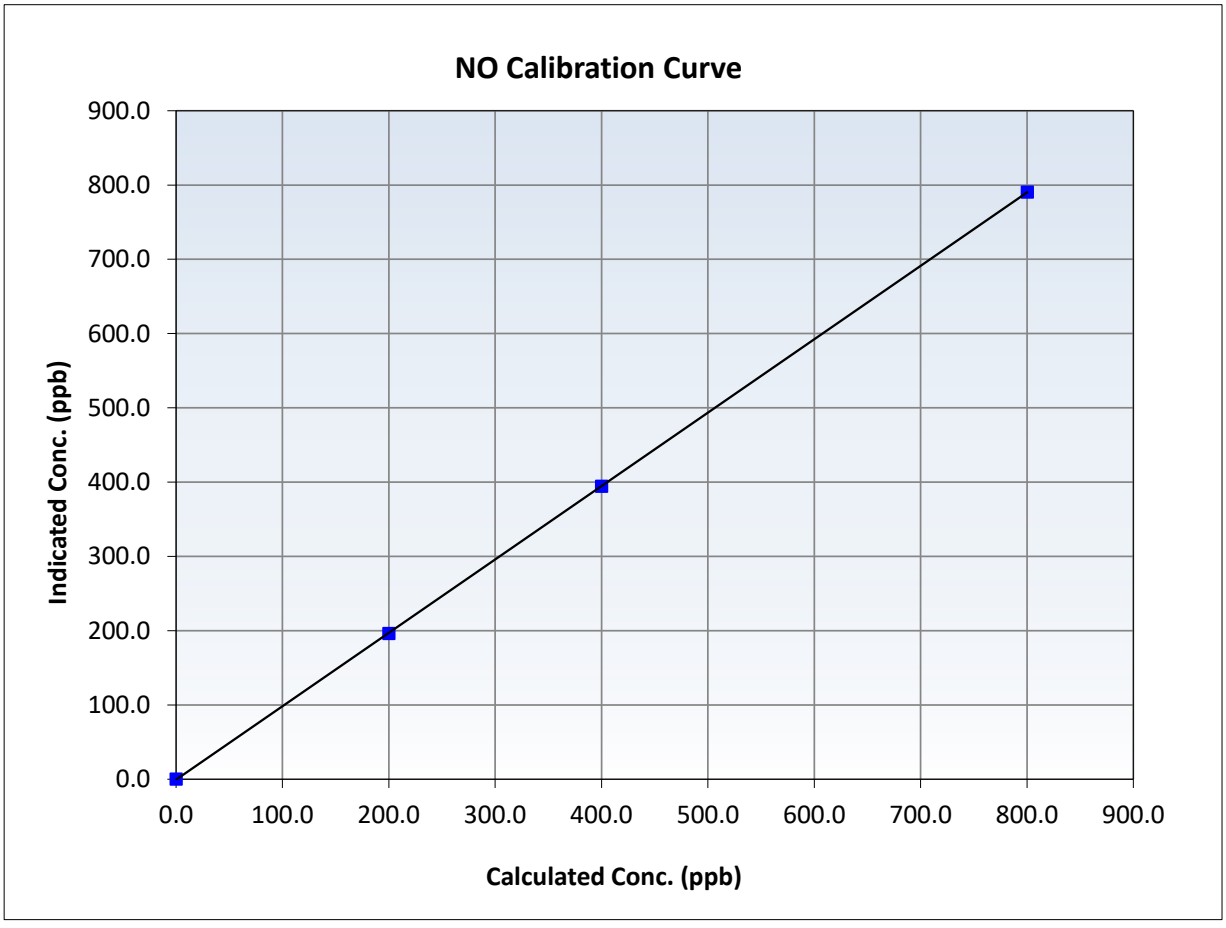
Station Information

Calibration Date:	November 26, 2024	Previous Calibration:	October 23, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:16	End Time (MST):	15:12
Analyzer make:	Teledyne API T200	Analyzer serial #:	833

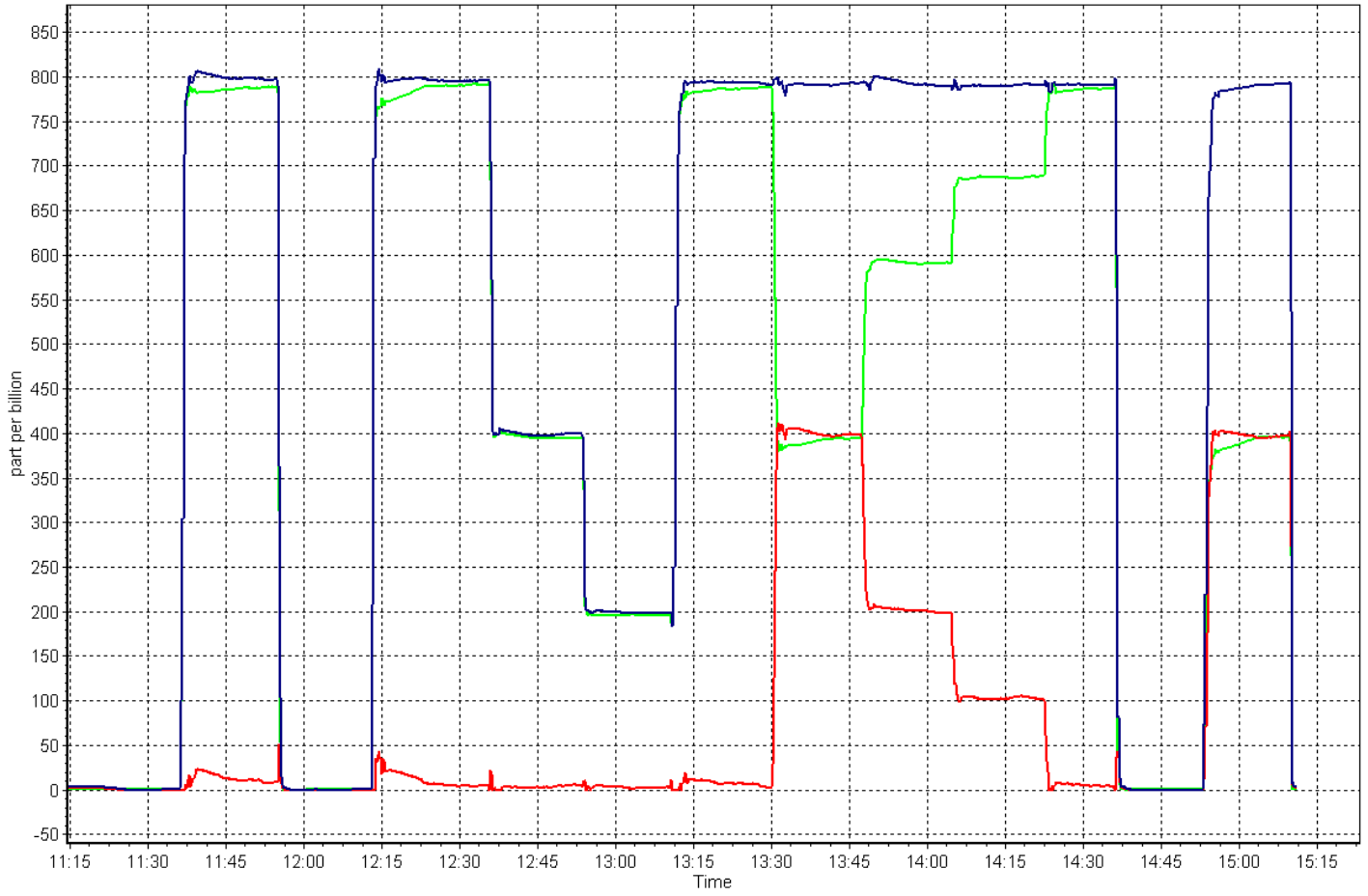
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
800.3	790.7	1.0122
400.1	394.4	1.0144
200.1	196.2	1.0197

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	0.988179	*0.90 - 1.10*
Intercept	-0.576326	*+/-20*



NO_X Calibration Plot Date: November 26, 2024 Location: Janvier



Wood Buffalo Environmental Association

O_3 Calibration Report

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	November 13, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	11:54	End time (MST):	14:49
Reason:	Routine		

Calibration Standards

O3 generation mode:	Photometer		
Calibrator Make/Model:	Teledyne API T700	Serial Number:	3806
ZAG Make/Model:	Teledyne API T701H	Serial Number:	691

Analyzer Information

Analyzer make:	Teledyne API T400	Analyzer serial #:	7046
Analyzer Range	0 - 500 ppb		

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003114	0.999771	Backgd or Offset:	2.1	1.5
Calibration intercept:	0.080000	1.440000	Coeff or Slope:	1.027	1.011

O_3 As Found Data

Set Point	Dilution air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero					
As found High point					
As found Mid point					
As found Low point					

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

O_3 Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	800.0	0.0	0.3	----
High point	5000	922.9	400.0	400.8	0.998
Mid point	5000	768.8	200.0	201.9	0.991
Low point	5000	656.1	100.0	102.6	0.975
As left zero	5000	800.0	0.0	0.1	----
As left span	5000	916.2	400.0	401.3	0.997
				Average Correction Factor	0.988

Notes: No as founds were performed due to the low UV lamp value. Changed the inlet filter and adjusted the lamp voltage. Adjusted both the zero and span.

Calibration Performed By: Rene Chamberland

Wood Buffalo Environmental Association

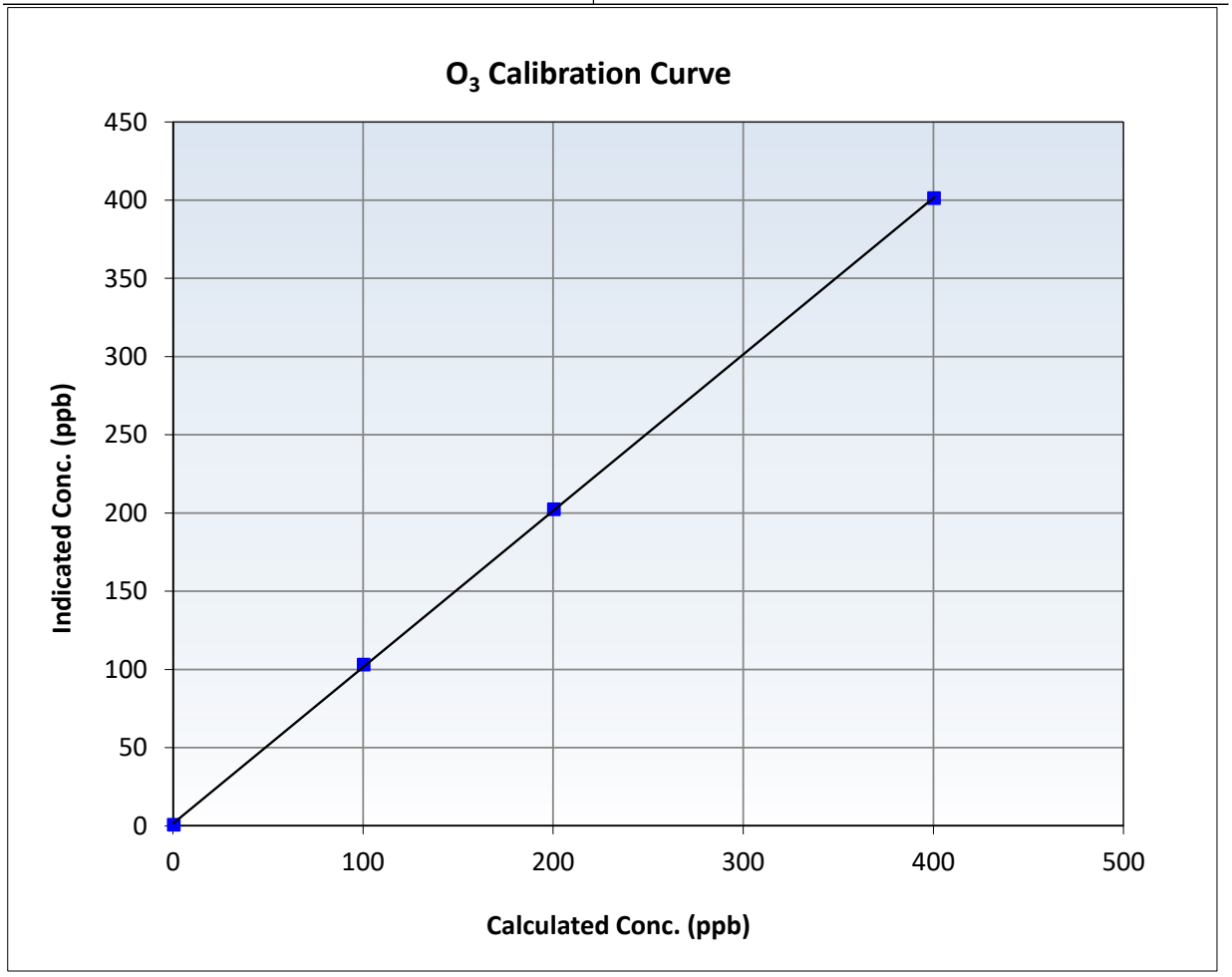
O_3 Calibration Summary

Station Information

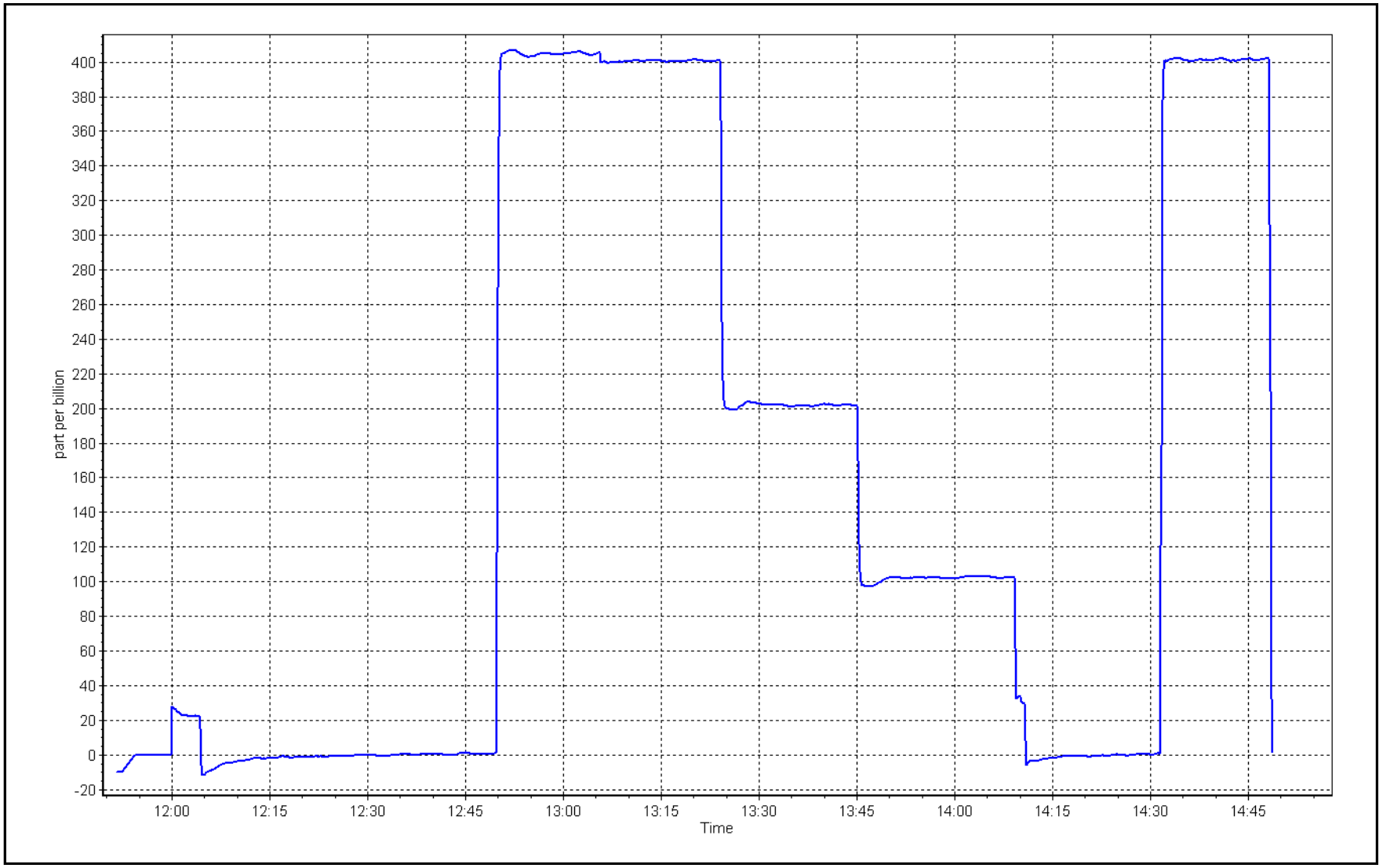
Calibration Date:	November 13, 2024	Previous Calibration:	October 18, 2024
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	11:54	End Time (MST):	14:49
Analyzer make:	Teledyne API T400	Analyzer serial #:	7046

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999963	*≥0.995*
400.0	400.8	0.9980	Slope	0.999771	*0.90 - 1.10*
200.0	201.9	0.9906			
100.0	102.6	0.9747	Intercept	1.440000	*+/- 5*



O_3 Calibration Plot Date: November 13, 2024 Location: Janvier



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	November 21, 2024	Last Cal Date:	October 29, 2024
Start time (MST):	10:13	End time (MST):	11:12
Analyzer Make:	Teledyne API T640	S/N:	325
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388752
Temp/RH standard:	Alicat FP-25BT	S/N:	388752

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-14.2	-14.5	-14.2	☐	+/- 2 °C
P (mmHg)	727.2	727.3	727.2	☐	+/- 10 mmHg
Flow (LPM)	5.01	5.04	5.01	☐	+/- 0.25 LPM
PW% (pump)	40	-----	40	☐	>80%
Zero Verification	PM w/o HEPA:	2.8	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 29, 2024

Date Disposable Filter Changed: October 29, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 29, 2024

Date RH/T Sensor Cleaned: October 29, 2024

Notes: Verified flow, temperature, and pressure. Leak checks passed.

Calibration by: Rene Chamberland

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS23
FORT HILLS
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	November 21, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	8:25	End time (MST):	11:06
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.76	ppm	Cal Gas Exp Date:	January 5, 2025
Cal Gas Cylinder #:	CC281425			
Removed Cal Gas Conc:	49.76	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	451
Zero Air Gen Model:	API T701		Serial Number:	5611

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1160290012	
Analyzer Range:	0-1000ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.997777	1.000937	Backgd or Offset:	18.4	18.3
Calibration intercept:	-0.443147	-0.623634	Coeff or Slope:	1.046	1.056

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.3	799.1	791.2	1.010
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.9	Previous response	796.9	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4920	80.3	799.1	799.6	0.999
Mid point	4960	40.2	400.1	399.6	1.001
Low point	4980	20.1	200.0	198.5	1.008
As left zero	5000	0.0	0.0	0.5	----
As left span	4920	80.3	799.1	800.8	0.998
				Average Correction Factor:	1.003

Notes: No Maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

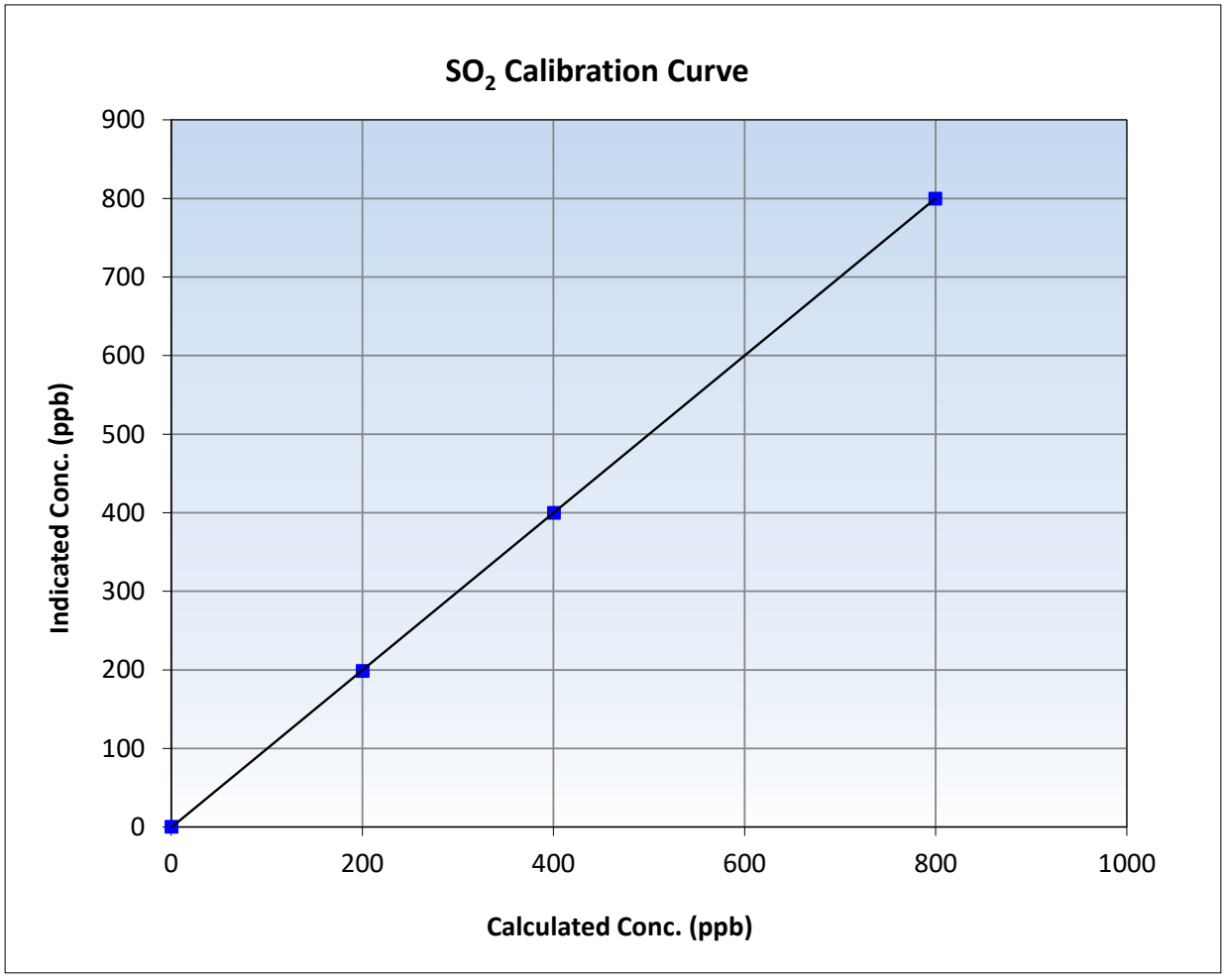
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 2, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:25	End Time (MST):	11:06
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290012

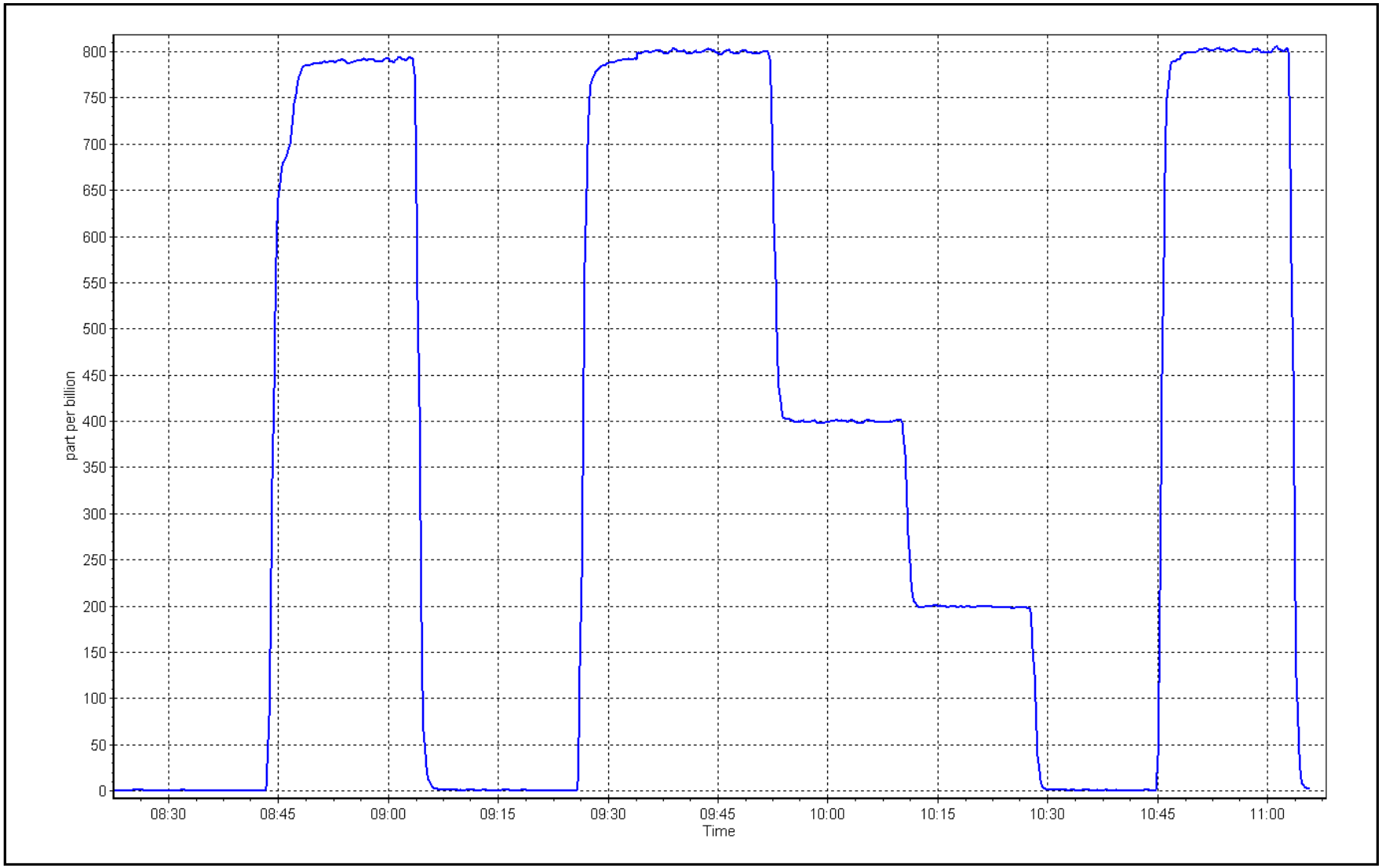
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.3	----
799.1	799.6	0.9994
400.1	399.6	1.0011
200.0	198.5	1.0077

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999994	*≥0.995*
Slope	1.000937	*0.90 - 1.10*
Intercept	-0.623634	*+/-30*



SO2 Calibration Plot Date: November 21, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	November 1, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	6:55	End time (MST):	10:52
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:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	451
ZAG Make/Model:	API T701		Serial Number:	5611

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1300156232	
Converter make:	CDN-101		Converter serial #:	594	
Analyzer Range	0 - 100 ppb		Converter Temp:	800	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.007344	1.000783	Backgd or Offset:	1.94	2.00
Calibration intercept:	-0.177989	-0.198212	Coeff or Slope:	1.148	1.172

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4923	77.0	80.1	78.8	1.016
As found Mid point	4962	38.5	40.0	39.1	1.024
As found Low point	4981	19.2	20.0	19.4	1.029
New cylinder response					

Baseline Corr As found:	78.8	Prev response:	80.49	*% change:	-2.1%
Baseline Corr 2nd AF pt:	39.1	AF Slope:	0.984657	AF Intercept:	-0.158477
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999978	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4923	77.0	80.1	80.0	1.001
Mid point	4962	38.5	40.0	39.9	1.003
Low point	4981	19.2	20.0	19.5	1.024
As left zero	5000	0.0	0.0	0.0	----
As left span	4923	77.0	80.1	83.0	0.965
SO2 Scrubber Check	4920	80.3	803.0	0.0	----

Date of last scrubber change:			Ave Corr Factor	1.009
Date of last converter efficiency test:	March 13, 2024		102.7%	efficiency

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

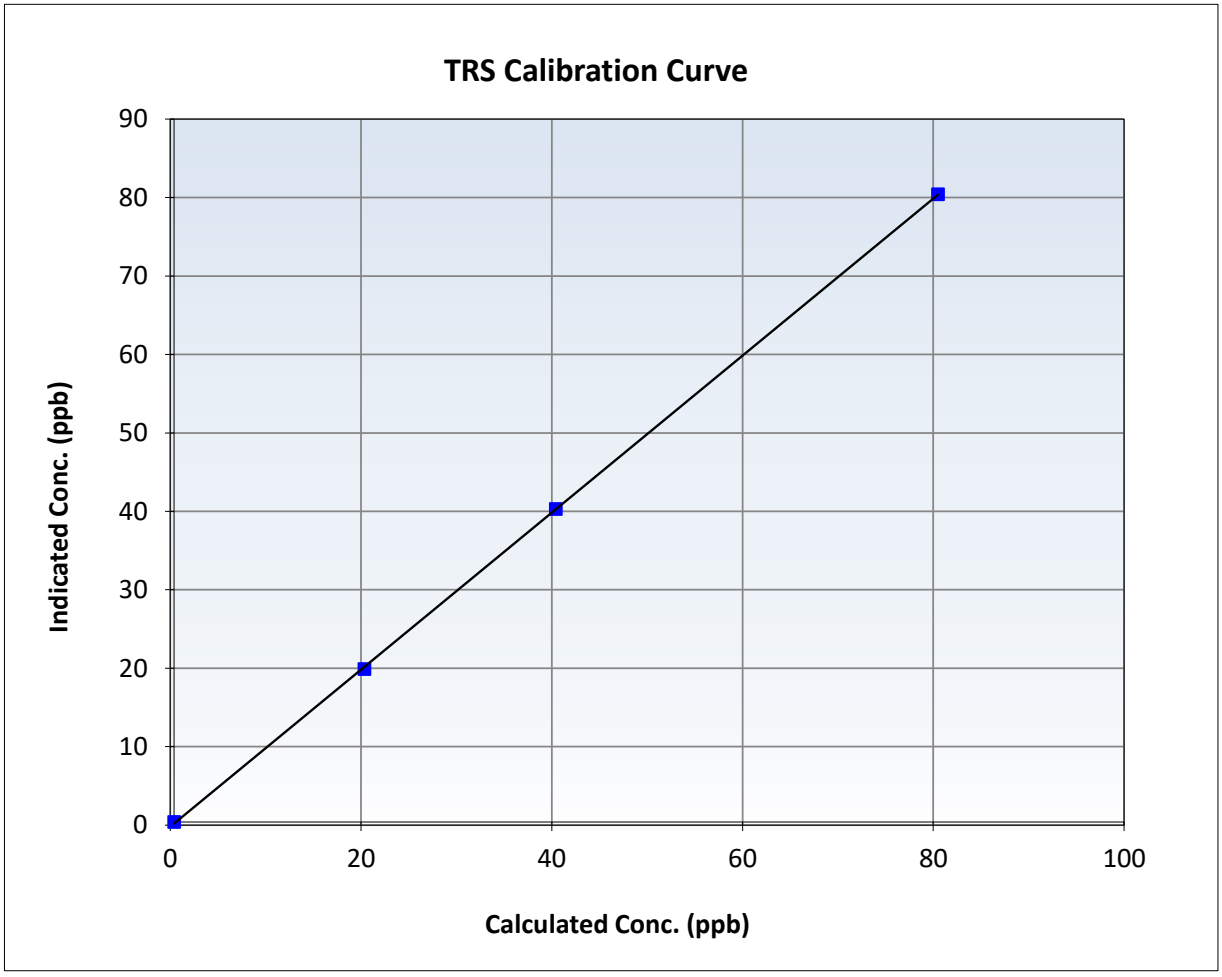
TRS Calibration Summary

Station Information

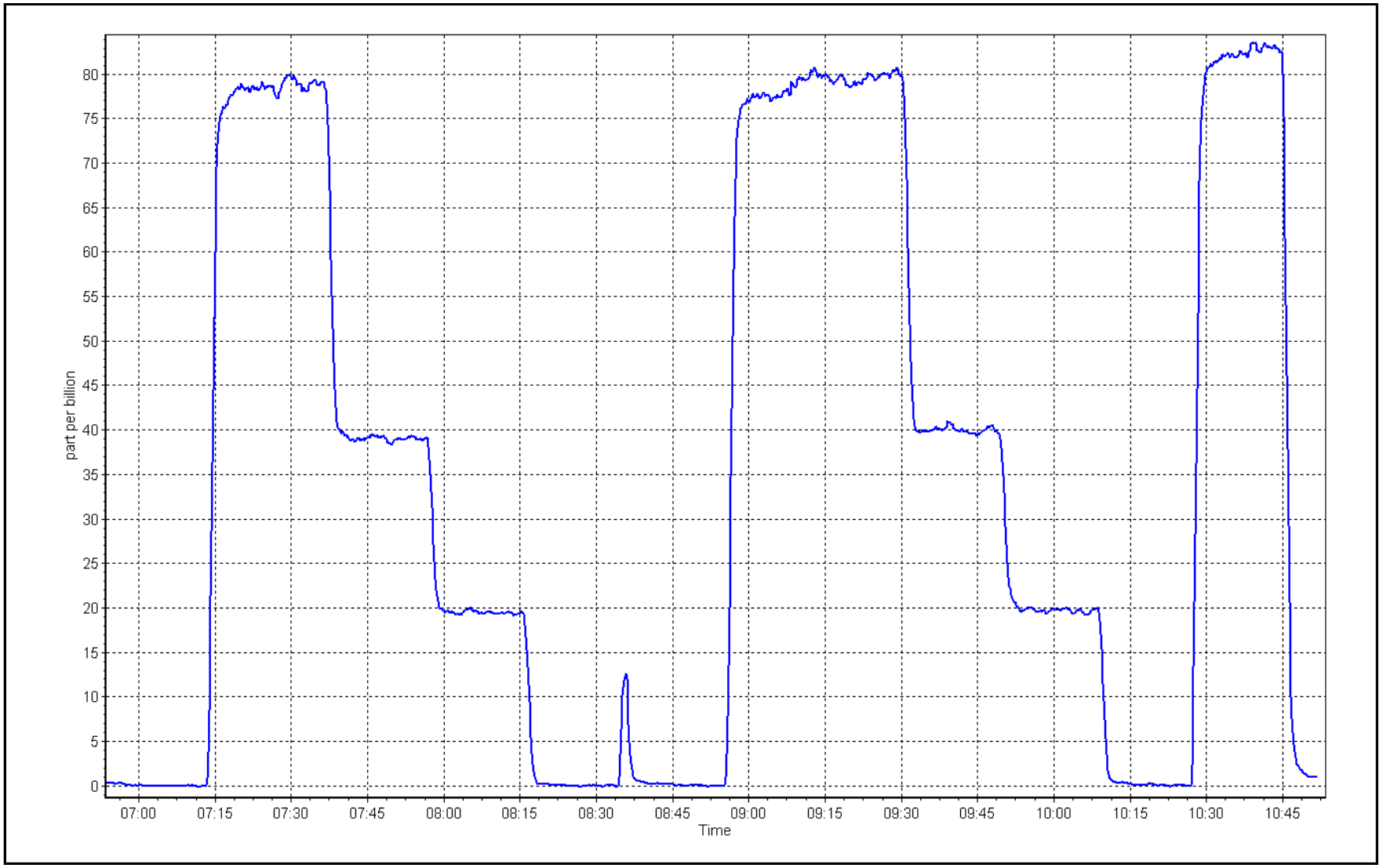
Calibration Date:	November 1, 2024	Previous Calibration:	October 11, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	6:55	End Time (MST):	10:52
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999965	*≥0.995*
80.1	80.0	1.0010	Slope	1.000783	*0.90 - 1.10*
40.0	39.9	1.0034			
20.0	19.5	1.0240	Intercept	-0.198212	*+/-3*



TRS Calibration Plot Date: November 1, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	November 21, 2024	Last Cal Date:	October 2, 2024
Start time (MST):	8:25	End time (MST):	11:05
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC281425	Cal Gas Expiry Date:	January 5, 2025
CH4 Cal Gas Conc.	500.2 ppm	CH4 Equiv Conc.	1070.6 ppm
C3H8 Cal Gas Conc.	207.4 ppm		
Removed Gas Cert:		Removed Gas Expiry:	
Removed CH4 Conc.	500.2 ppm	CH4 Equiv Conc.	1070.6 ppm
Removed C3H8 Conc.	207.4 ppm	Diff between cyl (THC):	
Diff between cyl (CH_4):		Diff between cyl (NM):	
Calibrator Model:	API T700	Serial Number:	451
Zero Air Gen model:	API T701	Serial Number:	5611

Analyzer Information

Analyzer make:	Thermo 55i	Analyzer serial #:	1152430012
THC Range:	0 - 20 ppm	NMHC/CH4 Range:	0 - 10 ppm

	Start	*Finish*		*Start*	*Finish*
CH4 SP Ratio:	2.02E-04	2.00E-05	NMHC SP Ratio:	6.78E-05	7.19E-05
CH4 Retention time:	12.2	12.0	NMHC Peak Area:	135181	127432
Zero Chromatogram:	OFF	OFF	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	17.19	16.74	1.027
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	16.74	Prev response	17.21	*% change	-2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	17.19	17.20	1.000
Mid point	4960	40.2	8.61	8.68	0.992
Low point	4980	20.1	4.30	4.40	0.978
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	17.19	17.40	0.988
				Average Correction Factor	0.990

Notes: No Maintenance done. Span adjusted.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	9.16	8.66	1.057
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.66	Prev response	9.19	*% change	-6.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	9.16	9.16	1.000
Mid point	4960	40.2	4.59	4.67	0.981
Low point	4980	20.1	2.29	2.41	0.951
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	9.16	9.35	0.980
				Average Correction Factor	0.978

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4920	80.3	8.03	8.08	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.08	Prev response	8.02	*% change	0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4920	80.3	8.03	8.04	0.999
Mid point	4960	40.2	4.02	4.00	1.004
Low point	4980	20.1	2.01	1.99	1.011
As left zero	5000	0.0	0.00	0.00	----
As left span	4920	80.3	8.03	8.06	0.997
				Average Correction Factor	1.005

Calibration Statistics

	Start	***Finish***
THC Cal Slope:	0.999197	0.998719
THC Cal Offset:	0.031191	0.052792
CH4 Cal Slope:	1.000060	1.001737
CH4 Cal Offset:	-0.010446	-0.013844
NMHC Cal Slope:	0.998416	0.996196
NMHC Cal Offset:	0.041237	0.065637

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

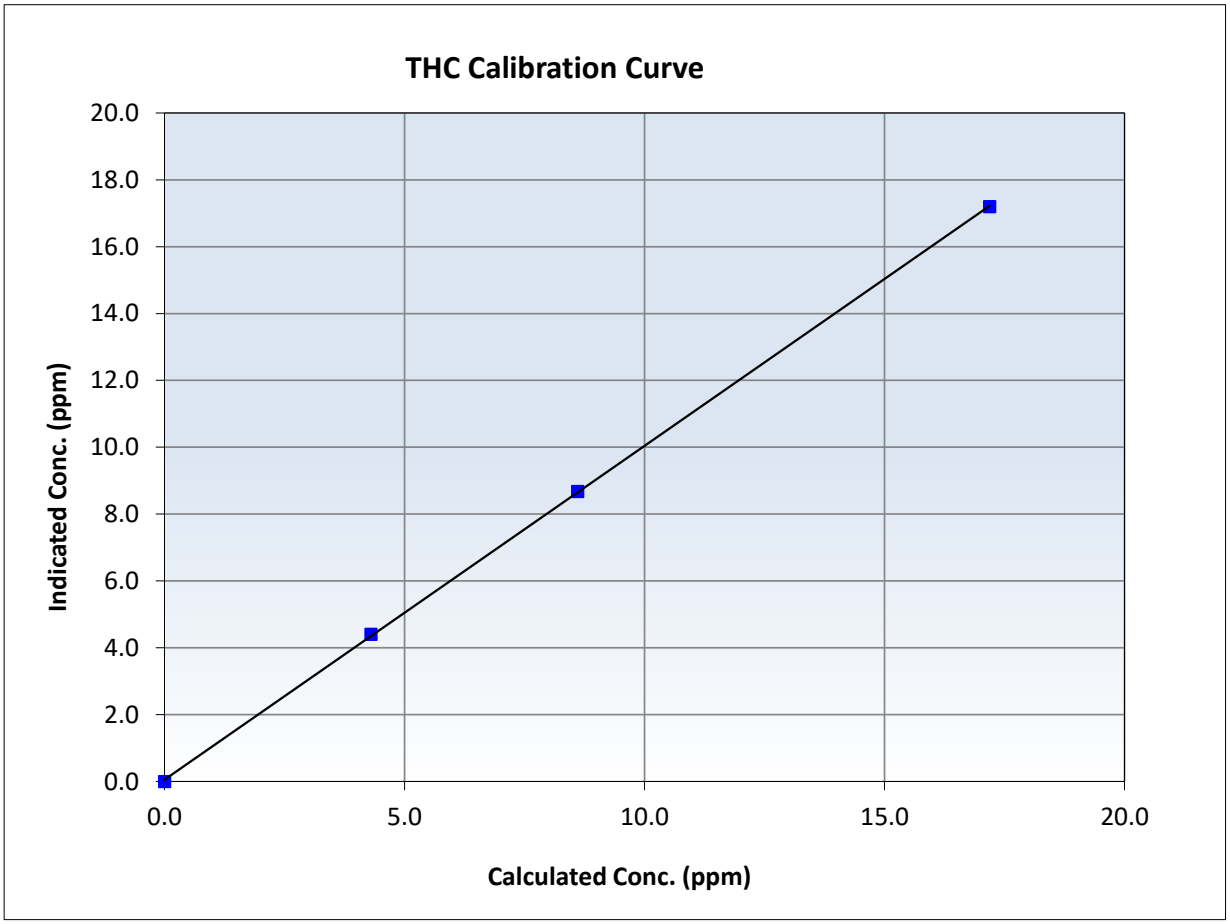
THC Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 2, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:25	End Time (MST):	11:05
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	0.999957	≥0.995
17.19	17.20	0.9998	Slope	0.998719	0.90 - 1.10
8.61	8.68	0.9917	Intercept	0.052792	+/-0.5
4.30	4.40	0.9779			



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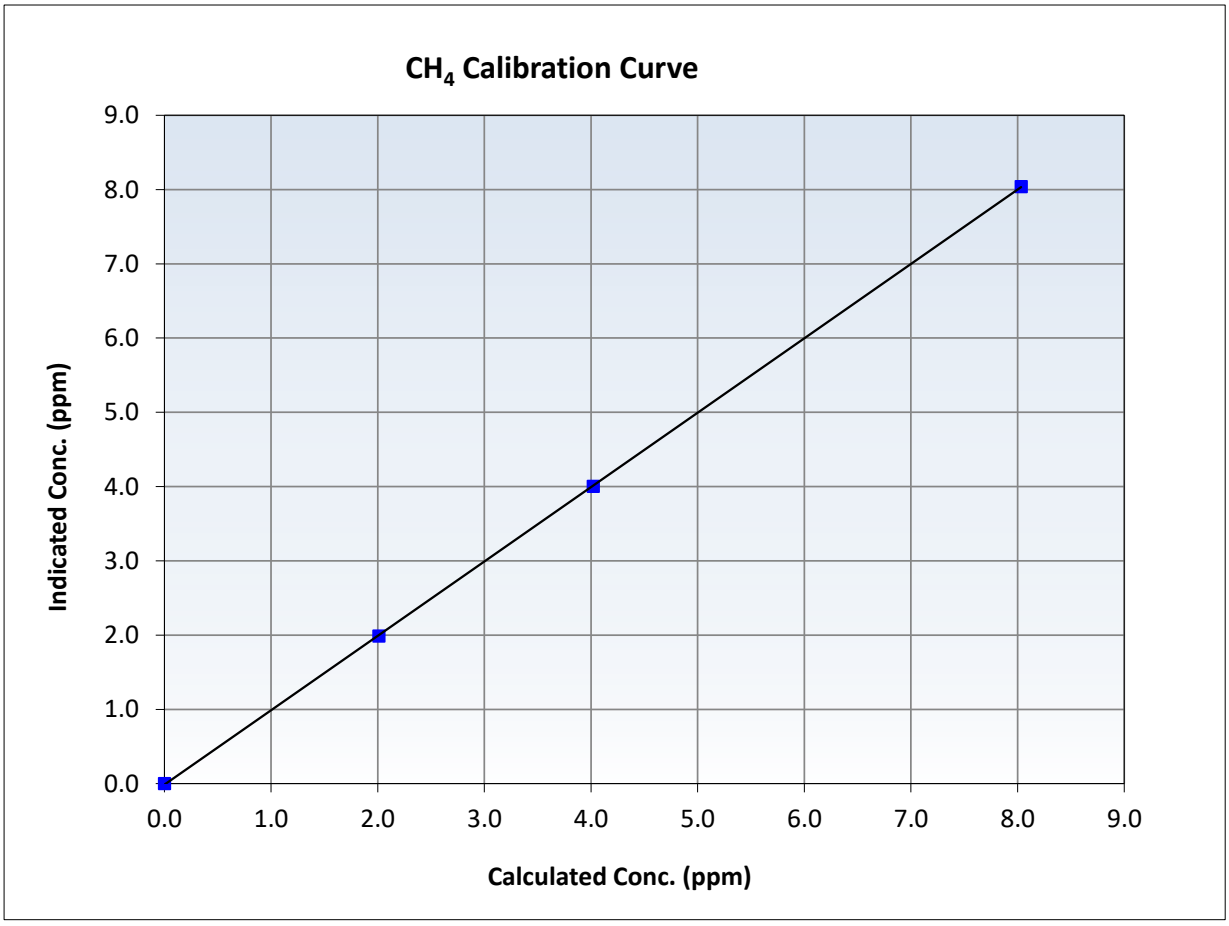
CH_4 Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 2, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:25	End Time (MST):	11:05
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	0.999986	*≥0.995*
8.03	8.04	0.9990	Slope	1.001737	*0.90 - 1.10*
4.02	4.00	1.0044	Intercept	-0.013844	*+/-0.5*
2.01	1.99	1.0109			



Wood Buffalo Environmental Association

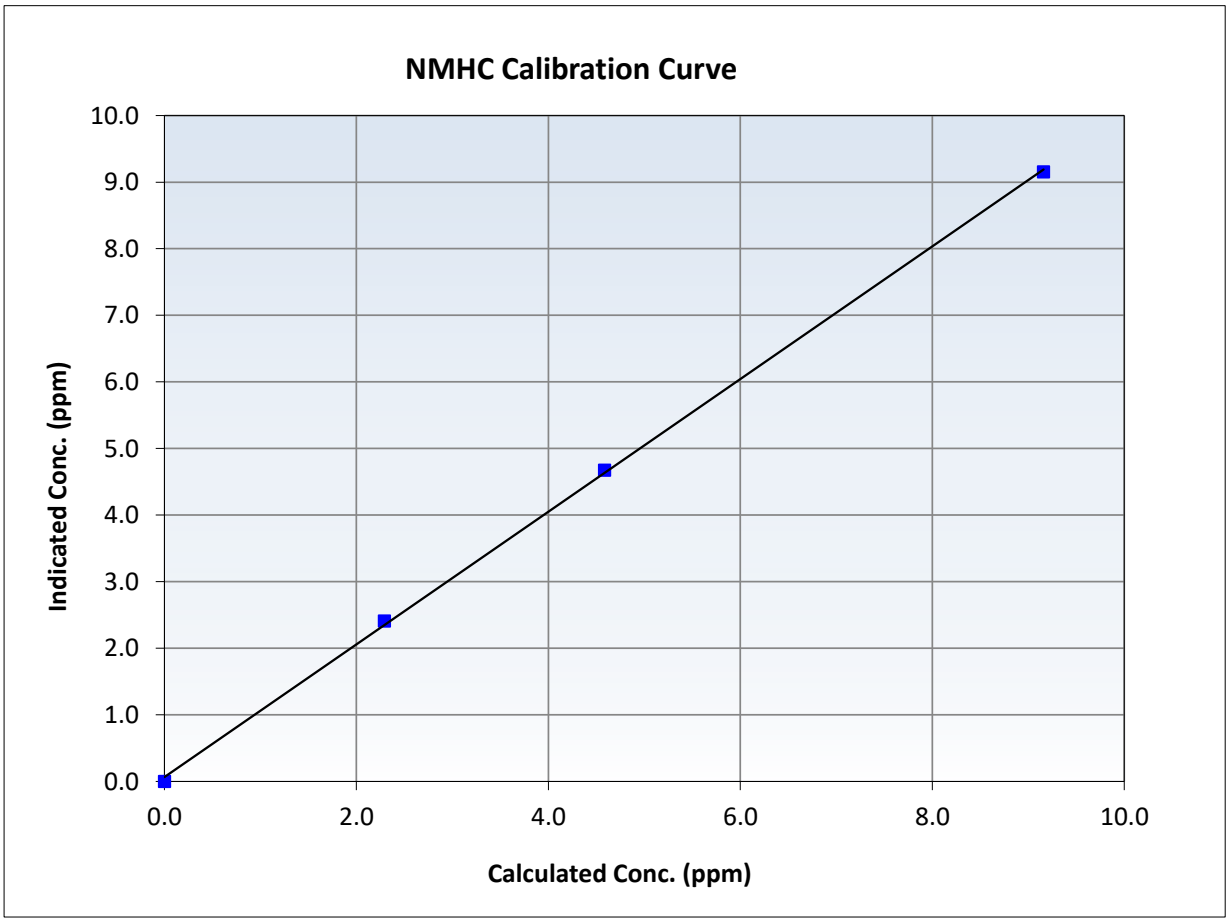
NMHC Calibration Summary

Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 2, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	8:25	End Time (MST):	11:05
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	0.999762	*≥0.995*
9.16	9.16	1.0005	Slope	0.996196	*0.90 - 1.10*
4.59	4.67	0.9813	Intercept	0.065637	*+/-0.5*
2.29	2.41	0.9510			



NMHC Calibration Plot Date: November 21, 2024 Location: Fort Hills

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Fort Hills
Station number:	AMS 23
Calibration Date:	November 4, 2024
Last Cal Date:	October 9, 2024
Start time (MST):	7:55
End time (MST):	12:10
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	CC358149	Cal Gas Expiry Date:	January 5, 1932
NOX Cal Gas Conc:	60.30 ppm	NO Cal Gas Conc:	60.10 ppm
Removed Cylinder #:		Removed Gas Exp Date:	
Removed Gas NOX Conc:	60.30 ppm	Removed Gas NO Conc:	60.10 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	451
ZAG make/model:	API T701	Serial Number:	5611

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2	----	----
AF High point	4934	66.3	799.5	796.9	2.7	775.5	769.8	5.7	1.0305	1.0349
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.6 ppb	NO = 797.4 ppb
Baseline Corr 1st pt	NO_X = 775.9 ppb	NO = 770.0 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -3.1%

*Percent Change NO = -3.6%

As Found Statistics

As found NO_X r^2: Nx Sl: Nx Int:

As found NO r^2: NO Sl: NO Int:

As found NO_2 r^2: NO2 Sl: NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1152430007

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	1.283	1.327	NO bkgnd or offset:	3.8	4.0
NOX coeff or slope:	0.992	0.990	NOX bkgnd or offset:	4.1	4.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	192.7	192.7

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	1.000056	0.999069
NO_X Cal Offset:	0.025741	-0.253684
NO Cal Slope:	1.002779	1.003782
NO Cal Offset:	-1.712937	-1.713073
NO_2 Cal Slope:	0.997708	0.994533
NO_2 Cal Offset:	-0.037795	-1.185414

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
High point	4934	66.3	799.5	796.9	2.7	798.6	799.0	-0.4	1.0012	0.9973
Mid point	4967	33.2	400.4	399.0	1.3	399.5	398.0	1.5	1.0022	1.0026
Low point	4983	16.6	200.2	199.5	0.7	200.0	197.0	2.9	1.0011	1.0129
As left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
As left span	4934	66.3	799.5	404.5	395.0	799.8	404.5	395.3	0.9997	1.0000
								Average Correction Factor	1.0015	1.0043

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	796.6	403.2	396.1	393.4	1.0067	99.3%
Mid GPT point	796.6	599.4	199.9	196.5	1.0171	98.3%
Low GPT point	796.6	697.5	101.8	99.4	1.0237	97.7%
				Average Correction Factor	1.0158	98.4%

Notes: No Maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

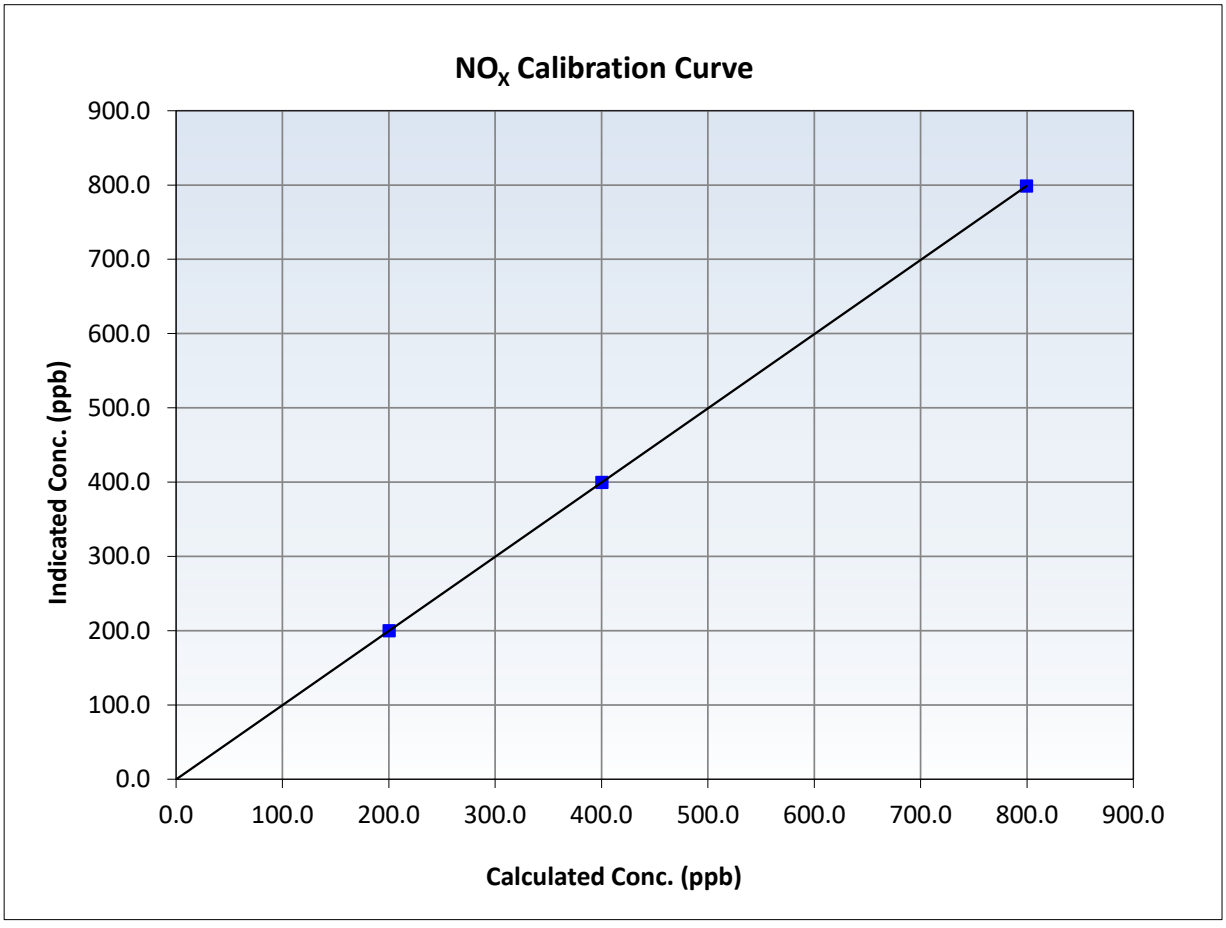
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	12:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
799.5	798.6	1.0012
400.4	399.5	1.0022
200.2	200.0	1.0011

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	0.999069	*0.90 - 1.10*
Intercept	-0.253684	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

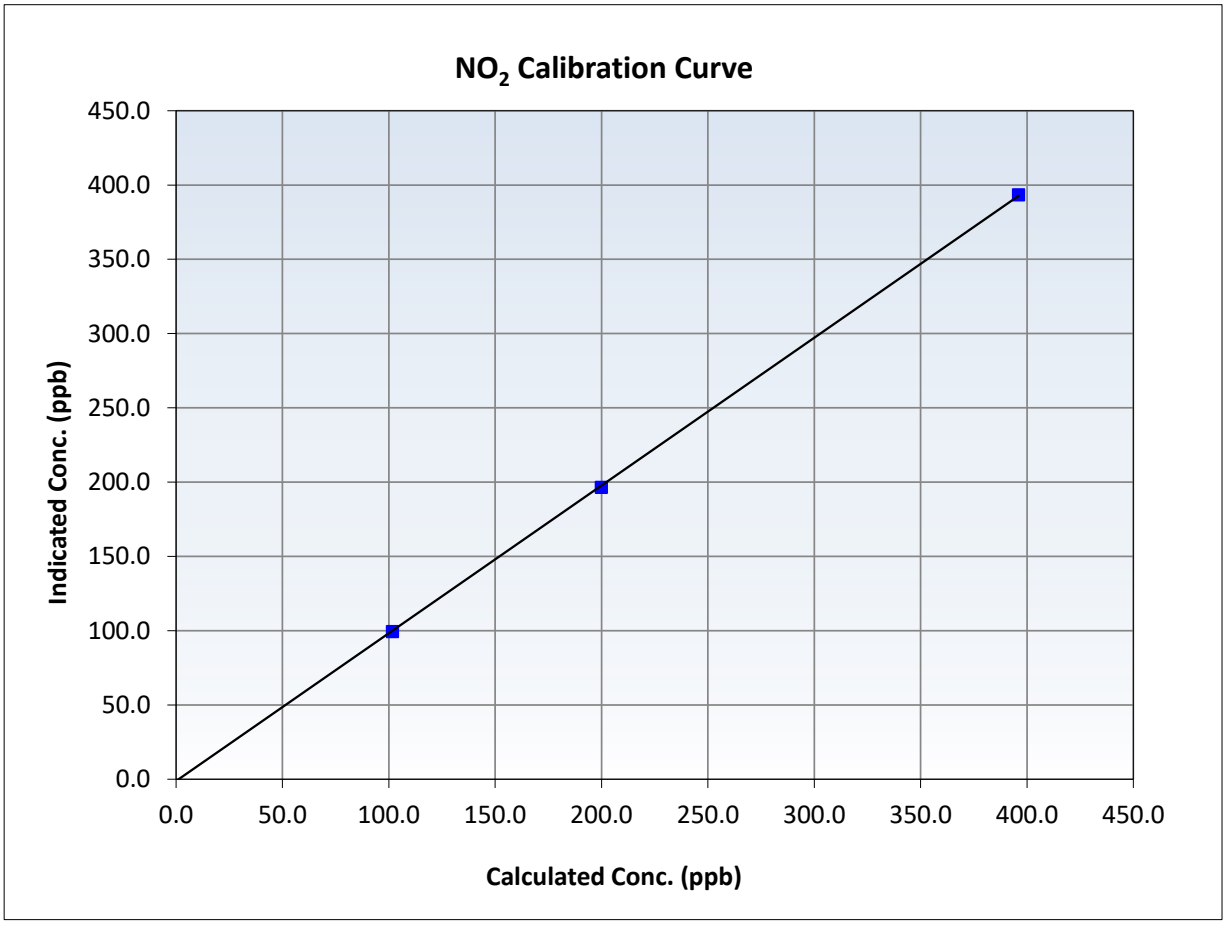
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	12:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
396.1	393.4	1.0067
199.9	196.5	1.0171
101.8	99.4	1.0237

Statistical Evaluation		Limits
Correlation Coefficient	0.999965	≥0.995
Slope	0.994533	0.90 - 1.10
Intercept	-1.185414	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

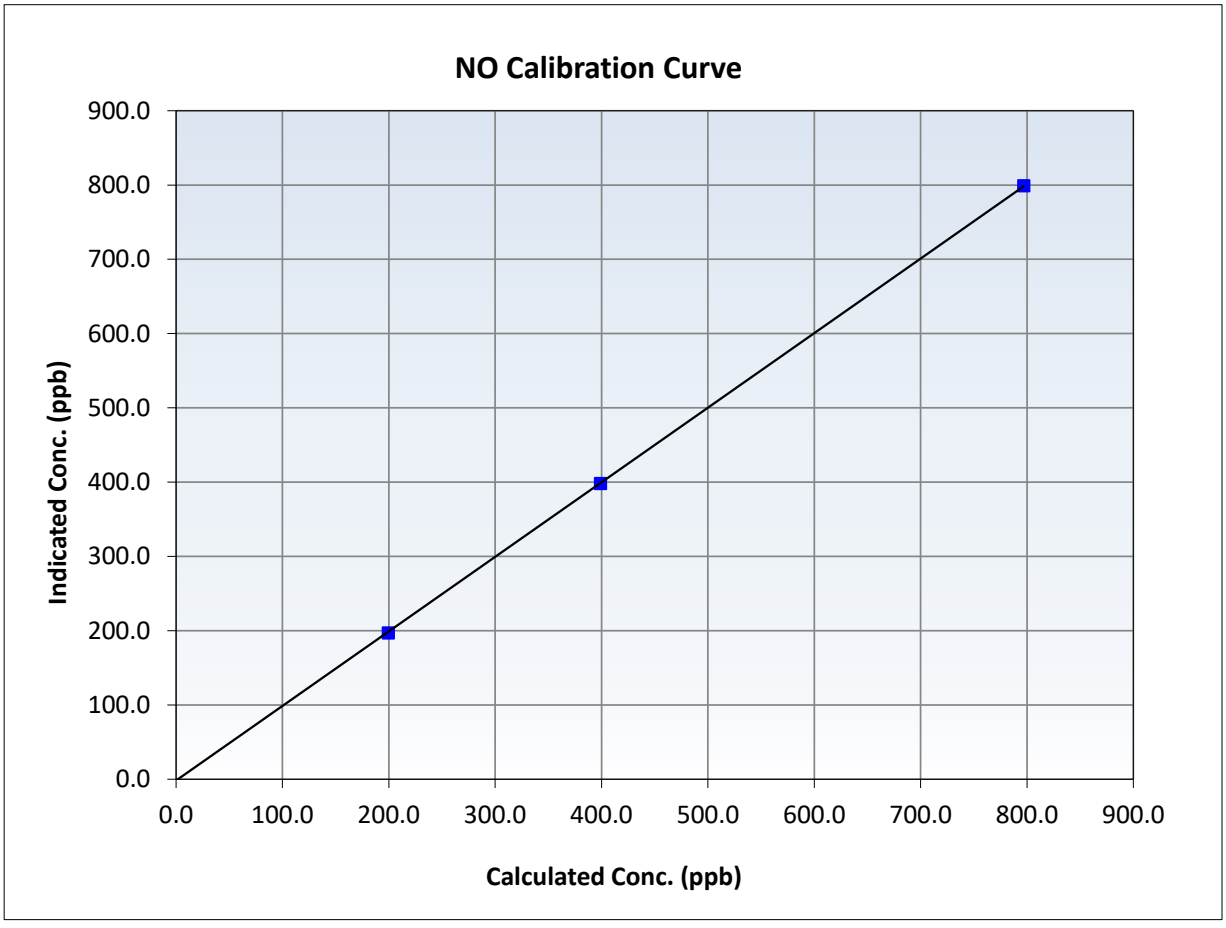
Station Information

Calibration Date:	November 4, 2024	Previous Calibration:	October 9, 2024
Station Name:	Fort Hills	Station Number:	AMS 23
Start Time (MST):	7:55	End Time (MST):	12:10
Analyzer make:	Thermo 42i	Analyzer serial #:	1152430007

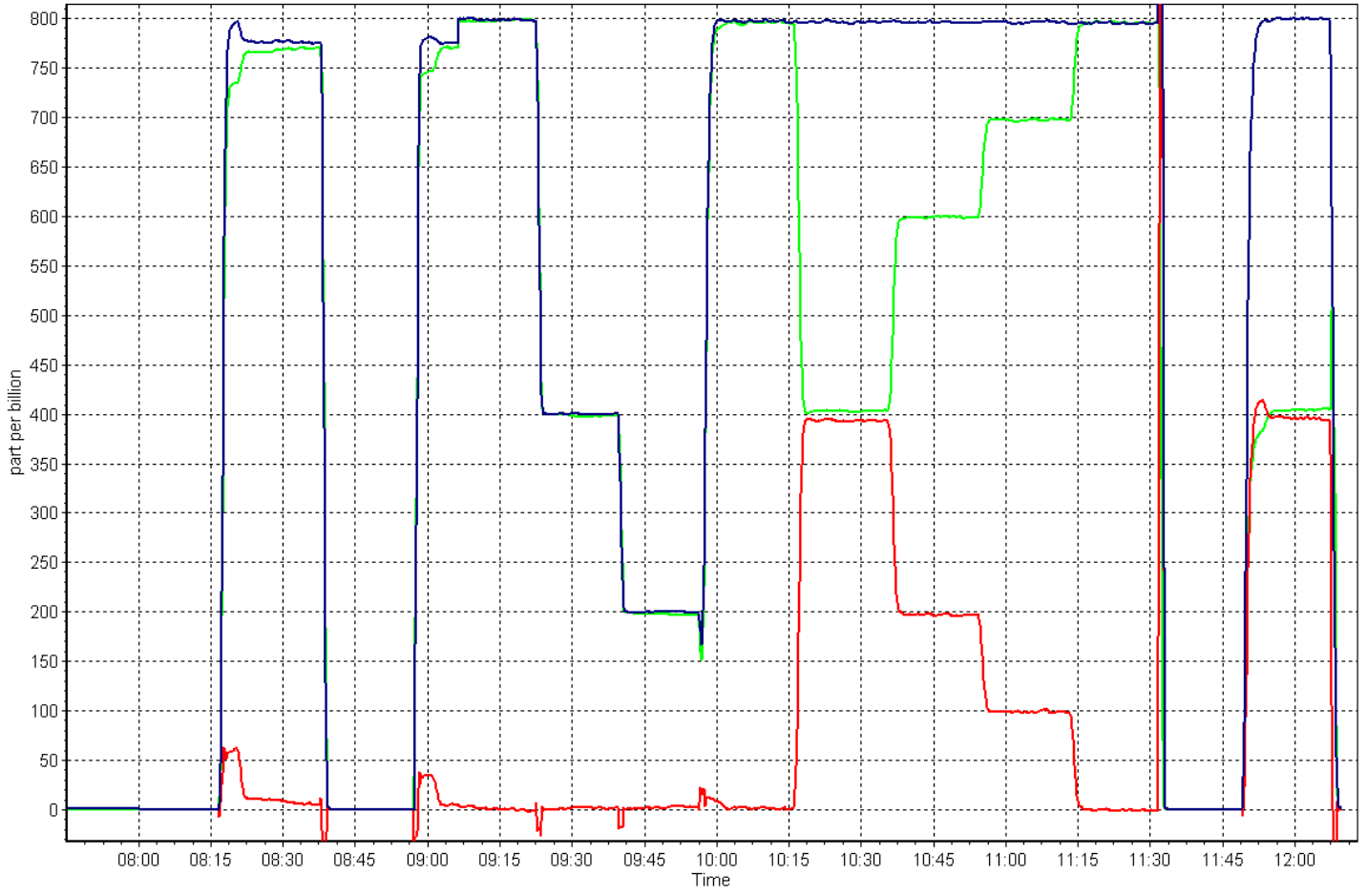
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
796.9	799.0	0.9973
399.0	398.0	1.0026
199.5	197.0	1.0129

Statistical Evaluation		Limits
Correlation Coefficient	0.999981	≥0.995
Slope	1.003782	0.90 - 1.10
Intercept	-1.713073	+/-20



NO_X Calibration Plot Date: November 4, 2024 Location: Fort Hills



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	November 21, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	7:39	End time (MST):	8:34
Analyzer Make:	API T640	S/N:	320
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388744
Temp/RH standard:	Alicat FP-25BT	S/N:	388744

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-15.3	-16	-15.3	☐	+/- 2 °C
P (mmHg)	748.1	747.5	748.1	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.51	5.01	☑	+/- 0.25 LPM
PW% (pump)	42	-----	37	☐	>80%
Zero Verification	PM w/o HEPA:	2.3	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 10.9 — Expiry Date: 10-Jun-24 — Lot No.: 100128-050-042

Parameter	As found	Post maintenance	As left	Adjusted	*(Limits)*
PMT Peak Test	9	10.5	10.5	☐	+/- 0.5

Date Optical Chamber Cleaned: November 21, 2024

Date Disposable Filter Changed: November 21, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 17, 2023

Date RH/T Sensor Cleaned: October 17, 2023

Notes: Flow adjusted. No other adjustments done. Leak Check passed before and after optical chamber cleaning. Touch Screen not working, was able to talk to it remotely.

Calibration by: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS25
WASKŌW OHCI PIMÂTISIWIN
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	November 28, 2024	Last Cal Date:	October 24, 2024
Start time (MST):	7:38	End time (MST):	10:50
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.70	ppm	Cal Gas Exp Date:	March 10, 2031
Cal Gas Cylinder #:	CC342445			
Removed Cal Gas Conc:	49.70	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	747
Zero Air Gen Model:	API T701		Serial Number:	4765

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1118148497	
Analyzer Range:	0-1000ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.002427	0.999070	Backgd or Offset:	11.2	11.6
Calibration intercept:	-0.712025	-0.112739	Coeff or Slope:	1.049	1.062

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.3	----
As found High point	4920	80.5	800.1	791.7	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	791.4	Previous response	801.3	*% change	-1.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.5	800.1	799.4	1.001
Mid point	4960	40.2	399.6	398.7	1.002
Low point	4980	20.1	199.8	199.6	1.001
As left zero	5000	0.0	0.0	-0.3	----
As left span	4920	80.5	800.1	802.4	0.997
				Average Correction Factor:	1.001

Notes: No Maintenance done. Zero and Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

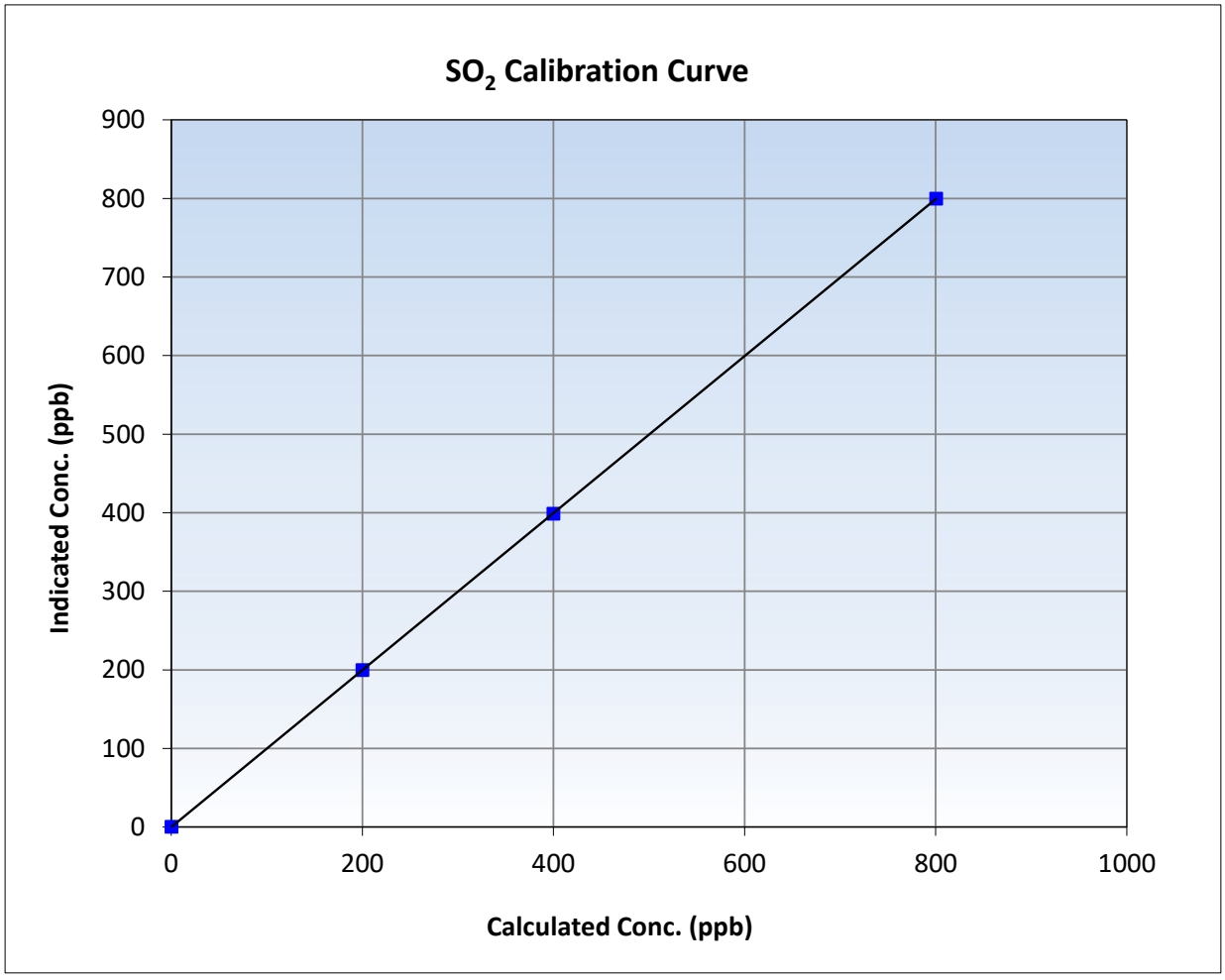
Station Information

Calibration Date:	November 28, 2024	Previous Calibration:	October 24, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	7:38	End Time (MST):	10:50
Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497

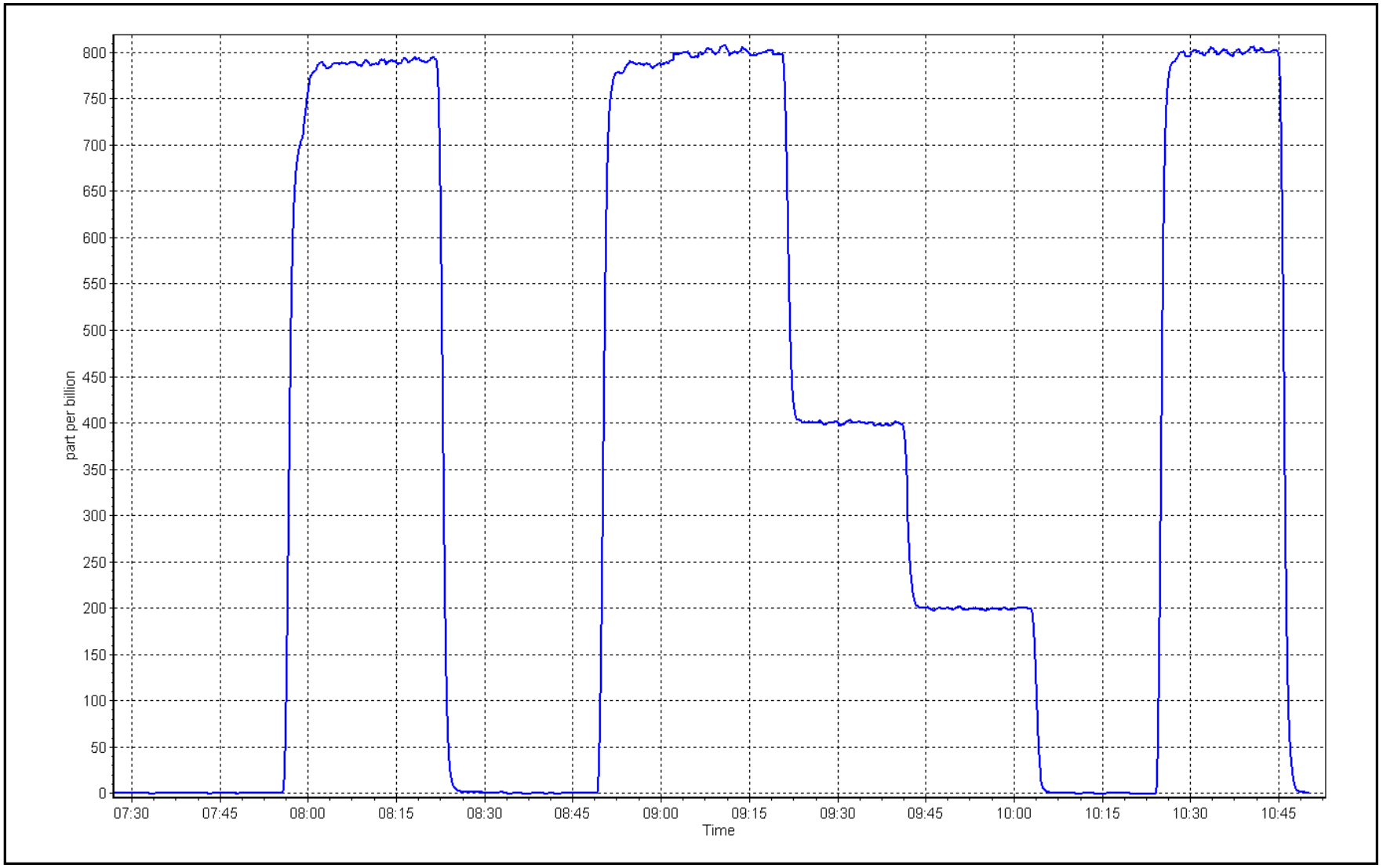
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.1	799.4	1.0009
399.6	398.7	1.0022
199.8	199.6	1.0010

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999999	*≥0.995*
Slope	0.999070	*0.90 - 1.10*
Intercept	-0.112739	*+/-30*



SO2 Calibration Plot Date: November 28, 2024 Location: Waskow ohci Pimatisiwin



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Waskow ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	November 27, 2024	Last Cal Date:	October 22, 2024
Start time (MST):	7:30	End time (MST):	11:47
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.97	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC517099			
Removed Cal Gas Conc:	4.97	ppm	Rem Gas Exp Date:	
Removed Gas Cyl #:			Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	747
ZAG Make/Model:	API T701		Serial Number:	261

Analyzer Information

Analyzer make:	Thermo 43i-LTE		Analyzer serial #:	1170050146
Converter make:	Global G-150		Converter serial #:	2022-219
Analyzer Range	0 - 100 ppb		Converter Temp:	350 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.005605	0.988502	Backgd or Offset:	3.42	3.42
Calibration intercept:	-0.060000	0.360000	Coeff or Slope:	1.074	1.074

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4920	80.0	79.5	79.8	0.996
As found Mid point	4960	40.0	39.8	39.9	0.996
As found Low point	4980	20.0	19.9	20.0	0.994
New cylinder response					

Baseline Corr As found:	79.8	Prev response:	79.91	*% change:	-0.1%
Baseline Corr 2nd AF pt:	39.9	AF Slope:	1.003306	AF Intercept:	0.020000
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	1.000000	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4920	80.0	79.5	78.7	1.010
Mid point	4960	40.0	39.8	40.2	0.989
Low point	4980	20.0	19.9	20.0	0.994
As left zero	5000	0.0	0.0	0.2	----
As left span	4912	88.3	800.0	796.4	1.005
SO2 Scrubber Check	4921	79.2	800.0	0.1	----
Date of last scrubber change:				Ave Corr Factor	0.998
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

H_2S Calibration Summary

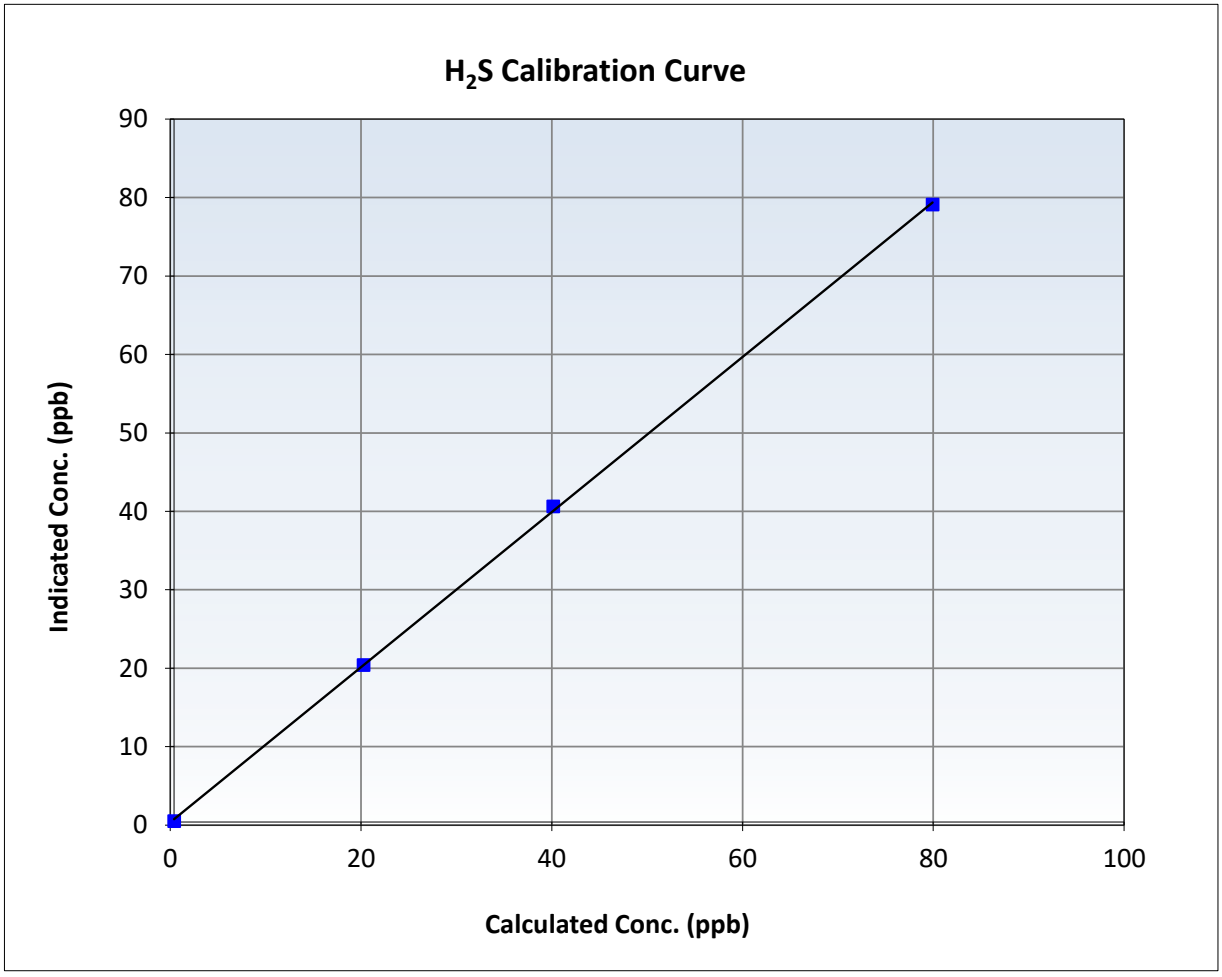
Station Information

Calibration Date:	November 27, 2024	Previous Calibration:	October 22, 2024
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS 25
Start Time (MST):	7:30	End Time (MST):	11:47
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146

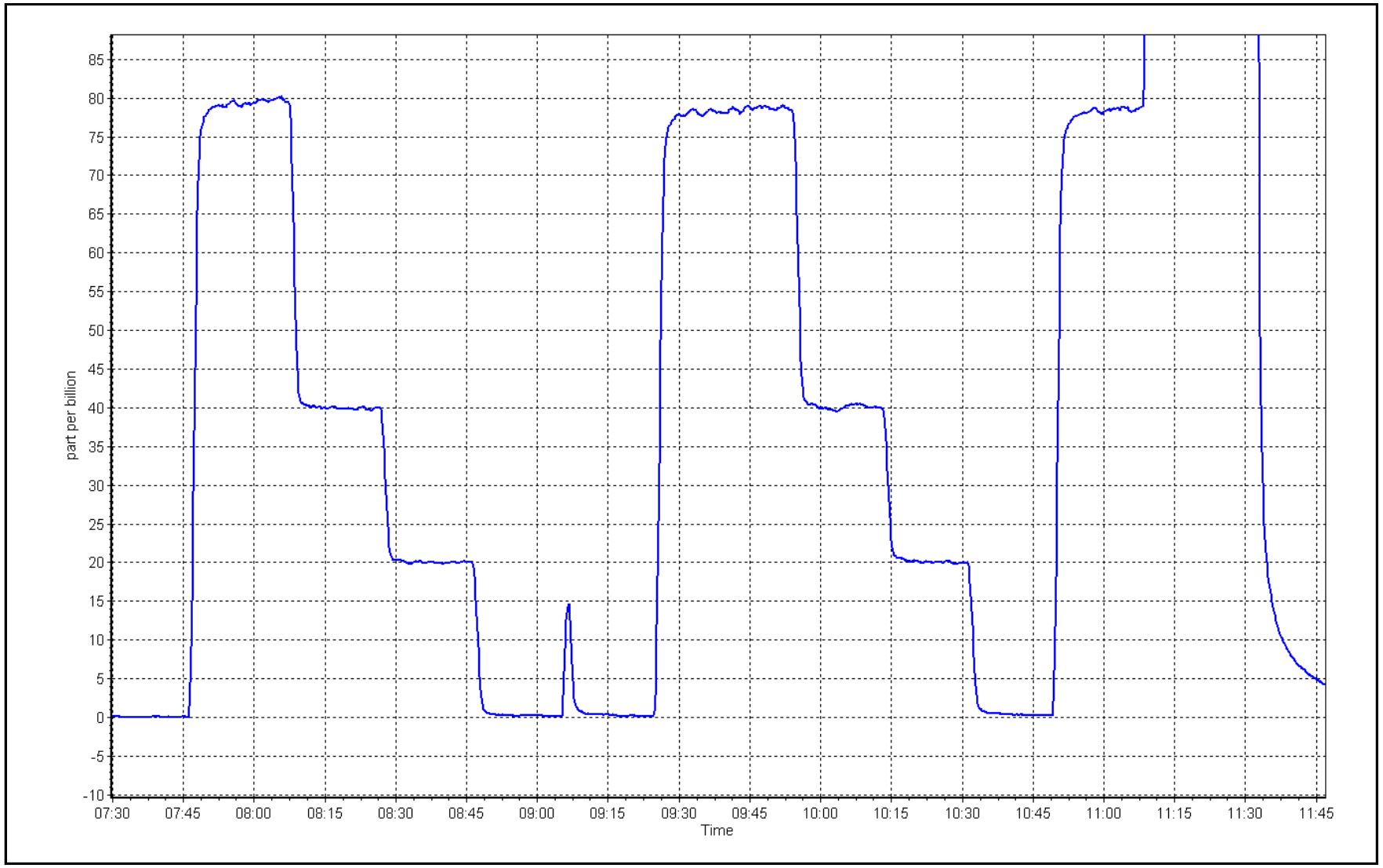
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
79.5	78.7	1.0104
39.8	40.2	0.9891
19.9	20.0	0.9940

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999874	*≥0.995*
Slope	0.988502	*0.90 - 1.10*
Intercept	0.360000	*+/-3*



H_2S Calibration Plot Date: November 27, 2024 Location: Waskow ohci Pimatisiwin



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS26
CHRISTINA LAKE
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	November 6, 2024	Last Cal Date:	October 23, 2024
Start time (MST):	8:55	End time (MST):	10:18
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	50.62	ppm	Cal Gas Exp Date:	March 10, 2031
Cal Gas Cylinder #:	EB0008522			
Removed Cal Gas Conc:	50.62	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	5258
Zero Air Gen Model:	API T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1152430005
Analyzer Range:	0- 1000 ppb			

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001596		Backgd or Offset:	29.0	NA
Calibration intercept:	-1.433141		Coeff or Slope:	0.977	NA

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4921	79.0	799.8	810.4	0.987
As found Mid point	4960	39.5	399.9	405.4	0.987
As found Low point	4980	19.8	200.5	201.1	0.997
New cylinder response					
Baseline Corr As found:	810.4	Previous response	799.6	*% change	1.3%
Baseline Corr 2nd AF pt:	405.4	AF Slope:	1.014146	AF Intercept:	-0.776000
Baseline Corr 3rd AF pt:	201.1	AF Correlation:	0.999992	* = > +/-5% change initiates investigation	

SO_2 Calibration Data

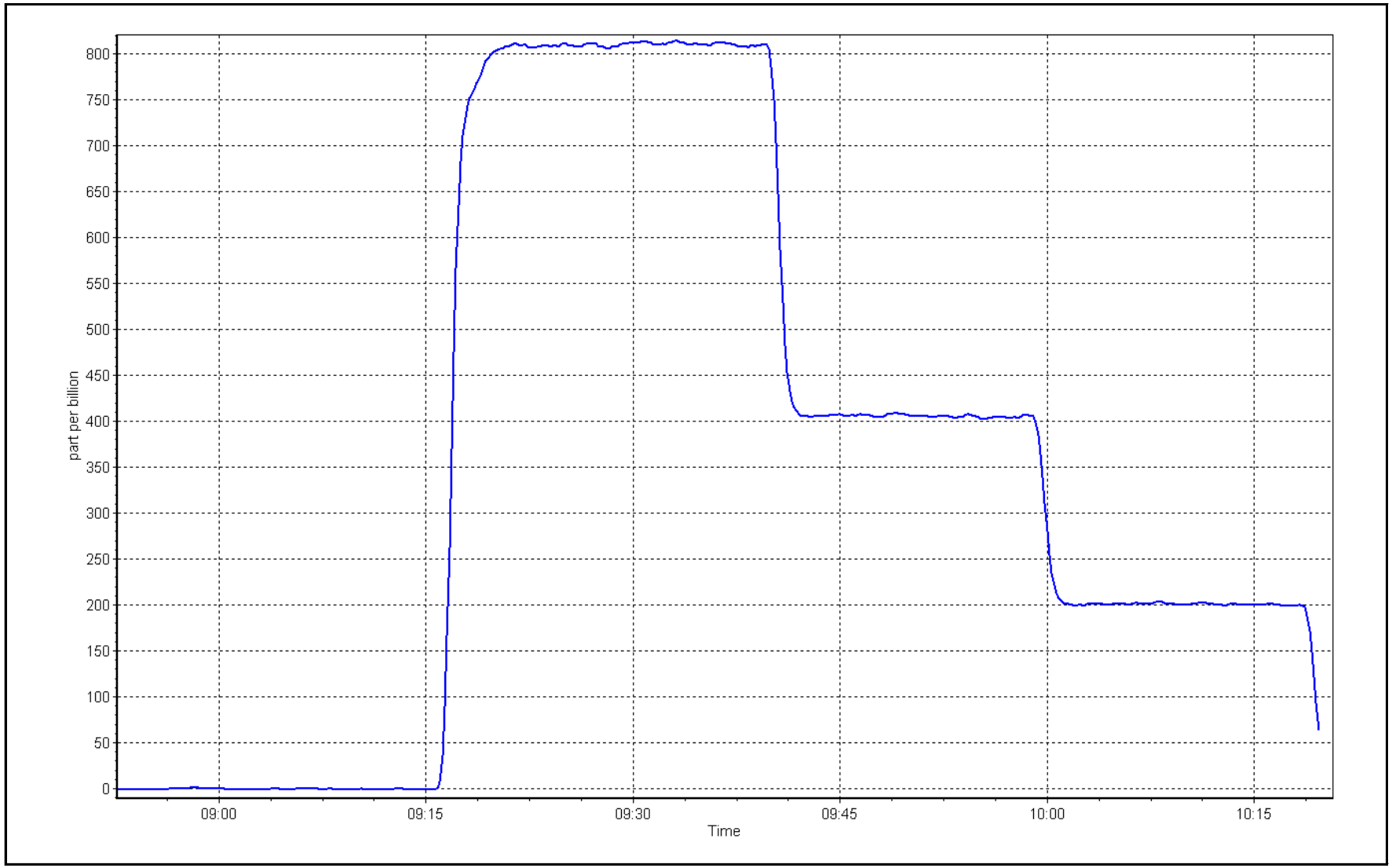
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero					
High point					
Mid point					
Low point					
As left zero					
As left span					

Average Correction Factor:

Notes: Removal calibrations done for the station move out. No issues.

Calibration Performed By: Jan Castro

SO2 Calibration Plot Date: November 6, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Christina Lake	Station number:	AMS 26
Calibration Date:	November 5, 2024	Last Cal Date:	October 29, 2024
Start time (MST):	14:59	End time (MST):	16:42
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	5.05	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0014831			
Removed Cal Gas Conc:	5.05	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne T700		Serial Number:	5258
ZAG Make/Model:	Teledyne T701H		Serial Number:	832

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12333331547
Converter make:	Global 150		Converter serial #:	2022-196
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000426		Backgd or Offset:	1.3	NA
Calibration intercept:	-0.061597		Coeff or Slope:	1.063	NA

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4921	79.2	80.0	79.5	1.005
As found Mid point	4960	39.6	40.0	39.9	1.000
As found Low point	4980	19.8	20.0	19.8	1.005
New cylinder response					

Baseline Corr As found:	79.6	Prev response:	79.96	*% change:	-0.5%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	0.995425	AF Intercept:	-0.061599
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999992	* = > +/-5% change initiates investigation	

H2S Calibration Data

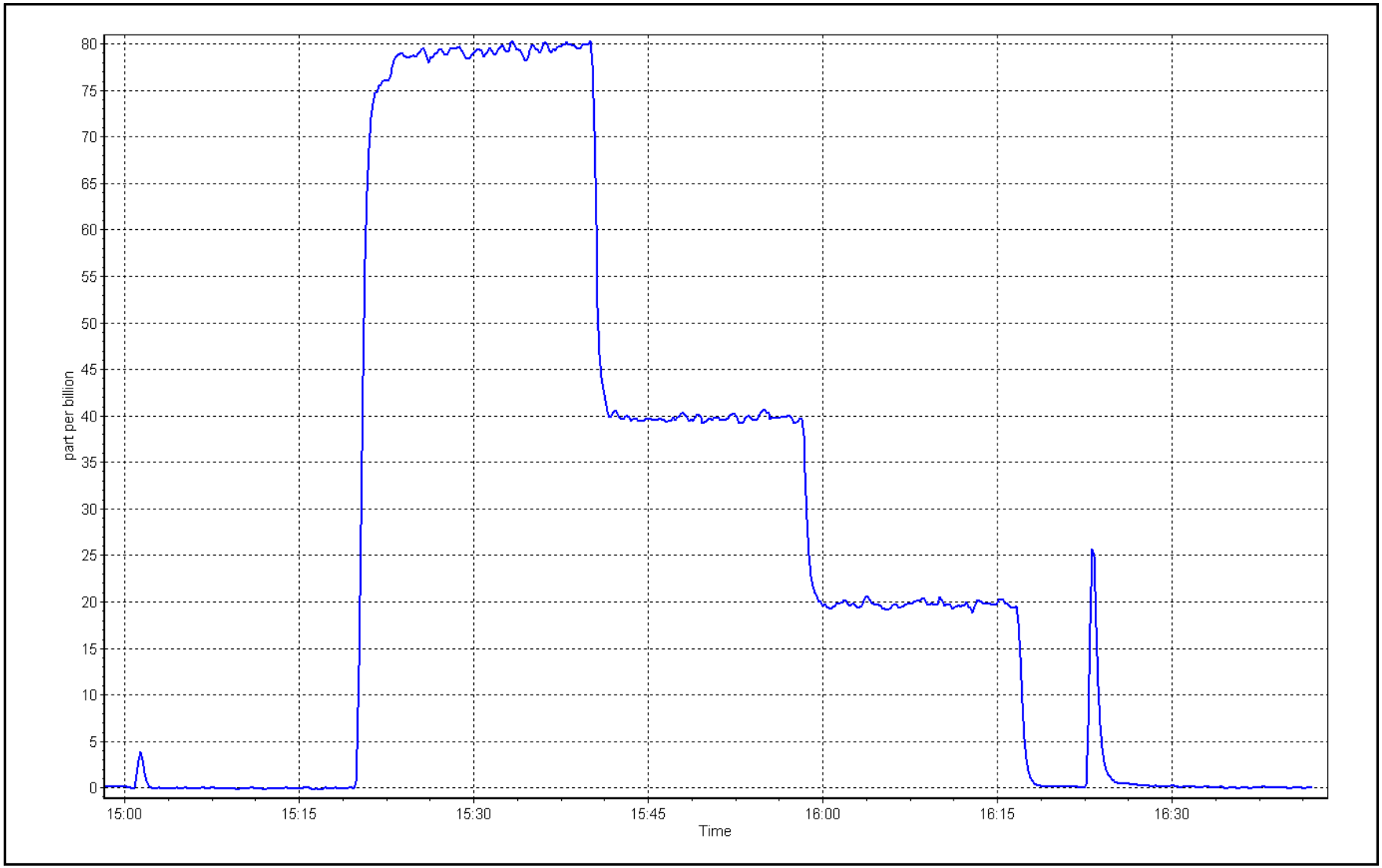
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point					
Mid point					
Low point					
As left zero					
As left span					
SO2 Scrubber Check	4921	79.0	790.0	0.1	----

Date of last scrubber change:	11-Apr-24	Ave Corr Factor	
Date of last converter efficiency test:			

Notes: Removal calibrations done for the station move out. No issues.

Calibration Performed By: Jan Castro

H2S Calibration Plot Date: November 5, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Christina Lake
Station number:	AMS 26
Calibration Date:	November 5, 2024
Last Cal Date:	October 24, 2024
Start time (MST):	12:03
End time (MST):	14:55
Reason:	Removal

Calibration Standards

NO Gas Cylinder #:	CC755290	Cal Gas Expiry Date:	January 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5258
ZAG make/model:	Teledyne API T701H	Serial Number:	832

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.1	----	----
AF High point	4918	82.1	802.9	799.6	3.3	798.0	791.8	6.3	1.0058	1.0098
AF Mid point	4959	41.1	401.9	400.3	1.6	398.0	393.9	4.0	1.0092	1.0160
AF Low point	4979	20.5	200.5	199.7	0.8	198.0	195.0	3.0	1.0111	1.0235
New cyl resp										

Previous Response	NO_X = 799.4 ppb	NO = 795.9 ppb
Baseline Corr 1st pt	NO_X = 798.3 ppb	NO = 791.9 ppb
Baseline Corr 2nd pt	NO_X = 398.3 ppb	NO = 394.0 ppb
Baseline Corr 3rd pt	NO_X = 198.3 ppb	NO = 195.1 ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = -0.1%

*Percent Change NO = -0.5%

As Found Statistics

As found	NO_X r^2: 0.999996	Nx Sl: 0.994503	Nx Int: -0.989
As found	NO r^2: 0.999982	NO Sl: 0.991114	NO Int: -1.649
As found	NO_2 r^2: 0.999857	NO2 Sl: 1.002618	NO_2 Int: 0.548

As Found GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NO2 Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Converter Efficiency *Limit = 96-104%*
As Found GPT zero	----	----	0.0	-0.1	----	----
As found high GPT point	787.1	369.5	420.9	421.2	0.9992	100.1%
As found mid GPT point	787.1	573.3	217.1	221.4	0.9805	102.0%
As found low GPT point	787.1	681.0	109.4	109.0	1.0035	99.6%

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i
Serial Number: 1173480006
NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.335	NA	NO bkgnd or offset:	2.6	NA
NOX coeff or slope:	0.991	NA	NOX bkgnd or offset:	2.7	NA
NO2 coeff or slope:	1.000	NA	Reaction cell Press:	161.6	NA

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.996839	
NO_X Cal Offset:	-1.009816	
NO Cal Slope:	0.997503	
NO Cal Offset:	-1.709874	
NO_2 Cal Slope:	0.998084	
NO_2 Cal Offset:	-0.051063	

Dilution Calibration Data

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

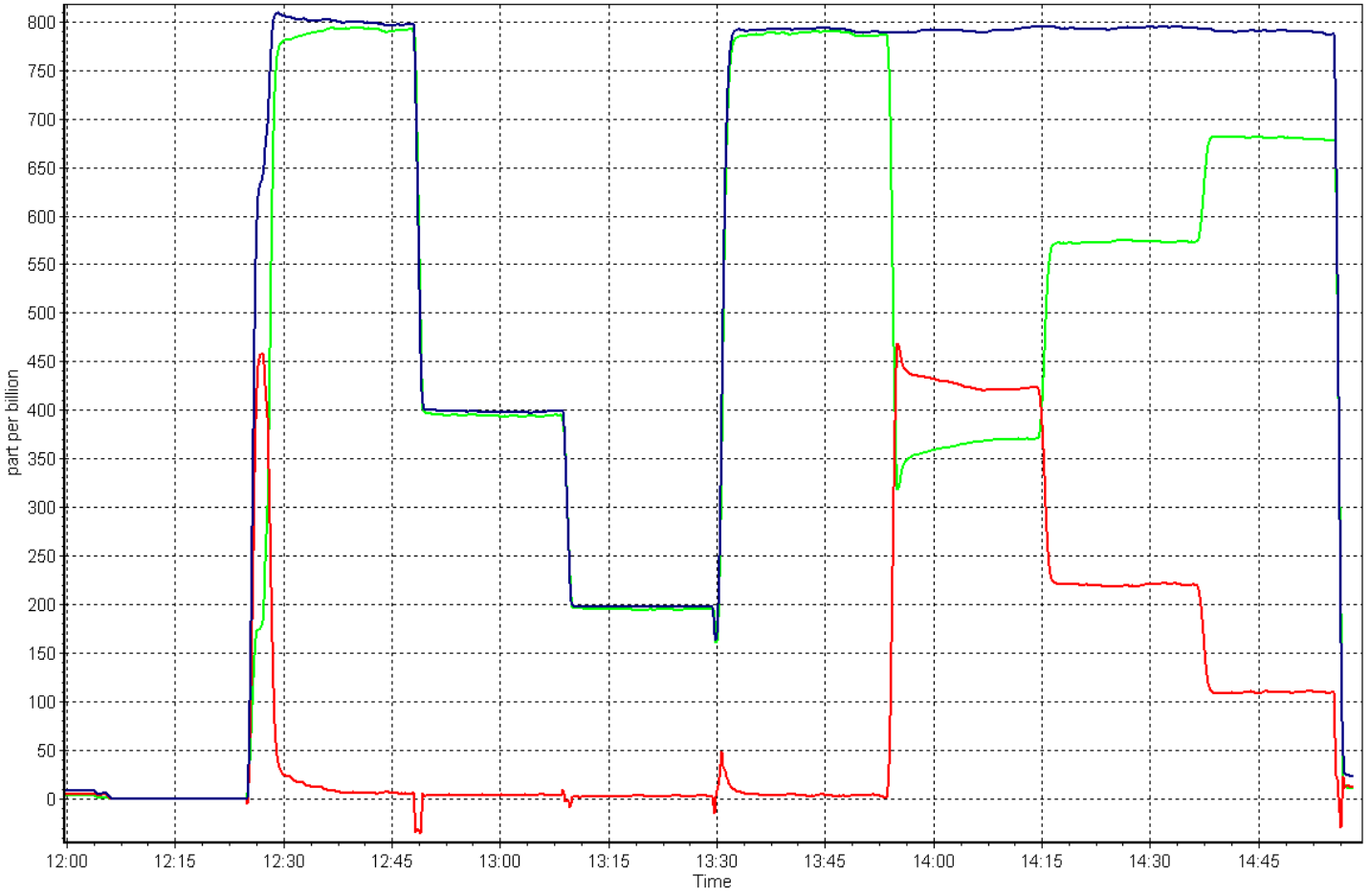
GPT Calibration Data

	O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero							
High GPT point							
Mid GPT point							
Low GPT point							
					Average Correction Factor		

Notes: Removal calibrations done for the station move out. No issues.

Calibration Performed By: Jan Castro

NO_X Calibration Plot Date: November 5, 2024 Location: Christina Lake



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Christina Lake	Station Number:	AMS 26
Calibration Date:	November 5, 2024	Prev Cal Date:	August 29, 2024
Start Time (MST):	12:40	End Time (MST):	14:22
Tower Height (m):	10.0	Reason:	Removal

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	P22395
WS Calibrator:	MetOne 053	Serial Number:	CA 03988

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error *Limit = +/- 1.5%*
0	0.0	0.0	---
200	20.2	20.1	-0.3%
400	39.4	39.4	0.1%
600	58.6	58.5	0.0%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999999	0.999999	*≥0.9995*
Calculated slope	0.998858	0.998858	*0.90 - 1.10*
Calculated intercept	0.034341	0.034341	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	N13744
As Found Declination (deg east of True North):	3.07	As Left Declination (deg east of True North):	NA
Solar noon time (MST):	21:20	Calc Declination*:	12.93 Degrees
Deadband calc:	3.0 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	1.8	---
90	90.7	0.2%
180	181.1	0.3%
270	271.7	0.5%
356	355.8	-0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999982	0.999989	*≥0.9995*
Calculated slope	1.006575	1.003320	*0.90 - 1.10*
Calculated intercept	-1.622466	-1.618380	*+/- 4*

Notes: Removal calibrations done for the station move out. No issues.

Calibration Performed By: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS27
JACKFISH 2/3
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	November 12, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	11:33	End time (MST):	14:41
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.58	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	SG9133974BAL			
Removed Cal Gas Conc:	50.58	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	3811
Zero Air Gen Model:	API 701		Serial Number:	268

Analyzer Information

Analyzer make:	Thermo 43iQ-TL		Serial Number:	12124313138	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.998699	0.993016	Backgd or Offset:	8.3	8.2
Calibration intercept:	-1.406165	-1.166634	Coeff or Slope:	0.927	0.927

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.5	----
As found High point	4919	79.1	800.5	794.1	1.009
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	793.6	Previous response	798.0	*% change	-0.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.5	----
High point	4919	79.1	800.5	794.5	1.008
Mid point	4960	39.5	399.6	395.0	1.012
Low point	4979	19.8	200.3	196.0	1.022
As left zero	5000	0.0	0.0	0.4	----
As left span	4921	79.1	800.2	795.2	1.006
				Average Correction Factor:	1.014

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

SO_2 Calibration Summary

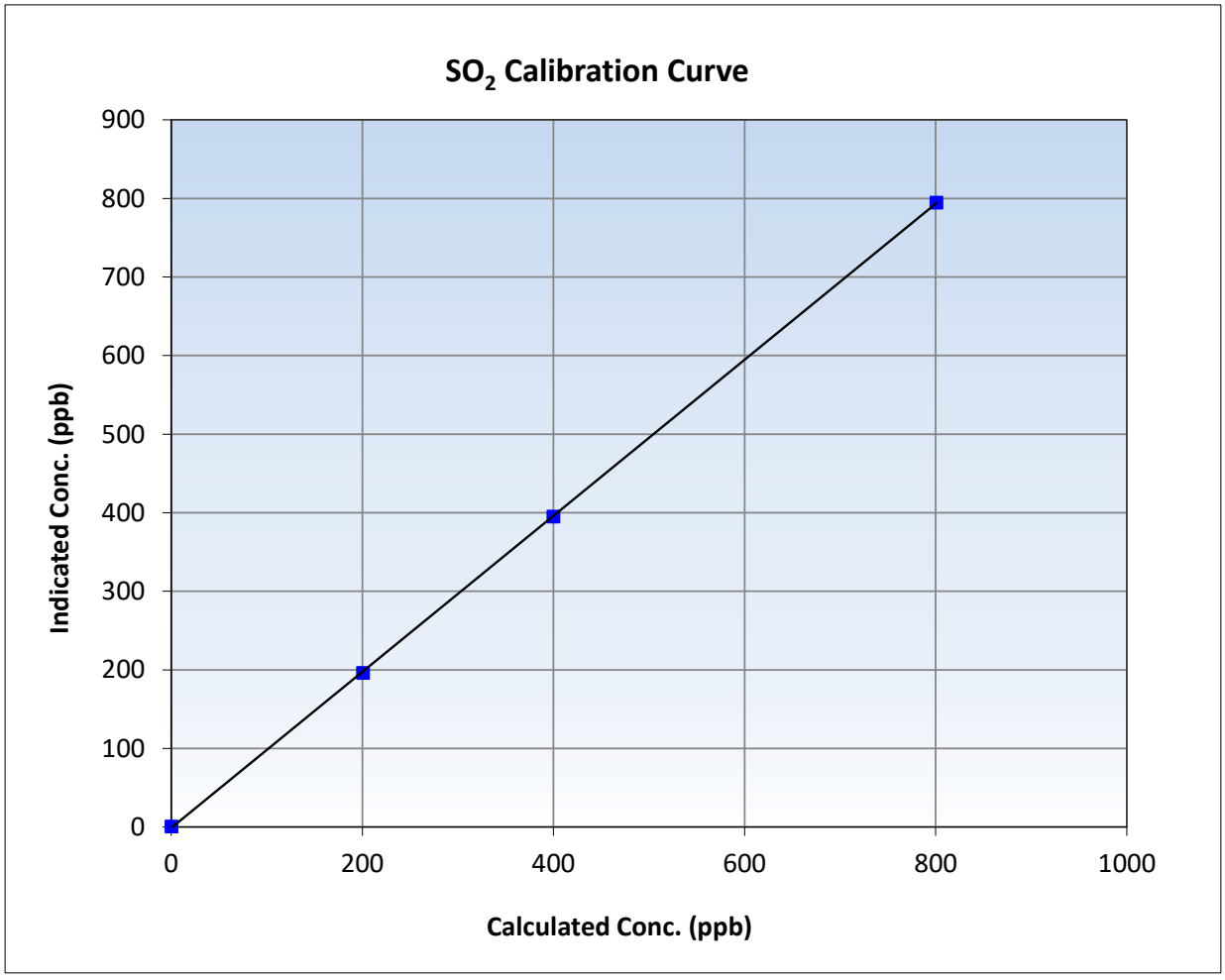
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 16, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:33	End Time (MST):	14:41
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	12124313138

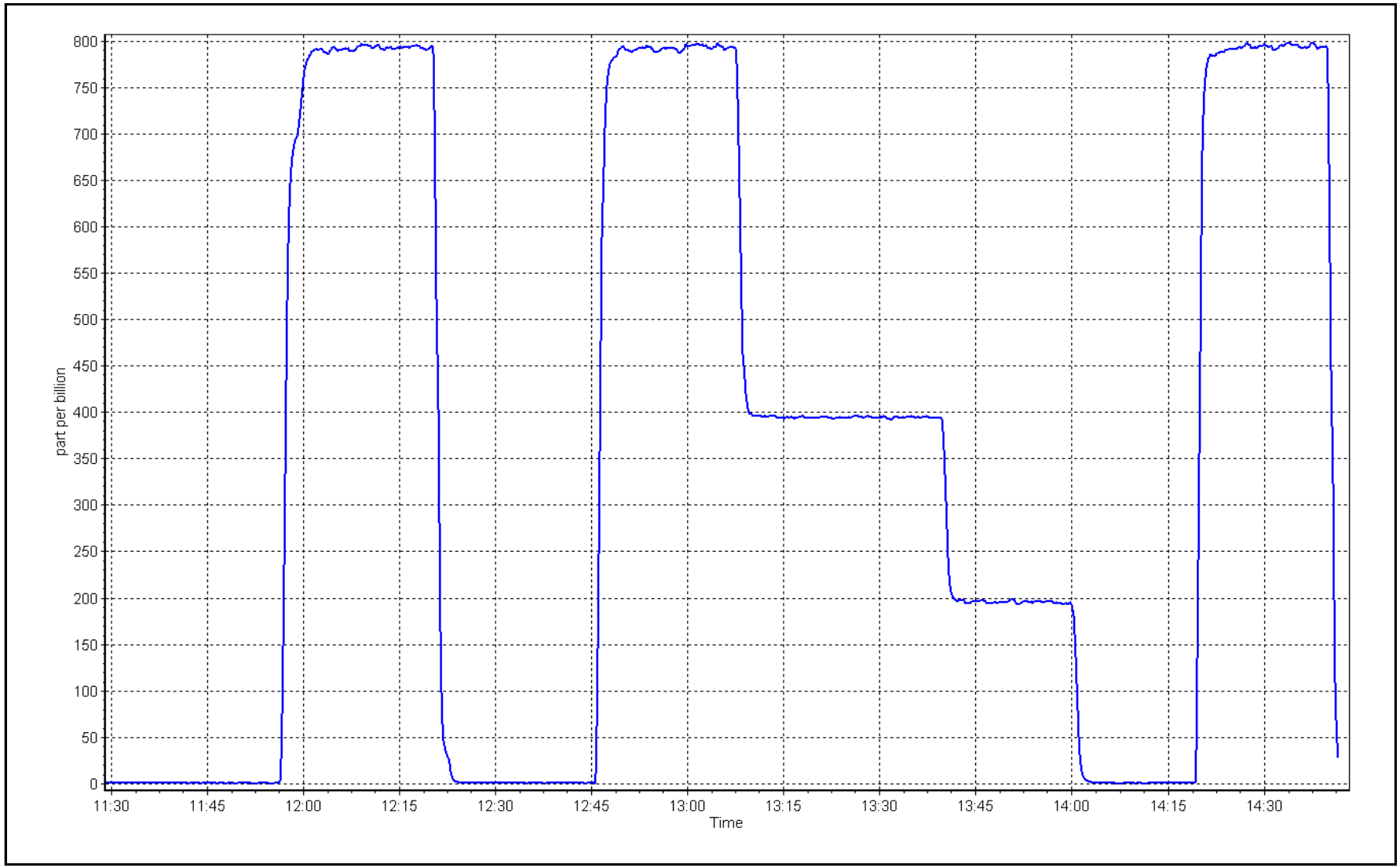
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.5	----
800.5	794.5	1.0075
399.6	395.0	1.0117
200.3	196.0	1.0222

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999980	*≥0.995*
Slope	0.993016	*0.90 - 1.10*
Intercept	-1.166634	*+/-30*



SO2 Calibration Plot Date: November 12, 2024 Location: Jackfish 2/3



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	November 19, 2024	Last Cal Date:	October 15, 2024
Start time (MST):	10:53	End time (MST):	12:53
Reason:	Removal		

Calibration Standards

Cal Gas Concentration:	5.41	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC345023			
Removed Cal Gas Conc:	5.41	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3811
ZAG Make/Model:	API 701		Serial Number:	268

Analyzer Information

Analyzer make:	API T101		Analyzer serial #:	621	
Converter make:	NA		Converter serial #:	NA	
Analyzer Range	0 - 100 ppb		Converter Temp:	316	degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.015167	NA	Backgd or Offset:	36.5	NA
Calibration intercept:	-0.137602	NA	Coeff or Slope:	0.830	NA

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4926	74.1	80.2	81.7	0.980
As found Mid point	4963	37.0	40.0	40.5	0.986
As found Low point	4982	18.5	20.0	19.8	1.006
New cylinder response					

Baseline Corr As found:	81.8	Prev response:	81.25	*% change:	0.7%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.022154	AF Intercept:	-0.357510
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999953	* = > +/-5% change initiates investigation	

H_2S Calibration Data

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

Date of last scrubber change:

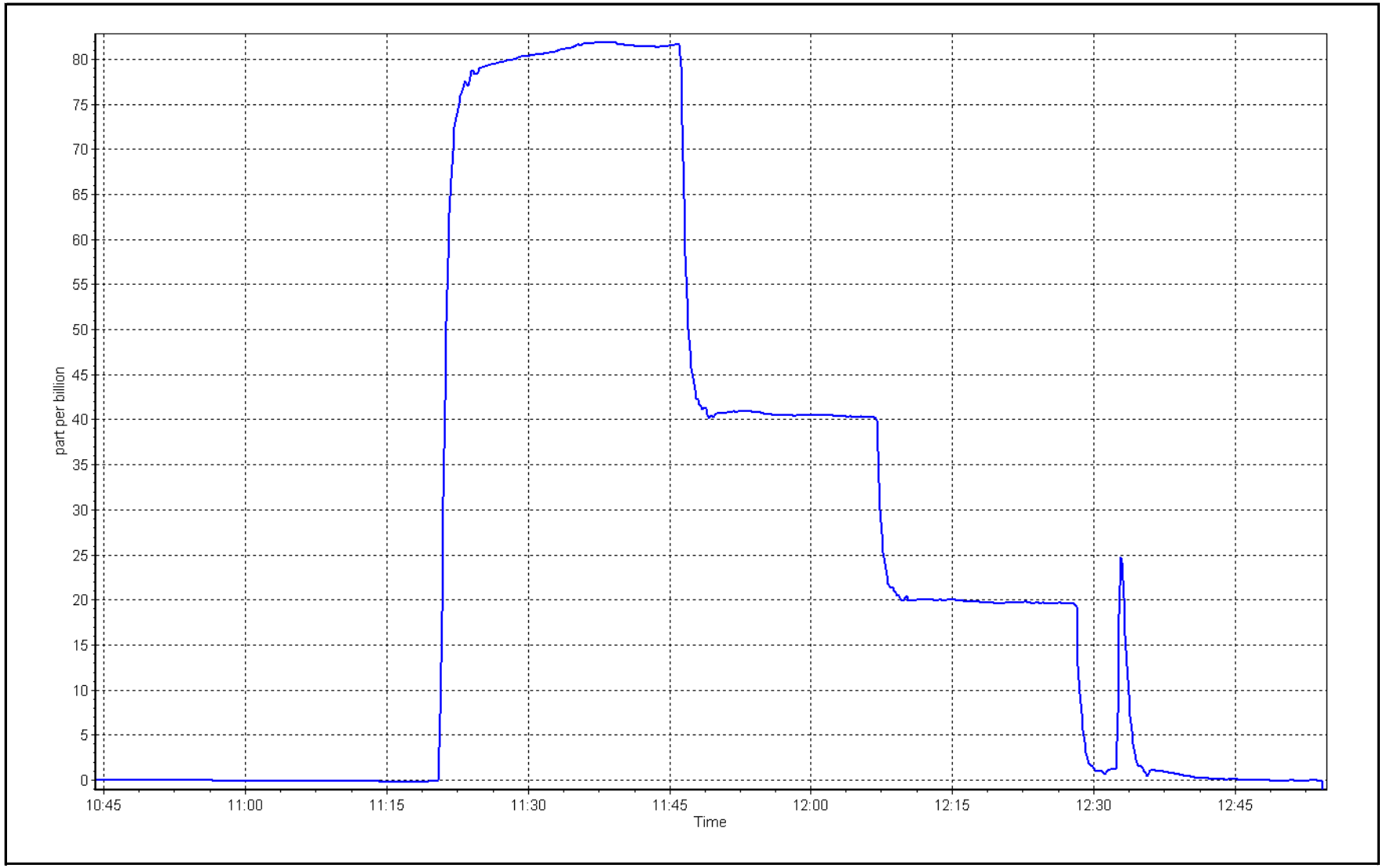
Ave Corr Factor

Date of last converter efficiency test:

Notes: Removal Calibration.

Calibration Performed By: Mohammed Kashif

H_2S Calibration Plot Date: November 19, 2024 Location: Jackfish 2/3



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Jackfish 2/3	Station number:	AMS 27
Calibration Date:	November 19, 2024	Last Cal Date:	NA
Start time (MST):	15:00	End time (MST):	18:30
Reason:	Install		

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 T701H		Serial Number:	268

Analyzer Information

Analyzer make:	Thermo 43iQ		Analyzer serial #:	12228021055	
Converter make:	Global G150		Converter serial #:	2022-195	
Analyzer Range	0 - 100 ppb		Converter Temp:	325	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	NA	1.022160	Backgd or Offset:	NA	3.6
Calibration intercept:	NA	-0.657722	Coeff or Slope:	NA	1.110

H_2S As Found Data

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

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

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4926	74.1	80.2	81.6	0.983
Mid point	4963	37.0	40.0	39.8	1.006
Low point	4982	18.5	20.0	19.5	1.026
As left zero	5000	0.0	0.0	-0.5	----
As left span	4926	74.1	80.2	81.3	0.986
SO2 Scrubber Check	4921	79.1	791.0	-0.1	----
Date of last scrubber change:				Ave Corr Factor	1.005
Date of last converter efficiency test:					

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

H_2S Calibration Summary

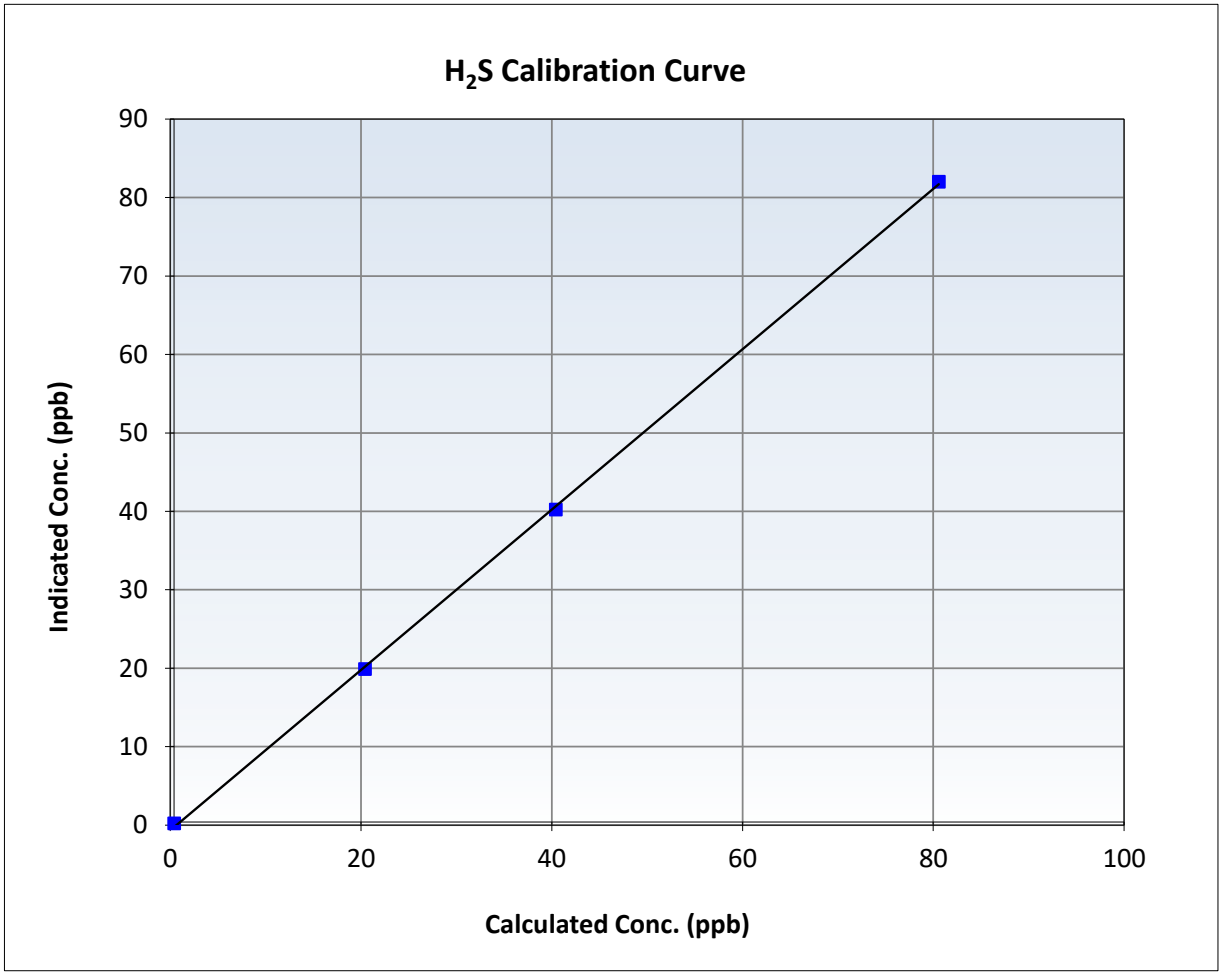
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	NA
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	15:00	End Time (MST):	18:30
Analyzer make:	Thermo 43iQ	Analyzer serial #:	12228021055

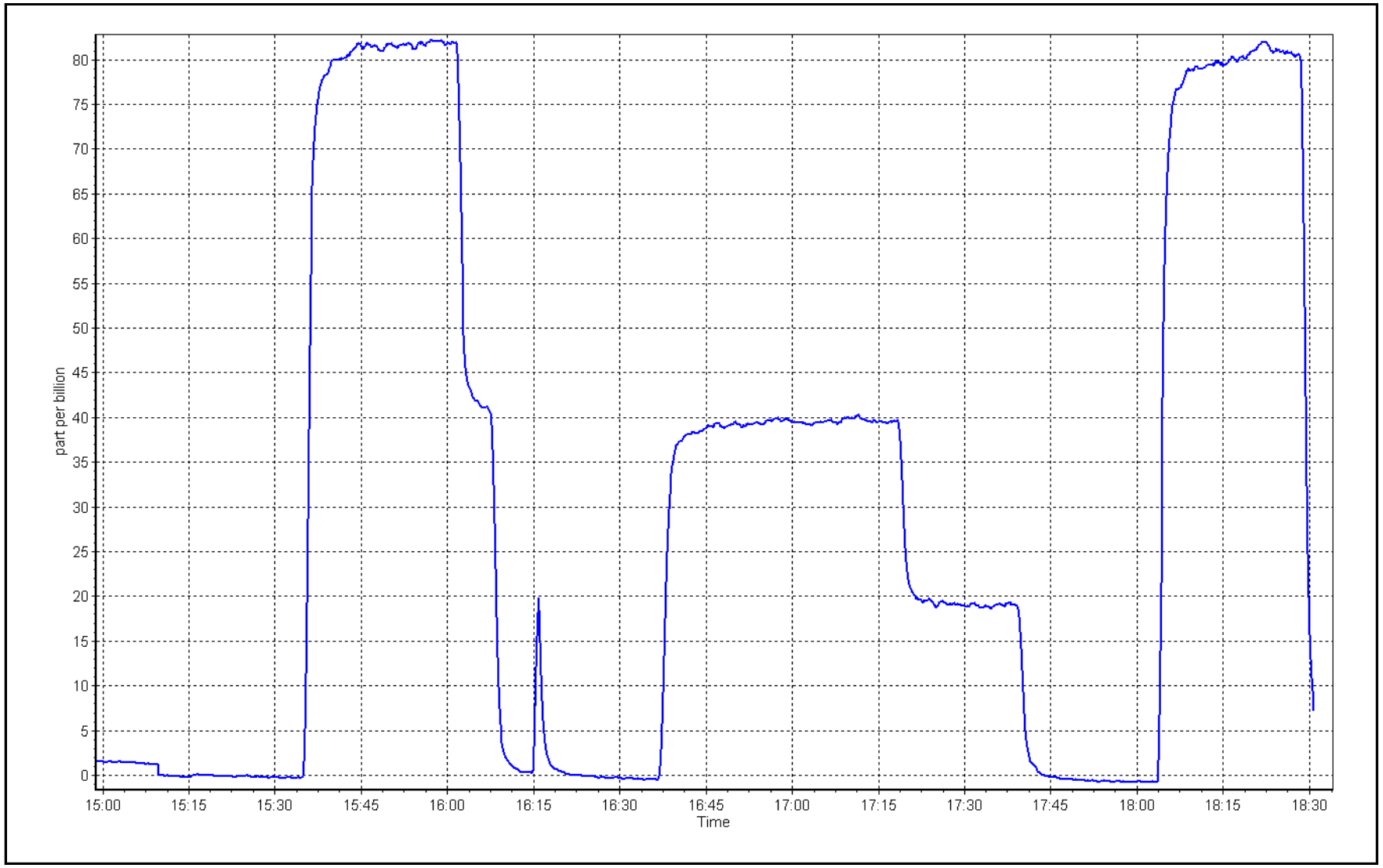
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
80.2	81.6	0.9825
40.0	39.8	1.0059
20.0	19.5	1.0264

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999834	*≥0.995*
Slope	1.022160	*0.90 - 1.10*
Intercept	-0.657722	*+/-3*



H_2S Calibration Plot Date: November 19, 2024 Location: Jackfish 2/3



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Jackfish 2/3
Station number:	AMS 27
Calibration Date:	November 15, 2024
Last Cal Date:	October 24, 2024
Start time (MST):	11:23
End time (MST):	16:27
Reason:	Install

Calibration Standards

NO Gas Cylinder #:	CC757838	Cal Gas Expiry Date:	January 9, 2032
NOX Cal Gas Conc:	60.30 ppm	NO Cal Gas Conc:	60.20 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	60.30 ppm	Removed Gas NO Conc:	60.20 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	3811
ZAG make/model:	Teledyne API T701	Serial Number:	268

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
AF High point	4942	66.5	800.6	799.3	1.3	806.5	806.2	0.3	0.9925	0.9912
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.8 ppb	NO = 798.6 ppb
Baseline Corr 1st pt	NO_X = 806.7 ppb	NO = 806.4 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 = 0.9%

*Percent Change NO = 1.0%

As Found Statistics

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

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1218153357

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.360	1.360	NO bkgnd or offset:	4.6	4.6
NOX coeff or slope:	0.990	0.992	NOX bkgnd or offset:	4.7	4.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	157.8	156.9

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.001502	1.008779
NO_X Cal Offset:	-2.034660	-2.133379
NO Cal Slope:	1.003711	1.014488
NO Cal Offset:	-3.675376	-4.293618
NO_2 Cal Slope:	0.983242	1.012471
NO_2 Cal Offset:	2.433503	-0.121108

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.9	0.0	0.8	----	----
High point	4942	66.5	800.6	799.3	1.3	807.2	808.7	-1.4	0.9919	0.9884
Mid point	4979	33.3	400.6	399.9	0.7	400.0	399.4	0.6	1.0015	1.0014
Low point	4996	16.6	199.7	199.4	0.3	196.6	193.6	3.0	1.0157	1.0298
As left zero	5000	0.0	0.0	0.0	0.0	1.8	0.1	1.7	----	----
As left span	4942	66.5	800.6	407.4	393.2	810.6	407.4	403.1	0.9877	1.0000
								Average Correction Factor	1.0030	1.0065

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.8	----	----
High GPT point	806.5	410.6	397.2	402.0	0.9881	101.2%
Mid GPT point	806.5	618.9	188.9	192.3	0.9825	101.8%
Low GPT point	806.5	712.3	95.5	94.6	1.0098	99.0%
				Average Correction Factor	0.9935	100.7%

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

Calibration Performed By: Mohammed Kashif

Wood Buffalo Environmental Association

NO_X Calibration Summary

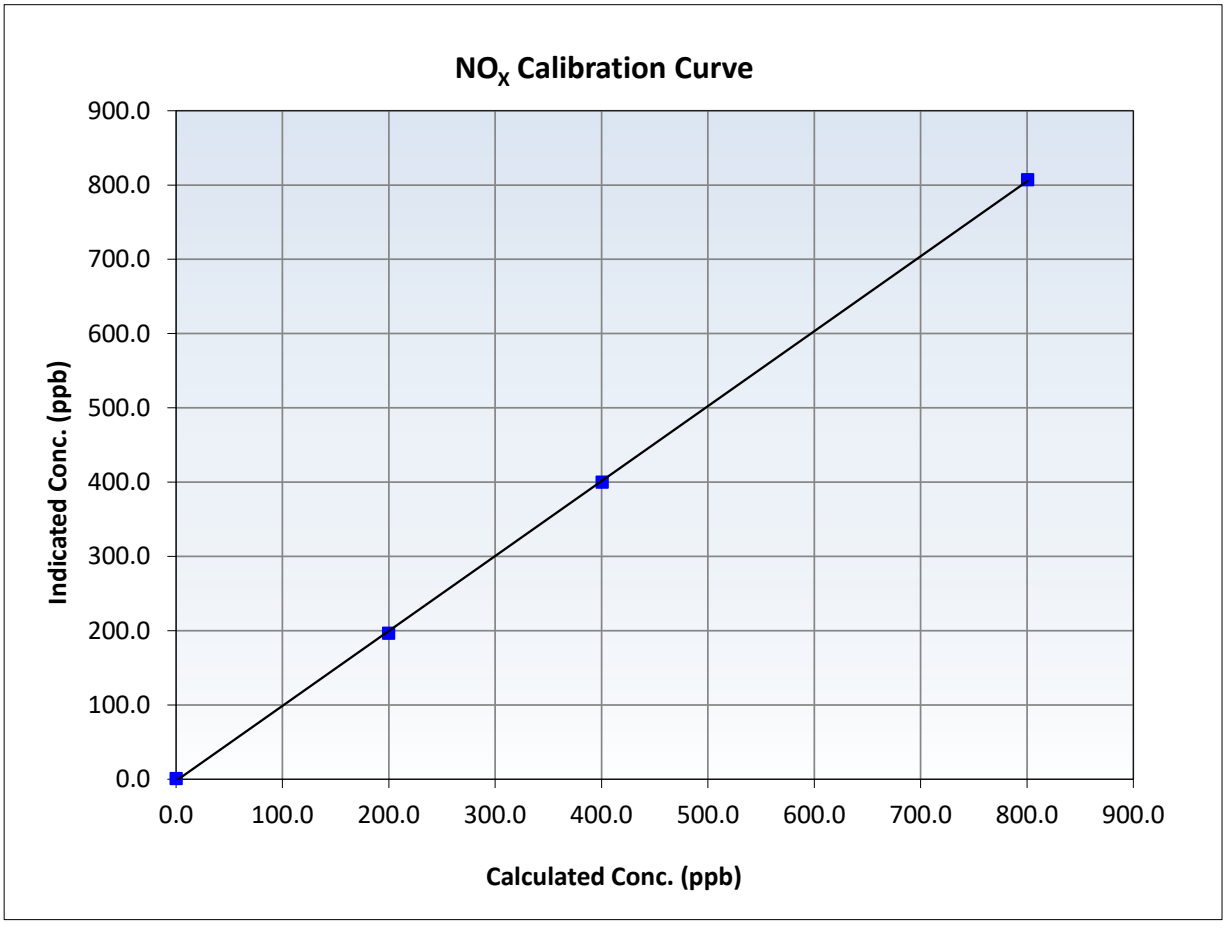
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 24, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:23	End Time (MST):	16:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.9	----
800.6	807.2	0.9919
400.6	400.0	1.0015
199.7	196.6	1.0157

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999935	*≥0.995*
Slope	1.008779	*0.90 - 1.10*
Intercept	-2.133379	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

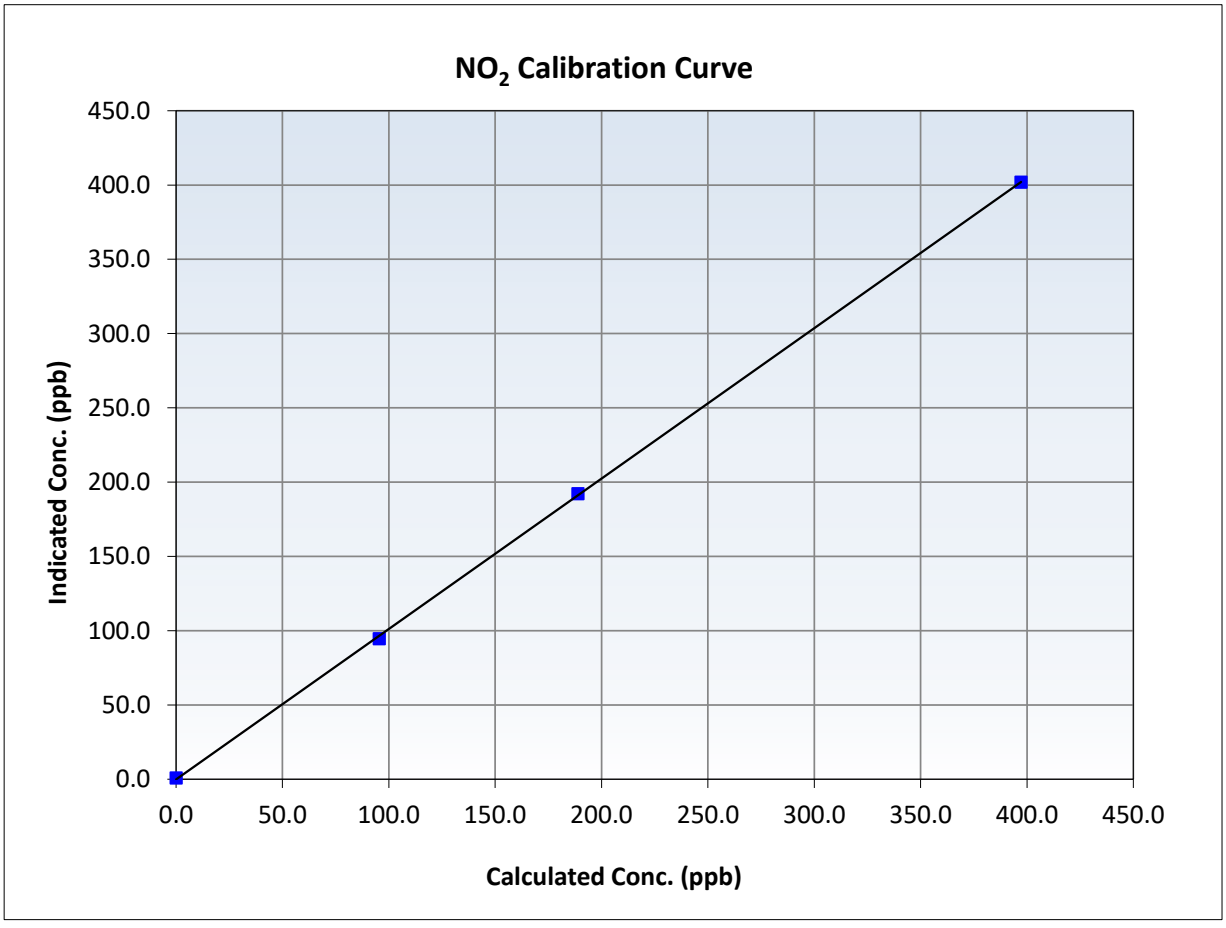
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 24, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:23	End Time (MST):	16:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.8	----
397.2	402.0	0.9881
188.9	192.3	0.9825
95.5	94.6	1.0098

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999931	*≥0.995*
Slope	1.012471	*0.90 - 1.10*
Intercept	-0.121108	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

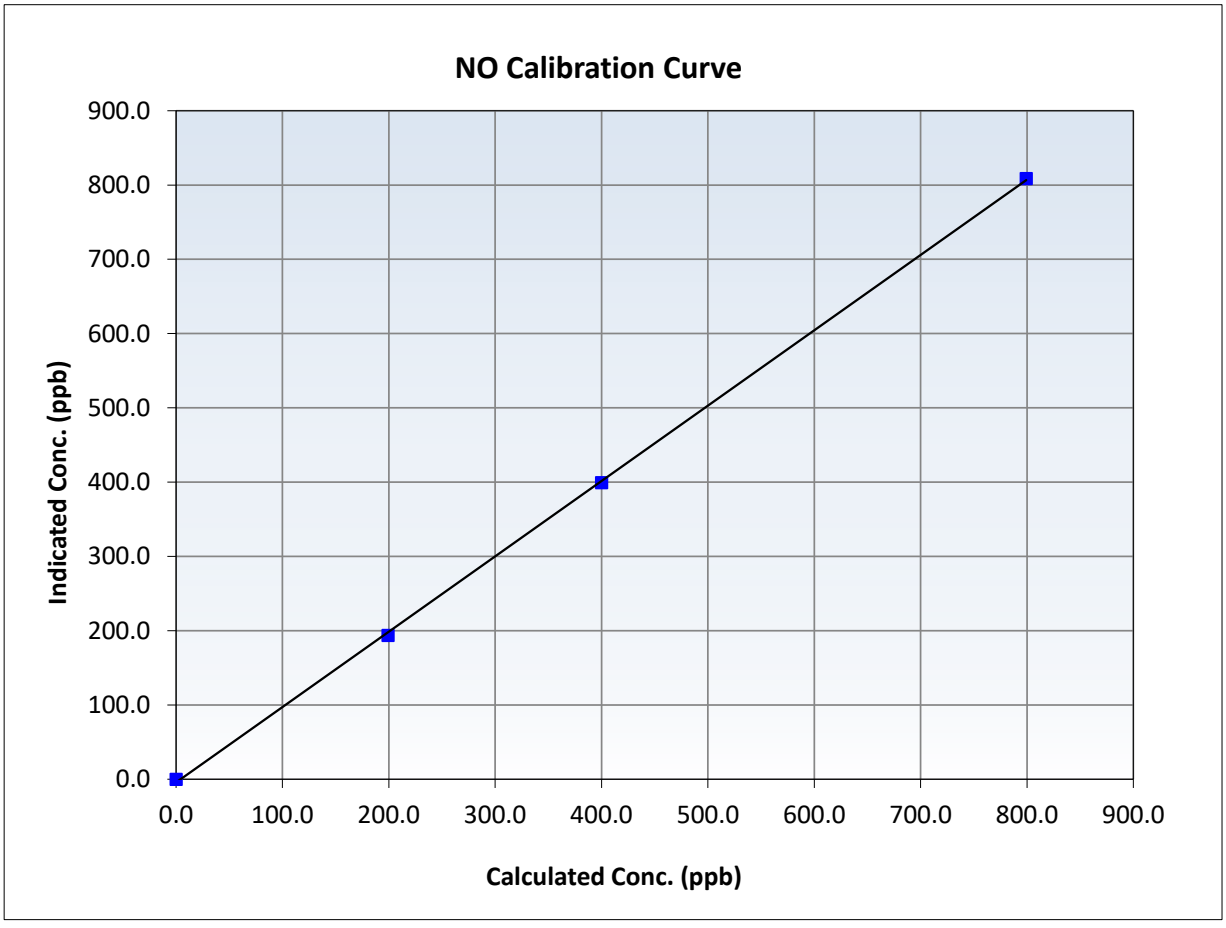
Station Information

Calibration Date:	November 15, 2024	Previous Calibration:	October 24, 2024
Station Name:	Jackfish 2/3	Station Number:	AMS 27
Start Time (MST):	11:23	End Time (MST):	16:27
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153357

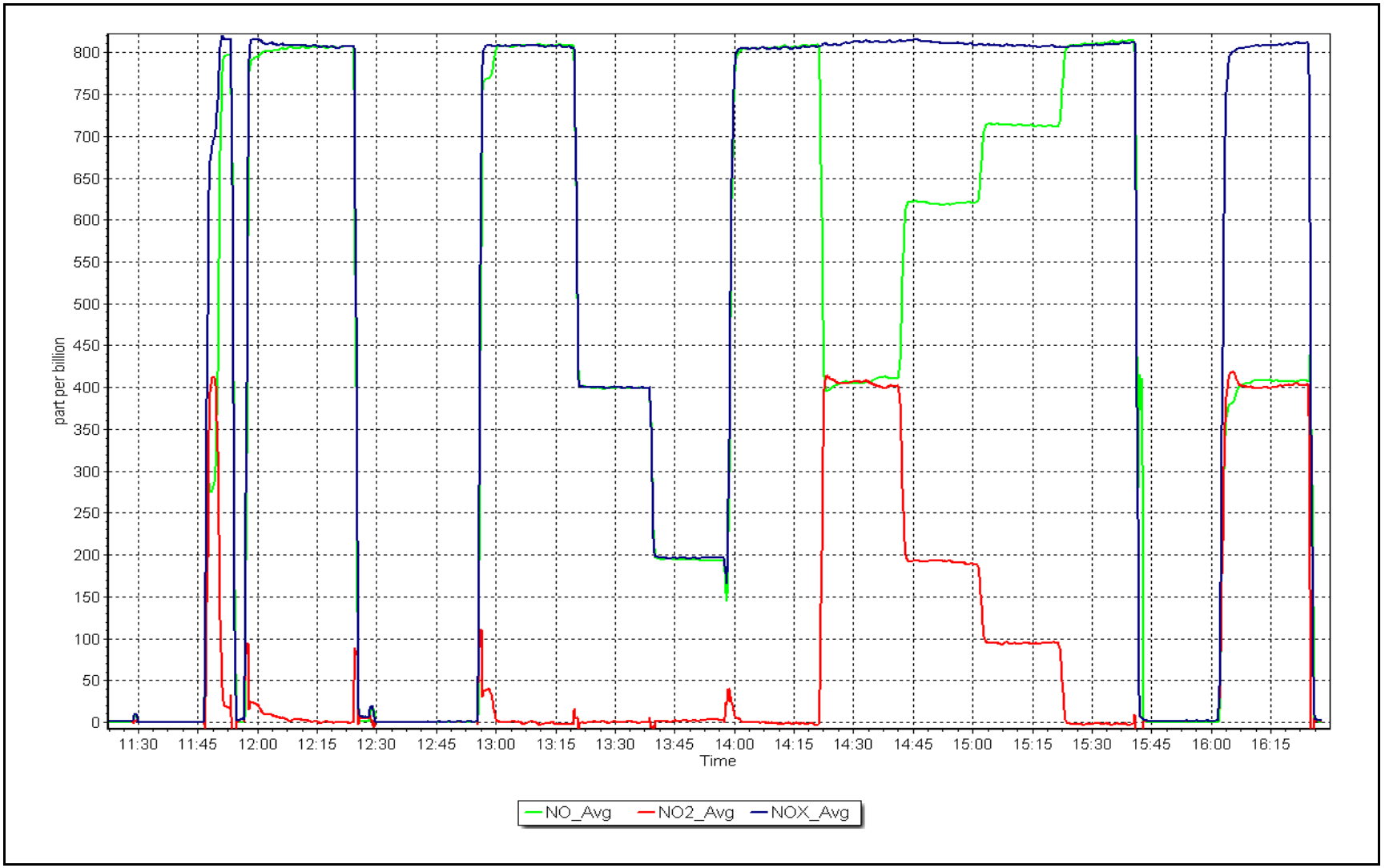
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.3	808.7	0.9884
399.9	399.4	1.0014
199.4	193.6	1.0298

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999872	*≥0.995*
Slope	1.014488	*0.90 - 1.10*
Intercept	-4.293618	*+/-20*



NO_X Calibration Plot Date: November 15, 2024 Location: Jackfish 2/3



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS29
SURMONT 2
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	November 7, 2024	Last Cal Date:	October 15, 2024
Start time (MST):	10:10	End time (MST):	12:59
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.21	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC356008			
Removed Cal Gas Conc:	49.21	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	5472
Zero Air Gen Model:	Teledyne API T701		Serial Number:	4698

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1170050150	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.003414	1.000130	Backgd or Offset:	13.0	13.0
Calibration intercept:	-1.825608	-1.425614	Coeff or Slope:	0.925	0.925

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.0	----
As found High point	4919	81.3	800.1	798.8	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	798.8	Previous response	801.0	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.1	----
High point	4919	81.3	800.1	799.4	1.001
Mid point	4959	40.7	400.6	398.7	1.005
Low point	4979	20.3	199.8	197.0	1.014
As left zero	5000	0.0	0.0	0.4	----
As left span	4919	81.3	800.1	800.0	1.000
				Average Correction Factor:	1.007

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

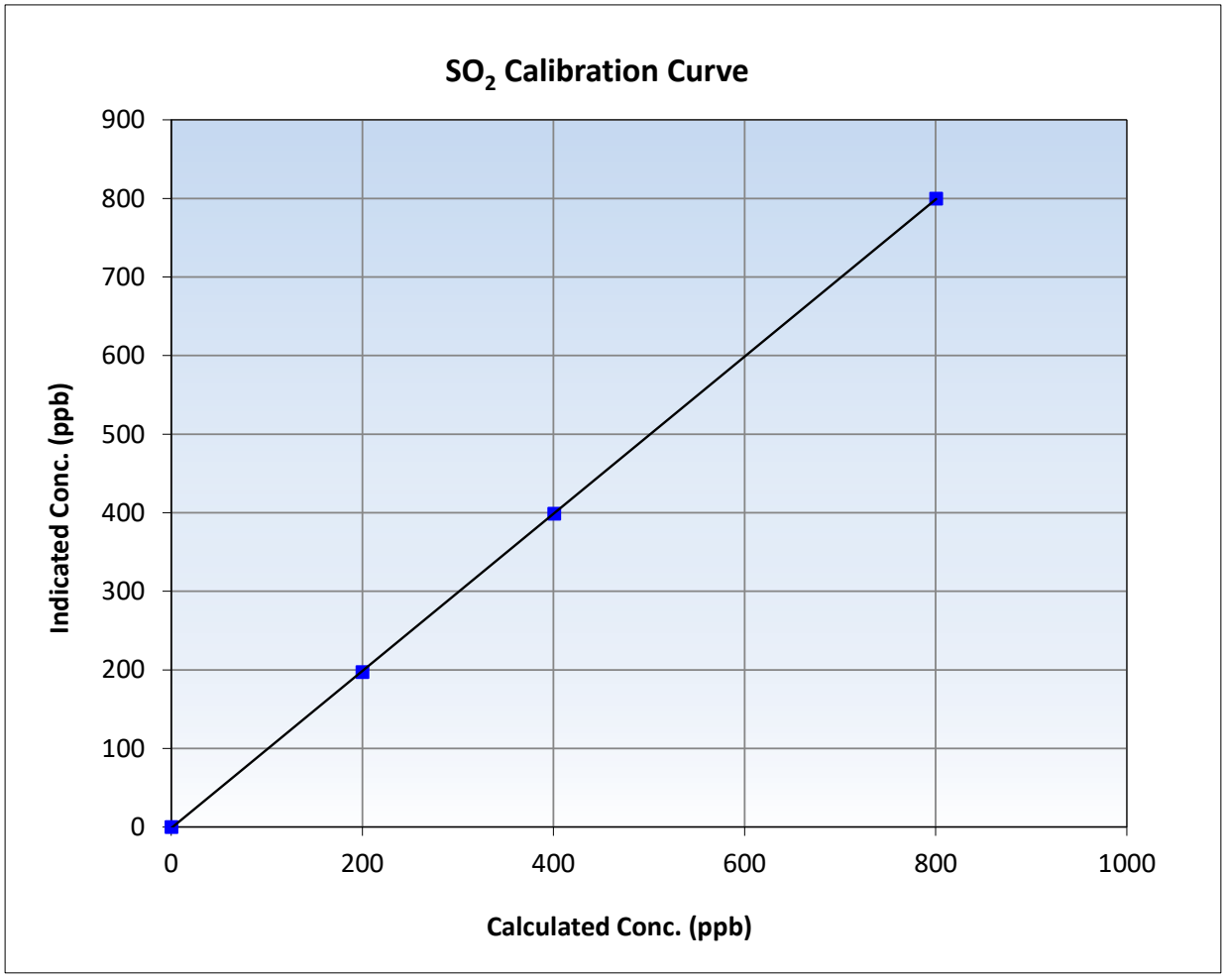
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:10	End Time (MST):	12:59
Analyzer make:	Thermo 43i	Analyzer serial #:	1170050150

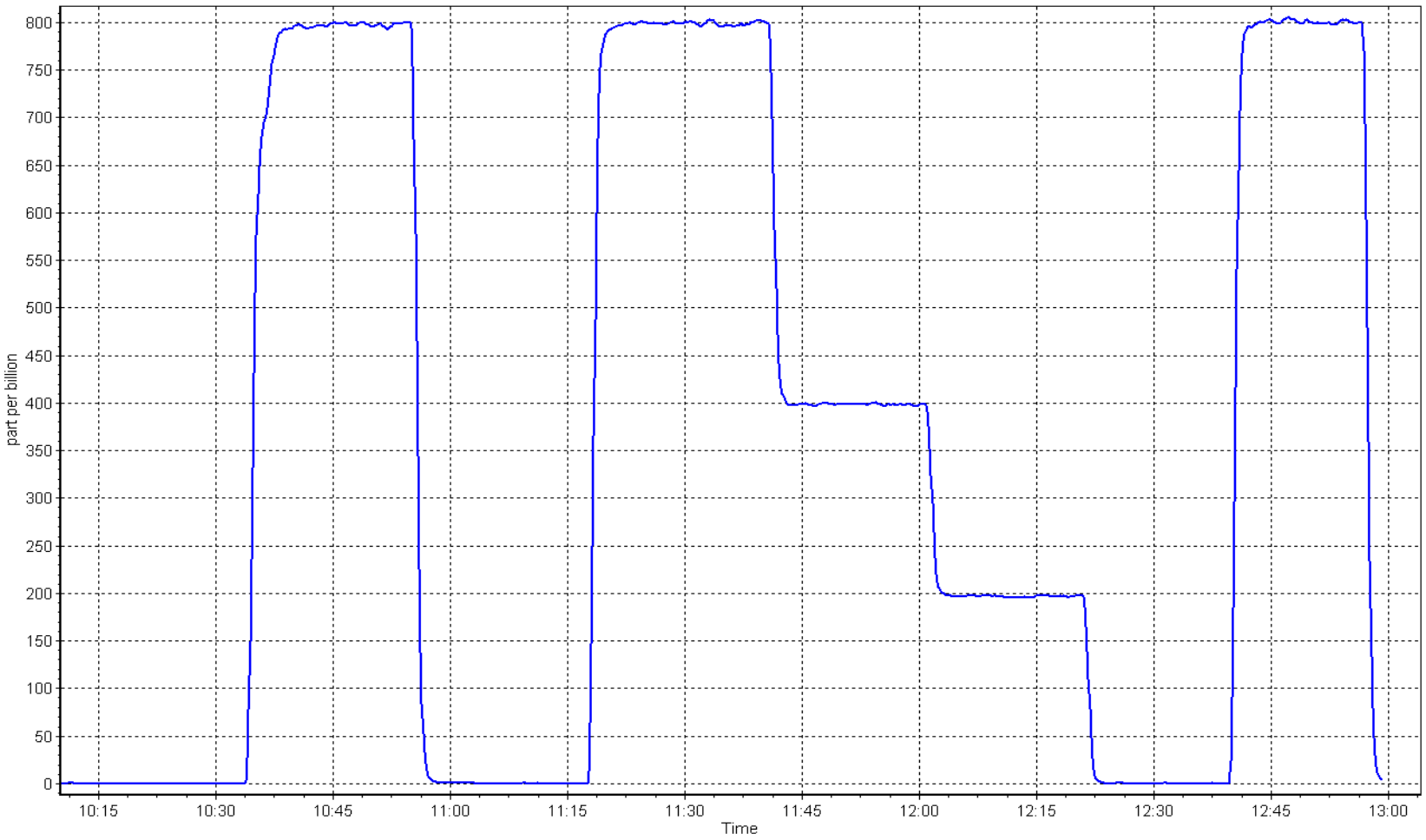
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
800.1	799.4	1.0009
400.6	398.7	1.0047
199.8	197.0	1.0143

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999987	*≥0.995*
Slope	1.000130	*0.90 - 1.10*
Intercept	-1.425614	*+/-30*



SO2 Calibration Plot Date: November 7, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	November 5, 2024	Last Cal Date:	October 8, 2024
Start time (MST):	10:50	End time (MST):	15:20
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.391	ppm	Cal Gas Exp Date:	January 4, 2025
Cal Gas Cylinder #:	CC508338			
Removed Cal Gas Conc:	5.391	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	CC508338		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5472
ZAG Make/Model:	Teledyne API T701		Serial Number:	4698

Analyzer Information

Analyzer make:	Thermo 43iQ-TLE		Analyzer serial #:	1200326170	
Converter make:	Global		Converter serial #:	2022-220	
Analyzer Range	0 - 100 ppb		Converter Temp:	350.0	degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.003325	1.000611	Backgd or Offset:	0.89	0.88
Calibration intercept:	-0.182706	-0.062596	Coeff or Slope:	1.030	1.030

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4926	74.2	80.0	81.2	0.984
As found Mid point	4963	37.2	40.1	40.5	0.988
As found Low point	4982	18.6	20.1	20.1	0.993
New cylinder response					

Baseline Corr As found:	81.3	Prev response:	80.09	*% change:	1.5%
Baseline Corr 2nd AF pt:	40.6	AF Slope:	1.016757	AF Intercept:	-0.203396
Baseline Corr 3rd AF pt:	20.2	AF Correlation:	0.999992	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4926	74.2	80.0	80.1	0.999
Mid point	4963	37.2	40.1	39.9	1.005
Low point	4982	18.6	20.1	19.9	1.008
As left zero	5000	0.0	0.0	0.1	----
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:				Ave Corr Factor	1.004
Date of last converter efficiency test:					

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H2S Calibration Summary

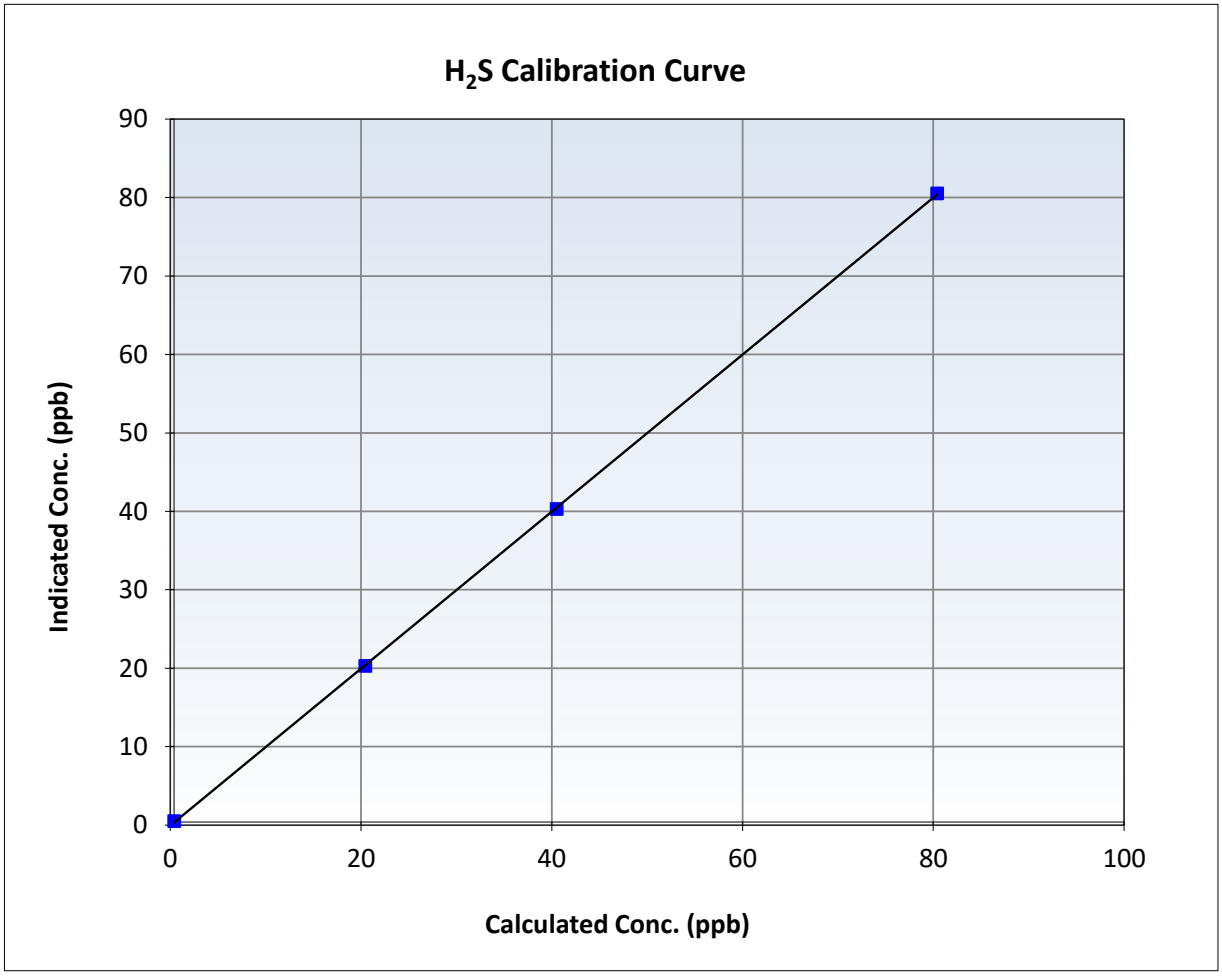
Station Information

Calibration Date:	November 5, 2024	Previous Calibration:	October 8, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:50	End Time (MST):	15:20
Analyzer make:	Thermo 43iQ-TLE	Analyzer serial #:	1200326170

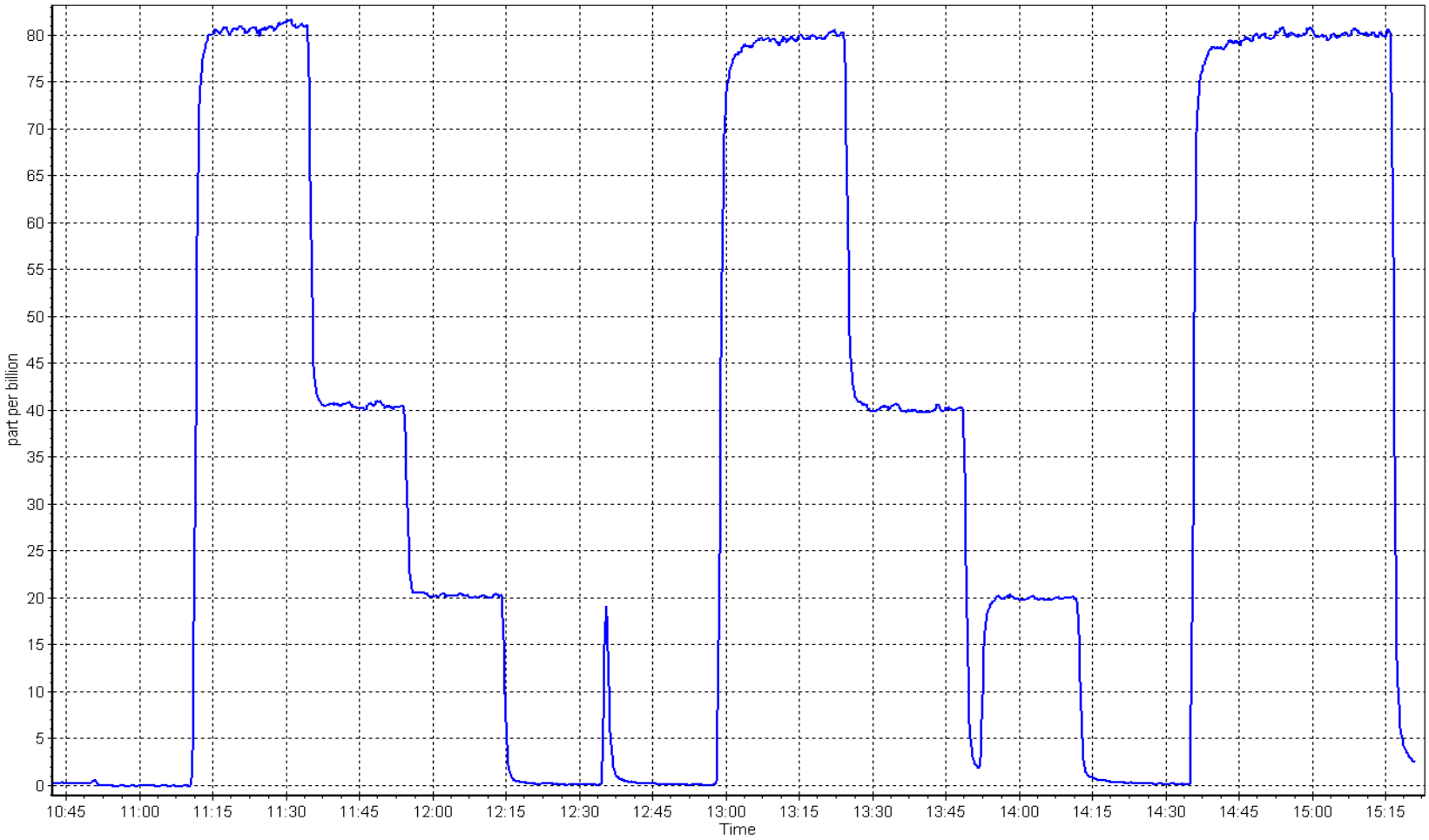
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	80.1	0.9988
40.1	39.9	1.0052
20.1	19.9	1.0077

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999978	*≥0.995*
Slope	1.000611	*0.90 - 1.10*
Intercept	-0.062596	*+/-3*



H2S Calibration Plot Date: November 5, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	November 7, 2024	Last Cal Date:	October 15, 2024
Start time (MST):	10:10	End time (MST):	12:59
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC356008		Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	499.0	ppm	CH4 Equiv Conc.	1064.7	ppm
C3H8 Cal Gas Conc.	205.7	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	499.0	ppm	CH4 Equiv Conc.	1064.7	ppm
Removed C3H8 Conc.	205.7	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5472	
ZAG Make/Model:	Teledyne API T701		Serial Number:	4698	

Analyzer Information

Analyzer make: Thermo 51i-LT Analyzer serial #: 1170050149

Analyzer Range: 0 - 20 ppm

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	0.994765	0.999669	Background:	3.47	3.47
Calibration intercept:	-0.007885	-0.082263	Coefficient:	3.856	3.856

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.06	----
As found High point	4918	81.3	17.31	17.11	1.008
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.17	Previous response	17.22	*% change	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.05	----
High point	4918	81.3	17.31	17.25	1.004
Mid point	4959	40.6	8.65	8.52	1.015
Low point	4979	20.3	4.32	4.23	1.023
As left zero	5000	0.0	0.00	-0.04	----
As left span	4918	81.3	17.31	17.36	0.997
				Average Correction Factor	1.014

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

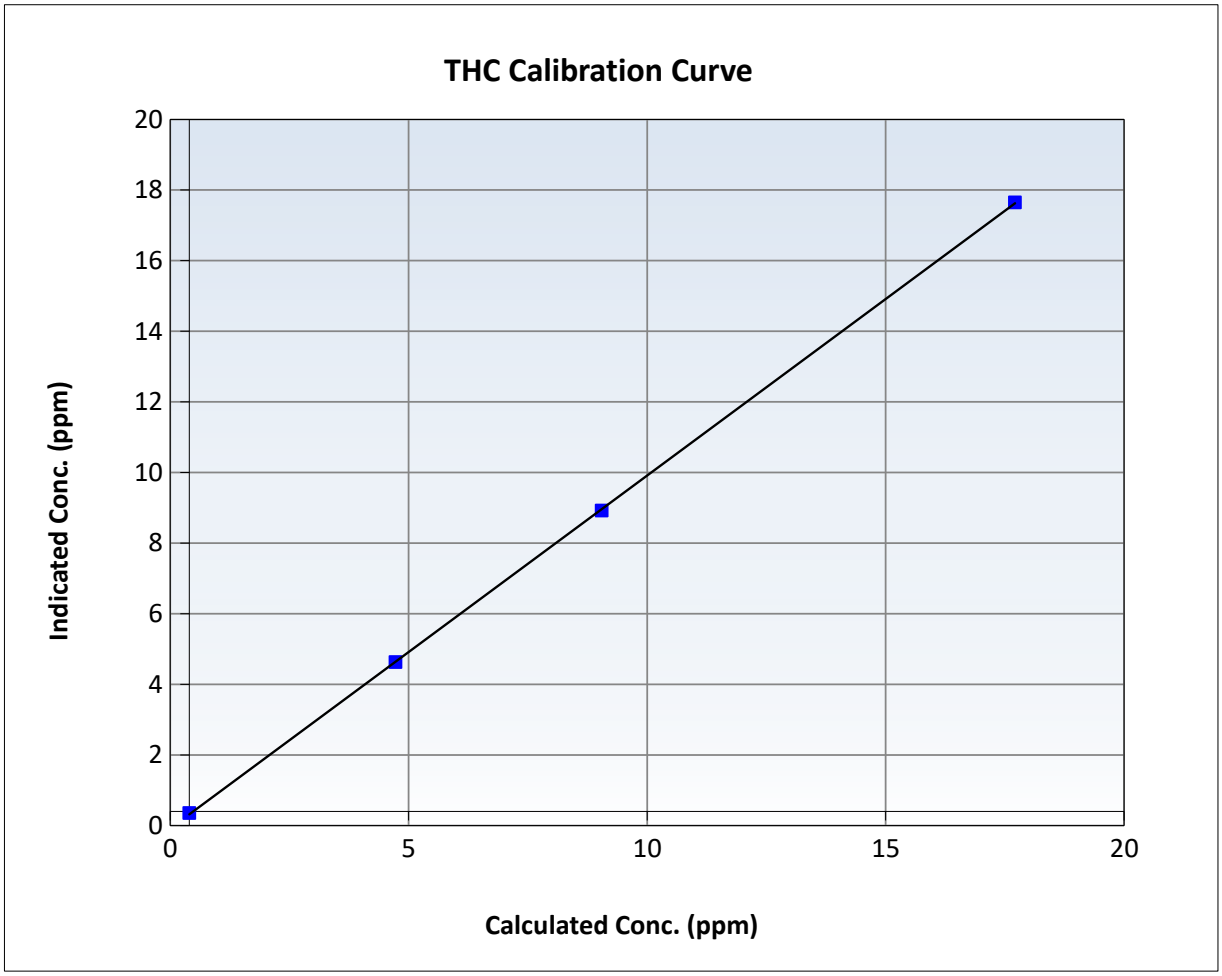
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 15, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	10:10	End Time (MST):	12:59
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

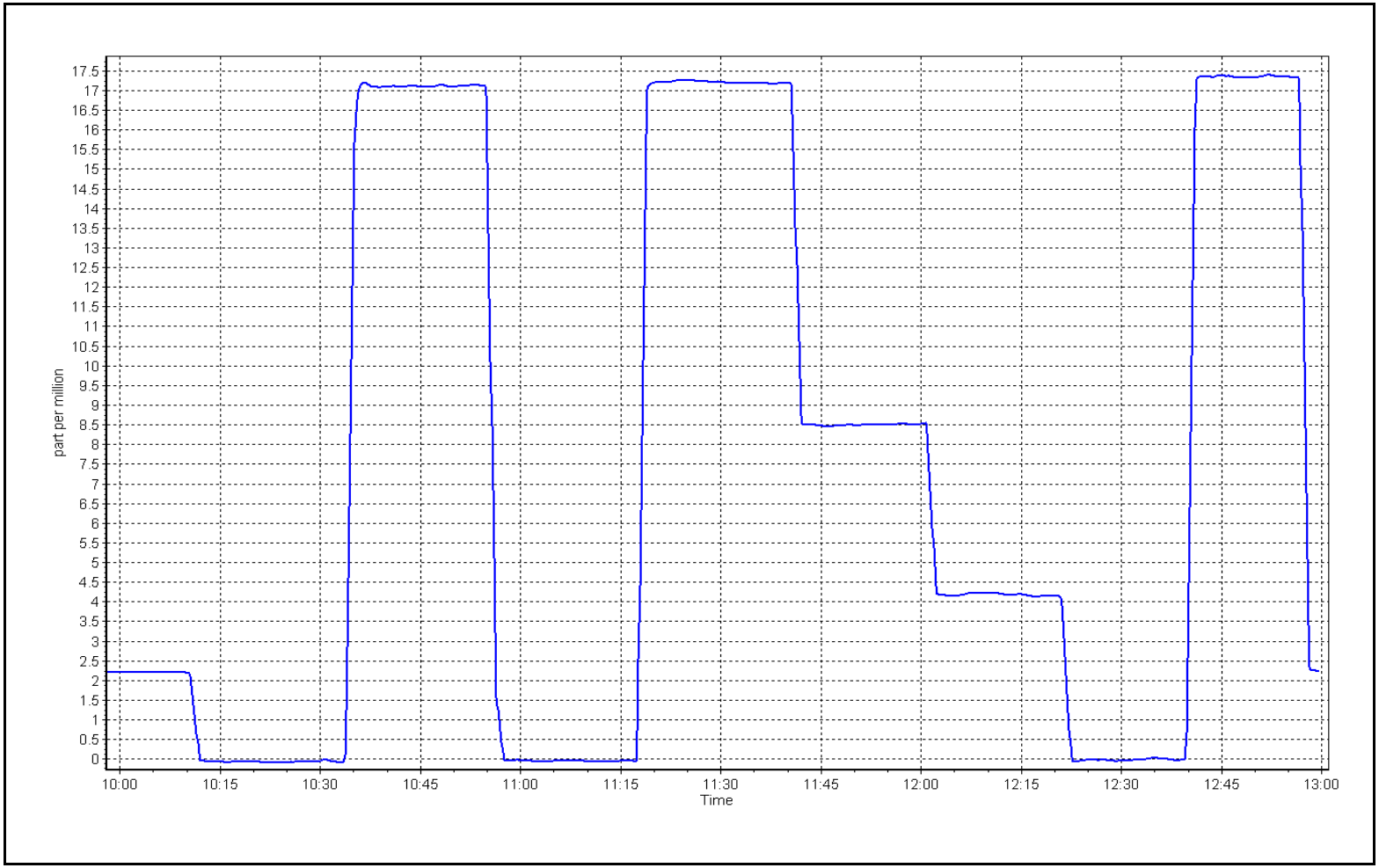
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.05	----
17.31	17.25	1.0037
8.65	8.52	1.0148
4.32	4.23	1.0232

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	0.999669	*0.90 - 1.10*
Intercept	-0.082263	*+/-1.5*



THC Calibration Plot Date: November 7, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Surmont 2
Station number:	AMS 29
Calibration Date:	November 19, 2024
Last Cal Date:	October 22, 2024
Start time (MST):	11:10
End time (MST):	16:50
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T12YYFE	Cal Gas Expiry Date:	October 30, 2024
NOX Cal Gas Conc:	47.46 ppm	NO Cal Gas Conc:	47.46 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	47.46 ppm	Removed Gas NO Conc:	47.46 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5472
ZAG make/model:	Teledyne API T701	Serial Number:	4698

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
AF High point	4916	84.3	800.1	800.1	0.0	797.5	794.7	2.8	1.0030	1.0066
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 799.1 ppb	NO = 799.4 ppb
Baseline Corr 1st pt	NO_X = 797.7 ppb	NO = 794.9 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = -0.2%
As found	NO r^2:	*Percent Change	NO = -0.6%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1170050148

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.630	1.639	NO bkgnd or offset:	1.4	1.4
NOX coeff or slope:	0.994	0.994	NOX bkgnd or offset:	1.5	1.5
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	190.7	194.1

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.999522	1.001911
NO_X Cal Offset:	-0.652076	-1.012618
NO Cal Slope:	1.000937	1.004112
NO Cal Offset:	-1.471932	-2.432496
NO_2 Cal Slope:	1.001153	1.002053
NO_2 Cal Offset:	-0.322528	-0.296979

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
High point	4916	84.2	799.2	799.2	0.0	799.8	801.0	-1.6	0.9992	0.9977
Mid point	4958	42.1	399.6	399.6	0.0	400.0	398.3	1.7	0.9990	1.0033
Low point	4979	21.1	200.3	200.3	0.0	198.0	195.9	2.1	1.0115	1.0223
As left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
As left span	4916	84.2	799.2	405.5	393.7	791.5	405.5	386.0	1.0097	1.0000
							Average Correction Factor		1.0033	1.0078

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	794.6	402.8	391.8	392.4	0.9985	100.2%
Mid GPT point	794.6	605.7	188.9	189.0	0.9995	100.1%
Low GPT point	794.6	699.1	95.5	95.0	1.0053	99.5%
				Average Correction Factor	1.0011	99.9%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

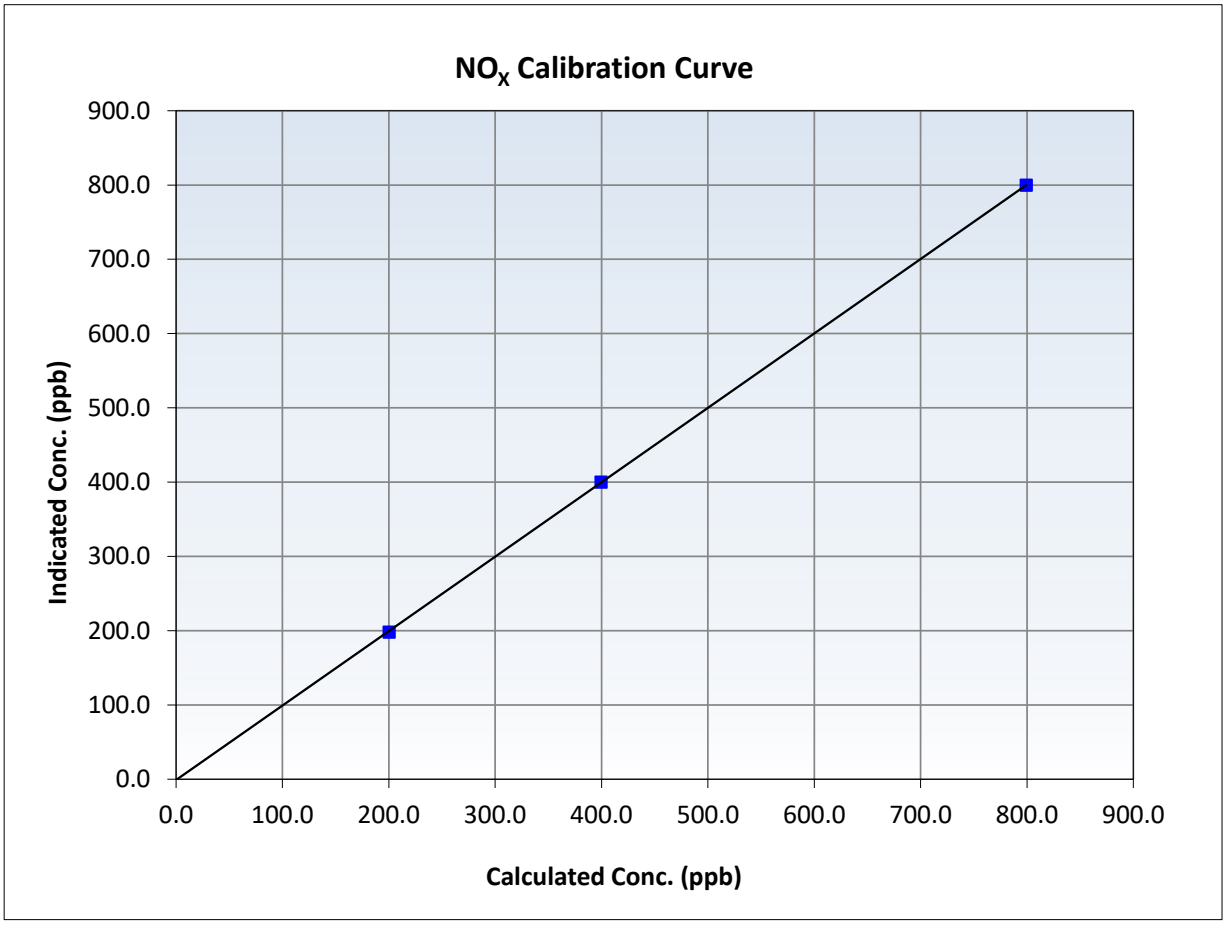
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	11:10	End Time (MST):	16:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.2	799.8	0.9992
399.6	400.0	0.9990
200.3	198.0	1.0115

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999989	*≥0.995*
Slope	1.001911	*0.90 - 1.10*
Intercept	-1.012618	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

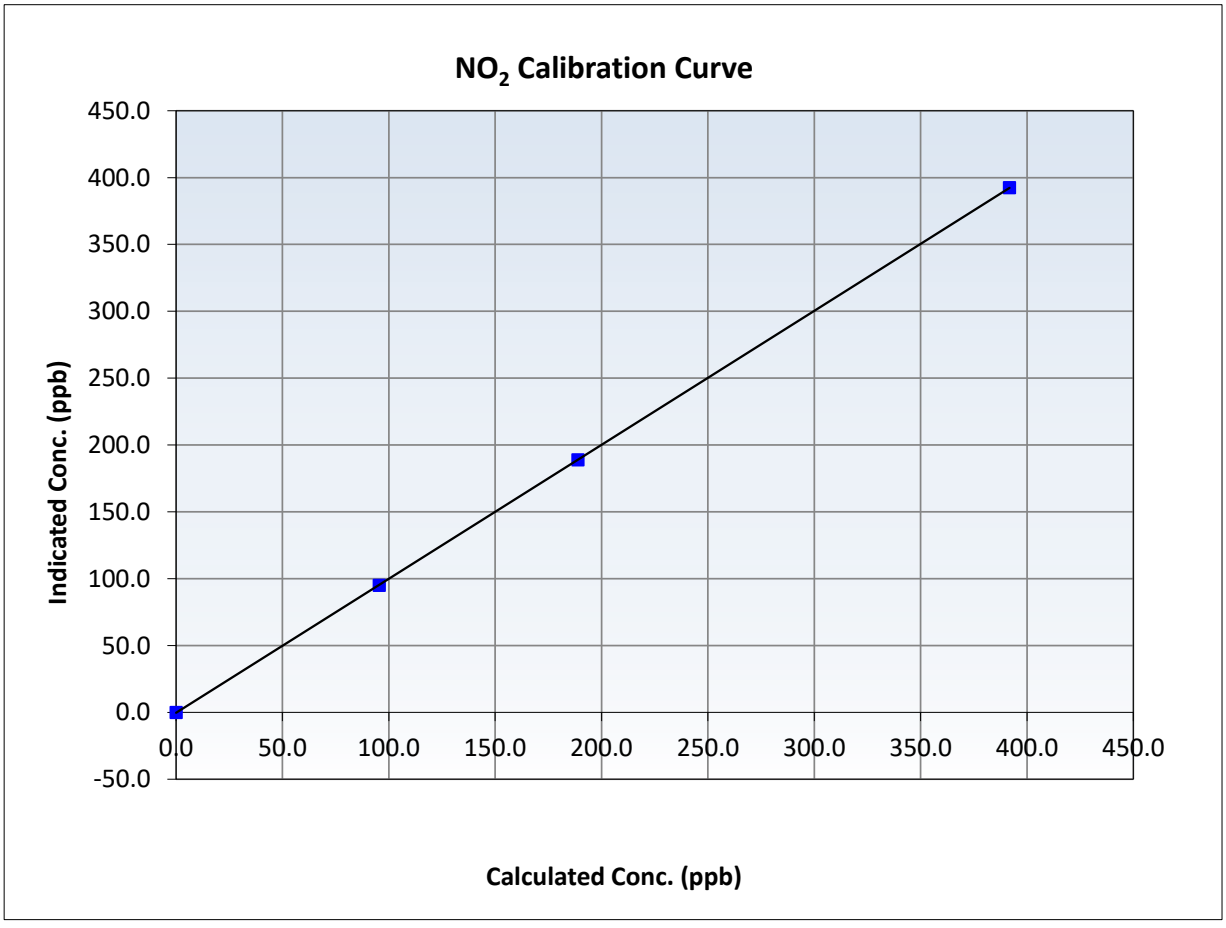
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	11:10	End Time (MST):	16:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
391.8	392.4	0.9985
188.9	189.0	0.9995
95.5	95.0	1.0053

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999997	*≥0.995*
Slope	1.002053	*0.90 - 1.10*
Intercept	-0.296979	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

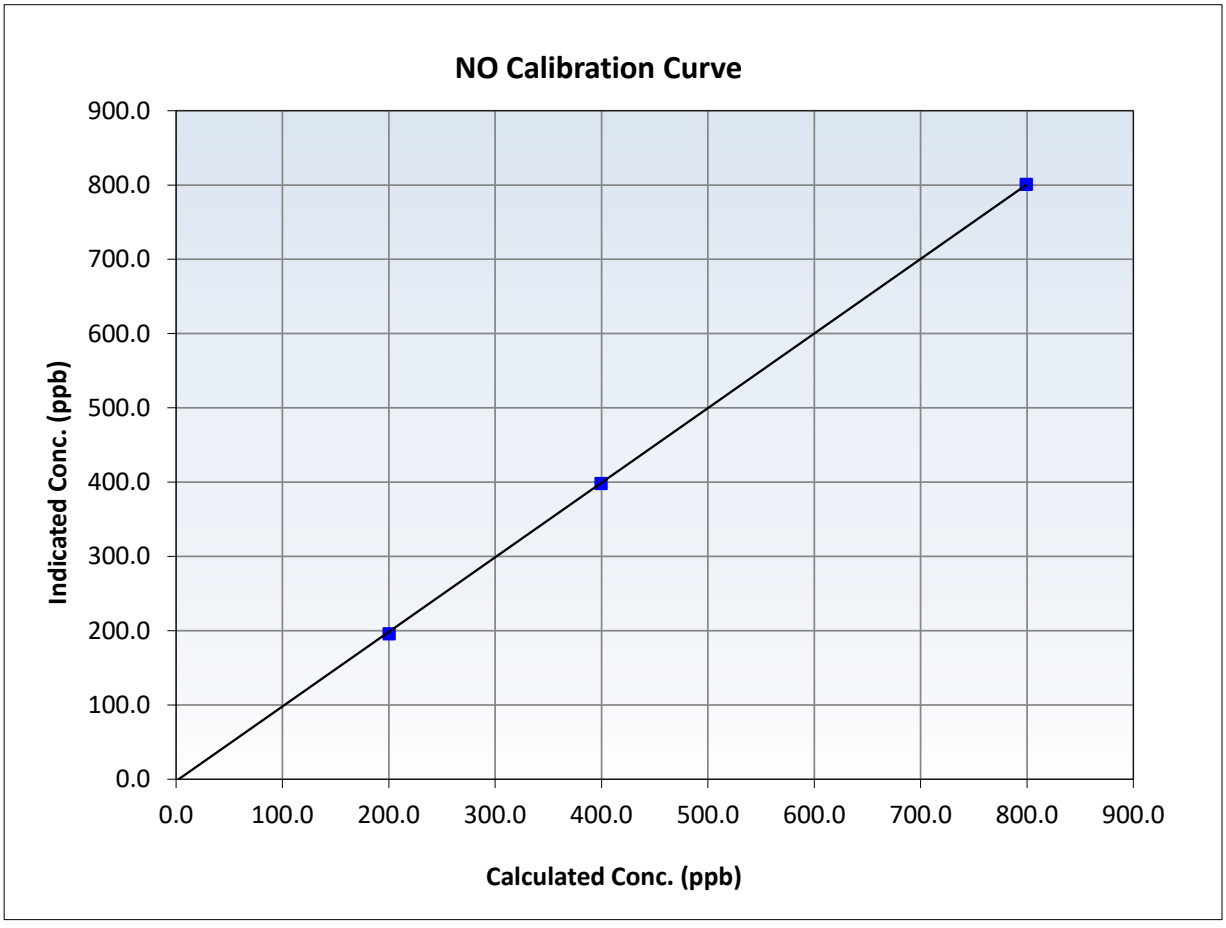
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Surmont 2	Station Number:	AMS 29
Start Time (MST):	11:10	End Time (MST):	16:50
Analyzer make:	Thermo 42i	Analyzer serial #:	1170050148

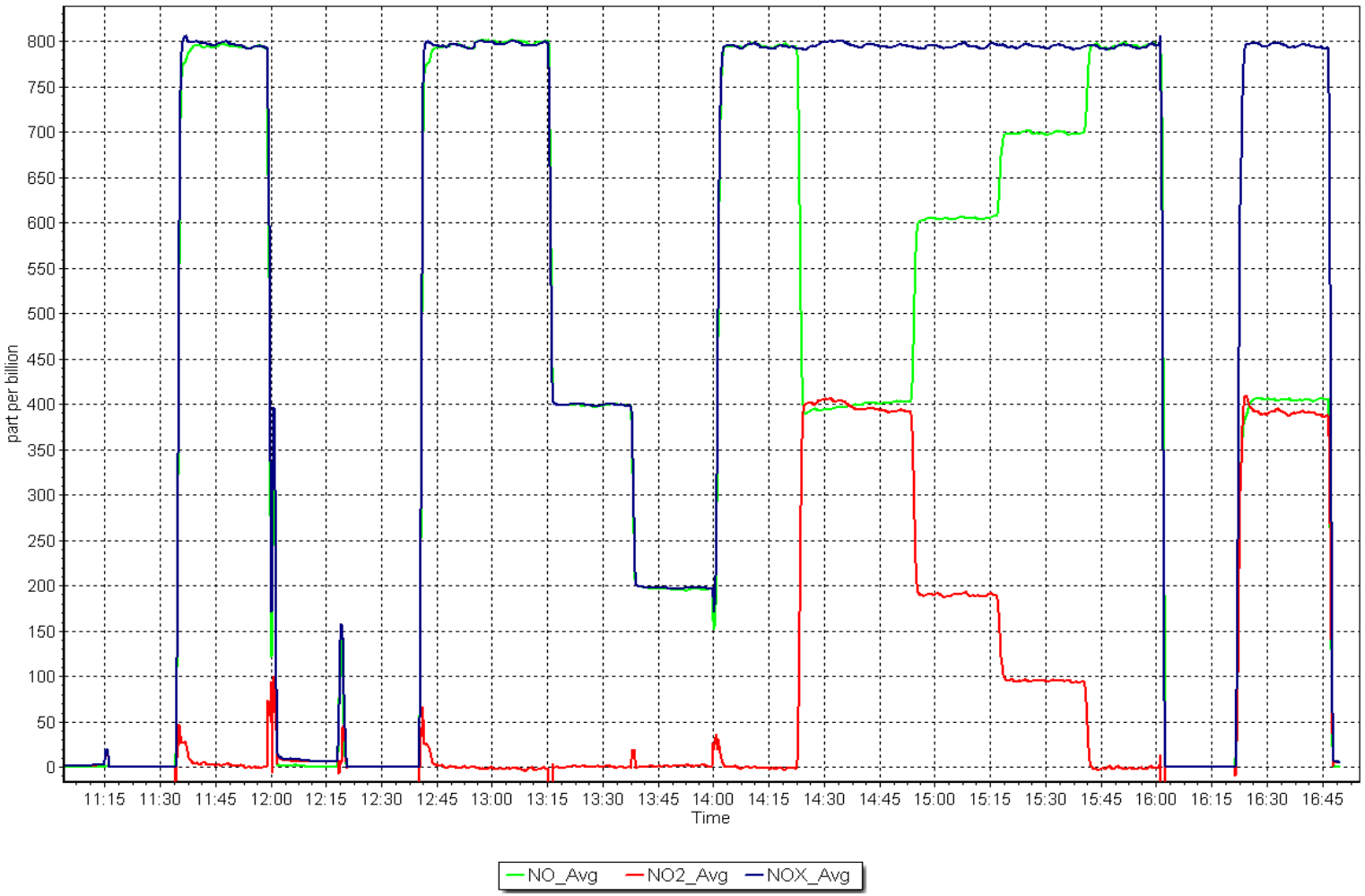
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
799.2	801.0	0.9977
399.6	398.3	1.0033
200.3	195.9	1.0223

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999959	*≥0.995*
Slope	1.004112	*0.90 - 1.10*
Intercept	-2.432496	*+/-20*



NO_X Calibration Plot Date: November 19, 2024 Location: Surmont 2



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Surmont 2	Station number:	AMS 29
Calibration Date:	November 19, 2024	Last Cal Date:	October 31, 2024
Start time (MST):	11:17	End time (MST):	11:49
Analyzer Make:	API T640	S/N:	323
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (°C)	-10.6	-10.58	-10.6	☐	+/- 2 °C
P (mmHg)	720.3	718.82	720.3	☐	+/- 10 mmHg
Flow (LPM)	4.97	4.942	4.97	☐	+/- 0.25 LPM
PW% (pump)	39	-----	39	☐	>80%
Zero Verification	PM w/o HEPA:	3.1	PM w/ HEPA:	0.0	<0.2 ug/m3

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

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

Quarterly Calibration Test

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

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

Date Optical Chamber Cleaned: October 31, 2024

Date Disposable Filter Changed: October 31, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 30, 2024

Date RH/T Sensor Cleaned: October 30, 2024

Notes: Verified temperature, pressure and flow. Leak check passed.

Calibration by: Braiden Boutilier

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS30
ELLS RIVER
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	November 1, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	9:52	End time (MST):	13:10
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	48.75	ppm	Cal Gas Exp Date:	March 10, 2031
Cal Gas Cylinder #:	CC350110			
Removed Cal Gas Conc:	48.75	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	API T700		Serial Number:	3061
Zero Air Gen Model:	API T701H		Serial Number:	358

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1008841397	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001089	1.003404	Backgd or Offset:	9.6	9.7
Calibration intercept:	-2.132048	-2.392023	Coeff or Slope:	0.992	0.992

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4918	82.0	799.5	798.4	1.002
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	798.3	Previous response	798.2	*% change	0.0%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4918	82.0	799.5	801.2	0.998
Mid point	4959	41.0	399.8	397.1	1.007
Low point	4980	20.5	199.9	195.9	1.020
As left zero	5000	0.0	0.0	0.2	----
As left span	4918	82.0	799.5	801.3	0.998
				Average Correction Factor:	1.008

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

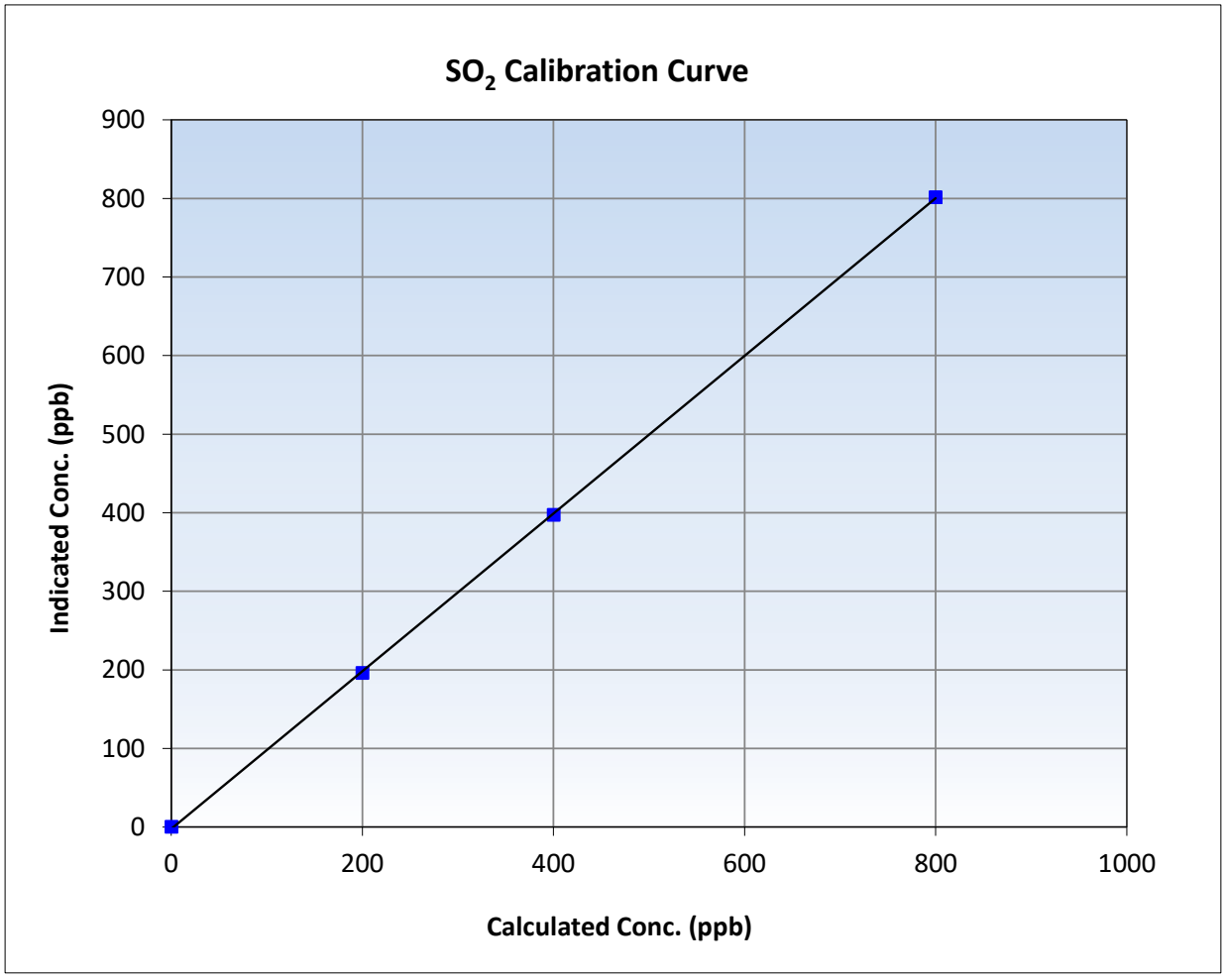
Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 11, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:52	End Time (MST):	13:10
Analyzer make:	Thermo 43i	Analyzer serial #:	1008841397

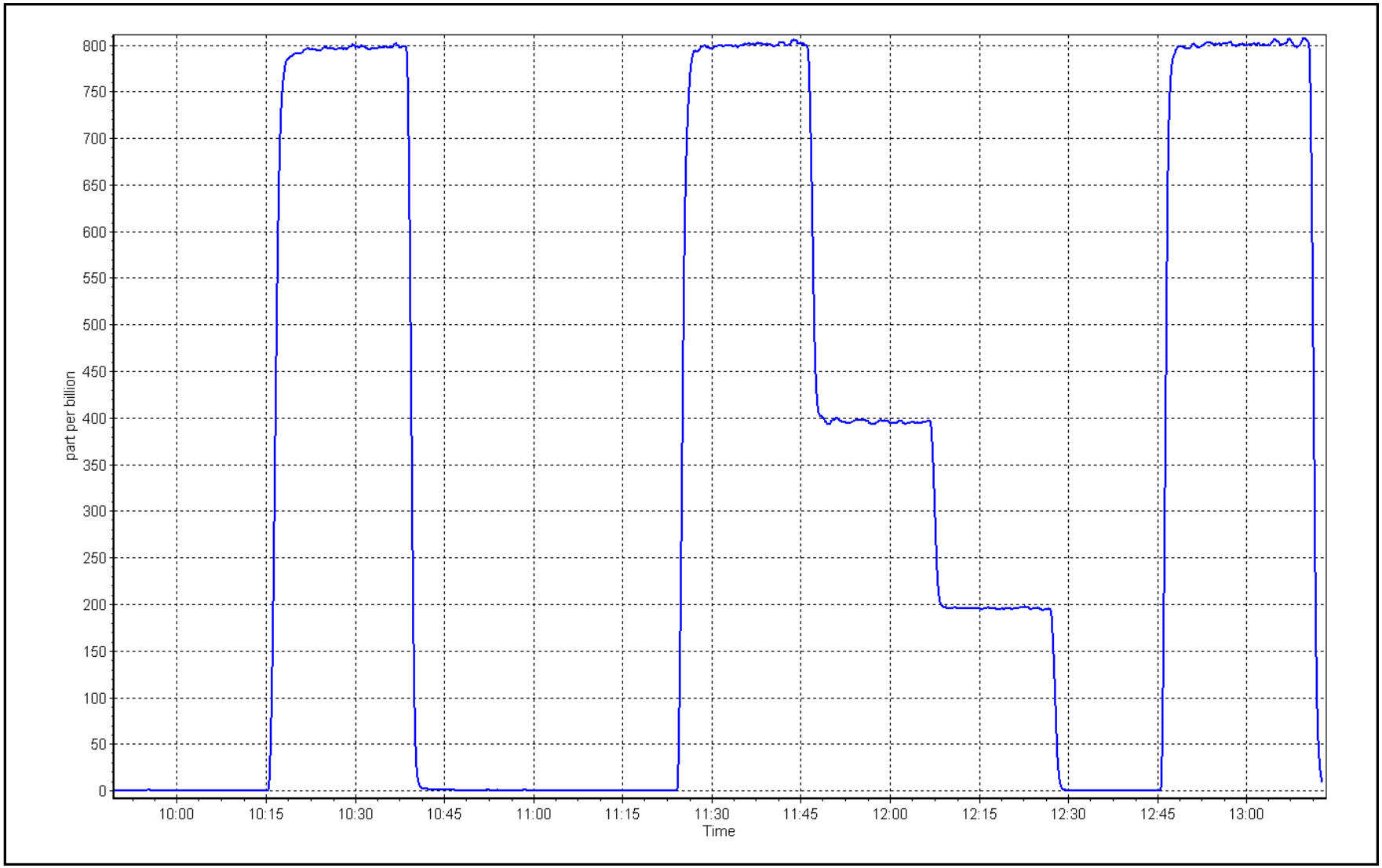
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.5	801.2	0.9979
399.8	397.1	1.0067
199.9	195.9	1.0202

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999955	*≥0.995*
Slope	1.003404	*0.90 - 1.10*
Intercept	-2.392023	*+/-30*



SO2 Calibration Plot Date: November 1, 2024 Location: Ells River



Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	November 4, 2024	Last Cal Date:	October 7, 2024
Start time (MST):	10:55	End time (MST):	15:04
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.99	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	CC505806			
Removed Cal Gas Conc:	4.99	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	3061
ZAG Make/Model:	API T701H		Serial Number:	358

Analyzer Information

Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1410661331	
Converter make:	CDN- 101		Converter serial #:	562	
Analyzer Range	0 - 100 ppb		Converter Temp:	800	degC
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001477	1.008757	Backgd or Offset:	1.7	1.7
Calibration intercept:	-0.080545	-0.060386	Coeff or Slope:	1.094	1.094

TRS As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4920	80.2	80.0	80.3	0.995
As found Mid point	4960	40.1	40.0	39.9	1.000
As found Low point	4980	20.0	20.0	19.7	1.008
New cylinder response					
Baseline Corr As found:	80.4	Prev response:	80.07	*% change:	0.4%
Baseline Corr 2nd AF pt:	40.0	AF Slope:	1.005332	AF Intercept:	-0.240477
Baseline Corr 3rd AF pt:	19.8	AF Correlation:	0.999986	* = > +/-5% change initiates investigation	

TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4920	80.2	80.0	80.7	0.992
Mid point	4960	40.1	40.0	40.3	0.993
Low point	4980	20.0	20.0	20.0	0.998
As left zero	5000	0.0	0.0	0.2	----
As left span	4920	80.2	80.0	80.7	0.992
SO2 Scrubber Check	4921	79.2	792.0	0.0	----
Date of last scrubber change:				Ave Corr Factor	0.994
Date of last converter efficiency test:					

Notes: Change sample inlet filter after multipoint as founds. Sox scrubber check done after calibrator zero and passed. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

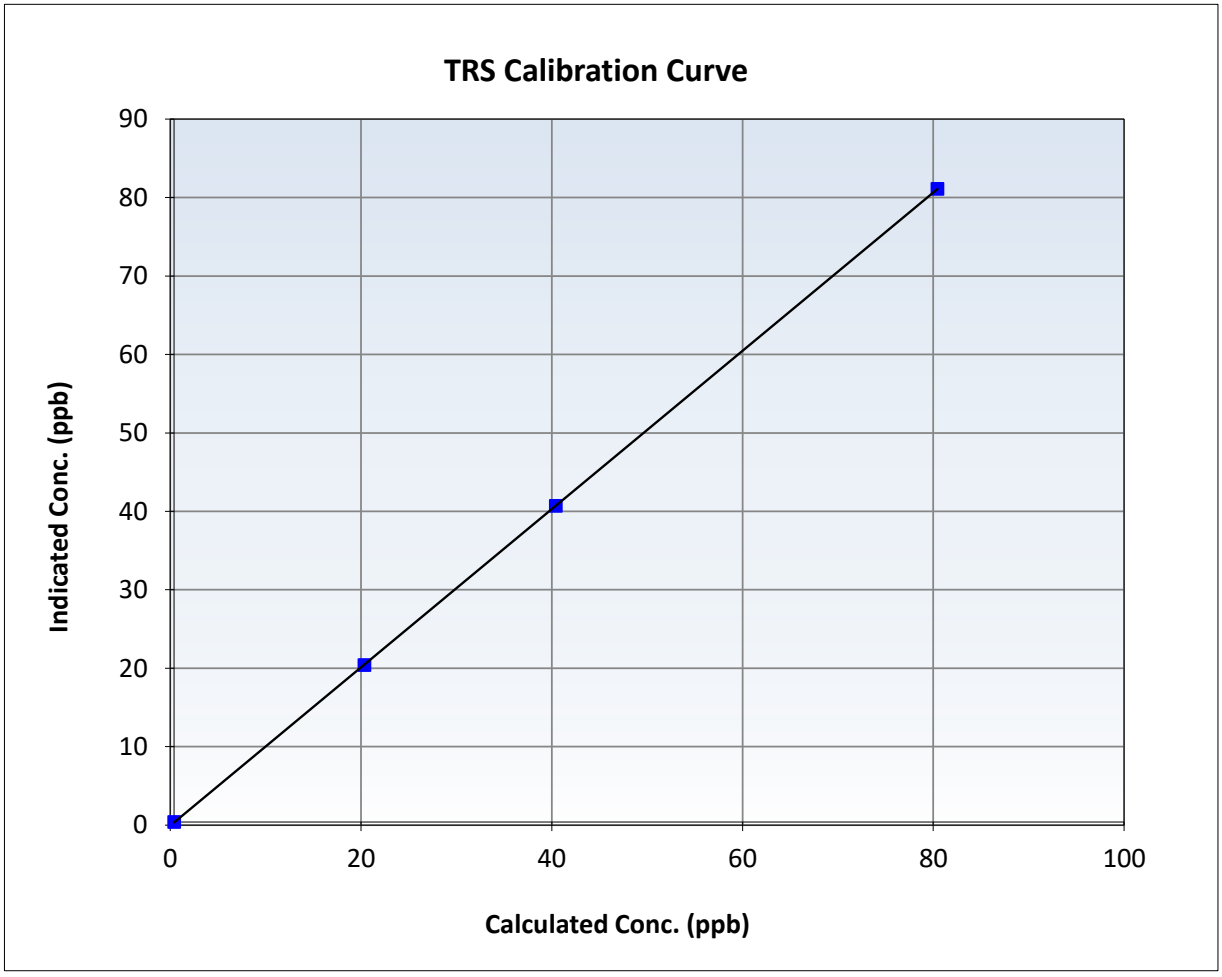
TRS Calibration Summary

Station Information

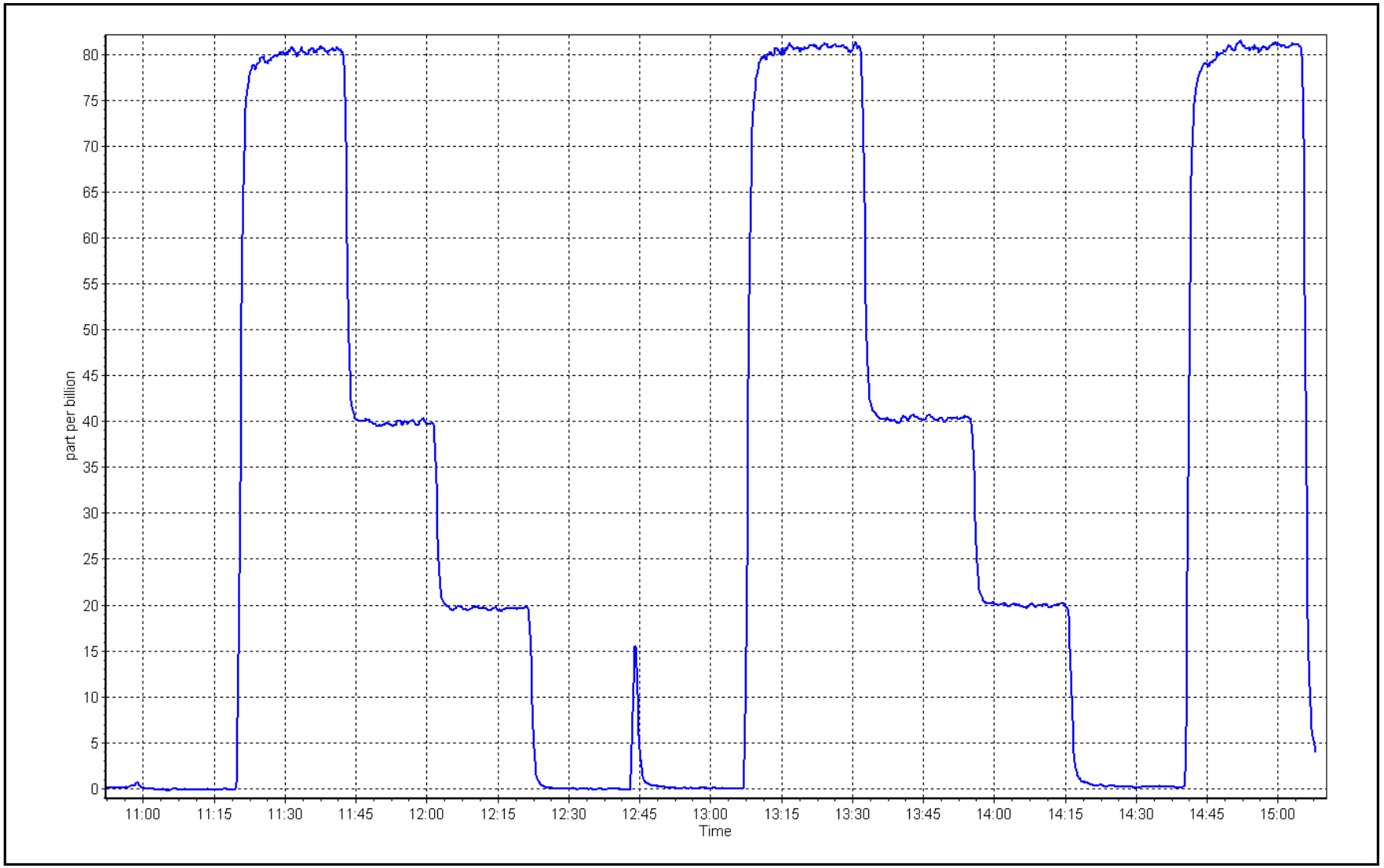
Calibration Date:	November 4, 2024	Previous Calibration:	October 7, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:55	End Time (MST):	15:04
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.0	----	Correlation Coefficient	0.999997	*≥0.995*
80.0	80.7	0.9918	Slope	1.008757	*0.90 - 1.10*
40.0	40.3	0.9930			
20.0	20.0	0.9980	Intercept	-0.060386	*+/-3*



TRS Calibration Plot Date: November 4, 2024 Location: Ells River



Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	November 1, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	9:52	End time (MST):	13:10
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC350110		Cal Gas Expiry Date:	March 10, 2031	
CH4 Cal Gas Conc.	496.6	ppm	CH4 Equiv Conc.	1066.4	ppm
C3H8 Cal Gas Conc.	207.2	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	496.6	ppm	CH4 Equiv Conc.	1066.4	ppm
Removed C3H8 Conc.	207.2	ppm	Diff between cyl (THC):		
Diff between cyl (CH_4):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3061	
Zero Air Gen model:	API T701H		Serial Number:	358	

Analyzer Information

Analyzer make:	Thermo 55i		Analyzer serial #:	1152430011	
THC Range:	0 - 20 ppm		NMHC/CH4 Range:	0 - 10 ppm	
	Start	***Finish***		***Start***	***Finish***
CH4 SP Ratio:	3.12E-04	3.12E-04	NMHC SP Ratio:	5.94E-05	5.94E-05
CH4 Retention time:	17.6	17.6	NMHC Peak Area:	157107	157107
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	82.0	17.49	17.58	0.995
As found Mid point					
As found Low point					
New cylinder response					

Baseline Corr AF:	17.58	Prev response	17.54	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/(Ic-AFzero)) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	82.0	17.49	17.51	0.999
Mid point	4959	41.0	8.74	8.71	1.004
Low point	4980	20.5	4.37	4.31	1.015
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	17.49	17.55	0.996
				Average Correction Factor	1.006

Notes: Sample inlet filter was changed after as founds. Adjusted zero chromatogram only.

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

NMHC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	82.0	9.34	9.40	0.994
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	9.40	Prev response	9.41	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	82.0	9.34	9.36	0.998
Mid point	4959	41.0	4.67	4.68	0.999
Low point	4980	20.5	2.34	2.33	1.002
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	9.34	9.40	0.994
				Average Correction Factor	1.000

CH4 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	0.00	----
As found High point	4918	82.0	8.14	8.18	0.996
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr AF:	8.18	Prev response	8.13	*% change	0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	0.00	----
High point	4918	82.0	8.14	8.15	1.000
Mid point	4959	41.0	4.07	4.03	1.011
Low point	4980	20.5	2.04	1.98	1.030
As left zero	5000	0.0	0.00	0.00	----
As left span	4918	82.0	8.14	8.15	0.999
				Average Correction Factor	1.014

Calibration Statistics

	Start	*Finish*
THC Cal Slope:	1.005243	1.002015
THC Cal Offset:	-0.041425	-0.036226
CH4 Cal Slope:	1.001183	1.002263
CH4 Cal Offset:	-0.026519	-0.033119
NMHC Cal Slope:	1.008793	1.002360
NMHC Cal Offset:	-0.015706	-0.004906

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

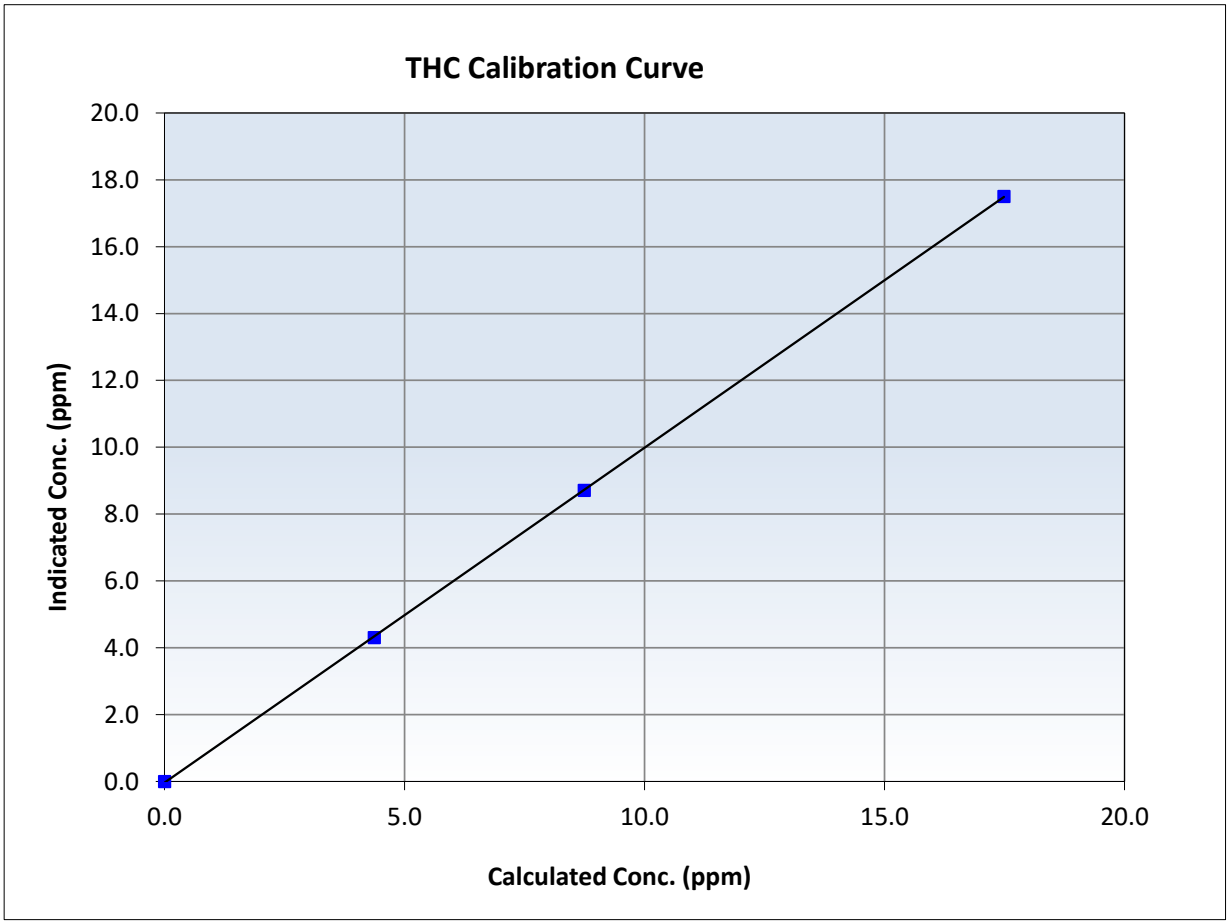
THC Calibration Summary

Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 11, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:52	End Time (MST):	13:10
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	0.999980	*≥0.995*
17.49	17.51	0.9990	Slope	1.002015	*0.90 - 1.10*
8.74	8.71	1.0042	Intercept	-0.036226	*+/-0.5*
4.37	4.31	1.0148			



Wood Buffalo Environmental Association

CH_4 Calibration Summary

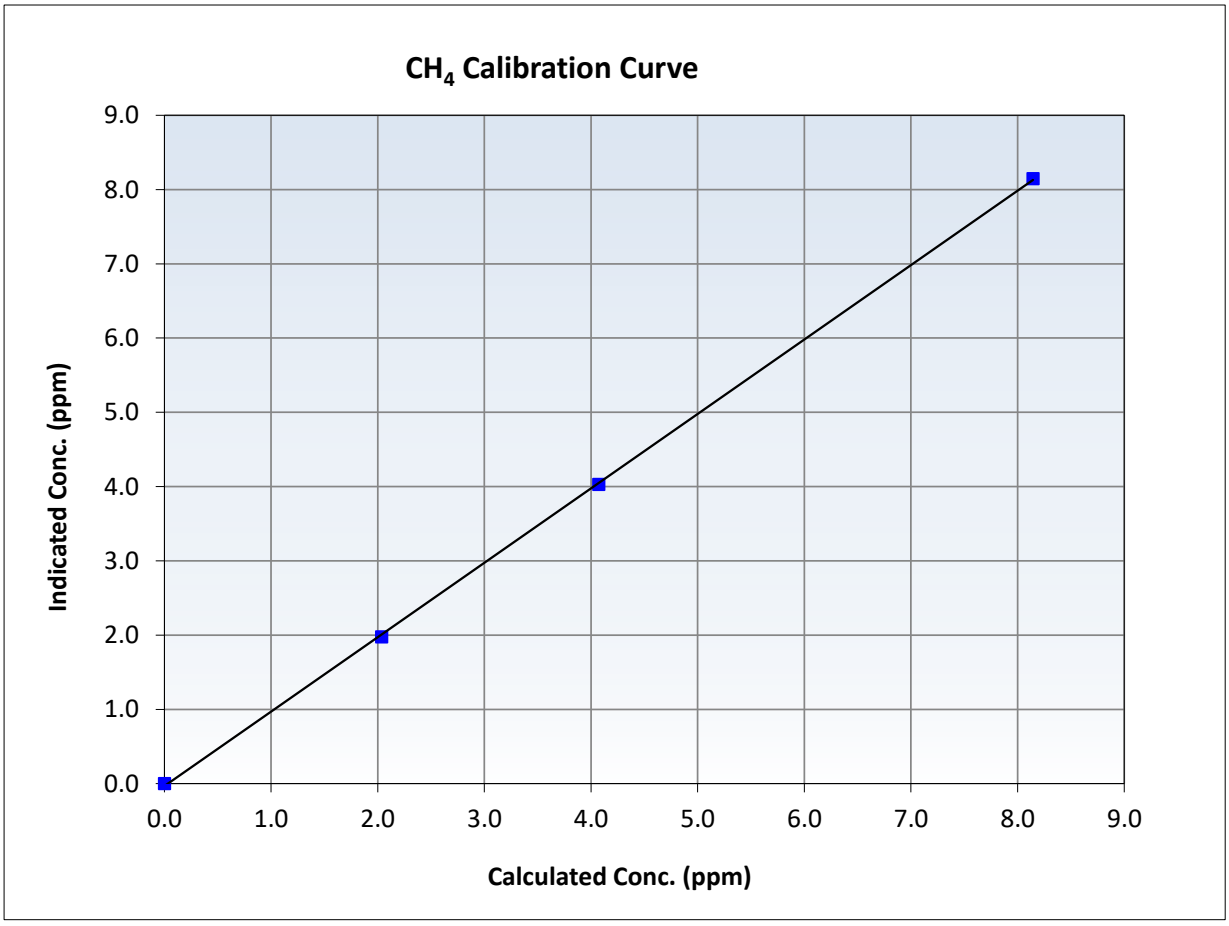
Station Information

Calibration Date:	November 1, 2024	Previous Calibration:	October 11, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:52	End Time (MST):	13:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	0.00	----
8.14	8.15	0.9997
4.07	4.03	1.0107
2.04	1.98	1.0303

Statistical Evaluation		Limits
Correlation Coefficient	0.999924	≥0.995
Slope	1.002263	0.90 - 1.10
Intercept	-0.033119	+/-0.5



Wood Buffalo Environmental Association

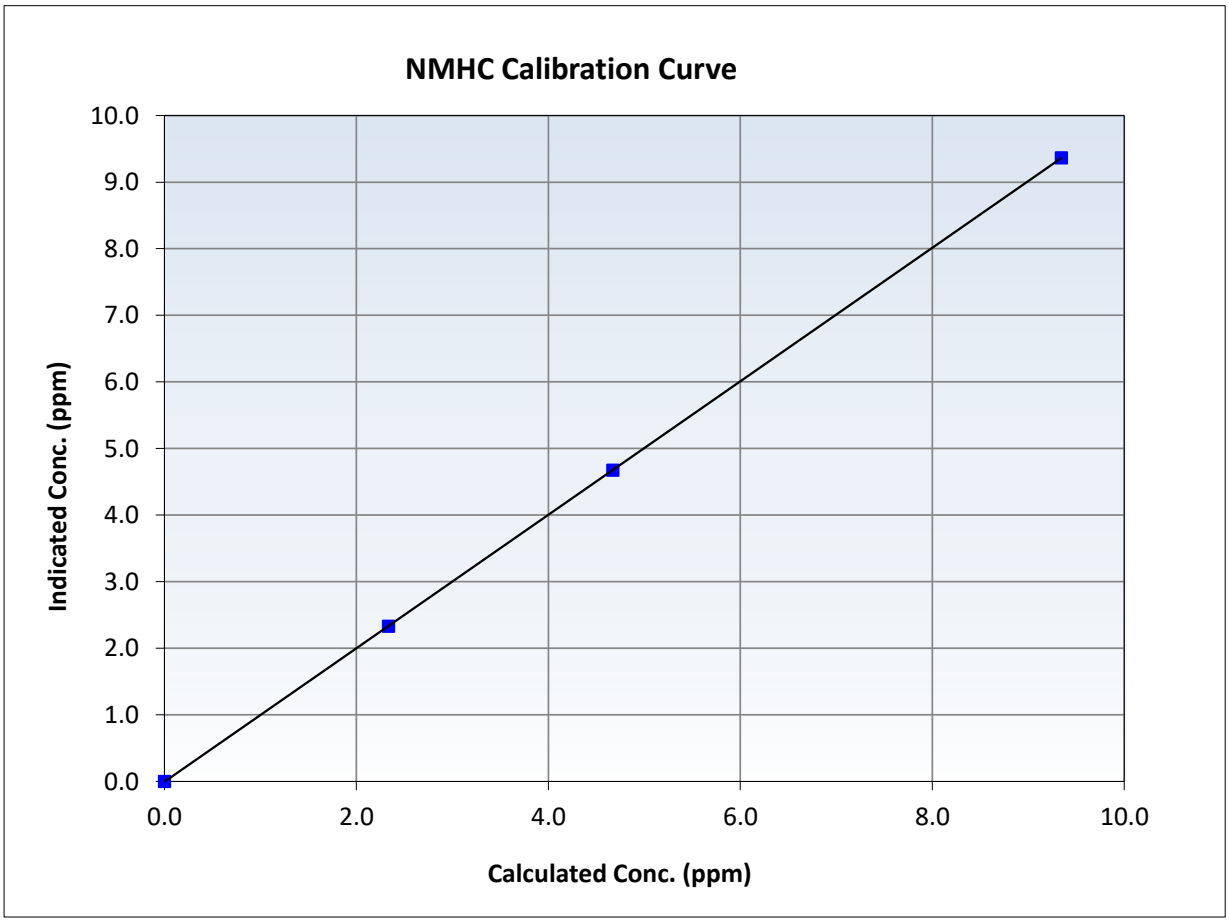
NMHC Calibration Summary

Station Information

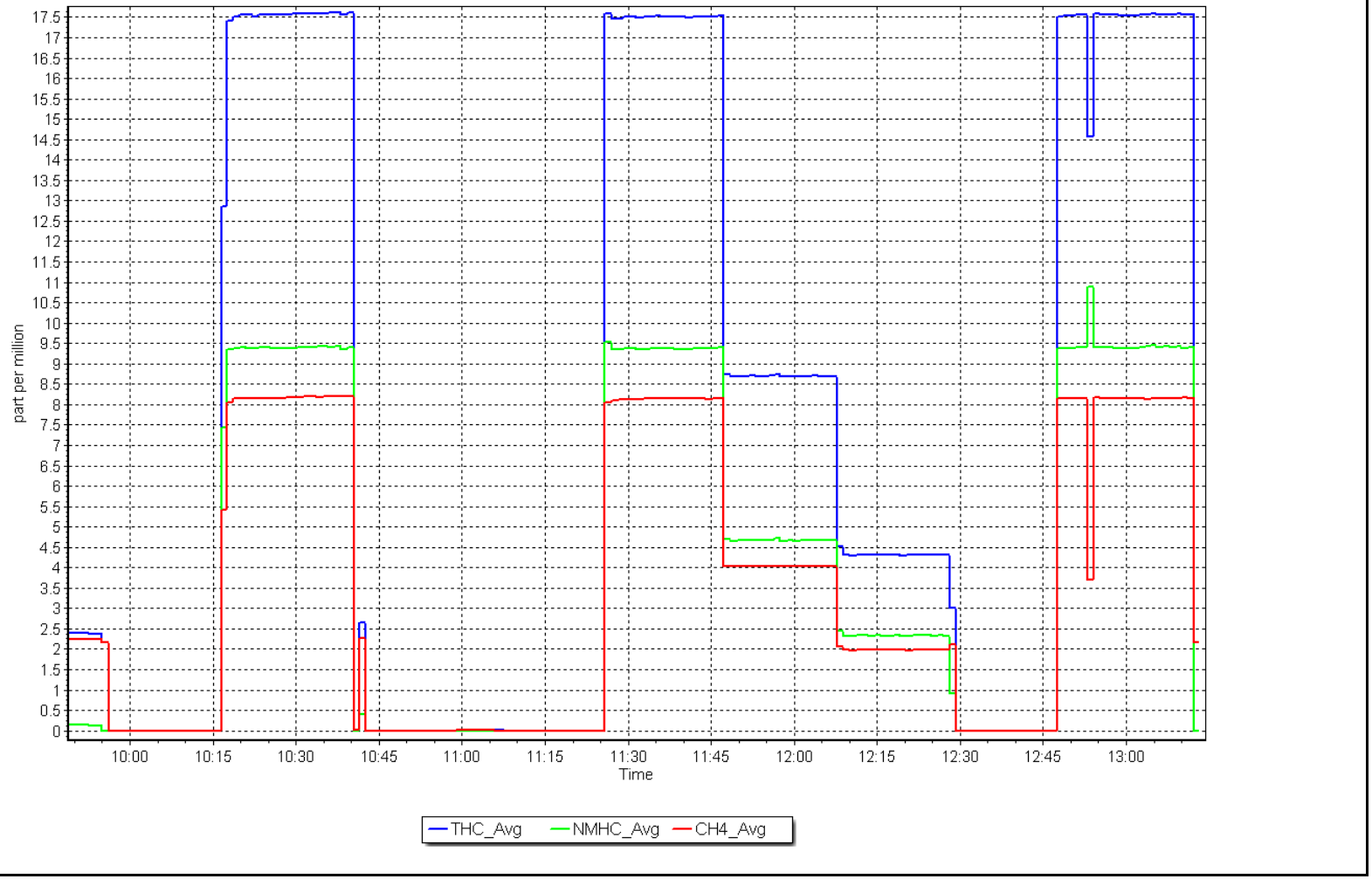
Calibration Date:	November 1, 2024	Previous Calibration:	October 11, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	9:52	End Time (MST):	13:10
Analyzer make:	Thermo 55i	Analyzer serial #:	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.00	0.00	----	Correlation Coefficient	0.999999	*≥0.995*
9.34	9.36	0.9979	Slope	1.002360	*0.90 - 1.10*
4.67	4.68	0.9990	Intercept	-0.004906	*+/-0.5*
2.34	2.33	1.0021			



NMHC Calibration Plot Date: November 1, 2024 Location: Ells River



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Ells River
Station number:	AMS 30
Calibration Date:	November 12, 2024
Last Cal Date:	October 15, 2024
Start time (MST):	10:37
End time (MST):	15:04
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0027487	Cal Gas Expiry Date:	January 9, 2032
NOX Cal Gas Conc:	59.30 ppm	NO Cal Gas Conc:	59.10 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	59.30 ppm	Removed Gas NO Conc:	59.10 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	API T700	Serial Number:	3061
ZAG make/model:	API T701H	Serial Number:	358

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.3	-0.3	----	----
AF High point	4932	67.7	803.0	800.3	2.7	806.6	802.2	4.4	0.9948	0.9972
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 801.9 ppb	NO = 800.2 ppb
Baseline Corr 1st pt	NO_X = 807.2 ppb	NO = 802.5 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

*Percent Change NO_X = 0.7%

*Percent Change NO = 0.3%

As Found Statistics

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

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 710321429

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.130	1.130	NO bkgnd or offset:	13.4	13.4
NOX coeff or slope:	0.992	0.992	NOX bkgnd or offset:	13.7	13.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	194.2	190.6

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.000756	1.000086
NO_X Cal Offset:	-1.638352	-1.078126
NO Cal Slope:	1.002773	1.002943
NO Cal Offset:	-2.259187	-2.018813
NO_2 Cal Slope:	0.998303	1.000104
NO_2 Cal Offset:	-0.976467	-0.123124

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
High point	4932	67.7	803.0	800.3	2.7	802.1	801.2	0.9	1.0011	0.9988
Mid point	4966	33.8	400.9	399.5	1.4	400.2	398.8	1.4	1.0017	1.0018
Low point	4983	16.9	200.4	199.8	0.7	198.1	195.7	2.4	1.0118	1.0208
As left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	----	----
As left span	4932	67.7	803.0	429.1	373.9	804.3	429.1	375.3	0.9983	1.0000
								Average Correction Factor	1.0049	1.0071

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	799.1	425.4	376.4	376.3	1.0003	100.0%
Mid GPT point	799.1	616.7	185.1	185.0	1.0006	99.9%
Low GPT point	799.1	708.1	93.7	93.7	1.0001	100.0%
				Average Correction Factor	1.0003	100.0%

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

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

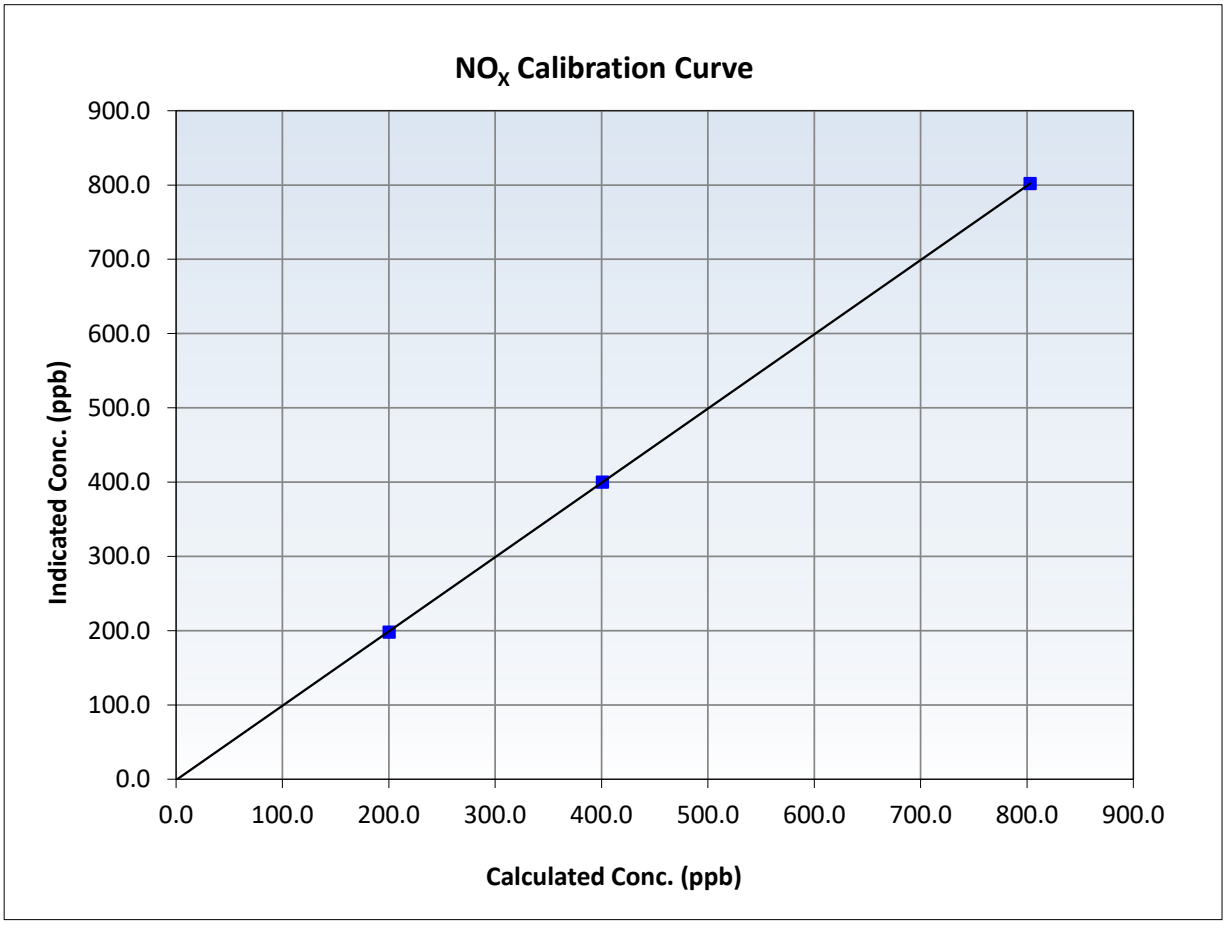
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 15, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:37	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.3	----
803.0	802.1	1.0011
400.9	400.2	1.0017
200.4	198.1	1.0118

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999993	*≥0.995*
Slope	1.000086	*0.90 - 1.10*
Intercept	-1.078126	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

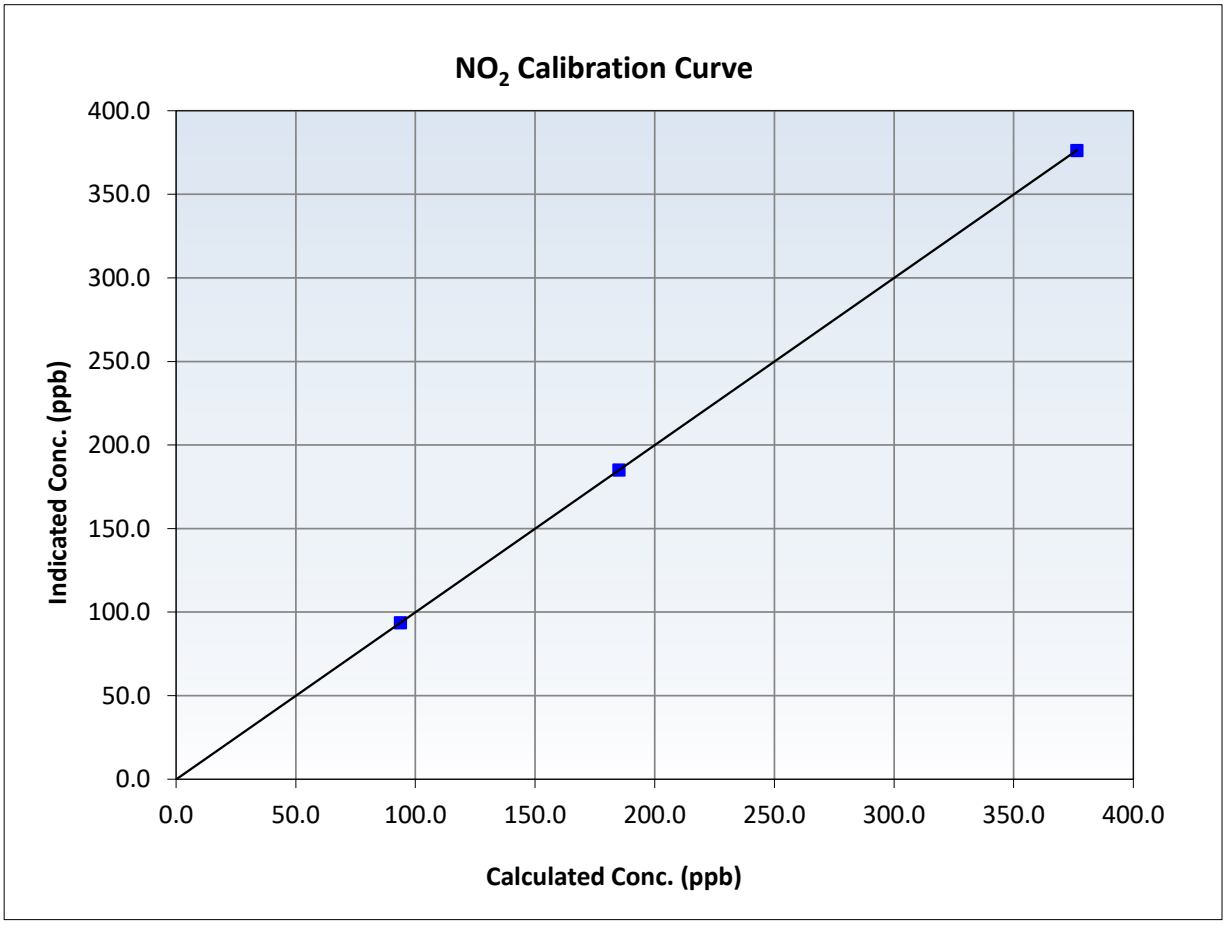
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 15, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:37	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
376.4	376.3	1.0003
185.1	185.0	1.0006
93.7	93.7	1.0001

Statistical Evaluation		*Limits*
Correlation Coefficient	1.000000	*≥0.995*
Slope	1.000104	*0.90 - 1.10*
Intercept	-0.123124	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

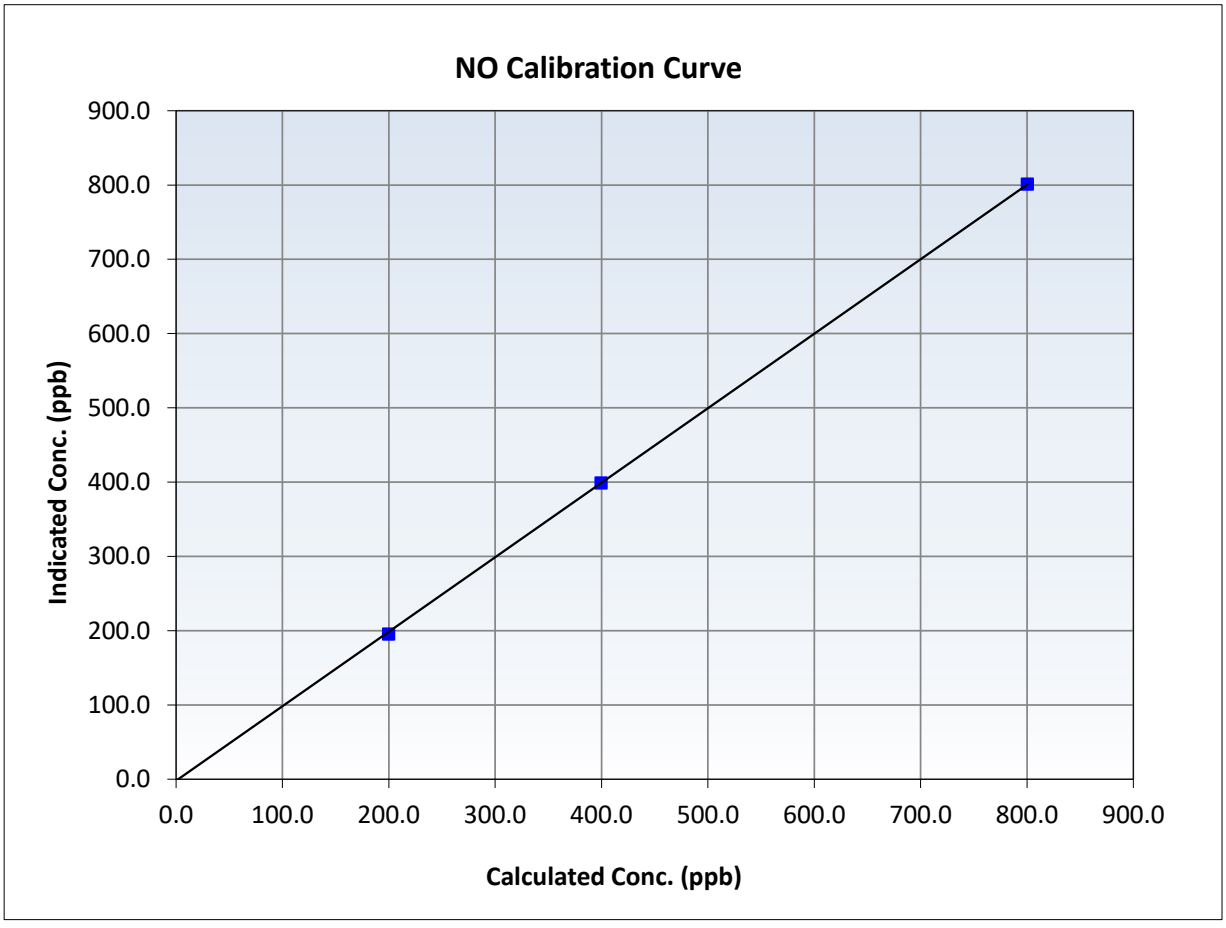
Station Information

Calibration Date:	November 12, 2024	Previous Calibration:	October 15, 2024
Station Name:	Ells River	Station Number:	AMS 30
Start Time (MST):	10:37	End Time (MST):	15:04
Analyzer make:	Thermo 42i	Analyzer serial #:	710321429

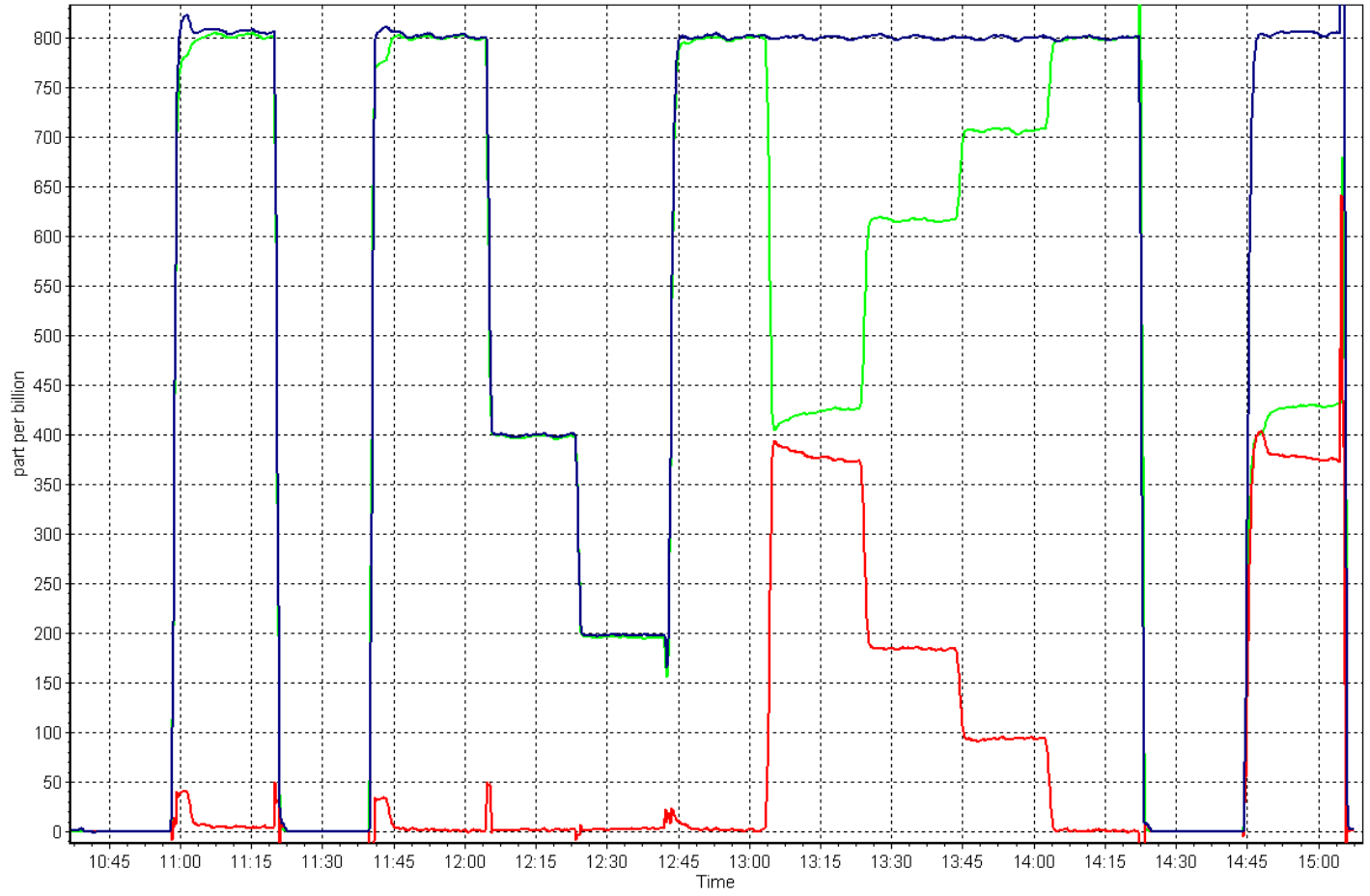
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
800.3	801.2	0.9988
399.5	398.8	1.0018
199.8	195.7	1.0208

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999969	*≥0.995*
Slope	1.002943	*0.90 - 1.10*
Intercept	-2.018813	*+/-20*



NO_X Calibration Plot Date: November 12, 2024 Location: Ells River



Wood Buffalo Environmental Association

T640 $PM_{2.5}$ CALIBRATION

Version-01-2024

Station Information

Station Name:	Ells River	Station number:	AMS 30
Calibration Date:	November 12, 2024	Last Cal Date:	October 11, 2024
Start time (MST):	12:42	End time (MST):	13:00
Analyzer Make:	API T640	S/N:	875
Particulate Fraction:	PM2.5		
Flow Meter Make/Model:	Alicat FP-25BT	S/N:	388754
Temp/RH standard:	Alicat FP-25BT	S/N:	388754

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	*(Limits)*
T (^{o}C)	0.50	0.02	0.50	☐	+/- 2 ^{o}C
P (mmHg)	718.60	720.24	718.60	☐	+/- 10 mmHg
Flow (LPM)	4.98	5.08	4.98	☐	+/- 0.25 LPM
PW% (pump)	34	-----	34	☐	>80%

Zero Verification — PM w/o HEPA: 6.20 — PM w/ HEPA: 0.00 — <0.2 ug/m3

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

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

Quarterly Calibration Test

SPAN DUST — Refractive Index: 10.90 — Expiry Date: September 29, 2024 — Lot No.: 100128-050-040

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

Date Optical Chamber Cleaned: October 11, 2024

Date Disposable Filter Changed: October 11, 2024

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

Annual Maintenance

Date Sample Tube Cleaned: October 27, 2023

Date RH/T Sensor Cleaned: February 23, 2024

Notes: Verified flow, temperature, pump power and pressure No adjustment made. Leak check passed.

Calibration by: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS33
MONDAY CREEK
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Monday Creek	Station number:	AMS 33
Calibration Date:	November 7, 2024	Last Cal Date:	October 23, 2024
Start time (MST):	14:12	End time (MST):	17:37
Reason:	Install		

Calibration Standards

Cal Gas Concentration:	50.62	ppm	Cal Gas Exp Date:	March 10, 2031
Cal Gas Cylinder #:	EB0008522			
Removed Cal Gas Conc:	50.62	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne T750		Serial Number:	281
Zero Air Gen Model:	Teledyne 751H		Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1152430005	
Analyzer Range:	0- 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001596	1.002587	Backgd or Offset:	29.0	29.0
Calibration intercept:	-1.433141	1.445233	Coeff or Slope:	0.977	0.977

SO_2 As Found Data

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

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

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	-0.2	----
High point	4921	79.0	799.8	802.1	0.997
Mid point	4960	39.5	399.9	404.4	0.989
Low point	4980	19.8	200.5	203.3	0.986
As left zero	5000	0.0	0.0	-0.2	----
As left span	4921	79.0	799.8	832.2	0.961
				Average Correction Factor:	0.991

Notes: Install calibrations. Sample inlet filter changed before calibrator zero. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

SO_2 Calibration Summary

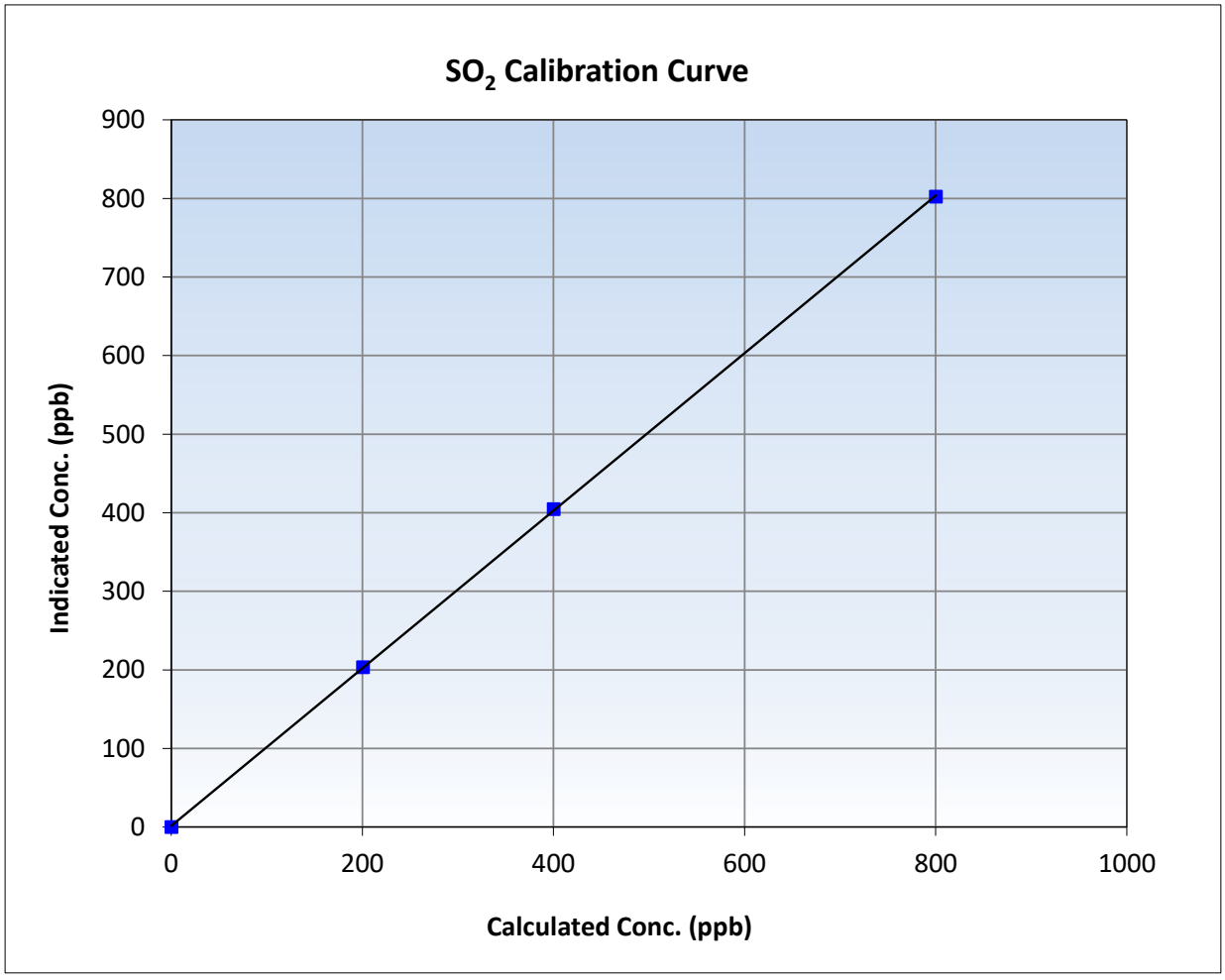
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 23, 2024
Station Name:	Monday Creek	Station Number:	AMS 33
Start Time (MST):	14:12	End Time (MST):	17:37
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430005

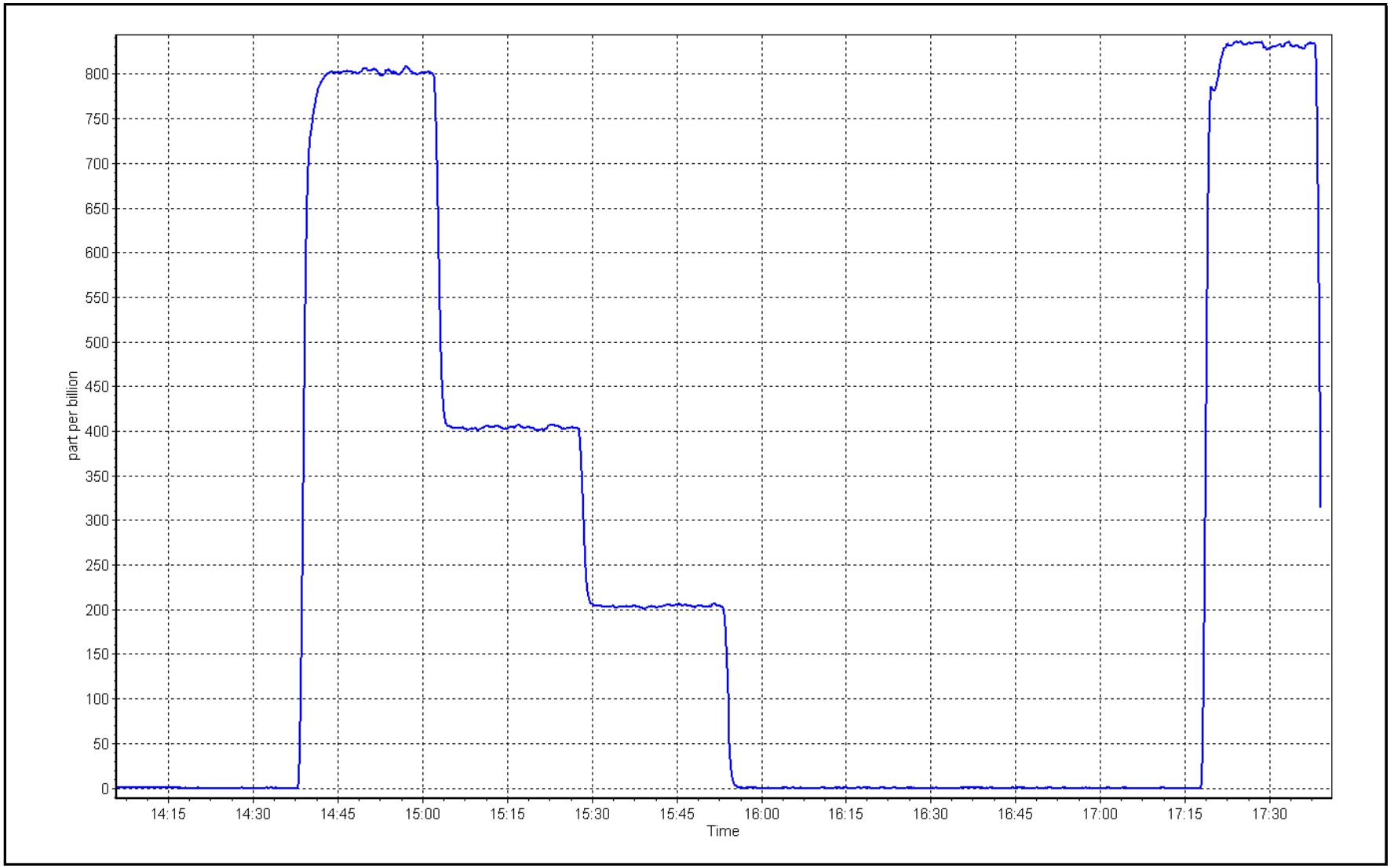
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
799.8	802.1	0.9971
399.9	404.4	0.9890
200.5	203.3	0.9860

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999975	*≥0.995*
Slope	1.002587	*0.90 - 1.10*
Intercept	1.445233	*+/-30*



SO2 Calibration Plot Date: November 7, 2024 Location: Monday Creek



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Monday Creek	Station number:	AMS 33
Calibration Date:	November 7, 2024	Last Cal Date:	October 29, 2024
Start time (MST):	11:49	End time (MST):	14:42
Reason:	Install		

Calibration Standards

Cal Gas Concentration:	5.05	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0014831			
Removed Cal Gas Conc:	5.05	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	Teledyne T750		Serial Number:	281
ZAG Make/Model:	Teledyne T751H		Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 43iQTL		Analyzer serial #:	12333331547
Converter make:	Global 150		Converter serial #:	2022-196
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000426	1.003998	Backgd or Offset:	1.3	1.3
Calibration intercept:	-0.061597	0.138391	Coeff or Slope:	1.063	1.063

H2S As Found Data

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

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

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.2	80.0	80.4	0.995
Mid point	4960	39.6	40.0	40.3	0.993
Low point	4980	19.8	20.0	20.4	0.980
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	82.0	0.975
SO2 Scrubber Check	4921	79.0	790.0	-0.1	----

Date of last scrubber change:	11-Apr-24	Ave Corr Factor	0.989
Date of last converter efficiency test:			

Notes: Install calibrations done. Sample inlet filter changed before calibrator zero. Sox scrubber check done after calibrator zero and passed. No adjustment made.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

H2S Calibration Summary

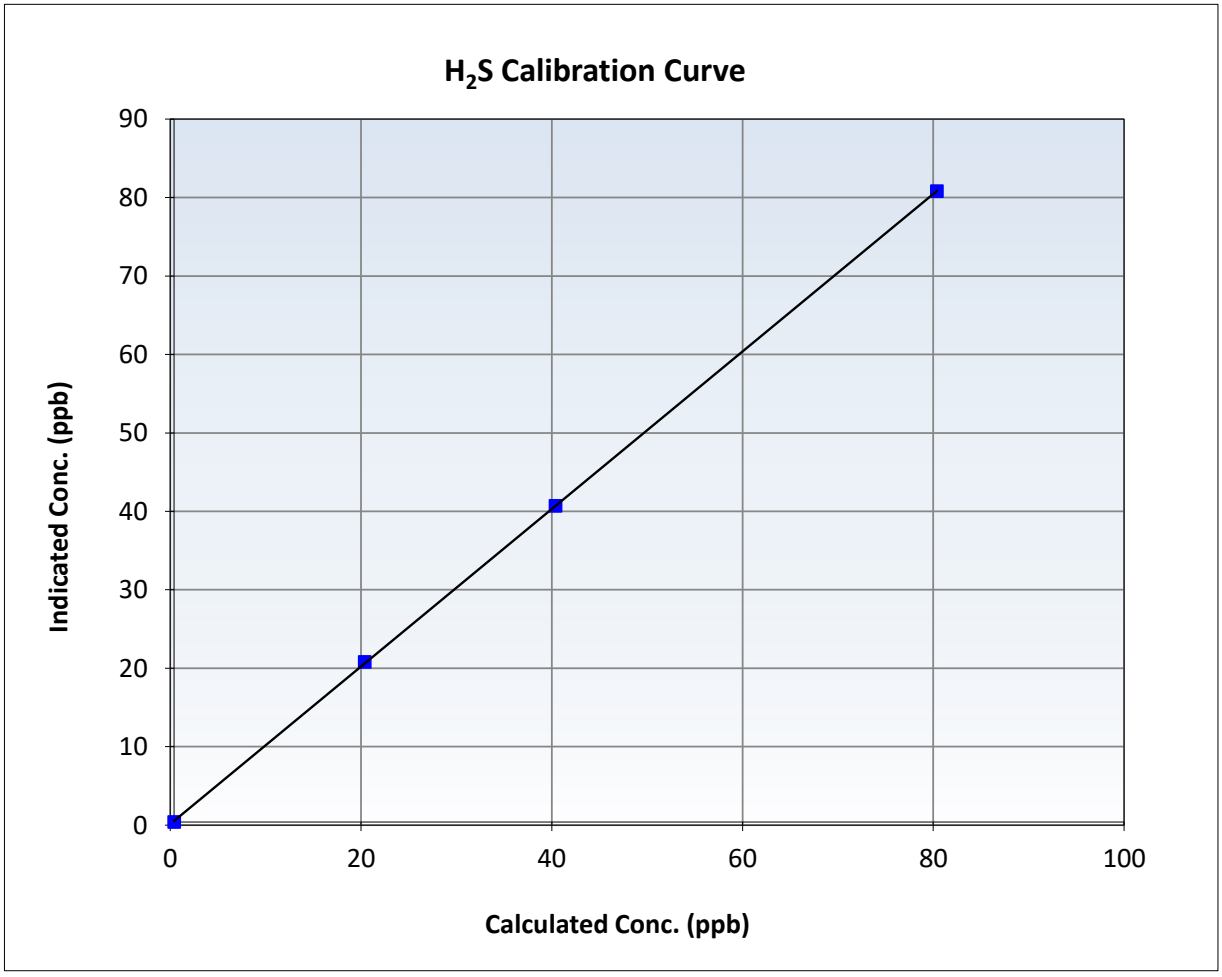
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 29, 2024
Station Name:	Monday Creek	Station Number:	AMS 33
Start Time (MST):	11:49	End Time (MST):	14:42
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	12333331547

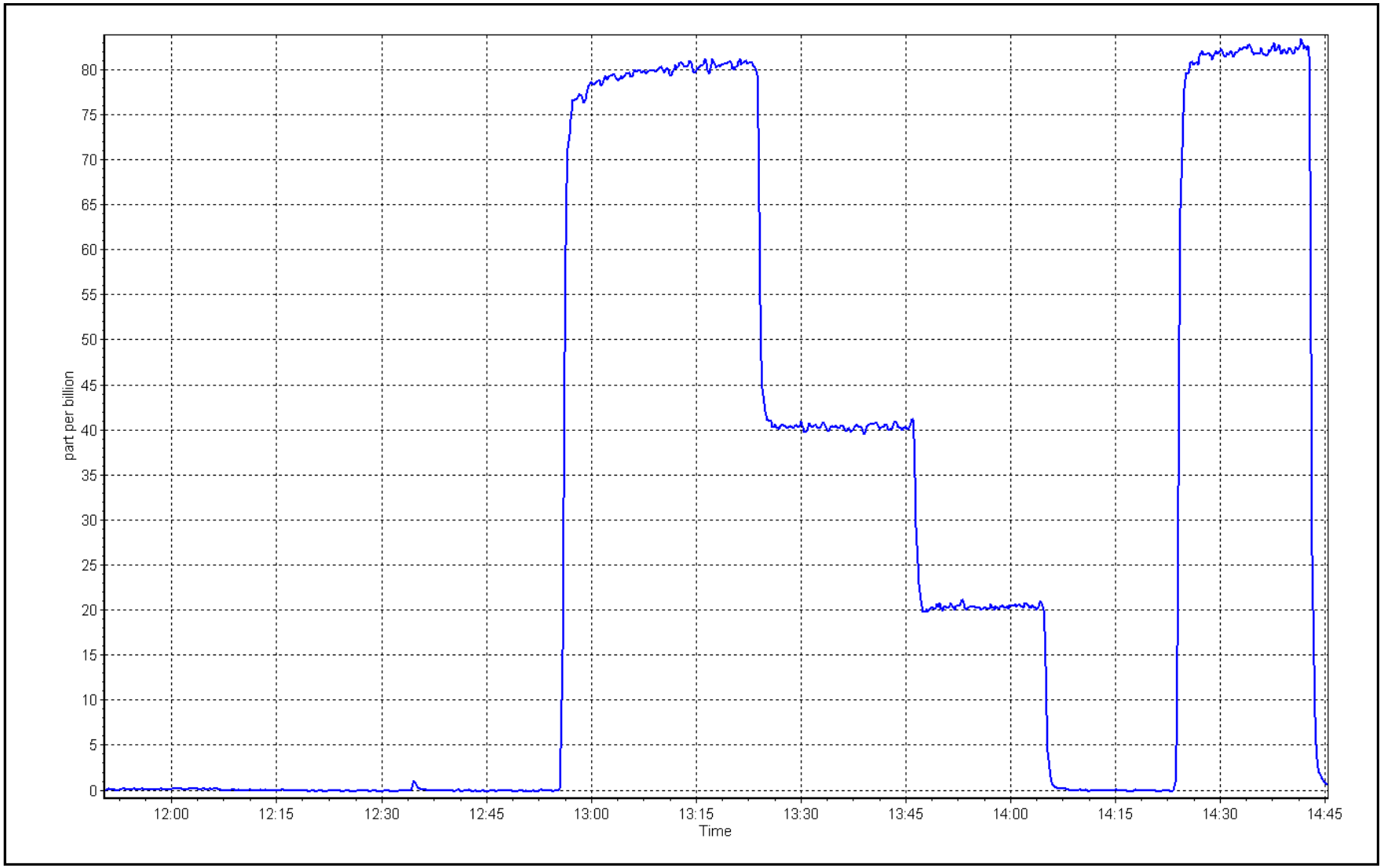
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	80.4	0.9949
40.0	40.3	0.9925
20.0	20.4	0.9803

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999984	*≥0.995*
Slope	1.003998	*0.90 - 1.10*
Intercept	0.138391	*+/-3*



H2S Calibration Plot Date: November 7, 2024 Location: Monday Creek



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Monday Creek
Station number:	AMS 33
Calibration Date:	November 7, 2024
Last Cal Date:	October 24, 2024
Start time (MST):	12:02
End time (MST):	17:02
Reason:	Install

Calibration Standards

NO Gas Cylinder #:	CC755290	Cal Gas Expiry Date:	January 3, 2031
NOX Cal Gas Conc:	48.90 ppm	NO Cal Gas Conc:	48.70 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	48.90 ppm	Removed Gas NO Conc:	48.70 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5258
ZAG make/model:	Teledyne API T701H	Serial Number:	832

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero										
AF High point										
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = NA	ppb	NO = NA	ppb	* = > +/-5% change initiates investigation	*Percent Change	NO_X =	NA
Baseline Corr 1st pt	NO_X = NA	ppb	NO = NA	ppb	As Found Statistics	*Percent Change	NO =	NA
Baseline Corr 2nd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA	ppb	NO = NA	ppb	As found NO r^2:	NO Sl:	NO Int:	
					As found NO_2 r^2:	NO2 Sl:	NO_2 Int:	

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1173480006

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.335	1.315	NO bkgnd or offset:	2.6	2.5
NOX coeff or slope:	0.991	0.984	NOX bkgnd or offset:	2.7	4.1
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	161.6	161.7

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	0.996839	0.997620
NO_X Cal Offset:	-1.009816	-1.409395
NO Cal Slope:	0.997503	1.004775
NO Cal Offset:	-1.709874	-1.729194
NO_2 Cal Slope:	0.998084	0.995663
NO_2 Cal Offset:	-0.051063	-1.104038

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
High point	4918	82.1	802.9	799.6	3.3	800.3	802.8	-2.6	1.0033	0.9961
Mid point	4959	41.1	401.9	400.3	1.6	398.7	399.0	-0.3	1.0082	1.0033
Low point	4979	20.5	200.5	199.7	0.8	197.6	197.6	0.1	1.0147	1.0106
As left zero	5000	0.0	0.0	0.0	0.0	-0.9	0.3	-1.2	----	----
As left span	4918	82.1	802.9	383.4	419.5	791.4	383.4	408.1	1.0146	1.0000
								Average Correction Factor	1.0087	1.0033

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.2	----	----
High GPT point	787.0	381.9	408.4	405.6	1.0069	99.3%
Mid GPT point	787.0	580.1	210.2	208.8	1.0066	99.3%
Low GPT point	787.0	685.8	104.5	101.3	1.0314	97.0%
				Average Correction Factor	1.0150	98.5%

Notes: Install calibrations done. Pump and sample inlet filter changed before calibrator zero. Adjusted zero and span. Used 2nd NO reference point because of drift.

Calibration Performed By: Jan Castro

Wood Buffalo Environmental Association

NO_X Calibration Summary

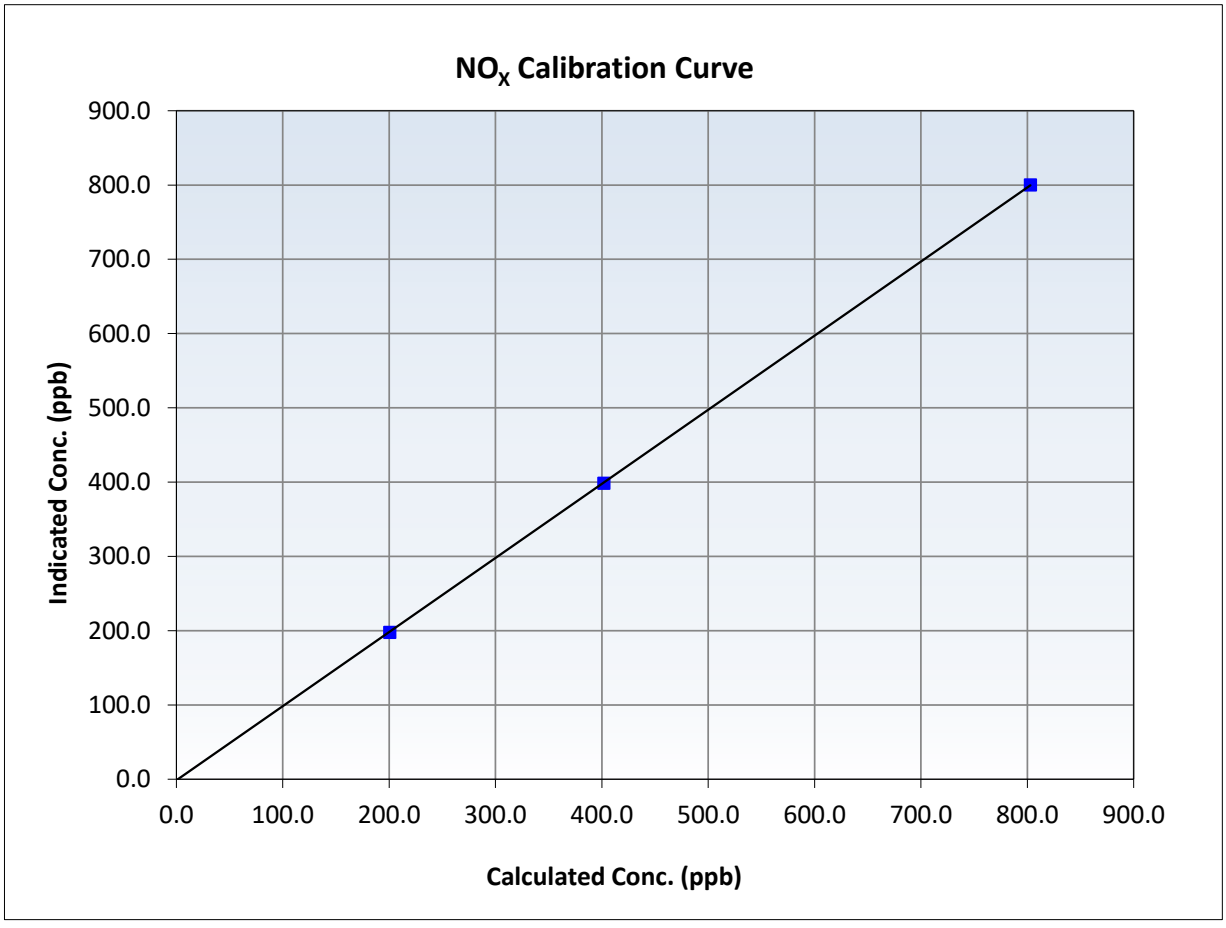
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 24, 2024
Station Name:	Monday Creek	Station Number:	AMS 33
Start Time (MST):	12:02	End Time (MST):	17:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
802.9	800.3	1.0033
401.9	398.7	1.0082
200.5	197.6	1.0147

Statistical Evaluation		Limits
Correlation Coefficient	0.999989	≥0.995
Slope	0.997620	0.90 - 1.10
Intercept	-1.409395	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

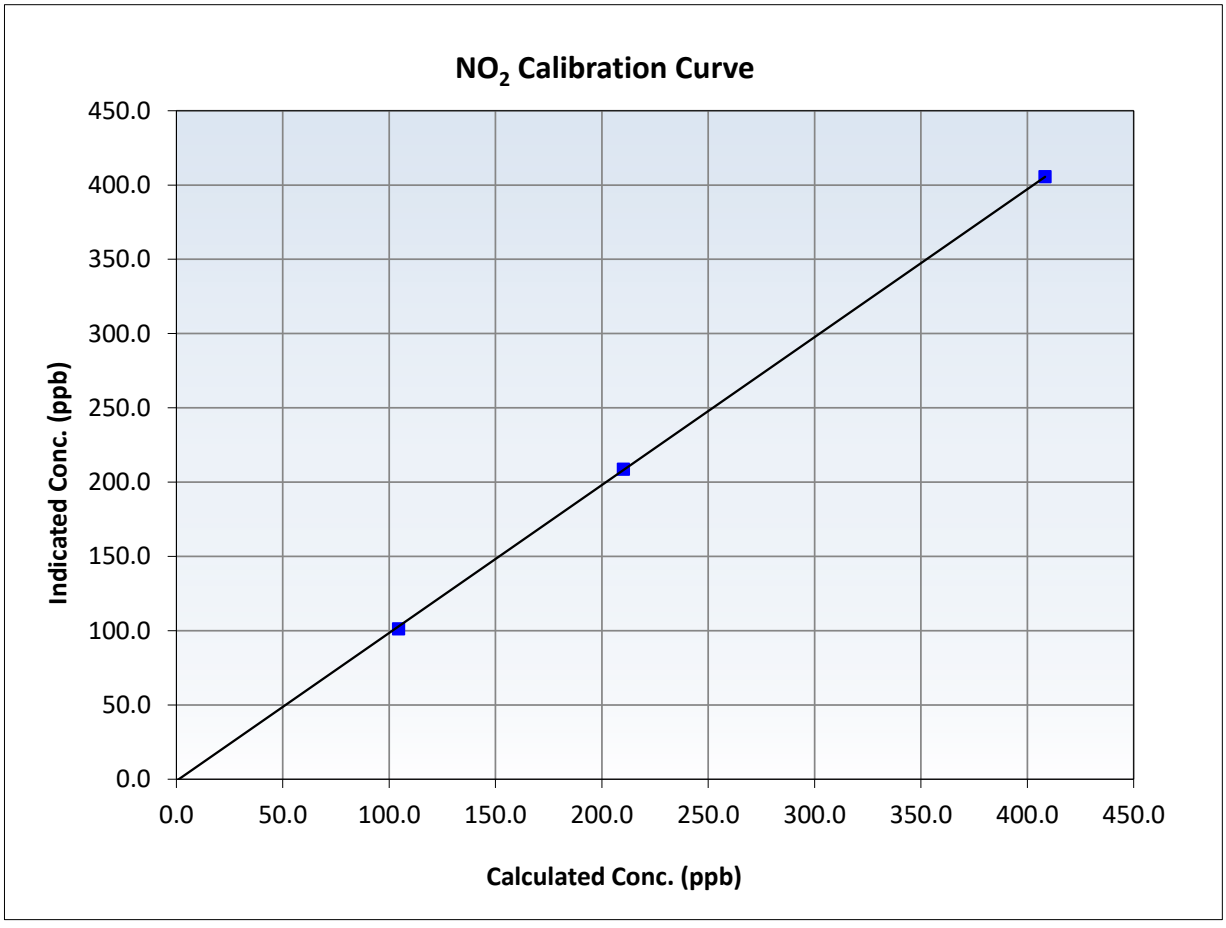
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 24, 2024
Station Name:	Monday Creek	Station Number:	AMS 33
Start Time (MST):	12:02	End Time (MST):	17:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.2	----
408.4	405.6	1.0069
210.2	208.8	1.0066
104.5	101.3	1.0314

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999957	*≥0.995*
Slope	0.995663	*0.90 - 1.10*
Intercept	-1.104038	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

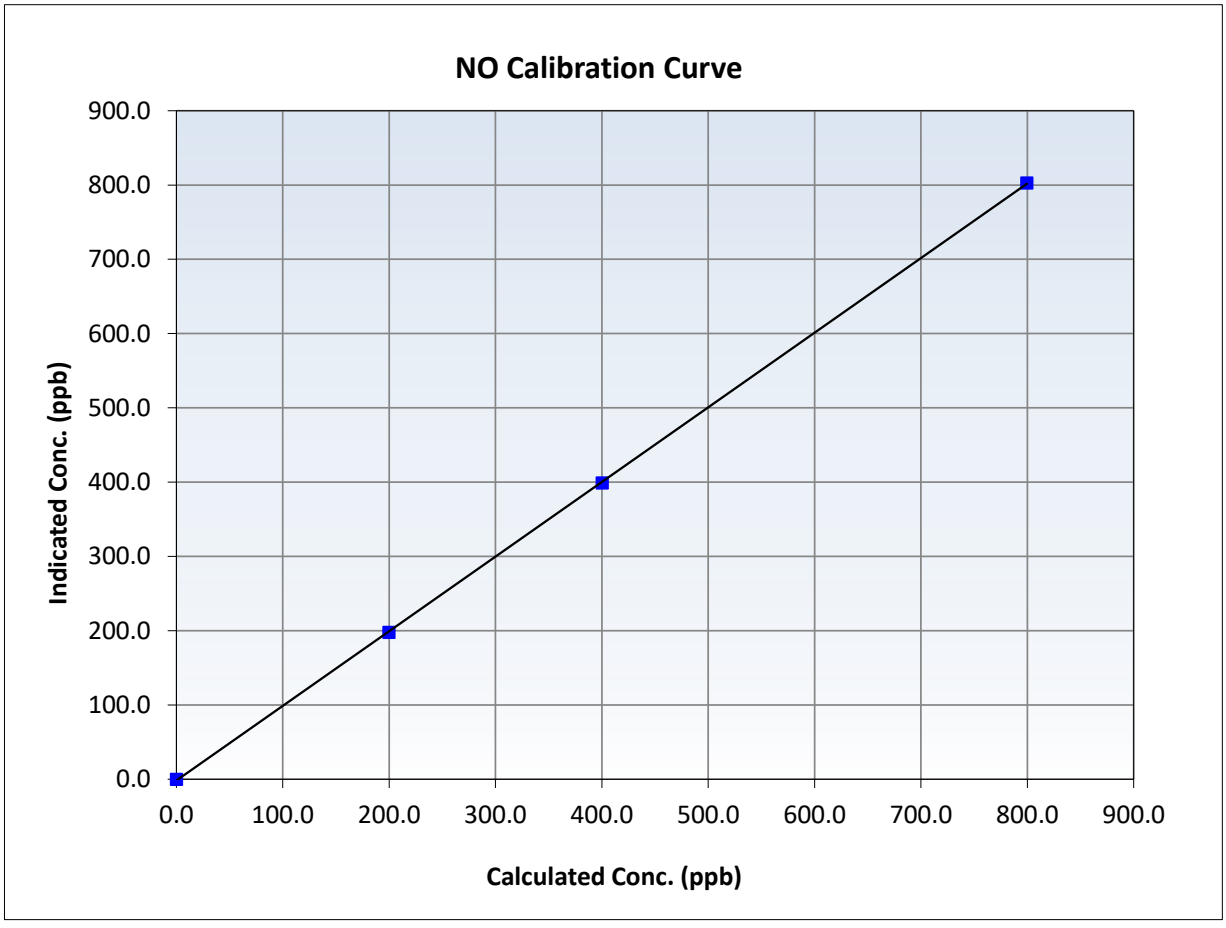
Station Information

Calibration Date:	November 7, 2024	Previous Calibration:	October 24, 2024
Station Name:	Monday Creek	Station Number:	AMS 33
Start Time (MST):	12:02	End Time (MST):	17:02
Analyzer make:	Thermo 42i	Analyzer serial #:	1173480006

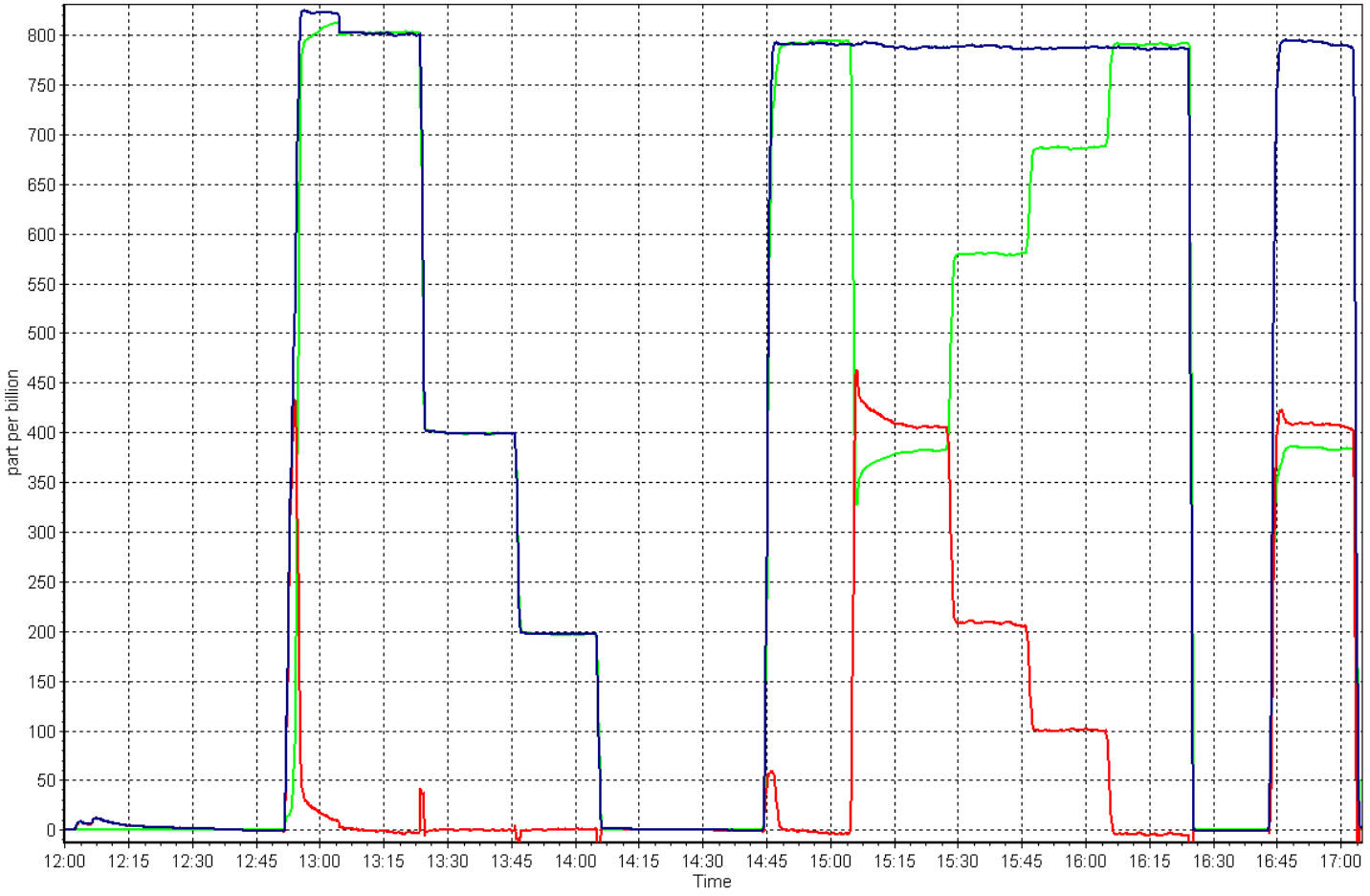
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
799.6	802.8	0.9961
400.3	399.0	1.0033
199.7	197.6	1.0106

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999977	*≥0.995*
Slope	1.004775	*0.90 - 1.10*
Intercept	-1.729194	*+/-20*



NO_X Calibration Plot Date: November 7, 2024 Location: Monday Creek



Wood Buffalo Environmental Association

Wind Speed/Direction Calibration Report

Version-10-2022

Station Information

Station Name:	Monday Creek	Station Number:	AMS 33
Calibration Date:	November 7, 2024	Prev Cal Date:	November 5, 2024
Start Time (MST):	13:28	End Time (MST):	15:36
Tower Height (m):	10.0	Reason:	Install

Wind Speed Information

Sensor make/model:	Met One 010C-1	Serial Number:	P22395
WS Calibrator:	MetOne 053	Serial Number:	CA 03988

Shaft RPM	Calculated Speed (K/hr) (Cv)	Indicated Speed (K/hr) (Iv)	% Error *Limit = +/- 1.5%*
0	0.0	0.0	---
200	20.2	20.1	-0.3%
400	39.4	39.4	0.1%
600	58.6	58.5	0.0%
800	77.8	77.8	0.1%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999999	0.999999	*≥0.9995*
Calculated slope	0.998858	0.998858	*0.90 - 1.10*
Calculated intercept	0.034341	0.034341	*+/- 2*

Wind Direction Information

Sensor make/model:	Met One 020C-1	Serial Number:	N13744
As Found Declination (deg east of True North):	NA	As Left Declination (deg east of True North):	13.00
Solar noon time (MST):	12:06	Calc Declination*:	12.91 Degrees
Deadband calc:	10.2 degrees (*Limit 4 deg*)		* - calculated declination as per NOAA website

Physical Direction (Degrees) (Cv)	Indicated Direction (Degrees) (Iv)	% Error (based on 357° FS) *Limit = +/- 1.0%*
0	1.5	---
90	89.2	-0.2%
180	179.4	-0.2%
270	269.5	-0.1%
350	348.3	-0.5%

	Start	***Finish***	*Limits*
Correl Coeff (r^2)	0.999989	0.999988	*≥0.9995*
Calculated slope	1.003320	1.006945	*0.90 - 1.10*
Calculated intercept	-1.618380	-0.813300	*+/- 4*

Notes: Install calibrations. Bearings still good. No issues. Verified true north using a compass.

Calibration Performed By: Jan Castro

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS506
JACKFISH 1
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Jackfish 1	Station number:	AMS 506
Calibration Date:	November 21, 2024	Last Cal Date:	October 16, 2024
Start time (MST):	9:28	End time (MST):	12:28
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.52	ppm	Cal Gas Exp Date:	December 29, 2028
Cal Gas Cylinder #:	CC274266			
Removed Cal Gas Conc:	50.52	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	2659
Zero Air Gen Model:	Teledyne API T701		Serial Number:	4427

Analyzer Information

Analyzer make:	Thermo 43i		Serial Number:	1160290011	
Analyzer Range:	0-1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.996102	1.001358	Backgd or Offset:	20.1	20.0
Calibration intercept:	0.084032	0.143923	Coeff or Slope:	0.979	0.989

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.1	----
As found High point	4921	79.2	800.2	790.6	1.012
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.7	Previous response	797.2	*% change	-0.8%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.2	----
High point	4921	79.2	800.2	801.0	0.999
Mid point	4960	39.6	400.2	402.2	0.995
Low point	4980	19.8	200.1	199.5	1.003
As left zero	5000	0.0	0.0	0.3	----
As left span	4921	79.2	800.2	800.0	1.000
				Average Correction Factor:	0.999

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

SO_2 Calibration Summary

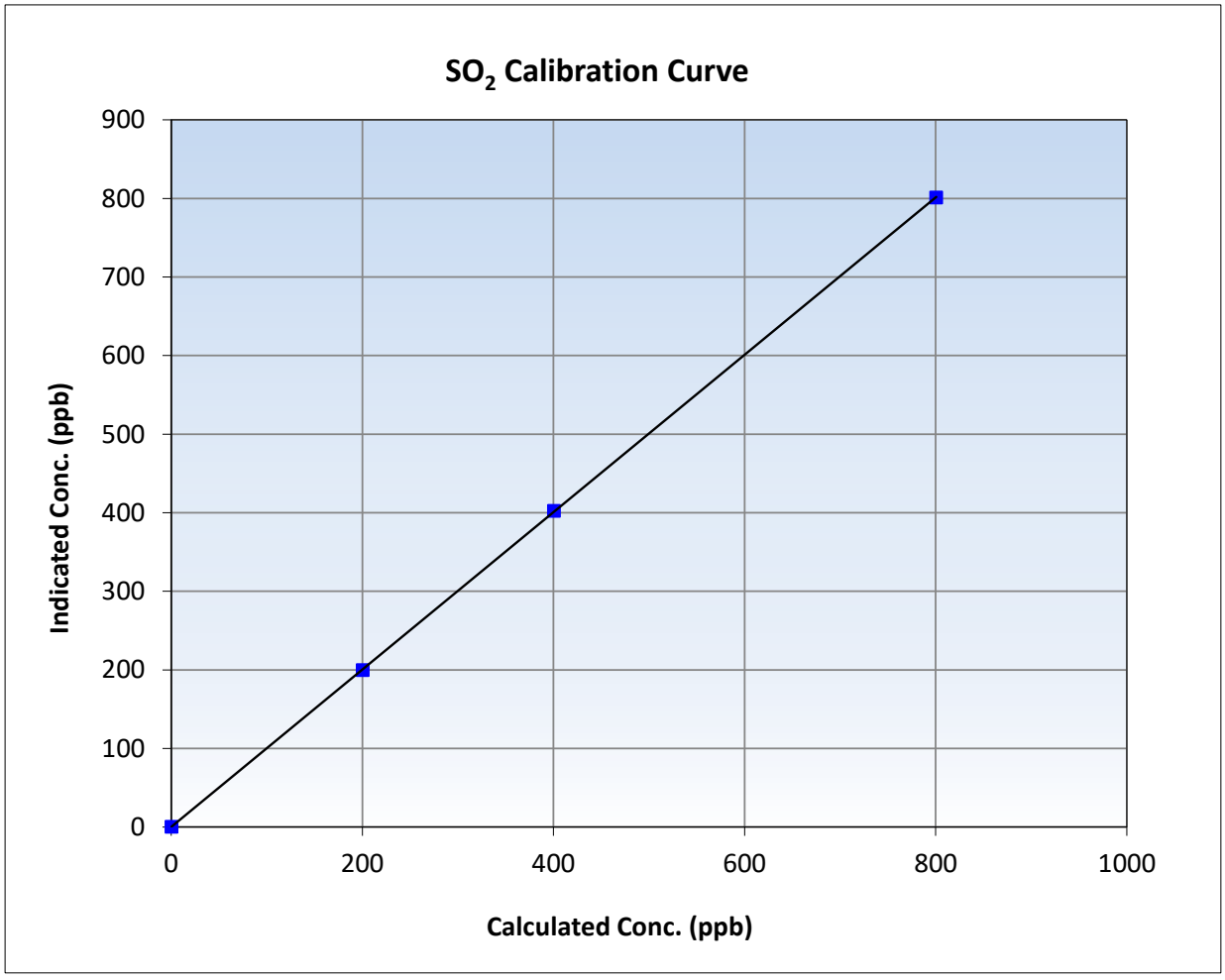
Station Information

Calibration Date:	November 21, 2024	Previous Calibration:	October 16, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	9:28	End Time (MST):	12:28
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290011

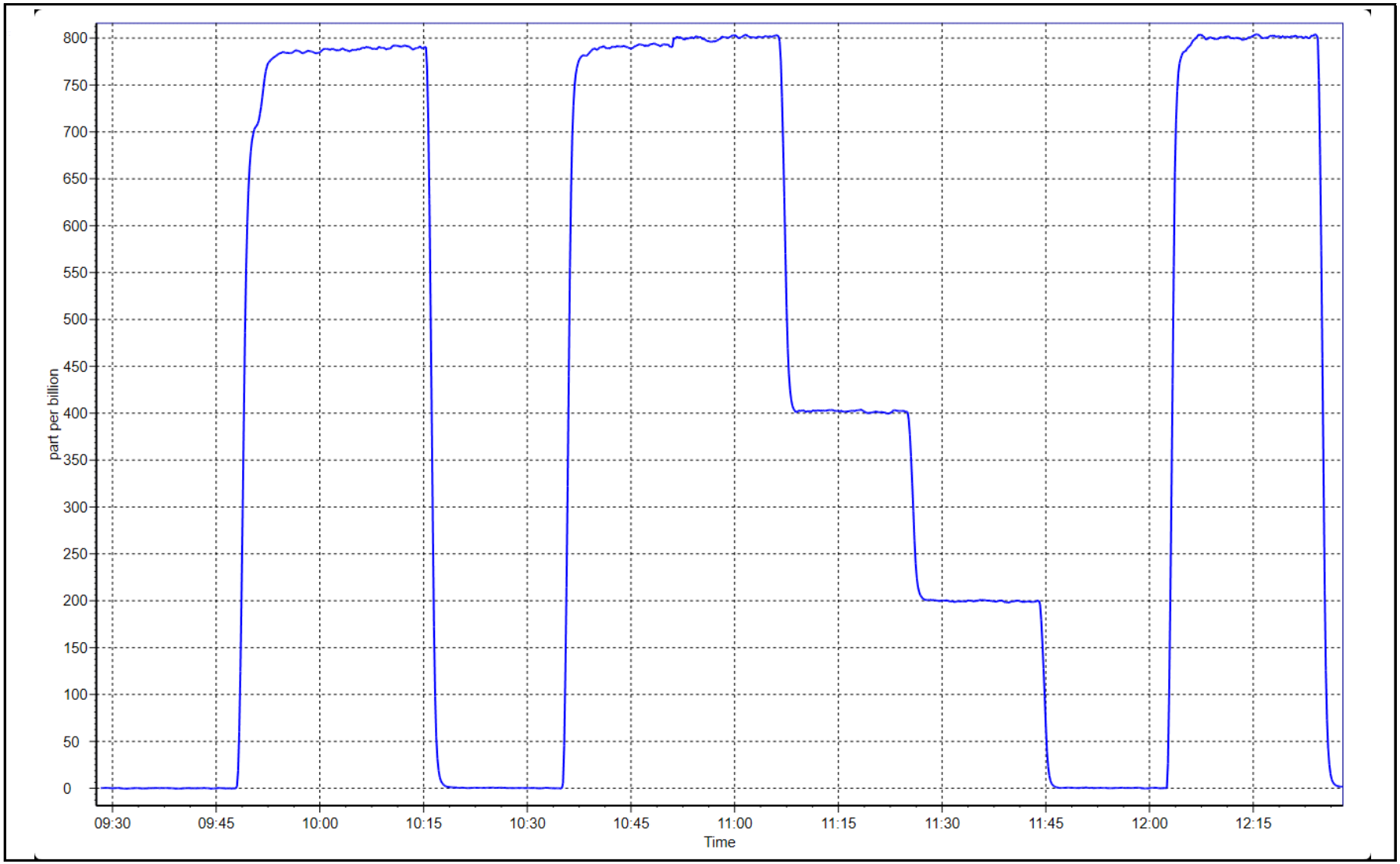
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.2	----
800.2	801.0	0.9990
400.2	402.2	0.9949
200.1	199.5	1.0028

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999991	*≥0.995*
Slope	1.001358	*0.90 - 1.10*
Intercept	0.143923	*+/-30*



SO2 Calibration Plot Date: November 21, 2024 Location: Jackfish 1



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Jackfish 1	Station number:	AMS 506
Calibration Date:	November 20, 2024	Last Cal Date:	October 24, 2024
Start time (MST):	9:34	End time (MST):	14:16
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	4.89	ppm	Cal Gas Exp Date:	September 5, 2027
Cal Gas Cylinder #:	CC737971			
Removed Cal Gas Conc:	5.14	ppm	Rem Gas Exp Date:	November 20, 2024
Removed Gas Cyl #:	CC511843		Diff between cyl:	0.6%
Calibrator Make/Model:	Teledyne 750		Serial Number:	282
ZAG Make/Model:	Teledyne 751H		Serial Number:	321

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1180540020
Converter make:	Global G150		Converter serial #:	2022-218
Analyzer Range	0 - 100 ppb		Converter Temp:	325.0 degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	0.999714	0.998310	Backgd or Offset:	3.56	3.56
Calibration intercept:	-0.118284	0.020574	Coeff or Slope:	1.135	1.154

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4922	77.8	80.0	78.0	1.023
As found Mid point	4961	38.9	40.0	39.2	1.015
As found Low point	4981	19.4	19.9	19.4	1.017
New cylinder response	4918	81.8	80.0	78.5	1.019

Baseline Corr As found:	78.2	Prev response:	79.84	*% change:	-2.1%
Baseline Corr 2nd AF pt:	39.4	AF Slope:	0.977715	AF Intercept:	-0.098803
Baseline Corr 3rd AF pt:	19.6	AF Correlation:	0.999982	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4918	81.8	80.0	79.9	1.001
Mid point	4959	40.9	40.0	40.0	1.000
Low point	4980	20.4	19.9	19.8	1.008
As left zero	5000	0.0	0.0	-0.1	----
As left span	4918	81.8	80.0	79.8	1.003
SO2 Scrubber Check	4921	79.2	800.2	0.0	----
Date of last scrubber change:				Ave Corr Factor	1.003
Date of last converter efficiency test:					

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

H2S Calibration Summary

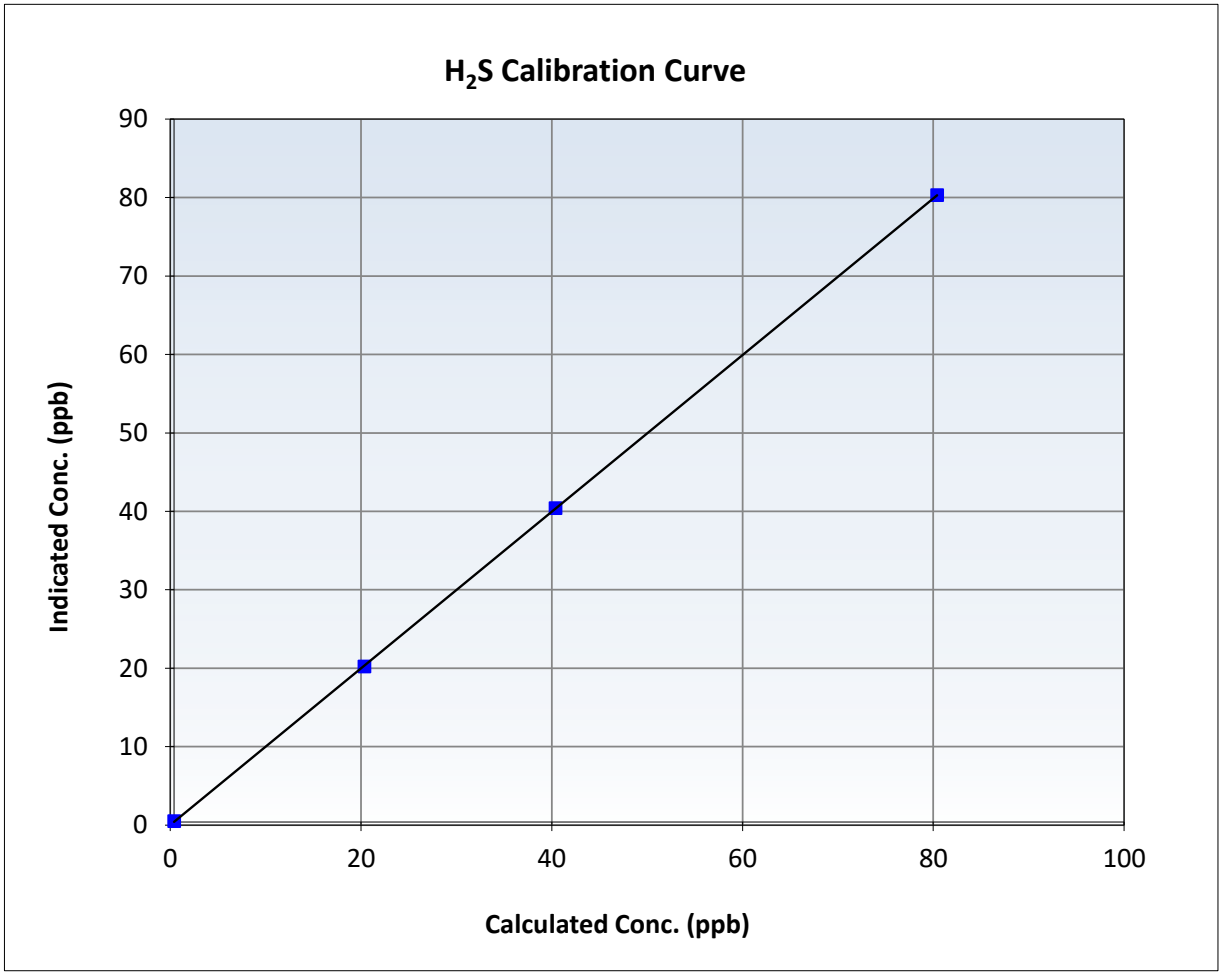
Station Information

Calibration Date:	November 20, 2024	Previous Calibration:	October 24, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	9:34	End Time (MST):	14:16
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540020

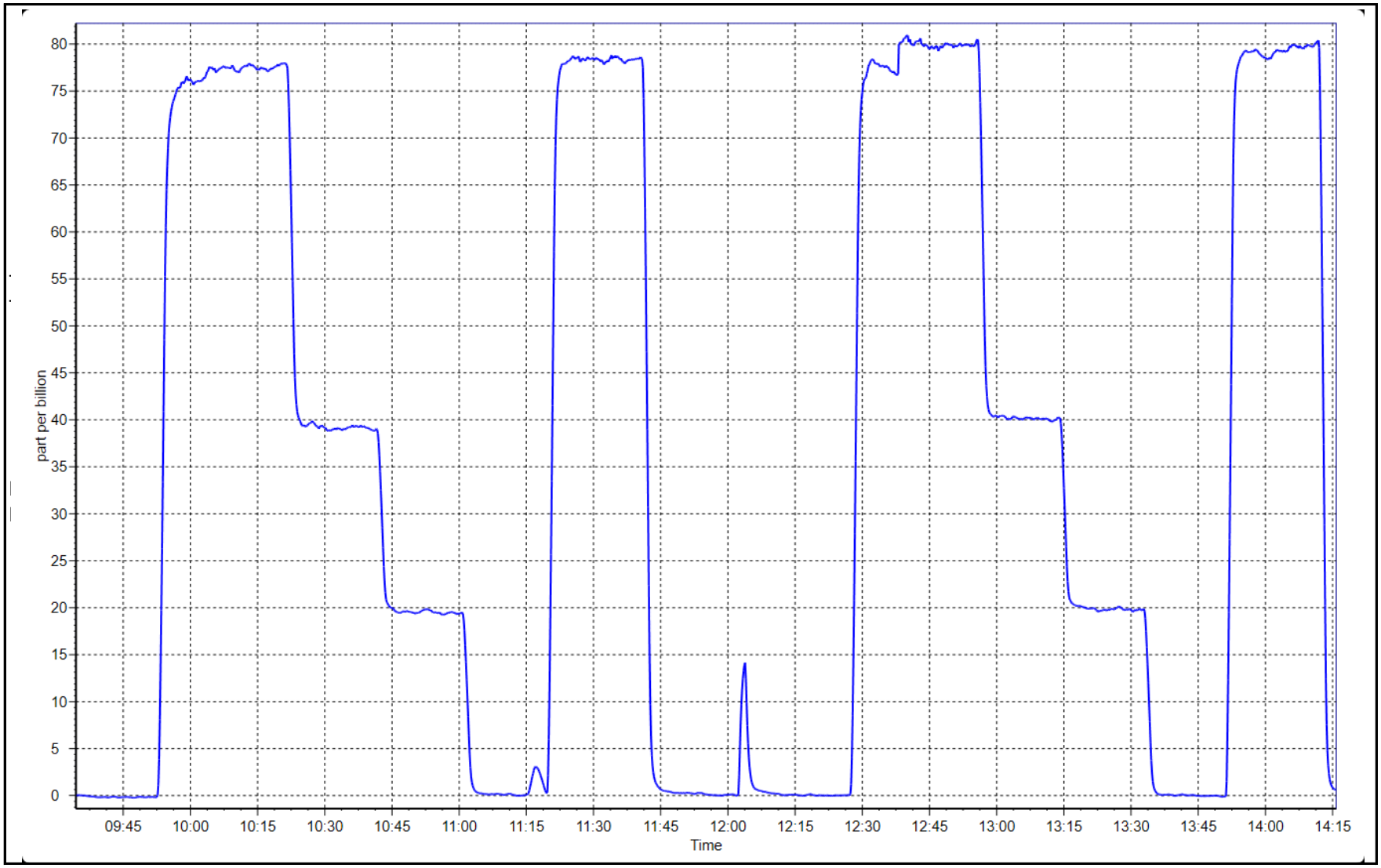
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
80.0	79.9	1.0013
40.0	40.0	1.0000
19.9	19.8	1.0076

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999992	*≥0.995*
Slope	0.998310	*0.90 - 1.10*
Intercept	0.020574	*+/-3*



H2S Calibration Plot Date: November 20, 2024 Location: Jackfish 1



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Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Jackfish 1
Station number:	AMS 506
Calibration Date:	November 19, 2024
Last Cal Date:	October 22, 2024
Start time (MST):	9:47
End time (MST):	14:55
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	DT0022706	Cal Gas Expiry Date:	October 30, 2024
NOX Cal Gas Conc:	60.20 ppm	NO Cal Gas Conc:	60.10 ppm
Removed Cylinder #:	T26811M	Removed Gas Exp Date:	October 30, 2024
Removed Gas NOX Conc:	47.46 ppm	Removed Gas NO Conc:	47.39 ppm
NOX gas Diff:	-0.6%	NO gas Diff:	-0.4%
Calibrator Model:	Teledyne API T750	Serial Number:	282
ZAG make/model:	Teledyne API T751H	Serial Number:	321

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.7	0.2	-0.6	----	----
AF High point	4916	84.4	801.1	799.9	1.2	820.0	818.0	2.4	0.9761	0.9781
AF Mid point										
AF Low point										
New cyl resp	4933	66.6	801.9	800.6	1.3	816.0	815.0	0.3	0.9771	0.9790

Previous Response	NO_X = 799.0 ppb	NO = 797.4 ppb	* = > +/-5% change initiates investigation		*Percent Change	NO_X =	2.6%
Baseline Corr 1st pt	NO_X = 820.7 ppb	NO = 817.8 ppb	As Found Statistics		*Percent Change	NO =	2.5%
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb	As found	NO_X r^2:	Nx Sl:	Nx Int:	
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb	As found	NO r^2:	NO Sl:	NO Int:	
			As found	NO_2 r^2:	NO2 Sl:	NO_2 Int:	

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1218153356

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.726	1.726	NO bkgnd or offset:	5.3	5.3
NOX coeff or slope:	0.989	0.989	NOX bkgnd or offset:	6.2	6.2
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	167.4	167.4

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.002459	1.002537
NO_X Cal Offset:	-4.007952	-2.268674
NO Cal Slope:	1.002654	1.000867
NO Cal Offset:	-4.607922	-3.349973
NO_2 Cal Slope:	1.002943	1.005533
NO_2 Cal Offset:	0.915349	1.350171

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
High point	4933	66.6	801.9	800.6	1.3	803.0	800.0	2.4	0.9987	1.0007
Mid point	4967	33.3	400.9	400.2	0.7	398.1	394.5	3.7	1.0071	1.0146
Low point	4983	16.6	199.9	199.5	0.3	196.0	193.6	3.0	1.0198	1.0307
As left zero	5000	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4	----	----
As left span	4933	66.6	801.9	402.1	399.8	807.0	402.1	405.3	0.9937	1.0000
								Average Correction Factor	1.0085	1.0153

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	796.7	396.8	401.2	403.8	0.9936	100.6%
Mid GPT point	796.7	607.0	191.0	195.3	0.9781	102.2%
Low GPT point	796.7	703.0	95.0	97.4	0.9757	102.5%
				Average Correction Factor	0.9825	101.8%

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

Calibration Performed By: Sean Bala

Wood Buffalo Environmental Association

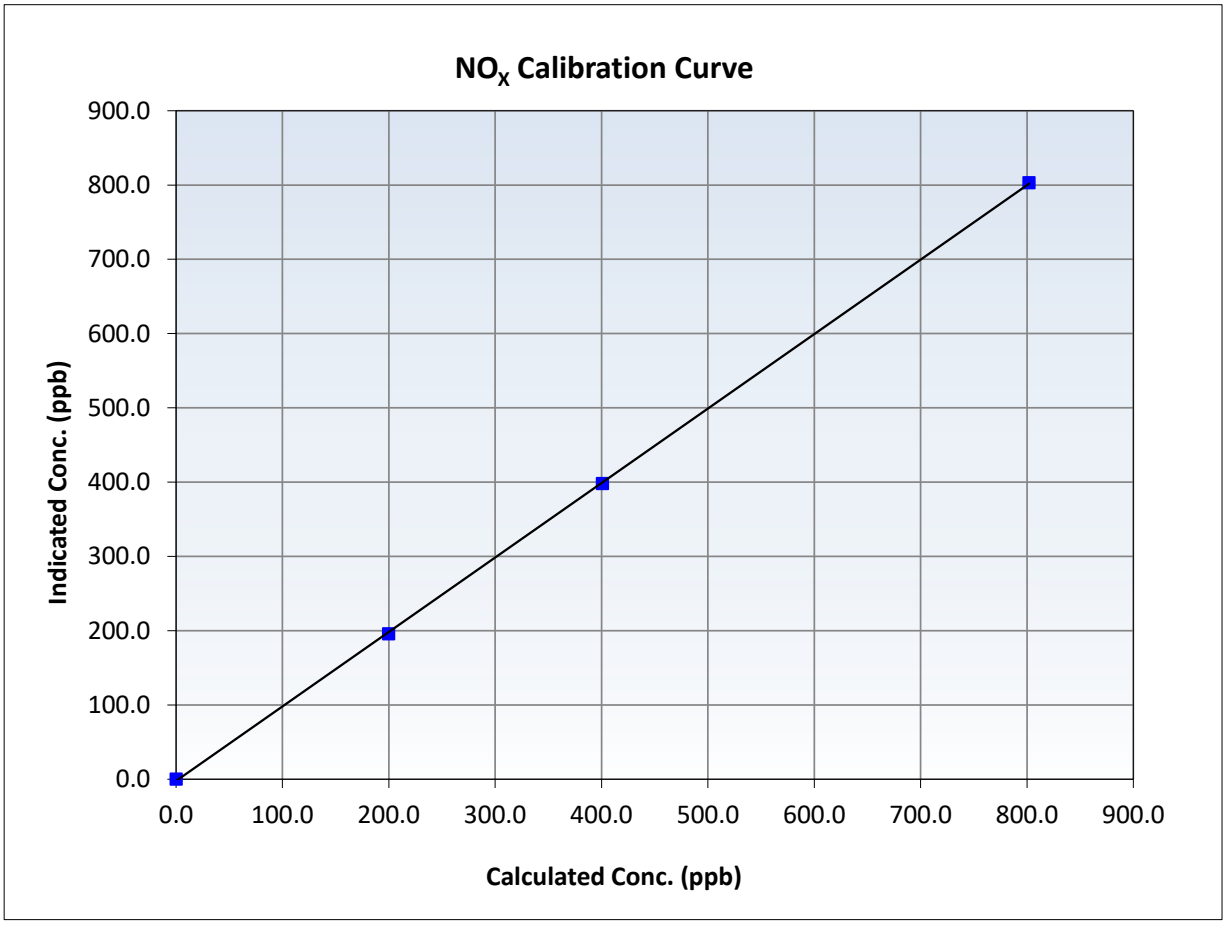
NO_X Calibration Summary

Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	9:47	End Time (MST):	14:55
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	0.999960	≥0.995
801.9	803.0	0.9987	Slope	1.002537	0.90 - 1.10
400.9	398.1	1.0071			
199.9	196.0	1.0198	Intercept	-2.268674	+/-20



Wood Buffalo Environmental Association

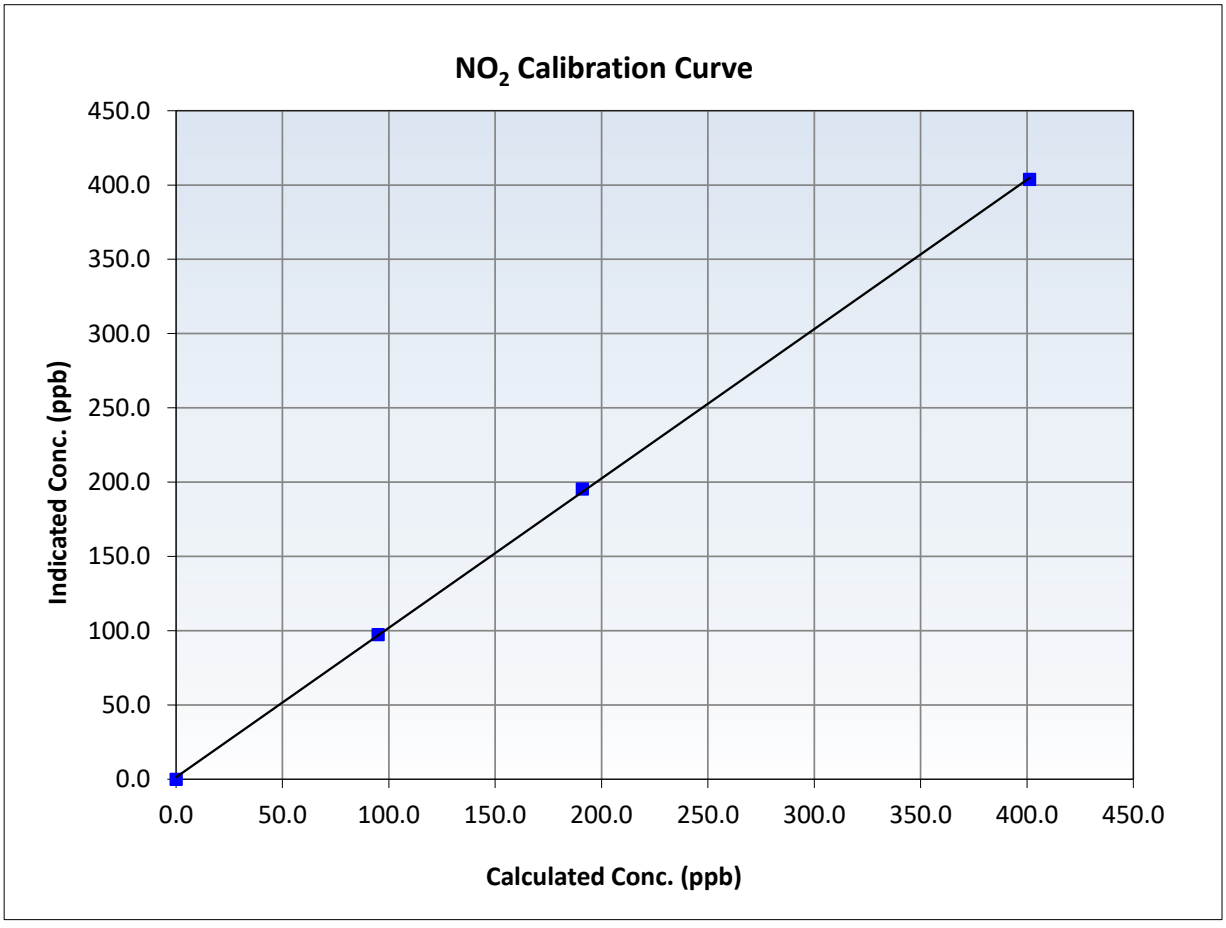
NO_2 Calibration Summary

Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	9:47	End Time (MST):	14:55
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	0.0	----	Correlation Coefficient	0.999927	≥0.995
401.2	403.8	0.9936	Slope	1.005533	0.90 - 1.10
191.0	195.3	0.9781	Intercept	1.350171	+/-20
95.0	97.4	0.9757			



Wood Buffalo Environmental Association

NO Calibration Summary

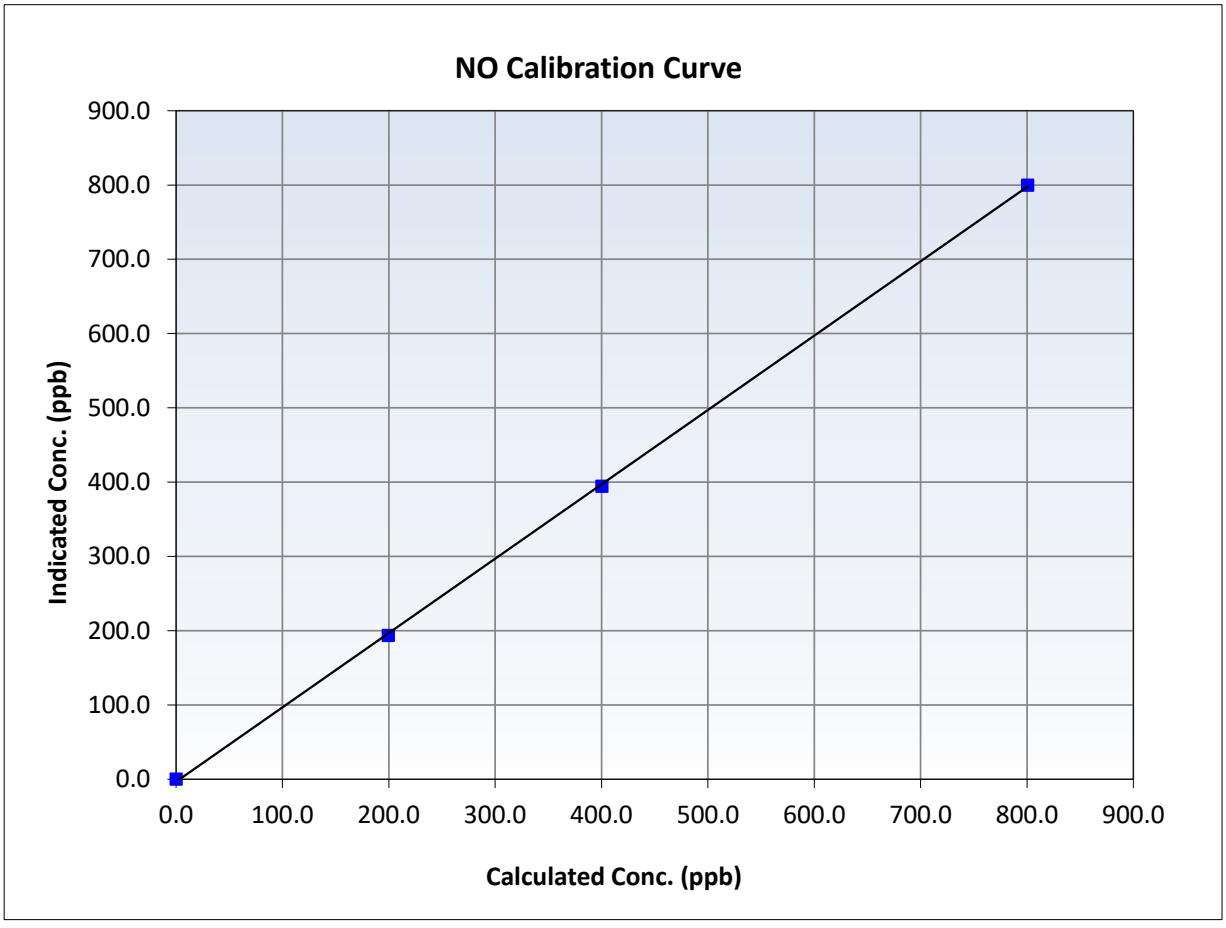
Station Information

Calibration Date:	November 19, 2024	Previous Calibration:	October 22, 2024
Station Name:	Jackfish 1	Station Number:	AMS 506
Start Time (MST):	9:47	End Time (MST):	14:55
Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356

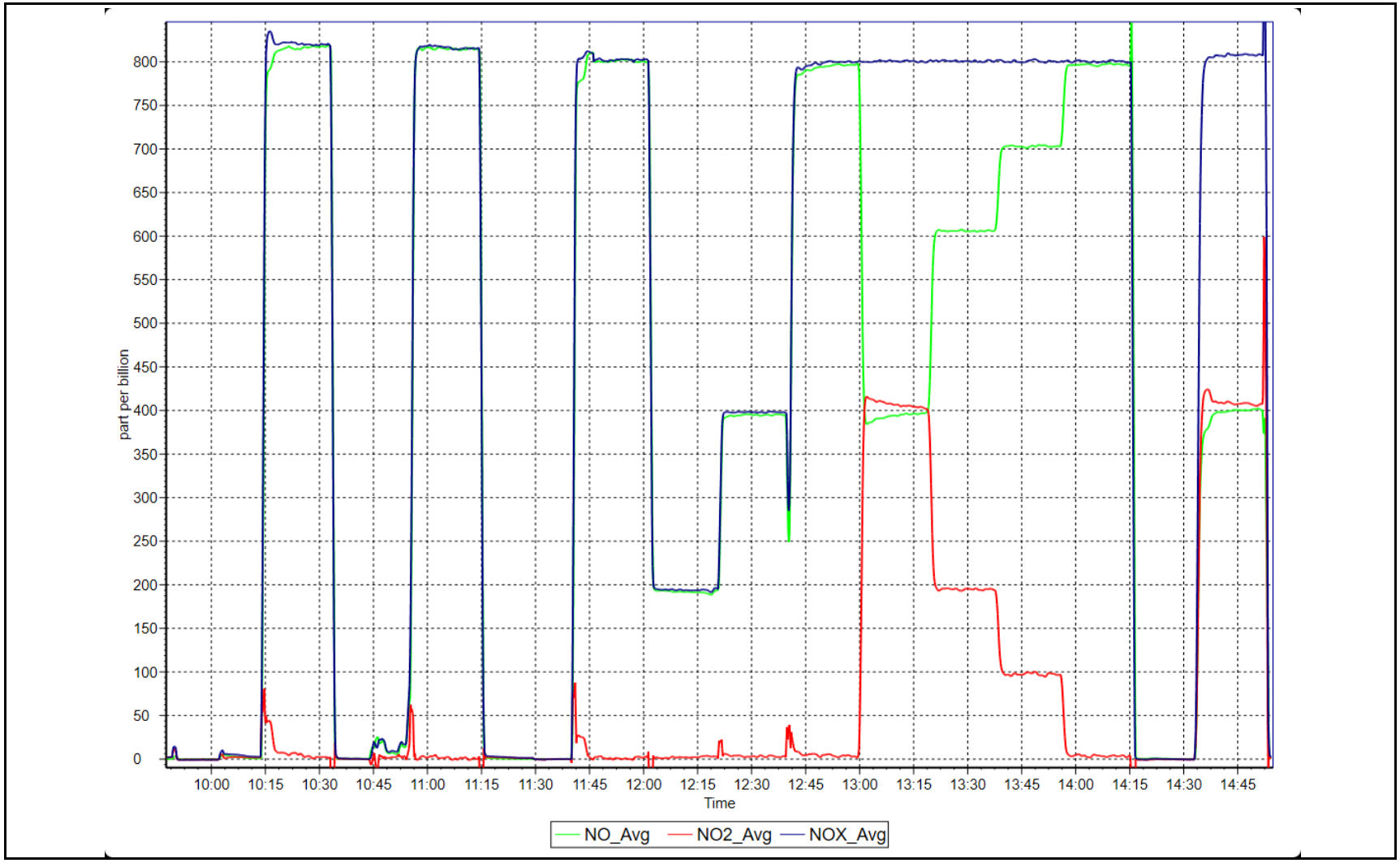
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.6	800.0	1.0007
400.2	394.5	1.0146
199.5	193.6	1.0307

Statistical Evaluation		Limits
Correlation Coefficient	0.999911	≥0.995
Slope	1.000867	0.90 - 1.10
Intercept	-3.349973	+/-20



NO_X Calibration Plot Date: November 19, 2024 Location: Jackfish 1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS508
KIRBY NORTH
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Kirby North	Station number:	AMS 508
Calibration Date:	November 13, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	15:34	End time (MST):	16:28
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	49.18	ppm	Cal Gas Exp Date:	February 23, 2025
Cal Gas Cylinder #:	CC303554			
Removed Cal Gas Conc:	49.18	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	5240
Zero Air Gen Model:	Teledyne API T701H		Serial Number:	880

Analyzer Information

Analyzer make:	Thermo 43iQ		Serial Number:	1182340007	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.000948	1.002407	Backgd or Offset:	26.4	26.6
Calibration intercept:	0.311461	0.151064	Coeff or Slope:	1.049	1.065

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4919	81.3	799.6	791.1	1.011
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	791.0	Previous response	800.7	*% 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	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.1	----
High point	4919	81.3	799.6	802.0	0.997
Mid point	4959	40.7	400.3	400.5	1.000
Low point	4980	20.3	199.7	201.0	0.993
As left zero	5000	0.0	0.0	0.1	----
As left span	4919	81.3	799.6	803.0	0.996
				Average Correction Factor:	0.997

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

SO_2 Calibration Summary

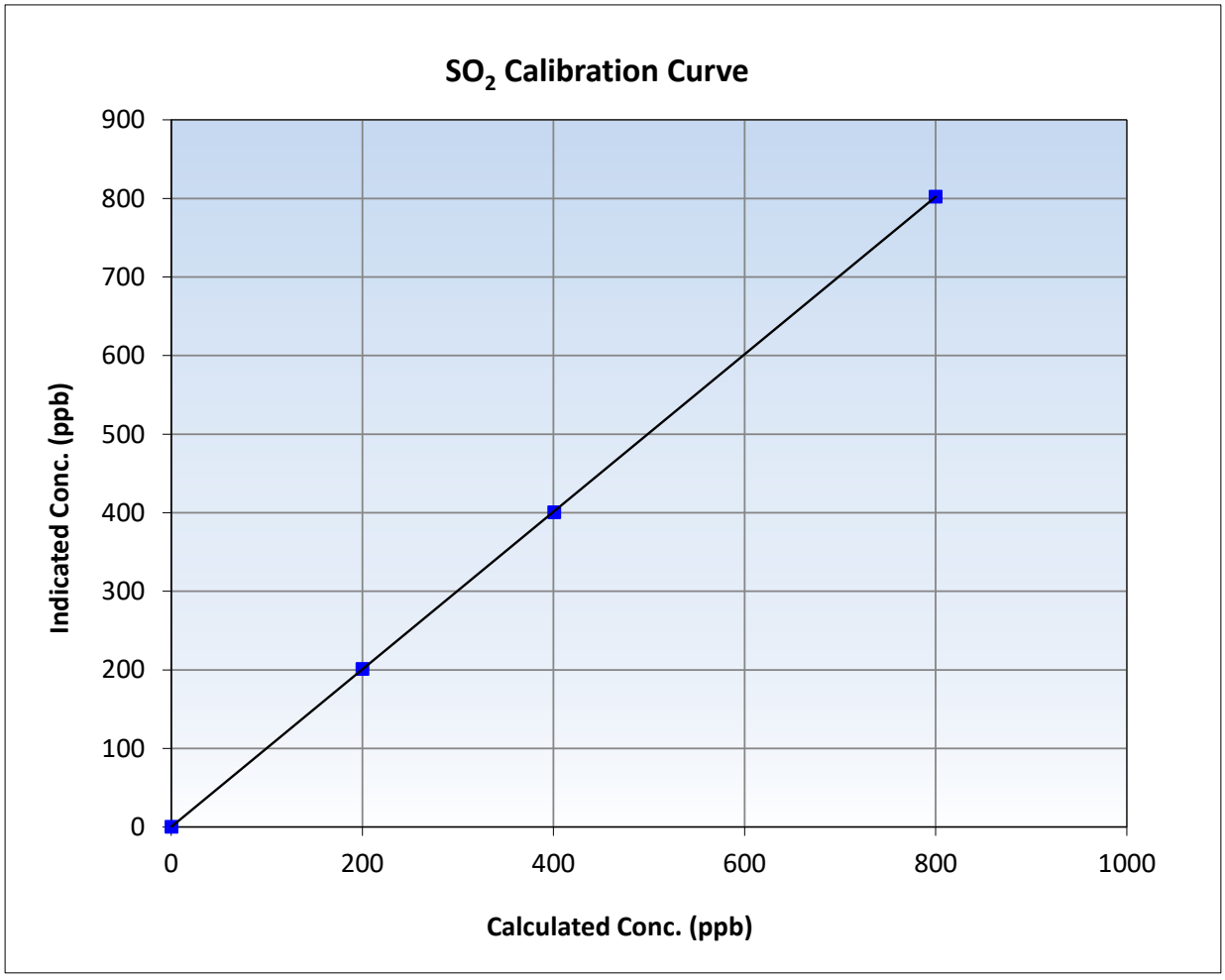
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 17, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	15:34	End Time (MST):	16:28
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007

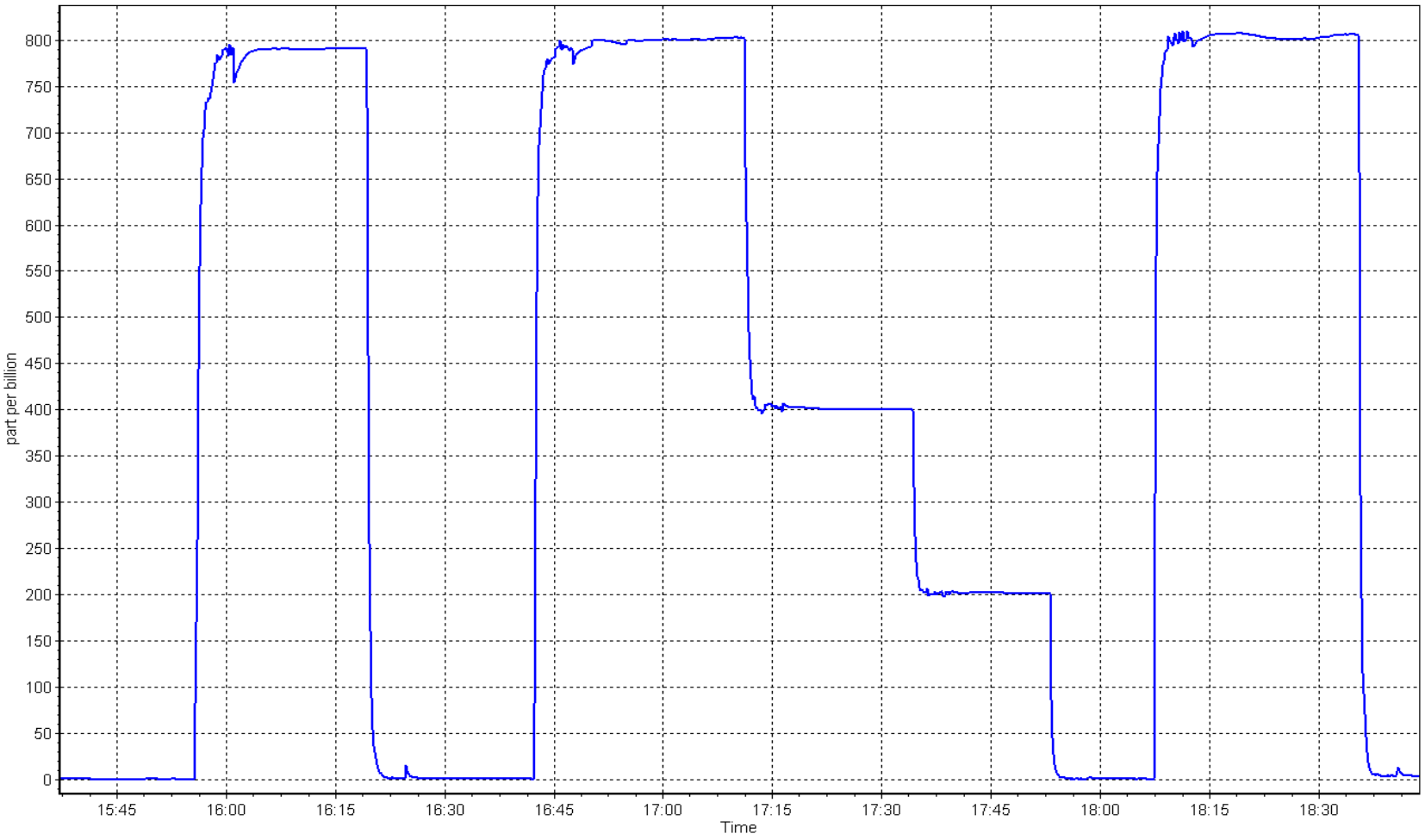
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
799.6	802.0	0.9970
400.3	400.5	0.9996
199.7	201.0	0.9933

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999996	*≥0.995*
Slope	1.002407	*0.90 - 1.10*
Intercept	0.151064	*+/-30*



SO2 Calibration Plot Date: November 13, 2024 Location: Kirby North



Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Station Name:	Kirby North	Station number:	AMS 508
Calibration Date:	November 13, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	10:58	End time (MST):	20:22
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.05	ppm	Cal Gas Exp Date:	November 15, 2026
Cal Gas Cylinder #:	DT0019762			
Removed Cal Gas Conc:	5.05	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	n/a		Diff between cyl:	
Calibrator Make/Model:	Teledyne API T750		Serial Number:	281
ZAG Make/Model:	Teledyne API T751H		Serial Number:	322

Analyzer Information

Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb		Converter Temp:	325	degC

	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.004956	0.996242	Backgd or Offset:	1.77	1.75
Calibration intercept:	-0.320958	0.259036	Coeff or Slope:	1.045	1.037

H2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	-0.2	----
As found High point	4921	79.2	80.0	82.0	0.973
As found Mid point	4960	39.6	40.0	41.1	0.969
As found Low point	4980	19.8	20.0	20.5	0.966
New cylinder response					

Baseline Corr As found:	82.2	Prev response:	80.07	*% change:	2.6%
Baseline Corr 2nd AF pt:	41.3	AF Slope:	1.027245	AF Intercept:	-0.100990
Baseline Corr 3rd AF pt:	20.7	AF Correlation:	0.999992	* = > +/-5% change initiates investigation	

H2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.0	----
High point	4921	79.2	80.0	79.8	1.002
Mid point	4960	39.6	40.0	40.3	0.993
Low point	4980	19.8	20.0	20.4	0.980
As left zero	5000	0.0	0.0	-0.1	----
As left span	4921	79.2	80.0	81.7	0.979
SO2 Scrubber Check	4919	80.0	800.2	0.0	----
Date of last scrubber change:		July 25, 2023		Ave Corr Factor	0.992
Date of last converter efficiency test:		n/a			

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

H2S Calibration Summary

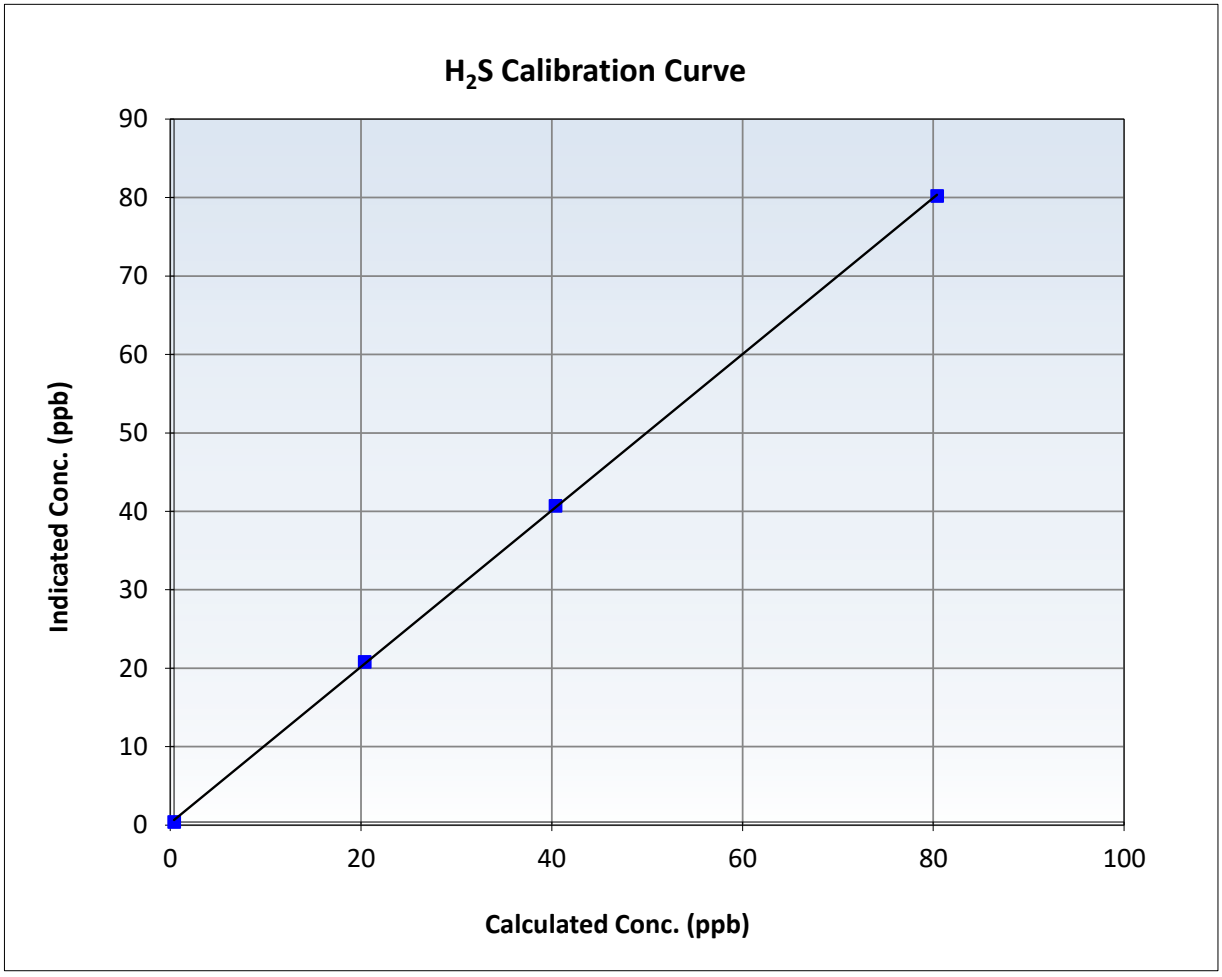
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 17, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:58	End Time (MST):	20:22
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

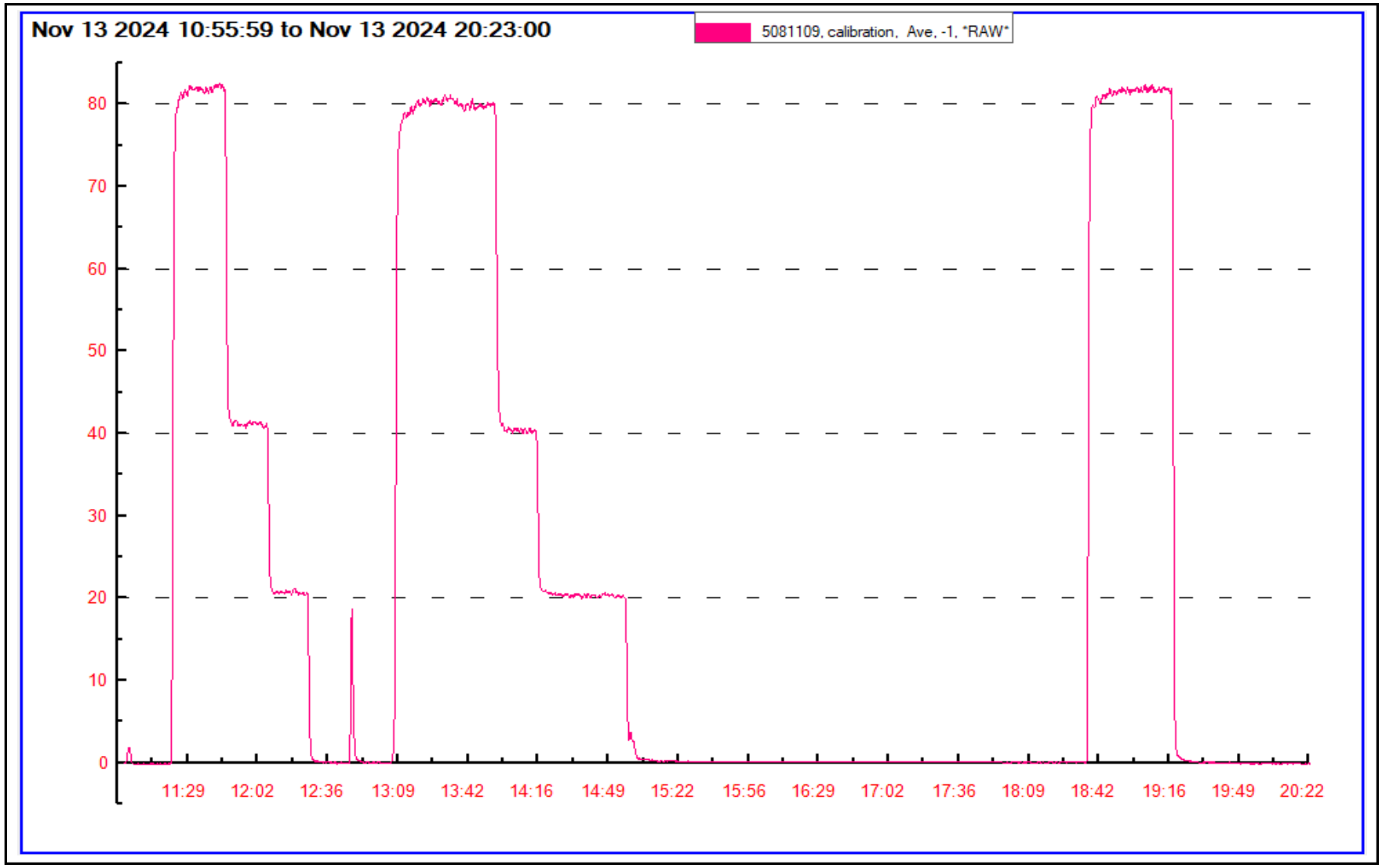
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
80.0	79.8	1.0024
40.0	40.3	0.9925
20.0	20.4	0.9803

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999950	*≥0.995*
Slope	0.996242	*0.90 - 1.10*
Intercept	0.259036	*+/-3*



H2S Calibration Plot Date: November 13, 2024 Location: Kirby North



Wood Buffalo Environmental Association

THC Calibration Report

Station Information

Station Name:	Kirby North	Station number:	AMS 508
Calibration Date:	November 13, 2024	Last Cal Date:	October 17, 2024
Start time (MST):	15:34	End time (MST):	18:46
Reason:	Routine		

Calibration Standards

Gas Cert Reference:	CC303554		Cal Gas Expiry Date:	February 23, 2025	
CH4 Cal Gas Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:	NA		Removed Gas Expiry:	NA	
Removed CH4 Conc.	496.6	ppm	CH4 Equiv Conc.	1061.7	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	5240	
ZAG Make/Model:	Teledyne API T701H		Serial Number:	880	

Analyzer Information

Analyzer make:	Thermo 51i-LT		Analyzer serial #:	1182340005	
Analyzer Range:	0 - 20 ppm				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.001339	1.005835	Background:	2.09	2.08
Calibration intercept:	-0.029911	-0.076119	Coefficient:	3.715	3.712

THC As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.00	-0.06	----
As found High point	4919	81.3	17.26	17.29	0.995
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	17.35	Previous response	17.26	*% change	0.5%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.00	-0.09	
High point	4919	81.3	17.26	17.28	0.999
Mid point	4959	40.7	8.64	8.63	1.002
Low point	4980	20.3	4.31	4.26	1.011
As left zero	5000	0.0	0.00	-0.05	----
As left span	4919	81.3	17.26	17.40	0.992
				Average Correction Factor	1.004

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

THC Calibration Summary

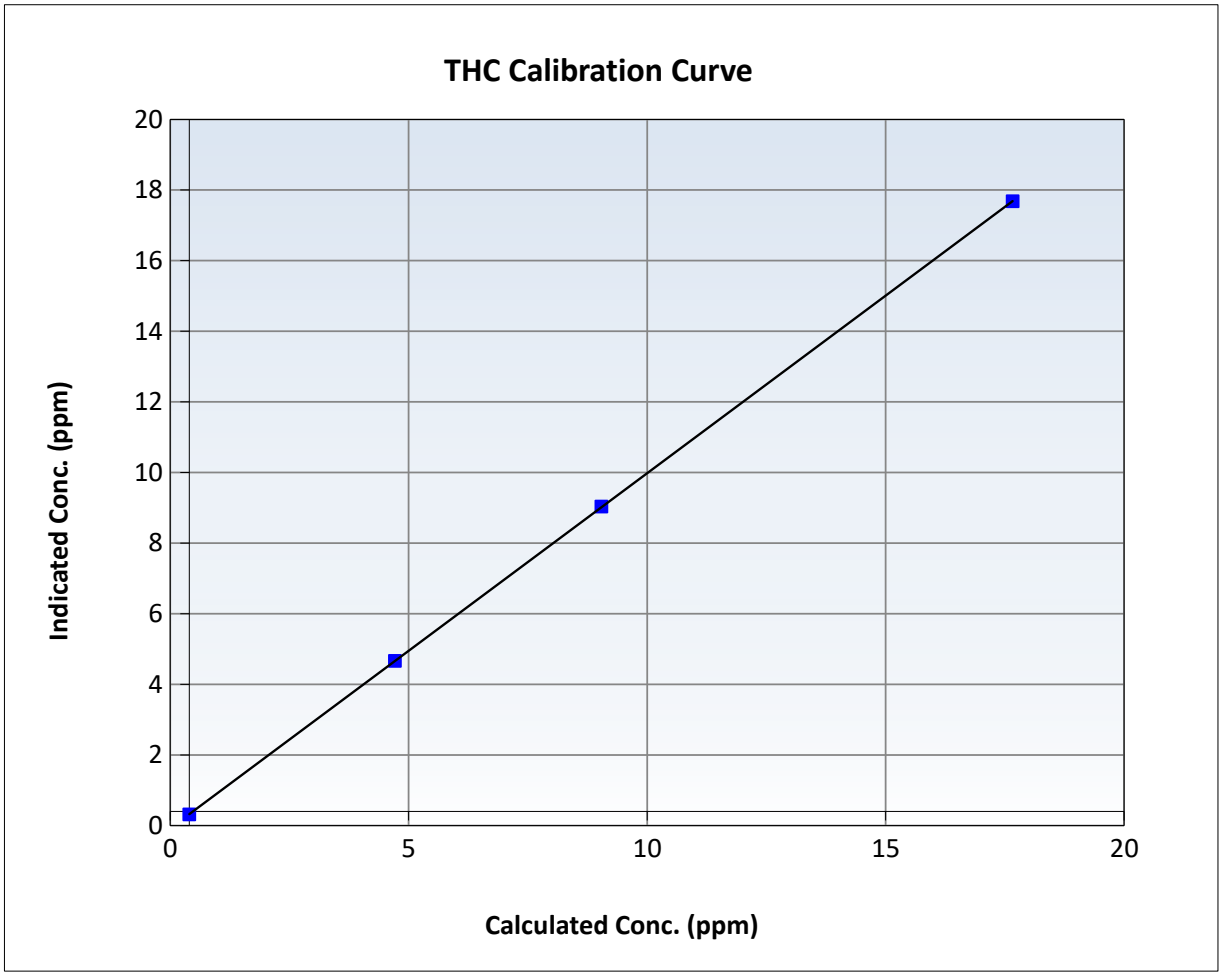
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 17, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	15:34	End Time (MST):	18:46
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1182340005

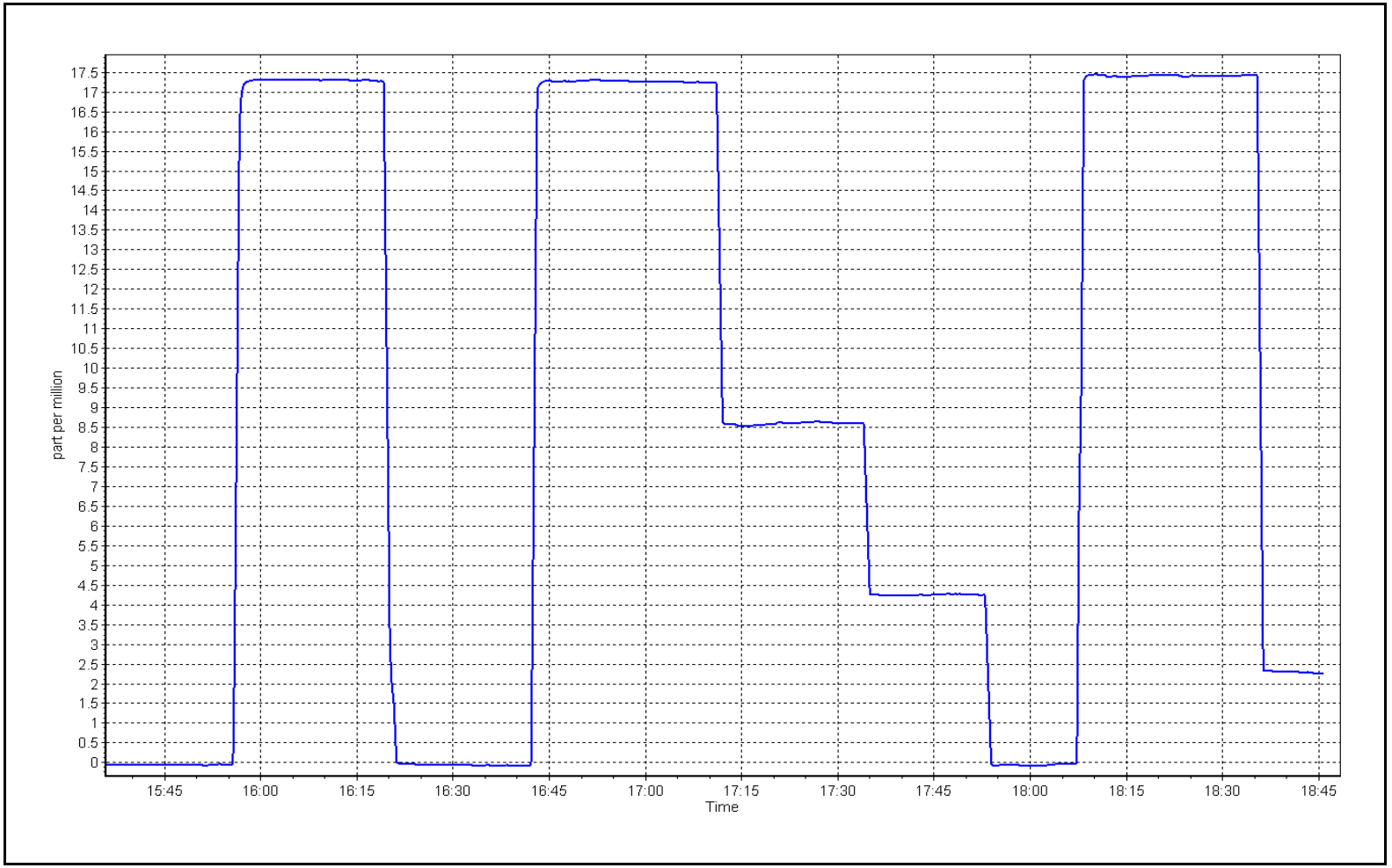
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)
0.00	-0.09	----
17.26	17.28	0.9990
8.64	8.63	1.0015
4.31	4.26	1.0112

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999998	*≥0.995*
Slope	1.005835	*0.90 - 1.10*
Intercept	-0.076119	*+/-1.5*



THC Calibration Plot Date: November 13, 2024 Location: Kirby North



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Kirby North
Station number:	AMS 508
Calibration Date:	November 13, 2024
Last Cal Date:	October 16, 2024
Start time (MST):	10:52
End time (MST):	15:48
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T34ULGL	Cal Gas Expiry Date:	March 8, 2025
NOX Cal Gas Conc:	49.39 ppm	NO Cal Gas Conc:	49.02 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	49.39 ppm	Removed Gas NO Conc:	49.02 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	5240
ZAG make/model:	Teledyne API T701H	Serial Number:	880

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
AF High point	4918	81.6	806.1	800.1	6.0	815.0	810.0	5.6	0.9891	0.9877
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 802.5 ppb	NO = 797.4 ppb
Baseline Corr 1st pt	NO_X = 815.0 ppb	NO = 810.0 ppb
Baseline Corr 2nd pt	NO_X = NA ppb	NO = NA ppb
Baseline Corr 3rd pt	NO_X = NA ppb	NO = NA ppb

* = > +/-5% change initiates investigation

As Found Statistics

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

*Percent Change	NO_X =	1.5%
*Percent Change	NO =	1.6%

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Thermo 42i Serial Number: 1118148496

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	*Finish*		*Start*	*Finish*
NO coeff or slope:	0.730	0.711	NO bkgnd or offset:	7.6	7.7
NOX coeff or slope:	0.995	0.994	NOX bkgnd or offset:	7.5	7.7
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	144.1	146.5

Calibration Statistics

	Start	*Finish*
NO_X Cal Slope:	0.999017	1.003355
NO_X Cal Offset:	-2.864007	-1.743898
NO Cal Slope:	1.001758	1.003858
NO Cal Offset:	-4.084132	-2.344036
NO_2 Cal Slope:	1.000096	0.987139
NO_2 Cal Offset:	0.178825	1.475739

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
High point	4918	81.6	806.1	800.1	6.0	808.0	802.0	5.2	0.9977	0.9976
Mid point	4959	40.8	403.0	400.0	3.0	401.7	398.1	3.6	1.0033	1.0048
Low point	4980	20.4	201.5	200.0	1.5	198.6	195.9	2.7	1.0146	1.0209
As left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
As left span	4918	81.6	806.1	410.6	395.5	803.0	410.6	392.3	1.0039	1.0000
								Average Correction Factor	1.0052	1.0078

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	0.0	----	----
High GPT point	799.2	403.7	401.5	397.4	1.0104	99.0%
Mid GPT point	799.2	608.2	197.0	195.8	1.0063	99.4%
Low GPT point	799.2	702.5	102.7	105.0	0.9785	102.2%
				Average Correction Factor	0.9984	100.2%

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

Calibration Performed By: Braiden Boutilier

Wood Buffalo Environmental Association

NO_X Calibration Summary

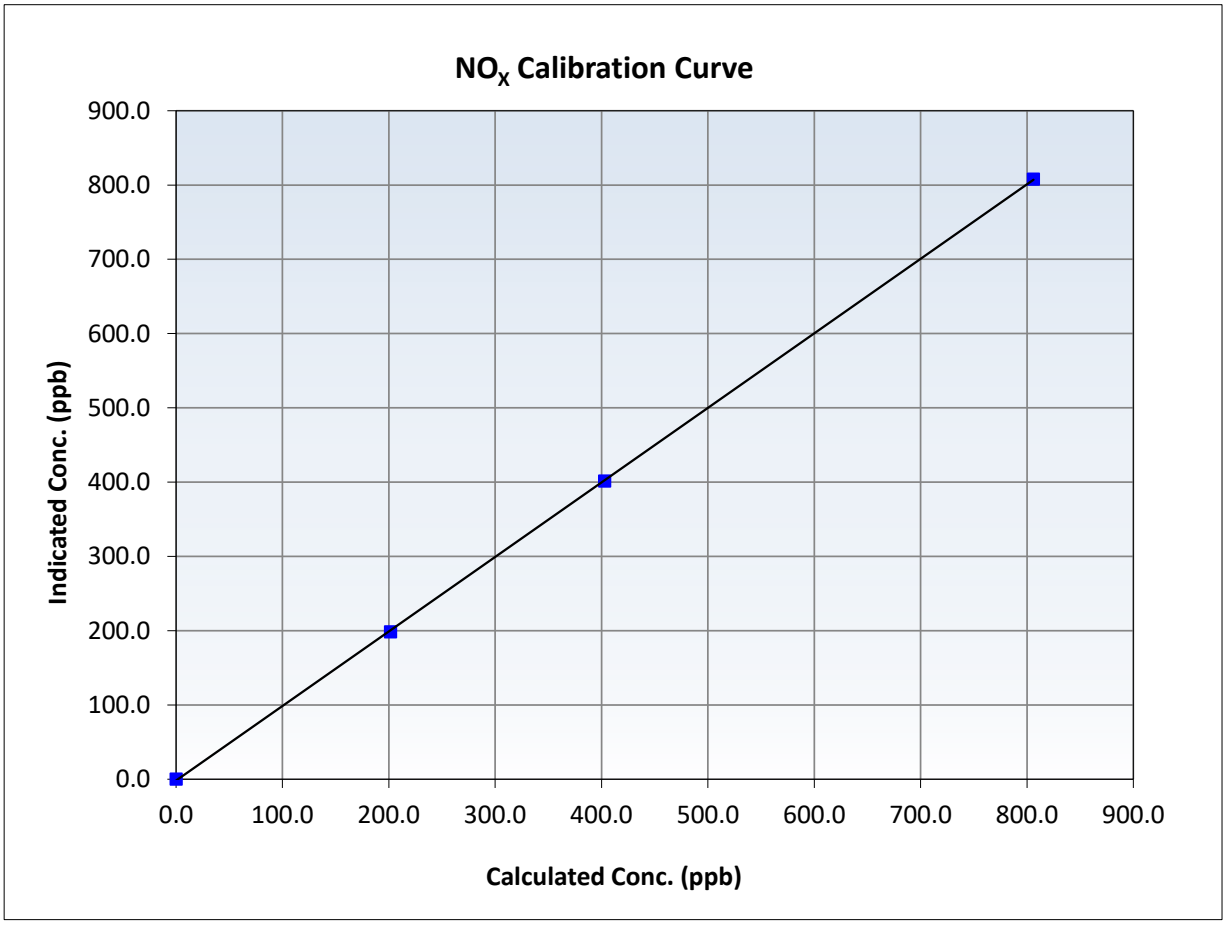
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 16, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:52	End Time (MST):	15:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
806.1	808.0	0.9977
403.0	401.7	1.0033
201.5	198.6	1.0146

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999976	*≥0.995*
Slope	1.003355	*0.90 - 1.10*
Intercept	-1.743898	*+/-20*



Wood Buffalo Environmental Association

NO_2 Calibration Summary

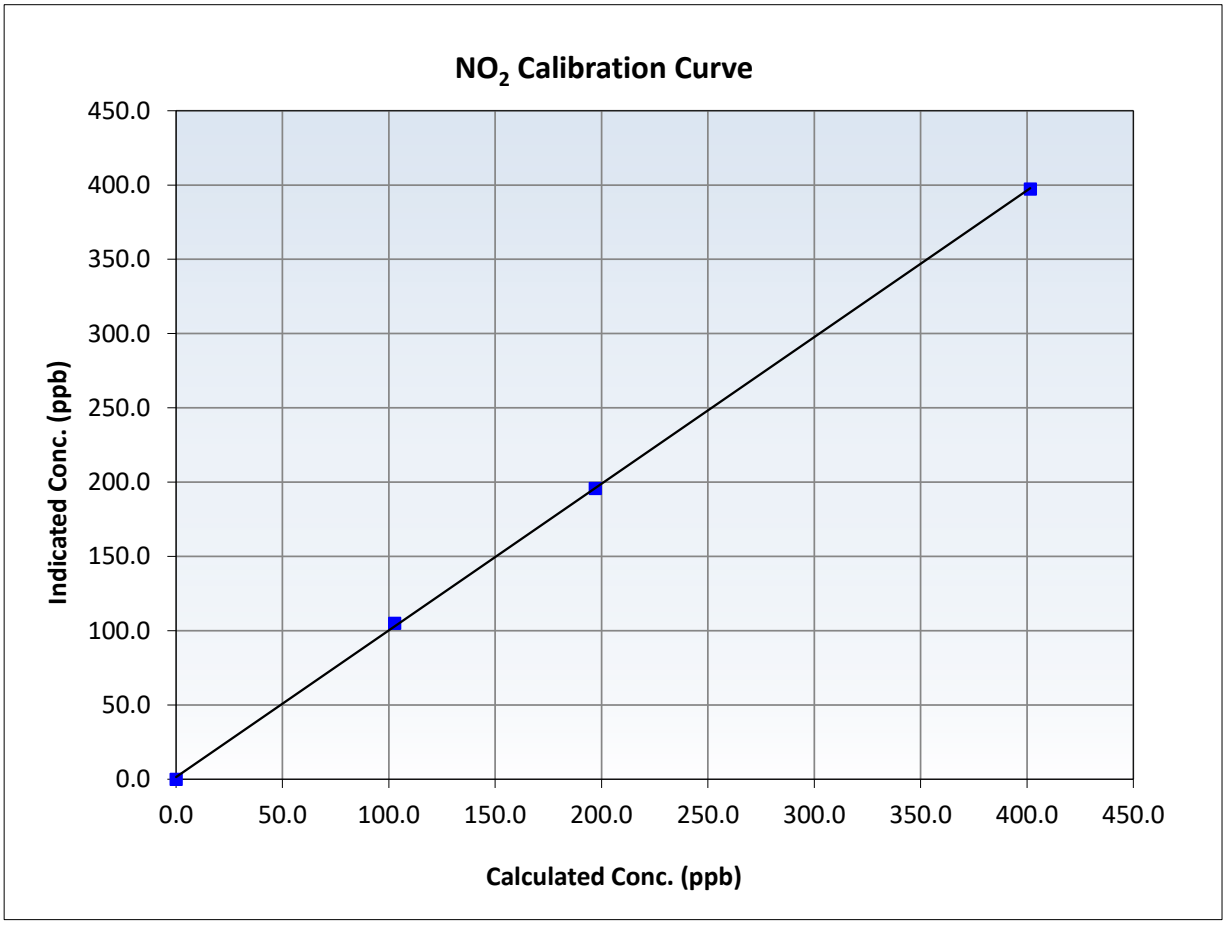
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 16, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:52	End Time (MST):	15:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
401.5	397.4	1.0104
197.0	195.8	1.0063
102.7	105.0	0.9785

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999920	*≥0.995*
Slope	0.987139	*0.90 - 1.10*
Intercept	1.475739	*+/-20*



Wood Buffalo Environmental Association

NO Calibration Summary

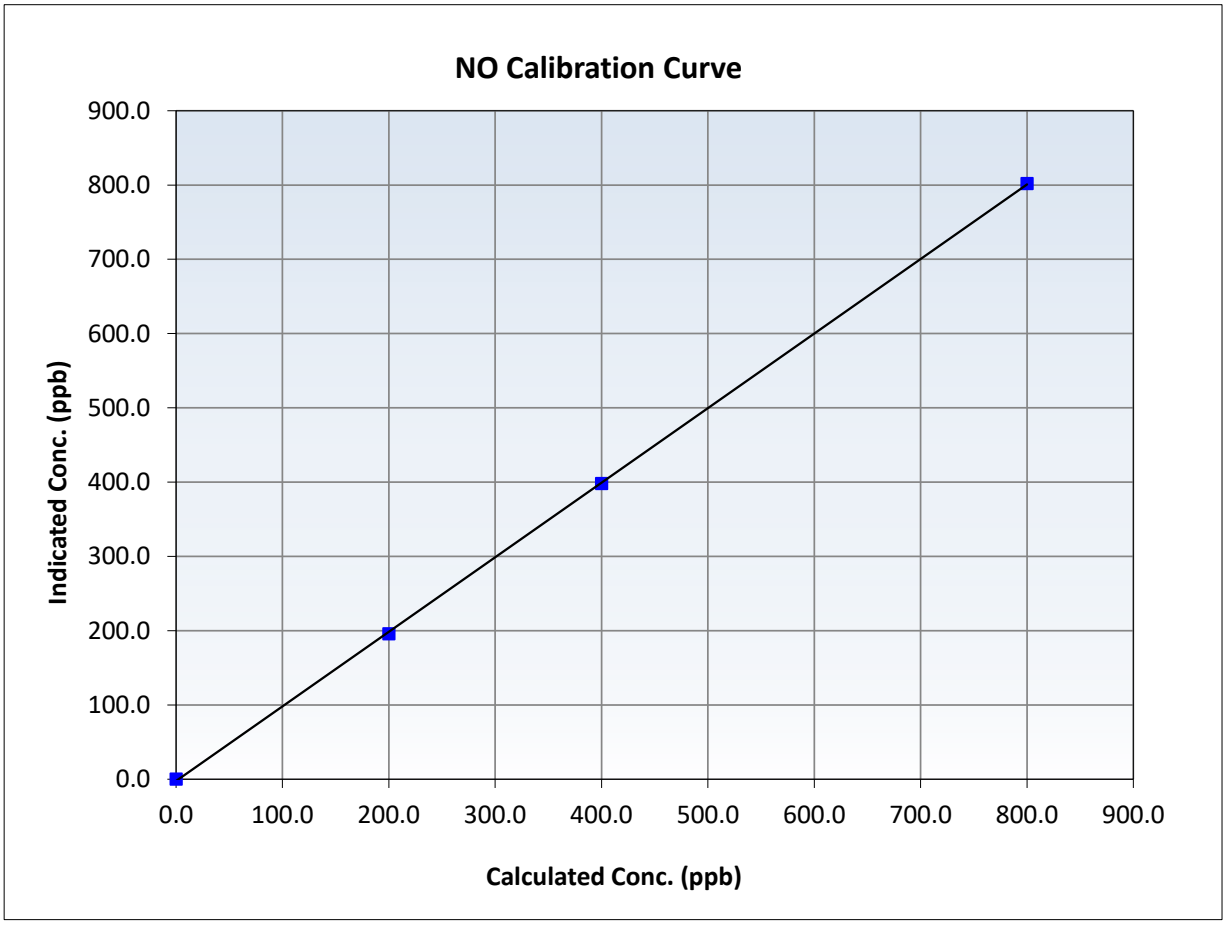
Station Information

Calibration Date:	November 13, 2024	Previous Calibration:	October 16, 2024
Station Name:	Kirby North	Station Number:	AMS 508
Start Time (MST):	10:52	End Time (MST):	15:48
Analyzer make:	Thermo 42i	Analyzer serial #:	1118148496

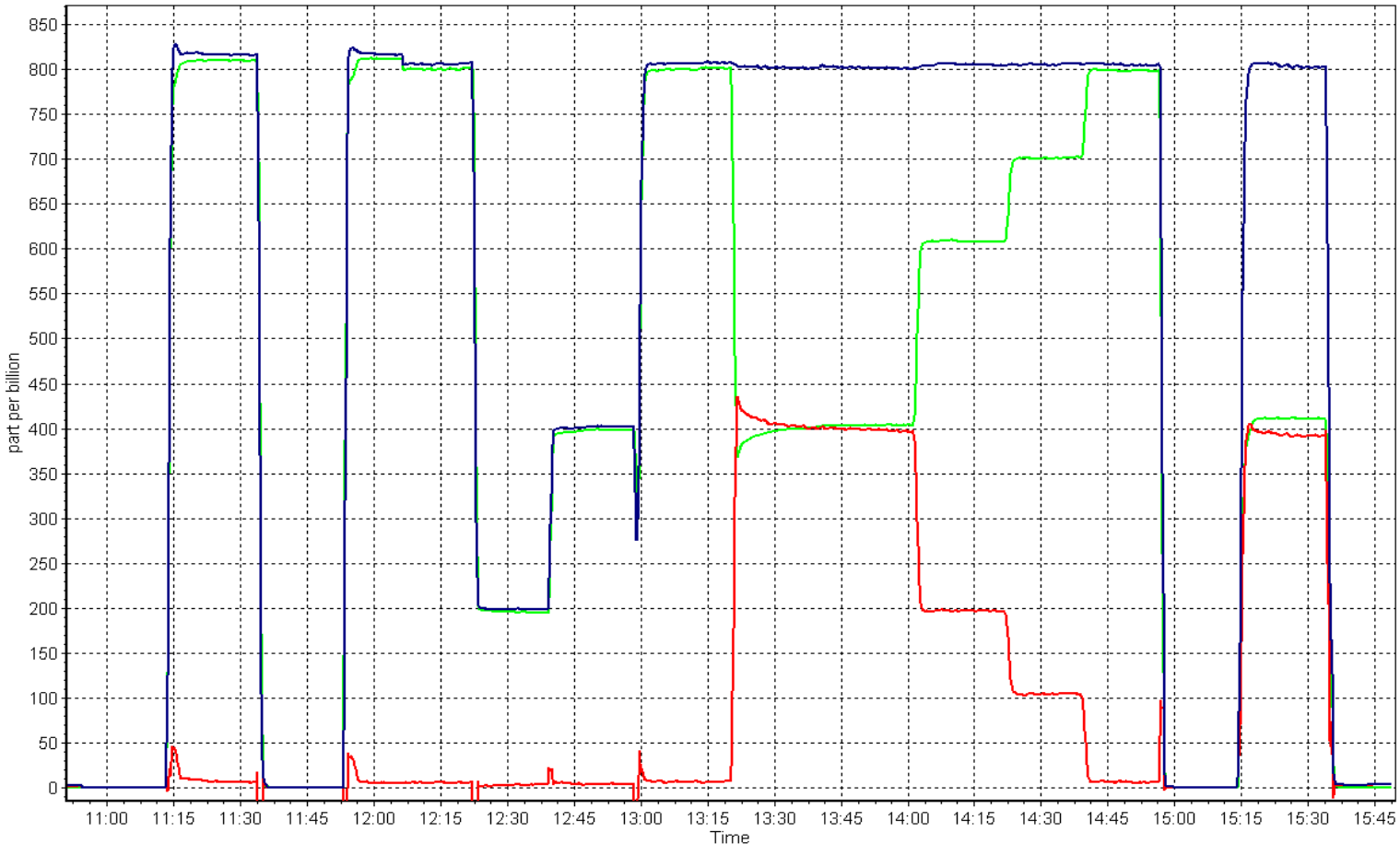
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.1	----
800.1	802.0	0.9976
400.0	398.1	1.0048
200.0	195.9	1.0209

Statistical Evaluation		Limits
Correlation Coefficient	0.999958	≥0.995
Slope	1.003858	0.90 - 1.10
Intercept	-2.344036	+/-20



NO_X Calibration Plot Date: November 13, 2024 Location: Kirby North



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
CALIBRATION REPORT

AMS512
HANGINGSTONE EXPANSION
NOVEMBER 2024

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

December 23, 2024

Wood Buffalo Environmental Association

SO_2 Calibration Report

Station Information

Station Name:	Hangingstone Expansion	Station number:	AMS 512
Calibration Date:	November 22, 2024	Last Cal Date:	October 18, 2024
Start time (MST):	7:58	End time (MST):	10:41
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	50.06	ppm	Cal Gas Exp Date:	January 5, 2029
Cal Gas Cylinder #:	CC147416			
Removed Cal Gas Conc:	50.06	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Model:	Teledyne API T700		Serial Number:	2445
Zero Air Gen Model:	Teledyne API 701		Serial Number:	138

Analyzer Information

Analyzer make:	Thermo scientific		Serial Number:	1173410001	
Analyzer Range:	0 - 1000 ppb				
	Start	***Finish***		***Start***	***Finish***
Calibration slope:	1.010912	1.002887	Backgd or Offset:	13.6	13.6
Calibration intercept:	-1.623998	-1.243382	Coeff or Slope:	1.151	1.164

SO_2 As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.4	----
As found High point	4920	79.8	799.0	791.2	1.010
As found Mid point					
As found Low point					
New cylinder response					
Baseline Corr As found:	790.8	Previous response	806.1	*% change	-1.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiates investigation	

SO_2 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.7	----
High point	4920	79.8	799.0	801.2	0.997
Mid point	4960	39.9	399.5	397.9	1.004
Low point	4987	20.0	200.0	197.7	1.011
As left zero	5000	0.0	0.0	0.4	----
As left span	4920	79.8	799.0	803.5	0.994
				Average Correction Factor:	1.004

Notes: No maintanence done. Span adjusted

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

SO_2 Calibration Summary

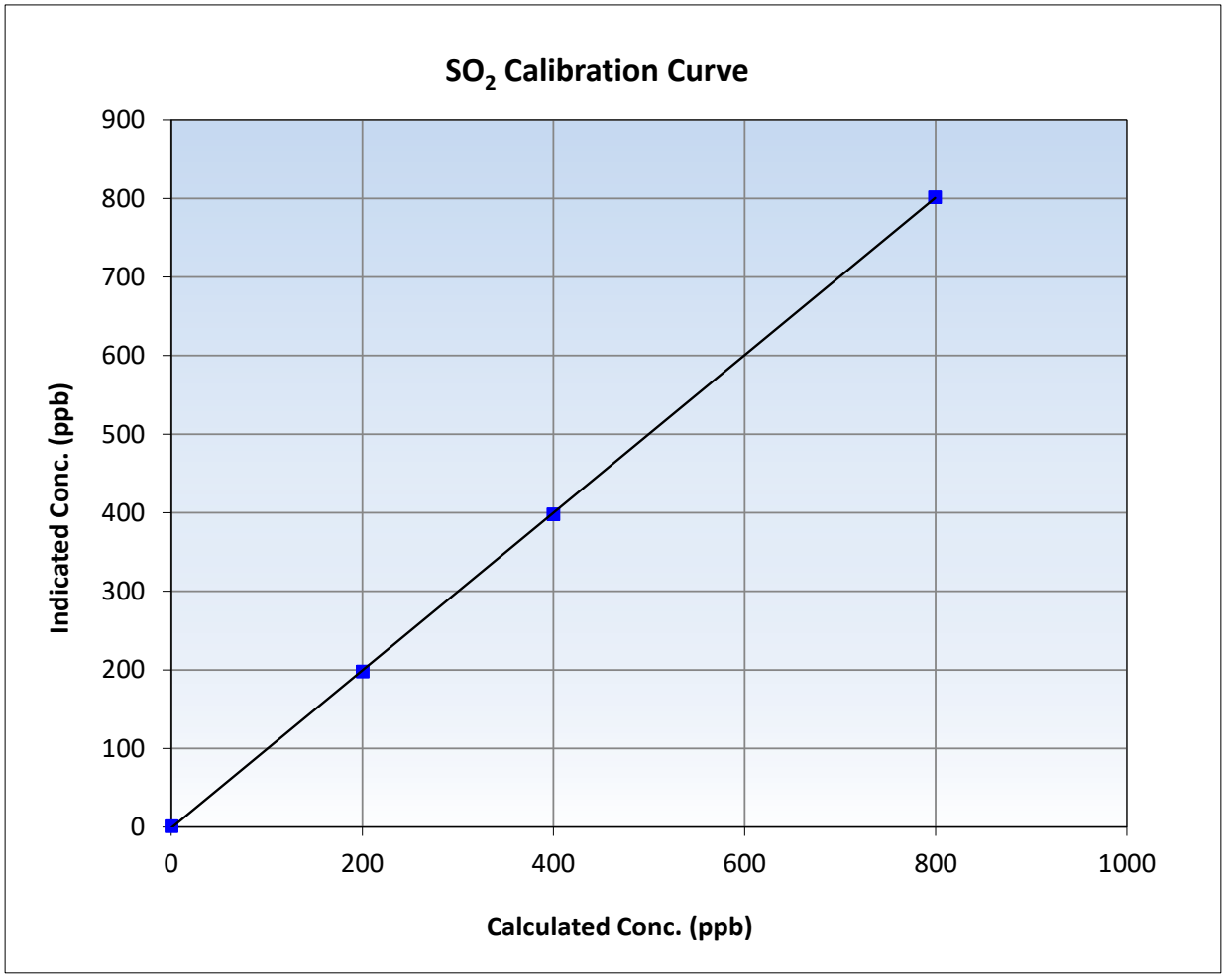
Station Information

Calibration Date:	November 22, 2024	Previous Calibration:	October 18, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	7:58	End Time (MST):	10:41
Analyzer make:	Thermo scientific	Analyzer serial #:	1173410001

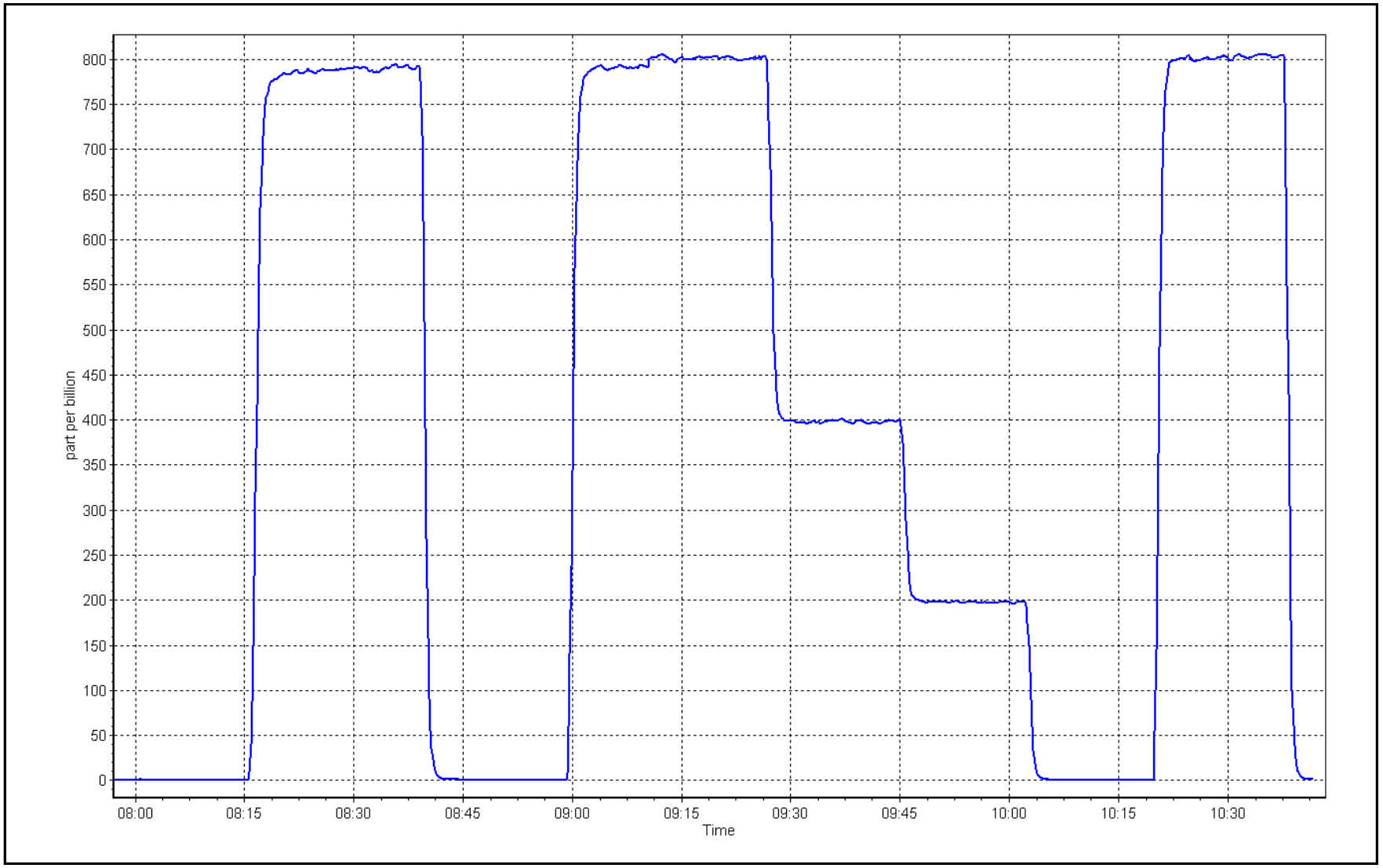
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.7	----
799.0	801.2	0.9972
399.5	397.9	1.0040
200.0	197.7	1.0114

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999972	*≥0.995*
Slope	1.002887	*0.90 - 1.10*
Intercept	-1.243382	*+/-30*



SO2 Calibration Plot Date: November 22, 2024 Location: Hangingstone Expansion



Wood Buffalo Environmental Association

H_2S Calibration Report

Station Information

Station Name:	Hangingstone Expansion	Station number:	AMS 512
Calibration Date:	November 20, 2024	Last Cal Date:	October 15, 2024
Start time (MST):	7:20	End time (MST):	11:44
Reason:	Routine		

Calibration Standards

Cal Gas Concentration:	5.139	ppm	Cal Gas Exp Date:	January 3, 2026
Cal Gas Cylinder #:	CC511397			
Removed Cal Gas Conc:	5.139	ppm	Rem Gas Exp Date:	NA
Removed Gas Cyl #:	NA		Diff between cyl:	
Calibrator Make/Model:	API T700		Serial Number:	2445
ZAG Make/Model:	API T701		Serial Number:	138

Analyzer Information

Analyzer make:	Thermo 43i-LTE		Analyzer serial #:	1336160090
Converter make:	Global G150		Converter serial #:	2022-227
Analyzer Range	0 - 100 ppb		Converter Temp:	325 degC

	Start	*Finish*		*Start*	*Finish*
Calibration slope:	1.000346	0.983476	Backgd or Offset:	3.51	3.51
Calibration intercept:	-0.159192	0.181186	Coeff or Slope:	1.194	1.194

H_2S As Found Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90-1.10*
As found zero	5000	0.0	0.0	0.1	----
As found High point	4922	77.8	80.0	79.5	1.007
As found Mid point	4961	38.9	40.0	39.7	1.010
As found Low point	4981	19.5	20.0	19.8	1.017
New cylinder response					

Baseline Corr As found:	79.4	Prev response:	79.83	*% change:	-0.5%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.993628	AF Intercept:	0.000903
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999993	* = > +/-5% change initiates investigation	

H_2S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Calibrator zero	5000	0.0	0.0	0.3	----
High point	4922	77.8	80.0	78.8	1.015
Mid point	4961	38.9	40.0	39.7	1.007
Low point	4981	19.5	20.0	19.6	1.022
As left zero	5000	0.0	0.0	0.3	----
As left span	4922	77.8	80.0	78.4	1.020
SO2 Scrubber Check	4920	80.0	800.0	-0.2	----
Date of last scrubber change:				Ave Corr Factor	1.015
Date of last converter efficiency test:					

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

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

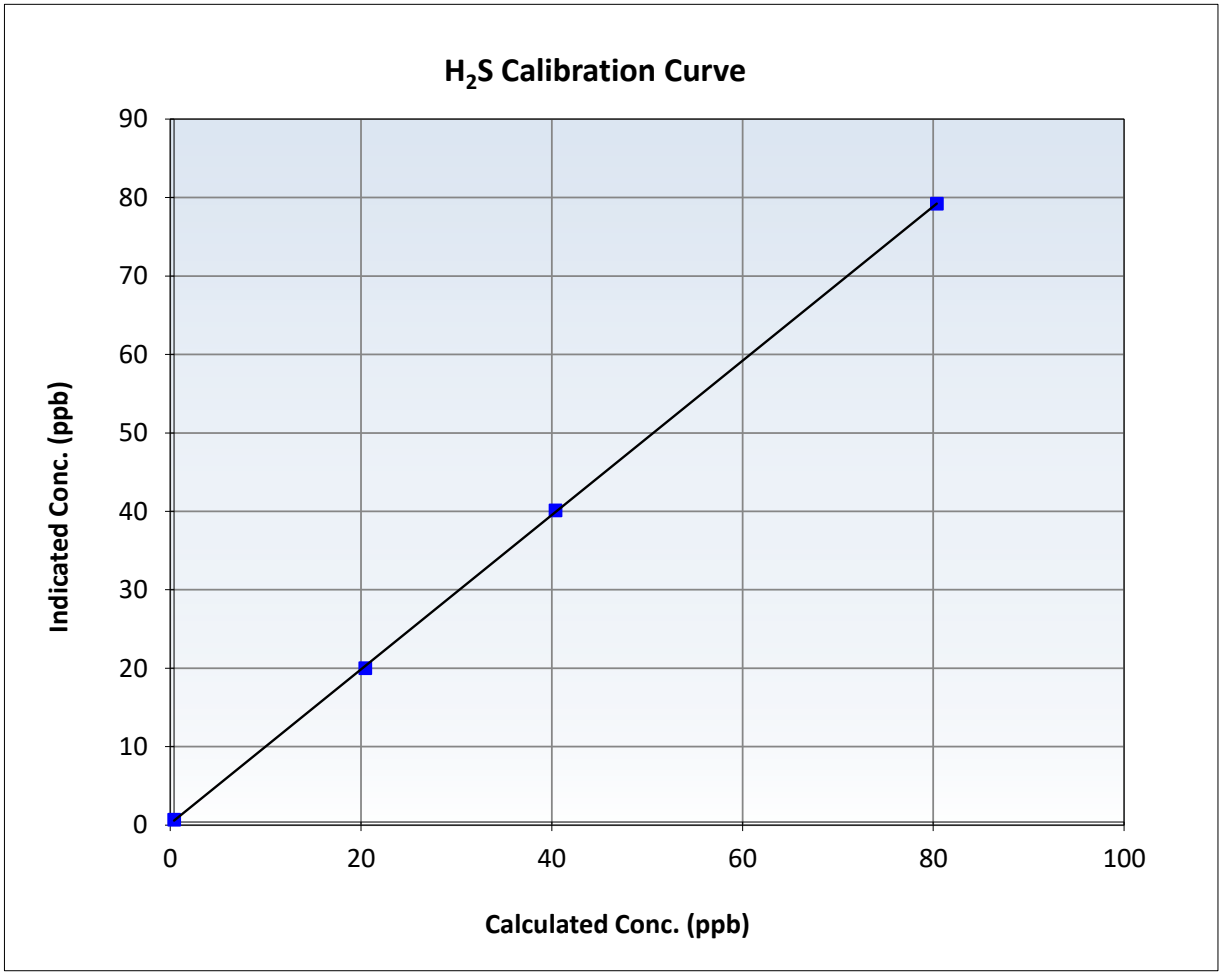
H_2S Calibration Summary

Station Information

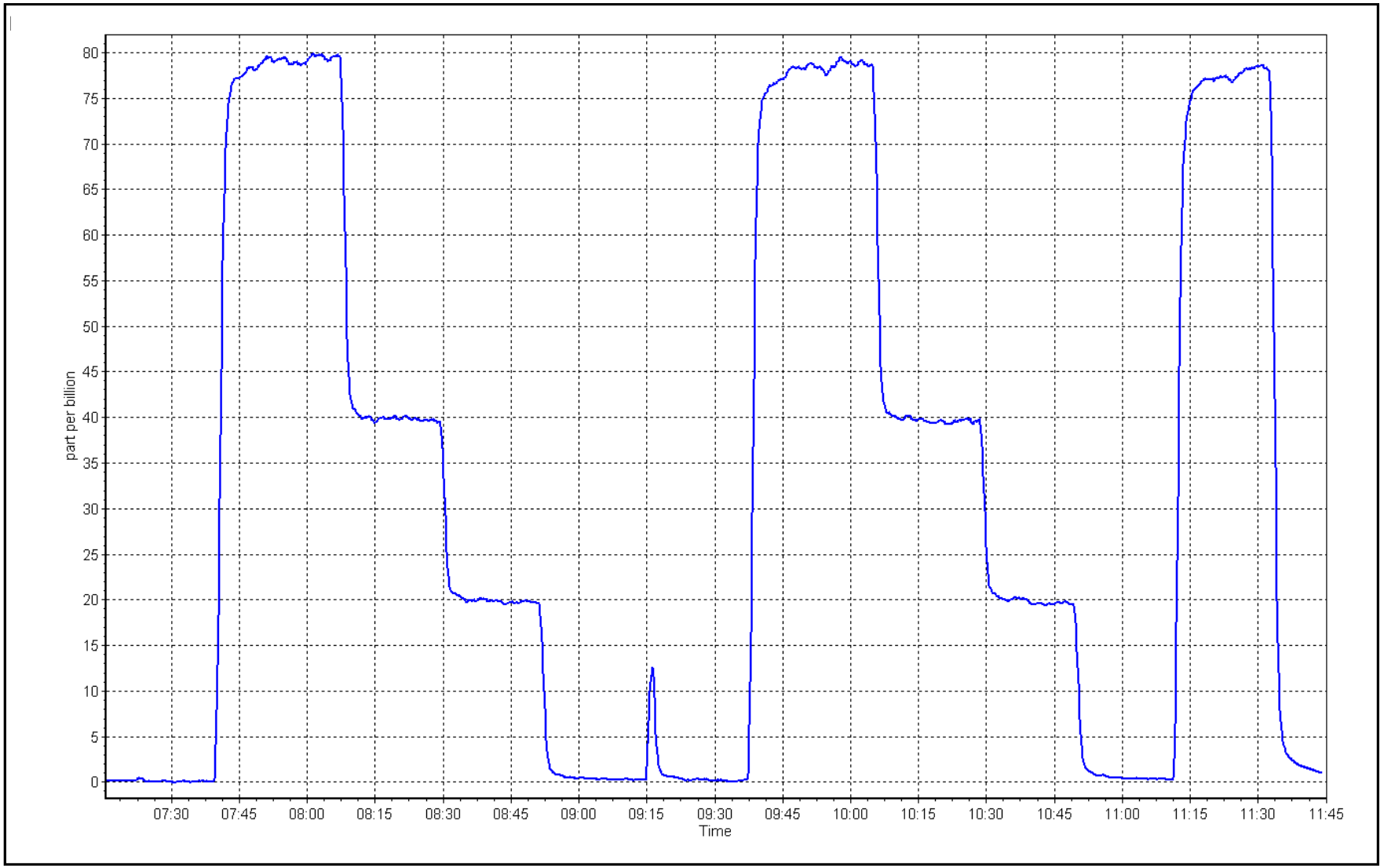
Calibration Date:	November 20, 2024	Previous Calibration:	October 15, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	7:20	End Time (MST):	11:44
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		*Limits*
0.0	0.3	----	Correlation Coefficient	0.999959	*≥0.995*
80.0	78.8	1.0148	Slope	0.983476	*0.90 - 1.10*
40.0	39.7	1.0071			
20.0	19.6	1.0225	Intercept	0.181186	*+/-3*



H_2S Calibration Plot Date: November 20, 2024 Location: Hangingstone Expansion



Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Station Information

Station Name:	Hangingstone Expansion
Station number:	AMS 512
Calibration Date:	November 18, 2024
Last Cal Date:	October 4, 2024
Start time (MST):	7:40
End time (MST):	11:58
Reason:	Routine

Calibration Standards

NO Gas Cylinder #:	T0F8P52	Cal Gas Expiry Date:	August 16, 2026
NOX Cal Gas Conc:	47.43 ppm	NO Cal Gas Conc:	47.43 ppm
Removed Cylinder #:	NA	Removed Gas Exp Date:	NA
Removed Gas NOX Conc:	47.43 ppm	Removed Gas NO Conc:	47.43 ppm
NOX gas Diff:		NO gas Diff:	
Calibrator Model:	Teledyne API T700	Serial Number:	2445
ZAG make/model:	Teledyne API T701	Serial Number:	138

As Found Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	Baseline Adjusted NOx Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*	Baseline Adjusted NO Correction factor (Cc/(Ic-AFzero)) *Limit = 0.90 - 1.10*
As found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
AF High point	4916	84.4	800.6	800.6	0.0	812.0	810.2	1.9	0.9857	0.9879
AF Mid point										
AF Low point										
New cyl resp										

Previous Response	NO_X = 808.3 ppb	NO = 808.0 ppb
Baseline Corr 1st pt	NO_X = 812.2 ppb	NO = 810.4 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

As Found Statistics

As found	NO_X r^2:	*Percent Change	NO_X = 0.5%
As found	NO r^2:	*Percent Change	NO = 0.3%
As found	NO_2 r^2:	Nx Sl:	Nx Int:
		NO Sl:	NO Int:
		NO2 Sl:	NO_2 Int:

As Found GPT Calibration Data

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

Wood Buffalo Environmental Association

NO_X \ NO \ NO_2 Calibration Report

Analyzer Information

Analyzer Make: Teledyne API T200 Serial Number: 7029

NOX Range (ppb): 0 - 1000 ppb

Instrument Settings

	Start	Finish		Start	Finish
NO coeff or slope:	1.075	1.056	NO bkgnd or offset:	0.2	0.2
NOX coeff or slope:	1.074	1.052	NOX bkgnd or offset:	0.4	0.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	4.6	4.6

Calibration Statistics

	Start	Finish
NO_X Cal Slope:	1.010930	1.000766
NO_X Cal Offset:	-1.032928	-1.272780
NO Cal Slope:	1.011530	1.000880
NO Cal Offset:	-1.792911	-1.712772
NO_2 Cal Slope:	1.002679	0.997612
NO_2 Cal Offset:	0.689580	0.073951

Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) *Limit = 0.95-1.05*	NO Correction factor (Cc/Ic) *Limit = 0.95-1.05*
Cal zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
High point	4916	84.4	800.6	800.6	0.0	800.5	800.3	0.1	1.0001	1.0003
Mid point	4958	42.2	400.3	400.3	0.0	398.7	398.4	0.3	1.0040	1.0048
Low point	4979	21.1	200.2	200.2	0.0	197.9	196.7	1.2	1.0114	1.0176
As left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
As left span	4916	84.4	800.6	402.9	397.7	793.4	402.9	390.4	1.0090	1.0000
								Average Correction Factor	1.0052	1.0076

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) *Limit = 0.95-1.05*	Converter Efficiency *Limit = 96-104%*
Cal zero	----	----	0.0	-0.1	----	----
High GPT point	797.6	401.1	396.5	395.5	1.0025	99.7%
Mid GPT point	797.6	617.1	180.5	180.4	1.0006	99.9%
Low GPT point	797.6	706.3	91.3	91.2	1.0011	99.9%
				Average Correction Factor	1.0014	99.9%

Notes: No maintenance done. Span adjusted.

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

NO_X Calibration Summary

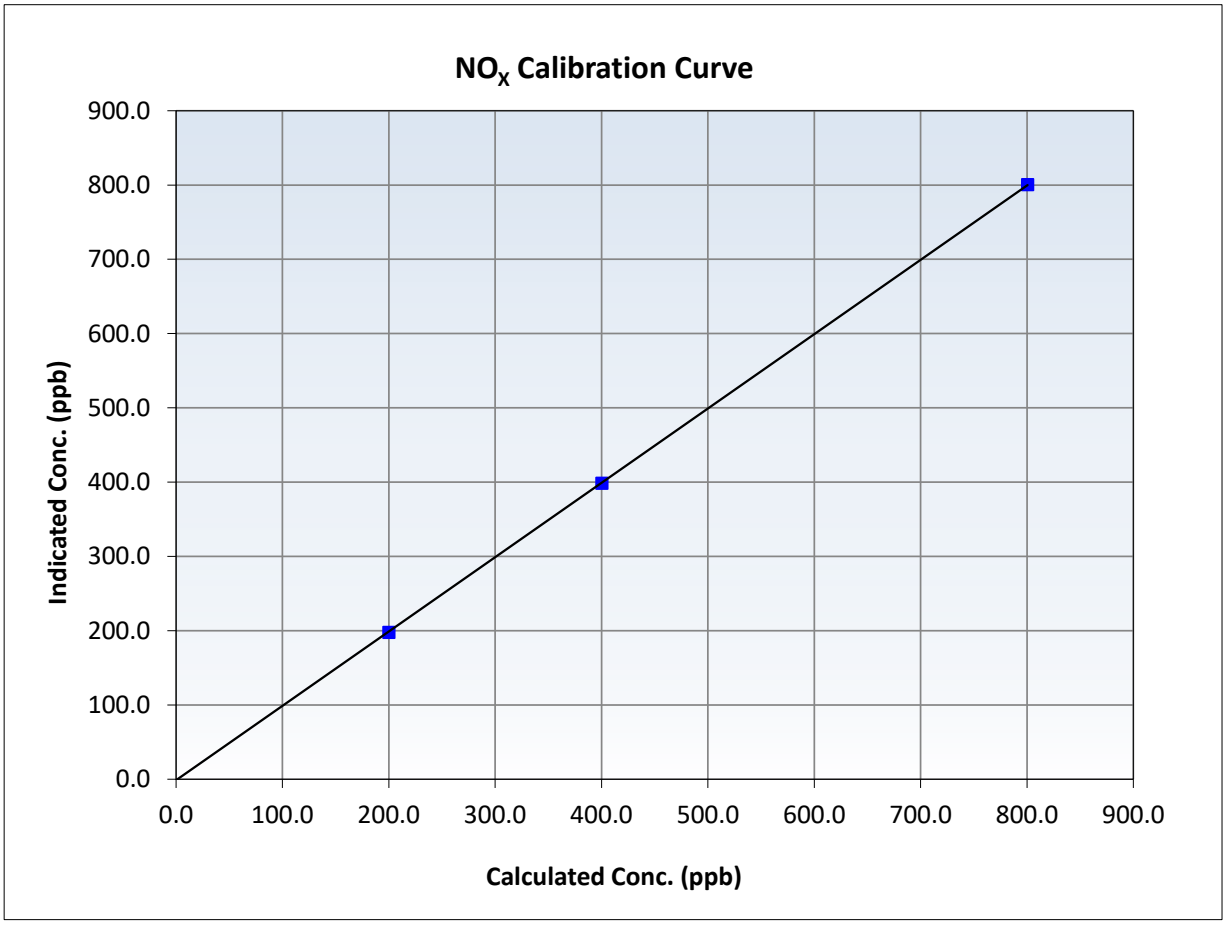
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 4, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	7:40	End Time (MST):	11:58
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
800.6	800.5	1.0001
400.3	398.7	1.0040
200.2	197.9	1.0114

Statistical Evaluation		Limits
Correlation Coefficient	0.999990	≥0.995
Slope	1.000766	0.90 - 1.10
Intercept	-1.272780	+/-20



Wood Buffalo Environmental Association

NO_2 Calibration Summary

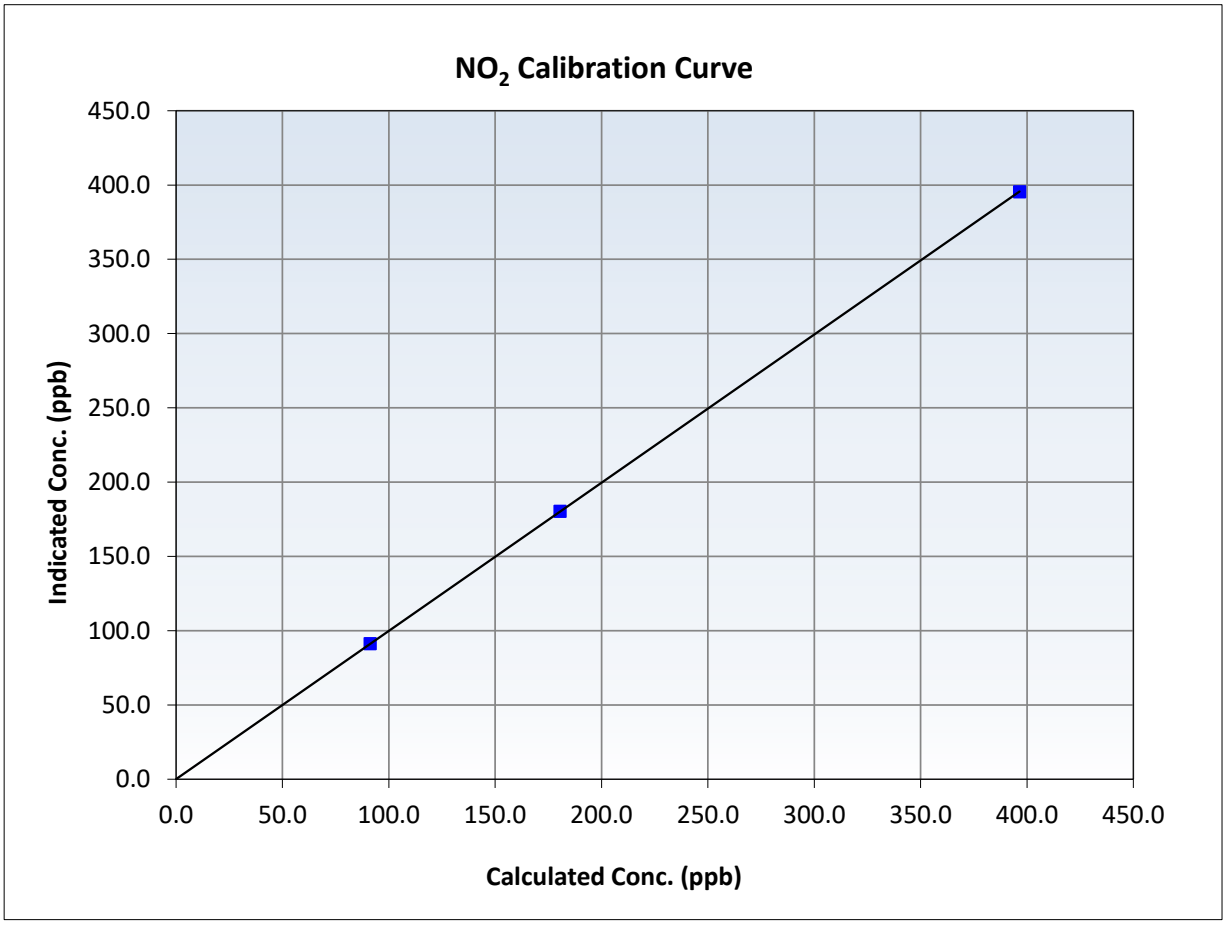
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 4, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	7:40	End Time (MST):	11:58
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	-0.1	----
396.5	395.5	1.0025
180.5	180.4	1.0006
91.3	91.2	1.0011

Statistical Evaluation		Limits
Correlation Coefficient	0.999999	≥0.995
Slope	0.997612	0.90 - 1.10
Intercept	0.073951	+/-20



Wood Buffalo Environmental Association

NO Calibration Summary

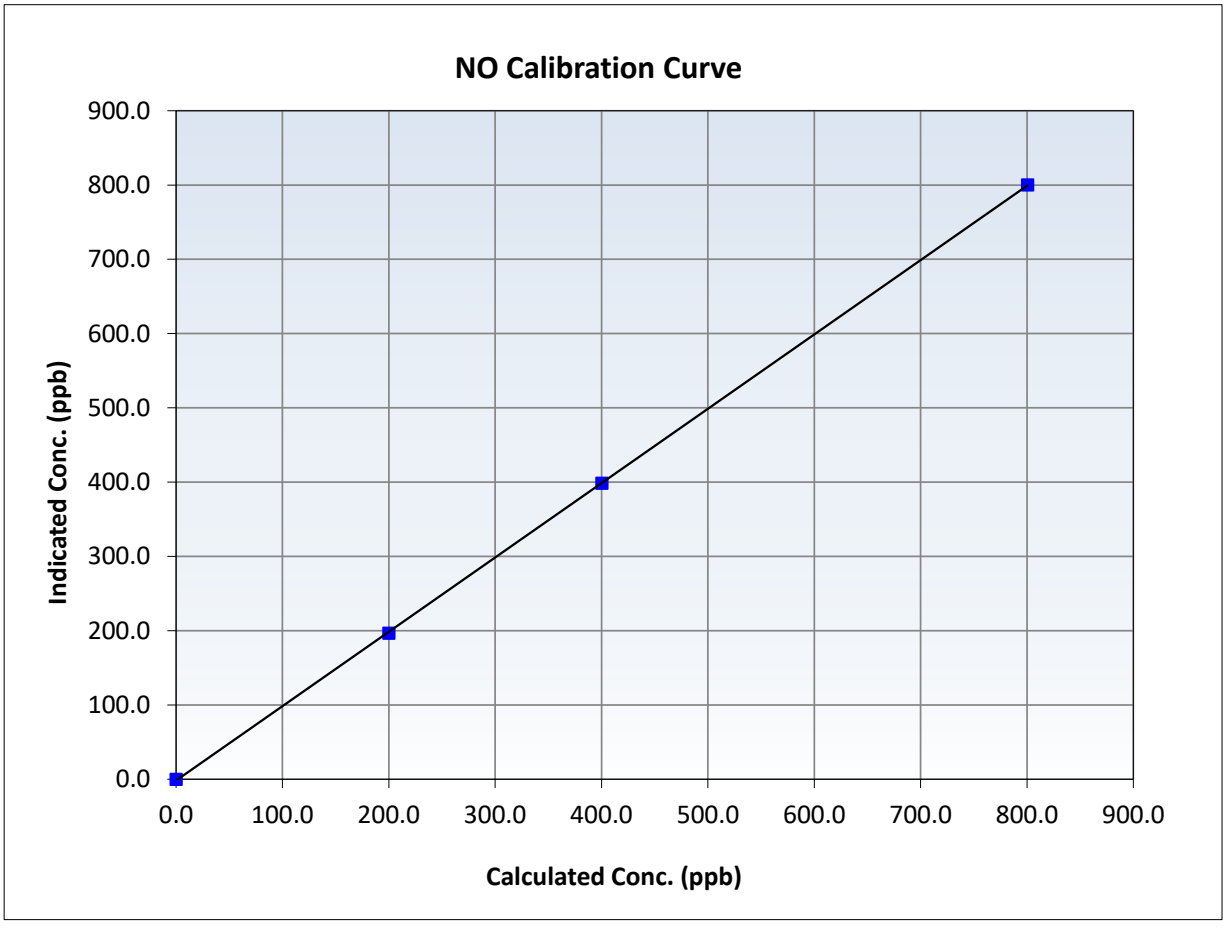
Station Information

Calibration Date:	November 18, 2024	Previous Calibration:	October 4, 2024
Station Name:	Hangingstone Expansion	Station Number:	AMS 512
Start Time (MST):	7:40	End Time (MST):	11:58
Analyzer make:	Teledyne API T200	Analyzer serial #:	7029

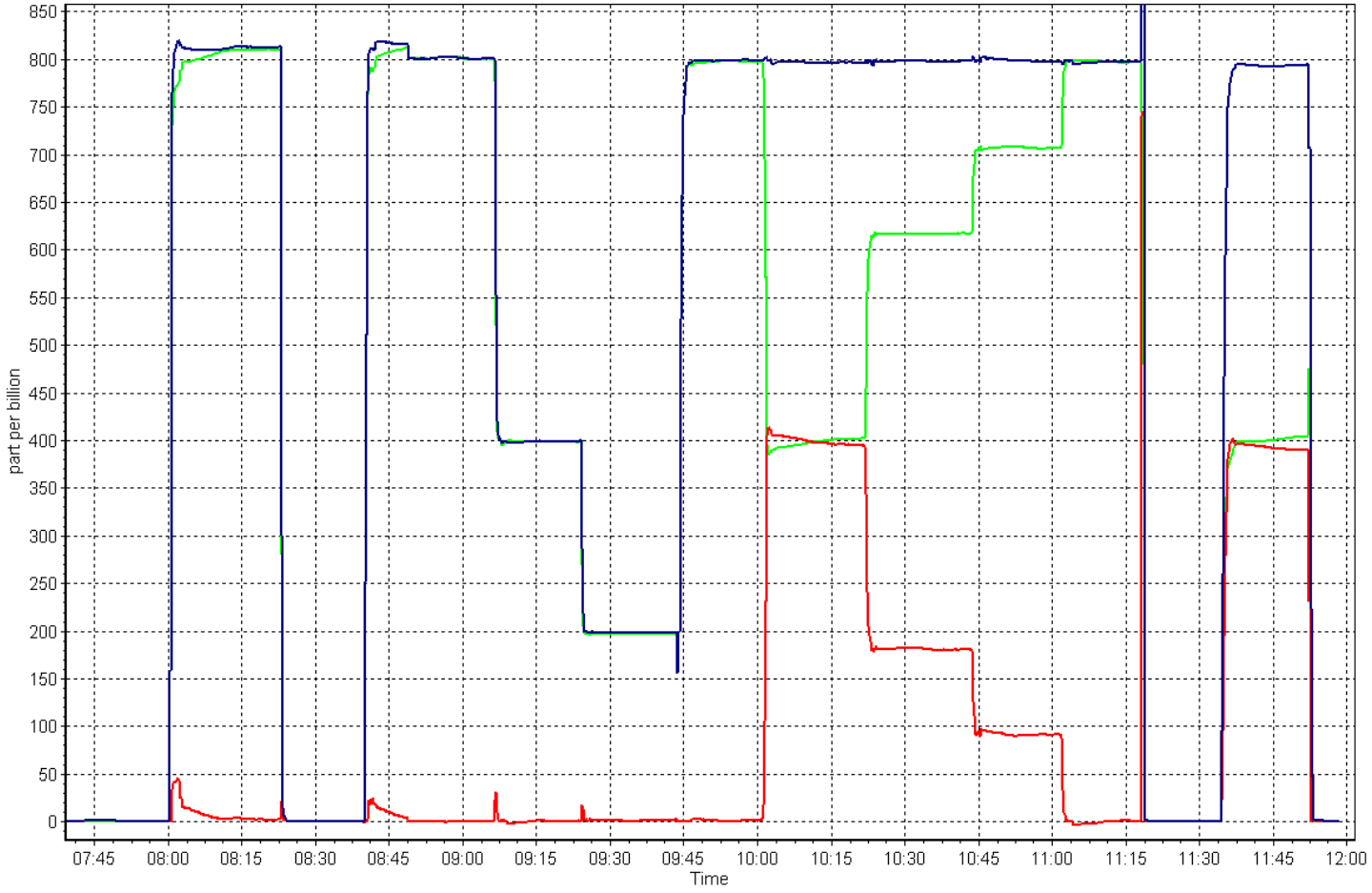
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
0.0	0.0	----
800.6	800.3	1.0003
400.3	398.4	1.0048
200.2	196.7	1.0176

Statistical Evaluation		*Limits*
Correlation Coefficient	0.999979	*≥0.995*
Slope	1.000880	*0.90 - 1.10*
Intercept	-1.712772	*+/-20*



NO_X Calibration Plot Date: November 18, 2024 Location: Hangingstone Expansion



End of Report