WOOD BUFFALO ENVIRONMENTAL ASSOCIATION MONTHLY AMBIENT AIR QUALITY MONITORING REPORT April 2023 REPORT HISTORY

Original report release date: May 31, 2023

Revised report release date: August 30, 2023

Revision 1 – Submission of H2S data and Revision of TRS data at Patricia McInnes.

The Patricia McInnes air monitoring station (AMS06) collected H_2S data from January 3, 2023, to June 12, 2023, but it was reported as TRS. On August 30, 2023, the data was resubmitted as H_2S to the Electronic Transfer System (ETS) and the TRS data was revised. The monthly report cover letter, station summary, network summary, and calibration report contained within have been revised to reflect the change.



Unit 3 - 805 Memorial Drive Fort McMurray, AB T9K 0K4 P: 780.799.4420 E: info@wbea.org **wbea.org**

Wood Buffalo Environmental Association

APRIL 2023

MONTHLY CALIBRATION REPORT

CONTINUOUS MONITORING August 30, 2023 Revision 01

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



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS01 BERTHA GANTER - FORT MCKAY APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort April 24, 2023 10:50 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 March 13, 2023 15:48	
		Calibration St	andards		
Cal Gas Concentration:	49.19		Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	49.19 CC486642	ppm	Cal Gas Exp Date.	rebiuary 25, 2025	
Removed Cal Gas Conc:	49.19	ppm	Rem Gas Exp Date:	NΔ	
Removed Gas Cyl #:	49.19 NA	ppin	Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565	
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609	
				5005	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	JC1501301448	
Analyzer Kange	e 0 - 1000 hhn				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.000943	0.998615	Backgd or Offset:	19.4	19.2
Calibration intercept:	-0.132808	0.106886	Coeff or Slope:	0.897	0.889
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lo Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.3	
as found span	4918	81.3	799.9	804.4	0.994
as found 2nd point	4959	40.7	400.4	400.7	0.999
as found 3rd point	4979	20.3	199.7	199.3	1.002
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4918	81.3	799.9	799.3	1.001
second point	4959	40.7	400.4	399.1	1.003
third point	4979	20.3	199.7	199.9	0.999
as left zero	5000	0.0	0.0	0.6	
as left span	4918	81.3	799.9	799.9	1.000
			Averag	ge Correction Factor	1.001
Baseline Corr As found:	804.10	Previous response	800.56	*% change	0.4%
Baseline Corr 2nd AF pt:	400.40	AF Slope:	1.005658	AF Intercept:	-0.833202
	199.00				
Baseline Corr 3rd AF pt:	199.00	AF Correlation:	0.999969		

Notes:

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

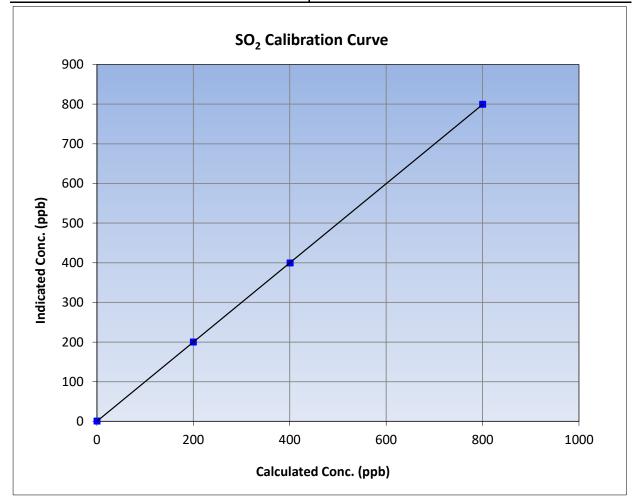
Calibration Performed By:

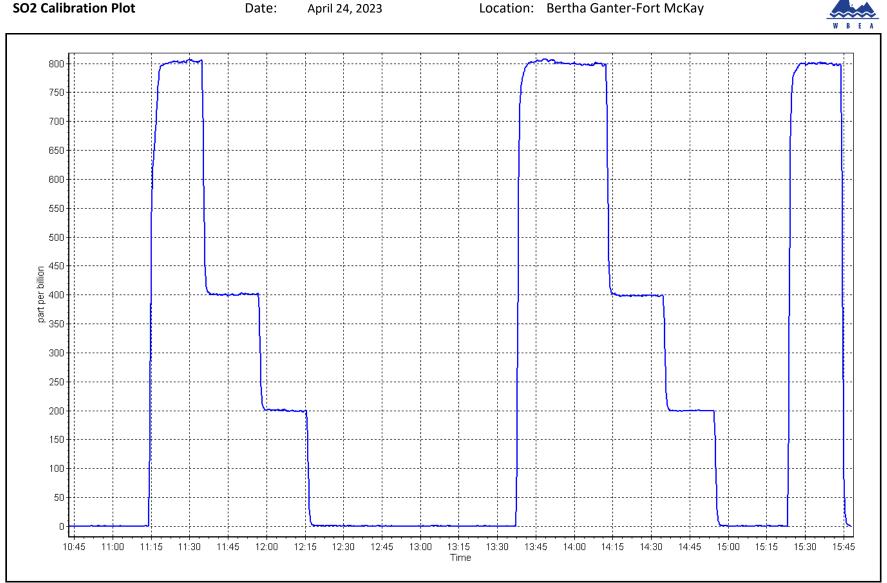
Rene Chamberland



SO₂ Calibration Summary

WBEA					Version-01-20
		Station	Information		
Calibration Date:	April 24, 2023		Previous Calibration:	March	13, 2023
Station Name:	Bertha Ganter	-Fort McKay	Station Number:	AM	1501
Start Time (MST):	10:5	0	End Time (MST):	15	5:48
Analyzer make:	Thermo	o 43i	Analyzer serial #:	JC1501	L301448
Calculated concentration		Correction factor	ration Data Statistical Evalua	tion	Limits
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)			
0.0	0.3		Correlation Coefficient	0.999997	≥0.995
799.9	799.3	1.0008		0.000007	20.000
400.4	399.1	1.0033	Slope	0.998615	0.90 - 1.10
199.7	199.9	0.9992			
			- Intercept	0.106886	+/-30





SO2 Calibration Plot

April 24, 2023

Location: Bertha Ganter-Fort McKay



TRS Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
itation Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort April 21, 2023 9:26 Maintenance	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 March 13, 2023 15:04	
		Calibration St	tandards		
Cal Gas Concentration:	5.10	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #:	<u>CC511749</u>				
Removed Cal Gas Conc:	5.10	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	<u>N/A</u>		Diff between cyl:		
Calibrator Make/Model: CAG Make/Model:	Teledyne API 1700 Teledyne API 1701		Serial Number: Serial Number:	3565 5609	
		Analyzer Info	ormation		
Analyzer make:	Thermo 43i-TLE		Analyzer serial #:	1218153461	
Converter make:	CD Nova		Converter serial #:	470	
Analyzer Range	0 - 100 ppb				
	Start	Finish		Start	Finish
Calibration slope:	1.000364	0.999078	Backgd or Offset:	2.27	2.26
alibration intercept:	0.439997	0.160000	Coeff or Slope:		0.919
Set Point	Dilution air flow rate	Source gas flow rate	Calculated concentration (ppb)	Indicated	Baseline Adjusted Correction factor
	(sccm)	(sccm)	(Cc)	concentration (ppb) (Ic)	(Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4921	78.4	80.0	80.1	1.000
as found 2nd point	4960	39.2	40.0	40.1	1.000
as found 3rd point	4980	19.6	20.0	20.0	1.005
new cylinder response					
		TRS Calibrati	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/Ic)
		(,	(Cc)	····· (PP-) (··)	Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4921	78.4	80.0	80.1	0.999
second point	4960	39.2	40.0	40.1	0.997
third point	4980	19.6	20.0	20.1	0.995
as left zero	5000 4921	0.0	0.0	0.2	
as left span		78.4	80.0	79.2	1.010
O2 Scrubber Check ate of last scrubber cha	4919	81.3 December 17, 2021	813.0	0.0	0.997
ate of last converter ef		Detember 17, 2021		Ave Corr Factor	efficiency
	neichey iest.				
				40/ 1	0 00/
aseline Corr As found:	80.0	Prev response:	80.46	*% change:	-0.6%
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	80.0 40.0 19.9	Prev response: AF Slope: AF Correlation:	80.46 1.000507 0.999998	AF Intercept:	-0.6% 0.059999

Inlet filter change and scrubber check completed after as founds. Replaced the sample pump. No adjustments made.

Calibration Performed By:

Notes:

Rene Chamberland

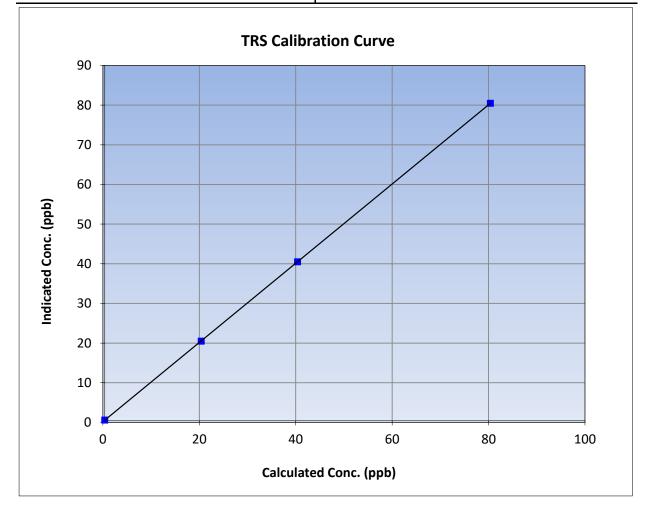


TRS Calibration Summary

WBEA			Version-11-2021
	Station	Information	
Calibration Date:	April 21, 2023	Previous Calibration:	March 13, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	9:26	End Time (MST):	15:04
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153461

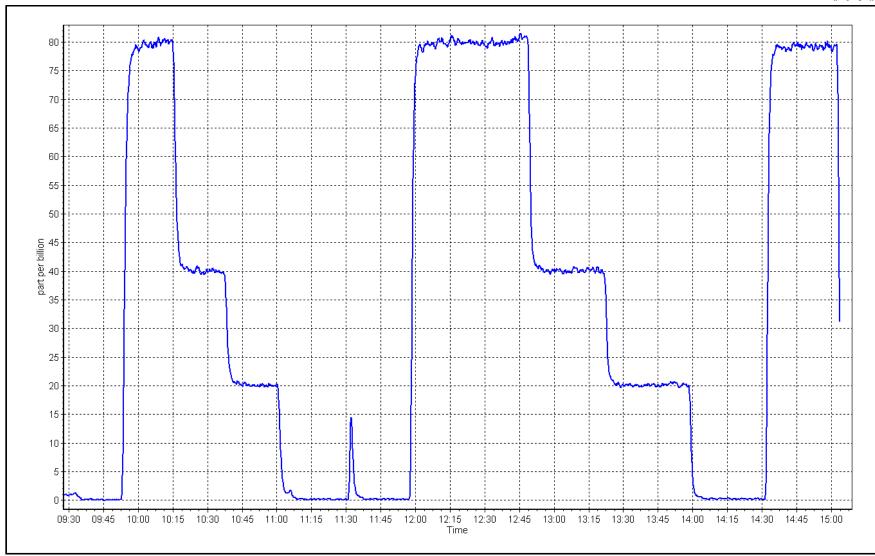
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999999	≥0.995
80.0	80.1	0.9987	correlation coefficient	0.999999	20.995
40.0	40.1	0.9975	Slope	0.999078	0.90 - 1.10
20.0	20.1	0.9949	Slope	0.999078	0.30 - 1.10
			- Intercept	0.160000	+/-3











H₂S Calibration Report

WBEA		Charles I. C			Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort April 21, 2023 9:26 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 March 13, 2023 15:04	
		Calibration S	tandards		
Cal Gas Concentration:	5.10	ppm	Cal Gas Exp Date:	September 16, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc:	<u>CC511749</u> 5.10	ppm	Rem Gas Exp Date:		
Removed Gas Cyl #:	<u>N/A</u>		Diff between cyl:	2565	
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	3565 5609	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Thermo Converter 0 - 100 ppb		Analyzer serial #: Converter serial #:	1200326167 N/A	
	Start	Finish		Start	Finish
Calibration slope:	0.996518	0.993089	Backgd or Offset:	1.94	1.90
Calibration intercept:	0.401597	0.521594	Coeff or Slope:	1.014	1.001
		H ₂ S As Fou	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4921	78.4	80.0	81.7	0.979
as found 2nd point	4960	39.2	40.0	41.2	0.971
as found 3rd point	4980	19.6	20.0	20.4	0.980
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	78.4	80.0	79.9	1.001
second point	4961	39.2	40.0	40.3	0.992
third point	4980	19.6	20.0	20.5	0.975
as left zero	5000	0.0	0.0	0.7	
as left span	4921	78.4	80.0	78.7	1.016
02 Scrubber Check	4919	81.3	813.0	-0.2	
Date of last scrubber cha		March 21, 2022		Ave Corr Factor	0.990
Date of last converter eff	-	•			efficiency
Baseline Corr As found:	81.7	Prev response:	80.10	*% change:	2.0%
JUJCHINE CONTINA TOURIU.		•		AF Intercept:	0.059995
Saseline Corr 2nd AF nt.	<u>4</u> 1)				
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	41.2 20.4	AF Slope: AF Correlation:		Ar intercept.	0.0555555

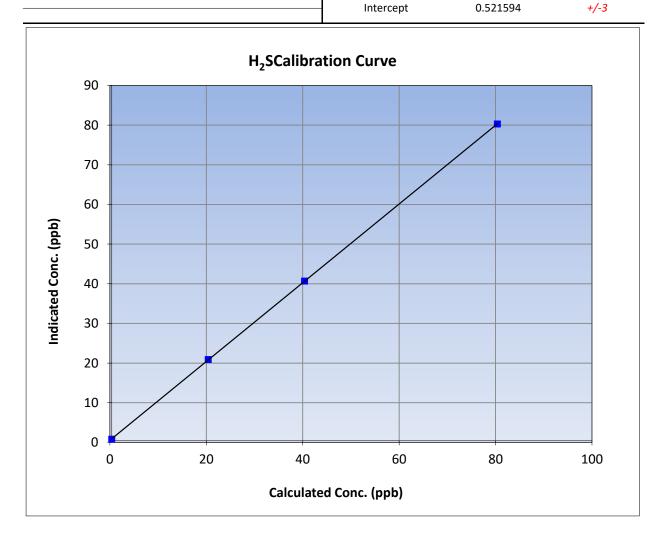
Notes:

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



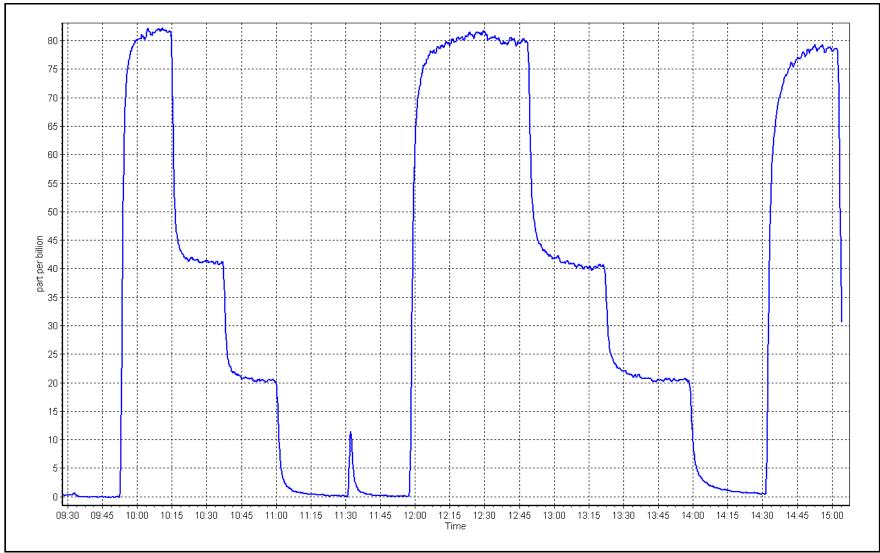
H₂S Calibration Summary

WBEA					Version-11-
		Station	Information		
Calibration Date:	April 21	2023	Previous Calibration:	March	13, 2023
Station Name:	Bertha Ganter	-Fort McKay	Station Number:	AN	1501
Start Time (MST):	9:2	6	End Time (MST):	15	5:04
nalyzer make: Thermo		43iQTL	Analyzer serial #:	12003	326167
		Calibi	ration Data		
Calculated concentration I (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999989	≥0.995
80.0	79.9	1.0012	Correlation Coefficient	0.999969	20.995
40.0	40.3	0.9923	Slope	0.993089	0.90 - 1.10
20.0	20.5	0.9755	Siope	0.333085	0.90 - 1.10
			Interest	0 5 2 1 5 0 4	.12











THC / CH_4 / NMHC Calibration Report

Version-01-2020

Station Name:	Berth
Calibration Date:	April
Start time (MST):	10:50
Reason:	Maint

ertha Ganter-Fort McKay pril 24, 2023 0:50 1aintenance Station number: AMS01 Last Cal Date: March 13, 2023 End time (MST): 15:48

Cal Gas Expiry Date: February 23, 2025

			Canor
Gas Cert Reference:	CC4	86642	
CH4 Cal Gas Conc.	497.7	ppm	
C3H8 Cal Gas Conc.	205.6	ppm	
Removed Gas Cert:		NA	
Removed CH4 Conc.	497.7	ppm	
Removed C3H8 Conc.	205.6	ppm	
Diff between cyl (CH ₄):			
Calibrator Model:	Teledyne API T700)	
ZAG make/model:	Teledyne API T701		

Calibration Standards

Station Information

CH4 Equiv Conc.	1063.1	ppm
Removed Gas Expiry: CH4 Equiv Conc.	NA 1063.1	ppm
Diff between cyl (THC):		
Diff between cyl (NM):		
Serial Number:	3565	
Serial Number:	5609	

		Analyzer In	formation		
Analyzer make: Th THC Range (ppm): 0			Analyzer serial #: 11	80320040	
	NMHC Range (ppm): 0 - 10 ppm		CH4 Range (ppm): 0 - 10 ppm		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.64E-04	2.78E-04	NMHC SP Ratio:	5.52E-05	6.06E-05
CH4 Retention time:	14.4	14.4	NMHC Peak Area:	166551	151639

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4918	81.3	17.29	16.12	1.072
as found 2nd point	4959	40.7	8.65	7.97	1.085
as found 3rd point	4980	20.3	4.32	3.98	1.084
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4918	81.3	17.29	17.37	0.995
second point	4959	40.7	8.65	8.63	1.003
third point	4980	20.3	4.32	4.32	0.998
as left zero	5000	0.0	0.00	0.00	
as left span	4918	81.3	17.29	17.36	0.996
			Ave	rage Correction Factor	0.999
Baseline Corr AF:	16.12	Prev response	17.31	*% change	-7.4%
Baseline Corr 2nd AF:	8.0	AF Slope:	0.932699	AF Intercept:	-0.036523
Baseline Corr 3rd AF:	4.0	AF Correlation:	0.999956	* = > +/-5% change initiat	es investigation



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.0		
as found zero	5000	0	0.00	0.00			
as found span	4918	81.3	9.19	8.47	1.086		
as found 2nd point	4959	40.7	4.60	4.21	1.093		
as found 3rd point	4980	20.3	2.30	2.11	1.087		
new cylinder response							
calibrator zero	5000	0	0.00	0.00			
high point	4918	81.3	9.19	9.25	0.994		
second point	4959	40.7	4.60	4.63	0.995		
third point	4980	20.3	2.30	2.33	0.984		
as left zero	5000	0	0.00	0.00			
as left span	4918	81.3	9.19	9.27	0.992		
			Aver	age Correction Factor	0.991		
Baseline Corr AF:	8.47	Prev response	9.21	*% change	-8.8%		
Baseline Corr 2nd AF:	4.2	AF Slope:	0.920790	AF Intercept:	-0.006752		
Baseline Corr 3rd AF:	2.1	AF Correlation:	0.999984	* = > +/-5% change initiat	es investigation		

CH4 Calibration Data

	CH4 Calibra	lion Dala		
Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
5000	0.0	0.00	0.00	
4918	81.3	8.09	7.65	1.058
4959	40.7	4.05	3.76	1.076
4980	20.3	2.02	1.87	1.081
5000	0.0	0.00	0.00	
4918	81.3	8.09	8.12	0.996
4959	40.7	4.05	4.00	1.012
4980	20.3	2.02	1.99	1.015
5000	0.0	0.00	0.00	
4918	81.3	8.09	8.08	1.001
		Aver	age Correction Factor	1.008
7.65	Prev response	8.09	*% change	-5.8%
3.76	AF Slope:	0.946229	AF Intercept:	-0.029771
1.87	AF Correlation:	0.999901	* = > +/-5% change initiat	es investigation
	Calibration	Statistics		
	<u>Start</u>		Finish	
	1.001736		1.004703	
	-0.010696		-0.018891	
	1.001692	1.004303		
	-0.013161		-0.027159	
	1.001763		1.005180	
	0.002265		0.008268	
	5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 7.65 3.76	Dil air flow rate Source gas flow rate 5000 0.0 4918 81.3 4959 40.7 4980 20.3 5000 0.0 4918 81.3 4959 40.7 4980 20.3 5000 0.0 4918 81.3 4959 40.7 4980 20.3 5000 0.0 4918 81.3 4959 40.7 4980 20.3 5000 0.0 4918 81.3 7.65 Prev response 3.76 AF Slope: 1.87 AF Correlation: Calibration Start 1.001736 -0.010696 1.001692 -0.013161 1.001763	5000 0.0 0.00 4918 81.3 8.09 4959 40.7 4.05 4980 20.3 2.02 5000 0.0 0.00 4918 81.3 8.09 4959 40.7 4.05 4980 20.3 2.02 5000 0.0 0.00 4918 81.3 8.09 4959 40.7 4.05 4980 20.3 2.02 5000 0.0 0.00 4918 81.3 8.09 4918 81.3 8.09 4918 81.3 8.09 4918 81.3 8.09 5000 0.0 0.9062 1.87 AF Correlation: 0.999901 Calibration Statistics Start 1.001736 -0.013161 1.001763	Dil air flow rateSource gas flow rateCalc conc (ppm) (Cc)Ind conc (ppm) (Ic) 5000 0.0 0.00 0.00 4918 81.3 8.09 7.65 4959 40.7 4.05 3.76 4980 20.3 2.02 1.87

Notes:

Changed out the inlet filter and sample pump after as founds. Adjused span only.

Calibration Performed By: Rene

Rene Chamberland



THC Calibration Summary

		Station I	nformation		
Calibration Date:	Date: April 24, 2023 Previous Calibrat		Previous Calibration:	March 1	.3, 2023
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	10	:50	End Time (MST):	15:	48
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
Calculated concentratior (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999981	≥0.995
17.29	17.37	0.9951			
8.65 4.32	8.63 4.32	<u>1.0030</u> 0.9982	Slope	1.004703	0.90 - 1.10
4.52	4.32	0.9982	Intercept	-0.018891	+/-0.5
18.0 -					
20.0		THC Calibratio	n Curve		
18.0 -					
16.0					
14.0 —					
E 12.0 -					
e					
J 10.0					
12.0		/			
ate					
. 6.0					
5					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

		Station I	nformation		
alibration Date:	April 2	4, 2023	Previous Calibration:	March 1	3, 2023
tation Name:	Bertha Gante	er-Fort McKay	Station Number:	AMS	
tart Time (MST):	10	:50	End Time (MST):	15:	48
nalyzer make:	Therr	no 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999924	≥0.995
8.09	8.12	0.9964		0.000021	
4.05	4.00	<u>1.0118</u> 1.0149	Slope	1.004303	0.90 - 1.10
			Intercept	-0.027159	+/-0.5
8.0 7.0 6.0 (mag 5.0					
Indicated Conc. (ppm)					
ndicatee 0.6 –					
2.0					
1.0					
0.0 🖊					
0.0 + 0.0	2.0	4.0	6.0	8.0	10.0

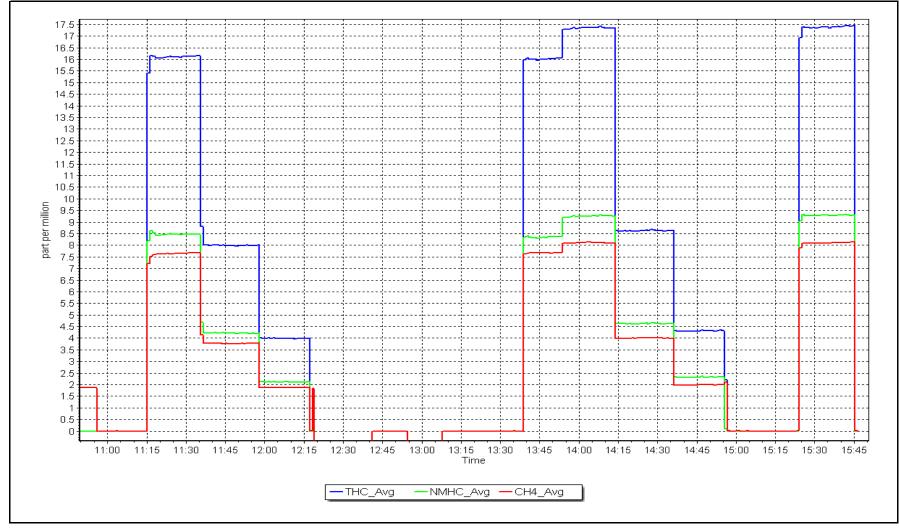


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Apri	l 24, 2023	Previous Calibration:	March 1	3, 2023
Station Name:	Bertha Gar	nter-Fort McKay	Station Number:	AM	S01
Start Time (MST):		10:50	End Time (MST):	15:	48
Analyzer make:	The	ermo 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentratic (ppm) (Ic)	On Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999990	≥0.995
9.19 4.60	9.25	0.9939 0.9951			
2.30	2.33	0.9839	Slope	1.005180	0.90 - 1.10
			Intercept	0.008268	+/-0.5
9.0 - 8.0 - 7.0 -					
7.0 -					
נב 6.0 - כ					
– 0.0 – Couc: (bbm) - 5.0 –					
- 0.4 di - 0.6 di					
2.0 -					
1.0 -					
0.0					
0.	0 2.0	4.0	6.0	8.0	10.0
01					

NMHC Calibration Plot







THC / CH_4 / NMHC Calibration Report

		Chat	on Information			
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-F April 26, 2023 10:09 Maintenance	ort McKay	Station Information Kay Station number: AMS01 Last Cal Date: April 24, 2023 End time (MST): 15:09 ccalibrating instrument due to drift			
		Calibr	ration Standards			
Gas Cert Reference:	C	C486642	Cal Gas Expiry Date: Fe	bruary 23, 202	25	
CH4 Cal Gas Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm	
C3H8 Cal Gas Conc.	205.6	ppm				
Removed Gas Cert:		NA	Removed Gas Expiry: N/	4		
Removed CH4 Conc.	497.7	ppm	CH4 Equiv Conc.	1063.1	ppm	
Removed C3H8 Conc.	205.6	ppm	Diff between cyl (THC):			
Diff between cyl (CH ₄):			Diff between cyl (NM):			
Calibrator Model:	Teledyne API T7	00	Serial Number: 35	65		
ZAG make/model:	Teledyne API T7)1	Serial Number: 56	609		
		Analy	vzer Information			
Analyzer make:	Thermo 55i		Analyzer serial #: 11	.80320040		
, THC Range (ppm):			,			
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	2.78E-04	2.82E-04	NMHC SP Ratio:	6.06E-05	6.11E-05	
CH4 Retention time:	14.4	14.6	NMHC Peak Area:	151639	150450	

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4918	81.3	17.29	17.12	1.010		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4918	81.3	17.29	17.29	1.000		
second point	4959	40.7	8.65	8.59	1.007		
third point	4980	20.3	4.32	4.27	1.010		
as left zero	5000	0.0	0.00	0.00			
as left span	4918	81.3	17.29	17.30	0.999		
			A	Average Correction Factor	1.006		
Baseline Corr AF:	17.12	Prev response	17.35	*% change	-1.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0	0.00	0.00				
as found span	4918	81.3	9.19	9.16	1.004			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0	0.00	0.00				
high point	4918	81.3	9.19	9.21	0.998			
second point	4959	40.7	4.60	4.61	0.998			
third point	4980	20.3	2.30	2.30	1.000			
as left zero	5000	0	0.00	0.00				
as left span	4918	81.3	9.19	9.20	0.999			
			A	Average Correction Factor	0.999			
Baseline Corr AF:	9.16	Prev response	9.25	*% change	-1.0%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			

CH4	Cal	ibration	Data

		CH4 Calibra	tion Data			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0.0	0.00	0.00		
as found span	4918	81.3	8.09	7.96	1.017	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4918	81.3	8.09	8.08	1.002	
second point	4959	40.7	4.05	3.98	1.018	
third point	4980	20.3	2.02	1.98	1.022	
as left zero	5000	0.0	0.00	0.00		
as left span	4918	81.3	8.09	8.10	0.999	
			A	verage Correction Factor	1.014	
Baseline Corr AF:	7.96	Prev response	8.10	*% change	-1.8%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		1.004703		1.000528		
THC Cal Offset:		-0.018891		-0.030303		
CH4 Cal Slope:		1.004303		0.999037		
CH4 Cal Offset:		-0.027159		-0.028760		
NMHC Cal Slope:		1.005180		1.001827		
NMHC Cal Offset:		0.008268		-0.001743		

Notes:

Re-calibrating instrument to possible resolve dipping issues after routine calibration completed on April 23, 2023. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



THC Calibration Summary

		Station	nformation		
			nformation		
Calibration Date:	1	.6, 2023	Previous Calibration:	April 24, 2023	
Station Name:		er-Fort McKay	Station Number:	AM	
Start Time (MST)	: 10):09	End Time (MST):	15:	09
Analyzer make:	Ther	mo 55i	Analyzer serial #:	11803	20040
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	ation Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999981	≥0.995
17.29	17.29	0.9999		0.555581	20.000
8.65	8.59	1.0074	Slope	1.000528	0.90 - 1.10
4.32	4.27	1.0101	•		
			Intercept	-0.030303	+/-0.5
20.0 -		THC Calibratio	n Curve		
18.0 -					
16.0 -					
14.0 -					
<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>					
30					
Indicated Conc. 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 1010.0 10.0 10.0 10.010.0 10.010.01010.010.010.01010.01010.010101010					
6.0 -					
4.0 -					
2.0 -					
0.0	.0 5	5.0	10.0	15.0	20.0
	.0		I Conc. (ppm)	13.0	20.0



CH₄ Calibration Summary

							Version-01-20
			Station I	nformation			
alibration	Date:	April	26, 2023	Previous Ca	libration:	April 24	, 2023
tation Nar	me:		ter-Fort McKay	Station	Number:	AMS	501
tart Time	(MST):	1	.0:09	End Tir	ne (MST):	15:	09
nalyzer m	nake:	The	rmo 55i	Analyze	er serial #:	118032	20040
			Calibra	ation Data			
alculated co (ppm)		on Indicated concentration (ppm) (Ic)	n Correction factor (Cc/Ic)		Statistical Eval	uation	<u>Limits</u>
0.0		0.00		Correlation C	oefficient	0.999914	≥0.995
8.0		8.08	1.0017				
4.0		3.98 1.98	1.0182 1.0216	Slope	е	0.999037	0.90 - 1.10
2.0	12	1.30	1.0210	linkaire		0.028760	
				Interce	εμι	-0.028760	+/-0.5
1	9.0		CH ₄ Calibratio	n Curve			
;	8.0 -					/	
	7.0 —						
	6.0 +						
лс. (p	5.0 —						
ed Col	4.0 -						
Indicated Conc. (ppm)	3.0 -						
	2.0 -						
	1.0 -						
	0.0 🛩						
	0.0	2.0	4.0	6	.0	8.0	10.0
			Calculated	d Conc. (ppn	n)		
			Calculated	a conc. (ppn	·· <i>)</i>		



NMHC Calibration Summary

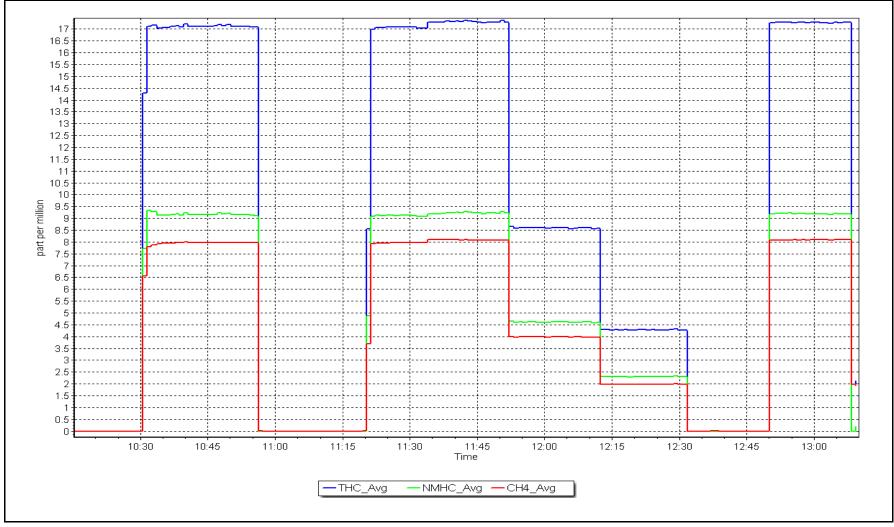
		Station I	nformation		
Calibration Date:	Apri	l 26, 2023	Previous Calibration:	April 24	l, 2023
Station Name:	Bertha Ga	nter-Fort McKay	Station Number: A		501
Start Time (MST)	:	10:09	End Time (MST):	15:	09
Analyzer make:	yzer make: Thermo 55i		Analyzer serial #:	11803	20040
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	ON Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.19	0.00 9.21	0.9983	Correlation Coefficient	1.000000	≥0.995
4.60	4.61	0.9983	Class	1 001027	0.00 6.10
2.30	2.30	1.0002	Slope	1.001827	0.90 - 1.10
			Intercept	-0.001743	+/-0.5
9.0 - 8.0 - 7.0 -					
(bbu) bbu) couc					
5 .0 -					
5 4.0 -					
- 0.4 Indicated - 0.6 -					
2.0 -					
1.0 -					
0.0					
0	.0 2.0	4.0	6.0	8.0	10.0

NMHC Calibration Plot

Date: April 26, 2023

Location: Bertha Ganter-Fort McKay





CALS_24



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station Name:
Calibration Date:
Start time (MST):
Reason:

Bertha Ganter-Fort McKay April 18, 2023 9:46 Routine

Station number: AMS01 Last Cal Date: March 3, 2023 End time (MST): 14:17

NO Gas Cylinder #:	-	F2Y1P9L	Cal Gas Expiry Date: Dee	cember 11, 2	2023
NOX Cal Gas Conc:	50.84	ppm	NO Cal Gas Conc:	50.04	ppm
Removed Cylinder #:		NA	Removed Gas Exp Date:		NA
Removed Gas NOX Conc:	50.84	ppm	Removed Gas NO Conc:	50.04	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T7	'00	Serial Number:	3565	
ZAG make/model:	Teledyne API T7	/01	Serial Number:	5609	

Analy	/zer	Inform	ation

Analyzer make: Thermo 42i NOX Range (ppb): 0 - 1000 ppb		Analyzer serial #: 1218153357				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
NO coeff or slope:	1.458	1.498	NO bkgnd or offset:	6.9	7.1	
NOX coeff or slope:	0.990	0.990	NOX bkgnd or offset:	7.0	7.2	
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	194.8	194.8	

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999171	0.999185
NO _x Cal Offset:	-0.060000	0.160000
NO Cal Slope:	1.000071	0.999572
NO Cal Offset:	-0.880000	-0.480000
NO ₂ Cal Slope:	0.998181	0.999865
NO ₂ Cal Offset:	-0.132907	-0.124708



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.4	0.1		
as found span	4920	80.0	813.4	800.6	12.8	791.1	775.3	15.7	1.0282	1.0327
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2		
high point	4920	80.0	813.4	800.6	12.8	813.2	800.3	12.8	1.0003	1.0004
second point	4960	40.0	406.7	400.3	6.4	406.2	399.1	7.1	1.0013	1.0031
third point	4980	20.0	203.4	200.2	3.2	203.0	198.8	4.2	1.0018	1.0068
as left zero	5000	0.0	0.0	0.0	0.0	0.7	0.2	0.5		
as left span	4920	80.0	813.4	401.2	412.2	812.5	398.9	413.6	1.0012	1.0059
							Average C	orrection Factor	1.0011	1.0034
Corrected As fo	ound NO _x =	790.6 ppb	NO =	774.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-2.8%
Previous Respo	onse NO _x =	812.7 ppb	NO =	799.8 ppb				*Percent Chan	ge NO =	-3.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	$1 NO r^2$:		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.9	398.5	412.2	412.2	1.0000	100.0%
2nd GPT point (200 ppb O3)	797.9	589.3	221.4	221.1	1.0014	99.9%
3rd GPT point (100 ppb O3)	797.9	693.6	117.1	116.6	1.0043	99.6%
			ŀ	Average Correction Factor	1.0019	99.8%

Notes:

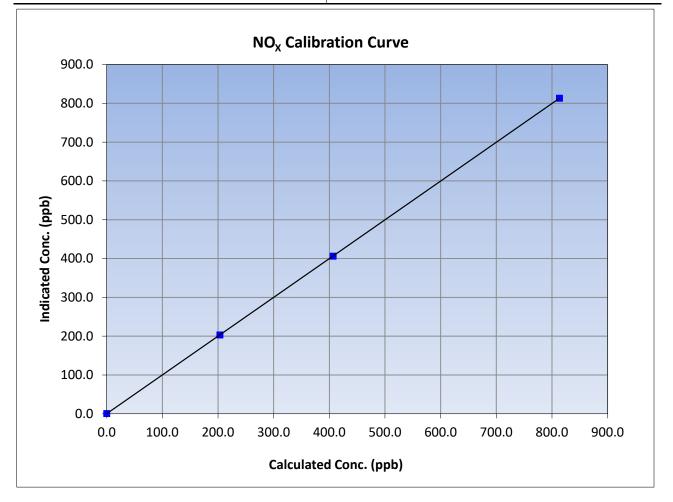
Changed the inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

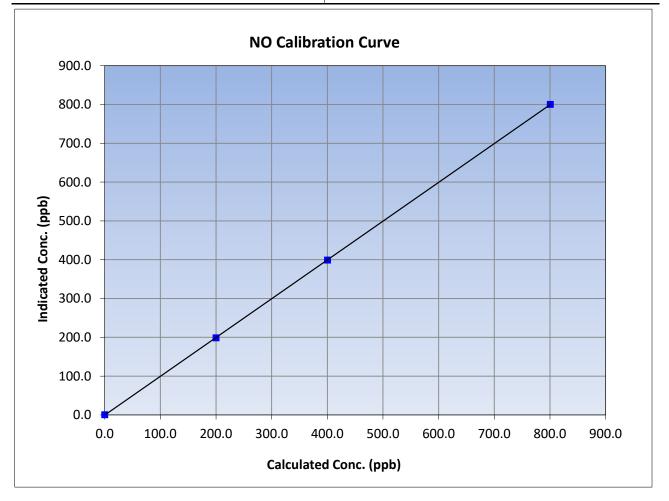
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 1	8, 2023	Previous Calibration:	March	3, 2023
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	9:	46	End Time (MST):	14	:17
Analyzer make: Thermo 42i			Analyzer serial #:	1218153357	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999999	≥0.995
813.4	813.2	1.0003	correlation coefficient	0.5555555	20.333
406.7	406.2	1.0013	Clana	0.999185	0.90 - 1.10
203.4	203.0	1.0018	Slope	0.999185	0.90 - 1.10
			Intercept	0.160000	+/-20





NO Calibration Summary

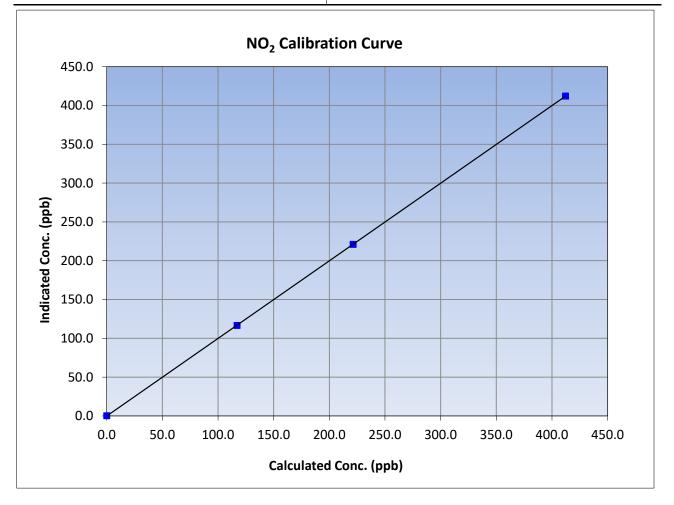
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	April 1	8, 2023	Previous Calibration:	March	3, 2023	
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01	
Start Time (MST):	9:	46	End Time (MST):	14	:17	
Analyzer make:				1218153357		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999994	≥0.995	
800.6	800.3	1.0004	correlation coernelent	0.555554	20.333	
400.3	399.1	1.0031	Clana	0.999572	0.90 - 1.10	
200.2	198.8	1.0068	Slope	0.999572	0.90 - 1.10	
			Intercept	-0.480000	+/-20	

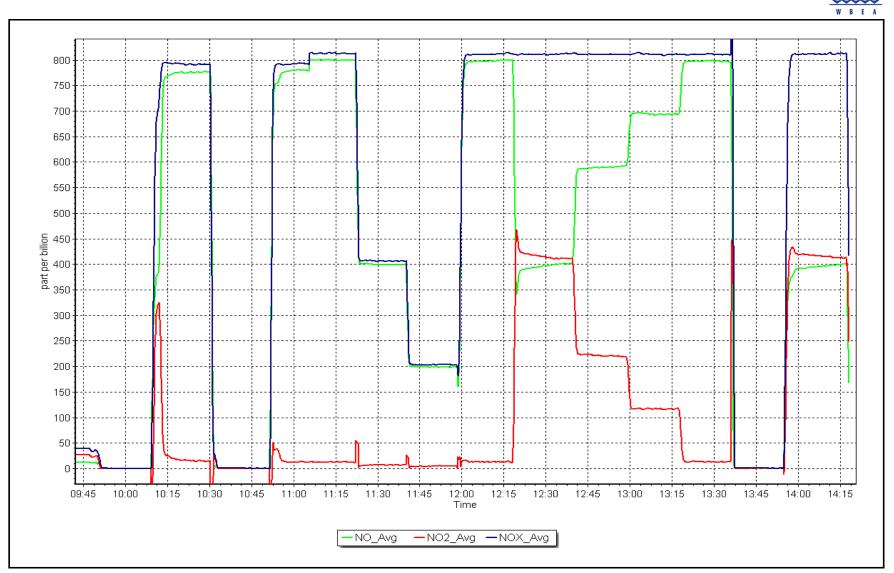




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 1	8, 2023	Previous Calibration:	March	3, 2023
Station Name:	Bertha Gante	er-Fort McKay	Station Number:	AM	S01
Start Time (MST):	9:	46	End Time (MST):	14	:17
Analyzer make: Thermo 42i			Analyzer serial #:	12181	53357
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999997	≥0.995
412.2	412.2	1.0000	correlation coefficient	0.555557	20.995
221.4	221.1	1.0014	Clana	0.000865	0.90 - 1.10
117.1	116.6	1.0043	Slope	0.999865	0.90 - 1.10
			Intercept	-0.124708	+/-20





April 18, 2023

Location: Bertha Ganter-Fort McKay



O₃ Calibration Report

Version-01-2020

		Station Infor	mation				
Station Name: Calibration Date:	Bertha Ganter-Fort April 5, 2023	МсКау	Station number: AMS01 Last Cal Date: March 1, 2023				
Start time (MST): Reason:	10:08 Routine			time (MST): 13:22			
		Calibration St	andards				
03 generation mode:	Photometer		Conicl Number				
Calibrator Make/Model: ZAG Make/Model:	I: Teledyne API T700Serial Number: 3565Teledyne API T701Serial Number: 5609						
		Analyzer Info	rmation				
Analyzer make Analyzer Range	: Teledyne API T400 e 0 - 500 ppb		Analyzer serial #:	1107			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
Calibration slope:	0.999829	1.001057	Backgd or Offset:	2.5	2.5		
Calibration intercept:	0.780000	0.440000	Coeff or Slope:	1.025	1.040		
		O ₃ Calibratio	on Data				
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/I Limit = 0.95-1.05		
as found zero	5000	0.0	0.0	0.0			
c 1		0.0	0.0	0.0			
as found span	5000	855.5	400.0	397.7	1.006		
as found span as found 2nd point	5000				1.006		
	5000				1.006		
as found 2nd point	5000				 1.006		
as found 2nd point as found 3rd point		855.5	400.0	397.7			
as found 2nd point as found 3rd point calibrator zero	5000	0.0	400.0 0.0	397.7 0.2			
as found 2nd point as found 3rd point calibrator zero high point	5000 5000	0.0 855.5	400.0 0.0 400.0	397.7 0.2 400.8	0.998		
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000	0.0 855.5 738.6	400.0 0.0 400.0 200.0	397.7 0.2 400.8 200.6 100.9 0.0	0.998 0.997		
as found 2nd point as found 3rd point calibrator zero high point second point third point	5000 5000 5000 5000 5000	0.0 855.5 738.6 649.2	400.0 0.0 400.0 200.0 100.0 0.0 400.0	397.7 0.2 400.8 200.6 100.9 0.0 400.5	0.998 0.997 0.991		
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000	0.0 855.5 738.6 649.2 0.0	400.0 0.0 400.0 200.0 100.0 0.0 400.0	397.7 0.2 400.8 200.6 100.9 0.0	0.998 0.997 0.991 		
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	5000 5000 5000 5000 5000 5000 5000	855.5 0.0 855.5 738.6 649.2 0.0 855.5	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	397.7 0.2 400.8 200.6 100.9 0.0 400.5 e Correction Factor	0.998 0.997 0.991 0.999 0.995		
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	5000 5000 5000 5000 5000 5000 397.7	855.5 0.0 855.5 738.6 649.2 0.0 855.5 Previous response	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag 400.7	397.7 0.2 400.8 200.6 100.9 0.0 400.5 ce Correction Factor *% change	0.998 0.997 0.991 0.999		
as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000 5000	855.5 0.0 855.5 738.6 649.2 0.0 855.5	400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag 400.7	397.7 0.2 400.8 200.6 100.9 0.0 400.5 e Correction Factor	0.998 0.997 0.991 0.999 0.995		

Notes:

Changed inlet filter after as founds. Adjusted span only.

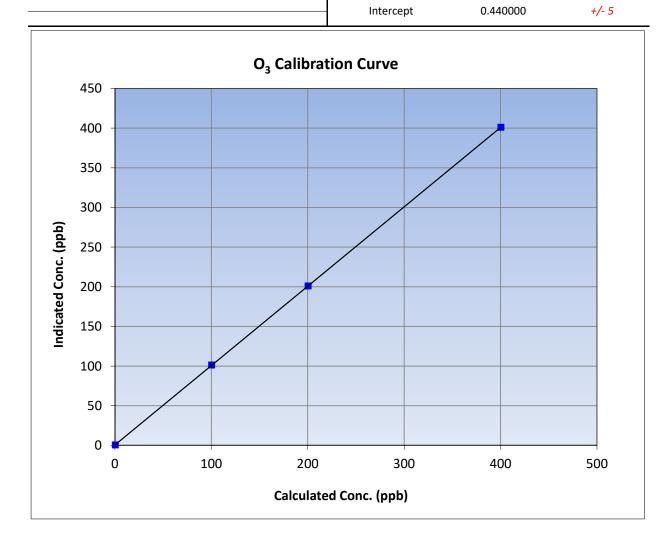
Calibration Performed By:

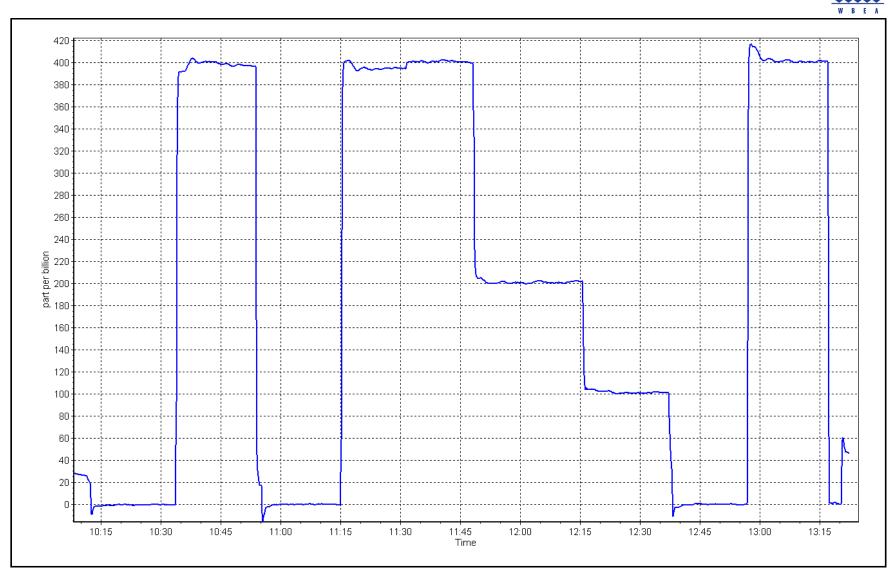
Rene Chamberland



O₃ Calibration Summary

WBEA					Version-01-2020	
		Station	n Information			
Calibration Date:	April 5,	2023	Previous Calibration:	March	rch 1, 2023	
Station Name:	Bertha Ganter-Fort McKay		Station Number:	AN	/IS01	
Start Time (MST):	10:08		End Time (MST):	13:22		
Analyzer make:	nalyzer make: Teledyne API T400			Analyzer serial #: 1107		
		Calib	oration Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.2					
400.0	400.8	0.9980	 Correlation Coefficient 	0.999998	≥0.995	
200.0	200.6	0.9970	Slope	1.001057	0.90 - 1.10	
100.0	100.9	0.9911	Siope	1.001037	0.30 - 1.10	





Location: Bertha Ganter-Fort McKay



CALS_33



T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023	
		Station Information	า				
Station Name:Fort McKay - Bertha CCalibration Date:April 20, 2023Start time (MST):11:23		Ganter					
Analyzer Make: Particulate Fraction:	API T640 PM2.5						
Flow Meter Make/Model:	Delta Cal		S/N:	1450			
Temp/RH standard:	Delta Cal	S/N: 1450					
		Monthly Calibration T	est				
<u>Parameter</u> T ([°] C)	<u>As found</u> 7.6	Measured 8.5	<u>As left</u> 8.9		Adjusted	<i>(Limits)</i> +/- 2 °C	
P (mmHg)	746.2	747.5	745.6			+/- 10 mmHg	
flow (LPM)	4.93	5.00	5.01			+/- 0.25 LPM	
Leak Test:	Date of check: PM w/o HEPA:	April 20, 2023 5.6	Last Cal Date: PM w/ HEPA:	March 3	-	<0.2 ug/m3	
		Quarterly Calibration	Test				
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>		Adjusted	(Limits)	
PMT Peak Test	9	11.8	11.1		\checkmark	10.9 +/- 0.5	
Post-maintenance		PM w/o HEPA:	w/ HEPA:		0		
Date Optical Chamber Cleaned: Disposable Filter Changed:		April 20, 2 March 30,			<0.2 ug/m3		
		Annual Maintenanc	e				
Date Sample Tul	be Cleaned:	August 31,	2022				
Date RH/T Sensor Cleaned:		December 19, 2022					
Notes:	Flow, temperature an	d pressure verified. Leak c	heck passed. Replace lowered from 1390V		Optical chai	mber cleaned.	
Calibration by:	Rene Chamberland	FINIT PEAK VOITAge	IOMELEO ILOUI 13900	10 13009.			



TN - NO_X - NH_3 Calibration Report

			A 3	•			
W B E A					Version-11-20		
		Station	Information				
Station Name: NOX Cal Date: Start time (MST): NH3 Cal Date: Start time (MST): Reason:	Bertha Ganter-Fo April 27, 2023 9:32 April 28, 2023 9:29 Routine	ort McKay	Station number: Last Cal Date: End time (MST): Last Cal Date: End time (MST):	AMS01 March 30, 2023 14:27 March 30, 2023 12:30			
		Calibrat	ion Standards				
NOX Cal Gas Conc:	50.84	ppm	NO Gas Cylinder #:	T2Y1P9L			
NO Cal Gas Conc:	50.04	ppm	NO Cal Gas Expiry:	March 3, 2028			
Removed NOX Conc:	50.84	ppm	Removed Cylinder #:	NA			
Removed NO Conc: NOX gas Diff:	50.04	ppm	Removed cyl Expiry: NO gas Diff:	NA			
NH3 Cal Gas Conc:	72.93	ppm	NH3 Gas Cylinder #:	CC281298			
			NH3 Cal Gas Expiry:	February 28, 2023			
Removed NH3 Conc:	72.93	ppm	Removed Cylinder #:	NA			
NH3 gas Diff:	- · ·		Removed cyl Expiry:	NA			
Calibrator Model:		ne API T700	Serial Number:	3565			
ZAG make/model:	leledy	ne API T701	Serial Number:	5609			
		Analyze	r Information				
Analyzer model:	: Teledyne API T20	01	Analyzer serial #	: 808			
Converter model:	: Teledyne API T50)1	Converter serial #	: 824			
NH3 Range (ppb):	: 0 - 2000 ppb		Reaction cell Press	: 5.20			
NOX Range (ppb):	: 0 - 1000 ppb		Sample Flow: 470				
	Start	Finish		Start	Finish		
NO coefficient:		0.834	TN coefficient		0.836		
NOX coefficient:		0.839	NO bkgrnd:		-0.626		
NO2 coefficient:	1.000	1.000	NOX bkgrnd		-0.402		
NH3 coefficient:	0.937	0.937	TN bkgrnd:	: 3.877	1.871		
		Calibrat	tion Statistics				
		<u>Start</u>		<u>Finish</u>			
NO _x Cal Slope:		1.003400		1.005241			
~ .							
NO _x Cal Offset:		-1.540000		-0.420000			
NO Cal Slope:		0.999800		1.000685			
NO Cal Offset:	:	-1.960000		-2.020000			
NO ₂ Cal Slope:	:	1.014549		1.007356			
NO ₂ Cal Offset:	:	0.808984		1.516016			
NH3 Cal Slope:		0.996086		1.005229			
NH3 Cal Offset:		-1.322705		-3.943276			
TN Cal Slope:		0.999769		1.009496			
-							
TN Cal Offset:		-1.287257		-3.914715			



TN - NOX - NH₃ Calibration Report

Version-11-2021

				Dilut	ion Calibration	Dala				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.1	-0.8		
as found NO	4920	80.0	813.4	813.4		812.2	813.0	-0.8	1.002	
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4		
high NO point	4920	80.0	813.4	813.4		815.5	817.2	-1.7	0.997	
NO/O3 point	4920	80.0	813.4	813.4		812.9	811.5	1.2	1.001	
as found NH3	3413	86.4	1800.6		1800.6	1813.7		1806.0	0.993	0.997
new NH3 cyl rp										
first NH3	3413	86.4	1800.6		1800.6	1813.7		1806.0	0.993	0.997
second NH3	3452	48.0	1000.2		1000.2	1009.6		1005.3	0.991	0.995
third NH3	3476	24.0	500.1		500.1	493.7		491.5	1.013	1.017
							Average C	orrection Factor	0.9991	1.0031
Corrected As fo	und TN =	813.1 ppb	NO _x = 813.1	ppb NH3 =	1806.8 ppb			*Percent Chang	e TN =	0.1%
Previous Respo	nse TN =	812 ppb	NO _x = 814.7	ppb NH3 =	1792.3 ppb			*Percent Chang	e NO _x =	-0.2%
NH3 Previous Converter Efficiency = 93.7%						*Percent Chang * = > +/-5% change		0.8% ion		

Dilution Calibration Data

NH3 Current Converter Efficiency = 93.7%



NO_x - NO - NO₂ Calibration Report

Version-11-2021

				Diluti	on Calibratior	Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-2.0		
as found span	4920	80.0	813.4	800.6	813.4	833.0	814.5	828.0	0.9765	0.9830
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	-0.4		
high point	4920	80.0	813.4	800.6	813.4	817.2	800.5	815.5	0.9954	1.0002
second point	4960	40.0	406.7	400.3	406.7	409.1	396.4	407.5	0.9942	1.0099
third point	4980	20.0	203.4	200.2	203.4	203.0	197.3	203.1	1.0018	1.0145
							Average C	Correction Factor	0.9971	1.0082
Baseline Corr A	s fnd TN =	830 ppb	NO _x = 833.0	ppb NO =	814.4 ppb			*Percent Chang	e TN =	2.2%
Previous Respo	nse TN =	812 ppb	NO _x = 814.7	ppb NO =	798.5 ppb			*Percent Chang	e NO _x =	2.2%
								*Percent Chang	e NO =	1.9%
								* = > +/-5% change i	nitiates investigati	on

		GF	PT Calibration Data			
O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	-0.1		
calibration zero			0.0	0.2		
1st GPT point (400 ppb O3)	795.4	389.4	418.8	422.7	0.9908	100.9%
2nd GPT point (200 ppb O3)	795.4	589.8	218.4	222.1	0.9833	101.7%
3rd GPT point (100 ppb O3)	795.4	692.8	115.4	119.2	0.9681	103.3%
				Average Correction Factor	0.9807	102.0%

Notes:

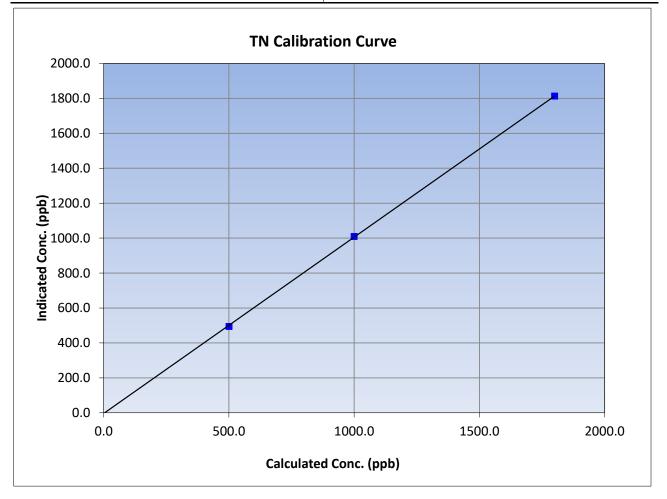
Changed the inlet filter. Adjusted both zero and span.

Calibration Performed By: Aswin Sasi Kumar & Rene Chamberland



TN Calibration Summary

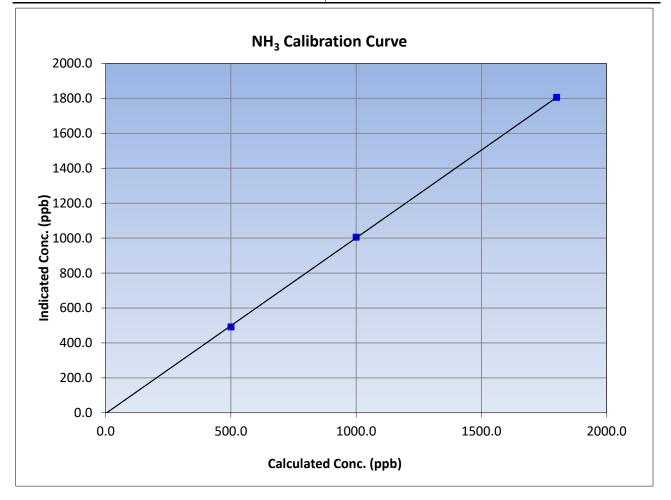
WBEA		t			Version-11-20
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	Marcl	n 30, 2023
Station Name:	Bertha Ganter-Fort McKay		Station Number: A		MS01
Start Time (MST):	Г): 9:32		End Time (MST):	-	14:27
Analyzer make:	Teledyne	e API T201	Analyzer serial #:		808
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999956	≥0.995
1800.6	1813.7	0.9928	conclation coefficient	0.5555550	20.000
1000.2	1009.6	0.9907	Slope	1.009496	0.90 - 1.10
500.1	493.7	1.0129	Slope	1.009490	0.90 - 1.10
			Intercept	-3.914715	+/-20





NH₃ Calibration Summary

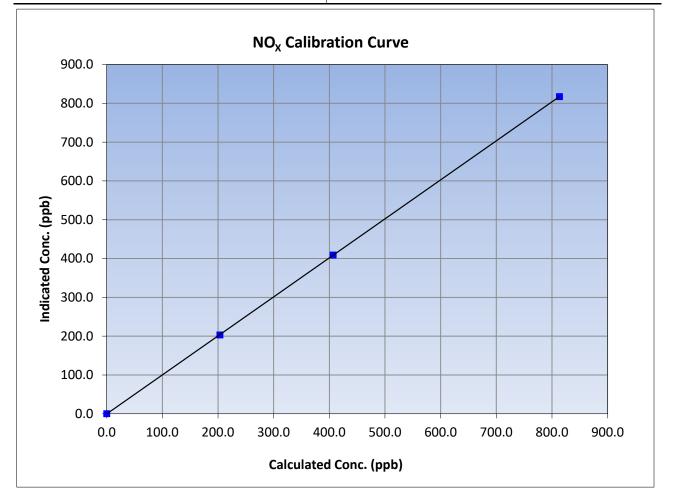
WBEA					Version-11-20
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March	n 30, 2023
Station Name:	Bertha Ganter-Fort McKay		Station Number:	А	MS01
Start Time (MST):	art Time (MST): 9:32		End Time (MST):	1	L4:27
Analyzer make:	Teledyne	API T201	Analyzer serial #:		808
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.4		Correlation Coefficient	0.999955	≥0.995
1800.6	1806.0	0.9970	correlation coernelent	0.9999955	20.333
1000.2	1005.3	0.9949	Clana	1.005229	0.90 - 1.10
500.1	491.5	1.0175	Slope	1.005229	0.90 - 1.10
			Intercept	-3.943276	+/-20





NO_x Calibration Summary

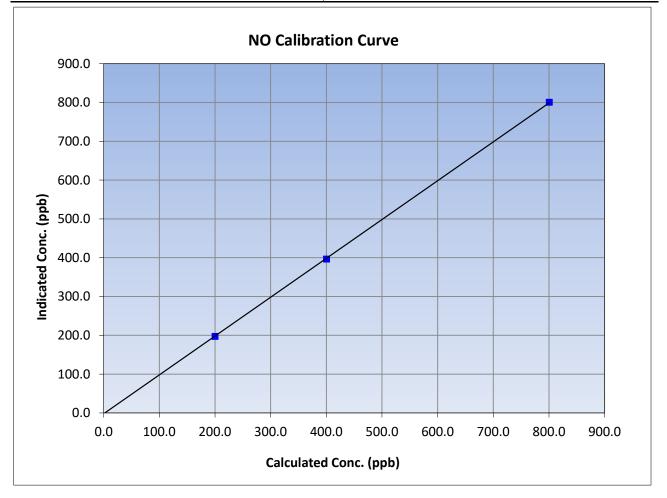
WBEA					Version-11-2
		Station	Information		
Calibration Date:	April 2	7, 2023	Previous Calibration:	March	30, 2023
Station Name:	Bertha Ganter-Fort McKay		Station Number: AI		VIS01
Start Time (MST):	MST): 9:32		End Time (MST):	1	4:27
Analyzer make:	Teledyne	e API T201	Analyzer serial #:	8	808
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
813.4	817.2	0.9954	correlation coernelent	0.9999990	20.995
406.7	409.1	0.9942	Class 4.0052		0.90 - 1.10
203.4	203.0	1.0018	Slope	1.005241	0.30 - 1.10
			Intercept	-0.420000	+/-20





NO Calibration Summary

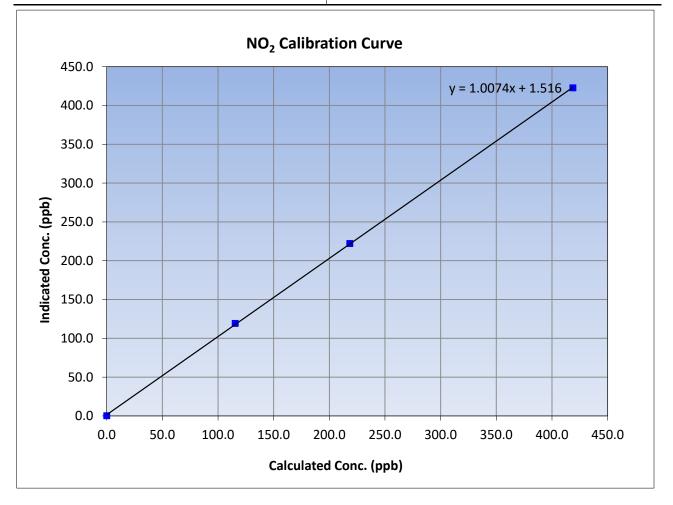
		Station	Information		Version-11-
Calibration Date: Station Name:	•	7, 2023 ar-Eort McKay	Previous Calibration: Station Number:		h 30, 2023 MS01
Start Time (MST):	· · · · · · · · · · · · · · · · · · ·		End Time (MST):	14:27	
Analyzer make:	Teledyne	API T201	Analyzer serial #:		808
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999969	≥0.995
800.6	800.5	1.0002	correlation coefficient	0.555505	20.000
400.3	396.4	1.0099	Slope	1.000685	0.00 1.10
200.2	197.3	1.0145	Slope	1.00085	0.90 - 1.10
			Intercept	-2.020000	+/-20

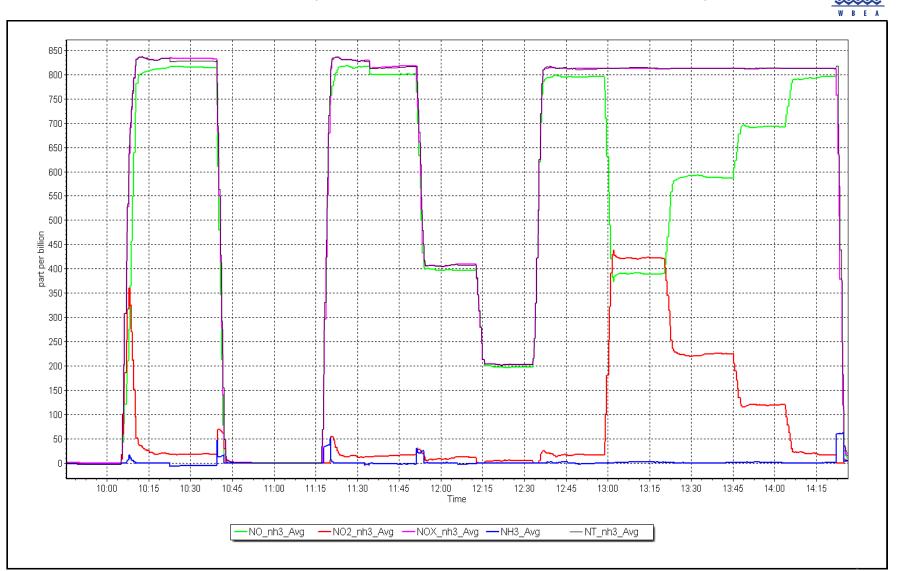




NO₂ Calibration Summary

WBEA					Version-11-2
		Station	Information		
Calibration Date:	April 2	7, 2023	Previous Calibration:	March	n 30, 2023
Station Name:	Bertha Ganter-Fort McKay				MS01
Start Time (MST):	ne (MST): 9:32		End Time (MST):	1	4:27
Analyzer make:	Teledyne	API T201	Analyzer serial #:		808
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999952	≥0.995
418.8	422.7	0.9908	correlation coefficient	0.5555552	20.333
218.4	222.1	0.9833	Slopp	1.007356	0.90 - 1.10
115.4	119.2	0.9681	Slope	1.007550	0.30 - 1.10
			Intercept	1.516016	+/-20



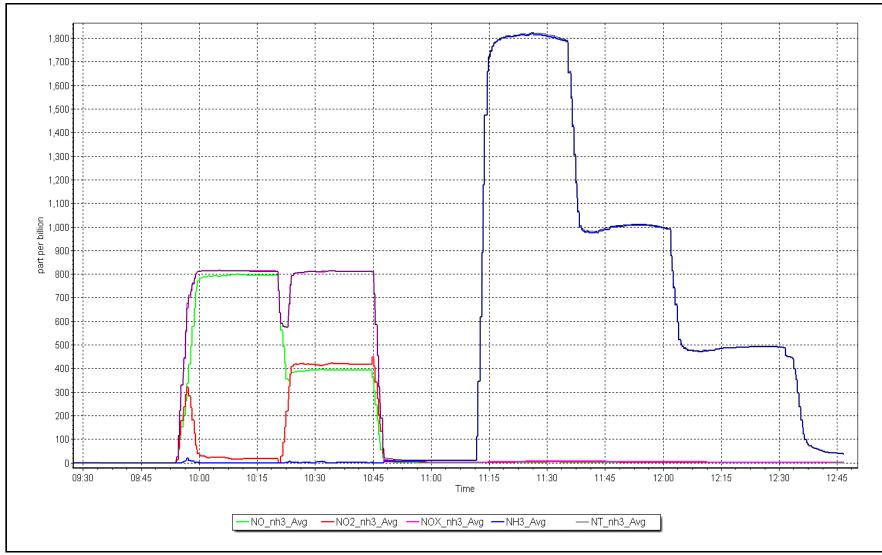


Location: Bertha Ganter-Fort McKay











CO Calibration Report

Version-01-2020

		Chatting Inform			
		Station Infor	mation		
Station Name:	Bertha Ganter-Fort	МсКау	Station number:	AMS01	
Calibration Date:	April 20, 2023		Last Cal Date:	March 8, 2023	
Start time (MST):	11:06		End time (MST):	14:15	
Reason:	Routine				
		Calibration St	andards		
Cal Gas Concentration:	2040			December 1, 2028	
Cal Gas Cylinder #:	<u>3040</u>	ppm	Cal Gas Exp Date:	December 1, 2028	
,	ALM042207		Dom Cos Eve Data	ΝΔ	
Removed Cal Gas Conc:	<u>3040</u>	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	<u>NA</u>		Diff between cyl:	2565	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565	
ZAG Make/Model:	Teledyne API T701		Serial Number:	5609	
		Analyzer Info	rmation		
Analyzer make:	: Teledyne API T300		Analyzer serial #:	3520	
Analyzer Range			- ,		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002977	1.001765	Backgd or Offset:	-0.012	-0.012
Calibratian intercents	0.109828	0.123811	Coeff or Slope:	0.996	0.992
Calibration intercept:	0.109828	0.123811	coen or slope.	0.550	0.552
calibration intercept:	0.109828			0.550	0.332
calibration intercept:	0.109828	CO Calibratio		0.550	0.332
		CO Calibratio	on Data Calculated		Correction factor
Set Point	Dilution air flow rate (sccm)		Calculated concentration (ppm)	Indicated concentration	Correction factor (Cc/Ic)
Set Point	Dilution air flow rate (sccm)	CO Calibratic Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor
Set Point as found zero	Dilution air flow rate (sccm) 5000	CO Calibratic Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	Indicated concentration (ppm) (Ic) 0.2	Correction factor (Cc/Ic) Limit = 0.95-1.05
Set Point as found zero as found span	Dilution air flow rate (sccm)	CO Calibratic Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point	Dilution air flow rate (sccm) 5000	CO Calibratic Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	Indicated concentration (ppm) (Ic) 0.2	Correction factor (Cc/Ic) Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point	Dilution air flow rate (sccm) 5000	CO Calibratic Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	Indicated concentration (ppm) (Ic) 0.2	Correction factor (Cc/Ic) Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point	Dilution air flow rate (sccm) 5000	CO Calibratic Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	Indicated concentration (ppm) (Ic) 0.2	Correction factor (Cc/Ic) Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point	Dilution air flow rate (sccm) 5000	CO Calibratic Source gas flow rate (sccm) 0.0	Calculated concentration (ppm) (Cc) 0.0	Indicated concentration (ppm) (Ic) 0.2	Correction factor (Cc/lc) Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response	Dilution air flow rate (sccm) 5000 4933	CO Calibratic Source gas flow rate (sccm) 0.0 66.7	Calculated concentration (ppm) (Cc) 0.0 40.6	Indicated concentration (ppm) (Ic) 0.2 41.2	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	Dilution air flow rate (sccm) 5000 4933 5000	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0	Calculated concentration (ppm) (Cc) 0.0 40.6	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	Dilution air flow rate (sccm) 5000 4933 5000 4933	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6	Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i> 0.983
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	Dilution air flow rate (sccm) 5000 4933 	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6 20.2	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983 0.998 0.981
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	Dilution air flow rate (sccm) 5000 4933 5000 4933 4966 4983	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6 20.2 10.2	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6 10.3	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	Dilution air flow rate (sccm) 5000 4933 5000 4933 4966 4983 5000	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7 0.0	Calculated concentration (ppm) (Cc) 0.0 40.6 	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6 10.3 0.0 40.2	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983 0.983 0.981 0.988 1.009
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	Dilution air flow rate (sccm) 5000 4933 5000 4933 4966 4983 5000 2960	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7 0.0 40.0	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6 20.2 10.2 0.0 40.5 Averag	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6 10.3 0.0 40.2 ge Correction Factor	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983 0.998 0.988 1.009 0.989
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	Dilution air flow rate (sccm) 5000 4933 5000 4933 4933 4966 4983 5000 2960 2960	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7 0.0 40.0 Prev response:	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6 20.2 10.2 0.0 40.5 Averag 40.79	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6 10.3 0.0 40.2 ge Correction Factor *% change:	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983 0.983 0.981 0.988 1.009
Set Point as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	Dilution air flow rate (sccm) 5000 4933 5000 4933 4966 4983 5000 2960	CO Calibratic Source gas flow rate (sccm) 0.0 66.7 0.0 66.7 33.3 16.7 0.0 40.0	Calculated concentration (ppm) (Cc) 0.0 40.6 0.0 40.6 20.2 10.2 0.0 40.5 Average 40.79	Indicated concentration (ppm) (Ic) 0.2 41.2 0.0 40.6 20.6 10.3 0.0 40.2 ge Correction Factor	Correction factor (Cc/lc) Limit = 0.95-1.05 0.983 0.998 0.988 0.988 1.009 0.989

Notes:

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

Calibration Performed By:

Rene Chamberland

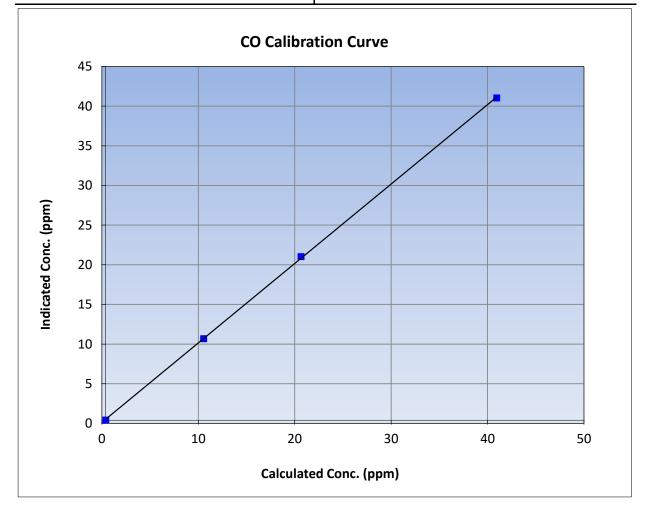


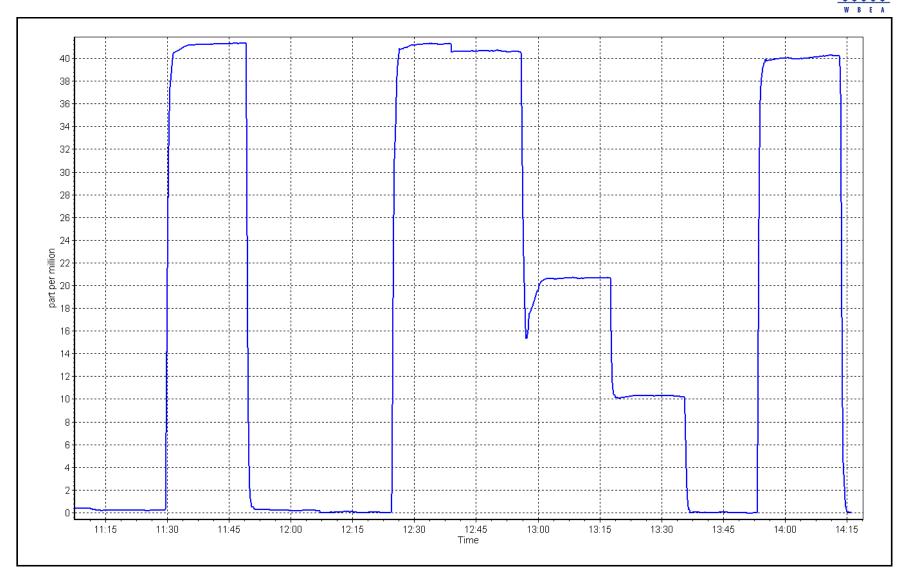
CO Calibration Summary

	Station	Information	
Calibration Date:	April 20, 2023	Previous Calibration:	March 8, 2023
Station Name:	Bertha Ganter-Fort McKay	Station Number:	AMS01
Start Time (MST):	11:06	End Time (MST):	14:15
Analyzer make:	Teledyne API T300	Analyzer serial #:	3520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999915	≥0.995
40.6	40.6	0.9979	correlation coefficient	0.999915	20.333
20.2	20.6	0.9811	Slope	1.001765	0.90 - 1.10
10.2	10.3	0.9878	Slope	1.001705	0.90 - 1.10
			Intercept	0.123811	+/-1.5





Date: April 20, 2023

Location: Bertha Ganter-Fort McKay



CO₂ Calibration Report

Version-01-2020

					version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Bertha Ganter-Fort April 19, 2023 9:57 Routine	МсКау	Station number: Last Cal Date: End time (MST):	AMS01 March 7, 2023 13:24	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	60,200 <u>ALM042207</u>	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	<u>60,200</u> <u>NA</u>	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3565	
N2 Gen Make/Model:	Peak Sci NG5000		Serial Number:	7220900034	
		Analyzer Info	rmation		
•	: Teledyne API 360 e 0 - 2,000 ppm		Analyzer serial #:	442	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.002067 -4.460000	1.000116 -5.740000	Backgd or Offset: Coeff or Slope:		0.037 0.880
		CO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration ((ppm) (Ic)	Correction factor (Cc/lo Limit = 0.95-1.05
as found zero	3000	0.0	0.0	-0.6	
as found span	2920	80.0	1605.3	1617.9	0.992
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	-0.2	
high point	2920	80.0	1605.3	1602.3	1.002
second point	2960	40.0	802.7	795.0	1.010
third point	2980	20.0	401.3	389.6	1.030
as left zero	3000	0.0	0.0	-0.4	
as left span	2960	40.0	802.7	782.8	1.025
			Averag	ge Correction Factor	1.014
Baseline Corr As found:	1618.50	Prev response:		*% change:	0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* /=	
				* = > +/-5% change initiat	es investigation

Notes:

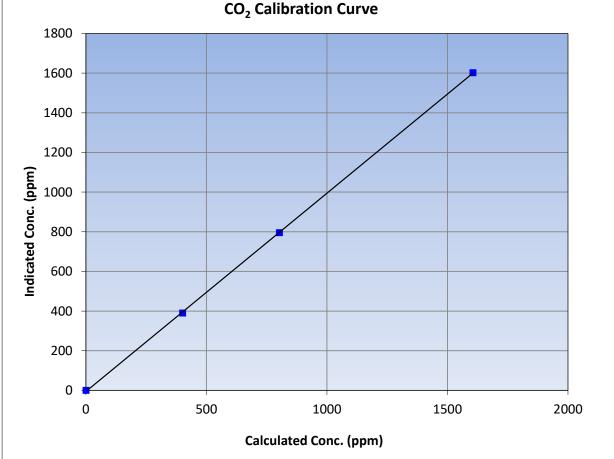
Changed the inlet filter after as founds. Cycled power to the analyzer. No adjustments made.

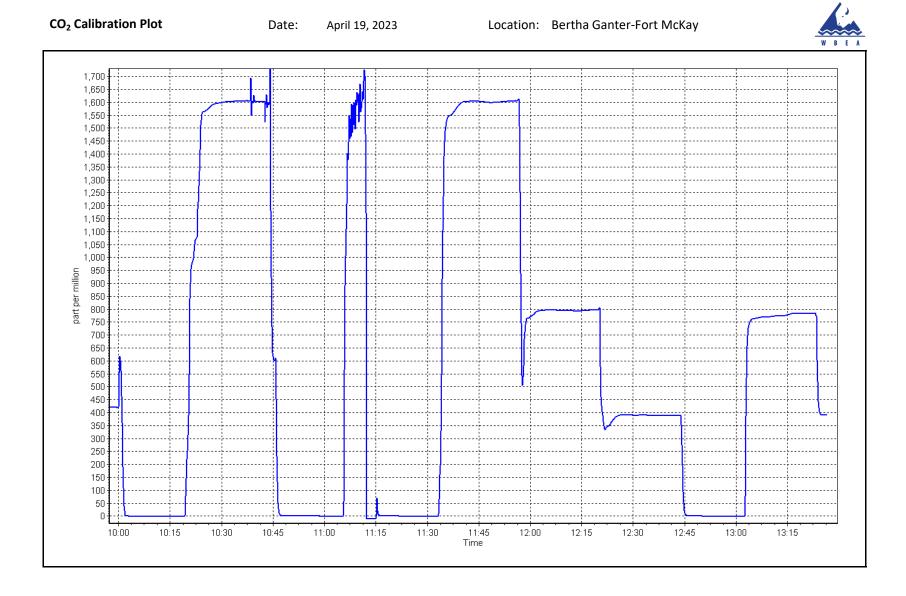
Calibration Performed By:



CO₂ Calibration Summary

W B E A					Version-01-20
		Station	Information		
Calibration Date	April 19,	2023	Previous Calibration Ma		7, 2023
Station Name	Bertha Ganter-	Fort McKay	Station Number		IS01
Start Time (MST)	9:57	7	End Time (MST) 13		:24
Analyzer make	Teledyne A	API 360	Analyzer serial #	4.	42
		Calib	ration Data		
alculated concentration In (ppm) (Cc)	dicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999945	≥0.995
1605.3 802.7	1602.3 795.0	1.0019			
401.3	389.6	1.0301	- Slope	1.000116	0.90 - 1.10
			Intercept	-5.740000	+/-10
1800		CO ₂ Calibr	ration Curve		
1800					
1600					
1400					
1400					







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS02 MILDRED LAKE APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake April 13, 2023 10:42 AM Routine		Station number: Last Cal Date: End time (MST):	AMS02 March 8, 2023 13:32	
		Calibration St	andards		
Cal Gas Concentration:	49.98	ppm	Cal Gas Exp Date:	August 12, 2024	
Cal Gas Cylinder #:	CC501209				
Removed Cal Gas Conc:	49.98	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	1185	
ZAG Make/Model:	API T701		Serial Number:	5608	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	JC1404901075	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002096	0.999874	Backgd or Offset:	18.0	18.3
Calibration intercept:	-0.984595	-0.805548	Coeff or Slope:	0.811	0.805
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	Correction factor (Cc/lo
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.2	
as found span	4920	80.2	801.6	809.6	0.990
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.2	801.6	801.0	1.001
second point	4960	40.1	400.8	400.1	1.002
third point	4980	20.0	199.9	197.8	1.011
as left zero	5000	0.0	0.0	-0.1	
as left span	4920	80.2	801.6	802.5	0.999
			Averag	ge Correction Factor	1.004
Baseline Corr As found:	809.80	Previous response	802.34	*% change	0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

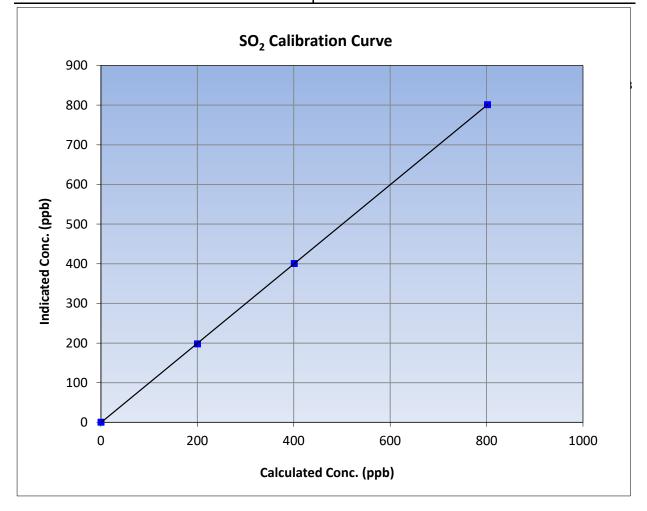


SO₂ Calibration Summary

WBEA			Version-01-2020
	Stat	ion Information	
Calibration Date:	April 13, 2023	Previous Calibration:	March 8, 2023
Station Name:	Mildred Lake	Station Number:	AMS02
Start Time (MST):	10:42	End Time (MST):	13:32
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075

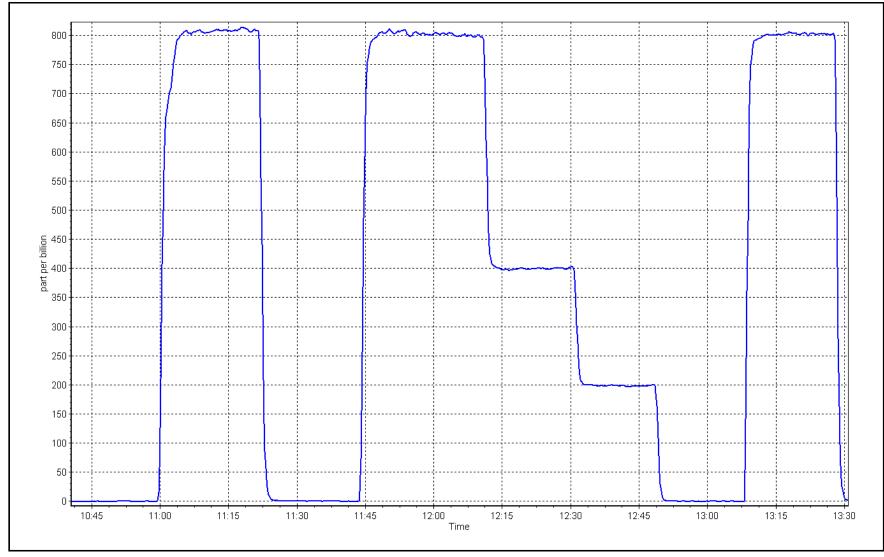
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999993	≥0.995	
801.6	801.0	1.0008	correlation coefficient	0.999995	20.995	
400.8	400.1	1.0018	Slope	0.999874	0.90 - 1.10	
199.9	197.8	1.0107	Slope	0.999874	0.90 - 1.10	
			Intercept	-0.805548	+/-30	











H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Mildred Lake April 4, 2023 9:03 Routine		Station number: Last Cal Date: End time (MST):	AMS02 March 16, 2023 13:23	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.29 CC345191	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	5.29 NA API T700 API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 1185 5608	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12113311966 2022-198	
Calibration slope: Calibration intercept:	<u>Start</u> 1.007251 0.000807	<u>Finish</u> 0.993678 0.100794	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.75 0.823
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4924	75.6	80.0	81.2	0.986
as found 2nd point	4962	37.8	40.0	40.8	0.983
as found 3rd point	4981	18.9	20.0	20.4	0.985
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4924	75.6	80.0	79.6	1.005
second point	4962	37.8	40.0	39.9	1.002
third point	4981	18.9	20.0	19.8	1.010
as left zero	5000	0.0	0.0	0.2	
as left span	4924	75.6	80.0	79.9	1.001
SO2 Scrubber Check	4920	80.2	802.0	0.0	
Date of last scrubber cha	-	12-Sep-22		Ave Corr Factor	1.006
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	81.1 40.7 20.3	Prev response: AF Slope: AF Correlation:	1.013966	*% change: AF Intercept:	0.7% 0.140813
Easenne con Starn pt.	20.5		0.00000	* = > +/-5% change initiate	es investigation

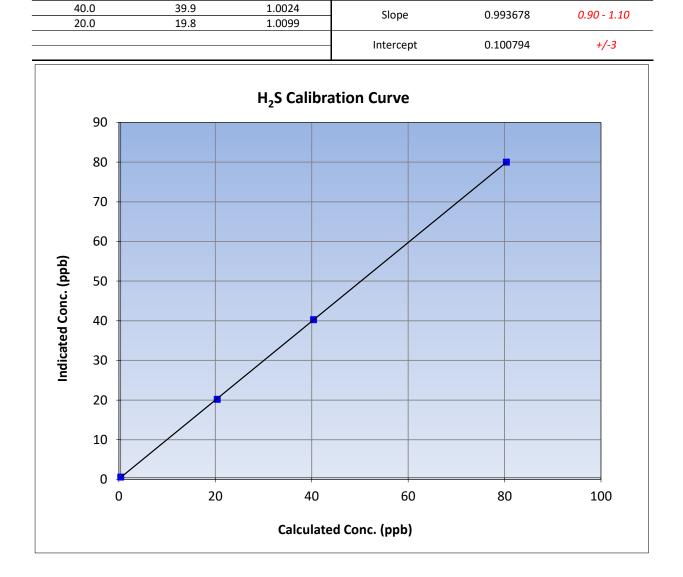
Notes:

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



H₂S Calibration Summary

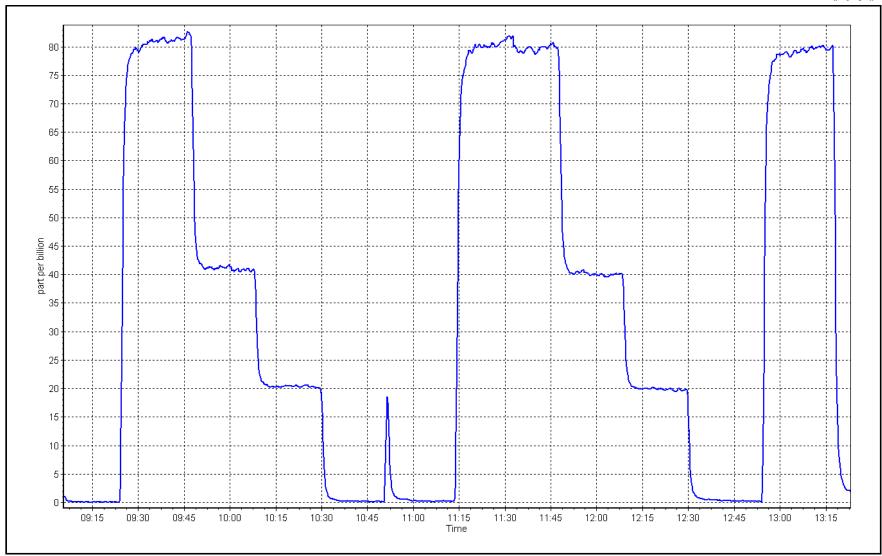
WBEA					Version-11-202
		Station	Information		
Calibration Date:	April 4,	2023	Previous Calibration:	March 16	, 2023
Station Name:	Mildred	Lake	Station Number:	AMS	02
Start Time (MST):	9:0	3	End Time (MST):	13:2	3
Analyzer make:	lyzer make: Thermo 43iQTL		Analyzer serial #: 1211331		1966
		Calib	ration Data		
		Calibi			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999988	≥0.995
80.0	79.6	1.0049	conclation coefficient	0.555500	20.995



H₂S Calibration Plot









H₂S Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
itation Name: Calibration Date: tart time (MST): Reason:	Mildred Lake April 5, 2023 8:55 Maintenance	will swap the pump	Station number: Last Cal Date: End time (MST): o (low flow)	AMS02 April 4, 2023 11:58	
		Calibration S	tandards		
Cal Gas Concentration:	5.29	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc:	CC345191 5.29	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701		Serial Number: Serial Number:	1185 5608	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	12113311966 2022-198	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.993678	1.015395	Backgd or Offset:	1.75	1.75
Calibration intercept:	0.100794	-0.059190	Coeff or Slope:	0.823	0.823
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjuster Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4924	75.6	80.0	80.2	0.999
as found 2nd point					
as found 3rd point					
new cylinder response		H ₂ S Calibrati	ion Data		
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	81.2	0.985
second point	4962	37.8	40.0	40.6	0.985
third point	4981	18.9	20.0	20.0	1.000
as left zero	5000	0.0	0.0	0.1	
as left span	4924	75.6	80.0	80.8	0.990
SO2 Scrubber Check		42.6			
	inge:	12-Sep-22		Ave Corr Factor	0.990 efficiency
Date of last scrubber cha	-				
Date of last scrubber cha Date of last converter eff	-				enciency
Date of last scrubber cha Date of last converter eff Baseline Corr As found:	ficiency test: 80.1	Prev response:		*% change:	0.6%
Date of last scrubber cha Date of last converter eff	ficiency test:	Prev response: AF Slope: AF Correlation:	NA	*% change: AF Intercept:	

Notes:

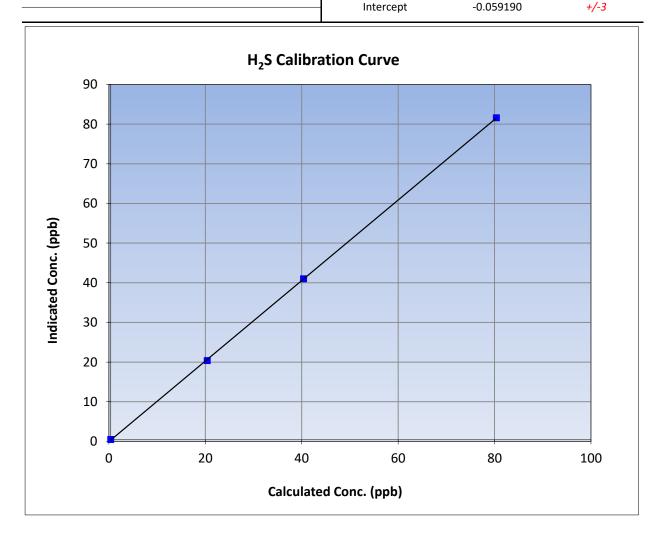
Pump changed after as founds. No adjustment made.

Calibration Performed By:



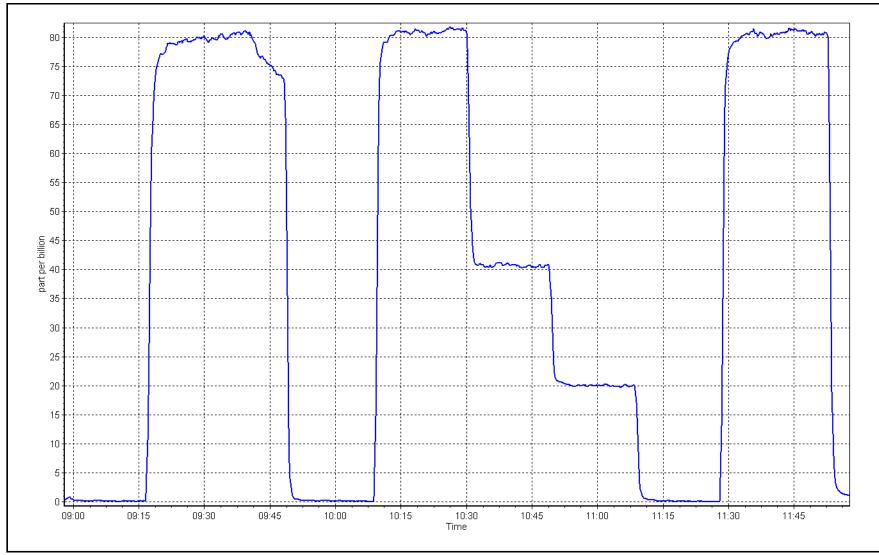
H₂S Calibration Summary

WBFA					Version-11-20
		Station	Information		
Calibration Date:	April 5,	2023	Previous Calibration:		4, 2023
Station Name:	on Name: Mildred Lake		Station Number:	AN	1502
tart Time (MST): 8:55		End Time (MST):		:58	
Analyzer make: Thermo 4		43iQTL	Analyzer serial #:	12113	311966
		Calibi	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Convolution Coofficient	0.00075	>0.005
80.0	81.2	0.9851	Correlation Coefficient	0.999975	≥0.995
40.0	40.6	0.9851	Slope	1.015395	0.90 - 1.10
20.0	20.0	0.9998	Siope	1.013333	0.50 - 1.10
			Intercent	0.050100	+/2











THC / CH_4 / NMHC Calibration Report

		Stat	ion Information		
Station Name:	Mildred Lake		Station number: Al	VIS02	
Calibration Date:	April 13, 2023		Last Cal Date: M	arch 8, 2023	
Start time (MST):	10:42		3:32		
Reason:	Routine				
		Calib	ration Standards		
Gas Cert Reference:	C	C501209	Cal Gas Expiry Date: Au	ugust 12, 2024	
CH4 Cal Gas Conc.	500.2	ppm	CH4 Equiv Conc.	1048.6	ppm
C3H8 Cal Gas Conc.	199.4	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:		
Removed CH4 Conc.	500.2	ppm	CH4 Equiv Conc.	1048.6	ppm
Removed C3H8 Conc.	199.4	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):			Diff between cyl (NM):		
Calibrator Model:	Teledyne API T7	00	Serial Number: 11	.85	
ZAG make/model:	Teledyne API T7	01	Serial Number: 56	508	
		Anal	yzer Information		
Analyzer make:	Thermo 55i		Analyzer serial #: 11	80320038	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.84E-04	2.86E-04	4 NMHC SP Ratio:	4.45E-04	4.49E-04
CH4 Retention time:	14.6	14.6	NMHC Peak Area:	197833	195861
Zero Chromatogram:	ON	ON	Flat Baseline:	OFF	OFF

		THC Calibra	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	16.82	16.71	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	16.82	16.82	1.000
second point	4960	40.1	8.41	8.39	1.003
third point	4980	20.0	4.19	4.17	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	16.82	16.88	0.997
			A	verage Correction Factor	1.003
Baseline Corr AF:	16.71	Prev response	16.80	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation



THC / CH_4 / NMHC Calibration Report

Version-06-2022

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.80	8.72	1.009
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.80	8.79	1.000
second point	4960	40.1	4.40	4.41	0.998
third point	4980	20.0	2.19	2.20	0.997
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.80	8.83	0.996
			A	Average Correction Factor	0.998
Baseline Corr AF:	8.72	Prev response	8.79	*% change	-0.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4 Calibration Data

		CIT+ Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	8.02	7.99	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	8.02	8.03	1.000
second point	4960	40.1	4.01	3.98	1.008
third point	4980	20.0	2.00	1.97	1.018
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	8.02	8.05	0.997
			A	verage Correction Factor	1.009
Baseline Corr AF:	7.99	Prev response	8.01	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		Start		Finish	
THC Cal Slope:		1.000469		1.000482	
THC Cal Offset:		-0.025314		-0.015912	
CH4 Cal Slope:		1.001069		1.001482	
CH4 Cal Offset:		-0.023053		-0.021253	
NMHC Cal Slope:		0.999791		0.999608	
NMHC Cal Offset:		-0.002261		0.004941	

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Sean Bala



THC Calibration Summary

			6			
		Station I	nformation			
Calibration Date:	April 13, 2023		Previous Calibration:	March 8, 2023		
Station Name:	Mildre	ed Lake	Station Number:	AM	AMS02	
Start Time (MST)	10	0:42 End Time (MS		13:32		
Analyzer make:	Ther	mo 55i	Analyzer serial #:	11803	20038	
		Calibra	tion Data			
		Calibra	tion Data			
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999996	≥0.995	
16.82	16.82	0.9999		0.00000		
8.41 4.19	8.39 4.17	1.0026 1.0068	Slope	1.000482	0.90 - 1.10	
4.15	4.17	1.0008	Intercept	-0.015912	+/-0.5	
		THC Calibratio				
18.0 -			n Curve			
16.0 -				_		
14.0 -						
14.0 -						
12.0 -						
Ē						
da 10.0 -						
nc.						
8 8.0 -						
ted						
- 0.01 (bbm) - 0.8 (bbm) - 0.6						
Ind						
4.0 -						
2.0 -						
0.0						
0.0	.0 5	.0	10.0	15.0	20.0	
0			_0.0		20.0	
		.	l Conc. (ppm)			



CH₄ Calibration Summary

Calibration Station Nam Start Time (Analyzer ma	ne:		Station I 13, 2023	nformation			
Station Nam Start Time (ne:		13, 2023				
Start Time (=0) =0=0	Previous Calibration	: March	8, 2023	
	MST):	Mildred Lake		Station Number		S02	
Analyzer ma		1	10:42	End Time (MST)	: 13	13:32	
	ake:	The	rmo 55i	Analyzer serial #	: 11803	20038	
			Calibra	tion Data			
Calculated con (ppm) (Indicated concentratio (ppm) (Ic)	n Correction factor (Cc/Ic)	Statistical I	Evaluation	<u>Limits</u>	
0.00		0.00		Correlation Coefficient	0.999967	≥0.995	
8.02		8.03	0.9996				
4.02		3.98 1.97	1.0079 1.0182	Slope	1.001482	0.90 - 1.10	
	0	1.37	1.0102	Intercept	-0.021253	+/-0.5	
				intercept	-0.021255	77-0.5	
	9.0		CH ₄ Calibration	n Curve			
	3.0 7.0						
	5.0 -						
(mqq)	5.0						
∠ Conc.	4.0						
Indicated Conc. (ppm)	3.0						
	2.0						
1	L.0 -						
с	0.0	2.0	4.0	6.0	8.0	10.0	
	0.0	2.0			0.0	10.0	
			Calculated	l Conc. (ppm)			



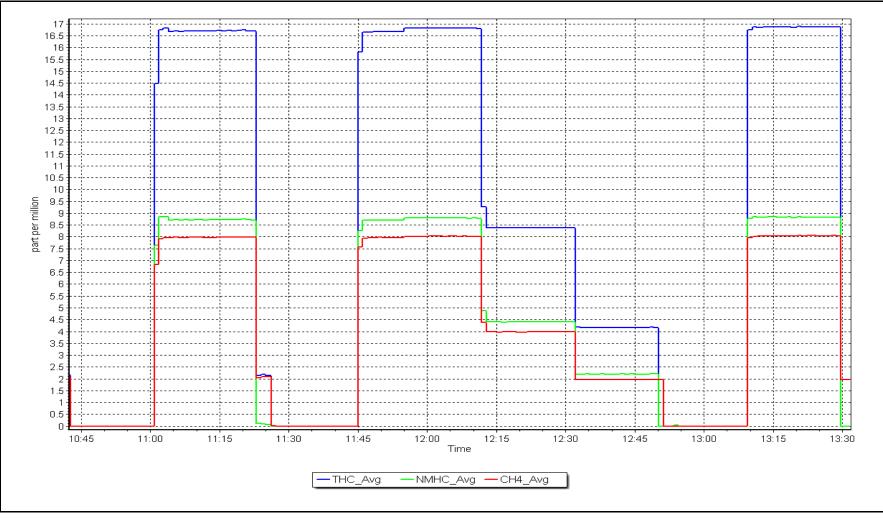
NMHC Calibration Summary

			Statior	Information			
Calibratio	on Date:	Ap	oril 13, 2023	Previous Calibr	ation: Ma	rch 8, 2023	
Station N	ame:	Μ	Mildred Lake		mber:	AMS02	
Start Tim	e (MST):		10:42	End Time (MST): 13:32		13:32	
Analyzer	make:	Т	hermo 55i	Analyzer serial #: 1180320038		80320038	
			Calib	ration Data			
	concentrat m) (Cc)	ion Indicated concentra (ppm) (Ic)	tion Correction factor (Cc/Id	c) Stat	istical Evaluation	<u>Limits</u>	
).00 3.80	0.00 8.79	1.0002	Correlation Coeff	icient 0.999998	≥0.995	
4	1.40 2.19	4.41 2.20	0.9979 0.9970	Slope	0.999608	0.90 - 1.10	
				Intercept	0.004941	+/-0.5	
	10.0 - 9.0 -		NMHC Calibr	ation Curve		2	
	8.0 -						
	7.0 -						
(md	6.0 -						
Conc. (ppm)	5.0 -						
ted C	4.0						
Indicated	3.0 -						
-	2.0						
	1.0 -						
	0.0 🗧						
	0.	0 2.	0 4.0	6.0	8.0	10.0	
			Calculate	ed Conc. (ppm)			

NMHC Calibration Plot

Location: Mildred Lake







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS04 BUFFALO VIEWPOINT APRIL 2023

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

May 31, 2023







SO₂ Calibration Report

Version-01-2020

Buffalo Viewpoint April 13, 2023 7:42 Routine		Station number: Last Cal Date:	AMS04 March 28, 2023	
7:42		Last Cal Date:	March 28 2022	
			ividi (11 20, 2025	
Routine		End time (MST):	11:14	
	Calibration St	andards		
50.02	ppm	Cal Gas Exp Date:	September 9, 2028	
	PPIII	cui dus Exp Dute.	50ptember 5, 2020	
	nnm	Rem Gas Exp Date:	NΔ	
	ppm		NA .	
			2808	
API 1701		Serial Number:	5011	
	Analyzer Info	rmation		
Thermo 43i	-		JC1327300932	
0 - 1000 ppb		/ analyzer serial #.	501027 000002	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
0.996516	1.001885	Backgd or Offset:	22.1	22.1
-0.920000	-0.100000	Coeff or Slope:	0.869	0.869
	SO ₂ Calibratio	on Data		
Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/lc) Limit = 0.95-1.05
5000	0.0	0.0	0.2	
4920	80.0	800.3	797.2	1.004
4960	40.0	400.2	399.9	1.001
4980	20.0	200.1	198.9	1.006
5000	0.0	0.0	0.4	
4920	80.0	800.3	801.7	0.998
4960	40.0	400.2	401.4	0.997
4980	20.0	200.1	199.3	1.004
	0.0	0.0	0.3	
				0.998
				1.000
797 00	Previous response	•		0.0%
			-	0.220000
			Ai intercept.	0.220000
190.70	AF CUITEIduUII:	0.3333333	* = > +/-5% change initiat	es investigation
	Start 0.996516 -0.920000 Dilution air flow rate (sccm) 5000 4920 4960 4980	CC470284 50.02 ppm NA API T700 API T701 Analyzer Info Thermo 43i 0 - 1000 ppb Start Finish 0.996516 1.001885 -0.920000 -0.100000 SO2 Calibration Dilution air flow rate (sccm) Source gas flow rate (sccm) 5000 0.0 4920 80.0 4960 40.0 4980 20.0 5000 0.0 4960 40.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 4920 80.0 AF Slope: 399.70	CC470284 So.02 ppm Rem Gas Exp Date: Diff between cyl: API T700 Serial Number: Serial Number: API T701 Serial Number: Serial Number: API T701 Serial Number: Serial Number: Thermo 43i Analyzer Information Analyzer serial #: 0 - 1000 ppb Start Finish Analyzer serial #: 0.996516 1.001885 Backgd or Offset: -0.920000 -0.100000 Coeff or Slope: SO2 Calibration Data Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) 5000 0.0 0.0 4980 4980 20.0 200.1 5000 0.0 0.0 4980 20.0 200.1 5000 0.0 0.0 4980 20.0 200.1 5000 0.0 0.0 4980 20.0 200.1 5000 0.0 0.0 4980 20.0 20.0	CC470284 So.02 ppm Rem Gas Exp Date: NA NA Diff between cyl: API T700 Serial Number: 3808 API T700 Serial Number: 5611 Analyzer Information Thermo 43i Analyzer Information Start Finish 0.1000 ppb Start Start 2.1 SO2 Calibration Data Dilution air flow rate Source gas flow rate Calculated Indicated concentration Concentration (ppb) (Cc) (ppb) (lc) 5000 0.0 0.2 399.9 4960 40.0 400.2 399.9 4980 20.0 20.0 198.9 Source gas flow rate Calculated Indicated concentration Concentration (ppb) (Cc) 5000 0.0 0.0 0.2 399.9 4980 20.0 200.1 198.9

Notes:

Analyzer moved to bottom shelf for more room for H2S analyzer. Sample line replaced to a longer line. Exhaust line extended. No adjustments done.

Calibration Performed By:

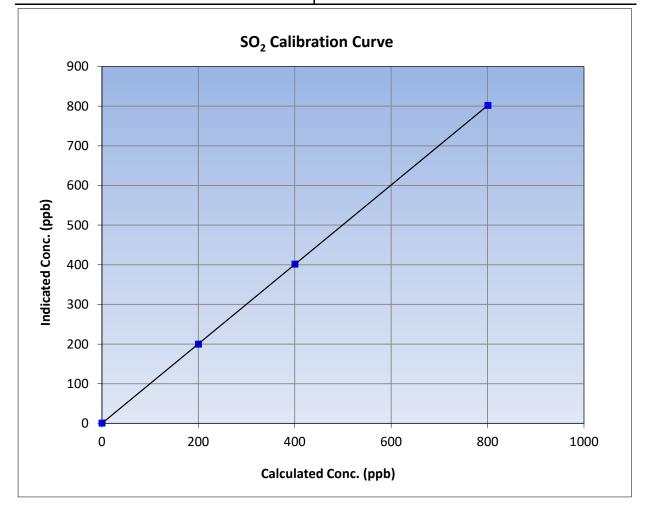


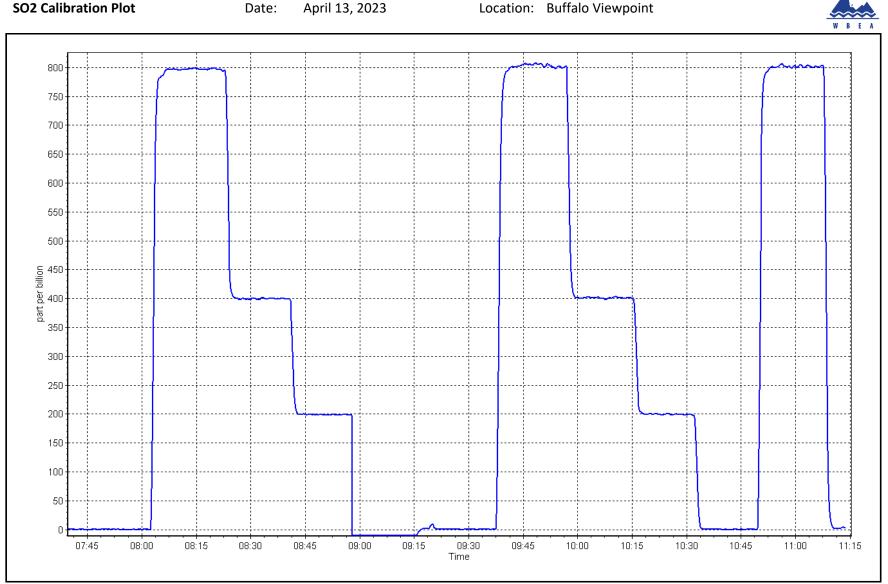
SO₂ Calibration Summary

WBEA			Version-01-2020
	Statio	on Information	
Calibration Date:	April 13, 2023	Previous Calibration:	March 28, 2023
Station Name:	Buffalo Viewpoint	Station Number:	AMS04
Start Time (MST):	7:42	End Time (MST):	11:14
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1327300932

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evaluation		<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999995	≥0.995	
800.3	801.7	0.9983	Correlation Coefficient	0.999995	20.995	
400.2	401.4	0.9969	Classe	1.001885	0.90 - 1.10	
200.1	199.3	1.0039	Slope	1.001865	0.90 - 1.10	
			Intercept	-0.100000	+/-30	





Location: Buffalo Viewpoint



H₂S Calibration Report

WBEA		2		-	
		Station Info	rmation		Version-11-20
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint April 27, 2023 6:42 Routine	Station into	Station number: Last Cal Date: End time (MST):	AMS04 March 8, 2023 10:38	
		Calibration S	tandards		
Cal Gas Concentration:	5.42	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	CC345266 5.42 CC345266 API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	January 4, 2025 3808 362	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i NA 0 - 100 ppb		Analyzer serial #: Converter serial #:	1336160094 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.995796 0.201944	0.996073 0.142229	Backgd or Offset: Coeff or Slope:		19.0 1.070
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.4	
as found span	4926	74.1	80.3	81.1	0.995
as found 2nd point	4963	37.0	40.1	40.9	0.990
as found 3rd point	4982	18.5	20.1	20.4	1.003
new cylinder response					
		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.1	
high point	4926	74.1	80.3	80.0	1.004
second point	4963	37.0	40.1	40.5	0.990
third point	4982	18.5	20.1	19.9	1.008
as left zero	5000	0.0	0.0	0.4	
as left span	4926	74.1	80.3	80.1	1.003
SO2 Scrubber Check	4920	80.0	800.0	0.0	
Date of last scrubber cha	-			Ave Corr Factor	1.001
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	80.7	Prev response:	80.19	*% change:	0.6%
Baseline Corr 2nd AF pt:	40.5	AF Slope:	1.005608	AF Intercept:	0.382341
Baseline Corr 3rd AF pt:	20.0	AF Correlation:	0.999983		
				* = > +/-5% change initiat	es investigation

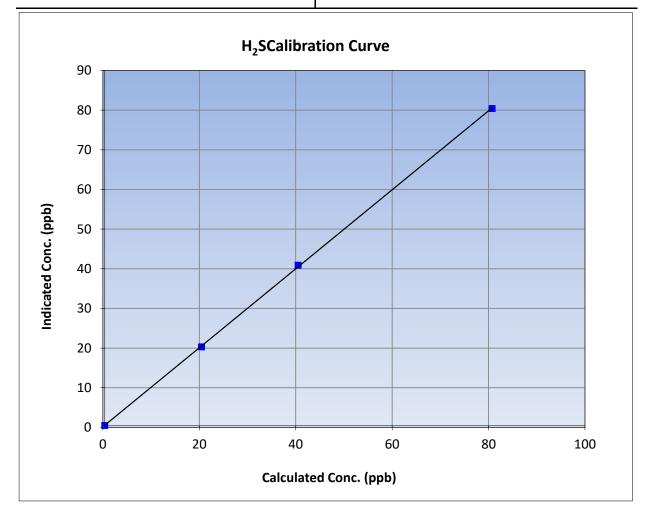
Notes:

Sox scrubber checked after the calibrator zero. Zero and Span adjusted.



H₂S Calibration Summary

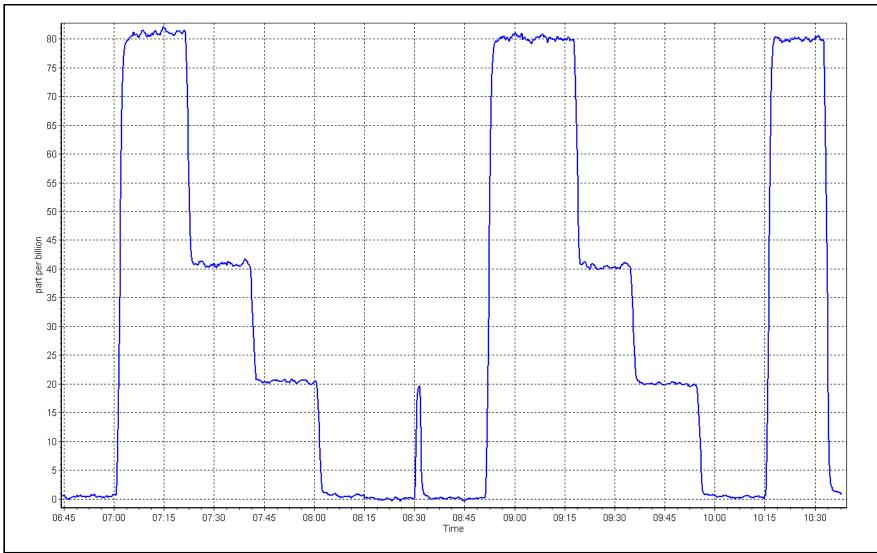
WBEA					Version-11-2
		Station	Information		
Calibration Date:	April 27,	2023	Previous Calibration:	n: March 8, 2023	
Station Name:	Buffalo Vie	ewpoint	Station Number:	AM	1504
Start Time (MST):	6:4	2	End Time (MST):	10	:38
Analyzer make:			Analyzer serial #:	13361	60094
	Indicated concentration	Correction factor	Statistical Evalua	ation	<u>Limits</u>
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)			
0.0 80.3	0.1 80.0	1.0040	Correlation Coefficient	0.999932	≥0 <i>.995</i>
40.1	40.5	0.9903			
20.1	19.9	1.0076	Slope	0.996073	0.90 - 1.10
			Intercept	0.142229	+/-3













THC / CH_4 / NMHC Calibration Report

		Stat	ion Information				
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpo May 4, 2023 8:35 Routine	int	Station number: AMS04 Last Cal Date: April 6, 2023 End time (MST): 11:17				
		Calib	oration Standards				
Gas Cert Reference:	(CC470284	Cal Gas Expiry Date: Sep	otember 9, 20	28		
CH4 Cal Gas Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm		
C3H8 Cal Gas Conc.	205.5	ppm					
Removed Gas Cert:		NA	Removed Gas Expiry: NA	L.			
Removed CH4 Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm		
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):				
Diff between cyl (CH ₄	.):		Diff between cyl (NM):				
Calibrator Model:	API T700		Serial Number: 380	08			
ZAG make/model:	API T701		Serial Number: 362	2			
		Anal	yzer Information				
Analyzer mak THC Range (ppm	e: Thermo 55i): 0 - 20 ppm		Analyzer serial #: 122	22762077			
NMHC Range (ppm			CH4 Range (ppm): 0 -	10 ppm			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>		

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	1.840E-04	1.860E-04	NMHC SP Ratio:	3.820E-05	3.870E-05
CH4 Retention time:	11.8	11.8	NMHC Peak Area:	236377	233712

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	17.01	16.76	1.015		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.0	17.01	16.98	1.002		
second point	4960	40.0	8.50	8.48	1.003		
third point	4980	20.0	4.25	4.21	1.010		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.0	17.01	16.96	1.003		
			Av	verage Correction Factor	1.005		
Baseline Corr AF:	16.76	Prev response	17.00	*% change	-1.4%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	9.04	8.94	1.011		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.0	9.04	9.04	1.000		
second point	4960	40.0	4.52	4.51	1.002		
third point	4980	20.0	2.26	2.24	1.009		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.0	9.04	9.04	1.000		
			ŀ	Average Correction Factor	1.004		
Baseline Corr AF:	8.94	Prev response	9.02	*% change	-0.9%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	7.96	7.83	1.017
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	7.96	7.94	1.003
second point	4960	40.0	3.98	3.97	1.003
third point	4980	20.0	1.99	1.98	1.006
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	7.96	7.92	1.006
			A	verage Correction Factor	1.004
Baseline Corr AF:	7.83	Prev response	7.96	*% change	-1.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.001213		0.999063	
THC Cal Offset:		-0.032000		-0.016000	
CH4 Cal Slope:		1.001406		0.997102	
CH4 Cal Offset:		-0.012000		-0.002000	
NMHC Cal Slope:		0.999779		1.000411	
NMHC Cal Offset:		-0.020000		-0.010000	

Notes:

Span adjusted. No maintenance done.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

					Version-01-2020
		Station I	nformation		
Calibration Date:	May 4	, 2023	Previous Calibration:	April 6	, 2023
Station Name:	Buffalo V	/iewpoint	Station Number:	AM	S04
Start Time (MST):	8:	35	End Time (MST):	11:	17
Analyzer make:	Therr	no 55i	Analyzer serial #:	12227	62077
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999995	≥0.995
17.01	16.98	1.0016			
8.50 4.25	8.48	1.0028 1.0099	Slope	0.999063	0.90 - 1.10
4.25	4.21	1.0099	Intercent	0.016000	. / 2.5
			Intercept	-0.016000	+/-0.5
18.0 -		THC Calibratio	n Curve		
16.0 -					
14.0 -					
12.0 -					
ud 10.0 -					
uc. (
9 8.0					
ate					
- 0.6 gi					
	_				
4.0 -					
2.0 -					
0.0 🚽					
0.0	0 5	.0	10.0	15.0	20.0
		Calculated	l Conc. (ppm)		
<u>.</u>					



CH₄ Calibration Summary

					Version-01-202
		Station I	nformation		
Calibration Date:	May 4	ł, 2023	Previous Calibration:	April 6,	2023
Station Name:	Buffalo \	/iewpoint	Station Number:	AMS	604
Start Time (MST):	8	35	End Time (MST):	11:	17
Analyzer make:	Therr	no 55i	Analyzer serial #:	122276	52077
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
7.96	7.94	1.0031			
3.98 1.99	3.97 1.98	1.0031 1.0057	Slope	0.997102	0.90 - 1.10
			Intercept	-0.002000	+/-0.5
0.8 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0					
<u>e</u> 2.0					
1.0					
0.0					
0.0	2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		

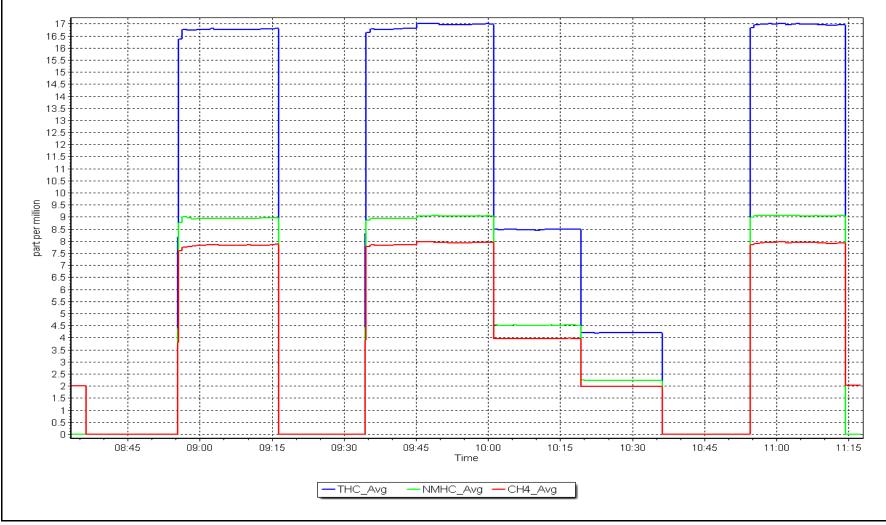


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	May 4	, 2023	Previous Calibration:	April 6	, 2023
Station Name:	Buffalo V	/iewpoint	Station Number:	AMS	504
Start Time (MST):	8:	35	End Time (MST):	11:	17
Analyzer make:	Thern	no 55i	Analyzer serial #:	12227	52077
		Calibra	ition Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999994	≥0.995
9.04 4.52	9.04 4.51	1.0002 1.0024			
2.26	2.24	1.0024	Slope	1.000411	0.90 - 1.10
			Intercept	-0.010000	+/-0.5
9.0 8.0 7.0					
6.0 (bbm) 5.0					
Conc		· · · · ·			
4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0					
2.0					
10					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-20
		Station	Information		
Station Name:	Buffalo Viewpo	int	Station number: Al	MS04	
Calibration Date:	April 13, 2023		Last Cal Date: A	pril 5, 2023	
Start time (MST):	6:15		End time (MST): 7:	44	
Reason:	Routine				
		Calibrati	on Standards		
Gas Cert Reference:		CC470284	Cal Gas Expiry Date: Se	eptember 9, 20	28
CH4 Cal Gas Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry: N	A	
Removed CH4 Conc.	497.8	ppm	CH4 Equiv Conc.	1062.9	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 38	308	
ZAG make/model:	API T701		Serial Number: 36	52	
		Analyze	r Information		
Analyzer make	: Thermo 55i		Analyzer serial #: 1222762077		
THC Range (ppm)	: 0 - 20 ppm				
NMHC Range (ppm)	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 1.840E-04	1.840E-04	NMHC SP Ratio:	3.820E-05	3.820E-05
CH4 Retention time	e: 11.8	11.8	NMHC Peak Area:	236377	236377

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	17.01	16.82	1.011		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.0	17.01	16.81	1.012		
second point							
third point							
as left zero							
as left span							
			A	Average Correction Factor	1.012		
Baseline Corr AF:	16.82	Prev response	17.00	*% change	-1.0%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.0
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	9.04	8.97	1.008
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	9.04	8.96	1.009
second point					
third point					
as left zero					
as left span					
·			Avera	ge Correction Factor	1.009
Baseline Corr AF:	8.97	Prev response	9.02	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	7.96	7.85	1.015
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	7.96	7.85	1.015
second point					
third point					
as left zero					
as left span					
I			Avera	ge Correction Factor	1.015
Baseline Corr AF:	7.85	Prev response	7.96	*% change	-1.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		1.001213		0.988428	
THC Cal Offset:		-0.032000		0.000000	
CH4 Cal Slope:		1.001406		0.985587	
CH4 Cal Offset:		-0.012000		0.000000	
NMHC Cal Slope:		0.999779		0.990931	
NMHC Cal Offset:		-0.020000		0.000000	
		-0.020000		0.000000	

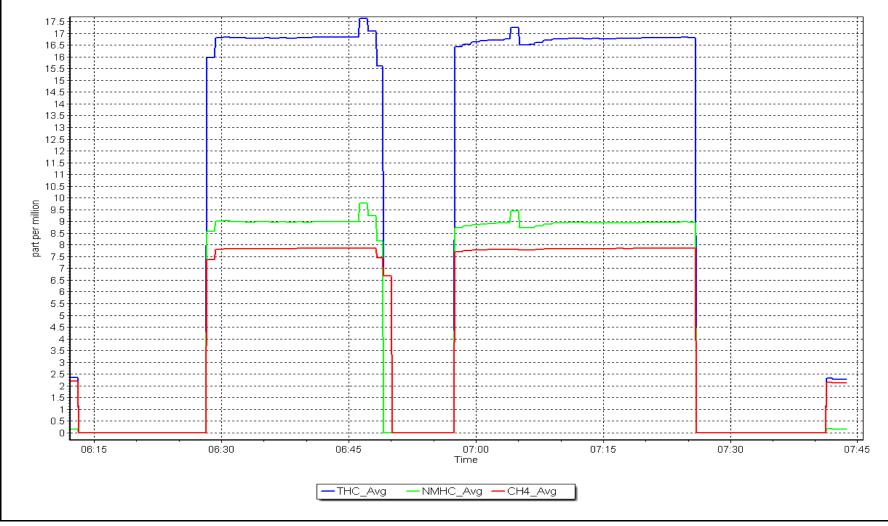
Hydrogen and Nitrogen cylinder change.

Calibration Performed By:

Melissa Lemay









$NO_X \setminus NO \setminus NO_2$ Calibration Report

		Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Buffalo Viewpoint April 4, 2023 6:20 Routine		Station number: Last Cal Date: End time (MST):	March 3, 2023	
		Calibrati	on Standards		
NO Gas Cylinder #:	T36RH1F		Cal Gas Expiry Date:	August 18, 2023	
NOX Cal Gas Conc:	51.16	ppm	NO Cal Gas Conc:	50.91	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	51.16	ppm	Removed Gas NO Conc:	50.91	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2445	
ZAG make/model:	API T701		Serial Number:	362	
Analyzer make: NOX Range (ppb):	0 - 1000 ppb <u>Start</u>	<u>Finish</u>	r Information Analyzer serial #:	<u>Start</u>	<u>Finish</u>
NO coeff or slope		1.014	NO bkgnd or offset:	-2.1	-2.1
NOX coeff or slope: NO2 coeff or slope:		1.013 1.000	NOX bkgnd or offset: Reaction cell Press:	-1.7 7.7	-1.7 7.6
NO_x Cal Slope: NO_x Cal Offset: NO Cal Slope: NO Cal Offset: NO_2 Cal Slope:		Calibrat <u>Start</u> 0.998743 0.546857 1.004711 -0.973240 0.992216	ion Statistics	<i>Finish</i> 0.999617 -0.133690 0.998232 -0.993777 0.984274	
NO ₂ Cal Offset:	:	0.603575		-0.102857	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3		
as found span	4922	78.1	799.1	795.2	3.9	782.1	780.8	1.3	1.0217	1.0184
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.5	-0.1		
high point	4922	78.1	799.1	795.2	3.9	798.9	793.5	5.4	1.0003	1.0021
second point	4961	39.1	400.1	398.1	2.0	399.6	395.8	3.8	1.0012	1.0058
third point	4981	19.5	199.5	198.5	1.0	198.7	195.6	3.1	1.0040	1.0150
as left zero	5000	0.0	0.0	0.0	0.0	0.8	0.9	-0.1		
as left span	4922	78.1	799.1	376.0	423.1	798.0	385.5	412.5	1.0014	0.9754
							Average C	orrection Factor	1.0018	1.0076
Corrected As fo	ound NO _x =	782.0 ppb	NO =	781.0 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-2.1%
Previous Respo	onse NO _x =	798.6 ppb	NO =	798.0 ppb				*Percent Chang	ge NO =	-2.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	797.1	377.9	423.1	416.4	1.0161	98.4%
2nd GPT point (200 ppb O3)	797.1	581.4	219.6	215.9	1.0172	98.3%
3rd GPT point (100 ppb O3)	797.1	686.8	114.2	112.4	1.0161	98.4%
				Average Correction Factor	1.0164	98.4%

Notes:

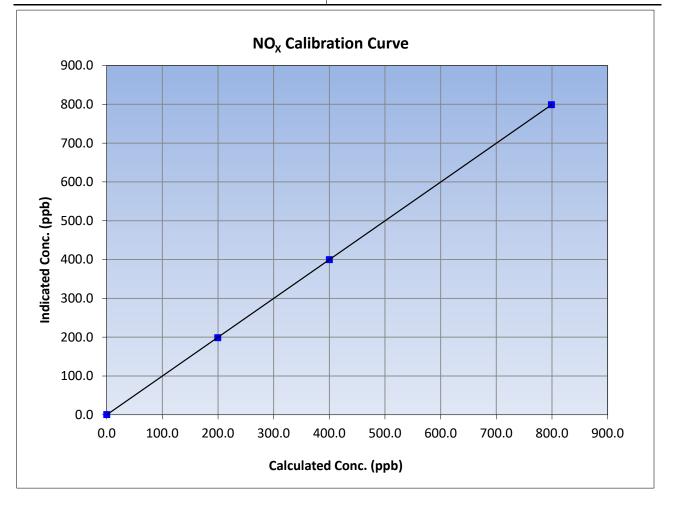
No maintenance done. Span adjusted. Due to drifting during the GPT the 2nd NO ref point used.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

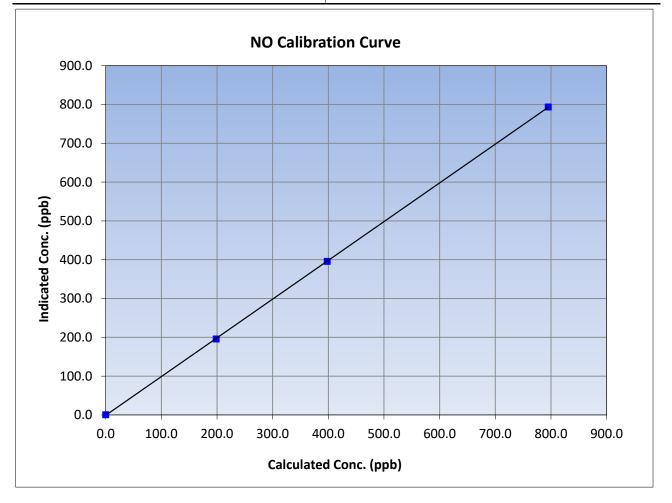
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 4	l, 2023	Previous Calibration: Mar		n 3, 2023	
Station Name:	Buffalo Viewpoint		Station Number:	AN	/IS04	
Start Time (MST):	6:20		End Time (MST):	1:	1:26	
Analyzer make:	API	T200	Analyzer serial #:		723	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.4		Correlation Coefficient	0.999998	≥0.995	
799.1	798.9	1.0003	correlation coefficient	0.555556	20.333	
400.1	399.6	1.0012	Slope	0.999617	0.90 - 1.10	
199.5	198.7	1.0040	Slope	0.999017	0.90 - 1.10	
			Intercept	-0.133690	+/-20	





NO Calibration Summary

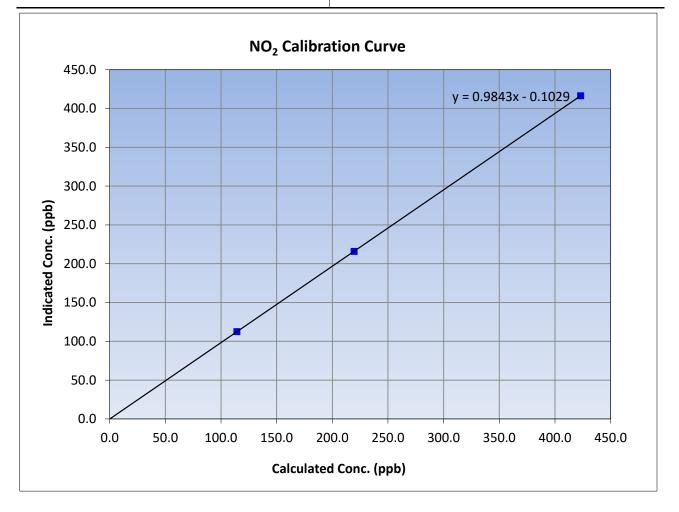
WBEA		Station	Information		Version-04-20
			Previous Calibration:		
Calibration Date:	April 4	April 4, 2023		Marc	h 3, 2023
Station Name:	Buffalo Viewpoint		Station Number: Al		MS04
Start Time (MST):	6:20		End Time (MST):	1	1:26
Analyzer make:	API	T200	Analyzer serial #:	Analyzer serial #:	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	0.5		Correlation Coefficient	0.999984	≥0.995
795.2	793.5	1.0021	conclation coefficient	0.555504	20.555
398.1	395.8	1.0058	Slope	0.998232	0.90 - 1.10
198.5	195.6	1.0150	Slope	0.998232	0.90 - 1.10
			Intercept	-0.993777	+/-20

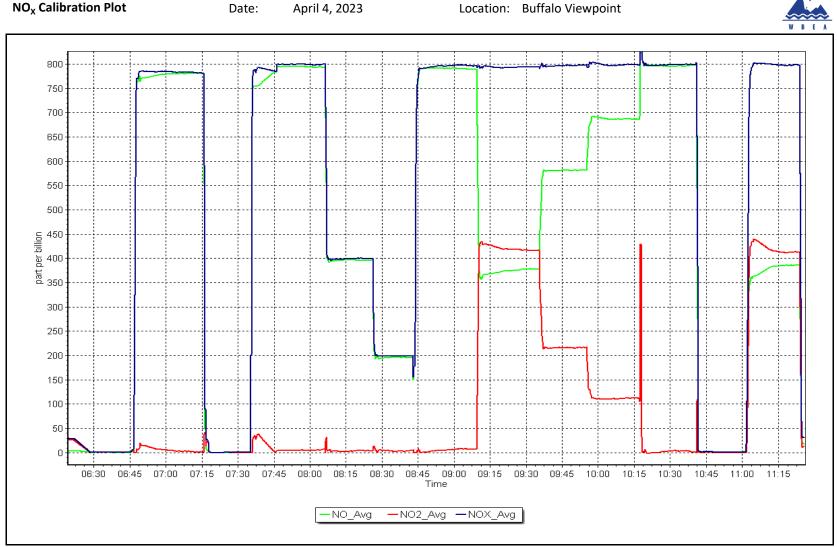




NO₂ Calibration Summary

WBEA					Version-04-20		
		Station	Information				
Calibration Date:	April 4	, 2023	Previous Calibration:		1arch 3, 2023		
Station Name:	Buffalo Viewpoint		Station Number: A		MS04		
Start Time (MST):	6:	20	End Time (MST): 11:2		1:26		
Analyzer make:			API T200 Analyzer serial #:			723	
		Calibra	ation Data				
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>		
0.0	-0.1		Correlation Coefficient	1.000000	≥0.995		
423.1	416.4	1.0161	correlation coernicient	1.000000	20.995		
219.6	215.9	1.0172	Slope	0.984274	0.90 - 1.10		
114.2	112.4	1.0161	Slope	0.984274	0.90 - 1.10		
			Intercept	-0.102857	+/-20		









O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST):	Buffalo Viewpoint April 3, 2023 6:20		Station number: Last Cal Date: End time (MST):	March 7, 2023	
Reason:	Routine				
		Calibration St	andards		
O3 generation mode:	Photometer				
Calibrator Make/Model:	API T700		Serial Number:	3808	
ZAG Make/Model:	API T701		Serial Number:	362	
		Analyzer Info	rmation		
Analyzer make	: API T400		Analyzer serial #:	2961	
Analyzer Range	e 0 - 500 ppb				
	Start	Finish		Start	Finish
Calibration slope:	0.996114	1.000143	Backgd or Offset:	-5.3	-2.7
Calibration intercept:	1.880000	-0.100000	Coeff or Slope:	1.178	1.035
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	Correction factor (Cc/I
	(sccm)	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	(sccm) 5000	Voltage Drive	concentration (ppb) (Cc)	(ppm) (Ic) 1.4	Limit = 0.95-1.05
as found zero as found span		_			
	5000	0.0	0.0	1.4	
as found span	5000 5000	0.0 976.7	0.0 400.0	1.4 407.7	 0.981
as found span as found 2nd point	5000 5000 5000	0.0 976.7 809.9	0.0 400.0 200.0	1.4 407.7 207.0	 0.981 0.966
as found span as found 2nd point as found 3rd point	5000 5000 5000 5000	0.0 976.7 809.9 702.3	0.0 400.0 200.0 100.0	1.4 407.7 207.0 106.4	0.981 0.966 0.940
as found span as found 2nd point as found 3rd point calibrator zero	5000 5000 5000 5000 5000 5000	0.0 976.7 809.9 702.3 0.0	0.0 400.0 200.0 100.0 0.0	1.4 407.7 207.0 106.4 0.1	0.981 0.966 0.940
as found span as found 2nd point as found 3rd point calibrator zero high point	5000 5000 5000 5000 5000 5000 5000	0.0 976.7 809.9 702.3 0.0 979.7	0.0 400.0 200.0 100.0 0.0 400.0	1.4 407.7 207.0 106.4 0.1 400.1	0.981 0.966 0.940 1.000
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9	0.0 400.0 200.0 100.0 0.0 400.0 200.0	1.4 407.7 207.0 106.4 0.1 400.1 199.7	0.981 0.966 0.940 1.000 1.002
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9 705.6	0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0	1.4 407.7 207.0 106.4 0.1 400.1 199.7 99.8	0.981 0.966 0.940 1.000 1.002 1.002
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9 705.6 0.0	0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 0.0 400.0	1.4 407.7 207.0 106.4 0.1 400.1 199.7 99.8 -0.6	0.981 0.966 0.940 1.000 1.002 1.002
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9 705.6 0.0	0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	1.4 407.7 207.0 106.4 0.1 400.1 199.7 99.8 -0.6 401.5	 0.981 0.966 0.940 1.000 1.002 1.002 0.996
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9 705.6 0.0 980.1	0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	1.4 407.7 207.0 106.4 0.1 400.1 199.7 99.8 -0.6 401.5 se Correction Factor	0.981 0.966 0.940 1.000 1.002 1.002 0.996 1.001
as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	5000 5000 5000 5000 5000 5000 5000 500	0.0 976.7 809.9 702.3 0.0 979.7 813.9 705.6 0.0 980.1 Previous response	0.0 400.0 200.0 100.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag 400.3	1.4 407.7 207.0 106.4 0.1 400.1 199.7 99.8 -0.6 401.5 ge Correction Factor *% change	 0.981 0.966 0.940 1.000 1.002 1.002 0.996 1.001 1.5%

Notes:

O3 scrubber replaced. Zero and Span adjusted.

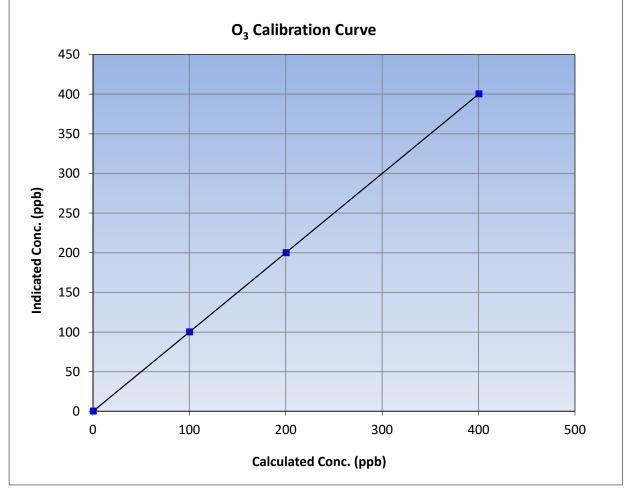
Calibration Performed By:

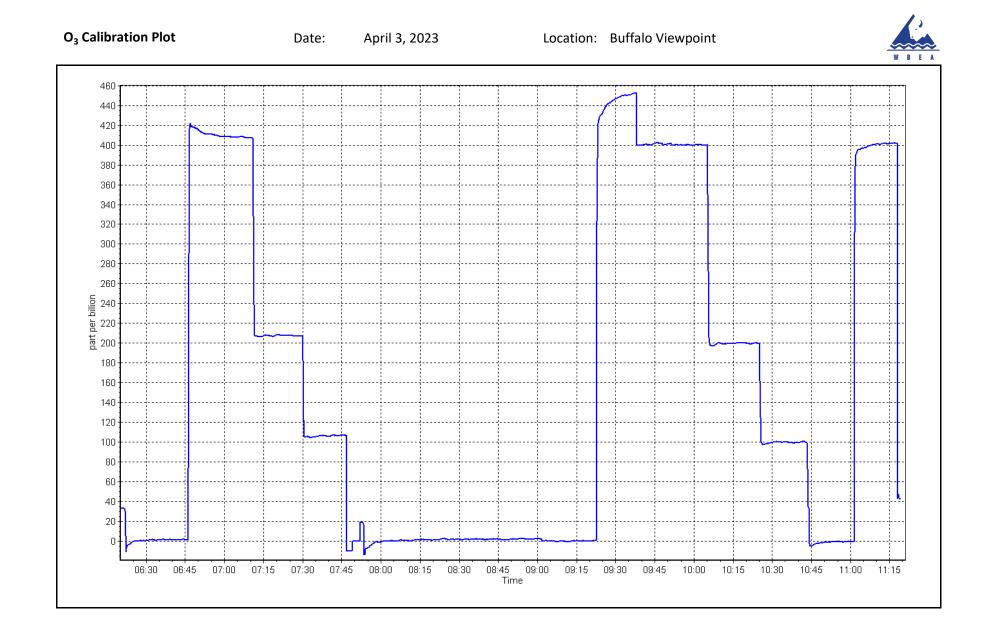
Melissa Lemay



O₃ Calibration Summary

		Station	Information		Version-01-
Calibration Date:	April 3,		Previous Calibration:	March	7, 2023
Station Name:	Buffalo Viewpoint		Station Number:		1504
Start Time (MST):			·	11	:19
Analyzer make:	API T4	400	Analyzer serial #:	29	961
		Calibu	ration Data		
Calculated concentration		Correction factor	ration Data Statistical Evalua	ation	<u>Limits</u>
(ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
		Correction factor		otion 0.999999	<u>Limits</u> ≥0.995
(ppb) (Cc) 0.0	(ppb) (lc) 0.1	Correction factor (Cc/Ic)	Statistical Evalua	0.999999	≥0.995
(ppb) (Cc) 0.0 400.0	(ppb) (Ic) 0.1 400.1	Correction factor (Cc/Ic) 0.9998	Statistical Evalua		







T640 PM_{2.5} CALIBRATION

W D E A					Version-01-2023
		Station Information	ו		
Station Name:	Buffalo Viewpoint		Station number:	AMS 04	
Calibration Date:	April 27, 2023		Last Cal Date:	March 29, 2023	
Start time (MST):	6:15		End time (MST):	6:40	
Analyzer Make:	API T640		S/N:	322	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	AliCat		S/N:	228085	
Temp/RH standard:	AliCat		S/N:	228085	
		Monthly Calibration T	est		
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	1.8	1.4	1.8		+/- 2 °C
P (mmHg)	730	731.1	730		+/- 10 mmHg
flow (LPM)	5	4.98	5		+/- 0.25 LPM
Leak Test:	Date of check:	April 27, 2023	Last Cal Date:	March 29, 2023	-
AL	PM w/o HEPA:	7.5	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be			serve as the pre mai	intenance leak check	
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibration 1	Fact		
Demonster	A s farmed	Quarterly Calibration		المعاد بالم	(I too too)
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test					10.9 +/- 0.5
Post-maintenance	leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	ber Cleaned:	March 28,	2023		<0.2 ug/m3
Disposable Filter	Changed:	March 28,	2023		
		Annual Maintenanc	•		
		Annual Maintenanc	e		
Date Sample Tub		September 1			
Date RH/T Senso	r Cleaned:	September 1	5, 2022		
		No odjustno	ate dana . Usad Class	ad	
Notes:		no adjustme	nts done. Head Clean	ieu.	
Calibration by:	Melissa Lemay				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS05 MANNIX APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Mannix April 25, 2023 8:06 Routine		Station number: Last Cal Date: End time (MST):	AMS05 March 2, 2023 11:15	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.02 XC026809B	ppm	Cal Gas Exp Date:	January 12, 2029	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.02 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	621 832	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1008841399	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.999400 -0.280000	1.003342 0.240000	Backgd or Offset: Coeff or Slope:		9.0 0.920
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4920	80.0	800.3	800.6	1.000
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.5	
high point	4920	80.0	800.3	803.5	0.996
second point	4960	40.0	400.2	401.2	0.997
third point as left zero	4980 5000	20.0	200.1	201.0 0.3	0.995
as left span	4920	80.0	800.3	806.3	0.993
as ieit spaii	4 <i>3</i> 20	00.0		ge Correction Factor	0.995
Baseline Corr As found:	800.40				
Baseline Corr As found: Baseline Corr 2nd AF pt:	800.40 NA	Previous response		*% change	0.1%
Baseline Corr 3rd AF pt:	NA	AF Slope: AF Correlation:		AF Intercept: * = > +/-5% change initiat	

Notes:

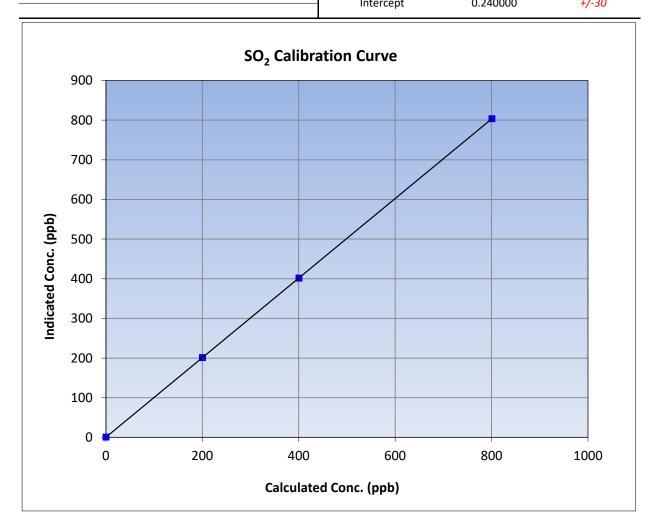
Sample inlet filter changed after as founds. No adjustments made.

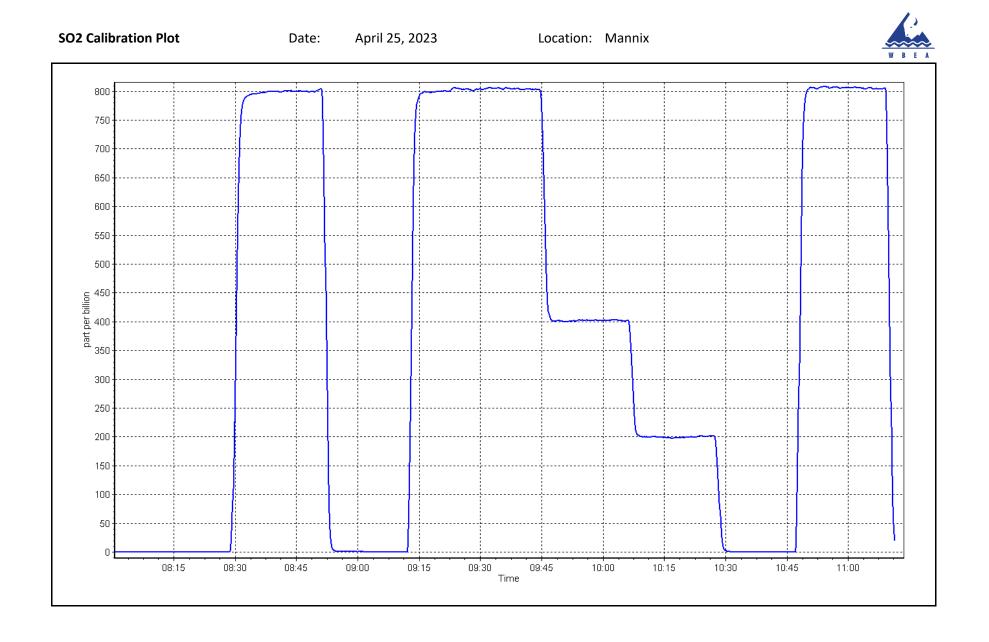
Calibration Performed By:



SO₂ Calibration Summary

WBEA					Version-01-2
		Station	Information		
Calibration Date:	April 25,	2023	Previous Calibration:	March	2, 2023
itation Name:	Man	nix	Station Number:	AN	1505
Start Time (MST):	8:0	6	End Time (MST):	11	:15
Analyzer make:	Thermo	o 43i	Analyzer serial #:	10088	341399
Calculated concentration		Correction factor	Statistical Evalua	ition	<u>Limits</u>
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)			
0.0	0.5		Correlation Coefficient	0.999999	≥0.995
800.3	803.5	0.9960			
400.2	401.2	0.9974	Slope	1.003342	0.90 - 1.10
200.1	201.0	0.9954	Siope	1.003342	0.50 1.10
			Intercept	0.240000	+/-30







H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Mannix April 17, 2023 9:10 Routine		Station number: Last Cal Date: End time (MST):	AMS05 March 15, 2023 13:55	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.92 EY0002433	ppm	Cal Gas Exp Date:	February 9, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	4.92 NA API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 1845 832	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQTL Global 0 - 100 ppb		Analyzer serial #: Converter serial #:	1203169745 2022-196	
Calibration slope: Calibration intercept:	<u>Start</u> 0.988329 0.380632	<u>Finish</u> 1.005327 0.060642	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 2.17 0.849
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4919	81.3	80.0	79.1	1.011
as found 2nd point	4960	40.7	40.0	39.6	1.011
as found 3rd point	4980	20.3	20.0	19.6	1.019
new cylinder response					
		H ₂ S Calibrat	ion Data		
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	80.0	80.5	0.994
second point	4960	40.7	40.0	40.3	0.994
third point	4980	20.3	20.0	20.1	0.994
as left zero	5000	0.0	0.0	0.3	
as left span	4919	81.3	80.0	79.7	1.004
SO2 Scrubber Check	4920	80.0	800.0	0.2	
Date of last scrubber cha Date of last converter eff	-			Ave Corr Factor	0.994 efficiency
	•	2	70	***	
Baseline Corr As found: Baseline Corr 2nd AF pt:	79.1 39.6	Prev response: AF Slope:	0.989473	*% change: AF Intercept:	-0.4% -0.059409
Baseline Corr 3rd AF pt:	19.6	AF Correlation:	0.999995	* = > +/-5% change initiate	es investigation

Notes:

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

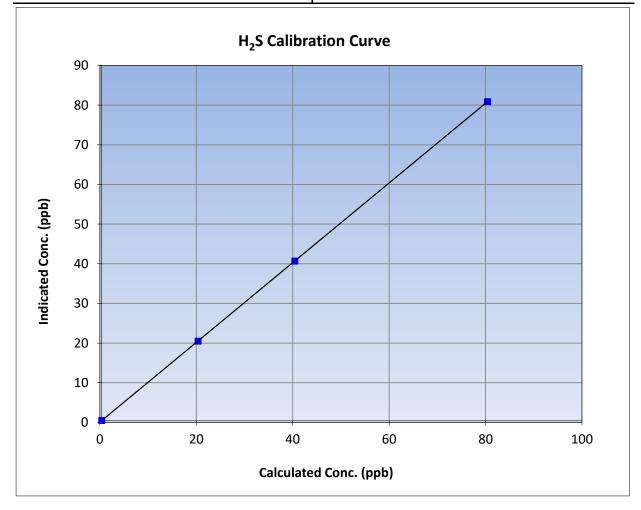
Calibration Performed By:

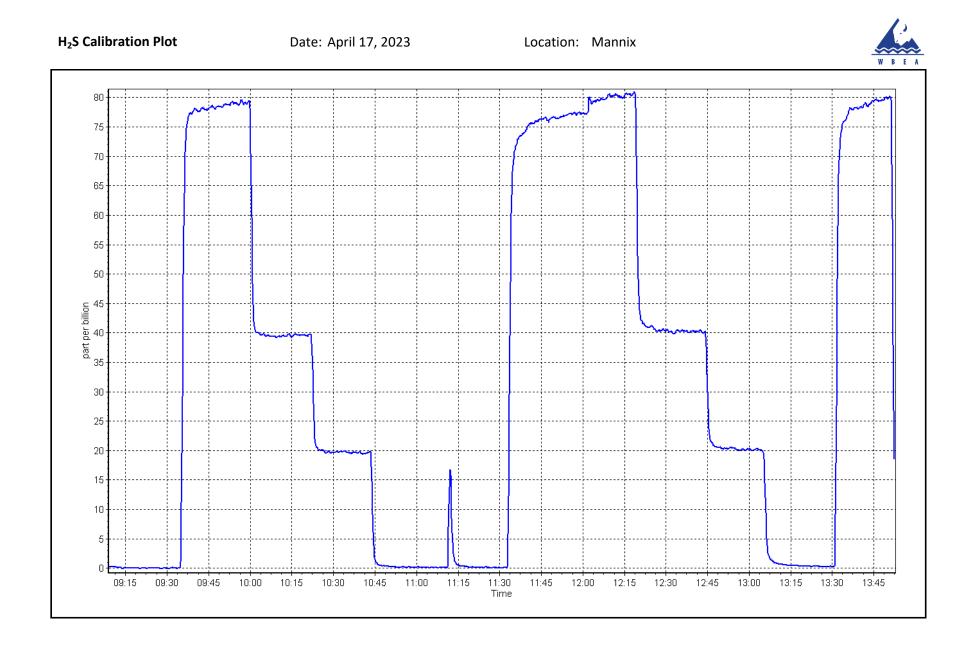


H₂S Calibration Summary

WBEA	Stat	ion Information	Version-11-20
Calibration Date:	April 17, 2023	Previous Calibration:	March 15, 2023
Station Name:	Mannix	Station Number:	AMS05
Start Time (MST):	9:10	End Time (MST):	13:55
Analyzer make:	Thermo 43iQTL	Analyzer serial #:	1203169745
	Са	libration Data	

Calculated concentratio (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
80.0	80.5	0.9937	correlation coefficient	0.999999	20.995
40.0	40.3	0.9936	Slope	1.005327	0.90 - 1.10
20.0	20.1	0.9937	Slope		0.90 - 1.10
			Intercept	0.060642	+/-3







THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Station	Information		
Station Name:	Mannix		Station number: AN	VIS05	
Calibration Date:	April 25, 2023		Last Cal Date: M	arch 2, 2023	
Start time (MST):	8:06		End time (MST): 11	:15	
Reason:	Routine				
		Calibrat	ion Standards		
Gas Cert Reference:	XC	0268098	Cal Gas Expiry Date: Ja	nuary 12, 2029	I
CH4 Cal Gas Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
C3H8 Cal Gas Conc.	207.9	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry:		
Removed CH4 Conc.	504.9	ppm	CH4 Equiv Conc.	1076.6	ppm
Removed C3H8 Conc.	207.9	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 62	21	
ZAG make/model:	API T701H		Serial Number: 83	32	
		Analyze	r Information		
Analyzer make	: Thermo 55i		Analyzer serial #: 11	52430011	
THC Range (ppm)	: 0 - 20 ppm				
NMHC Range (ppm)	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 2.58E-04	2.65E-04	NMHC SP Ratio:	4.50E-05	4.42E-05
CH4 Retention time	: 15.00	15.00	NMHC Peak Area:	203233	206898

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.0	17.23	17.19	1.002		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.0	17.23	17.24	0.999		
second point	4960	40.0	8.61	8.61	1.000		
third point	4980	20.0	4.31	4.31	0.999		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.0	17.23	17.29	0.997		
			A	verage Correction Factor	1.000		
Baseline Corr AF:	17.19	Prev response	17.22	*% change	-0.2%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4920	80	9.15	9.35	0.979
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80	9.15	9.16	0.998
second point	4960	40	4.57	4.59	0.997
third point	4980	20	2.29	2.30	0.993
as left zero	5000	0	0.00	0.00	
as left span	4920	80	9.15	9.20	0.994
			A	Average Correction Factor	0.996
Baseline Corr AF:	9.35	Prev response	9.16	*% change	2.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4 Calibration Data	CH4	Calibration	Data
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Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.0	8.08	7.84	1.030
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.0	8.08	8.08	1.000
second point	4960	40.0	4.04	4.02	1.004
third point	4980	20.0	2.02	2.01	1.007
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.0	8.08	8.08	1.000
			A	verage Correction Factor	1.004
Baseline Corr AF:	7.84	Prev response	8.06	*% change	-2.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>	
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000262		1.000899	
THC Cal Offset:		-0.006600		-0.002400	
CH4 Cal Slope:		0.999646		1.000594	
CH4 Cal Offset:		-0.011800		-0.009400	
NMHC Cal Slope:		1.000469		1.001168	
NMHC Cal Offset:		0.005800		0.007000	

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

		Station I	nformation		
Calibration Date:	Anril 2	5, 2023	Previous Calibration:	March	2, 2023
Station Name:		nnix	Station Number:	AM	
Start Time (MST):		06	End Time (MST):	11:	
Analyzer make:		no 55i	Analyzer serial #:	11524	
analyzer make.	inen		Analyzer Schark.	11324	30011
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
17.23	17.24	0.9991			
8.61 4.31	8.61 4.31	1.0001 0.9994	Slope	1.000899	0.90 - 1.10
			Intercept	-0.002400	+/-0.5
20.0					
18.0 —					
16.0					
14.0					
<u>፪</u> 12.0					
<u>م</u> بي 10.0					
0 eq Co					
Indicated Conc. (ppm)					
4.0					
2.0					
0.0		-			
0.0	5	.0	10.0	15.0	20.0
			Conc. (ppm)		



CH₄ Calibration Summary

						Version-01-202
			Station I	nformation		
Calibration D	Date:	April 2	5, 2023	Previous Calibrati	on: March	2, 2023
Station Nam	ne:	Ma	Mannix		ber: AM	S05
Start Time (N	MST):	8	06	End Time (M	ST): 11	:15
Analyzer ma	ke:	Ther	no 55i	Analyzer seria	ll #: 11524	30011
			Calibra	tion Data		
Calculated cond (ppm) (0		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statisti	cal Evaluation	<u>Limits</u>
0.00		0.00		Correlation Coeffici	ent 0.999993	≥0.995
8.08 4.04		8.08	0.9998			
2.02		2.01	1.0040	Slope	1.000594	0.90 - 1.10
				Intercept	-0.009400	+/-0.5
7	3.0					
Indicated Conc. (ppm) 5 5 5	5.0					
ouo 4	.0					
ndicate 5	.0					
	2.0					
1	0					
0	0.0	2.0	4.0	6.0	8.0	10.0
				l Conc. (ppm)		
			Calculatet			



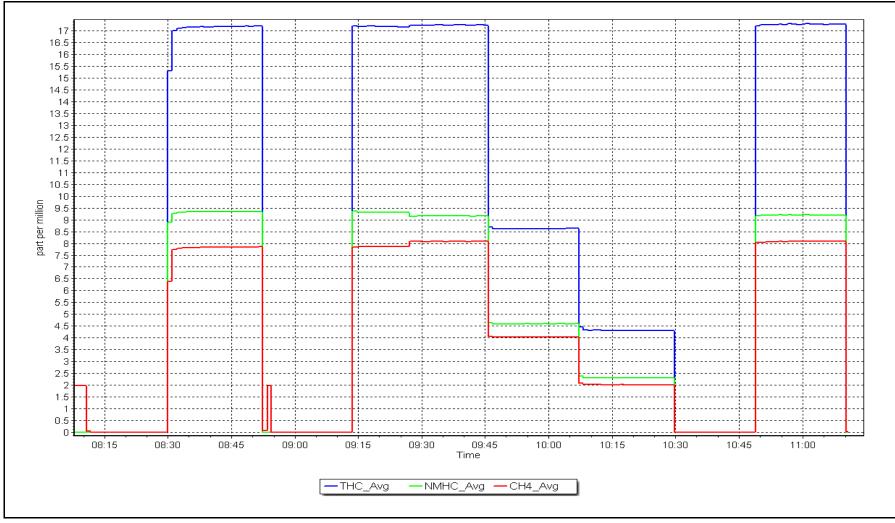
NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Арг	il 25, 2023	Previous Calibration:	March 2	2, 2023
tation Name:		Mannix	Station Number:	AM	\$05
start Time (MST):		8:06	End Time (MST):	11:	15
Analyzer make:	Tł	iermo 55i	Analyzer serial #:	11524	30011
		Calibra	tion Data		
Calculated concentratio (ppm) (Cc)	on Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.15	0.00 9.16	 0.9984	Correlation Coefficient	0.999997	≥0.995
4.57	4.59	0.9967	Slope	1.001168	0.90 - 1.10
2.29	2.30	0.9926	Intercept	0.007000	+/-0.5
9.0 - 8.0 - 7.0 -					
7.0					
6.0 +					
(bbm) 6.0 - 5.0 - Couc					
0 + 0.0 +					
udicated 3.0 -					
– 2.0 –					
1.0 -					
0.0) 2.() 4.0	6.0	8.0	10.0

NMHC Calibration Plot

Location: Mannix







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS06 PATRICIA MCINNES APRIL 2023

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

August 30, 2023

Revision 01



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date:	Patricia McInnes April 13, 2023		Station number: Last Cal Date:	AMS06 March 13, 2023	
Start time (MST):	8:55		End time (MST):	11:50	
Reason:	Routine			11.00	
		Calibration St	andards		
Cal Gas Concentration:	49.78	ppm	Cal Gas Exp Date:	September 9, 2024	
Cal Gas Cylinder #:	AAL070632	ppm	ear eas Exp Bate.	oopto	
, Removed Cal Gas Conc:	49.78	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	689	
ZAG Make/Model:	API T701		Serial Number:	3566	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1160290013	
	Start	Finish		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.991070	1.001234	Backgd or Offset:		17.2
Calibration intercept:	1.621614	1.539845	Coeff or Slope:		0.907
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4920	80.3	799.5	803.0	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.3	799.5	801.2	0.998
second point	4960	40.2	400.2	403.1	0.993
third point	4980	20.1	200.1	203.4	0.984
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.3	799.5	806.7	0.991
			Avera	ge Correction Factor	0.992
	803.10	Previous response	793.95	*% change	1.1%
Baseline Corr As found:				-	
Baseline Corr As found: Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	

Notes:

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

Calibration Performed By:

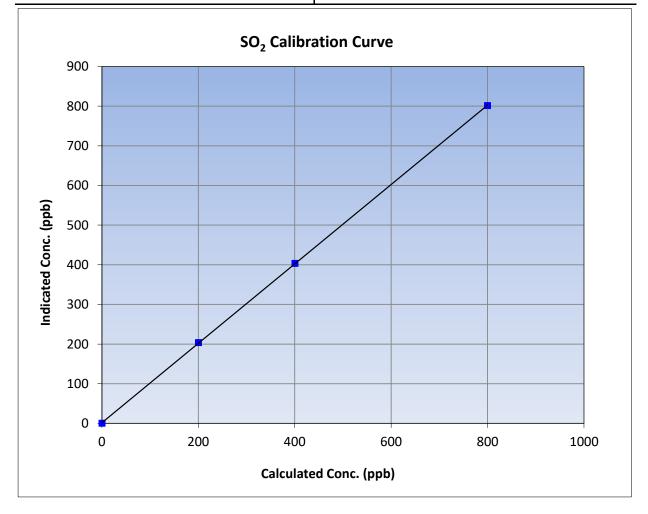


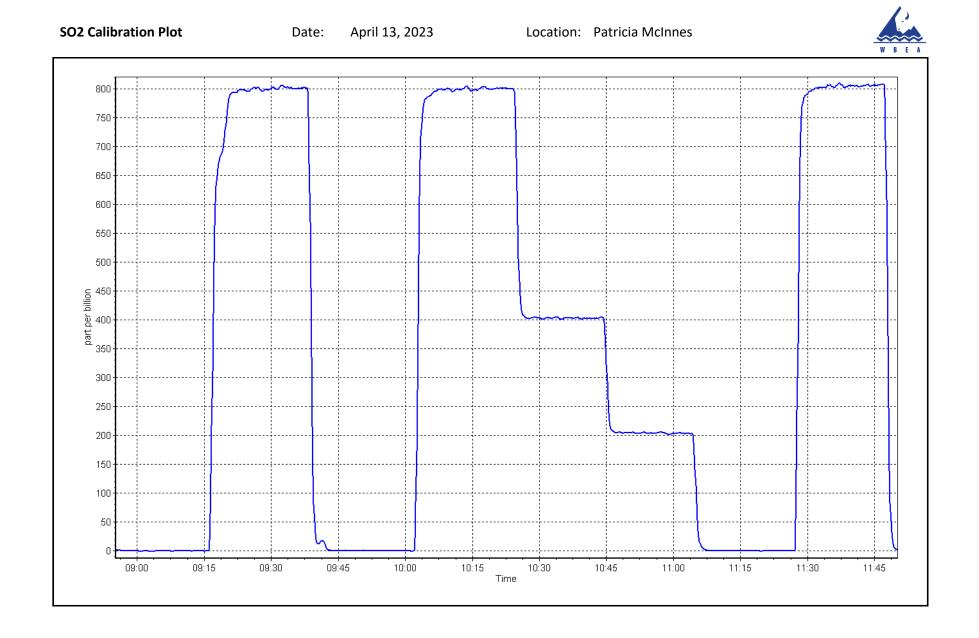
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	April 13, 2023	Previous Calibration:	March 13, 2023
Station Name:	Patricia McInnes	Station Number:	AMS06
Start Time (MST):	8:55	End Time (MST):	11:50
Analyzer make:	Thermo 43i	Analyzer serial #:	1160290013

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999983	≥0.995	
799.5	801.2	0.9978	correlation coefficient	0.999905	20.990	
400.2	403.1	0.9929	Slope	1.001234	0.90 - 1.10	
200.1	203.4	0.9839	Slope	1.001234	0.30 - 1.10	
			- Intercept	1.539845	+/-30	







H2S Calibration Report

			•		
				Version-11-202	
	Station Info	rmation			
Patricia McInnes April 5, 2023 9:22 Routine		Station number: Last Cal Date: End time (MST):	AMS 06 March 15, 2023 13:55		
	Calibration St	tandards			
5.38	ppm	Cal Gas Exp Date:	March 2, 2023		
EY0000809 5.38 N/A API T700 API T701 H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	N/A 3566 689		
	Analyzer Info	ormation			
Thermo 43i TLE Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153358 2022-195		
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
0.997060 0.257193	0.992200 0.277270	Backgd or Offset: Coeff or Slope:	1.84 1.070	1.84 1.070	
	H2S As Four	nd Data			
Dilution 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	
5000	0.0	0.0	0.0		
4926	74.3	79.9	79.1	1.011	
4963	37.2	40.0	39.6	1.011	
4981	18.6	20.0	20.0	1.001	
	H2S Calibrati	ion Data			
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	
5000	0.0	0.0	0.1		
4926	74.3	79.9	79.5	1.006	
4963	37.2	40.0	40.1	0.998	
4981	18.6	20.0	20.3	0.986	
5000	0.0	0.0	0.2		
4926	74.3	79.9	79.9	1.001	
4920	80.3	803.0	0.0		
-	December 20, 2021	L	Ave Corr Factor	0.997	
ficiency test:				efficiency	
79.1	Prev response:	79.96	*% change:	-1.1%	
79.1 39.6 20.0	Prev response: AF Slope: AF Correlation:	0.988623	*% change: AF Intercept:	-1.1% 0.077446	
	April 5, 2023 9:22 Routine 5.38 EY0000809 5.38 N/A API T700 API T701 H Thermo 43i TLE Global G150 0 - 100 ppb <u>Start</u> 0.997060 0.257193 Dilution air flow rate (sccm) 5000 4926 4963 4981 Dilution air flow rate (sccm) 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4963 4981 5000 4926 4920 nge:	Patricia McInnes April 5, 2023 9:22 Routine Calibration S 5.38 ppm EY0000809 ppm 5.38 ppm N/A ppm API T700 API T701 H API T701 H Analyzer Info Start Finish Global G150 0.997060 0.100 ppb Start Start Finish 0.997060 0.992200 0.257193 0.277270 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Regioner (sccm) Source gas flow rate (sccm) Source gas flow rate (sccm) Source (sccm) Source gas flow rate (sccm) Source (sccm)	April 5, 2023 9:22 Routine Last Cal Date: End time (MST): End time (MST): 5.38 EY0000809 5.38 N/A ppm Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number: Serial Number: Serial Number: API 7700 API 7701 H Serial Number: Serial Number: Serial Number: Thermo 43i TLE Global G150 0.997060 Analyzer Information Converter serial #: Converter serial #: Converter serial #: Converter serial #: Coeff or Slope: Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) </td <td>Patricia McInnes April 5, 2023 Station number: Last Cal Date: End time (MST): AMS 06 March 15, 2023 9:22 Routine End time (MST): 13:55 Station number: Station number: March 15, 2023 9:22 Routine ppm Cal Gas Exp Date: March 2, 2023 EY0000809 5.38 ppm Rem Gas Exp Date: N/A N/A Diff between cyl: Serial Number: 3566 API T701 H Serial Number: 689 Analyzer Information Thermo 43i TLE Global G150 Converter serial #: 1218153358 Start Analyzer Serial Number: Start O.997060 0.992200 Backgd or Offset: 1.84 O.277270 Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Source gas flow rate (sccm) <th colspa="</td"></th></td>	Patricia McInnes April 5, 2023 Station number: Last Cal Date: End time (MST): AMS 06 March 15, 2023 9:22 Routine End time (MST): 13:55 Station number: Station number: March 15, 2023 9:22 Routine ppm Cal Gas Exp Date: March 2, 2023 EY0000809 5.38 ppm Rem Gas Exp Date: N/A N/A Diff between cyl: Serial Number: 3566 API T701 H Serial Number: 689 Analyzer Information Thermo 43i TLE Global G150 Converter serial #: 1218153358 Start Analyzer Serial Number: Start O.997060 0.992200 Backgd or Offset: 1.84 O.277270 Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Dilution air flow rate (sccm) Calculated concentration (ppb) Indicated concentration (ppb) Source gas flow rate (sccm) <th colspa="</td"></th>	

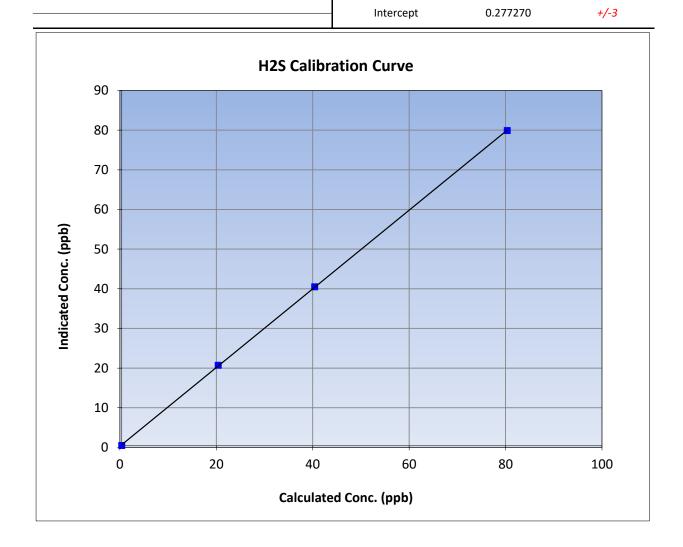
Notes:

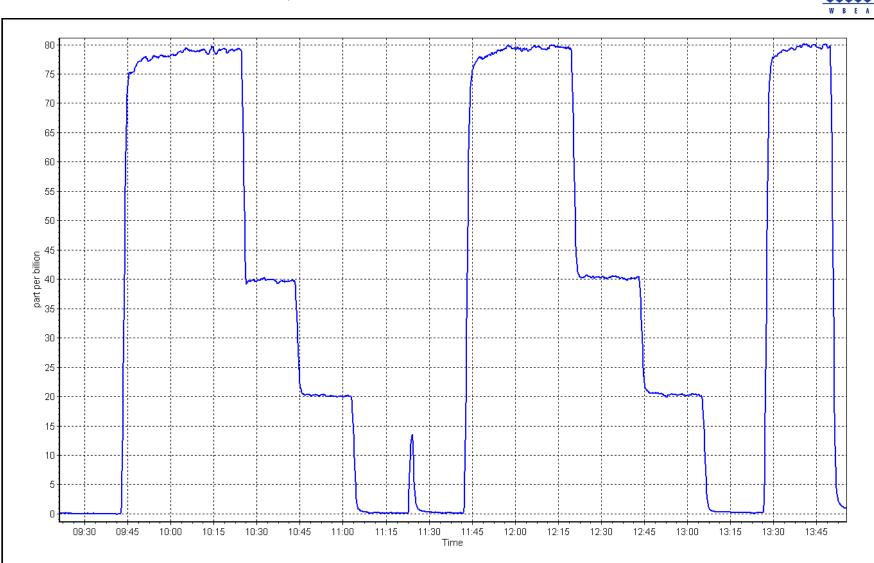
Changed the inlet filter after as founds. Ran a SO2 scrubber check after the calibrator zero. No adjustments made.



H2S Calibration Summary

WBEA					Version-11-202
		Station	Information		
Calibration Date:	April 5,	2023	Previous Calibration:	March	15, 2023
Station Name:	Patricia N	IcInnes	Station Number:	AM	IS 06
Start Time (MST):	ime (MST): 9:22		End Time (MST):	13	:55
Analyzer make:	Analyzer make: Thermo		Analyzer serial #:	12182	153358
		Calib	ration Data		
		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999977	≥0.995
79.9	79.5	1.0056	Correlation Coefficient	0.999977	20.995
40.0	40.1	0.9981	Slope	0.992200	0.90 - 1.10
20.0	20.3	0.9860	Siope	0.332200	0.50 - 1.10





Location: Patricia McInnes



THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-202
		Station	Information		
Station Name:	Patricia McInne	S	Station number: Al	MS06	
Calibration Date:	April 13, 2023		Last Cal Date: M	arch 13, 2023	
Start time (MST):	8:56		End time (MST): 11	L:50	
Reason:	Routine				
		Calibrat	ion Standards		
Gas Cert Reference:	A	AL070632	Cal Gas Expiry Date: Se	eptember 9, 20	24
CH4 Cal Gas Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
C3H8 Cal Gas Conc.	205.3	ppm			
Removed Gas Ref.		N/A	Removed Gas Expiry: N	/A	
Removed CH4 Conc.	501.6	ppm	CH4 Equiv Conc.	1066.2	ppm
Removed C3H8 Conc.	205.3	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 35	566	
ZAG make/model:	API T701		Serial Number: 26	51	
		Analyze	r Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	L80320037	
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 3.33E-04	3.33E-04	NMHC SP Ratio:	5.86E-05	5.86E-05
CH4 Retention time:	: 14	14.0	NMHC Peak Area:	154840	154840

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.3	17.12	17.08	1.003			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.3	17.12	17.03	1.006			
second point	4960	40.2	8.57	8.51	1.007			
third point	4980	20.1	4.29	4.29	1.000			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	17.12	17.03	1.006			
			A	verage Correction Factor	1.004			
Baseline Corr AF:	17.08	Prev response	17.15	*% change	-0.4%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation				



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0	0.00	0.00		
as found span	4920	80.3	9.07	9.06	1.000	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0	0.00	0.00		
high point	4920	80.3	9.07	9.04	1.003	
second point	4960	40.2	4.54	4.54	1.001	
third point	4980	20.1	2.27	2.29	0.992	
as left zero	5000	0	0.00	0.00		
as left span	4920	80.3	9.07	9.04	1.003	
			ŀ	Average Correction Factor	0.999	
Baseline Corr AF:	9.06	Prev response	9.08	*% change	-0.2%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation		

CH4 Calibration Data

		CH4 Calibra	IIIOII Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.06	8.01	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920 80		8.06	7.98	1.009
second point	oint 4960		4.03	3.97	1.015
third point	4980	20.1	2.02	2.00	1.008
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.06	7.99	1.009
			A	Average Correction Factor	1.011
Baseline Corr AF:	8.01	Prev response	8.06	*% change	-0.7%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation
Baseline Corr 3rd AF:	NA	AF Correlation: Calibration	Statistics	* = > +/-5% change initial	tes investigation

Start Finish THC Cal Slope: 1.000848 0.993826 THC Cal Offset: 0.007935 0.007564 CH4 Cal Slope: 0.990693 1.001093 CH4 Cal Offset: -0.000603 -0.004180 NMHC Cal Slope: 1.000428 0.996672 NMHC Cal Offset: 0.010746 0.009337

Notes:

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

Calibration Performed By:

Max Farrell



THC Calibration Summary

		Station I	nformation		
alibration Date:	April 13, 2023		Previous Calibration:	March 1	3, 2023
tation Name:	Patricia	McInnes	Station Number:	AM	S06
tart Time (MST):	8:	56	End Time (MST):	11:	50
nalyzer make:	Therr	no 55i	Analyzer serial #:	11803	20037
		Calibra	tion Data		
alculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999996	≥0.995
17.12	17.03	1.0056			
8.57 4.29	8.51 4.29	1.0071 0.9998	Slope	0.993826	0.90 - 1.10
			Intercept	0.007564	+/-0.5
14.0					
16.0					
12.0					
u 10.0					
ис. (
0.8 CO					
0.0 					
4.0					
2.0					
0.0					
	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

					Version-01-20
		Station I	nformation		
Calibration Date:	April	13, 2023	Previous Calibration:	March 1	3, 2023
tation Name:	Patricia	a McInnes	Station Number:	AMS	506
start Time (MST):	8	::56	End Time (MST):	11:	50
nalyzer make:	Ther	mo 55i	Analyzer serial #:	118032	20037
		Calibra	tion Data		
alculated concentratio (ppm) (Cc)	n Indicated concentration (ppm) (Ic)		Statistical Eva	luation	<u>Limits</u>
0.00	0.00				
8.06	7.98	1.0090	Correlation Coefficient	0.999987	≥0.995
4.03 2.02	3.97 2.00	1.0151 1.0082	Slope	0.990693	0.90 - 1.10
			Intercept	-0.004180	+/-0.5
8.0 7.0 6.0 E					
dd 5.0 -					
O 4.0					
Indicated Conc. (ppm)					
2.0					
1.0 -					
0.0					
	2.0	4.0	6.0	8.0	10.0
0.0	2.0	_		0.0	10.0

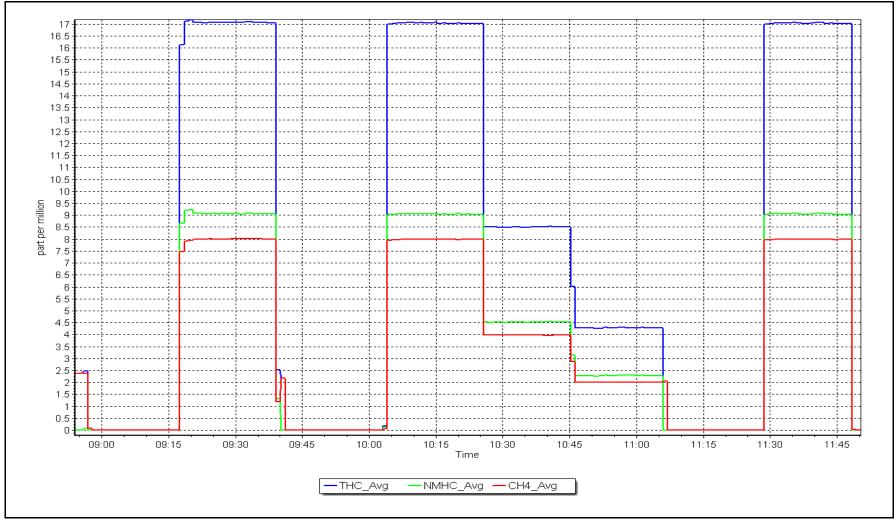


NMHC Calibration Summary

			Station I	nformation		
alibratio	n Date:	April 13, 2023		Previous Calibration:	March 1	.3, 2023
tation Na	ame:	Patricia	McInnes	Station Number:	AM	S06
tart Time	e (MST):	8	:56	End Time (MST):	11:	50
nalyzer n	nake:	Ther	mo 55i	Analyzer serial #:	11803	20037
			Calibra	tion Data		
	oncentration n) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
	.00 .07	0.00 9.04	1.0026	Correlation Coefficient	0.999993	≥0.995
	.54	4.54	1.0020			
	.27	2.29	0.9924	Slope	0.996672	0.90 - 1.10
				Intercept	0.010746	+/-0.5
(9.0					
Conc. (ppm)	6.0					
onc.	5.0					
ed C	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
	0.0				0.0	10.0

NMHC Calibration Plot







THC / CH₄ / NMHC Calibration Report

			Station Inforr	mation			
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes April 25, 2023 8:18 Maintenance			Station number: AMS06 Last Cal Date: April 13, 2023 End time (MST): 12:15			
		C	alibration Sta	andards			
Gas Cert Reference:	A	AL070632		Cal Gas Expiry Date: S	September 9, 202	24	
CH4 Cal Gas Conc.	501.6	ppm		CH4 Equiv Conc.	1066.2	ppm	
C3H8 Cal Gas Conc.	205.3	ppm					
Removed Gas Ref.		N/A	R	emoved Gas Expiry: N	N/A		
Removed CH4 Conc.	501.6	ppm		CH4 Equiv Conc.	1066.2	ppm	
Removed C3H8 Conc.	205.3	ppm		f between cyl (THC):			
Diff between cyl (CH ₄)			Dit	f between cyl (NM):			
Calibrator Model:	API T700			Serial Number: 3			
ZAG make/model:	API T701			Serial Number: 2	261		
		ŀ	Analyzer Infor	mation			
Analyzer make	e: Thermo 55i			Analyzer serial #: 1	1180320037		
THC Range (ppm)): 0 - 20 ppm						
NMHC Range (ppm)): 0 - 10 ppm			CH4 Range (ppm): (0 - 10 ppm		
	<u>Start</u>	<u>Fi</u>	<u>nish</u>		<u>Start</u>	Finish	
CH4 SP Ratio	o: 3.33E-04	3.4	7E-04	NMHC SP Ratio:	5.86E-05	5.75E-05	
CH4 Retention time	e: 14	1	4.4	NMHC Peak Area:	154840	158039	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>			
as found zero	5000	0.0	0.00	0.00				
as found span	4920	80.3	17.12	16.74	1.023			
as found 2nd point	4960	40.2	8.57	8.36	1.026			
as found 3rd point	4980	20.1	4.29	4.21	1.019			
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4920	80.3	17.12	17.11	1.001			
second point	4960	40.2	8.57	8.53	1.005			
third point	4980	20.1	4.29	4.29	0.998			
as left zero	5000	0.0	0.00	0.00				
as left span	4920	80.3	17.12	17.03	1.005			
			Aver	age Correction Factor	1.001			
Baseline Corr AF:	16.74	Prev response	17.02	*% change	-1.7%			
Baseline Corr 2nd AF:	8.4	AF Slope:	0.977199	AF Intercept:	0.001439			
Baseline Corr 3rd AF:	4.2	AF Correlation:	0.999996	* = > +/-5% change initia	tes investigation			



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4920	80.3	9.07	8.94	1.014
as found 2nd point	4960	40.2	4.54	4.47	1.015
as found 3rd point	4980	20.1	2.27	2.25	1.009
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4920	80.3	9.07	9.07	1.000
second point	4960	40.2	4.54	4.53	1.002
third point	4980	20.1	2.27	2.28	0.996
as left zero	5000	0	0.00	0.00	
as left span	4920	80.3	9.07	9.05	1.002
			Ave	rage Correction Factor	0.999
Baseline Corr AF:	8.94	Prev response	9.05	*% change	-1.2%
Baseline Corr 2nd AF:	4.5	AF Slope:	0.985465	AF Intercept:	0.003975
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999997	* = > +/-5% change initiat	tes investigation

CH4 Calibration Data

		CH4 Calibra	lion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.0
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	8.06	7.80	1.032
as found 2nd point	4960	40.2	4.03	3.89	1.038
as found 3rd point	4980	20.1	2.02	1.96	1.031
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	8.06	8.05	1.000
second point	4960	40.2	4.03	4.00	1.009
third point	4980	20.1	2.02	2.01	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	8.06	7.99	1.008
			Aver	age Correction Factor	1.004
Baseline Corr AF:	7.80	Prev response	7.98	*% change	-2.2%
Baseline Corr 2nd AF:	3.89	AF Slope:	0.968249	AF Intercept:	-0.003536
Baseline Corr 3rd AF:	1.96	AF Correlation:	0.999989	* = > +/-5% change initial	tes investigation

Calibration Statistics

	<u>Start</u>	<u>Finish</u>	
THC Cal Slope:	0.993826	0.999051	
THC Cal Offset:	0.007564	-0.003849	
CH4 Cal Slope:	0.990693	0.999177	
CH4 Cal Offset:	-0.004180	-0.007594	
NMHC Cal Slope:	0.996672	0.999419	
NMHC Cal Offset:	0.010746	0.002345	

Notes:

Completed multipoint as founds. Changed the actuator after the as founds to fix the dipping issue. New actuator fixed the issue. Adjusted the span only.

Calibration Performed By: Max Farrell



THC Calibration Summary

					Version-01-20
		Station I	nformation		
Calibration Date:	bration Date: April 25, 2023		Previous Calibration:	April 13	3, 2023
Station Name:	Patricia	McInnes	Station Number:	AMS06	
Start Time (MST)	: 8	::18	End Time (MST):	12:	15
Analyzer make:		mo 55i	Analyzer serial #:	11803	20037
			tion Data		
(ppm) (Cc)	ation Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	lation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
17.12	17.11	1.0005			
8.57 4.29	<u>8.53</u> 4.29	<u>1.0049</u> 0.9984	Slope	0.999051	0.90 - 1.10
4.29	4.25	0.3384	Intercept	-0.003849	+/-0.5
		THC Calibratio	n Curve		
18.0 -			ii curve		
16.0 -				_	
14.0 -					
14.0					
12.0					
12.0 -					
- 0.01 (bbm) - 0.8 (bbm)					
ਰੂ 10.0 -					
nc.					
ප 8.0 -					
ted					
- 0.6 [2]					
pu					
- 4.0 -	×				
-					
2.0 -					
2.0					
0.0					
	.0 5	5.0	10.0	15.0	20.0
Ū					_0.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

						Version-01-202
			Station I	nformation		
Calibratio	on Date:	April 2	5, 2023	Previous Calibration:	April 13	, 2023
Station Na	ame:	Patricia	McInnes	Station Number:	AMS	506
Start Time	e (MST):	8:	18	End Time (MST):	12:	15
Analyzer r	make:	Therr	no 55i	Analyzer serial #:	118032	20037
			Calibra	tion Data		
	concentration m) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.	0.00	0.00		Correlation Coefficient	0.999978	≥0.995
	3.06	8.05	1.0005		0.000070	
	.03 .02	4.00	1.0087 1.0017	Slope	0.999177	0.90 - 1.10
				Intercept	-0.007594	+/-0.5
(m	8.0 7.0 6.0					
onc. (ppm)	5.0					
d Co	4.0					
Indicated C	3.0					
-	2.0					
	1.0					
1	0.0	2.0	4.0	6.0	8.0	10.0
	0.0	2.0			0.0	10.0
			Calculated	l Conc. (ppm)		



NMHC Calibration Summary

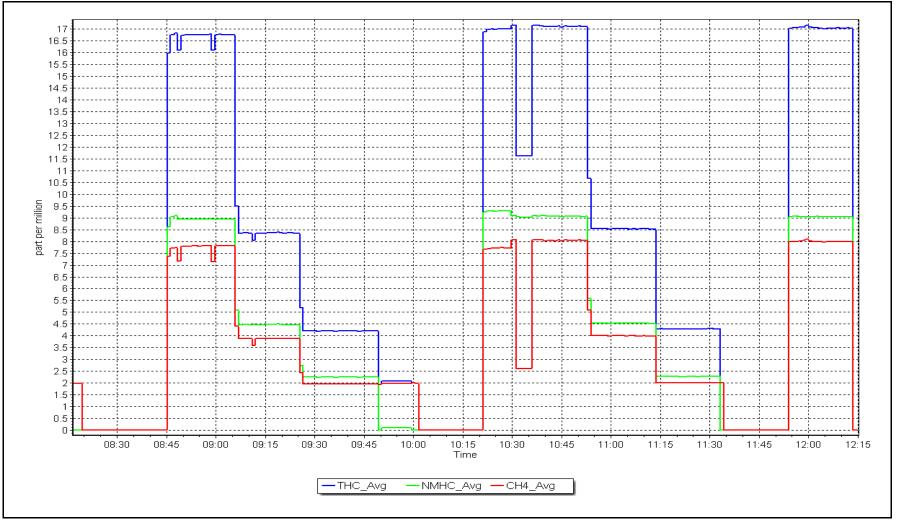
			Station I	nformation		
Calibration Da	te:	April 2	5, 2023	Previous Calibratio	n: April 13	3, 2023
Station Name:			McInnes	Station Numbe		
Start Time (MS			18	End Time (MST		
Analyzer make	2:	Therr	no 55i	Analyzer serial	#: 11803	20037
			Calibra	tion Data		
Calculated concer (ppm) (Cc)		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistica	l Evaluation	<u>Limits</u>
0.00 9.07		0.00 9.07	1.0001	Correlation Coefficie	nt 0.999997	≥0.995
4.54		4.53	1.0018	Clana	0.000/10	0.00 1.10
2.27		2.28	0.9959	Slope	0.999419	0.90 - 1.10
				Intercept	0.002345	+/-0.5
10.0 9.0						
8.0	,					
7.0)					
(ud 6.0)					
0.6 (bbm) 5.0)					
ated 0						
4.0 3.0 3.0)					
2.0						
1.0)					
0.0		2.0	4.0	6.0	8.0	10.0
	0.0	2.0		6.0 I Conc. (ppm)	0.0	10.0
1			Calculated	conc. (ppm)		

NMHC Calibration Plot

Date: April 25, 2023

Location: Patricia McInnes







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station Information					
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes April 4, 2023 8:40 Routine		Last Cal Date:	Station number: AMS06 Last Cal Date: March 7, 2023 End time (MST): 13:32				
			Calibration Standards					
NO Gas Cylinder #: NOX Cal Gas Conc: Removed Cylinder #: Removed Gas NOX Conc: NOX gas Diff: Calibrator Model: ZAG make/model:	T26D9MR 52.51 N/A 52.51 Teledyne API T700 Teledyne API T701	ppm ppm	Cal Gas Expiry Date: NO Cal Gas Conc: Removed Gas Exp Date: Removed Gas NO Conc: NO gas Diff: Serial Number: Serial Number:	51.98 N/A 51.98	ppm ppm			
			Analyzer Information					
Analyzer make: NOX Range (ppb):			Analyzer serial #:	1172750022				
NO coeff or slope: NOX coeff or slope: NO2 coeff or slope:	0.996		Finish0.835NO bkgnd or offset:0.996NOX bkgnd or offset:1.000Reaction cell Press:			<u>Finish</u> 3.2 3.9 155.1		

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.993329	1.001408
NO _x Cal Offset:	2.240132	2.760164
NO Cal Slope:	0.991966	0.998955
NO Cal Offset:	1.559980	1.840130
NO ₂ Cal Slope:	1.003238	1.006294
NO ₂ Cal Offset:	1.111866	1.349835



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ition Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as found span	4923	76.9	807.6	799.5	8.2	796.7	784.0	12.7	1.0137	1.0197
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.1		
high point	4923	76.9	807.6	799.5	8.2	810.3	799.7	10.4	0.9967	0.9997
second point	4962	38.5	404.3	400.2	4.1	408.7	402.3	6.4	0.9893	0.9949
third point	4981	19.2	201.6	199.6	2.0	207.4	203.0	4.4	0.9722	0.9833
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.3	-0.2		
as left span	4923	76.9	807.6	390.6	417.1	813.0	390.8	422.0	0.9934	0.9994
							Average C	orrection Factor	0.9861	0.9926
Corrected As fo	ound NO _x =	796.6 ppb	NO =	783.9 ppb	* = > +/-59	% change initiates i	investigation	*Percent Chang	ge NO _x =	-1.0%
Previous Respo	nse NO _x =	804.5 ppb	NO =	794.6 ppb				*Percent Chang	ge NO =	-1.4%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.5	391.6	417.1	420.8	0.9911	100.9%
2nd GPT point (200 ppb O3)	800.5	391.6	417.1	420.8	0.9911	100.9%
3rd GPT point (100 ppb O3)	800.5	697.9	110.8	114.5	0.9673	103.4%
				Average Correction Factor	0.9831	101.7%

Notes:

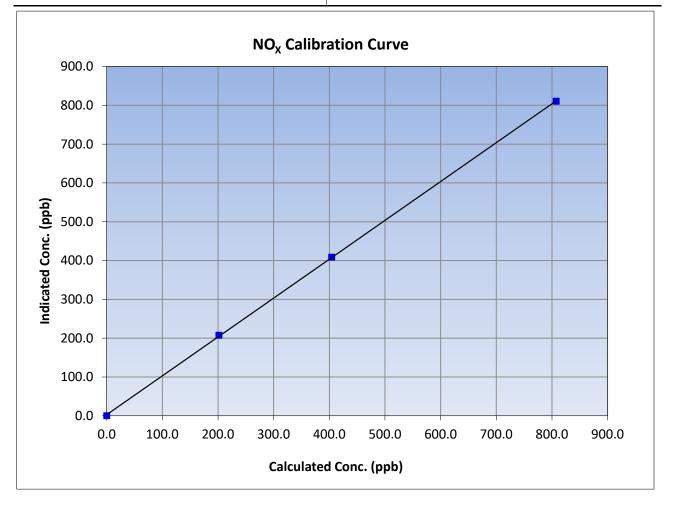
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

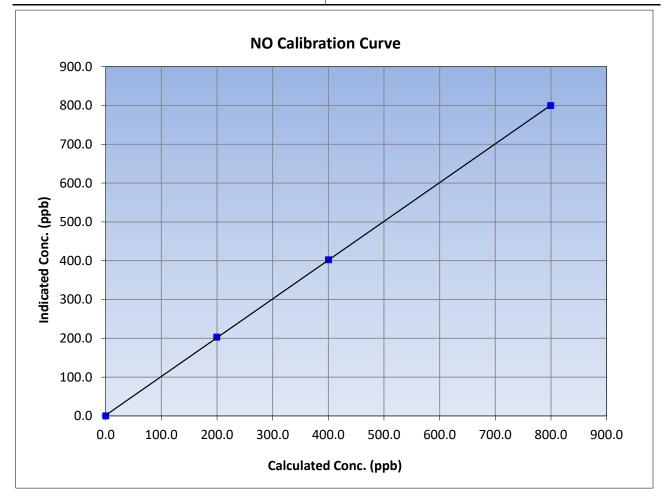
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 4	l, 2023	Previous Calibration:	March	7, 2023
Station Name:	Patricia	McInnes	Station Number:	AM	S06
Start Time (MST):	8:	40	End Time (MST):	13	:32
Analyzer make:	Therr	no 42i	Analyzer serial #:	11727	50022
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999954	≥0.995
807.6	810.3	0.9967	correlation coefficient	0.5555554	20.333
404.3	408.7	0.9893	Slope	1.001408	0.90 - 1.10
201.6	207.4	0.9722	Slope	1.001408	0.30 - 1.10
			Intercept	2.760164	+/-20





NO Calibration Summary

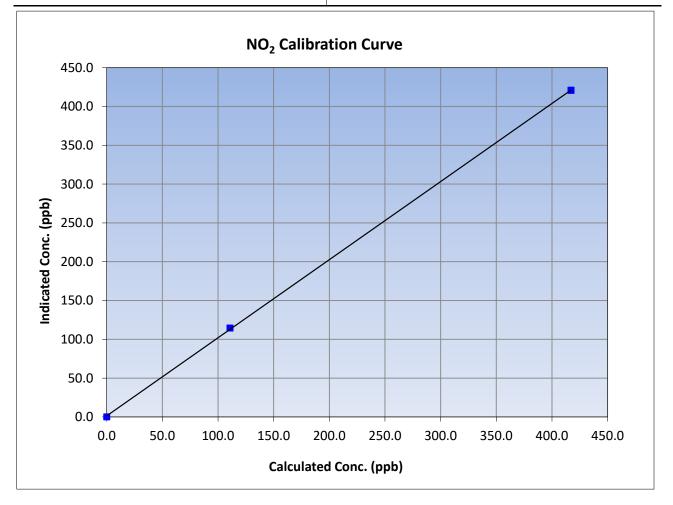
WBEA					Version-04-20		
		Station	Information				
Calibration Date:	April 4	, 2023	Previous Calibration:	March	7, 2023		
Station Name:	Patricia	McInnes	Station Number:	AM	S06		
Start Time (MST):	8:	40	End Time (MST):	13	:32		
Analyzer make:	Therr	no 42i	Analyzer serial #: 11727				
		Calibra	ation Data				
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>		
0.0	0.2		Correlation Coefficient	0.999981	≥0.995		
799.5	799.7	0.9997	correlation coefficient	0.999901	20.335		
400.2	402.3	0.9949	Slope	0.998955	0.90 - 1.10		
199.6	203.0	0.9833	Siope	0.996955	0.90 - 1.10		
			Intercept	1.840130	+/-20		

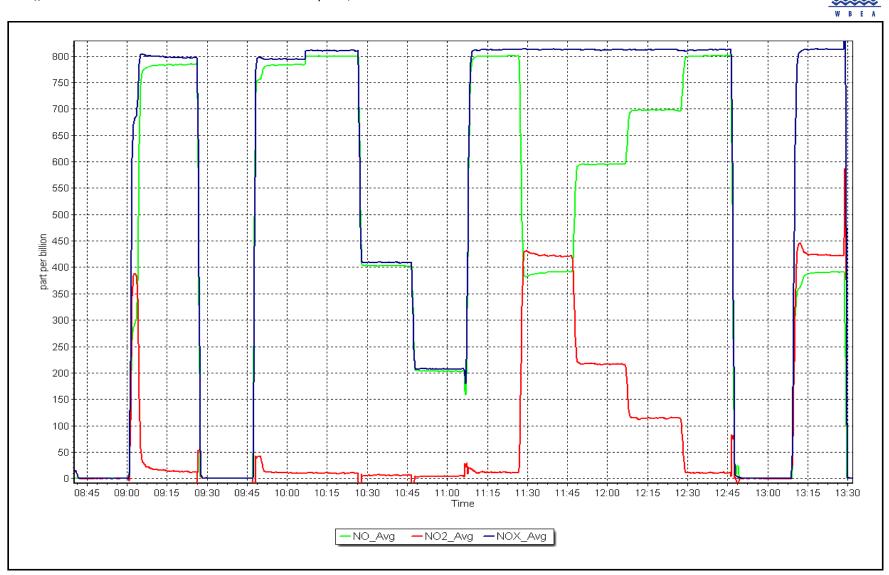




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 4	, 2023	Previous Calibration:	March	7, 2023
Station Name:	Patricia	McInnes	Station Number:	AM	S06
Start Time (MST):	8:	40	End Time (MST):	13	:32
Analyzer make:	Therr	no 42i	Analyzer serial #:	11727	50022
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999967	≥0.995
417.1	420.8	0.9911	correlation coefficient	0.555507	20.995
417.1	420.8	0.9911	Clana	1.006294	0.90 - 1.10
110.8	114.5	0.9673	Slope	1.006294	0.90 - 1.10
			Intercept	1.349835	+/-20





Date: April 4, 2023

Location: Patricia McInnes





O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Patricia McInnes April 3, 2023 9:15 Routine		Station number: Last Cal Date: End time (MST):	March 9, 2023	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer API T700 API T701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1300156234	
Calibration slope: Calibration intercept:	<u>Start</u> 1.005771 0.940000	<u>Finish</u> 1.006429 0.300000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -0.2 1.019
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppm) (Ic)	Correction factor (Cc/I Limit = 0.95-1.05
as found zero	5000	800.0	0.0	0.5	
as found span	5000	1303.0	400.0	403.9	0.990
as found 2nd point as found 3rd point					
calibrator zero	5000	800.0	0.0	-0.2	
high point	5000	1303.0	400.0	402.7	0.993
second point	5000	966.5	200.0	201.6	0.992
third point	5000	794.3	100.0	101.6	0.984
as left zero	5000	800.0	0.0	0.1	
as left span	5000	1303.0	400.0	403.6	0.991
			Avera	ge Correction Factor	0.990
Baseline Corr As found: Baseline Corr 2nd AF pt:	403.4 NA	Previous response AF Slope:		*% change AF Intercept:	0.0%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

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

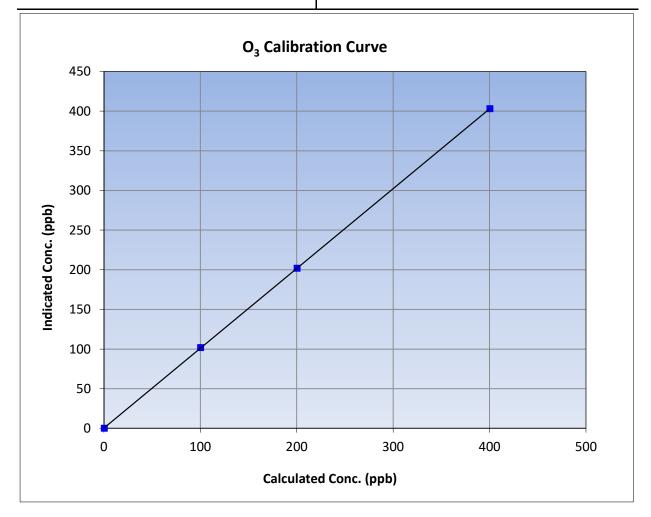
Calibration Performed By:

Max Farrell



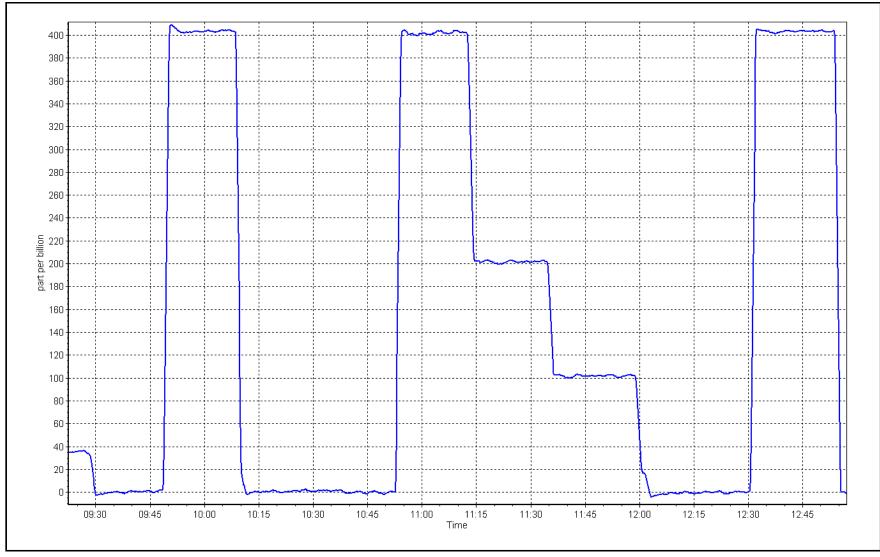
O₃ Calibration Summary

WBEA					Version-01-2	
		Station	Information			
Calibration Date:	April 3,	2023	Previous Calibration:	March 9, 2023		
Station Name:	Patricia N	1cInnes	Station Number:	AM	1506	
Start Time (MST):	9:1	5	End Time (MST):	12	:58	
Analyzer make:	Thermo	o 49i	Analyzer serial #:	13001	156234	
Calculated concentration		Correction factor	Statistical Evalua	ation	<u>Limits</u>	
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	1			
0.0 400.0	-0.2 402.7	0.9933	Correlation Coefficient	0.999992	≥0.995	
200.0	201.6	0.9933				
100.0	101.6	0.9843	Slope	1.006429	0.90 - 1.10	
			Intercept	0.300000	+/- 5	











T640 PM_{2.5} CALIBRATION

W B E A					Version-01-2023
		Station Information			
Station Name:	Patricia McInnes		Station number:	AMS 06	
Calibration Date:	April 13, 2023				
Start time (MST):	12:12				
Analyzer Make:	API T640				
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	ALICAT FP-25		S/N:	388755	
Temp/RH standard:	ALICAT FP-25		S/N:	388755	
		Monthly Calibration Te	est		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
Т (°С)	10.5	10.9	10.5		+/- 2 °C
P (mmHg)	722	722.4	722		+/- 10 mmHg
flow (LPM)	4.99	5.14	4.99		+/- 0.25 LPM
Leak Test:	Date of check:	April 13, 2023	Last Cal Date:	March 15, 2023	
	PM w/o HEPA:	5.6	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre mai	ntenance leak check	
		Questarly Calibration T	aat		
Devenueter	A o forward	Quarterly Calibration T		ا مانینده	(1 instea)
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	11	11	11		10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	10.4	w/ HEPA:	0
Date Optical Cham	-	April 13, 2			<0.2 ug/m3
Disposable Filte	r Changed:	April 13, 2	023		
		Annual Maintenance	2		
Date Sample Tub Date RH/T Senso	-	April 13, 2			
		April 13, 2	023		
Notes:	PMT	Peak test completed. Lea	ık check passed. Nc	adjustments made.	

Calibration by:

Max Farrell



TN - NO_X - NH_3 Calibration Report

WBEA					Version-11-202
		Stat	tion Information		
Station Name:	Patricia McInnes		Station number:	AMS 06	
NOX Cal Date:	April 20, 2023		Last Cal Date:	March 8, 2023	
Start time (MST):	8:10		End time (MST):	12:00	
NH3 Cal Date:	April 20, 2023		Last Cal Date:	March 8, 2023	
Start time (MST):	8:10		End time (MST):	12:00	
Reason:	Cylinder Change	NH3 cylinder	swap		
		Calib	oration Standards		
NOX Cal Gas Conc:	52.51	ppm	NO Gas Cylinder #:	T26D9MR	
NO Cal Gas Conc:	51.98	ppm	NO Cal Gas Expiry:	August 18, 2023	
Removed NOX Conc:	52.51	ppm	Removed Cylinder #:	N/A	
Removed NO Conc:	51.98	ppm	Removed cyl Expiry:	N/A	
NOX gas Diff:			NO gas Diff:		
NH3 Cal Gas Conc:	77.8	ppm	NH3 Gas Cylinder #:	CC710812	
			NH3 Cal Gas Expiry:	March 30, 2023	
Removed NH3 Conc:	73.9	ppm	Removed Cylinder #:	CC430800	
NH3 gas Diff:	-2.7%		Removed cyl Expiry:	January 7, 2023	
Calibrator Model:	A	PI T700	Serial Number:	3566	
ZAG make/model:	A	PI T701	Serial Number:	689	
		۸nal	yzer Information		
Analyzer model:		Alla	Analyzer serial #	. 150	
Converter model:			Converter serial #		
			Reaction cell Press		
NH3 Range (ppb):					
NOX Range (ppb):			Sample Flow		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient:		0.823			0.822
NOX coefficient:		0.824	6		-0.1
NO2 coefficient:		1.000	-		0.0
NH3 coefficient:	0.951	0.951	TN bkgrnd:	0.0	0.0
		Cali	bration Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope:	:	0.99933	37		
NO _x Cal Offset:	:	1.04188	37		
NO Cal Slope:		0.99701			
NO Cal Offset:		2.11963			
NO ₂ Cal Slope:		0.99372			
NO ₂ Cal Offset:		-1.38659			
NH3 Cal Slope:		1.00598			
NH3 Cal Offset:	:	7.24060			
TN Cal Slope:	:	1.01142	22		
TN Cal Offset:	:	7.10217	78		



TN - NOX - NH_3 Calibration Report

Version-11-2021

							Dilut	ion Calib	ration	Data				
Set Point	Dilution flow rate (sccm)		gas flow (sccm)	Calculate concente (ppb)	ration	conce	ated NOX entration bb) (Cc)	Calculate concentr (ppb) (ation	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correctio factor (Cc/Ic) <i>Limit = 0.95-1.0</i>
as found zero														
as found NO														
calibrator zero														
high NO point														
NO/O3 point														
as found NH3	3415	8	5.3	1801	1.0			1801	0	1811.9		1802.0	0.994	0.999
new NH3 cyl rp	3419	8	1.2	1805	5.1			1805	5.1	1767.2		1758.2	1.021	1.027
first NH3														
second NH3														
third NH3														
											Average (Correction Factor		
Corrected As fou	ind TN =	NA	ppb	NO _X =	NA	ppb	NH3 =	NA I	opb			*Percent Chang	ge TN =	NA
Previous Respon	se TN =	NA	ppb	NO _x =	NA	ppb	NH3 =	1819.1	opb			*Percent Chang	ge NO _x =	NA
												*Percent Chang	ge NH3 =	NA
NH3 Previous Co	nverter Efficie	ncy =	95.1%									* = > +/-5% change	initiates investigat	ion
NH3 Current Cor	nverter Efficien	icy =	95.1%											

Dilution Calibration Data



NO_x - NO - NO₂ Calibration Report

Version-11-2021

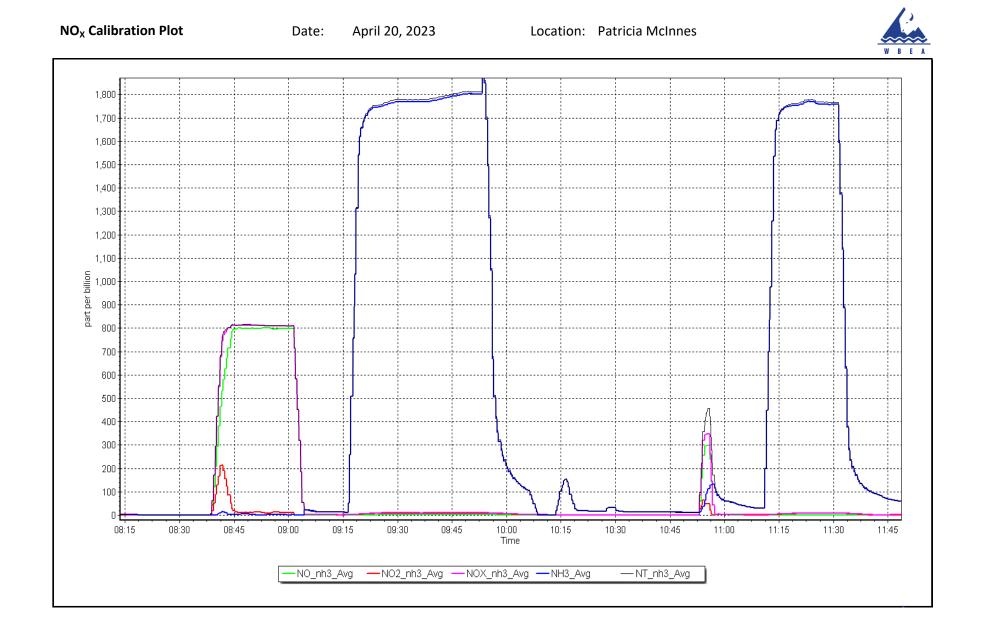
				Dilut	ion Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.4	0.5		
as found span	4923	76.9	807.6	799.5	807.6	809.6	797.5	811.1	0.9975	1.0024
new NO cyl rp										
calibrator zero										
high point										
second point										
third point										
							Average C	Correction Factor		
Baseline Corr As	fnd TN =	810.6 ppb	NO _x = 810.1	ppb NO =	797.9 ppb			*Percent Chang	e TN =	-1.6%
Previous Respon	ise TN =	823.9 ppb	NO _x = 808.1	ppb NO =	799.2 ppb			*Percent Chang	e NO _x =	0.2%
								*Percent Chang		-0.2%
								* = > +/-5% change		

		GF	PT Calibration Data			
O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found zero			0.0	-0.1		
calibration zero						
1st GPT point (400 ppb O3)						
2nd GPT point (200 ppb O3)						
3rd GPT point (100 ppb O3)						
			Ave	erage Correction Factor		

Notes: Changing out the NH3 cal gas cylinder. Completed as founds and swapped out the NH3 cylinder. Completed NH3 span for comparison. Will complete a full calibration tomorrow.

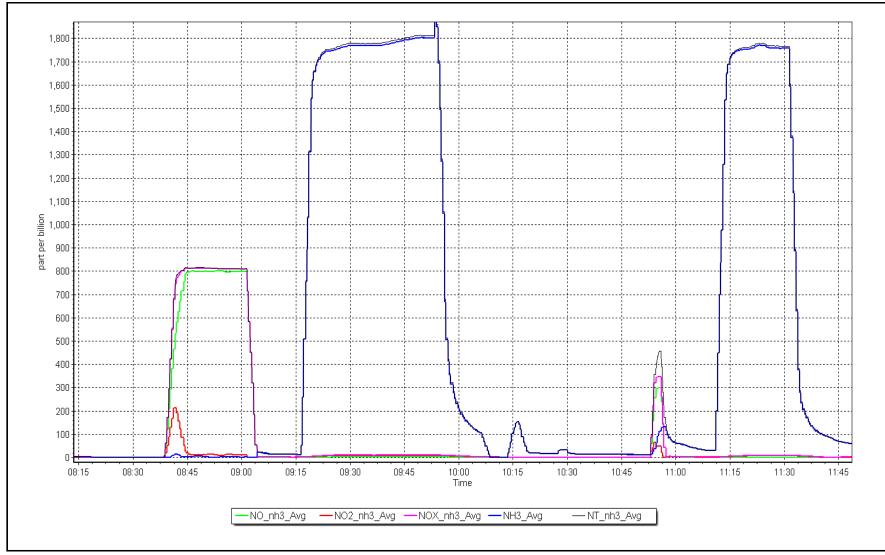
Calibration Performed By:

Max Farrell











TN - NO_X - NH_3 Calibration Report

WBEA					Version-11-202
		Stat	ion Information		
Station Name: NOX Cal Date:	Patricia McInnes April 27, 2023	;	Station number: Last Cal Date:	AMS 06 March 8, 2023	
Start time (MST): NH3 Cal Date:	8:10 April 27, 2023		End time (MST): Last Cal Date:	12:39 March 8, 2023	
Start time (MST):	13:00		End time (MST):	14:48	
Reason:	Routine			14.40	
			ration Standards		
NOX Cal Gas Conc:	52.51	ppm	NO Gas Cylinder #:	T26D9MR	
NO Cal Gas Conc:	51.98	ppm	NO Cal Gas Expiry:	August 18, 2023	
Removed NOX Conc:	52.51	ppm	Removed Cylinder #:	N/A	
Removed NO Conc:	51.98	ppm	Removed cyl Expiry:	N/A	
NOX gas Diff: NH3 Cal Gas Conc:	77.8	222	NO gas Diff:	CC710812	
NH3 Cal Gas Conc:	//.8	ppm	NH3 Gas Cylinder #: NH3 Cal Gas Expiry:	March 30, 2023	
Removed NH3 Conc:	77.8	ppm	Removed Cylinder #:	War (11 30, 2023	
NH3 gas Diff:	77.0	PP1	Removed cyl Expiry:		
Calibrator Model:	Δ	PI T700	Serial Number:	3566	
ZAG make/model:		PI T701	Serial Number:	689	
		Anal	yzer Information		
Analyzer model	: API T201		Analyzer serial #:	152	
Converter model	: API T501		Converter serial #:	147	
NH3 Range (ppb)			Reaction cell Press:	5.70	
NOX Range (ppb)	: 0 - 1000 ppb		Sample Flow:	531	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	Finish
NO coefficient	: 0.823	0.833	TN coefficient:	0.822	0.837
NOX coefficient	: 0.824	0.839	NO bkgrnd:	-0.1	-0.1
NO2 coefficient	: 1.000	1.000	NOX bkgrnd:	0.0	0.0
NH3 coefficient	: 0.951	0.951	TN bkgrnd:	0.0	0.0
		Calil	oration Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	0.99933	7	1.004262	
NO _x Cal Offset		1.04188		2.034812	
NO Cal Slope NO Cal Offset		0.99701 2.11963		1.000294	
			-	0.654848	
NO_2 Cal Slope		0.99372		1.003690	
NO ₂ Cal Offset		-1.38659		0.714817	
NH3 Cal Slope		1.00598		1.003144	
NH3 Cal Offset		7.24060		4.931327	
TN Cal Slope		1.01142		1.008443	
TN Cal Offset	:	7.10217	8	5.257930	



TN - NOX - NH₃ Calibration Report

Version-11-2021

				Diluti	on Calibration	Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) Limit = 0.95-1.05	NH3 Correction factor (Cc/Ic) Limit = 0.95-1.0
as found zero	5000	0.0	0.0	0.0	0.0	0.6	-0.7	1.3		
as found NO	4923	76.9	807.6	807.6		791.1	794.2	-3.1	1.021	
calibrator zero	5000	0.0	0.0	0.0	0.0	1.1	0.1	1.0		
high NO point	4923	76.9	807.6	807.6		812.2	812.2	-0.2	0.994	
NO/O3 point	4923	76.9	807.6	807.6		807.0	807.8	-0.8	1.001	
as found NH3	3419	81.0	1800.7		1800.7	1818.5		1808.9	0.990	0.995
new NH3 cyl rp										
first NH3	3419	81.0	1800.7		1800.7	1818.5		1808.9	0.990	0.995
second NH3	3455	45.0	1000.4		1000.4	1017.0		1010.9	0.984	0.990
third NH3	3478	22.5	500.1		500.1	513.6		510.6	0.974	0.980
							Average C	Correction Factor	0.9976	0.9882
Corrected As fo	und TN =	790.5 ppb	NO _x = 794.9	opb NH3 =	1807.6 ppb			*Percent Chang	e TN =	-4.2%
Previous Respoi	nse TN =	823.9 ppb	NO _x = 808.1	opb NH3 =	1818.8 ppb			*Percent Change	e NO _x =	-1.7%
NH3 Previous C	onverter Efficie	ncy = 95.1%						*Percent Chang * = > +/-5% change i		-0.6% ion

Dilution Calibration Data

NH3 Current Converter Efficiency = 95.1%



NO_x - NO - NO₂ Calibration Report

Version-11-2021

				Diluti	on Calibration	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.2	0.6		
as found span	4923	76.9	807.6	799.5	807.6	794.2	787.4	791.1	1.0169	1.0153
new NO cyl rp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	1.1		
high point	4923	76.9	807.6	799.5	807.6	812.2	800.3	812.2	0.9944	0.9990
second point	4962	38.5	404.3	400.2	404.3	408.8	400.6	408.4	0.9890	0.9990
third point	4981	19.2	201.6	199.6	201.6	206.6	201.3	207.0	0.9759	0.9915
							Average C	Correction Factor	0.9864	0.9965
Baseline Corr A	s fnd TN =	790.5 ppb	NO _x = 794.9	ppb NO =	787.6 ppb			*Percent Chang	e TN =	-4.2%
Previous Respo	onse TN =	823.9 ppb	NO _x = 808.1	ppb NO =	799.2 ppb			*Percent Chang	e NO _x =	-1.7%
								*Percent Chang	e NO =	-1.5%
								* = > +/-5% change i	initiates investigati	on

	GPT Calibration Data								
O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Cc	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%			
as found zero			0.0	-0.4					
calibration zero			0.0	0.0					
1st GPT point (400 ppb O3)	798.1	380.9	425.4	427.0	0.9961	100.4%			
2nd GPT point (200 ppb O3)	798.1	589.1	217.2	219.8	0.9880	101.2%			
3rd GPT point (100 ppb O3)	798.1	693.7	112.6	113.9	0.9882	101.2%			
				Average Correction Factor	0.9908	100.9%			

Notes:

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

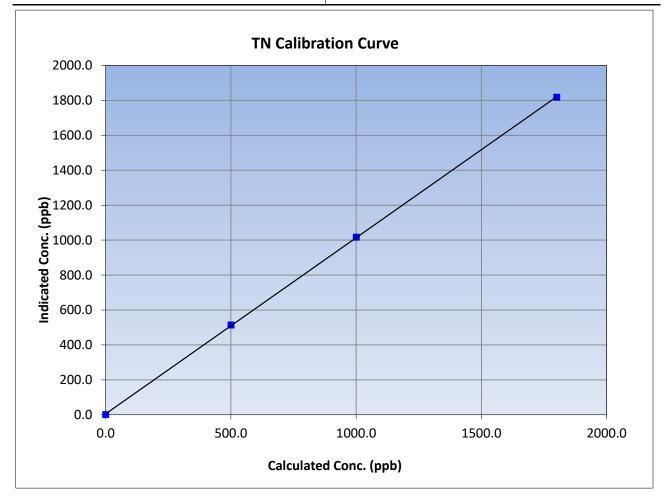
Calibration Performed By:

Max Farrell



TN Calibration Summary

		Station	Information		
Calibration Date:	April 27, 2023		Previous Calibration:	March 8, 2023	
Station Name:	Patricia McInnes		Station Number:		MS 06
Start Time (MST):	8:10		End Time (MST):	1	2:39
Analyzer make:	API T201		Analyzer serial #:		152
Calibr Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic) Correction factor (Cc/Ic)			ation Data Statistical Evalu	<u>Limits</u>	
0.0	1.1		Correlation Coefficient	0.999973	≥0.995
1800.7	1818.5	0.9902	correlation coefficient	0.999975	20.995
1000.4	1017.0	0.9837	Slope	1.008443	0.90 - 1.10
500.1	513.6	0.9738	Siope	1.008443	0.30 - 1.10
			Intercept	5.257930	+/-20

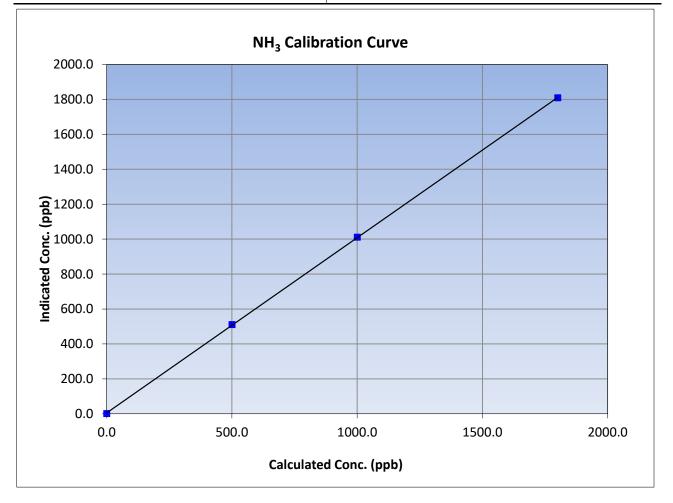


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NH₃ Calibration Summary

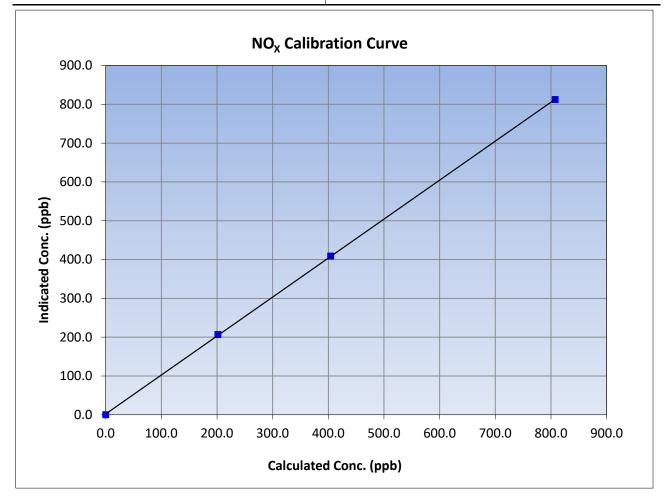
WBEA		Station	Information		Version-11-2
		Station	mormation		
Calibration Date:	April 2	7, 2023	Previous Calibration:	March	n 8, 2023
Station Name:	Patricia	McInnes	Station Number:	AN	/IS 06
Start Time (MST):	8:10		End Time (MST):	1	2:39
Analyzer make:	API T201		Analyzer serial #:	:	152
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalue	ation	<u>Limits</u>
0.0	1.0		Convolation Coofficient	0.000076	2.0.005
1800.7	1808.9	0.9955	Correlation Coefficient	0.999976	≥0.995
1000.4	1010.9	0.9896	Slope	1.003144	0.90 - 1.10
500.1	510.6	0.9795	Siope	1.003144	0.90 - 1.10
			Intercept	4.931327	+/-20





NO_x Calibration Summary

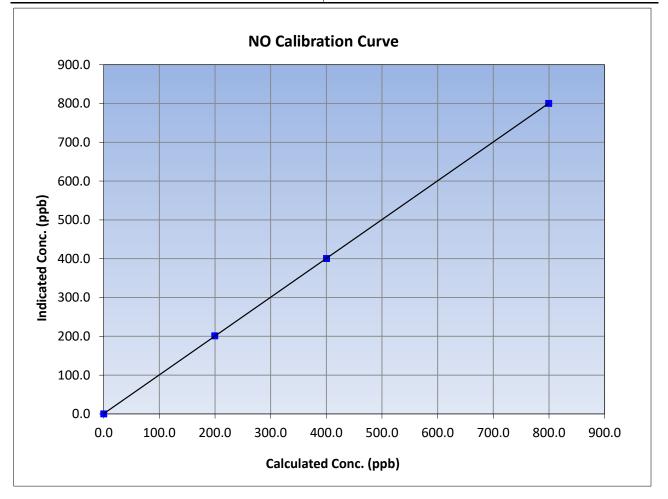
WBEA		Station	Information		Version-11-2	
Calibration Date:	April 27, 2023				arch 8, 2023	
Station Name:	Patricia	McInnes	Station Number:	AN	AS 06	
Start Time (MST):	8:10		End Time (MST):	12	2:39	
Analyzer make:	API T201		Analyzer serial #:		152	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999974	≥0.995	
807.6	812.2	0.9944	correlation coernicient	0.555574	20.995	
404.3	408.8	0.9890	Slope	1.004262	0.90 - 1.10	
201.6	206.6	0.9759	Slope	1.004202	0.90 - 1.10	
			Intercept	2.034812	+/-20	





NO Calibration Summary

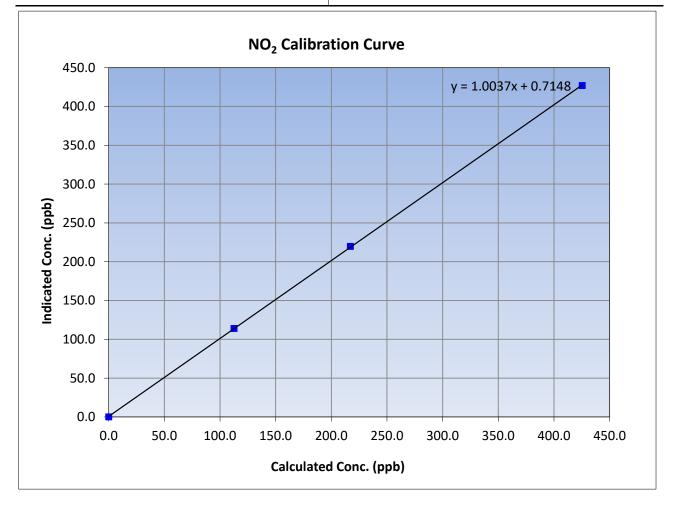
WBEA					Version-11-20
		Station	Information		
Calibration Date:	April 2	7, 2023	Previous Calibration:	Marc	:h 8, 2023
Station Name:	Patricia	McInnes	Station Number:	А	MS 06
Start Time (MST):	8:10		End Time (MST):	1	12:39
Analyzer make:	API T201 Analyzer serial #:			152	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)) Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999996	≥0.995
799.5	800.3	0.9990	correlation coefficient	0.9999990	20.333
400.2	400.6	0.9990	Slope	1.000294	0.90 - 1.10
199.6	201.3	0.9915	Slope	1.000294	0.90 - 1.10
			Intercept	0.654848	+/-20

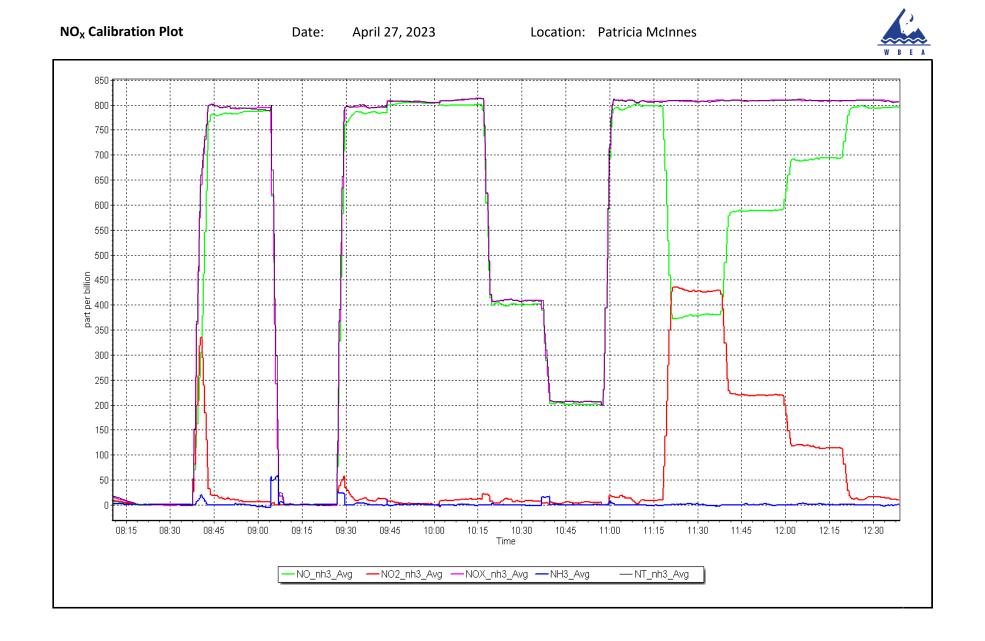




NO₂ Calibration Summary

WBEA					Version-11-20	
		Station	Information			
Calibration Date:	April 2	April 27, 2023		March	n 8, 2023	
Station Name:	Patricia	McInnes	Station Number:	AN	1S 06	
Start Time (MST):	8:10		End Time (MST):	12	2:39	
Analyzer make:	e: API T201		Analyzer serial #:		152	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999977	>0.005	
425.4	427.0	0.9961	correlation coefficient	0.999977	≥0 <i>.995</i>	
217.2	219.8	0.9880	Slope	1.003690	0.90 - 1.10	
112.6	113.9	0.9882	Siope	1.003090	0.30 - 1.10	
			Intercept	0.714817	+/-20	













WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS07 ATHABASCA VALLEY APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Athabasca Valley		Station number:	AMS07	
Calibration Date:	April 19, 2023		Last Cal Date:	March 9, 2023	
Start time (MST):	7:10		End time (MST):	9:58	
Reason:	Routine				
		Calibration St	andards		
Cal Gas Concentration:	50.52	ppm	Cal Gas Exp Date:	December 29, 2028	
Cal Gas Cylinder #:	CC282115				
Removed Cal Gas Conc:	50.52	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	3805	
ZAG Make/Model:	API 701H		Serial Number:	198	
		Analyzer Info	rmation		
Analyzer make	: Thermo 43i-LTE	,	Analyzer serial #:	1507864683	
Analyzer Range			Allalyzet sellal#.	1307804083	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995896	1.003328	Backgd or Offset:	2.70	2.70
Calibration intercept:	2.083550	2.004886	Coeff or Slope:	0.857	0.857
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	orrection factor (Cc/ Limit = 0.95-1.05
as found zone	F 000	0.0	0.0	0.0	
as found zero as found span	5000 4921	0.0	0.0 801.2	0.0 804.3	0.996
as found 2nd point	4921	79.5	801.2	804.5	0.996
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4921	79.3	801.2	804.3	0.996
second point	4960	39.6	400.2	406.3	0.985
third point	4980	19.8	200.1	203.4	0.984
as left zero	5000	0.0	0.0	0.2	
as left span	4921	79.2	800.2	806.3	0.992
				ge Correction Factor	0.988
Baseline Corr As found:	804.30	Previous response	799.99	*% change	0.5%
				AF Intercept:	
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF IIILEILEDI.	

No adjustments or maintenance done.

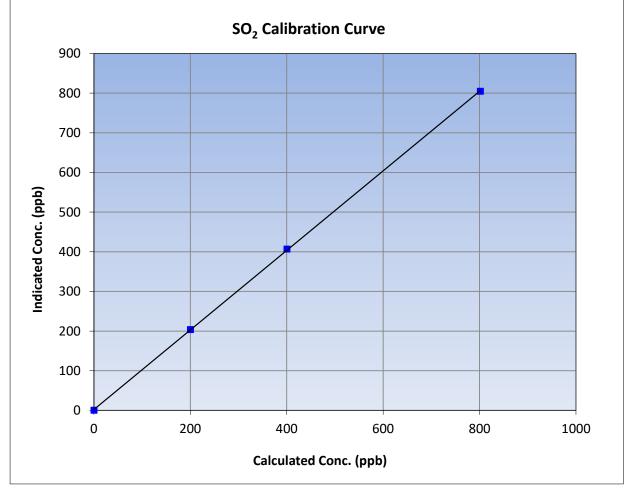
Calibration Performed By:

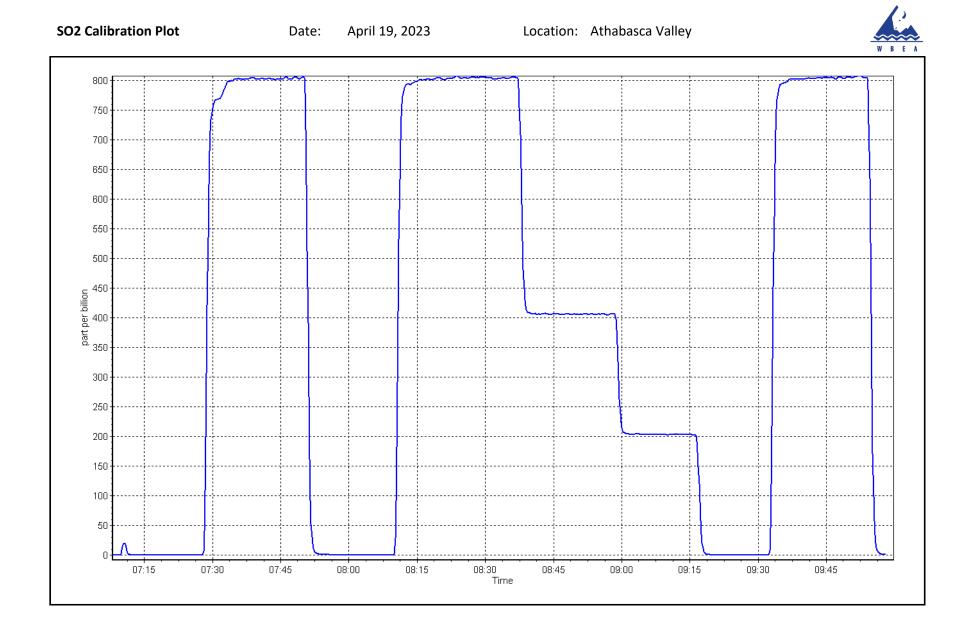


SO₂ Calibration Summary

WBEA				Version-01-2020	
		Station	Information		
Calibration Date:	April 19,	2023	Previous Calibration:	March 9, 2023	
Station Name:	Athabasca	a Valley	Station Number:	AMS07	
Start Time (MST):	7:1	0	End Time (MST):	9:58	
Analyzer make:	Analyzer make: Thermo		3i-LTE Analyzer serial #:		
		Calibr	ation Data		
		Calibi			
Calculated concentration Indi (ppb) (Cc)	icated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1		Correlation Coofficient 0		

 0.0	0.1		Correlation Coefficient	0.999959	≥0.995	
 801.2	804.3	0.9961	correlation coefficient	0.5555555	20.333	
400.2	406.3	0.9849	Slope	1.003328	0.90 - 1.10	
200.1	203.4	0.9836	Slope	1.005528	0.90 - 1.10	
			Intercept	2.004886	+/-30	







TRS Calibration Report

			•	
				Version-11-202
	Station Info	rmation		
Athabasca Valley April 26, 2023 6:18 Routine		Station number: Last Cal Date: End time (MST):	AMS07 March 13, 2023 10:29	
	Calibration S	tandards		
4.94	ppm	Cal Gas Exp Date:	February 9, 2024	
EY0002277 4.94 NA API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3805 198	
	Analyzer Info	ormation		
Thermo 43i LTE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1180540018 551	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
0.993485	0.993201	Backgd or Offset:	2.20	2.17
0.081597	0.141603	Coeff or Slope:	0.841	0.829
	TRS As Four	nd Data		
Dilution 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
5000	0.0	0.0	-0.1	
4918	81.6	80.6	81.2	0.992
4959	40.8	40.3	40.5	0.993
4980	20.4	20.2	20.0	1.003
	TRS Calibrat	ion Data		
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
5000	0.0	0.0	0.1	
4918	81.6	80.6	80.2	1.005
4959	40.8	40.3	40.2	1.003
4980	20.4	20.2	20.2	0.998
5000	0.0	0.0	0.6	
4918	81.6	80.6	79.8	1.010
4921	79.2	800.2	0.0	
				1.002
iciency test:	April 22, 2022		98.5%	efficiency
81.3	Prev response:	80.18	*% change:	1.4%
40.6			AF Intercept:	-0.198377
20.1	AF Correlation:	0.999992		
			* = > +/-5% change initiat	es investigation
	April 26, 2023 6:18 Routine 4.94 EY0002277 4.94 NA API T700 API T701H Thermo 43i LTE CDN-101 0 - 100 ppb 5tart 0.993485 0.081597 Dilution air flow rate (sccm) 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000 4918 4959 4980 5000	Athabasca Valley April 26, 2023 6:18 Routine Calibration S 4.94 FY0002277 4.94 API T700 API T701H ppm AAPI T700 API T701H ppm Start 0.993485 0.993201 0.081597 Finish 0.993201 0.141603 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm)	April 26, 2023 Last Cal Date: 6:18 End time (MST): Routine Cal Gas Exp Date: 4.94 ppm Cal Gas Exp Date: EY0002277 4.94 ppm Rem Gas Exp Date: NA Diff between cyl: Serial Number: API T700 Serial Number: Serial Number: API T701H Serial Number: Serial Number: Diff between cyl: Serial Number: Serial Number: 0 - 100 ppb Start Analyzer serial #: Converter serial #: 0.993485 0.993201 Backgd or Offset: Oceff or Slope: Dilution air flow rate Source gas flow rate Calculated concentration (ppb) (cc) 5000 0.0 0.0 0.0 4980 20.4 20.2 Zol2 TRS Calibration Data Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (cc) Source gas flow rate (sccm) <t< td=""><td>Athabasca Valley April 26, 2023 6:18 RoutineStation number: Last Cal Date: End time (MST):AMS07 March 13, 2023 10:296:18 RoutineppmCal Gas Exp Date: Serial Number:February 9, 20244.94 EY0002277 4.94 API 7700 API T700 API T701HppmRem Gas Exp Date: Serial Number:NAMarch 13, 2023 Diff between cyl: API T701HSerial Number: Serial Number:3805Apit T701HSerial Number: Serial Number:1180540018 S000Stort O.993485 0.993201 0.081597Finish 0.141603Stort Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentr</td></t<>	Athabasca Valley April 26, 2023 6:18 RoutineStation number: Last Cal Date: End time (MST):AMS07 March 13, 2023 10:296:18 RoutineppmCal Gas Exp Date: Serial Number:February 9, 20244.94 EY0002277 4.94 API 7700 API T700 API T701HppmRem Gas Exp Date: Serial Number:NAMarch 13, 2023 Diff between cyl: API T701HSerial Number: Serial Number:3805Apit T701HSerial Number: Serial Number:1180540018 S000Stort O.993485 0.993201 0.081597Finish 0.141603Stort Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentr

Notes:

Sox scrubber checked after calibrator zero. Span adjusted.

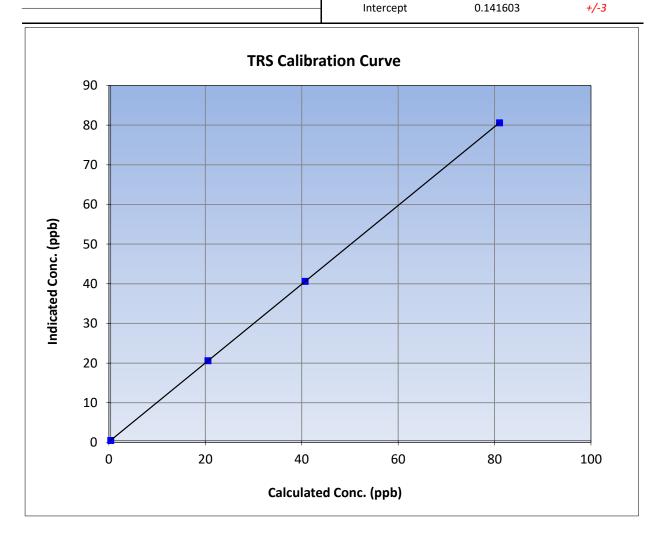
Calibration Performed By:

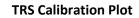
Melissa Lemay



TRS Calibration Summary

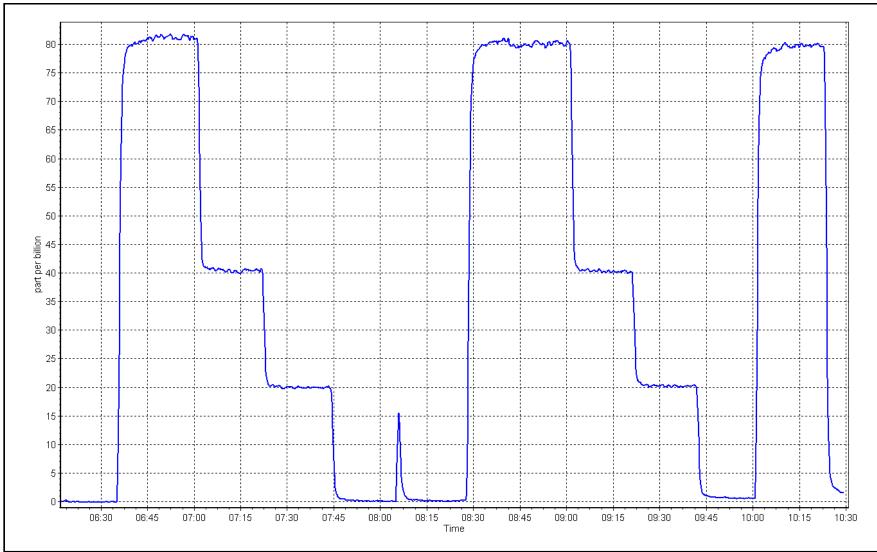
WBEA					Version-11-
		Station	Information		
Calibration Date:	April 26,	2023	Previous Calibration:	March	13, 2023
Station Name:	Athabasca	a Valley	Station Number:	A	MS07
Start Time (MST):	6:1	6:18		10:29	
Analyzer make: CDN-		101	Analyzer serial #:	!	551
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
80.6	80.2	1.0053	Correlation Coerricient	0.9999999	20.995
40.3	40.2	1.0028	Slope	0.993201	0.90 - 1.10
20.2	20.2	0.9977	ыоре	0.555201	0.90 - 1.10
			Intercent	0 1 4 1 6 0 2	1/2













THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-20
		Sta	tion Information		
Station Name:	Athabasca Val	еу	Station number: AN	/IS07	
Calibration Date:	April 19, 2023			arch 9, 2023	
Start time (MST):	7:10		End time (MST): 9:5	57	
Reason:	Routine				
		Cali	bration Standards		
Gas Cert Reference:		CC282115	Cal Gas Expiry Date: De	cember 29, 20)28
CH4 Cal Gas Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
C3H8 Cal Gas Conc.	208.7	ppm			
Removed Gas Cert:		NA	Removed Gas Expiry: NA	A Contraction of the second seco	
Removed CH4 Conc.	501.2	ppm	CH4 Equiv Conc.	1075.1	ppm
Removed C3H8 Conc.	208.7	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄):			Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 38	05	
ZAG make/model:	API 701H		Serial Number: 19	8	
		Ana	lyzer Information		
Analyzer make:	Thermo 55i		Analyzer serial #: 13	17958219	
THC Range (ppm):	0 - 20 ppm				
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): 0 -	10 ppm	
	<u>Start</u>	Finish	<u>l</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	0.000270	0.0002	78 NMHC SP Ratio:	4.42E-05	4.49E-05
CH4 Retention time:	13.4	13.8	NMHC Peak Area:	205840	202584

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4921	79.3	17.05	16.67	1.023			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4921	79.3	17.05	17.04	1.001			
second point	4960	39.6	8.52	8.51	1.001			
third point	4980	19.8	4.26	4.27	0.997			
as left zero	5000	0.0	0.00	0.00				
as left span	4921	79.2	17.03	17.00	1.002			
				Average Correction Factor	0.999			
Baseline Corr AF:	16.67	Prev response	16.97	*% change	-1.9%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation			



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0	0.00	0.00			
as found span	4921	79.3	9.10	8.95	1.017		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4921	79.3	9.10	9.10	1.000		
second point	4960	39.6	4.55	4.56	0.997		
third point	4980	19.8	2.27	2.29	0.993		
as left zero	5000	0.0	0.00	0.00			
as left span	4921	79.2	9.09	9.07	1.002		
			A	Average Correction Factor	0.997		
Baseline Corr AF:	8.95	Prev response	9.13	*% change	-2.0%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4	Cal	ibration	Data
CIT	Cu	is a cion	Dutu

		CH4 Calibra	lion Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.3	7.95	7.72	1.030
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.3	7.95	7.94	1.001
second point	4960	39.6	3.97	3.96	1.002
third point	4980	19.8	1.98	1.98	1.002
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.94	7.93	1.001
			A	verage Correction Factor	1.002
Baseline Corr AF:	7.72	Prev response	7.86	*% change	-1.8%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.994780		0.999083	
THC Cal Offset:		0.013474		0.005889	
CH4 Cal Slope:		0.988322		0.998961	
CH4 Cal Offset:		-0.000211		-0.002189	
NMHC Cal Slope:		1.001323		0.999315	
NMHC Cal Offset:		0.012086		0.010081	

Notes:

CH4 channel is dipping a bit. Flame temp is a bit lower then last month. RT has moved. Span adjusted. No maintenance done.

Calibration Performed By: Melissa Lemay



THC Calibration Summary

Version-01-2020

		.	6		Version-01-20	
			nformation			
Calibration Date:		9, 2023	Previous Calibration:	March	March 9, 2023	
Station Name:	Athabas	ca Valley	Station Number:	AM	S07	
Start Time (MST):	7:	10	End Time (MST):	9:5	57	
Analyzer make:	lyzer make: Thermo 55i		Analyzer serial #:	13179	58219	
		Calibra	tion Data			
Calculated concentratior (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.00	0.00		Correlation Coefficient	0.999999	≥0.995	
17.05	17.04	1.0006		0.555555	20.000	
8.52	8.51	1.0007	Slope	0.999083	0.90 - 1.10	
4.26	4.27	0.9971	latereet	0.005.890		
			Intercept	0.005889	+/-0.5	
18.0		THC Calibratio	n curve	_		
16.0 —						
14.0 —						
12.0 —						
(mdg 10.0 -						
10.0 (bbm) 0.8 0.0						
- 0.6						
4.0						
2.0						
0.0		0	10.0	15.0	20.0	
	5	.0	10.0	15.0	20.0	



CH₄ Calibration Summary

Version-01-2020

							Version-01-202	
			Station I	nformation				
Calibratio	on Date:	April 1	9, 2023	Previous Ca	alibration:	March 9	9, 2023	
Station N	ame:	Athabas	sca Valley	Station Number:		AMS	AMS07	
Start Time	e (MST):	7:	:10	End Time (MST):		9:5	57	
Analyzer make:		Therr	no 55i	Analyze	er serial #:	13179	58219	
			Calibra	ation Data				
	concentratio m) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)		Statistical Eval	uation	<u>Limits</u>	
	0.00	0.00		Correlation C	oefficient	0.999999	≥0.995	
	⁷ .95	7.94	1.0011					
	.97 98	3.96 1.98	1.0025 1.0024	Slop	e	0.998961	0.90 - 1.10	
1		1.58	1.0024	Interes		0.002180	. (0.5	
				Interce	ept	-0.002189	+/-0.5	
	9.0		CH ₄ Calibratio	n Curve				
	8.0							
	7.0 -							
	6.0							
ि								
udo	5.0							
Indicated Conc. (ppm)	5.0							
ouo	4.0							
о р	4.0							
ate	2.0							
dic	3.0 +							
느		/						
	2.0 +							
	1.0 -							
l								
	0.0 🗲 0.0	2.0	4.0	6	5.0	8.0	10.0	
l	0.0	2.0				5.0	20.0	
			Calculated	d Conc. (ppr	n)			
					-			



NMHC Calibration Summary

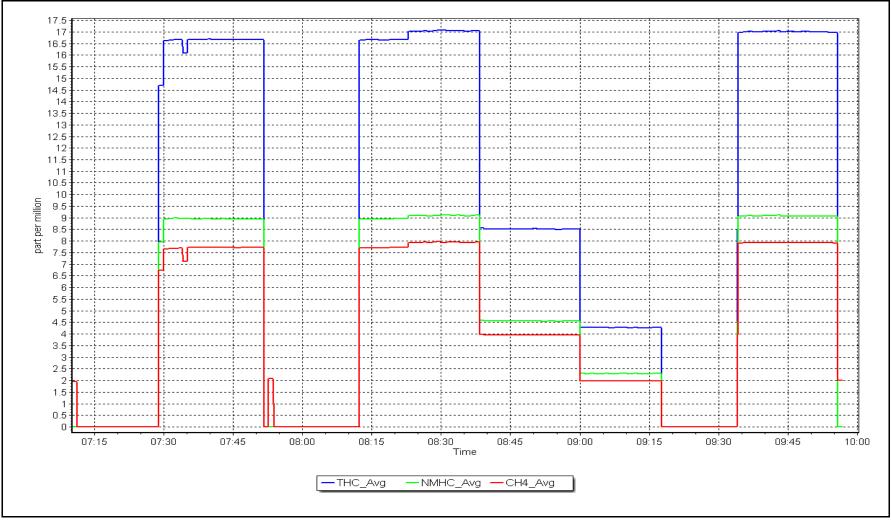
Version-01-2020

			Station I	nformation		
Calibratio	n Date:	April	19, 2023	Previous Calibration:	March	9, 2023
Station Na	ame:	Athaba	sca Valley	Station Number:	AM	S07
Start Time	e (MST):	7	::10	End Time (MST):	9:5	57
Analyzer n	nake:	Ther	mo 55i	Analyzer serial #:	13179	58219
			Calibra	tion Data		
	oncentration 1) (Cc)	ration Indicated concentration (ppm) (Ic) Correction factor (Cc		Statistical Eval	uation	<u>Limits</u>
	00 10	0.00 9.10	1.0002	Correlation Coefficient	0.999994	≥0.995
	.55	4.56	0.9969			
	27	2.29	0.9925	Slope	0.999315	0.90 - 1.10
				Intercept	0.010081	+/-0.5
1	9.0					
	8.0					
	7.0			/		
(mqc	6.0					
Conc. (ppm)	5.0					
ited C	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0				8.0	10.0
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

NMHC Calibration Plot

Location: Athabasca Valley







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Sta	tion Information				
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley April 21, 2023 5:48 Routine		Last Cal Date:	Station number: AMS07 Last Cal Date: March 10, 2023 End time (MST): 10:18			
		Calil	oration Standards				
NO Gas Cylinder #:	T2Y1KA4		Cal Gas Expiry Date:	November 30, 2	023		
NOX Cal Gas Conc:	50.92	ppm	NO Cal Gas Conc:	49.92	ppm		
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA			
Removed Gas NOX Conc:	50.92	ppm	Removed Gas NO Conc:	49.92	ppm		
NOX gas Diff:			NO gas Diff:	2005			
Calibrator Model: ZAG make/model:	API T700 API T701H		Serial Number: Serial Number:	3805 198			
ZAG make/mouel.	APITIOIN		Serial Number.	198			
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> : 1.048 : 0.995	Ana <u>Finisa</u> 1.04 0.99 1.00	8 NO bkgnd or offset: 5 NOX bkgnd or offset:	1160120024 <u>Start</u> 7.3 7.5 203.5	<u>Finish</u> 7.3 7.5 203.5		
		Cali	bration Statistics				
		Star	<u>t</u>	<u>Finish</u>			
NO _x Cal Slope		0.9974		1.001476			
NO _x Cal Offset		1.3584		1.279327			
NO Cal Slope		0.9974		1.000931			
NO Cal Offset		1.0544		1.195212			
NO ₂ Cal Slope		1.0016		1.007625			
NO ₂ Cal Offset	:	0.6816	581	1.013573			



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4920	80.2	816.7	800.7	16.0	818.2	800.9	17.4	0.9982	0.9997
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
high point	4920	80.2	816.7	800.7	16.0	818.4	801.8	16.5	0.9980	0.9986
second point	4960	40.1	408.4	400.4	8.0	411.6	403.4	8.2	0.9922	0.9924
third point	4980	20.0	203.7	199.7	4.0	205.8	201.4	4.3	0.9897	0.9915
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1		
as left span	4920	80.2	816.7	397.4	419.3	825.1	398.1	427.0	0.9898	0.9982
							Average C	orrection Factor	0.9933	0.9942
Corrected As fo	ound NO _x =	818.3 ppb	NO =	801.0 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	0.3%
Previous Respo	onse NO _x =	816.0 ppb	NO =	799.7 ppb				*Percent Chang	ge NO =	0.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$I NO_{\chi} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO r^2 :		NO SI:	NO Int:	
					As found	$I NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.9	395.6	419.3	423.0	0.9913	100.9%
2nd GPT point (200 ppb O3)	798.9	598.7	216.2	219.4	0.9856	101.5%
3rd GPT point (100 ppb O3)	798.9	699.4	115.5	118.5	0.9750	102.6%
				Average Correction Factor	0.9840	101.6%

Notes:

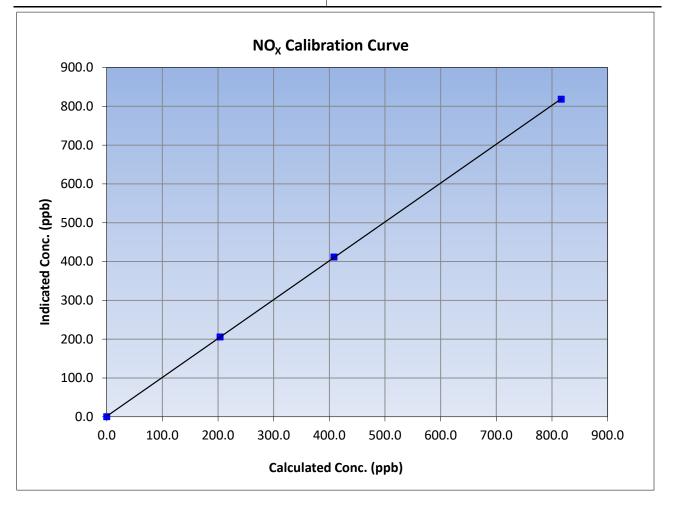
No maintenance or adjustments done.

Calibration Performed By:



NO_x Calibration Summary

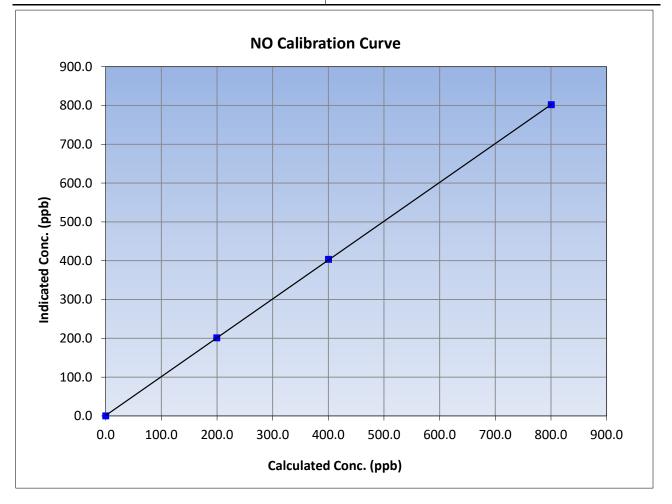
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 2	1, 2023	Previous Calibration:	March 1	10, 2023	
Station Name:	Athabasca Valley		Station Number:	AM	S07	
Start Time (MST):	5:	5:48 End Time (MST): 10		10	:18	
Analyzer make: Thermo 42i			Analyzer serial #:	11601	20024	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.2		Correlation Coefficient	0.999989	>0.005	
816.7	818.4	0.9980	Correlation Coefficient	0.999989	≥0 <i>.995</i>	
408.4	411.6	0.9922	Slope	1.001476	0.90 - 1.10	
203.7	205.8	0.9897	Jope	1.001470	0.50 1.10	
			Intercept	1.279327	+/-20	





NO Calibration Summary

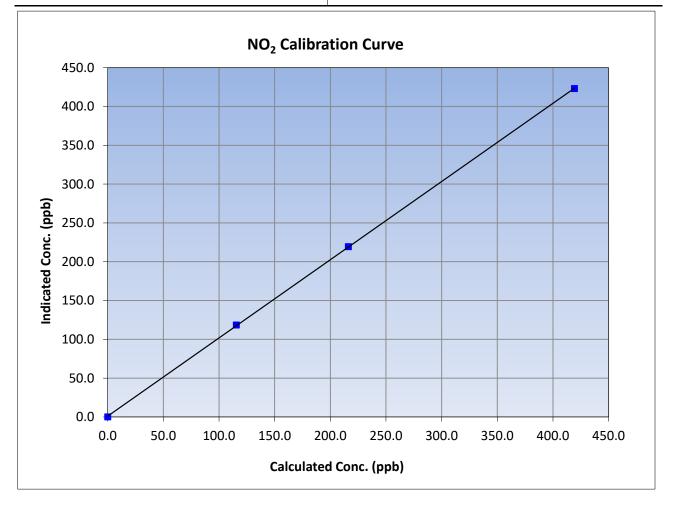
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	1, 2023	Previous Calibration:	March 1	0, 2023
Station Name:	Athabasca Valley		Station Number:	AM	S07
Start Time (MST):	/IST): 5:48 End Time (N		End Time (MST):	10	:18
Analyzer make: Thermo 42i			Analyzer serial #: 1160120		20024
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999989	≥0.995
800.7	801.8	0.9986	correlation coernelent	0.555565	20.995
400.4	403.4	0.9924	Slope	1.000931	0.90 - 1.10
199.7	201.4	0.9915	Siope	1.000951	0.90 - 1.10
			Intercept	1.195212	+/-20

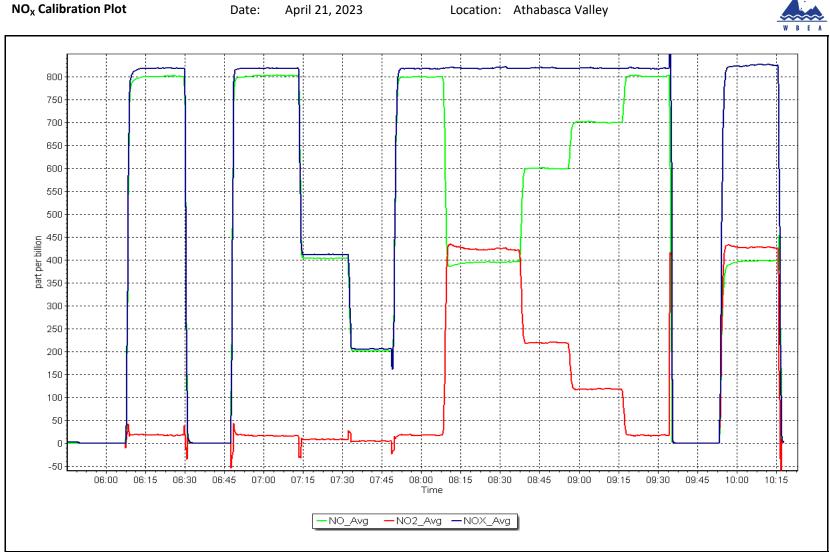




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	1, 2023	Previous Calibration:	March 2	10, 2023
Station Name:	Athabasca Valley		Station Number:	AM	S07
Start Time (MST):	5:	48	End Time (MST):	10	:18
Analyzer make: Thermo 42i			Analyzer serial #:	11601	20024
		Calibr	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999972	≥0.995
419.3	423.0	0.9913	correlation coefficient	0.555572	20.333
216.2	219.4	0.9856	Slope	1.007625	0.90 - 1.10
115.5	118.5	0.9750	Siope	1.007025	0.30 - 1.10
			Intercept	1.013573	+/-20









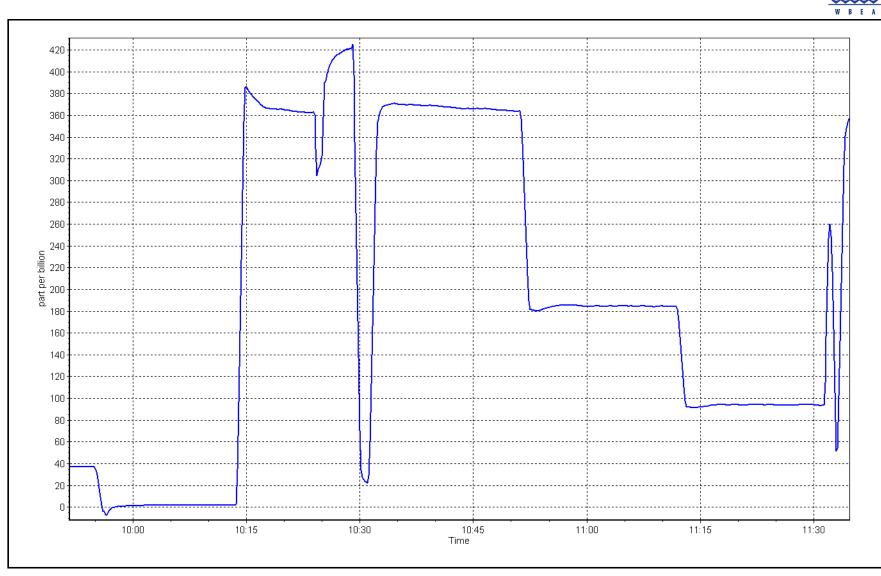
O₃ Calibration Report

Version-01-2020

					Version-01-2		
		Station Infor	mation				
Station Name:	Athabasca Valley	Station number: AMS07					
Calibration Date:	April 19, 2023		Last Cal Date: I	March 9. 2023			
Start time (MST):	9:55	End time (MST): 12:12					
Reason:	Removal						
	i ci i o vai						
		Calibration St	andards				
O3 generation mode:	Photometer						
Calibrator Make/Model:	T700		Serial Number:	3805			
ZAG Make/Model:	T701H		Serial Number:	198			
,							
		Analyzer Info	rmation				
Analyzer make	: Thermo 49i		Analyzer serial #:	1507964700			
Analyzer Range	e 0 - 500 ppb						
	Start	<u>Finish</u>		<u>Start</u>	Finish		
Calibration slope:	0.994371		Backgd or Offset:	-0.6	-0.6		
Calibration intercept:	2.260000		Coeff or Slope:	1.170	1.170		
		O ₃ Calibratio	n Data				
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated I concentration (ppb) (Cc)	ndicated concentration Co (ppm) (Ic)	orrection factor (Co Limit = 0.95-1.05		
as found zero	5000	0.0	0.0	1.9			
as found span	5000	1400.0	400.0	365.2	1.095		
as found 2nd point	5000	1029.9	200.0	184.6	1.083		
as found 3rd point	5000	848.3	100.0	93.9	1.065		
calibrator zero							
high point							
second point							
third point							
as left zero							
as left span							
			Average	e Correction Factor			
Baseline Corr As found:	363.3	Previous response	400.0	*% change	-10.1%		
Baseline Corr 2nd AF pt:	-180.6	AF Slope:	0.907543	AF Intercept:	2.580000		
Baseline Corr 3rd AF pt:	-90.7	AF Correlation:	0.999983				
				* = > +/-5% change initiate	s investigation		
Notes:		Removed	d due to leak in the so	blenoids			
Calibration Per	formed By:	Melissa Lemav					

Calibration Performed By:

Melissa Lemay



O₃ Calibration Plot

Location: Athabasca Valley





O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Athabasca Valley April 20, 2023 10:28 Install		Station number: Last Cal Date: End time (MST):	April 19, 2023	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer T700 T701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1152220023	
Calibration slope: Calibration intercept:	<u>Start</u>	<u>Finish</u> 0.998171 0.120000	Backgd or Offset: Coeff or Slope:	<u>Start</u>	<u>Finish</u> -2.8 1.435
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/lo Limit = 0.95-1.05
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
calibrator zero	5000	0.0	0.0	0.0	
high point	5000	1391.3	400.0	399.5	1.001
second point	5000	1026.7	200.0	199.3	1.004
third point	5000	848.3	100.0	100.4	0.996
as left zero	5000	0.0	0.0	0.2	
as left span	5000	1392.4	400.0 Averag	395.0 e Correction Factor	1.013
Baseline Corr As found: Baseline Corr 2nd AF pt:	NA NA	Previous response AF Slope:		*% change AF Intercept:	NA
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

Install due to suspected leak in old O3 analyzer.

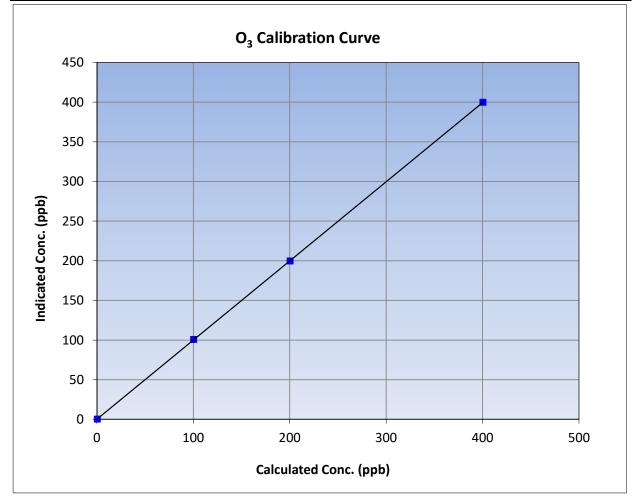
Calibration Performed By:

Melissa Lemay



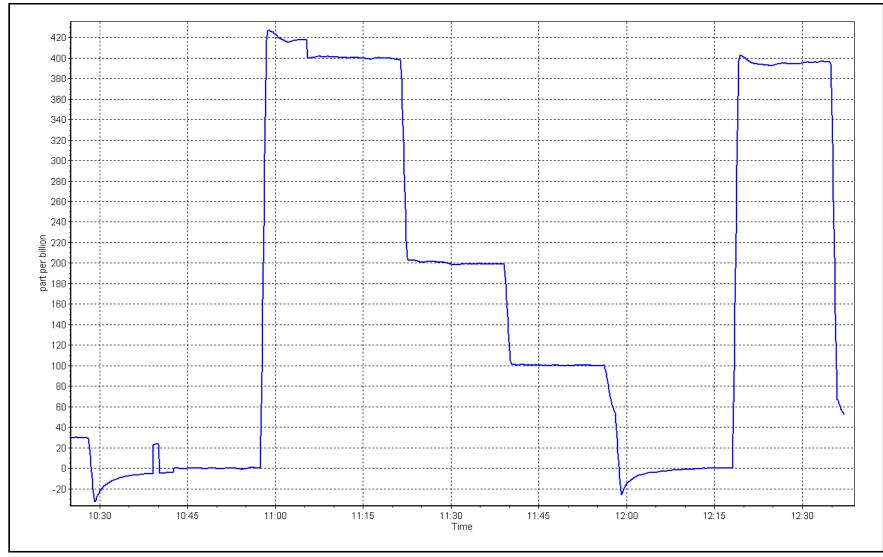
O₃ Calibration Summary

WBEA					Version-01-2	
		Station	Information			
Calibration Date:	April 20, 2023		Previous Calibration: April		9, 2023	
Station Name:	Athabasca Valley		Station Number:	AMS07		
Start Time (MST):	ST): 10:28		End Time (MST):	12:37		
Analyzer make:	Thermo	o 49i	Analyzer serial #:	#: 1152220023		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	tion	<u>Limits</u>	
0.0	0.0					
400.0	399.5	1.0013	Correlation Coefficient	0.999995	≥0 <i>.995</i>	
200.0	199.3	1.0035	Clana	0.998171	0.90 - 1.10	
100.0	100.4	0.9960	Slope	0.330171	0.30 - 1.10	
			Intercept	0.120000	+/- 5	











T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023
		Station Information	n			
Station Name:	Athabasca Valley		Station number:	AMS 07		
Calibration Date:	April 26, 2023		Last Cal Date:	March 31, 2023	i	
Start time (MST):	10:32		End time (MST):	11:04		
			- 4 -			
Analyzer Make:	API T640		S/N:	645		
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 T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	Ad	justed	(Limits)
T (°C)	6.6	6.68	6.6			+/- 2 °C
P (mmHg)	735.8	734.7	735.8			+/- 10 mmHg
flow (LPM)	5	5.14	5			+/- 0.25 LPM
Leak Test:	Date of check:	April 26, 2023	Last Cal Date:	March 31, 2	 	,
Leak rest.	PM w/o HEPA:	3.8	PM w/ HEPA:	0	JZJ	<0.2 ug/m3
Note: this leak check will be				-	check	
Inlet cleaning :	Inlet Head		·			
C C						
		Quarterly Calibration	Test			
<u>Parameter</u>	<u>As found</u>	Post maintenance	<u>As left</u>	Ad	justed	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenanc		PM w/o HEPA:		w/ HEPA:		
Date Optical Chan		February 1,				<0.2 ug/m3
Disposable Filte	er Changed:	February 1,	, 2023			
		Annual Maintenanc	e			
Date Sample Tu		December 5				
Date RH/T Sens	or Cleaned:	December 5	5, 2022			
Notoci		No adjustmer	nts done. Head clea	ned		
Notes:				neu.		
Calibration by:	Melissa Lemay					



CO Calibration Report

Version-01-2020

	Station Infor	mation		
Athabasca Valley April 25, 2023 5:58 Routine		Station number: Last Cal Date: End time (MST):	AMS07 March 14, 2023 8:51	
	Calibration St.	andards		
2 000			December 12, 2020	
	ppm	Cal Gas Exp Date:	December 12, 2026	
3,000	ppm		NA	
NA				
API 700H		Serial Number:	198	
	Analyzer Info	rmation		
: Thermo 48i-LTE : 0 - 50 ppm		Analyzer serial #:	1408761381	
<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>
0.998030	0.994802	-		3.896
0.026535	0.030541	Coeff or Slope:	1.079	1.079
	CO Calibratio	on Data		
Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/lc) <i>Limit = 0.95-1.05</i>
5000	0.0	0.0	0.1	
4933	66.7	40.0	40.2	0.996
5000	0.0	0.0	0.0	
				1.006
				0.999
				1.003
	66.7	40.0	39.7	1.007
	-			1.003
40.05	Prev response:			0.2%
			AF Intercept:	0.270
NA	AF Slope:		AF IIILEILEDI.	
	April 25, 2023 5:58 Routine 3,000 LL66942 3,000 NA API T700 API 700H Thermo 48i-LTE 0 - 50 ppm <u>Start</u> 0.998030 0.026535 Dilution air flow rate (sccm) 5000	Athabasca Valley April 25, 2023 5:58 Routine Calibration State ppm 3,000 LL66942 3,000 NA API 7700 API 700H ppm AAPI T700 API 700H ppm Start 0.998030 0.094802 0.026535 Finish 0.994802 0.030541 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) 5000 0.0 4933 66.7 4967 33.3 4983 16.7 5000 0.0 0.0 0.0 4933 66.7	April 25, 2023 Last Cal Date: End time (MST): Routine Routine Calibration Standards 3,000 ppm Cal Gas Exp Date: LL66942 3,000 ppm Rem Gas Exp Date: Diff between cyl: Serial Number: API 7700 Serial Number: Serial Number: API 7700 Serial Number: Serial Number: Start Finish 0.998030 0.026535 Backgd or Offset: Coeff or Slope: Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppm) (Cc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppm) (Cc) S000 0.0 0.0 0.0 4933 66.7 40.0 4967 33.3 20.0 4983 16.7 10.0 5000 0.0 0.0 4933 66.7 40.0 4933 66.7 40.0 4933 66.7 40.0 4933 66.7 40.0 4933 66.7 40.0 4933 66.7 40.0 4000 40.0	Athabasca Valley April 25, 2023 5:58 Routine Station number: Last Cal Date: End time (MST): AMS07 March 14, 2023 8:51 Routine Calibration Standards 8:51 3,000 LL66942 3,000 ppm Cal Gas Exp Date: Serial Number: December 12, 2026 API 7700 API 7700 Serial Number: Serial Number: 3805 API 7700 API 700H Serial Number: Serial Number: 198 Start 0.998030 0.026535 Finish 0.030541 1408761381 Backgd or Offset: 0.000 0.000 Start (sccm) Finish (sccm) (sccm) Start (cc) Start 0.000 Dilution air flow rate (sccm) Source gas flow rate (sccm) (Cc) Calculated concentration (ppm) (Cc) Indicated concentration (ppm) (lc) S000 0.0 0.0 0.1 4933 66.7 40.0 39.8 4967 33.3 20.0 20.0 4983 16.7 10.0 0.0 4983 16.7 40.0 39.8 4967 33.3 20.0 20.0 4983 16.7 40.0 39.7 4983 16.7

Notes:

No Maintenance done. Zero adjusted.

Calibration Performed By:

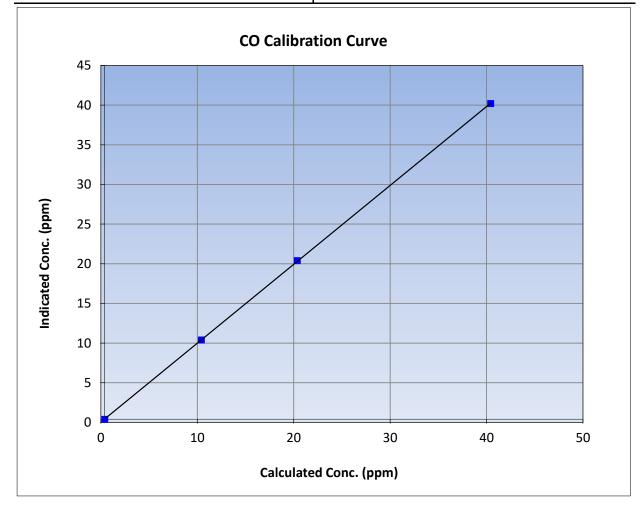


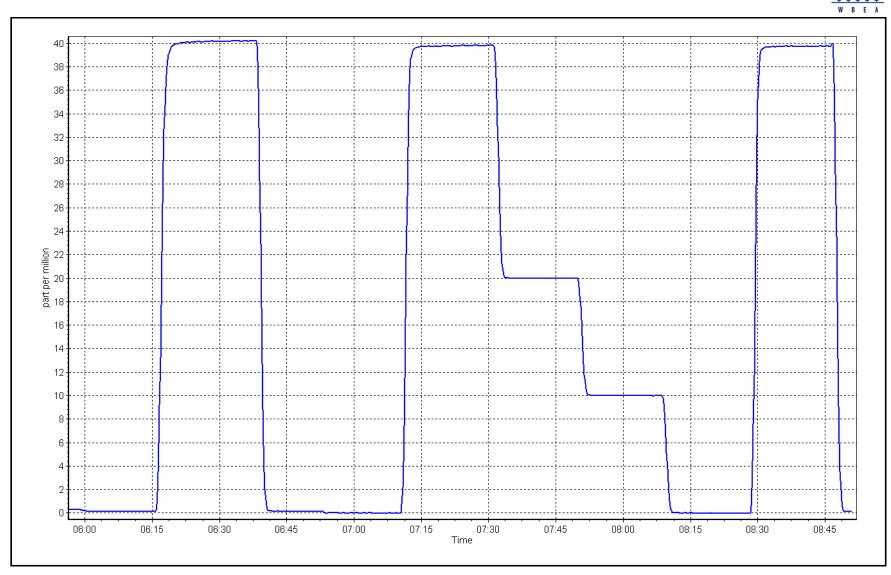
CO Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	April 25, 2023	Previous Calibration:	March 14, 2023
Station Name:	Athabasca Valley	Station Number:	AMS07
Start Time (MST):	5:58	End Time (MST):	8:51
Analyzer make:	Thermo 48i-LTE	Analyzer serial #:	1408761381

Calibration Data

Calculated concentration Indicated concentration (ppm) (Cc) (ppm) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999985	≥0.995
40.0	39.8	1.0056	correlation coefficient	0.999985	20.333
20.0	20.0	0.9989	Slope	0.994802	0.90 - 1.10
10.0	10.0	1.0031	Siope	0.994802	0.90 - 1.10
			Intercept	0.030541	+/-1.5





Location: Athabasca Valley



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS08 FORT CHIPEWYAN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan April 12, 2023 10:22 Routine		Station number: Last Cal Date: End time (MST):	AMS08 March 13, 2023 13:13	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	49.84 CC196697 49.84 NA Teledyne API T700 Teledyne API T701	ppm ppm	Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	January 6, 2030 NA 3252 260	
		Analyzer Info	rmation		
Analyzer make Analyzer Range	: Thermo 43i-TLE e 0 - 1000 ppb	-	Analyzer serial #:	1136451241	
Calibration slope: Calibration intercept:	<u>Start</u> 0.996661 1.336570	<u>Finish</u> 1.003016 1.535287	Backgd or Offset: Coeff or Slope:	<u>Start</u> 1.27 0.981	<u>Finish</u> 1.29 1.010
		SO ₂ Calibration	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	orrection factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4920	80.3	800.4	778.6	1.028
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4920	80.3	800.4	804.4	0.995
second point	4960	40.2	400.7	402.0	0.997
third point	4980	20.1	200.4	205.1	0.977
as left zero	5000	0.0	0.0	0.3	
as left span	4920	80.3	800.4 Averag	805.3 ge Correction Factor	0.994
				· · · · · · · · · · · · · · · · · · ·	0.530
Baseline Corr As found:	778.50	Previous response	799.05	*% change * = > +/-5% change initiate	-2.6% s investigation

Notes:

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

Calibration Performed By:

Morgan Voyageur

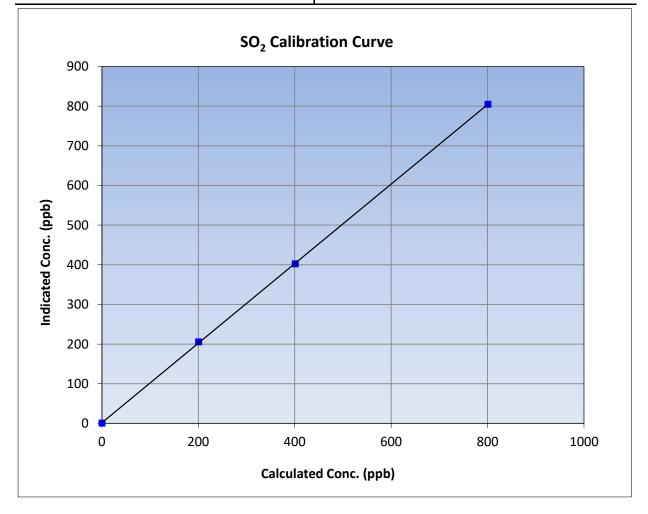


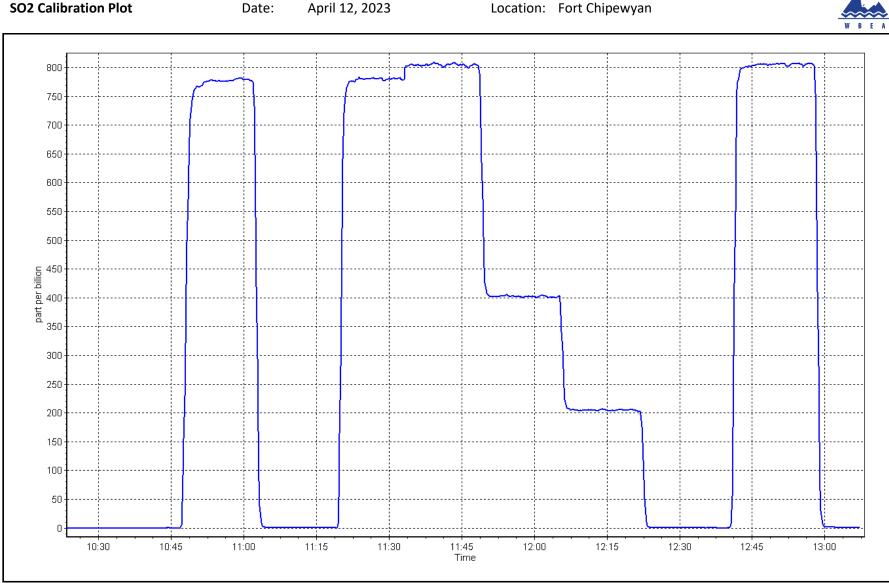
SO₂ Calibration Summary

WBEA			Version-01-2020
	Stati	on Information	
Calibration Date:	April 12, 2023	Previous Calibration:	March 13, 2023
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	10:22	End Time (MST):	13:13
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1136451241

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	ation	<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999970	≥0.995
800.4	804.4	0.9950	correlation coefficient	0.999970	20.333
400.7	402.0	0.9968	Slope	1.003016	0.90 - 1.10
200.4	205.1	0.9769	Slope	1.003010	0.30 - 1.10
			- Intercept	1.535287	+/-30





Location: Fort Chipewyan



TRS Calibration Report

				•	
WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan April 26, 2023 9:05 Routine		Station number: Last Cal Date: End time (MST):	AMS08 March 12, 2023 13:10	
		Calibration S	tandards		
Cal Gas Concentration:	4.97	ppm	Cal Gas Exp Date:	February 9, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	EY0002276 4.97 NA Teledyne API T700 Teledyne API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3252 260	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ-TL CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1203169744 14639	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.995571 0.018651	0.994424 0.158770	Backgd or Offset: Coeff or Slope:		0.92 0.694
		TRS As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
as found zero	5000	0.0	0.0	-0.5	
as found span	4920	80.5	80.0	82.6	0.963
as found 2nd point	4960	40.2	40.0	40.9	0.965
as found 3rd point	4980	20.1	20.0	20.3	0.961
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4920	80.5	80.0	79.6	1.005
second point	4960	40.2	40.0	40.1	0.996
third point	4980	20.1	20.0	20.1	0.994
as left zero	5000	0.0	0.0	0.1	
as left span	4920	80.5	80.0	79.3	1.009
SO2 Scrubber Check	4919.7	80.3	803.0	0.0	
Date of last scrubber cha		March 7, 2022		Ave Corr Factor	0.999
Date of last converter eff	iciency test:	March 15, 2022		100.7%	efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt:	83.1 41.4	Prev response: AF Slope:		*% change: AF Intercept:	4.1% -0.500550
Baseline Corr 3rd AF pt:	20.8	AF Correlation:		* = > +/-5% change initial	

Notes:

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

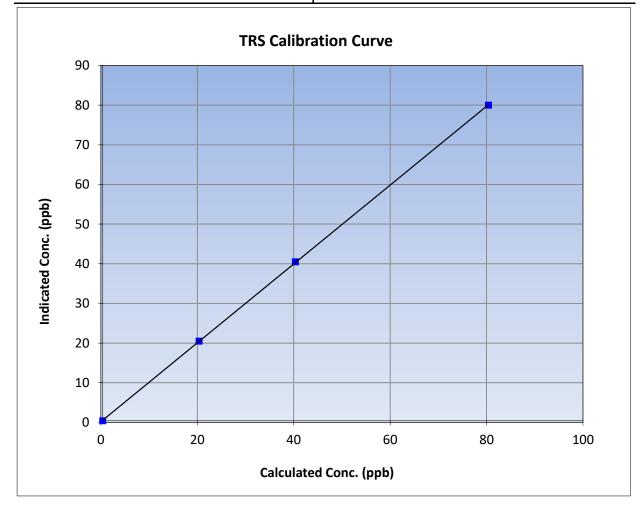


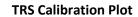
TRS Calibration Summary

WBEA			Version-11-2
	Stati	on Information	
Calibration Date:	April 26, 2023	Previous Calibration:	March 12, 2023
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	9:05	End Time (MST):	13:10
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744
Analyzer make:	Thermo 43iQ-TL	Analyzer serial #:	1203169744

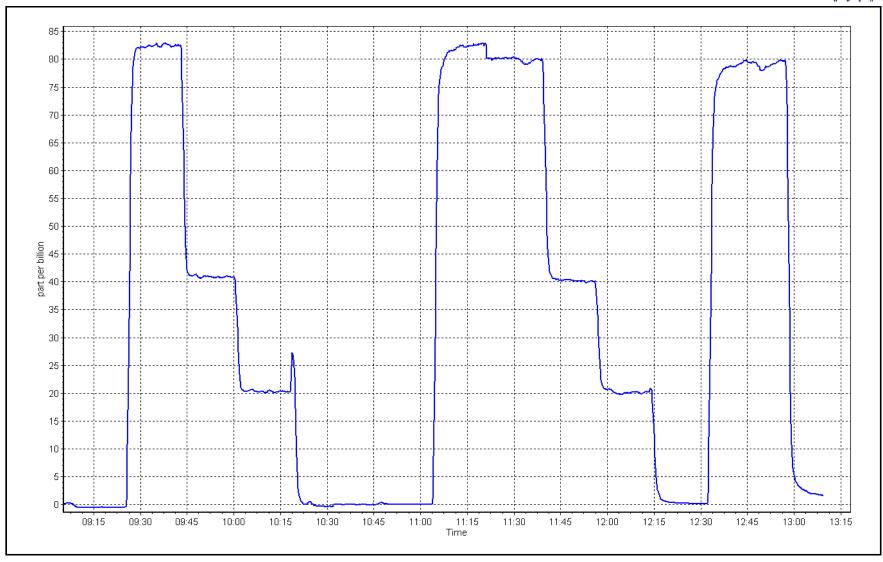
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999975	≥0.995
80.0	79.6	1.0051	correlation coefficient	0.999975	20.995
40.0	40.1	0.9964	Slope	0.994424	0.90 - 1.10
20.0	20.1	0.9940	Slope	0.334424	0.90 - 1.10
			- Intercept	0.158770	+/-3











Station Name:

Reason:

Calibration Date:

Start time (MST):

Fort Chipewyan

April 13, 2023

8:28

Routine

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS08 Last Cal Date: March 13, 2023 End time (MST): 12:48

			the set of the set of the		
		Cal	ibration Standards		
NO Gas Cylinder #:	CC363447		Cal Gas Expiry Date:	February 2, 2024	
NOX Cal Gas Conc:	48.80	ppm	NO Cal Gas Conc:	48.80	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA	
Removed Gas NOX Conc:	48.80	ppm	Removed Gas NO Conc:	48.80	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	3252	
ZAG make/model:	Teledyne API T701H	1	Serial Number:	260	

Analyzer Information

Analyzer make: Th NOX Range (ppb): 0			Analyzer serial #: 14	26262592	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.844	1.882	NO bkgnd or offset:	7.9	7.9
NOX coeff or slope:	0.993	1.000	NOX bkgnd or offset:	8.1	8.1
NO2 coeff or slope:	1.000	0.995	Reaction cell Press:	256.6	241.1

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000657	0.996544
NO _x Cal Offset:	0.680000	1.320000
NO Cal Slope:	1.001428	0.995845
NO Cal Offset:	0.260000	0.740000
NO_2 Cal Slope:	1.016898	1.003157
NO ₂ Cal Offset:	0.900918	0.613431



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.1		
as found span	4918	82.0	800.3	800.3	0.0	799.1	795.6	3.4	1.0015	1.0059
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4918	82.0	800.3	800.3	0.0	798.1	797.3	0.7	1.0028	1.0038
second point	4959	41.0	400.2	400.2	0.0	401.0	399.8	1.3	0.9979	1.0009
third point	4980	20.5	200.1	200.1	0.0	202.0	200.6	1.3	0.9905	0.9974
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1		
as left span	4918	82.0	800.3	407.9	392.4	801.6	406.6	395.1	0.9984	1.0032
							Average C	orrection Factor	0.9971	1.0007
Corrected As fo	ound NO _x =	799.4 ppb	NO =	795.7 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-0.3%
Previous Respo	nse NO _x =	801.5 ppb	NO =	801.7 ppb				*Percent Chan	ge NO =	-0.8%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	794.4	402.0	392.4	394.1	0.9957	100.4%
2nd GPT point (200 ppb O3)	794.4	601.3	193.1	194.1	0.9948	100.5%
3rd GPT point (100 ppb O3)	794.4	700.0	94.4	96.4	0.9793	102.1%
			ŀ	Average Correction Factor	0.9899	101.0%

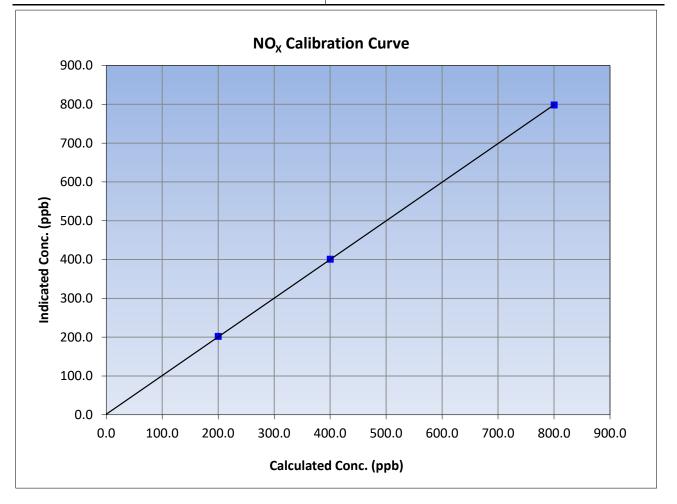
Notes:

Sample inlet filter changed after as founds. No adjustment need.



NO_x Calibration Summary

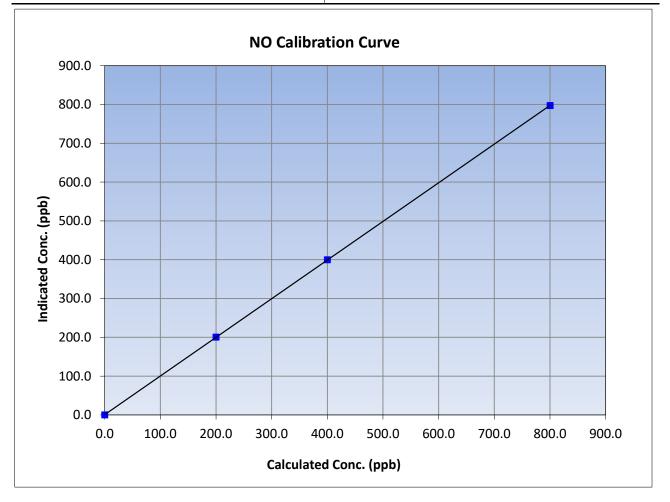
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 1	3, 2023	Previous Calibration:	March 1	.3, 2023	
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08	
Start Time (MST):	8:	28	End Time (MST):	12:	48	
Analyzer make:	Thern	no 42i	Analyzer serial #: 14262		262592	
		Calibr	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999985	≥0.995	
800.3	798.1	1.0028	correlation coefficient	0.555565	20.333	
400.2	401.0	0.9979	Slope	0.996544	0.90 - 1.10	
200.1	202.0	0.9905	Siope	0.990544	0.90 - 1.10	
			Intercept	1.320000	+/-20	





NO Calibration Summary

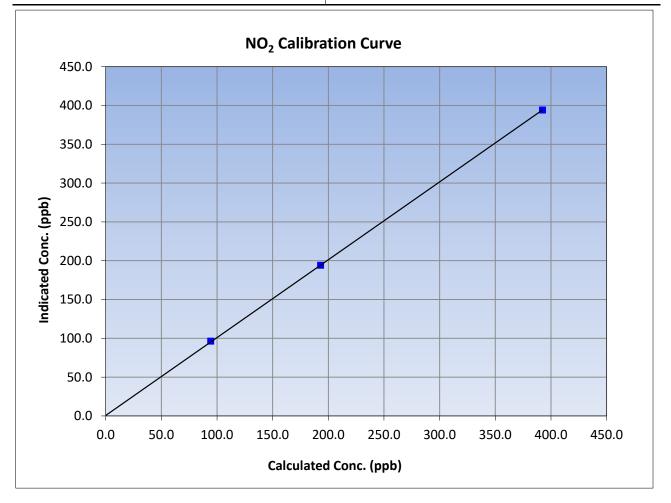
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 1	3, 2023	Previous Calibration:	March 1	13, 2023
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08
Start Time (MST):	8:	28	End Time (MST):	12	:48
Analyzer make:			Analyzer serial #:	Analyzer serial #: 1426262	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
800.3	797.3	1.0038	correlation coernicient	0.555550	20.995
400.2	399.8	1.0009	Slope	0.995845	0.90 - 1.10
200.1	200.6	0.9974	Siope	0.333043	0.90 - 1.10
			Intercept	0.740000	+/-20

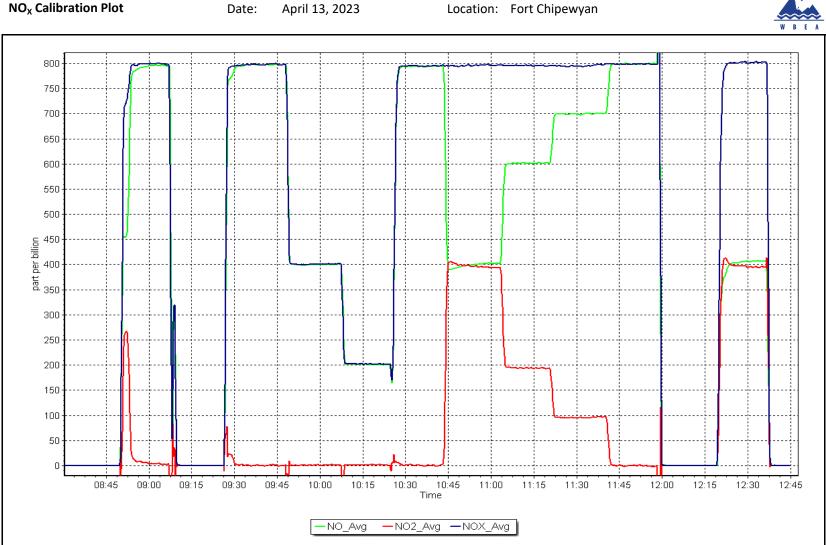




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 1	3, 2023	Previous Calibration:	March 1	13, 2023	
Station Name:	Fort Ch	ipewyan	Station Number:	AM	S08	
Start Time (MST):	8:28		End Time (MST):	12	:48	
Analyzer make:	Thern	no 42i	Analyzer serial #: 14262		262592	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Callbra	ation Data Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.000070	2 0 005	
392.4	394.1	0.9957	Correlation Coefficient	0.999979	≥0.995	
193.1	194.1	0.9948	Slope	1.003157	0.90 - 1.10	
94.4	96.4	0.9793	Siope	1.005157	0.50 1.10	
			Intercept	0.613431	+/-20	







O₃ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Fort Chipewyan		Station number:	AMS08	
Calibration Date:	April 12, 2023		Last Cal Date:	March 13, 2023	
Start time (MST):	7:52		End time (MST):		
Reason:	Routine				
		Calibration St	andards		
	Dhatawataw	calibration st			
D3 generation mode: Calibrator Make/Model:	Photometer Teledyne API T700		Serial Number:	2252	
ZAG Make/Model:	Teledyne API T701		Serial Number:		
LAG Make/Mouel.	Teledylle AFT 1701		Senai Number.	200	
		Analyzer Info	rmation		
Analyzer make:	Teledyne API T400		Analyzer serial #:	3872	
Analyzer Range					
	Start	Finish		Start	Finish
Calibration slope:	1.002171	1.013200	Backgd or Offset:	-2.0	-2.0
Calibration intercept:	-0.880000	-0.960000	Coeff or Slope:	1.036	1.036
•			•		
		O ₂ Calibratio	-		
		O ₃ Calibratio	-		
	Total air flow rate	O ₃ Calibratic	-	Indicated concentration C	• •
Set Point	Total air flow rate (sccm)	-	on Data	Indicated concentration C (ppm) (Ic)	Correction factor (Cc, Limit = 0.95-1.05
		Calibrator Lamp	on Data Calculated		• •
Set Point	(sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	(ppm) (Ic)	<i>Limit = 0.95-1.05</i>
Set Point as found zero	(sccm) 5000	Calibrator Lamp Voltage Drive NA	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.2	Limit = 0.95-1.05
Set Point as found zero as found span	(sccm) 5000	Calibrator Lamp Voltage Drive NA	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.2	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point	(sccm) 5000	Calibrator Lamp Voltage Drive NA	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.2	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 5000	Calibrator Lamp Voltage Drive NA 963.6	Calculated concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) 0.2 405.9	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero	(sccm) 5000 5000 5000	Calibrator Lamp Voltage Drive NA 963.6 NA	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0	(ppm) (Ic) 0.2 405.9 0.3	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point	(sccm) 5000 5000 	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0	(ppm) (Ic) 0.2 405.9 0.3 404.9	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point	(sccm) 5000 5000 5000 5000 5000 5000	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0	(ppm) (lc) 0.2 405.9 0.3 404.9 201.2	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	(sccm) 5000 5000 5000 5000 5000 5000 5000	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3 701.3	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0	(ppm) (lc) 0.2 405.9 0.3 404.9 201.2 99.0	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3 701.3 NA	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (Ic) 0.2 405.9 0.3 404.9 201.2 99.0 0.4	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3 701.3 NA	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0	(ppm) (Ic) 0.2 405.9 0.3 404.9 201.2 99.0 0.4 405.9	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3 701.3 NA 963.3	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	(ppm) (Ic) 0.2 405.9 0.3 404.9 201.2 99.0 0.4 405.9 ge Correction Factor	Limit = 0.95-1.05
Set Point as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive NA 963.6 NA 961.7 810.3 701.3 NA 963.3 Previous response	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	(ppm) (Ic) 0.2 405.9 0.3 404.9 201.2 99.0 0.4 405.9 ge Correction Factor *% change	Limit = 0.95-1.05

Notes:

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

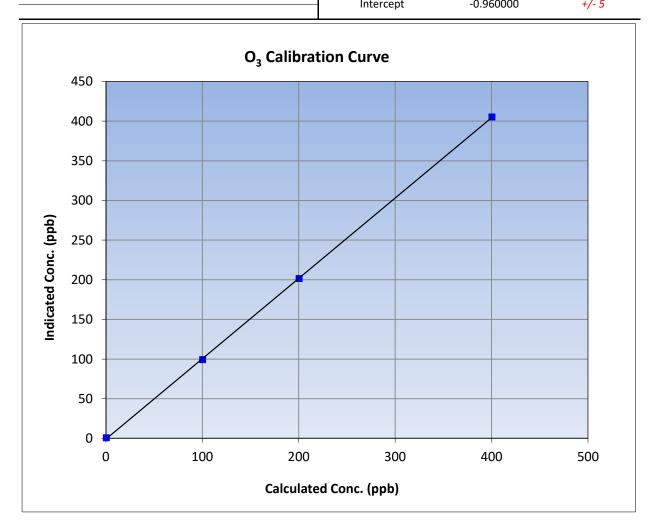
Calibration Performed By:

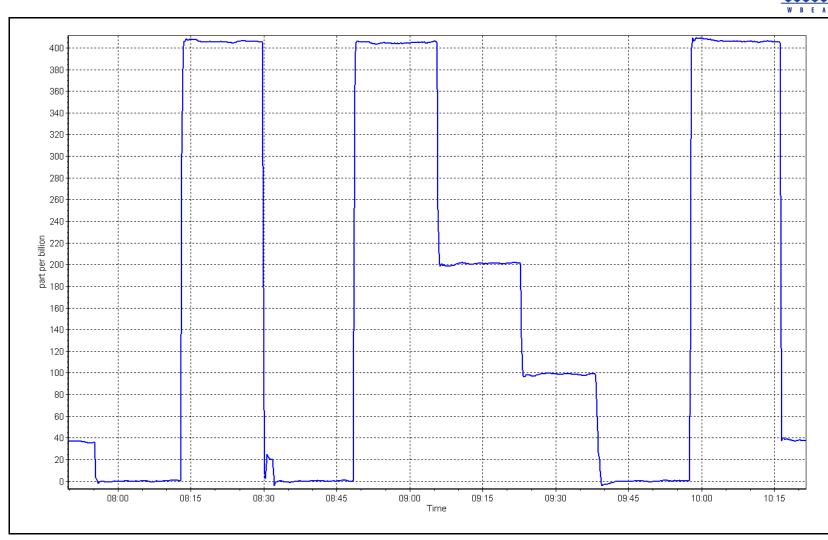
Morgan Voyageur



O₃ Calibration Summary

WBEA					Version-01-
		Station	Information		
Calibration Date:	April 12,	2023	Previous Calibration:	March	13, 2023
Station Name:	Fort Chip	ewyan	Station Number:	AN	/IS08
Start Time (MST):	7:5	2	End Time (MST):	10	0:19
Analyzer make:	nalyzer make: Teledyne API T		Analyzer serial #:	3	872
Calculated concentration	Indicated concentration		ration Data		
Calculated concentration		Correction factor	Statistical Evalua	ation	Limits
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)			
0.0	0.3		Correlation Coefficient	0.999955	≥ <i>0.995</i>
400.0	404.9	0.9879		0.000000	20.000
200.0	201.2	0.9940	Slope	1.013200	0.90 - 1.10
100.0	99.0	1.0101	Siope	1.013200	0.90 - 1.10
			Intercept	-0.960000	+/- 5





Location: Fort Chipewyan



T640 PM_{2.5} CALIBRATION

Calibration Date: April 26, 2023 End time (MST): 1:24 Analyzer Make: API S. End time (MST): 11:24 Analyzer Make: API S. End time (MST): 11:24 Analyzer Make: PM2.5 Flow Meter Make/Model: Delta Cal S/N: 212 Temp/RH standard: Delta Cal S/N: 1212 Monthly Calibration Test Parameter As found Y.2, 7 2.9 (Limits) flow (LPM) 4.99 4.33 4.99 +/- 10 mmHg flow (LPM) 4.99 4.33 4.99 +/- 10 mmHg flow (LPM) 4.99 4.33 4.99 (Limits) (Action 13, 2023) PM w/o HEPA: 0.1 PM w/ IERA Inlet Cleaning : Inlet Head (Limits) PM w/o HEPA: w/ HEPA: (Limits) PMT Peak Test Post-maintenance leak check Inlet cleaning : Inlet Head (Limits) PMT Peak Test PM w/o HEPA: w/ HEPA: (Limits) PMT Peak Test PM w/o HEPA: w/ HEPA: (Limits) Date Optical Chamber Cleaned: March 13, 2023 w/ HEPA: (Limits) Disposable Filter Changed: March 13, 2023 (w/ HEPA: (Jaster HEPA) Date Sample Tube Cleaned: July 14, 2022 (July 14, 2022	WDEA					Version-01-2023
Calibration Date: April 26, 2023 Last Cal Date: March 13, 2023 Start time (MST): 12:41 End time (MST): 11:24 Analyzer Make: API PM2.5 Flow Meter Make/Model: Delta Cal S/N: 216 Particulate Fraction: PM2.5 Flow Meter Make/Model: Delta Cal S/N: 1212 <u>Parameter As found Yang As left Adjusted (Limits)</u> T (°C) 2.9 2.7 2.9 or you have a stel of the second of the secon			Station Information	1		
Start time (MST): 12:41 End time (MST): 11:24 Analyzer Make: API Particulate Fraction: PM2.5 Flow Meter Make/Model: Delta Cal S/N: 216 Temp/RH standard: Delta Cal S/N: 1212 Monthly Calibration Test Parameter As found Measured As left Adjusted (Limits) r (°C) 2.9 2.7 2.9 P (mmHg) 733.0 724.3 733.0 · · · · 10 mmHg flow (LPM) 4.99 4.33 4.99 · · · · · 0.1 PM (March 13, 2023) PM w/o HEPA: 0.1 PM (March 13, 2023) · · · · 0.2 ug/m3 Note: this leak check will be completed before the quarterity work and will serve as the pre maintenance leak check Inlet Cleaning : Inlet Head · · · · · · · · · · · · · · · · · · ·	Station Name:	Fort Chipewyan		Station number:	AMS 08	
Analyzer Make: API S.M.: 213 Particulate Fraction: PM2.5 Flow Meter Make/Model: Delta Cal S.M.: 1212 Temp/RH standard: Delta Cal S.M.: 1212 Monthly Calibration Test Measured As left Adjusted (Limits) T (°C) 2.9 2.7 2.9 -/-2°C +/-10 mmHg Monthly Calibration Test Measured As left Adjusted (Limits) +/-2°C P (mmHg) 733.0 724.3 733.0 -/-2°C +/-10 mmHg +/-0.25 DM Leak Test: Date of check: April 26,2023 Last Cal Date: March 13,2023 -02.0g/m3 Note: Inlet Cleaning : Inlet Head - <	Calibration Date:	April 26, 2023		Last Cal Date:	March 13, 2023	
Particulate Fraction: PM2.5 Flow Meter Make/Model: Delta Cal S/N: 1212 Temp/RH standard: Delta Cal S/N: 1212 Monthly Calibration Test Parameter As found Measured As left Adjusted (limits) T (°C) 2.9 2.7 2.9 4/-2 °C P (mmHg) 733.0 724.3 733.0 4/-2 °C P (mmHg) 733.0 724.3 733.0 6/-4/-10 mmHg flow (LPM) 4.99 4.33 4.99 6/-0 25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 PM w/o HEPA: 0.1 PM w/ HEPA: 0.0 color 20 g/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet cleaning : Inlet Head 6/- PM model PA (Color 20 g/m3) PM model PLA (Color 20 g/m3) PM model PLA (Color 20 g/m3) PM model PLA (Color 20 g/m3) Note: The standard (Limits) (Limits) PM model PLA (Color 20 g/m3) PM model PLA (Color 20	Start time (MST):	12:41		End time (MST):	11:24	
Particulate Fraction: PM2.5 Flow Meter Make/Model: Delta Cal S/N: 1212 Temp/RH standard: Delta Cal S/N: 1212 Monthly Calibration Test Parameter As found Measured As left Adjusted (limits) T (°C) 2.9 2.7 2.9 4/-2 °C P (mmHg) 733.0 724.3 733.0 4/-2 °C P (mmHg) 733.0 724.3 733.0 6/-4/-10 mmHg flow (LPM) 4.99 4.33 4.99 6/-0 25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 PM w/o HEPA: 0.1 PM w/ HEPA: 0.0 color 20 g/m3 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet cleaning : Inlet Head 6/- PM model PA (Color 20 g/m3) PM model PLA (Color 20 g/m3) PM model PLA (Color 20 g/m3) PM model PLA (Color 20 g/m3) Note: The standard (Limits) (Limits) PM model PLA (Color 20 g/m3) PM model PLA (Color 20	Analyzer Make:	ΔΡΙ		s/N·	216	
Temp/RH standard: Delta Call S/N: 1212 Monthly Callbration Test T (°C) As found Measured As left Adjusted (Limits) T (°C) 2.9 2.7 2.9 - +/- 2°C P (mmHg) 733.0 724.3 733.0 - +/- 2°C P (mmHg) 4.99 4.33 4.99 - +/- 0.25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 - - - - - - - - - - 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 Outerly Calibration Test - - - 11.3 +/- 0.5 PMT Peak Test Inlet Head Post maintenance As left Adjusted (Limits) - 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: w/w/ HEPA: - - - - - - - - - - - - - - - - - -	Particulate Fraction:			5/14.	210	
Temp/RH standard: Delta Call S/N: 1212 Monthly Callbration Test T (°C) As found Measured As left Adjusted (Limits) T (°C) 2.9 2.7 2.9 - +/- 2°C P (mmHg) 733.0 724.3 733.0 - +/- 2°C P (mmHg) 4.99 4.33 4.99 - +/- 0.25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 - - - - - - - - - - 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 Outerly Calibration Test - - - 11.3 +/- 0.5 PMT Peak Test Inlet Head Post maintenance As left Adjusted (Limits) - 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: w/w/ HEPA: - - - - - - - - - - - - - - - - - -	Flow Meter Make/Model:	Delta Cal		S/N:	1212	
Parameter As found Measured As left Adjusted (Limits) T (°C) 2.9 2.7 2.9 +/-2°C +/-2°C P (mmHg) 733.0 724.3 733.0 +/-10°C +/-2°C P (mmHg) 733.0 724.3 733.0 +/-10°C +/-10°C flow (LPM) 4.99 4.33 4.99 +/-0.25 LPM +/-0.25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 - <	Temp/RH standard:	Delta Cal				
Parameter As found Measured As left Adjusted (Limits) T (°C) 2.9 2.7 2.9 +/-2°C +/-2°C P (mmHg) 733.0 724.3 733.0 +/-10°C +/-2°C P (mmHg) 733.0 724.3 733.0 +/-10°C +/-10°C flow (LPM) 4.99 4.33 4.99 +/-0.25 LPM +/-0.25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 - <			Monthly Calibration To	est		
P (mmHg) 733.0 724.3 733.0 - +/- 10 mmHg flow (LPM) 4.99 4.33 4.99 - +/- 10 mmHg Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023	Parameter	As found			Adjusted	(Limits)
P (mmHg) 733.0 724.3 733.0 - +/- 10 mmHg flow (LPM) 4.99 4.33 4.99 - +/- 10 mmHg Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023	T (°C)	2.9	2.7	2.9		+/- 2 °C
flow (LPM) 4.99 4.33 4.99 -/- 0.25 LPM Leak Test: Date of check: April 26, 2023 Last Cal Date: March 13, 2023 Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check 0.0 <0.2 ug/m3		733.0	724.3	733.0		+/- 10 mmHg
PM w/o HEPA: 0.1 PM w/ HEPA: 0.0 <0.2 ug/m3		4.99	4.33	4.99		+/- 0.25 LPM
Note: this leak check will be completed before the quarterly work and will serve as the pre maintenance leak check Inlet deaning : Inlet Head Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test Inlet Head Inlet Head Inlet Head Inlet Head Inlet Head Inlet Head Post-maintenance leak check: PM w/o HEPA: w/ HEPA: w/ HEPA: • <td>Leak Test:</td> <td>Date of check:</td> <td>April 26, 2023</td> <td>Last Cal Date:</td> <td>March 13, 2023</td> <td></td>	Leak Test:	Date of check:	April 26, 2023	Last Cal Date:	March 13, 2023	
Inlet cleaning : Inlet Head Parameter As found PMT Peak Test Post maintenance Post-maintenance leak check: PM w/o HEPA: Date Optical Chamber Cleaned: March 13, 2023 Disposable Filter Changed: March 13, 2023 March 13, 2023 Date Sample Tube Cleaned: July 14, 2022 Date Sample Tube Cleaned: July 14, 2022 July 14, 2022 July 14, 2022 Notes: No adjustments made.			-	-		<0.2 ug/m3
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test II.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: w/ HEPA: Date Optical Chamber Cleaned: March 13, 2023 <-0.2 ug/m3	Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre mai	intenance leak check	
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test	Inlet cleaning :	Inlet Head				
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test						
Parameter As found Post maintenance As left Adjusted (Limits) PMT Peak Test						
PMT Peak Test 11.3 +/- 0.5 Post-maintenance leak check: PM w/o HEPA: w/ HEPA: Date Optical Chamber Cleaned: March 13, 2023 <0.2 ug/m3						
Post-maintenance leak check: PM w/o HEPA: w/ HEPA: Date Optical Chamber Cleaned: March 13, 2023 <0.2 ug/m3	Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	Adjusted	(Limits)
Date Optical Chamber Cleaned: March 13, 2023 <0.2 ug/m3	PMT Peak Test					11.3 +/- 0.5
Disposable Filter Changed: March 13, 2023 Annual Maintenance Date Sample Tube Cleaned: July 14, 2022 Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.	Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Annual Maintenance Date Sample Tube Cleaned: July 14, 2022 Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.	Date Optical Cham	nber Cleaned:	March 13,	2023	· · · · · · · · · · · · · · · · · · ·	<0.2 ug/m3
Date Sample Tube Cleaned: July 14, 2022 Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.	Disposable Filte	r Changed:	March 13,	2023		
Date Sample Tube Cleaned: July 14, 2022 Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.						
Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.			Annual Maintenance	e		
Date RH/T Sensor Cleaned: July 14, 2022 Notes: No adjustments made.						
Notes: No adjustments made.						
	Date RH/1 Sense	or Cleaned:	July 14, 2	022		
	Notec		hc an	iustments made		
Calibration by: Morgan Voyageur	Notes.					
	Calibration by:	Morgan Voyageur				



CO Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST):	Fort Chipewyan April 21, 2023 7:44		Station number: Last Cal Date: End time (MST):	AMS08 March 13, 2023 12:42	
Reason:	Maintenance				
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	3,030 ALM014846	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc:	3,030	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	5272	
ZAG Make/Model:	API T701H		Serial Number:	197	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	3505	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998892	0.997452	Backgd or Offset:	-0.014	-0.014
Calibration intercept:	0.030961	0.118914	Coeff or Slope:	0.996	1.005
		CO Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.18	
as found span	4933	66.7	40.4	40.6	0.996
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4934	66.7	40.4	40.4	1.001
second point	4967	33.3	20.2	20.4	0.991
third point	4983	16.7	10.1	10.3	0.985
as left zero	5000	0.0	0.0	0.0	
as left span	2960	40.0	40.4	40.1	1.007
			Averag	ge Correction Factor	0.993
Baseline Corr As found:	40.78	Prev response:	40.41	*% change:	0.9%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		·	
•				* = > +/-5% change initiate	

Notes:

Changed inlet filter after as founds. Adjusted the zero and span. Pump failed on multi-point as found, replaced pump.

Calibration Performed By:

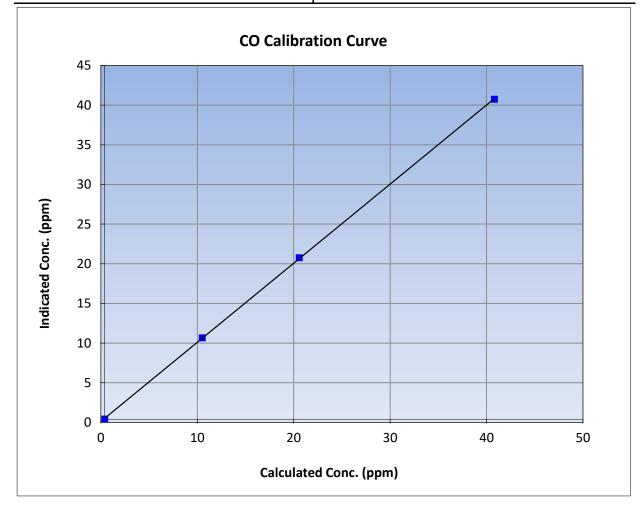


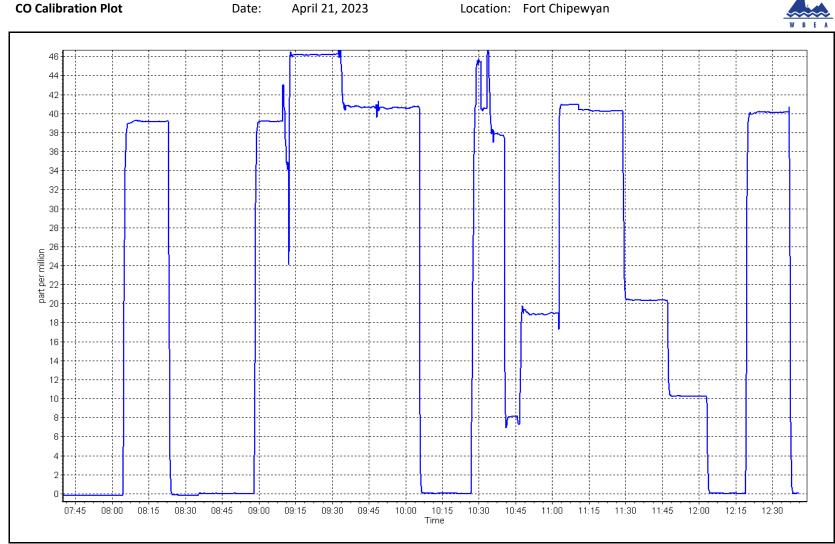
CO Calibration Summary

WBEA			Version-01-2020
	Stat	on Information	
Calibration Date:	April 21, 2023	Previous Calibration:	March 13, 2023
Station Name:	Fort Chipewyan	Station Number:	AMS08
Start Time (MST):	7:44	End Time (MST):	12:42
Analyzer make:	API T300	Analyzer serial #:	3505

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999965	≥0.995	
40.4	40.4	1.0014	Correlation Coerricient	0.999900	20.995	
20.2	20.4	0.9911	Slope	0.997452	0.90 - 1.10	
10.1	10.3	0.9854	Slope	0.997452	0.90 - 1.10	
			Intercept	0.118914	+/-1.5	







CO₂ Calibration Report

Version-01-2020

					version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Chipewyan April 21, 2023 12:55 Routine		Station number: Last Cal Date: End time (MST):	AMS08 March 12, 2023 15:39	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	60,220 ALM014846	ppm	Cal Gas Exp Date:	December 1, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	60,220 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: N2 Gen Make/Model:	Teledyne API T700 NG 5000		Serial Number: Serial Number:	5272 771048318	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range	Teledyne API T360 0 - 2,000 ppm		Analyzer serial #:	289	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998937 -4.820000	<u>Finish</u> 0.992226 -4.080000	Backgd or Offset: Coeff or Slope:	<u>Start</u> 0.006 1.018	<u>Finish</u> 0.006 1.018
		CO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/le Limit = 0.95-1.05
as found zero	3000	0.0	0.0	0.0	
as found span	2920	80.0	1605.9	1594.0	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	3000	0.0	0.0	0.6	
high point	2920	80.0	1605.9	1595.4	1.007
second point	2960	40.0	802.9	779.0	1.031
third point	2980	20.0	401.5	397.1	1.011
as left zero	3000	0.0	0.0	0.2	
as left span	2960	40.0	802.9	774.8	1.036 1.016
	450 - 55		-	ge Correction Factor	
Baseline Corr As found:	1594.00	Prev response:	1599.34	*% change:	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

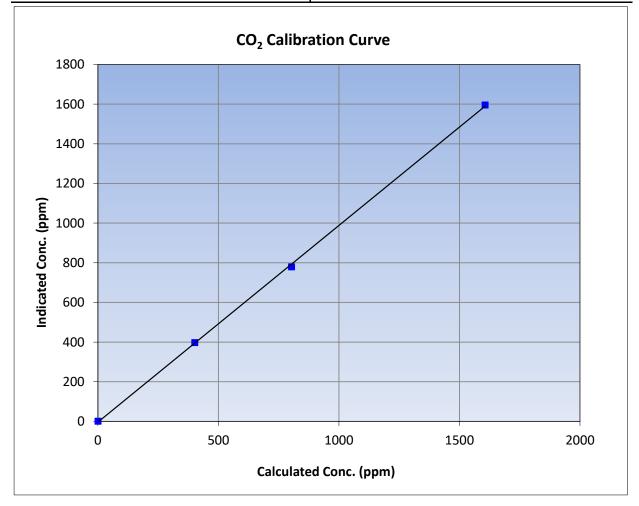
Sample inlet filter changed after as founds. no adjustments made

Calibration Performed By:



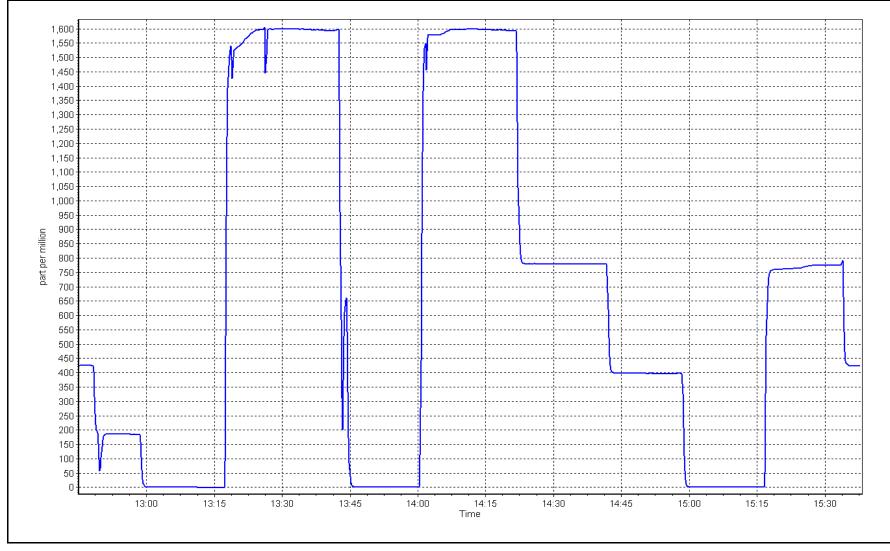
CO₂ Calibration Summary

WBEA					Version-01-202
		Station	Information		
Calibration Date	April 21	, 2023	Previous Calibration	March	12, 2023
Station Name	Fort Chip	ewyan	Station Number	AN	1508
Start Time (MST)	12:5	55	End Time (MST)	15	5:39
Analyzer make	Teledyne A	Teledyne API T360 Analyzer serial #		2	89
		Calibi	ration Data		
Calculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999818	≥0.995
1605.9	1595.4	1.0066	correlation coefficient	0.999818	20.333
802.9	779.0	1.0307	Slope	0.992226	0.90 - 1.10
401.5	397.1	1.0110	0.000	0.002220	0.00 1.10
			Intercept	-4.080000	+/-20











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS09 BARGE LANDING APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing April 11, 2023 9:28 Routine		Station number: Last Cal Date: End time (MST):	AMS09 March 10, 2023 13:11	
		Calibration St	andards		
Cal Gas Concentration:	49.96	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #:	CC151285		Dave Cas Eve Data		
Removed Cal Gas Conc: Removed Gas Cyl #:	49.96 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	API T700		Serial Number:	3812	
ZAG Make/Model:	API 1700 API 1701		Serial Number:	4888	
			Schul Wumber.	4000	
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1118148498	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.001709	0.998843	Backgd or Offset:	9.7	9.7
Calibration intercept:	0.631572	-0.089025	Coeff or Slope:	0.986	0.986
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4919	80.2	801.5	798.6	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.3	
high point	4919	80.2	801.5	801.0	1.001
second point	4959	40.1	400.8	399.0	1.004
third point	4980	20.0	199.8	199.8	1.000
as left zero	5000	0.0	0.0	0.3	
as left span	4919	80.2	801.5	795.7	1.007
			Averag	ge Correction Factor	1.002
		. .	803.49	*% change	-0.6%
Baseline Corr As found:	798.50	Previous response	003.45	70 change	0.070
Baseline Corr As found: Baseline Corr 2nd AF pt:	798.50 NA	AF Slope:		AF Intercept:	0.070

Notes:

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

Calibration Performed By:



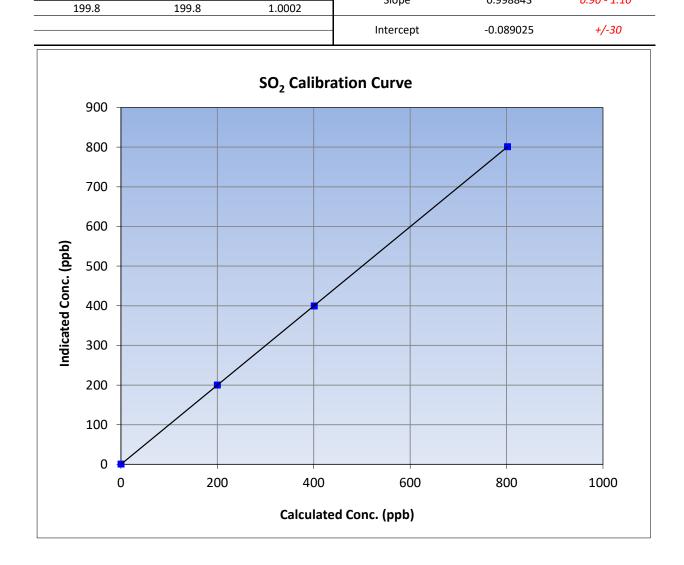
SO₂ Calibration Summary

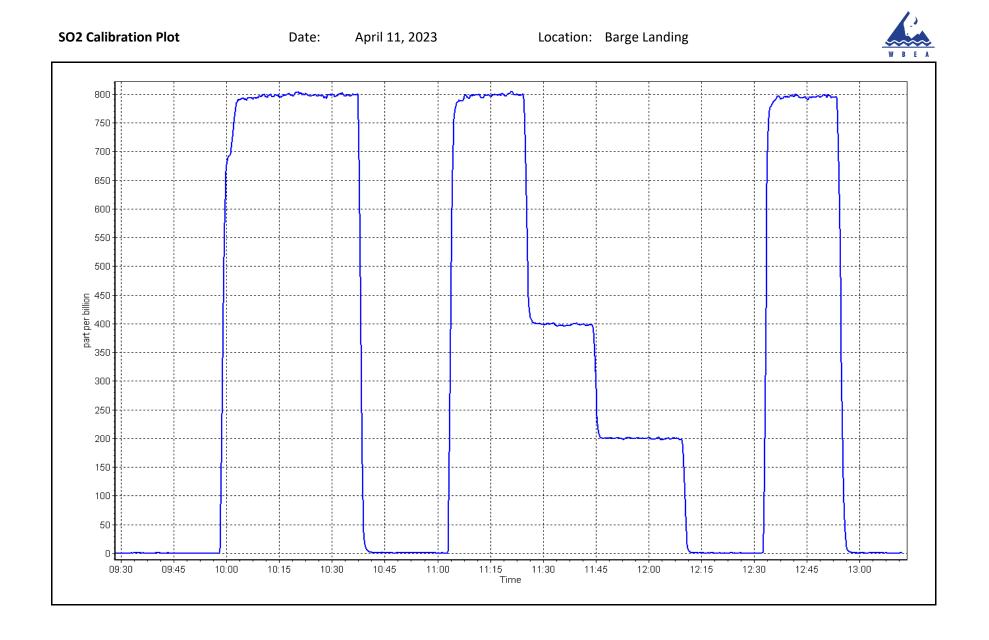
Slope

0.998843

0.90 - 1.10

WBEA					Version-01-20	
		Station	Information			
Calibration Date:	April 11,	2023	Previous Calibration:	March	10, 2023	
Station Name:	Barge La	inding	Station Number:	AM	1509	
Start Time (MST):	9:2	8	End Time (MST):	13	3:11	
nalyzer make: Thermo 43i		o 43i	Analyzer serial #: 111		8148498	
		Calibi	ration Data			
		Correction factor (Cc/Ic)	Statistical Evalua	ition	<u>Limits</u>	
0.0	0.3		Correlation Coefficient	0.999994	≥0.995	
801.5	801.0	1.0006	Correlation Coefficient	0.5559994	≥0.995	
400.8	399.0	1.0044	Slone	0 998843		







TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing April 17, 2023 9:36 Routine		Station number: Last Cal Date: End time (MST):	AMS09 March 23, 2023 15:01	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.87 EY0002346	ppm	Cal Gas Exp Date:	September 2, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	4.87 NA API T700 API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3812 4888	
	AFTIYOI		Senai Number.	4000	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1331259320 519	
	<u>Start</u>	<u>Finish</u>		Start	Finish
Calibration slope: Calibration intercept:	1.006146 0.019102	1.008720 0.079030	Backgd or Offset: Coeff or Slope:		2.78 1.137
		TRS As Fou	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4918	82.1	80.0	78.6	1.017
as found 2nd point	4959	41.1	40.0	39.3	1.019
as found 3rd point	4979	20.5	20.0	19.7	1.014
new cylinder response			-		
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4918	82.1	80.0	80.7	0.991
second point	4959	41.1	40.0	40.5	0.988
third point	4979	20.5	20.0	20.3	0.984
as left zero	5000	0.0	0.0	0.0	
as left span	4918	82.1	80.0	80.6	0.992
SO2 Scrubber Check	4920	80.2	802.0	-0.1	
Date of last scrubber cha	-	28-Feb-23		Ave Corr Factor	0.988
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt:	78.6 39.3	Prev response: AF Slope:	0.982568	*% change: AF Intercept:	-2.4% 0.019097
Baseline Corr 3rd AF pt:	19.7	AF Correlation:	0.999998	* = > +/-5% change initiate	es investigation

Notes:

Changed sample inlet filter after as founds. SOx scrubber check done after calibrator zero. Adjusted span.

Calibration Performed By:

Braiden Boutilier

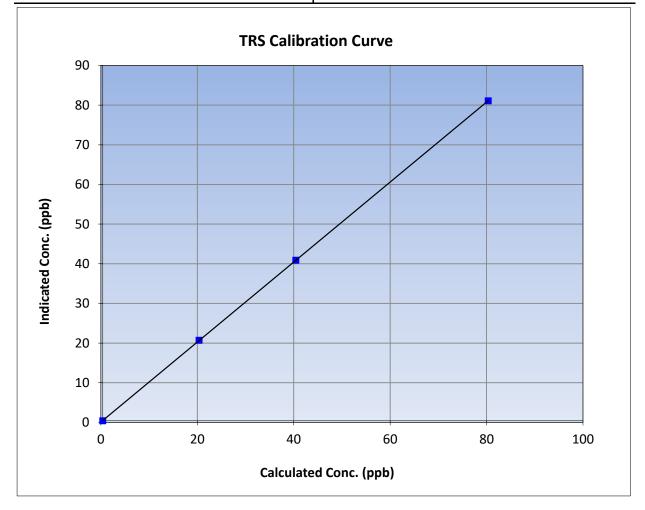


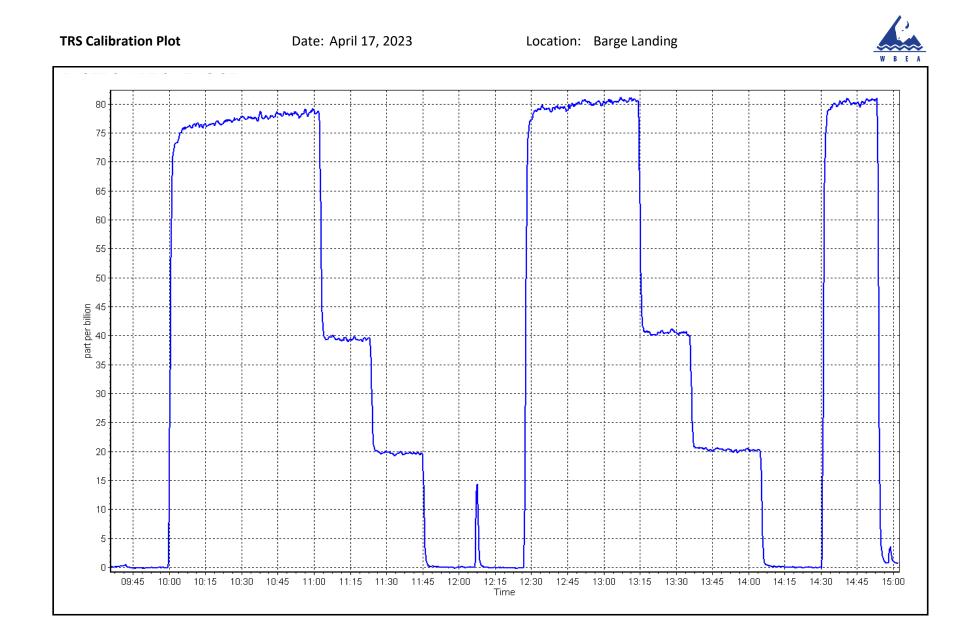
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	April 17, 2023	Previous Calibration:	March 23, 2023					
Station Name:	Barge Landing	Station Number:	AMS09					
Start Time (MST):	9:36	End Time (MST):	15:01					
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1331259320					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999996	≥0.995
80.0	80.7	0.9909	correlation coefficient	0.9999990	20.333
40.0	40.5	0.9884	Slope	1.008720	0.90 - 1.10
20.0	20.3	0.9837	Slope	1.008720	0.30 - 1.10
			- Intercept	0.079030	+/-3







THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-2020			
		St	ation Information					
Station Name:	Barge Landing		Station number: AN	AS09				
Calibration Date:	April 11, 2023	11, 2023 Last Cal Date: March 28, 2023						
Start time (MST):	9:28		End time (MST): 13	:11				
Reason:	Routine							
		Cal	ibration Standards					
Gas Cert Reference:		CC151285	Cal Gas Expiry Date: Ja	nuary 5, 2025				
CH4 Cal Gas Conc.	497.6	ppm	CH4 Equiv Conc.	1067.1	ppm			
C3H8 Cal Gas Conc.	207.1	ppm						
Removed Gas Cert:		NA	Removed Gas Expiry: NA	4				
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: 38	12				
ZAG make/model:	API T701		Serial Number: 48	88				
		An	alyzer Information					
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	93585649				
THC Range (ppm):	: 0 - 100 ppm							
NMHC Range (ppm):	: 0 - 50 ppm		CH4 Range (ppm): 0 -	- 50 ppm				
	<u>Start</u>	<u>Finis</u>	<u>sh</u>	<u>Start</u>	<u>Finish</u>			
CH4 SP Ratio:	2.49E-04	2.49E	-04 NMHC SP Ratio:	4.79E-05	4.79E-05			
CH4 Retention time:	15.2	15.	2 NMHC Peak Area:	190949	190949			

THC Calibration Data									
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05				
as found zero	5000	0.0	0.00	0.00					
as found span	4919	80.2	17.12	17.07	1.003				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4919	80.2	17.12	17.06	1.003				
second point	4960	40.1	8.56	8.54	1.002				
third point	4980	20.0	4.27	4.29	0.995				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	80.2	17.12	17.18	0.996				
			ŀ	Average Correction Factor	1.000				
Baseline Corr AF:	17.07	Prev response	17.08	*% change	-0.1%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	tes investigation				



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.0				
as found span	4919	80.2	9.14	9.08	1.006			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4919	80.2	9.14	9.07	1.007			
second point	4960	40.1	4.57	4.54	1.006			
third point	4980	20	2.28	2.28	0.998			
as left zero	5000	0	0.00	0.00				
as left span	4919	80.2	9.14	9.10	1.004			
			ŀ	Average Correction Factor	1.004			
Baseline Corr AF:	9.08	Prev response	9.13	*% change	-0.5%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation			

СН4	Cal	ibration	Data
CH4	Ca	INIALIOII	Dala

		CH4 Calibra			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	80.2	7.98	7.99	0.999
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	80.2	7.98	8.00	0.998
second point	4960	40.1	3.99	4.00	0.997
third point	4980	20.0	1.99	2.01	0.990
as left zero	5000	0.0	0.00	0.00	
as left span	4919	80.2	7.98	8.08	0.988
			A	verage Correction Factor	0.995
Baseline Corr AF:	7.99	Prev response	7.95	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.997787		0.995837	
THC Cal Offset:		0.002047		0.017643	
CH4 Cal Slope:		0.996643		1.000907	
CH4 Cal Offset:		-0.003745		0.007869	
NMHC Cal Slope:		0.998523		0.991957	
NMHC Cal Offset:		0.006592		0.009575	

Notes:

Changed Nitrogen cylinder and sample inlet filters after as founds. No adjustments made.

Calibration Performed By:



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	April 1	1, 2023	Previous Calibration:	March 2	8, 2023
Station Name:		anding	Station Number:	AMS09	
Start Time (MST):		28	End Time (MST):	13:	
Analyzer make:		no 55i	Analyzer serial #:	11935	
,					
		Calibra	tion Data		
Calculated concentratior (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999994	≥0.995
17.12 8.56	17.06 8.54	1.0035 1.0021			
4.27	4.29	0.9945	Slope	0.995837	0.90 - 1.10
			Intercept	0.017643	+/-0.5
16.0 —				_	
18.0				_	
14.0 —					
14.0					
12.0					
ud 10.0 -					
(bbm) 10.0 5000 8.0					
ouc		×			
9 8.0					
0.6 undicated					
di 0.9 di					
4.0					
2.0					
0.0					
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

Version-01-2020

		a t			Version-01-20
			Information		
Calibration Date:		il 11, 2023	Previous Calibration:	March 2	
Station Name:	Bar	ge Landing	Station Number:	AM	509
Start Time (MST):		9:28	End Time (MST):	13:	11
Analyzer make:	Tł	iermo 55i	Analyzer serial #:	11935	85649
		Calibra	ation Data		
Calculated concentrati (ppm) (Cc)	on Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Eva	luation	<u>Limits</u>
0.00	0.00		- Correlation Coefficient	0.999995	≥0.995
7.98	8.00	0.9985		0.000000	
3.99 1.99	4.00	0.9969 0.9902	Slope	1.000907	0.90 - 1.10
1.35	2.01	0.3302	Interest	0.007860	
			Intercept	0.007869	+/-0.5
9.0 - 8.0 -					
7.0 -					
6.0					
uda 5.0 -					
Ouc 4.0 –					
dicated 3.0 -					
Indicated Conc. (ppm) 3.0 – 2.0 –					
2.0 - 1.0 - 0.0 -					
2.0 - 1.0 -	0 2.0) 4.0	6.0	8.0	10.0



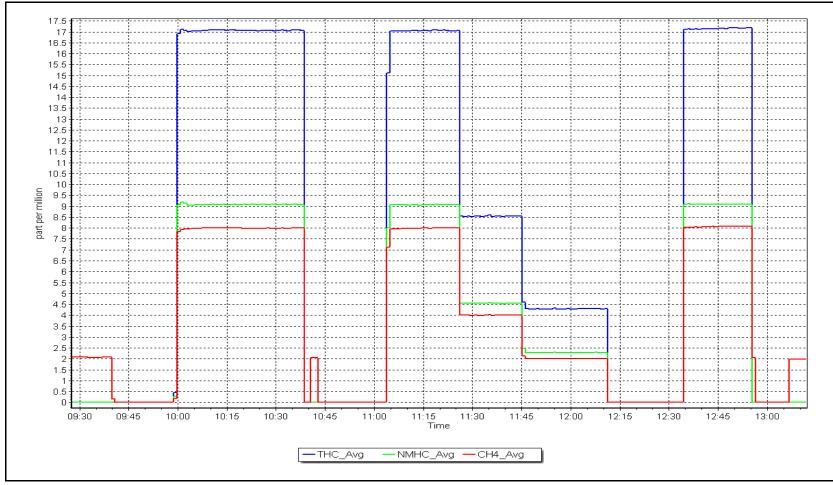
NMHC Calibration Summary

Version-01-2020

			Station I	nformation		
Calibratio	n Date:	April 1	.1, 2023	Previous Calibration:	March 2	8, 2023
tation Na	ame:	Barge	Landing	Station Number:	AMS	509
start Time	e (MST):	9	:28	End Time (MST):	13:	11
Analyzer r	make:	Ther	mo 55i	Analyzer serial #:	11935	85649
			Calibra	ition Data		
	concentratior n) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
	.00	0.00		Correlation Coefficient	0.999994	≥0.995
	.14 .57	9.07 4.54	1.0073 1.0063			
	.28	2.28	0.9979	Slope	0.991957	0.90 - 1.10
				Intercept	0.009575	+/-0.5
(8.0					
Conc. (ppm)	6.0					
onc.	5.0					
_	4.0					
Indicated	3.0					
-	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0









NO Cal Slope:

NO Cal Offset:

NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Barge Landing April 28, 2023 9:38 Routine		Station number: AM Last Cal Date: Ma End time (MST): 14	arch 15, 2023	
		Calibratio	on Standards		
NO Gas Cylinder #:	DT0036634		Cal Gas Expiry Date: Jan	nuary 28, 2024	
NOX Cal Gas Conc:	50.00	ppm	NO Cal Gas Conc:	49.70	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date: NA	L Contraction of the second seco	
Removed Gas NOX Conc:	50.00	ppm	Removed Gas NO Conc:	49.70	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3812	
ZAG make/model:	API T701		Serial Number:	4888	
		Analyzer	Information		
Analyzer make:	Thermo 42i		Analyzer serial #: 142	26262593	
NOX Range (ppb):			- ,		
- ,		Finich		Start	Finich
NO coeff or slope	<u>Start</u> : 1.175	<u>Finish</u> 1.175	NO bkgnd or offset:	<u>Start</u> 10.5	<u>Finish</u> 10.5
NOX coeff or slope		0.995	NOX bkgnd or offset:	10.5	10.5
NO2 coeff or slope		1.000	Reaction cell Press:	179.2	174.9
	1.000	1.000		175.2	174.5
		Calibrati	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	0.998241		0.997105	
NO _x Cal Offset	:	0.748819		0.848780	

1.000056

-0.352413

1.001921

-0.892005

0.996586

-0.413290

1.003813

0.518213



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as found span	4919	80.5	805.1	800.3	4.8	805.0	797.1	7.5	1.000	1.004
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1		
high point	4919	80.5	805.1	800.3	4.8	803.0	797.4	5.5	1.003	1.004
second point	4959	40.2	402.1	399.7	2.4	402.7	397.5	5.2	0.998	1.005
third point	4979	20.1	201.0	199.8	1.2	201.8	198.3	3.6	0.996	1.008
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4919	80.5	805.1	436.9	368.2	802.0	432.9	368.7	1.004	1.009
							Average C	orrection Factor	0.999	1.006
Corrected As fo	und NO _x =	805.0 ppb	NO =	797.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	0.1%
Previous Respo	nse NO _x =	804.4 ppb	NO =	799.9 ppb				*Percent Chang	ge NO =	-0.3%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	795.0	431.6	368.2	369.9	0.995	100.5%
2nd GPT point (200 ppb O3)	795.0	656.9	142.9	144.4	0.990	101.0%
3rd GPT point (100 ppb O3)	795.0	724.6	75.2	76.5	0.983	101.7%
			/	Average Correction Factor	0.990	101.1%

Notes:

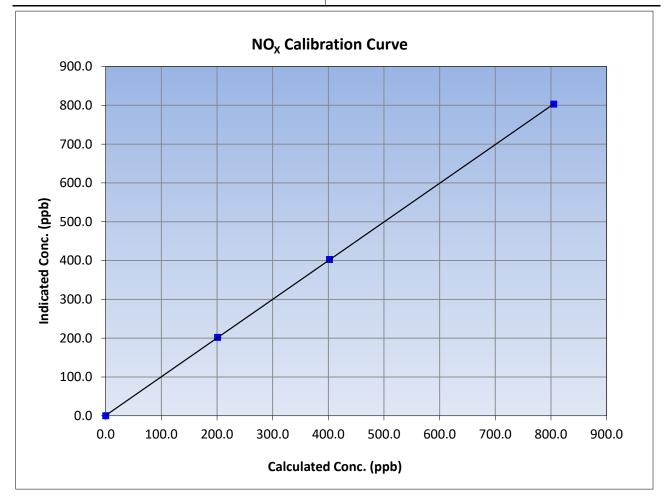
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

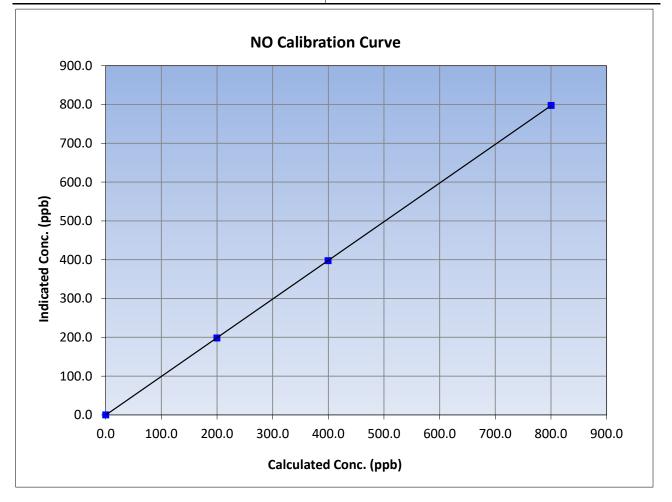
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 2	15, 2023
Station Name:	Barge	Landing	Station Number:	AM	S09
Start Time (MST):	9:38		End Time (MST):	14	:32
Analyzer make:	Thermo 42i		Analyzer serial #:	14262	62593
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)) Statistical Evaluation <u>Lin</u>		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999994	≥0.995
805.1	803.0	1.0026	correlation coefficient	0.555554	20.995
402.1	402.7	0.9984	Clana	0.007105	0.90 - 1.10
201.0	201.8	0.9962	Slope	0.997105	0.90 - 1.10
			Intercept	0.848780	+/-20





NO Calibration Summary

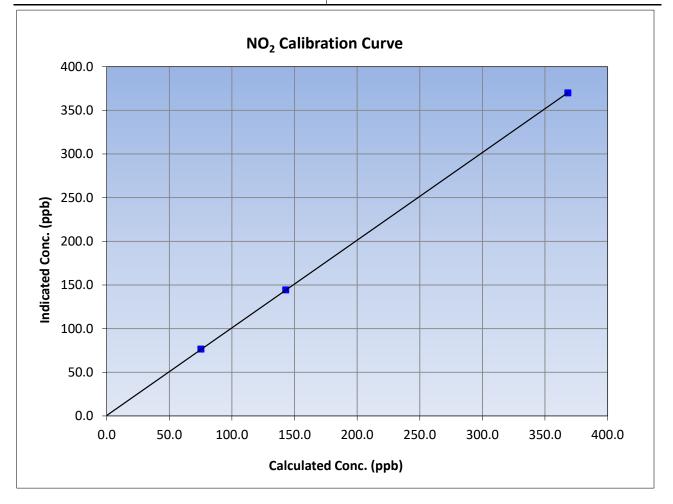
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 1	5, 2023
Station Name:	Barge	Landing	Station Number:	AM	S09
Start Time (MST):	9:38		End Time (MST):	14	:32
Analyzer make:	nake: Thermo 42i		Analyzer serial #: 14262		262593
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	c) Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999998	≥0.995
800.3	797.4	1.0036	correlation coefficient	0.555558	20.995
399.7	397.5	1.0054	Slopp	0.996586	0.90 - 1.10
199.8	198.3	198.3 1.0077 Slope	0.990580	0.90 - 1.10	
			Intercept	-0.413290	+/-20

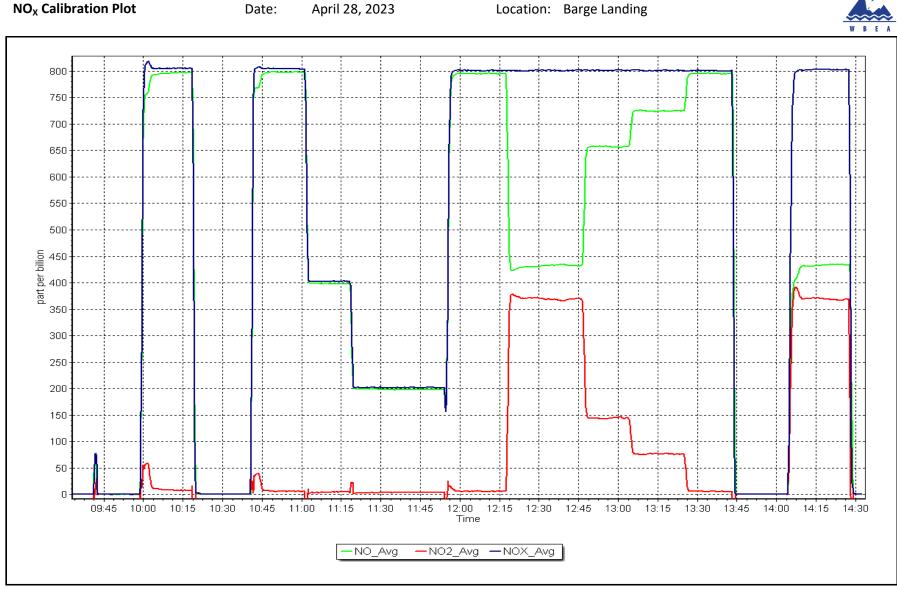




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 1	15, 2023
Station Name:	Barge I	Landing	Station Number:	AM	S09
Start Time (MST):	9:38		End Time (MST):	14	:32
Analyzer make:	Thermo 42i		Analyzer serial #:	14262	62593
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (lc)	Correction factor (Cc/lc)	Ic) Statistical Evaluation		<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999989	≥0.995
368.2	369.9	0.9955	correlation coefficient	0.999909	20.995
142.9	144.4	0.9898	Slope	1.003813	0.90 - 1.10
75.2	76.5	0.9834	Slope	1.005615	0.90 - 1.10
			Intercept	0.518213	+/-20





April 28, 2023

Location: Barge Landing



T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Information			
Station Name:	Barge Landing		Station number:	AMS 09	
Calibration Date:	April 28, 2023		Last Cal Date:	March 23, 2023	
Start time (MST):	11:18		End time (MST):	11:48	
Analyzer Make:	API T640		S/N:	321	
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 Te	est		
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
Т ([°] С)	14.3	15.60	14.3		+/- 2 °C
P (mmHg)	733.8	735.67	733.8		+/- 10 mmHg
flow (LPM)	5.00	4.901	5.00		+/- 0.25 LPM
Leak Test:	Date of check:	April 28, 2023	Last Cal Date:	March 23, 2023	
	PM w/o HEPA:	1.8	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre ma	intenance leak check	
Inlet cleaning :	Inlet Head	\checkmark			
		Quarterly Calibration T	est		
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	-	-	-		11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	_
Date Optical Cham		February 28,	2023	wy ner A.	<0.2 ug/m3
Disposable Filte		February 28,			1012 06/110
		Annual Maintenance	2		
Date Sample Tul	be Cleaned:	November 15	<i>,</i> 2022		
Date RH/T Sense	or Cleaned:	November 15	5, 2022		
	N	o adjustments made. Cle	aned inlet head. Le	eak check passed.	
Notes:		-		-	
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS11 LOWER CAMP APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Lower Camp April 11, 2023 9:50 Routine		Station number: Last Cal Date: End time (MST):	AMS11 March 7, 2023 12:47	
	Calibration St	andards		
49.25	ppm	Cal Gas Exp Date:	February 23, 2025	
		Dave Cas Fire Data		
	ppm		NA	
		-	2007	
		Scharwaniser.	150	
	Analyzer Info	rmation		
: Thermo 43i e 0 - 1000 ppb		Analyzer serial #:	100841398	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
0.995374	0.995416	Backgd or Offset:	14.0	14.3
-0.208611	-0.748519	Coeff or Slope:	1.051	1.051
	SO ₂ Calibratio	on Data		
Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)		Correction factor (Cc/Ic) Limit = 0.95-1.05
5000	0.0	0.0	0.3	
4919	81.3	800.8	793.7	1.009
				1.004
				1.012
				1.010
4919	81.3			1.008
		Averag	se correction Factor	1.009
793.40	•		*% change	-0.4%
NA	AF Slope:		AF Intercept:	
NA	AF Correlation:			
	April 11, 2023 9:50 Routine 49.25 CC2216 49.25 NA Teledyne API T700 Teledyne API T700 Teledyne API T700 Teledyne API T700 Teledyne API T700 Teledyne API T700 Tolution air flow rate 0.995374 -0.208611 Dilution air flow rate (sccm) 5000 4919 5000 4919 5000 4919 4959 4980 5000 4919	Lower Camp April 11, 2023 9:50 Routine 49.25 ppm CC2216 49.25 ppm NA Teledyne API T700 Teledyne API T700 Teledyne API T701 5000 ppb 5000 pp5374 0.995374 0.995416 -0.208611 5000 0.0 5000 0.0 5000 0.0 4919 81.3 5000 0.0 4919 81.3 4959 40.7 4980 20.3 5000 0.0 4919 81.3	April 11, 2023 Last Cal Date: 9:50 End time (MST): Routine Cal Gas Exp Date: 49.25 ppm Cal Gas Exp Date: CC22166 ppm Rem Gas Exp Date: 49.25 ppm Rem Gas Exp Date: NA Diff between cyl: Serial Number: Teledyne API T700 Serial Number: Teledyne API T701 Serial Number: Start Finish 0.995374 0.995416 0.995374 0.995416 0.995374 0.995416 0.995374 0.995416 Source gas flow rate Calculated (sccm) Coeff or Slope: Dilution air flow rate Source gas flow rate Calculated (sccm) 0.0 0.0 4919 81.3 800.8 4919 81.3 800.8 4959 40.7 400.9 4959 40.7 400.9 4959 40.7 400.9 4959 40.7 400.9 4959 40.7 400.9 4959 <td>Lower Camp April 11, 2023 9:50 Station number: AMS11 March 7, 2023 End time (MST): March 7, 2023 March 7, 2023 End time (MST): Routine Calibration Standards I2:47 49.25 ppm Cal Gas Exp Date: February 23, 2025 CC2216 9.25 ppm Rem Gas Exp Date: NA 9.50 ppm Rem Gas Exp Date: NA 11 Diff between cyl: 3807 Teledyne API T700 Serial Number: 3807 Teledyne API T701 Serial Number: 196 Thermo 43i Analyzer Information 196 Start Finish 0.995416 Backgd or Offset: 14.0 0.995374 0.995416 Backgd or Offset: 14.0 0.995416 Backgd or Offset: 14.0 0.208611 -0.748519 Coeff or Slope: 1.051 Dilution air flow rate (sccm) Source gas flow rate (sccm) (sccm) (ppb) (lc) (ppb) (lc) 5000 0.0 0.0 0.6 393.7 4919 81.3 800.8 793.7 4919 81.3 800.8</td>	Lower Camp April 11, 2023 9:50 Station number: AMS11 March 7, 2023 End time (MST): March 7, 2023 March 7, 2023 End time (MST): Routine Calibration Standards I2:47 49.25 ppm Cal Gas Exp Date: February 23, 2025 CC2216 9.25 ppm Rem Gas Exp Date: NA 9.50 ppm Rem Gas Exp Date: NA 11 Diff between cyl: 3807 Teledyne API T700 Serial Number: 3807 Teledyne API T701 Serial Number: 196 Thermo 43i Analyzer Information 196 Start Finish 0.995416 Backgd or Offset: 14.0 0.995374 0.995416 Backgd or Offset: 14.0 0.995416 Backgd or Offset: 14.0 0.208611 -0.748519 Coeff or Slope: 1.051 Dilution air flow rate (sccm) Source gas flow rate (sccm) (sccm) (ppb) (lc) (ppb) (lc) 5000 0.0 0.0 0.6 393.7 4919 81.3 800.8 793.7 4919 81.3 800.8

Notes:

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

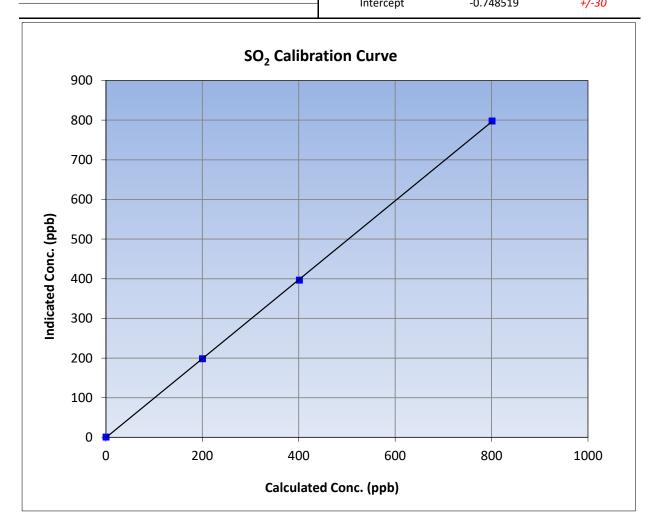
Calibration Performed By:

Mohammed Kashif



SO₂ Calibration Summary

WBEA					Version-01-20	
		Station	Information			
Calibration Date:	April 11,	2023	Previous Calibration:	March	7, 2023	
Station Name:	Lower (Camp	Station Number:	AM	1511	
Start Time (MST):	9:5	0	End Time (MST):		12:47	
Analyzer make:	Thermo	o 43i	Analyzer serial #:	1008	41398	
		Calibi	ration Data			
Calculated concentration		Correction factor	Statistical Evalua	ation	Limits	
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)				
0.0	0.6		Correlation Coefficient	0.999977	≥0.995	
800.8	797.5	1.0041	correlation coefficient	0.555577	20.000	
400.9	396.2	1.0119	Slope	0.995416	0.90 - 1.10	
199.9	197.9	1.0103	Siope	0.555410	0.00 - 1.10	
			Intercept	-0.748519	+/-30	





SO2 Calibration Plot

Location: Lower Camp



H₂S Calibration Report

WBEA		-			Version-11-2
		Station Info	rmation		VC13I011-11-2
Station Name: Calibration Date: Start time (MST): Reason:	Lower Camp April 13, 2023 8:42 Routine		Station number: Last Cal Date: End time (MST):	AMS11 March 28, 2023 12:19	
		Calibration S	tandards		
Cal Gas Concentration:	5.429	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	CC501097 5.429 NA API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3807 196	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450iQ NA 0 - 100 ppb		Analyzer serial #: Converter serial #:	CM20080003 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.026375 0.532956	1.015352 0.293967	Backgd or Offset: Coeff or Slope:		14.0 1.043
		H ₂ S As Four	nd Data		
Set Point	Dilution 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 span	4926	73.6	79.9	80.8	0.993
as found 2nd point	4963	36.8	40.0	40.4	0.996
as found 3rd point	4982	18.6	20.2	20.3	1.010
new cylinder response					
		H ₂ S Calibrati	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction facto (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.4	
high point	4926	73.6	79.9	81.5	0.981
second point	4963	36.8	40.0	40.8	0.979
third point	4982	18.6	20.2	20.7	0.976
as left zero	5000	0.0	0.0	0.5	
as left span	4926	73.6	79.9	81.4	0.982
O2 Scrubber Check	4919	81.1	811.0	0.0	
Date of last scrubber cha	-			Ave Corr Factor	0.979
Date of last converter eff	iciency test:				efficiency
Baseline Corr As found:	80.5	Prev response:	82.56	*% change:	-2.6%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	40.1 20.0	AF Slope: AF Correlation:	1.008475	AF Intercept:	0.134769
basenne con siù Ar pl:	20.0	AF COITEIdtiON:	0.333300	* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

Mohammed Kashif

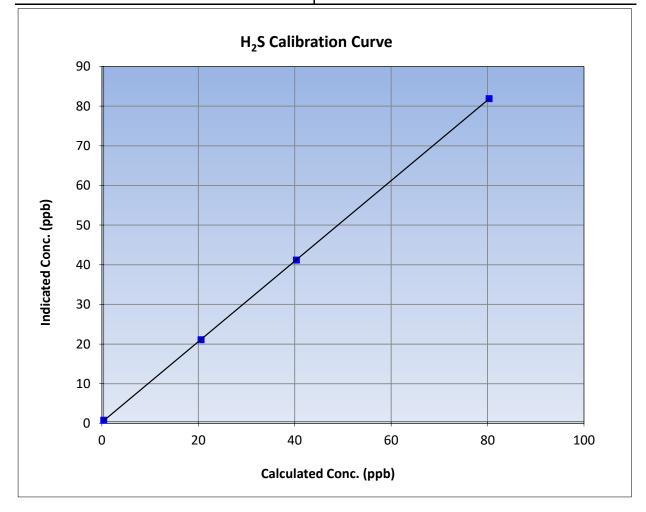


H₂S Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	April 13, 2023	Previous Calibration:	March 28, 2023					
Station Name:	Lower Camp	Station Number:	AMS11					
Start Time (MST):	8:42	End Time (MST):	12:19					
Analyzer make:	Thermo 450iQ	Analyzer serial #:	CM20080003					

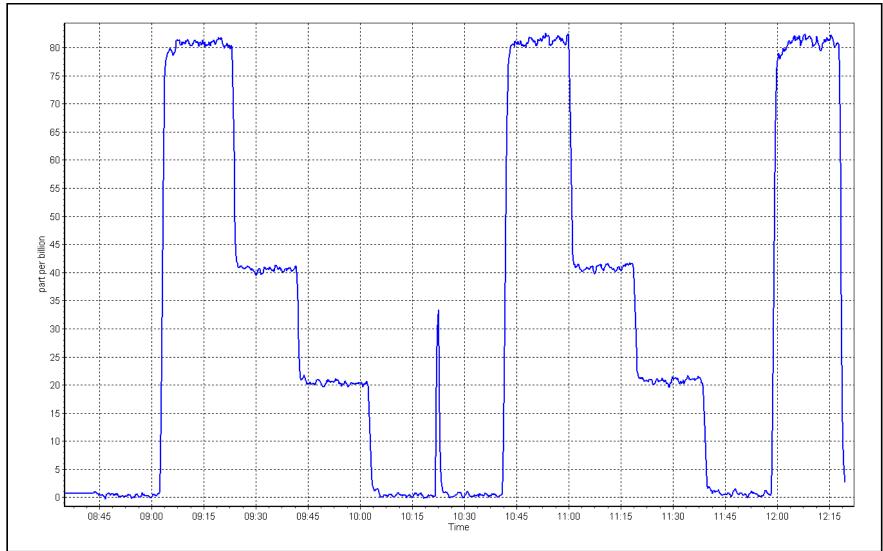
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999992	≥0.995
79.9	81.5	0.9806	correlation coefficient	0.999992	20.333
40.0	40.8	0.9794	Slope	1.015352	0.90 - 1.10
20.2	20.7	0.9755	Slope	1.015552	0.90 - 1.10
			- Intercept	0.293967	+/-3











THC / CH_4 / NMHC Calibration Report

WBEA					Version-01-2020
		Stat	tion Information		
Station Name:	Lower Camp		Station number: AI	MS11	
Calibration Date:	April 11, 2023		Last Cal Date: M	arch 7, 2023	
Start time (MST):	9:50		End time (MST): 12	2:47	
Reason:	Routine				
		Calik	oration Standards		
Gas Cert Reference:		CC2216	Cal Gas Expiry Date: Fe	bruary 23, 202	25
CH4 Cal Gas Conc.	502.0	ppm	CH4 Equiv Conc.	1067.1	ppm
C3H8 Cal Gas Conc.	205.5	ppm			
Removed Gas Cert:			Removed Gas Expiry:		
Removed CH4 Conc.	502.0	ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):		
Diff between cyl (CH ₄)	:		Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number: 38	307	
ZAG make/model:	API T701		Serial Number: 19	96	
		Ana	yzer Information		
Analyzer make	: Thermo 55i		Analyzer serial #: 15	505164381	
THC Range (ppm)					
NMHC Range (ppm)			CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 3.02E-04	3.02E-0	4 NMHC SP Ratio:	5.86E-05	5.86E-05
CH4 Retention time	: 13.8	13.8	NMHC Peak Area:	156599	156599

THC Calibration Data						
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0.0	0.00	0.00		
as found span	4919	81.3	17.35	17.22	1.008	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4919	81.3	17.35	17.32	1.002	
second point	4959	40.7	8.69	8.59	1.011	
third point	4980	20.3	4.33	4.29	1.011	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.3	17.35	17.33	1.001	
			ŀ	Average Correction Factor	1.008	
Baseline Corr AF:	17.22	Prev response	17.30	*% change	-0.4%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		<pre>* = > +/-5% change initiates investigation</pre>		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4919	81.3	9.19	9.12	1.007		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4919	81.3	9.19	9.16	1.004		
second point	4959	40.7	4.60	4.55	1.011		
third point	4980	20.3	2.29	2.27	1.009		
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.3	9.19	9.18	1.001		
			ŀ	Average Correction Factor	1.008		
Baseline Corr AF:	9.12	Prev response	9.15	*% change	-0.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4	Cal	ibration	Data
CIT	Cu	is a cion	Dutu

Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
5000	0.0	0.00	0.00	
4919	81.3	8.16	8.10	1.008
5000	0.0	0.00	0.00	
4919	81.3	8.16	8.16	1.000
4959	40.7	4.09	4.04	1.011
4980	20.3	2.04	2.01	1.013
5000	0.0	0.00	0.00	
4919	81.3	8.16	8.16	1.001
		A	verage Correction Factor	1.008
8.10	Prev response	8.15	*% change	-0.7%
NA	AF Slope:		AF Intercept:	
NA	AF Correlation:		* = > +/-5% change initiat	es investigation
	Calibration	Statistics		
	<u>Start</u>		Finish	
	0.998030		0.998101	
	-0.019190		-0.029983	
	1.000126		1.000279	
	-0.010089	-0.017886		
	0.996404		0.996415	
	-0.009301	0.009301 -0.012098		
	5000 4919 5000 4919 4959 4980 5000 4919 8.10 NA	Dil air flow rate Source gas flow rate 5000 0.0 4919 81.3 5000 0.0 4919 81.3 4959 40.7 4980 20.3 5000 0.0 4919 81.3 4959 40.7 4980 20.3 5000 0.0 4919 81.3 8.10 Prev response NA AF Slope: NA AF Slope: NA AF Slope: 0.998030 -0.019190 1.000126 -0.010089 0.996404 0.996404	5000 0.0 0.00 4919 81.3 8.16 5000 0.0 0.00 4919 81.3 8.16 4919 81.3 8.16 4959 40.7 4.09 4980 20.3 2.04 5000 0.0 0.00 4919 81.3 8.16 4959 40.7 4.09 4980 20.3 2.04 5000 0.0 0.00 4919 81.3 8.16 A 8.10 Prev response 8.15 NA AF Slope: A NA AF Correlation: A Calibration Statistics Start 0.998030 -0.019190 1.000126 -0.010089 0.996404	Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (Ic) 5000 0.0 0.00 0.00 4919 81.3 8.16 8.10 5000 0.0 0.00 0.00 4919 81.3 8.16 8.10 5000 0.0 0.00 0.00 4919 81.3 8.16 8.16 4959 40.7 4.09 4.04 4980 20.3 2.04 2.01 5000 0.0 0.00 0.00 4919 81.3 8.16 8.16 4980 20.3 2.04 2.01 5000 0.0 0.00 0.00 4919 81.3 8.16 8.16 Average Correction Factor Start Average Correction Factor 8.10 Prev response 8.15 *% change initiat NA AF Correlation: * = > +/-5% change initiat 0.998030 0.998101 -0.019983 <td< td=""></td<>

Changed sample inlet filter after as founds. No adjustments required.

Calibration Performed By:

Mohammed Kashif



THC Calibration Summary

		Station I	nformation		Version-01-20
alibration Date:	April 1	1, 2023	Previous Calibration:	March	7, 2023
tation Name:		r Camp	Station Number:	AM	
tart Time (MST):		.50	End Time (MST):	12:	47
nalyzer make:	Therr	no 55i	Analyzer serial #:	15051	64381
		Calibra	tion Data		
Calculated concentratic (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00 17.32	1.0020	Correlation Coefficient	0.999973	≥0.995
8.69	8.59	1.0113			
4.33	4.29	1.0110	Slope	0.998101	0.90 - 1.10
			Intercept	-0.029983	+/-0.5
20.0		THC Calibration			
18.0 —					
16.0 —					
14.0 —					
(u 12.0 –					
12.0					
ated 0					
indica					
4.0					
2.0					
0.0 🚅				45.0	
	-				
0.0	5	.0	10.0 Conc. (ppm)	15.0	20.0



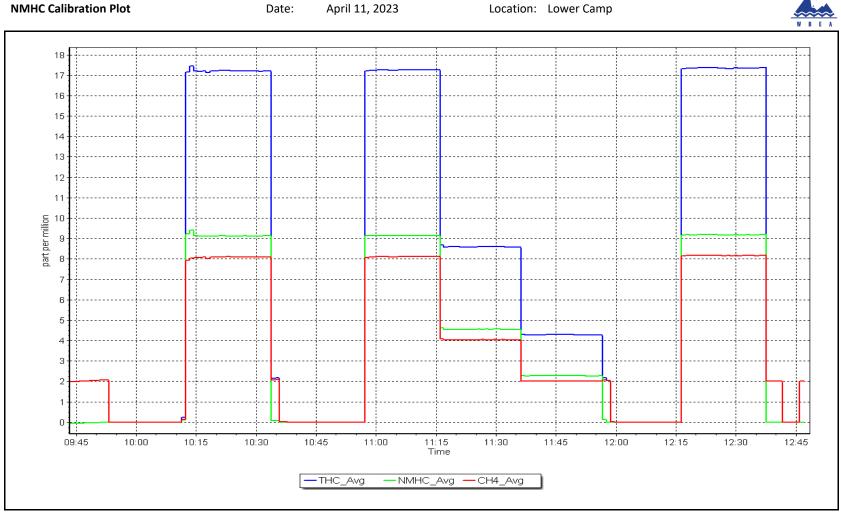
CH₄ Calibration Summary

						Version-01-20
			Station	Information		
Calibratior	n Date:	Ар	ril 11, 2023	Previous Calibration:	March	7, 2023
station Na	ime:	La	ower Camp	Station Number:	AM	511
start Time	(MST):		9:50	End Time (MST):	12:	47
Analyzer m	nake:	T	hermo 55i	Analyzer serial #:	15051	64381
			Calibr	ation Data		
alculated co (ppm)		on Indicated concentra (ppm) (Ic)	tion Correction factor (Cc/Ic	Statistical Ev	valuation	<u>Limits</u>
	00 16	0.00 8.16	1.0000	Correlation Coefficient	0.999961	≥0.995
<u> </u>		4.04	1.0108	Clana	1 000370	0.00 1.10
2.0		2.01	1.0129	Slope	1.000279	0.90 - 1.10
				– Intercept	-0.017886	+/-0.5
	8.0 - 7.0 - 6.0 -					
nc. (pp	5.0 -					
	4.0					
Indicated Conc. (ppm)	3.0 -					
	2.0					
	1.0 +					
	0.0	2.0	0 4.0	6.0	8.0	10.0
			Calculate	d Conc. (ppm)		



NMHC Calibration Summary

					Version-01-2
		Station I	nformation		
Calibration Date:	April 1	.1, 2023	Previous Calibration:	March	7, 2023
Station Name:	Lowe	r Camp	Station Number:	AM	S11
Start Time (MST):	9	:50	End Time (MST):	12:	47
Analyzer make:	Ther	mo 55i	Analyzer serial #:	15051	64381
		Calibra	tion Data		
Calculated concentrati (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.19	0.00 9.16	1.0036	Correlation Coefficient	0.999982	≥0.995
4.60	4.55	1.0113	Slope	0.996415	0.90 - 1.10
2.29	2.27	1.0094	1		
			Intercept	-0.012098	+/-0.5
9.0 - 8.0 - 7.0 - () 6.0 -					•
(bbm) - 0.0 - (bbm) - 0.0 - 0.					
b o b o b o b o b o b o b o b o					
cate					
ip 3.0 –					
2.0					
1.0 -					
0.0 4 0.0	0 2.0	4.0	6.0	8.0	10.0
	2.0			0.0	20.0
		Calculated	l Conc. (ppm)		







third point as left zero

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-20
		Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Lower Camp April 27, 2023 9:21 Cylinder Change		Station number: Last Cal Date: End time (MST):	April 11, 2023	
		Calibrat	ion Standards		
Gas Cert Reference:	C	C2216	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	ente Equiv conc.	1007.1	PPIII
Removed Gas Cert:	205.5	PPIII	Removed Gas Expiry:		
Removed CH4 Conc.	502.0	ppm	CH4 Equiv Conc.	1067.1	ppm
Removed C3H8 Conc.	205.5	ppm	Diff between cyl (THC):		FF
Diff between cyl (CH_4):		r r	Diff between cyl (NM):		
Calibrator Model:	API T700		Serial Number:	3807	
ZAG make/model:	API T701		Serial Number:	196	
		Analyze	r Information		
Analyzer make: THC Range (ppm):			Analyzer serial #:	1505164381	
NMHC Range (ppm):			CH4 Range (ppm):	0 - 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	3.02E-04	3.02E-04	NMHC SP Ratio:	5.86E-05	5.86E-05
CH4 Retention time:	13.8	13.8	NMHC Peak Area:	156599	156599
		THC Cal	ibration Data		
Set Point	Dil air flow rate	Source gas flow rat	e Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	17.35	17.34	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
nigh point	4919	81.3	17.35	17.31	1.002
second point					

as left span					
				Average Correction Factor	1.002
Baseline Corr AF:	17.34	Prev response	17.29	*% change	0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:	* = > +/-5% change initiates investigation		



THC / CH_4 / NMHC Calibration Report

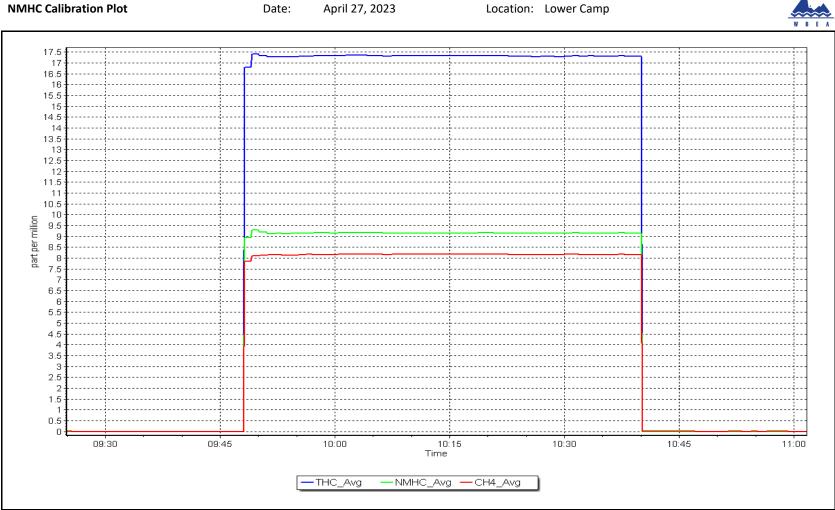
Version-01-2020

		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	9.19	9.16	1.003
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	9.19	9.15	1.004
second point					
third point					
as left zero					
as left span					
·			Avera	ge Correction Factor	1.004
Baseline Corr AF:	9.16	Prev response	9.14	*% change	0.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4919	81.3	8.16	8.18	0.998
as found 2nd point		01.0	0.20	0.20	0.000
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4919	81.3	8.16	8.16	1.000
second point		01.0	0.20	0.20	2.000
third point					
as left zero					
as left span					
			Avera	ge Correction Factor	1.000
Baseline Corr AF:	8.18	Prev response	8.15	*% change	0.4%
Baseline Corr 2nd AF:	NA	AF Slope:	0.20	AF Intercept:	••••
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiati	es investigation
Saseline con Stu AL.		Calibration	Statistics	,	
			JIALISLIUS	Einich	
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		0.998101		0.997440	
THC Cal Offset:		-0.029983		0.004000	
CH4 Cal Slope:		1.000279		0.999139	
CH4 Cal Offset:		-0.017886		0.004000	
NMHC Cal Slope:		0.996415		0.995714 0.000000	
NMHC Cal Offset:		-0.012098			

Notes:

Changed N2 cylinder after as founds.

Calibration Performed By: Sean Bala



Location: Lower Camp



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS13 FORT MCKAY SOUTH APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		mation	Station Inform		
	AMS13 March 2, 2023 12:04	Last Cal Date:		Fort McKay South April 19, 2023 8:54 Routine	Station Name: Calibration Date: Start time (MST): Reason:
		andards	Calibration Sta		
	December 29, 2028	Cal Gas Exp Date:	ppm	50.55	Cal Gas Concentration:
				CC260812	Cal Gas Cylinder #:
	N/A	Rem Gas Exp Date:		50.55	Removed Cal Gas Conc:
	2448	Diff between cyl: Serial Number:		N/A API T700	Removed Gas Cyl #:
	1117			API 700 API 701	Calibrator Make/Model: ZAG Make/Model:
	111/	Senai Number.			
		mation	Analyzer Infor		
	599	Analyzer serial #:			Analyzer make:
				0 - 1000 ppb	Analyzer Range
Finish	Start		Finish	Start	
80.5	77.5	Backgd or Offset:	1.002614	1.001413	Calibration slope:
0.731	0.735	Coeff or Slope:	-2.958216	-2.738219	Calibration intercept:
		on Data	SO ₂ Calibratio		
Correction factor (Cc/I Limit = 0.95-1.05	Indicated concentration Cor (ppb) (Ic)	Calculated concentration (ppb) (Cc)	Source gas flow rate (sccm)	Dilution air flow rate (sccm)	Set Point
	-0.3	0.0	0.0	5000	as found zero
0.994	804.5	799.7	79.1	4921	as found span
					as found 2nd point
					as found 3rd point
					new cylinder response
	-0.2	0.0	0.0	5000	calibrator zero
0.999	800.1	799.7	79.1	4921	high point
1.008	396.3	399.3	39.5	4961	second point
1.028	194.8	200.2	19.8	4980	third point
	-0.2	0.0	0.0	5000	as left zero
1.001	798.5 e Correction Factor	799.7 Averag	79.1	4921	as left span
				804 80	Deceline Corr Ac found:
0.8%	-	/90.Uð			
	Ar miercept:		•		
	e Correction Factor *% change AF Intercept: * = > +/-5% change initiat	798.08	Previous response AF Slope: AF Correlation:	804.80 NA NA	Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:

Notes:

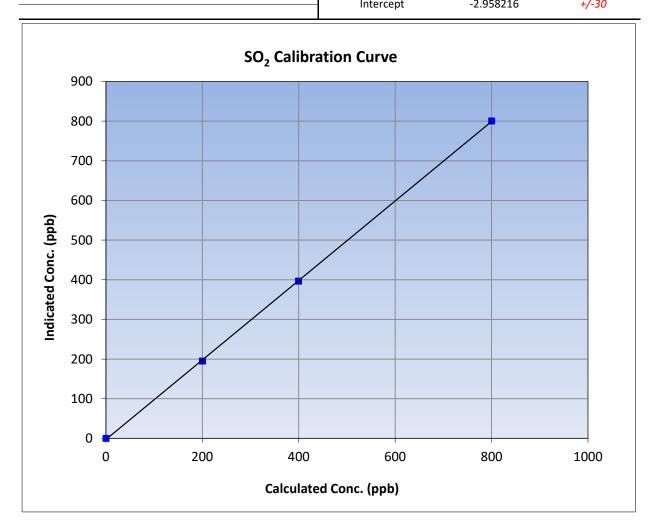
Changed the inlet filter after as founds. Adjusted span only.

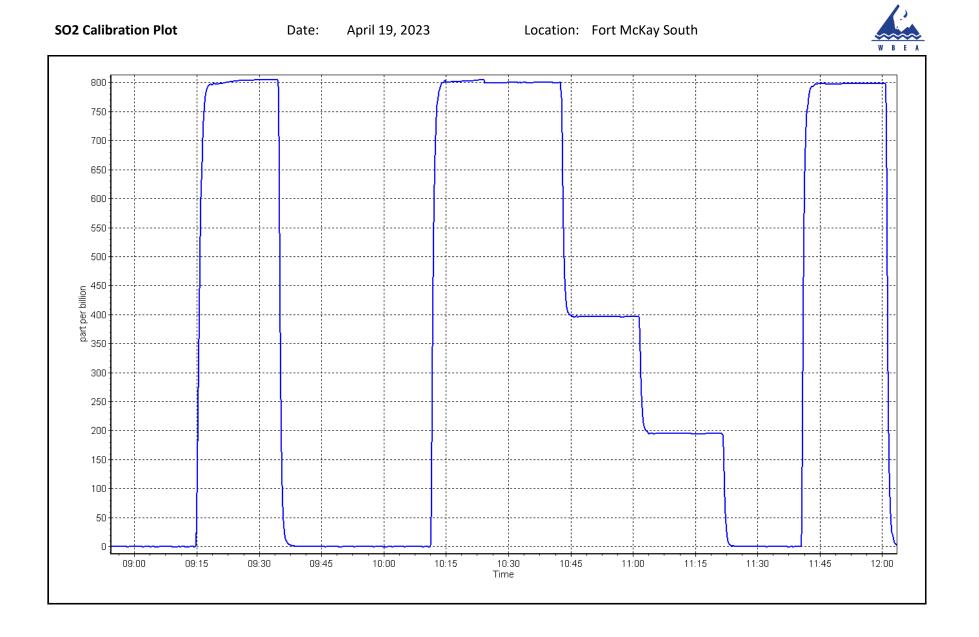
Calibration Performed By:



SO₂ Calibration Summary

WBFA					Version-01-20
		Station	Information		
Calibration Date:	April 19	2023	Previous Calibration:	Marc	h 2, 2023
Station Name:	Fort McKa	y South	Station Number:	A	MS13
Start Time (MST):	8:5	8:54		1	.2:04
Analyzer make:	API T	100	Analyzer serial #:		599
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999946	≥0.995
799.7	800.1	0.9995	correlation coernicient	0.999940	20.333
399.3	396.3	1.0076	Slope	1.002614	0.90 - 1.10
200.2	194.8	1.0276	Siope	1.002014	0.90 - 1.10
			Intercept	-2.958216	+/-30







TRS Calibration Report

WBEA					Version-11-2
		Station Infor			
tation Name: alibration Date: tart time (MST): eason:	Fort McKay South April 3, 2023 9:23 Routine		Station number: Last Cal Date: End time (MST):	AMS13 March 1, 2023 13:20	
		Calibration St	andards		
Cal Gas Concentration:	5.34	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	CC500241 5.34 NA Teledyne API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	2448	
ZAG Make/Model:	Teledyne API 700		Serial Number:	1117	
		Analyzer Info	rmation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i TLE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1180540017 521	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.987178	1.003341	Backgd or Offset:	3.69	3.71
campration intercept.	0.057822	-0.062227	Coeff or Slope:	1.120	1.120
		TRS As Foun	d Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4925	75.5	80.6	80.8	0.999
as found 2nd point	4962	37.7	40.3	40.3	1.002
as found 3rd point	4981	18.9	20.2	19.7	1.030
new cylinder response					
		TRS Calibrati	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/Ic)
calibrator zero	5000	0.0	(Cc) 0.0		Limit = 0.95-1.05
				0.1	
				80.0	0.007
high point	4925	75.5	80.6	80.9	0.997
high point second point	4925 4962	75.5 37.7	80.6 40.3	40.3	0.999
high point second point third point	4925 4962 4981	75.5 37.7 18.9	80.6 40.3 20.2	40.3 20.0	
high point second point third point as left zero	4925 4962 4981 5000	75.5 37.7 18.9 0.0	80.6 40.3 20.2 0.0	40.3 20.0 0.2	0.999 1.009
high point second point third point as left zero as left span	4925 4962 4981 5000 4925	75.5 37.7 18.9 0.0 75.5	80.6 40.3 20.2 0.0 80.6	40.3 20.0 0.2 80.6	0.999 1.009 1.000
high point second point third point as left zero as left span O2 Scrubber Check	4925 4962 4981 5000 4925 4921	75.5 37.7 18.9 0.0 75.5 79.1	80.6 40.3 20.2 0.0	40.3 20.0 0.2 80.6 0.1	0.999 1.009 1.000
high point second point third point as left zero as left span 602 Scrubber Check Date of last scrubber char	4925 4962 4981 5000 4925 4921 nge:	75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20	80.6 40.3 20.2 0.0 80.6	40.3 20.0 0.2 80.6 0.1 Ave Corr Factor	0.999 1.009 1.000 1.002
high point second point third point as left zero as left span 602 Scrubber Check Date of last scrubber char	4925 4962 4981 5000 4925 4921 nge:	75.5 37.7 18.9 0.0 75.5 79.1	80.6 40.3 20.2 0.0 80.6 791.0	40.3 20.0 0.2 80.6 0.1 Ave Corr Factor	0.999 1.009 1.000 1.002 efficiency
high point second point third point as left zero as left span 602 Scrubber Check Date of last scrubber char Date of last converter effi Baseline Corr As found:	4925 4962 4981 5000 4925 4921 nge: ciency test: 80.7	75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20 NA Prev response:	80.6 40.3 20.2 0.0 80.6 791.0 79.65	40.3 20.0 0.2 80.6 0.1 Ave Corr Factor *% change:	0.999 1.009 1.000 1.002 efficiency 1.3%
high point second point third point as left zero	4925 4962 4981 5000 4925 4921 nge: ciency test:	75.5 37.7 18.9 0.0 75.5 79.1 20-Mar-20 NA	80.6 40.3 20.2 0.0 80.6 791.0 79.65 1.003338	40.3 20.0 0.2 80.6 0.1 Ave Corr Factor	0.999 1.009 1.000 1.002 efficiency

Notes:

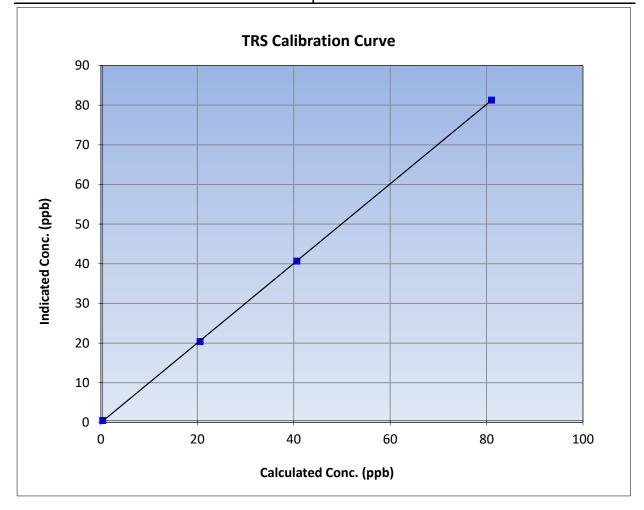
Changed the inlet filter after as founds. Completed a SO2 scrubber check after calibrator zero. No adjustment made.

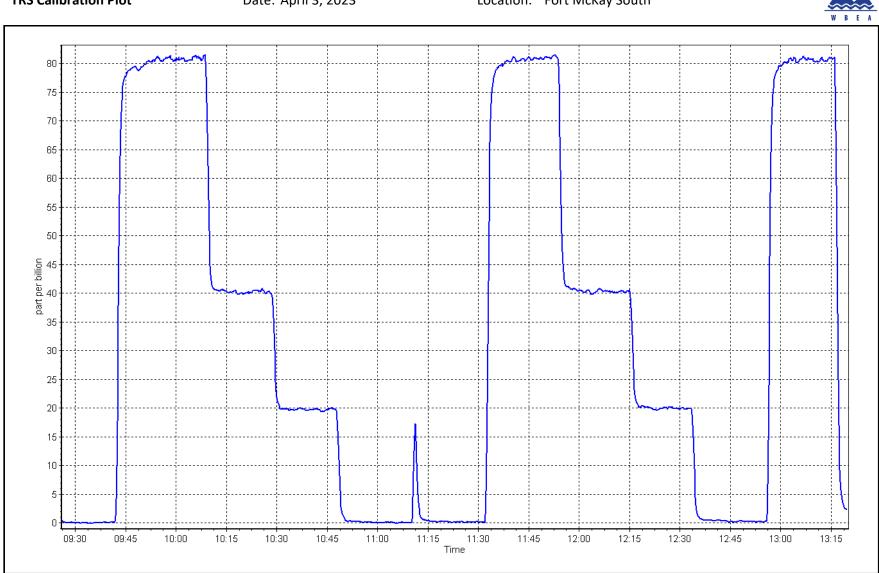


TRS Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	April 3, 2023	Previous Calibration:	March 1, 2023
Station Name:	Fort McKay South	Station Number:	AMS13
Start Time (MST):	9:23	End Time (MST):	13:36
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1180540017
	Cal	ibration Data	

Calculated concentration (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999981	≥0.995
80.6	80.9	0.9966	correlation coefficient	0.999901	20.333
40.3	40.3	0.9992	Slope	1.003341	0.90 - 1.10
20.2	20.0	1.0093	Siope	1.005541	0.90 - 1.10
			Intercept	-0.062227	+/-3





TRS Calibration Plot

Location: Fort McKay South



THC / CH₄ / NMHC Calibration Report

W B E A					Version-01-2020
		Statio	n Information		
Station Name:	Fort McKay Sou	ith	Station number: Al		
Calibration Date:	April 19, 2023		Last Cal Date: M	arch 3, 2023	
Start time (MST):	8:54		End time (MST): 12	2:04	
Reason:	Install				
		Calibra	tion Standards		
Gas Cert Reference:	C	CC260812	Cal Gas Expiry Date: De	ecember 29, 20	028
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: N	Ą	
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: 24	148	
ZAG make/model:	API 701		Serial Number: 11	117	
		Analyz	er Information		
Analyzer make	: Thermo 55i		Analyzer serial #: 11	170050130	
THC Range (ppm)	: 0 - 20 ppm				
NMHC Range (ppm)	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio	: 2.16E-04	2.19E-04	NMHC SP Ratio:	5.11E-04	5.04E-04
CH4 Retention time	: 12.8	12.8	NMHC Peak Area:	177635	179990

THC Calibration Data										
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05					
as found zero	5000	0.0	0.00	0.00						
as found span	4921	79.1	17.05	17.09	0.997					
as found 2nd point										
as found 3rd point										
new cylinder response										
calibrator zero	5000	0.0	0.00	0.00						
high point	4921	79.1	17.05	17.05	1.000					
second point	4961	39.5	8.51	8.38	1.016					
third point	4980	19.8	4.27	4.09	1.042					
as left zero	5000	0.0	0.00	0.00						
as left span	4921	79.1	17.05	17.11	0.996					
			A	verage Correction Factor	1.019					
Baseline Corr AF:	17.09	Prev response	17.06	*% change	0.2%					
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:						
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation					



THC / CH₄ / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0	0.00	0.00	
as found span	4921	79.1	9.08	9.20	0.987
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4921	79.1	9.08	9.07	1.001
second point	4960	39.5	4.53	4.48	1.012
third point	4980	19.8	2.27	2.20	1.035
as left zero	5000	0	0.00	0.00	
as left span	4921	79.1	9.08	9.12	0.996
			1	Average Correction Factor	1.016
Baseline Corr AF:	9.20	Prev response	9.10	*% change	1.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initia	tes investigation

			_
СНЛ	Calib	oration	Data
C14	Calli	παιισπ	ναια

Dil air flow rate	Source gas flow rate			
	Source gas now rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
5000	0.0	0.00	0.00	
4921	79.1	7.97	7.89	1.010
5000	0.0	0.00	0.00	
4921	79.1	7.97	7.97	0.999
4960	39.5	3.98	3.90	1.022
4980	19.8	1.99	1.90	1.050
5000	0.0	0.00	0.00	
4921	79.1	7.97	7.99	0.997
		A	Average Correction Factor	1.024
7.89	Prev response	7.95	*% change	-0.8%
NA	AF Slope:		AF Intercept:	
NA	AF Correlation:		* = > +/-5% change initiat	tes investigation
	4921 5000 4921 4960 4980 5000 4921 7.89 NA	4921 79.1 5000 0.0 4921 79.1 4960 39.5 4980 19.8 5000 0.0 4921 79.1 4960 39.5 4980 19.8 5000 0.0 4921 79.1 77.89 Prev response NA AF Slope:	4921 79.1 7.97 4921 79.1 7.97 5000 0.0 0.00 4921 79.1 7.97 4960 39.5 3.98 4980 19.8 1.99 5000 0.0 0.00 4921 79.1 7.97 5000 0.0 0.00 4921 79.1 7.97 Frev response 7.89 Prev response 7.95 NA AF Slope: AF Slope:	4921 79.1 7.97 7.89 5000 0.0 0.00 0.00 4921 79.1 7.97 7.97 4960 39.5 3.98 3.90 4980 19.8 1.99 1.90 5000 0.0 0.00 0.00 4921 79.1 7.97 7.97 4960 39.5 3.98 3.90 4980 19.8 1.99 1.90 5000 0.0 0.00 0.00 4921 79.1 7.97 7.99 Average Correction Factor 7.89 Prev response 7.95 *% change NA AF Slope: AF Intercept:

	<u>Start</u>	<u>Finish</u>	
THC Cal Slope:	1.005694	1.002569	
THC Cal Offset:	-0.086175	-0.096376	
CH4 Cal Slope:	1.003875	1.003704	
CH4 Cal Offset:	-0.046747	-0.056151	
NMHC Cal Slope:	1.007142	1.001425	
NMHC Cal Offset:	-0.039766	-0.040562	

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Sean Bala



THC Calibration Summary

					Version-01-20	
		Station I	nformation			
Calibration Date:	April 19	9, 2023	Previous Calibration:	March	3, 2023	
station Name:	Fort McK	ay South	Station Number:	AM	AMS13	
start Time (MST):	8:	54	End Time (MST):	End Time (MST): 12:04		
Analyzer make:	Thern	no 55i	Analyzer serial #:	11700	50130	
		Calibra	tion Data			
Calculated concentration (ppm) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.00 17.05	0.00 17.05	1.0000	Correlation Coefficient	0.999853	≥0.995	
8.51 4.27	8.38 4.09	1.0162 1.0423	Slope	1.002569	0.90 - 1.10	
7.27		1.0723	Intercept	-0.096376	+/-0.5	
18.0		THC Calibratio				
16.0 —						
14.0 —						
12.0						
(mdd 10.0 -						
- 0.8 Conc						
Indicated Conc. (ppm)						
= 4.0 -						
2.0 —						
0.0	/					
	5	.0	10.0	15.0	20.0	
0.0	J.	.0	10.0	15.0	20.0	



CH₄ Calibration Summary

		Station I	nformation		
Calibration Date:	April 19	9, 2023	Previous Calibration:	March 3	3, 2023
Station Name:	Fort McK	ay South	Station Number:	AMS13	
Start Time (MST):	8:	54	End Time (MST):		04
Analyzer make:	Thern	no 55i	Analyzer serial #:	11700	50130
		Calibra	tion Data		
Calculated concentration I (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999765	≥0.995
7.97	7.97	0.9992		0.333703	
<u> </u>	3.90 1.90	1.0215 1.0502	Slope	1.003704	0.90 - 1.10
			Intercept	-0.056151	+/-0.5
9.0					
7.0					
6.0					
Undicated Conc. (ppm)					
b 4.0					
0.6 udicate					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
			Conc. (ppm)		

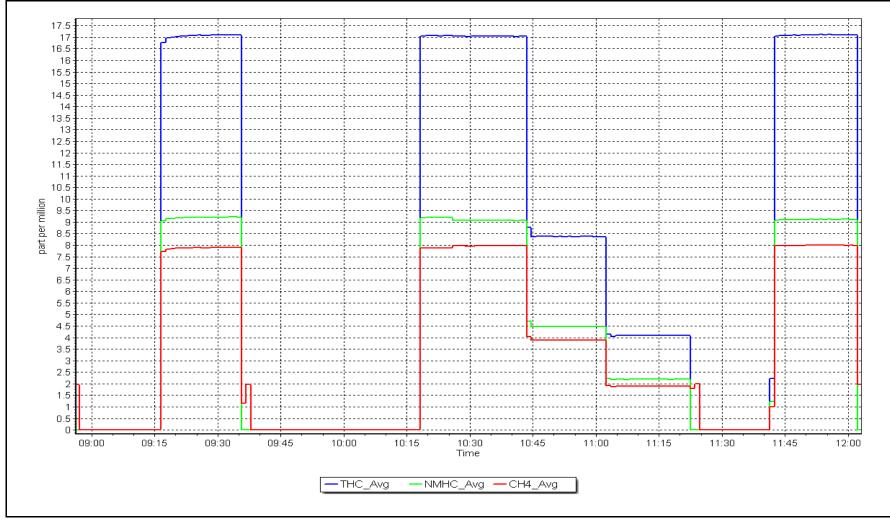


NMHC Calibration Summary

			Station I	nformation		
Calibratio	on Date:	Apri	il 19, 2023	Previous Calibration:	March	3, 2023
Station N	ame:		rt McKay South Station Number:		AMS13	
Start Tim	e (MST):		8:54	End Time (MST):	12:	04
Analyzer	make:	Th	ermo 55i	Analyzer serial #: 1170050130		50130
			Calibra	ation Data		
	concentratior m) (Cc)	n Indicated concentratio (ppm) (Ic)	on Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
	0.00 0.08	0.00 9.07	1.0008	Correlation Coefficient	0.999909	≥0.995
	.53	4.48	1.0008	Clane	1 001 425	0.00 1.10
2	.27	2.20	1.0355	- Slope	1.001425	0.90 - 1.10
				Intercept	-0.040562	+/-0.5
	10.0 9.0 8.0 7.0					
(mdo	6.0					
Conc. (ppm)	5.0					
ted C	4.0					
Indicated	3.0					
-	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0

NMHC Calibration Plot







NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South April 12, 2023 8:34 Routine		Station number: A Last Cal Date: M End time (MST): 1	1arch 23, 2023	
		Calibratio	on Standards		
NO Gas Cylinder #:	T2Y1P76		Cal Gas Expiry Date: D	ecember 11, 20	23
NOX Cal Gas Conc:	50.98	ppm	NO Cal Gas Conc:	49.32	ppm
Removed Cylinder #:	N/A		Removed Gas Exp Date: N	/A	
Removed Gas NOX Conc:	50.98	ppm	Removed Gas NO Conc:	49.32	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	2448	
ZAG make/model:	API T701		Serial Number:	1117	
		Analyzer	Information		
Analyzer make: NOX Range (ppb):		Analyzer	Information Analyzer serial #: 1	410661329	
-		Analyzer <u>Finish</u>		410661329 <u>Start</u>	<u>Finish</u>
-	0 - 1000 ppb <u>Start</u>			_	<u>Finish</u> 9.6
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> : 1.213	<u>Finish</u>	Analyzer serial #: 1	<u>Start</u>	
NOX Range (ppb): NO coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992	<u>Finish</u> 1.213	Analyzer serial #: 1 NO bkgnd or offset:	<u>Start</u> 9.7	9.6
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992	<u>Finish</u> 1.213 0.992	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset:	<u>Start</u> 9.7 9.7	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992	Finish 1.213 0.992 1.000	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset:	<u>Start</u> 9.7 9.7	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992	Finish 1.213 0.992 1.000	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992 : 1.000	Finish 1.213 0.992 1.000 Calibratio	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7 196.2	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992 : 1.000	<u>Finish</u> 1.213 0.992 1.000 Calibratio <u>Start</u>	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7 196.2 <u>Finish</u>	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope: NO2 coeff or slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992 : 1.000	Finish 1.213 0.992 1.000 Calibration Start 1.000036	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7 196.2 <u>Finish</u> 1.001266	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope: NO2 coeff or slope: NO _x Cal Slope: NO _x Cal Offset:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992 : 1.000	Finish 1.213 0.992 1.000 Calibratio <u>Start</u> 1.000036 -2.351272	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7 196.2 <u>Finish</u> 1.001266 -2.371415	9.6 9.7
NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope: NO2 coeff or slope: NO _x Cal Slope: NO _x Cal Offset: NO Cal Slope:	0 - 1000 ppb <u>Start</u> : 1.213 : 0.992 : 1.000	Finish 1.213 0.992 1.000 Calibratic Start 1.000036 -2.351272 1.002705	Analyzer serial #: 1 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 9.7 9.7 196.2 <u>Finish</u> 1.001266 -2.371415 1.003448	9.6 9.7

-0.332208

-0.712517



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1		
as found span	4919	81.1	826.9	800.0	26.9	827.9	801.0	27.1	0.9988	0.9987
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0		
high point	4919	81.1	826.9	800.0	26.9	826.8	801.0	25.6	1.0001	0.9987
second point	4960	40.6	413.9	400.4	13.5	410.7	397.0	13.7	1.0078	1.0086
third point	4980	20.3	207.0	200.2	6.7	202.6	194.4	8.1	1.0216	1.0300
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4919	81.1	826.9	378.3	448.6	838.0	382.2	455.7	0.9867	0.9897
							Average C	orrection Factor	1.0098	1.0124
Corrected As fo	ound NO _x =	828.0 ppb	NO =	801.2 ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	0.4%
Previous Respo	nse NO _x =	824.6 ppb	NO =	798.9 ppb				*Percent Chang	ge NO =	0.3%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As foun	d NO r ² :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.2	376.5	448.6	447.6	1.0023	99.8%
2nd GPT point (200 ppb O3)	798.2	585.0	240.1	239.1	1.0043	99.6%
3rd GPT point (100 ppb O3)	798.2	690.5	134.6	132.7	1.0145	98.6%
			1	Average Correction Factor	1.0070	99.3%

Notes:

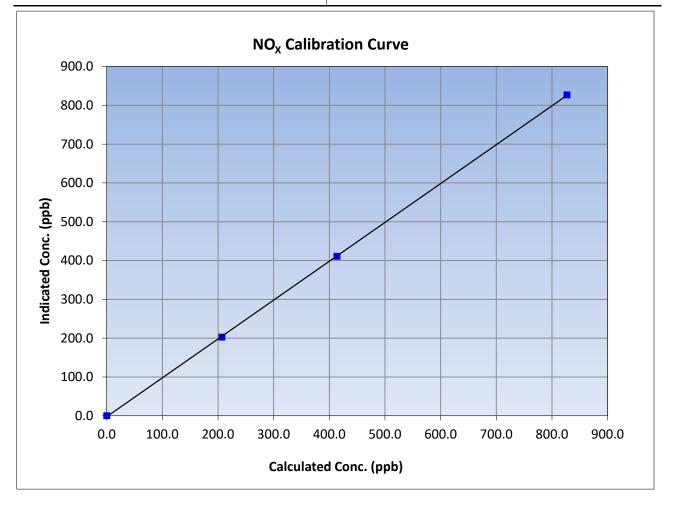
Changed the inlet filter after as founds. No adjustment made.

Calibration Performed By:



NO_x Calibration Summary

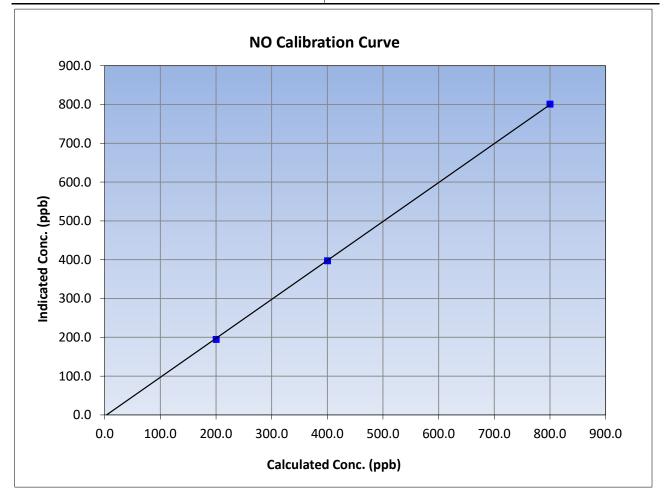
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 12, 2023		Previous Calibration: March		23, 2023
Station Name:	Fort McKay South		Station Number:	AM	S 13
Start Time (MST):	8:34		End Time (MST):	12	:42
Analyzer make:	Thermo 42i Analyzer serial #		Analyzer serial #:	14106	61329
		Calibr	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999962	≥0.995
826.9	826.8	1.0001	correlation coernelent	0.555502	20.333
413.9	410.7	1.0078	Slope	1.001266	0.90 - 1.10
207.0	202.6	1.0216	Slope	1.001200	0.90 - 1.10
			Intercept	-2.371415	+/-20





NO Calibration Summary

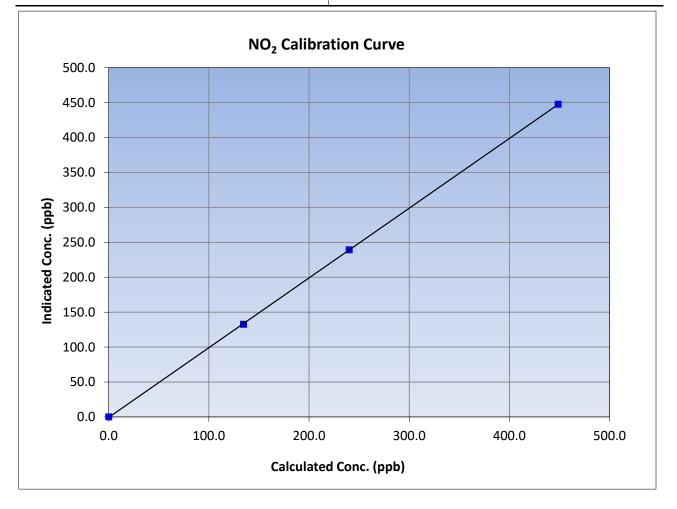
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 12, 2023		Previous Calibration:	March 2	23, 2023
Station Name:	Fort Mck	(ay South	Station Number:	AM	S 13
Start Time (MST):	8:34		End Time (MST):	12:42	
Analyzer make:	r make: Thermo 42i		Analyzer serial #:	14106	61329
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999928	≥0.995
800.0	801.0	0.9987	correlation coefficient	0.999928	20.995
400.4	397.0	1.0086	Clana	1.003448	0.90 - 1.10
200.2	194.4	1.0300	Slope	1.003448	0.90 - 1.10
			Intercept	-3.285243	+/-20

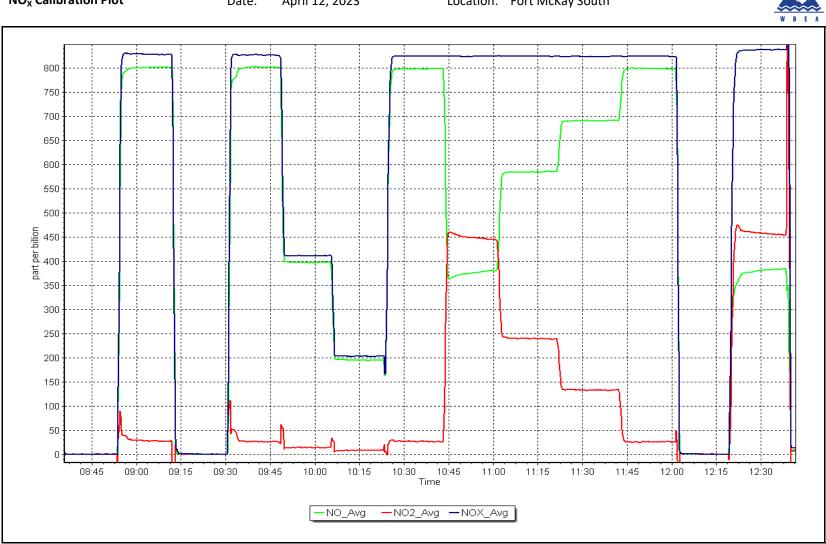




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 12, 2023		Previous Calibration:	March 2	23, 2023	
Station Name:	Fort McKay South		Station Number:	AM	S 13	
Start Time (MST):	8:34		End Time (MST):	12	:42	
Analyzer make:	Thermo 42i		Analyzer serial #:	14106	561329	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999985	≥0.995	
448.6	447.6	1.0023	Correlation Coefficient	0.999965	20.995	
240.1	239.1	1.0043	Slope	0.998635	0.90 - 1.10	
134.6	132.7	1.0145	Slope	0.996055	0.90 - 1.10	
			Intercept	-0.712517	+/-20	









O₃ Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort McKay South April 11, 2023 9:09 Routine		Station number: Last Cal Date: End time (MST):	March 22, 2023	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range	Teledyne API T400 0 - 500 ppb		Analyzer serial #:	3871	
Calibration slope: Calibration intercept:	<u>Start</u> 0.997886 0.320000	<u>Finish</u> 0.997171 0.620000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 3.4 0.963
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/ Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-1.1	
as found span	5000	969.9	400.0	399.3	1.002
as found 2nd point as found 3rd point					
calibrator zero	5000	0.0	0.0	-0.2	
high point	5000	980.6	400.0	399.1	1.002
second point	5000	838.0	200.0	200.4	0.998
third point	5000	735.3	100.0	101.2	0.988
as left zero	5000	0.0	0.0	-0.4	
as left span	5000	979.1	400.0	401.6	0.996
			Avera	ge Correction Factor	0.996
Baseline Corr As found: Baseline Corr 2nd AF pt:	400.4 NA	Previous response AF Slope:		*% change AF Intercept:	0.2%
Baseline Corr 3rd AF pt:	NA	AF Slope. AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

Changed inlet filter after as founds. Zero adjusted.

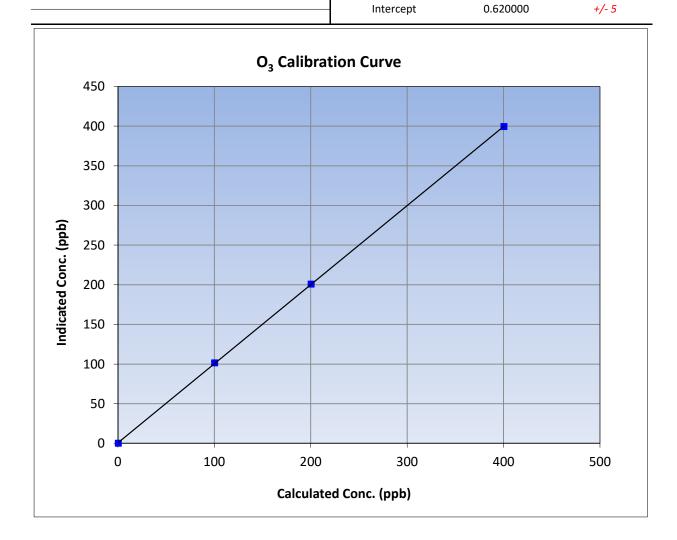
Calibration Performed By:

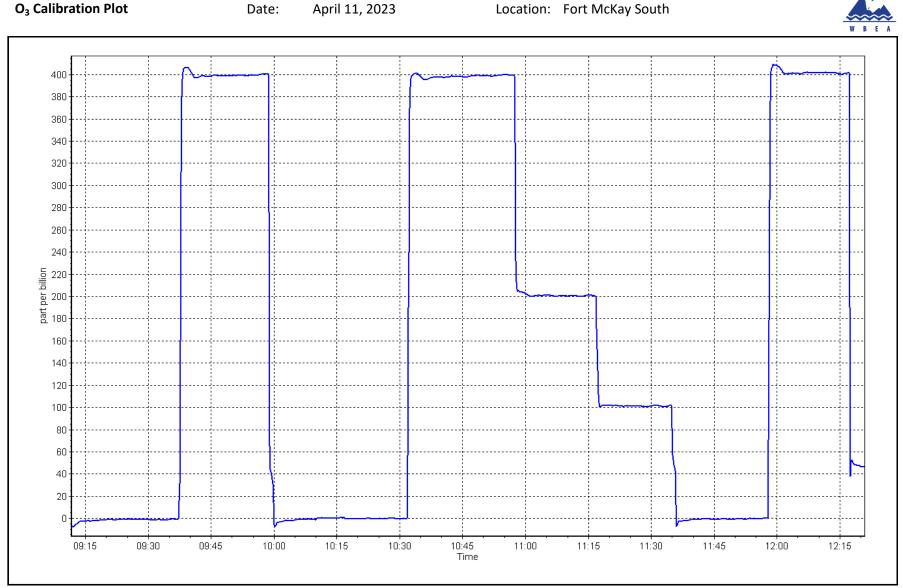
Sean Bala



O₃ Calibration Summary

WBEA					Version-01-202
		Station	Information		
Calibration Date:	April 11,	2023	Previous Calibration:	March	22, 2023
Station Name:	Fort McKa	y South	Station Number:	AM	1513
Start Time (MST):	9:09		End Time (MST):	12	2:21
Analyzer make: Teledyne		VPI T400	Analyzer serial #:	38	371
		Calib	ration Data		
Calculated concentration (ppb) (Cc)	lculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Statistical Evaluation		<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999981	≥0.995
400.0	399.1	1.0023	Correlation Coefficient	0.999981	20.995
200.0	200.4	0.9980	Slope	0.997171	0.90 - 1.10
100.0	101.2	0.9881	Siope	0.557171	0.50 - 1.10





Location: Fort McKay South



T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023
		Station Information	1			
Station Name:	Fort McKay South		Station number:			
Calibration Date:	April 12, 2023		Last Cal Date:		2023	
Start time (MST):	10:56		End time (MST):	11:56		
Analyzer Make:	API T640		S/N:	319		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N:	141229		
Temp/RH standard:	Delta Cal		S/N:	141229		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	4.5	4.5	4.5			+/- 2 °C
P (mmHg)	729.3	730	729.3			+/- 10 mmHg
flow (LPM)	5.03	5.04	5.03			+/- 0.25 LPM
Leak Test:	Date of check:	April 12, 2023	Last Cal Date:	March 2	2, 2023	
	PM w/o HEPA:	2.6	PM w/ HEPA:	2		<0.2 ug/m3
Note: this leak check will be	•		serve as the pre ma	aintenance	leak check	
Inlet cleaning :	Inlet Head					
		Oversterly Calibration 1				
Daramatar	As found	Quarterly Calibration 1			Adjusted	(Limite)
Parameter	As Tound	Post maintenance	<u>As left</u>		Adjusted	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:	8.9	w/ HEPA:		0.0
Date Optical Cham	ber Cleaned:	April 12, 2	.023			<0.2 ug/m3
Disposable Filter	Changed:	March 22,				
		Annual Maintenanc	e			
Date Sample Tub	-					
Date RH/T Senso	or Cleaned:					
	Inlet head clean ar	nd inspected. Leak check	is not passing at fi	rst. Optical	chamber cle	eaning was
Notes:		as inspected and making		•		-
			passed.			
Calibration by:	Sean Bala					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS14 ANZAC APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac April 18, 2023 7:55 Routine		Station number: Last Cal Date: End time (MST):	AMS 14 March 17, 2023 10:21	
		Calibration St	andards		
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 #: Calibrator Make/Model:	NA API T700		Diff between cyl: Serial Number:	5239	
ZAG Make/Model:	API 1700 API T701H		Serial Number:	357	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	0710321322	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997012	0.997195	Backgd or Offset:	25.1	25.2
Calibration intercept:	-1.625104	-0.864371	Coeff or Slope:	0.795	0.798
		SO ₂ Calibratio	on Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration C	orrection factor (Cc/
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.2	
as found span	4920	80.1	800.2	794.6	1.007
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.6	
high point	4920	80.1	800.2	797.5	1.003
second point	4960	40.0	399.6	397.8	1.005
third point	4980	20.0	199.8	196.3	1.018
as left zero as left span	5000 4920	0.0	0.0 800.2	0.3 799.9	
as ieit spall	4920	80.1		ge Correction Factor	1.000
Baseline Corr As found:	794.40	Previous response	796.17	*% change	-0.2%
				AF Intercept:	
Baseline Corr 2nd AF pt:	NA	AF Slope:			

Notes:

No Maintenance done. Span adjusted.

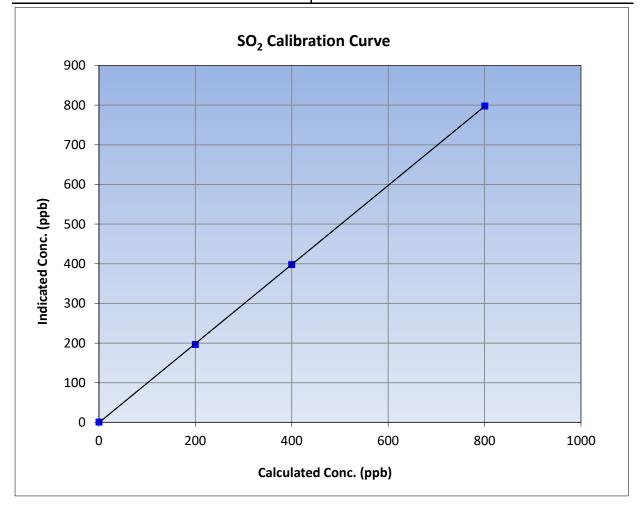
Calibration Performed By:

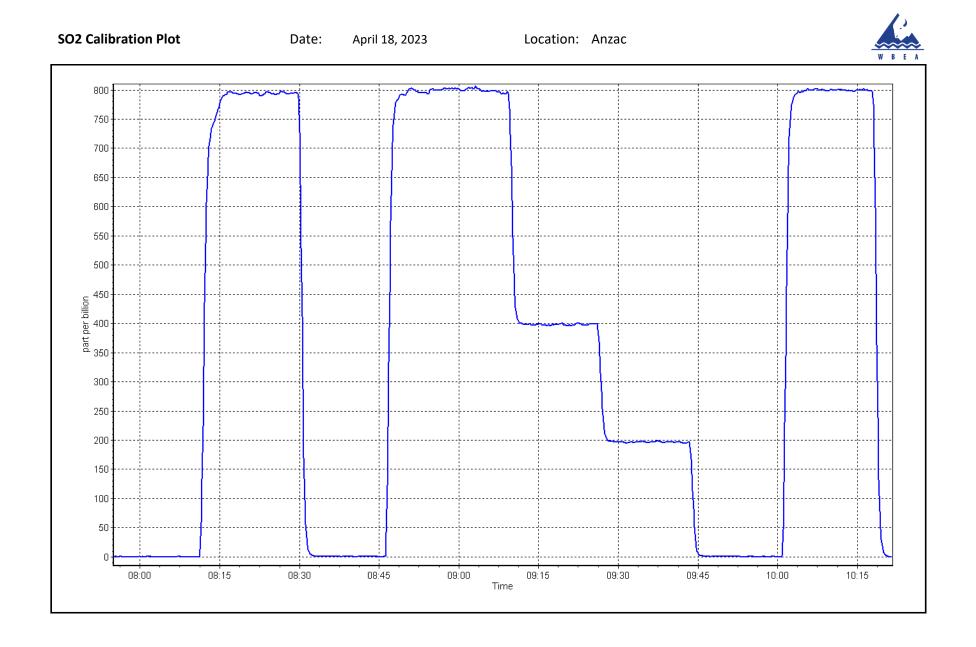


SO₂ Calibration Summary

ation					
evious Calibration:	March 17, 2023				
Station Number:	AMS 14				
End Time (MST):	10:21				
Analyzer make: Thermo 43i Analyzer serial #:					
	Station Number: End Time (MST):				

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.6		Correlation Coefficient	0.999981	≥0.995
800.2	797.5	1.0034	Correlation Coefficient	0.999981	20.995
399.6	397.8	1.0045	Slope	0.997195	0.90 - 1.10
199.8	196.3	1.0178	Slope	0.997195	0.30 - 1.10
			Intercept	-0.864371	+/-30







TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac April 5, 2023 7:43 Routine		Station number: Last Cal Date: End time (MST):	AMS14 March 1, 2023 11:50	
		Calibration S	tandards		
Cal Gas Concentration:	5.38	ppm	Cal Gas Exp Date:	February 3, 2023	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	EY0000859 5.38 NA API T700 API 701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 5252 357	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD Nova CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1180540019 503	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.004840 0.178882	1.002553 -0.041067	Backgd or Offset: Coeff or Slope:		5.51 0.993
		TRS As Four	nd Data		
Set Point	Dilution 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 span	4925	74.3	80.0	83.9	0.956
as found 2nd point	4962	37.2	40.0	41.8	0.965
as found 3rd point	4981	18.6	20.0	20.6	0.986
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.3	
high point	4925	74.3	80.0	80.3	0.996
second point	4962	37.2	40.0	39.9	1.003
third point	4981	18.6	20.0	19.7	1.016
as left zero	5000	0.0	0.0	0.4	
as left span	4925	74.3	80.0	79.5	1.006
SO2 Scrubber Check	4920	80.0	800.0	0.1	
Date of last scrubber cha				Ave Corr Factor	1.005
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	83.6 41.5 20.3	Prev response: AF Slope: AF Correlation:	1.047722	*% change: AF Intercept:	3.7% -0.022058
	20.0		0.000002	* = > +/-5% change initiat	es investigation

Notes:

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

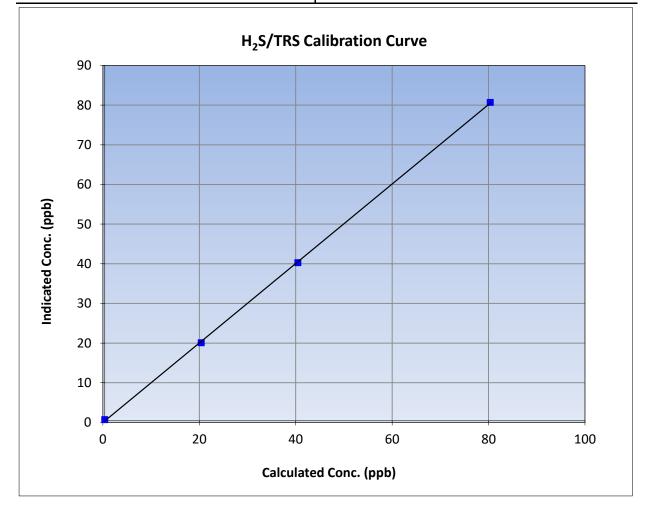


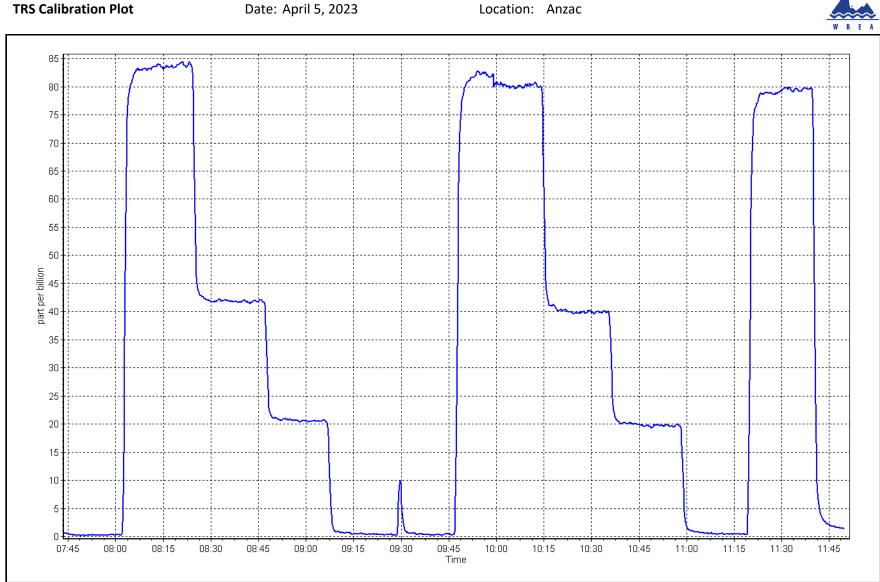
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	April 5, 2023	Previous Calibration:	March 1, 2023					
Station Name:	Anzac	Station Number:	AMS14					
Start Time (MST):	7:43	End Time (MST):	11:50					
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540019					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.3		Correlation Coefficient	0.999917	≥0.995
80.0	80.3	0.9957	correlation coefficient	0.999917	20.333
40.0	39.9	1.0033	Slope	1.002553	0.90 - 1.10
20.0	19.7	1.0160	Slope	1.002555	0.90 - 1.10
			Intercept	-0.041067	+/-3







as left zero

Wood Buffalo Environmental Association

THC / CH_4 / NMHC Calibration Report

Anzac April 5, 2023 5:40 Cylinder Change CC 499.3 207.1 499.3 207.1	Nitrogen Cylinder C	End time (MST):	March 17, 2023 7:45	ppm	
April 5, 2023 5:40 Cylinder Change CC 499.3 207.1 499.3	Calibration 279389 ppm ppm NA	Last Cal Date: End time (MST): Change 5 Standards Cal Gas Expiry Date: CH4 Equiv Conc.	March 17, 2023 7:45 January 5, 2025	ppm	
499.3 207.1 499.3	279389 ppm ppm NA	Cal Gas Expiry Date: . CH4 Equiv Conc.		ppm	
499.3 207.1 499.3	ppm ppm NA	CH4 Equiv Conc.		ppm	
499.3 207.1 499.3	ppm ppm NA	CH4 Equiv Conc.		ppm	
207.1 499.3	ppm NA				
499.3	NA	Removed Gas Expiry:			
	ppm			NA	
207.1		CH4 Equiv Conc.	1068.8	ppm	
	ppm	Diff between cyl (THC):			
		Diff between cyl (NM):			
API T700		Serial Number:	5252		
API 701H		Serial Number: 3	357		
	Analyzer li	nformation			
Thermo 55i		Analyzer serial #: 1	1118148494		
) - 20 ppm					
) - 10 ppm		CH4 Range (ppm): (0 - 10 ppm		
Start	Finish		Start	Finisl	h
		NMHC SP Ratio:			
12.00	12.00	NMHC Peak Area:	204554	20455	
	THC Calibr	ration Data			
Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.</i> 9	95-1.05
5000	0.0	0.00	0.00		
4920	80.1	17.12	16.99	1.00	8
5000	0.0	0.00	0.00		
4920	80.1	17.12	16.89	1.01	4
	207.1 PI T700 PI 701H hermo 55i - 20 ppm - 10 ppm <u>Start</u> 3.85E-04 12.00 Dil air flow rate 5000 4920	207.1 ppm PI T700 PI 701H Analyzer II hermo 55i - 20 ppm - 10 ppm <u>Start Finish</u> 3.85E-04 3.85E-04 12.00 12.00 THC Calibu Dil air flow rate Source gas flow rate 5000 0.0 4920 80.1	207.1ppmDiff between cyl (THC): Diff between cyl (NM): Serial Number: Serial Numb	207.1 ppm Diff between cyl (THC): Diff between cyl (NM): PI 7700 Serial Number: 5252 PI 701H Serial Number: 357 Analyzer Information hermo 55i - 20 ppm - 10 ppm CH4 Range (ppm): 0 - 10 ppm Start Start 3.85E-04 NMHC SP Ratio: 3.85E-04 NMHC Peak Area: 204554 THC Calibration Data Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (lc) 5000 0.0 0.00 4920 80.1 17.12 5000 0.0 0.00 0.00	207.1 ppm Diff between cyl (THC): Diff between cyl (NM): PI 7700 Serial Number: 5252 PI 701H Serial Number: 357 Analyzer Information hermo 55i - 20 ppm - 10 ppm CH4 Range (ppm): 0 - 10 ppm Start Finish Start 3.85E-04 3.85E-04 NMHC SP Ratio: 4.46E-05 4.46E-05 12.00 12.00 NMHC Peak Area: 204554 20455 THC Calibration Data Dil air flow rate Source gas flow rate Calc conc (ppm) (Cc) Ind conc (ppm) (lc) CF Limit= 0.1 5000 0.0 0.00 0.00 5000 0.0 0.00 0.00

as left span					
				Average Correction Factor	1.014
Baseline Corr AF:	16.99	Prev response	17.03	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:	<pre>* = > +/-5% change initiates investigation</pre>		



THC / CH_4 / NMHC Calibration Report

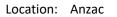
Version-01-2020

		NMHC Calibr			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	9.12	9.07	1.006
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	9.12	9.02	1.011
second point					
third point					
as left zero					
as left span					
			Avera	ge Correction Factor	1.011
Baseline Corr AF:	9.07	Prev response	9.10	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	8.00	7.92	1.010
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	8.00	7.87	1.016
second point					
third point					
as left zero					
as left span					
I			Avera	ge Correction Factor	1.016
Baseline Corr AF:	7.92	Prev response	7.94	*% change	-0.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.996031		0.986437	
THC Cal Offset:		-0.019815		0.000000	
CH4 Cal Slope:		0.993278		0.983919	
CH4 Cal Offset:		-0.004047		0.000000	
NMHC Cal Slope:		0.998568		0.988644	
NMHC Cal Offset:		-0.013765		0.000000	
		0.010/00		0.000000	

Calibration Performed By:

Melissa Lemay







17 16.5 16-15.5 15 14.5 14 13.5 13-12.5 12 11.5 11 10.5 10 -10 9.5 9 9 -2.8 -2.8 -2.7 -2.7 7.5 7 6.5 6 5.5 5 4.5 4 3.5 3 2.5 2 1.5 0.5 04 06:45 07:00 07:15 07:30 07:45 Time -THC_Avg -NMHC_Avg -CH4_Avg



THC / CH_4 / NMHC Calibration Report

WDEA						Version-01-202
		St	ation Information			
Station Name: Calibration Date: Start time (MST): Reason:	Anzac April 18, 2023 7:55 Routine		Station number: A Last Cal Date: N End time (MST): 1	March 17, 2023		
		Cal	ibration Standards			
Gas Cert Reference:	(C279389	Cal Gas Expiry Date: J	anuary 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: 5	5252		
ZAG make/model:	API 701H		Serial Number: 3	357		
		An	alyzer Information			
Analyzer make	: Thermo 55i		Analyzer serial #: 1	118148494		
, THC Range (ppm)			,			
NMHC Range (ppm)			CH4 Range (ppm): C) - 10 ppm		
	<u>Start</u>	<u>Finis</u>	<u>h</u>	<u>Start</u>		<u>Finish</u>
CH4 SP Ratio	: 3.85E-04	3.90E	-04 NMHC SP Ratio:	4.46E-05		4.53E-05
CH4 Retention time	:: 12.00	12.2	0 NMHC Peak Area:	204554		201206

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.1	17.12	16.85	1.016		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.1	17.12	17.01	1.007		
second point	4960	40.0	8.55	8.56	0.999		
third point	4980	20.0	4.28	4.24	1.008		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.1	17.12	17.11	1.001		
			A	Average Correction Factor	1.005		
Baseline Corr AF:	16.85	Prev response	17.03	*% change	-1.1%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	tes investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	9.12	8.97	1.017
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	9.12	9.11	1.001
second point	4960	40.0	4.56	4.56	0.999
third point	4980	20.0	2.28	2.25	1.012
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	9.12	9.12	1.000
			ŀ	Average Correction Factor	1.004
Baseline Corr AF:	8.97	Prev response	9.10	*% change	-1.4%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

			lion Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.1	8.00	7.89	1.014
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.1	8.00	7.99	1.001
second point	4960	40.0	3.99	4.00	0.999
third point	4980	20.0	2.00	1.98	1.009
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.1	8.00	8.00	1.000
			A	verage Correction Factor	1.003
Baseline Corr AF:	7.89	Prev response	7.94	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.996031		0.994025	
THC Cal Offset:		-0.019815		0.010201	
CH4 Cal Slope:		0.993278		0.999707	
CH4 Cal Offset:		-0.004047		-0.004033	
NMHC Cal Slope:		0.998568		0.999569	
NMHC Cal Offset:		-0.013765		-0.007757	

Notes:

No Maintenance done. Span adjusted.

Calibration Performed By:

Melissa Lemay



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	April 1	8, 2023	Previous Calibration:	March 1	7, 2023
Station Name:	-	zac	Station Number:		5 14
Start Time (MST):	7:55		End Time (MST):	10:	
Analyzer make:	Thermo 55i		Analyzer serial #:	11181	
,					
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	(Correction factor (Cc/lc)		ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999978	≥0.995
17.12	17.01	1.0066			
8.55 4.28	8.56 4.24	0.9989 1.0083	Slope	0.994025	0.90 - 1.10
4.20	4.24	1.0085	Intercept	0.010201	+/-0.5
16.0					
18.0				•	
14.0					
12.0					
E I					
ਰੂ 10.0 –					
(Ludi) 10.0					
. 8.0					
0.0 udicated					
— 0.6 <mark>jet</mark>					
pu					
- 4.0 -					
2.0					
0.0	/				
0.0	5	.0	10.0	15.0	20.0



CH₄ Calibration Summary

Version-01-2020

			-		Version-01-202
		Station I	nformation		
Calibration Date:	April 18	3, 2023	Previous Calibration:	March 1	
Station Name:	An	zac	Station Number:	AMS	5 14
Start Time (MST):	7:	55	End Time (MST):	10:	20
Analyzer make:	Thern	no 55i	Analyzer serial #:	11181	48494
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 8.00	0.00 7.99	1.0011	Correlation Coefficient	0.999992	≥0.995
<u>3.99</u> 2.00	4.00	0.9986	Slope	0.999707	0.90 - 1.10
2.00	1.30	1.0007	Intercept	-0.004033	+/-0.5
0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		

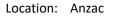


NMHC Calibration Summary

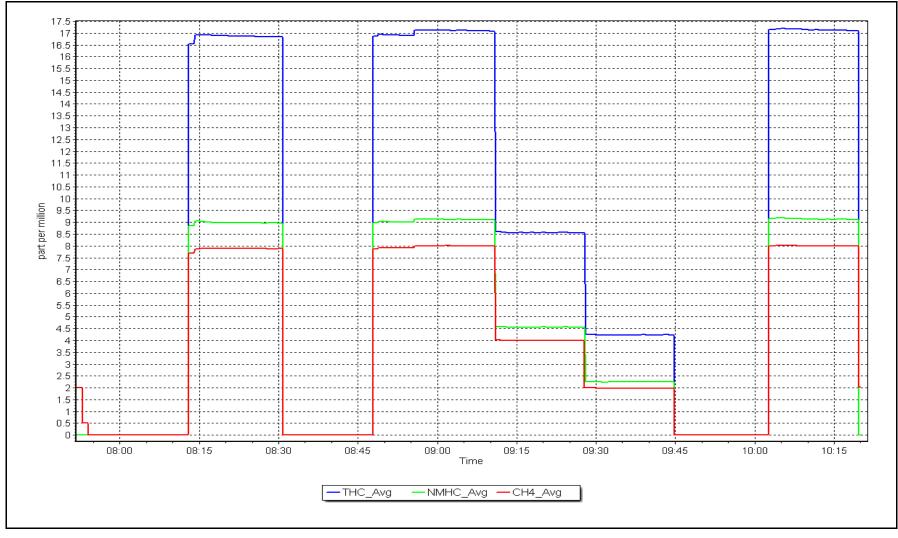
Version-01-2020

			Station I	nformation		
Calibratior	n Date:	April 1	8, 2023	Previous Calibration:	March 1	7, 2023
Station Na	ime:	Ar	izac	Station Number:	AMS	5 14
Start Time	(MST):	7	:55	End Time (MST):	10:	:20
Analyzer n	nake:	Therr	no 55i	Analyzer serial #:	11181	48494
			Calibra	tion Data		
Calculated co (ppm		Indicated concentration (ppm) (Ic)	Correction tector (Cc/lc)		valuation	<u>Limits</u>
0.0		0.00 9.11	1.0015	Correlation Coefficient	0.999986	≥0.995
4.5		4.56	0.9992	Classe	0.0005.00	
	28	2.25	1.0125	Slope	0.999569	0.90 - 1.10
				Intercept	-0.007757	+/-0.5
	10.0		NMHC Calibra			
	9.0					
	8.0					
	7.0					
(mq	6.0					
Conc. (ppm)	5.0					
	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

NMHC Calibration Plot









$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		S	Station Information			
Station Name: Calibration Date: Start time (MST): Reason:	Anzac April 14, 2023 8:45 Routine		Station number: AMS 14 Last Cal Date: March 2, 2023 End time (MST): 11:32			
		Ca	alibration Standards			
NO Gas Cylinder #:	T2Y1P8D		Cal Gas Expiry Date:	December 11, 2023		
NOX Cal Gas Conc:	50.92	ppm	NO Cal Gas Conc:	50.05	ppm	
Removed Cylinder #:	NA		Removed Gas Exp Date:	NA		
Removed Gas NOX Conc: NOX gas Diff:	50.92	ppm	Removed Gas NO Conc: NO gas Diff:	50.05	ppm	
Calibrator Model:	Teledyne API T700		Serial Number:	5239		
ZAG make/model:	Teledyne API 701H		Serial Number:	357		
		А	nalyzer Information			
	Thormo 42;		Analyzer serial #:	1426262502		
Analyzer make:	mermo 42i		Allalyzel sellal #.	1420202592		
Analyzer make: NOX Range (ppb):			Analyzer senai #.	1420202592		
•		<u>Fin</u>	ish	<u>Start</u>		<u>Finish</u>
•	0 - 1000 ppb <u>Start</u>					<u>Finish</u> 3.7
NOX Range (ppb):	0 - 1000 ppb <u>Start</u> 1.361	1.3	ish	<u>Start</u>		

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.993239	1.002446
NO _x Cal Offset:	-0.747177	-0.745161
NO Cal Slope:	0.995505	1.004625
NO Cal Offset:	-2.010875	-2.149028
NO ₂ Cal Slope:	0.999852	1.000896
NO ₂ Cal Offset:	0.368111	0.328255



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.3		
as found span	4921	78.6	800.5	786.8	13.7	803.7	788.7	15.0	0.9961	0.9977
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	-0.1	-0.2		
high point	4921	78.6	800.5	786.8	13.7	802.0	789.2	12.8	0.9982	0.9970
second point	4961	39.3	400.2	393.4	6.8	400.5	392.5	8.0	0.9993	1.0022
third point	4980	19.6	199.6	196.2	3.4	198.2	192.6	5.6	1.0072	1.0188
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4921	78.6	800.5	393.6	406.9	796.3	386.5	409.8	1.0053	1.0185
							Average C	orrection Factor	1.0015	1.0060
Corrected As fo	und NO _X =	803.6 ppb	NO =	788.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	1.1%
Previous Respon	nse NO _x =	794.4 ppb	NO =	781.3 ppb				*Percent Chang	ge NO =	1.0%
Baseline Corr 2r	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3r	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	782.7	389.5	406.9	407.3	0.9990	100.1%
2nd GPT point (200 ppb O3)	782.7	584.7	211.7	212.4	0.9966	100.3%
3rd GPT point (100 ppb O3)	782.7	684.2	112.2	113.2	0.9910	100.9%
				Average Correction Factor	0.9955	100.5%

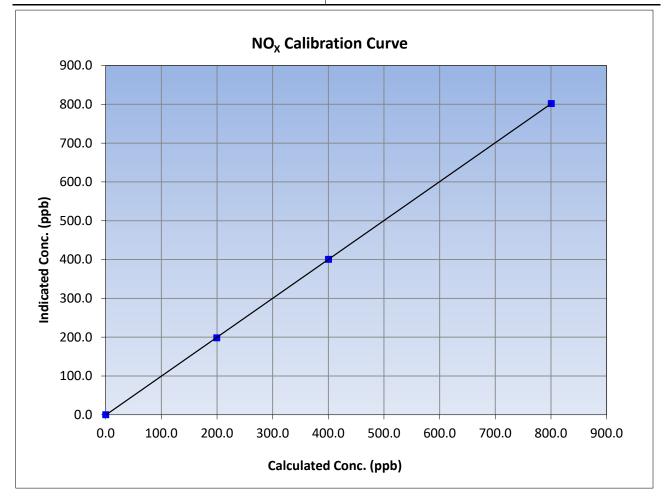
Notes:

No maintenance or adjustments done.



NO_x Calibration Summary

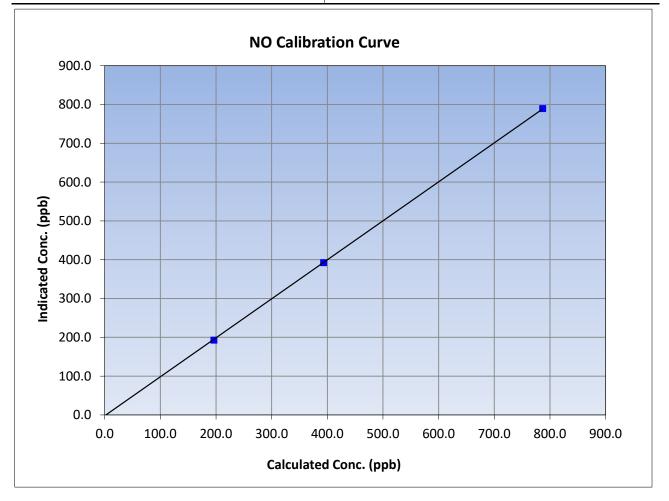
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 1	4, 2023	Previous Calibration:	March	2, 2023	
Station Name:	Anzac		Station Number:	AMS	S 14	
Start Time (MST):	8:	45	End Time (MST):	11:	:32	
Analyzer make:	Thern	no 42i	Analyzer serial #: 1426		6262592	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999994	≥0.995	
800.5	802.0	0.9982	Correlation Coefficient	0.555554	20.995	
400.2	400.5	0.9993	Slope	1.002446	0.90 - 1.10	
199.6	198.2	1.0072	Slope	1.002440	0.90 - 1.10	
			Intercept	-0.745161	+/-20	





NO Calibration Summary

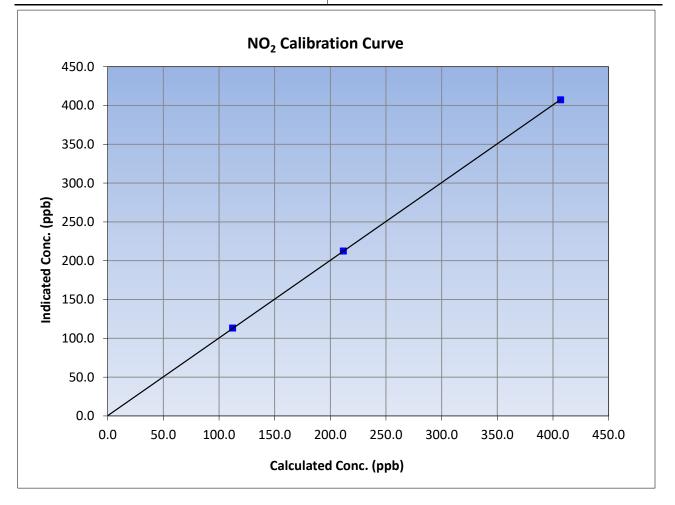
WBEA		Station	Information		Version-04-20
		Station	mormation		
Calibration Date:	April 1	4, 2023	Previous Calibration:	March	2, 2023
Station Name:	An	zac	Station Number:	AM	S 14
Start Time (MST):	8:	45	End Time (MST):	11:	:32
Analyzer make:	Thermo 42i Analyze			14262	62592
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999968	≥0.995
786.8	789.2	0.9970	correlation coefficient	0.999908	20.333
393.4	392.5	1.0022	Slope	1.004625	0.90 - 1.10
196.2	192.6	1.0188	Slope	1.004025	0.30 - 1.10
			Intercept	-2.149028	+/-20

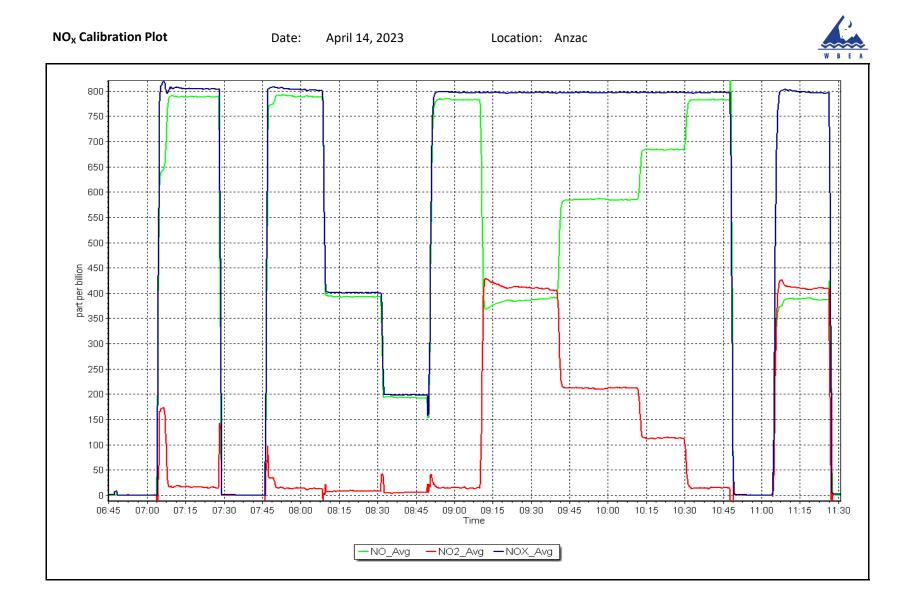




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 1	4, 2023	Previous Calibration:	March	2, 2023	
Station Name:	Anzac		Station Number:	AM	S 14	
Start Time (MST):	8:	45	End Time (MST):	11:	:32	
Analyzer make:	Thern	no 42i	Analyzer serial #: 1426		6262592	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.2		Correlation Coefficient	0.999992	≥0.995	
406.9	407.3	0.9990	correlation coernelent	0.555552	20.995	
211.7	212.4	0.9966	Clana	1.000896	0.90 - 1.10	
112.2	113.2	0.9910	Slope	1.000890	0.90 - 1.10	
			Intercept	0.328255	+/-20	







O₃ Calibration Report

Version-01-2020

					Version-01-2020
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Anzac April 18, 2023 6:45 Routine		Station number: Last Cal Date: End time (MST):	March 30, 2023	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer API T700 API 701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	1426262595	
Calibration slope: Calibration intercept:	<u>Start</u> 1.001686 0.080000	<u>Finish</u> 1.000057 0.140000	Backgd or Offset: Coeff or Slope:	<u>Start</u> 0.9 1.516	<u>Finish</u> 1.3 1.516
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.3	
as found span	5000	884.8	400.0	401.9	0.995
as found 2nd point	5000	771.6	200.0	201.1	0.995
as found 3rd point	5000	672.9	100.0	100.7	0.993
calibrator zero	5000	0.0	0.0	-0.1	
high point	5000	886.1	400.0	400.1	1.000
second point	5000	772.1	200.0	200.1	1.000
third point	5000	671.5	100.0	100.5	0.995
as left zero	5000	0.0	0.0	-0.9	
as left span	5000	885.7	400.0	401.4	0.997
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	401.6	Previous response	400.8	*% change	0.2%
Baseline Corr 2nd AF pt:	200.8	AF Slope:		AF Intercept:	0.300000
Baseline Corr 3rd AF pt:	100.4	AF Correlation:		* = > +/-5% change initiate	

Notes:

Ozone Scrubber Replaced. Zero adjusted.

Calibration Performed By:

Melissa Lemay

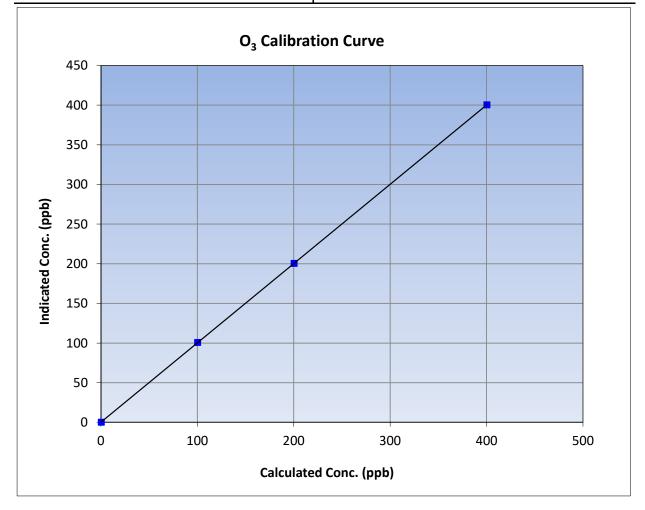


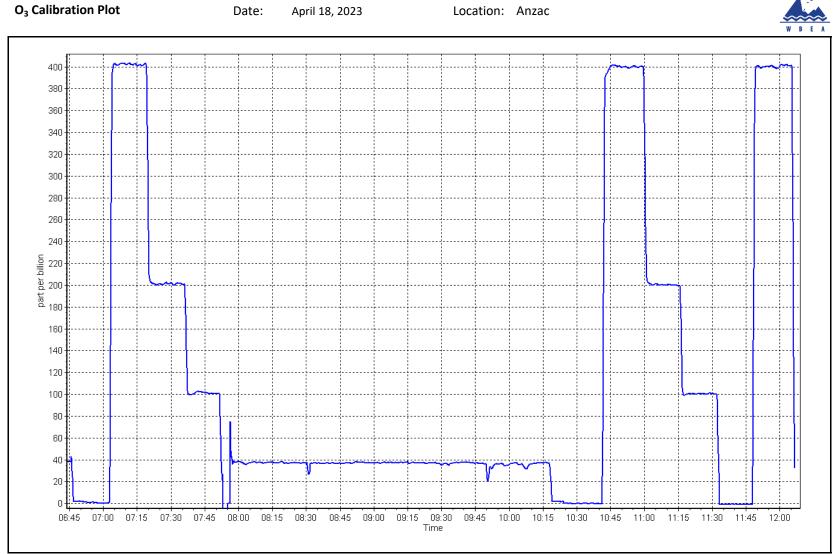
O₃ Calibration Summary

	Stat	ion Information	
Calibration Date:	April 18, 2023	Previous Calibration:	March 30, 2023
Station Name:	Anzac	Station Number:	AMS14
Start Time (MST):	6:45	End Time (MST):	12:07
Analyzer make:	Thermo 49i	Analyzer serial #:	1426262595

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999998	≥0.995
400.0	400.1	0.9998	correlation coefficient	0.999998	20.333
200.0	200.1	0.9995	Slope	1.000057	0.90 - 1.10
100.0	100.5	0.9950	Slope	1.000057	0.90 - 1.10
			Intercept	0.140000	+/- 5









T640 PM_{2.5} CALIBRATION

T (°C) 2.5 2.8 2.5 +/ P (mmHg) 708.6 709.7 708.6 +/- 10 flow (LPM) 5 5.08 5 +/- 0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023	on-01-2023
Calibration Date: April 18, 2023 Last Cal Date: March 30, 2023 Start time (MST): 7:03 End time (MST): 7:25 Analyzer Make: API T640 S/N: 825 Particulate Fraction: PM2.5 S/N: 388753 Flow Meter Make/Model: Alicat FP-25 S/N: 388753 Temp/RH standard: Alicat FP-25 S/N: 388753 Monthly Calibration Test Monthly Calibration Test Parameter As found Measured As left Adjusted (Lir T (°C) 2.5 2.8 2.5 4/ P (mmHg) 708.6 709.7 708.6 4/-10 If low (LPM) 5 5.08 5 4/-0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 40.223 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	
Start time (MST): 7:03 End time (MST): 7:25 Analyzer Make: API T640 S/N: 825 Particulate Fraction: PM2.5 S/N: 388753 Flow Meter Make/Model: Alicat FP-25 S/N: 388753 Temp/RH standard: Alicat FP-25 S/N: 388753 Vertex Make/Model: Alicat FP-25 S/N: 388753 Vertex Make/Model: Alicat FP-25 S/N: 388753 Vertex Model: Alicat FP-25 S/N: 388753 Vertex Make/Model: Alicat FP-25 S/N: 388753 Vertex Match Parameter As found Measured As left Adjusted (Lin T (°C) 2.5 2.8 2.5 4/ (Lin 4/ P (mmHg) 708.6 709.7 708.6	
Analyzer Make: API T640 S/N: 825 Particulate Fraction: PM2.5 S/N: 388753 Flow Meter Make/Model: Alicat FP-25 S/N: 388753 Temp/RH standard: Alicat FP-25 S/N: 388753 Monthly Calibration Test Monthly Calibration Test Parameter As found Measured As left Adjusted (Lir T (°C) 2.5 2.8 2.5 4/ P (mmHg) 708.6 709.7 708.6 4/ flow (LPM) 5 5.08 5 4/-10 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	
Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25 S/N: 388753 Temp/RH standard: Alicat FP-25 S/N: 388753 Monthly Calibration Test Monthly Calibration Test Parameter As found Measured As left Adjusted (Lin T (°C) 2.5 2.8 2.5 4/ P (mmHg) 708.6 709.7 708.6 4/-11 flow (LPM) 5 5.08 5 4/-0 Leak Test: Date of check: April 18, 2023 PM w/o HEPA: Last Cal Date: March 30, 2023 PM w/ HEPA: 0 <0.2	
Particulate Fraction: PM2.5 Flow Meter Make/Model: Alicat FP-25 S/N: 388753 Temp/RH standard: Alicat FP-25 S/N: 388753 Monthly Calibration Test Monthly Calibration Test Parameter As found Measured As left Adjusted (Lin T (°C) 2.5 2.8 2.5 4/ P (mmHg) 708.6 709.7 708.6 4/-11 flow (LPM) 5 5.08 5 4/-0 Leak Test: Date of check: April 18, 2023 PM w/o HEPA: Last Cal Date: March 30, 2023 PM w/ HEPA: 0 <0.2	
Temp/RH standard: Alicat FP-25 S/N: 388753 Monthly Calibration Test Monthly Calibration Test Parameter As found Measured As left Adjusted (Lir T (°C) 2.5 2.8 2.5 +/ P (mmHg) 708.6 709.7 708.6 +/-10 flow (LPM) 5 5.08 5 +/-0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	
Monthly Calibration Test Parameter As found Measured As left Adjusted (Lin T (°C) 2.5 2.8 2.5 4/ P (mmHg) 708.6 709.7 708.6 +/-10 flow (LPM) 5 5.08 5 +/-0 Leak Test: Date of check: April 18, 2023 PM w/o HEPA: Last Cal Date: March 30, 2023 PM w/ HEPA: 0 <0.2	
Parameter As found Measured As left Adjusted (Lin T (°C) 2.5 2.8 2.5 +/ P (mmHg) 708.6 709.7 708.6 +/-10 flow (LPM) 5 5.08 5 +/-0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	
T (°C) 2.5 2.8 2.5 +/ P (mmHg) 708.6 709.7 708.6 +/- 10 flow (LPM) 5 5.08 5 +/- 0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	
P (mmHg) 708.6 709.7 708.6 +/-1 flow (LPM) 5 5.08 5 +/-0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	nits)
flow (LPM) 5 5.08 5 4/-0 Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	- 2 °C
Leak Test: Date of check: April 18, 2023 Last Cal Date: March 30, 2023 PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	0 mmHg
PM w/o HEPA: 2.8 PM w/ HEPA: 0 <0.2	.25 LPM
Note: this leak check will be completed before the guarterly work and will serve as the pre maintenance leak check	ug/m3
Inlet cleaning : Inlet Head 🗹	
Questark Collibration Test	
Quarterly Calibration Test	
	nits)
PMT Peak Test 10.9	+/- 0.5
Post-maintenance leak check: PM w/o HEPA: w/ HEPA:	
Date Optical Chamber Cleaned:March 30, 2023<0.2	ug/m3
Disposable Filter Changed: March 30, 2023	
Annual Maintenance	
Date Sample Tube Cleaned: June 21, 2022	
Date RH/T Sensor Cleaned: June 21, 2022	
No adjustments done. Head Cleaned.	
Calibration by: Melissa Lemay	



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS17 WAPASU APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu April 13, 2023 9:10 Routine		Station number: Last Cal Date: End time (MST):	AMS17 March 9, 2023 12:40	
		Calibration St	andards		
Cal Gas Concentration:	<u>50.38</u>	ppm	Cal Gas Exp Date:	January 12, 2029	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	<u>ALM066507</u> <u>50.38</u> <u>n/a</u> API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	n/a 2449	
ZAG Make/Model:	API 701H		Serial Number:	359	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1218153459	
Calibration slope: Calibration intercept:	<u>Start</u> 0.999724 -1.859598	<u>Finish</u> 0.999723 -1.559214	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 12.4 1.099
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.4	800.0	794.5	1.007
as found 2nd point					
as found 3rd point					
new cylinder response	5000		0.0	0.1	
calibrator zero	5000	0.0	0.0	-0.1	
high point	4921	79.4	800.0	799.6	1.000
second point third point	<u>4960</u> 4980	39.7 19.8	400.0 199.5	<u> </u>	1.011 1.009
as left zero	5000	0.0	0.0	0.3	1.009
as left span	4920	79.4	800.1	799.9	1.000
us icit span	7520	, ,.,		ge Correction Factor	1.000
Baseline Corr As found:	794.60	Previous response		*% change	-0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	01/0
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	

Notes:

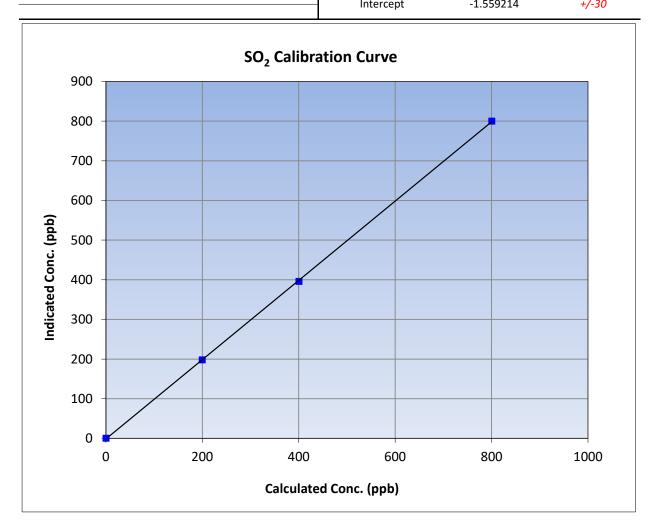
Sample inlet filter changed after as founds. No adjustments made.

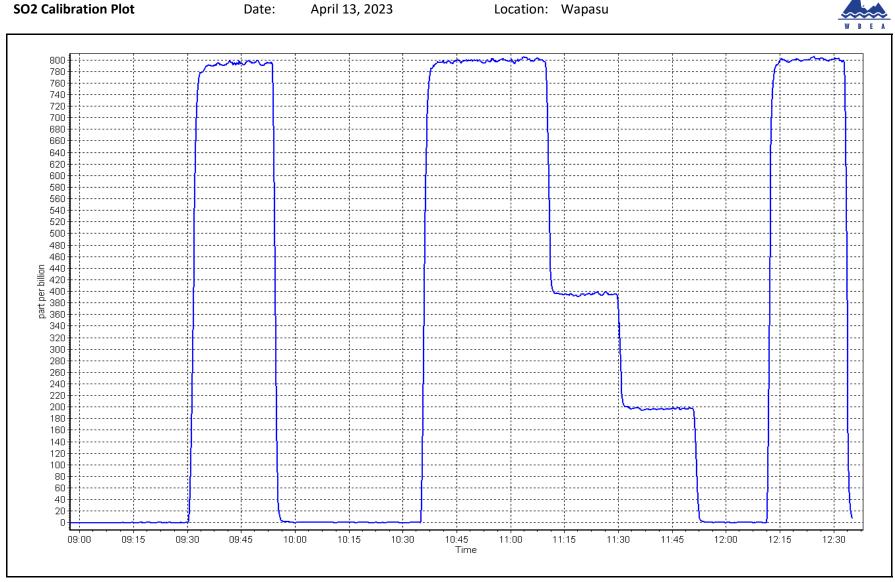
Calibration Performed By:



SO₂ Calibration Summary

WBEA					Version-01
		Station	Information		
Calibration Date:	April 13,	2023	Previous Calibration:	March	9, 2023
Station Name:	Wapa	asu	Station Number:	AN	1517
Start Time (MST):	9:1	0	End Time (MST):	12	2:40
Analyzer make:	Thermo	o 43i	Analyzer serial #:	12182	153459
		Calibi	ration Data		
Calculated concentration I (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999966	≥0.995
800.0	799.6	1.0005		0.999900	20.995
400.0	395.6	1.0112	Slope	0.999723	0.90 - 1.10
199.5	197.8	1.0087	Siope	0.555725	0.90 - 1.10
			Intercept	-1.559214	+/-30







H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu April 21, 2023 9:02 Routine		Station number: Last Cal Date: End time (MST):	AMS17 March 8, 2023 13:23	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.076 CC511852	ppm	Cal Gas Exp Date:	September 16, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	5.076 n/a	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	n/a 2449	
ZAG Make/Model:	API 1700 API T701H		Serial Number:	359	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i n/a 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153583 n/a	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.990568	0.990854	Backgd or Offset:		12.7
Calibration intercept:	0.180784	0.220786	Coeff or Slope:	1.085	1.085
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
as found zero	5000	0.0	0.0	0.1	
as found span	4921	78.8	80.0	79.7	1.005
as found 2nd point	4961	39.4	40.0	39.8	1.007
as found 3rd point	4980	19.7	20.0	20.0	1.005
new cylinder response		H ₂ S Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	78.8	80.0	79.6	1.005
second point	4921	39.4	40.0	39.7	1.005
third point	4980	19.7	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.5	
as left span	4921	78.8	80.0	78.1	1.024
SO2 Scrubber Check	4921	79.4	800.0	0.1	
Date of last scrubber cha		n/a		Ave Corr Factor	1.006
Date of last converter eff		n/a			efficiency
Baseline Corr As found:	79.6	Prev response:	79.43	*% change:	0.2%
Baseline Corr 2nd AF pt:	39.7	AF Slope:		AF Intercept:	0.080792
Baseline Corr 3rd AF pt:	19.9	AF Correlation:			
				* = > +/-5% change initiate	s investigation

Notes:

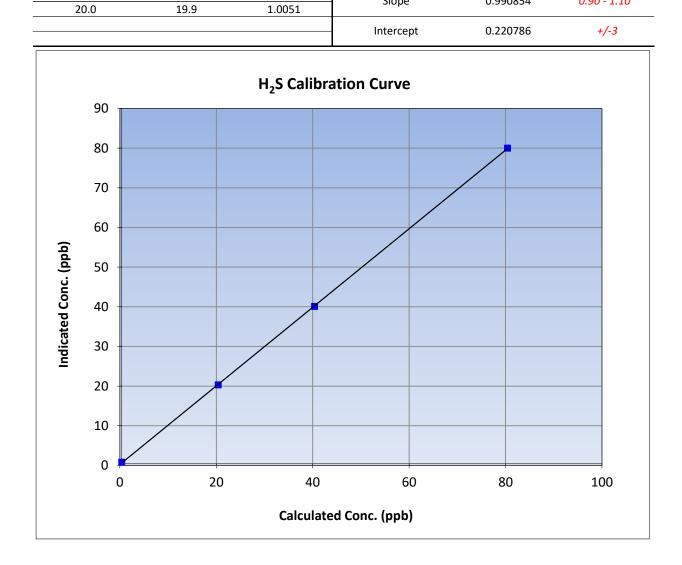
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

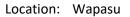


H₂S Calibration Summary

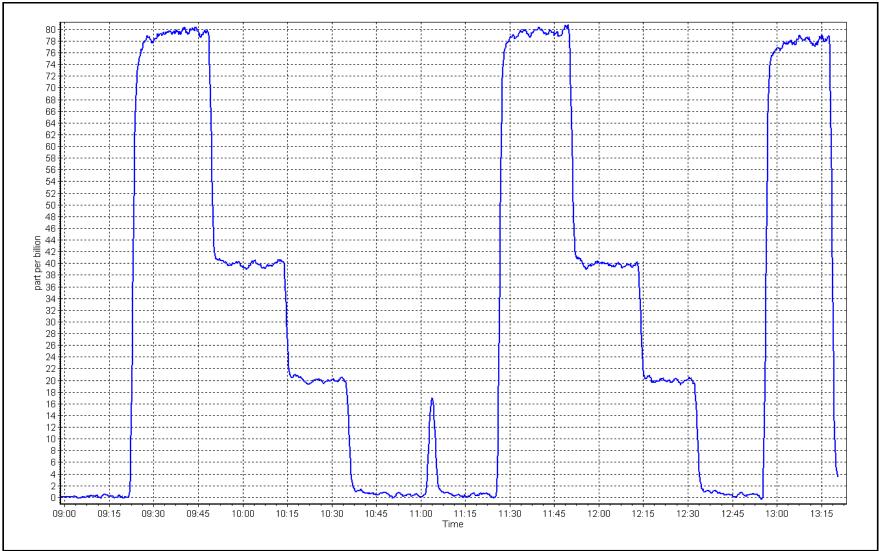
WBEA					Version-11-20
		Station	Information		
Calibration Date:	April 21	2023	Previous Calibration:	March	8, 2023
Station Name:	Wapa	asu	Station Number:	AM	1S17
Start Time (MST):	9:0	2	End Time (MST):	13	3:23
Analyzer make:	Thermo	450i	Analyzer serial #:	1218:	153583
		Calib	ration Data		
Calculated concentration Ir (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999975	≥0.995
80.0	79.6	1.0050		0.333975	20.995
40.0	39.7	1.0074	Slope	0.990854	0.90 - 1.10
20.0	10.0	1 0051	Siope	0.330034	0.30 - 1.10



H₂S Calibration Plot









THC Calibration Report

Version-01-2020

		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu April 13, 2023 9:10 Routine		Station number: Last Cal Date: End time (MST):	AMS17 March 9, 2023 12:40	
		Calibration S	tandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	<u>503.5</u> 208.3	066507 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	January 12, 2029 1076.3	ррт
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	503.5 208.3 API T700 API 701H	n/a ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	1076.3 2449 359	ppm
		Analyzer Info	ormation		
Analyzer make Analyzer Range	e: Thermo 51i-LT e: 0 - 20 ppm	,	Analyzer serial #:	1218153352	
Calibration slope: Calibration intercept:	<u>Start</u> 1.000425 -0.058335	<u>Finish</u> 1.001474 -0.066926	Background: Coefficient:	<u>Start</u> 3.140 4.250	<u>Finish</u> 3.070 4.296
		THC Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	-0.11	
as found span as found 2nd point as found 3rd point	4921	79.4	17.09	16.82	1.016
new cylinder response					
calibrator zero	5000	0.0	0.00	-0.03	
high point	4921	79.4	17.09	17.09	1.000
second point	4960	39.7	8.55	8.41	1.016
third point	4980	19.8	4.26	4.21	1.013
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.4	17.09	17.13	0.998
				ge Correction Factor	
Baseline Corr As found:	16.93	Previous response		*% change	
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

Notes:

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

Calibration Performed By:

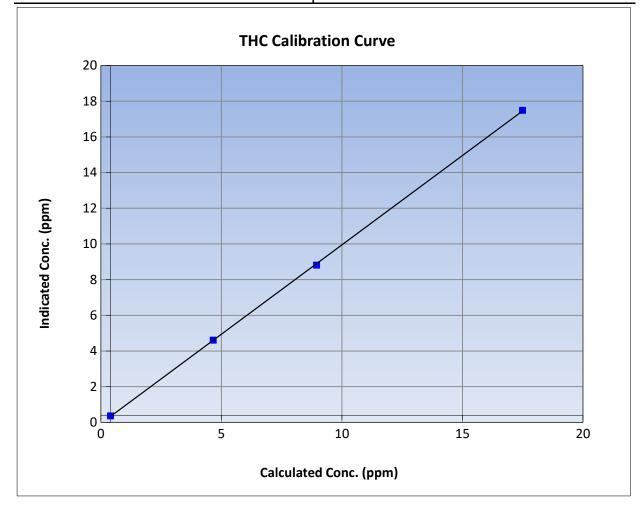


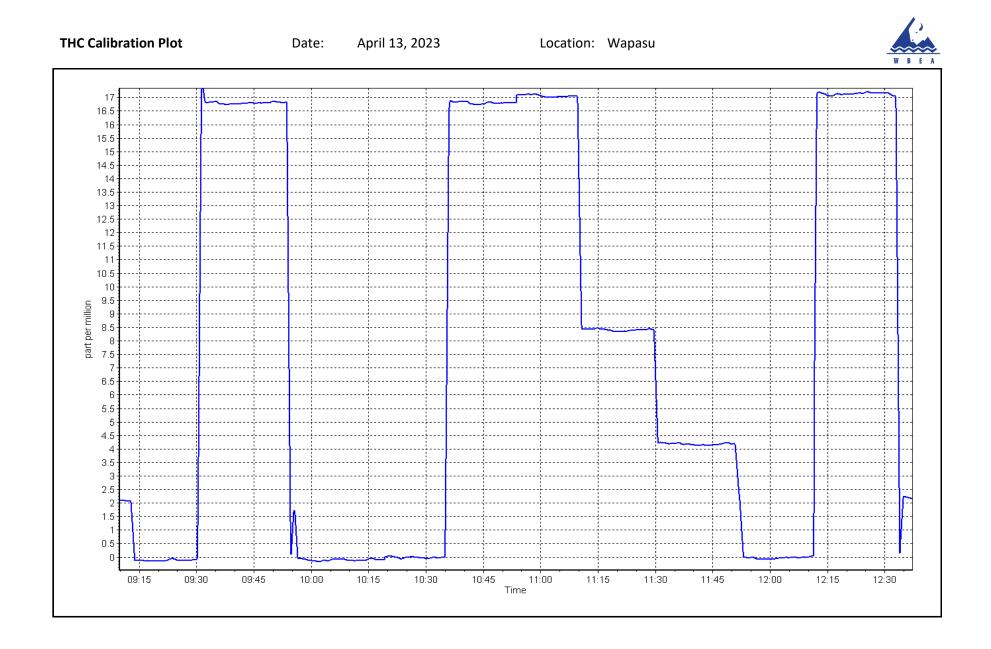
THC Calibration Summary

WBEA			Version-01-2020
	Stat	ion Information	
Calibration Date:	April 13, 2023	Previous Calibration:	March 9, 2023
Station Name:	Wapasu	Station Number:	AMS17
Start Time (MST):	9:10	End Time (MST):	12:40
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352

Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	-0.03		Correlation Coefficient	0.999944	≥0.995
17.09	17.09	1.0002	correlation coefficient	0.999944	20.333
8.55	8.41	1.0159	Slope	1.001474	0.90 - 1.10
4.26	4.21	1.0129	510pe	1.001474	0.30 - 1.10
			Intercept	-0.066926	+/-1.5







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Wapasu April 25, 2023 10:10 Routine		Station number: AN Last Cal Date: Ma End time (MST): 15	arch 23, 2023	
		Calibratio	on Standards		
NO Gas Cylinder #:	Т37	'5YK8	Cal Gas Expiry Date: Ap	oril 13 2025	
NOX Cal Gas Conc:	49.11	ppm	NO Cal Gas Conc:	48.07	ppm
Removed Cylinder #:			Removed Gas Exp Date:		
Removed Gas NOX Conc:	<u>49.11</u>	ppm	Removed Gas NO Conc:	<u>48.07</u>	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number: 24		
ZAG make/model:	API T701H		Serial Number: 35	9	
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	<u>Start</u> : 0.820 : 0.812	<i>Finish</i> 0.836 0.828 1.000	Information Analyzer serial #: 83 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	3 <u>Start</u> 0.1 -0.4 4.4	<u>Finish</u> 0.1 -0.4 4.4
		Calibratio	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope		0.987970		1.001718	
NO _x Cal Offset		-1.020000		-1.660000	
NO Cal Slope		0.989414		1.001759	
NO Cal Offset		-1.920000		-1.940000	
NO ₂ Cal Slope		0.999015		0.991719	
NO ₂ Cal Offset		0.401105		-0.351144	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.0	0.5		
as found span	4917	83.2	817.2	799.9	17.3	799.3	780.8	18.5	1.0224	1.0244
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	-0.2	0.4		
high point	4917	83.2	817.2	799.9	17.3	818.0	800.0	17.7	0.9990	0.9999
second point	4958	41.6	408.6	399.9	8.7	406.2	398.5	7.6	1.0059	1.0036
third point	4979	20.8	204.3	200.0	4.3	201.6	196.2	5.4	1.0134	1.0192
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2		
as left span	4917	83.2	817.2	399.1	418.1	810.0	398.3	411.8	1.0089	1.0020
							Average C	orrection Factor	1.0061	1.0076
Corrected As fo	ound NO _x =	798.8 ppb	NO =	780.8 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	-0.9%
Previous Respo	onse NO _x =	806.3 ppb	NO =	789.5 ppb				*Percent Chan	ge NO =	-1.1%
Baseline Corr 2	nd pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	ard pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.5	397.7	418.1	414.7	1.0082	99.2%
2nd GPT point (200 ppb O3)	798.5	599.3	216.5	214.0	1.0117	98.8%
3rd GPT point (100 ppb O3)	798.5	700.2	115.6	113.5	1.0186	98.2%
				Average Correction Factor	1.0128	98.7%

Notes:

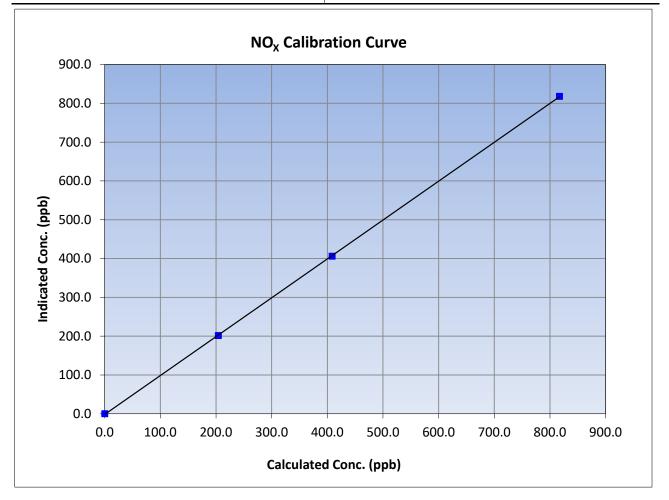
Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By:



NO_x Calibration Summary

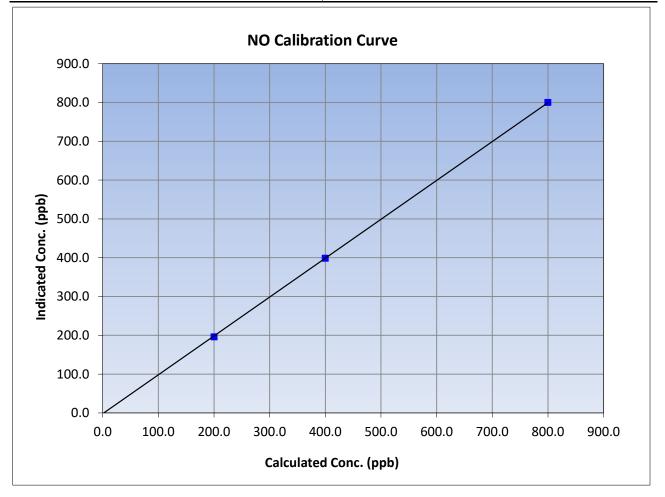
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	5, 2023	Previous Calibration:	March	23, 2023
Station Name:	Wa	pasu	Station Number:	AN	MS17
Start Time (MST):	10	:10	End Time (MST):	1	5:05
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	8	333
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999978	≥0.995
817.2	818.0	0.9990	correlation coernelent	0.555578	20.995
408.6	406.2	1.0059	Slope 1.001718		0.90 - 1.10
204.3	201.6	1.0134	Slope	1.001/18	0.90 - 1.10
			Intercept	-1.660000	+/-20





NO Calibration Summary

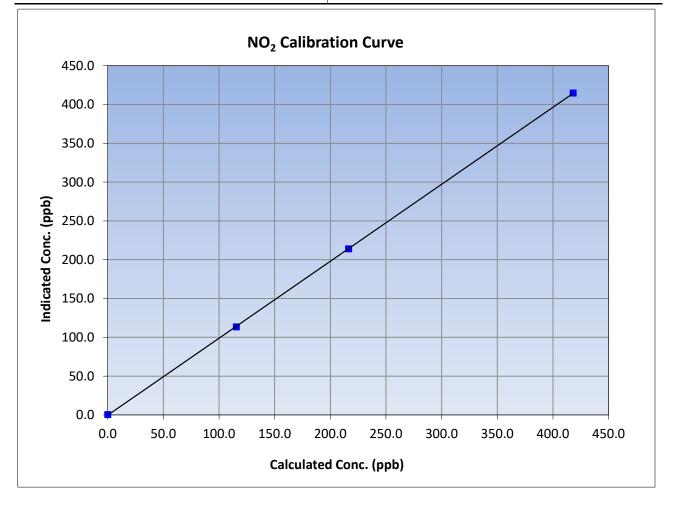
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 2	5, 2023	Previous Calibration:	March	1 23 <i>,</i> 2023	
Station Name:	Wa	pasu	Station Number:	А	MS17	
Start Time (MST):	10	:10	End Time (MST):	1	15:05	
Analyzer make:	Teledyne	API T200	Analyzer serial #:		833	
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (lc)	Calibra Correction factor (Cc/lc)	ation Data Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.2		Correlation Coefficient	0.999976	≥0.995	
799.9	800.0	0.9999	correlation coefficient	0.999970	20.995	
399.9	398.5	1.0036	Slope	1.001759	0.90 - 1.10	
200.0	196.2	1.0192	Siope	1.001759	0.90 - 1.10	
			Intercept	-1.940000	+/-20	

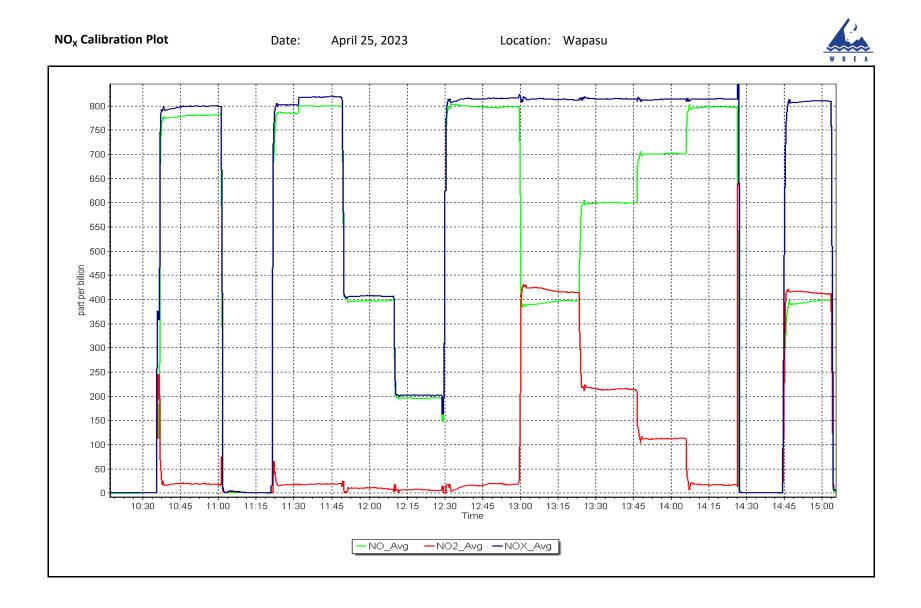




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	5, 2023	Previous Calibration:	March	23, 2023
Station Name:	Wa	pasu	Station Number:	A	MS17
Start Time (MST):	10	:10	End Time (MST):	1	5:05
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	;	833
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999984	≥0.995
418.1	414.7	1.0082	correlation coefficient	0.999984	20.333
216.5	214.0	1.0117	Slope	0.991719	0.90 - 1.10
115.6	113.5	1.0186	Slope	0.991719	0.90 - 1.10
			Intercept	-0.351144	+/-20







O₃ Calibration Report

Version-01-2020

		A A A A					
		Station Infor	mation				
Station Name:	Wapasu		Station number: AMS17				
Calibration Date:	April 11, 2023		Last Cal Date: March 3, 2023				
Start time (MST):	9:55	End time (MST): 13:13					
Reason:	Routine						
		Calibration St	andards				
O3 generation mode:	Photometer						
Calibrator Make/Model:	API T700		Serial Number:	2449			
ZAG Make/Model:	API T701H		Serial Number:	359			
		Analyzer Info	rmation				
Analyzer make	: API T400		Analyzer serial #:	3870			
Analyzer Range	e 0 - 500 ppb		·				
	Start	Finish		Start	Finish		
Calibration slope:	1.006086	1.008600	Backgd or Offset:		-1.8		
Calibration intercept:	-0.540000	-0.380000	Coeff or Slope:		1.020		
		Q. Calibratia	- Data				
		U ₃ Calibratio	on Data				
		O ₃ Calibratio	on Data				
Set Point	Total air flow rate	Calibrator Lamp	Calculated	Indicated concentration C	•		
Set Point	Total air flow rate (sccm)			Indicated concentration C (ppm) (Ic)	Correction factor (Cc Limit = 0.95-1.05		
Set Point as found zero		Calibrator Lamp	Calculated		•		
	(sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	(ppm) (Ic)	Limit = 0.95-1.05		
as found zero	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.1	Limit = 0.95-1.05		
as found zero as found span	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.1	Limit = 0.95-1.05		
as found zero as found span as found 2nd point	(sccm) 5000	Calibrator Lamp Voltage Drive 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppm) (Ic) 0.1	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000 5000	Calibrator Lamp Voltage Drive 0.0 1077.3	Calculated concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) 0.1 403.6	Limit = 0.95-1.05 0.991		
as found zero as found span as found 2nd point as found 3rd point calibrator zero	(sccm) 5000 5000 5000	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0	Calculated concentration (ppb) (Cc) 0.0 400.0	(ppm) (Ic) 0.1 403.6 0.1	Limit = 0.95-1.05 0.991 		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point	(sccm) 5000 5000 	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0	(ppm) (Ic) 0.1 403.6 0.1 403.2	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point	(sccm) 5000 5000 	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3	Calculated concentration (ppb) (Cc) 0.0 400.0 	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point	(sccm) 5000 5000 5000 5000 5000 5000	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3 789.5	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4 99.8	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3 789.5 0.0	Calculated concentration (ppb) (Cc) 0.0 400.0 	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4 99.8 0.1	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3 789.5 0.0	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Averag	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4 99.8 0.1 405.8	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3 789.5 0.0 1077.3	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 400.0 Averag 401.9	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4 99.8 0.1 405.8 ge Correction Factor	Limit = 0.95-1.05		
as found zero as found span as found 2nd point as found 3rd point calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	(sccm) 5000 5000 5000 5000 5000 5000 5000 50	Calibrator Lamp Voltage Drive 0.0 1077.3 0.0 1077.3 900.3 789.5 0.0 1077.3 Previous response	Calculated concentration (ppb) (Cc) 0.0 400.0 0.0 400.0 200.0 100.0 0.0 400.0 Average 401.9	(ppm) (Ic) 0.1 403.6 0.1 403.2 201.4 99.8 0.1 405.8 ge Correction Factor *% change	Limit = 0.95-1.05		

Notes:

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

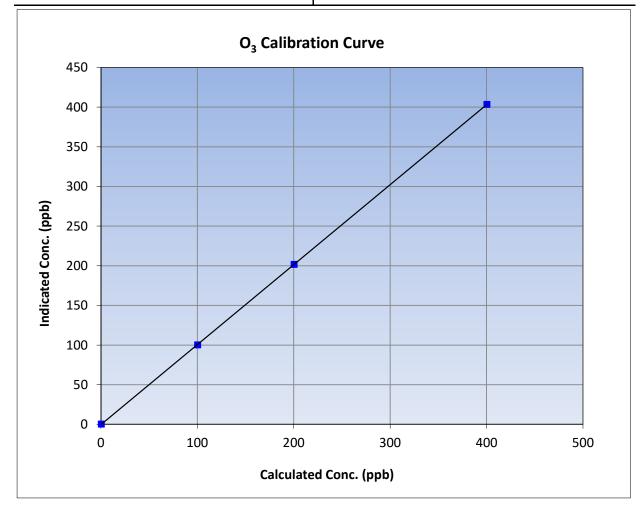
Calibration Performed By:

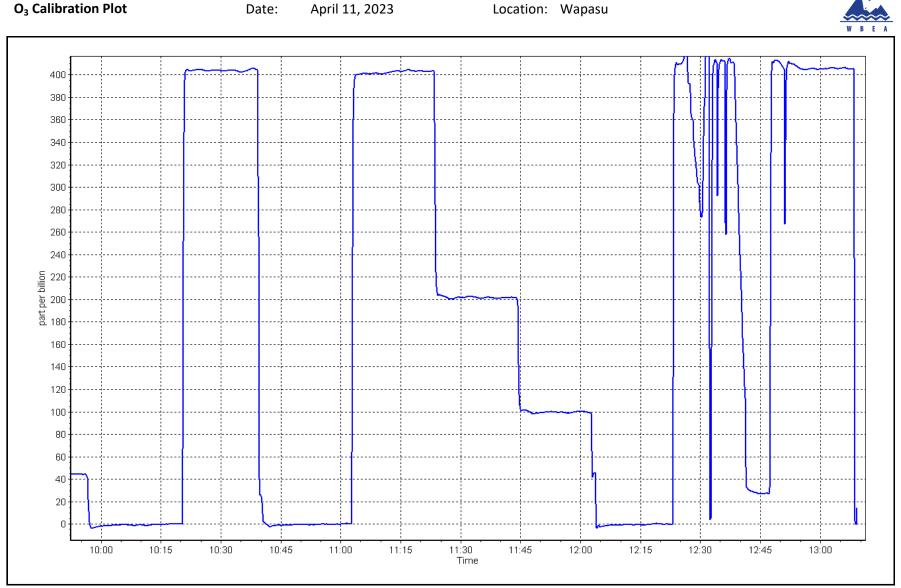
Karan Pandit



O₃ Calibration Summary

WBEA					Version-01-2	
		Station	Information			
Calibration Date:	April 11,	2023	23 Previous Calibration: Mar		rch 3, 2023	
Station Name:	Wapa	asu	Station Number:	AN	AS17	
Start Time (MST):	9:5	5	End Time (MST):	13:13		
Analyzer make:	API T4	100	Analyzer serial #:	3	870	
Calculated concentration	Indicated concentration	Calibr Correction factor	ration Data	tion	Limite	
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evalua	ition	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999992	≥0.995	
400.0	403.2	0.9921	Correlation Coefficient	0.999992	20.995	
200.0	201.4	0.9930	Slope	1.008600	0.90 - 1.10	
100.0	99.8	1.0020	5.0pc	1.000000	0.00 1.10	
			Intercept	-0.380000	+/- 5	







T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023
		Station Information	1			
Station Name:	Wapasu		Station number:	AMS 17		
Calibration Date:	April 25, 2023		Last Cal Date:	March 23, 20	23	
Start time (MST):	13:15		End time (MST):	14:34		
Analyzer Make:	API T640		S/N:	1183		
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 To	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>/</u>	<u>Adjusted</u>	(Limits)
T (°C)	4.60	4.06	4.60			+/- 2 °C
P (mmHg)	710.00	712.43	710.00			+/- 10 mmHg
flow (LPM)	5.00	5.05	5.00			+/- 0.25 LPM
Leak Test:	Date of check:	April 25, 2023	Last Cal Date:	March 23,	2023	
	PM w/o HEPA:	6.9	PM w/ HEPA:	0.0		<0.2 ug/m3
Note: this leak check will be			erve as the pre mai	intenance lea	k check	
Inlet cleaning :	Inlet Head	\checkmark				
		Quarterly Calibration T	est			
Parameter	<u>As found</u>	Post maintenance	As left		Adjusted	(Limits)
PMT Peak Test	<u>As tound</u>	<u>r ost maintenance</u>	<u>As left</u>	<u>'</u>		10.9 +/- 0.5
TWITT Cak TCSt						10.5 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham	ber Cleaned:	March 23,	2023			<0.2 ug/m3
Disposable Filte	r Changed:	March 23,	2023			
		Annual Maintenance	2			
			-			
Date Sample Tub	pe Cleaned:					
Date RH/T Sense	or Cleaned:					
Notes:		No adjustments	made. Leak check p	bassed.		
Calibration by:	Aswin Sasi Kumar					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS18 STONY MOUNTAIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Stony Mountain		Station number:	AMS 18	
Calibration Date:	April 27, 2023		Last Cal Date:	March 30, 2023	
Start time (MST):	9:50		End time (MST):	12:48	
Reason:	Routine				
		Calibuation Ct	e u de ude		
		Calibration St			
Cal Gas Concentration:	49.40	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	CC463851				
Removed Cal Gas Conc:	49.40	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	2658	
ZAG Make/Model:	Teledyne API 701H		Serial Number:	360	
		Analyzer Info	rmation		
Analyzer make	· Thermo 43i	, -	Analyzer serial #:	IC1501301453	
Analyzer Range				501501501455	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.006974	0.997063	Backgd or Offset:	22.9	22.6
Calibration intercept:	-1.482948	0.035860	Coeff or Slope:	0.817	0.808
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/I Limit = 0.95-1.05
as found zero	5009	0.0	0.0	-0.2	
as found span	4919	81.0	800.3	805.9	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4919	81.0	800.3	797.6	1.003
second point	4959	40.5	400.2	400.2	1.000
third point	4979	20.2	199.6	198.2	1.007
as left zero	5000	0.0	0.0	0.0	
as left span	4919	81.0	800.3	799.2	1.001
				ge Correction Factor	1.003
Baseline Corr As found:	806.10	Previous response	804.38	*% change	0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
		e.epei		in meeteeper	

Notes:

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

Calibration Performed By:

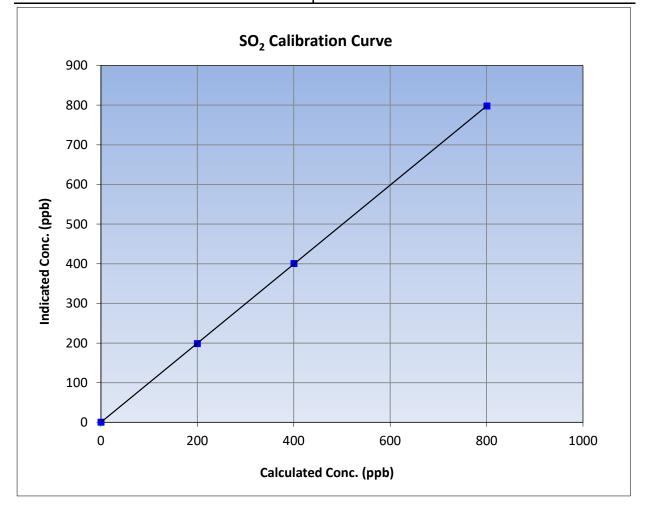


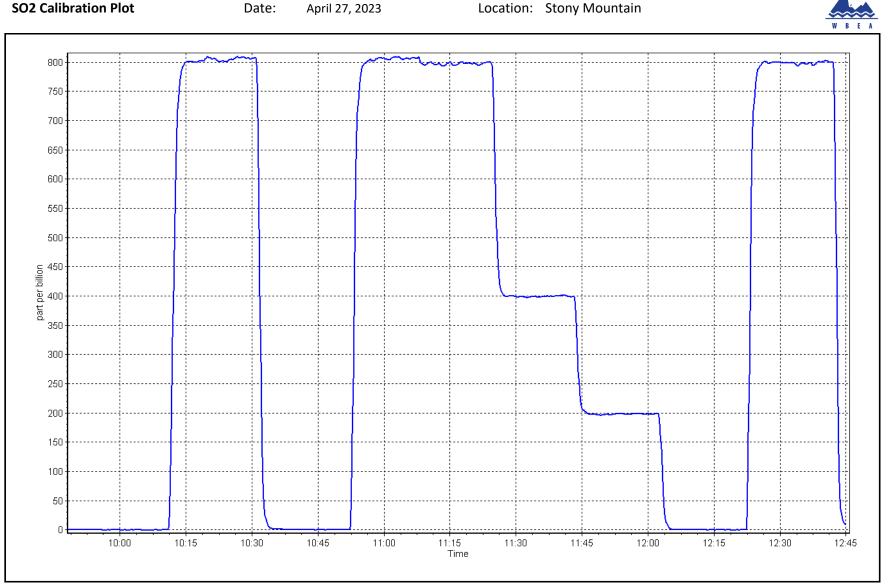
SO₂ Calibration Summary

WBEA			Version-01-2020					
Station Information								
Calibration Date:	April 27, 2023	Previous Calibration:	March 30, 2023					
Station Name:	Stony Mountain	Station Number:	AMS 18					
Start Time (MST):	9:50	End Time (MST):	12:48					
Analyzer make:	Thermo 43i	Analyzer serial #:	JC1501301453					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999994	≥0.995	
800.3	797.6	1.0034	correlation coefficient	0.555554	20.333	
400.2	400.2	1.0000	Slope	0.997063	0.90 - 1.10	
199.6	198.2	1.0071	Slope	0.997003	0.90 - 1.10	
			Intercept	0.035860	+/-30	





April 27, 2023

Location: Stony Mountain





TRS Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain April 26, 2023 9:37 Routine		Station number: Last Cal Date: End time (MST):	AMS18 March 7, 2023 14:00	
		Calibration S	tandards		
Cal Gas Concentration:	5.479	ppm	Cal Gas Exp Date:	January 4, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #:	CC500395 5.479 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	Teledyne API T700 Teledyne API T701		Serial Number: Serial Number:	2658 360	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD Nova CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1218153359 555	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.005159	0.994871	Backgd or Offset:	2.56	2.60
Calibration intercept:	0.260882	0.321057	Coeff or Slope:	1.151	1.151
		TRS As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4927	73.0	80.0	78.6	1.019
as found 2nd point	4964	36.5	40.0	39.6	1.012
as found 3rd point	4983	18.3	20.0	19.5	1.033
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.2	
high point	4927	73.0	80.0	79.8	1.002
second point	4964	36.5	40.0	40.3	0.992
third point	4983	18.3	20.0	20.3	0.988
as left zero	5000	0.0	0.0	0.3	
as left span	4927	73.0	80.0	79.7	1.004
O2 Scrubber Check	4923	77.1	771.0	0.0	
ate of last scrubber cha		17-Dec-21		Ave Corr Factor	0.994
ate of last converter eff	iciency test:				efficiency
	78.5	Prev response:	80.67	*% change:	-2.8%
Baseline Corr As found:	70.5				
	39.5			AF Intercept:	0.041427
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:		AF Slope: AF Correlation:	0.982863	AF Intercept:	0.041427

Notes:

Sample inlet filter changed after as founds. Scrubber check completed after calibrator zero. No adjustments made.

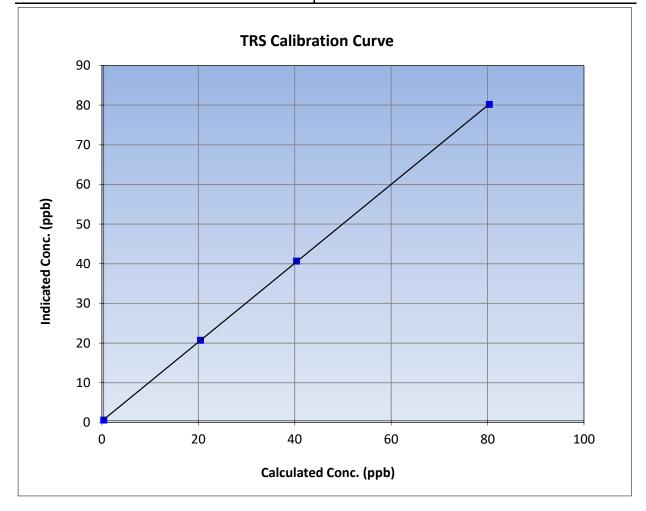


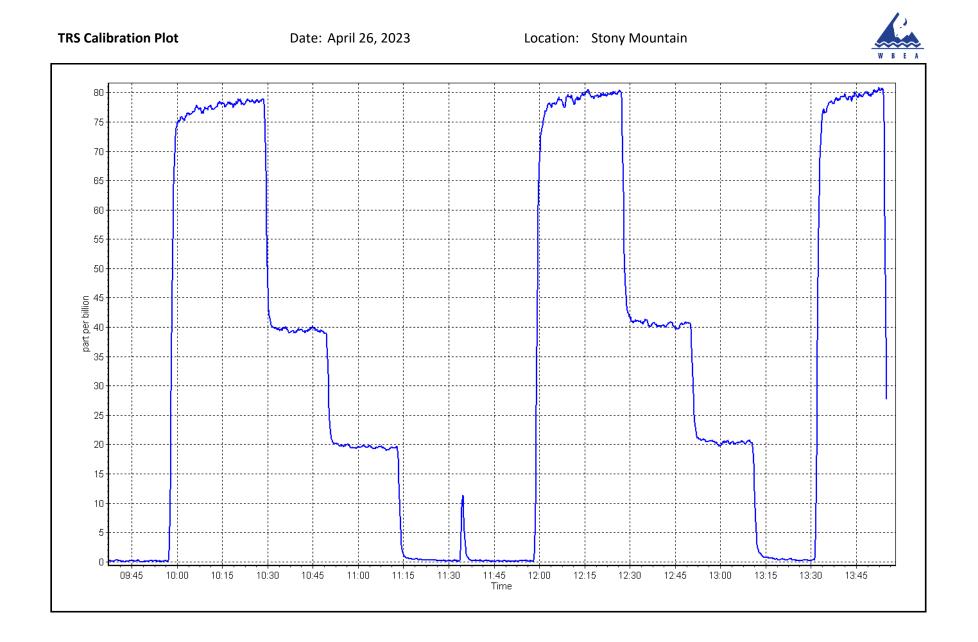
TRS Calibration Summary

Station Information								
Calibration Date:	April 26, 2023	Previous Calibration:	March 7, 2023					
Station Name:	Stony Mountain	Station Number:	AMS18					
Start Time (MST):	9:37	End Time (MST):	14:00					
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1218153359					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999982	≥0.995
80.0	79.8	1.0024	correlation coefficient	0.999982	20.995
40.0	40.3	0.9924	Slope	0.994871	0.90 - 1.10
20.0	20.3	0.9876	Slope	0.994071	0.90 - 1.10
			- Intercept	0.321057	+/-3







THC / CH₄ / NMHC Calibration Report

Version-01-2020 **Station Information** Station Name: Stony Mountain Station number: AMS 18 Last Cal Date: March 30, 2023 Calibration Date: April 27, 2023 9:50 End time (MST): 12:48 Start time (MST): Reason: Routine **Calibration Standards** Gas Cert Reference: Cal Gas Expiry Date: February 23, 2025 CC463851 CH4 Cal Gas Conc. 500.8 CH4 Equiv Conc. 1066.8 ppm ppm

C3H8 Cal Gas Conc.	205.8	nnm		-		
	205.8	ppm				
Removed Gas Cert:		NA		Removed Gas Expiry: NA	A	
Removed CH4 Conc.	500.8	ppm		CH4 Equiv Conc.	1066.8	ppm
Removed C3H8 Conc.	205.8	ppm	Di	ff between cyl (THC):		
Diff between cyl (CH ₄	ı):		Di	iff between cyl (NM):		
Calibrator Model:	Teledyne API T7	700		Serial Number: 26	58	
ZAG make/model:	Teledyne API T7	701H		Serial Number: 36	0	
			Analyzer Info	rmation		
			/			
Analyzer mak	e: Thermo 55i			Analyzer serial #: 11	80320039	
THC Range (ppm	i): 0 - 20 ppm					
NMHC Range (ppm): 0 - 10 ppm			CH4 Range (ppm): 0 -	10 ppm	
	Ctart		Finich		Chaut	Finit

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	3.06E-04	3.06E-04	NMHC SP Ratio:	5.66E-05	5.73E-05
CH4 Retention time:	14.60	14.60	NMHC Peak Area:	162130	159925

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4919	81.0	17.28	17.12	1.009		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4919	81.0	17.28	17.27	1.000		
second point	4959	40.5	8.64	8.63	1.002		
third point	4979	20.2	4.31	4.31	1.001		
as left zero	5000	0.0	0.00	0.00			
as left span	4919	81.0	17.28	17.32	0.998		
			A	Average Correction Factor	1.001		
Baseline Corr AF:	17.12	Prev response	17.22	*% change	-0.6%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data									
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05				
as found zero	5000	0.0	0.00	0.00					
as found span	4919	81.0	9.17	9.03	1.015				
as found 2nd point									
as found 3rd point									
new cylinder response									
calibrator zero	5000	0.0	0.00	0.00					
high point	4919	81.0	9.17	9.17	1.000				
second point	4959	40.5	4.58	4.59	0.998				
third point	4979	20.2	2.29	2.30	0.993				
as left zero	5000	0.0	0.00	0.00					
as left span	4919	81	9.17	9.19	0.998				
			A	Average Correction Factor	0.997				
Baseline Corr AF:	9.03	Prev response	9.11	*% change	-0.8%				
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:					
Baseline Corr 3rd AF:	Baseline Corr 3rd AF:NAAF Correlation:* = > +/-5% change initiates investigation								

СН4	Cal	ibration	Data
CH4	Ca	INIALIOII	Dala

			lion Data			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	5000	0.0	0.00	0.00		
as found span	4919	81.0	8.11	8.09	1.003	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4919	81.0	8.11	8.11	1.001	
second point	4959	40.5	4.06	4.03	1.006	
third point	4979	20.2	2.02	2.00	1.011	
as left zero	5000	0.0	0.00	0.00		
as left span	4919	81.0	8.11	8.14	0.997	
			A	verage Correction Factor	1.006	
Baseline Corr AF:	8.09	Prev response	8.11	*% change	-0.3%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		0.997054		0.999520		
THC Cal Offset:		-0.008797		-0.003183		
CH4 Cal Slope:		1.001440		0.999834		
CH4 Cal Offset:		-0.011209		-0.012012		
NMHC Cal Slope:		0.992924		0.999279		
NMHC Cal Offset:		0.002412	0.008428			

Notes:

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

Calibration Performed By:

Karan Pandit



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	April 2	7, 2023	Previous Calibration:	March 3	0, 2023
Station Name:	Stony N	Iountain	Station Number:	AMS	5 18
Start Time (MST):	9:	50	End Time (MST):	12:	48
Analyzer make:	Therr	no 55i	Analyzer serial #:	11803	20039
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	1.000000	≥0.995
17.28	17.27	1.0005			
8.64 4.31	8.63 4.31	1.0016 1.0012	Slope	0.999520	0.90 - 1.10
			Intercept	-0.003183	+/-0.5
20.0 - 18.0 -					
16.0 -				_	
14.0 -					
14.0					
ີ ແລະ 12.0 -					
(bbu) (bb))(bb)(
- 0.8 ated					
+ 0.8 Indicated + 0.6 +					
4.0 -					
2.0					
0.0	<u> </u>	.0	10.0	15.0	20.0
0.0	5 5	.0	10.0	13.0	20.0



CH₄ Calibration Summary

Version-01-2020

			Station I	nformation		
Calibration D	Date:	April 2	7, 2023	Previous Calibrati	on: March	30, 2023
Station Nam			lountain	Station Num		IS 18
Start Time (N			50	End Time (M		2:48
Analyzer ma			no 55i	Analyzer seria		320039
			Calibra	ation Data		
Calculated cond (ppm) ((Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statisti	cal Evaluation	<u>Limits</u>
0.00		0.00		Correlation Coeffici	ent 0.999989	≥0.995
8.11		8.11	1.0007			
4.06		4.03	1.0057 1.0108	- Slope	0.999834	0.90 - 1.10
	-	2.00	1.0100	Intercept	-0.012012	+/-0.5
7	2.0 2.0 5.0 .0					
4 Conc. (I	.0					
Indicated Conc. (ppm) 5 5	.0					
	.0					
1	0					
0	0.0	2.0	4.0	6.0	8.0	10.0
	0.0	2.0			0.0	10.0
			Calculated	d Conc. (ppm)		



NMHC Calibration Summary

Version-01-2020

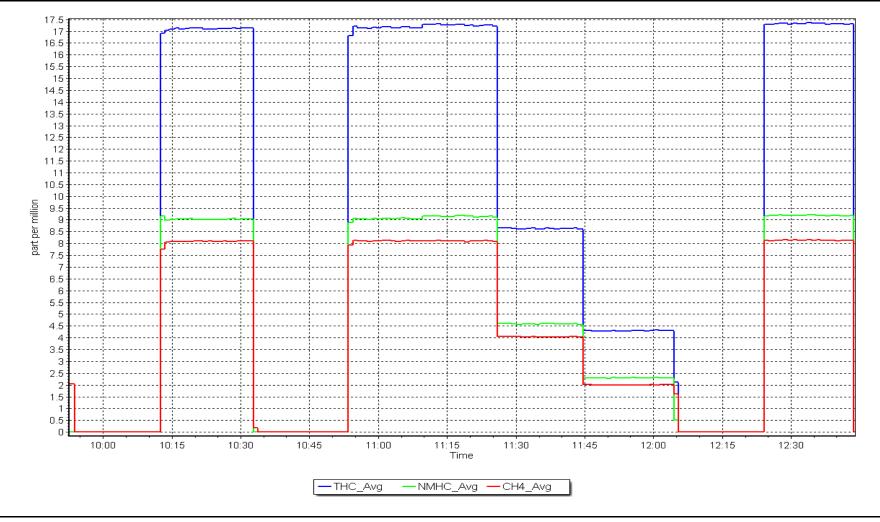
			Station I	nformation		
Calibration Da	ate:	April 2	7, 2023	Previous Calibration:	March 3	0, 2023
Station Name	2:	Stony N	lountain	Station Number:	AMS	5 18
Start Time (M	1ST):	9:	50	End Time (MST):	12:	48
Analyzer mak	ke:	Therr	no 55i	Analyzer serial #:	11803	20039
			Calibra	tion Data		
Calculated conce (ppm) (Co		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eva	luation	<u>Limits</u>
0.00		0.00		Correlation Coefficient	0.999996	≥0.995
9.17 4.58		9.17 4.59	1.0003 0.9980			
2.29		2.30	0.9980	Slope	0.999279	0.90 - 1.10
				Intercept	0.008428	+/-0.5
9. 8. 7.	0 —					
6.0 Conc. (bbm)						
5 .0	0 +					
	o —					
Indicated 3.0	o —					
2.	o —					
1.0	0 +					
0.		-				
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

NMHC Calibration Plot

Date: April 27, 2023

Location: Stony Mountain







Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

ppm

ppm

Station Information

Station number: AMS 18 Last Cal Date: March 22, 2023 End time (MST): 13:45

			Calibration Standards	
NO Gas Cylinder #:	T2XX7ME		Cal Gas Expiry Date: January 14, 202	24
NOX Cal Gas Conc:	50.48	ppm	NO Cal Gas Conc: 49.22	
Removed Cylinder #:	NA		Removed Gas Exp Date: NA	
Removed Gas NOX Conc:	50.48	ppm	Removed Gas NO Conc: 49.22	
NOX gas Diff:			NO gas Diff:	
Calibrator Model:	Teledyne API T700		Serial Number: 2658	
ZAG make/model:	Teledyne API 701H		Serial Number: 360	

Stony Mountain

April 20, 2023

9:18

Routine

Analyzer Information

•	Analyzer make: Thermo 42i NOX Range (ppb): 0 - 1000 ppb		Analyzer serial #: 13	36160088	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.062	1.062	NO bkgnd or offset:	3.0	3.0
NOX coeff or slope:	0.984	0.984	NOX bkgnd or offset:	3.0	3.0
NO2 coeff or slope:	0.999	0.999	Reaction cell Press:	223.9	230.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999873	0.993566
NO _x Cal Offset:	-0.210265	0.129802
NO Cal Slope:	1.002239	0.995555
NO Cal Offset:	-0.950426	-1.209770
NO ₂ Cal Slope:	0.999365	0.999137
NO ₂ Cal Offset:	-0.185598	0.306137



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ition Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4919	81.3	820.8	800.3	20.5	815.7	793.7	22.1	1.0062	1.0083
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4919	81.3	820.8	800.3	20.5	815.4	796.0	19.3	1.0066	1.0054
second point	4959	40.7	410.9	400.7	10.3	409.0	397.4	11.6	1.0047	1.0082
third point	4980	20.3	204.9	199.8	5.1	203.4	196.3	7.1	1.0076	1.0179
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.1		
as left span	4919	81.3	820.8	380.5	440.3	818.6	374.0	444.7	1.0026	1.0173
							Average C	orrection Factor	1.0063	1.0105
Corrected As fo	ound NO _x =	815.8 ppb	NO =	793.8 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-0.6%
Previous Respo	nse NO _x =	820.4 ppb	NO =	801.1 ppb				*Percent Chan	ge NO =	-0.9%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO _X r^2 :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	794.8	375.0	440.3	440.2	1.0002	100.0%
2nd GPT point (200 ppb O3)	794.8	584.8	230.5	230.4	1.0004	100.0%
3rd GPT point (100 ppb O3)	794.8	693.5	121.8	122.4	0.9950	100.5%
				Average Correction Factor	0.9985	100.1%

Notes:

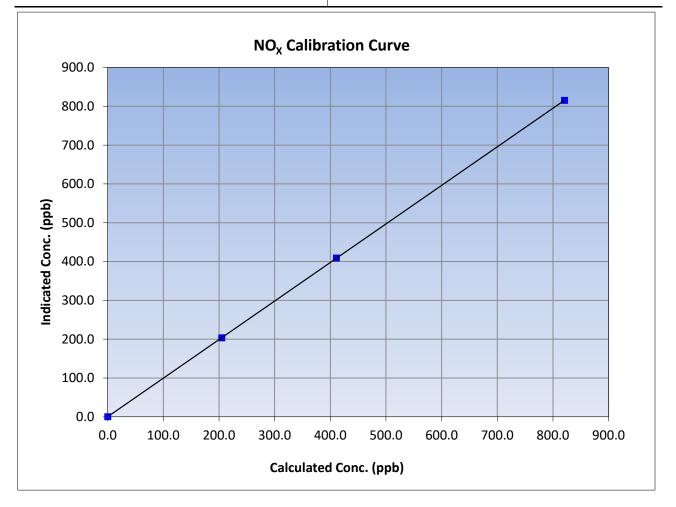
Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:



NO_x Calibration Summary

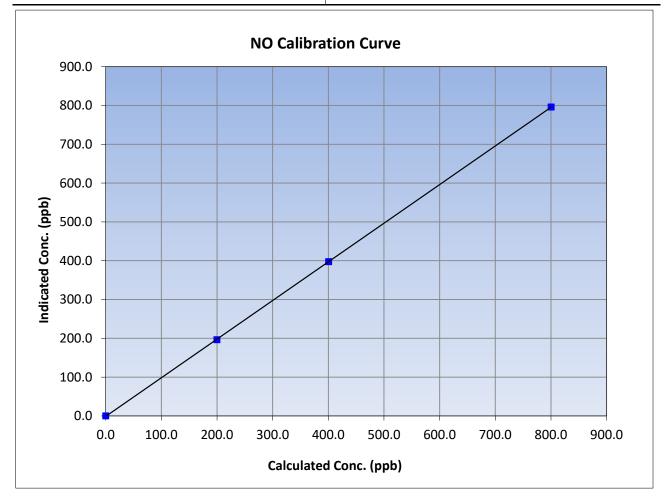
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	0, 2023	Previous Calibration:	March 2	22, 2023
Station Name:	Stony N	Iountain	Station Number:	AM	S 18
Start Time (MST):	9:18		End Time (MST):	13	:45
Analyzer make:	Therr	no 42i	Analyzer serial #:	13361	.60088
		Calibr	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999999	≥0.995
820.8	815.4	1.0066	correlation coefficient	0.5555555	20.333
410.9	409.0	1.0047	Slope	0.993566	0.90 - 1.10
204.9	203.4	1.0076	Slope	0.995500	0.90 - 1.10
			Intercept	0.129802	+/-20





NO Calibration Summary

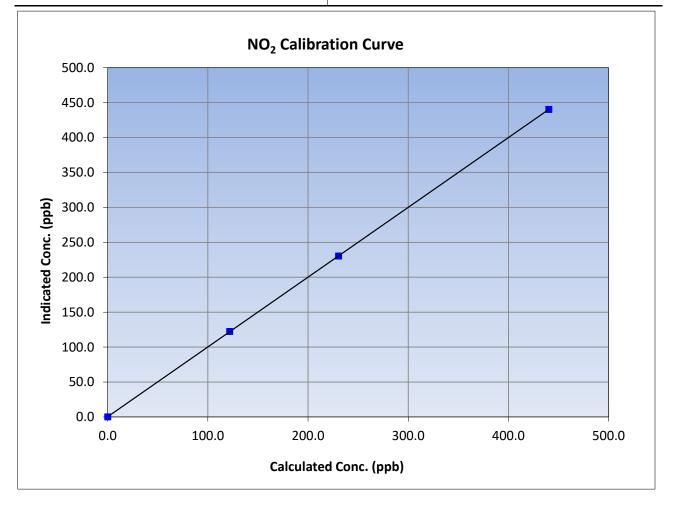
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 20, 2023		Previous Calibration:	March 2	March 22, 2023	
Station Name:	Stony Mountain		Station Number:	AM	AMS 18	
Start Time (MST):	9:18		End Time (MST):	13	13:45	
Analyzer make:	Thermo 42i		Analyzer serial #:	13361	1336160088	
		Calibr	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999989	≥0.995	
800.3	796.0	1.0054			20.333	
400.7	397.4	1.0082	Slope	0.995555 0.90	0.90 - 1.10	
199.8	196.3	1.0179			0.90 - 1.10	
			Intercept	-1.209770	+/-20	

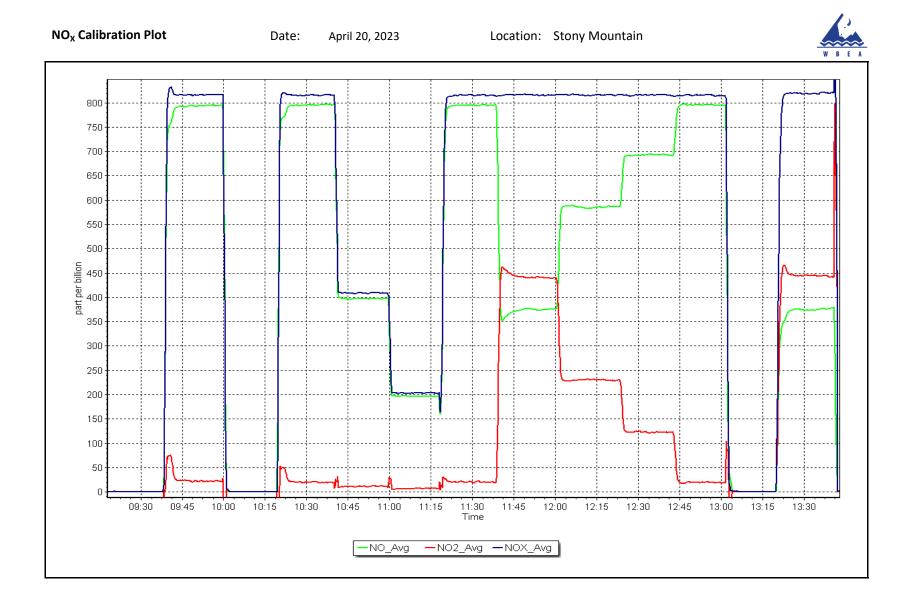




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 20, 2023		Previous Calibration:	March 2	22, 2023	
Station Name:	Stony Mountain		Station Number:	AM	AMS 18	
Start Time (MST):	9:18		End Time (MST):	13	13:45	
Analyzer make:	Thermo 42i		Analyzer serial #:	1336160088		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999998 ≥0	≥0.995	
440.3	440.2	1.0002			20.995	
230.5	230.4	1.0004	Slope	0.999137	0.90 - 1.10	
121.8	122.4	0.9950		0.555157	0.90 - 1.10	
			Intercept	0.306137	+/-20	







O₃ Calibration Report

Version-01-2020

					Version-01-202
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Stony Mountain April 4, 2023 9:28 Routine		Station number: Last Cal Date: End time (MST):	March 1, 2023	
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer Teledyne API T700 Teledyne API T701H		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make: Analyzer Range			Analyzer serial #:	825	
Calibration slope: Calibration intercept:	<u>Start</u> 0.993829 0.180000	<u>Finish</u> 0.999114 -0.420000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.000 0.993
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppm) (Ic)	Correction factor (Cc/l Limit = 0.95-1.05
as found zero	5000	800.0	0.0	-0.3	
as found span	4888	1096.9	400.0	401.1	0.997
as found 2nd point as found 3rd point					
calibrator zero	5000	800.0	0.0	-0.3	
high point	4888	1101.7	400.0	399.3	1.002
second point	4888	863.9	200.0	199.3	1.004
third point	4888	741.4	100.0	99.4	1.006
as left zero	5000	800.0	0.0	0.1	
as left span	4812	1097.9	400.0	400.6	0.999
			Avera	ge Correction Factor	1.004
Baseline Corr As found: Baseline Corr 2nd AF pt:	401.4 NA	Previous response AF Slope:		*% change AF Intercept:	0.9%
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	es investigation

Notes:

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

Calibration Performed By:

Karan Pandit

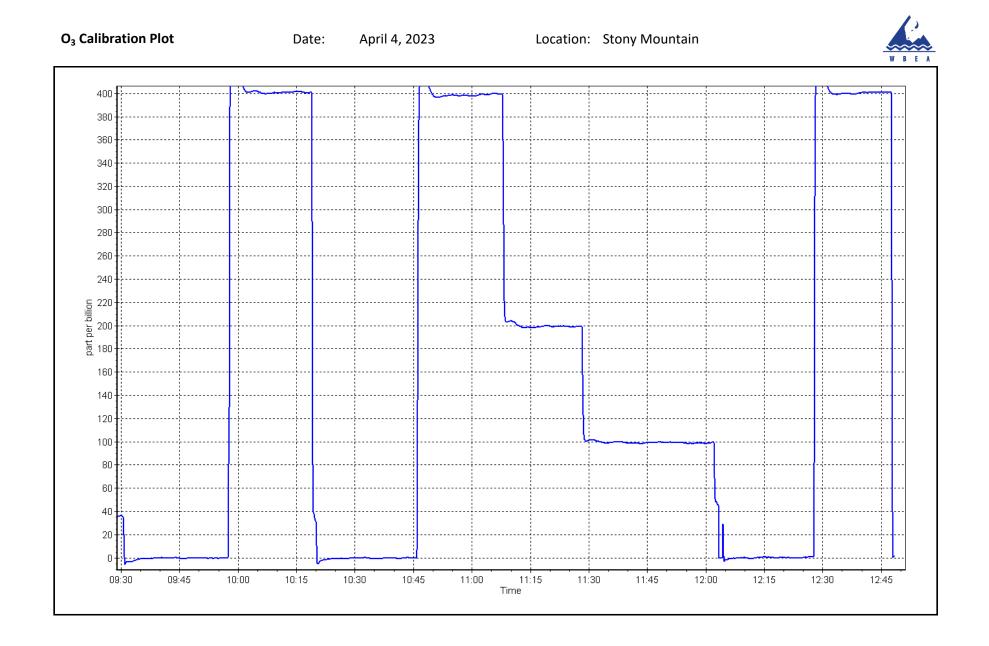


Calculated Conc. (ppb)

Wood Buffalo Environmental Association

O₃ Calibration Summary

W B E A						Version-01-20	
			Station	Information			
Calibration Date Station Name:	Sto	April 4, 2023 Stony Mountain		Previous Calibration Station Number	: AM	March 1, 2023 AMS18	
Start Time (MS Analyzer make:	Γ):	9:28 API T400		End Time (MST) Analyzer serial #		2:50 325	
			Calibr	ation Data			
Calculated concent (ppb) (Cc)	ration Indicated concent (ppb) (Ic)	ration Correctior (Cc/I		Statistical Ev	aluation	<u>Limits</u>	
0.0 400.0	-0.3 399.3	1.00	18	Correlation Coefficient	1.000000	≥0.995	
200.0 100.0	199.3 99.4	1.00		Slope	0.999114	0.90 - 1.10	
				Intercept	-0.420000	+/- 5	
450		0 ₃ C	alibra	tion Curve			
400							
350							
300							
Indicated Conc. (ppb) 500 120 120							
200 ga							
150 150							





T640 PM_{2.5} CALIBRATION

W D E A					Version-01-2023
		Station Information	n		
Station Name:	Stony Mountain		Station number:	AMS 18	
Calibration Date:	April 19, 2023		Last Cal Date:	March 22, 2023	
Start time (MST):	10:23		End time (MST):	10:45	
Analyzar Maka			C /NI-	1225	
Analyzer Make: Particulate Fraction:	API T640 PM2.5		S/N:	1335	
	PIVI2.5				
Flow Meter Make/Model:	Delta Cal		S/N:	1102	
Temp/RH standard:	Delta Cal		S/N:	1102	
		Monthly Calibration T	est		
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	0.5	0.7	0.5		+/- 2 °C
P (mmHg)	701.5	703.2	701.5		+/- 10 mmHg
flow (LPM)	5.01	4.92	5.01		+/- 0.25 LPM
Leak Test:	Date of check:	April 19, 2023	Last Cal Date:	March 22, 2023	
	PM w/o HEPA:	0.7	PM w/ HEPA:	0.0	<0.2 ug/m3
Note: this leak check will be	e completed before the	quarterly work and will	serve as the pre mai	ntenance leak check	-
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	Test		
Parameter	As found	Post maintenance	<u>As left</u>	<u>Adjusted</u>	(Limits)
PMT Peak Test	-37.0				10.9 +/- 0.5
Post-maintenanc		PM w/o HEPA:		w/ HEPA:	
Date Optical Chan		March 22,			<0.2 ug/m3
Disposable Filte	er Changed:	March 22,	2023		
		Annual Maintenanc	e		
Date Sample Tu	be Cleaned:	August 30,	2022		
Date RH/T Sens		August 30,			
		Domoval shasks	for instrument share		
Notes:		Removal Checks	for instrument chang	;e out.	
Calibration by:	Karan Pandit				



T640 PM_{2.5} CALIBRATION

W B E A						Version-01-2023
		Station Information	1			
Station Name:	Stony Mountain		Station number:	AMS 18		
Calibration Date:	April 19, 2023		Last Cal Date:			
Start time (MST):	10:50		End time (MST):	11:22		
Analyzer Make:	API T640		S/N:	1162		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N:	1102		
Temp/RH standard:	Delta Cal		S/N:	1102		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>		<u>Adjusted</u>	(Limits)
T (°C)	0.9	0.8	0.9			+/- 2 °C
P (mmHg)	704.1	704.6	704.1			+/- 10 mmHg
flow (LPM)	4.99	4.71	4.99		\checkmark	+/- 0.25 LPM
Leak Test:	Date of check:	April 19, 2023	Last Cal Date:	N	A	
	PM w/o HEPA:	2.2	PM w/ HEPA:	0.	0	<0.2 ug/m3
Inlet cleaning :	Inlet Head	_				
		Quarterly Calibration	ſest			
Parameter	As found	Post maintenance	<u>As left</u>		<u>Adjusted</u>	(Limits)
PMT Peak Test	10.9		10.9			10.9 +/- 0.5
Post-maintenanc	e leak check:	PM w/o HEPA:	4.8	w/ HEPA:		0.0
Date Optical Chan	nber Cleaned:	March 22,	2023	-		<0.2 ug/m3
Disposable Filte	r Changed:	March 22,	2023	- -		
		Annual Maintenanc	e			
Date Sample Tul	ha Claanad:	August 20	2022			
Date RH/T Sense	-	August 30, August 30,				
	-					
Notes:	Install calibra	tion. Adjusted the flow on	lv. Leak check passe	d. No PMT ac	liustments m	ade.
NOLES.		·,····································	,		,	-
Calibration bas						

Karan Pandit



CO Calibration Report

Version-01-2020

Calibration Date: A Start time (MST): 9: Reason: Re Cal Gas Concentration: Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: Te	tony Mountain april 12, 2023 :32 toutine 3,050 ALM063503 3,050 NA eledyne API T700 feledyne API T701	Calibration Sta ppm ppm	Station number: Last Cal Date: End time (MST): andards Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	2658	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: Te	ALM063503 3,050 NA eledyne API T700	ppm	Cal Gas Exp Date: Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2658	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: Te	ALM063503 3,050 NA eledyne API T700		Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2658	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: Te	3,050 NA eledyne API T700	ppm	Diff between cyl: Serial Number:	2658	
Calibrator Make/Model: Te	eledyne API T700		Serial Number:		
-					
			Senar Namber.	360	
		Analyzer Info	rmation		
Analyzer make: A Analyzer Range: 0			Analyzer serial #:	3504	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002302	1.011069	Backgd or Offset:	-0.009	-0.012
Calibration intercept:	0.205803	0.019763	Coeff or Slope:	0.904	0.912
		CO Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.2	
as found span	4933	66.7	40.7	41.1	0.990
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4933	66.7	40.7	41.1	0.990
second point	4966	33.3	20.3	20.7	0.981
third point	4983	16.7	10.2	10.3	0.991
as left zero	3000	0.0	0.0	0.0	
as left span	2960	40.0	40.7	41.2	0.987
				ge Correction Factor	0.987
Baseline Corr As found:	40.87	Prev response:		*% change:	-0.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:		* = > +/-5% change initiate	

Notes:

Sample inlet filter changed after as founds. Adjusted the zero only.

Calibration Performed By:

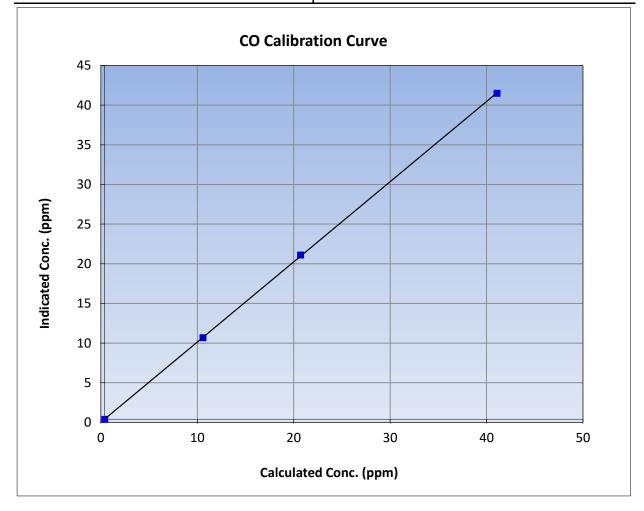


CO Calibration Summary

	Station Inform	nation								
		Station Information								
Calibration Date: April 12,	2023 P	revious Calibration:	March 24, 2023							
Station Name: Stony Mor	untain	Station Number:	AMS 18							
Start Time (MST): 9:32		End Time (MST):	12:10							
Analyzer make: API T3	00	Analyzer serial #:	3504							

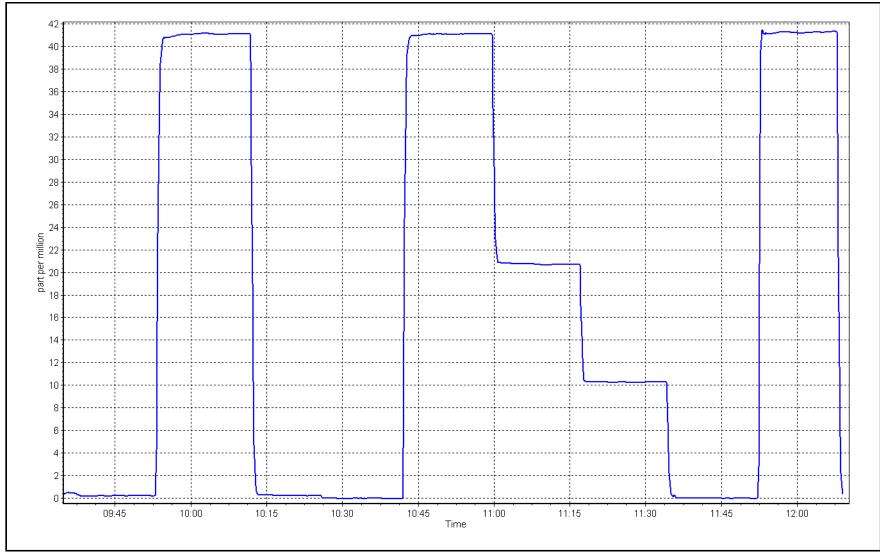
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999972	≥0.995
40.7	41.1	0.9900	correlation coefficient	0.999972	20.995
20.3	20.7	0.9814	Slope	1.011069	0.90 - 1.10
10.2	10.3	0.9910	Siope	1.011009	0.90 - 1.10
			- Intercept	0.019763	+/-1.5











CO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Stony Mountain		Station number:	AMS 18	
April 19, 2023		Last Cal Date:	March 29, 2023	
10:02		End time (MST):	13:12	
Maintenance				
	Calibration St	andarda		
60.000			December 1, 2020	
	ppm	Cal Gas Exp Date:	December 1, 2026	
		Dama Cas Even Datas	NIA	
	ppm		NA	
			2650	
Peak Scientific		Serial Number:	//104831/	
	Analyzer Info	rmation		
: API T360		Analyzer serial #:	283	
e 0 - 2,000 ppm		,		
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.008751	1.012352	Backgd or Offset:	-0.059	-0.069
4.460000	0.980000	Coeff or Slope:	1.066	1.076
	CO ₂ Calibratio	on Data		
	C	Calculated	1. P	
	-	concentration (ppm)		• •
(sccm)	(sccm)	(Cc)	(ppm) (IC)	<i>Limit = 0.95-1.05</i>
3000	0.0	0.0	0.6	
3000 2920	0.0 80.0		0.6 1612.7	 0.996
		0.0		
		0.0		
		0.0		
		0.0		
2920	80.0	0.0 1605.9	1612.7	0.996
2920 3000	80.0	0.0 1605.9 0.0	-0.1	0.996
2920 3000 2920	80.0 0.0 80.0	0.0 1605.9 0.0 1605.9	-0.1 1624.1	0.996 0.989
2920 3000 2920 2960	80.0 0.0 80.0 40.0	0.0 1605.9 0.0 1605.9 802.9	-0.1 1624.1 820.5	0.996 0.989 0.979
2920 3000 2920 2960 2980 3000	80.0 0.0 80.0 40.0 20.0 0.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0	-0.1 -0.1 1624.1 820.5 404.4 0.5	0.996 0.989 0.979 0.993
2920 3000 2920 2960 2980	80.0 0.0 80.0 40.0 20.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 1600.5	-0.1 -0.1 1624.1 820.5 404.4 0.5 1621.9	0.996 0.989 0.979 0.993 0.987
2920 3000 2920 2960 2980 3000 2930	80.0 0.0 80.0 40.0 20.0 0.0 80.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 1600.5 Averag	-0.1 -0.1 1624.1 820.5 404.4 0.5 1621.9 ge Correction Factor	0.996 0.989 0.979 0.993 0.987 0.987
2920 3000 2920 2960 2980 3000 2930 1612.10	80.0 0.0 80.0 40.0 20.0 0.0 80.0 Prev response:	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 1600.5 Averag 1624.38	-0.1 -0.1 1624.1 820.5 404.4 0.5 1621.9 ge Correction Factor *% change:	0.996 0.989 0.979 0.993 0.987
2920 3000 2920 2960 2980 3000 2930	80.0 0.0 80.0 40.0 20.0 0.0 80.0	0.0 1605.9 0.0 1605.9 802.9 401.5 0.0 1600.5 Averag 1624.38	-0.1 -0.1 1624.1 820.5 404.4 0.5 1621.9 ge Correction Factor	0.996 0.989 0.979 0.993 0.987 0.987
	April 19, 2023 10:02 Maintenance 60,220 ALM063503 60,220 NA Teledyne API T700 Peak Scientific API T360 0 - 2,000 ppm <u>Start</u> 1.008751	Stony Mountain April 19, 2023 10:02 MaintenanceCalibration St60,220 ALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmALM063503 60,220ppmStart 1.008751Finish 1.012352 0.980000Start 1.008751Finish 1.012352 0.980000Julution air flow rateSource gas flow rate	April 19, 2023 10:02Last Cal Date: End time (MST):MaintenanceCal Gas Exp Date:60,220ppmCal Gas Exp Date:ALM063503 60,220ppmRem Gas Exp Date:ALM063503 60,220ppmRem Gas Exp Date:NADiff between cyl:Teledyne API T700 Peak ScientificSerial Number:Peak ScientificSerial Number:API T360 0 - 2,000 ppmAnalyzer Information 1.012352Start 1.008751 4.460000Finish 0.980000Backgd or Offset: Coeff or Slope:Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppm)	Stony Mountain April 19, 2023 10:02 MaintenanceStation number: Last Cal Date: End time (MST):AMS 18 March 29, 2023 13:12March 29, 2023 13:12Calibration Station number: End time (MST):Amsch 29, 2023 13:12Calibration Station (MST):Differ Station number:60,220 ALM063503 60,220 ppmppmCal Gas Exp Date: Serial Number:December 1, 2026ALM063503 60,220 PpmppmRem Gas Exp Date: Serial Number:NATeledyne API T700 Peak ScientificSerial Number: Serial Number:2658 771048317Analyzer Information API T360 0 - 2,000 ppmFinish 1.012352 0 - 2,000 ppmStart I.0023751 0.980000Start I.012352 Backgd or Offset: -0.059 Coeff or Slope:Start 1.066CO2 Calibration DataDilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppm)Indicated concentration (ppm)

Notes:

Sample inlet filter changed after as founds. Adjusted the zero only.

Calibration Performed By:



401.5

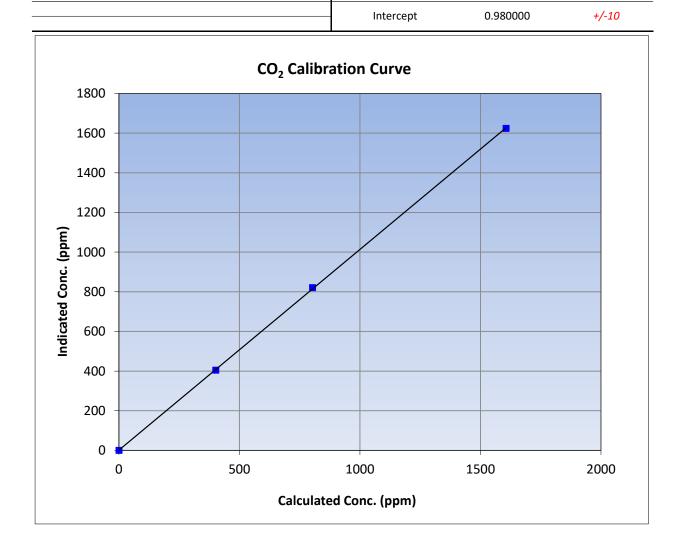
404.4

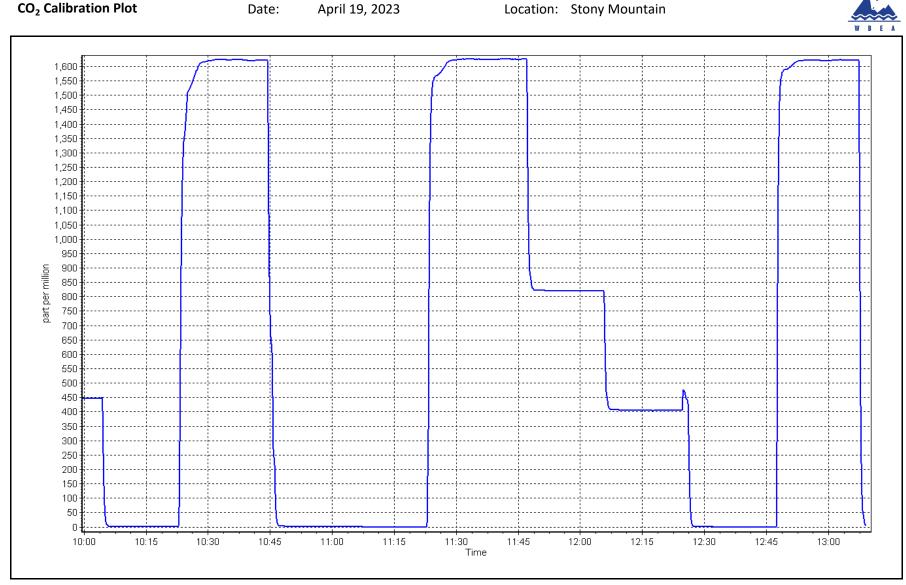
Wood Buffalo Environmental Association

CO₂ Calibration Summary

WBEA					Version-01-202	
		Station	Information			
Calibration Date	April 19	, 2023	Previous Calibration	March	March 29, 2023	
Station Name			AMS 18 13:12			
Start Time (MST)						
Analyzer make API T360		360	Analyzer serial #		283	
		Calib	ration Data			
Calculated concentration Ir (ppm) (Cc)	ndicated concentration (ppm) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999958	≥0.995	
1605.9	1624.1	0.9888		0.333328	≥0.995	
802.9	820.5	0.9786	Slope	1.012352	0.90 - 1.10	
401 5	404.4	0 9927	Siope	1.012352	0.30 - 1.10	

0.9927





Location: Stony Mountain



5



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS19 FIREBAG APRIL 2023

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

May 31, 2023







SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag April 14, 2023 10:45 Routine		Station number: Last Cal Date: End time (MST):	AMS 19 March 7, 2023 14:48	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	49.29 CC716618	ppm	Cal Gas Exp Date:	February 23, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	49.29	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701		Serial Number: Serial Number:	1607 1118	
		Analyzer Info	rmation		
Analyzer make Analyzer Rang			Analyzer serial #:	1410661308	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.000420 -0.181972	1.000391 -0.421893	Backgd or Offset: Coeff or Slope:	10.0 0.976	10.2 0.992
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	Correction factor (Cc/ Limit = 0.95-1.05
Set Point as found zero		•			
as found zero as found span	(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero as found span as found 2nd point	(sccm) 4999	(sccm) 0.0	concentration (ppb) (Cc)	(ppb) (Ic) -0.5	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 4999	(sccm) 0.0	concentration (ppb) (Cc)	(ppb) (Ic) -0.5	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 4999 4919	(sccm) 0.0 81.1	concentration (ppb) (Cc) 0.0 799.5	(ppb) (Ic) -0.5 786.1	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	(sccm) 4999 4919 	(sccm) 0.0 81.1 0.0	concentration (ppb) (Cc) 0.0 799.5 0.0 0.0	(ppb) (Ic) -0.5 786.1 -0.2	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	(sccm) 4999 4919 	(sccm) 0.0 81.1 0.0 81.1	concentration (ppb) (Cc) 0.0 799.5 0.0 0.0 799.5	(ppb) (Ic) -0.5 786.1 -0.2 799.5	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	(sccm) 4999 4919 	(sccm) 0.0 81.1 0.0 81.1 40.6	concentration (ppb) (Cc) 0.0 799.5 0.0 799.5 400.3	(ppb) (Ic) -0.5 786.1 -0.2 799.5 399.8	Limit = 0.95-1.05 1.017 1.000 1.001
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 4999 4919 	(sccm) 0.0 81.1 0.0 81.1	concentration (ppb) (Cc) 0.0 799.5 0.0 0.0 799.5	(ppb) (Ic) -0.5 786.1 -0.2 799.5	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 4999 4919 	(sccm) 0.0 81.1 0.0 81.1 40.6 20.3	concentration (ppb) (Cc) 0.0 799.5 0.0 0.0 799.5 400.3 200.1	(ppb) (Ic) -0.5 786.1 -0.2 799.5 399.8 199.6	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 4999 4919 4999 4999 4919 4959 4959 4980 4999	(sccm) 0.0 81.1 0.0 81.1 40.6 20.3 0.0	concentration (ppb) (Cc) 0.0 799.5 0.0 799.5 400.3 200.1 0.0 799.5	(ppb) (Ic) -0.5 786.1 -0.2 799.5 399.8 199.6 -0.2	Limit = 0.95-1.05 1.017 1.000 1.001 1.003
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span Baseline Corr As found:	(sccm) 4999 4919 4919 4999 4919 4959 4959 4980 4999 4919 786.60	(sccm) 0.0 81.1 0.0 81.1 40.6 20.3 0.0 81.1 Previous response	concentration (ppb) (Cc) 0.0 799.5 0.0 799.5 400.3 200.1 0.0 799.5 Average 799.62	(ppb) (Ic) -0.5 786.1 -0.2 799.5 399.8 199.6 -0.2 800.0 ge Correction Factor *% change	Limit = 0.95-1.05 1.017 1.000 1.001 1.003 0.9999
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 4999 4919 4999 4999 4919 4959 4980 4999 4919	(sccm) 0.0 81.1 0.0 81.1 40.6 20.3 0.0 81.1	concentration (ppb) (Cc) 0.0 799.5 0.0 799.5 400.3 200.1 0.0 799.5 Average 799.62	(ppb) (Ic) -0.5 786.1 -0.2 799.5 399.8 199.6 -0.2 800.0 ge Correction Factor	Limit = 0.95-1.05 1.017 1.000 1.001 1.003 0.999 1.001

Changed sample inlet filter after as founds. Adjusted span.

Calibration Performed By:



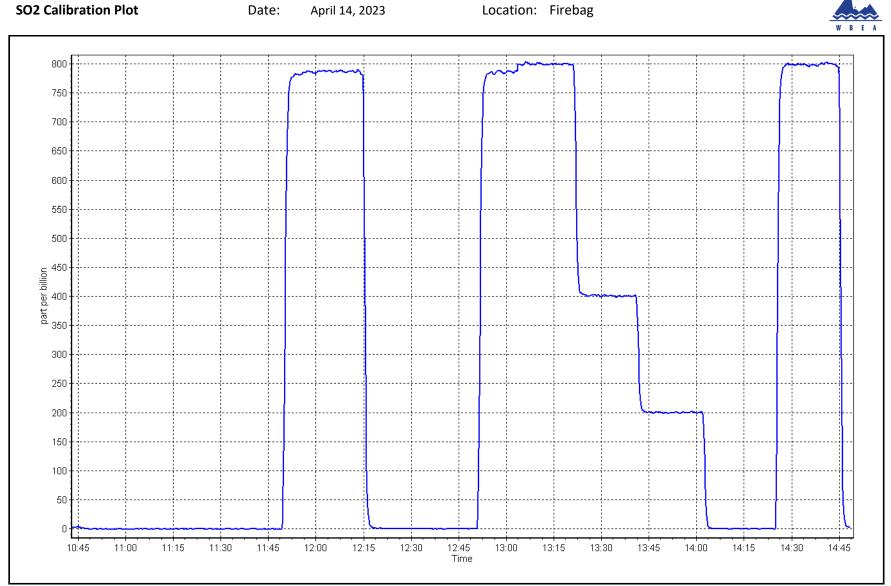
Calculated Conc. (ppb)

Wood Buffalo Environmental Association

SO₂ Calibration Summary

		Station	Information			
Calibration Date:	April 14, 2023		Previous Calibration:	March	7, 2023	
Station Name:		Firebag Station Number:		AMS 19		
Start Time (MST):	10:		End Time (MST):	14	14:48	
Analyzer make:	Therm	io 43i	Analyzer serial #:	14106	561308	
		Caliby	ration Data			
Calculated concentration I (ppb) (Cc)	(ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0 799.5	-0.2 799.5	1.0000	Correlation Coefficient	1.000000	≥0.995	
400.3	399.8	1.0012	Slope	1.000391	0.90 - 1.10	
200.1	199.6	1.0025	Intercept	-0.421893	+/-30	
900						
800						
700			/			
600						
(qdc _00						
<u>9</u> 500						
5 400 -						
100 500 (bbb) 300 300 300 (bbb)						
<u> ۲</u>						
200	/					

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H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag April 3, 2023 10:02 Routine		Station number: Last Cal Date: End time (MST):	AMS19 March 2, 2023 13:40	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.114 CC517427	ppm	Cal Gas Exp Date:	February 5, 2024 ,	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	5.114 n/a Teledype API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	n/a 1607	
ZAG Make/Model:	Teledyne API T700		Serial Number:	1118	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE Global 0 - 100 ppb		Analyzer serial #: Converter serial #:	1336160090 2022-222	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.003769	1.003054	Backgd or Offset:	3.18	3.12
Calibration intercept:	0.038321	0.038381	Coeff or Slope:	0.990	0.990
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.1	
as found span	4922	78.2	80.0	80.3	0.995
as found 2nd point	4961	39.1	40.0	40.1	0.995
as found 3rd point	4980	19.6	20.0	20.0	0.997
new cylinder response					
		H ₂ S Calibrat	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/lc)
calibrator zero	5000	0.0	(Cc) 0.0	0.0	Limit = 0.95-1.05
high point	4922	78.2	80.0	80.2	0.997
second point	4961	39.1	40.0	40.3	0.992
third point	4980	19.6	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.1	
as left span	4922	78.2	80.0	80.0	1.000
SO2 Scrubber Check	4922	78.3	800.2	0.0	
Date of last scrubber cha	nge:	January 18, 2023		Ave Corr Factor	0.996
Date of last converter eff	-	n/a			efficiency
Baseline Corr As found:	80.4	Prev response:	80.32	*% change:	0.1%
Baseline Corr 2nd AF pt:	40.2	AF Slope:		AF Intercept:	-0.121676
Baseline Corr 3rd AF pt:	20.1	AF Correlation:	0.999999		
				* = > +/-5% change initiate	es investigation

Notes:

SOx scrubber check done after calibrator zero. No adjustments made. Changed sample inlet filter after MPAF's.

Calibration Performed By:

Braiden Boutilier

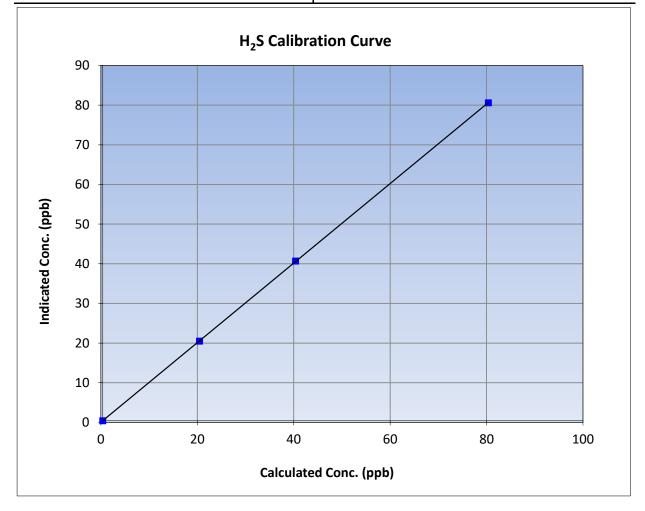


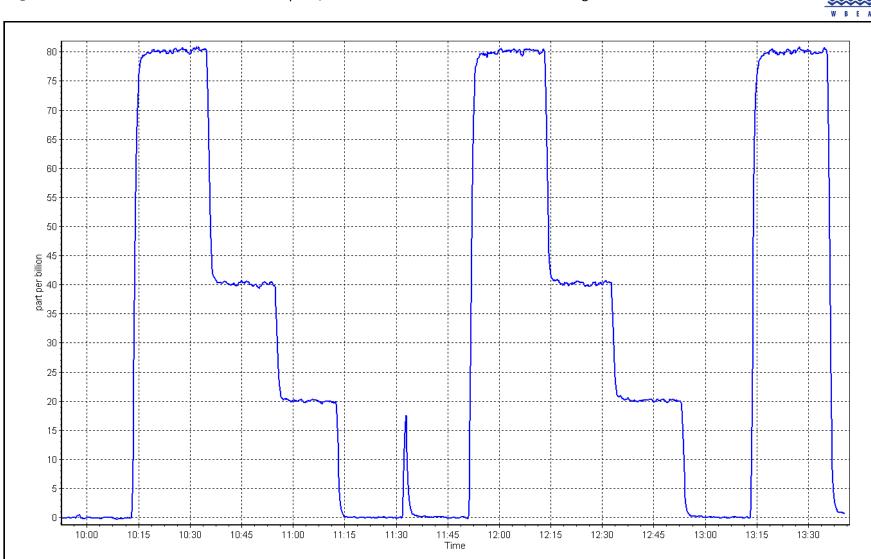
H₂S Calibration Summary

Station Information									
Calibration Date:	April 3, 2023	Previous Calibration:	March 2, 2023						
Station Name:	Firebag	Station Number:	AMS19						
Start Time (MST):	10:02	End Time (MST):	13:40						
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1336160090						

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999992	≥0.995
80.0	80.2	0.9973	correlation coefficient	0.555552	20.333
40.0	40.3	0.9923	Slope	1.003054	0.90 - 1.10
20.0	20.1	0.9974	Slope	1.003034	0.30 - 1.10
			Intercept	0.038381	+/-3







THC Calibration Report

Version-01-2020

		Station Info	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag April 14, 2023 10:45 Routine		Station number: Last Cal Date: End time (MST):	AMS 19 March 7, 2023 14:48	
		Calibration S	itandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC7: 500.7 205.9	16618 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	February 23, 2025 1066.9	ppm
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	500.7 205.9 API T700 API T701	ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	1066.9 1607 1118	ppm
		Analyzer Info	ormation		
Analyzer make Analyzer Range	: Thermo 51i-LT : 0 - 20 ppm		Analyzer serial #:	1336160089	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998521 -0.017736	<u>Finish</u> 0.997928 -0.020741	Background: Coefficient:	<u>Start</u> 2.24 3.732	<u>Finish</u> 2.62 3.815
		THC Calibrat	tion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.00	0.44	
as found span as found 2nd point as found 3rd point	4919	81.1	17.31	17.27	1.002
new cylinder response					
calibrator zero	4999	0.0	0.00	0.02	
high point	4919	81.1	17.31	17.27	1.002
second point	4959	40.6	8.66	8.60	1.007
third point	4980	20.3	4.33	4.27	1.015
as left zero	5000	0.0	0.00	-0.08	
as left span	4919	81.1	17.31	17.23	1.004
Baseline Corr As found: Baseline Corr 2nd AF pt:	16.83 NA	Previous response AF Slope:	17.26	<u>se Correction Factor</u> *% change AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Slope. AF Correlation:		Ai intercept.	

Notes:

Reset 51i initially as it was frozen and not communicating. Changed sample inlet filter after as founds. Adjusted zero and span.

Calibration Performed By:

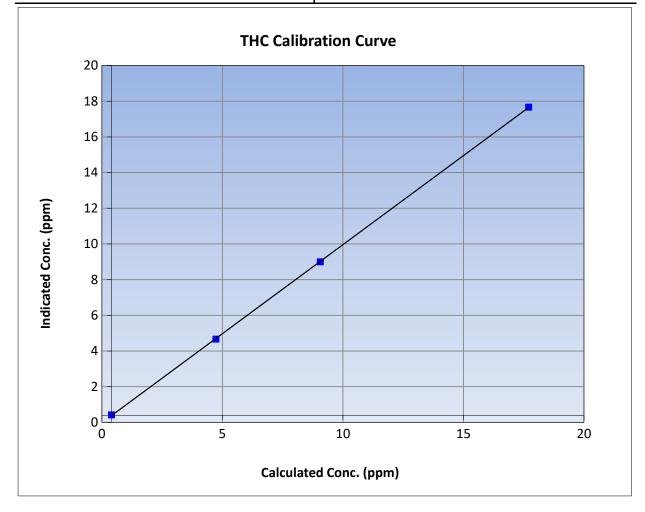


THC Calibration Summary

WBEA			Version-01-2020
	Stati	ion Information	
Calibration Date:	April 14, 2023	Previous Calibration:	March 7, 2023
Station Name:	Firebag	Station Number:	AMS 19
Start Time (MST):	10:45	End Time (MST):	14:48
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089

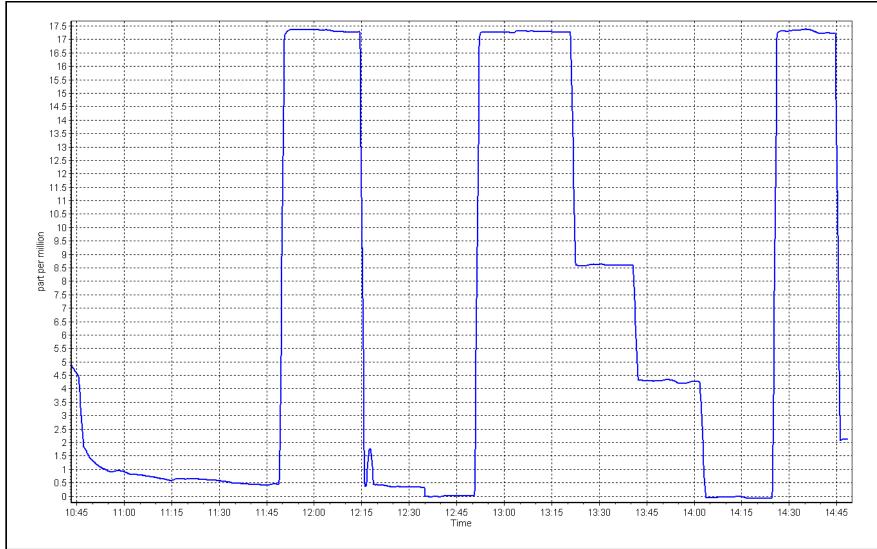
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.00	0.02		Correlation Coefficient	0.999977	≥0.995	
17.31	17.27	1.0020	correlation coefficient	0.555577	20.333	
8.66	8.60	1.0075	Slope	0.997928	0.90 - 1.10	
4.33	4.27	1.0151	510pe	0.337328	0.90 - 1.10	
			Intercept	-0.020741	+/-1.5	











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		9	Station Information		
Station Name: Calibration Date: Start time (MST): Reason:	Firebag April 4, 2023 10:06 Routine		Station number: Last Cal Date: End time (MST):	March 3, 2023	
		С	alibration Standards		
NO Gas Cylinder #:	T2Y1K63		Cal Gas Expiry Date:	November 30, 2023	
NOX Cal Gas Conc:	51.12	ppm	NO Cal Gas Conc:	49.40	ppm
Removed Cylinder #:	n/a		Removed Gas Exp Date:	n/a	
Removed Gas NOX Conc:	51.12	ppm	Removed Gas NO Conc:	49.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T700		Serial Number:	1607	
ZAG make/model:	Teledyne API T701		Serial Number:	1118	
Analyzer make: NOX Range (ppb): NO coeff or slope: NOX coeff or slope: NO2 coeff or slope:	0 - 1000 ppb <u>Start</u> 1.041 0.996	<u>Fin</u> 1.0 0.9	Analyzer Information Analyzer serial #: <u>hish</u> 041 NO bkgnd or offset: 096 NOX bkgnd or offset: 000 Reaction cell Press:	1410661309 <u>Start</u> 7.2 7.3 206.6	Finish 7.3 7.3 210.9
		C	Calibration Statistics		
		Ste	art_	<u>Finish</u>	
NO _x Cal Slope:		0.99	4815	0.991227	
NO _x Cal Offset:		0.75	5137	0.554416	
NO Cal Slope:		0.99	3858	0.991132	
NO Cal Offset:			7575	-0.133220	
NO ₂ Cal Slope:		1.00	3159	0.999545	
NO ₂ Cal Offset:		0.56	1215	-0.476369	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dil	ution Calibratio	n 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/lc) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	4999	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0		
as found span	4919	81.0	828.1	800.3	27.9	826.0	794.5	31.5	1.0026	1.0073
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	4999	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
high point	4919	81.0	828.1	800.3	27.9	821.0	792.9	28.2	1.0087	1.0093
second point	4960	40.5	414.0	400.1	13.9	411.6	396.9	14.6	1.0059	1.0081
third point	4980	20.2	206.5	199.6	6.9	205.7	197.3	8.4	1.0040	1.0115
as left zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as left span	4919	81.0	828.1	362.7	465.5	825.0	356.7	468.4	1.0038	1.0168
							Average C	orrection Factor	1.0062	1.0096
Corrected As fo	ound NO _x =	826.2 ppb	NO =	794.7 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.2%
Previous Respo	onse NO _x =	824.6 ppb	NO =	795.7 ppb				*Percent Chan	ge NO =	-0.1%
Baseline Corr 2	2nd pt NO _x =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	Brd pt NO _X =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	790.5	352.9	465.5	465.1	1.0008	99.9%
2nd GPT point (200 ppb O3)	790.5	570.6	247.8	246.8	1.0039	99.6%
3rd GPT point (100 ppb O3)	790.5	682.1	136.3	135.3	1.0071	99.3%
				Average Correction Factor	1.0039	99.6%

Notes:

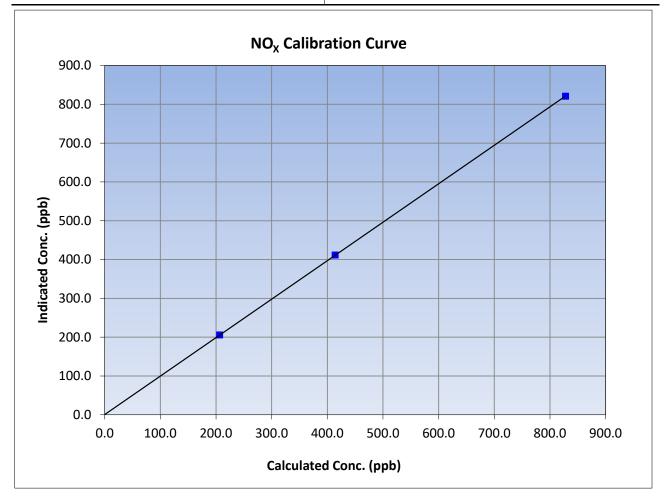
No adjustments made. Changed sample inlet filter after as founds.

Calibration Performed By:



NO_x Calibration Summary

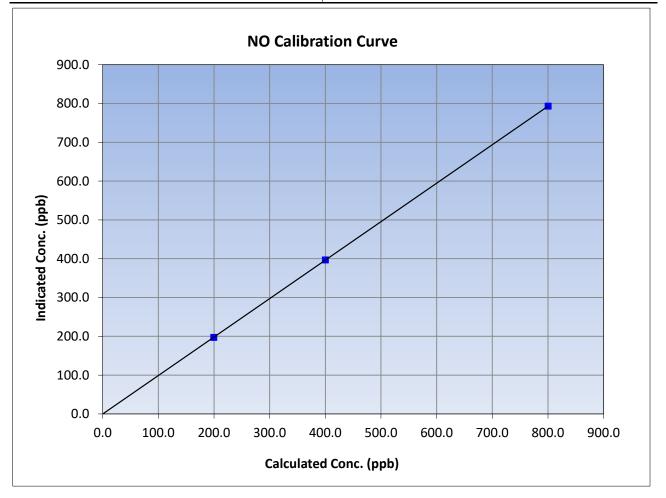
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	April 4	1, 2023	Previous Calibration:	Calibration: March 3, 202		
Station Name:	Fire	ebag	Station Number:	AM	S 19	
Start Time (MST):	10:06		End Time (MST):	14	:32	
Analyzer make:	Therr	no 42i	Analyzer serial #:	al #: 1410661309		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999997	≥0.995	
828.1	821.0	1.0087	correlation coefficient	0.555557	20.333	
414.0	411.6	1.0059	Slope	0.991227	0.90 - 1.10	
206.5	205.7	1.0040	Slope	0.991227	0.30 - 1.10	
			Intercept	0.554416	+/-20	





NO Calibration Summary

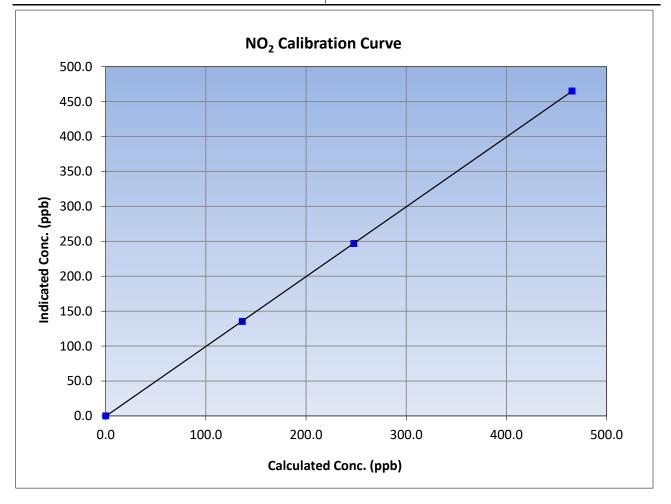
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	April 4	1, 2023	Previous Calibration:	March	3, 2023	
Station Name:	Firebag		Station Number:	AM	S 19	
Start Time (MST):	10:06		End Time (MST):	14	:32	
Analyzer make:	Therr	no 42i	Analyzer serial #:	1410661309		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999999	≥0.995	
800.3	792.9	1.0093	correlation coefficient	0.5555555	20.995	
400.1	396.9	1.0081	Slope	0.991132	0.90 - 1.10	
199.6	197.3	1.0115	Siope	0.991152	0.90 - 1.10	
			Intercept	-0.133220	+/-20	

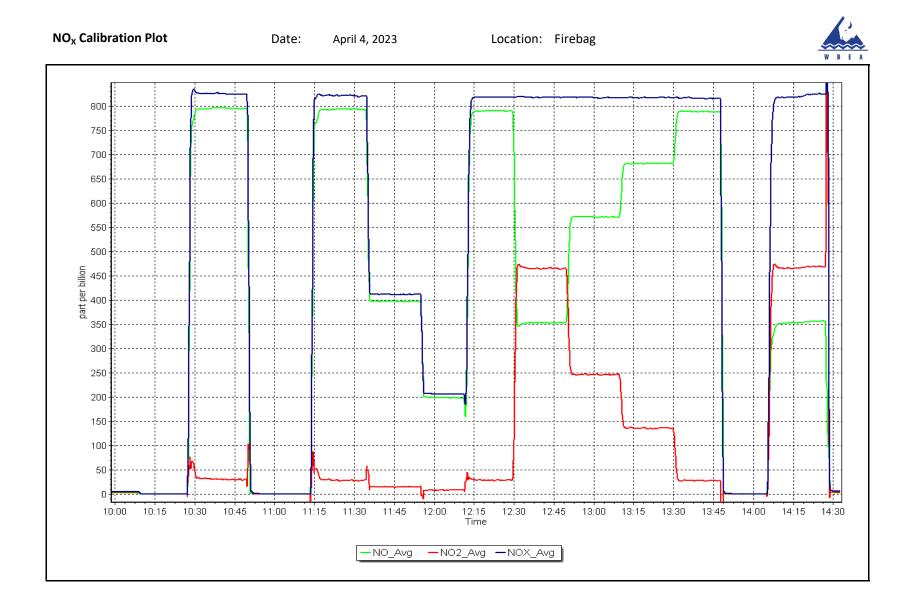




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 4	, 2023	Previous Calibration: March 3		3, 2023	
Station Name:	Fire	ebag	Station Number:	AMS	5 19	
Start Time (MST):	10	:06	End Time (MST):	14:	32	
Analyzer make:	Therr	no 42i	Analyzer serial #:	erial #: 1410661309		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999994	≥0.995	
465.5	465.1	1.0008	correlation coefficient	0.555554	20.333	
247.8	246.8	1.0039	Slope	0.999545	0.90 - 1.10	
136.3	135.3	1.0071	Slope	0.999040	0.90 - 1.10	
			Intercept	-0.476369	+/-20	







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS20 MACKAY RIVER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

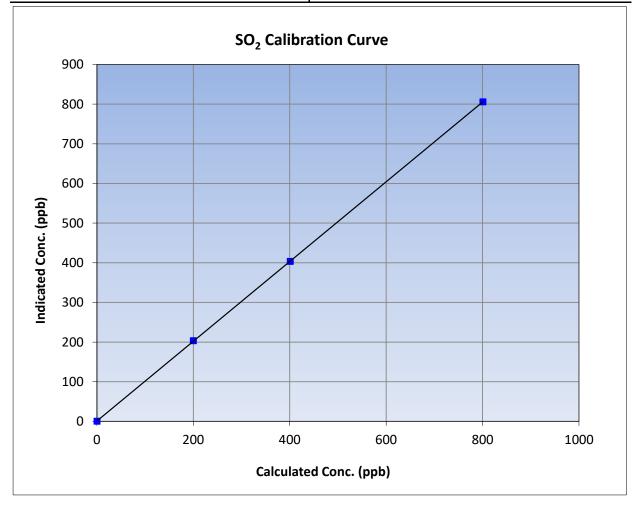
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River April 3, 2023 10:04 Routine		Station number: Last Cal Date: End time (MST):	AMS20 March 1, 2023 13:02	
		Calibration St	andards		
Cal Gas Concentration:	<u>49.22</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #:	<u>CC306868</u>				
Removed Cal Gas Conc:	<u>49.22</u>	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	<u>NA</u>		Diff between cyl:		
Calibrator Make/Model:	Teledyne API T700		Serial Number:	1220	
ZAG Make/Model:	Teledyne API 701		Serial Number:	4522	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1501301450	
Analyzer Kallge	e 0 - 1000 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.992140	1.005548	Backgd or Offset:	19.1	18.9
Calibration intercept:	3.311046	0.790939	Coeff or Slope:	0.974	0.974
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	
as found span	4919	81.3	800.3	805.6	0.993
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.2	
high point	4919	81.3	800.3	805.5	0.994
second point	4959	40.7	400.7	403.1	0.994
third point	4980	20.3	199.8	202.9	0.985
as left zero	5000	0.0	0.0	0.3	
as left span	4919	81.3	800.3 Averas	804.8 ge Correction Factor	0.994 0.991
Baseline Corr As found:	805.60	Previous response		*% change	1.0%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA	AF Slope:		AF Intercept:	
	NA	AF Correlation:			

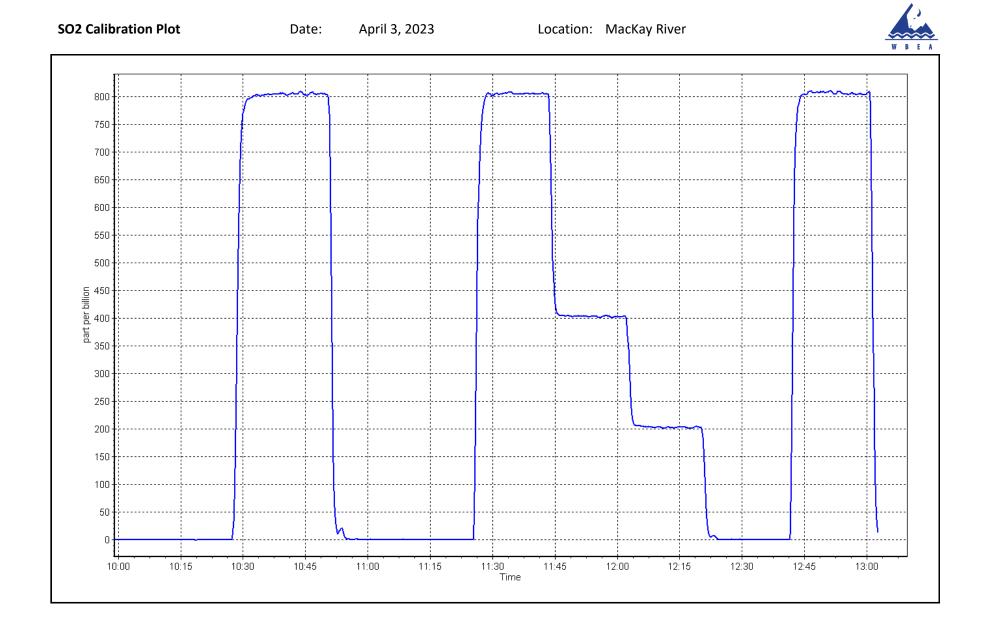
Sample inlet filter changed after as founds. No adjustments requried.



SO₂ Calibration Summary

WBEA					Version-01-202
		Station	Information		
Calibration Date:	April 3, 2023		Previous Calibration:	March 1, 2023	
Station Name:	MacKay River		Station Number:	AN	1520
Start Time (MST):	10:04		End Time (MST):	13	3:02
Analyzer make: Thermo 43i		o 43i	Analyzer serial #:	1501301450	
		Calibr	ation Data		
Calculated concentration Indicated concentration Correction factor (ppb) (Cc) (ppb) (Ic) (Cc/Ic)		Statistical Evaluation		<u>Limits</u>	
0.0	0.2				
800.3	805.5	0.9935	Correlation Coefficient	0.999994	≥0.995
400.7	403.1	0.9940	Slope	1.005548 0.9	0.90 - 1.10
199.8	202.9	0.9848			0.50 - 1.10
			Intercept	0.790939	+/-30







H₂S Calibration Report

WBEA					Version-11-2021
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River April 4, 2023 9:59 Routine		Station number: Last Cal Date: End time (MST):	AMS20 March 8, 2023 14:52	
		Calibration St	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.87 EY0001922		Cal Gas Exp Date:	May 5, 2023	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	4.87 NA Teledyne API T700 Teledyne API 701	••	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 1220 4522	
		Analyzer Info	rmation		
Analyzer make: Converter make: Analyzer Range	Teledyne API T101 Internal 0 - 100 ppb	-	Analyzer serial #: Converter serial #:	196 NA	
Calibration slope: Calibration intercept:	<u>Start</u> 0.999432 0.479018	<u>Finish</u> 1.003004 0.079047	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 46.3 0.987
		H ₂ S As Foun	id Data		
Set Point	Dilution 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 span	4918	82.1	80.0	83.1	0.969
as found 2nd point	4959	41.1	40.0	42.1	0.965
as found 3rd point	4979	20.5	20.0	21.4	0.960
new cylinder response			_		
		H ₂ S Calibrati	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.1	
high point	4918	82.1	80.0	80.2	0.997
second point	4959	41.1	40.0	40.3	0.993
third point	4979	20.5	20.0	20.3	0.984
as left zero	5000	0.0	0.0	0.0	
as left span	4918	82.1	80.0	79.5	1.006
SO2 Scrubber Check	4919	80.0	800.2	0.1	
Date of last scrubber cha Date of last converter eff	-	December 15, 2020		Ave Corr Factor	0.991 efficiency
					•
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	82.5 41.5 20.8	Prev response: AF Slope: AF Correlation:	80.40 1.031156 0.999990	*% change: AF Intercept:	2.5% 0.718981
	20.0		0.00000	* = > +/-5% change initiate	es investigation

Notes:

Changed inlet filter after multi point as founds. Performed scrubber test after calibrator zero. Adjusted zero and span.

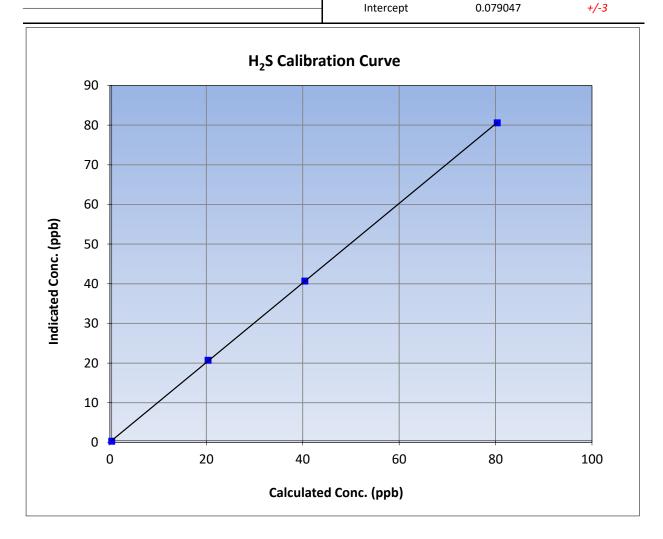
Calibration Performed By:

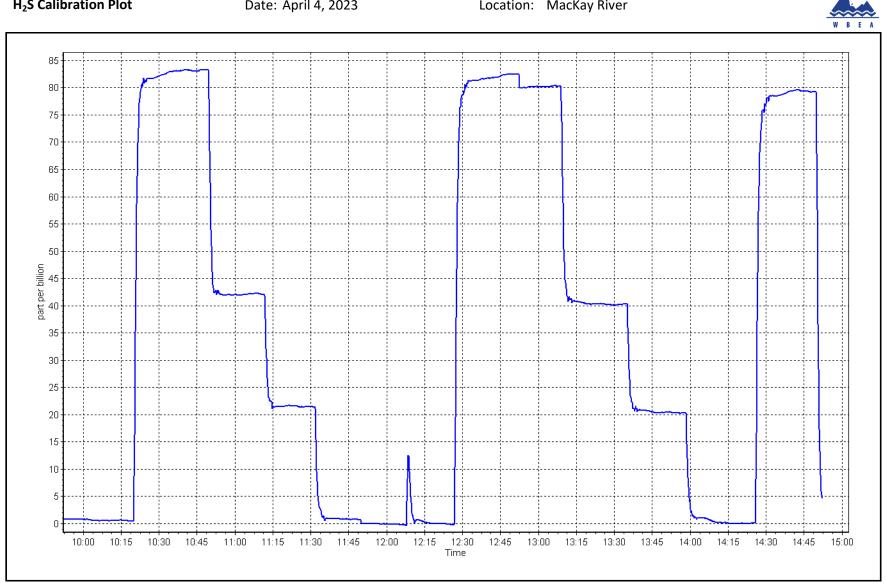
Mohammed Kashif



H₂S Calibration Summary

WBEA					Version-11-2	
		Station	Information			
Calibration Date:	April 4,	2023	Previous Calibration:	March	March 8, 2023	
Station Name:			Station Number:	AMS20		
Start Time (MST):			End Time (MST):		14:52	
Analyzer make:	Teledyne /	API T101	Analyzer serial #:	196		
			ration Data			
Calculated concentration I (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0 000077	>0.005	
80.0	80.2	0.9971		0.999977	≥0.995	
40.0	40.3	0.9933	Slope	1.003004	0.90 - 1.10	
20.0	20.3	0.9837			0.90 - 1.10	
				0 0700 17	. 10	





H₂S Calibration Plot

Date: April 4, 2023



THC Calibration Report

Version-01-2020

		Station Info	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	MacKay River April 3, 2023 10:04 Routine		Station number: Last Cal Date: End time (MST):	AMS20 March 1, 2023 13:02	
		Calibration S	itandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC30 <u>499.40</u> <u>206.20</u>	96868 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	February 23, 2025 1066.45	ppm
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	N <u>499.40</u> <u>206.20</u> Teledyne API T700 Teledyne API 701	IA ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	NA 1066.45 1220 4522	ppm
		Analyzer Inf	ormation		
Analyzer make Analyzer Range	: Thermo 51i-LT : 0 - 20 ppm	· · · · · · · · · · · · · · · · · · ·	Analyzer serial #:	1501663727	
Calibration slope: Calibration intercept:	<u>Start</u> 0.993043 0.145942	<u>Finish</u> 0.995858 -0.025166	Background: Coefficient:		<u>Finish</u> 3.160 5.328
		THC Calibrat	tion Data		
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
Set Point as found zero		-			
	(sccm)	(sccm)	(ppm) (Cc)	(ppm) (lc)	Limit = 0.95-1.05
as found zero as found span as found 2nd point	(sccm) 5000	(sccm)	(ppm) (Cc) 0.00	(ppm) (Ic) 0.25	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000	(sccm)	(ppm) (Cc) 0.00	(ppm) (Ic) 0.25	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 5000 4919	(sccm) 0.0 81.3	(ppm) (Cc) 0.00 17.34	(ppm) (Ic) 0.25 17.14	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	(sccm) 5000 4919 	(sccm) 0.0 81.3 0.0	(ppm) (Cc) 0.00 17.34 0.00	(ppm) (Ic) 0.25 17.14 -0.03	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	(sccm) 5000 4919 	(sccm) 0.0 81.3 0.0 81.3	(ppm) (Cc) 0.00 17.34 0.00 17.34	(ppm) (Ic) 0.25 17.14 -0.03 17.26	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	(sccm) 5000 4919 5000 4919 4959	(sccm) 0.0 81.3 0.0 81.3 40.7	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68	(ppm) (lc) 0.25 17.14 -0.03 17.26 8.57	Limit = 0.95-1.05 1.012 1.005 1.014
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4919 5000 4919 4959 4980	(sccm) 0.0 81.3 0.0 81.3 40.7 20.3	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33	(ppm) (lc) 0.25 17.14 -0.03 17.26 8.57 4.34	Limit = 0.95-1.05 1.012 1.005 1.014 0.999
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4919 5000 4919 4959 4959 4980 5000	(sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00	(ppm) (lc) 0.25 17.14 -0.03 17.26 8.57 4.34 -0.02	Limit = 0.95-1.05 1.012 1.005 1.014 0.999
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4919 5000 4919 4959 4980	(sccm) 0.0 81.3 0.0 81.3 40.7 20.3	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34	(ppm) (lc) 0.25 17.14 -0.03 17.26 8.57 4.34 -0.02 17.06	Limit = 0.95-1.05 1.012 1.005 1.014 0.999 1.017
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4919 5000 4919 4959 4959 4980 5000 4919	(sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0 81.3	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34 Aver	(ppm) (Ic) 0.25 17.14 -0.03 17.26 8.57 4.34 -0.02 17.06 rage Correction Factor	Limit = 0.95-1.05 1.012 1.005 1.014 0.999 1.017 1.006
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4919 5000 4919 4959 4959 4980 5000	(sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	(ppm) (Cc) 0.00 17.34 0.00 17.34 8.68 4.33 0.00 17.34 Aver 17.36	(ppm) (lc) 0.25 17.14 -0.03 17.26 8.57 4.34 -0.02 17.06	Limit = 0.95-1.05 1.012 1.005 1.014 0.999 1.017 1.006 -2.9%

Notes:

Sample inlet filter changed after as founds. Adjusted zero only.

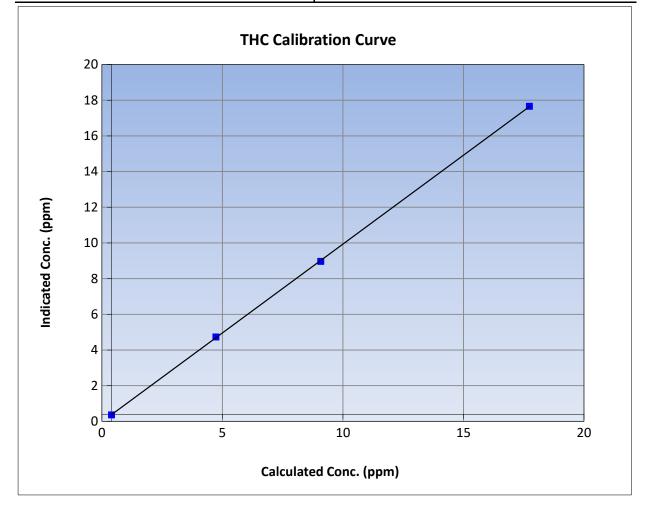
Calibration Performed By:

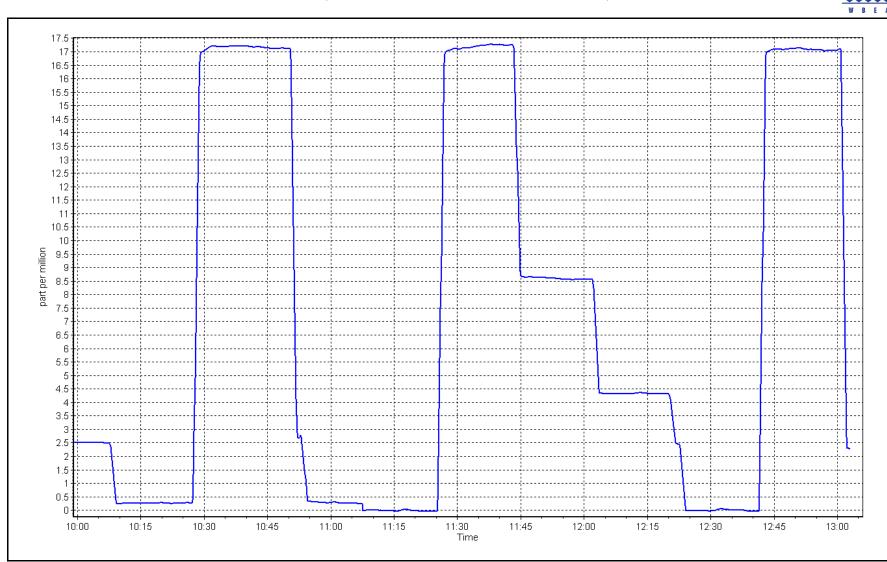


THC Calibration Summary

WBEA			Version-01-2020
	Stat	ion Information	
Calibration Date:	April 3, 2023	Previous Calibration:	March 1, 2023
Station Name:	MacKay River	Station Number:	AMS20
Start Time (MST):	10:04	End Time (MST):	13:02
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	-0.03		Correlation Coefficient	0.999965	≥0.995
17.34	17.26	1.0047	correlation coefficient	0.999905	20.333
8.68	8.57	1.0136	Slope	0.995858	0.90 - 1.10
4.33	4.34	0.9987	510pe	0.995858	0.50 - 1.10
			Intercept	-0.025166	+/-1.5





April 3, 2023

Date:

Location: MacKay River



Station Name:

Reason:

Calibration Date:

Start time (MST):

Wood Buffalo Environmental Association

NO_X \ NO \ NO₂ Calibration Report

Version-04-2020

Station Information

Station number: AMS20 Last Cal Date: March 9, 2023 End time (MST): 14:26

ppm

ppm

		Calibration Standards			
NO Gas Cylinder #:		T376265	Cal Gas Expiry Date: April 13, 2025		
NOX Cal Gas Conc:	<u>49.19</u>	ppm	NO Cal Gas Conc: <u>48.04</u>		
Removed Cylinder #:		NA	Removed Gas Exp Date: NA		
Removed Gas NOX Conc:	<u>49.19</u>	ppm	Removed Gas NO Conc: <u>48.04</u>		
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T	700	Serial Number: 1220		
ZAG make/model:	Teledyne API 7	01	Serial Number: 4522		

MacKay River

April 19, 2023

9:47

Routine

Analyzer Information

Analyzer make: The NOX Range (ppb): 0 -			Analyzer serial #: 15	05164379	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.412	1.459	NO bkgnd or offset:	3.9	4.0
NOX coeff or slope:	0.990	0.990	NOX bkgnd or offset:	3.9	4.0
NO2 coeff or slope:	0.995	0.995	Reaction cell Press:	182.5	181.9

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.000735	0.996899
NO _x Cal Offset:	3.529487	1.929986
NO Cal Slope:	1.004217	0.999776
NO Cal Offset:	2.250337	0.730780
NO ₂ Cal Slope:	1.000187	0.995110
NO ₂ Cal Offset:	-1.449451	-1.870675



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4917	83.3	819.5	800.3	19.2	796.4	775.6	20.8	1.0290	1.0318
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4917	83.3	819.5	800.3	19.2	818.3	800.7	17.7	1.0014	0.9995
second point	4956	41.7	410.4	400.8	9.6	410.9	401.2	9.7	0.9989	0.9991
third point	4979	20.8	204.6	199.9	4.8	208.5	201.7	6.7	0.9815	0.9908
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1		
as left span	4917	83.3	819.5	457.8	361.7	819.5	456.8	362.7	0.9999	1.0022
							Average C	orrection Factor	0.9939	0.9965
Corrected As fo	ound NO _x =	796.5 ppb	NO =	775.7 ppb	* = > +/-5%	change initiates i	nvestigation	*Percent Chang	ge NO _X =	-3.4%
Previous Respo	onse NO _x =	823.6 ppb	NO =	805.9 ppb				*Percent Chang	ge NO =	-3.9%
Baseline Corr 2	nd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO _X r ² :		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO r^2 :		NO SI:	NO Int:	
					As found	$I NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.3	455.8	361.7	359.4	1.0063	99.4%
2nd GPT point (200 ppb O3)	798.3	619.0	198.5	194.2	1.0219	97.9%
3rd GPT point (100 ppb O3)	798.3	704.6	112.9	108.5	1.0402	96.1%
			ŀ	Average Correction Factor	1.0228	97.8%

Notes:

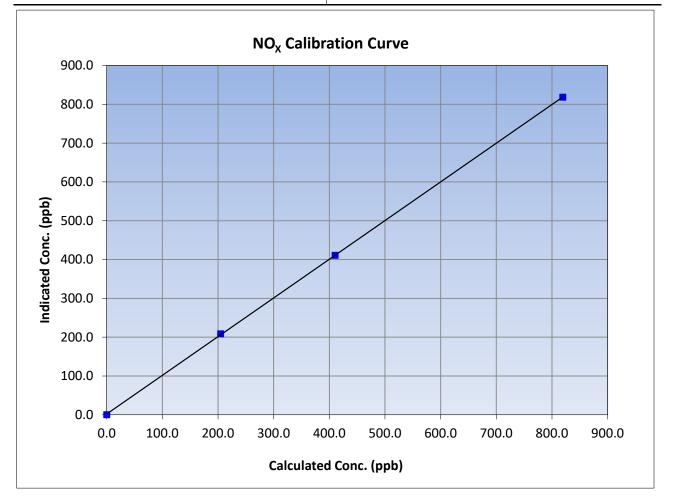
Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

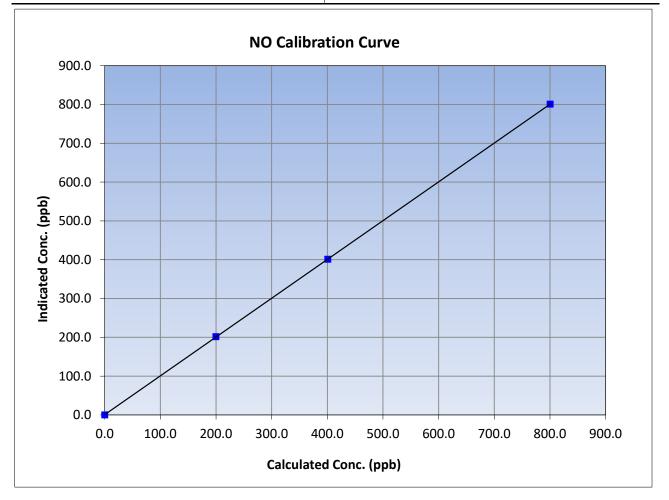
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 1	9, 2023	Previous Calibration:	March	9, 2023
Station Name:	MacKa	ıy River	Station Number:	AM	S20
Start Time (MST):	9:	47	End Time (MST):	14	:26
Analyzer make:	Thermo 42i		Analyzer serial #:	1505164379	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999972	≥0.995
819.5	818.3	1.0014	correlation coefficient	0.999972	20.995
410.4	410.9	0.9989	Clana	0.006800	0.90 - 1.10
204.6	208.5	0.9815	Slope	0.996899	0.90 - 1.10
			Intercept	1.929986	+/-20





NO Calibration Summary

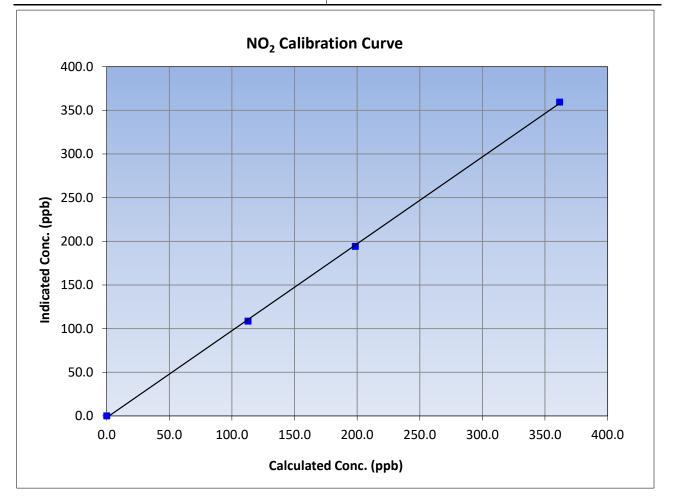
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 1	9, 2023	Previous Calibration:	March	9, 2023
Station Name:	MacKa	ny River	Station Number:	AM	S20
Start Time (MST):	9:	47	End Time (MST):	14	:26
Analyzer make:	Thermo 42i		Analyzer serial #:	15051	.64379
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999994	≥0.995
800.3	800.7	0.9995	correlation coefficient	0.555554	20.995
400.8	401.2	0.9991	Classe	0.999776	0.90 - 1.10
199.9	201.7	0.9908	Slope	0.999770	0.90 - 1.10
			Intercept	0.730780	+/-20

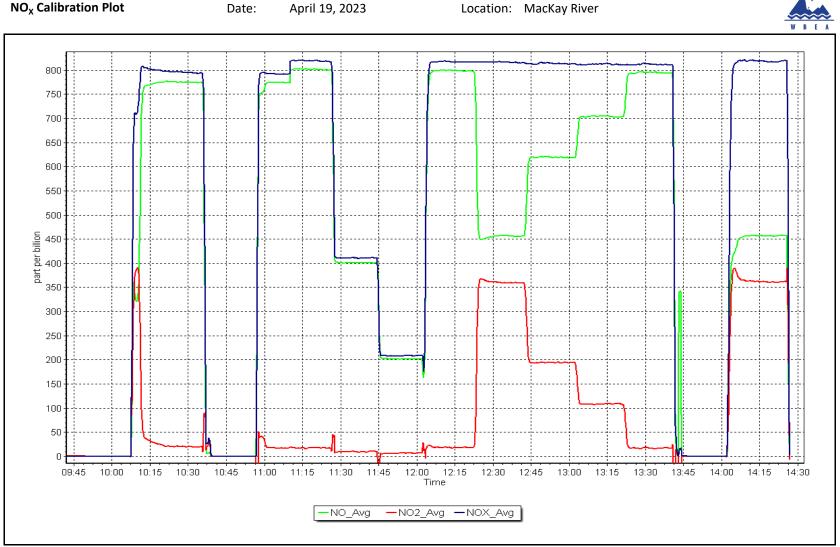




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 1	9, 2023	Previous Calibration:	March	9, 2023
Station Name:	MacKa	y River	Station Number:	AM	S20
Start Time (MST):	9:	47	End Time (MST):	14	:26
Analyzer make:	Therr	no 42i	Analyzer serial #:	15051	64379
		Calibr	ation Data		
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999833	≥0.995
361.7	359.4	1.0063	correlation coefficient	0.555655	20.333
198.5	194.2	1.0219	Slope	0.995110	0.90 - 1.10
112.9	108.5	1.0402	Slope	0.995110	0.90 - 1.10
			Intercept	-1.870675	+/-20





April 19, 2023



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS21 CONKLIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Conklin April 13, 2023 9:14 Routine		Station number: Last Cal Date: End time (MST):	AMS21 March 3, 2023 12:00	
	Calibration St	andards		
49.93	ppm	Cal Gas Exp Date:	January 5, 2025	
<u>CC259455</u>		_		
49.93	ppm		NA	
Toloduno ADI T700		-	2910	
Teledyne Al 1701		Sena Number.	202	
	Analyzer Info	rmation		
Thermo 43i 0 - 1000 ppb		Analyzer serial #:	1428701363	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.005625	1.015856	Backgd or Offset:	28.6	28.4
0.356047	0.896430	Coeff or Slope:	0.914	0.914
	SO ₂ Calibratio	on Data		
Dilution air flow rate	Source gas flow rate	Calculated		Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
(seem)	(seem)	concentration (ppb) (cc)	(ppb) (ic)	Ellinit = 0.35-1.05
5005	0.0	0.0	0.0	
4920	80.2	800.8	812.0	0.986
F 00F	0.0	0.0	0.1	
				0.984
				0.984
				0.982
				0.985
	-			0.980
812 00	Previous response			0.8%
		000.71	-	0.070
NA	AF Correlation:			
	April 13, 2023 9:14 Routine 49.93 <u>CC259455</u> 49.93 Teledyne API T700 Teledyne API 701 Thermo 43i 0 - 1000 ppb <u>Start</u> 1.005625 0.356047 Dilution air flow rate (sccm) Dilution air flow rate (sccm) 5005 4920 4920 4920 4960 4980 5005 4920 4920 4980 5005	Conklin April 13, 2023 9:14 Routine Calibration St 49.93 49.93 ppm ppm CC259455 49.93 ppm Teledyne API T700 Teledyne API 701 Analyzer Infor Thermo 43i 0 - 1000 ppb Inotses 1.005625 Start 1.005625 Finish 1.015856 0.356047 Dilution air flow rate (sccm) Source gas flow rate (sccm) Dilution air flow rate (sccm) Source gas flow rate (sccm) 5005 0.0 4920 80.2 5005 0.0 4920 80.2 4960 40.1 4980 20.0 5005 0.0 4920 80.2 812.00 Previous response NA	April 13, 2023 9:14 RoutineLast Cal Date: End time (MST): End time (MST):Calibration Standards 49.93 49.93 49.93 ppmCal Gas Exp Date: Diff between cyl: Serial Number: Serial Number:Teledyne API 7700 Teledyne API 701Serial Number: Serial Number:Start 1.005625 0.356047Finish 1.015856 0.896430Backgd or Offset: coreft or Slope:Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)S005 50050.00.04920 4920 496080.2800.84960 40.1400.4400.44980 4920 50050.00.04920 4920 50050.00.04920 50050.00.04920 4920 80.2800.84960 40.1400.44980 4920 4920 5005805.71NA A AF Slope:805.71	Conklin April 13, 2023 9:14 RoutineStation number: Last Cal Date: March 3, 2023 I 2:00AMS21 March 3, 2023 Last Cal Date: March 3, 2023 I 2:00Calibration Standards 49.93 49.93 ppmCal Gas Exp Date: Date:January 5, 2025 I 2:00CC259455 49.93ppmRem Gas Exp Date: Diff between cyl: Serial Number:3810 262Teledyne API T700 Teledyne API 701Serial Number: Serial Number:262Start 1.005625Finish 1.015856Backgd or Offset: Coeff or Slope:Start 0.914Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated (concentration (ppb) (Cc)Indicated concentration C (ppb) (lc)Dilution air flow rate (sccm)Source gas flow rate (sccm)Calculated concentration (ppb) (Cc)Indicated concentration C (ppb) (lc)S0050.00.00.00.0492080.2800.88112.0S0050.00.00.00.0498020.020.020.1205.1S0050.00.00.00.0498020.080.3813.0AAF Slope:805.71*% change MA

Notes:

No adjustments made.

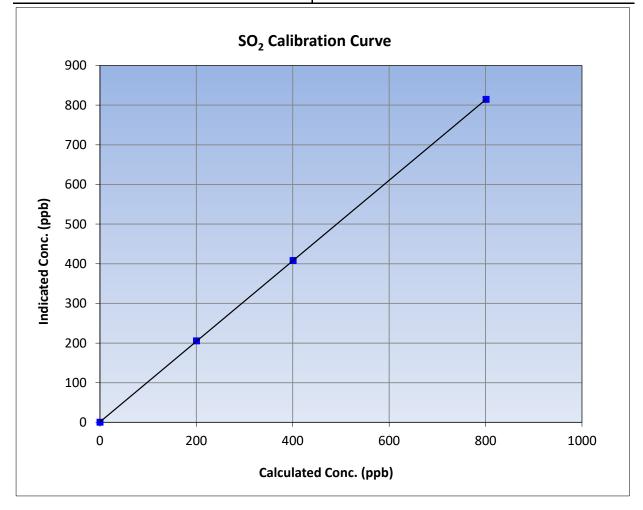
Calibration Performed By:

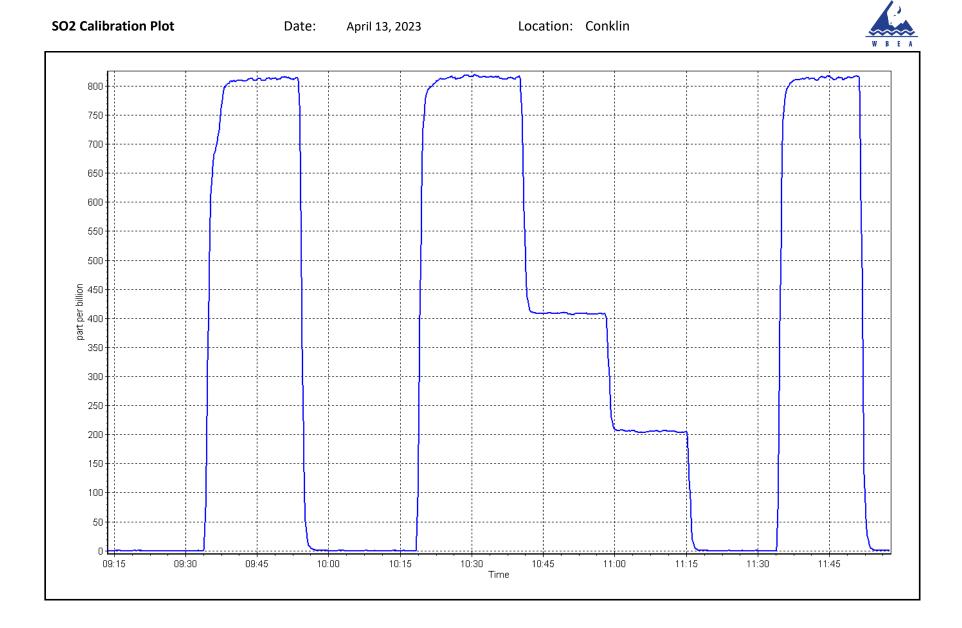


SO₂ Calibration Summary

	Stat	ion Information	Version-01-202
Calibration Date:	April 13, 2023	Previous Calibration:	March 3, 2023
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:14	End Time (MST):	12:00
Analyzer make:	Thermo 43i	Analyzer serial #:	1428701363
	Ca	libration Data	

Calculated concentration (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999995	≥0.995
800.8	814.1	0.9837	correlation coefficient	0.999995	20.335
400.4	407.9	0.9817	Slope	1.015856	0.90 - 1.10
200.1	205.1	0.9757	Slope	1.015850	0.90 - 1.10
			Intercept	0.896430	+/-30







TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin April 26, 2023 9:17 Routine		Station number: Last Cal Date: End time (MST):	AMS21 March 22, 2023 13:05	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.03 CC505493	ppm	Cal Gas Exp Date:	April 16, 2022	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	5.03 NA API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 3810	
ZAG Make/Model:	API 701H		Serial Number:	691	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CD-Nova 101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1236656116 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.019442	1.009291	Backgd or Offset:	2.9	2.8
Calibration intercept:	0.237078	-0.082550	Coeff or Slope:	0.991	0.974
		TRS As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.4	
as found span	4921	79.5	80.0	81.9	0.972
as found 2nd point	4960	39.8	40.0	41.1	0.965
as found 3rd point	4980	19.9	20.0	20.5	0.958
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	-0.3	
high point	4921	79.5	80.0	80.5	0.993
second point	4960	39.8	40.0	40.5	0.989
third point	4980	19.9	20.0	20.3	0.986
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.5	80.0	80.5	0.993
SO2 Scrubber Check	4920	80.2	802.0	0.1	
Date of last scrubber cha	inge:			Ave Corr Factor	0.989
Date of last converter ef					efficiency
Baseline Corr As found:	82.3	Prev response:	81.76	*% change:	0.7%
Baseline Corr 2nd AF pt:	41.5	AF Slope:		AF Intercept:	-0.222949
Baseline Corr 3rd AF pt:	20.9	AF Correlation:		•	
				* = > +/-5% change initiate	es investigation

Notes:

Adjusted the span only.

Calibration Performed By:

Denny Ray Estador

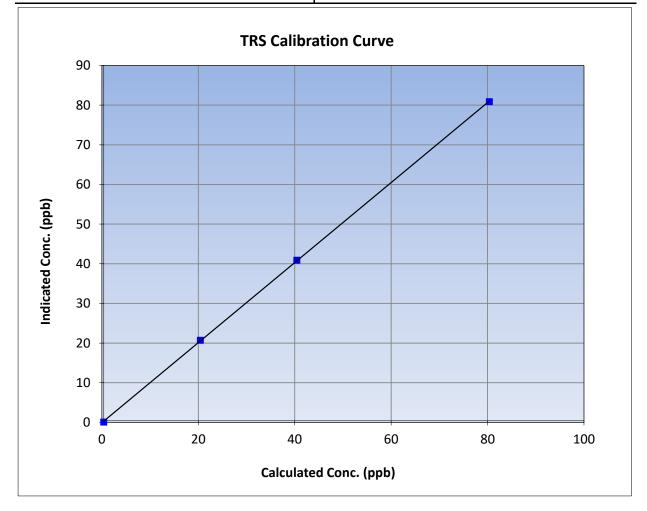


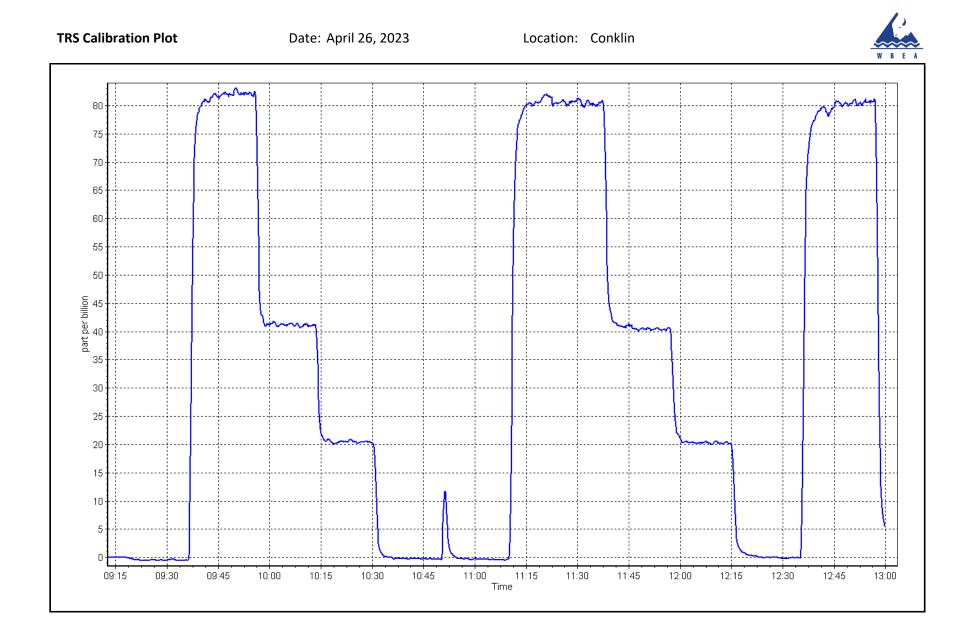
TRS Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	April 26, 2023	Previous Calibration:	March 22, 2023
Station Name:	Conklin	Station Number:	AMS21
Start Time (MST):	9:17	End Time (MST):	13:05
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1236656116

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999965	≥0.995
80.0	80.5	0.9934	correlation coefficient	0.999905	20.995
40.0	40.5	0.9887	Slope	1.009291	0.90 - 1.10
20.0	20.3	0.9862	Slope	1.009291	0.90 - 1.10
			Intercept	-0.082550	+/-3







THC / CH_4 / NMHC Calibration Report

		Stat	ion Information		
Station Name:	Conklin		Station number: AN	/IS21	
Calibration Date:	April 13, 2023		Last Cal Date: Ma	arch 3, 2023	
Start time (MST):	9:14		End time (MST): 12	:00	
Reason:	Routine				
		Calib	oration Standards		
Gas Cert Reference:	(C259455	Cal Gas Expiry Date: Jar	nuary 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	4	
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 T	700	Serial Number: 38	10	
ZAG make/model:	Teledyne API 70	01	Serial Number: 69	1	
		Anal	yzer Information		
Analyzer make:	Thermo 55i		Analyzer serial #: 11	8148495	
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0 -	- 10 ppm	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	1.86E-04	1.86E-0	4 NMHC SP Ratio:	4.56E-05	4.56E-05
CH4 Retention time:	12.60	12.60	NMHC Peak Area:	200658	200658

THC Calibration Data	Calibration Data	THC
----------------------	------------------	-----

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.19	0.996
as found 2nd point	4960	40.1	8.56		
as found 3rd point	4980	20.0	4.27		
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	17.13	17.16	0.998
second point	4960	40.1	8.56	8.62	0.994
third point	4980	20.0	4.27	4.34	0.984
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	17.13	17.05	1.004
			A	Average Correction Factor	0.992
Baseline Corr AF:	17.19	Prev response	17.21	*% change	-0.1%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation



THC / CH₄ / NMHC Calibration Report

Version-06-2022

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.2	9.14	9.19	0.994		
as found 2nd point	4960	40.1	4.57				
as found 3rd point	4980	20.0	2.28				
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.2	9.14	9.19	0.994		
second point	4960	40.1	4.57	4.60	0.993		
third point	4980	20.0	2.28	2.32	0.982		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	9.14	9.07	1.007		
			A	Average Correction Factor	0.990		
Baseline Corr AF:	9.19	Prev response	9.17	*% change	0.2%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4 Calibration Data

			liuli Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	8.00	0.998
as found 2nd point	4960	40.1	3.99		
as found 3rd point	4980	20.0	1.99		
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	7.97	1.002
second point	4960	40.1	3.99	4.02	0.994
third point	4980	20.0	1.99	2.02	0.986
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	7.98	1.001
			A	verage Correction Factor	0.994
Baseline Corr AF:	8.00	Prev response	8.04	*% change	-0.5%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.003632		1.000983	
THC Cal Offset:		0.026595		0.032189	
CH4 Cal Slope:		1.005332		0.996933	
CH4 Cal Offset:		0.011959		0.019545	
NMHC Cal Slope:		1.002247		1.004534	
NMHC Cal Offset:		0.014236		0.012844	

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

		Station I	nformation		Version-06-202
Calibration Date:	April 1	3, 2023	Previous Calibration:	March	3 2023
Station Name:		3, 2023 hklin	Station Number:	AM	
Start Time (MST):		:14	End Time (MST):	12:	
Analyzer make:	men	no 55i	Analyzer serial #:	11814	18495
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	tion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999984	≥0.995
17.13	17.16	0.9980			
8.56	8.62	0.9937	Slope	1.000983	0.90 - 1.10
4.27	4.34	0.9838	Intercent	0.032189	+/-0.5
			Intercept	0.032189	+/-0.5
20.0 -		THC Calibratio	n Curve		
18.0 -					
16.0 -					
14.0 -					
e 12.0 -					
طع 10.0 -					
- 0.21 (bbm) - 0.0 (bbm) - 0.8 qConc.					
- 0.6 -					
4.0 -					
2.0 -					
0.0		2		15.0	
0.	.0 5	.0	10.0	15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

		.	f		Version-06-202
			nformation Previous Calibration:		
Calibration Date:		•		March 3	
Station Name:		nklin	Station Number:	AMS	
Start Time (MST):		14	End Time (MST):	12:	
Analyzer make:	Therr	no 55i	Analyzer serial #:	11814	8495
		Calibra	tion Data		
Calculated concentratic (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 7.99	0.00 7.97	1.0021	Correlation Coefficient	0.999970	≥0.995
3.99 1.99	4.02	0.9940 0.9859	Slope	0.996933	0.90 - 1.10
			Intercept	0.019545	+/-0.5
9.0 8.0 7.0					
6.0 -					
Indicated Conc. (ppm)					
ороосоросоросоросоросоросоросороса, и славания и средски сред					
– 0.6 –					
2.0					
1.0 -					
0.0	2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		



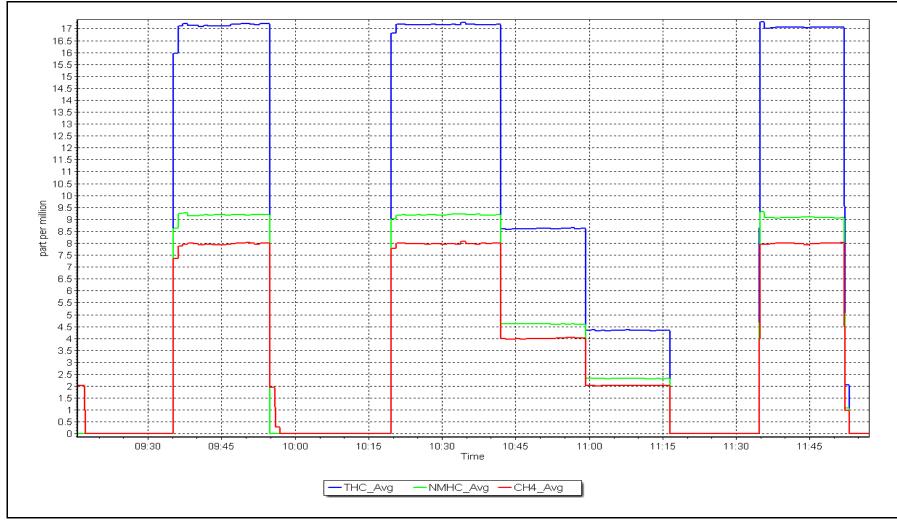
NMHC Calibration Summary

		Station I	nformation		
alibration Date:	Ар	April 13, 2023 F		March	3, 2023
tation Name:		Conklin	Station Number:	AM	S21
itart Time (MST)	:	9:14	End Time (MST):	12:	00
Analyzer make:	TI	nermo 55i	Analyzer serial #:	11814	18495
		Calibra	tion Data		
Calculated concentra (ppm) (Cc)	ation Indicated concentrat (ppm) (Ic)	ion Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999989	≥0.995
9.14 4.57	9.19 4.60	0.9945 0.9932			
2.28	2.32	0.9932	Slope	1.004534	0.90 - 1.10
			Intercept	0.012844	+/-0.5
9.0 - 8.0 - 7.0 -					
6.0 - bbm 5.0 -					
5 .0					
0 + 4.0					
4.0 - Iudicated 3.0 -					
2.0		×			
1.0					
0.0			6.0	8.0	10.0
0	0.0 2.0		6.0	8.0	10.0
		Calculated	l Conc. (ppm)		

NMHC Calibration Plot

Location: Conklin







THC / CH_4 / NMHC Calibration Report

		Stat	tion Information			
Station Name: Calibration Date: Start time (MST): Reason:	ConklinStation number: AMS21April 16, 2023Last Cal Date: April 13, 202310:14End time (MST): 12:50MaintenanceMaintenance					
	Wantenance	Calik	pration Standards			
Gas Cert Reference:	C	C259455	Cal Gas Expiry Date: Ja	nuary 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: N/	4		
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 T7	00	Serial Number: 3810			
ZAG make/model:	Teledyne API 70	1	Serial Number: 691			
		Anal	yzer Information			
Analyzer make:	Thermo 55i		Analyzer serial #: 11	18148495		
THC Range (ppm):	0 - 20 ppm					
NMHC Range (ppm):	0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	1.86E-04	1.82E-0	NMHC SP Ratio:	4.56E-05	4.58E-05	
CH4 Retention time:	12.60	12.20	NMHC Peak Area:	200658	199772	

THC C	alibra	ation	Data
-------	--------	-------	------

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.2	17.13	17.24	0.993		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.2	17.13	17.16	0.998		
second point	4960	40.1	8.56	8.61	0.994		
third point	4980	20.0	4.27	4.32	0.988		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	17.13	16.86	1.016		
			A	verage Correction Factor	0.993		
Baseline Corr AF:	17.24	Prev response	17.17	*% change	0.4%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			



THC / CH_4 / NMHC Calibration Report

Version-06-2022

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.10	1.004
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	9.14	9.13	1.001
second point	4960	40.1	4.57	4.61	0.992
third point	4980	20.0	2.28	2.32	0.984
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	9.14	8.98	1.018
			ŀ	Average Correction Factor	0.992
Baseline Corr AF:	9.10	Prev response	9.19	*% change	-1.0%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4	Cal	ibration	Data
CIT	Cu	is a cion	Dutu

			lion Data			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	und zero 5000 0.0		0.00	0.00		
as found span	4920	80.2	7.99	8.14	0.981	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.2	7.99	8.03	0.995	
second point	4960	40.1	3.99	4.01	0.997	
third point	4980	20.0	1.99	2.01	0.992	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.2	7.99	7.88	1.013	
			A	verage Correction Factor	0.994	
Baseline Corr AF:	8.14	Prev response	7.98	*% change	2.0%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		1.000983		1.001470		
THC Cal Offset:		0.032189		0.023785		
CH4 Cal Slope:		0.996933	1.005018			
CH4 Cal Offset:		0.019545		0.000556		
NMHC Cal Slope:		1.004534		0.998508		
NMHC Cal Offset:		0.012844		0.023429		

Notes:

Analyzer was having dipping issue and had to recalibrate. Adjusted the span.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

					Version-06-202
		Station I	nformation		
Calibration Date:	April 1	April 16, 2023		April 13	3, 2023
Station Name:	Cor	klin	Station Number:	AM	S21
Start Time (MST):	10	:14	End Time (MST):	12:	50
Analyzer make:		no 55i	Analyzer serial #:	11814	18495
,					
		Calibra	tion Data		
Calculated concentrat (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999991	≥0.995
17.13	17.16	0.9979		0.00001	
8.56	8.61	0.9943	Slope	1.001470	0.90 - 1.10
4.27	4.32	0.9877			
			Intercept	0.023785	+/-0.5
20.0		THC Calibratio			
18.0 -					
16.0 -					
14.0 -					
ີ ມ ີ 12.0 -					
10.0 - uo					
Indicated Conc. (ppm) 10.0 - 8.0 - 6.0 -					
bib 6.0 –					
4.0 -					
2.0 -					
0.0 🗧					
0.	0 5	.0	10.0	15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

						Version-06-202
			Station I	nformation		
Calibratio	on Date:	April 16, 2023		Previous Calibration:	April 13	3, 2023
Station Na	ame:	Сог	nklin	Station Number:	AMS	521
Start Time	e (MST):	10	:14	End Time (MST):	12:	50
Analyzer r	make:	Theri	no 55i	Analyzer serial #:	11814	8495
			Calibra	tion Data		
			Calibra	tion Data		
(ppn	m) (Cc)	n Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
	.00	0.00		Correlation Coefficient	0.999997	≥0.995
	.99 .99	8.03	0.9946 0.9968			
	.99	2.01	0.9918	Slope	1.005018	0.90 - 1.10
				Intercept	0.000556	+/-0.5
	9.0 8.0 7.0 6.0					
Indicated Conc. (ppm)	5.0					
d Cone	4.0					
ndicate	3.0 -					
=	2.0					
	1.0 -					
	0.0	2.0	4.0	6.0	8.0	10.0
	0.0	2.0			5.0	20.0
			Calculated	l Conc. (ppm)		

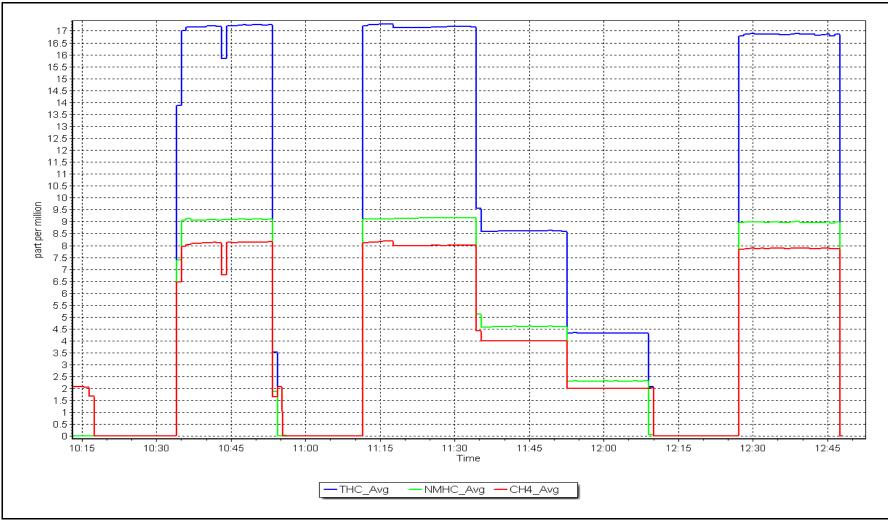


NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	April	April 16, 2023 P		April 13	3, 2023
Station Name:	C	onklin	Station Number:	AM	S21
Start Time (MST):	1	.0:14	End Time (MST):	12:	50
Analyzer make:	The	rmo 55i	Analyzer serial #:	11814	18495
		Calibra	tion Data		
Calculated concentrati (ppm) (Cc)	on Indicated concentratio (ppm) (Ic)	n Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.14	0.00 9.13		Correlation Coefficient	0.999967	≥0.995
4.57	4.61	1.0006 0.9917			
2.28	2.32	0.9841	Slope	0.998508	0.90 - 1.10
			Intercept	0.023429	+/-0.5
10.0 - 9.0 - 8.0 - 7.0 -					
Indicated Conc. (ppm) - 0.0 0.0 0.0					
5 .0 -					
ט 4.0 -					
ndica 3.0 –					
2.0					
1.0 -					
0.0					
0.0	0 2.0	4.0	6.0	8.0	10.0
		Calculated	l Conc. (ppm)		









THC / CH_4 / NMHC Calibration Report

			Station	Information			
Station Name: Calibration Date: Start time (MST): Reason:	ConklinStation number: AMS21April 18, 2023Last Cal Date: April 16, 20239:50End time (MST): 11:10RemovalFind time (MST): 11:10						
			Calibrat	ion Standards			
Gas Cert Reference:	C	C259455		Cal Gas Expiry Date: Ja	nuary 5 <i>,</i> 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. Diff between cyl (CH ₄):	207.2	ppm		Diff between cyl (THC): Diff between cyl (NM):			
Calibrator Model:	Teledyne API T7	700	Serial Number: 3810				
ZAG make/model:	Teledyne API 70	01	Serial Number: 691				
			Analyze	r Information			
Analyzer make:	Thermo 55i			Analyzer serial #: 11	L8148495		
THC Range (ppm):	: 0 - 20 ppm						
NMHC Range (ppm):	: 0 - 10 ppm			CH4 Range (ppm): 0 -	- 10 ppm		
	<u>Start</u>		<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	1.82E-04		NA	NMHC SP Ratio:	4.58E-05	NA	
CH4 Retention time:	12.20		NA	NMHC Peak Area:	199772	NA	

THC Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.0</i>
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	17.13	17.02	1.006
as found 2nd point	4960	40.1	8.56	8.51	1.006
as found 3rd point	4980	20.0	4.27	4.28	0.998
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
	Average Correction Factor				
Baseline Corr AF:	17.02	Prev response	17.17	*% change	-0.9%
Baseline Corr 2nd AF:	8.5	AF Slope:	0.993144	AF Intercept:	0.014151
Baseline Corr 3rd AF:	4.3	AF Correlation:	0.999995	* = > +/-5% change initia	ates investigation



THC / CH_4 / NMHC Calibration Report

Version-06-2022

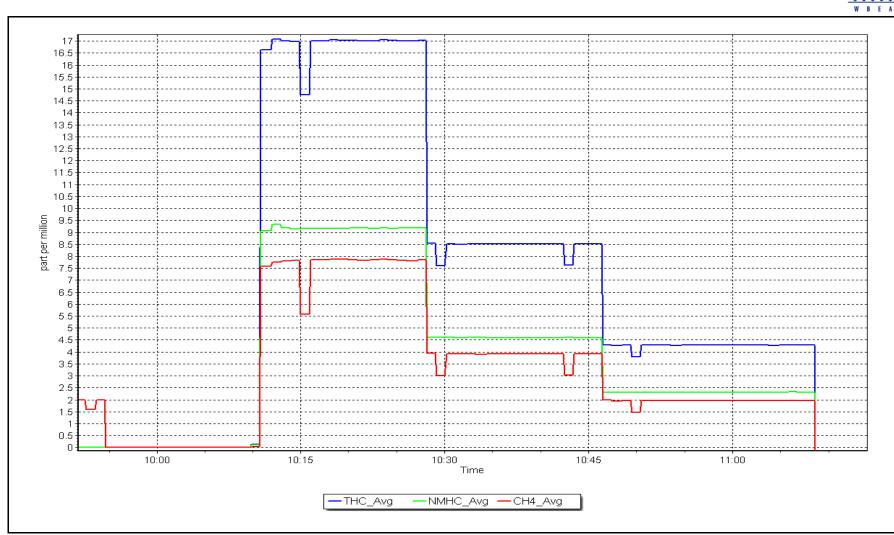
		NMHC Calibr	ation Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	9.14	9.18	0.996
as found 2nd point	4960	40.1	4.57	4.59	0.996
as found 3rd point	4980	20.0	2.28	2.31	0.987
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span					
			Aver	age Correction Factor	
Baseline Corr AF:	9.18	Prev response	9.19	*% change	-0.1%
Baseline Corr 2nd AF:	4.6	AF Slope:	1.003685	AF Intercept:	0.008240
Baseline Corr 3rd AF:	2.3	AF Correlation:	0.999994	* = > +/-5% change initiat	es investigation
		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.2	7.99	7.84	1.019
as found 2nd point	4960	40.1	3.99	3.92	1.019
as found 3rd point	4980	20.0	1.99	1.97	1.011
new cylinder response					
calibrator zero					
high point					
second point					
third point					
as left zero					
as left span				1	
				age Correction Factor	
Baseline Corr AF:	7.84	Prev response	7.98	*% change	-1.8%
Baseline Corr 2nd AF:	3.92	AF Slope:	0.981080	AF Intercept:	0.005912
Baseline Corr 3rd AF:	1.97	AF Correlation:	0.999996	* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000983			
THC Cal Offset:		0.032189			
CH4 Cal Slope:		0.996933			
CH4 Cal Offset:		0.019545			
NMHC Cal Slope:		1.004534			
NMHC Cal Offset:		0.012844			

Notes:

Removal calibration for instrument change out.

Calibration Performed By: Ka

Karan Pandit



Location: Conklin

5



THC / CH_4 / NMHC Calibration Report

					version-00-20	
		Station	Information			
Station Name: Calibration Date: Start time (MST): Reason:	Conklin April 18, 2023 11:55 Install	Station number: AMS21				
		Calibratio	on Standards			
Gas Cert Reference:	CC	259455	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			P.F	
Removed Gas Cert:		NA	Removed Gas Expiry:	NA		
Removed CH4 Conc.	497.9	ppm	CH4 Equiv Conc.	1067.7	ppm	
Removed C3H8 Conc. Diff between cyl (CH ₄):	207.2	ppm	Diff between cyl (THC): Diff between cyl (NM):			
Calibrator Model:	Teledyne API T700)	Serial Number:	3810		
ZAG make/model:	Teledyne API 701		Serial Number:	691		
		Analyzer	Information			
Analyzer make:	Thermo 55i		Analyzer serial #:	118148495		
THC Range (ppm):	0 - 20 ppm		·			
NMHC Range (ppm):			CH4 Range (ppm):	0 - 10 ppm		
	Start	Finish		Start	Finish	
CH4 SP Ratio:		2.16E-04	NMHC SP Ratio:	NA	4.66E-05	
CH4 Retention time:		12.00	NMHC Peak Area:	NA	196084	
		THE Colli	hustion Data			
Set Point	Dil air flow rate	Source gas flow rate	calc conc (ppm) (Cc)	Ind conc (ppm) (Ic)	CF <i>Limit= 0.95-1.05</i>	
as found zero	Dir dir now rate				Ci Linne 0.00-1.00	
as found span						
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.2	17.13	17.14	0.999	
second point	4960	40.1	8.56	8.63	0.992	
third point	4980	20.0	4.27	4.36	0.979	
as left zero	5000	0.0	0.00	0.00		



THC / CH_4 / NMHC Calibration Report

Version-06-2022

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero							
as found span							
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.2	9.14	9.15	0.999		
second point	4960	40.1	4.57	4.61	0.991		
third point	4980	20.0	2.28	2.33	0.979		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.2	9.14	9.18	0.996		
			А	verage Correction Factor	0.990		
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 initiat	es investigation		

CH4 Calibration Data

Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	:) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.2	7.99	8.00	0.999
second point	4960	40.1	3.99	4.02	0.993
third point	4980	20.0	1.99	2.03	0.980
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.2	7.99	8.00	0.998
			Av	verage Correction Factor	0.991
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 initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		NA		0.999574	
THC Cal Offset:		NA		0.045989	
CH4 Cal Slope:		NA		0.999808	
CH4 Cal Offset:		NA		0.019754	
NMHC Cal Slope:		NA		0.999495	
NMHC Cal Offset:		NA		0.026235	

Notes:

Install calibration.

Calibration Performed By:

Karan Pandit



THC Calibration Summary

	Station I	nformation		
April 1	April 18, 2023		ious Calibration: NA	
Cor	Conklin		Station Number: AMS21	
11	:55	End Time (MST):	14	:29
Therr	no 55i	Analyzer serial #:	11814	18495
	Calibra	tion Data		
	Calibra	tion Data		
tion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00		Correlation Coefficient	0.999967	≥0.995
		Slope	0.999574	0.90 - 1.10
4.50	0.9795		0.045000	(
		Intercept	0.045989	+/-0.5
	0	10.0	15.0	20.0
υ 5			12.0	20.0
	Calculated	Conc. (ppm)		
	Cor 11 Therr tion Indicated concentration (ppm) (Ic) 0.00 17.14 8.63 4.36	April 18, 2023 Conklin 11:55 Thermo 55i Calibra ton Indicated concentration (ppm) (Ic) Correction factor (Cc/Ic) 0.00 17.14 0.9991 8.63 0.9924 4.36 0.9793 THC Calibration THC Calibration 0 5.0	Conklin Station Number: 11:55 End Time (MST): Thermo 55i Analyzer serial #: Calibration Data Correction factor (Cc/Ic) Statistical Evaluation 0.00	April 18, 2023 Previous Calibration: N Conklin Station Number: AM 11:55 End Time (MST): 14 Thermo 55i Analyzer serial #: 11814 Calibration Data Correction factor (CC/Ic) 0.00



CH₄ Calibration Summary

					Version-06-202
		Station I	nformation		
Calibration Date:	April 1	8, 2023	Previous Calibration:	N	A
Station Name:	Cor	Conklin		AMS	521
Start Time (MST):	11	11:55		14:	29
Analyzer make:	Therr	no 55i	Analyzer serial #:	11814	8495
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 7.99	0.00 8.00	0.9989	Correlation Coefficient	0.999972	≥0.995
3.99 1.99	4.02 2.03	0.9933 0.9801	Slope	0.999808	0.90 - 1.10
			Intercept	0.019754	+/-0.5
8.0 7.0 6.0 (udd) 5.0					
Indicated Conc. (ppm) 0.0 3.0					
0.6 dicate					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
	-		l Conc. (ppm)		-
		Calculated			



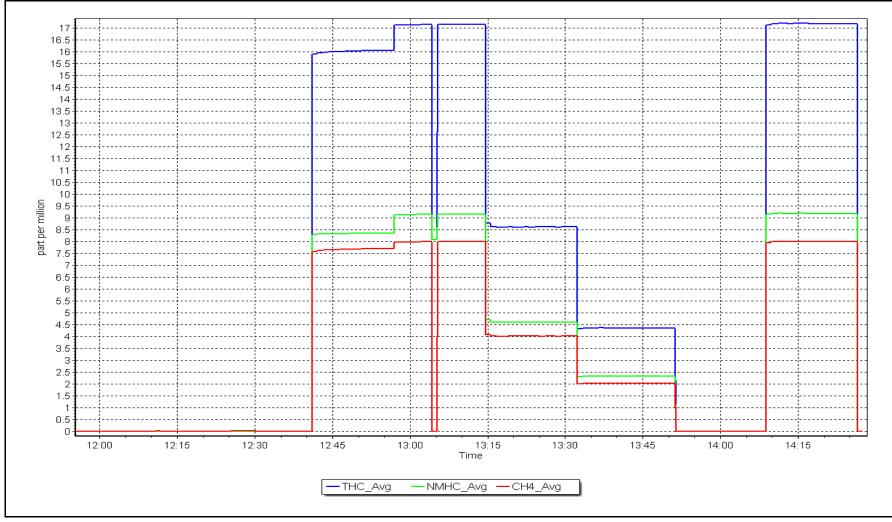
NMHC Calibration Summary

		Station I	nformation		
Calibration Date:	Anril 1		Previous Calibration:	N	Δ
Station Name:	April 18, 2023 Conklin		Station Number:	AM	
Start Time (MST):		:55	End Time (MST):	14:	
Analyzer make:		no 55i	Analyzer serial #:	11814	
			,, <u>-</u> c., c.,		
		Calibra	tion Data		
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999962	≥0.995
9.14 4.57	9.15 4.61	0.9992 0.9915			
2.28	2.33	0.9786	Slope	0.999495	0.90 - 1.10
			Intercept	0.026235	+/-0.5
9.0					•
8.0					
7.0					
(bbm) 6.0 5.0 Couc					
- 5.0 OUC					
1.0 4.0 Indicated					
ip 3.0					
2.0					
1.0					
0.0	2.0	4.0	6.0	8.0	10.0
			l Conc. (ppm)		

NMHC Calibration Plot

Location: Conklin







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station Name: Calibration Date: Start time (MST): Reason: Conklin April 28, 2023 8:34 Routine Station number: AMS21 Last Cal Date: March 29, 2023 End time (MST): 12:30

Calibration	Standards
-------------	-----------

NO Gas Cylinder #:	T2Y1P1H		Cal Gas Expiry Date: December 11, 2023		
NOX Cal Gas Conc:	51.09	ppm	NO Cal Gas Conc:	50.39	ppm
Removed Cylinder #:	n/a		Removed Gas Exp Date: n/a		
Removed Gas NOX Conc:	51.09	ppm	Removed Gas NO Conc:	50.39	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	Teledyne API T7	00	Serial Number:	3810	
ZAG make/model:	Teledyne API T70	1H	Serial Number:	691	

Analy	vzer	Inform	ation
	,		

Analyzer make: T NOX Range (ppb): 0		Analyzer serial #: 1501663731				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>	
NO coeff or slope:	1.144	1.144	NO bkgnd or offset:	11.6	11.6	
NOX coeff or slope:	1.001	1.001	NOX bkgnd or offset:	11.8	11.8	
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	220.7	219.5	

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.009334	1.010616
NO _x Cal Offset:	2.026079	2.246244
NO Cal Slope:	1.010890	1.008763
NO Cal Offset:	0.963352	1.982980
NO_2 Cal Slope:	1.002951	1.003351
NO ₂ Cal Offset:	-0.706596	-0.204066



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1		
as found span	4921	79.4	811.2	800.1	11.1	820.4	807.4	13.1	0.9888	0.9910
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4921	79.4	811.2	800.1	11.1	820.9	807.9	13.0	0.9882	0.9904
second point	4960	39.7	405.7	400.1	5.6	413.5	407.3	6.3	0.9811	0.9824
third point	4980	19.8	202.3	199.6	2.8	209.0	204.8	4.2	0.9681	0.9744
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
as left span	4921	79.4	811.2	377.3	433.9	821.8	390.1	431.7	0.9872	0.9673
							Average C	orrection Factor	0.9791	0.9824
Corrected As fo	ound NO _X =	820.6 ppb	NO =	807.6 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	0.0%
Previous Respo	nse NO _x =	820.8 ppb	NO =	809.8 ppb				*Percent Chan	ge NO =	-0.3%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI: ;	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	808.0	385.2	433.9	434.9	0.9977	100.2%
2nd GPT point (200 ppb O3)	808.0	602.5	216.6	218.1	0.9932	100.7%
3rd GPT point (100 ppb O3)	808.0	702.4	116.7	116.1	1.0053	99.5%
				Average Correction Factor	0.9987	100.1%

Notes:

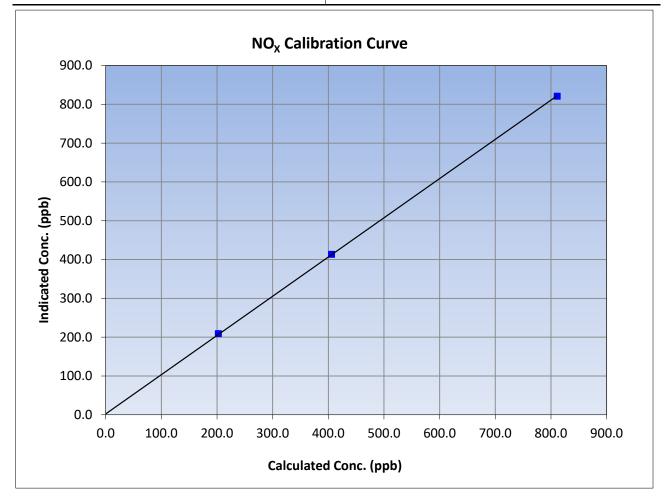
No adjustments required.

Calibration Performed By:



NO_x Calibration Summary

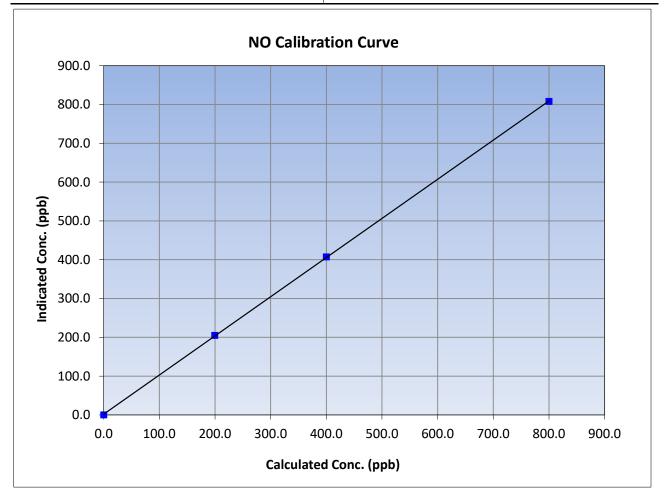
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 2	29, 2023
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	8:34		End Time (MST):	12	:30
Analyzer make:	ke: Thermo 42i		Analyzer serial #:	15016	63731
Calculated concentration		Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
(ppb) (Cc) 0.0	(ppb) (Ic) -0.1				
811.2	820.9	0.9882	Correlation Coefficient	0.999963	≥ <i>0.995</i>
405.7	413.5	0.9811	Slope	1.010616	0.90 - 1.10
202.3	209.0	0.9681	Slope	1.010010	0.90 - 1.10
			Intercept	2.246244	+/-20





NO Calibration Summary

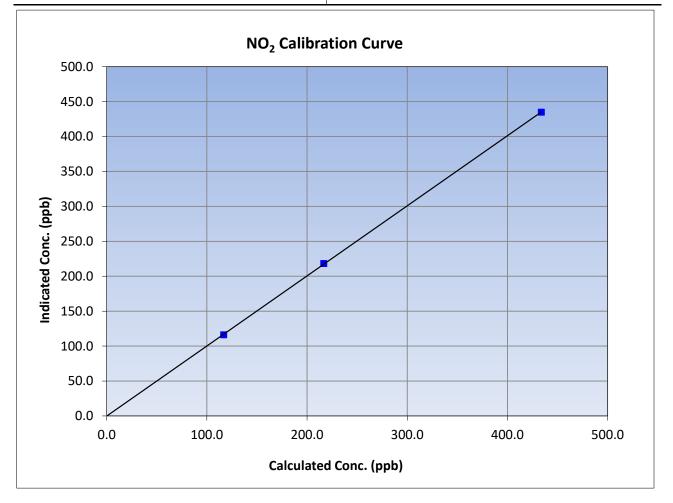
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 2	29, 2023
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	8:	34	End Time (MST):	12	:30
Analyzer make:	ake: Thermo 42i		Analyzer serial #:	rial #: 1501663731	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999970	≥0.995
800.1	807.9	0.9904	correlation coernicient	0.333370	20.333
400.1	407.3	0.9824	Slope	1.008763	0.90 - 1.10
199.6	204.8	0.9744	Slope	1.008705	0.90 - 1.10
			Intercept	1.982980	+/-20

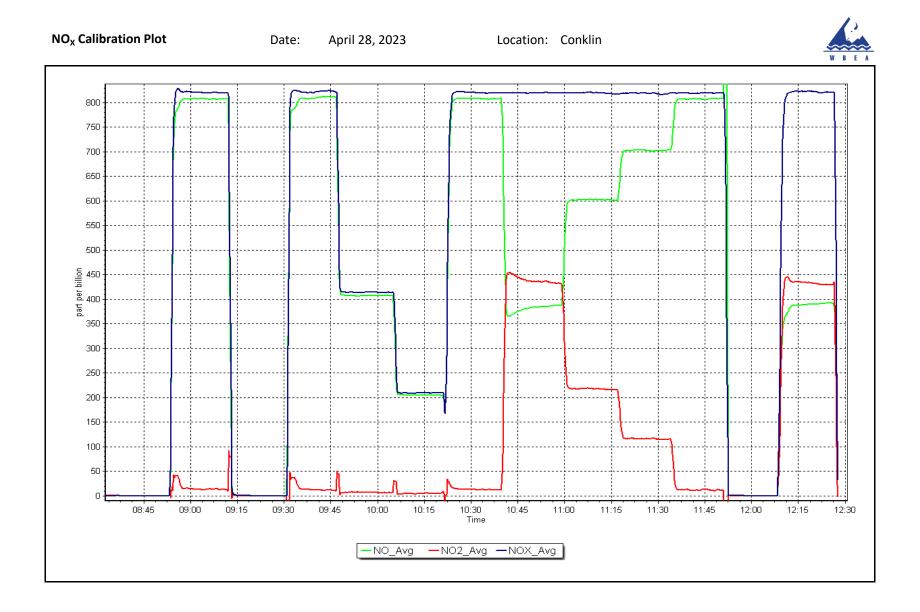




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	8, 2023	Previous Calibration:	March 2	29, 2023
Station Name:	Cor	nklin	Station Number:	AM	S21
Start Time (MST):	8:34		End Time (MST):	12	:30
Analyzer make:	xe: Thermo 42i		Analyzer serial #:	15016	63731
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Calibra Correction factor (Cc/Ic)	ation Data Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1			0.000004	
433.9	434.9	0.9977	Correlation Coefficient	0.999984	≥0.995
216.6	218.1	0.9932	Slope	1.003351	0.90 - 1.10
116.7	116.1	1.0053	Slope	1.005551	0.30 - 1.10
			Intercept	-0.204066	+/-20









O₃ Calibration Report

Version-01-2020

					Version-01-20
		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Conklin April 14, 2023 9:02 Routine	Station number: AMS21 Last Cal Date: March 9, 2023 End time (MST): 11:51			
		Calibration St	andards		
O3 generation mode: Calibrator Make/Model: ZAG Make/Model:	Photometer Teledyne API T700 Teledyne API 701		Serial Number: Serial Number:		
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1501663734	
Calibration slope: Calibration intercept:	<u>Start</u> 1.000343 0.240000	<u>Finish</u> 0.999857 0.700000	Backgd or Offset: Coeff or Slope:		<u>Finish</u> -1.2 1.002
		O ₃ Calibratio	on Data		
Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppm) (Ic)	Correction factor (Cc, Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-1.1	
as found span	5000	944.3	400.0	400.0	1.000
as found 2nd point					
as found 3rd point calibrator zero	5000	0.0	0.0	0.1	
high point	5000	946.2	400.0	400.0	1.000
second point	5000	803.2	200.0	202.0	0.990
third point	5000	705.0	100.0	100.6	0.994
as left zero	5000	0.0	0.0	0.0	
as left span	5000	936.0	400.0	404.7	0.988
•				ge Correction Factor	0.995
Baseline Corr As found: Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	401.1 NA NA	Previous response AF Slope: AF Correlation:		*% change AF Intercept:	0.2%
				* = > +/-5% change initiate	es investigation

Notes:

Adjusted the zero.

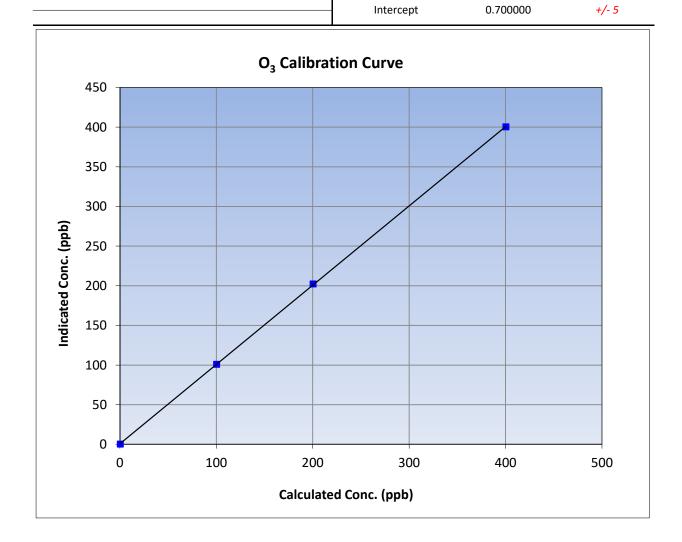
Calibration Performed By:

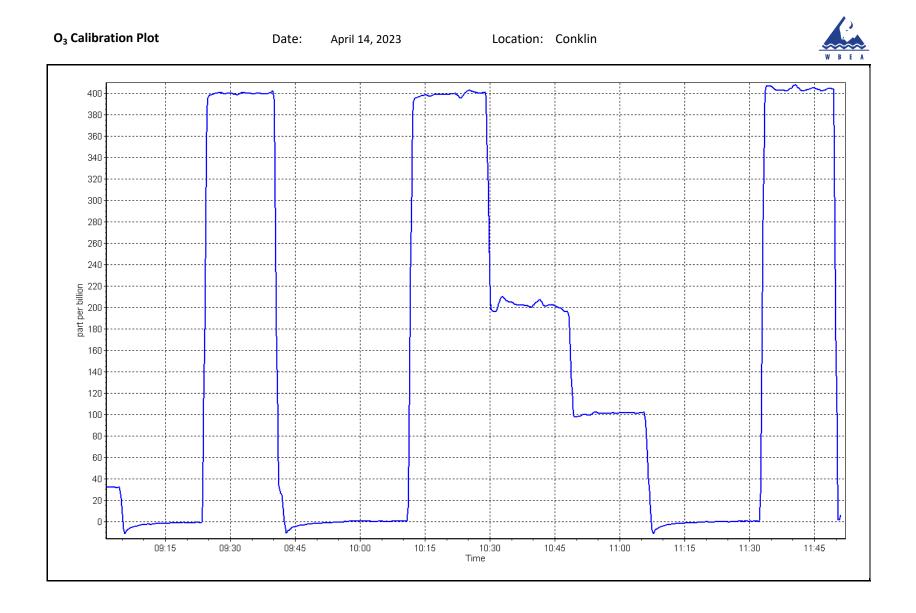
Denny Ray Estador



O₃ Calibration Summary

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	April 14,	2023	Previous Calibration:	March	9, 2023
Station Name:	Conk	lin	Station Number:	AM	/IS21
Start Time (MST):	rt Time (MST): 9:02		End Time (MST):	11	L:51
Analyzer make:	Analyzer make: Thermo		Analyzer serial #:	15016	663734
		Calib	ration Data		
Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999971	≥0.995
400.0	400.0	1.0000		0.999971	20.995
200.0	202.0	0.9901	Slope	0.999857	0.90 - 1.10
100.0	100.6	0.9940	Siope	0.553057	0.30 - 1.10







T640 PM_{2.5} CALIBRATION

W D E A						Version-01-2023
		Station Information	1			
Station Name:	Conklin		Station number:	AMS 21		
Calibration Date:	April 28, 2023		Last Cal Date:	March 29, 202	23	
Start time (MST):	9:52		End time (MST):	10:10		
Analyzer Make:	API T640		S/N:	1547		
Particulate Fraction:	PM2.5		5/11.	1347		
Flow Meter Make/Model:	DeltaCal		S/N:	954		
Temp/RH standard:	DeltaCal		S/N:	954		
		Monthly Calibration T	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>A</u>	<u>djusted</u>	(Limits)
T (°C)	14	14.5	14			+/- 2 °C
P (mmHg)	712.8	710	712.8			+/- 10 mmHg
flow (LPM)	5.01	5.09	5.01			+/- 0.25 LPM
Leak Test:	Date of check:	April 28, 2023	Last Cal Date:	March 29,	2023	
	PM w/o HEPA:		PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be	e completed before the	e quarterly work and will s	erve as the pre mai	intenance leak	check	
Inlet cleaning :	Inlet Head					
. .		Quarterly Calibration				6.0 m h
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>	<u>A</u>	djusted	(Limits)
PMT Peak Test						10.9 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:		
Date Optical Cham				,		<0.2 ug/m3
Disposable Filte	r Changed:					
		Annual Maintenanc	e			
Date Sample Tub	be Cleaned:					
Date RH/T Sense	or Cleaned:					
Notes:		No adjustments made. In	spected inlet head;	relatively clea	ın.	
Calibration by:	Denny Ray Estador					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS22 JANVIER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier April 26, 2023 10:44 Routine		Station number: Last Cal Date: End time (MST):	AMS 22 March 15, 2023 13:45	
		Calibration St	andards		
Cal Gas Concentration:	50.11	ppm	Cal Gas Exp Date:	January 18, 2029	
Cal Gas Cylinder #:	CC281519		Rom Cas Eve Data	NA	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.11 NA	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model:	Teledyne API T700		Serial Number:	3806	
ZAG Make/Model:	Teledyne API T701		Serial Number:	4890	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1152430006	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998449	0.998121	Backgd or Offset:	21.6	21.8
Calibration intercept:	0.464715	0.804418	Coeff or Slope:	1.022	1.003
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.6	
as found span	4920	79.8	799.8	812.2	0.985
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	79.8	799.8	798.7	1.001
second point	4960	39.9	399.9	400.4	0.999
third point	4980	20.0	200.4	201.5	0.995
as left zero	5000	0.0	0.0	0.3	
as left span	4920	79.8	799.8	800.6	0.999
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	811.60	Previous response	799.01	*% change	1.6%
	NA	AF Slope:		AF Intercept:	
Baseline Corr 2nd AF pt:					

Inlet filter changed after as founds. Adjusted both zero and span.

Calibration Performed By:

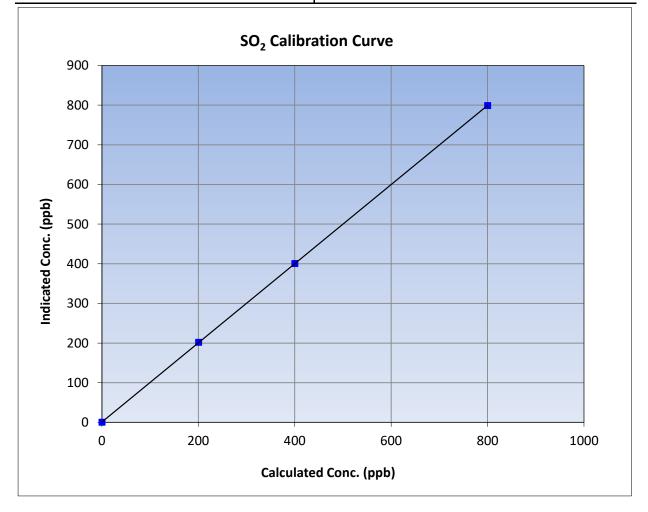


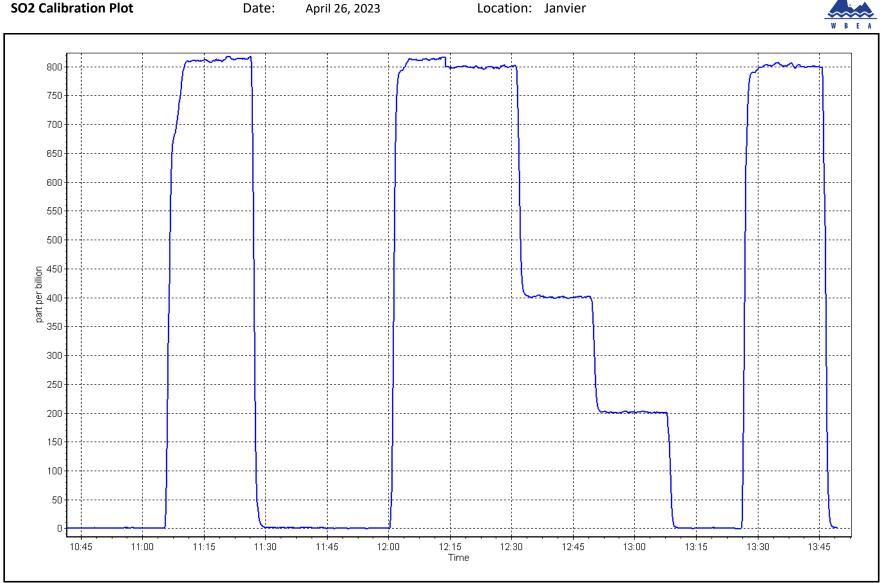
SO₂ Calibration Summary

	Stat	ion Information	
Calibration Date:	April 26, 2023	Previous Calibration:	March 15, 2023
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	10:44	End Time (MST):	13:45
Analyzer make:	Thermo 43i	Analyzer serial #:	1152430006

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999996	≥0.995
799.8	798.7	1.0014	correlation coefficient	0.999990	20.333
399.9	400.4	0.9987	Slope	0.998121	0.90 - 1.10
200.4	201.5	0.9947	Slope	0.998121	0.30 - 1.10
			- Intercept	0.804418	+/-30





Location: Janvier



TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Janvier April 25, 2023 10:33 Routine		Station number: Last Cal Date: End time (MST):	AMS22 March 29, 2023 16:35	
		Calibration S	tandards		
Cal Gas Concentration:	5.03	ppm	Cal Gas Exp Date:	April 16, 2022	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	DT0018680 5.03 NA Teledyne API T700 Teledyne API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3806 4890	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i-TLE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1151680031 587	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.999222	0.999363	Backgd or Offset:	3.50	5.95
Calibration intercept:	0.140953	-0.038984	Coeff or Slope:	1.220	1.071
		TRS As Four	nd Data		
Set Point	Dilution 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	0.9	
as found span	4920	79.5	80.0	87.6	0.923
as found 2nd point	4960	39.8	40.0	45.0	0.908
as found 3rd point	4980	19.9	20.0	23.0	0.906
new cylinder response					
		TRS Calibrat	ion Data		
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	79.5	80.0	79.9	1.001
second point	4960	39.8	40.0	40.0	1.001
third point	4980	19.9	20.0	19.9	1.006
as left zero	5000	0.0	0.0	0.0	
as left span	4920	79.5	80.0	79.4	1.007
SO2 Scrubber Check	4920	79.8	798.0	0.0	
Date of last scrubber cha	-			Ave Corr Factor	1.003
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	86.7	Prev response:	80.06	*% change:	7.7%
Baseline Corr 2nd AF pt:	44.1	AF Slope:	1.083245	AF Intercept:	1.199186
Baseline Corr 3rd AF pt:	22.1	AF Correlation:	0.999916		
				* = > +/-5% change initiat	es investigation

Changed out the inlet filter and flash lamp after as founds. Adjusted the flash lamp voltage and PMT voltage. Scrubber check passed. Adjusted both zero and span.

Calibration Performed By:

Notes:

Rene Chamberland

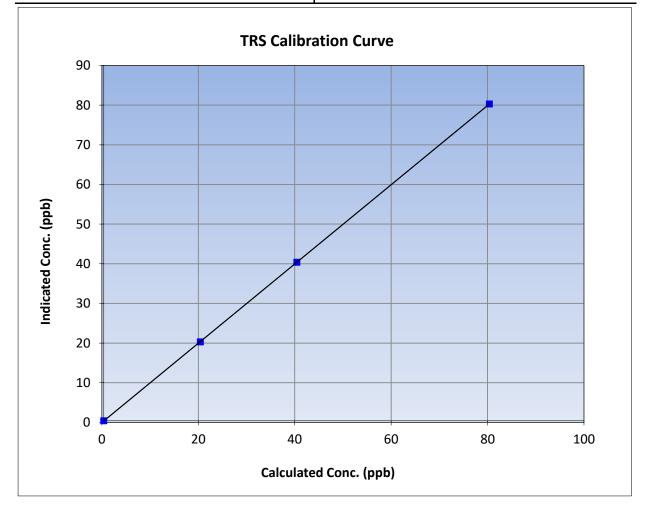


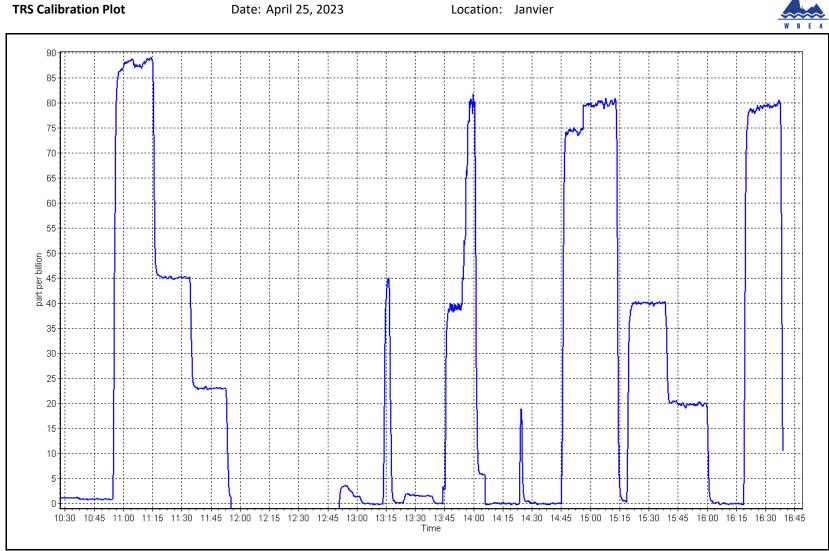
TRS Calibration Summary

WBEA			Version-11-2021				
Station Information							
Calibration Date:	April 25, 2023	Previous Calibration:	March 29, 2023				
Station Name:	Janvier	Station Number:	AMS22				
Start Time (MST):	10:33	End Time (MST):	16:35				
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1151680031				

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999998	≥0.995
80.0	79.9	1.0011	correlation coefficient	0.999998	20.333
40.0	40.0	1.0010	Slope	0.999363	0.90 - 1.10
20.0	19.9	1.0060	Slope	0.999303	0.90 - 1.10
			Intercept	-0.038984	+/-3









THC / CH₄ / NMHC Calibration Report

WBEA					Version-01-2020
		Sta	ation Information		
Station Name:	Janvier		Station number: AN	VIS 22	
Calibration Date:	April 26, 2023		Last Cal Date: M	arch 15, 2023	
Start time (MST):	10:44		End time (MST): 13	3:45	
Reason:	Routine				
		Cal	bration Standards		
Gas Cert Reference:	C	C281519	Cal Gas Expiry Date: Ja	nuary 18, 2029	
CH4 Cal Gas Conc.	502.8	ppm	CH4 Equiv Conc.	1075.9	ppm
C3H8 Cal Gas Conc.	208.4	ppm			
Removed Gas Cert:		N/A	Removed Gas Expiry: N/	/Α	
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 70	C	Serial Number: 38	306	
ZAG make/model:	Teledyne API 70	1	Serial Number: 48	390	
		Ana	alyzer Information		
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	72750023	
THC Range (ppm):	: 0 - 20 ppm				
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finis</u>	<u>h</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	: 2.150E-04	2.150E	-04 NMHC SP Ratio:	4.51E-05	4.45E-05
CH4 Retention time:	: 13.20	13.2	0 NMHC Peak Area:	202703	205602

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	79.8	17.17	17.54	0.979		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	79.8	17.17	17.20	0.998		
second point	4960	39.9	8.59	8.56	1.004		
third point	4980	20.0	4.30	4.26	1.011		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	79.8	17.17	17.10	1.004		
			A	verage Correction Factor	1.004		
Baseline Corr AF:	17.54	Prev response	17.15	*% change	2.2%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation		



THC / CH_4 / NMHC Calibration Report

Version-01-2020

NMHC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0	0.00	0.00			
as found span	4920	79.8	9.15	9.30	0.983		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0	0.00	0.00			
high point	4920	79.8	9.15	9.15	1.000		
second point	4960	39.9	4.57	4.56	1.003		
third point	4980	20.0	2.29	2.27	1.012		
as left zero	5000	0	0.00	0.00			
as left span	4920	79.8	9.15	9.11	1.005		
				Average Correction Factor	1.005		
Baseline Corr AF:	9.30	Prev response	9.10	*% change	2.2%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation		

CH4 Calibration Data

		CH4 Calibra	lion Dala		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	79.8	8.03	8.23	0.975
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	79.8	8.03	8.05	0.996
second point	4960	39.9	4.01	3.99	1.005
third point	4980	20.0	2.01	1.99	1.011
as left zero	5000	0.0	0.00	0.00	
as left span	4920	79.8	8.03	7.99	1.004
			A	verage Correction Factor	1.004
Baseline Corr AF:	8.23	Prev response	8.05	*% change	2.2%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		<u>Finish</u>	
THC Cal Slope:		1.000168		1.002618	
THC Cal Offset:		-0.027388		-0.031798	
CH4 Cal Slope:		1.005284		1.004358	
CH4 Cal Offset:		-0.018965		-0.017966	
NMHC Cal Slope:		0.995905		1.001328	
NMHC Cal Offset:		-0.008823		-0.014032	

Notes:

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

Calibration Performed By:

Rene Chamberland



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	April 2		Previous Calibration:	March 1	5, 2023
Station Name:		vier	Station Number:	AMS 22	
Start Time (MST):		:44	End Time (MST):	13:	
Analyzer make:	Therm		Analyzer serial #:	11727	
			· · · · · · · · · · · · · · · · · · ·		
		Calibra	tion Data		
Calculated concentrati (ppm) (Cc)	on Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999984	≥0.995
17.17	17.20	0.9982			
8.59 4.30	8.56 4.26	1.0036 1.0114	Slope	1.002618	0.90 - 1.10
4.50	4.20	1.0114	Intercept	-0.031798	+/-0.5
		THC Calibration	n Curve		
20.0					
18.0 -					
16.0 -					
14.0 -					
u 12.0					
ໂມ 12.0 + ເມັນ 10.0 + ເບັນ 10.0 -					
- 0.8 d					
- 0.8 Indicated					
4.0					
2.0					
0.0			10.0	45.0	
0.0	J 5.	.0		15.0	20.0
		Calculated	Conc. (ppm)		



CH₄ Calibration Summary

Version-01-2020

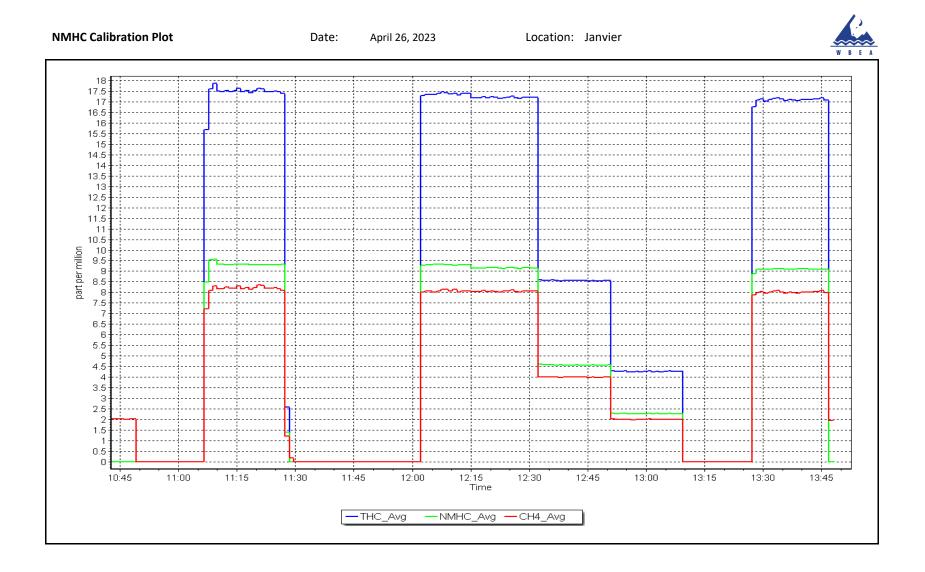
			Station I	nformation				
Calibration [ibration Date: April 26, 2023			Previous Calibration:	March 1	5, 2023		
Station Nam			vier	Station Number:	AMS			
Start Time (N	MST):	10:44		End Time (MST):	13:	13:45		
Analyzer ma		Therr	no 55i	Analyzer serial #:	11727	50023		
			Calibra	tion Data				
Calculated con (ppm) (Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>		
0.00		0.00 8.05	0.9964	Correlation Coefficient	0.999974	≥0.995		
4.01	L	3.99 1.99	1.0046 1.0107	Slope	1.004358	0.90 - 1.10		
	<u> </u>	1.55	1.0107	Intercept	-0.017966	+/-0.5		
7	3.0 7.0							
(udd) 5	.0 —							
4 Con	.0 -							
Indicated (.0							
	.0							
1	0							
0	0.0	2.0	4.0	6.0	8.0	10.0		
	0.0	2.0			0.0	10.0		
			Calculated	l Conc. (ppm)				



NMHC Calibration Summary

Version-01-2020

		Station	Information		
alibration Date:	Date: April 26, 2023		Previous Calibration:	March 1	5, 2023
tation Name:		Janvier	Station Number:	AM	5 22
Start Time (MST): 10:44		10:44	End Time (MST):	13:	45
nalyzer make:	Т	hermo 55i	Analyzer serial #:	11727	50023
		Calibi	ration Data		
alculated concentra (ppm) (Cc)	tion Indicated concentra (ppm) (Ic)	ation Correction factor (Cc/Ic) Statistical Eval	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999989	≥0.995
9.15 4.57	9.15 4.56	0.9996			
2.29	2.27	1.0121	– Slope	1.001328	0.90 - 1.10
			Intercept	-0.014032	+/-0.5
9.0 - 8.0 - 7.0 - 6 .0 -					
- 0.0 - Couc. (bbm) - 5.0 -					
- 0.6 Indicated Co			-		
. 9.0 -					
Ē					
<u> </u>					
2.0 - 1.0 -					
2.0 - 1.0 - 0.0 •	.0 2.	.0 4.0	6.0	8.0	10.0





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station Info	rmation				
Station Name: Calibration Date: Start time (MST): Reason:	Janvier April 27, 2023 11:33 Routine		Station number: AMS 22 Last Cal Date: March 9, 2023 End time (MST): 16:55					
			Calibration S	tandards				
NO Gas Cylinder #:	CC424183			Cal Gas Expiry Date:	April 16, 2023			
NOX Cal Gas Conc:	48.60	ppm		NO Cal Gas Conc:	48.60	ppm		
Removed Cylinder #:	NA		F	Removed Gas Exp Date:	NA			
Removed Gas NOX Conc:	48.60	ppm	F	Removed Gas NO Conc:	48.60	ppm		
NOX gas Diff:				NO gas Diff:				
Calibrator Model: ZAG make/model:	Teledyne API T700 Teledyne API T701			Serial Number: Serial Number:	3806 4890			
			Analyzay Info					
			Analyzer Info					
Analyzer make: NOX Range (ppb):	Teledyne API T200 0 - 1000 ppb			Analyzer serial #:	7117			
	Start		<u>Finish</u>		<u>Start</u>	<u>Finish</u>		
NO coeff or slope:			1.012	NO bkgnd or offset:	-0.3	4.8		
NO coeff or slope: NOX coeff or slope:	1.019		1.012 1.002	NO bkgnd or offset: NOX bkgnd or offset:	-0.3 0.4	4.8 5.9		

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	1.001316	0.999487
NO _x Cal Offset:	0.648371	0.688544
NO Cal Slope:	1.001644	0.999800
NO Cal Offset:	0.008462	-0.271133
NO ₂ Cal Slope:	1.000730	1.003470
NO ₂ Cal Offset:	0.876715	0.116060



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	4.1	2.2	1.9		
as found span	4918	82.3	799.9	799.9	0.0	809.4	803.9	5.7	0.9883	0.9950
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1		
high point	4918	82.3	799.9	799.9	0.0	799.8	799.5	0.3	1.0001	1.0005
second point	4959	41.2	400.4	400.4	0.0	401.3	400.3	1.0	0.9979	1.0004
third point	4980	20.6	200.2	200.2	0.0	201.6	199.4	2.3	0.9931	1.0041
as left zero	5000	0.0	0.0	0.0	0.0	-1.5	-1.3	-0.2		
as left span	4918	82.3	799.9	400.3	399.6	795.2	398.0	397.2	1.0059	1.0058
							Average C	orrection Factor	0.9970	1.0016
Corrected As fo	ound NO _x =	805.3 ppb	NO =	801.7 ppb	* = > +/-5	% change initiates	investigation	*Percent Chang	ge NO _x =	0.5%
Previous Respo	nse NO _X =	801.6 ppb	NO =	801.2 ppb				*Percent Chang	ge NO =	0.1%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As foun	d NO ₂ r ² :		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	796.2	396.6	399.6	400.9	0.9968	100.3%
2nd GPT point (200 ppb O3)	796.2	595.2	201.0	202.2	0.9941	100.6%
3rd GPT point (100 ppb O3)	796.2	694.8	101.4	101.9	0.9951	100.5%
				Average Correction Factor	0.9953	100.5%

Notes:

Changed the inlet filter after as founds. Changed out the ZAG charcoal scrubbers. Adjusted both zero and span.

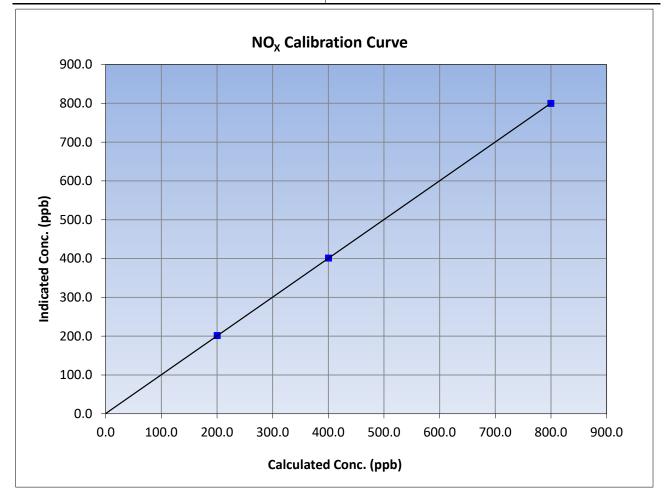
Calibration Performed By:

Rene Chamberland



$NO_{\rm X}$ Calibration Summary

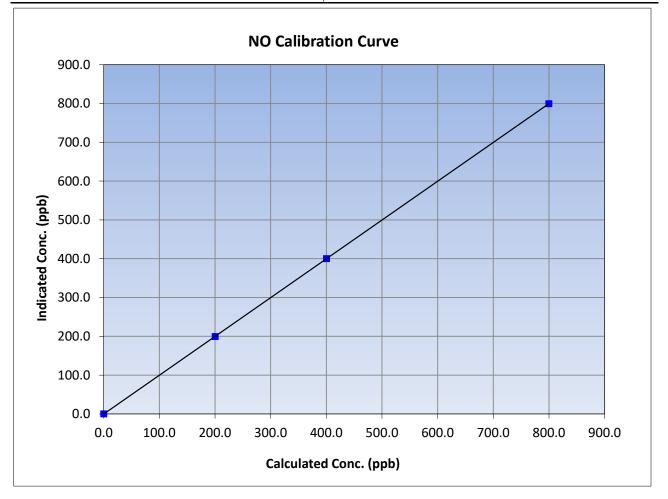
WBEA					Version-04-20	
		Station	Information			
Calibration Date:	April 2	7, 2023	Previous Calibration:	March	9, 2023	
Station Name:	Jan	vier	Station Number:	AN	1S 22	
Start Time (MST):	art Time (MST): 11:33		End Time (MST):	16	6:55	
Analyzer make:	Teledyne	e API T200	Analyzer serial #:		7117	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999996	≥0.995	
799.9	799.8	1.0001	correlation coernicient	0.555550	20.995	
400.4	401.3	0.9979	Clone	0.999487	0.90 - 1.10	
200.2	201.6	0.9931	Slope	0.999487	0.90 - 1.10	
			Intercept	0.688544	+/-20	





NO Calibration Summary

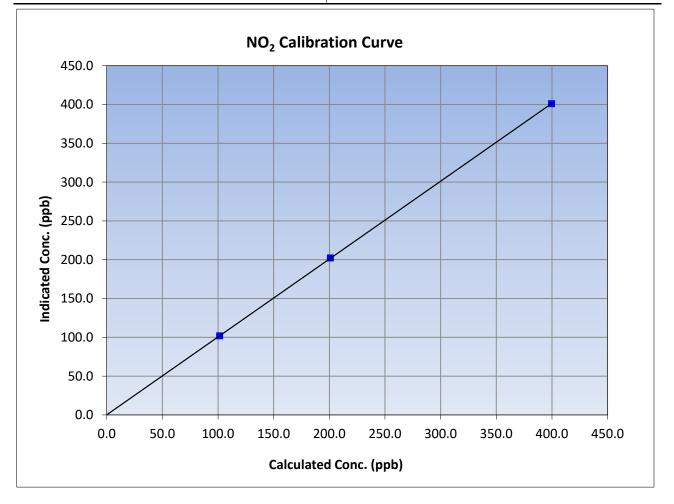
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	7, 2023	Previous Calibration:	Marc	h 9, 2023
Station Name:	Jan	ivier	Station Number:	A	VIS 22
Start Time (MST):	tart Time (MST): 11:33		End Time (MST):	1	.6:55
Analyzer make:	Teledyne	e API T200	Analyzer serial #: 7117		7117
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999999	≥0.995
799.9	799.5	1.0005	correlation coefficient	0.9999999	20.333
400.4	400.3	1.0004	Slope	0.999800	0.90 - 1.10
200.2	199.4	1.0041	Slope	0.999800	0.90 - 1.10
			Intercept	-0.271133	+/-20

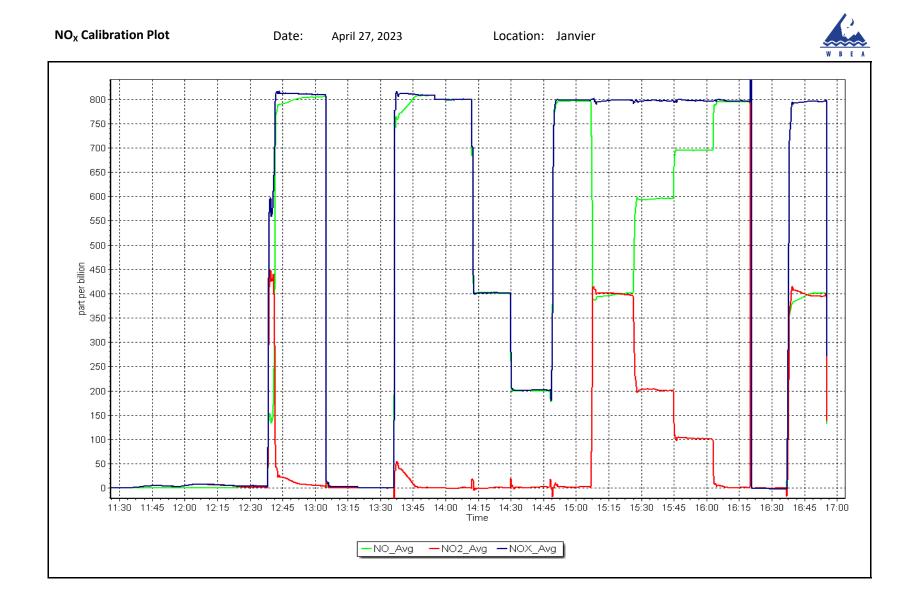




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	7, 2023	Previous Calibration:	March	n 9, 2023
Station Name:	Jan	vier	Station Number:	AN	/IS 22
Start Time (MST):	11	:33	End Time (MST):	1	6:55
Analyzer make:	Teledyne	e API T200	Analyzer serial #:	'117	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	-0.1		Correlation Coefficient	0.999997	≥0.995
399.6	400.9	0.9968	correlation coefficient	0.999997	20.333
201.0	202.2	0.9941	Class 4 002470		0.90 - 1.10
101.4	101.9	0.9951	Slope	1.003470	0.90 - 1.10
			Intercept	0.116060	+/-20







O₃ Calibration Report

Version-01-2020

anvier April 26, 2023 13:45 Routine Photometer	Station Infor Calibration St	Station number:	March 28, 2023	
April 26, 2023 13:45 Routine	Calibration St	Last Cal Date:	March 28, 2023	
'hotometer	Calibration St			
vhotometer		andards		
Feledyne API T700 Feledyne API T701		Serial Number: Serial Number:		
eledyne Art 1701		Senai Number.	201	
	Analyzer Info	rmation		
Feledyne API T400) - 500 ppb		Analyzer serial #:	3869	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.000429	1.007857	Backgd or Offset:	-2.0	-2.0
0.000000	0.800000	Coeff or Slope:	1.011	1.011
	O ₃ Calibratio	on Data		
Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppm) (Ic)	Correction factor (Cc/I Limit = 0.95-1.05
5000	800.0	0.0	-0.5	
4893	899.1	400.0	401.1	0.997
5000	800.0	0.0	-0.3	
4893	899.1	400.0	403.4	0.992
4893	753.4	200.0	202.9	0.986
4893	655.7	100.0	102.7	0.974
5000	800.0	0.0	-0.2	
4816	899.1	400.0	404.7	0.988
		Averag	e Correction Factor	0.984
401.6	Previous response	400.2	*% change	0.4%
		400.2	•	0.470
			Ai intercept.	
			* = > +/-5% change initiate	es investigation
	Total air flow rate (sccm) 5000 4893 5000 4893 4893 4893 4893 5000	Analyzer Info eledyne API T400 - 500 ppb Start Finish 1.000429 1.007857 0.000000 0.800000 O3 Calibratic Total air flow rate (sccm) Calibrator Lamp Voltage Drive 5000 800.0 4893 899.1 4893 753.4 4893 655.7 5000 800.0 4816 899.1 401.6 Previous response NA	Analyzer Information eledyne API T400 Analyzer serial #: - 500 ppb Finish 1.000429 1.007857 Backgd or Offset: 0.000000 0.800000 Coeff or Slope: O3 Calibration Data Total air flow rate (sccm) Calibrator Lamp Voltage Drive Calculated concentration (ppb) (Cc) 5000 800.0 0.0 4893 899.1 400.0 4893 753.4 200.0 4893 655.7 100.0 5000 800.0 0.0 4893 655.7 100.0 4893 655.7 100.0 4816 899.1 400.0 Atta Atta Average 401.6 Previous response 400.2 NA AF Slope: 400.2	Analyzer Information Analyzer serial #: 3869 i= 500 ppb Start <u>Finish</u> <u>Start</u> 1.000429 1.007857 Backgd or Offset: -2.0 0.000000 0.800000 Coeff or Slope: 1.011 O_3 Calibration Data Total air flow rate Calibrator Lamp Calculated Indicated concentration C 5000 800.0 0.0 -0.5 4893 899.1 400.0 401.1 5000 800.0 0.0 -0.3 4893 899.1 400.0 403.4 4893 753.4 200.0 202.9 4893 655.7 100.0 102.7 5000 800.0 0.0 -0.2 4816 899.1 400.0 404.7 4816 899.1 400.0 404.7 Average Correction Factor 401.6 Previous response 400.2 *% change NA AF Slope: AF Intercept:

Notes:

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

Calibration Performed By:

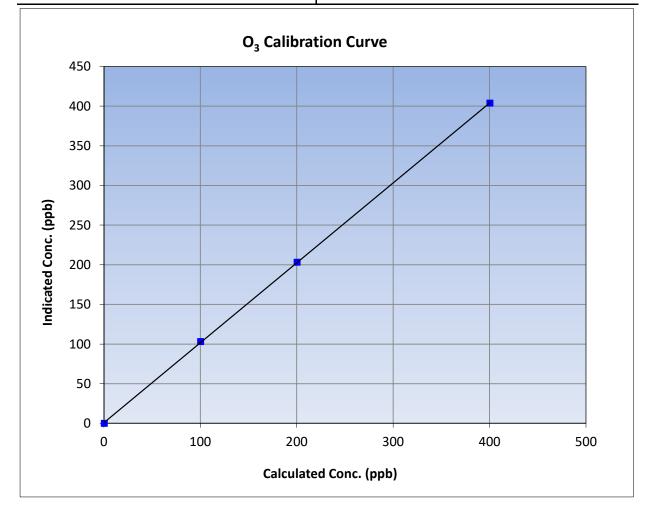
Rene Chamberland



O₃ Calibration Summary

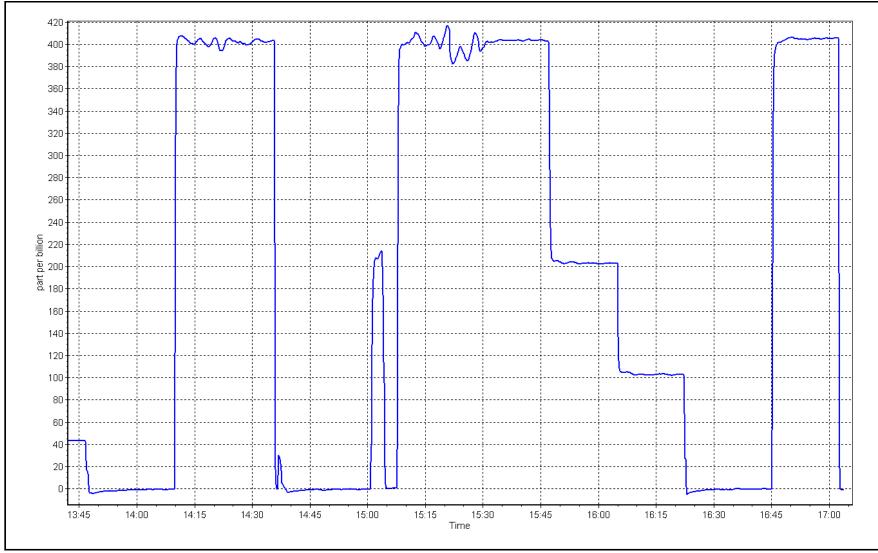
	Statio	on Information	
Calibration Date:	April 26, 2023	Previous Calibration:	March 28, 2023
Station Name:	Janvier	Station Number:	AMS 22
Start Time (MST):	13:45	End Time (MST):	17:04
Analyzer make:	Teledyne API T400	Analyzer serial #:	3869
	Cali	ibration Data	

(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evalua		LIMITS	
 0.0	-0.3		Correlation Coefficient	0.999966	≥0.995	
400.0	403.4	0.9916	correlation coefficient	0.999900	20.333	
 200.0	202.9	0.9857	Slope	1 007957	1.007857	0.90 - 1.10
100.0	102.7	0.9737	Siope	1.007857	0.90 - 1.10	
			– Intercept	0.800000	+/- 5	
			intercept	0.000000	17 3	











T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023	
		Station Information	1				
Station Name: Janvier		Station number: AMS 22					
Calibration Date:	April 27, 2023	Last Cal Date: March 29, 2023					
Start time (MST):	13:00		End time (MST):	14:26			
Analyzer Make:	Teledyne API T640		S/N:	325			
Particulate Fraction:	PM2.5						
Flow Meter Make/Model: Delta Cal		S/N: 1450					
Temp/RH standard:	Delta Cal	S/N: 1450					
		Monthly Calibration To	est				
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>		<u>Adjusted</u>	(Limits)	
⊤ (°C)	11.7	11.8	12.8			+/- 2 °C	
P (mmHg)	718.6	719	718.6			+/- 10 mmHg	
flow (LPM)	5.01	4.97	4.99			+/- 0.25 LPM	
Leak Test:	Date of check:	April 27, 2023	Last Cal Date:	March 2	9, 2023		
	PM w/o HEPA:	3.8	PM w/ HEPA:	()	<0.2 ug/m3	
Note: this leak check will be	completed before the	quarterly work and will s	erve as the pre ma	intenance le	eak check		
Inlet cleaning :	Inlet Head	\checkmark					
_		Quarterly Calibration T				<i></i>	
Parameter	<u>As found</u>	Post maintenance	<u>As left</u>		Adjusted	(Limits)	
PMT Peak Test	10.2	11.8	11.1		\checkmark	11.3 +/- 0.5	
Post-maintenance	e leak check:	PM w/o HEPA:	6.5	w/ HEPA:		0	
Date Optical Cham	nber Cleaned:	April 27, 2023				<0.2 ug/m3	
Disposable Filte	r Changed:	April 27, 2023					
		Annual Maintenance	e				
Date Sample Tul	he Cleaned:	October 6,	2022				
Date RH/T Sense		October 6, 2022					
	-						
Notes:	Verified flow, tempera	ture, and pressure. Leak test p	assed. Adjusted PMT p	eak voltage fr	om 1385V to :	1380V. Optical	
		chamber cleaned and dispo	sable filter changed. In	let head clean	ed.		
Calibration by:	Rene Chamberland						



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

> AMS23 FORT HILLS APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills April 14, 2023 9:37 Routine		Station number: Last Cal Date: End time (MST):	AMS23 March 2, 2023 12:35	
		Calibration St	andards		
Cal Gas Concentration:	49.76 CC281425	ppm	Cal Gas Exp Date:	January 5, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc:	49.76	ppm	Rem Gas Exp Date:	N/A	
Removed Gas Cyl #:	N/A	PP	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	451	
ZAG Make/Model:	API T701		Serial Number:	5611	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1160290012	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.995960	1.007702	Backgd or Offset:	18.5	18.5
Calibration intercept:	-0.582785	-1.064774	Coeff or Slope:	1.053	1.053
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration Co (ppb) (Ic)	orrection factor (Cc, Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.2	
as found span	4920	80.3	799.1	803.0	0.995
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.1	
high point	4920	80.3	799.1	804.8	0.993
second point third point	4960 4980	40.2 20.1	400.1 200.0	<u>401.4</u> 199.4	0.997
as left zero		0.0	0.0	-0.1	1.003
as left span	5000 4920	80.3	799.1	805.5	0.992
as ieit spaii	4520	00.5		ge Correction Factor	0.992
Baseline Corr As found:	803.20	Previous response	795.29	*% change	1.0%
	NA	AF Slope:		AF Intercept:	
Baseline Corr 2nd AF pt:					

Notes:

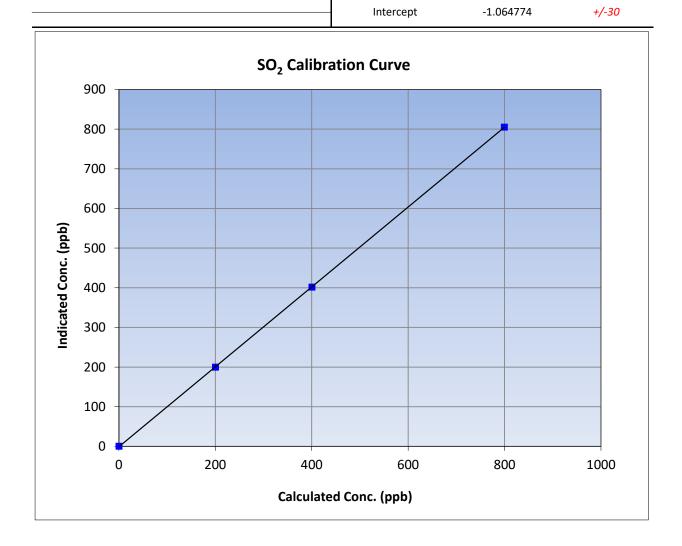
Changed the inlet filter after as founds. No adjustments made.

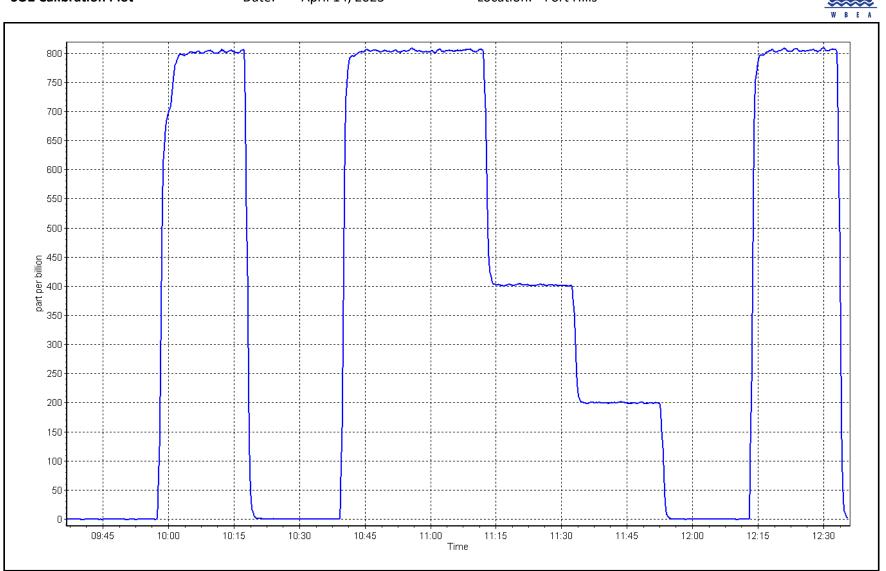
Calibration Performed By:



SO₂ Calibration Summary

WBEA					Version-01-2020	
		Station	Information			
Calibration Date:	April 14,	2023	Previous Calibration:	March	arch 2, 2023	
Station Name:	Fort H	lills	Station Number:	AN	1523	
Start Time (MST):	9:3	7	End Time (MST):	12	2:35	
Analyzer make:	Thermo	o 43i	Analyzer serial #:	11602	290012	
		Calib	ration Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalua	tion	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999990	≥0.995	
799.1	804.8	0.9929	correlation coefficient	0.553990	20.995	
400.1	401.4	0.9966	Slope	1.007702	0.90 - 1.10	
200.0	199.4	1.0032	Siope	1.007702	0.30 - 1.10	





Location: Fort Hills





TRS Calibration Report

WBEA					Version-11-202
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills April 5, 2023 10:04 Routine		Station number: Last Cal Date: End time (MST):	AMS23 March 17, 2023 14:30	
		Calibration S	tandards		
Cal Gas Concentration:	5.20	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	CC517372 5.20 N/A API T700 API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	•	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ TLE CDN-101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1300156232 594	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	0.998462 -0.258331	1.003023 0.182125	Backgd or Offset: Coeff or Slope:		1.92 1.132
		TRS As Fou	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.0	
as found span	4923	77.0	80.0	71.8	1.114
as found 2nd point	4962	38.5	40.0	36.0	1.111
as found 3rd point	4981	19.2	19.9	17.8	1.121
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.0	80.0	80.4	0.995
second point	4962	38.5	40.0	40.2	0.995
third point	4981	19.2	19.9	20.5	0.973
as left zero	5000	0.0	0.0	0.7	
as left span	4923	77.0	80.0	81.1	0.986
SO2 Scrubber Check	4920	80.3	803.0	0.1	
Date of last scrubber cha				Ave Corr Factor	0.988
Date of last converter eff	ficiency test:				efficiency
Baseline Corr As found:	71.8	Prev response:	79.62	*% change:	-10.9%
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	36.0 17.8	AF Slope: AF Correlation:		AF Intercept:	-0.020379
				* = > +/-5% change initiat	es investigation

Calibrated due to a large span shift seen during a nightly span. Adjusted span. SOx scrubber check done after calibrator zero.

Calibration Performed By:

Notes:

Braiden Boutilier

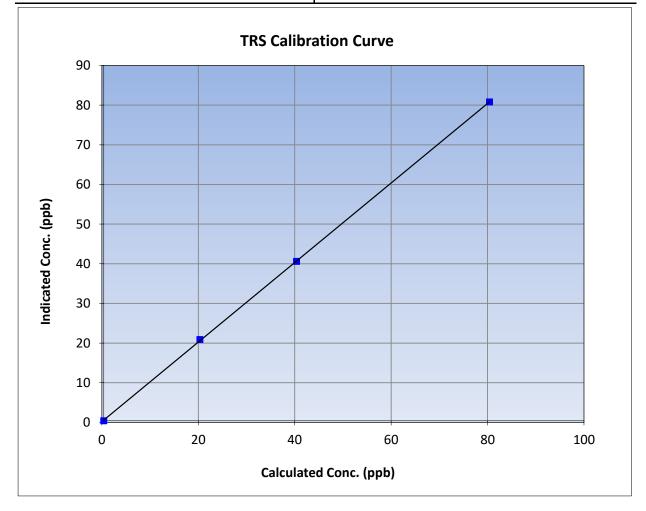


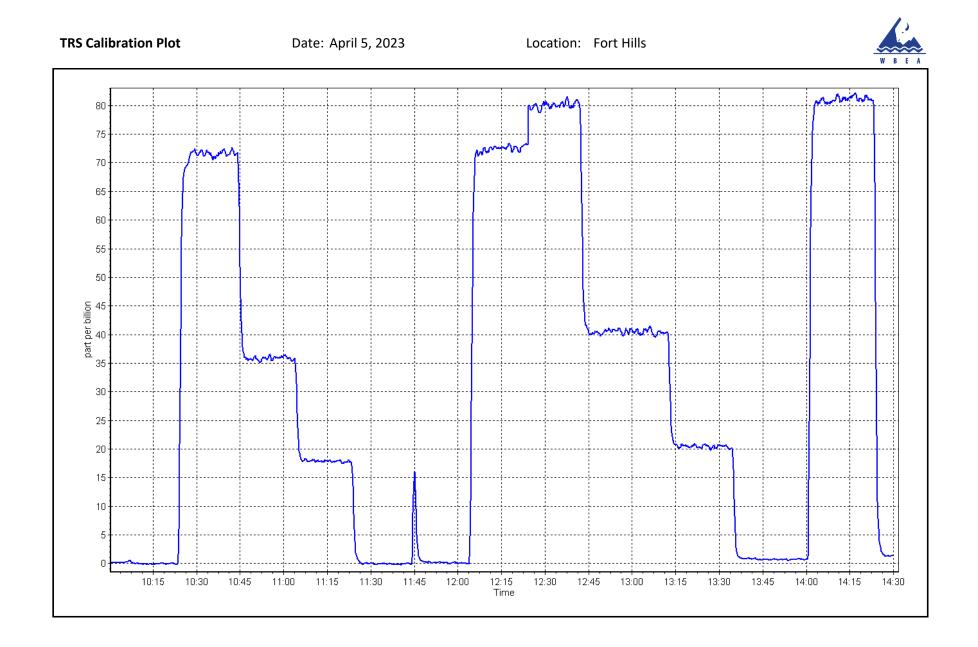
TRS Calibration Summary

WBEA			Version-11-2021					
Station Information								
Calibration Date:	April 5, 2023	Previous Calibration:	March 17, 2023					
Station Name:	Fort Hills	Station Number:	AMS23					
Start Time (MST):	10:04	End Time (MST):	14:30					
Analyzer make:	Thermo 43iQ TLE	Analyzer serial #:	1300156232					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999960	≥0.995
80.0	80.4	0.9951	correlation coefficient	0.999900	20.333
40.0	40.2	0.9950	Slope	1.003023	0.90 - 1.10
19.9	20.5	0.9731	Slope	1.003023	
			- Intercept	0.182125	+/-3







THC / CH_4 / NMHC Calibration Report

	ort Hills	Sta	tion Information		
	ort Hills				
Start time (MST): 9	Fort HillsStation number: AMS23May 10, 2023Last Cal Date: April 14, 20239:24End time (MST): 12:35RoutineFourtime				
		Cali	bration Standards		
Gas Cert Reference:	(C281425	Cal Gas Expiry Date: Ja	nuary 5, 2025	
CH4 Cal Gas Conc.	500.2	ppm	CH4 Equiv Conc.	1070.6	ppm
C3H8 Cal Gas Conc.	207.4	ppm			
Removed Gas Cert:		N/A	Removed Gas Expiry: N/	/Α	
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: A	API T700		Serial Number: 45	51	
ZAG make/model: A	API T701		Serial Number: 56	511	
		Ana	lyzer Information		
Analyzer make: T	Thermo 55i		Analyzer serial #: 11	93585648	
THC Range (ppm): 0) - 20 ppm				
NMHC Range (ppm): 0) - 10 ppm		CH4 Range (ppm): 0	- 10 ppm	
	<u>Start</u>	<u>Finis</u>	<u>h</u>	<u>Start</u>	<u>Finish</u>
CH4 SP Ratio:	2.32E-04	2.32E-	04 NMHC SP Ratio:	5.06E-05	5.06E-05
CH4 Retention time:	13.0	13.0	NMHC Peak Area:	181940	181940

THC Calibration Data							
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05		
as found zero	5000	0.0	0.00	0.00			
as found span	4920	80.3	17.19	17.21	0.999		
as found 2nd point							
as found 3rd point							
new cylinder response							
calibrator zero	5000	0.0	0.00	0.00			
high point	4920	80.3	17.19	17.19	1.000		
second point	4960	40.2	8.61	8.56	1.005		
third point	4980	20.1	4.30	4.29	1.003		
as left zero	5000	0.0	0.00	0.00			
as left span	4920	80.3	17.19	17.15	1.003		
			A	verage Correction Factor	1.003		
Baseline Corr AF:	17.21	Prev response	17.26	*% change	-0.3%		
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:			
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiates investigation			



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4920	80.3	9.16	9.15	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4920	80.3	9.16	9.14	1.003
second point	4960	40.2	4.59	4.60	0.997
third point	4980	20.1	2.29	2.32	0.990
as left zero	5000	0.0	0.00	0.00	
as left span	4920	80.3	9.16	9.12	1.004
			A	Average Correction Factor	0.997
Baseline Corr AF:	9.15	Prev response	9.20	*% change	-0.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

СН4	Cal	ibration	Data
CH4	Ca	INIALIOII	Dala

		CH4 Calibra	tion Data			
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (C	c) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05	
as found zero	5000	0.0	0.00	0.00		
as found span	4920	80.3	8.03	8.07	0.996	
as found 2nd point						
as found 3rd point						
new cylinder response						
calibrator zero	5000	0.0	0.00	0.00		
high point	4920	80.3	8.03	8.05	0.997	
second point	4960	40.2	4.02	3.96	1.015	
third point	4980	20.1	2.01	1.98	1.017	
as left zero	5000	0.0	0.00	0.00		
as left span	4920	80.3	8.03	8.02	1.001	
			A	verage Correction Factor	1.010	
Baseline Corr AF:	8.07	Prev response	8.06	*% change	0.1%	
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:		
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation	
		Calibration	Statistics			
		<u>Start</u>		<u>Finish</u>		
THC Cal Slope:		1.002839		0.999810		
THC Cal Offset:		0.020787		-0.013170		
CH4 Cal Slope:		1.005380	1.003198			
CH4 Cal Offset:		-0.017654		-0.029231		
NMHC Cal Slope:		1.000647	0.996713			
NMHC Cal Offset:		0.038041		0.016062		

Notes:

Changed the inlet filter and the N2 cylinder after as founds. No adjustments made.

Calibration Performed By: Max Farrell



THC Calibration Summary

Version-01-2020

		Station I	-formation		
			nformation		
Calibration Date:		0, 2023	Previous Calibration:	April 14	
Station Name:		Hills	Station Number:	AM	
Start Time (MST):		24	End Time (MST):	12:	
Analyzer make:	Thern	no 55i	Analyzer serial #:	11935	85648
		Calibra	tion Data		
Calculated concentratior (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	lation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999992	≥0.995
17.19	17.19	1.0001		0.555552	
8.61	8.56	1.0052	Slope	0.999810	0.90 - 1.10
4.30	4.29	1.0027	Intercept	-0.013170	+/-0.5
			intercept	-0.013170	+/-0.3
20.0		THC Calibration	n Curve		
18.0					
16.0					
14.0					
E 12.0					
ິພຸດ 12.0 ອີງ 10.0 ອີງ 10.0					
0.8 Undicated 0					
bip 6.0					
4.0					
2.0					
0.0	ς	.0	10.0	15.0	20.0
0.0	J		Conc. (ppm)	10.0	20.0



CH₄ Calibration Summary

Version-01-2020

						Version-01-20
			Station I	nformation		
Calibration Dat	e:	May	10, 2023	Previous Calibration:	April 14	l, 2023
station Name:		For	Fort Hills		AM	\$23
start Time (MS	т):	g	9:24	End Time (MST):	12:	35
analyzer make:	:	The	mo 55i	Analyzer serial #:	11935	85648
			Calibra	tion Data		
alculated concent (ppm) (Cc)	tration	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Ev	valuation	<u>Limits</u>
0.00		0.00		Correlation Coefficient	0.999907	≥0.995
8.03		8.05 3.96	0.9975			
2.01		1.98	1.0171	Slope	1.003198	0.90 - 1.10
				Intercept	-0.029231	+/-0.5
9.0 8.0 7.0 6.0						
Indicated Conc. (ppm) 3.0 3.0						
ndicate						
= 2.0						
1.0	-					
0.0	0.0	2.0	4.0	6.0	8.0	10.0
				l Conc. (ppm)		
			Carculated			



NMHC Calibration Summary

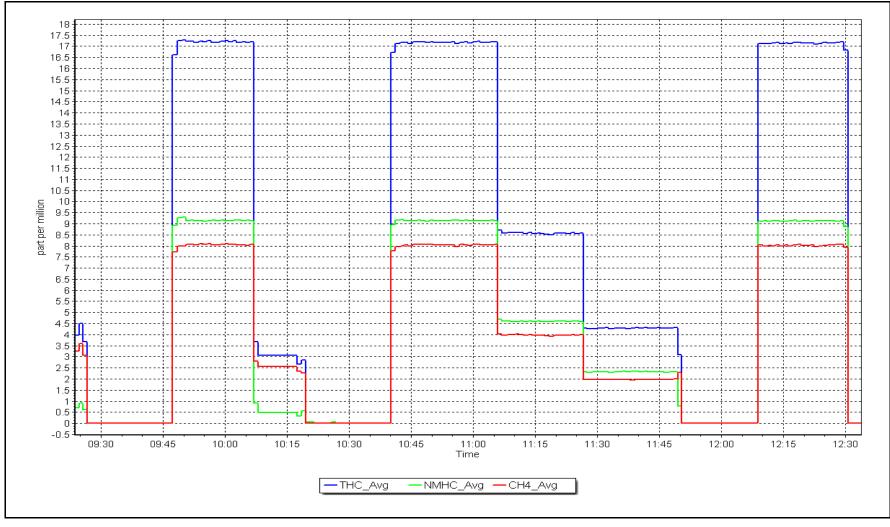
Version-01-2020

			Station I	nformation		
Calibratio	n Date:	May 1	0, 2023	Previous Calibratio	n: April 1	4, 2023
Station Na			Hills	Station Numbe		
Start Time			24	End Time (MS		:35
Analyzer r	nake:	Therr	no 55i	Analyzer serial	#: 11935	85648
			Calibra	tion Data		
	oncentration 1) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistica	l Evaluation	<u>Limits</u>
	00 16	0.00 9.14	 1.0025	Correlation Coefficie	nt 0.999985	≥0.995
	59	4.60	0.9973	Slopo	0.996713	0.90 - 1.10
2.	29	2.32	0.9904	Slope	0.330713	0.90 - 1.10
				Intercept	0.016062	+/-0.5
1	9.0		NMHC Calibrat			
	8.0					
(mq	6.0					
Conc. (ppm)	5.0					
ted C	4.0					
Indicated	3.0					
	2.0					
	1.0					
	0.0					
	0.0	2.0	4.0	6.0	8.0	10.0
			Calculated	l Conc. (ppm)		

NMHC Calibration Plot

Location: Fort Hills







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station Ir	nformation				
Station Name: Calibration Date: Start time (MST): Reason:	Fort Hills April 21, 2023 8:48 Routine			Station number: Last Cal Date: End time (MST):	: March 2	1, 2023		
			Calibratio	n Standards				
NO Gas Cylinder #:	CC332703			Cal Gas Expiry Date:	: January	28, 2024		
NOX Cal Gas Conc:	49.7	ppm		NO Cal Gas Conc		49.7	ppm	
Removed Cylinder #:	N/A			Removed Gas Exp Date:	: N/A			
Removed Gas NOX Conc: NOX gas Diff:	49.7	ppm		Removed Gas NO Conc: NO gas Diff:	-	49.7	ppm	
Calibrator Model:	Teledyne API T750			Serial Number:	:	275		
ZAG make/model:	Teledyne API T751H			Serial Number:	:	307		
			Analyzer I	nformation				
Analyzer make: NOX Range (ppb):				Analyzer serial #:	115243	0007		
	<u>Start</u>		<u>Finish</u>		9	<u>Start</u>		<u>Finish</u>
NO coeff or slope:	1.025		1.065	NO bkgnd or offset:	: -	2.8		2.9
NOX coeff or slope:			0.995	NOX bkgnd or offset:		3.1		3.2
NO2 coeff or slope			1.000	Reaction cell Press:		155.0		158.3

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.992756	1.003237
NO _x Cal Offset:	0.201484	0.084507
NO Cal Slope:	0.995756	1.004153
NO Cal Offset:	-1.598210	-1.236008
NO ₂ Cal Slope:	0.998881	1.006445
NO ₂ Cal Offset:	0.599000	0.589439



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Set Point (on flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx	Calculated NO	Coloulated NO2					
			concentration (ppb) (Cc)	concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
as found span 4	4920	80.5	800.2	800.2	0.0	775.9	771.5	4.4	1.031	1.037
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point 4	4920	80.5	800.2	800.2	0.0	802.6	802.7	-0.1	0.997	0.997
second point 4	4960	40.2	399.6	399.6	0.0	401.7	399.9	1.8	0.995	0.999
third point 4	4980	20.1	199.8	199.8	0.0	200.0	197.8	2.2	0.999	1.010
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as left span	4920	80.5	800.2	440.0	360.2	797.8	435.7	362.1	1.003	1.010
							Average Co	orrection Factor	0.997	1.002
Corrected As found	NO _x =	775.9 ppb	NO =	771.6 ppb	* = > +/-5	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	-2.4%
Previous Response	NO _X =	794.6 ppb	NO =	795.2 ppb				*Percent Chang	ge NO =	-3.1%
Baseline Corr 2nd pt	: NO _x = I	NA ppb	NO =	NA ppb	As foun	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3rd pt	NO _x = I	NA ppb	NO =	NA ppb	As foun	d NO r^2 :		NO SI:	NO Int:	
					As foun	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.0	437.8	360.2	362.7	0.993	100.7%
2nd GPT point (200 ppb O3)	798.0	621.0	177.0	179.5	0.986	101.4%
3rd GPT point (100 ppb O3)	798.0	708.0	90.0	91.3	0.986	101.4%
				Average Correction Factor	0.988	101.2%

Notes:

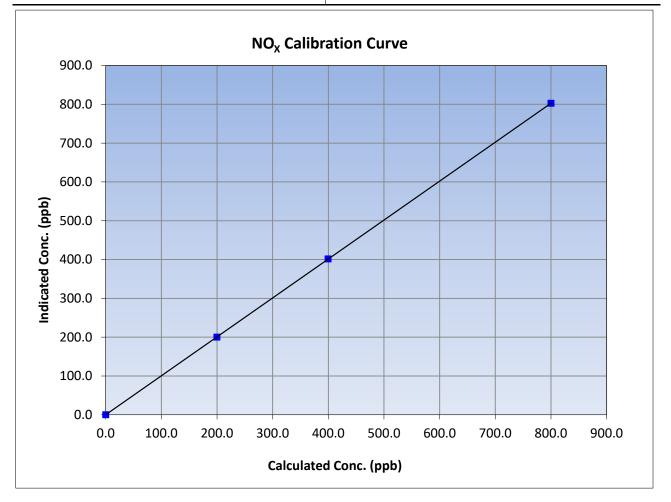
Changed the inlet filter after as founds. Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

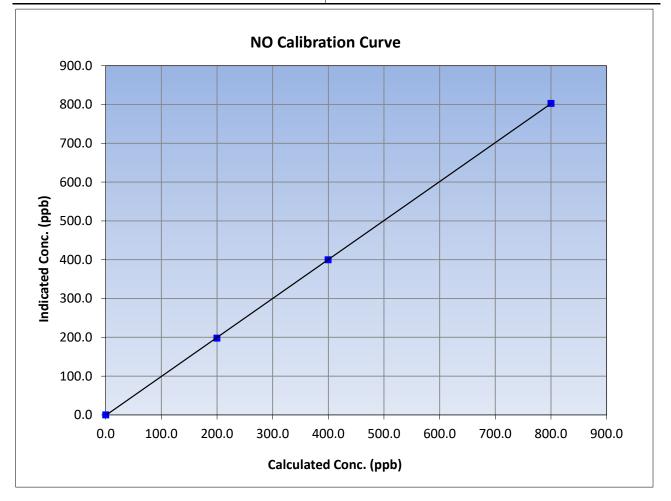
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	1, 2023	Previous Calibration:	March	1, 2023
Station Name:	Fort	Hills	Station Number:	AM	S23
Start Time (MST):	8:48		End Time (MST):	13	:36
Analyzer make:	Thermo 42i		Analyzer serial #:	11524	30007
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999997	≥0.995
800.2	802.6	0.9970	correlation coefficient	0.555557	20.333
399.6	401.7	0.9947	Slope	1.003237	0.90 - 1.10
199.8	200.0	0.9990	Slope	1.005257	0.90 - 1.10
			Intercept	0.084507	+/-20





NO Calibration Summary

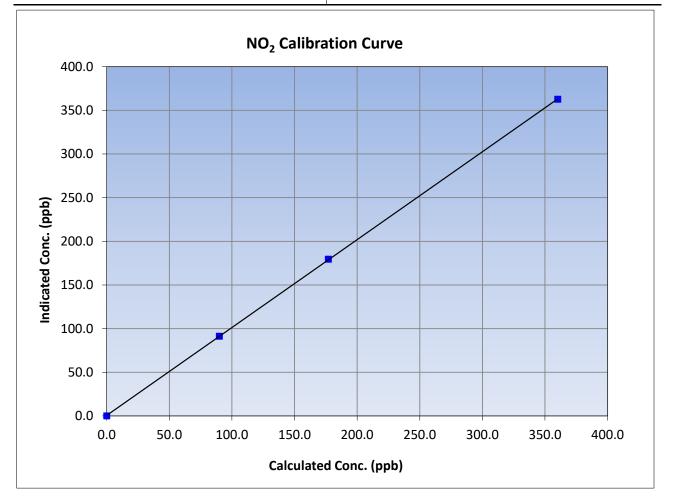
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	1, 2023	Previous Calibration:	March	1, 2023
Station Name:	Fort Hills		Station Number: AM		S23
Start Time (MST):	8:48		End Time (MST):	13	:36
Analyzer make:	make: Thermo 42i Analyzer serial #: 11		11524	30007	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999988	≥0.995
800.2	802.7	0.9968	correlation coefficient	0.555588	20.995
399.6	399.9	0.9992	Clana	1.004153	0.90 - 1.10
199.8	197.8	1.0101	Slope	1.004155	0.90 - 1.10
			Intercept	-1.236008	+/-20





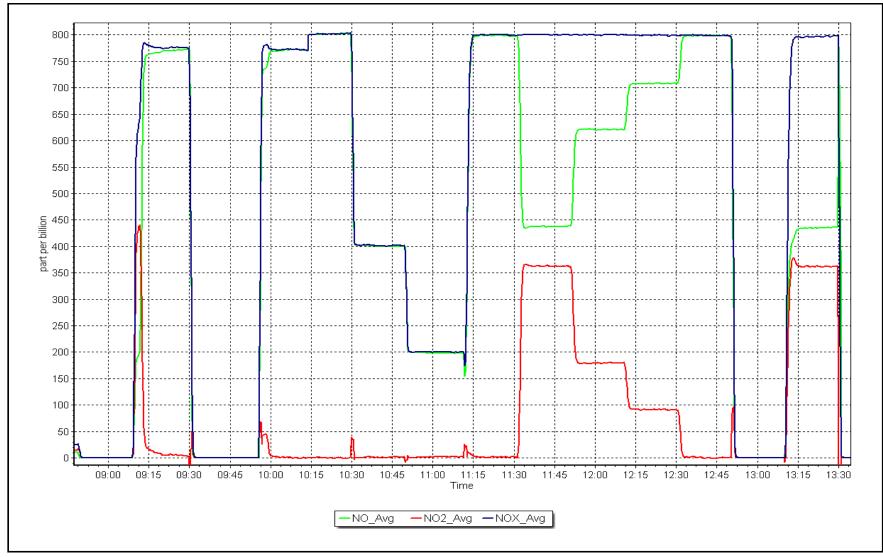
NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 2	1, 2023	Previous Calibration:	March	1, 2023
Station Name:	Fort	Hills	Station Number:	n Number: AMS	
Start Time (MST):	8:48		End Time (MST):	13	:36
Analyzer make:	Thermo 42i Analyzer serial #: 11		11524	30007	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999986	≥0.995
360.2	362.7	0.9931	correlation coefficient	0.999960	20.995
177.0	179.5	0.9861	Slope	1.006445	0.90 - 1.10
90.0	91.3	0.9858	Slope	1.000445	0.90 - 1.10
			Intercept	0.589439	+/-20











T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Information	า		
Station Name:	Fort Hills		Station number:	AMS 23	
Calibration Date:	April 21, 2023		Last Cal Date:	March 18, 2023	
Start time (MST):	13:12		End time (MST):	13:41	
Analyzer Make:	API T640		S/N:	1546	
Particulate Fraction:	PM2.5				
Flow Meter Make/Model:	Alicat FP-25BT		S/N:	388755	
Temp/RH standard:	Alicat FP-25BT		S/N:	388755	
		Monthly Calibration T	est		
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
⊤ (°C)	9.6	10.8	9.6		+/- 2 °C
P (mmHg)	747.10	746.3	747.10		+/- 10 mmHg
flow (LPM)	4.97	5.05	4.97		+/- 0.25 LPM
Leak Test:	Date of check:	April 21, 2023	Last Cal Date:	March 18, 2023	
N N N N N N N N N N	PM w/o HEPA:	7	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be			serve as the pre mai	intenance leak check	
Inlet cleaning :	Inlet Head				
		Quarterly Calibration	Test		
Parameter	As found	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test	Astound	<u>r ost maintenance</u>	Aster		
PIVIT PEAK TEST					11.3 +/- 0.5
Post-maintenance	e leak check:	PM w/o HEPA:		w/ HEPA:	
Date Optical Cham	nber Cleaned:	March 18,	2023		<0.2 ug/m3
Disposable Filte	er Changed:	March 18,	2023		
		Annual Maintenanc	_		
		Annual Maintenanc	e		
Date Sample Tul	be Cleaned:	September 2	6, 2022		
Date RH/T Sense	or Cleaned:	September 2	6, 2022		
Notes:		Leak check passe	ed, no adjustments i	needed.	
Calibration by:	Max Farrell				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Waskow ohci Pimat April 11, 2023 7:10 Install	tisiwin	Station number: Last Cal Date: End time (MST):	AMS25 March 15, 2023 10:54	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.54 CC437219	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc:	52.4	ppm	Rem Gas Exp Date:	October 19, 2022	
Removed Gas Cyl #:	ET0016672		Diff between cyl:	3.2%	
Calibrator Make/Model:	API T700		Serial Number:	747	
ZAG Make/Model:	API T701		Serial Number:	261	
		Analyzer Info	rmation		
Analyzer make	: Thermo 43i		Analyzer serial #:	1118148497	
Analyzer Range					
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.043841	0.998563	Backgd or Offset:		10.0
Calibration intercept:	-0.116149	0.983970	Coeff or Slope:	1.039	1.008
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	Correction factor (Cc/lc Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.1	
as found span	4924	76.3	799.6	798.0	1.002
as found 2nd point					
as found 3rd point					
new cylinder response	4921	79.2	800.5	825.3	0.970
calibrator zero	5000	0.0	0.0	0.4	
high point	4921	79.2	800.5	799.9	1.001
second point	4960	39.6	400.3	401.5	0.997
third point	4980	19.8	200.1	201.1	0.995
as left zero	5000	0.0	0.0	0.3	
as left span	4921	79.2	800.5	803.2	0.997 0.998
			Averag	ge Correction Factor	0.998
Baseline Corr As found:	797.90	Previous response	834.51	*% change	-4.6%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

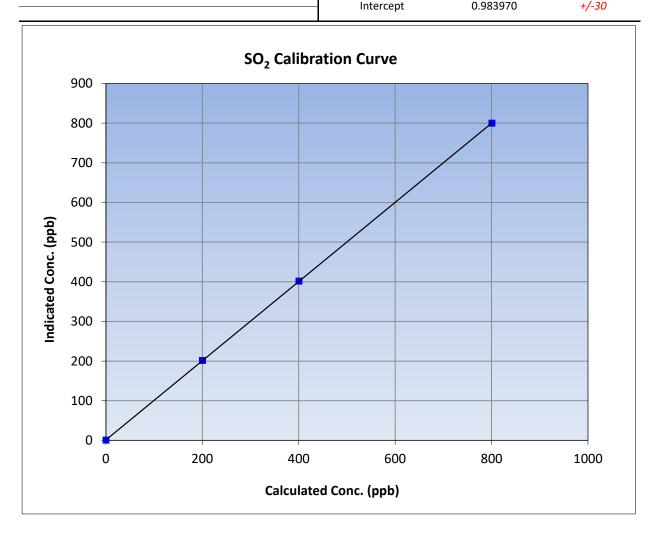
Calibration Gas Changed. Span adjusted.

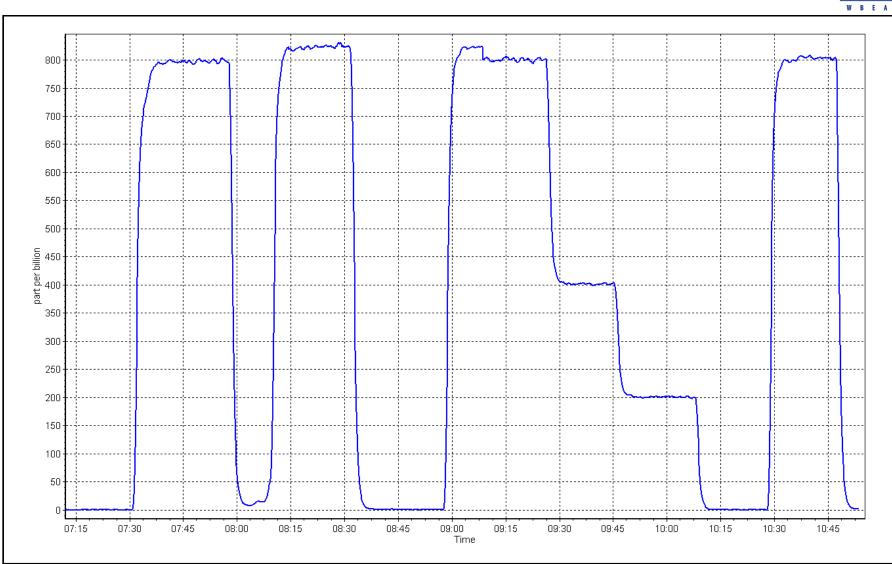
Calibration Performed By:



SO₂ Calibration Summary

		Station	Information		
Calibration Date:	April 11,	2023	Previous Calibration:	March	15, 2023
Station Name:	n Name: Waskow ohci Pimatisiwin		Station Number:	AMS25	
Start Time (MST):	7:1	D	End Time (MST):	10):54
Analyzer make:	Thermo	o 43i	Analyzer serial #:	11181	148497
Calculated concentration Ir	ndicated concentration	Correction factor	Statistical Evalua	ation	Limits
(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evalua	ition	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999996	≥0.995
800.5	799.9	1.0008		5.555556	20.000
400.3	401.5	0.9970	Slope	0.998563	0.90 - 1.10
200.1	201.1	0.9953	51000	0.550505	0.50 - 1.10
			Intercent	0 983970	+/-30





April 11, 2023

Date:

SO2 Calibration Plot

Location: Waskow ohci Pimatisiwin



H₂S Calibration Report

WBEA					Version-11-2
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Waskow ohci Pima April 12, 2023 6:25 Routine	tisiwin	Station number: Last Cal Date: End time (MST):	AMS25 March 16, 2023 11:17	
		Calibration S	tandards		
Cal Gas Concentration:	4.97	ppm	Cal Gas Exp Date:	January 3, 2026	
Cal Gas Cylinder #:	CC517099				
Removed Cal Gas Conc:	4.90	ppm	Rem Gas Exp Date:	May 5, 2023	
Removed Gas Cyl #:	LL119538		Diff between cyl:	-0.9%	
Calibrator Make/Model:			Serial Number:	747	
ZAG Make/Model:	API T701		Serial Number:	261	
		Analyzer Info	ormation		
Analyzer make:	Thermo 43i-LTE		Analyzer serial #:	1170050146	
Converter make:	Thermo 43C		Converter serial #:	328702539	
Analyzer Range	0 - 100 ppb				
	Start	Finish		Start	Finish
Calibration slope:	1.003738	1.014757	Backgd or Offset:	<u>Start</u> 3.3	<u>71111511</u> 3.4
Calibration intercept:	0.281608	0.200000	Coeff or Slope:	1.085	1.108
	0.201000	0.200000	coen or slope.	1.005	1.100
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	0.1	
as found span	4918	81.6	80.0	79.9	1.002
as found and naint	1050		40.0	40.1	1 000
as found 2nd point	4959	40.8	40.0		1.000
as found 3rd point	4959 4980	40.8 20.4	20.0	20.1	1.000
as found 3rd point	4980	20.4	20.0 79.5	20.1	1.000
as found 3rd point new cylinder response	4980 4920	20.4 80.0 H ₂ S Calibrat	20.0 79.5 ion Data Calculated	20.1 78.7	1.000 1.010 Correction facto
as found 3rd point	4980 4920 Dilution air flow rate	20.4 80.0	20.0 79.5 ion Data Calculated concentration (ppb)	20.1 78.7 Indicated	1.000 1.010 Correction facto (Cc/lc)
as found 3rd point new cylinder response Set Point	4980 4920 Dilution air flow rate (sccm)	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm)	20.0 79.5 ion Data Calculated concentration (ppb) (Cc)	20.1 78.7 Indicated concentration (ppb) (Ic)	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05
as found 3rd point new cylinder response Set Point calibrator zero	4980 4920 Dilution air flow rate (sccm) 5000	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05
as found 3rd point new cylinder response Set Point calibrator zero high point	4980 4920 Dilution air flow rate (sccm) 5000 4920	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05 0.983
as found 3rd point new cylinder response Set Point calibrator zero high point second point	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.983 0.979
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.983 0.979 0.979
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05 0.983 0.979 0.979
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4912	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0 800.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.983 0.979 0.979 0.951
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span O2 Scrubber Check	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4912 4924	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3 76.3	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0 0.1	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05 0.983 0.979 0.979 0.951
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4912 4924 ange:	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0 800.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05 0.983 0.979 0.979 0.951 0.980
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4912 4924 ange:	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3 76.3	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0 800.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0 0.1	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.983 0.979 0.979 0.951
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero as left span 502 Scrubber Check Date of last scrubber cha Date of last converter ef	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4980 5000 4912 4924 ange:	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3 76.3	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0 800.0 800.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0 0.1	1.000 1.010 Correction facto (Cc/lc) Limit = 0.95-1.05 0.983 0.979 0.979 0.951 0.980
as found 3rd point new cylinder response Set Point calibrator zero high point second point third point as left zero	4980 4920 Dilution air flow rate (sccm) 5000 4920 4960 4960 4980 5000 4912 4924 ange: ficiency test: 79.8	20.4 80.0 H ₂ S Calibrat Source gas flow rate (sccm) 0.0 80.0 40.0 20.0 0.0 88.3 76.3 19-Jul-10	20.0 79.5 ion Data Calculated concentration (ppb) (Cc) 0.0 79.5 39.7 19.9 0.0 800.0 800.0 800.0 800.0	20.1 78.7 Indicated concentration (ppb) (Ic) 0.2 80.8 40.6 20.3 0.2 841.0 0.1 Ave Corr Factor	1.000 1.010 Correction facto (Cc/Ic) Limit = 0.95-1.05 0.983 0.979 0.979 0.979 0.951 0.980 efficiency

Notes:

Sox scrubber checked after the calibrator zero. H2S calibration Gas changed. Span adjusted.

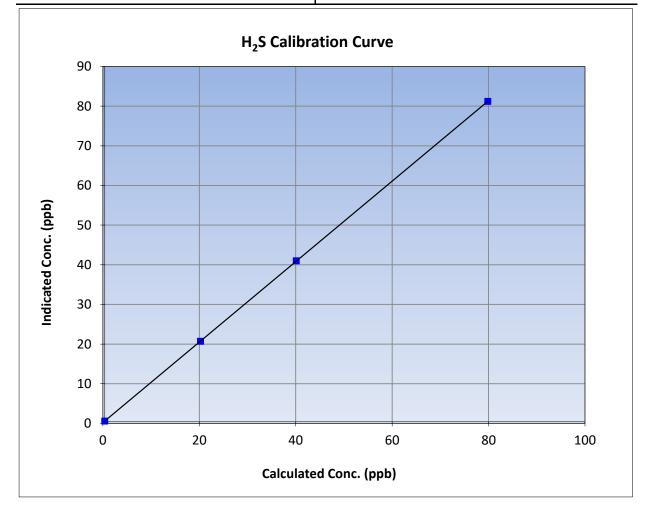


H₂S Calibration Summary

WBEA			Version-11-2021
	Station	Information	
Calibration Date:	April 12, 2023	Previous Calibration:	March 16, 2023
Station Name:	Waskow ohci Pimatisiwin	Station Number:	AMS25
Start Time (MST):	6:25	End Time (MST):	11:17
Analyzer make:	Thermo 43i-LTE	Analyzer serial #:	1170050146

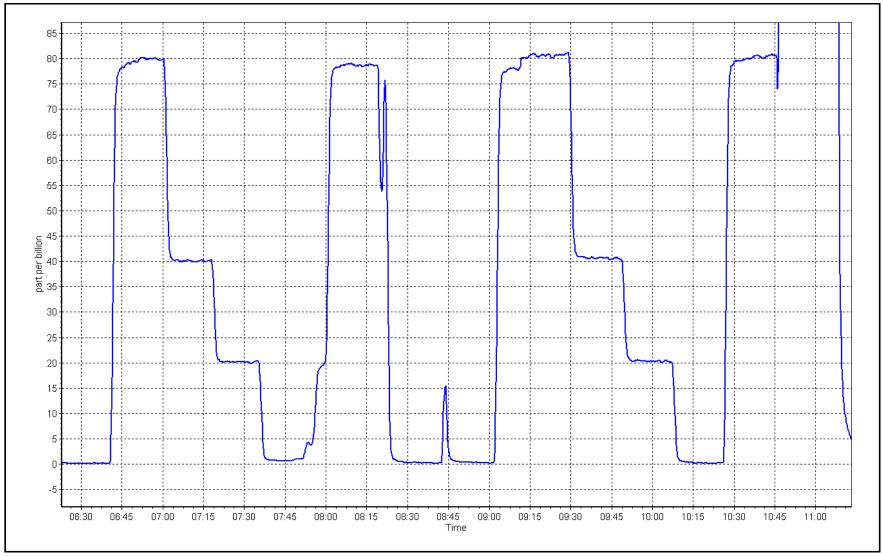
Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)		Statistical Evalua	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999997	≥0.995
79.5	80.8	0.9834	correlation coefficient	0.999997	20.333
39.7	40.6	0.9785	Slope	1.014757	0.90 - 1.10
19.9	20.3	0.9785	Slope	1.014757	0.90 - 1.10
			Intercept	0.200000	+/-3











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS26 CHRISTINA LAKE APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Christina Lake		Station number:	AMS 26	
Calibration Date:	April 27, 2023		Last Cal Date:	March 23, 2023	
Start time (MST):	7:23		End time (MST):	9:56	
Reason:	Routine				
		California Ci	e a de ade		
		Calibration St			
Cal Gas Concentration: Cal Gas Cylinder #:	49.56 <u>CC362134</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Removed Cal Gas Conc:	49.56	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA	P P · · ·	Diff between cyl:		
Calibrator Make/Model:	API T700		Serial Number:	2447	
ZAG Make/Model:	API T701		Serial Number:	953	
	,				
		Analyzer Info	rmation		
Analyzer make	: Thermo 43i		Analyzer serial #:	1173410001	
Analyzer Range			, and yeer sector at an		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.990536	1.010951	Backgd or Offset:		16.5
Calibration intercept:	-2.994790	-2.757950	Coeff or Slope:	0.929	0.929
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.5	
as found span	4919	80.6	799.0	807.8	0.989
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.4	
high point	4919	80.6	799.0	806.5	0.991
second point	4960	40.3	399.4	399.6	1.000
third point	4980	20.2	200.2	196.4	1.019
as left zero	5000	0.0	0.0	0.4	
as left span	4919	80.6	799.0	807.7	0.989
			Averag	ge Correction Factor	1.003
Baseline Corr As found:	807.30	Previous response	788.42	*% change	2.3%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
		AF Correlation:			

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

Calibration Performed By:

Mohammed Kashif

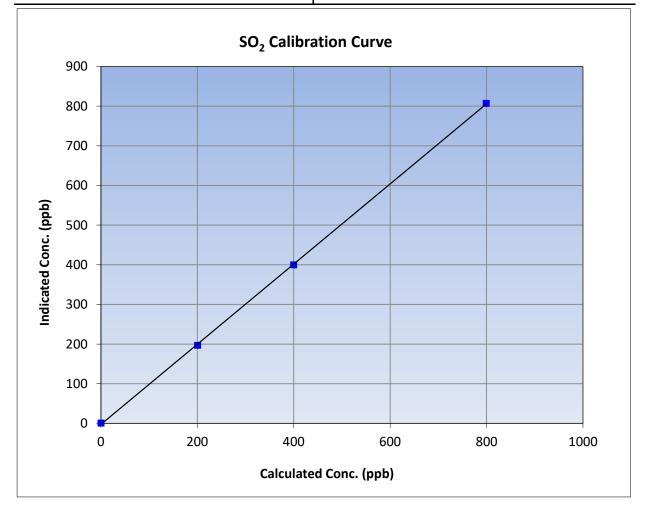


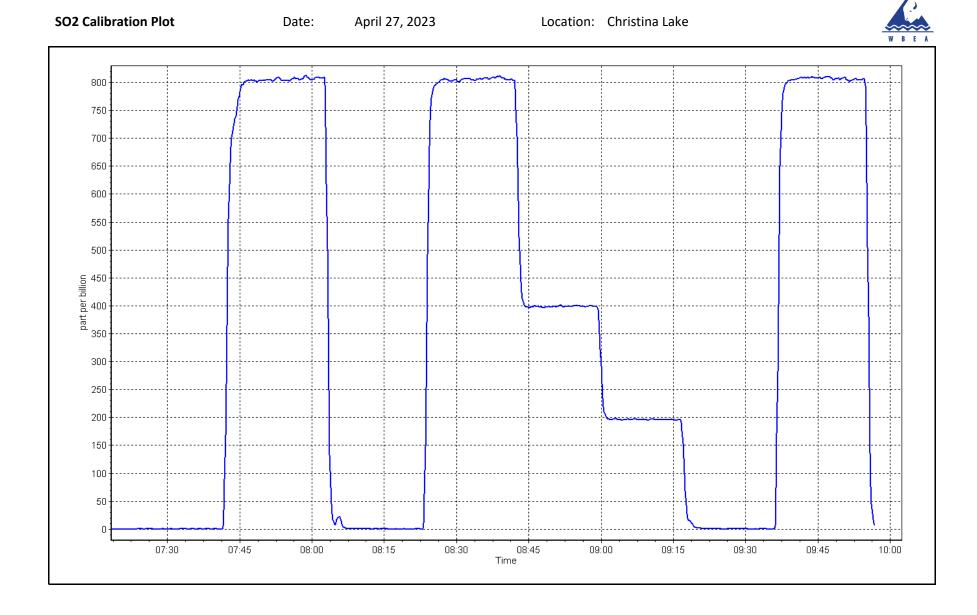
SO₂ Calibration Summary

	Stat	ion Information	
Calibration Date:	April 27, 2023	Previous Calibration:	March 23, 2023
Station Name:	Christina Lake	Station Number:	AMS 26
Start Time (MST):	7:23	End Time (MST):	9:56
Analyzer make:	Thermo 43i	Analyzer serial #:	1173410001

Calibration Data

Calculated concentration (ppb) (Cc)	Calculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)				Statistical Evalua	ation	<u>Limits</u>
0.0	0.4		Correlation Coefficient	0.999930	≥0.995		
799.0	806.5	0.9907	correlation coefficient	0.999930	20.333		
399.4	399.6	0.9996	Slope	1.010951	0.90 - 1.10		
200.2	196.4	1.0194	Siope	1.010951	0.90 - 1.10		
			Intercept	-2.757950	+/-30		







H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake April 25, 2023 11:18 Routine		Station number: Last Cal Date: End time (MST):	AMS26 March 22, 2023 15:02	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	4.89 <u>EY0002466</u>	ppm	Cal Gas Exp Date:	February 9, 2024	
emoved Cal Gas Conc: emoved Gas Cyl #: calibrator Make/Model:	4.89 NA API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2447	
AG Make/Model:	API T701		Serial Number:	953	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 450i NA 0 - 100 ppb		Analyzer serial #: Converter serial #:	1180030032 NA	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
alibration slope:	0.979904	1.005611	Backgd or Offset:	33.6	35.4
alibration intercept:	0.438608	-0.360862	Coeff or Slope:	1.125	1.125
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero	5000	0.0	0.0	1.3	
as found span	4918	81.8	80.0	82.4	0.986
as found 2nd point	4959	40.9	40.0	41.4	0.998
as found 3rd point	4979	20.4	20.0	21.1	1.008
new cylinder response					
		H ₂ S Calibrati	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	-0.2	
high point	4918	81.8	80.0	80.2	0.998
	4959	40.9	40.0	39.7	1.008
second point			20.0	19.6	1.018
second point third point	4979	20.4	20.0	2010	1.018
	4979 5000	20.4	0.0	-0.2	
third point					0.984
third point as left zero as left span	5000	0.0	0.0	-0.2	
third point as left zero as left span D2 Scrubber Check	5000 4918 4919	0.0 81.8	0.0 80.0	-0.2 81.3	
third point as left zero as left span O2 Scrubber Check Date of last scrubber cha	5000 4918 4919 ange:	0.0 81.8 80.6	0.0 80.0	-0.2 81.3 0.0 Ave Corr Factor	 0.984
third point as left zero as left span O2 Scrubber Check Date of last scrubber cha Date of last converter ef	5000 4918 4919 ange:	0.0 81.8 80.6	0.0 80.0 806.1	-0.2 81.3 0.0 Ave Corr Factor	0.984 1.008
third point as left zero	5000 4918 4919 inge: ficiency test:	0.0 81.8 80.6 27-Feb-19	0.0 80.0 806.1 78.83	-0.2 81.3 0.0 Ave Corr Factor	 0.984 1.008 efficiency

Changed sample inlet filter after MAF's. Ran scrubber check after calibrator zero. Adjusted zero only.

Calibration Performed By:

Notes:

Mohammed Kashif

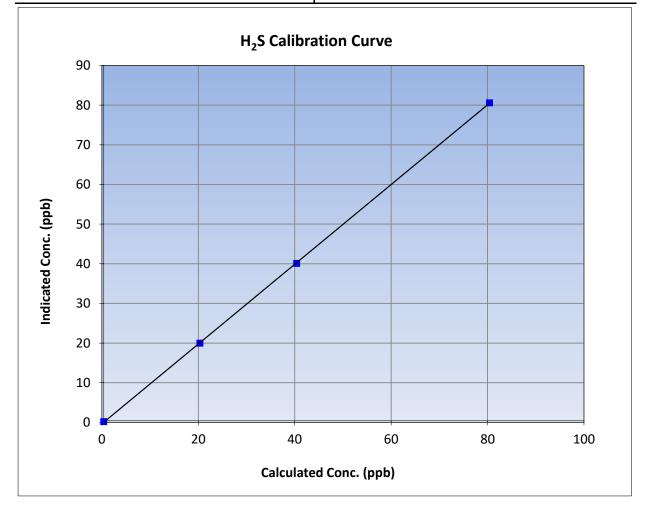


H₂S Calibration Summary

	Stat	ion Information	
Calibration Date:	April 25, 2023	Previous Calibration:	March 22, 2023
Station Name:	Christina Lake	Station Number:	AMS26
Start Time (MST):	11:18	End Time (MST):	15:02
Analyzer make:	Thermo 450i	Analyzer serial #:	1180030032

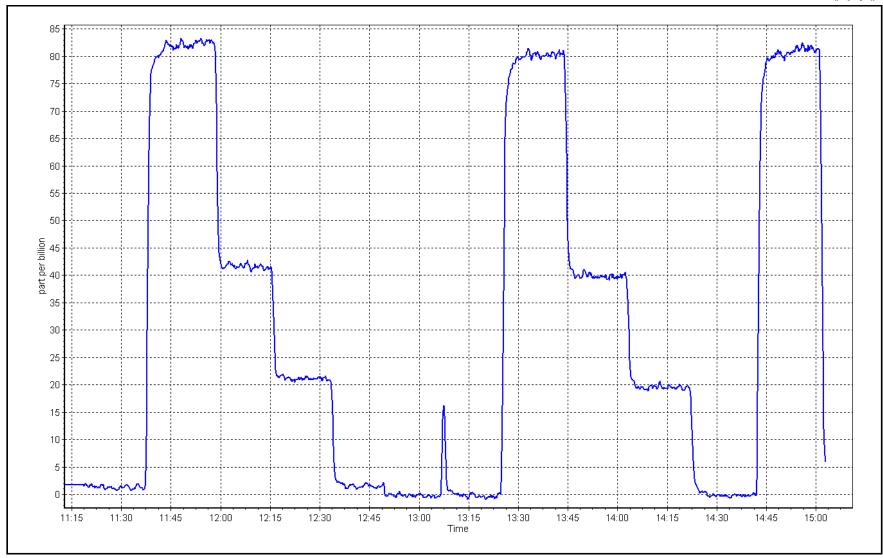
Calibration Data

Calculated concentration (ppb) (Cc)	alculated concentration Indicated concentration (ppb) (Cc) (ppb) (Ic)				Statistical Evalua	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999979	≥0.995		
80.0	80.2	0.9976	correlation coefficient	0.999979	20.335		
40.0	39.7	1.0076	Slope	1.005611	0.90 - 1.10		
20.0	19.6	1.0180	Slope	1.005011	0.90 - 1.10		
			Intercept	-0.360862	+/-3		











$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Christina Lake April 26, 2023 10:16 Routine		Station number: Al Last Cal Date: M End time (MST): 16	arch 29, 2023	
		Calibratio	on Standards		
NO Gas Cylinder #:	T2Y1P4C		Cal Gas Expiry Date: No	ovember 12, 20)23
NOX Cal Gas Conc:	50.82	ppm	NO Cal Gas Conc:	50.02	ppm
Removed Cylinder #:	NA		Removed Gas Exp Date: N/	4	
Removed Gas NOX Conc:	50.82	ppm	Removed Gas NO Conc:	50.02	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number: Serial Number:	2447	
ZAG make/model:	API T701		Serial Number:	953	
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> : 1.713 : 0.996	Analyzer <u>Finish</u> 1.762 0.997 1.000	Information Analyzer serial #: 11 NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	173480006 <u>Start</u> 2.9 2.9 191.9	<u>Finish</u> 2.9 3.0 198.6
		Calibratio	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope	:	0.989754		0.999958	
NO _x Cal Offset		-1.920000		-1.700000	
NO Cal Slope		0.990261		0.999786	
NO Cal Offset		-2.780000		-2.340000	
NO ₂ Cal Slope		1.001972		1.003094	
NO ₂ Cal Offset	:	0.216428		0.778854	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0		
as found span	4920	80.0	813.1	800.3	12.8	796.4	781.2	15.2	1.0210	1.0245
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4920	80.0	813.1	800.3	12.8	812.2	798.9	13.4	1.0011	1.0018
second point	4960	40.0	406.6	400.2	6.4	404.2	396.8	7.3	1.0058	1.0085
third point	4980	20.0	203.3	200.1	3.2	199.6	195.2	4.5	1.0184	1.0250
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1		
as left span	4920	80.0	813.1	397.1	416.0	815.5	399.3	416.2	0.9971	0.9945
							Average C	orrection Factor	1.0085	1.0117
Corrected As fo	ound NO _X =	796.5 ppb	NO =	781.3 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	-0.8%
Previous Respo	nse NO _x =	802.9 ppb	NO =	789.7 ppb				*Percent Chan	ge NO =	-1.1%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.2	395.0	416.0	417.6	0.9962	100.4%
2nd GPT point (200 ppb O3)	798.2	597.2	213.8	215.9	0.9903	101.0%
3rd GPT point (100 ppb O3)	798.2	702.3	108.7	110.3	0.9855	101.5%
				Average Correction Factor	0.9906	100.9%

Notes:

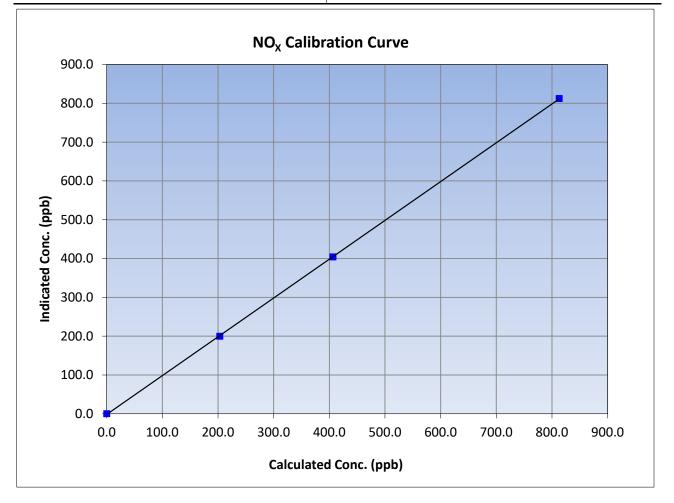
Changed sample inlet filter after as founds. Adjusted span only.

Calibration Performed By:



NO_x Calibration Summary

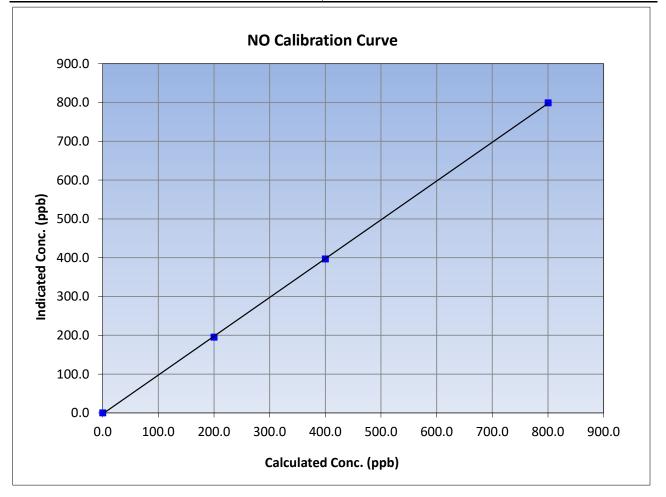
WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 26, 2023		Previous Calibration:	March	29, 2023
Station Name:	Christina Lake		Station Number:	AN	/IS 26
Start Time (MST):	10:16		End Time (MST):	1	6:57
Analyzer make:	Therr	no 42i	Analyzer serial #:	1	4:00
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999977	≥0.995
813.1	812.2	1.0011	correlation coernicient	0.555577	20.333
406.6	404.2	1.0058	Slope	0.999958	0.90 - 1.10
203.3	199.6	1.0184	Slope	0.999958	0.90 - 1.10
			Intercept	-1.700000	+/-20





NO Calibration Summary

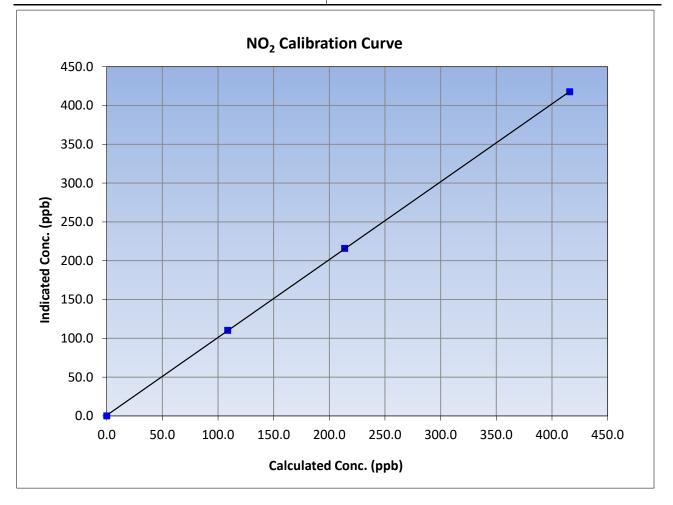
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	April 26, 2023		March	29, 2023
Station Name:	Christi	na Lake	Station Number:	AMS 26	
Start Time (MST):	10:16		End Time (MST):	10	6:57
Analyzer make:	Therr	no 42i	Analyzer serial #:	14	4:00
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/lc)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999961	≥0.995
800.3	798.9	1.0018	correlation coefficient	0.999901	20.995
400.2	396.8	1.0085	Slope	0.999786	0.00 1.10
200.1	195.2	1.0250	Slope	0.999780	0.90 - 1.10
			Intercept	-2.340000	+/-20





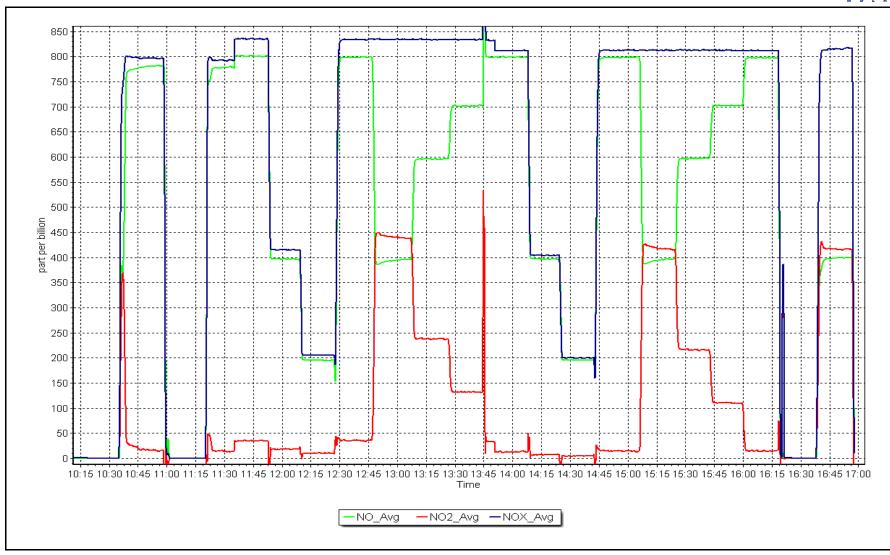
NO₂ Calibration Summary

WBEA					Version-04-20	
		Station	Information			
Calibration Date:	April 2	6, 2023	Previous Calibration:	March	29, 2023	
Station Name:	Christi	na Lake	Station Number:	AN	1S 26	
Start Time (MST):	10	:16	End Time (MST):	10	6:57	
Analyzer make:	Therr	no 42i	Analyzer serial #:	Analyzer serial #: 14:00		
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999986	≥0.995	
416.0	417.6	0.9962	correlation coernicient	0.555580	20.333	
213.8	215.9	0.9903	Slope	1.003094	0.00 1.10	
108.7	110.3	0.9855	Slope	1.003094	0.90 - 1.10	
			Intercept	0.778854	+/-20	











WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS27 JACKFISH 2/3 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Inforn	nation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 April 4, 2023 9:39 Routine		Station number: Last Cal Date: End time (MST):	AMS 27 March 8, 2023 12:07	
		Calibration Sta	ndards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.58 <u>SG9133974BAL</u>	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.58 <u>NA</u>	ppm	Rem Gas Exp Date: Diff between cyl:	NA	
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	3811 135	
		Analyzer Infor	mation		
Analyzer make Analyzer Range			Analyzer serial #:	12124313138	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.002034 -2.538384	1.012431 -1.377395	Backgd or Offset: Coeff or Slope:	7.8 0.990	7.9 0.990
		SO ₂ Calibration	n Data		
Set Point	Dilution air flow rate (sccm)	SO ₂ Calibration Source gas flow rate (sccm)	n Data Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	orrection factor (Cc/I Limit = 0.95-1.05
Set Point as found zero		- Source gas flow rate	Calculated		
as found zero as found span	(sccm)	- Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero as found span as found 2nd point	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppb) (Ic) 0.0	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated concentration (ppb) (Cc) 0.0	(ppb) (Ic) 0.0	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 5000 4921	Source gas flow rate (sccm) 0.0 79.1	Calculated concentration (ppb) (Cc) 0.0 800.2	(ppb) (Ic) 0.0 810.0	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	(sccm) 5000 4921 5000	Source gas flow rate (sccm) 0.0 79.1 0.0	Calculated concentration (ppb) (Cc) 0.0 800.2	(ppb) (lc) 0.0 810.0 0.1	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	(sccm) 5000 4921 5000 4921	Source gas flow rate (sccm) 0.0 79.1 0.0 0.0 79.1	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2	(ppb) (lc) 0.0 810.0 0.1 809.0	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	(sccm) 5000 4921 5000 5000 4921 4961	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 0.0 79.1 39.5	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4921 5000 4921 4921 4961 4980	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5 200.3	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8 199.0	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4921 5000 4921 4921 4961 4980 5000	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8 0.0	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5 200.3 0.0	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8 199.0 0.2	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4921 5000 4921 4921 4961 4980	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5 200.3 0.0 800.2	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8 199.0 0.2 811.3	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	(sccm) 5000 4921 5000 4921 4961 4980 5000 4921	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8 0.0 79.1	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5 200.3 0.0 800.2 Averag	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8 199.0 0.2 811.3 ge Correction Factor	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4921 5000 4921 4921 4961 4980 5000	Source gas flow rate (sccm) 0.0 79.1 0.0 79.1 39.5 19.8 0.0	Calculated concentration (ppb) (Cc) 0.0 800.2 0.0 800.2 399.5 200.3 0.0 800.2 0.0 800.2 Average 799.25	(ppb) (lc) 0.0 810.0 0.1 809.0 403.8 199.0 0.2 811.3	Limit = 0.95-1.05

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

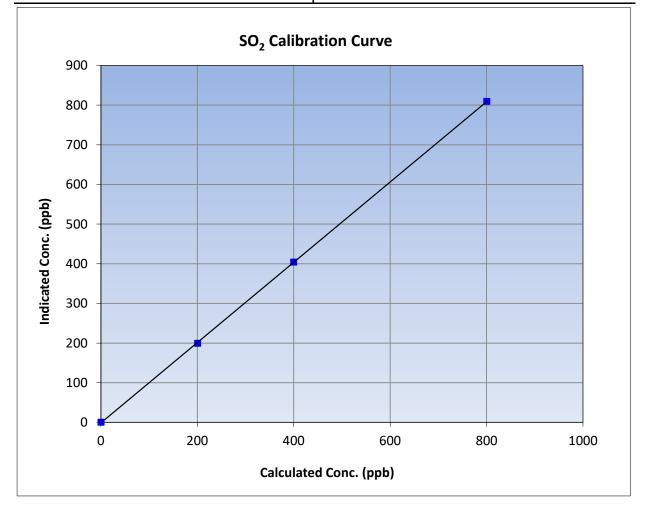


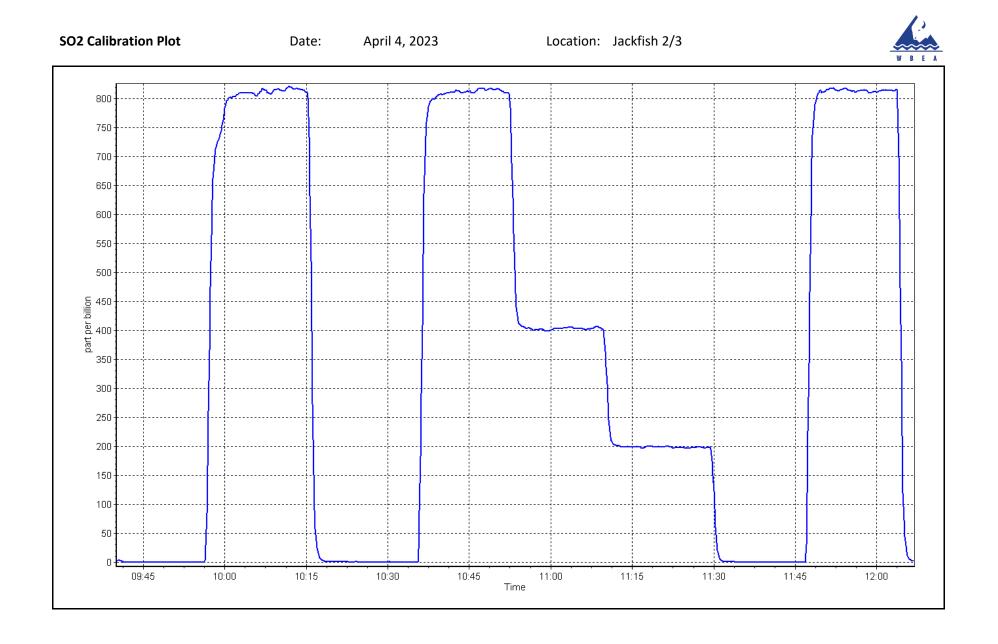
SO₂ Calibration Summary

Station Information								
Calibration Date:	April 4, 2023	Previous Calibration:	March 8, 2023					
Station Name:	Jackfish 2/3	Station Number:	AMS 27					
Start Time (MST):	9:39	End Time (MST):	12:07					
Analyzer make:	Thero 43iQ	Analyzer serial #:	12124313138					

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999976	≥0.995	
800.2	809.0	0.9891	- Correlation Coefficient 0.999976		20.333	
399.5	403.8	0.9895	Slope	1.012431	0.90 - 1.10	
200.3	199.0	1.0066	Slope	1.012451	0.90 - 1.10	
			Intercept	-1.377395	+/-30	







H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 April 27, 2023 9:18 Routine		Station number: Last Cal Date: End time (MST):	AMS27 March 23, 2023 13:12	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.41 CC345023	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model:	5.41 NA API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 3811	
ZAG Make/Model:	API 701		Serial Number:	135	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	API T101 0 - 100 ppb		Analyzer serial #: Converter serial #:	621	
	Start	Finish		<u>Start</u>	Finish
Calibration slope:	0.983812	1.000342	Backgd or Offset:		25.7
Calibration intercept:	-0.138417	-0.217897	Coeff or Slope:		0.970
		H ₂ S As Four	nd Data		
Set Point	Dilution 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 span	4926	74.1	80.2	79.7	1.010
as found 2nd point	4963	37.0	40.0	39.8	1.014
as found 3rd point	4982	18.5	20.0	19.5	1.042
new cylinder response		H & Calibrati	ion Data		
		H ₂ S Calibrat	Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4926	74.1	80.2	80.0	1.002
second point	4963	37.0	40.0	40.0	1.001
third point	4982	18.5	20.0	19.4	1.032
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.1	80.2	79.9	1.003
SO2 Scrubber Check	4921	79.1	791.0	0.1	
Date of last scrubber cha	inge:			Ave Corr Factor	1.012
Date of last converter ef	ficiency test:				efficiency
Baseline Corr As found:	79.4	Prev response:	78.74	*% change:	0.8%
Baseline Corr 2nd AF pt:	39.5	AF Slope:	0.992790	AF Intercept:	0.021866
Baseline Corr 3rd AF pt:	19.2	AF Correlation:	0.999931	* / 50/	
				* = > +/-5% change initiate	es investigation

Notes:

Adjusted the zero and span.

Calibration Performed By:

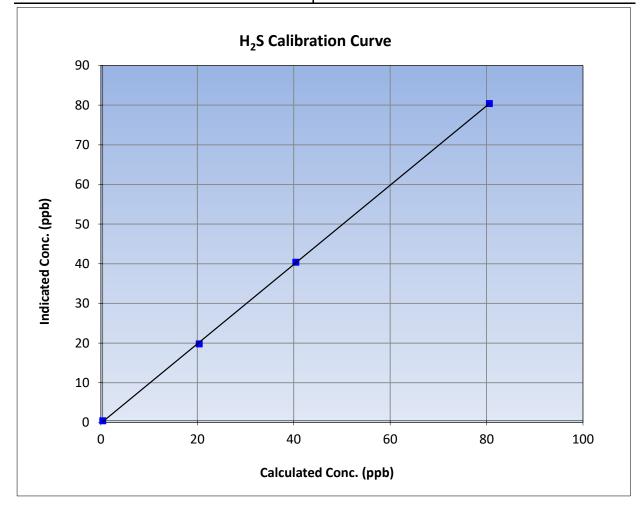
Denny Ray Estador



H₂S Calibration Summary

Station Information									
Calibration Date:	April 27, 2023	Previous Calibration:	March 23, 2023						
Station Name:	Jackfish 2/3	Station Number:	AMS27						
Start Time (MST):	9:18	End Time (MST):	13:12						
Analyzer make:	API T101	Analyzer serial #:	621						
	C	libration Data							

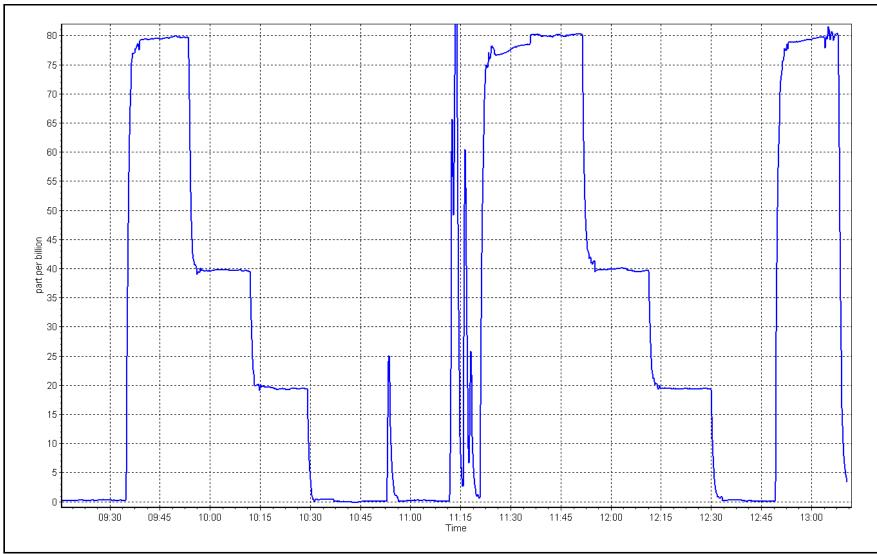
Calculated concentratio (ppb) (Cc)	n Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	<u>Limits</u>	
0.0	0.0		Correlation Coefficient	0.999932	≥0.995
80.2	80.0	1.0022	correlation coefficient	0.999932	20.335
40.0	40.0	1.0009	Slope	1.000342	0.90 - 1.10
20.0	19.4	1.0317	Slope	1.000342	0.50 - 1.10
			Intercept	-0.217897	+/-3













NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 April 19, 2023 9:42 Removal		Station number: AM Last Cal Date: Mar End time (MST): 12:	rch 28, 2023	
		Calibratio	on Standards		
NO Gas Cylinder #:	T2Y1P35		Cal Gas Expiry Date: Dec	ember 11, 20	023
NOX Cal Gas Conc: Removed Cylinder #:	51.44 NA	ppm	NO Cal Gas Conc: Removed Gas Exp Date: NA	50.40	ppm
Removed Gas NOX Conc: NOX gas Diff:	51.44	ppm	Removed Gas NO Conc: NO gas Diff:	50.40	ppm
Calibrator Model: ZAG make/model:	API T700 API T701		Serial Number: Serial Number:	3811 135	
Analyzer make: NOX Range (ppb):		Analyzer	Information Analyzer serial #: 446	0	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	: 1.241	N/A	NO bkgnd or offset:	0.9	N/A
NOX coeff or slope		N/A	NOX bkgnd or offset:	0.9	N/A
NO2 coeff or slope:	: 1.000	N/A	Reaction cell Press:	4.4	N/A
		Calibratio	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope:	:	0.998179		N/A	
NO _x Cal Offset:	:	-4.217263		N/A	
NO Cal Slope		0.998789		N/A	
NO Cal Offset		-3.720948		N/A	
NO ₂ Cal Slope	:	0.995821		N/A	

-0.727241

N/A



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	on 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/lc) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.2	-0.8	0.9		
as found span	4921	79.4	816.8	800.3	16.5	805.0	793.4	11.6	1.0147	1.0087
as found 2nd	4960	39.7	408.5	400.2	8.3	400.2	392.1	8.2	1.0206	1.0207
as found 3rd	4980	19.8	203.7	199.6	4.1	198.9	190.9	8.0	1.0242	1.0455
new cyl resp										
calibrator zero										
high point										
second point										
third point										
as left zero										
as left span									1	I
							Average Co	orrection Factor		
Corrected As for	und NO _x =	804.8 ppb	NO =	794.2 ppb	* = > +/-5	% change initiates	investigation	*Percent Chan	ge NO _x =	83.2%
Previous Respor	nse NO _X =	135.0 ppb	NO =	795.6 ppb				*Percent Chan	ge NO =	-0.2%
Baseline Corr 2r	nd pt NO _X =	400.0 ppb	NO =	392.9 ppb	As foun	d $NO_X r^2$:	0.999986	Nx SI: 0.9858	Nx Int:	-1.098
Baseline Corr 3r	d pt NO _x =	198.7 ppb	NO =	191.7 ppb	As foun	d NO r ² :	0.999917	NO SI: 0.9945	NO Int:	-4.202
					As foun	d $NO_2 r^2$:	0.999899	NO2 SI: 0.9927	NO ₂ Int:	-0.742

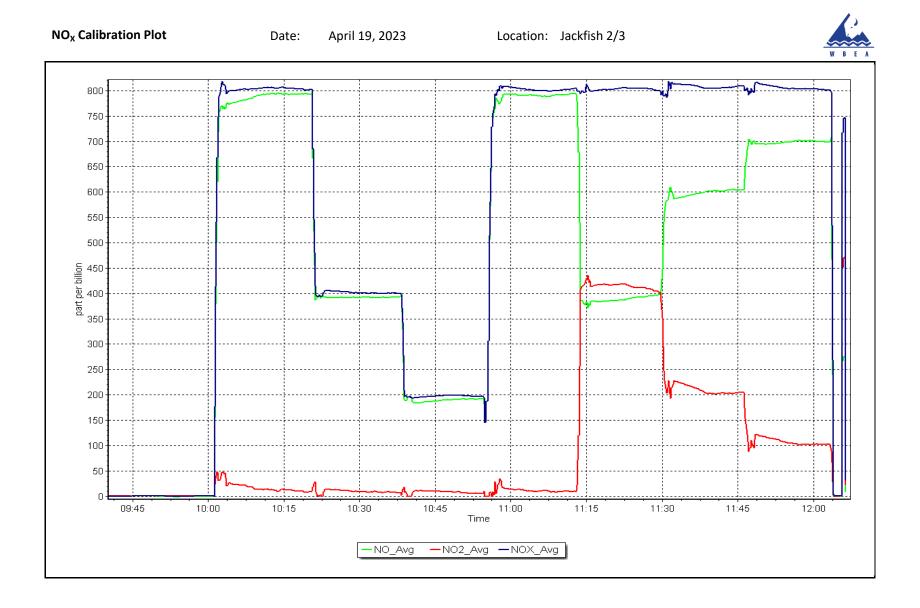
GPT Calibration Data

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/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%	
as found GPT zero			0.0	0.9			
as found GPT point (400 ppb NO2)	790.9	392.7	414.7	411.4	1.0081	99.2%	
as found GPT point (200 ppb NO2)	790.9	600.5	206.9 205.1 1.0088		1.0088	99.1%	
as found GPT point (100 ppb NO2)	790.9	700.6	106.8	102.8	1.0390	96.2%	
1st GPT point (400 ppb O3)							
2nd GPT point (200 ppb O3)							
3rd GPT point (100 ppb O3)	N/A						
			Av	erage Correction Factor			

Notes:

Conducted MPAFs for a removal calibration; analyzer will be replaced.

Calibration Performed By:





$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station Information		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 2/3 April 20, 2023 9:18 Install		Station number: A Last Cal Date: A End time (MST): 13	pril 19, 2023	
		(Calibration Standards		
NO Gas Cylinder #:	T2Y1P35		Cal Gas Expiry Date: D	ecomber 11 20	22
NOX Cal Gas Conc:	51.44	ppm	NO Cal Gas Conc:	50.40	ppm
Removed Cylinder #:	NA	ppm	Removed Gas Exp Date: N		ppin
Removed Gas NOX Conc:		ppm	Removed Gas NO Conc:	50.40	ppm
NOX gas Diff:			NO gas Diff:		
Calibrator Model:	API T700		Serial Number:	3811	
ZAG make/model:	API T701		Serial Number:	135	
Analyzer make: NOX Range (ppb): NO coeff or slope NOX coeff or slope NO2 coeff or slope	0 - 1000 ppb <u>Start</u> : 1.241 : 1.228	<u>F</u> 1	Analyzer Information Analyzer serial #: 72 Einish 1.003 NO bkgnd or offset: 1.005 NOX bkgnd or offset: 1.000 Reaction cell Press:	22 <u>Start</u> 0.9 0.9 4.4	<u>Finish</u> -3.0 -2.6 4.4
			Calibration Statistics		
			<u>Start</u>	<u>Finish</u>	
NO _x Cal Slope			N/A	1.005888	
NO _x Cal Offset			N/A	-2.995962	
NO Cal Slope			N/A	1.002272	
NO Cal Offset			N/A	-2.840268	
NO ₂ Cal Slope			N/A	0.996178	
NO ₂ Cal Offset	:		N/A	1.252891	



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero										
as found span										
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
high point	4921	79.4	816.8	800.3	16.5	820.0	800.6	19.2	0.9961	0.9996
second point	4960	39.7	408.5	400.2	8.3	406.8	397.2	9.6	1.0041	1.0076
third point	4980	19.8	203.7	199.6	4.1	198.5	194.0	4.5	1.0262	1.0288
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.9	-0.4		
as left span	4921	79.4	816.8	407.9	410.1	814.4	405.6	408.9	1.0029	1.0057
							Average C	orrection Factor	1.0088	1.0120
Corrected As fo	ound NO _X =	NA ppb	NO =	NA ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chan	ge NO _x =	NA
Previous Respo	nse NO _x =	NA ppb	NO =	NA ppb				*Percent Chan	ge NO =	NA
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	$d NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	$1 ext{NO } r^2$:		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	800.1	406.5	410.1	409.1	1.0025	99.8%
2nd GPT point (200 ppb O3)	800.1	615.2	201.4	202.7	0.9937	100.6%
3rd GPT point (100 ppb O3)	800.1	707.8	108.8	110.8	0.9821	101.8%
				Average Correction Factor	0.9927	100.7%

Notes:

Install calibration; Replaced analyzer due to poor performance. Adjusted both zero and span.

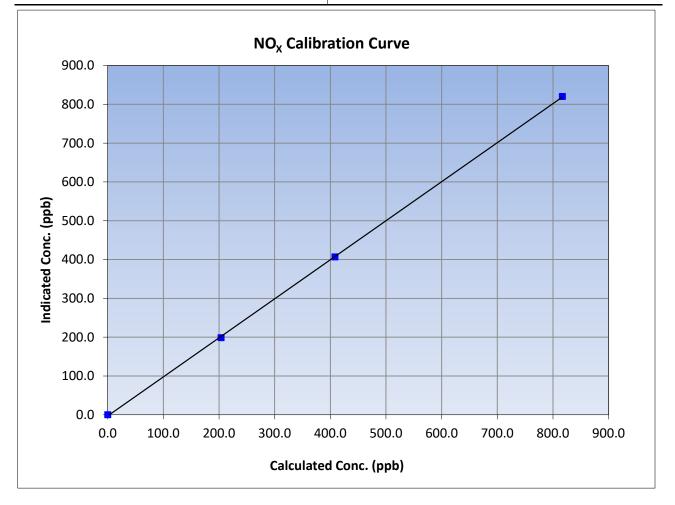
Calibration Performed By:

Denny Ray Estador



NO_x Calibration Summary

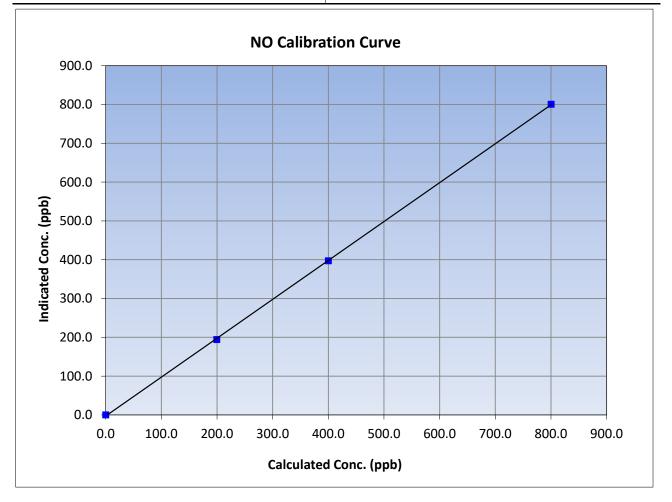
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 20, 2023		Previous Calibration:	April :	19, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	AN	MS27
Start Time (MST):	9:18		End Time (MST):	1	3:15
Analyzer make:	API T200		Analyzer serial #:	7	722
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999934	≥0.995
816.8	820.0	0.9961	correlation coefficient	0.555554	20.333
408.5	406.8	1.0041	Slope	1.005888	0.90 - 1.10
203.7	198.5	1.0262	Slope	1.005666	0.90 - 1.10
			Intercept	-2.995962	+/-20





NO Calibration Summary

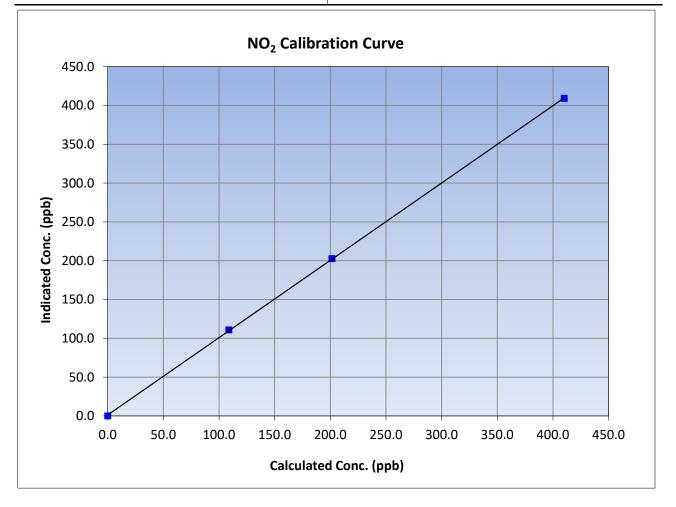
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	0, 2023	Previous Calibration:	April	19, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	AN	MS27
Start Time (MST):	9:18		End Time (MST):	1	3:15
Analyzer make:	API T200		Analyzer serial #:	-	722
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999938	≥0.995
800.3	800.6	0.9996	correlation coefficient	0.555558	20.333
400.2	397.2	1.0076	Slope	1.002272	0.90 - 1.10
199.6	194.0	1.0288	Slope	1.002272	0.90 - 1.10
			Intercept	-2.840268	+/-20

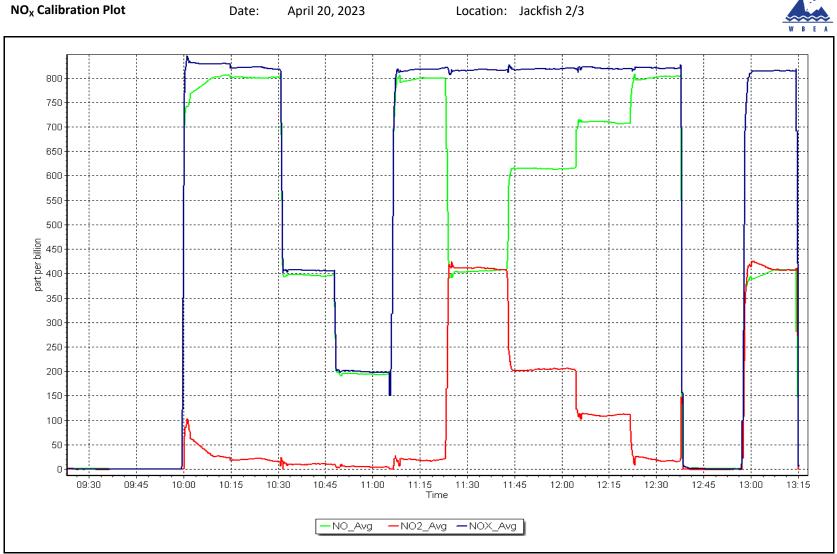




NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 20, 2023		Previous Calibration:	April	19, 2023
Station Name:	Jackfi	sh 2/3	Station Number:	A	VIS27
Start Time (MST):	9:18		End Time (MST):	1	3:15
Analyzer make:	API T200		Analyzer serial #:	-	722
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999955	≥0.995
410.1	409.1	1.0025	correlation coefficient	0.5555555	20.333
201.4	202.7	0.9937	Clana	0.006179	0.90 - 1.10
108.8	110.8	0.9821	Slope	0.996178	0.90 - 1.10
			Intercept	1.252891	+/-20









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS29 SURMONT 2 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 April 13, 2023 10:01 Routine		Station number: Last Cal Date: End time (MST):	AMS29 March 13, 2023 13:12	
		Calibration St	andards		
Cal Gas Concentration:	<u>49.21</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Cal Gas Cylinder #: Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	<u>CC356008</u> <u>49.21</u> <u>NA</u> Teledyne API T700 Teledyne API T701	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 5258 4297	
		Analyzer Info	rmation		
Analyzer make Analyzer Range		-	Analyzer serial #:	1170050150	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.006112 -2.145180	0.998958 -0.765478	Backgd or Offset: Coeff or Slope:		12.3 0.922
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration C (ppb) (Ic)	orrection factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.2	
as found span	4919	81.3	800.1	805.0	0.994
as found 2nd point					
as found 3rd point					
new cylinder response			0.0	0.4	
calibrator zero	5000	0.0	0.0 800.1	0.4	
high point	4919	81.3 40.7	400.6	799.1	1.001
second point third point	<u>4959</u> 4979	20.3	400.6	<u> </u>	1.004
as left zero	5000	0.0	0.0	0.1	
	4919	81.3	800.1	799.5	1.001
as left span		01.0			
as left span			Avera	ge Correction Factor	1.005
as left span Baseline Corr As found: Baseline Corr 2nd AF pt:	805.20 NA	Previous response AF Slope:	802.85	ge Correction Factor *% change AF Intercept:	1.005 0.3%

Notes:

Changed sample inlet filter after as founds. Adjusted span.

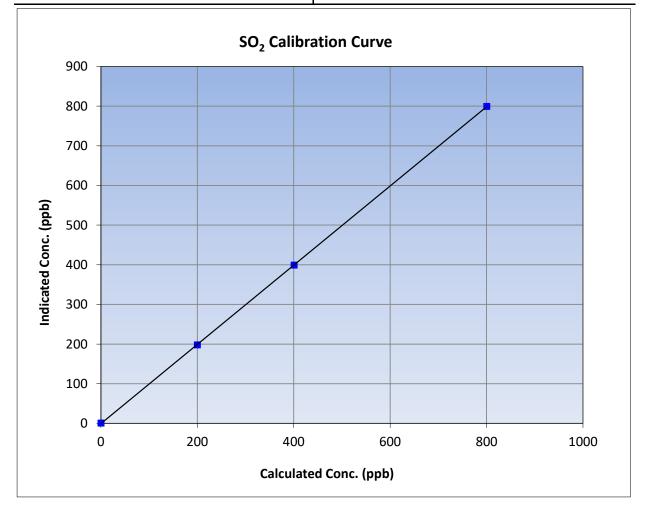
Calibration Performed By:

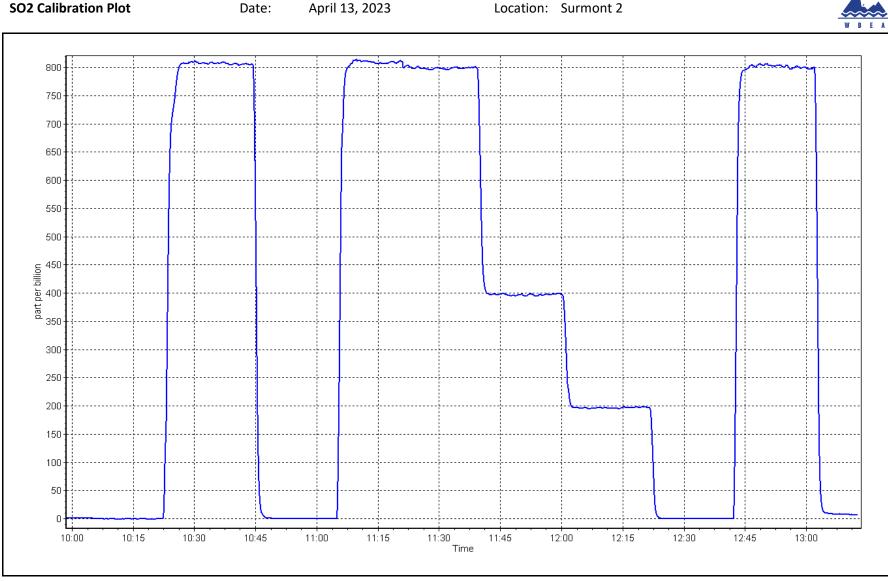


SO₂ Calibration Summary

WBEA				Version-01-2020	
		Station I	nformation		
Calibration Date:	April 13	, 2023	Previous Calibration:	March 13, 2023	
Station Name:	ame: Surmont 2		ne: Surmont 2 Station Number:		AMS29
Start Time (MST):	rt Time (MST): 10:01		End Time (MST):	13:12	
Analyzer make: Thermo		o 43i	Analyzer serial #:	1170050150	
		Calibra	tion Data		
		Calibra	ation Data		
Calculated concentration In (ppb) (Cc)	dicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	

	((()))	(hhn) (ic)	(hhn) (cc)	(hhn) (cc)
Correlation Coefficient		0.4	0.0	0.0
	1.0013	799.1	800.1	800.1
Slope	1.0045	398.8	400.6	400.6
	1.0107	197.7	199.8	199.8
Intercept				
intercept				





Location: Surmont 2



H₂S Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 April 12, 2023 9:31 Routine		Station number: Last Cal Date: End time (MST):	AMS29 March 30, 2023 14:54	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	<u>5.391</u> <u>CC508338</u>	ppm	Cal Gas Exp Date:	January 4, 2025	
Removed Cal Gas Conc: Removed Gas Cyl #:	<u>5.391</u> <u>CC508338</u> Taladara ADI T700	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	Teledyne API 1700 Teledyne API 1701		Serial Number: Serial Number:	5258 4297	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43iQ-TLE Global 0 - 100 ppb		Analyzer serial #: Converter serial #:	1200326170 2022-223	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	1.002040	0.999326	Backgd or Offset:	1.22	0.82
Calibration intercept:	-0.162687	-0.142577	Coeff or Slope:	1.043	1.043
		H ₂ S As Four	nd Data		
Set Point	Dilution 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 span	4926	74.2	80.0	78.9	1.008
as found 2nd point	4963	37.2	40.1	39.0	1.015
as found 3rd point	4982	18.6	20.1	19.0	1.028
new cylinder response					
		H ₂ S Calibrati	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) Limit = 0.95-1.05
calibrator zero	5000	0.0	0.0	0.0	
high point	4926	74.2	80.0	79.9	1.001
second point	4963	37.2	40.1	39.8	1.008
third point	4982	18.6	20.1	19.8	1.013
as left zero	5000	0.0	0.0	0.0	
as left span	4926	74.2	80.0	80.3	0.996
SO2 Scrubber Check	4919	81.3	813.0	0.1	
Date of last scrubber cha	nge:			Ave Corr Factor	1.007
Date of last converter eff	-				efficiency
Baseline Corr As found:	79.4	Prev response:	80.00	*% change:	-0.8%
Baseline Corr 2nd AF pt:	39.5	AF Slope:		AF Intercept:	-0.722284
Baseline Corr 3rd AF pt:	19.5	AF Correlation:		•	
				* = > +/-5% change initiate	es investigation

Notes:

Changed external valve. Adjusted zero only. SOx scrubber check done after calibrator zero.

Braiden Boutilier

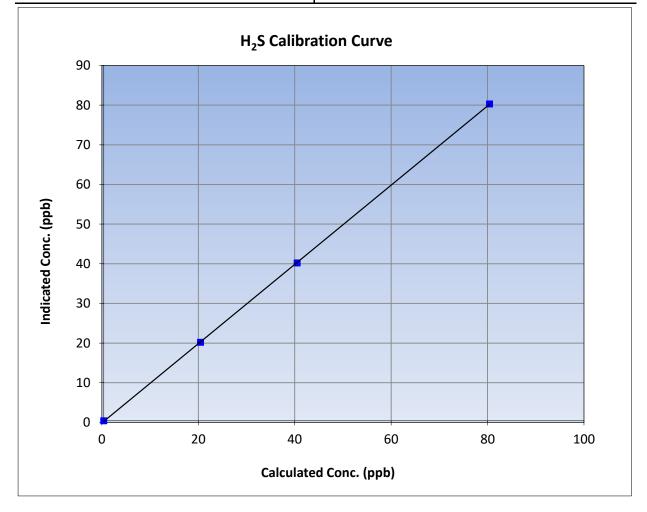


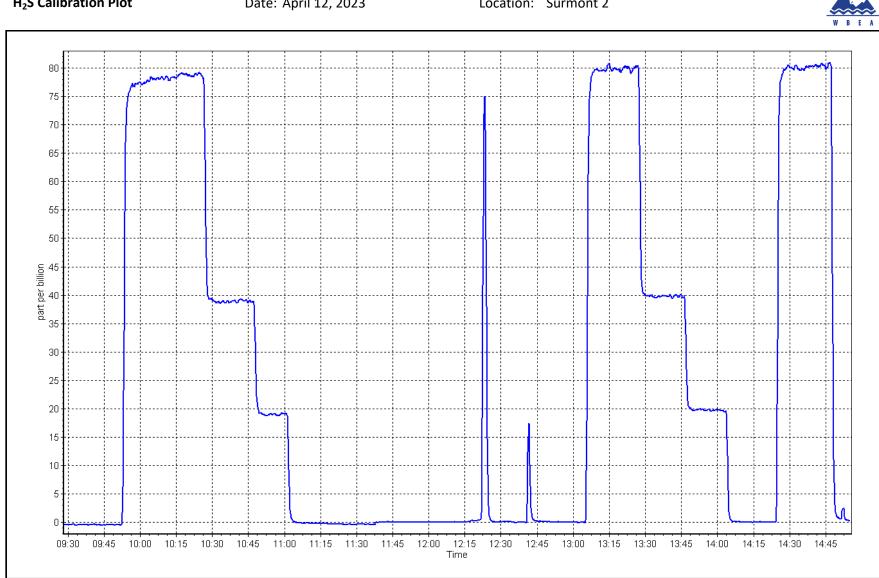
H₂S Calibration Summary

	Stati	on Information	
Calibration Date:	April 12, 2023	Previous Calibration:	March 30, 2023
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	9:31	End Time (MST):	14:54
Analyzer make:	Thermo 43iQ-TLE	Analyzer serial #:	1200326170

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999983	≥0.995
80.0	79.9	1.0013	correlation coefficient	0.999905	20.995
40.1	39.8	1.0077	Slope	0.999326	0.90 - 1.10
20.1	19.8	1.0128	Slope	0.999320	0.30 - 1.10
			Intercept	-0.142577	+/-3





Location: Surmont 2



THC Calibration Report

Version-01-2020

		Station Info	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	Surmont 2 April 13, 2023 10:01 Routine		Station number: Last Cal Date: End time (MST):	AMS29 March 13, 2023 13:12	
		Calibration S	standards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC35 <u>499.0</u> 205.7	56008 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	February 23, 2025 1064.7	ppm
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:		NA ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	NA 1064.7 5258 4297	ppm
		Analyzer Info	ormation		
Analyzer make Analyzer Range	: Thermo 51i-LT : 0 - 20 ppm		Analyzer serial #:	1170050149	
Calibration slope: Calibration intercept:	<u>Start</u> 1.008880 -0.118074	<u>Finish</u> 1.000707 -0.035654	Background: Coefficient:		<u>Finish</u> 4.62 5.286
		THC Calibrat	tion Data		
	Dilution air flow rate	Source gas flow rate	Calculated Concentration	Indicated Concentration (ppm)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
Set Point	(sccm)	(sccm)	(ppm) (Cc)	(Ic)	Linit - 0.55 1.05
Set Point as found zero	(sccm) 5000	(sccm) 0.0	(ppm) (Cc) 0.00	(Ic) -0.04	
as found zero as found span					
as found zero as found span as found 2nd point	5000	0.0	0.00	-0.04	
as found zero as found span as found 2nd point as found 3rd point	5000	0.0	0.00	-0.04	
as found zero as found span as found 2nd point as found 3rd point new cylinder response	5000 4918	0.0 81.3	0.00 17.31	-0.04 17.32	1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4918 5000	0.0 81.3 0.0	0.00 17.31 0.00	-0.04 17.32 -0.03	1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point	5000 4918 5000 4918	0.0 81.3 0.0 81.3	0.00 17.31 0.00 17.31	-0.04 17.32 -0.03 17.30	 1.000 1.001
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	5000 4918 5000	0.0 81.3 0.0	0.00 17.31 0.00	-0.04 17.32 -0.03	1.000
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point	5000 4918 5000 4918 4918 4959	0.0 81.3 0.0 81.3 40.7	0.00 17.31 0.00 17.31 8.67	-0.04 17.32 -0.03 17.30 8.62	 1.000 1.001 1.005
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	5000 4918 5000 4918 4959 4979	0.0 81.3 0.0 81.3 40.7 20.3	0.00 17.31 0.00 17.31 8.67 4.32	-0.04 17.32 -0.03 17.30 8.62 4.29	 1.000 1.001 1.005 1.008
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero as left span	5000 4918 5000 4918 4959 4979 5000 4918	0.0 81.3 0.0 81.3 40.7 20.3 0.0	0.00 17.31 0.00 17.31 8.67 4.32 0.00 17.31 Averag	-0.04 17.32 -0.03 17.30 8.62 4.29 -0.03	 1.000 1.001 1.005 1.008 0.995
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	5000 4918 5000 4918 4959 4979 5000	0.0 81.3 0.0 81.3 40.7 20.3 0.0	0.00 17.31 0.00 17.31 8.67 4.32 0.00 17.31 Averag 17.35	-0.04 17.32 -0.03 17.30 8.62 4.29 -0.03 17.40	 1.000 1.001 1.005 1.008 0.995 1.005 0.1%

Notes:

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

Calibration Performed By:

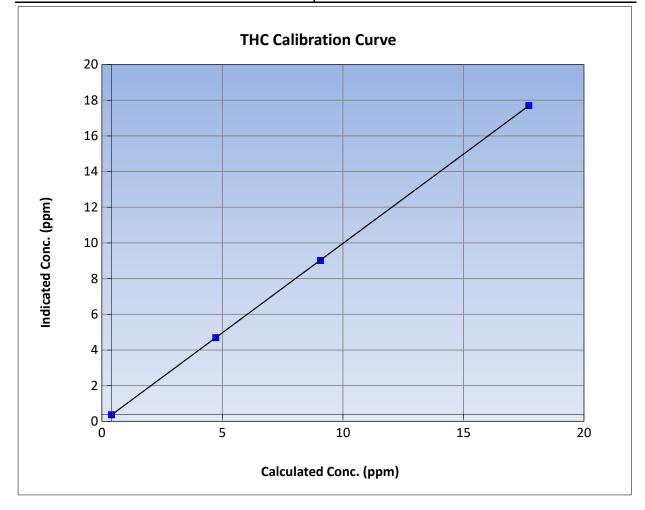


THC Calibration Summary

WBEA			Version-01-2020
	Stati	ion Information	
Calibration Date:	April 13, 2023	Previous Calibration:	March 13, 2023
Station Name:	Surmont 2	Station Number:	AMS29
Start Time (MST):	10:01	End Time (MST):	13:12
Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149

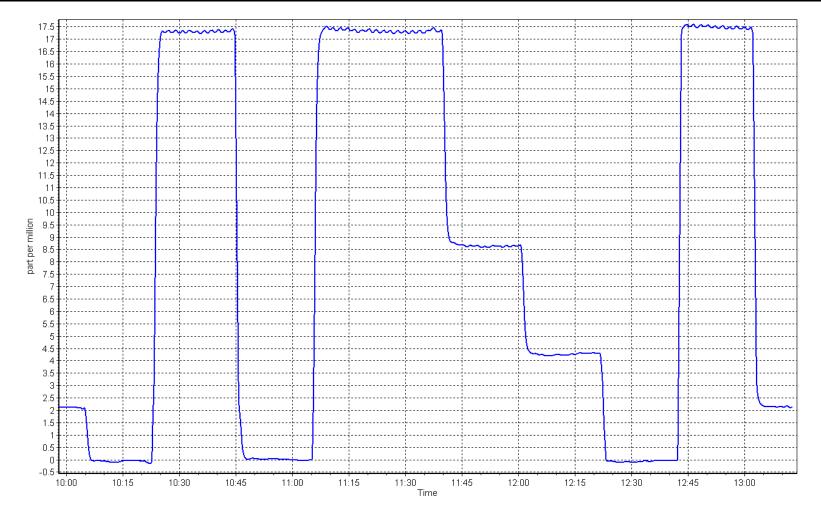
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	-0.03		Correlation Coefficient	0.999997	≥0.995
17.31	17.30	1.0008	correlation coefficient	0.555557	20.333
8.67	8.62	1.0054	Slope	1.000707	0.90 - 1.10
4.32	4.29	1.0082	51066	1.000707	0.30 - 1.10
			- Intercept	-0.035654	+/-1.5











Station Name:

Reason:

Calibration Date:

Start time (MST):

Surmont 2

10:00

Routine

April 26, 2023

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

Station Information

Station number: AMS29 Last Cal Date: March 16, 2023 End time (MST): 15:05

		c	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 pp	m
Removed Cylinder #:		NA	Removed Gas Exp Date: NA	
Removed Gas NOX Conc:	47.46	ppm	Removed Gas NO Conc: 47.46 pp	m
NOX gas Diff:			NO gas Diff:	
Calibrator Model:	Teledyne API T7	00	Serial Number: 5258	
ZAG make/model:	Teledyne API T7	01	Serial Number: 4297	
		1	Analyzer Information	
	The way a 42:		Analyzan april 4, 1170050148	

Analyzer make: NOX Range (ppb):			Analyzer serial #:	1170050148	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:	1.357	1.370	NO bkgnd or offset:	1.3	1.3
NOX coeff or slope:	0.996	0.995	NOX bkgnd or offset:	1.4	1.4
NO2 coeff or slope:	1.000	1.000	Reaction cell Press:	175.2	173.2

Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO _x Cal Slope:	0.999093	1.000252
NO _x Cal Offset:	-1.251932	-0.432516
NO Cal Slope:	0.999707	0.999765
NO Cal Offset:	-1.991859	-1.012030
NO ₂ Cal Slope:	0.998536	0.997717
NO ₂ Cal Offset:	0.601598	0.172614



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	tion Calibratio	n 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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0		
as found span	4916	84.2	799.2	799.2	0.0	792.0	790.3	1.7	1.0091	1.0113
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1		
high point	4916	84.2	799.2	799.2	0.0	798.8	797.9	1.0	1.0005	1.0016
second point	4958	42.1	399.6	399.6	0.0	400.2	399.7	0.5	0.9985	0.9998
third point	4979	21.1	200.3	200.3	0.0	198.7	197.2	1.4	1.0079	1.0156
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	396.7	402.5	794.4	392.4	402.0	1.0060	1.0109
							Average C	orrection Factor	1.0023	1.0057
Corrected As fo	ound NO _x =	792.2 ppb	NO =	790.4 ppb	* = > +/-5%	6 change initiates i	nvestigation	*Percent Chang	ge NO _x =	-0.6%
Previous Respo	onse NO _x =	797.2 ppb	NO =	797.0 ppb				*Percent Chan	ge NO =	-0.8%
Baseline Corr 2	nd pt NO _x =	NA ppb	NO =	NA ppb	As found	$I NO_{\chi} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	NO r^2 :		NO SI:	NO Int:	
					As found	$I NO_2 r^2$:		NO2 SI:	NO_2 Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	793.3	390.8	402.5	402.2	1.0007	99.9%
2nd GPT point (200 ppb O3)	793.3	595.7	197.6	195.9	1.0087	99.1%
3rd GPT point (100 ppb O3)	793.3	696.6	96.7	97.7	0.9898	101.0%
				Average Correction Factor	0.9997	100.0%

Changed sample inlet filter after as founds. Adjusted span. Second high NO reference point used for the GPT calibration formulas.

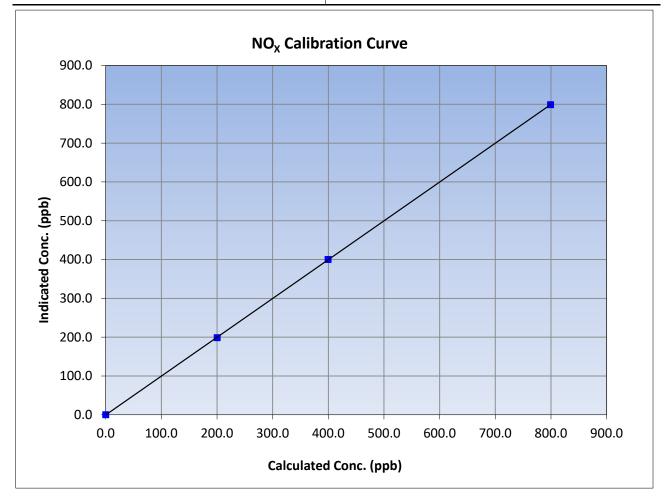
Calibration Performed By:

Notes:



NO_x Calibration Summary

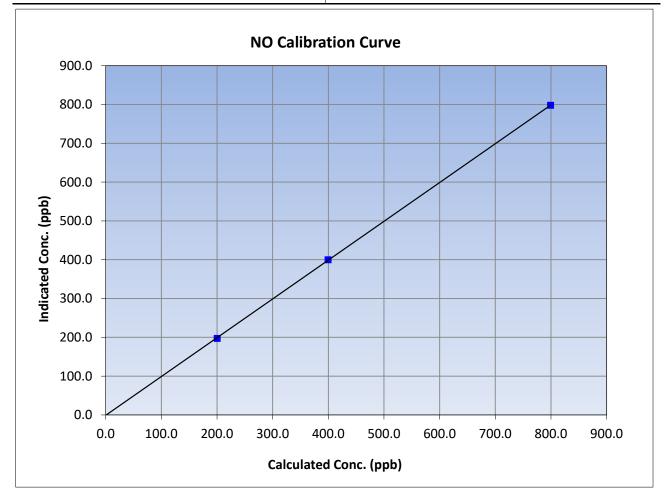
WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 2	6, 2023	Previous Calibration:	March 1	16, 2023
Station Name:	Surm	iont 2	Station Number:	AM	S29
Start Time (MST):	10	:00	End Time (MST):	15	:05
Analyzer make:	Therr	no 42i	Analyzer serial #:	1170050148	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999993	≥0.995
799.2	798.8	1.0005	correlation coefficient	0.999995	20.995
399.6	400.2	0.9985	Slope	1.000252	0.90 - 1.10
200.3	198.7	1.0079	Slope	1.000252	0.90 - 1.10
			Intercept	-0.432516	+/-20





NO Calibration Summary

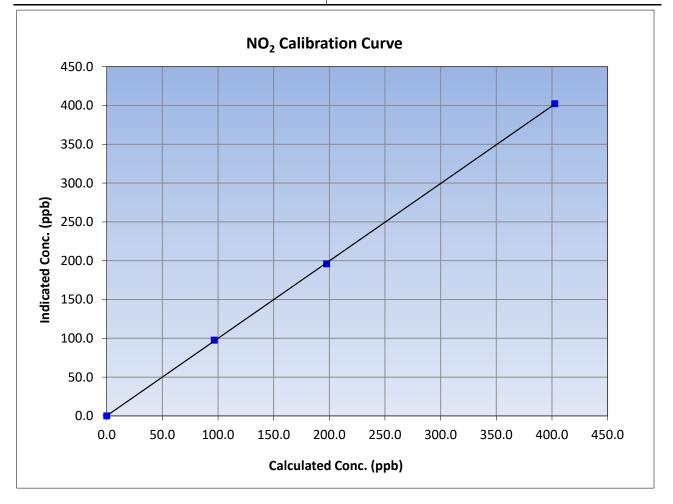
WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 2	6, 2023	Previous Calibration:	March 1	16, 2023	
Station Name:	Surm	iont 2	Station Number:	AM	S29	
Start Time (MST):	10	:00	End Time (MST):	15	:05	
Analyzer make:	Therr	no 42i	Analyzer serial #: 11700501		50148	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	-0.1		Correlation Coefficient	0.999982	≥0.995	
799.2	797.9	1.0016	correlation coernelent	0.555582	20.333	
399.6	399.7	0.9998	Slope	0.999765	0.90 - 1.10	
200.3	197.2	1.0156	Slope	0.999705	0.90 - 1.10	
			Intercept	-1.012030	+/-20	

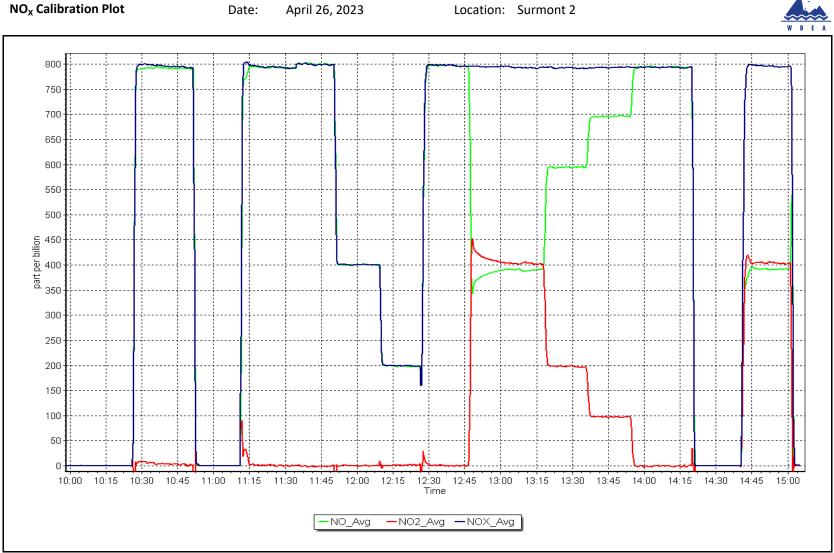




NO₂ Calibration Summary

WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	6, 2023	Previous Calibration:	March 1	16, 2023
Station Name:	Surm	iont 2	Station Number:	AM	S29
Start Time (MST):	10	:00	End Time (MST):	15	:05
Analyzer make:	Therr	Analyzer serial #:	1170050148		
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999962	≥0.995
402.5	402.2	1.0007	correlation coernelent	0.555502	20.999
197.6	195.9	1.0087	Slope	0.997717	0.90 - 1.10
96.7	97.7	0.9898	Slope	0.997717	0.30 - 1.10
			Intercept	0.172614	+/-20









T640 PM_{2.5} CALIBRATION

WBEA					Version-01-2023
		Station Information	1		
Station Name:	Surmont 2		Station number:	AMS 29	
Calibration Date:	April 26, 2023		Last Cal Date:	March 13, 2023	
Start time (MST):	11:38		End time (MST):	12:38	
Analyzer Make:	API T640		S/N:	253	
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 T	est		
Parameter	<u>As found</u>	Measured	<u>As left</u>	<u>Adjusted</u>	(Limits)
T (°C)	6.5	5.76	6.5		+/- 2 °C
P (mmHg)	706.8	707.79	706.8		+/- 10 mmHg
flow (LPM)	4.99	5.068	4.99		+/- 0.25 LPM
Leak Test:	Date of check:	April 26, 2023	Last Cal Date:	March 13, 2023	_
	PM w/o HEPA:	1.5	PM w/ HEPA:	0	<0.2 ug/m3
Note: this leak check will be			erve as the pre mai	intenance leak check	
Inlet cleaning :	Inlet Head				
		Quarterly Calibration 1	est		
Parameter	<u>As found</u>	Post maintenance	As left	Adjusted	(Limits)
PMT Peak Test					11.3 +/- 0.5
Post-maintenance		PM w/o HEPA:		w/ HEPA:	
Date Optical Cham		February 17			<0.2 ug/m3
Disposable Filte	r Changed:	February 17	, 2023		
		Annual Maintenanc	e		
Date Sample Tube Cleaned: Date RH/T Sensor Cleaned:		September 3			
Date RH/T Sense	or Cleaned:	October 6,	2022		
Notes:		No adjustments	made, Leak check p	Dassed.	
Calibration by:	Braiden Boutilier				



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS30 ELLS RIVER APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River April 11, 2023 9:19 Routine		Station number: Last Cal Date: End time (MST):	AMS 30 March 1, 2023 12:20	
		Calibration St	andards		
Cal Gas Concentration: Cal Gas Cylinder #:	50.53 CC494126	ppm	Cal Gas Exp Date:	December 29, 2028	
Removed Cal Gas Conc: Removed Gas Cyl #:	50.53	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	АРІ T700 АРІ T701Н		Serial Number: Serial Number:	3061 358	
		Analyzer Info	rmation		
Analyzer make Analyzer Range			Analyzer serial #:	1008841397	
	<u>Start</u>	Finish	Dealard or Offertu	<u>Start</u>	<u>Finish</u>
Calibration slope: Calibration intercept:	1.004115 -2.615941	1.003073 -2.075962	Backgd or Offset: Coeff or Slope:		9.0 0.988
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/Ic Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.1	
as found span	4921	79.2	800.4	799.4	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	0.0	
high point	4921	79.2	800.4	801.9	0.998
second point	4960	39.6	400.2	398.0	1.006
third point	4980	19.8	200.1	196.8	1.017
as left zero	5000	0.0	0.0	0.0	
as left span	4921	79.2	800.4 Averag	802.6 ge Correction Factor	0.997
Baseline Corr As found:	799.50	Previous response		*% change	-0.2%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF pt:	NA	AF Correlation:			

No adjustments made.

Calibration Performed By:



400.2

398.0

Wood Buffalo Environmental Association

SO₂ Calibration Summary

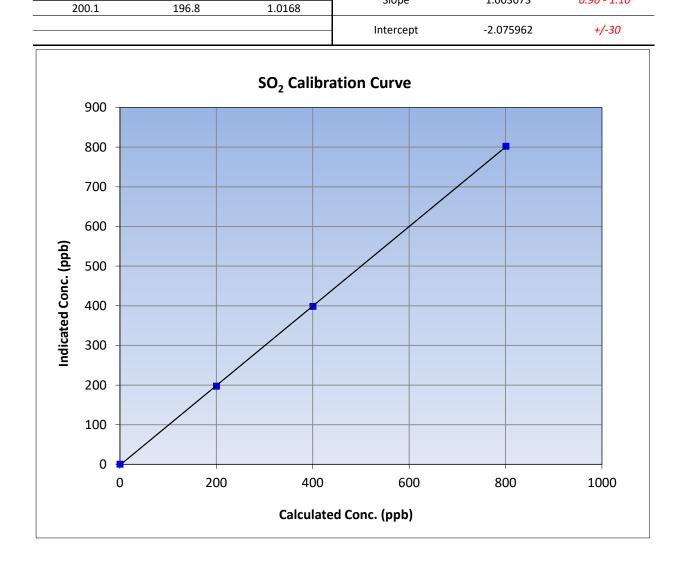
Slope

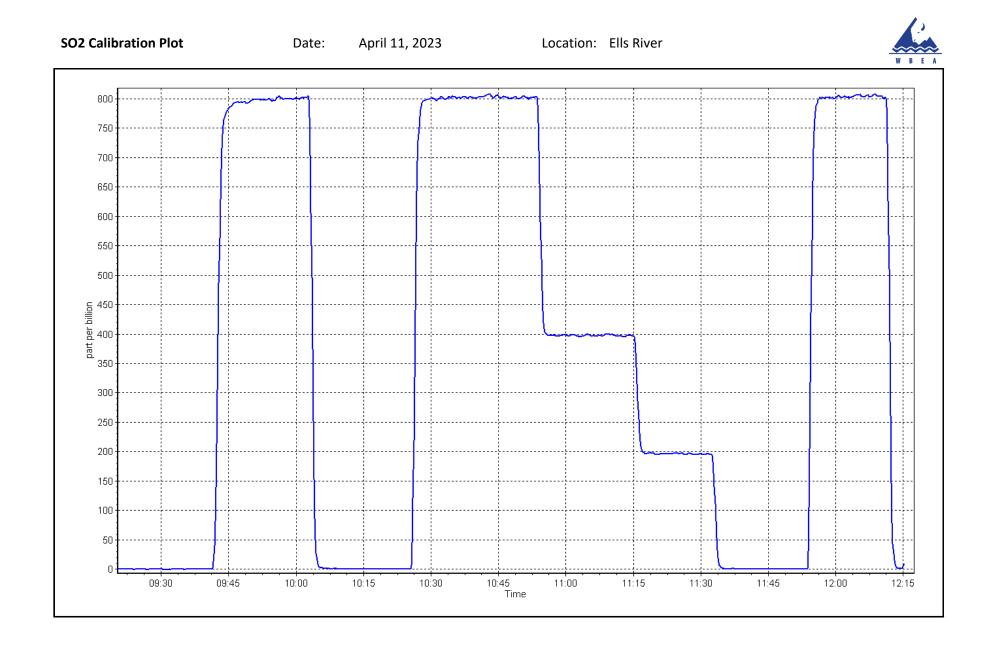
1.003073

0.90 - 1.10

WBEA					Version-01-2020
		Station	Information		
Calibration Date:	April 11,	2023	Previous Calibration:	March 2	1, 2023
Station Name:	Ells Ri	ver	Station Number:	AMS	5 30
Start Time (MST):	9:1	9	End Time (MST):	12:	20
Analyzer make:	Thermo	o 43i	Analyzer serial #:	10088	41397
		Calib	ration Data		
Calculated concentration I (ppb) (Cc)	ndicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	on	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999969	≥0.995
800.4	801.9	0.9981		0.555509	20.995

1.0056







TRS Calibration Report

WBEA					Version-11-2021
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River April 3, 2023 9:34 Routine		Station number: Last Cal Date: End time (MST):	AMS30 March 2, 2023 13:15	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.08 EY0002443	ppm	Cal Gas Exp Date:	February 9, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #:	5.08	ppm	Rem Gas Exp Date: Diff between cyl:		
Calibrator Make/Model: ZAG Make/Model:	API T700 API T701H		Serial Number: Serial Number:	3061 358	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i TLE CDN - 101 0 - 100 ppb		Analyzer serial #: Converter serial #:	1410661331 555	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.998207	1.000494	Backgd or Offset:	1.57	1.55
Calibration intercept:	0.060852	-0.019196	Coeff or Slope:	1.092	1.092
		TRS As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) <i>Limit = 0.90-1.10</i>
as found zero	5000	0.0	0.0	0.0	
as found span	4921	78.7	80.0	79.3	1.008
as found 2nd point	4961	39.4	40.0	39.6	1.011
as found 3rd point	4980	19.7	20.0	19.9	1.006
new cylinder response					
		TRS Calibrat	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.0	
high point	4921	78.7	80.0	80.0	1.000
second point	4961	39.4	40.0	40.0	1.001
third point	4980	19.7	20.0	20.0	1.001
as left zero	5000	0.0	0.0	0.3	
as left span	4921	78.7	80.0	80.0	1.000
SO2 Scrubber Check	4921	79.2	800.4	0.1	
Date of last scrubber cha	inge:	N/A		Ave Corr Factor	1.000
Date of last converter ef	ficiency test:	N/A		95.1%	efficiency
Baseline Corr As found:	79.3	Prev response:	79.88	*% change:	-0.7%
Baseline Corr 2nd AF pt:	39.6	AF Slope:	0.991347	AF Intercept:	0.000989
Baseline Corr 3rd AF pt:	19.9	AF Correlation:	0.999997		
				* = > +/-5% change initiat	tes investigation

Notes:

No adjustments made.

Calibration Performed By:

Denny Ray Estador

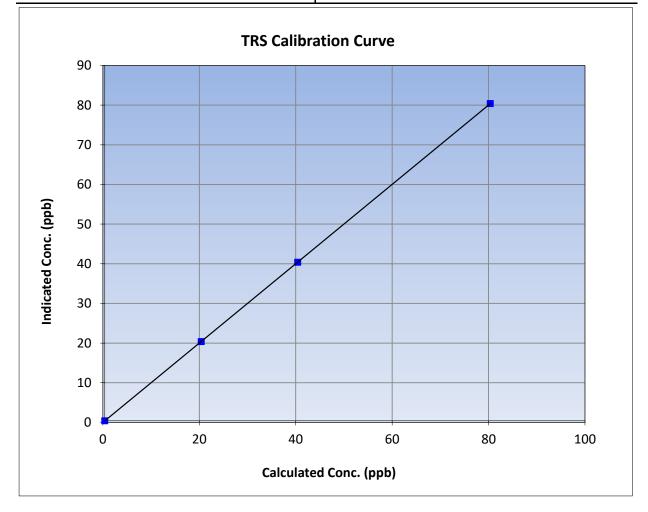


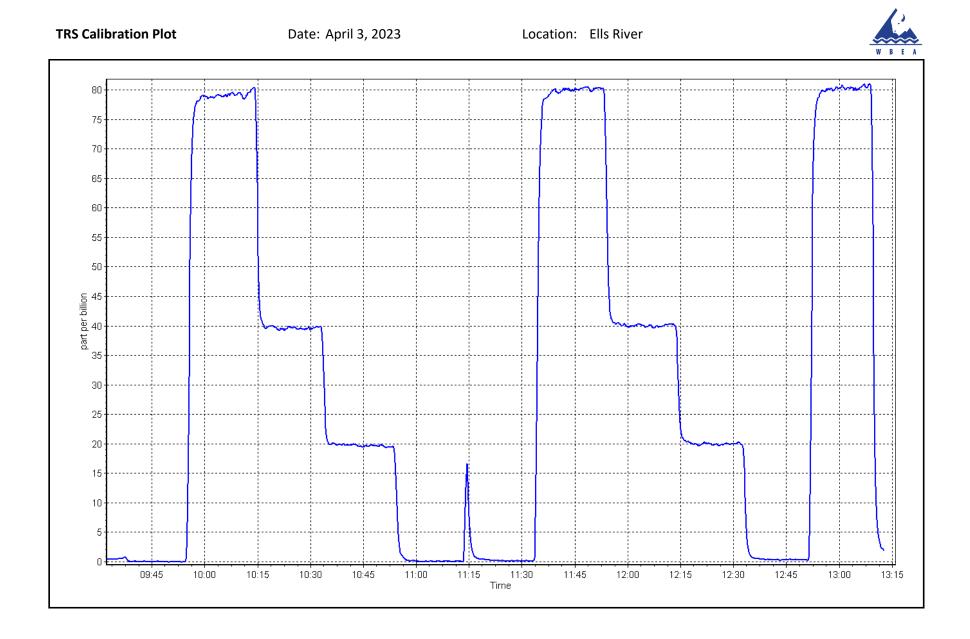
TRS Calibration Summary

WBEA			Version-11-2021
	Stati	on Information	
Calibration Date:	April 3, 2023	Previous Calibration:	March 2, 2023
Station Name:	Ells River	Station Number:	AMS30
Start Time (MST):	9:34	End Time (MST):	13:15
Analyzer make:	Thermo 43i TLE	Analyzer serial #:	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	r Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	1.000000	≥0.995
80.0	80.0	0.9995	correlation coefficient	1.000000	20.333
40.0	40.0	1.0007	Slope	1.000494	0.90 - 1.10
20.0	20.0	1.0008	Siope	1.000494	0.90 - 1.10
			Intercept	-0.019196	+/-3







THC / CH_4 / NMHC Calibration Report

W B E A					Version-01-2020	
		Stat	ion Information			
Station Name:	Ells River		Station number: Al	MS 30		
Calibration Date:	April 11, 2023		Last Cal Date: M	larch 1, 2023		
Start time (MST):	9:19	End time (MST): 12:20				
Reason:	Routine					
		Calib	ration Standards			
Gas Cert Reference:	C	C494126	Cal Gas Expiry Date: D	ecember 29, 20	28	
CH4 Cal Gas Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm	
C3H8 Cal Gas Conc.	209.2	ppm				
Removed Gas Cert:			Removed Gas Expiry:			
Removed CH4 Conc.	499.7	ppm	CH4 Equiv Conc.	1075.0	ppm	
Removed C3H8 Conc.	209.2	ppm	Diff between cyl (THC):			
Diff between cyl (CH ₄):	:		Diff between cyl (NM):			
Calibrator Model:	API T700		Serial Number: 30	061		
ZAG make/model:	API T701H		Serial Number: 35	58		
		Anal	yzer Information			
Analyzer make:	: Thermo 55i		Analyzer serial #: 11	193585650		
THC Range (ppm):						
NMHC Range (ppm):	: 0 - 10 ppm		CH4 Range (ppm): 0	- 10 ppm		
	<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>	
CH4 SP Ratio:	. 0.000234	0.00023	8 NMHC SP Ratio:	4.19E-05	4.39E-05	
CH4 Retention time:	: 14.2	14.2	NMHC Peak Area:	217301	207620	

THC Calibration Data								
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (0	Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05			
as found zero	5000	0.0	0.00	0.00				
as found span	4921	79.2	17.03	16.46	1.035			
as found 2nd point								
as found 3rd point								
new cylinder response								
calibrator zero	5000	0.0	0.00	0.00				
high point	4921	79.2	17.03	16.98	1.003			
second point	4960	39.6	8.51	8.42	1.012			
third point	4980	19.8	4.26	4.16	1.023			
as left zero	5000	0.0	0.00	0.00				
as left span	4921	79.2	17.03	17.06	0.998			
			ŀ	Average Correction Factor	1.012			
Baseline Corr AF:	16.46	Prev response	16.96	*% change	-3.0%			
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:				
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initial	es investigation			



THC / CH_4 / NMHC Calibration Report

Version-01-2020

		NMHC Calib	ration Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Cc) Ind conc (ppm) (Ic)	CF Limit= 0.95-1.05
as found zero	5000	0	0.00	0.00	
as found span	4921	79.2	9.11	8.72	1.045
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0	0.00	0.00	
high point	4921	79.2	9.11	9.10	1.001
second point	4960	39.6	4.56	4.53	1.007
third point	4980	19.8	2.28	2.24	1.016
as left zero	5000	0	0.00	0.00	
as left span	4921	79.2	9.11	9.13	0.998
			ŀ	Average Correction Factor	1.008
Baseline Corr AF:	8.72	Prev response	9.10	*% change	-4.3%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation

CH4 Calibration Data

		CH4 Calibra	tion Data		
Set Point	Dil air flow rate	Source gas flow rate	Calc conc (ppm) (Co	c) Ind conc (ppm) (Ic)	CF <i>Limit=</i> 0.95-1.05
as found zero	5000	0.0	0.00	0.00	
as found span	4921	79.2	7.91	7.74	1.022
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.00	0.00	
high point	4921	79.2	7.91	7.88	1.005
second point	4960	39.6	3.96	3.89	1.017
third point	4980	19.8	1.98	1.92	1.031
as left zero	5000	0.0	0.00	0.00	
as left span	4921	79.2	7.91	7.92	0.999
			Av	verage Correction Factor	1.018
Baseline Corr AF:	7.74	Prev response	7.87	*% change	-1.6%
Baseline Corr 2nd AF:	NA	AF Slope:		AF Intercept:	
Baseline Corr 3rd AF:	NA	AF Correlation:		* = > +/-5% change initiat	es investigation
		Calibration	Statistics		
		<u>Start</u>		Finish	
THC Cal Slope:		0.998858		0.998335	
THC Cal Offset:		-0.050537		-0.048138	
CH4 Cal Slope:		0.997766		0.996510	
CH4 Cal Offset:		-0.031956		-0.029356	
NMHC Cal Slope:		1.000170		0.999568	
NMHC Cal Offset:		-0.018781		-0.018381	

Notes:

Adjusted the span.

Calibration Performed By:

Denny Ray Estador



THC Calibration Summary

Version-01-2020

		Station I	nformation		
Calibration Date:	April 1	1, 2023	Previous Calibration:	March	1, 2023
station Name:	Ells	River	Station Number:	AM	5 30
start Time (MST):	9:	19	End Time (MST):	12:	20
Analyzer make:	Therr	no 55i	Analyzer serial #:	11935	85650
		Calibra	tion Data		
Calculated concentrati (ppm) (Cc)	ion Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	uation	<u>Limits</u>
0.00	0.00		Correlation Coefficient	0.999962	≥0.995
17.03	16.98	1.0028			
8.51 4.26	8.42	1.0117 1.0229	Slope	0.998335	0.90 - 1.10
4.20	4.10	1.0229	Intercept	-0.048138	+/-0.5
			intercept	010 10100	.,
		THC Calibratio	n Curve		
18.0 –					
				· ·	
16.0					
14.0 -					
12.0 -					
Indicated Conc. (ppm) - 0.8 - 0.9 - 0.0					
onc on					
9 8.0					
tec					
<u>is</u> 6.0 –					
Ind					
4.0 +					
2.0 -					
0.0 🖷					
0.0	ר ה	.0	10.0	15.0	20.0
0.0	J J	.0	10.0	10.0	20.0
		Calculated	l Conc. (ppm)		



CH₄ Calibration Summary

Version-01-2020

Calibration Da			Station	Information			
.	ate:	April 1	.1, 2023	Previous Cal	libration:	March 2	1, 2023
Station Name	2:	Ells	River	Station	Number:	AMS	5 30
Start Time (M	1ST):	9	:19	End Tim	ne (MST):	12:	20
Analyzer mak	æ:	Ther	mo 55i	Analyzei	r serial #:	11935	85650
			Calibra	ation Data			
Calculated conce (ppm) (Co		Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	5	Statistical Evalu	uation	<u>Limits</u>
0.00		0.00		- Correlation Co	pefficient	0.999932	≥0.995
7.91		7.88	1.0049				
3.96 1.98		3.89 1.92	1.0175 1.0307	- Slope	2	0.996510	0.90 - 1.10
		1.02	1.0007	- Interce	pt	-0.029356	+/-0.5
9.0	0 —		CH ₄ Calibratio	n Curve			
8.0	0					/	
7.0	0 -						
6.0	o 🗕						
(udd 5.0							
uc. (b							
O 4.0	0						
Indicated Conc. (ppm)	0						
= 2.0	o —						
1.0	o —						
0.0	0						
	0.0	2.0	4.0	6.	0	8.0	10.0
			Calculate	d Conc. (ppm	ı)		



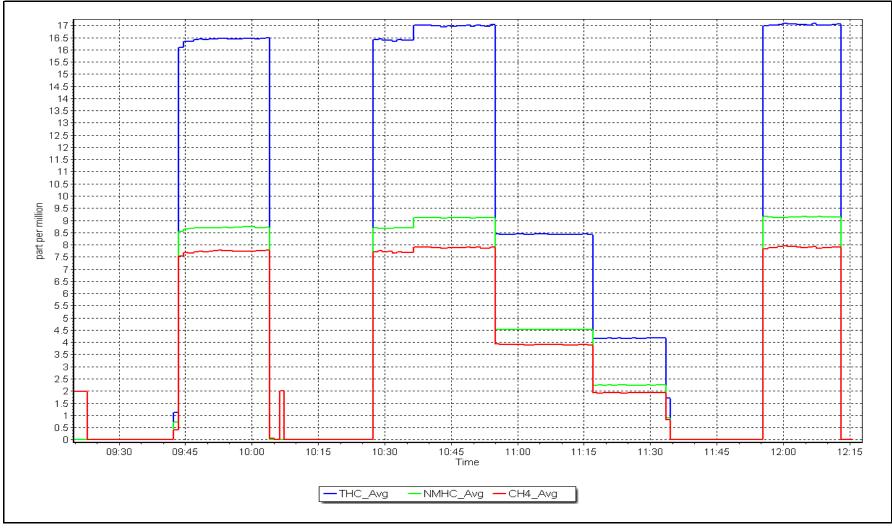
NMHC Calibration Summary

Version-01-2020

			Station I	nformation		
Calibration Dat	e:	April 1	.1, 2023	Previous Calibration:	March 2	L, 2023
station Name:		Ells	River	Station Number:	AMS	30
start Time (MS	т):	9	:19	End Time (MST):	12:	20
Analyzer make:	:	Ther	mo 55i	Analyzer serial #:	119358	35650
			Calibra	tion Data		
Calculated concent (ppm) (Cc)	tration	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Eval	uation	<u>Limits</u>
0.00 9.11		0.00 9.10	1.0014	Correlation Coefficient	0.999981	≥0.995
4.56		4.53	1.0014			
2.28		2.24	1.0162	Slope	0.999568	0.90 - 1.10
				Intercept	-0.018381	+/-0.5
10.0 9.0						•
8.0						
7.0						
6.0 (bbm) 5.0						
) . 5.0	_					
4.0 3.0						
– 2.0						
1.0						
0.0						
	0.0	2.0	4.0	6.0	8.0	10.0

NMHC Calibration Plot







$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Ells River April 5, 2023 8:57 Routine			Station number: AN Last Cal Date: Ma End time (MST): 13	arch 15, 2023	
			Calibrati	on Standards		
NO Gas Cylinder #:		T2Y1P2R		Cal Gas Expiry Date: De	cember 11, 2	023
NOX Cal Gas Conc:	50.83	ppm		NO Cal Gas Conc:	49.97	ppm
Removed Cylinder #:				Removed Gas Exp Date:		
Removed Gas NOX Conc:	50.83	ppm		Removed Gas NO Conc:	49.97	ppm
NOX gas Diff:				NO gas Diff:		
Calibrator Model:	API T700			Serial Number: 30	61	
ZAG make/model:	API T701H			Serial Number: 35	8	
			Analyzer	Information		
Analyzer make:	Thermo 42i			Analyzer serial #: 71	0321429	
NOX Range (ppb):				· · · · · ·		
C (11)	Start		<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope:			1.029	NO bkgnd or offset:	12.5	12.5
NOX coeff or slope:			0.992	NOX bkgnd or offset:	12.5	12.5
NO2 coeff or slope:			0.992 1.000	Reaction cell Press:	12.4	12.5
NO2 coen or slope.	. 1.000		1.000	Reaction cell Fless.	102.7	185.0
			Calibrat	ion Statistics		
			Start		Finish	
			0.00120		1 000576	

NO _x Cal Slope:	0.999129	1.000576
NO _x Cal Offset:	-0.900000	-1.140000
NO Cal Slope:	0.999714	0.998571
NO Cal Offset:	-1.740000	-1.840000
NO ₂ Cal Slope:	1.002165	1.002663
NO ₂ Cal Offset:	0.164860	0.679699



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ition Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.3	0.3		
as found span	4920	80.0	813.3	799.5	13.8	813.0	796.8	16.1	1.0003	1.0034
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
high point	4920	80.0	813.3	799.5	13.8	813.3	797.6	15.7	1.0000	1.0024
second point	4960	40.0	406.6	399.8	6.9	404.9	396.0	8.9	1.0043	1.0095
third point	4980	20.0	203.3	199.9	3.4	201.2	196.2	4.9	1.0105	1.0188
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as left span	4920	80.0	813.3	437.9	375.4	812.3	435.3	376.8	1.0012	1.0060
							Average C	orrection Factor	1.0049	1.0102
Corrected As fo	ound NO _x =	813.0 ppb	NO =	797.1 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _x =	0.2%
Previous Respo	nse NO _x =	811.7 ppb	NO =	797.6 ppb				*Percent Chang	ge NO =	-0.1%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/lc) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	793.8	432.2	375.4	376.7	0.9964	100.4%
2nd GPT point (200 ppb O3)	793.8	611.9	195.7	197.2	0.9922	100.8%
3rd GPT point (100 ppb O3)	793.8	702.3	105.3	106.8	0.9856	101.5%
				Average Correction Factor	0.9914	100.9%

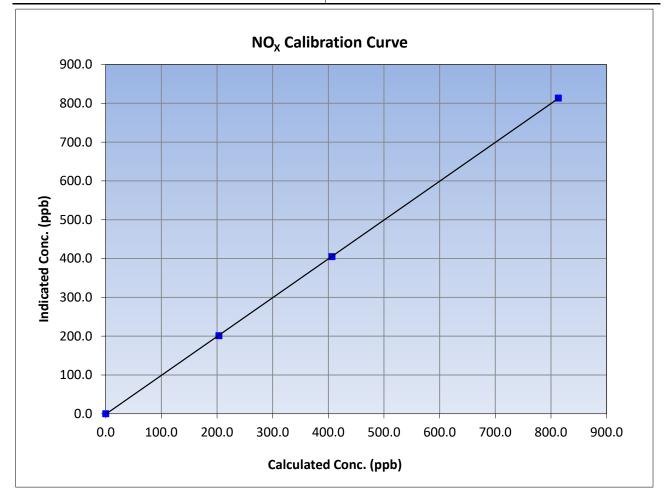
Notes:

No adjusments have been made.



NO_x Calibration Summary

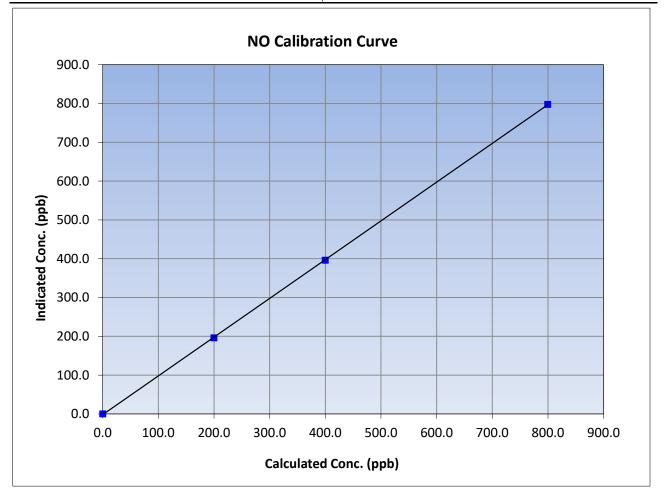
WBEA		Station	Information		Version-04-2	
		Station	intornation			
Calibration Date:	April 5	5, 2023	Previous Calibration:	March 1	March 15, 2023	
Station Name:	Ells	Ells River		Station Number: AMS		
Start Time (MST):	8:	57	End Time (MST):	13:	:15	
Analyzer make:	Therr	no 42i	Analyzer serial #:	71032	21429	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>	
0.0	0.1		Correlation Coefficient	0.999989	≥0.995	
813.3	813.3	1.0000	correlation coefficient	0.999909	20.335	
406.6	404.9	1.0043	Slope	1.000576	0.90 - 1.10	
203.3	201.2	1.0105	Slope	1.000570	0.30 - 1.10	
			Intercept	-1.140000	+/-20	





NO Calibration Summary

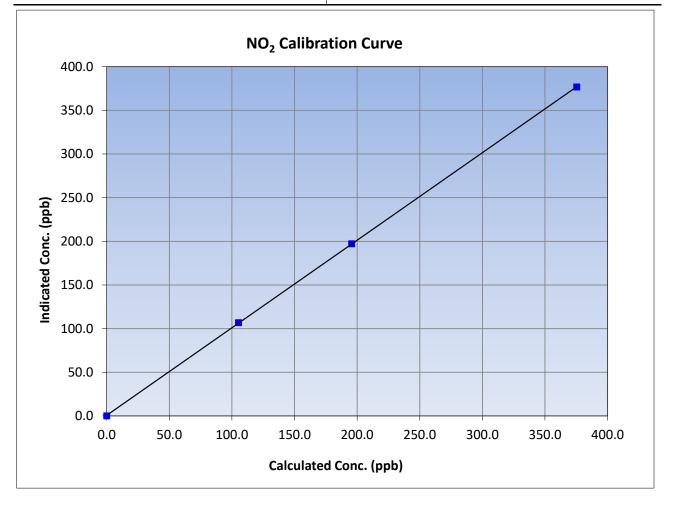
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 5	5, 2023	Previous Calibration:	March 2	15, 2023
Station Name:	Ells River		Station Number: AMS		S 30
Start Time (MST):	8:	57	End Time (MST):	13	:15
Analyzer make:	Therr	no 42i	Analyzer serial #:	71032	21429
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999975	≥0.995
799.5	797.6	1.0024	correlation coernelent	0.333375	20.333
399.8	396.0	1.0095	Slope	0.998571	0.90 - 1.10
199.9	196.2	1.0188	Slope	0.996571	0.90 - 1.10
			Intercept	-1.840000	+/-20

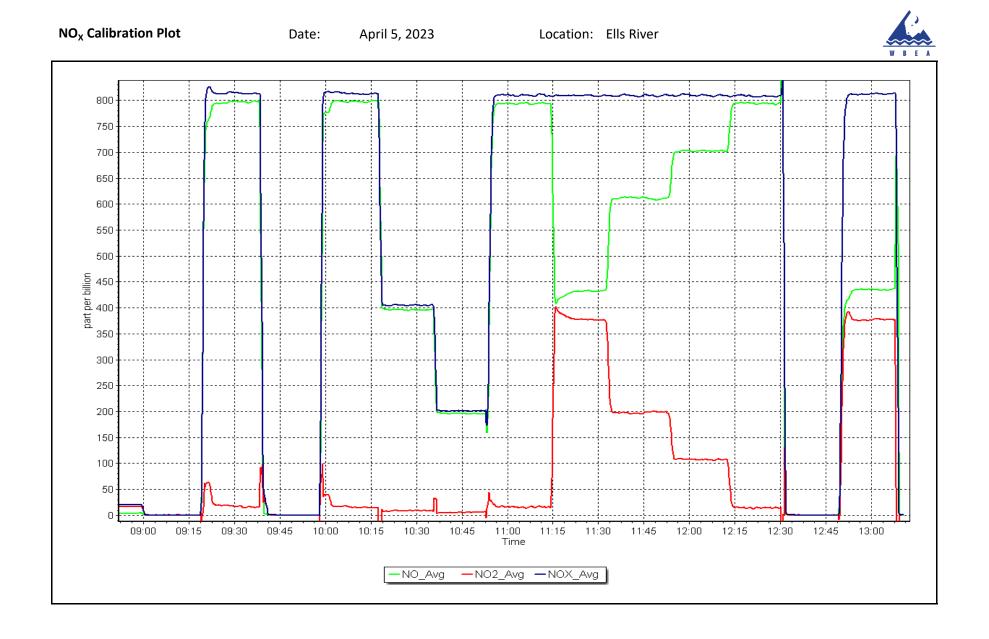




NO₂ Calibration Summary

WBEA					Version-04-2
		Station	Information		
Calibration Date:	April 5	5, 2023	Previous Calibration:	March 1	15, 2023
Station Name:	Ells River		Station Number:	AM	S 30
Start Time (MST):	8:	57	End Time (MST):	13	:15
Analyzer make:	Therr	no 42i	Analyzer serial #:	71032	21429
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.1		Correlation Coefficient	0.999988	≥0.995
375.4	376.7	0.9964	correlation coernelent	0.555588	20.995
195.7	197.2	0.9922	Slope	1.002663	0.90 - 1.10
105.3	106.8	0.9856	Slope	1.002005	0.90 - 1.10
			Intercept	0.679699	+/-20







T640 PM_{2.5} CALIBRATION

WBEA						Version-01-2023
		Station Information	1			
Station Name:	Ells River		Station number:	AMS 30		
Calibration Date:	April 11, 2023		Last Cal Date:	March 16, 202	3	
Start time (MST):	10:57		End time (MST):	11:20		
Analyzer Make:	API T640		S/N:	875		
Particulate Fraction:	PM2.5					
Flow Meter Make/Model:	Delta Cal		S/N:	954		
Temp/RH standard:	Delta Cal		S/N:	954		
		Monthly Calibration To	est			
<u>Parameter</u>	<u>As found</u>	Measured	<u>As left</u>	<u>A</u>	<u>djusted</u>	(Limits)
Т ([°] С)	-11	-10.2	-11			+/- 2 °C
P (mmHg)	724	724	724			+/- 10 mmHg
flow (LPM)	5.02	5.05	5.02			+/- 0.25 LPM
Leak Test:	Date of check:	April 11, 2023	Last Cal Date:	March 16,	2023	
	PM w/o HEPA:	3.1	PM w/ HEPA:	0		<0.2 ug/m3
Note: this leak check will be			erve as the pre mai	ntenance leak	check	
Inlet cleaning :	Inlet Head					
		Quarterly Calibration T	est			
Parameter	As found	Post maintenance	As left	A	djusted	(Limits)
PMT Peak Test	<u>, 10 10 ana</u>	<u> </u>	<u></u>	<u></u>		10.9 +/- 0.5
						,
Post-maintenance		PM w/o HEPA:		w/ HEPA:		
Date Optical Cham						<0.2 ug/m3
Disposable Filte	r Changed:					
		Annual Maintenance				
		Annual Maintenanco	e			
Date Sample Tul	be Cleaned:					
Date RH/T Sense	or Cleaned:					
Notes:		No adjustments r	nade. Inlet head sti	ll clean.		
Calibration by:	Denny Ray Estador					



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS506 JACKFISH 1 APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

	Station Infor	mation		
Jackfish 1 April 20, 2023 8:39 Routine		Station number: Last Cal Date: End time (MST):	AMS 506 March 9, 2023 11:20	
	Calibration St	andards		
<u>50.52</u>	ppm	Cal Gas Exp Date:	December 29, 2028	
<u>CC274266</u>				
	ppm		NA	
		-	2659	
	Analyzer Info	rmation		
: Thermo 43i		Analyzer serial #:	1160290011	
e 0 - 1000 ppb				
<u>Start</u>	Finish		<u>Start</u>	<u>Finish</u>
1.001172	1.003357	Backgd or Offset:	18.9	18.7
-1.416002	-1.656062	Coeff or Slope:	0.966	0.949
	SO ₂ Calibratio	on Data		
Dilution air flow rate	Source gas flow rate	Calculated	Indicated concentration (Correction factor (Cc/Ic)
(sccm)	(sccm)	concentration (ppb) (Cc)	(ppb) (Ic)	<i>Limit = 0.95-1.05</i>
5000	0.0	0.0	-0.6	
4921	79.2	800.2	813.2	0.984
5000	0.0	0.0	-0.3	
4921	79.2	800.2	801.4	0.999
4921 4960	79.2 39.6	800.2 400.2	801.4 400.7	0.999 0.999
4921 4960 4980	79.2 39.6 19.8	800.2 400.2 200.1	801.4 400.7 196.7	0.999 0.999 1.017
4921 4960 4980 5000	79.2 39.6 19.8 0.0	800.2 400.2 200.1 0.0	801.4 400.7 196.7 -0.2	0.999 0.999 1.017
4921 4960 4980	79.2 39.6 19.8	800.2 400.2 200.1 0.0 800.2	801.4 400.7 196.7 -0.2 800.4	0.999 0.999 1.017 1.000
4921 4960 4980 5000 4921	79.2 39.6 19.8 0.0 79.2	800.2 400.2 200.1 0.0 800.2 Averag	801.4 400.7 196.7 -0.2 800.4 ge Correction Factor	0.999 0.999 1.017 1.000 1.005
4921 4960 4980 5000 4921 813.80	79.2 39.6 19.8 0.0 79.2 Previous response	800.2 400.2 200.1 0.0 800.2 Average 799.73	801.4 400.7 196.7 -0.2 800.4 ge Correction Factor *% change	0.999 0.999 1.017 1.000
4921 4960 4980 5000 4921	79.2 39.6 19.8 0.0 79.2	800.2 400.2 200.1 0.0 800.2 Averag 799.73	801.4 400.7 196.7 -0.2 800.4 ge Correction Factor	0.999 0.999 1.017 1.000 1.005
	April 20, 2023 8:39 Routine <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>50.52</u> <u>5000</u>	Jackfish 1 April 20, 2023 8:39 Routine	Jackfish 1 April 20, 2023 8:39 Routine Calibration Standards 50.52 ppm Cal Gas Exp Date: 50.52 ppm Cal Gas Exp Date: 50.52 ppm Rem Gas Exp Date: 0:50 ppm API 700 API 700 API 701 Serial Number: API 701 Serial Number: Cal Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	Jackfish 1 April 20, 2023 B:39 RoutineStation number: Last Cal Date: End time (MST):AMS 506 March 9, 2023 End time (MST):SoutineEnd time (MST):11:2050.52 50.52 50.52ppmCal Gas Exp Date: Diff between cyl: Serial Number:December 29, 2028 2659 Serial Number:MA API 7700 API 701NA Serial Number:NA 2659 2659Start 1.001172 -1.416002Finish 1.003357 -1.656062Start Backgd or Offset: Coeff or Slope:Start 0.966Start 1.001172 -1.656062Source gas flow rate (sccm)Calculated concentration (ppb) (JC)Indicated concentration C (ppb) (Jc)

Notes:

Changed inlet filter after as founds. Adjusted span only.

Calibration Performed By:

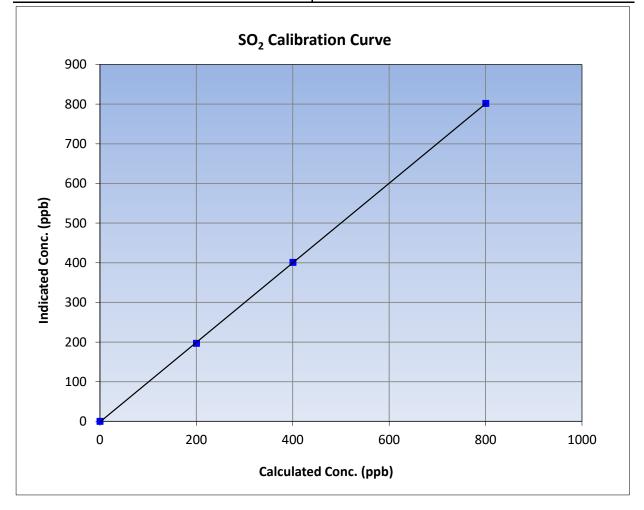


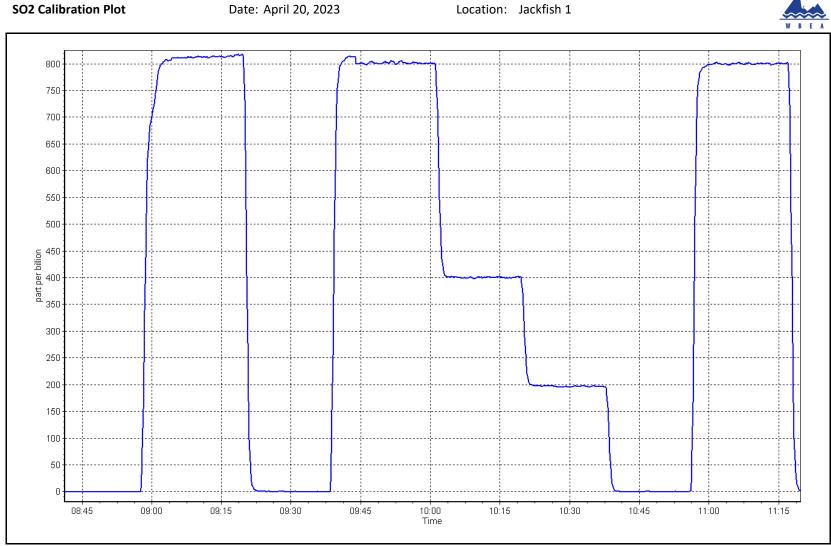
SO₂ Calibration Summary

	Stat	ion Information	
alibration Date:	April 20, 2023	Previous Calibration:	March 9, 2023
tation Name:	Jackfish 1	Station Number:	AMS 506
tart Time (MST):	8:39	End Time (MST):	11:20
nalyzer make:	Thermo 43i	Analyzer serial #:	1160290011

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	-0.3		Correlation Coefficient	0.999976	≥0.995
800.2	801.4	0.9985	correlation coefficient	0.999970	20.995
400.2	400.7	0.9986	Slope	1.003357	0.90 - 1.10
200.1	196.7	1.0171	Slope	1.003337	0.90 - 1.10
			- Intercept	-1.656062	+/-30









H₂S Calibration Report

				Version-11-202
	Station Info	rmation		
Jackfish 1 April 25, 2023 9:04 Routine		Station number: Last Cal Date: End time (MST):	AMS506 March 29, 2023 12:54	
	Calibration S	tandards		
5.14 CC511843	ppm	Cal Gas Exp Date:	September 16, 2024	
5.14 NA API T700	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number:	NA 2659	
API 701		Serial Number:	4427	
	Analyzer Info	ormation		
Thermo 43i-TLE Global G150 0 - 100 ppb		Analyzer serial #: Converter serial #:	1180540020 2022-218	
<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
1.005003	0.999860	Backgd or Offset:	3.42	3.37
-0.178301	-0.298400	Coeff or Slope:	1.090	1.066
	H ₂ S As Four	nd Data		
Dilution 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
5000	0.0	0.0	-0.2	
4922	77.8	80.0	80.8	0.987
4961	38.9	40.0	40.1	0.992
4981	19.4	19.9	19.7	1.002
	H ₂ S Calibrati	ion Data		
Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
(sccm)	(sccm)	concentration (ppb) (Cc)	concentration (ppb) (Ic)	(Cc/Ic) <i>Limit = 0.95-1.05</i>
5000	0.0	0.0	-0.2	
4922	77.8	80.0	79.7	1.004
4961	38.9	40.0	39.7	1.007
4981	19.4	19.9	19.5	1.023
5000	0.0	0.0	-0.2	
4000	77.8	80.0	79.9	1.001
4922		702.0	0.0	
4921	79.2	792.0		
4921 ange:	79.2 24-Feb-23	792.0	Ave Corr Factor	1.011
4921		792.0	Ave Corr Factor	1.011 efficiency
4921 ange:	24-Feb-23		Ave Corr Factor	
4921 ange: ficiency test:	24-Feb-23 December 1, 2022	80.20 1.013717	Ave Corr Factor	efficiency
	April 25, 2023 9:04 Routine 5.14 CC511843 5.14 NA API 7700 API 701 Thermo 43i-TLE Global G150 0 - 100 ppb <u>Start</u> 1.005003 -0.178301 Dilution air flow rate (sccm) Dilution air flow rate (sccm) Dilution air flow rate (sccm) 5000 4922 4961 4981	Jackfish 1 April 25, 2023 9:04 Routine Soutine Calibration S 5.14 ppm CC511843 ppm 5.14 ppm NA API 7700 API 7701 Analyzer Info Thermo 43i-TLE Finish Global G150 0.999860 0 - 100 ppb Finish Start Finish 1.005003 0.999860 -0.178301 -0.298400 Dilution air flow rate Source gas flow rate (sccm) 0.0 4961 38.9 4981 19.4 Dilution air flow rate Source gas flow rate (sccm) 0.0 4961 38.9 4981 19.4	April 25, 2023 9:04 Routine Last Cal Date: End time (MST): End time (MST): Source as flow rate (CC511843) 5.14 ppm Cal Gas Exp Date: Diff between cyl: S.14 CC511843 5.14 ppm Rem Gas Exp Date: Diff between cyl: API 7700 API 701 Serial Number: API 7700 API 701 Serial Number: Converter serial #: Global G150 0 - 100 ppb Analyzer serial #: Converter serial #: Converte	Jackfish 1 April 25, 2023 9:04 Routine AMS506 March 29, 2023 12:54 9:04 Routine Last Cal Date: End time (MST): March 29, 2023 12:54 5.14 CC511843 5.14 ppm Cal Gas Exp Date: Diff between cyl: Serial Number: September 16, 2024 API T700 API 701 Serial Number: Serial Number: 2659 2659 API 701 Serial Number: Serial Number: 2659 2022-218 Thermo 43i-TLE Global G150 0 - 100 ppb Analyzer serial #: 2022-218 1180540020 2022-218 Start 1.005003 Finish 0.999860 0.999860 Start Backgd or Offset: 3.42 Coeff or Slope: Start 3.42 Dilution air flow rate (sccm) Source gas flow rate (sccm) (sccm) Calculated concentration (ppb) (cc) Indicated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilution air flow rate (sccm) Source gas flow rate (sccm) Calculated concentration (ppb) (lc) Dilu

Notes:

Changed inlet filter after multi-point as founds. Scrubber test done and passed after calibrator zero. Adjusted span only.

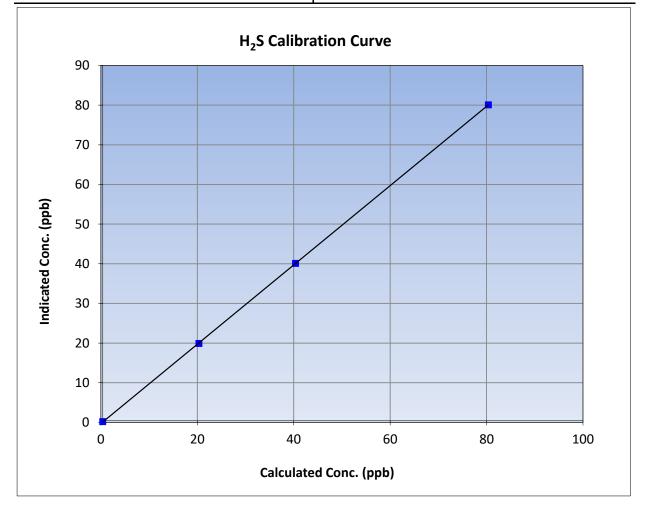


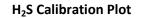
H₂S Calibration Summary

WBEA			Version-11-2021						
Station Information									
Calibration Date:	April 25, 2023	Previous Calibration:	March 29, 2023						
Station Name:	Jackfish 1	Station Number:	AMS506						
Start Time (MST):	9:04	End Time (MST):	12:54						
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1180540020						

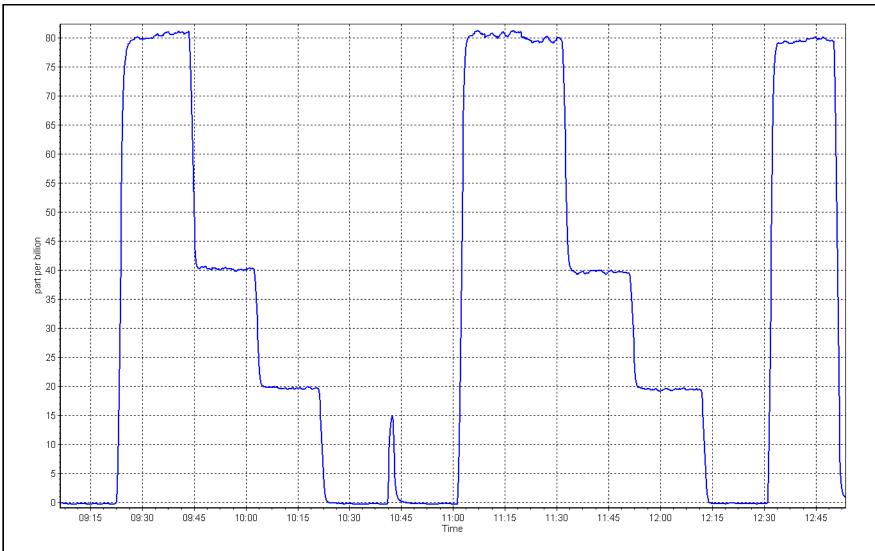
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	-0.2		Correlation Coefficient	0.999991	≥0.995
80.0	79.7	1.0035	Correlation Coefficient	0.999991	20.995
40.0	39.7	1.0073	Slope	0.999860	0.90 - 1.10
19.9	19.5	1.0226	Slope		0.90 - 1.10
			Intercept	-0.298400	+/-3











NO Cal Slope:

NO Cal Offset:

NO₂ Cal Slope:

NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

			Station I	nformation		
Station Name: Calibration Date: Start time (MST): Reason:	Jackfish 1 April 26, 2023 8:21 Routine			Station number: AMS506 Last Cal Date: March 30, 2023 End time (MST): 12:30		
			Calibratio	on Standards		
NO Gas Cylinder #: NOX Cal Gas Conc: Removed Cylinder #: Removed Gas NOX Conc: NOX gas Diff: Calibrator Model: ZAG make/model:	<u>47.46</u> <u>47.46</u> API T700 API 701	T26811M ppm NA ppm		Cal Gas Expiry Date: NO Cal Gas Conc: Removed Gas Exp Date: Removed Gas NO Conc: NO gas Diff: Serial Number: 26 Serial Number: 44	<u>47.39</u> <u>47.39</u> 559	ber 30, 2024 ppm NA ppm
			Analyzer	Information		
Analyzer make: NOX Range (ppb):				Analyzer serial #: 12	218153356	
NO coeff or slope NOX coeff or slope NO2 coeff or slope	0.993		Finish 1.143 0.993 1.000	NO bkgnd or offset: NOX bkgnd or offset: Reaction cell Press:	<u>Start</u> 3.2 3.3 172.2	<i>Finish</i> 3.3 3.4 172.5
			Calibrati	on Statistics		
NO _x Cal Slope NO _x Cal Offset			<u>Start</u> 1.003601 0.808032		<u>Finish</u> 1.001147 -0.448022	

1.002854

-1.627998

1.003399

0.523900

0.999625

-1.447978

1.006063

0.960980



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n Data				
Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) Limit = 0.95-1.05	NO Correction factor (Cc/Ic) Limit = 0.95-1.05
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1		
as found span	4916	84.4	801.1	799.9	1.2	792.4	786.0	6.3	1.0109	1.0177
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
high point	4916	84.4	801.1	799.9	1.2	801.2	798.3	3.0	0.9998	1.0020
second point	4958	42.2	400.5	400.0	0.6	402.2	399.5	2.6	0.9959	1.0011
third point	4979	21.1	200.3	200.0	0.3	198.1	195.5	2.6	1.0110	1.0229
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	0.0		
as left span	4916	84.4	801.1	402.4	398.7	803.1	402.5	400.6	0.9975	0.9997
							Average C	orrection Factor	1.0022	1.0087
Corrected As fo	ound NO _x =	792.3 ppb	NO =	785.9 ppb	* = > +/-59	% change initiates i	nvestigation	*Percent Chang	ge NO _X =	-1.4%
Previous Respo	onse NO _X =	803.1 ppb	NO =	800.5 ppb				*Percent Chang	ge NO =	-1.9%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_{\chi} r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r^2 :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (C	Indicated NO2 c) concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	798.8	401.3	398.7	401.7	0.9925	100.8%
2nd GPT point (200 ppb O3)	798.8	595.0	205.0	207.2	0.9893	101.1%
3rd GPT point (100 ppb O3)	798.8	692.5	107.5	110.4	0.9736	102.7%
				Average Correction Factor	0.9851	101.5%

Notes:

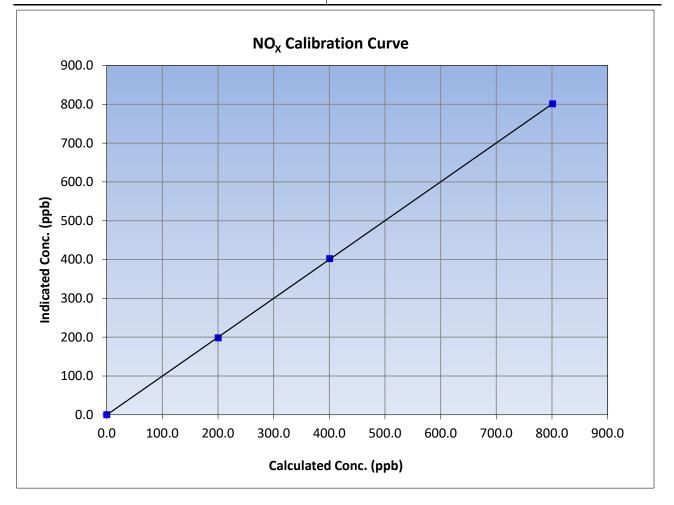
Adjusted the span only.

Calibration Performed By:



NO_x Calibration Summary

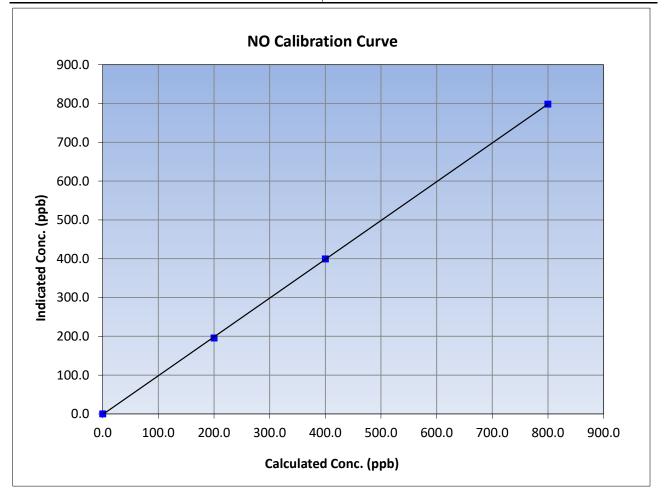
WBEA					Version-04-202
		Station	Information		
Calibration Date:	alibration Date: April 26, 2023		Previous Calibration:	March 3	80, 2023
Station Name:	Jackt	fish 1	Station Number:	AMS	506
Start Time (MST):	8:	21	End Time (MST):	12	:30
Analyzer make:	Therr	no 42i	Analyzer serial #:	12181	53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999980	≥0.995
801.1	801.2	0.9998	correlation coefficient	0.555560	20.335
400.5	402.2	0.9959	Claure.	1.001147	0.90 - 1.10
200.3	198.1	1.0110	Slope	1.001147	0.90 - 1.10
			Intercept	-0.448022	+/-20





NO Calibration Summary

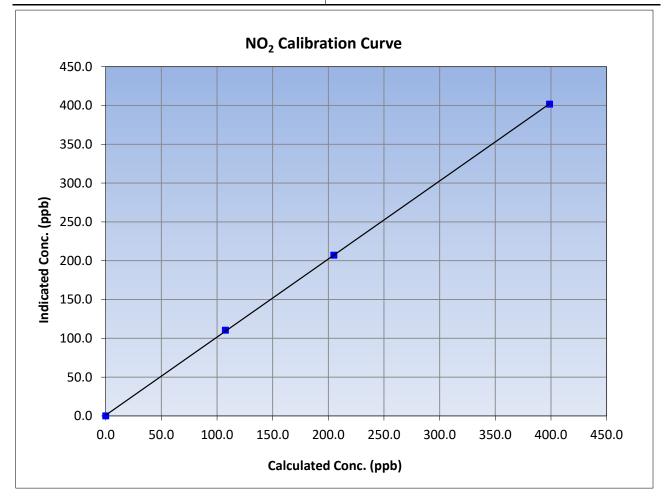
WBEA					Version-04-202
		Station	Information		
Calibration Date:	April 2	6, 2023	Previous Calibration:	March	30, 2023
Station Name:	Jack	fish 1	Station Number:	AM	\$506
Start Time (MST):	8:	21	End Time (MST):	12	:30
Analyzer make:				12181	53356
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.2		Correlation Coefficient	0.999963	≥0.995
799.9	798.3	1.0020	correlation coefficient	0.555505	20.995
400.0	399.5	1.0011	Clana	0.999625	0.90 - 1.10
200.0	195.5	1.0229	Slope	0.999625	0.90 - 1.10
			Intercept	-1.447978	+/-20

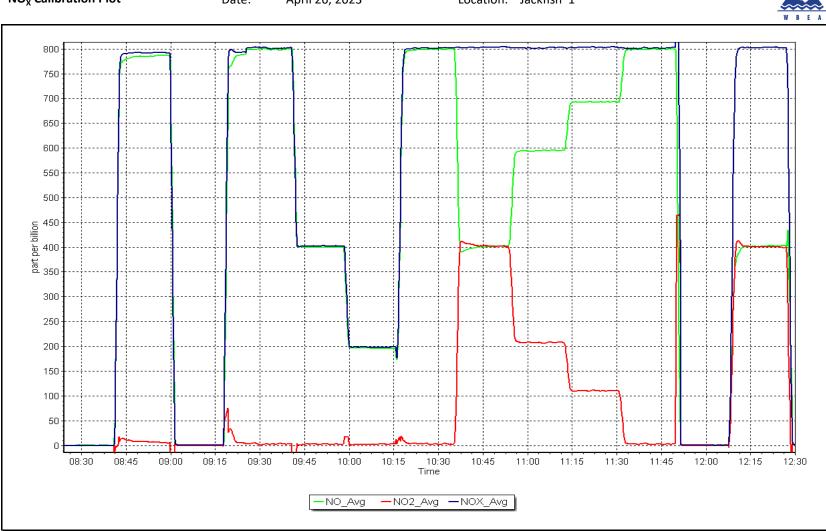




NO₂ Calibration Summary

WBEA					Version-04-2	
		Station	Information			
Calibration Date:	April 2	6, 2023	Previous Calibration:	March 3	30, 2023	
Station Name:	Jackt	fish 1	Station Number:	AMS	506	
Start Time (MST):	8:	21	End Time (MST):	12	:30	
Analyzer make:	Therr	no 42i	Analyzer serial #: 1218		8153356	
		Calibra	ation Data			
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	lc) Statistical Evaluation			
0.0	0.0		Correlation Coefficient	0.999968	≥0.995	
398.7	401.7	0.9925	correlation coernelent	0.555508	20.995	
205.0	207.2	0.9893	Claura,	1.006063	0.90 - 1.10	
107.5	110.4	0.9736	Slope	1.000005	0.90 - 1.10	
			Intercept	0.960980	+/-20	









WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM CALIBRATION REPORT

AMS508 KIRBY NORTH APRIL 2023

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

May 31, 2023



SO₂ Calibration Report

Version-01-2020

		Station Infor	mation		
Station Name:	Kirby North		Station number:	AMS508	
Calibration Date:	April 21, 2023		Last Cal Date:	March 9, 2023	
Start time (MST):	9:33		End time (MST):	12:46	
Reason:	Routine				
		Calibration St	andarde		
				F I 00 000F	
Cal Gas Concentration: Cal Gas Cylinder #:	49.18 <u>CC303554</u>	ppm	Cal Gas Exp Date:	February 23, 2025	
Removed Cal Gas Conc:	49.18		Bom Cas Eve Data	ΝΑ	
		ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:			Diff between cyl:	2004	
Calibrator Make/Model:	API T700		Serial Number:	3804	
ZAG Make/Model:	API T701H		Serial Number:	880	
		Analyzer Info	rmation		
Analyzer make:	Thermo 43iO	,	Analyzer serial #:	1182340007	
Analyzer Range			Analyzer senar#.	1182340007	
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Calibration slope:	0.997350	0.997420	Backgd or Offset:	19.6	19.5
Calibration intercept:	-0.929311	-0.728926	Coeff or Slope:	1.151	1.151
		SO ₂ Calibratio	on Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration ((ppb) (Ic)	Correction factor (Cc/lc Limit = 0.95-1.05
as found zero	5000	0.0	0.0	-0.2	
as found span	4919	81.3	799.6	799.2	1.001
as found 2nd point					
as found 3rd point					
new cylinder response					
calibrator zero	5000	0.0	0.0	-0.4	
high point	4919	81.3	799.6	797.3	1.003
second point	4959	40.7	400.3	397.5	1.007
third point	4980	20.3	199.7	198.7	1.005
as left zero	5000	0.0	0.0	-0.3	
as left span	4919	81.3	799.6	800.0	1.000
•				ge Correction Factor	1.005
Baseline Corr As found:	799.40	Previous response	796.57	*% change	0.4%
Baseline Corr 2nd AF pt:	NA	AF Slope:		AF Intercept:	-
	NA	AF Correlation:		intercepti	

Notes:

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

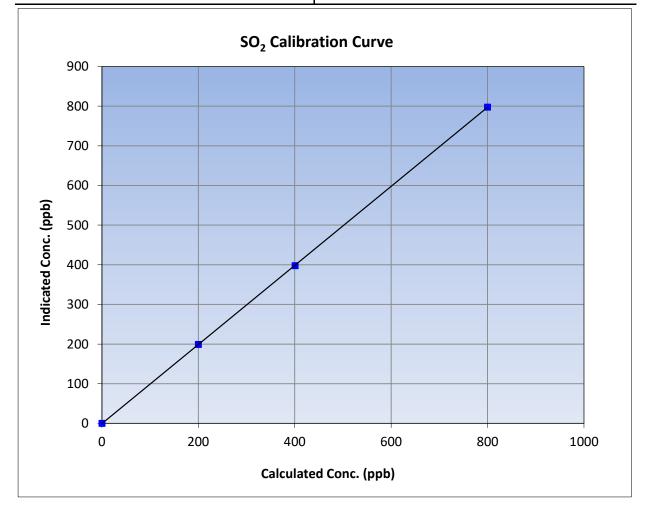
Calibration Performed By:

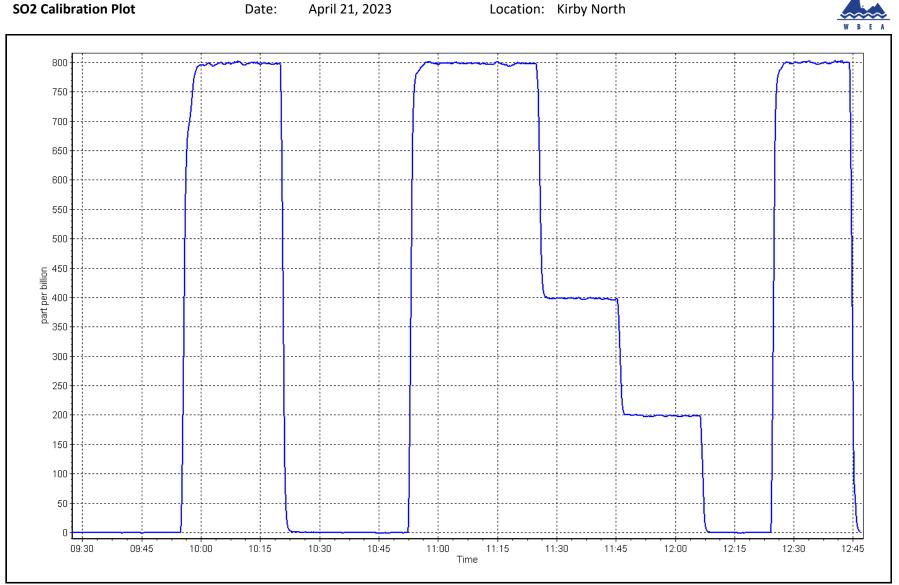


SO₂ Calibration Summary

	Stat	ion Information	
Calibration Date:	April 21, 2023	Previous Calibration:	March 9, 2023
tation Name: Kirby North		Station Number:	AMS508
art Time (MST): 9:33		End Time (MST):	12:46
Analyzer make:	Thermo 43iQ	Analyzer serial #:	1182340007
	Ca	libration Data	

(ppb) (Cc)	(ppb) (Ic)	(Cc/Ic)	Statistical Evaluation		LIMILS	
 0.0	-0.4		Correlation Coefficient	0.999995	≥0.995	
799.6	797.3	1.0029	correlation coefficient	0.999995	20.995	
400.3	397.5	1.0072	Slope	0.997420	0 007/20	0.90 - 1.10
199.7	198.7	1.0048	Slope		0.30 - 1.10	
			Intercept	-0.728926	+/-30	







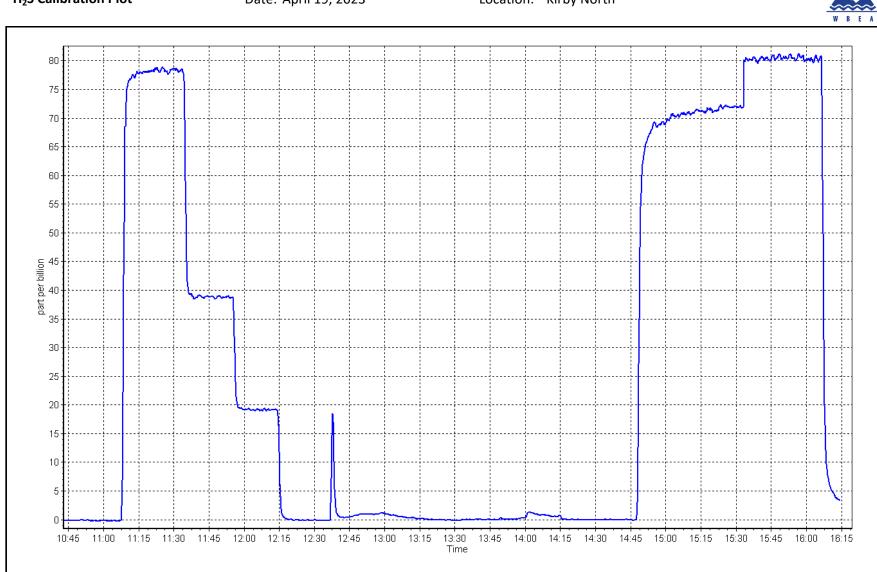
H₂S Calibration Report

		2		-	
WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North April 19, 2023 10:48 As Found		Station number: Last Cal Date: End time (MST):	AMS508 March 9, 2023 16:14	
		Calibration S	tandards		
Cal Gas Concentration:	5.167	ppm	Cal Gas Exp Date:	February 5, 2024	
Cal Gas Cylinder #:	<u>CC517378</u>				
Removed Cal Gas Conc:	5.167	ppm	Rem Gas Exp Date:	NA	
Removed Gas Cyl #:	NA		Diff between cyl:		
Calibrator Make/Model:			Serial Number:	3804	
ZAG Make/Model:	API T701H		Serial Number:	880	
		Analyzer Info	ormation		
Analyzer make:	Thermo 43i TLE		Analyzer serial #:	1150840012	
Converter make:	Global		Converter serial #:	2022-197	
Analyzer Range	0 - 100 ppb				
	Start	Finish		<u>Start</u>	Finish
Calibration slope:	1.007456	<u></u>	Backgd or Offset:		1.71
Calibration intercept:	-0.140937		Coeff or Slope:		1.114
		H₂S As Four	ad Data		
		n ₂ 5 AS FOUI			
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Baseline Adjusted Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/(Ic-AFzero))
	, , ,	, , ,	(Cc)		Limit = 0.90-1.10
as found zero	5000	0.0	0.0	-0.2	
as found span	4923	77.4	80.0	78.4	1.018
as found 2nd point	4961	38.8	40.1	38.8	1.028
as found 3rd point	4981	19.3	19.9	19.2	1.028
new cylinder response			-		
		H ₂ S Calibrati	ion Data		
	Dilution air flow rate	Source gas flow rate	Calculated	Indicated	Correction factor
Set Point	(sccm)	(sccm)	concentration (ppb)	concentration (ppb) (Ic)	(Cc/Ic)
		. ,	(Cc)		<i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.4	80.0	80.3	0.996
second point					
third point					
as left zero					
as left span	4020	70.0	700.0	0.1	
SO2 Scrubber Check	4920	79.8	798.0	0.1	
Date of last scrubber cha Date of last converter ef		19-Apr-23		Ave Corr Factor	0.996
	inciency test.				efficiency
Baseline Corr As found:	78.6	Prev response:		*% change:	-2.3%
Baseline Corr 2nd AF pt:	39.0	AF Slope:		AF Intercept:	-0.360848
Baseline Corr 3rd AF pt:	19.4	AF Correlation:	0.999967		
				* = > +/-5% change initiat	es investigation

As founds completed. Replaced SOx scrubber, third scrubber check passed. Adjusted zero and span. The remaining portion of the calibration will be completed April 20, 2023.

Notes:

Braiden Boutilier



Location: Kirby North



H₂S Calibration Report

WBEA					Version-11-20
		Station Info	rmation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North April 20, 2023 6:30 Routine		Station number: Last Cal Date: End time (MST):	AMS508 April 19, 2023 9:14	
		Calibration S	tandards		
Cal Gas Concentration: Cal Gas Cylinder #:	5.167 <u>CC517378</u>	ppm	Cal Gas Exp Date:	February 5, 2024	
Removed Cal Gas Conc: Removed Gas Cyl #: Calibrator Make/Model: ZAG Make/Model:	5.167 <u>NA</u> API T700 API T701H	ppm	Rem Gas Exp Date: Diff between cyl: Serial Number: Serial Number:	NA 3804 880	
		Analyzer Info	ormation		
Analyzer make: Converter make: Analyzer Range	Thermo 43i TLE Global 0 - 100 ppb		Analyzer serial #: Converter serial #:	1150840012 2022-197	
Calibration slope: Calibration intercept:	<u>Start</u> 1.007456 -0.140937	<u>Finish</u> 1.001312 -0.100838	Backgd or Offset: Coeff or Slope:		<u>Finish</u> 1.60 1.046
		H ₂ S As Four	nd Data		
Set Point	Dilution air flow rate (sccm)	- Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Baseline Adjusted Correction factor (Cc/(Ic-AFzero)) Limit = 0.90-1.10
as found zero					
as found span					
as found 2nd point					
as found 3rd point					
new cylinder response					
		H ₂ S Calibrati	ion Data		
Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
calibrator zero	5000	0.0	0.0	0.0	
high point	4923	77.4	80.0	80.1	0.998
second point	4961	38.8	40.1	39.8	1.007
third point	4981	19.3	19.9	19.9	1.002
as left zero	5000	0.0	0.0	0.1	
as left span	4923	77.4	80.0	80.2	0.997
O2 Scrubber Check					
ate of last scrubber cha		19-Apr-23		Ave Corr Factor	1.003
ate of last converter eff	ficiency test:				efficiency
aseline Corr As found:	NA	Prev response:	NA	*% change:	NA
Baseline Corr 2nd AF pt: Baseline Corr 3rd AF pt:	NA NA	AF Slope: AF Correlation:	NA	AF Intercept:	NA

Notes:

Completed calibration, as founds and scrubber check done April 19, 2023. Adjusted span.

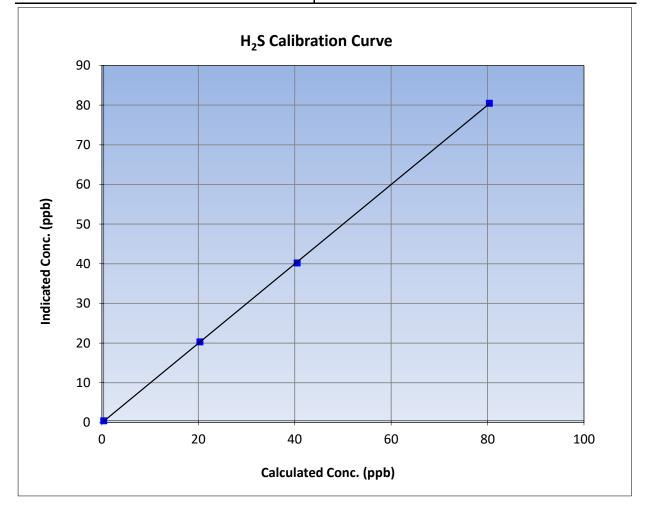


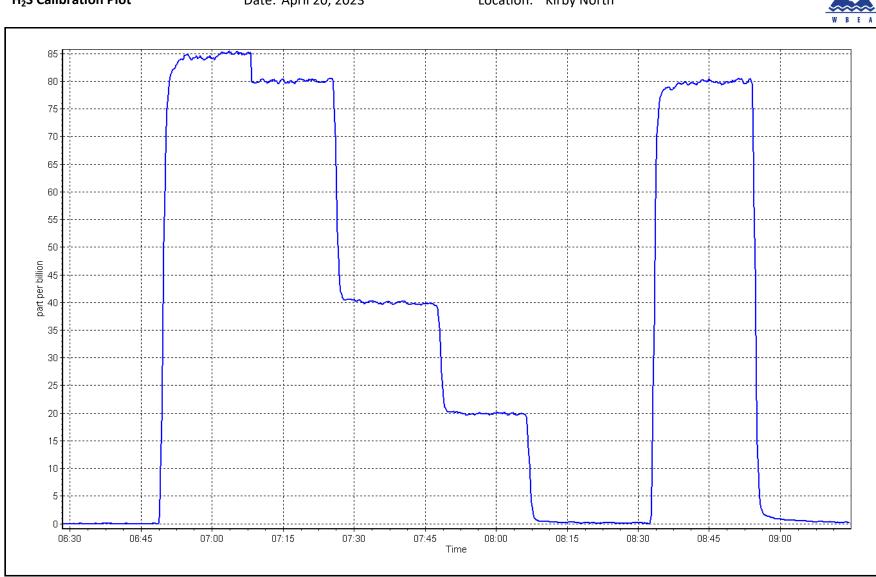
H₂S Calibration Summary

WBEA			Version-11-2021
	Stati	ion Information	
Calibration Date:	April 20, 2023	Previous Calibration:	April 19, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	6:30	End Time (MST):	9:14
Analyzer make:	Thermo 43i-TLE	Analyzer serial #:	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999975	≥0.995
80.0	80.1	0.9985	correlation coefficient	0.999975	20.995
40.1	39.8	1.0075	Slope	1.001312	0.90 - 1.10
19.9	19.9	1.0022	Slope	1.001312	0.90 - 1.10
			Intercept	-0.100838	+/-3





Location: Kirby North



THC Calibration Report

Version-01-2020

		Station Info	ormation		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North April 21, 2023 9:33 Routine		Station number: Last Cal Date: End time (MST):	AMS508 March 9, 2023 12:46	
		Calibration S	itandards		
Gas Cert Reference: CH4 Cal Gas Conc. C3H8 Cal Gas Conc.	CC3(496.6 205.5)3554 ppm ppm	Cal Gas Expiry Date: CH4 Equiv Conc.	March 23, 2025 1061.7	ppm
Removed Gas Cert: Removed CH4 Conc. Removed C3H8 Conc. Calibrator Make/Model: ZAG Make/Model:	N 496.6 205.5 API T700 API T701H	IA ppm ppm	Removed Gas Expiry: CH4 Equiv Conc. Diff between cyl: Serial Number: Serial Number:	NA 1061.7 3804 880	ppm
		Analyzer Info	ormation		
Analyzer make Analyzer Range			Analyzer serial #:	1182340005	
Calibration slope: Calibration intercept:	<u>Start</u> 0.998186 0.031226	<u>Finish</u> 0.994800 0.044805	Background: Coefficient:		Finish 2.62 3.695
		THC Calibrat	tion Data		
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
Set Point		Source gas flow rate	Calculated Concentration	Concentration (ppm)	
as found zero as found span	(sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Concentration (ppm) (Ic)	<i>Limit = 0.95-1.05</i>
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000	Source gas flow rate (sccm) 0.0	Calculated Concentration (ppm) (Cc) 0.00	Concentration (ppm) (Ic) -0.36	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response	(sccm) 5000 4919	Source gas flow rate (sccm) 0.0	Calculated Concentration (ppm) (Cc) 0.00	Concentration (ppm) (Ic) -0.36	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point	(sccm) 5000	Source gas flow rate (sccm) 0.0 81.3	Calculated Concentration (ppm) (Cc) 0.00 17.26	Concentration (ppm) (Ic) -0.36 16.89	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero	(sccm) 5000 4919 5000	Source gas flow rate (sccm) 0.0 81.3 0.0	Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00	Concentration (ppm) (Ic) -0.36 16.89 	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4919 5000 4919 4959 4959 4980	Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3	Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 8.64 4.31	Concentration (ppm) (lc) -0.36 16.89 	Limit = 0.95-1.05
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4919 5000 4919 4959 4959 4980 5000	Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 8.64 4.31 0.00	Concentration (ppm) (lc) -0.36 16.89 0.04 17.22 8.63 4.35 0.10	Limit = 0.95-1.05 1.022 1.002 1.002 0.991
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point	(sccm) 5000 4919 5000 4919 4959 4959 4980	Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3	Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 8.64 4.31 0.00 17.26	Concentration (ppm) (lc) -0.36 16.89 0.04 17.22 8.63 4.35 0.10 17.29	Limit = 0.95-1.05 1.022 1.002 1.002 0.991 0.998
as found zero as found span as found 2nd point as found 3rd point new cylinder response calibrator zero high point second point third point as left zero	(sccm) 5000 4919 5000 4919 4959 4959 4980 5000	Source gas flow rate (sccm) 0.0 81.3 0.0 81.3 40.7 20.3 0.0	Calculated Concentration (ppm) (Cc) 0.00 17.26 0.00 17.26 8.64 4.31 0.00 17.26 8.64 4.31	Concentration (ppm) (lc) -0.36 16.89 0.04 17.22 8.63 4.35 0.10	Limit = 0.95-1.05 1.022 1.002 1.002 0.991 0.998 0.998

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

Calibration Performed By:

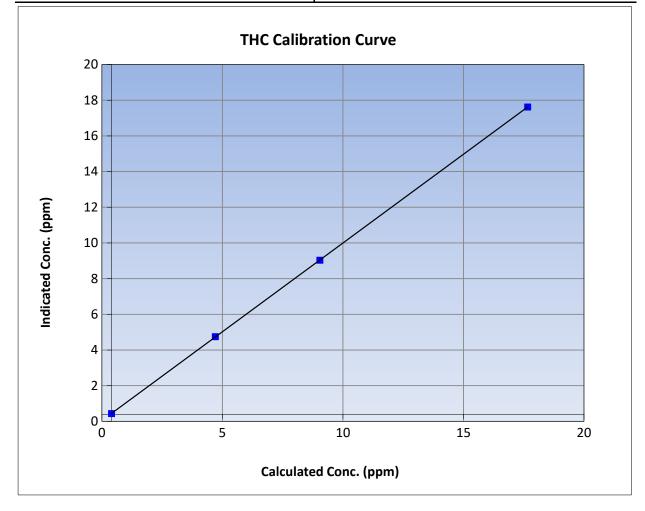


THC Calibration Summary

WBEA			Version-01-2020
	Stat	ion Information	
Calibration Date:	April 21, 2023	Previous Calibration:	March 9, 2023
Station Name:	Kirby North	Station Number:	AMS508
Start Time (MST):	9:33	End Time (MST):	12:46
Analyzer make:	Thermo 51i	Analyzer serial #:	1182340005

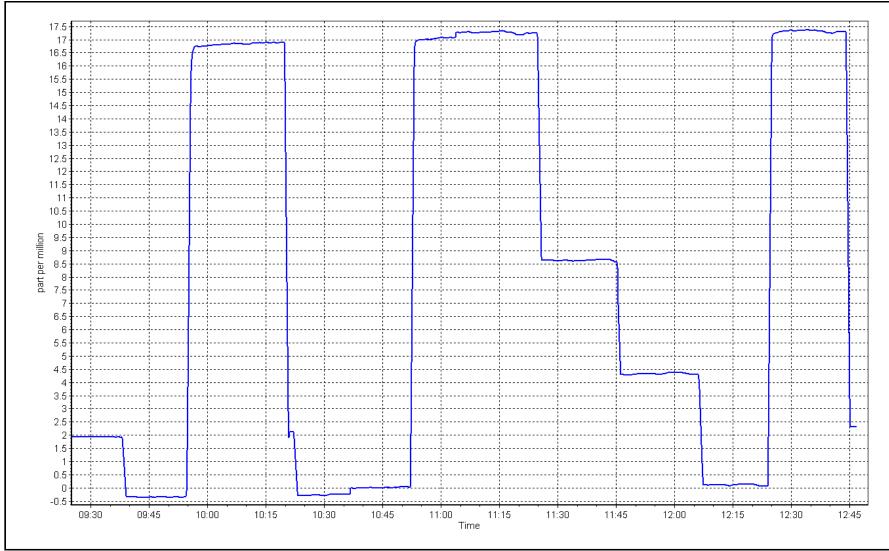
Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evalua	ation	<u>Limits</u>
0.00	0.04		Correlation Coefficient	0.999997	≥0.995
17.26	17.22	1.0025	correlation coefficient	0.555557	20.333
8.64	8.63	1.0015	Slope	0.994800	0.90 - 1.10
4.31	4.35	0.9911	510pe	0.994800	0.90 - 1.10
			Intercept	0.044805	+/-1.5











NO₂ Cal Offset:

Wood Buffalo Environmental Association

$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

		Station	Information		
Station Name: Calibration Date: Start time (MST): Reason:	Kirby North April 20, 2023 8:53 Routine		Station number: Last Cal Date: End time (MST):	AMS508 March 8, 2023 13:44	
		Calibratio	on Standards		
NO Gas Cylinder #:		T34ULGL	Cal Gas Expiry Date:	March 8. 2025	
NOX Cal Gas Conc:	49.39	ppm	NO Cal Gas Conc:		ppm
Removed Cylinder #:		NA	Removed Gas Exp Date:		
Removed Gas NOX Conc: NOX gas Diff:	49.39	ppm	Removed Gas NO Conc: NO gas Diff:		ppm
Calibrator Model:	API T700		Serial Number:		
ZAG make/model:	API 701H		Serial Number:		
		Analyzer	Information		
Analyzer make:	API T200		Analyzer serial #:	7029	
NOX Range (ppb):	0 - 1000 ppb				
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coeff or slope		1.026	NO bkgnd or offset:		0.1
NOX coeff or slope		1.023	NOX bkgnd or offset:		0.3
NO2 coeff or slope	: 1.000	1.000	Reaction cell Press:	5.0	5.0
		Calibrati	on Statistics		
		<u>Start</u>		<u>Finish</u>	
NO _x Cal Slope		0.997146		0.999458	
NO _x Cal Offset		-1.392505		-0.151623	
NO Cal Slope		0.996559		1.001479	
NO Cal Offset		-2.174660		-1.633427	
NO ₂ Cal Slope	•	1.007853		1.001970	

0.638504

1.001988



$NO_X \setminus NO \setminus NO_2$ Calibration Report

Version-04-2020

				Dilu	ution Calibratio	n 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/lc) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1		
as found span	4919	81.0	800.1	794.1	6.0	795.6	787.6	8.0	1.0057	1.0083
as found 2nd										
as found 3rd										
new cyl resp										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
high point	4919	81.0	800.1	794.1	6.0	799.4	794.4	5.0	1.0009	0.9997
second point	4960	40.5	400.0	397.0	3.0	400.2	395.4	4.8	0.9995	1.0041
third point	4980	20.2	199.5	198.0	1.5	198.7	194.9	3.8	1.0042	1.0161
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0		
as left span	4919	81.0	800.1	415.2	384.9	799.0	414.3	384.7	1.0014	1.0022
							Average C	orrection Factor	1.0015	1.0066
Corrected As fo	ound NO _x =	795.5 ppb	NO =	787.6 ppb	* = > +/-59	% change initiates	investigation	*Percent Chang	ge NO _x =	-0.1%
Previous Respo	nse NO _x =	796.4 ppb	NO =	789.2 ppb				*Percent Chang	ge NO =	-0.2%
Baseline Corr 2	nd pt NO _X =	NA ppb	NO =	NA ppb	As found	d $NO_X r^2$:		Nx SI:	Nx Int:	
Baseline Corr 3	rd pt NO _x =	NA ppb	NO =	NA ppb	As found	d NO r ² :		NO SI:	NO Int:	
					As found	d $NO_2 r^2$:		NO2 SI:	NO ₂ Int:	

GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO Reference concentration (ppb)	Indicated NO Drop concentration (ppb)	Calculated NO2 concentration (ppb) (Co	Indicated NO2 concentration (ppb) (Ic)	NO2 Correction factor (Cc/Ic) Calibration Limit = 0.95-1.05 As Found Limit = 0.90-1.10	Converter Efficiency Calibration Limit = 96-104%
as found GPT zero						
as found GPT point (400 ppb NO2)						
as found GPT point (200 ppb NO2)						
as found GPT point (100 ppb NO2)						
1st GPT point (400 ppb O3)	791.5	412.6	384.9	386.0	0.9971	100.3%
2nd GPT point (200 ppb O3)	791.5	608.3	189.2	191.6	0.9874	101.3%
3rd GPT point (100 ppb O3)	791.5	706.7	90.8	92.6	0.9805	102.0%
			ŀ	Average Correction Factor	0.9884	101.2%

Notes:

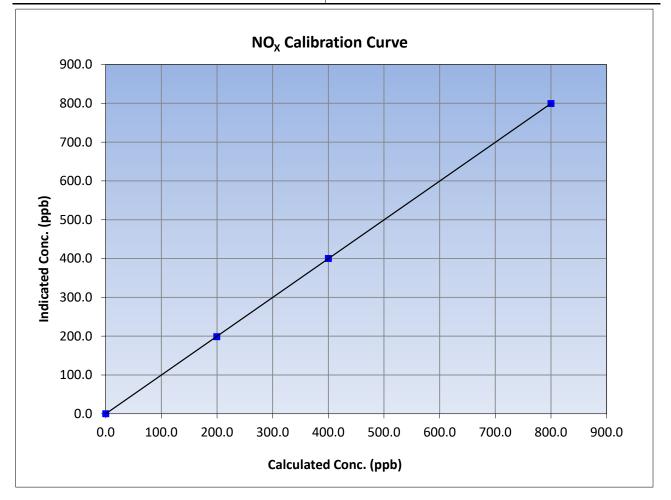
Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By:



$NO_{\rm X}$ Calibration Summary

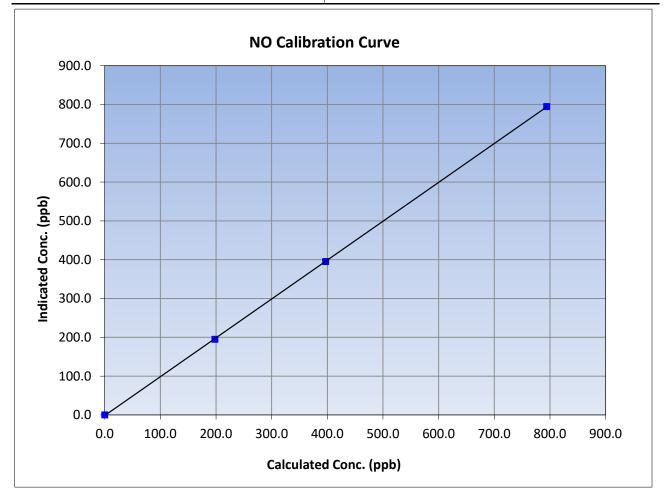
WBEA		Station	Information		Version-04-20
		Station	information		
Calibration Date:	April 2	0, 2023	Previous Calibration:	March	n 8, 2023
Station Name:	Kirby	North	Station Number:	AM	1S508
Start Time (MST):	8:	53	End Time (MST):	1	3:44
Analyzer make:	API	T200	Analyzer serial #:	7	029
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999998	≥0.995
800.1	799.4	1.0009	correlation coefficient	0.555556	20.333
400.0	400.2	0.9995	Slope	0.999458	0.90 - 1.10
199.5	198.7	1.0042	Slope	0.999458	0.90 - 1.10
			Intercept	-0.151623	+/-20





NO Calibration Summary

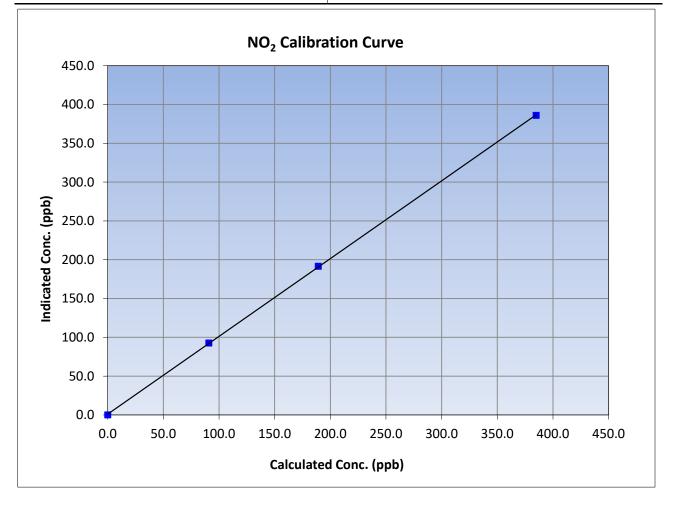
		Station	Information		
Calibration Date:	April 2	0, 2023	Previous Calibration:	March	n 8, 2023
Station Name:	Kirby	North	Station Number:	AN	1S508
Start Time (MST):	8:	53	End Time (MST):	1	3:44
Analyzer make:	API	Т200	Analyzer serial #:	7	029
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evalu	ation	<u>Limits</u>
			Statistical Evalu		
	(ppb) (Ic)	Correction factor (Cc/lc)		ation 0.999980	<u>Limits</u> ≥0.995
(ppb) (Cc) 0.0	(ppb) (Ic) 0.0	Correction factor (Cc/Ic)	Statistical Evalu	0.999980	≥0.995
(ppb) (Cc) 0.0 794.1	(ppb) (Ic) 0.0 794.4	Correction factor (Cc/Ic) 0.9997	Statistical Evalu		





NO₂ Calibration Summary

WBEA					Version-04-20
		Station	Information		
Calibration Date:	April 20, 2023		Previous Calibration: Ma		8, 2023
Station Name:	Kirby North		Station Number:	AMS508	
Start Time (MST):	8:53		End Time (MST):	13:44	
Analyzer make:	API T200		Analyzer serial #:	7029	
		Calibra	ation Data		
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.0	0.0		Correlation Coefficient	0.999965	≥0.995
384.9	386.0	0.9971		0.999905	20.333
189.2	191.6	0.9874	Slope	1.001970	0.90 - 1.10
90.8	92.6	0.9805		1.001970	0.90 - 1.10
			Intercept	1.001988	+/-20







End of Report